BEATRICE

M1

Radio Interface Network Audio Intercom

PRODUCT DETAILS

GLENSOUND ELECTRONICS LTD, THE DESIGN BUILDINGS, 6 BROOKS PLACE, MAIDSTONE, KENT, ME14 1HE.
TEL: +44 (0)1622 753662
Visit our Website at www.glensound.com

Glensound Electronics Ltd

Thank you for choosing a new Glensound product.

All rights reserved.

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 the product then we can be contacted at:

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

Telephone: +44 (0) 1622 753662

EMAIL ADDRESSES

General enquires: sales@glensound.com

Technical enquires: techinfo@glensound.com

Sales enquires: sales@glensound.com

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 FOR:

GS-BEATRICE M1

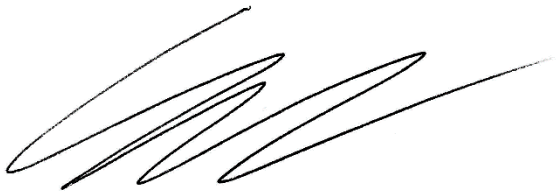
Radio Interface Dante/ AES67 intercom

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:

Low Voltage Directive:	EN60065 and EN62368-1:2014
Emissions:	BS EN55032:2015
Immunity:	BS EN55035:2017

Signed for and on behalf of Glensound Electronics Ltd.



Gavin Davis, Managing Director
Maidstone, Kent, England

Date: 30/04/2020

RoHS DIRECTIVE

EC directive 2002/95/EC restricts the use of the hazardous substances listed below in electrical and electronic equipment.

This product conforms to the above directive and for this 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 BEATRICE M1

HANDBOOK CONTENTS

Issue 1.2

Description Page No.

Contents

PRODUCT WARRANTY: 4
HANDBOOK CONTENTS 8
OVERVIEW 9
B4 PANEL LAYOUT 10
Front, Rear & Side 10
FEATURES 11
CONFIGURATION MENU 13
FACTORY PRESETS 16
RADIO INTERFACE 17
General operation 17
Connector cable 18
Relay in series example 19
Relay shunting example 19
Relay across sleeves 20
AUDIO BLOCK DIAGRAM 20
CONNECTING THE BEATRICE UNITS TO A DANTE NETWORK 21
Getting Dante Controller 22
Connecting Beatrice To The Network 22
Audio Over IP Network 22
Running Dante Controller 23
Dante Controller TIP 23
Device Not Showing Up In Dante Controller 24
AES67 MODE 25
Turning On AES67 Mode 25
Sending AES67 Audio 26
Receiving AES67 Audio 27
AES67 Restrictions 27
UPDATING FIRMWARE 28
Equipment needed 28
Instructions 28
UPDATING THE ULTIMO CHIPSET 33
WIRING INFORMATION 33
D9 connector wiring 33

OVERVIEW

The BEATRICE range of IP intercoms was designed for broadcast, theatre and professional audio applications.

Our Beatrice intercom system utilises the reliable and proven Dante™ network audio transmission protocol to allow real time distribution of uncompressed audio across standard networks. As such the BEATRICE M1 is fully compatible with other manufacturers' equipment using the Dante™ protocol. The Beatrice M1 is fully AES67 compatable.

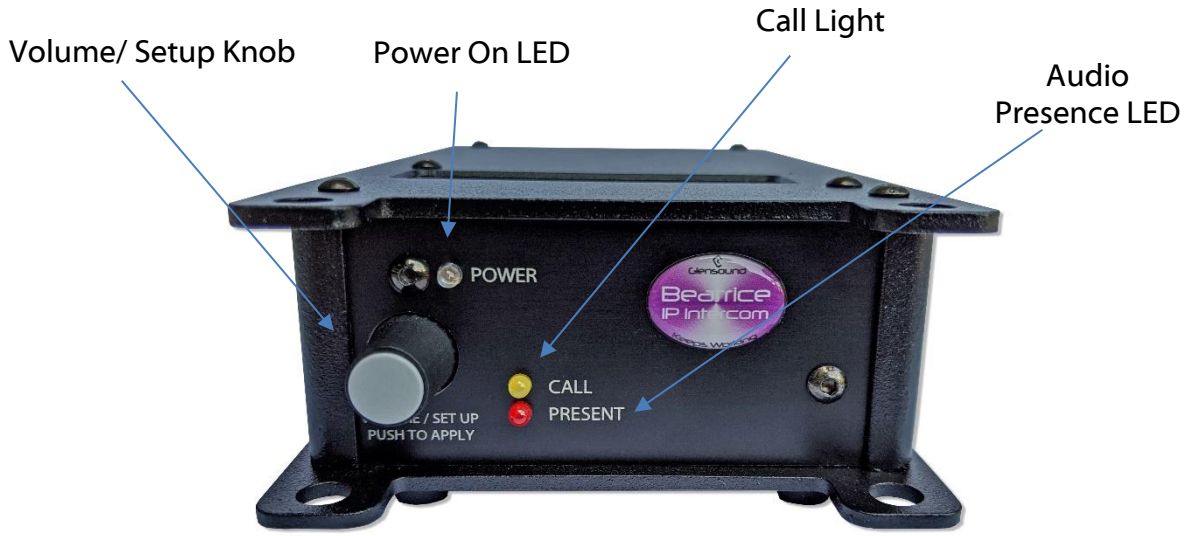
All units in the system are designed to be very easy to use for the operator and simple to setup for the technician. They includes all the basic functionality required for small intercom systems and none of the overly complex installation requirements normally associated with large systems.

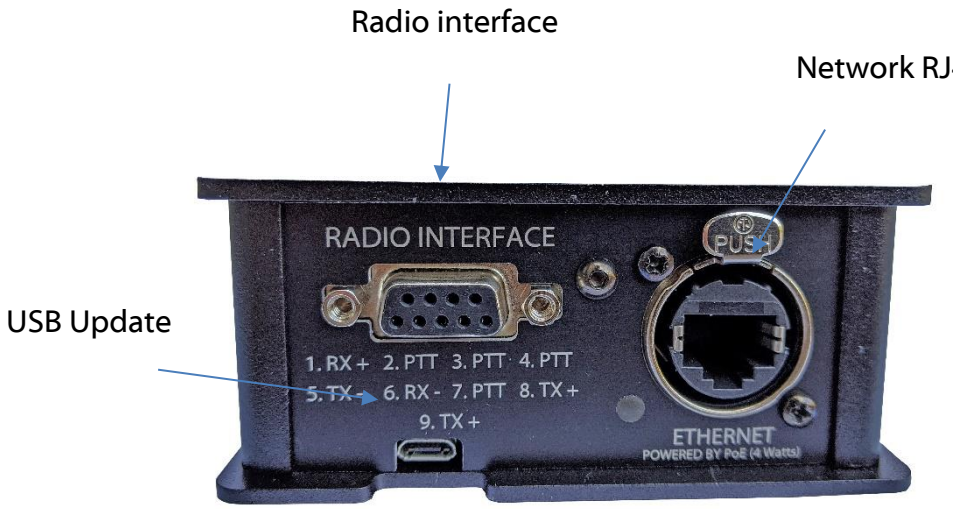
The name Beatrice was chosen for our intercom range as she was the love of Dante Alighieri:

'Dante had fallen in love with another, Beatrice Portinari (known as Bice), whom he first met when he was only nine.' Source Wikipedia.

B4 PANEL LAYOUT

Front, Rear & Side





FEATURES

1. **Volume/ Setup Knob**

   This multi-function knob provides several different functions depending upon whether the user is in setup mode or not.

   In normal operation, rotating the control increases / decreases the output to radio system volume.

   In Setup Mode:

   The knob is used to enter menus and change parameters. This is done by rotating the knob until the desired menu is seen on the display, then push the knob and the menu will be accessed, rotate the knob again to select the desired setting and press the knob in to select and save that setting.

2. **Power On LED**

   The power on LED indicates that the device is powered on and the internal microprocessor is working correctly.

3. **Call Light**

   This bright yellow LED will flash to indicate an incoming call on that circuit. Pressing the speak key will automatically cancel the call light.

4. **Audio Presence LED**

   The red audio presence LED indicates when audio from the Dante network is triggering the radio push-to-talk.

5. **Radio interface**

   This 9-way D type connector is for connecting the unit to a radio base station or walkie talkie receiver. Audio paths are sent and received, and an internal relay controlled by the microcontroller is used to key PTT radio systems.

   Refer to this section of the manual for wiring information.

6. **USB Update**

   The USB connector is used for connected a PC to the device for loading firmware updates.

7. **Network RJ45**

   The Neutrik Ethercon network socket can connect to both Neutrik Ethercons and standard RJ45 cables. It is a 100M/bit standard IP network connection. The status LED flashes to show when data is being correctly communicated with the attached switch.
   If connected to a Power Over Ethernet (PoE) source, then the unit will be powered from it.

8. **Enter Setup Button**

   Pressing the small tactile switch will put the unit in setup mode.

   The setup mode is protected by a 2-digit passcode. The passcode is 45 (the numeric equivalent of GL). Just turn the volume/ setup knob until 45 is shown on the screen and then push the knob to select.

9. **Gain potentiometers**

   A RX and TX gain trimmer pots allow hardware control of the audio signal being sent and received from the Radio system connected via the D9 connector.
   They should be used for setting acceptable levels for the Radio system and to make sure that the outgoing signal is high enough to trigger a radio's push to talk function (with the relay).

   For a more detailed guide see the Radio interface section.

10. **Radio Set DIP switch**

    This 3-way DIP switch changes the gain level of M1 to Radio audio to allow different manufactures Radio's push-to-talk to work correctly. For a more detailed guide see the Radio interface section.

CONFIGURATION MENU

1. Entering/ Leaving Setup

To enter setup press the small round flush mounted button marked ‘SETUP’

If no action is taken the unit will automatically exit setup mode after about 30 seconds of inactivity.

When in setup mode pressing the ‘SETUP’ button will exit the mode and the unit will return to normal operation.

A. Unlock Code

To prevent operators entering the configuration menu and altering the device’s settings when you first enter the setup mode the display asks for an unlock code.

To unlock the device rotate the Volume/ Setup knob until the number 45 is displayed on the screen and then push the Volume/ Setup knob.

2. Selecting The Different Menus & Options Within The Menu

Once in setup mode with the device unlocked, rotate the Volume/ Setup knob to scroll between the different menu settings. Once the display indicates the desired menu that you would like to alter push the Volume/ Setup knob to enter that selected sub menu.

Once in the sub menu, rotate the Volume/ Setup knob both clockwise and anti-clockwise to display all available options for that parameter. When the setting that you want to make is displayed on the screen push the Volume/ Setup knob and it will then be set.

Idle

In idle mode the Beatrice M1 will show an idle screen that has Radio RX metering with > symbols (incoming radio audio).

B. Radio RX

This adjusts the internal digital input gain of the radio input and should be used to set the output level of the user’s microphone to the intercom network.

The gain range is nominally marked 0 – 30.

C. Radio TX

This mode allows digital adjustment of gain for the signal from Dante being sent to the radio system. The gain range is marked 0 – 30.

D. PTT Detection threshold

This mode allows the user to set incoming Dante audio threshold for keying the radio push to talk and sending Dante audio out to the radio system. The range is 0 – 7.

Threshold 7 will activate at line level with each step a 5 dBu increment. 0, the lowest threshold value is -35dBu and 8 the highest value is full scale. To help set the threshold, the display will show >>>X when the audio is above the threshold.

E. PTT hold time

This sets the time the push to talk stays open after incoming Dante audio has fallen below the threshold so that speech is not interrupted or cut off. The range is 0 – 8.

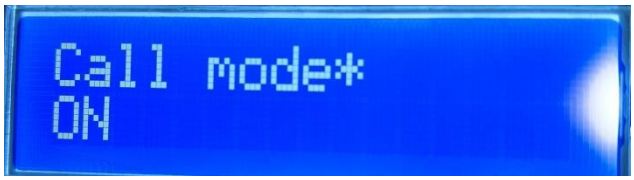
0 = 210ms, 1 = 420ms, 2 = 840ms, 3 = 1.26s, 4 = 1.68s, 5 = 2.1s, 6 = 2.52s. 7 = 2.94s, 8 = 3.36s

F. Radio duplex set

This mode will change the output audio setting so that the device can work correctly with either Simplex or Full Duplex radio systems. In Simplex mode, the M1 mutes it's own radio input whenever it is transmitting Dante audio to the radio. In Full Duplex, the M1 does not mute it's radio input when it is transmitting to the radio.

G. Call mode

This mode provides the ability to turn off the calling feature for any of the channels. If you are in a setup where the calling feature is not being used, then turning it off (disabling it) can prevent accidental triggering of the call circuit.



Turning call mode off will stop the device detectors from listening for 20k from the Dante network.

H. Pip Tone Vol

Pip tone is the audio alert that a call has been received on and is used to indicate to the user that there is an incomming call.

The volume of this alert can be adjusted using this control.

I. Save Preset

There are 4 presets available. If you select a preset (1 – 4) and push the volume/ setup knob then all the current settings will be saved to that position in non-volatile memory. If there was a previously saved preset on the same preset number this will be overwritten.

Please note the preset only saves configurations available via the menu system, it does not save any Dante network information.

J. Load Preset

The load preset menu recalls previously saved configurations.

K. Factory Reset

If the factory reset menu is entered and ‘Yes’ selected (and then the Volume/ Setup knob is pushed) then the units configuration will return to factory defaults.

FACTORY PRESETS

If the factory reset menu option is sleected the device will return to the following parameters.

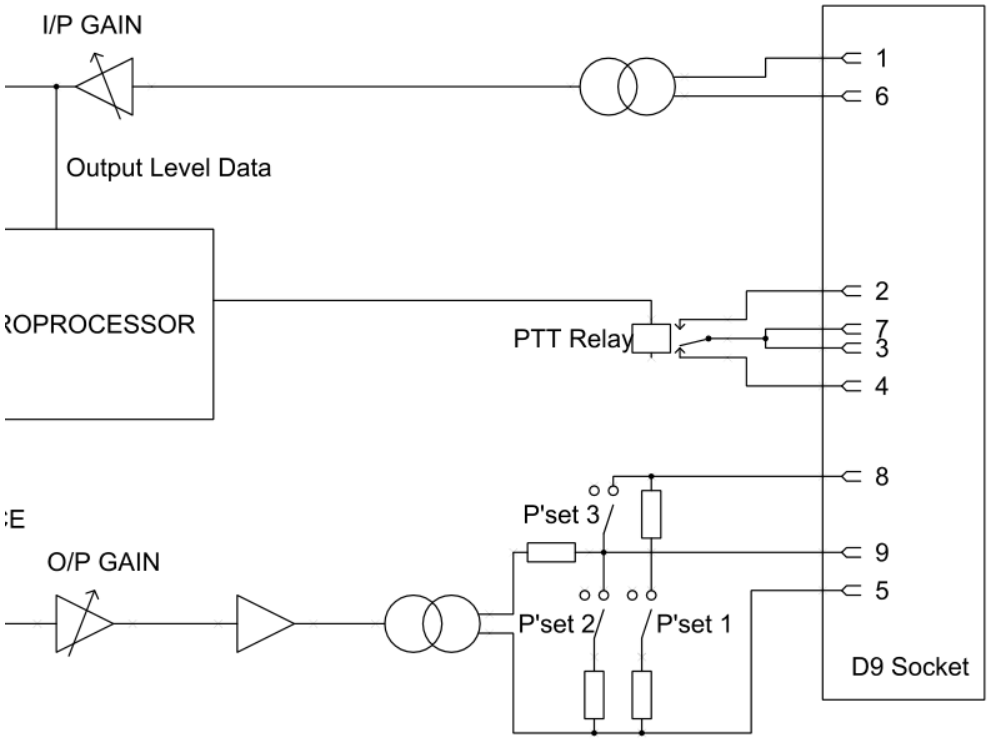
Please note that any saved presets are not affected by the factory reset operation.

Radio RX gain	= 15
Radio TX gain	= 15
PTT threshold	= 4 (-15dBu)
PTT Hold time	= 2 (840ms)
Duplex mode	= Simplex
Call Mode	= On
Pip tone level	= 7

RADIO INTERFACE

General operation

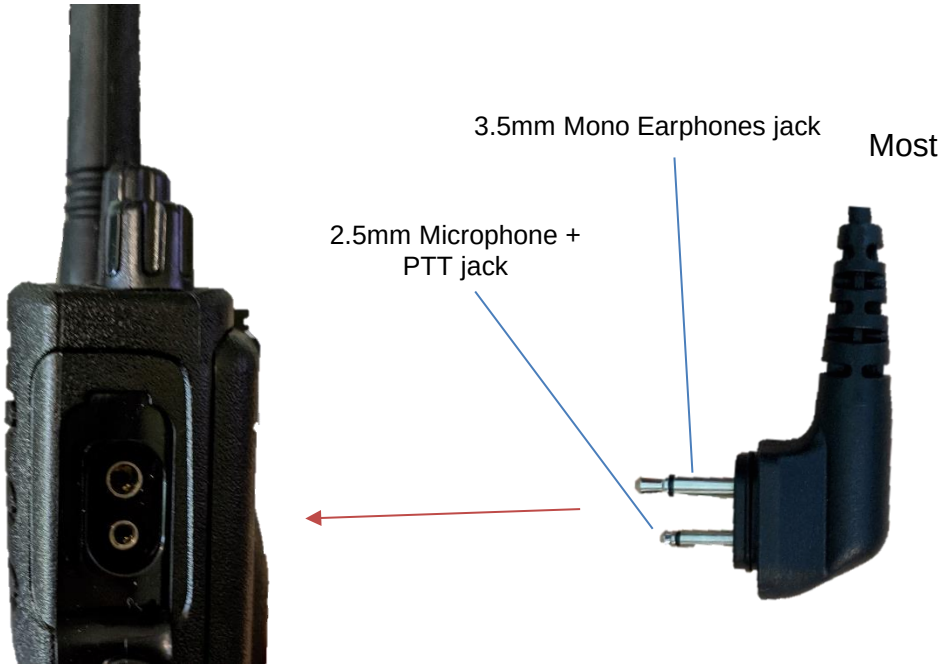
The activation of the relay for triggering the radio's speak switch is done on detection of an incoming audio signal from the Dante network. The threshold and hold time of this activation can be set in the menu system.



Connector cable

To make your M1 work correctly with your two-way radio system you must first make a cable to connect your radio to the Beatrice M1.

You will need a soldering iron, cable snippers, spare wire, the two connectors and some shielded cable (2 pairs).



Motorola radio systems use a dual 3.5mm + 2.5mm combo jack for external headsets with the earphones on the larger 3.5mm jack and microphone + PTT on the 2.5mm jack. Sometimes referred to as the “M1” connector. Note: the 2.5mm jack is not a standard 2.5mm plug.

To connect your radio, you will need to obtain a compatible connector. In most cases the easiest way to obtain one is to buy a cheap radio headset and snip the wire off at the headset end.

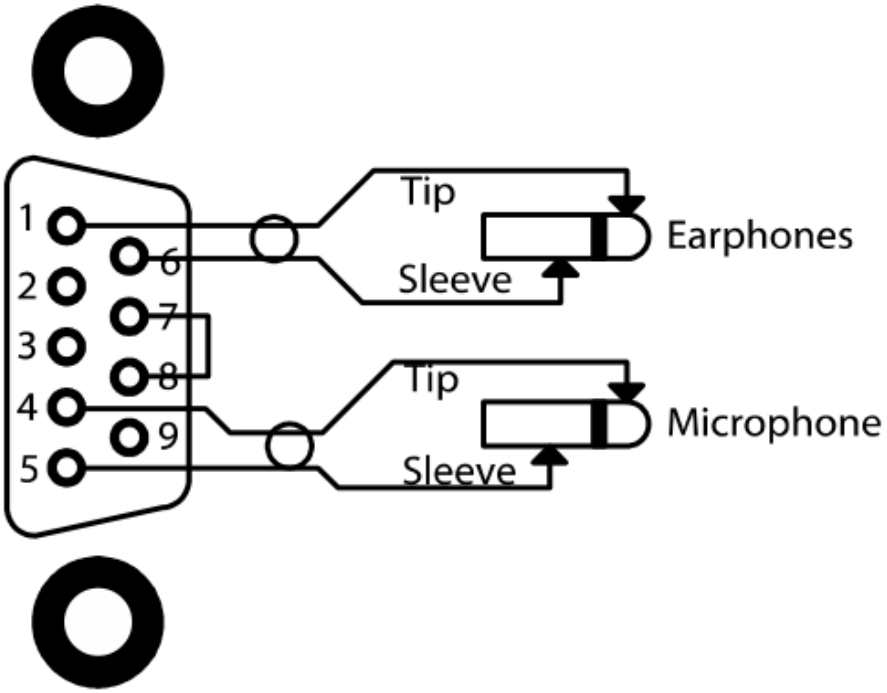
When you have the correct adapter for your radio, you need to obtain a male 9-way D type plug connector which will connect to the Beatrice M1. These are widely available and cheap to buy.

There are a few different methods of push to talk that your radio system may use. The most common type tends to be ‘relay in series’ with the microphone to key PTT. Note: the relay is located in the internal circuitry of the Beatrice M1.

The majority of radio’s should work with the following three example, so you will need to trial and error in order to find the solution that works for you.

The dip switch on the side of the unit will control level attenuation and the DC path for the microphone. Make sure to set accordingly or experiment to get a suitable level for your radio.

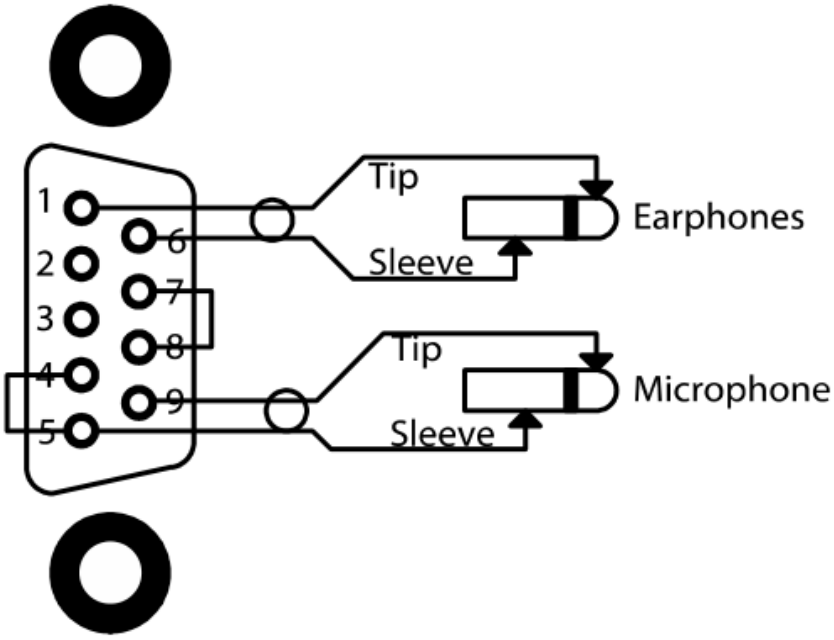
Relay in series example



Dip Switch position

1. Off
2. Medium gain for mic
3. Mic DC path

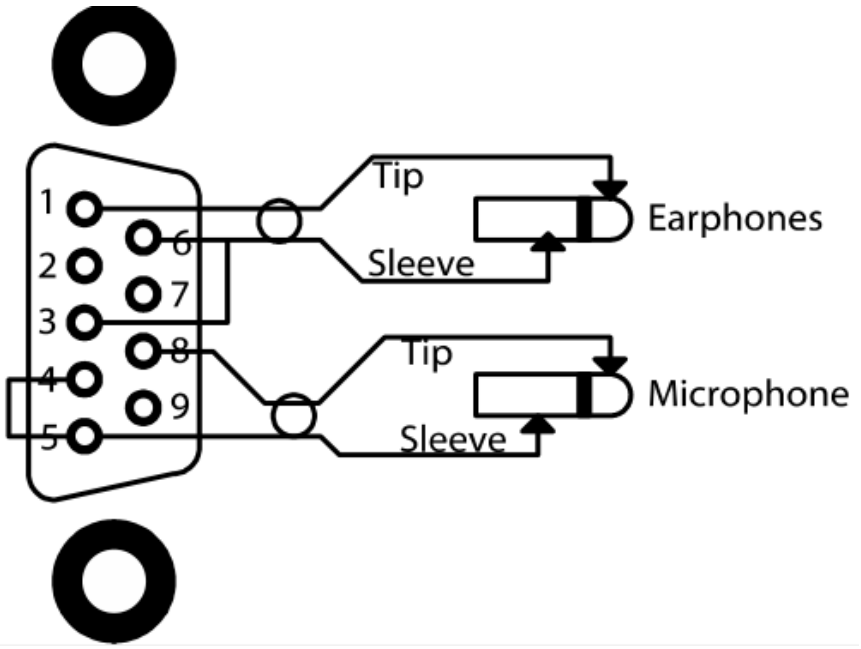
Relay shunting example



Dip Switch position

1. Off
2. Medium gain for mic
3. Off

Relay across sleeves



Dip Switch position

1. Off
2. Medium gain for mic
3. Mic DC path

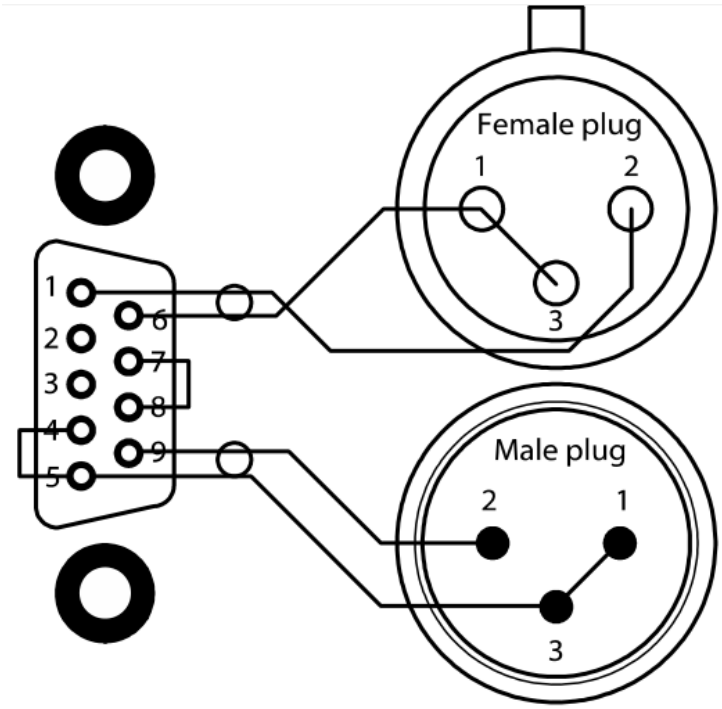
After making the cable, make sure that the Beatrice M1 keys the push-to-talk of your radio system when Dante audio is received.

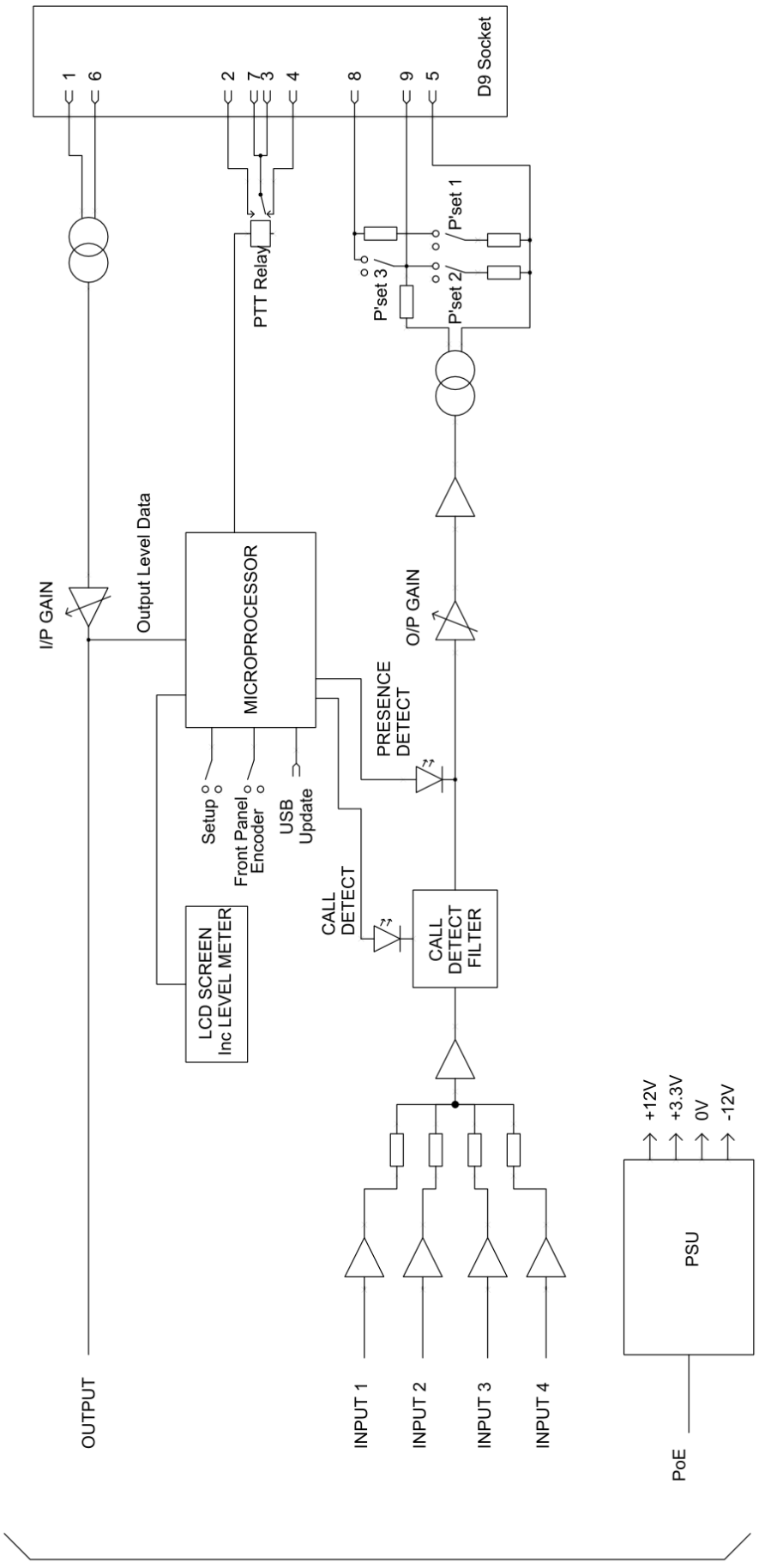
You will need to make sure your Dante source audio is above the configurable threshold set in the Beatrice M1 menu.

To balanced XLR base station

The transformer isolated inputs and outputs of the M1 can be connected to a base station with balanced XLR inputs and outputs. Below is an example wiring diagram for an adapter cable assembly.

AUDIO BLOCK DIAGRAM




D9 Socket
1
6
2
7
3
4
8
9
5
PTT Relay
P'set 1
P'set 2
P'set 3
I/P GAIN
Output Level Data
MICROPROCESSOR
O/P GAIN
PRESENCE DETECT
Setup
Front Panel Encoder
USB Update
LCD SCREEN Inc LEVEL METER
CALL DETECT
CALL DETECT FILTER
+12V
+3.3V
0V
-12V
PSU
OUTPUT
INPUT 1
INPUT 2
INPUT 3
INPUT 4
PoE
AUDIO TO/ FROM DANTE NETWORK

CONNECTING THE BEATRICE UNITS TO A DANTE NETWORK

The Beatrices are network audio devices 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.audinate.com

Getting Dante Controller

If you are connecting the Beatrice 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.audinate.com

Connecting Beatrice To The Network

Beatrice units can be connected to the network that you are going to use for your audio distribution simply by plugging in either, and, or any of the network connections on the rear. Once connected to the network it will be possible to see the Beatrice M1 from within the Dante controller and route its' audio circuits.

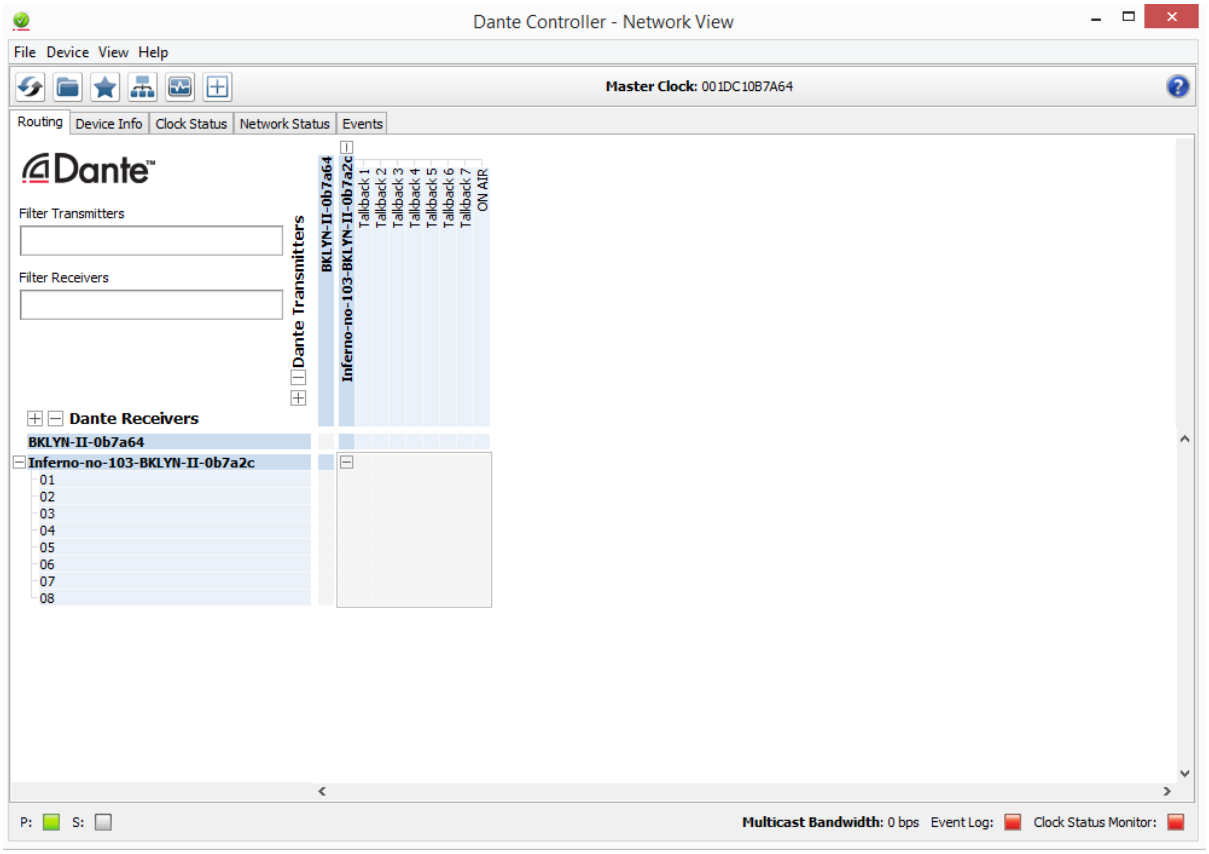
Audio Over IP Network

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.audinate.com

Running Dante Controller

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



The Beatrice M1 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:

‘GLENSOUND-BEA-M1-SN-XXXX’

Where ‘BEA-M1’ refers to the Glensound product i.e. Beatrice M1.

The ‘SN-XXXX’ refers to the serial number of the Beatrice M1 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 Beatrice M1 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 ‘BEA-M1-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.

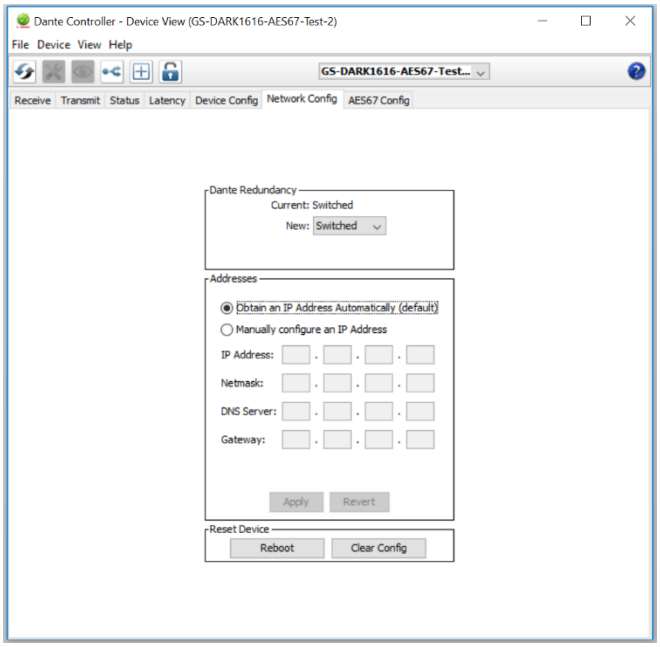
Device Not Showing Up In Dante Controller

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.



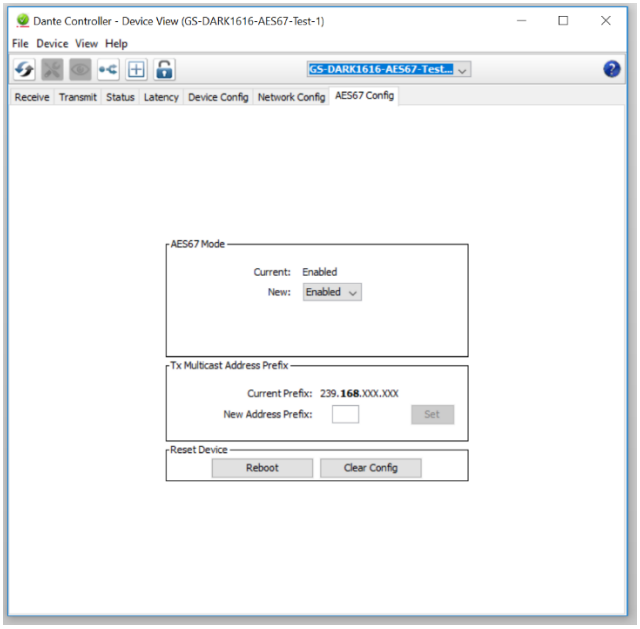
AES67 MODE

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

Please note however that Glensound are relying on Audinate's AES67 interface and are unfortunately not able to provide full AES67 support for the unit. AES67 support should be sought directly from Audinate.

Turning On AES67 Mode

If you want to use your Beatrice on an AES67 network and it has not been set to AES67 mode then this can be set in Dante controller by double clicking the Beatrice to open the Device View window where you will find an AES67 tab to enable AES67 support.

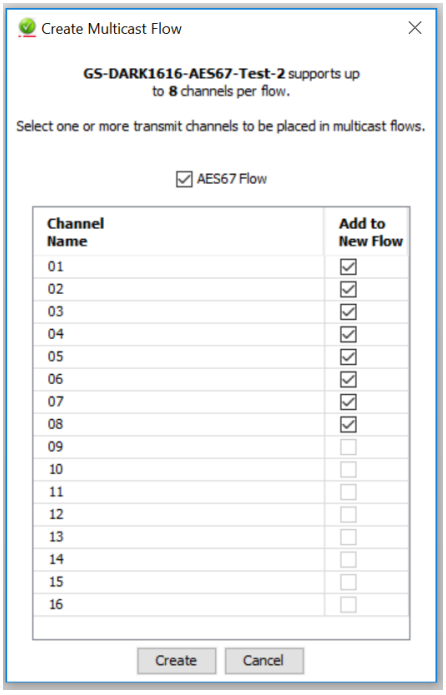


Once the AES67 drop down box has been enabled you'll have to reboot the Beatrice for the change to take effect. After the reboot go back to the AES67 tab and set the multicast prefix address to one that is suitable for your newtork.

Sending AES67 Audio

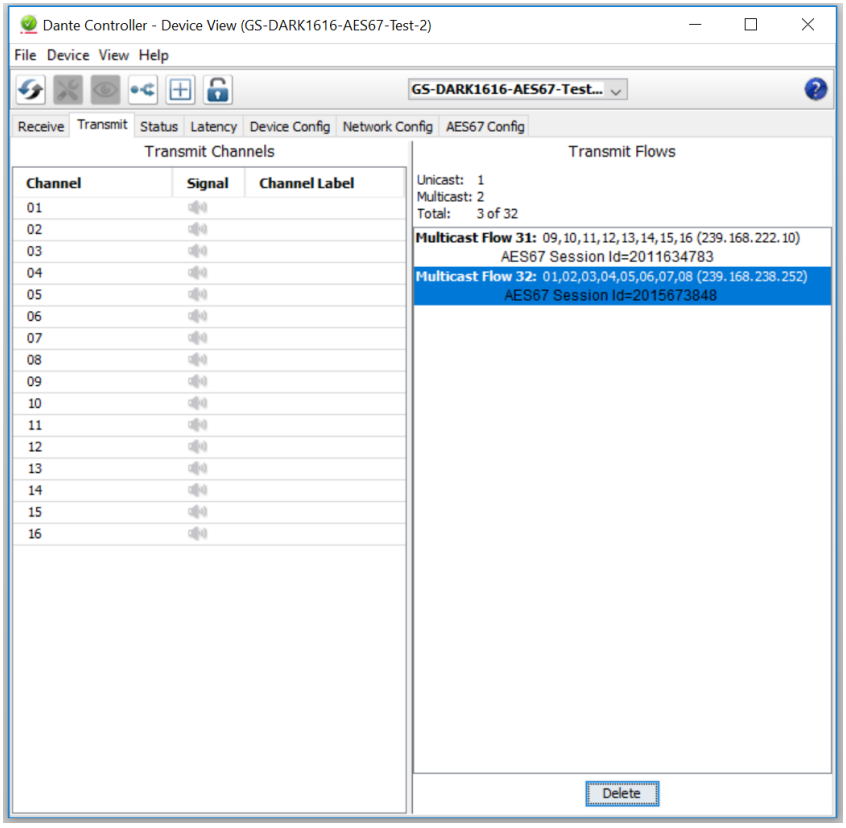
To transmit AES67 audio to the network a multicast flow must first be setup.

This is done by selecting the ‘Create New Multicast Flow’ Icon in the Device View.



Tick the AES67 Flow check box, then select up to 4 channels to be included in the flow then click ‘Create’

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



Receiving AES67 Audio

Once a compatible AES67 stream is detected on the network by Dante Controller the AES67 flows will appear in the Dante Transmitters section in the Routing tab.

AES67 Restrictions

AES67 flows can only be generated with the following constraints:

- 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 have the following constraints:

- Multicast Only
- Non-redundant
- Destination address in range 239.nnn.0.0 to 239.nnn.255.255 (239.nnn/16), port 5004. Must match destinatio address range.
- 48kHz sampling rate
- L16 or L24 encoding
- 125usec, 250usec, 333usec, 1 msec packet time
- Up to 8 channels per stream

UPDATING FIRMWARE

The Beatrice M1 is a digital audio system comprising of a Micro Controller and ADC and DAC converters. These items run software and may need to be occasionally updated.

Equipment needed

- A windows based PC
- USB Type A to Micro B cable
- A copy of 'DfuSe Demo' software
- The latest firmware from Glensound
- The Beatrice unit to update

Instructions

1. Download and install DfuSE Demo

   'DfuSE Demo' is a firmware updating tool that is required for loading new firmware on to the Beatrice.

   It can be downloaded from the STMicroelectronics website found here: https://goo.gl/AbzhsA. It is the file named "STSW-STM32080".

   Once you have downloaded this file you will need to extract the .exe "DfuSe_Demo_V3.0.5_Setup.exe", then run and install it.

2. Install DFuSE driver

   Once DFuSE is installed, navigate to the following location on your machine:

   C:\Program Files (x86)\STMicroelectronics\Software\DfuSe v3.0.6\Bin\Driver\Win10

   You now need to run the following driver.
   -If your machine is 64 bit run 'dpinst_amd64.exe'
   -If your machine is 32 bit run 'dpinst_x86.exe'

   This will install the driver you need.

3. Download firmware

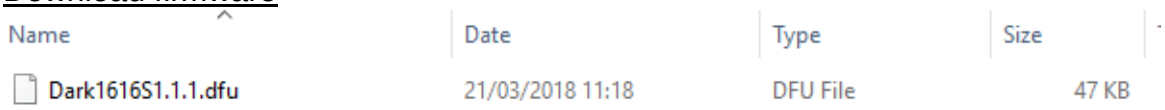


Figure 1 Example filename

4. Connect To A PC

   Connect the Beatrice to the PC via the USB cable. The Micro USB connector is located on the rear panel of the unit.

5. Firmware update preperation

To prepare the Beatrice for a firmware update;

1. Press and hold down the Enter Setup button
2. Power on the unit
3. Release the Enter Setup button

Your PC should make an audible sound when this process is successful as windows is detecting a new USB device.

6. Loading the firmware

Now open DfuSe Demo.

If the Beatrice successfully entered DFU mode then it will appear as ‘STM Device in DFU Mode’ under the ‘Available DFU Devices tab’.

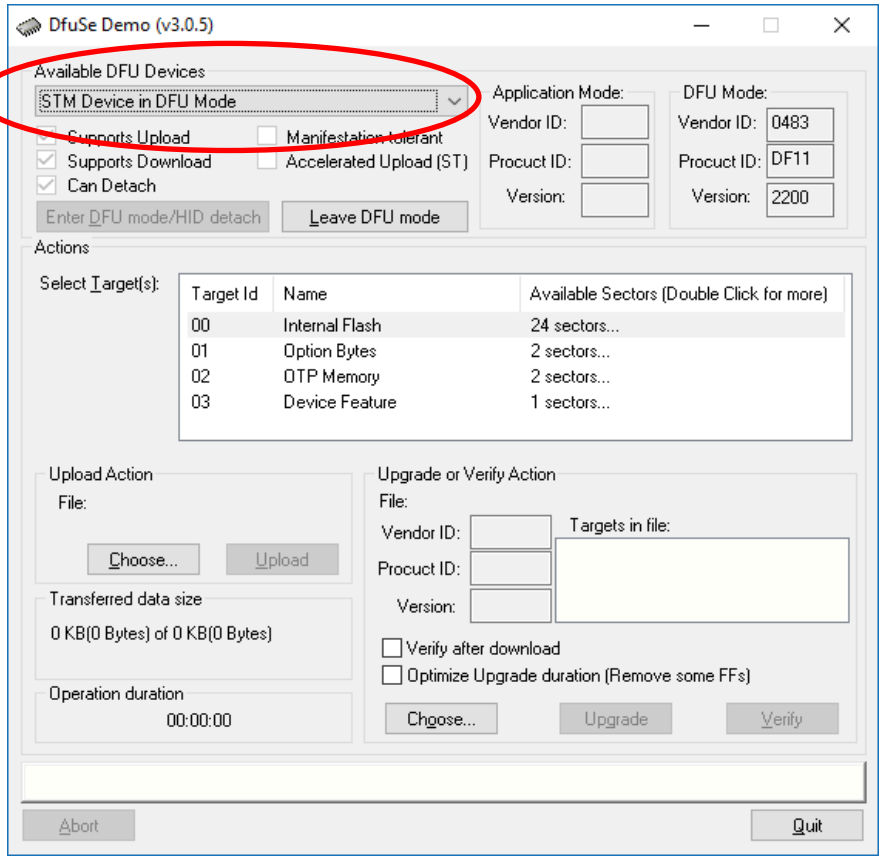


Figure 2 Device successfully recognised

Now the .dfu file needs to be selected so that DfuSe Demo knows the correct firmware to put on to the Beatrice.

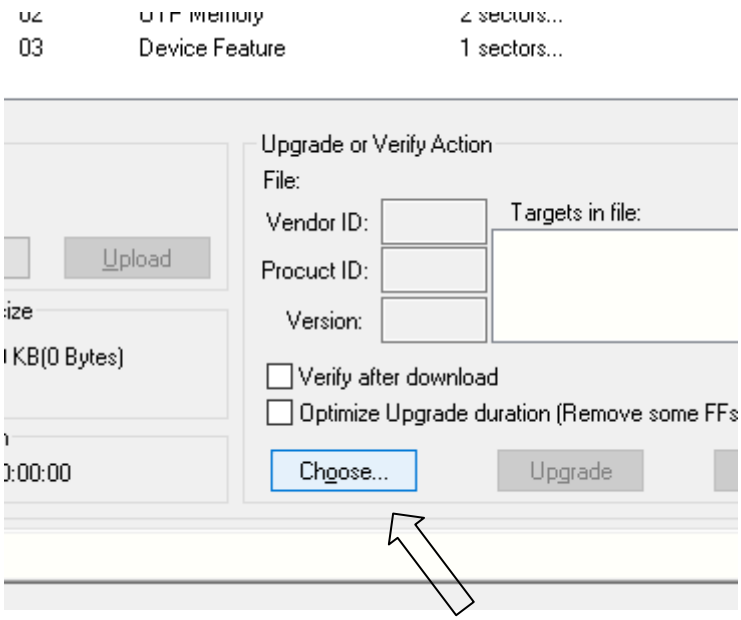


Figure 3 Choose .dfu file

Click choose and then select the .dfu file that you downloaded from the Glensound website. This will be located in your downloads folder by default.

If the file loads successfully then it will read along the bottom 'File correctly loaded'.

7. Upgrading the Beatrice firmware

The firmware is now ready to be put on to the Beatrice. Tick the 'Verify after download' box first and then click 'Upgrade'.

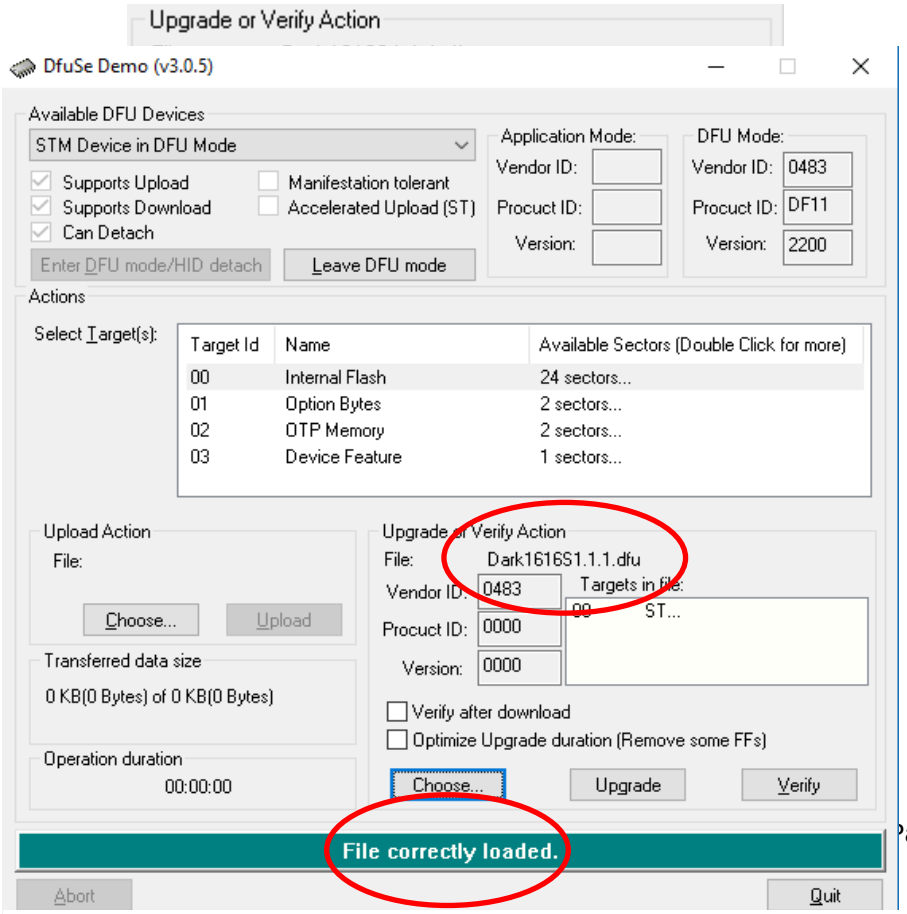


Figure 4 .dfu successfully loaded

Click yes to proceed.

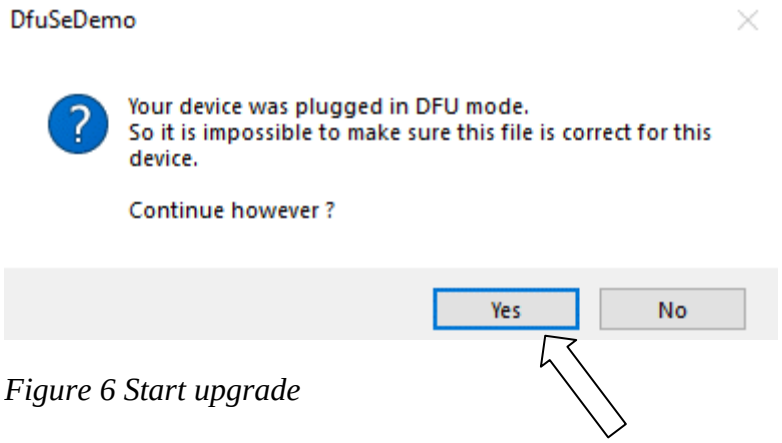


Figure 6 Start upgrade

The progress bar along the bottom will show the status of the operation. If the operation was successful, DfuSe Demo will report that “Target 00: Verify Successful!”.

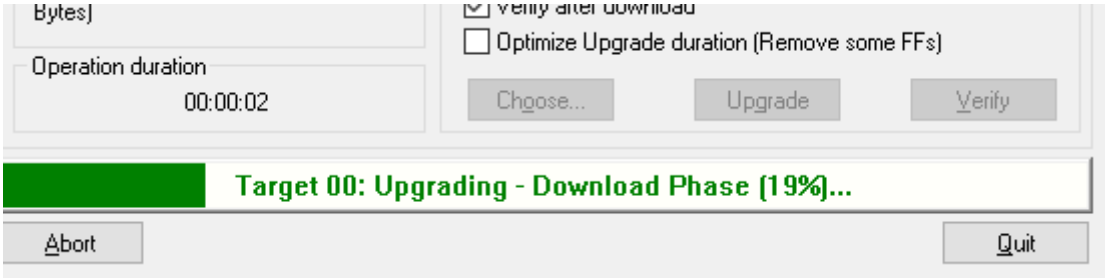


Figure 7 Upgrade status

You may also see that it will report how much data was successfully transferred.

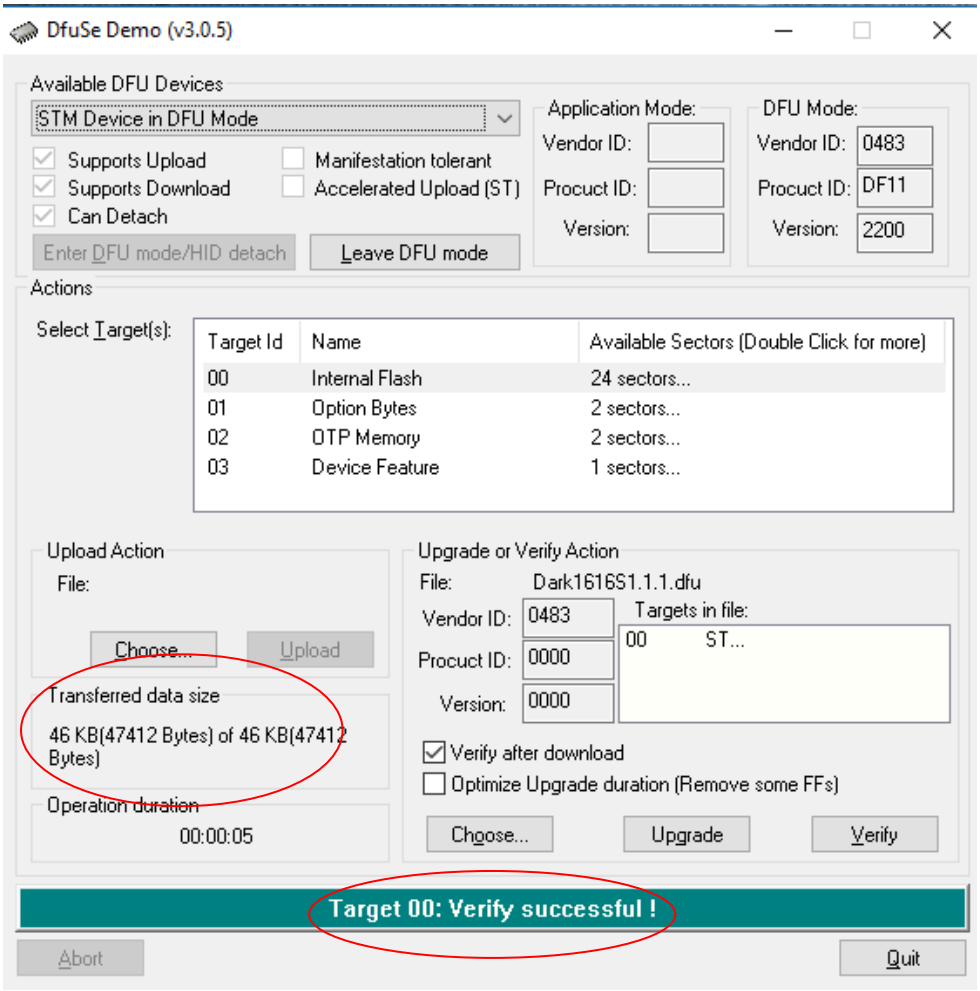


Figure 8 Successful upgrade!

8. Final steps

Now click “Leave DFU mode” to finish the procedure.

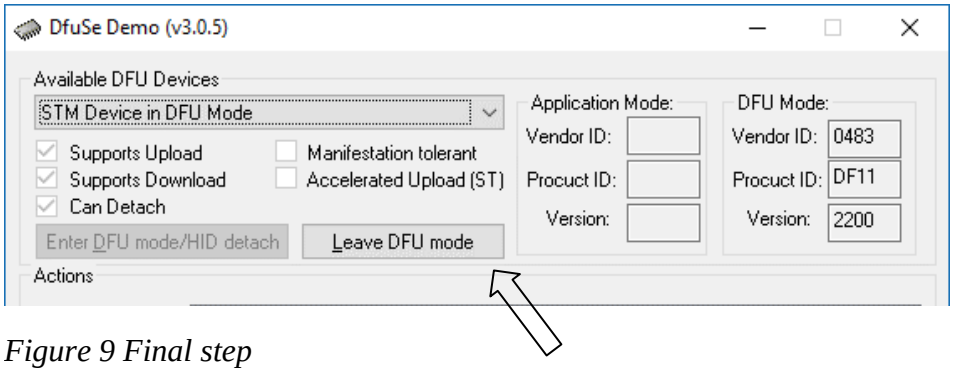


Figure 9 Final step

You may now disconnect the USB cable and continue to use the Beatrice with the freshly updated firmware!

UPDATING THE ULTIMO CHIPSET

The Ultimo Chipset is a device supplied by Audinate that does most of the processing for the actual Dante/ AES67 network audio streams. There is one Ultimo Chipset in each Beatrice. We supply special code (a .dnt file) that sets up/ initiates the Ultimo Chipset and makes it work in particular way that is compatible to the Beatrice.

1. Finding Out Current Installed Version

Using Dante® controller double click on the Beatrice device name in the routing tab to open the Device View box.
In the Device View box open the Status Tab.

The 'Product Version:' shows the currently installed version of Ultimo Chipset dnt code.

2. Updating the Ultimo Chipset

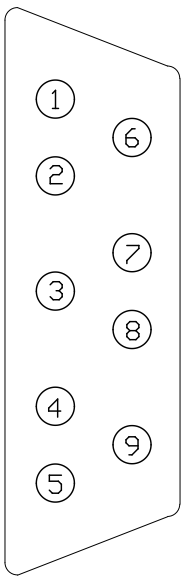
The firmware that runs in the Ultimo Chipset is updated using Audinate's Firmware updating tool. The updating tool and a user guide can be downloaded from Audinate's website:

https://www.audinate.com/products/firmware-update-manager

NOTE:
Please note we strongly advise that when you do the update that only your PC and the device that you want to update are on the network to save accidently updating the wrong Dante device.

WIRING INFORMATION

D9 connector wiring



1. Radio RX +
6. Radio RX -
2. PTT Relay 1

7. PTT Relay 2
3. PTT Relay 2
8. Radio TX +

4. PTT Relay 3
9. Radio TX +
5. Radio TX -