GLENSOUND ELECTRONICS LTD.

Broadcast Equipment Manufacturers

GS-LSA-001
Glensound Electronics Ltd
www.glensound.co.uk

SEATTLE 7

POWER   INPUTS   OUTPUT FAULT

GS-LSA-001
Glensound Electronics Ltd
www.glensound.co.uk

Serial Number: 111

REMOTE   DC LOOPS   RADIO   MIC   SPARE 1   SPARE 2

EXPANSION   ETHERNET
IN   OUT

CONTROL
PANEL   RESET

IN (L)   IN (R)   OUT   IN   IN   IN

OUTPUTS
1 2 3 4

OUTPUTS
5 6 7 8

232VAC

T2AH   T2AH

GS-LSA-001 Loudspeaker Amplifier
Handbook

GLENSOUND ELECTRONICS LIMITED

GS-LSA-001 HANDBOOK

Table of Contents

Overview

The GS-LSA-001 has been designed to meet the requirements of HSBC in providing 'Branch Music'. The system has four prioritised analogue inputs (one Radio, one microphone and two spares). When an audio signal becomes present on an input, it will replace any audio on lower priority inputs. A LED on the front panel indicates which input is active.

The system can be managed remotely over a TCP/IP network via management software.
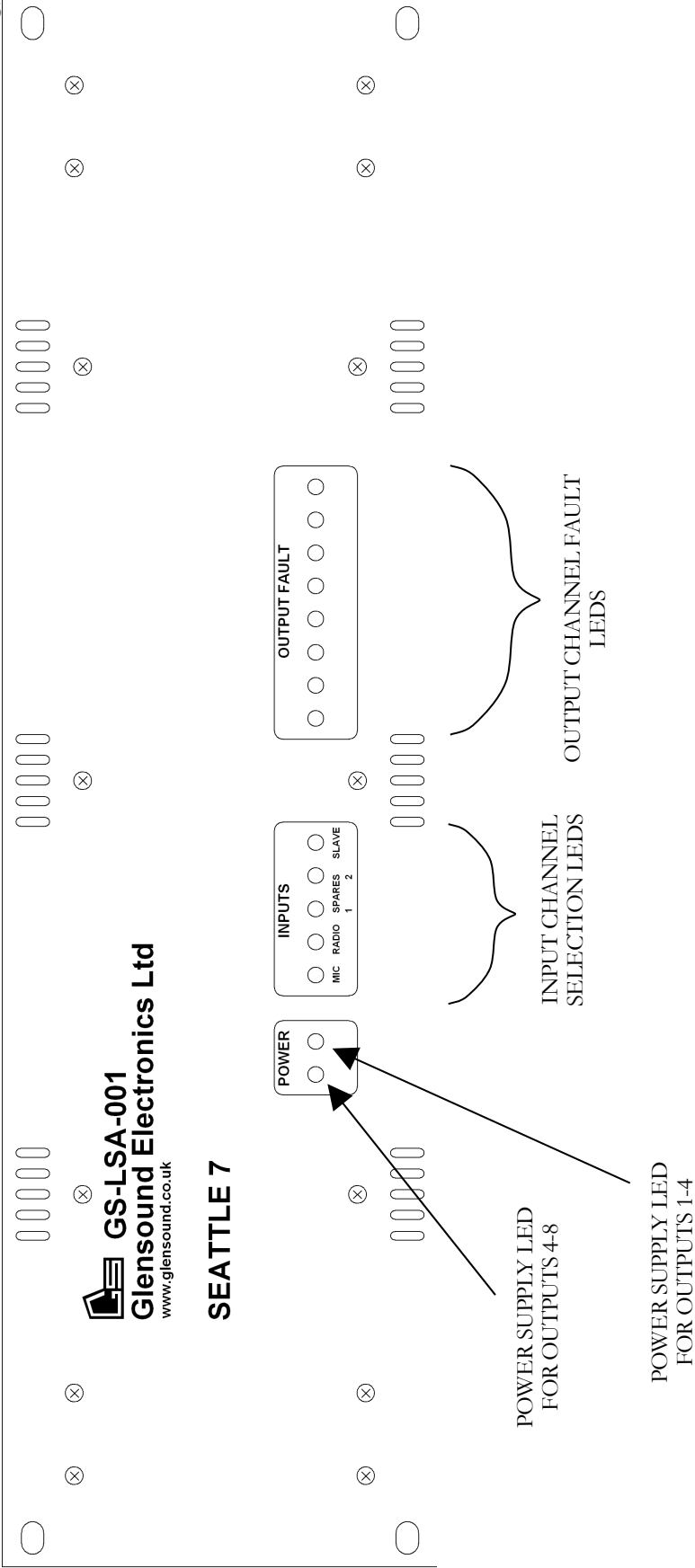
The overall volume level can be set to one of three preset volumes, to cater for varying numbers of customers. This selection can be made via a wall-mounted Branch Control panel, or via management software. The preset volume levels can be chosen via management software.

The GS-LSA-001 has eight output channels, each capable of driving up to two speakers. The volume level of each output channel can be individually adjusted via Infra-Red remote control or management software. Each channel has output current monitoring and fault indication LEDs on the front panel. The system is expandable in blocks of eight channels.

The GS-LSA-001 has a built-in real-time clock and will perform an automatic reset once per day. As part of this reset, the individual volume levels of the output channels will be reset to a known value.

Front Panel

GS-LSA-001
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SEATTLE 7

POWER

INPUTS

MIC RADIO SPARES SLAVE
1 2

OUTPUT FAULT

OUTPUT CHANNEL FAULT LEDS

INPUT CHANNEL SELECTION LEDS

POWER SUPPLY LED FOR OUTPUTS 4-8

POWER SUPPLY LED FOR OUTPUTS 1-4

Rear Panel

ANALOGUE INPUTS

SPARE 2   IN

SPARE 1   IN

MIC   IN

RADIO
OUTPUT

RADIO   OUT

IN (R)

IN (L)

RADIO OUTPUT

DC LOOPS

DC LOOPS

REMOTE
ETHERNET
RESET
EXPANSION
IN   OUT
CONTROL
PANEL

NETWORK
PORT

EXPANSION IN
& EXPANSION OUT

GS-LSA-001
Glensound Electronics Ltd
www.glensound.co.uk

Serial Number: 002

OUTPUTS
1 2 3 4

OUTPUTS
5 6 7 8

LOUDSPEAKER OUTPUTS

LOUDSPEAKER OUTPUTS

POWER

230VAC

T2AH

T2AH

RESET
SWITCH

4

Principle of operation

Inputs

The GS-LSA-001 has four separate analogue inputs, as shown on the diagram. When an audio signal becomes present on an input, it will replace any lower priority inputs using a smooth cross fade. Approximately two seconds after the signal has been removed, lower priority sources will be restored, again using a smooth cross fade. When there is no audio present on any of the inputs, an internal pink noise source may be used, if enabled in management software.

The priority of the inputs, starting with the input of lowest priority, is as follows:

- Pink noise (internal)

- Radio

- Spare 1

- Mic

- Spare 2

- Expansion In (Slave)

RADIO

The Radio input can be mono or stereo; however it is internally summed to mono as part of the input stage. For convenience, this mono signal is available on the Radio output. Automatic Gain Control (AGC) is normally applied, but may be disabled by management software. AGC does not affect the Radio output. When the Radio input is active, the green 'RADIO' LED on the front panel of the GS-LSA-001 will be lit.

SPARE 1

The Spare 1 input will override the Radio input. When the Spare 1 input is active, the green 'SPARE 1' LED on the front panel of the GS-LSA-001 will be lit.

MIC

The Mic input has a higher gain than the other inputs, and it is intended that a microphone be plugged in directly, without need for additional preamplifier stages. A compressor is used on this input. The input can be used for in-branch public announcements, and will automatically override both the Radio and Spare 1 inputs. The microphone used should ideally be fitted with a 'push-to-talk' switch. When the Mic input is active, the green 'MIC' LED on the front panel of the GS-LSA-001 will be lit.

SPARE 2

The Spare 2 input overrides all other inputs. When the Spare 2 input is active, the green 'SPARE 2' LED on the front panel of the GS-LSA-001 will be lit.

EXPANSION IN (SLAVE)

This is a professional AES3 digital audio input that overrides all other inputs. When digital audio is present on this input, the GS-LSA-001 will enter Slave Mode and the green 'SLAVE' LED on the front panel of the GS-LSA-001 will become lit. When digital audio is not present, the GS-LSA-001 will be in Master Mode, and the Expansion In port will be used to connect the Branch Control panel to the main unit.

Outputs

EXPANSION OUT

The Expansion Out port provides professional AES3 digital audio output. When in Slave Mode, this audio is taken directly from the Expansion In port.

RADIO OUTPUT

For the purposes of convenience and flexibility, the audio signal applied to the stereo Radio input is made available (as mono) on the Radio output. This output can be used for any purpose, for example as an input to a different speaker system, or for other monitoring purposes.

LOUDSPEAKER OUTPUTS

The GS-LSA-001 can drive up to eight separate loudspeakers, each with Infra-Red remote controlled volume. These speakers are connected through RJ45 (CAT-5) connectors to the back of the GS-LSA-001 unit, as shown in the real panel drawing. During the automatic system reset that occurs once per day, the individual volume levels of the output channels will be reset to a known value. More information about the speakers is provided in the Loudspeakers section.

DC Loops

A DC Loop system is provided to allow control of the system via DC signals. When a voltage-free contact is applied to DC Loop 0, all output channels will be muted. When a voltage-free contact is applied to DC Loop 1 of a master amplifier, the master amplifier and any other slave amplifiers will be placed in CALIBRATE mode.

Ethernet

The Ethernet port is used for configuration of the unit, both on site (via a laptop and a crossover cable), and remotely via management software. It is designed for use in a standard TCP/IP network.

Reset

The Reset switch, located below the Ethernet port, enacts a reset of the entire system with the exception of the electronics in the speakers and speaker wall boxes. The systems real-time clock will also perform an automatic reset once per day.

Loudspeakers

The GS-LSA-001 can identify up to 8 different types of loudspeaker. This identification is made possible by an ID code sent from the speaker through the RJ45 (CAT-5) cable. The ID information is used to set the equalisation settings for the speaker, ensuring best possible performance. The speakers will normally have two RJ45 (CAT-5) connectors, as shown in the example in Figure 1 (Left). For some types of speakers, these connectors may be housed in a separate wall box, Figure 1 (Right). Either of these connectors can be used to connect the speaker to the main unit. The other connector can be used to connect a second speaker in parallel with the first. When doing this, the following points should be noted:

- **<u>Never</u> connect more than one additional speaker per output channel**

- The first and additional speakers should be of the same type

- The volume of the additional speaker cannot be adjusted independently

- The remote control cannot be used to adjust the volume of the output channel when pointed at the additional speaker

The volume of each speaker output can be adjusted using the supplied Infra-Red remote control. The Infra-Red receiver is normally located under the grill of the speaker. When operated, a red "Infra-Red Received" LED behind the grill of the speaker will flash. See the Remote Control section for more details.

If a speaker that does not have ID functionality is connected to an output, the system will identify it as type 'generic', and suitable generic equalisation settings will be used. Care must be taken to ensure that the chosen speaker does not exceed the design limits of the loudspeaker outputs.
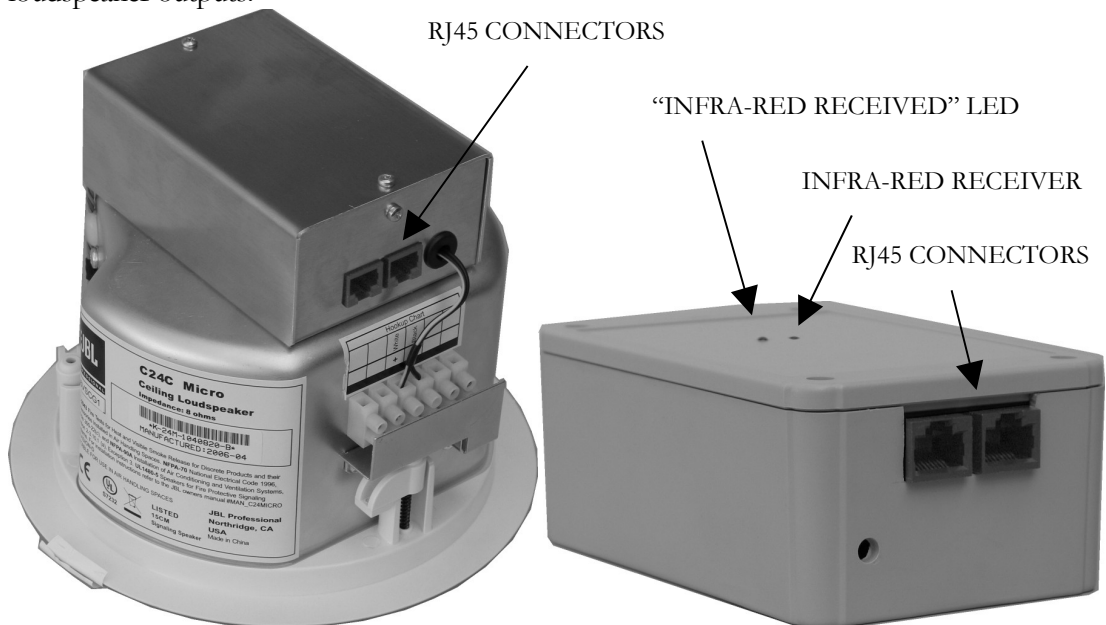

Figure 1: A loudspeaker with integrated electronics (Left), and a wall box, required for speakers without integrated electronics (Right).

Remote Control

The standard remote control supplied with the GS-LSA-001 has three buttons. These buttons are labelled 'UP', 'NORMAL' and 'DOWN', as shown on Figure 2. The remote control must be pointed at the Infra-Red receiver, which is located either behind the speaker grill, or inside the wall box (in the case of speakers that require separate wall boxes). When operated, the 'UP' and 'DOWN' buttons will adjust the volume of the speaker accordingly. The 'NORMAL' button will reset the volume to a predefined level. The remote control will have no affect if its Infra-Red transmission can be seen by more than one receiver, although the "Infra-Red Received" LED will still flash.

The remote control requires two 1.5V AA batteries. The battery compartment can be accessed by sliding the back of the remote control up.
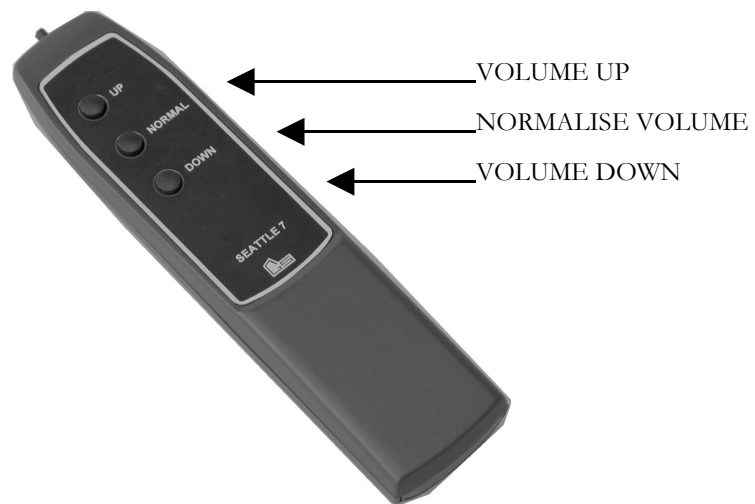

Figure 2: The standard GS-LSA-001 Infra-Red remote control

Branch Control

The branch control is a wall-mounted unit that can be used to adjust the overall volume of the system. Three settings are available; these are 'BRANCH BUSY', 'BRANCH NORMAL' and 'BRANCH EMPTY'. The actual volume levels that the three settings refer to are preset by management software. Three LEDs indicate which setting is currently selected. If none of the LEDs are lit, then the volume level has been temporarily set to a custom level by management software.
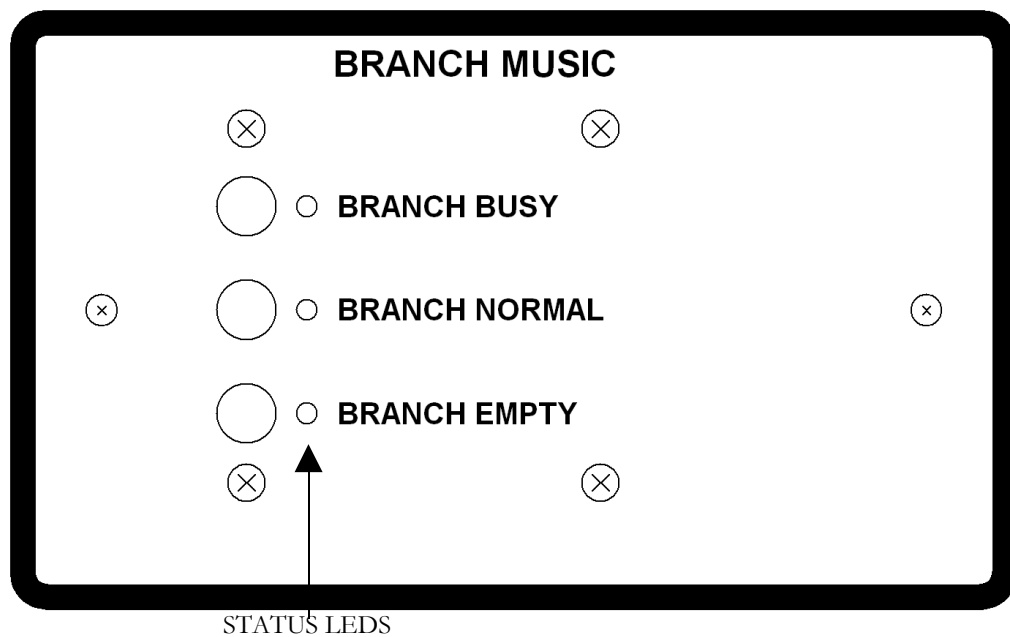

Figure 3: The Branch Control panel

Installation Procedure

Installation of main unit

1. The GS-LSA-001 should be mounted in a 19" rack. It will occupy 3U of rack space. If a 19" rack is not available, the GS-LSA-001 can be placed on a flat surface. If mounted in a rack, ensure that the front of the GS-LSA-001 is securely fastened to the rack.

2. Ensure that the ventilation holes on the top and bottom of the unit are not obstructed, and that adequate ventilation space is provided for these vents.

3. Ensure that a suitable power supply is used to power the unit.

4. If more than one GS-LSA-001 is to be used (in a master/slave relationship), use an RJ45 (CAT-5) cable to connect the EXPANSION OUT of the master unit to the EXPANSION IN of the slave unit. Label this cable appropriately. The following steps regarding XLR inputs/outputs will then only apply to the master unit.

5. Use two 3-pin XLR cables to connect the customer's choice of audio source to the RADIO IN (L) and RADIO IN (R) on the back of the GS-LSA-001. Label the cables appropriately.

6. The customer's requirements will dictate if the remaining XLR inputs (MIC, SPARE 1 and SPARE2), the RADIO OUT and the DC LOOPS should be used. If these sockets are used, label the cables appropriately.

7. Connect RJ45 (CAT-5) cables to the numbered speaker OUTPUTS. These cables should be appropriately routed to the speakers. When labelling each cable it is important to write the number of the output socket that each one connects to, as the cables must not become rearranged once the unit is configured.

8. Connect an RJ45 (CAT-5) cable to the EXPANSION IN socket. This cable should be appropriately routed to the Branch Control panel. Label the cable appropriately.

Installation of speakers

1. Refer to the individual loudspeaker manuals for information on mounting each speaker, and mount them accordingly.

2. If the speaker is of a type that requires a separate wall box, this should be mounted in an appropriate place near the speaker. The speaker wires should then be screwed into the screw terminals inside the wall box, observing polarity.

3. The RJ45 (CAT-5) cable associated with the speaker should be connected to either of the two connectors on the back of the speaker or wall box. Refer to Figure 1.

4. If the customer requires an additional speaker to be connected in parallel with the first, then the following procedure will be adopted.-

   - All speaker locations will have double outlets.

   - The first speaker will always use the first outlet ie 17/18 outlet 17 (IN) will be used.

   - Where connectivity to a second speaker is required then 18 (OUT) will be used to return to the NAC cabinet.

   - At the NAC cabinet a fly lead will be used to patch to the second speaker.

   - Therefore be aware that 2 fly leads will be required at the first speaker and a patch cable required at the NAC cabinet.

5. When doing this, the following points should be noted:

   - **<u>Never</u> connect more than one additional speaker per output channel**

   - The first and additional speakers should be of the same type

   - The volume of the additional speaker cannot be adjusted independently

   - The remote control cannot be used to adjust the volume of the output channel when pointed at the additional speaker

6. In the event that a locally powered speaker requires connection to the amplifier, then the speaker cable should be terminated on a 3Pin XLR socket to RCA phono socket and connected to the amplifier via the RADIO OUT connection.

Installation of branch control

1. The branch control panel should be mounted in an appropriate place as agreed with the site contact. It should be at a height and position that is easily accessible and clearly viewed. Ideally it should be adjacent to an existing structured cable RJ45 outlet.

2. The RJ45 (CAT-5) cable associated with the branch control should be fed through the back of the branch control enclosure and connected into the PCB mounted connector.

Connecting to the branch network

This method can only be used to configure the GS-LSA-001 if the installation engineer has permission to connect a laptop computer to the branch network. Additionally, the branch network must have a DHCP server, or the GS-LSA-001 must already be configured to a static IP address.

The GS-LSA-001 can be connected to the network by connecting the ETHERNET port to an appropriate TCP/IP network router. A laptop can then be connected to the branch network, and used to configure the unit.

Connecting directly to the GS-LSA-001

If the installation engineer does not have permission to connect a laptop computer to the branch network, a crossover cable can be used to connect the ETHERNET port directly to the laptop computer. If this method is used, the laptop must be configured to use a static IP address (Control Panel > Network Connections > Properties > TCP/IP Properties).

Alternatively, a separate TCP/IP network router with integral DHCP server could be used. This may be more convenient, as more than one unit can be connected at a time. Both the laptop computer and the ETHERNET port of the GS-LSA-001 would be connected to this router, which would remain separate from the branch network. If this method is used, the laptop would not need to be configured to use a static IP address.

Configuration of IP address

If there is a need to change the IP address of the GS-LSA-001, the following should be followed:

1. If the GS-LSA-001 is not already powered up then power it up now. The ETHERNET port will become active approximately 30 seconds after power-up.

2. Run the HSBC Seattle 7 Manager software and click on 'Configure IP'. The GS Device Discovery software will now start.

3. If a crossover cable is being used to connect to the GS-LSA-001, only one device will appear in the list. This device will be identified as GS-LSA-001-A.

   Alternatively if the GS-LSA-001 is being configured via the branch network, many devices may appear in the list. The correct device can be identified using the 'Name' field, which by default contains the text "Seattle7-" followed by the serial number which can be found on the back panel of the main unit. Note that the text in the 'Name' field may have been altered.

Figure 4: A GS-LSA-001 device is detected by the GS Device Discovery software

4. Select this device and click 'Configure network settings'. In the dialog box that appears, select 'Manually configure network settings' and enter the desired IP settings. When done, click 'Save'. GS Device Discovery will now prompt you to restart the device.
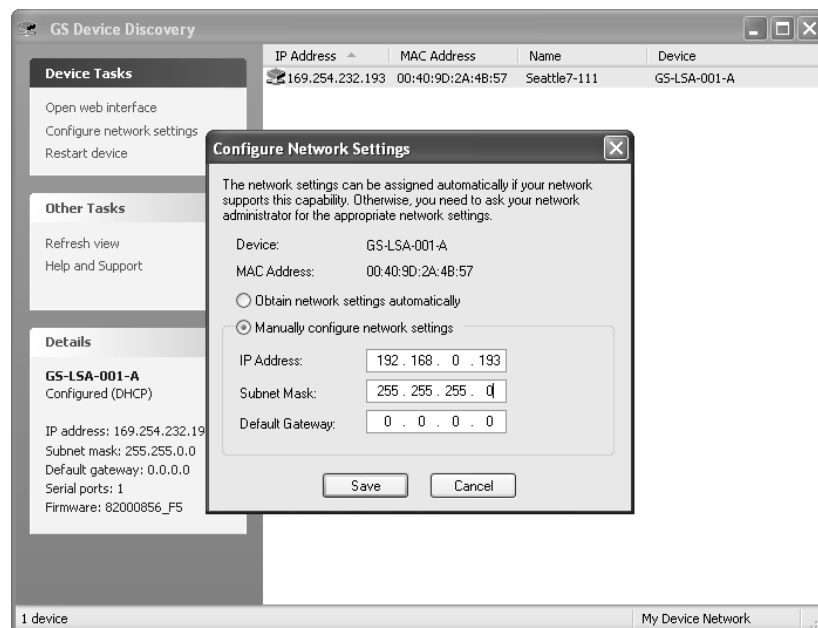

Figure 5: Configuring the network settings using GS Device Discovery

5. When the network module in the GS-LSA-001 has rebooted, confirm that the IP settings are as required.

6. If a crossover cable has been used to configure the IP address, the ETHERNET port can now be connected to an appropriate TCP/IP network router.

Calibration of speakers

It is important to ensure that each speaker produces an appropriate volume for its location. To do this, follow the procedure below.

1. Plug the supplied key (9-way D plug) into the DC Loops socket on the back of the master amplifier. The GS-LSA-001 master amplifier, and any other slave amplifiers will now be in CALIBRATE mode. While in this mode, the speakers will emit two beeps every eight seconds.

2. Ensure that the audio source connected to the Radio input is operating normally.

3. Use the remote control to adjust the volume of each speaker such that they all produce an appropriate volume for their location. The volume level of the beeps should be ignored.

4. Remove the key from from the DC Loops socket. The unit will now reboot.

Remote controls

The GS-LSA-001 remote controls are supplied with two 1.5V AA batteries. These batteries should be inserted, and the remote controls tested as part of the installation procedure.

Specification

Power

SUPPLY: 230 – 250V a.c. 50 Hz

POWER CONSUMPTION:

Inputs

AUDIO INTERFACE LEVELS (0 dBFS):

	RADIO:	+18dBu
	SPARE 1:	+18dBu
	SPARE 2:	+18dBu
	MIC:	

Outputs
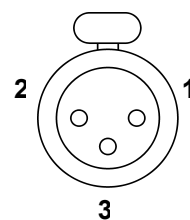
POWER PER CHANNEL:

IMPEDANCE: 32R
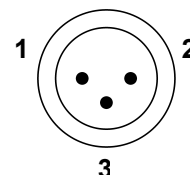
DYNAMIC RANGE:

DISTORTION (1KHZ):

Connector Pin-outs

XLR Inputs (RADIO IN, MIC, SPARE 1, SPARE 2)
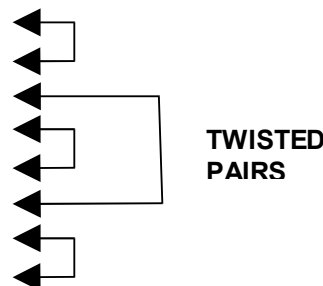Pin 1   Ground
Pin 2   In Phase
Pin 3   Mate

XLR Output (RADIO OUT)
Pin 1   Ground
Pin 2   In Phase
Pin 3   Mate

RJ45 (CAT-5) Speaker Outputs
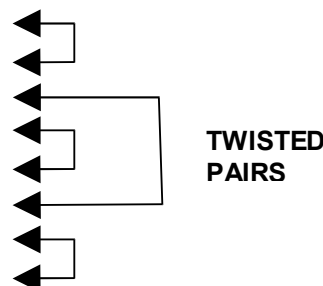Pin 1   Infra-Red data PHASE
Pin 2   Infra-Red data MATE
Pin 3   + V
Pin 4   Audio OUT
Pin 5   Audio OUT
Pin 6   + V
Pin 7   Audio RETURN
Pin 8   Audio RETURN

TWISTED PAIRS

RJ45 (CAT-5) EXPANSION OUT
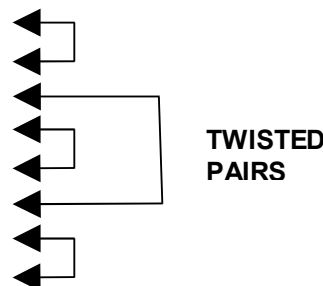Pin 1   Branch Control PHASE
Pin 2   Branch Control MATE
Pin 3   + V
Pin 4   AES3 OUT PHASE
Pin 5   AES3 OUT MATE
Pin 6   + V
Pin 7   GND
Pin 8   GND

TWISTED PAIRS

RJ45 (CAT-5) EXPANSION IN
Pin 1   Branch Control PHASE
Pin 2   Branch Control MATE
Pin 3   +V
Pin 4   AES3 IN PHASE
Pin 5   AES3 IN MATE
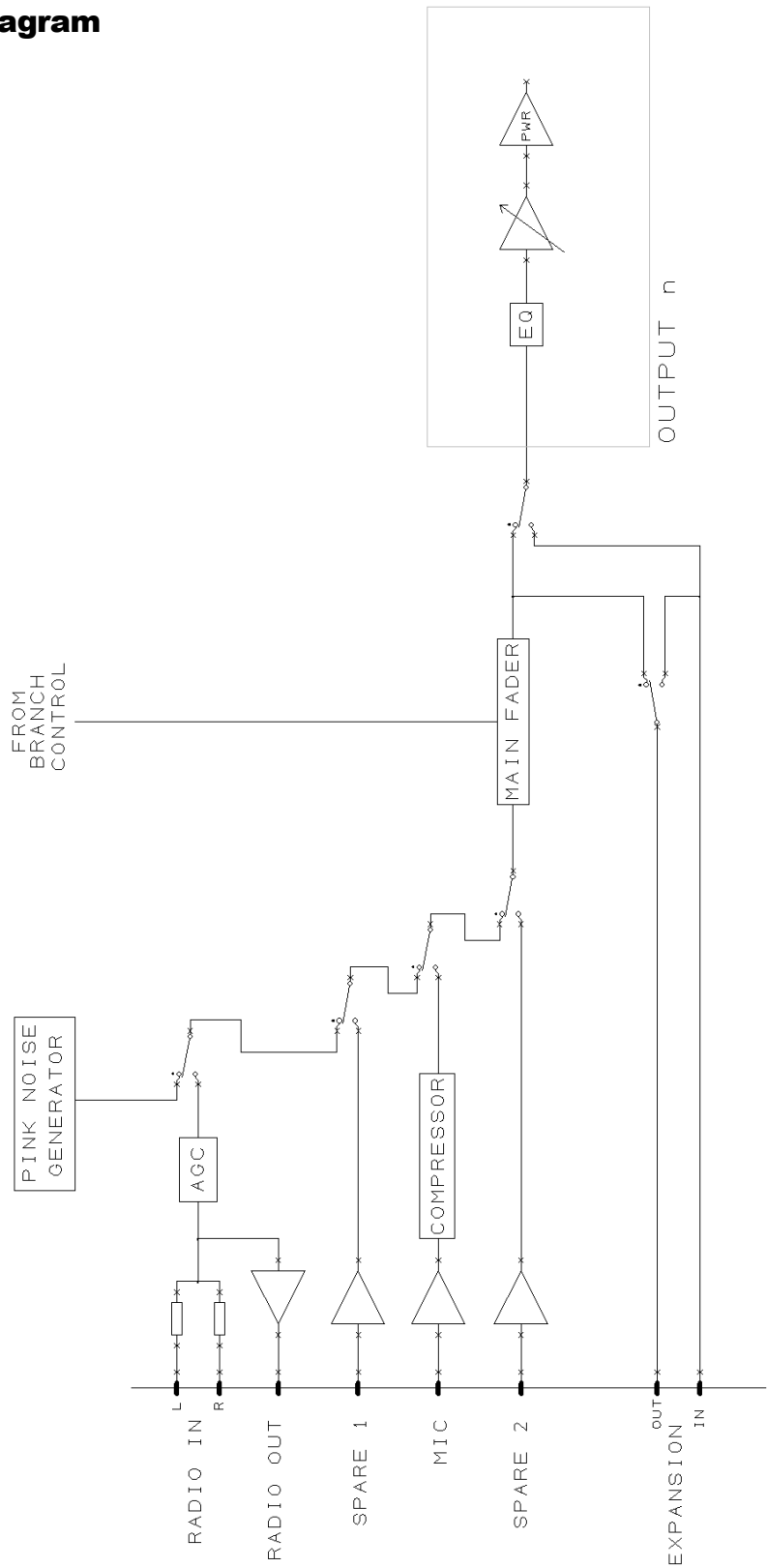Pin 6   +V
Pin 7   GND
Pin 8   GND

TWISTED PAIRS

9 Pin D Type DC LOOPS
Pin 1 – 2   GND
Pin 3   DC Loop 1 – Calibrate
Pin 4   GND
Pin 5   Opto-isolated output
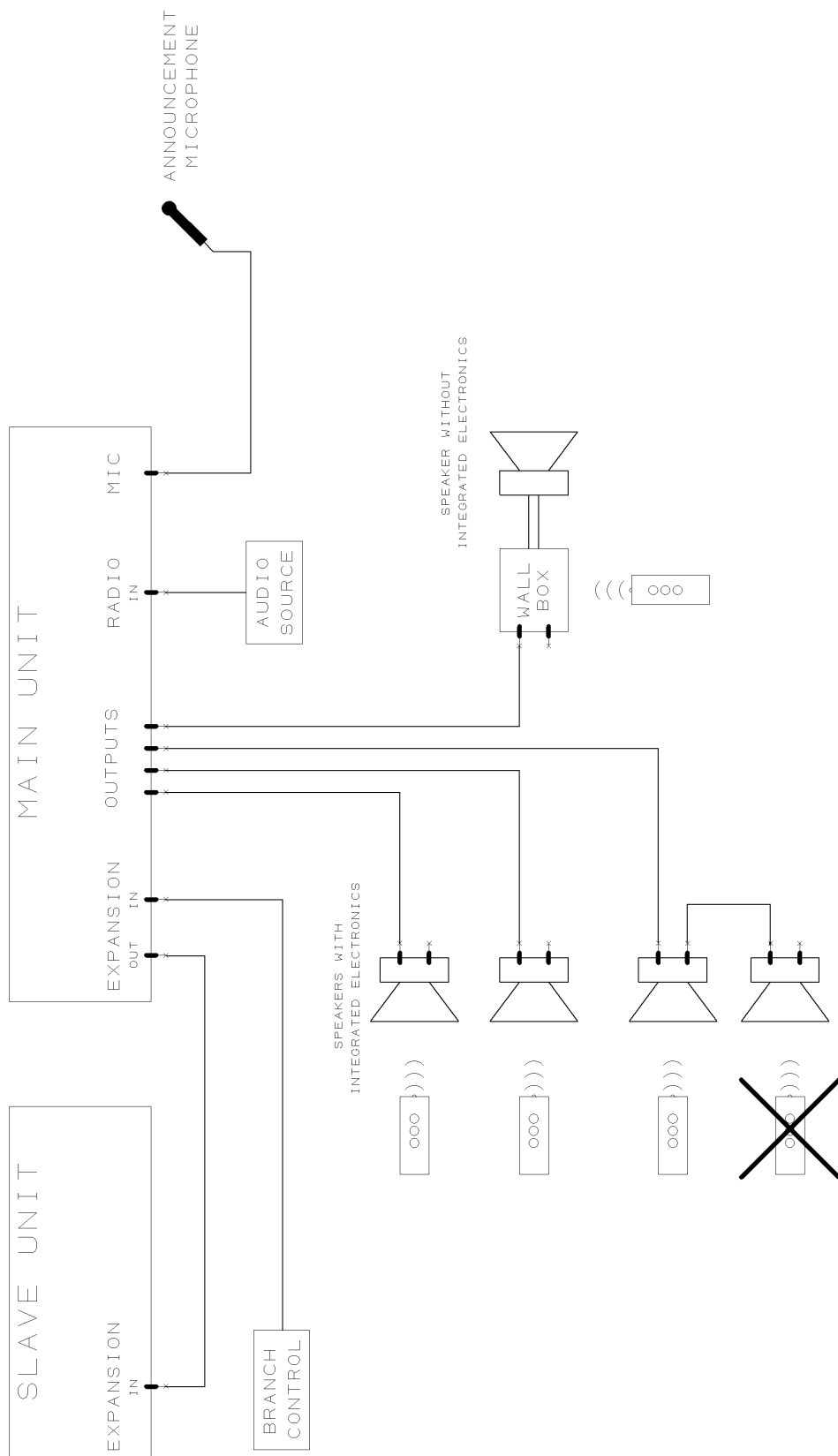Pin 6   DC Loop 0 – Mute
Pin 7 – 9   GND

Diagrams

Block Diagram

Typical Connection Diagram

ANNOUNCEMENT MICROPHONE

MAIN UNIT

RADIO MIC

AUDIO SOURCE

OUTPUTS

EXPANSION IN
OUT

SLAVE UNIT

EXPANSION IN

BRANCH CONTROL

SPEAKER WITHOUT INTEGRATED ELECTRONICS

WALL BOX

SPEAKERS WITH INTEGRATED ELECTRONICS

GLENSOUND ELECTRONICS LTD.

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SUBJECT
HSBC Typical Connection Diagram

DRG.REF.
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