

21 Series Mixing Console

Operation Manual



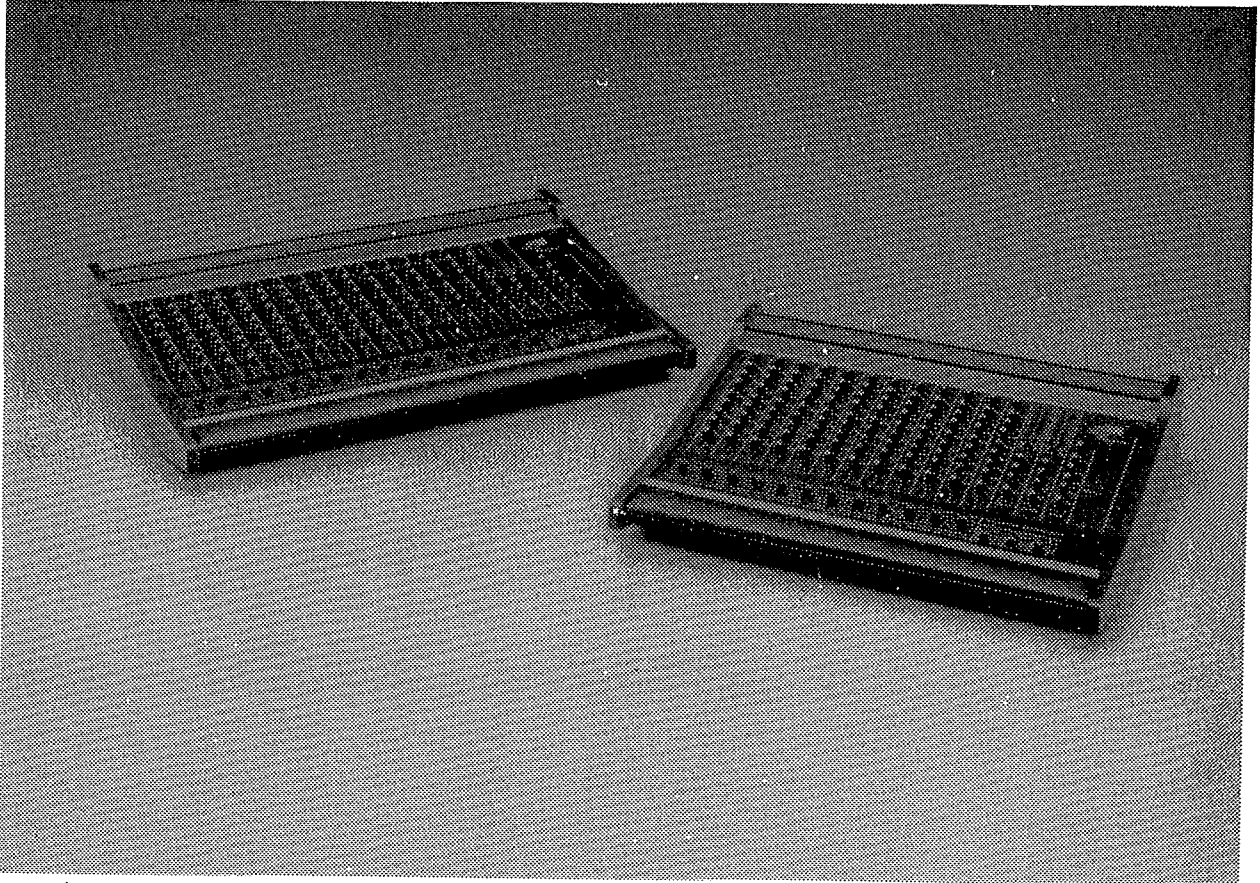
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BIAMP SYSTEMS
1221-1621 MIXING CONSOLE
OPERATING GUIDE

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FEATURES OF THE MIXING CONSOLE



Extended range gain Trim controls on each channel lets you adjust input levels easily while preserving maximum signal-to-noise ratio.

In addition to submaster 1 & 2 and the main output there are three sends on each mic input: 2 pre-fader pre-EQ (monitor), 1 post-fader post-EQ (echo) that can be used for monitor, effects, echo or cue purposes.

Four Equalization Controls permit fast, positive, musical equalization.

Internal Reverb featuring the latest Accutronics Type 9 Spring with 2 stages of sophisticated electronic limiting.

Each input channel has a Pan control to assign the signal to Sub 1 or Sub 2 Submasters or to place the signal in the stereo image if Sub 1 & 2 are being used as stereo mains.

Red and Green Multi-Function LED's on the mic input channels signal various states (1) when any signal above -20dB is present (i.e., when the channel is live) (2) when 10dB of headroom remains, and (3) when signal level approaches the clipping (distortion) point. The LEDs simplify monitoring of each microphone channel, including its pre-fader input and output.

60mm faders provide the sensitive feel required for recording yet are not subject to self-movement from vibration, avoiding noise or drift in a live performance situation.

Each of the two auxiliary inputs has its own pan control and level control and can be used for echo returns, remote or on stage mixers, tape deck returns, slate inputs. These inputs are panned between Sub 1 and Sub 2 outputs.

Each of the two Echo Return inputs has its own return level control which is assigned to the main mono output.

Two 10 segment LED output displays can be assigned to provide accurate level indication of: Submaster 1 & Submaster 2, main output and monitor output.

Separate rotary master output controls are provided for the aux, monitor and echo mixing busses.

Low Frequency filters (high pass) are provided on the Sub 1, Sub 2, main and monitor buss.

SECTION I. INTRODUCTION

The BIAMP SYSTEMS 21 Series fills the growing need for a flexible, roadworthy, high sound quality mixing console. We know because we consulted at great length with soundmen, recording engineers, dealers and customers before we designed this series. Their valuable input guided our production of this all-new, top-performing console.

The 21 series console not only incorporates new features, it also refines the standard ones in ways that enhance your abilities as an artist and technician. Check out features like transformerless balanced inputs, submaster mixing, 4 bands of EQ, separate aux, monitor and echo busses. This console has the functions you want, and whole lot more. It combines high quality components with the latest in semiconductor technology, and packages them in a sturdy, roadworthy package that is ideally suited to a variety of applications.

Only the finest components are used in the BIAMP 21 Series consoles, including transformerless balanced input designs that provide low noise and extended frequency response. The latest super low noise, high slew rate amplifiers (the same type found in professional recording studio and custom road consoles) optimize the board's gain bandwidth and virtually eliminate all traces of slew rate limiting and TIM (Transient Intermodulation Distortion). These components are mounted on G-10 epoxy filled fiberglass circuit boards, and housed in a heavy-gauge steel chassis with extruded aluminum frame members that together establish this console's superb on-the-road durability without compromising size or weight. The textured Duracron finish with baked-on epoxy ink nomenclature ensures that the panels will stay handsome after months and years of tough professional use. The large, led output displays are easy-on-the-eyes hour after hour, providing you with positive accurate peak-reading level reference.

SECTION II. BRIEF OPERATING INSTRUCTIONS

MIC/LINE INPUT CHANNELS (1-16)TRIM

This rotary control continuously varies the input channel's gain from maximum at full clockwise rotation to -50dB at full counterclockwise rotation (i.e., from line to mic sensitivity). TRIM works on both the channel's jacks, so the line input can actually accept any signal: high impedance microphones, tape outputs and high- or low-level lines. By reducing the gain rather than adding padding for higher level inputs, TRIM ensures optimum signal-to-noise ratio.

AUX BUSS

This rotary control adjusts the amount of signal being sent from the channel to the aux mixing buss. In live sound reinforcement, the aux buss is useful as an extra monitor buss since the console comes wired prefader from the factory. This buss can be changed on any channel to post fader by simply moving a jumper on the circuit board. (Illustration on Page 19)

EFFECTS

This rotary control adjusts the amount of signal being sent from the channel to the effects mixing buss. The effects signal is wired post-fader and post-EQ from the factory, however this buss can be changed on any channel to pre-fader by simply moving a jumper on the channel circuit board. The signal then goes to the effects out and the internal reverb. (Illustration on Page 19)

MONITOR

This rotary control adjust the amount of signal being sent to the monitor mixing buss. The monitor send is pre-fader and pre-EQ. This buss is handy for creating a mix for the stage monitor speakers in live sound reinforcement applications, or as a headphone cue send in recording or broadcast production work.

CHANNEL EQUALIZER

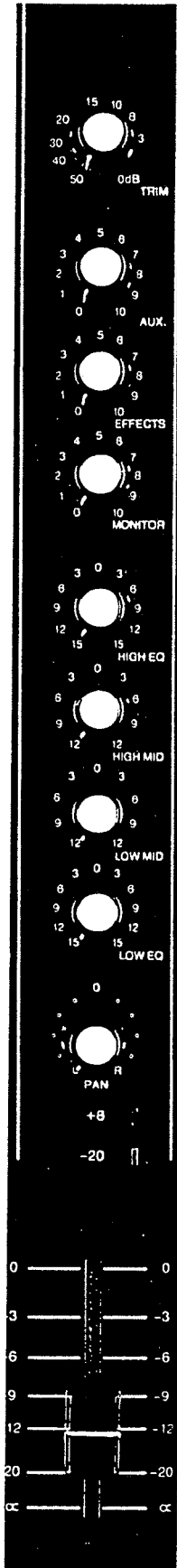
The equalizer consists of 4 controls.

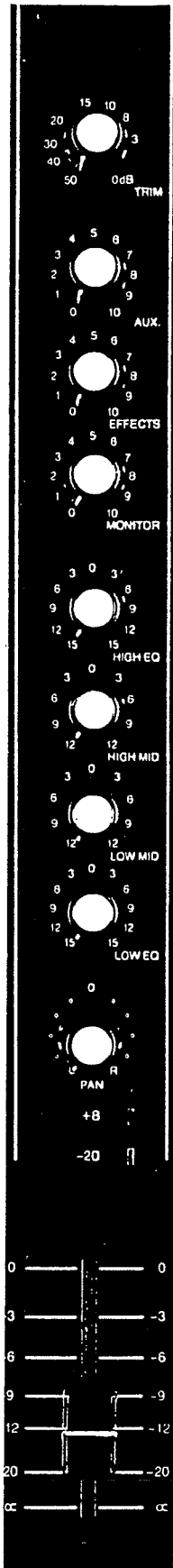
High: +15dB shelving EQ that reaches maximum
13.0 kHz.

High Mid: +12dB peaking EQ, band centered at 2.5 kHz

Low Mid: +12dB peaking EQ, band centered at 350 Hz

Low: +15dB shelving EQ that reaches maximum at
80 Hz





PAN

Panning counter clockwise assigns signal to submaster mixing buss 1 and panning clockwise assigns signal to buss 2.,

L.E.D.

Two Light Emitting Diodes monitor the channel signal level just after the TRIM control (but ahead of all other channel and after the EQ level controls). The green light will indicate whenever a nominal level signal is present in the channel, regardless of fader level. If a high or overload (overdrive) level is present anywhere in the channel, the red light will indicate it regardless of any channel control setting (except TRIM, which can reduce the level).

The green L.E.D. flashes whenever the program level is -20dB and stays on when the signal is -7dB or higher. Thus, the green L.E.D. should be ON continuously when the input channel is under operation.

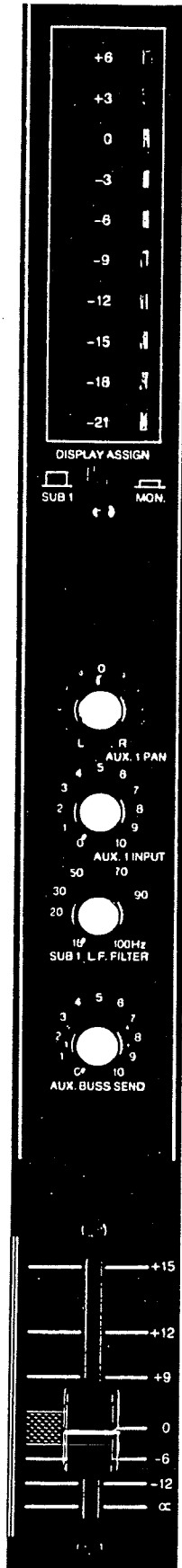
The red L.E.D. flashes when program transients exceed $+8\text{dB}$. At the point where flashing just begins, the input channel has 10dB of headroom before clipping. The red L.E.D. stays ON if program peaks continuously exceed $+8\text{dB}$. This is a warning that peak distortion could occur, adjust the TRIM control so that red L.E.D. just flashes on peaks.

LEVEL AT INPUT CHANNEL DIRECT OUTPUT	RESPONSE OF LEDS
+ 18dB	Clipping distortion begins
+ 6dB	Red LED is ON continuously
+ 3dB	Red LED flashes constantly
0dB	Red LED flashes occasionally
- 7dB	Green LED is ON continuously (Red LED OFF)
- 20dB	Green LED flaches constantly
- 25dB	Green LED flashes occasionally

INPUT CHANNEL FADER

This straight-line control has a 60mm travel path, and is oil damped for smoothest feel and precise level adjustments. Normally the faders should be operated at about the -6dB position. In certain live sound reinforcement situations, however, it may be desirable to use a nominal fader setting of "0" (top position), and to reset the TRIM controls accordingly. Mixing is then done by moving down from maximum, avoiding the possibility of inadvertently pushing a fader up to the point where it might cause feed-back during the performance.

SUB 1



SUB 1

SUBMASTERS 1 & 2

10 Segment LED Display 8 Green and 2 Red output peak reading display assures accurate monitoring of 4 outputs (main, monitor, sub 1 and sub 2).

DISPLAY ASSIGN SWITCH

Sub 1 - Button up displays submaster 1 output
button down displays the monitor buss output.

Sub 2 - Button up displays submaster 2 output
button down displays main mono output.

AUX. 1 & 2 INPUT PAN CONTROL

This control pans auxiliary input between Sub 1 and Sub 2.

AUX. 1 & 2 INPUT LEVEL CONTROL

This control varies the input level from auxiliary input on the rear panel.

SUB 1 & 2 L.F. FILTER

This control varies the frequency of the 3dB down point of the 18dB per octave high pass filter continuously variable from 16Hz to 100Hz.

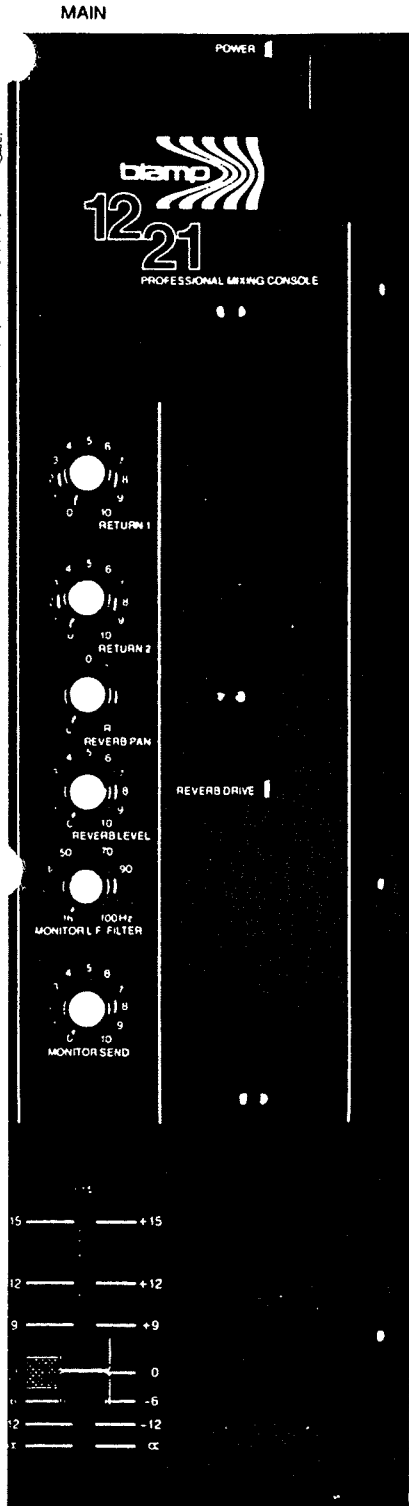
SEND CONTROLS

Aux output master level control

Effects output master level control

SUBMASTER FADER

This fader has the same construction as the input faders. It affects the submaster feed to the main mono buss and the rear panel Sub 1 and Sub 2 unbalanced outputs jacks.



MAIN OUTPUT (MONO SUM OF SUB 1 & 2)

RETURN 1

This rotary control adjusts the incoming signal from the echo return 1 input rear panel jack prior to feeding the main output fader.

RETURN 2

This control adjusts the incoming signal from the echo return 2 input rear panel jack prior to feeding the main output fader.

REVERB PAN

This rotary control pans the internal reverb signal between Sub 1 and Sub 2.

REVERB DRIVE

This green LED flashes when the built in peak limiter of the reverb circuit is operating properly. The reverb level controls of each input channel should be set so the LED FLASHES: The associated circuitry then eliminates annoying spring slap normally heard with other consoles.

REVERB LEVEL

This control determines the amount of reverb signal "mixed in" with the straight through signal.

MONITOR LOW FREQUENCY (HIGH PASS) FILTER

This rotary control varies the frequency of the 3dB down point of the 18dB per octave high pass filter continuously variable from 16 Hz to 100 Hz.

MONITOR LEVEL

Controls monitor level on monitor output jacks.

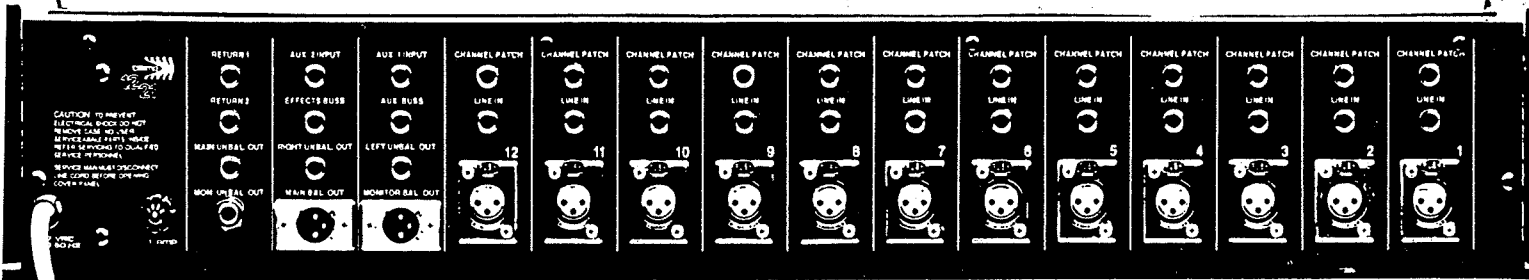
MAIN OUTPUT FADER

This fader has the same construction as the input faders. It affects the output level of the main balanced (XLR Type) and unbalanced output jacks on the rear panel.

A.C. POWER SWITCH

This rocker switch causes the Green LED to glow when the A.C. Power is ON.

"21 SERIES" REAR PANEL



CHANNEL PATCH (CAUTION- Use Stereo Phone Jack (tip, ring, sleeve) only or Channel will not Function.)

This patch point comes before the channel's fader and EQ, and is suitable for insertion of a variety of signal processing/special effects devices, including compressor/limiters, echo/reverb units, phasers, noise gates, and so forth. Anything plugged into the jack interrupts the internal signal path and feeds the channel Fader and all other channel buss feeds.

TIP - OUTPUT
RING - INPUT
SLEEVE - GROUND

Individual Channel Recording outputs can be achieved by connecting the tip and ring together on a stereo phone Jack. This will give you a channel pre fader - pre EQ recording send without interrupting the channel.

LINE INPUT

This unbalanced mono phone jack is suitable for low or high impedance inputs from mic to line level (depending on the channel's TRIM control setting).

MICROPHONE INPUT

This XLR type low impedance connector provides a transformerless balanced input that optimizes noise, slew rate and transient response yet providing more than adequate common mode rejection.

MAIN OUTPUT

An unbalanced phone jack and a balanced XLR-Type connector both carry the same mix. This provides optimum compatibility with power amplifiers, recorders, broadcast feeds, etc. The outputs are post main fader. The balanced output is 6dB greater than the unbalanced output.

SUB 1 & SUB 2 OUTPUTS

These unbalanced phone jacks carry their own post submaster fader outputs.

MONITOR OUTPUTS

The main monitor buss has an unbalanced phone jack and a balanced XLR type connector and both carry the same mix. This provides optimum compatibility with EQ's, crossovers, power amps, etc. The outputs are post the main monitor rotary control.

AUX BUSS OUTPUT

This $\frac{1}{4}$ " standard phone jack is most normally used as a second monitor send to the stage monitor mix amplifiers. It is post main aux send rotary control. It can also be used as the 2nd effects send control by changing a jumper on the printed circuit board.

EFFECTS BUSS OUTPUT

This unbalanced jack is most normally used as the effects send to an external effects unit. It is post main effects send rotary control. However, by changing a circuit board jumper, the Effects buss can be converted to prefader, pre-EQ stage monitor mix buss.

AUX 1 & 2 INPUTS

These unbalanced jacks provide inputs to either submaster 1 or 2 depending on the Aux input pan control. These inputs are very handy for stereo tape deck inputs when playing background music on the musicians break. They can also be used as echo returns or any other line level inputs from an external source such as auxiliary mixers.

RETURN 1 & 2

These unbalanced jacks provide access to the main output mixing buss. They are ideal for echo returns of stacking inputs.

FUSE

The fuse type is $\frac{1}{2}$ Amp Slo Blo.

POWER SUPPLY

The internal power supply is designed for either U.S.A. or Foreign operations. (100v, 120v, 200v, 220v, 240v, 50 or 60Hz) All U.S.A. shipments are wired for 120v operations. If you tour abroad internal changes will be required but are easily achieved.

SPECIFICATIONS

Frequency Response	± 1 dB 15Hz to 33KHz $\pm .5$ dB 2.4Hz to 288KHz
Total Harmonic Distortion	Below .01%
Slew Rate	Greater than 14v per micro second @0dB
Signal to Noise Ratio	Better than -80dB
Residual Noise	All faders down better than -95dB below 1 volt out
Cross Talk	Below 70dB at 1KHz channel to channel Below 60dB at 10KHz buss to buss
Equalization	HF ± 15 dB at 12.5 KHz HM ± 12 dB at 3.3 KHz LM ± 12 dB at 250 Hz LF ± 15 dB at 80 Hz
Dimensions	1221 27 $\frac{3}{4}$ " W x 5 $\frac{3}{4}$ " H x 25"D 1621 33 5/8" W x 5 $\frac{3}{4}$ " H x 25"D

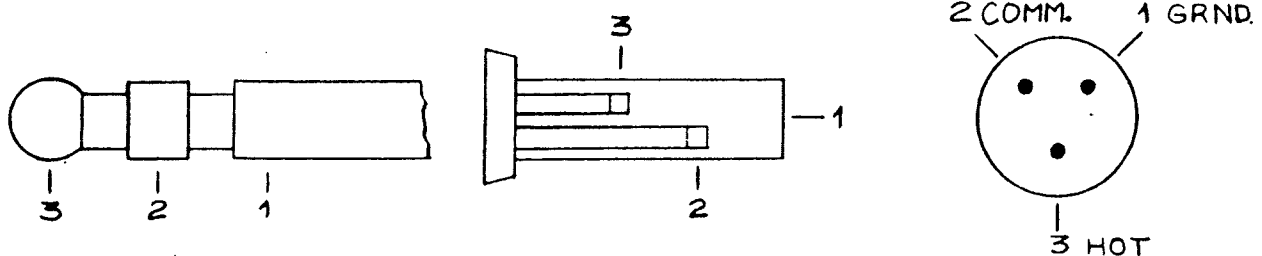
SECTION IV. CONNECTIONS & BASIC SYSTEM SET UP

WIRING A BASIC SOUND REINFORCEMENT SYSTEM

CAUTION: When setting up any sound system, the power amplifiers are the last equipment that should be turned ON.

1. Connect low impedance microphones to the 21 series Microphone Inputs. The Line Input jacks will accept high impedance microphones as well as low or high impedance line-level sources with adjustment of the TRIM control.
2. Connect the 21 Series Main and Monitor outputs to the appropriate power amplifiers. Use 3 terminal male connectors (XLR-type) for balanced lines, and standard tip-sleeve phone plugs for unbalanced lines. (The balanced and unbalanced jacks for a given output can be used simultaneously if desired for multiple outputs.)
3. A tape recorder input can be connected to the Sub 1 and Sub 2 outputs for recording.
4. If an external echo or reverb unit is used, connect a cable from the 21 series effects buss output to input of external effects unit. Connect output of external unit to return 1 or 2. Return 1 & 2 level control will control the amount of effects returned.
5. Only after all connections are made, and the system has been "initialized" in terms of basic control settings (see page 20 of this manual), should you turn ON the power supply's AC power rocker switch with the power amp controls turned down.

WIRING A TIP-RING-SLEEVE PHONE PLUG AND A 3-PIN XLR TYPE
CONNECTOR FOR BALANCED CONNECTIONS



SCHEMATIC OF TRANSFORMERLESS BALANCED OUTPUT
FEEDING A TRANSFORMER-BALANCED INPUT

The 21 Series transformerless balanced outputs can drive any line transformer that has an actual input impedance of 600 ohms or higher. A true 600-ohm termination is not necessary to preserve proper frequency response in the 21 Series because the console has no output transformers.

Since the 21 Series does have a high output level capability of +18dB it is capable of saturating many line input transformers, thus creating distortion in the external device's transformers before the 21 Series output amplifiers clip. It is a good idea to check the input capability of any transformers which are being driven from the 21 Series balanced outputs, and then set the console's output levels accordingly.

Driving more than one transformer from a given 21 Series output is permissible so long as the total load does not drop below 600 ohms. Assuming the multiple transformers are driven in parallel, if two identical transformers are driven, they each must have an actual input impedance of at least 1,200 ohms (if three transformers, each must be at least 1,800 ohms, and so forth).

USING TRANSFORMERLESS BALANCED LINES

Transformerless balanced lines have become ever more popular in professional audio systems. This new system does not have the loss and distortion inherent in many transformer designs. Transformerless balanced lines are capable of excellent noise rejection and improved transient response, and they permit a high-quality audio system to be assembled at a considerably lower cost than would be possible using transformers. High Quality solid state devices insure against any R.F. (Radio Frequency) disturbance.

When a mixer utilizes output transformers, they must operate into the proper impedance or the mixer will not have a flat frequency response, and in some cases there can be an increase in distortion and/or an impairment of signal-to-noise ratio. Thus, a transformer output that is rated at "600 ohms for a precision resistor or 620-ohms for a standard part). Interconnecting transformerless balanced lines is simple; just plug them together. Impedance matching (or termination) is not critical, so the output will work into high or low impedance inputs (so long as the output is not overloaded by too low an input impedance).

HOW TO USE UNBALANCED LINES WITH THE 21 SERIES TRANSFORMERLESS BALANCED OUTPUTS

Generally, there is no reason to use an unbalanced line with the 21 Series balanced outputs because the main balanced output has a companion unbalanced output. However, a transformerless balanced output can feed an unbalanced line, if necessary. Just connect the "low" side of the output to the shield ground (i.e., ring to sleeve on a phone plug or pin 2 to pin 1 on an XLR). Since only half of the dual output amplifier is connected to the load in this unbalanced mode, the maximum output drive capability is 6dB lower.

INITIAL SETUP OF THE 21 SERIES CONSOLES

1. Preset the Trim control as follows:

<u>(dB of atten.)</u>	<u>Input Source</u>
-50 to -40	line inputs
-40 to -45	"hot" microphones (high output mics)
-20 to -30	average-level microphones
-10 to -15	low output microphones (or mics with weak signals)

(The final Trim setting is established during the sound check.)

2. Preset the four EQ controls. The choice of frequencies (low, low mid high mid and/or high) and the amount of boost or cut will vary with the sound source, overall program, personal preferences and acoustics. As a rule, it is best to use as little EQ as possible, and use cut in preference to boost (i.e., cut the treble rather than boosting the bass).
3. Set the channel Fader to -6 position.
4. Assign the channel to Sub 1 or Sub 2 with the pan control.

NOTE: The 21 Series has been designed to simplify live mixing. Setups can be handled more easily by setting up 2 subgroups, where a single fader controls several channels at once. In essence the ability to set up 2 different subgroups makes the 21 Series consoles two mixers in one. Assigning several channels to a given subgroup allows you to balance the mix of those channels with their individual faders, and to control the overall "group" mix level with the sub-master fader.

5. Leave the Aux Buss, Echo and Monitor controls at zero until the main mix has been established.

Main (Master) Fader

1. Pull the main fader DOWN
2. Turn the Aux Buss, Echo and Monitor master controls DOWN
3. Set the Led Display buttons as follows: Both buttons up
4. Turn On the rest of the equipment in the sound system (i.e. equalizers, electronic crossovers, and power amplifiers with the power amp controls turned down. After all units are on, turn up the power amps.

SOUND CHECK FOR A LIVE PERFORMANCE

1. Set the Trim controls for each microphone input, using the LED's above the faders as a guide. The green LED should be ON so long as there is any sound present at the mic, and the red LED should just flash when the voice or instrument is at its highest level.
 - a) If the red LED stays ON, lower the Trim setting, and
 - b) If the green LED does not stay ON, increase the Trim setting.
 - c) Optimum performance is achieved when the red L.E.D. is just flashing.
2. Now that all the Trim controls are set, the channel gains are optimized for wide headroom and low noise, and the channel faders all have the same sensitivity. This makes it easy to know how far to move a fader.
3. When the input Pan controls are in center position, they feed the full channel output level to Submaster 1 & 2. If, however, you wish to feed more of the signal to one submaster than another, see explanation below:
 - a) Pan counter clockwise to feed more level to Submaster 1 than to Submaster 2.
 - b) Pan clockwise to feed more level to Submaster 2 than to Submaster 1.
4. Set the Submaster Faders for nominal output indicator readings of from 9 to 0 VU, with peaks no higher than +3 VU on the LED Display.
5. Engage the main display assign switch and adjust the Main Fader for nominal LED display readings of from -9 VU to 0 VU, with peaks no higher than +3. If the sound level gets too high during this procedure, turn down the volume at the power amplifiers (and/or at the electronic crossover network of a bi- or tri-amplified system).

The system is now basically set up and ready for mixing. You can adjust the various effects, aux and monitor send controls, set the effects, aux and monitor master output controls, adjust the Line Input/Effects Return levels. and fine-tune the balance and equalization of the overall program.

SECTION V. MAIN, SUBMASTER, MONITOR AND EFFECTS MIXING

SUBMASTER MIXING

The 21 Series has been designed to simplify live mixing. Setups can be handled more easily by setting up 2 subgroups, where a single fader controls several channels at once. In essence the ability to set up 2 different subgroups makes the 21 Series consoles two mixers in one. Assigning several channels to a given subgroup allows you to balance the mix of those channels with their individual faders, and to control the overall "group" mix level with the submaster fader.

MONITOR, ECHO & AUX BUSS MASTERS

Separate rotary "Master" level controls are provided for the Monitor, Echo and Aux Mixing Busses. These controls work essentially like the Main Slide Faders, serving as overall output level controls for their respective outputs. The Monitor Master affects both the unbalanced and balanced Monitor output jacks. The Echo Master and Aux Buss Master each feed one unbalanced output phone jack.

MONITOR MIXING

Monitor mixing (also known as "foldback") is essential so that performers can hear themselves and/or their fellow performers. The monitor mix is nearly always different from the main mix. In live performances, the monitor mix is usually fed to a separate amplifier and on-stage speakers. In recording, the monitor mix may be fed to a headphone amplifier (a small power amp) and a headphone distribution system.

A separate monitor mix can be established by using the Monitor level control of each Input channel plus the Master Monitor level control located above the main output fader. The monitor mix receives its signal from each channel ahead of the fader and equalizer (i.e., it is pre-fader, pre-EQ). This means that any changes in your main house mix will not affect the monitors. With circuit board jumper wire changes it is possible to achieve 3 independent monitor mixes.

EFFECTS MIXING AND REVERB OPERATION

Effects mixing refers to any mix that is fed to a reverb chamber, electro-mechanical reverb or echo, purely electronic reverb or echo, phaser, flanger, compressor/limiter (used for sustain), and so forth. Some inputs may be fed "straight" to the main mix and also to the effects unit. Other inputs may be fed to the main mix only via the effects unit. Other inputs may not be subject to any effects.

A separate echo (effects) mix can be established by using the effects level control of each Input channel, plus the Master effects level control located above the Sub 2 Fader. The effects mix derives its signal from each channel after the Fader and Equalizer (i.e., it is post-fader, post-EQ). This means that the Effects mix is receiving the benefit of any level and EQ adjustments you make in the feed to the main mix.

The output of your effects device(s) can be returned to return 1 or 2. You adjust the amount of return with the return 1 & 2's rotary level control. Alternately you could connect the effects return to the Aux. 1 or 2 input jacks.

If you desire a second effects mix, this can be established using the Aux Buss level control of each input channel, plus the Master Aux Buss level control located above the Sub 1 Fader. This requires an internal change on the input channel circuit board. See your Biamp dealer or authorized Biamp Service Center for details.

Individual Channel Effects Patching

If a special effect is desired on just one input channel, such as compression, limiting, phasing, etc., you do not use the Echo or Aux controls. Instead, connect the channel's channel patch jack effects device. The level sent to the effect is adjusted by the channel's Trim control, and the return level is set by the channel's Fader.

Setting The Internal Reverb

The Biamp 21 series mixers incorporate an advanced reverberation system presently unknown in any mixer. This means higher quality reverberation and lower noise. Electronic limiters are built in to eliminate spring slap, boing, rumble and over drive distortions that cause professionals to question using built in reverberation devices in mixing consoles.

NOTE: Studio quality reverberation devices are complex to use. The 21 series has incorporated a quality reverb and simplified the controls and operation, yet lowest noise and high sound quality are achieved when channel effects level controls are properly set.

Operation

Turn up desired effect levels on each channel. With all levels up the Green reverb drive L.E.D. on the lower right side of the console should flash. If it does not flash the reverb signal from the channels is not high enough for the best reverb performance. Turn up all channel effect levels until the L.E.D. flashes. This will insure the best signal to noise ratio. If the green reverb drive L.E.D. stays on constantly reduce all the channel levels. This will insure the best reverb sound quality and proper operation of the limiter circuit.

Reverb Level Control

This control attenuates the level fed to the submasters from effects/reverb buss.

Reverb Pan

This control pans the effects/reverb buss signal between Sub 1 and Sub 2.

SECTION VI. RECORDING AND OTHER INFORMATION

RECORDING

The 21 Series is primarily a live performance sound reinforcement mixing console. However, its features make it very useable for 2 track recording work, especially location recording that is done simultaneously during a live performance.

Stereo recordings can be made using the two Submaster outputs. Stereo recordings can be played back using any of the Input channels or the Aux 1 & 2 inputs. (Make sure your recorder is not feeding the Aux. 1 & 2 Inputs while you are making the recording.)

COMPLEX MONITOR MIXING

The 21 Series permits up to 3 independant monitor mixes (Monitor, Effects and Aux Buss) with minor circuit board changes. In some complex stage productions, you may require more monitor mixes. In that instance, you can use the Pre-Fader Output on the channel patch jack, (tip) from each input channel to feed another mixer whose sole function is stage monitor mixing - - a console which can be set up with different EQ than the house and with many mixes from the same inputs to suit the various performers' needs.

LIMITED WARRANTY

BIAMP SYSTEMS, INC. warrants to the original consumer purchaser of each BIAMP product that the unit is free from defects in materials and workmanship. This express warranty commences on the date of purchase from an authorized BIAMP dealer and extends for one year. Completion and return of the warranty registration card enclosed with each unit within ten days of the date of purchase is a condition precedent to coverage and performance under this express warranty.

EXCLUSIONS AND LIMITATIONS: This warranty will be VOIDED if the serial number has been removed or defaced, or if the unit has been subjected to abuse, alterations, attempted repair by any person not authorized by warrantor to make repairs, accident, or installation contrary to the warrantor's instructions. Cosmetic blemishes, such as handles, feet, and knobs are not warranted. All implied warranties, including the warranty of MERCHANTABILITY are limited to the duration of this express warranty, and, if the registration card is not promptly returned, the implied warranties are limited to the duration of the express warranty if it had been effective. In no event will BIAMP SYSTEMS, INC. be responsible for incidental or consequential damages, except for injury to the person.

HOW TO OBTAIN REMEDY: Carefully pack your BIAMP product and return it to one of the BIAMP Authorized Service Centers listed below, or write the BIAMP Customer Service Department at the address below for instructions on how to return your unit to the factory. Pack a letter with the unit explaining the nature of the problem and giving your name and address. You are responsible for freight and insurance charges to the Authorized Service Center or the factory.

WHAT BIAMP WILL DO: BIAMP will repair or, at its option, replace each unit covered by this warranty. Units sent to the factory will be returned to the owner freight collect. Units brought to Authorized Service Centers will be held for pickup by the owner for a period of time established by the individual Authorized Service Center, or, at the owner's option, returned to the owner freight collect.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. For instance, some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

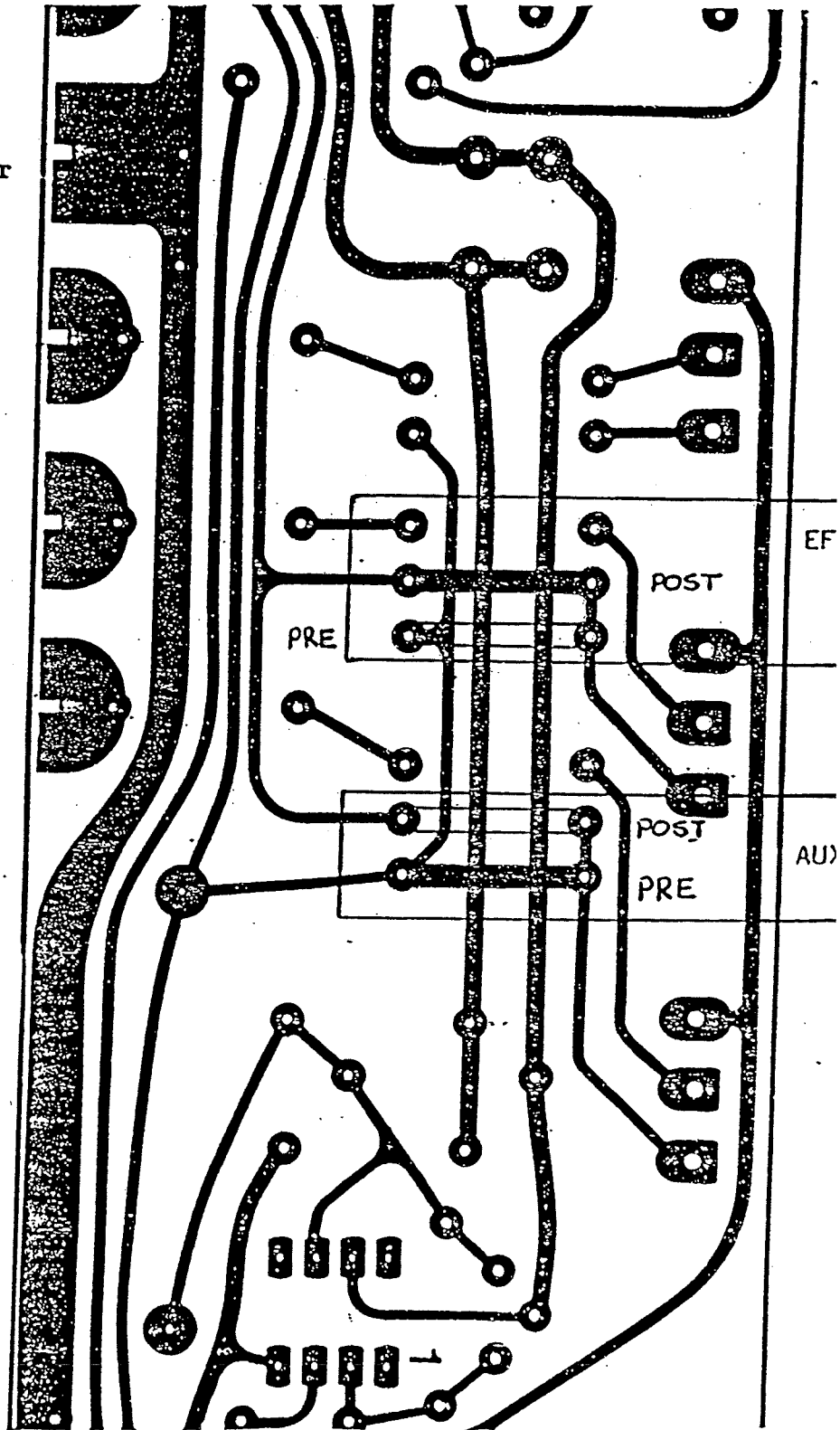
BIAMP CUSTOMER SERVICE DEPARTMENT
Biamp Systems, Inc.
9600 S.W. Barnes Road
Portland, Oregon 97225

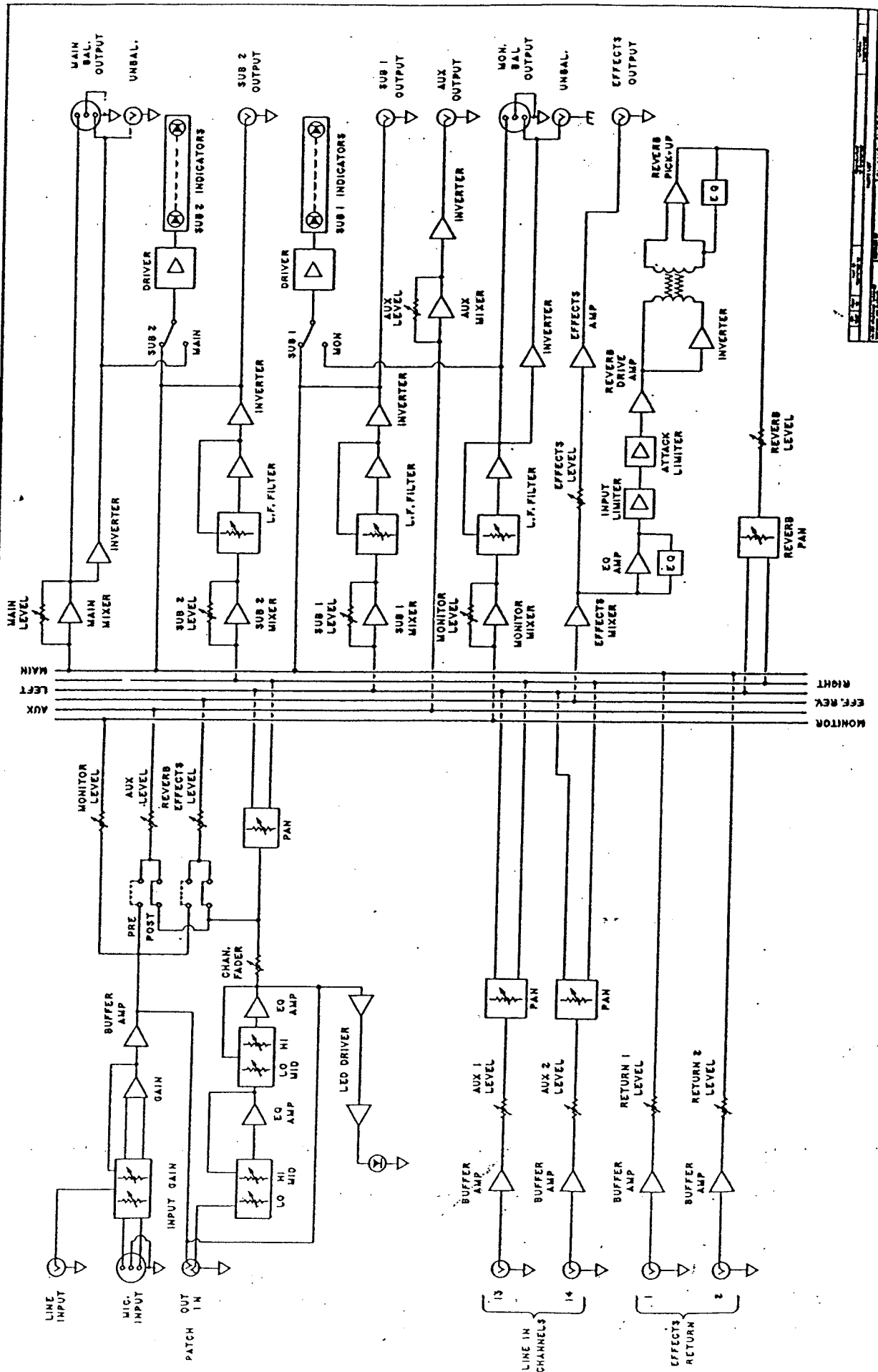
"21 SERIES" PREAMP PC BOARD
(SOLDER SIDE)

ALL MODIFICATIONS MUST BE MADE BY QUALIFIED SERVICE PERSONEL

The Effects Buss is factory wired for Post - EQ., Post-Fader, Indicated by the solid Jumper. For prefader operation move the jumper to open indicated connections

The Aux Buss is factory wired pre-fader indicated by the solid jumper. For Post fader operation move the jumper to the open indicated connections





16-CHANNEL SYSTEM