AvediaStream

exterity®

AvediaStream® g4400 Series TVgateway v1.2

Administrator's Guide

Leading IPTV Delivery

Notices

Document Reference

1300-0090-0001

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http://www.exterity.com

Products Described by This Guide

AvediaStream g4410 - avstr-g4410

AvediaStream g4412 - avstr-g4412

AvediaStream g4415-sm - avstr-g4415-sm

AvediaStream g4418 - avstr-g4418

AvediaStream g4442 - avstr-g4442

AvediaStream g4448 - avstr-g4448

Trademarks

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Safety Notices

Before installing and operating these products, please read the safety information contained in this guide.

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Safety Notices

Before installing and operating these products, please read the safety information in this manual.

Important Safety Instructions

There are no instructions specifically for service personnel in this document. There are no user serviceable parts inside any Exterity product. To prevent electric shock or fire hazard, do not remove cover. Refer service to qualified service personnel.

This chapter contains important safety information. If you are unsure about any of the information in the section, please contact Exterity.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

USA and Canada

1 Read these instructions.

2 Keep these instructions.

3 Heed all warnings.

4 Follow all instructions.

5 Do not use this apparatus near water.

6 Clean only with dry cloth.

7 Do not block any ventilation openings. Install in accordance with the instructions contained in this manual.

8 Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9 Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10 Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11 Only use attachments/accessories specified by the manufacturer.

12 Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13 Unplug this apparatus during lightning storms or when unused for long periods of time.

14 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

15 Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.

16 To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.

17 The mains plug of the power supply cord shall remain readily operable.

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

EU and Others

Do not proceed beyond a **Warning** notice until you have understood the hazardous conditions and have taken appropriate steps.

Safety Information

Warning: There are no user serviceable parts inside any Exterity product. To prevent electric shock or fire hazard, do not remove cover. Refer service to qualified service personnel.

For 230/240 volt operation, be sure to use a harmonized grounded 3 conductor cord, rated 6 Amp minimum. Use a suitable cord for connection to the equipment and terminating in an IEC.

This equipment relies upon a safety earth for operation, ensure that you always use a power cord with appropriate earth and that the inlet to which is inserted also has the appropriate earth. If in any doubt about the earth provision in your building consult a qualified electrician.

Use only the dedicated power supply or cord supplied for your device.

Exterity products use ventilation holes for cooling. None of the ventilation holes should be blocked. Keep all materials at least 5cm away from all the ventilation holes.

Do not expose the product to any rain or moisture.

Do not use the product near a naked flame e.g. a candle.

The operating conditions of the product should be 0°C – 40°C with a Relative Humidity of 5 – 95%. The product should not be operated outside of these conditions.

There are no user-serviceable parts inside these products. Any servicing, adjustment, maintenance, or repair must only be performed by service-trained personnel.

About this Guide

This manual explains how to set up, use and manage AvediaStream g44xx TVgateways. These TVgateways are network devices that receive digital terrestrial, satellite, and cable TV channels and make them available as MPEG transport streams over an IP network. Channels are automatically announced on the network using the information contained in the digital broadcast for easy viewing on Exterity Receivers and Artio Desktop clients.

Audience

This manual is intended for use by systems integrators or systems administrators who are installing and setting up Exterity products. It assumes that readers are familiar with installing and configuring network-based products.

Scope

This edition of the manual refers to version 1.2 of the g44xx TVgateway firmware. All Exterity AvediaStream g44xx TVgateway products are covered.

Glossary

The following terms and definitions are used in this document:

AV	Audio/Video
Data channels	Data channels do not carry normal audio-video streams but are typically used as control channels under the DSM-CC protocol (part 6 of the MPEG-2 standard).
DVB	Digital Video Broadcasting, a suite of internationally accepted open standards for digital television transmission over terrestrial, cable, and satellite networks.
DVB-C/C2	Digital Video Broadcasting standard for Cable delivery.
DVB-T/T2	Digital Video Broadcasting standards for Terrestrial delivery.
EIT	Found in a Transport Stream, the Event Information Table provides information to enable construction of Program Guides.
EPG	Electronic Program Guide
FEC	Forward Error Correction
FTA	Free to Air
FTP	File Transfer Protocol
IP	Internet Protocol, a protocol used for communicating data across a network using the Internet Protocol Suite, also referred to as TC/I.
IP TOS	The Type of Service (TOS) field is a six-bit Differentiated Services Code Point (DSC) field and a two-bit Explicit Congestion Notification field.
MEG	A family of compression methodologies for audio and video.
MEG Transport Stream	A communications protocol enabling multiplexing of digital audio, video and data which is specified in MEG-2 art 1, Systems (ISO/IEC standard 13818-1).
NTP	Network Time Protocol, used for synchronizing the clocks of computer systems.
PAT	Found in a Transport Stream, the Program Association Table lists all the services found in a transport stream. The PAT is always on PID 0.
PID	Found in a Transport Stream, the Packet ID identifies a particular stream of data (e.g. video, audio, etc) within an MPEG Transport Stream
PMT	Found in a Transport Stream, the Program Map Table identifies all the Elementary Streams within a service.
SAP	Session Announcement Protocol, a protocol used to advertise the presence of multicast sessions on an IP network.
Transmitter file	A transmitter file typically lists all the frequencies available for transmission in a particular country or geographic region.

Section 1 - Getting Started

This section contains information on the following:

- An introduction to the AvediaStream TVgateways.
- A configuration overview.
- The different methods you can use to manage the TVgateway.
- Managing attributes of the TVgateway not associated with IPTV streaming.
- The connections required to connect the TVgateway to a terrestrial or satellite source.

1 Getting Started

Product Overview

TVgateways are network devices that receive digital TV channels and make them available as MPEG transport streams over an IP network. Each channel is automatically announced on the network using the information contained in the digital broadcast for easy viewing on Exterity Receivers and desktop clients.

For the purposes of this manual, "TVgateway" refers to a single TVgateway blade in an AvediaStream chassis. Each blade is a separate entity and is configured and managed independently from any other blades in the chassis.

The following TVgateways are currently available and supported by this firmware version:

- AvediaStream g4410 (Dual DVB-S/S2)
- AvediaStream g4412 (Dual DVB-S/S2 + Dual CAM)
- AvediaStream g4415-sm (Dual DVB-S/S2 + Dual CAM)
- AvediaStream g4418 (Octal DVB-S/S2)
- AvediaStream g4442 (Dual DVB-T/T2/DVB-C/C2 + Dual CAM)
- AvediaStream g4448 (Octal DVB-T/T2/DVB-C/C2)

These devices are operated and managed largely in the same way. Each blade has its own unique features and management requirements which are identified and highlighted in the document.

TVgateways with CAM slots have the ability to descramble channels; to do this, a CAM and subscription card from the package provider are required. If you are descrambling content using a TVgateway with CAM, ensure that you have the appropriate authority/rights to distribute the descrambled content on the network.

Network Considerations

The TVgateway transmits audio/video using IP multicast. In order for this to work satisfactorily, it is vital that the network switches are multicast-enabled in order to prevent unwanted flooding of traffic on the network.

For these purposes, "Multicast-enabled" is understood to mean that all network switches carry out IGMP snooping, and one switch must function as the IGMP querier.

Exterity TVgateways support V2 and V3 of IGMP.

Channel Announcements

The TVgateway announces the list of channels it is streaming using the Session Announcement Protocol (SAP). This enables Exterity Receivers/desktop clients and third-party equipment to automatically discover and connect to the available channels on the network.

SecureMedia® Technology

The Exterity content protection solution is designed to meet the Digital Rights Management (DRM) requirements of content owners and broadcasters.

SecureMedia technology forms part of this solution, and is integrated into the AvediaStream g4415-sm TVgateway. The g4415-sm first decrypts the selected channels using a CAM, then uses SecureMedia to re-encrypt the content prior to streaming onto the LAN. Using this TVgateway in

conjunction with an Exterity SecureMedia Server and correctly licensed viewing clients ensures that video content is always delivered securely throughout the IPTV system. This is illustrated in Figure 1.

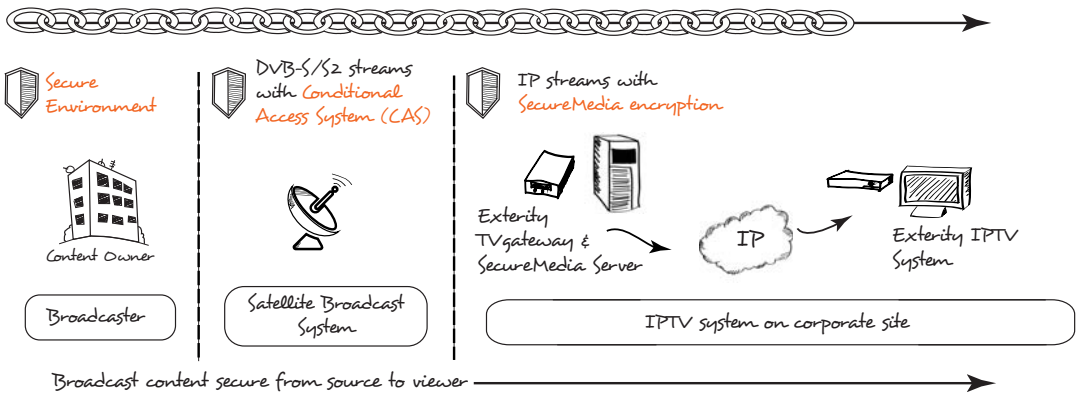


Figure 1 *Using the g4415-sm TVgateway with SecureMedia to protect video content*

Please note the following:

- If a CAM on an AvediaStream g4415-sm has been used to decrypt content, it **never** streams that content in the clear. However, it can stream FTA channels which have never been encrypted.
- All other AvediaStream g44xx TVgateways with CAM slots can stream de-scrambled content in the clear. For example, the g4412 can decrypt content using a CAM and then stream it on the LAN in an unencrypted format.

For more information about SecureMedia licenses, please see Appendix A, "Using the Product Feature Manager Application".

For more information on how to set up and use SecureMedia encryption technology, please see the Exterity website.

Configuration Overview

This section contains a brief overview of the steps required to install and configure the TVgateway.

1 Installing the TVgateway

Before using the TVgateway, it must be powered on and connected to the network and satellite source. This process is described in the installation guide for the chassis and also in Chapter 4, "Physical Interfaces".

2 Configuring the IP address of the TVgateway

By default, the TVgateway requires a DHCP server to be available on the network to assign it an IP address.

There are two methods of assigning a static IP address to the TVgateway, if required:

a. Temporarily set up a DHCP server on an isolated network. Once an IP address has been assigned to the TVgateway, you can configure a static IP address using the Web Management Interface. For more information, see “IP Address Configuration” on page 19.

b. Use the Admin Interface to configure the IP address. For more information, see “Admin Interface” on page 16.

3 Naming the TVgateway

Provide a name (and location) for the device so you can easily identify it in the future. You can do this using the Web Management Interface (see page 14) or the AvediaServer Director Application.

4 Scanning for Channels

Scan the source to discover details of the available channels. This is done on a per-tuner basis and is described in Chapter 6, "Scanning DVB-T/T2 & DVB-C/C2 Channels" and Chapter 7, "Scanning DVB-S/S2 Satellite Channels".

5 Selecting the Multiplex

Once you have successfully scanned for channels, select the multiplex containing the channels you want to stream. This is also carried out on a per-tuner basis. This is described in Chapter 9, "Channel Configuration".

6 Configuring the Channels

Once you have successfully scanned for channels and selected a suitable multiplex, select the channels you want to stream, again on a per-tuner basis. This is described in Chapter 9, "Channel Configuration".

7 Streaming the Channels

You are now ready to stream channels onto the network. See Chapter 10, "Streaming" for details of this final step.

2 Management Interfaces

The TVgateway can be managed in the following ways:

- Web Management Interface
- Admin Interface
- AvediaServer Director

It can also be managed by third party applications using SNMP or using Exterity's propriety Terminal Control Interface (TCI).

Note: Each TVgateway blade in a chassis must be configured independently.

Web Management Interface

You can manage all major aspects of the TVgateway's functionality using the Web Management Interface, which is supported by Microsoft Internet Explorer, Mozilla Firefox and Google Chrome. Open the Web Management Interface as follows:

1 Enter the IP address of the TVgateway directly into your browser, or click the TVgateway's name in the AvediaServer Director application as shown on page 17.

2 When prompted, enter the username and password. The default login details are:

Username: admin

Password: labrador

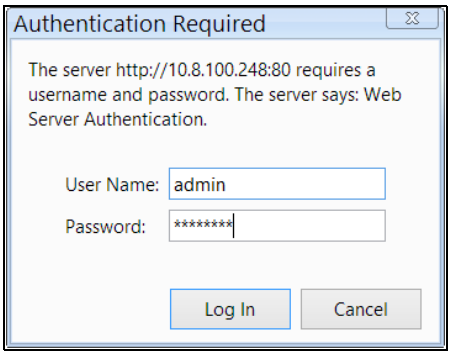


Figure 2 *Login window*

Note: You can also change the admin password using the Admin Interface. Please refer to "Admin Interface" on page 16.

3 The Web Management Interface opens in your browser, as shown below.

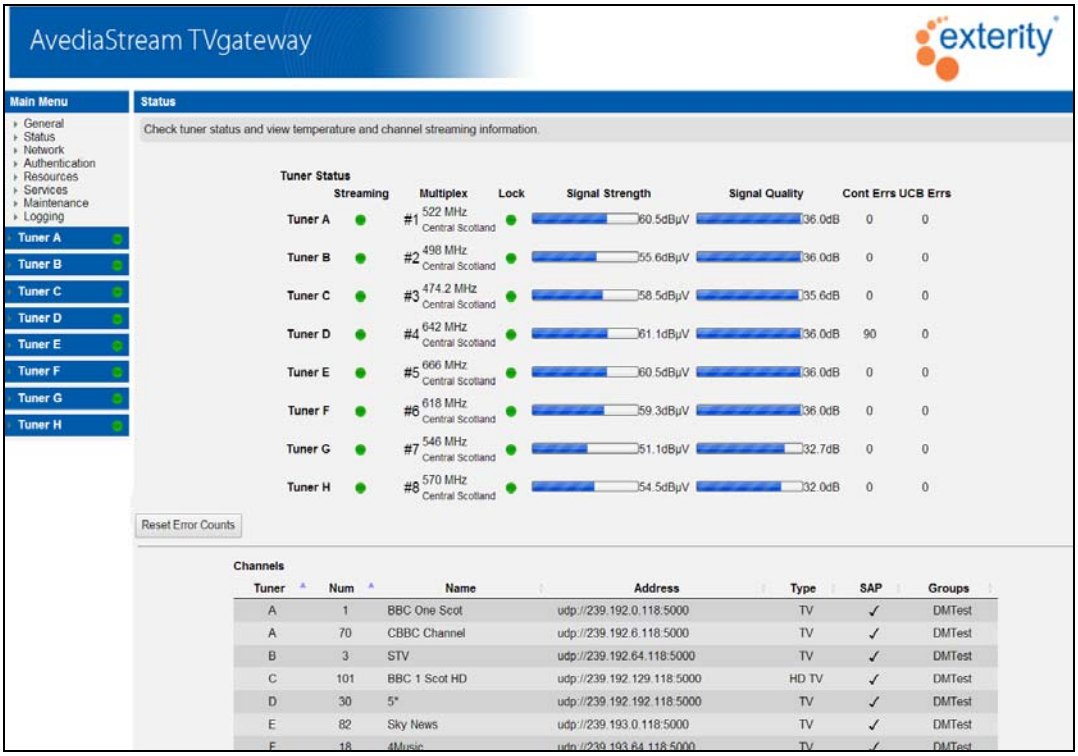


Figure 3 *Web management interface (AvediaStream g4448)*

4 Use this menu to navigate through the pages, changing settings as required. Click Apply on each page to save your changes.

Note: For security reasons, we recommend that you change the administrator password as soon as possible. Please see “Authentication” on page 23 for details of how to do this.

Admin Interface

In certain circumstances it may not be possible to manage the TVgateway via the Web Management Interface. For these situations, a text-based Admin Interface is provided, which is available via the serial interface (marked 'ADM' on the chassis front panel) or via SSH.

See Appendix B, "Serial Interface Connection" for details of how to connect to the serial admin port.

Once connected, log in using username `admin` and password as for the Web Interface (default `labrador`).

The options are as follows:

1	Show Diagnostics	Displays the device log file.
2	Show Bootloader params	Displays the internal configuration used by the bootloader.
3	Show Network Config	Displays the IP addressing information of the device.
4	Set Network Config	Allows the administrator to set the IP address of the device.
5	Set Admin Password	Allows the administrator to change the admin password for the Admin and Web Interfaces.
6	Run a shell	Allows the administrator to run a shell as admin.
7	Return to factory defaults	Allows the administrator to set all configuration to factory defaults.
8	Upgrade	Allows the administrator to specify a TFTP server and initiate a firmware upgrade.
9	Reboot	Restarts the device.
10	Exit	Exits the application.

AvediaServer Director

The AvediaServer Director is used for device discovery and management and is an integral part of the AvediaServer platform. The Director uses SNMP to manage a subset of device functionality and can also be used to open the Web Management Interface of the TVgateway.

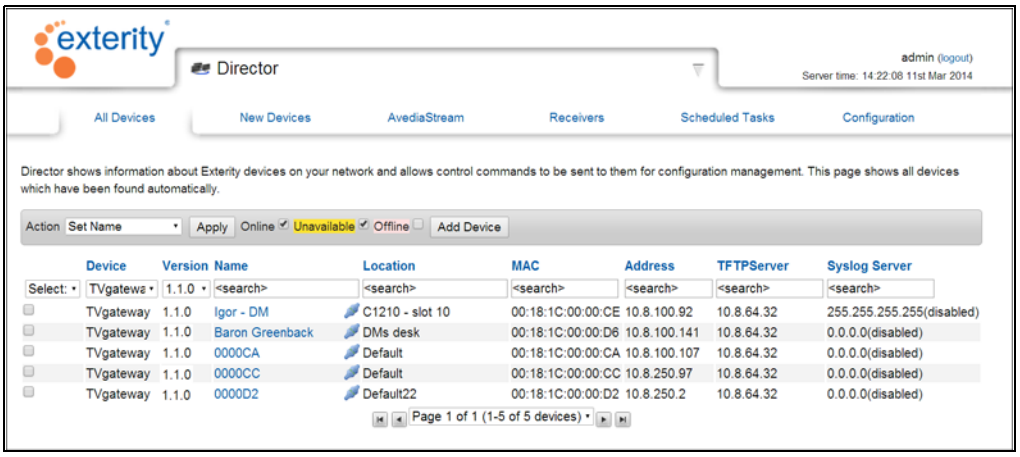


Figure 4 *AvediaServer Director*

You can carry out the following actions on the TVgateway using the Director:

- **Set Name** - Specify the TVgateway name.
- **Set Location** – Specify the TVgateway location.
- **Reboot** – Re-start the TVgateway.
- **Ping** – Ping the TVgateway.
- **Upgrade Firmware** – Upload new device firmware.
- **Factory Reset** – Set the TVgateway back to factory default configuration.
- **Export Config** – Export the current configuration for archiving or applying to another device.
- **Import Config** – Restore the TVgateway to a previously saved configuration.
- **Set TFTP Server** – Specify the IP address of the TFTP server to be used.
- **Set Syslog Server** – Specify the IP address of the Syslog server to be used.

To start the TVgateway Web Interface with AvediaServer Director:

1 Open the AvediaServer Web Interface and start the AvediaServer Director application.

2 Select TVgateway from the Device drop-down list to display only TVgateways, and use the column sort functions to help locate the TVgateway you want to configure.

3 Click the required TVgateway Name hyperlink to launch the Web Interface login window.

4 Enter the admin login credentials to display the Web Interface.

To open the Admin Interface via telnet with AvediaServer Director:

1 Open the AvediaServer Web Interface and start the Director application.

2 Select TVgateway from the Device drop-down list to display only TVgateways, and use the column sort functions to help locate the TVgateway you want to configure.

3 Click the required TVgateway icon hyperlink ( ) in the Name column to launch the Admin Interface window.

3 General Device Management

This chapter describes how to manage attributes of the TVgateway not associated with IPTV streaming. All procedures described in this section assume that you are running the Web Management Interface as described in Chapter 2, "Management Interfaces".

About the TVgateway

The General page in the web interface displays specific information about the TVgateway. Much of this information is useful for identifying the software and hardware revisions in use on this blade. If contacting technical support regarding a problem with the device, it can be useful to provide all this information.

- **Product Type**: The AvediaStream TVgateway model number.
- **Software Version**: The version of software (often known as firmware) running on this device.
- **Description**: A detailed version description identifying when the software was built.
- **Serial number**: The MAC address of the unit.
- **IP Address**: The IP address being used by the unit.
- **Hardware Type**: This identifies the exact type of hardware in the device.
- **Date**: The configured NTP server is used to generate the displayed date and time. (If no NTP server is present, the TVgateway's internal clock is used, starting on Jan 1 1970 (Linux Epoch).)
- **Secure Hardware**: Shows hardware has security and tamper proofing features required for video content protection.
- **License**: A comma-separated list of feature licenses that have been deployed on this device.

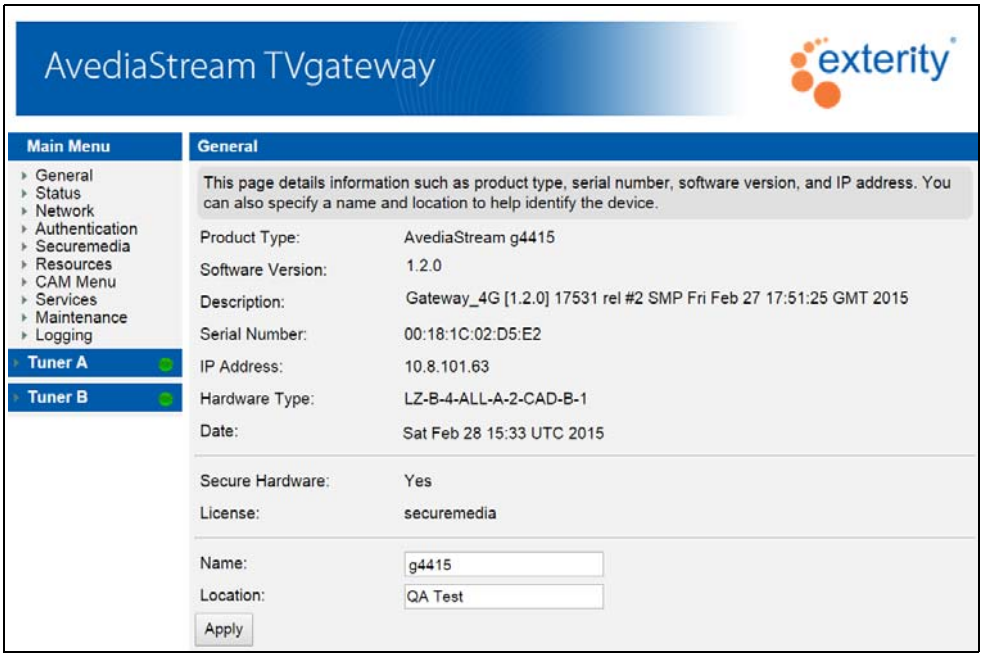


Figure 5 *Example of TVgateway General Page (AvediaStream g4415-sm)*

Device Naming

You can assign a name and location to the TVgateway which can help identify it in a management application, such as AvediaServer Director.

To specify the name and location:

1 Click General.

2 Enter a name and location as required in the Name and Location fields, then click Apply.

Note: You can also configure the name and location using the Name and Location actions in the AvediaServer Director application.

Network Configuration

This section describes TVgateway options relating to network connections. These options are all available from the Network page.

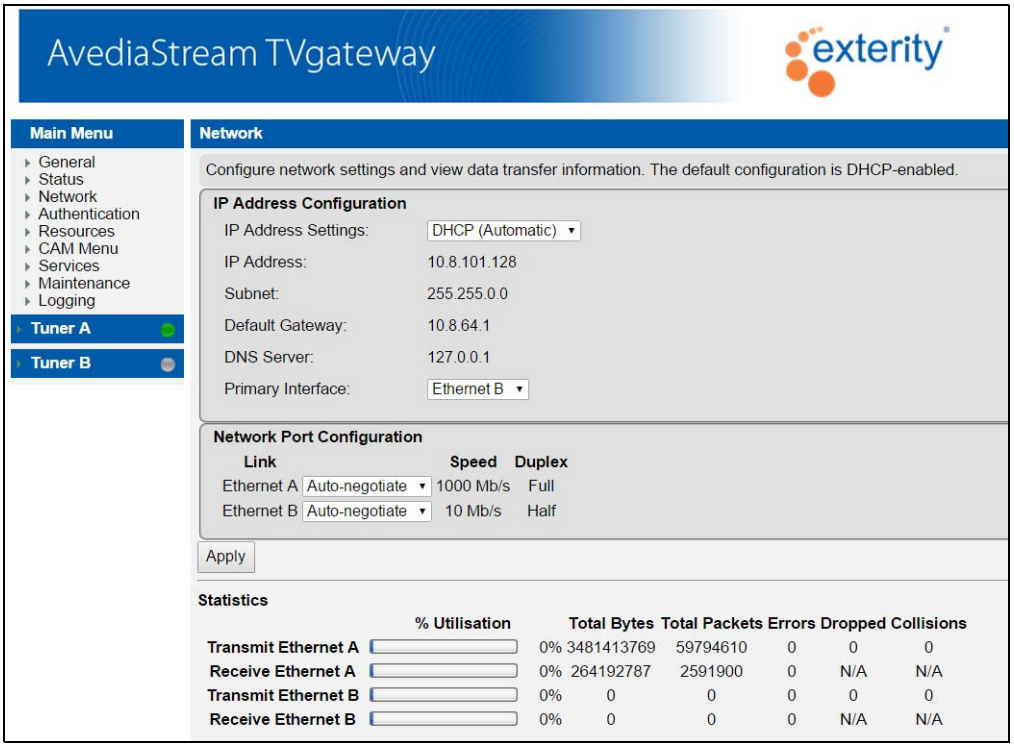


Figure 6 *Network Page (AvediaStream g4442)*

IP Address Configuration

You can configure the TVgateway to obtain an IP address automatically using DHCP, or you can specify static addressing information, i.e. IP address, subnet mask, default gateway and DNS server.

Note: An IP addressing change may take a short time to come into effect. The device starts using the new IP address automatically - no reboot is necessary.

To configure automatic IP address allocation:

1 Click Network.

2 In the IP Address Configuration section, select DHCP (Automatic) from the IP Address Settings drop-down list and click Apply.

To configure a static IP address:

1 Click Network.

2 In the IP Address Configuration section, select Static (use below) from the IP Address Settings drop-down list.

3 Specify values for IP Address, Subnet Mask, Default Gateway and DNS Server, then click Apply.

Network Port Configuration

The TVgateway can automatically negotiate any combination of 10/100/1000 Mbps and half/full duplex with an Ethernet switch. It is also possible to disable auto-negotiation. The two LEDs on the front of the AvediaStream chassis indicate the type and status of the link. See “Network Port Status” on page 65 for more information.

Caution: It is important to ensure that the TVgateway settings match the settings on the switch port to which the TVgateway is connected. If this is not the case, it can result in dropped packets causing breakup of audio/video.

In practice this means the TVgateway and the connected network switch should be configured for operation as follows:

Auto-negotiation enabled on *both* the TVgateway and the connected network switch.
or
Auto-negotiation disabled on *both* the TVgateway and the connected network switch, and a fixed setting of 100FD (Full Duplex) configured on the switch.

We do not recommend connecting the TVgateway to a half duplex Ethernet port.

To enable/disable Ethernet auto-negotiation:

1 Click Network.

2 In the Network Port Configuration section, choose On or Off as appropriate from the Auto-negotiation drop-down list and click Apply.

Note: If you turn off Auto-negotiation, the TVgateway uses 100 Mb/s, Full Duplex.

Ethernet Redundancy (c1210 only)

When inserted into an AvediaStream c1210 chassis, all AvediaStream g44xx TVgateways have automatic Ethernet backup, provided that both Ethernet ports for that blade slot on the chassis are connected. If the primary interface becomes unavailable, all data is automatically transferred to the secondary interface. Once the primary interface becomes available again, data is automatically transferred back to it.

No user configuration is required to enable switching between Ethernet interfaces.

The statistics at the bottom of the Network page indicate which Ethernet interface is active. In Figure 7, the higher transmit stats for Ethernet A indicate that it is currently in use:

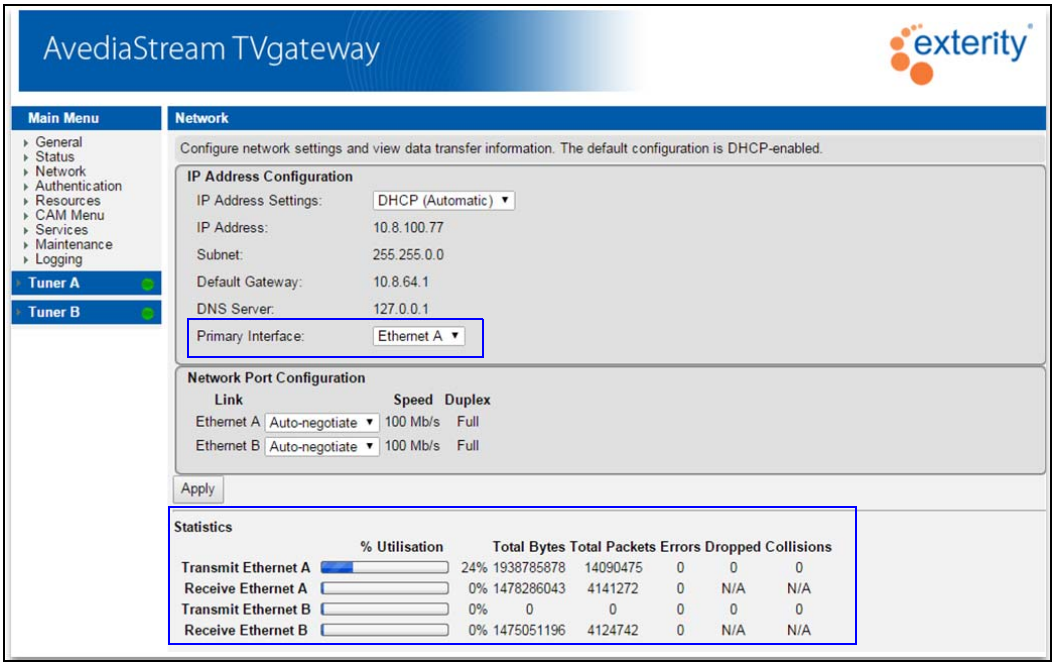


Figure 7 *Network page with Ethernet redundancy*

The Primary Interface defines which Ethernet interface is used for transmitting data if both interfaces are available. By default, Ethernet A is the primary interface. To change this, select Ethernet B in the drop-down list and click Apply.

Information on Ethernet port usage and switching is also recorded in the log file. Please see “Logging” on page 69.

Authentication

Admin Password

You can control access to the web management interface and admin interface by changing the password. This option is available from the Authentication page in the Web Interface.

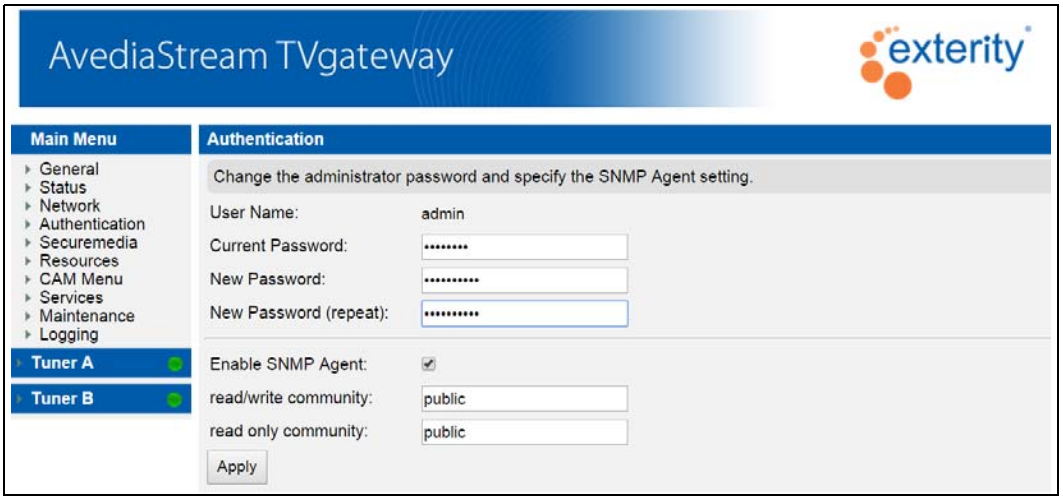


Figure 8 *Authentication Page (AvediaStream g4415-sm)*

To change the admin password:

1 Click Authentication.

2 Enter the required passwords and click Apply.

Password Requirements

Administrator passwords:

- should contain at least six characters;
- should contain a mix of four different types of characters:
  - upper case letters,
  - lower case letters,
  - numbers,
  - special characters such as !@#$%^&*,;".

SNMP

SNMP is used by management applications such as the AvediaServer Director application to manage a subset of the TVgateway functions and configuration. It is possible to completely disable the use of SNMP; however, if you disable SNMP on the TVgateway, management applications such as the AvediaServer Director will not be able to communicate with it.

Note: Device discovery and configuration change traps are still sent even when SNMP control is disabled.

To configure SNMP community strings:

1 Click Authentication.

2 Enter the required read/write and read-only community strings in the appropriate boxes.

3 Click Apply.

To enable/disable SNMP control:

1 Click Authentication.

2 Check or uncheck the Enable SNMP Agent box as required (default: checked – enabled).

3 Click Apply.

4 Physical Interfaces

AvediaStream TVgateways can operate in any of the following chassis:

- AvediaStream c1101
- AvediaStream c1103
- AvediaStream c1210 (required for Ethernet redundancy)
- AvediaStream c1110 (no longer available)

The blade input signal interfaces are on the rear panel, while the edge connector enables access to the network and admin ports via the chassis front panel connections.

The installation guide for each chassis describes the connection of the blades to the power supply, the network and to a PC via serial connection.

Overview

This section describes the connections required to connect the following TVgateways to the terrestrial/satellite source:

- AvediaStream g4410 (Dual DVB-S/S2)
- AvediaStream g4412 (Dual DVB-S/S2 + Dual CAM)
- AvediaStream g4415-sm (Dual DVB-S/S2 + Dual CAM)
- AvediaStream g4418 (Octal DVB-S/S2)
- AvediaStream g4442 (Dual DVB-T/T2/DVB-C/C2 + Dual CAM)
- AvediaStream g4448 (Octal DVB-T/T2/DVB-C/C2)

AvediaStream g4410 (Dual DVB-S/S2)

The AvediaStream g4410 satellite (DVB-S/S2) TVgateway receives unencrypted live TV and radio from satellite RF sources and streams them across an IP network. Encrypted channels are streamed onto the network with the original CA encryption still in place.

The g4410 is shown in Figure 9. It has two tuners, connected to the antennae by two female F-type connector inputs.

Caution: Please disconnect all RF cables from the blade before inserting or removing from a chassis.

Figure 9 *AvediaStream g4410 TVgateway*

AvediaStream g4412 (Dual DVB-S/S2 + Dual CAM)

The AvediaStream g4412 satellite (DVB-S/S2) with Dual CAM TVgateway receives content-protected live TV and radio from satellite RF sources. The CAM is used to decrypt the content, which is then streamed across an IP network.

The g4412 is shown in Figure 10. It has two tuners, connected to the antennae by two female F-type connector inputs. Descrambling capability is enabled using an appropriate CAM and subscription card.

Caution: Please disconnect all RF cables from the blade before inserting or removing from a chassis.

To insert a CAM, first insert the smart card into the CAM. Then insert the CAM into the CAM slot for the associated tuner, A or B. You can insert/remove the CAM while the TVgateway is powered on.

Connect the satellite dish LNB or multiswitch to the selected TVgateway tuner input using the F-type connector. The satellite dish should be installed by a professional installer, ensuring that the signal levels conform to the requirements listed in Appendix C, "Recommended Signal Levels".

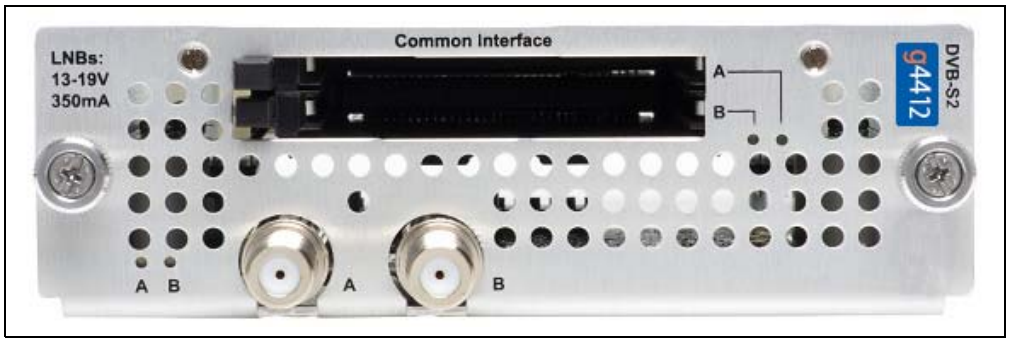


Figure 10 *AvediaStream g4412 TVgateway*

AvediaStream g4415-sm (Dual DVB-S/S2 + Dual CAM)

The AvediaStream g4415-sm satellite (DVB-S/S2) with Dual CAM TVgateway captures content-protected live TV and radio from satellite sources and streams it securely across an IP network using SecureMedia. It never streams content in the clear.

The g4415-sm is shown in Figure 11. It has two tuners, connected to the antennae by two female F-type connector inputs. Descrambling capability is enabled using an appropriate CAM and subscription card.

Caution: Please disconnect all RF cables from the blade before inserting or removing from a chassis.

To insert a CAM, first insert the smart card into the CAM. Then insert the CAM into the CAM slot for the associated tuner, A or B. You can insert/remove the CAM while the TVgateway is powered on.

Connect the satellite dish LNB or multiswitch to the selected TVgateway tuner input using the F-type connector. The satellite dish should be installed by a professional installer, ensuring that the signal levels conform to the requirements listed in Appendix C, "Recommended Signal Levels".

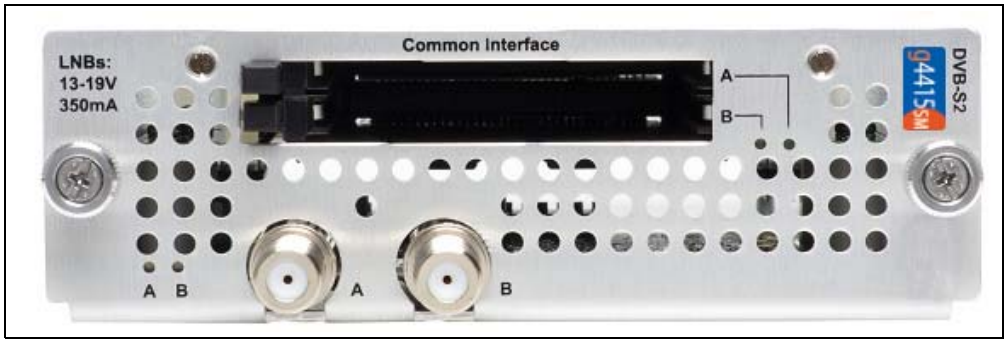


Figure 11 *AvediaStream g4415-sm TVgateway*

AvediaStream g4418 (Octal DVB-S/S2)

The AvediaStream g4418 satellite (DVB-S/S2) TVgateway receives unencrypted live TV and radio from terrestrial RF sources and streams them across an IP network. Encrypted channels are streamed onto the network with the original CA encryption still in place.

The g4418 is shown in Figure 12, and has eight tuners, Tuner A to H, connected to the antennae by eight female F-type connector inputs.

Caution: Please disconnect all RF cables from the blade before inserting or removing from a chassis.

Connect the satellite dish LNB or multiswitch to the selected TVgateway tuner input using the F-type connector. The satellite dish should be installed by a professional installer, ensuring that the signal levels conform to the requirements listed in Appendix C, "Recommended Signal Levels".

Caution: Connect the AvediaStream g4418 to a multiswitch rather than directly to an LNB if the LNB draws more than 100 mA from the TVgateway. Failure to do this may result in power to the LNB being switched off.

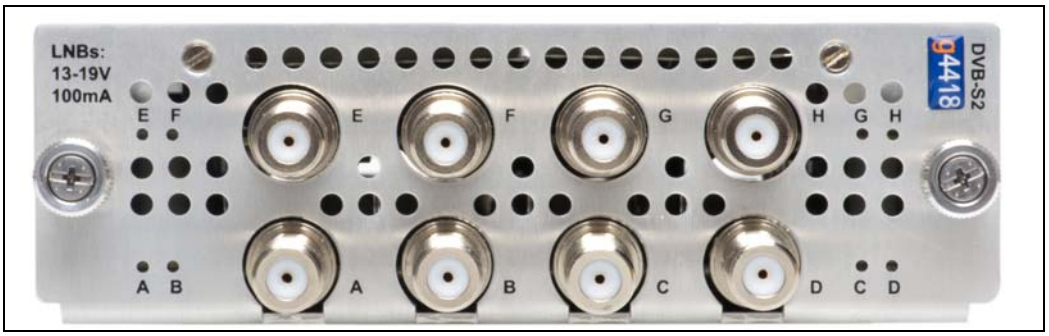


Figure 12 *AvediaStream g4418 TVgateway*

AvediaStream g4442 (Dual DVB-T/T2/DVB-C/C2 + Dual CAM)

The AvediaStream g4442 dual terrestrial TVgateway receives content-protected live TV and radio from terrestrial RF sources and streams them across an IP network. With dual conditional access slots, it descrambles and distributes encrypted and free to air channels across your IP network.

The g4442, shown in Figure 13 has two tuners, connected to the antennae by one female F-type connector input.

Connect the antenna feed to the TVgateway tuner input using the F-type connector. The antenna should be installed by a professional installer, ensuring that the signal levels conform to the requirements listed in Appendix C, "Recommended Signal Levels".

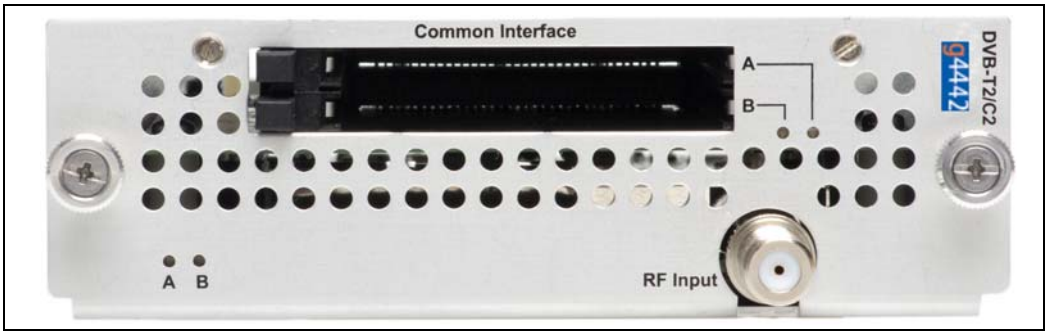


Figure 13 *AvediaStream g4442 TVgateway*

AvediaStream g4448 (Octal DVB-T/T2/DVB-C/C2)

The AvediaStream g4448 octal terrestrial TVgateway captures live TV and radio from terrestrial sources and streams them across an IP network. Encrypted channels are streamed onto the network with the original CA encryption still in place.

The g4448, shown in Figure 14 has eight tuners, Tuner A to H, connected to the antennae by two female F-type connector inputs. Input 1 feeds tuners A-D, and input 2 feeds tuners E-H.

Caution: Please disconnect all RF cables from the blade before inserting or removing from a chassis.

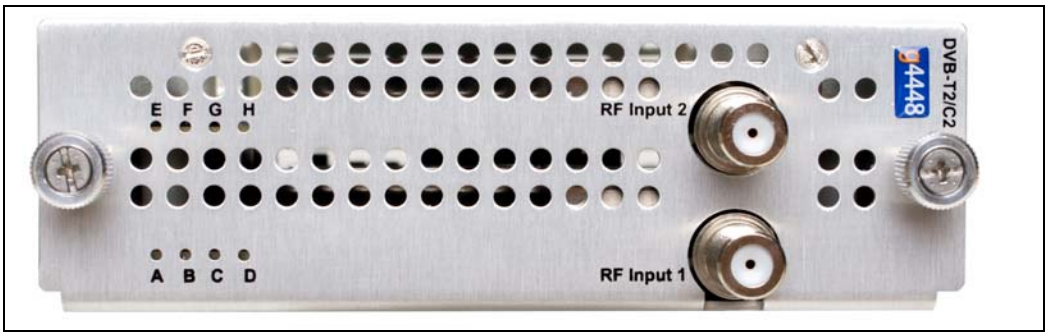


Figure 14 *AvediaStream g4448 TVgateway*

Section 2 - Channel Selection, Configuration and Streaming

This section contains the following:

- An introduction to the process of scanning for channels.
- Specific process details for selecting the RF signal source, tuning the TVgateway tuner to specified frequencies and reviewing the channel contents of a multiplex:
  - Chapter 6, "Scanning DVB-T/T2 & DVB-C/C2 Channels".
  - Chapter 7, "Scanning DVB-S/S2 Satellite Channels"
- Understanding the results of a scan and managing the TVgateway transmitter files.
- Enabling specific channels from the selected multiplex and configuring or changing channel parameter details.
- Setting up parameters to announce and stream the selected channels onto the IP network.

5 Scanning Overview

Overview

DVB-S/S2, DVB-T/T2 and DVB-C/C2 signals consist of television and radio channels collected into bundles called multiplexes. Each multiplex is transmitted on a separate frequency, or for satellite (DVB-S/S2) a combination of frequency and signal polarization.

A TVgateway, in common with all RF receivers, must tune to the transmission frequency to access the channels in a multiplex. Each tuner in a TVgateway can tune to one frequency and therefore stream all the channels transmitted on that particular frequency.

TVgateways are supplied with transmitter files for many commonly used satellite transponders, terrestrial transmitters and cable sources. These files contain the required tuning parameters such as frequency, polarization, modulation schemes, symbol rate, and error correction information. Tune the TVgateway by selecting the source for the relevant multiplex and initiating a scan. When tuned, the required channels can be selected and subsequently streamed to the IP network.

Appendix D, "Scan Resources" contains some useful tips on how to find information which will help you decide what to scan. To use the advanced scanning procedure you must know the frequencies, polarization, symbol rate and delivery system information for the satellite you intend to use. The process of tuning the TVgateway to the required transmitter source, selecting channels, and streaming them onto the IP network follows the logical process shown in Figure 15.

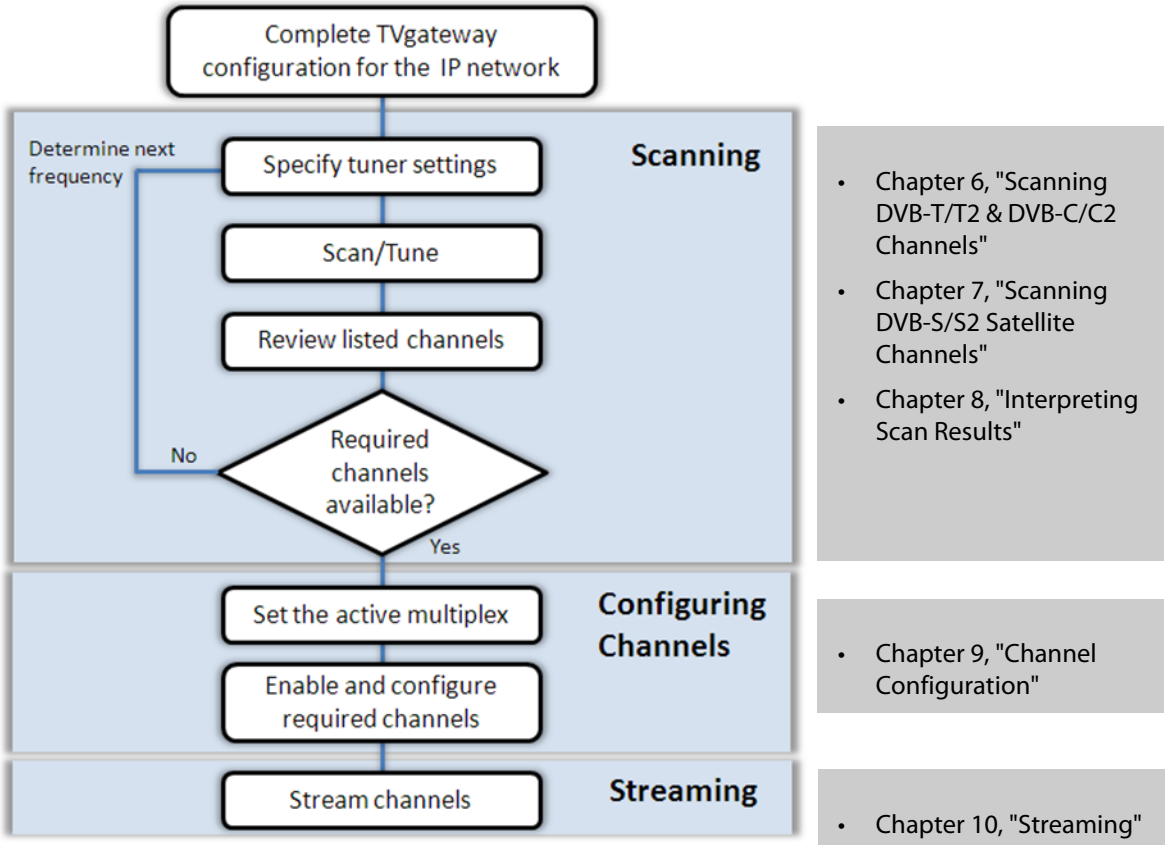


Figure 15 *Configuring the TVgateway*

This section contains the following information:

- The process of selecting the RF signal source, tuning the TVgateway tuner to specified frequencies and reviewing the channel contents of a multiplex. Refer to the following chapters for the relevant signal source:
  - Chapter 6, "Scanning DVB-T/T2 & DVB-C/C2 Channels"
  - Chapter 7, "Scanning DVB-S/S2 Satellite Channels"
- To understand the results of a scan and manage the TVgateway transmitter files, refer to Chapter 8, "Interpreting Scan Results".
- To enable specific channels from the selected multiplex, configure or change channel parameter details, refer to Chapter 9, "Channel Configuration".
- To set up the parameters to announce and stream the selected channels onto the IP network, refer to Chapter 10, "Streaming".

6 Scanning DVB-T/T2 & DVB-C/C2 Channels

This section explains how to scan Terrestrial (DVB-T/T2) and Cable (DVB-C/C2) broadcast sources for available channels.

Scanning Terrestrial and Cable Channels

In order to successfully receive and stream channels, the input signal level and quality must meet the requirements specified in Appendix C, "Recommended Signal Levels". There are three types of scan:

- **Frequency Range Scans** enable you to scan the complete list of frequencies listed in a transmitter file.
- **Basic Scans** provide the ability to individually scan any frequency listed in a transmitter file for a specific transmitter.
- **Advanced Scans** provide the ability to tune to a multiplex not listed in the transmitter files.

  Note: This version of firmware does not have transmitter files for DVB-C/C2 built in.

Frequency Range Scan

A Frequency Range Scan scans the complete list of frequencies listed in a transmitter file. Transmitter files typically list all the frequencies available for transmission in a particular country or geographic region. Exterity terrestrial TVgateways are supplied with the following transmitter files, listed on the Resources page:

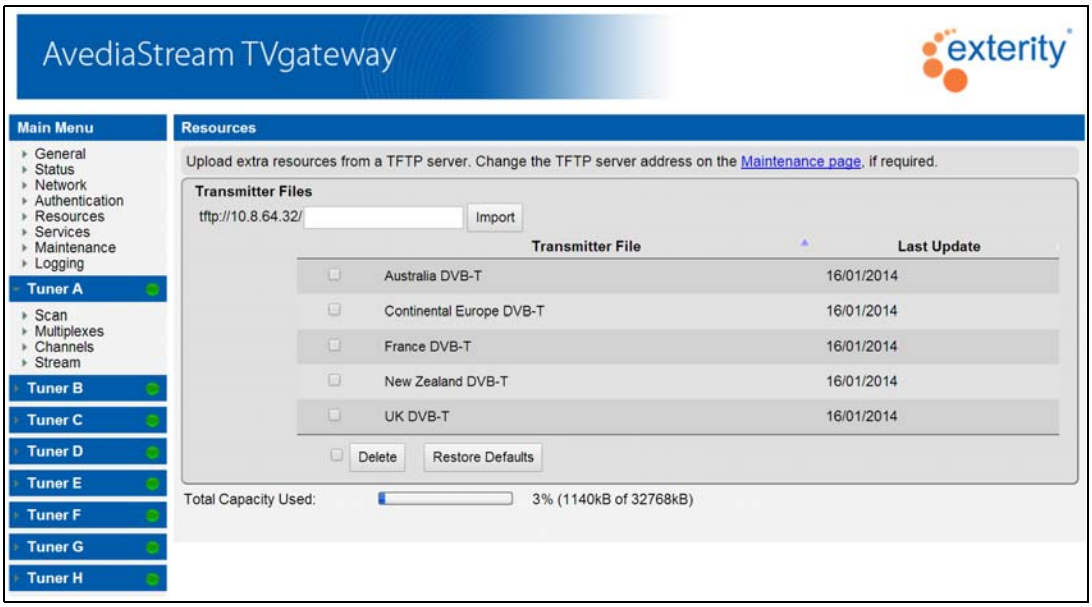


Figure 16 *Resources page (AvediaStream g4448)*

If you cannot find a suitable configuration file, you can add additional files using the Transmitter Files import function on the Resources page as shown in Figure 16. See Appendix F, "Transmitter File Format" for file format information, and “Managing Transmitter Files” on page 42.

To perform a Frequency Range Scan:

1 Click Scan in the required Tuner menu to display the relevant Scan page.

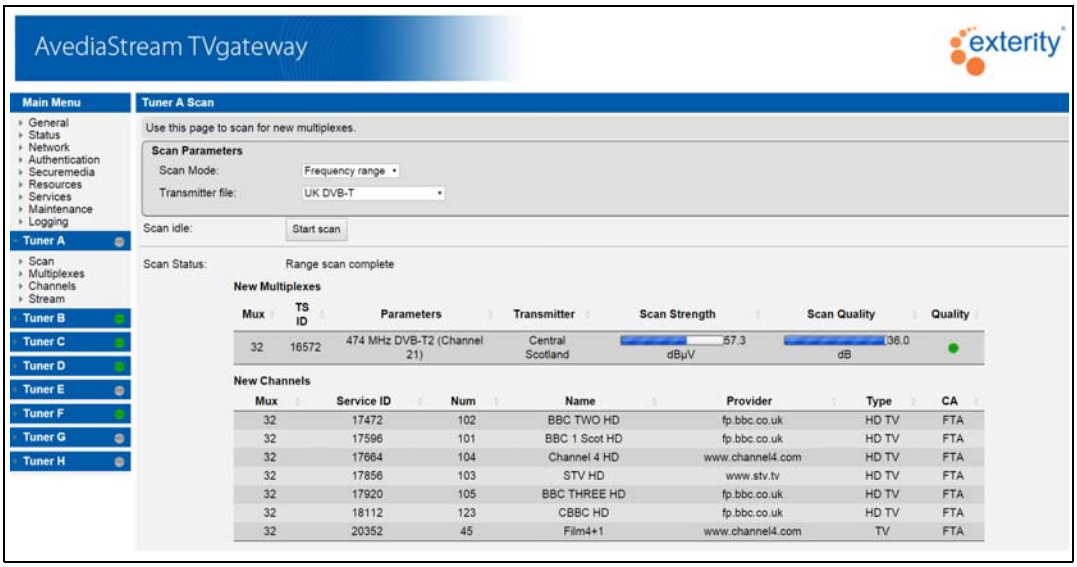


Figure 17 *TVgateway DVB-T terrestrial frequency range scan (AvediaStream g4448)*

2 From the Scan Mode drop-down list, select Frequency range.

3 From the Transmitter file drop-down list, select the file you want to use.

4 Click Start Scan.

The scan starts and a progress bar is shown before results are displayed on the screen. For more information, refer to “Interpreting Scan Results” on page 40.

Note: The time required to scan all the frequencies listed in a complete transmitter file depends upon two factors: the number of entries, and the number of active frequencies discovered. The TVgateway requires approximately 5 seconds to tune to each frequency, and when a frequency is active, approximately 20 seconds to determine and store the details of the multiplex.

Basic Scan

A Basic scan provides the ability to individually scan individual frequencies listed in a transmitter file.

To scan a specific frequency:

1 Click Scan in the required Tuner menu to display the relevant Scan page.

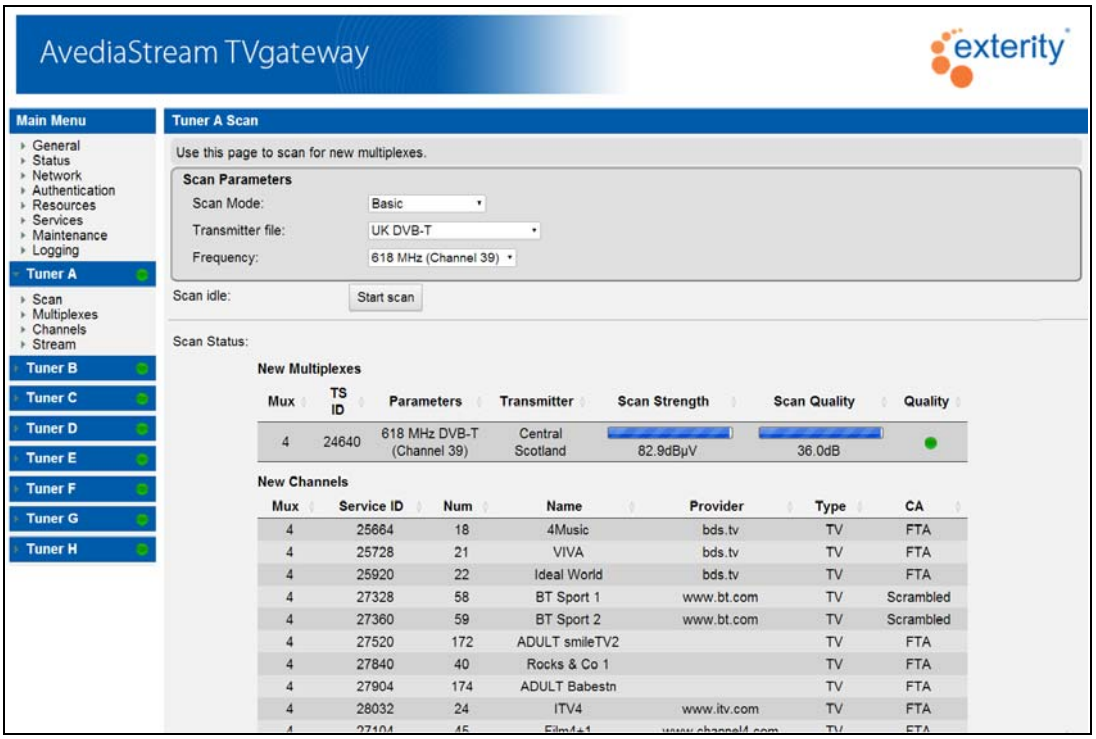


Figure 18 *TVgateway DVB-T terrestrial basic scan (AvediaStream g4448)*

2 From the Scan Mode drop-down list, select Basic.

3 From the Transmitter file drop-down list, select the file you want to use.

4 From the Frequency drop-down list, select the frequency/UHF channel number you want to scan.

5 Click Start Scan.

The scan starts and a progress bar is shown before results are displayed on the screen. For more information, refer to “Interpreting Scan Results” on page 40.

Advanced Scan

An advanced scan provides the ability to tune to a multiplex not listed in the transmitter files. If required you can configure specific values for each parameter, or leave at the default.

Note: You must use the advanced scan method for DVB-C/C2 signals.

To carry out an advanced scan:

1 Click Scan on the required tuner menu.

2 From the Scan Mode drop-down list, select Advanced.

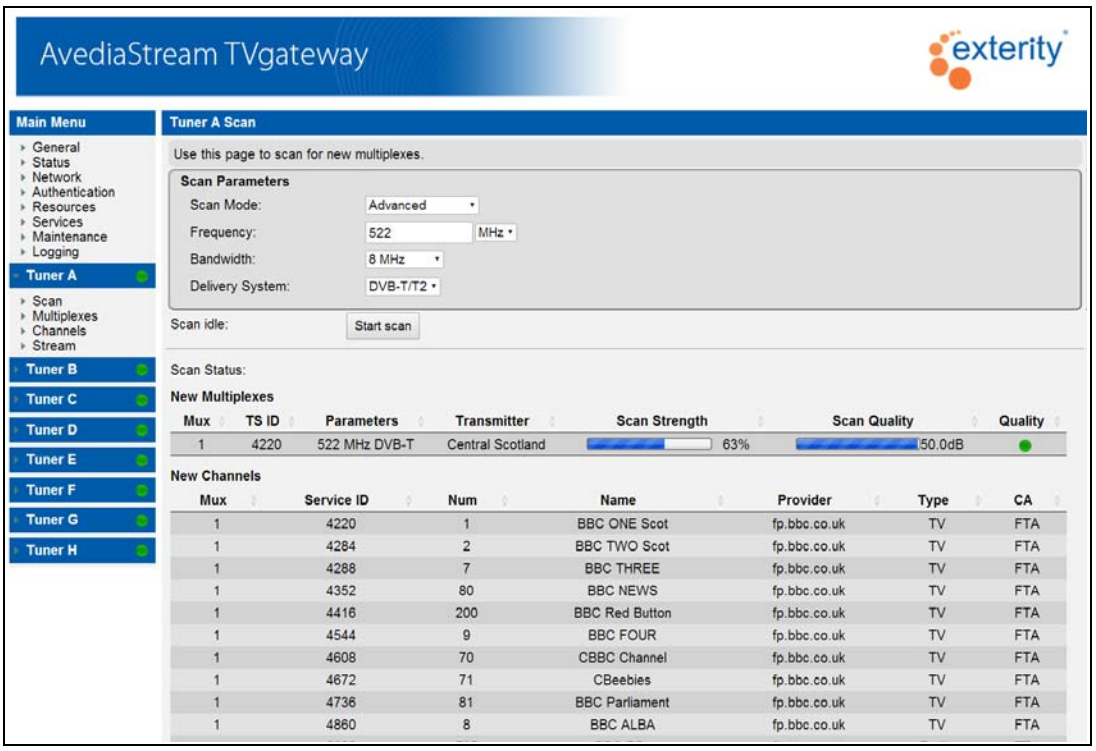


Figure 19 *TVgateway DVB-T terrestrial advanced scan (AvediaStream g4448)*

3 Enter the frequency, making sure to select the correct frequency units from the drop-down list.

4 Select a value from the Bandwidth drop-down list. The default is 8 MHz.

5 Select the delivery system: DVB-T, DVB-T2, DVB-T/T2, DVB-C or DVB-C2.

Note: The DVB-T/T2 option scans for both DVB-T and DVB-T2 multiplexes.

6 Click Start Scan.

The scan starts and a progress bar is shown before results are displayed on the screen. For more information, refer to “Interpreting Scan Results” on page 40.

7 Scanning DVB-S/S2 Satellite Channels

This chapter shows how to scan satellite sources for available channels.

Scanning Satellite Channels (DVB-S/S2)

In order to successfully receive and stream channels, the input signal level and quality must meet the requirements specified in Appendix C, "Recommended Signal Levels". There are two types of DVB-S/DVB-S2 scan:

- Basic Scan
- Advanced Scan

Basic Scan

The basic scan provides the ability to individually scan any frequency listed in a transmitter file for a specific satellite. The DVB-S/S2 TVgateways in their factory default condition are supplied with the following transmitter files, listed on the Resources page:

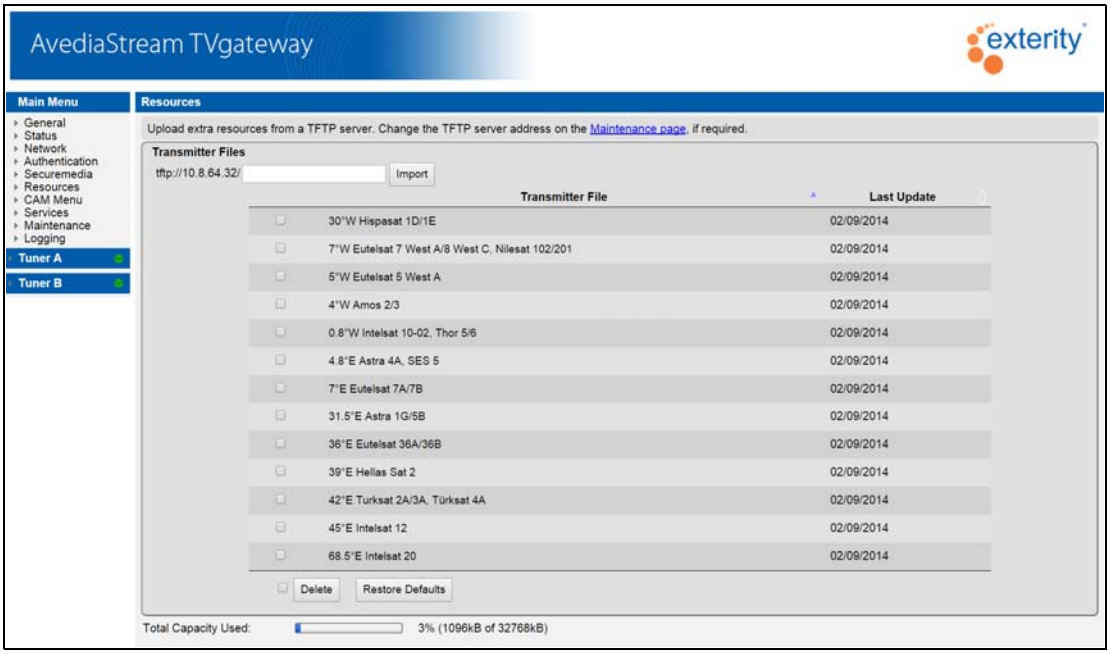


Figure 20 *Resources page (AvediaStream g4415-sm)*

If you cannot find a suitable configuration you can add additional transmitter files using the Transmitter Files import function on the Resources page (see “Managing Transmitter Files” on page 42). See Appendix F, "Transmitter File Format" for file format information.

To scan a frequency on a particular satellite:

1 Click Scan in the required Tuner menu to display the Tuner Scan page.

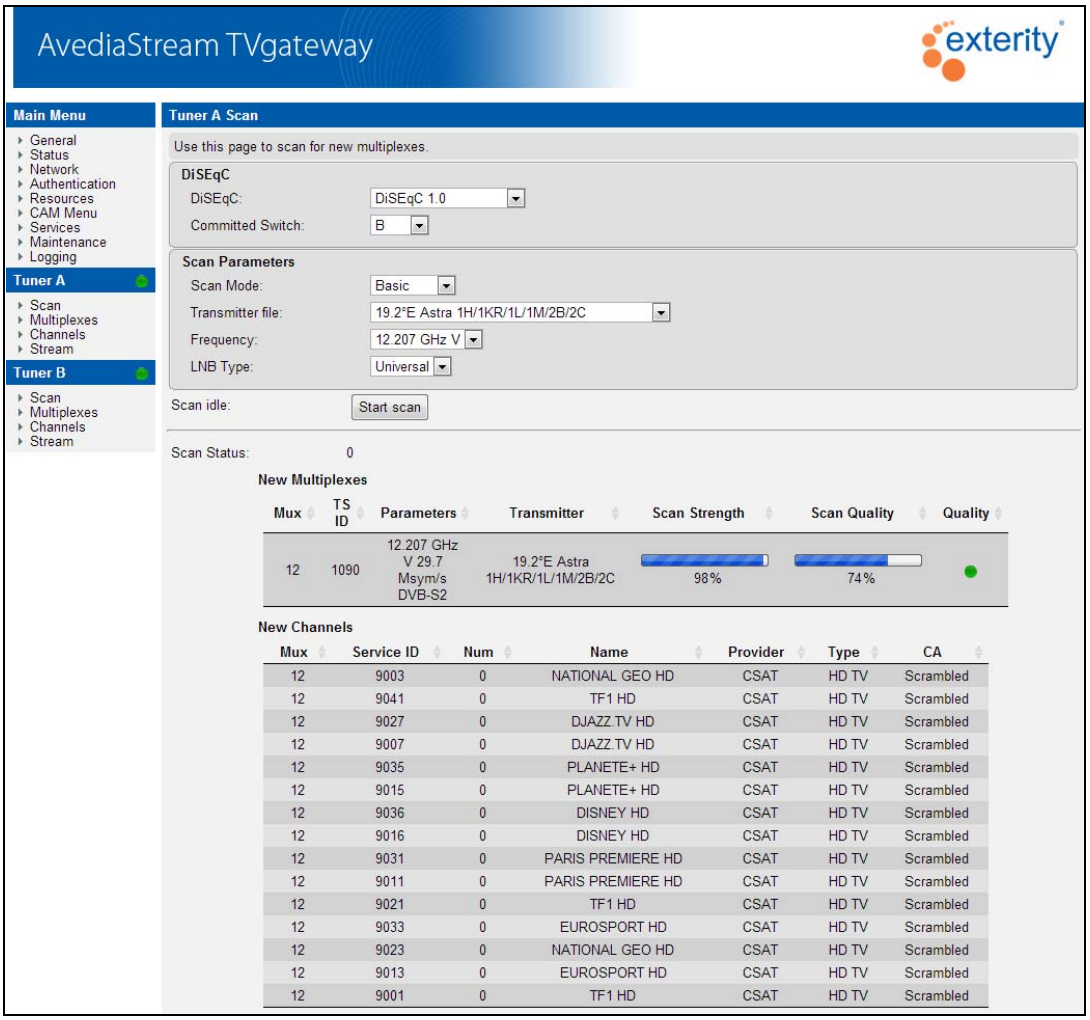


Figure 21 *TVgateway satellite scan*

2 Select the required version from the DiSEqC drop-down list. If None is selected, no further DiSEqC configuration is required.

3 Select the required DiSEqC switch position from the Committed Switch drop-down list.

For detailed configuration of the DiSEqC settings refer to “Configuring the DiSEqC Switch Position” on page 38.

4 From the Scan Mode drop-down list, select Basic.

5 From the Transmitter file drop-down list, select a satellite.

6 Select the required RF frequency and polarization from the Scan Frequency drop-down list.

7 Select the installed LNB type from the LNB Type drop-down list. (The default is Universal, the most commonly used.)

Note: Tool-tips show the Local Oscillator (LO) frequency used for each LNB type when you place your cursor over each LNB Type in the drop-down list (as shown in Figure 22).

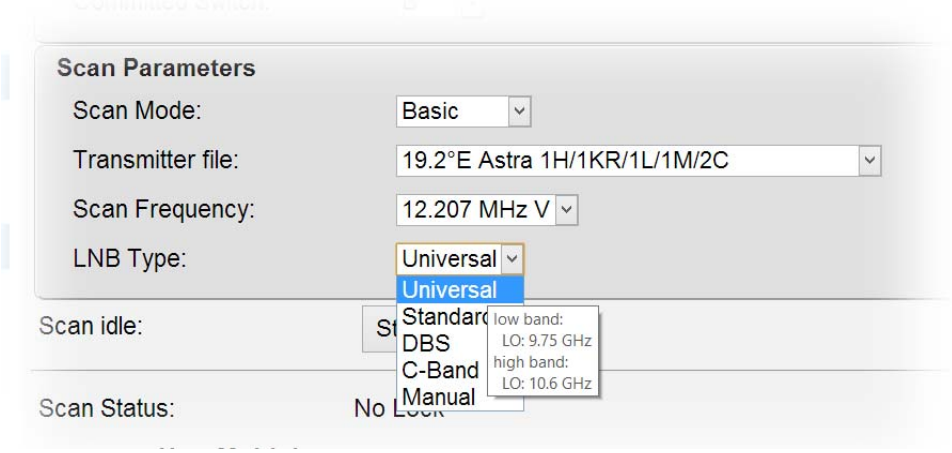


Figure 22 *Local oscillator frequency*

8 Click Start Scan.

The scan starts and a progress bar is shown before results are displayed on the screen. For more information, refer to Chapter 8, "Interpreting Scan Results" on page 35.

Advanced Scan

The advanced scan provides the ability to scan a multiplex not listed in the transmitter files. In order to carry out such a scan, the following information is required: frequency, polarization, symbol rate, delivery system and LNB type.

To carry out an advanced scan:

1 Click Scan on the required tuner menu.

2 Select the DiSEqC switch position from the DiSEqC drop-down menu. (For more information, refer to “Configuring the DiSEqC Switch Position” on page 38.

3 From the Scan Mode drop-down list, select Advanced.

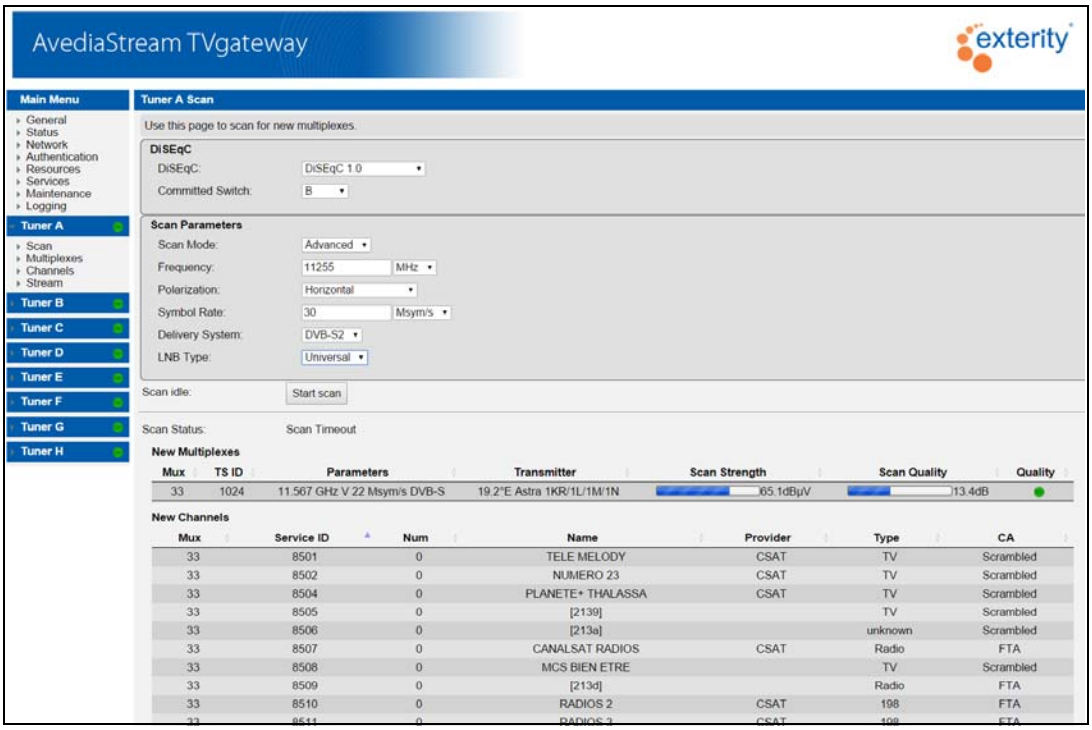


Figure 23 *Advanced satellite scan (AvediaStream g4418)*

4 Enter the frequency in the Frequency field, making sure to select the correct units from the drop-down list.

5 Select an option from the Polarization drop-down list.

6 Enter the symbol rate in the Symbol Rate field, making sure to select the correct units from the drop-down list.

7 Select DVB-S or DVB-S2 from the Delivery System drop-down list.

8 Select the LNB type. If required select Manual and configure as described in "Specifying LNB Parameters" on page 39.

9 Click Start Scan.

The scan starts and a progress bar is shown before results are displayed on the screen. For more information, refer to "Interpreting Scan Results" on page 40.

Configuring the DiSEqC Switch Position

DiSEqC (Digital Satellite Equipment Control) is a communication protocol used by satellite reception devices. It enables the reception device to select specific signal paths from multiple LNBs and provides position control of steerable dishes.

If the satellite equipment is connected to the TVgateway through a DiSEqC switch, it is necessary to configure the required input prior to starting a scan. To do this use the DiSEqC settings on the Scan page.

Configuration of the DiSEqC settings is common to all types of satellite scan described above.

Note: If the satellite equipment is not connected through a DiSEqC switch, the DiSEqC version described in the following procedure should be left at the default value of 'None'.

All Exterity TVgateways support the versions of DiSEqC listed in Table 1.

Table 1 DiSEqC version details

DiSEqC version	Description
1.0	Enables switching between up to four satellite sources on a committed switch.
1.1	Adds to 1.0 the ability to switch between up to 16 satellite sources on an uncommitted switch. Uncommitted switches can also be daisy-chained from committed switches.
1.2	Adds to 1.1 the ability to steer a motorized dish to a stored position number.
1.1 + Goto X	Adds to 1.1 the ability to steer a motorized dish to a satellite at a particular longitude.

Note: DiSEqC 2.x switches are backwards-compatible with DiSEqC 1.x satellite receivers. The TVgateway can therefore operate with DiSEqC 2.x switches.

Note: Motorized dishes require some time to move to a new position therefore more than 30 seconds may elapse before a scan starts if one of the motorized position options is selected.

To configure the DiSEqC settings before starting a scan, follow the instructions below.

To select the required satellite input using DiSEqC 1.0:

1 Select DiSEqC 1.0 from the DiSEqC drop-down menu.

2 Select a switch (A, B, C, D or None) from the DiSEqC committed switch drop-down menu.

Note: The DiSEqC switch inputs may be numbered rather than lettered. In this case, position A would correspond to the lowest numbered position. For example, if the switch is labeled with positions 0 – 3, position A corresponds to position 0, position B to position 1, and so on.

To select the required satellite input using DiSEqC 1.1:

1 Select DiSEqC 1.1 from the DiSEqC drop-down menu.

2 Select a committed switch position as for DiSEqC 1.0 if required.

3 Select a switch (1 to 16 or None) from the DiSEqC uncommitted switch drop-down menu.

To steer a motorized dish to a particular longitude using DiSEqC 1.1 + Goto X:

1 Select DiSEqC 1.1 + Goto X from the DiSEqC drop-down menu.

2 Select committed and non-committed switch positions as for DiSEqC 1.0 and 1.1, if required.

3 Enter the geographic coordinates of the satellite dish location in the Ground Station fields.

4 Enter the satellite longitude position in the Satellite Longitude field.

Note: The geographic coordinates are required in order for the TVgateway to calculate the correct angle offsets for the dish. It is up to the administrator to make sure that it is possible to receive the signal from the required satellite from this location and using this dish.

To steer a motorized dish to a stored position using DiSEqC 1.2:

1 Select DiSEqC 1.2 from the DiSEqC drop-down menu.

2 Select committed and non-committed switch positions as for DiSEqC 1.0 and 1.1, if required.

3 Enter the required position number as specified by the satellite installer in the Stored Position # field.

Specifying LNB Parameters

The TVgateway assumes the LNB Local Oscillator frequency as shown in the table below for the type of LNB specified:

LNB Type	LO Frequency (GHz)	Transmission Frequency (GHz)
Universal	9.75	<11.7
	10.6	>11.7
Standard	10.75	—
DBS	11.25	—
C-Band	5.15	—

If a different type of LNB is used, you can manually configure the Local Oscillator frequency.

For a Universal LNB, the TVgateway selects the LO frequency by disabling/enabling a 22kHz tone to the LNB for transmission frequencies below/above 11.7GHz respectively. Again, this can be manually configured.

To specify the LNB LO frequency:

1 Select the LNB in use from the LNB Type drop-down list. To specify the LNB local oscillator frequency:

   a. Choose Manual from the LNB Type drop-down list.

   b. Enter the frequency in kHz in the LNB Osc Freq field.

   c. Specify Off (low band) or On (high band) to specify the use of the 22kHz tone from the 22kHz tone drop-down list.

2 If the configuration is complete, click Start Scan.

Refer to Chapter 8, "Interpreting Scan Results" to review the Multiplex and Channels Lists.

8 Interpreting Scan Results

The scan process produces the details of the discovered multiplex(es), including the frequency and other details used in scanning. If the scan of a frequency was successful, the mux and channel information is listed. If unsuccessful, a Scan Status of "No Lock" is displayed.

The Scan Status displays the following states:

- **Tuning** – The TVgateway tuner is tuning to the specified scan frequency.
- **Tuner Locked** – The TVgateway tuner has found and is locked to the specified scan frequency.
- **Scan Complete** – The TVgateway has completed the scan of the specified frequency and the multiplex and channel details are listed.
- **No Lock** – The TVgateway tuner has been unable to locate a signal at the specified frequency.
- **Scan timed out** – No data has been received from the tuner.

Examples of successful satellite frequency/polarization and terrestrial scans are shown below:

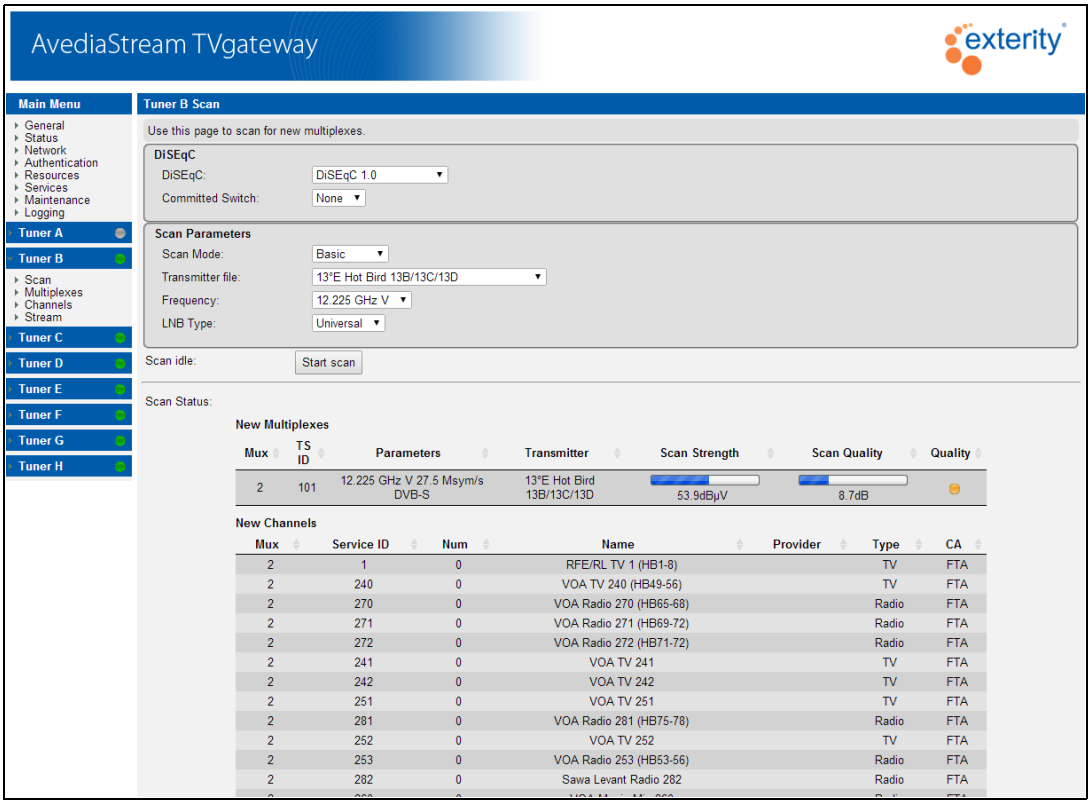


Figure 24 *Successful satellite scan results (AvediaStream g4418)*

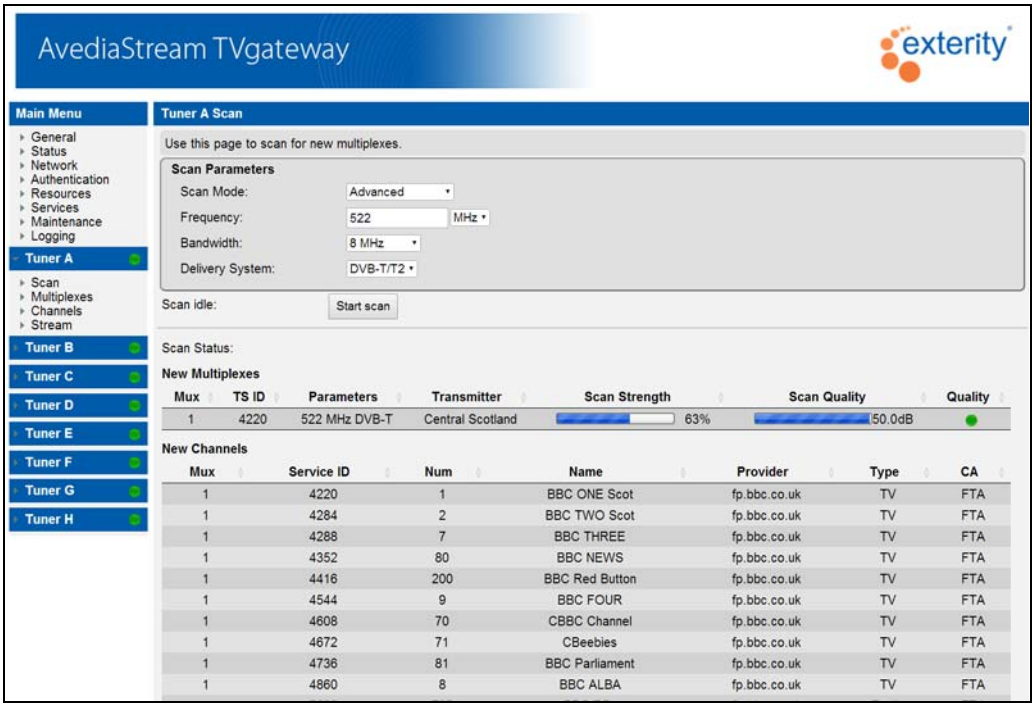


Figure 25 *Successful terrestrial scan results (AvediaStream g4448)*

Summary information about the scanned multiplex and its channel content is displayed as shown in Figure 24.

New Multiplexes

The New Multiplexes section displays the following information:

Mux Number	On completion of a successful scan the detected multiplex is assigned a value by the TVgateway (in sequence) and added to the list on the Multiplexes page.
TS ID	Displays the identification of the multiplex as assigned by the broadcaster.
Parameters	Displays the multiplex frequency and delivery system polarization (if applicable), and symbol rate.
Transmitter	Displays the transmitter/transmitter family name, if available.
Scan Strength	Signal strength at the time of the scan.
Scan Quality	Signal quality at the time of the scan.
Quality	Green or orange indicate that the signal is good enough to stream; red indicates that the signal is not strong enough.

New Channels

The channel content for the New Multiplex is listed and the following information is displayed:

Mux Number	On completion of a successful scan, the detected multiplex is assigned a value by the TVgateway (in sequence) and added to the list on the Multiplexes page.	
Service ID	The identification of the channel as assigned by the broadcaster.	
Num –	The channel number assigned by the broadcaster. If none is available, 0 is displayed.	
Name	The channel name assigned by the broadcaster.	
Provider	The service provider name.	
Type	The type of channel content detected, for example:	TV/Radio/HD TV/Data

CA	The Conditional Access status of the channel:	**FTA**, indicating Free to Air: Scrambled: g4410/g4418/g4448 - indicates that the channel is encrypted (and cannot be decrypted by the TVgateway). g4415-sm - indicates that a CAM Module, access card and SecureMedia server are required. g4412/g4442 - indicates that a CAM Module and access card are required.

Managing Transmitter Files

The TVgateway is supplied with transmitter information files for commonly used terrestrial and satellite sources. These files list the frequencies in use on the particular transmitter and allow for straightforward scanning of the available channels.

You can upload additional configuration files for additional satellites to the TVgateway. These files may be supplied to you by your Exterity reseller. The format of these files is shown in Appendix F, "Transmitter File Format".

The TVgateway uses TFTP to acquire transmitter files, so the new transmitter file must be hosted on a TFTP server for the TVgateway to be able to download it. For more information, refer to “Specifying the TFTP Server’s Address” on page 67.

The transmitter files are managed from the Resources page on the Web Management Interface (see Figure 28).

Viewing the Contents of a Transmitter File

You can view the details of each installed transmitter file on the Web Interface. To view transmitter file details:

1 Click Resources to display the list of installed transmitter files:

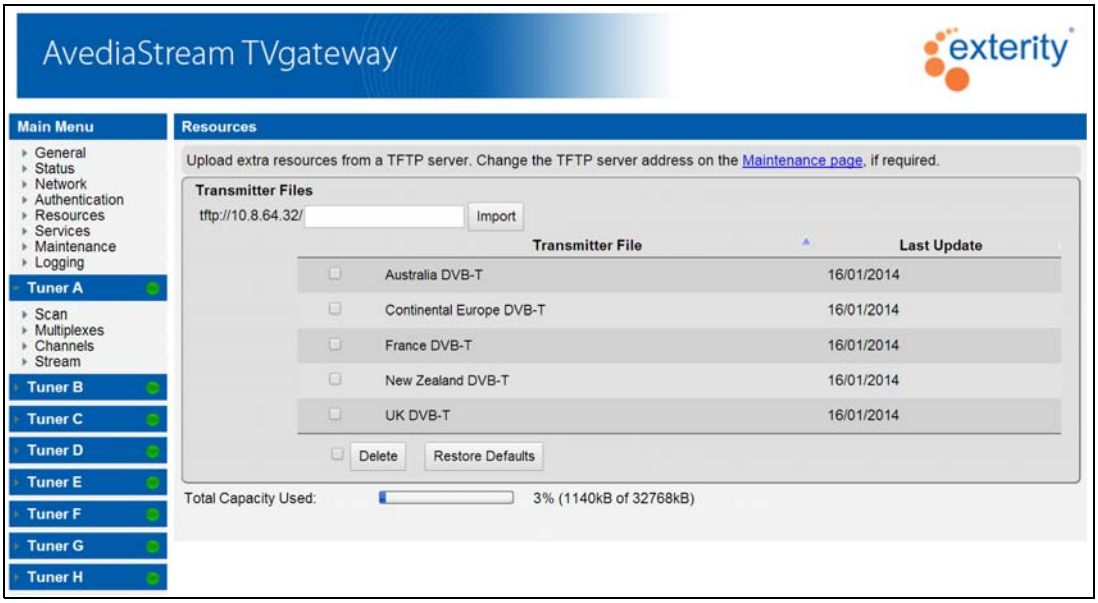


Figure 26 *Resources page (AvediaStream g4448)*

2 Click the name of the transmitter file you want to examine.

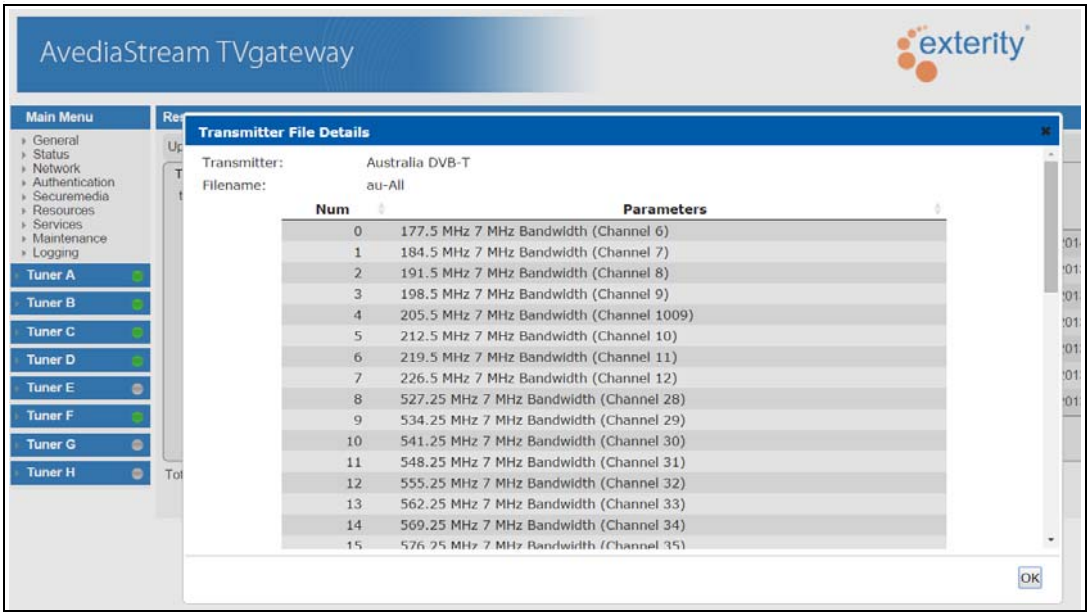


Figure 27 *Transmitter file details (AvediaStream g4448)*

3 Click OK to close the window.

Adding/Deleting Transmitter Files

To add a new transmitter file to the TVgateway:

1 Ensure that the TFTP server is running.

2 Ensure that the transmitter file is hosted correctly in the root directory of the TFTP server.

3 Click Resources.

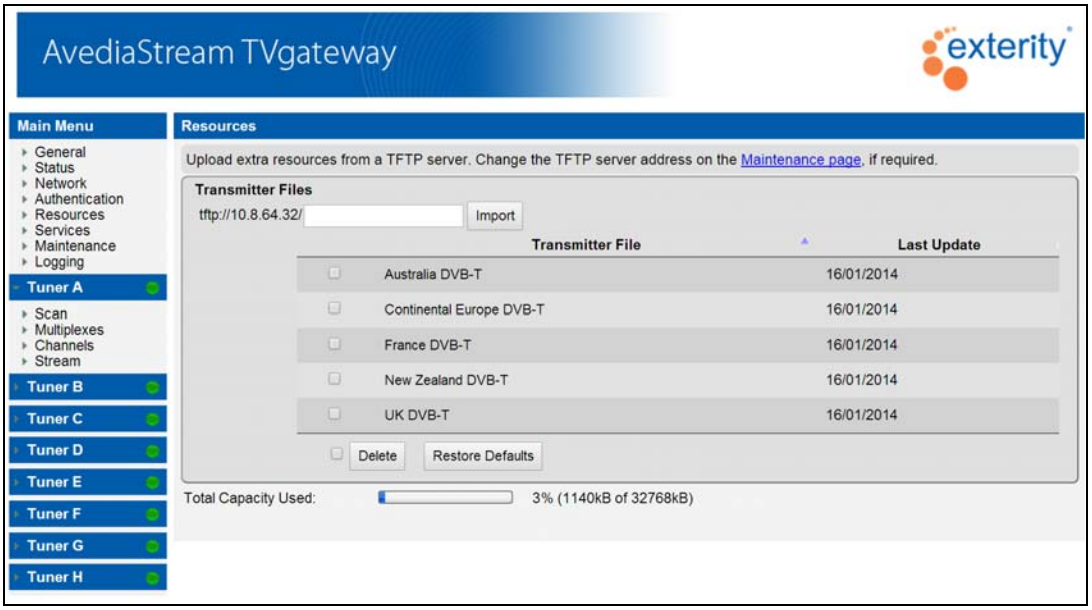


Figure 28 *Resources Page (AvediaStream g4448)*

4 Ensure that the correct TFTP Server address is shown. This is configured on the Maintenance page (see “Specifying the TFTP Server’s Address” on page 67 for more details).

5 Enter the name of the file in the Transmitter Files field.

6 Click Import.

The file is retrieved from the TFTP server and is available for use on the Scan page on completion of the upload.

To delete a transmitter file from the TVgateway:

1 Click Resources.

2 Click the box for each file you want to delete.

3 Click Delete.

To restore the factory default transmitter files:

1 Click Resources.

2 Click Restore Defaults.

9 Channel Configuration

This chapter contains the following sections:

- Selecting a Multiplex
- Checking the Channel List
- Selecting Channels for Streaming
- Advanced Channel Configuration

Overview

A successful scan results in a list of one or more multiplexes, and lists of channels for each scanned multiplex. From these lists you can select the channels to be streamed onto the network.

Use the Channels page to view all the channels. By default, channels are ordered by multiplex. To re-order the table, click any of the column headings. Any multiplex may contain a mix of TV, radio, and data channels. (Data channels do not carry normal audio-video streams but are typically used as control channels.) A tuner tunes to a specified frequency and can therefore stream all the channels in the multiplex at that frequency.

You can change the announced Channel Names and Numbers. More advanced channel editing allows you to enable/disable discrete elements. For example you can choose to enable or disable subtitles if they are a discrete part of the channel stream. Refer to "Advanced Channel Configuration" on page 48 for more information.

Selecting a Multiplex

Once you have identified the multiplex containing the channels you want to stream, you must select it as the active multiplex so that the TVgateway tunes to the correct frequency.

To select a multiplex:

1 Click Multiplexes on the required tuner.

2 Click the Active button for the required multiplex.

3 Click Set Active Multiplex.

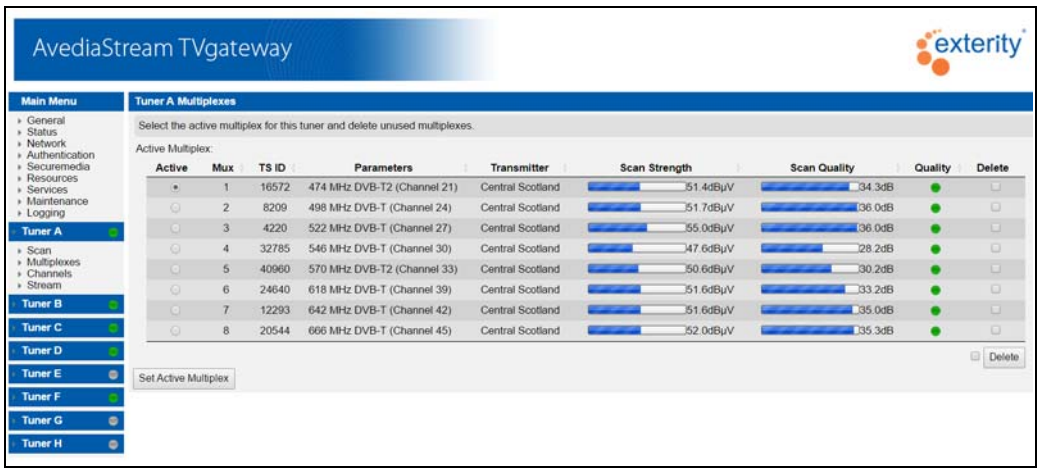


Figure 29 *Setting an active multiplex (AvediaStream g4448)*

To remove unwanted multiplexes from the table:

1 Select the respective Delete check box(es).

2 Click Delete.

Note: If you delete a multiplex, all associated channels are also deleted.

Checking the Channel List

This section describes the information displayed in the multiplex and channel lists, and explains how to select and configure the channels you want to stream. The channels discovered by the scan process are listed on a per-tuner basis. The View check boxes allow you to display only the types of channels required.

To see the channel list for a tuner:

1 In the required tuner menu, click Channels.

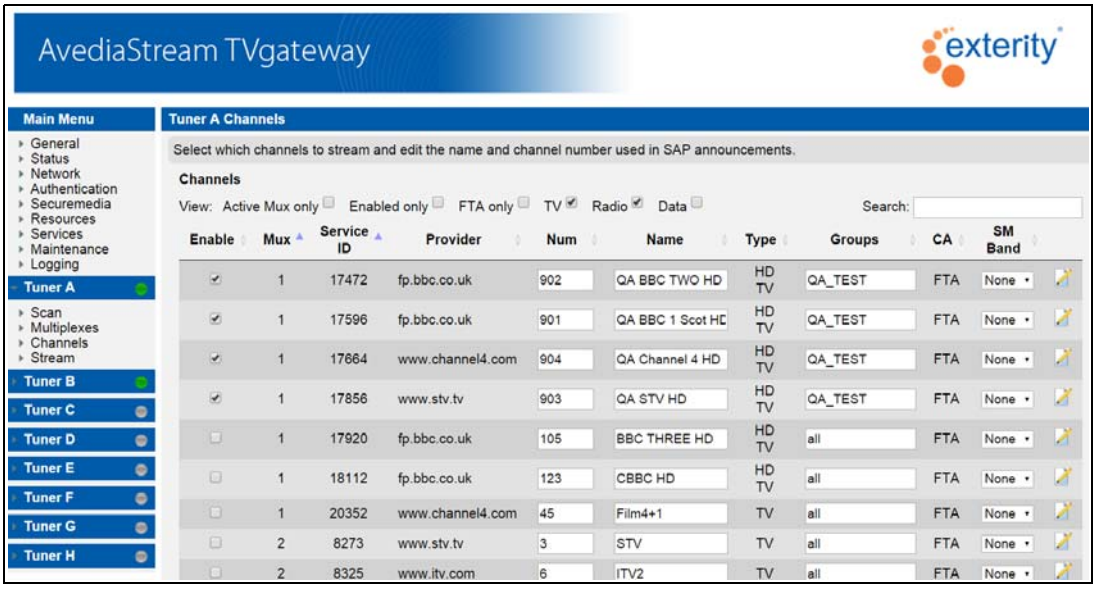


Figure 30 *Channels page (AvediaStream g4448)*

2 Select the View check boxes for the types of channels required. For example, click TV and Radio to list only TV and radio channels. Click the Active Mux only check box to list only the channels on the selected multiplex.

Note: The View check box selection is applied and saved in your browser; no configuration changes are applied to the TVgateway.

3 Click the headings to sort the list and help you to find the specific channels you want to stream. For example, click Name to sort the channels in alphabetical order. The information displayed is described in Table 2.

Table 2 Channels page details

Column	Description and Function
Enable	Click the check box to enable streaming of the selected channel. **Note**: To stream the specified channel you must set the respective multiplex as the active mux.
Mux	The reference number of the multiplex containing this channel. Click Mux to order the channels by multiplex number.
Service ID	The Service ID of the channel.
Provider	The service provider for the multiplex/channel.

Table 2 Channels page details

Column	Description and Function
Num	The channel number is displayed in the channel list on the Status page. This is the number displayed by AvediaPlayer Receivers, AvediaPlayer/Artio desktop clients, and the AvediaServer Channel Monitor application, and can be configured as required. The Channel number field may be pre-populated by the scan.
Name	The channel name. This is the name displayed by AvediaPlayer Receivers, AvediaPlayer/Artio desktop clients and the AvediaServer Channel Monitor application. The default name is that applied by the broadcaster. To change this name, click the name and edit the text field.
Type	The type of channel: TV, HD TV, Radio or Data.
Groups	Within the Exterity IPTV system a simple but powerful mechanism called *groups* is used to filter access to content available to receivers or computer based clients on the network. For example, you can configure a group of sports channels and a group of children's channels. Channels are assigned to group(s) by Exterity Encoders and TVgateways. The name is included as part of the SAP announcements and the groups mechanism allows Exterity Receivers and AvediaServer/Artio desktop clients to list only channels in a particular group or groups. The default value is "all", meaning that the channel is a member of all groups. To change the group membership for a channel, click the group name and edit the text field. Where required, enter more than one group name(s) in a comma-separated list. **Note:** Valid characters are: A-Z (upper case alphabet), a-z (lower case alphabet), 0-9, and _ (underscore)
CA	Indicates whether or not the channel is scrambled (encrypted). FTA indicates Free To Air with no restriction on streaming. When Scrambled is indicated, a SecureMedia server, CAM and access card are required to stream the channel (g4415-sm only). **Note:** Some broadcast multiplexes do not use the Conditional Access (CA) bit as expected, so this information is displayed as a hint only.
SM Band	(g4415-sm only) In order to stream a channel which is scrambled, select the required band from the drop-down list for the channels you want to encrypt and stream. These bands match those set up on the SecureMedia Broadcast Director, and are available only if the TVgateway has been registered with the Broadcast Director.
Decrypt	(g4412 and g4442 only) Select Decrypt to decrypt the encrypted channel using the CAM and stream it in the clear.
(Edit Channel)	The Edit Channel window allows you to configure advanced channel configuration settings such as more than one destination address and PID filtering. Refer to "Advanced Channel Configuration" on page 48 for more information.

Selecting Channels for Streaming

After filtering the list of channels to list only those you want to stream, check the Mux column on the Channels page. Identify the channels you want to stream from each tuner.

Selecting Channels

To select channels:

1 Click Channels on the required tuner.

2 Click the View: Active Mux only check box to list only the channels on the selected multiplex:

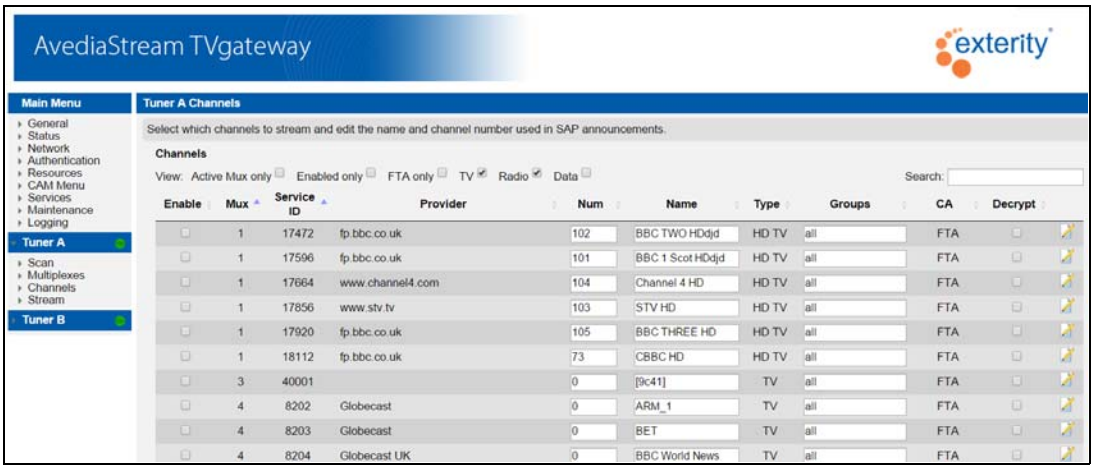


Figure 31 *Selecting channels (AvediaStream g4412)*

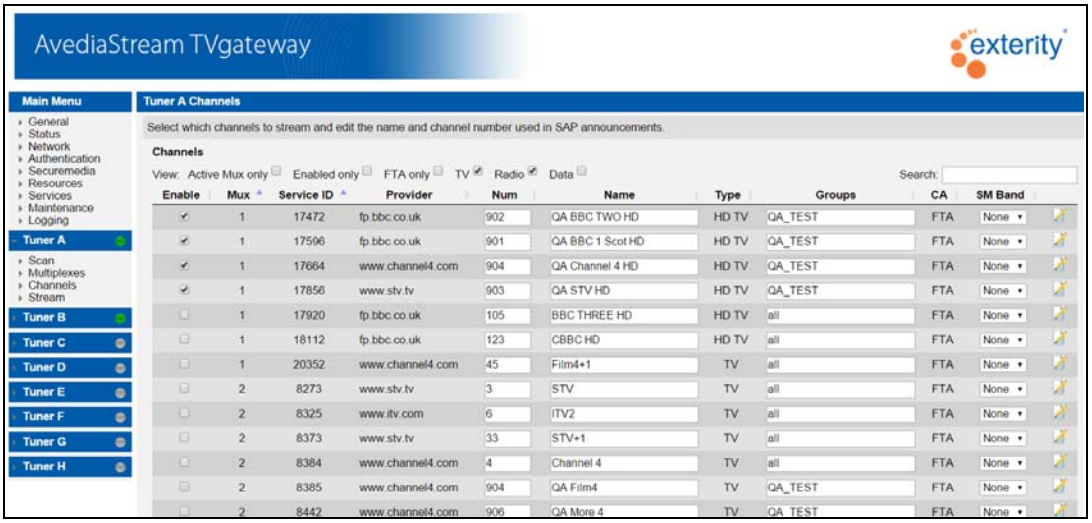


Figure 32 *Selecting channels (AvediaStream g4448)*

3 Click the Enabled only check box to display only the channels you have selected for streaming.

4 If required, change the Name and Number of any channel using the Name and Num fields.

5 If required, enter the group membership name(s) in the Groups field. Refer to Table 2 on page 46 for more information about Exterity groups.

To stream the selected channels onto the IPTV network refer to Chapter 10, "Streaming". Refer to “Advanced Channel Configuration” below for more information about advanced channel configuration such as PID filtering.

Advanced Channel Configuration

In most circumstances, the default streaming settings are suitable. However, if required, you can use the advanced channel configuration to:

- Manually configure parameters such as the multicast address. Each channel selected for streaming can be individually configured.
- Create and configure duplicate channels, allowing you to stream a multi-language channel as discrete single language channels, for example.

Specifying the channel content and meta data makes use of the Service Information (SI) and Program Specific Information (PSI) tables.

Note: When making changes in the Edit Channel window, click OK to close the window, then click Apply on the Channel page to save your settings.

This section contains the following information:

- Configuring the Stream Destination
- Using PID Filtering to Specify Channel Content
- Including More Service Information in the Stream

Configuring the Stream Destination

The TVgateway is configured to automatically assign a multicast address to each channel on a per tuner basis. (Details of this can be found in Appendix E, "Assigning Multicast Addresses".)

Alternatively, you can manually set a multicast address for each channel, which overrides the automatic setting. If you do this, ensure the address you specify for each channel is unique for the network.

Note: If you manually specify a multicast address, you must also specify the port number. If you do not do this, the entered multicast address is ignored and the default address used instead.

You can enter multiple addresses separated by commas, as shown in Figure 34.

You can manually configure a different multicast address, or one or more unicast addresses. When streaming to unicast addresses, you may also want to disable SAP announcement of the channel.

Note: To globally disable SAP announcements, deselect the SAP Service check box on the Services page.

To configure the channel address:

1 Configure each channel required for streaming as described in “Selecting Channels for Streaming” on page 47.

2 Click  for the channel you want to configure to open the Edit Channel window.

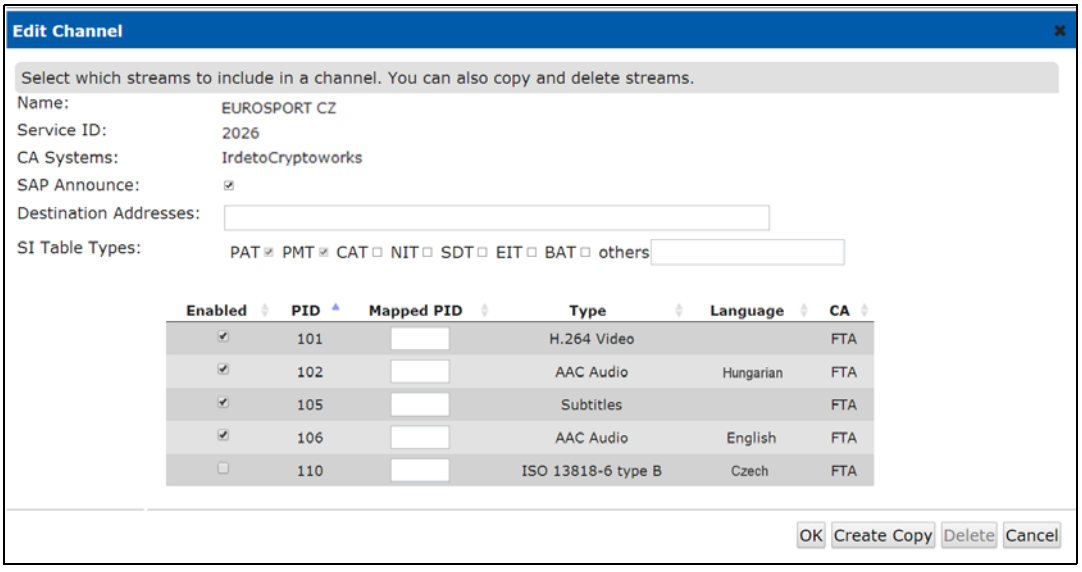


Figure 33 *Edit Channel Window*

3 To disable SAP announcement of the channel, deselect the SAP Announce check box.

4 Specify the Destination Addresses. If left blank, the default multicast address and port are used.

Caution: Please be aware that entering multiple addresses creates multiple streams which increases bandwidth usage.

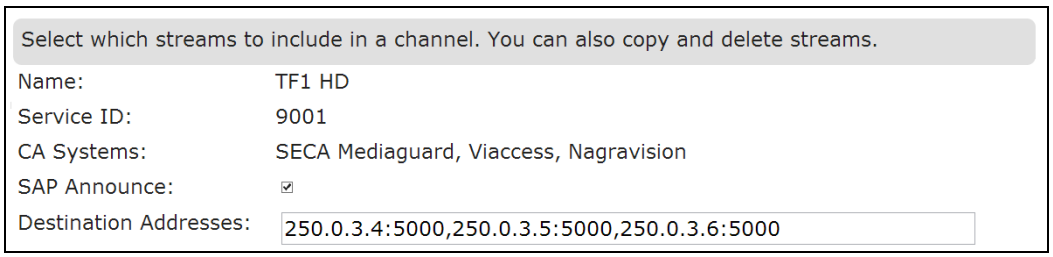


Figure 34 *Multiple stream destinations*

Using PID Filtering to Specify Channel Content

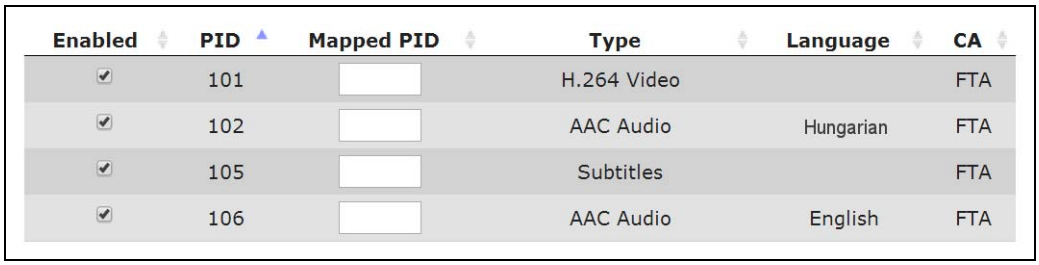
You can enable/disable specific elements of the transport stream if required. For example, a channel may contain multiple audio language and codec elements which are not required. Figure 33 on page 49 shows a channel with two audio elements, each for a different language.

To specify channel elements:

1 Configure each channel required for streaming as described in "Selecting Channels for Streaming" on page 47.

2 Click  for the channel you want to configure to open the Edit Channel window.

Note: The TVgateway automatically enables all video, audio, subtitle/closed caption and Teletext elements.



Enabled	PID	Mapped PID	Type	Language	CA
☑	101		H.264 Video		FTA
☑	102		AAC Audio	Hungarian	FTA
☑	105		Subtitles		FTA
☑	106		AAC Audio	English	FTA

Figure 35 *Automatically enabled channel elements*

3 Click the Enabled check boxes to enable each channel element you want to include in the stream.

4 If you require a particular number for the PID, enter this in the Mapped PID box. This is then used instead of the default PID for that element.

5 Click OK to close the window.

6 Click Apply to save your changes.

Including More Service Information in the Stream

You can allow additional service information to be included in a channel output stream. The Edit Channel window allows you to include commonly used information tables in the channel stream, such as the Conditional Access Table (CAT) and the Network Information Table (NIT). You can specify additional tables by entering their decimal value in the entry field (0-255). Note that the Program Association Table (PAT) and Program Map Table (PMT) are always enabled.

Including additional service information may be useful for processes subsequently applied to the channel after it is streamed. For example, if the channel is to be decrypted by an IPTV set-top box or player client, the CAT is most likely required.

To specify additional service information:

1 Configure each channel required for streaming as described in "Selecting Channels for Streaming" on page 47.

2 Click  for the channel you want to configure to open the Edit Channel window.

3 Click the check box for the additional SI table(s) you want to include in the stream. (For example, CAT and NIT.)

Figure 36 *Including additional SI elements*

4 Click OK to apply your changes.

Tip: To specify additional tables not available from the check boxes, you can enter the decimal value of the required table(s). Enter the table number and/or ranges separated by commas. For example 4,7,100-104:

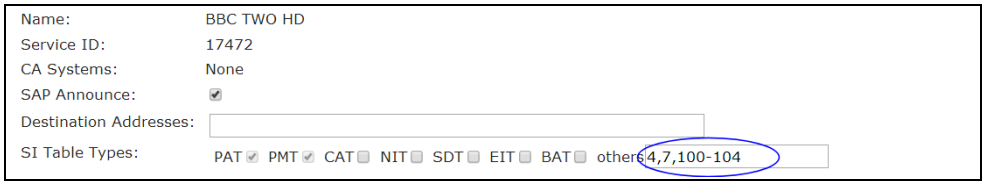


Figure 37 *Entering additional table numbers*

5 Click OK to close the window, then click Apply to save your changes.

Creating a Duplicate Channel

Creating duplicate channels enables you to stream more than one version of a channel, each containing different elements of the original stream. In the following example, a multi-language channel is copied and by individually enabling/disabling the audio PIDs, single language versions of the channel are created.

To create and configure duplicate channels:

1 Configure each channel required for streaming as described in “Selecting Channels for Streaming” on page 47.

2 Click  for the channel you want to configure to open the Edit Channel window.

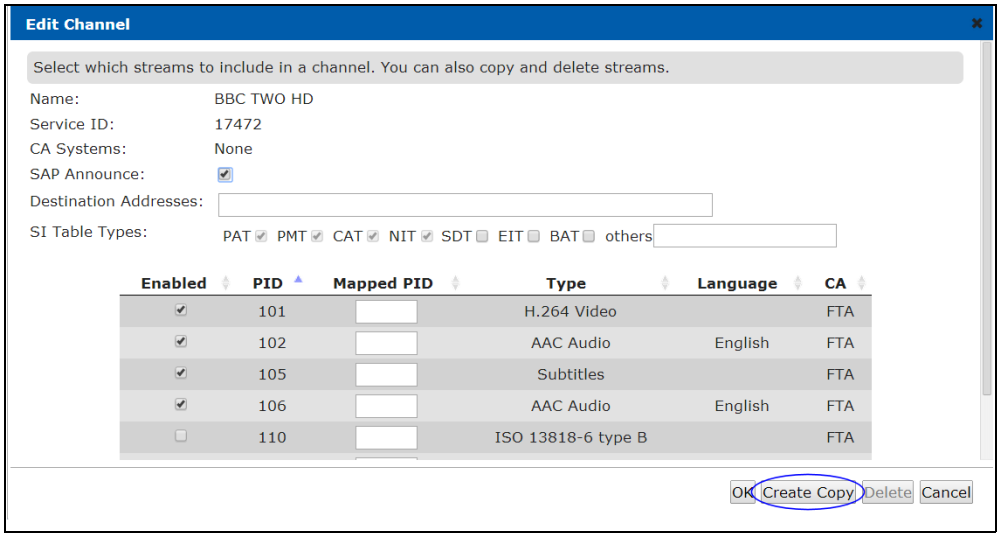


Figure 38 *Copying a channel*

3 Click Create Copy. The duplicate channel is added to the channel list.

4 Re-name the duplicate channel by clicking in the name field and editing the name, for example Euronews. Click Apply to save the new name.

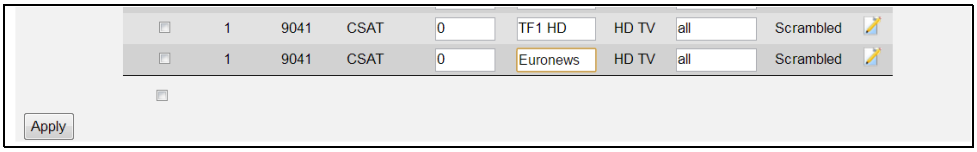


Figure 39 *Renaming a channel*

5 Click  for the new channel.

6 Deselect the Audio PIDs you do not want to include in this channel.

7 Click OK to save the changes.

8 Continue the process of copying the channel, re-naming and enabling the required content until you have configured all the required channels.

9 Stream the required channels by clicking the Enabled check boxes.

Duplicate channels can be deleted when required. You cannot delete the source channel listing.

To delete duplicate channels:

1 Click  for the duplicate channel you want to remove.

2 Click Delete.

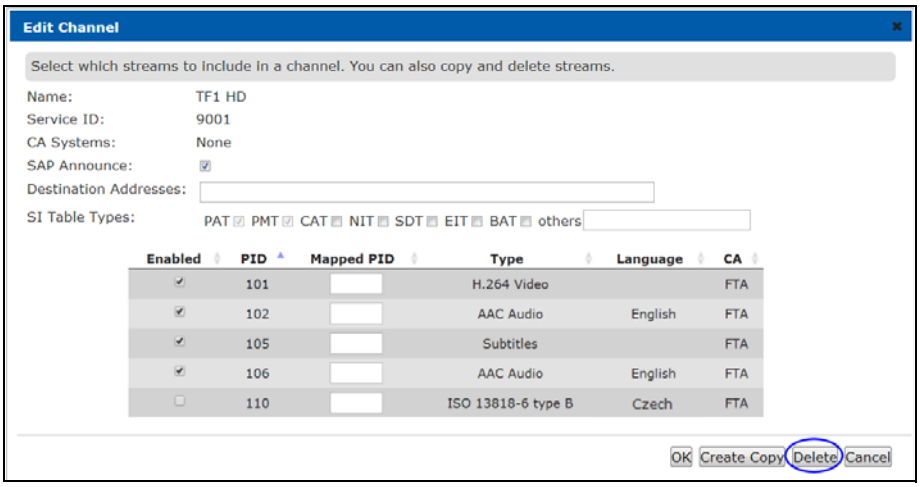


Figure 40 *Deleting duplicate channels*

10 Streaming

This chapter contains the following sections:

- Configuring Stream Settings
- Viewing Streaming Status
- Stream Configuration

Once you have scanned for channels and selected those required, you can stream the channels onto the IP network. Streaming is configured for each individual tuner. In most circumstances the default settings are suitable, but you can manually configure parameters such as the base IP address used for the multicast address assignment.

Caution: The g4418 and g4448 TVgateways can be configured to concurrently access multiple high bit rate channels, and are capable of streaming up to 500Mbps onto the network. Ensure your network architecture and devices are capable of handling these high data rates. Refer to the Transmit% Utilisation on the Network page to determine how much of the capacity of the Ethernet interface is being used for streaming TV channels.

You should also take the number of channels into account and ensure that you do not exceed the number of multicast groups the network can handle. For example, lower end switches and routers may only support 255 different multicast groups.

Configuring Stream Settings

This section shows you how to specify the basic streaming settings. It contains the following:

- Specifying the Startup Mode
- Starting/Stopping Streaming

Specifying the Startup Mode

By default the TVgateway streams on boot (startup). This enables a previously configured TVgateway to restart the channel streams after a power outage; however, you can disable this on a per-tuner basis. To configure startup mode for a tuner:

1 Click Stream in the required tuner menu.

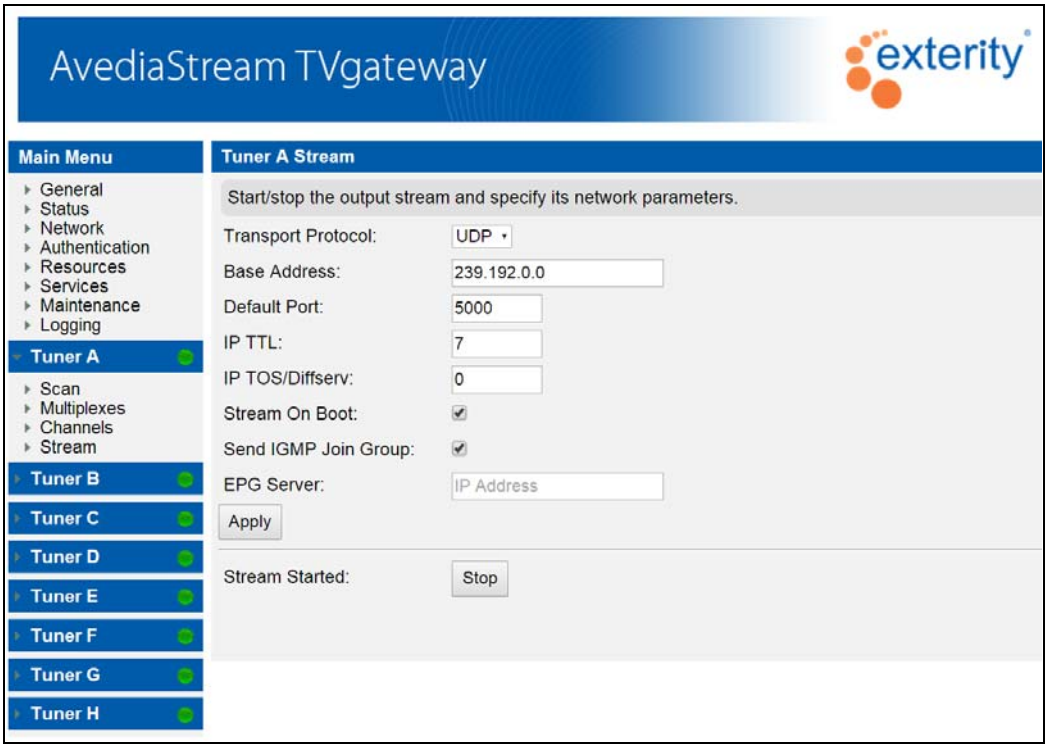


Figure 41 *Stream page (AvediaStream g4448)*

2 Click the Stream on Boot check box to disable or enable the stream on boot function.

3 Click Apply.

Starting/Stopping Streaming

Start/stop control of streaming is applied on a per-tuner basis. When the TVgateway has started streaming, the complete list of channels streaming is shown on the Status page.

To control streaming on a tuner:

1 Click Stream for the required tuner.

2 Click Start or Stop to start or stop all channels streamed from the tuner.

3 Repeat as required for each tuner.

Note: If a tuner is already streaming when you apply changes to the list of channels, you do not need to manually stop and restart channel streaming as the changes are made dynamically. However, if the tuner is not streaming, you must manually restart streaming after making changes.

Viewing Streaming Status

You can display the list of all channels streaming from the TVgateway on the Status page, as shown in Figure 42.

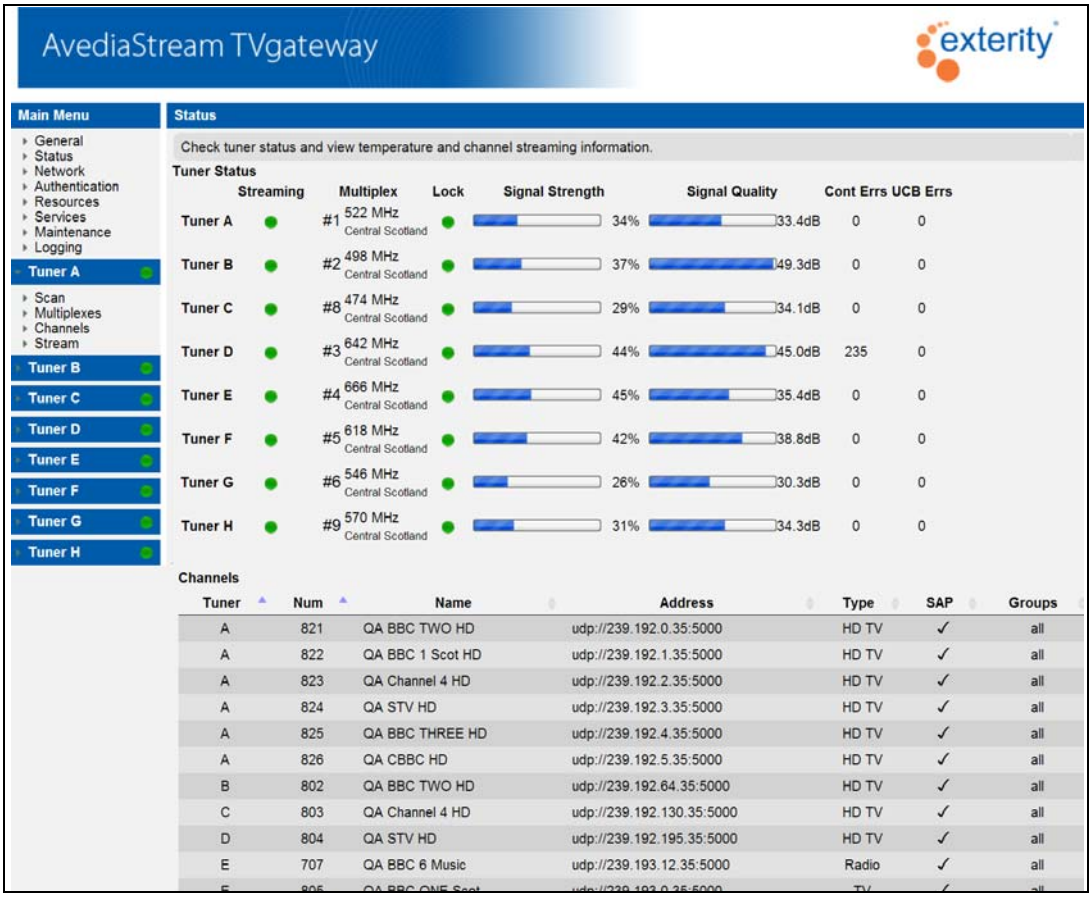


Figure 42 *Status Page (AvediaStream g4448)*

Table 3 Streaming channels information

Parameter	Description
Tuner	The tuner this channel is streaming from.
Num	The channel number as advertised in SAP announcements and displayed in the channel list on Exterity Receivers and clients.
Name	The channel name as advertised in SAP announcements and displayed in the channel list on Exterity Receivers and clients.
Address	The stream destination as a URI, in the format `<protocol>://<destination address>:<port>`. The protocol is udp or rtp. The destination address is the multicast or unicast destination IP address of the stream. The port is the destination UDP port number of the stream. If multiple destinations are configured for a channel, each is represented by an individual URI.
Type	Indicates the type of content (TV, HD TV Radio, Data).
SAP	Indicates the SAP announcement state of the channel. Note that the SAP setting on the Services page can globally enable/disable SAP announcements. If SAP is disabled, the SAP column is empty.
Groups	Lists the groups to which this channel belongs.
SM Band	(g4415-sm only) Indicates which SecureMedia band has been selected on the Channels page. These bands match those set up on the SecureMedia Broadcast Director, and are available only if the TVgateway has been registered with the Broadcast Director.

Note: Please see “Selecting Channels” on page 47 for information on how to change the channel name and number and to configure group membership.

Stream Configuration

This section explains how to apply stream settings. These mainly relate to the way the stream is transmitted on the network, such as the Transport Protocol. It contains the following:

- Selecting the Stream Protocol
- Specifying the Stream Base Address
- Specifying IP TTL (Time to Live)
- Specifying IP TOS/Diffserv
- IGMP Join Group
- Configuring the EPG Server Address

Selecting the Stream Protocol

Streams from the TVgateway are transmitted as MPEG transport streams using UDP or RTP protocols. UDP is the default. The RTP option is provided mainly as a network debugging tool, as the sequence number in the RTP header can help identify packet loss. RTP may also be required to enable interoperability with some third party products. To configure the stream type for a tuner:

1 Click Stream in the required tuner menu.

2 Choose UDP or RTP from the Transport Protocol drop-down list.

3 Click Apply.

4 Repeat as required for each tuner.

Specifying the Stream Base Address

The TVgateway automatically assigns unique multicast addresses for each channel, based on the configured base address. Details of the algorithm used can be found in Appendix E, "Assigning Multicast Addresses".

Note: Automatically assigned multicast addresses can be manually overridden on the Channels page.

Using the default base address 239.192.0.0 as an example, these automatic addresses will occupy the following address ranges (where 'y' represents the last octet of the TVgateway's IP address):

Tuner	From	To
A	239.192.0.y	239.192.63.y
B	239.192.64.y	239.192.127.y
C	239.192.128.y	239.192.191.y
D	239.192.192.y	239.192.255.y
E	239.193.0.y	239.193.63.y
F	239.193.64.y	239.193.127.y
G	239.193.128.y	239.193.191.y
H	239.193.192.y	239.193.255.y

Note: If a multiplex carries more than 64 channels the additional channels will require manual configuration.

To configure the base address:

1 Click Stream in the required tuner menu.

2 Enter the required base address, remembering that only the first 15 bits are relevant (refer to Appendix E, "Assigning Multicast Addresses").

3 Click Apply.

Specifying the Stream Destination Port Number

Streams transmitted by the TVgateway automatically use the destination UDP port number specified on the Stream page. The default value is 5000.

Note: The port number for each channel can be manually overridden on the Channels page.

To configure the stream destination port number:

1 Click Stream in the required tuner menu.

2 Enter the new value in the Default Port field and click Apply.

3 Repeat as required for each tuner.

Note: These settings are ignored if you have specified destinations in the Channels page. Refer to "Advanced Channel Configuration" on page 48 for more information.

Specifying IP TTL (Time to Live)

By default, all streams are transmitted with an IP TTL of 7. The TTL can be set to any value between 0 and 255 to allow operation across different network topologies.

Note: This TTL value applies only to channel streams. The TTL for SAP announcements can also be configured using a hidden configuration option. Details are available on request.

To specify the IP TTL:

1 Click Stream.

2 Enter a value between 0 and 255 in the IP TTL field.

3 Click Apply.

Specifying IP TOS/Diffserv

You can set the value of the TOS byte in the IP header. By default, the stream is sent with an IP TOS value of 0. Note that the value can be set between 0 and 255. To configure only a Differentiated Services Code Point (DSCP), only the upper six bits are required, with the two lower Explicit Congestion Notification bits (ECN) set to zero.

0	1	2	3	4	5	6	7	Decimal Value
DCSP Value						ECN		
0	0	0	0	0	1	0	0	4

For example, as shown here, to specify a DCSP (decimal) value of 1 you must left shift the binary value by 2 bits and enter a value of 4 in the IP TOS/Diffserv entry field. Refer to RFC 2474 for more detailed information. To specify the IP TOS/Diffserv:

1 Click Stream.

2 Enter a value between 0 and 255 in the IP TOS box.

3 Click Apply.

Stream on Boot

When this option is selected, the TVgateway automatically starts to stream on startup (assuming it has been previously configured to do so, and the RF feed is connected) and restarts the channel streams after an event such as a power outage. Deselect this if you do not want the streams to start immediately on boot. Stream on boot is enabled by default.

To specify the stream on boot setting:

1 Click Stream.

2 Select or deselect the Stream On Boot box as required.

3 Click Apply.

IGMP Join Group

By default, the TVgateway uses IGMP to join the multicast groups for its own streams. This can be essential to prevent flooding on some network switches.

If required, deselect the check box to disable this function.

To specify the IGMP Join Group setting:

1 Click Stream.

2 Select or deselect the Send IGMP Join Group box as required.

3 Click Apply.

Configuring the EPG Server Address

If you have an AvediaServer EPG Server application running on the IPTV network, specify its IP address here. The TVgateway sends EPG information for all streaming channels to this EPG server. The function is disabled when no address is entered. This can be configured on a per-tuner basis.

To configure the EPG server address:

1 Click Stream in the required tuner menu.

2 Enter the AvediaServer's IP address in the EPG Server field.

3 Click Apply.

4 Repeat as required for each tuner.

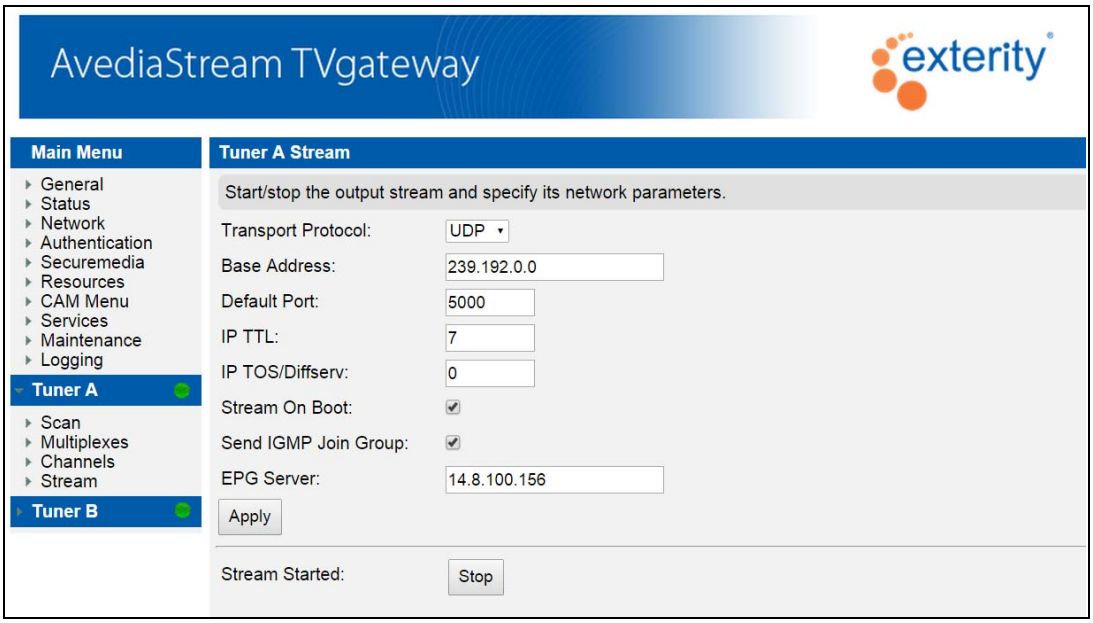


Figure 43 *Configuring Base and EPG Server addresses (AvediaStream g4415-sm)*

Section 3 - Maintenance

This section contains information on how to:

- Check the operating status of the TVgateway
- Carry out various maintenance tasks, such as importing/exporting configuration and restarting the device
- Upload extra resources from a TFTP server
- Create log files of device activity

11 Status Monitoring

This section explains how to check the operating status of the TVgateway. It contains the following sections:

- Viewing TVgateway Details
- Viewing Operating Status
- Warning Messages
- Viewing Network Statistics
- Viewing CAM Status

Viewing TVgateway Details

Click General to display the TVgateway General page, as shown in Figure 44.

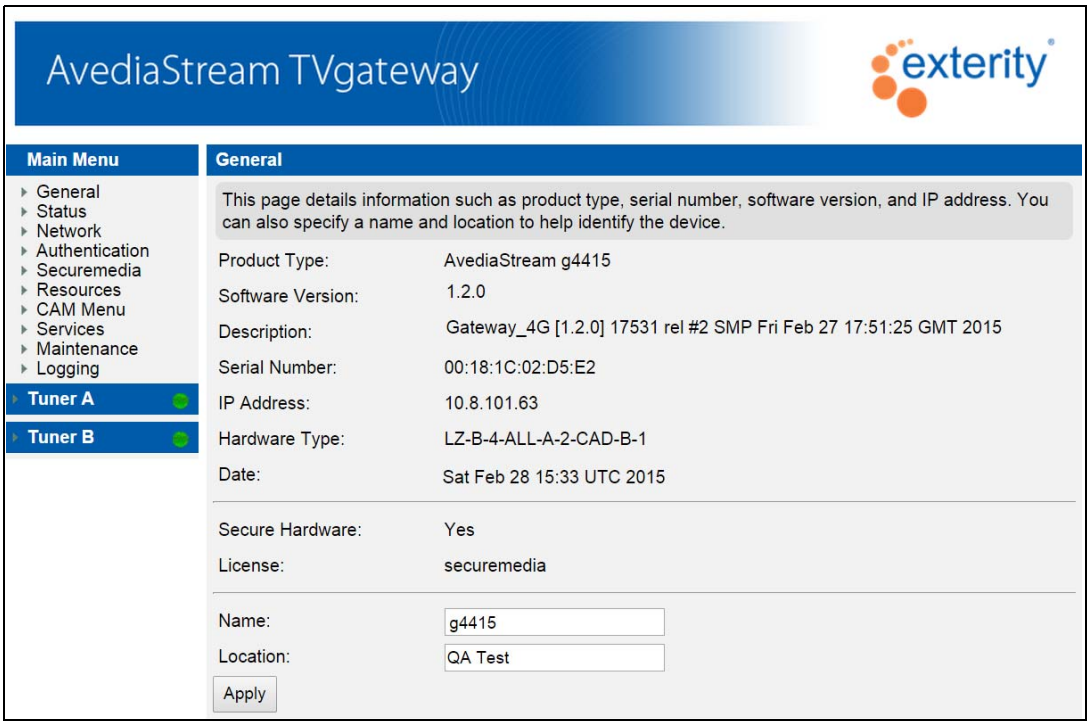


Figure 44 *TVgateway General Page (AvediaStream g4415-sm)*

For details of each item, please see "About the TVgateway" on page 18. This information is useful for identifying the software and hardware revisions in use on this device. If contacting technical support regarding a problem with the device, it can be useful to provide all this information.

Viewing Operating Status

The TVgateway reports on the status of the tuners on a per-tuner basis. The streaming status of the tuner is reported, as well as a number of statistics that represent the quality of the input RF signal.

Note: Status information is refreshed automatically.

To view details of the operating status of the TVgateway, click Status to display the page as shown in Figure 45.

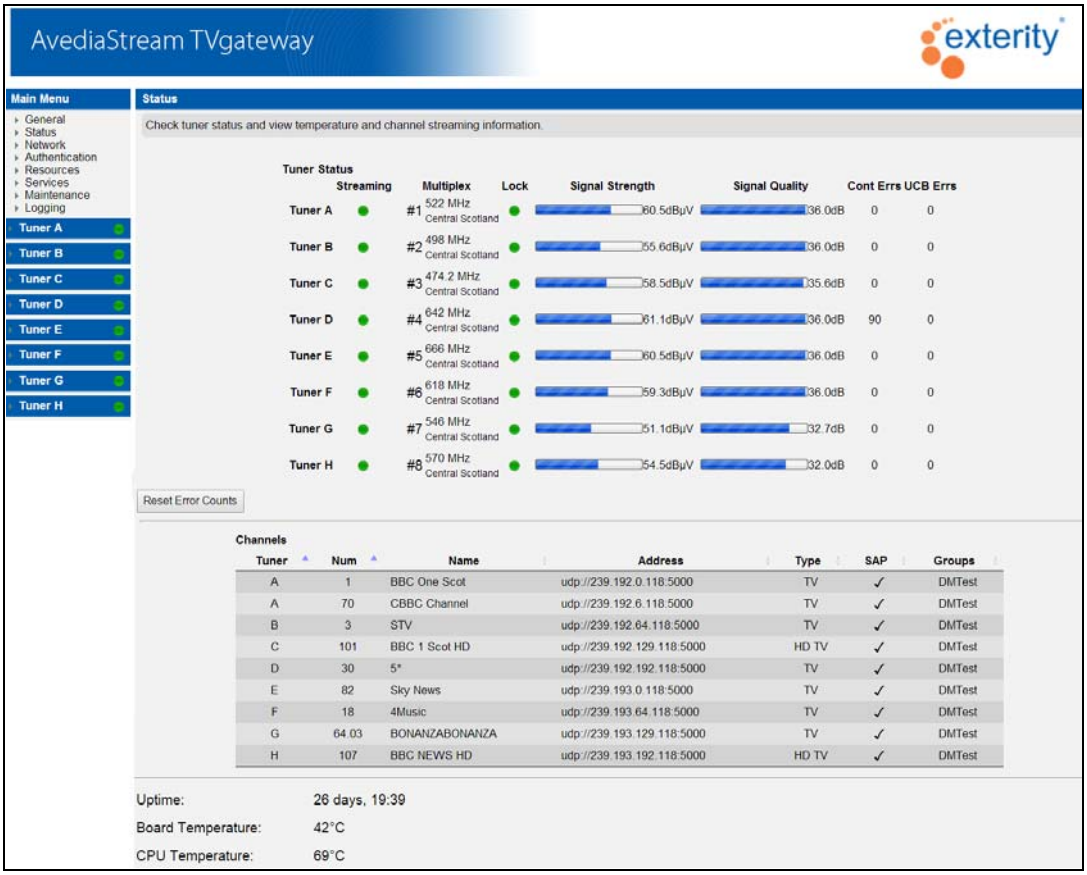


Figure 45 *TVgateway Status Page (AvediaStream g4448)*

The operating status information can be found in three locations:

- **Main Menu**

  On the left side of the Status page operational status is summarized for each tuner using simple traffic light indicators in the tuner name label. The indicators are visible at all times. Refer to Table 4 on page 64 for more information.

- **Tuner Status**

  The Tuner Status section of the page displays more details about each tuner, including indicators for streaming status and signal, signal strength and quality information, and summary information about the selected multiplex and each channel currently streaming. Refer to Table 4 on page 64 for more information about the traffic light indicators.

- **Rear Panel**

  Each tuner has its own LED on the rear panel, which provides information about the TVgateway's operational status. Refer to Table 4 on page 64 for more information.

Warning Messages

CPU and Temperature Status

These details are found on the Status page. The TVgateway alerts you if there are changes in CPU fan activity, for example, if the fan speed drops, or if the temperature starts to rise. The uptime is also indicated. This is the length of time since the device was restarted.

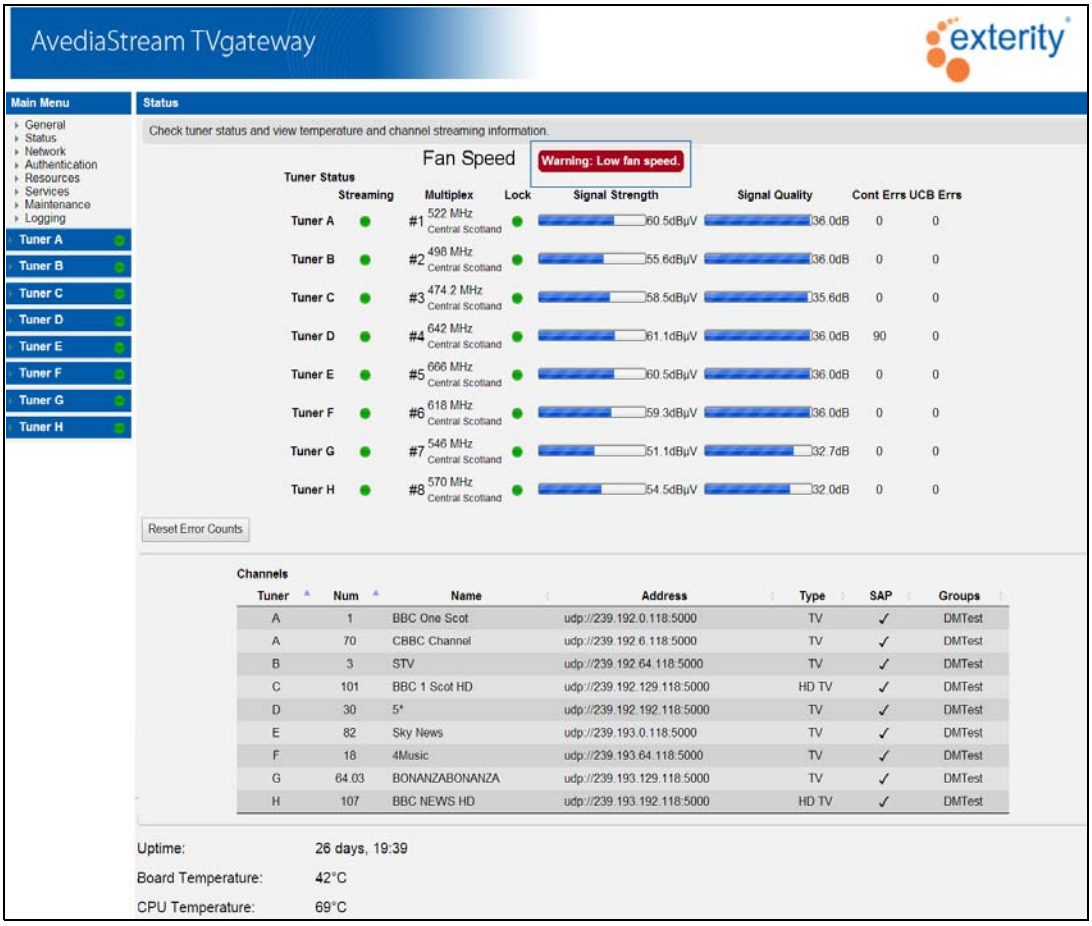


Figure 46 *TVgateway Status Page with fan speed warning (AvediaStream g4448)*

Caution: If a low fan speed warning is displayed, please contact Exterity support as the CPU could start to overheat if the fan stops spinning. If the CPU's core temperature gets too hot the unit automatically stops streaming and waits for user intervention.

If the Board Temperature exceeds 60°C, you should stop using the unit immediately.

LNB Over Current Warning

Please refer to Appendix C, "Recommended Signal Levels" for details of the maximum LNB supply per tuner on each TVgateway.

Caution: Connect the AvediaStream g4418 to a multiswitch rather than directly to an LNB if the LNB draws more than 100 mA from the TVgateway. Failure to do this may result in an Over Current warning (Figure 47), and power to the LNB being switched off.

The AvediaStream g4410, g4412 or g4415-sm can be connected to either a multiswitch or LNB.

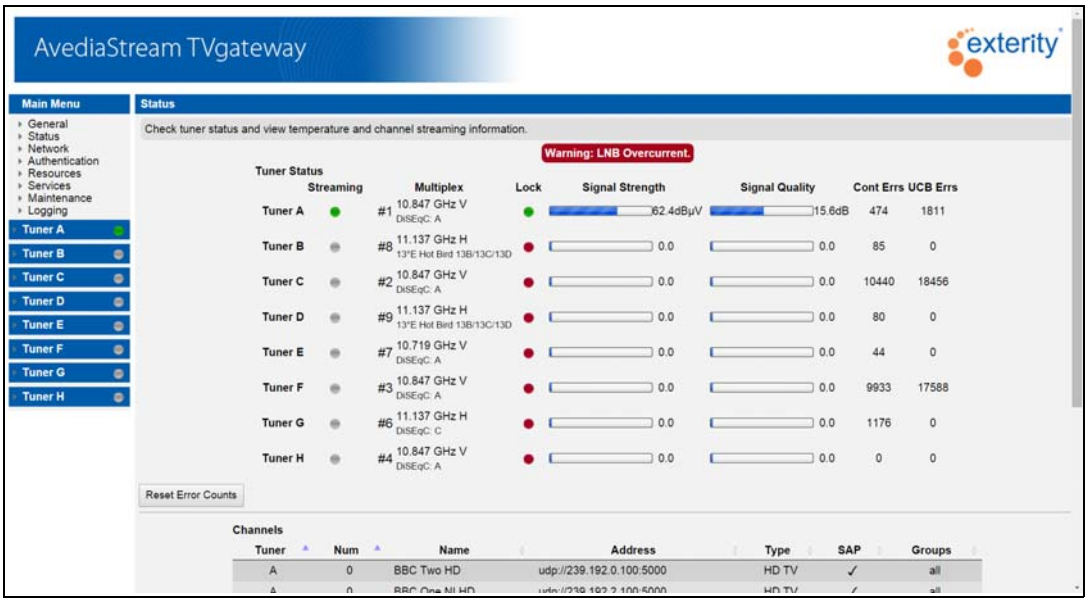


Figure 47 *TVgateway Status Page with over current warning (AvediaStream g4418)*

If a scan is attempted but fails because of over-current, a warning is also provided on the Scan page:

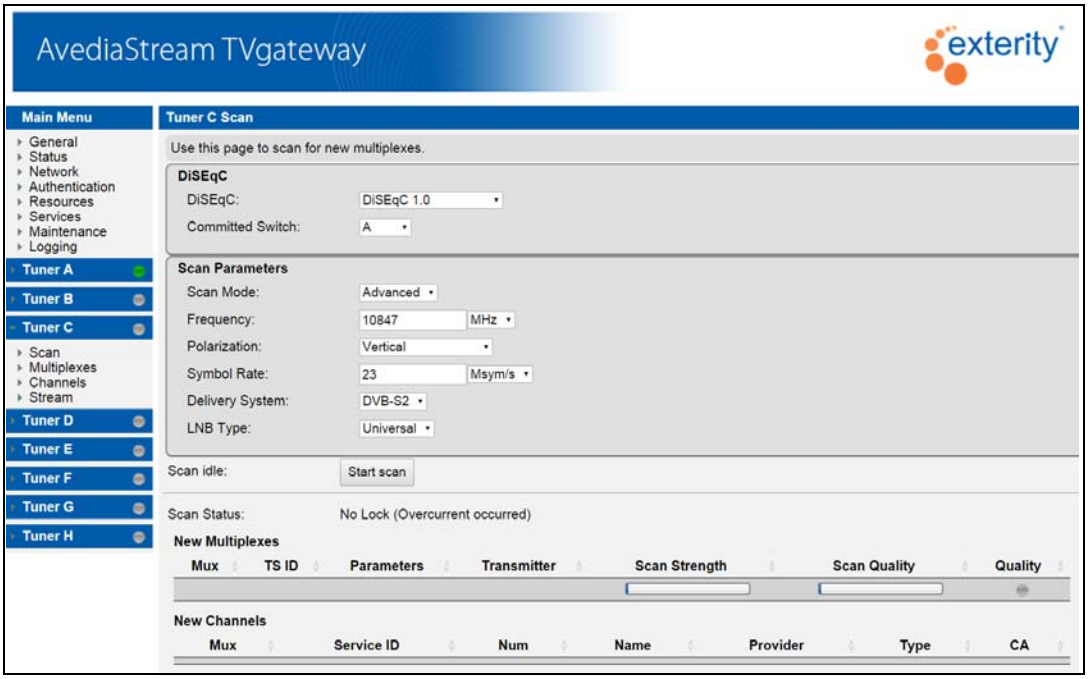


Figure 48 *TVgateway Scan Page with over current warning (AvediaStream g4418)*

Understanding the Traffic Light Indicators

The traffic light indicators provide status information at a glance. Table 4 provides more information.

Table 4 Operational status

Rear Panel LEDs	Main Menu Tuner Indicator	Status Page Streaming Indicator	Status Page Lock Indicator	Status
●	●	●	●	Tuner is not tuned and not locked, no channels have been selected for streaming, and the TVgateway is not streaming.
●	●	●	●	Tuner is tuned and locked, channels have been selected and are being streamed.
●	●	●	●	Streaming has been stopped (Tuner Stream page). When streaming is stopped, the associated tuner is also turned off, so the Lock indicator and Rear Panel LED are also red.
●	●	●	●	Tuner is tuned and locked, and the TVgateway is streaming, but no channels have been enabled for streaming (Channels Page).

Multiplex Information

The Multiplex section shows the following details about the multiplex you have selected to be active on the Tuner Multiplex pages:

- Displays the number (internal ID) of the multiplex. For example, in Figure 45 Multiplex 1 (#1) has been selected for Tuner A.
- Displays the RF input signal frequency (and polarization for satellite inputs). For example, in Figure 45 Tuner A is tuned to a signal at 522 MHz with horizontal polarization.
- Displays details taken from the selected transmitter file. For example, in Figure 45 Tuner A is using the transmitter file for Central Scotland.

Signal Strength and Quality Information

These parameters provide an approximate guide to the strength and quality of the input signal.

- Signal Strength – Indicates the power level of the RF input signal. Generally, the stronger the signal, the better.
- Signal Quality – The average number of received bit errors that have been successfully corrected. This number will vary slightly over time. Note that the signal quality is an instantaneous measurement and may fluctuate.

Error Statistics

Uncorrectable Blocks

Most RF signals contain errors. The tuners frequently correct these errors automatically. Some of these errors are not correctable and are reported as uncorrectable blocks under the heading UCB Errs.

This is the most important metric for determining the quality of RF signal to the TVgateway. If this value is steadily increasing, the signal is almost certainly not of good enough quality and results in a poor TV picture.

Continuity Errors

DVB programs are transmitted as MPEG Transport Streams. Transport Stream packets contain a continuity counter which allows stream integrity to be checked. Any missing packet is reported as a continuity error under the heading Cont Err.

If the continuity error count is steadily increasing it will probably result in a poor TV picture and usually indicates that the signal is not of good enough quality.

If the continuity error count is increasing while the UCB error count remains static, this may indicate that the TVgateway is close to its performance limit.

The Error Counter Reset button allows you to reset the error counts to 0. This can be useful to see if a change you have made to rectify a problem (such as a signal quality issue) has been successful.

Viewing Network Statistics

The network statistics reported for the TVgateway give an indication of network interface utilization as well as reporting any errors.

To view details of network port utilization, click Network.

The Ethernet interface statistics are shown along the bottom of the page.

Note: If the TVgateway has been inserted into a c1210 chassis, and both Ethernet interfaces have been connected, Ethernet statistics are shown for both interfaces.

- **Transmit % Utilization**– Indicates how much of the capacity of the Ethernet interface is being used for streaming TV channels. Best practice suggests that you do not exceed 80% capacity in normal usage, and you may have to adjust the number of channels being streamed to maintain this.
- **Transmit Errors** – (Errors, Dropped, Collisions, Discarded) If being recorded in any volume, these may indicate that the interface capacity has been reached, or may indicate a mismatch in Ethernet settings between the TVgateway and the network switch (e.g. auto-negotiation settings mismatch). Any transmit errors may adversely affect the quality of TV picture at the endpoints.
- **Receive % Utilization** – Indicates how much traffic the TVgateway is receiving from the network. Under normal circumstances this should be 0%. If this is non-zero, this may indicate that the network is not correctly multicast enabled, resulting in the TVgateway receiving multicast traffic from other streaming devices.

Note: Even if the Receive Utilization% displays 0%, some non-streaming traffic is being constantly received. This may be traffic:

- from the web interface
- added by standard network protocols such as DNS, DHCP and NTP

Network Port Status

The two LEDs on the AvediaStream Chassis denote the status of the link, as follows:

Green LED	Link Status
Solid	Link is up but there is no data
Flickering	Link is up and data is being transmitted

LED	Connection type (Mbps)
Green and orange	10
Green only	100
Orange only	1000

Viewing CAM Status

On a TVgateway with CAM slots you can view information about the installed CAM and associated subscription card. The displayed details are specific to the type of CAM and subscription card. An example with an Viaccess CAM is shown in Figure 49.

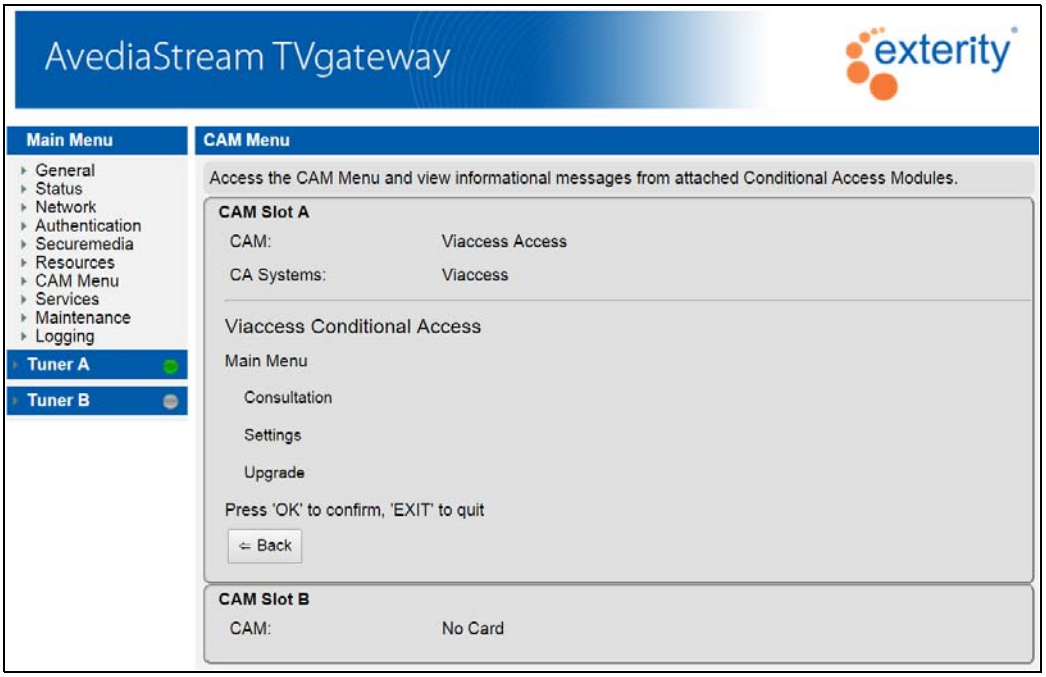


Figure 49 *CAM Menu*

Navigate the CAM menu system and view the details available by clicking the information labels (such as Consultation) and Back. To use the admin interface:

1 Log in to the Admin Interface, as described in “Admin Interface” on page 16.

2 Select option 1>Show Diagnostics (enter ‘1’) to display the diagnostics list as shown in Figure 50:

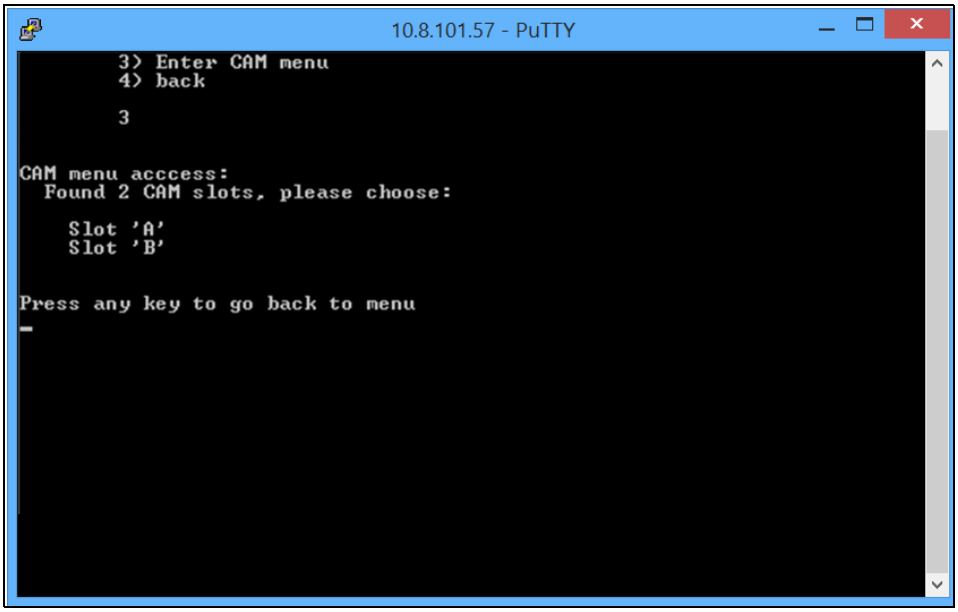


Figure 50 *Admin Interface show diagnostics*

3 Select option 3> Enter CAM menu (enter ‘3’).

Note: The CAM menu is type specific. No other details are included here.

12 Maintenance

This chapter describes various maintenance tasks. It covers:

- Specifying the TFTP Server's Address
- Specifying the SNMP Trap Manager IP Address
- Specifying the Time Server Address
- Restarting the TVgateway
- Upgrading Firmware
- Restoring Factory Defaults
- Exporting/Importing Configuration Settings
- Logging

These tasks are managed from the Maintenance page.

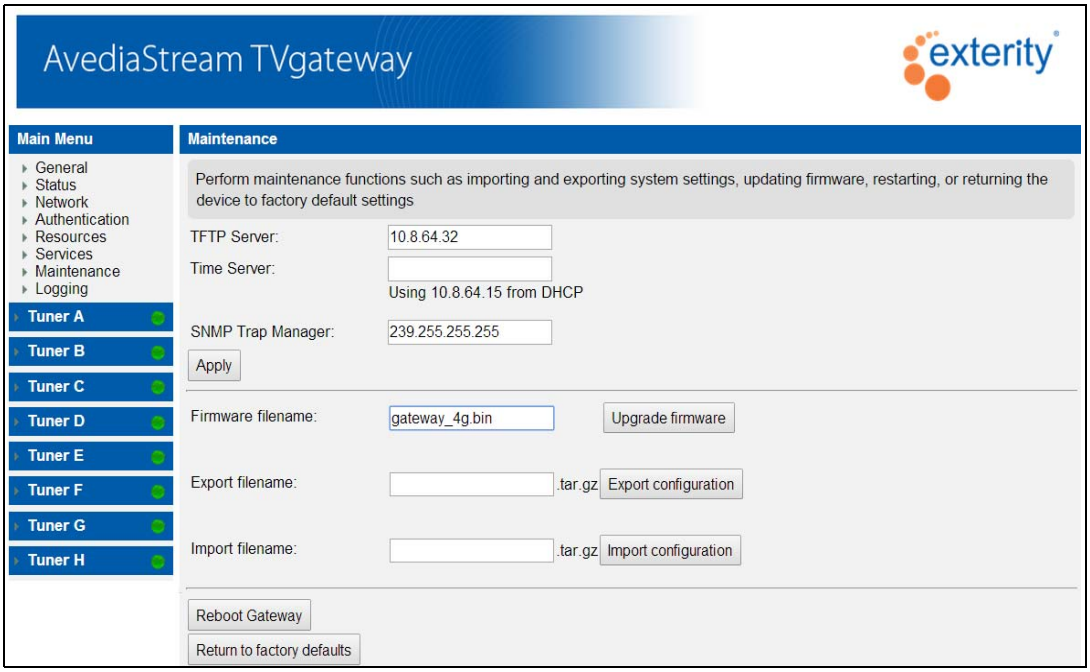


Figure 51 *Maintenance Page (AvediaStream g4448)*

Specifying the TFTP Server's Address

The TVgateway uses TFTP to download new firmware releases and transmitter files. For this to operate correctly, it must be configured to communicate with the TFTP server.

To specify the TFTP server's IP address:

1 Click Maintenance.

2 Enter the IP address of the TFTP server in the TFTP Server field.

3 Click Apply.

Specifying the SNMP Trap Manager IP Address

SNMP traps are mainly used as device discovery messages; they enable Exterity's management applications to discover devices on the network. These traps are always broadcast on the local subnet. They are also transmitted to an additional configurable destination. By default, this is the multicast address 239.255.255.255, but this can be reconfigured to any broadcast, multicast or unicast destination as required. To set the SNMP trap manager address:

1 Click Maintenance.

2 Enter the required IP address in the SNMP Trap Manager field.

3 Click Apply.

Specifying the Time Server Address

Using a time server ensures this device has the correct time. The TVgateway uses NTP (Network Time Protocol) to maintain accurate time on the device, using the time server specified. This is useful when examining the device log file as each log message has an accurate universal time code (UTC) timestamp.

Note: If no time server is present, the TVgateway's internal clock is used, which starts at Jan 1 1970 (Linux Epoch).

The TVgateway can be configured with a Time Server IP address in one of two ways:

- Automatically using DHCP
- Manual configuration

Tip: A manually configured time server overrides a time server provided by the DHCP Server.

To specify a time server manually:

1 Click Maintenance.

2 Enter the IP address or the host name of the time server in the Time Server field, and click Apply. If already configured, the IP address is displayed.

Restarting the TVgateway

You can restart the TVgateway to return it to a known state. All current settings are maintained during a reboot. To restart the TVgateway at any time, click Maintenance and click Reboot TVgateway.

Upgrading Firmware

By upgrading firmware regularly, you can ensure that you are always using the most recent version. As the new firmware is uploaded using TFTP, you must first ensure that the TVgateway is using the correct TFTP server address (see "Specifying the TFTP Server's Address" on page 67).

To upgrade the TVgateway to a new version of firmware:

1 Click Maintenance.

2 Ensure that you have specified the IP address of your TFTP server and that it is running and configured correctly.

3 Ensure that the following firmware file is hosted in the root directory of the TFTP server:

```
gateway_4g.bin
```

4 Ensure that the Firmware filename field shows the file indicated above (or matches the name of the firmware file if this is different).

5 Click Upgrade firmware.

6 The firmware is downloaded from the TFTP server. This process will take several minutes.

Restoring Factory Defaults

You can return the TVgateway to its factory default configuration.

Note: When resetting to factory default settings, all previously saved settings are lost. IP addressing is returned to DHCP.

To restore the factory default settings:

1 Click Maintenance.

2 Click Return to factory defaults.

3 Click Return to factory defaults again to confirm. The device reboots.

Exporting/Importing Configuration Settings

Once you have set up the TVgateway, you can save (export) its configuration settings. You can then import the saved configuration file to restore the settings if required, or to copy the settings to additional devices. Use TFTP to export and import configuration files.

All configuration settings, including device-specific settings (IP address, name and location) are saved when exported.

When a saved configuration file is imported, all settings *except* the IP address, name and location are imported.

To export configuration settings:

1 Ensure that the TFTP server is running and is correctly configured (see "Specifying the TFTP Server's Address" on page 67).

2 Click Maintenance.

3 Enter a name for your configuration archive in the Export filename field.

4 Click Export configuration.

To import configuration settings:

1 Ensure that the TFTP server is running and that the configuration file is hosted in the root directory of the TFTP server.

2 Click Maintenance.

3 Enter the name of the configuration file in the Import Filename field.

The configuration file is downloaded from the TFTP server and the TVgateway reboots.

Logging

The TVgateway saves historical information about internal events within the device to its log file. This can be useful when troubleshooting problems with the device. All log information up to the selected level (see Table 5) is automatically saved locally and can be viewed in the Web Interface.

Use of a time server ensures all devices in your IPTV system are synchronized. The TVgateway uses NTP to maintain an accurate time on the device, useful when examining log files as each log message has an accurate timestamp (UTC time zone). Logging is configured in the Web Interface Logging page as shown below.

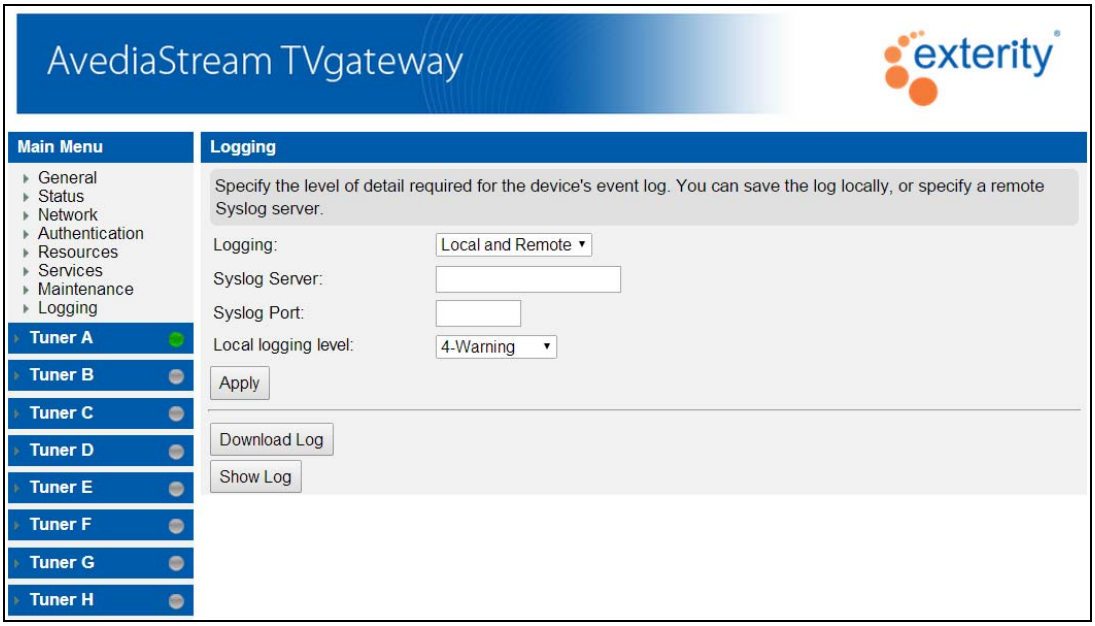


Figure 52 *Logging page (AvediaStream g4448)*

Table 5 Logging levels

Level	Suggested usage
Emergency (level 0)	The highest priority, usually reserved for catastrophic failures and reboot notices.
Alert (level 1)	A serious failure in a key system.
Critical (level 2)	A failure in a key system.
Error (level 3)	Something has failed.
Warning (level 4)	Something is amiss and might fail if not corrected.
Notice (level 5)	Things of moderate interest to the user or administrator.
Info (level 6)	The lowest priority that you would normally log, and purely informational in nature.
Debug (level 7)	The lowest priority, and normally not logged except for messages from the kernel.

Under normal circumstances, the log level should be set to 6. Level 7 should ideally only be used for diagnostics, as it logs all device activity. The default logging level is 4.

Local Logging

You can view the log file in the Web Interface or download it to your computer. All log information up to the selected level is automatically saved locally. The log is stored in memory and is lost if the TVgateway is rebooted or powered down. As TVgateway memory capacity is limited, older log information is overwritten. To configure local logging:

1 Click Logging.

2 Select Local from the Logging drop-down list.

3 Select a logging level from the Local logging level drop-down list and click Apply.

To view the log file:

1 Click Logging, and click Show Log to display the log in a browser window.

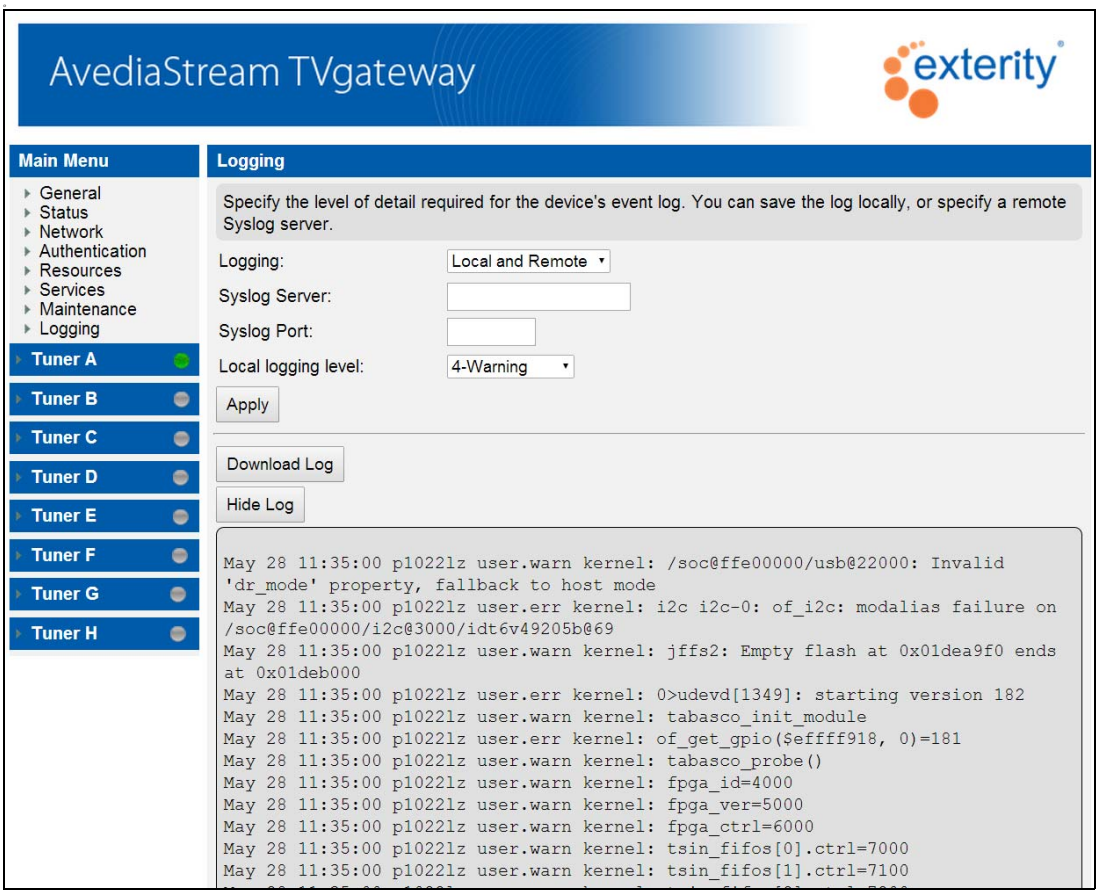


Figure 53 *Log displayed (AvediaStream g4448)*

2 Click Hide Log to close the log display.

To download the log file:

1 Click Logging.

2 Click Download log to download the log file to the configured download folder on your local computer.

Note: The downloaded log file can be more easily viewed with an application which understands Unix line endings. For example, on Windows®, Wordpad is preferable to Notepad.

Remote Logging

To send device log information to a remote server, you need to install a syslog server application on the remote server. Then set up the remote logging function on the TVgateway as described below.

To configure remote logging:

1 Click Logging, then select Local and Remote from the Logging drop-down list.

2 In the Syslog server field, enter the IP address or host name of the syslog server where the log files are to be sent.

3 In the Syslog port field, enter the port number on the syslog server. The default value is 514.

4 Click Apply.

Section 4 - Appendices

This section contains information on the following:

- Licensing the TVgateway for SecureMedia using the Product Feature Manager
- Connecting to the serial interface
- Recommended signal levels
- Useful scanning resources
- Assigning multicast addresses
- Transmitter file format
- Support information

A Using the Product Feature Manager Application

The Product Feature Manager application allows you to manage the licensed features for the Exterity products on the IPTV network. This provides a mechanism to centrally manage licenses for product features such as advanced codecs and content protection protocols.

Licensing of these advanced features can be applied during manufacture or at a later date using additional purchased licenses and the AvediaServer Product Feature Manager application.

The Product Feature Manager allows you to:

- Distribute the licenses to devices.
- Report licensing status of devices.
- Show licensing discrepancies (difference between the license held by the AvediaServer and the licensed capabilities of the device).

Deleting a license only removes it from the Product Feature Manager listing. The feature, if deployed, remains on the device.

This chapter contains the following information:

- Reviewing the License Status of the IPTV Network Devices
- Importing Licenses to the Product Feature Manager
- Deploying Features to Specific Devices

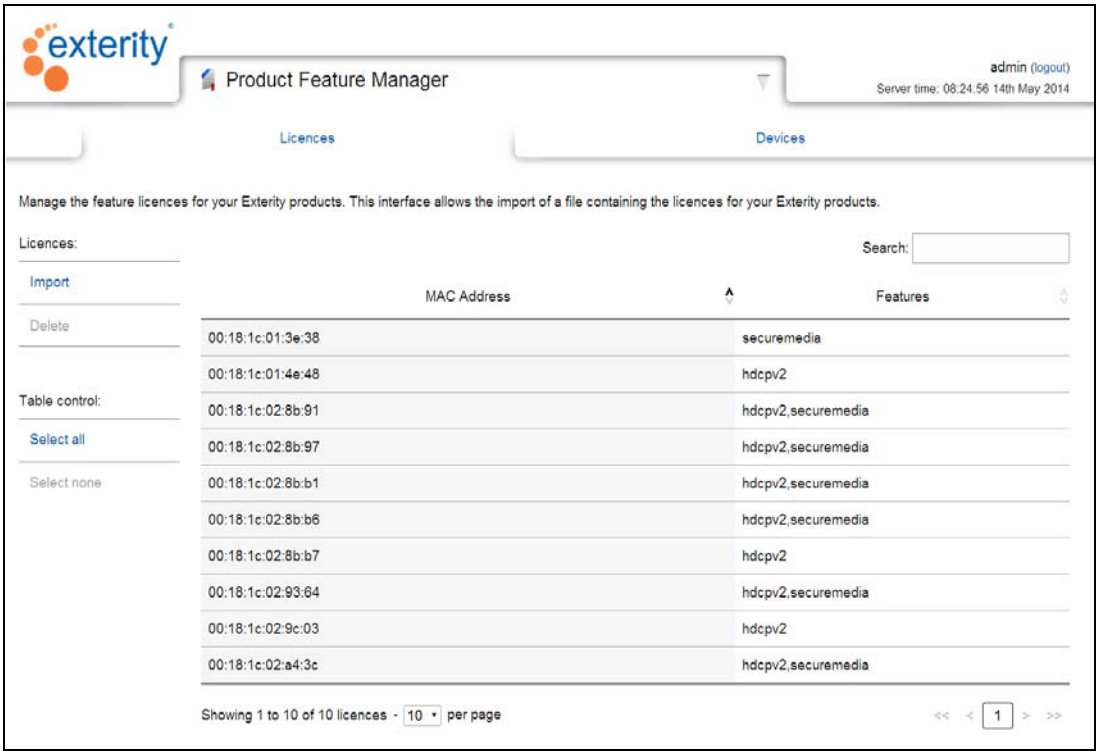


Figure 54 *Product Feature Manager - Licenses Page*

Reviewing the License Status of the IPTV Network Devices

The Product Feature Manager allows you to review the status of installed and/or available feature licenses for each device in the IPTV network. Devices are listed on the Devices page only when:

- The device has a feature license.
- A feature license is available for the device in the Product Feature Manager.

To review license status:

1 Start the Product Feature Manager to display the Licenses page.

2 Click Devices to view the table of devices and license status.

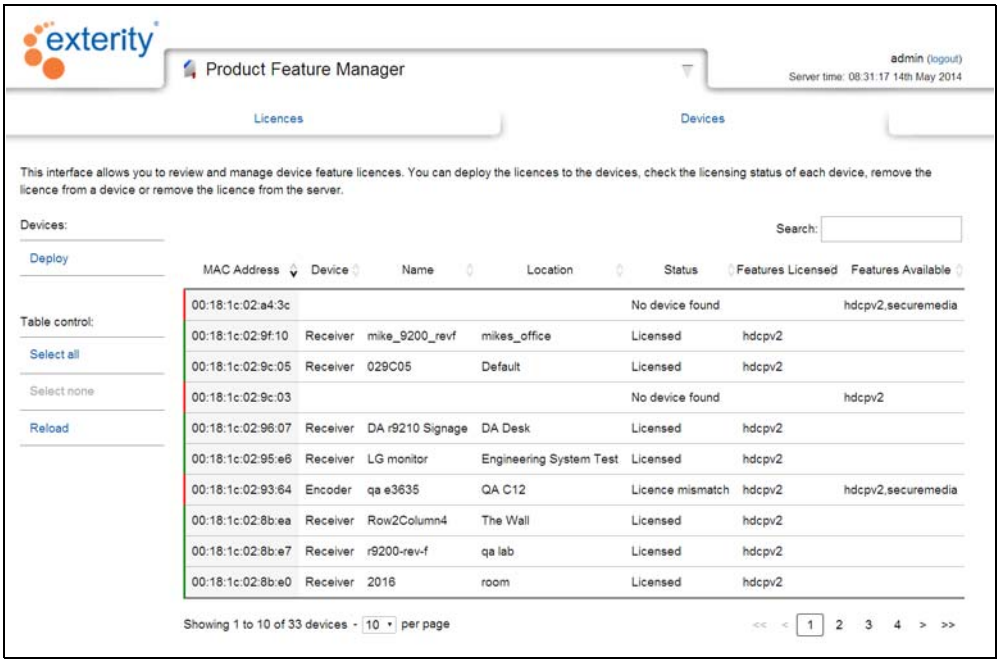


Figure 55 *Product Features Manager - Devices Page*

The Devices page displays the following information:

- Device MAC Address – MAC address of each listed device.
- Device Type, Name, and Location – Type, Name, and Location of each listed device.
- Status – Shows the results of the license/device features check:
  - Licensed – Indicates a license is held on the AvediaServer and its feature(s) are deployed on the device. The device may also list additional features not specified in the license.
  - License mismatch – Indicates a that feature(s) specified in the AvediaServer held license are not deployed on the device.
  - No device found – Indicates the device associated with the AvediaServer held license is not visible to the AvediaServer.

  In summary, when licensed features have been deployed on the respective device, the status is "licensed." When the licensed features have not been deployed on the respective device, the status is "License mismatch"
- Features Licensed – Features enabled on each listed device.
- Features Available – Features specified in the license for each listed device held in the Product Feature Manager.

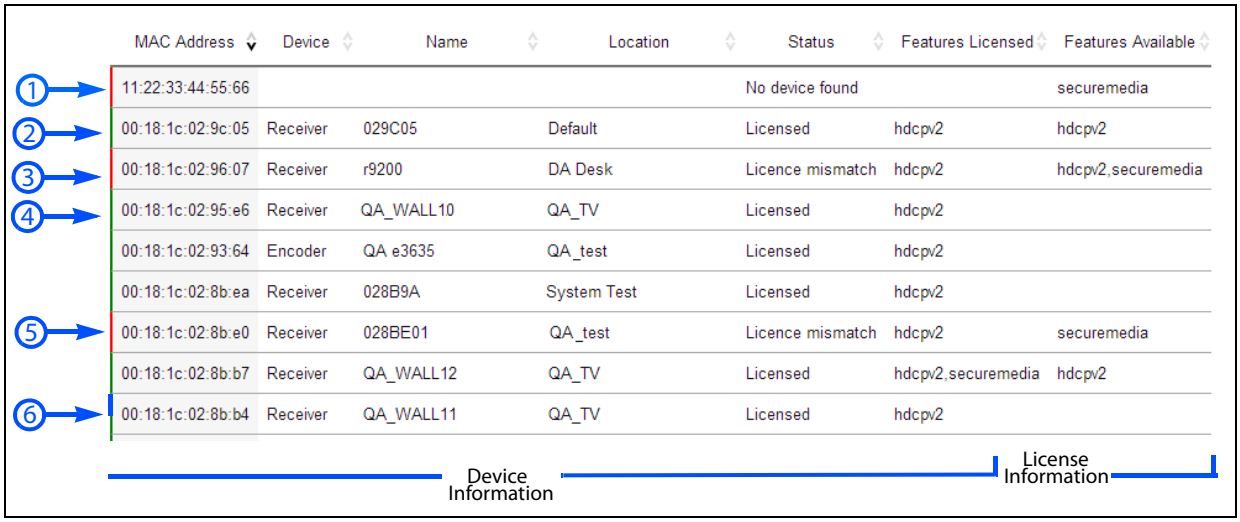


Figure 56 *Status details*

Figure 56 shows examples of the three license Status column values and red/green indicator:

1 The device associated with this license cannot be found on the network.

2 This receiver indicates “Licensed” in the Status column. This shows the features enabled by the licenses held on the AvediaServer have been deployed on the device; in this case HDCPv2.

3 This receiver indicates a “Licence mismatch”. Whilst the HDCPv2 feature in the license has been deployed on the device, the SecureMedia feature has not.

4 These three devices indicate “Licensed”. Although there is no AvediaServer held license for their HDCPv2 feature, it has been deployed on the devices.

5 This receiver indicates a “Licence mismatch”. The device lists an existing HDCPv2 license, but the SecureMedia feature license has not been deployed.

6 This receiver indicates “Licensed”. In this case the HDCPv2 license has been deployed on the device. The device also lists the SecureMedia feature.

Importing Licenses to the Product Feature Manager

Device licenses are managed by the Product Feature Manager and must be uploaded to the AvediaServer prior to deployment on the required devices. The format of the license is a tar.gz file and named in the following format: <FeatureLicense_SALESORDERNUMBER.tar.gz>.

To import a feature license:

1 Start the Product Feature Manager to display the Licences page:

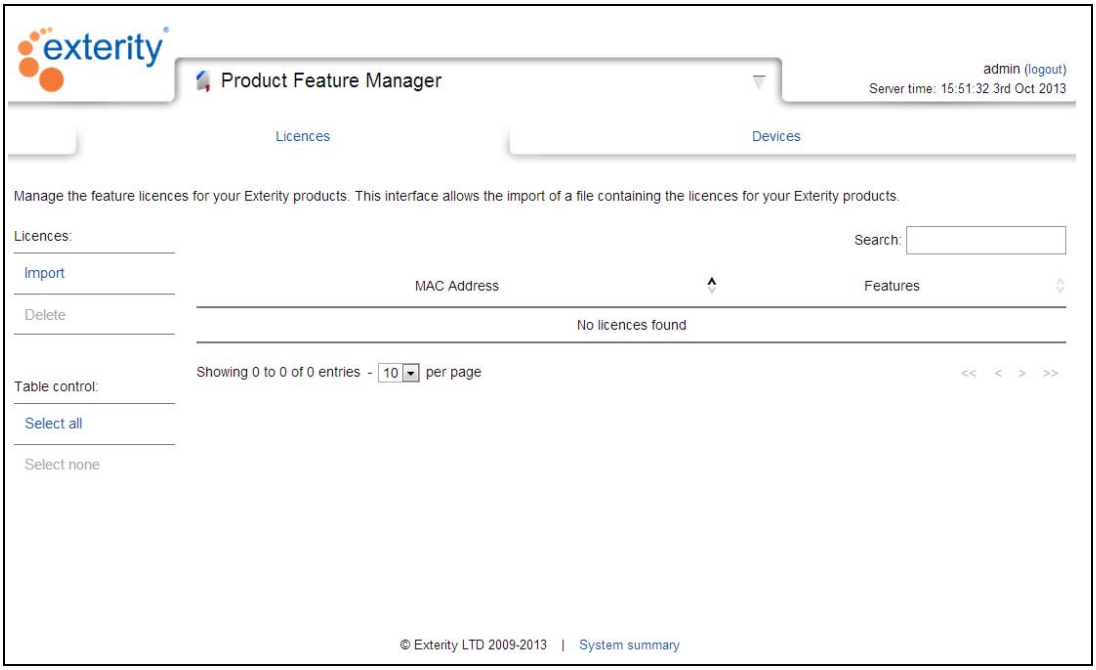


Figure 57 *Product Feature Manager - Licences Page*

2 Click Import.

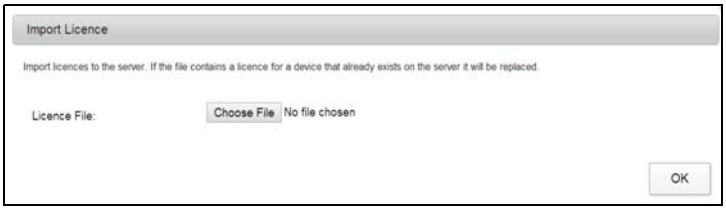


Figure 58 *Importing a license file*

3 Click Choose File, navigate to and select the required file.

4 Confirm the license table is updated with a listing for the associated MAC address and licensable features.

Note: Licenses are cumulative. For example if you are adding Feature B to a previously licensed Feature A on a specific device, the Feature B license is uploaded to the Product Feature Manager and both licenses are retained in a single license file.

Deploying Features to Specific Devices

Once you have imported license file(s) to the AvediaServer you can deploy them on the specified devices to enable the required feature(s).

To deploy the license:

1 Start the Product Feature Manager to display the licenses page.

Click the Devices tab to view the table of devices and license status. In Figure 59, a license has been uploaded to the Product Feature Manager for device 00:18:1c:02:93:64 (Encoder, qa 3635), but has not yet been deployed onto the device (Features Available). This results in a status of Licence mismatch, and has been highlighted in red.

2 Select the device(s) for license deployment:

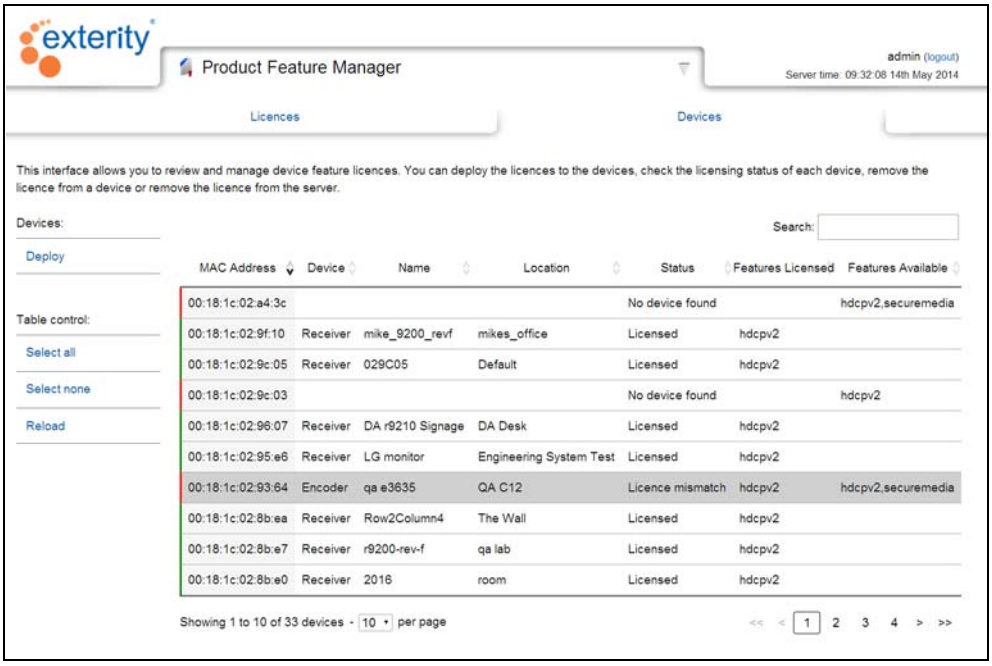


Figure 59 *Product Feature Manager - device selected*

The Status column contains information about the status of the license on the server and the device itself.

3 Click Deploy:

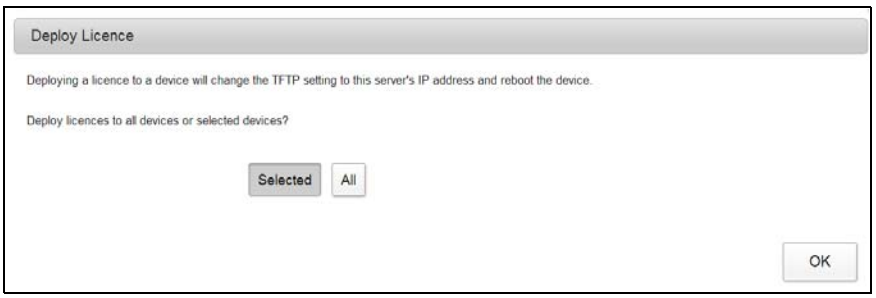


Figure 60 *Deploying the selected licenses*

4 Choose Selected to deploy the licenses on the devices selected in step 3, or choose All to apply the license to all listed devices.

5 Click OK to deploy the licenses to the devices. The devices reboot, and their TFTP server address is set to the AvediaServer address.

When the newly licensed devices are viewed on the Feature Manager devices page, the devices appear with a green highlight, and “Licensed” is displayed in the status column.

Note: Deployed license(s) do not persist when a device is returned to its factory default settings. If reset to factory default, you must re-deploy any required feature licenses.

B Serial Interface Connection

The serial port provides access to a small subset of device functionality. For example, you can configure an IP address using a terminal program session, such as PuTTY or HyperTerminal. See Chapter 2, "Management Interfaces" for more information.

Cabling

To connect to the serial interface use the female DB-9 to RJ45 adaptor shown in Figure 61 (Exterity part number access-srl), or the USB – RJ45 serial cable shown in Figure 62 (Exterity part number access-usb).

Figure 61 *DB-9 – RJ45 serial adaptor*

The female DB-9 connector should be plugged into the serial port on a PC. A straight-through network cable should be used between the RJ45 socket on the adaptor and the admin port on the Exterity device.

Figure 62 *USB – RJ45 serial cable*

Note: Although the cable fits, the admin port should not be connected to the Ethernet port on a PC.

Adaptor Wiring

If you do not have an adaptor you can make one using the details shown in Figure 63.

Figure 63 *DB-9 to RJ45 connector*

Table 6 Serial Pin Out

DB9 Connector Pin No	Description	RJ45 Pin No
2	TxD	8
3	RxD	2
5	GND	4

Opening a Session

1 Open a terminal program such as PuTTY or HyperTerminal.

2 Set up the serial port with the following settings:

- Baud rate: 115200
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow control: none

The program should now connect and present a login prompt when you press the Return key.

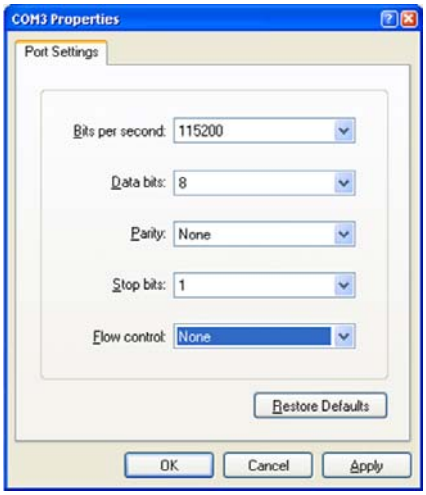


Figure 64 *Serial port settings*

C Recommended Signal Levels

The digital satellite, terrestrial and cable AvediaStream TVgateways require good quality signals at their inputs. The recommended signal levels are specified below.

AvediaStream g4410, g4412, g4415-sm & g4418 — DVB-S/S2

The recommended satellite input signal is as follows:

- -25 dBm to -65 dBm

Satellite Input Signal

- Input connector: two/eight 75 ohm F-type
- Tuning range: 950 to 2150 MHz
- Input level: -25 dBm to -65 dBm
- Symbol rate range: 1 to 45 MSymbols/s

DVB-S (ETSI EN 300 421 Broadcast services)

- Decoding: Viterbi/Reed-Solomon
- Code Rate: QPSK: 1/2, 2/3, 3/4, 5/6, 7/8
- Roll off: 0.35

DVB-S2 (ETSI EN 302 307 Broadcast services)

- Decoding: LDPC/BCH
- Code Rate:
  - QPSK: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
  - 8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10
  - Roll off: 0.2, 0.25, 0.35
- Diseqc: 1.0, 1.1, 1.2
- LNB supply (g4410/g4412/g4415-sm): 350mA with Short circuit protection
- LNB supply (g4418): 100mA with Short circuit protection
- LNB Voltage: 13 or 18v

AvediaStream g4442, g4448— DVB-T/T2, DVB-C/C2

The recommended terrestrial input signal is as follows:

1 Minimum Signal Levels:

DVB-T 8K, 64 QAM, Code Rate 2/3	79.6dBm
DVB-T2 8K, 64 QAM, Code Rate 2/3 (DTG 104)	78.1dBm
DVB-T2 32K, 256 QAM, Code Rate 3/5 (DTG 106)	78.2dBm
DVB-T2 32K, 256 QAM, Code Rate 2/3 (DTG 109)	76.3dBm
DVB-C, 64 QAM, Code Rate 2/3	79.6dBm
DVB-C2, 1024 QAM, Code Rate 3/4	76.3dBm

2 Bit Error Rate (BER): < 2E-04

D Scan Resources

This page lists useful sources of information which may help you scan for the required channels.

Satellite

The websites listed below contain details of major satellites broadcasting DVB-S/S2 signals. Channels are listed on a per-frequency basis, and maps are available detailing satellite coverage.

- http://www.lyngsat.com
- http://www.kingofsat.net

Terrestrial

DVB-T broadcasts are country-specific, and within a country there will be multiple transmitters, each broadcasting on a different set of frequencies. To find out the transmission frequencies for your location you may need to get this information from the relevant national broadcasting authority.

For example, in the UK this information is available at the site below:

- http://www.digitaluk.co.uk

E Assigning Multicast Addresses

The TVgateway is configured to automatically assign a multicast address to each channel on a per tuner basis. The following algorithm is used:

Parameter	Meaning
ip_address	The TVgateway's IP address
base_addr	The base {multi,uni}cast address to use (typically 239.192.0.0)
tuner	The number of the tuner supplying the channel
program_idx	The index of the program on the current multiplex
auto_dst_ip	The generated destination address

Example

Multicast addresses are generated using the values below:

BBBBBBBB.BBBBBBT.TTNNNNNN.IIIIIIII

where:

- B = Base address. In this example, this starts at 239.192.
- T = 3 bits required to specify any of the 8 tuners in the gateway.
- N = 6 bits used from the program index.
- I = 8 bits used to specify the last octet of the TVgateway's IP address.

BBBBBBBB	BBBBBBBT	TTNNNNNN	IIIIIIII
239	192 + 0/1	x	y (0-255)
The first octet of the base address, fixed at 239	The second octet of the base address, fixed at 192 PLUS the most significant binary bit of the 3 bits required to specify the source tuner A to H.	The second and third bits of the tuner ID, PLUS the the index of the program on the current multiplex	The final octet of the TVgateway's own IP address.

Octets

- **Octet 1** is the first octet of the base address – fixed at 239 (decimal).
- **Octet 2** is the sum of the second octet of the base address – 192 (decimal) (B)+ the first bit of the three bits required to specify the source tuner (T) in binary:
  - Tuner A = **0**00
  - Tuner B = **0**01
  - Tuner C = **0**10
  - Tuner D = **0**11
  - Tuner E = **1**00
  - Tuner F = **1**01
  - Tuner G = **1**10
  - Tuner H = **1**11

For example:

For a stream from tuners A to D, the second octet is 192 (192 + 0)

For a stream from tuners E to H, the second octet is 193 (192 + 1)

- **Octet 3** is determined by the TVgateway – it combines the two remaining bits of the source tuner (T) with 6 bits used to define the program index to get the 8 bits.

  Note: If a multiplex has more than 63 channels, you should manually assign multicast addresses to these channels to avoid conflicts.

Tuner	Program Index
A	0 - 63
B	64-127
C	128 - 191
D	192 - 255
E	0 - 63
F	64-127
G	128 - 191
H	192 - 255

- **Octet 4** is the final octet of the TVgateway's own IP address, 0 to 255.

F Transmitter File Format

The transmitter files supplied with the TVgateway contain all required parameters to enable the TVgateway to tune to a particular transponder/multiplex.

Transmitter files are supplied as text files, with the first two lines being description and date parameters; see the example below.

Table 7 details all parameters used in transmitter files and their meanings, and the “Examples” section below provides examples of these for satellite, terrestrial, and cable transmitter types.

Table 7

ID	Parameter	Units/Parameter Value
3	Frequency	Hz
4	Modulation type	0 = QPSK
		1 = QAM 16
		2 = QAM 32
		3 = QAM 64
		4 = QAM 128
		5 = QAM 256
		6 = Auto
		7 = 8 VSB
		8 = 16 VSB
		9 = 8PSK
5	Bandwidth	Hz
8	Symbol Rate	Hz
9	FEC	1 - 1/2
		2 - 2/3
		3 - 3/4
		4 - 4/5
		5 - 5/6
		7 - 7/8
		8 - 8/9
		9 - Auto
		10 - 3/5
		11 - 9/10
		12 - 2/5
		13 - 1/4
		14 - 1/3

(continued)

Table 7

ID	Parameter	Units/Parameter Value
17	Delivery System	1 - DVB-C
		2 - J.83/B
		3 - DVB-T
		5 - DVB-S
		6 - DVB-S2
		11 - ATSC
		16 - DVB-T2
		19 - DVB-C2
		240 - DVB-T/T2
516	Polarization	104 - Horizontal
		108 - Left Hand Circular
		114 - Right Hand Circular
		118 - Vertical
550	VHF/UHF Channel Number	Channel number

Examples

The following examples are described in Table 8 below:

```
desc: Various examples of transmitter file entries
date: 1404294928
0:{3: 10714000000, 516:104, 8:22000000, 9:5, 17:5, 4:0}
1:{3: 498000000, 5:8000000, 17:240, 550:24}
4:{3: 114000000, 4:5, 8:6900000, 17:1}
```

Table 8

Transponder Number	Type	Parameters
0	Satellite	• Frequency: 10.714GHz • Polarization: Horizontal • Symbol rate: 22M sym/s • FEC: 5/6 • Delivery system: DVB-S • Modulation: QPSK
1	Terrestrial	• Frequency: 498MHz • Bandwidth: 8Mhz • Delivery system: DVB/DVB-T2 • UHF channel number: 24
4	Cable	• Frequency: 114MHz • Modulation type: QAM 128 • Symbol rate: 6.9 Msyms/s • Delivery system: DVB-C

G Support and Contact Information

Technical Support for Exterity products is provided by authorized Systems Integrators and Resellers. Please contact your Systems Integrator or Reseller with any support issues.