

HANDBOOK

## CM-BH4W Beltpack & CM-BH4WX Beltpack

Belt-Pack 4-Wire  
Headphone Amp



Manufacturers of audio & video  
products for radio & TV broadcasters

**SONIFEX**

This handbook is for use with the following product:  
CM-BH4W Beltpack Belt-Pack 4-Wire Headphone Amp.  
Stock Code: 30-292

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## 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.

## Warranty

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- (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.

## Repairs & Returns

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.

# SONIFEX

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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 :**

**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

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

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

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 March 2014  
Signature: 



### 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.

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### 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.



# 1. CM-BH4W Belt Pack 4 Wire Headphone Amplifier

## Introduction



Fig 1-1: CM-BH4W Belt Pack Headphone Amplifier 4 Wire

The CM-BH4W is a portable, battery powered 4 wire beltback for use in talkback and IFB applications, providing two-way communication with a wide range of studio equipment, including the Sonifex CM-TB8.

The built in automatic gain control (AGC) ensures a constant line output level is maintained for a wide range of headset microphones, and in IFB mode the input audio is passively switched to the output when the talk button is not pressed, giving a fail-safe audio path through the unit.

A low battery warning LED flashes when the 9V PP3 battery has depleted to 6V, giving plenty of notice to swap the battery. The low power circuitry of the CM-BH4W gives up to 150 hours

use from a single alkaline 9V PP3 battery, and removing the jack plug from the headset socket switches the unit off to conserve battery life.

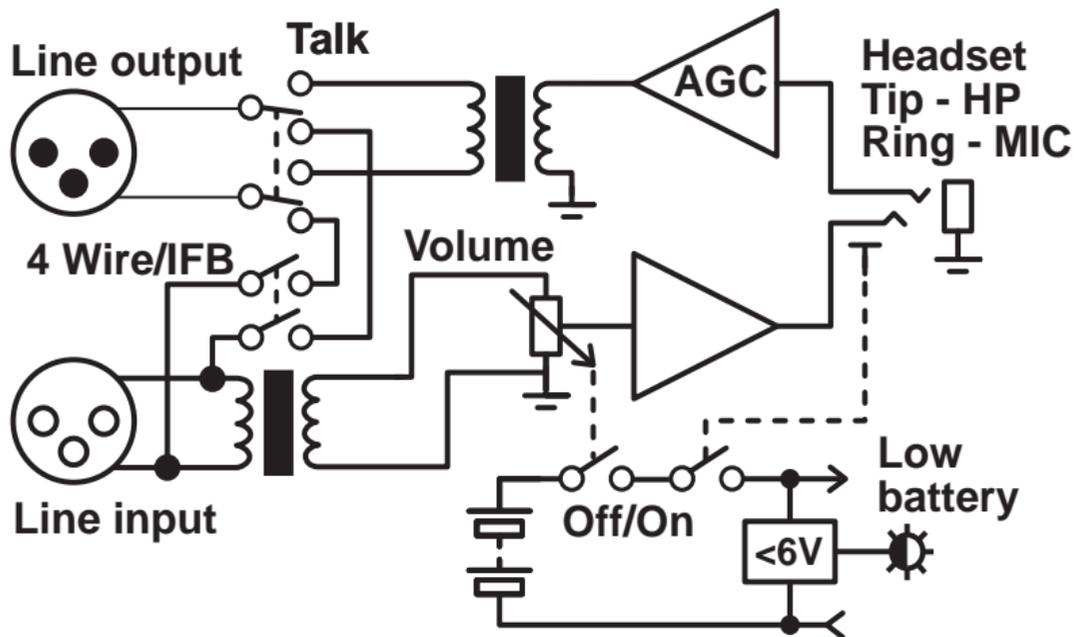


Fig 1-2: CM-BH4W Block Diagram

## 2. Controls & Indicators

### Top Panel Controls & Indicators



Fig 2-1: Top Panel View of CM-BH4W

#### Headset Socket

The headset connector is a ¼" jack socket that provides an unbalanced microphone input

alongside an unbalanced, mono headphone output. The socket has the following connections:

- Tip: Headphone Output
- Ring: Microphone Input
- Screen: Headphone/Microphone Common
- Volume Control

The volume control modifies the headphone output volume, giving up to 10dB of gain for low level line inputs. The control also acts as a power switch, turning the unit off when fully anticlockwise.

#### Low Battery Indicator

Should the battery voltage fall below 6V, the 3mm red low battery indicator will flash, warning you that the battery should be changed as soon as possible to prevent failure.

## TALK Pushbutton

The TALK button routes the microphone audio via an automatic gain control (AGC) circuit to the line output. The AGC maintains the output level at +2dBu for a wide range of microphone input levels. The TALK switch can be set as a momentary or latching switch by inserting/removing an internal pin (set as momentary by default). Contact Sonifex for more information on this.

## Side Panel Controls

### 4 Wire/IFB Mode Switch

The mode of operation is set using the 4 wire/IFB mode switch.

- In 4 wire mode, the line output remains silent until the TALK button is pressed.
- In IFB mode, the line input is routed to the line output until the TALK button is pressed, after which it is interrupted by the microphone audio.



Fig 2-2: Side Panel View of CM-BH4W

### Bottom Panel Connections



Fig 2-3: Bottom Panel View of CM-BH4W

The audio connections are found on the bottom panel, and both have the following connections:

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

#### Line Input

The line input is a transformer balanced audio input with  $>10k\Omega$  input impedance. The line input can accept input levels of up to +24dBu.

#### Line Output

The line output is either a direct connection to the line input (if IFB mode is set and talk is not pressed) or is a transformer balanced audio output containing post AGC microphone audio.

## CM-BH4WX Belt-Pack 4-Wire Headphone Amp With 4 Pin XLR Headset Connector

This is a version of the CM-BH4W with a 4 pin XLR headset connection instead of a stereo jack connector. In all other respects it is the same as the CM-BH4W.



Fig 2-4: Top Panel View of CM-BH4WX

The XLR connections are:

- Pin 1: Microphone non-phase (-)
- Pin 2: Microphone phase (+)
- Pin 3: Headphone non-phase (-)
- Pin 4: Headphone phase (+)

## 3. Technical Specification CM-BH4W/X Belt Pack

### Mic In to Line Out

Mic Input Impedance: 1k $\Omega$  Unbalanced for 200 $\Omega$  dynamic microphone

Limiter Input Threshold: -60dBu

Line Output Level: +2dBu

Line Output Impedance: 150 $\Omega$  Transformer balanced

### Line In to Headphone Out

Line Input Impedance: >10k $\Omega$  Transformer balanced

Input Gain/Volume: Adjustable off to +10dB

Maximum Input Level: +24dBu

Maximum HP Output Level: +7dBu (ref 9V battery voltage, <1% THD, 100 $\Omega$  load)

Minimum HP Impedance: 100 $\Omega$

### Connections

Line Input: 1 x XLR 3 pin female socket (balanced)

Line Output: 1 x XLR 3 pin male plug (balanced)

Headset (CM-BH4W): 1 x ¼" (6.35mm) mono unbalanced jack socket

Headset (CM-BH4WX): 1 x XLR 4 pin male plug (balanced)

**Equipment Type**

CM-BH4W: Belt-pack 4-wire headphone amplifier

CM-BH4WX: Belt-pack 4-wire headphone amplifier with 4 pin XLR headset connector

**Physical Specification**

Dimensions (Raw): 12.5cm (W) x 6.7cm (D) x 4.8cm (H)  
4.9" (W) x 2.6" (D) x 1.9" (H)

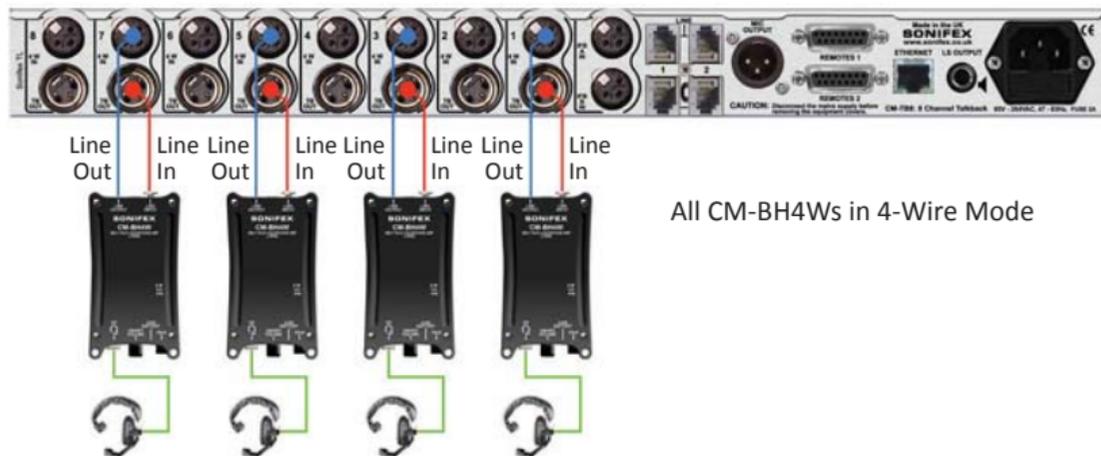
Dimensions (Boxed): 23cm (W) x 13cm (D) x 8cm (H)  
9.1" (W) x 5.1" (D) x 3.1" (H)

Weight: Nett: 0.3kg Gross: 0.4kg  
Nett: 0.6lbs Gross: 1.0lbs

## 4. Applications

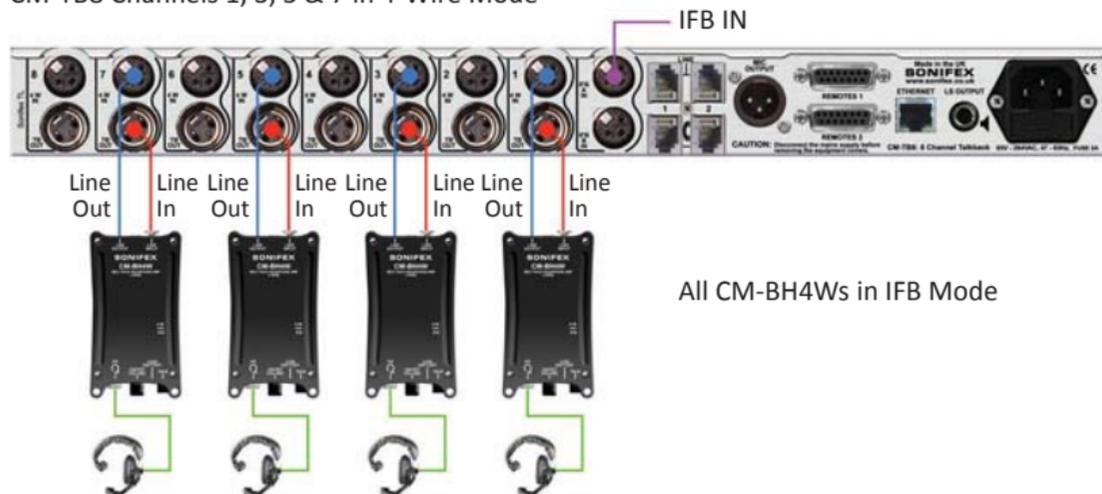
### Basic 4 Wire Star Network

CM-TB8 Channels 1, 3, 5 & 7 in IFB Mode with IFBA sent



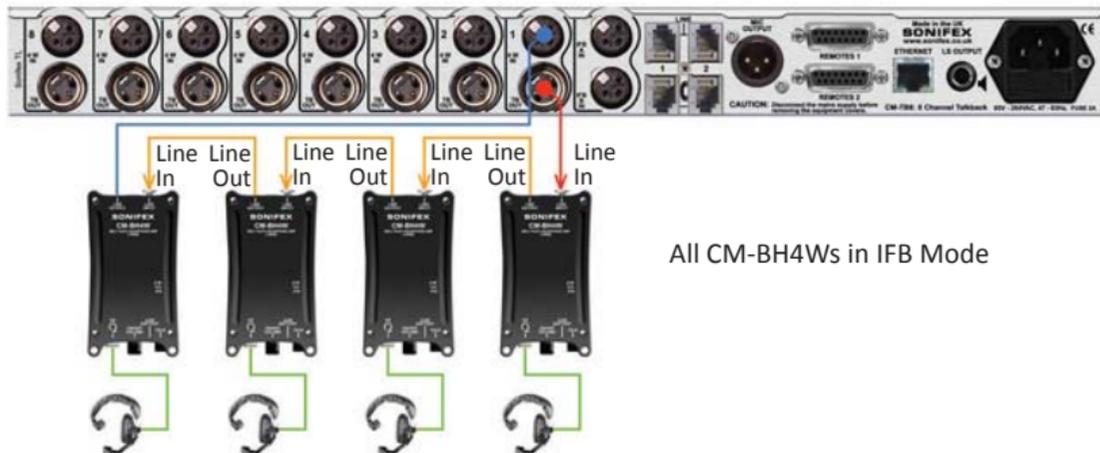
## IFB Star Network

CM-TB8 Channels 1, 3, 5 & 7 in 4-Wire Mode



## “Ring” Network Using a Single CM-TB8 Channel

CM-TB8 Channel 1 in 4-Wire Mode





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