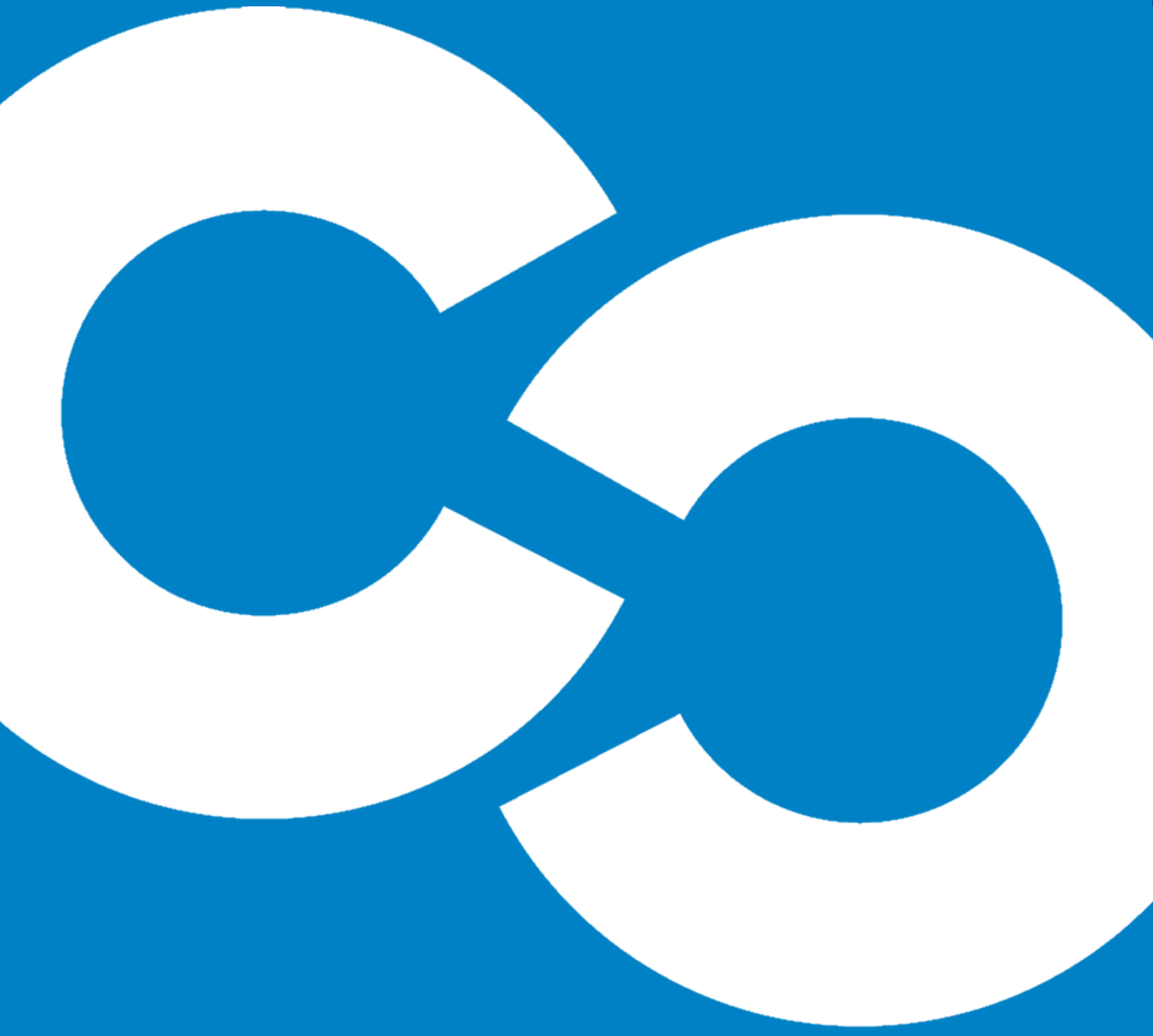


Broadcast Delay Service

Customer Service

Support.

By Phone in Europe.

- Service is available from CloudCast Systems in the United Kingdom at +44 808 196 0362.

By Phone in the United States.

- Service is available from CloudCast Systems in the United States at +1 844 967 2157.

By Phone in Australia.

- Service is available from CloudCast Systems in the Australia at +61 7 5606 8211.

By E-Mail.

- The address is **support@cloudcastsystems.com.au.**

Online.

- The CloudCast Systems Web site has a variety of information which may be useful for product selection and support. The URL is **http://www.cloudcastsystems.com.au**.

Feedback

We welcome feedback on any aspect of CloudCast Systems products or this manual. Please contact us with your comments.

Updates

All of our products are undergoing constant improvement. Periodic updates may become available - to determine if this is the case, visit our web site periodically, or contact us for advice concerning whether a newer release is more suitable to your needs

Warranty

Please see Appendix C.

Contents

Date	Revision	Description	Initial
01/10/2019	1.0	Initial	
17/10/2019	1.1	Added extra GPIO control for Rollout and Compress. Added Extra GPIO Status for RolloutEnd	
22/10/2019	1.2	Added section on mix minus rollout output device	
26/11/2019	1.3	Added Asset Fill Stretch and Squeeze Options	
3/12/2019	1.4	Added Logging Section	
12/12/2019	1.5	Added Log and Dump File Purge, Added Wheatstone ACI	
13/12/2019	1.6	Added build after dump mode	

21/12/2019	1.7	Added Ember+	
07/02/2020	1.8	Added new web interface buttons and predelay censor overfill and underfill	
24/05/2020	1.9	Changes to UDP Data Ports	
12/07/2020	2.0	Added ASIO, WASAPI	
31/10/2020	2.1	Updated BDS Protocol/Added Syslog	
05/03/2020	2.2	Added user management and TCP/UDP Client	
15/09/2022	2.3	Added Post Cough, Force Censor Reset and Added Delay Cart Rotation	
24/03/2024	2.4	Added Rollout Status Output, SSL/TLS Configuration	

Under the Hood

BDS has all the same features as most if not all broadcast delay units on the market.

- 4 Build Modes (Pre-Roll, Expand, Insert File, Insert External Input).
- 2 Exits Modes (Roll out, Compress).
- Rollout Mix Minus audio output enables seamless monitoring when exiting.
- 3 Dump Modes (Dump All, Dump Segment, Censor Audio).
- Cough Functionality.
- External Censoring Feature which allows for Censoring of Pre and Post Delay Audio via the use of tone insertion.
- Run up to 6 units on a single windows machine.
- Shout cast stream Pre and Post Delay Audio via the Browser.
- Receive compressed mp3 dumped audio files via email.
- Simple web interface for management and configuration including ssl/tls encryption.
- Delayed TCP/UDP data ports for use with now playing and playout systems.
- User management including active directory integration
- Axia GPIO, Wheatstone ACI and Ember+ Protocols.
- Proprietary TCP control protocol for use with external systems.
- Day part scheduling for file insert and censor audio.
- Upload and manage audio assets from the browser.
- Supports most audio file formats. Wav, mp3, aac, 3gp, aif, mwa, m4a.
- External control from Stream Deck, Stream Deck XL and Stream Deck Mini.
- Verbose logging and external syslog capabilities

Getting Started – System Requirements

- Intel Core i7, Xeon, or Core i9 multicore processors specified for desktop or server applications.
- Physical Machines 2 CPU's, Virtual Platforms 4 CPU's
- System must have 8GB minimum RAM
- Operating system should be Windows 7, 8, 8.1,10 (32 and 64 Bit), Server2012 R2 or Server2016
- Gigabit Ethernet LAN
- Microsoft .NET Framework 4.5

Virtual Machine Tips

Broadcast Delay Service has been verified on the following virtual platforms

- VMware 6.5

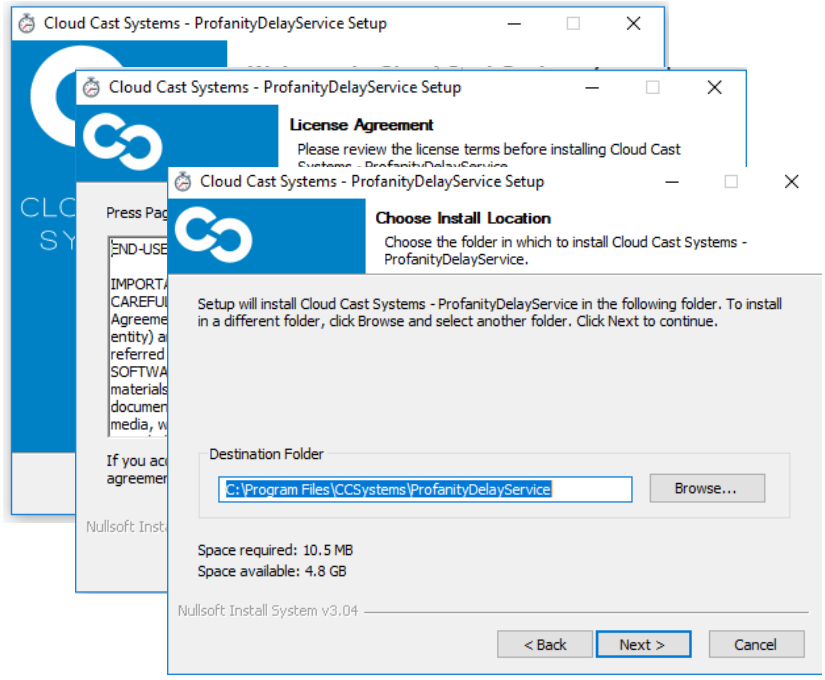
To familiarize yourself with the VMWare environment, please read the following Technical White Papers (from VMWare):

- Deploying Extremely Latency-Sensitive Applications in VMware vSphere 5.5
- Best Practices for Performance Tuning of Telco and NFV Workloads in vSphere

When configuring VMWare for use with Broadcast Delay Service, it is essential to use the latency sensitivity settings (mentioned in the white papers), and to follow the "100% reservation rule" for CPU and memory.

Getting Started - Installation

Getting started with BDS is as simple as downloading BDS from the cloud cast systems website and navigating through the standard installation procedure.

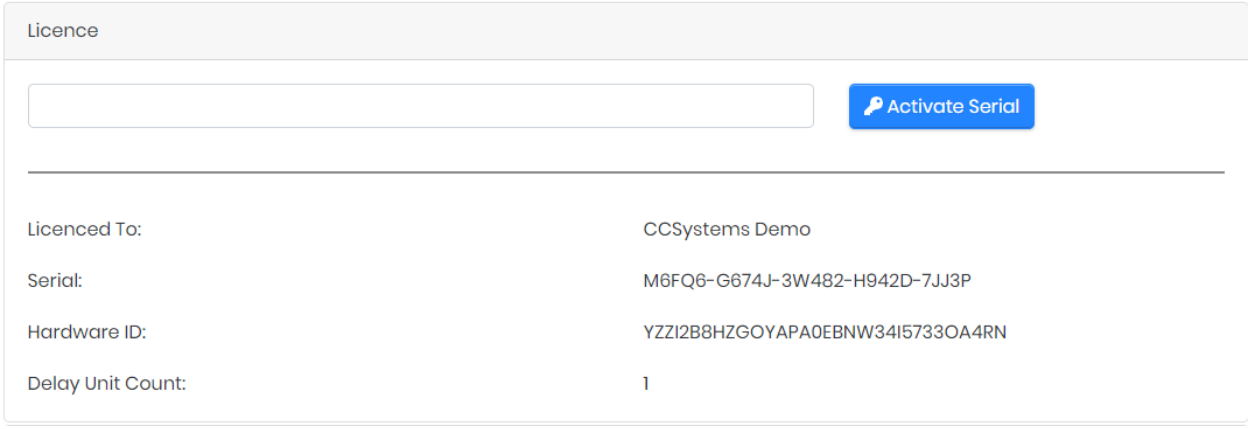


Getting Started – Registering License

Licensing for BDS is done via online activation, this means that the machine BDS is installed on requires access to the cloudcastsystems.com.au website. If your machine is unable to access the internet please contact support@cloudcastsystems.com.au for offline activation.

To Activate your copy of BDS please following the procedure below:

1. Ensure BDS service is running, the service is called "ProfanityDelayService".
2. In Google Chrome navigate to http://127.0.0.1:81 which will load the BDS webserver.
3. If prompted enter the default login – username: **admin** password: **password.**
4. Navigate to Settings -> License and enter the serial number provided by CloudCast Systems.
5. Select Activate and wait until license server responds.



License To	Shows the name the software is activated for
Serial	Shows the serial used to activate the software
Hardware ID	Shows the Unique Hardware which locks the Serial to this machine
Delay Unit Count	Shows the amount of Delay Units that are able to be launced

Getting Started – Trial Activation

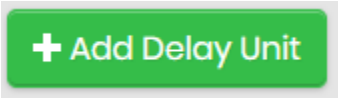
BDS Allows for a trial license which is valid for 30 days from activation, trial activation is only valid if a license is unable to be found on the machine.

To Activate your trial license please follow the procedure below:

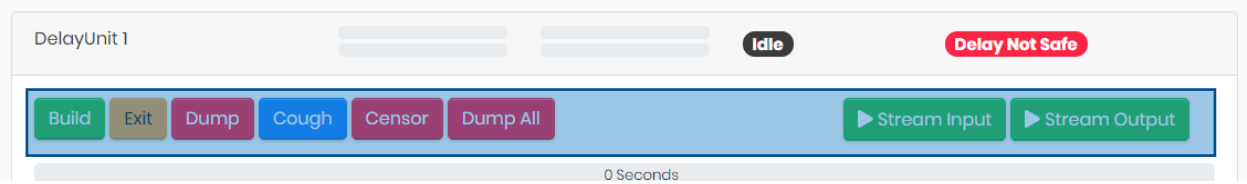
1. Ensure BDS Service is running, the service is called “ProfanityDelayService”.
2. In Google Chrome navigate to http://127.0.0.1:81 which will load the BDS webserver.
3. Navigate to Settings -> License -> Register for Trial -> Enter your Email address Select Activate.
4. If Registration is successful, an email will be sent to your inbox asking you activate the trial. Select the Activate Link inside the body of the email to activate.
5. Re-Enter your email into the Register for Trial Dialog to Activate 30 Day Trial license.

Basic Operation

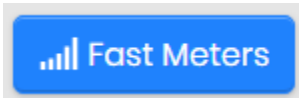
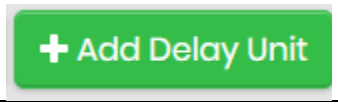
By Default BDS has no delay units configured, to Add your first delay unit, Navigate to the webserver and select "Add Delay Unit" button which is in the top right corner of the webpage.



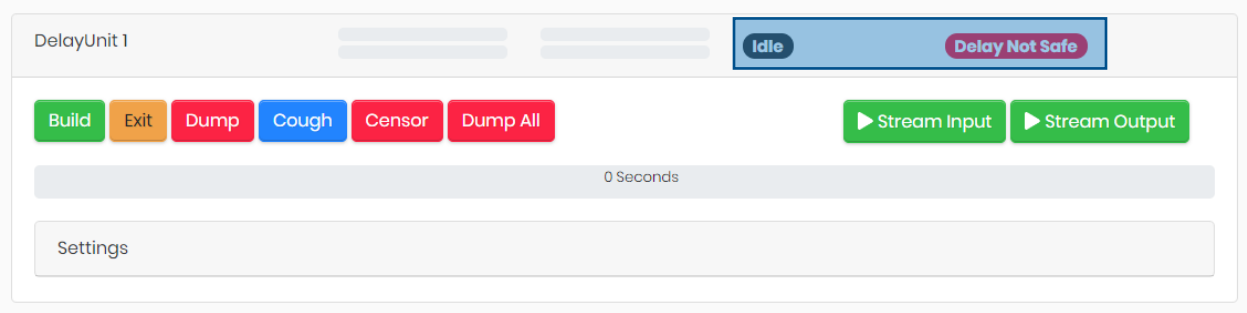
Web Interface Buttons



Web Interface Buttons	
Build Delay using Default delay mode	Build
Exit Delay using default delay mode	Exit
Dump Delay Segment	Dump
Cough	Cough
Pre-Delay Censor Button	Censor
Dump All Button	Dump All
Stream Audio Input	Stream Input
Stream Audio Output	Stream Output

Speed up meter updates from 1 second to 100ms	
Add Extra delay unit	
Launch help	

Web Interface Status



Unit is in idle	
Unit is Building	
Unit is Exiting	
Unit has reached minimum delay segment	
Censor currently active	
Cough button currently active	
Delay has not reached minimum segment	
Delay has reached minimum segment	

Getting Started – Setting up Delay Unit

Before you can use BDS you must first setup the Input and Output Devices for the unit to function.

Choosing Audio Mode

BDS supports 3 audio modes, Wave, WASAPI and ASIO. Wave IN and WASAPI provide an easy solution as they support most Inputs and Outputs using the windows mixer, but it comes with a higher latency value then ASIO.

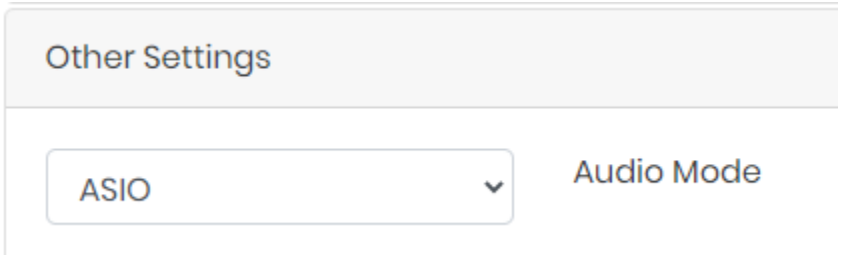
CloudCast Systems recommends ASIO for minimal throughput latency.

Mode	Compatibility	Throughput Latency*
Wave	Windows 7 >	350ms
WASAPI	Windows 7 >	250-300ms
ASIO	Soundcard Dependent	<200ms#

*Tested using AXIA ASIO Driver

When using buffer sample size of 64 or less.

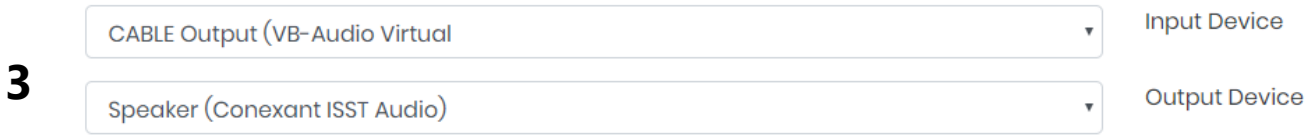
To Set Audio Mode navigate to Setting -> Other Settings -> Audio Mode.



***NOTE:** Changing audio modes should only be done when BDS has been bypassed, the audio will stop as the input and output channels are different between audio modes.

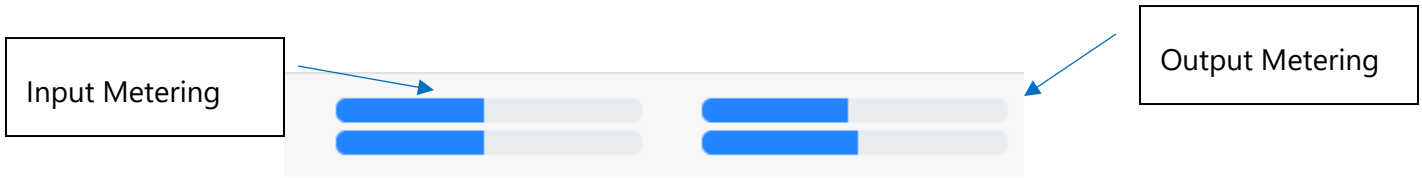
Assigning Input and Output Devices

1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Select your Input and Out Device.



4. Select Update Delay Settings.

5. Once updated successfully you should see metering on the input meters .



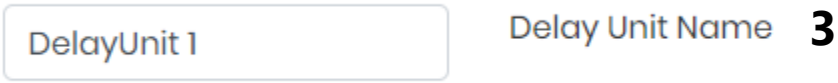
Setting Delay and Dump Times

1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Set the Desired Delay Size which will be the total delay time when completely built.
4. Set the Desired Dump Size which will allow for multiple dumping of audio segments.

Note the Delay size cannot exceed the dump size

Setting Delay Unit Name

1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Enter new name in Delay Box and Update Settings.



4. Select Update Delay Settings.

Setting Build Modes

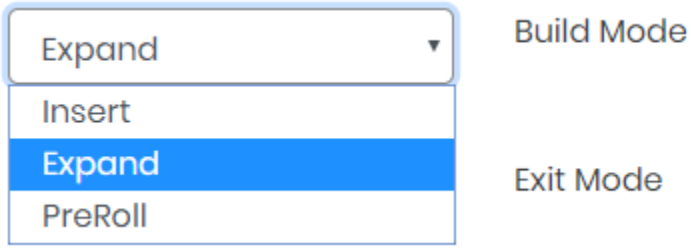
BDS has 4 Available build modes. Expand, Insert File, Insert External Input & Pre-Roll. By default the Build Mode will be set to Insert File.

Expand

Expand will slow the rate of playback by the amount set in the Build Rate setting. For Building after Dump Mode please see section under dump mode.

1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Under the Build Mode Drop down box Select "Expand".
4. Enter the Build Rate Percentage (Recommended 6-10 %).
5. Select Update Delay Settings.

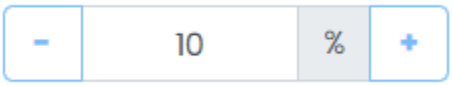
Set Build Mode to Expand



3

Set Build Rate

4



Time to build can be expressed in the following formula:

Time to Build = Desired Delay Size / (Build Rate * 0.01).

10 Seconds	10%	100 Seconds
20 Seconds	7%	286 Seconds
30 Seconds	15%	200 Seconds

Pre Roll

Pre-Roll is best used when feeding a network and not a transmitter site, this is because it is assumed you need to send silence before the program starts.

To use Pre Roll the user presses the build button X seconds before the show is due to start, for example if the Delay Size is 30 Seconds and the show is due to start at 09:00:00 AM then the user would press the build button and start their show at 08:59:30 AM.

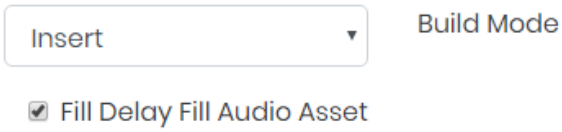
1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Under the Build Mode Drop down box Select "Pre-Roll".
4. Select Update Delay Settings.

Set Build mode to Pre-Roll

3

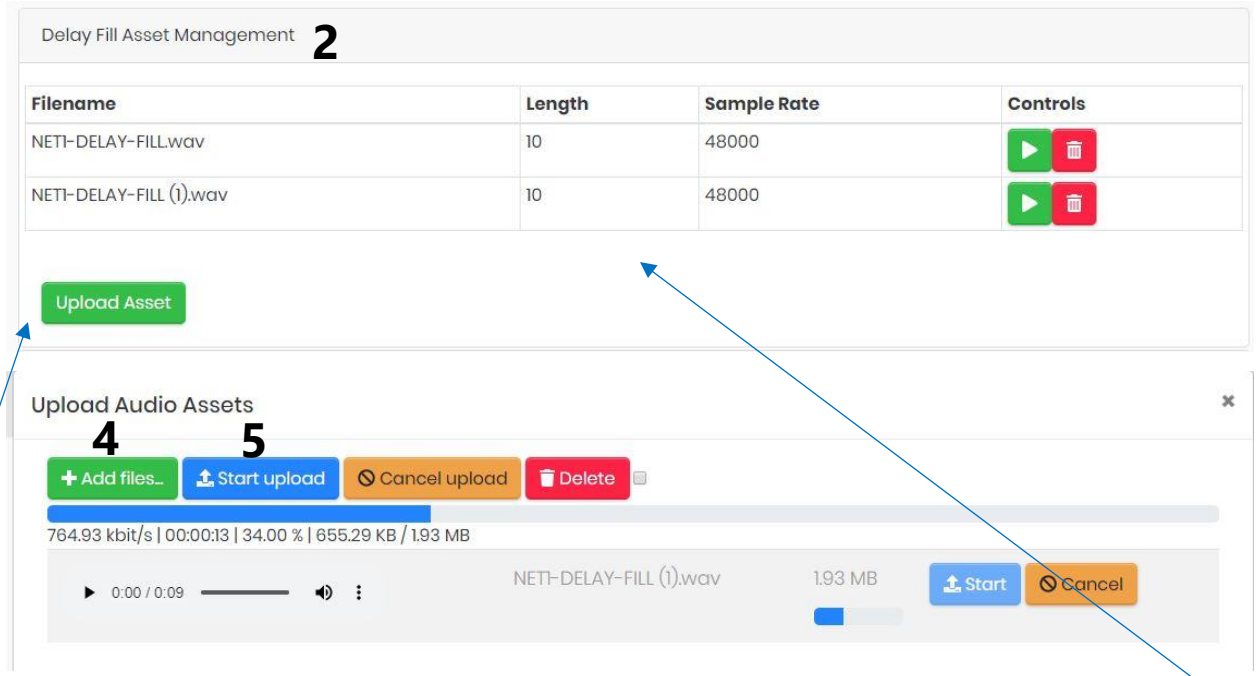
Insert – File

Insert File allows for a Default or Day Part Scheduled audio file to be inserted during delay build. The audio file will be stretched and squeezed to fit the desired delay size when the ***Fill Delay Fill Audio Asset*** is enabled. If this option is not enabled the entire audio file will play and the audio input will be mixed once the desired delay time has been reached.



Uploading Audio Assets

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Delay Fill Asset Management.
3. Select Upload Asset.
4. Select Add Files and Choose the audio assets you wish to load.
5. Select Start Upload to upload assets.



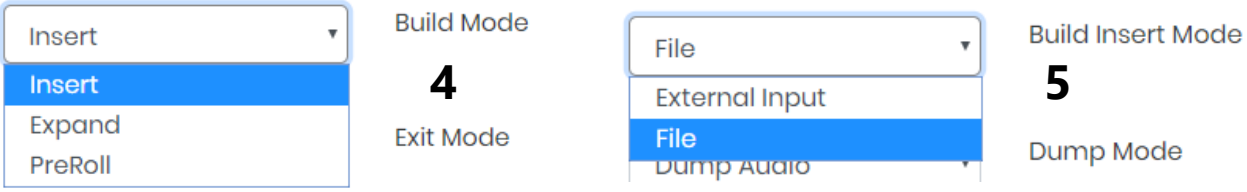
3
Upload Audio Asset Dialog

Uploaded Assets

Configure Delay Unit for Insert File Mode

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings.
4. Under the Build Mode Drop down box Select “Insert”.
5. Under Build Insert Mode Drop down box Select “File”.

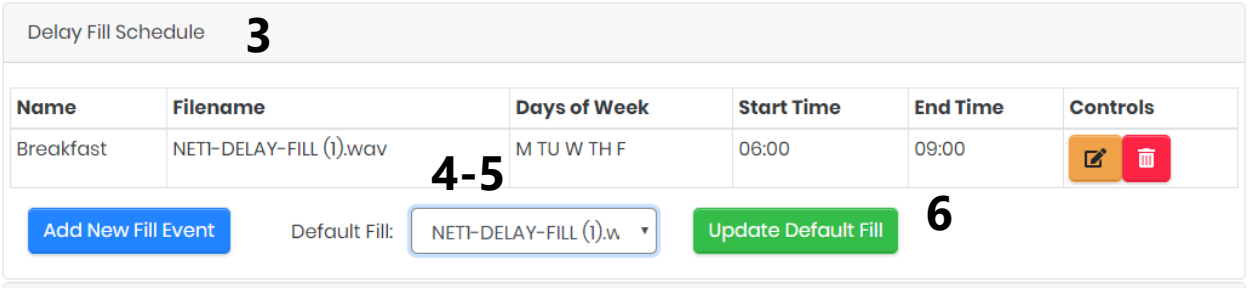
6. Select Update Delay Settings.



Set Default Audio Asset

By selecting a default audio asset this will enable an audio asset to play when delay build is selected, if no asset is selected then silence will be played for the duration of the delay size.

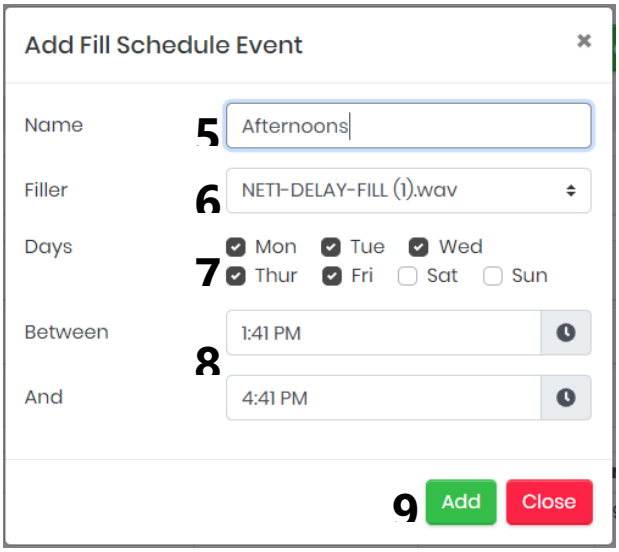
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Fill Schedule.
4. Select the Default Audio File from the Default Fill File Dropdown.
5. Select the desired audio asset.
6. Select the update default fill button.



Create Daypart Audio Asset

By Creating a Daypart Audio Asset it enables a specific asset to play at certain times during the day and during the week. **Note: When multiple assets are set for the same day part, the assets will be sequentially played in order.**

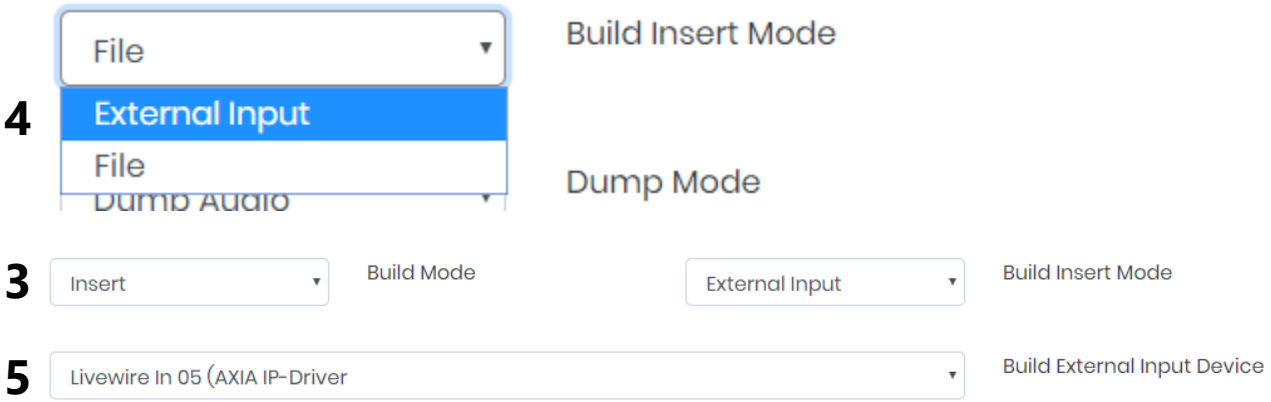
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Fill Schedule.
4. Select Add New Fill Event.
5. Enter Name.
6. Select Audio Asset.
7. Select Days to Play Asset.
8. Select Play Times.
9. Select Add.



Insert – External Input

Insert External Input allows for an external audio input to be used during delay build. This would be used for cases where the delay fill audio would come from a playout system or an external audio player.

1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Under the Build Mode Drop down box Select “Insert”.
4. Under Build Insert Mode Drop down box Select “External Input”.
5. Under Build External Input Device Selected the Audio Input.
6. Select Update Delay Settings.



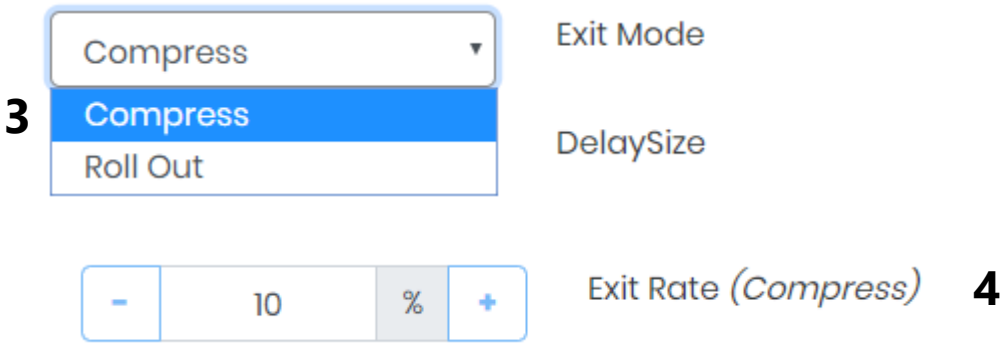
Setting Exit Modes

BDS has 2 Available exit modes. Rollout and Compress.

Compress

Compress will increase the rate of playback by the amount set in the Exit Rate setting.

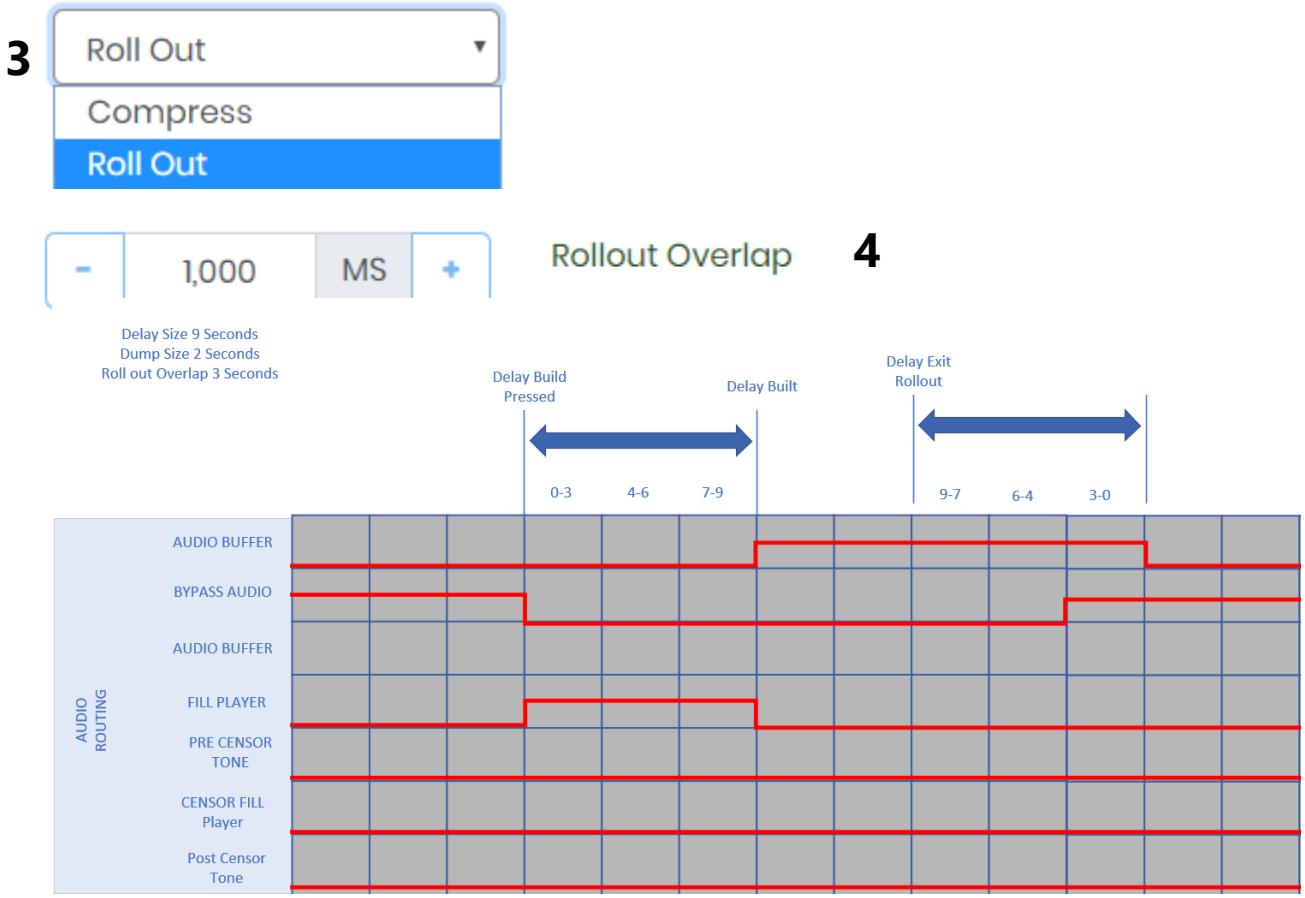
1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Under the Exit Mode Drop down box Select "Compress".
4. Enter the Exit Rate Percentage (Recommended 6-10 %).
5. Select Update Delay Settings.



Rollout

Rollout will mute the input and start to empty the delayed audio buffer, when the audio left in the buffer is equal to the Rollout Overlap time the mixer will switch on the bypassed audio input which allows for a smooth cross mix between the delayed audio and the bypass audio.

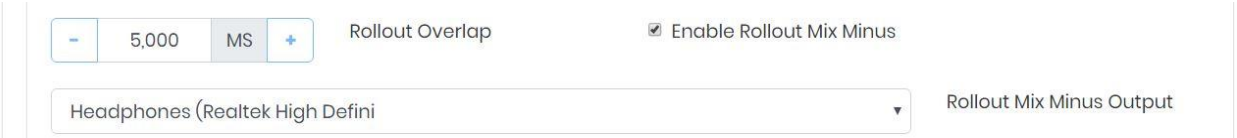
1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Under the Exit Mode Drop down box Select "Rollout".
4. Enter your desired overlap time in the Rollout Overlap box *(1-3 Seconds Recommended).*
5. Select Update Delay Settings.



Rollout Mix Minus Output

Some users may require a clean feed of the audio buffer to be mixed into local studio monitoring whilst exiting delay. This enables the user to listen to the output of the delay unit and then proceed to talk without hearing themselves back through the delay unit.

To Enable the Rollout Mix Minus Output simply select the “Enable Rollout Mix Minus" and select the output device.



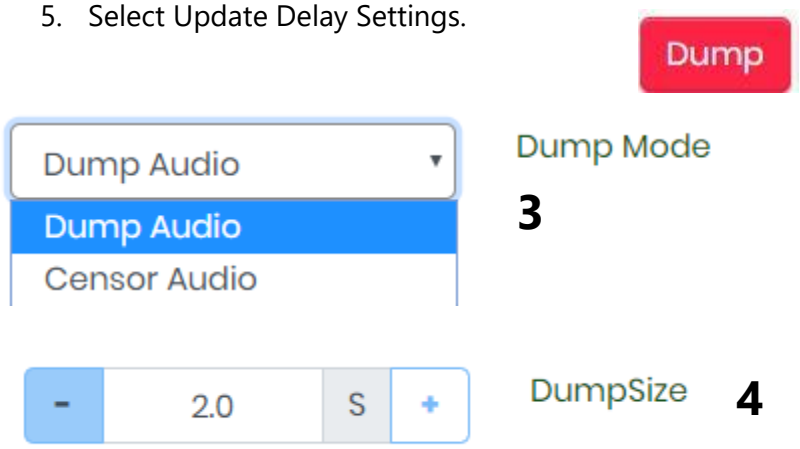
Setting Dump Modes

DBS has 3 Dump Modes. Dump All, Dump Audio Segment and Censor Audio.

Dump Audio

Dump Audio mode allows the user to dump the dump size amount from the audio buffer, if the dump size is equal to the delay size then it will dump all audio. If the dump size is smaller then the delay size it will allow incremental dumps by only removing the dump size from the audio buffer.

1. Navigate to the BDS webserver at http://127.0.0.1:81 and select the delay unit you wish to configure.
2. Select Settings - > Delay Settings.
3. Under the Dump Mode Drop down box Select "Dump Audio".
4. Select the Desired Dump Size.
5. Select Update Delay Settings.



Dump All

Dump all is available from within the control protocol or external control protocols, when the dump all control is called it will remove all audio from the delay buffer.

Build after Dump Mode

When the dump mode is set for Dump Audio BDS allows for automatic building of delay after the dump button has been pressed. When this mode is enabled the delay unit will use Expand to build the delay. This can be set to run in 4 different modes.

Disabled	No Action is taken after dump
Build after Segment Dump	Delay will rebuild after Dump is pressed, Even if the buffer is reduced to 0 seconds it will continue to build
Build after Dump All	Delay will only rebuild after the Dump All button is pressed
Build After Both	Delay will rebuild after either dump buttons are pressed

Uploading Build after Dump Mode

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings.
4. Under the Dump Mode Drop down box Select “Dump Audio”.
5. Under Build After Dump mode select the mode.
6. Select Update Delay Settings.

Censor Audio

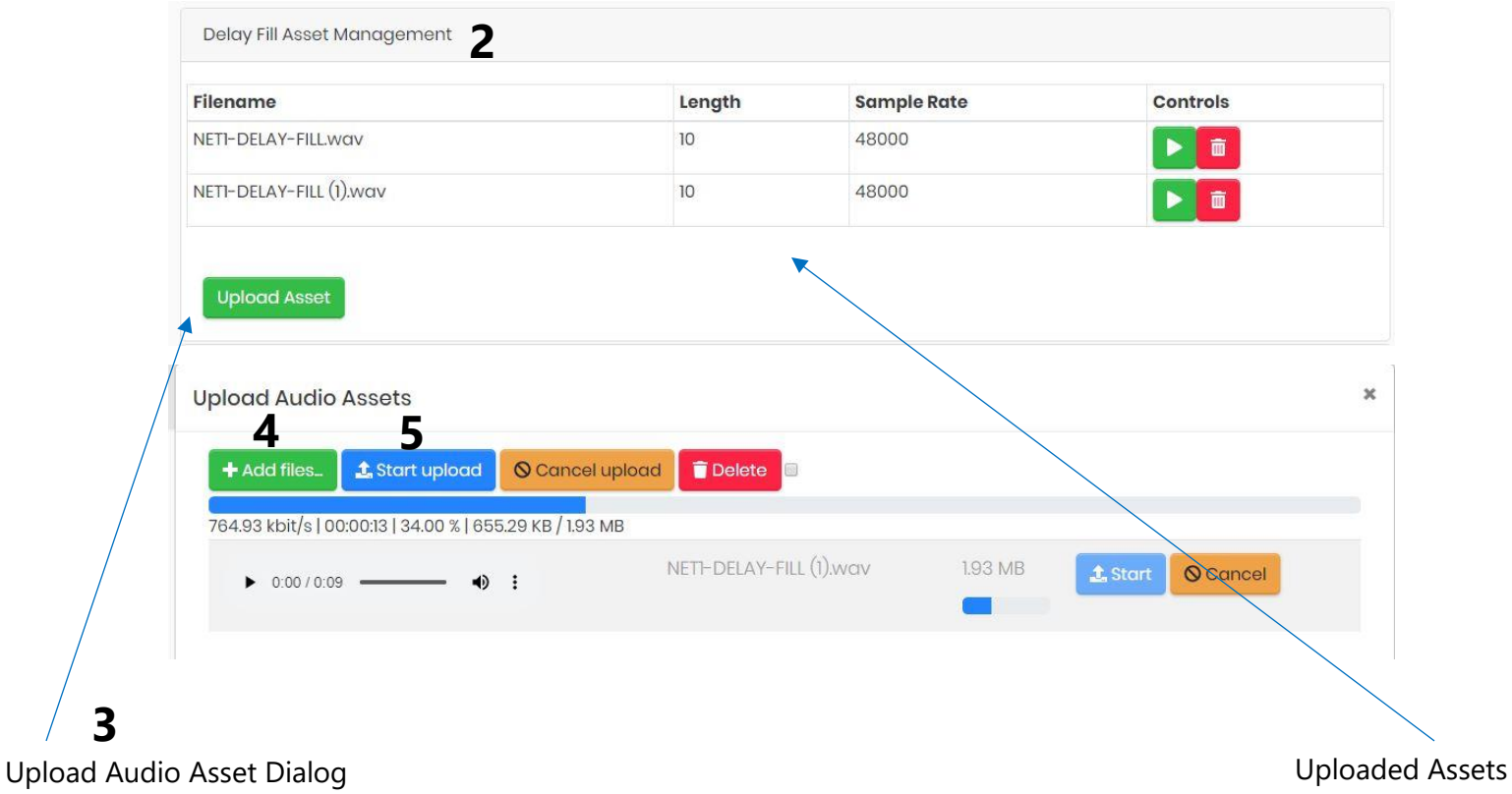
Censor Audio allows for an audio asset to be played over the top of the audio output; this feature allows the delay to be retained whilst the profanity is removed from the audio buffer.

Note: The censor audio asset must have the same duration as the delay size otherwise silence will fill the gap between the end of the audio asset playing and the total delay time.

Uploading Audio Assets for Censor Audio

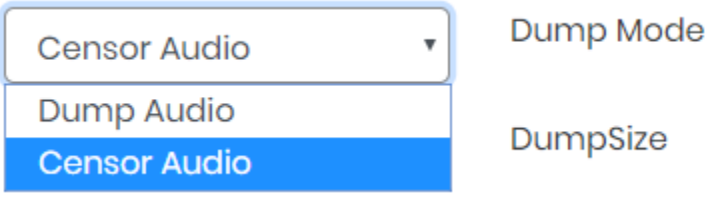
7. Navigate to the BDS webserver at http://127.0.0.1:81.
8. Select Delay Fill Asset Management.
9. Select Upload Asset.
10. Select Add Files and Choose the audio assets you wish to load.

11. Select Start Upload to upload assets.



Configure Delay Unit for Censor Audio Dump Mode

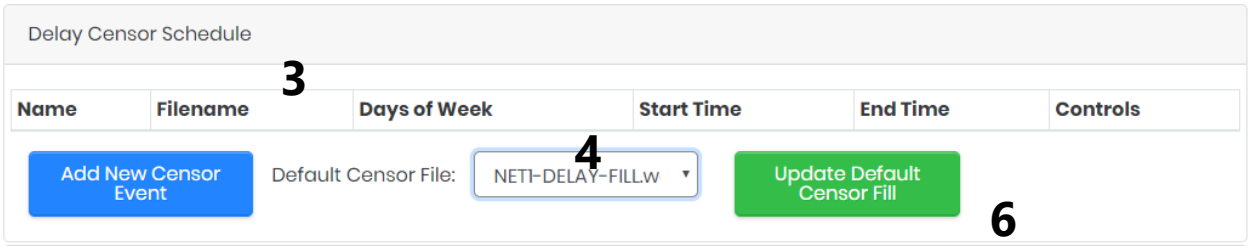
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings.
4. Under the Dump Mode Drop down box Select "Censor Audio".
5. Select Update Delay Settings.



Set Default Audio Asset for Censor Audio

By selecting a default censor fill audio asset this will enable an audio asset to play when dump is selected, if no asset is selected then silence will be played for the duration of the delay size.

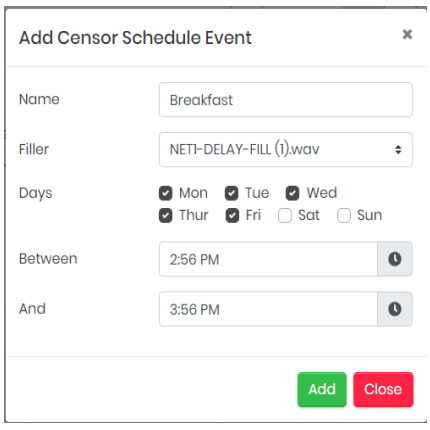
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Censor Fill Schedule.
4. Select the Default Audio File from the Default Fill File Dropdown.
5. Select the desired audio asset.
6. Select the update default censor fill button.



Create Daypart Censor Fill Audio Asset

By creating a scheduled censor fill audio event a specific asset will play at certain times during the day/week.

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Censor Fill Schedule.
4. Select Add New Fill Event.
5. Enter Name.
6. Select Audio Asset.
7. Select Days to Play Asset.
8. Select Play Times.
9. Select Add.



Dump File Maintenance

All Dump Files are stored on the machine under the following location.

"C:\Program Files\CCSystems\ProfanityDelayService\DumpFiles".

Each File is stored as an MP3 and is saved in the following format.

Type	File Name
Pre Delayed Feed	DelayUnit_{unitid}_{delayunitname}_OFFAIR_{yyyy_mm_dd_ss_ms}.mp3
Post Delayed Audio	DelayUnit_{unitid}_{delayunitname}_ONAIR_{yyyy_mm_dd_ss_ms}.mp3

Dump Files are stored for a default of 90 Days but can be changed via the settings menu

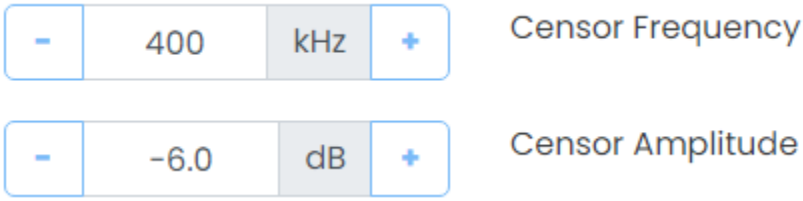
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Other Settings.
3. Change Keeps Dump Files for Option.
4. Select Update Other Settings.

Using the Censor Feature

BDS allows for censoring of the content whilst listening to a pre and post delay feed. When the user hears content that is undesirable, they can engage the censor feature which will inject a tone over the audio blocking out the undesirable audio. The censor feature allows for a pre-delay injection and for safety allows for a post delay injection.

Censor Frequency and Amplitude

Each Delay unit has the ability to set seprate sensor frequencies and ampltude. The Tone is a Sine wave and by default is set to 400khz with an amplitude of -6dB.



Pre-Delay Censor

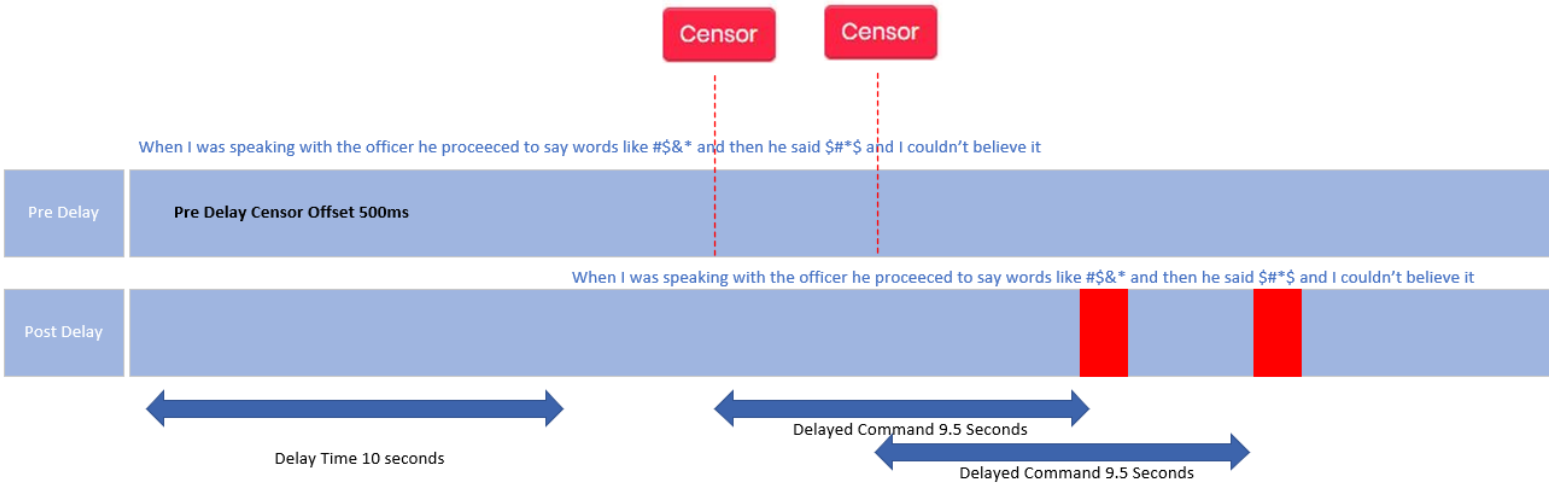
When the pre-delay censor control is used the censor command is delayed by the amount of the audio buffer minus the predelay censor offset. This offset is used to compensate for reaction time. When the command executes it injects a tone over the output masking the undesired content.

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings.
4. Set the desired Censor Frequency.
5. Set the Desired Pre Censor Offset.

6. Select Update Delay Settings.
7. Pre Delay Censor Timeline Example.

Pre Delay Censor Over Fill / Underfill

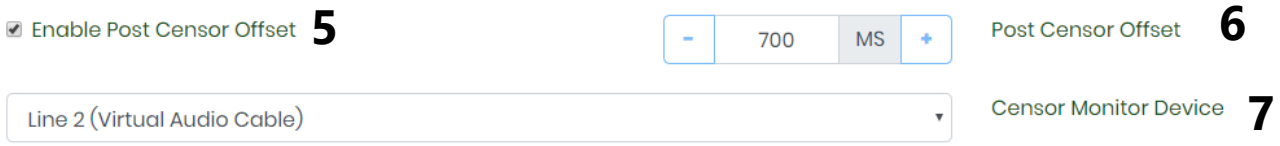
To compensate for inconsistent reaction times BDS also allows for underfill and overfill of the pre censor function, this enables you to start the tone earlier and finish later.



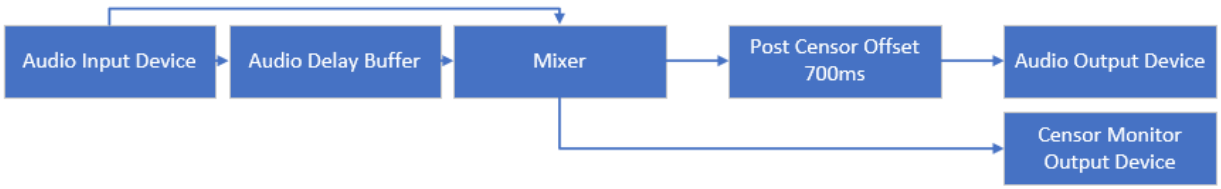
Post-Delay Censor

When the post-delay censor control is used a new audio output is created and the program output is delayed by the Post Censor Offset, this offset should represent the reaction time between the user hitting the post delay censor button and the tone being injected.

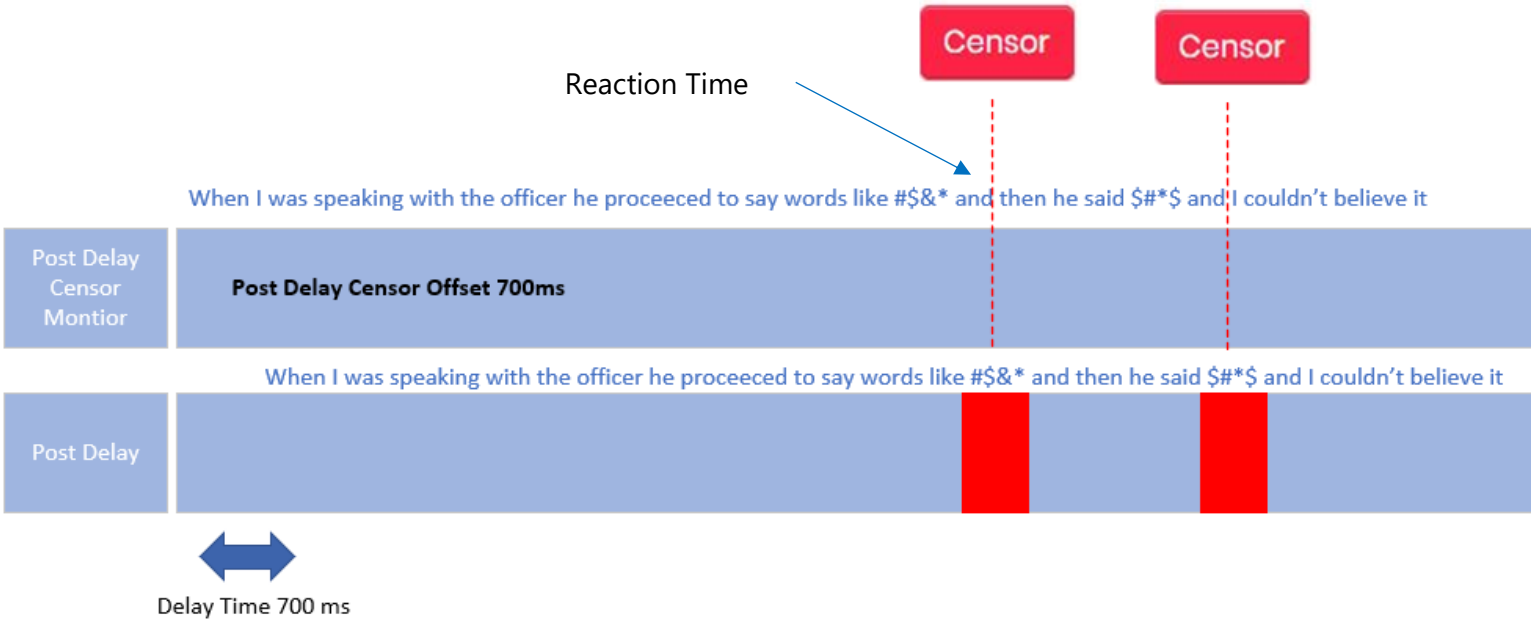
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings.
4. Set the desired Censor Frequency.
5. Select Enable Post Censor Offset.
6. Set the Desired Post Censor Offset.
7. Set the Desired Monitor Output Device.
8. Select Update Delay Settings.



Signal Flow Example for Post Delay Censor Offset of 700ms.



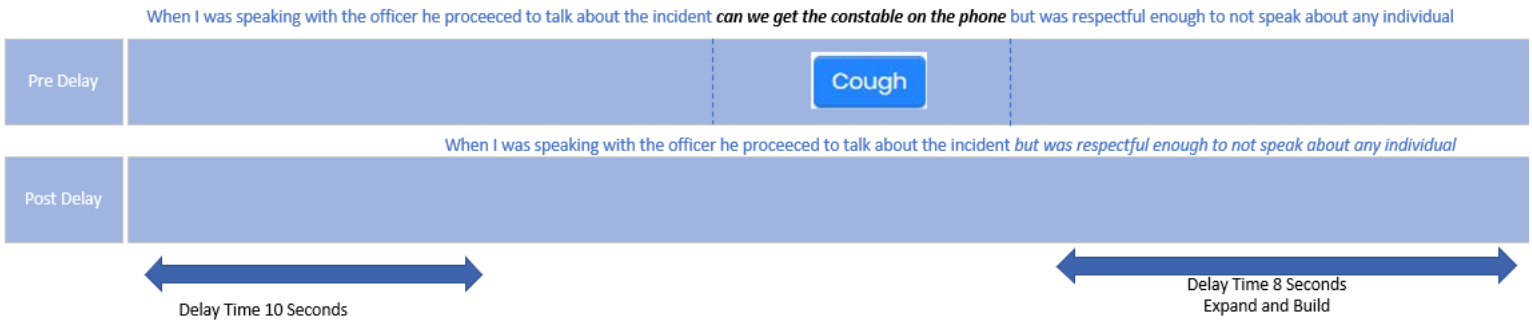
Post Delay Censor Timeline Example:



Using the Cough Feature

BDS also has a cough feature which allows the user to remove any coughs or sneezes from the program and allows for the user to talk privately to other people in the studio. When the cough button is pressed the delay unit mutes the audio input and continues to play audio from the audio buffer.

When the cough button is released the delay unit will re-build the delay to the desired delay time using the expand feature. If the user holds the cough button longer then the delay size the unit will mute and send silence to the program output.



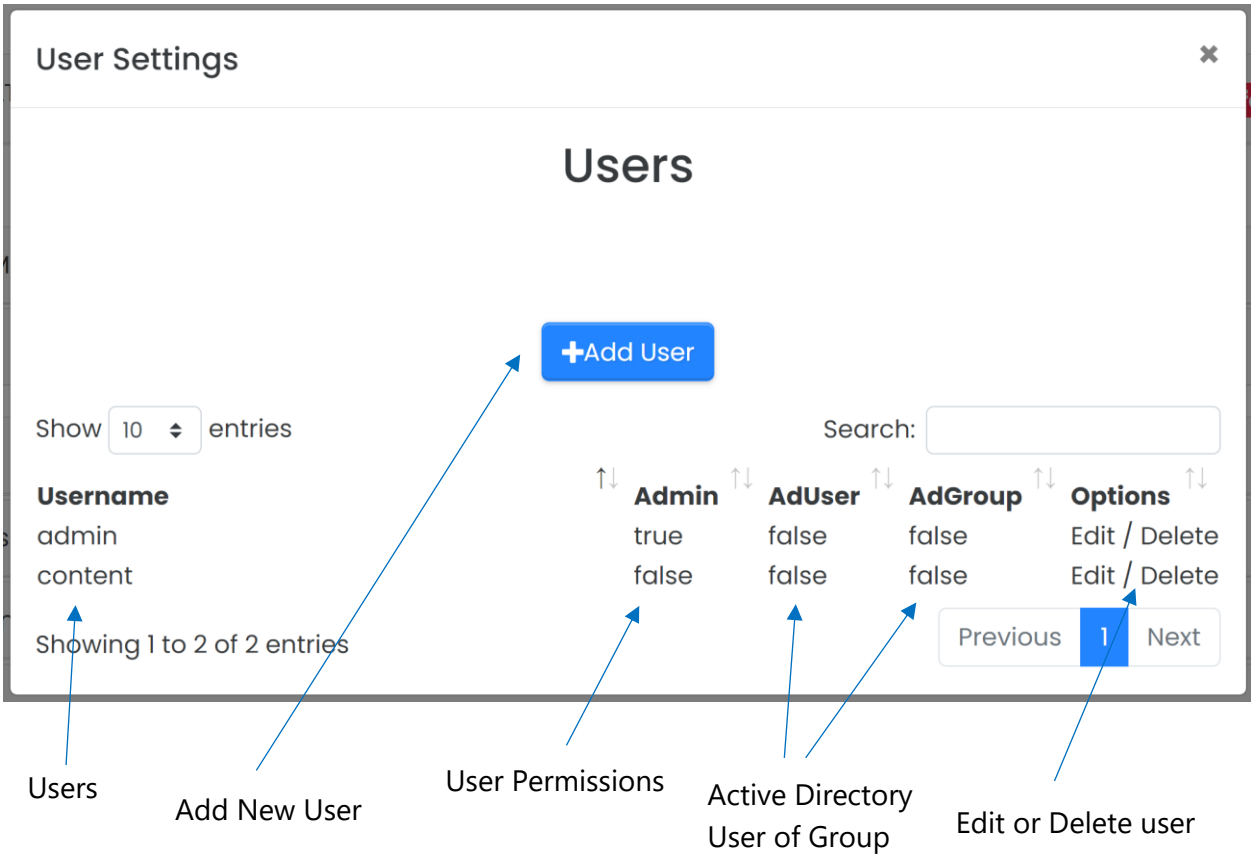
User Management

BDS has the ability to add local users or integrate with Microsoft Active Directory. Permissions allow you to control access to each delay and limit the configuration options to non technical users like programming staff.

To access the user management:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Access
3. Select Manage Credentials

User Management Dialog



User Permissions

BDS allows user permissions to be set to allow programming users to only managed the audio assets.

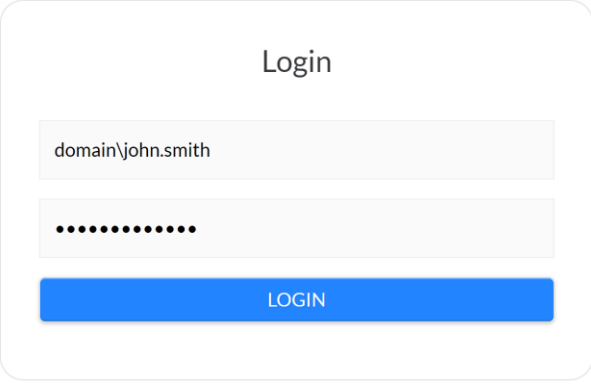
When a user is set to Admin, the user has the ability to completely manage all aspect of BDS. When the user is NOT set to Admin the user only has the ability to upload and delete audio assets, add day part fill schedules and set the default delay fill asset.

Active Directory Integration

BDS has the ability to integrate with Microsoft Active Directory for users and for user groups.

Active Directory User

When adding a new user AD user, select the AD user option. When selecting this option this will force BDS to check against Active Directory when logging in. When this mode is used the password field is ignored.

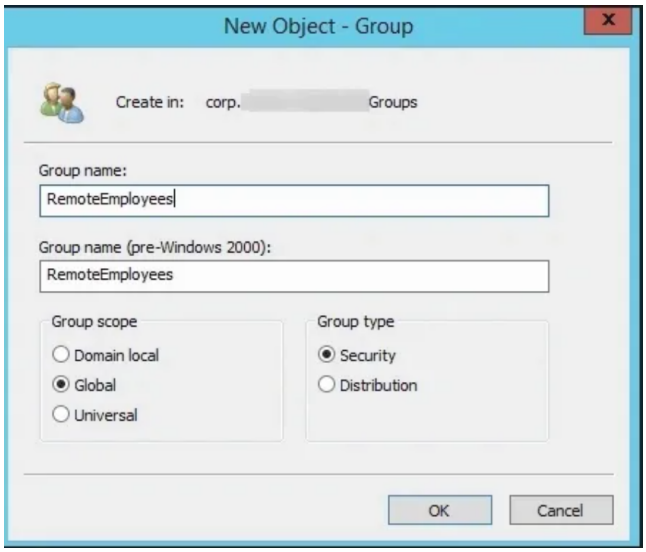


When logging into BDS the short domain name must precede the username

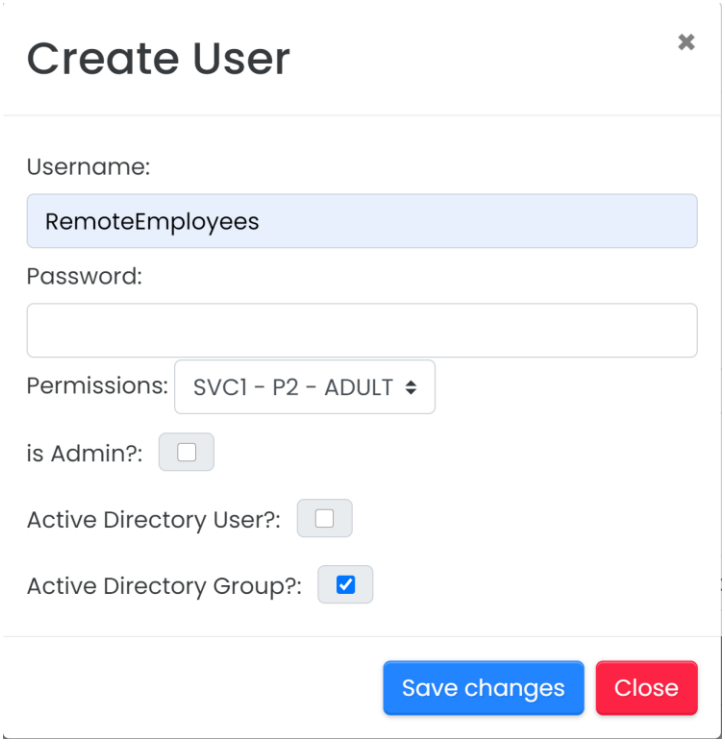
Active Directory User Groups

When adding Active Directory User Groups, Select the AD Group option and enter the name of the active directory group into the username field.

Active Directory Group Object



BDS new user dialog

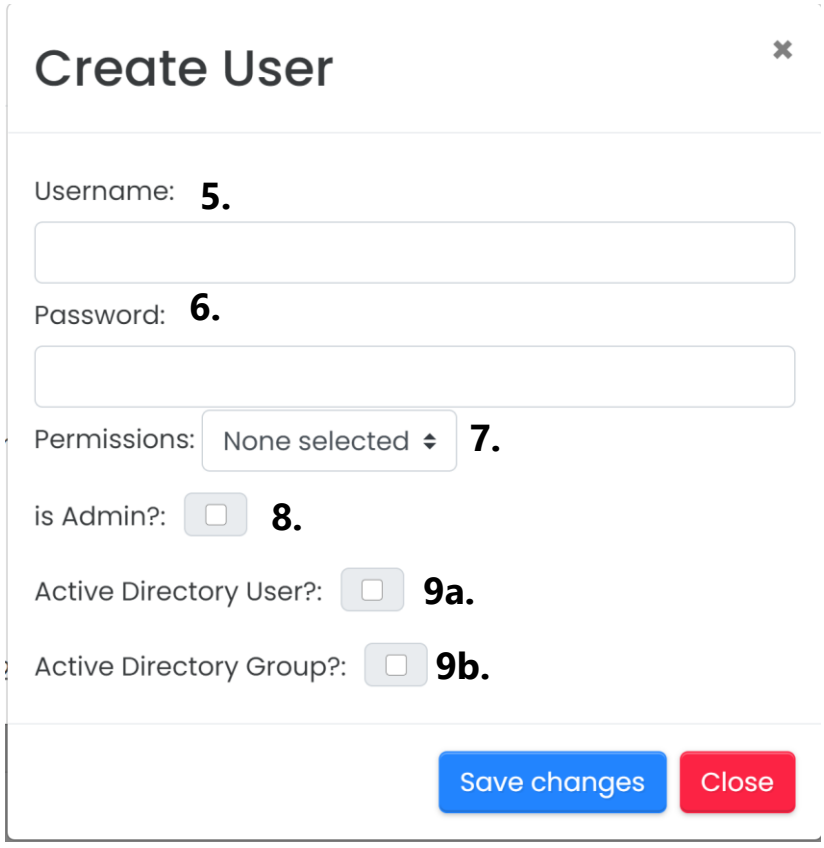


Add New User

To add a new user:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Access.
3. Select Manage Credentials.
4. Select Add User
5. Enter Username
6. Enter Password
7. Assign Delay Unit Permissions
8. Apply Admin Permissions
9. If
    a. User is AD User select AD User
    b. Or if User is AD Group select AD Group
10. Save Changes

When selecting AD user or AD Group, the password field is ignored and is not used.



Editing Users

To edit an existing user:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Access.
3. Select manage credentials.
4. Select edit on the user.
5. Edit user settings.

Deleting Users

To delete an existing user:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Access.
3. Select manage credentials.
4. Select delete on the user.
5. Select OK when prompted to delete

Note the admin user cannot be deleted.

Configuring Email

BDS allows for the sending of emails when a delay unit is dumped. Each Delay unit can have a specific email group which allows for sending to multiple content teams.

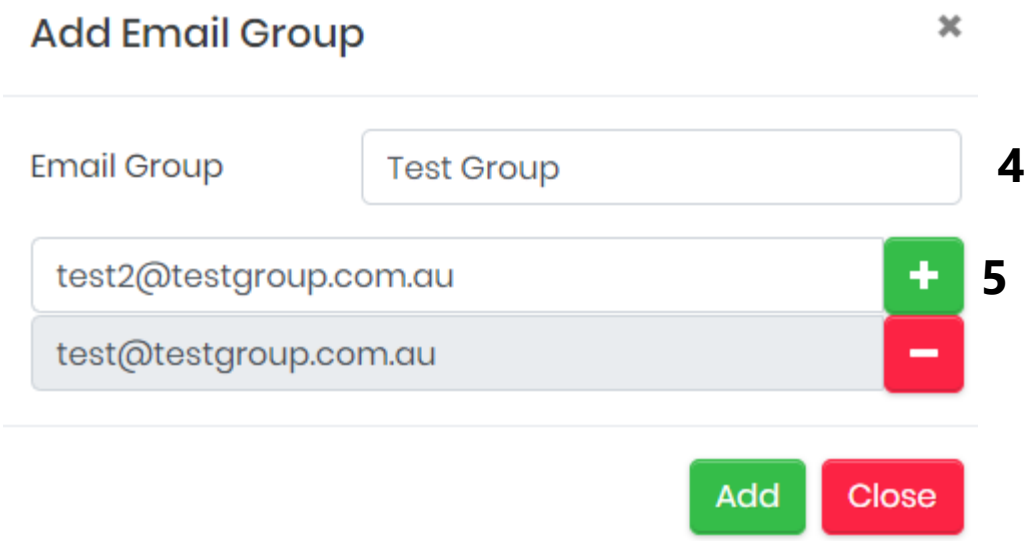
Configuring Email Server

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Email.

Email Server	Set email server ip or dns address
Email Server Port	Set specific email port ie. 25 for SMTP
From Address	The address which the emails will be sent from
Send Dump Files in Email	Allows Mp3 files to be attached to email with dumped audio
Authenticate Server	Set for server authentication
Username	Server username
Password	Server password

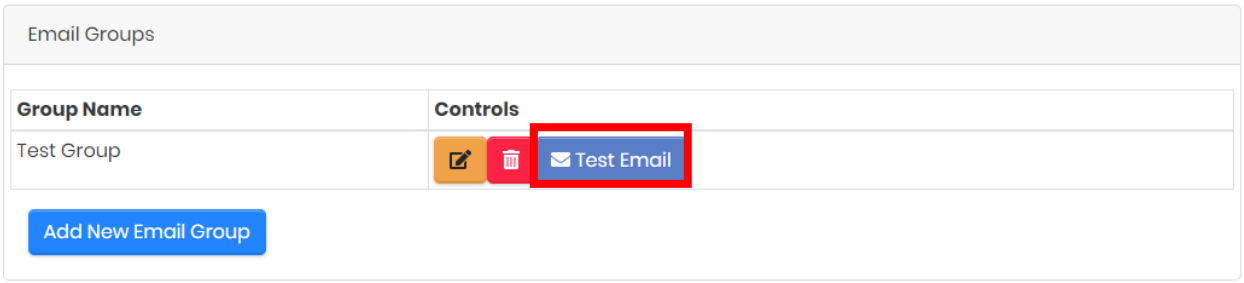
Creating Email Group

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Email -> Email Groups.
3. Select Add New Group.
4. Enter Group Name.
5. Enter Address and Select + Symbol.
6. Enter more address's as needed.
7. Select Add.



Testing Email Group

Once the email group has been created you can test the group by select the test email button.



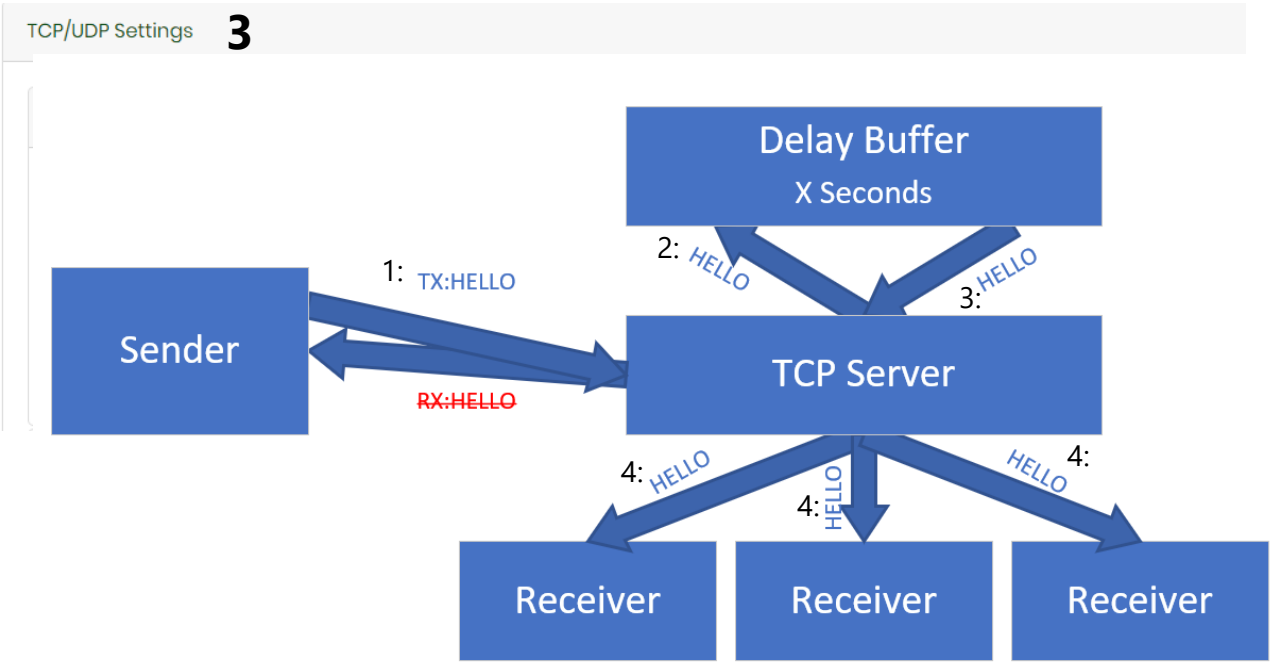
Assign Email Group to Delay Unit

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings.
4. Set desired email group.
5. Select Update Delay Settings.

Adding Server Data Port

BDS allows for TCP Server Data ports which delays incoming data by the current delay size. This feature could be used to delay now playing data from the playout system. When using TCP server the signal flow diagram is shown in fig 1.1.

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings -> TCP/UDP Settings -> ServerData Ports.
4. Select Add New Port.
5. Enter the TCP Port into the input box.
6. Select the green tick to confirm.



Adding Client Data Port

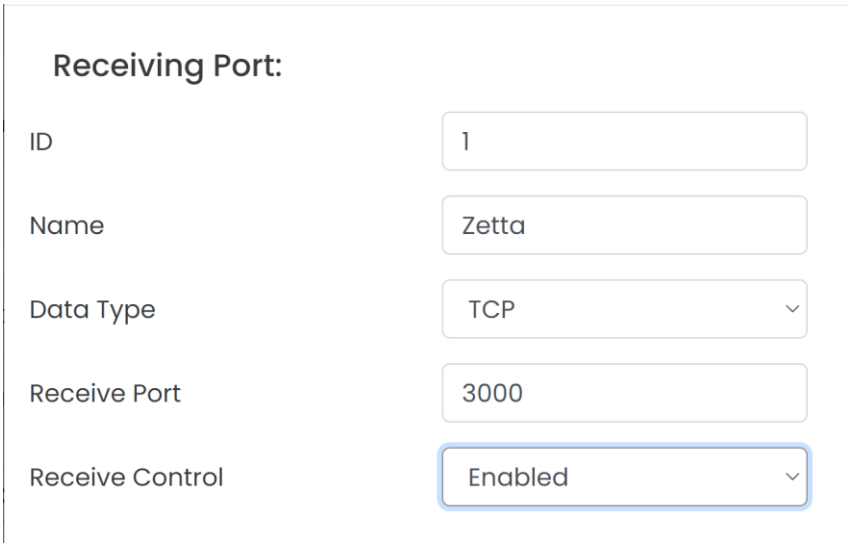
BDS allows for UDP/TCP Client Data ports to be created which delays incoming data by the current delay size.

This feature could be used to delay now playing data from a playout system. When creating a client data por, a receive port needs to specified first before transmit ports can be added.

Once the receive port has been created both UDP and TCP ports can be added

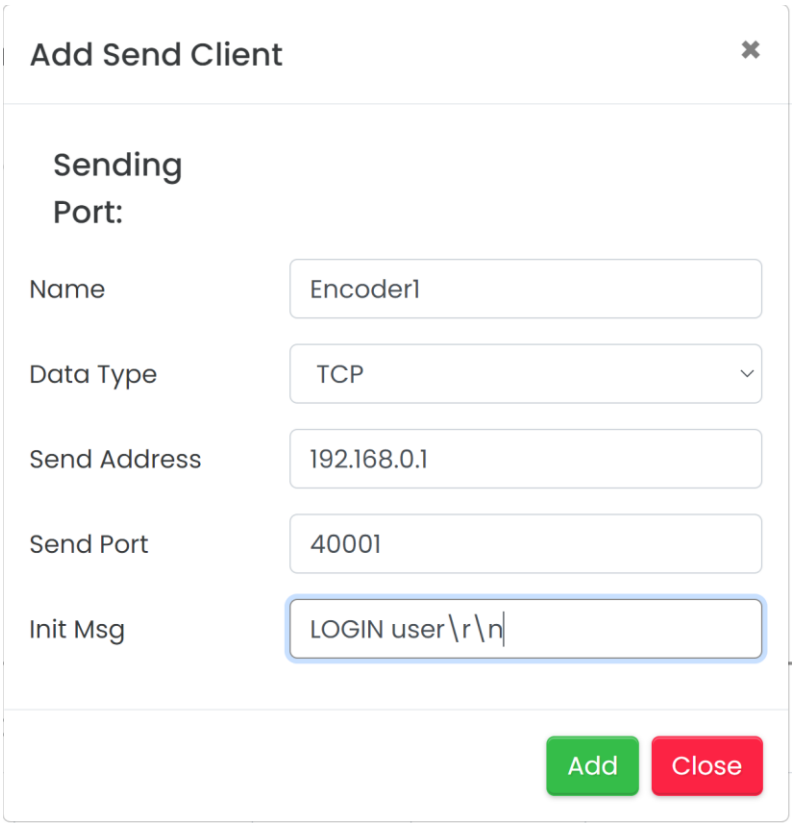
Creating Receive Port

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the delay unit you wish to configure.
3. Select settings - > Delay Settings -> TCP/UDP Settings -> Client data ports.
4. Select add new port.
5. Enter control ID. *for enabling and disabling from BDS Protocol.*
6. Enter name of the receive port.
7. Enter the data type (UDP or TCP).
8. Enter the Port Number.
9. Select Port Enabled.



Adding Transmit Port

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the delay unit you wish to configure.
3. Select settings - > Delay Settings -> TCP/UDP Settings -> Client data ports.
4. Select edit on the client data port 
5. Select Add TX port.
6. Enter name of the transmit port.
7. Enter the data type (UDP or TCP).
8. Enter the sending address.
9. Enter the port number.
10. Enter the init msg *(optional)*.
11. Select Port Enabled.

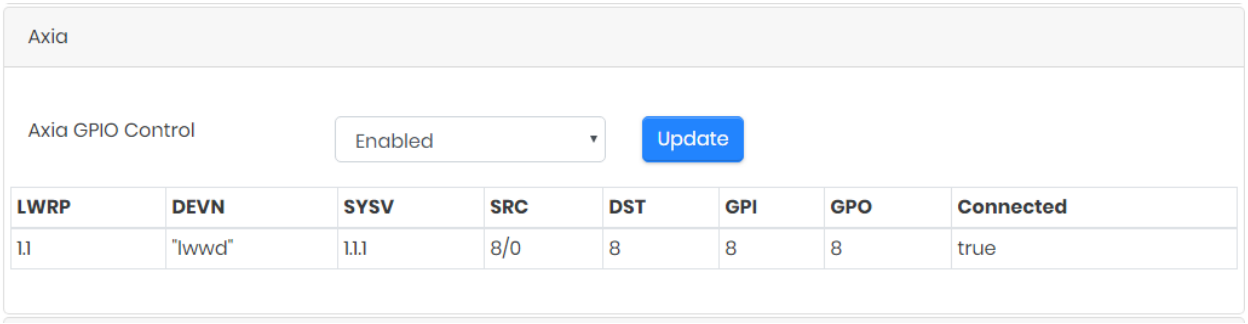


Adding and Configuring Axia GPIO

BDS allows for control via the axia gpio protocol.

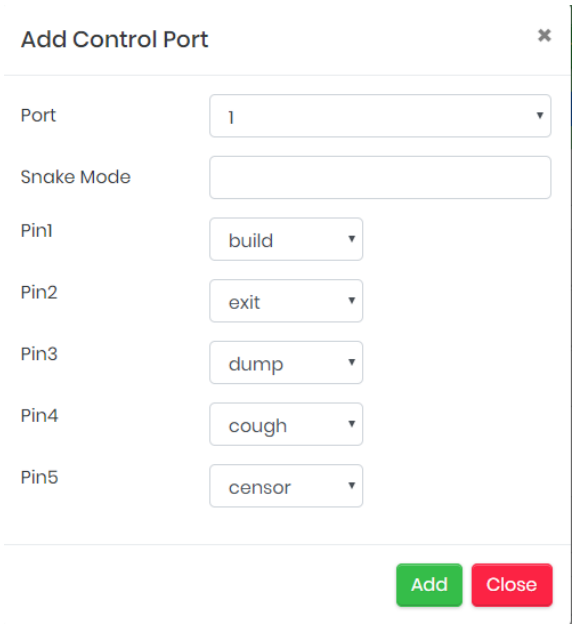
Enabling Axia GPIO Service

To Enable the AXIA GPIO service you must enable the option in the Settings -> Controls Options -> Axia menu.



Adding Control Port (GPI)

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings -> External Control -> Axia GPIO -> Axia GPIO Control.
4. Select Add Control Port (Appendix A).
5. Enter Port Details.
6. Select Add.



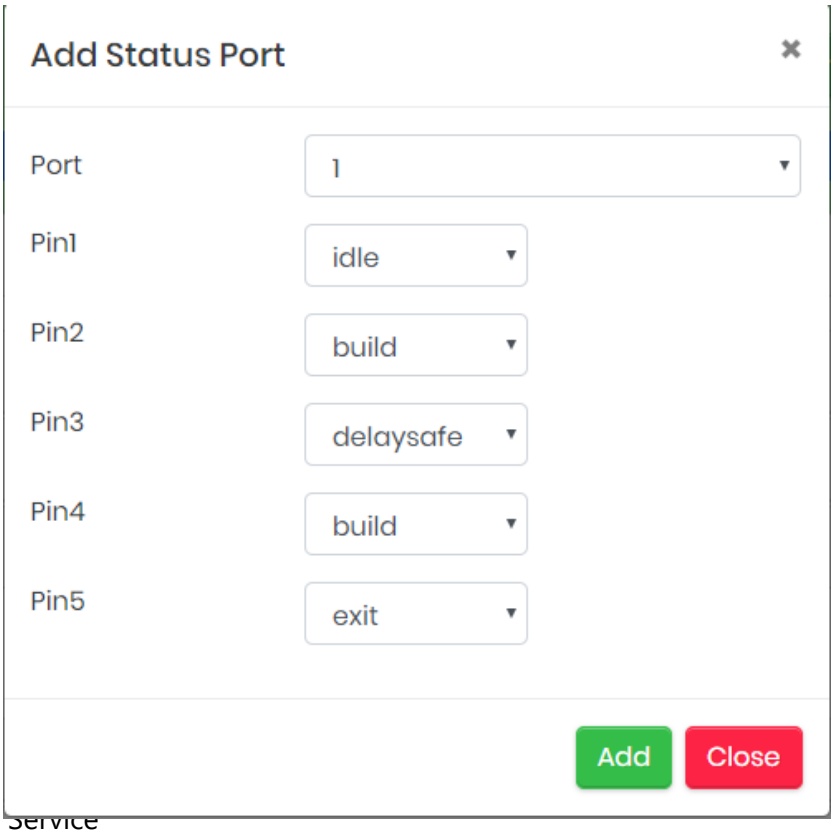
Port	Set Port Number
SnakeMode	Set Snake Mode Route
Pin 1	Set Pin 1 Control
Pin 2	Set Pin 2 Control
Pin 3	Set Pin 3 Control
Pin 4	Set Pin 4 Control

Pin 5	Set Pin 5 Control

Adding Status Port (GPO)

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings ->External Control -> Axia GPIO -> Axia GPIO Control.
4. Select Add Status Port (Appendix A).
5. Enter Port Details.
6. Select Add.

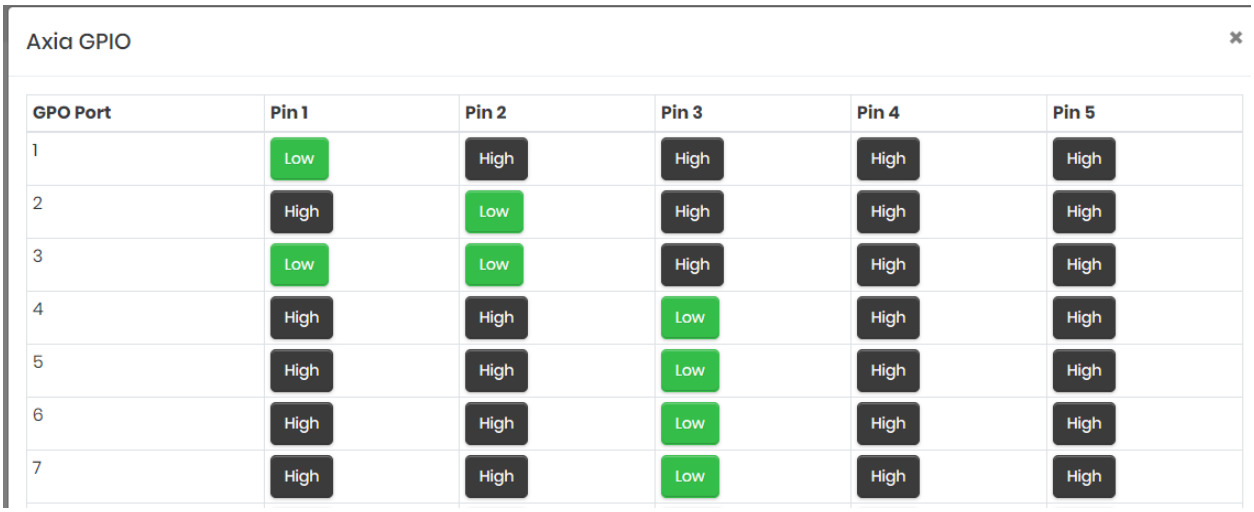
Port	Set Port Number
Pin 1	Set Pin 1 Control
Pin 2	Set Pin 2 Control
Pin 3	Set Pin 3 Control
Pin 4	Set Pin 4 Control
Pin 5	Set Pin 5 Control



Debugging Axia GPIO

To Test and Monitor Axia GPIO you can access the GPIO Pins from the BDS Webserver.

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings -> Axia GPIO -> View Axia GPIO.



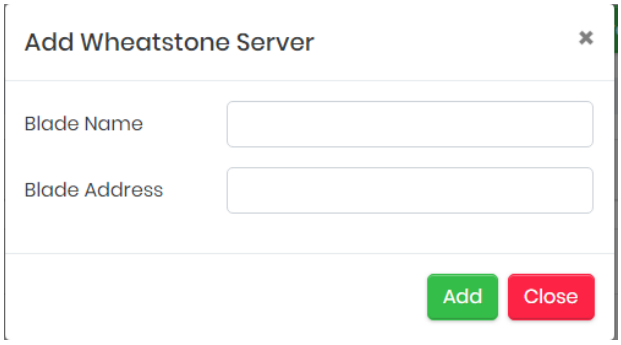
Adding Wheatstone SLIO

BDS allows for control via the wheatstone aci protocol. To enable the use of status and control SLIO you must first add a blader server. This blade server could be on the local machine (127.0.0.1) or an external server.

Adding Blade Server

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Control Options -> Wheatstone Blade Server.
4. Select Add New Server.
5. Enter Server Details.
6. Select Add.

Name	Set Name for Server
Server Address	Set IP Address

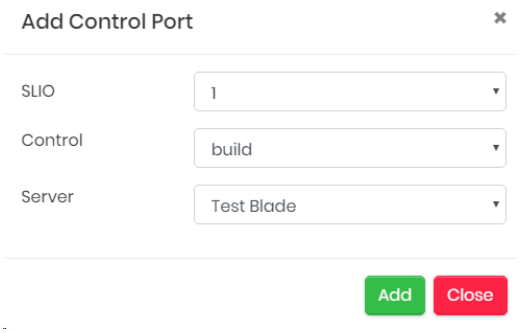


Adding and Configuring Wheatstone SLIO

BDS Allows for individual SLIO's to be configured for both Status and Control on each delay unit.

Adding Control Port

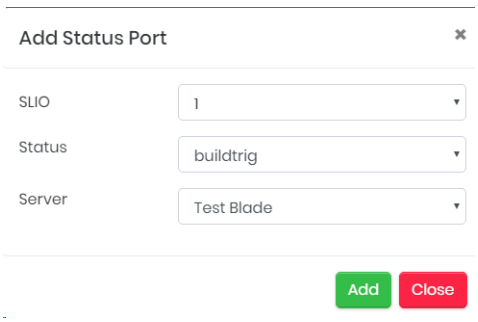
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings -> External Control - >Wheatstone ACI -> Wheatstone ACI Control.
4. Select Add Control Port (Appendix A).
5. Enter Port Details.
6. Select Add.



SLIO	Set SLIO Number
Control	Set Control
Server	Set Blade Server

Adding Status Port

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select the Delay Unit you wish to configure.
3. Select Settings - > Delay Settings -> External Control - >Wheatstone ACI -> Wheatstone ACI Control.
4. Select Status (Appendix A).
5. Select Add.



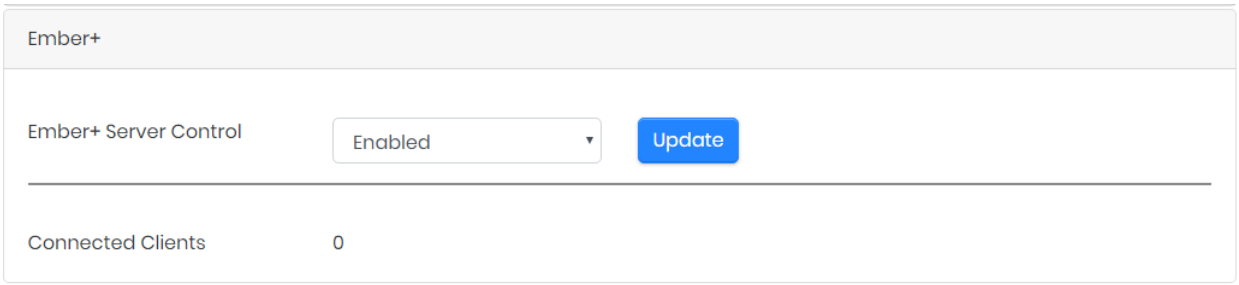
SLIO	Set SLIO Number
Status	Set Status
Server	Set Blade Server

Using Ember+

BDS allows for control and monitoring via the Ember+ Protocol.

Enabling Ember+ Service

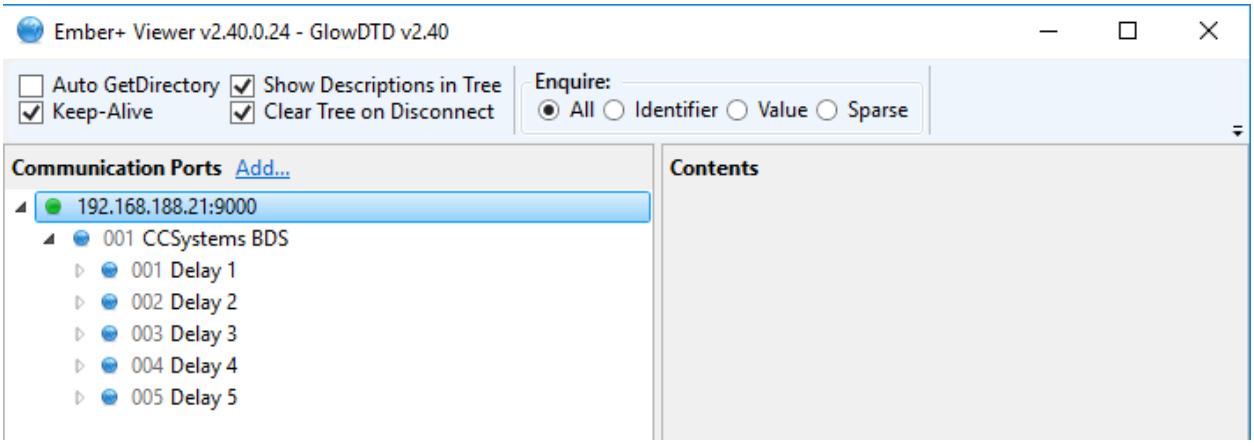
To enable the Ember+ service you must enable it via the Settings -> Control Options -> Ember+ Menu.



Each Delay Unit Spawns a tree which contains Controls and Status from each unit. The Controls and Status can be found in Appendix A.

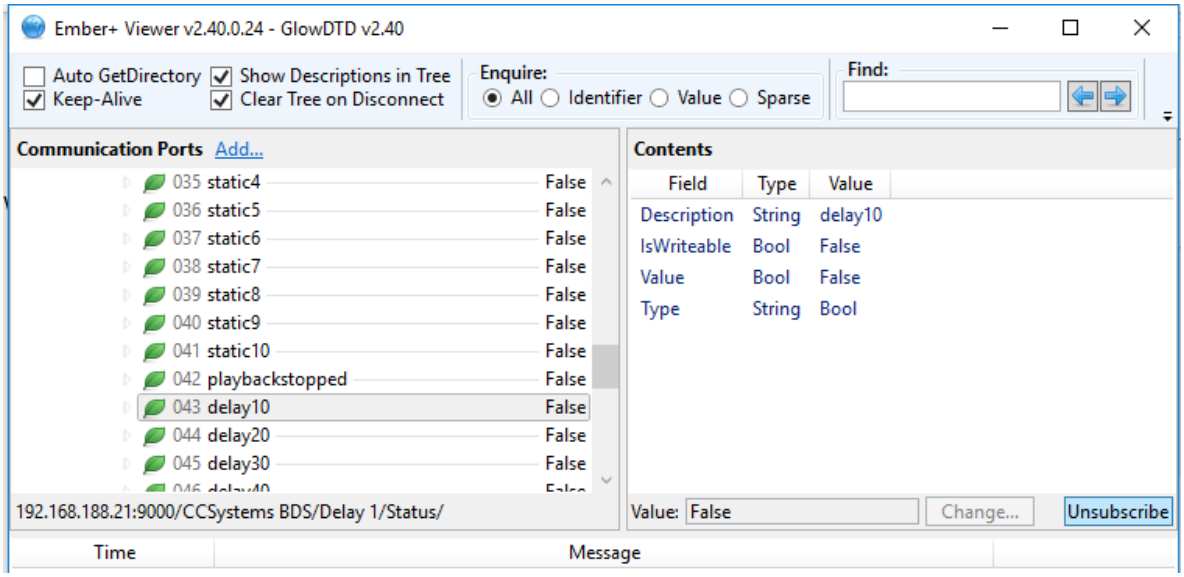
Connecting to Ember+ Server

The Ember+ service runs on tcp port 9000.



Subscribing to Delay Size Updates

To minimize Ember+ traffic all delay size status updates are disabled, to receive delaysize updates you must subscribe to each delaysize segment.



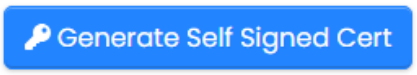
SSL/TLS Certificates

BDS has the ability to load into SSL/TLS Certificates to enable scure http and websocket connections, this is recomended partriculary when using Active Directory Credentials

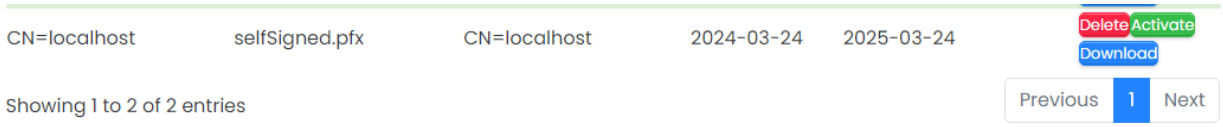
Generate Self Signed Certificate

To generate a self signed certificate:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > SSL/TLS.
3. Select Generate Self Signed Cert.
4. Enter the Common Name – for example localhost.
5. Enter the password.
6. Select Submit.



If the Certificate is generate correctly you'll see a new selfSigned.pfx certificate generate. Please note that only once selfsigned certificate can be generated, if you configure a new certificate it will override the old certificate.

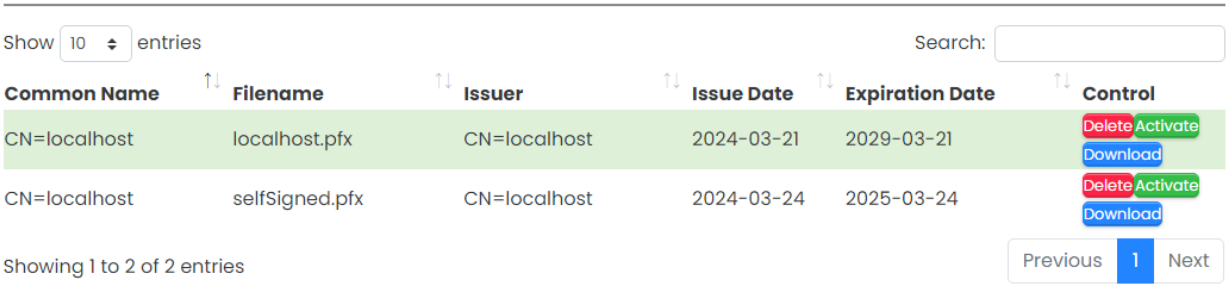


Load a SSL/TLS Certificate

BDS enables the ability to load in multiple certificates, this is particularly useful when a certificate is due to expire. Currently BDS only allows PFX certificates to be loaded.

To load a PFX certificate:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > SSL/TLS.
3. Select Import PFX and find the PFX Certificate.
4. Select Upload File and enter the PFX Password.
5. If the certificate is loaded succesfully it will show in the certificates table.
6. Select Submit.



Activate SSL/TLS Certificate

BDS enables the user to reload the webserver with a new certificate **without interupting the audio.** The currently activated certificate is hightlighted green in the SSL/TLS certificates table.

To activate a certificate:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > SSL/TLS.
3. Select activate on the certificate you wish to activate.
4. The page will refresh after 5 seconds with the newly loaded certificate.

Clear SSL/TLS Certificates

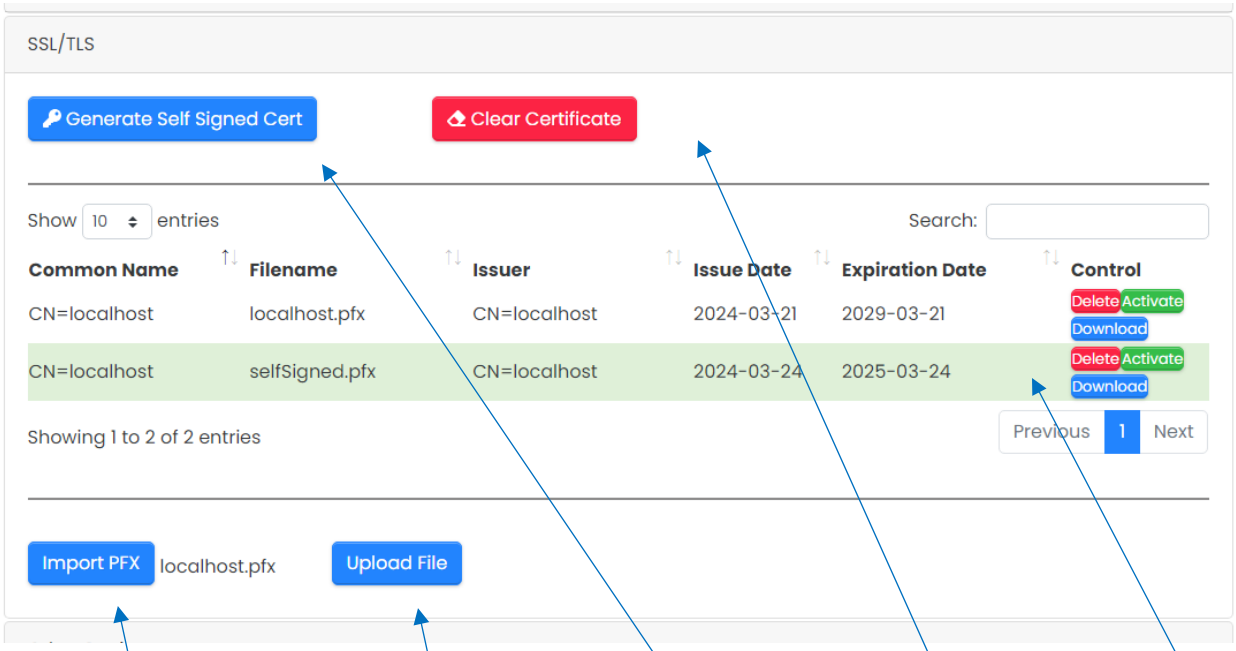
BDS enables the user to reload the webserver after removing the certificate **without interupting the audio.**

To remove a SSL/TLS from the webserver:

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > SSL/TLS.
3. Select Clear Certificate.
4. The page will refresh after 5 seconds with the http prefix.

SSL/TLS Menu Layout

Delete SSL Certificate	Delete
Activate SSL Certificate	Activate
Download PFX Certificate	Download



Import PFX Certificate

Upload PFX to server

Generate Self Signed Certificate

Clear Certificate

Green indicates currently activate certificate

Logging

BDS creates a 24 hour log of all activity, there is individual logs for each udp/tcp data port, axia, wheatstone, external control protocol, http access and general delay activity. BDS also captures a global log which contains all messages.

BDS also allows the general delay activity logs to be sent via UDP to an external syslog server.

Logs

Log	Filename	Location
General Delay Activity	BroadcastDelayService-{date }.txt	logs
Axia Messages	Axiamsg-{DATE}.txt	logs\axia
Wheatstone Messages	Wheatstone-{DATE}.txt	logs\wheatstone
Ember+	Emberplus-{DATE}.txt	Logs\emberplus
UDP Data	udpserver-{rxport}-{txaddress}-{txport}-{date}.txt	logs\udp
TCP Data	Tcpserver-{rxport}-{date}.txt	logs\tcp
TCP Control Protocol	tcpcontrol.{date}.txt	Logs\control
Global	BDS-ALL-{date}.txt	Logs

External Syslog Server

BDS allows you to send the general delay activity log to an external syslog server, BDS currently only supports UDP based connections.

To enable external syslog communication:

5. Navigate to the BDS webserver at http://127.0.0.1:81.
6. Select Settings - > Other Settings.
7. Select external syslog to enabled.
8. Enter the remote server address.
9. Enter the remote server port.
10. Select Update Other Settings.

Log Maintenance

By Default BDS will purge the delay logs every 30 days. To change this setting:

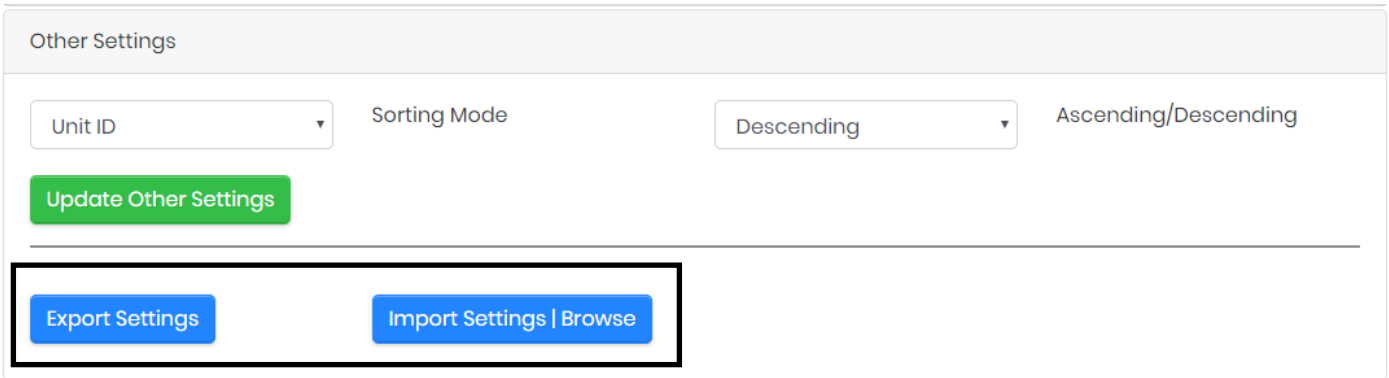
11. Navigate to the BDS webserver at http://127.0.0.1:81.
12. Select Settings - > Other Settings.
13. Change Keeps Logs for Option.
14. Select Update Other Settings.

Other Settings

Export and Import Settings

For easy configuration and configuration backup use the Import/Export Settings buttons from within the BDS webserver.

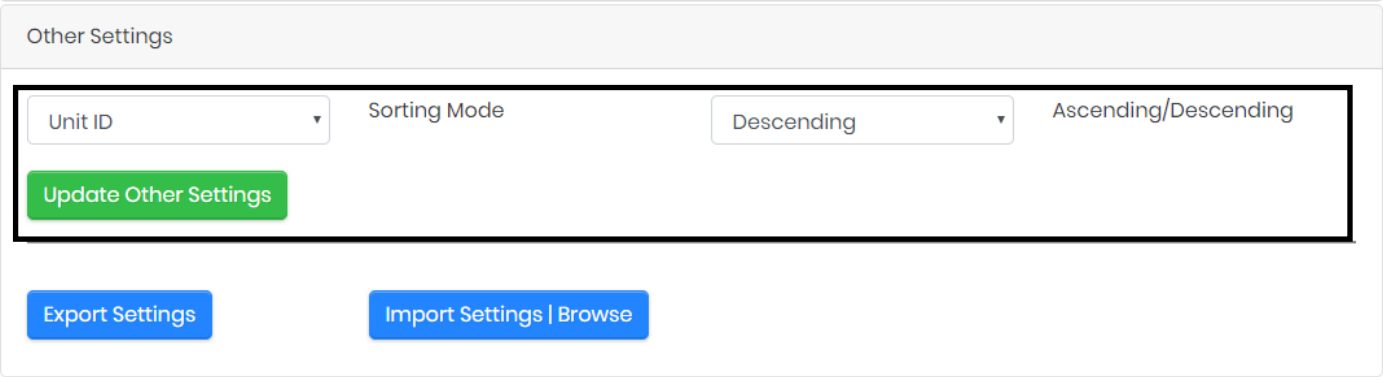
1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings -> Other Settings.



Arranging Delay Units in Webserver

BDS allows you to sort each delay unit either by the unique ID or by the Delay Unit Name.

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings -> Other Settings.



Restarting One or All Broadcast Delay Units

To restart a single Delay unit, navigate to the Delay Settings Menu and Select Reload Player, select OK at the popup window to restart delay unit instance.

To restart all delay units navigate to Settings->Other Settings -> Reload All Players, Select OK at the popup window to restart delay unit instance.

FAQ

How do I add extra Delay Units to my License?

If you have requested an upgrade to your license to add more delay units contact support at support@cloudcastsystems.com.au. Once confirmed simply re-enter your serial and the Delay Unit count will increase.

What is the bitrate of the Shout cast Streams?

the bitrate of the shout cast streams is 128 kpbs by default but can be changed in the options menu.

1. Navigate to the BDS webserver at http://127.0.0.1:81.
2. Select Settings - > Other Settings.
3. Streaming Encoder Bitrate.
4. Select Update Other Settings.

What Audio File Formats are Supported

Most audio file formats are supported using the Windows Media Foundation Codec Library. When played out BDS will sample rate convert to 48000.

wav, aac, mp3, m4a, wma, 3gp, aiff.

How do I Reduce internal IO Latency

For system optimization please download and read the following document:

Optimizing PC for Audio Performance

Depending on the performance of the PC you can also adjust various buffers that will reduce buffer sizes and therefor latency. Changing ASIO buffers is done within the driver itself however for WAVEIN and WASAPI these must be changed within the BDS application, For more information on WAVEIN and WASAPI buffers please contact support@cloudcastsystems.com.au.

What is the default login for the webserver?

Username: admin

Password: password

What if I forgot the webserver password?

Please contact support@cloudcastsystems.com.au for instructions on how to reset the webserver password.

What format is the TCP and UDP Buffers?

The TCP and UDP Data buffers accept binary data, this means all characters are expected.

What is the Maximum size delay I can run?

BDS is not restricted to a minimum delay size however since the audio buffers are held in memory, considerations should be taken on the amount of memory a single unit will occupy.

For example

1 BDS unit with a 10 Second Delay Uses Approx 25Mb of Memory.

How do I upgrade my version of BDS

To upgrade your version of BDS simply install the new version over the top of the old. Its good practice to make a copy of the settings.xml file in the application directory however the settings file is not upated.

How do I change the default webserver port?

The webserver port can be changed in the settings.xml file. Ensure you stop the service first before editing the settings.xml file.

To Change the port edit the following xml tag <webPort>81</webPort>.

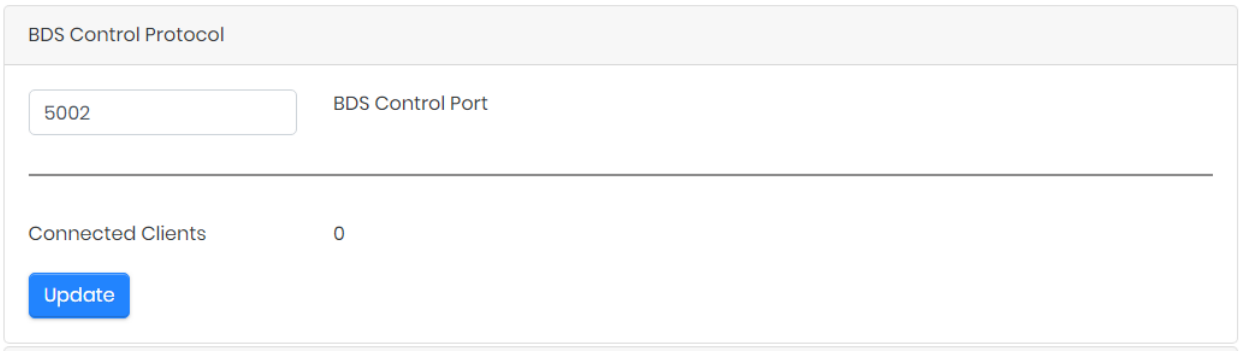
How do I change the default webserver websocket port?

The webserver websocket port can be changed in the settings.xml file. Ensure you stop the service first before editing the settings.xml file.

To Change the port edit the following xml tag <websocketPort>8090</websocketPort>.

How do I change the default TCP Control Protocol Port?

The tcp control port can be changed in Settings -> Control Options -> BDS Control Protocol.



How do I deactivate my licence?

Ensure your BDS machine can access the internet and press the activate button in the licence menu, this will de-register the machine from our licencing server. This will then put the BDS application into grace period which will allow it run for 30days.

Appendix A

Status

None	No Status
idle	Unit is in Idle
build	Unit is Building
buildtrig	Unit is Building (Pulsed)
exit	Unit is Exiting
exittrig	Unit is Exiting (Pulsed)
indelay	Unit is In Delay
delaysafe	Unit has built minimum dump size
precensor	PreDelay Censor Pressed
precensortrig	PreDelay Censor Pressed (Pulsed)
postcensor	Post Delay Censor Pressed
postcensortrig	Post Delay Censor Pressed (Pulsed)
cough	Cough Button Pressed
coughtrig	Cough Button Pressed (Pulsed)
dumptrig	Dump Button Pressed (Pulsed)
dumpalltrig	Dump All Button Pressed (Pulsed)
delayfull	Delay Buffer Full
delayfulltrig	Delay Buffer Full (Pulsed)
delayempty	Delay Buffer Empty
delayemptytrig	Delay Buffer Empty (Pulsed)
rolloutendtrig	Turns On when Rollout Overlap Occurs, off when Exit Complete. For use with Playout Systems.
rolloutoverlap	Turns On when Rollout Overlap Occurs, off when Exit Complete. For use with Playout Systems.
rolloutoverlaptrig	Turns On when Rollout Overlap Occurs, off when Exit Complete. For use with Playout Systems. (Pulsed)
pulse1	Pulsed 200ms
pulse2	Pulsed 200ms
pulse3	Pulsed 200ms
pulse4	Pulsed 200ms
pulse5	Pulsed 200ms
pulse6	Pulsed 200ms
pulse7	Pulsed 200ms
pulse8	Pulsed 200ms
pulse9	Pulsed 200ms
pulse10	Pulsed 200ms
static1	Continuous Logic

static2	Continuous Logic
static3	Continuous Logic
static4	Continuous Logic
static5	Continuous Logic
static6	Continuous Logic
static7	Continuous Logic
static8	Continuous Logic
static9	Continuous Logic
static10	Continuous Logic
playbackstopped	Playback has stopped (used for debug)
delay10	Delay has Built 10% (Pin is Low only when at delay percentage)
delay20	Delay has Built 20% (Pin is Low only when at delay percentage)
delay30	Delay has Built 30% (Pin is Low only when at delay percentage)
delay40	Delay has Built 40% (Pin is Low only when at delay percentage)
delay50	Delay has Built 50% (Pin is Low only when at delay percentage)
delay60	Delay has Built 60% (Pin is Low only when at delay percentage)
delay70	Delay has Built 70% (Pin is Low only when at delay percentage)
delay80	Delay has Built 80% (Pin is Low only when at delay percentage)
delay90	Delay has Built 90% (Pin is Low only when at delay percentage)
delay100	Delay has Built 100% (Pin is Low only when at delay percentage)
delay10static	Delay has Built 10% (Pin is Low whilst equal or greater than)
delay20static	Delay has Built 20% (Pin is Low whilst equal or greater than)
delay30static	Delay has Built 30% (Pin is Low whilst equal or greater than)
delay40static	Delay has Built 40% (Pin is Low whilst equal or greater than)
delay50static	Delay has Built 50% (Pin is Low whilst equal or greater than)
delay60static	Delay has Built 60% (Pin is Low whilst equal or greater than)
delay70static	Delay has Built 70% (Pin is Low whilst equal or greater than)
delay80static	Delay has Built 80% (Pin is Low whilst equal or greater than)
delay90static	Delay has Built 90% (Pin is Low whilst equal or greater than)
delay100static	Delay has Built 100% (Pin is Low whilst equal or greater than)

Controls

none	No control
build	Delay Build
exit	Delay Exit
dump	Delay Dump
dumpall	Delay Dump All
cough	Cough
censor	PreDelay Censor
censorpost	Post Delay Censor
compress	Forces unit to exit via Compress
rollout	Forces unto to exit via rollout
pulse1	200ms Pulse
pulse2	200ms Pulse
pulse3	200ms Pulse
pulse4	200ms Pulse
pulse5	200ms Pulse
pulse6	200ms Pulse
pulse7	200ms Pulse
pulse8	200ms Pulse
pulse9	200ms Pulse
pulse10	200ms Pulse
static1	Continuous Logic
static2	Continuous Logic
static3	Continuous Logic
static4	Continuous Logic
static5	Continuous Logic
static6	Continuous Logic
static7	Continuous Logic
static8	Continuous Logic
static9	Continuous Logic
static10	Continuous Logic
reload	Restart Delay Unit
forcecensoroff	Force all Censor Commands Off
coughpost	Post Delay Cough

Appendix B

Broadcast Delay Service Control Protocol

Delay Unit Control Protocol V1.3

Global Commands

LOGIN - Unit must be logged in to use SET/SUB & UNSUB

GET DELAYUNITS - Get All Available Units

Specific Unit Commands

GET/SET *x = Unit ID*

DELAY_x.DELAYSTATUS (Read Only)

IDLE - Unit is Idle

BUILDING - Unit is Building Delay

EXITING - Unit is Exiting Delay

IN DELAY - Unit is in Delay

DELAY_x.DELAYSAFE (Read Only)

TRUE - Unit is in enough delay to suffice dump size

FALSE - Not Enough Delay has been built to suffice dump size

DELAY_x.DELAYTIME - Buffered Time in Milliseconds (Read Only)

DELAY_x.DELAYTIMESECONDS - Buffered Time in Seconds (Read Only)

DELAY_x.DELAYSIZE - Desired Delay Time in Milliseconds (Read/Write)

DELAY_x.DUMPSIZE - Dump Segment Size (Read/Write)

DELAY_x.MAXDELAYSIZE - Maximum amount of delay allowed to be built in MS

DELAY_x.DUMPWRITEWAITTIME - Time to Wait before Sending Dump Emails (Read/Write)

DELAY_x.BUILDRATE - Rate of Change (Default 7)

DELAY_x.EXITRATE - Rate of Change (Default 7)

DELAY_x.DELAYBUILDMODE (Read/Write)

INSERT

PREROLL

EXPAND

DELAY_x.DELAYEXITMODE (Read/Write)

ROLLOUT

COMPRESS

DELAY_x.DELAYINSERTMODE (Read/Write)

FILE - Indicates that Insert Mode will use external file

EXTERNAL - indicates the audio will some from another input

DELAY_x.TCPCONTROLPORT

BEGIN

PORT=5000 ADDRESS=127.0.0.1 CLIENTS=10

PORT=5001 ADDRESS=127.0.0.1 CLIENTS=10

END

DELAY_x.DATAPORT

BEGIN

ID=1 NAME=TEST12345 DATATYPE=UDP RXPORT=30002 ENABLE=FALSE

DATATYPE=TCP TXADDRESS=127.0.0.1 TXPORT=30000

DATATYPE=UDP TXADDRESS=127.0.0.1 TXPORT=30000

ID=2 NAME=TEST2 DATATYPE=UDP RXPORT=30008 ENABLE=TRUE

DATATYPE=TCP TXADDRESS=127.0.0.1 TXPORT=30007

ID=3 NAME=ZETTA DATATYPE=TCP RXPORT=3000 ENABLE=TRUE

END

DELAY_x.TCPDATAPORT

PORT=5000 ADDRESS=127.0.0.1 CLIENTS=10

DELAY_x.WAVEINDEVICE (Read/Write)

BEGIN

ID=0 NAME=MIC1

ID=1 NAME=MIC2

END

DELAY_x.WAVEOUTDEVICE (Read/Write)

BEGIN

ID=0 NAME=HEADPHONES

ID=1 NAME=SPEAKERS

END

DELAY_x.WAVEOUTMODE

WAVEOUT

WASAPI

ASIO

DIRECTSOUND

SET *x = Unit ID*

DELAY_x.DELAYCONTROL=

BUILD

EXIT

DUMP

DUMPALL

DELAY_x.COUGH= - Engage Cough Function

TRUE

FALSE

DELAY_x.CENSOR= - Engage Censor Pre Delay Function

TRUE

FALSE

DELAY_x.CENSORPOST= - Engage Censor Post Delay Function

TRUE

FALSE

DELAY_x.DATAPORT.y.ENABLE= - Enable/Disable UDP Data Port

y = UDP Data Port Control ID

TRUE

FALSE

SUB *x = Unit ID*

DELAY_x.BUILD - Subscribe to Building Messages

DELAY_x.EXIT - Subscribe to Exiting Messages

DELAY_x.DELAYTIME - Subscribe to DelayT ime Updates

UNSUB *x = Unit ID*

DELAY_x.BUILD -Unsubscribe to Building Messages

DELAY_x.EXIT - Unsubscribe to Exiting Messages

DELAY_x.DELAYTIME - Unubscribe to DelayTime Updates

ADD *x = Unit ID*

DELAY_x.TCPCONTROLPORT=*PORT*

DELAY_x.TCPDATAPORT=*PORT*

DEL *x = Unit ID*

DELAY_x.TCPCONTROLPORT=*PORT*

DELAY_x.TCPDATAPORT=*PORT*

EXAMPLES

TX: GET DELAY_1.DELAYSTATUS

RX: STATUS DELAY_1.DELAYSTAUS=IDLE

TX:GET DELAY_1.DUMPSIZE, DELAYSIZE, BUILDMODE

RX: STATUS DELAY_1.DUMPSIZE=10000, DELAYSIZE=10000, BUILDMODE=INSERT

TX:SET DELAY_1.DUMPSIZE=10000, BUILDRATE=10

RX:STATUS DELAY_1.DUMPSIZE=10000

RX:STATUS DELAY_1.BUILDRATE=10

TX:SET DELAY_1.EXITRATE=7

RX:STATUS DELAY_1.EXITRATE=7

TX:SET DELAY_1.DELAYSTATUS=BUILD

RX:ERROR IN COMMAND

TX: SUB DELAY_1.BUILD

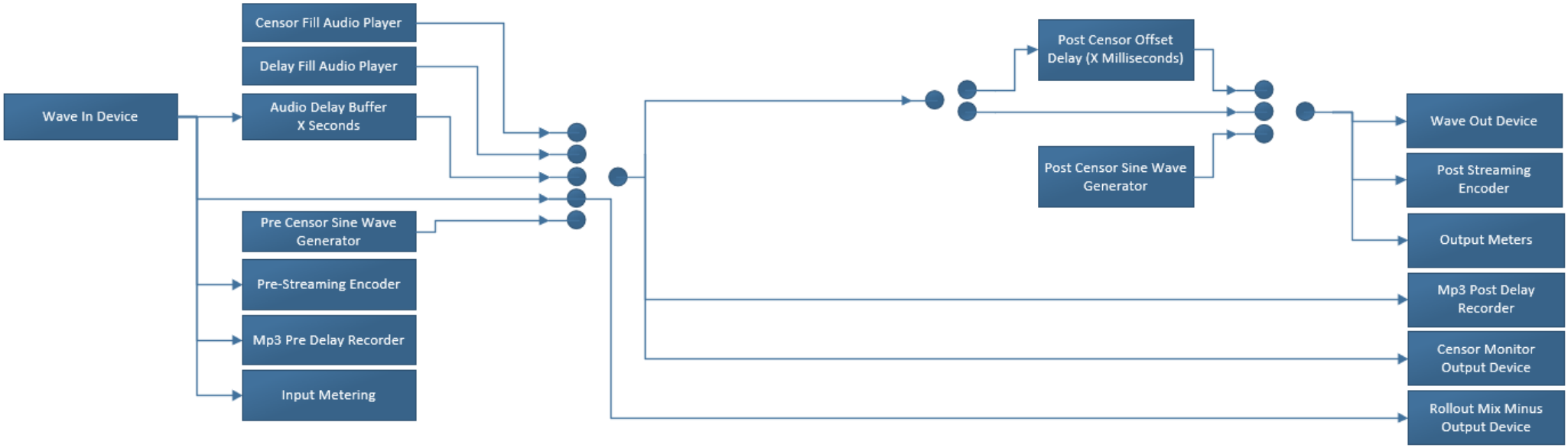
RX: STATUS SUB BUILD

TX:UNSUB DELAY_1.BUILD

RX:STATUS UNSUB BUILD

Appendix C

Signal Flow Diagram



Appendix C

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