



RB-DDA22 Digital Audio  
Distribution Amplifier With  
Multiple Outputs  
**User Handbook**



# RB-DDA22 USER HANDBOOK



## RB-DDA22 USER HANDBOOK

This handbook is for use with the following product:

Redbox RB-DDA22 Digital Audio Distribution Amplifier With Multiple Outputs

©Sonifex Ltd, 2011  
All Rights Reserved  
Revision 1.00, March 2011

Sonifex Ltd, 61, Station Road, Irthlingborough,  
Northants, NN9 5QE, England.  
Tel: +44 (0)1933 650 700  
Fax: +44 (0)1933 650 726  
Email: [sales@sonifex.co.uk](mailto:sales@sonifex.co.uk)  
Website: <http://www.sonifex.co.uk>

Information in this document is subject to change without notice and does not represent a commitment on the part of the vendor. Sonifex Ltd shall not be liable for any loss or damage whatsoever arising from the use of information or any error contained in this manual.

No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, information storage and retrieval systems, for any purpose other than the purchaser's personal use, without the express written permission of Sonifex Ltd. Unless otherwise noted, all names of companies, products and persons contained herein are part of a completely fictitious adaptation and are designed solely to document the use of Sonifex product.



<b>Warranty</b>	<b>i</b>
Warranty and Liability	i
Unpacking the RB-DDA22	iii
Returning the Warranty Card	iii
<b>Safety Information</b>	<b>iv</b>
Safety of Mains Operated Equipment	iv
Voltage Setting Checks	iv
Fuse Rating	iv
Power Cable and Connection	iv
Ordering the Correct Mains Lead	v
<b>Installation Information</b>	<b>v</b>
Atmosphere	v
Electromagnetic Radiation	v
Fitting Redboxes	v
WEEE & RoHS Directives - Sonifex Statement	vi
<b>1. RB-DDA22 Digital Audio Distribution Amplifier With Multiple Outputs</b>	<b>1</b>
Introduction	1
Operating Mode	2
Input Select Mode	2
Auto Select Mode	2
System Block Diagram	2
<b>2. Rear Panel Connections and Operations</b>	<b>3</b>
Digital Audio Inputs	3
AES/EBU Inputs	3
S/PDIF Input	3
Optical Input	3
Digital Audio Outputs	3
AES/EBU Outputs	3
S/PDIF Outputs	4
Optical Outputs	4
<b>3. Technical Specifications</b>	<b>5</b>



**CONTENTS**

# FIGURES



## FIGURES

### Figures

Fig A: Packing List	iii
Fig B: Power Connections	iv
Fig C: Mains Lead Table	v
Fig D: RB-RK3 Large Redbox Rear Rack-mount Kit	v
Fig 1-1: RB-DDA22 Front Panel	1
Fig 1-2: RB-DDA22 Front Panel Controls	1
Fig 1-3: RB-DDA22 System Block Diagram	2
Fig 2-1: RB-DDA22 Rear Panel	3



## Warranty

### Warranty and Liability

**Important: the purchaser is advised to read this clause**

- 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 12 months of the date of despatch 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.



WARRANTY

## WARRANTY



## WARRANTY

- 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).
  - iii. 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 the RB-DDA22

The RB-DDA22 is shipped with the following equipment. Please check your packaging to ensure that you have all of the items below. If anything is missing, please contact the supplier of your equipment immediately.

Item	Quantity RB-DDA22
RB-DDA22	1
IEC Mains lead fitted with moulded mains plug	1
Handbook and warranty card	1

Fig A: Packing List

Each RB-DDA22 is shipped in protective packaging and should be inspected for damage before use. Where an item is found to have transit damage, 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.

### Returning the Warranty Card

In order to register the date of purchase so that we can keep you informed of any design improvements or modifications, it is important to complete the warranty registration document that is enclosed and return it to Sonifex Ltd in the UK.

For your own records you should write down the serial number (which can be found on the rear of the RB-DDA22).

Serial Number	.....
---------------	-------



**WARRANTY**

# SAFETY INFORMATION



SAFETY INFORMATION

## Safety Information

### Safety of Mains Operated Equipment



This equipment has been designed to meet the safety regulations currently advised in the country of purchase and it conforms to the safety regulations specified by use of the CE Mark.

**Warning :** 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.

### Voltage Setting Checks

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

### Fuse Rating

The RB-DDA22 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 fuse rating for the RB-DDA22 is:

230 or 115 V operation - 2A 5 x 20mm SB

The active fuse is fitted on the outside rear panel of the unit.

### Power Cable and Connection

An IEC power connector is supplied with the RB-DDA22 which has a moulded plug attached – this is a legal requirement. If no moulded plug has been supplied with your RB-DDA22, please contact your supplier, because an IEC connector is always supplied from the Sonifex factory.

If for any reason, you need to use the RB-DDA22 with a different power cable, you should use the following wiring guidelines.

Wire Colour	Connection
Green, or green and yellow	Earth (E)
Blue, or Black	Neutral (N)
Brown, or Red	Live (L)

*Fig B: Power Connections*

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.

**Important Note :** The terminal marked on the rear panel must be earthed.





### Ordering the Correct Mains Lead

When ordering a Redbox from Sonifex, it is helpful if you can specify your required operating voltage and mains lead. After the product code add:





UK, for 230V, UK 3 pin to IEC lead	
EC, for 230V, European Schuko 2 pin to IEC lead	
US, for 115V, 3 pin to IEC lead	
AU for 230V, Australasian 3 pin to IEC lead	

Fig C: Mains Lead Table

E.g. order RB-DDA22 UK for a UK IEC lead to be supplied.

## Installation Information

### Atmosphere

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

### Electromagnetic Radiation

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.

### Fitting Redboxes

Redboxes can be fixed to the underside of a mixing 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:

**Rear Mounting The RB-DDA22:** The **RB-RK3** 1U rear panel rack kit can be used for large Redboxes such as the RB-DDA22.



Fig D: RB-RK3 Large Redbox Rear Rack-mount Kit

**Note:** When fitting the rear-mounting rack-kits, a notch has been left on the inside of the right-hand rack-piece for the mains cable to pass through. Make sure that the mains cable has been put through the notch before attaching the right hand rack-piece.

# SAFETY & INSTALLATION INFORMATION



## SAFETY & INSTALLATION INFORMATION

### WEEE & RoHS Directives - Sonifex Statement



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. It applies to a huge spectrum of products. It encourages and sets criteria for the collection, treatment, recycling and recovery of waste electrical and electronic equipment. All products manufactured by Sonifex Ltd have the WEEE directive label placed on the case. It gives a contact for individuals who are unsure about the correct procedure when the product has reached its “end of use”.

Sonifex Ltd will be happy to give you information about local organisations that can reprocess the products, or alternatively all products that have reached “end of use” can be returned to Sonifex and will be reprocessed correctly free of charge.

Sonifex Ltd has phased out the use of certain hazardous substances identified in the European Union’s Restriction of Hazardous Substances (RoHS) directive. The RoHS directive limits the use of certain hazardous substances currently used in EEE manufacture, including lead, mercury, cadmium, hexavalent chromium, and halide-containing compounds PBB (polybrominated biphenyl) and PBDE (polybrominated diphenyl ether). Elimination of these substances will result in more environmentally friendly recycling of electronic equipment. For the products which Sonifex manufacture, the main area where products were affected was in the use of lead for manufacturing and assembling electronics circuit boards.

Sonifex Ltd practices lead-free (LF) manufacturing processes. LF solder is used on the surface-mount PCB manufacturing processes and for hand soldering. The printed circuit boards (PCBs) used are either gold plated, or immersion tin plated, both of which use no lead. Historically the PCBs were hot air solder levelled (HASL) PCBs which used tin/lead based solder.

The manufacturing processes include the assembly of purchased components from various sources. Product is offered as RoHS compliant, or LF, only after sufficient evidence is received from the component manufacturers that their components are RoHS compliant. Sonifex Ltd relies solely on the distributor, or manufacturer, of the components for identification of RoHS compliance. Thus whilst every effort is made to ensure compliance, Sonifex Ltd makes no warranty, or certification, or declaration of compliance concerning said components.

Sonifex Ltd defines “Lead Free” as pertaining to any product, which has been manufactured by Sonifex Ltd using components which have been declared by the manufacturers as “Lead Free”. All statements by Sonifex Ltd of RoHS compliance are based on component manufacturer documentation.



## 1. RB-DDA22 22 Way Stereo Digital Audio Distribution Amplifier

### Introduction



Fig 1-1: RB-DDA22 Front Panel

The RB-DDA22 digital distribution amplifier is used for distributing digital audio data in many formats, repeating both the audio data and the status information of the input whilst re-clocking the data and re-normalising to the appropriate standard digital audio levels.

The unit has 5 inputs and you can select one of them to distribute to all of the 22 outputs.

#### Input Signals:

- 1 x XLR 3 female AES/EBU digital audio input
- 1 x BNC AES-3id digital audio input
- 1 x RJ45 AES/EBU digital audio input
- 1 x RCA Phono S/PDIF input
- 1 x TOSLink digital audio optical input

#### Output Signals:

- 6 x XLR-3 male AES/EBU digital audio outputs
- 6 x BNC AES-3id digital audio outputs
- 6 x RJ45 AES/EBU digital audio outputs
- 2 x RCA Phono S/PDIF outputs
- 2 x TOSLink optical outputs

The RJ-45 connectors are wired to be StudioHub+ compatible, a format defined by Radio Systems Inc.

Applications include distributing audio from a digital mixing desk to multiple digital recorders, or feeding multiple studios with an output from a USB audio player.

It can accept input sample rates in the range of 30kHz - 200kHz, and bit rates of 16, 20 and 24 bit. So, it can be used for standard CD signal distribution at 16 bit 44.1kHz, as well as for high quality 24 bit 96kHz or 192kHz recording.



Fig 1-2: RB-DDA22 Front Panel Controls

The front panel has an INPUT SELECT button and 7 indicator LEDs. The button is used to select the input to be used and shows the mode of operation of the unit. The LEDs will indicate, depending on the mode of operation, the input selected, valid signal presence, or the operational frequency.

StudioHub+™ is a registered trademark of Radio Systems Inc





### Operating Mode

In 'operating mode', the central button LED is unlit. The unit selects this mode when a valid input signal has been present and no button presses have been made for 8 seconds. The LEDs around the button illuminate amber to directly indicate the following frequencies 32, 44.1, 48, 88.2, 96, 176.4 & 192 kHz. If the input is at a non-standard frequency then the unit will indicate both the frequencies either side of the incoming frequency – e.g. if the input signal has a frequency of 64kHz then both the 48kHz and 88.2kHz LEDs will be illuminated. If the frequency is below 32kHz or above 192kHz then the appropriate LED will flash.

### Input Select Mode

Pressing the INPUT SELECT central button illuminates it red and allows you to select the required input. Pressing the button will step the selected input to the next input selection including auto mode.

In Input Select Mode the LEDs have the following states:

Off – Signal not selected and no valid signal present

Green – Signal not selected and valid signal present

Red – Signal selected and no valid signal present

Amber – Signal selected and valid signal present or Auto Mode Selected

Note: Input Select mode is chosen automatically when the selected input is not present.

### Auto Select Mode

In this special input select mode the unit will hunt through all the inputs until it finds a valid signal. If multiple signals are present you can force selection of the next input by holding the input select button down for 2 seconds, when the next valid input will be selected.

### System Block Diagram

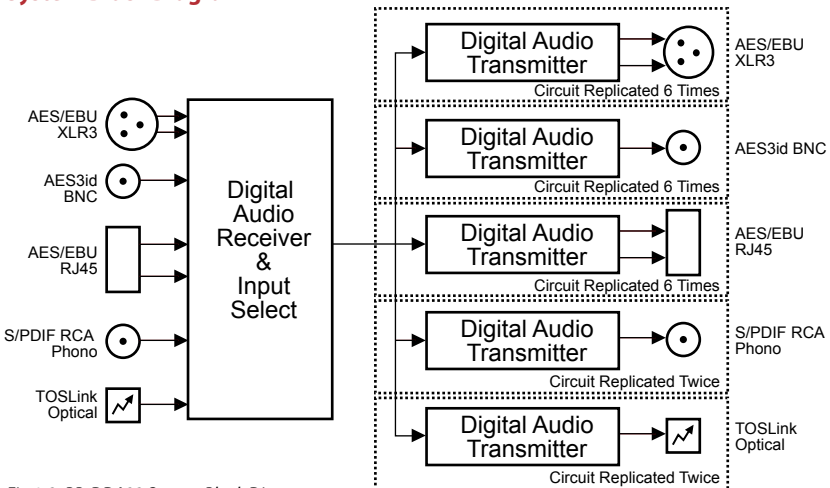


Fig 1-3: RB-DAA22 System Block Diagram



## 2. Rear Panel Connections and Operations

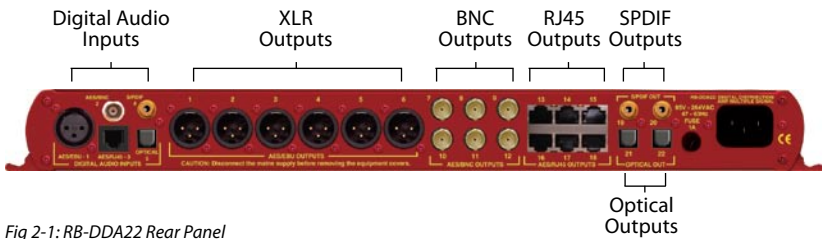


Fig 2-1: RB-DDA22 Rear Panel



REAR PANEL CONNECTIONS AND OPERATIONS

### Digital Audio Inputs

#### AES/EBU Inputs

The 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 BNC AES3id input has an impedance of 75Ω.

The RJ45 AES input has an impedance of 110Ω. It has the following connections:

- Pin 1: Phase
- Pin 2: Non-phase
- Pin 3: No Connection
- Pin 4: Screen
- Pin 5: No Connection
- Pin 6: No Connection
- Pin 7: No Connection
- Pin 8: No Connection

#### S/PDIF Input

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

#### Optical Input

The optical input is a standard TOSLink connector.

### Digital Audio Outputs

#### AES/EBU Outputs

The XLR 3 pin sockets have an impedance of 110Ω. They have the following connections:

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

# 2

## REAR PANEL CONNECTIONS AND OPERATIONS



### REAR PANEL CONNECTIONS AND OPERATIONS

The BNC AES3id outputs have an impedance of  $75\Omega$ .

The RJ45 AES outputs have an impedance of  $110\Omega$ . They have the following connections:

- Pin 1: Phase
- Pin 2: Non-phase
- Pin 3: No Connection
- Pin 4: Screen
- Pin 5: No Connection
- Pin 6: No Connection
- Pin 7: No Connection
- Pin 8: No Connection

#### **S/PDIF Outputs**

The S/PDIF phono outputs have an impedance of  $75\Omega$ .

#### **Optical Outputs**

The optical outputs are standard TOSLink connectors.



### 3. Technical Specifications

#### Audio Specifications

Sample Frequency Range: 30-200kHz (i.e. including 32kHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz and 192kHz)

Bit Depth: Up to and including 24 bit

Input Impedance: AES/EBU or RJ45:  $110\Omega \pm 20\%$  balanced  
AES BNC:  $75\Omega \pm 20\%$  unbalanced  
S/PDIF:  $75\Omega \pm 5\%$  unbalanced

Input Signal Level: AES/EBU or RJ45: 3V/10V peak to peak min/max  
AES/BNC: 1.0V  $\pm 20\%$  min  
S/PDIF: 0.5V  $\pm 20\%$  min

Output Impedance: AES/EBU or RJ45:  $110\Omega \pm 20\%$  balanced  
AES BNC:  $75\Omega \pm 20\%$  unbalanced  
S/PDIF:  $75\Omega \pm 5\%$  unbalanced

Input Signal Level: AES/EBU or RJ45: 3V/10V peak to peak min/max  
AES/BNC: 1.0V  $\pm 20\%$  min  
S/PDIF: 0.5V  $\pm 20\%$  min

#### Front Panel Operational Controls & Indicators

Digital Input Select: AES/EBU (XLR), AES/EBU (BNC), AES/EBU (RJ45), S/PDIF or TOSlink optical

Indicators: Input presence and sample rate being used indicators via tricolour LEDS around the input select button

#### Connections

Inputs: 1 x AES/EBU XLR 3 pin female (balanced)  
1 x AES3id BNC (unbalanced)  
1 x AES StudioHub+™ RJ45 (balanced)  
1 x S/PDIF RCA phono female (unbalanced)  
1 x TOSLink optical receiver



TECHNICAL SPECIFICATION

# 3

## TECHNICAL SPECIFICATION



### TECHNICAL SPECIFICATION

**Outputs:**

- 6 x AES/EBU XLR 3 pin male (balanced)
- 6 x AES3id BNC male (balanced)
- 6 x AES StudioHub+™ RJ45 (balanced)
- 2 x S/PDIF RCA phono female (unbalanced)
- 2 x TOSLink optical transmitter

**Mains Input:** Filtered IEC, 85-264VAC 47-63Hz, fused, 10W max

**Fuse Rating:** Anti-surge fuse 1A 20 x 5mm

### Equipment Type

**RB-DDA22:** Digital audio distribution amplifier with multiple outputs

### 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 2.75" (H)

**Weight:** Nett: 1.4kg    Gross: 2.0kg  
          Nett: 3.0lbs    Gross: 4.4lbs





**NOTES**

# NOTES



# NOTES



NOTES



NOTES

# SONIFEX

[www.sonifex.co.uk](http://www.sonifex.co.uk)

t:+44 (0)1933 650 700

f:+44 (0)1933 650 726

[sales@sonifex.co.uk](mailto:sales@sonifex.co.uk)

