

SD-4/16

In-picture audio meter

From the range of colour in-picture audio meters by Chromatec

User instructions



DISTRIBUTED WORLDWIDE:
MICHAEL STEVENS & PARTNERS LTD
INVICTA WORKS ELLIOTT ROAD BROMLEY KENT BR2 9NT UK
TEL: +44 (0)20 8460 7299 Fax: +44 (0)20 8460 0499
E-MAIL: SALES@MICHAEL-STEVENSON.COM
WEB: [HTTP://WWW.CHROMATEC.COM](http://www.chromatec.com)

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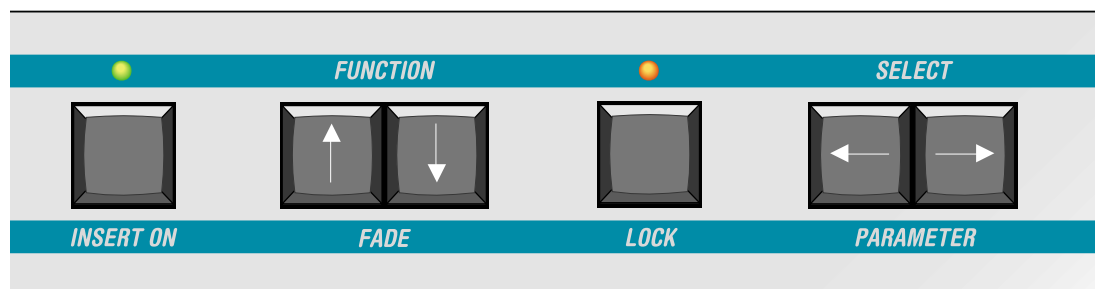
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Model overview

The Model SD-4/16 is a serial digital in-picture audio meter, capable of simultaneously displaying up to 16 channels of embedded audio metering in bargraph form. Additionally, it is possible to monitor either 2 pairs of external analogue or AES/EBU audio channels, depending on the version specified. The audio bargraphs and on-screen data are mixed with the outgoing SDI signal. A composite video monitor output is also provided.

A comprehensive on-screen menu allows the user to configure the SD-4/16 according to requirements including bar colours, position on screen, level references, etc. Up to four groups of four audio channels may be displayed together with sum & difference (M&S) meters and a phase correlation meter. Six standard meter scales and ballistics are available together with VU superimposed on PPM. Alarms are provided for audio/video loss, over level, and sustained anti-phase with TTL outputs and on-screen indication in an alarm condition. There is provision for a wired remote control, duplicating the operation of the front panel buttons.

Front panel buttons



Insert on

The 'Insert On' button switches the bargraphs on or off according to the bar groups pre-selected from the Menu and at the previously set fade level.

Function/fade

The Fade buttons determine the mix level of the bargraphs superimposed on the outgoing video and operate only when the unit is locked (with the red LED off). When the unit is unlocked and in the Menu mode, these buttons are used to move the cursor up or down the Menu line in order to select a function.

Lock

The 'Lock' button performs two functions depending on which mode the unit is operating. Unlock is activated by keeping the button pressed for about 3 seconds after which the red LED will be lit and the on-screen Menu appears, disabling the Fade function. While in the Menu mode some actions require confirmation which is carried out by pressing both Lock and Insert buttons simultaneously (see below). After carrying out changes within the Menu, pressing the Lock button again will save the settings and return the SD-4/16 to the normal meter mode.

Select parameter

When the unit is unlocked the Select Parameter buttons are used to change the system settings depending on the Menu line selected.

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System Menu

In order to change the numerous parameters of the SD-4/16 it is necessary to enter the system Menu by pressing the Lock button for approximately 3 secs, whereupon the red LED above the Lock button will light and the Menu will appear on-screen. In all cases the "Select Parameter" buttons select the value shown in the centre column of the menu. Where applicable, the adjustable values shown in the third column are carried out by using the "Insert" button as a "shift" key together with the "Select Parameter" buttons. Those menu lines that have a red flashing cursor require confirmation of an action which is carried out by pressing both the "Insert" and "Lock" buttons simultaneously, whereupon the cursor stops flashing. See following Menu pages.

Note - The order of the following menu lines may vary according to the software release of your SD-4/16.

Menu display

Menu Page 1

USER CONFIGURATION SELECT

The SD-4/16 has two user memories, User 1 and User 2, where all configuration settings are stored. Depending on which user is currently shown or subsequently selected, exiting the menu will store any changes made in the menu to that user. In the unlikely event that a system reset is required then all user settings will be returned to the factory default settings.

USER CONFIGURATION COPY/RESET

It is possible to copy one user configuration to the other user or reset users to the factory default settings. Each option has a flashing red cursor indicating that confirmation of this action is required. This is carried out by pressing the Insert and Lock buttons simultaneously.

METER GROUP HEIGHT

The main bargraph group height may be set to Normal (full height), Half or Quarter depending on the vertical meter resolution required.

METER GROUPS VERT POSITION

Allows vertical adjustment of the bargraph groups. The menu marker provides an approximation of their relative position on screen.

AUDIO SOURCE SELECT

The SD-4/16 may be switched to display audio derived from the incoming SDI video feed (embedded), or either external AES/EBU or external analogue. In all cases a maximum of 16 level meters may be displayed at any one time. When viewing de-embedded audio it is possible display all four groups of audio.

Menu Page 1/2

METER GROUP [X] DISPLAY

Up to four bargraph groups, A,B,C & D may be displayed, by default A & B are located to the left of the screen and C & D to the right. Each of these groups can be assigned to display Level, Sum & Difference, Sum only, or turned off.

METER GROUP [X] CHANNELS ASSIGN

Any combination of channel pair assignments may be selected, depending upon the audio source. In embedded audio mode channels 1+2, 3+4, or all 4 channels from any embedded group can be assigned to each meter group. In external AES/EBU or external analogue mode channels 1+2, 3+4 or all 4 external channels can be assigned.

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METER GROUP [X] HORIZ POSITION

Allows horizontal adjustment of the bargraph group. The menu marker provides an approximation of its relative position on screen. When moving a group and another group is in the way, one group will "push" the other one along.

METER GROUP [X] SCALES POSITION

Whichever scale is selected (see Menu p3), it may be placed to the left or right of the bargraph or turned off.

BAR WIDTH

The bar width of all bars or individual bars within each group can be adjusted by first selecting which bar to adjust using the Select Parameter buttons. Then the bargraph width value (in pixels) may be changed by using the Insert button as a "shift" key together with the Select Parameter buttons. Selecting "All Bars" applies the value chosen to all bargraphs.

BAR SPACING

The bar spacing between bars in each group can be adjusted by first selecting which bar to adjust using the Select Parameter buttons. The bargraph spacing value (in pixels) may then be changed by using the Insert button as a "shift" key together with the Select Parameter buttons. Selecting "All Groups" applies the value chosen to all Groups.

PEAK HOLD ENABLE

The peak hold indicator is a small coloured line located at the top of each audio level meter and may be turned off if not required. All signal peaks are displayed for the time period selected unless updated by a higher peak in the meantime. If Infinite is selected then the peak levels of a complete programme may be monitored.

PEAK HOLD INDICATOR COLOUR

The required indicator colour may be chosen.

SUM LEVEL SET

Depending on operating requirements the sum level may be adjusted. Normally this is set to -6dB .

Menu Page 3

DIGITAL SCALES SELECT

The scales to use when the audio source is digital are chosen here. By default standard AES/EBU digital scales are displayed. However, these may be changed to any of five internationally recognised analogue scales (together with their respective ballistics). In this case it is necessary to set the Digital/Analogue Scale Reference as shown below.

DIGITAL UPPER-RANGE POINT

This value sets the upper colour transition point of the bargraph when the audio source is embedded audio or AES/EBU. This value is always in dBfs.

DIGITAL LOWER-RANGE POINT

This value sets the lower colour transition point of the bargraph when the audio source is embedded audio or AES/EBU. This value is always in dBfs.

DIGITAL/ANALOGUE SCALE REF

It is necessary to set this value when displaying a digital input signal on an analogue scale. The European default value is -18dBfs whereas in the USA this is usually -20dBfs .

ANALOGUE SCALES SELECT

By default standard DIN PPM scales are displayed. The chosen scale is used when the audio source is analogue. These may be changed to any of five

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internationally recognised analogue scales (together with their respective ballistics).

ANALOGUE UPPER-RANGE POINT

This value sets the upper colour transition point of the bargraph when the audio source is analogue.

ANALOGUE LOWER-RANGE POINT

This value sets the lower colour transition point of the bargraph when the audio source is analogue.

ANALOGUE 0dB REFERENCE

The selected value is the level (in dBu) of the analogue input signal that is to be displayed at 0dB when using an analogue scale.

BAR COLOUR OVER-RANGE

The "Over-Range" portion of the bargraph is at the top. The required bargraph is selected and then colours may be changed by using the Insert button as a "shift" key together with the Select Parameter buttons. Selecting "All" applies the colour chosen to all bargraphs.

BAR COLOUR UPPER-RANGE

The "Upper-Range" portion of the bargraph is at the centre. The required bargraph is selected and then colours may be changed by using the Insert button as a "shift" key together with the Select Parameter buttons. Selecting "All" applies the colour chosen to all bargraphs.

BAR COLOUR LOWER-RANGE

The "Lower-Range" portion of the bargraph is at the bottom. The required bargraph is selected and then colours may be changed by using the Insert button as a "shift" key together with the Select Parameter buttons. Selecting "All" applies the colour chosen to all bargraphs.

METER GROUP BACKGROUND COLOUR

The required background colour may be chosen.

METER GROUP SCALES COLOUR

The required scales colour may be chosen.

METER GROUP LABELS COLOUR

The labels are situated at the base of the bargraph groups. The required colour may be chosen.

Menu Page 4

PHASE BAR MULTI-INDICATORS

When set to IN+OUT mode a small phase correlation bar appears at the top of all pairs of level meters. The OUT ONLY option will cause a flashing anti-phase indicator bar to appear at the top of each pair of level meters only when the pairs are out of phase.

PHASE BAR [X] ASSIGN

Assigns Phase Bar A or B to the selected channels or bargraph group.

PHASE BAR [X] HORIZ POSITION

Allows horizontal adjustment of the selected phase bar. The menu marker provides an approximation of its relative position on screen.

PHASE BAR [X] VERT POSITION

Allows vertical adjustment of the selected phase bar. The menu marker provides an approximation of its relative position on screen.

PHASE BARS MAX HOLD ENABLE

A maximum hold cursor may be selected to indicate any negative phase

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excursion. This may be reset by briefly pressing the Lock button when in the normal operating mode.

PHASE BAR COLOURS

After selecting Phase In or Phase Out the colours may be selected by pressing the Insert button as a "shift" key together with the Lock button.

Menu Page 5

ALARM INDICATORS

The on-screen alarm indicators comprise small coloured squares placed at the top of the respective bargraph groups. These are colour coded for each type of alarm condition. They may be hidden if not required. The colour code are:

- Yellow for audio loss.
- Red for audio over
- Magenta for anti-phase
- White for AES carrier loss

ALARMS MASTER RESET

All alarms may be reset. The flashing red cursor indicates that confirmation of this action is required. This is carried out by pressing the Insert and Lock buttons simultaneously.

ALARMS AUTO RESET

When activated, in an alarm condition the relevant alarms will automatically be reset after the selected time period subject to no further alarm conditions occurring in the interim. The timing of each individual alarm is independent and is taken from the point that the alarm is triggered or re-triggered.

ALARM, SDI LOSS ENABLE

When turned on, this alarm will be triggered if the SDI input is lost.

ALARM, PICTURE FREEZE ENABLE

When turned on, this alarm will be triggered if there is no change detected in consecutive frames of the incoming video over a period of 1 second.

ALARM, PICTURE LOSS ENABLE

When turned on, this alarm will be triggered when there is a persistent low luminance level in the whole incoming video.

ALARM, AES LOSS ENABLE

When turned on, this alarm will be triggered if any of the selected AES/EBU inputs are lost.

ALARM, AUDIO OVER CHANNELS

When turned on, this alarm will be triggered if the selected audio channels exceed the selected level.

SET DIGITAL LEVEL

Sets the threshold level for the audio over alarm when the levels being monitored are from a digital source. The level set here is in dBfs.

SET ANALOGUE LEVEL

Sets the threshold level for the audio over alarm when the levels being monitored are from an analogue source.

ALARM, AUDIO LOSS ENABLE

When turned on, this alarm will be triggered if the selected audio channels do not reach the selected threshold within the time set below.

SET TIME

Sets the time before the audio loss alarm is triggered.

SET DIGITAL THRESHOLD

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Sets the threshold level below which the audio loss alarm will be triggered. The level set here applies when the audio input is digital, and the levels set here are in dBfs.

SET ANALOGUE THRESHOLD

Sets the threshold level below which the audio loss alarm will be triggered. The level set here applies when the audio input is analogue.

Menu Page 6

ALARM, ANTI-PHASE ENABLE

When turned on, this alarm will be triggered if the selected phase bars are out of phase according to the parameters set below.

SET TIME

Sets the time before the anti-phase alarm is triggered.

SET THRESHOLD

Sets the threshold in degrees beyond which the anti-phase alarm will be triggered.

ALARM ASSIGN 1-8

Assigns an alarm to each of the 8 GPI alarm outputs. The alarms assigned here also need to be enabled on menu pages 5 and 6. An untriggered alarm will have 0V on the assigned pin, a triggered alarm will cause the assigned pin to output +5V.

Menu Page 7

VIDEO DISPLAY

In the Auto mode, if the incoming SDI feed is lost the SD-4/16 will automatically switch to internally generated black enabling the external analogue or AES/EBU audio still to be viewed. If the SDI signal is reinstated the SD-4/16 will automatically revert to displaying the video from this feed. When set to Internal, any audio feed (SDI embedded, AES/EBU or analogue – as selected in Page 1 of the menu) may be viewed on internal black if in-picture audio metering is not required.

VIDEO STANDARD INTERNAL

If the SD-4/16 is used as a dedicated audio meter in Internal mode only it will be necessary to set the outputs to 525 line NTSC or 625 line PAL. Although the incoming SDI video standard is detected automatically it is still necessary to set the internal black generator manually so that if the incoming video is lost (and Auto mode is selected) then the SD-4/16 will output the required television standard.

NTSC PEDESTAL

The NTSC pedestal of the outgoing composite video may be set on or off.

Master Reset

Master Reset is achieved by turning off the power for a few seconds, and turning it back on again while pressing both Fade/Function buttons until the bargraphs appear. A Master Reset is employed to return all settings to the factory default, or it may be carried out in the unlikely event that the unit fails to respond to the front panel push buttons. **Please note that all user settings will be lost.**

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Connections

SDI

The SD-4/16 is normally connected in-line with an SDI monitor feed via the appropriate 75ohm BNC connectors and is designed to accept 525 or 625 line SMPTE 259M serial digital video. An active loop-through copy output is also provided.

Analogue video

The composite output is on 75ohm BNC connectors. This is an analogue copy of the SDI input plus superimposed audio bargraphs.

Audio

Two pairs of AES/EBU and two pairs of analogue inputs are provided to accompany the SDI when separate audio and video feeds are employed.

Power

The SD-4/16 will operate from a nominal 115VAC or 230VAC mains supply. The mains input voltage is selected by the switch located on the rear panel next to the power inlet.

Connector Details

Alarms: 25 way 'D' female

Pin	Description
1	Alarm Assign 1
2	Alarm Assign 3
3	Alarm Assign 5
4	Alarm Assign 7
5	No connection
6	No connection
7	No connection
8	No connection
9	Reset All Alarms (Short to GND for reset)
10	No connection
11	+5V
12	GND
13	GND
14	Alarm Assign 2
15	Alarm Assign 4
16	Alarm Assign 6
17	Alarm Assign 8
18	No connection
19	No connection
20	No connection
21	No connection
22	No connection
23	No connection
24	+5V
25	GND

RS422 Data Port: 9 way 'D' female

Pin	Description
1	+5V
2	Rx-
3	Tx-
4	GND
5	GND
6	+5V
7	Rx+
8	Tx+
9	GND

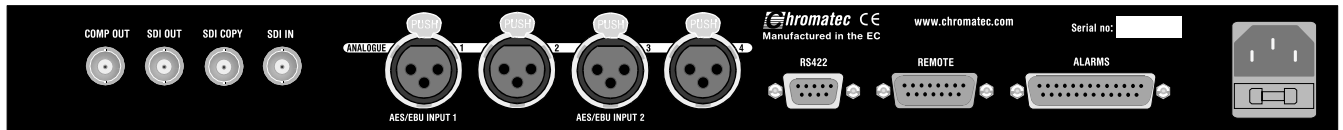
Remote Control: 15 way 'D' female

Pin	Description
1	Insert on/off
2	Fade +, up arrow
3	Left arrow
4	No connection
5	Lock LED
6	No connection
7	+5V
8	+5V
9	Fade -, down arrow
10	Lock
11	Right arrow
12	No connection
13	Insert on/off LED
14	GND
15	GND

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Rear panel layout



SD-4/16 specifications

(subject to change without notice)

Inputs:

- 1 x SMPTE 259M Serial digital 525/625 75ohm BNC.
- 2 x Pairs AES/EBU digital audio, 110ohm balanced (SD-4/16D)
- 2 x Pairs analogue audio, balanced, 30kohm impedance (SD-4/16A)
- 1 x Remote front panel connection

Outputs:

- 1 x SMPTE 259M Serial 525/625 75ohm BNC
- 1 x SMPTE 259M Serial 525/625 75ohm BNC copy output
- 1 x Composite video, 1Vp-p, PAL/NTSC 75ohm BNC
- 8 x Alarm Assignment GPI outputs

Embedded audio extraction:

- Sampling rate: 32-48kHz variable, automatically detected
- Digital audio processing resolution: 16 bits
- Audio channels extracted: All 4 groups (16 channels)

Scales & ballistics:

- AES/EBU: Overall dynamic range: 60dB (0dBu to -60dBu)
- Attack time: 1 sample
- Decay time: 1.5secs per 20dB
- DIN PPM: Overall dynamic range: 55dB (+5dB to -50dB)
- Attack time: 10ms
- Decay time: 1.5secs per 20dB
- BBC PPM: Overall dynamic range: 28dB (+12dB to -16dB)
- Attack time: 10ms
- Decay time: 2.8secs per 24dB
- Nordic PPM Overall dynamic range: 60dB (+12dB to -48dB)
- Attack time: 10ms
- Decay time: 1.7secs per 20dB
- VU: Overall dynamic range: 23dB (+3dB to -20dB)
- Attack time: 300ms
- Decay time: 300ms per 20dB
- VU EXT D: Overall dynamic range: 80dB (+10dB to -70dB)
- Attack time: 300ms
- Decay time: 300ms per 20dB

Phase correlation:

- Attack time: 1sec for 0 to ± 1 deviation
- Decay time: 1sec for ± 1 to 0 deviation
- Input dynamic range: 45dB
- Minimum input level: -50dB