# NODESTER

## User Manual


NODE STREAM™

Please read these instructions carefully before using this product, and save this user guide for future use.

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## Information for your safety (if iPAD is supplied)

The device should only be serviced and maintained by qualified service personnel. Improper repair work can be dangerous. Tampering with this device may result in injury, fire, or electric shock.

Be sure to use the specified power source for the device. Connection to an improper power source may cause fire or electric shock.

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## Symbols

Warning or caution to prevent injury or death, or damage to property.

Extra notes on the topic or steps of the instructions being outlined.

Further information to content outside the scope of the user guide.

Extra pointers or suggestions in executing instructions.

Contact and Support
support@harvest-tech.com.au

Harvest Technology Pty Ltd
7 Turner Avenue, Technology Park
Bentley WA 6102, Australia
www.harvest.technology

# Table of Contents

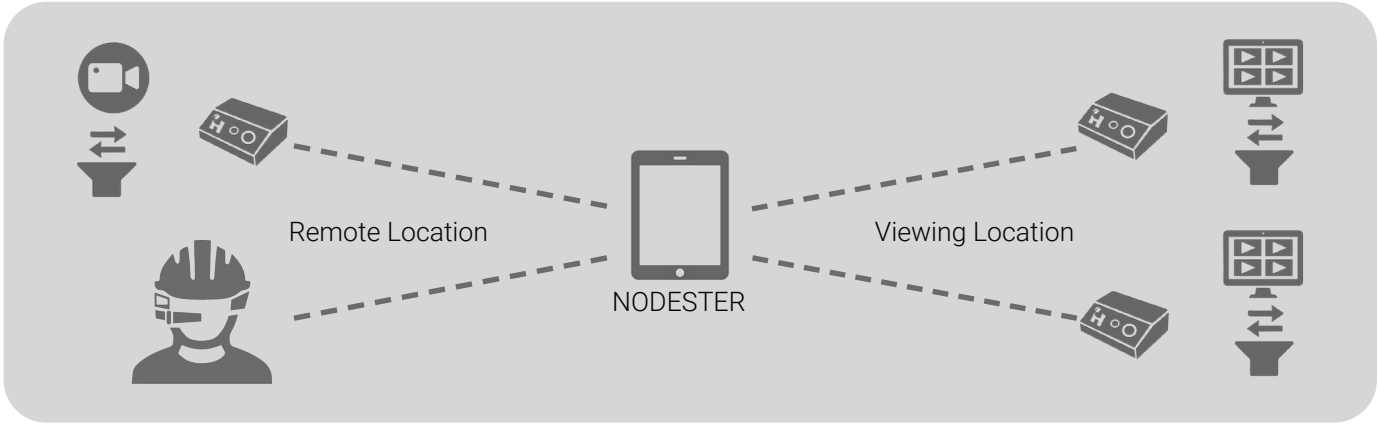
# Overview

The Harvest NODESTER iOS application is the control interface for the Nodestream video and audio streaming suite, intuitively allowing clients to group devices, manage connections, and configure video and audio settings to suit requirements and networks.

## Feature Summary

- Create locations to group video and audio devices
- Manage Nodestream devices and connections anywhere in the world
- Customise stream settings to suit challenging network environments

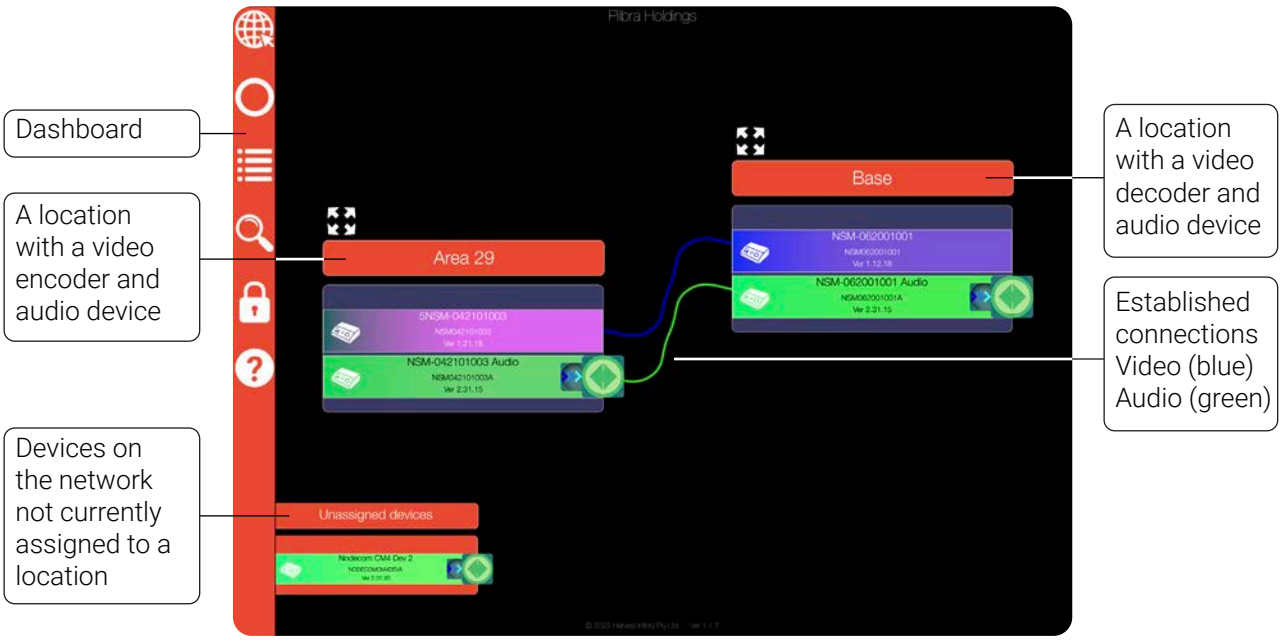
## Device Management Solution




## In the Box

- 1 x Apple iPad
- 1 x Apple charger
- 1 x Apple lightning to USB cable
- 1 x iPad cover

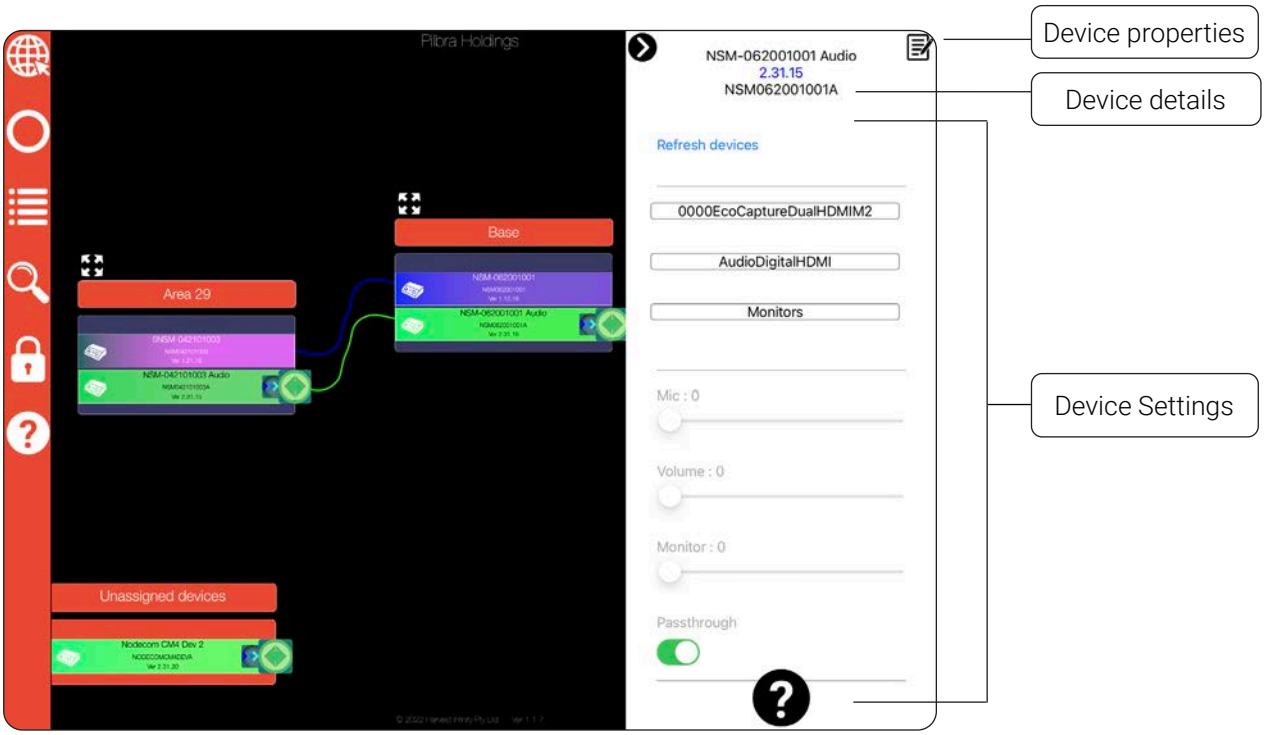
# Interface




| | |
|---|---|
| | Network Status: Icon stationary = connected to server |
| | Network status: Icon rotating = connecting to server |
| | Network Status: No internet connection |
| | Centre or reveal all locations |
| | Preset configuration |
| | Toggle: show all devices, all online devices or offline devices |
| | Lock / unlock screen |
| | Help |
| | Handle to move a location |
| | Connector for an audio device |
| | Audio passthrough disabled |
| | Audio passthrough enabled |
| | Connector for a decoder |
| | Device properties |
| | Video device - encoder (magenta) or decoder (blue) |
| | Audio device (green) |
| | Wearwolf video and audio device (dark green) |
| | Downloadable device (blue) |

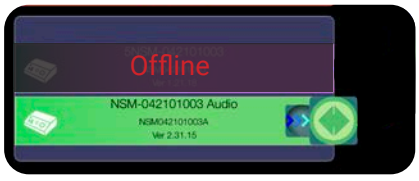
# Device Settings Overview

Tap on a device to reveal its settings.


See “Device Configuration” on page 25 for more information.

# Device States




Encoder Offline
Audio Online


Encoder Online
Audio Online

The device settings can not be accessed while in an offline state.

# Getting Started

## Installing NODESTER

The NODESTER application comes pre-loaded on Harvest supplied iPad devices.  Alternatively, customers can install via the app store.

### App Store

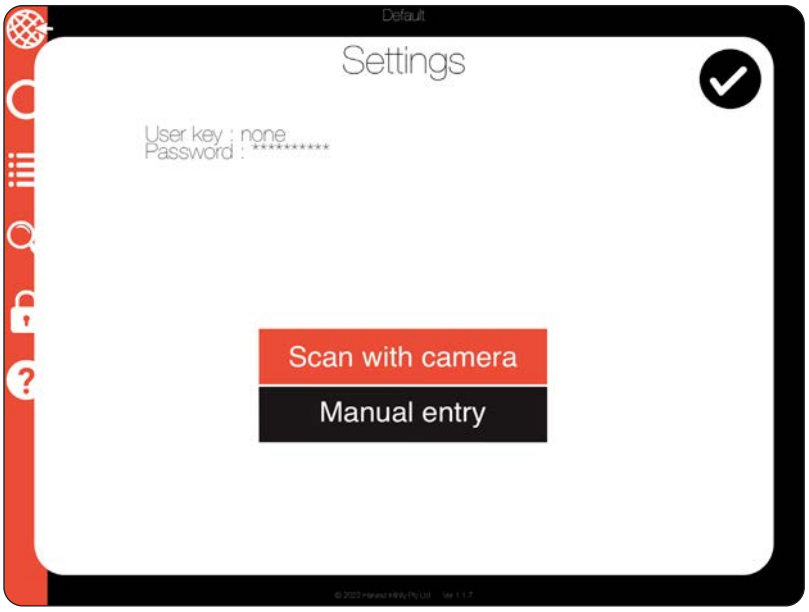
If using your own iPad, search for **NODESTER** in the app store.
(https://apps.apple.com/us/app/infinity-nodester/id1498900424)

## Account Configuration

1. Select the NODESTER application from the device home page:

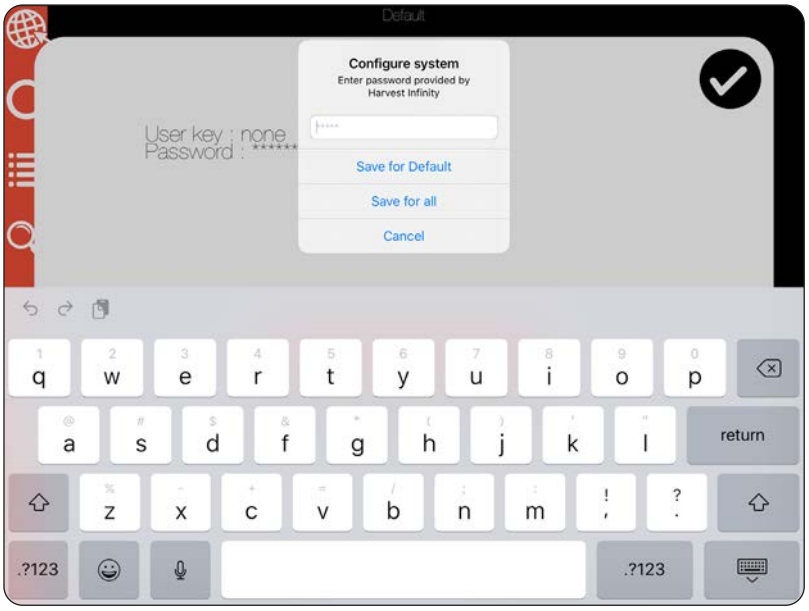

2. Tap the Network icon 

3 Tap **Scan with camera**




4 Using the device camera, scan the QR code provided

5 Enter password provided
Tap
**Save for Default** Preset or
**Save for all** Presets




If multiple user accounts are not required, simply use the provided “default” preset.

If the account details were entered correctly associated video and audio devices will be displayed.


If the account details were entered incorrectly, network icon remains black. Please try again or contact Harvest support.

When signing into your account or selecting a preset, the application will attempt to connect to the server. The network icon will diplay as follows.

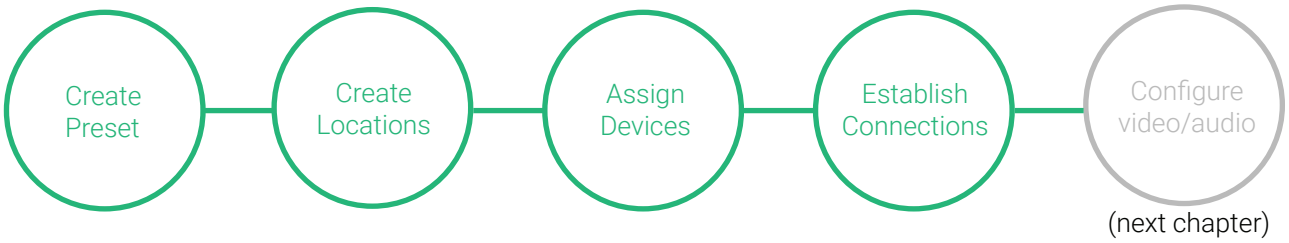

## Advanced Account Configuration

Multiple accounts can be set up on a single NODESTER instance. For best practice, ensure dedicated “presets” are created for each account before signing on. Presets allow multiple Nodestream networks to be set up into separate layouts.

IMPORTANT: If an additional account is signed in, it will overwrite an existing preset if selected. Ensure to use a different preset - see “Presets” on page 10.

# Set Up

## Typical workflow for creating a new Nodestream network

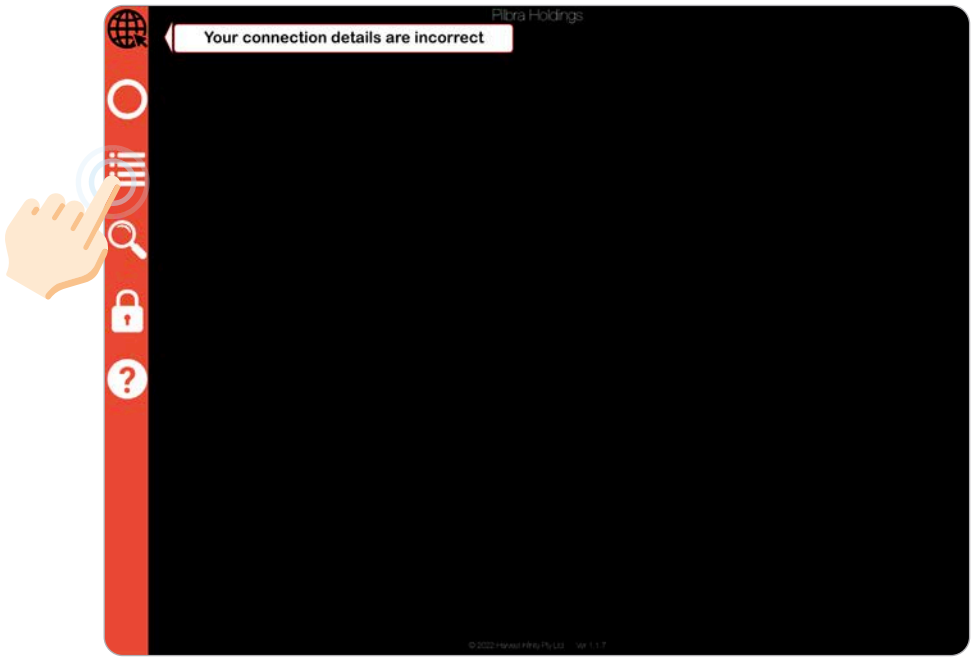



## Presets

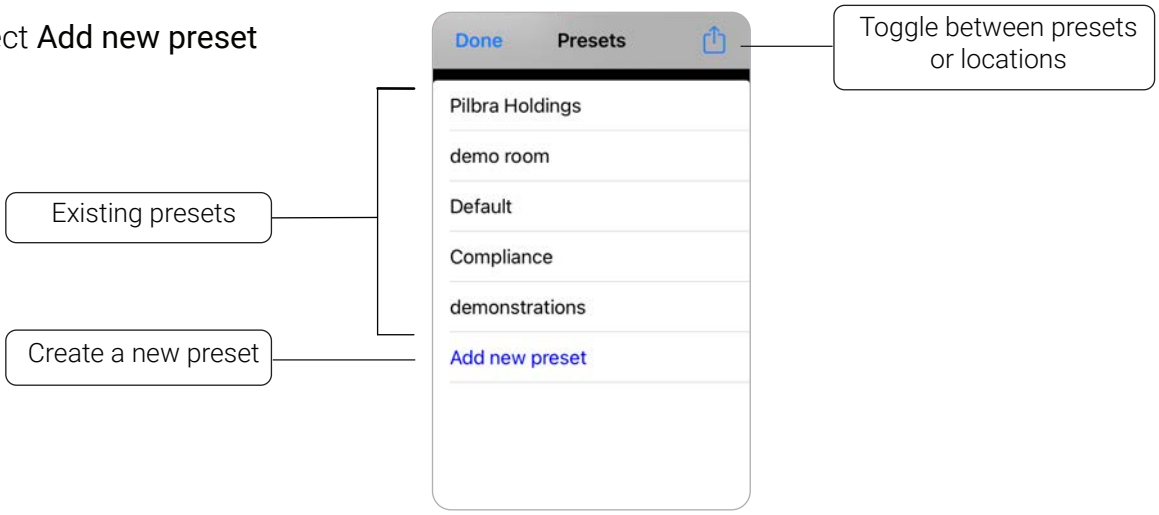
Presets allow for management of large, more complex Nodestream networks and/or multiple user accounts. Devices and locations can be configured for a particular operation or region within a company network then saved to allow recall at a later time.

### Creating a Preset

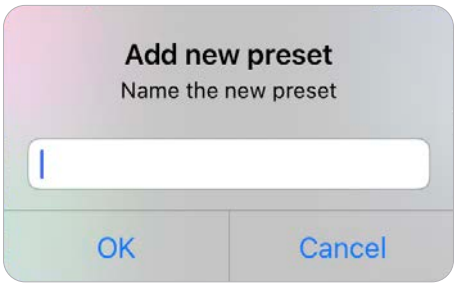
1 Tap the Presets icon



2 Select **Add new preset**

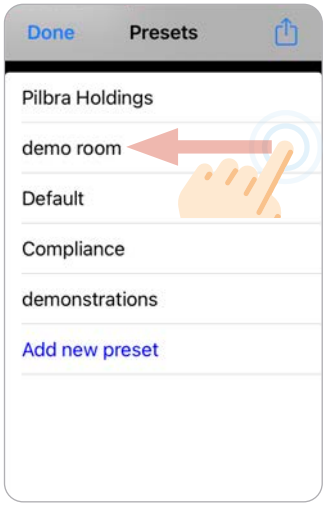



3 Enter preset name, then **OK**




## Deleting a Preset

1 Tap the Presets icon




2 Swipe left on a Preset to delete

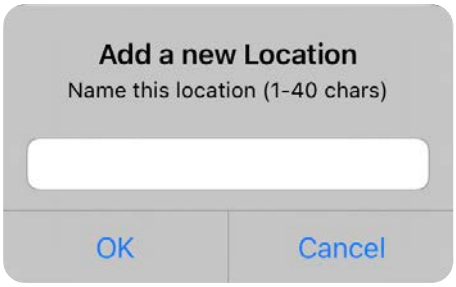
# Locations

Locations are used to group one or more devices within a Preset. These are generally associated with physical locations.

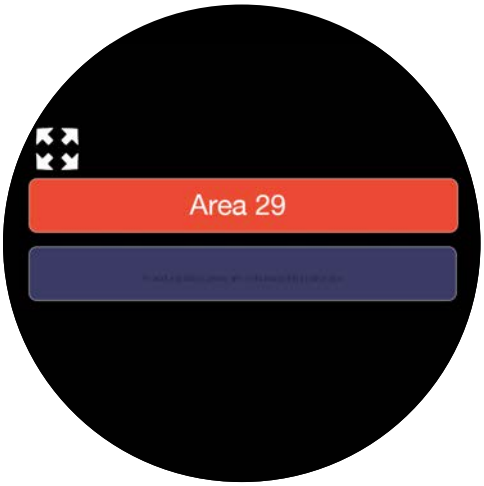
## Creating a Location

1. Tap and hold on a blank area

2. Enter location name, then **OK**

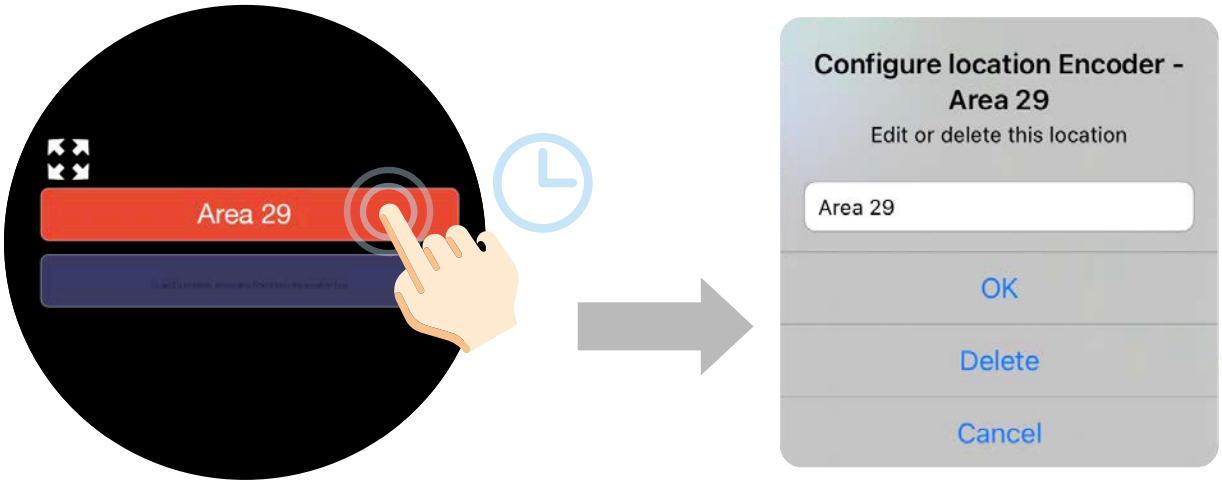



3. The new location (Area 29) will be displayed

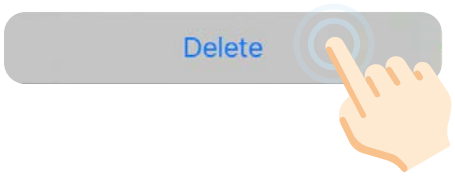


## Deleting a Location

1

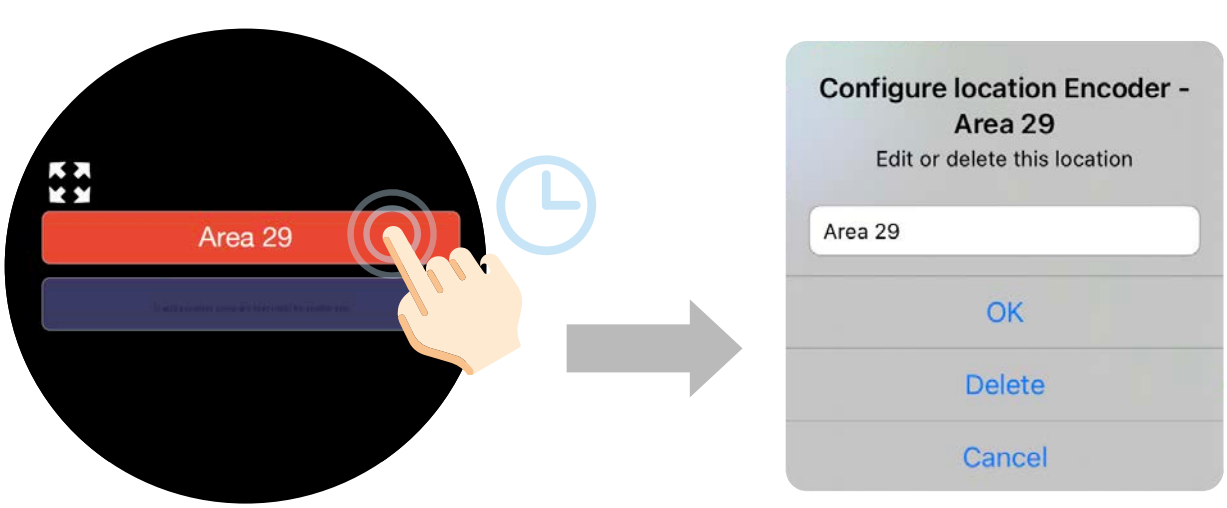



2




## Renaming a Location

1




2 Rename then tap **OK** to save

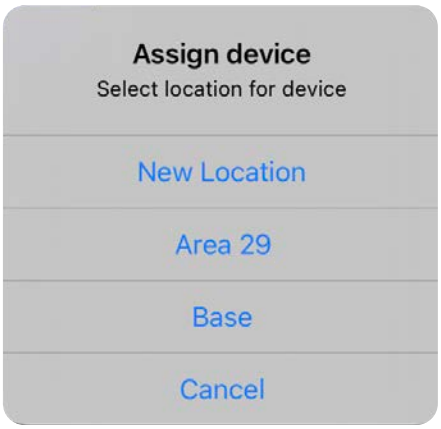
# Device Assignment

## Assign Devices

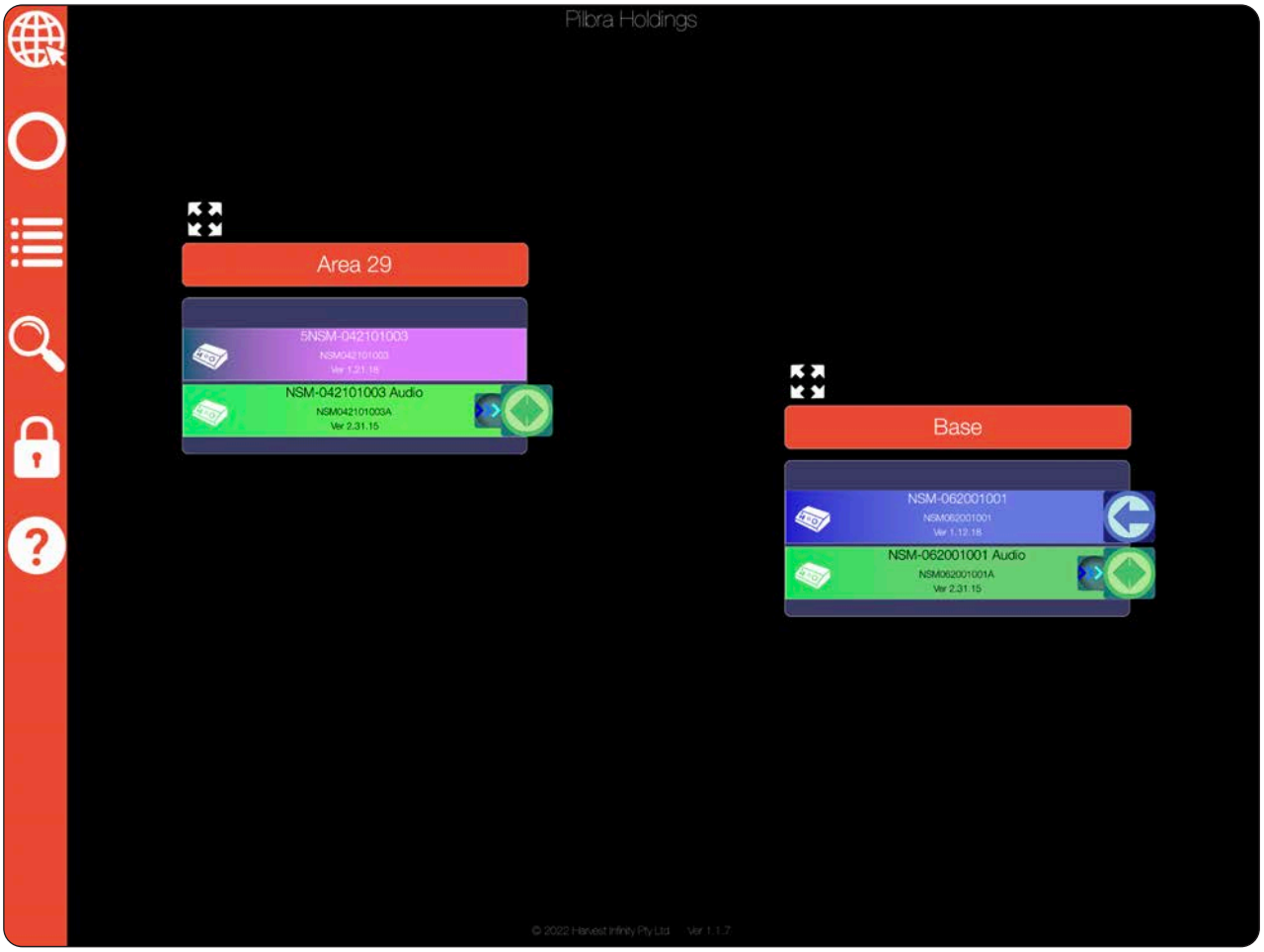
Select to toggle display between online and offline devices.

1 Tap a device in **Unassigned devices**


2 Select the location

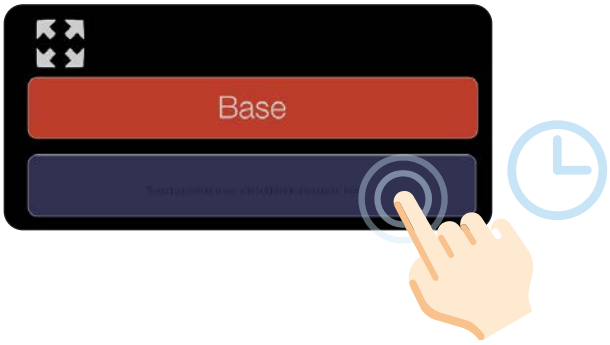


The screenshot below shows two devices assigned in each location.
The devices are currently not connected.

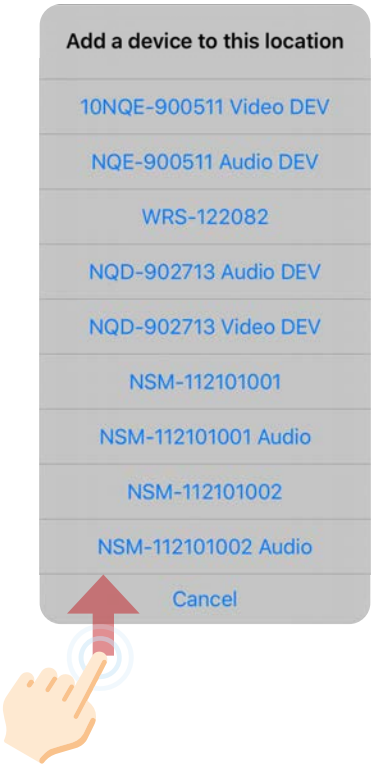


Alternatively, devices can be assigned from the Location

1 Tap and hold in the body of the location

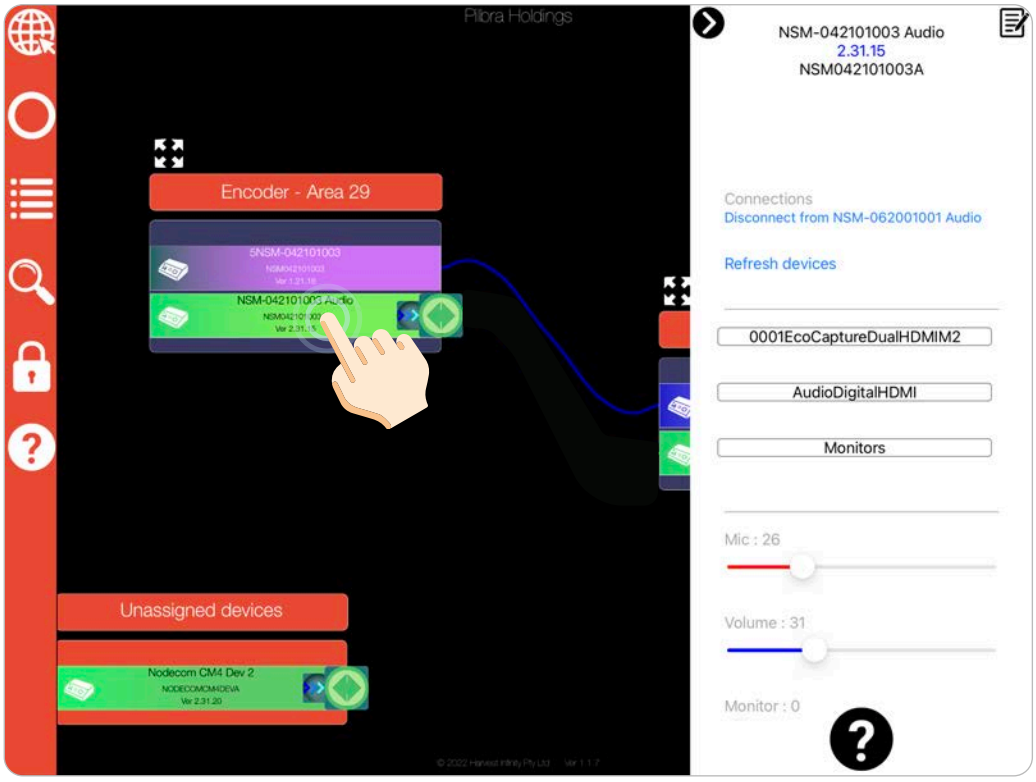



2 Tap a device to assign it to the location

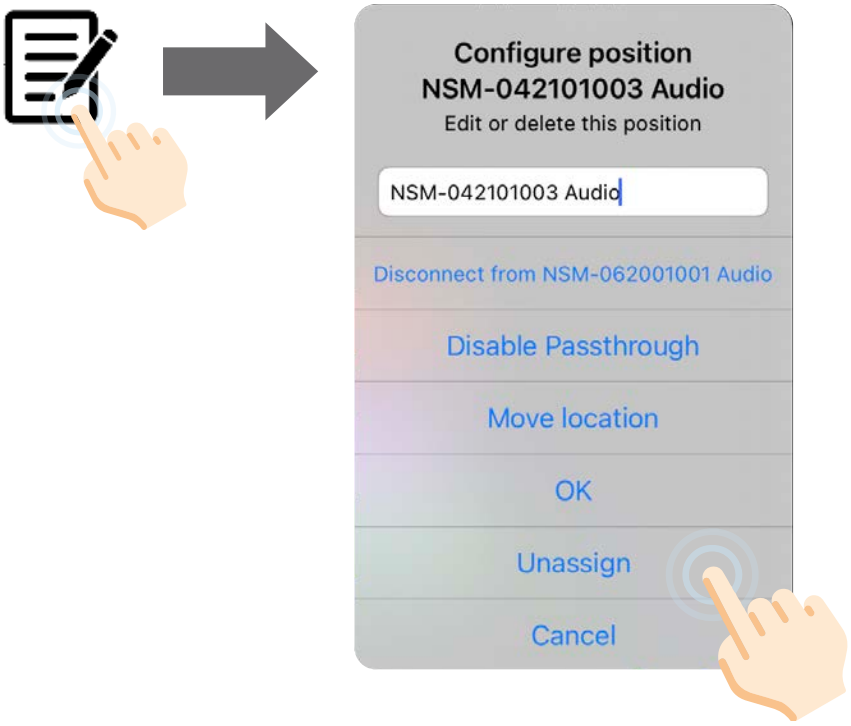


## Unassign Devices

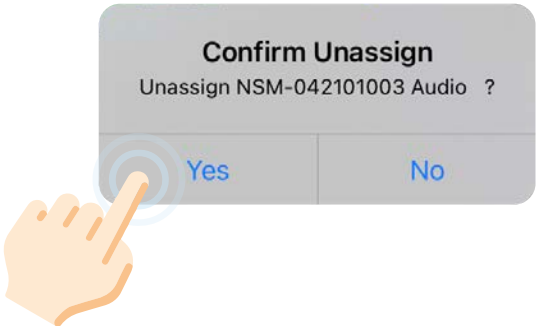
1 Tap a device in a location



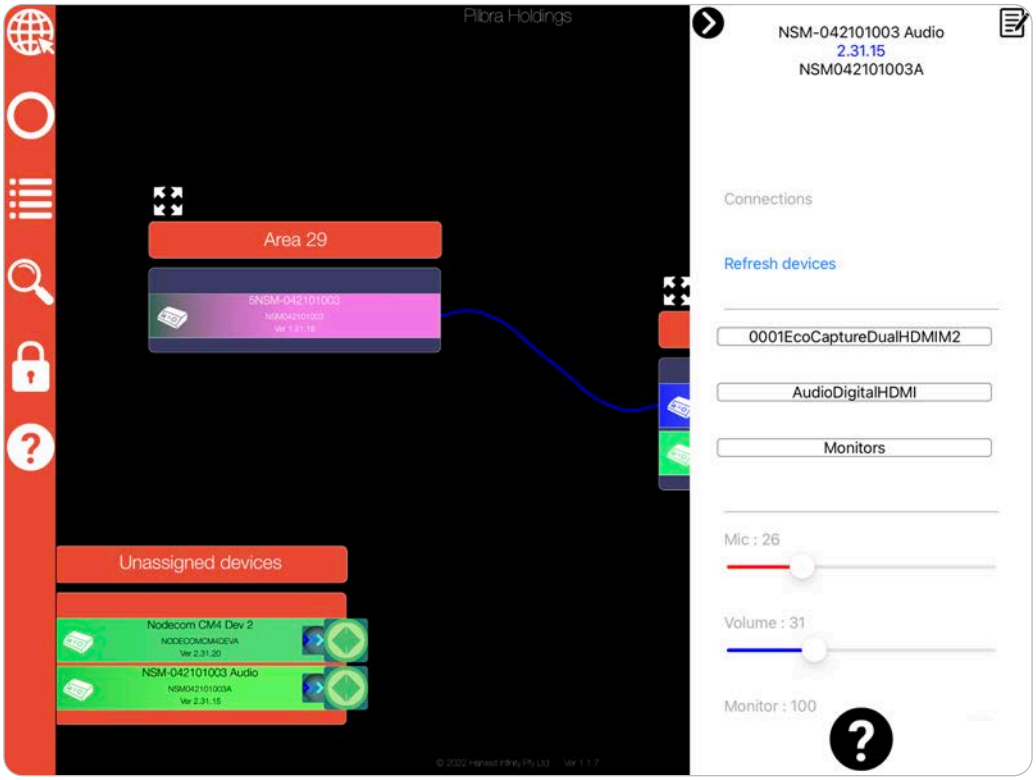

2



3




The device (audio) is removed, and returns back to unassigned devices

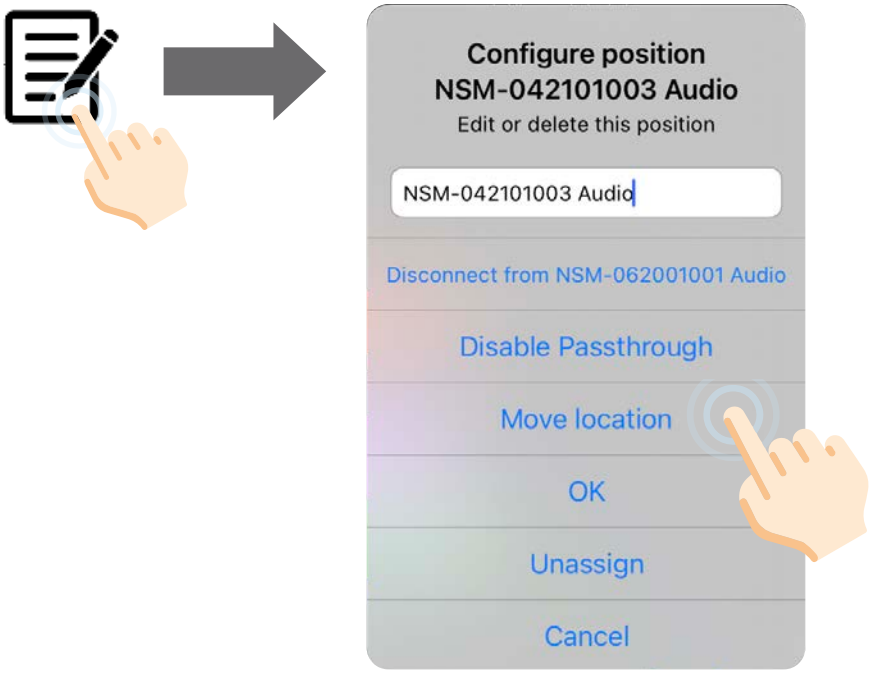



"Remove all connections before unassigning..." displays if you have not first removed the connection. See "Connections" on page 20.

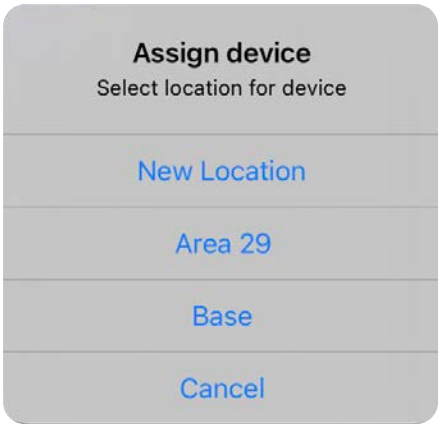
## Move Device to another Location

1 Tap a device in a location


2




3 Select a location

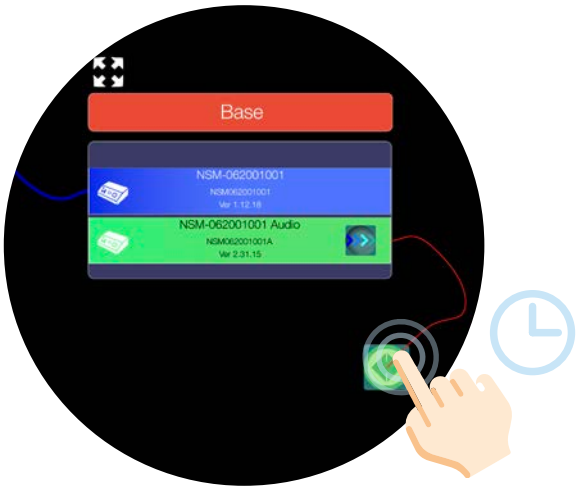


# Connections

Established connections are represented in blue (video), and green (audio). The connecting line remains red while dragging or attempting to connect incompatible devices.

## Connect Devices

1 Tap and hold a device connector

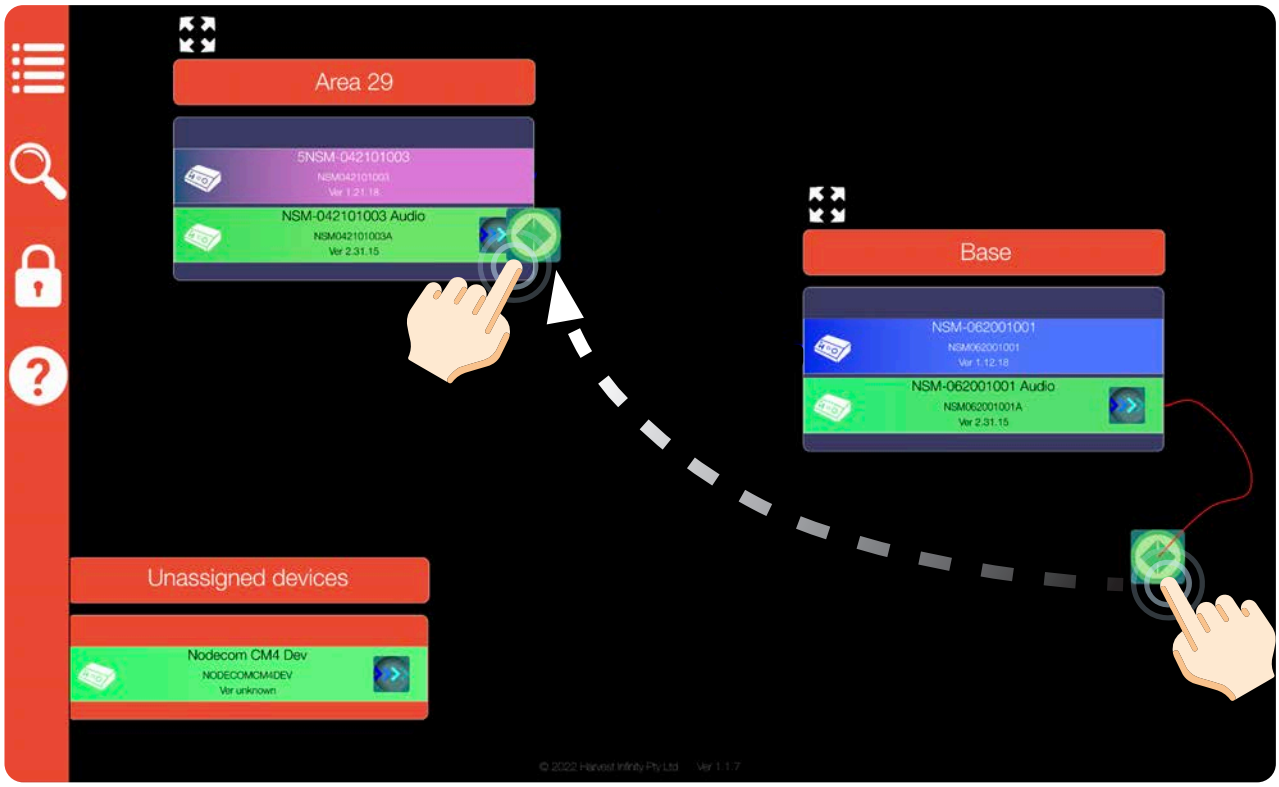



Decoder connector

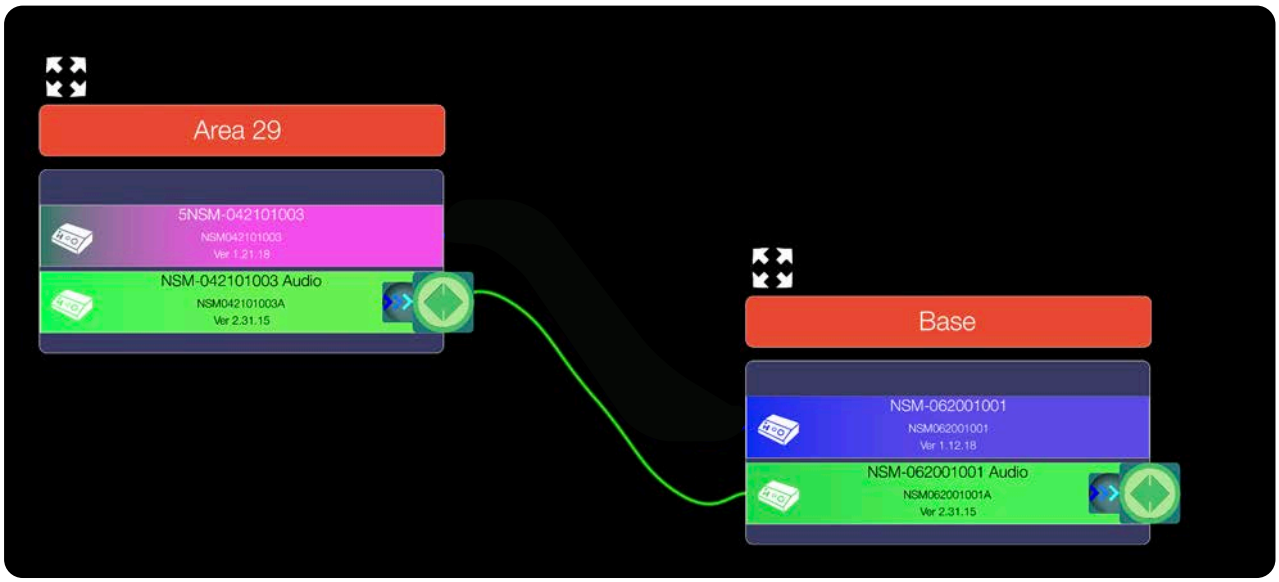
Audio connector

A Wearwolf device can be connected to an audio and video device

2 Drag connector to another device

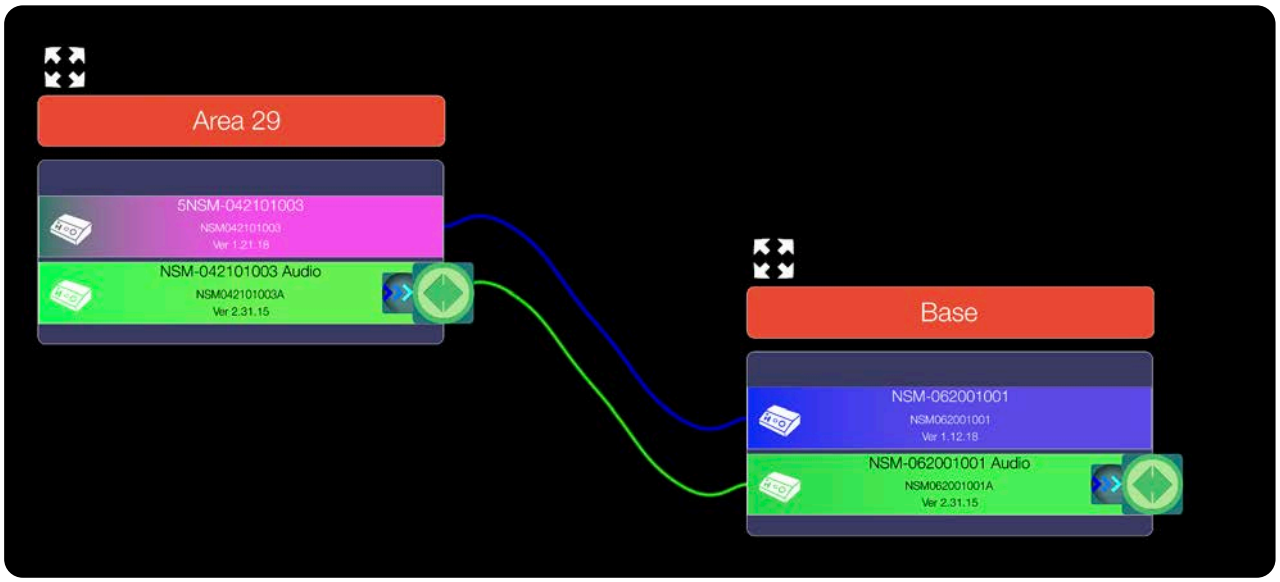


The connection is established



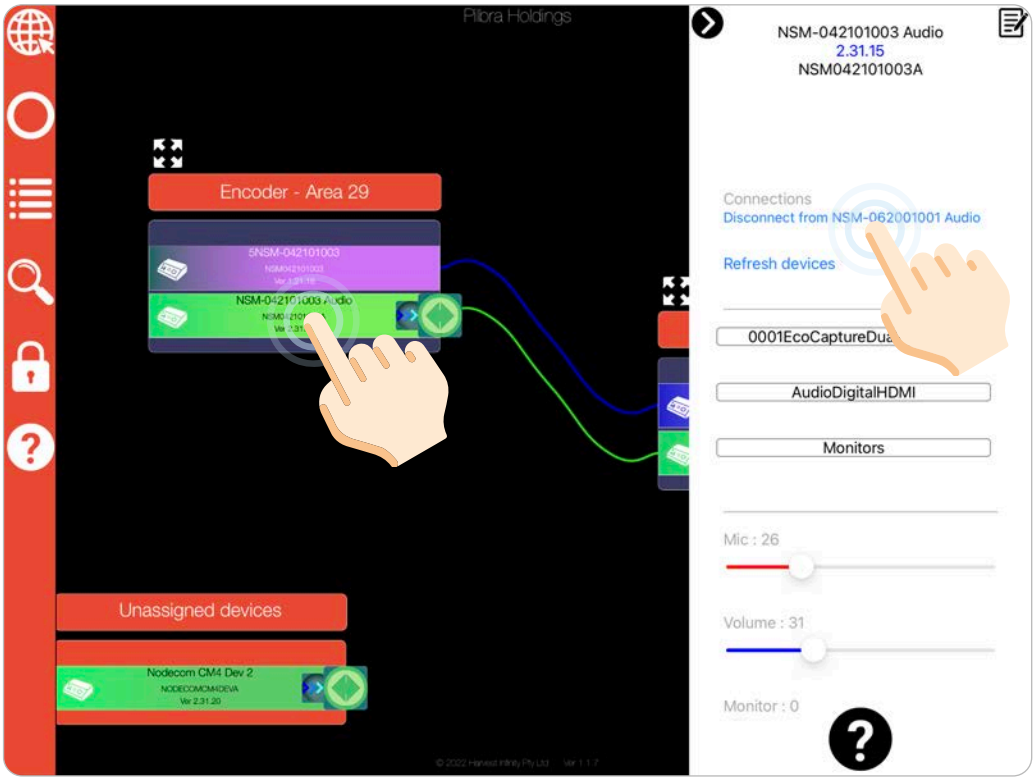

An audible tone will be heard when an audio connection is established

3 Repeat to connect other devices

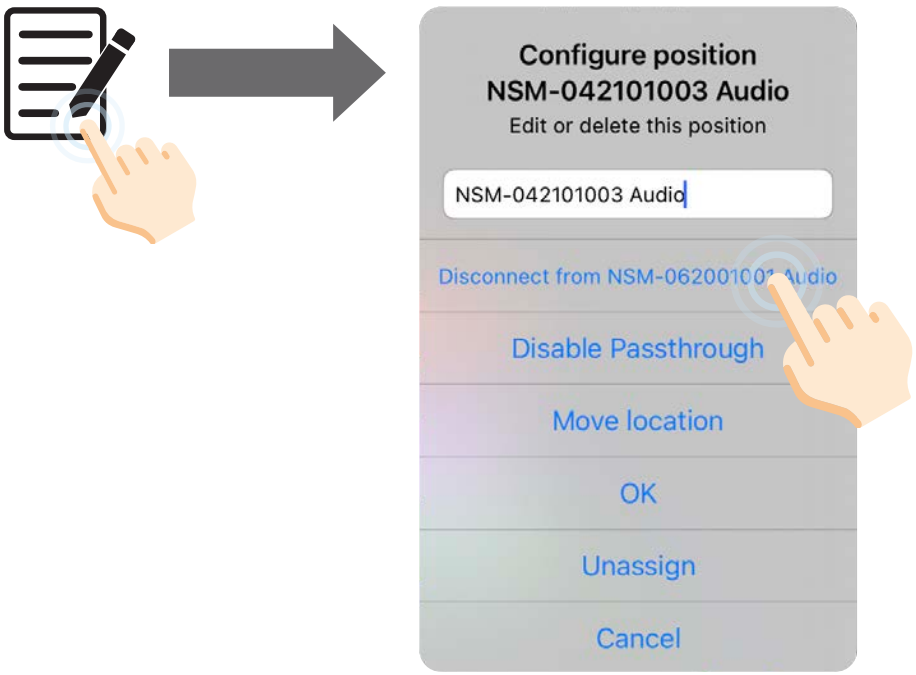


## Disconnect Device

1 Tap a connected device, then **Disconnect from** *device name*




Alternatively...



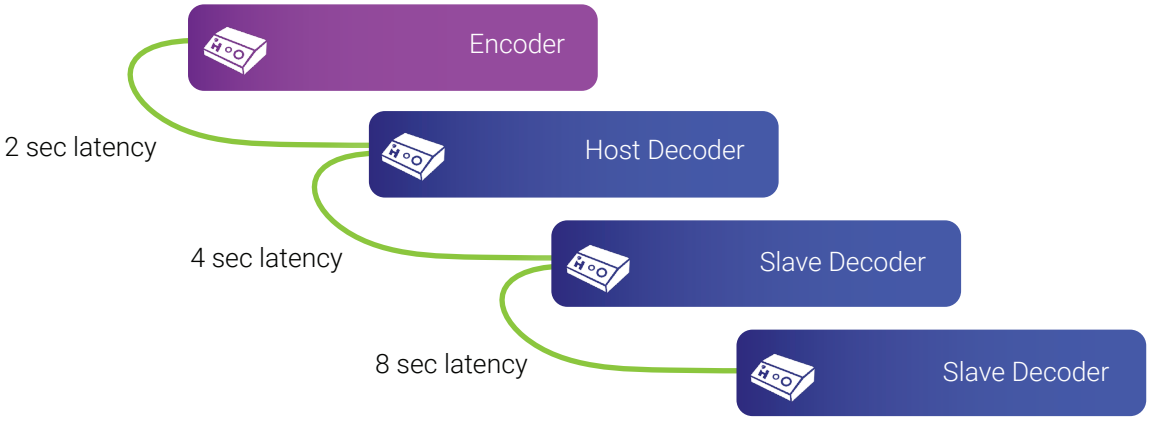
# Advanced Connection Management

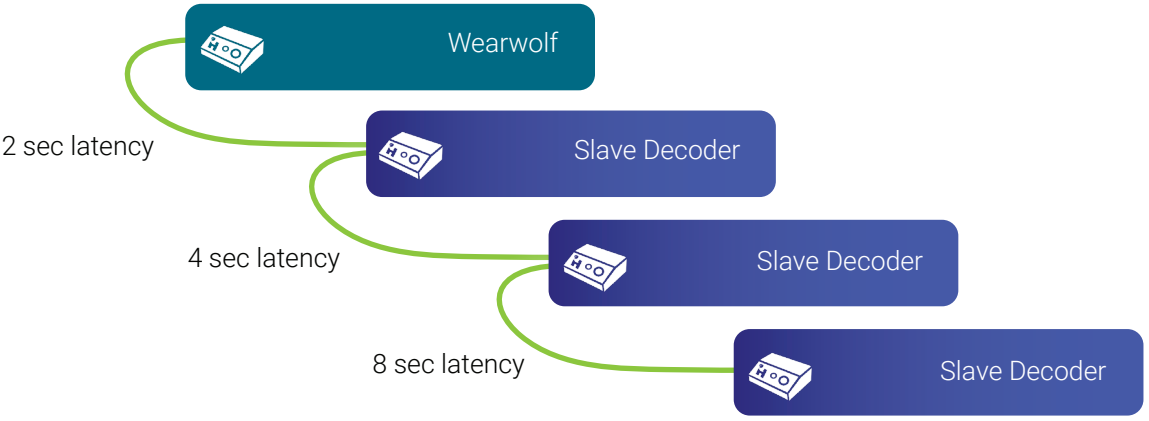
Nodester allows for unique connection architectures to be designed to suit a customers requirements.

## Video Connections

When connected to a Nodestream encoder, the first decoder becomes the host, with all downstream decoders becoming slaved. Connection bitrate and latency settings can only be configured by the host decoder.

- A maximum of three decoders can be connected together at any one time
- Connection latency is doubled for every slave added
- An encoder can only be connected to 1 decoder at any one time
- When connected to a Wearwolf device, a decoder will be in slave mode with all settings controlled by the Wearwolf. Set latency prior to establishing a connection



## Audio Connections

- A maximum of three devices that can be connected from a single device.
- Passthrough can be used to control which of the connected devices communicate with each other by blocking or allowing audio transmission to pass “through” a device.

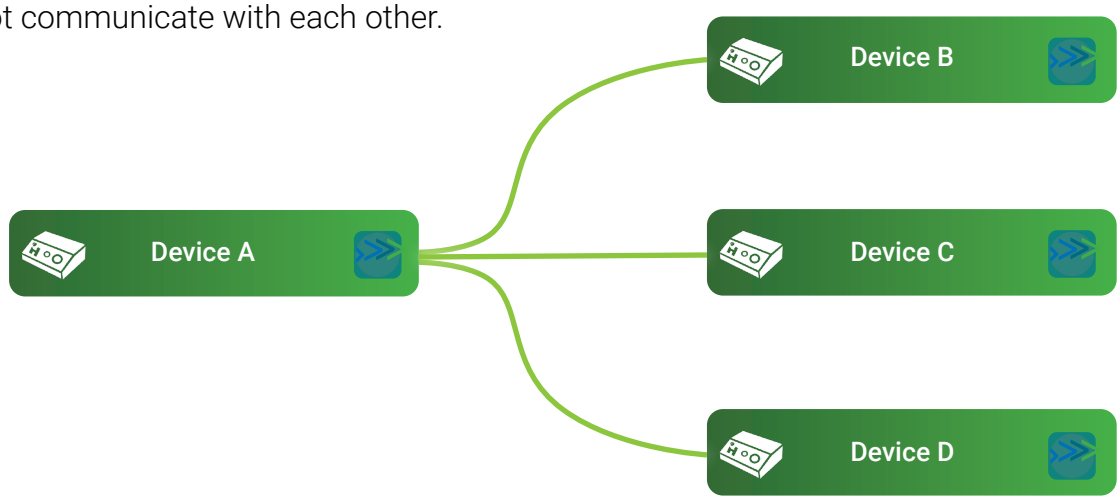
Passthrough disabled:

Passthrough enabled:

For information on how to enable or disable passthrough, see “Audio devices” on page 34.

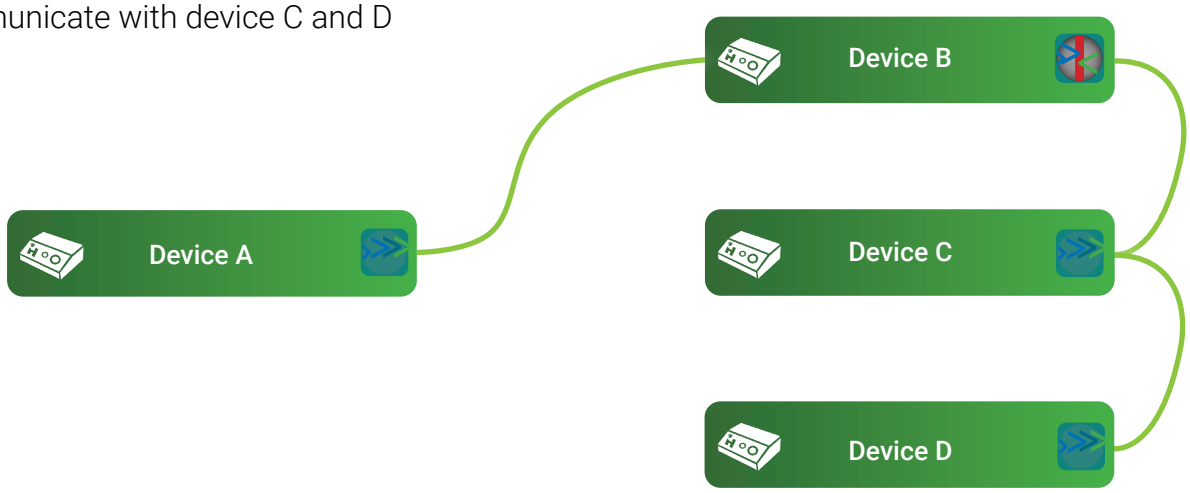
Scenario A

Device A passthrough enabled - all devices can communicate with each other.
Device A passthrough disabled - all devices can communicate with device A. Devices B, C and D cannot communicate with each other.




Scenario B (all other devices passthrough enabled)

Device B passthrough enabled - all devices can communicate with each other.
Device B passthrough disabled - all devices can communicate with device. Device A cannot communicate with device C and D



# Device Configuration

Nodester enables users to target a desired outcome (high quality or low latency) to suit their network properties through the configuration of the connected Nodestream devices. To successfully achieve this, it is important to have a solid understanding of resolution, framerate, bitrate and latency and their relationship with each other.

- Resolution Number of pixels contained in each frame
- Framerate Number of frames per second
- Bitrate Amount of data per second
- Latency Time taken for data to be sent from the source to the destination

The technical limits of the connected network needs to be considered when configuring a connection as this determines the maximum bitrate available and initial latency. A target bitrate cannot be achieved if the network cannot support it.

Below are examples of setting relationships and how they may impact the connection

Resolution
- A higher resolution requires more bitrate, while a lower resolution requires less bitrate
- Increase resolution if higher quality is desired
- Decrease resolution if lower latency is desired

Frame-rate
- A higher framerate requires more bitrate, while a lower frame-rate requires less bitrate
- Increase framerate if a smoother stream is desired
- Decrease framerate if higher image quality or lower latency is desired

Bit-rate
- Bitrate live on a decoder shows the current bitrate utilisation of the connection, adjust the target bitrate to suit. For best results, set target bitrate to 80% of available bitrate
- If the target bitrate is greater than the bitrate live, stream quality will be affected

Latency
- Increasing latency allows data more time to correctly transfer from an encoder to a decoder
- Increase latency if higher quality is desired
- Decrease latency if less delay is desired

- Devices must be online to allow configuration. Some setting may only be available when the device is connected to another.
- Audio connections will be affected if all available bandwidth is consumed by video streams

## Configuration Examples

### Example 1

A client has a requirement for a single video stream over a limited satellite connection with 132Kbps of available bandwidth

**Target high quality**

- Resolution - 720p
- Framerate - 15
- Bitrate - 100Kbps
- Latency - Max

**Target low latency**

- Resolution - 480p
- Framerate - 5 to 10
- Bitrate - 100Kbps
- Latency - Min (increase as required)

### Example 2

A client has a requirement for a 4 x HD video streams over a network connection with 2Mbps of available bandwidth

**Target high quality**

- Resolution - 1080p
- Framerate - 60
- Bitrate - 1600Kbps
- Latency - 2000ms

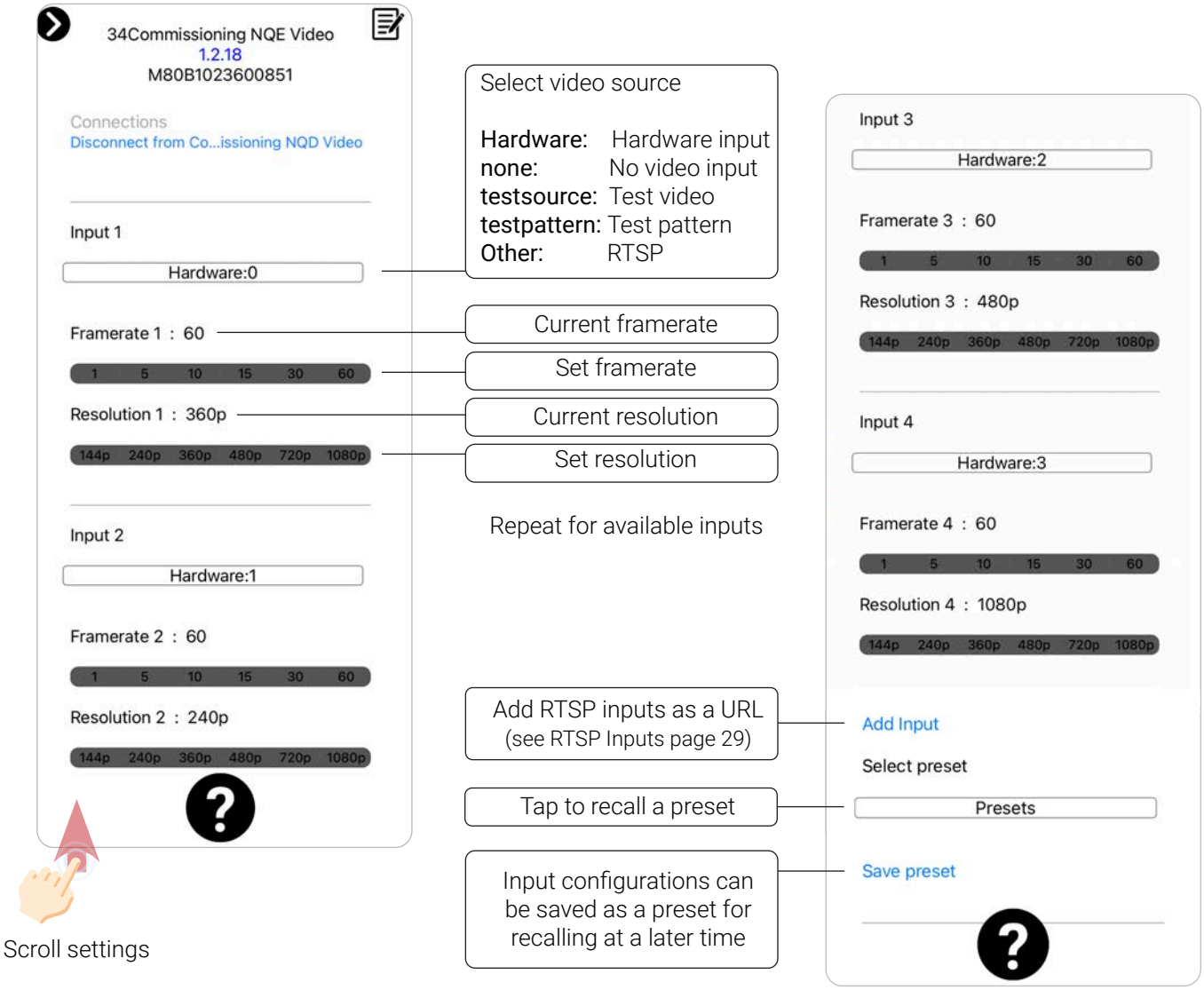
**Target low latency**

- Resolution - 720p
- Framerate - 30
- Bitrate - 1600Kbps
- Latency - 20ms

See troubleshooting section for assistance with diagnosing streaming issues

# Video Encoders

## NQE/NSM




Number of available configurable inputs will reflect the number of available inputs on the device

## Wearwolf


Set the latency on the decoder prior to connecting it to a Wearwolf, as the decoder settings are not available once connected.

# RTSP Inputs

RTSP (real time streaming protocol) streams, typically associated with network IP cameras, can be added as inputs to Nodestream encoders if the network is correctly configured (see device user manual). There is no limit to how many IP cameras can be added however generally there is a limitation of 254 for a given IP network.

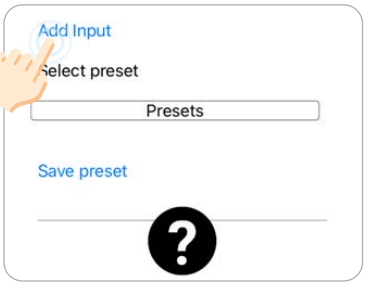
RTSP URL's are unique to camera manufacturers and can differ between models. The URL must be known prior to entering the input. It is recommended to confirm the URL address is correct by using a simple network stream viewer such as VLC.

- IP address and port is required
- User name and password is required if stream security is enabled
- RTSP stream may need to be enabled via the camera web interface

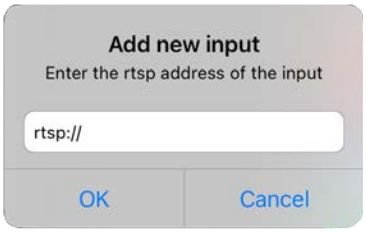
**RTSP URL example:** rtsp://admin:admin@192.168.1.30:554/profile2/media.smp

User name / password | IP address | Port

1 Tap **Add Input**

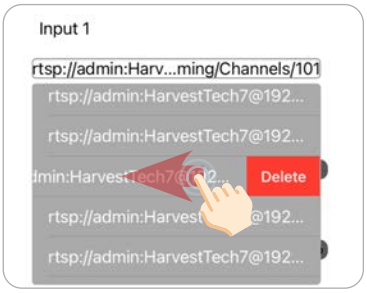



2 Enter RTSP URL, then **OK**




3 The RTSP stream will now be available as an input

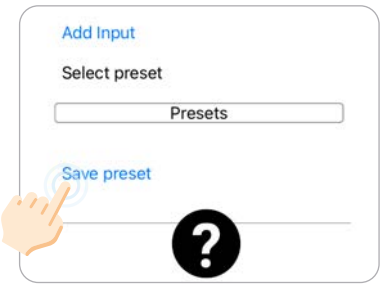
4 Swipe left on an RTSP input to delete



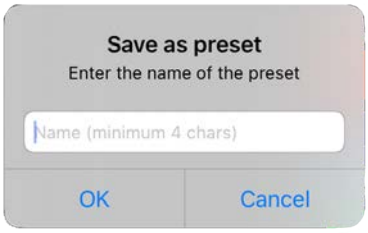

## Input Presets

Input configurations can be saved and recalled using the **Input Preset** function. This allows for easier management of encoders with multiple RTSP inputs.

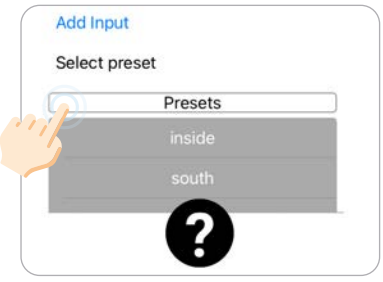
1 Once inputs are configured, tap **Save preset**



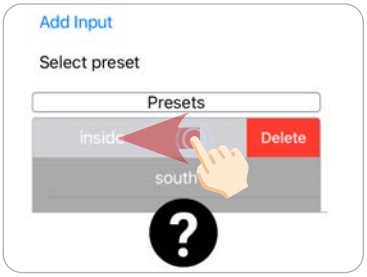

2 Enter preset name and tap **OK**




3 Tap **Presets** to list saved presets

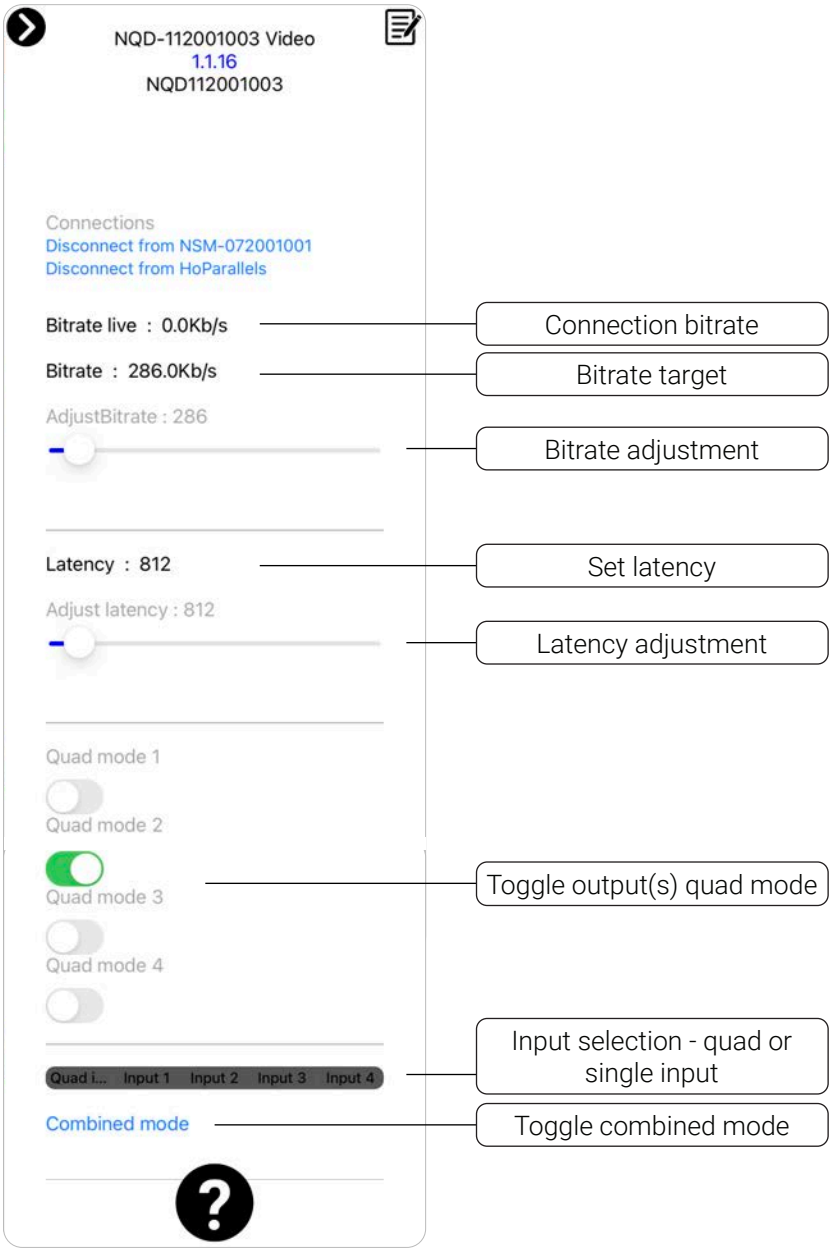



4 Swipe left on a preset to delete



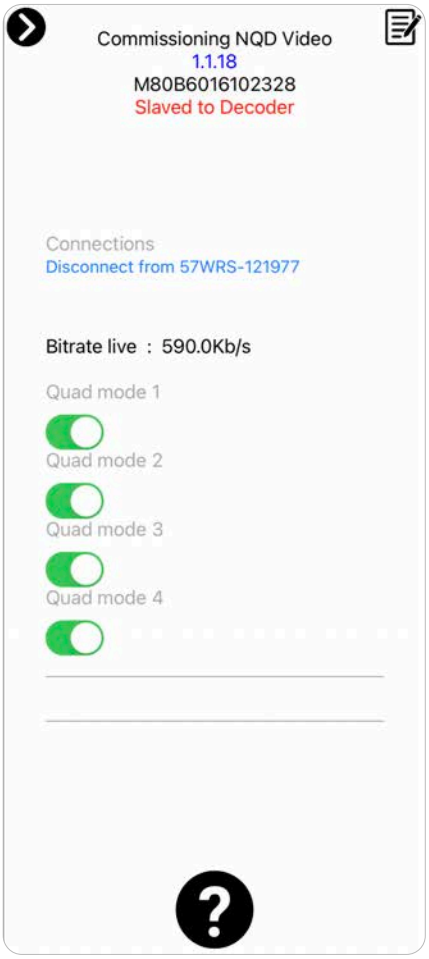
# Video Decoders

## NQD/NSM




Slaved to Decoder:

A slaved decoder only has control of output settings. Bitrate and latency are controlled via the host decoder or Wearwolf device




- Number of available quad modes will reflect the number of available outputs on the device
- For more information on Quad mode, Input selection and combined mode see next section

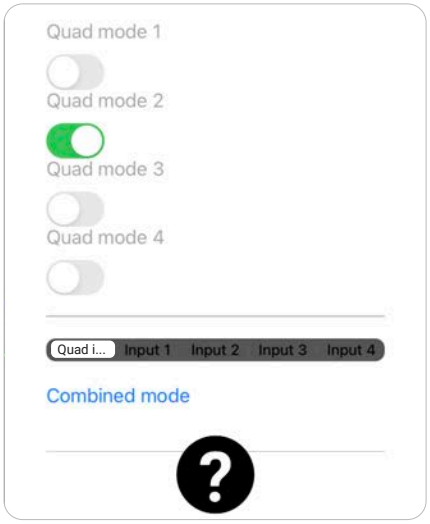
## Decoder Output(s)

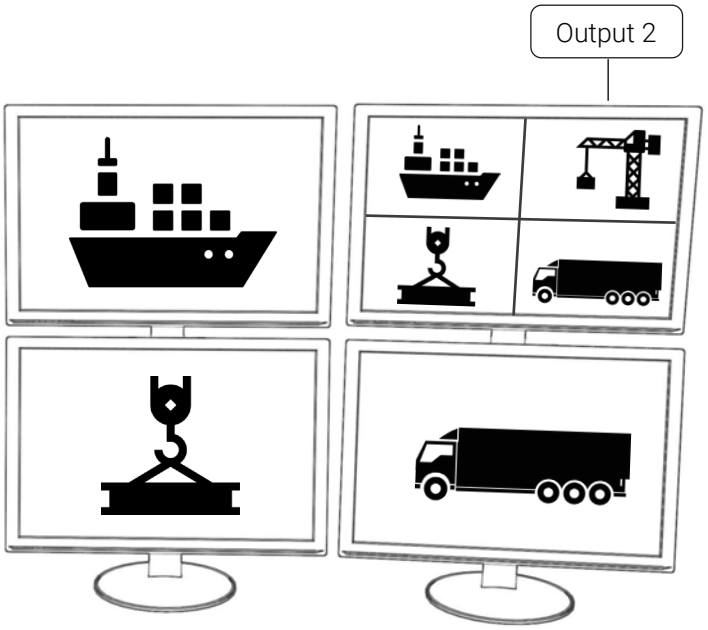
### Quad Mode

Quad Mode enables all 4 inputs (when connected to a 4ch encoder) to be displayed on a single monitor output. This can be useful when there is a requirement for all channels to be recorded or further streamed from a single channel device like the Harvest AVR2.

The number of quad modes available is reflected by the number of physical outputs on a device.

In the example below, quad mode is enabled on output 2 with quad inputs selected.



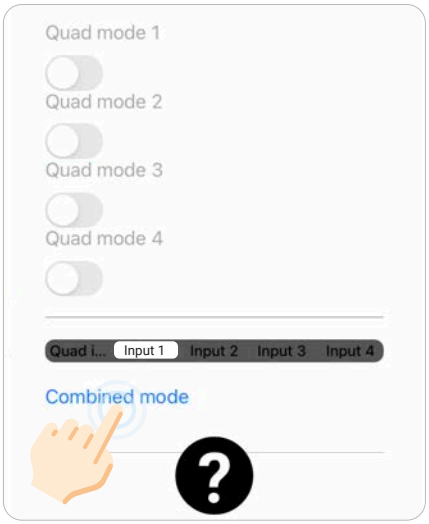

### Input Selection

The input selection setting on a decoder controls the encoded stream from the encoder. When quad input is selected all 4 inputs (when connected to a 4ch encoder) are encoded and streamed to the decoder. When a single input (1, 2, 3 or 4) is selected, only that input is encoded and streamed with all the set bandwidth allocated to that channel. Streaming a single channel enables a much higher quality video stream.

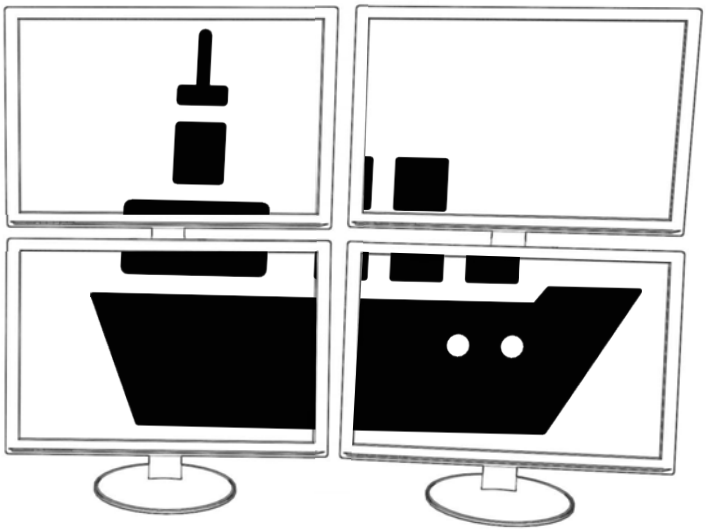
- On a 4ch decoder when a single input is selected the input will be shown on all outputs.
- Single channel selection can also be used when using Combined mode (see below).

### Combined Mode

Combined mode displays a single input split across all 4 outputs (when connected to a 4ch decoder)

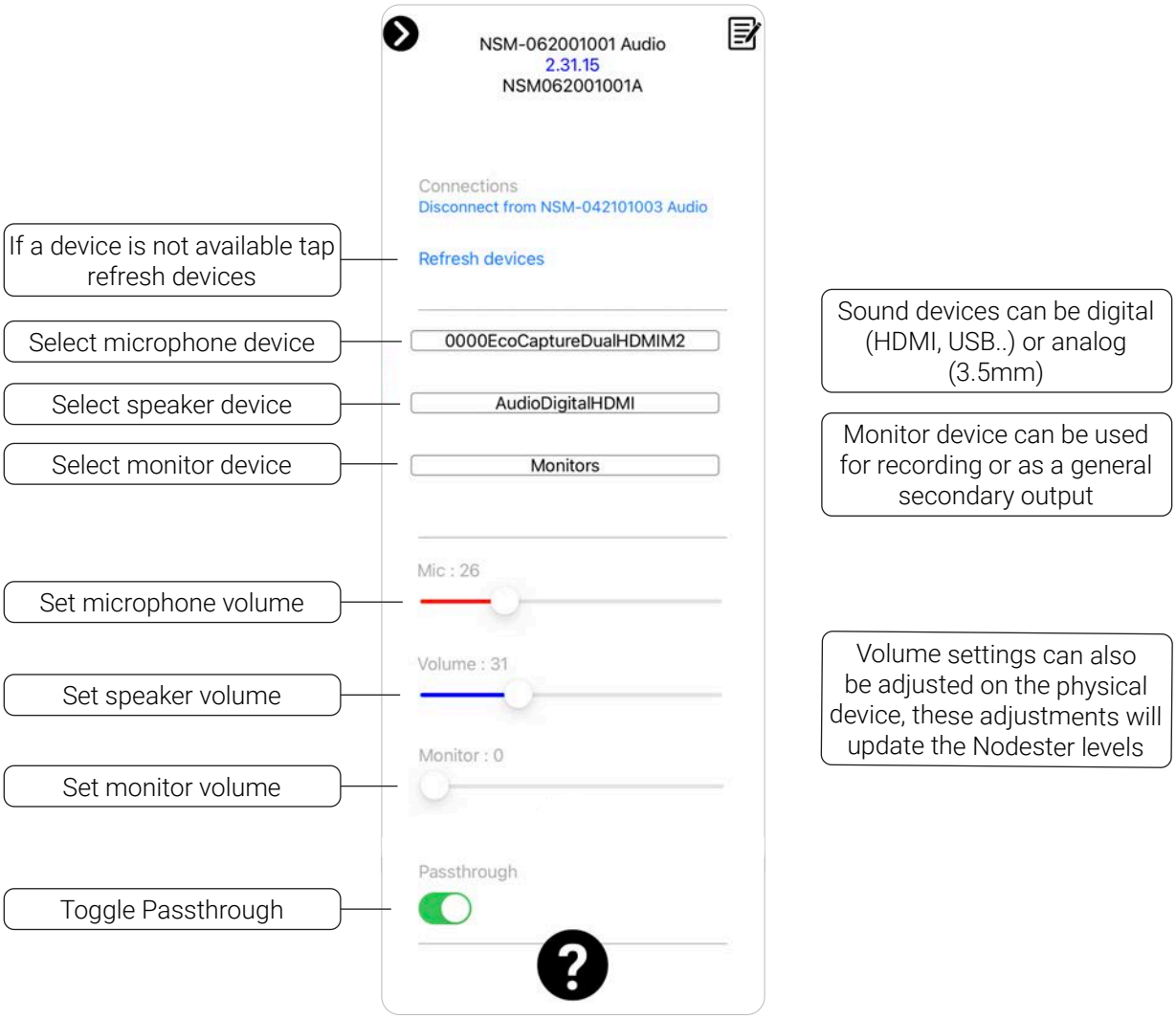



Tap to toggle combined mode



If display output configuration is incorrect, change inputs on the connected encoder

# Audio Devices




Combined audio devices such as speakerphones and headsets require the mic and speaker to be set individually.

# Troubleshooting

## Connection

| Issue | Cause | Resolution |
|---|---|---|
| Device is showing as “Offline”. | The device is not powered or not connected to the Harvest server. | Check the device is powered on, and has a valid internet connection. Check the software is running and inputs streaming, or |
| Dragging a line between the locations/devices shows a red line. | The two devices are not compatible.<br><br>The devices have reached their connection limit.<br><br>The devices already have an existing connection to each other.<br><br>One device is offline. | Ensure the device is compatible - video to video device, and audio to audio device.<br><br>If a maximum of three devices are already connected, work out a new architecture.<br><br>No action necessary.<br><br>Check cables, network and troubleshoot |
| Device is taking a long time to connect. | This can be caused by poor network quality (such as satellite or mobile), or in the case of video can indicate the bandwidth is too high for the network, or the latency is too low. This can also be caused when both devices are on a LAN or WLAN with local isolation turned on. | Ensure both devices have a stable internet connection. For video decoders, set the latency to 3 seconds and start with a low bandwidth connection (128Kb/s) to test a connection is possible. The system will continuously attempt to traverse firewalls, however some highly strict configurations will block traffic between devices. In this circumstance, contact the network |
| The network status icon continuously spinning. | The iPad is attempting to contact the Harvest server. | If this continues for a prolonged period (>30 seconds) an internet connection is not available, or a firewall is blocking traffic between the iPad and the Nodestream server. Check the iPad with an alternative internet connection if available or contact |
| The network status icon is red. | The account settings are incorrect. | Ensure all connection settings are as supplied by Harvest. If the problem persists, contact Harvest support. |

# Video

| Issue | Cause | Resolution |
|---|---|---|
| Video connection taking excessively long to establish, or won't establish. | Network traffic in one direction is being blocked or is not available. | Disconnect the devices via Nodester.<br><br>If the connection is between a Nodestream decoder and a Nodestream encoder, open the decoder connection controls.<br>If the device is a Wearwolf, open the video settings<br>In both cases, lower the bitrate to 1/4 of the known network bandwidth. (If unsure, set to 128Kb/s). Increase the latency to 3 seconds (3000ms). Reconnect the devices. If a connection is achieved, increase the bitrate to the desired value. If at any point grey screen / artfacts begin to appear, the network link cannot sustain the set bitrate. Lower the bitrate until the video is stable.<br><br>If this fails to rectify the problem, check the network settings on both devices. Contact your network administrator to confirm firewall settings are not preventing a connection. |
| Video connection will not draw between two video devices. | The device has too many connections, or is not compatible. | If the device connection limit is reached, no further connections will be allowed. |
| Video is excessively delayed. | Latency is induced in the video system, to enable packet re-transmission in the event forward error correction fails. | At a proven bitrate, lower the device latency (connection controls for decoders when connecting encoders, or "Infinity settings" when connecting to Infinity Wearwolf) to the desired latency. If video errors begin to occur, the network is not capable of sustaining streaming video at this setting. Increase the latency until stable video is achieved. |

# Audio

| Issue | Cause | Resolution |
|---|---|---|
| Audio connection keeps re-establishing (Connection sound can be heard repeating and no or one way communication can be heard ) | Network traffic in one direction is being blocked or is not available. | Disconnect the two devices via the iPad, and establish a new connection. If this fails to rectify the problem, check the network settings on both devices. |
| A delayed echo of the user voice can be heard. | The remote microphone is repeating the audio output.<br><br>A loop condition has been drawn between devices. | If the microphone can detect the speaker, the microphone level is too high or the microphone is too close to the speaker.<br>If a loop condition has been drawn (a connection where 3 or more devices are linked together in a loop) passthrough must be disabled at some point in the loop to prevent audio travelling full circle to all |
| Audio connection will not draw between two audio devices. | The device has too many connections, or is not compatible. | If the device connection limit is reached, no further connections will be allowed. |
| Audio is excessively delayed | During extremely poor network conditions, network buffering can occur, causing a delay in audio. | Disconnect and reconnect the audio connection to clear any audio buffers. |
| The network status icon is red | The account settings are incorrect. | Ensure all account settings are as supplied by Harvest. If the problem persists, contact Harvest support. |

Contact and Support
support@harvest-tech.com.au

Harvest Technology Pty Ltd
7 Turner Ave, Technology Park
Bentley WA 6102, Australia
www.harvest.technology