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BEATRICE LUCIA

A Dante®/ AES67 Party-Line Intercom Interface

Highlights

- Easily Interface Dante to Legacy Intercoms
- Broadway Chipset AES67/ SMPTE 2110 Complaint*
- RTS & Clear-Com Standards Supported
- Sophisticated Auto Null Circuit
- Wet powering of Party-Line
- Mains or PoE Powered

Overview

The Glensound Beatrice Lucia is a simple and cost effective way of interfacing legacy party-line (two wire) intercoms to modern audio networks.

Each party-line interface supports both single channel Clear-Com/ Tecpro and RTS standards as well as the two channel RTS unbalanced standard. Whilst its network interface utilizes the Broadway chipset from Audinate which supports Dante, AES67 and SMPTE 2110-30*. As such it can also be used as a way of extending RTS Omneo intercom networks to legacy party-lines.

Lucia's 1RU subrack can house 1 or 2 independent Party-Line interfaces and can be powered by an internal mains supply or PoE. If powered by mains then it can provide 'wet' power to the party-line interfaces.

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Party-Line Features

- **One or Two Party-Line Interfaces**
  Each Lucia 1Ru subrack can be fitted with either 1 or 2 completely independent party-line interfaces. This provides great flexibility for example if you're installing this to interface modern network audio circuits to your theatre's legacy intercom system then you're never going to need two party-line interfaces so why pay for them? Of course if your circumstances change and in the future need a second party-line interface then this can be fitted by your local dealer.

- **Party-Line Interface Standards**
  For easy integration to existing party-line systems each Lucia party-line interface supports the Clear-Com and RTS single channel party-line standards (which are also used by many other intercom manufacturers (eg Tecpro)). Each Lucia party-line interface also supports the two channel RTS unbalanced standard.

- **Auto Nulling Hybrid Circuit**
  To achieve best possible party-line audio performance the Lucia incorporates a sophisticated digitally controlled analogue hybrid. The hybrid's job is to separate the go and return audio channels from the party-line as cleanly as possible and provide as much separation between the channels as possible to help with overall system audio intelligibility. To do this we use digitally controlled analogue circuits that when operated process in excess of 65,000 different phase and amplitude settings in less than 60 seconds before settling on the best possible attributes for your specific setup.

- **Impedance matching**
  To interface with party-lines it is important that the attached equipment's termination impedance is correct for the line that it is attached to. The Lucia automatically sets its termination impedance to interface with RTS or Clear-Com standards in both dry or wet (when the Lucia is powering the party-line) scenarios. It even allows a specific RTS functionality of doubling the wet impedance to allow two power supplies on one RTS party-line.

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Party-Line Features

- **Wet or Dry Modes**
  Many party-line devices such as beltpacks are traditionally powered by the party line that they are attached to. If the Lucia is just being used to interface an audio network to an existing party-line system then it is likely that the party-line will already have its own power supply and therefore the Lucia would be set to dry mode (i.e. it would not supply power to the party-line). However if the Lucia is being used to interface a new party-line with an audio network then it can be set to wet mode and supply power to the party-line. Please note however that the Lucia can only provide power to a party-line if itself is running from a mains power supply.

- **Party-Line Send and Receive Gain Controls**
  Our experience of party-lines is that although they should all in theory provide similar audio levels in practice they don't. Therefore to enable a meaningful audio level to be sent between the party-line and the audio network we provide simple to use front panel audio level controls to adjust the send and receive audio levels on both single and two channel party-line circuits.

- **Send & Receive Level Meters**
  Being able to adjust your send and receive audio levels is great, but to be really useful you need to know what your send and receive audio levels actually are. Therefore the Lucia is fitted with individual LED PPM style meters for each send and receive circuit showing the audio level after the gain controls.

- **Call Signals**
  As well as converting between network audio and party-line audio Lucia also handles and converts call signals between the systems.
  Typically RTS and Clear-Com both use different party-line calling techniques, (RTS use a 20kHz signal and Clear-Com a DC voltage). Lucia however recognises both standards and when she receives a call signal from the party-line she converts it into the network audio standard used by our own Beatrice intercom system (and other manufacturers).
  Lucia can also receive call signals from the audio network and convert these into Clear-Com and RTS call signals that te party-lines will respond to.

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Party-Line Features

- **Party-Line XLRs**
  For each party-line interface fitted two XLRs are provided on the rear panel for providing the physical party-line interface. One female and one male standard 3 pin XLR is provided to allow easy connection to your party-line setup.

- **Mic Kill**
  To enable the autonull process to work well it is important that all microphones attached to the party-line circuits are turned off (this is to stop both acoustical feedback and extraneous audio from open microphones). To do tis Lucia sends 'mic kill' signals to the attached party-lines to tell the party-line equipment to turn off their mics. The Clear-com and RTS standards use different techniques for this so Lucia automatically sends the correct mic kill signal standard for the attached party-line.

- **Protected Front Panel Controls**
  Simple, easy to use push buttons are provided on the front panel of the Lucia for setting its party-line interfaces. The controls that switch between Clear-Com and RTS modes, turn on wet power and auto null the circuits are all protected by requiring a long button press of at least 3 seconds, preventing accidental use. Plus the 400 Ohm impedance mode can only be set if the Lucia is set to RTS mode and Wet power is turned on.

- **Mains and/ or PoE Powering**
  The Lucia features an internal wide range mains power supply fitted with an industry standard IEC power inlet. It also has a Power Over Ethernet (PoE) circuit allowing it to be powered by PoE from the Ethernet network. Front panel LEDs clearly indicate when each of these power sources are attached.
  Due to the power limitations of a PoE supply if the Lucia is being powered by PoE then it cannot supply wet power to the party-line interfaces.
  If both mains and PoE are present then either can act as a redundant supply for the other. If wet power is turned on and the unit is powered from a mains supply which fails, then when switching over to being powered by PoE the Lucia has to automatically turn wet power off to the party-lines.

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Network Features

- **Network Interfaces**
  On the rear of the Lucia is a gigabit copper Ethernet interface alongside a standard SFP slot for fibre Ethernet connections.

- **Audio Network Protocols**
  Lucia utilises the Broadway chipset from Audinate for its network audio circuits. This chipset provides Dante network audio as its primary network audio standard. However it also is fully AES67 compliant and it is easy to turn on its AES67 mode if required. For broadcasters also distributing network video as well as sound it also supports SMPTE 2110-30. It is worth noting however that for setup and integration of the Broadway chipset in a 2110 network then Dante Domain Manager must be used (for which a licence fee is required).

- **Network Redundancy**
  If both the copper ethernet interface and an SFP ethernet interface are used then when using the Dante network protocol redundant network circuits can be setup to offer glitch free network audio backup.

- **4 Network Audio Circuits For Party-Lines**
  The analogue party-line interfaces are fed via high quality ADCs and DACs to the audio network. In total 4 bi-directional network audio circuits are provided for these circuits derived from the 2 two channel party-lines. (assuming Lucia is fitted with 2 x party-line interfaces).

- **4 Network Audio Mix Circuits**
  We have spare capacity on the Broadway chipset and DSP used in the Lucia so rather than wasting these resources we've included 4 fixed ratio mixers. In total there are 4 inputs from the network to these mixers and 4 outputs. The mixers are 'fixed' such that there are no level controls and all inputs are mixed at unity gain. The table below shows the mixer configuration.

DANTE TRANSMITTER	Sum of Mix in 1-2	Sum of Mix in 3-4	Sum of Mix in 1-3	Sum of Mix in 1-4
DANTE RECEIVER				
Mix in 1	X		X	X
Mix in 2	X		X	X
Mix in 3		X	X	X
Mix in 4		X		X

Having the simple network mixer on your network can be a very useful tool. For example you could use it for mixing a programme feed into the return talkback feed from the network enabling all party-line beltpacks to hear programme as well as talkback.

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Specification

NETWORK/ Dante®

Physical Interface
1 off RJ45 & 1 off SFP slot
(Can be set to work in redundant mode)

Audio
48kHz 24 Bit 8 channels to/from network

Transfer Rate
1000 Mbps

Dante® Chipset
Broadway

AES67 Compliant
AES67 compliant

SMPTE 2110-30 Compliant
2110-30 compliance via use of Dante Domain Manager (licence fees apply see audinate.com)

PHYSICAL

Mechanics
All aluminium with laser etched panels and light textured black powder coated lid & base

Size
19" wide, 1RU high, 225mm deep

Weight
2.1Kg 4.85lb (fitted with 2 x party-lines)

Shipping Weight
3.5Kg 7.7lb

Shipping Size
62 x 42 x 12 cms

Shipping Carton
Rugged export quality cardboard

ENVIRONMENTAL

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

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

Relative Humidity
0 to 95% non-condensing

POWER

Mains Voltage
100 - 240 VAC +/-10%

Mains Frequency
50 to 60 Hz

Power over Ethernet (PoE)
May be powered by PoE on Copper Port
Complies to: IEEE 802.3af-2003
Classification Class 0

Consumption
Mains <150 Watts PoE <15 Watts

Redundancy
PoE to Mains = Seemless
Mains to PoE = Partial (wet power not supported by PoE)

Power On LEDs
Bright Blues

PARTY-LINE AUDIO

Frequency Response
Network to Party Line <-2dB 230Hz to 8.1kHz (-3dB @ 200Hz & 9.1kHz)
Party Line to Network <-2dB 230Hz to 8.5kHz (-3dB @ 200Hz & 8.7kHz)

Gain Control
+/- 15dB to & from Party-Line/ Network

Line Up Levels (@ unity gain)
-18dBFs from Network = -10dBu on Party-Line
-10dBu from Party-Line = -18dBFs on Network

Distortion (THD+N)
Network to Party-Line >= 0.015% (Pin2)
Party-Line to Network >= 0.016% (Pin 2)

Signal To Noise @ Line Up
Network to Party-Line >= -80dBu (Pin 2)
Party-Line to Network >= -93dBFs (Pin 2)

PPM LED Levels

From Network To Party -Line	From Party -Line to Network
-5 dBu	-12 dBFs
-11 dBu	-18 dBFs
-17 dBu	-24 dBFs
-25 dBu	-30 dBFs

Maximum Signal Level
Pin 2 & Pin 3: = +7dBu

Trans-Hybrid Loss (amount of null in 200R termination)
Pin 2 Dry Mode:
-53dB@300Hz, -53dB@1kHz, -56dB@8kHz
Pin 3 Dry Mode:
-56dB@300Hz, -60dB@1kHz, -63dB@8kHz
Pin 2 Wet Mode:
-47dB@300Hz, -48dB@1kHz,-67dB@2.7kHz -32dB@8kHz
Pin 3 Wet Mode:
-39dB@300Hz, -47dB@1kHz, -52dB@2kHz -46dB@8kHz

PARTY-LINE GENERAL

Compatibility
Clear-Comm/ TecPro standard single channel
RTS standard single & unbalanced two channel

Party-Line Impedance
Dry mode: > 10 kOhms
Clear-Comm Wet mode: = 200 Ohms
RTS wet mode: 200/ 400 Ohms (selectable)

Power (Wet Mode)
Voltage: = 29 Volts DC
Max current: = 0.75 ampere (each party-line)

Nulling Cable Length
Max cable length: 1 km

Nulling Impedance Range
100 - 200 Ohms

Call Signals
RTS mode: 20 kHz, +/-1%
Clear-Com mode: 7 Volts DC on Pin 3, +/-5%

INCLUDED ITEMS

Handbook
By download

RJ45 Network Cable
2 metre Cat5 RJ45plug /RJ45plug cable

Mains Cable
2 metre IEC (UK & Europe Only)

E & OE

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