



SONIFEX

Reference Monitors

September 2008



www.sonifex.co.uk

t: +44 (0)1933 650 700

f: +44 (0)1933 650 726

sales@sonifex.co.uk

Contents

Below is a list of links to sections within this document. Click on the required subject to go to that section.

Introduction	1
RM-2S4 Reference Monitor, 2 LED Meters & 4 Stereo Channel Inputs	3
RM-2S10 Reference Monitor, 2 LED Meters & 10 Stereo Channel Inputs	3
RM-4C8 Reference Monitor, 4 LED Meters, 8 Channel Inputs & Dual Source Selectors	6
RM-HD1 Reference Monitor HD-SDI Expansion Card	8
RM-HDE1 Reference Monitor HD-SDI & Dolby® E Expansion Card	8
RM-E1X Reference Monitor Dolby E Decoder XLR AES Expansion Card	9
RM-E1B Reference Monitor Dolby E Decoder BNC Expansion Card	9
RM-CA2 Confidence Monitor, 2 LED Meters & 2 Analogue Stereo Inputs	10
RM-CAD8 Confidence Monitor, 2 LED Meters, 2 Analogue & 6 Digital Stereo Inputs	11



REFERENCE MONITORS

Reference Monitors

Reference Monitor Range of Rack-Mount Audio Monitors



The Reference Monitor Range is a new series of rack-mount audio monitors, combining the latest DSP technology with outstanding audio enclosure design to produce monitors of the highest standards with exceptional sound quality, a comprehensive feature set and good looks in the rack.

Uniquely an embedded 5 band parametric EQ allows you to configure the monitor for your environment or to suit your listening tastes.

Detail In The Design

In the design of the product, every care has been taken to ensure the best and most accurate reproduction of the audio sources.

In a 1U rack, the propagation of high power sound waves in such a small enclosure could have a tendency to produce rattles or move components, but the Reference Monitors have been designed to ensure that their audio performance is not compromised.

Anti-Vibration

A welded and sealed stainless-steel case with milled aluminium fascia provides exceptional rigidity and has been used to

The three monitors in the range are:

RM-2S4 Reference Monitor, 2 LED meters, 4 stereo channel audio inputs.

RM-2S10 Reference Monitor, 2 LED meters, 10 stereo channel audio inputs.

RM-4C8 Reference Monitor, 4 LED meters, 8 channel inputs, dual selectors.

ensure that there are no extraneous metallic rattles. The lid is sealed with extensive thin foam cut-outs to provide damping to the lid and multi-point screw fixings are used to ensure lid rigidity.

The XLR and USB port connectors on the rear panel are sealed with foam, and silicon sealant is used on components which could move, or vibrate, under high SPL conditions.

Accurate Sound System

The speaker system comprises a three-way arrangement with two mid/high frequency speakers providing excellent stereo imaging and a separately driven, forward facing, dual magnet, mono bass driver.

Custom-moulded, profiled, HF enclosures are used to minimise standing waves and eliminate response peaks, and acoustic damping in the HF enclosures is used to reduce colouration, effectively creating a separate, sealed, infinite-baffle enclosure for each driver. ▶

// The Reference Monitors are a breakthrough in design - if you want to find out what the deal is, just listen to them, you'll notice how good they are. //



Reference Monitors

Each of the drivers is magnetically shielded so that the monitors are perfectly safe to use near CRTs and TFT displays and each speaker uses a separate, highly efficient class-D switching amplifier.

Even cable lengths to and from the speaker enclosures have been kept short to reduce any potential microphonic induction.

DSP Based Design

The use of a modern electronic architecture allows a much better audio performance to be realised. The DSP-based, 3rd-order active crossover provides perfect separation between mid-range and bass sounds.

A DSP-based electronic equalisation is used to flatten the frequency response and also enables the 5 band parametric EQ. Additionally, the fast-attack DSP loudspeaker limiter protects the drivers from overload damage.

Audio Modifiers

Six illuminated soft-touch pushbuttons allow front panel muting and dimming of the loudspeakers, stereo-to-mono conversion, phase inversion and Middle+Side encoding/decoding with all front panel settings stored in non-volatile memory which is recalled at power-up. A universal power supply ensures global voltage operation without adjustment.

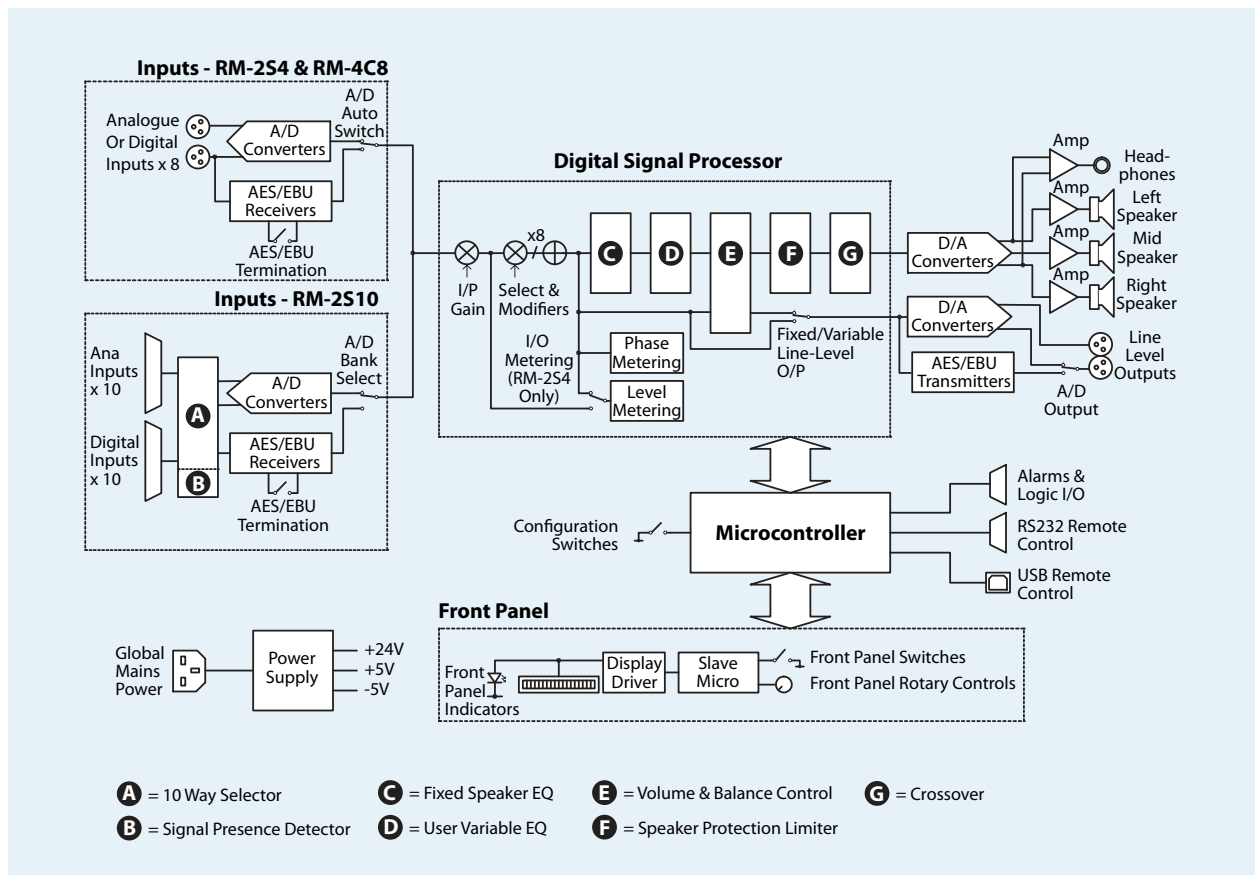
Optional HD Expansion Cards

RM-HD1 HD-SDI expansion card & RM-HDE1 HD-SDI & Dolby® E expansion card

The HD-SDI video input expansion cards allow multiple AES groups embedded within an HD-SDI or SD-SDI signal to be de-embedded and monitored, either as linear PCM with Dolby® E or Dolby® Digital encoding (RM-HDE1), or as non-encoded linear PCM (RM-HD1).

The HD-SDI input is equalised, internally reclocked and re-transmitted to provide a reclocked output to pass to external equipment via an output BNC connector, allowing the reference monitor to be inserted into an HD-SDI chain.

Reference Monitor Block Diagram



REFERENCE MONITORS

Reference Monitors

- RM-2S4** Reference Monitor, 2 LED Meters & 4 Stereo Channel Inputs
- RM-2S10** Reference Monitor, 2 LED Meters & 10 Stereo Channel Inputs



RM-2S4 Front & Rear Views

5 Band Parametric Equalisation

Each product in the Reference Monitor range contains an embedded 5 band parametric equaliser.

On testing the units, they are set up to give a flat response across the quoted frequency range, but the parametric EQ allows you to alter the response either to account for poor acoustics in the room that the monitor is mounted in, or to suit your particular listening tastes.

Using the free of charge SCi remote control software, preset EQ settings can be selected, or different EQ settings can be created and stored.

Two separate audio monitors for monitoring stereo channels:

- RM-2S4 with 4 analogue or digital stereo channels
- RM-2S10 with 10 analogue and 10 digital stereo channels

The RM-2S4 and RM-2S10 are 1U rack-mount units offering quality loudspeaker monitoring and accurate, high-resolution metering of up to four (RM-2S4) or twenty (RM-2S10 both analogue and digital) stereo audio sources and more with the addition of optional expansion

cards. Sources may be in any mixture of analogue and AES/EBU digital formats, with sample rates up to 192kHz accepted.

Audio inputs on the RM-2S4 can be analogue or digital because they are autoswitching using the left Neutrik™ XLR for AES/EBU, or both Neutrik™ XLRs for analogue inputs and they can be used in any combination. The RM-2S10 has 10 separate analogue and digital inputs.

Analogue inputs can be balanced or unbalanced in any combination. The digital inputs have switchable AES/EBU termination for (close-range) bridging operation and there is extra global input gain available for both analogue and digital low-level sources.

Sources (and additional banks of sources, if fitted) are selected via a front panel



RM-2S4 Front Panel



RM-2S4 Rear Panel

Reference Monitors



RM-2S10 Front & Rear Views

rotary encoder, with clear LED indication of the current selection. On the RM-2S10, the Source LEDs also act as signal present indicators. A pair of line-level audio outputs, configurable as analogue or AES/EBU digital, follow the selected source at either a fixed level or one mirroring the loudspeaker volume.

The level of the chosen source is displayed on a pair of bright, multicoloured 53-segment bargraph meters, with a choice of seven accurately modelled scales/responses to suit different applications and local preferences. Clear scale labels are provided for you to chose the scale displayed and the meter brightness can be adjusted from the front panel. A separate phase meter indicates channel correlation or phase error conditions. On the rear panel, open-collector alarm outputs provide hardware indication of sustained underlevel, overlevel, phase errors and digital source lock.

Six illuminated pushbuttons provide access to a range of audio 'modifiers' – instant dimming of the volume, individual muting of each audio channel, stereo-to-mono conversion, phase inversion and Middle+Side transcoding. On the rear panel, logic-level inputs allow direct remote access to the DIM and MUTE functions.

The three-way loudspeaker system is fed via a DSP-based active crossover and a trio of highly efficient Class-D amplifiers. Careful attention to driver selection, materials and case design, plus active DSP equalisation, has ensured a flat response and outstanding reproduction from such a shallow unit. A protective limiter prevents damage to the loudspeakers under overload conditions and the front-panel headphone socket automatically mutes the internal loudspeakers when a plug is inserted.

A Balance control allows you to alter the stereo imaging of the left and right channels.

A further five-band parametric equaliser can be accessed for room-equalisation purposes via Sonifex SCi Windows-based remote control software. Source selection, status monitoring and unit ID functions, plus firmware updates to add extra functionality, are all accessible remotely via both USB and RS232 connections in conjunction with Sonifex SCi software. The open control protocol also allows operation with terminal programs or customised applications.

Optional additions to the RM-2S4 and RM-2S10 include HD video input expansion cards, allowing multiple AES groups embedded within an HD-SDI or SD-SDI signal to be de-embedded and monitored.

Both RM-2S4 and RM-2S10 units operate from global mains voltages (85-264V AC, 47-63Hz) without adjustment.



RM-2S10 Front Panel



RM-2S10 Rear Panel

Reference Monitors

Technical Specification For RM-2S4 & RM-2S10

Inputs	
Audio Inputs (RM-2S4):	4 x stereo analogue or AES/EBU digital (autoselecting)
Audio Inputs (RM-2S10):	10 x stereo analogue, plus 10 x stereo AES/EBU digital
Max level (0dB input gain):	+18dBu (analogue)/0dBFS (digital)
CMRR:	>60dB typical
Input Impedance:	20kohms (analogue) 110 ohms (digital with termination switchable)
AES/EBU Sample Rate:	32 to 192kHz, converted internally to 48kHz
Input Gain:	0, +6, +12 or +18dB digital gain (switchable)
Selection:	Front panel rotary control with indicator LEDs

Line Level Outputs	
Audio Outputs:	1 x stereo analogue or AES/EBU digital (switchable)
Gain re Selected Input:	Unity or variable, following volume control (switchable)
Maximum Output Level:	+18dBu (analogue)/0dBFS (digital)
Output Impedance:	<50 ohms (analogue)/110 ohms (digital)
AES/EBU Sample Rate:	48kHz
Distortion:	<0.02% (1kHz, +8dBu output)
Noise:	-84dB RMS, unity gain ref +8dBu output
Frequency Response:	20Hz-20kHz +0/-0.5dB
Crosstalk 1kHz input:	Analogue I/O, ref 0dBu <-90dB
10kHz input:	<-85dB

Audio Modifiers	
Modifier Selection:	Illuminated front panel pushbuttons
DIM:	Reduces speaker audio level by 10dB
CUT L & CUT R:	Mutes left/right speaker audio
MONO:	Combines left and right audio inputs
PHASE INVERT:	Inverts phase of right audio input
M+S:	Converts stereo input to Middle (sum) and Side (difference) signals

User-Variable Equalisation	
Type:	Parametric
Bands:	Five
Centre Frequency:	200Hz to 18kHz
Bandwidth:	0.25 to 2 octaves
Boost/Cut:	±12dB
Programming:	Via USB/serial control port

Amplifier/Loudspeakers	
Configuration:	Three-way with stereo mid/high-frequency drivers & mono low-frequency driver
Power Output:	2 x 5W (HF) + 20W (LF) with protective limiter
Crossover:	500Hz (3rd order Butterworth)
Distortion (HF Outputs):	< 0.05% (1kHz, 3W output)
Distortion (LF Output):	< 0.05% (100Hz, 6W output)
Noise:	More than 80dB below full output
Volume:	Mute to full volume via front panel rotary control
Balance Trim:	±6dB via front panel rotary control.
Peak Acoustic Level:	102dB SPL @ 2ft

Level Metering	
Number:	2 x 53-segment tri-colour LED bargraphs
Characteristics:	Selectable by switch from: 1. Dual BBC PPM + standard VU 2. BBC PPM 3. EBU PPM 4. Nordic PPM 5. AES/EBU digital PPM 6. DIN PPM 7. Standard VU 8. Extended VU
Ballistics:	According to selected characteristic
Line-Up Level:	According to selected characteristic

Phase Metering	
Type:	5-segment, indication at 0, 45, 90, 135 and 180 degrees

Remote Control	
USB:	Slave device, 19200 baud
Serial:	RS232, 19200 baud, 3-wire connection
Alarm Outputs:	1. Audio underlevel/fail (latching) 2. Audio overlevel (latching) 3. Sustained phase error (latching) 4. AES/EBU input unlock (non-latching) Open-collector outputs rated at 30V, 50mA maximum Output low/conducting in normal condition (no alarm)
Control Inputs:	1. Mute audio 2. Dim audio 3. Alarm reset Pull-to-ground to activate inputs

Status Indicators	
LIMIT:	Indicates loudspeaker protection limiter is active.
CLIP:	Indicates internal digital clipping due to overlevel.
LOCK:	Indicates lock achieved on selected digital input(s).
OPT:	For future use.

Connectors	
Audio Inputs (RM-2S4):	8 x XLR 3-pin female (balanced, may be unbalanced)
Audio Inputs (RM-2S10):	3 x D-type 25-pin female (balanced, may be unbalanced)
Audio Outputs:	2 x XLR 3-pin male (balanced, may be unbalanced)
Headphones:	1/4" (6.35mm) A-gauge 3-pole stereo jack socket
USB:	Type B socket
Serial:	D-sub 9-pin female
Remote I/O:	D-sub 15-pin male
Mains Input:	Filtered 3-pin IEC male, continuously rated 85 - 264VAC, 47 - 63Hz, fused, 60W peak, 30W average
Fuse Rating:	Anti-surge fuse 2A 20 x 5mm

Equipment Type	
RM-2S4:	Reference Monitor, 2 LED meters, 4 stereo channel inputs
RM-2S10:	Reference Monitor, 2 LED meters, 10 stereo channel inputs

Physical Specification	
Dimensions (Raw):	48cm (W) x 30.5cm (D) x 4.4cm (H) (1U) 19" (W) x 12" (D) x 1.73" (H) (1U)
Dimensions (Boxed):	55cm (W) x 43cm (D) x 18cm (H) 21.7" (W) x 16.9" (D) x 7.1" (H)
Weight:	Nett: 4.5kg Gross: 5.9kg Nett: 10lb Gross: 13lb

Options	
RM-HD1:	HD-SDI expansion card
RM-HDE1:	HD-SDI & Dolby® E expansion card

“ The 5 band parametric EQ allows you to alter the monitor's response to suit the room it's in, or to suit your particular taste in listening. ”



Reference Monitors

RM-4C8 Reference Monitor, 4 LED Meters, 8 Channel Inputs & Dual Source Selectors



RM-4C8 Front & Rear Views

With 4 x bright high-resolution 26 segment meter displays and separate left and right source selectors, the RM-4C8 is ideal for monitoring audio channels in an SDI group, or groups of de-embedded AES/EBU channels.

The RM-4C8 offers the same functionality as the RM-2S4 but with an additional source selector so that any of the 4 channels in the selected group, or bank, can be monitored independently on left and right speakers.

Also, 4 meters are provided so that every channel in the selected group, or bank, can be visually monitored and 4 expansion port groups of 4 channels are allowed, so that all audio channels in an HD-SDI signal can be monitored, using the optional RM-HD(E)1 cards.

The audio inputs on the RM-4C8 are auto-sensing, for digital AES/EBU using the left

input XLR, or both XLRs for analogue inputs. The inputs can be used in any combination of analogue or digital.

With full remote control via GPI, RS232 or USB, a 5 band parametric equaliser, 6 front panel modifier buttons and the ability to take the optional HD-SDI expansion cards, the RM-4C8 is a flexible and versatile monitoring solution.

The same high level of care has been taken in the design of the RM-4C8 as in the RM-2S4 to ensure that it will be the best sounding 1U rack-mount audio monitor that you listen to.



RM-4C8 Front Panel



RM-4C8 Rear Panel

Reference Monitors

Technical Specification For RM-4C8

Inputs	
Audio Inputs	8 analogue or AES/EBU digital channels (autoselecting)
Max level (0dB input gain):	+18dBu (analogue)/0dBFS (digital)
CMRR:	>60dB typical
Input Impedance:	20kohms (analogue) 110 ohms (digital with termination switchable)
AES/EBU Sample Rate:	32 to 192kHz, converted internally to 48kHz
Input Gain:	0, +6, +12 or +18dB digital gain (switchable)
Selection:	2 x Front panel rotary control with indicator LEDs

Line Level Outputs	
Audio Outputs:	1 x stereo analogue or AES/EBU digital (switchable)
Gain re Selected Input:	Unity or variable, following volume control (switchable)
Maximum Output Level:	+18dBu (analogue)/0dBFS (digital)
Output Impedance:	<50 ohms (analogue)/110 ohms (digital)
AES/EBU Sample Rate:	48kHz
Distortion:	<0.02% (1kHz, +8dBu output)
Noise:	-84dB RMS, unity gain ref +8dBu output
Frequency Response:	20Hz-20kHz +/-0.5dB
Crosstalk	Analogue I/O, ref 0dBu
1kHz input:	<-90dB
10kHz input:	<-85dB

Audio Modifiers	
Modifier Selection:	Illuminated front panel pushbuttons
DIM:	Reduces speaker audio level by 10dB
CUT L & CUT R:	Mutes left/right speaker audio
MONO:	Combines left and right audio inputs
PHASE INVERT:	Inverts phase of right audio input
M+S:	Converts stereo input to Middle (sum) and Side (difference) signals

User-Variable Equalisation	
Type:	Parametric
Bands:	Five
Centre Frequency:	200Hz to 18kHz
Bandwidth:	0.25 to 2 octaves
Boost/Cut:	±12dB
Programming:	Via USB/serial control port

Amplifier/Loudspeakers	
Configuration:	Three-way with stereo mid/high-frequency drivers & mono low-frequency driver
Power Output:	2 x 5W (HF) + 20W (LF) with protective limiter
Crossover:	500Hz (3rd order Butterworth)
Distortion (HF Outputs):	< 0.05% (1kHz, 3W output)
Distortion (LF Output):	< 0.05% (100Hz, 6W output)
Noise:	More than 80dB below full output
Volume:	Mute to full volume via front panel rotary control
Balance Trim:	±6dB via front panel rotary control
Peak Acoustic Level:	102dB SPL @ 2ft

Level Metering	
Number:	4 x 26-segment tri-colour LED bargraphs
Characteristics:	Selectable by switch from: 1. Dual BBC PPM + standard VU 2. BBC PPM 3. EBU PPM 4. Nordic PPM 5. AES/EBU digital PPM 6. DIN PPM 7. Standard VU 8. Extended VU
Ballistics:	According to selected characteristic
Line-Up Level:	According to selected characteristic

Phase Metering	
Type:	5-segment, indication at 0, 45, 90, 135 and 180 degrees

Remote Control	
USB:	Slave device, 19200 baud
Serial:	RS232, 19200 baud, 3-wire connection
Alarm Outputs:	1. Audio underlevel/fail (latching) 2. Audio overlevel (latching) 3. Sustained phase error (latching) 4. AES/EBU input unlock (non-latching) Open-collector outputs rated at 30V, 50mA maximum Output low/conducting in normal condition (no alarm)
Control Inputs:	1. Mute audio 2. Dim audio 3. Alarm reset Pull-to-ground to activate inputs

Status Indicators	
LIMIT:	Indicates loudspeaker protection limiter is active.
CLIP:	Indicates internal digital clipping due to overlevel.
LOCK:	Indicates lock achieved on selected digital input(s).
OPT:	For future use.

Connectors	
Audio Inputs:	8 x XLR 3-pin female (balanced, may be unbalanced)
Audio Outputs:	2 x XLR 3-pin male (balanced, may be unbalanced)
Headphones:	1/4" (6.35mm) A-gauge 3-pole stereo jack socket
USB:	Type B socket
Serial:	D-sub 9-pin female
Remote I/O:	D-sub 15-pin male
Mains Input:	Filtered 3-pin IEC male, continuously rated 85 - 264VAC, 47 - 63Hz, fused, 60W peak, 30W average
Fuse Rating:	Anti-surge fuse 2A 20 x 5mm

Equipment Type	
RM-4C8:	Reference Monitor, 4 LED meters, 8 channel inputs & dual source selectors

Physical Specification	
Dimensions (Raw):	48cm (W) x 30.5cm (D) x 4.4cm (H) (1U) 19" (W) x 12" (D) x 1.73" (H) (1U)
Dimensions (Boxed):	55cm (W) x 43cm (D) x 18cm (H) 21.7" (W) x 16.9" (D) x 7.1" (H)
Weight:	Nett: 4.5kg Gross: 5.9kg Nett: 10lb Gross: 13lb

Options	
RM-HD1:	HD-SDI expansion card
RM-HDE1:	HD-SDI & Dolby® E expansion card



Reference Monitors

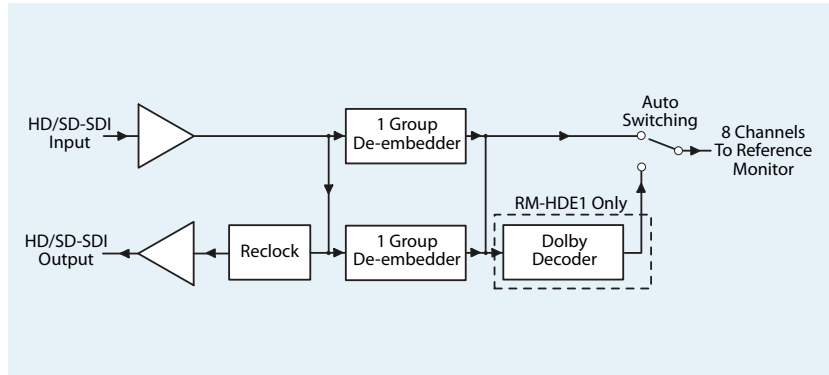
RM-HD1 Reference Monitor HD-SDI Expansion Card & RM-HDE1 Reference Monitor HD-SDI & Dolby® E Expansion Card

These expansion boards allow the monitoring of embedded audio channels within an SD/HD-SDI video signal. The embedded audio can be either non-encoded linear PCM (RM-HD1), Dolby® E or Dolby® Digital (RM-HDE1) depending on which card is used.

The RM-HDE1 card is for use with the RM-4C8 whilst the RM-HD1 card can be used with the RM-2S4, RM-2S10 and RM-4C8.

The expansion board can extract two AES/EBU groups (4 stereo pairs) from the video signal and pass them to the main Reference Monitor unit for monitoring. The input is autosensing for either SD or HD input formats and the extraction of embedded audio complies with SMPTE-272 (SD) and SMPTE-299 (HD).

The SDI input is equalized, internally reclocked and re-transmitted to provide a reclocked output to pass to external equipment such as another reference monitor.



RM-HD(E)1 Block Diagram

		Reference Monitor		
		RM-2S4	RM-2S10	RM-4C8
Expansion Card	RM-HD1	✓	✓	✓
	RM-HDE1	✗	✗	✓



RM-HD1 Expansion Card



RM-HDE1 Expansion Card

Technical Specification RM-HD1 & RM-HDE1

<p>SDI Input</p> <p>SDI Video: SMPTE 259M – SD @ 270 Mbps or SMPTE 292M – HD @ 1.5 Gbps</p> <p>Input Impedance: 75Ω</p>	<p>Jitter: < 0.2UI</p> <p>Embedded Audio Standard: SMPTE 272M or SMPTE 299M 24 bit 48 kHz synchronous/asynchronous*</p> <p>*Audio must be synchronous in SD. If asynchronous audio is presented in an HD input then only one group can be presented at any one time.</p>	<p>Equipment Type</p> <p>RM-HD1: HD-SDI expansion card</p> <p>RM-HDE1: HD-SDI & Dolby® E expansion card</p>
<p>SDI Output</p> <p>SDI Video: Reclocked input</p> <p>Output Impedance: 75Ω</p> <p>Output Level: 0.8 Vp-p</p> <p>Return Loss: > 15 dB (1.5 GHz)</p>	<p>Connectors</p> <p>HD-SDI Input: 1 x BNC 75Ω SDI input</p> <p>HD-SDI Output: 1 x BNC 75Ω SDI output (reclocked loop through)</p>	<p>Physical Specification</p> <p>Dimensions (Raw): 15cm (W) x 11.5cm (D) x 3.1cm (H) 5.9" (W) x 4.5" (D*) x 1.2" (H) (1U)</p> <p>Dimensions (Boxed): 25cm (W) x 20cm (D) x 10cm (H) 9.8" (W) x 7.9" (D*) x 3.9" (H) (1U)</p> <p>Weight (RM-HD1): Nett: 0.13kg Gross: 0.4kg Nett: 0.3lb Gross: 0.9lb</p> <p>Weight (RM-HDE1): Nett: 0.15kg Gross: 0.4kg Nett: 0.3lb Gross: 0.9lb</p>

Dolby and the double-D symbol are registered trademarks of Dolby Laboratories.

Reference Monitors

RM-E1X Reference Monitor Dolby E Decoder XLR AES Expansion Card & RM-E1B Reference Monitor Dolby E Decoder BNC Expansion Card

These expansion boards for the Reference Monitor RM-4C8 allow the monitoring of a digital audio stream containing either Linear PCM or Dolby* encoded audio.

The RM-E1X has 2 x XLR inputs to accept AES/EBU level inputs and the RM-E1B has 2 x BNC connectors for S/PDIF level inputs.

Dolby data is decoded and passed to the Reference Monitor as either a stereo down mix or the full complement of individual channels. If the signal is standard Linear PCM, then this audio data is simply passed straight through.

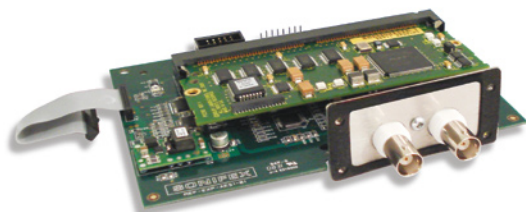
The input is re-transmitted with minimal delay, to allow connection to other equipment.

Technical Specification For RM-E1X and RM-E1B

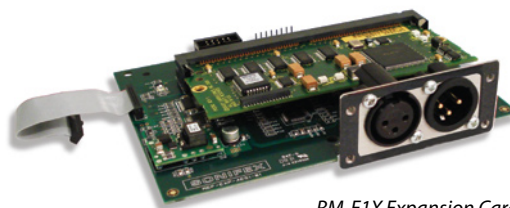
AES Input/Output (RM-E1X):	110Ω transformer coupled balanced I/O
S/PDIF Input/Output (RM-E1B):	75Ω transformer coupled unbalanced I/O
Sample Rates:	32 - 48 kHz
Audio Formats:	Linear PCM Dolby E (16, 20 and 24 bit) Dolby Digital (16 and 32 bit)

Connectors

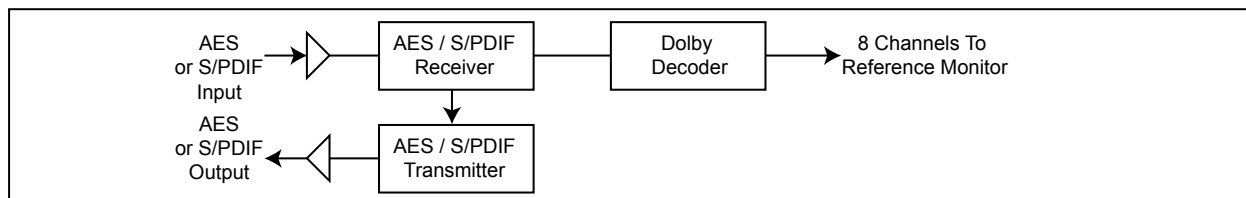
AES Input:	1 x XLR 3 pin socket (RM-E1X)
AES Output:	1 x XLR 3 pin plug (RM-E1X)
S/PDIF Input:	1 x BNC (RM-E1B)
S/PDIF Output:	1 x BNC (RM-E1B)



RM-E1B Expansion Card



RM-E1X Expansion Card



Dolby and the double-D symbol are registered trademarks of Dolby Laboratories

Confidence Monitors

RM-CA2 Confidence Monitor, 2 LED Meters & 2 Analogue Stereo Inputs



The latest additions to the Reference Monitor range of 1U rack-mount audio monitors are two new confidence monitors. Using the same outstanding speaker system as the Reference Monitor range, the confidence monitors offer a superb sound with a cut-down feature set.

The confidence monitors have been designed to give the best possible performance at a reduced price:

The RM-CA2 is a 1U rack-mount unit offering quality loudspeaker monitoring and 2 channel metering of two stereo analogue audio sources. Input 1 has stereo balanced Neutrik™ XLRs and Input 2 has both stereo balanced Neutrik™ XLRs and stereo unbalanced RCA phono connectors. The balanced analogue inputs can be wired unbalanced if required.

Sources are selected via a front panel push-button switch, with clear LED indication of the current source.

A rear panel DIP switch setting allows the unit to monitor either:

- Stereo signals, with the two front panel control knobs acting as stereo volume and balance control, to alter the stereo imaging of the left and right channels, or
- Dual mono signals, with the two front panel control knobs acting as left and right volume controls.

There is a front panel headphone socket which responds to the volume controls and the headphone socket automatically mutes the internal loudspeakers when a plug is inserted.

A pair of line-level analogue audio outputs follow the selected source at the selected level, or optionally at 10dB lower (if using the unbalanced input), set via rear-panel DIP switch.

The level of the chosen source is shown on an 8 segment LED bar-graph display with PPM and VU scales indicated. The bar-graph can optionally be lowered by 10dB (if using the unbalanced input), set via rear-panel DIP switch.

A single phase meter LED indicates channel correlation or phase error conditions.

The three-way loudspeaker system is fed via a DSP-based active crossover and a trio of highly efficient Class-D amplifiers. Careful attention to driver selection, materials and case design, plus active DSP equalisation, has ensured a flat response and outstanding reproduction from such a shallow unit. A protective limiter prevents damage to the loudspeakers under overload conditions

The RM-CA2 operates from global mains voltages (85-264V AC, 47-63Hz) without adjustment and can optionally be ordered with a DC 9V to 36V input instead of the AC input. ▶



Confidence Monitors

- Anti-vibration steel case.
- Sealed lid with foam cut-outs to dampen lid.
- Multi-point screw fixings ensure lid rigidity.
- Rear connector ports sealed with foam.
- Glue used on components which could move, or vibrate.
- Accurate 3-way speaker system.
- Two mid/high frequency speakers provide excellent stereo imaging.
- Separately driven, forward facing, dual magnet, mono bass driver.
- Custom-moulded, profiled, HF enclosures minimise standing waves.
- Acoustic damping in the HF enclosures reduces colouration.
- Separate, sealed, infinite-baffle enclosure for each driver.
- Magnetically shielded drivers so that the monitors are perfectly safe to use near CRTs and TFT displays.
- Separate, highly efficient class-D switching amplifier for each speaker.
- Short, even cable lengths to and from the speaker enclosures to reduce any potential microphonic induction.
- DSP based design allows better audio performance to be realised.
- Active crossover provides perfect separation between mid-range and bass sounds.
- A universal power supply ensures global voltage operation without adjustment.
- Optional DC power input.

RM-CAD8 Confidence Monitor, 2 LED Meters, 2 Analogue & 6 Digital Stereo Inputs



// The source select button illuminates to indicate synchronisation lock to the incoming digital source. //

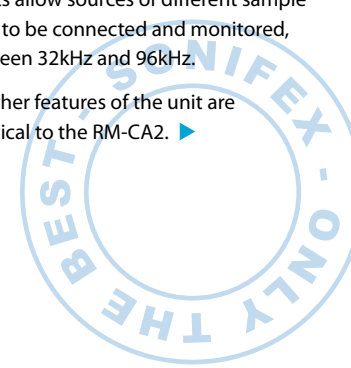
The RM-CAD8 has all the features of the RM-CA2 together with the ability to select from an additional 6 stereo digital inputs. As well as the 2 stereo analogue inputs there are also:

- 4 x stereo AES/EBU balanced inputs on XLR 3 pin female.
- 1 x stereo S/PDIF unbalanced input on RCA phono female.
- 1 x stereo Toslink unbalanced input on an optical connector.

The source select button illuminates to indicate synchronisation lock to the incoming digital source.

Sample rate converters on the digital inputs allow sources of different sample rates to be connected and monitored, between 32kHz and 96kHz.

All other features of the unit are identical to the RM-CA2. ▶



Confidence Monitors

Technical Specification For RM-CA2 & RM-CAD8

Inputs

Audio Inputs (RM-CA2): 2 x stereo analogue (1 x XLR balanced, 1 x XLR balanced or RCA phono unbal)
 Audio Inputs (RM-CAD8): 2 x stereo analogue (1 x XLR balanced, 1 x XLR balanced or RCA phono unbal)
 4 x stereo XLR balanced AES/EBU digital
 1 x stereo RCA phono S/PDIF digital
 1 x stereo optical TOSLink digital

Max Level (0dB Input Gain): +18dBu (analogue)/0dBFS (digital)

CMRR: >60dB typical

Analogue Input Impedances: XLR: >20kΩ balanced bridging
 RCA: >10kΩ unbalanced

Digital Input Impedances: (RM-CAD8 only):
 110Ω ±20% AES/EBU balanced I/O
 75Ω ±5% S/PDIF unbalanced I/O
 75Ω ±5% TOSlink unbalanced I/O

AES/EBU Sample Rate: 32 to 96kHz, converted internally to 48kHz

Input Gain: +10dB on unbalanced input

Selection: Front panel push button with indicator LEDs

Line Level Outputs

Audio Outputs: 1 x stereo analogue

Gain re Selected Input: Unity or -10dB (switchable)

Maximum Output Level: +18dB

Output Impedance: <50 ohms

Distortion: <0.02% (1kHz, +8dBu output)

Noise: -95dB RMS, unity gain ref +8dBu output

Frequency Response: 20Hz-20kHz +0/-0.5dB

Crosstalk: Analogue I/O, ref 0dBu
 1kHz input: <-90dB
 10kHz input: <-85dB

Amplifier/Loudspeakers

Configuration: Three-way with stereo mid/high-frequency drivers & mono low-frequency driver

Power Output: 2 x 7W (HF) + 15W (LF) with protective limiter

Crossover: 250Hz (24dB/octave, Linkwitz-Riley)

Distortion (HF Outputs): < 0.1% (1kHz, 3W output)

Distortion (LF Output): < 0.1% (100Hz, 6W output)

Noise: More than 102dB below full output

Volume: Mute to full volume via front panel rotary control

Balance Trim: ±6dB via front panel rotary control.

Peak Acoustic Level: 98dB SPL @ 2ft

Level & Phase Metering

Number: 2 x 8-segment LED bargraphs

Line-Up Level: 0dB on scale can be set to 0dB or -10dB via rear panel DIP switch

Phase Meter: Single LED indication showing average

Connectors

Audio Inputs (RM-CA2): 4 x XLR 3-pin female balanced
 2 x RCA female phono unbalanced

Audio Inputs (RM-CAD8): 4 x XLR 3-pin female analogue
 2 x RCA phono analogue
 4 x XLR 3-pin female AES/EBU digital
 1 x RCA phono female S/PDIF digital
 1 x optical TOSLink digital

Audio Outputs: 2 x XLR 3-pin male (balanced, may be unbalanced)

Headphones: 1/4" (6.35mm) A-gauge 3-pole stereo jack socket

Mains Input: Filtered 3-pin IEC male, continuously rated 85 - 264VAC, 47 - 63Hz, fused, 60W peak, 30W average

Fuse Rating: Anti-surge fuse 2A 20 x 5mm

Equipment Type

RM-CA2: Confidence Monitor, 2 LED meters, 2 analogue stereo inputs

RM-CA2-DC: Confidence Monitor, 2 LED meters, 2 analogue stereo inputs, DC supply

RM-CAD8: Confidence Monitor, 2 LED meters, 2 analogue & 6 digital stereo inputs

RM-CAD8-DC: Confidence Monitor, 2 LED meters, 2 analogue & 6 digital stereo inputs, DC supply

Physical Specification

Dimensions (Raw): 48cm (W) x 27cm (D) x 4.4cm (H) (1U)
 19" (W) x 12" (D) x 1.73" (H) (1U)

Dimensions (Boxed): 55cm (W) x 43cm (D) x 18cm (H)
 21.7" (W) x 16.9" (D) x 7.1" (H)

Weight: Nett: 4.4kg Gross: 5.8kg
 Nett: 10lb Gross: 13lb

SONIFEX

www.sonifex.co.uk

t:+44 (0)1933 650 700

f:+44 (0)1933 650 726

sales@sonifex.co.uk

61 Station Road
Irthlingborough
Northants NN9 5QE
United Kingdom

interstage

Phistersvej 31, 2900 Hellerup, Danmark
Telefon 3946 0000, fax 3946 0040
www.interstage.dk



- pro audio with a smile

