

BBE[®]
Sound Inc.
MODEL 702
USER MANUAL

5500 Bolsa Ave., Suite 245
Huntington Beach, CA 92649, (714) 897-6766
in USA (800) 233-8346, in CA (800) 558-3963
FAX (714) 895-6728

BBE is the registered trademark of BBE Sound, Inc.
Covered by U.S. Patent 4,482,866
Other U.S. and foreign patents pending
dbx is the registered trademark of dbx, Inc.

WHAT IS THE BBE PROCESS?

The BBE process was developed to overcome the phase and amplitude distortion inherent in most speaker systems.

When the complex audio waveforms pass through a speaker, their proper phase order is lost. The higher frequencies are delayed which may cause lower order frequencies to reach the listener's ears first or simultaneously with the higher frequencies. This is known as "envelope distortion" and gives the listener a "muddy" or "smeared" perception of the music program.

The BBE process imparts a pre-determined phase correction to the high frequencies where most of the harmonic information exists. This is done by breaking the signal into three sub-bands: a low frequency band which is crossed over at 150Hz, a mid-range band which is crossed over at 1200Hz and the high frequency band that handles everything else up to 20kHz.

The low band is delayed about 2.5ms (milliseconds) through a passive low pass filter. By delaying the mid-range band about 0.5ms through an active band pass filter and using the high frequency band as a reference, a voltage controlled amplifier (VCA) then makes continuous adjustments to maintain a constant level of harmonic content per amount of mid-range program at the output.

USING THE BBE 702

The BBE model 702 is a card format of the BBE process that is designed to operate in the dbx 900 series of modular mainframes.

The BBE 702 is a single ended processor to be used "in line" in the audio signal chain. This may be accomplished by using an insertion point either on an individual channel or sub group, or on the main outputs of the mixing console.

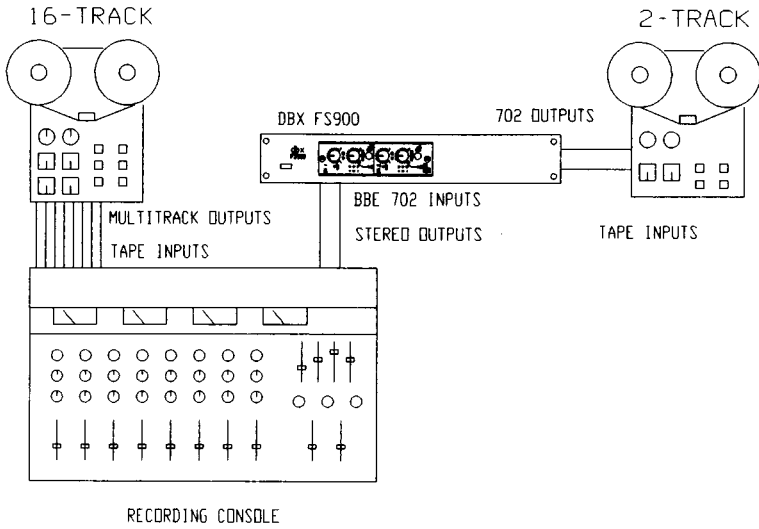
The BBE 702 should not be used in an effects loop since the phase shift in the BBE process may cause phase cancellation in the program.

The BBE process may be used on the entire mix of the program or on individual instruments such as violin, clarinet, guitar or vocals.

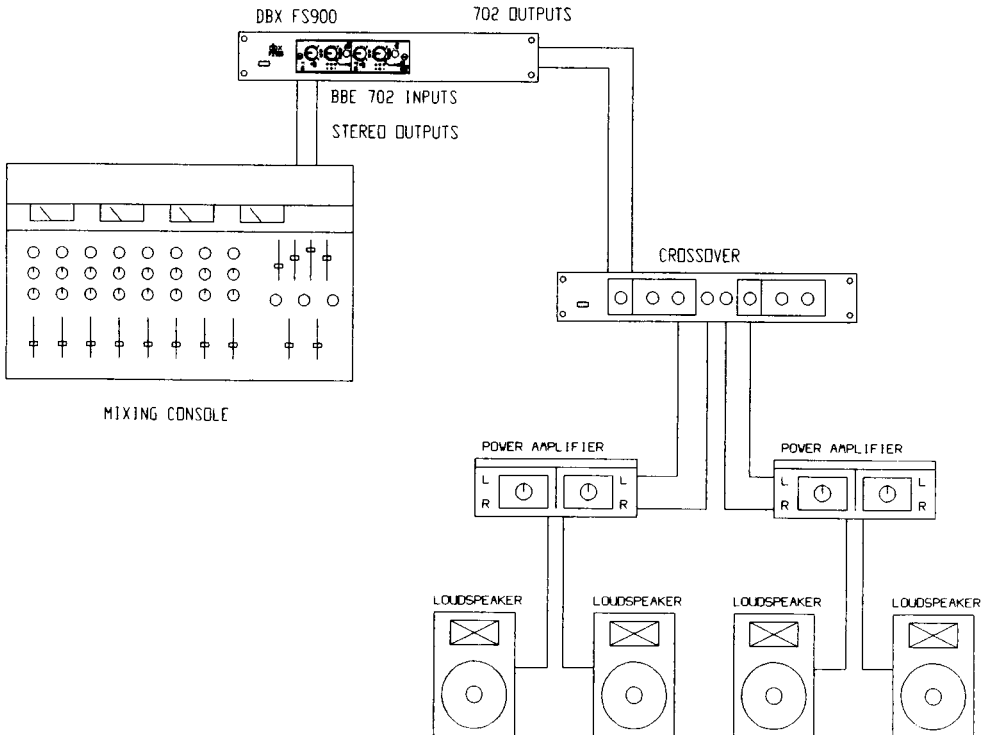
It is recommended that any equalization be reduced as much as possible prior to introducing the BBE process so the original mix is processed correctly. Equalization may be added later to suit the listener's taste.

Whether used live or in the recording studio, the BBE process will increase the overall intelligibility of program material in the most demanding of circumstances.

RECORDING APPLICATION



LIVE SOUND APPLICATION



THE CONTROLS

1) LO EQ

Each channel has a LO EQ control that regulates the amount of phase compensated bass equalization. This adjustment ranges from -10dBu fully counterclockwise to +11dBu fully clockwise at 50Hz relative to the input. In the middle position, there is a +3dBu boost.

2) PROCESS CONTROL

Each channel has a process control that, when minimum, switches the unit into bypass mode. A slight turn clockwise will switch the BBE 702 into process mode, illuminating the "on" LED, where the high frequencies are slightly attenuated. As the knob is turned clockwise, it will increase the amount of amplitude compensation to the program up to +6dBu.

3) LED STACK

Each channel is equipped with a set of LED indicators that instantly show the relative amount of high frequency compensation as compared to the mid band.

RED LED: Marked "-": The amplitude of the high band is too high as compared to the mid-band and is being compressed.

AMBER LED: Marked "0": No amplitude compensation is needed. The program spectral content is correct.

GREEN LED: Marked "+": The amplitude of the high band is too low as compared to the mid band and is being expanded to compensate.

CLIP LED: This LED indicates that the input of the BBE 702 has reached the maximum level of +20dBu (The clip LED lights +3dBu prior to true clip on the BBE 702).

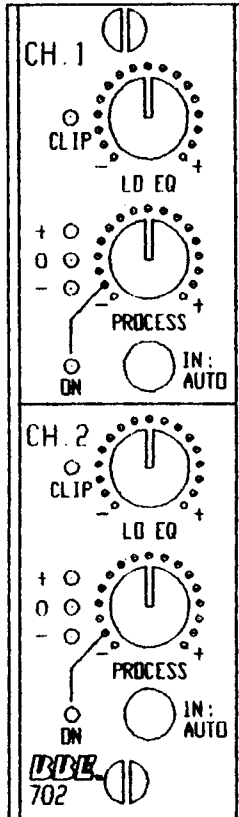
4) IN/AUTO SWITCH:

In the "in" position, the BBE 702 provides dynamic response to the high frequency band in relation to the mid band. This in turn will allow the BBE process to either expand or compress the high band.

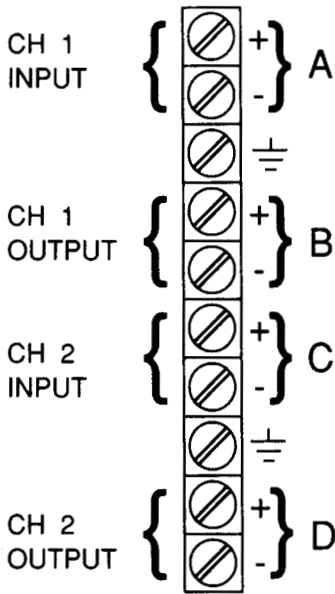
The "out" position, on the other hand, provides for a factory preset expansion ratio for the high band. This mode of operation can also be used for program with a wide dynamic range so that it will

process the "quiet" passages as well as the "loud" ones evenly.

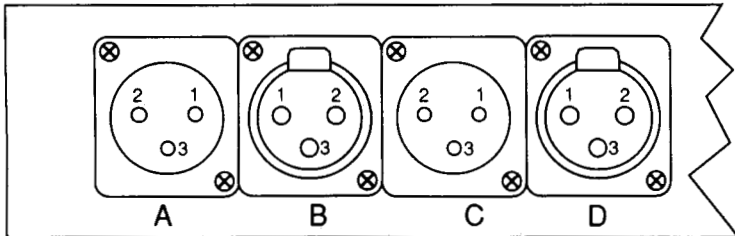
Both modes are controlled by the PROCESS and LO EQ controls. The "in" position would be considered normal operation.



REAR PANEL BARRIER STRIP CONNECTIONS



REAR PANEL XLR CONNECTIONS



CH 1
INPUT

CH 1
OUTPUT

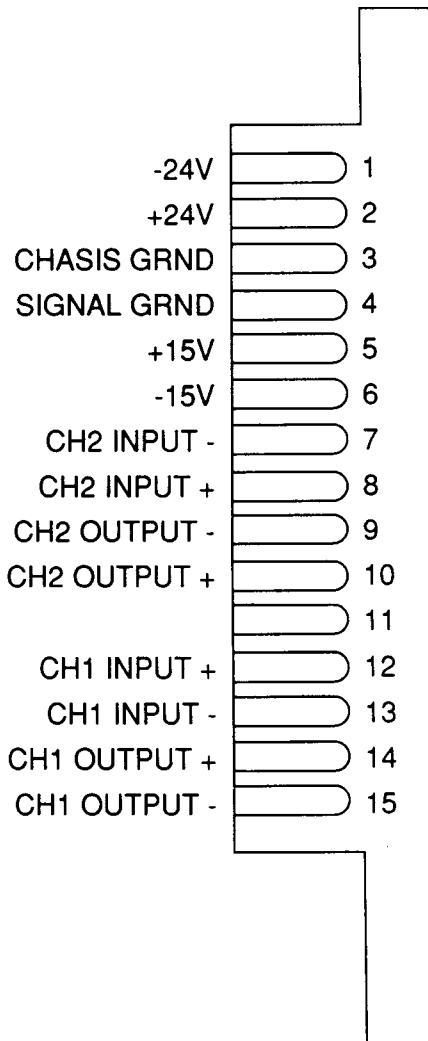
CH 2
INPUT

CH 2
OUTPUT

PIN 1. GND
PIN 2. - SIGNAL
PIN 3. + SIGNAL

CONNECTIONS

PC CARD
FINGERS



SPECIFICATIONS FOR THE BBE 702

Frequency Response

BypassDC to 20kHz
Process Modeprogram controlled

Noise in Process Mode.....-85dBu below 0dBu output level

Total Harmonic Distortion

in process modeless than 0.1% @ 1kHz @ +4dBu

Input CharacteristicsPin 3 hot

Input Impedance15k Ohms (balanced or unbalanced)
Nominal Input Range-10dBu to +8dBu
Maximum Input Level+23dBu (input clip point)

Output CharacteristicsPin 3 hot

Minimum Load Impedance
for Full Output.....600 Ohms (balanced or unbalanced)
Nominal Output Level-10dBu to +8dBu
Maximum Output Level+23dBu into 600 Ohm load (clip point)
Output Impedance.....600 Ohms (balanced or unbalanced)

Power Requirements250mA @ +/-15VDC regulated
65mA @ +/-24VDC unregulated; 8w

Dimensions5.25"H x 1.5"W x 9.5"D
(depth is measured from the rear of the front panel)

Weight10oz.

Note: 0dBu=0.775Vrms

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

SERVICE

There are no user replaceable parts nor should the unit be worked on for any reason unless you are a qualified technician. Calibration should be performed if parts are replaced or if a performance check-out indicates a problem with calibration.

We recommend that if at all possible a BBE 702 which requires repair, be sent to our facility in Huntington Beach, CA. We request that a "RETURN AUTHORIZATION" be issued to the dealer from whom you purchased the unit, or from BBE directly by using the toll free U.S. Watts (800) 233-8346. In California, (800) 558-3963. Upon shipping, include a copy of the bill of sale so that the warrantee procedure may be expedited.

In the event local service is desired, BBE Sound, Inc. will provide a schematic diagram for the BBE 702. BBE Sound, Inc. however, cannot be responsible for the cost of such service and such local service will void the warranty on the product.

WARRANTY

The BBE 702 processor is warranted against defects in material and workmanship for a period of one (1) year from the date of purchase from BBE Sound, Inc. or from an Authorized Dealer.

During this period, we will repair units free of charge providing that they are shipped prepaid to BBE Sound, Inc., 5500 Bolsa Ave., Suite 245, Huntington Beach, CA. 92649. We will pay return UPS shipping charges within the USA. All charges related to non-US shipping, including customs clearance, will be billed.

This warranty will be considered null and void by BBE Sound, Inc. if any of the following is found:

1. The equipment has been physically damaged.
2. The equipment shows signs of abuse.
3. The equipment has been electrically damaged by improper connection or attempted repair by the customer or a third party.
4. The equipment has been modified without authorization from BBE Sound, Inc.
5. The bill of sale indicates that the purchase date of the equipment is not within the warranty period.

BBE SOUND, INC. IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES. Should the processor fail to operate for any reason, our sole obligation is to repair the unit as described above.

CALIBRATION PROCEDURE FOR THE BBE® MODEL 702

THE MODEL 702 WAS CALIBRATED AT THE FACTORY SO CALIBRATION IS NOT NECESSARY. THIS PROCEDURE IS FOR SERVICE PERSONNEL ONLY

Date: April 17, 1990 – Revision H

EQUIPMENT REQUIRED:

- 1) Audio Signal Generator (sine wave)
- 2) Two digital voltmeters (DVM #1 and DVM #2)

INITIAL SETTINGS:

- 1) DEFINITION control to minimum (just prior to bypass).
- 2) LO-CONTOUR control and all internal potentiometers to their middle positions.
- 3) IN:AUTO button to the "in" position.
 - Since both channels are identical in calibration and component numbers only channel A will be outlined. (Channel B will be in brackets).
 - All tests are done with a signal level of **0dBu (0.775Vrms)** except for the clip test.
 - The signal will be input into the corresponding channel connector marked "A" for channel 1, "C" for channel 2.
 - The **DVM #1** will monitor the output of the corresponding channel marked "B" for channel 1, "D" for channel 2.
 - The **DVM #2** will be used to measure various test points in the test procedure (relative to ground).

PROCEDURE:

Offset Adjustment:

- 1) With no signal present at the input (open), measure TPA [TPB] with the DVM #2 set to DC volts.
- 2) Adjust VR5A [VR5B] until DVM reads **0.00Vdc**.

Power Supply Test:

- 1) With DVM set to DC volts measure pin 4 of U1. It should be -15VDC (+/- .5VDC).
- 2) With DVM set to DC volts measure pin 8 of U1. It should be + 15VDC (+/- .5VDC).
- 3) With DVM set to DC volts measure the cathode of D7. It should read 24VDC (+/- 2.0VDC).

Unity Adjustment:

- 1) Input a signal of 5000Hz (0dBu) into the input and adjust **VR3A [VR3B]** for a reading of **-4.00dBu** as read by DVM #1.
- 2) Input a signal of 500Hz (0dBu) into the input and adjust **VR6A [VR6B]** until DVM #1 reads **-1.00dBu**.
- 3) Repeat steps 1 thru 2 as some interaction exists.

Lo-Contour Test:

- 1) Input a signal of 50Hz (0dBu) into the input and adjust the LO CONTOUR control to the middle position marked "0". DVM #1 should read **+3.00dBu (1.1Vrms) (tolerance= +/- 1.0dBu)**.
- 2) Turn the LO-CONTOUR to "-" (minimum). You should read **-10dBu (0.245Vrms) on DVM #1 (+/- 1.0dBu)**.

- 3) Turn the LO-CONTOUR to "+" (maximum). You should read **+11dBu (2.85Vrms) on DVM #1 (+/- 1.0dBu)**.

Detector Check:

- 1) Input a 5000Hz signal 0.0dBu (0.775Vrms) into the input.
- 2) With DVM #2 (set to DC volts) measure **TPA [TPB]**. The meter should read **+0.490Vdc (+/-40mVdc)**.
- 3) Input a 500Hz signal 0.0dBu (0.775Vrms) into the input. DVM #2 should read **+0.190 (+/- 50mVdc)**.

Manual Process Switch Test:

- 1) Switch the PROCESS switch to MANUAL.
- 2) Input a 5000Hz signal (0dBu) into the input.
- 3) With the DEFINITION control to MAXIMUM using the DVM #1 measure **TPA [TPB]**.
- 4) The DVM should read **0.400VDC (+/- 0.030VDC)**.
- 5) Measure the output with DVM #2. It should read **+6dBu (+/-1dBu)**.
- 6) Return the DEFINITION control to MINIMUM.

Clip Indicator Adjustment:

- 1) Input a 500Hz signal into the input with an amplitude of **7.75Vrms(+20dBu)**.
- 2) Adjust **VR1A [VR1B]** until the CLIP indicator just turns on. If the LED is already on adjust **VR1A [VR1B]** until the LED goes out and then bring it back up until it just turns on. **(+19dBu should turn it off {6.90Vrms})**

XLR Balanced/Unbalanced Test:

- 1) With a balanced connection, insure that the unit functions normally as described above.
- 2) With an unbalanced connection, insure that the unit functions normally as described above.

Bypass Check:

- 1) Turn the definition completely counterclockwise until the process "clicks" off.
- 2) Since the model 702 has "hard wire" bypass, whatever is present at the input of the device should be present at the output when in bypass mode. Verify that this is so.

DC Voltage at Output Test:

- 1) Measure the output XLR connectors, both pins 2 and 3, with the DVM set to DCvolts the voltage must be **0.00Vdc**.

LED Test:

- 1) Input a 5000Hz signal (@0dBu) into the connector marked CHANNEL A [B] INPUT. The green (+) LED should light.
- 2) Input a 500Hz signal (@0dBu) in the connector marked CHANNEL A [B] INPUT. The red (-) LED should light.
- 3) Disconnect the signal input and the amber (0) LED should light.
- 4) With the FUNCTION turned to the ON position the corresponding green LED should be lit.
- 5) With the FUNCTION turned to the OUT position, the corresponding green LED should turn off.

Offset Drift Test:

- 1) With no signal present at the input(open) measure **TPA [TPB]** with the DVM set to DC volts.
- 2) Insure this voltage is **0.00Vdc (+/-0.25mVdc)**

THIS COMPLETES THE CALIBRATION OF THE BBE® MODEL 702