



HANDBOOK

## Redbox User Handbook No 5

- RB-HD1** Stereo Headphone Amplifier With VCA Volume Control
- RB-HD2** Dual Headphone Amplifier
- RB-HD6** 6 Way Stereo Headphone Distribution Amplifier
- RB-DHD6** Digital 6 Way Headphone Distribution Amplifier
- RB-MA1** Single Microphone Amplifier
- RB-MA2** Dual Microphone Amplifiers
- RB-MA2G** Dual Microphone Amplifier with Gain
- RB-DMA2** Dual Digital Microphone Amplifier
- RB-ML2** Stereo Microphone & Line Level Limiter
- RB-SL2** Twin Mono, Or Stereo, Limiter
- RB-SM1** Single Stereo To Mono Converter
- RB-SM2** Dual Stereo To Mono Converter
- RB-LC3** 3 Way Light/Power Controller



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# SONIFEX

## Register Online for an Extended 2 Year Warranty

As standard, Sonifex products are supplied with a 1 year back to base warranty.

If you register the product online, you can increase your product warranty to 2 years and we can also keep you informed of any product design improvements or modifications.

Product: \_\_\_\_\_

Serial No: \_\_\_\_\_

To register your product, please go online to [www.sonifex.co.uk/register](http://www.sonifex.co.uk/register)

## Product Warranty - 2 Year Extended

As standard, Sonifex products are supplied with a 1 year back to base warranty. In order to register the date of purchase and so that we can keep you informed of any product design improvements or modifications, it is important to complete the warranty registration online. Additionally, if you register the product on the Sonifex website, you can increase your product warranty to 2 years. Go to the Sonifex website at: <http://www.sonifex.co.uk/technical/register/index.asp> to apply for your 2 year warranty.

### Sonifex Warranty & Liability Terms & Conditions

#### 1. Definitions

‘the Company’ means Sonifex Ltd and where relevant includes companies within the same group of companies as Sonifex Limited.

‘the Goods’ means the goods or any part thereof supplied by the Company and where relevant includes: work carried out by the Company on items supplied by the Purchaser; services supplied by the Company; and software supplied by the Company.

‘the Purchaser’ means the person or organisation who buys or has agreed to buy the Goods.

‘the Price’ means the Price of the Goods and any other charges incurred by the Company in the supply of the Goods.

‘the Warranty Term’ is the length of the product warranty which is usually 12 months from the date of despatch; except when the product has been registered at the Sonifex website when the Warranty Term is 24 months from the date of despatch.

‘the Contract’ means the quotation, these Conditions of Sale and any other document incorporated in a contract between the Company and the

Purchaser.

This is the entire Contract between the parties relating to the subject matter hereof and may not be changed or terminated except in writing in accordance with the provisions of this Contract. A reference to the consent, acknowledgement, authority or agreement of the Company means in writing and only by a director of the Company.

#### 2. Warranty

- a. The Company agrees to repair or (at its discretion) replace Goods which are found to be defective (fair wear and tear excepted) and which are returned to the Company within the Warranty Term provided that each of the following are satisfied:
  - i. notification of any defect is given to the Company immediately upon its becoming apparent to the Purchaser;
  - ii. the Goods have only been operated under normal operating conditions and have only been subject to normal use (and in particular the Goods must have been correctly connected and must not have been subject to high voltage or to ionising radiation and must not have been used contrary to the Company’s technical recommendations);
  - iii. the Goods are returned to the Company’s premises at the Purchaser’s expense;
  - iv. any Goods or parts of Goods replaced shall become the property of the Company;
  - v. no work whatsoever (other than normal and proper maintenance) has been carried out to the Goods or any part of the Goods without the Company’s prior written consent;

- vi. the defect has not arisen from a design made, furnished or specified by the Purchaser;
  - vii. the Goods have been assembled or incorporated into other goods only in accordance with any instructions issued by the Company;
  - viii. the defect has not arisen from a design modified by the Purchaser;
  - ix. the defect has not arisen from an item manufactured by a person other than the Company. In respect of any item manufactured by a person other than the Company, the Purchaser shall only be entitled to the benefit of any warranty or guarantee provided by such manufacturer to the Company.
- b. In respect of computer software supplied by the Company the Company does not warrant that the use of the software will be uninterrupted or error free.
- c. The Company accepts liability:
- (i) for death or personal injury to the extent that it results from the negligence of the Company, its employees (whilst in the course of their employment) or its agents (in the course of the agency);
  - (ii) for any breach by the Company of any statutory undertaking as to title, quiet possession and freedom from encumbrance.
- d. Subject to conditions (a) and (c) from the time of despatch of the Goods from the Company's premises the Purchaser shall be responsible for any defect in the Goods or loss, damage, nuisance or interference whatsoever consequential economic or otherwise or wastage of material resulting from or caused by or to the Goods. In particular the Company shall not be liable for any loss of profits or other economic losses. The Company accordingly excludes all liability for the same.
- e. At the request and expense of the Purchaser the Company will test the Goods to ascertain performance levels and provide a report of the results of that test. The report will be accurate at the time of the test, to the best of the belief and knowledge of the Company, and the Company accepts no liability in respect of its accuracy beyond that set out in Condition (a).
- f. Subject to Condition (e) no representation, condition, warranty or other term, express or implied (by statute or otherwise) is given by the Company that the Goods are of any particular quality or standard or will enable the Purchaser to attain any particular performance or result, or will be suitable for any particular purpose or use under specific conditions or will provide any particular capacity, notwithstanding that the requirement for such performance, result or capacity or that such particular purpose or conditions may have been known (or ought to have been known) to the Company, its employees or agents.
- g. (i) To the extent that the Company is held legally liable to the Purchaser for any single breach of contract, tort, representation or other act or default, the Company's liability for the same shall not exceed the price of the Goods.
- (ii) The restriction of liability in Condition (g)(i) shall not apply to any liability accepted by the Seller in Condition (c).
- h. Where the Goods are sold under a consumer transaction (as defined by the Consumer Transactions (Restrictions on Statements) Order 1976) the statutory rights of the Purchaser are not affected by these Conditions of Sale.

## Unpacking Your Product

Each product is shipped in protective packaging and should be inspected for damage before use. If there is any transit damage take pictures of the product packaging and notify the carrier immediately with all the relevant

details of the shipment. Packing materials should be kept for inspection and also for if the product needs to be returned.

The product is shipped with the following equipment so please check to ensure that you have all of the items below. If anything is missing, please contact the supplier of your equipment immediately.

Item	Quantity
Product unit	1
IEC mains lead fitted with moulded mains plug	1
Handbook and warranty card	1

If you require a different power lead, please let us know when ordering the product.

## Repairs & Returns

Please contact Sonifex or your supplier if you have any problems with your Sonifex product. Email [technical.support@sonifex.co.uk](mailto:technical.support@sonifex.co.uk) for the repair/upgrade/returns procedure, or for support & questions regarding the product operation.

## CE Conformity

The products in this manual comply with the essential requirements of the relevant European health, safety and environmental protection legislation.

The technical justification file for this product is available at Sonifex Ltd.

The declaration of conformity can be found at:  
<http://www.sonifex.co.uk/declarations>

## Safety & Installation of Mains Operated Equipment

There are no user serviceable parts inside the equipment. If you should ever need to look inside the unit, always disconnect the mains supply before removing the equipment covers. The cover is connected to earth by means of the fixing screws. It is essential to maintain this earth/ground connection to ensure a safe operating environment and provide electromagnetic shielding.

### Voltage Setting Checks

Ensure that the machine operating voltage is correct for your mains power supply by checking the box in which your product was supplied. The voltage is shown on the box label. The available voltage settings are 115V, or 230V. Please note that all products are either switchable between 115V and 230V, or have a universal power supply.

### Fuse Rating

The product is supplied with a single fuse in the live conducting path of the mains power input. For reasons of safety it is important that the correct rating and type of fuse is used. Incorrectly rated fuses could present a possible fire hazard, under equipment fault conditions. The active fuse is fitted on the outside rear panel of the unit.





### Power Cable & Connection

An IEC power connector is supplied with the product which has a moulded plug attached.

The mains plug or IEC power connector is used as the disconnect device. The mains plug and IEC power connector shall remain readily operable to disconnect the apparatus in case of a fault or emergency.

The mains lead is automatically configured for the country that the product is being sent to, from one of:



Territory	Voltage	IEC Lead Type	Image
UK & Middle East	230V	UK 3 pin to IEC lead	
Europe	230V	European Schuko round 2 pin to IEC lead	
USA, Canada and South America	115V	3 flat pin to IEC lead	
Australia & New Zealand	230V	Australasian 3 flat pin to IEC lead	

Connect the equipment in accordance with the connection details and before applying power to the unit, check that the machine has the correct operating voltage for your mains power supply.

This apparatus is of a class I construction. It must be connected to a mains socket outlet with a protective earthing connection.

**Important note:** If there is an earth/ground terminal on the rear panel of the product then it must be connected to Earth.



Fig A: RB-RK1 Small Redbox Front Rack-mount Kit .

## WEEE Directive



The Waste Electrical and Electronic Equipment (WEEE) Directive was agreed on 13 February 2003, along with the related Directive 2002/95/EC on Restrictions of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS). The Waste Electrical and Electronic Equipment Directive (WEEE) aims to minimise the impacts of electrical and electronic equipment on the environment during their life times and when they become waste. All products manufactured by Sonifex Ltd have the WEEE directive label placed on the case. Sonifex Ltd will be happy to give you information about local organisations that can reprocess the product when it reaches its “end of use”, or alternatively all products that have reached “end of use” can be returned to Sonifex and will be reprocessed correctly free of charge.

## Atmosphere/Environment

This apparatus should be installed in an area that is not subject to excessive temperature variation (<0°C, >50°C), moisture, dust or vibration.

This apparatus shall not be exposed to dripping or splashing, and no objects filled with water, such as vases shall be placed on the apparatus.

## Fitting Redboxes

Redboxes can be fixed to the underside of a desk, or other surfaces using 4.2mm holes in the sides and fixed with 2 x M4 screws or 2 x No. 6 countersink wood screws.

They can also be rack-mounted, with either the front, or rear of the Redbox positioned at the front of the rack (Note: this product is front rack-mounted as standard):

**Front Mounting Redboxes:** For rack mounting smaller (28cm) units the optional **RB-RK1** (Red) or **RB-RK1B** (Black) kit can be used (which include 4 off M6 panel fixing screws).

**Rear Mounting a Redbox:** For rear panel mounting you can use either the **RB-RK2** (in this case), or **RB-RK3**, depending on the size of your Redbox.

**RK2**

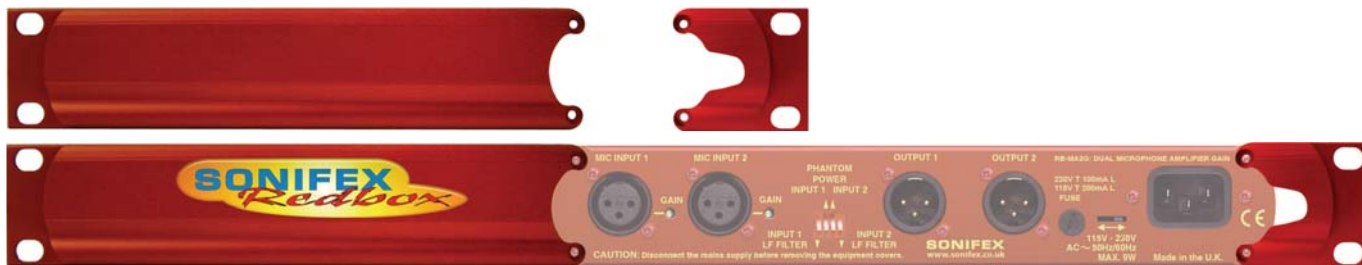


Fig B: RB-RK2 Small Redbox Rear Rack-mount Kit.

**RK3**



Fig C: RB-RK3 Large Redbox Rear Rack-mount Kit.

# 1 RB-HD1 Stereo Headphone Amplifier With VCA Volume Control

## Introduction



Fig 1-1: RB-HD1 Front Panel

The RB-HD1 is a 1U rack-mount stereo headphone amplifier for driving up to two pairs of professional stereo headphones from a single stereo or mono input. One headphone socket is on the front panel with one on the rear.

The main stereo input uses electronically balanced XLR-3 connectors on the rear panel, which can be wired un-balanced. The output volume for the headphones can be controlled either by a pot situated on the front panel or a VCA signal supplied externally via the remote connector.

A mono input can be mixed into the main headphone feed, for example, for mixing in talkback to the headphones. This has an input level control via a recessed adjustable potentiometer. The mono mix input can also be controlled remotely.

A stereo/mono switch is recessed on the rear panel to prevent accidental knocking. With mono selected, audio is sent to both left and right ear pieces. A LED power indicator on the front panel displays the power supply connection.

## System Block Diagrams

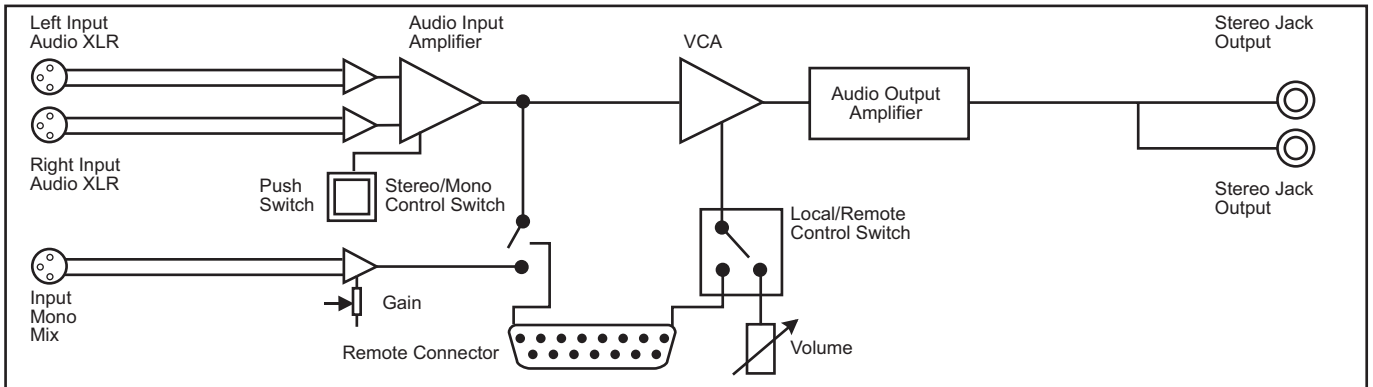


Fig 1-2: RB-HD1 System Block Diagram

## Front Panel Connections and Controls



Fig 1-3: RB-HD1 Front Panel Controls

### Stereo Outputs 1-2 (Mono Outputs1-2)

The outputs available on the front and rear panel through ¼” stereo jack sockets are push-pull, designed to drive 150 mW into 32Ω to 600Ω professional headphones. Each output is individually buffered.

### Volume Level Control

The volume level control sets the output level of the two stereo headphone sockets. The two headphone outputs have a maximum output of +11dBu.

## Rear Panel Connections and Operation



Fig 1-4: RB-HD1 Rear Panel

### Main Stereo Inputs (Left and Right)

The XLR-3 input connectors can take balanced professional levels, or unbalanced by using the volume control to increase the input level, and by connecting the non-phase to the signal ground. The input can be configured as either a stereo input with two stereo outputs or a mono input with two mono paired outputs. The XLR 3 pin input has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Stereo Input Gain Adjustment

There are two preset controls on the rear panel that adjust the level of the master input signal to the outputs from -12dB to +20dB gain.

### Stereo/Mono Operation

The mode of operation may be switched between a stereo distributed channel to 2 stereo channels, or a mono channel to two mono paired outputs (i.e. the same signal to both ear pieces) by using the push button, mounted on the rear panel to prevent accidental switching.

### Mono Mix Input

The XLR-3 input connector can take balanced professional levels, or unbalanced by connecting the non-phase to the signal ground. This input is used for mixing with the main stereo input, which is controlled by the MIX\_EN pin (pin 8 on the remote connector) on the remote connector. While this signal is shorted to the ground pin (pin 9 on the remote connector) mixing is enabled and is only disabled once the signal from MIX\_EN to pin 9 is open on the remote connector. The XLR 3 pin input has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Mono Mix Input Gain Adjustment

A rotary pre-set potentiometer can be used to adjust the gain of the mono mix input by 22dBu.

### Local/Remote Control Operation

The level to the two outputs can be controlled in one of two ways, either locally, by the pot situated on the front panel or remotely, by a VCA signal supplied externally to the remote connector.

### Remote Connector

The remote connector is a 9-pin D-type socket, which is situated on the rear panel. It has connections as shown below.

Pin No.	Signal	I/O	Description
Pin 1	Pot wiper	I	Volume control signal
Pin 2	Pot top	O	+5V
Pin 3	N/C	-	No connection
Pin 4	N/C	-	No connection
Pin 5	N/C	-	No connection
Pin 6	Pot bottom	-	Ground
Pin 7	N/C	-	No connection
Pin 8	MIX_EN	I	Make to pin 9
Pin 9	0V	-	Ground

Fig 1-5: RB-HD1 Remote Connector

## Technical Specifications RB-HD1

### Audio Specifications RB-HD1 & RB-HD2:

Maximum Input Level:	+28dBu
Input Impedance:	>20kΩ balanced bridging (main)
Input Gain Range:	-12dB to +20dB (pre-set pots) (RB-HD2)
Output Level:	Drives 150 mW into 32Ω to 600Ω headphones
Volume Control:	-80dB to +11dB gain
Mono Mix Input Gain Range:	22dBu (RB-HD1)

### Connections

Main Stereo Input:	2 x XLR 3 pin female (Balanced, can be wired unbalanced)
Mono Mix Input:	1 x XLR 3 pin female (Balanced, can be wired unbalanced)
Outputs:	2 x ¼" (6.35mm) A/B gauge 3-pole stereo jack sockets
Remote Control:	9-pin D-type socket
Mains Input:	Filtered IEC, 110V-120V, or 220-240V switchable, fused, 9W maximum
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-HD1:  Stereo headphone amplifier

### Physical Specifications

Dimensions (Raw):	48cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 19" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	53cm (W) x 20.5cm (D) x 6cm 21" (W) x 8" (D) x 2.4"
Weight:	Nett: 1.35kg    Gross: 2.0kg Nett: 3lbs      Gross: 4.4lbs

## 2 RB-HD2 Dual Headphone Amplifier

### Introduction



Fig 2-1: RB-HD2 Front Panel

The RB-HD2 is a high performance 2-way stereo headphone distribution amplifier for driving up to 2 pairs of professional stereo headphones from a single stereo or mono input. A switch on the rear panel enables the distribution of a mono signal to all four outputs (i.e. both earpieces of a pair of stereo headphones) via the left channel input. The stereo/mono switch is located on the rear panel to prevent accidental knocking.

### System Block Diagrams

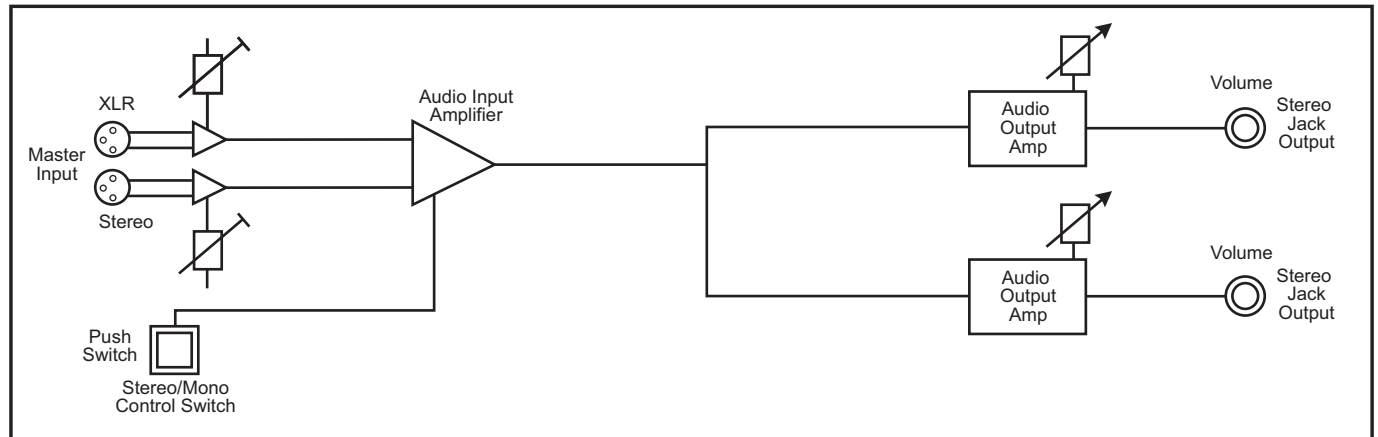


Fig 2-2: RB-HD2 System Block Diagram

The XLR-3 inputs are electronically balanced and can be wired unbalanced. There are two pre-set controls on the rear panel that adjust the level of the master input signal to the outputs.

Each output is on a  $\frac{1}{4}$ " stereo jack socket and is designed to drive 150mW into 32 ohm to 600 ohm stereo headphones. The outputs are individually buffered with their own front panel volume control. A LED power indicator on the front panel displays the power supply connection.

### Front Panel Connections and Controls

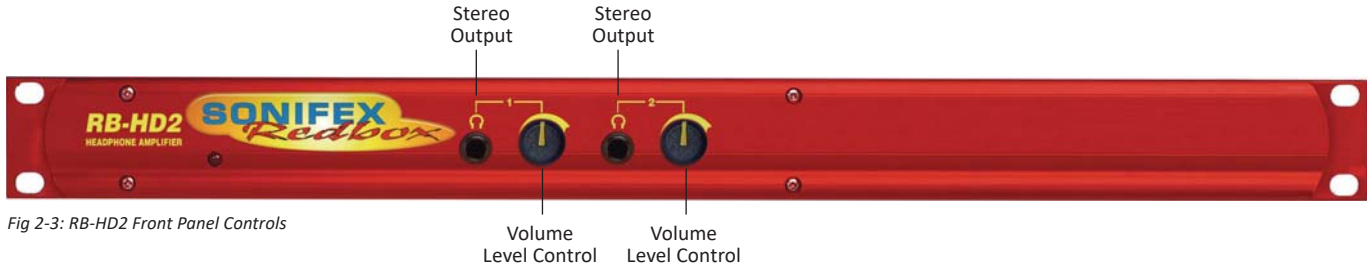


Fig 2-3: RB-HD2 Front Panel Controls

### Stereo Outputs 1-2 (Mono Outputs 1-2)

The outputs available on the front panel through ¼” stereo jack sockets are push-pull, designed to drive 150 mW into 32Ω to 600Ω professional headphones. Each output is individually buffered.

### Channel Volume Controls

Each channel has its own volume control so that you have control of the signal volume to an individual output from the master input.

### Rear Panel Connections and Operation

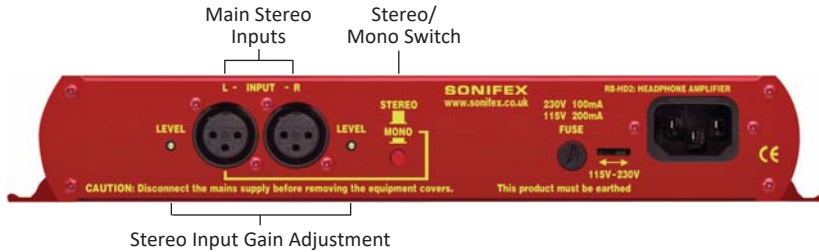


Fig 2-4: RB-HD2 Rear Panel



### Main Stereo Inputs (Left and Right)

The XLR-3 input connectors can take balanced professional levels, or unbalanced by using the volume control to increase the input level, and by connecting the non-phase to the signal ground. The input can be configured as either a stereo input with two stereo outputs or a mono input with two mono paired outputs. The XLR 3 pin input has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Stereo/Mono Operation

The mode of operation may be switched between a stereo distributed channel to 2 stereo channels, or a mono channel to two mono paired outputs (i.e. the same signal to both ear pieces) by using the push button, mounted on the rear panel to prevent accidental switching.

## Technical Specifications RB-HD2

### Audio Specifications RB-HD2:

Maximum Input Level: +28dBu

Input Impedance: >20kΩ balanced bridging (main)

Input Gain Range: -12dB to +20dB (pre-set pots) (RB-HD2)

Output Level: Drives 150 mW into 32Ω to 600Ω headphones

Volume Control: -80dB to +11dB gain

Mono Mix Input Gain Range: 22dBu (RB-HD1)

### Connections


Main Stereo Input 2 x XLR 3 pin female (Balanced, can be wired unbalanced)

Outputs: 2 x ¼" (6.35mm) A/B gauge 3-pole stereo jack sockets

Mains Input: Filtered IEC, 110V-120V, or 220-240V, fused, switchable, 9W maximum

Fuse Rating: Anti-surge fuse 100mA 20 x 5mm (230VAC)  
Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-HD2:  Dual stereo headphone amplifier

### Physical Specifications

Dimensions (Raw): 48cm (W) x 10.8cm (D) x 4.2cm (H) (1U)  
19" (W) x 4.3" (D) x 1.7" (H) (1U)

Dimensions (Boxed): 53cm (W) x 20.5cm (D) x 6cm  
21" (W) x 8" (D) x 2.4"

Weight: Nett: 1.35kg Gross: 2.0kg  
Nett: 3lbs Gross: 4.4lbs

## 3 RB-HD6 6 Way Stereo Headphone Distribution Amplifier

### Introduction



Fig 3-1: RB-HD6 Front Panel

The RB-HD6 is a high performance 6-way stereo headphone distribution amplifier for driving up to 6 pairs of professional stereo headphones from a single stereo or mono input. A switch on the rear panel enables the distribution of a mono signal to all twelve outputs (i.e. both earpieces of a pair of stereo headphones) via the left channel input.

Alternatively, the RB-HD6 can be used as six separate stereo headphone amplifiers by using the override (insert-point, or break-jack) input associated with each outlet. A typical application might be to provide common headphone feeds for guests around a table in a radio studio, with a separately derived feed, perhaps including talkback, for the presenter. The over-ride inputs can also be configured as parallel outputs (to the front outputs) by altering jumper settings inside the unit.

The XLR-3 inputs are electronically balanced and can be wired unbalanced. There is a master control that adjusts the level of the master signal to all the outputs. This master control can be disabled by the use of internal jumpers. Each output is designed to drive 150 mW into 32 $\Omega$  to 600 $\Omega$  stereo headphones and is individually buffered with its own volume control.

The input level and output volume controls are all potentiometers on the front panel. The stereo/mono switch is recessed on the rear panel to prevent accidental knocking. A LED power indicator on the front panel displays the power supply connection.

## System Block Diagram

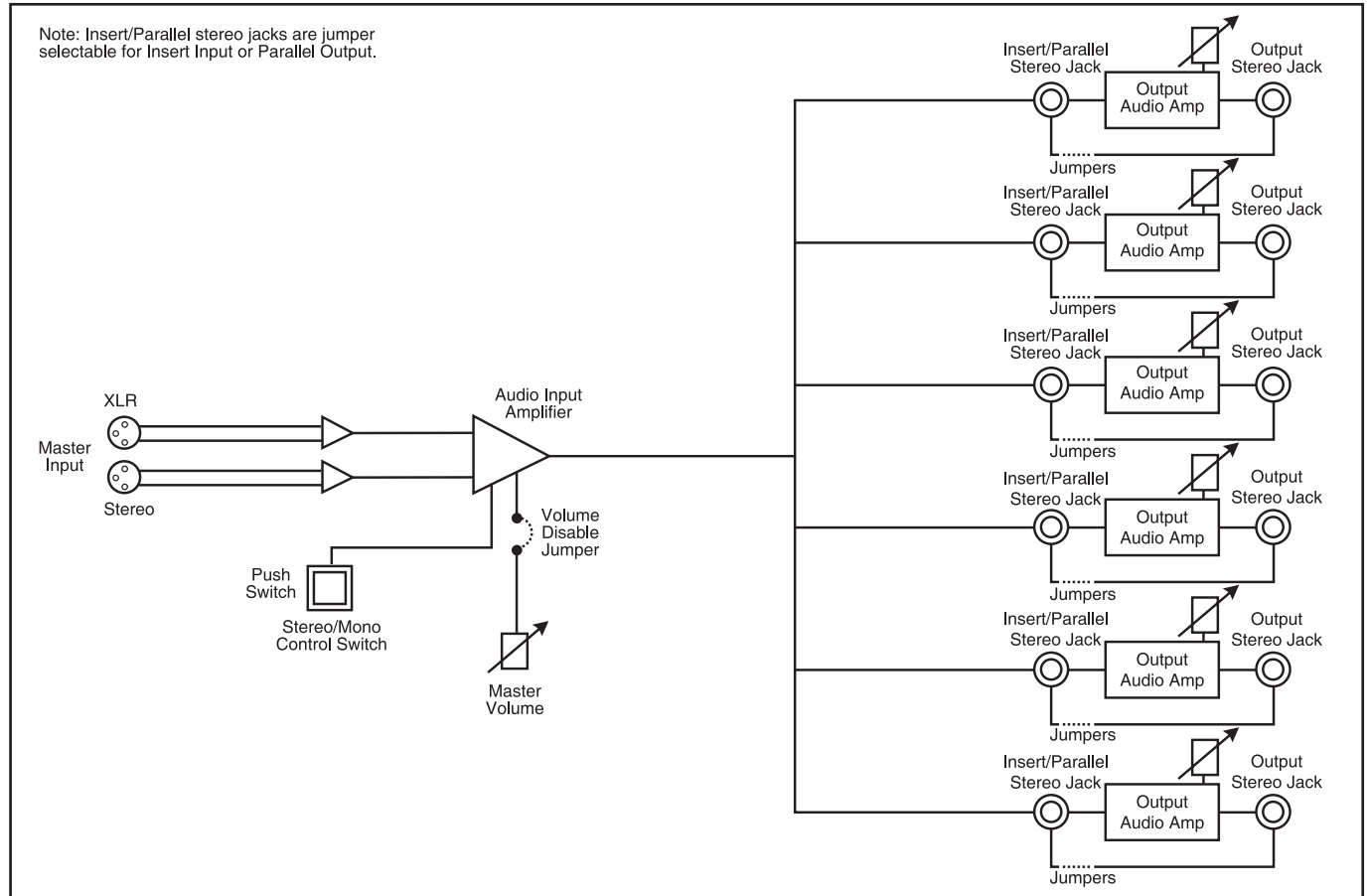


Fig 3-2: RB-HD6 System Block Diagram

## Rear Panel Connections and Operation

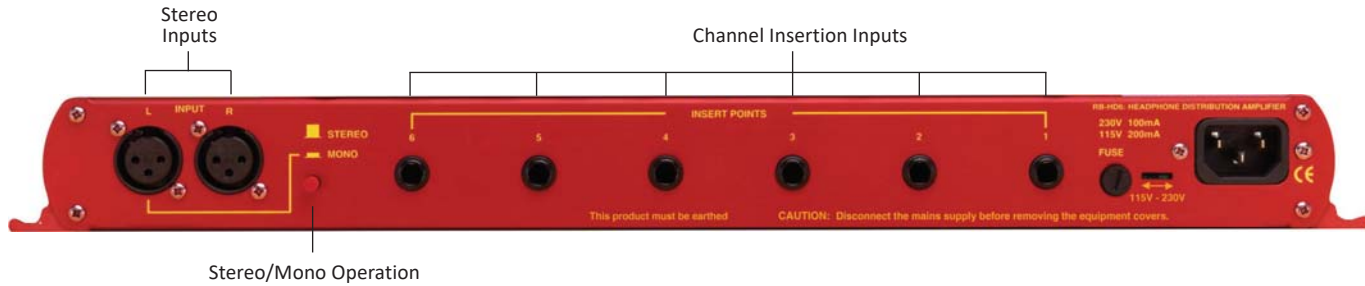


Fig 3-3: RB-HD6 Rear Panel

### Stereo Input (Left and Right)

The XLR-3 input connectors can take balanced professional levels, or unbalanced by using the front panel master control to increase the input level, and by connecting the non-phase to the signal ground. The input can be configured as either a stereo input with six stereo outputs or a mono input with six mono paired outputs. The XLR 3 pin input has the following connections:

- Pin 1: Screen
- Pin 2: Phase
- Pin 3: Non-phase

### Stereo/Mono Operation

The mode of operation may be switched between a stereo distributed channel to 6 stereo channels, or a mono channel to six mono paired outputs (i.e. the same signal to both ear pieces), by the push button on the rear panel which is recessed to prevent accidental switching.

### Channel Insertion Inputs/Parallel Outputs

Each channel has an unbalanced override/insertion input via a 1/4" stereo audio jack socket on the rear panel, which overrides the master input.

Each connector can also be individually configured as a parallel output providing the same signal as the output on the front of the unit. To configure the jack connector as an output, you'll need to alter some jumper settings inside the unit.

### Removing the Equipment Covers

To get inside the RB-HD6, first ensure that it has been disconnected from the mains power and that the mains IEC lead to the unit has been removed. Observing anti-static precautions, undo the four cross-head screws on the back panel at the far left and far right of the panel (2 at each end). Also undo the small brass screws which hold the top and bottom panels to the rear panel. The rear panel should slide backwards out of the unit together with the main circuit board.

### Configuring Insert Inputs/Parallel Outputs

On the main circuit board, you'll see some jumpers (small black rectangles), the position of which will define whether a particular jack socket operates as an input or output. The drawings below show the different jumper settings available. Each input/output can be configured individually, so you could have three jacks set as inputs and three as outputs if needed.

Input/Output		1	2	3	4	5	6
Jumpers to Alter	Left	JP1 & 2	JP5 & 6	JP9 & 10	JP13 & 14	JP17 & 18	JP21 & 22
	Right	JP3 & 4	JP7 & 8	JP11 & 12	JP15 & 16	JP19 & 20	JP23 & 24

Fig 30-4: RB-HD6 Jumper Assignments

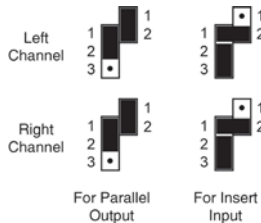


Fig 3-5: RB-HD6 Jumper Positions

Once you've set up the jumpers, slide the circuit board back into the Redbox housing using the slots along the inside edge of the metalwork as a guide. Replace the screws on the top, bottom and rear panels of the RB-HD6.

**Important Note :** The screws provide earthing protection to the chassis and grounding protection for CE approval – it is important that you reinsert all the screws provided.

## Front Panel Connections and Controls

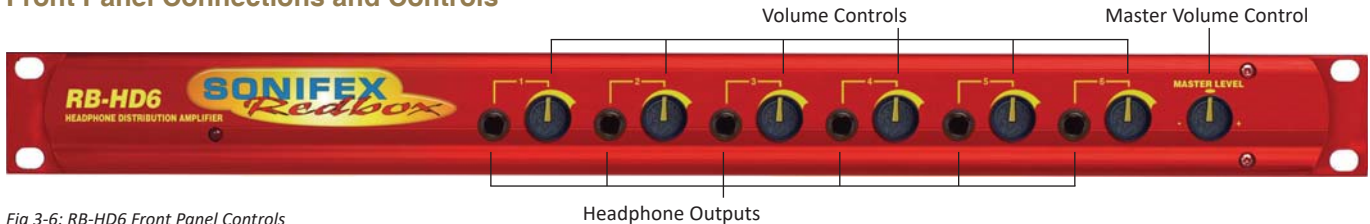


Fig 3-6: RB-HD6 Front Panel Controls

## Stereo Outputs 1-6 (Mono Outputs 1-6)

The outputs available on the front panel through ¼" stereo jack sockets are push-pull, designed to drive 150 mW into 32Ω to 600Ω professional headphones. Each output is individually buffered.

## Master Level Control

The master level control will set the maximum level of all channels and will need to be set high if an unbalanced consumer input level (-10dbu) is used. This level control can be disabled by setting jumpers within the unit. See page 10 for details on removing the equipment covers. The two jumpers JP25 and JP26 can be found near the volume potentiometer VR1 :

Jumper	JP25	JP26
Enable Master Level Control	On	On
Disable Master Level Control	Off	Off

Fig 3-7: RB-HD6 Master Level Control

## Channel Volume Controls

Each channel has its own volume control so that you have control of the signal volume to an individual output whether it is from the master input or the override input.

## Technical Specifications RB-HD6

### Audio Specifications

Input Impedance:	>20k $\Omega$ balanced bridging (main), >10k $\Omega$ unbalanced (insert points)
Maximum Input Level:	+28dBu
Output Level:	Drives 150 mW into 32 $\Omega$ to 600 $\Omega$ headphones
Override Inputs:	+3dBu for full volume at +18dB gain
Individual Volume Control:	-60dB to +18dB gain
Master Volume Control:	$\pm$ 10dB gain

### Connections

Main Stereo Inputs:	2 x XLR 3 pin female (Balanced, can be wired unbalanced)
Insert Inputs & Parallel Outputs:	6 x ¼" (6.35mm) A-gauge 3-pole stereo jack sockets (unbalanced, jumper configured)
Outputs:	6 x ¼" (6.35mm) A-gauge 3-pole stereo jack sockets
Mains Input:	Filtered IEC, 110V-120V, or 220-240V switchable, fused, 9W maximum
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-HD6:	 6 way stereo headphone distribution amplifier
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### Physical Specifications

Dimensions (Raw):	48cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 19" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	53cm (W) x 20.5cm (D) x 6cm (H) 21" (W) x 8" (D) x 2.4" (H)
Weight:	Nett: 1.35kg    Gross: 2.0kg Nett: 3lbs      Gross: 4.4lbs

## 4 RB-DHD6 Digital 6 Way Headphone Distribution Amplifier

### Introduction



Fig 4-1: RB-DHD6 Front Panel

24 BIT  
96 KHz

The RB-DHD6 digital 6 way headphone distribution amplifier is a 1U rack-mount which receives a digital input signal, as either AES/EBU or S/PDIF and converts it to 6 individually buffered, jack-plug, headphone outputs, each with their own volume control.

Useful for connection to digital mixing desks, digital routers and matrices, the RB-DHD6 connects directly to an AES/EBU or S/PDIF output to provide the highest quality audio directly to the headphones. The input connectors consist of a single balanced XLR-3 for the AES/EBU input and a single unbalanced phono connector for the S/PDIF input.

A button located on the rear panel is used to select either the AES/EBU, or S/PDIF, input and de-emphasis on the output can be controlled via dipswitch. If de-emphasis is selected, the RB-DHD6 will decode 50/15 $\mu$ s emphasis when indicated by certain channel status bits in the incoming digital audio data.

When operating, the front panel power LED flashes red and amber whenever the unit is not synchronised to the incoming digital signal.

### System Block Diagram

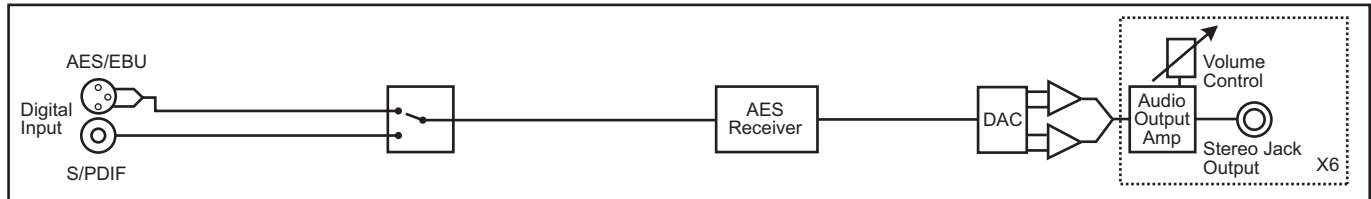


Fig 4-2: RB-DHD6 System Block Diagram

## Front Panel Indicators & Controls

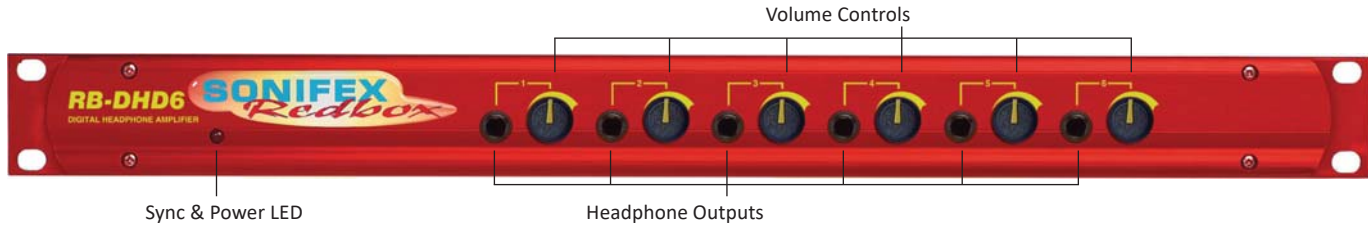


Fig 4-3: RB-DHD6 Front Panel Controls

### Sync & Power Indicator

The LED on the front panel is normally red to indicate that power is present on the unit. However, it also has a secondary role to indicate the status of the digital inputs

Flashing between red and amber – indicates a loss of a valid digital input signal.

### Headphone Outputs

The headphone outputs on the front panel consist of six ¼" stereo jack sockets, designed to drive 150 mW into 32Ω to 600Ω professional headphones.

### Volume Control

The headphone outputs each have their own volume control and have a maximum output level of +12dBu.

## Rear Panel Connections and Operation



Fig 4-4: RB-DHD6 Rear Panel



**AES/EBU Input**

The digital input XLR 3 pin socket has an impedance of 110Ω. It has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

The signals on this connector should meet the IEC 60968 specification

**S/PDIF Input**

The S/PDIF digital phono input has an impedance of 75Ω.

**Status Select Switches**

Status		
1	On	De-emphasis On
1	Off	De-emphasis Off
2		Reserved
3		Reserved
4		Reserved

Fig 4-5: RB-DHD6 Status Select Switches

If de-emphasis is 'on' (switch 1) the RB-DHD6 will decode 50/15μs emphasis when indicated by certain channel status bits in the incoming digital audio data. When 'off', no de-emphasis is applied. The switch is 'on' when it is down.

**Digital Input Select Button**

This button is used to switch the digital input between the AES/EBU XLR connector (button out) and the S/PDIF phono connector (button in).

## Technical Specifications RB-DHD6

### Audio Specification

Input Impedance:	110Ω ± 20% AES/EBU 75Ω ±5% S/PDIF
Sample Freq. Range:	30kHz – 100kHz
Dynamic Range:	>100dB
Headphones:	Drives 150 mW into 32Ω to 600Ω headphones
Max Output Level:	+12dBu
Headphone Gain Range:	-80dBu to +12dBu


### Connections

Digital Inputs:	1 x AES/EBU XLR 3 pin female 1 x S/PDIF RCA phono
Headphone Outputs:	6 x ¼" (6.35mm) A/B gauge 3-pole stereo jack sockets
Mains Input:	Filtered IEC, 110-120V, or 220-240V switchable, fused 10W max
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Operational Controls

Digital Input Select:	AES/EBU or S/PDIF, via push-switch
De-emphasis:	DIP switch

### Equipment Type

RB-DHD6:	 Digital 6 way stereo headphone distribution amplifier
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### Physical Specifications

Dimensions (Raw):	48cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 19" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	53cm (W) x 20.5cm (D) x 6cm (H) 21" (W) x 8" (D) x 2.4" (H)
Weight:	Nett: 1.6kg Gross: 2.2kg Nett: 3.5lbs Gross: 4.8lbs

## 5 RB-MA1 Single Microphone Amplifier

### Introduction



Fig 5-1: RB-MA1 Front Panel

The RB-MA1 consists of an independent low-noise microphone pre-amplifier for converting microphone level signals to line level, or for driving long lines from microphones to mixing equipment.

All connections and controls are on the rear panel. The microphone input is XLR-3 type and is electronically balanced. The input gain can be adjusted individually by a recessed pre-set potentiometer.

The XLR-3 line output is electronically balanced and can be wired unbalanced by grounding the non-phase signal, allowing you to feed both balanced and unbalanced equipment.

For each channel there are independent switches to control a high pass filter (low frequency roll-off at 125Hz) and to provide phantom power at +48V to the connected microphone. An LED power indicator on the front panel displays the power supply connection.

### System Block Diagram

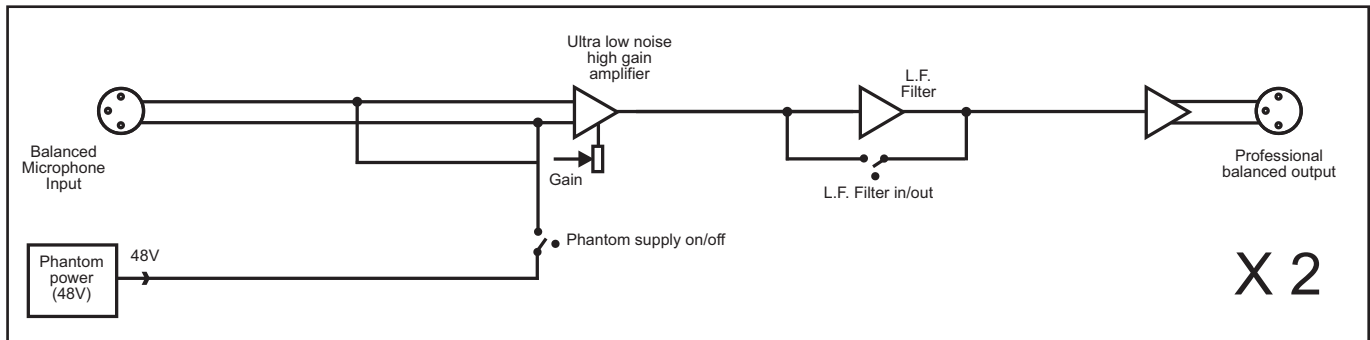


Fig 5-2: RB-MA1 System Block Diagram

## Rear Panel Connections and Operation



Fig 5-3: RB-MA1 Rear Panel

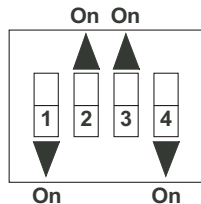
### Mic Inputs

The XLR 3 pin sockets used for the microphone are electronically balanced. They have the following connections:

- Pin 1: Screen
- Pin 2: Phase
- Pin 3: Non-phase

### Input Gain

Recessed pre-set potentiometers allow for adjustment of the gain of the microphone inputs. This provides a gain range of 36dB to 75dB which enables the use of dynamic and powered microphones. Connect the mic input and adjust the gain until the line output is at the level that you need.



- 1 Channel 1 Low Frequency (LF) Filter
- 2 Channel 1 Phantom Power
- 3 Channel 2 Phantom Power (only applies to MA2)
- 4 Channel 2 Low Frequency

Fig 5-4: Switch to Control LF Filter and Phantom Power

### Using Phantom Powered Microphones

For the input channel there are independent switches to provide phantom power at +48V to the connected microphones. With phantom power selected, a voltage of +48V is applied to pins 2 and 3 of the XLR connector to power the microphone, supplied through 6k8 resistors giving a current of 14mA. Phantom power is used when the switch is pointing towards the arrow.

### Using the LF Filter

A switch also provides control for a high pass filter with low frequency roll off at 125Hz. The filter is in when the switch is in the down position (towards the arrow).

### Output

The XLR 3 pin plug output connector is electronically balanced and can be wired unbalanced by grounding

the non-phase signal, allowing you to feed balanced and unbalanced equipment. It has the following connections:

- Pin 1: Screen
- Pin 2: Phase
- Pin 3: Non-phase

The connector provides a line level output with an impedance of <math><50\Omega</math> and a maximum output level of +28dBu.

## Technical Specifications RB-MA1

### Audio Specifications

Maximum Input Level: -10dBu

Maximum Output Level: +28dBu

Input Impedance: 2k $\Omega$  nominal balanced

Output Impedance: <50 $\Omega$

Low Frequency Roll-Off: 125Hz @ 6dB/octave

Gain Range: Adjustable 36dB to 75dB gain

E.I.N.: 130dB

Distortion: 0.01% THD @ 1kHz, ref +8dBu output

Common Mode Rejection:>66dB typically

Phantom Power: 48V

Frequency Response: 20Hz to 20kHz  $\pm$ 0.1dB (600 $\Omega$  load, ref 1kHz)

### Connections

Input: 1 x XLR 3 pin female (Balanced)

Output: 1 x XLR 3 pin male (Balanced, can be unbalanced)

Mains Input: Filtered IEC, 110V-120V, or 220-240V switchable, fused, 6W maximum

Fuse Rating: Anti-surge fuse 100mA 20 x 5mm (230VAC)  
Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-MA1:  Single microphone amplifier

### Physical Specifications

Dimensions (Raw): 28cm (W) x 10.8cm (D) x 4.2cm (H) (1U)  
11" (W) x 4.3" (D) x 1.7" (H) (1U)

Dimensions (Boxed): 36cm (W) x 20.5cm (D) x 6cm (H)  
14.2" (W) x 8" (D) x 2.4" (H)

Weight RB-MA1: Nett: 0.90kg Gross: 1.35kg  
Nett: 2lbs Gross: 3lbs

## 6 RB-MA2 Dual Microphone Amplifiers

### Introduction



Fig 6-1: RB-MA2 Front Panel

The RB-MA2 dual microphone amplifier consists of two low noise pre amplifiers for converting microphone level signals to line level, or for driving long lines from microphones to mixing equipment.

All connections and controls are on the rear panel. The microphone input is XLR-3 type and is electronically balanced. The input gain can be adjusted individually by a recessed pre-set potentiometer.

The XLR-3 line output is electronically balanced and can be wired unbalanced by grounding the non-phase signal, allowing you to feed both balanced and unbalanced equipment.

For each channel there are independent switches to control a high pass filter (low frequency roll-off at 125Hz) and to provide phantom power at +48V to the connected microphone. An LED power indicator on the front panel displays the power supply connection.

### System Block Diagram

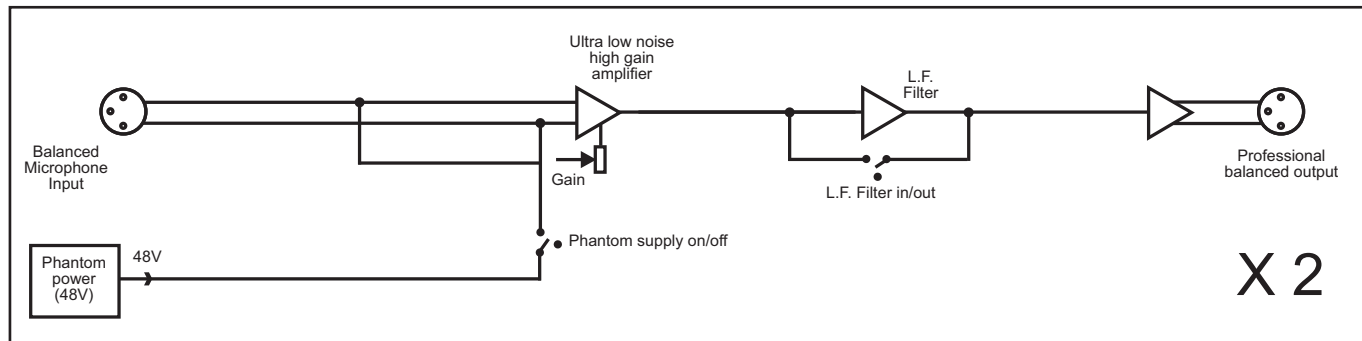


Fig 6-2: RB-MA2 System Block Diagram

## Rear Panel Connections and Operation

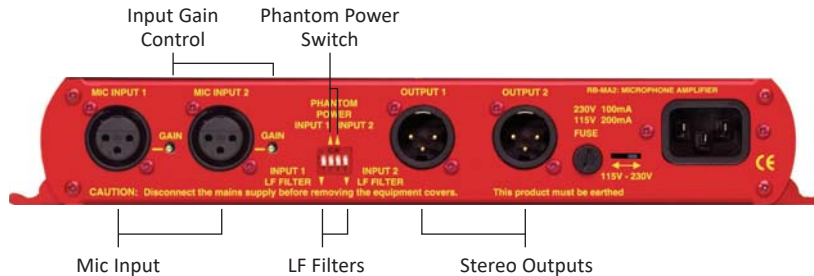


Fig 6-3: RB-MA2 Rear Panel.

### Mic Inputs

The XLR 3 pin sockets used for the microphone are electronically balanced.

They have the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Input Gain

Recessed pre-set potentiometers allow for adjustment of the gain of the microphone inputs. This provides a gain range of 36dB to 75dB which enables the use of dynamic and powered microphones. Connect the mic input and adjust the gain until the line output is at the level that you need.

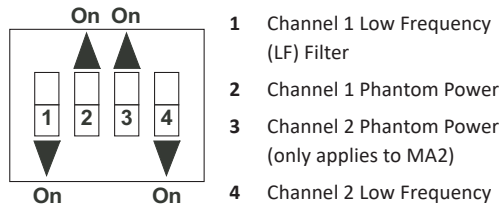


Fig 6-4: Switch to Control LF Filter and Phantom Power

### Using Phantom Powered Microphones

For the input channel there are independent switches to provide phantom power at +48V to the connected microphones. With phantom power selected, a voltage of +48V is applied to pins 2 and 3 of the XLR connector to power the microphone, supplied through 6k8 resistors giving a current of 14mA. Phantom power is used when the switch is pointing towards the arrow.

### Using the LF Filter

A switch also provides control for a high pass filter with low frequency roll off at 125Hz. The filter is in when the switch is in the down position (towards the arrow).

### Output

The XLR 3 pin plug output connector is electronically balanced and can be wired unbalanced by grounding the non-phase signal, allowing you to feed balanced and unbalanced equipment. It has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

The connector provides a line level output with an impedance of <math><50\Omega</math> and a maximum output level of +28dBu.

## Technical Specifications RB-MA2

### Audio Specifications

Maximum Input Level:	-10dBu
Maximum Output Level:	+28dBu
Input Impedance:	2k $\Omega$ nominal balanced
Output Impedance:	<50 $\Omega$
Low Frequency Roll-Off:	125Hz @ 6dB/octave
Gain Range:	Adjustable 36dB to 75dB gain
E.I.N.:	130dB
Distortion:	0.01% THD @ 1kHz, ref +8dBu output
Common Mode Rejection:	>66dB typically
Phantom Power:	48V
Frequency Response:	20Hz to 20kHz $\pm$ 0.1dB (600 $\Omega$ load, ref 1kHz)

### Connections

Input:	2 x XLR 3 pin female (Balanced)
Output:	2 x XLR 3 pin male (Balanced, can be unbalanced)
Mains Input:	Filtered IEC, 110V-120V, or 220-240V switchable, fused, 6W maximum
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-MA2: Dual microphone amplifier



### Physical Specifications

Dimensions (Raw):	28cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 11" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	36cm (W) x 20.5cm (D) x 6cm (H) 14.2" (W) x 8" (D) x 2.4" (H)
Weight RB-MA2:	Nett: 1.00kg Gross: 1.45kg Nett: 2.2lbs Gross: 3.2lbs



## 7 RB-MA2G Dual Microphone Amplifier with Gain

### Introduction

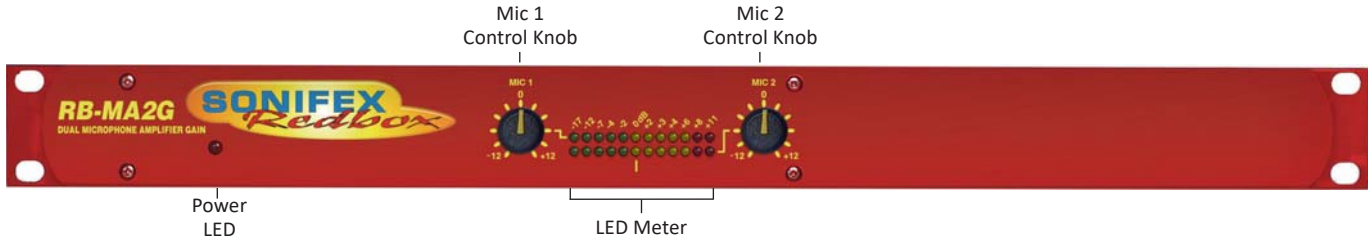


Fig 7-1: RB-MA2G Front Panel

The RB-MA2G consists of two independent low-noise microphone pre-amplifiers for converting microphone level signals to line level, or for driving long lines from microphones to mixing equipment.

All connections are on the rear panel. The microphone input is XLR-3 type and is electronically balanced. The input gains can be adjusted individually by recessed pre-set potentiometers.

Two front panel potentiometers give  $\pm 12\text{dB}$  level adjustment and a 12 segment LED meter shows the audio level for each channel.

The XLR-3 line output is electronically balanced and can be wired unbalanced by grounding the non-phase signal, allowing you to feed both balanced and unbalanced equipment.

For each channel there are independent switches to control a high pass filter (low frequency roll-off at 125Hz) and to provide phantom power at +48V to the connected microphone. An LED power indicator on the front panel displays the power supply connection.

### System Block Diagram

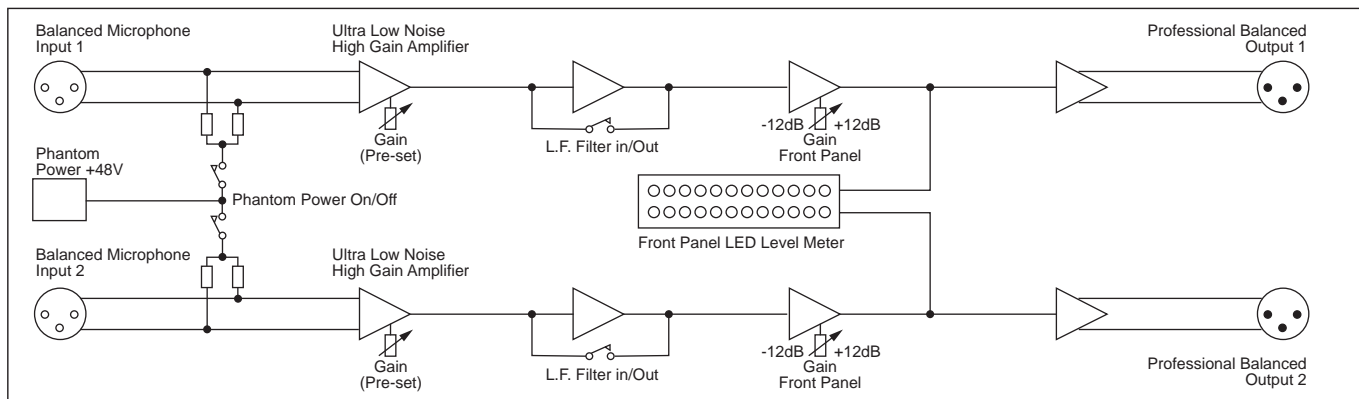


Fig 7-2: RB-MA2G System Block Diagram

### Rear Panel Connections and Operation

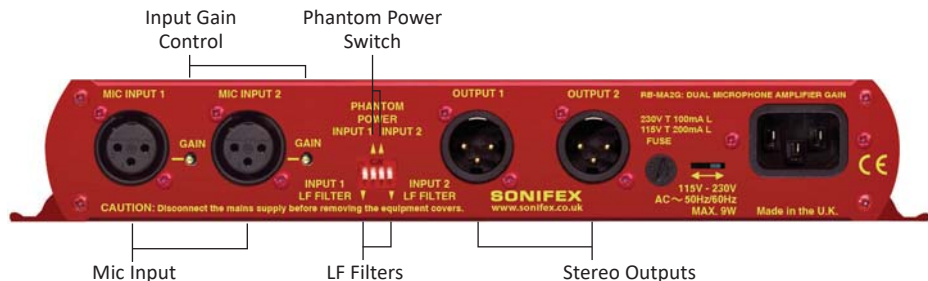


Fig 7-3: RB-MA2G Rear Panel

### Mic Inputs

The XLR 3 pin sockets used for the microphone are electronically balanced. They have the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Input Gain

Recessed pre-set potentiometers allow for adjustment of the gain of the microphone inputs. This provides a gain range of 24dB to 68dB which enables the use of dynamic and powered microphones. Connect the mic input and adjust the gain until the line output is at the level that you need.

Once the input gain is set to suit the microphone to be used, the front panel level adjustment can be used to trim the level up or down for quiet or loud microphone users.

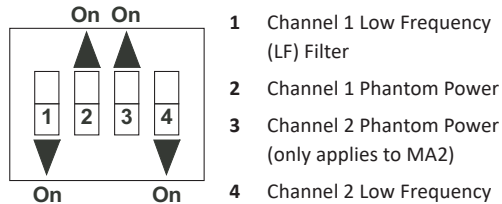


Fig 7-4: Switch to Control LF Filter and Phantom Power

### Using Phantom Powered Microphones

For the input channel there are independent switches to provide phantom power at +48V to the connected microphones. With phantom power selected, a voltage of +48V is applied to pins 2 and 3 of the XLR connector to power the microphone, supplied through 6k8 resistors giving a current of 14mA. Phantom power is used when the switch is pointing towards the arrow.

### Using the LF Filter

A switch also provides control for a high pass filter with low frequency roll off at 125Hz. The filter is in when the switch is in the down position (towards the arrow).

### Analogue Line Level Outputs

The XLR 3 pin plug analogue line output connector is electronically balanced and can be wired unbalanced by grounding the non-phase signal, allowing you to feed balanced and unbalanced equipment. It has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

The connector provides a line level output with an impedance of <math><50\Omega</math> and a maximum output level of +28dBu.

## Front Panel Controls

### Level Adjustment Potentiometers

Two front panel potentiometers provides  $\pm 12$ dB of level adjustment, useful for changing the audio gain for different users (i.e. less gain when a loud user is using the microphone, more gain when the user is quiet). In conjunction with the rear panel preset, this gives the RB-MA2G a 12dB to 80dB gain range.

### Level Meter

A 12 segment LED meter is provided to indicate the output level of both channels. This is useful in helping to set the front panel level adjust for a specific microphone user. Professional audio levels should be at 0dBu with peaks at approximately +4dBu.

## Technical Specifications RB-MA2G


### Audio Specifications

Maximum Input Level:	+4dBu
Maximum Output Level:	+28dBu
Input Impedance:	2k $\Omega$ Nominal balanced
Output Impedance:	<50 $\Omega$ Balanced
Low Frequency Roll-Off:	125Hz @ 6dB/octave
Gain Range:	Adjustable 12dB to 80dB gain
E.I.N.:	-128dBu, 20kHz BW, max gain, Rs=200 $\Omega$
Distortion:	<0.01%, +8dBu, 20Hz – 20kHz, 40dB gain, 20kHz bandwidth
Common Mode Rejection:	>66dB @ 1kHz
Phantom Power:	48V
Frequency Response:	20Hz to 20kHz +0/-0.2dB

### Connections

Input:	2 x XLR 3 pin female (Balanced)
Output:	2 x XLR 3 pin male (Balanced, can be unbalanced)
Mains Input:	Filtered IEC, 110V-120V, or 220-240V switchable, fused, 9W maximum
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-MA2G:  Dual microphone amplifier with gain



### Physical Specifications

Dimensions (Raw):	48cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 19" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	58.5cm (W) x 22.5cm (D) x 7cm (H) 23" (W) x 8.9" (D) x 2.8" (H)
Weight:	Nett: 1.35kg   Gross: 2.0kg Nett: 3.0lbs   Gross: 4.4lbs

## 8 RB-DMA2 Dual Digital Microphone Amplifier

### Introduction



Fig 8-1: RB-DMA2 Front Panel

24 BIT  
96 KHz

The RB-DMA2 consists of two independent low-noise microphone pre-amplifiers for converting microphone level signals to digital AES/EBU, or S/PDIF, and analogue line level

outputs. The RB-DMA2 can be used as a front end for digital mixing desks or routers, which do not have microphone inputs. The analogue outputs can be used for routing to talkback systems.

The microphone inputs are XLR-3 type and are electronically balanced. The input gain for each input can be adjusted individually by coarse and fine gain controls on the front panel and each input has a level indicator. Additionally the fine gain control knob can be disabled by internal jumpers. A switch on the rear panel allows input 1 to be routed to both left and right digital outputs, or as input 1 to left output and input 2 to right output respectively.

For each channel there are independent switches to control a high pass filter (low frequency roll-off at 125Hz) and to provide phantom power at +48V to the connected microphones.

It also has AES/EBU, S/PDIF and Word Clock sync inputs.

The unit operates in four modes:

**Master Mode** - In this mode the unit receives a microphone-input signal, which is digitised and formatted for digital serial transmission (IEC958). The

necessary clock signals are generated internally from an on board master clock at a selectable rate (32kHz, 44.1kHz, 48kHz, 64kHz, 88.2kHz or 96kHz).

**Slave Mode** - In this mode the unit automatically detects the presence of a digital audio sync signal, if present at the digital input or word clock input, and synchronises the digital output to it. If no sync is present, no output will be generated.

**Auto Mode** - Here the unit synchronises to the digital audio sync signal if present at the digital input and uses the internal master clock only if no sync input signal is detected. In this case, the internal master clock is used at the selected sample rate.

**Auto Lock Mode** - This operates like the auto mode except that if no sync-input signal is detected, it will use the internal master clock to sync to the sample rate which was last clocked to. When operating in sync modes, the front panel power LED flashes whenever the unit is not synchronised to the incoming digital signal, or when the unit is being calibrated. The unit should be calibrated once it has been powered up for more than 10 minutes.

For the digital output, there is a switch available to define the content of the channel status bits embedded within the digital audio stream. The channel status bits will be forced to Professional Mode for sample rates above 48kHz, as they are not supported by the Consumer Mode. For

sample rates of 32kHz, 44.1kHz and 48kHz, the status bits can be either set to Professional or Consumer Mode.

The bit depth of the digital output can be set to 16, 20 or 24 bits, with a psycho acoustic noise filter used to dither signals below 24 bit.

### System Block Diagram

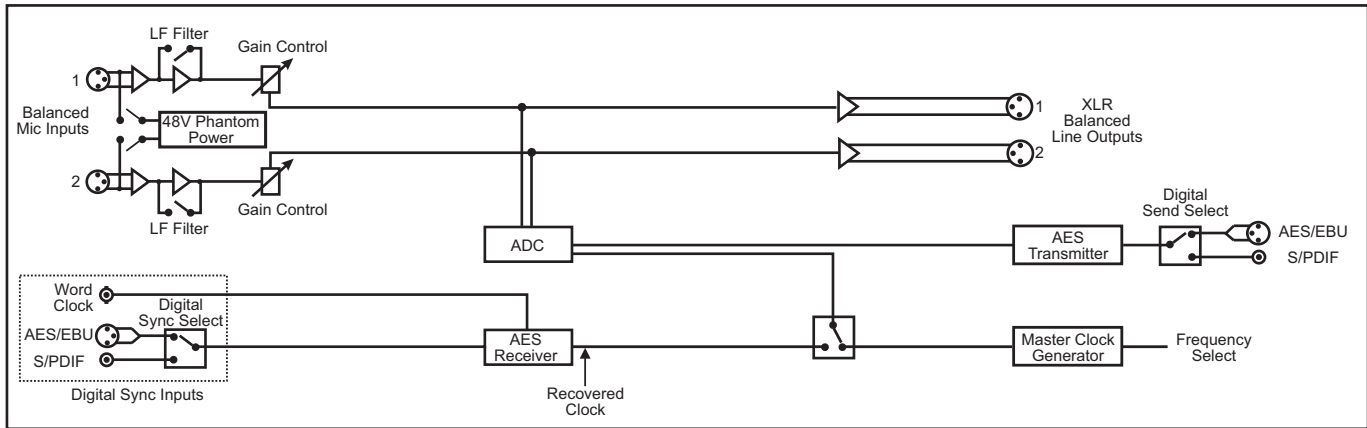


Fig 8-2: RB-DMA2 System Block Diagram

### Front Panel Indicators & Controls



Fig 8-3: RB-DMA2 Front Panel

**Sync & Power Indicator**

The LED on the front panel is normally red to indicate that power is present on the unit. However, it also has a secondary role to indicate the status of the digital inputs: Fast flashing between red and amber indicates a loss of digital input signal, or that the unit is being calibrated.

**Input Level Adjustment**

Front panel potentiometers, coarse and fine, allow for adjustment of the gain of each microphone input. The recessed screw-head potentiometer coarse control provides a total gain range of 44dB, with the level knob fine control providing a  $\pm 12$ dB adjustment.

Connect the mic input and adjust the gain until the line output is at the level that you need. The wide gain range allows the use of both dynamic and powered microphones.

**Disabling the Fine Gain Control Knob**

Each fine control also has the ability to be disabled via a jumper (JP1 for MIC1 and JP2 for MIC2) situated on the PCB. When the jumper is fitted the control is enabled.

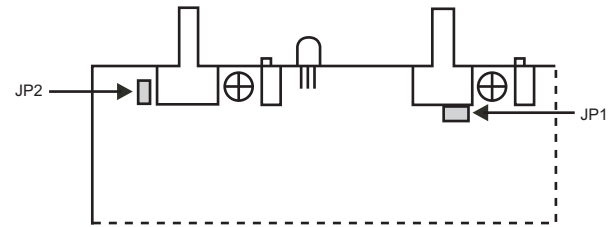


Fig 8-4: Jumpers to Disable Fine Gain Control

**Input Level Indicators**

For each input there is a tri-colour LED to give an indication of the level of the incoming mic signals. Green indicates -18dBFS, orange indicates -12dBFS and red indicates -6dBFS.

**Rear Panel Connections and Operation**

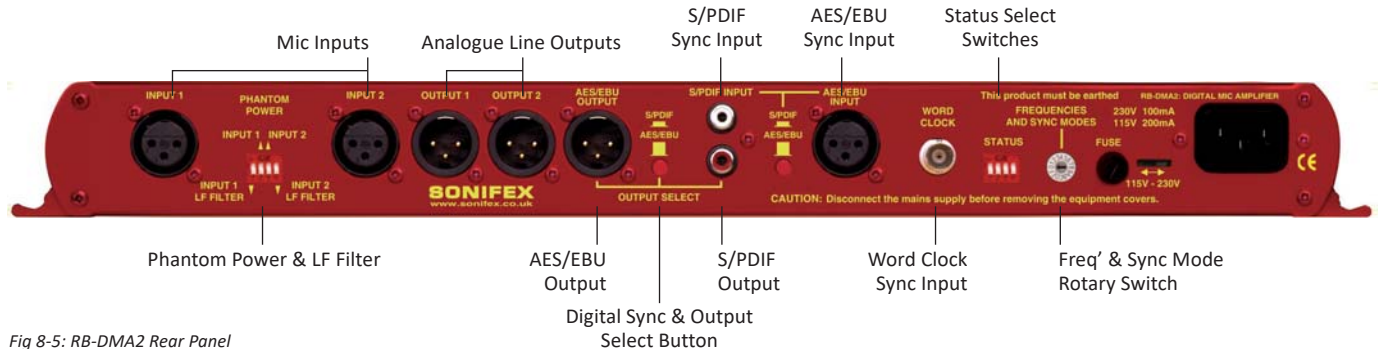


Fig 8-5: RB-DMA2 Rear Panel

**RB-DMA2 Inputs****Mic Inputs**

The XLR 3 pin sockets used for the microphone inputs are electronically balanced. They have the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

**AES/EBU Sync Input**

The digital AES/EBU synchronisation input XLR 3 pin socket has an impedance of 110  $\Omega$  and the signals meet the IEC 60968 specification. It has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

**Word Clock Sync Input**

The BNC TTL word clock input has an impedance of 50  $\Omega$ .

**S/PDIF Sync Input**

The S/PDIF digital phono input has an impedance of 75  $\Omega$ .

**RB-DMA2 Outputs****AES/EBU Output**

The digital output XLR 3 pin socket has an impedance of 110 $\Omega$  and the signals on this connector comply with the IEC 60968 specification. It has the following connections :

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

**S/PDIF Output**

The digital output S/PDIF phono output has an impedance of 75 $\Omega$ .

**Analogue Line Outputs**

There is an analogue output on XLR 3 pin plug for each microphone input.

The plug has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

**Rear Panel Controls****Status Select Switches**

These switches are used to determine the status or content of the digital output signals. The type of information encoded in the channel status bits of a digital audio signal can be professional or consumer and is determined by switch 1. However at frame rates higher than 48kHz, consumer mode is not available, so professional mode is used and this switch will be ignored.

The sample size for the analogue to digital conversion can be set to 24, 20 or 16 bits (switches 3 & 4). When the signal is truncated from 24 bits, a psycho-acoustic filter is applied to maintain optimum signal quality. These settings are summarised below and also on the top panel of the unit.

Status		
1	ON	Professional
1	OFF	Consumer
2	ON	Dual Mono
2	OFF	Mono

Bits			
	16	20	24
3	OFF	ON	ON
4	OFF	OFF	ON

Fig 8-6: RB-DMA2 Status Select Switches



### ***Output Routing***

This uses switch 2 of the STATUS dipswitch block. When switch 2 is “ON”, the audio signal from Mic input 1 is copied to both channels of the digital output signal (channel B = channel A) and Mic input 2 is ignored (Dual mono mode). When “OFF”, the Mic input 1 signal is on channel A only of the digital output signal and channel B contains the Mic input 2 signal (Mono mode).

**Note:** This does not affect the routing of the analogue outputs.

### ***Phantom Power & LF Filter***

For each channel there are independent switches to provide phantom power at +48V to the connected microphones. With phantom power selected, a voltage of +48V is applied to pins 2 and 3 of the XLR connector to power the microphone, supplied through 6k8 resistors giving a current of 14mA. Phantom power is used when the switches are towards the arrows.

The LF filter switches provide control for a high pass filter with low frequency roll off at 125Hz. The roll-off filters are switched “in” when the switches are in the down position (towards the arrows).

### ***Digital Sync & Output Select Buttons***

These buttons are used to switch the digital connection between the AES/EBU XLR connector (button out) and the S/PDIF phono connector (button in) independently for the digital sync input and the digital output.

**Note:** There is no switch to select the Word Clock as a sync input. The unit automatically searches for a sync signal on the Word Clock, or the selected digital input, and automatically locks to a valid sync clock.

### ***Frequency and Sync Mode Rotary Switch***

This rotary switch is used to select the Synchronisation Mode and to select the frequency of the digital output when using the on-board clock generator. There are 4 modes of operation: - Master Mode, Auto Sync Mode, Auto Lock Sync Mode & Slave Mode.

- In Master Sync Mode, switch positions 0 – 5, the digital output sample rate is simply set by, and locked to, the internal on-board clock generator. No sync signal is used or required.
- In Auto Sync Mode, switch positions 6–B, the digital output sample rate follows the digital input. When the digital input signal is not present the output sample rate will be set by, and locked to, the internal on-board clock generator at a frequency determined by the switch position.
- In Auto-Lock Sync Mode, switch position C, No output will be generated until lock is achieved with a digital input signal. The digital output sample rate now follows the digital input. If the digital input signal is removed then the output sample rate will be set by, and locked to, the internal on-board clock generator at the closest frequency available to the previous digital input.
- In Slave Sync Mode, switch position D, the digital output sample rate follows the digital input. When the digital input signal is not present the digital output is turned off.

The following table, also printed on the top of the unit, summarises the above settings and shows the sample rate generated by the internal clock generator in master and auto sync modes.

Frequencies and Sync Modes		
Rotary Switch Number	Mode	Sample Frequency (kHz)
0	Master	32
1	Master	44.1
2	Master	48
3	Master	64
4	Master	88.2
5	Master	96
6	Auto	32
7	Auto	44.1
8	Auto	48
9	Auto	64
A	Auto	88.2
B	Auto	96
C	Auto Lock	-
D	Slave	-
F	Calibration	-

Fig 8-7: RB-DMA2 Frequency and Sync Rotary Switch Selections

### Test/Calibration Mode

For optimum performance of the RB-DMA2, the unit should be calibrated when it has been powered up for approximately 10-15 minutes. The circuitry and chipsets contained in the unit will warm up during this time and the performance will deteriorate unless calibrated (the noise floor and

dynamic range will be 1-2dB lower than the best possible performance). The calibration cycle calibrates the gain and the zero reference of the A/D converter.

To calibrate the RB-DMA2, set the rotary FREQUENCIES AND SYNC MODES switch to position "F". The power LED on the front panel will flash quickly for 2 – 3 seconds and will illuminate fully when the unit is calibrated. Once calibration is complete, reset the rotary switch to the position that you require.

## Technical Specifications RB-DMA2

### Connections

Analogue Mic Inputs: 2 x XLR 3 pin (balanced)

Analogue Line Outputs: 2 x XLR 3 pin (balanced)

Digital Sync Inputs: 1 x AES/EBU XLR 3 pin female  
1 x S/PDIF RCA phono  
1 x TTL BNC female (sync) 50 ohm impedance

Digital Outputs: 1 x AES/EBU XLR 3 pin plug  
1 x S/PDIF RCA phono socket

Mains Input: Filtered IEC, 110-120V, or 220-240V switchable, fused 10W max

Fuse Rating: Anti-surge fuse 100mA 20 x 5mm (230VAC)  
Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Audio Specification

Min/Max Input Level: -63dBu / 5dBu to give FSD

Input Impedance: 2kΩ nominal balanced

Gain Range: 68dB

Signal to Noise: 128dB EIN

Dynamic Range: >110dB

Distortion and Noise: < 0.01% THD + N absolute @ 1kHz

Phantom Power: +48V

Low Frequency Roll-off: 125Hz @ 6dB/octave

Analogue Output Level: +18dBu Ref. FSD

### Operational Controls & Indicators

Bit Depth: 16, 20 or 24 bits via DIP switch

Digital Output Select: AES/EBU or S/PDIF, via push switch

Sample Frequencies: 32kHz – 96kHz, via rotary switch

Sync Modes: Master, Slave, Auto, Auto-Lock via rotary switch


Digital Input Select: AES/EBU or S/PDIF, via push-switch

Channel Status Bits: Set to consumer or professional mode via DIP switch

Output Routing: Set dual mono output via dipswitch

Led Level: Green ind. -18dBFS, Orange ind. -12dBFS, Red ind. -6dBFS

### Equipment Type

RB-DMA2:  Dual digital microphone amplifier

### Physical Specifications

Dimensions (Raw): 48cm (W) x 10.8cm (D) x 4.2cm (H) (1U)  
19" (W) x 4.3" (D) x 1.7" (H) (1U)

Dimensions (Boxed): 53cm (W) x 20.5cm (D) x 6cm (H)  
21" (W) x 8" (D) x 2.4" (H)

Weight: Nett: 1.6kg Gross: 2.2kg  
Nett: 3.5lbs Gross: 4.8lbs

## 9 RB-ML2 Stereo Microphone & Line Level Limiter

### Introduction



Fig 9-1: RB-ML2 Front Panel

The RB-ML2 is a stereo microphone and line level limiter. The unit is mainly used where assistance with level control is required, for protection of mixer inputs and to prevent distortion. The RB-ML2 is ideal for news-booths, and the input to PC work stations, it provides an economical level control solution.

The RB-ML2 has two electronically balanced XLR-3 inputs, which are routed to a line amplifier, or microphone amplifier, via a rear push-button. The microphone amplifiers have independent pre-set gain controls, and DIP switches for a high pass filter (low frequency roll-off at 125Hz) and phantom power to provide +48V to the connected microphones.

The outputs of these amplifiers are passed through a VCA limiter circuit that can operate jointly on the signals in stereo mode, or independently in dual mono mode. The rear panel mode switch changes the unit from dual mono to stereo.

The two XLR-3 electronically balanced outputs can be set to either line or mic output levels via a push button. This allows the RB-ML2 to be used in line with a line or mic input on a mixer, or similar equipment

System Block Diagram

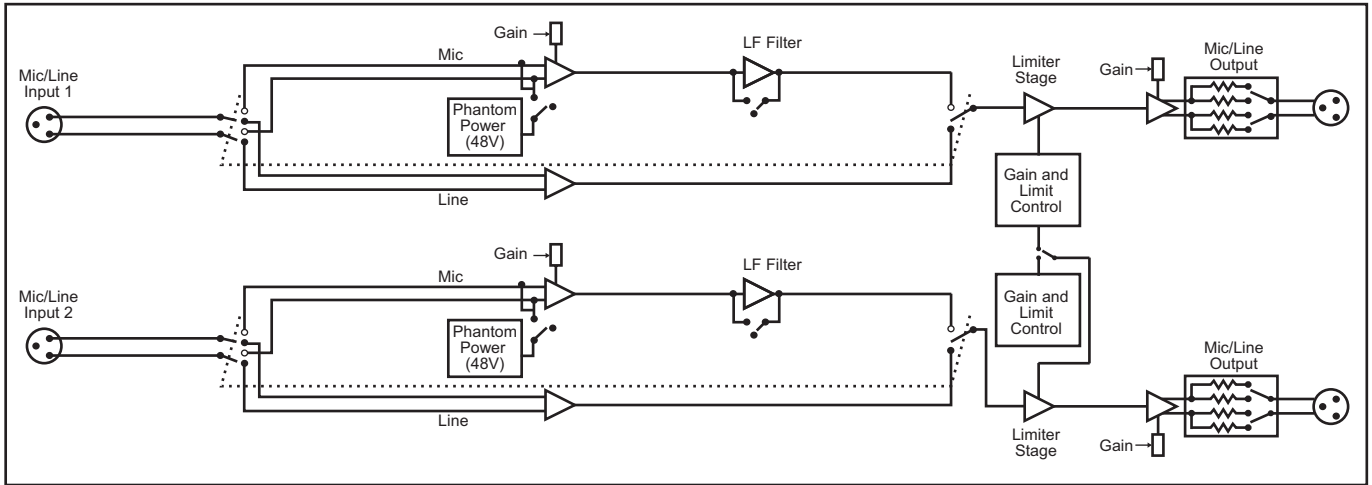


Fig 9-2: RB-ML2 System Block Diagram

Rear Panel Connections and Operation

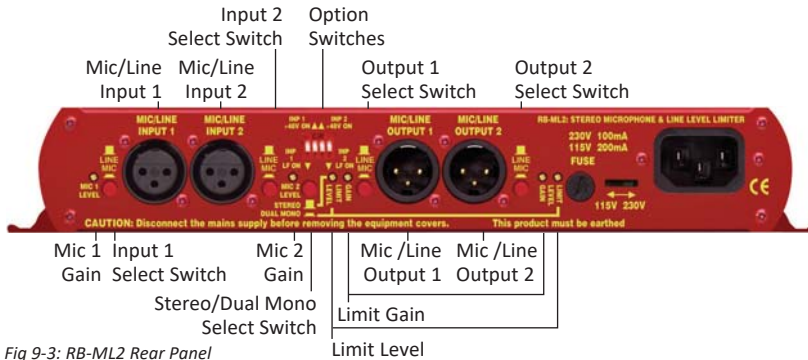


Fig 9-3: RB-ML2 Rear Panel

### Mic / Line Inputs

The XLR 3 pin sockets used for the mic/line inputs are electronically balanced. They have the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Mic Input Gain

Recessed pre-set potentiometers allow for adjustment of the gain of the microphone inputs. This provides a gain range of +22dB to +67dB which enables the use of dynamic and powered microphones. Connect the mic input and adjust the gain until the line output is at the level that you need.

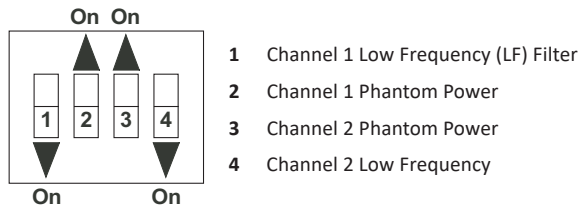


Fig 9-4: Switch to Control LF Filter and Phantom Power

### Using Phantom Powered Microphones

For the mic input channel there are independent switches to provide phantom power at +48V to the connected microphones. With phantom power selected, a voltage of +48V is applied to pins 2 and 3 of the XLR connector to power the microphone, supplied through 6k8 resistors giving a current of 14mA. Phantom power is used when the switch is pointing towards the arrow. The phantom power only applies when the input is set to mic mode.

### Using the LF Filter

A switch also provides control for a high pass filter with low frequency roll off at 125Hz. The filter is in when the switch is in the down position

(towards the arrow). The filter only applies when the input is set to mic mode.

### Mic / Line Outputs

The XLR 3 pin plug output connector is electronically balanced and can be wired unbalanced by grounding the non-phase signal, allowing you to feed balanced and unbalanced equipment. It has the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

The connector provides a line level output with an impedance of <math><50\Omega</math> in line mode and

### Mic / Line Output Gain

The output gain is adjustable from -54dB to -24dB when mic is selected and adjustable between -8dB to +22dB for line, with reference to 0dBu line input. The gain is adjusted via two potentiometers on the rear panel of the unit, although it is pre-set in production.

### Level Limiting

Stereo limiting operates by limiting both left and right outputs if either the left and right input needs to be limited. Dual mono limiting operates by limiting left and right signals individually.

The characteristics of the limiter can be set via level threshold pre-sets. For each channel there is an input gain and a threshold level control. With the limit threshold set to maximum, the input through to output can be normalised using the input potentiometers. Once the unit is acting as a buffer with gain/attenuation, the limit threshold level can be set, with the recovery adjusted for the application. The power LED indicates limiting by flashing.

### Mode Select Switch

The mode switch changes the unit from dual mono to stereo mode. In stereo mode, only the pre-sets for channel 1 (left) are active and they are applied to both channels. Stereo limiting operates by limiting both left and right outputs if either left or right input needs to be limited. Dual mono limiting operates by limiting left and right signals individually – you can use the RB-ML2 as two separate mono limiters.

## Technical Specifications RB-ML2

### Audio Specifications

Maximum Input Level:	-6dBu (mic), +28dBu (line), electronically balanced
Input Impedance:	>20kΩ balanced bridging
Input Gain Range:	Adjustable +22dB to +67dB gain (mic) Via 2 x pre-set potentiometers (L&R), 0dB gain (line)
Maximum Output Level:	-18dBu (mic), +28dBu (line), electronically balanced
Output Impedance:	150Ω(mic), <50Ω balanced (line)
Output Gain Range:	-8dB to +22 dB gain (line), ref 0dBu line input Gain via 2 x pre-set potentiometers
Limit Threshold:	Adjustable -8dBu to +28dBu
Frequency Response:	20Hz to 20 kHz +/- 0.1dB (600 ohm load, ref 1kHz)
E.I.N:	130dB
Distortion:	<0.02% THD @ 1kHz, ref +8dBu output
Common Mode Rejection (mic):	>86dB typically
Common Mode Rejection (line):	>66dB typically
Phantom Power:	48V
LF Filter:	125Hz@6dBs/octave

### Connections

Analogue Input:	2 x XLR 3 pin female mic or line switchable (Balanced)(L &R)
Mic/Line Input Control:	2 x push-buttons for mic/line inputs
Analogue Outputs:	2 x XLR 3 pin male or line switchable (Balanced)(L&R)
Mic/Line Output Control:	2 x push-button for mic/line outputs
Phantom Power & LF Filter:	1x 4-way DIP switch
Mono/Stereo Mode Select:	1 x push button
Limit Level Threshold Set:	2 x pre-set potentiometers
Mains Input:	Filtered IEC, 110V-120V, or 220-240V switchable, fused, 6W maximum
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-ML2:  Stereo microphone & line level limiter

### Physical Specifications

Dimensions (Raw):	28cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 11" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	36cm (W) x 20.5cm (D) x 6cm (H) 14.2" (W) x 8" (D) x 2.4" (H)
Weight RB-ML2:	Nett: 0.90kg Gross: 1.35kg Nett: 2lbs Gross: 3lbs

## 10 RB-SL2 Twin Mono, Or Stereo, Limiter

### Introduction



Fig 10-1: RB-SL2 Front Panel

The RB-SL2 is a stereo, or twin independent mono, VCA limiter for use in news-rooms and other locations where the correct level into recording equipment is required, but not necessarily under the control of an engineer, for example, for overload protection. It can also be used as an inexpensive main output limiter for low cost radio installations, RSL's, hospital and student radio.

The XLR-3 electronically balanced inputs and outputs can be wired unbalanced to accept an output from domestic equipment. For each channel there is an input gain and a threshold level control.

A rear panel switch changes the unit from dual mono to stereo, when only the pre-sets for channel 1 (left) are active and apply to both channels. An LED power indicator on the front panel displays the power supply connection and also indicates limiting.

- 1) Steady "Amber" indicates that the unit is powered and not in limiting.
- 2) Flashing "Amber" "Red" indicates that input 1 left channel is in limit.
- 3) Flashing "Amber" "Green" indicates that input 2 right channel is in limit.
- 4) Flashing "Amber" on and off indicates that both inputs are in limit.

**Please note** that all four conditions are possible in "Dual Mono" mode but only conditions

1 and 4 are valid in "Stereo" mode.



### System Block Diagram

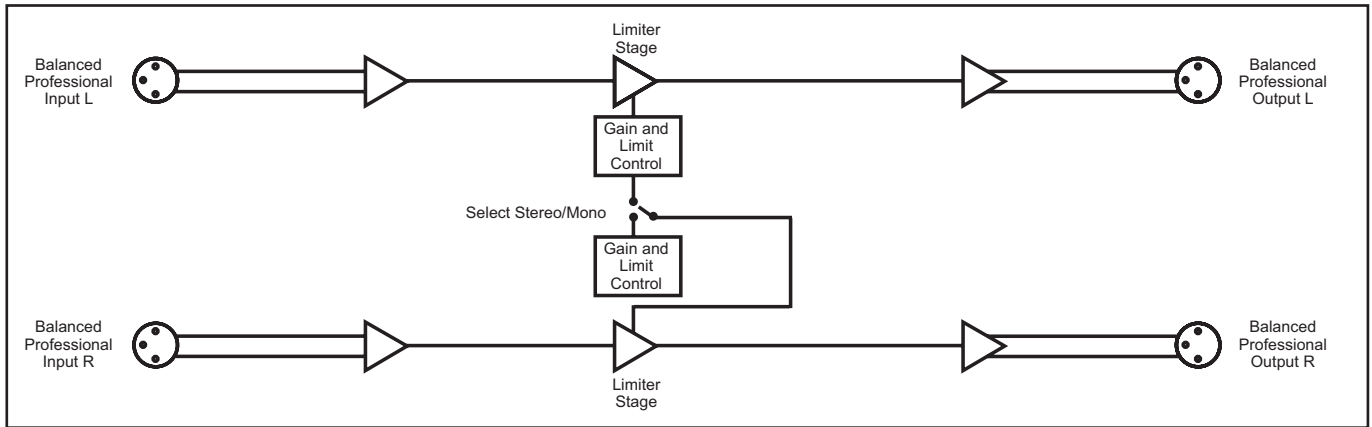


Fig 10-2: RB-SL2 System Block Diagram

### Rear Panel Connections and Operation

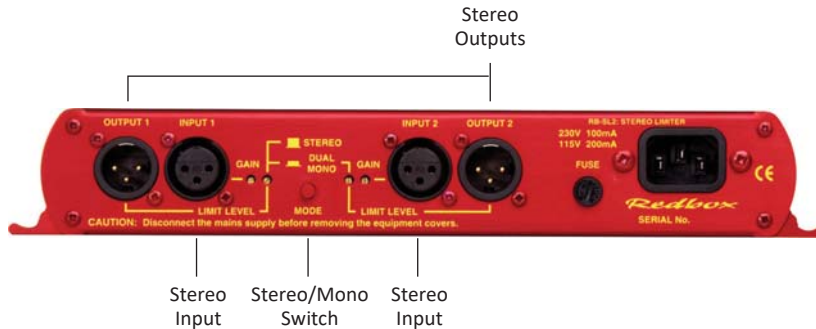


Fig 10-3: RB-SL2 Rear Panel

### Outputs

The XLR 3 pin plug connectors are electronically balanced and can be wired unbalanced to accept an output from domestic equipment. They have the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Inputs

The XLR 3 pin sockets are electronically balanced, and can be wired unbalanced to accept an output from domestic equipment. They have the following connections:

Pin 1: Screen

Pin 2: Phase

Pin 3: Non-phase

### Gain Control

Each channel has an input gain (GAIN) and a threshold level control (LIMIT LEVEL). Setting the limit level to maximum (fully anti-clockwise) enables the input through to output to be normalised using the input gain potentiometers. Once the unit is acting as a buffer with gain/attenuation, the limit level can be set, with the recovery adjusted for the application. Limiting is indicated by the power LED on the front panel. (see page 38).

### Mode Switch

This switch changes the unit from dual mono to stereo mode. In stereo mode, only the pre-sets for channel 1 (left) are active and they are applied to both channels. Stereo limiting operates by limiting both left and right outputs if either left or right input needs to be limited. Dual mono limiting operates by limiting left and right signals individually – you can use the RB-SL2 as two separate mono limiters.

## Technical Specifications RB-SL2

### Audio Specifications

Maximum Input Level: +28dBu

Maximum Output Level: +28dBu

Input Impedance: >20k $\Omega$  bridging

Output Impedance: <50 $\Omega$

Input Gain: Adjustable -8dBu to +18dBu gain

Limit Threshold: Adjustable -8dBu to +28dBu

Frequency Response: 20Hz to 20kHz  $\pm$ 0.1dB (600 $\Omega$  load, ref 1kHz)

Noise: -100dB unity gain, ref +8dBu

Distortion: 0.01% THD @ 1kHz ref +8dBu output,  
threshold set at +10dBu

Common Mode Rejection:>66dB typically

### Connections

Inputs: 2 x XLR 3 pin female (Balanced, can be unbalanced)

Outputs: 2 x XLR 3 pin male (Balanced, can be unbalanced)

Mains Input: Filtered IEC, 110V-120V, or 220-240V switchable, fused, 6W maximum

Fuse Rating: Anti-surge fuse 100mA 20 x 5mm (230VAC)  
Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-SL2:   Twin mono, or stereo, limiter

### Physical Specifications

Dimensions (Raw): 28cm (W) x 10.8cm (D) x 4.2cm (H) (1U)  
11" (W) x 4.3" (D) x 1.7" (H) (1U)

Dimensions (Boxed): 36cm (W) x 20.5cm (D) x 6cm (H)  
14.2" (W) x 8" (D) x 2.4" (H)

Weight: Nett: 1.0kg Gross: 1.45kg  
Nett: 2.2lbs Gross: 3.2lbs

## 11 RB-SM1 Single Stereo To Mono Converter

### Introduction



Fig 11-1: RB-SM1 Front Panel

The RB-SM1 consists of an independent converter that will produce a fully buffered and balanced mono line output from a stereo input.

All connections are on the rear panel. The XLR-3 inputs are electronically balanced with an impedance of 20k $\Omega$  bridging. These can be wired unbalanced to accept an output from domestic equipment.

The XLR-3 line output's are electronically balanced with an output impedance of <50 $\Omega$ . The output's can be wired unbalanced by grounding

the non-phase signal, allowing you to feed both balanced and unbalanced equipment.

Output gain adjustment using a pre-set potentiometer for both converters allows a normalised mono output from domestic stereo equipment. The potentiometer is accessible through the rear panel. An LED power indicator on the front panel displays the power supply connection.

### System Block Diagram

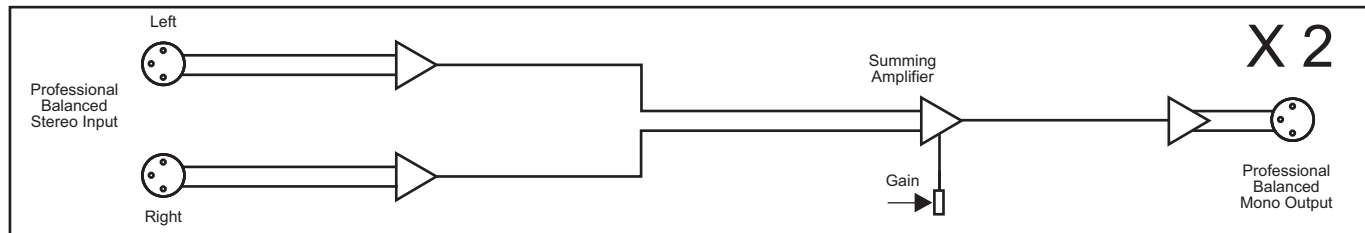


Fig 11-2: RB-SM1 System Block Diagram

## Rear Panel Connections and Operation



Fig 11-3: RB-SM1 Rear Panel

### Stereo Inputs

The input's are a stereo pair consisting of two XLR 3 pin sockets electronically balanced with an impedance of 20k $\Omega$  bridging. They can be wired unbalanced to accept an output from domestic equipment. They have the following connections:

- Pin 1: Screen
- Pin 2: Phase
- Pin 3: Non-phase

### Mono Output

The XLR 3 pin mono output connectors are electronically balanced with an output impedance of <math><50\Omega</math>. They can be wired unbalanced by grounding the non-phase signal, enabling you to feed both balanced and unbalanced equipment. The output has the following connections:

- Pin 1: Screen
- Pin 2: Phase
- Pin 3: Non-phase

### Output Gain

Output gain adjustment using a pre-set potentiometer for the converters allows a normalised mono output from domestic stereo equipment. The potentiometers are accessible through the rear panel and provide a gain range of 8dB loss to 18dB gain.

## Technical Specifications RB-SM1

### Audio Specifications

Maximum Input Level:	+28dBu
Maximum Output Level:	+28dBu
Input Impedance:	>20k $\Omega$ balanced bridging
Output Impedance:	<50 $\Omega$ balanced
Frequency Response:	20Hz to 20kHz $\pm$ 0.1dB (600 $\Omega$ load, ref 1kHz)
Gain Range:	Adjust 8dB loss to 18dB gain, ref 0dB input on L and R
Common Mode Rejection:	>66dB typically
Distortion:	0.01% THD @ 1kHz, ref +8dBu output
Noise:	-100dB unity gain, ref +8dBu output

### Connections

Inputs:	2 x XLR 3 pin female (Balanced, can be unbalanced)
Output:	1 x XLR 3 pin male (Balanced, can be unbalanced)
Mains Input:	Filtered IEC, 110V-120V, or 220-240V switchable, fused, 6W maximum
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-SM1:  Dual stereo to mono converter



### Physical Specifications

Dimensions (Raw):	28cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 11" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	36cm (W) x 20.5cm (D) x 6cm (H) 14.2" (W) x 8" (D) x 2.4" (H)
Weight:	Nett: 1.00kg Gross: 1.45kg Nett: 2.2lbs Gross: 3.2lbs

## 12 RB-SM2 Dual Stereo To Mono Converter

### Introduction



Fig 12-1: RB-SM2 Front Panel

The RB-SM1 consists of an independent converter that will produce a fully buffered and balanced mono line output from a stereo input. The RB-SM2 consists of two independent converters and will produce two fully buffered and balanced mono line outputs from two stereo inputs.

All connections are on the rear panel. The XLR-3 inputs are electronically balanced with an impedance of 20k $\Omega$  bridging. These can be wired unbalanced to accept an output from domestic equipment.

The XLR-3 line output's are electronically balanced with an output impedance of <math><50\Omega</math>. The output's can be wired unbalanced by grounding the non-phase signal, allowing you to feed both balanced and unbalanced equipment.

Output gain adjustment using a pre-set potentiometer for both converters allows a normalised mono output from domestic stereo equipment. The potentiometer is accessible through the rear panel. An LED power indicator on the front panel displays the power supply connection.

### System Block Diagram

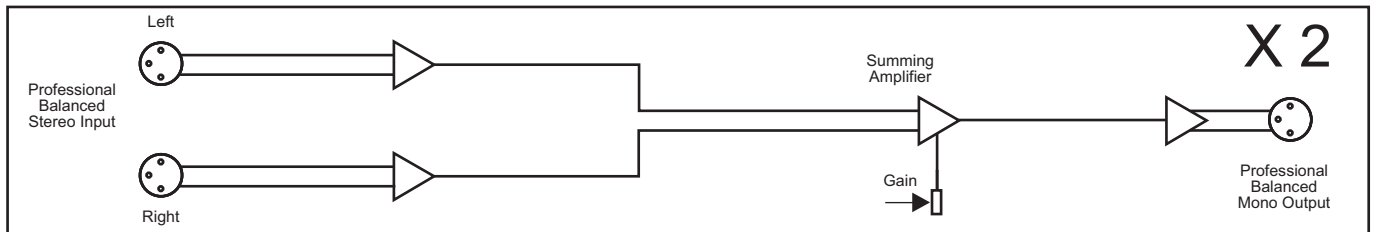


Fig 12-2: RB-SM2 System Block Diagram

## Rear Panel Connections and Operation

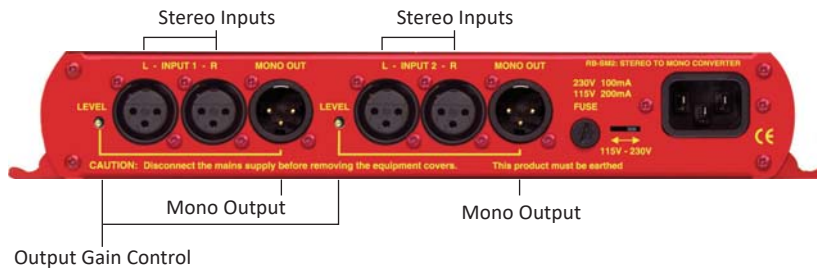


Fig 12-3: RB-SM2 Rear Panel

### Stereo Inputs 1 & 2

The input's are a stereo pair consisting of two XLR 3 pin sockets electronically balanced with an impedance of 20k $\Omega$  bridging. They can be wired unbalanced to accept an output from domestic equipment. They have the following connections:

- Pin 1: Screen
- Pin 2: Phase
- Pin 3: Non-phase

### Mono Output 1 & 2

The XLR 3 pin mono output connectors are electronically balanced with an output impedance of <math><50\Omega</math>. They can be wired unbalanced by grounding the non-phase signal, enabling you to feed both balanced and unbalanced equipment. The output has the following connections:

- Pin 1: Screen
- Pin 2: Phase
- Pin 3: Non-phase

### Output Gain

Output gain adjustment using a pre-set potentiometer for the converters allows a normalised mono output from domestic stereo equipment. The potentiometers are accessible through the rear panel and provide a gain range of 8dB loss to 18dB gain.



## Technical Specifications RB-SM2

### Audio Specifications

Maximum Input Level:	+28dBu
Maximum Output Level:	+28dBu
Input Impedance:	>20k $\Omega$ balanced bridging
Output Impedance:	<50 $\Omega$ balanced
Frequency Response:	20Hz to 20kHz $\pm$ 0.1dB (600 $\Omega$ load, ref 1kHz)
Gain Range:	Adjust 8dB loss to 18dB gain, ref 0dB input on L and R
Common Mode Rejection:	>66dB typically
Distortion:	0.01% THD @ 1kHz, ref +8dBu output
Noise:	-100dB unity gain, ref +8dBu output

### Connections

Inputs:	4 x XLR 3 pin female (Balanced, can be unbalanced)
Output:	2 x XLR 3 pin male (Balanced, can be unbalanced)
Mains Input:	Filtered IEC, 110V-120V, or 220-240V switchable, fused, 6W maximum
Fuse Rating:	Anti-surge fuse 100mA 20 x 5mm (230VAC) Anti-surge fuse 250mA 20 x 5mm (115VAC)

### Equipment Type

RB-SM2:  Single stereo to mono converter



### Physical Specifications

Dimensions (Raw):	28cm (W) x 10.8cm (D) x 4.2cm (H) (1U) 11" (W) x 4.3" (D) x 1.7" (H) (1U)
Dimensions (Boxed):	36cm (W) x 20.5cm (D) x 6cm (H) 14.2" (W) x 8" (D) x 2.4" (H)
Weight:	Nett: 1.05kg    Gross: 1.50kg Nett: 2.3lbs    Gross: 3.3lbs

## 13 RB-LC3 3 Way Light/Power Controller

### Introduction



Fig 13-1: RB-LC3 Front Panel

The RB-LC3 is a triple output switching unit for controlling external mains indicators, primarily studio status lights for broadcasting applications, such as On-Air, Mic-Live and Rehearsal/Live lights. Each output can be individually controlled by one of three remote inputs (pulled high, or low), by a telephony input (when ringing, or off-hook or both), or a combination of two inputs (to control two outputs, e.g. for Rehearsal/Live situations). The type of control is set using a 12 way DIP switch (4 switches for each output allowing 16 different settings, 14 for control type selection and 2 for operating mode selection).

All connections are on the rear panel. The three IEC outputs are controlled by zero-cross point drivers. When an output is activated, the A.C. voltage level at that output will be equal to the mains input voltage used to power the unit.

External control of the switched mains outputs is via the 15 way D-type plug connector.

The telephone Line input and Handset output are via two RJ11-4 type connectors. The telephone connections are wired pin to pin from Line to Handset except when the remote Ring Mute control input is asserted. In this case the ring signal to the Handset is muted. The status of the telephone Line is continually monitored so that Handset ringing and off-hook conditions can be indicated.

A pre-set potentiometer on the rear panel controls the flash rate of the output when the appropriate mode is selected. Neon indicators on each power socket show the status of the mains output.

An LED power indicator on the front panel displays the incoming power supply connection.

## System Block Diagram

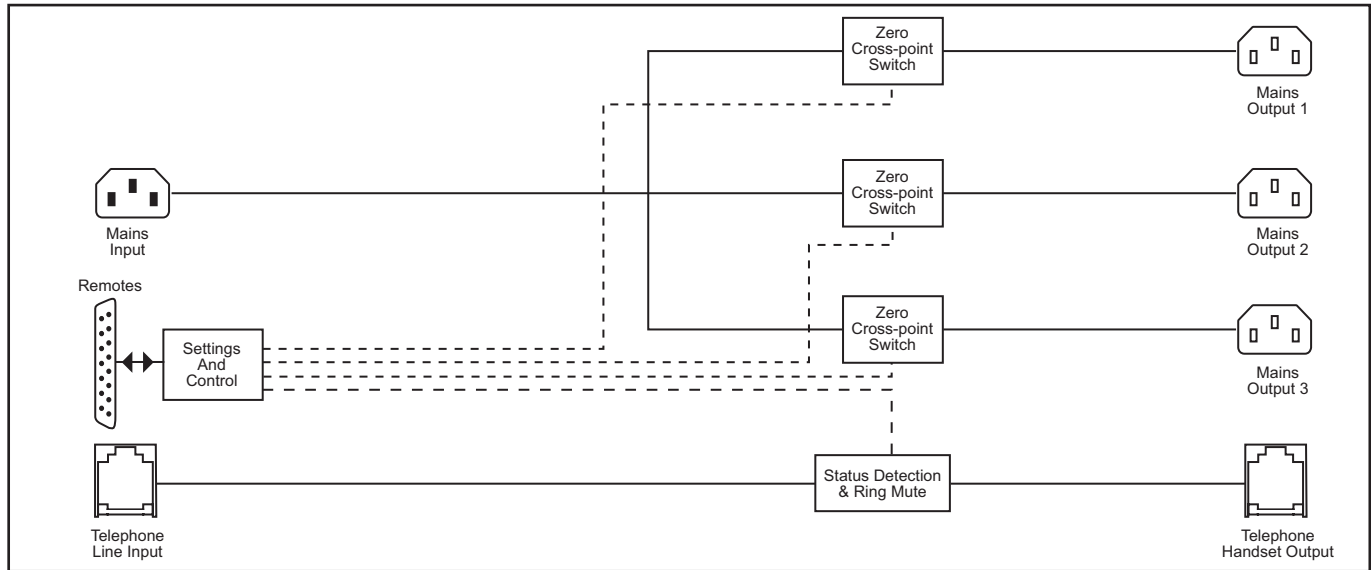


Fig 13-2: RB-LC3 System Block Diagram

## Rear Panel Connections and Operation

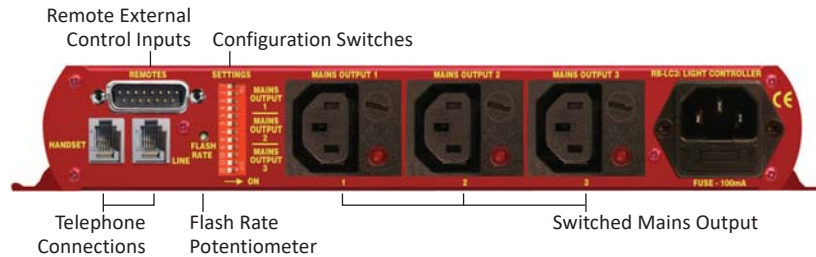


Fig 13-3: RB-LC3 Rear Panel

### Switched Mains Outputs

The 3 off IEC connectors provide the switched mains outputs. Each output is rated at 1A and is individually fused. A neon indicator shows when the output is live. The outputs are driven by zero cross-point drivers. When an output is activated, the A.C. voltage level at that output will be equal to the mains input voltage used to power the unit.

### Telephone Connections

The telephone connections are wired pin to pin from Line to Handset except when the Ring Mute control input is asserted. In this case the ring signal to the Handset is muted. The status of the telephone Line is continually monitored so that Handset ringing and off-hook conditions can be indicated. (Please note that the ring mute function will only work on handsets that use pin 3 of a standard BT connector. This is often not connected on common phones that typically use tone dialling. Phones that support pulse dialling should have the connection and should therefore work with the RB-LC3).

### Remote External Control Inputs

The 15 way D-type connector provides the control inputs that switch the three mains outputs and control the telephone handset ring mute. All inputs have both active high (+5V to +30V) and active low (0V) control. An output-on or “Tally” indication for each output is also provided on this connector in the form of three open-collector driven outputs capable of sinking 20mA each. The connections are as follows:

Pin 1: Remote 1 (Active High)  
 Pin 2: Remote 1 (Active Low)  
 Pin 3: Remote 2 (Active High)  
 Pin 4: Remote 2 (Active Low)  
 Pin 5: Remote 3 (Active High)  
 Pin 6: Remote 3 (Active Low)

Pin 7: Ring Mute (Active High)  
 Pin 8: Ring Mute (Active Low)  
 Pin 9: Output 1 Tally (Open Collector)  
 Pin 10: Output 2 Tally (Open Collector)  
 Pin 11: Output 3 Tally (Open Collector)  
 Pin 12: No Connection  
 Pin 13: No Connection  
 Pin 14: 0V  
 Pin 15: 0V

### Configuration Switches

The configuration switches are used to set the flash mode for each output separately. The selections allow the outputs to be controlled by a remote input, a telephone call, or a combination of remote inputs, say, for example to control 2 lights such as “Rehearsal” and “Live”, using the Settings in Figure 28-4 to 28-6.

### Latching and Momentary Mode

The configuration switches are also used to select the operating mode, either latching or momentary, for each output. The operating mode is set when power is applied to the unit and the configuration switches are set to either Setting 15 or 16. The Output will flash once to indicate latching mode has been selected or twice to indicate momentary mode has been selected. The configuration switches can then be returned to the required Setting. In Latching Mode (Setting 15 selected on power up), the Output is On/Flashing only while the selected Remote Inputs remain asserted. In Momentary Mode (Setting 16 selected on power up), each separate assertion of the selected Remote Inputs changes the state of the Output. For example, using setting 4, the first assertion of Remote 1 switches Output 1 on. The second assertion of Remote 1 switches Output 1 off. The operating mode has no effect when using Settings No1-3.

The available settings for output 1, configured using switches Sw1 to Sw4, are detailed below:

Setting No	Sw1	Sw2	Sw3	Sw4	Description
1	Off	Off	Off	Off	Flash Output 1 when telephone rings. Output 1 On when telephone is off-hook
2	On	Off	Off	Off	Output 1 On when telephone is off-hook
3	Off	On	Off	Off	Flash Output 1 when telephone rings
4	On	On	Off	Off	Output 1 On when Remote 1 asserted
5	Off	Off	On	Off	Output 1 On when Remote 2 asserted
6	On	Off	On	Off	Output 1 On when Remote 3 asserted
7	Off	On	On	Off	Flash Output 1 when Remote 1 asserted
8	On	On	On	Off	Flash Output 1 when Remote 2 asserted
9	Off	Off	Off	On	Flash Output 1 when Remote 3 asserted
10	On	Off	Off	On	Output 1 On when Remote 1 or Remote 2 asserted
11	Off	On	Off	On	Output 1 On when Remote 1 asserted and Remote 2 not asserted
12	On	On	Off	On	Output 1 On when Remote 1 not asserted and Remote 2 asserted
13	Off	Off	On	On	Output 1 On when Remote 1 asserted and Remote 2 asserted
14	On	Off	On	On	Reserved for future assignment
15	Off	On	On	On	Latching Mode selection for Output 1
16	On	On	On	On	Momentary Mode selection for Output 1

Fig 13-4: Output 1 Configuration Setting

The available settings for output 2, configured using switches Sw5 to Sw8, are detailed below:

Setting No	Sw5	Sw6	Sw7	Sw8	Description
1	Off	Off	Off	Off	Flash Output 2 when telephone rings. Output 2 On when telephone is off-hook
2	On	Off	Off	Off	Output 2 On when telephone is off-hook
3	Off	On	Off	Off	Flash Output 2 when telephone rings
4	On	On	Off	Off	Output 2 On when Remote 1 asserted
5	Off	Off	On	Off	Output 2 On when Remote 2 asserted
6	On	Off	On	Off	Output 2 On when Remote 3 asserted
7	Off	On	On	Off	Flash Output 2 when Remote 1 asserted
8	On	On	On	Off	Flash Output 2 when Remote 2 asserted
9	Off	Off	Off	On	Flash Output 2 when Remote 3 asserted
10	On	Off	Off	On	Output 2 On when Remote 1 or Remote 2 asserted
11	Off	On	Off	On	Output 2 On when Remote 1 asserted and Remote 2 not asserted
12	On	On	Off	On	Output 2 On when Remote 1 not asserted and Remote 2 asserted
13	Off	Off	On	On	Output 2 On when Remote 1 asserted and Remote 2 asserted
14	On	Off	On	On	Reserved for future assignment
15	Off	On	On	On	Latching Mode selection for Output 2
16	On	On	On	On	Momentary Mode selection for Output 2

Fig 13-5: Output 2 Configuration Settings

The available settings for output 3, configured using switches Sw9 to Sw12, are detailed below:

Setting No	Sw9	Sw10	Sw11	Sw12	Description
1	Off	Off	Off	Off	Flash Output 3 when telephone rings. Output 3 On when telephone is off-hook
2	On	Off	Off	Off	Output 3 On when telephone is off-hook
3	Off	On	Off	Off	Flash Output 3 when telephone rings
4	On	On	Off	Off	Output 3 On when Remote 1 asserted
5	Off	Off	On	Off	Output 3 On when Remote 2 asserted
6	On	Off	On	Off	Output 3 On when Remote 3 asserted
7	Off	On	On	Off	Flash Output 3 when Remote 1 asserted
8	On	On	On	Off	Flash Output 3 when Remote 2 asserted
9	Off	Off	Off	On	Flash Output 3 when Remote 3 asserted
10	On	Off	Off	On	Output 3 On when Remote 1 or Remote 2 asserted
11	Off	On	Off	On	Output 3 On when Remote 1 asserted and Remote 2 not asserted
12	On	On	Off	On	Output 3 On when Remote 1 not asserted and Remote 2 asserted
13	Off	Off	On	On	Output 3 On when Remote 1 asserted and Remote 2 asserted
14	On	Off	On	On	Reserved for future assignment
15	Off	On	On	On	Latching Mode selection for Output 3
16	On	On	On	On	Momentary Mode selection for Output 3

Fig 13-6: Output 3 Configuration Settings

#### Flash Rate Preset Potentiometer

This preset potentiometer sets the rate at which the mains output is switched on/off when one of the Flash Output settings is selected. The range of adjustment is from 0.5 seconds to 2 seconds.

## Technical Specifications RB-LC3

### Connections

Mains Input: Non-filtered IEC, 110V-240V auto-adjusting, fused, 6W maximum

Fuse Rating (Mains Input): Anti-surge fuse 100mA 20 x 5mm (230VAC)  
Anti-surge fuse 250mA 20 x 5mm (115VAC)

Mains Outputs: 3 x Non-filtered IEC plugs, 1A fused

Fuse Rating (Mains Outputs): 3 x Anti-surge fuse 1A 20 x 5mm

Telephone: 2 x RJ11-4 sockets

Control Inputs & Outputs: 15 way D-type plug  
Inputs: 0V– 5V DC  
Outputs: Open Collector 20mA sink capability

### Equipment Type

RB-LC3:  3 way light/power controller

### Physical Specifications

Dimensions (Raw): 28cm (W) x 10.8cm (D) x 4.2cm (H) (1U)  
11" (W) x 4.3" (D) x 1.7" (H) (1U)

Dimensions (Boxed): 36cm (W) x 20.5cm (D) x 6cm (H)  
14.2" (W) x 8" (D) x 2.4" (H)

Weight: Nett: 1.00kg Gross: 1.45kg  
Nett: 2.2lbs Gross: 3.2lbs









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