

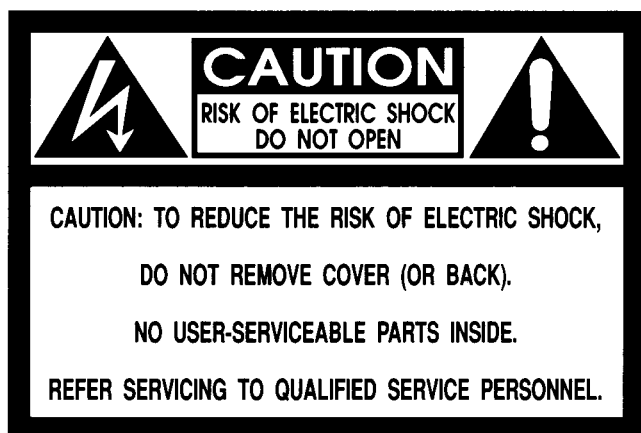
BBE[®]
Sound Inc.



SONIC MAXIMIZER + NOISE REDUCTION

USER MANUAL

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**.

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Congratulations on your purchase of the BBE 362NR Sonic Maximizer plus Noise Reduction—a two channel signal processor that will benefit any sound reproduction system. You now own a very unique signal processing device with no equal in the audio world. Whether you purchased the BBE 362NR for your home studio, P.A., or DJ system, you will find the unit's rugged construction and careful electronic design a welcome addition to your arsenal.

This manual will help you to effectively utilize the BBE process and noise reduction system. Reviewing the information contained in this manual will answer most of the common questions that our service department receives. If you still have questions, please feel free to call (714) 897-6766.

The BBE Process—“What it is”

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 proved unsolvable and were thus delegated 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 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 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 reach the listener's ear ahead of some or all of the harmonic components.

This change in the phase and amplitude relationship on 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 between 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 identify the characteristics of 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 correction, the overall pattern of correction needed is remarkably consistent.

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

The BBE Process—“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: a.) LOs (20Hz-150Hz), b.) MIDs (150Hz-1200Hz), and c.) HIGHS (1200Hz-20kHz).

The low group is delayed about 2.5 ms (milliseconds) via a delay within the passive low pass filter. The front panel LO CONTOUR control allows for either a flat response or a boost 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 VCA (Voltage Controlled Amplifier). The high group is used as a point of reference to make dynamic amplitude corrections to the high frequencies.

The 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 362NR is an intelligent audio processor and a single ended noise reduction system combined into one unit. The true beauty of the BBE 362NR is in its ease of operation and setup. The BBE 362NR is a ganged dual channel, single rack space device for use in -10dBu unbalanced line level applications.

The BBE portions of the BBE 362NR consist of a function switch, lo contour control, process control, and a pair of clip lights. The function switch is for comparing the processed sound to the direct sound. The lo contour control is for adjusting the level of phase corrected low frequencies in the program material. The process control is for adjusting the level of the phase corrected high frequencies in the program material. Each channel output is monitored by a clipping circuit which turns on an LED when the output level is at 3dB below true clipping.

The Noise Reduction portion of the BBE 362NR consist of a function switch, threshold control, and a release control. The function switch is for comparing the processed signal to the direct signal. The threshold control is for setting the level at which the noise reduction circuit begins to activate. With the threshold control set fully counter clockwise (min) the noise reduction circuitry is working its hardest and will remove the largest amount of “hiss”. The secret to properly setting this control is to first set the threshold control to its maximum position (fully clockwise) and then listen to the program material. Next, begin turning the threshold control counter clockwise (toward minimum) until the program material just starts to lose its high frequency content then adjust the threshold control so that the program material sounds the same with the noise reduction function switch either in or out. Once the program material stops, all background “hiss” should be reduced. In using any noise reduction system, you must always balance between the high frequency content of the program material and the acceptable level of background “hiss”. The release control is connected to the “hiss” detectors and is adjustable. Under most operating situations you will leave the release time in the fast mode, there is no absolute “right” way to adjust the release control. In general, you would only want to slow down the release time if you begin to hear “pumping” or “breathing” noise accompanying the desired program material.

Things to Remember

The BBE 362NR is designed to work with -10dBu levels. This is suitable for most semi-pro mixers, P.A. console, home recording systems, or D.J. equipment. The BBE 362NR drives load impedances down to 1K ohm and supplies a maximum output level of +16dBu. Plugging a guitar or other high impedance device into the BBE 362NR will not work properly as its input impedance is 50K ohms.

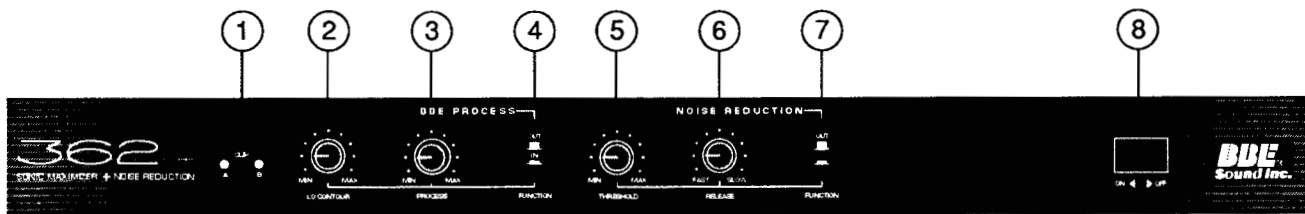
Set-Up

The BBE 362NR is connected into the chain in series with the signal path the same way a graphic equalizer or limiter would be connected. The output of a mixer, pre-amp, or other sound source feeds the input of the BBE 362NR. Setting up the BBE 362NR as an echo send device like a digital reverb is not recommended as the processed effect is not fully realized when summed with the original source audio.

WARNING!

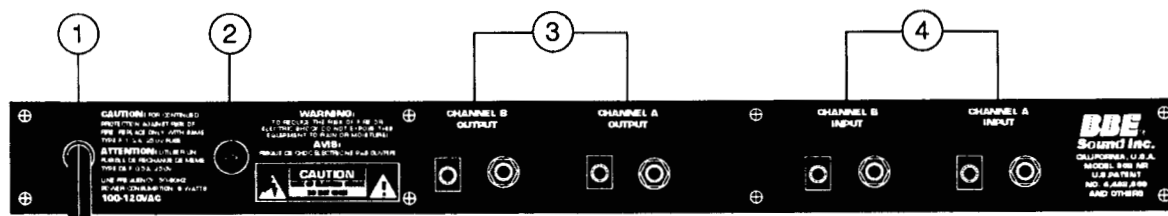
To prevent possible speaker or amplifier damage, always power-up peripheral devices first, wait 10 seconds, and then turn on the power amplifier. Turn off power amplifier first, then power-down peripheral devices.

Panel Controls



FRONT PANEL

1. **CLIP LEDs:** These LEDs indicate when the output of the BBE 362NR is 3dB below true clipping.
2. **LO CONTOUR:** Each channel shares a common Lo Contour control that regulates the amount of phase corrected bass frequencies.
3. **PROCESS:** Each channel shares a common process control that regulates the amount of phase corrected treble frequencies.
4. **BBE FUNCTION:** This push button switch allows for quick comparison of processed with unprocessed sound. When the switch is pushed in, the process is on and the indicator LED is green. When the switch is out, the process is off and the indicator LED is red.
5. **THRESHOLD:** Each channel shares a common threshold control that sets the level at which noise reduction will begin. When the threshold control is at minimum, the noise reduction circuit is removing the highest amount of "hiss". You will also notice that the high frequency content of the program material is lower than normal. As the threshold control is rotated towards maximum, the high frequencies in the program material begin to return.
6. **RELEASE:** Each channel shares a common release control that sets the speed of the "hiss" detector. Under most situations, you will set this control to fast. Only on problematic program material where "pumping" and "breathing" are unacceptable, should the release time be slowed down.
7. **NOISE REDUCTION FUNCTION:** This push button switch allows for quick comparison of processed with unprocessed sound. When the switch is pushed in, the noise reduction is on and the indicator LED is green. When the switch is out, the noise reduction is off and the LED is red.
8. **POWER:** This switch controls primary power to the BBE 362NR.



REAR PANEL

1. **AC POWER CORD:** Plugs into AC power receptacle. U.S. Model, 100-120Vac, 50/60Hz. All other models, 200-240Vac, 50/60Hz.
2. **FUSE:** Turn cap on fuse holder counter-clockwise to remove fuse. (Note: For U.S. Model, replace with 250Vac, 1/2A Fastblow type fuse. For all other models, replace with 250Vac, .125A Fastblow type fuse.)
3. **HI-Z UNBALANCED OUTPUTS:** Each channel is equipped with a 1/4" phone and an RCA jack that is a low impedance unbalanced line level output and can deliver up to +16dBu into 1K Ohms.
4. **HI-Z UNBALANCED INPUTS:** Each channel is equipped with a 1/4" phone and RCA jack that accepts a high impedance unbalanced line level input with an average of -10dBu. (Note: +16dBu is the maximum input before clipping.)

Applications

Music and P.A. Systems

The BBE 362NR is a welcomed addition to any P.A. system because the BBE circuit dramatically improves the clarity and intelligibility of vocals and musical instruments. The single ended noise reduction circuitry of the 362NR is very effective in reducing the level of "hiss" in the preamp section of all P.A. systems. The 362NR is designed to be placed just before the power amp. With this placement, all noise generated from units feeding the 362NR can be reduced. It is important to remember that this is a noise reduction unit and not a noise eliminator. Single ended noise reduction systems are very good at removing around 12dB of noise without adversely effecting program material.

When using a pink noise generator to set up or check any sound system, be sure to have the BBE and noise reduction functions off. After the sound system has been set up for the "house curve", the BBE process can then be used to dial in the perfect sound. Once the sound is set, you can use the noise reduction section to reduce the overall level of "hiss" in the system.

The BBE 362NR has unbalanced inputs and outputs so the user should be aware of the level and impedance of the mixing board if the 362NR is going to be used in an insert loop.

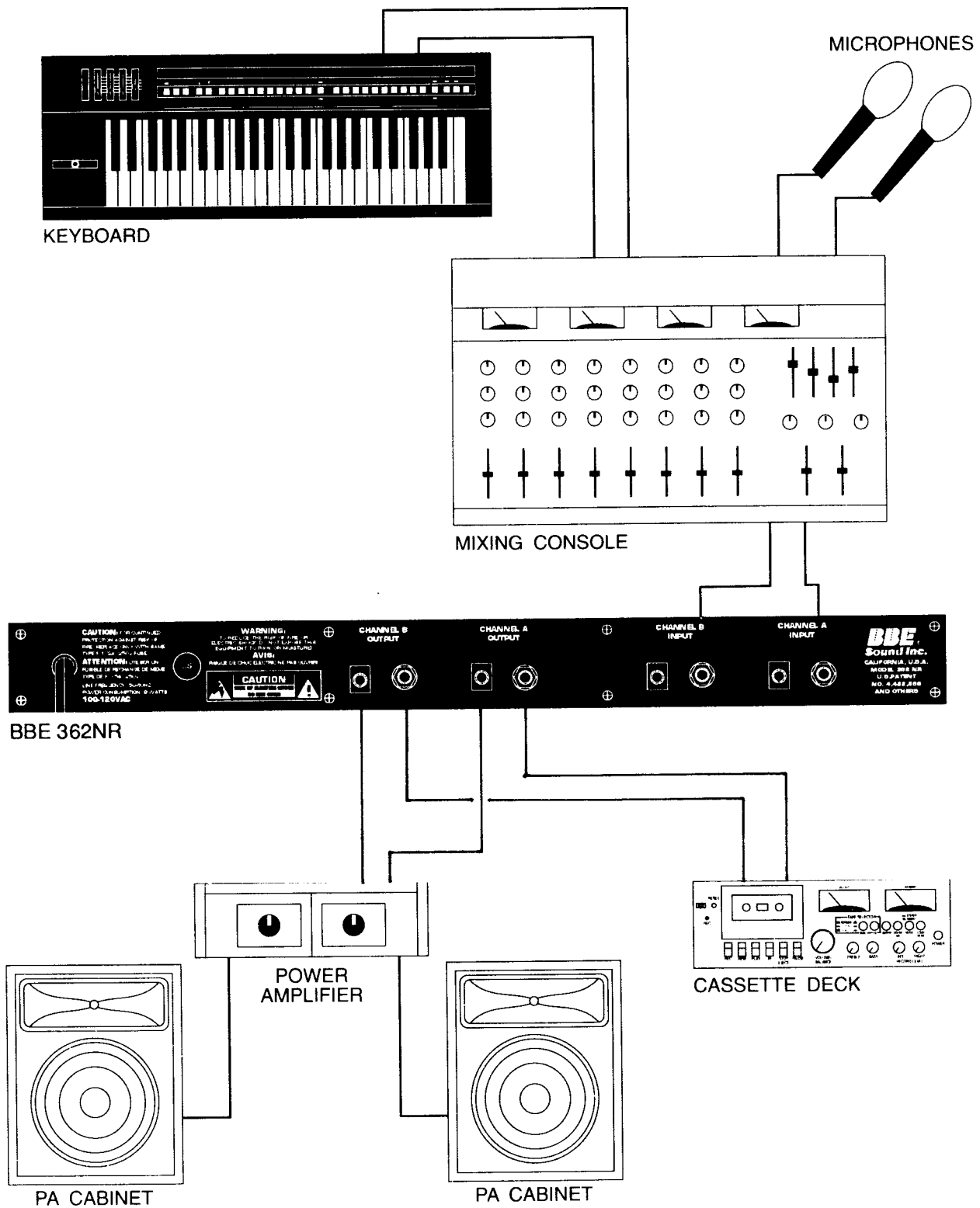
Home Studios

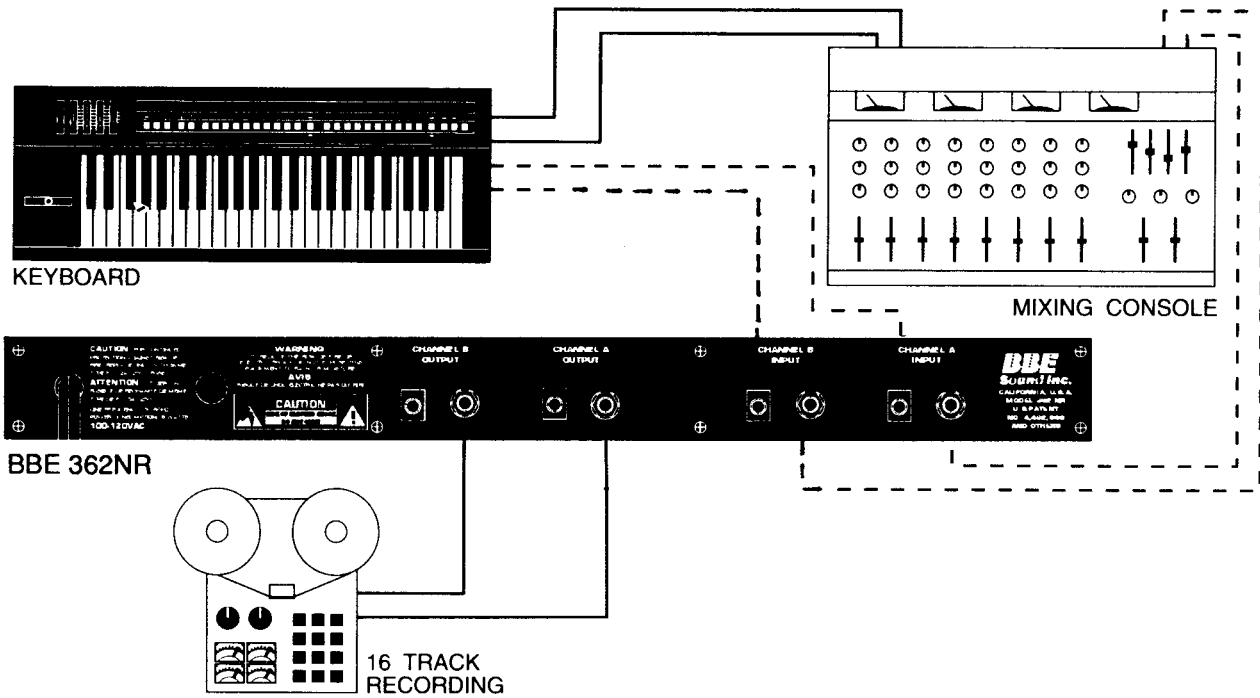
The BBE 362NR gives a pro-edge to otherwise dull recordings on multi-track recorders. Snare drums and guitars take on a brighter tonal quality without equalization. Annoying hiss from rack equipment can be reduced both while recording to individual tracks and later during the mix-down process. By using the BBE 362NR in your home studio recordings, you will notice that program transients are audibly improved and mid-range "smear" is eliminated.

Cassette Copies

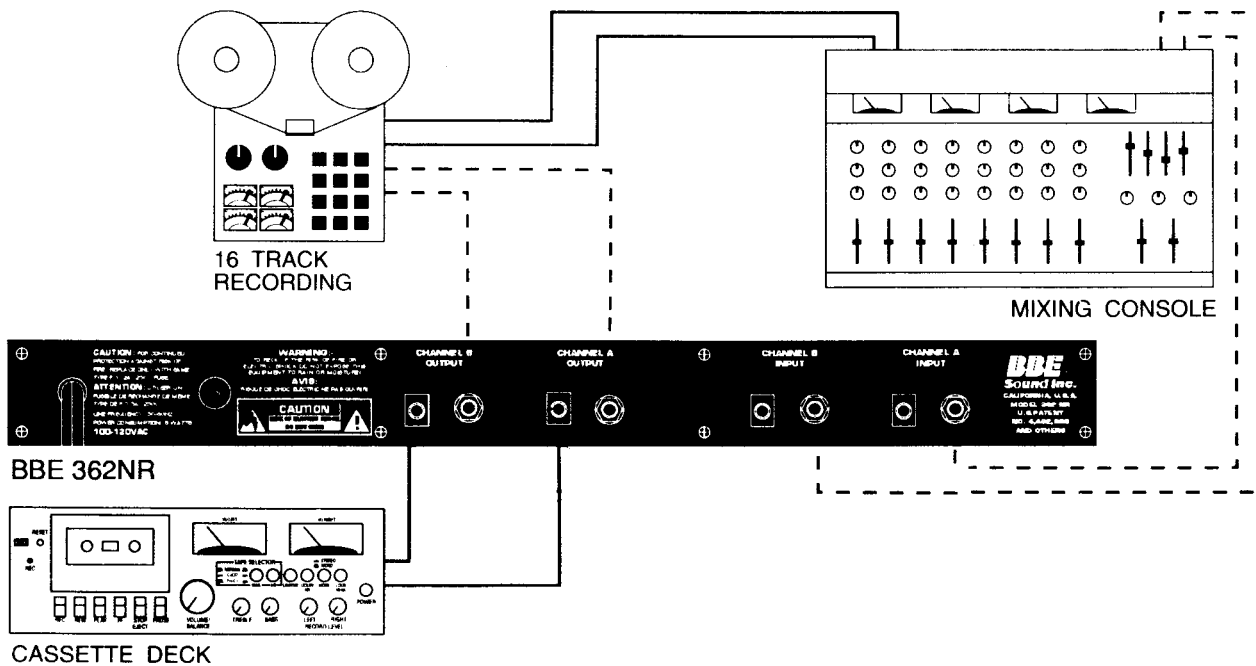
Since the BBE 362NR is a singled ended processor that requires no encoding or decoding, the 362NR can be used on older tapes that are noisy and unintelligible. When making copies of older tapes, or even newer ones, you will notice a clearer and more defined copy.

Live Sound System Non-Powered Mixer





Mastering or Dubbing



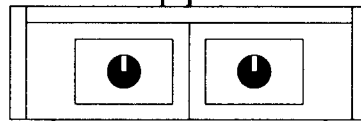
Individual Instruments



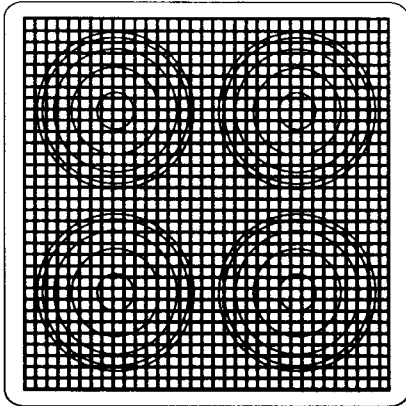
BBE 381 GUITAR PREAMP



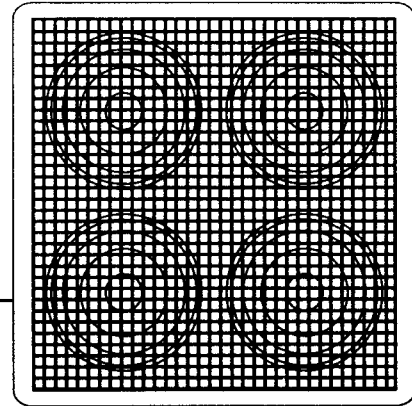
BBE 362NR



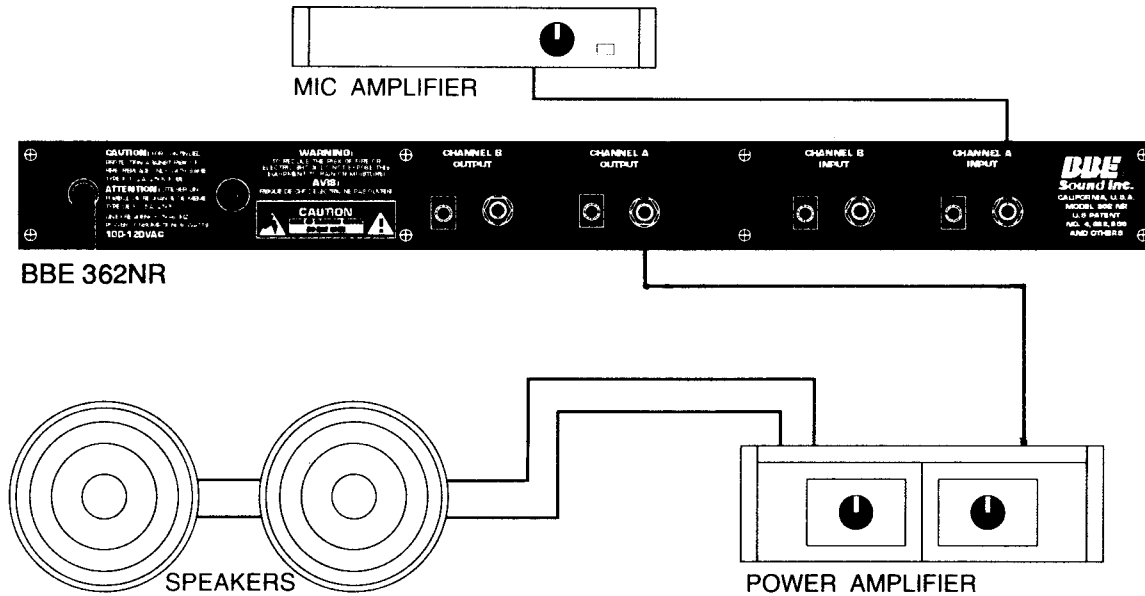
GUITAR POWER AMPLIFIER



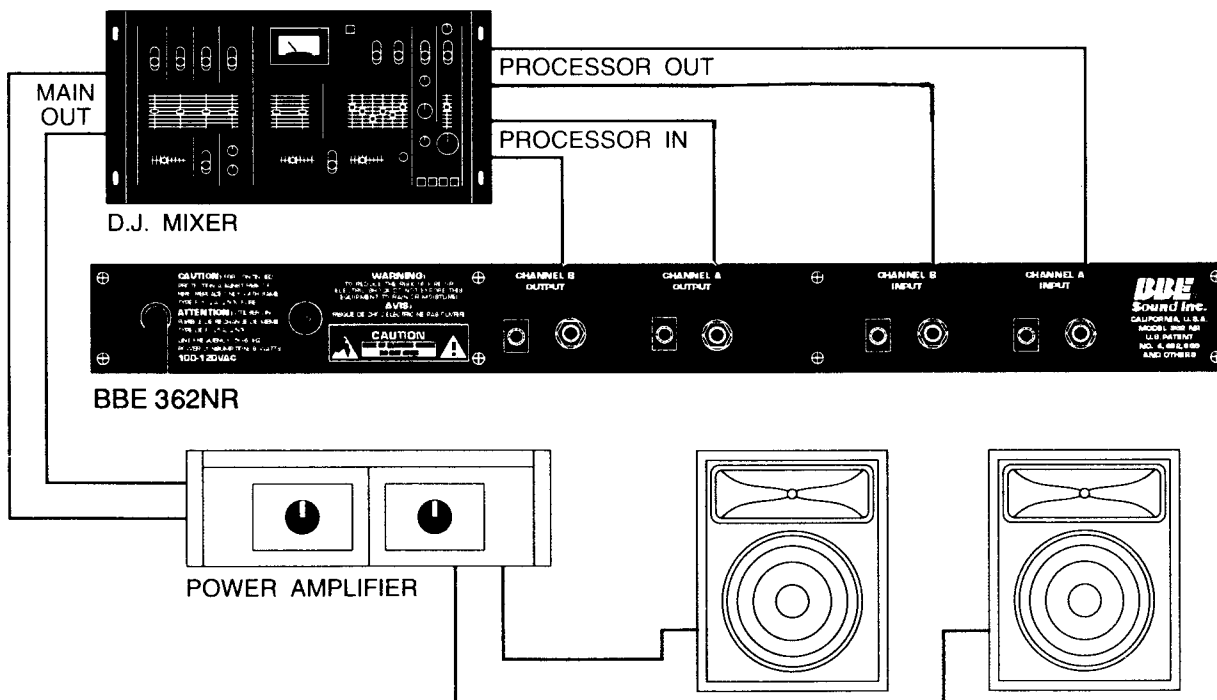
4 X 12" CABINET



4 X 12" CABINET



DJ Application



SPECIFICATIONS

Frequency Response	
Bypass	DC to 100kHz
Process	program controlled
Signal to Noise Ratio	108dB process in 120dB process out 126dB NR in
Total Harmonic Distortion	
in Process Mode	less than 0.1%@-10dBu level
Input Characteristics	
Input Impedance	50K Ohms
Nominal Input Level	-10dBu
Output Characteristics	+20dBu
Minimum Load Impedance	
for full output level	1K Ohm
Nominal Output Level	-10dBu
Maximum Output Level	+20dBu

Power Requirements	
U.S. Model	100-120Vac, 50/60Hz, 10 Watts
All Other Models	200-240Vac, 50/60Hz, 10 Watts
AC Line fuse protected	U.S. Model: 250Vac/ 1/2A Fastblow type fuse All Others: 250Vac/ .125A Fastblow type fuse
Terminations/Connectors	
-rear panel	1/4" Phone jacks/RCA Jacks
Dimensions	Standard 1U single rack 1 3/4" H x 19" W x 5 3/4"D
Weight	4 1/2 lbs. (2.5Kgs)

Note: 0dBu = 0.775 Vrms

Note: Due to continuing product improvement, specifications and design are subject to change without notice.

Service

We recommend that if at all possible, a BBE 362NR which requires service be sent to our facility in Huntington Beach, California. We request that a "RETURN AUTHORIZATION" be issued by the dealer from whom you purchased the unit. If this is not possible, call BBE Sound, Inc. directly (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 revision 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 RESPONSIBILITY 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 362NR 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., 5381 Production Drive, 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 consider 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 sales 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 362NR 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 362NR 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.

Calibration Procedures for the BBE 362NR

**NOTE: THIS UNIT WAS CALIBRATED AT THE FACTORY.
THIS PROCEDURE IS FOR QUALIFIED SERVICE PERSONNEL ONLY.**

INITIAL SETTINGS:

1. BBE Process control VR2 and Lo Contour control VR1, threshold control VR3, and release control VR4 to minimum (fully C.C.W.).
2. Trim controls VR5, VR6, and VR7 set fully clockwise.
3. power switch on, BBE Function switch in (LED green), Noise Reduction switch out (LED red).

POWER SUPPLY TEST:

1. With DVM set to DC volts, measure the positive end of C38. You should read less than +30 VDC.
2. With DVM set to DC volts, measure the negative end of C40. You should read less than -30 VDC.
3. Measure DC voltage on JMP 35. Reading should be +12 VDC, (+/-0.5 VDC).
4. Measure DC voltage on JMP 14. Reading should be -12 VDC, (+/-0.5 VDC).

BBE PROCESS TEST:

1. Input a 5kHz signal @ -10dBu into Channel A [B] input.
2. Measure the Channel A [B] output with the DVM set to AC volts.
3. With Process control at minimum (fully C.C.W.), DVM should read -9.5dBu (+/- 0.5dBu).
4. With Process control at maximum (fully C.W.), DVM should read -1dBu (+/- 0.5dBu).

LO CONTOUR TEST:

1. input a 50Hz signal @ -10dBu into channel A [B] input.
2. Measure the channel A [B] output with the DVM set to AC volts.
3. With Lo Contour control at minimum (fully C.C.W.) DVM should read -9dBu (+/- 0.5dBu).
4. With Lo Contour control at maximum (fully C.W.) DVM should read -.5dBu (+/- 0.5dBu).

BYPASS TEST: (NOTE: Lo Contour and Process controls at maximum)

1. Input a 500Hz signal @ -10dBu into channel A [B] input.
2. Measure the channel A [B] output with the DVM set to AC volts.
3. With the Process in, the DVM should read -10.5dBu (+/- 0.5dBu). NOTE: The Process LED should illuminate green.
4. With the Process out, the DVM should read -9.5dBu (+/- 0.5dBu). NOTE: The Process LED should illuminate red.

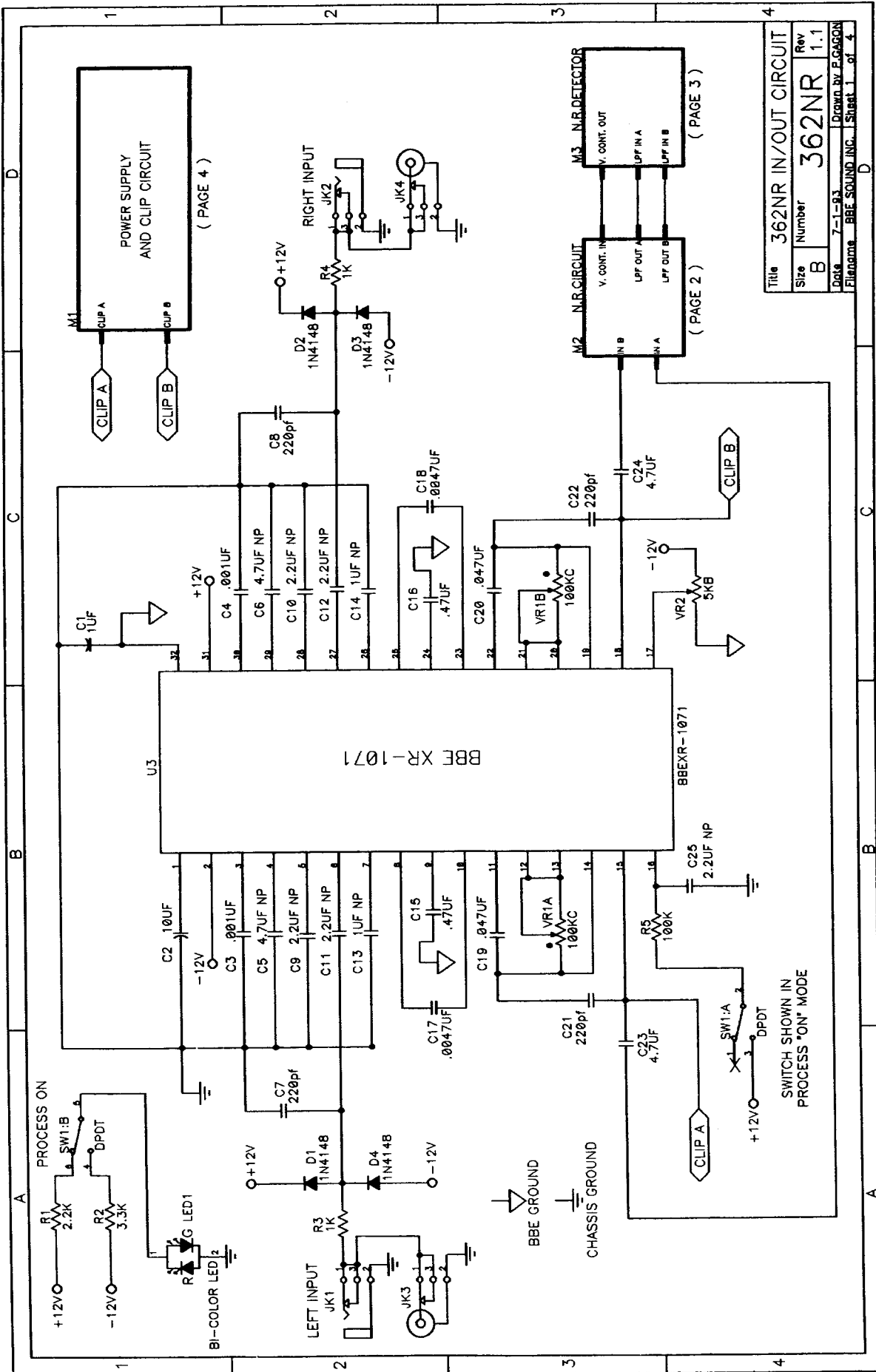
CLIP INDICATOR TEST:

1. Input a 500Hz signal @ +16dBu into the channel A [B] input.
2. Verify that the channel A [B] clip indicator is on.
3. Change signal input level to +13dBu and verify that the channel A [B] clip indicator turns off.

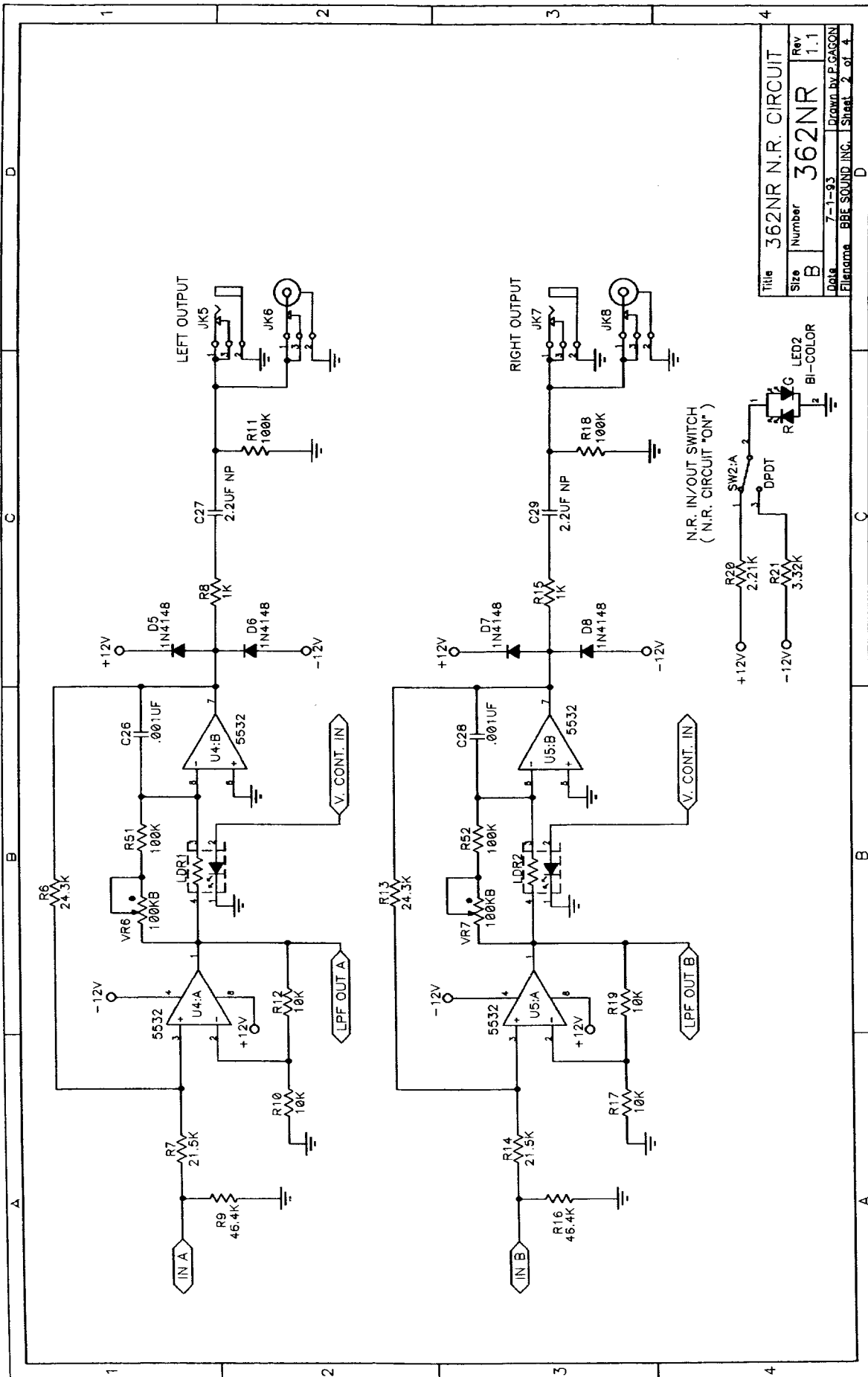
NOISE REDUCTION TEST:

1. Verify that BBE Function switch is off (LED red).
2. Input a 1kHz signal @ -10dBu into channel A [B] input.
3. Measure the channel A [B] output with the DVM set to A.C. volts.
4. With noise reduction Function out, reading should be -9.5dBu (+/-0.5dBu).
5. Turn noise reduction function switch on (LED green) and adjust VR5 for a reading of -12.5dBu.
6. Check output balance between channels A and B. To balance the two channels measure the output levels and select the channel with the lower output level.
7. Adjust VR6 (for channel A) or VR7 (for channel B) so that the two channels have similar output levels at -12.5dBu.
8. With threshold control adjusted to maximum, (fully C.W.), DVM should read -9.5dBu (+/-0.5dBu).

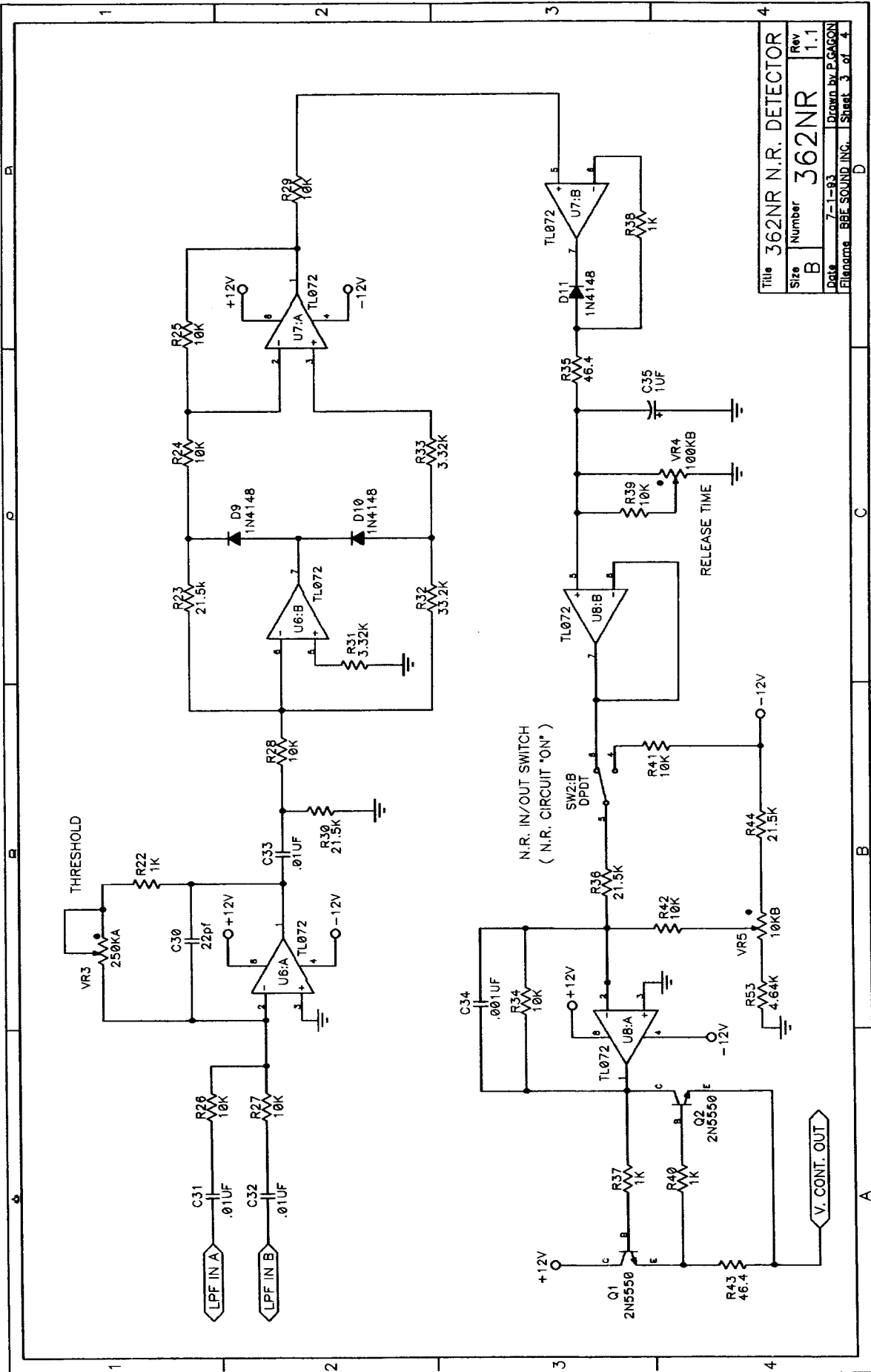
END TEST



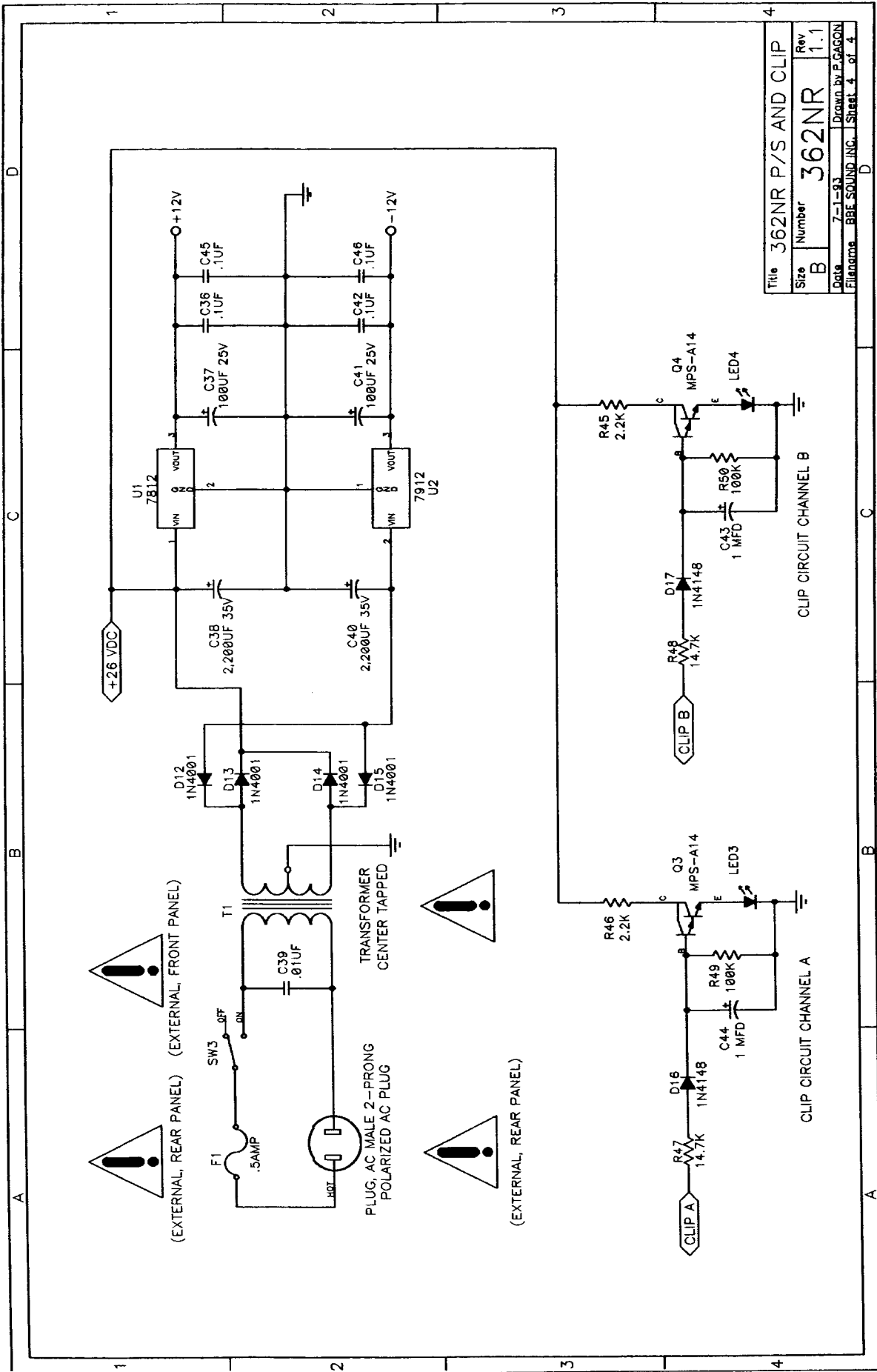
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Title	362NR N.R. CIRCUIT		
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Title 362NR P/S AND CLIP	
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Number 362NR	Drawn by P.CAGON
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