Manual
BM-A1-16SHD

16 Channel Digital Audio Monitor

User's Guide

Version 2.0 18/12/2012

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Contents

Introduction

The BM-A1-16SHD is a 1U high-quality sixteen-channel video/audio monitor with multiple I/O as standard. The unit accepts audio from any one of four AES input pairs, eight analogue inputs or one of two SDI inputs and produces four pairs of AES outputs and eight analogue outputs. The SDI inputs automatically detect SD or HD or 3G video and de-multiplex all 16 audio channels. An active loop-through output is available for the SDI inputs.
The headphone output is taken before the limiters and mutes the speakers when used. Eight high-resolution tri-colour bargraphs are provided with user-selectable ballistics and colour break points. Up to sixteen PCM audio inputs can be selected individually or mixed and directed to each speaker.

Bargraph meters are arranged in two groups of eight, they can display 1 to 8 or 9 to 16 using the select button under the status display. Stick-on graticule scales, which may be applied to the spaces between the front-panel bargraphs, are supplied with the machine.

The eight audio channels are provided at the rear of the unit as four pairs of AES signals on BNC connectors and four pairs of differential analogue signals. The analogue outputs and line outputs can be at a fixed level or slaved to the front panel volume control. The analogue and two line outputs can be muted independently from the menu or under the control of the front panel mute switch.

Main features

- Four pairs of unbalanced (BNC) digital audio (AES) inputs four unbalanced line inputs
- Two auto-sensing SD/HD/3G inputs with loop-through
- Two groups of four tri-colour bargraphs
- Analogue line output and 8 analogue audio outputs, eight pairs of AES outputs
- Headphone connector with speaker mute

Front panel rotary controls

Volume

The volume of the speaker and headphone output can be adjusted using this control. Pressing the end of the control will mute the speaker audio. This can also mute the line and analogue outputs.

Balance

This control will differentially adjust the level of the speaker and headphone output. Pressing the end of this control will centre the audio output.

Channel Pair select

This control has no function on the BM-A1-16SHD.

Dolby Mix

This control will set the way in which the monitor will treat the incoming audio. The **PCM** position will treat the current audio input as straight PCM encoding and reproduce it unprocessed on the 16 available channels.

Other positions will have no function, as they are Dolby related and will mute the audio output.

Menu

Pressing the end of this control will enter the menu mode described in the ***Menu*** section.

Input select

Rotating this control will select one of the four audio input sources; Analogue, AES, SDI1 or SDI2.

Operation

Selecting sources

The input source select switch determines which source (Analogue, AES, SDI 1 or SDI 2) is available to the speaker selectors and bargraphs. AES inputs can be at 44.1 kHz or 48 kHz sampling rate.

SDI input mode

The unit automatically detects SD, HD or 3G video. The four SDI groups will be demuxed to give 16 audio signals

Dolby mode

Dolby decoding is not available on the BM-A1-16SHD.

Using the PROGRAM switch

Keep the switch in the **PCM** position as the other modes only relate to Dolby features that are not implemented in the BM-AV2-16SHD. If any of the other modes are selected then the output will mute.

Directing sources to speakers

Where more than two audio signals are present it may be useful to direct and combine sources to selected speakers. The left speaker is indicated by a red LED and the right by a green LED on the top of the bargraphs.

To direct a particular source to the left or right speakers proceed as follows:
Repeatedly press the button under the bargraph corresponding to the input audio signal required until the top LEDs of the bargraph shows red for the left speaker, green for the right or both to direct the audio to both speakers. Each speaker can receive a mix of audio from inputs 1 to 16. Select either lower or upper 8 sources using the select button.

Note that the mix button assignments are retained over power-down.

Status display

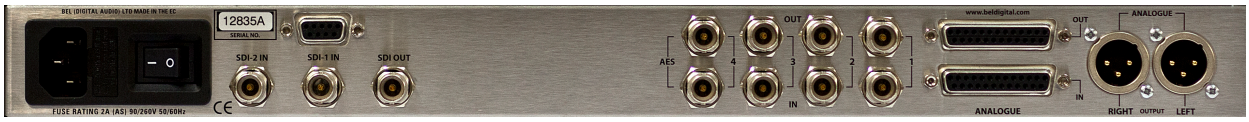
The Status display will show general status information related to the currently selected input such as the source selected and video standard where applicable.

Rear panel inputs

The BM-A1-16SHD accepts SDI video, AES and analogue audio inputs. Eight differential analogue inputs are provided on a 25 way 'D' type connector. Four pairs of AES unbalanced inputs are available on BNC connectors. Two SD, HD, 3G auto select SDI inputs are provided.

Rear panel outputs

The BM-A1-16SHD provides both digital and analogue audio outputs on the rear panel. Eight differential analogue outputs on a 25 way 'D' type connector and four pairs of AES3 on BNC connectors are available. The audio carried on the AES outputs are derived from the currently selected input source (analogue, AES or SDI). In effect, these audio outputs are a copy of the signals shown on the unit's bargraphs. The analogue outputs are derived from the lower 8 inputs (ch1-8). They can thus be a copy of the AES inputs, or two of the currently demuxed SDI groups. Two line outputs are provided which carry the same audio as the speakers. The levels of the analogue and line outputs are adjustable in the menu. It is possible to mute the output from the unit's speakers by pressing the end of the **VOLUME** control. It is also possible to independently mute the analogue outputs and the line outputs using the volume control.
An SDI loop-through is available which carries a reconstituted SDI signal from the currently selected SDI input.



Menu

Many of the characteristics of the BM-A1-16SHD can be adjusted in the menu. When the menu is activated, by pressing the **NAV** rotary encoder, the top level of the menu will appear. The items in this level can be selected by rotating the encoder and then pressing it for approximately 0.5 seconds. The second level will then appear and the required item selected by rotating the encoder and then pressing it. At this point in the menu the value of the current parameter can be adjusted. To go back one step in the menu press and hold the encoder for longer than 1 second.

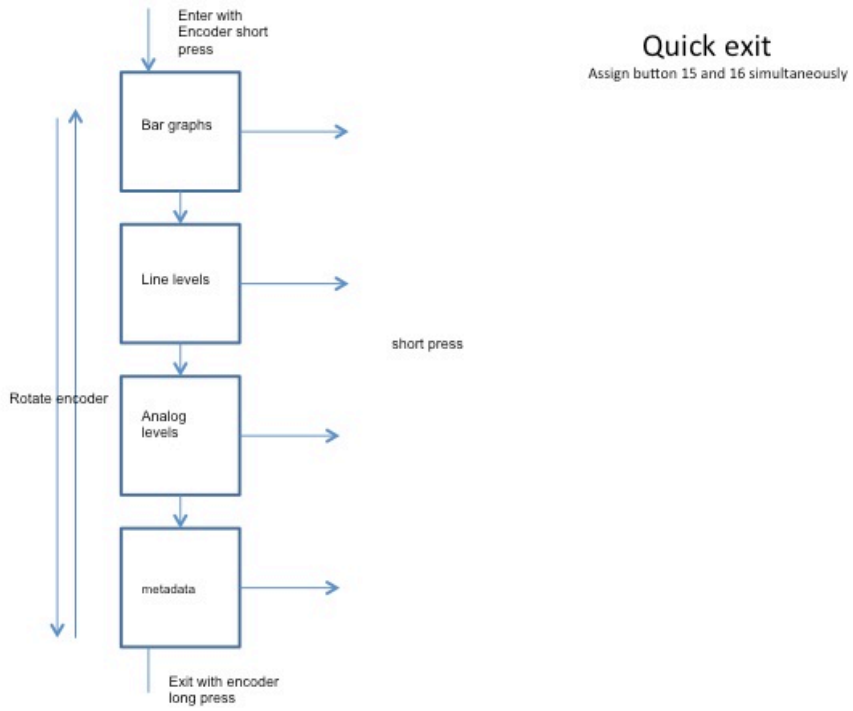
Tip: Simultaneously pressing the buttons under the bargraphs 7 and 8 will completely exit the menu.

The characteristics that can be adjusted in the menu are shown below.

Top level menu page

The top level of the menu carries the main areas of operation of the BM-A1-16SHD that can be adjusted.

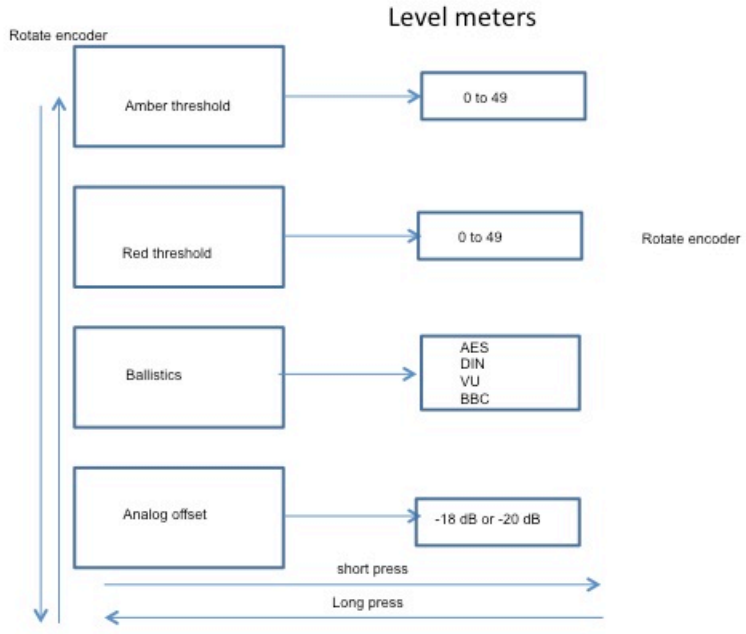
1. **Level meters** - This section allows access to the bargraph colour break points and ballistics.
2. **Line levels** - The line output level control can be selected here (either fixed level or controlled by the volume control). The line output can also be muted, or slaved to the main speaker mute control.
3. **Analogue levels** - The analogue output level control can be selected here (either fixed level or controlled by the volume control). The analogue output can also be muted, or slaved to the main speaker mute control.
4. **Dolby** – not available on the BM-A1-16SHD.



Level Meter Adjustment

Various aspects of the audio level indication can be adjusted here.

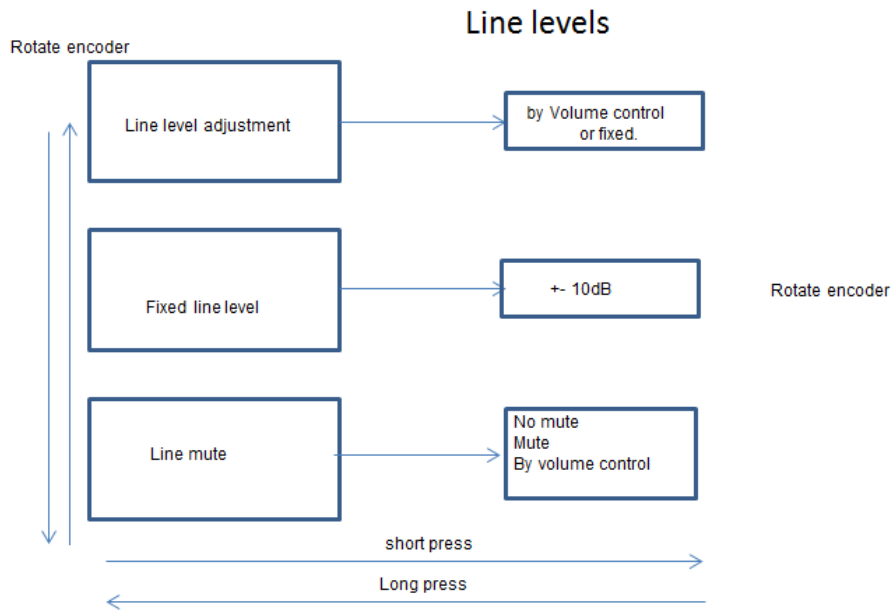
1. **Amber threshold** - The point at which the bargraph changes from green to amber can be adjusted here. Bargraph 16 is forced to full scale to allow easy control of the colour transitions.
2. **Red threshold** - The point at which the bargraph changes from amber to red can be adjusted here. Bargraph 16 is forced to full scale to allow easy control of the colour transitions.
3. **Ballistics** - The scales and dynamics of the bargraphs can be selected here. The options are AES, DIN, VU and BBC. The appropriate scales should be affixed to the front panel.
4. **Analogue offset** - When an analogue input is selected and the bargraph ballistics are AES the way in which this is displayed is adjusted here. If 0 dB analogue is applied to the unit the bargraph can be configured to show either -18 dB or -20 dB.



Line level output adjustment

The audio currently selected for the two front panel speakers is also available on two XLR connectors on the rear panel. The level of these can be adjusted from this menu.

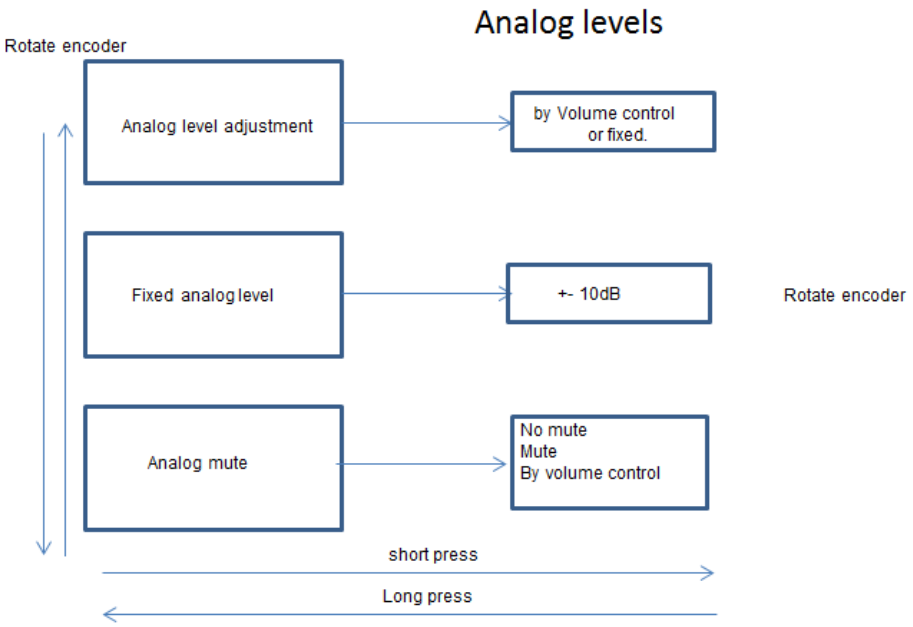
1. **Line level** - The line output level can be fixed or controlled by the front panel volume control and this can be selected here.
2. **Fixed line level** - When fixed output level is selected its level can be adjusted here.
3. **Line mute** - The line outputs can be muted here or the mute can be slaved to the front panel volume control.



Analogue output level

The audio currently showing on the 8 bargraphs are directed to 8 analogue outputs on a 25-way 'D' connector on the rear panel. The level of these can be adjusted here.

1. **Analogue level control** - The analogue output level can be fixed or controlled by the front panel volume control from here.
2. **Fixed analogue output level** - When fixed analogue output level is selected, its level can be adjusted here.
3. **Analogue output mute** - The analogue outputs can be muted here or the mute can be slaved to the front panel volume control.

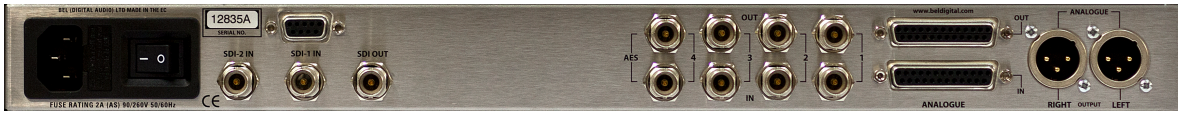


Dolby Information

Not available on the BM-A1-16SHD

Installation

The BM-A1-16SHD is designed to be installed in 19" bays on an equipment tray. Ventilation is by natural convection.



Analogue audio inputs and outputs

n	Description
1	A 1+
2	A 1-
3	GND
4	A 2+
5	A 2-
6	GND
7	A 3+
8	A 3-
9	GND
10	A 4+
11	A 4-
12	GND
13	GND
14	GND
15	A 5+
16	A 5-
17	GND
18	A 6+
19	A 6-
20	GND
21	A 7+
22	A 7-
23	GND
24	A 8+
25	A 8-

Specifications

Audio inputs

Digital	AES3-id 4 x 75 ohm (BNC connector). Sample rate 44.1/48 kHz.
Analogue	8 differential (25-way 'D' connector). Clipping +15 dB

Audio outputs

Digital	AES3-id 4x 75 ohm (BNC connector) sample rate 48 kHz.
Analogue	8 differential audio channels, level adjustable (25-way 'D' connector).
Line output	Copy of speaker outputs, level adjustable on 2 x XLR3M connectors.
Analogue noise	Noise+THD: -108 dB w.r.t clipping
Analogue frequency response:	20 Hz to 20 kHz ±1dB

Video inputs

Video format	SDI SD, HD or 3G

Video output

1 SDI active loop-through (BNC connector).

Main drive amp

Noise +THD -80dB w.r.t. maximum output.

Speaker driver units

Peak acoustic level (@2ft)	100 dB SPL
Shielding	Magnetic

Meters

8 tri-colour LED bargraphs with adjustable colour break points and ballistics.

DIN PPM: Overall dynamic range: 55 dB (+5 to -50 dB)
Attack time: 10 mSec
Fallback: 1.5 Sec per 20 dB decay

BBC PPM: Overall dynamic range: (+12 to-12 dB from mark 7 to mark 1)
Attack time: 10 mSec
Fallback: 2.85 Sec (from mark 7 to mark 1)

VU: Overall dynamic range: 23 dB (+3 to -20 dB)
Attack time: 300 mSec
Fallback: 300 mSec

AES/EBU: Overall dynamic range: 60 dB (0 to -60 dB)
Attack time: 1 mSec
Fallback: 1.5 Sec per 20 dB decay

Dimensions

19” Rack Mount: 1U high.
Outline Dimensions: 483 mm(W) x 256 mm(D) x 44.3 mm(H)
Outline Dimensions: 19 inch(W) x 10 inch(D) x 1.75 inch(H)

Environmental

Temperature 0° C to 30° C Humidity 70% max (non-condensing)

Weight

6 kg (14lbs)