NetworkTV

Operational User Guide
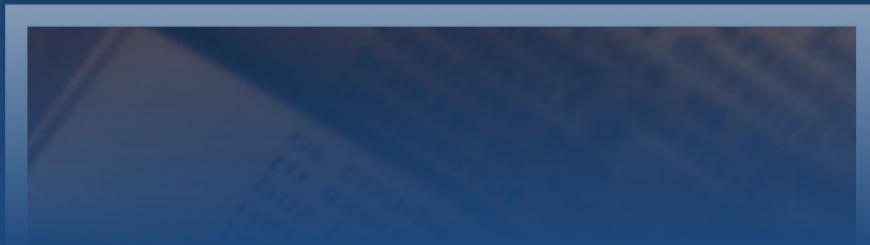
TABLE OF CONTENTS

NETWORK TV

NetworkTV Introduction

NetworkTV is an IPTV video content management system that is structured as a client/server solution. The NetworkTV server application runs on a Linux Ubuntu operating system with an Apache Tomcat webserver and a mySQL database. Management of the system is via an HTML5 browser that provides the NetworkTV Management Portal (via username and password) that is responsible for controlling all of the different NetworkTV services across the IP attached devices in the system (e.g. DVB tuners, encoders, set top boxes etc) as well as setting recordings and uploading content into the integrated library. PC Users also get access to the live channels and pre-recorded video content via an HTML5 browser. A separate interface has been created to deliver access to the live channels and library of content for the set top box.

NetworkTV Live systems provide similar Management and User interfaces to the full system, but with reduced functionality to take into account that only live channels are being managed and distributed.

This Operational User Guide (OUG) covers all of the key functionality for NetworkTV.
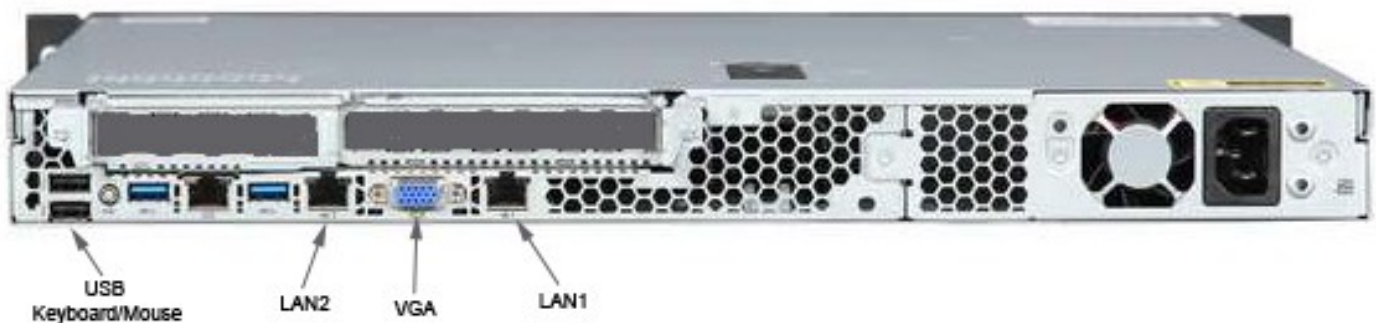
NetworkTV Server Set Up

The NetworkTV Management Server (NTVSERV) is based on an HP DL20 Server or Dell R220, with 16Gb RAM, 4Tb HDD, 1Gb Ethernet NIC (2 ports). It's running a Linux Ubuntu 18.04 Server Operating System, Tomcat webserver and a mySQL database.

The NetworkTV Management Server is a 1U short depth rack server so that it will fit neatly into an AV style rack and therefore suitable for most types of installations. However, the server will also install just as well in a full IT rack in a data comms room. The server dimensions are approximately: 1.7" (4.32cm) Height x 17.11" (43.46cm) Width x 15.07" (38.30cm) Length.

The server is configured with a single processor supporting the latest quad core Intel Xeon E3-1200 v3 processor. It has two PCIe 3.0 slots, DDR3 1600 MHz memory and 4 terabytes of internal storage, plus a state of the art HP iLO Management Engine or Dell OpenManage. The server can be expanded with additional RAM and hard disks. We can also custom build a different server config if required including providing RAID compatibility as an option. We can also provide NetworkTV as an OVF file to be used in a virtual environment.

The NetworkTV Management Server will be delivered pre-configured and will include the NetworkTV Management Software which provides the capability to manage encoders, tuners, streams, recordings and set top boxes. It also includes video content management via the NetworkTV Central Library system which allows you to record or upload your content (about 1000 hours at HD quality) so that users can choose what they watch and when.

Install the server into the rack (server rails are included) and connect an RJ45 network cable to the LAN1 port (see picture below). Then connect a USB keyboard and mouse to the USB ports. Then connect a screen to the VGA port. Finally, connect the IEC power lead to the power socket and turn the system on.

Server Addressing Setup

The NetworkTV system is running on a Linux Ubuntu 18.04 server operating system and utilize the WICD-CURSES utility to configure some basic functions of the NetworkTV server including setting its static IP address (which we recommend). To access the NetworkTV Server setup utility, enter the following login and password details at the Linux terminal prompt:

u: admin
p: auroraadmin

The admin setup screen will be similar to the screenshots here.

Use the arrow keys to move between the fields. The Wired Networks (wired-default) line should be highlighted so press the right arrow (→) to enter the IP set up screen details. Enter 'X' in the Use Static IPs checkbox. Then use the down arrow (↓) and enter the desired fixed server IP address, then the Netmask, then the Gateway. Then input DNS details if required.

If the Wired Network option isn't showing, press Shift and P together to access the Prefs menu (see below) and enter the name of the "Wired Interface" (usually enp1s0 on the HP or eth01 on Dell) and press the space bar to enable "Always show wired interface", "Always switch to wired connection when available", "Use default profile on wired autoconnect" and "Automatically reconnect on connection loss".
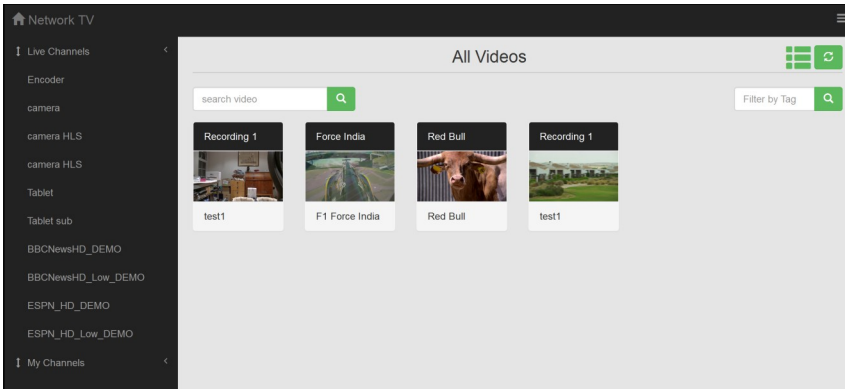
Once you are happy with the details, press F10 to confirm and 'Q' to quit and exit. You can follow the instructions above to change the details of the server at anytime, but remember if you have STBs then you will have to change the url path in the setup pages on each STB unit. See the Manage STB section later in this document.
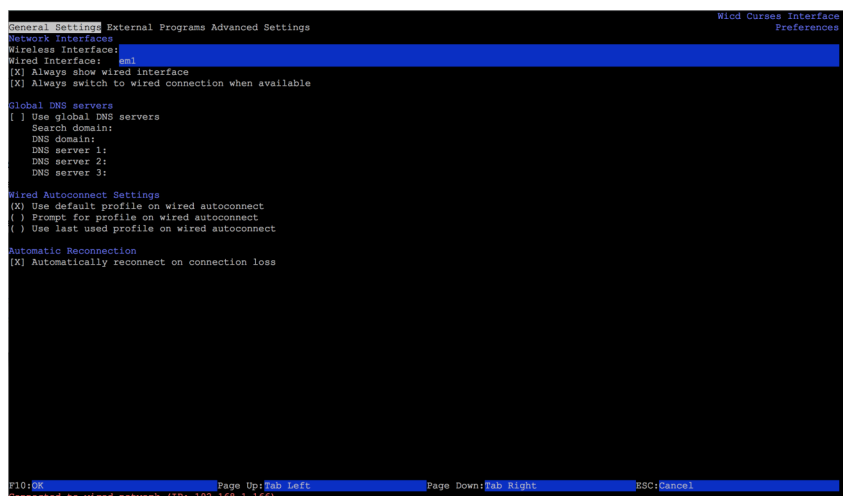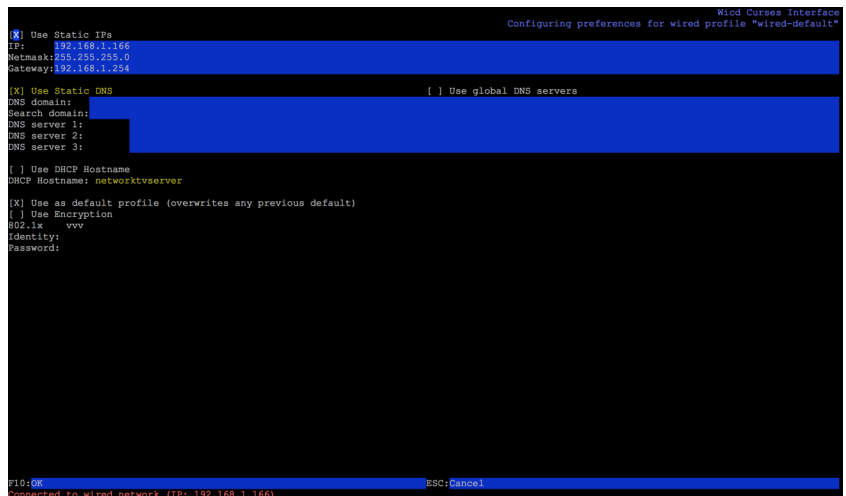
NetworkTV Browser & Manage Settings

Access to NetworkTV is via an HTML5 browser. NetworkTV has been tested on the latest versions of Micro-soft Windows operating systems including Vista, Windows 7, Windows 8 and Windows 10 and also on Apple's OS X. The system has been tested and works w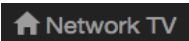ith Safari, Firefox and Pale Moon and are the preferred browsers as they will currently accept and play multicast streams with the use of a VLC plugin (update: Firefox v52.0 has withdrawn the support for NPAPI plugins but has released a Firefox v52ESR (Extended Support Release) which is downloadable from the Mozilla.org website. We suggest using the 32bit Firefox and 32bit VLC versions. Chrome, Opera and IE will not currently accept VLC plugins and therefore cannot receive and decode multicasts but can be used to manage the system or watch pre recorded videos in a variety of formats including .ts, h.264, .avi, .mp4, .mov, and .flv.

You can also access the list of live channels or On-Demand content from the menu displayed via a Set Top Box (STB). However, administration of the NetworkTV system is only available from the browser and requires a Login and Password.

From a PC, browse to NetworkTV (http://<<server IP address>>:8080/aurora/WebApp) and you will be presented with the landing page shown on the left above.

Clicking on the logo 🏠 Network TV at the top left of the page will bring you back to this Home page.

The channel list is on the left hand side and comprises *Live Channels* which are the live broadcast TV channels, encoded streams, Internet TV channels and other live sources such as IP cameras. Underneath the live channels is *My Channels* which are the on-demand channel categories that have been set up by the system administrator. These folders hold your recordings and pre-recorded uploaded content and can be categorized in any way you want eg. by name, genre, department, date, course etc.

Clicking this icon changes the layout of the page.

By clicking this button the content will refresh in the folder and any new content that has been recorded or uploaded will appear as long as they are not marked as private.

To play a *Live Channel*, click on it from the list on the left (see next page for a screenshot of a typical video playing).

To play a video from the *My Channel* library, click on the thumbnail and it will begin playing.

NETWORK TV

Note: If you have only purchased a NetworkTV Live system, some Tabs and Buttons will be greyed-out and you will not be able to access the NetworkTV On-Demand, Library or Recording functionality.
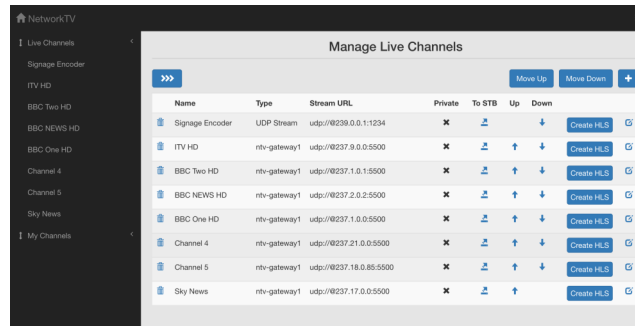
The management functions are accessed via the buttons at the top of the page. You will see **Recording, Live Channels**, **My Channels**, **Video Content** and **Set Top Boxes**. To access the management functions, select the management **Log In** button which is situated at the top right of the page. You will be asked for your user name and password to allow you access to the system Administration functions. Login with your name and default password is: azureadmin.

The Send to STB button will be covered later in this Guide under the Manage STB section but it allows the user to push specific live channels or pre-recorded video content to individual, groups or all set top boxes.

If you hover over the video window while a video is playing, the Maximise button appears on the bottom right of the player window. If you click this, the video will play fullscreen on the computer. Pressing the button again or alternatively the "esc" button on your keyboard will return to the browser player window.

Managing Live Channels

The Manage Live Channels function allows Administrators to create or configure live channels. A Live channel can be a DVB or ATSC broadcast TV channel, an encoded feed, an IP camera or a third party stream. *Click the Live Channels button and you will be displayed with the page below.*

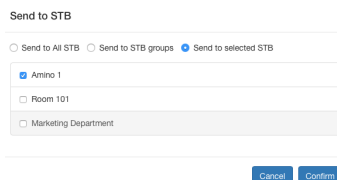**Delete Live Channel:** Click the Trash Can 🗑 to delete a channel from the list.

Name: This gives you the name of the live channel. It can be edited via the Configure Channel button.

Type: Shows you where the channel is delivered from (ie Gateway is the NetworkTV DVB Gateway, UDP is network stream, Encoder is from a managed hardware encoder).

Stream URL: This shows the URL address of each stream.

Private: If the Private button is ticked then the channel will only be available to Administrators and not visible in the channel list for users.

Send to Set Top Box (STB): To send a specific live channel from the list to a STB, click 📤 and choose to send the channel to all STBs, a group or an individual STB. The Groups or individual STBs available will be shown in a list (see screenshot left). Tick the STB or Group you want the channel to be sent to and click Confirm. The chosen STB(s) will immediately start playing that live channel.

Live Channel Order: To move the position that the live channels will appear in the User Interface, use the *UP* and *Down* arrows to move channels up or down the list.

Create HLS: This allows any live H.264 stream to be repurposed into an HTTP Live Streaming (HLS) channel. Click the Create HLS button and you will be asked if you want a Native (current channel bit rate) or Transcode stream (set at 1Mbit). A new channel will be added to the bottom of the live channels list. HLS channels are unicast streams and can be viewed in PC browsers, mobile devices like iPhones, iPads, Android tablets and phones.

NETWORK TV

Configure Channel: You will also be able to configure the metadata detail of each video by selecting the **Configure Channel** button. The **Update Live Channel** dialogue box will open.

Update Live Channel: To edit the name of the channel or the Channel Type or its URL (depending upon the type of live channel it is), enter the details.

When you have finished, click **Save Changes** to confirm.

## Adding New Live Channel

Add a New Live Channel

To add a new live channel, whether it's an encoder stream, IP camera feed or third party stream, then click the ➕ button and the following window will open.

Insert a channel name, choose the type of channel from the dropdown *(Note: use UDP for most networked streams)* and enter the URL for its multicast, HTTP or RTSP address. Tick the Private Channel box if you want this channel to remain hidden from users. Click **Save Changes** when you have finished.

Note: Any of the live channels can be recorded.

💡 *Note: See the Manage Live Channels screenshot on the previous page for examples of the different URL nomenclature (URL addresses) of multicast, HLS, HTTP and RTSP streams. See Appendix B for explanation and examples.*
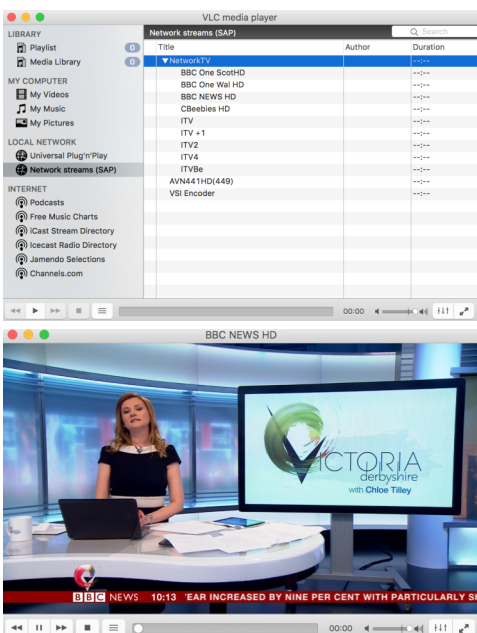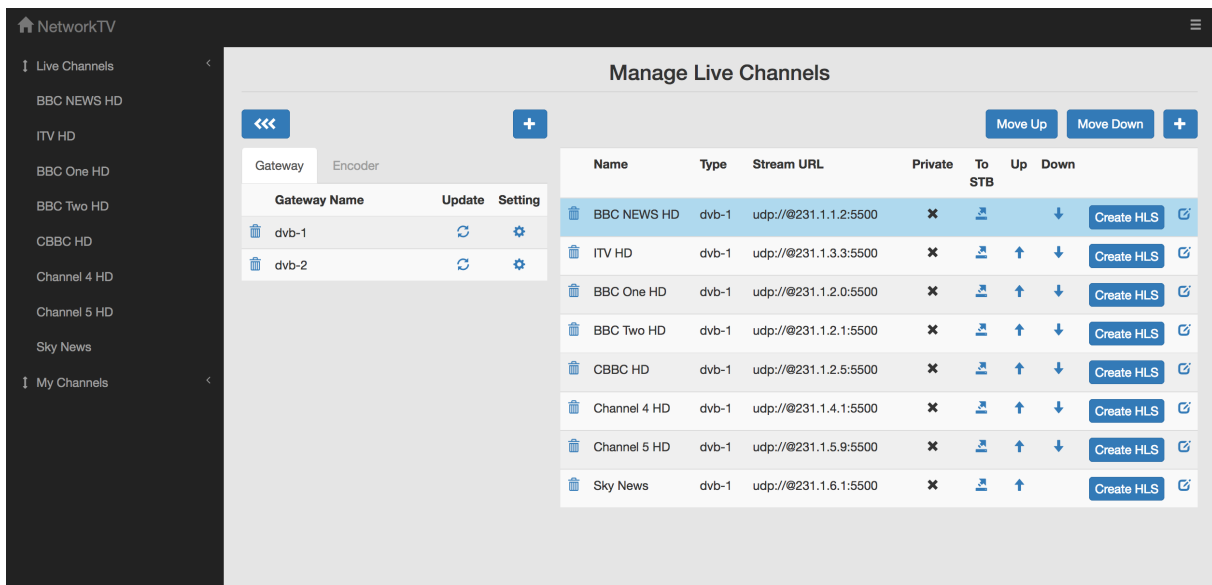
SAP Announcements

Session Announcement Protocol (SAP) is a protocol for broadcasting multicast session information. Each live TV channel that is output by the NetworkTV Live Gateway system produces these SAP announcements which identify the TV channel by name. Some encoders and IP devices also produce SAP announcements such as the VSI AVN encoder range.

This enables a user to open a media player such as VLC and see the channel line-up (playlist) of live multicast streams that are being broadcast by NetworkTV or other IP devices. The user can then choose a channel by double-clicking on it or clicking the play arrow icon and VLC will display the channel. Resize the window for your needs or play full screen. You can also choose to allow the VLC player to "float on top" which means you can keep the player window open and it will sit on top of whatever applications you are working on.

Managing NetworkTV Digital TV Gateways and Importing Channel Lists

Adding NetworkTV Gateway Appliances

Once you have scanned the tuners and created your channel lists on the NetworkTV Gateway Appliance(s), then it's an easy process to add and import the channels into the main NetworkTV system. Once the NetworkTV Gateway Appliance is integrated into the main NetworkTV Administration UI then you will be able to manage the imported channels from the Live Channels management interface. Follow the instructions below.

To add a Gateway Appliance:

First select **Manage Settings > Live Channels**.

1. Click Gateway **>>>** button
2. Click the Add new Gateway button **+** and the **New Digital TV Gateway** dialogue box (left) will open.
3. Enter the IP Address of the Gateway in the dialogue box and Click **Apply.**
4. The new Gateway will then appear in your Digital TV Gateways list. The TV channels that have been enabled in the Gateway tuners will automatically be published in the Live Channels list in the NetworkTV UI.

To Manage a Gateway & Import TV Channels:

1. Click the **Setting** button ⚙ of the Gateway you want to manage and this will launch the management page in a new browser window (refer to pages 12-19 for configuration instructions).
2. After you make changes on the Gateway go back to the main Network TV page (above) and click the Update from Gateway button ↻ to import all channels selected in the Gateway UI.

NetworkTV Live Digital TV Gateway & Pro Servers

NetworkTV Live provides the equipment and software to manage live video streams. NetworkTV Live can manage various types of live streams including DVB-T2, DVB-S2, DVB-C, ATSC QAM, encoded and unmanaged multicasts.

There are two types of NetworkTV Live systems:

1. NetworkTV Live Digtal TV Gateway Appliance is a 1U short depth rack unit so that it will fit neatly into an AV style rack and therefore suitable for most types of installations. However, the Gateway Appliance will also install just as well in a full IT rack in a data comms room.

The NetworkTV Live Digital TV Gateway Appliance will be delivered pre-configured as a package and will include the NetworkTV Management software which provides the capability to manage tuners, encoders, streams and set top boxes. The NetworkTV Live Gateway will be shipped with the appropriate tuner cards already installed.

The NetworkTV Live Starter Packages include options for different types of DVB and ATSC tuners.

The NetworkTV Live Digital TV Gateway Appliance can be used as a standalone system to deliver just live channels or as a slave tuner chassis in a full NetworkTV Video Content Management System.

The NetworkTV Live Digital TV Gateway Appliance (NTVLGAPP) is a chassis holding up to four DVB/ATSC cards running a Linux Ubuntu Operating System and the NetworkTV Management Software. You can mix and match different types of NetworkTV tuners in the same chassis to access DVB-T/T2, DVB-S/S2, DVB-C and ATSC transmissions as well as tuner cards with Common Interfaces for Conditional Access Modules to receive scrambled TV channels (see picture below).

Simply plug in the power lead, the RF coax cables to the connectors, an RJ45 network fly lead to the LAN port and then turn the unit on.

2. **NetworkTV Live Pro Server** is an expandable system employed to create a solution that can manage large numbers of various types of live streams and users. This system is also capable of being expanded to include recording, archiving and Video-on-Demand. It is also a 1U short depth rack server based on an Intel Xeon CPU with capability for expansion for RAID and additional RAM. The server will be the same chassis as stated in NetworkTV Server Set Up. For connections see the NetworkTV Server Set Up page.

Configuring NetworkTV Live Digital TV Gateways

NetworkTV Live Digital TV Gateway Appliance Set-up

The NetworkTV Live Digital Gateway Appliance can act as a standalone system or as a slave device to a NetworkTV Server. The NetworkTV server can either be a NetworkTV Live Server or a NetworkTV Video Content Management Server.

The first step is to configure the NetworkTV Gateway Appliance and set up the channel lists from the tuners by following the instructions below.

The second step is then to import the Appliance and the channels into the main NetworkTV Administration UI.
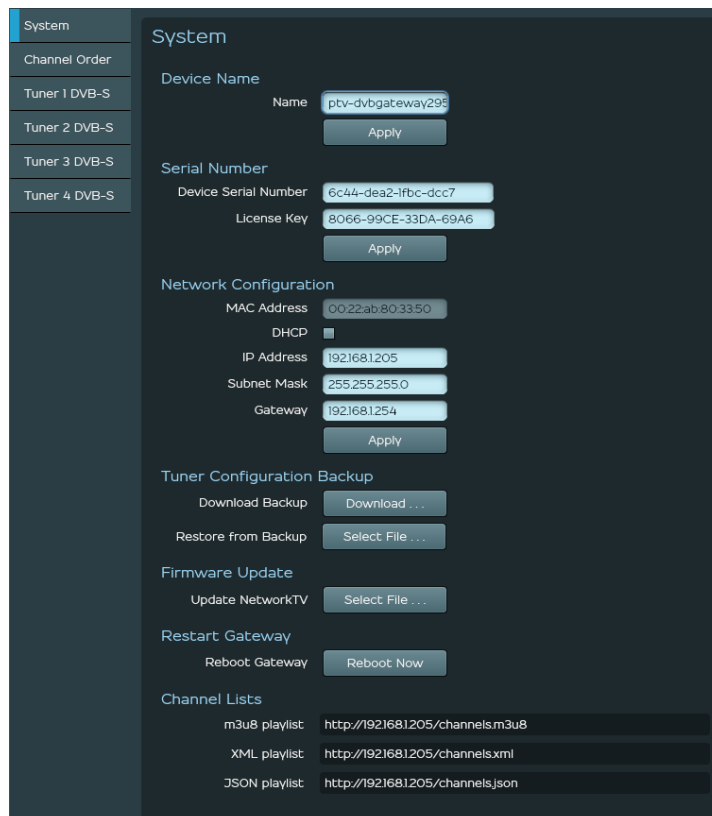
Managing NetworkTV Live Gateway Appliances

First add the NetworkTV Gateway as shown in the previous pages or browse to the IP address of the NetworkTV Gateway Appliance and login as Administrator. You will be presented with a web page login screen.

Login: admin

Password: gateway

Select *Manage Channels > Live Channels*.

System settings

Device Name

This is the name that is used to identify the Gateway Appliance on the network. It is limited to 16 characters and must contain no spaces.

Network Configuration

Use this section to configure the network settings of the Gateway Appliance. We recommend you always use a static IP address (ie no DHCP).

Settings

DHCP: Dynamic Host Configuration Protocol provides automatic network configuration on a network that has a DCHP server.

IP Address: If DHCP is not selected then enter the IP Address to use.

Subnet Mask: If DHCP is not selected then enter the Subnet Mask to use.

Gateway: If DHCP is not selected then enter the default Gateway to use.

Tuner Configuration Backup

Use this section to save and restore backups of the configuration of all of the tuners.

If you need to perform a major update the entire firmware of the Gateway, then to save having to re-scan and configure all of the tuners again, simply backup the Configuration information, perform the update and restore the configuration.

You can also use the backups on another Gateway as a quick means of configuration, possible after you have installed new hardware at another location. Please note however that DVB-T settings are only valid if the new installation is covered by the same transmitter.

Also, loading a backup onto a new Gateway that has a different mix of tuners (e.g. DVB-T and DVB-S) may result in unexpected behaviour.

Note: After you Restore from Backup you will need to click Reboot Now.

NETWORK TV

Firmware Update

Incremental updates to the Gateway firmware can be applied using this web page. More substantial updates are applied by connecting a USB memory stick to the broadcaster and rebooting it, which then updates the entire firmware set erasing the current tuner configuration.

To perform an update from this web page simply Select the File and the update will be transferred to the Gateway, at this point it will re-boot to perform the update.

Note: minor updates will not destroy the current tuning data so there is no need to perform a Tuner Configuration Backup before applying an update from this web page.

Restart Gateway

You need to reboot the Gateway if you have changed the Device Name or Network Configuration or have performed a Firmware Update.

Channel Lists

Channel Lists are available in three formats, m3u8, XML and JSON.

To test the channels use VLC player and select *Media > Open Network Stream* and enter the m3u8 playlist URL http://192.168.0.123/channels.m3u8

To change channels select *View > Playlist*.

DVB-T Tuners

DVB-T Tuners enable you to receive terrestrial digital TV broadcasts using a domestic TV aerial. DVB transmits a number of digital channels on a single frequency.

Each country has its own set of UHF frequencies it uses to transmit these multiple channels and within each country only a small range of available frequencies are used for each geographic region. For this reason DVB-T tuners need to scan all of the available frequencies for that country to find the actual frequencies that are being used in that location. So, when you first configure a DVB-T tuner you will need to run a full scan.

The tuners that are installed in your NetworkTV Gateway Appliance are listed down the left hand side of the screen. Click on the tuner you want to scan then proceed to the instructions below.

Settings for scanning   See above for an example screenshot of the NetworkTV Live Gateway DVB-T Scanning page.

Modulation: Unless you know the specific modulation to use then select QAMAUTO.

Select your Country: This determines the specific set of frequencies that will be scanned.

Start Scan Now: This starts the scan which may take up to 20 or 30 minutes.

Abort Scan : Stops the scan and saves the channels found so far.

Scan Status: This displays the current scan status.
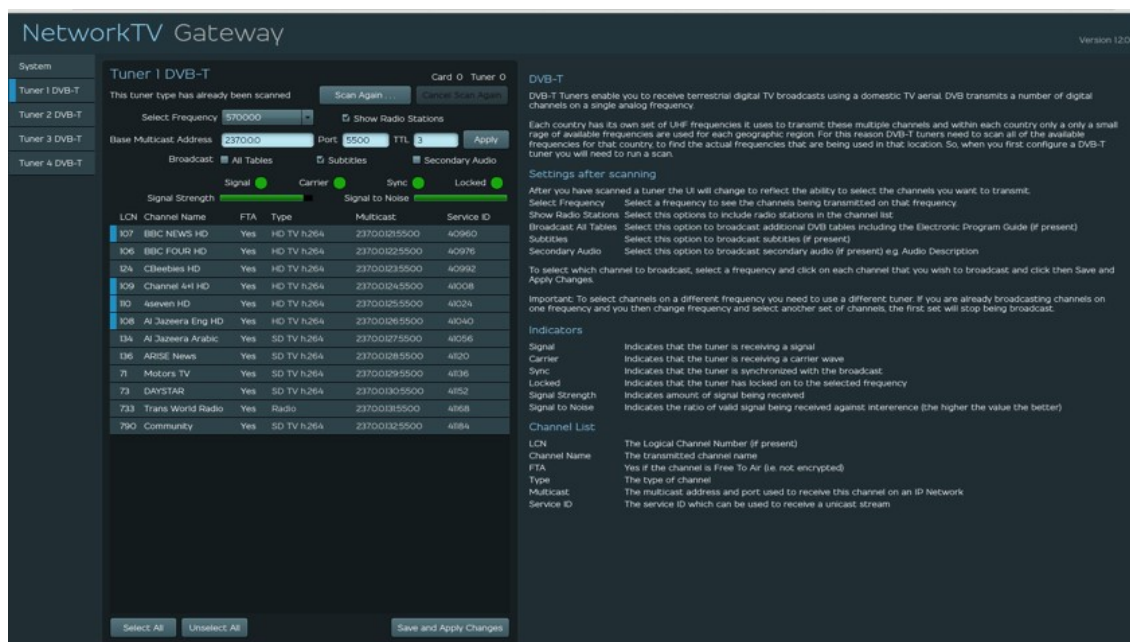
As the scan proceeds, you will see the Scan Frequency change and as channels are found they will be displayed in the list and the total number of channels found updated.

Note: you only need to scan a single tuner of this type as the frequencies and channels found are available to all tuners of this type. However, you may need to retune from time to time if frequencies change .

Settings after scanning

After you have scanned a tuner the UI will change to reflect the ability to select the channels you want to transmit. See below for an example screenshot of the NetworkTV Live Gateway DVB-T tuner settings page.

Select Frequency

Select a frequency of the transponder you want to tune to.

Show Radio Stations

Select this option to include radio stations in the channel list.

Base Multicast Address

Enter the multicast address you want to have the channels to start from eg 237.0.0.0. Each channel will automatically have assigned to it the next sequential number.

Port   Enter the port number that you want to assign the channels to mul-
                            ticast on.

TTL   Enter the TTL (time to live) you require according to your IP setup.

Broadcast All Tables   Select this option to broadcast additional DVB tables including the
                            Electronic Programme Guide (if present).

Subtitles   Select this option to broadcast subtitles (if present).

Secondary Audio   Select this option to broadcast secondary audio (if present) e.g. Au-
                            dio Description.

> 💡 To select which channel to broadcast, select a frequency and click on
> each channel that you wish to broadcast and click on Save and Apply
> Changes.

Important: To select channels on a different frequency you need to use a different tuner. If you are already broadcasting channels on one frequency and you then change frequency and select another set of channels, the first set will stop being broadcast.

Signal: Indicates that the tuner is receiving a signal

Carrier: Indicates that the tuner is receiving a carrier wave

Sync: Indicates that the tuner is synchronized with the broadcast

Locked: Indicates that the tuner has locked onto the selected frequency

Signal Strength: Indicates amount of signal being received

Signal to Noise: Indicates the ratio of valid signal being received against interference (the higher the value the better)

Channel List

LCN: The Logical Channel Number (if present)

Channel Name: The transmitted channel name

FTA: It will indicate *Yes* if the channel is Free To Air (i.e. not encrypted)

Type: The type of channel (eg SD or HD and video format)

Multicast: The multicast address and port used to receive this channel on an IP Network

Service ID: The service ID of the channel (every channel has a unique ID no.)

> 💡 *Note: Don't forget to select the channels you want to broadcast by clicking on them in the list and then click Save and Apply Changes.*

DVB-S Tuners

DVB-S Tuners enable you to receive digital TV broadcasts using a satellite dish. DVB transmits a number of digital channels on a single frequency.

To configure a DVB-S Tuner you need to know the settings for the transponder on the satellite you want to tune to. Point your browser at www.kingofsat.net or www.lyngsat.com to find the information you require.
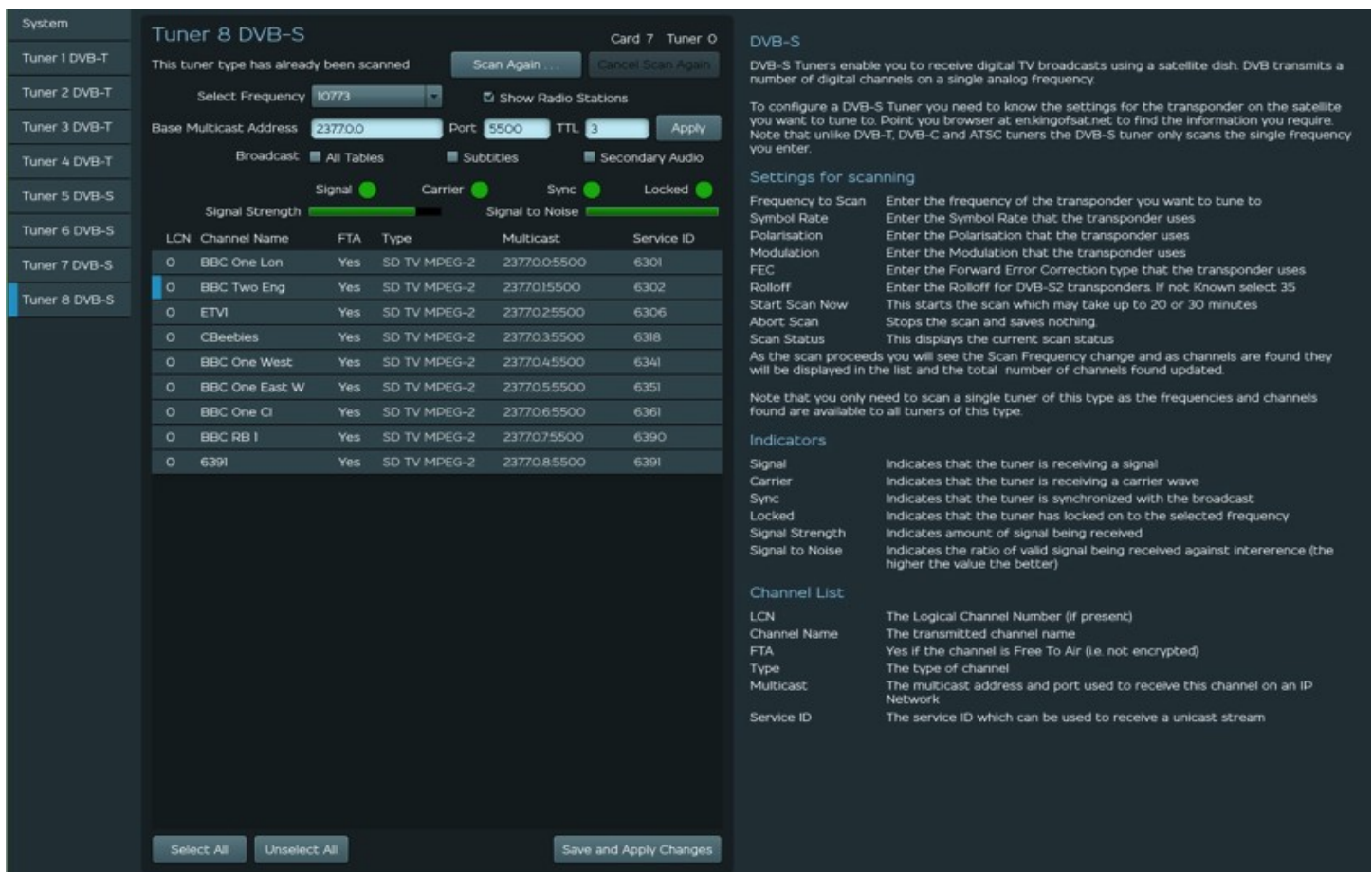
The tuners that are installed in your NetworkTV Gateway Appliance are listed down the left hand side of the screen. Click on the tuner you want to scan then proceed to the instructions below.

Note that unlike DVB-T, DVB-C and ATSC tuners the DVB-S tuner only scans the single frequency you enter.

Settings for scanning

See below for an example screenshot of the NetworkTV Live Gateway DVB-S Settings page.

Frequency to Scan: Enter the frequency of the transponder you want to tune to.

Symbol Rate: Enter the Symbol Rate that the transponder uses.

Polarisation: Enter the Polarisation that the transponder uses.

Modulation: Enter the Modulation that the transponder uses.

DVB-S2 Tick this box if you require channels from DVB-S2 transponders.

FEC: Enter the Forward Error Correction type that the transponder uses.

Rolloff: Enter the Rolloff for DVB-S2 transponders. If not known select 35.

Start Scan Now: This starts the scan which just scans the specified frequency.
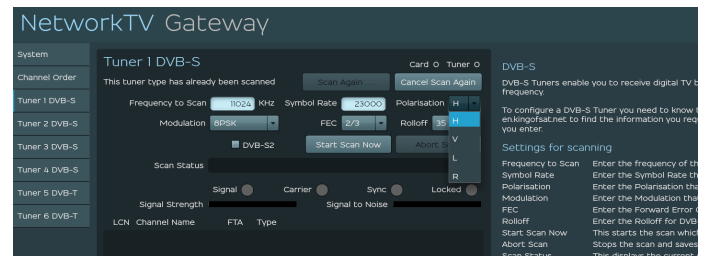
Abort Scan: Stops the scan and saves the channels found so far.

Scan Status: This displays the current scan status.

As the scan proceeds, you will see the Scan Frequency change and as channels are found in the multiplex they will be displayed in the list and the total number of channels found updated.

Note: you only need to scan a single tuner of this type as the frequencies and channels found are available to all tuners of this type.

Base Multicast Address

Enter the multicast address you want to have the channels to start from eg 237.0.0.0. Each channel will automatically have assigned to it the next sequential number.

Port

Enter the port number that you want to assign the channels to multicast on.

TTL

Enter the TTL (time to live) you require according to your IP setup.

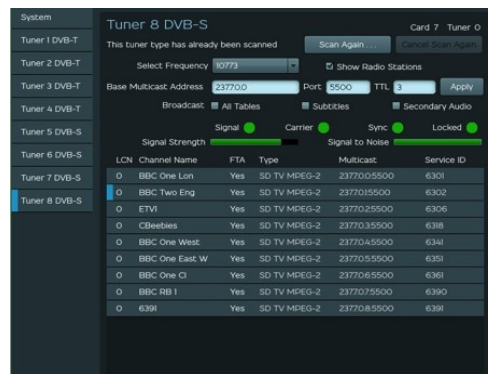|	
Broadcast All Tables	Select this option to broadcast additional DVB tables including the Electronic Programme Guide (if present).
Subtitles	Select this option to broadcast subtitles (if present).
Secondary Audio	Select this option to broadcast secondary audio (if present) e.g. Audio Description.
	To select which channel to broadcast, select a frequency and click on each channel that you wish to broadcast and click on Save and Apply Changes.

Important: To select channels on a different frequency you need to use a different tuner. If you are already broadcasting channels on one frequency and you then change frequency and select another set of channels, the first set will stop being broadcast.

Indicators

Signal:	Indicates that the tuner is receiving a signal.
Carrier:	Indicates that the tuner is receiving a carrier wave.
Sync:	Indicates that the tuner is synchronized with the broadcast.
Locked:	Indicates that the tuner has locked onto the selected frequency.
Signal Strength:	Indicates amount of signal being received.
Signal to Noise:	Indicates the ratio of valid signal being received against interference (the higher the value the better).

Channel List

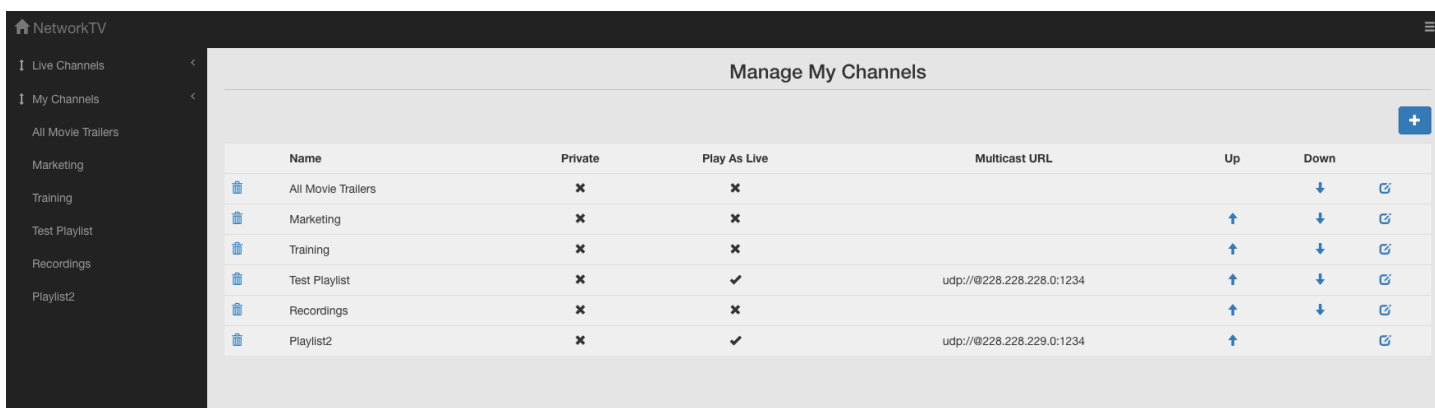|	
LCN:	The Logical Channel Number (if present).
Channel Name:	The transmitted channel name.
FTA:	Yes if the channel is Free To Air (i.e. not encrypted).
Type:	The type of channel.
Multicast:	The multicast address and port used to receive this channel on an IP Network.
Service ID:	The service ID of the channel (every channel has a unique ID no.)

Note: Don't forget to select the channels you want to broadcast by clicking on them in the list and then click Save and Apply Changes.

NETWORK TV

Manage My Channels

My Channels provides access to any pre recorded video content stored within the library as video-on-demand. The concept is that within *My Channels*, channel folders (or categories) are created and each category can hold an unlimited number of pre-recorded videos relevant to that category (dependent on hard disk storage capacity). These category channels within the NetworkTV Library are where you would normally organise and archive videos relevant to a department, course, genre, skill, date etc. Video's can be uploaded or recorded into a chosen *My Channels* category. Managing *My Channels* allows you to create, change, make private or delete category channels within the NetworkTV Library. You can have an unlimited number of *My Channels* in a NetworkTV Library. *Click **My Channels** and the page below will be displayed.*

Add New Channel

Click the [+] and the ***Add new Channel*** dialogue box will open. Enter a name for the new channel and whether it is *Private* or not, click *Save* to confirm the changes.

Private

Indicates if this channel is *Private* and therefore only visible to administrators. The content within it will be hidden from user channel lists. Access will be via the Admin UI only.

Channel Order

To move the position that the channel categories in *My Channels* appear in the User Interface, use the *UP* and *Down* arrows to move channels up or down the list.

Edit Channel Details

To edit the name of the channel and whether it is a Private Channel or not, click on the [edit] button. When you have edited the Channel Name and whether it is *Private* or not, click *Save* to confirm the changes.

Delete Channel

Click the Trash Can [trash] to delete a channel from the list.

Managing Video Content in the NetworkTV Library

Manage Video Content

My Channels provides access to the pre recorded video content stored within the library. The channels are listed by category and each category can hold an unlimited number of pre-recorded videos relevant to that category. To manage this content, select the *Video Content* Tab.

To display all of the video content in the library select *All Channels* in the *Filter By Channels* dropdown box.

If you only want to see the list of videos in a particular channel category, select that category in the *Filter By Channels* dropdown box.
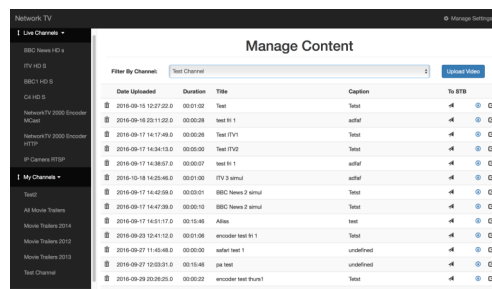
Delete Video

Click the Trash Can 🗑 to delete a video from the library.

Metadata

The page shows when the video was uploaded (or recorded), it's duration and size. It also gives the title and caption.

To STB

To make a specific video play out on a single, group or all set top boxes, click the 📤 button and the *Send to STB* dialogue box will open. Choose the option you require and then click *Confirm* to send it.
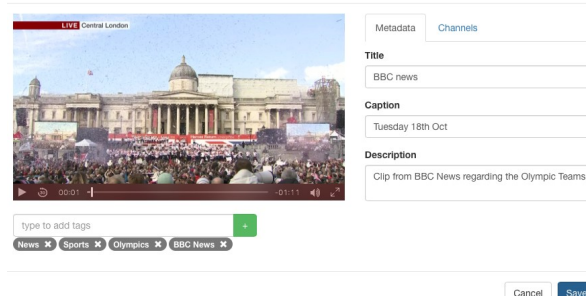
Download

Click the ⬇ button to download a specific video. Depending on the browser you are using, the video will either start playing or be placed into your Downloads Folder. To save it to a different location, right-click and save as.

Edit Video Properties

If you need to update, change or add any metadata to a video, click on the *Edit Video Properties* button 📝 . The following window will open.

Click on the *Metadata* tab Enter or edit the text for the video: *Title*, *Caption* and *Description*.

Then click on the *Type to add Tags* box if you want to add tag types to the video. Users will be able to search for videos using the tags associated with a video. You can add multiple Tags. You can also add new tags to the list by entering the tag type and clicking the add [+] button.

Click on the *Channels* tab and tick the category folder or folders you want the video to appear in on the *My Channels* list.

Click [Save] when you are finished editing.

Upload New Video

Upoad

Click the [Upload] button to upload a video. The *Upload New Video* box will open. NetworkTV is able to handle a variety of video formats including .ts, .mp4, .mov, .avi, .wmv.

Click *Choose File* to find your required video file (note: Explorer will open on a Windows PC and Finder will open on a Mac). Browse to the video you want to upload and click Open or Choose. You can also play the video if you want to make sure it's the correct one.

Follow the instructions in the *Edit Video Properties* section on the previous page to add any metadata to the *Metadata* and *Channels* tabs. Once you have made the changes click [Upload] and the video will start uploading to the NetworkTV library. The green bar will indicate that it is being uploaded.

By clicking [↻] will refresh the content in that list if videos have been added or deleted.

Managing Recordings

NetworkTV provides two recorders as standard in each of the NetworkTV Video Content Management Starter Packages, but additional recorders can be added upon request. The Recorders will record any of the live stream formats handled by NetworkTV including MPEG2 TS, MPEG4 H.264, HLS, HTTP and RTSP formats.

The recording function allows for a maximum 4 hours recording time for one individual recording. Depending upon the bitrate, the size of a 4 hour recording file could be very large. The amount of storage required will be determined by how long the video's are and the bit rate at which they were encoded. The matrix table below provides some guidance on the amount of storage space required for video's of a specific length at a range of bit rates.

Video Bit Rate (megabits per second)	Mbytes Storage per Minutes		
	1Min	10 Min	60 Min
0.5Mbps	3.8Mb	38Mb	228Mb
1Mbps	7.5Mb	75Mb	450Mb
2Mbps	15Mb	150Mb	900Mb
4Mbps	30Mb	300Mb	1800Mb
6Mbps	45Mb	450Mb	2700Mb
10Mbps	75Mb	750Mb	4500Mb

The Recorders

To access the recording function, select the ***Recording*** button. This will open the Recording page as seen here giving you access to the ***Recorders***. The Recorders can record the same or different channels simultaneously. To set up a recording, choose which Recorder you want to use and click the edit [icon] button.

Setting up a Recording

By editing the configuration of a recorder, it will store the metadata you enter for that recording. From here you can start the Recorder or you can save the configuration so that the same channel will be recorded each time. This may be useful if you have a room or channel that you regularly record.
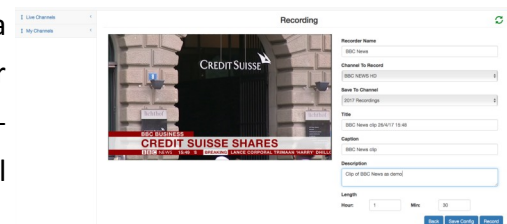
Recorder Name: Enter the name for the Recorder. This will be displayed above the Recorder pane in the Recordings Page.

Channel to Record: Click on the dropdown to choose the live channel that you want to record.

NETWORK TV

Save recording to Channel: Click on the dropdown to choose the category area (On Demand My Channel) of the content library that you want your recording to be recorded into.

Title: Enter a title for the Video. This could be the channel name or a time or date.

Caption: Enter a caption which which will act as a short description.

Description: Enter a full description.

Length: Set a time in hours and minutes for a set recording length.

Save Config and Exit: Click the [Save Config and Exit] for the Recorder to remember this setting for future recordings. You can then Start the recording from the Recording page.

Start Now: Click the [Start Now] recording button to begin recording. The page will then revert back to the Recording page. The recording will show a red button if that Recorder is currently recording .

Stop Recording: To Stop a recording, just click the red button. Once the recording has been stopped the video is automatically published to the category you chose and available to be watched On Demand by users.

💡 *Note: All of the metadata is editable after you have stopped the recording via the Edit Video Properties function in the Manage Content administration page.*

When a Recorder has been configured, and you have entered the metadata, if you click the 🛈 button on the Recorder pane, you will see the information for that channel as seen on the screenshot on the right.

The Recorder pane also shows the status of a stream with the colour of the camera icon in the top right of the pane:

📹 The black icon means no live feed available

📹 The amber icon means requesting stream

📹 The green icon indicates that the stream is good and being recorded.

If the stream is good the camera icon will turn green after about 10 seconds, alternatively you can refresh the Recorders to make sure the stream is being received. If a red camera icon appears 📹 then the recording has failed to start, so check connections and restart the recording.

Start Recording: You can start a recording directly from the Recorder by pressing the ⊙ button. It will then turn green ⬛ as you can see in the *BBC News Recorder 1* in the screenshot above. Click it again to stop the recording.

Audio: The audio for each recorder is turned off by default but you can click the speaker button 🔈 to hear the audio from that live stream. Click it again to turn it off.

💡 *Note: The metadata you enter for a recording will be displayed in the user interfaces (PC & STB) and can help as another resource alongside Filters and Tags when users search for specific videos in the NetworkTV library archive.*
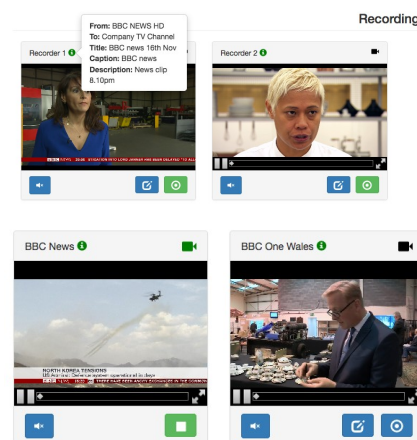
Managing Set Top Boxes

NetworkTV currently offers either our own STB or the Amino H140 set top box (STB) as decoder devices that accept the incoming IP video streams and outputs them via HDMI onto large format displays. Control of each STB can be with a handheld remote control or via the NetworkTV Administration Portal.

The **Manage Set Top Boxes** function provides the capability to manage all of the set top boxes that are installed as part of a NetworkTV system.

Manage Set Top Boxes

To manage the STB's, select the **Set Top Boxes** button and the **Manage Set Top Boxes** page will open (see below).

When a STB has been configured (see Page 27), NetworkTV will automatically find it on the IP network and by clicking the Refresh button ⟳ at the top right of the page those correctly configured STBs will be displayed in the list. However, you can also add STBs manually by clicking on the ➕ button. It also shows its IP address, the Group it's a member of and its **Status** (what channel or content it's currently playing).

Delete Selected STB   To delete a STB, click on the 🗑 button.

Reboot STB   If a STB requires a reboot then click on the STB that you want to reboot and then click on the **Reboot STB** ⟳ button.

Configure STB   To change the name of an existing STB or change its IP address, click on the **Configure STB** ☑ button, click **Save Changes** to confirm.

Reboot All STBs   From time to time — maybe after a power loss or a firmware update — all of the set top boxes may need to be rebooted. The Reboot All feature allows all of them to be rebooted rather than having to visit each one individually to reboot/power cycle them.

Manage Groups

NetworkTV provides the capability to create Groups of set top boxes. This may be relevant if you want to create Departmental groups so that you can send specific video's only to those displays in that Department.

Click the [Manage Groups] button and the **Manage Set Top Box Groups** page opens:

	Name	Multicast Address	
	Default	255.10.10.10	✎
🗑	Public Displays	241.0.0.1	✎
🗑	Ist Floor	241.0.0.2	✎
🗑	2nd Floor	241.0.0.3	✎

Group Name [   ]

Address [   ]

[Add]

Add new Group

Enter a name for the Group you want to create and then give that Group a unique IP multicast address. The IP multicast address is required because STBs assigned to a specific Set Top Box Group listen for commands sent on the multicast address assigned to that group. Click **Add** to confirm.

Note: Multicast addresses will most likely be allocated by your IT Department.

Edit Selected Group

To rename an existing Group or change its IP multicast address, click on the Group in the **Groups** list and click the edit button ✎ . Edit the **Group Name** or change its IP multicast address. Click **Add** to confirm.

Delete Selected Group

If you want to delete one of the existing groups, click on the 🗑 button.

Setting up & Configuring the NetworkTV Set Top Box

The set-top boxes access your NetworkTV system and display available live channels and content on a connected video source such as a large format display. The set-top boxes will be primarily used to play H.264, MP4 and MPEG .ts content but are also able to play other various format content including 4K. They support viewing live video as well as on-demand (and support Stop, Play, Pause, Fast Forward and Rewind features in VoD).

Before you can use your set top box to view video, you must configure it to access your NetworkTV system. Although you can use the RCU to set up the STB, you may find it easier to connect a USB keyboard and mouse (optional items) to access the configuration pages for the unit.

Connecting the set-top box:

1. Use an HDMI cable to connect the HDMI port on the set-top box to an HDMI port on your video display. HDMI also transmits an audio signal in addition to video (there is also an AV audio out mini jack).
2. Connect an RJ-45 LAN cable to the LAN port on the rear of the unit. The other end of the cable connects to your LAN.
3. Connect the power supply to the power connector on the rear of the unit and press the on button
4. Press the 'hamburger' button ▤ on the RCU to access the Management Settings menu. Use the arrow keys on the RCU to move around the menus.
5. Set STB to be DHCP or Static IP in the **Network Settings** menu.
6. Set the screen resolution in the **Resolution** menu.
7. **Display Adaptation** allows you to stretch or reduce the image if necessary.
8. Click the **More** menu for access to the **Account Settings** configuration.
   - Scroll down to **Advanced Settings** and enter. The login is **3008** then click **Confirm**.
   - Enter **Account Settings**.
   - In the **Primary Address** enter your NetworkTV Server url which will point the STB at your server:
   <<NTV Server ip address>>:8080/aurora/sunlive.html
   - Click **Confirm**.
   - Escape out or use Back key on RCU.
   - Reboot the STB.
   - Use EPG on the RCU to get the channel line up on screen.
   - Select the channel by scrolling down and clicking OK on the RCU.

You are able to bring up on the display an onscreen keyboard by pressing the **OK** button when you are in a text box. The Back button ↻ hides the onscreen keyboard.

NETWORK TV

Playlists

NetworkTV provides the functionality to create Playlists. A Playlist is a list of video or audio files that can be played back sequentially in a loop. Multiple Playlists can be created to run simultaneously so that users can select the Playlist Channel they want to display.

Setting up a Playlist

Create Playlist: In My Channels, click on the [+] button to create a new Playlist.

1. Name the Playlist
2. Indicate if it will be a Private Channel (not published to Users)
3. Choose Play it Live if you want it to play in a loop as a live channel
4. Enter a unique multicast address and provide a port number (the example here shows the full url and port 5500)

Adding Pre Recorded Clips: 5. Click Manage Content and choose the content you want to add

(filter the content in the library if you need to—see screenshot on left)

6.When you have selected the video, choose the edit button

7. Tick the Channel box that you want the video to play in.
8. Save.
9. Repeat steps 5-8 above to create the list of video's that you want to run in the Playlist loop.
10. The Playlist will start automatically and will be available in the Live Channel List so that it can be chosen by users to play.

NETWORK TV

Manage Virtual Matrix

The NetworkTV Virtual Matrix will allow you to set up a matrix of routes that take the input from IP encoders or live TV streams to destination endpoint decoders. So the matrix can route one live stream to a specific decoder (eg encoder in room 1 to show on the display in room 2. Or maybe the encoder in room 1 to show it on the displays in rooms 2, 3, 4, 5 or all the displays).

Once you have created your list of routes, this can be saved as a unique matrix which can be recalled and run at any time. Meaning you don't have to waste time recreating matrix routes and therefore different matrices can be created for different uses and scheduled to run at different times. Because the way NetworkTV Virtual Matrix has been designed and the technology it uses, more than one administrator can use the system at a time which means that several people can be setting up and managing their own version of the Virtual Matrix simultaneously.

Control From Anywhere

NetworkTV Virtual Matrix runs in a browser and can therefore be managed and controlled via a PC, tablet or mobile device and means that with the correct authentication an administrator anywhere in the world can set up and manage their own virtual matrices.

Setting up a Matrix

First, create your matrix by giving it a unique name then choose your inputs by ticking the boxes. Then tick the outputs that you want the streams to play on and save the matrix.
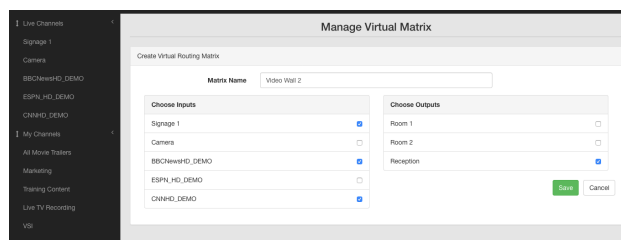
Then all you have to do is select the matrix you want by selecting from the list on the left.
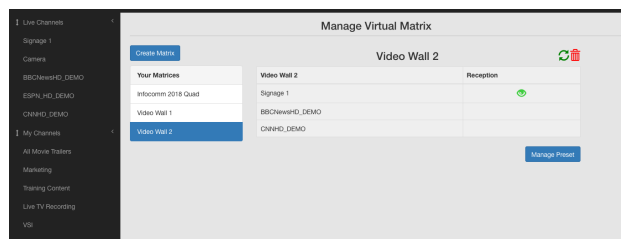
You can also set up Presets within each Virtual Matrix. This allows you to select a specific input to be played on a specific output just by clicking the Manage Preset button so that you can schedule channels to play on a specific output.
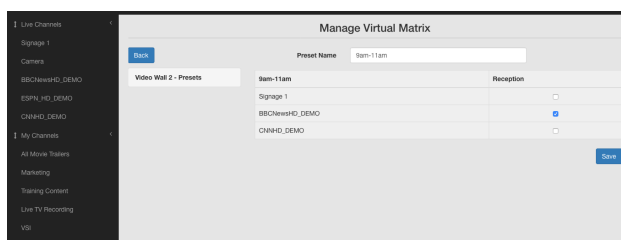
Appendix A — Graceful Shutdown & Restart of NetworkTV System

Overview

In the event of a planned or unplanned network or electrical outage, the following steps should be taken to ensure a controlled shutdown and restart of the NetworkTV system.

The order of restart is fairly important to provide data to the control components in the correct manner. If the system is brought back into service randomly or in improper order, you may see some random error messages appearing in the user interfaces.

Shutdown

The order of shutdown is not as critical as the restarting, but the recommended order of tasks are:

NetworkTV HD Encoder

Powering off the encoder by unplugging its power cable is normally sufficient.

Amino Set Top Box

Power off unit by disconnecting the power cable from rear of unit (see Page 27).

Note: It may not be necessary to power down every Amino throughout the facility in the event of a planned network or power outage, but it is a recommended practice. When network and power are restored, it may be necessary to use the Reboot All STBs from the Manage STB Administration page (see Page 25). The NetworkTV System will then poll the Amino STBs on the IP LAN and populate the STB list automatically in the NetworkTV management interface.

NetworkTV Live Servers

Power off unit by disconnecting the power cable from rear of unit (see Page 11).

NetworkTV Server

Attach a keyboard, mouse and screen to the NetworkTV Server and login with your username and password. (the default is: u: admin/p: auroraadmin).

Type Q and the system will close down. Remove the power cable from the rear of the server (see Page 4 for details of the server UI).

Startup/Restart

The order of startup is important to the proper operation of the system following a network or power out-age. Several of the system components provide configuration or status details to each other, and the absence of that information can cause components to malfunction. It's important that the networking infrastructure (switches, hubs, routers etc.) are powered-on first followed by the NetworkTV Server.

A short wait period between powering up each device is recommended to ensure that each has a chance to initialize before the next, to provide any needed configuration or status data in the proper sequence.

If the servers, Gateway appliances, encoders or STBs come online without network present, they may default to local loop-back addressing if they don't have static IP addresses, which would impair or stop necessary ser-vices within those devices.

Troubleshooting

In the case that this procedure is followed, but does not return the system to functionality, there are several steps which may be performed to verify which portion(s) of the system is not operating properly. For pur-poses of this document, these steps are bulleted, with more detailed information referenced.

No TV signal on screen from STB

- Verify that the display is connected to power and to the STB.
- Verify that the display is powered on and set to the correct source.
- Verify that the STB is connected to power, network, and to the video display.
- Verify that the STB is powered on, and has network connectivity by checking the red LED on the front of the STB, and the network connectivity and activity lights on the rear of the unit.
- Verify that the correct video display input is selected (check video connection from STB).
- Verify that the STB has a proper IP address and default browser page config-ured (refer to the Configuring the Set Top Box section on page 27 for more information.)

No TV signal from Trans-mitter

- Verify that network switch is operational, and that connectivity/activity lights are illuminated and flashing.
- Verify that CATV/Satellite/Cable connection/service is functioning, and that transmitters have power, coaxial (RF), and network connections.
- Verify that NetworkTV Live Gateway is powered on, or that power source (strip/UPS, etc) is working.
- Verify that NetworkTV Live Gateway has active network connections with net-work activity lights on the NIC illuminated and flashing.
- Verify that the NetworkTV Live Gateway is configured and has a saved chan-nel list (see Page 15 and 18 for the tuner set up instructions).

NETWORK TV

Appendix B — Live Channel Types

Overview

There are three main ways to stream media over a network: Unicast, Multicast, and Broadcast. Unicast creates a one-to-one connection between an individual user and a server. Each additional connection between a user and the server is a separate unicast connection, and takes up its own amount of bandwidth. In a unicast system, the demand on the server increases as the number of users increases. However, each unicast stream is independent allowing each user to independently control their content.

Broadcast creates a one-to-all connection between all users and a server. Because it transmits data to all the workstations on a network, broadcast is bandwidth-intensive.

Multicast creates a one-to-many connection between several users and a server. Only the users wanting to receive the signal will receive it. Multicast is generally preferred to broadcast on a corporate LAN, because it only transmits data to users that are actually accessing the information at a given time.

NetworkTV is capable of handling most of the main live streaming format types such as multicast, HTTP, RTSP, HLS, RTMP and RTP. The URL nomenclature (or address) for each type of channel differs for each of the above types and when creating new live channels you will need to know what type of stream it is and decide how you want to distribute it.

Example Stream Addresses

The example URL's below give you an example of the format of the address to be used for each video stream type. When creating a live channel be aware to avoid conflicts with ports being used for other purposes.

Multicast

udp://@238.0.0.1:1234—The multicast IP address selection range is between 224.0.1.0 and 238.255.255.255.

HTTP

http://192.168.1.168:80/hdmi_ext (identifier "hdmi" can be changed here).
HTTP Port: Set the port to be used for http streaming (usually port 80).

RTSP

rtsp://192.168.1.168:554/hdmiStream (identifier "hdmi" can be changed here).
RTSP Port: usually 554 but any port from 1-65535 can be chosen.

HLS

http://192.168.1.166:8080/aurora/content/0000/010033ed-fd25-42e8-965a-a6e10095b244/live.m3u8. The HLS stream will be created automatically from the Manage Live Channels Page.