BCD AUDIO

Broadcast Audio
Custom Manufacture
Design and Consultancy

BLACK BOXES INDEX

The BCD Audio Black-box range provides the user with an easy to use series of useful Audio interface products.

Most of the units use a common DC power system, of 12 – 24V , provided on a 2.5mm barrel socket or mini-XLR at extra cost. The units may be powered from third-party units, or BCD can supply suitable power-units:

BCD-UK-PSU for the United Kingdom,
BCD-US-PSU for Canada and the USA,
and
BCD-EU-PSU for Europe, with Switzerland

BCD can also supply 2U mounting panels for the units: One, two and four slot panels are available. See Page 13

Blanking panels to cover unused slots are also available. This has the reference no. BCD-BLANK

The BCD ALT2-R and BCD ALT2-S are new for 2016, and replace the ALT-1.

BCD ALT-2R and ALT-2S units

BCD Audio, Angerton, Church Road, Farringdon, Alton, Hants, GU34 3EG
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HEADPHONES UNITS
HPNS-M, HPNS-S

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The HPNS-M headphones unit is designed to complement the ALT-2R, and is powered from the unit.

The HPNS-S box is a stand-alone , DC powered unit.

HPNS-M
The HPNS-M offers headphone monitoring in mono for the ALT-2R

HPNS-S
The HPNS is a stand-alone headphone monitoring unit.

HPNS-M detail

- Mono Headphones level control
- Stereo headphones jack socket
- Broadcast quality output and level
- Balanced audio inputs on XLR
- DC power +/12V (from ALT-2R)

HPNS-S detail

- Stereo Headphones level control
- Mono left and right push buttons.
- Stereo headphones jack socket on front and rear
- Broadcast quality output and level
- Balanced audio inputs on two XLR’s
- Universal DC inlet 12-24V on 2.5mm barrel socket.

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AUTO LEVEL TAKERS
ALT-2R, ALT-2S

The BCD Audio Auto Level Takers are high quality microphone amplifiers with automatic gain control designed for use in 'unattended' studios and other situations where no sound engineer is present to adjust the level. The two versions operate in the same way and are tuned for the different applications.

ALT-2R

The ALT-2R has balanced inputs and outputs on XLR and unbalanced out with remote control options on Dtype.

ALT-2S

The ALT-2S has a switchable mono/stereo balanced input to 3.5mm mini-jack output, for driving PC type active loudspeakers.

Front panel of ALT-2S

Rear panel of ALT-2R

Rear panel of ALT-2S

The unit accepts balanced or unbalanced signals at levels ranging from -80dBu to -20dBu, to produce a balanced output at a level of 0dBu using a precision level meter driving a high quality digitally-controlled VCA. An external DC power supply providing 2W at between 12V and 24V is required; switchable 48V phantom power is derived internally.

Description-ALT-2

The ALT-2 is set up by pressing a single illuminated momentary push-button switch that flashes until signal is applied to the input. The illumination then becomes steady for a period of six seconds, while the device samples the incoming level and automatically adjusts the gain to provide a nominal output level of 0dBu.

After this adaptation phase the gain setting remains fixed until the TAKE button is pressed again; the level parameters are stored in non-volatile EEROM.

Occasional peaks in level are controlled by a compressor/limiter in the output circuit that compresses signals above +4dBu, at a ratio of 2:1 and limits +8dBu. The limiter attack time represents a carefully engineered compromise between minimum over-shoot and high audio quality. The design has excellent signal handling characteristics and, under gross overload conditions, it is capable of applying very high levels of limiting without compromising the noise and distortion performance achieved at normal operating level.

An additional feature that assists with short-term level variations is the application of progressive gain reduction by up to 8dB when limiting is detected. The gain is restored over a period of 20 seconds when limiting ceases.

Three LED indicators on the front panel show the gain range that the unit is working in during the adaptation phase, and revert to showing the status of the compressor, limiter and gain reduction systems after adaptation.

The phantom power switch is an electronically latched illuminated push-button, which may be latched on or off as required. If the switch is held down at the time of applying power, the switch will be toggled between locked and operational. In the locked mode, the phantom power will remain on or off, depending on the original setting.

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More data overleaf

AUTO LEVEL TAKERS
ALT-2R, ALT-2S

BCD AUDIO

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BCD 29/12/2022

Specification

Broadcast quality adaptive mic-amplifier
Input level: -80dBu to -20dBu
Input impedance: 10K
Both input modes electronically balanced
Noise less than -83dBu peak at 0dB gain
Distortion better than 0.02% at +10dBu
Output impedance 50R, electronically balanced.
Unbalanced output on D9. (ALT-2R)
Remote power and control on D9. (ALT-2R)
Line level stereo balanced to mini-jack (ALT-2S)

Typical applications

Outside Broadcast systems
Unattended studios
Camera head-end microphone amplifier
Talkback systems

Power requirements and connector

External DC 12V–24V @ 4W maximum.
Power supplied with 2.5mm barrel connector.
Inner = +ve, Outer = -ve
The supply is isolated to eliminate ground loops.

Recommended accessories

BCD-UK-PSU UK plug-top power supply
BCD-EU-PSU European version of above
BCD-IEC-PSU Free-standing IEC inlet version
BCD-2U4 2U rack mount panel for four units
BCD-2U2 2U rack mount panel for two units
BCD-2U1 2U rack mount panel for one unit

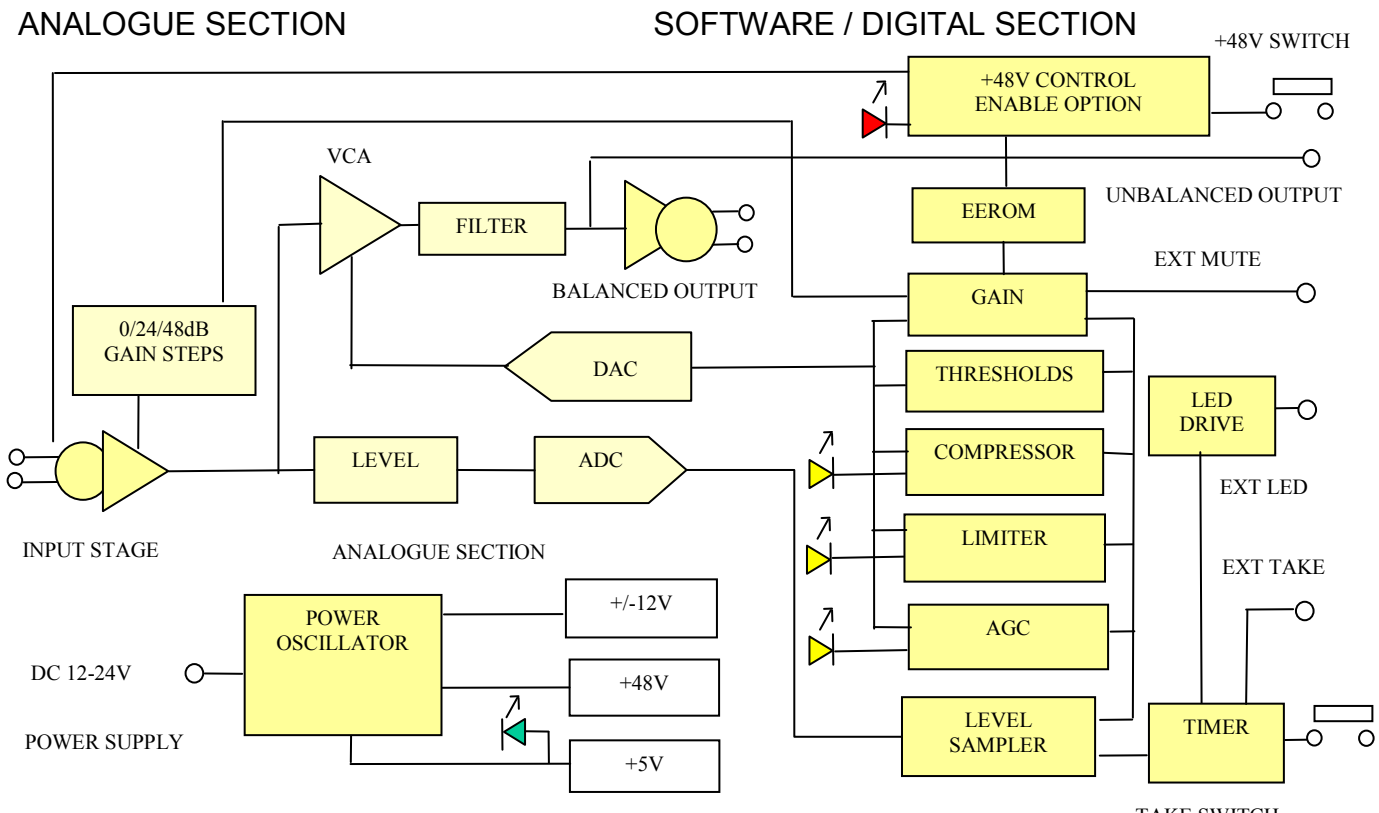
Matching headphone amplifiers

BCD-HPNS-M. Low cost unit that takes power from the ALT-2R D9, and takes mono line level inputs to headphones jack.

BCD-HPNS-S. Stand-alone stereo unit, self powered.

ALT-2R D9 Connector

Pin1	PSU +ve	Pin6	+5V or +12V outlet
Pin2	PSU –ve	Pin7	Ext Mute
Pin3	Ext take	Pin8	User or –12V outlet
Pin4	Ground	Pin9	Unbalanced output
Pin5	Ext LED		



BLOCK DIAGRAM

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INTERBOXES
ITB-2F

The Interbox 2F interfaces a GO and RETURN path from a consumer S/PDIF device to a professional AES3 device, with optional Sample rate conversion.

The ITB-2F represents an ideal & cost-effective method of fully interfacing consumer digital audio equipment to the professional AES3 environment.

Front panel of Interbox-2F

Rear panel of Interbox-2F

Description-ITB1F

The ‘S/PDIF to AES’ side of the unit auto-senses between TOSLINK and Phono socket inputs, with the optical feed taking priority. The Channel Status information is automatically converted to Professional format and passed to the AES3 output.

If ‘SRC’ is selected, the AES3 output is clocked from the AES3 input, and the necessary sample rate conversion from Consumer input to AES3 output is performed, completely isolating Consumer side from the Professional side.

The ‘AES3 to S/PDIF’ side of the unit accepts an AES3 signal and automatically converts the Channel Status information to ‘Consumer, Copy enable’ suitable for consumer CD-R/MD & computer interfaces.
The signal is passed out of the S/PDIF Phono and TOSLINK feeds simultaneously.

If the SRC is selected, the S/PDIF output is clocked from the S/PDIF input, completely isolating the Consumer side from the Professional side.

Applications

Interface of DAT machines to Digital mixers.
Interface of Minidisk machines.
Interface of Consumer PC digital audio cards.
S/PDIF to AES3 conversion
AES3 to S/PDIF conversion with channel status correction.
44.1KHz to 48KHz conversion and visa versa.

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More data overleaf

INTERBOXES
ITB-2F

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Specification – Inputs

AES3 input on XLR3F.
Transformer balanced, earth-free input.
Termination impedance 110R
Minimum signal level 200mV p-p

SPDIF input on phono socket.
Unbalanced input to IEC958
Input impedance 75R
Minimum signal level 200mV p-p

OPTICAL input on TOSLINK with dust cap.

Specification – Outputs

AES3 output on XLR3M.
Transformer balanced, earth-free output.
Output impedance 110R.
Output level 4V p-p nominal

S/PDIF output on phono socket.
Unbalanced output to IEC958
Output impedance 75R
Output level 1V p-p nominal

OPTICAL output on TOSLINK with dust cap.

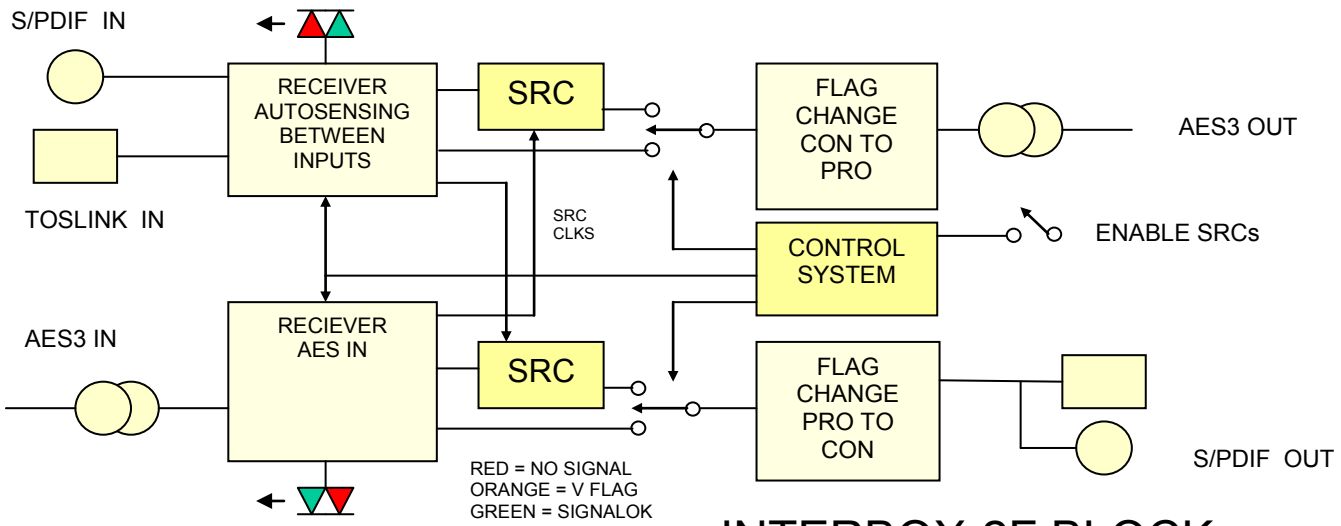
Specification – General

DC power 10-30V DC on 2.5mm barrel plug, centre +ve.

Tri-colour LOCK LEDs indicate
Red = no signal,
Orange = Errors & Validity flag
Green = Signal OK.
SRC conversion to 24bit.

Overall dimensions and finish

Heavy duty aluminum extrusion, plastic bezels
Height 52mm, width 94mm, depth 108mm
Weight 250g



INTERBOX-2F BLOCK

BCD AUDIO

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DIGITAL TONE GENERATOR DTG-1

The DTG-1 is a portable, hand-held device which produces a variety of standard tones in AES-EBU format. The unit is ideal for testing AES-EBU systems within an installation, laboratory or service department.

Front panel of DTG-1

Rear panel of DTG-1

Power supply

The unit is powered from an internal 9V battery, or from an external DC power supply of 8–30V via a 2.5mm barrel connector.
A slider switch on the rear panel selects battery on/off.

Left hand switch

The left-hand switch selects MUTE, LEFT only, L+R RIGHT only, GLITS and SPECIAL. The LEFT, L+R and RIGHT settings allow signals at standard frequencies and levels to be selected from the right - hand switch.
These settings allow the left and right channels to be identified, and noise and crosstalk tests to be undertaken.

Right hand switch

The right-hand switch selects three frequencies at three different levels for the LEFT, L+R and RIGHT settings. These are shown on the inner scale. The 0dBFS tones provide precise peak levels, the -18dBFS is a standard line-up level, and the -48dBFS enables low-level distortion measurements to be made.

GLITS setting

In the GLITS setting, six alternative stereo ID sequences can be selected. (400Hz was added mid 2006)
Setting 1 is 400Hz and setting 2 is 1KHz BBC format.
Setting 3 is 400Hz and setting 4 is 1KHz EBU format.
Settings 5 and 6 are spare.
The EBU sequence of is -18dB continuous on RIGHT, and interrupted every three seconds for 0.25 seconds on LEFT. The BBC sequence is LEFT interrupting once and RIGHT interrupting twice for 0.25 seconds every four seconds.

Specials setting

In the SPECIAL setting, the right hand switch selects a number of different signals:
PHASE signal outputs a clipped 400Hz waveform that can be used for signal polarity tests.
NOISE produces white noise at -3dBFS, which is useful for checking Equalisers.
+EMPH outputs -18dBFS at 10kHz, with the emphasis flag asserted.
V FLAG output 0dBFS at 10kHz with the validity flag set.

Output

The output is transformer balanced via an XLR, at the internally produced 48kHz rate. If external Wordclock is connected via the BNC socket, the unit will synchronise to the external rate and the frequencies will scale accordingly. If a 44.1kHz Wordclock is connected the frequencies will be approximately 9% lower.

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More data overleaf

DIGITAL TONE GENERATOR DTG-1

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Battery power consumption

Battery life with the output connected is approximately 15 hours; battery usage is therefore not recommended for normal use of this product.
The power consumption of the unit during Battery operation depends on usage:
Power consumption no load,
or no Wordclock input — 11mA
Power consumption with 110R load – 20mA
Power consumption with 110R load and Wordclock — 30mA

Status LED

Normally the status LED shows power-on. Under low battery conditions the LED is flashed slowly and the AES3 output is disabled. Under hardware fault conditions the LED is fast-flashed. Under gross hardware fault conditions the LED glows dimly.

Signal purity

1kHz and 10kHz frequencies generated to 24-bit.
Distortion better than 0.005% for these tones.
400Hz is generated to 16-bit resolution.
There is no left/right crosstalk in the unit.

Power requirements and Connector

External DC 8-30V @ 0.5W maximum.
Power supplied with 2.5mm barrel connector.
Inner = +ve, Outer = -ve
The -ve power input is connected to chassis.
Battery operation from PP3 battery

Recommended accessories

BCD-UK-PSU UK plug-top power supply
BCD-EU-PSU European version of above
BCD-US-PSU USA and Canadian version.
BCD-2U4 2U rack mount panel for four units
BCD-2U2 2U rack mount panel for two units

Specification – Outputs

AES3 output on XLR3M
Transformer balanced, earth-free output
Output impedance 110R.
Output level 5V p-p nominal (external power)
Output level 3V p-p nominal (battery power)

Specification – Wordclock input

TTL Wordclock input on BNC connector
Frequency range 30kHz to 52kHz.
Output frequencies scale with Wordclock input.

Channel status information

Channel status information is transmitted in professional
mode, and relates to the front panel switch settings:
Normal mode — Professional flag, Audio, no emphasis
Emphasis mode — Emphasis flags asserted.
Validity mode — Validity bit is asserted.
Signal bits set to twin channel, 24-bit signal, not reference.
Frequency bits set to 48kHz on internal clock.
Frequency bits set to ‘unknown’ on external clock.

Alphanumeric source & destination information

Signal muted — ‘MUTE TONE’ is transmitted.
Phase check signal — ‘PHSE TONE’ is transmitted.
GLITS check signal — ‘GLIT TONE’ is transmitted.
For other settings the frequency is transmitted in the destination field and levels are transmitted in the source field.
The source field indicates 0dB<n>, -18dB<n> or -48dB<n>, where <n> is L,R, or M depending on whether the left, right or mono signal is being transmitted.
The destination field indicates 1kHz, 10kH or 400H depending on the frequency being transmitted.

Overall dimensions and finish

Heavy duty aluminum extrusion, plastic bezels
Height 52mm, width 94mm, depth 108mm
Weight 250g

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ANALOGUE TO DIGITAL CONVERTER
ATOD-1

The BCD ATOD-1 is a top quality Analogue to Digital converter, packaged in our black box. Ideal for use with portable recording equipment, due to its 12V power source.

Specification– Analogue

Balanced audio inputs , ground pin 1,left on pins +2,-3 and right on pins +4,-5.
Nominal calibration 0dBu input for –18dBFS.
Internal presets allow for other calibrations.

Distortion better than 0.005%.
Output noise, as measured by DtoA conversion, better than –86dB, 20-20KHz, with maximum output +18dBu.
Input impedance 30K .

Input balance better than 60dB at 1KHz.
Left-right crosstalk better than -100dB @ 1KHz.
Left-right crosstalk better than –85dB @ 10KHz.

Specification – Digital

Transformer balanced AES3 output.
Output impedance 110R +/10%.
Output level 4V p-p, loaded.
Output jitter better than 8nS.

Power requirements

DC input, with +ve on centre pin.
Minimum input voltage 8V, maximum 30V.
Recommended input voltage 12 to 24V DC.
Power consumption at 12V input 120mA.

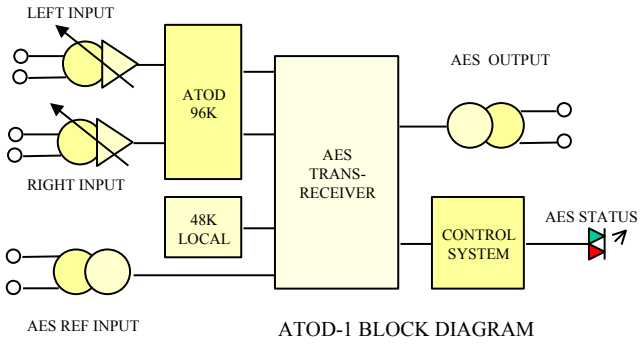
Features

Dual balanced audio inputs on 5pin XLR.

AES3 transformer balanced output on XLR.

AES3 transformer balanced reference input XLR.

Wide range DC power inlet on 2.5mm socket.



ATOD-1 BLOCK DIAGRAM

Description

The ATOD-1 converts balanced audio at broadcast levels to digital audio.

The unit automatically references to an external AES3 signal if present, or defaults to an internally generated 48KHz if the reference is missing.

The external reference may be in the range 32KHz up to 110KHz, enabling 48KHz and 96KHz operation as well as Consumer frequencies.

The single status LED indicates Red during the initial calibration phase, orange for internal clock and green for external reference clock.

The internal control system correctly inserts Channel status information, and maintains the sample frequency information to the latest standards.

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DIGITAL TO ANALOGUE BOX DTOA-1

Broadcast Audio
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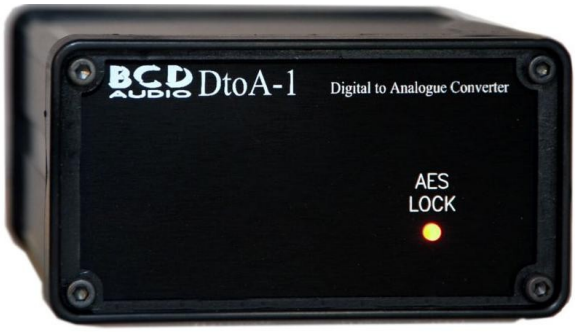
BCD 29/12/2022

The DtoA-1 is a top quality digital to analogue converter, housed in our black-box.
Stereo or twin audio is recovered from an AES3 signal at up to 200KHz sample rate.



Features

AES3 INPUT 110R on XLR input.

Stereo balanced audio output on 3pin XLR's.

DC inlet on 2.5mm barrel socket.

Lock indicator LED.

Specification – Aes input

Transformer balanced AES3 input on XLR.
Input impedance 110R.
Sample rates 24KHz up to 200KHz.

Specification – Analogue outputs.

Balanced dual or stereo outputs on 3-pin XLRs.

Maximum output level +26dBu.

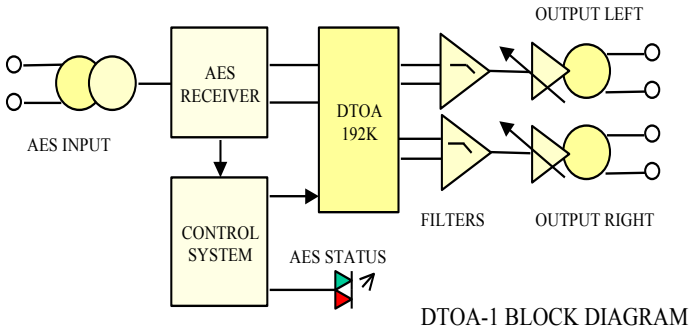
Normal calibration 0dB for –18dBFs signal.
Internal presets allow for alternative calibrations.
Output noise –92dB rms 20-20kHz bandwidth, referenced to 0dB calibration.
Distortion better than 0.003% at maximum output and reference level.
Output impedance 50R.
Output balance better than -40dB.
Left-right crosstalk better than –95dB @ 10KHz.

DC power requirements

10 to 30V DC on 2.5mm barrel socket.
+ve on centre pin.
Recommended voltage range 12V to 24V.
Current consumption at 12V DC 150mA.

Description

The transformer balanced AES3 input is taken to a 192KHz compatible AES3 receiver and digital to analogue converter.



DTOA-1 BLOCK DIAGRAM

The control system automatically configures the converter for the correct rate, an indicates lock status on the bi-colour LED. The LED indicates RED for no signal or error, ORANGE for signal OK but muted or GREEN for signal good.

Balanced third-order filters reconstruct the analogue signal to high precision, and electronically balanced output stages complete the signal chain.

The floating power supply accepts a wide range of DC inputs, and produces all of the required voltage rails.

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LOW LEVEL AES RECOVERY BOX
LAB-1

The BCD LAB-1 enables AES3 signals on twisted pair to be recovered from long cables. Normal AES3 equipment is capable of 100 metres and specially equalised equipment is capable of 200 metres use; the LAB-1 extends this range to 500 metres.

Features

AES3 low-level input on XLR.

AES3 transformer balanced output on XLR.

Wide range DC power inlet on 2.5mm socket.

Specification– Input

AES3 digital audio inputs on pins 2&3.
Ground pin 1 of XLR.
Input impedance 110R.
Electronically balanced with input RF filter.
Minimum input level better than 50mV P-P.

Input carrier level detection

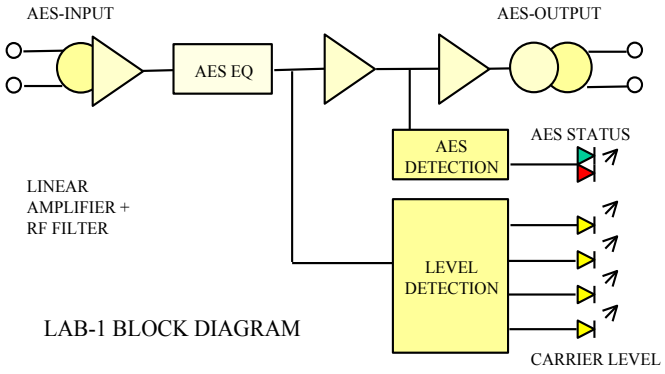
Carrier level detection of 100mV, 300mV, 1V and 3V p-p.

Specification – Digital

Transformer balanced AES3 output.
Output impedance 110R +/10%.
Output level 3V p-p, loaded.
Output jitter better than 20nS, dependant on length of cables used.

Power requirements

DC input, with +ve on centre pin.
Minimum input voltage 8V, maximum 30V.
Recommended input voltage 12 to 24V DC.
Power consumption at 12V input 80mA.



LAB-1 BLOCK DIAGRAM

Description

The LAB-1 recovers low-level AES3 signals from twisted pair, enabling long cables to be used. The AES input is passed via an RF-filter to a wide-band linear amplifier, and then equalised.

The signal level is monitored , and displayed on front panel LEDs, giving an indication of the received carrier strength.

The AES3 signal is passed to a high-speed comparator, and to an RS422 transformer balanced output for final output.

An AES3 receiver is connected to the signal, and a bi-colour LED indicates whether the signal is suitable for use. Sample rates from 24KHz to 200KHz are supported.

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FIBRE TO AES BOX
FAB-1

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Conventional copper AES3 circuits may be no longer than 100 metres unless specialised recovery and equaliser equipment is used. The FAB-1 extends this range to 2 kilometers using ST fibre.
The FAB-1 has a GO and a RETURN circuit, and is compatible with BCD's other ST fibre products.

Features

AES3 INPUT 110R on XLR input to ST fibre transmitter.

ST fibre input to AES3 output on XLR.

DC inlet on 2.5mm barrel socket.

Lock indicator LEDs for each circuit.

Specification – AES input

Transformer balanced AES3 input on XLR.
Input impedance 110R.
Sample rates 24KHz up to 200KHz.
Equalised for medium length cables up to 200metres.

Specification – AES output

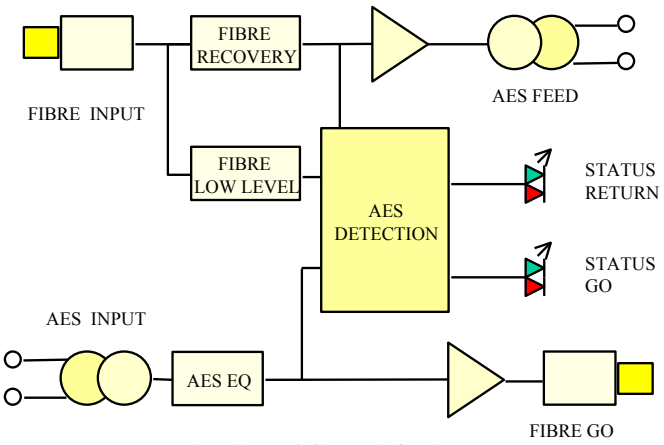
Transformer balanced AES3 output on XLR.
Output impedance 110R +/-10%.
Output level 3V P-P loaded 110R.

Specification – Fibre conversion

Fibre type 50 or 62.5 micron types.

DC power requirements

DC power applied via 2.5mm barrel socket, +ve on centre pin.
Input voltage range 8V to 30V DC.
Recommended input range 12 to 24V DC.
Current consumption at 12V input 120mA.



FAB-1 BLOCK DIAGRAM

Description

The AES3 input is equalised for medium length cables, and modulates the ST fibre transmitter. A status LED indicates the integrity of the input signal.

The ST fibre signal is recovered and passes to the RS422 transformer balanced output.

A status LED indicates the integrity of the AES3 signal, and also glows orange for low-level fibre inputs.

The unit is powered from a wide ranging DC power source.

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BLACK BOX 2U MOUNTING PANELS

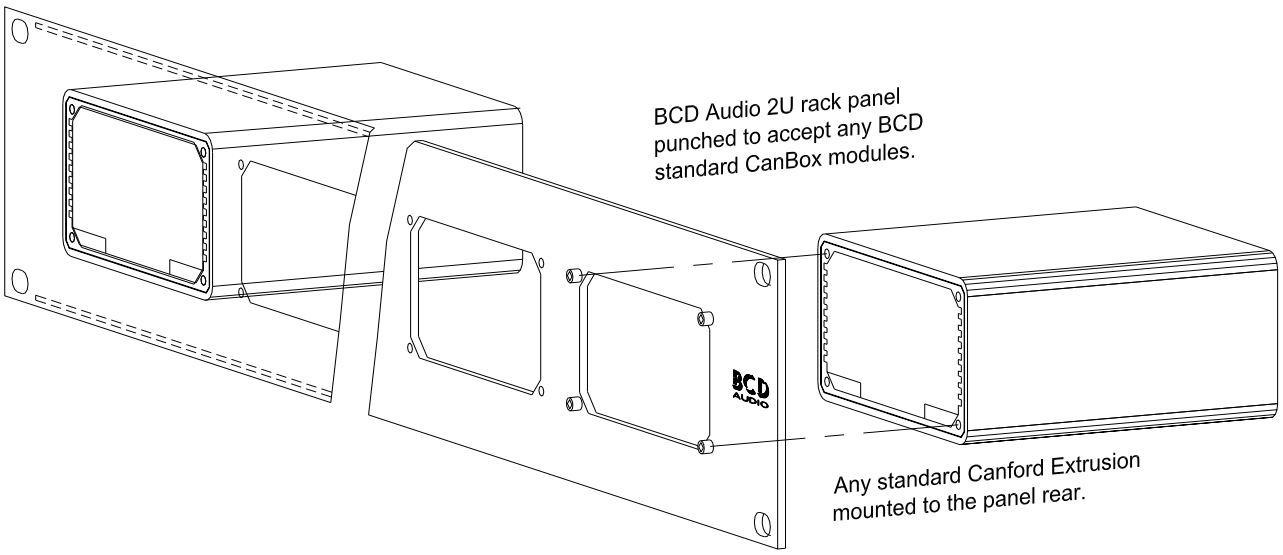
The 2U Mounting panels are designed to accept any of the Black boxes produced by BCD Audio, and may also accept other units produced by Canford Audio.

Three versions are available, with a blanking panel to cover an used slot :

- Four unit version BCD-2U4 (Canford 16-126)
- Two unit version BCD-2U2 (Canford 16-127)
- One unit version BCD-2U1 (new in 2012)
- Blanking panel BCD-BLANK (covers unused slots) (Canford 16-128).

Installation instructions

Remove the four fixing screws from the front of the Black box device, separating the front panel and bezel from the unit. The bezel is no longer required.
Hold the front panel in place on the unit, taking care that any front panel controls and Indicators are still in the correct place, offer up to the panel, and reattach using the fixing screws.
The fixing screws will bite into the 2U panel and also the extrusion , giving good contact.
Some replacement screws have been provided, should any get lost!
Nuts and washers are also provided with the blanking panel, to enable it be mounted.



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