Redbox RB-VHDA2X4
3G/HD/SD-SDI 2 Input,
8 Output Video Distribution
Amplifier

Manufacturers of audio & video
products for radio & TV broadcasters

SONIFEX

This handbook is for use with the following product:

Redbox RB-VHDA2x4 3G/HD/SD-SDI 2 Input, 8 Output Video Distribution Amplifier

Stock Code: 30-290

Made in the UK by **SONIFEX**

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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.

To register your product, please go online to www.sonifex.co.uk/register

Product Warranty - 2 Year

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 within 30 days of purchase, 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.

Note: For your own records the product serial number is recorded on the CE certification page of this handbook.

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 for the repair/upgrade/returns procedure, or for support & questions regarding the product operation.

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CE Declaration of Conformity and Approval Information

This document certifies that the Sonifex product that you have purchased is compliant with CE specifications. If you would like further information on compliance of all Sonifex products, please check the website at the address above where full information is available.

Sonifex Limited hereby certify that the following product with serial number shown has been designed and manufactured in accordance with the following specifications :

Product: _____

_____

Serial No: _____

EMC:	EN 55103-1: 1997 Electromagnetic Compatibility. Limits of disturbance for audio apparatus for professional use For use in environments 1 to 4.
	EN 55103-2: 1997 Electromagnetic Compatibility. Limits of disturbance for audio apparatus for professional use For use in environments 1 to 4.
Safety:	EN 60950: 1992 Safety of Information Technology Equipment Including Electrical Business Equipment.
Hybrid Approvals:	BS6301, BS7002, BS415, CTR21, R&TTE directive (1999/5/EC)

The Reference Technical Justification File for this product is available at Sonifex Ltd.

Authorised By:

Name: Chris Stills

Position: Technical Director

Date of Issue: 01 September 2014

Signature:

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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 – this is a legal requirement 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.

Important Note: If there is an earth/ground terminal on the rear panel of the product then it must be earthed/grounded.

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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.

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.

Sonifex Ltd practices lead-free (LF) manufacturing processes and does not use any of the hazardous substances identified in the European Union's Restriction of Hazardous Substances (RoHS) directive. 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.

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.

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 a 1U Rackmount Redbox:

The RB-RK3 1U rear panel rack kit can be used for large 1U rackmount Redboxes.

Note: When fitting the RB-RK3 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.

Introduction

Fig 1-1: The RB-VHDA2x4 3G/HD/SD-SDI 2 Input, 8 Output Video Distribution Amplifier

The RB-VHDA2x4 is a high performance, reliable dual input and eight output digital video distribution amplifier for re-clocking and distributing up to two 3G, HD (high definition) or SD (standard definition) SDI sources.

By default, the RB-VHDA2x4 acts as two independent video distribution amplifiers, with input 1 routed to outputs 1-4 and input 2 routed to outputs 5-8. Either input can also be routed to all outputs if desired which can be selected by the Input Select switch on the front panel or via the built-in webserver. The webserver also provides status information for the unit.

The unit provides automatic input detection, re-clocking and cable equalisation of the input signals to 100/350 meters (HD/SD) of coax cable.

The full range of 3G, SD and HD standards are supported by the unit allowing PAL and NTSC signals up to 1080p 60Hz to be distributed. Each output is individually buffered providing separately driven outputs for greater reliability.

As well as an AC power input, the unit also has a 12V DC input for use, for example, in outside broadcast vehicles. Both power inputs can be used to give a dual redundant power supply.
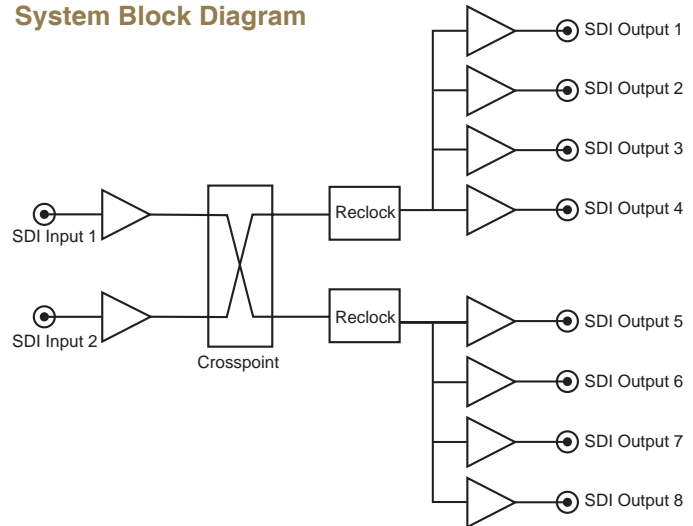
System Block Diagram

Fig 1-2: The RB-VHDA2x4 System Block Diagram

Front Panel Controls and Indicators

Fig 2-1: The RB-VHDA2x4 Front Panel

Power LED

The POWER LED illuminates whilst internal power is present within the unit. If this indicator is not on, the most likely reason is simply the absence of mains power, but under fault conditions it may also indicate a ruptured mains fuse or a problem with the internal power supply module.

Reset Button

In the unlikely event that the unit fails to respond, press the reset button to reboot the unit.

Input Status

There are two LED indicators on the front panel to provide input lock status. When a valid input signal has been applied to either input then the corresponding LED will be lit solid green. When an input has not detected a valid signal the LED will flash green. Each input has its own status indication.

Mode Select

This button provides local control to allow the user to cycle through the routing modes available. Pressing the button once will indicate the current mode selected using the two front panel status LEDs. Pressing again while the current mode is displayed will cycle though the modes. The modes and the corresponding LED states are described below.

Mode Selection Table		
Mode	**Input 1 Status**	**Input 2 Status**
Input 1 Input 1 to Outputs 1-8	ON	OFF
Input 2 Input 2 to Outputs 1-8	OFF	ON
Dual Input 1 to Outputs 1-4 Input 2 to Outputs 5-8	ON	ON

Rear Panel Connections

Ethernet   Fuse

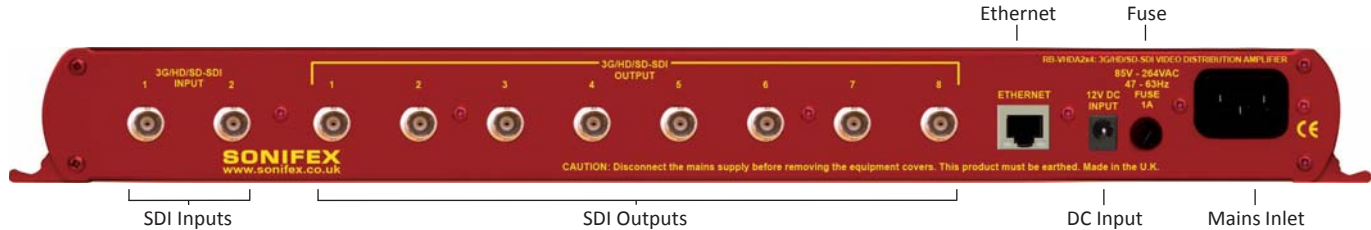SDI Inputs   SDI Outputs   DC Input   Mains Inlet

Fig 2-2 The RB-VHDA2x4 Rear Panel

Mains Power

Power is applied via a standard three-pin IEC male socket. Mains voltages between 85V and264V AC and frequencies between 47 and 63Hz are accepted without adjustment. A 1A, 5 x 20mm SB fuse is used. The Earth pin MUST be connected to ensure safety.

DC Power

The unit provides a secondary power source for the unit via a DC input. This power input can accept voltages in the range of 9 – 14V and must be able to source 500mA. Both mains and DC power sources can be connected at the same time.

Ethernet

The Ethernet port is connected using a standard RJ-45 connector on the rear of the panel.

It is a 10/100Mbps link. The unit can be controlled remotely over the Ethernet connection using the built-in webserver. By default the unit is configured for dynamic addressing using DHCP and Auto-IP. If a static IP address is required then this must be configured through the webserver.

Ethernet Connector (RJ-45)	
Pin No.	Function
1	Transmit Data (+)
2	Transmit Data (-)
3	Receive Data (+)
4	No connection
5	No connection
6	Receive Data (-)
7	No connection
8	No connection

SDI Inputs

The SDI inputs are connected using a female BNC and have a 75Ω input impedance. They are both a triple rate SDI receiver with automatic input rate detection and equalisation. They support the full range of 3G, SD and HD standards from NTSC and PAL up to 1080p 60Hz. The status of the inputs are displayed on the status LEDs on the front panel. When the SDI input rate and format has been detected, the indicator will be lit solid green.

SDI Outputs 1 to 8

The eight SDI outputs are connected using the female BNC connectors on the rear panel. They have a 75Ω output impedance in accordance with the SMPTE standard and are both re-clocked and independently buffered.

Webserver & Unit Discovery

The RB-VHDA2x4 uses the Zeroconf networking methodology to allow the unit to be a "plug and play" device. Just simply connect it to the network and use it. The unit is assigned an IP address using a DHCP server, or a self-assigned address using AUTOIP when one isn't available.

The RB-VHDA2x4 uses Bonjour discovery on a network. Once the unit has been connected to the network it will try to obtain an IP address from a DHCP server on the network, if none is found then the unit will use Auto-IP to assign itself an IP address. There is no direct method for the user to determine exactly which IP address has been assigned to the unit. Using a Bonjour discovery application or browser plug-in, the unit can be discovered and connected to with relative ease. Bonjour is available as standard on MAC OS and as plug-in for Internet Explorer for the Bonjour for windows download. You can also use the discovery application provided by Sonifex and available from the download page.

Technical Specification For RB-VHDA2x4

Compatible Standards:	SMPTE-424M (3G)
	SMPTE-292M (HD-SDI) SMPTE-259M-AC1 (SD-SDI)
	SMPTE 344M
	DVB-ASI at 270Mb/s
	1. Other rates will be passed without reclocking.
1. Other rates will be passed without reclocking.	
Impedance:	75Ω terminating
Equalisation:	Up to 100m of Belden 1694A at 1.485Gbps
	Up to 350m of Belden 1694A at 270 Mbps
Data Rates:	143, 270, 1483.5,
Fully supported Passed but not reclocked:	1485, 2967 & 2970Mbps
	177, 360 & 540Mbps
Reclocking & Equalisation:	Automatic
Resolution:	Automatic
Return Loss:	>15dB at 1500MHz
Output Jitter:	<0.2UI
Signal Level:	800mV ±10%

Front Panel Indicators

Power LED:	Red indicates power is present
Input Status 1 & 2 LEDs:	Green indicates signal is present, flashing green indicates signal is missing.

Rear Panel Connections

3G/HD/SD-SDI Video Input:	2 x BNC (Unbalanced)
3G/HD/SD-SDI Video Outputs:	8 x BNC (Unbalanced)
Ethernet Port:	RJ45 with status LEDs
Power Supply: AC:	Filtered IEC, continuously rated 85-264VAC, 47-63Hz, fused, max 10W
Fuse Rating: DC:	Anti-surge fuse 1A 20 x 5mm 12V 500mA max, DC supply, 2.5mm socket fused

Equipment Type

RB-VHDA2x4:	3G/HD/SD-SDI 2 inputs, 8 output video distribution amplifier

Physical Specification

Dimensions (Raw):	48cm (W) x 10.8cm (D) x 4.3cm (H)
	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: 1.3kg Gross: 1.9kg
	Nett: 2.9lbs Gross: 4.2lbs

Accessories

RB-RK3:	1U Rear panel rack kit for large Redboxes

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