# Imagine
## COMMUNICATIONS™

## User Guide

# Selenio™ Broadcast Network Processor (BNP)

**Release 3.7.1**

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**Revision A**

# Publication Information

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U.S. Patents: 6,996,129; 7,046,677; 7,818,355; 8,180,920. Other US and foreign patents pending.

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# Document Change History

BNP Element Manager User Guide document history

| Part Number | Software Version | Release Date | Document Changes |
|---|---|---|---|
| 250-0363-01 rev. A | 3.7.1 | 12/18/15 | • Program redundancy.<br>• RTP support.<br>• AAA: support for custom user privileges.<br>• Option to force reallocation of output TSs .<br>• Shutdown now includes video shutdown.<br>• Ghost program data PID can be groomed with ES. |
| 250-0309-01 rev A | 3.7.0 | 11/20/14 | • New 2xr+ presentation at Element Manager GUI<br>• Support for E-AC-3 audio.transcoding. |
| 250-0188-01 rev A | 3.5.4 | 1/28/13 | Support for selection of both short and long names for ATSC output programs. |
| 250-0164-01 rev A | 3.5.2 | 8/7/12 | Update to remove crawl speed restrictions. |
| 250-0160-01 rev A | 3.5.1 | 6/21/12 | Minor changes:<br>• Descriptions: global postBlack, and change MPEG-2 advanced rate control to MPEG-2 aggressive rate control.<br>• Add long delay for H.264 DPI to output TS. |
| 250-0146-01 rev A | 3.5.0 | 4/30/12 | • Quick Keys/shortcuts.<br>• Updated safety information.<br>• Updates for localization |
| 250-0136-01 rev A | 3.4.0 | 12/18/15 | • Support for 1800 EAS characters (EAS CAP)<br>• Audio splice with type mismatch<br>• Support for DSCP<br>• PSMON improvement |
| 250-0125-01 rev A | 3.3.2 | 9/6/11 | • Maintenance release. |
| 250-0106-01 rev A | 3.3.0 | 6/24/11 | • Changed part number<br>• Support for up to 512 user-created input TSs<br>• Support for up to 1527 dynamically created input TSs<br>• Support for up to 4 source IP addresses per multicast input TS<br>• Support for PCR Interval for Stripped NULL Packet<br>• Support for DPI Splicing |
| 250-0098-01 rev A | 3.2.1 | 05/16/2011 | • Changed part number<br>• Network cue forwarding during DPI<br>• PSI & PSIP pass-through<br>• H.264 enhancements for HD |
| 250-0052-01 rev E | 3.2.0 | 03/02/2011 | • DPI cue and postblack handling |
| 250-0052-01 rev D | 3.1.1 | 02/23/2011 | • Added appendix of Caution and Warning statements in French and German and TÜV GS certification |

BNP Element Manager User Guide document history

| Part Number | Software Version | Release Date | Document Changes |
|---|---|---|---|
| 250-0052-01 rev C | 3.1.1 | 10/18/2010 | • Added transparency support for Non-Ascii text.<br>• Added EBIF support.<br>• Added AAA User Authentication.<br>• DC power supply support.<br>• Enhanced NTP synchronization feature.<br>• Output TS modification enhancements.<br>• DVB-CA enhancements.<br>• Added ES-level grooming. |
| 250-0052-01 rev B | 3.0.1 | 05/07/2010 | • Added Operator, Advanced Messaging, and Logo Overlay scheduling feature.<br>• PSIP enhanced grooming configuration. |
| 250-0052-01 rev A | 3.0 | 02/18/2010 | Production Release |

# Table of Contents

# Introduction

The Selenio ™ Broadcast Network Processor (BNP) products—BNP 2xr, BNP 2xr+, and BNP 3xr—deliver the industry's highest density digital video solution for grooming, statistical multiplexing, transrating, digital program insertion (DPI). Additionally, the BNP 3xr, features incorporation of DVB Conditional Access for program encryption. Each model features a flexible, scalable and modular platform that simplifies and expedites deployments of advanced video services, simplifies operation and management, and reduces operational and capital costs.

Figure 1.      BNP 2xr



Figure 2.      BNP 2xr+



Figure 3.      BNP 3xr



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 in the BNP 3xr.

The BNP is fully MPEG compliant and interoperable with leading cable industry equipment. The 3xr unit offers hot-swappable redundant fan modules and power supplies.

The BNP simplifies configuration 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.

# Document Organization

This guide is organized as follows:

- Chapter 1, "Introduction," (this chapter) describes the contents and conventions used in this guide.
- Chapter 2, "Overview," provides a detailed description of the BNP and its features.
- Chapter 3, "BNP Element Manager Basics," introduces the *BNP Element Manager* GUI you use to configure and manage the BNP.
- Chapter 4, "System Configuration," describes the initial product setup and product configuration using the Java-based BNP *Element Manager*.
- Chapter 5, "System Redundancy," describes how to set up a pair of BNPs for redundant operations.
- Chapter 6, "Grooming and PSIP," shows you how to set up grooming, transrating, and other configuration and operational procedures.
- Chapter 7, "Maintenance," contains guidelines for using the Maintenance menu options from the *BNP Element Manager*.
- Chapter 8, "Digital Program Insertion (DPI)," describes DPI using the BNP.
- Chapter 9, "DVB Conditional Access," describes how to set up DVP-CA system using the BNP.
- Chapter 10, "ETV Binary Interchange Format," provides an overview of EBIF and typical use cases for configuration.
- Chapter 11, "Monitoring Alarms and Events," discusses the methods used to monitor the health of the BNP and its status in the network.
- Chapter A, "Editing the DVB NIT Table," shows you how to edit, make additions to, and delete items from the NIT table, one of the DVB tables.
- The glossary and index can be used to quickly reference information.

# Document Audience

This guide is for system administrators and operators who are responsible for installation and maintenance of the BNP and for processing network broadcast. You should be familiar with general video and networking terminology, and should be familiar with basic installation of hardware.

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

# Related Documentation

- *BNP 2xr Hardware and Installation Reference*
- *BNP 2xr Quickstart*
- *BNP2xr+ Hardware and Installation Reference*
- *BNP 2xr+ Quickstart*
- *BNP 3xr Hardware and Installation Reference*
- *BNP 3xr Quickstart*
- *BNP 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: |
|---|---|
|  | **Note:** This points out information that may not be part of the text but provide tips and other helpful advice. |
|  | **Caution:** This provides an alert to an action that 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. |
|  | **Warning!** This shows that failure to take the necessary precautions or to follow guidelines could cause harm to equipment and personnel. |
|  | Navigation tip: follow the path alongside the pointer to navigate to a specific option. Because many functions can be accessed via various methods, this section provides navigation information associated with the GUI menus and, as applicable, quick keys and toolbar icons. |
| Clicking any blue link takes you to the item to which the link refers. | |

# Graphics Used

In some cases, the screens shown in this manual may have been slightly modified after the manual was released, or may appear slightly different on different browsers.

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 provides a functional overview of the *Selenio* ™ Broadcast Network Processors (BNPs).

## In This Chapter:

- "Product Overview," next.
- "Product Features" on page 14.
- "BNP Applications" on page 15.
- "BNP Deployment Architecture" on page 17.
- "Redundancy" on page 20.

## Product Overview

The BNP product suite consists of the BNP 3xr, BNP 2xr, and BNP2xr+, each of which is managed by using its BNP *Element Manager* GUI. All BNP devices provide support for ASI2 hardware modules, and the following functions:

- Support of both standard definition (SD) and high definition (HD) program services in either MPEG-2 or H.264 encoding; the BNP simultaneously grooms and inserts digital ads.
- High density video transrating (rate shaping), statistical multiplexing, grooming and digital program insertion (DPI); transrating video streams with impressively high video quality.
- Multiple levels of redundancy support including service level and 1:1 chassis level redundancy.
- Support for up to eight Gigabit Ethernet (GigE) interfaces for video input or output, as well as up to 18 asynchronous serial interface (ASI) I/O ports in a single rack unit device.

Table 2.      Comparing BNPs

| BNP Model | Characteristics |
|---|---|
| 2xr | 1RU (rack unit) device that contains Gigabit Processor-2 (GBP2) and Processor-2 (PROC2) hardware modules. |
| 2xr+ | 1RU device that contains Gigabit Processor-3 (GBP3) and Processor-3 (PROC3) hardware modules. |
| 3xr | 2RU device that contains the BNP 3xr contain Gigabit Processor-3 (GBP3) and Processor-3 (PROC3) hardware modules. This BNP also provides hot-swappable redundant fan modules and power supplies. |
| | Support for DVB Conditional Access (CA) common scrambling algorithm—which is configurable with the BNP *Element Manager,* for encryption of programs processed by the BNP 3xr. |

# Product Features

**Applicable Platforms:** Any BNP device.

- Based on proprietary flexible Video Intelligence Architecture™ (VIA).
- A graphical user interface for easy configuration and management.
- Eight GigE interfaces standard and up to 18 optional ASI ports.
- Management via two 10/100BaseT Ethernet ports
- Ability to process and encrypt MPEG-2 and H.264 program streams over any of its Gigabit Ethernet or ASI inputs, and route them to any of these interfaces.
- Seamless digital ad insertion and program substitution.
- Fully interoperable ad insertion with SeaChange, Arris, and other industry standard ad servers.
- Graphic overlay insertions anywhere on a program (MPEG-2) using the BNP GUI to import standard graphic files (PNG).
- International Time Zones.
- Interface to Event Information Scheduler (EIS), Entitlement Control Message Generator (ECMG) and Entitlement Management Message Generator (EMMG).
- Support for:
  - ATSC and DVB content, including ability to configure and pass through both long and short names for ATSC TS output programs.
  - EBIF
  - "FAT" ASI transport services, multiple program groups over a single TS / ASI interface.
  - H.264 grooming and multiplexing in a MPEG-2 TS format.
  - Language-specific GUI.
  - Multiple levels of redundancy at the chassis, input stream, service (program), and Ethernet port level.
  - Operator-generated text and graphic messages from the BNP GUI based on digital overlay technology.
  - Program substitution of a primary network source with a secondary source based on SCTE 30 control.
  - RADIUS/TACACS+ authentication.
  - Scheduling for Logo Overlay and Operator Messaging up to one month in advance.
  - SCTE 18 Digital Emergency Alert Messaging (EAS), which is used to integrate the BNP with EAS management systems to control the playout of message crawls and audio during an emergency alert event.
    SCTE 21 to SCTE 20 closed caption conversion.
    Full compliance with the SCTE 30 and SCTE 35 standards.

**Applicable Platform:** BNP 3xr

- Incorporation og DVB Conditional Access common scrambling algorithm (CSA), compliant with DVB CSA and DVB SimulCrypt protocols.
- Bandwidth-based DVB-CA licensing support.
- Dedicated 10/100 BaseT IP management interface for DVB CA encryption.

# BNP Applications

The BNP delivers the industry's highest density digital video processing solution for a variety of applications, some of which are described in the following topics:

- "Grooming, Transrating and Multiplexing," next.
- "DPI-Based Ad Splicing" on page 15.
- "Messaging System Applications" on page 16.
- "DVB Conditional Access (DVB-CA) Encryption" on page 17 (for BNP 2xr+ and 3xr).

## Grooming, Transrating and Multiplexing

Using proprietary Video Intelligence Architecture™ (VIA), the BNP provides the ability to transrate program streams with the highest quality is unsurpassed in the industry. The BNP seamlessly grooms multi-program transport streams (MPTS / MUX) and single-program transport streams (SPTS) on both input and output ports. It also offers multiple Quality of Service (QoS) priority levels on any MPEG-2 program stream enabling selection of the desired level of transrating.

## DPI-Based Ad Splicing

The BNP can concurrently groom and seamlessly splice both SD and HD program streams encoded in either MPEG-2 or H.264 formats. This grooming and splicing capability eliminates the need to dedicate multiple devices for different functions. The simplified installation, wiring and configuration reduces system deployment time. The BNP is fully compliant with SCTE 30 and SCTE 35 standards and is interoperable with the leading digital program insertion (DPI) ad servers. This flexible product can also perform SCTE 30 to SCTE 35 conversion to support digital ad insertion at the hub. The BNP is an ideal solution for both centrally located DPI systems at the headend facility, distributed DPI systems, and zoned and targeted ad insertion.

A BNP deployed in a cable digital broadcast video grooming and ad insertion environment is shown in Figure 4.

Figure 4.     Regional Ad Zone Insertion
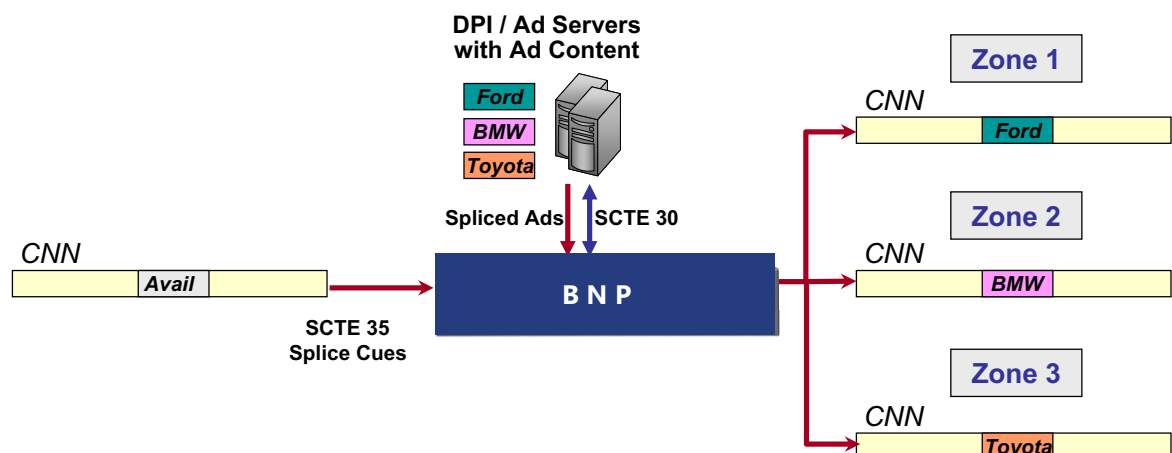
## Messaging System Applications

BNP support for messaging system applications is described in the following topics:

- Digital EAS and Operator / Advanced Messaging.
- Graphic Overlay Insertion.

### Digital EAS and Operator / Advanced Messaging

Leveraging its existing high-density video processing technology, the BNP's digital Messaging System capability allows operators to program both digital SCTE 18 Emergency Alert System (EAS) alerts and operator-generated messages. The Advanced Messaging option allows importing graphics and text files into the operator crawl message. EAS and Operator / Advanced Messaging alerts are delivered universally throughout the network, overcoming existing challenges that cable operators face in supporting analog and digital subscribers with an increasing range of decoding technologies.

The BNP's Messaging System support can be applied selectively to any MPEG-2 program being processed. EAS and operator-generated messages are digitally rendered and overlaid directly onto a program, delivered directly to any digital subscriber set-top box or to analog decoders, and presented as an overlay alert crawl to viewers. The BNP also supports operator-configurable audio override or audio stream insertion to complement the text crawl message generated by industry-leading EAS management vendors for a completely customizable deployment.

A BNP in an SCTE 18 digital EAS application is shown in Figure 5.

Figure 5.    BNP in SCTE 18 Digital EAS Application
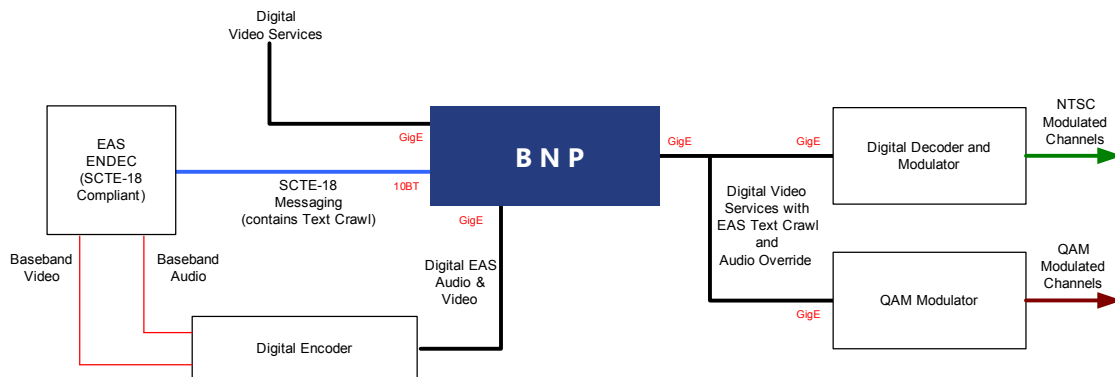


### Graphic Overlay Insertion

In addition to EAS and operator messaging, the BNP Messaging System Logo Overlay option supports insertion of graphic overlays into any MPEG-2 program being processed. Graphic overlays are based on importing static graphic Portable Network Graphics (PNG) files. Importing text files is also supported, meaning that customers can create a library of graphic and text files to routinely use (see workflow example below). You can preview the imported PNG files before starting the overlay insertion.

The location of the insertion is configurable with positioning anywhere on the display screen defined by (x,y) screen coordinates based on pixels relating to program resolution (e.g., SD and HD). Logo overlay files can be created with PNG alpha channels to control transparency effects supported by the BNP during the insertion of the overlay. Additionally, background transparency support is available for non-ascii text overlays in order to support foreign markets.

## DVB Conditional Access (DVB-CA) Encryption

**Applicable Platform:** BNP 3xr

The BNP 3xr supports the DVB-CA common scrambling algorithm (CSA) for encryption of MPEG-2 and H.264 programs. The embedded SimulCrypt Engine is a low cost, high density, scalable encryption and management control implementation that is fully DVB-CA compliant.

The DVB-CA encryption feature includes the following functionalities:

- SimulCrypt Synchronization (SCS).
- Control Word Generation (CWG).
- Common Scrambling Algorithm (CSA).
- ECM / EMM insertion.
- CA-related PSI / SI generation and insertion.
- SimulCrypt EIS Lite GUI configuration and management.

RGB's SimulCrypt engine interfaces with the following external devices:

- Event Information Scheduler (EIS).
- Entitlement Control Message Generator (ECMG).
- Entitlement Management Message Generator (EMMG).

Figure 6 shows the BNP in a DVB-CA network.

Figure 6.    BNP in a DVB-CA Network
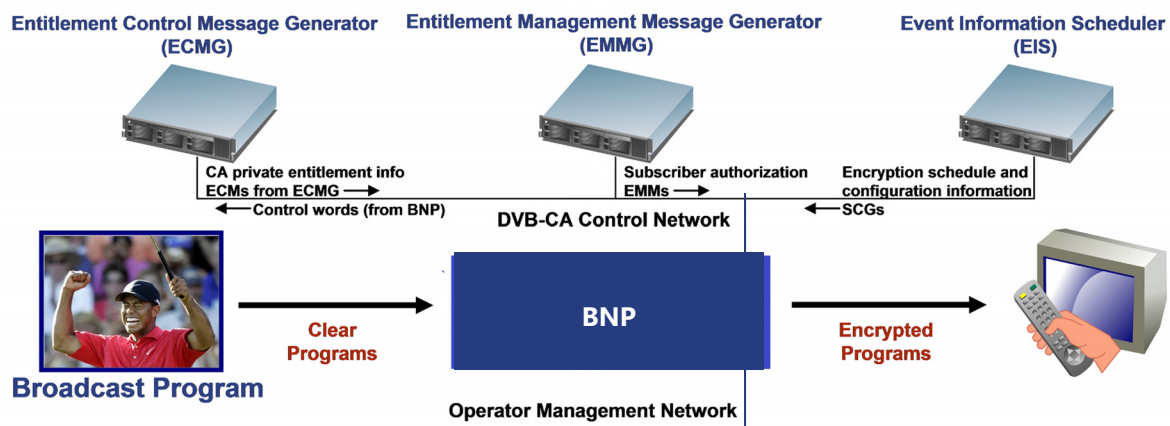


# BNP Deployment Architecture

The BNP's modular and programmable platform is designed to provide operators with full processing scalability to meet their specific processing requirements. The program density of the BNP is software-configurable and upgradeable, allowing operators to start at lower densities and upgrade to the full hardware capacity through software licenses as their stream densities and network needs grow.

This scalability reduces capital costs and allows operators to allocate budgets accordingly. By paying for processing on an as needed basis, operators can wisely plan budgets based on today's requirements and avoid over-allocation to meet future needs. The programmable and upgradeable architecture of the BNP, as well as its high processing power, eliminates hardware changes and will simplify and expedite future deployments of new video processing applications.

The BNP supports both ASI and Gigabit Ethernet interfaces, allowing operators who deploy Gigabit Ethernet networks to profit from the increased cost-efficiency offered with this transport, while still providing support for operators with legacy ASI networks. This flexibility enables operators with ASI networks to continue with their existing infrastructures while providing an upgrade path for a future transition to an IP-based network.

The BNP has eight Gigabit Ethernet interfaces and is scalable to support up to 18 ASI interfaces using up to three ASI modules. The Gigabit Ethernet interfaces are part of the BNP's base configuration and no additional hardware or licensing is required to utilize these ports. Providing added flexibility, each ASI interface is software configurable as input or output by using an easy-to-use graphical user interface.

Figure 7.    Example of BNP Grooming of GigE or ASI Input Over GigE Transport Network
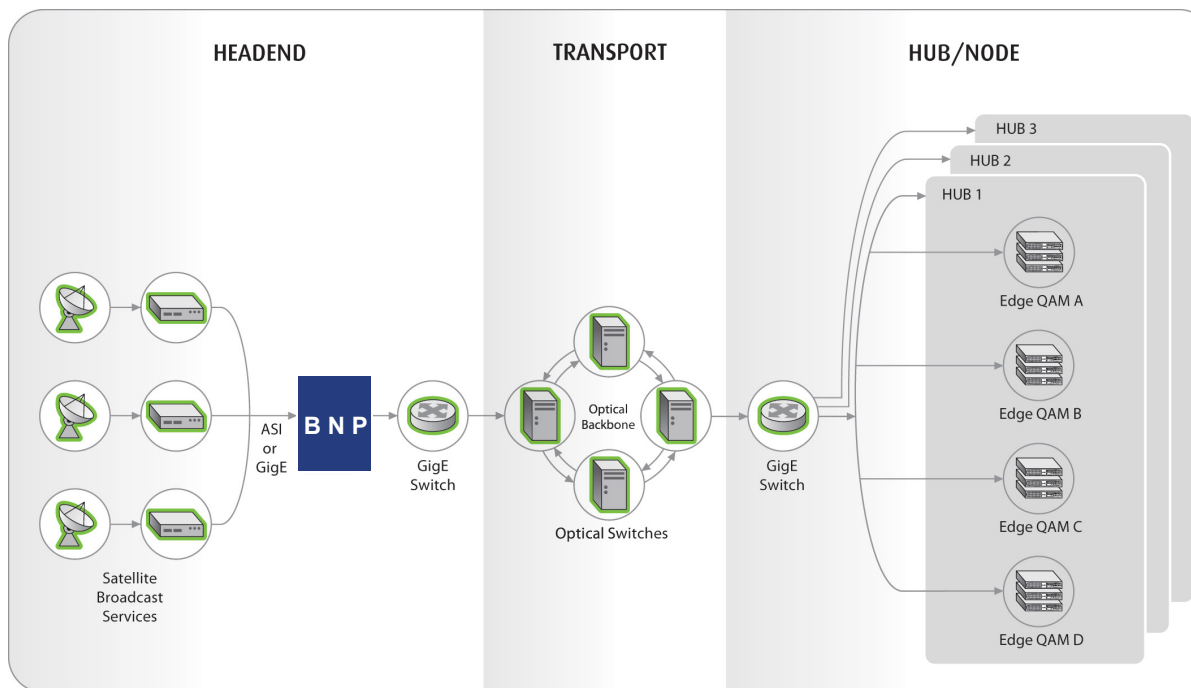


A BNP deployed for bulk rate capping in a Switched Digital Video (SDV) architecture is shown in Figure 8.

Figure 8.     Example of SDV Architecture over GigE Transport Network
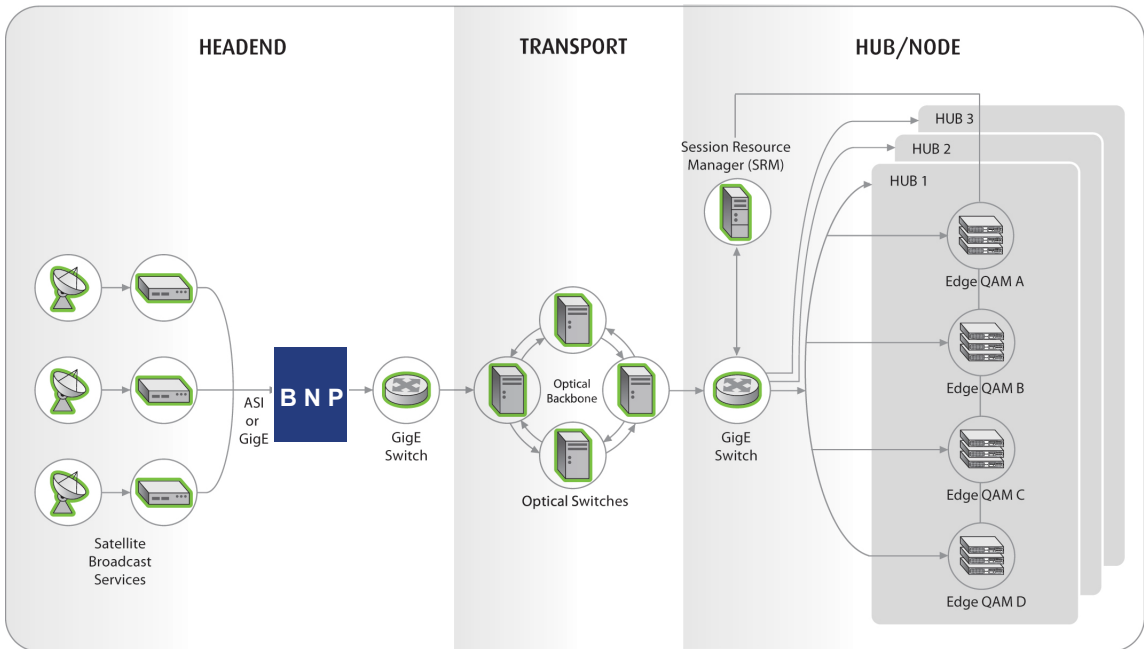


Figure 9 shows how the BNP fits within the network for a centralized system architecture using ASI interfaces. GigE interfaces could also be used for both input and output in a co-located headend application.

Figure 9.     Example of Co-Located ASI Architecture
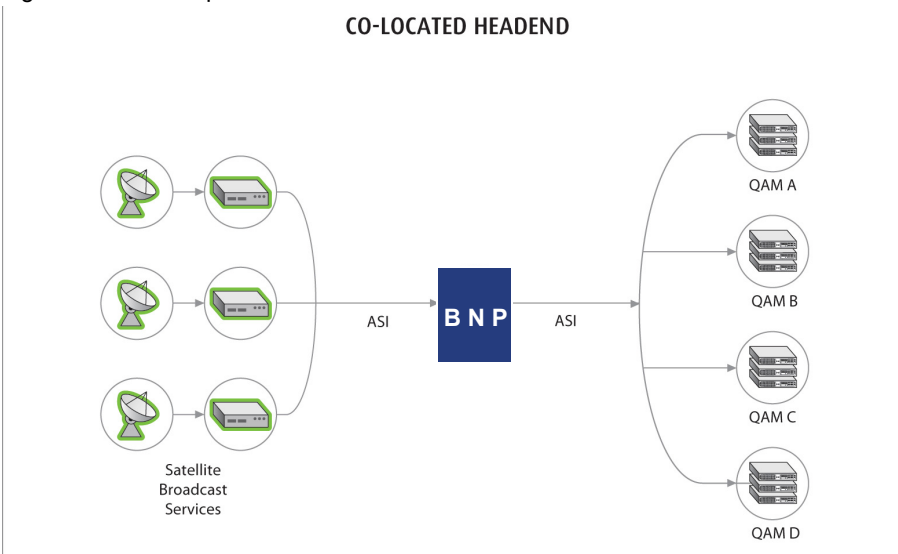


Either ASI or GigE interfaces are used for MPEG input or output. Because of the distance, GigE interfaces are typically used for transport between the headend and the hub/node.

# Redundancy

Since a single BNP may deliver advanced video services to tens or even thousands of subscribers in a video network, it is critical that the BNP provide a high availability of services. To achieve such reliability, the BNP supports a multi-level redundancy feature to ensure service availability and reduce system downtime. With proper configuration, the BNP can provide full chassis-level redundancy. On the hardware level, a BNP provides fan, power, and chassis redundancy; on the software level, the BNP Gigabit Ethernet port redundancy and a configurable program service redundancy feature.

Four user-configurable redundancy options are supported by the BNP:

- Source Specific Multicast (SSM) Redundancy
- Program Redundancy
- Port Redundancy
- 1:1 Chassis Redundancy

The first three redundancies—SSM, Program, and Port—operate within a single BNP chassis. The fourth—1:1 Chassis Redundancy—makes use of two BNP chassis. The redundancy for hot-swappable fan trays and power supply modules happens automatically.

## Source Specific Muliticast (SSM) Redundancy

The BNP supports the configuration of up to four source IP addresses per multicast input TS. The BNP will join one of the four source specific multicasts, when configured. When the input PAT from the current source times out, then BNP will switch to another source configured for that input TS. All the streams coming from various sources must be identical (PIDs, program numbers, number of programs etc.). Therefore, it does not matter which source specific multicast the BNP joins and receives program information from at any given instance. Also, there is no priority associated with configured sources. BNP achieves source redundancy using IGMPv3 SSM joins and leave messages. When SSM redundancy is configured for an input TS, the BNP joins the first configured source specific multicast and waits a maximum of two seconds for the reception of the PAT. If the PAT is not received in two seconds, then BNP joins the next configured SSM and repeats the process until it receives a PAT. Video could be interrupted for up to three seconds (in worst case).

SSM redundancy cannot be coupled with program redundancy on the same input TS.

Because SSM Redundancy requires IGMPv3, the router/switch connected to the GigE port of the input transport stream must have IGMPv3 enabled.

For information on configuring SSM redundancy, refer to "Creating Input Transport Streams" on page 109.

## Program Redundancy

The BNP supports program redundancy, which is sometimes referred to as service-level redundancy. For this type of redundancy, when the primary program is gone, the BNP automatically switches to a redundant or backup program. If any elementary streams are missing from one of the ports, the BNP switches to the secondary port.

In a program redundancy configuration, a switch to backup occurs when:

- Missing MPTS/SPTS streams are identified by checking the PAT.

- Missing program streams are identified by checking the PMT.
- A missing video stream is detected.

You can assign a backup program for every program, and any program can be assigned to back up a running primary program. The backup program can be another program on the same GigE port or it can be on a different GigE port in the same chassis.

Program-level redundancy is supported such that when there is a groomed program missing, a designated input program can function as a standby program and will take over for the missing program. The detection of a PAT / PMT missing for over 2 seconds is used as the threshold for the detection of the missing input program.

A program in an input TS that has SSM redundancy configured cannot be used as a backup program for program redundancy.

For information about Program Redundancy configuration, see "Program Redundancy" on page 152.

## Port Redundancy

The BNP supports Gigabit Ethernet port output mirroring within the same chassis. The mirrored port serves as a standby port in case the primary port fails. The mirroring port must have a unique IP address configured. The BNP delivers identical streams to both the primary port and the mirrored port with the same destination IP address and port number, but a different source IP address.

The multiplexes output on one GigE are delivered to the mirrored GigE port simultaneously as a fully operational, redundant output GigE port. Regardless of mirroring, all active GigE ports must have unique IP addresses assigned.

To set GigE port-level redundancy, see "GigE Port Configuration" on page 44.

## 1:1 Chassis-level Redundancy

When the ports and global settings are configured to do so, the BNP provides 1:1 redundancy. The BNP supports hot-standby 1:1 chassis redundancy through heartbeat and virtual IP failover mechanisms.

Heartbeats provide the ability to synchronize failover to a secondary BNP. A heartbeat daemon on the primary unit will send out unicast heartbeat messages every 250 milliseconds.The heartbeat daemon running on the standby BNP listens to the heartbeats coming from the primary BNP. If the standby BNP does not hear the primary BNP's, it initiates a failover and takes ownership. The heartbeat daemon running on the standby BNP checks for heartbeats coming from the primary BNP over both the normal Ethernet 10/100BaseT management connection and optionally the eighth Gigabit Ethernet port (GigE 8) connection (when used as a backup to the Ethernet 10/100BaseT management port).

The Backup LED on the front of the chassis indicates the redundancy role of a chassis: green indicates the active chassis, and orange indicates a standby chassis.

The standby chassis takes over if the primary (active) chassis fails, if there is a system or module overheat, failed fan, failed power supply, or missing heartbeat from the primary unit. The former standby (now the active) chassis now becomes configurable through the BNP *Element Manager*.

Virtual IP addressing is used to support the BNP 1:1 chassis redundancy feature. If the active chassis fails, the standby assumes the virtual IP address. Network devices communicate with the virtual IP addresses, not to the physical IP addresses. If the input/output of the active chassis changes, the new setting is automatically synchronized to the standby chassis.

GigE 8 can be configured to send heartbeat messages in the initial setting. If the network Ethernet 10/100 management connection is unplugged, the active chassis remains active. If the input or output GigE link is down, the active chassis shows a hardware fault and becomes the standby.

The standby chassis does not have any separate licenses. The license usage on the active and standby chassis is always synchronized; if the standby chassis becomes the active chassis, it assumes the licenses of the active chassis.

Figure 10 illustrates a typical configuration scenario of the BNP hot-standby 1:1 chassis redundancy feature.

Figure 10.    1:1 Chassis Redundancy using Heartbeat and Virtual IP Failover Mechanism
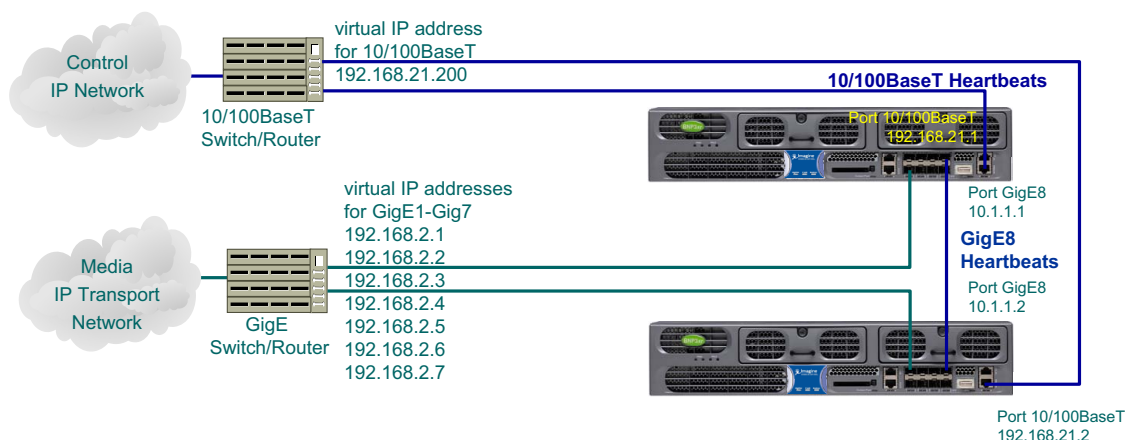


In this example, the primary BNP has a management IP address of 192.168.21.1 and the secondary BNP has an address of 192.168.21.2. A third IP address in the same subnet 192.168.21.200 is configured as a virtual IP address. The video server and management workstation will use this virtual IP address to communicate to the active BNP unit. During the normal course of operation, the primary BNP assumes the virtual IP address and acts as the active unit. When a failover event happens, the secondary BNP will take ownership of the virtual IP address and assume the active role. It achieves this by sending an ARP request to associate the MAC addresses of the secondary ports with the virtual IP addresses.

For information about 1:1 chassis redundancy configuration, see "1:1 Redundancy Best Practices and Considerations" on page 94.

# BNP Element Manager Basics

This chapter provides information about the *Selenio ™ BNP Element Manager,* which is used to configure and monitor the Broadcast Network Processor (BNP).

## In This Chapter:

## BNP *Element Manager* Overview

The BNP *Element Manager* is a Java-based GUI available using a standard web browser, which offers a variety of features intended to simplify the setup and operation of the BNP:

- An embedded GUI application for configuration and management via XML/RPC over HTTP.
- Program level drag and drop grooming.
- PID Management.
- Input program redundancy.
- Output port mirroring.
- Simultaneous bitrate analysis of input and output transport streams and programs.
- Viewing of alarm and event logs.
- Module redundancy configurations.
- Full configuration of system functions and Gigabit Ethernet ports.

# Obtaining Java Runtime Environment

The *BNP Element Manager* requires that the PC on which it is running have Java™ Runtime Environment (JRE) v1.6 or higher. If your PC does not have the correct JRE installed, it is available free from the Imagine Communications Customer Portal.

To obtain installation instructions and the latest version of JRE that is compatible with the *BNP Element Manager,* log in to Imagine Communications Customer Portal and search for *Download Java Runtime Environment.*

# Broadcast Network Processor Home Page

The *BNP Element Manager* software is pre-installed on the BNP at the factory and is presented as a home page (Figure 11) following entry of a BNP's network address from a web browser. In addition to providing access to the *BNP Element Manger*, several other tools are accessible from the home page (Figure 11 and Table 3).

Figure 11.     BNP Home Page
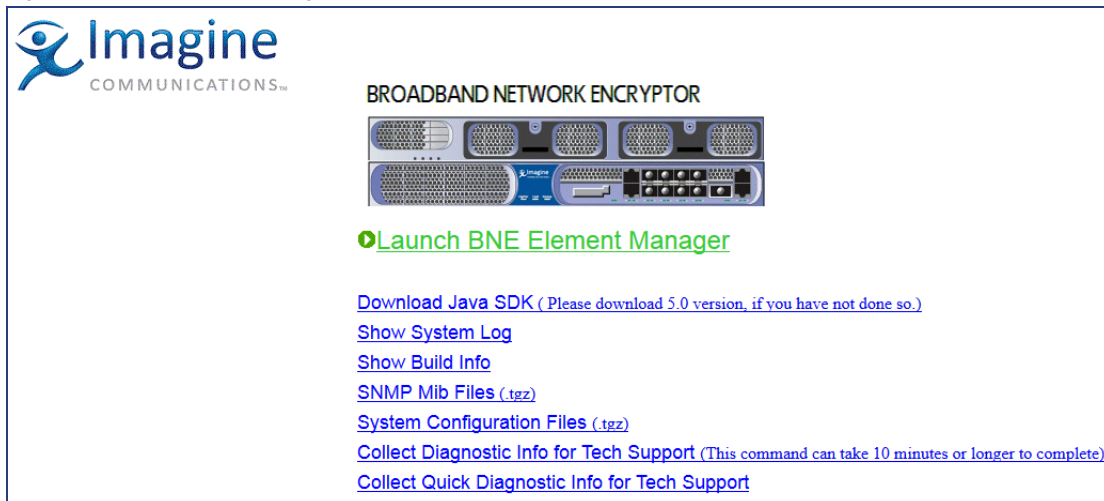


Table 3.        Broadcast Network Processor Home Page Options

| Link Option | Description |
| --- | --- |
| Launch BNP Element Manager | Click to start the launch, which will present the login dialog prior to revealing the *BNP Element Manager* screen. |
| Download Java SDK | Quick-access to the Oracle website, if you need to download the recommended version of the Java SDK to your desktop. |
| Show System Log | View events and error messages recorded by the BNP. |
| Show Build Info | View the current software version number and build number. |
| SNMP Mib Files | Access and save or open the MIB files for the current BNP release. |

Table 3.        Broadcast Network Processor Home Page Options  (Continued)

| Link Option | Description |
|---|---|
| System Configuration Files | Access the .cfg files associated with the current BNP release. |
| Collect Diagnostic Info for Tech Support | Generate complete diagnostic files that can be provided to RGB Customer Support about your BNP system. |
| Collect Quick Diagnostic Info for Tech Support | Generate the short system diagnostic file set. |

## Log in and Access the BNP Element Manager

1.   Open a web browser from the management workstation and enter the IP address of the BNP in the browser's address field to display the *BNP Element Manager* home page.

2.   Click **Launch** BNP **Element Manager**. The *BNP Element Manager* **Log in** dialog is now presented for local login (shown) or login via AAA.
     For login with AAA, additional fields are provided in the login screen, for entry of SNMP read/write strings (see also "Changing the SNMP Community String" on page 193).



3.   Enter login parameters:

     –   At **IP Address or Host Name**: enter the **IP address** of the BNP to manage, or use that already provided in this field.

     –   At **User:** select the user account from the drop-down list. If using an AAA server for authentication, the drop-down list is not available— you will need to type the user name in this field. (Table 4, and Table 21 on page 50).

     –   At the **Password:** field, type the password string. Note that passwords are case sensitive.
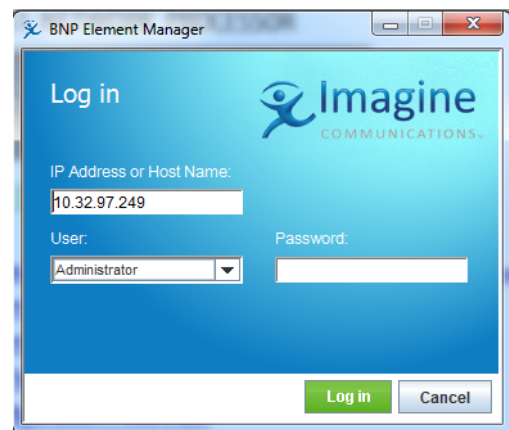
Table 4.        *BNP Element Manager* User Accounts

| User | Password | Privileges |
|---|---|---|
| Administrator | Admin | Unrestricted access and ability to change password. This level of access is typically used only by Field Application Engineers and Technical Support personnel. However, this access can be granted to head-end personnel in your organization. |
| Operator | Operator | Read-write access that allows configuration changes. This is the typical login level. |
| User | User | Read-only access. This user account cannot modify BNP configuration. |

4.   Click **Log in**.

     Successful login presents the **Grooming-Mapping** tab screen (Figure 13).

## Logging Off

Use the **Exit** option to log off gracefully from your BNP *Element Manager* session.

| 👉 **Menu Path** | From the BNP *Element Manager* main menu -> **File** -> **Exit**.<br>or use quick keys: Alt **f**, Alt **e** |
|---|---|

The BNP screen is now dismissed. Use steps provided in "Log in and Access the BNP Element Manager" on page 25 to initiate another session.

# BNP *Element Manager* GUI

The BNP *Element Manager* provides a convenient, intuitive method for management of a BNP. In addition to numerous tools built into the interface for configuration of services, status of the BNP system is always displayed at the bottom border of the *Element Manager* screen. You can navigate to the various functions by selecting options from the tabs and menus, and menu items are associated with keyboard mnemonics for quck access (Figure 12).

Figure 12.     Hierarchy of *BNP Element Manager* Menus and Tabs
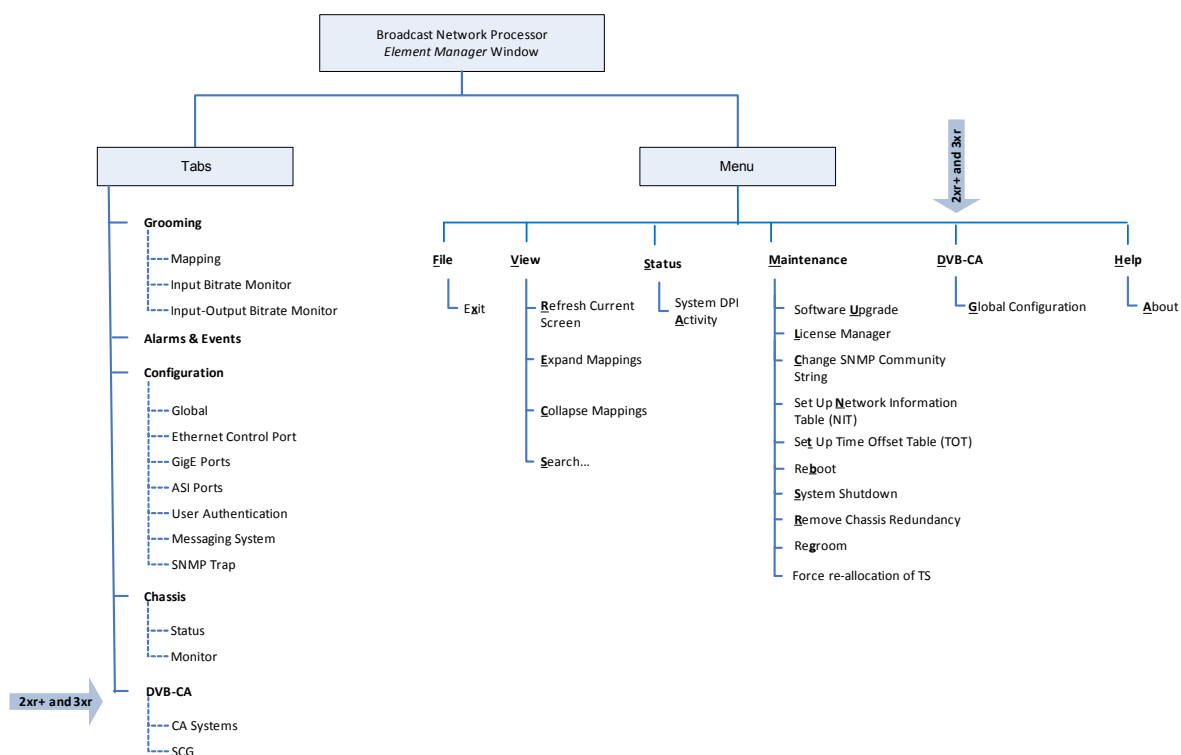
## *BNP Element Manager Window*

The *BNP Element Manager* provides menus, icons, tabs, and colors in the GUI, which assist in navigating to configuration functions and determining status of the BNP (Figure 13).

Figure 13.    BNP *Element Manager* GUI Components
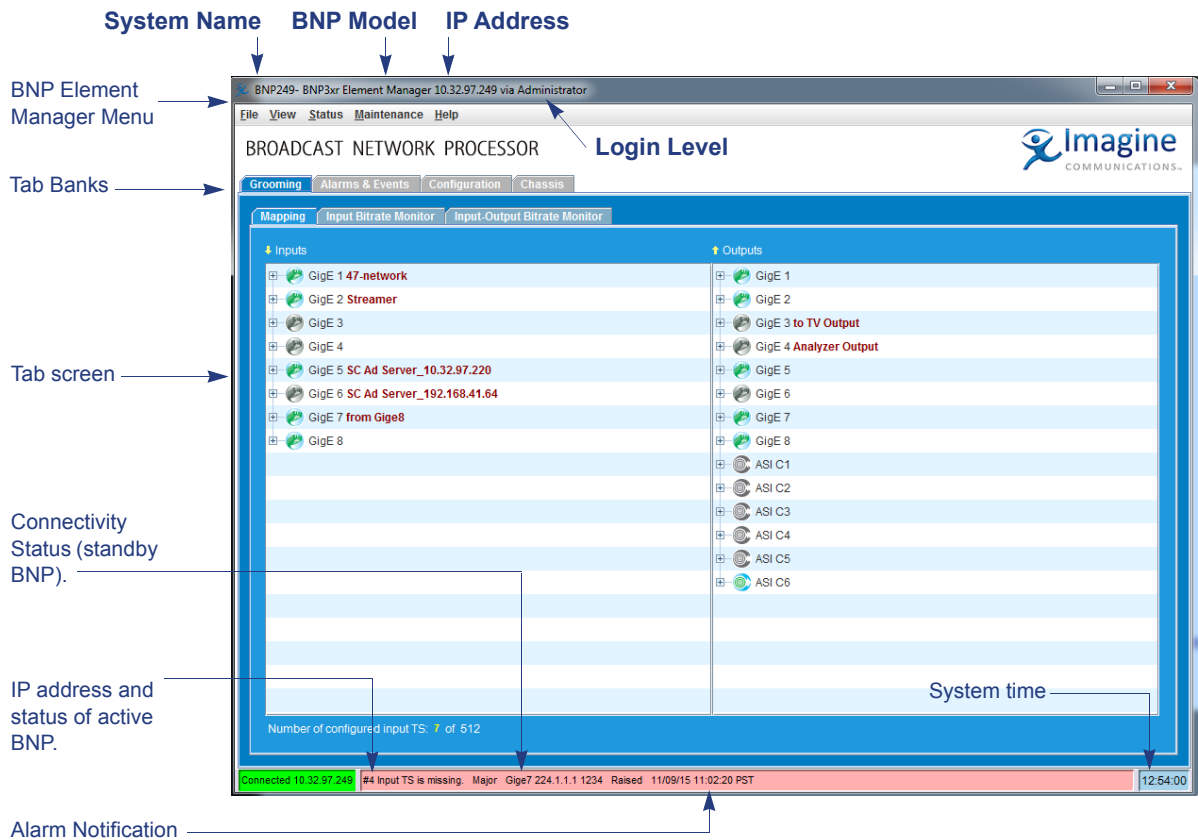


Note that the identity of the BNP and the currently logged in user is always in view at the top bar of the window. Status of the connection between the BNP and the *BNP Element Manager* is always on display at the bottom bar, alongside the overall status of the BNP system.

## BNP *Element Manager* Menus

Use the BNP *Element Manager* menus (Table 5) to perform tasks listed in Table 6. You can access these options either by using the pull-down menu, or by combining the **Alt** key with the underlined character particular to a function.

Table 5.  BNP *Element Manager* Menus

| Menu | BNP | Purpose |
|------|-----|---------|
| File | All | Exit the BNP *Element Manager*. |
| View | All | Refresh the currently active window or control view of mapping. |
| Status | All | View DPI Activity. |
| Maintenance | All | Upgrade software, manage licensing, edit the SNMP community string, set up NIT or TOT tables, reboot, perform a BNP shutdown, remove BNP redundancy, or regroom. |
| DVB-CA | 3xr | Perform global DVB-CA configuration. |
| Help | All | Access the About screen, in which to view current release information about the BNP in use. |

Table 6.  BNP *Element Manager* Main Menu and Quick Keys

| Menu | Description | Additional Information |
|------|-------------|------------------------|
| File (**Alt f**) | Perform a graceful logout from the BNP *Element Manager*, with the following option:<br>• Exit (**Alt x**) | "BNP Version Information" on page 33. |
| View (**Alt v**) | Adjust the view in the BNP *Element Manager* window, with the following options:<br>• Refresh Current Screen (**Alt r**)<br>• Expand Mapping (**Alt e**)<br>• Collapse Mapping (**Alt c**) | Examples that demonstrate results of expand and collapse are provided in Figure 55, "Grooming-Mapping View - Collapsed View," on page 104, and Figure 57, "View --> Expand Mapping to View All Contents," on page 106. |
| Status | Check DPI status and/or summary at the BNP system level. | |

Table 6.        BNP *Element Manager* Main Menu and Quick Keys (Continued)

| Menu | Description | Additional Information |
|---|---|---|
| <u>M</u>aintenance<br>(**Alt m**) | Access BNP maintenance functions, with the following options: | |
| | • Upgrade Software | "Software Upgrade" on page 185. |
| | • License Manager | "Managing Licenses" on page 190. |
| | • Change SNMP Community String | "Changing the SNMP Community String" on page 193. |
| | • Set up Network Information Table (NIT) | "You will need to log in as described above for any workstation that is accessing the Element Manager for the first time after the SNMP Read / Write Community Strings have been changed." on page 194. |
| | • Set Up Time Offset Table (TOT) | "Configuring the Time Offset Table (TOT)" on page 194. |
| | • Reboot | "Rebooting the System" on page 196. |
| | • System Shutdown | "System Shutdown" on page 197. |
| | • Remove Chassis Redundancy | "Removing Chassis Redundancy" on page 198. |
| | • Regroom | "Regrooming" on page 198. |
| <u>H</u>elp<br>(**Alt h**) | View version information in the About screen, with the following option:<br>• <u>A</u>bout (**Alt a**) | "BNP Version Information" on page 33. |

## BNP *Element Manager* Tabs

Use the BNP *Element Manager* tabs to perform the configuration, monitoring, grooming tasks listed in Table 7.

Table 7.        BNP *Element Manager* Window Tabs

| Tab | Use |
|---|---|
| Grooming | Perform mapping tasks, access real-time bitrate monitoring views. See also "Grooming Tab" on page 30 |
| Alarms & Event | View real-time lists of alarms and events logged by this BNP. See also Chapter 11, "Monitoring Alarms and Events" on Page 252. |
| Configuration | Access various configuration parameters via the subtabs labelled Global, Ethernet Control Port, GigE Ports, ASI Ports, User Authentication, Messaging System, and SNMP Trap.See also "Configuration Tab" on page 31 |
| Chassis | Provides a quick overview of the BNP system state. Clicking a card or port provides specific information for that item. Clicking any other part of the BNP displays system information about the BNP. See also "Chassis Tab" on page 31. |

## BNP *Element Manager* Status Bar

The status bar at the bottom of the BNP *Element Manager* always remains in view to report status information about the BNP. Color coding (Table 8) indicates the current, highest-level severity of the situation reported for connectivity and alarms.

### Connectivity

Status of connectivity to the BNP is reported at the left portion of the status bar, where you can view the currently connected IP address of the BNP, and current status of connectivity between the BNP and the *BNP Element Manager* as either green (good) or red (error).

### Alarms

Status of most critical event reported by the BNP is displayed as a text string and color code (Table 8) in the middle section of the status bar.

Table 8.        BNP *Element Manager* System Status

| Color | | Meaning |
|-------|---|---------|
| Green | | Informational alert or event. |
| Yellow | | Minor alert or event may require operator action. |
| Pink | | Major alert or event requires operator action. |
| Red | | Critical error has occurred and operator intervention is needed. |

# Grooming Tab

The **Grooming** tab screen provides access to the mapping page and the bitrate monitoring pages. For more information about the Grooming tab, see the following topics:

- "Grooming - Mapping" on page 104.
- "Monitoring Bitrates" on page 182.

# Alarms & Events tab

The **Alarms & Events** tab provides information about the current state of the system and is viewable at any time. For more information about the Alarms & Event tab, see Chapter 11, "Monitoring Alarms and Events."

# Configuration Tab

The **Configuration** tab provides access to several types of configuration tasks (Table 9).

Table 9.       BNP *Element Manager* Configuration Tab Banks

| Tab | Use |
|-----|-----|
| Global | View and set parameters to be applied to the BNP system. These settings control functions such as system time source, chassis redundancy, DPI ad parameters and splicing. |
| | See "Global Chassis Configuration" on page 37. |
| Ethernet Control Port | Configure the BNP to use either a static IP address or that obtained via BOOTP/DHCP. This page provides all network addresses, and the chassis MAC address, currently used by the BNP's Ethernet Control Port. |
| | See also "Ethernet Control Port Configuration" on page 43. |
| GigE Port | Use the GigE Port tab screen to define IP, subnet, and gateway addresses for each BNP GigE port, and to manage port mirroring and port negotiations. |
| | See also "GigE Port Configuration" on page 44 |
| ASI Ports | Use the ASI Ports tab screen to set ASI port directions, as either Input or Output. |
| | See also "ASI Port Configuration" on page 47. |
| User Authentication | Set parameters for *BNP Element Manager* user accounts. |
| | See also "User Authentication Configuration" on page 49. |
| Messaging System | Use the Messaging System tab to define messaging zones and/or logo overlay zones. |
| | See also "Messaging System Configuration" on page 60. |
| SNMP Trap | Use the SNMP Trap tab to set up to eight IP addresses, which identify the SNMP traps to be used by the BNP. |
| | See also "SNMP Trap Agent Configuration" on page 92. |

# Chassis Tab

The BNP *Element Manager* automatically detects the chassis hardware and provides a graphical display of the product components and their current states (Figure 14). Both the front and rear panels are displayed, as associated with the currently logged in BNP model. The information displayed on this screen is

• Read-only.

• Available regardless of whether the selected BNP is the active or standby unit (Table 10). For standby units, however, some configuration options will not be available

Figure 14.     Chassis tab (BNP 3xr)
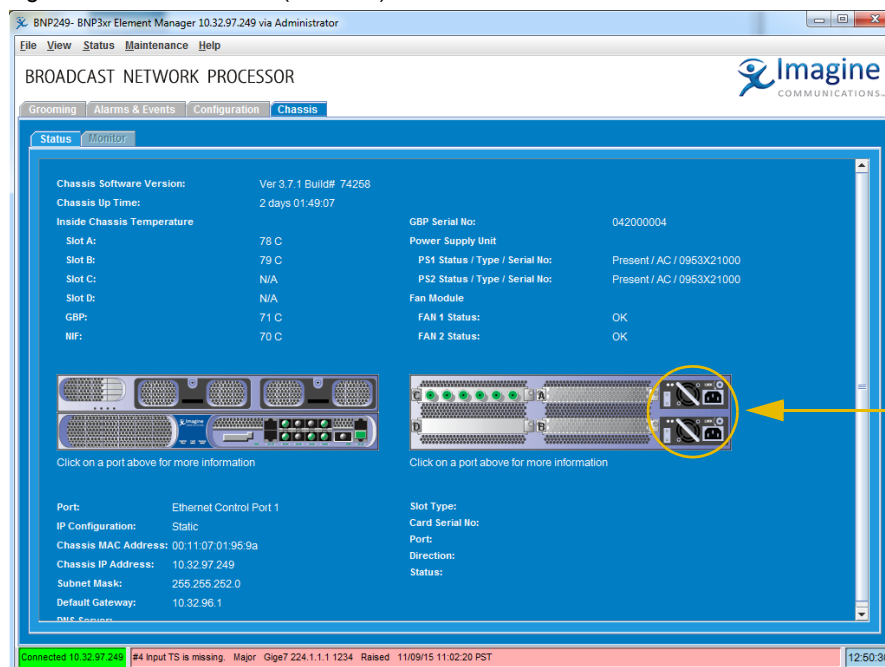


To view specific port information, position the arrow cursor on a port until it becomes a hand symbol, then click on the port to immediately view detail about the selected port.

The BNP power unit is displayed at the rear panel, as either AC (shown) or DC.

Table 10. Chassis tab screen information

| Field | Description |
| --- | --- |
| Chassis Software Version | Version of the software currently installed on the BNP. |
| Chassis Serial No | Serial number for the chassis; useful when troubleshooting or contacting technical support. The serial number is the same as the 100-BaseT port MAC address. |
| Chassis Up Time | Amount of time that the chassis has been continuously accessible. |
| Inside Chassis Temperature | The internal junction temperature of the FPGA chip is displayed, enabling easy determination that the FPGA die temperature is within acceptable limits.<br><br>If the value of any component inside the chassis exceeds 100°, an alarm is generated. |
| GBP Serial No | The serial number of the Gigabit Processing card. |
| Power Supply Unit | The Status and Serial Numbers for both power supply units (PS1 and PS2).<br><br>• When a power supply is present and operable, status is displayed as *Present*.<br>• When a power supply is not present or out of range, status is displayed as *Not Present*. |
| Fan Module | The Status information for FAN1 and FAN2.<br><br>• When a fan is present and operating, status is reported as OK.<br>• When a fan is not present or inoperable, status is reported as *Failed*. |
| Graphical view of physical configuration | A graphical representation of the front and rear of the chassis configuration.<br><br>Click on any individual module to display its configuration. |
| GigE port information | Configuration and addresses of the GigE ports.<br><br>Click on the port on the graphical representation to view its information. |

Table 10. Chassis tab screen information  (Continued)

| Field | Description |
|-------|-------------|
| Ethernet Control ports | Configuration and addresses of the Ethernet Control Port.<br>Click either management port on the graphical representation to view the information. |
| ASI Port Information | Port, direction, and status.<br>Click a port on the representation to see details about the port. |
| PROC Slot Information | Clicking on the card shows Slot (A, B, C, or D) and Card Serial No. |

# BNP Version Information

BNP software version information is located from the BNP **Home** page, the **Help** menu and the **Chassis** tab screen.
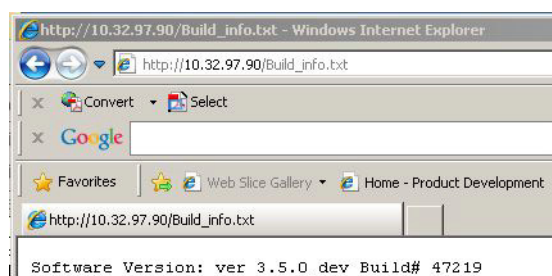
| | | |
|---|---|---|
| 👉 | **Menu Path** | From the BNP Home page, click on **Show Build Info** to present a web view (Figure 15) of the software version number and build number. |

Figure 15.　Viewing Software Version Information—from **Home** Page
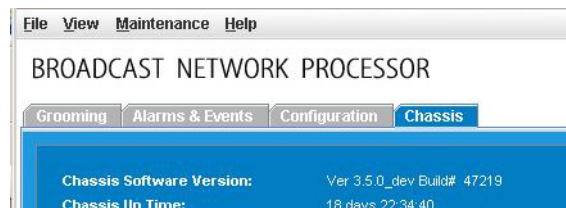


| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Chassis** tab screen, you can view the version number and build number displayed alongside the **Chassis Software Version** field (Figure 16). |

Figure 16.　Viewing Software Version Information—from **Chassis** Page



| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Help** menu, select **About** to present the **About** screen (Figure 17). Locate the software version alongside the **Software Version** field. |

Figure 17.     Viewing Software Version Information—from BNP *Element Manager* **About** screen

# Quick Keys

The BNP *Element Manager* contains numerous shortcuts (Table 11) you can use to navigate quickly from the main menu, and to adjust views.

Table 11.        BNP *Element Manager* Quick Keys

| Key(s) | Action |
|---|---|
| Esc | Close all dialog windows at once. |
| Tab | In dialogs, navigate to next editable field. |
| Alt **f**, Alt **e** | Log off the current user session and dismiss the BNP Element Manager screen. |
| Alt **v** | Display the <u>**View**</u> options from the BNP *Element Manager* main menu. |
| Alt **v,** Alt **r** | Refresh the current view of the BNP *Element Manager* screen. |
| Alt **v**, Alt **e** | Expand the current view in the **Grooming**-->**Mapping** tab page, to reveal all current transport streams, programs, and elements associated with the GigE and ASI ports. |
| Alt **v**, Alt **c** | Collapse the current view in the **Grooming**-->**Mapping** tab page, to hide all current transport streams, programs, and elements associated with the GigE and ASI ports. |
| Alt s, Alt a | View System DPI Activity |
| Alt **m** | Display the <u>**Maintenance**</u> options from the BNP *Element Manager* main menu. |
| Alt **h** | Display the <u>**Help**</u> option from the BNP *Element Manager* main menu. |
| Alt **h**, Alt **a** | Access the **About** dialog. |

CHAPTER 4

# System Configuration

The *Selenio* ™ *BNP* is configurable through a Java-based graphical user interface (GUI) available through a standard Web browser, or through SNMP using standard network management applications. The easy-to-use interface offers a variety of features that simplify the set-up and operation of the BNP, including program and transport level drag and drop grooming; simultaneous bit rate analysis of input and output transport streams and programs; alarms and logs window; scheduled dynamic grooming with start/end time and calendar entry; redundancy configuration; and full configurability of ASI and Gigabit Ethernet ports.

This chapter describes how to configure the BNP using the BNP *Element Manager*. You can also use the BNP *Element Manager* to define and manage network processing as described in Chapter 6, "Grooming and PSIP," and to monitor the BNP system as described in Chapter 11, "Monitoring Alarms and Events."

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

## In This Chapter:

# Global Chassis Configuration

Use the **Global** tab screen (Figure 18) to view and configure parameters applicable to the BNP system.

**Note:** *This screen provides tools you use to establish system redundancy. See also Chapter 5, "System Redundancy" for details pertinent to managing active and standby BNPs.*

**Menu Path** | *BNP Element Manager* **Configuration tab -> Global** tab screen.

Figure 18. Global tab screen



1. At the **Global** tab screen, use guidelines from the following tables to set parameters for the BNP system:

    - Table 12, "System Time Source—Global Configuration," on page 38.
    - Table 13, "Time Zone, Name, Log Address—Global Configuration," on page 38.
    - Table 56, "Chassis Redundancy Parameters," on page 95.
    - Table 14, "Virtual IP Address Configuration—Global Configuration," on page 39.
    - Table 15, "Advanced System Parameters—Global Configuration," on page 39.
    - Table 16, "Advanced DPI Parameters—Global Configuration," on page 41.
    - Table 17, "PID Display Format—Global Configuration," on page 41.

2. Click **Apply Configuration to save and implement your settings.**

Table 12.      System Time Source—Global Configuration

| Field | Description/Values |
|---|---|
| Force Sync | Click this button to force synchronization between the BNP and the NTP server. This action will prompt for a reboot of the BNP. See "NTP Server Force Sync" on page 42 for details. |
| IP Address (Servers 1-5) | Enter up to five IP addresses for the NTP server; the first field cannot be blank. Enter one per NTP Address field. |
| | A green circle to the left of the Server number field represents the active NTP server. The lack of a green circle would mean the specified server is not active. |
| Offset (msec) | This value shows the difference in milliseconds between the reference time and the system clock. |
| Jitter (msec) | This value indicates the magnitude of jitter in milliseconds between several time queries. |

Table 13.      Time Zone, Name, Log Address—Global Configuration

| Field | Description/Values |
|---|---|
| Time Zone | If Internal is selected, choose the time zone from the pull-down list that coincides with the location of the server, and which represents the Daylight Savings Time (DST) rules in effect in that city or country. |
| | The time displayed at the bottom right corner of the BNP main screen is synchronized with the time reported by the BNP Server box that is local to the time zone in which the server is collocated. All system alarms (raised and cleared), program start and end times, splice sent, converted and received times, EAS start and stop times, and Message Table times are managed and displayed in the server time zone. The server time zone may be controlled from the client's configuration screen. |
| | If the pull-down list does not contain the time zone you require, contact Imagine Communications Customer Support for assistance. |
| System Name | You can assign a unique system name for this BNP. After you click *Apply Configuration*, this name will appear at the top of the screen. |
| System Log Address | Enter the IP address to communicate with a Syslog server. |

**Note:** *The BNP must be rebooted following modification of the virtual IP address configuration.*

Table 14.    Virtual IP Address Configuration—Global Configuration

| Field | Description/Values |
|---|---|
| IP Address for 10/100 | Enter the virtual IP address used by the system to manage redundancy for the 10/100 management port.<br>• This address must be the *same* on both the active and standby chassis as it is shared by both units.<br>• This address must be on the same subnet as the physical IP address.<br>• Leave blank if no redundancy system is in place |
| Gateway for 10/100 | (Optional) Enter the IP address of the gateway (default router) that the 10/100 virtual IP should use This address must be the *same* on both the active and standby chassis as it is shared by both units. |
| IP Address for ETH 2 | **Applicable Platform**: BNP 3xr<br>Enter the virtual IP address used by the system to manage redundancy for the ETH 2 DVB-CA port.<br>• This address must be the *same* on both the active and standby chassis as it is shared by both units.<br>• This address must be on the same subnet as the physical IP address for ETH 2.<br>• Leave blank if no redundancy system is in place |
| Gateway for ETH 2 | **Applicable Platform**: BNP 3xr<br>(Optional) Enter the IP address of the gateway (default router) that the ETH 2 DVB-CA port should use This address must be the *same* on both the active and standby chassis as it is shared by both units. |
| IP Address for GigE (1-8) | For each redundant GigE port, (1 through 8) enter the IP address shared by the redundant ports. Each GigE port must be on a separate subnet. |

Table 15.    Advanced System Parameters—Global Configuration

| Field | Description/Values |
|---|---|
| Support SCTE 27 Subtitle (Stream Type 0x82) | SCTE 27 Subtitling defines stream type 0x82 for program subtitles and subtitling methods. The default value is checked. When unchecked stream type 0x82 is not treated as a subtitle. |
| Enable SCTE-21 to SCTE-20 Conversion | Check this box to enable the input program conversion of SCTE 21 to both SCTE 21 and SCTE 20 closed captioning formats on the output program. |
| Enable PSIP processing | Check this box to enable the BNP to detect PSIP tables and pass them from the input to the output. PSIP processing is enabled by default. |

Table 15.     Advanced System Parameters—Global Configuration (Continued)

| Field | Description/Values |
|---|---|
| PAL Mode | Check this box to optimize BNP processing of Phase Alternating Line (PAL) content.<br>• This setting is recommended if most programming from the BNP uses PAL.<br>• This setting is not recommended with progressive content.<br>Note: Enabling *PAL Mode* disables *Enable EAS CAP*. |
| Optimize Messaging on HD | Check this box when using a 3 to 1 ratio of HD programs per transport stream on which messaging is enabled. This feature will decrease the PROC card's capacity. This box is unchecked by default. |
| Enable EAS CAP | Leave this box unchecked to enable ten Messaging Zones ("About Messaging Zones" on page 60) of up to 400 characters each.<br>Check this box to enable two Messaging Zones of up to 1800 characters each (to comply with FCC regulations). This will delete all but the first two messaging zones and their associations with output programs, if any exist.<br>Note: If you disable EAS CAP after having it enabled, any existing messaging zones will be retained, but the messages will be truncated to the first 400 characters.<br>Note: Changing this setting requires a reboot of the BNP.<br>Note: Enabling *PAL Mode* disables *Enable EAS CAP*. |
| Enable Transparency for Messaging System | Check this box to enable transparency filters in the Messaging System tab.<br>• This box must be checked if you wish to enable transparency for Operator Messaging, Advanced Messaging, and Logo Overlay in the *Configuration -> Messaging System* tab.<br>• Checking this box reduces BNP capacity[a]. |
| PCR Interval for Stripped Null Packet TS (msec) | The duration between two PCRs of an output SPTS with *Stripped NULL Packet* checked. A value of *0* (zero) indicates the duration between two PCRs will follow the default BNP setting (80ms for ATSC, 38ms for DVB). A non-zero value applies to all modes. The value can range from *0* to *100*. |

a.  Please see the latest *Release Notes* for the impact of enabling transparency for load time and bandwidth on the BNP.

Table 16.        Advanced DPI Parameters—Global Configuration

| Category | Field | Description/Values |
|---|---|---|
| Postblack Enable Options | AD Server Request | Check this to play postblack that an ad server specifies for the end of an ad. Left unchecked, the BNP ignores postblack requests from ad servers. |
| | AD Underflows | Check this to insert black frames before transitioning back to the network, when AD underflows. This will allow a smooth transition between the AD that under flowed and the network. |
| DPI Splicing | Accurate splicing for non CUE DPI | Check this to allow BNP to delay or advance the splicing per current latency on the stream. This feature is for frame accurate splicing for DTMF based DPI. |

Table 17.        PID Display Format—Global Configuration

| Category | Description/Values |
|---|---|
| Hex (0xffff) | Click to set display of PIDs only as hex values. |
| Decimal (65535) | Click to set display of PIDs only as decimal values. |

## NTP Server Force Sync

The BNP can be configured to use up to five NTP servers with which the BNP will attempt to synchronize. In the event of a significant disparity between the BNP's time and that of the NTP server, the BNP may (by design) require considerable time to synchronize with the NTP server. You can manually force a quick synchronization between the server and the BNP.

Forcing a synchronization will prompt for a reboot of the BNP, thus resulting in a service disruption on non-redundant BNP configurations. NTP synchronization on non-redundant BNP configurations should be conducted during a maintenance window.

Use steps in this section to perform the following forced synchronizations on the BNP:

- "Forcing Synchronization of the BNP with an NTP Server," next.
- "Ethernet Control Port Configuration" on page 43.

### Forcing Synchronization of the BNP with an NTP Server

| | | |
|---|---|---|
| ☞ | **Menu Path** | From the *Element Manager*, select **Configuration -> Global** to access the **Global** tab screen. |

1. At the Global tab screen, click **Force Sync**. The **Option** dialog queries for verification of this operation.

2. At the **Option** dialog, click **Yes** to continue, or **No** to abort this operation. The **Password Verification** dialog is now displayed.

3. At the **Password Verification** dialog, enter the Administrator password and click **OK**. The **Reboot** confirmation dialog is now displayed.

4. Click **Yes** to reboot, or **No** to abort the reboot.
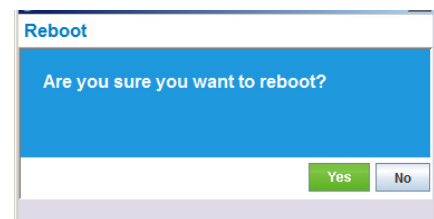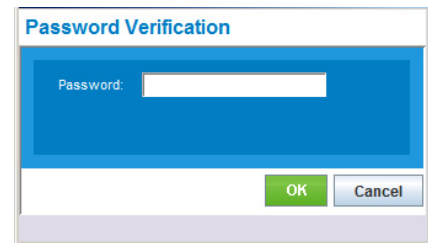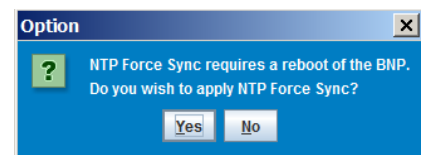
# Ethernet Control Port Configuration

There are two Ethernet control ports for each BNP: one for basic management and access to the *Element Manager*. On the BNP 3xr, the other port is used for DVB-CA connectivity and access.
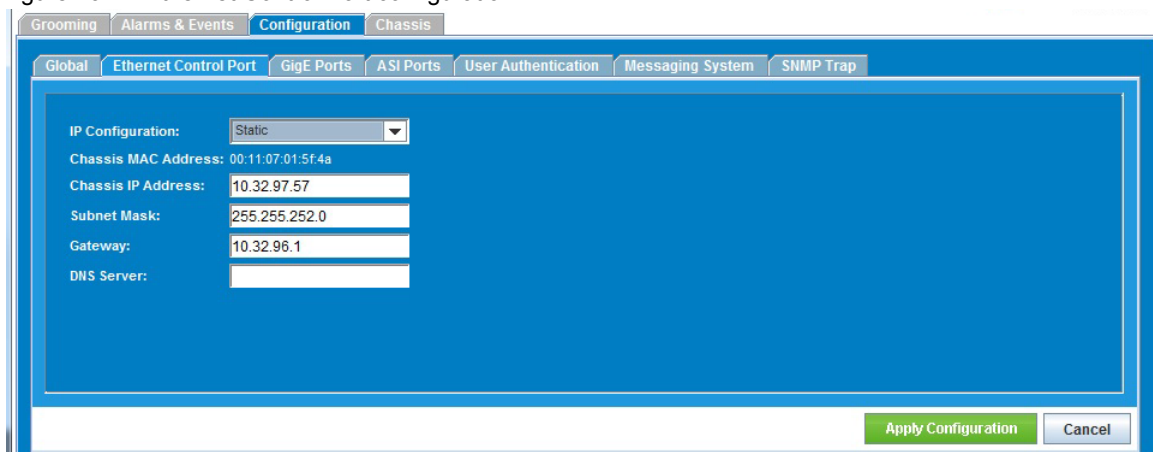
Use the **Ethernet Control Port** tab screen (Figure 19 and Table 18) to view and configure BNP Ethernet control ports.

| 👉 | **Menu Path** | From the *Element Manager* tabs, select **Configuration -> Ethernet Control Port**. |
|---|---|---|

1. At the **Ethernet Control Port** tab screen, enter and/or type Ethernet control port values. Use the following guidelines for IP addressing of these ports:
   - The IP address for Ethernet port 1 must be on a different subnet from any of the Gigabit Ethernet IP addresses.
   - The IP address for Ethernet port 2 must be on a different subnet from the IP address of Ethernet port 1, and any of the Gigabit Ethernet IP addresses.
2. Click **Apply Configuration** to save and load the settings.

You can view the current Ethernet control port configuration either at **Ethernet Control Port** tab screen, or at the **Chassis** tab screen.

Figure 19.     Ethernet Control Port configuration

Parameters for static IP configuration are described in Table 18. For information about BOOTP/DHCP IP configuration, see "DHCP and BNP IP Configuration" on page 44.

Table 18.    Ethernet Control Port Configuration Fields

| Field | Description |
|---|---|
| IP Configuration | Select the source of the BNP boot configuration file from the pull-down menu as either *BOOTP/ DHCP* or *Static.* |
| MAC Address | A read-only field that displays the MAC address of the 10/100 management port. |
| IP Address | Enter the IP address of the management port for the BNP; this field cannot be blank. |
| Subnet Mask | Enter the subnet mask of the management port for the BNP; this field cannot be blank. |
| Gateway | Enter the IP address where management packets are routed out of the local network (the default router address). |
| DNS Server | Enter the IP address of the DNS server being used for management of the BNP.This field is optional. |

## DHCP and BNP IP Configuration

**Note:** *If you use DHCP rather than a static IP address for your Ethernet control port configuration, you will need the assistance of Imagine Communications customer support. Contact them before you choose DHCP.*

If DHCP is selected to obtain an IP address, the BNP IP address cannot be obtained through the *Element Manager*. One of the following three methods can be used to determine the IP address.:

- Connect to the BNP through the serial console and at a prompt type **ifconfig eth0**.
- If the DHCP server is available, check the MAC and IP mapping on the DHCP server.
- Use a "sniffer" to sniff the network for DHCP traffic.

# GigE Port Configuration

All GigE ports for the BNP can be configured from the BNP *Element Manager*. The GigE ports support full duplex processing of transport streams: the same GigE port can be used for input and output.

Use the **GigE Ports** tab screen (Figure 20 and Table 19) to view and configure BNP GigE ports. All GigE ports for the BNP are displayed in a list. For easy identification, the ports appear with a color-coded icon to delineate the active and inactive ports. Active ports are displayed in green.

| | |
|---|---|
| **Menu Path** | From the *Element Manager* tabs, select **Configuration** -> **GigE Ports**. |

Figure 20.     GigE port configuration



1.   At the **GigE Ports** tab screen, set network addressing, mirroring, and/or negotiation for specific GigE ports.

2.   Click **Apply Configuration** to save and load the settings.

3.   You can view the current GigE port configurations either at the **GigE Ports** tab screen, or at the **Chassis** tab screen. Clicking a GigE port at the **Chassis** tab screen displays all configured information for the selected port.

Table 19.     GigE Port Configuration Fields

| Field | Description |
| --- | --- |
| Port | The GigE port number, listed sequentially. |
| Status | Read-only; the current status of the port. |
| MAC Address | Read-only; the MAC address of the port. |
| IP Address | The IP address for the interface; if no IP address is used, leave the field empty.<br><br>Note that the Element Manager allows the IP address of the GigE ports to be configured in the same subnet. However, Imagine Communications recommends that all GigE ports be configured on different subnets, for proper routing. |
| Subnet Mask | The subnet mask address. |
| Default Gateway | The default gateway (default router) to use, if applicable. |
| Mirrored To | If the port is mirrored, the port to which the selected port is mirrored appears in a read-only field. When you mirror two GigE ports, in the event of failure of one, the other one takes over without interruption. |
| Mirroring | Click **Set** to open a dialog, allowing you to mirror this port. See also "Gigabit Ethernet Port Mirroring" on page 46. |
| Auto negotiation | Enable or disable auto negotiation. |

## Gigabit Ethernet Port Mirroring

Port mirror configuration is typically used in Source Specific Multicast deployment with IGMPv3 support, in which the Gigabit Ethernet port pairs serves as two different sources for the same video traffic.

When configured for port mirroring, output traffic on a specified GigE port will be copied to another GigE port. For example, Figure 21 demonstrates a configuration in which GigE port 6 is mirrored to GigE port 3. In this configuration, output traffic on GigE port 6 is copied over to Gigabit Ethernet 3. The only difference for the traffic coming from Gigabit Ethernet 6 and Gigabit Ethernet 3 is the source IP address.

### Configuring GigE Port Mirroring

Use the **GigE Ports** tab screen (Figure 21) to define port pairs for mirroring.

| | | |
|---|---|---|
| 👉 | **Menu Path** | *BNP Element Manager* **Configuration** tab -> **GigE Ports** tab screen. |

Figure 21.    Mirroring GigE ports
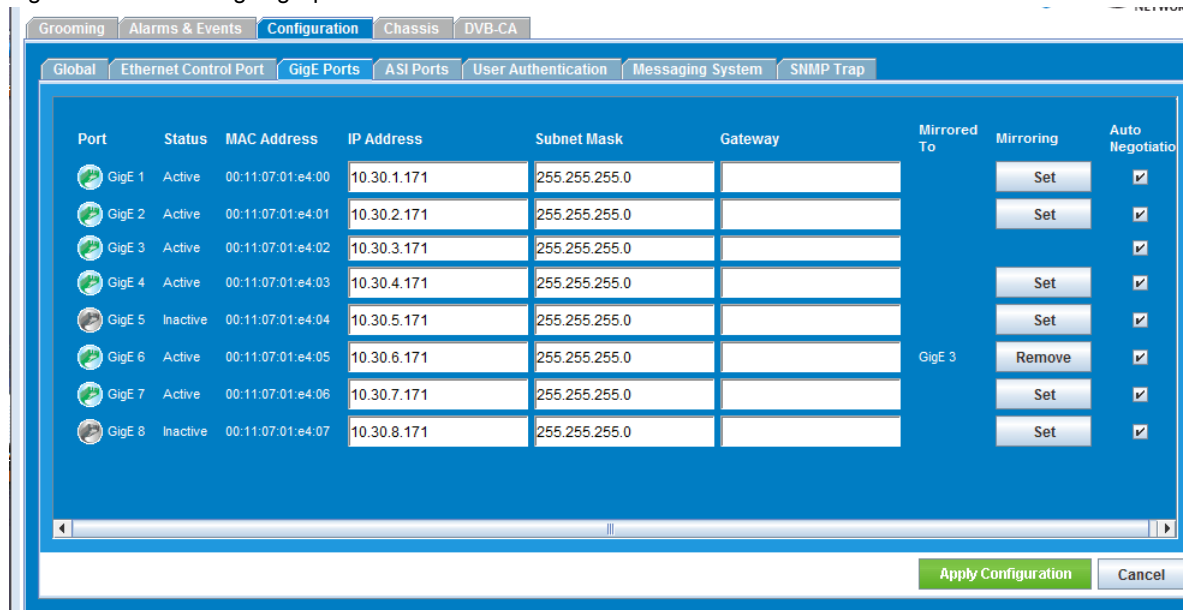


1. At the **GigE Ports** tab screen, click the **Set** button next to the port that is to be mirrored. Clicking on the **Set** button results in displays of a drop-down selection range that lists the GigE ports.

2. Use the drop-down to specify the GigE port to which the current port is to be mirrored. The port is mirrored when you see the following on the GigE Ports tab screen:

   – The mirrored-to **Set** button disappears.
   – The mirrored-to GigE port is now listed in the *Mirrored to* column.
   – The **Set** button at the originating port is replaced by the **Remove** button.

   There is no need to click **Apply Configuration** as the mirroring happens as soon as the port is chosen. Mirrored ports are identified at the **Grooming** --> **Mapping** tab screen.

### Removing Port Mirroring

Use the **GigE Ports** tab screen (Figure 21) to remove port mirror settings.

| | **Menu Path** | *BNP Element Manager* **Configuration** tab -> **GigE Ports** tab screen. |
|---|---|---|

1. At the *Mirroring* column, click the **Remove** button.
2. At the confirmation query, click **Yes** to continue. The port is no longer mirrored when you see the following on the GigE Ports tab screen:

   – The mirrored-to **Set** button is displayed.
   – The mirrored-to GigE port is no longer listed in the *Mirrored to* column.
   – The **Set** button at the originating port is replaced by the **Set** button.

   There is no need to click **Apply Configuration** as the ports discontinue mirroring as soon as the port is chosen. Also, the **Grooming** -> **Mapping** tab screen is immediately updated to remove the mirroring label.

## ASI Port Configuration

Use the **ASI Ports** tab screen (Figure 22 and Table 20) to view the current ASI port configuration and to set a direction for specified ASI ports on the BNP.
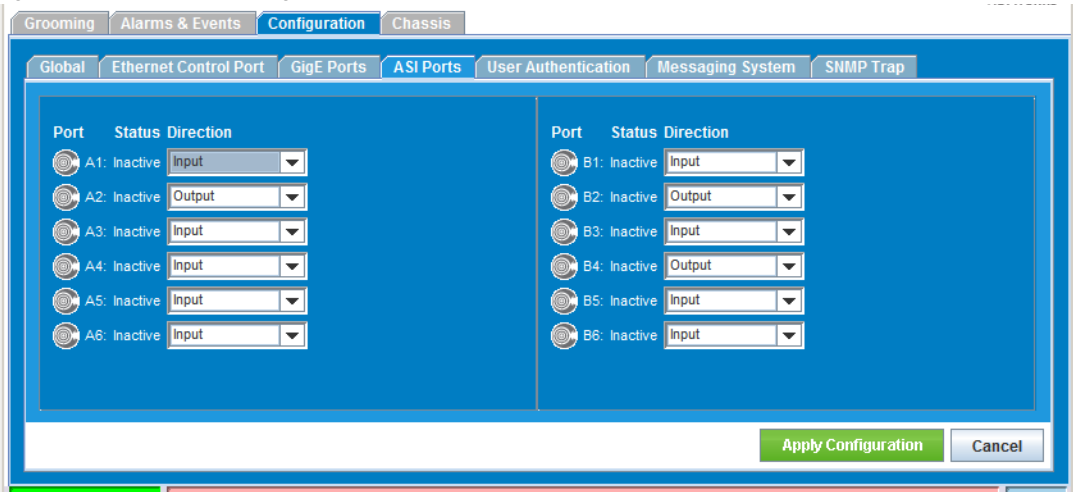
| | **Menu Path** | *BNP Element Manager* **Configuration** tab -> **ASI Ports** tab screen. |
|---|---|---|

Figure 22.     ASI port configuration tab

At the **ASI Ports** tab screen, only the active slots are displayed: inactive slots are not displayed. Each slot is displayed as a separate block containing the information listed in Table 20. Note that you can go to the **Chassis** tab screen to view all ASI slots and associated information.

Table 20.    ASI Port tab screen

| Field | Description |
|---|---|
| Port | BNP slot and port number. The example in Figure 22 demonstrates that ports list in the left-side block are associated with BNP slot C; ports in the right-side block are associated with BNP slot D. |
| Status | Current status of each ASI port as either *Active* or *Inactive*. |
| Direction | Dataflow direction on this port, as either *Input* or *Output*. You can use the drop-down selector from this field to change the setting. |

**Note:** *To enable display of an ASI port on the* **Inputs panel** *of the* **Grooming -> Mapping** *window, the port direction must be* **Input.**
*To enable display of an ASI port on the* **Outputs panel** *of the* **Grooming -> Mapping** *window, the port direction must be* **Output**.

# Port Naming

Use the **Modify Port Name** dialog (Figure 23) to set a new name for a specified input or output port—GigE or ASI—on the BNP. Note that the GigE port number will not be removed, but the new name will be displayed alongside the GigE port number.

| | |
|---|---|
| **Menu Path** | BNP *Element Manager* **Grooming** tab -> **Mapping** tab screen -> Inputs or Outputs panel -> right-click for popup menu on the port to be renamed, and select **Modify Port Name**. |

Figure 23.    Modify Port Name Menu and dialog
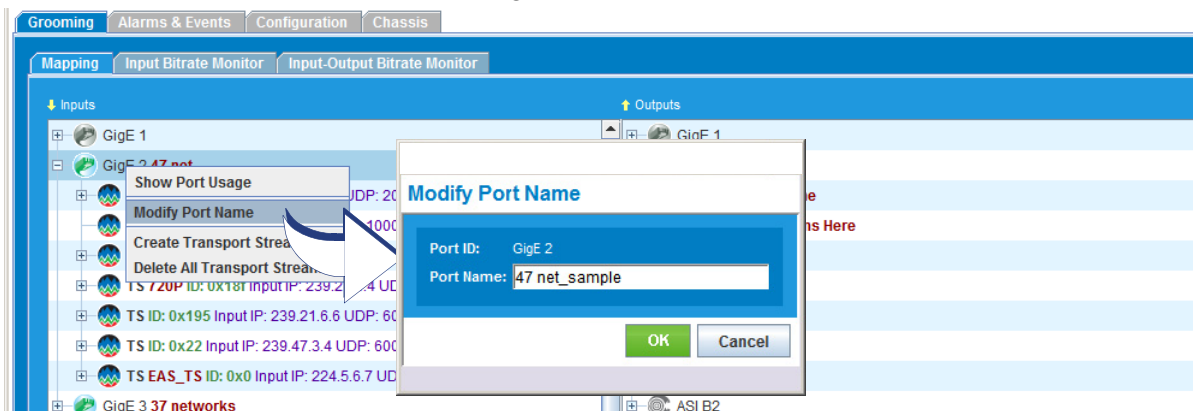


1. At the **Port Name** field, type the alphanumeric string that will identify this port.

2. Click **OK** to apply the port name to all instances that reference the port ID in the *BNP Element Manager*. Figure 24 demonstrates display of a new name at a port listing.

Figure 24.    Port Name Modified
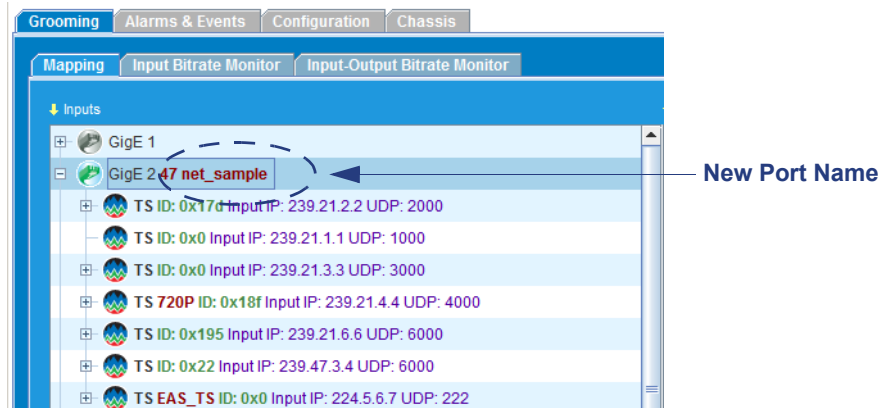


# User Authentication Configuration

The **User Authentication** tab provides a central area from which user control settings can be edited, added, or deleted. The BNP permits both local and remote user authentication.

The BNP authenticates with an AAA server when the AAA feature is enabled from the BNP, using the name and password provided by the user account during the login process. If the user name exists in the AAA server and the password matches with that stored on the AAA server, the user authorization level—as either *Admin*, *Operator*, or *User*—is then returned to the BNP (see also "User Account Privileges" on page 500.

- Remote user authentication is performed using an authentication, authorization and accounting (AAA) server that supports RADIUS or TACACS+. The AAA server handles requests for access to system resources to be configured, allowing maintenance of user profiles to be performed once for any number of clients. When a client wants to access a system resource, it must first get permission from the AAA server.
- By default, the BNP provides a local user fallback authentication method that allows users to log in when an AAA server is not available. However, for security and account management reasons, use of AAA is recommended. All passwords configured for AAA—both remote and local—are encrypted.

  You can also create additional, customized user accounts which may be useful for authentication and authorization where AAA is disabled on the BNP or when AAA servers are not reachable from the BNP (as indicated by a timeout occurring for an authentication request to a AAA server).

The following work flow (Figure 25) illustrates the authentication process when a user attempts to log in to the BNP.

Figure 25.    BNP User Authentication Workflow
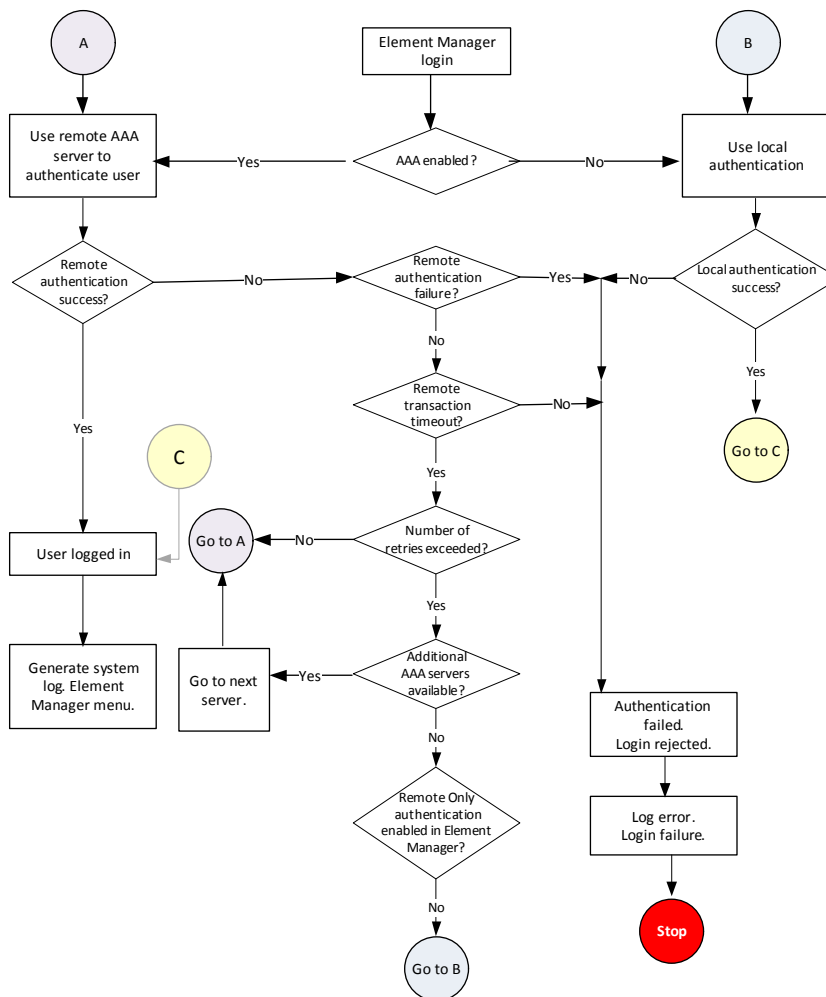


# User Account Privileges

**Table 21  User Privileges and Operations**

| BNP Operation | Function | Admin | Op | User |
|---|---|---|---|---|
| Configuration | User Authentication | yes | no | no |
| | Global->Apply Config (button) | yes | yes | no |
| | Ethernet Control Port -> Apply Config (button) | yes | yes | no |
| | GigE Ports ->Apply Config (button) | yes | yes | no |
| | ASI Ports -> Apply Config (button) | yes | yes | no |
| | Messaging System ->Apply Config (button) | yes | no | no |
| | SNMP Trap -> Apply Config (button) | yes | yes | no |

**Table 21  User Privileges and Operations (Continued)**

| BNP Operation | Function | Admin | Op | User |
|---|---|---|---|---|
| Maintenance | Software Upgrade | yes | yes | no |
| | Reboot | yes | yes | no |
| | System Shutdown | yes | yes | no |
| | Remove Chassis Redundancy | yes | yes | no |
| | Regroom | yes | yes | no |

## AAA Status and Impact to Authentication

**Table 22  AAA Behavior Reference**

| Server | Server Status | User Priv at Server DB | Does User Exist? | | User Priv at Local DB | Auth results | Local Auth effort? | logged in as |
|---|---|---|---|---|---|---|---|---|
| | | | In server DB? | In Local DB? | | | | |
| RADIUS | UP | admin | yes | na | na | pass | no | admin |
| | DOWN | admin | yes | yes | admin | pass | yes | admin |
| | DOWN | admin | yes | yes | op | pass | yes | op |
| | DOWN | user | yes | yes | admin | pass | yes | admin |
| | DOWN | admin | no | yes | admin | pass | yes | admin |
| | UP | admin | no | na | na | fail | na | failed |
| | DOWN | admin | yes | no | na | fail | yes | failed[a] |
| TACACS+ | UP | admin | yes | na | na | pass | no | admin |
| | DOWN | admin | yes | yes | admin | pass | yes | admin |
| | DOWN | admin | yes | yes | op | pass | yes | op |
| | DOWN | user | yes | yes | admin | pass | yes | admin |
| | DOWN | admin | no | yes | admin | pass | yes | admin |
| | UP | admin | no | na | na | fail | na | failed |
| | DOWN | admin | yes | no | na | fail | yes | failed[b] |
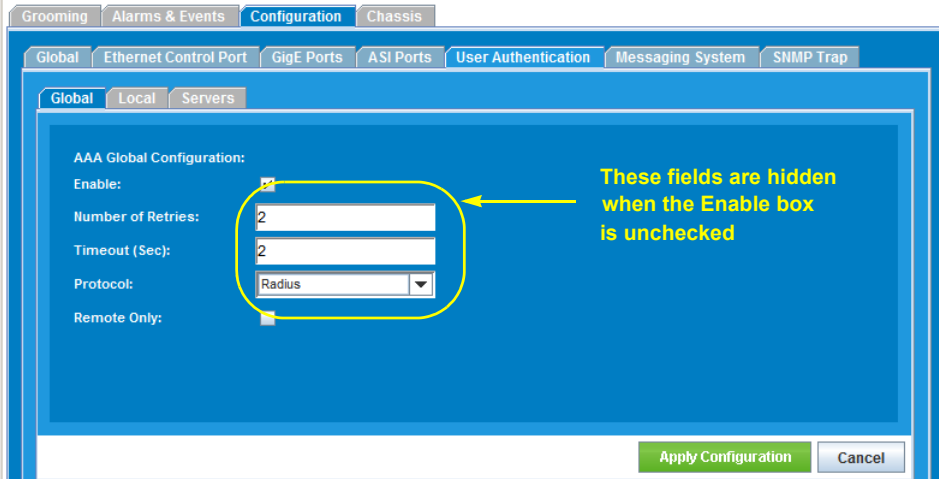
a.  network down or server not stated + user not present in local db
b.  network down or server not stated + user not present in local db

## Global User Authentication Configuration

Use the **Global** tab screen (Figure 26 and Table 23) to set global AAA options for the BNP. These settings enable or disable user authentication using AAA.

| | | |
|---|---|---|
| 👉 | **Menu Path** | *BNP Element Manager* **Configuration** tab -> **User Authentication** tab **-> Global** tab screen. |

Figure 26.     User Authentication - Global, AAA disabled



1.  At the **Global** tab screen, click the **Enable** box to reveal the AAA parameter fields.
2.  Use guidelines in Table 23 for entries in this screen.
3.  Click **Apply Configuration** to save and load the settings.

Table 23.     User Authentication Global Fields

| Field | Description |
|---|---|
| Enable | Enable (check) or disable (uncheck) authentication using AAA. When checked, the remaining fields in this table will appear. |
| | When enabled, user authentication will be performed by the specified AAA server. |
| | When disabled, local user authentication will be used. |
| | Default is *unchecked*. |
| Number of Retries | The number of times the system will try connecting to a remote server before trying another server in the list. |
| | Default is *0*. Valid range is from 0 to 2. |
| Timeout (sec) | The amount of time (in seconds) to wait for a response from the remote server. |
| | Default is 2. Valid range is from 1 to 4. |

Table 23.      User Authentication Global Fields  (Continued)

| Field | Description |
|-------|-------------|
| Protocol | The preferred protocol to use in selecting a server.<br><br>Valid options are:<br><br>• Radius - Try all RADIUS servers before trying TACACS+ servers.<br><br>• TACACS+ - Try all TACACS+ servers before trying RADIUS servers.<br><br>Default = *Radius*. |
| Remote Only | Checking this box will require the BNP to use only remote authentication. If enabled and remote authentication fails or connection with the AAA server is not established, local authentication is not performed and the user is not logged in.<br><br>Default = *unchecked*.<br><br>At least one AAA server must first be configured before the Remote Only option is checked and the configuration applied to the BNP. See "User Authentication Server Configuration" on page 57 for details on configuring an AAA server. |

## Local User Authentication Configuration

Use the **Local** tab screen (Figure 27) to view and manage users currently set up to access this BNP. The default user types—Administrator, Operator, and User—are always displayed and cannot be deleted. Any additional users that you configure will be displayed in this tab page.

| | |
|---|---|
| **Menu Path** | *BNP Element Manager* **Configuration** tab-> **User Authentication** tab **-> Local** tab screen. |

Figure 27.      User Authentication Setup- Local
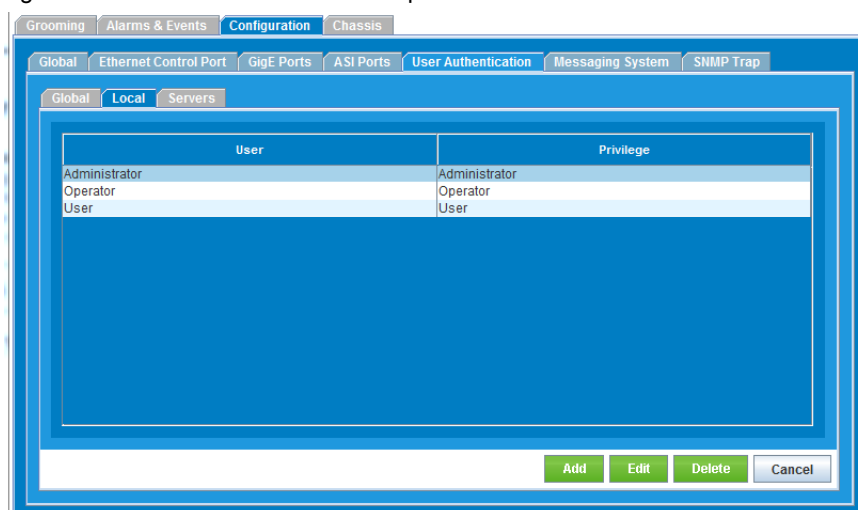
Table 24.       Local User Tab Functions

| Button | Description |
|--------|-------------|
| Add | Access the **Add Local User** screen, in which to set up additional local user accounts. See also "Managing Local User Accounts" on page 54. |
| Edit | Access the Edit Local User screen, in which to modify an existing password for a specified local user account. |
| Delete | Remove a selected (customized) user account from the local tab screen and from the BNP database. Only customized local user accounts may be deleted: an error message is presented with any attempt to delete one of the default *Administrator*, *Operator* or *User* accounts. |

Table 25.      User Account Privilege Levels:

| Field | Description |
|-------|-------------|
| User | Read-only access account. No changes to the configuration are allowed. Default password is: *User* |
| Operator | Read and write access are allowed for all configuration operations except changing passwords. Default password is: *Operator*. |
| Administrator | Full access to the BNP system configuration is allowed. This is the only user account that is authorized to change passwords. Default password is: *Admin*. |

# Managing Local User Accounts

A BNP *default* Administrator can add, edit, or delete any other user account, and can provision roles for those user accounts. Additional, custom administrator account(s) can be configured (Figure 28), but these administrators are limited to creation of accounts with Operator or User roles.

Topics in this section:

- "Adding a Local User Account," next.
- "Modifying a Local User Account" on page 55.
- "Deleting a Local User Account" on page 56/

## Adding a Local User Account

Use the **Add Local User** screen to set up a new local user account.

| | Menu Path | *BNP Element Manager* **Configuration** tab-> **User Authentication** tab **-> Local** tab screen. |
|---|---|---|

Figure 28.    Add Local User
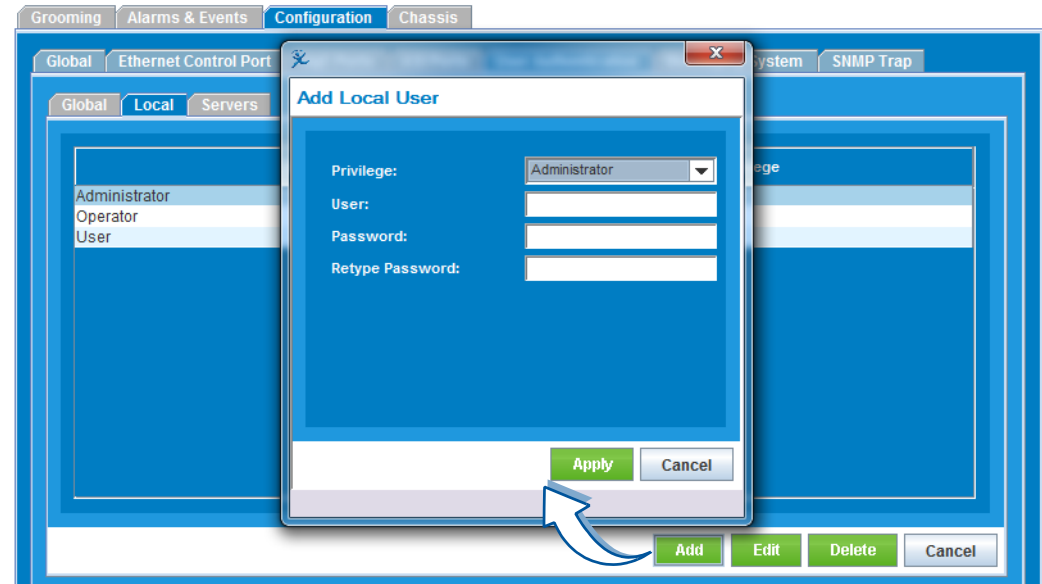


1. At the **Local** Tab screen, click **Add** to present the **Add Local User** screen.

2. At the **Add Local User** screen, set the privilege level, and type the user name and password strings.

3. Click **Apply** to dismiss this screen and to view your entry as a new row in the table of local user accounts.

Table 26.    Local User Parameters

| Button | Description |
|---|---|
| Privilege | Select a privilege level—as either Administrator, Operator, or User—for this user account from the drop-down menu. |
| | For more information about privilege levels, see Table 21, "User Privileges and Operations," on page 50, and Table 25, "User Account Privilege Levels:," on page 54. |
| User | Alphanumeric string to name this user account. |
| Password | Alphanumeric string—maximum 15 characters—to be used with this user login |
| Retype Password | at the BNP. |

## Modifying a Local User Account

Use the **Edit Local User** screen to modify the password for an existing user account. The current role and user name cannot be modified.

| | Menu Path | *BNP Element Manager* **Configuration** tab-> **User Authentication** tab **-> Local** tab screen. |
|---|---|---|

Figure 29.    Edit Local User
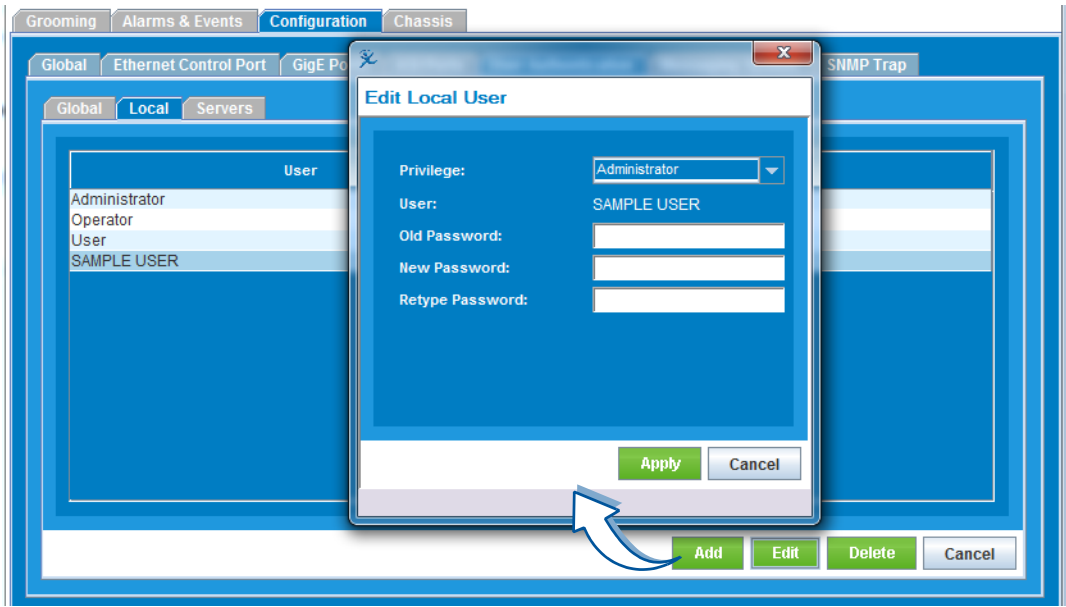


1.  At the **Local** Tab screen, click on the user account to be modified. The **Edit Local User** screen is now presented.

2.  At the **Edit Local User** screen, type the current password, then type/retype the new password for this account.

3.  Click **Apply** to dismiss this screen and to return to the Local table of user accounts.

## Deleting a Local User Account

Use the **Delete** button on the **Local** tab screen to instruct deletion of a specified user account.

**Note:**    *The default user accounts—Administrator, Operator, User—cannot be deleted. Only those accounts created by use of the Add Local User function can be deleted. t*

| | |
|---|---|
| **Menu Path** | *BNP Element Manager* **Configuration** tab-> **User Authentication** tab **-> Local** tab screen. |

1.  At the **Local** tab screen, click to highlight the user account to be deleted.

2.  Click **Delete**.

3.  At the confirmation query, click **Yes** to continue.
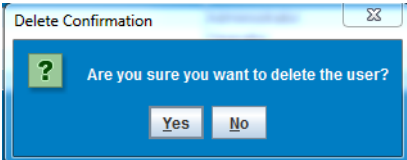


The selected user account is immediately removed from the Local table of user accounts.

## User Authentication Server Configuration

Use the **Server** tab screen (Figure 30) to view the current AAA server configurations, and to access tools you can use to set AAA server parameters.

| 👉 | **Menu Path** | **Configuration** tab **-> User Authentication** tab **-> Servers** tab screen. |
|---|---|---|

Figure 30.     User Authentication - Servers
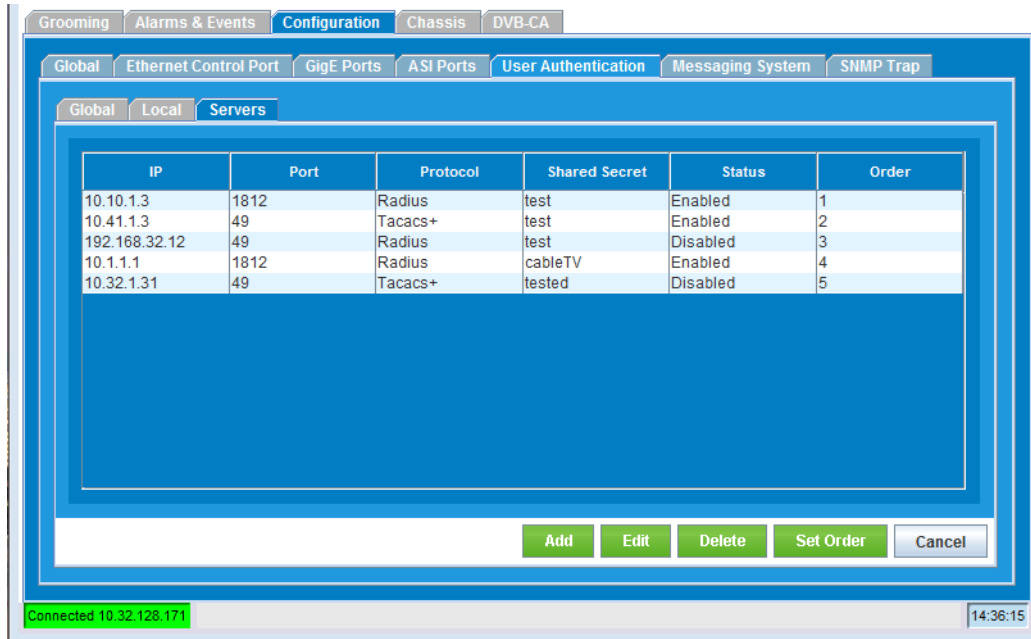


ℹ️ **Note:**  *When deleting an AAA server, it may be necessary to first reorder the list of servers so that the desired server may be deleted in descending order. See also "About AAA Server Order," in the next section.*

### About AAA Server Order

The order in which the system attempts to connect to an AAA server is based on the following criteria:

- The preferred authentication protocol specified in the **Protocol** field of the **User Authentication - > Global** tab;
- The current server order as shown in the Order column of the **User Authentication -> Servers** tab.

If the preferred authentication protocol is set to **Radius**, all Radius servers will be tried first, followed by TACACS+ servers. If set to **TACACS+**, all TACACS+ servers will be tried first, followed by RADIUS servers.

For example, if four AAA servers have been added to the AAA server list (see Table 27) and the specified protocol preference is Radius, the order in which the servers are tried is A, D, B, C.

Table 27.    AAA Server List Example

| AAA Server | Current Server Order | Protocol |
|------------|---------------------|----------|
| A | 1 | RADIUS |
| B | 2 | TACACS+ |
| C | 3 | TACACS+ |
| D | 4 | RADIUS |

## Adding or Editing an AAA Server

Use the **Edit AAA Server** dialog (Figure 31 and Table 28) to add a new AAA server or to edit an existing AAA server. You can add up to eight AAA servers.

**i** **Note:**    *At least one AAA server must be enabled when the **Remote Only** option is selected from the AAA Global Configuration menu. See "Global User Authentication Configuration" on page 52 for more information.*

| 👉 **Menu Path** | From the *Element Manager* tabs, select **Configuration** -> **User Authentication > Servers**; click the **Add** button or the **Edit** button**.** |
|---|---|

Figure 31.    Add or Edit AAA Server



**Adding an AAA**                                **Editing an AAA**

1.  At the **Edit AAA Server** dialog, enter information to define the AAA server details. Be sure to check the Enable box if this server must be available for the BNP to use when logging in to the BNP Element Manager via AAA.

2.  Click **Apply** to save and load the settings.

Table 28.    User Authentication - Servers - Add/Edit Server Fields

| Field | Description |
|-------|-------------|
| IP Address | The IP address of the AAA server. When adding a server, default is blank. When editing a server, this field is read-only. |
| Port | Enter the TCP port to use on the AAA server. Valid range is: 0 to 65535. Default for Radius is *1812*. Default for TACACS+ is *49*. |

| Field | Description |
|---|---|
| Protocol | Select the authentication protocol from the drop-down box to use when communicating with the AAA server. Choose between Radius and TACACS+. Default is *Radius*. |
| Shared Secret | Enter the password or passphrase used to authenticate with the AAA server. **NOTE**: this setting must match with that present in the server's configuration file. |
| Retype Shared Secret | Re-enter the password or passphrase used to authenticate with the AAA server. |
| Enable | Check this box to enable the AAA server. If an AAA server is not enabled, it will not be available for the BNP to use when logging in via AAA. |

## Reordering the AAA Server Query List

Use the **Edit AAA Server Order** dialog (Figure 32 and Table 29) to modify the order in which the BNP system queries for AAA servers.
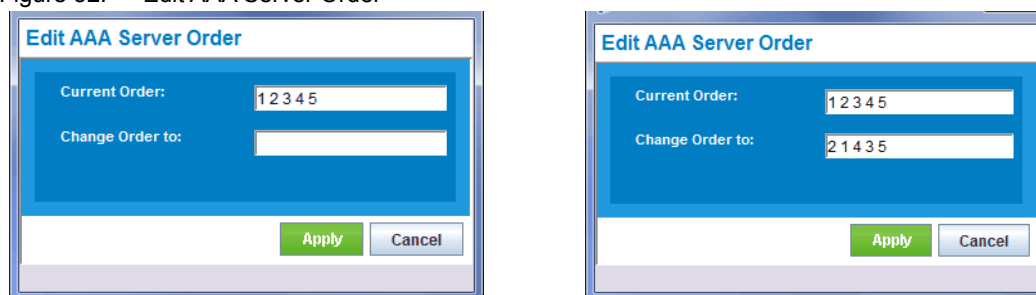
| ☞ **Menu Path** | From the *Element Manager* tabs, select **Configuration** -> **User Authentication-> Servers**; click the **Set Order** button**.** |
|---|---|

Figure 32.    Edit AAA Server Order



**Current AAA Server**                                          **Modifying the AAA Order**

1.  At the **Edit AAA Server Order** dialog, in the **Change Order to:** field, type the new sequence.

2.  Click **Apply** to save and load this setting. The new server order will be displayed in the **Order** column of the Server tab screen.

Table 29.    User Authentication - Servers - Edit AAA Server Order Fields.

| Field | Description |
|---|---|
| Current Order | Displays the current AAA server order. The default server order is the order in which the AAA servers were added to the list. This field is read-only. |
| Change Order To | The new server order to use.<br>• Separate each number with one space.<br>• The same number of servers must be entered that are listed in the current order field. For example, if there are 5 servers listed in the Current Order field, changing the order to 1 2 4 3 would be invalid; changing the order to 1 2 4 3 5 is valid. |

### Deleting an AAA Server

AAA servers must be deleted in descending order. For example, if there are four servers in the order of 1, 2, 3, 4, the order in which the servers must be deleted is 4 3 2 1. Prior to attempting deletion of a server whose order is not last, reorder the servers to change the desired deletion to the last number in that order.

Use the following steps to remove an AAA server from the **User Authentication Servers** tab screen:

1. At the **Servers** tab screen, select the highest numbered AAA server from the **Order** column (see Figure 30, "User Authentication - Servers," on page 57)/

2. Click **Delete**.

3. At the **Delete Configuration** dialog (Figure 3), click **Yes** to remove the specified AAA server.
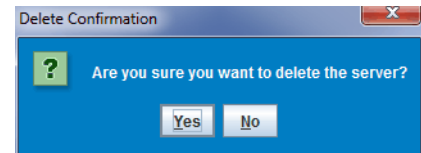
# Messaging System Configuration

The **Configuration -> Messaging System** tab allows you to configure parameters for the BNP to integrate with external messaging systems, insert operator messages directly from the BNP GUI, or configure the BNP to use external text or graphic files as overlay messages. You can also configure the BNP to insert a graphics file (PNG) into one or more programs as a digital logo overlay. To configure these features you must create specific Messaging or Logo Overlay zones under the **Messaging System** tab, which are then associated to desired programs through the **Grooming -> Mapping** tab.

This section describes how to create both Messaging and Logo Overlay zones. See "Show Program List" on page 89 for instructions on how to associate and enable programs to Messaging or Logo Overlay zones.

## About Messaging Zones

Use the **Messaging Zones** tab screen to view a snapshot of all messaging zones. This page also provides a global parameter associated only with EAS messaging for system-wide configuration of audio EAS override during DPI.

The number of messaging zones allowable is dependent on the following conditions at the **Configuration -> Global** tab screen (see Figure 18, "Global tab screen," on page 37, and the EAS Enable CAP description in Table 15):

Table 30.     Global tab screen—Dependencies for Messaging Zones

| Enable EAS CAP option | Description |
| --- | --- |
| unchecked | Up to ten messaging zone, of 400 characters each, can be configured for the BNP. |
| checked | Up to two messaging zones can be configured for the BNP. |
|  | Per FCC requirement, up to 1800 characters are allowed on the EAS messages. However, the BNP Element Manager displays only the first 400 characters: operator messages remain restricted to 400 characters. |

Within each zone, two types can be configured: EAS or Operator and Advanced. A Messaging Zone may be sent either SCTE 18 alerts that are used for **EAS Messaging**, **Operator Messaging** based on operator-defined text, or **Advanced Messaging** created from imported graphics (.PNG) or text files, and advanced text parameters.

> **Note:** *If the EAS text consists of 1800 characters, it might take up to one minute to overlay the EAS message on to video. Therefore, any operator message that was active before receiving the EAS message will stay active (if it was intended to continue for long) until the EAS message is overlaid.*

> **Note:** *The BNP does not process and act upon the received EAS event code (EAN, EAT, NIC, RMT, RWT, NPT). It processes the event based on the "alert remaining time" and priority of the received EAS message.*

## Accessing Messaging Zones

Use the **Message Zones** tab screen to view the current messaging zone configurations and to access messaging zone configuration tools.

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the *BNP Element Manager* tabs, select **Configuration** -> **Messaging System -> Messaging Zones** |

Figure 33.     Configuration -> Messaging System tab (Enable EAS CAP unchecked)



Table 31.     Messaging Zones subtab

| Field | Description |
|---|---|
| Reject EAS audio override during DPI | When checked, the BNP will reject all external SCTE 18 EAS messages with audio override priority for the duration of an ad insertion (text crawling will continue). |
| Zone Index | The sequential index number of the created zone.This field is read-only. Up to ten zones can be added. |
| Zone Type | Displays what type of zone has been created. Choices are: *EAS* or *Operator and Advanced Messaging.* |

Table 31.      Messaging Zones subtab (Continued)

| Field | Description |
|---|---|
| Zone Status (for EAS Messaging Zones) | Read-only: The status of the Messaging Zone. If the zone is an EAS Messaging Zone, possible choices are:<br><br>• *Enable:* EAS Zone is ready for SCTE 18 EAS message.<br>• *Emergency Alert Crawl On:* SCTE 18 EAS alert activated, text crawl is displaying.<br>• *Emergency Alert Audio Override:* SCTE 18 EAS alert activated with Priority 1-14, emergency audio is playing, text crawl will be present.<br>• *Emergency Alert Video Switch:* SCTE 18 EAS alert activated with Priority 15, emergency video is playing. |
| Zone Status (for Operator or Advanced Messaging zones) | Read-only: The status of the Messaging Zone. If the zone is an Operator or Advanced Messaging Zone, possible choices are:<br><br>• *Enable*: Messaging zone is ready to start Operator messaging or Advanced Messaging operations.<br>• *Operator Messaging Loaded:* Operator message is loaded on the BNP and is ready to start the operator message.<br>• *Operator Messaging Text On:* Operator Alert Message is loaded on the BNP and crawl text is displaying in the zone.<br>• *Overlay On*: The Overlay that is loaded in the zone is currently being overlaid onto programs that are part of the zone.<br>• *Advanced Messaging Loaded:* Text or graphic file is loaded on the BNP and ready to play.<br>• *Advanced Messaging On*: Advanced Messaging is loaded on the BNP and imported graphic and/or text crawl is displaying in the zone<br>• *Scheduled:* Operator Messaging or Advanced Messaging has been loaded and scheduled, but currently is not being played. |
| Zone Name | Read-only: The name of the zone. This information is created following addition or modification of a Messaging Zone. |
| UDP | Read-only: The UDP port used to detect an external SCTE 18 EAS server message. This information is the result of adding or modifying a new EAS Messaging Zone. If the zone is Operator or Overlay this field displays "N/A". |

## EAS Messaging Zones

The BNP Digital EAS feature supports the SCTE 18 (2007) "Emergency Alert Messaging for Cable" standard specification for EAS message control and display, which defines the standard for playout of text message crawls and audio during an emergency alert event. Using the 10/100 BaseT management interface, the BNP supports the following SCTE 18 messages:

- EAS text crawl.
- EAS text crawl with audio override.
- Substitute EAS detail channel for the network feed.

The BNP responds to any EAS alert based on the SCTE 18-defined alerts list in Table 32.

Table 32. SCTE 18 Defined Alerts

| Levels/Priorities | BNP Response |
|---|---|
| 1 - 14 | The BNP delivers a text crawl and allows adherence to the SCTE 18 specification to override the audio source on defined channel with text information and encoded audio sources from the EAS system. |
| 15 (highest priority) | The BNP offers user configuration to allow adherence to the SCTE 18 specification to override both video and audio on a detailed channel with the encoded service provided by the EAS system, or to use the same configuration options for Levels 1-14. The BNP will force tune to the detailed channel for H.264 and treat it as a data program |

The BNP communicates with an external EAS management system for messaging zone control information, including interpretation of FIPS (Federal Information Processing Standards) announcements. Additionally, user configurable audio muting and audio override of the network program's audio is supported.

### Configuring a new EAS Messaging Zone

**Note:** *You must be logged in as the Administrator to add, modify, or delete **Messaging Zones** configuration.*

Use the **Add EAS Messaging Zone** screen (Figure 34 and Table 33) to set parameters for a new EAS Messaging Zone.

| | | |
|---|---|---|
| 👉 | **Menu Path** | **Configuration -> Messaging System** tab ->**Messaging Zones** subtab ->right-click at white or blue table rows and select **Add EAS Messaging Zone.** |

Figure 34.    Messaging Zone pop-up window



1.  At the Add **EAS Messaging Zone** screen, provide information in the entry and drop-down fields.Guidelines are provided in the following topics:

    –   Table 33, "Zone Index for EAS Messaging," on page 64.
    –   Table 34, "EAS Video Configuration for EAS Messaging," on page 65.
    –   Table 35, "EAS Zone Control Configuration," on page 65.
    –   Table 36, "EAS Crawl Configuration," on page 66.
    –   Table 37, "EAS Zone Status," on page 66.
    –   Table 38, "EAS Alert Text," on page 66.

2.  Click **Apply** to save and load the new EAS Messaging Zone. The new zone will be displayed in the **Messaging Zones** tab screen.

Table 33.    Zone Index for EAS Messaging

| Field | Description |
| --- | --- |
| Zone Name | Assign a unique name for the zone to be created. This field accepts alphanumeric entries. |
| | Up to ten Messaging Zones may be created; these may be a mix of EAS or Operator and Advanced zones. |

Parameters for EAS Video Configuration (Table 34) define the EAS video source for substitution over the network program due to alert status or audio override option.

Table 34. EAS Video Configuration for EAS Messaging

| Field | Description |
|---|---|
| Port | Select desired GigE or ASI[a] port from the pull down menu on which detailed channel information (transport stream) is received for EAS messaging. |
| IP Address | The IP address of the GigE port. Input a valid multicast IP address on which the detailed channel transport stream is received for EAS messaging. (Not required for ASI ports.) |
| Source IP Address | The IP address of the source from which the GigE port receives data; the source IP address is optional and should only be included for IGMPv3 transport streams. (Not required for ASI ports.) |
| UDP Port | Input a valid UDP port on which the detailed channel transport stream is received for EAS messaging. Valid range is from 1 to 65535. (Not required for ASI ports.) |
| Program Number | Input the program number on which the program information is received for EAS messaging. |
| Audio Override Delay (In Secs) | Specifies the delay of audio splicing of the EAS program by x number of seconds. Range is from 0-255. A setting of 0 specifies no delay. |

a. The applicable ASI port (if selecting) must have been configured as an input port in order to appear in the pull down menu

Table 35. EAS Zone Control Configuration

| Field | Description |
|---|---|
| UDP Port | Input the UDP port which will be used to detect an external SCTE 18 EAS server message. The typical port number used for this is 5050.<br>• SCTE 18 zone specific messaging will vary by UDP port configuration.<br>• A unique UDP port should be configured for each EAS zone. |
| PID | Choice of two hexadecimal values as defined by the SCTE 18 standard. Choose which value corresponds to your server:<br>*0x1FFB* or *0x1FFC* |
| Crawl Only Priority | Sets the threshold at which program audio will be overridden by an external EAS source.<br>• If the SCTE 18 message is less than or equal to the value set here, then audio override will not occur.<br>• If the SCTE 18 message is higher than this level, but lower than priority 15, audio override will occur.<br>• If the SCTE 18 message is priority 15, then all output programs configured to receive EAS messaging are tuned to the emergency channel and the audio and text crawl is overridden.<br>• If priority is set to 0, then no SCTE 18 messages will be set to Crawl Only. |

Table 36.      EAS Crawl Configuration

| Field | Description |
|---|---|
| Crawl Position | Select the location on the end user's TV screen in which the crawl text will appear, as either *Top*, *Middle*, or *Bottom.* The BNP displays crawl positions (in pixels) in accordance with various resolutions: |

| Resolution | Crawl Height | Top | Middle | Bottom |
|---|---|---|---|---|
| 480 SD | 48 | 32 | 208 | 384 |
| 576 SD | 48 | 48 | 256 | 464 |
| 720 HD | 80 | 64 | 320 | 576 |
| 1080 HD | 80 | 96 | 496 | 896 |

| Field | Description |
|---|---|
| Crawl Speed | Select the speed at which text will crawl across the end user's TV screen, as either *Fast, Normal, or Slow*. |
| Crawl Background Color | Select the background color on which the crawl text will be displayed as either *Red, Green, Blue,* or *Black*. |

Table 37.      EAS Zone Status

| Field | Description |
|---|---|
| Start Time | Read-only:. Displays the day, date, and time that the crawl has or will begin. Applies to both external SCTE 18 EAS server and Operator Alert messages. |
| Remaining Time | Read-only:. If a limit was placed on the duration of the alert (either in the Operator-defined *Crawl Duration* field or from the external SCTE 18 EAS server), the time remaining is displayed here. |
| Event Duration | Read-only:. Displays how long the event is to take place. |
| Current Status | Read-only: Displays current status of the EAS Zone, as one of the following:<br><br>• Enable<br><br>• Emergency Alert Crawl On<br><br>• Emergency Alert Audio Override<br><br>• Emergency Alert Video Switch<br><br>See the Zone Status topics in Table 31 for a complete description of these values. |
| Priority | Read only field. This field will display the EAS message priority (1-15). |

Table 38.      EAS Alert Text

| Field | Description |
|---|---|
| Alert Text | Read only field. Displays up to 400 characters of the EAS message alert. |

## Modifying an EAS Messaging Zone

Use the **EAS Messaging Zone** screen (Figure 35) to change parameters associated with a specific zone.
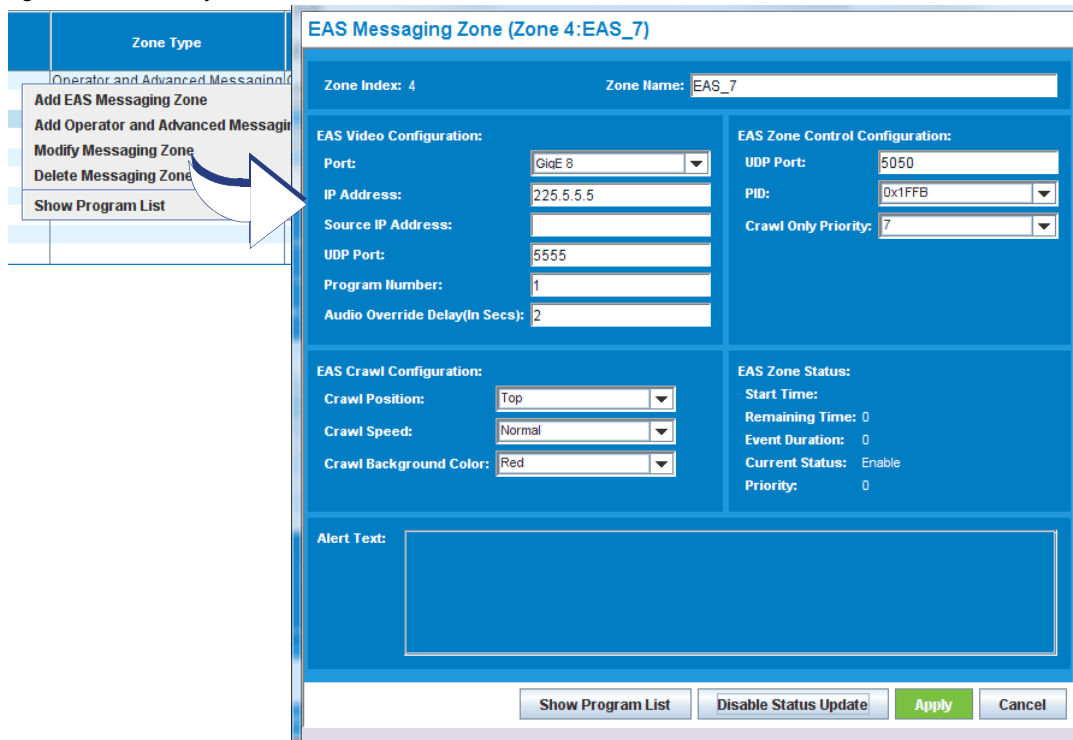
| | |
|---|---|
| 👉 **Menu Path** | **Configuration** -> **Messaging System -> Messaging Zones** ->double-click the EAS messaging zone or right-click EAS on the zone to be modified-> select **Modify Messaging Zone** from the pop-up menu (Figure 34). |

Figure 35.     Modify EAS Zone



1. At the EAS Messaging Zone screen, enter or select information to modify parameters for this zone. Guidelines for entries are provided in the following topics:
    – Table 33, "Zone Index for EAS Messaging," on page 64.
    – Table 34, "EAS Video Configuration for EAS Messaging," on page 65.
    – Table 35, "EAS Zone Control Configuration," on page 65.
    – Table 36, "EAS Crawl Configuration," on page 66.
    – Table 37, "EAS Zone Status," on page 66.
    – Table 38, "EAS Alert Text," on page 66.

    You can use this screen to view the current program list for the zone, and enable to disable status updates.
    – **Show Program List**: Click this button to view the Zone Program List screen, which displays all programs associated with the specified zone.
    – **Disable Status Updates**: Click this button to toggle between disable and enable of real-time polling of the zone status fields and operator-defined text crawls.
2. Click **Apply** to save and apply the settings.

### Deleting an EAS Messaging Zone

The system queries for confirmation to delete a specified zone, as follows:

- If no output transport streams are associated with the selected zone, you will be asked to confirm in the **Delete Messaging Zone** dialog.
- If output transport streams are currently associated with the selected zone, the system will remind you in the **Delete Messaging Zone** dialog.

| | Menu Path | **Configuration -> Messaging System -> Messaging Zones** menu, highlight and right-click on the EAS Messaging Zone you wish to delete. |
|---|---|---|

1. At the **Delete Messaging Zone** dialog, either click **Yes** to delete the zone, or click **No** to abort this action and dismiss the dialog.
2. Confirm that the zone is deleted: it should no longer be displayed at the **Messaging Zones** tab screen.

## Operator and Advanced Messaging Zones

For MPEG-2 programs only, the BNP Messaging System feature supports Operator and Advanced Messaging Zones, which allows the cable operator to generate a text crawl of up to 400 characters in length directly from the BNP *Element Manager* or to specify a text or graphic file as an overlay. Both Operator and Advanced zones can be associated to individual programs.

This capability is only allowed using Administrator login privileges.

**Note:** *An **Advanced Overlay** license must be purchased in order to view or configure an Advanced Messaging Zone. For more information on **Advanced Overlay** licensing, see "Managing Licenses" on page 190.*

**Note:** *SCTE 18 EAS messages take precedence over Operator and Advanced Alert Messages. The latter can not be sent to a program that has an active SCTE 18 message alert. An SCTE 18 message alert sent to a zone will immediately override any current GUI generated alert message playout.*

### Configuring an Operator Messaging Zone

Use the **Add Operator and Advanced Messaging Zone** screen (Figure 36 and Table 39) to set parameters for an operator messaging zone.

**Note:** *You must be logged in as the Administrator to add, modify, or delete **Messaging Zone** configuration.*

| | Menu Path | **Configuration -> Messaging System** ->**Messaging Zones** ->Right-click anywhere on the white or light blue rows for popup menu -> select **Add Operator and Advanced Messaging Zone**. |
|---|---|---|

Figure 36.     Add Operator and Advanced Messaging Zone - Operator Messaging tab



1. At the **Add Operator and Advanced Messaging Zone** screen, enter information to define the zone name, crawl configuration, and crawl text, as described in the following topics:

   – Table 39, "Operator Messaging Configuration - Zone Name," on page 69.
   – Table 40, "Operator Messaging Configuration - Crawl Configuration," on page 69.
   – Table 41, "Operator Messaging Configuration - Crawl Text, Duration, Frequency," on page 70.
   – Table 42, "Operator Messaging Configuration - Schedule," on page 70.
   – Table 43, "Operator Messaging Configuration - Zone Status," on page 71.

2. Click **Apply** to save changes and create the messaging zone.

Table 39.     Operator Messaging Configuration - Zone Name

| Field | Description |
|---|---|
| Zone Name | This field is common to both Operator and Advanced tabs. |
| | Up to ten Messaging Zones may be created; these may be a mix of EAS or Operator and Advanced zones. |

Table 40.     Operator Messaging Configuration - Crawl Configuration

| Field | Description |
|---|---|
| Crawl Position | Select the location on the end user's TV screen in which the crawl text will appear. Choices are: |
| | Top, Middle, Bottom. |
| | For details on crawl positioning, see Table 36. |
| Crawl Speed | Select the speed at which text will crawl across the end user's TV screen. Choices are: |
| | *Fast, Normal, Slow*. |

Table 40.     Operator Messaging Configuration - Crawl Configuration

| Field | Description |
|---|---|
| Crawl Background Color | Select the background color on which the crawl text will be displayed. Choices are: <br> *Red, Green, Blue, Black*. |
| Background Transparency Level | Specifies the level of transparency in which the background color will be displayed. At 0%, the background color will be opaque; at 100% there will be no background color. <br> You may type in any value from 0 to 100 or choose a value from the drop-down box as follows: <br> 0% (opaque), 25%, 50%, 75%, and 100% <br> NOTE: This box will not display unless Transparency was enabled in the Global Configuration window. |

Table 41.     Operator Messaging Configuration - Crawl Text, Duration, Frequency

| Field | Description |
|---|---|
| Crawl Text | Input the desired alert message up to 400 alphanumeric characters. |
| Crawl Duration | This section provides the following options for the duration of the text crawl: <br> • *One Cycle*: Plays the full message one time all the way through. <br> • *Play* xxx *Seconds:* Plays the message for the specified number of seconds (with a 5 second or one cycle minimum). Message will play for the duration that is *longest*: Specified value of seconds OR one cycle. <br> • *Continuous:* Continuously plays message until the *Stop Crawl* button is clicked. |
| Frequency | Choose between two options for how often message is played: <br> • *Once*: Plays message once, either for one cycle or specified number of seconds (see above). <br> • *Every*: Select either *30* or *60* to play message every thirty or sixty minutes, either for one cycle or for specified number of seconds (see above) from the moment *Start* is clicked until the moment *Stop* is clicked. |

Table 42.     Operator Messaging Configuration - Schedule

| Field | Description |
|---|---|
| Start | The BNP permits you to start a message immediately or schedule it. <br> • *Now*: Starts play immediately. <br> • *Time*: Allows you to schedule start time. Click on the pulldown arrow to display a popup window (seen in Figure 37, "Advanced Messaging Schedule Window," on page 71) to set start. |
| Stop | • *Forever*: If message is set to play once (see *Frequency*, above) this is the default. <br> • *Time*: When *Frequency* is set to every *30* or *60* minutes, the Scheduler popup is enabled. Click on the pulldown arrow to display (see Figure 37, "Advanced Messaging Schedule Window," on page 71) and set. |

Table 43.        Operator Messaging Configuration - Zone Status

| Field | Description |
|---|---|
| Start Time | Read-only field. Displays the day, date, and time that the crawl has or will begin. |
| Remaining Time | Read-only field. If a limit was placed on the duration of the alert, the time remaining is displayed here. |
| Event Duration | Read-only field. Displays how long the event is to take place. |
| Current Status | This field is read-only and will display one of the following values:<br><br>• *Enable*<br>• *Operator Messaging Loaded*<br>• *Operator Messaging Text On*<br>• *Advanced Messaging Loaded*<br>• Advanced Messaging On<br>• *Scheduled*<br><br>See Table 31 on page 61 for a complete description of these values. |
| Next Start Time | Read-only field. Displays the time that the next round of messaging will begin. |
| Overlay Image | Read-only field. Applicable to *Advanced Messaging* tab. Displays the status of the graphic and/or text overlay. Possible values are:<br><br>• *Complete*: An image or text file has been uploaded to the BNP.<br>• *None*: No image or text file has been uploaded to the BNP. |

## Scheduling Messaging in Advance

Use the following steps at the **Schedule** section of the **Operator Messaging** tab:

1.  Click the **Time** button. The current date and time is now presented in a pull-down selector alongside your selection.

2.  Click anywhere in the **Time** field to present the **Advanced Messaging Schedule Window** (Figure 37).

3.  In the calendar, click the **Month**, **Day**, and **Time** fields to schedule the message.

4.  Press **OK** to dismiss the calendar.

Figure 37.     Advanced Messaging Schedule Window
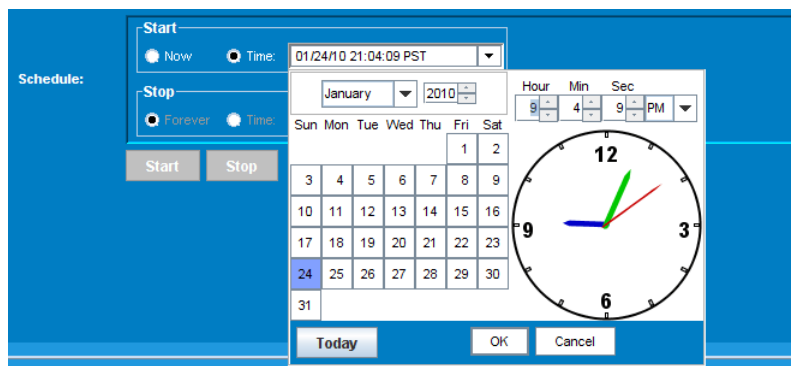
## Modifying an Operator Messaging Zone

Use the **Operator and Advanced Messaging Zone** screen for a specified zone to change parameters for the messaging zone.

| | | |
|---|---|---|
| 👉 | **Menu Path** | **Messaging System -> Messaging Zones ->** double-click the messaging zone or right-click the zone to be modified -> **Modify Messaging Zone** from the pop-up menu (Figure 38, and see also Figure 34, "Messaging Zone pop-up window," on page 64). |

Figure 38.    Modify Operator Messaging Zone

## Configuring an Advanced Messaging Zone

Use the **Add Operator and Advanced Messaging Zone** screen (Figure 39) to set advanced messaging parameters for a specified zone.

**i** **Note:** *You must be logged in as the Administrator to add, modify, or delete **Messaging Zone** configuration.*

**i** **Note:** *An **Advanced Overlay** license must be purchased in order to view or configure an Advanced Messaging Zone. For more information on **Advanced Overlay** licensing, see "Managing Licenses" on page 190.*

| | |
|---|---|
| **Menu Path** | **Configuration -> Messaging System** -> **Messaging Zones** -> Right-click anywhere on the white or blue rows for popup menu -> select **Add Operator and Advanced Messaging Zone**. |

Figure 39.    Add Operator and Advanced Messaging Zone - Advanced Messaging screen



1.  At the **Advanced Messaging** screen, set parameters for zone, crawl, and scheduling. Parameter and button descriptions are provided in the following tables:

    –   Table 44, "Zone Name and Status - Advanced Messaging," on page 74.

    –   Table 45, "Crawl Overlay - Advanced Messaging," on page 75.

    –   Table 46, "Preview, Crawl Resolution, Crawl Duration, and Frequency - Advanced Messaging," on page 76.

    –   Table 47, "Schedule - Advanced Messaging," on page 76.

    –   Table 48, "Advanced Messaging Buttons," on page 77.

**2.** Click **Apply** to save and apply the settings.

Table 44.        Zone Name and Status - Advanced Messaging

| Field | Description |
|---|---|
| Zone Name | This field is common to both Operator and Advanced tabs. |
| | Up to ten Messaging Zones may be created; these may be a mix of EAS, Operator, or Advanced zones. |
| Start Time | Read-only field. Displays the day, date, and time that the crawl has or will begin. |
| Remaining Time | Read-only field. If a limit was placed on the duration of the alert, the time remaining is displayed here. |
| Event Duration | Read-only field. Displays how long the event is to take place. |
| Current Status | This field is read-only and will display one of the following values:<br>• *Enable*<br>• *Operator Messaging Loaded*<br>• *Operator Messaging Text On*<br>• *Advanced Messaging Loaded*<br>• Advanced Messaging On<br>• *Scheduled*<br>See Table 31 on page 61 for a complete description of these values. |
| Next Start Time | Read-only field. Displays the time that the next round of messaging will begin. |
| Overlay Image | Read-only field. Displays the status of the graphic and/or text overlay. Possible values are:<br>• *Complete*: An image or text file has been uploaded to the BNP.<br>• *None*: No image or text file has been uploaded to the BNP. |

Table 45.       Crawl Overlay - Advanced Messaging

| Field | Description |
|-------|-------------|
| Foreground Color | Specifies the foreground color of the imported text file. Click the *Select Color* button to choose which color and color scheme to use. |
| Background Color | Specifies the background color of the imported text file. Click the *Select Color* button to choose which color and color scheme to use. |
| Crawl Position | Select the location on the end user's TV screen in which the imported crawl text or graphic will appear. Choices are: <br> Top, Middle, Bottom. <br> For details on crawl positioning, see Table 36 on page 66. |
| Background Transparency Level[a] | Specifies the level of transparency at which the background color will be displayed for ASCII and Non-Ascii text. At 0%, the background color will be opaque; at 100% there will be no background color[b]. <br> • You may type in any value from 0 to 100 or choose a value from the drop-down box as follows: <br> • 0% (opaque), 25%, 50%, 75%, and 100%. <br> NOTE: This box will not be displayed unless Transparency was enabled in the Global Configuration window. |
| Crawl Speed | Select the speed at which the imported text or graphic will crawl across the end user's TV screen. Choices are: <br> *Fast, Normal, Slow*. |
| Font | Choose the font in which the imported or typed text should be displayed. Click the *Select Font* button to choose font style, size, and attributes. |
| Text | Input the desired alert message up to 400 alphanumeric characters, or use the *Import Text* button to select a text file from the hard drive of the computer on which the *Element Manager* is running. The text file will then be uploaded to the BNP's memory. |
| Graphic | Displays the name of the.PNG file being used for overlay crawl. If no file has been specified, this field will be blank. To select a graphic file as an overlay crawl, click on the *Import Graphic* button and choose a.PNG file from the local computer on which the *Element Manager* is running. The graphic will be uploaded to the BNP's memory when *Apply* is clicked. |
| Foreground Color | Specifies the foreground color of the imported text file. Click the *Select Color* button to choose which color and color scheme to use. |

a. *The Background Transparency Level* setting in the *Advanced Messaging* tab is applicable only to ASCII and Non-ASCII text characters. Background Transparency Level is not applied to graphic overlays within text crawls. Alpha Channel Transparency settings for the graphic overlay, if present in the.PNG file, will be preserved.
b. Please see the latest *Release Notes* for details on the impact of enabling transparency for load time and bandwidth on the BNP.

Table 46.        Preview, Crawl Resolution, Crawl Duration, and Frequency - Advanced Messaging

| Field | Description |
|---|---|
| Preview[a] | Allows you to choose in which order the overlay (if using both text and graphics) will appear. Choose from:<br><br>*Graphic+Text*: Graphic on the left, text on the right<br><br>*Text+Graphic*: Text on the left, graphic on the right<br><br>NOTE: The Background Transparency setting only applies to the text portion (ASCII or Non-ASCII) of the overlay. |
| Crawl Resolution | Allows you to choose at which resolution the overlay will appear. Choose from:<br><br>SD (Wx48): Standard definition, width of overlay by 48 pixels in height.<br><br>HD (Wx80): High definition, width of overlay by 80 pixels in height. |
| Crawl Duration | This section provides the following options for the duration of the text crawl:<br><br>• *One Cycle*: Plays the full message one time all the way through.<br><br>• *Play* xxx *Seconds:* Plays the message for the specified number of seconds (with a 5 second or one cycle minimum). Message will play for the duration that is *longest*: Specified value of seconds OR one cycle.<br><br>• *Continuous:* Continuously plays message until the *Stop Crawl* button is clicked. |
| Frequency | Choose between two options for how often message is played:<br><br>• *Once*: Plays message once, either for one cycle or specified number of seconds (see above).<br><br>• *Every*: Select either *30* or *60* to play message every thirty or sixty minutes, either for one cycle or for specified number of seconds (see above) from the moment *Start* is clicked until the moment *Stop* is clicked. |

a.   When importing a.PNG or.TXT file for the first time, the graphic will appear in the *Preview* box; however, after the graphic has been uploaded to the BNP and the *Advanced Message* tab is closed, the graphic is no longer available for preview, even though it remains stored in the BNP.

Table 47.        Schedule - Advanced Messaging

| Field | Description |
|---|---|
| Start | The BNP permits you to start a message immediately or schedule it.<br><br>• *Now*: Starts play immediately.<br><br>• *Time*: Allows you to schedule start time. Click on the pulldown arrow to display a popup window (seen in Figure 37, "Advanced Messaging Schedule Window," on page 71) to set start. |
| Stop | • *Forever*: If message is set to play once (see *Frequency*, above) this is the default.<br><br>• *Time*: When *Frequency* is set to every *30* or *60* minutes, the Scheduler popup is enabled. Click on the pulldown arrow to display and set (see Figure 37, "Advanced Messaging Schedule Window," on page 71). |

Table 48.       Advanced Messaging Buttons

| Button | Description |
|---|---|
| Show Program List | Clicking this button will open the *Show Program List* window, which displays all programs associated for the specified zone.<br>• This button only appears when modifying a zone, and not when creating a zone. |
| Enable Status Update / Disable Status Update | Clicking this button will enable real-time polling of the Zone Status fields as well as any Operator-defined text crawls.<br>• When the *Enable Status Update* button is clicked and real-time polling enabled, the button will change to *Disable Status Update*. Clicking the *Disable Status Update* button will disable real-time polling.<br>• This button only appears when modifying a zone, and not when creating a zone. |

## Modifying an Advanced Messaging Zone

Use the **Advanced Messaging** screen (Figure 40) to change parameters for a specified zone.

| | |
|---|---|
| **Menu Path** | **Messaging System** -> **Messaging Zones** -> right-click or double-click on the zone name for popup menu -> select **Modify Messaging Zone**. |

Figure 40.　　Modify Advanced Zone screen



1. Use guidelines as described for **Advanced Messaging** configuration (page 73) to set parameters.
2. Click **Apply** to save and apply the changes.

## To Delete an Operator or Advanced Messaging Zone

Use the **Delete Messaging Zone** function to remove a specified zone from the BNP. The system will query for confirmation of the deletion as follows:

- Where no output transport streams are associated with the selected zone, you will be asked to confirm deletion and the zone will be deleted.
- Where output transport streams are associated with the selected zone, the system will apprise you.
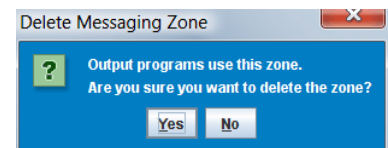


## Operator and Advanced Messaging Zones Best Practices and Considerations

The following guidelines should be used when creating and modifying Operator and Advanced Messaging zones:

1. Only one type of **Messaging Zone** (Operator or Advanced) may be loaded or actively playing as a crawl in each zone.

2. Anytime you wish to make changes to an actively playing or loaded **Messaging Zone**, you must stop the active crawl, make the desired changes, apply the changes to load them onto the BNP's memory, and start or restart the crawl.

3. If you wish to change an actively playing **Messaging Zone** from one type to another (e.g., from an **Operator Message** to an **Advanced Message**), follow these guidelines:

   - Click the **Enable Status Update** button and check the current status of the **Messaging Zone** (see Table 31 on page 61 for a description of status messages).
   - If the current status of either **Operator** or **Advanced Messaging** is *ON*, stop the crawl by clicking **Stop** in the active zone's subtab.
   - Make any changes to the desired subtab (**Operator** or **Advanced**).
   - Click **Apply** to load the new message to the BNP's memory.
   - Click the **Start** button to begin playing the message.
   - If the **Enable Status Update** button has been clicked, the new status will be appear as *[Operator Messaging Text or Advanced Messaging] On* in the **Current Status** field.

4. If you wish to change a loaded but not actively playing **Messaging Zone** from one type to another (e.g., from an **Operator Message** to an **Advanced Message**), follow these guidelines:

   - Ensure the **Enable Status Update** button has been clicked.

> **Note:** *Use caution when opening multiple windows with the **Enable Status Update** option activated as multiple GUI queries can place additional processing load on the BNP.*

   - Confirm the current status of the **Messaging Zone** is **not** *ON* (see Table 31 on page 61 for a description of status messages).
   - Make any changes to the desired subtab (**Operator** or **Advanced**).
   - Click **Apply** to load the new message to the BNP's memory.
   - If the **Enable Status Update** button has been clicked, the new status will be appear as *[Operator or Advanced] Messaging Loaded* in the Current Status field.

## Logo Overlay Zones

In addition to EAS and operator messaging, the BNP Messaging System Logo Overlay option supports inserting graphic overlays into any MPEG-2 program being processed. Graphic overlays are based on importing static graphic Portable Network Graphics (PNG) files. You can preview the imported PNG files before starting the overlay insertion, but once the graphic has been saved and uploaded to the BNP, you can only see the name of the last file uploaded.

The location of the logo insertion is user configurable with positioning anywhere on the display screen defined by (x,y) screen coordinates based on pixels relating to program resolution (e.g., SD and HD). Additionally, the BNP will support alpha channel transparency inherent in the PNG file's creation. Logo overlay files can be created with PNG alpha channels to control transparency effects supported by the BNP during the insertion of the overlay.

### Alpha Channel Transparency

In general, a graphics file consists of three layers, or channels: RGB for red, green, and blue. Another type of channel may be added to a graphics file to allow for the configuration of transparency in the pixels when the RGB colors are merged, or layered, one on top of the other. This is known as an *alpha channel*. Alpha channels define the importance of each pixel in the layering process so that certain portions of the image can either be completely or partially masked. This allows for rectangular-shaped

images to appear as irregular-shaped by controlling the pixel opacity, which is important when overlaying a logo to a TV screen.

PNG files are the most common and advanced file extension for supporting alpha channel transparency. The BNP will support any transparency mask inherent to the alpha channel of a PNG file as long as the **Enable Mask** field is checked in the **Logo Overlay Zone** menu.

**Note:**   *The **Enable Mask** field is only visible when the **Enable Transparency for Overlays** option is checked in the **Configuration -> Global** window.*

Figure 41 shows examples of PNG files in which alpha channel transparency has been configured for 100% background transparency: the left most image demonstrates the view where transparency is not enabled on the BNP, and the right-side example is a view in which transparency is enabled.

Figure 41.     Alpha Channel Transparency Examples



**Alpha channel transparency has been configured in the PNG file but not enabled on the BNP.**

**Alpha channel transparency has been configured in the PNG file and enabled on the BNP.**

## Overlay Zone Configuration

Use the **Logo Overlay Zones** screen (Figure 42) to view all currently configured overlay zones, and to access functions for management of the zones.

**Note:**   *An **Advanced Overlay** license must be purchased in order to view or configure a Logo Overlay Zone. For more information on **Advanced Overlay** licensing, see "Managing Licenses" on page 190.*

**Note:**   *SCTE 18 EAS alerts (highest priority) and Operator and Advanced Alert messages (second priority) take precedence over Logo Overlays. A Logo Overlay can not be sent to a program that has an active SCTE 18 message or Operator and Advanced Messaging alert. An SCTE 18 message alert sent to a zone will immediately override any current GUI generated alert message playout.*

| 👉 **Menu Path** | **Configuration** tab **-> Messaging System** tab, **-> Logo Overlay Zones** subtab. |
| --- | --- |

Figure 42.　　Configuration -> Logo Overlay Zones tab
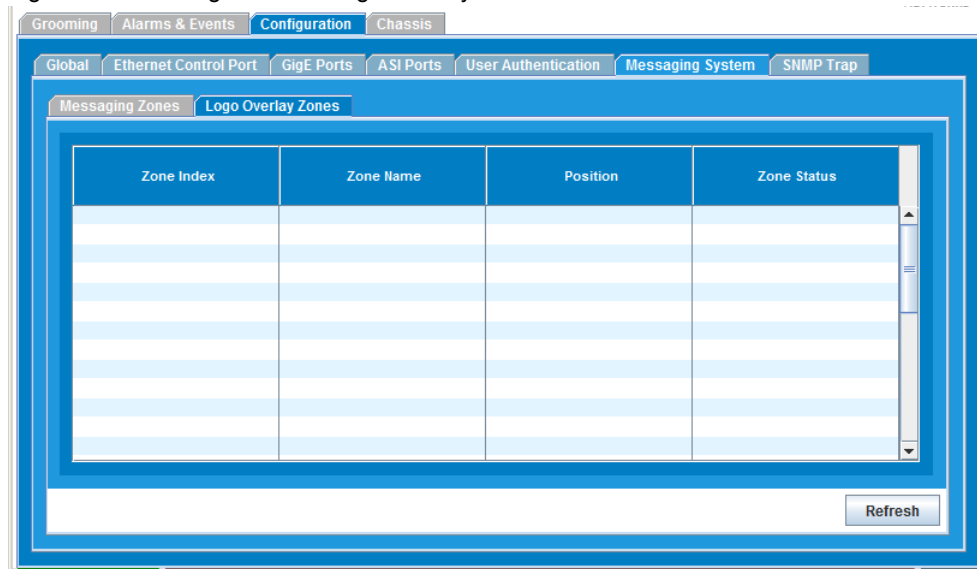


Table 49.　　Logo Overlay Zones screen

| Table Column | Description |
|---|---|
| Zone Index | The sequential index number of the created zone.This field is read-only. Up to 32 zones can be added. |
| Zone Name | The name of the zone. This field is read-only and is created when adding or modifying a new Messaging Zone. |
| Position | Displays the X,Y position (in multiples of 16 pixels) of the logo placement and whether the X axis is from the Left or Right (L or R) and the Y axis is from Top or Bottom (T or B). |
| Zone Status | The status of the Logo Overlay Zone. This field is read-only. Possible choices are:<br>• *Enable*: Logo Overlay zone is ready to start Logo Overlays.<br>• *Logo Loaded:* Logo is loaded on the BNP and is ready to start overlay.<br>• *Logo On:* Logo is loaded on the BNP and is currently displaying in the zone.<br>• *Scheduled:* Logo has been loaded and scheduled, but currently is not being displayed. |

### Recommendations for Logo TV Screen Positioning

To simplify logo positioning for both SD and HD programs, the TV screen of either SD or HD has been divided into four quadrants with the X,Y coordinates positioned relative to each corner:

- On the X axis, the screen has been divided into left and right from 0 to 960 pixels (based on half the width of a typical HD 1920 pixel screen).
- On the Y axis, the screen has been divided into top and bottom from 0 to 540 pixels (based on half the height of a typical HD 1080i screen).

In this manner a static overlay graphic may be accurately positioned regardless of SD or HD as long as the X, Y coordinates for an SD program do not exceed an SD's resolution. *In order to ensure accurate positioning, it is recommended that the X, Y coordinates be kept to a relatively low number.*

Figure 43 shows an example of Logo Overlay positioning for an HD program (top graphic) and an SD program (bottom graphic). The X, Y coordinates for the green logo boxes have been set to relatively low numbers (x=64, y=64) so as to remain positioned closer to the corners of the TV screen for both HD and SD resolutions. The X, Y coordinates for the blue logo have been set to high numbers (x=900, y=500). As such, while the logo for an HD resolution of 1920 x 1080i is positioned in the center of the screen, the X, Y values are too large for the blue logo to be placed within the bounds of an SD screen at 720 x 480i resolution.

Figure 43.    Logo Overlay Positioning
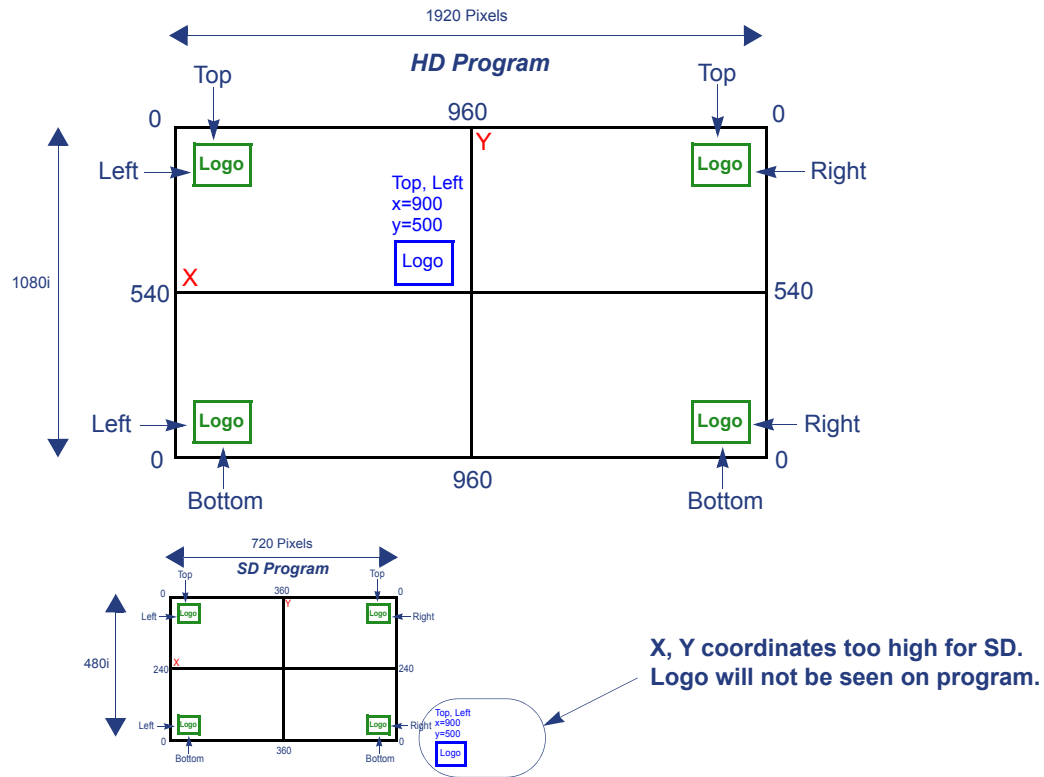


## Configuring a Logo Overlay Zone

Use the **Add Logo Overlay Zone** screen (Figure 44) to set parameters for a specific logo and use of the logo in a zone.

> **Note:**  *You must be logged in as the Administrator to add, modify, or delete **Logo Overlay Zone** configuration.*

| | |
|---|---|
| **Menu Path** | **Configuration** tab**-> Messaging System** tab -> right-click on white or blue row for popup menu -> select **Add Logo Overlay Zone**. |

Figure 44.    Logo Overlay Zone screen



1.  At the **Add Logo Overlay Zone** screen, enter information to supply zone and logo information. Parameter and button descriptions are provided in the following tables:

    – Table 50, "Zone Index and Name - Zone Overlay," on page 84.
    – Table 51, "Logo Configuration - Zone Overlay," on page 84.
    – Table 52, "Zone Status - Zone Overlay," on page 85.
    – Table 53, "Logo Import - Zone Overlay," on page 85.
    – Table 54, "Crawl, Frequency, Scheduling - Zone Overlay," on page 86.
    – Table 55, "Buttons - Zone Overlay," on page 86.

2.  Click **Apply** to save and apply your settings.

Table 50.     Zone Index and Name - Zone Overlay

| Field | Description |
|-------|-------------|
| Zone Index | The sequential index number of the created zone.This field is read-only. Up to 32 zones can be added. |
| Zone Name | The name of the zone. This field is read-only and is created when adding or modifying a new Messaging Zone. |

Table 51.     Logo Configuration - Zone Overlay

| Field | Description |
|-------|-------------|
| X Position (0 to 960) (Multiple of 16 pixels) | Enter the pixel number (in multiples of 16) where the logo will begin for the X position (horizontal) of either the left or right quadrants of the TV screen. |
| *(X Position)* From Left | Click this button if the logo's X position is to start from the left quadrant of either the top or bottom quadrant. |
|  | For example, if the X position were set to 32 and the *From Left* button selected, the logo's left most edge would start 32 pixels from the left quadrant of either the top or bottom quadrant (whichever is selected). |
| *(X Position)* From Right | Click this button if the logo's X position is to start from the right quadrant of either the top or bottom quadrant. |
|  | For example, if the X position were set to 32 and the From Right button selected, the logo's right most edge would start 32 pixels from the right quadrant of either the top or bottom quadrant (whichever is selected). |
| Y Position (0 to 540) (Multiple of 16 pixels) | Enter the pixel number (in multiples of 16) where the logo will begin for the Y position (vertical) of either the top or bottom quadrants of the TV screen. |
| (Y Position) From Top | Click this button if the logo's Y position is to start from the top quadrant of either the left or right quadrants. |
|  | For example, if the Y position were set to 32 and the From Top button selected, the logo's top most edge would start 32 pixels from the top quadrant of either the left or right quadrants (whichever is selected). |
| (Y Position) From Bottom | Click this button if the logo's Y position is to start from the bottom quadrant of either the left or right quadrants. |
|  | For example, if the Y position were set to 32 and the From Bottom button selected, the logo's bottom most edge would start 32 pixels from the bottom quadrant of either the left or right quadrants (whichever is selected). |
| Enable Mask | Check this box if the BNP is to display and support alpha channel transparency configurations inherent to the imported graphic. For more information, see "Alpha Channel Transparency" on page 79. |

Table 52.    Zone Status - Zone Overlay

| Field | Description |
|---|---|
| Start Time | Read-only field. Displays the day, date, and time that the crawl has or will begin. |
| Remaining Time | Read-only field. If a limit was placed on the duration of the alert, the time remaining (in a running-down counter) is displayed here. |
| Event Duration | Read-only field. Displays how long the event is to take place. |
| Current Status | This field is read-only and will display one of the following values:<br>• Enable<br>• *Logo Loaded*<br>• *Logo On*<br>• Scheduled<br>See Table 49 for a complete description of these values. |
| Next Start Time | Read-only field. Displays the time that the next round of messaging will begin. |

Table 53.    Logo Import - Zone Overlay

| Field | Description |
|---|---|
| Logo Image | Displays the location and name of the imported graphic that has been uploaded to the BNP. |
| Import Graphic... | Click this button to select a PNG file from the local computer on which the *Element Manager* is running. |
| Logo Render Preview (Max logo image size is 256x176 pixels) | When uploading a new graphic to the BNP, it will be displayed here. After the logo has been uploaded (i.e., *Apply* has been clicked), and the *Logo Overlay* window is closed, the graphic will not be displayed again, however, the file name will still be displayed in the *Logo Image* field. |

Table 54.        Crawl, Frequency, Scheduling - Zone Overlay

| Field | Description |
|---|---|
| Crawl Duration | This section provides the following options for the duration of the text crawl:<br><br>• *Play* xxx *Seconds:* Displays the graphic for the specified number of seconds (with a 5 second or one cycle minimum). Logo will display for the duration that is *longest*: specified value of seconds OR one cycle.<br><br>• *Continuous:* Continuously displays logo until the *Stop* button is clicked. |
| Crawl Frequency | Choose between two options for how often message is played:<br><br>• *Once*: Displays graphic once or for specified number of seconds (see above).<br><br>• *Every*: Select either *30* or *60* to display graphic every thirty or sixty minutes, either for one cycle or for specified number of seconds (see above) from the moment *Start* is clicked until the moment *Stop* is clicked. |
| Schedule - Start (button) | The BNP permits you to start a message immediately or schedule it.<br><br>• *Now*: Starts play immediately.<br><br>• *Time*: Allows you to schedule start time. Click on pulldown arrow to display a popup window (seen in Figure 37, "Advanced Messaging Schedule Window," on page 71) to set start. |
| Schedule - Stop (button) | • *Forever*: If message is set to play once (see *Frequency*, above) this is the default.<br><br>• *Time*: When *Frequency* is set to every *30* or *60* minutes, the Scheduler popup is enabled. Click on the pulldown arrow to display (seen in Figure 37, "Advanced Messaging Schedule Window," on page 71) and set. |

Table 55. Buttons - Zone Overlay

| Field | Description |
|---|---|
| Show Program List | Clicking this button will open the *Show Program List* window, which displays all programs associated for the specified zone.<br><br>• This button only appears when modifying a zone, and not when creating a zone. |
| Enable Status Update/ Disable Status Update | Clicking this button will enable real-time polling of the Logo Overlay Zone Status fields.<br><br>• When the *Enable Status Update* button is clicked and real-time polling enabled, the button will change to *Disable Status Update*. Clicking the *Disable Status Update* button will disable real-time polling.<br><br>• This button only appears when modifying a zone, and not when creating a zone. |

## Modifying a Logo Overlay Zone

Use the **Zone Overlay Zone** screen (Figure 45)—for a specified zone—to modify parameters for the logo overlay.

> **Note:** *If a Logo Overlay is currently On (click the **Enable Status Update** button to see real time status updates of the zone), stop the overlay first before modifying desired parameters.*

| ☞ **Menu Path** | **Messaging System** tab **-> Logo Overlay Zones** subtab -> double-click the zone or right-click the zone for popup menu -> select **Modify Logo Overlay Zone**. |
| --- | --- |

Figure 45.     Modify Logo Overlay Zone window



1.  Use guidelines from the following references to modify fields in the Zone Overlay:

    –   Table 50, "Zone Index and Name - Zone Overlay," on page 84.
    –   Table 51, "Logo Configuration - Zone Overlay," on page 84.
    –   Table 52, "Zone Status - Zone Overlay," on page 85.
    –   Table 53, "Logo Import - Zone Overlay," on page 85.
    –   Table 54, "Crawl, Frequency, Scheduling - Zone Overlay," on page 86.

– Table 55, "Buttons - Zone Overlay," on page 86.

2. Click **Apply** to save and upload new changes to the overlay zone.

## Deleting a Logo Overly Zone

1. From the **Configuration -> Messaging System -> Logo Overlay Zones** menu, highlight and right-click on the Logo Overlay Zone you wish to delete.

2. Select **Delete Logo Overlay Zone** from the pop-up menu (Figure 44, "Logo Overlay Zone screen," on page 83).

   – If no output transport streams are associated with the selected zone, you will be asked to confirm deletion of the zone and the zone will be deleted.

   – If output transport streams are associated with the selected zone, the **Delete Messaging Zone** dialog will query for confirmation of the deletion.

3. Click **Yes** to delete the zone and its association to any programs.
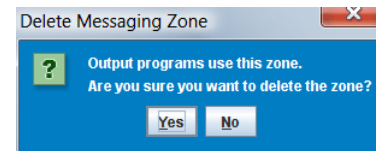
# Messaging System Zone Priority

At any given time there can be only one Messaging System zone active for a particular program, even though each type of zone (EAS, Operator and Advanced, or Logo Overlay) can be enabled or associated to a particular program at the same time. If all associated zones have been activated, the priority of message playout is as follows:

1. **EAS Messaging** - will always override any Operator-defined crawl or Logo Overlay for the duration of EAS playout.

2. **Operator and Advanced Messaging** - will override an active Logo Overlay for the duration of playout. If playout is continuous and Logo Overlay is also active, then no Logo Overlay will be seen.

3. **Logo Overlay** - no override.

As an example, let us assume that a program playing on Channel 2 has all three zones configured with EAS, Operator and Advanced, and Logo Overlay zones, with a scheduled **Operator Messaging** text crawl scheduled to playout one cycle every hour and a continuously active **Logo Overlay**. During the time that the Operator Messaging crawl is scheduled to play, the Logo Overlay will not be present, however, when the crawl has finished its cycle the Logo Overlay will return. If, at any time, an EAS message is generated, both the Operator crawl and the Logo Overlay (after the crawl has finished) will be overridden until the EAS messaged has completed its cycle.

# Show Program List

Within each Messaging System zone you can view which active programs have been configured and enabled for messaging services.

## Programs Configured for Messaging Services

When a program is groomed from an input source to an output transport stream, you can specify which **Messaging System Settings** are configured (or associated) on a per program basis. A program can be associated with any or all three Messaging zone types (EAS, Operator and Advanced, and Logo Overlay). For more information on associating programs for Messaging Zones, see "Managing Output Transport Streams" on page 113.

## Managing Program Activity for Messaging Service Zones

An output program may join or leave a Messaging Service zone at any time. The changes take effect the next time a message event starts. Once a program has been associated with a Messaging Service zone, the program can then be enabled or disabled for the specified zone either from the **Grooming -> Mapping** screen (see "Managing Output Transport Streams" on page 113) or through the **Show Program List** screen.

The **Show Program List** screen (Figure 46) displays all output programs across all transport streams on all ports (GigE and ASI) that are currently enabled for the selected zone. You can use this screen to enable or disable Messaging Service operation for one or all programs in a zone.

Use any of the following methods to access the **Zone Program List**:

| | |
|---|---|
| 👉 **Menu Path** | **Configuration** tab **-> Messaging System** tab -> **Messaging Zones** screen -> right-click in the zone's row for popup menu --> select **Show Program List** (Figure 46).<br><br>OR<br><br>**Configuration** tab **-> Messaging System** tab -> **Logo Overlay Zones** screen -> right-click in the zone's row for popup menu -> select **Show Program List.**<br><br>OR<br><br>From the **Modify Messaging Zone** screen -> click the **Show Program List** button.<br><br>OR<br><br>From the **Modify Logo Overlay Zone** screen - > click the **Show Program List** button. |

Figure 46.    Show Program List
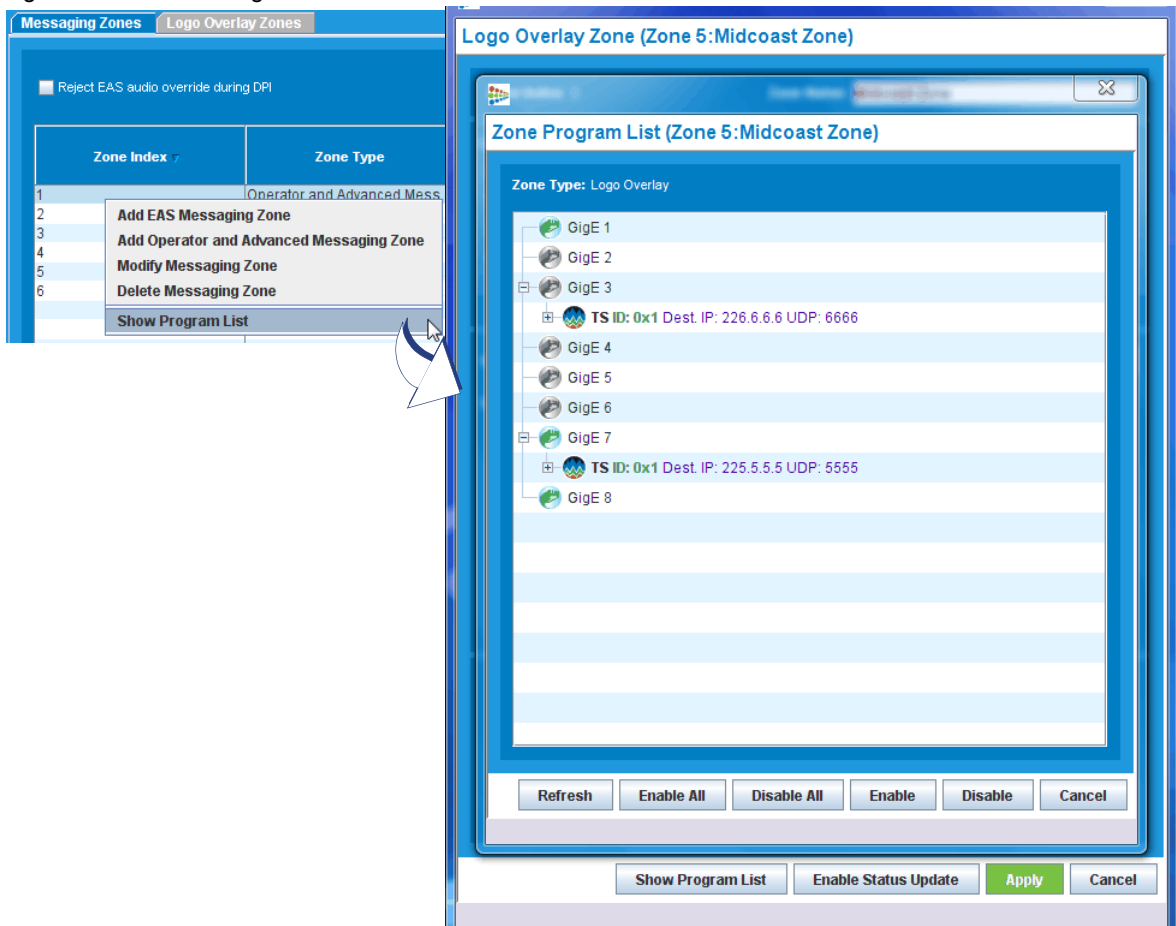


To view the specific programs and whether or not they are enabled for Messaging Services, click the + icon alongside a listed transport stream.

## Enabling or Disabling Specific Programs for Messaging

At the **Zone Program List** screen, use either the popup menu or screen buttons to enable or disable a specific program for messaging.

- .To use the popup menu, highlight, then right-click on a program and select **Enable** or **Disable.**
- To use screen buttons, click the **Enable** or **Disable** button at the bottom of the **Zone Program List** screen.
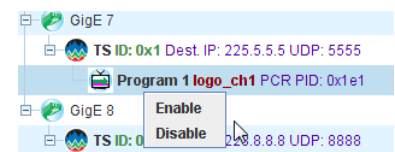


## Enabling or Disabling All Configured Programs for Messaging

At the **Zone Program List** screen, click the **Enable All** or **Disable All** button at the bottom of the screen.

## Viewing Messaging Status

At the **Zone Program List** screen, look for the following icons to view which programs under a specific transport stream are either configured only, or configured and enabled for messaging (Figure 47):

• An icon with a dark brown line under the green arrow is configured *but not* enabled for messaging.

• An icon with a pink line under the green arrow is configured *and* enabled for messaging.

Figure 47.    Messaging Zone Icons
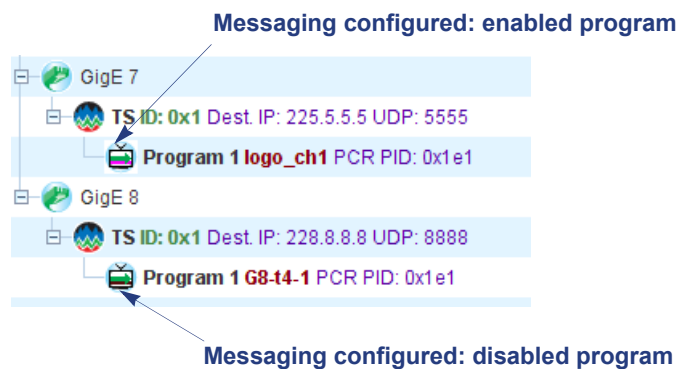


## Refreshing a Program List

Click the **Refresh** button from the bottom bar of the **Zone Program List** to update the view.

## Quick-View Program Status via Scroll-over

At the **Zone Program List** screen, point your cursor on a program name and hover. A popup view of the current status of the program will be displayed.
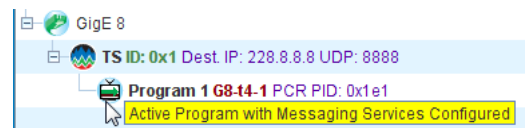


## Creating Messaging Zone Transport Streams and Output Programs

To create a transport stream or output program to use a Messaging Zone, see "Managing Output Transport Streams" on page 113 and "Creating Programs" on page 130.

# SNMP Trap Agent Configuration

You can use SNMP to monitor and control network devices as well as manage configurations and collect statistics. Use either an in-band or an out-of-band IP interface to manage the system with SNMP. At the BNP, you can configure from one to eight trap addresses; each of which will issue event notifications to the network management status. You can change this SNMP information at any time.

## To Configure SNMP for System Management with SNMP

1. Assign an IP address to an in-band Ethernet port.
2. Set the destination IP address to which the traps are forwarded by the system agent.

Use the **SNMP Trap** screen (Figure 48) to set up to eight IP addresses for SNMP traps.

| | **Menu Path** | **Configuration** tab -> **SNMP Trap** screen. |
|---|---|---|

Figure 48.　　SNMP configuration window.

CHAPTER 5

# System Redundancy

Use guidelines in this chapter to set up a pair of BNP systems for redundant operations. To find out how to clear a redundancy, see "Removing Chassis Redundancy" on page 198.

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

## In This Chapter:

- "Overview," next.
- "Basic BNP Redundancy Configuration" on page 96.
- "Forcing Redundancy" on page 98.
- "Synchronizing Redundant BNP Systems" on page 98
- "Configuring GigE Ports for Heartbeat Detection" on page 98.

## Overview

A redundant BNP configuration consists of two BNP systems; one BNP operates as the active system, and the other BNP serves as the standby system. During normal operations, each listens for the heartbeat of the other to ensure that the partner system is alive and operational. Upon detection of no heartbeat, the standby system takes over operations until the previously active system is ready to resume operations.

Heartbeats are detected primarily over the IP network as a result of your configuration that establishes connectivity through the active and standby management ports (as described in "Basic BNP Redundancy Configuration" on page 96).

If the network connection to the 10/100 control port on the active chassis fails, both chassis will have the same output. Because this can be confusing to the network, and to ensure continuous healthy operations, Imagine Communications recommends that you also set up a direct connection between the active and standby GigE 8 ports, as described in "Configuring GigE Ports for Heartbeat Detection" on page 98.

### Before You Begin

Prior to setting parameters for 1:1 BNP system redundancy, please review the caveats provided in the following topics:

- "Conditions and Restrictions," next.
- "1:1 Redundancy Best Practices and Considerations" on page 94.

## Conditions and Restrictions

1. Software Version:
   Ensure that the BNPs to be configured for 1:1 redundancy are running the identical BNP software version.

2. IP Addresses:
   Because you will be setting the Virtual IP address for the GigE ports, the 10/100BaseT management port, or the 10/100BaseT DVB-CA port (on a BNP 3xr), you must first have valid physical IP addresses for these ports.

3. Virtual IP address:
   Both active and standby chassis must have the same virtual IP address: one VIP for the 10/100 management port and one VIP for the DVB-CA port (ETH 2 on the BNP 3xr).
   An ad or video server should only send ads or video streams to the virtual IP addresses.

4. Virtual gateway (optional):
   Both active and standby chassis must have the identical virtual gateway address for the 10/100 management port. The same rule applies if configuring the virtual gateway for ETH 2.

5. GigE ports:
   Currently, the BNP does not support the Gigabit Ethernet input port level redundancy. The 1:1 chassis level redundancy will cover Gigabit Ethernet input port failure events (such as disconnection of the Gigabit Ethernet cable, or loss of the Gigabit Ethernet link).
   When a Gigabit Ethernet port delivers only one program and the program is missing for over 2 seconds, the 1:1 chassis failover is used, instead of standby program failover.

**Note:** *For hot-standby 1:1 chassis redundancy configured with virtual IP failover, unicast inputs cannot be received by both the active BNP and the standby BNP simultaneously. This means that unicast stream failover will not be immediate and the standby unit will need to initiate new unicast sessions, which will not allow an immediate failover condition for those streams. As an alternative, two BNP units without virtual IP coordination could be configured with identical streams routed to both units running in parallel with the standby unit output muted.*

## 1:1 Redundancy Best Practices and Considerations

The following information must be considered when working with 1:1 chassis-level redundancy:

- The configuration of the standby chassis is not available from the *BNP Element Manager* while the unit is a standby unit.
- Because the virtual subnet mask is not configurable, the virtual IP address must be on the same subnet as the physical chassis IP addresses.
- Any changes to the virtual IP address requires a reboot of the active chassis.

# Redundancy Management

Use the **Global** tab screen (Figure 49) to view and configure parameters applicable to the BNP system redundancy.

| | **Menu Path** | Access via *BNP Element Manager* **Configuration tab -> Global** tab screen. |
|---|---|---|

This chapter focuses primarily on use of the **Redundancy** portion (lower half) of this screen. The parameters are described in Table 56.

After you complete the "Basic BNP Redundancy Configuration" on page 96, you can also use this screen to switch the roles of the current active and standby BNPs, by clicking the **Redundancy Switch** button (see also "Forcing Redundancy" on page 98).

Figure 49.    Global tab screen



Table 56.    Chassis Redundancy Parameters

| Field | Description/Values |
|---|---|
| Chassis Active Status | Read-only field that displays the current role of this chassis, as either *Primary* or *Standby*. |
| Redundancy Switch (button) | Toggle the Primary and Standby BNPs in a redundant configuration. |
| IP Address for 10/100 | Enter the IP address of the 10/100 port at the partner system:<br>• In the *BNP Element Manager* GUI for the Active chassis, enter the IP address of the Standby chassis.<br>• In the *BNP Element Manager* GUI for the Standby chassis, enter the IP address of the Active chassis. |
| IP Address for GigE 8 (Optional) | Enter the IP address of the GigE 8 port, if used, to pass redundancy information.<br>This port is essential to the configuration described in "Configuring GigE Ports for Heartbeat Detection" on page 98. |

# Basic BNP Redundancy Configuration

The configuration steps in this section establish an active and a standby BNP, and ensure that the two systems can listen to each other via their respective management ports.

Use steps in this section to first configure the standby BNP, then configure the active BNP, as described in the following topics:

- "Step 1 (of 2)—Configure the Standby BNP Chassis," next.
- "Step 2 (of 2)—Configure the Active BNP Chassis" on page 97.

Web Browser

Virtual IP

Mgmt IP of Active

| Eth0    10/100 |
| **BNP - Active** |
| GigE 1 |
| GigE 2 |
| GigE 3 |
| GigE 4 |
| GigE 5 |
| GigE 6 |
| GigE 7 |
| **GigE 8** |

Mgmt IP of Standby

| Eth0    10/100 |
| **BNP - Standby** |
| GigE 1 |
| GigE 2 |
| GigE 3 |
| GigE 4 |
| GigE 5 |
| GigE 6 |
| GigE 7 |
| **GigE 8** |
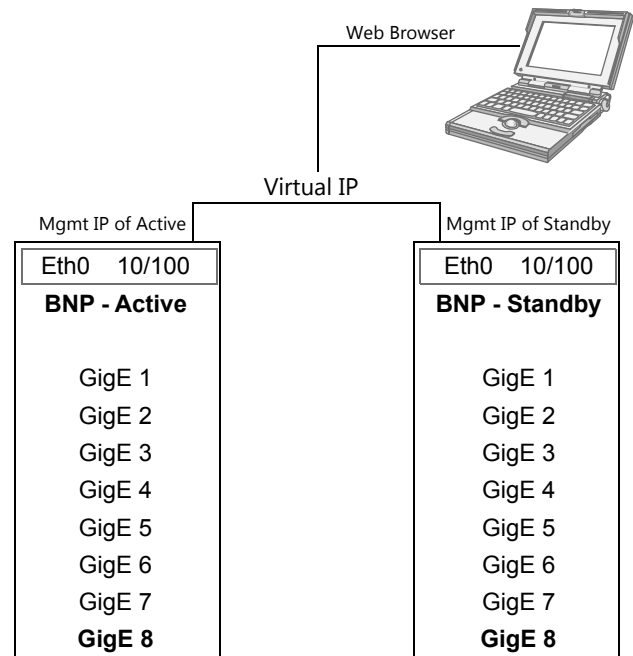
## Step 1 (of 2)—Configure the Standby *BNP* Chassis

Complete steps 1 through 8 of this standby chassis configuration, before attempting to configure the active chassis for the redundant pairing.

1. Log in to the *Element Manager* of the standby chassis as described in "Log in and Access the BNP Element Manager" on page 25.

2. If you have not already done so, go to the **Configuration -> Ethernet Control Port** tab screen, and change the IP Configuration, IP Address, Subnet Mask, and Gateway fields for Ethernet Port 1 and Ethernet Port 2 of this standby chassis to the appropriate parameters for your network. See "Ethernet Control Port Configuration" on page 43 for more information.

   Modification to any of these parameters requires a system reboot. The system will prompt for the reboot after you click **Apply Configuration**.

   You will need to re-launch the *BNP Element Manager* and log in again to this standby following this reboot.

3. From the *BNP Element Manager* of the standby chassis, go to the **Configuration -> Global** tab screen and enter data into the following fields:

   - Redundant Chassis Configuration:
     **IP Address for 10/100**: Type the IP address of the active BNP Ethernet control port.
   - Virtual IP Address Configuration:
     - **IP Address for 10/100**: Type the IP address of the 10/100 port to be shared by both the active and standby chassis.
     - **IP Address for ETH2**: Type the IP address of the Ethernet 2 port that is to be share by both the active and standby chassis, for the DVB-CA management port (BNP 3xr only).
     - **Gateway for 10/100**: Type the IP address of the gateway to be used by both active and standby chassis.

- **Gateway for ETH2**: Type the IP address to be shared by both the active and standby chassis.

4. At the **Global** tab screen, click **Apply Configuration**.

5. Wait two minutes for the configuration to be saved. During this time, a change will occur to the BNP GUI status bar: Look for the addition of an indicator showing *Active* and *Standby* BNP IP addresses.

6. From the *BNP Element Manager* main menu, go to **<u>M</u>aintenance** (**Alt m**)--> **License Manager** to display the **License Manager** screen.

   - At the **License Manager** screen, confirm there are no entries in any of the License Key fields. See "Managing Licenses" on page 190 for more information.

   - If you see entries in any of these fields, please contact Imagine Communications Customer Support for assistance on how to remove the license keys.

7. From *BNP Element Manager* main menu, go to **<u>M</u>aintenance** (**Alt m**)**-> Shutdown** to shut down this BNP and exit the GUI.

8. Physically remove power from the standby chassis.


## Step 2 (of 2)—Configure the Active BNP Chassis

Complete all steps in this section only after completing the steps provided in "Step 1 (of 2)—Configure the Standby BNP Chassis" on page 96.

1. Log in to *Element Manager* of the active chassis, as described in "Log in and Access the BNP Element Manager" on page 25.

2. From the *BNP Element Manager* of the active chassis, go to the **Configuration -> Global** tab and enter data into the following fields:

   – Redundant Chassis Configuration:
   **IP Address for 10/100**: Type the IP address of the standby BNP Ethernet control port.

   – Virtual IP Address Configuration:

     - **IP Address for 10/100**: Type the IP address of the 10/100 port to be shared by both the active and standby chassis.

     - **IP Address for ETH2**: Type the IP address of the Ethernet 2 port that is to be shared by both the active and standby chassis, for the DVB-CA management port (BNP 3xr only)

     - **Gateway for 10/100**: Type the IP address of the gateway to be used by both active and standby chassis.

     - **Gateway for ETH2**: Type the IP address to be shared by both the active and standby chassis.

3. At the **Global** tab screen, click **Apply Configuration**.

4. From the *BNP Element Manager* main menu, go to **<u>M</u>aintenance** (**Alt m**)--> **License Manager** to display the **License Manager** screen.

   Check the **License Manager** to ensure that this active chassis has a license key.

5. Physically remove power from this active chassis.

6. Apply power to this active chassis and wait for it to fully boot up.

7. Apply power to the standby chassis.

# Forcing Redundancy

⚠ **Caution:** *Care is needed when selecting this action: forcing a redundancy change will temporarily (and briefly) interrupt services during the failover process.*

To force the current redundancy configuration to change (the secondary will become the active, or vice versa), click the **Redundancy Switch button** from the **Configuration -> Global** tab.

# Synchronizing Redundant BNP Systems

Use steps in this section to force an NTP server sync in a 1:1 redundancy configuration.

Perform the following tasks at both the active and the standby BNPs.

1.  Log in to the standby chassis, using the physical IP address of the standby BNP.
2.  At the *BNP Element Manager*, go to **Configuration** tab **-> Global** tab screen, and click the **Force Sync** button. The system now queries for confirmation.
3.  At the **Force Sync** confirmation dialog, click **Yes**. The system now queries for administrative password.
4.  At the **Password Verification** dialog type the Administrator password, then click **OK**.The system now queries for confirmation to reboot this BNP.
5.  At the The **Reboot** confirmation window, click **Yes**.
6.  Allow the standby BNP to reboot and return to its available backup status.
7.  Log in to the active BNP, using its Virtual IP address.
8.  From *BNP Element Manager*, go to **Configuration** tab **-> Global** tab screen, and click the **Redundancy Switch** button. The standby chassis now becomes the active chassis.
9.  Log in to the new standby BNP (formerly, the active chassis) via its physical IP address.
10. At the **Force Sync** confirmation dialog, click **Yes**. The system now queries for administrative password.
11. At the **Password Verification** dialog type the Administrator password, then click **OK**.

    The system now queries for confirmation to reboot this BNP.
12. At the The **Reboot** confirmation window, click **Yes**.
13. Allow the new standby BNP to reboot and return to its available backup status.

# Configuring GigE Ports for Heartbeat Detection

In this configuration, each BNP is configured at the global level to disable auto-negotiation, and at the port level to recognize the partner management IP and GigE 8 port IP address. Additionally, the virtual IP address setting for GigE 8 ports must be blank (Figure 50).

Figure 50.    BNP Redundancy via Direct Connection
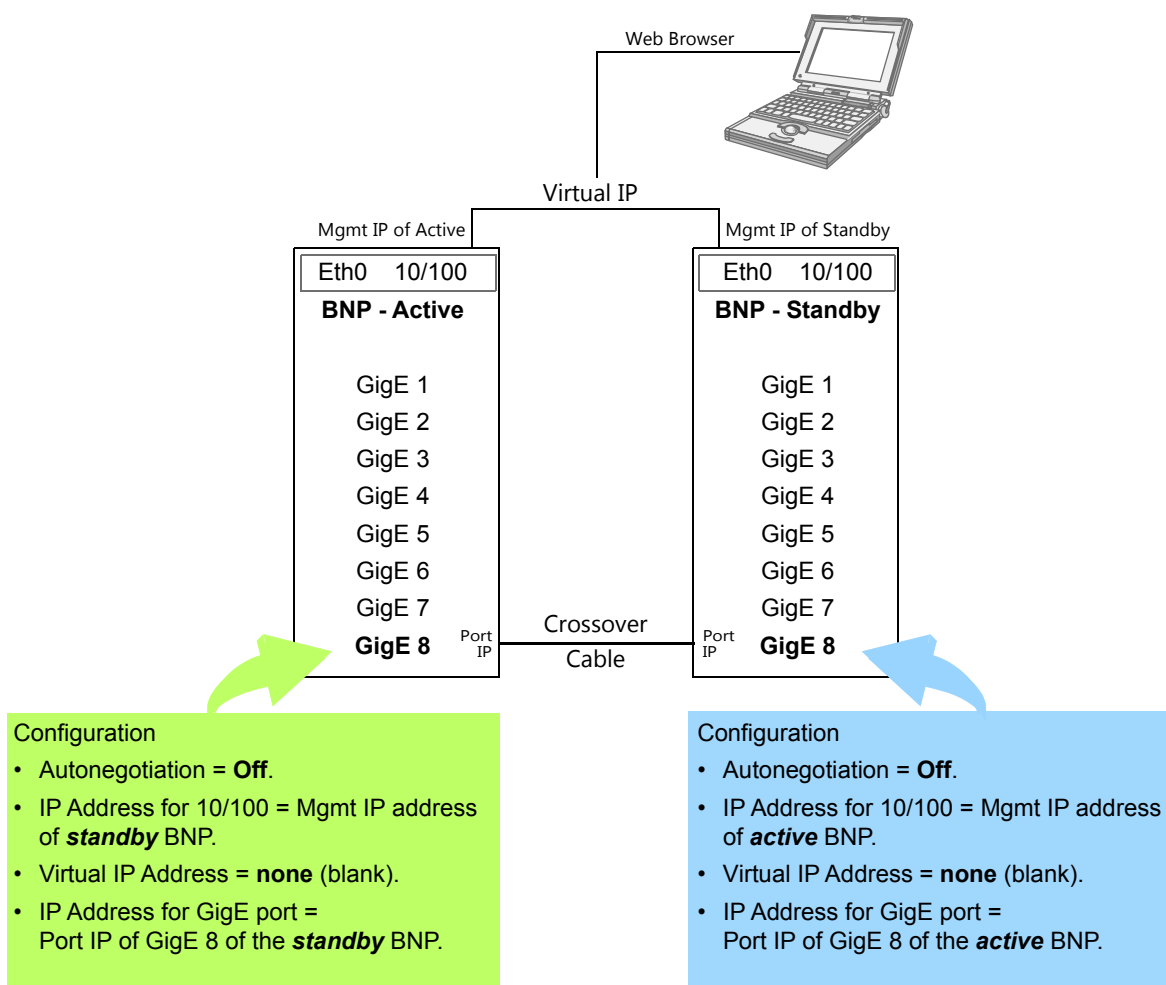


This configuration will ensure that the active and standby BNPs may continue to listen for heartbeats if their management ports can no longer detect heartbeats over a faulty IP connection.

Use the following information and steps to set up a heartbeat configuration using cable-to-cable (cross-over) connection between the GigE8 ports of the active BNP and the standby BNP.

- "Prerequisites," next.
- "Configuring the Active BNP" on page 100.
- "Configuring the Standby BNP" on page 101.

# Prerequisites

The following assumptions apply to this configuration:

- The active and standby BNPs are configured with IP addresses at their management ports.
- The active and standby BNPs are running on the same IP subnet.
- A cross-over cable physically connects the active BNP and the standby BNP at their GigE ports.

## Configuring the Active BNP

1. Log in to the *BNP Element Manager* of the active BNP.

2. From the *BNP Element Manager* of the active chassis, go to **Configuration** --> **GigE Ports** tab screen, and disable (uncheck) **Auto Negotiation** for GigE 8 (Figure 51).

Figure 51.     Active BNP—Disable Auto Negotiation
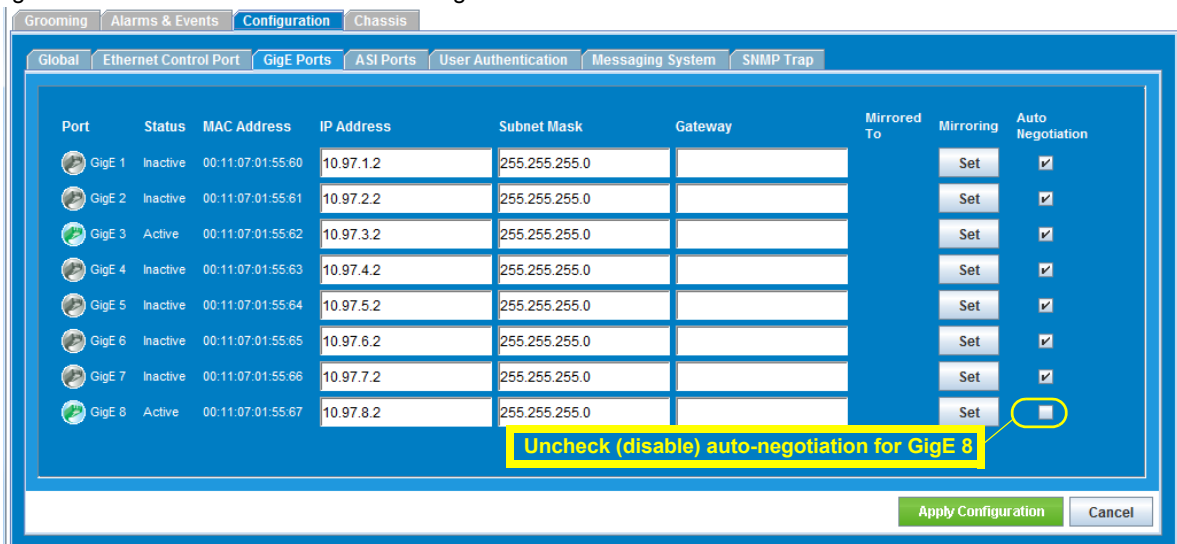


3. Go to the **Configuration** -> **Global** tab screen (Figure 52), and enter the following information:

    – **IP Address for 10/100**: Type the IP address of the standby BNP management port.

    – **IP Address for GigE 8**: Type the IP address of the standby BNP GigE 8 port.

    – **Virtual IP Address Configuration for GigE 8:** Make sure this field is blank.

Figure 52.    Active BNP—Set Chassis Redundancy



## Configuring the Standby BNP

**1.** Log in to the *BNP Element Manager* of the standby BNP.

**2.** From the *BNP Element Manager* of the standby chassis, go to **Configuration** -> **GigE Ports** tab screen, and disable (uncheck) **Auto Negotiation** for GigE 8 (Figure 53).

Figure 53.    Standby BNP—Disable Auto Negotiation



**3.** Go to the **Configuration** -> **Global** tab screen (Figure 54), and enter the following information:

– **IP Address for 10/100**: Type the IP address of the active BNP management port.

– **IP Address for GigE 8**: Type the IP address of the active BNP GigE 8 port.

– **Virtual IP Address Configuration for GigE 8:** Make sure this field is blank.

Figure 54.    Standby BNP—Set Chassis Redundancy

**CHAPTER 6**

# Grooming and PSIP

This chapter describes how to perform grooming and Program and System Information Protocol (PSIP) tasks on the *Selenio*™ BNP, using the *BNP Element Manager*. Topics focus on tasks performed with the Grooming function to map transport streams and programs, and to monitor bitrates.

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

## In This Chapter:

- "Before You Begin," next.
- "Grooming - Mapping" on page 104.
- "Monitoring Bitrates" on page 182.

## Before You Begin

Before you begin performing grooming tasks, complete the general configuration described in Chapter 4, "System Configuration."

# Grooming - Mapping

Grooming refers to the process of grouping specific input programs and services from multiple sources into different packages, such as customized channel lineups for subscribers. Using guidelines provided in this chapter, you can select-and-drag transport streams or programs from the input column into specific output GigE/ASI interfaces, transport streams or programs.

Use the **Mapping** tab screen (Figure 55) to manage your grooming operations (Table 57) for the BNP GigE ports.

Table 57.        Grooming and Mapping Functions

| Function | For more information |
|---|---|
| • Create input and output streams. | "Creating Input Transport Streams" on page 109. |
| • Create output program | "Creating Programs Manually" on page 131. |
| • Perform drag and drop grooming on individual programs or full transport streams. | "Drag and Drop Grooming" on page 140. |
| • Set program schedule. | "Scheduling Grooming - One time event" on page 151. |

☞ **Menu Path** | *BNP Element Manager* **Grooming** tab -> **Mapping** tab screen.

Figure 55.        Grooming-Mapping View - Collapsed View
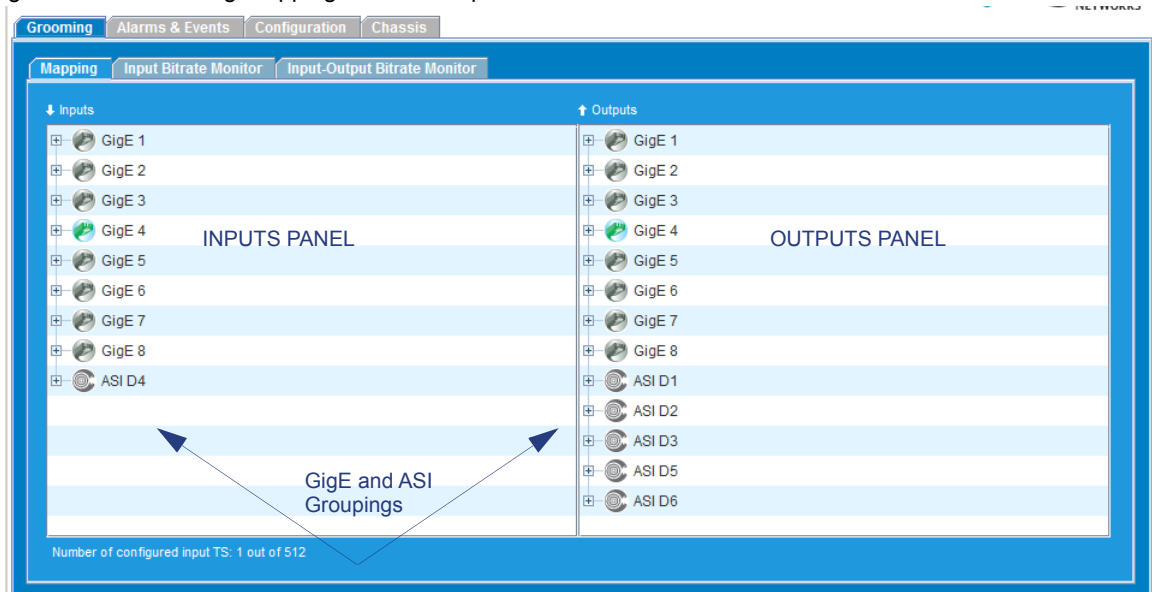


- The **Inputs** panel of the **Mapping** tab screen displays all existing transport streams, program names, and elementary streams for input on BNP ports.
- The **Outputs** panel of the **Mapping** tab screen displays output content after you apply input data into entities at the output panel. You can do this by using either of the following two methods:
    - Use the popup menu from an entity at the **Outputs** panel to create an transport stream or program.
    - Drag and drop input transport streams or programs into specific entities at the **Outputs** panel.

The GigE ports that you configured (as described in "GigE Port Configuration" on page 44) are shown in the **Inputs** (left) column, and color coded in accordance with current status:

- Active ports are displayed as green icons
- Inactive ports are display as gray icons.

From any GigE port displayed in this screen, you can create transport streams. From the **Inputs** panel, the transport streams can be selected and dragged into output ports at the **Outputs** panel. Each input transport stream has associated PSIP information where appropriate. Other types of transport streams may show similar information.

Figure 56.      Inputs and Outputs
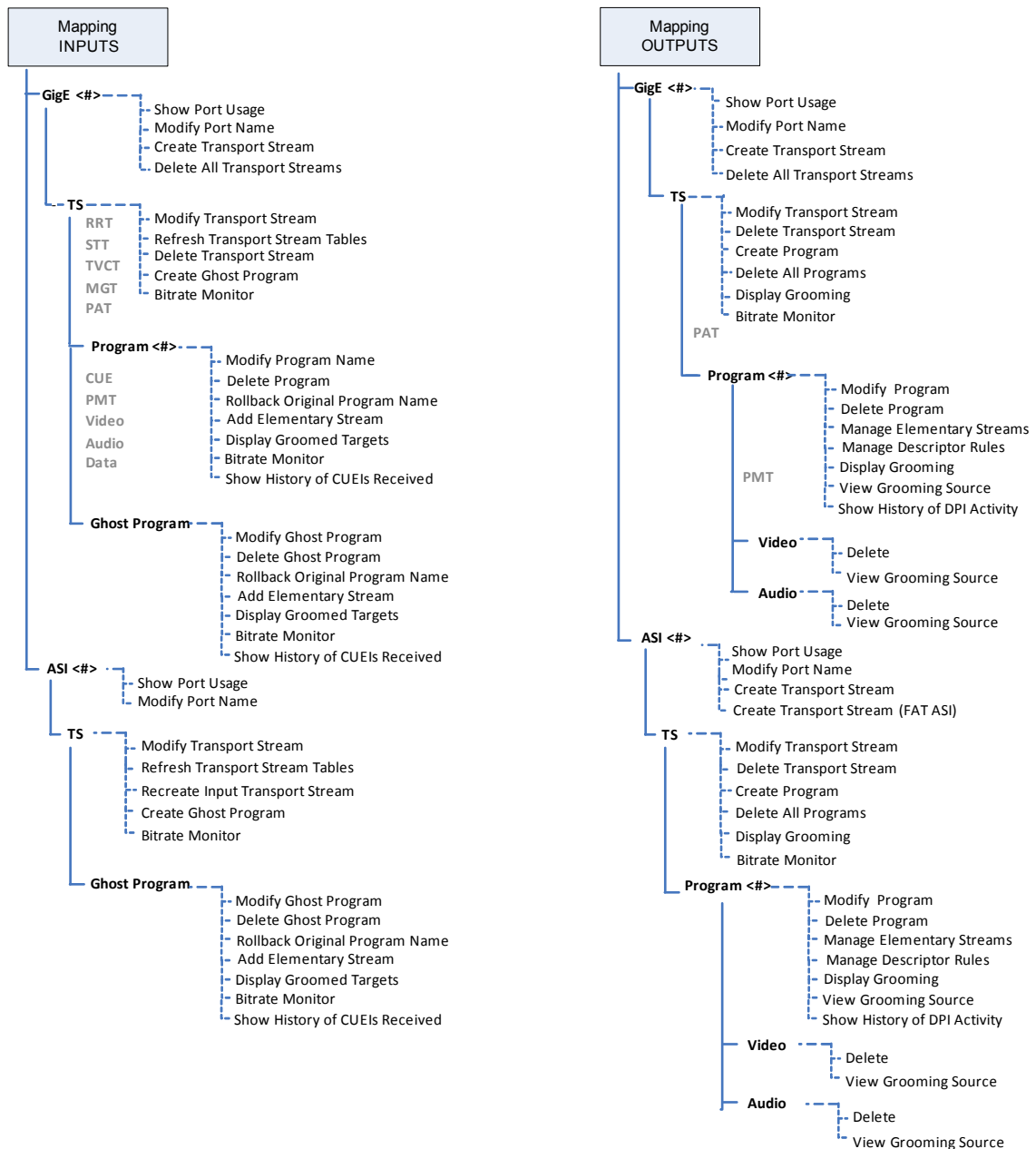
## Expanding and Collapsing Mapping Views

Programs are displayed under the transport stream in which they arrive (or to which they are output), and the elementary streams are displayed beneath their program ID. Each transport stream has an associated set of programs and PSIP tables. Each program includes video, audio, and PSIP tables which result in display of numerous icons. See Table 58, "Program Status Icons," on page 106 and Table 59, "Elementary Stream Icons," on page 107 for details about the icons.

With the **Mapping** tab screen in view, you can elect to expand or collapse the entire view or individual views. Expanding and collapsing affect only the display, This function does not change the underlying grooming.

- To expand the view of an individual entity, click on the + symbol and the content will be revealed. To collapse the view, click the- symbol and the contents will be hidden.
- For screen-wide expand/collapse, use the main menu **View** -> **Expand Mapping** (Alt **v,** Alt **e**) option, or the **View** -> **Collapse Mapping** (Alt **v**, Alt **c**) option.

Figure 57.    View --> Expand Mapping to View All Contents



## Programs and Elementary Streams

In an expanded view, you can see any program(s) currently associated with a BNP port. All programs on both the **Inputs** and **Outputs panel**s are displayed alongside status icons (Table 58), which reveal the program source.

Table 58.    Program Status Icons

| Symbol | Name |
|---|---|
|  | Network Program |
|  | Messaging Services Configured, Program Disabled |
|  | Messaging Services Configured and Program Enabled |
|  | Digital Program Insertion (DPI) |

Table 58.    Program Status Icons

| Symbol | Name |
|--------|------|
|  | Messaging Services Configured with DPI |
|  | Encrypted Program |
|  | Inactive |

The **Mapping** tab screen displays all Elementary Streams (ESs), on both the **Inputs** and **Outputs panel**s, alongside icons (Table 58) that indicate ES type and stream type. Elementary Streams are listed beneath an associated program when the view is expanded.

Table 59.    Elementary Stream Icons

| Symbol | ES Type | Stream Type | Description |
|--------|---------|-------------|-------------|
|  | Video | MPEG2  2 (0x2) <br> H.264   27 (0x1b) <br> SCTE  128 (0x80) | Represents the presence of a video elementary stream on an input or output program. |
|  | Audio | MPEG1 <br> MPEG2 <br> AC-3 (0x06) <br> AC-3 (0x81) <br> AAC (0x0f) <br> HE-AAC (0x11) <br> E-AC-3 | Represents the presence of an audio elementary stream on an input or output programs. <br><br> Available audio options are: <br><br> None <br> Arabic <br> English <br> French <br> German <br> Hindi <br> Italian <br> Japanese <br> Mandarin Chinese <br> Portuguese <br> Russian <br> Spanish |
|  | Data | 5 <br> 6 Teletext <br> 6 Sub Title <br> 7 – 191 <br> 192 <br> 193-255 | Represents the presence of a data elementary stream with all stream types *except*: <br><br> 5 EBIF <br> 5 EISS <br> 192 EBIF <br> 192 EISS <br><br> A blue data stream icon can be displayed on either an input or an output program. |
|  | Data | 5 EBIF <br> 5 EISS <br> 192 EBIF <br> 192 EISS | Represents the presence of an EBIF or EISS data elementary stream. <br><br> A blue data stream icon can be displayed on either an input or an output program. |

Table 59.       Elementary Stream Icons

| Symbol | ES Type | Stream Type | Description |
|--------|---------|-------------|-------------|
| | Data | 5<br>6 Teletext<br>6 Sub Title<br>7 – 191<br>192<br>193-255 | Represents the presence of an ES-level groomed data stream with all data stream types *except*:<br>5 EBIF<br>5 EISS<br>192 EBIF<br>192 EISS<br><br>A green data stream icon can only be displayed on an output program. |
| | Data | 5 EBIF<br>5 EISS<br>192 EBIF<br>192 EISS | Represents the presence of an ES-level groomed EBIF or EISS data stream.<br><br>A green data stream icon can **only** be displayed on an output program. |

## Viewing Program-Level Input Source

| | **Menu Path** | From the *BNP Element Manager*, go to the **Grooming** tab -> **Mapping** tab screen |
|--|--|--|

At the **Mapping** tab screen, use the following procedure to view the input source of a selected output program.

1. Right-click on a program in the **Outputs panel** (Figure 58), and select **View Grooming Source** from the popup menu.

2. Look at the row now highlighted in the **Inputs panel**. The highlighted row is grooming source for the selected program.

Figure 58.       Viewing program-level input source
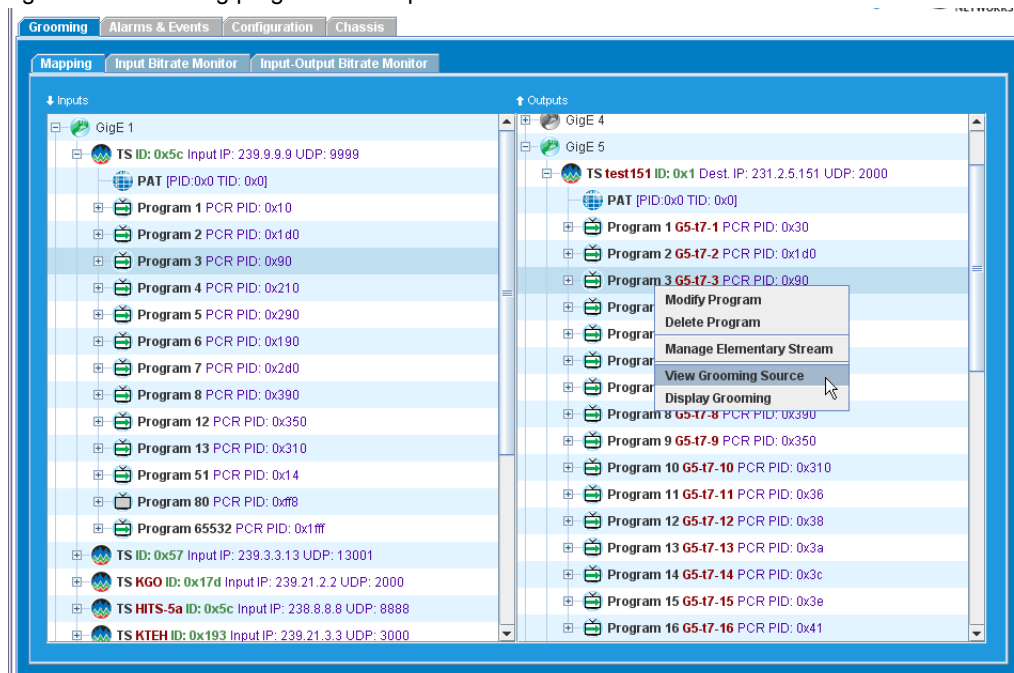
## Viewing ES-Level Input Source

At the **Mapping** tab screen, use the following procedure to view the input source of a selected Elementary Stream (ES).

1.  Expand the output program to display the ES you wish to view on the **Outputs panel**.

2.  Right-click on the ES in the **Outputs panel** (Figure 59), and select **View Grooming Source** from the popup menu.

3.  Look at the row now highlighted in the **Inputs panel**, which is the grooming source for the selected program.

Figure 59.    Viewing ES-level input source
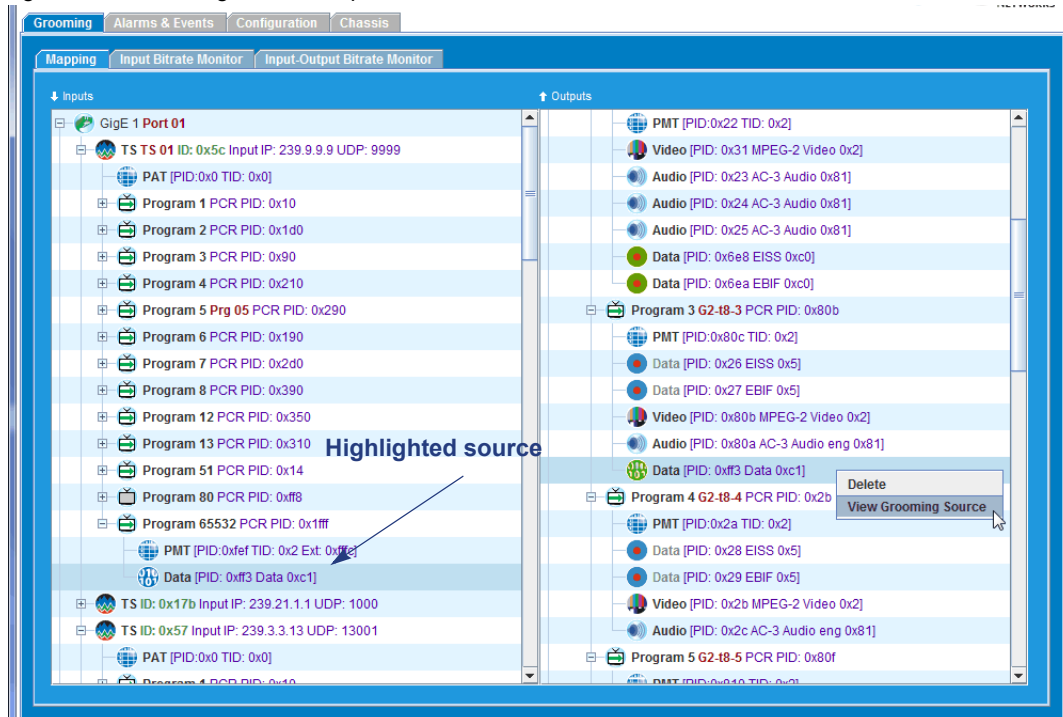


# Creating Input Transport Streams

The information required to create a transport stream (TS) depends on whether you are creating a transport stream on an input port or an output port, and on the type of TS created. Each TS creation dialog is described here.

## Basic Input Transport Stream Creation

Use the **Create GigE Input Transport Stream** dialog (Table 60 and Table 60) to set parameters for an input transport stream.

| | | |
|---|---|---|
| 👉 | **Menu Path** | *BNP Element Manager* **Grooming** tab -> **Mapping** tab screen - > **Inputs panel** -> right-click on an input port for popup menu -> select **Create Transport Stream**. |

Figure 60.     Create GigE Input TS

**Selecting No SSM Redundancy**



**Selecting SSM Redundancy**



1. At the **Create GigE Input Transport Stream** dialog, enter information about the transport stream.

2. Click **OK** to apply the configuration and to dismiss the dialog. The new TS will now be displayed in the **Inputs panel** for the specified port.

Table 60.     Create GigE Input Transport Stream Parameters

| Input Transport Stream | Description |
|---|---|
| GigE Port | This is the read-only port ID, and is based on the selected GigE port (GigE 1, GigE 2, etc.) |
| TS Name | Alphanumeric string to name the transport stream. This name will be displayed on the mapping page. |
| Multicast | If this is a multicast stream, check this box to enable multicast. |
| SSM Redundancy | Check to enable Source Specific Multicast (SSM) mode. If checked, you can configure up to four source IP addresses.<br><br>*SSM Redundancy* can only be checked if *Multicast* is also checked. |
| IP Address | The unicast or multicast IP address on which the stream is received. |
| UDP Port | Enter the UDP port to use for transmitting data. |
| Source IP Address [1-4] | The IP address of the source from which the stream is originating.<br><br>The *Source IP Address* can only be configured if *Multicast* is checked.<br><br>If *SSM Redundancy* is unchecked, *Source IP Address 1* is available and optional and should only be included for IGMPv3/SSM transport streams.<br><br>If *SSM Redundancy* is checked, *Source IP Address 2* to *4* are available. At least two source IP addresses must be configured. All source IP addresses must be unique. |
| Multiple TS | Click this button if you are creating multiple transport streams. You can create incrementing IP addresses, incrementing UDP ports, or incrementing IP Addresses and UDP ports simultaneously. See also "Multiple IP and UDP Creation" on page 111/ |

## Multiple IP and UDP Creation

Use the **Select Multiple IP and UDP** dialog (Figure 61 and Table 61) to set parameters for multiple transport streams.

| 👉 **Menu Path** | *BNP Element Manager* **Grooming** tab -> **Mapping** tab screen -> **Inputs panel** -> right-click on an input port for popup menu -> select **Create Transport Stream** -> **Create GigE Input Transport Stream** dialog, click **Multiple TS**. |
|---|---|

Figure 61.     Selecting Multiple UDP/IP Ports



1.  At the **Select Multiple IP and UDP** dialog, use guidelines from Table 61 for this configuration.

2.  Click **OK** to apply the settings to the GigE input TS, and to return to the **Create GigE Input Transport Stream** dialog.

3.  Click **OK** at the **Create GigE Input Transport Stream** dialog to save the settings and to place the new TS at the **Inputs** panel of the **Mapping** screen (see example in Figure 62).

Table 61.     Selecting Multiple IP and UDP

| Field | Description |
|---|---|
| Start IP Address | A read-only field indicating the starting IP address. |
| End IP Address | A read-only field indicating the ending IP address. |
| Start UDP | A read-only field indicating the starting UDP port number. |
| End UDP | A read-only field indicating the ending UDP port number. |
| Increment IP Address | When checked, the starting IP address will be incremented by one for each multiple chosen. |
| Increment UDP | When chosen, the UDP port number will be incremented by one for each multiple chosen. |
| Increment both IP Address and UDP | When checked both the IP address and UDP port number will be incremented by one for each multiple chosen. |
| Multiple Number | The number of multiple creations, either or both, IPs or UDPs. |
| Excluded UDP Ports | UDP ports that you want excluded from any automatic numbering. |

Figure 62.     Input Transport Streams created

> **Note:** *Each TSID is a unique number used to identify a transport stream. It is a partition of two 16-bit hex numbers. The lower 16 bits is the MPEG transport stream ID. The upper 16 bits (0x) is used strictly internally.*

> **Note:** *There are no configuration parameters required for creating a transport stream on an input ASI port. Each input ASI port is automatically configured with one transport stream.*

## Managing Input Transport Streams

After an input transport stream has been created, various options are available for managing the stream, as described in the following topics:

- "GigE Port Transport Stream Options," next.
- "ASI Port Transport Stream Options" on page 112.

### GigE Port Transport Stream Options

Use the popup menu from an input GigE port to view and select operations that can be performed on the selected port.

| | |
|---|---|
| **Menu Path** | From the **Inputs** panel of the **Grooming -> Mapping** screen, right-click on a transport stream under a GigE port and select an option (Figure 63, described in Table 62) from the popup menu. |

Figure 63.     Input Transport Stream pop-up menu - GigE
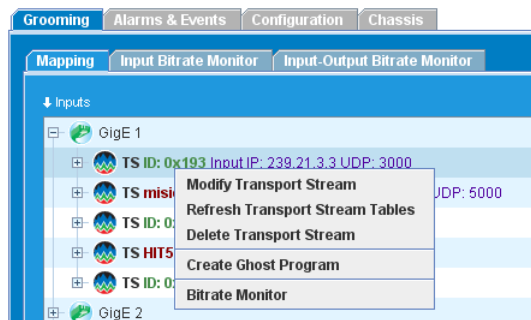


### ASI Port Transport Stream Options

Use the popup menu from an input ASI port to view and select operations that can be performed on the selected port.

| | |
|---|---|
| **Menu Path** | From the **Inputs** panel of the **Grooming -> Mapping** screen, right-click on a transport stream under an ASI port and select an option (Figure 64, described in Table 62) from the popup menu. |

Figure 64.     Input Transport Stream pop-up menu - ASI
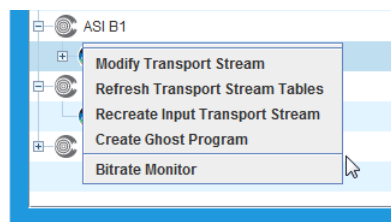
Table 62.      Input Transport Stream pop-up menu options

| Menu | Description |
|---|---|
| Modify Transport Stream | Allows you to modify only the name of the transport stream. If you wish to modify any other parameter, you must delete the transport stream and create it again. |
| | If you enabled SSM Redundancy for the transport stream, a green dot will indicate the active multicast source IP address. |
| Refresh Transport Stream Tables | When this option is selected, the internal Program Association Table (PAT) for this transport stream is invalidated, and the next incoming PAT will be used for the associated PSIP and DVB tables for selected transport stream. |
| Delete Transport Stream (GigE only) | Deletes the transport stream at the GigE port, and all grooming for the associated output programs. |
| Recreate Input Transport Stream (ASI only) | Deletes the transport stream at the selected ASI port and all grooming for the associated output programs, and recreates the transport stream with no associated grooming. |
| Create Ghost Program | Used for created programs with unreferenced PIDs. See "Adding an Unreferenced PID as an Elementary Stream" on page 167 for details. |
| Bitrate Monitor | Allows you to monitor bitrates for the selected transport stream. |

# Managing Output Transport Streams

This section provides information about how to access configuration screens and provide parameters for output streams.

## Creating MPEG-2 Output Transport Streams

Use the **Create Output Transport Stream** screen to set parameters for MPEG-2 transport streams, as described in the following topics:

- "Creating an MPEG-2 Output Stream on an ASI Port," next.
- "Creating an MPEG-2 Output Stream on a GigE Port" on page 115.

## Creating an MPEG-2 Output Stream on an ASI Port

Navigate to the **Create Output Transport Stream** screen for ASI ports (Figure 65, and Table 63), and specify MPEG-2 as the TS Type.

| 👉 | **Menu Path** | From the **Outputs** panel of the **Grooming -> Mapping** tab screen, right-click on an ASI port and select **Create Transport Stream** from the popup menu. |
|---|---|---|

Figure 65.     Create Output Transport Stream (ASI)—MPEG-2 or SCTE



1.  At the **Create Output Transport Stream** dialog **TS Type** field, select, **MPEG-2**.

2.  Use guidelines from Table 63 to provide MPEG-2 information in the remaining fields.

3.  Click **OK** to save your settings and to place the new transport stream in the **Outputs** panel of the **Grooming**->**Mapping** tab screen beneath the selected ASI port.

Table 63.     Create Output Transport Stream Dialog Parameters (ASI)—MPEG-2 or SCTE

| Field | Description |
| --- | --- |
| Port | Read-only, shows either ASI or GigE depending on the port selected. |
| SPTS | Check if the output is a single program transport stream (SPTS). |
| Non-DPI | Check this box if the transport stream is to use a Grooming-only (Non-DPI) license. |
| TS Name | The (optional) name you want to assign to this output transport stream. |
| Bitrate (Mbps) | The bitrate at which the stream is transported. |
| Unique TS ID | Allows you to assign a unique numeric ID to this transport stream.<br>• When this option is *checked*, the TS ID value placed in this field will be reserved as unique for the entire chassis.<br>• When this option is *unchecked*, a TS ID value may still be entered, however the value may be the same as another TS ID as long as that TS ID's value has not been reserved as a Unique TS ID.<br>• Note that each TSID is a unique number used to identify a transport stream. It is a partition of two 16-bit hex numbers. The lower 16 bits (user-specified in decimal and converted to hex) is the MPEG transport stream ID. The upper 16 bits (0x) is strictly used internally.<br>• Default value is "*1*" if no value is specified.<br>• Broadcasters must configure this value with a unique ID to meet FCC standards. |
| Reserved Bandwidth | Enter any bandwidth value to be reserved from the total bitrate of transport stream. |
| Network PID | Decimal value to define the program ID on which network information is received.<br>Note that display of this entry, in applicable screens, is dependent on the current setting—as either hexadecimal or decimal—for **Configuration**-->**Global PID Display.** |

Table 63.    Create Output Transport Stream Dialog Parameters (ASI)—MPEG-2 or SCTE  (Continued)

| Field | Description |
|-------|-------------|
| TS Type | The type of stream. The type of stream you choose determines what other information is required. Choices are:<br>*MPEG-2, ATSC, SCTE*, or *DVB* |
| Enable Messaging System | Check this box to allow configuration of Messaging System zones for specific programs in this transport stream. See "Messaging System Configuration" on page 60 for information on configuring Messaging Zones. |
| MPEG-2 Aggressive Rate Control | Check this box for output transport streams that required more aggressive rate control due to severe oscillations from the input bitrate. |
| Long Delay to support H.264 DPI | Check this box for an output TS when it contains an H.264 program on which ADs can be placed. Checking this box will allow smooth DPI splicing on H.264 programs. |
| H.264 Alarm Bitrate Level (Mbps) | This setting can assist in maintaining video quality for MPEG-2 video content in the presence of other content, such as H.264, which bypasses the BNP's transrater. This is done by generating an alarm when H.264 program bandwidth exceeds the percent of the TS bandwidth specified in this setting.<br>This option is only available if *SPTS* is unchecked. |

## Creating an MPEG-2 Output Stream on a GigE Port

Navigate to the **Create Output Transport Stream** screen for GigE ports (Figure 66, and Table 64), and specify MPEG-2 as the TS Type.
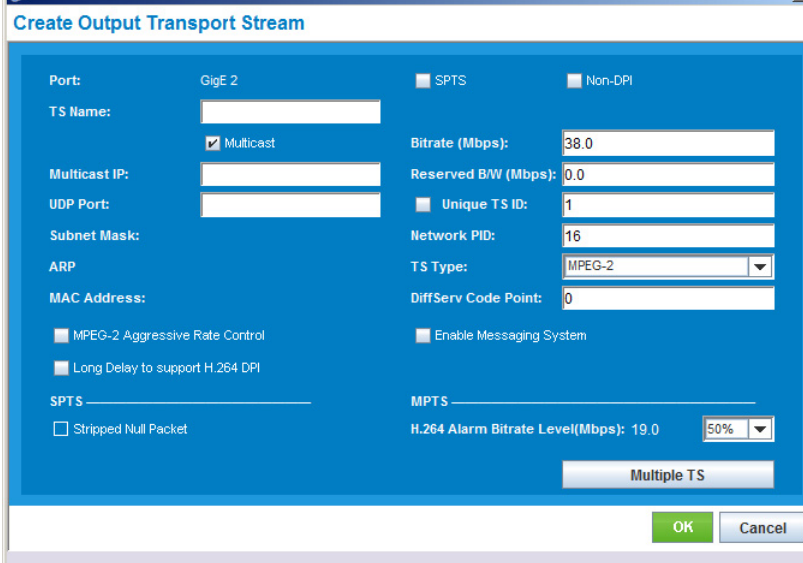
| | |
|---|---|
| ☞ **Menu Path** | From the **Outputs** panel of the **Grooming -> Mapping** tab screen, right-click on a GigE port and select **Create Transport Stream** from the popup menu. |

Figure 66.    Create Output Transport Stream (GigE)—MPEG-2 (default multicast view)



1.  At the **Create Output Transport** dialog **TS Type** field, select, **MPEG-2**.

2.  Use guidelines from Table 64 to provide MPEG-2 information in the remaining fields.

3. Click **OK** to save your settings and to place the new transport stream in the **Outputs** panel of the **Grooming**-->**Mapping** tab screen, beneath the selected GigE port.

Table 64.       Create Output Transport Stream Dialog Parameters (GigE)—MPEG-2 or SCTE

| Field | Description |
|---|---|
| Port | This is read-only and is used for identification purposes. |
| SPTS | Check if the output is a single program transport stream (SPTS). |
| Non-DPI | Check this box if the transport stream is to use a Grooming-only (Non-DPI) license. |
| TS Name | The (optional) name you want to assign to this output transport stream. |
| Multicast | Check if the output is for multicast operation. |
| Bitrate (Mbps) | The bitrate at which the stream is transported. |
| Multicast/Unicast IP | The IP address to which the output stream is routed.<br>• If *Multicast* is checked, this must be a valid multicast IP address.<br>• If *Multicast* is unchecked, this must be a valid unicast IP address. See also Figure 67. |
| Reserved Bandwidth (Mbps) | Enter any bandwidth value to be reserved from the total bitrate of transport stream. |
| UDP Port | Enter the UDP port to use for transmitting data. |
| Unique TS ID | Allows you to assign a unique numeric ID to this transport stream.<br>• When this option is *checked*, the TS ID value placed in this field will be reserved as unique for the entire chassis.<br>• When this option is *unchecked*, a TS ID value may still be entered, however the value may be the same as another TS ID as long as that TS ID's value has not been reserved as a Unique TS ID.<br>• Note that each TSID is a unique number used to identify a transport stream. It is a partition of two 16-bit hex numbers. The lower 16 bits (user-specified in decimal and converted to hex) is the MPEG transport stream ID. The upper 16 bits (0x) is strictly used internally.<br>• Default value is "*1*" if no value is specified.<br>• Broadcasters must configure this value with a unique ID to meet FCC standards. |
| Subnet Mask | For unicast (Multicast unchecked), enter the subnet mask IP for the unicast IP address entered in the *Destination IP* field. |
| Network PID | Decimal value to define the program ID of transport stream packets which contain the network information table.<br>Note that display of this entry, in applicable screens, is dependent on the current setting—as either hexadecimal or decimal—for **Configuration**-->**Global PID Display.** |
| ARP | If Multicast is checked, this field is *hidden*.<br>If Multicast is unchecked, this box will appear. Un-checking this box will allow you to disable the use of Address Resolution Protocol (ARP) and to manually specify a MAC address. See also Figure 67. |
| TS Type | The type of stream. The type of stream you choose determines what other information is required. Choices are:<br>*MPEG-2, ATSC, SCTE*, or *DVB*. |

Table 64.      Create Output Transport Stream Dialog Parameters (GigE)—MPEG-2 or SCTE

| Field | Description |
|---|---|
| MAC Address | If *Multicast* or *ARP* are checked, this field is read-only.<br><br>For Unicast or if ARP is disabled (un-checked) this field can be modified to include a hardcoded MAC address to be used to transport this stream. See also Figure 67. |
| MPEG-2 Aggressive Rate Control | Check this box for output transport streams that require more aggressive rate control due to severe oscillations from the input bitrate. |
| Long Delay to support H.264 DPI | Check this box for an output TS when it contains an H.264 program on which ADs can be placed. Checking this box will allow smooth DPI splicing on H.264 programs. |
| Diffserv Code Point | Set value, in the range 0 - 63, to define the differentiated service code point (DSCP) for the output TS.<br><br>The DSCP is a 6 bit field in the IP header that classifies network traffic and provides QoS. The BNP allows you to configure a DSCP value for IP packets generated for any type of GigE output transport stream. See also "Using DSCP" on page 118.<br><br>Default = 0 |
| Enable Messaging System | Check this box to allow configuration of Messaging System zones for specific programs in this transport stream. See "Messaging System Configuration" on page 60 for information on configuring Messaging Zones. |
| Stripped Null Packet | Check this box to generate SPTS outputs with no NULL packets to reduce the average required bandwidth.<br><br>This option is only available if *SPTS* is checked.<br><br>*Note:* When this mode is enabled, the output TS stream is no longer compliant to MPEG2 TS with respect to PCR jitter and accuracy. |
| H.264 Alarm Bitrate Level (Mbps) | This setting can assist in maintaining video quality for MPEG-2 video content in the presence of other content, such as H.264, which bypasses the BNP's transrater. This is done by generating an alarm when H.264 program bandwidth exceeds the percent of the TS bandwidth specified in this setting.<br><br>This option is only available if *SPTS* is unchecked. |
| Multiple TS | Click if multiple transport streams are used. See "Multiple IP and UDP Creation" on page 111 for details. |

## Unicast Parameters for GigE Transport Streams

To present the Unicast version of the **Create Output Transport Stream** dialog, disable (un-check) **Multicast**. The entry fields for **Subnet Mask**, **ARP**, and **MAC Address** are then revealed (Figure 67). Other entry fields in this screen are described in Table 64.

Figure 67.      Create Output Transport Stream (Gig E) MPEG-2 or SCTE (unicast view)



## Using DSCP

For all supported output transport streams on GigE ports, you can configure traffic classifications—using the Differentiated Service Code Point (DSCP) option—to provide various quality of service levels on transport streams configured for a GigE port. This configuration applies only to output transport streams on GigE ports: any DSCP on input streams is not carried forward into output streams.

You can modify a DSCP value at any time following creating of the output transport stream and your setting will remain intact following BNP reboots and Release 3.4+ upgrades. A DSCP value configured on the active BNP is carried over to the standby BNP and used as output if the standby become active.

| | |
|---|---|
| **Menu Path** | Use the **Create Output Transport Stream** dialog with a selected GigE port, at the Diffserv Code Point field, to set a DSCP value (Table 64). |

**Note:**   A system downgrade to a release prior 3.4 will remove all DSCP settings.

## Creating ATSC Output Transport Streams

For ATSC transport types, you must include the information about PSIP tables. The PID values of major and minor channels are automatically numbered across the multiplex, reducing the chance of conflict.

Use the **Create Output Transport Stream** screen to set parameters for ATSC transport streams, as described in the following topics:

- "Creating an ATSC Output Stream on an ASI Port," next.
- "Creating an ATSC Output Stream on a GigE Port" on page 120.
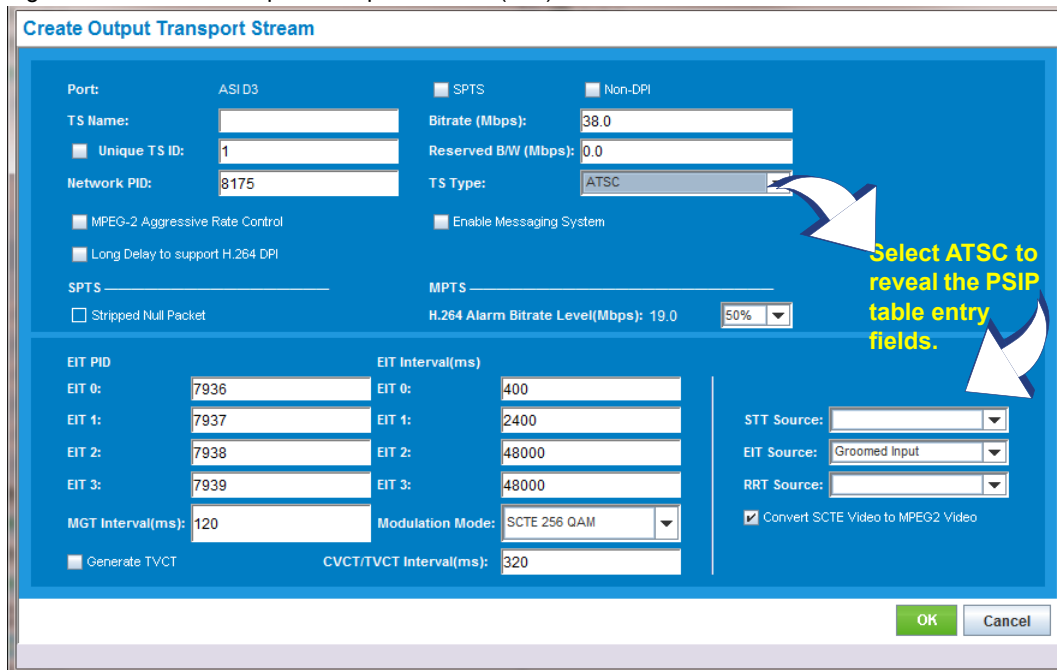
### Creating an ATSC Output Stream on an ASI Port

Go to the ATSC version of the **Create Output Transport Stream** dialog (Figure 68 and Table 65):

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Outputs panel** of the **Grooming** tab **-> Mapping** tab screen, right-click on an ASI port and select **Create Transport Stream** from the popup menu. At the **Create Output Transport Stream** dialog **TS Type** field, select **ATSC**. |

The dialog now provides entry fields for PSIP tables that can be applied to the selected ASI port.

Figure 68.     Create Output Transport Stream (ASI)—ATSC



1.  At the **Create Output Transport Stream** dialog, enter information to define the ATSC transport stream:

    – Use guidelines from Table 63 to provide ASI port information at the upper portion.

    – Use guidelines from Table 65 to provide PSIP information.

2.  Click **OK** to save the settings, and to put the new TS at the **Outputs** panel of the **Mapping** screen, beneath the selected ASI port.

## Creating an ATSC Output Stream on a GigE Port

Go to the ATSC version of the **Create Output Transport Stream** dialog (Figure 69 and Table 65):

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Outputs panel** of the **Grooming** tab **-> Mapping** tab screen, right-click on a GigE port and select **Create Transport Stream** from the popup menu. At the **Create Output Transport Stream** dialog **TS Type** field, select **ATSC**. |

The dialog now provides entry fields for PSIP tables that can be applied to the selected GigE port.

Figure 69.     Create Output Transport Stream (GigE)—ATSC



1.  At the **Create Output Transport Stream** dialog, enter information to define the ATSC transport stream:

    –   Use guidelines from Table 64 to provide GigE port information at the upper portion.
    –   Use guidelines from Table 65 to provide PSIP information.

2.  Click **OK** to save the settings, and to put the new TS at the **Outputs** panel of the **Mapping** screen, beneath the selected GigE port.

Table 65.      Create Output Transport Stream—ATSC PSIP Table Information Configuration Parameters

| PSIP Table Information[a] | Description |
|---|---|
| EIT PID (0-3) | The Event Information Table (EIT) packet identifier (PID) values can be set manually (as a decimal value), overriding the PID in the MGT. |
| | Note that display of this entry, in applicable screens, is dependent on the current setting—as either hexadecimal or decimal—for **Configuration -->Global PID Display.** |
| EIT PID Interval (ms) | This value can be set manually, overriding the PID in the MGT. Value in milliseconds. |
| MGT Interval (ms) | The Master Guide Table (MGT) is highest order in the ATSC transport stream table hierarchy; it also provides program-identification (PID) locations so that receivers can locate other tables; the MGT can also inform the receiver of changes or table updates. |
| Modulation Mode | Choose one of the following modes from the pull-down menu: |
| | Analog, SCTE 64 QAM, SCTE 256 QAM, ATSC 8 VSB, and ATSC 16 VSB. |
| Generate TVCT | Check this box to generate TVCT tables *instead* of CVCT tables. A Terrestrial Virtual Channel Table (TVCT) is a mandatory PSIP table for terrestrial broadcast that lists all the virtual channels available in an ATSC transport stream. This feature is required for broadcasted channels. |
| | • When *Modulation Mode* is set to ATSC 8 VSB or ATSC 16 VSB, you must enable this option. |
| CVCT/TVCT Interval (ms) | Specifies the interval in milliseconds at which CVCT/TVCT tables are generated. If the *Generate TVCT* option has been enabled, this field sets the interval for TVCT; if the *Generate TVCT* option has *not* been enabled, this field sets the interval for CVCT. |
| | The Cable Virtual Channel Table (CVCT) provides information about the channels, such as channel name, navigation identifier, and stream components. |
| STT Source | The System Time Table (STT) defines the GPS time and the daylight-savings time indicator to the consumer's decoder, synchronizing the concept of "now" between the decoder and the broadcaster. This configuration is not generated by the BNP and requires a proper source to be valid on the output transport. |
| | Choose an appropriate value from the pull-down menu. There must be a valid STT source to be ATSC compliant. |
| EIT Source | Specifies how an EIT table is generated by the BNP. |
| | When *Groomed Input* (default) is selected, an Event Information Table (EIT) is generated based on that which is received from the groomed input program of the ATSC TS. |
| | Choose an appropriate value from the pull-down menu. |
| RRT Source | The Rating Region Table (RRT) source transmits the program rating information |
| | Choose an appropriate value from the pull-down menu. There must be a valid RRT source to be ATSC compliant. |
| Convert SCTE Video to MPEG2 Video | Check this box to convert SCTE video (type 0x80) to MPEG2 video (type 0x2). |

a. PSIP (Program and System Information Protocol) is a collection of tables operating within the terrestrial broadcast Transport Stream (TS) of every digital (and sometimes analog) television. PSIP settings are configured as part of the transport stream.

These tables contain system information and program data:
- System information allows navigation and access of the channels within the DTV transport stream.
- Program data provides necessary information for efficient browsing and event selection.
- Some PSIP tables contain the information to locate digital streams.

If you are not sure of the PSIP guidelines, there are many good references on the Internet, including the *ATSC Recommended Practice: Program and System Information Protocol Implementation Guidelines for Broadcasters* at http://www.atsc.org/cms/standards/a_69-2009.pdf

# Creating SCTE Output Transport Streams

Use the **Create Output Transport Stream** screen to set parameters for SCTE transport streams, as described in the following topics:

- "Creating an SCTE Output Transport Stream on an ASI Port," next.
- "Creating an SCTE Output Transport Stream on a GigE Port" on page 123.

## Creating an SCTE Output Transport Stream on an ASI Port

Go to the SCTE version of the **Create Output Transport Stream** dialog (Figure 70):
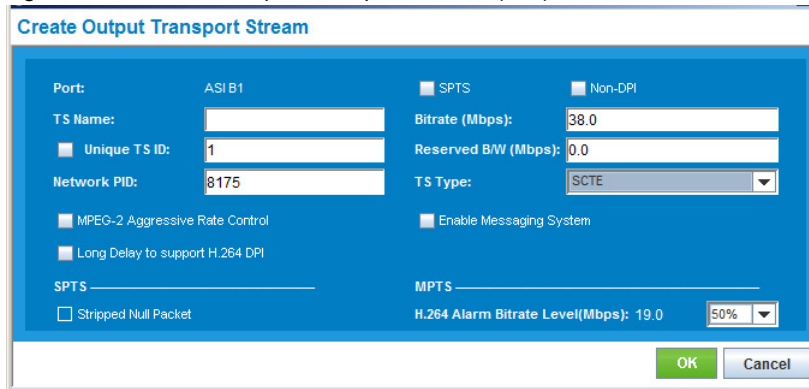
| | | |
|---|---|---|
| 👉 | Menu Path | From the **Outputs panel** of the **Grooming** tab **-> Mapping** tab screen, right-click on an ASI port and select **Create Transport Stream** from the popup menu. At the **Create Output Transport Stream** dialog **TS Type** field, select **SCTE**. |

Figure 70.     Create Output Transport Stream (ASI)—SCTE



1. At the **Create Output Transport Stream** dialog, use guidelines from Table 63 to provide port information in the remaining fields.

2. Click **OK** to save your settings and to place the new SCTE transport stream in the **Outputs** panel of the **Grooming**-->**Mapping** tab screen beneath the selected ASI port.

### Creating an SCTE Output Transport Stream on a GigE Port

Go to the SCTE version of the **Create Output Transport Stream** dialog (Figure 71):
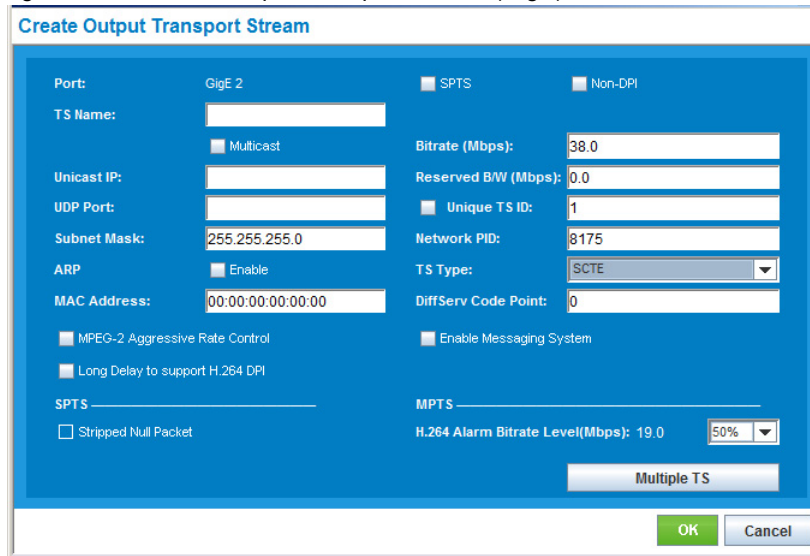
| | | |
|---|---|---|
| 👉 | Menu Path | From the **Outputs panel** of the **Grooming** tab **-> Mapping** tab screen, right-click on a GigE port and select **Create Transport Stream** from the popup menu. At the **Create Output Transport Stream** dialog **TS Type** field, select **SCTE**. |

Figure 71.     Create Output Transport Stream (GigE)—SCTE



1.  At the **Create Output Transport Stream** dialog, use guidelines from Table 64 to provide port information in the remaining fields.

2.  Click **OK** to save your settings and to place the new SCTE transport stream in the **Outputs** panel of the **Grooming** ->**Mapping** tab screen, beneath the selected GigE port.

## Creating DVB Output Transport Streams

Use the **Create Output Transport Stream** screen to set parameters for Digital Video Broadcast (DVB) transport streams, as described in the following topics:

*   "Creating a DVB Output Transport Stream on a GigE Port," next.
*   "Creating a DVB Output Transport Stream on an ASI Port" on page 124.

### Creating a DVB Output Transport Stream on a GigE Port

Go to the DVB version of the **Create Output Transport Stream** dialog (Figure 72):

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Outputs panel** of the **Grooming** tab **-> Mapping** tab screen, right-click on a GigE port and select Create Transport Stream from the popup menu. At the **Create Output Transport Stream** dialog **TS Type** field, select **DVB**. |

Figure 72.　　Create Output Transport Stream (GigE)—DVB



1. At the **Create Output Transport Stream** dialog, enter information to define the DVB transport stream:

   – Use guidelines from Table 64 to provide GigE port information at the upper portion.

   – Use guidelines from Table 66 to provide the DVB information.

2. Click **OK** to save the settings, and to put the new TS at the **Outputs** panel of the **Mapping** screen, beneath the selected GigE port.

## Creating a DVB Output Transport Stream on an ASI Port

Go to the DVB version of the **Create Output Transport Stream** dialog (Figure 73):

| | Menu Path | From the **Outputs panel** of the **Grooming** tab **-> Mapping** tab screen, right-click on an ASI port and select Create Transport Stream from the popup menu. At the **Create Output Transport Stream** dialog **TS Type** field, select **DVB**. |
|---|---|---|

Figure 73.    Creating Output TS (DVB) - ASI port



1. At the **Create Output Transport Stream** dialog, enter information to define the DVB transport stream on the ASI port:

   – Use guidelines from Table 63 to provide ASI port information at the upper portion.

   – Use guidelines from Table 66 to provide the DVB information.

2. Click **OK** to save the settings, and to put the new TS at the **Outputs** panel of the **Mapping** screen, beneath the selected ASI port.

Table 66.    DVB Output Transport Stream Configuration Parameters

| Field | Description |
|---|---|
| Network ID | Input the Network ID of the current transport stream. |
| Modulation Mode | Use the pull-down menu to select the modulation mode used for the TS. Choice between *SCTE 64 QAM* and *SCTE 256 QAM*. |
| Original Network ID | Input the Network ID from which this stream has originated. |
| NIT Source | Use the pull-down menu to select the source for the network information table. |
| TDT/TOT Source | Use the pull-down menu to select the source for the time and date table or the time offset table. |
| SDT Source | Source of the service description table for this transport stream. If you select N/A then SDT is not generated for this output TS. |
| EIT Source | Source of the Event Information Tabled (EIT) for the programs in this transport stream. If you select N/A then EIT will not be generated. |

## Setting Up Network Information Tables (NITs) for DVB

You can generate a Network Information Table using one of three methods:

- Locally generated, using the NIT editor (as described in this section).
- NIT pass-through, with editing at the output transport stream.
- Complete pass-through of NIT from the input to the output transport stream.

Use the **Setup Network Information Table (NIT)** dialog to perform the following operations:

- "Adding a NIT," next.
- "Editing a NIT" on page 127.
- "Deleting a NIT" on page 128.



| | Menu Path | From the main *BNP Element Manager* menu, select **M**aintenance (**Alt m**)**-->** **Setup Network Information Table (NIT)**. |
|---|---|---|

### Adding a NIT

Use the **Edit Network Information Table (NIT)** screen (Figure 74) to add a NIT to the BNP. You can also use this screen to access the XML version of the NIT file or to import a NIT file from another BNP.

| | Menu Path | From the main *BNP Element Manager* menu, select **M**aintenance (**Alt m**)**-->** **Setup Network Information Table (NIT)** --> **Setup Network Information Table (NIT)** dialog, click **Add** |
|---|---|---|

Figure 74.     Add NIT
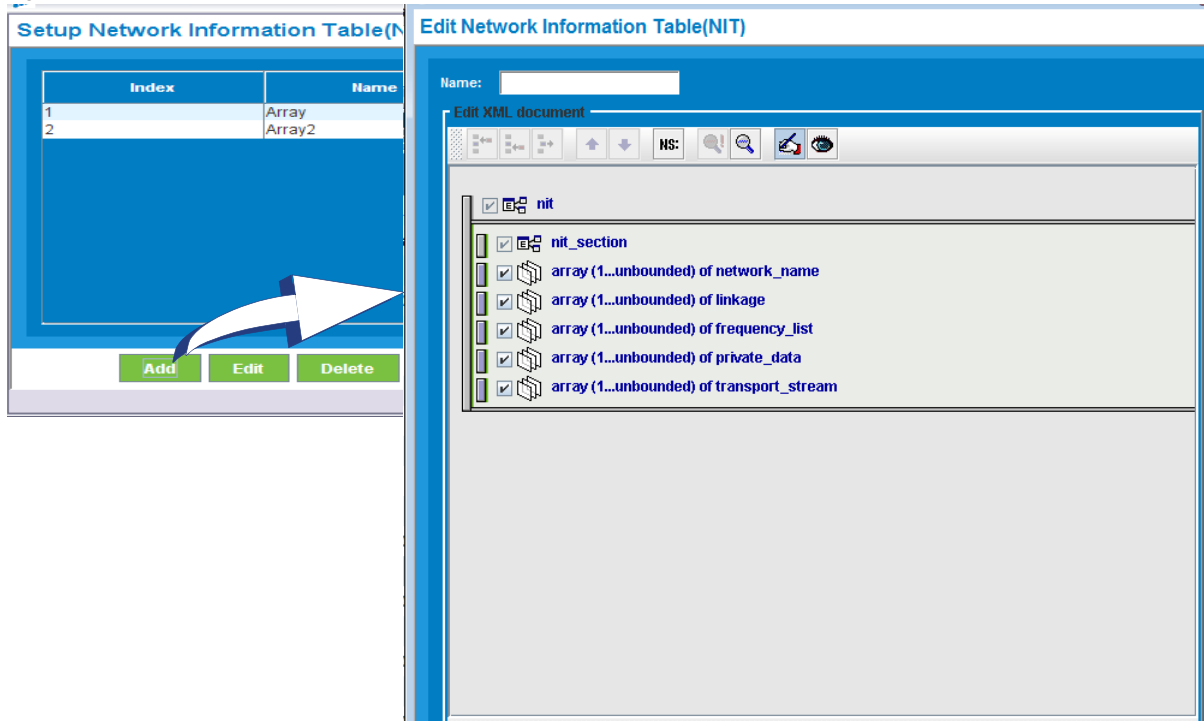


1. Edit the Network Information Table as described in *Appendix A, "Editing the DVB NIT Table"*.

2. Click **OK** to apply the NIT configuration.

## Editing a NIT

Use the **Edit Network Information Table (NIT)** screen (Figure 75) to modify a NIT You can also use this screen to access the XML version of the NIT file or to import a NIT file from another BNP.

| 👉 Menu Path | From the main *BNP Element Manager* menu, select **Maintenance** (**Alt m**) **-> Setup Network Information Table (NIT)** -> **Setup Network Information Table (NIT)** dialog, click **Edit** |
| --- | --- |

Figure 75.     Edit NIT
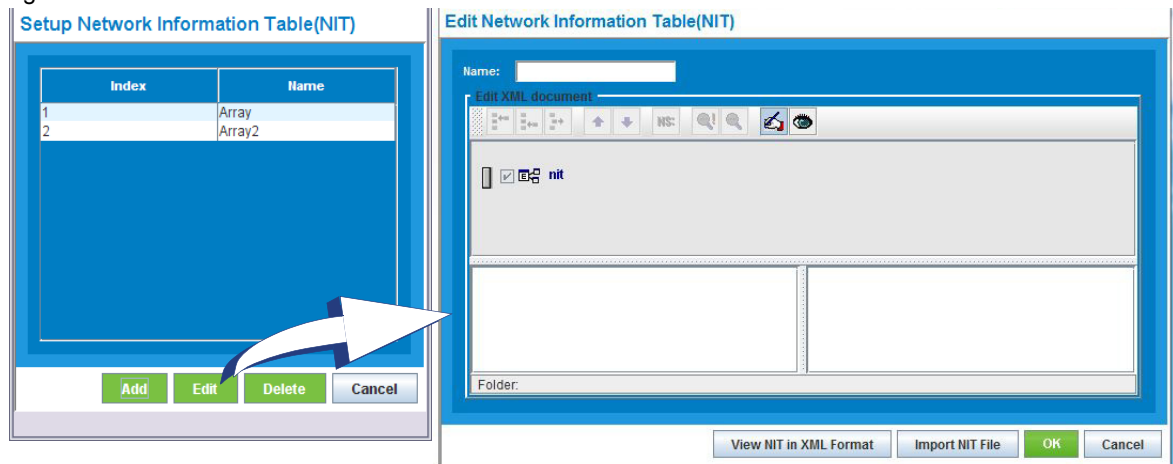


1. Edit the **Network Information Table** as described in *Appendix A, "Editing the DVB NIT Table"*.

**2.** Click **OK** to apply any changes.

### Deleting a NIT

Use the **Delete** function to remove a NIT from the BNP.

| | | From the main *BNP Element Manager* menu, select **Maintenance** (**Alt m**)**->** **Setup Network Information Table (NIT)** -> **Setup Network Information Table (NIT)** dialog, click **Delete** |
|---|---|---|
| 👉 | **Menu Path** | |
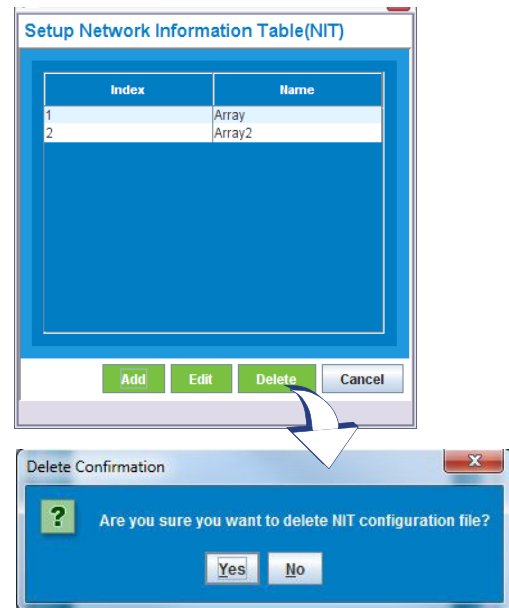
## Creating a FAT ASI Port Output Transport Stream

Use the **Create Output Transport Stream (FAT ASI)** dialog (Figure 76 and Table 67) to set parameters for up to four FAT ASI groups.

ℹ️ **Note:** *The following restriction applies when creating a FAT ASI transport streams:*
*Two FAT ASI transport streams per card are allowed:*
*one at one of the first three ports, and one at the last port.*

| | | Right-click on an ASI port and select **Create Transport Stream (FAT ASI)** from the popup menu. |
|---|---|---|
| 👉 | **Menu Path** | |

Figure 76.     Create Output Transport Stream (FAT ASI)



1.  At the **Create Output Transport Stream** (FAT ASI) dialog, set parameters.

2.  Click **OK**.

View results of this configuration at the **Outputs panel** (Figure 77) of the **Mapping** tab screen.

Table 67.      Create Output Transport Stream (FAT ASI)

| Field | Description |
|---|---|
| Port | Read-only, Shows either ASI or GigE depending on the port selected. |
| Non-DPI | Enable (check) or disable (un-check) a Grooming-only (Non-DPI) license for the TS. |
| TS Name | The (optional) name you want to assign to this output transport stream. |
| Bitrate (Mbps) | The bitrate at which the stream is transported. |
| Unique TS ID | Assign a unique numeric ID to this transport stream.<br><br>• When this option is *checked*, the TS ID value placed in this field will be reserved as unique for the entire chassis.<br><br>• When this option is *unchecked*, a TS ID value may still be entered, however the value may be the same as another TS ID as long as that TS ID's value has not been reserved as a Unique TS ID.<br><br>• Note that each TSID is a unique number used to identify a transport stream. It is a partition of two 16-bit hex numbers. The lower 16 bits (user-specified in decimal and converted to hex) is the MPEG transport stream ID. The upper 16 bits (0x) is strictly used internally.<br><br>• Default value is "*1*" if no value is specified.<br><br>• Broadcasters must configure this value with a unique ID to meet FCC standards. |
| Reserved B/W (Mbps) | Enter any bandwidth value to be apportioned to the transport stream. |
| Network PID | Decimal value to define the program ID on which the stream is received.<br><br>Note that display of this entry, in applicable screens, is dependent on the current setting—as either hexadecimal or decimal—for **Configuration-->Global PID Display.** |

Table 67.      Create Output Transport Stream (FAT ASI)  (Continued)

| Field | Description |
|---|---|
| TS Type | The type of stream. The type of stream you choose determines what other information is required. Choices are:<br><br>*MPEG-2, ATSC, SCTE*, or *DVB*<br><br>• For information on additional fields for ATSC transport streams, see Table 65.<br>• For information on additional fields for DVB transport streams, see Table 66. |
| Enable Messaging System | Check this box to allow configuration of Messaging System zones for specific programs in this transport stream. See "Messaging System Configuration" on page 60 for information on configuring Messaging Zones. |
| Number of Group | The number of groups you want to assign to this port. Choose from 1 to 4. The default is 4. |
| Group Name *(A-D)* | The name you want to assign to each group. |
| Group Bitrate (Mbps)<br><br>(A-D) | The bitrate, in megabits per second, that you want to assign to groups. The value entered will be applied to all Groups. The total bitrate for all groups cannot exceed the value in the *Bitrate* field in the top portion of the window. |
| H.264 Alarm Bitrate Level (Mbps) | Assists in maintaining video quality for MPEG-2 video content in the presence of H.264 content, which bypasses the BNP's transrater. This is done by generating an alarm when H.264 program bandwidth exceeds the percent of the TS bandwidth specified in this setting.<br><br>Choices are: 0%, 25%, 50%, 75%, 100%. |
| Reserved B/W (Mbps) | The reserved bandwidth you want to assign for each group. The total bandwidth for all groups cannot exceed the value in the *Reserved B/W* field in the top portion of the window. |

Figure 77.     FAT ASI Ports Created
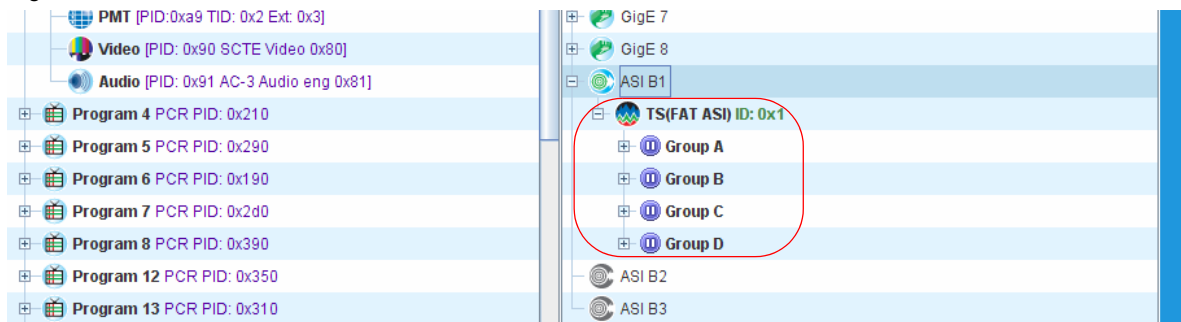


# Creating Programs

Use information in this section to create output programs, as described in the following topics:

- "Creating Programs Manually," next.
- "Program Messaging System Setting" on page 134.

**Note:**  *With the exception of ghost programs, input programs cannot be created; these must be automatically detected from a GigE or ASI port. For information about ghost program creation, see "Managing Elementary Streams" on page 156.*

You can create output programs in one of two ways:

- Manual configuration, as described in "Creating Programs Manually," next.
- Drag and drop grooming, as described in "Drag and Drop Grooming" on page 140.

For either method, the program mapping configuration is identical. You can also schedule programs by using either method.

## Creating Programs Manually

Use the **Create Output Program** dialog to set parameters for an output program. Fields displayed in the **ETV Configuration** portion of this dialog are the result or PIDs priority setting as either **Ad** or **Network**.

| 👉 **Menu Path** | From the **Outputs** panel of the **Grooming -> Mapping** tab, right-click on a transport stream and select **Create Program** from the popup menu (Figure 78 and Table 68). |
|---|---|

Figure 78.    Create Output Program



ETV PIDs Priority set to *Ad*    ETV PIDs Priority set to *Network*
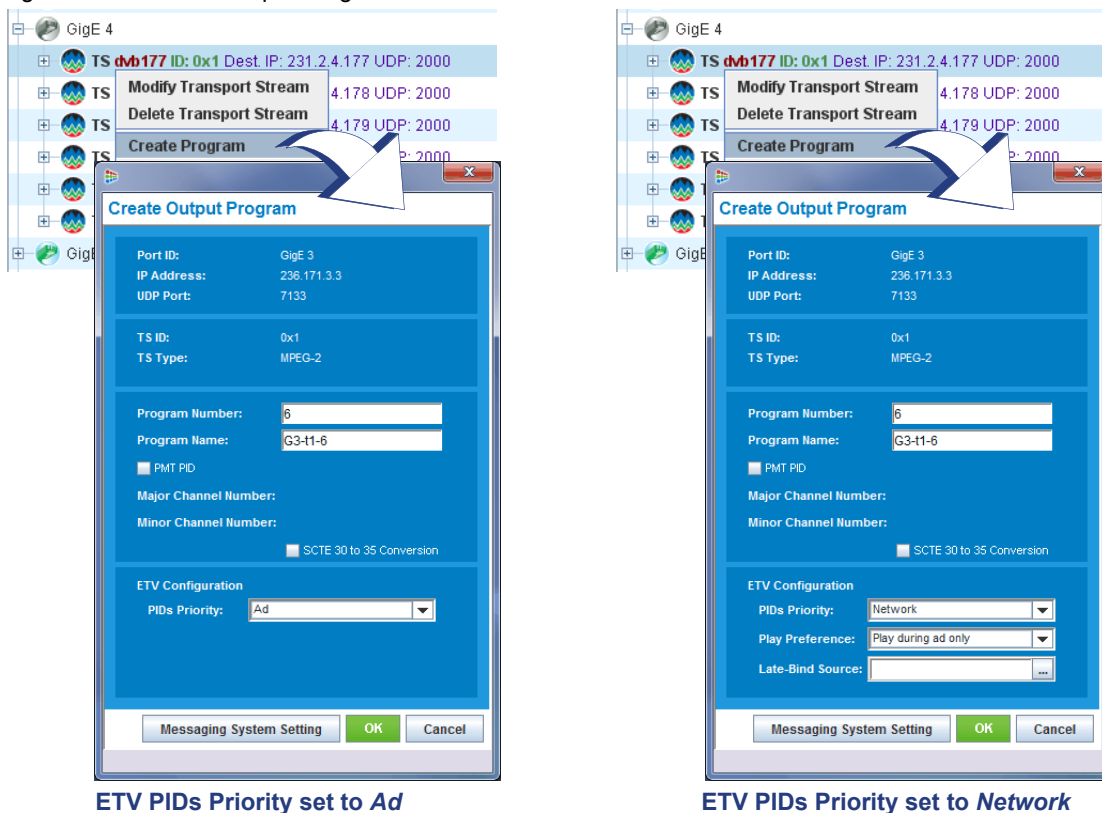
**1.** At the **Create Output Program** dialog, set parameters for the program, then click **OK**.

2. View results of the program configuration at the **Outputs** panel of the **Mapping** page, directly beneath the selected TS.

For information about the **Messaging System Setting** button, see "Program Messaging System Setting" on page 134.

Table 68.      Create Output Program Configuration Parameters

| Field | Description |
|---|---|
| **Port Parameters** | |
| Port ID | Read-only field. The GigE or ASI port on which the program resides. |
| IP Address | Read-only field. The destination IP address of the transport stream. |
| UDP Port | Read-only field. UDP port the program uses, based on UDP port of the transport stream. |
| **TS Parameters** | |
| TS ID | Read-only field. The ID number of the transport stream on which this program streams. |
| TS Type | Read-only field. Indicates the type of transport stream for the program. |
| **Program/Channel Info Parameters** | |
| Program Number | MPEG number assigned to this program |
| Program Name | Name assigned to this program. Output program names must be unique. |
| PMT PID | Select this option to activate the PMT ID box, into which you can then enter the PMT ID, or the ID of the program map table (PMT). |
| | To set a PMT PID, enter a decimal value in this field. |
| | Note that display of this entry, in applicable screens, is dependent on the current setting—as either hexadecimal or decimal—for **Configuration**-->**Global PID Display.** |
| Major Channel Number | Operator-defined channel number: for terrestrial broadcast, the major channel number is limited to the range 1 to 99 for ATSC digital television or audio services. For cable, major channel numbers may range from 1 to 999. |
| | This field can be edited if ATSC is enabled. |
| Minor Channel Number | Operator-defined minor channel number: any whole number in the range from 0 to 999. |
| | This field can be edited if ATSC is enabled. |
| Enable DPI[a] | Select this option to enable DPI for the program only, rather than the whole TS. |
| | • This option is hidden unless a PROGRAM WITH DPI license key has been entered in the License Manager screen (see also "Managing Licenses" on page 190. |
| Allow SCTE 30- to-SCTE 35 conversion | When checked, enables SCTE 30 to SCTE 35 conversion. |
| Allow Audio Mismatch During DPI | Check this box to allow ads to have a different audio format from the input program during DPI. By default, ads must have the same audio format as the input program. |
| | Note: Audio mismatch is limited to MPEG-1 and MPEG-2 audio types. |
| | Note: If you enable this feature while DPI is active on the output program, then the audio mismatch is allowed only from the next set of ads. |
| | Note: PMT is not updated even if the BNP matches MPEG-1 audio to MPEG-2 audio. |
| **ETV Configuration[b] Parameters** | |

Table 68.      Create Output Program Configuration Parameters  (Continued)

| Field | Description |
|-------|-------------|
| ETV PIDs Priority | Indicates the source of EBIF ES data for the duration of the ad time and provides the option to replace or not replace the pre-bound EBIF ESs during ad splicing.<br><br>• When *Ad* is selected, the spliced ad will provide the EBIF and EISS elementary streams (ESs). If the EBIF and EISS ESs from the ad do not match the stream type and descriptors of the network EBIF and EISS ESs, then the network EBIF and EISS ESs will be dropped. If no EBIF and EISS data are pre-configured at the output program or no EBIF and EISS data are present at the output then the EBIF and EISS ESs form the ad are dropped.<br><br>• When *Network* is selected, the EBIF and EISS ESs from the ad server will be *ignored*, even if they are present.<br><br>Default is set to *Ad*. |
| Play Preference | When the *ETV PIDs Priority* is set to *Network*, the following three options will appear in a drop down box:<br><br>• *Play through ad*: any EBIF ES data that is part of the output program will continue to be played during the ad.<br><br>• *Drop during ad:* any EBIF ES data that is part of the output program will be dropped during the ad.<br><br>• *Play during ad only:* provides the ability to select the input EBIF ES source that will be playing only during the ad time; if an EBIF ES source is not available, the EBIF ES that currently exists in the output program will be played.<br><br>Default setting is *Play through ad*. |
| Late-Bind Source | This option is only available when the *ETV PIDs Priority* is set to *Network* and the *Play Preference* is set to *Play during ad only*.<br><br>• When the above two conditions have been met, an additional field with ellipses (**. . .**) will appear. Clicking on the ellipses will open the *Late-Bind Source Dialog* window, which will allow the option to choose a valid pair of EBIF/EISS ES from the BNP's input. |
| Messaging System Parameters | |
| Messaging System Setting | Click this button to open the Program Messaging System Setting window to configure and enable messaging zones for the program. See "Program Messaging System Setting," below for details. |

a.  A GROOMING WITH DPI license key (which enables DPI for the TS) cannot co-exist with a PROGRAM WITH DPI license key.

b.  For additional information in ETV configuration including details on various EBIF and EISS use cases, see Chapter 10, "ETV Binary Interchange Format."

## Program Messaging System Setting

Use the **Program Messaging System Setting** dialog to configure and enable one of each of the three types of Messaging Zones per program. (Figure 79 and Table 69).
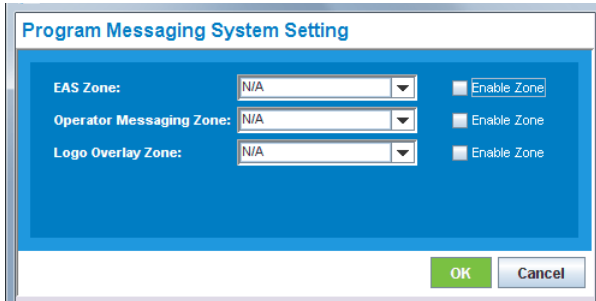
| 👉 | Menu Path | From the **Outputs** panel of the **Grooming -> Mapping** tab, right-click on a TS and select **Create Program** from the popup menu -> click the **Messaging System Setting** button. |
|---|---|---|

Figure 79.     Program Messaging System Setting dialog



> ℹ️ **Note:**  *To select a zone from each of the three types of zone choices in the **Program Messaging System Setting** window, the zones must first be created from the **Configuration -> Messaging System** menu as described in "Messaging System Configuration" on page 60 in Chapter 4.*

You may select one of each zone type to configure and enable per program. Only previously created zones will appear in the drop-down menu. Table 69 describes the fields available in the **Program Messaging System Setting** window.

Table 69.     Messaging System Setting window

| Field | Description |
|---|---|
| EAS Zone | Select an EAS zone from the pull-down menu to associate with the program. See "EAS Messaging Zones" on page 63 in Chapter 4 for additional information. <br><br> Click the *Enable Zone* button next to the selection to enable the EAS messaging zone for the specified program. |
| Operator Messaging Zone | Select an Operator or Advanced Messaging zone from the pull-down menu to associate with the program. See "Operator and Advanced Messaging Zones" on page 68 in Chapter 4 for additional information. <br><br> Click the *Enable Zone* button next to the selection to enable the Operator or Advanced Messaging zone for the specified program. |
| Logo Overlay Zone | Select a Logo Overlay zone from the pull-down menu to associate with the program. See "Logo Overlay Zones" on page 79 in Chapter 4 for additional information. <br><br> Click the *Enable Zone* button next to the selection to enable the Logo Overlay zone for the specified program. |

# Modifying and Deleting Streams or Programs

If a transport stream or a program configuration needs to be modified, use the main **Grooming -> Mapping** window to access the change options:

## Modifying Input Transport Streams

Use the **Modify GigE Input Transport Stream** dialog to change the name of an input transport stream. Other parameters cannot be modified.

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the inputs side of the **Grooming -> Mapping** tab screen, right-click on a TS associated with a GigE port or an ASI port, and select **Modify Transport Stream** from the popup menu. |

Figure 80.     Modify Input TS — GigE Port and ASI Port Options



Modify ASI TS

Modify GigE TS
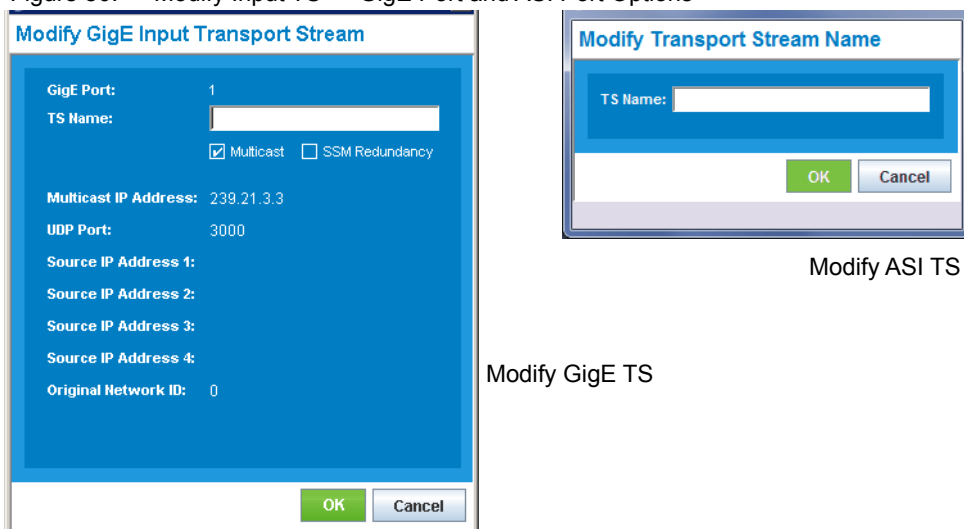
1.  At the TS Name field, type an alphanumeric string to provide a new name for the TS.
2.  Click **OK** to save changes and dismiss the dialog.

## Modifying Output Transport Streams - GigE

Use the **Modify Output Transport Stream** dialog (Figure 81) to change parameters for output GigE transport streams.

| 👉 **Menu Path** | From the outputs panel of the **Grooming -> Mapping** tab screen, right-click on a GigE transport stream and select **Modify Transport Stream** from the popup menu. |
|---|---|

Figure 81.     Modify Output TS (MPEG-2 shown) - GigE port



1.  At the **Modify Output Transport Stream** dialog, enter parameters to editable fields.

    Note that certain parameters are common to all transport stream types (Table 64 on page 116): additional parameters can be modified for ATSC and DVB transport streams (Table 70).

    Table 70.     Modifiable Parameters for GigE Output Transport Stream

| For All TS Types | Additional Modifications | |
|---|---|---|
| | For ATSC TS | For DVB TS |
| TS Name | Generate TVCT | Network ID |
| Multicast | STT Source | Original Network ID |
| Destination IP | EIT Source | NIT Source |
| UDP Port | RRT Source | TDT/TOT Source |
| Subnet Mask | | SDT Source |
| ARP | | EIT Source |
| ARP Address | | |
| Enable Message System | | |

2.  Click **OK** to save the changes and dismiss the dialog.

## Modifying Output Transport Streams - ASI

Use the **Modify Output Transport Stream** dialog to dialog (Figure 82) to change parameters for output ASI transport streams.

| 👉 **Menu Path** | From the outputs panel of the **Grooming -> Mapping** tab screen, right-click on an ASI transport stream and select **Modify Transport Stream** from the popup menu. |
|---|---|

Figure 82.    Modify Output TS - ASI port.



1.  At the **Modify Output Transport Stream** dialog, enter parameters to editable fields.

    Note that certain parameters are common to all transport stream types (Table 63 on page 114): additional parameters can be modified for ATSC and DVB transport streams (Table 71).

    Table 71.    Modifiable Parameters for ASI Output Transport Stream

| For All TS Types | Additional Modifications | |
|---|---|---|
| | **For ATSC TS** | **For DVB TS** |
| TS Name | Generate TVCT | Network ID |
| Enable Message System | STT Source | Original Network ID |
| | EIT Source | NIT Source |
| | RRT Source | TDT/TOT Source |
| | | SDT Source |
| | | EIT Source |

2.  Click **OK** to save the changes and dismiss the dialog.

## Modifying Input Programs

The Program Name is the only editable parameter for input programs. Use the **Modify Input Program** dialog (Figure 83) to change an existing input program name.

| | Menu Path | From the inputs panel of the **Grooming -> Mapping** tab screen, right-click on a program and select **Modify Program Name** from the popup menu. |
|---|---|---|

Figure 83.    Program Pop-Up menu - Modify Program
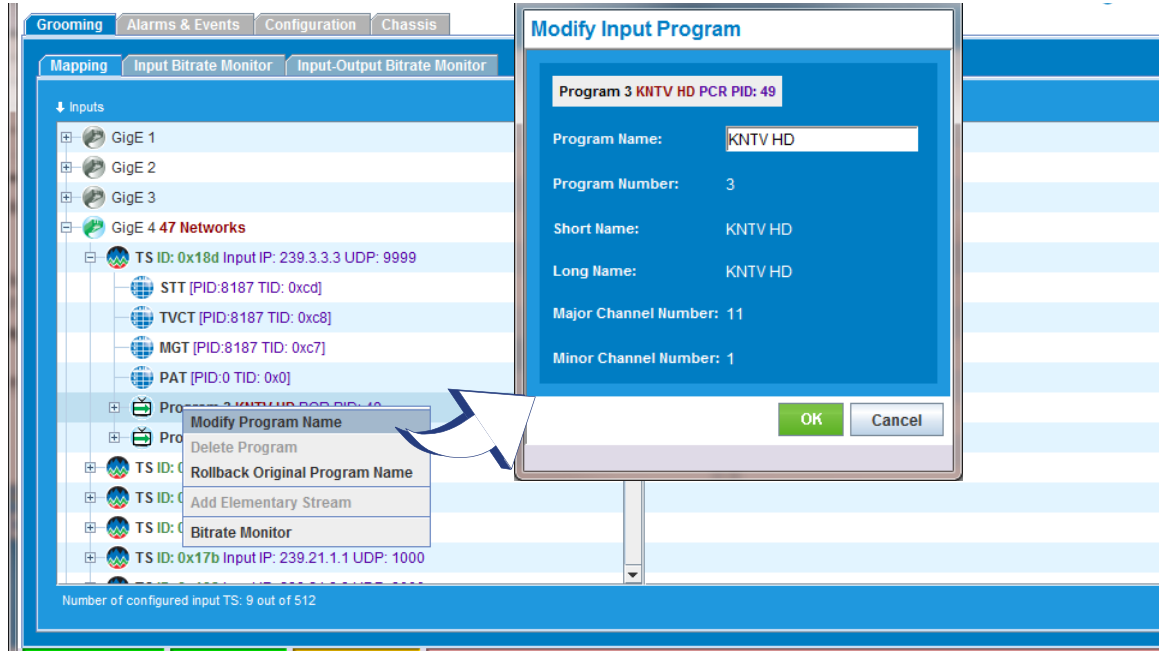


1.   At the **Modify Input Program** dialog, type an alphanumeric string in the **Program Name** field.

2.   Click **OK** to save changes. The new program name is now listed in the inputs panel of the **Grooming** --> **Mapping** tab screen.

## Modifying Output Programs

Use the **Modify Output Program** dialog (Figure 84) to change the Program Name and/or PIDs Priority for a specified output program.

| 👉 **Menu Path** | From the outputs panel of the **Grooming -> Mapping** tab screen, right-click on a program and select **Modify Program** from the popup menu. |
|---|---|

Figure 84.     Modify Output program - GigE or ASI port
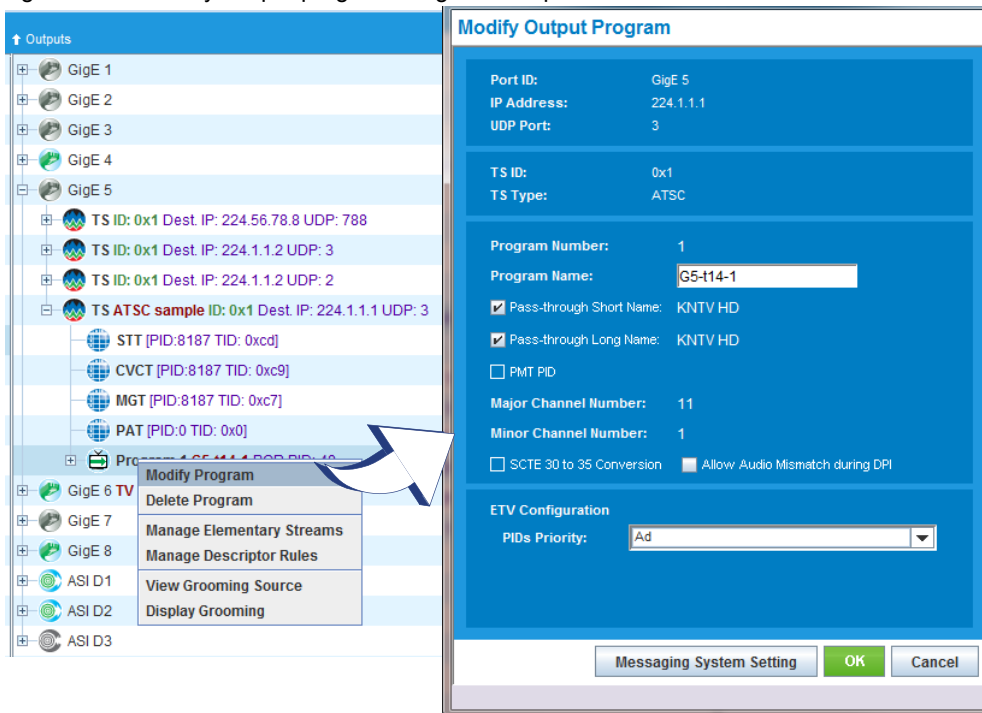


1.  At the **Modify Output Program** dialog, enter parameters to editable fields (see also Table 68, "Create Output Program Configuration Parameters," on page 132 for descriptions):

    –   Program Name.

    –   Allow Audio Mismatch During DPI.

    –   Any relevant **ETV Configuration** fields: PIDs Priority, Play Preference, Late-Bind Source.

    –   Any relevant **Messaging System Setting** fields: EAS Zone, Operator Messaging Zone, Logo Overlay Zone.

ℹ️ **Note:**  *Any other attributes that you wish to change on a program must be changed on the program's Elementary Stream(s).*

2.  Click **OK** to save your changes.

## Deleting Output Streams and Programs

Use the **Delete** function to remove a stream or program from the BNP.

1. From the **Grooming -> Mapping** tab screen, right-click on a TS and select one of the following options from the popup menu:

   – **Delete Transport Stream**, to remove the individual output stream from the ASI or GigE interface.
   – **Delete All Programs**, to remove all output programs from the ASI or GigE interface.

2. At the confirmation dialog, click **Yes**.

Figure 85.    Delete Output Transport Stream or Program
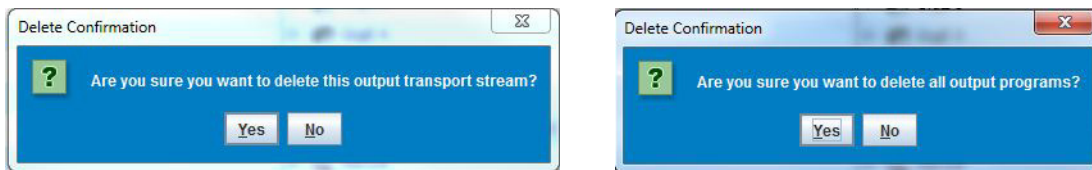


# Drag and Drop Grooming

You can groom programs by using the drag and drop method to associate input transport streams, programs, or data elementary streams with selected output elements (Table 72). You can drag a transport stream to a port, or over an existing transport stream. You can drag a program to a transport stream, or over an existing program. You can also drag an elementary stream to a program or to an existing elementary stream..

Table 72.    Drag and drop grooming

| Drag and Drop Components | Grooming Behavior |
| --- | --- |
| Transport Stream to Transport Stream | Deletes all current programs and replaces them with the dragged Transport Stream |
| Transport Stream to GigE Port | The entire Transport Stream is copied to the output port |
| Program to Transport Stream | The program is created in the Transport Stream; the *Configure Program Mapping* window appears, allowing you to modify the program mapping information<br>See also "Program to Transport Stream Grooming" on page 141. |
| Program to Program | Deletes the existing program and replaces it with the dragged program<br>See also "Program to Program Grooming" on page 142. |
| Elementary Stream to Elementary Stream | For EBIF, EISS, and regular data streams only; deletes existing ES and replaces it with the dragged ES. Opens the Configure Elementary Stream Mapping window. Only supports replacing the ES, not modification.<br>See also "Input Elementary Stream to Output Elementary Stream Grooming" on page 150 |
| Elementary Stream to Program | For EBIF, EISS, and regular data streams only; adds the dragged ES to the program. If the ES already exists in the program, the dragged ES will replace the existing ES.<br>See also "Elementary Stream Grooming" on page 148. |

⚠ **Caution:**    *If you replace one transport stream with another, the original will be completely deleted.*

## Program to Transport Stream Grooming

Use steps in this section to associate a specific input program with output transport stream. All PSIP tables and schedules that are part of the input program will be set to the specified output port.

1.  At the **Grooming** -> **Mapping** tab screen, select and drag an input program and drop it onto a specific output transport stream to present the **Configure Program Mapping Grooming** tab screen (Figure 86).

    Figure 86.    Drag input program to output TS
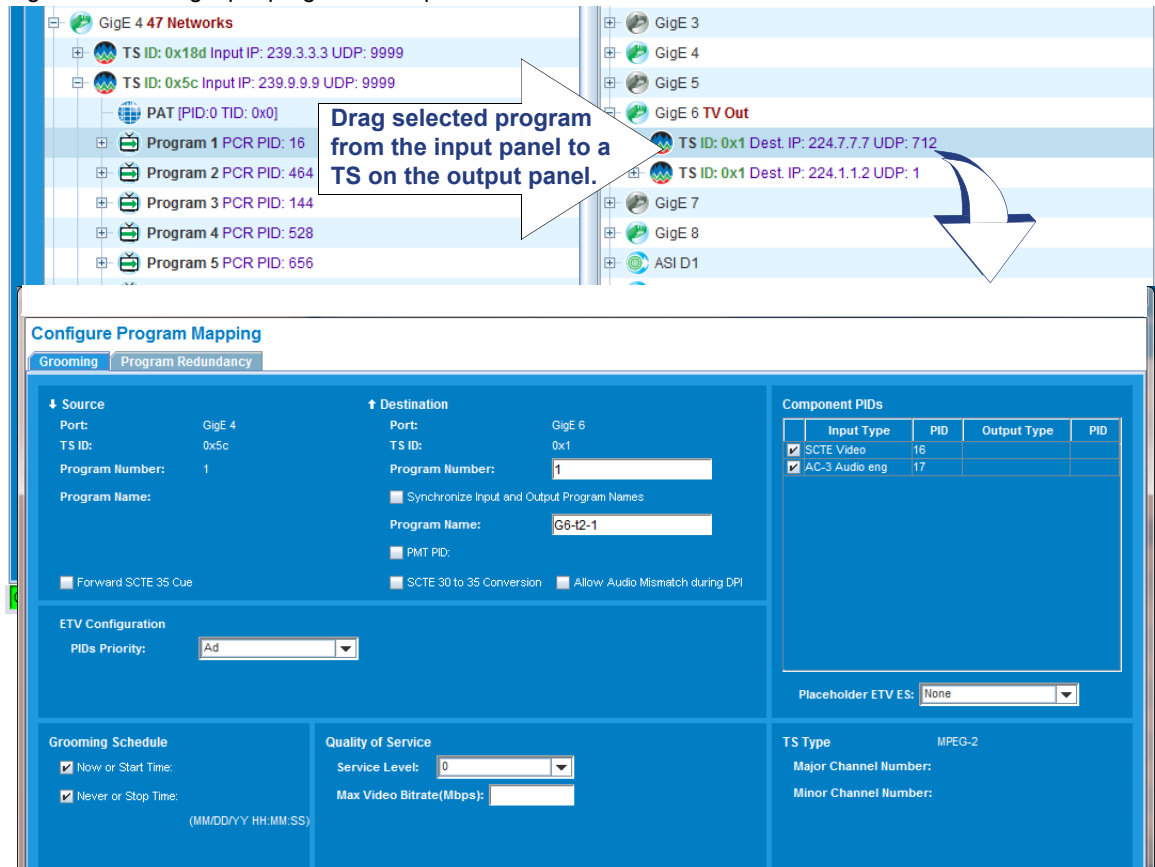
    

2.  At the **Configure Program Mapping Grooming** tab screen, enter information to define the mapping. See Table 73 for parameter descriptions.

    If this is a backup program, click the **Program Redundancy** tab and enter the input ports, transport streams, and programs. (See "Program Redundancy" on page 152 for details.)

3.  Click **OK** to save and use the settings.

## Program to Program Grooming

Use steps in this section to associate a specific input program with a selected output program.

**Note:** *If you are using the drag and drop method of program creation and you wish to configure or enable Messaging System Settings for this program, you must modify the program after drag and drop and then associate zones for the program as described in "Program Messaging System Setting" on page 134.*

**Note:** *As of BNP Release 3.7.1 the Element Manager allows you to groom an input Ghost program to an output TS*

1. At the **Grooming** -> **Mapping** tab screen, select and drag an input program and drop it onto a specific output program (Figure 87) to present the **Configure Program Mapping Grooming** tab screen.

Figure 87.   Drag input program to output program



2. At the **Configure Program Mapping Grooming** tab screen, enter information to define the mapping.

See the following tables for guidelines:

– Table 74, "Configure Program Mapping—Grooming Parameters—ETV Configuration," on page 144.

– Table 75, "Configure Program Mapping—Grooming Parameters—Destination," on page 145

– Table 76, "Configure Program Mapping—Grooming Parameters—Grooming Schedule," on page 146.

– Table 77, "Configure Program Mapping—Grooming Parameters—Quality of Service," on page 146.

– Table 78, "Configure Program Mapping—Grooming Parameters—Component PIDs," on page 146.

– Table 79, "Quality of Service Levels," on page 147.

If this is a backup program, click the **Program Redundancy** tab and enter the input ports, transport streams, and programs. (See "Program Redundancy" on page 152 for details.)

3. Click **OK** to save and use the settings.

Table 73.        Configure Program Mapping—Grooming Parameters—Source

| Field | Description |
|---|---|
| Port | Read-only. Specifies the input GigE or ASI port used for the input program. The GigE port to use, transport stream ID, program name and number for both the source and the destination of this program must be defined. For input streams, you can choose to Forward SCTE 35 Cue. For output streams, you can enable and specify PMT PID, and enable SCTE 30 to 35 Conversion. |
| TS ID | Read-only. Specifies the input Transport Stream ID used for the input program. |
| Program Number | Read-only. Specifies the program number for the input program. |
| Program Name | Read-only. Specifies the program name (if one was given) for the input program.This section also displays pass-through status as either enabled (checked) or disabled (un-checked) for long and short program names. |
| Synchronize input and output program names | Check this box to copy the input program name into the output program name at creation time.<br><br>An output program can have up to three names when it is part of an ATSC transport stream, to serve the following purposes:<br><br>• The unique name, which is used for DPI purposes, that enables the BNP to identify the program.<br><br>• The short name (max 7 characters), for use in ATSC tables. The short name is not required to be unique at the BNP or at the output TS level.<br><br>• The long name (max 32 characters), for use in ATSC tables. The long name is not required to unique at the BNP or at the output TS level. |
| Short Name | If available, string consisting of 1 - 7 characters, which identifies the short program name. |
| Long Name | If available, string consisting of 1 - 32 characters, which identifies the long program name. |
| Forward SCTE 35 Cue | Check this box to forward SCTE 35 cue tones from the input program.<br><br>*You cannot select this option and SCTE 30 to 35 Conversion for the same output program.* |

Table 74.        Configure Program Mapping—Grooming Parameters—ETV Configuration

| Field | Description |
|---|---|
| ETV PIDs Priority | Indicates the source of EBIF ES data for the duration of the ad time and provides the option to replace or not replace the pre-bound EBIF ESs during ad splicing.<br><br>• When *Ad* is selected, the spliced ad will provide the EBIF and EISS elementary streams (ESs). If the EBIF and EISS ESs from the ad do not match the stream type and descriptors of the network EBIF and EISS ESs, then the network EBIF and EISS ESs will be dropped. If no EBIF and EISS data are pre-configured at the output program or no EBIF and EISS data are present at the output then the EBIF and EISS ESs form the ad are dropped.<br><br>• When *Network* is selected, the EBIF and EISS ESs from the ad server will be *ignored*, even if they are present.<br><br>Default = *Ad*. |
| Play Preference | When the *ETV PIDs Priority* is set to *Network*, the following three options will appear in a drop down box:<br><br>• *Play through ad*: any EBIF ES data that is part of the output program will continue to be played during the ad.<br><br>• *Drop during ad:* any EBIF ES data that is part of the output program will be dropped during the ad.<br><br>• *Play during ad only:* provides the ability to select the input EBIF ES source that will be playing only during the ad time; if an EBIF ES source is not available, the EBIF ES that currently exists in the output program will be played.<br><br>Default = *Play through ad*. |
| Late-Bind Source | This option is only available when the *ETV PIDs Priority* is set to *Network* and the *Play Preference* is set to *Play during ad only*.<br><br>When the above two conditions have been met, an additional field with ellipses (**. . .**) will appear. Clicking on the ellipses will open the *Late-Bind Source Dialog* window, which will allow the option to choose a valid pair of EBIF/EISS ESs from the BNP's input. |

**Note:** *For more information about ETV Configuration, see also* Chapter 10, "ETV Binary Interchange Format."

Table 75.       Configure Program Mapping—Grooming Parameters—Destination

| Field | Description |
|---|---|
| Port | Displays the destination GigE or ASI port of the output port to which the program will be groomed. |
| TS ID | Displays the destination Transport Stream ID of the output TS to which the program will be groomed. |
| Program Number | View or modify the destination program number of the output program to which the program will be groomed. |
| Synchronize Input and Output Program Names | Enable (check) or disable (un-check) copying of the current input program name into the output program name when grooming. |
| Program Name | View or modify the destination program name of the output program name to which the program will be groomed. |
| Pass-through Short Name | View or modify the short name.<br>• When enabled (checked) the name currently displayed in this field is passed through.<br>• When disabled (un-checked), up to 7characters can be entered to define the short name to be passed through. |
| Pass-through Long Name | View or modify the long name.<br>• When enabled (checked) the name currently displayed is passed through.<br>• When disabled (un-checked), up to 32 characters can be entered to define the long name to be passed through. |
| PMT PID | Select this option to activate the PMT ID box, into which you can then enter the PMT ID, or the ID of the program map table (PMT).<br>To set this PMT PID, enter a decimal value in the range 32 to 8175.<br>Note that display of this entry, in applicable screens, is dependent on the current setting—as either hexadecimal or decimal—for **Configuration**-->**Global PID Display.** |
| Enable DPI | Select this option to enable DPI for the program only, rather than the whole TS.<br>• This option is hidden unless a PROGRAM WITH DPI license key has been entered in the License Manager screen. See also "Managing Licenses" on page 190.<br>• A GROOMING WITH DPI license key (which enables DPI for the TS) cannot co-exist with a PROGRAM with DPI license key. |
| SCTE 30 to 35 Conversion | When checked, converts SCTE 30 messages to SCTE 35 cues for transport to the destination.<br>*You cannot select this option and Forward SCTE 35 Cue for the same output program.* |
| Allow Audio Mismatch During DPI | Check this box to allow ads to have a different audio format from the input program during DPI. By default, ads must have the same audio format as the input program.<br>Note: Audio mismatch is limited to MPEG-1 and MPEG-2 audio types.<br>Note: If you enable this feature while DPI is active on the output program, then the audio mismatch is allowed only from the next set of ads.<br>Note: PMT is not updated even if the BNP matches MPEG-1 audio to MPEG-2 audio. |

Table 76.       Configure Program Mapping—Grooming Parameters—Grooming Schedule

| Field | Description |
|-------|-------------|
| Now or Start Time | To specify the time the program should start, or to continue until either manually stopped or to stop at a specified time, enable these features. If you choose to specify a start or stop time, enable the feature and type the time directly into the appropriate field. A check mark appears when the feature is active.<br><br>See "Scheduling Grooming - One time event" on page 151 for additional information. |
| Never or Stop Time | To tell the program the time to start, or to continue until either manually stopped or to stop at a specified time, enable these features. If you choose to specify a start or stop time, enable the feature and type the time directly into the appropriate field. A check mark appears when the feature is active.<br><br>See "Scheduling Grooming - One time event" on page 151 for additional information. |

Table 77.       Configure Program Mapping—Grooming Parameters—Quality of Service

| Field | Description |
|-------|-------------|
| Service Level | Set a value from the pull-down to define the bit rate adaptation technique to be applied to MPEG-2 encoded streams, as one of the following:<br><br>• Any integer from -8 to +8<br>• 0 (off)<br>• Bypass Transrater<br>  (not for use when grooming a DPI-enabled program)<br>• Handle as Data<br>  (not for use when grooming a DPI-enabled program)<br>• No Rate shaping<br>See also Table 79, "Quality of Service Levels," on page 147. |
| Max Video Bitrate | Sets the limits for the maximum bitrate (in Mbps) for this program. Choosing a specific max rate will bypass automatic transrating based on priorities. |

Table 78.       Configure Program Mapping—Grooming Parameters—Component PIDs

| Field | Description |
|-------|-------------|
| | For this program input, this category allows stream grooming by deselecting specific input PIDs. |
| Input Type | Specifies the stream type of the input ESs for this program. |
| PID | Specifies the PID of the input ESs for this program. |
| Output Type | If clicking in the blue space under this field, opens the *Select Elementary Stream* window, which will allow you to change the PID of the chosen ES. |
| PID | If clicking in the blue space under this field, opens the *Select Elementary Stream* window, which will allow you to change the PID of the chosen ES.<br><br>The PID is displayed either as a hexadecimal value or a decimal value, as based on the current setting for "PID Display Format—Global Configuration". |
| Stay Unreferenced | If the input program is a *Ghost Program*, the *Stay Unreferenced* option will appear in this section. Check this box if the PIDs in this stream are to remain unreferenced in any PSI tables. See "Adding an Unreferenced PID as an Elementary Stream" on page 167 for more information. |

Table 78.    Configure Program Mapping—Grooming Parameters—Component PIDs  (Continued)

| Field | Description |
|---|---|
| Treat As Async Data | If the input program is a data-only program or all video and audio streams in the Component PIDs section are unchecked, the *Treat as Async Data* option will appear in this section. Check this box to disable PCR timing information for this program. |
| Placeholder ETV ESs | If the input program does not contain EBIF and EISS elementary streams, a drop down box for the *Placeholder ETV ES* field will be displayed and editable. This option allows pre-configuration of an EBIF and EISS ES pair with a stream type of 5 or 192. When selecting either *EBIF/EISS 5* or *EBIF/EISS 192* the system will automatically generate the following:<br><br>• 1 new ES with a *Preconfigured for PMT* setting of Yes for each EBIF and EISS stream.<br>(See "Managing Elementary Streams" on page 156.)<br><br>• 2 new Descriptor Rules for each new EBIF and EISS ES.<br>(See "Managing PMT and ES Descriptors" on page 177.) |

## Configure Program Mapping—Quality of Service Levels

The **Service Level** field of the Configure Program Mapping tab screen allows assignment of transrating priorities and conditions for each program. Table 79 provides additional details about the supported service levels.

Table 79.    Quality of Service Levels

| QoS Service Level Configuration | Video Processing | Can DPI be performed? | Effect on Video Output Bandwidth |
|---|---|---|---|
| Transrating Service Level Values | Video elementary stream (ES) is processed through the transrater.<br><br>• -8: highest transrating, lowest quality.<br><br>• +8: lowest transrating, highest quality. | YES[a] | Transrated output video ES requires less bandwidth than input video ES. |
| No Rate shaping | Video ES processing is limited through the transrater with null packet removal.<br><br>• Video quantization level is unchanged | YES[b] | Output video ES bandwidth will vary depending on level of ES null packet removal. |
| Bypass Transrater | Video ES is not processed through the transrater.<br><br><br>• Video can be displayed. | YES | Output video ES uses the same bandwidth as input video ES.<br><br>• Can not use more than the bandwidth of output TS. |
| Handle As Data | Video ES is not processed through the transrater.<br><br><br>• Video cannot be displayed. | NO | Output data ES is treated as data and will therefore use the same bandwidth as input video ES.<br><br>• Cannot use more than the bandwidth of output TS. |

a.  DPI sessions carry same QOS settings as network.
b.  DPI sessions carry same QOS settings as network.

## Elementary Stream Grooming

Use steps in this section to groom a specific input elementary stream to an output program. You can also replace an existing elementary data stream within an output program.

| | | |
|---|---|---|
| 👉 | **Menu Path** | At the **Inputs** panel of the **Grooming** -> **Mapping** tab screen, select and drag generic data or the EBIF/EISS elementary stream and drop it into program in the **Outputs** panel (Figure 88). The **Configure Elementary Stream Mapping** screen is now presented. |

ℹ️ **Note:** *For information about various data stream types and their icons, see Table 59 on page 107.*

Figure 88.    ES-to-Program Drag and Drop
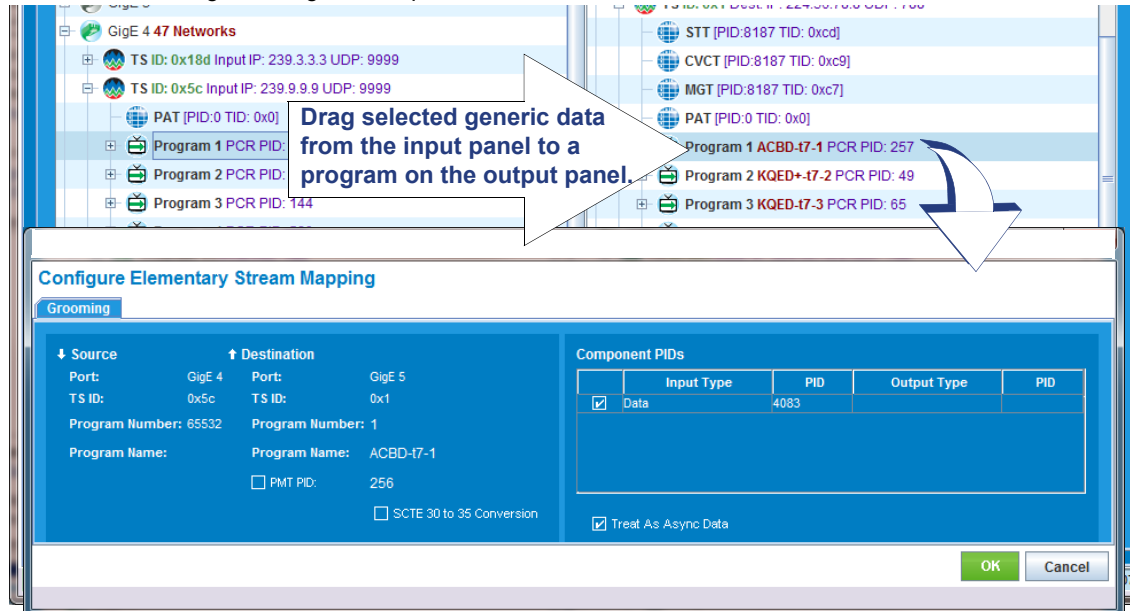


At the **Configure Elementary Stream Mapping** screen, all fields—except **Output Type** and **PID**—are read-only (Table 80).

1. To set a value for either **Output Type** or **PID**, click in the field to present the **ES PID** dialog.

2. At the **New Reserved PID** field, type the ID string and click **OK**.

   The new ES PID will be displayed in the **Configure Elementary Stream Mapping** screen.

3. At the **Configure Elementary Stream Mapping** screen, click **OK** to dismiss the screen.
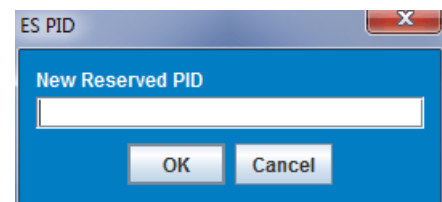
Table 80 describes the fields available in the **Configure Elementary Stream Mapping** window.

Table 80.        Configure Elementary Stream Mapping

| Category | Field | Description |
|---|---|---|
| Source | Port | Displays the source GigE or ASI port of the elementary stream's input program. |
| | TS ID: | Displays the source Transport Stream ID of the ES's input TS. |
| | Program Number | Displays the source program number of the ES's input program. |
| | Program Name | Displays the source program name of the ES's input program. |
| Destination | Port | Displays the destination GigE or ASI port of the output port to which the ES will be groomed. |
| | TS ID: | Displays the destination Transport Stream ID of the output TS to which the ES will be groomed. |
| | Program Number | Displays the destination program number of the output program to which the ES will be groomed. |
| | Program Name | Displays the destination program name of the output program name to which the ES will be groomed. |
| | PMT PID | Displays the Program Map Table PID assigned to the output program.<br><br>The displayed value—as either hexadecimal or decimal—is based on the current setting from **Configuration--**>**Global PID Display.** |
| | SCTE 30 to 35 Conversion | Displays whether or not *SCTE 30 to 35 Conversion* has been enabled for the output program to which the ES will be groomed. |
| Component PIDs | Input Type & PID Output Type & PID | Displays the ES *Input Type* and *PID*, *Output Type* and *PID*. For *Input Type*, the options that will be seen are as follows:<br><br>• Data<br>• EBIF<br>• EISS<br><br>Click the blue space under Output Type or PID to enter a reserved PID for this ES. |
| | Treat as Async Data | When grooming a data, EBIF, or EISS ES to an output program, the Treat *as Async Data* option will always be enabled.<br><br>When data is treated as *Async Data*, then the timing information in the data stream is not processed. |

## Input Elementary Stream to Output Elementary Stream Grooming

Use steps in this section to groom an elementary stream from an input program into an output elementary stream. This operation will replace the targeted output ES with the selected input ES.

**Note:** *An elementary stream may only be groomed on top of an existing ES-level groomed elementary stream (not a program-level groomed stream), and the Stream Types of the input ES and the output ES must match.*

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Grooming** -> **Mapping** screen **Inputs** panel, select either a generic data or the EBIF / EISS elementary stream and drag to an output ES at the **Outputs** panel (Figure 89). The **ES Grooming Replacement** dialog is now presented. |

Figure 89.     ES-to-ES Drag and Drop.



Input Data ES to groom                                    Drag input ES to output ES
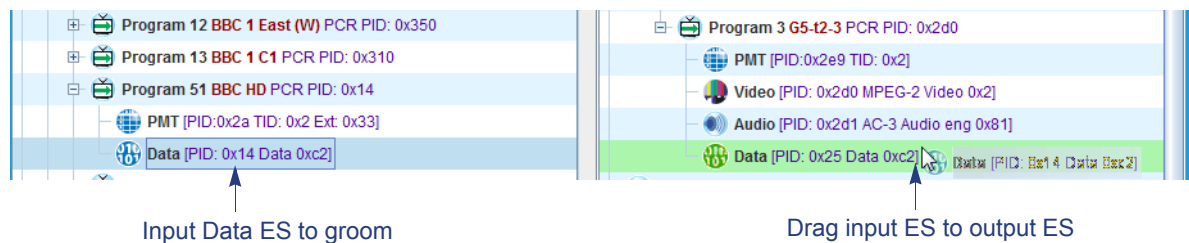
**At the ES Grooming Replacement** dialog, click **Yes** to continue/replace the ES.
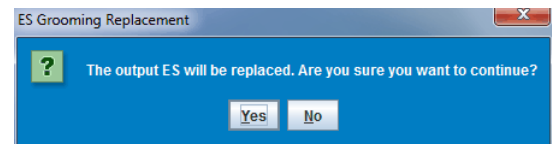


## Elementary Stream Grooming Icon Colors

The ES icons are displayed as green or blue (Table 81).

Table 81.     ES Icon Colors

| ES Color at Outputs Panel | Description |
|---|---|
| Green | The ES has been groomed from an input program to an output program, or directly onto an output ES. |
| Blue | An entire program (and therefore all of its ESs) has been groomed to an output TS, or replaces an existing output program. |

See Table 59 on page 107 for additional information.

# Viewing Grooming Details

1.  In the **Outputs panel** of the **Grooming -> Mapping** window, select the transport stream or program whose details and schedule you want to see.

2.  Right-click and select **Display Grooming**.

    The BNP *Element Manager* will display the currently defined mapping and scheduling window. If you chose to view grooming for the whole TS, all grooming for the programs in that TS will be displayed; if you chose to view grooming for a specific program, only the grooming for that program will appear.

    Figure 90.     Grooming detail display - TS



The presence of ES-level grooming is indicated by a black asterisk (**\***) next to the relevant ES in the **Component PIDs** section of the **Current Program Mapping and Schedule** window.

3.  Click **Refresh** to refresh the view, or **Cancel** to close the window.

> **Note:** In *Figure 90*, the times specified in the Grooming Schedule section (see *Figure 1* for a sample) are from the NTP server. Your PC that is used for configuration may show a different time. This "PC time" should be disregarded; the start and stop times you enter will be referenced to the NTP server.

# Scheduling Grooming - One time event

> **Note:** It should be noted that proper use of BNP's scheduled grooming feature depends on an NTP server as an accurate timing source. Additionally, when scheduling grooming, only a single event can be scheduled, rather than an ongoing occurrence.

To schedule grooming at a specific time for a one-time occurrence, perform steps 1 through 4 in the last section, "Creating Programs Manually" above in order to open the **Configure Program Mapping** window. Then proceed as follows:

1. From the **Configure Program Mapping** window, un-check **Now or Start time** and click on the pull-down menu to access the calendar/clock screen.

2. If you want to start grooming immediately, click **OK**. If you want to start at a later time, set the time and date and then click **OK**.

3. To set the stop time, un-check **Never or Stop Time**. The grooming schedule of Figure 1 appears. If you don't want to stop grooming, click **OK**. To set a stop time, set the time and date for grooming to stop and click **OK**.

4. Click **OK** to apply the mapping to the program.

## Program Redundancy

The BNP supports program level redundancy on all the output services. Program level standby is configurable using the *BNP Element Manager*, which allows you to designate any input service as a "standby program" with the exception of the same service. This redundancy can be configured on output streams associated with GigE port as well as ASI ports.

The health of the standby program will be checked before failover and the BNP will not perform the switch if the standby is degraded. In automatic recovery mode, the BNP returns back to the primary program from the standby program when the primary program recovers from the interruption.

A program in an input TS that has SSM redundancy configured cannot be used as a backup program for program redundancy.

## Modes of Program Redundancy Operation

The BNP supports two modes of Program Redundancy operation (Table 82):

- Automatic recovery from the backup program to the primary program, or
- Manual selection, by user, when the recovery process should occur.

Table 82.      Program Redundancy Modes of Operation

| Category | Primary to Backup | Backup to Primary |
|---|---|---|
| Automatic Failover to Backup Program / Automatic Recovery to Primary Program | Automatic failover operation is based on two conditions detected, either one will trigger a failover to the designated backup program:<br>• Video ES failure detection<br>or<br>• Missing PAT/PMT detection. | Automatic recovery operation is based on two conditions detected, both are required to trigger a recovery to the primary program:<br>• Video ES recovery detection<br>and<br>• PAT/PMT detection. |
| Automatic Failover to Backup Program / Manual Recovery to Primary Program | Automatic failover operation is based on two conditions detected, either one will trigger a failover to the designated backup program:<br>• Video ES failure detection,<br>or<br>• Missing PAT/PMT detection. | Manual recovery operation is based on the user selecting when a single program or all programs should be recovered to their respective primary programs. |

## Configuring Program Redundancy

Use the **Configure Program Redundancy** screen (examples: Figure 91, Figure 92) to define the program to be used as backup on ASI or GigE ports.

| | |
|---|---|
| 👉 **Menu Path** | **Grooming** tab **-> Mapping** tab screen: from the **Inputs** panel, drag and drop a program to an output transport stream or an output program at the **Outputs** panel-> click the **Program Redundancy** tab, then enable (check) **Specify a Backup Program**. |

1. At the **Program Redundancy** screen, select the program that is to be the backup for the output program.

   Your selected port, TS ID, program number, and program name (if applicable) is displayed at the right panel of the screen.

   – Figure 91 shows an example of program redundancy in which the backup is selected as GigE 2, Transport Stream ID 0x5c, and Program Number 1.
   – Figure 92 shows an example of program redundancy in which the selected backup is ASI D5, Transport Stream ID 0x1, and Program number 1.

2. At **Selected Program Redundancy Mode** click to select either **Automatic Failover / Automatic Recovery** or **Automatic Failover / Manual Recovery**. See Table 82 for details.

3. Click **OK** to return to the **Mapping** tab screen.

Figure 91.　　Configure Program Mapping - Program Redundancy on GigE Port
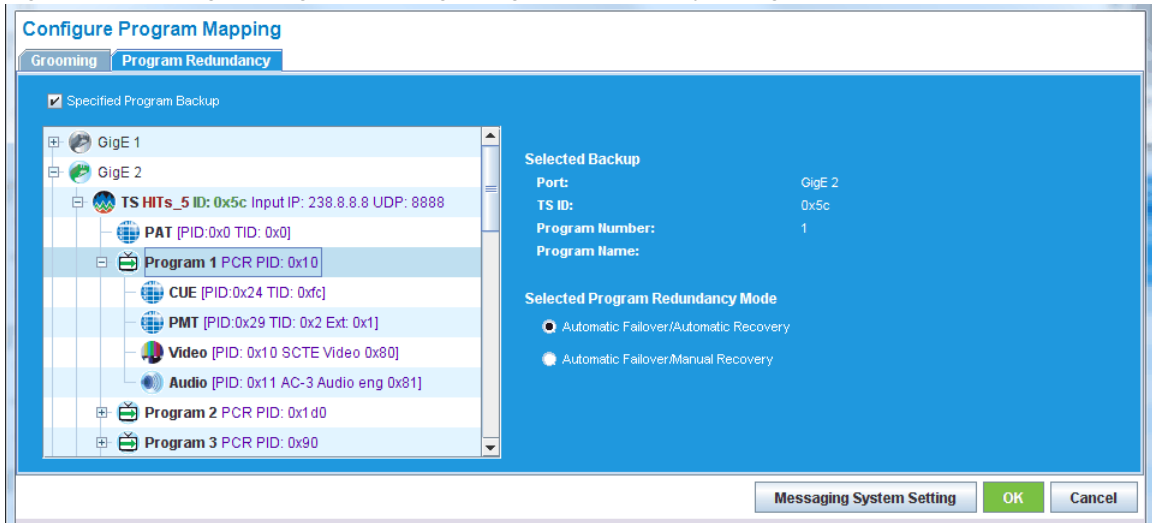


Figure 92.　　Configure Program Mapping - Program Redundancy on ASI Port
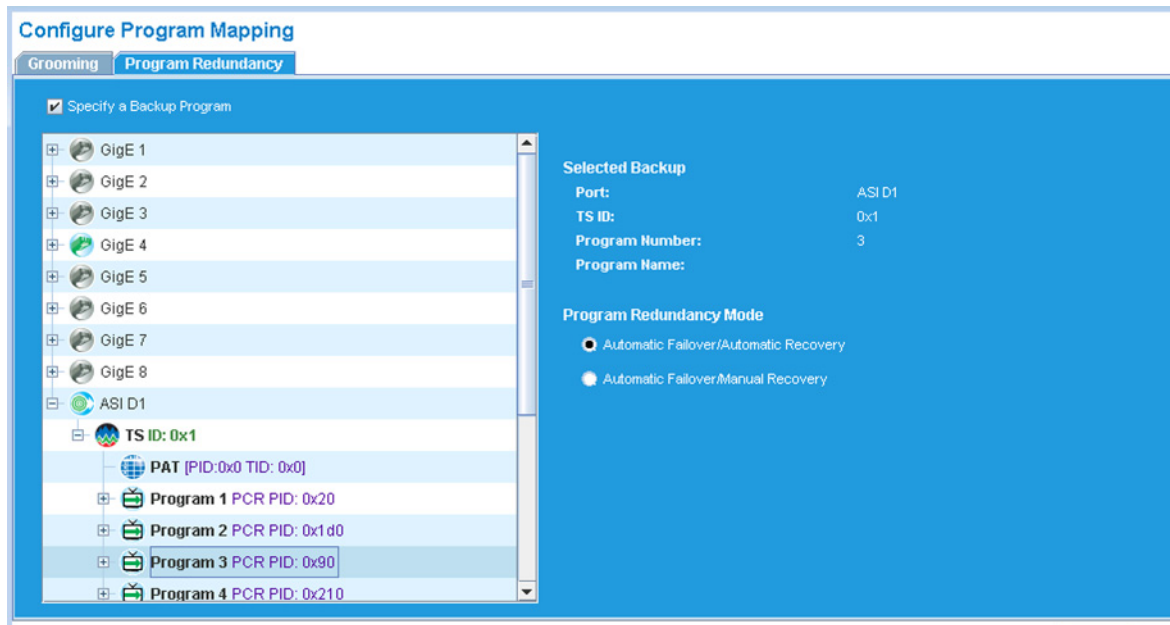
## Manual Recovery Procedures

The BNP supports the ability to manually switch between the Primary and Backup programs. Use the steps provided in this section to perform a manual recovery:

1. From the **Outputs panel** of the **Grooming -> Mapping** window, right-click the desired program and select **Display Grooming** from the pop-up menu.

    The **Current Program Mapping and Schedule** window opens (Figure 93).

    Figure 93.    Program Redundancy - Manual Recovery



2. Select the scheduled program and right-click.

3. From the pop-up menu, select **Switch to Backup**.

The **Switch to Backup** option is available when the selected program is already in the *Manual Recovery to Primary Program* operation mode. (The *Automatic Recovery to Primary Program* mode does not allow staying in the Backup Program.)

Figure 93 above illustrates the *Manual Recovery* selection for program redundancy operation on individual programs. This can be used for the *Manual Recovery Primary Program* procedure following an *Automatic Failure to Backup Program,* or for toggling between primary and backup programs for test purposes.

To recover all programs, from the main *Element Manager* window, select **Maintenance** (**Alt m**)-**>** **Regroom**. See "Regrooming" on page 198 for additional information.

## Managing Elementary Streams

Use guidelines provided in the following topics for management of elementary streams:

- "Creating an Elementary Stream," next.
- "Reordering an Elementary Stream" on page 162.
- "Remapping Elementary Streams" on page 163.

### Creating an Elementary Stream

Use the **Manage Elementary Streams** screen (Figure 94) to add a new elementary stream to an output program.

> **Note:** *An **ES Type, Stream Type, PID** number, **Dummy** value, and **Preconfigured for PMT** value can only be modified when the word "**New**" appears next to it in the **Stream Order** column. Once you click **OK** to save changes, you will not be able to modify any of these parameters for this particular stream without deleting the stream and adding it again.*

| | |
|---|---|
| **Menu Path** | From the **Outputs** panel of the **Grooming -> Mapping** tab screen, right-click on a program and select **Manage Elementary Streams** from the pop-up menu. |

Figure 94.      Manage Elementary Streams



1.  At the **Manage Elementary Streams** screen, click **Add ES** to add a new elementary stream entry to the table on display. By default, the new stream is an AC-3 Audio stream (as demonstrated in Figure 95).

Figure 95.     Manage Elementary Streams - Add ES
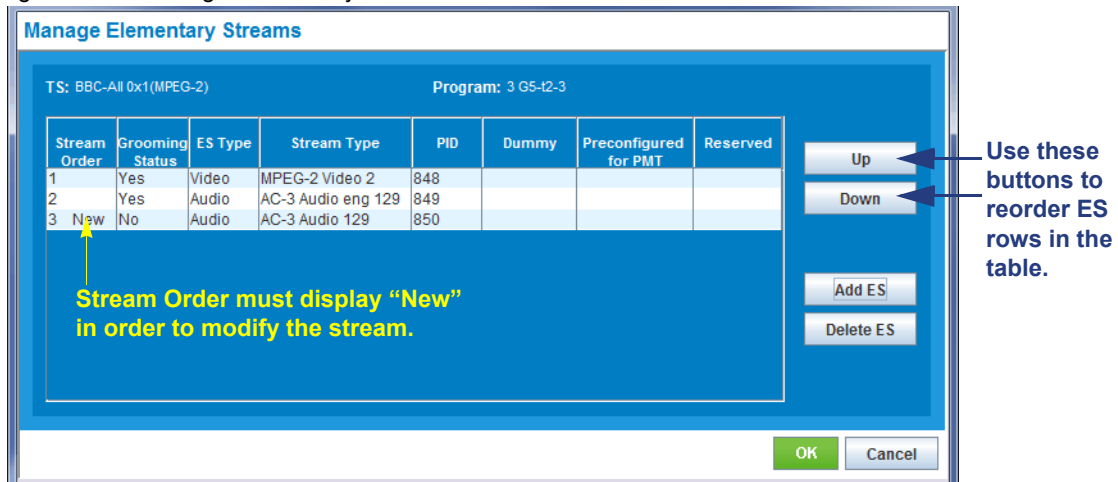


## Modifying Elementary Stream Parameters

Use the **Manage Elementary Streams** screen (Figure 94) to modify parameters for an output elementary stream. See Table 83 on page 160 for details about the screen parameters.

| | |
|---|---|
| 👉 **Menu Path** | **Grooming** tab **-> Mapping** tab screen: from the **Inputs** panel, drag and drop a program to an output transport stream or an output program at the **Outputs** panel-> click the **Program Redundancy** tab, then enable (check) **Specify a Backup Program**. |

1. At the table, click in the column you want to modify:

   To set ES Type, click in the **ES Type** column and select either Audio, Data, or Video (Figure 96).

   Figure 96.     Manage Elementary Streams - ES Type choices
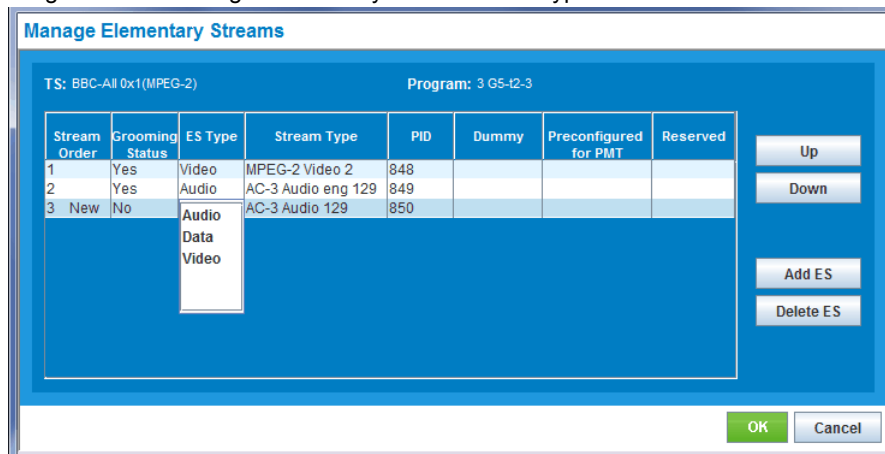


   To set Stream Type, click in the **Stream Type** column (Figure 97). Options provided from a Stream Type cell are dependent on your selection of TS Type:

   – For Video, you can select an option from the pull-down options (Figure 97).

   – For audio or data, the Audio Selection dialog (Table 98) or Data Selection dialog (Table 99) is presented.

Figure 97.    Manage Elementary Streams - Stream Type, drop down for Video ES



Figure 98.    Manage Elementary Streams - Audio Selection



The **Audio Selection** dialog is presented by clicking in a Stream Type cell of the Manage Elementary Streams table, if ES Type is Audio .

Figure 99.    Manage Elementary Streams - Data Selection



The **Data Selection** dialog is presented by clicking in a Stream Type cell of the Manage Elementary Streams table, if ES Type is Data.

ℹ️   **Note:**   *If Stream Type is EBIF, EISS or EBIF and EISS, two new descriptor rules will be automatically added for each new EBIF or EISS stream. See "Managing PMT and ES Descriptors" on page 177 for additional information.*

To set PID, double-click the **PID** field (Figure 100), then type the new PID entry into the field.

Figure 100. Manage Elementary Streams - PID



Note: *When entering a PID you must enter its decimal conversion from its hex listing in the **Outputs panel** of the **Grooming -> Mapping** window. For example, if you are creating a Dummy PID based on an input data stream that has been groomed to a program on an output TS whose PID is 0xf05 (note, the "0x" portion of the PID is for internal reference only), the decimal conversion would be as follows:*

*hex: F05 converts to decimal: 3845.*

To set the dummy PID for a data ES, click in the **Dummy** column to select either **Yes** or **No** (Table 101)**.**

Figure 101. Manage Elementary Streams - Dummy



To set **Preconfigured for PMT**, click in the column and select either **Yes** or **No** (Table 102).

Figure 102.   Manage Elementary Streams - Preconfigured for PMT



2.  Click **OK** to save and use the new configuration. The new or modified ES will be displayed in the **Outputs** panel of the **Grooming -> Mapping** window.

Essential information about the table columns in the **Manage Elementary Streams** screen is provided in Table 83.

Table 83.   Manage Elementary Streams Screen—ES Configuration Columns

| Column | Description |
|---|---|
| Dummy | Read-only if stream is groomed; only applicable for data stream. Clicking this field will bring up a drop down box with the following options: <br><br>• *Yes:* Select this if the elementary stream is a dummy stream and the associated data stream with the same PID is carried by another program in the same transport stream. <br><br>• *No:* This is a read-only value which will appear if the PID is "non-dummy" and therefore treated as a regular stream. <br><br>Note: The *Preconfigured for PMT* and *Dummy* fields are mutually exclusive; therefore, when one is set to *Yes*, the other will be automatically set to *No* |
| ES Type | Read-only if changes have been saved (i.e., *OK* has been clicked). If the changes to the stream have not yet been applied, clicking this field will open a drop down menu with the following options from which to choose: <br><br>Audio, Data, or Video. |
| Grooming Status | Read-only. Displays whether or not the stream is currently groomed. |
| PID | Read-only if changes have been saved (i.e., *OK* has been clicked). If the changes to the stream have not yet been applied, double-clicking this field allow you to modify the PID associated with the new elementary stream. <br><br>• You must enter this value as a decimal conversion of the hex format which appears in the *Grooming -> Mapping* window. |
| Preconfigured for PMT | Read-only if stream is groomed; applies to all stream types, but most useful for EBIF / EISS streams. <br><br>• Provides the ability to preconfigure the ES by creating associated descriptor rules, regardless of whether or not the data for the corresponding ES is present in the MPEG stream. When the *Preconfigured for PMT* option is set to *Yes*, the BNP will not update the PMT, as the assumption is the data is already included in the PMT. <br><br>Note: The *Preconfigured for PMT* and *Dummy* fields are mutually exclusive; therefore, when one is set to *Yes*, the other will be automatically set to *No*. |

Table 83.        Manage Elementary Streams Screen—ES Configuration Columns  (Continued)

| Column | Description |
|---|---|
| Reserved | Read-only. If the stream is a reserved PID, *Yes* will appear; if the stream is not a reserved PID, the field will be empty. |
| Stream Order | Read-only. Displays the stream order in the program mapping table (PMT). |
| Stream Type | Read-only if changes have been saved (i.e., *OK* has been clicked). If the changes to the stream have not yet been applied, and depending on the selection from *ES Type*, clicking this field will open variable options:<br><br>• For *Stream Type Audio*, the **Audio Selection** dialog is presented. Use this dialog to define Audio Type and/or Language for the TS.<br><br>   - **Audio Type**: select one of the following options from the drop-down menu:<br><br>     MPEG-1 Audio     MPEG-2 Audio     AC-3 Audio (0x6)<br>     AC-3 Audio (0x81)    AAC Audio (0x0f)   HE-AAC Audio (0x11)<br>     E-AC-3 Audio<br><br>   - **Language Selection**: select one of the following options from the drop-down menu:<br><br>     Arabic      English      French    German    Hindi      Italian<br>     Japanese   Portuguese   Russian   Spanish    Mandarin Chinese<br><br>• For *Stream Type Data*[a], the Data Selection dialog is presented. Use this dialog to define Stream Type and/or Stream Sub Type for the TS:<br><br>   - **Stream Type**: select a decimal values in the range *5* to *255*[b].<br><br>   - **Stream Sub Type**: select *Data*, *EISS*, *EBIF*, or *EBIF and EISS*<br><br>• For *Stream Type Video*, a drop down box displays to enable choice of *MPEG2 Video, H.264 Video*, or *SCTE Video*. |

a. When Stream Type is EBIF, EISS or EBIF and EISS, *two* new descriptor rules will be automatically added for *each* new EBIF or EISS stream. See "Managing PMT and ES Descriptors" on page 177 for additional information.
b. This number appears as hex in the *Grooming -> Mapping* window; you will need to perform hex to decimal conversion when selecting this value

## Reordering an Elementary Stream

Use the **Manage Elementary Streams** screen to reorder streams in the PMT. (As might be required, for example, when you need to change the order a stream is placed in the PMT when sent to the end-user's STB.)

1.  At the **Manage Elementary Streams** screen, highlight the row containing the ES you want to reorder (Figure 103).

    Figure 103.    Reordering an Elementary Stream

    

2.  Click the **Up** or **Down** button, as required, to put the stream in its proper place in the table.

    Figure 104.    ES Reordered

    

3.  Click **OK** to save and use the settings.

### Remapping Elementary Streams

You can create a reserved PID or select any specific PID from existing output PIDs—during grooming in the **Configure Program Mapping** screen—as an outgoing PID. You have the flexibility of selecting any PID value for an outgoing PID.

- When you select from an existing PID, it should be of the same ES Type and language (for audio) as the corresponding Input ES. Without an exact match, you cannot select that existing output PID.
- You cannot create a Reserved PID for Video if there is an existing video PID in the output program on which you are grooming.

# Working with PIDs

This section provides information about display and management of PIDs, in the following topics:

- "PID Display," next.

- "Reserved PIDs" on page 163
- "Dummy PIDs" on page 164
- "Adding an Unreferenced PID as an Elementary Stream" on page 167

- "Elementary Stream Ghost PID Management" on page 170
- "Unreferenced PID Pass Through" on page 171
- "Unreferenced PID Mapping" on page 172
- "Referenced PID Mapping" on page 174

## PID Display

You can set PIDs to be displayed either as hexadecimal values or decimal values. The setting affects display at the **Grooming**-**Mapping** tab page and in screens that contain PID fields.

Use the global PID option to control format of PIDs to be displayed at the BNP *Element Manager*:

| | |
|---|---|
| **Menu Path** | *BNP Element Manager* **Configuration tab -> Global** tab screen, **PID Display Format** -> click either **Hex** or **Decimal**. |

See also Figure 18, "Global tab screen," on page 37, and Table 17, "PID Display Format—Global Configuration," on page 41.

## Reserved PIDs

Reserved PIDs allow you to create PIDs under output programs which will maintain PID values and ES Type and Subtype across reboots and regrooming even when the PID is not groomed. These types of output elementary streams are called Reserved PIDs.

The **Manage Elementary Streams** screen can be used to add the ES and to specify its PID and subtype, as well as the language for the audio ES. The subtype of the reserved video stream will be overwritten by the input Video Subtype but the PID value will be maintained. You can delete any reserved ES if it is not groomed from the main screen by right-clicking the ES, and choosing **Delete**.

See "Unreferenced PID Mapping" on page 172 for steps on creating reserved PID mapping.

# Dummy PIDs

Maintenance and removal of dummy PIDs are described in the following topics:

- "Guidelines for Dummy PID Configuration," next.
- "Deleting Dummy PIDs" on page 166.

## Guidelines for Dummy PID Configuration

The following guidelines should be taken into account when configuring data streams that use dummy PIDs:

1. You cannot configure a Dummy PID data stream unless an actual data stream has been groomed to a program in the relevant transport stream.

2. You cannot delete a program with a data stream to which other dummy PID streams point.

3. If you are creating multiple dummy PIDs under one program, they must all point to the original data streams from a single program. You cannot create multiple dummy PIDs in one program that point to data streams from multiple programs.

4. You can only reference a dummy PID data stream to a data stream in a program that is within the same transport stream.

5. A dummy data PID referenced in a output program will be used regardless of the input source, such as the originally groomed network program source, during program redundancy or program substitution service, or during a DPI ad insertion.

6. You cannot configure the value in an ES as "Yes" for the **Dummy** field and "Yes" for the **Preconfigure in PMT** field at the same time.

7. Groom the actual data stream for which you wish to create a dummy PID, from an input program to a specific output program.

   This section contains an example that creates a dummy data PID that is associated to the real data stream (Figure 105):
   ```
   Data [PID: 0x21 Data 0xc2] in Program 6975 BBC HD
   ```

   Figure 105.   Dummy PID: Real data stream groomed
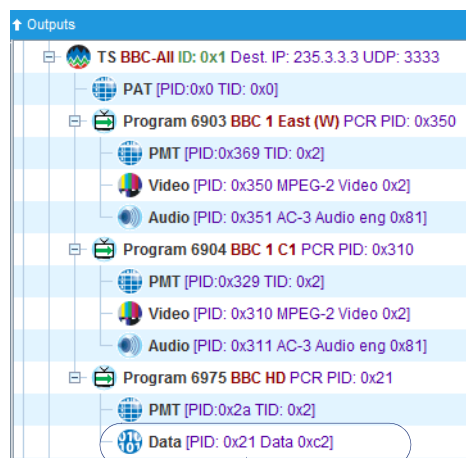


**Dummy PID will be associated to this Data**

8.  At the Outputs panel of the **Grooming** --> **Mapping** tab screen, right-click on an ES and select **Manage Elementary Streams** from the pop-up menu, to present the Manage Elementary Streams screen (Figure 106).

    In this example, we will use `Program 6904 BBC 1 C1`.

    Figure 106.    Manage ES - New ES for Dummy PID
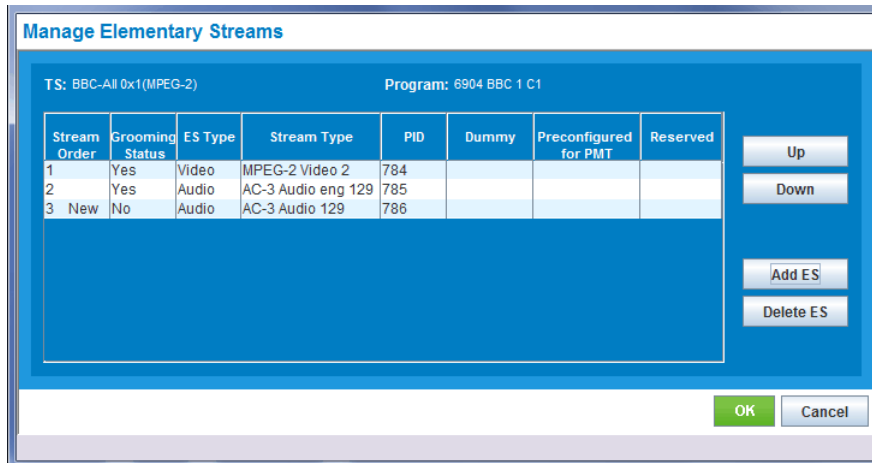


9.  At the **Manage Elementary Streams** screen, click the **Add ES** button. A new audio ES is now displayed as the last entry to the table of streams.

10. Click in the **ES Type** column, and select **Data**. The **Data Selection** dialog is now presented.

> **Note:**  *See the section, "Creating an Elementary Stream" on page 156 for complete details on manipulating the fields in the Manage Elementary Streams window.*

11. At the **Data Selection** dialog, select the decimal number that matches the actual data stream's hex ID (this is NOT the PID). In the following example, the number *194* is selected because it matches the hex number *c2* from the data stream:

    `Data [PID: 0x21 Data 0xc2]` in `Program 6975 BBC HD`.

12. At the **Manage Elementary Streams** screen, click in the **PID** column and enter the decimal value that corresponds to the hex value from the actual data stream. In the following example, the number *33* is entered because it corresponds to the hex value of *21* in the data stream:

    `Data [PID: 0x21 Data 0xc2]` in `Program 6975 BBC HD`.

13. At the **Dummy** column, select **Yes** from the drop down box to indicate that this is a dummy PID.

    The **Manage Elementary Streams** window should now contain entries as shown in (Figure 107).

Figure 107.   Manage Elementary Streams - Dummy PID fields completed
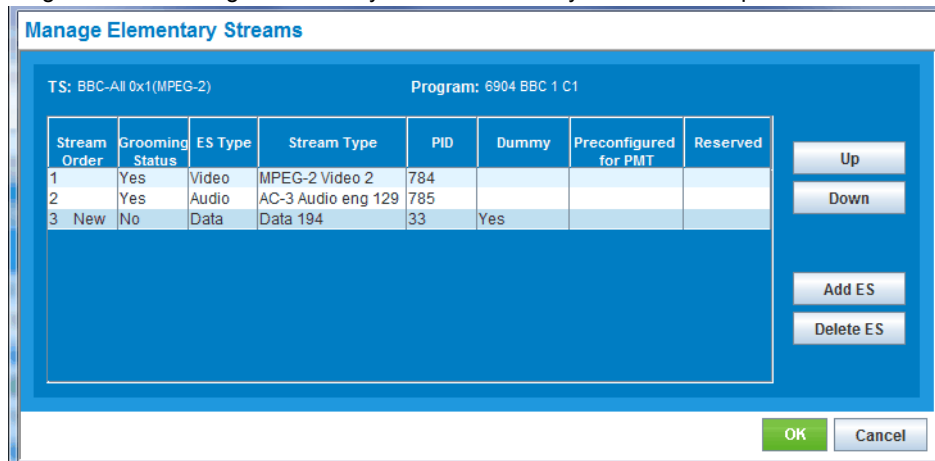


**14.** Click **OK** to save changes and add this stream to the **Outputs panel** of the **Grooming -> Mapping** window.

The data stream (grayed out to indicate dummy PID reference) with associated dummy PID will be displayed under the appropriate program (Figure 108).

Figure 108.   Dummy Data PID in Grooming -> Mapping window
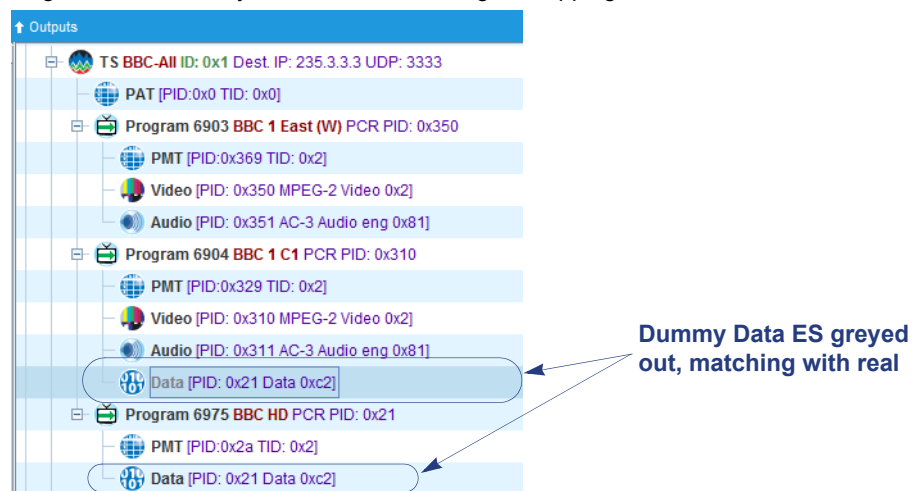


**15.** Repeat step 8-step 14 for each additional program (within the same transport stream) under which to create your dummy PID reference.

## Deleting Dummy PIDs

Use the delete function to remove a dummy PID.

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Grooming -> Mapping** window, right-click on a dummy PID data stream and select **Delete** from the popup menu. |

## Adding an Unreferenced PID as an Elementary Stream

You can add an unreferenced PID to an input transport stream. This allows you to manage unreferenced PID inputs for various applications in the BNP output. Unreferenced PID streams are those MPEG-2 elementary streams encapsulated in the MPEG-2 SPTS or MPTS, whose PIDs are not referenced in any PSI (PAT and PMT) tables. These unreferenced PID streams may be purposely inserted for some special control and applications; they could also result from the stream originator's error.

Unreferenced PIDs can come from the program inputs from GigE interfaces or from ASI inputs. In some applications, these unreferenced PIDs need to be routed to the appropriate output GigE ports or ASI ports as pass-through, or with-or-without the PIDs being remapped. In other cases, these unreferenced PIDs need to be dropped, either because such unreferenced PIDs are not required or the streams are corrupted.

Use the **Create Ghost Program** function to add an unreferenced PID as an ES.

| | Menu Path | From the **Inputs** panel of the **Grooming -> Mapping** tab screen, right-click on a transport stream and select **Create Ghost Program** from the popup-menu (Figure 109). |
|---|---|---|

Figure 109.   Creating an Input Ghost Program
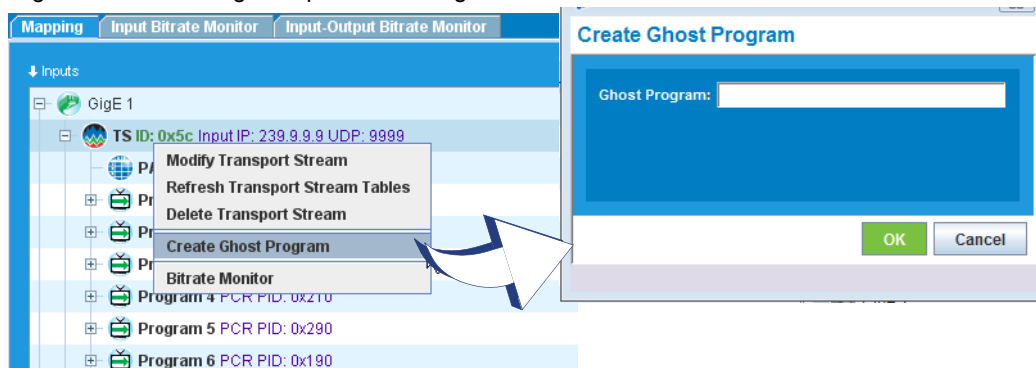


1.  Enter the **Ghost Program Name**.

2.  Click **OK**. A new program stream is now displayed in the **Inputs** column for the TS.

    

3.  Right click the new Ghost Program you have created, and choose **Add Elementary Stream** (Figure 110) to present the **Add Elementary Stream** dialog (for single or multiple ES).
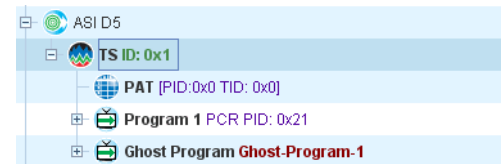
Figure 110.   Adding an Elementary Stream
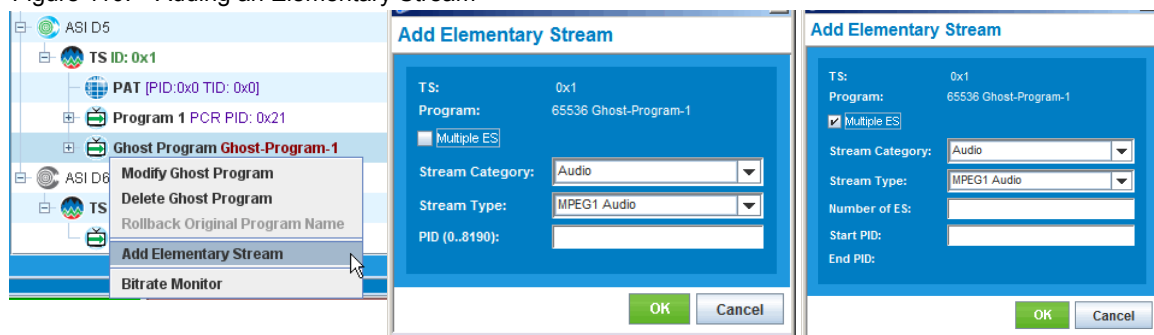
4. From the pull-down menus, select the **Stream Category**, **Stream Type**, and **PID**.

   If you check **Multiple ES**, you can simultaneously define sequential unreferenced PIDs by entering the number of Elementary Streams (**Number of ES**) and the **Start PID**.

5. At the **Add Elementary Stream** dialog, click **OK** to present the new PID in the **Inputs** column for the **Ghost Program**
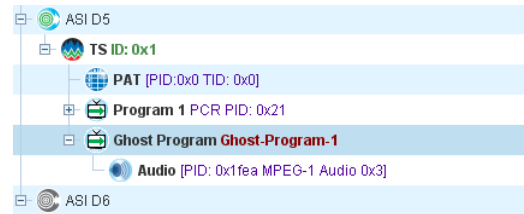


Table 84.     Add Elementary Stream

| Field | Description/Values |
|---|---|
| TS | Read-only field that identifies the transport stream associated with this configuration. |
| Program | Read-only field that identifies the program associated with this configuration. |
| Multiple ES (checkbox) | Enable (check) or disable (un-check) multiple elementary streams for this TS. |
| Stream Category | Choose either Audio, Data, or Video to define the stream category for this ES. |
| Stream Type | As dependent on your selection for **Stream Category**, select an option from this range to define the selected stream category. See also the following topics in this section:<br>• "ES Audio Stream Types".<br>• "ES Data Stream Types".<br>• "ES Video Stream Types" |
| Number of ES | For Multiple TS, value to set number of elementary streams allowable for this TS, in the range 1 - 32. |
| Start PID | For Multiple TS, value to set beginning PID. |
| End PID | For Multiple TS, value to set end PID. |
| PID (0..8190) | For single TS, value to set PID, in the range 0 - 8190. |

## ES Audio Stream Types

Use the **Add Elementary Stream** dialog from an Input Ghost Program to define audio (Figure 111) for a TS.

Figure 111.    ES Audio Options
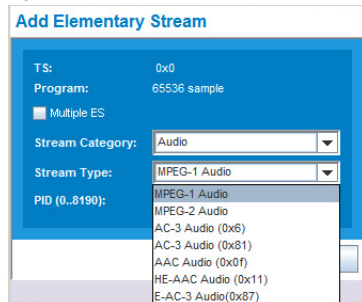


Options are:

- MPEG-1 Audio
- MPEG-2 Audio
- AC-3 Audio (0x6)
- AC-3 Audio (0.81)
- AAC Audio (0x0f)
- HE-AAC Audio (0x11)
- E-AC-3 Audio (0x87

## ES Data Stream Types

Use the **Add Elementary Stream** dialog from an Input Ghost Program to define data (Figure 112) for a TS.

Figure 112.    ES Data Options
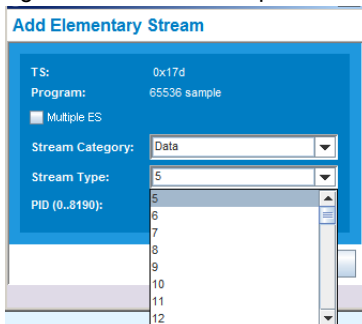


Values are: 5 to 255

## ES Video Stream Types

Use the **Add Elementary Stream** dialog from an Input Ghost Program to define video (Figure 113) for a TS.

Figure 113.    ES Video Options
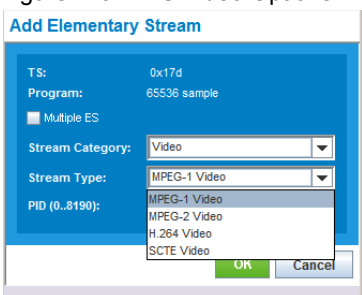


Options are:

- MPEG-1 Video
- MPEG-2 Video
- H.264 Video
- SCTE Video

# Elementary Stream Ghost PID Management

Ghost programs and PIDs are extra input and output streams not referenced in a Program Association Table (PAT). The BNP allows you to manage elementary stream (ES) Ghost PIDs in three ways:

- **Unreferenced PID Pass Through.** The PID output is unreferenced in the Program Mapping Table (PMT) nor is there any mapping to any other program or transport stream table. Typical applications are Data PID transport and grooming.
- **Unreferenced PID Mapping.** This has no reference in the PMT, but is mapped as a table entry in the PAT at the transport stream level. This is used in various electronic program guide (EPG) applications.
- **Referenced PID Mapping.** The PID output is referenced as a PMT entry. A typical application might be to associate EPG data with one or more programs.

Unreferenced PIDs streams are those MPEG-2 streams encapsulated in the MPEG-2 SPTS or MPTS but their PIDs are not referenced in any PSI (PAT and PMT) tables. These unreferenced PID streams may be purposely inserted for some special control and applications; they could also result from the stream originator's error.

Unreferenced PIDs can come from the program inputs from GigE interfaces or from ASI inputs. In some applications, these unreferenced PIDs need to be routed to the appropriate output GigE ports or ASI ports as pass-through without or with PIDs remapping. In other cases, these unreferenced PIDs need to be dropped, either because such unreferenced PIDs are not needed or the streams are corrupted.

The BNP allows you to add and drop the unreferenced PIDs in its inputs from both GigE and ASI ports.

The BNP can groom the unreferenced PIDs from the inputs to the appropriate output transport stream (SPTS or MPTS) with or without PID remapping using the GUI configuration for the unreferenced PIDs.

Unreferenced PIDs associated with program inputs are usually known in advance, so they can be configured through the GUI for pass-through or drop. The GUI enables the user-configurable remapping as an output PID for the input unreferenced PID; the output PID can also be referenced in the output TS when necessary through GUI configuration.

For input ASI ports, the TS is automatically created for the input ASI port. User-configured unreferenced PID streams are routed based on grooming rules.

The BNP guarantees there is no conflict between the unreferenced PIDs and the referenced PIDs in its output MPTS or SPTS. If there are unreferenced PIDs causing conflict in the output MPTS or SPTS, then the groomed unreferenced PID causing the conflict is dropped. This could happen when an unreferenced PID is not allowed to be remapped for output.

# Unreferenced PID Pass Through

Use the steps in this section to create a ghost program with a data ES, and map the unreferenced PID from a program input such as that shown in Figure 114.

Figure 114.     Ghost Program With Unreferenced PID.
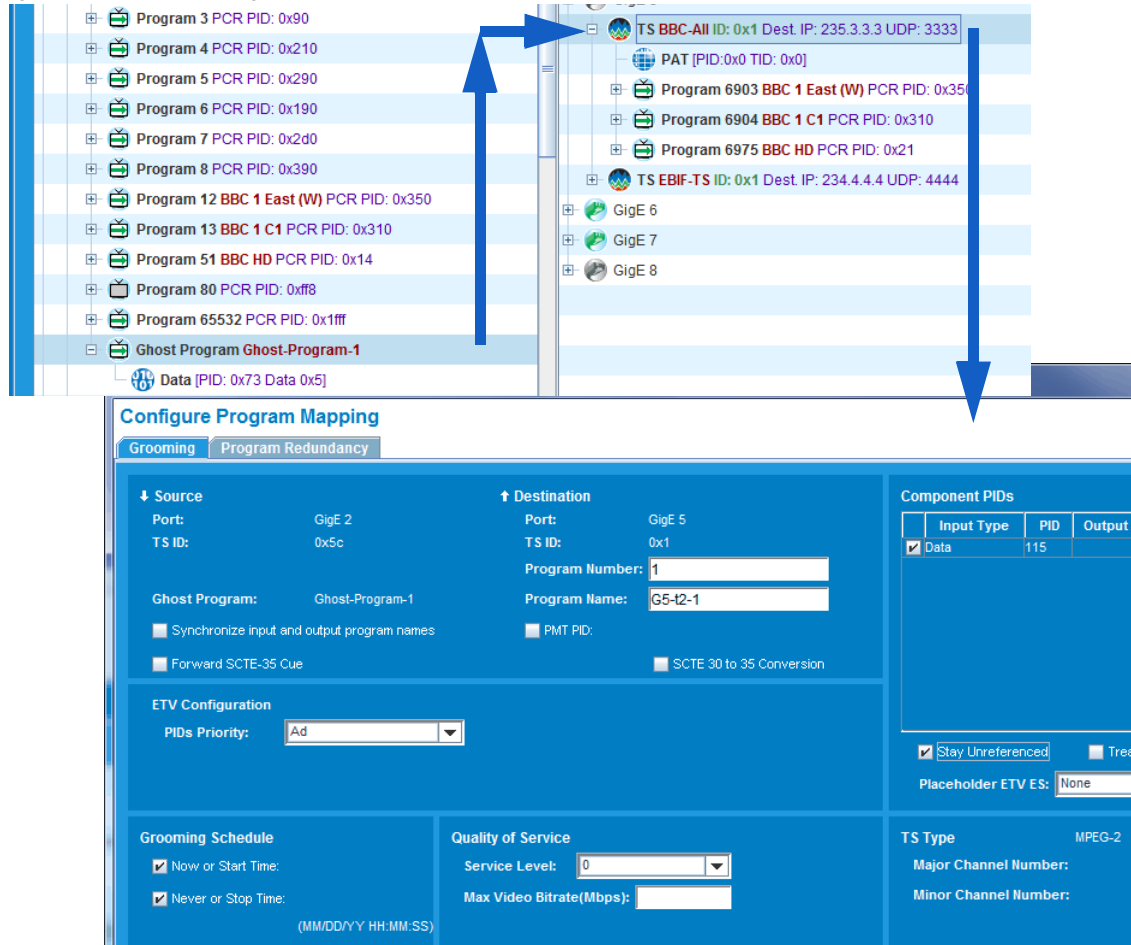


1.  Drag and drop the ghost program from the **Inputs panel** of the **Grooming -> Mapping** window to the desired output transport stream to present the **Configure Mapping Window**.

    Note the PID number of the component PID (in this case, 115). You will need this when you want to create a referenced PID mapping.

2.  Be sure that the **Stay Unreferenced** box is checked, and click **OK**.

    The ghost program and its data transport stream with PID of 0x73 (hex conversion from decimal) appears on both the input and output (Figure 115) panels, which indicates that the stream has been passed through.

Figure 115.     Ghost Program Passed Through

## Unreferenced PID Mapping

**Note:** *You cannot change an unreferenced output program to a referenced output program (and vice-versa) during a regroom. You must first delete the output program (and grooming) to change this setting.*

1. At the **Grooming Mapping** tab page, right-click on an output port and select **Create Output Transport Stream** from the popup menu to present the **Create Output Stream** dialog (Figure 116).

Figure 116.   Unreferenced PID Mapping
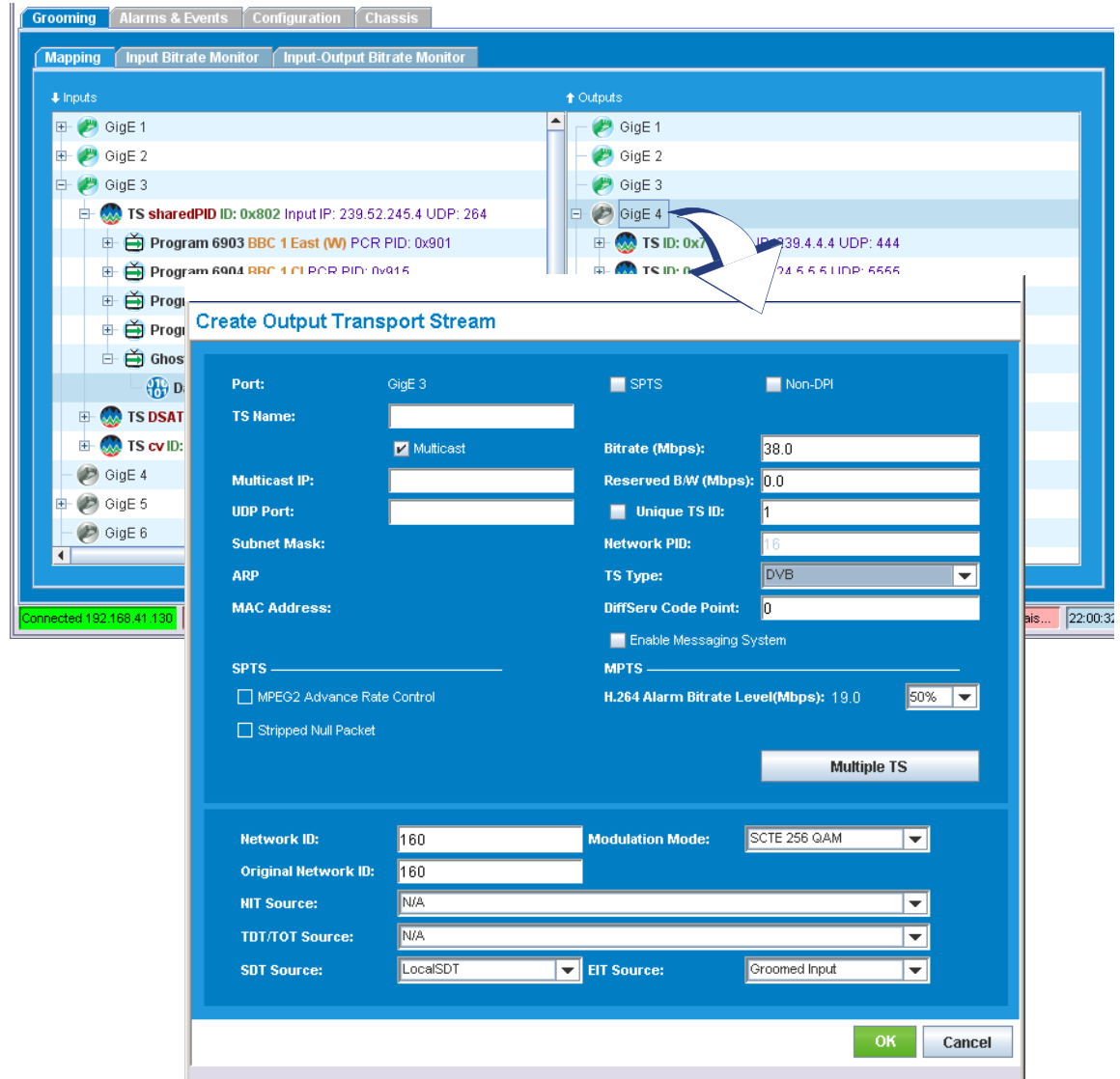


2. Enter the **Destination IP** address and the **UDP Port** number, choose **DVB** as the **TS Type** and click **OK.**

3. Drag the ghost program from the input panel and drop it on the DVB transport stream you just created. The **Configure Program Mapping** window (Figure 117) is now presented.

Figure 117.    Configure Program Mapping Window



4.  At the **Configure Program Mapping** screen, be sure that the **Stay Unreferenced** box is checked.

5.  Click the empty field to the right of the Component PIDs. The **Select Elementary Stream** window of Figure 118 appears.

Figure 118.    Select Elementary Stream Window



6.  Enter the new reserved PID number and click **OK**.

7.  Click **OK** in the **Configure Program Mapping** window. The unreferenced PID is mapped.

## Referenced PID Mapping

Input Ghost ES PIDs can be groomed by the BNP and referenced as ES PIDs in one or more program in the output TS. Figure 119 shows the starting window with the unreferenced data PID ES created under a Ghost Program on the input.

Figure 119.    Starting Window for Referenced PID Mapping
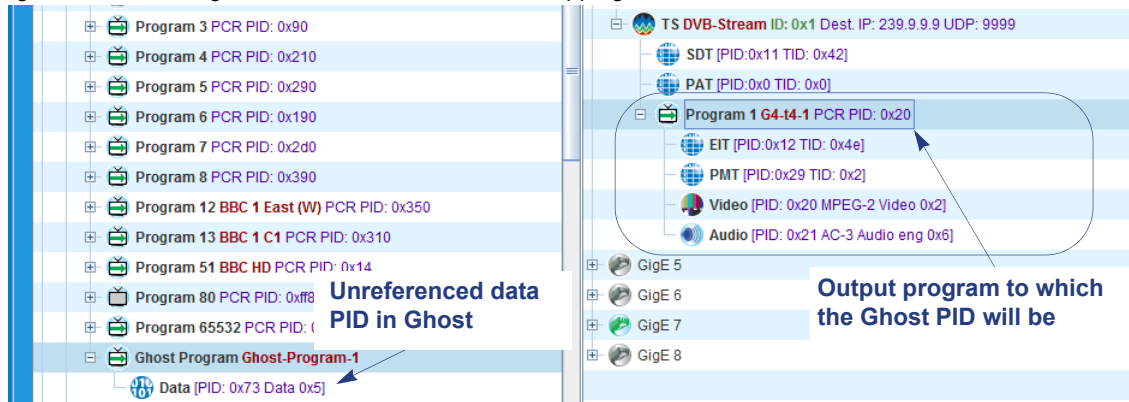


1. Drag and drop the input ghost program (in this case: `Ghost-Program-1`) to the output transport stream. Be sure the **Stay Unreferenced** box is checked (Figure 120).

> **Note:**   *The ghost program must be groomed to the output TS first (step 1) before creating a dummy PID as described in step 4.*

Figure 120.    Mapping the Transport Stream

2. Click **OK**.

   The ghost program and its unreferenced PID appear in the **Outputs panel** of the **Mapping** window.
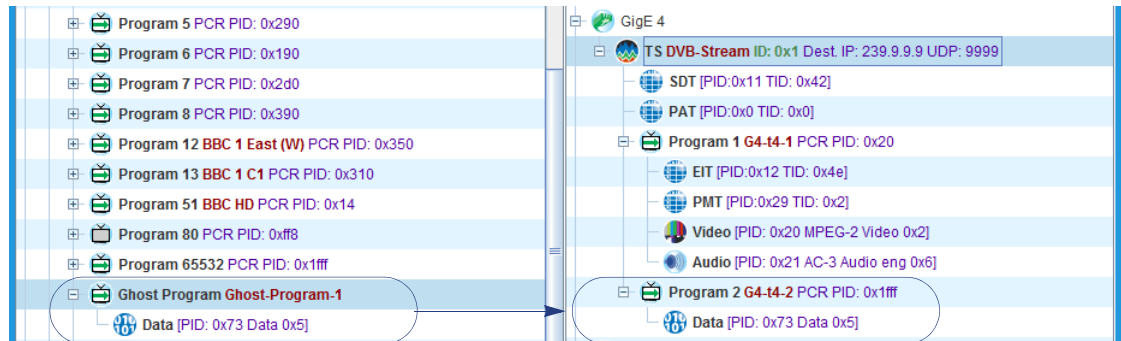
   

3. Highlight the output program (from Figure 119) you wish to reference the data PID to, right click and choose **Manage Elementary Streams**.

   Figure 121.   Manage Elementary Streams
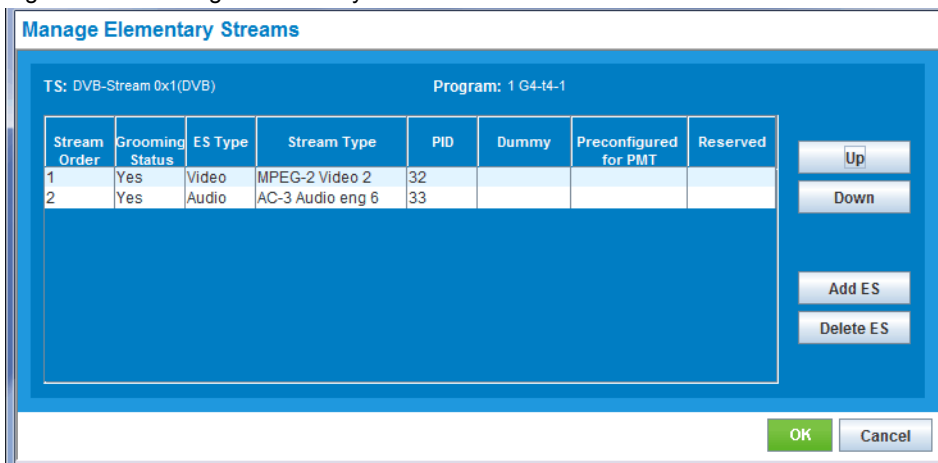
   

4. Click **Add ES** and fill in the new row (Figure 122) as described in "Dummy PIDs" on page 164. You will need to know the PID reference, which, in this case, is 115. Be sure to select **Yes** in the **Dummy** column.

   Figure 122.   New ES filled In
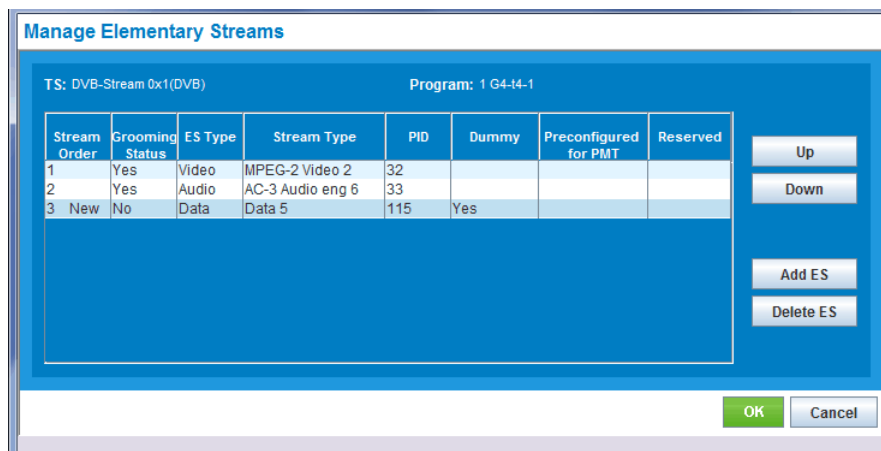
**5.** Click **OK**.

The new ES will appear under the program. The mapping window shows the same PID in both programs, with the (dummy) PID in Program 1 grayed out.

Figure 123.   Dummy data PID in Program grayed out
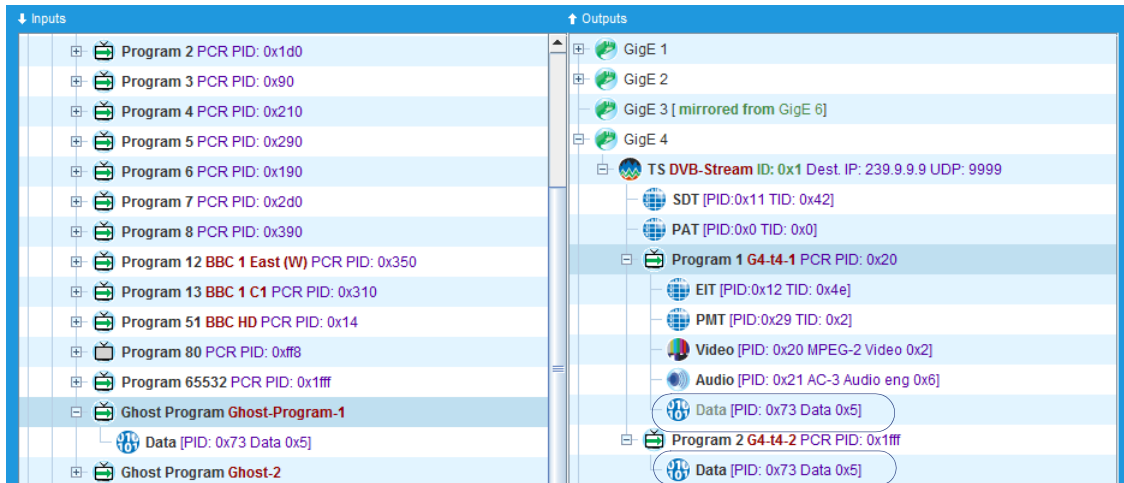


Clicking on the program of the grayed out data PID and selecting **Manage Elementary Streams** will show the Dummy PID status of **Yes** and a Reserved PID status of **Yes** as well:

Figure 124.   Manage ES - Dummy and Reserved status
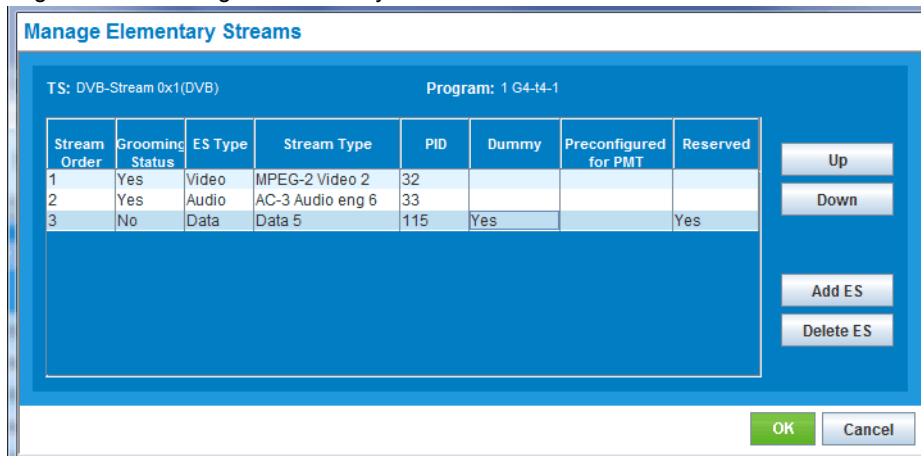
# Managing PMT and ES Descriptors

The *Element Manager* provides the ability to create program descriptor rules that the BNP will apply when it sends out a Program Management Table (PMT) for a specified output program. The rules allow for the appending or removal of output stream descriptors on the PMT level and will remain persistent upon program regrooming.

Use the **Manage Descriptor Rules** screen (Figure 125) to view, add, edit, and delete program descriptor rules.

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Outputs panel** of the **Grooming -> Mapping** tab screen, right-click on a program and select **Manage Descriptor Rules** from the pop-up menu. |

Figure 125.   Manage Descriptor Rules window
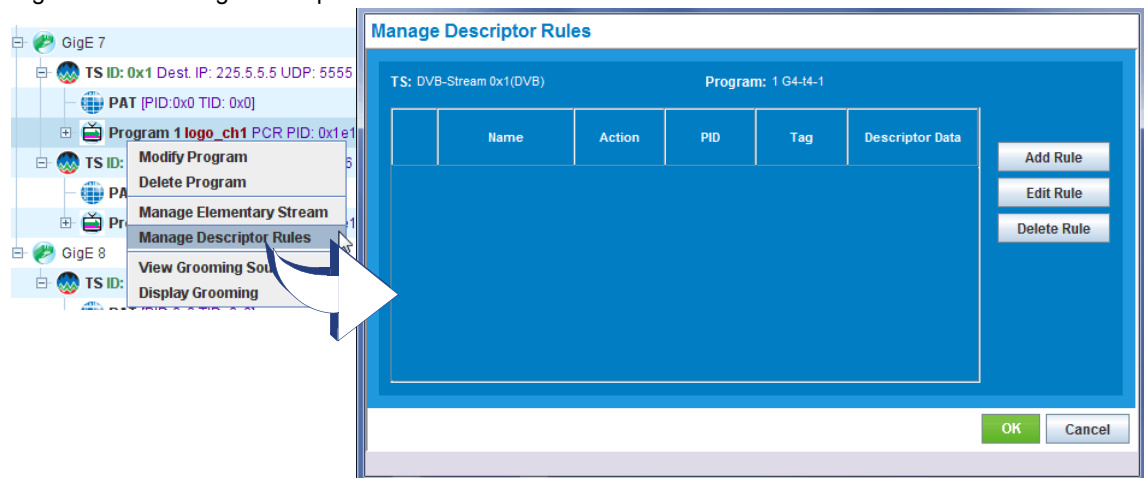


The **Manage Descriptor Rules** screen displays details about currently configured rules. Details about operations you can perform from this screen are described in the following topics:

- "Adding Program Descriptor Rules," next.
- "Editing Program Descriptor Rules" on page 180.
- "Deleting Program Descriptor Rules" on page 181.

## Adding Program Descriptor Rules

Use the **Add Descriptor Rule** dialog (Figure 126) to set parameters for a new descriptor rule. A new descriptor rule is not applied at the BNP until all steps in this procedure are completed.

| | | |
|---|---|---|
| 👉 | **Menu Path** | **Manage Descriptor Rule** screen: click **Add Rule** --> **Add Descriptor Rule** dialog. |

Figure 126.   Add Descriptor Rule window
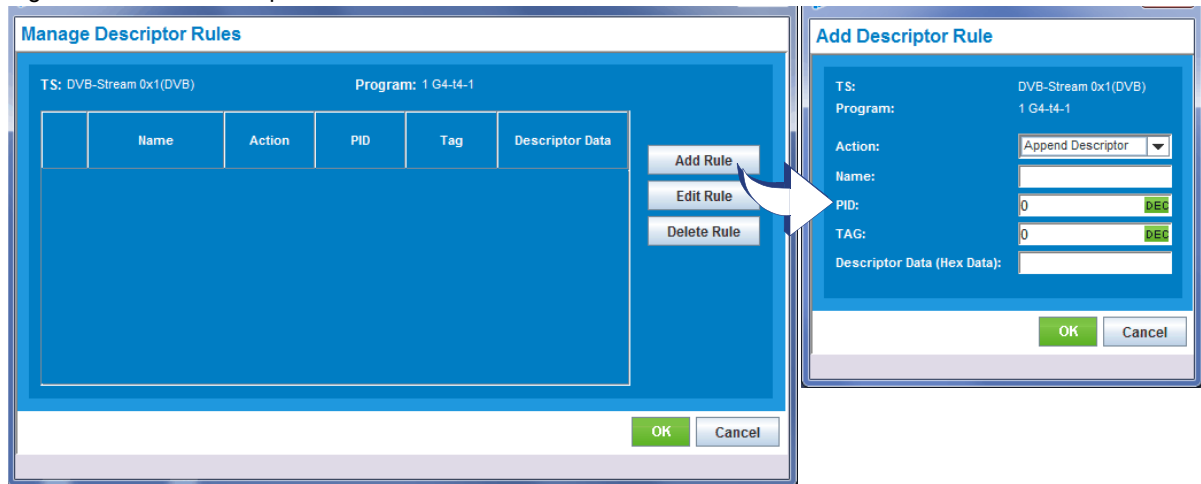


1.  At the **Add Descriptor Rule** dialog, set parameters for the rule. Guidelines are provided in Table 85 on page 179.

2.  Click **OK** to create the rule. It will now be displayed as "**New**" in the Manage Descriptor Rules screen (Figure 130).

**Note:**   *The rule is not yet applied to the BNP.*

Figure 127.   Add Descriptor Rule - New status
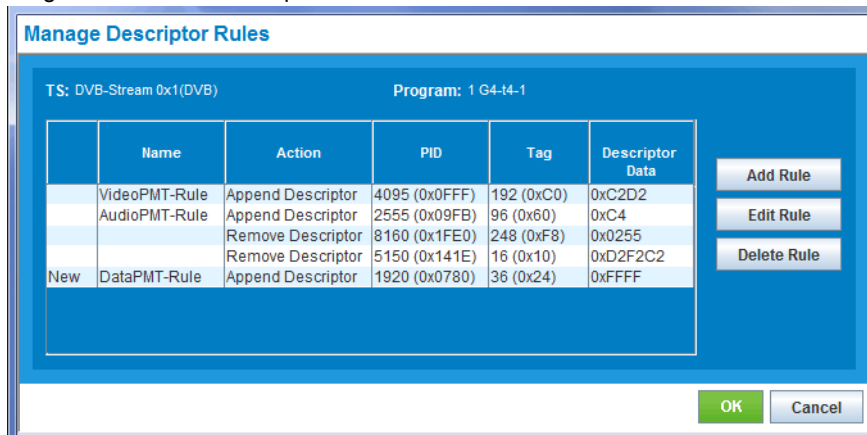


3.  At the **Manage Descriptor Rules** screen, click **OK** to apply the new rule change to the BNP. Status **"New"** is now removed from the screen (Figure 128).

Figure 128.   Manage Descriptor Rules - Rules Added
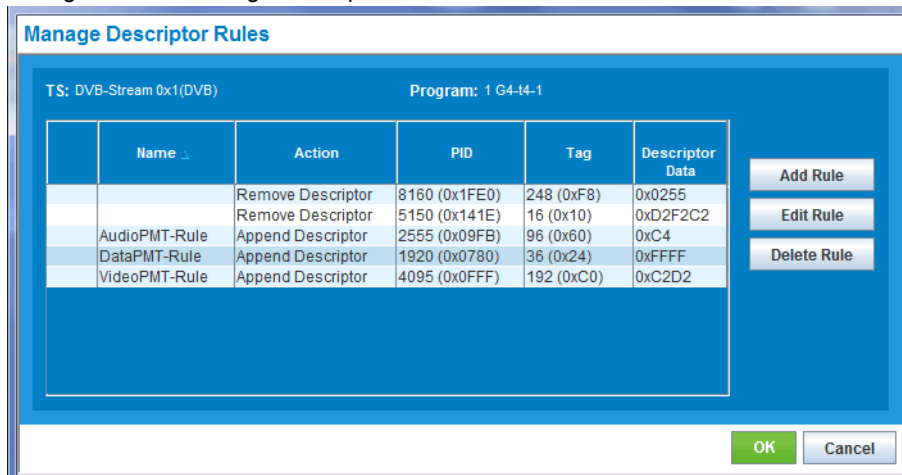


4.   Click **Cancel** to close the window.

Table 85 describes the fields available in the **Add Descriptor Rule** menu.

Table 85.       Manage Descriptor Rules fields

| Field | Description |
|---|---|
| TS | This field is read-only. Displays the Transport Stream ID and type for which the rule will apply. |
| Program | This field is read-only. Displays the name of the program for which the rule will apply. |
| Name | For reference use only when appending (or adding) an output program descriptor. Do *not* enter data in this field when removing a descriptor. |
| Action | Specify which action is to occur for this rule. Choices are:<br><br>• *Append Descriptor:* adds the specified descriptor to the PMT of the output stream. The descriptor is appended to the end of the program descriptor loop if the PID is 0, or the ES descriptor loop if the configured PID matches the elementary stream PID.<br><br>• *Remove Descriptor:* removes the specified descriptor from the PMT of the output stream. If the BNP doesn't find a match descriptor in the PMT, no action is taken. |
| PID | Specifies the PID of the stream. Valid range is from 0 to 8190. If the descriptor is a program descriptor, enter a value of 0. Otherwise, enter the elementary stream (ES) PID value; the descriptor rule is applied to this ES.<br><br>• Clicking the green DEC button in this field will toggle the field from decimal to hex view.<br><br>• Clicking the green HEX button in this field will toggle the field from hex to decimal view.<br><br>• See Figure 129 for an example of the DEC to HEX toggle view. |

Table 85.      Manage Descriptor Rules fields  (Continued)

| Field | Description |
|---|---|
| TAG | Specifies the TAG of the stream. First 8 bits of the descriptor packet as viewed from an MPEG analyzer.<br><br>Valid range is from 0 to 255 (decimal) or 0 to FF (hex), up to 8 bits.<br><br>• Clicking the green DEC button in this field will toggle the field from decimal to hex view.<br>• Clicking the green HEX button in this field will toggle the field from hex to decimal view.<br>• See Figure 129 for an example of the DEC to HEX toggle view. |
| Descriptor Data (Hex Data): | Enter the hex value program descriptor to be appended or removed to or from the PMT of the output stream.<br><br>• This value must be an even numbered hex value.<br>• This value must be an exact match for the program descriptor as known or discovered through an MPEG analyzer. The BNP will not discover or display the descriptors from the actual TS.<br>• When the rule applies to an input stream, the Descriptor Data field is passed through based on information from the input program. |

Figure 129 shows an example of the DEC to HEX toggle view in the **Add Descriptor Rule** window.

Figure 129.   Add Descriptor Rule - DEC to HEX toggle



## Editing Program Descriptor Rules

Use the **Add Descriptor** dialog, from the **Edit Rule** option, to modify details for a specified descriptor rule.

| | Menu Path | **Manage Descriptor Rules** screen, highlight one of the displayed rules, and click the **Edit Rule** button --> **Add Descriptor** dialog. |
|---|---|---|

1. Use guidelines listed in Table 85 on page 179 to enter parameters for a descriptor rule.

   If the rule you wish to edit has already been applied to the BNP, you will only be able to edit the **Descriptor Data** field.

2. Click **OK** to save changes.

   The status field at the far left of the **Manage Descriptor Rules** window will show a status of "Changed."

Figure 130.   Edit Descriptor Rule - Changed status
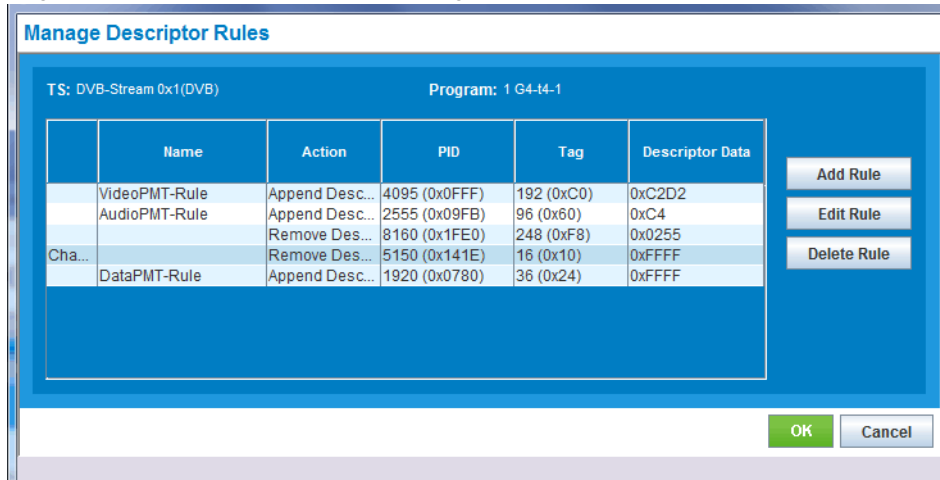


3.  Click OK in the **Manage Descriptor Rules** window apply the new rule change to the BNP, removing the "**New**" status from the far left of the menu.

4.  Click **Cancel** to close the window.

## Deleting Program Descriptor Rules

Use the **Delete Rule** function to remove a specified descriptor rule. This operation removes rule information from the **Descriptor Rules** screens, and from the BNP.

| | |
|---|---|
| Menu Path | **Manage Descriptor Rules** screen, highlight one of the displayed rules, and click the **Delete Rule** button. |

1.  At the **Delete Rule** confirmation dialog (Figure 131), click **Yes**.

2.  Note that the rule is now removed from the **Manage Descriptor Rules** screen.

Figure 131.   Manage Descriptor Rules - Delete Rule
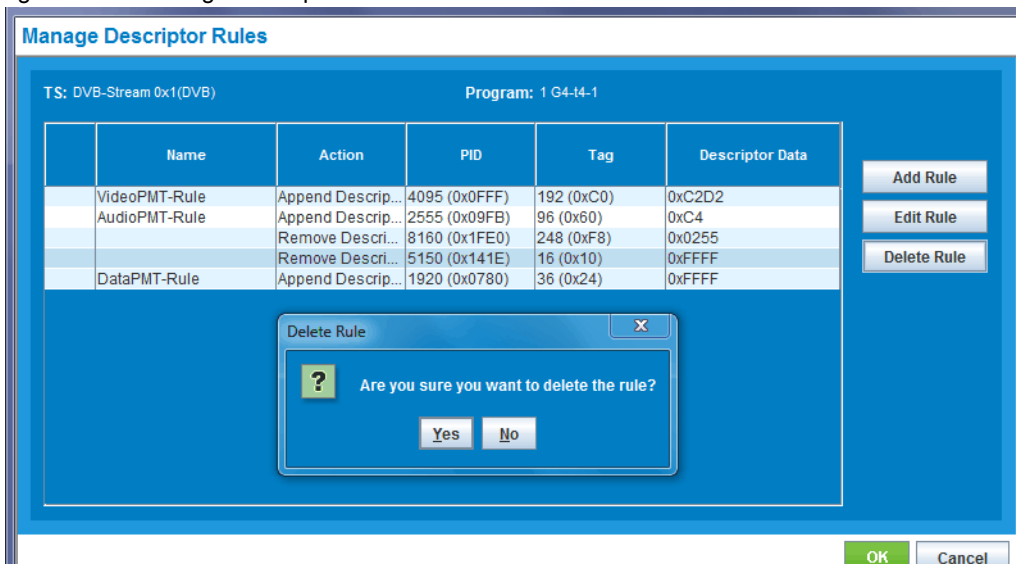
# Monitoring Bitrates

The BNP can simultaneously monitor up to 14 programs. If the total selected number of programs exceeds 15, the programs in the earlier monitoring list are shifted out, and newly selected programs are added to the bottom of the list. The bit rate monitor window only keeps up to 14 programs. Each program is shown as a percentage of the total.

Access and view real-time monitoring graphs, as described in the following topics:

- "Using the Input Bitrate Monitor," next.
- "Using the Input-Output Bitrate Monitor" on page 184.

## Using the Input Bitrate Monitor

By default, the **Input Bitrate Monitor** screen is not monitoring anything until you select a program or stream to monitor. You can opt to view input bitrate only (default) or combine this with a view of video input bitrate and CC errors.

| | |
|---|---|
| ☞ **Menu Path** | **Grooming** tab -> **Input Bitrate Monitor** tab. |

1. At the **Input Bitrate Monitor** screen, click the **Select Input** button (Figure 132).
2. At the **Select Input Programs to Monitor** screen, click one or more transport streams, then click **OK** to dismiss the selection screen.
3. To include a view of Input Video Program CC Error Counts per second, click the **Video Input Bitrate and CC Errors** option.

Figure 132.    Selecting Input Programs to be Monitored
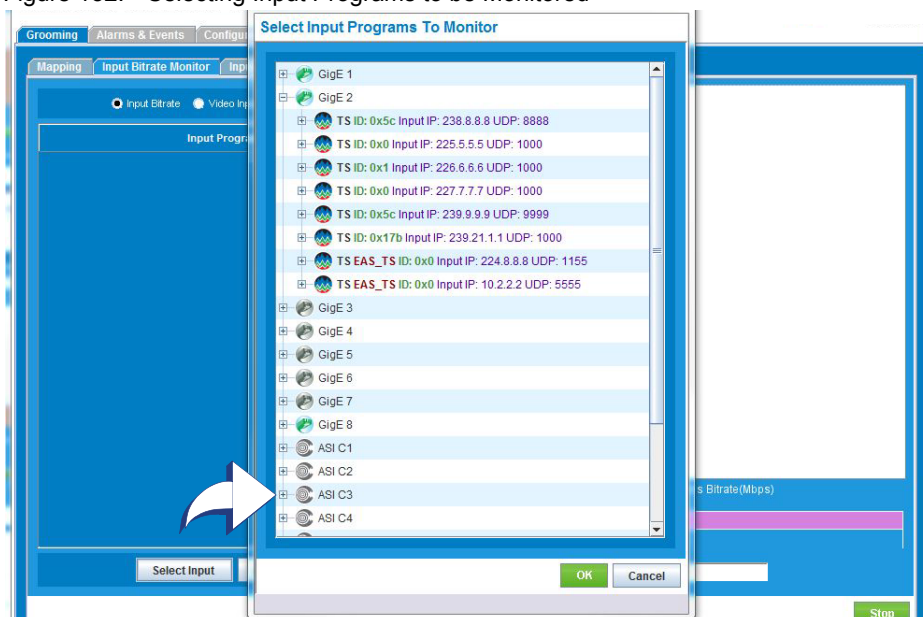


The following changes now occur in the **Input Bitrate Monitor** screen (Figure 133):

- The left panel lists the names of your selected transport streams, at the **Input Program List**.

- The right panel presents a dynamic bar chart showing the bitrates associated with each of the selected streams. If you selected the **Video Input Bitrate and CC Errors** option, monitoring results are displayed above the input bitrate bar chart (Figure 133).

Figure 133.   Viewing Monitoring Detail for Input Programs



Video Input Bitrate and CC Errors

Total input rate as compared to the assumed output

Stop monitoring: freeze the view.

Click to remove monitoring of a highlighted row from the Program List.

Percentage of total output bit rate for each program. Default = 38.7. You an enter a different value here.
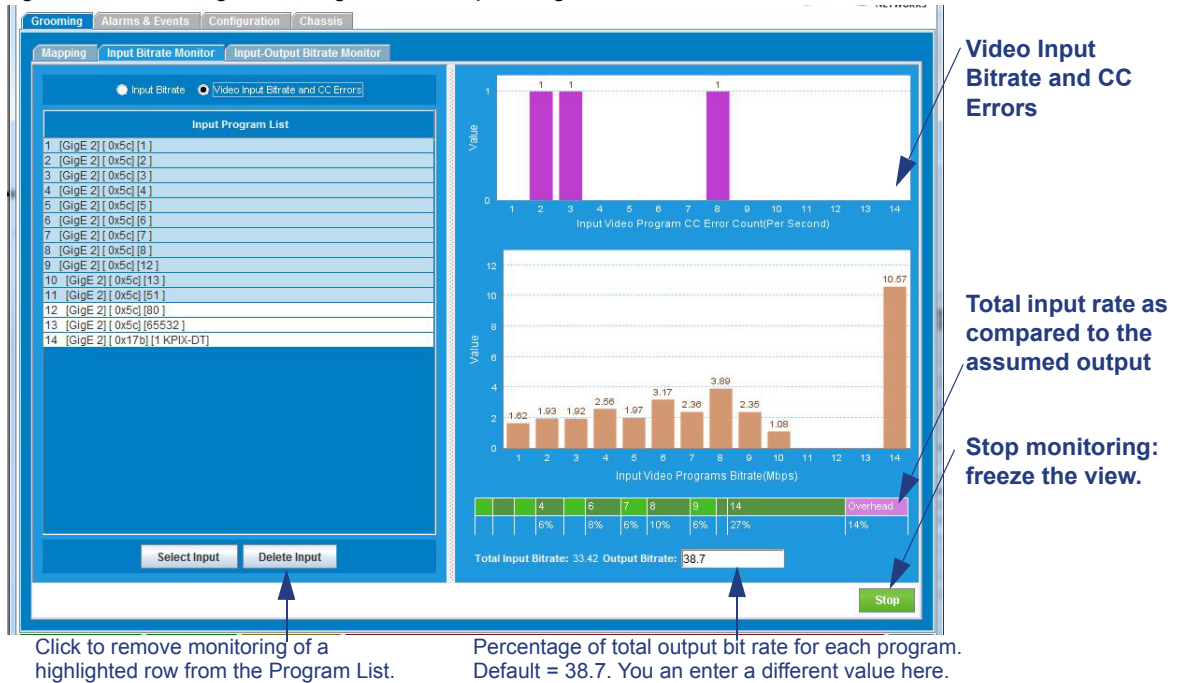
Figure 134.   Example—Input bitrate exceeds output
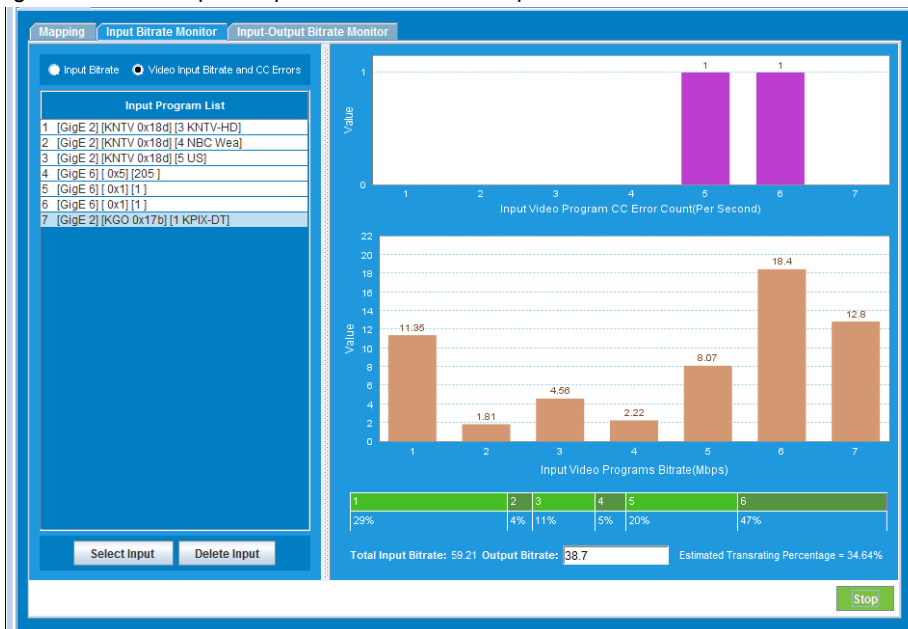
## Using the Input-Output Bitrate Monitor

By default, the **Input-Output Bitrate Monitor** screen is not monitoring anything until you select a GigE port and transport stream to monitor.

| | |
|---|---|
| 👉 **Menu Path** | **Grooming** -> **Input-Output Bitrate Monitor** tab. |

1. At the **Port** pull-down menu, select a GigE port.

2. At the **Transport Stream** pull-down menu, select a transport stream.

3. Enable (check) or disable (un-check) the any or all of the following options to monitor:

   – Input Bitrate

   – Output Bitrate

   – CC Errors

Figure 135.    Input-Output Bit Rate Monitor tab screen
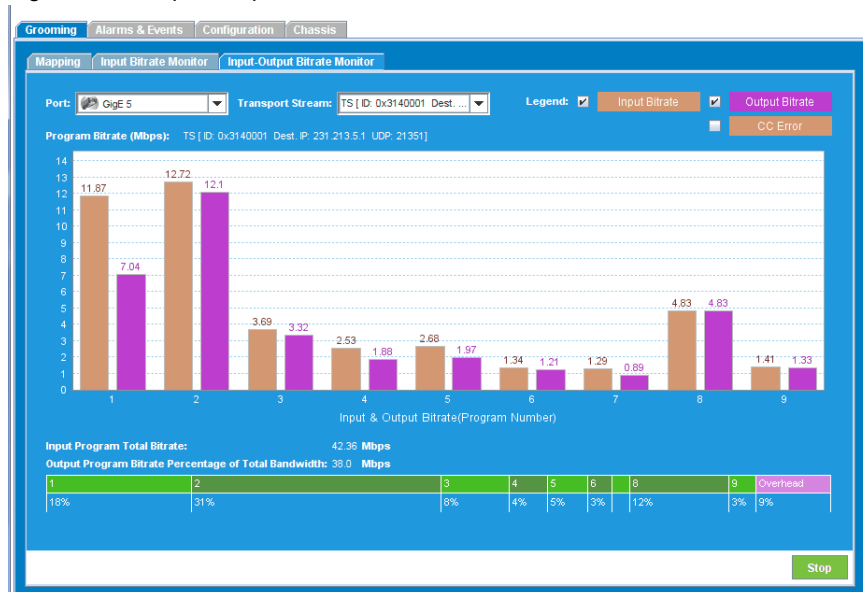
CHAPTER 7

# Maintenance

This chapter describes how to use the *BNP Element Manager* to perform maintenance tasks.

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

## In This Chapter:

## Software Upgrade

To upgrade to the latest BNP software, download the software from an FTP server and use the BNP *Element Manager* upgrade feature to perform the upgrade. You will receive the specific information about the upgrade software when you purchase an upgrade, or when you are notified that an upgrade is available.

In most cases, you can simply upgrade from your currently running release to the most recent, regardless of the sequence of releases in between (see "Upgrade Sequence" on page 186). However, systems running BNP software previous to 3.5.0 must first upgrade to 3.5.0 prior to attempting an upgrade to the currently available release.

**Note:** *Always refer to the Release Notes for supported upgrade paths.*

Use this section to find out how to upgrade a standalone BNP, or the active and standby BNPs in a redundant configuration, as described in the following topics:

**Note:** *Please contact Imagine Communications Customer Support for assistance in performing a software downgrade process.*

## Upgrade Sequence

The BNP can be upgraded from any of the following releases to the current release:

- BNP 3.5.5 (build 64325)
- BNP 3.5.4 (build 57976)
- BNP 3.5.3 (build 55783)
- BNP 3.5.2 (build 53116)
- BNP 3.5.1 (build 52097)
- BNP 3.5.0 (build 50397)

**Note:** *If the BNP is running a release prior to any of the above, you must first update the system to Release 3.5.0 before attempting to upgrade to the current release.*

## Upgrading Software in a Single Chassis Environment

Use the **Upgrade Software** dialog (Figure 136 and Table 87) to define the source and destination for software intended for use by a standalone (non-redundant) BNP. This dialog also allows you to enable or disable auto-reboot of the system upon completion of the upgrade. A typical upgrade procedure for use with a standalone system is provided in Table 86.
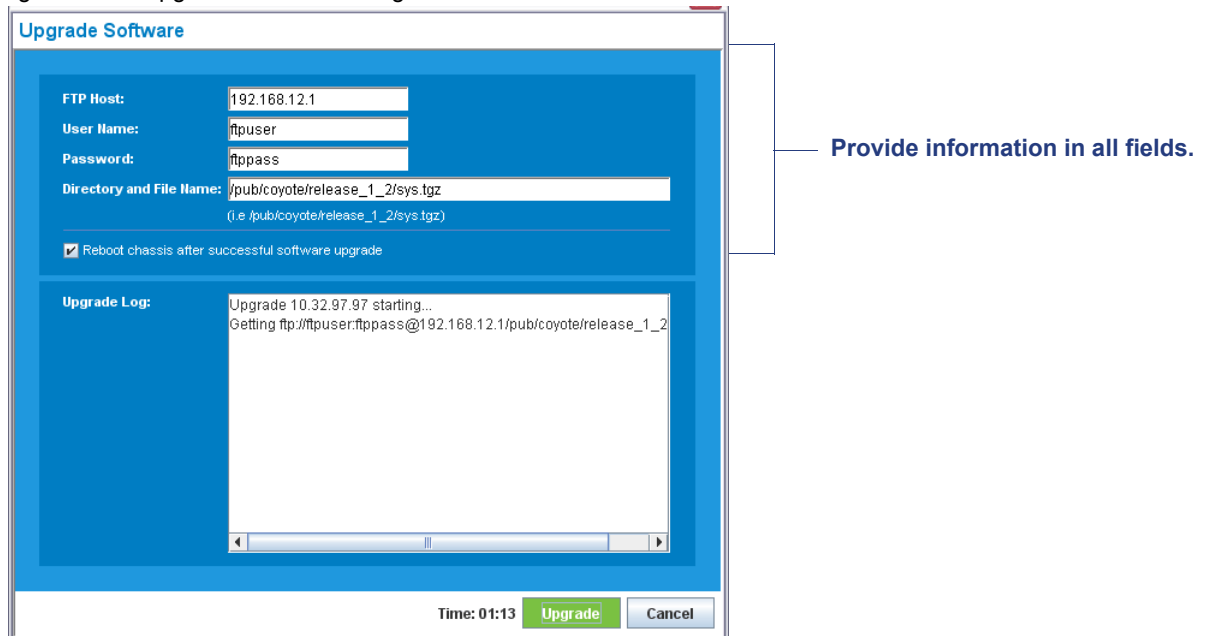
| | | |
|---|---|---|
| | **Menu Path** | BNP *Element Manager* main menu: **Maintenance** -> **Software Upgrade** |

Figure 136. Upgrade Software dialog



Provide information in all fields.

Table 86. Standalone Chassis Software Upgrade Steps

| Step | Description |
|---|---|
| 1. Upgrade the BNP chassis. | At the **Upgrade Software** screen: <br> a. Type the FTP Host, User Name, Password, and Directory and File Name: *Un-check* the **Reboot chassis after successful software upgrade** option. <br> b. Click **Upgrade** and wait until you see the 100% completion message in the Upgrade Log. |
| 2. Shut down the chassis. | Log into the BNP via its **Physical IP** address and use the **Maintenance ->** menu to perform a . |
| **3.** Remove power from the chassis. | After shutting down the system through the *Element Manager*, wait one minute (or until the Fault LED has stopped blinking) and unplug the power cord from the chassis. |
| 4. Power cycle the BNP. | Apply power to the BNP and wait until the chassis is accessible through the GUI and output streams are verified. |

Table 87. Upgrade Software - Configuration Fields

| Field | Description |
|---|---|
| FTP Host | Enter the IP address of the FTP server on which the upgrade software package resides. |
| User Name | Enter the user name needed to access the FTP server. |
| Password | Enter the password for the user name provided above. |
| Path | Enter the source location of the upgrade software. Specify the directory and file name using the format shown on the **Upgrade Software** dialog. |

Table 87.     Upgrade Software - Configuration Fields (Continued)

| Field | Description |
|---|---|
| Upgrade Log | Viewing area in which to watch messages during the upgrade. The upgrade is complete when you see status as 100% installed. |
| Reboot chassis after successful software upgrade | To reboot the chassis automatically, enable this feature; otherwise, you will have to reboot the chassis manually. |

## Upgrading Software in a Redundant Chassis Environment

In a redundant BNP environment, both the active and standby chassis will need to be upgraded. The **Upgrade Software** dialog (Figure 137) for redundant BNPs presents options that allow you to define how to apply your software upgrade parameters—to both active and standby, or only to active or standby. This dialog also allows you to enable or disable auto-reboot of the system upon completion of the upgrade. Use the procedure in Table 88 to perform a redundant BNP software upgrade.

| | **Menu Path** | BNP *Element Manager* menu: **Maintenance** -> **Software Upgrade** |
|---|---|---|

Figure 137.    Software Upgrade - Redundant chassis



Table 88.        Redundant Chassis Software Upgrade Steps

| Step | Description |
|---|---|
| 1.    Upgrade the active BNP chassis | At the **Upgrade Software** screen:<br><br>a.    Type the FTP Host, User Name, Password, and Directory and File Name.<br><br>b.    Select the **Both Active and Standby** radio button.<br><br>c.    *Un-check* the **Reboot chassis after successful software upgrade** option.<br><br>d.    Click **Upgrade** and wait until you see the 100% completion message in the Upgrade Log. |
| **2.**    Shut down the Standby chassis, then shut down the Active chassis. | a.    Log into the Standby's *Element Manager* via its **Physical IP** address and use the **Maintenance ->**  menu to perform a .<br><br>b.    Log into the Active's *Element Manager* via its **Virtual IP** address and use the **Maintenance ->**  menu to shutdown the system. |
| **3.**    Remove power from the Standby chassis. | After shutting down the Standby through the *Element Manager*, wait one minute (or until the Fault LED has stopped blinking) and unplug the power cord from the standby chassis. |
| **4.**    Power cycle the Active chassis, then power up the Standby chassis. | a.    Power cycle the active chassis.<br><br>b.    Wait until the active chassis is accessible through the GUI and output streams are verified.<br><br>c.    Replace power to the standby chassis and proceed with boot up. |

# Clearing the Web Start Cache

Any time that you downgrade software, you must clear the cache from the Java Web Start. Older versions of the *BNP Element Manager* use Web Start when the *BNP Element Manager* is started. This is only needed when you change to a software version previous to the current one.

### To clear the Java Web Start cache (on a Windows system)

1. From the Windows **Start** Menu, select **Settings** -> **Control Panel** -> **Java** to launch the **Java Control Panel**.

2. From the **Temporary Internet Files** section, click the **Settings button**.

3. At the *Temporary Files Settings* screen now on display, click **Delete Files** and **OK**.

4. Click Advanced tab, and check to ensure that the **Application and Applets** and **Trace and Log Files** boxes are checked.

5. Click **OK** to clear the cache and close the Java Control application.

# Managing Licenses

The determination of what type of license is used for a particular transport stream and its bandwidth is made when you configure an output transport stream. A transport stream can only be assigned to a license type after the license has been installed. For more information on configuring various types of output transport streams, see the relevant sections in the *Grooming and PSIP* chapter of the *BNP User Guide*.

BNP licensing is based on the total bandwidth of output multiplexes where each Mux can be MPTS or SPTS. An associated license allows the creation of as many Mux or programs as will fit in the licensed bandwidth. For example, z40 Mbps Mux allows a MPTS with programs averaging at around 2.5 Mbps, or 10 CBR SPTS programs at 4 Mbps.

All license keys are tied to the serial number of the compact flash card, which allows flash portability and access to stored configurations.

Topics in this section:

- "BNP License Types," next.
- "Purchasing Licenses" on page 191.
- "Activating a License Key" on page 192.
- "Checking Hardware Capacity Status" on page 193.
- "Flash Portability" on page 193.

## BNP License Types

The license types available for use with the BNP are listed in Table 89.

Table 89.    BNP License Types

| Type of License | Description |
|---|---|
| **Grooming with DPI** | Enables all product features, including grooming, statistical multiplexing, transrating, DPI (ad insertion), PSIP, all redundancy options, Gigabit Ethernet, and SCTE 30 to SCTE 35 conversion. |
| | This license is also referred to as the 'standard' grooming license. |
| | **Applicable Platforms:** BNP 2xr, BNP 2xr+, BNP 3xr |
| **Grooming** | Enables all features without DPI. This license provides the option to add support for all features with a DPI license upgrade at a later time. |
| | **Applicable Platforms:** BNP 2xr, BNP 2xr+, BNP 3xr |
| **Messaging System** | Enables use of integration with an external digital SCTE 18 EAS server, including option for Operator-defined message alerts. |
| | This license must be used in conjunction with the *Grooming with DPI* or *Grooming* (non-DPI) license. |
| | **Applicable Platforms:** BNP 2xr, BNP 2xr+, BNP 3xr |
| **Advanced Overlay** | Provides ability for static logo insertion and import of external text or graphics for playout. |
| | This license must be used in conjunction with the following licenses: |
| | • Either the *Grooming with DPI* or *Grooming* (non-DPI) license. |
| | • The *Messaging System* license. |
| | **Applicable Platforms:** BNP 2xr, BNP 2xr+, BNP 3xr |
| **SPTS** | Allows a Single Program Transport Stream to be created on the output. |
| | The functionality of this license is identical to the standard grooming license with the exception that creation of an MPTS on the output is not allowed. |
| | **Applicable Platforms:** BNP 2xr, BNP 2xr+, BNP 3xr |
| **Program with DPI** | Allows Digital Program Insertion on a per-program basis. |
| | This license is used in conjunction with the standard Grooming license and the SPTS license which enable grooming, statistical multiplexing, and transrating. |
| | **Applicable Platforms:** BNP 2xr, BNP 2xr+, BNP 3xr |
| **DVB-CA** | Allows DVB Conditional Access on a per-TS MUX bandwidth basis. This license is available in 4Mbps increments and is tracked at the TS level. |
| | **Applicable Platforms:** BNP 2xr+, BNP 3xr |

## Purchasing Licenses

The BNP is shipped with a license key pre-loaded on the system.To purchase an upgrade license, submit your request and PO to your reseller or to Imagine Communications if you purchased the product directly. Your request will then be processed and a new license key will be sent to you.

In your request, be sure to include the serial number of your compact flash card and the current number of licenses you have for that particular system. Imagine Communications will issue a new license key that will accommodate the total number of licenses for that system. For example, if you currently have a 4-Mux license (160 Mbps) for a single BNP and you are ordering two more licenses for this system, Imagine Communications will issue a new license key for 6 Muxes (240 Mbps). If purchasing licenses for multiple systems, you will need to indicate how many licenses per system with the serial number of the compact flash of each system clearly indicated. Imagine Communications will then issue separate license keys for each system.

## Activating a License Key

After you receive the license key, use the **License Manager** screen (Figure 138) to activate a license.
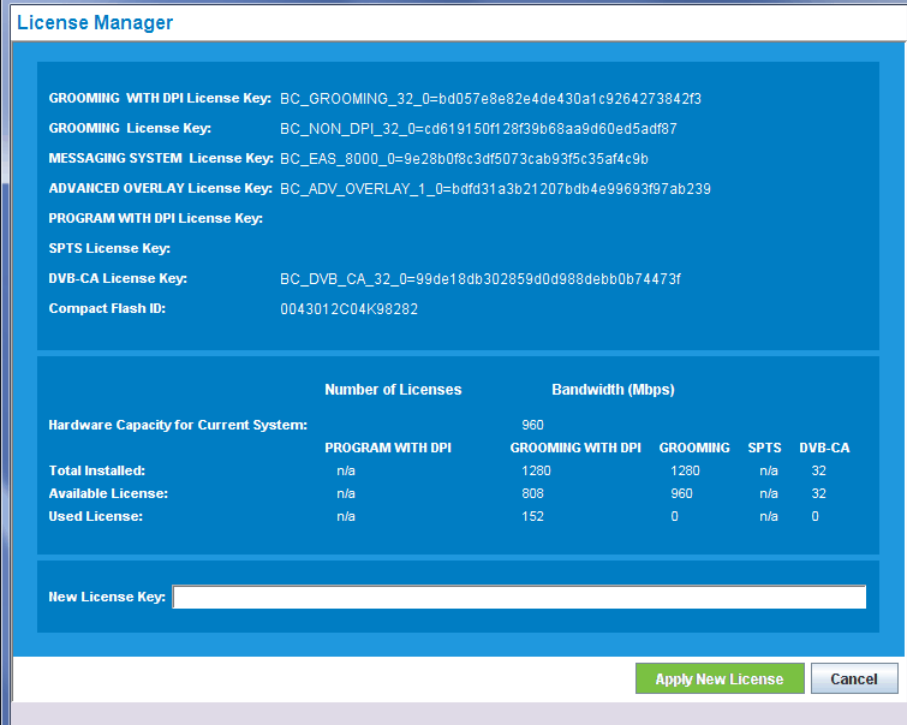
| | |
|---|---|
| 👉 **Menu Path** | BNP *Element Manager* main menu: **Maintenance** (Alt **m**)-> **License Manager** |

1.  At the **License Manager** screen, verify that the information currently on display is correct.

2.  In the **New License Key** field, enter the license key

ℹ️ **Note:**   *There is only one field in which to input a license key; this field is applicable to all types of licenses.*

Figure 138.   The License Manager (BNP 3xr Example)



3.  Click **Apply New License**. The updated information is now displayed in the **License Manager**. Figure 138 shows the currently installed license key and Compact Flash ID (serial number).

ℹ️ **Note:**   *Adding a Messaging System or Advanced Overlay license key also requires a reboot to take effect.*

## Checking Hardware Capacity Status

Use the **Hardware Capacity for Current System** section of the **License Manager** window to view hardware capacity information—which is defined as the maximum number of licenses and bandwidth that the system can currently support, as based on the hardware currently installed in the BNP. In the **License Manager screen**, capacity information is provided in the following rows:

- **Total Installed**—the number of licenses residing in the compact flash and the resulting potential bandwidth available in each license category. This number of licenses shown in this display may exceed your current hardware capability.
- **Available License**—based on either the installed licensed bandwidth or hardware capacity bandwidth, whichever is less. In this display, *Used Bandwidth + Available Bandwidth* equals either the Total Installed licensed bandwidth or the Hardware Capacity, as depending on which is lower.
- **Used License**—indicates the bandwidth actually in operation.

## Flash Portability

One of the advantages of the BNP's licensing structure is flash portability. In the unlikely case that your system suffers a catastrophic failure and you need to replace the hardware, remove the compact flash from the old BNP chassis and install it into the new hardware. The new system should now operate just like the old system as long as the hardware in the new system can support the same configuration. For example, if the failed system used two processor cards with two ASI cards, your new system would need to have the same hardware to support an identical configuration.

# Changing the SNMP Community String

SNMP community strings control read and write access to BNP configuration. To *read* the BNP's configuration, an SNMP Network Manager must provide a community string that matches the BNP's **Read Community String**. To *change* the BNP's configuration, the SNMP Network Manager must provide a string that matches the BNP's **Write Community String**.

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the *Element Manager*, select **M**aintenance (Alt **m**)**--> Change SNMP Community String.** |

1. At the **Modify SNMP Community String** dialog, change either or both the Read and Write strings to the desired values, then click **OK**.

   When the BNP prompts for a reboot. Click **OK** to proceed.
2. After the system reboots, log in to the *Element Manager*.

   ℹ️ **Note:** *You will not be able to change the **SNMP Community String** at this point. You will need to log in as normal and allow the system to produce an error, thus prompting for new SNMP Community String entries.*

3.  After you click the **Log in** button, the BNP will timeout and display the BNP unreachable message. Click **OK** to dismiss this message.
    The BNP Log In screen is now displayed, with fields in which to enter the SNMP Community String Read and Write strings.
    Enter the new **Read** and/or **Write** community strings to match the entries you changed in step 1 above.

4.  Click the **Log in** button.

    The BNP will log you in as normal.
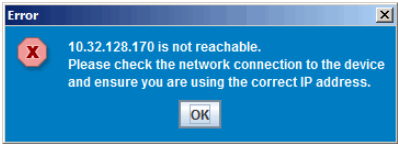
**Note:**    *You will need to log in as described above for any workstation that is accessing the Element Manager for the first time after the **SNMP Read / Write Community Strings** have been changed.*

# Configuring the Time Offset Table (TOT)

The TOT conveys additional information about summer and winter time periods and gives the local time offset with respect to UTC for different countries or regions. If the TOT is locally generated, user interaction is required to define the country or region in which the receiver is operated. The BNP supports the required DVB tables, including TOT.

Use the **Set up Time Offset table (TOT)** dialog for this configuration.

| | | |
|---|---|---|
| ☞ | **Menu Path** | From the *Element Manager*, select <u>M</u>aintenance (Alt **m**)--> **Setup Time Offset table (TOT)** (Alt **t**) (Figure 139 and Table 90). |

Figure 139.   Accessing TOT Parameters
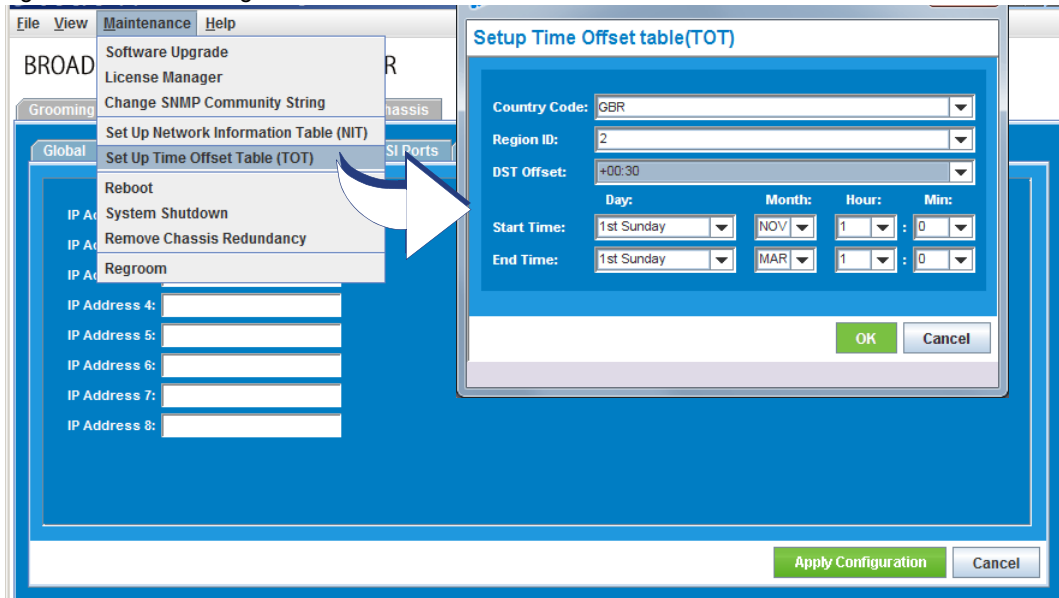


Table 90.      TOT Parameters

| Field | Description |
|---|---|
| Country Code | The three-character country code. |
| Region ID | Value, in the range 0 to 60, to set the region identifier. 0 = one time zone in the country. Other time zones are numbered from 1 (most easterly) up to 60 (most westerly). |
| DST Offset | The DST offset: (range is -2:00, -1:30, -1:00, -0:30, 0, +0:30, +1:00, +1:30, +2:00). The value is 0: when DST is not applicable; otherwise the offset to be applied to current time when DST is in effect. For example, in the US, the local time offset when DST is not in effect is -8, and when DST is in effect, it is –7. So, the DST offset is +1. polarity is 1 as time is behind UTC. |
| Start Time | Fields to set day, month, hour, and minute, to define when DST takes effect in the current year. |
| End Time | Fields to set day, month, hour, and minute, to define when DST ends in the current year. |
| Day | Select option to set start or end day for TOT: 1st Sunday, 2nd Sunday, 3rd Sunday, or Last Sunday. |
| Month | Select option, to set start or end month for TOT: January to December. |
| Hour | Select value, to set start or end hour for TOT: Range: 1 to 23. |
| Minute | Select value, to set start or end minute for TOT: Range: 0 to 59. |

# Rebooting the System

Any time you load a new software image, you must reboot the system. When a power cycle or reboot is performed, the BNP will retain previously saved configuration settings. Only the parameters of newly introduced features need to be set when the system is upgraded and rebooted.

You can reboot the BNP either by using a power cycle or by using the reboot option from the BNP *Element Manager*.

## Rebooting the BNP

The BNP does not have a power switch. To power the unit down, disconnect the power cable from the connector as described in your BNP installation guide.

A system reboot can be performed by Administrative or Operator user accounts.

Use the **Reboot** option from the *BNP Element Manager*. The system will prompt for your Administrative or Operator password, and for confirmation of the reboot.

| | Menu Path | BNP *Element Manager* main menu --> **Maintenance** (Alt **m**)--> **Reboot** (Alt **b**) |
|---|---|---|

1. At the **Password Verification** dialog, enter your password and click **OK**.

2. At the **Reboot** confirmation screen, click **Yes** to continue or **No** to dismiss the dialog and to cancel the reboot.
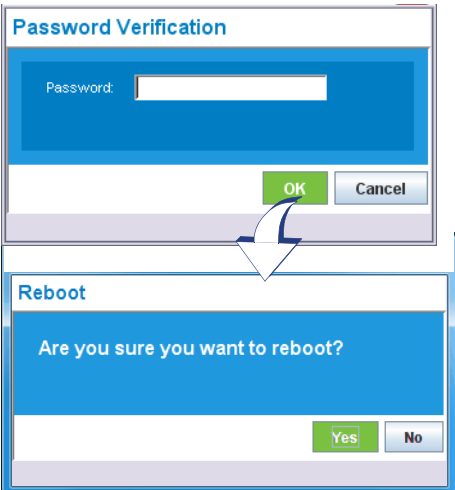
# System Shutdown

Use the procedure in this section if you need to power off the system for servicing, such as when removing a Video Processing Module, ASI module, or GBP3 module.

**Note:** *It is not necessary to power-off or shut down the system when servicing hot-swappable modules.*

During a system shutdown, video services are stopped, and the BNP Administrative interface is disabled but you can use Telnet to connect to the BNP. A system shutdown stops all video services on the BNP. If chassis-level redundancy is configured and you are stopping all services on the active BNP, the standby BNP will become active.

**Note:** *The only way to restart video services following a system shudown is to manually power cycle the chassis by removing and reinserting the power cord.*

**Note:** *Prior to performing the steps in this section, ensure there is a technician standing by at the physical location of the BNP.*

A system shudown can be performed by Administrative or Operator user accounts.

Use the system shutdown option from the *BNP Element Manager*. The system will prompt for your Administrative or Operator password, and for confirmation of the shutdown.

| | |
|---|---|
| **Menu Path** | BNP *Element Manager* main menu -> **Maintenance** (Alt **m**)-> System Shutdown (Alt **s**) |

1. At the  confirmation dialog, click **Yes** to continue, or **No** to abort.

2. At the **Password Verification** prompt , type your Administrative or Operator password, and click **OK**.

   All services at the BNP will now be stopped. Look for the solid green (or unlit) *Fault* LED on the BNP to verify that services are stopped.

3. Disconnect power from the power source. Ensure that all LEDs are unlit. No sounds should be audible from the unit at this time.
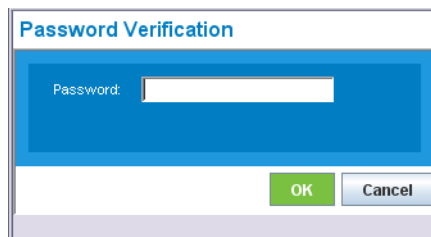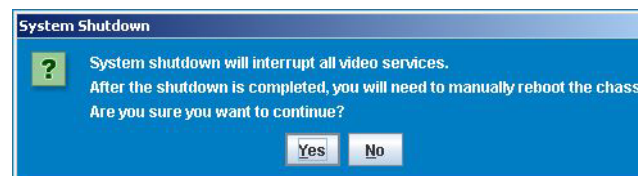
   On a **DC system**, remove the power cables from the BNP power supply connectors (or both sets of cabling in the case of power supply redundancy).
   On an **AC system**, remove the power cord from BNP power supply connector (or both cords in the case of power supply redundancy).

# Removing Chassis Redundancy

Use the **Remove Chassis Redundancy** function to tear down the redundant configuration between a pair of BNPs.

| | | |
|---|---|---|
| 👉 | **Menu Path** | *Element Manager* main menu -->**Maintenance** (Alt **m**)--> **Remove Chassis Redundancy** (Alt **r**) |

The *BNP Element Manager* will query for confirmation of the removal.

At the **Confirmation** dialog, click **Yes** to proceed, or **No** to dismiss this dialog.
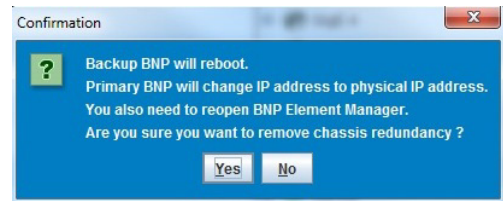


# Regrooming

Regrooming lets you reset all of the programs that are currently configured in Program Redundancy to their Active Programs. Once initiated, the command will check to see that the active program has been restored. If the active program has not been not restored, no change will occur to the current state of the program.

The Regrooming feature resets all programs with a properly detected primary program available.

ℹ️ **Note:** *This feature cannot be used to regroom a selected stream.*

## To Reset all of Grooming to the Active Chassis

Use the **Regroom** function to apply a chassis regroom on the active BNP.

| | | |
|---|---|---|
| 👉 | **Menu Path** | *Element Manager* main menu -->**Maintenance** (Alt **m**)--> **Regroom** (Alt **g**) |

At the **Regroom** dialog, click **Apply regroom** to proceed, or **Cancel** to dismiss this dialog.
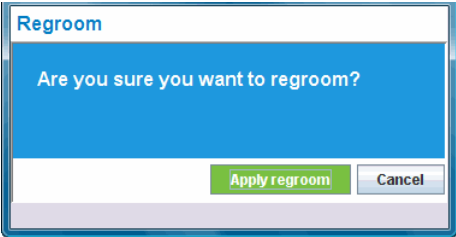
# Force Re-allocation of TS

Use the **Force Rec-allocation of TS** function to redistribute output transport streams to available PROC modules in the BNP.

This action will require restart of the BNP, as indicated by the confirmation popup.
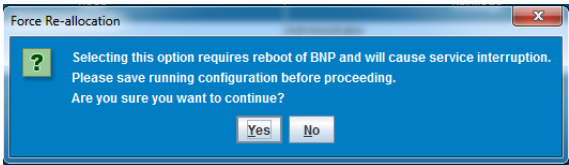
| | | |
|---|---|---|
| 👉 | **Menu Path** | *Element Manager* main menu --> **Maintenance** (Alt **m**)--> **Force re-allocation of TS** (Alt **a**) |

# Digital Program Insertion (DPI)

This chapter describes digital program insertion and how it relates to the *Selenio™ BNP*.

To implement DPI on the BNP, you need either a GROOMING WITH DPI license key or a PROGRAM WITH DPI license key. See "Managing Licenses" on page 190 for additional information.

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

## In This Chapter:

## Digital Program Insertion

The BNP supports industry standard digital program insertion (DPI) applications, such as program substitution and ad insertion.

The BNP is fully interoperable with industry compliant ad servers through the SCTE 30 interface. When a successful SCTE 30 initialization has been established with the BNP, the *Element Manager* indicates such with an arrow icon on the Input/Output window of the **Grooming -> Mapping** tab.

The BNP is fully compliant with the SCTE 30 and SCTE 35 standards. A common DPI / ad insertion application deployment using SCTE 30 and 35 (the latter carrying in-band availability cue messages) may be represented by the following regional ad zone insertion illustration:

Figure 140.   Regional Ad Zone Insertion Illustration
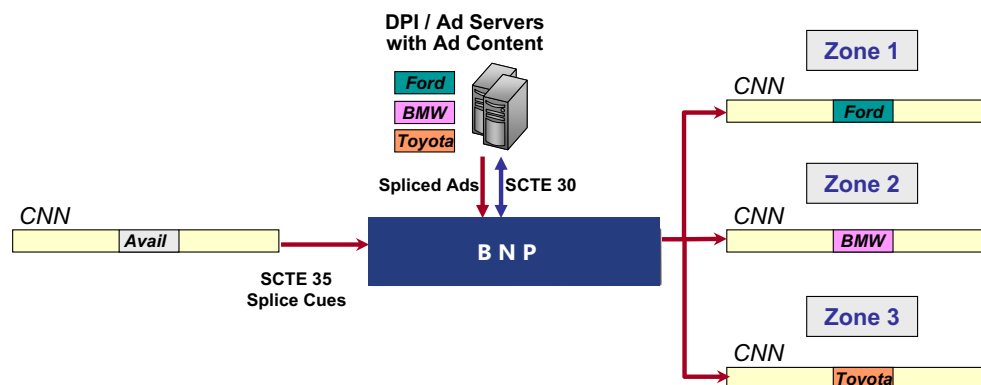


The BNP receives ads along with SCTE 30 splice messages from an ad server. Receiving these messages triggers the BNP to splice the ad. The ad is then treated the same as other objects in the BNP configuration.

> **Note:** *Imagine Communications recommends that you use an NTP server with the BNP. An NTP server is required if you are performing Digital Program Insertion (DPI) and dynamic grooming. You must have the NTP server up and running prior to booting up your BNP.*

> **Note:** *When configuring a DPI-enabled program, do not use **Handle as Data** Quality of Service levels when grooming a program. See Table 79 on page 147 for additional information.*

# Connecting an Ad Server to the BNP

Figure 141 shows how the ad server is connected to the BNP. Other connections may be possible, but this figure shows the general connection.

Figure 141.   Ad server - BNP connection
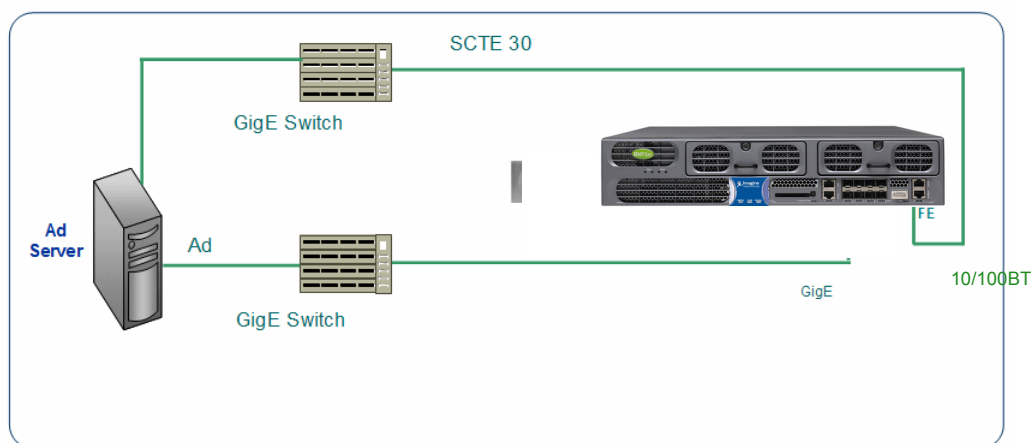
# Setting SCTE 30 and SCTE 35 Message Handling

The BNP is capable of receiving SCTE 30 messages from an ad server and converting those messages into SCTE 35 messages.

Figure 142.   SCTE 30 to SCTE 35 Conversion
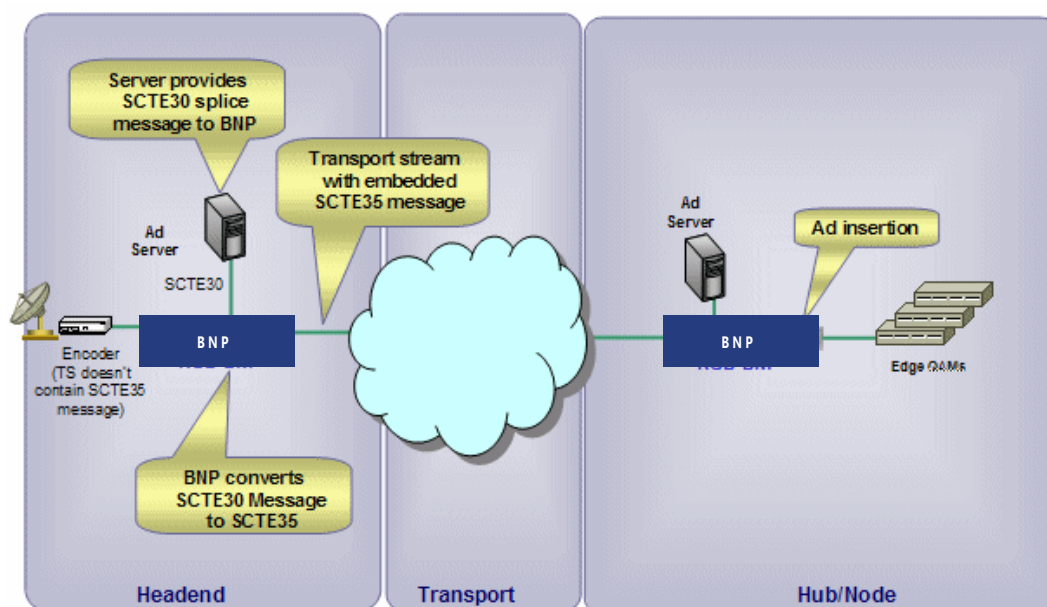


The BNP is also capable of forwarding SCTE 35 messages from input streams to output streams during network time and ad time.

To set SCTE 30 and 35 message handling options:

1.  Launch the *Element Manager* and log in as the administrator as described in "Log in and Access the BNP Element Manager" on page 25.

2.  Select the **Grooming -> Mapping** window.

3.  Groom an input program to an output transport stream as described in "Drag and Drop Grooming" on page 140.

    The **Configure Program Mapping** window appears.

4.  From the **Configure Program Mapping** window, check either the **Forward SCTE 35 Cue** or the **SCTE 30 to 35 Conversion** box.

Figure 143.    Configure Program Mapping window



5.    Click **OK**.

ℹ️ **Note:**    *You can either forward SCTE 35 cues from the input stream or convert SCTE 30 messages from an ad server, but not both.*

ℹ️ **Note:**    *Once SCTE 30 to 35 Conversion is enabled, the BNP only performs conversion; no splicing is performed.*

When you choose **Forward SCTE 35 Cue** or **SCTE 30 to 35 Conversion** on an output program, the BNP automatically allocates a PID for the cue (splice information) table, even if the input program contains no cue table. Figure 144 shows an example of an input program with no cue table groomed to an output program selected to forward SCTE 35 cues. Notice the allocation for the cue table in the output program.

Figure 144.    Allocated PID for Cue Table

# Setting Postblack Options for DPI

*Postblack* refers to insertion of black video and muted audio at the end of a spliced ad. Postblack might be necessary if the ad is shorter than the specified duration or if there are transmission errors. The BNP offers the following configuration options for postblack.

- **Postblack in ad server requests** — Determine whether to accept or ignore postblack settings in SCTE 30 Splice Request messages from ad servers.
- **Postblack for ad underflows** — Determine whether to insert postblack after ads that are shorter than the time specified in the SCTE 30 Splice Request message. If enabled, postblack is inserted at the end of the ad for the remaining time.

Postblack handing is a global setting on the BNP. To view and configure postblack settings:

1. From the *Element Manager*, select **Configuration -> Global**.

   The **Global** chassis configuration window appears.

Figure 145.   Global chassis configuration

2. Set your postblack options according to the following table:

Table 91.    Postblack Enable Options

| Category | Field | Description/Values |
|---|---|---|
| Postblack Enable Options | AD Server Request | Check this to play postblack that an ad server specifies be played at the end of an ad. Left unchecked, the BNP will ignore any postblack requests from ad servers. |
| | AD Underflows | Check this to insert black frames before transitioning back to the network, when AD underflows. This will allow a smooth transition between the AD that under flowed and the network. |
| DPI Splicing | Accurate splicing for non CUE DPI | Check this to allow BNP to delay or advance the splicing per current latency on the stream. This feature is for frame accurate splicing for DTMF based DPI. |

3. Click **Apply Configuration**.

# Viewing DPI Status

Use the **System DPI Activity** screen (Figure 146) to view the BNP chassis-level DPI activity.

| | **Menu Path** | BNP *Element Manager* main menu: <u>S</u>tatus -> System **DPI** <u>A</u>ctivity |
|---|---|---|

Figure 146.   System DPI Activity Screen
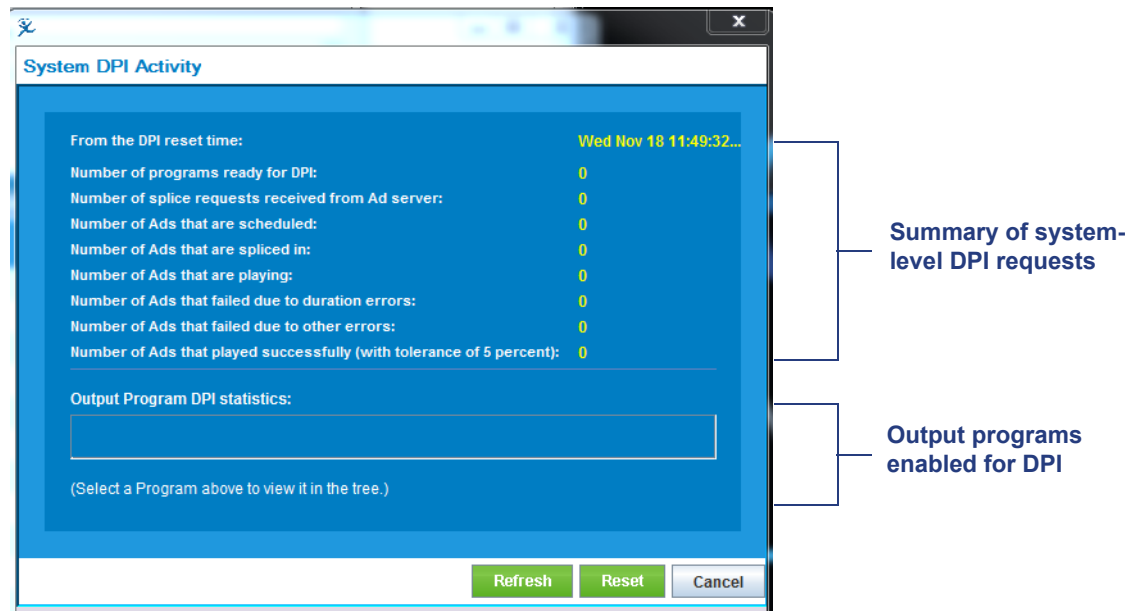


Table 92  System DPI Activity Options

| Button | Description |
|---|---|
| Refresh | Click to update display of real-time statistics/counters. |
| Reset | Click to set all displayed counters to zero and to reset the time. |
| Cancel | Click to dismiss this screen. |

Click on any output program listed at the bottom to find more information related to AD insertions at the output program level.

CHAPTER 9

# DVB Conditional Access

This chapter describes the functionality and configuration parameters for the *Selenio ™ BNP* DVB Conditional Access (DVB-CA) feature.

**Applicable Platforms:** The information in this chapter can be used only with BNP2xr+ or BNP 3xr.

## In This Chapter:

- "Overview," next.
- "DVB-CA Required Components" on page 208.
- "DVB-CA Configuration" on page 208.
- "DVB-CA Best Practices and Considerations" on page 235.

## Overview

The BNP supports the DVB-CA Common Scrambling Algorithm (CSA) and DVB SimulCrypt protocols (ETSI TS 103 197 V1.5.1) for Conditional Access System (CAS) which interfaces with DVB systems. This allows for encryption of MPEG-2 and H.264 programs in both SD and HD resolutions. The embedded SimulCrypt Engine is a low cost, high density, scalable encryption and management control implementation that is fully DVB-CA compliant. The BNP provides two 10/100 Ethernet management ports, allowing one of these port to be dedicated to the DVB-CA network. For an example topolgoy, see Figure 6, "BNP in a DVB-CA Network," on page 17.

The DVB-CA encryption feature includes the following functions:

- SimulCrypt Synchronizer (SCS).
- Control Word Generation (CWG).
- Common Scrambling Algorithm (CSA).
- ECM / EMM insertion.
- CA-related PSI / SI generation and insertion.

BNP's proprietary SimulCrypt engine interfaces with the following devices:

- Entitlement Control Message Generator (ECMG).
- Entitlement Management Message Generator (EMMG).
- Optional external Event Information Scheduler (EIS)[1].

---

1. The BNP may be configured to use an external EIS server or the internal EIS server provided by the BNP software.

# DVB-CA Required Components

The following components are necessary for a fully functioning DVB-CA system for the BNP:

1. BNP running software version 3.0 or higher.
2. DVB Transport Streams (TSs) configured on the output of the BNP.
3. Conditional Access System (CAS) with the following components:
   – Entitlement Control Message Generator (ECMG);
   – Entitlement Management Message Generator (EMMG);
   – Optional external Event Information Scheduler (EIS);
   – Valid NTP server.
4. Determination of whether External EIS mode or Internal EIS mode will be used.

# DVB-CA Configuration

This section describes the steps required for configuration of a DVB-CA system.

These steps require an **Admin** login level from the *Element Manager*.

1. Verifying the DVB-CA License.
2. Setting Up an NTP Server.
3. Configuring Ethernet Control Port for DVB-CA.
4. Configuring GigE or ASI Port(s) for DVB-CA System.
5. Creating Input TS(s) for DVB-CA System.
6. Creating Output DVB TS(s) for DVB-CA System.
7. Grooming Input Program(s) to Output DVB TS.
8. Creating Input PSI/SI Table Grooming.
9. Grooming the Ghost Program to Output DVB TS.
10. Configuring DVB-CA Global Parameters.
11. Configuring DVB-CA: External and Internal EIS Mode.
12. Configuring DVB-CA for Internal EIS Mode.

## Verifying the DVB-CA License

To view or configure DVB-CA parameters in the *Element Manager*, you must first have a valid DVB-CA license. See "Managing Licenses" on page 190 for details on obtaining or verifying a DVB-CA license. When a valid DVB-CA license is present, the DVB-CA option is displayed on the main *Element Manager* menu and in the DVB-CA tab (Figure 147).

Figure 147.    Evidence of DVB-CA at the Element Manager
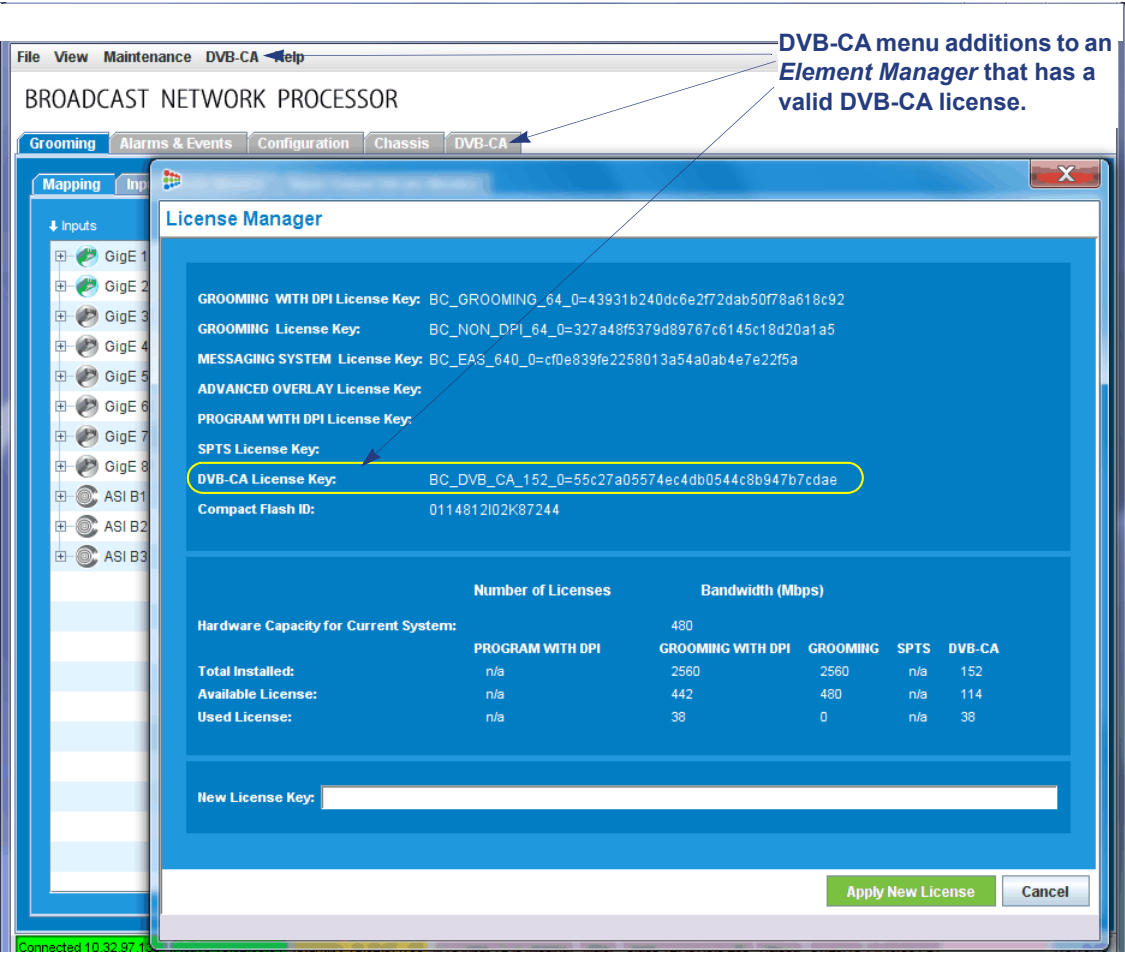
## Setting Up an NTP Server

To enable proper interaction of the DVB-CA feature with the CAS, a network time protocol (NTP) server must be set up in the *Element Manager* such that the IP Address of the NTP server is from the same source as that used by the CAS.

Use the **Global** configuration tab page to set NTP parameters.

| | Menu Path | Access via *BNP Element Manager* **Configuration tab -> Global** tab screen. |
|---|---|---|



1. At the **Server 1**: field, type the IP address of the NTP server, in dotted decimal format.
2. Click the **Apply Configuration** button to save and use the settings displayed in this tab page.
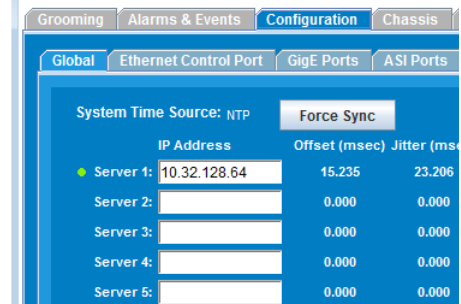
## Configuring Ethernet Control Port for DVB-CA

Of the two 10/100 Base T Ethernet management ports on the BNP, only **Ethernet Port 2** is available for management access to the CAS. However, you must configure an IP address for both Ethernet Port 1 and Ethernet Port 2 for proper DVB-CA functionality.

The ports you will configure at the *Element Manager* are mapped to the physical ports of the BNP as shown in Figure 148.

Figure 148.    DVB-CA - Ethernet Control Port mapping
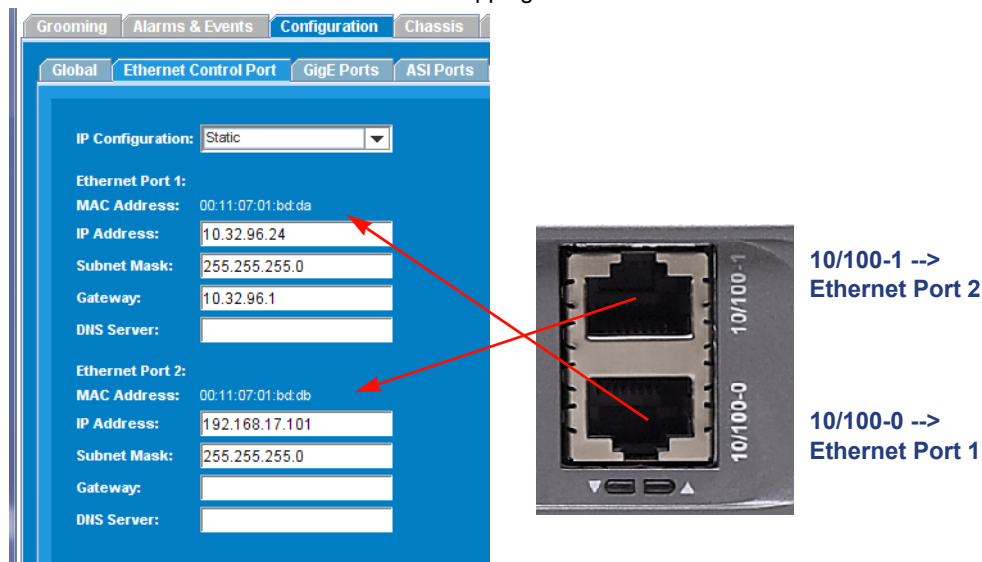


Use the **Ethernet Control Port** tab page to configure the BNP control ports.

| | Menu Path | Access via *BNP Element Manager* **Configuration tab -> Ethernet Control Port** tab screen. |
|---|---|---|

1. In the **Ethernet Port 2** section, type the **IP Address, Subnet Mask, Gateway,** and **DNS Server** (optional) to which the CAS will connect.

> **Note:** *If you have configured the BNP in a 1:1 redundancy environment, the Gateway IP Address for Ethernet Port 2 must be configured.*

2. Click the **Apply Configuration** button to indicate confirmation of the settings displayed on the screen.

Before using the settings, the BNP will prompt for a reboot. Additional information for performing BNP reboots is provided in "Rebooting the System" on page 196.

Settings will take effect upon completion of the reboot.

# Configuring GigE or ASI Port(s) for DVB-CA System

Use guidelines in this section to set port addresses, mirroring, and/or negotiation, as described in the following topics:

- "GigE Port Input and Output Interface Configuration," next.
- "ASI Port Input and Output Configuration" on page 212.

## GigE Port Input and Output Interface Configuration

Use the **GigE Ports** tab page to manage the GigE ports for the BNP. Note that GigE port can be used for simultaneous input and output.

| | |
|---|---|
| **Menu Path** | Access via *BNP Element Manager* **Configuration tab -> GigE Ports** tab page. |

Figure 149.  Configure GigE - DVB-CA



1. Type the **IP Address, Subnet Mask, Gateway**, and **Auto-negotiation** information for the input and output GigE port(s) that are to be used for encryption.

2. Click **Apply Configuration** to save changes.

## ASI Port Input and Output Configuration

Use the ASI Ports tab page to manage the ASI ports for the BNP. Note that an ASI port cannot be used for simultaneous input and output: only one direction per port may be selected.
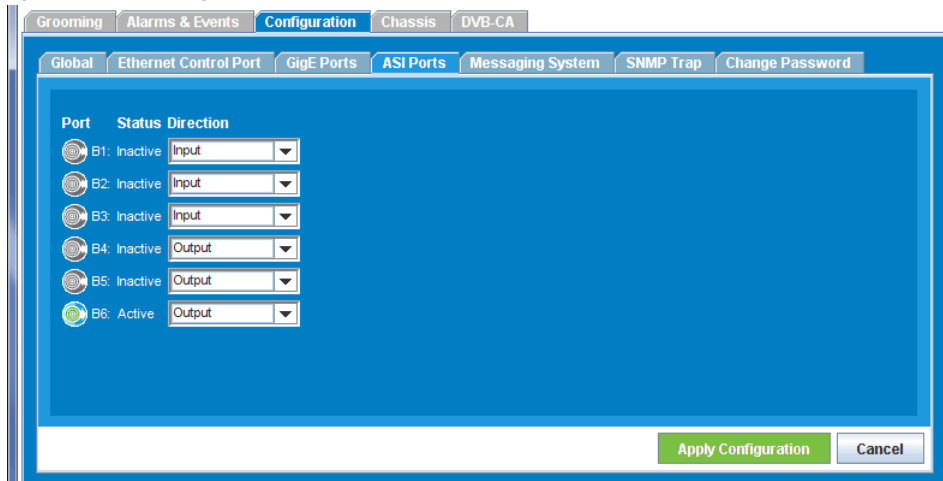
| | **Menu Path** | Access via *BNP Element Manager* **Configuration tab -> ASI Ports** tab page. |
|---|---|---|

Figure 150.   Configure ASI - DVB-CA
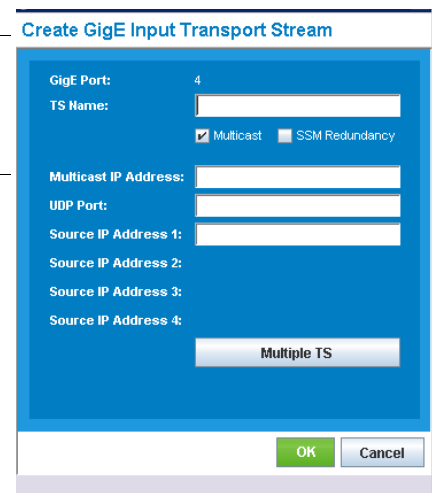


1.  At the selection field for any particular ASI, select either **Input** or **Output**.
2.  Click **Apply Configuration** to save changes.

# Creating Input TS(s) for DVB-CA System

Use the **Create GigE Transport Stream** screen to create an input transport stream for which programs are to be encrypted.

| | **Menu Path** | Access via *BNP Element Manager* **Grooming -> Mapping** window**,** right-click on an input GigE or ASI port and select **Create Transport Stream** from the popup menu. |
|---|---|---|



1.  Enter the **TS Name, IP Address**, and **UDP Port** of the Input TS for the programs to be encrypted.

    Guidelines for entering parameters in this screen are provided in "Creating Input Transport Streams" on page 109.
2.  Click **OK** to save and use the settings displayed in this screen.

## Creating Output DVB TS(s) for DVB-CA System

Use the **Create Output Transport Stream** screen to create a new DVB output stream for a GigE or ASI port.

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Outputs panel** of the **Grooming** tab **-> Mapping** tab screen, right-click on an ASI port or GigE port, and select **Create Transport Stream** from the popup menu. At the **Create Output Transport Stream** dialog **TS Type** field, select **DVB**. |

Figure 151.   Create Output TS - DVB-CA: GigE port and ASI port



**GigE Port**                    **ASI Port**

1.  Enter parameters for the output stream.

    –   Refer to general guidelines provided in "Creating DVB Output Transport Streams" on page 123 to create a new DVB Transport Stream for either a GigE or an ASI port.

    –   For proper encryption operations, ensure that the parameters listed in Table 93 are configured.

2. Click **OK** to save and use the settings displayed in this screen.

Table 93.        Output DVB TS parameters for DVB-CA configuration

| Output TS Parameter | Description | Required DVB-CA Value |
|---|---|---|
| Unique TS ID[a] | Allows you to assign a unique numeric ID to this transport stream.<br>• When this option is *checked*, the TS ID value placed in this field will be reserved as unique for the entire chassis.<br>• When this option is *unchecked*, a TS ID value may still be entered, however the value may be the same as another TS ID, as long as that TS ID's value has not been reserved as a Unique TS ID. | This field *must* be checked.<br>The value in this field *must* match that of the CAS. |
| TS Type | The type of stream. The type of stream you choose determines what other information is required. Choices are:<br>*MPEG-2, ATSC, SCTE*, or *DVB.* | This field *must* be set to *DVB*. |
| Network ID | The Network ID of the current transport stream. | The value in this field *must* match that of the CAS. |
| Original Network ID | The Network ID from which this stream has originated. | The value in this field *must* match that of the CAS. |
| Modulation Mode | Use the pull-down menu to select the modulation mode used for the TS.<br>• The Modulation Mode information is carried in the Network Information Table (NIT) of the input from the CAS vendor.<br>• Choice between *SCTE 64 QAM* and *SCTE 256 QAM*. | The selection in this field *must* match that of the CAS, unless NIT is passed through. |
| SDT Source | Source of the service description table for this transport stream. If you select N/A then SDT is not generated for this output TS. | This field *must* be set to N/A if SDT is originating from an external source. |
| EIT Source | Source of the Event Information Tabled (EIT) for the programs in this transport stream. If you select N/A then EIT will not be generated. | This field *must* be set to N/A if EIT is originating from an external source. |

a. The DVB-CA standard requires a unique pair value of the TS ID and Network ID fields.


## Grooming Input Program(s) to Output DVB TS

Use the **Configure Program Mapping** screen to groom a selected input program for an output DVB transport stream

| | | |
|---|---|---|
| 👉 | **Menu Path** | From the **Inputs** panel of the **Grooming** tab **-> Mapping** tab screen, select an input program and drag it to the output DVB created in the **Outputs** panel -> **Configure Program Mapping** screen. |

Figure 152.   Configure Program Mapping - DVB-CA



1.  In the **Destination** section, change the **Program Number** to the number *assigned and provided by the CAS*.

2.  If you are using an external EIS server, you may need to reserve the elementary stream PIDs *per the CAS configuration to match those from the external EIS server.*

    If you are using an internal EIS server, reserving a PID is optional and you may proceed to step 4 below.

    In the **Component PIDs** section, double click on the **Output Type** or **PID** fields for each elementary stream to assign a new reserved PID and to present the **Select Elementary Stream** screen.

    In the example above and below in Figure 152 and Figure 153, the `Input SCTE Video` PID of `16` will be changed to `3011` and the `AC-3 Audio` PID of `17` will be changed to `3012`.

Figure 153.   Reserve ES PIDs - DVB-CA



**Note:**   *When entering elementary stream PID values in the BNP Element Manager, the values must be entered in decimal format. However—in the **Grooming -> Mapping** screen—these values will always appear in hexadecimal format. It will be necessary to perform hex-to-decimal (and vice versa) conversion during the DVB-CA configuration.*

3.  Select the **New Reserved PID** radio button and enter the PID, as provided by the CAS vendor, for the elementary stream.

4.  Click **OK** to save changes and return to the **Configure Program Mapping** window (Figure 154).

Figure 154.   Configure Program Mapping - PIDs & Program changed - DVB-CA



5.  Repeat step 2 through step 4 for every elementary stream in the **Configure Program Mapping** window.

6.  Click **OK** in the **Configure Program Mapping** window to complete the grooming process.

The program with the new reserved PIDs (in hexadecimal format: `bc3=3011; bc4=3012`) is now displayed in the **Grooming -> Mapping** window (similar to the example shown in Figure 155).

Figure 155.   Reserved PIDs to Output (in hex) - DVB-CA
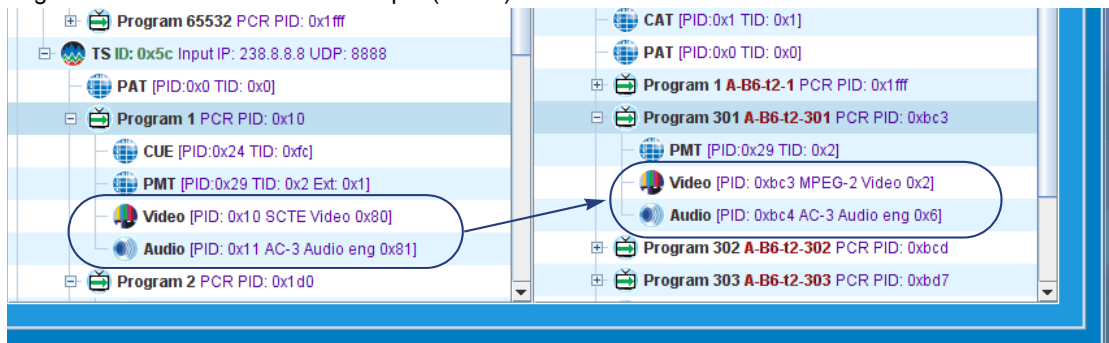
## Creating Input PSI/SI Table Grooming

Use the **Create GigE Input Transport Stream** screen to begin this configuration.

| | | |
|---|---|---|
| 👉 | **Menu Path** | Access via *BNP Element Manager* **Grooming -> Mapping** window**,** right-click on an input GigE or ASI port and select **Create Transport Stream** from the popup menu. |

1. At the **Create GigE Input Transport Stream** screen:

   − Enter the **IP Address**, and **UDP Port**.

   − Click **OK** to create the transport stream and to dismiss this screen.

2. At **Inputs** in the **Grooming** -> **Mapping** page:

   Right-click the TS that you just created, then select the **Create Ghost Program** option from the popup menu.
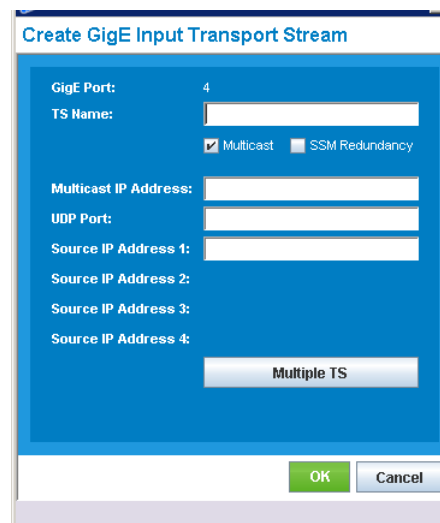
   The **Create Ghost Program** dialog is now presented.

3. At the **Create Ghost Program** dialog:

   − Type a name in the **Ghost Program:** field.

   − Click **OK** to dismiss the **Create Ghost Program** dialog.

   The new ghost program is now displayed in the **Inputs** section of the **Grooming** -> **Mapping** page.

4. At **Inputs** in the **Grooming** -> **Mapping** page, right-click the new ghost program and select **Add Elementary Stream** from the popup menu.

   The **Add Elementary Stream** dialog is now presented.
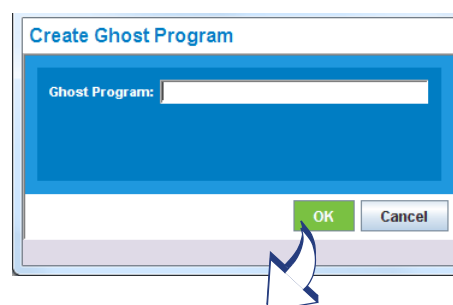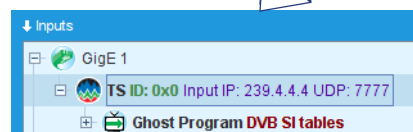
5. In the **Add Elementary Stream** dialog:
   – Change the **Stream Category** to *Data*.
   – Match the **Stream Type** and **PID** number provided by the CAS.
   – Click **OK** to add the elementary stream to the Ghost program and to dismiss this dialog
6. Repeat these steps for every elementary stream provided by the CAS vendor for which a PSI/SI table must be generated.
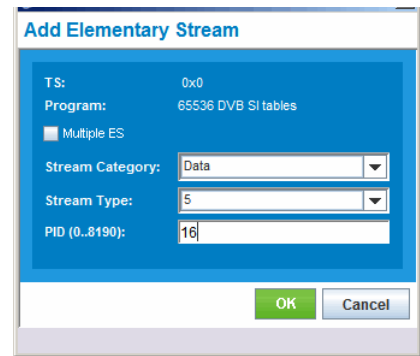
Completion of the elementary stream configurations will result in **Inputs** display in Inputs display similar to the example shown at right .
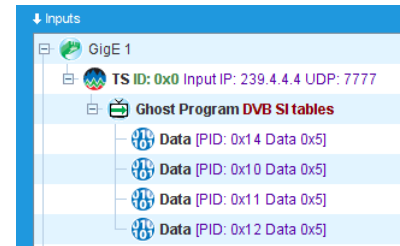
# Grooming the Ghost Program to Output DVB TS

1. Groom the Ghost Program you just created above by dragging the program from the Inputs panel of the **Grooming -> Mapping** window to the output DVB TS from "Creating Output DVB TS(s) for DVB-CA System" on page 213.
2. In the **Configure Program Mapping** window that opens, check the **Stay Unreferenced** box.

Figure 156.   Configure Program Mapping - Ghost Program - DVB-CA
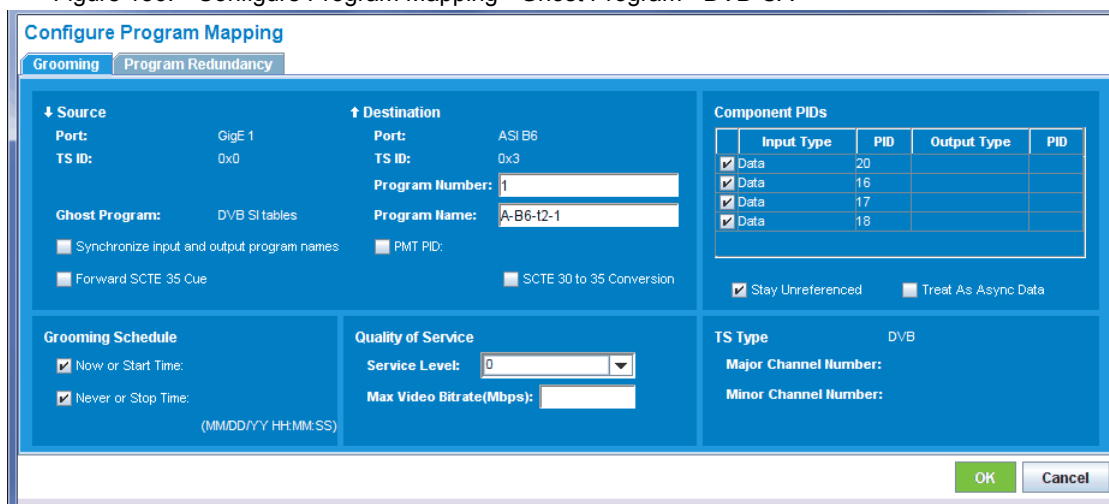
3. Click **OK** to complete the grooming process.

   The **Grooming -> Mapping** window will look similar to Figure 157 below:

Figure 157.   Output grooming window with ghost program added - DVB-CA
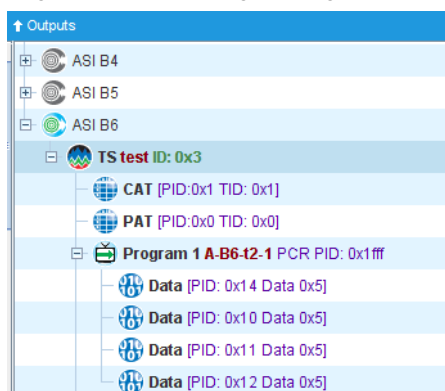


# Configuring DVB-CA Global Parameters

Before configuring the DVB-CA global parameters, determine if you will be using an external EIS server or the BNP's internal EIS server. External EIS mode requires different setup and menus that are determined in the **DVB-CA Global Configuration** menu. Changing from an external EIS to an internal EIS or vice versa will require a reboot of the BNP and will remove all previously configured DVB-CA encryption streams.

To configure the DVB-CA global parameters:

**1.** From the main *Element Manager* window, select **DVB-CA -> Global Configuration**.

The **DVB-CA Global Configuration** window of Figure 158 opens:

Figure 158.   DVB-CA Global Configuration - Internal EIS mode default
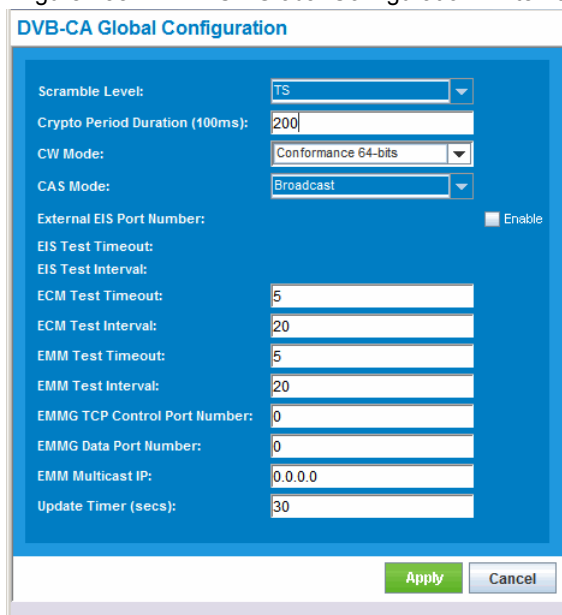
If an external EIS server is being used (i.e., the **Enable** button in this window checked), the **DVB-CA Global Configuration** window of Figure 159 will appear as follows:

Figure 159.   DVB-CA Global Configuration - External EIS mode default



2.  Fill out the fields of this window according to the descriptions listed in Table 94.

3.  Click **Apply** to save any changes.

4.  If the **Enable** button next to the **External EIS Port Number** field has been checked or unchecked, the system will prompt for a reboot. Click **Yes** to accept the reboot.

Table 94 describes the fields available in the **DVB-CA Global Configuration** window.

Table 94.      DVB-CA Global Configuration fields

| Field | Description | Internal EIS mode or External EIS mode |
|---|---|---|
| Scramble Level | Specifies the default scramble level for the BNP chassis. The default is set to TS (transport stream). This field is read-only. | Common to both |
| Crypto Period Duration (100ms) | Specifies the default crypto period for the BNP chassis in 100 millisecond increments.<br>• The default is set to 200 (which is 20,000 msecs, or 20 seconds). | Common to both |
| CW Mode | Specifies the Control Word mode to be used for the BNP chassis. Choose one of the following options from the pull-down menu:<br>• *Conformance 64-bits*, *Non-conformance 64-bits*, *Fixed 0*, or *Fixed 1*.<br>• Default is *Conformance 64-bits*. | Common to both |
| CAS Mode | Specifies the CAS mode for the BNP chassis.<br>Default is *Broadcast* mode; this field is read-only. | Common to both |

Table 94.      DVB-CA Global Configuration fields  (Continued)

| Field | Description | Internal EIS mode or External EIS mode |
|---|---|---|
| External EIS Port Number | Specifies the TCP port number that the BNP will use to connect to the external Event Information System (EIS) server.<br><br>• This field is for an External EIS server to communicate with the BNP.<br>• Default value is 1; valid range is from 1 to 65535. | External EIS mode only |
| *Enable* button | Checking this button will do the following:<br><br>• Switch the DVB-CA system from an internal CAS to an external CAS.<br>• Allow editing of the External EIS Port Number, EIS Test Timeout, and EIS Test Interval fields.<br><br>Un-checking this button will do the opposite of the above. | Determines if system uses External EIS mode or Internal EIS mode |
| EIS Test Timeout | Specifies the testing timeout (in seconds) for the external EIS server.<br><br>Default is 5 seconds. | External EIS mode only |
| EIS Test Interval | Specifies the interval (in seconds) in which the EIS test timeout will occur.<br><br>Default is 20 seconds. | External EIS mode only |
| ECM Test Timeout | Specifies the testing timeout (in seconds) for the Entitlement Control Message Generator (ECMG).<br><br>Default is 5 seconds. | Common to both |
| ECM Test Interval | Specifies the interval (in seconds) in which the ECMG test timeout will occur.<br><br>Default is 20 seconds. | Common to both |
| EMM Test Timeout | Specifies the testing timeout (in seconds) for the Entitlement Management Message Generator (EMMG).<br><br>Default is 5 seconds. | Common to both |
| EMM Test Interval | Specifies the interval (in seconds) in which the EMMG test timeout will occur.<br><br>Default is 20 seconds. | Common to both |
| EMMG TCP Control Port Number | Specifies the TCP control port number for the EMMG.<br><br>Default is 0; valid range is 1 to 65535. | Common to both |
| EMMG Data Port Number | Specifies the UDP number for the EMMG.<br><br>Default is 0; valid range is 1 to 65535. | Common to both |

Table 94.        DVB-CA Global Configuration fields  (Continued)

| Field | Description | Internal EIS mode or External EIS mode |
|---|---|---|
| EMM Multicast IP | Specifies the multicast IP address on which Ethernet Port 2 will receive EMM packets.<br><br>• Enter a valid multicast IP address in this field to enable Ethernet Port 2 for receiving EMM packets.<br><br>• Enter all 0's (or leave field at the default of all 0's) to not send EMM traffic via Ethernet Port 2. | Common to both |
| Update Timer (secs) | Specifies the amount of time (in seconds) before the BNP should begin to transmit video services in order to allow for encryption processing.<br><br>• Default is *0*.<br><br>• The higher the number, the longer it will take the end user to receive a video signal. If the number is too low, programming will be transmitted in the clear until the encryption engine takes over. The recommendation is to choose a number that will be an acceptable level of delay for the end user while still providing the minimum amount of clear data transmission. | Common to both |

## Configuring DVB-CA: External and Internal EIS Mode

Use steps in this section to configure DVB-CA for external and internal EIS modes. For internal EIS mode, please include the additional steps provided in "Configuring DVB-CA for Internal EIS Mode" on page 230 to complete that configuration.

The tasks for this configuration are provided in the following topics:

### Step 1  Create CA System

1.  From the main *Element Manager* menu tabs, click the **DVB-CA** tab to view the **CA System** and **SCG** subtabs.

2.  Click the **CA System** subtab.

    Note that if no **CA System** has been configured, the "+" expansion symbol is not displayed alongside the folder (as demonstrated in Figure 160).

    Figure 160.   DVB-CA tab
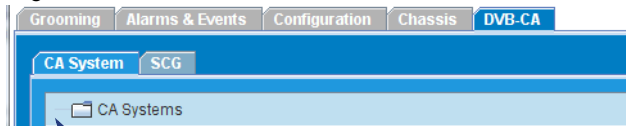
    

    **The absence of an "+" here indicates that no CA Systems are currently configured.**
    **The absence of an "+" here indicates that no CA Systems are currently configured.**

3.  Right-click the **CA Systems** folder and select **Create CA System** from the pop-up menu.

    The **Create CA System** dialog is now in view.

4.  Use the **Create CA System** dialog to set parameters for the CA System:

    –   In the **CAS Name** field, type a name for this CAS. This name should be unique across the chassis.

    –   In the **CAS ID** field, enter the ID number as provided by the CAS.

    –   Click **Apply** to save the displayed settings and to dismiss this dialog.
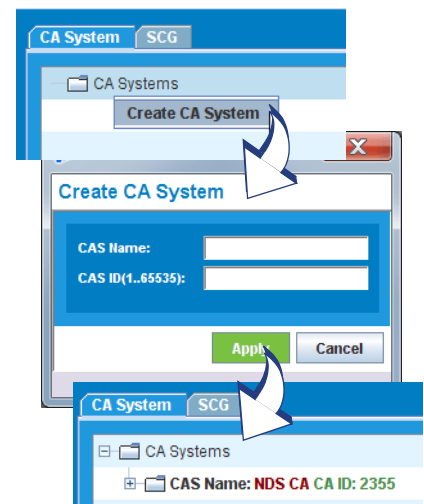
5.  At the **CA System** tab page, check to ensure that the new CAS is added to the CA Systems list.

### Step 2  Create ECMG

1.  Expand the CA Systems list using either of two methods:

    –   Click the "+" icon next to the name of the CAS you just created
        or

    –   Double-click on the name of the CAS.

2.  Under the CAS Name: list, right-click on the **ECMG List** folder and select **Create ECMG** from the pop-up menu:

    The **Create ECMG** dialog is now in view.
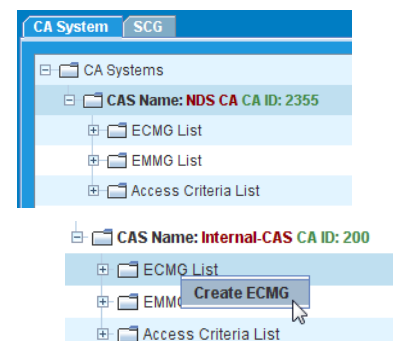
3.  Use the **Create ECMG** dialog to set parameters for the ECMG. Parameter descriptions are provided in Table 95 (below).

4.  Click **Apply** to save the displayed settings, exit this dialog, and create the ECMG.

5.  Check the **CA System** tab page to ensure that the new ECMG is now displayed in the list.
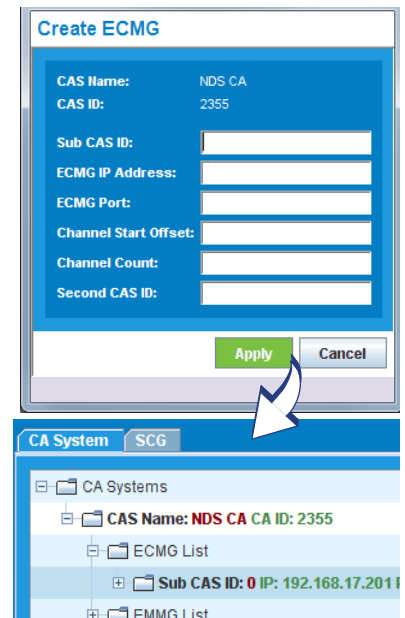
Table 95.     **Create ECMG** parameters

| Field | Description | Info Provided by: |
|---|---|---|
| CAS Name | Specifies the name of the CAS created in the CA Systems subtab. This field is read-only. | CAS |
| CAS ID | Specifies the CAS ID number created in the CA Systems subtab. This field is read-only. | CAS |
| Sub CAS ID | Enter the Sub CAS ID for this ECMG.<br>• Valid range is 0 to 65535; enter 0 if this field is to be ignored.<br>• This field is optional. | CAS |
| ECMG IP Address | Enter the IP address of the ECMG | CAS |
| ECMG Port | Enter the UDP number of the ECMG | CAS |
| Channel Start Offset | Specifies the first channel for the ECMG.<br>• This field is optional.<br>• Valid range is any integer.<br>• Default is 0. | CAS |
| Channel Count | Specifies the total number of channels this ECMG is currently maintaining.<br>• This field is optional.<br>• Valid range is any integer.<br>• Default is 10. | CAS |
| Second CAS ID | Enter the second CAS ID (if provided with one) from the CAS.<br>Range is 0 to 65535; enter 0 if not using a second CAS ID.<br>• This field is optional. | CAS |

### Step 3  Create EMMG

Up to four EMMGs may be created for a CAS.

**1.** Under the **CAS Name** folder, right-click on the **EMMG List** folder and select **Create EMMG** from the pop-up menu:

The **Create EMMG** dialog is now in view.

**2.** Use the **Create EMMG** dialog to define the client ID. At the **Client ID:** field, enter the Client ID number in *decimal format*.

**Note:** *If this value is being provided by the CAS, you will most likely receive this number in hexadecimal format. If so, you will need to convert the format from hex to decimal in order for this value to properly populate the field.*

**3.** Click **Apply** to save the displayed settings, exit this dialog, and create the EMMG.

**4.** Check the **CA System** tab page to ensure that the new EMMG is now displayed in the list.
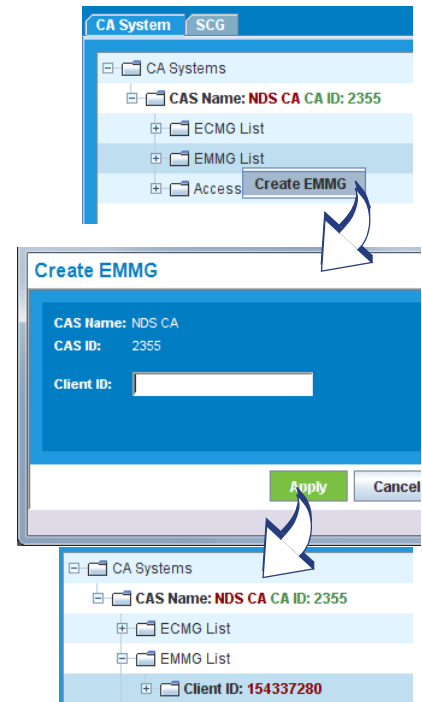
### Step 4  Create EMM

**1.** Under the **CAS Name** folder, right-click on the **Client ID** folder and select **Create EMM** from the pop-up menu.

The **Create EMM** dialog is now in view.

**2.** Use the **Create EMM** dialog to set parameters for this EMM.

Table 96 provides parameter descriptions for this configuration.

**3.** Click **Apply** to save the displayed settings, exit this dialog, and create the EMM.

**4.** At the **CA System** tab page, check to ensure that the new EMM is added under the **Client ID** folder.
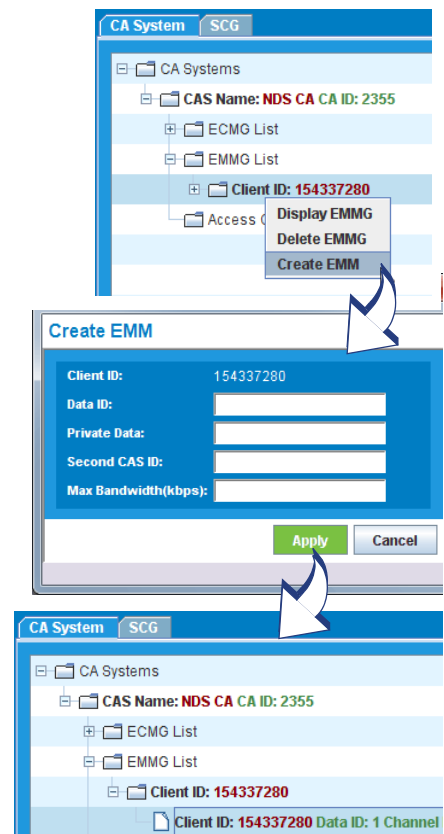
Table 96.        **Create EMM** parameters

| Field | Description | Provided by: |
|-------|-------------|--------------|
| Client ID | Displays the value created in the Create EMMG dialog.<br>This value is read-only. | CAS |
| Data ID | Specifies the unique identification of an EMM / private data stream of a Client ID.<br>Range is 0 to 65535 | CAS |
| Private Data | Enter additional data into the CA descriptor in the PMT.<br>• For a service, add private data into the program level's CA descriptor.<br>• For an ES, add private data into the ES level's CA descriptor.<br>• Default is blank.<br>• Format must be hex. | CAS |
| Second CAS ID | Enter the second CAS ID (if provided with one) from the CAS vendor.<br>Range is 0 to 65535; enter 0 if not using a second CAS ID. | CAS (optionally) |
| Max Bandwidth (kbps) | Enter the maximum bandwidth that will be allocated by the MUX. | CAS |

### Step 5  Join TS to EMM

1.  Under the **EMMG List**, expand the **Client ID** folder and right-click on an EMM to select **Join/ Disjoin TS to EMM** from the popup menu.

    The **Join/Disjoin TS to EMM** screen is now in view.
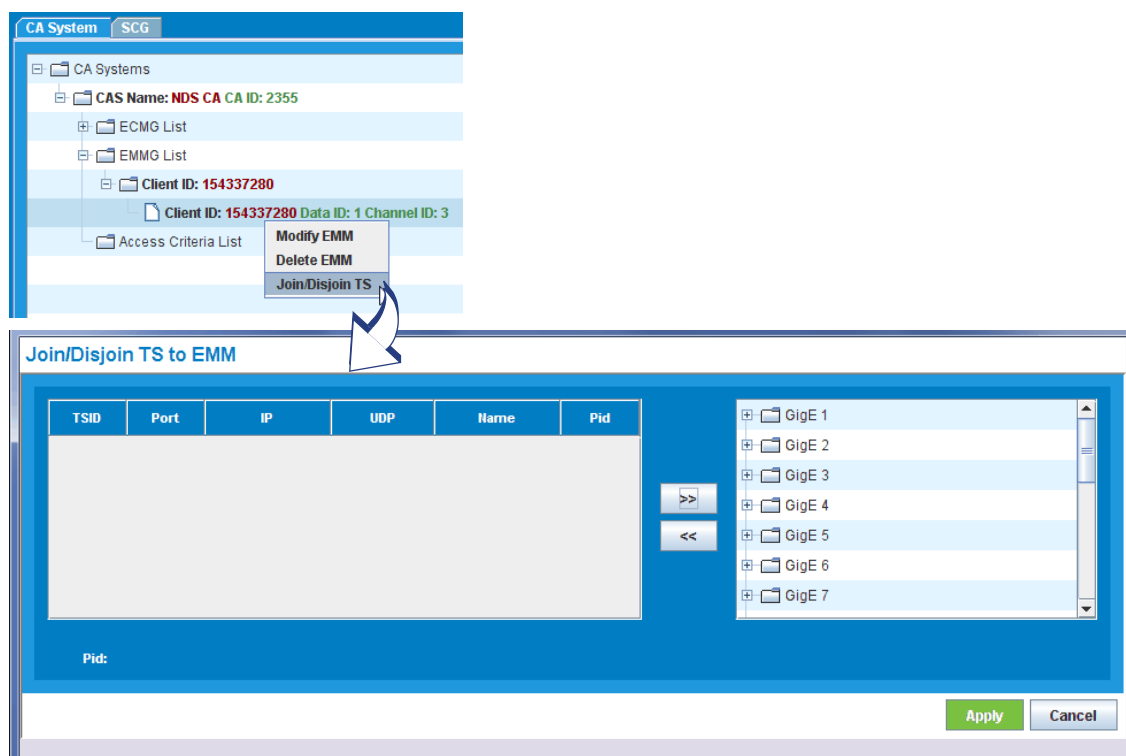
2. From the right side of the window, expand the GigE or ASI port in which you created the original DVB TS (See "Creating Output DVB TS(s) for DVB-CA System" on page 213.)

3. Highlight the TS and click the left arrow button (<<) next to the port list.
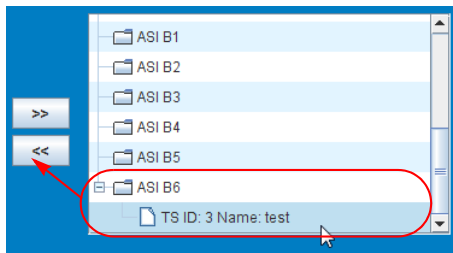


4. The TS is now added to the left side of the window with a PID value of 0 (Figure 161), which you will need to change.

Figure 161.    Join/Disjoin TS - TS added to EMM - No PID
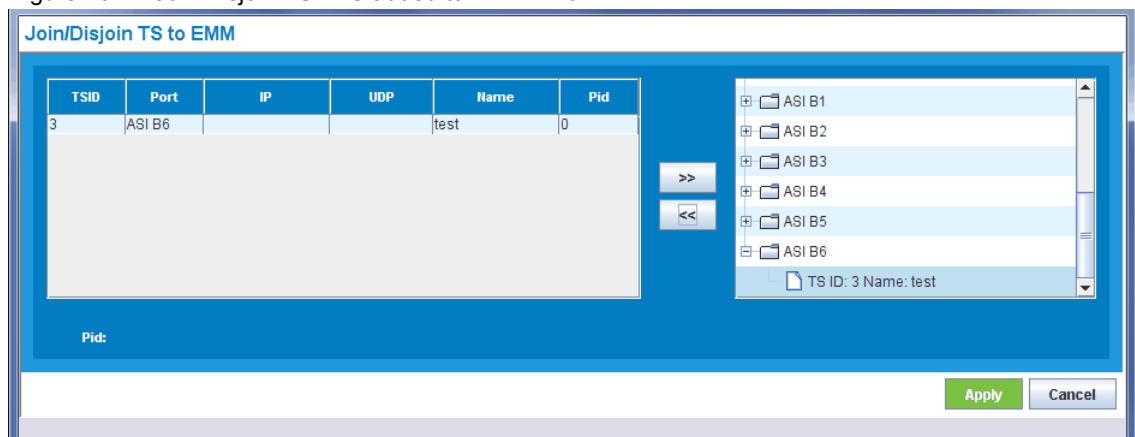


5. Edit the PID value:

   – Click on the TS displayed in the left panel of the window to activate the **PID:** field at the bottom of the screen.

   – At the **PID**: field, type a PID value for this TS. The PID value may be any valid PID
     or
     Leave the **PID** value as 0 to automatically generate a default PID for the entry.

Figure 162.    Join/Disjoin TS - PID entry



6. Tap the <**Enter**> key to set the specified value into the **Pid** column at the top of the window (as demonstrated in Figure 163.

Figure 163.   Join/Disjoin TS - PID modified
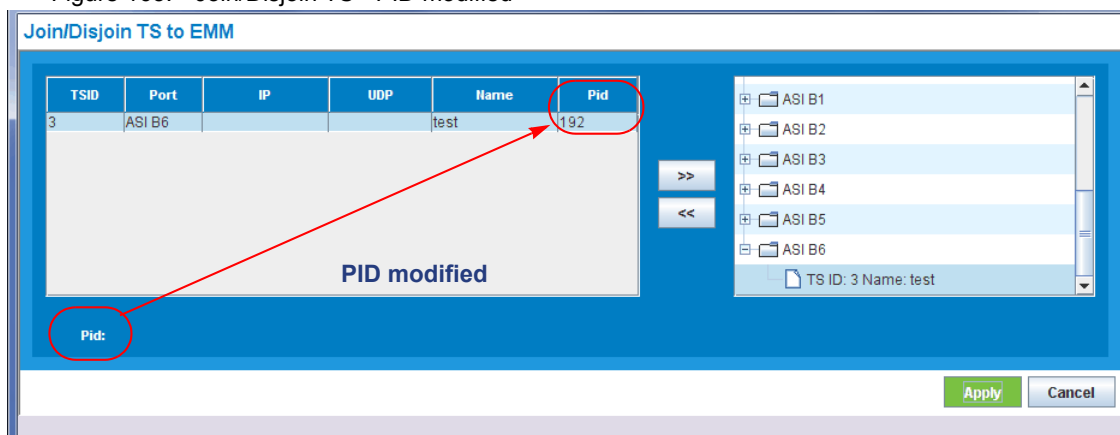


7. Click **Apply** to complete the process of joining the TS to the EMM.

8. At the **Grooming -> Mapping** tab page, anew EMM program is now displayed under the TS to which the EMM was joined.

Figure 164.   EMM Program joined to TS
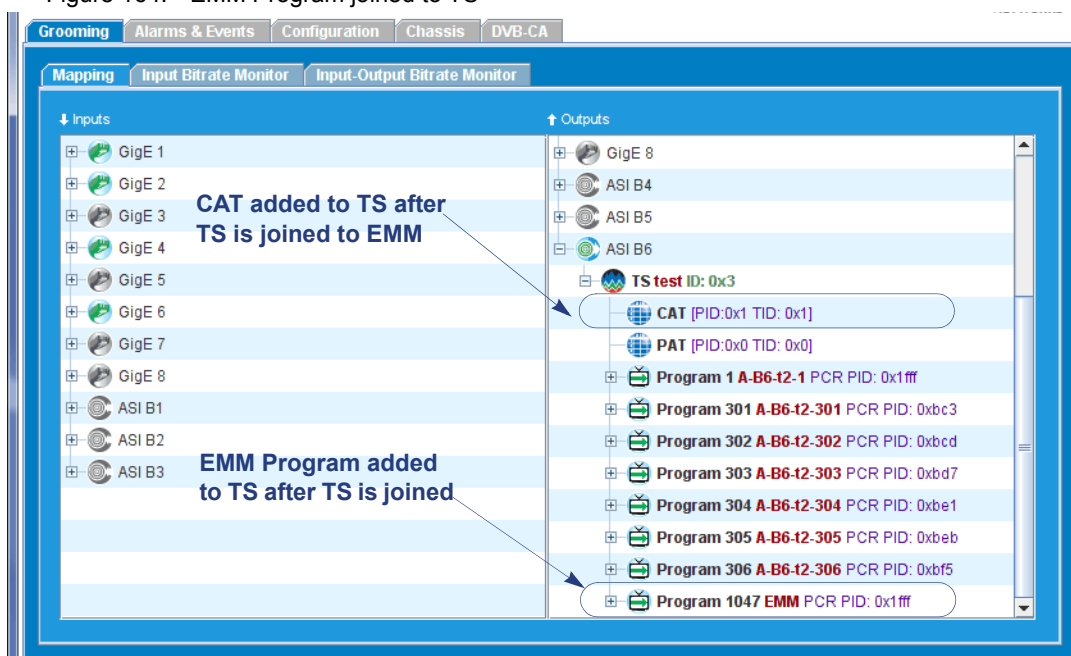


## Step 6  Verify Scrambling

The best way to verify scrambling is to confirm encrypted streams through the use of an analyzer. However, the following methods from the *Element Manager* may also be useful:

- "Verification via the Channel View," next.
- "Verification via the Service List" on page 229.

## Verification via the Channel View

You can view the channel information being received on the BNP by selecting the following menu path from the DVB-CA tab:

**CA System -> CAS Name -> ECMG List -> Sub CAS ID -> Channel**.

If scrambling is occurring, the stream IDs for each program will display "*connected*" status (Figure 165).

Figure 165.   Stream IDs connected
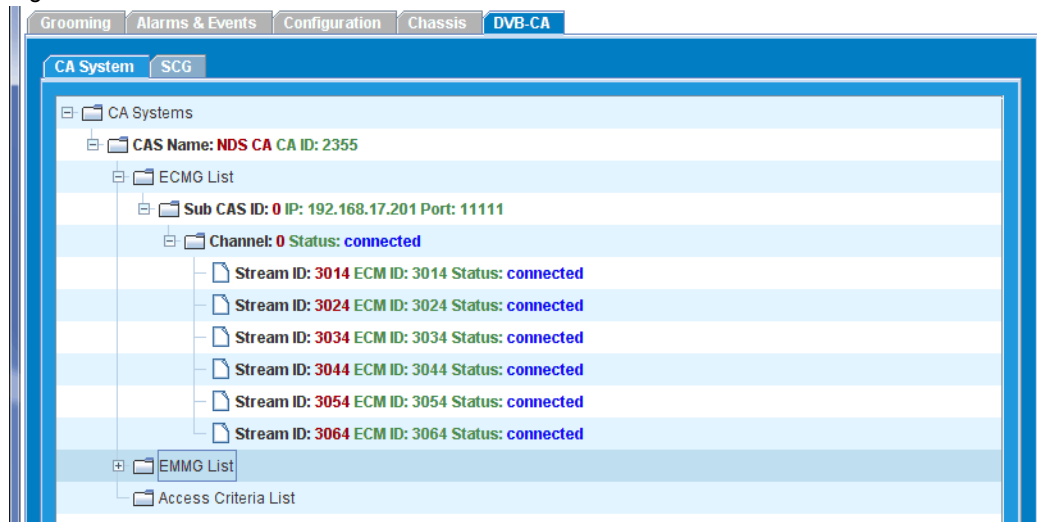


## Verification via the Service List

Depending on the configuration of the DVB-CA system, you may be able to view the elementary stream(s) joined to the SCG in the **Service List** folder under the **SCG** tab. To use this method, select the following menu path (as shown in Figure 166) from the DVB-CA tab:

**SCG -> SCG Group -> SCG -> Service List -> ES Type**

Figure 166.   SCG List - ESs Scrambled



This completes the DVB-CA configuration process in external EIS mode. See the next section, "Configuring DVB-CA for Internal EIS Mode" for the additional steps required for configuration of an internal CAS.

# Configuring DVB-CA for Internal EIS Mode

This section contains the configuration requirements necessary when setting up a DVB-CA system that uses the BNP's internal EIS. Use these steps in addition to those described for "Configuring DVB-CA: External and Internal EIS Mode" on page 222

The tasks for this configuration are provided in the following topics:

- "Step 1, Create Access Criteria List" on page 230.
- "Step 2, Create SCG" on page 231.
- "Step 3, Create ECM" on page 233.
- "Step 4, Join Program and ES to the SCG" on page 234.
- "Step 5, Verify Scrambling" on page 234.

## Step 1  Create Access Criteria List

An Access Criteria List is CA system-specific information needed by the ECMG to build an ECM, which is required only for internal EIS mode configuration.

1. From the **CA System** tab page, navigate to **CAS Name -> Access Criteria List**.

2. Right-click on the **Access Criteria List** folder and select **Create Access Criteria** from the pop-up menu.

   The **Create Access Criteria** dialog is now in view and displays read-only **CAS Name** and **CAS ID** fields, which are based on the information already configured (see also Create CA System section on page 223),

3. Use the **Create Access Criteria** dialog to configure the following parameters:

   – **AC Name** field—type an alphanumeric string to define a name that is unique to the chassis.

   – **AC Data** field—enter the hexadecimal number, as provided by the CAS.

   The AC Data entry is a hex number provided by the CAS, formatted as follows:

   [*vendor #*] [*Unique TS ID*] [*ECM PID*]

   For example:

   0b04 0003 0bc6

4. Click **Apply** to create the **Access Criteria** List.
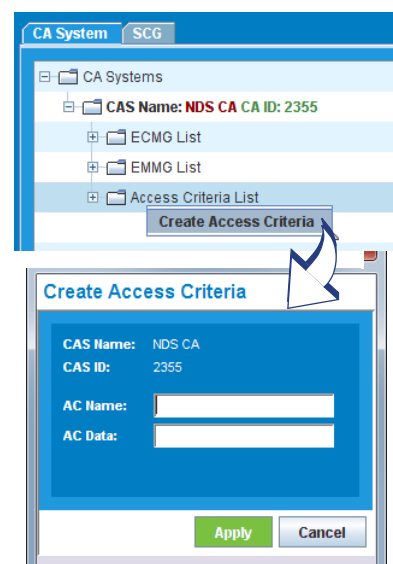
## Viewing the total count of Conditional Access systems

1. From the **DVB-CA** menu click on the **CA Systems** tab.

2. Expand the **CA Systems** folder to display a list of CA Systems.

3. Highlight the **Access Criteria List** folder to view the **TOTAL ACs** pop-up (Figure 167).

Figure 167.   Access Criteria List - Show Total ACs
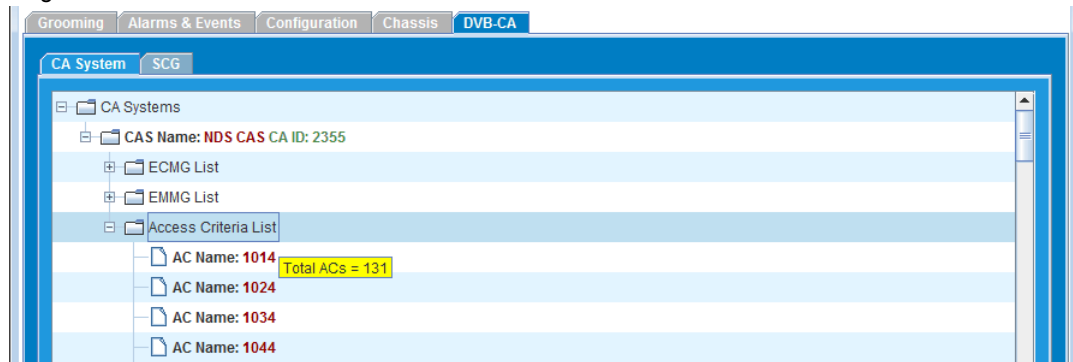


### Step 2  Create SCG

The conventions described in Table 97 are applicable for creation of an SCG, as based on whether the DVB-CA system uses an external or internal EIS server.

Table 97.       EIS Servers and SCG Creation

| EIS Server Type | SCG Creation |
|---|---|
| External | An SCG is automatically created for every program to be encrypted. In this case, you can only display the SCG for external EIS mode. You cannot create the SCG for external EIS mode. |
| Internal | An SCG must be manually created. An SCG must be created for every program to be encrypted. |

Repeat the following steps for every program to be encrypted.

1.  From the **SCG** tab page, right-click on the **SCG Group** folder and select **Create SCG** from the pop-up menu.

    The **Create SCG** dialog is now in view.

2.  Use the Create SCG dialog to define parameters for the SCG to be included in the selected group.

    Use guidelines from Table 98 (below) with this dialog.

3.  Click **Apply** to save the settings displayed in this dialog, dismiss this dialog, and to create the SCG

4.  At the **SCG** tab page, check to ensure that the new SCG is listed in the expanded SCG Group.
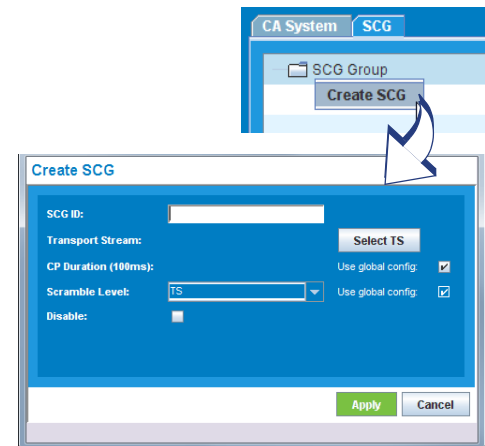


Table 98.       Create SCG dialog - Internal EIS mode parameters

| Field | Description |
|---|---|
| SCG ID | Specify a unique number that will identify an SCG within the system. Range is 1 to 65534; default is blank. |
| Transport Stream | Use the Select TS button to select the TS under which the desired programs are to be encrypted. This TS *must* be a DVB TS. See "Creating Output DVB TS(s) for DVB-CA System" on page 213. |

Table 98.    Create SCG dialog - Internal EIS mode parameters (Continued)

| Field | Description |
|-------|-------------|
| CP Duration (100ms) | Specify the Crypto Period for this SCG. Specifies the default crypto period for the BNP chassis in 100 millisecond increments.<br>• Check the *Use global config* box to follow the default parameter as specified in the DVB-CA Global Configuration fields table.<br>• Un-check the *Use global config* box to specify a different Crypto Period for the SCG.<br>• Default is set to *Use global config*. |
| Scramble Level | Specifies the default scramble level used to configure the scrambler for this SCG.<br>• TS is currently the only option.<br>• This field is read-only.<br>• *Use global config* box is read-only and defaulted to checked. |
| Disable | Checking this button will disable all scrambling on the SCG, changing all scrambled programs to clear.<br>• Default is unchecked. |

## Monitoring SCG

Use the **Monitor SCG** dialog to view a **Basic** or **Extension** display of CP counters.

1.  From the **DVB-CA** tab page, click on the **SCG** tab.

2.  Right-click on a selected SCG and select **Monitor SCG** from the popup menu.

    The **Monitor SCG** dialog is now in view.

3.  At the **View Type:** field, use the pull-down menu to choose the **Basic** or **Extension** view (Figure 168).

    Figure 168.    Monitor SCG dialog
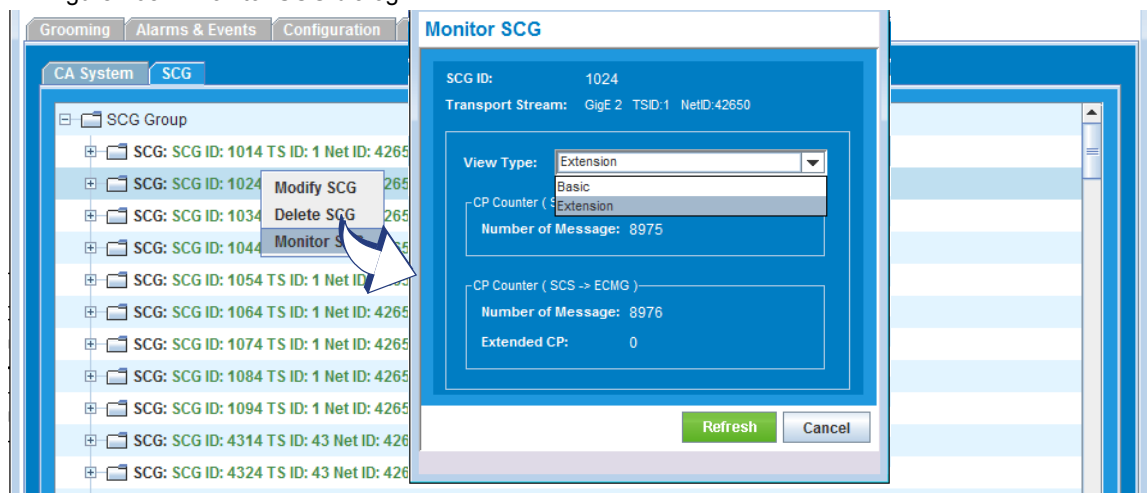


-   The **Basic** view displays data between the SCS and the MUX.
-   The **Extension** view additionally displays counters that are collected between the SCS and the ECMG.

### Step 3 Create ECM

The conventions described in Table 99 are applicable for creation of an ECM, as based on whether the DVB-CA system uses an external or internal EIS server.

Table 99.     EIS Servers and ECM Creation

| EIS Server Type | ECM Creation |
| --- | --- |
| External | The ECM must be created manually. |
| Internal | An ECM is automatically created for each SCG. |

1.  From the **SCG** tab, expand the **SCG Group** and navigate to the **ECM Groups** folder.

2.  Right-click on the **ECM Groups** folder and select **Create ECM** from the pop-up menu.

    The **Create ECM** dialog is now in view.

3.  Use the **Create ECM** dialog to set parameters for the ECM to be included in the specified group.

    Use guidelines from Table 100 (below) with this dialog.

4.  Click **Apply** to use the displayed settings, dismiss this dialog and to create the ECM.

5.  At the **SCG** tab page, check to ensure that the new ECM is listed in the expanded ECM folder.
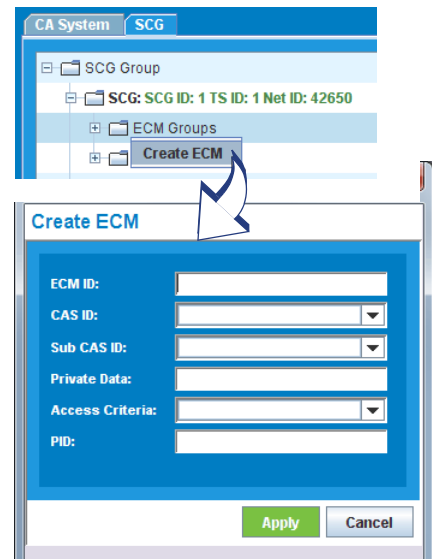
Table 100.    Create ECM dialog

| Field | Description |
| --- | --- |
| ECM ID | Enter a unique PID (allocated by the MSO) to identify the ECM stream for a Super CAS ID. The combination of the Super CAS ID and the ECM ID uniquely identifies the ECM stream in the system as a whole.<br>• Default is blank<br>• Valid range is up to a 10-digit number and must be equal to or greater than 0. |
| CAS ID | Select the CAS ID from the drop-down box. This value should have been provided by the CAS and configured in the CA System tab. |
| Sub CAS ID | Select the Sub CAS ID from the drop-down box. This value should have been provided by the CAS and configured in the CA System tab. |
| Private Data | Enter additional data into the CA descriptor in the PMT.<br>• For a service, add private data into the program level's CA descriptor.<br>• For an ES, add private data into the ES level's CA descriptor.<br>• Default is blank.<br>• Format must be hex. |
| Access Criteria | Select the name of the Access Criteria from the drop-down menu created from the Access Criteria List menu. |
| PID | Enter the PID to use for the ECM.<br>• Default is blank.<br>• Valid range is 52 to 8175. |

### Step 4  Join Program and ES to the SCG

The conventions described in Table 101 are applicable for joining elementary streams or programs, as based on whether the DVB-CA system uses an external or internal EIS server.

Table 101.    EIS Servers and Joining

| EIS Server Type | Description |
| --- | --- |
| External | Each elementary stream or program must be joined to the SCG. |
| Internal | The elementary stream(s) or program are automatically joined to an SCG. |

1.  From the **SCG** tab, expand the **SCG Group** and navigate to the **Service Lists** folder.

2.  Right-click on the **Service Lists** folder and select **Join Program and ES** from the pop-up menu.

    The **Select service list and ES list Objects** dialog is now in view. This screen displays the list of programs available for this TS. The associated streams are contained in the program folder.

    Programs that are not available are displayed as gray text.

3.  Use the **Select service list and ES list Objects** screen to select the program to be encrypted.

    To select a stream to be encrypted, expand the program folder and select one of its streams.

4.  Click **Apply** to join the program or ES to the SCG.
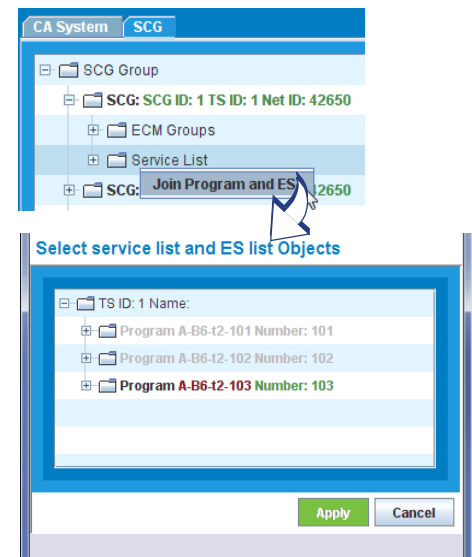
### Step 5  Verify Scrambling

To verify if programs are being scrambled, use steps provided in "Verify Scrambling" on page 228.

# DVB-CA Best Practices and Considerations

The following guidelines should be taken into consideration when setting up a DVB-CA system:

- In a BNP redundancy configuration only the primary BNP is connected to the EIS, ECMG, and EMMG servers.
- During switchover the old primary (now standby) disconnects to CA servers and the new primary reconnects to them.
- The Update Timer is used to avoid sending clear streams during boot up & switchover because the boot up time and CAS reconnection time vary from configuration to configuration.
- It is recommended that Ethernet Port 2 be connected downstream of an IP switch such that multicast traffic does not spill onto the CAS network and flood the EMM and ECM traffic.
- The BNP can optionally be configured to receive EMM traffic via a multicast socket on Ethernet Port 2.
- Virtual IP configuration for Ethernet Port 2 must be configured when using 1:1 chassis redundancy; this virtual IP address must be used by CA servers (external EIS and ECMG configuration).

# ETV Binary Interchange Format

This chapter describes how the *Selenio*™ *BNP* can be configured to process Enhanced Television (ETV) Binary Interchange Format (EBIF) content for delivery of interactive data in the video processing network.

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

## In This Chapter:

- "Overview," next.
- "Functionality" on page 237.
- "Prerequisite Reading" on page 236.
- "Use Case Configuration Examples" on page 237.

## Overview

The CableLabs EBIF standard provides a solution for the delivery of interactive data to existing set-top boxes (STBs), including older models of STBs. EBIF condenses interactive applications in order to use the minimal STB resources available for interactive data delivery. Since ETV can make use of scant resources, the MSO has the ability to deliver interactive broadcasts and advertisements to the widest possible audience, including the STB user who still relies on legacy hardware. Because ETV applications are very compact and can be downloaded to the STB rapidly, the ETV format is particularly suitable for authoring interactive commercials.

## Prerequisite Reading

To better understand the *Use Cases* described in this chapter, you should familiarize yourself with the concepts and steps described in Chapter 6, "Grooming and PSIP." In particular, the following sections will be useful:

- "Viewing ES-Level Input Source" on page 109.
- "Programs and Elementary Streams" on page 106.
- "Creating Programs" on page 130.
- "Drag and Drop Grooming" on page 140.
- "Managing Elementary Streams" on page 156.
- "Managing PMT and ES Descriptors" on page 177.

# Functionality

ETV is interpreted by a **User Agent**: a software application that runs on the set-top box that is installed remotely by the MSO.

When ETV is downloaded to the STB, it uses a pairing of data elementary streams, which consist of the following:

- ETV Binary Interchange Format (EBIF) data ES — carries the application data.
- ETV Integrated Signaling Stream (EISS) data ES — carries timing signals that trigger events associated with the application.

ETV applications are typically "bound" (or **Pre-bound**) to particular pieces of content, and packaged in a program together with video and audio while being broadcast to the STB. This content can be a 30-second ad or a network stream (a dedicated channel or program with EBIF content coded into it). Another possible source of ETV data is a local EBIF streamer: a server that provides pre-packaged EBIF content, allowing the BNP to enhance a video or audio program (network stream or ad) with additional ETV data. The process of adding EBIF enhancement to an existing network stream or ad is referred to as **Late-binding**.

Figure 169 shows the basic ETV data source flow.

Figure 169.   ETV EBIF Data Source flow
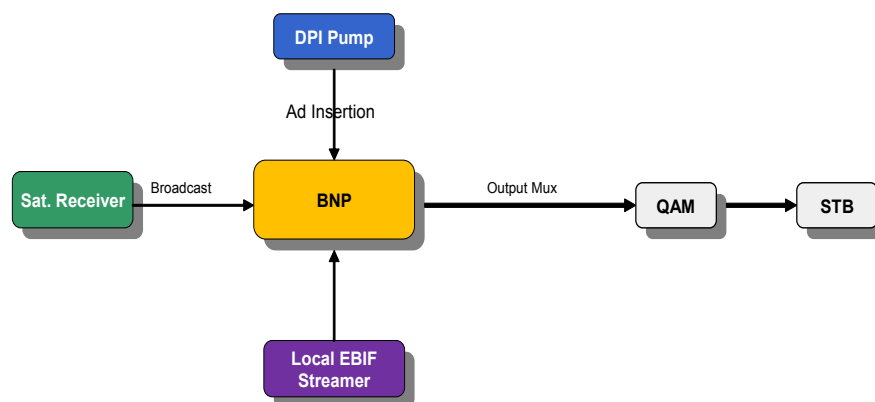


# Use Case Configuration Examples

The BNP can groom, splice or filter ETV data streams, including, but not limited to, the *Use Case* examples listed below:

1. Pre-Bound Ad Splice.
2. Pre-Bound EBIF Passthrough (no DPI).
3. Pre-Bound EBIF Drop.
4. Pre-Bound EBIF Passthrough and Keep During Ad Splice.
5. Pre-Bound Network EBIF; Late-Bind EBIF During Ad.

> ℹ **Note:** *In all of the following Use Cases (except as specified as "Non-DPI") it is assumed that the BNP is configured for DPI. See Chapter 8, "Digital Program Insertion (DPI)" for details on configuring DPI.*

# Pre-Bound Ad Splice

In pre-bound ad splicing, the input network (or program) stream does not contain ETV data; rather, an ad containing ETV data ESs is spliced in later. In this case, the BNP would be configured to play the ad's ETV streams on the output during the ad splice.

Figure 170 shows an example of pre-bound ad splice.

Figure 170. Pre-bound Ad Splice flow
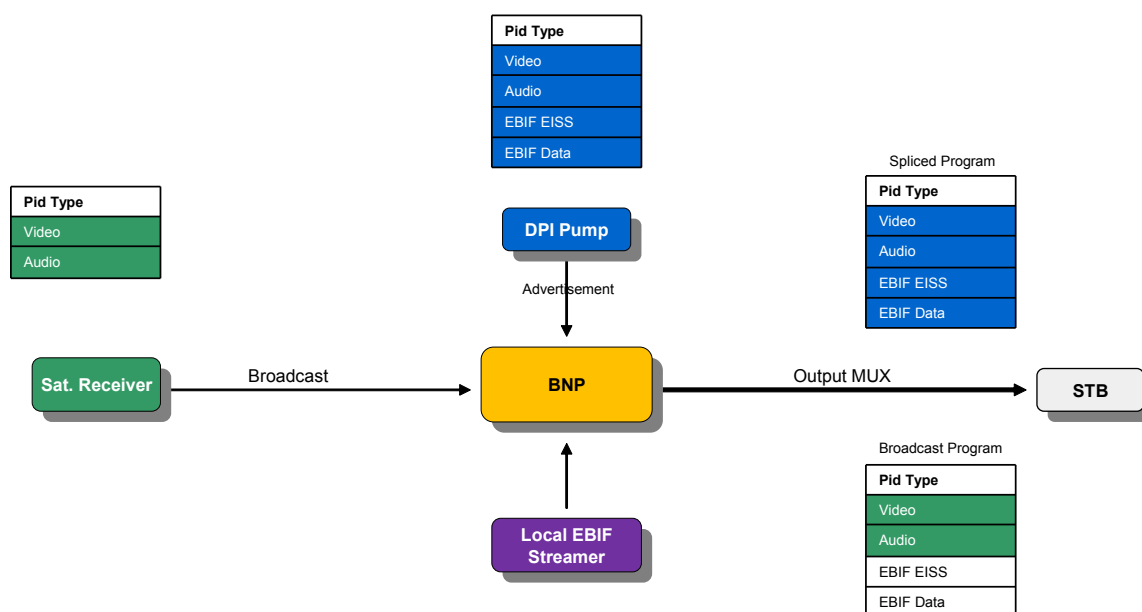


## Configuration Steps:

To configure pre-bound ad splice:

1. From the BNP *Element Manager*, click on the **Grooming -> Mapping** tab.

2. Create an output transport stream, if necessary. (See the section that begins with, "Managing Output Transport Streams" on page 113 for additional information.)

3. Use the Drag and Drop Grooming feature to groom a desired input program to the desired output transport stream (oTS), as seen in Figure 171, for example.

> ℹ **Note:** *In this use case, the input program does not contain any ETV elementary streams.*

Figure 171.   Input program (without ETV data) groomed to oTS
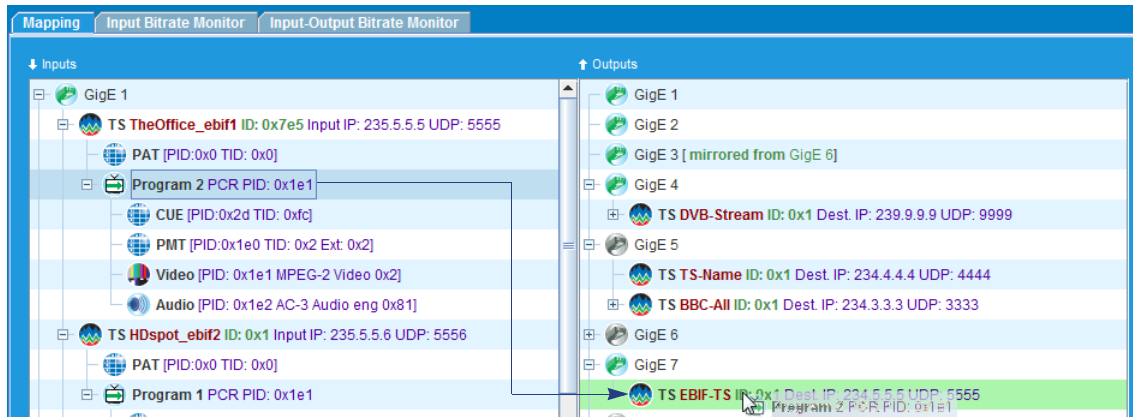


The **Configure Program Mapping** window will open.

**4.** In the **ETV Configuration** section, the **PIDs Priority** setting should remain at the default of **Ad**.

**5.** In the **Component PIDs** section under **Placeholder ETV ESs**, select the appropriate type of EBIF and EISS elementary stream placeholders from the drop down box. The type of ESs selected here should match those of the ETV ESs in the ad.

**6.** If necessary, change the PID values of the EISS and EBIF ESs by clicking the blue space under the **Output Type** or **PID** columns next to the appropriate input ES.

Figure 172 shows the **Configure Program Mapping** window with the above options filled in.

Figure 172.   Configure Program Mapping window - EBIF/EISS Placeholder
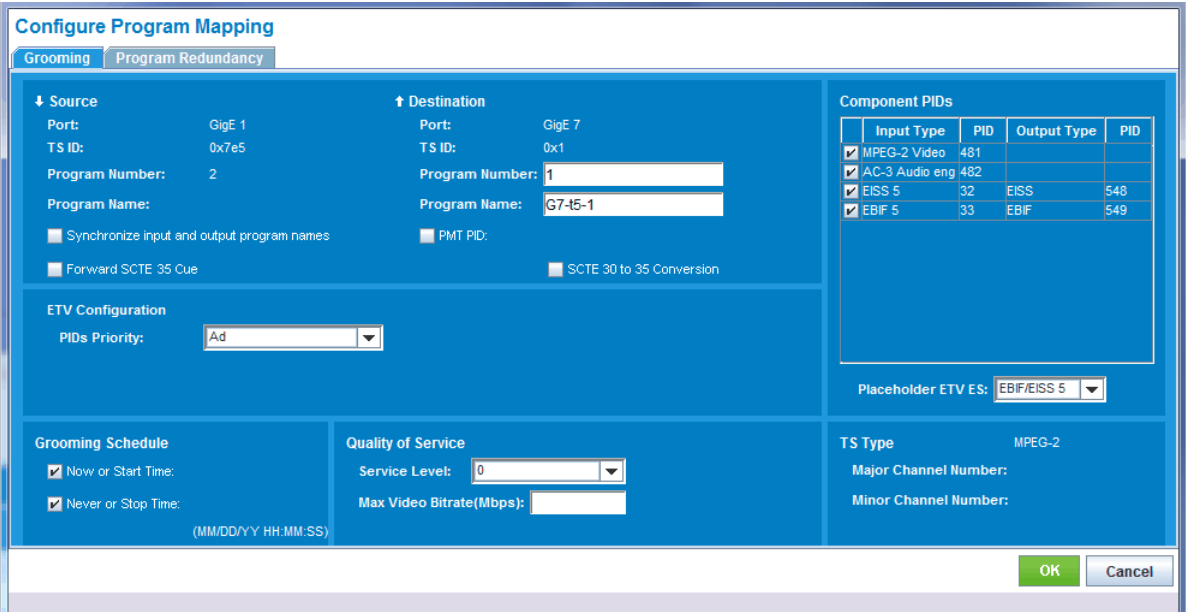


**7.** Click **OK**.

The **Grooming -> Mapping** window will now show the groomed program with two Data EBIF/EISS ESs grayed out.

Figure 173.   Program with placeholders groomed - ESs grayed out
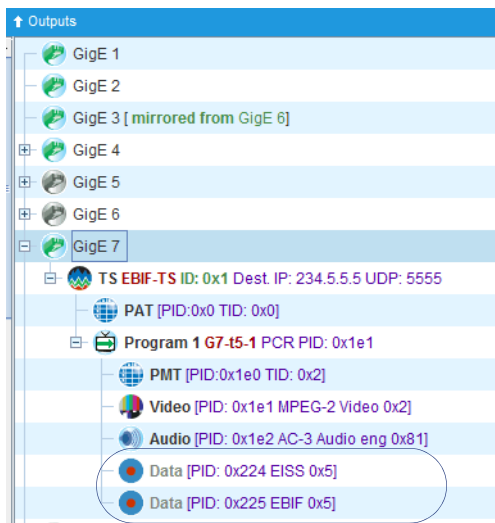


**Note:**   *When creating Placeholder ETV ESs, two new descriptor rules with default values will be created for each ES used as a placeholder. The Descriptor Data information in these rules may be edited, if necessary. In this case, there will be 4 new descriptor rules (2 for EISS and 2 for EBIF) that are created in the* **Manage Descriptor Rules** *window.*

To view the descriptor rules created with the placeholder ESs:

1.   From the **Outputs panel** of the **Grooming -> Mapping** window, right-click on the program you just groomed and select **Manage Descriptor Rules** from the pop-up menu.

   The **Manage Descriptor Rules** window will open, showing two descriptor rules for each ES placeholder:

Figure 174.   Manage Descriptor Rules - EISS & EBIF additions
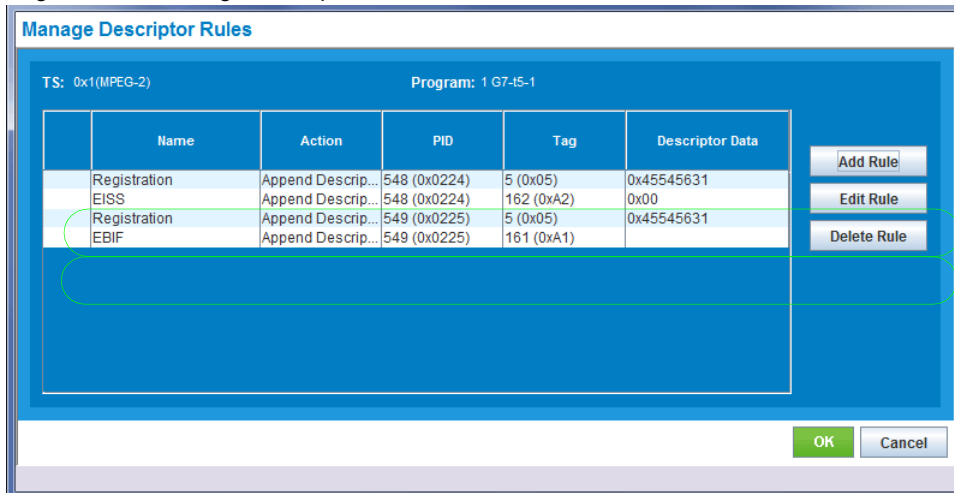


2.   Click **Cancel** to close the **Manage Descriptor Rules** window.

# Pre-Bound EBIF Passthrough (no DPI)

In pre-bound EBIF passthrough on a non-DPI program, the network stream contains the pre-bound ETV data streams, and the BNP is configured to play the input ETV streams on the output.

Figure 175 shows an example of pre-bound EBIF passthrough.

Figure 175.   Broadcast EBIF enabled
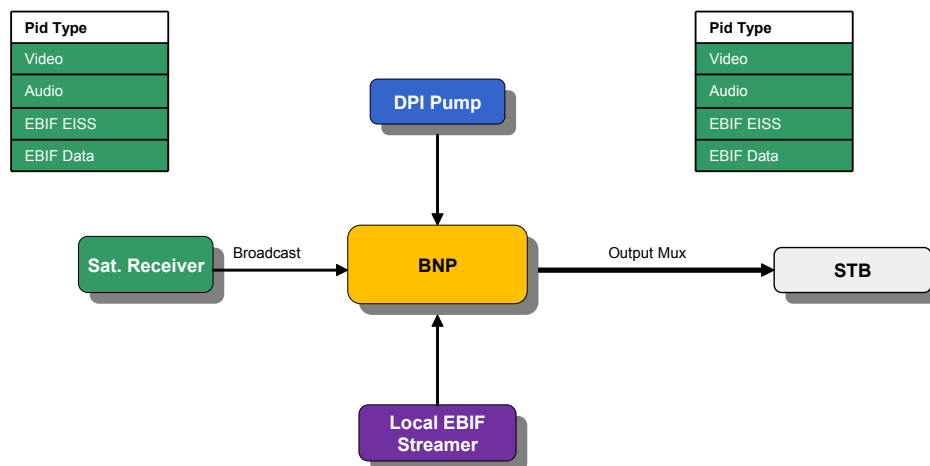


## Configuration Steps:

To configure pre-bound EBIF passthrough:

1. From the BNP *Element Manager*, click on the **Grooming -> Mapping** tab.

2. Create an output transport stream, if necessary. (See the section that begins with, "Managing Output Transport Streams" on page 113 for additional information.)

3. Use the Drag and Drop Grooming feature to groom a desired input program to the desired output transport stream (oTS), as seen in Figure 176, for example.

**Note:**   *In this use case, the input program **does** contain two ETV elementary streams.*

Figure 176.   Input program (with ETV data) groomed to TS
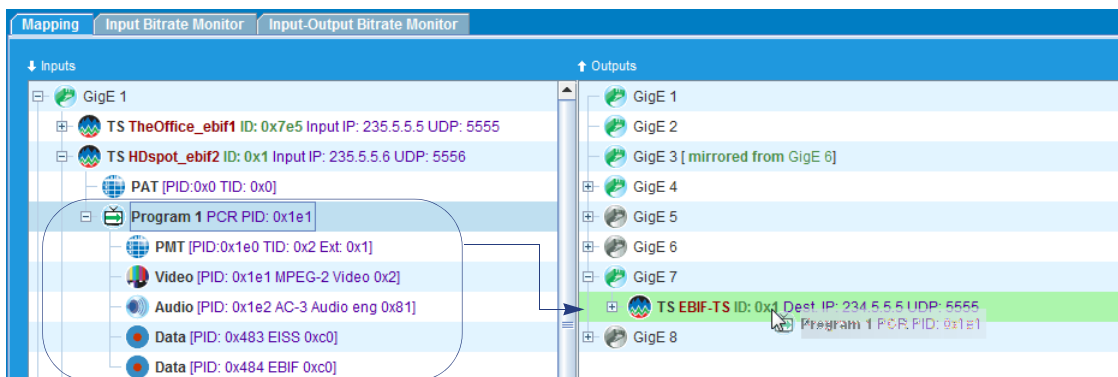
The **Configure Program Mapping** window will open.

Figure 177.   Configure Program Mapping - EBIF/EISS defaults



4.   In the **ETV Configuration** section, leave the **PIDs Priority** set to the *default* of **Ad**.

5.   In the **Component PIDs** section, leave the *EISS* and *EBIF* ESs checked. You may change the PID values or leave them at their defaults.

6.   Click **OK**.

The **Grooming -> Mapping** window will now show the groomed program with the data EBIF/EISS ESs passed through to the output.

Figure 178.   Program with ETV ESs passed through
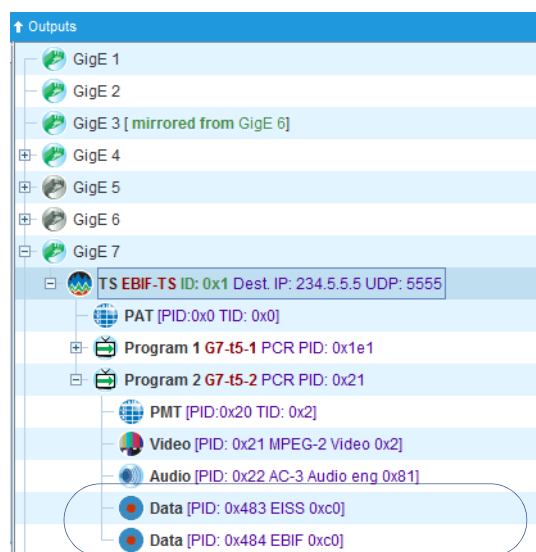
## Pre-Bound EBIF Drop

In pre-bound EBIF drop, the network stream contains pre-bound ETV data streams and the BNP is configured to not play (*to drop*) the network ETV streams on the output.

Figure 179 shows an example of pre-bound EBIF where the ETV streams are dropped.

Figure 179.   Broadcast EBIF disabled
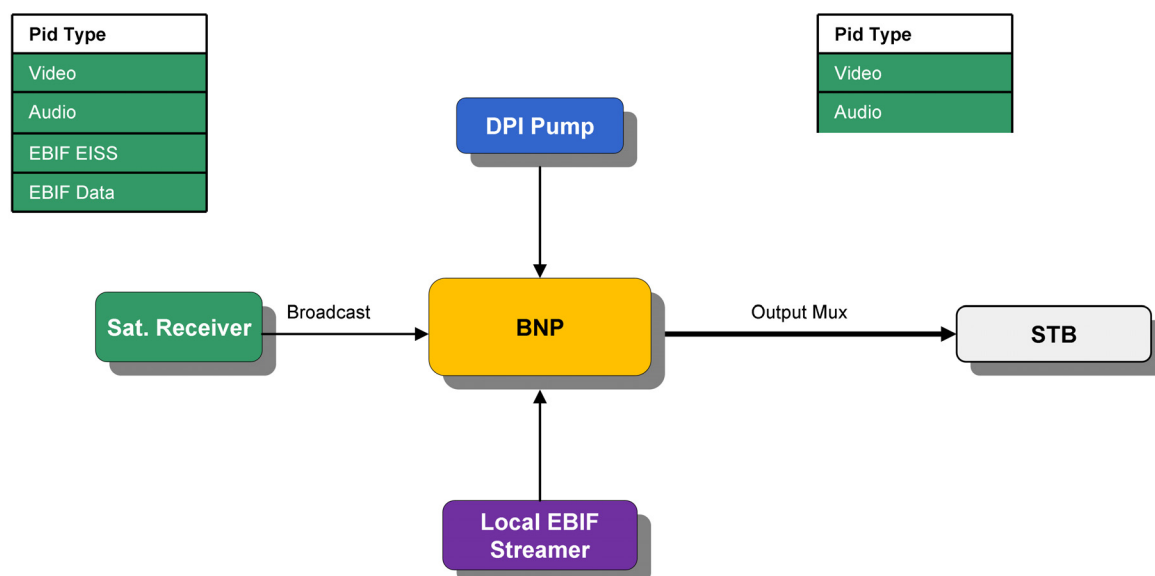


### Configuration Steps:

To configure pre-bound EBIF to be dropped:

1.   From the BNP *Element Manager*, click on the **Grooming -> Mapping** tab.

2.   Create an output transport stream, if necessary. (See the section that begins with, "Managing Output Transport Streams" on page 113 for additional information.)

3.   Use the Drag and Drop Grooming feature to groom a desired input program to the desired output transport stream (oTS), as seen in Figure 176, "Input program (with ETV data) groomed to TS," on page 241, for example.

> **Note:**   *In this use case, the input program **does** contain two ETV elementary streams.*

The **Configure Program Mapping** window will open.

4.   In the **ETV Configuration** section, leave the **PIDs Priority** set to the *default* of **Ad**.

5.   In the **Component PIDs** section, *un-check* the *EISS* and *EBIF* ESs.

The **Configure Program Mapping** window will look similar to Figure 180.

Figure 180.   Configure Program Mapping - EBIF/EISS unchecked
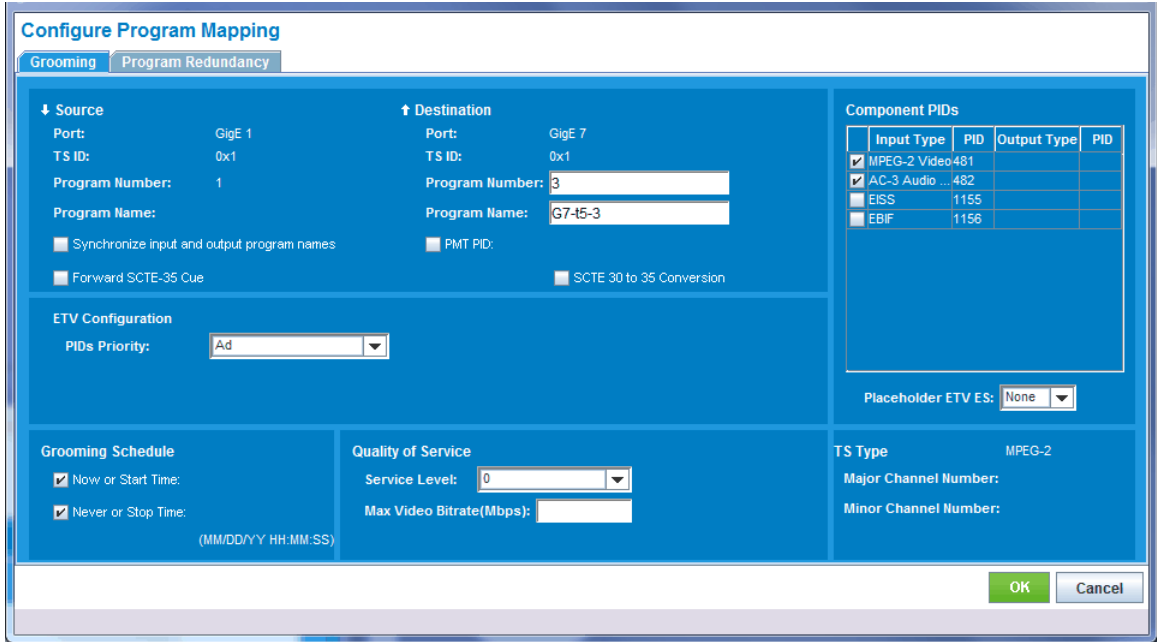


6.  Click **OK**.

The **Grooming -> Mapping** window will now show the groomed program with the data EBIF/EISS ESs dropped from the output.

Figure 181.   Program with ETV ESs dropped
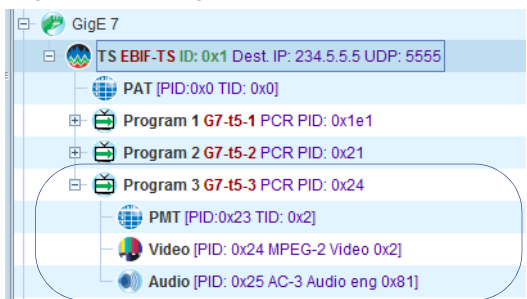


# Pre-Bound EBIF Passthrough and Keep During Ad Splice

In this example, the network stream contains pre-bound ETV data streams and the ads are un-enhanced. When the network stream is groomed to the output the BNP is configured to continue playing (*keep*) the network ETV streams during ad splices.

Figure 182 shows an example of broadcast EBIF groomed as Splice/Keep.

Figure 182.   Broadcast EBIF groomed as Splice/Keep
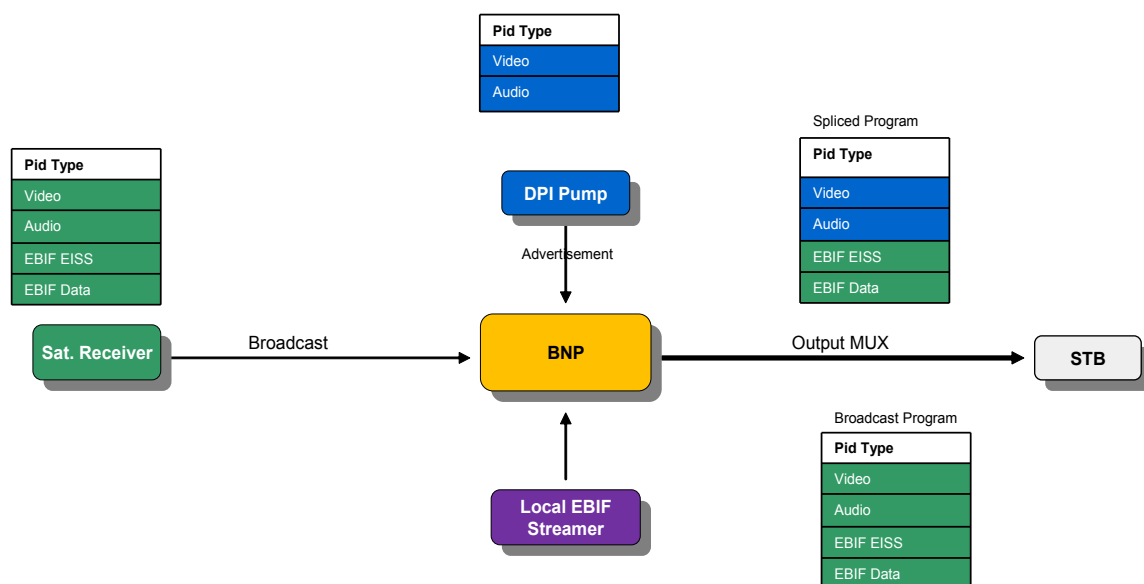


## Configuration Steps:

To configure pre-bound EBIF to play through and be kept during an ad splice, proceed as follows:

1.  From the BNP *Element Manager*, click on the **Grooming -> Mapping** tab.

2.  Create an output transport stream, if necessary. (See the section that begins with, "Managing Output Transport Streams" on page 113 for additional information.)

3.  Use the Drag and Drop Grooming feature to groom a desired input program to the desired output transport stream (oTS), as seen in Figure 176, "Input program (with ETV data) groomed to TS," on page 241, for example.

> **Note:**   *In this use case, the input program **does** contain two ETV elementary streams.*

  The **Configure Program Mapping** window will open.

4.  In the **ETV Configuration** section, click on the **PIDs Priority** drop-down box and select **Network**.

  When **Network** is selected in **PIDs Priority,** the **Play Preference** drop-down box will be displayed.

5.  In the **Play Preference** drop-down box, leave the setting at the default of **Play through ad**.

  The **Configure Program Mapping** window will look similar to Figure 183.

Figure 183.   Configure Program Mapping - Play through ad



6.   Click **OK**.

The **Grooming -> Mapping** window will now show the groomed program with the data EBIF/EISS ESs passed through to the output.

Figure 184.   Program with ETV ESs passed through (Splice/Keep)
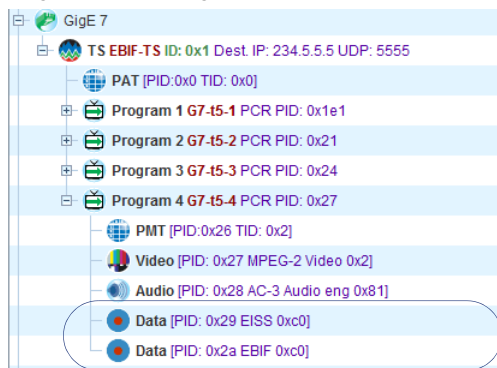


To verify that the ETV ESs are configured for **Play through ad**, highlight the program and select **Modify Program** from the pop-up menu.

## Pre-Bound Network EBIF; Late-Bind EBIF During Ad

In this example, the network stream contains pre-bound ETV data streams and a local streamer or another source (such as another input program) streams another pair of ETV ESs (late-bind source). The BNP is configured to play the network ETV streams when the network stream is played, then to switch to the late-bind source during the ad.

Figure 185 shows an example of pre-bound network EBIF and late-bind EBIF during an ad.

Figure 185.  Pre-bound Network EBIF, late-bind EBIF during ad
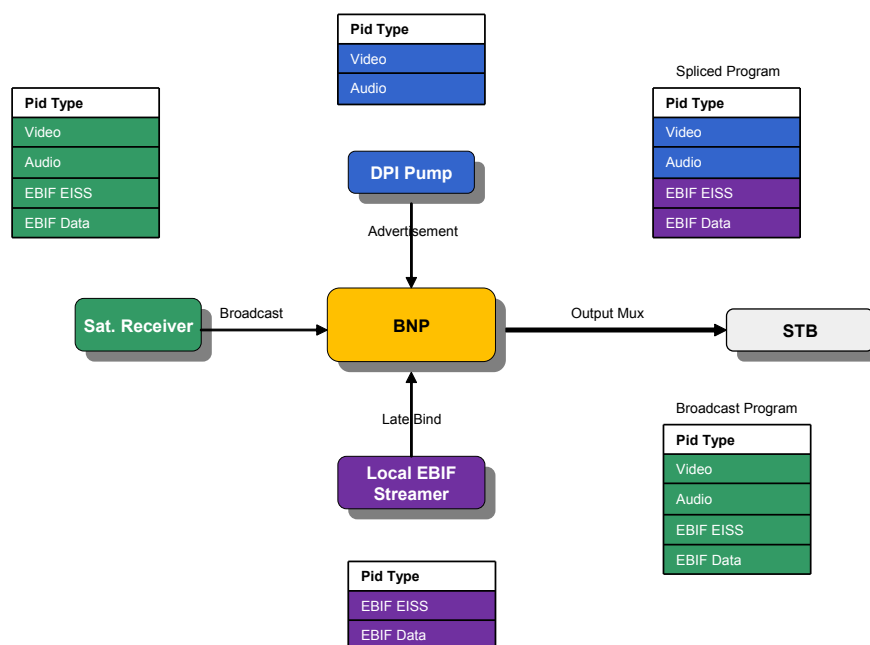


## Configuration Steps:

To configure a late-bound EBIF ad to play through a pre-bound program, proceed as follows:

1.  From the BNP *Element Manager*, click on the **Grooming -> Mapping** tab.

2.  Create an output transport stream, if necessary. (See the section that begins with, "Managing Output Transport Streams" on page 113 for additional information.)

3.  Use the Drag and Drop Grooming feature to groom a desired input program to the desired output transport stream (oTS), as seen in Figure 186, for example.

**Note:**  *The input program **should** contain at least two ETV elementary streams and there should be an additional two ETV ESs available for the late-bound streams.*

Figure 186.    Input program (with ETV data) groomed to TS; Late-bound
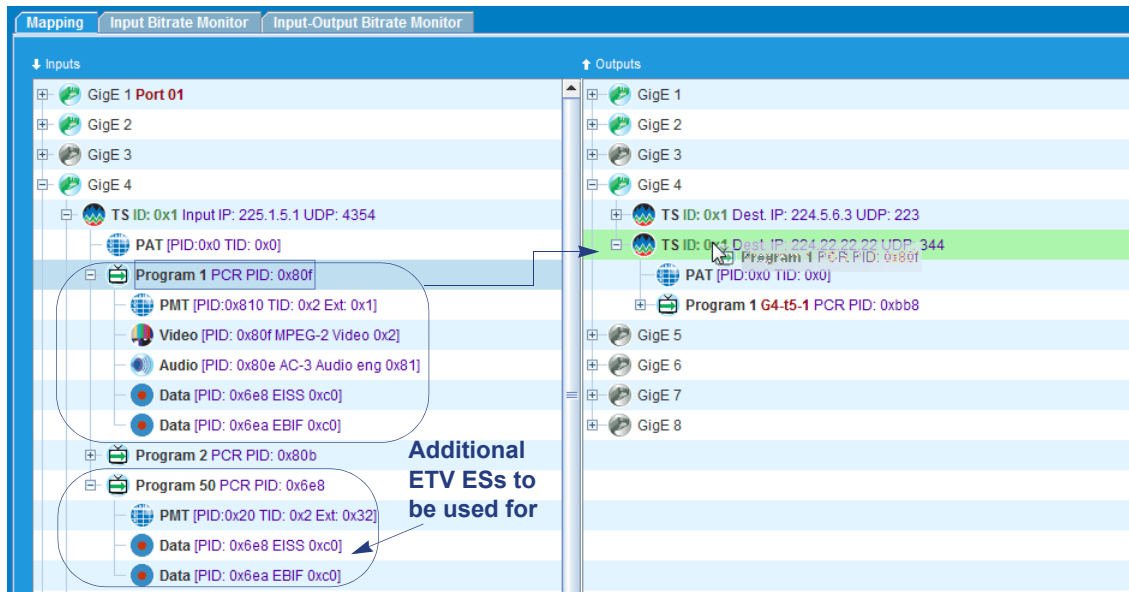


The **Configure Program Mapping** window will open.

4.    In the **ETV Configuration** section, click on the **PIDs Priority** drop-down box and select **Network**.

When **Network** is selected in **PIDs Priority,** the **Play Preference** drop-down box will be displayed.

5.    In the **Play Preference** drop-down box and select the **Play during ad only** option.

The **Configure Program Mapping** window will look similar to Figure 187.

> **Note:**    *The times displayed in the Alarms and Events table are quoted local to the time zone from the NPM server collocation which governs the Daylight Savings Time (DST) rules in effect and the specific time zone abbreviations. All system alarm (raised and cleared) times are displayed in the server time zone. The server time zone may be controlled from the client's configuration screen.*

Figure 187.    Configure Program Mapping - Play during ad only
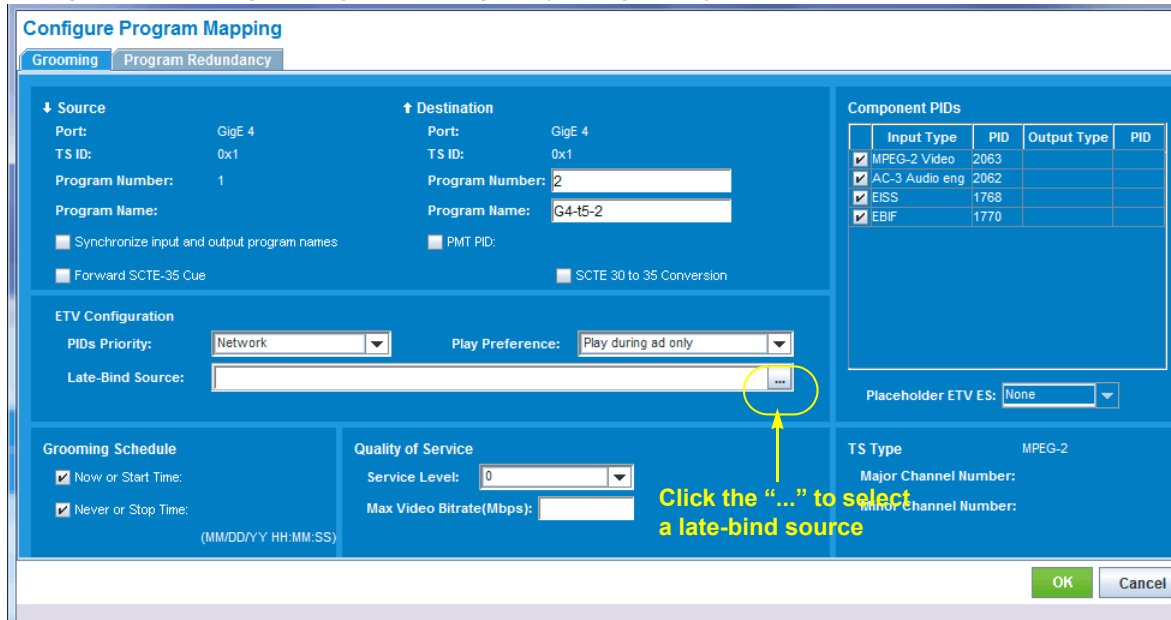


When the **Play during ad only** option is selected, the **Late Bind Source** field will be displayed.

6.  Click on the ellipses (**. . .**) on the right-hand side of the **Late Bind Source** field to open the **Late-Bind Source Dialog** window.

![i] **Note:** *This window displays the* **Inputs panel** *of the* Element Manager's ***Grooming -> Mapping** window.*

Figure 188.   Late-Bind Source Dialog window
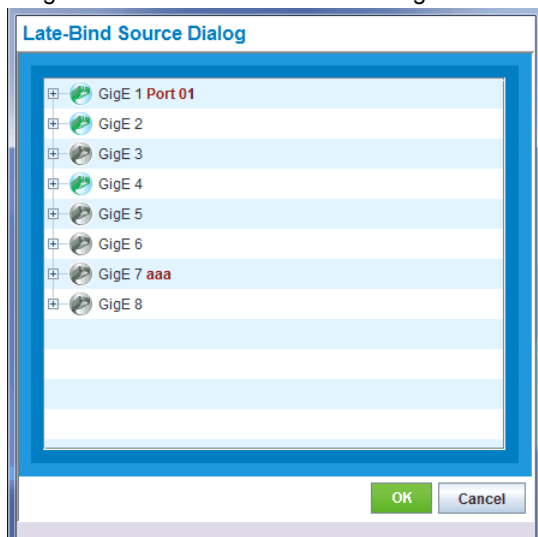


7.  In the **Late-Bind Source Dialog** window, drill down to the program level.

8.  Select the desired program with ETV ESs that will be used to play during the ad; this is also called the *late-bound ETV source.*

Figure 189.   Late-Bind Source selected
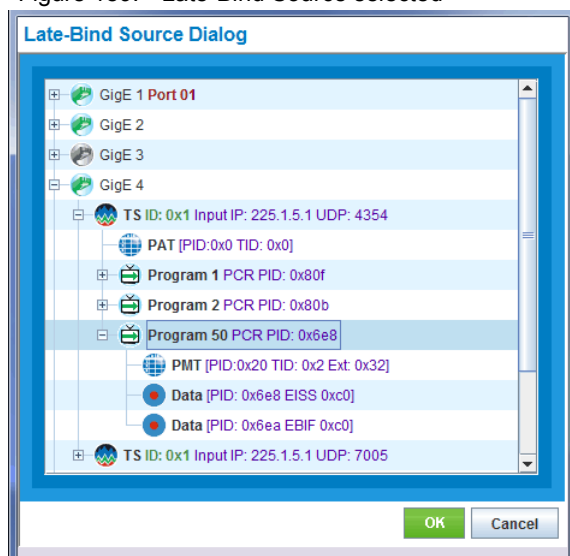


9.  Click **OK** to return to the **Configure Program Mapping** window, which will look similar to Figure 190:

10. Click **OK** to complete the grooming process.

    The **Grooming -> Mapping** window will now show the groomed program with the late-bound data EBIF/EISS ESs in the output.

    Figure 191.   Program with late-bound ETV ESs



    To view which late-bound ETV source is configured for **Play during ad only**, highlight the program and select **Modify Program** from the pop-up menu.

Figure 192.   View Late-Bind Source in output program

CHAPTER 11

# Monitoring Alarms and Events

This chapter describes information about the system that you can monitor to ensure that the system is always healthy. The **Alarms & Events** tab provides system information and health status.

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

# In This Chapter:

- "Selecting the Elements to View,"  next.
- "Viewing Alarms and Events" on page 252.
- "The Status Bar" on page 254.

# Selecting the Elements to View

The upper portion of the **Alarms & Events** tab lets you define the information you want to see on the screen. You can select as many options as you choose. The information is cumulative. To sort alarms and events, click the table header. The BNP *Element Manager* re-sorts the information according to your selection.

Once you have selected the events to display, click **Apply Filter** to accept the changes and refresh the window.

Types of alarms and events that can be displayed include:

- **All** shows all alarms and events, regardless of severity
- **Raised** shows all alarms that have been raised, but not cleared
- **Cleared** shows all alarms that have been raised and cleared
- **Critical** shows only critical severity alarms; these are alarms that must be dealt with immediately
- **Major** shows major alarms; these are alarms that may not require immediate intervention but cannot be allowed to continue indefinitely
- **Minor** shows minor alarms that will not disrupt the system

# Viewing Alarms and Events

After you have set the types of alarms to display, you can tab to Alarms & Events at any time to see the current state of the system. Figure 193 shows a typical alarms window.

For each alarm, you see a description, status, severity, source, cleared time (if the alarm has been cleared), any comment, and the user who cleared the alarm.

**Note:** *Only those alarms whose levels have been checked (Figure 193) will be displayed. The others will be hidden until checked.*

Cleared events remain in the list for historical purposes.

Figure 193.   Alarms & Events tab



## Alarms and Events

The following alarms are available:

- Video underflow
  - PID missing
  - Grooming failed
- Missing input-Missing PAT/PMT, this could be caused by:
  - A disconnected cable
  - A TS packet missing or lost

- Input GigE not operational
- Cooling system failure
- Failure of ad insertion/splicing
- Postblack duration from ad server ignored or greater than four seconds

The four severity levels include **info**, **minor**, **major**, and **critical**.

# The Status Bar

The status bar is visible regardless of the tab selected. This ensures that you can see if there are any critical alarms that need attention. The bottom portion of the window displays the IP address to which the BNP *Element Manager* is connected and the highest-priority current alert. The information is color-coded. A green IP address section indicates that the connection is active.

For alarms, the color-coding is one of the following:

- **Green** indicates that the alert or event displayed is informational.
- **Yellow** indicates a situation that might need operator action.
- **Pink** indicates a major alarm requiring operator attention.
- **Red** indicates a critical error has occurred and immediate operator intervention is needed.

Figure 194.    The status bar
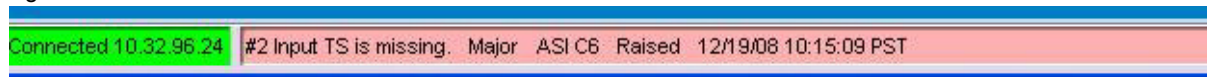
# *Editing the DVB NIT Table*

This appendix describes how to edit, make additions to, and delete items from the NIT table, one of the DVB tables. To understand the meaning and context of the various values in the table, consult one or both of the following documents:

- *Digital broadcasting systems for television, sound and data services; Allocation of Service Information (SI) codes for Digital Video Broadcasting (DVB) systems*, ETSI Technical Report, ETR 162, European Telecommunications Standards Institute, October 1995.
- *Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems,* ETSI EN 300 468 V1.5.1 (2003-05), European Telecommunications Standards Institute.

**Applicable Platforms:** The information in this chapter can be used with any BNP device.

## In This Appendix:

- "NIT Values Supported," next.
- "Naming, Viewing, Deleting and Editing NIT Configuration Files" on page 257.
- "Suggestions for Editing the NIT Table" on page 268.

## NIT Values Supported

Table 102 shows the NIT values Mandatory values are indicated with an asterisk (*).

Table 102.    Values Supported

| NIT Section | Value Name | Default | Range |
|---|---|---|---|
| nit_section | network_id | 100 | |
| | Version_ Number | 1 | |
| | *current_next_indicator | 1 | |
| Array of network_name: | *name | my network name | Any name |
| Array of linkage: | *Transport stream ID | 1 | Any value that fits in 16 bits |
| | *original_network ID | 129 | Any value that fits in 16 bits |
| | *service_id | 16642 | Any value that fits in 16 bits |
| | *linkage_type | 9 | Any value that fits in 16 bits |
| Array of private_data_byte: | data | private1 | Array of bytes of hex integers (if type is 8 or 9). Else it is char string |

Table 102.     Values Supported (Continued)

| NIT Section | Value Name | Default | Range |
|---|---|---|---|
| Array of Freqency List | *coding_type | 2 | 0 (not defined), 1(Satellite), 2 (cable) and 3 (terrestrial) |
| | *Center_frequency: | 3300000 | 32 bit unsigned integers |
| | *Private_data: | private_data_1 | 32 bit unsigned integer (currently defined values are) 1 (SES), 2 (BSKYB1), 3(BSKY2), 4(BSKY3) BE (BetaTechnik), 0x6000 (News DataCom), 0x6001(NDC1), 0x6002(NDC2), 0x6003(NDC3) 0x6004(NDC4), 0x6005(NDC5), 0x6006(NDC6) 0x362275(Irdeto) 0x4E544C(NTL) 0x532D41(SFA) 0x44414E59(NEWS DATACOM), 0x46524549(NEWS DATACOM) 0x53415053 (SFA) |
| Array of Transport Stream | *transport stream id | 769 | Any value that fits in 16 bits |
| | *original network id | 1920 | Any value that fits in 16 bits |
| Array of service: | id | 16398 | Any value that fits in 16 bits |
| | type | 1 | 1 to 0x10 and 0x80 to FE 1(digital television service) |
| | *id | 16403 | Any value that fits in 16 bits |
| | *type | 1 | 1 to 0x10 and 0x80 to FE 1(digital television service) |
| Cable delivery system: | *frequency | 6312500 | Up to 8 digit (decimals) value in MHz |
| | *FEC_Outer | 2 | 4 bit integer 0,1, 2 |
| | *modulation | 4 | 8 bit integer (00, 01, 02,03, 04 and 05) |
| | symbol_rate | 68750 | 7 digit (decimals) integer specifying symbols/second |
| | *FEC_Inner | 5 | 4 bit integer 0 (not defined),1 (1/2 conv code rate), 2(2/3), 3 (3/4), 4 (5/6), 5 (7/8), 6 (8/9), F (no conv Coding |
| Satellite Delivery System | *frequency | 1208400 | up to 8 digits (decimal) value in GHz |
| | orbital_position | 970 | up to 4 digit (decimal) value orbital position. A decimal occurs after the third character |
| | west_east_flag | 0 | 0 or 1 (0 indicates western, 1 indicates eastern) |
| | polarization | 1 | 0 (linear horizontal), 1 (linear vertical), 2 (circular left) or 3 (circular right) |
| | modulation | 1 | 0 (not defined), 1 (QPSK), 2 (8 PSK) or 3 (16 QAM) |
| | symbol_rate | 220000 | 7 digit value specifing mega symbol/sec (decimal (imaginary) occurs after third digit) |
| | FEC_Inner | 3 | 4 bit integer 0 (not defined),1 (1/2 conv code rate),2 (2/3), 3 (3/4), 4 (5/6), 5 (7/8), 6 (8/9), F(no conv Coding |

Table 102.    Values Supported (Continued)

| NIT Section | Value Name | Default | Range |
|---|---|---|---|
| Terrestrial Delivery System | centre_frequency | 739000000 | 32 bit integer (expressed in multiple of 10Hz) |
| | bandwidth | 0 | 0 (8 MHZ), 1 (7 MHZ) or 2 (6 MHZ) (3 bit field) |
| | constellation | 2 | 0 (QPSK), 1 (16 QAM), 2 (64 QAM) (2 bit field) |
| | *hierarchy_information | 0 | 0 (non hierarchical),1 (alpha = 1), 2 (alpha = 2), 3 (alpha=4) (3 bit field) |
| | code_rate-HP_stream | 0 | 0 (1/2),1 (2/3), 2 (3/4), 3 (5/6), 4 (7/8) (3 bit field) |
| | code_rate-LP_stream | 0 | 0 (1/2), 1 (2/3), 2 (3/4), 3 (5/6), 4 (7/8) (3 bit field) |
| | *guard_interval | 3 | 0 (1/32), 1 (1/16), 2 (1/8) or 3 (1/4) (2 bit field) |
| | transmission_mode | 1 | 0 (2k mode) or 1 (8k mode) (2 bit field) |
| | *other_frequency_flag | 1 | 0 (no other frequency in use) or 1 (more than one frequency in use) |
| Array of Private Data | data | 1 | 32 bit unsigned integer (currently defined values are) 1 (SES), 2 (BSKYB1), 3 (BSKY2), 4 (BSKY3) BE (BetaTechnik), 0x6000 (News DataCom), 0x6001 (NDC1), 0x6002 (NDC2), 0x6003 (NDC3) 0x6004 (NDC4), 0x6005 (NDC5), 0x6006 (NDC6) 0x362275 (Irdeto) 0x4E544C (NTL) 0x532D41 (SFA) 0x44414E59 (NEWS DATACOM), 0x46524549 (NEWS DATACOM) 0x53415053 (SFA) |
| Array of Frequency List | coding_type | 2 | 0 (not defined),1 (Satellite),2 (cable) and 3 (terrestrial) |
| | Center_Frequency | 1300000 | |

# Naming, Viewing, Deleting and Editing NIT Configuration Files

## Naming a Configuration File

An opening window with no files named is shown in Figure 195. The default configuration file is present.

Figure 195.   Window With No Arrays
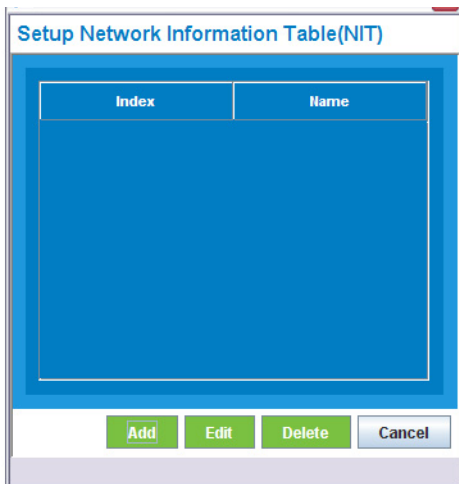


To name a configuration file:

1. Click **Edit**. The default configuration file appears (Figure 196).

   Figure 196.   Default Array
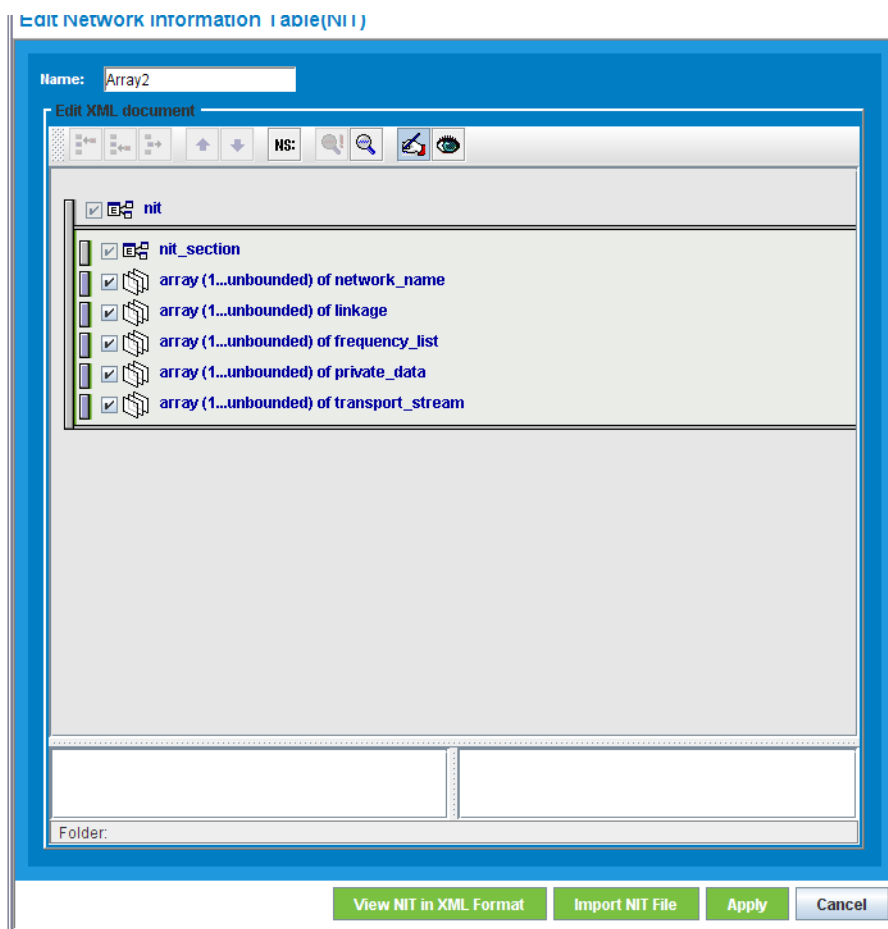
   

2. Now enter a name for the file in the **Name** space, in this case *Array2*.
3. Click **Apply**.

The configuration file is named as Array2. (Figure 197).

Figure 197.   Array2 Added
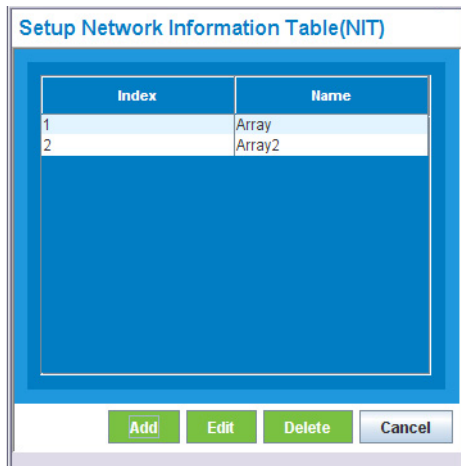


# Viewing a Configuration File

You can view an configuration file in XML format.

1.  In Figure 197, choose View NIT in XML Format. A window similar to Figure 198 appears.

    Figure 198.   NIT Configuration File Viewed in XML Format

```
:?xml version="1.0" encoding="UTF-8" ?>
:nit xmlns="http://www.example.org/nit" xmlns:x0="http://www.w3.org/2001/XMLSchema">
  <nit_section current_next_indicator="1" network_id="100" version_number="1.0" />
  <network_name name="my network name" />
  <linkage linkage_type="5" original_network_id="129" service_id="16642" transport_stream_id="1">
    <private_data_byte data="01" />
    <private_data_byte data="02" />
  </linkage>
  <frequency_list coding_type="2">
    <centre_frequency frequency="3300000" />
    <centre_frequency frequency="3500000" />
  </frequency_list>
  <private_data data="1" />
  <transport_stream original_network_id="1920" transport_stream_id="769">
 – <service_list>
      <service id="16398" type="01" />
      <service id="16403" type="01" />
    </service_list>
    <cable_delivery_system FECInner="5" FECOuter="2" frequency="6312500" modulation="04" symbolrate="68750" />
    <private_data data="1" />
 – <frequency_list coding_type="2">
      <centre_frequency frequency="1300000" />
      <centre_frequency frequency="1500000" />
    </frequency_list>
  </transport_stream>
:/nit>
```

2.  Navigate to where the arrays are stored and click **Open**. The window of Figure 199 appears.

Figure 199.   Assigning a Name to a Configuration File
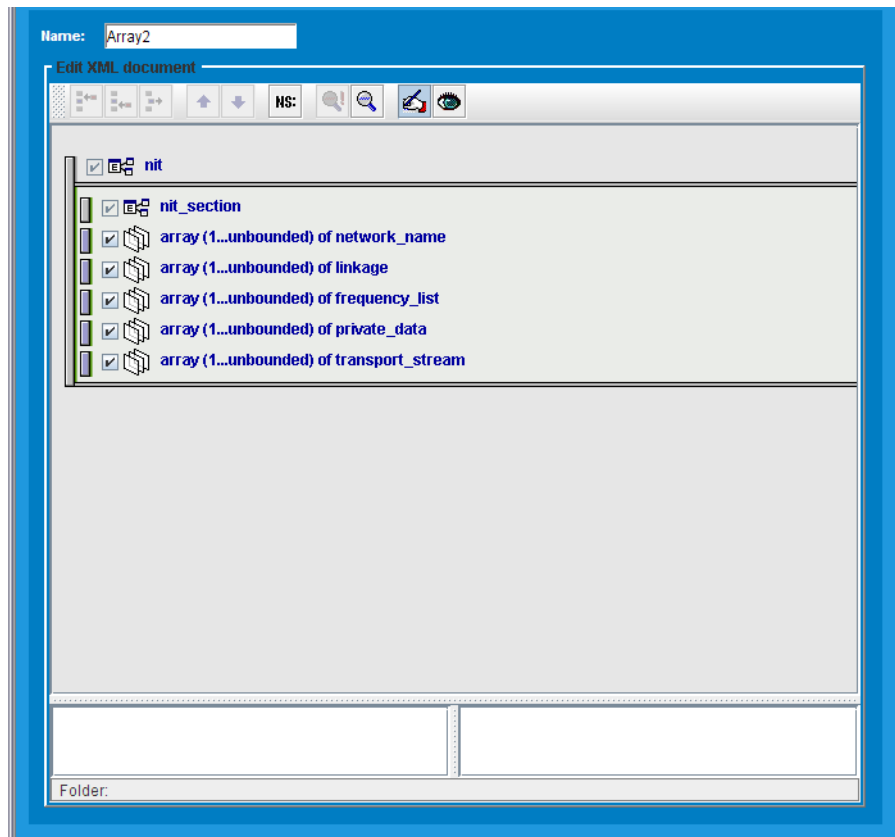


3.   Assign the name you want to the Array. In this example, we chose *Array2*.

## Deleting a Configuration File

1.   To delete an array, highlight the array to be deleted in Figure 197.

2.   Click **Delete**.

3.   The delete confirmation box appears (Figure 200).

Figure 200.   Delete Confirmation
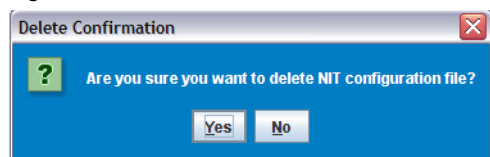


4.   Click **Yes** if you want to delete the configuration file

The Array is deleted.

## Editing a Configuration File

1.   Highlight the configuration file you want to edit (Figure 201).

Figure 201.   Setup Network Information Table screen
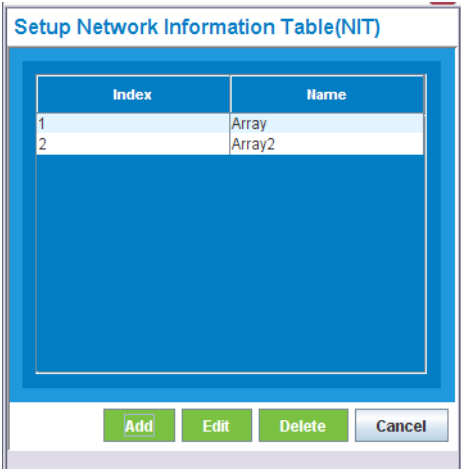


**2.** Click **Edit**. The window of Figure 202 appears.

Figure 202.   Editing Window
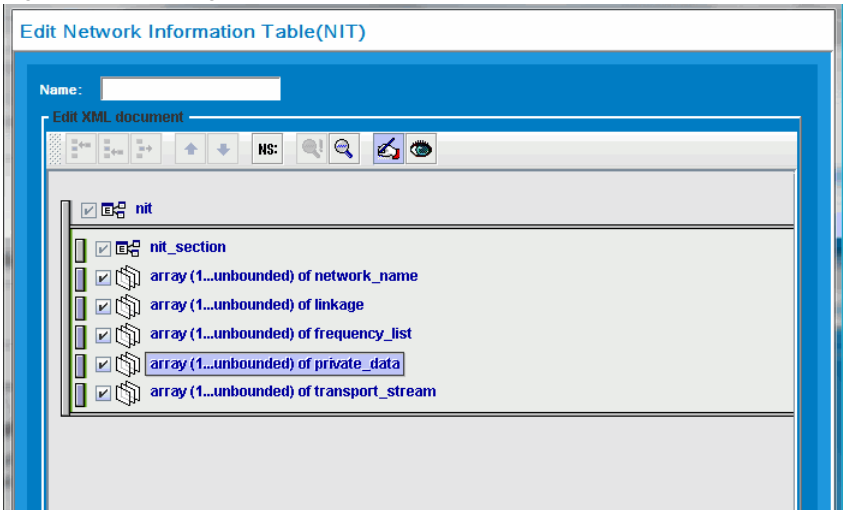


## Icon Menu

Figure 203 shows the icons appearing at the top of the window.

Figure 203. Icon Menu
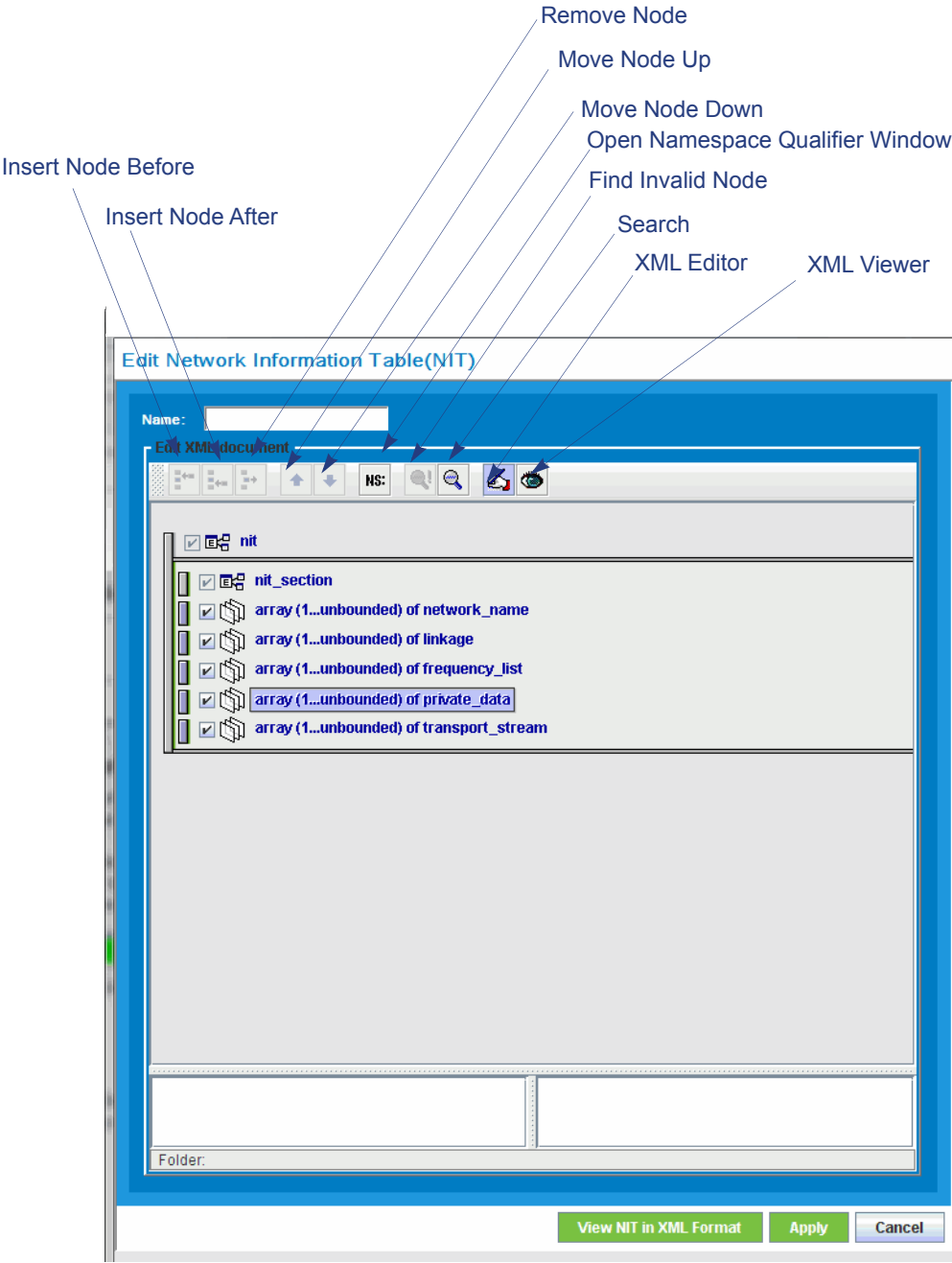


Figure 204 shows the Namespace Qualifiers window, obtained when you click the Namespace Qualifier icon.

Figure 204.   Namespace Qualifier Window
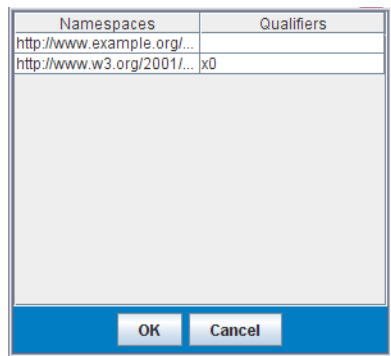


Figure 205 shows the Search window, obtained when you click the Search icon.

Figure 205.   Search Window
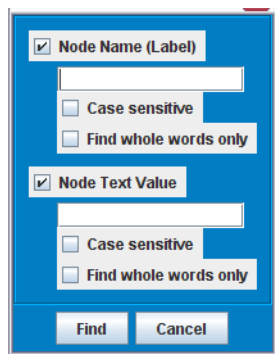


## Expanding the NIT Edit Window

The vertical bars shown in the window of Figure 202, "Editing Window," on page 261 are used to toggle between an expanded and reduced view. through show three layers of expansion. Clicking the large vertical bar compresses the display as shown in Figure 206.

Figure 206.   Large Vertical Bar Clicked Fully Compress
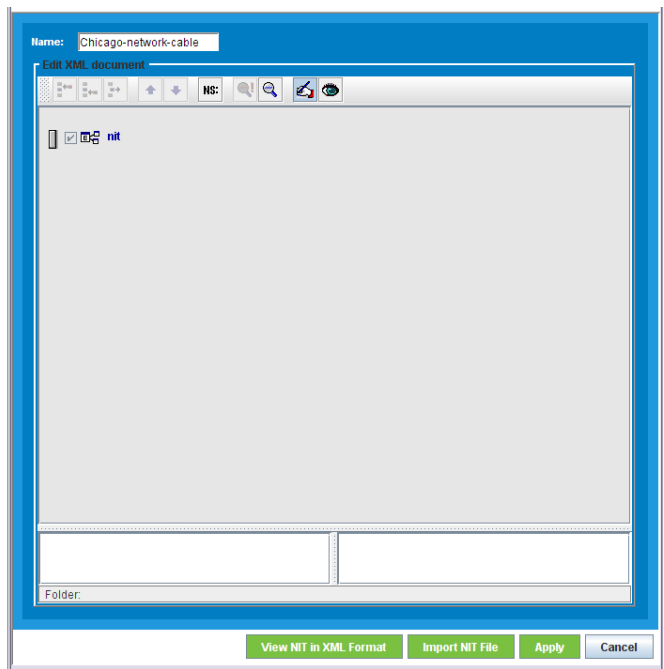


Figure 207 shows the first level of expansion from Figure 202, "Editing Window," on page 261, obtained by clicking all of the small bars to the right of the large bar.

Figure 207.   First Level of Expansion
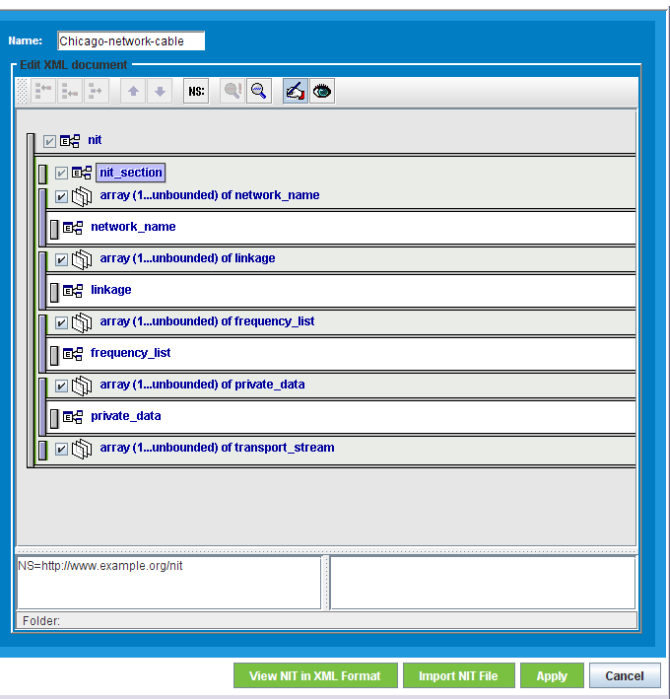


Clicking all of the smaller bars in Figure 207 creates the second level of expansion shown in Figure 208.

Figure 208.   Second Level of Expansion
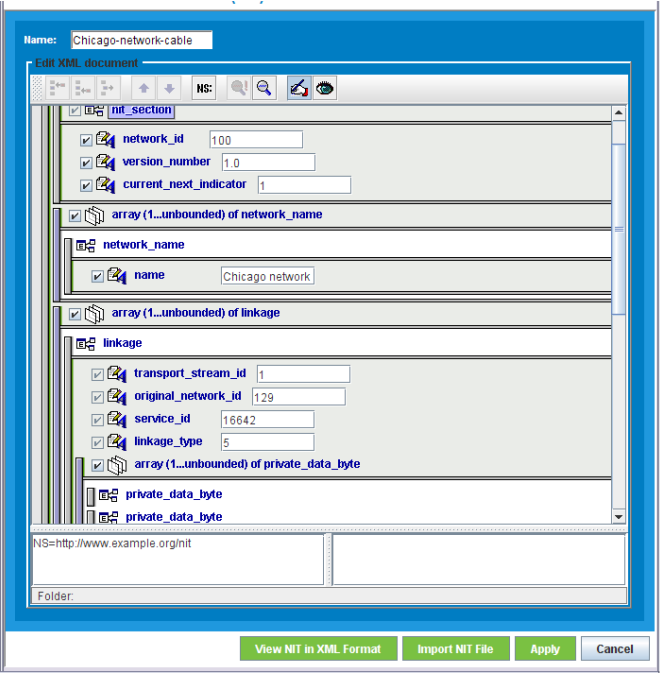


Clicking the smaller bars in Figure 208 creates the third level of expansion shown in Figure 209.

Figure 209.   Third Level of Expansion
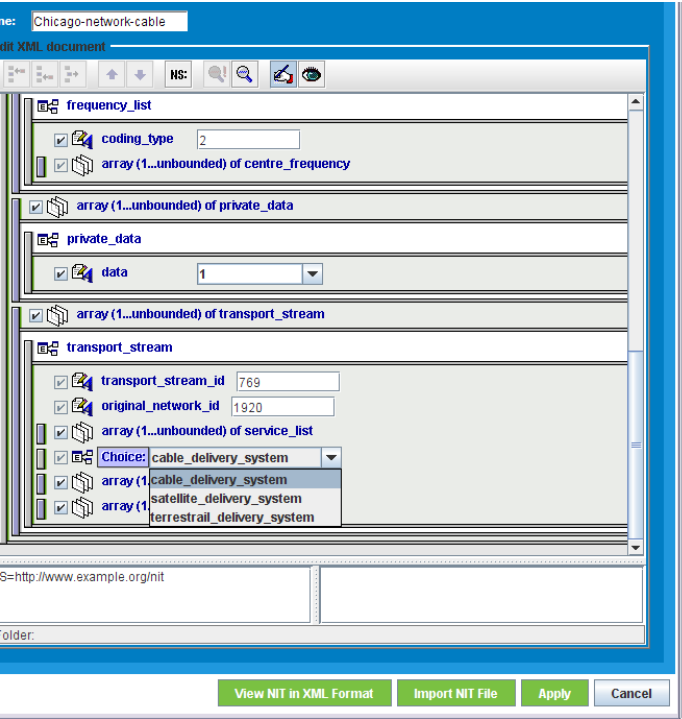
## Inserting a Node

To insert a node, select the node and click **Insert Node Before** (Figure 210).

Figure 210.    Inserting a Node Before
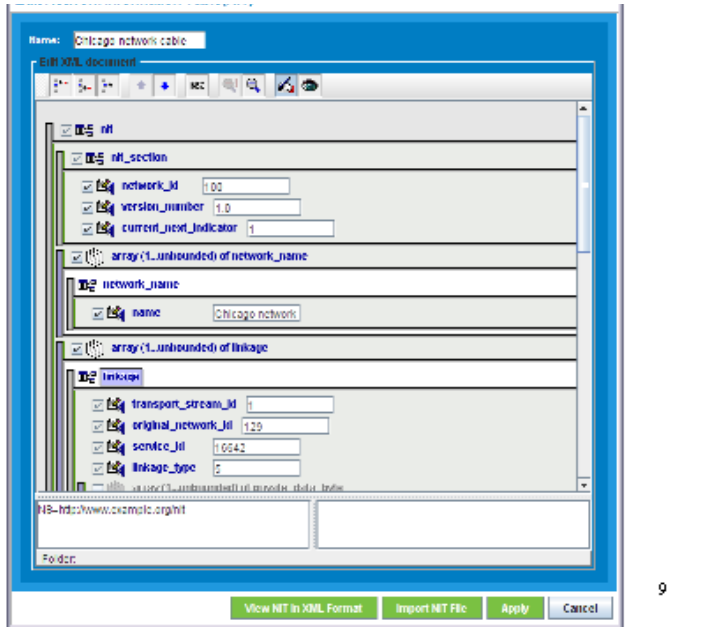


Figure 211 shows the result.

Figure 211.    Node Inserted Before
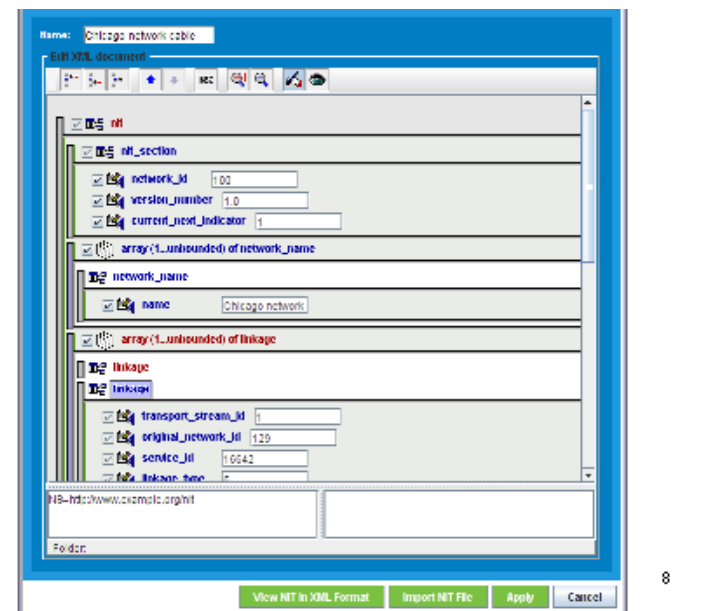


In the node that was added, we attempted to change the value of the transport stream to an alpha value, 'a." An error message resulted (Figure 212).

Figure 212.   Error Message from Wrong Type of Data Character
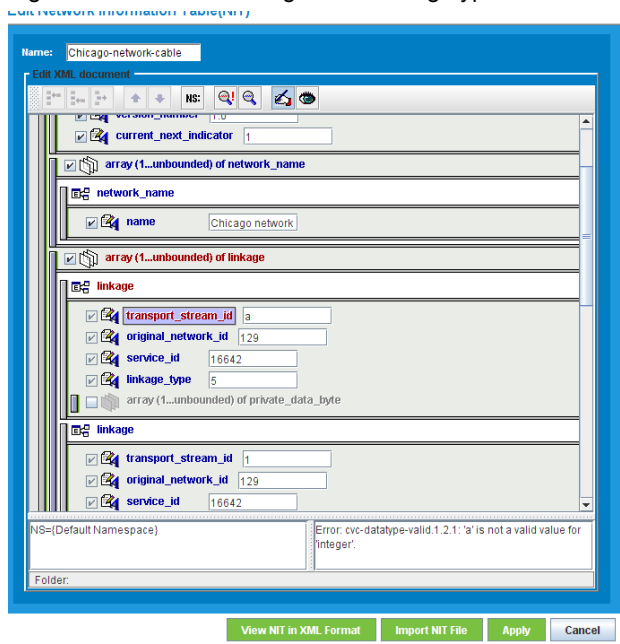


Using the proper data types we changed the values so they are different from the original (Figure 213).

Figure 213.   Data Type Mismatch Corrected
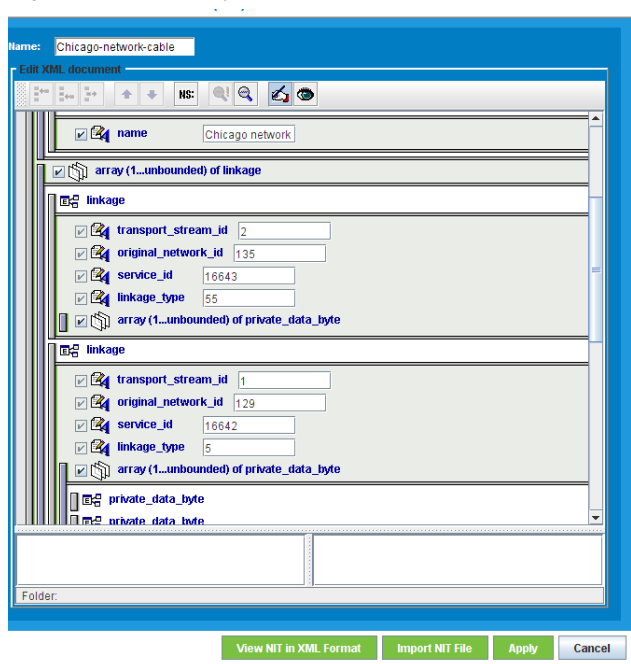


## Deleting a Node

You can delete a node. In the example, highlight the linkage to be deleted and click Remove Node. The node is deleted (Figure 214).

Figure 214.    Linkage Deleted



# Suggestions for Editing the NIT Table

The following are some suggestions that may prove helpful in editing the NIT table:

- In editing fields, go to the next tab to apply.
- When adding new nodes or fields, it is easiest to right click on the node to be added, then choose **Insert**.
- Uncheck optional fields if they are not needed.

# *Glossary*

This glossary defines the acronyms common in the video industry, and used in this guide. It is not all-inclusive but serves as a reference.

## Numeric

3DES
: Triple Data Encryption Standard. A mode of DES that encrypts data three times. Three 64-bit keys are used, for an overall key length of 192 bits.

## A

AES
: Advanced Encryption Standard. AES is a privacy transform for IPSec and Internet Key Exchange, and is replacing the Data Encryption Standard (DES). AES offers a larger key size and a variable key length.

Alpha Channel
: In reference to editing image files, an alpha channel stores selections as grayscale images. Adding alpha channels to an image allows the creation and storing of masks in order to manipulate or protect parts of an image.

ARP
: Address Resolution Protocol. ARP broadcasts a packet containing the IP address that the sender specifies to all hosts attached to an Ethernet connection. When the target recognizes that the IP address is its own, it returns a response.

ASI
: Asynchronous Serial Interface. ASI extends the functionality from strictly a video/audio-bounded device to a transport stream-based system that can store data in either a single program stream or a set of multiple program streams.

ATSC
: Advanced Television Systems Committee. ATSC is working to coordinate television standards among different communications media. ATSC is also developing digital television implementation strategies.

## C

CA
: Conditional Access. Conditional access is an encryption/decryption management method by which a broadcaster controls a subscriber's access to services.

CAS
: Conditional Access Systems. These are systems that ensure broadcast service is accessible only to those entitled to access, usually by scrambling or encrypting the service.

CBR
: Constant Bit Rate. Constant bit rate encoding ensures that the rate at which a codec's output is consumed is constant. Because it is the maximum bitrate that matters, CBR is useful for streaming multimedia content on limited capacity channels. See also VBR.

CSA
: Common Scrambling Algorithm.

# D

DCCT              Direct Channel Change Table, part of 9 tables in the ATCS PSIP. The DCCT instructs the receiver to change channels based on viewer preferences, demographics or geographical location. This table works with a DCCSDT in the set top box.

DCCSDT            DCC Selected Code Change Table, part of 9 tables in the ATCS PSIP.

DES               Data Encryption Standard. DES specifies a FIPS approved cryptographic algorithm as required by FIPS 140-1. Encrypting data converts it to an unintelligible form called cipher. The cryptographic security of the data depends on the security provided for the key used to encipher and decipher the data. Data can be recovered from cipher only by using exactly the same key used to encipher it.

DET               Data Event Table, part of 9 tables in the ATCS PSIP. The DET announces the data portion of a video/audio/data event when the data event does not match the exact duration of an video/audio event.

DHCP              Dynamic Host Configuration Protocol. DHCP servers let individual computers on an IP network extract their configurations. DHCP servers have no specific information about the individual computers until they request the information.

DOCSIS            Data Over Cable Service Interface Specifications. Now known as CableLabs Certified Cable Modems. DOCSIS specifies modulation schemes and the protocol for exchanging bidirectional signals over cable.

DPI               Digital Program Insertion. The digital splicing of one MPEG program (typically a commercial) into another based on digital cues within the MPEG transport stream.

DVB               Digital Video Broadcast. A European set of defined transmission standards for digital broadcasting systems.

DWDM              Dense Wavelength Division Multiplexing. A fiber-optic transmission technique using light wavelengths to transmit data parallel-by-bit or serial-by-character.

# E

EAS               Emergency Alert System. An operational structure for national and local emergency alerts used by broadcast, cable, and wireless cable.

EBIF              Enhanced Binary Interchange Format. EBIF standard provides a solution for the delivery of interactive data to existing set-top boxes (STBs), including older models of STBs. EBIF condenses interactive applications in order to use the minimal STB resources available for interactive data delivery

ECM               Entitlement Control Messages.

ECMG              ECM Generator.

EISS              ETV Integrated Signaling Stream data ES — carries timing signals that trigger events associated with the user-agent application loaded onto the STB.

EIT               Event Information Table, part of 9 tables in the ATCS PSIP. EITs are associated with a specific virtual channel in the VCT, contain event information, and point to the location of extended text in the ETT. Each EIT PID contains 3 hours worth of events per program.

EM                Element Manager. The graphical user interface for the BNP.

EMM               Entitlement Management Message. A packet containing the information necessary to decrypt the picture.

EMMG              Entitlement Management Message Generator. The component of the conditional access headend that delivers entitlements to the multiplexers.

EOD                    Everything-On-Demand.

ES                     Elementary Stream, an individual audio, video, or data output stream that is transmitted in a program

ETT                    Extended Text Table, part of 9 tables in the ATCS PSIP. ETTs carry longer text messages than EITs for describing events and virtual channels.

ETV                    Enhanced Television.

## F

FCC                    Federal Communications Commission. The agency that regulates communications services, including cable television, at the Federal level.

FPGA                   Field Programmable Gate Array. An array of logic gates that can be hardware-programmed to fulfill user-specified task.

FVOD                   Free-Video-On-Demand.

## G

GigE                   Gigabit Ethernet. Ethernet which supports data transfer rates of 1 Gigabit (1,000 megabits) per second.

GBP /GBP2              Gigabit Ethernet Processor module.

GUI                    Graphical User Interface.

## H

HD                     High Definition. High-resolution digital television combined with Dolby Digital surround sound (AC-3).

HFC                    Hybrid Fiber/Coax. A distribution system combining fiber and coax cable. An HFC system is used to distribute CATV signals into a neighborhood.

## I

IGMP                   Internet Group Management Protocol. IP hosts use IGMP to register dynamic multicast group membership. Connected routers discover the group members using the same protocol.

IP                     Internet Protocol. The network layer for the TCP/IP Protocol Suite. It is a connectionless, best-effort packet switching protocol.

ITU                    International Telecommunication Union. An international organization through which governments and the private sector coordinate global telecommunications networks and devices.

## J

JRE                    Java Runtime Environment. JRE is made up of the Java virtual machine, the Java platform core classes, and supporting files.

## L

LED             Light Emitting Diode. A semiconductor diode that emits light when current passes through it. LEDs are used as indicators.

## M

MGT             Master Guide Table, part of 9 tables in the ATCS PSIP. MGT provides program-identification (PID) locations so a receiver can find the other tables, and informs the receiver of changes or table updates.

MIB             Management Information Base. MIB defines the variables needed by the SNMP protocol to monitor and control elements in a network.

MID             Mid-plane.

MPEG            Moving Pictures Experts Group. The standards group and the standard for compression and storage of motion video.

MPTS            Multi-Program Transport Stream. A combined multiplex of video streams.

MUX             Multiplexer. A device that both combines multiple data sources into a single data stream for transmission, and demultiplexes the single data stream into its composite forms.

## N

NTP             Network Time Protocol. A TCP protocol that assures accurate local time-keeping with reference to radio and atomic clocks, and can synchronize distributed clocks within milliseconds.

NTSC            National Television System Committee. Committee that defined the current standard for analog color television in North America, as well as the name for the standard. The format is 525 lines in 4MHx of video bandwidth.

## O

OOB             Out-Of-Band.

## P

PAT             Program Association Table. A table ID that indicates the MPEG-2 SI packet type.

PCR             Program Clock Reference.

PMT             Program Map Table. A table ID that indicates the MPEG-2 SI packet type.

PNG             Portable Network Graphics. PNG format is used for lossless compression and for display of images on the web. Unlike GIF, PNG supports 24-bit images and produces background transparency without jagged edges. PNG format supports RGB, Indexed Color, Grayscale, and Bitmap mode images without alpha channels. PNG preserves transparency in grayscale and RGB images.

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|---|---|
| PSI | Program Specific Information, as part of MPEG-2. |
| PSIP | Program and System Information Protocol. PSIP is a collection of nine tables that allow the DTV transport stream to provide information about a station's services and programming. These nine tables include: |

Master Guide Table (MGT)
System Time Table (STT)
Virtual Channel Table (VCT)
Rating Region Table (RRT)
Event Information Table (EIT)
Extended Text Table (ETT)
Data Event Table (DET)
Directed Channel Change Table (DCCT)
DCC Selected Code Change Table (DCCSDT)

## Q

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|---|---|
| QAM | Quadrature Amplitude Modulation. This is the modulation technique used in systems carrying digital video. |
| QoS | Quality of Service. Guarantees network bandwidth and availability for applications. |

## R

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|---|---|
| RF | Radio Frequency. Television signals are modulated onto RF signals and are then demodulated by the television tuner. |
| RTP | Real Time Protocol. RTP provides services such as payload type identification, sequence numbering, time-stamping, and delivery monitoring to real-time applications. |
| RU | Rack Unit. A common increment of equipment space height. The height of 1 RU is 1.75 inches. |

## S

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|---|---|
| SAP | Secondary Audio Program. A way to provide a second audio channel within a TV broadcast channel. Commonly used for stereophonic sound or bilingual audio tracks. |
| SCTE | Society of Cable Telecommunications Engineers. An organization that develops training for cable television installers and engineers and standards for the cable industry. |
| SD | Standard definition. |
| SFP | Small Form Factor Pluggable. An optical interface that is used in network switches for Fibre Channel, Gigabit Ethernet and InfiniBand. |
| SNMP | Simple Network Management Protocol. A protocol used to monitor and control network devices, and to manage configurations, statistics collection, performance, and security. |
| SPTS | Single Program Transport Stream. |
| SSM | Source Specific Multicast. A way to deliver multicast packets whereby only packets delivered to a receiver are those that have originated from a specific source IP address that has been requested by the receiver. |

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|---|---|
| STP | Strip Processor. The STP modules (NP and ASI) is one of the units that comprise the BNP. |
| STT | System Table Time. Allows a broadcaster to present time indicators to the consumer, ensuring that the time is synchronized. |
| SVOD | Subscription-Video-on-Demand. This is a Video-on-Demand service offered by subscription, providing viewers with access to select programs from the libraries of featured cable networks. |

## T

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| TFTP | Trivial File Transfer Protocol. TFTP uses UDP and is often used by servers to boot diskless workstations, X-terminals, and routers. |
| TS | Transport Stream, the result of multiplexed--or combined--audio, video, or other data content that is packaged and transmitted through the broadcast network. |
| TVCT | A Terrestrial Virtual Channel Table is a mandatory PSIP table that lists all the virtual channels available in an ATSC transport stream, and optionally, virtual channels available in other ATSC transport streams. |

## U

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| UDP | User Datagram Protocol. A connectionless protocol that runs on top of IP networks. UDP provides a direct way to send information over an IP network. It is used primarily for broadcasting messages over a network. |

## V

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|---|---|
| VBI | Vertical Blanking Interval. A portion of a television signal that carries non-audio/video data, such as closed-caption text. |
| VBR | Variable Bit Rate. VBR streams vary in bandwidth over time. |
| VCT | Virtual Channel Table, part of 9 tables in the ATCS PSIP. The VCT contains a list of all the channels that are or will be online, along with their channel name and number. This table contains the set of data that enables a receiver to tune and locate the service being broadcast. |
| VOD | Video-on-Demand. Video-on-demand systems allow users to watch video content over a network as part of an interactive television system, either by streaming or by download. |

## X

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| XFP | 10 Gigabit Small Form Factor Pluggable (SFP). The XFP is a pluggable, hot-swappable optical interface for 10 Gigabit SONET/SDH, Fibre Channel, Gigabit Ethernet, and other applications. XFP modules are optical transceivers, typically 1310nm or 1550nm. Optical XFPs include digital diagnostics. |

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