BBE®
Sound Inc.

MODEL 1002
USER MANUAL

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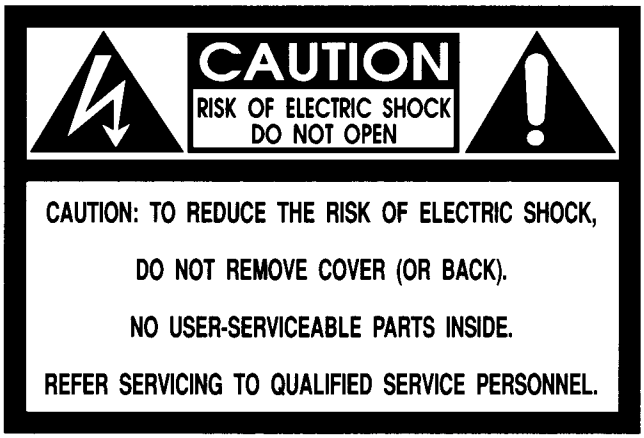
BBE® is the registered trademark of BBE Sound, Inc.

Important Safeguards



WARNING **To prevent fire or shock hazard, do not expose the unit to rain or moisture.**

ATTENTION: RISQUE DE CHOC ELECTRIC- NE PAS OUVRIR.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point, within a equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For your protection, please read these safety instructions completely before operating the appliance, and keep this manual for future reference.

Carefully observe all warnings, precautions and instructions on the appliance and described in the operating instructions supplied with the appliance.

INSTALLATION

Water and Moisture - Do not install the appliance near water: for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.

Heat - Do not install the appliance near sources of heat such as radiators, heat registers, stoves, or other appliances that produce heat.

Ventilation - Situate the product so its location or position does not interfere with its proper ventilation. For example, you should not place the product on a bed, sofa, rug, or similar surface that might block the vent openings, or placed in a built-in installation, such as a bookcase or cabinet that might impede the flow of air through the ventilation openings.

Wall or Ceiling Mounting - If your appliance can be mounted to a wall or ceiling, mount it only as recommended.

USE

Power Source - Connect the appliance to a power supply only of the type described in the operating instructions or as marked on the appliance.

Power-Cord Protection - Route the power cord so that it is not likely to be walked on or pinched by having objects placed on it, paying particular attention to the plugs, receptacles, and the point where the cord exits from the appliance.

Grounding or Polarization - Do not defeat the grounding or polarization feature of the AC power cord. If your AC receptacle will not accept the power cord plug, contact your electrician to install a proper AC receptacle.

When not in use - Unplug the power cord of the appliance from the outlet when left unused for a long period of time.
To disconnect the cord, pull it out by grasping the plug. Never pull the plug out by the cord.

AC Receptacle - Check to make sure that the AC receptacle holds the power cord plug firmly and securely. If the power cord plug is loose, contact your electrician to replace the defective and unsafe AC

Foreign Objects - Be careful that foreign objects and liquids do not enter the enclosure through openings.

SERVICE

Unplug the appliance from the wall outlet and consult qualified service personnel when:

- the power cord or the plug has been damaged.
- a solid object or liquid has fallen into the cabinet.
- the appliance has been exposed to rain or moisture.
- the appliance does not appear to operate normally or exhibits a marked change in performance.
- the appliance has been dropped, or the enclosure damaged.

Do not attempt to service the appliance beyond that described in the operating instructions. For all other servicing, refer to qualified service personnel **only.**

Congratulations!

Thank you for buying the BBE 1002 Sonic Maximizer. You will find that this manual will help you use the BBE 1002 more effectively and in ways of which you may not be aware. Review of the information contained in this owner's manual will answer most of the common questions that our service department receives. But if you still have questions, please feel free to call us at (714) 897-6766.

The BBE® Process — "What Is It?"

Dynamic loudspeakers have difficulty dealing with the electronic signals supplied by an amplifier. These difficulties cause such major phase and amplitude distortion that the sound reproduced by a speaker differs significantly from the sound produced by the original source.

In the past, these problems have proved unsolvable and were thus relegated to a position of secondary importance in audio system design. However, phase and amplitude integrity is essential to accurate sound reproduction. Research shows that the information which the listener translates into the recognizable characteristics of a live performance are intimately tied into the complex time and amplitude relationships between the fundamental and harmonic components of a given musical note or sound. These relationships define a sound's "sound".

When these complex relationships pass through a speaker, the proper order is lost. The higher frequencies are delayed. A lower order frequency may reach the listener's ear first or perhaps simultaneously with that of a higher frequency. In some cases, the fundamental components may be so time-shifted that they can reach the listener's ear ahead of some or all the harmonic components.

This change in the phase and amplitude relationship of the harmonic and fundamental frequencies is technically called "envelope distortion". The listener perceives this loss of sound integrity in the reproduced sound as "muddy" and "smeared". In the extreme, it can become difficult to tell the difference among musical instruments, for example, an oboe and a clarinet.

BBE Sound, Inc. conducted extensive studies of numerous speaker systems over a ten year period. With this knowledge it became possible to develop an ideal speaker and to distill the corrections necessary to return the fundamental and harmonic frequency structures to their correct order. While there are differences among various speaker designs in the magnitude of their needs for correction, the overall pattern of correction needed is remarkably consistent.

The BBE® process is so unique that 42 patent claims have been awarded by the U.S. Patent Office.

"How It Works"

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

The low group is delayed about 2.5 ms (milliseconds) via a group delay within a passive low pass filter. The front panel control allows for either a flat response, a cut or a boost of the lows at 50Hz.

The mid-range group is delayed only about 0.5ms and passes through an active band-pass filter while the high frequency group is passed through a high quality VCA (Voltage Controlled Amplifier). The high group is used as a point of reference to make dynamic amplitude corrections in both positive and negative directions to the high frequencies.

Two RMS average loudness detectors continuously monitor both the mid-range and high frequencies to compare the relative harmonic content levels of the two bands and apply the appropriate amount of control voltage to the VCA, thereby determining the amount of high frequency harmonic content present at the final output of the BBE® processor.

Product Description

The BBE 1002 is an intelligent audio processor designed to solve a series of complex problems as described in the previous section. It is, however, very simple to set up and operate and once installed will function flawlessly without further attention.

It is a dual channel device for use in -15dBu unbalanced line level applications such as those found in consumer home stereos. RCA Connectors are provided at the rear panel for connection to a program source.

A front panel control allows the user to adjust the amplitude compensation desired. An indicator light system consisting of an LED for each channel which changes from red to green gives an indication of the relative amount of amplitude compensation being provided.

An additional front panel control allows the user to apply low frequency (bass) equalization if desired.

Other front panel controls allow the user to:

(a) select between the BBE® process mode and the bypass mode in order to hear the difference BBE® is making to the raw signal.

(b) to switch the signal input between the normal signal source such as an amplifier, radio, or CD and the tape deck.

(c) to listen to what is being recorded in the tape record mode.

Installation and Set-Up

The BBE® Model 1002 has been designed to interface easily with most consumer audio equipment. It may be installed in a tape monitor loop (the preferred location), between a preamplifier and power amplifier, or inline between the program source and preamplifier.

The Tape Loop

The great majority of preamplifiers, integrated amplifiers and receivers available today include what is known as a tape monitor loop to allow monitoring of the signal while recording. The tape loop is also generally considered to be the best place to connect a signal processing device as it supplies a constant signal level, regardless of the volume control setting. To determine whether your equipment includes this feature, look at the front panel to see whether there is a switch labelled "Tape On" or something similar, or whether a pair of selector switches labelled "Listen" and "Play" are provided. If either of these two arrangements are present, your equipment has a tape loop. If not, another means for installing BBE® can be used. (See Preamp Loop or Using BBE® with a Single Source.)

No changes or modifications on the installation of other equipment is needed when BBE® is installed properly through the tape loop as all sources pass through the tape loop and thus can be processed by BBE®.

Installing BBE in the Tape Loop of an Amplifier/Receiver

Locate the jacks on the rear panel of your amplifier or receiver labelled "Tape In" and "Tape Out". They may also be labelled "Play" and "Record" — "Play" is the same as the "Tape In" and "Record" is the same as "Tape Out". There may be two sets of "Tape In" and "Tape Out" jacks on your equipment, probably labelled "Tape One" and "Tape Two". Either set may be used for the BBE® installation.

Connect one set of stereo interconnect cables between the "Tape Out" jacks on your equipment and the "Source In" jacks on the BBE 1002. Connect the second cable set between the "Tape In" on your equipment and the "Source Out" on the BBE 1002. Be sure that Left and Right connections are correct for both cables.

Adding a Tape Deck to the Above Installation

There may already be equipment installed in the tape loop that you have chosen for your BBE 1002. If that equipment is a tape deck, it should be connected to the tape jacks on the rear of the BBE 1002. Connect the "Tape In" (or "Record") jacks on the tape deck to "Tape Out" on the BBE 1002. Connect the "Tape Out" (or "Play") jacks on the tape deck to "Tape In" on the BBE 1002. (See Figure 1B)

Installing Additional Processors

Many stereo installations already have one or more signal processors installed in the tape loop. Equalizers, reverb units, and surround sound units are but a few of the devices available to the consumer which are typically installed in the same fashion as BBE®. If you already have a processor(s) in your tape loop, the BBE 1002 may be easily added. We suggest that the BBE 1002 be the FIRST in the processing chain with all equalization set flat. The "Tape Out" connector on the amp/preamp/receiver should be connected to the "Source In" connector on the BBE 1002. The "Source Out" connector on the BBE® unit should go to the Input of the next processor in line. This is known as "daisy chaining" the processors. (Figure 2A.)

If you have an additional processor and a tape deck you can connect the tape loop of the BBE 1002 to the "Source In/Out" connectors of the additional processor. Then connect the tape deck to the tape loop of the additional processor. This enables you to record and playback on the tape deck using both processors without changing the connections. (Figure 2B.)

The Pre-Amp Loop

If a tape loop is not available, the BBE 1002 may be installed between a preamplifier and power amplifier. This is a simple task if the preamp and amp are physically separate units. Additionally, some integrated amplifiers and receivers allow a user to remove a link between the device's preamplifier and amplifier so that a processor may be inserted between the two.

The preamp-amp loop connection will allow the BBE 1002 to correct the signal from any of the signal sources connected to the preamp as that signal passes to the amplifier. (See Figure 3)

There are two drawbacks to this method of interface, however. First, because the BBE 1002 unit is installed after the preamp's volume control, the level of processing will vary with the volume setting. This is primarily an incovenience, making it necessary that the process level control be readjusted whenever the volume control level is changed. The second drawback is that any processor installed between the preamp and the power amp cannot be used to correct the signal going to a tape deck. As explained later in this manual, making tape copies using BBE® is one of the more exciting applications of the BBE 1002.

Using BBE® with a Single Source

If no other means are available, the BBE 1002 can be connected between a signal source and preamp, integrated amp, or receiver. For example, you may wish to disconnect your CD player from the amp, plug it into the BBE 1002 "Source In" jacks, then connect the BBE 1002 "Source Out" jacks to the amplifier's input. With this hookup, the drawback is that only one signal source may be processed. On the positive side, the normal taping and process loop functions will be operated with BBE® intact for that source. (See Figure 4)

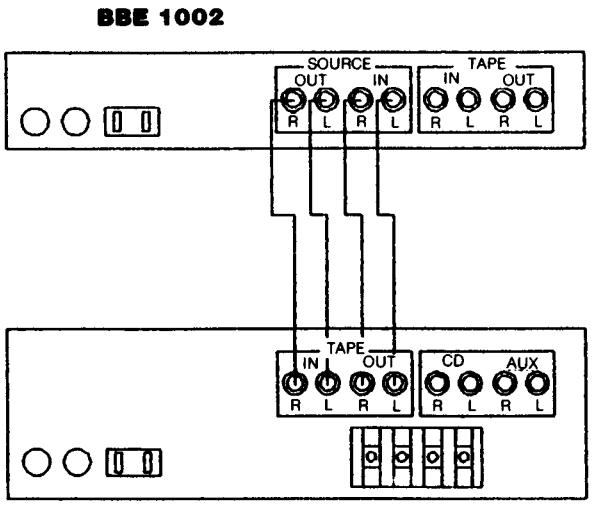
Tape Dubbing

One of the most effective uses of the BBE 1002 is in dubbing (duplicating) tapes. The BBE® process is completely recordable and does not require a decoder for playback. For example, a tape cassette which has been recorded with BBE® processing will sound wonderfully clear and open whether played back on a home system or on a car cassette player.

Campatibility With Other Processors

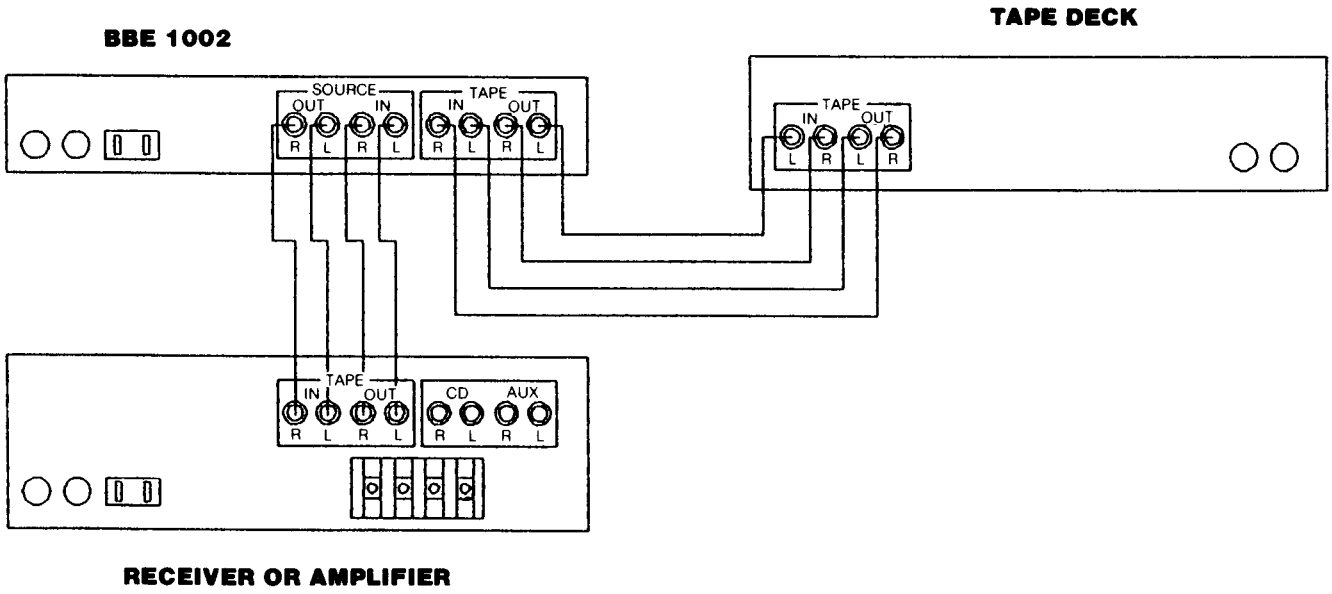
The first-time user should set all equalization, tone control, and other signal processing devices flat or off entirely. This is not to imply that the BBE® process is incompatible with the range of signal processing equipment available to the consumer, nor that the consumer must discard any other expensive pieces of equipment. The BBE 1002 addresses specific problems with the speaker-amplifier interface in a way which is completely compatible with other equipment. Our experience has shown, however, that many people have been using other equipment in their sound systems in somewhat of a 'shotgun' approach to attempt to solve the problems addressed directly by the BBE 1002.

Virtually all signal processors used in this way have severe side effects due to the fact that they were not designed to address this specific problem, but were intended as "general purpose" processors. A common response from first-time users of the BBE 1002 is that they no longer feel the need for equalization or tone controls. Because the BBE 1002 is performing corrections accurately, additional modification to the sound is generally not needed. Of course, personal taste is the ultimate deciding factor, and other processing may be added if desired!



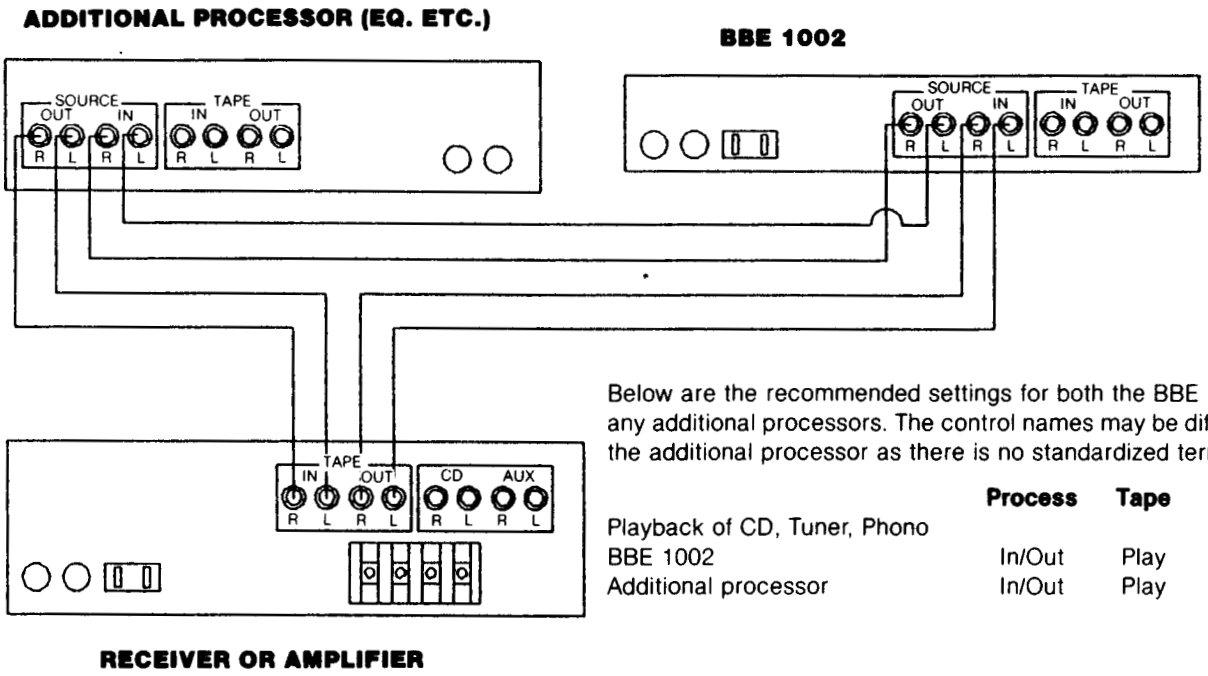
	Process	Tape	Program
Playback of CD, Tuner, Phono (any source other than cassette)	In/Out	Play	Source

FIGURE 1A INSTALLING BBE® IN THE TAPE LOOP



	Process	Tape	Program
Playback of CD, Tuner, Phono	In/Out	Play	Source
Playback of cassette (*not* recording)	In/Out	Play	Tape
Recording a cassette with BBE	In/Out	Record	Tape

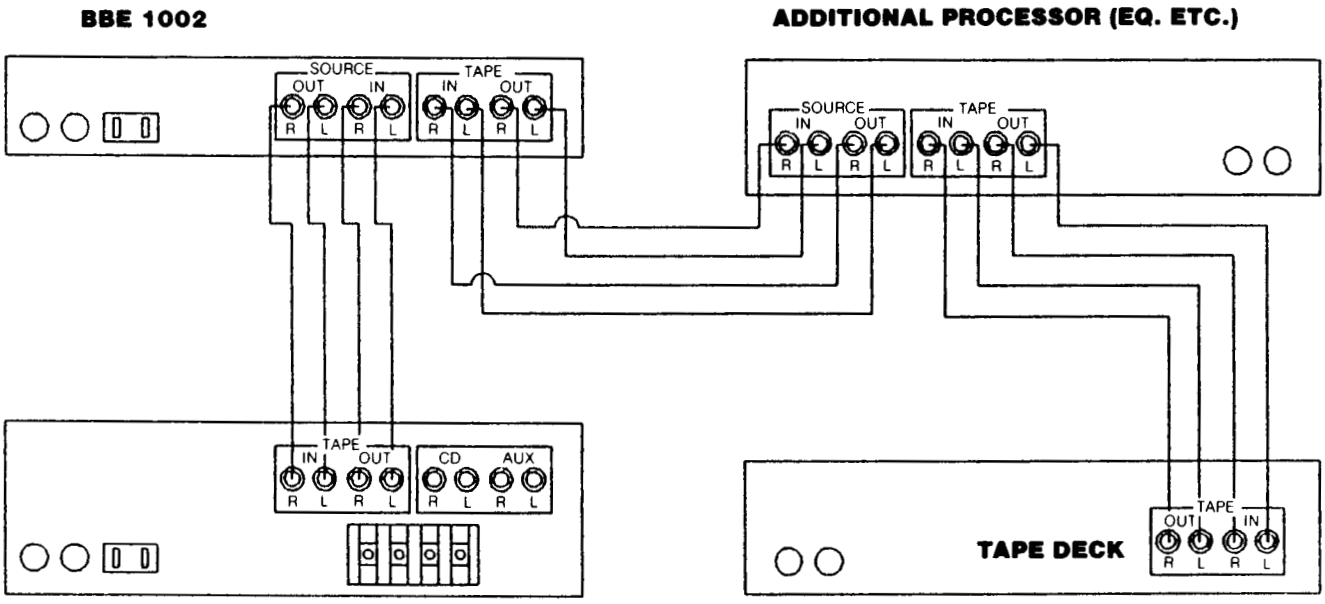
FIGURE 1B ADDING A TAPE DECK TO THE BBE®



Below are the recommended settings for both the BBE 1002 and any additional processors. The control names may be different on the additional processor as there is no standardized terminology.

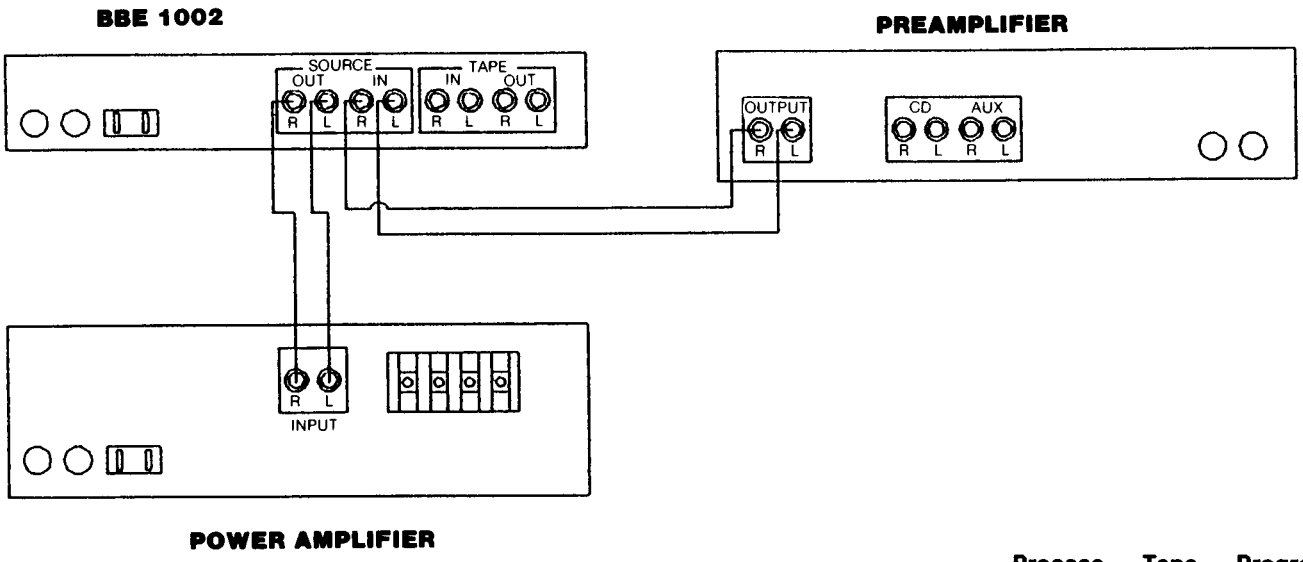
	Process	Tape	Program
Playback of CD, Tuner, Phono			
BBE 1002	In/Out	Play	Source
Additional processor	In/Out	Play	Source

FIGURE 2A USING AN ADDITIONAL PROCESSOR WITH THE BBE®



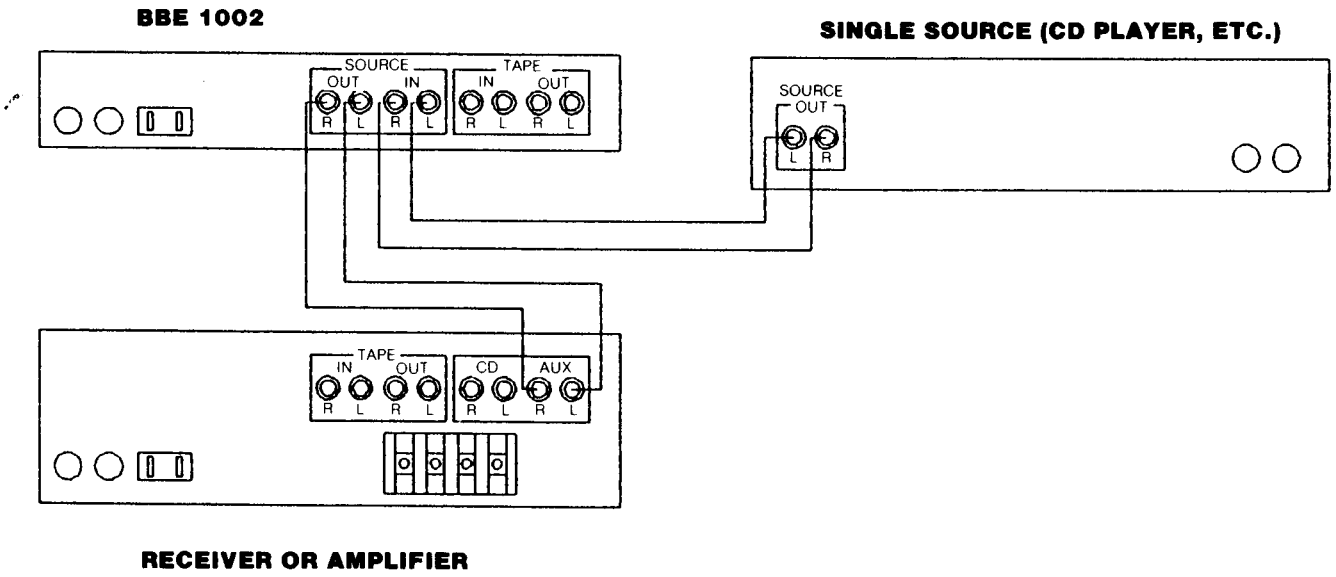
	Process	Tape	Program
Playback of CD, Tuner, Phono			
BBE 1002	In/Out	Record	Tape
Additional processor	In/Out	Play	Source
Playback of cassette			
BBE 1002	In/Out	Play	Tape
Additional processor	In/Out	Play	Tape
Record to cassette	In/Out	Record	Tape
Additional processor	In/Out	Record	Tape

FIGURE 2B USING A TAPE DECK AND AN ADDITIONAL PROCESSOR WITH THE BBE®



	Process	Tape	Program
Playback of all components	In/Out	Play	Source

FIGURE 3 USING BBE® WITH SEPARATE COMPONENTS

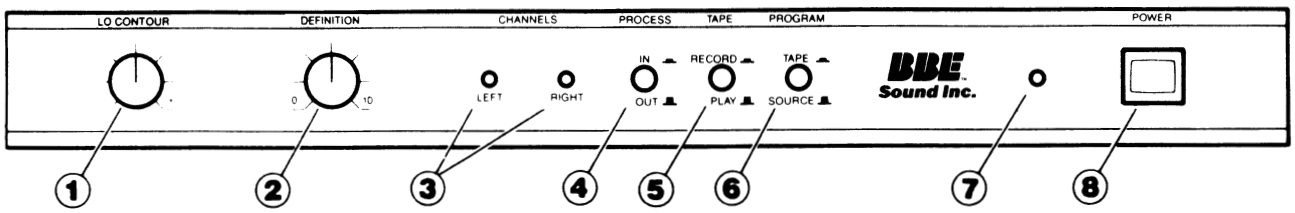


	Process	Tape	Program
Playback of single source	In/Out	Play	Source

FIGURE 4 USING BBE® WITH A SINGLE SOURCE

Operations

Operation of the BBE 1002 is quite simple due to the sophisticated circuitry within the unit. Below are the names and purposes of each control on the BBE 1002.



Front Panel

1. Lo Contour — This control regulates the amount of phase compensated bass equalization in both channels. This adjustment ranges from −10dBu (fully counterclockwise) to +10dBu (fully clockwise) at 50Hz relative to the input. The middle position is flat or unity gain. The primary use of this feature is in "filling out" the sound of smaller speaker systems as desired.

2. Definition — This control regulates that amount of amplitude compensation in both channels indicated by the LED light. The minimum (fully counterclockwise) position yields a flat frequency response with phase compensation only. Turning clockwise increases the amplitude of the high frequency band relative to the mid band amplitude providing an improved spectral balance between the high and mid bands.

NOTE: The process level should always be ultimately set by ear. The LED system is useful primarily as a set-up guide.

3. Process LED Light — Shows the relative degree of processing in each channel going from red (no processing) to green (maximum processing).

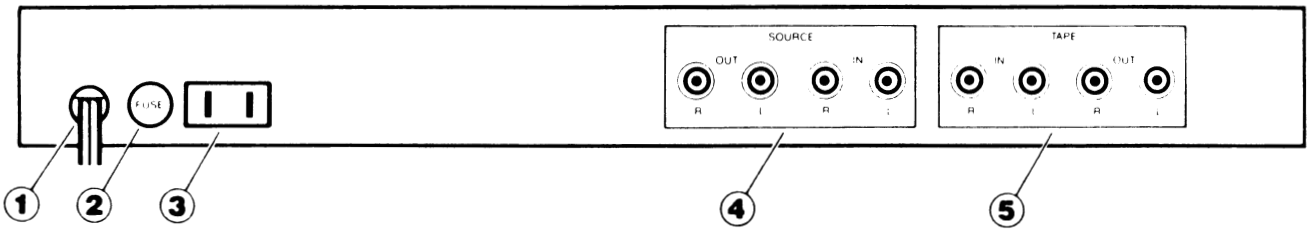
4. Process Switch — Select the BBE® process or bypass the BBE® process, hear the difference the BBE® makes.

5. Tape Switch — Select the "play" mode except when recording through a tape recorder. Select the "record" mode when recording a cassette tape through the BBE 1002.

6. Program Switch — Select the "source" mode except when playing a cassette tape through the BBE 1002.

7. Power Light — Indicates the unit is "on" or "off".

8. Power Switch — This switch controls the primary power to the BBE 1002.



Rear Panel

1. AC Power Cord — Plugs into AC power receptacle. U.S. Model, 100-120Vac, 50/60Hz. Standard Model, 200-240Vac, 50/60Hz.

2. Fuse — Turn cap on fuse holder counterclockwise to remove fuse. (Note: For U.S. Model, replace with 250Vac, ½A Fastblow type fuse. For Standard Model, replace with 250Vac, .125A Fastblow type fuse.)

3. AC Power Source — An unswitched power source which is available to supply normal AC current to another electronic component.

4. Source — The "tape out" output on the amp/preamp/receiver should be connected to the "Source In" connector of the BBE 1002 being careful that the channels are kept in the same order. The "Source Out" on the BBE 1002 should go to the next processor in line ("daisy chain") or back to the "tape in" connector in the amp/preamp/receiver.

5. Tape — (The "Tape In" and "Tape Out" connectors are supplied for convenient connection of a tape recorder only. No processing is done through these connections.) The "play" on the tape recorder/player should be connected to the "Tape In" in the BBE 1002; the "Tape Out" on the BBE 1002 should be connected to the "record" on the tape recorder/player.

Specifications BBE 1002

Frequency Response	
Bypass	DC to 20kHz
Process Mode	program controlled
Noise in Process Mode	-85dBu below 0dBu
Total Harmonic Distortion	
Process Mode	less than 0.1% @ 1kHz @ -15dBu level
Input Characteristics	
Input Impedance	10K Ohms
Nominal Input Level	-15dBu
Maximum Input Level	+18dBu
Input Sensitivity	35dBu for Maximum Process
Output Characteristics	
Minimum Load Impedance for full output level	1K Ohm
Nominal Output Level	-15dBu
Maximum Output Level	+18dBu
Power Requirements	
U.S. Model	100-120Vac, 50/50Hz, 10 Watts
Standard Model	200-240Vac, 50/60Hz, 10 Watts
AC Line Fuse Protected	U.S. Model, 250Vac, 1/2A Fastblow type fuse Standard Model, 250Vac, .125 Fastblow type fuse
Terminations/Connectors	
Rear Panel	RCA jacks
Dimensions	1 3/4" H x 16 1/2" W x 9" D
Weight	6 lbs. (2.5Kgs)

NOTE: 0dBu = 0.775 Vrms

Service

We recommend that if at all possible a BBE 1002 which requires service be sent to our facility in Huntington Beach, CA. We request that a "RETURN AUTHORIZATON" be issued by the dealer from whom you purchased the unit. If this is not possible, call BBE Sound, Inc. directly at (714) 897-6766, to obtain a 'RETURN AUTHORIZATION". Include a copy of the bill of sale with the unit when it is shipped to BBE Sound, Inc. so that the service can be expedited.

As the repair turnaround time is minimal, we request that the unit be sent to BBE Sound, Inc. We also need to add reliability data to our files so that future revisions may be undertaken, if necessary, to improve the product.

Warranty

Warranty registration of the unit to BBE Sound, Inc. is not necessary. It is strongly recommended that you retain a copy of the bill of sale for future reference.

IT IS THE SOLE RESPONSIBLIITY OF THE END USER TO PROVIDE THE BILL OF SALE OR OTHER MEANS OF PROOF OF PURCHASE TO VALIDATE THE WARRANTY IF WARRANTY SERVICE IS REQUESTED.

The BBE 1002 is warranted against defects in material and workmanship for a period of one(1)year from 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-UPS shipping, including customs clearance, will be billed. The warranty will be honored for the longer of either 90 days from the date of any service or the remainder of the original 1 Year factory warranty.

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.
5. The bill of sale indicates that the purchase date of the equipment is not within the warranty period.

All non-warranty repairs are warranted for a period of 90 days from the date of service.

BBE Sound, Inc. is NOT LIABLE FOR CONSEQUENTIAL DAMAGES. Should the unit fail to operate for any reason, our sole obligation is to repair it as described above.

DO NOT RETURN ANY PRODUCT TO THE ABOVE ADDRESS WITHOUT INSTRUCTIONS AND AUTHORIZATION ISSUED BY THE ABOVE LOCATION.

Maintenance

Maintenance of the BBE 1002 is limited to proper cleaning of the unit with mild household cleaner such as Formula 409™ or Windex™. The chassis and cover are steel finished with a durable polyurethane paint, while the front panel is an anodized aluminum extrusion.

There are no user replaceable parts and the unit should not be opened 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. Long term use has shown that over the life of this unit there is little or no drift of the components in the BBE 1002 which would cause a change in calibration. A very conservative design philosophy has resulted in a piece of equipment which runs very cool and should give years of trouble-free service.

TEST PROCEDURE FOR THE BBE® MODEL 1002

NOTE: THIS UNIT WAS CALIBRATED AT THE FACTORY. THIS PROCEDURE IS FOR QUALIFIED SERVICE PERSONNEL ONLY.
Revision K.2, May 1, 1990

Equipment Required:
1) Two Digital Voltmeters (DVM #1 and DVM #2)
2) Audio Signal Generator (sine wave)

Initial Settings of the 1002:
1) LO CONTOUR CONTROL and all internal potentiometers to their middle positions.
2) DEFINITION control to minimum (completely counter-clockwise).
3) PROCESS switch to in.
4) TAPE switch to PLAY.
5) PROGRAM switch to SOURCE.
6) POWER switch to ON.

PROCEDURE:

IN THE FOLLOWING PROCEDURE ONLY THE LEFT CHANNEL WILL BE OUTLINED. THE PROCEDURE FOR THE RIGHT CHANNEL IS IDENTICAL WITH CORRESPONDING DESIGNATORS IN BRACKETS ( ).

Power Supply Test:
1) With DVM set to DC volts measure the positive end of C26. It should be less than **+30VDC.**
2) With DVM set to DC volts measure the negative end of C29. It should be less than **-30VDC.**
3) With DVM set to DC volts measure pin-4 of U2. You should read **+15VDC (+/- 0.5VDC).**
4) With DVM set to DC volts measure pin-11 of U2. You should read **-15VDC (+/- 0.5VDC).**

Offset Adjustment:
1) Unit should be on and the regulators should be warm to the touch.
2) With no signal present at the input (open) measure TP1 [TP2] with the DVM set to DC volts.
3) Adjust VR4 [VR6] until DVM reads **0.00VDC.**

Unity Adjustment:
1) Input 500Hz @ -10 dBu and check reading on DVM #1. It should be **-10.50 dBu (+/- 0.75dB).**
2) Input 5000Hz @ -10dBu and adjust VR3 [VR5] for **-13.5 dBu.**
3) Repeat steps 2 thru 3 since some interaction exists.

Lo-Contour Test:
1) Input a 50Hz signal, @ -10dBu), and check reading on DVM #1. It should be **-10 dBu +/- 2 dB.** (Note: LO CONTOUR CONTROL to middle position "0").
2) Turn the LO-CONTOUR control to minimum. The DVM #1 should read **-22dB (+/- 1.0dBu).**
3) Turn the LO-CONTOUR control to maximum. The DVM #1 should read **0dBu (+/-0.5dBu).**

Detector Check:
1) Input a 500Hz signal @ -10dBu and measure TP1 [TP2]. It should read **+0.490Vdc.**
2) Input a 5000Hz signal @ -10dBu and measure TP1 [TP2]. It should read **+0.545Vdc +/- 0.04Vdc.**

LED Check:
1) With DEFINITION CONTROL at minimum, input 500Hz @ -10dB. The CHANNEL indicators should be lit RED.
2) Turn DEFINITION CONTROL to maximum. The LED indicator should turn GREEN.
3) Repeat steps 1 and 2 substituting 5000Hz for the input frequency.
4) Observe the POWER LED. It should be lit RED all the time.

Switching Check:

IN THE FOLLOWING PROCEDURE THE 1002 WILL BE IN BYPASS MODE (PROCESS OUT). THE OUTPUT WILL BE READ IN DB BY DVM#1 AND SHOULD BE -10DBu +/- 1.0DB FOR ALL TESTS. CHECK BOTH CHANNELS.

Source IN/ Source OUT Test
1) Set the 1002 TAPE switch to PLAY and the PROGRAM switch to SOURCE.
2) Input a 500Hz, @ -10dBu signal into SOURCE IN LEFT [RIGHT].
3) With DVM #1 measure SOURCE OUT LEFT [RIGHT]. It should read **-10dBu +/- 1.0dBu.**

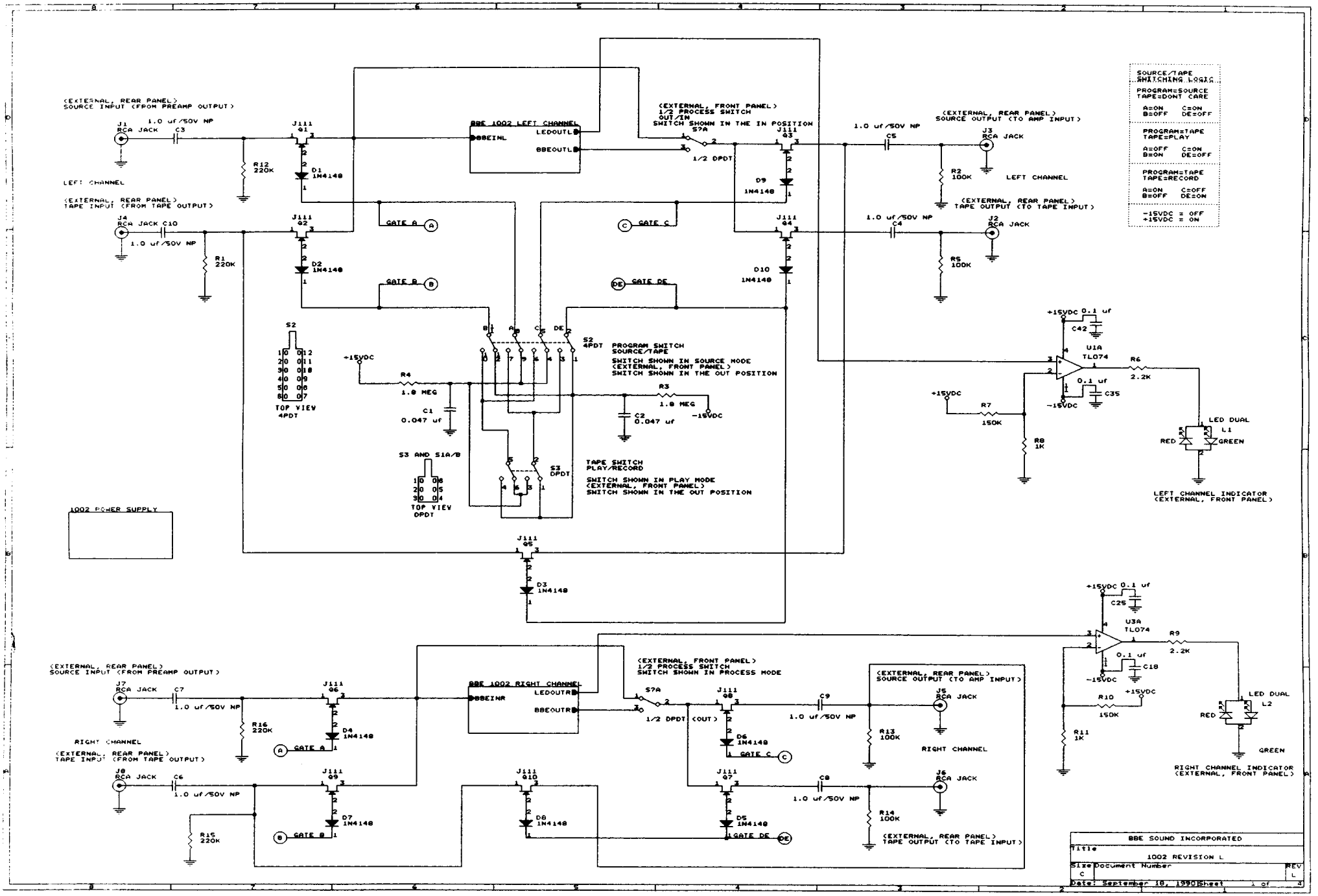
Tape Play Test:
1) Set the 1002 Tape switch to PLAY and the PROGRAM switch to TAPE.
2) Input a 500Hz, @ -10dBu signal into TAPE IN LEFT [RIGHT].
3) With DVM #1 measure SOURCE OUT LEFT [RIGHT]. It should read **-10dBu +/- 1.0dBu.**

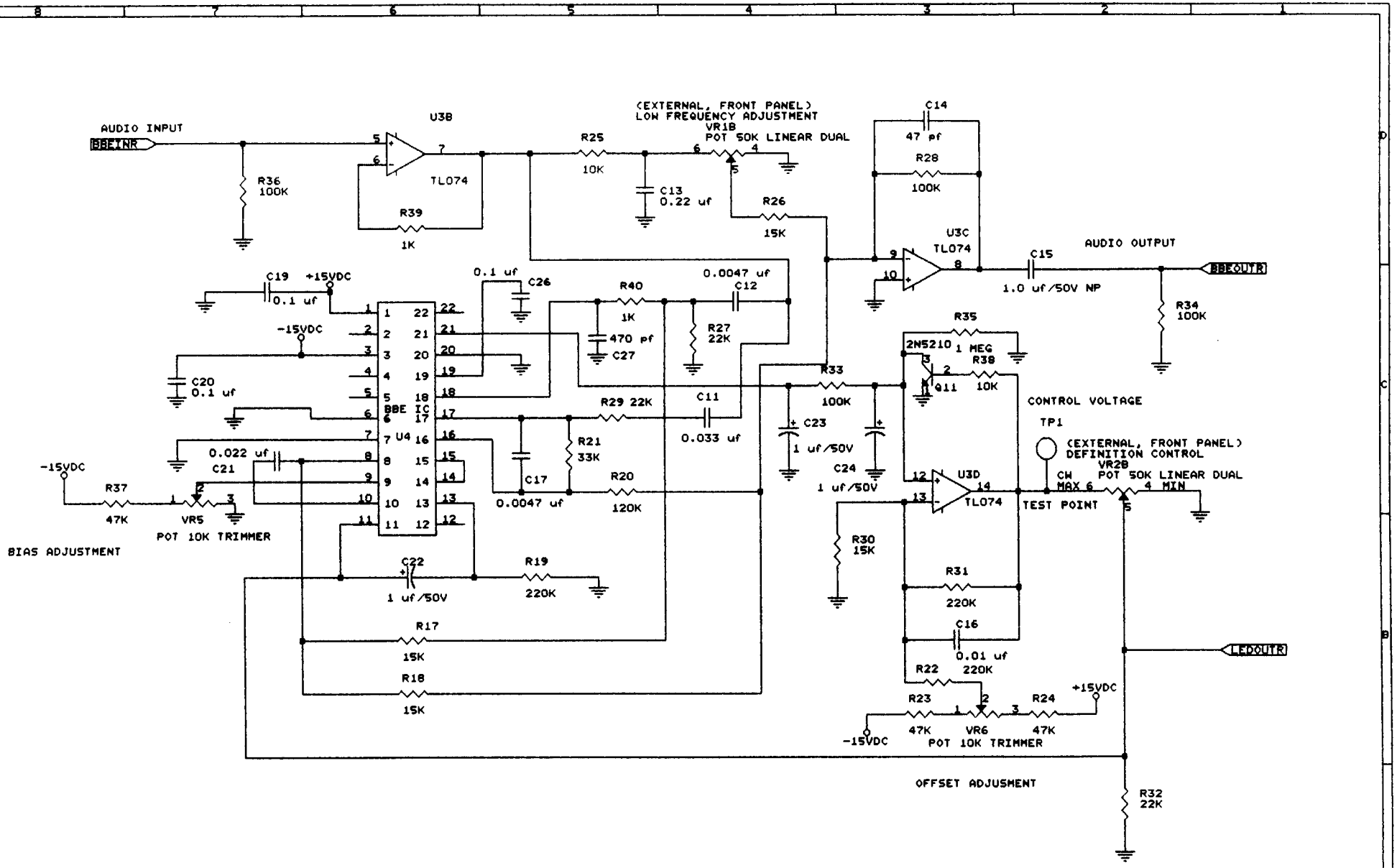
Tape Record Test:
1) Set the 1002 Program switch to TAPE and the TAPE switch to RECORD.
2) Input a 500Hz, @ -10dBu signal into SOURCE IN LEFT [RIGHT].
3) With DVM #1 measure TAPE OUT LEFT [RIGHT]. It should read -10dBu +/- 1.0dBu.
4) Input a 500Hz, @ -10dBu signal into TAPE IN LEFT [RIGHT].
5) With DVM #1 measure SOURCE OUT LEFT [RIGHT]. It should read -10dBu +/- 1.0dBu.

DC Voltage at Output Test:
1) Measure the output jacks to ground with the DVM set to DC volts the voltage must be less then **10mVDC.**

Offset drift test:
1) With no signal present at the input (open) measure TP1 [TP2] with the DVM set to DC volts.
2) Insure this voltage is **0.00VDC (+/- 25mVDC).**

END TEST


SOURCE/TAPE SWITCHING LOGIC
PROGRAM=SOURCE TAPE=DONT CARE
A=ON B=OFF C=ON DE=OFF
PROGRAM=TAPE TAPE=PLAY
A=OFF B=ON C=ON DE=OFF
PROGRAM=TAPE TAPE=RECORD
A=ON B=OFF C=OFF DE=ON
-15VDC = OFF
+15VDC = ON
(EXTERNAL, REAR PANEL) SOURCE INPUT (FROM PREAMP OUTPUT)
J1 RCA JACK
1.0 uf/50V NP
C3
R12 220K
D1 1N4148
LEFT CHANNEL
(EXTERNAL, REAR PANEL) TAPE INPUT (FROM TAPE OUTPUT)
J4 RCA JACK
C10
1.0 uf/50V NP
R1 220K
D2 1N4148
BBE 1002 LEFT CHANNEL
LEDOUTL
BBEINL
BBEOUTL
GATE A
GATE B
GATE C
GATE DE
(EXTERNAL, FRONT PANEL) 1/2 PROCESS SWITCH OUT/IN SWITCH SHOWN IN THE IN POSITION
S7A
1/2 DPDT
D9 1N4148
D10 1N4148
(EXTERNAL, REAR PANEL) SOURCE OUTPUT (TO AMP INPUT)
1.0 uf/50V NP
C5
J3 RCA JACK
R2 100K
LEFT CHANNEL
(EXTERNAL, REAR PANEL) TAPE OUTPUT (TO TAPE INPUT)
1.0 uf/50V NP
C4
J2 RCA JACK
R5 100K
S2
TOP VIEW 4PDT
+15VDC
R4 1.8 MEG
C1 0.047 uf
R3 1.8 MEG
C2 0.047 uf
-15VDC
S2 4PDT PROGRAM SWITCH SOURCE/TAPE
SWITCH SHOWN IN SOURCE MODE (EXTERNAL, FRONT PANEL) SWITCH SHOWN IN THE OUT POSITION
S3 AND S1A/B
TOP VIEW DPDT
S3 DPDT
TAPE SWITCH PLAY/RECORD
SWITCH SHOWN IN PLAY MODE (EXTERNAL, FRONT PANEL) SWITCH SHOWN IN THE OUT POSITION
1002 POWER SUPPLY
D3 1N4148
+15VDC 0.1 uf
C42
U1A TL074
R6 2.2K
0.1 uf
C35
-15VDC
R7 150K
R8 1K
LED DUAL L1
RED
GREEN
LEFT CHANNEL INDICATOR (EXTERNAL, FRONT PANEL)
(EXTERNAL, REAR PANEL) SOURCE INPUT (FROM PREAMP OUTPUT)
J7 RCA JACK
C7
1.0 uf/50V NP
R16 220K
D4 1N4148
RIGHT CHANNEL
(EXTERNAL, REAR PANEL) TAPE INPUT (FROM TAPE OUTPUT)
J8 RCA JACK
C6
1.0 uf/50V NP
R15 220K
D7 1N4148
BBE 1002 RIGHT CHANNEL
LEDOUTR
BBEINR
BBEOUTR
D8 1N4148
(EXTERNAL, FRONT PANEL) 1/2 PROCESS SWITCH SWITCH SHOWN IN PROCESS MODE
S7A
1/2 DPDT (OUT)
D6 1N4148
D5 1N4148
(EXTERNAL, REAR PANEL) SOURCE OUTPUT (TO AMP INPUT)
C9
1.0 uf/50V NP
J5 RCA JACK
R13 100K
RIGHT CHANNEL
C8
1.0 uf/50V NP
J6 RCA JACK
R14 100K
(EXTERNAL, REAR PANEL) TAPE OUTPUT (TO TAPE INPUT)
+15VDC 0.1 uf
C25
U3A TL074
R9 2.2K
0.1 uf
C18
-15VDC
R10 150K
+15VDC
R11 1K
LED DUAL L2
RED
GREEN
RIGHT CHANNEL INDICATOR (EXTERNAL, FRONT PANEL)
BBE SOUND INCORPORATED
Title
1002 REVISION L
Size C
Document Number
REV L
Date: September 18, 1990 Sheet 1 of 4



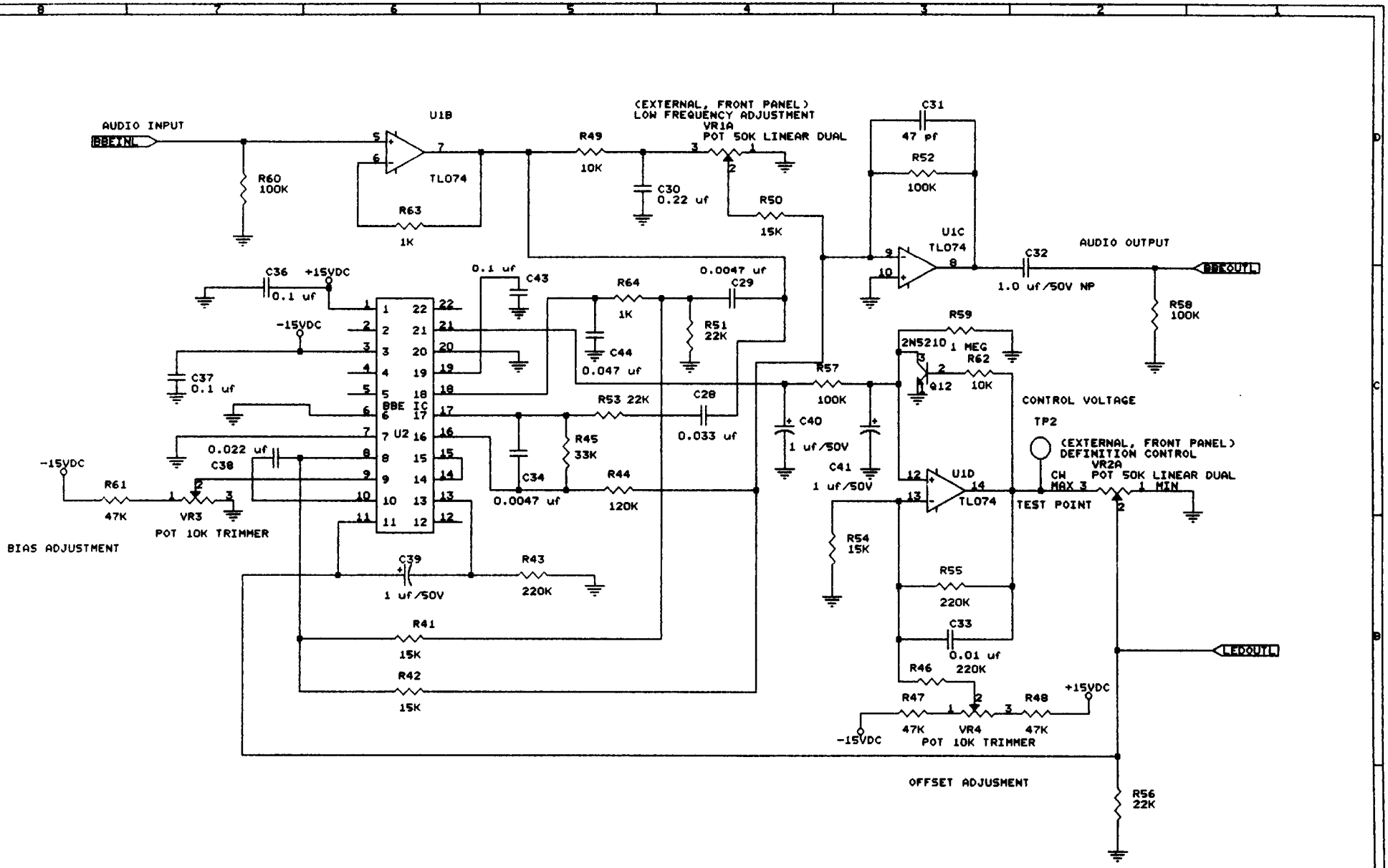
BBE SOUND INCORPORATED

5500 BOLSA AVENUE SUITE# 245
HUNTINGTON BEACH, CA 92649
FILE= 1002LR

Title: 1002 BBE CIRCUIT RIGHT CHANNEL

Size	Document Number	REV
B	3012-3-4	G

Date: September 18, 1990 Sheet 2 of 4



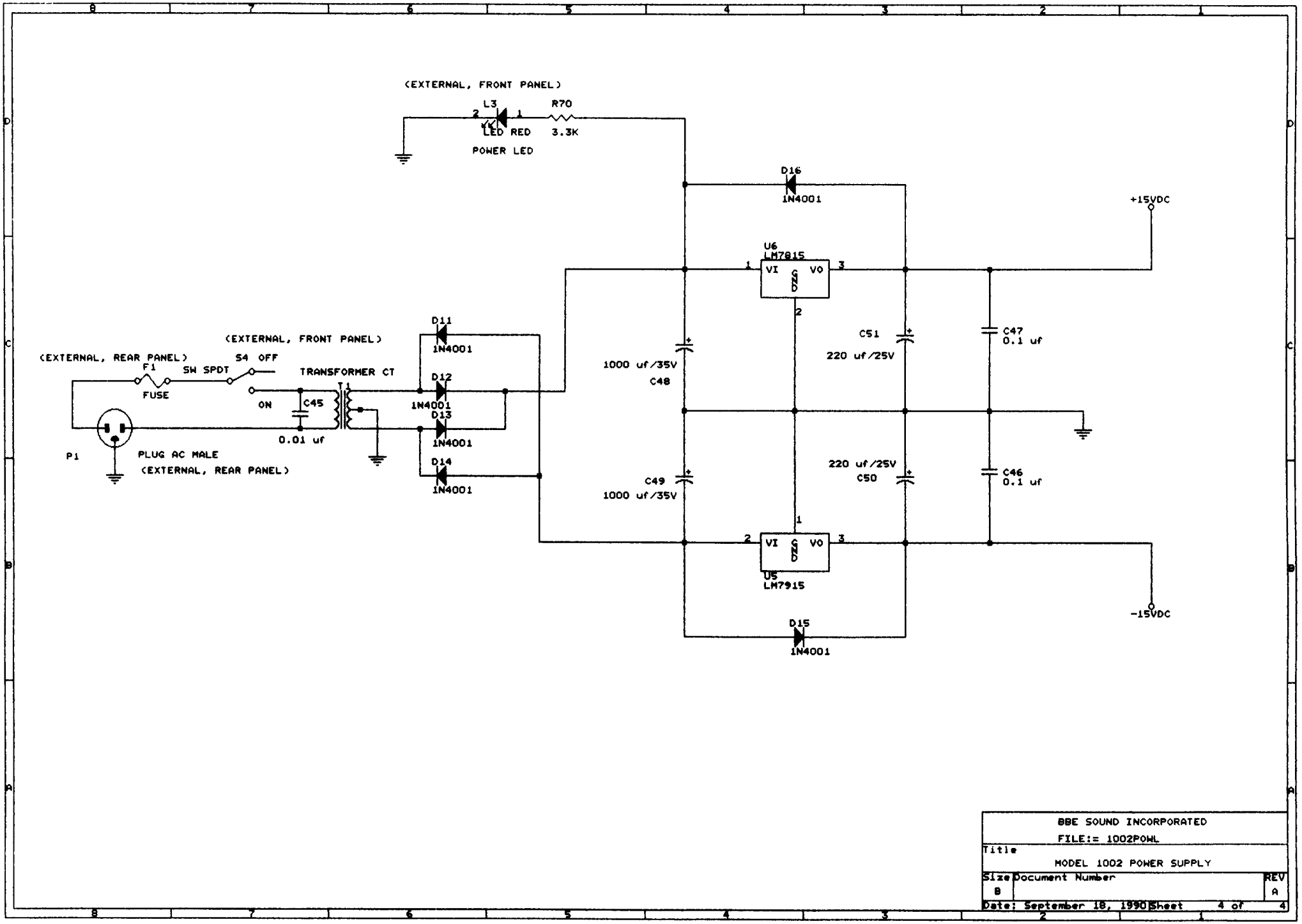
BBE SOUND INCORPORATED

5500 BOLSA AVENUE SUITE# 245
HUNTINGTON BEACH, CA 92649
FILE= 1002LL

Title: 1002 BBE CIRCUIT LEFT CHANNEL

Size	Document Number	REV
B	3012-3-4	G

Date: September 18, 1990 Sheet 3 of 4


(EXTERNAL, FRONT PANEL)
L3
R70
LED RED
3.3K
POWER LED
D16
1N4001
+15VDC
U6
LM7815
VI
GND
VO
(EXTERNAL, REAR PANEL)
F1
FUSE
SW SPDT
S4 OFF
(EXTERNAL, FRONT PANEL)
TRANSFORMER CT
T1
ON
C45
0.01 uf
P1
PLUG AC MALE
(EXTERNAL, REAR PANEL)
D11
1N4001
D12
1N4001
D13
1N4001
D14
1N4001
1000 uf/35V
C48
C51
220 uf/25V
C47
0.1 uf
C49
1000 uf/35V
220 uf/25V
C50
C46
0.1 uf
U5
LM7915
-15VDC
D15
1N4001
BBE SOUND INCORPORATED
FILE:= 1002POWL
Title
MODEL 1002 POWER SUPPLY
Size
B
Document Number
REV
A
Date: September 18, 1990
Sheet 4 of 4