

## General Description

The Rane BB 44X Balance Buddy is a handy professional-grade tool used to convert and provide isolation for unbalanced -10 dBV consumer level RCA outputs up to balanced +4 dBu professional XLR inputs—and vice-versa. Two channels each way, or a stereo pair each way (however you prefer to think about it). The BB 44X converts one pair from -10 dBV to +4 dBu and another pair from +4 dBu to -10 dBV simultaneously. There are two female and two male XLR connectors, and four RCA jacks.

Unbalanced lines should always be kept to 10 feet or less to prevent undesirable effects such as hum and noise. The BB 44X allows conversion to balanced lines that can be run across a studio or a house without loss of signal quality. For

instance, a stereo tape recorder with RCA connectors attaches easily—inputs and outputs—to one BB 44X, allowing record source and playback amplifiers to be in another room.

Signal-to-noise performance is perfectly preserved using the BB 44X, since it uses only passive transformers to convert signal levels. It adds no additional noise whatsoever. Use of professional quality nickel core (“80” Ni) transformers guarantee low distortion, wide bandwidth and high signal level handling capability.

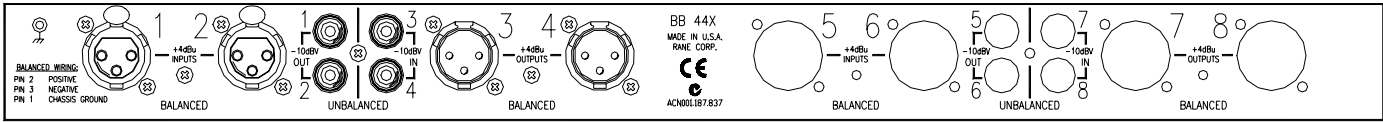
The BB 44X’s isolation transformers provide a quick and affordable answer to most jobs requiring signal level conversion and output balancing.

## Features

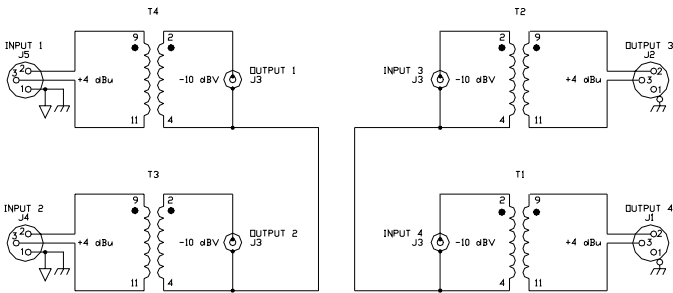
- 2 Channels of -10 dBV to +4 dBu Conversion
- 2 Channels of +4 dBu to -10 dBV Conversion
- Nickel Core “80” Ni Transformers
- Wide Bandwidth
- Low Distortion
- +24 dBu Maximum Levels
- RCA & XLR Connectors
- Expandable to 8 Channels with Option 88 Accessory

Parameter	Specification	Limit	Units	Conditions/Comments
Transformer Construction	Nickel Core Bobbin Wound			Grade “80” Ni
Turns Ratio	1:3.89			-10 dBV (316 mV): +4 dBu (1.23 V)
Maximum Levels	(In or Out )			
.....-10dBV	+12.2 (40 Hz-20 kHz); +6.7 (20 Hz)	0.5dB	dBu	1% THD Point
.....+4dBu	+24 (40 Hz-20 kHz); +18.5 (20 Hz)	0.5dB	dBu	1% THD Point
Input Impedance	(Load Impedances as Shown)			
.....-10dBV	1k	5 %	ohms	Load Impedance 15k ohms
.....+4dBu	15k	5 %	ohms	Load Impedance 1k ohms
Insertion Loss	0.5	0.1	dB	With Recommended Load Impedance
DC Resistance	47.5/200	10%	ohms	-10 dBV/+4 dBu
Frequency Response	20-20 kHz	0.2	dB	+4 dBu In/Out
Bandwidth	90 kHz	-3	dB	Half Power Frequency
THD + Noise	less than .04 (40 Hz-20 kHz)	.01	%	+4 dBu In/Out
Unit: Agency Listing	UL, CSA CE (EMC), CE (Safety)			Exempt Exempt
Unit: Construction	All Steel			
.....Size	1.75"H x 19"W x 5.3"D (1U)			(4.4 cm x 48.3 cm x 13.3 cm)
.....Weight	4 lb			(3 kg)
Shipping: Size	4.25" x 20.3" x 13.75"			(11 cm x 52 cm x 35 cm)
.....Weight	8 lb			(5 kg)
All specifications apply both directions, unless noted.				
0 dBu=0.775 volts; 0 dBV=1.0 volts				

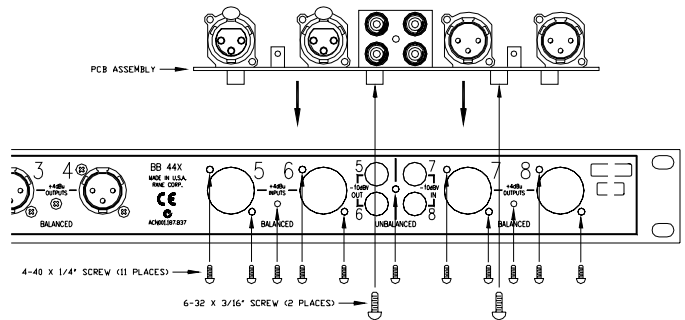
**Rear Panel**



**Block Diagram**



**OPTION 88 Accessory**



**Application Information**

**Conversion Ratio**

The casual observer would think to convert -10 dBV to +4 dBu, you would need 14 dB of gain. The casual observer would be wrong. You only need 12 dB of gain. The reason is not only do you change levels, you also change *reference levels*—from dBV to dBu. The first (dBV) references everything to 1.0 volt, while the second (dBu) references everything to 0.775 volts (this comes from the old *power* reference of 0 dBm, which equaled 1mW into 600 ohms, which equaled .775 volts).

**Driving Impedances**

Some people wrongly feel you cannot use a transformer to convert between -10 dBV and +4 dBu because of low impedances. This is not a problem as long as you use them to interconnect equipment with *at least 15k ohms input impedance*. Since most professional products have input impedances of 20k ohms or greater (50k and 100k ohms are not uncommon), this should never be difficult. A 15k ohm load winds up looking like 1k ohm to the equipment with the -10 dBV output (due to transformer action). This may seem excessively low, but is not in practice. The maximum transformer output level of +24 dBu occurs with an input level of +10 dBV, which equals 3.16 volts. And 3.16 volts driving 1k ohms only requires 3.16 milliamps, which is a very modest requirement for any -10 dBV equipment to deliver.

**Wiring**

The BB 44X follows AES/ANSI/IEC standards of pin 2 positive and pin 3 negative. Note the shields (commons) of

the RCA jacks are tied for the Inputs and the Outputs but not to each other. This allows ground isolation of stereo Input and Output pairs. A positive signal applied to pin 2 of the XLR connectors causes a positive signal to appear on the tip of the associated RCA jacks, and vice-versa.

**Signal Direction**

Signal can be converted through the channels either direction. That means there is the possibility of having four channels -10 dBV unbalanced to +4 dBu balanced, or vice versa (in the standard unit). The only problem arises in the gender of the XLR connector. The solution requires same-sex XLR adaptors or special cables.

**Chassis Grounding**

A tapped hole and a 6-32 screw is provided for chassis grounding purposes. Good practice dictates earth-grounding the BB 44X. If the grounding integrity of the rack screws is in doubt, run a wire from this screw to a known earth ground.

**OPTION 88**

The OPT 88 (Option-88) expands the BB 44X into an eight channel model. The OPT 88 consists of a printed circuit board with four additional transformers and jacks soldered in place. The OPT 88 installs easily in the blank side of the BB 44X. Assembly is simple: remove the cover, install the board in place, and secure with the supplied mounting screws. No soldering required; all you need are #1 and #2 Phillips screwdrivers.