BM-A1

Audio monitor/alarm system

User's Guide

Version 0.2 05/02/04

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Contents

Introduction

The BM-A1 is a professional audio monitor and alarm system housed in a 1U rack.

The unit features three internal speakers, left, right and bass.

Audio input signals can be in the form of analog or AES.

The BM-A1 accepts audio inputs in groups of 4 channels from the selected source and can direct any two from these to the speakers. The same signal is also available as a line-level audio monitor output.

Alarms can be set to monitor audio-over-level, audio-loss and anti-phase.

Main features

- 2 x AES and 2 x analog audio input pairs

- Option for balanced XLR or unbalanced BNC digital audio I/O

- High-quality, high SPL audio reproduction with bass speaker and soft limiting

- 4 x tri-color bargraphs with six standard scales and ballistics, adjustable color transition points and peak-hold facility

- Alarms for audio/AES loss, over-level and anti-phase

- Line level analog audio output of sources directed to loudspeakers

- Headphone connector with speaker mute

- Individually user-calibrated audio level inputs/outputs and metering

- Windows GUI and separate RS232 protocol for remote control of all alarm functions and audio switching

- TTL port for alarms reset and remote alarms indication
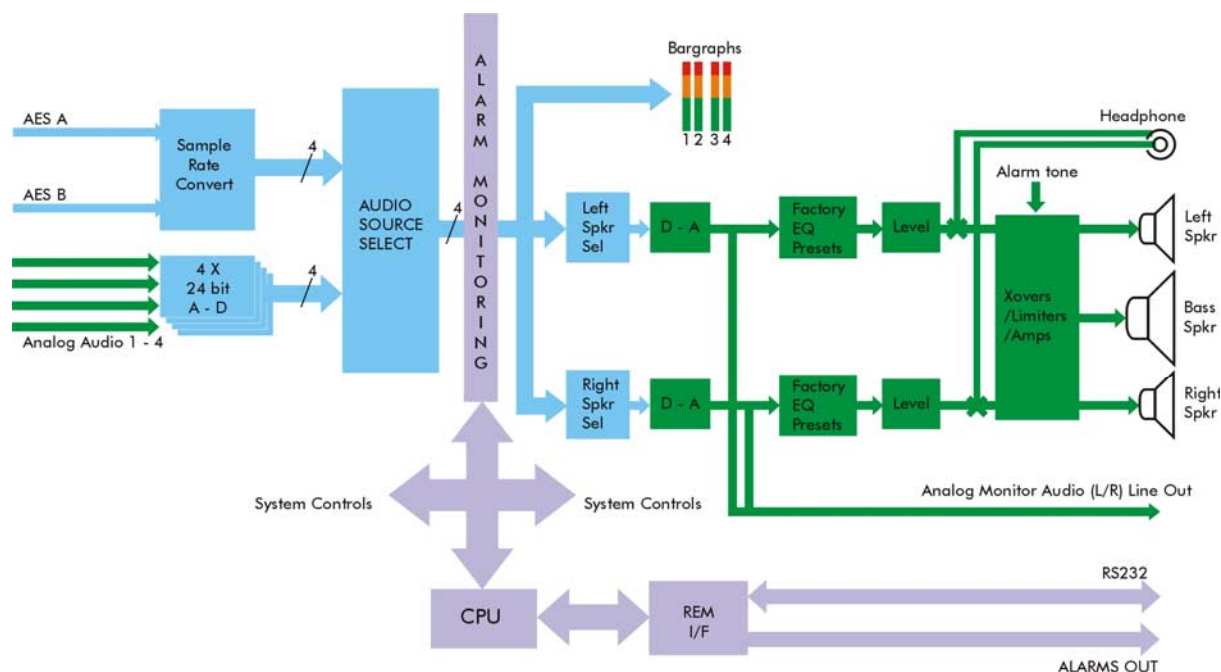
The BEL Digital BM-A1

All audio inputs are converted to 24 bit digital form and AES inputs are re-sampled using sample rate converters where necessary at an internally generated 48kHz.

The audio source switch selects which audio source is available to the speaker selectors, the bargaphs and the analogue audio monitor line-out connectors.

The left and right speaker switches select which of the currently selected audio channels is available at the speakers after three stages of analog processing.

The selected audio is first passed through factory preset equalization filters. Then electronic level control is applied with the balance and volume knobs providing control voltages. Soft limiters are used to protect the speakers. The headphone output, which is taken before the limiters, mutes the speakers when used. Alarm tone is added just before the speaker output.

When select switches are used a soft mute is applied to the audio to reduce glitches.

Operation

The front panel user interface consists of 5 rotary controls, an alarms switch, and four bargraphs. In addition there is a headphone output, two LEDs for sustained anti-phase and a further five LED indicators.

The BM-A1front control panel

Selecting sources

The audio source switch routes either analogue or AES source audio to the speaker selectors, the bargaphs and the monitoring line output.

Using alarms

The BM-A1 can provide the following warnings:

Alarm event	Notes	Alarm indication
Audio loss	The currently selected four audio channels are monitored for persistent under-level. An alarm is generated when an input is < -30dB (-50dB for AES meter) for more than 15 seconds.	Bottom bargraph segment flashes amber Audio tone, TTL/serial o/p
Audio-over-level	The currently selected four audio channels are monitored for transient over-level. An alarm is generated immediately when the first red segment of the relevant bargraph is illuminated.	Bottom bargraph segment flashes red Audio tone, TTL/serial o/p
Audio anti-phase	Audio pairs 1&2 and pairs 3&4 are monitored for sustained anti-phase.	Phase LED illuminates Audio tone, TTL/serial o/p (if enabled)

Note: The over-level alarm threshold can be adjusted by moving the red bar transition point.

The anti-phase tone and external alarm can only be armed via serial control.

Alarm arming

No alarms are generated unless alarm functions have been 'armed'.

The front panel alarm toggle switch has four functions:

1. Left hand position held – ALARM RESET - any armed input alarms are cleared

2. Left hand position momentary – resets bargraph peak-level indicators

3. Middle position – OFF/MUTE - the internal audible alarm is muted

4. Right hand position – SET - alarm functions are selectively armed

The switch must be held in the left hand ALARM RESET position for more than 3 seconds for a reset to occur.

In the right hand SET position the inputs currently active are automatically detected and the appropriate alarms are selectively enabled. The unit is then set to monitor only the active inputs. The SET function can be disabled using a serial command.

If alarms are present, moving the toggle switch to the center position will stop the audible alarm, but retain the visual alarm indications and TTL/serial alarm outputs. The switch must be held in the ALARM RESET position for more than 3 seconds for all alarms to be cleared.

The center position is the recommended position when alarm indication is not required.

Note: Restoring input signals to normal condition does not clear alarms.

Arming phase alarms

Only the phase LED on the front panel is armed using the SET switch. The audio tone and external phase alarms can only be armed using serial control.

To prevent the anti-phase detector from generating intermittent alarms, only persistent anti-phase conditions are used to raise an external alarm or generate an audio tone.

An alarm is generated when an anti-phase condition exists for more than 10 seconds.

Bargraph scales

The following bargraph ballistics may be selected using internal switches.

Scale type	Range	Attack	Fallback
AES/EBU:	60dB (0 to -60dB)	1ms	1.5Sec per 20dB decay
DIN PPM:	55dB (+5 to -50dB)	10mSec	1.5Sec per 20dB decay
VU:	23dB (+3 to -20dB)	300mSec	300mSec
BBC PPM:	+12 to-12dB - mark 7 to 1	10mSec	2.85Sec - mark 7 to 1
VU EXT:	80dB (+20 to -60dB)	300mSec	300mSec
NORDIC:	54dB (+12 to -42dB)	5mSec	1.7Sec per 20dB decay

BM-A1 scale ballistics

Stick-on scale graticules, which may be applied to the space between the front-panel bargraphs, are supplied with the unit.
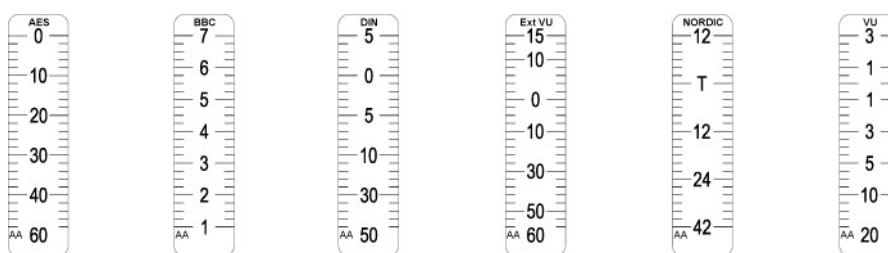
BM-A1 scale graticules

Note: Bargraph color transition points and peak hold decay may also be adjusted internally.

Refer to the Configuration chapter for switch settings and graticule fitting instructions.

Installation

The BM-A1 1U frame may be installed in 19 inch bays with 327mm depth including typical cable and connector depth. The dimensions of the BM-A1 are 483x283x44.3. Its weight is 5kg and the max power dissipated is 60 W.

Ventilation is by natural convection and there are vents at each side and on the top and bottom covers of the unit. Frames may be installed into bays, providing airflow through these vents is not impeded.

Connector I/O

All connections, with the exception of the headphone socket, are provided on the rear panel of the frame. All data connectors use 9 way 'D' type connectors.

The BM-A1balanced audio version rear view

Digital audio I/O may be supported with either XLR connectors for balanced audio or BNCs for unbalanced audio, depending on the BM-A1version specified at the time of ordering.

Alarms connector pinout

Connector type: 9 way sub-D female

Pin	Description
1	Audio alarm out (TTL compatible active high)
2	Not used
3	Reset in (TTL compatible active low)
4	GND
5	Not connected
6	Not connected
7	Not connected
8	Not connected
9	Not connected

Note: TTL outputs can supply up to 10mA.

RS232 Host interface connector pinout

Connector type: 9 way D female

Speed: 9600 bps

Format: 8 bit, no parity, 2 stop bits

Pin	Description
1	Not connected
2	Rx (from host)
3	Tx (to host)
4	Not connected
5	GND
6	Not connected
7	Not connected
8	Not connected
9	Not connected

Note: A null-modem lead will be required to interface to a PC.

Configuration

Access to BM-A1internal adjustments is obtained with the top removed.

BM-A1 internal adjustments
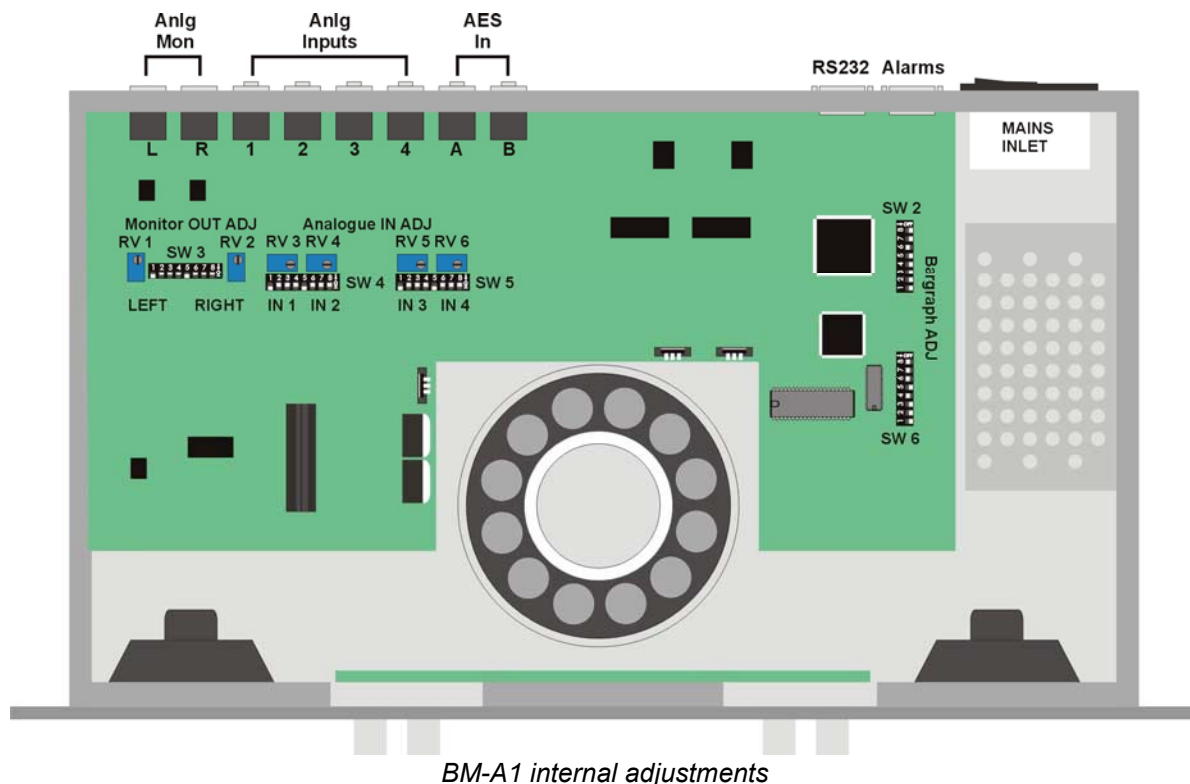
The following adjustments may be made:

- Monitor output level – SW3 & potentiometers main board RV1 & RV2
- Analog input level – SW4 and SW5 & potentiometers RV3/4/5/6 main board
- Bargraph settings – SW2 and SW6 main board, near power supply

Warning: Configuration instructions are for trained personnel. To avoid dangerous electric shock, do not remove any covers or carry out adjustments unless qualified to do so.

Adjusting analog input level

In the following tables, ON is obtained with a switch lever in the DOWN position. The adjustments are located on the main board under the output sub-board.

Analog input adjustments – 0dB setting shown

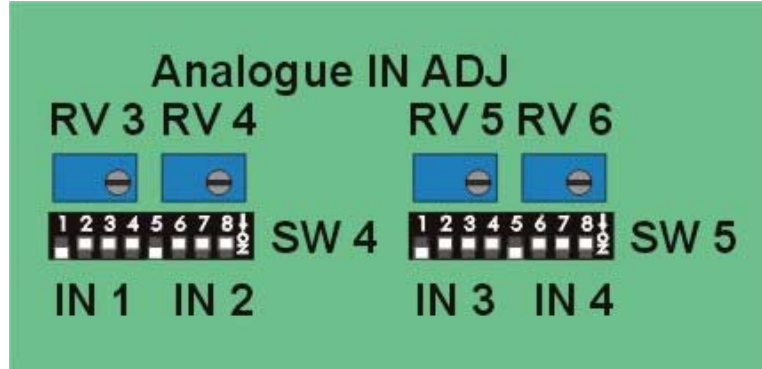| SW4	Anlg Input	Setting when ON
1	1	0 dB (0dBu in = 0 on analog scale)
2	1	4 dB (+4dBu in = 0 on analog scale)
3	1	8 dB (+8dBu in = 0 on analog scale)
4	1	Variable – adjacent pot* –10 to +12 dB
5	2	0 dB (0dBu in = 0 on analog scale)
6	2	4 dB (+4dBu in = 0 on analog scale)
7	2	8 dB (+8dBu in = 0 on analog scale)
8	2	Variable – adjacent pot* –10 to +12 dB

SW5	Anlg Input	Setting when ON
1	3	0 dB (0dBu in = 0 on analog scale)
2	3	4 dB (+4dBu in = 0 on analog scale)
3	3	8 dB (+8dBu in = 0 on analog scale)
4	3	Variable – adjacent pot* –10 to +12 dB
5	4	0 dB (0dBu in = 0 on analog scale)
6	4	4 dB (+4dBu in = 0 on analog scale)
7	4	8 dB (+8dBu in = 0 on analog scale)
8	4	Variable – adjacent pot* -10 to +12 dB

Note: It is intended that only one switch lever is set ON for each analog input.

The ON position is obtained with a switch lever in the direction of the arrow (downward in the above drawing).

*Clockwise rotation increases gain.

Adjusting audio monitor output level

In the following tables, ON is obtained with a switch lever in the DOWN position. The adjustments are located on the main board under the output sub-board.
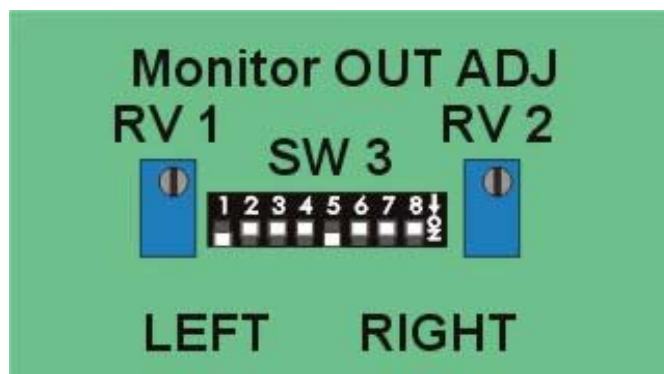
Analog monitor output adjustments – 0dB setting shown

SW3	Monitor Output	Setting when ON
1	Left	0 dB (0 on analog scale = 0dBu on output)
2	Left	4 dB (0 on analog scale = +4dBu on output)
3	Left	8 dB(0 on analog scale = +8dBu on output)
4	Left	Variable – adjacent pot* 0 to +12 dB
5	Right	0 dB (0 on analog scale = 0dBu on output)
6	Right	4 dB (0 on analog scale = +4dBu on output)
7	Right	8 dB(0 on analog scale = +8dBu on output)
8	Right	Variable – adjacent pot* 0 to +12 dB

Note: It is intended that only one switch lever is set to ON for each monitor output.

The ON position is obtained with a switch lever in the direction of the arrow (downward in the above drawing).

*Clockwise rotation increases gain.

Adjusting bargraph break-points and ballistics

The adjustments, SW2 and SW6 are located near the power supply.
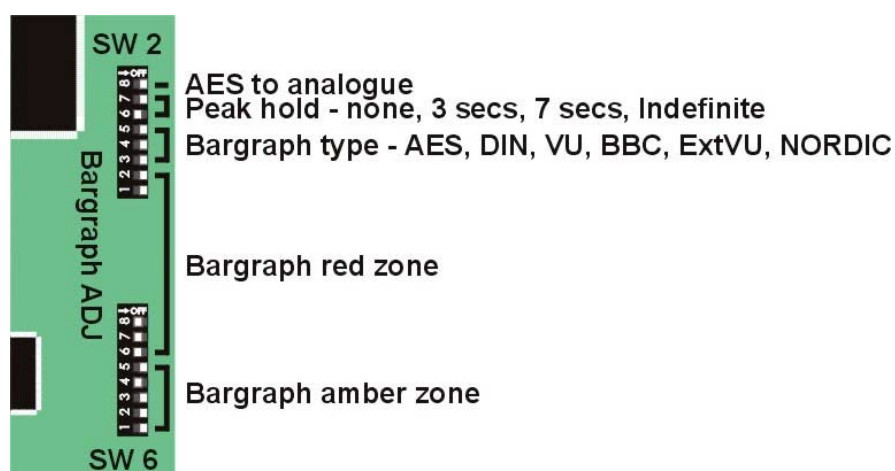
BM-A1bargraph adjustments

SW2-8	AES to analog adjust
OFF	-18dBFS = 0 on analog scale
ON	-20dBFS = 0 on analog scale

The –18dB and –20dB settings define the correspondence between AES input level and the 0 mark on an analog scale. This allows analog scales to be used with digital signals.

Note: When digital inputs are used with an analogue scale the analogue outputs will be less than that indicated on the meters since the digital to analogue converters clip at +15 dB. The effective loss is -3dB when the 18 dB position is selected and -5dB when the 20 dB position is selected.

SW2-7	SW2-6	Peak hold decay
OFF	OFF	None (Off)
OFF	ON	3 seconds
ON	OFF	7 seconds
ON	ON	Indefinite

SW2-5	SW2-4	SW2-3	Scale type
OFF	OFF	OFF	AES
OFF	OFF	ON	DIN
OFF	ON	OFF	VU
OFF	ON	ON	BBC
ON	OFF	OFF	Extended VU
ON	OFF	ON	NORDIC
ON	ON	OFF	No scale
ON	ON	ON	No scale

Note: The OFF position is obtained with a switch lever in the direction of the arrow, (to the right in the above drawing).

The bargraph displays have 26 LEDs. The bottom LED in each bar is reserved for the audio under and over level alarm. The remaining 25 LED level segments may be assigned to three colored zones, red, amber and green.

Up to 25 of the top most segments may be colored red. Up to 25 segments from the end of the red zone downward may be colored amber and the remaining segments (if any) are always green.

Choosing how many segments are colored red from the top of the bargraph sets the 'red zone'. Select from none to 25 using SW2-2, SW2-1, SW6-8, SW6-7 and SW6-6 as follows:

SW2-2	SW2-1	SW6-8	SW6-7	SW6-6	Segment from bargraph top
OFF	OFF	OFF	OFF	OFF	None
OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	ON	ON	3
OFF	OFF	ON	OFF	OFF	4
OFF	OFF	ON	OFF	ON	5
OFF	OFF	ON	ON	OFF	6
OFF	OFF	ON	ON	ON	7
OFF	ON	OFF	OFF	OFF	8
OFF	ON	OFF	OFF	ON	9
OFF	ON	OFF	ON	OFF	10
OFF	ON	OFF	ON	ON	11
OFF	ON	ON	OFF	OFF	12
OFF	ON	ON	OFF	ON	13
OFF	ON	ON	ON	OFF	14
OFF	ON	ON	ON	ON	15
ON	OFF	OFF	OFF	OFF	16
ON	OFF	OFF	OFF	ON	17
ON	OFF	OFF	ON	OFF	18
ON	OFF	OFF	ON	ON	19
ON	OFF	ON	OFF	OFF	20
ON	OFF	ON	OFF	ON	21
ON	OFF	ON	ON	OFF	22
ON	OFF	ON	ON	ON	23
ON	ON	OFF	OFF	OFF	24
ON	ON	OFF	OFF	ON	25
ON	ON	OFF	ON	OFF	25
ON	ON	OFF	ON	ON	25
ON	ON	ON	OFF	OFF	25
ON	ON	ON	OFF	ON	25
ON	ON	ON	ON	OFF	25
ON	ON	ON	ON	ON	25

Note: It is not possible to set 25 red *and* 25 amber segments, since there are only 25 segments for level display purposes.

Choosing how many segments are colored amber from the end of 'red zone' sets the 'amber zone'. Select from none to 25 using SW6-5, SW6-4, SW6-3, SW6-2 and SW6-1 as follows:

SW6-5	SW6-4	SW6-3	SW6-2	SW6-1	Segment from last RED ZONE
OFF	OFF	OFF	OFF	OFF	None
OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	ON	ON	3
OFF	OFF	ON	OFF	OFF	4
OFF	OFF	ON	OFF	ON	5
OFF	OFF	ON	ON	OFF	6
OFF	OFF	ON	ON	ON	7
OFF	ON	OFF	OFF	OFF	8
OFF	ON	OFF	OFF	ON	9
OFF	ON	OFF	ON	OFF	10
OFF	ON	OFF	ON	ON	11
OFF	ON	ON	OFF	OFF	12
OFF	ON	ON	OFF	ON	13
OFF	ON	ON	ON	OFF	14
OFF	ON	ON	ON	ON	15
ON	OFF	OFF	OFF	OFF	16
ON	OFF	OFF	OFF	ON	17
ON	OFF	OFF	ON	OFF	18
ON	OFF	OFF	ON	ON	19
ON	OFF	ON	OFF	OFF	20
ON	OFF	ON	OFF	ON	21
ON	OFF	ON	ON	OFF	22
ON	OFF	ON	ON	ON	23
ON	ON	OFF	OFF	OFF	24
ON	ON	OFF	OFF	ON	25
ON	ON	OFF	ON	OFF	25
ON	ON	OFF	ON	ON	25
ON	ON	ON	OFF	OFF	25
ON	ON	ON	OFF	ON	25
ON	ON	ON	ON	OFF	25
ON	ON	ON	ON	ON	25

Note: Any remaining unassigned segments will be green.

Inserting bargraph graticules

The following bargraph scale graticules are supplied with each BM-A1:
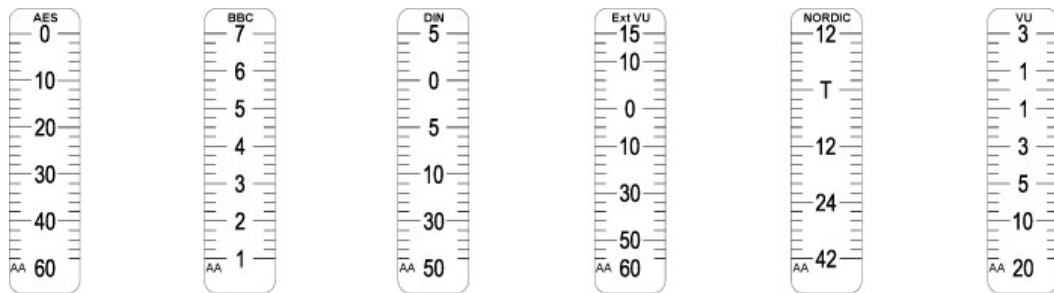
BM-A1 scale graticules

To apply a graticule proceed as follows:

- peel back the protective backing from the chosen graticule
- apply the graticule to the space between a pair of bargraphs
- repeat the process for the other bargraph graticule position
- ensure that the bargraph setting matches the graticule
- adjust the color transitions and peak hold decay as desired

BM-A1 serial protocol

Overview

The BM-A1 is automatically placed in the remote mode upon receipt of a valid RS232 command. The front panel can be reactivated by powering off and on or by sending it a disconnect command.

Commands to be communicated to the remote unit (BM-A1) are arranged in frames. These frames will then be sent to the remote unit, which will always reply with either ACK for acceptance or NAK for rejection. Any requested reply then follows in the same frame format.

Frame format

The frame starts with a start character 0xAA (alternating ones and zeros). This is followed by the destination address, the source address, the command code, the data count, the data, a checksum and an end flag 0xFE.

Start Flag 0XAA
Destination Address
Source Address
Command
Data Count
Data
Checksum
End Flag 0XFE

Start Flag:

The start flag 0XAA may be sent at any time. If sent during a frame this will cause the frame to effectively restart.

Destination Address:

This should be set to 1.

Source Address:

This should be set to 1.

Command:

This character is the command for the remote unit and must fall in the range 0X80 to 0XEF. More details of the relevant codes are shown below.

Data count:

This is the total number of data bytes following, up to a maximum of 127.

Data:

The data required for the command is carried here. Each character can have a value of 0X00 to 0X7F i.e. 7 bits.

Checksum:

This is the modulo sum of the characters in the frame between the destination address and the last data character inclusively. It is calculated thus:

```
DO
{
checksum = (character+checksum) AND 0x7F
}
FOR ALL CHARACTERS IN FRAME.
```

End Flag:

A character 0XFE ends the frame.

Commands

Commands from the remote controller to the BM-A1.

Code(Hex)	Function	Reply
80	General prompt for a reply	C0 - ACK (OK) C1 - NAK (send again)
81	Use first data char as a second command	ACK
82	Request unit identifier	C2.
83	Set up switches Data count =5 See below for format	ACK
84	Set up alarm functions Data count=2 See below for format	ACK
85	Request Detail	C5
86	Request Switches	C6

Replies

Replies, when requested (e.g. 82), will consist of frames that contain the original command value plus 0X40. So a request for an ident, 0x82, will elicit a reply of a frame containing 0xC2 and the ident string. (BM-A1Vn.n)

Data formats

General Prompt (0x80)

This command will cause the BM-A1 to respond with an ACK or NACK reply. It can be used to poll for alarms.

Set up switches (0x83)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						Ms bit of Audio select	Audio select	Audio select
Byte 1					Ms bit of Right speaker select	Right speaker select	Ms bit of Left speaker select	Left speaker select
Byte 2				Ms Red zone	Red zone	Red zone	Red zone	Red zone
Byte 3				Ms amber zone	Amber zone	Amber zone	Amber zone	Amber zone
Byte 4			AES offset	Ms Peak type	Peak type	Ms bar type	Bar type	Bar type

Audio select codes

Code	Function	Notes
000	Analog audio input selected	
001	AES audio input selected	
010	None	
011	None	
100	None	
101	None	

Left and right speaker select codes

Code	Function
00	Select audio input 1
01	Select audio input 2
10	Select audio input 3
11	Select audio input 4

Red zone data

The numerical value of the five bits of the red zone data corresponds to the length of the red zone. The origin of the red zone if the top of the bar graph.

Amber zone data

The numerical value of the five bits of the red zone data corresponds to the length of the amber zone. This zone is 'attached' to the bottom of the red zone.

Bar type

These 3 bits select the bar ballistics and type.

Code	Bar type
000	AES
001	DIN
010	VU
011	BBC
100	Extended VU
101	Nordic

Bar peak indicator

These two bits select the peak indicator timing.

Code	Time
00	No peak indicator
01	3 Second hold time
10	7 Second hold time
11	Indefinite hold time

AES offset

This bit selects the bar graph offset when AES is input to an analog bar graph.

Code	Function
0	-18dB
1	-20dB

Set up alarms (0x84)

	Bit 6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reset	Auto			Audio Channel 4	Audio Channel 3	Audio Channel 2	Audio Channel 1
Byte 1	Toggle Disable	Anti- Phase 3/4	Anti-Phase 1/2	Over-level 4	Over-level 3	Over-level 2	Over-level 1

The Auto bit will cause the BM-A1 to generate spontaneous ACK signals every second while an alarm is active. The toggle disable bit will inhibit the set-up function of the front panel toggle switch.

Request Detail (0x85)

This command will cause the BM-A1 to respond with a frame containing the command 0XC5 and data describing the state of the unit and any alarms.

	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0					Ms bit of Audio select	Audio select	Audio select
Byte 1 Alarms				Audio loss 4	Audio loss 3	Audio loss 2	Audio loss 1
Byte 2 Alarms		Anti-phase 3/4	Anti-phase 1/2	Audio over-level 1	Audio over-level 1	Audio over-level 1	Audio over-level 1
Byte 3					AES 2 lock	AES 1 lock	
Byte 4							
Byte 5				Armed Audio loss 4	Armed Audio loss 3	Armed Audio loss 2	Armed Audio loss 1
Byte 6		Armed Anti-phase 3/4	Armed Anti-phase 1/2	Armed Audio over-level 4	Armed Audio over-level 3	Armed Audio over-level 2	Armed Audio over-level 1

Request Current switch settings (0X86)

This command will cause the BM-A1 to respond with a frame containing the command 0XC6, data describing the settings of the front panel and internal switches.

The data will be returned in the same format as the set up switch command (0X85).

ACK format

ACK is a standard frame with command 0xC0 and one data byte. This byte contains brief alarm and status information.

		AES2 lock	AES1 lock	Remote mode	Auto		Audio Alarm
Byte 0							

NACK format

A reply indicating that an error occurred communicating with the MM2 it carries the command 0xC1. Brief error information is carried in two data bytes.

Byte 0	Error message value
Byte 1	Erroneous checksum character

Error message values

Value	Message
1	A time out occurred after receipt of a valid start character
2	A character was detected before receipt of a start character.
3	A checksum error occurred. The erroneous value is placed in Byte 1

RS232 format

8 data bits, no parity, 2 stop bits, 9600 Baud.

Problem solving

The front panel provides a total of seven LED indicators.

The BM-A1 status LEDs

The LEDs have the following functions:

- PHASE CH1/2 – lights red to indicate a phase error between channels 1 and 2
- PHASE CH3/4 – lights red to indicate a phase error between channels 3 and 4
- ON – lights green when the unit is powered and switched on
- LIMIT – lights red to indicate that the soft limiter is protecting the speakers
- AES A – lights yellow to indicate the presence of the AES A input
- AES B – lights yellow to indicate the presence of the AES B input
- ALARM – lights yellow to indicate an active alarm event

Note: The bottom bargraph segment in each bar is used as an audio alarm.

Sample problems and their solutions

There is no power to the unit

Check the power cabling and the integral fuse in the IEC mains socket at the rear of the frame.

Check that the power switch at the rear is in the on position.

The bargraph display does not have the desired ballistics or color transition points

Check that the appropriate scale and color transition points have been selected with the internal DIL switches.

Check that the chosen ballistics setting and bargraph scale graticules match.

An alarm continues to sound even though normal signals have been restored

Mute the alarm with the ALARM MUTE switch or reset all alarms with the ALARM RESET switch by holding it upwards for more than 3 seconds.

An input signal has failed but no alarm was asserted

Alarms are only generated in respect of selected audio signals when the ALARM SET switch is in the SET position.

Why can't I enable an audio tone or external alarm for anti-phase errors?

Only the phase LED on the front panel is armed using the SET switch. The audio tone and external phase alarms must be armed using serial control. Anti-phase errors are a common feature of most audio sources and may not require a high-priority alarm.

Note: In the unlikely event that the unit 'locks up' switch the unit off at the rear for a few seconds and then restore power.

Specification

Audio inputs

Analog inputs impedance	25k Ω differential
Digital inputs impedance	110Ω differential (XLR connector) or 75Ω unbalanced (BNC connector)

Analog monitor outputs

Max output level	+15dB
Noise +THD	-95dB (Analog input)
	-98dB (AES input)

Frequency response

All analog outputs	20 Hz to 20kHz ±1dB

Main drive amps

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

Speaker driver units

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

Main drive amp

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

Speaker driver units

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

Meters

Level meters	4 x hi-resolution tri-color bargraphs

(All audio measurements made using Audio Precision un-wtd 22Hz to 22kHz

Scales and Ballistics

NORDIC: Overall dynamic range: 54dB (+12 to -42dB)

Attack time: 5mSec

Fallback: 1.7Sec per 20dB decay

DIN PPM: Overall dynamic range: 55dB (+5 to -50dB)

Attack time: 10mSec

Fallback: 1.5Sec per 20dB decay

BBC PPM: Overall dynamic range: (+12 to-12dB from mark 7 to mark 1)

Attack time: 10mSec

Fallback: 2.85Sec (from mark 7 to mark 1)

VU: Overall dynamic range: 23dB (+3 to -20dB)

Attack time: 300mSec

Fallback: 300mSec

VU EXT: Overall dynamic range: 80dB (+20 to -60dB)

Attack time: 300mSec

Fallback: 300mSec

AES/EBU: Overall dynamic range: 60dB (0 to -60dB)

Attack time: 1mSec

Fallback: 1.5Sec per 20dB decay

Alarms

Audio loss, audio-over-level, sustained audio anti-phase,
AES/EBU carrier loss

Housing   19" Rack Mount: 1U high.

Outline Dimensions: 483mm(W) x 283mm(D) x 44.3mm(H)

19inch(W) x 11.1inch(D) x 1.75inch(H)

Power   60W (max) 90-264 VAC 50-60Hz Autoselect, Fuse 4A HAC

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

Weight   11.6lbs (5kg)

Computer interface   9 pin RS-232 male PC-AT serial interface (null-modem)