Glensound
Keeps Working

Charon

Dante SDI audio embedder and de-embedder

PRODUCT DETAILS

Dante®

6 BROOKS PLACE, MAIDSTONE, KENT, ME141HE. ENGLAND.
Visit our website at www.glensound.com
TEL: +44 (0) 1622 753662
FAX: +44 (0) 1622 762330

Glensound Electronics Ltd

Thank you for choosing a new Glensound product.

Information contained in this manual is subject to change without notice, if in doubt please contact us for the latest product information.

If you need any help with your product then we can be contacted at:

Glensound Electronics Ltd
1 – 6 Brooks Place
Maidstone
Kent
ME14 1HE
United Kingdom

Telephone: +44 (0) 1622 753662

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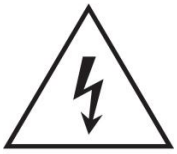
EMAIL ADDRESSES

General and Technical enquires: office@glensound.com

Sales enquires: sales@glensound.com

Patents: audinate.com/patents

IMPORTANT SAFETY INSTRUCTIONS



This symbol is intended to warn that dangerous voltages within the product are present and constitute a risk of electric shock.

This symbol is intended to warn that the product can be energised from more than one Mains power source. Care must be taken if accessing internal components. Ensure that both Mains Power supplies are fully disconnected.

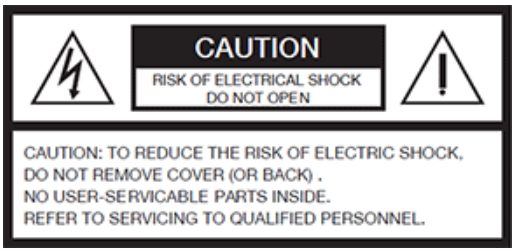
This symbol is intended to highlight that the equipment must have a valid earth connection with the protective earthing conductor.

This product is fitted with two internal ceramic fuse cartridges (one for each Mains inlet).
In the event of fuse blow, a replacement fuse must exhibit the follow specifications:
Rating: 250VAC 3.15AH
Sand/silica filled
Time delay blow
5mm x 20mm

High sound pressure
Hearing damage risk
Do not listen at high volume levels for long periods.

This symbol is intended to highlight that there are important operating & maintenance instructions in the literature accompanying this unit.

1) Read these instructions
2) Keep these instructions
3) Heed all warnings
4) Follow all instructions
5) This product is intended for indoor use only
6) The intended ambient operating temperature of this product is 0°c to 40°c
7) Do not use this apparatus near water
8) Clean only with a dry cloth
9) Do not block any ventilation openings. Install in accordance with manufacturer's instructions
10) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat
11) Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has 2 blades with one wider than the other. A grounding type plug has 2 blades and third grounding prong. The wider blade or the 3rd prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet



12) Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles and the point where they exit from the apparatus
13) The socket outlet used for mains power to this device must be easily accessible
14) Only use attachments/ accessories specified/ supplied by the manufacturer
15) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/ apparatus combination to avoid injury from tip over

16) Unplug this apparatus during lightning storms or when unused for long periods of time
17) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped
18) Do not attempt to modify this product. Doing so could result in personal injury and/ or product failure

PRODUCT WARRANTY

All equipment is fully tested before dispatch and carefully designed to provide you with trouble free use for many years.

We have a policy of supporting products for as long as possible and guarantee to be able to support your product for a minimum of 10 years.

For a period of one year after the goods have been despatched the Company will guarantee the goods against any defect developing after proper use providing such defects arise solely from faulty materials or workmanship and that the Customer shall return the goods to the Company’s works or their local dealer.

All non-wear parts are guaranteed for 2 years after despatch and any defect developing after proper use from faulty materials or workmanship will be repaired under this warranty providing the Customer returns the goods to the Company's works or their local dealer.

CE

EU DECLARATION OF CONFORMITY

Charon

Dante SDI audio embedder and de-embedder

This declaration of conformity is issued under the sole responsibility of the manufacturer.

This equipment is manufactured by Glensound Electronics Ltd of Brooks Place Maidstone Kent ME14 1HE is CE marked and conforms to the following Union harmonisation legislation:

Emissions:	BS EN55032:2015
Immunity:	BS EN55035:2017

Signed for and on behalf of Glensound Electronics Ltd.

Marc Wilson, Managing Director
Maidstone, Kent, England

Date: 05/03/25

RoHS DIRECTIVE

RoHS 2 Directive 2011/65/EU restricts the use of the hazardous substances listed below in electrical and electronic equipment.

This product conforms to the above directive and for these purposes, the maximum concentration values of the restricted substances by weight in homogenous materials are:

Lead	0.1%
Mercury	0.1%
Hexavalent Chromium	0.1%
Polybrominated Biphenyls	0.1%
Polybrominated Diphenyl Ethers	0.1%
Cadmium	0.01%

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT REGULATIONS 2006 (WEEE)

Glensound Electronics Ltd is registered for business to business sales of WEEE in the UK our registration number is:

WEE/JJ0074UR

GLENSOUND Charon

Handbook Contents

Contents

Overview

The Charon is a simple SDI audio embedder/de-embedder for the first 8 audio channels of an SDI video stream.

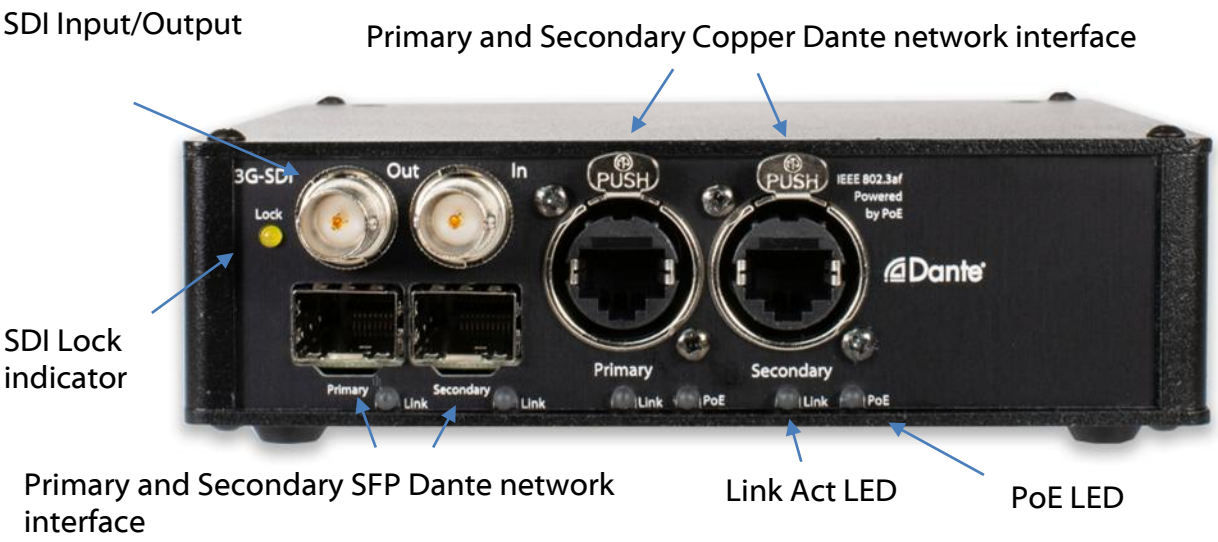
The Charon has been designed for simple operation for situations where basic SDI audio embed/de-embed functions are required without the excess functions of other units that inevitably cost more.

Network connections are fully redundant with primary and seconday connections via CAT5 copper Ethernet, or fibre via primary and secondary SFP cages. Power redundancy can be achieved with PoE or Mains (depending on the Charon variant).

The Charon is available in three variants:

Name	Form factor	Number of SDI interfaces	PoE Power Pri & Sec Redunancy	DC Power	Mains Power Pri & Sec Redundancy
Charon 8P	Portable	1	✓	✓	x
Charon 8R1	19" Rack mounted	1	✓	x	✓
Charon 8R2	19" Rack mounted	2	✓	x	✓

Charon 8P Front Panel Layout



SDI Input/Output

The Charon has a 3G-SDI interface for de-embedding and embedding audio from/to an SDI video feed with two 75 Ohm BNC connectors. A Lock LED indicates a valid SDI input signal is present. Please see this section for more information.

Primary and Secondary Copper Dante network interface

Primary and Secondary 1Gbps ethernet IP interfaces allow connection to a Dante network. The Charon can operate in full redundant mode or in switched mode for daisy-chaining network devices. The LED indicates network activity. Both connectors are Neutrik etherCON which allow locking connections with a compatible etherCON cable.

The Charon has two internal PoE power supplies (one for each interface) to support full redundant power configurations. The PoE source used to power the device can be a mid-span adapter or a network switch with PoE conforming to IEEE 802.3af.

The blue LED beneath each connector illuminates when PoE power is present. If PoE is sourcing power the LED will illuminate solidly.

Primary and Secondary SFP Dante network interface

Standard SFP Fibre network interface modules can be fitted in these 2 ports. SFP modules are available in many different formats, if required Glensound can supply suitable SFP modules, contact sales@glensound.co.uk for further information.

Charon 8P Rear Panel Layout

Update button and USB C connector

This reversable USB C connector is used for manual firmware updates. The 'Update' button must be pushed and held whilst applying power to the Charon for the Charon to enter it's update mode. Please see this section for more information.

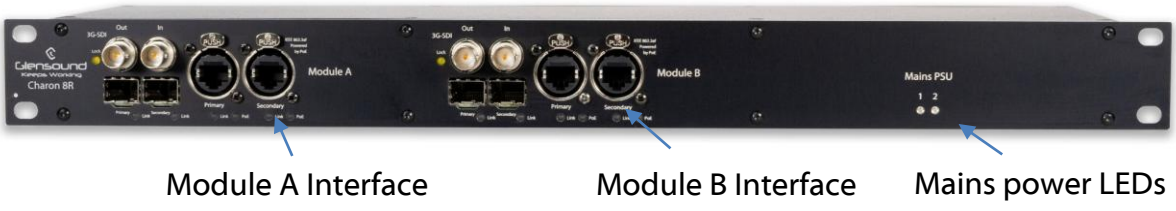
12V DC Power Inlet

This is a 2 pin barrel type DC input connector. The centre pin is 2.5mm. It is wired centre pin + Volts. It is designed to accept a + volt DC input between 9 and 15 volts.

Charon 8R (8R1/8R2) panel layout

8R1

8R2



IEC Mains Inlets

2x 60W 3-pin IEC Mains inlets accepting a mains input range of 100 – 240 VAC. Connect both to two power sources for full power redundancy. The front panel Mains PSU LEDs illuminate to show when one is connected.

The internal mains power supplies are wired in parallel for power redundancy. Connecting only PSU1 or only PSU2 will always power both Module A and B simultaneously.

SDI Interface

Note: A valid SDI video input signal must be present on the Input BNC connector for the Charon to be able to embed audio to an outgoing SDI video feed.

The Charon supports de-embedding and embedding audio from/to an SDI video feed.

SDI Input

The Charon can support SDI video speeds of 2.970Gb/s, 2.970/1.001Gb/s, 1.485Gb/s, 1.485/1.001Gb/s and 270Mb/s and is compliant to SMPTE ST 425 (Level A and Level B), SMPTE ST 424, SMPTE 292 and SMPTE ST 259-C.

The SDI input supports typical equalized length of Belden 1694A cable up to:

- 200m at 2.97Gb/s
- 280m at 1.485Gb/s
- 500m at 270Mb/s

SDI Output

In accordance with SMPTE ST 272 and SMPTE ST 299, the Charon can embed 8 channels of audio at 48kHz.

The SDI output is capable of typically driving at least 800mV at 75 Ohms.

De-embedded and Embedded audio channels

The Charon can de-embed and embed on the first 8 channels of an SDI video stream:

Thes 8 de-embedded and 8 embedded channels are presented in Dante Controller as 8 transmit channels and 8 receive channels.

Channel number	De-embedded channel name	Embedded channel name
1	Group 1 pair 1 L	Group 1 pair 1 L
2	Group 1 pair 1 R	Group 1 pair 1 R
3	Group 1 pair 2 L	Group 1 pair 2 L
4	Group 1 pair 2 R	Group 1 pair 2 R
5	Group 2 pair 1 L	Group 2 pair 1 L
6	Group 2 pair 1 R	Group 2 pair 1 R
7	Group 2 pair 2 L	Group 2 pair 2 L
8	Group 2 pair 2 R	Group 2 pair 2 R

Supported video modes (as of DFU firmware version v.1.02)

These are video modes that have been tested and verified as working with the Charon so far.

SD

525i YCbCr-422-10
- 59.94 Hz

625i YCbCr-422-10
- 50 Hz

HD

720p YCbCr-422-10
- 23.98 Hz
- 24 Hz
- 25 Hz
- 29.97 Hz
- 30 Hz
- 50 Hz
- 59.94 Hz
- 60 Hz

1035i YCbCr-422-10
- 59.94 Hz
- 60 Hz

1080i YCbCr-422-10
- 50 Hz
- 59.94 Hz
- 60 Hz

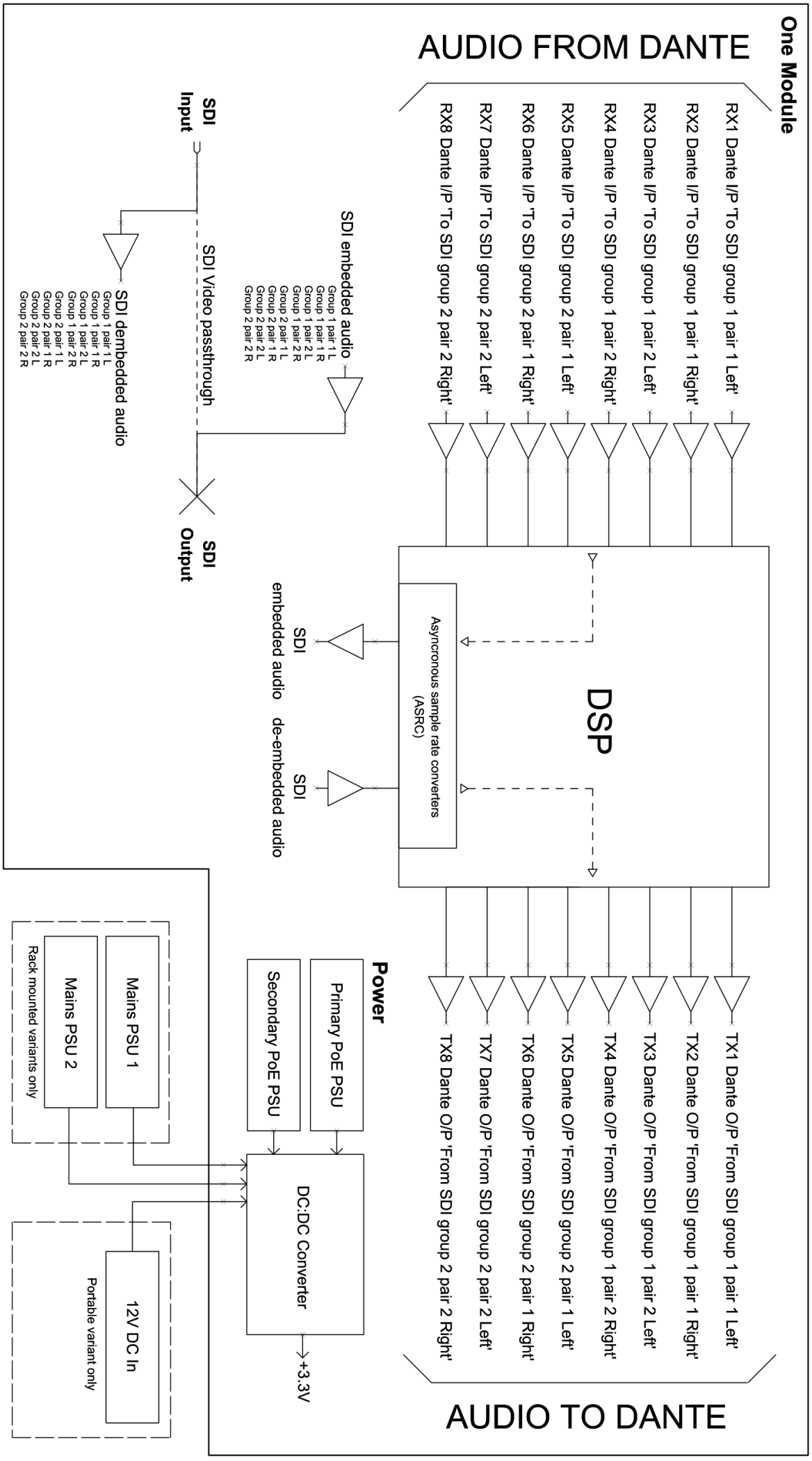
1080sF YCbCr-422-10
- 23.98 Hz -> 1080s23
- 24 Hz -> 1080s24
- 25 Hz -> 1080i50
- 29.97 Hz -> 1080i59
- 30 Hz -> 1080i60

1080p YCbCr-422-10
- 23.98 Hz
- 24 Hz
- 25 Hz
- 29.97 Hz
- 30 Hz

3G-A

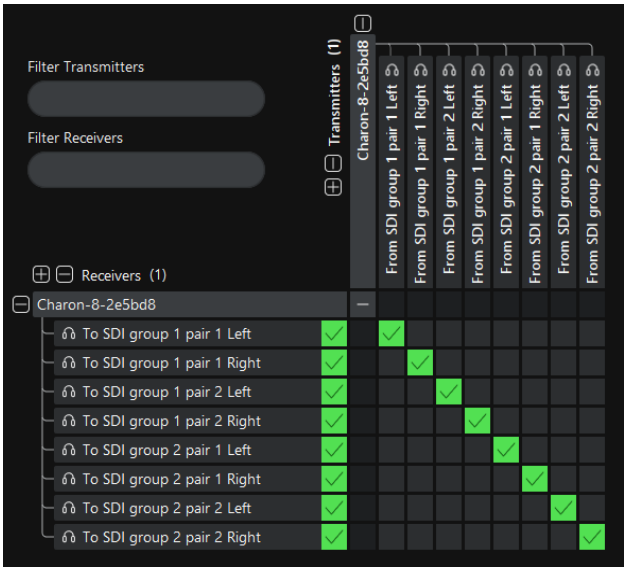
None

Device Block Diagram (Charon DFU Firmware version v1.0.2)



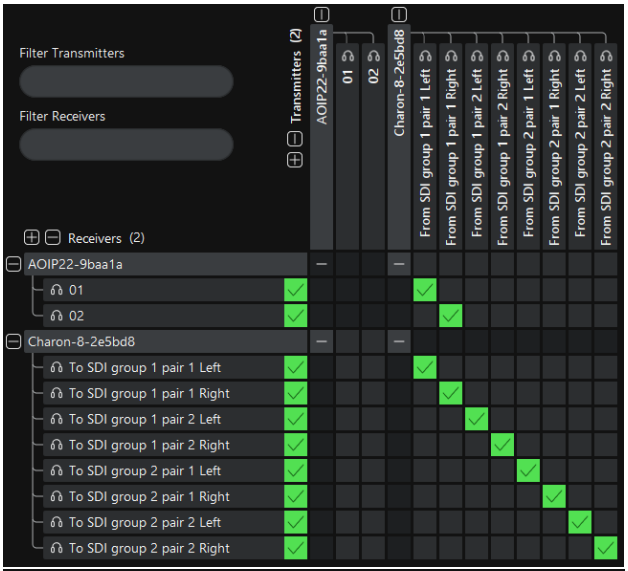
Audio Routing

The audio routing for the Charon is handled by the user creating mixes with the routing table of Dante controller.
Several mix capabilities are possible with this method. Here are some examples:



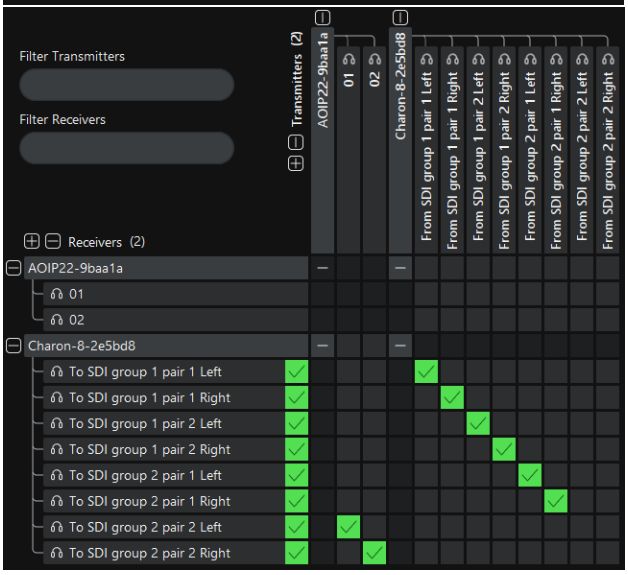
Pass through

All 8 audio channels de-embedded from the incoming SDI video are passed through to the output SDI video embedded audio channels 1-1



Pass through and send to Dante device

All 8 de-embedded audio channels are passed through to the SDI embedded audio 1-1.
The first two embedded channels are also being sent to another Dante device.



Pass through and receive from Dante device

Audio channels 1-6 de-embedded from the incoming SDI video are passed through to the output SDI video embedded audio channels 1-6.

Output SDI video embedded channels 7-8 are originating from another Dante device.

Connecting The Charon To A Dante Network

The Charon is a network audio device utilizing the reliable and versatile Dante audio over IP protocol. Dante is a proprietary system (although very widely used) the originators of which are Audinate.

The information below is only meant as a very basic guide. Full details of the power of Dante network audio and instructions for using it can be found at www.getdante.com

Getting Dante Controller

If you are connecting the Charon to a new Dante network the first thing you will need to do is to get the free Dante controller software from Audinate.
This can be downloaded by visiting Audinate's web site at www.getdante.com

Connecting Charon device to the network

The Charon can be connected to the network that you are going to use for your audio distribution simply by plugging in to the RJ45 network connections on the unit. Once connected to the network it will be possible to see the Charon from within the Dante controller and route its' audio circuits.

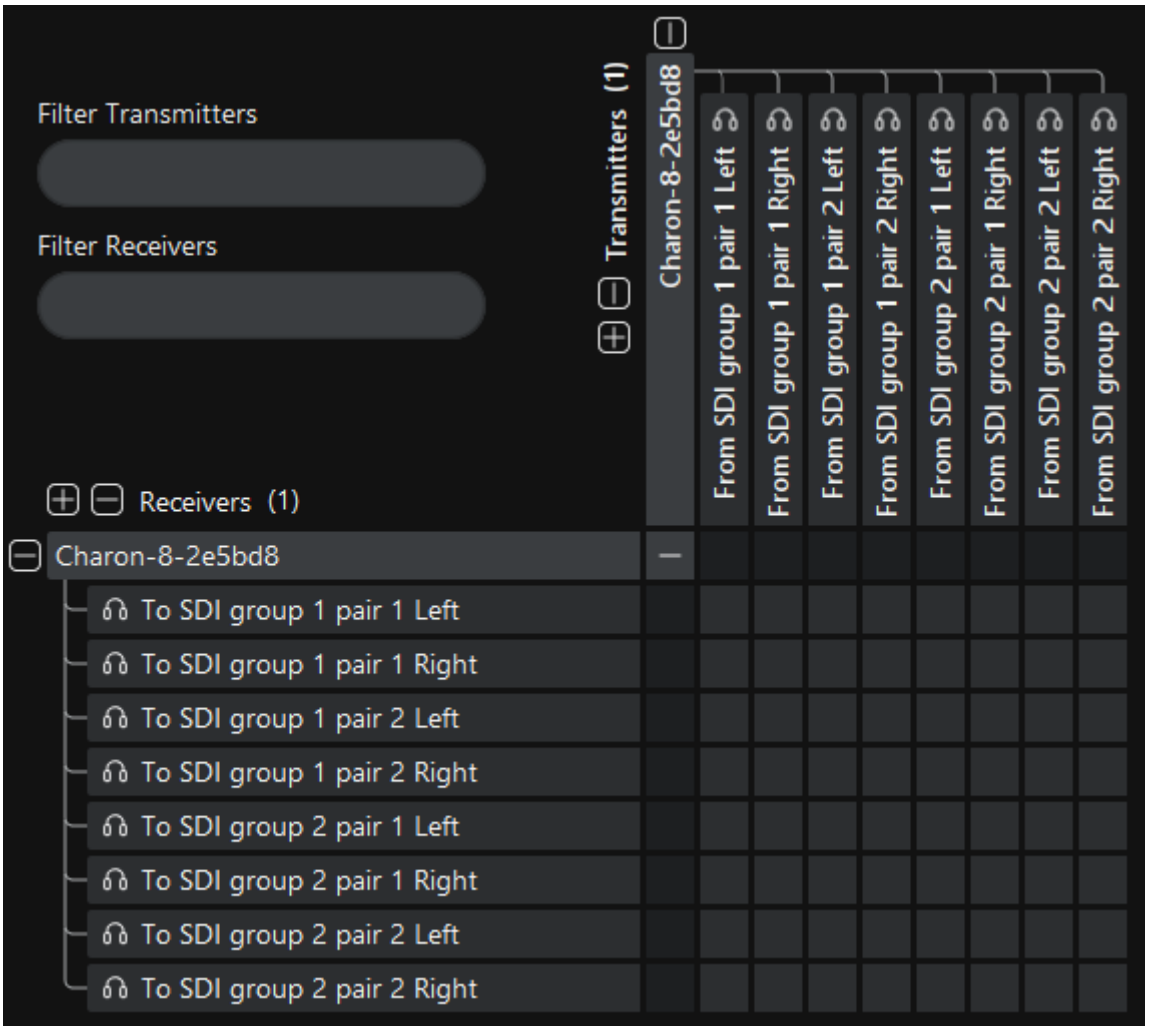
Audio Over IP Network

We strongly recommend that you consider your network topology carefully and would not recommend sharing broadcast audio and general data on the same network.

For more details of audio over IP network structure please visit www.getdante.com

Running Dante Controller

At the time of writing this manual the Dante Controller looks as per the screenshot below:



The Charon will have been named at the factory during test to allow them to be identified by the Dante controller.

The format used for the factory name is:

‘Charon-SN-XXXX’

Where ‘Charon’ refers to the Glensound product i.e. Charon

The ‘SN-XXXX’ refers to the serial number of the Charon which can be found printed on the rear or side of the unit.

The unit may be renamed in Dante controller by opening the ‘Device view’ window and selecting Charon in the drop-down menu. Go to the ‘Device Config’ tab and change the name with the Rename Device box.

Note if you upload a new DNT file or clear the devices config then the name will change to ‘Charon-xxXxXx’ whereby the ‘X’s refer to the devices MAC address.

Dante Controller TIP

If you have never run Dante controller before then make sure that on the bottom left of the Dante controllers' screen 'P' or 'S' is next to a green square as this indicates that it is connected to a network. By clicking 'P' or 'S' a pop up box opens to allow you to set what network interface the controller is using.

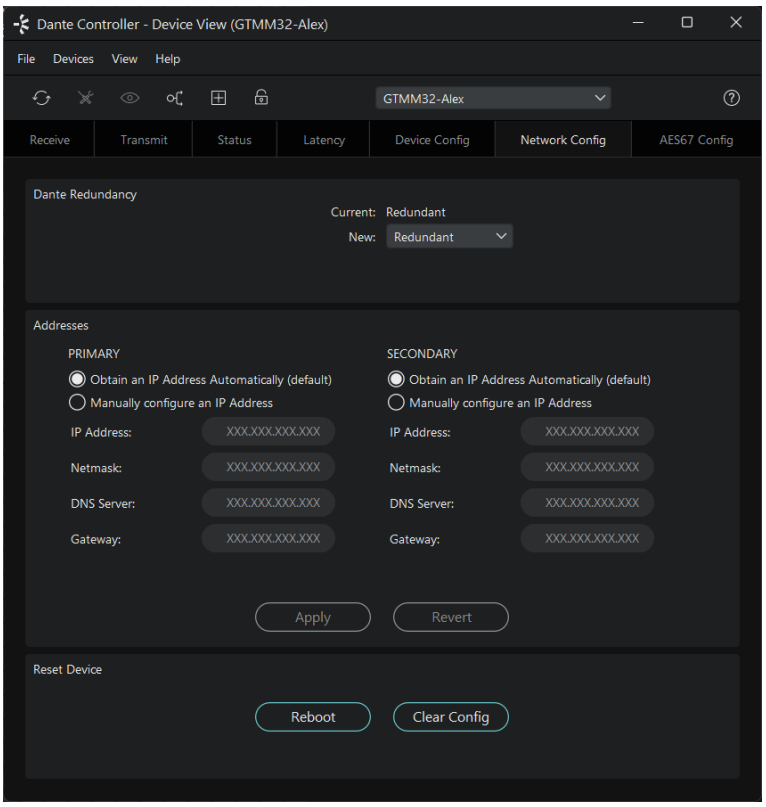
Device not showing up in Dante Controller

If your Dante device does not show up in Dante Controller then the most likely issue is that the device's IP Address is not appropriate for your network.

A) It maybe that the device is set to obtain an IP address automatically using DHCP (this is the default configuration) and your network is setup for fixed IP addresses only and does not have a DHCP server.
B) It maybe that the device has had a fixed IP address assigned but that this address is not suitable for your network.

The solution to both scenarios is basically the same.

1) You must connect your Dante device directly to the Ethernet port of your computer using an Ethernet cable.
2) Make sure that your computer is set to 'Obtain an IP address automatically'
3) After a few minutes the Dante device should now appear in Dante Controller.
4) Double click the device name to open up device view.
5) Open up the 'Network Config' tab
6) Either turn on 'Obtain an IP Address Automatically' or correctly configure the 'Manually configure an IP Address' options for your network.
7) Click on 'Apply' to confirm the new settings, then disconnect the computer and reconnect the Dante device to your network.

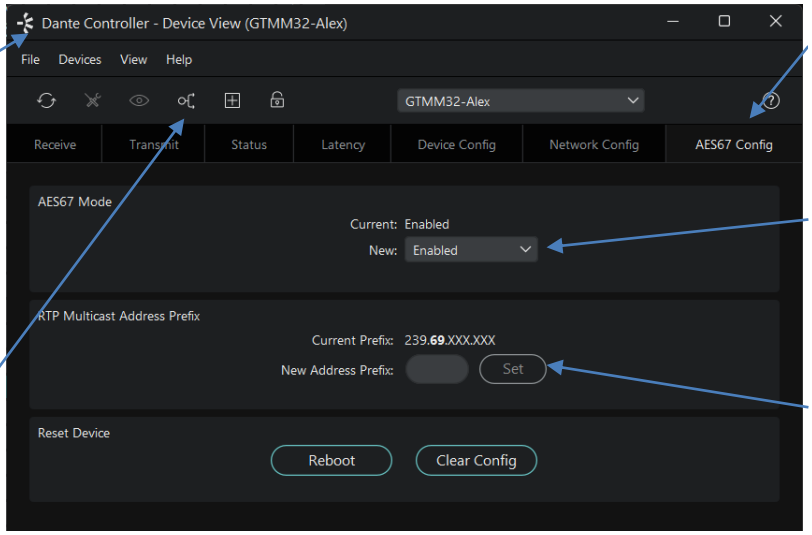


AES67 Mode

The Charon uses a module from Audinate called the Brooklyn 3 for its network audio interface. Audinate are the company behind Dante and as such the primary network audio protocol is Dante, however Audinate have enabled their chip to comply with AES67 and therefore the Charon can be set to AES67 mode for interaction with other AES67 devices.

Sending AES67 audio

1. Double click on the device in Dante controller to open the Device View window

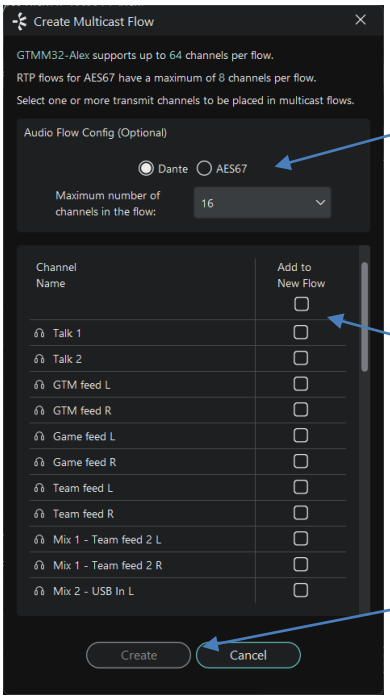


2. Open the AES67 Config tab

3. Enable AES67 mode. Reboot for changes to take effect.

4. Allows setting a different multicast prefix address if needed

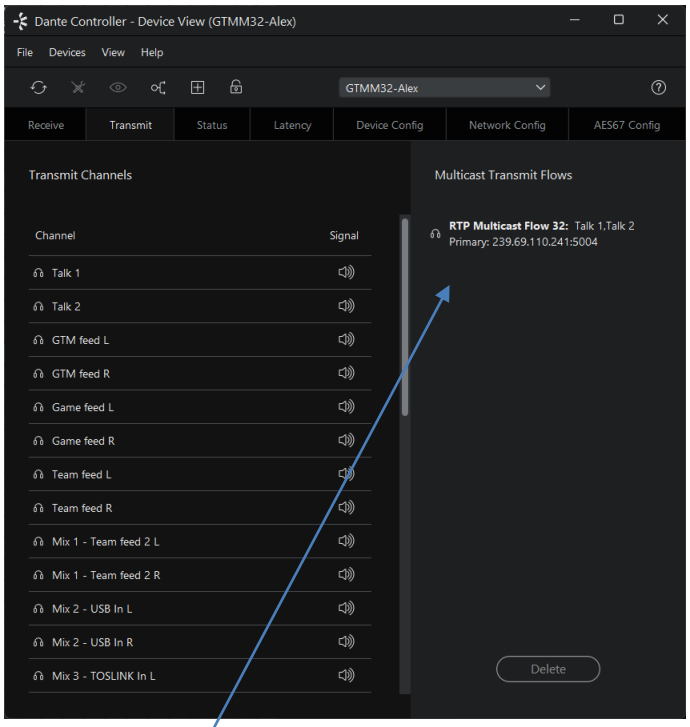
5. Create multicast flow



Select ‘AES67’

Select channels to be included in the flow

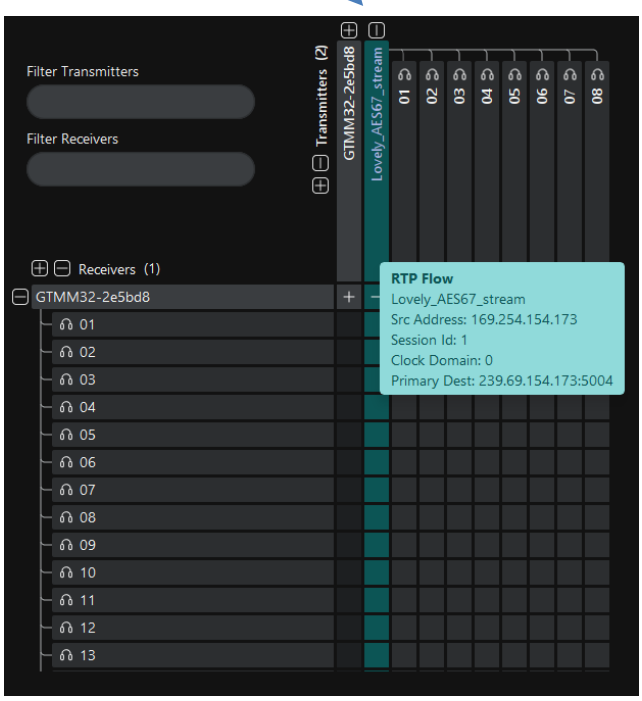
Create the flow



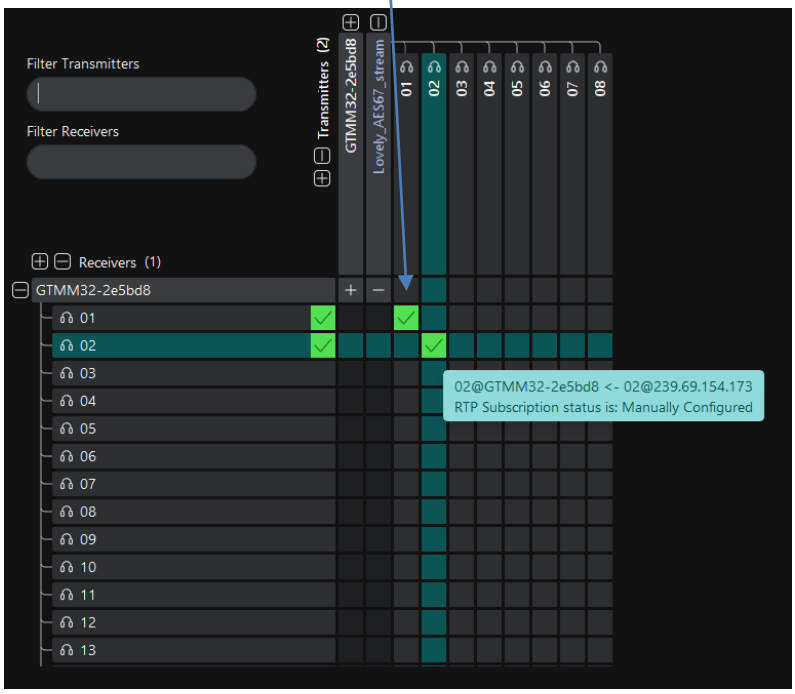
Once set the flows can be seen in the transmit tab of the device view.

Receiving AES67 Audio

Compatable AES67 stream from a non Dante device are detected (shows as a blue transmitter)



Make subscriptions in the router matrix as normal



AES67 Restrictions

AES67 flows originating from a Dante device can only be generated with the following parameters:

- Multicast Only
- Non-redundant
- Destination address in range 239.nnn.0.0 to 239.nnn.255.255 (239.nnn/16), port 5004
- 48kHz sampling rate
- 24 bit linear (L24) encoding
- 1 msec packet time
- Up to 8 channels per stream

Received AES67 flows must adhere to these parameters to work with Dante devices:

- Multicast Only
- Non-redundant
- Destination address in range 239.nnn.0.0 to 239.nnn.255.255 (239.nnn/16), port 5004. **Stream must match destination address range (i.e the RTP Multicast Address prefix of the Dante device).**
- 48kHz sampling rate
- L16 or L24 encoding
- 125usec, 250usec, 333usec, 1 msec packet time
- Up to 8 channels per stream

The Charon also supports SMPTE-ST2110-30 via Dante Domain Manager (DDM), with a licesnse purchased from Audinate.

Updating Glensound device firmware with Glensound Activator

The microcontroller code is the main firmware that operates the Charon. It can be updated via Glensound Activator using USB.

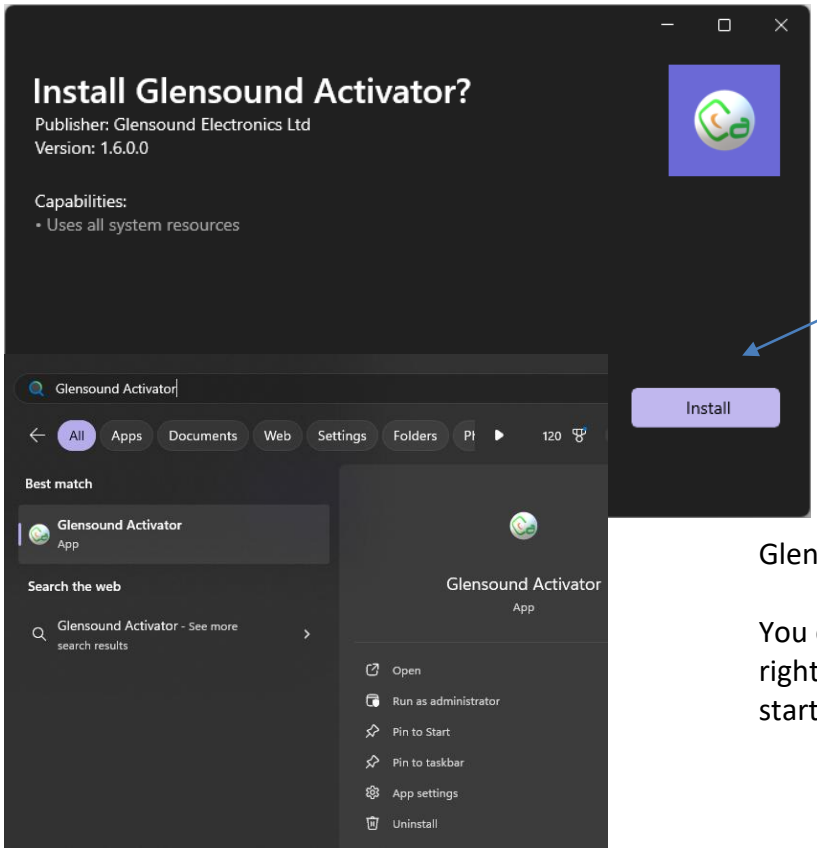
Items needed

- A Windows PC
- USB C cable
- Power source for the Charon
- A .dfu firmware file
- Glensound Activator
- STM device driver installed

Install Glensound Activator

1. Download activator from the following link:

   https://www.glensound.co.uk/Software/Dante/GS_Activator_v1.6.0.zip
2. Extract all contents of the downloaded folder
3. Run the “GlenActivator_1.6.0.0_Win32.msix’ file



Click to install

Glensound Activator is now installed.

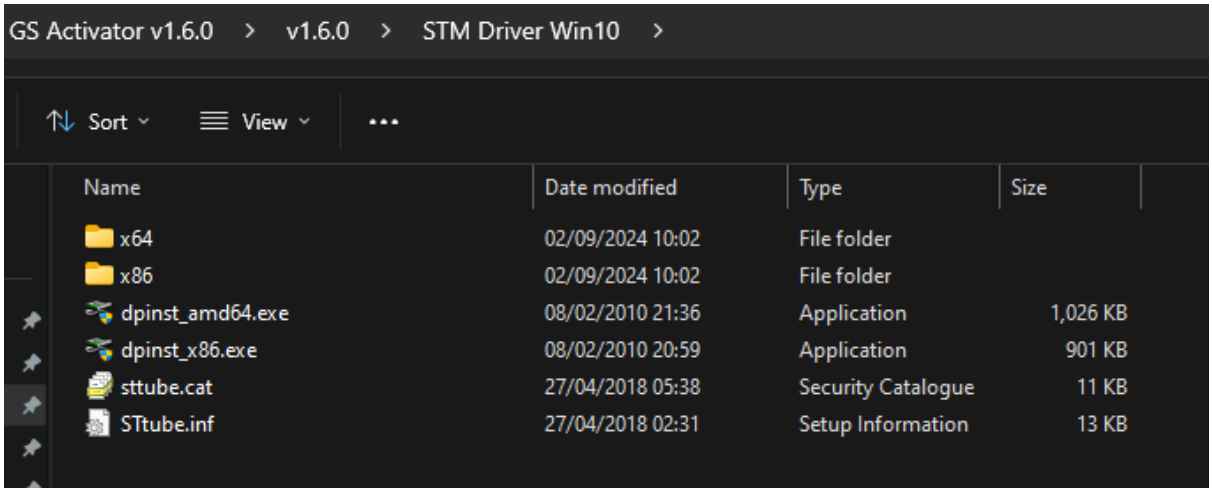
You can uninstall at any time by simply right clicking on Activator in the Windows start menu and selecting ‘Uninstall’

Install STM device driver

Once Glensound Activator is installed you need to install the STM device driver from STMicroelectronics for Windows to recognise STM32 devices.

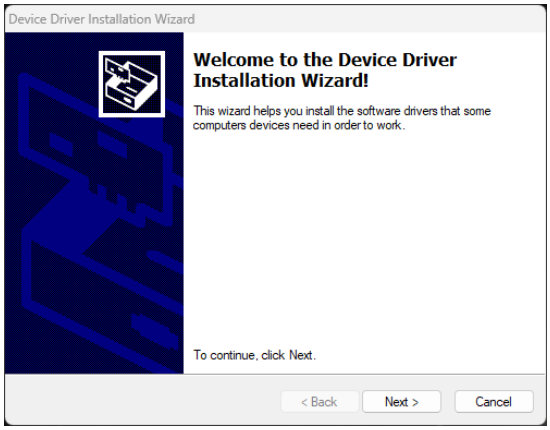
Navigate to the folder titled ‘STM Driver Win10’

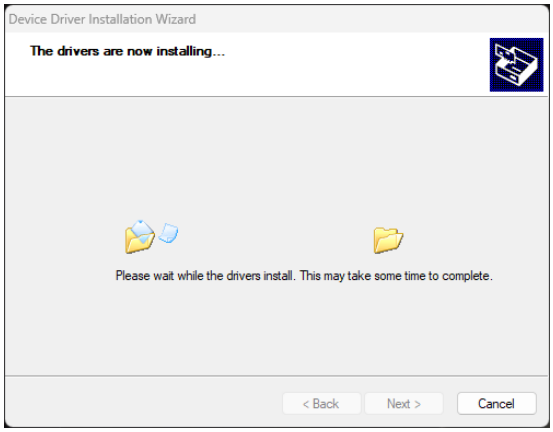
In this folder are two .exe driver installers.

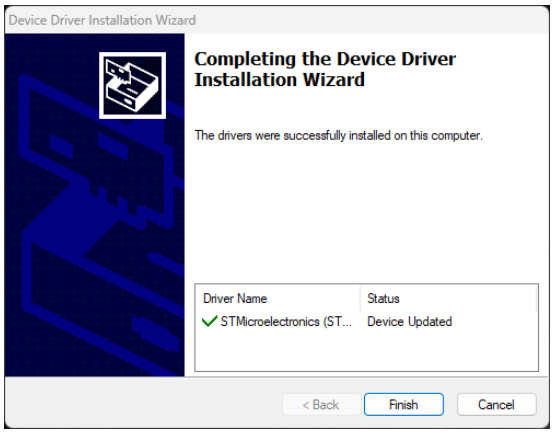


If your PC is 64 bit run dpinst_amd64.exe

If your PC is 32 bit run dpinst_x86.exe





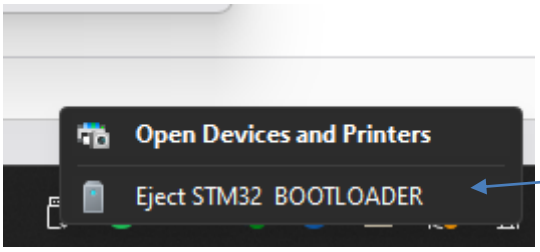


You PC should now be able to recognize STM devices.

Put the Charon in ‘DFU’ mode

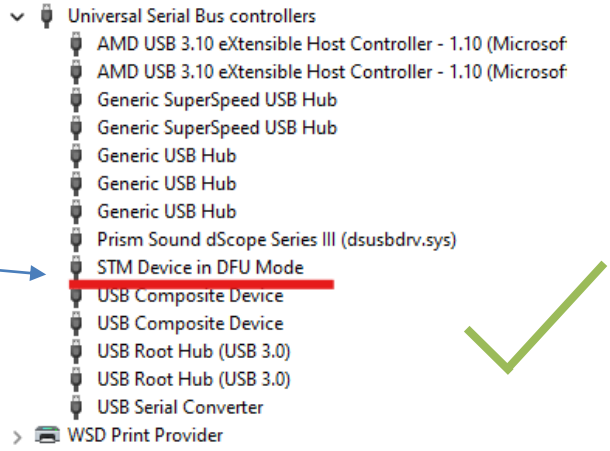
1. Plug the USB cable from your PC in to the Charon
2. Push and hold the ‘Update’ button
3. Power up the Charon
4. Wait a few seconds and then release the the ‘Update’ button
5. The device should now be in ‘DFU mode’ and ready for updating

To verify if Windows has successfully detected the device look for this icon in the taskbar

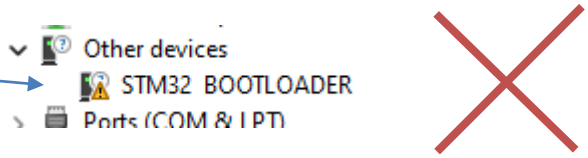


When selected it should show this

If you don’t see the icon in the taskbar you can verify if the device has been detected by checking the Windows Device Manager for this device



If the device appears like this then the driver was not installed correctly and Glensound Activator won’t be able to see it

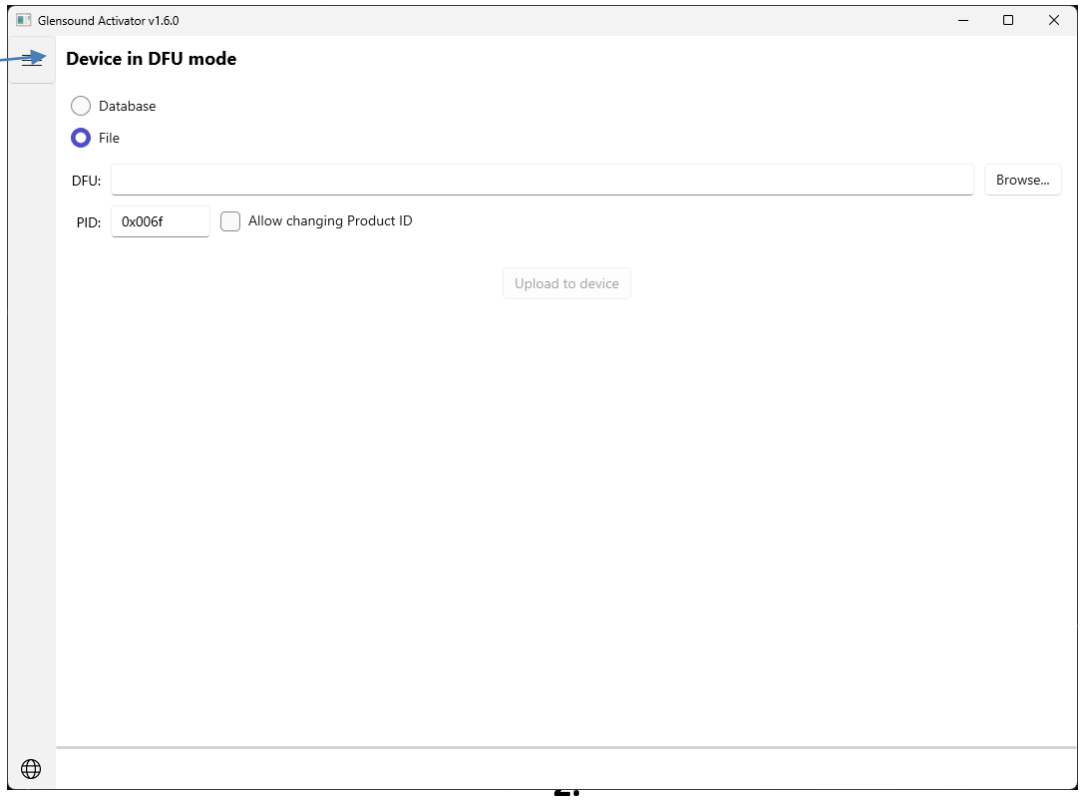


Update the firmware in Glensound Activator

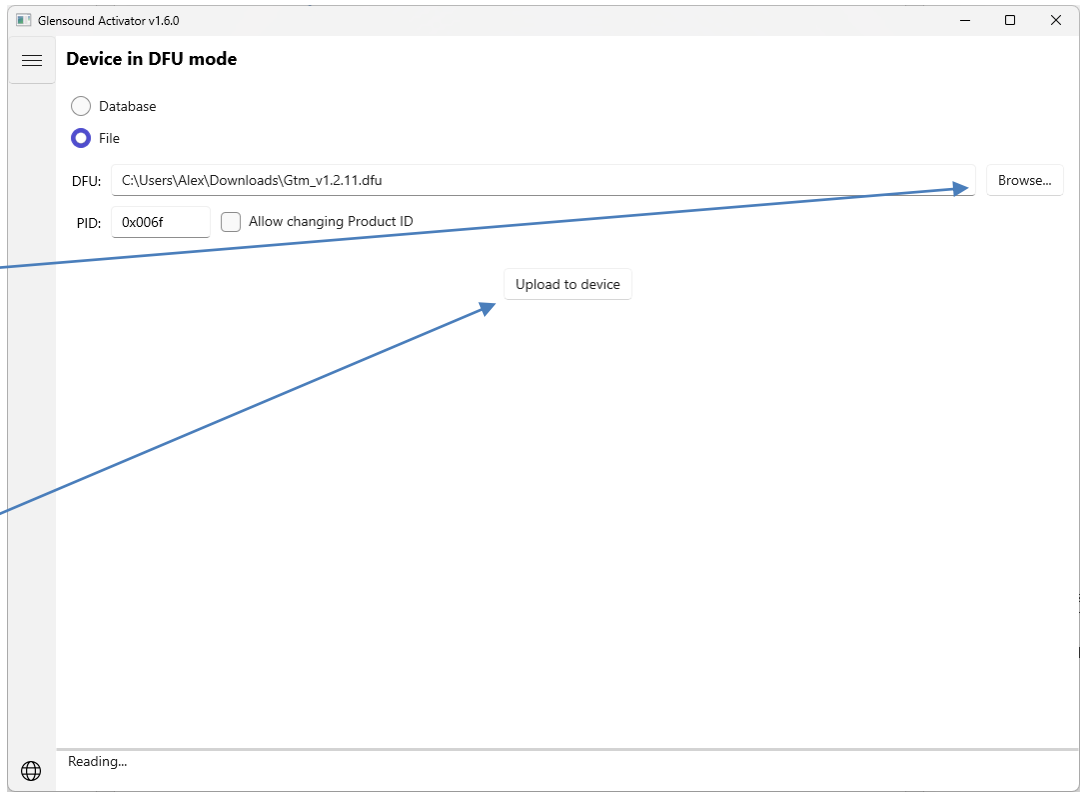
Now open Glensound Activator

1.

Device has been recognised



2.

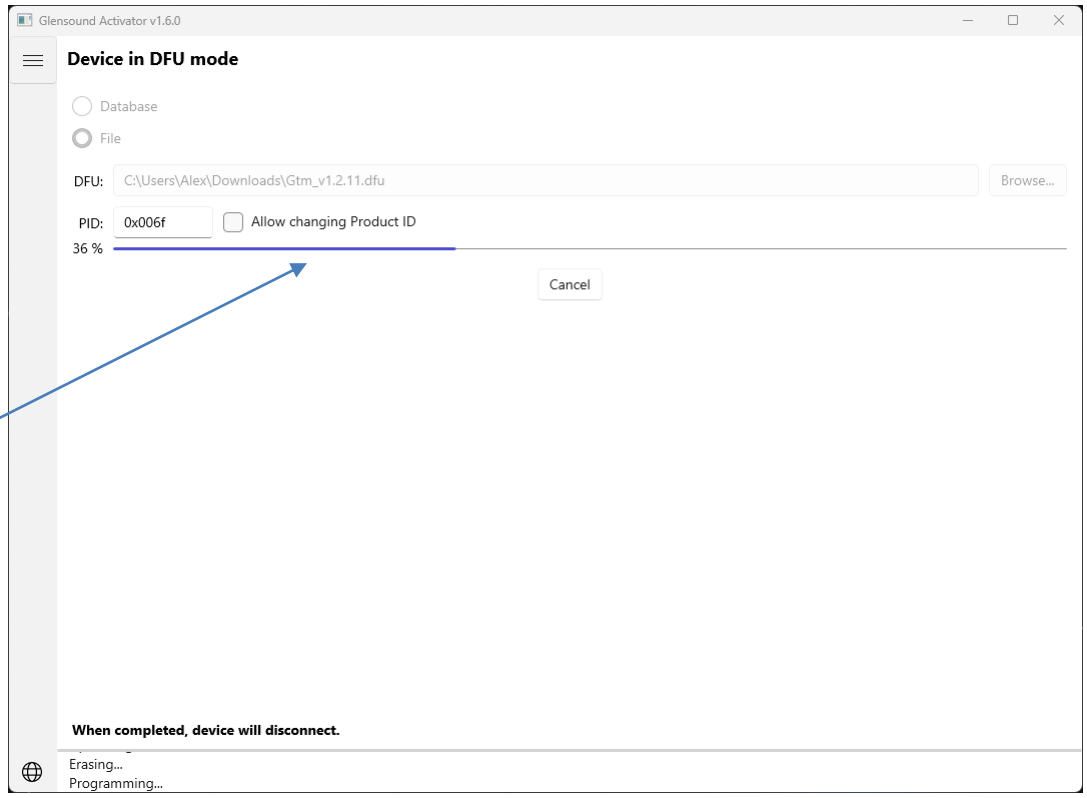


A. Choose Browse and select your .dfu file

B. Click to begin updating

Caution! Audio will be interrupted during the device update

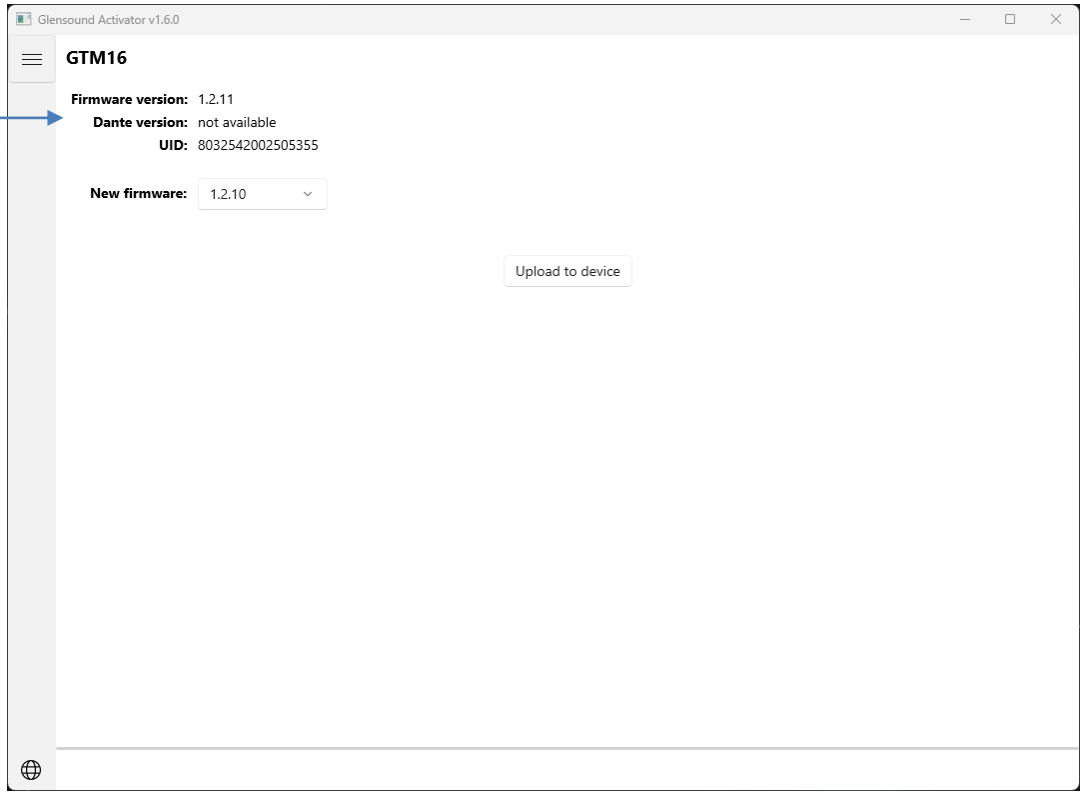
3.



Update progression bar

When the update is finished, the device will restart automatically

4.



Update complete. Device displays the firmware version that is running on the device.

Note that devices that don't support Glensound Controller features may not show here once the update is complete.
This is normal behaviour, and the update was still completed.

The device can now be safely disconnected from USB and the firmware update process is complete

Updating The Dante firmware

The Charon has Dante specific firmware that runs inside the Dante module, known as Brooklyn 3.

The Brooklyn 3 Module is a device supplied by Audinate that does most of the processing for the actual Dante/ AES67 network audio streams. There is one Brooklyn 3 Module in each Charon.

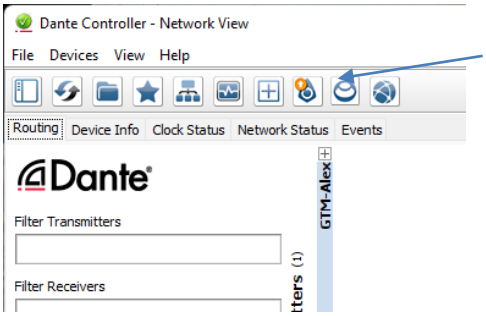
Updating the device

The firmware that runs in the Brooklyn 3 Module can be updated using the built-in Dante Updater in Dante Controller. Please ensure you have a connection to the internet.

If you want to update devices on a Dante network that is not connected to the Internet, you can download the files ahead of time to your computer, move the computer to the offline network, and then update the devices using the downloaded files.

Dante Updater displays a list of all online firmware files in the Library tab, so you can choose which files to download, or even download the entire database if you are not sure which files you will need. For further details please visit www.getdante.com

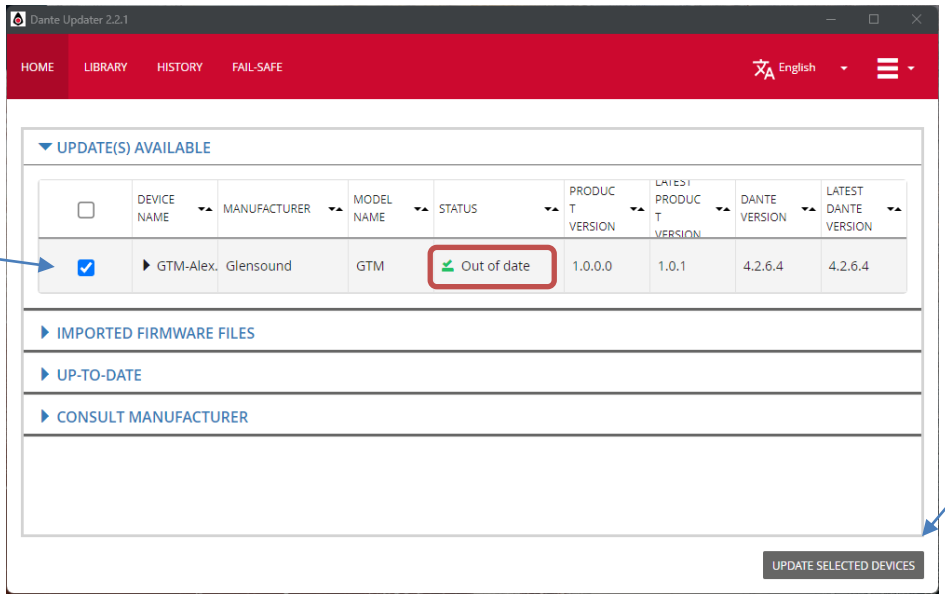
1.



Dante controller notifies you if a device on your network is out of date.

Click the icon

2.

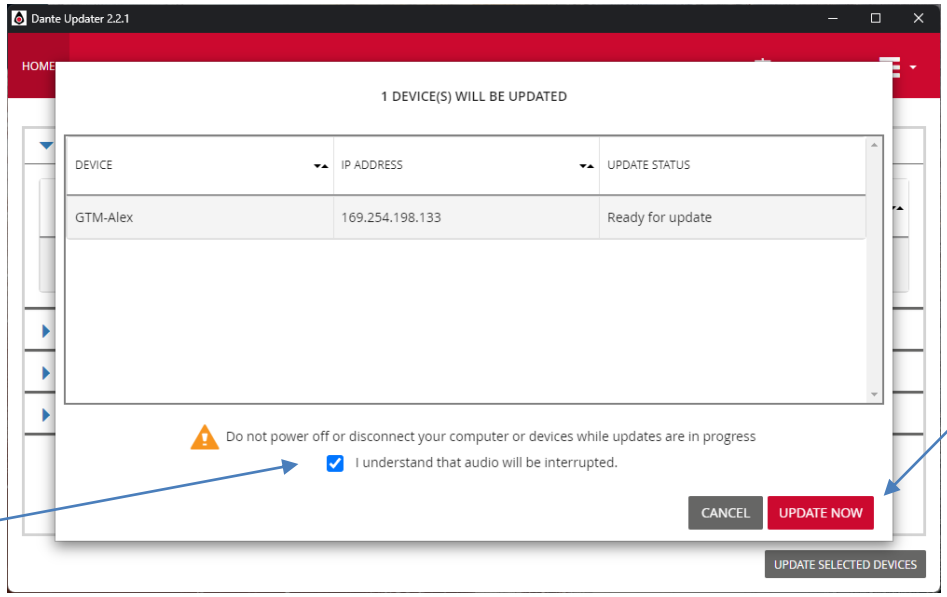


A. Tick the box to choose your unit for updating

B. Press to update device

3.

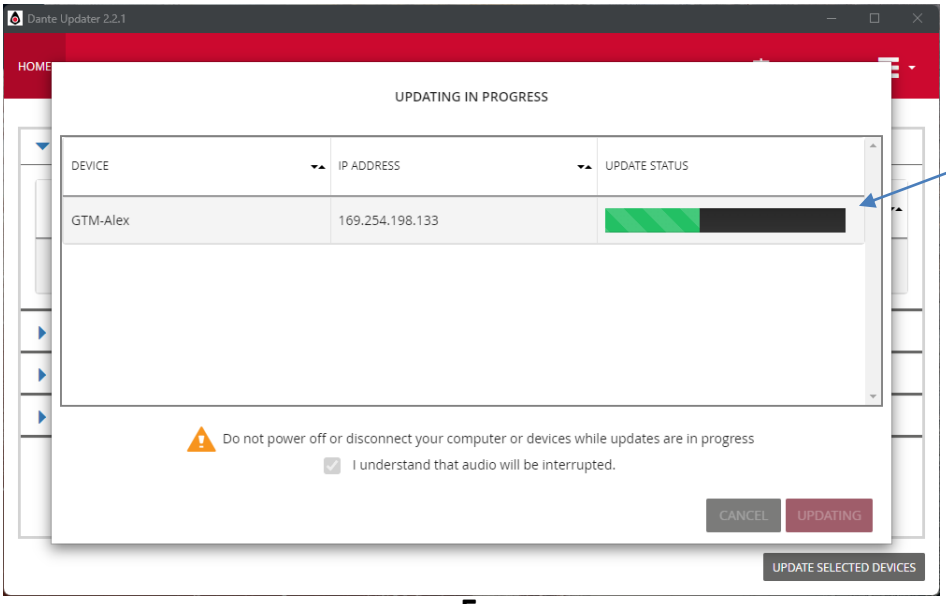
Caution! Audio will be interrupted during the device update



A. Tick box to confirm

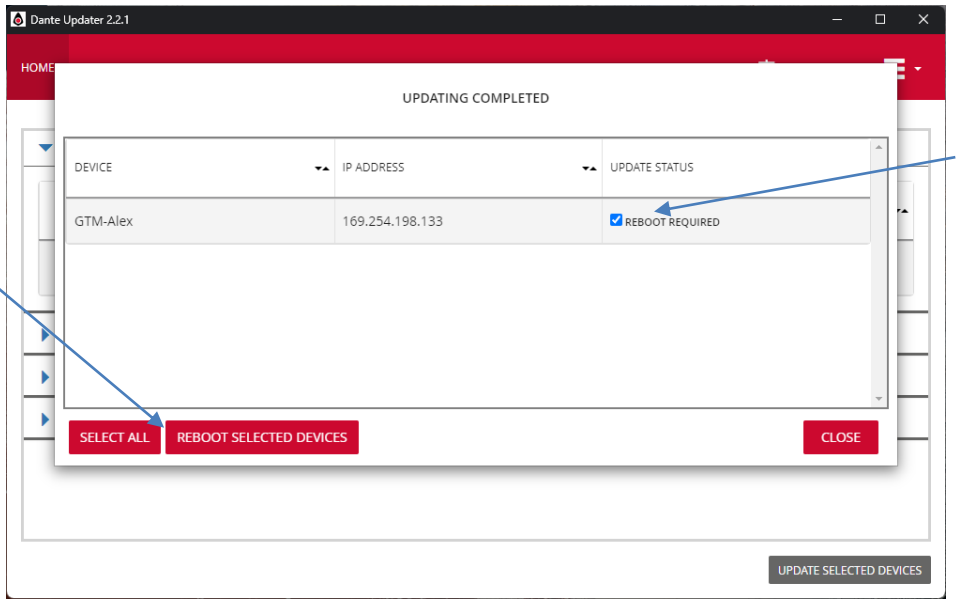
B. Press to update device

4.



Update is in progress

5.



A. Update finished. Tick box to continue

B. Press to reboot device

Update finished, device will now reboot

POWER

PoE
Powered by the PoE network port
Complies to: IEEE 802.3af-2003
Classification Class 0

DC
12V

Consumption
<3 Watts

Power On LED
Bright Blue

NETWORK

Dante
Yes using the Ultimo module

AES67 Compliant
Yes

SMPTE ST-2110-30 Compliant
No

Number Of Network Interfaces
1

Copper Ethernet
1 x Neutrik EtherCON connectors

Fibre Ethernet
No

Transfer Rate
100 Mbps

Dante Network Sample Rate
44.1k, 48k, 88.2k, 96k

AES67 Network Sample Rate
48k

Resolution
24 bit

PHYSICAL

Size
153 x 105 x 41mm(WxDxH)

Weight
g

Mechanics
All aluminium construction, anodized and laser etched, powder coated sides

AUDIO

Mic Input Gain Range
Dynamic 48 - 68dB
Phantom 38- 58dB

Phantom Power
48v

Equivalent Input Noise
-125dBu

Frequency Response
100Hz to 20kHz. +/- 1dB
300Hz to 20kHz. +/- 1dB LCF On

ENVIRONMENTAL

Operating Temperature
0 to +50˚C (32 to 122˚F)

Storage Temperature
-20 to +70˚C (-4° to 158˚F)

Relative Humidty
0 to 95% non-condensing

INCLUDED ITEMS

Handbook
Available by download

RJ45 Network Cable
2 metre Cat5 Rj45 plug /Rj45 plug cable