

# Charon

## Dante SDI audio embedder and de-embedder

## **PRODUCT DETAILS**

## - Dante

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## **Glensound Electronics Ltd**

Thank you for choosing a new Glensound product.

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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:

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### **IMPORTANT SAFETY INSTRUCTIONS**



#### **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 **C C** marked and conforms to the following Union harmonisation legislation:

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

Signed for and on behalf of Glensound Electronics Ltd.

Million

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

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#### **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 ava	ilable ir	n 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	$\checkmark$	$\checkmark$	х
Charon 8R1	19" Rack mounted	1	$\checkmark$	х	$\checkmark$
Charon 8R2	19" Rack mounted	2	$\checkmark$	х	$\checkmark$

#### **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 <u>this section</u> 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 <u>sales@glensound.co.uk</u> 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 <u>this section</u> 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



#### **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.

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#### **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.

#### <u>SDI Input</u>

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



#### 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 <u>www.getdante.com</u>

#### **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 <u>www.getdante.com</u>

#### **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:

Filter Transmitters	nitters (1)	8-2e5bd8	eft D	ght 🏷 🚽	eft D -	ght 🏷 🚽	eft D -	ght 🏷 🚽	eft 🏷 🚽	ght 🔊 🚽
Filter Receivers	🕀 🖂 Transmit	Charon-	From SDI group 1 pair 1 L	From SDI group 1 pair 1 Rig	From SDI group 1 pair 21	From SDI group 1 pair 2 Rig	From SDI group 2 pair 1 L	From SDI group 2 pair 1 Rig	From SDI group 2 pair 2 L	From SDI group 2 pair 2 Rig
Charon-8-2e5bd8		-								
െ To SDI group 1 pair 1 Left										
െ To SDI group 1 pair 1 Right										
െ To SDI group 1 pair 2 Left										
–										
🗆 ស To SDI group 2 pair 1 Left										
🗆 ស To SDI group 2 pair 1 Right										
🗆 ស To SDI group 2 pair 2 Left										
└ ស To SDI group 2 pair 2 Right										

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.

-🔆 Dante Controller - Device	View (GTMM32-Alex)			- 0	×
File Devices View Help					
Jo 💿 🗶 🖸	⊞ 🔓	GTMM32-Alex			?
Receive Transmit		Device Config	Network Config	AES67 C	
Dante Redundancy	Current New	: Redundant : Redundant 🗸 🇸			
Addresses PRIMARY O Obtain an IP Addres Manually configure IP Address: Netmask: DNS Server:	ss Automatically (default) an IP Address XXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXX	SECONDARY  O Obtain an IP Addre Manually configure IP Address: Netmask: DNS Server:	ss Automatically (defa an IP Address 2000-000000000 2000-000000000 2000-00000000	ault) CX CX	
Gateway:	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Gateway:			
Reset Device	Reboot	Clear Config			

#### 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





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)

Filter Transmitters Filter Receivers	🕀 🖯 Transmitters (2)	GTMM32-2e5bd8	Lovely_AES67_stream	01 \$	02 \$	03 \$	04 2	05 \$	06 2	07 D –	L & 80
		4	-1	RTP	Flor	N					
				Love Src./	ely_A Nddr	ES67	str	eam	15/	173	
- 68 01				Sess	ion I	d: 1	105.	204.	194.	175	
-				Cloc	k Do	mair	n: 0				
-				Prim	ary I	Dest:	239	9.69.	154.	173:	5004
-											
–											
-											
–											
- A 08											
- A 09											
– ស 10											
– ស 11											
– ត 12											
–											

Make subscriptions in the router matrix as normal

#### (2) GTMM32-2e5bd8 Filter Transmitters 01 \$ 02 \$ 03 \$ 04 ව 05 ව Transmitters Filter Receivers Ξ (1) Receivers GTMM32-2e5bd8 + -02@GTMM32-2e5bd8 <- 02@239.69.154.173 െ 04 RTP Subscription status is: Manually Configured ഒ 10 ഒ 12 െ 13

#### **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**

- Download activator from the following link: <u>https://www.glensound.co.uk/Software/Dante/GS\_Activator\_v1.6.0.zip</u>
- 2. Extract all contents of the downloaded folder
- 3. Run the "GlenActivator\_1.6.0.0\_Win32.msix' file



#### **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.

GS .	Activator v1.6.0 > v1.6.0 > STM Driv	ver Win10 >			
	∿ Sort ~ ≡ View ~ ···				
	Name	Date modified	Туре	Size	
	<b>2</b> x64	02/09/2024 10:02	File folder		
	💳 x86	02/09/2024 10:02	File folder		
*	🍣 dpinst_amd64.exe	08/02/2010 21:36	Application	1,026 KB	
	🝣 dpinst_x86.exe	08/02/2010 20:59	Application	901 KB	
	🥏 sttube.cat	27/04/2018 05:38	Security Catalogue	11 KB	
*	📓 STtube.inf	27/04/2018 02:31	Setup Information	13 KB	

If your PC is 64 bit run dpinst\_amd64.exe

If your PC is 32 bit run dpinst\_x86.exe

Device Driver Installation Wizard	Device Driver Installation Wizard
Welcome to the Device Driver Installation Wizard!	The drivers are now installing
This wizard helps you install the software drivers that some computers devices need in order to work.	Please wait while the drivers install. This may take some time to complete.
< Back Next > Cancel	< Back Next > Cancel



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





#### Glensound Activator v1.6.0 • × Device has been Device in DFU mode ₹ recognised Database O File DFU: Browse... PID: 0x006f Allow changing Product ID Upload to device $\bigoplus$ ۷. Glensound Activator v1.6.0 • × $\equiv$ Device in DFU mode Database O File DFU: C:\Users\Alex\Downloads\Gtm\_v1.2.11.dfu Browse... A. Choose PID: 0x006f Allow changing Product ID Browse and Upload to device select your .dfu file B. Click to begin updating Reading... $\oplus$

#### Update the firmware in Glensound Activator

Now open Glensound Activator

1.

	💽 Gler	nsound Activator v1.6.0 -			×
	≡	Device in DFU mode			
Update progression bar	=	Device in DFU mode	Bro	IWSE.	
	$\oplus$	Erasing Programming			

When the update is finished, the device will restart automatically

3.

Update complete. Device displays the firmware version that is running on the device.	4. Clensound Activator v1.6.0 GTM16 Firmware version: 1.2.11 Dante version: not available UID: 8032542002505355 New firmware: 1.2.10 ~	- 0 X
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.	Upload to device	

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

л

#### **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 <u>www.getdante.com</u>



2.

	Dante Update	Dante Updater 2.2.1 –								×	$\times$		
	HOME LIE	BRARY HISTORY	FAIL-SAFE					🗙 English	-	•			
	▼ UPDA	▼ UPDATE(S) AVAILABLE											
A. Tick the box to		DEVICE NAME	MANUFACTURER 🗸	MODEL NAME	STATUS 🗸	PRODUC T +	PRODUC T VERSION	DANTE VERSION	LATEST DANTE VERSION	**			
choose your unit for		GTM-Alex.	Glensound	GTM	生 Out of date	1.0.0.0	1.0.1	4.2.6.4	4.2.6.4				
updating	► IMPO	IMPORTED FIRMWARE FILES											
	► UP-TO	► UP-TO-DATE									B. Press to		
	► CONS	CONSULT MANUFACTURER									update		
											device		
								UPDATE S	Selected De	VICES			

