

ALESIS Studio 12R

Reference Manual

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IMPORTANT SAFETY INSTRUCTIONS

Safety symbols used in this product



This symbol alerts the user that there are important operating and maintenance instructions in the literature accompanying this unit.



This symbol warns the user of uninsulated voltage within the unit that can cause dangerous electric shocks.

Please follow these precautions when using this product:



1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a damp cloth. Do not spray any liquid cleaner onto the faceplate, as this may damage the front panel controls or cause a dangerous condition.
7. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.



9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Use only attachments or accessories specified by the manufacturer.
12. Use only with a cart, stand, bracket, rack, or table designed for use with professional audio or music equipment. In any installation, make sure that injury or damage will not result from cables pulling on the apparatus and its mounting. If a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.



14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. This unit produces heat when operated normally. If this unit is installed in a rack, make sure that there is proper ventilation when operated. Do not operate with the rack covers on. If there are other units in the rack that generate a large amount of heat, spread them apart. Do not sandwich this product between two large heat-producing units.
16. This product, in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.

INTRODUCTION

The Alesis Studio 12R Microphone Preamplifier/Mixer

The Alesis Studio 12R is a high-quality, rack-mountable 12-input, stereo output audio mixer. It is designed to handle eight microphones, two stereo line inputs, and to route signal to and from external effect processing devices. As a basic, easy-to-understand mixer, it can be used in a wide variety of applications from sound reinforcement to multitrack recording. It may also be used as an accessory or submixer to a larger console.

Using this manual

To get the most out of your Studio 12R, please read this manual. While the mixer is not complicated to operate, the manual contains information that will help you get the highest level of performance from it. We've included creative alternative techniques that aren't obvious at first glance.

To find what you need quickly, refer to the index at the back of the manual, or the Table of Contents.

We appreciate your feedback. If you have any suggestions on how to improve this manual, please write to us at:

Technical Communications Dept.
Alesis Corp.
3630 Holdrege
Los Angeles, CA 90016

or via email at: alecorp@alesis1.usa.com

Conventions

The buttons, knobs, and rear panel connectors are referred to in this manual just as their names appear on the Studio 12R, using all capital letters (*Example:* [TRIM] control, [PAN] knob, [PHONES] jack, etc.).



When something important appears in the manual, an icon (like the one on the left) will appear in the left margin. This symbol

indicates that this information is vital when operating the Studio 12R.

Grounding Instructions

This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local rules and ordinances.



DANGER - *Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product; if it will not fit the outlet, have a proper outlet installed by a qualified electrician.*

INSTALLATION

Unpacking

The Studio 12R box should contain:

1. The mixer itself
2. A packet of literature along with this manual
3. An AC power cable
4. An Alesis warranty card

Please send in your warranty card right away. Your warranty is not registered with Alesis until the card is returned. Please save your sales receipt as your ultimate proof of purchase and warranty date. By sending in your warranty card, you will receive the Alesis First Reflection magazine free of charge, and we will be able to notify you of special programs and offers from Alesis. Should repair ever become necessary, having the unit registered will make it faster and easier to obtain service.

Note that the warranty is valid only in the country of purchase; i.e., units purchased in the United States must be serviced in the United States.

AC power

READ ALL SAFETY WARNINGS IN THE PREVIOUS SECTION OF THIS MANUAL TO ENSURE SAFE OPERATION OF THIS UNIT. Connect the Studio 12R to the specified power using the AC cable supplied with the unit. The AC cable is removable. If the distance to your AC outlet is longer or shorter than the supplied cable, you may substitute an approved standard NEMA-to-CEE power cable of the correct length, available from most electronics stores.

Grounding



CONNECT THE STUDIO 12R TO A PROPERLY GROUNDED OUTLET ONLY. DO NOT USE ADAPTERS WHICH REMOVE THE SAFETY GROUND PROTECTION OR CUT OFF THE GROUNDING PRONG ON THE POWER CORD. Proper grounding is essential for user safety and low noise. If you experience 60-cycle hum in your sound system as a result of different ground potentials between different units in your system, plug all units into the same AC circuit (if the total power load allows) and make sure other devices in the system are properly grounded themselves. The Studio 12R features balanced inputs and outputs, so if it is properly connected to other balanced units, AC ground potentials will not affect the audio. If you cannot get rid of ground loops, consult a professional electrician familiar with sound system power designs.

Use clean power

The Studio 12R's internal power supply is designed to filter out most AC line noise. However, it is still good practice to plug your sound equipment into an AC circuit that is not shared with lighting dimmers, refrigerators, air conditioning units, or other appliances that may induce noise into the power system.

Power switch

The POWER switch is located on the back panel. A power indicator is on the front panel next to the meter. Avoid turning the power switch on or off while the Studio 12R is connected to a live amplifier.

Mounting

The Studio 12R may be rack mounted in a standard EIA 19" rack, occupying three standard 1.75" rack spaces. Any angle of orientation is acceptable. Note that (as with most audio equipment) if it is mounted into metal rack rails, the chassis ground of all units in the rack will be connected together by the rail. In some cases this is desirable, but if hum is a problem in the system, you may need to install non-conductive rack screws and washers on the Studio 12R or other equipment in the rack to isolate the chassis grounds from each other.

The mixer may also be used on a table top. To avoid scratching a tabletop surface, apply rubber or felt feet to the bottom of the Studio 12R.

CONNECTIONS

Inputs

Cable common sense

Make all connections to the Studio 12R with the power turned off wherever possible. If you must connect or disconnect inputs while power is on, make sure the channel fader and [TRIM] are turned all the way down to avoid sudden pops and clicks which may damage speakers or other equipment.

Use good-quality cable: 99% of all mixer problems turn out to be cable or connector problems. Use the best quality cable you can, for highest reliability and lowest noise. If something goes wrong, check the cable and its connection to the mixer first. If the connectors are dirty or corroded, clean them with isopropyl alcohol or other approved electrical contact cleaner before inserting them into the Studio 12R. High quality cables are low-capacitance shielded cables with a stranded (not solid) internal conductor and a low-resistance shield. Although quality cables cost more, they do make a difference.

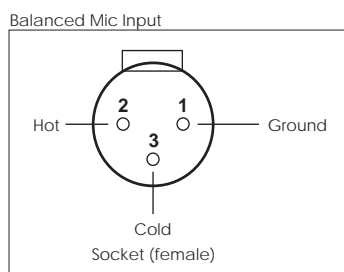
Route cables in your system correctly by observing the following precautions:

- Do not bundle audio cables with AC power cords.
- Avoid running audio cables, or placing the Studio 12R itself, near sources of electromagnetic interference such as transformers, monitors, computers, etc.
- Never unplug a cable by pulling on the wire itself. Always unplug by firmly grasping the body of the plug and pulling directly outward.
- Do not place cables where they can be stepped on. Stepping on a cable may not cause immediate damage, but it can compress the insulation between the center conductor and shield (degrading performance), or reduce the cable's reliability.
- Avoid twisting the cable or having it make sharp, right angle turns.

Microphone Inputs

The Alesis Studio 12R features eight studio-grade, low-noise hybrid microphone preamplifiers. These [MIC] jacks are designed to work with almost any low-impedance

microphone using standard 3-conductor XLR connectors. The [MIC] jacks also feature 48 volt phantom power, which may be turned on and off by the [PHANTOM] switch on the back panel, for condenser microphones which require external powering.



The MIC Input is designed to accept a wide range of balanced or unbalanced low impedance input signals, with up to 60 dB of amplification available (which is 10 to 20 dB more than many other rack-mount mixers). It is wired with "pin 2 hot" according to the accepted standard.



Use only one input per channel. The LINE IN jack and the MIC IN jack of a channel can't be used at the same time. If you turn up the level of a line source to hear it at the same time a microphone is connected, you may damage the microphone.

Phantom power

Certain types of microphones (called condenser microphones) require a DC power supply from the mixer. “Phantom power” sends 48 volts of DC through the microphone cable. If any of your microphones need phantom power, turn on the [PHANTOM POWER] switch on the Studio 12R’s back panel to connect all the XLR MIC IN jacks to the Studio 12R’s internal 48 volt phantom power source. Since the power is applied equally to pins 2 and 3, phantom power should not affect dynamic microphones (which do not require phantom power). However, make sure that your microphone cables have no short circuits or intermittent connections to avoid damage to the system.



Avoid connecting or disconnecting any microphones while [PHANTOM POWER] is turned on. Make all connections with the Studio 12R powered off. If this is not possible, make sure the channel's fader and [TRIM] are down, make the connections, then turn on the [PHANTOM POWER] switch on the back panel before bringing the fader and [TRIM] back up. Many microphones make a loud "pop" when first powered, so make sure your faders are down to avoid damaging your speakers or hearing.



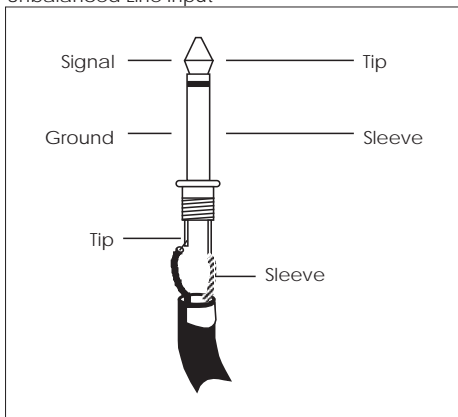
Never connect the MIC jack to an UNBALANCED source or to a line-level device (such as a tape recorder or synthesizer) when phantom power is being used.

If none of your microphones need phantom power, leave the phantom power switch off.

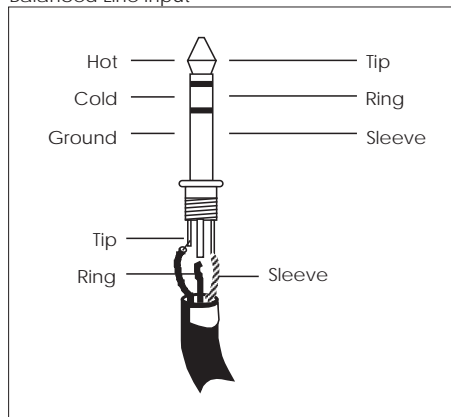
Line-level devices (synthesizers, CD players, video)

The Studio 12R features line-level inputs on 1/4" phone jacks which accept standard unbalanced or balanced signals.

Unbalanced Line Input



Balanced Line Input



Unbalanced -10 dBV line level sources: Most synthesizers, drum machines, effect devices, cassette decks and CD players operate at this level. Their average signal level is about 1/3 of a volt. They have a 2-conductor output jack that is either a 1/4" phone or "RCA phono" type. These may be plugged directly into any of the Studio 12R's [LINE IN] jacks, with the [TRIM] level set at approximately the 1 o'clock position. Plug stereo sources such as synthesizers, CD players, and drum machine main outputs into the STEREO LINE channels (9/10 and 11/12) if possible.

Electric guitars and basses may be plugged directly into the [LINE IN] jacks, if you raise the [TRIM] level. The Studio 12R has more than enough gain (up to 50 dB when the channel fader and trim are set to maximum) for guitars, although some pickups may sound better if they're plugged directly into a high-impedance preamp designed for guitar use. Plug the output of such preamps into any [LINE IN] jack.

A reminder: do not plug a line input and a microphone input into the same channel. The inputs are not designed to handle two sources at the same time. If you crank up the line level input to extremes to compensate for the level loss, you may damage the microphone.

Balanced +4 dBu line level sources: Professional recording and processing equipment typically provides a balanced, 3-conductor signal output that is a higher voltage (1.24 volts nominal level) than most synthesizers and stereo equipment. The Studio 12R's [LINE IN] jacks are designed to handle these balanced inputs.

Balanced sources often feature XLR outputs. However, they should NOT be connected to the XLR [MIC] inputs of the Studio 12R unless absolutely necessary, because the higher gain of the MIC jacks gives you less headroom than the LINE IN jacks do (also, the source could be damaged by phantom power if it's turned on). Connect them to the [LINE IN] jacks using an XLR-to-1/4 inch phone TRS (tip-ring-sleeve) cable, as shown below:



If the proper connector cable or adapter is not available, +4 dBu line level sources may be connected to the [MIC] jacks **ONLY IF PHANTOM POWER WILL NOT BE USED!!**



Connecting a line-level output to a phantom-powered XLR input on the Alesis Studio 12R may cause damage to the external unit. Alesis cannot be responsible for any damages caused by this kind of misuse.

The nominal trim setting for a +4 dBu signal plugged into a line input is approximately 11 o'clock (12 o'clock on the stereo channels). This will give you plenty of headroom to start with.

Maximum levels: The maximum level the [MIC] jack can receive with the [TRIM] control full counter-clockwise is +12 dBu before clipping, so there's only 8 dB of headroom if you plug a +4 dBu line source into the mic jack. The [LINE IN] jack on channels 1-8 may receive levels up to +32 dBu without clipping, a headroom advantage of 20 dB. The stereo channels may receive a +22 dBu (balanced or unbalanced) maximum input.

TAPE IN jacks

The [TAPE IN] jacks on the rear panel are designed for playback of a stereo tape deck (or any other -10 dBV level signal) through the [MONITOR OUT] and [PHONES] jacks only. A signal at the [TAPE IN] jacks cannot be heard from the [MAIN OUT] jacks.

This allows you to use the Studio 12R to monitor a mixdown to a 2-track deck through your headphones. (If you plugged your mixdown deck into the line inputs on the channels, it would cause feedback when you press “record”.) By placing the [PHONES/MONITOR] switch in the TAPE position, you will hear the mixer's output after it has been passed through the mixdown deck, so you can make sure that it is recording correctly.

- *Another use for the [TAPE IN] jacks is to play a CD or tape into a PA system, automatically turning off all the microphones into the main PA system when the front panel MSTR/TAPE switch is set to the TAPE position. Note that in this application, the PA system must be fed from the MONITOR OUT instead of the MAIN OUT jacks, and will be affected by the level of the [PHONES/MONITOR] control as well as by the [MASTER] control fader.*

Phonograph turntables

If you're using a record turntable, you may not plug it directly into the line inputs of the Studio 12R (well, you can, but it will sound very thin and noisy). Obtain a phono preamp from your dealer or an electronics specialty store.

1. Plug the outputs of the phonograph pickup into the RIAA-equalized phono preamp.
2. Plug the outputs of the preamp into the LINE IN 9-10 or 11-12 inputs of the Studio 12R.

Do not connect any of the following to any input of the Studio 12R!

- The speaker output of any power amplifier.
- Any source that is too loud for the input (no more than 3 volts RMS into a [MIC] jack or 13 volts RMS into a [LINE IN] jack).
- Any unshielded cable.

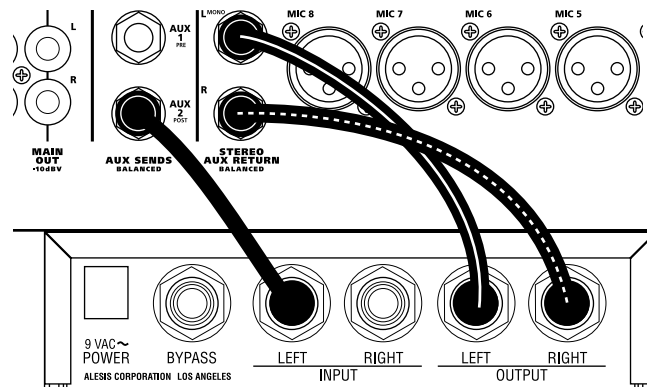
How to connect effect devices and signal processors

Alesis and other companies make many different types of signal processors which may be connected to the Studio 12R mixer. There are two ways to connect these units: using the AUX system or via the INSERT jacks.

Effects via Aux Send and Aux Return

If you want to add an effect such as reverb, chorus, or delay to several different inputs at once, you will use the AUX system.

1. Connect the AUX 2 (POST) AUX SEND output of the 12R to the input of the effect device. If the effect has a stereo input, check the manual of the effect to see which jack is the mono jack. (In most cases, you won't need to connect anything to the other input jack of the device, but you will still get a stereo effect output).
2. Connect the left and right outputs of the effect device to the [STEREO AUX RETURN] jacks of the Studio 12R.



- *Alternatively, you may connect the output of the effect device to either of the STEREO LINE channels ([9-10 or 11-12].) This will allow you to control the effect with a large fader, send the effects to the Aux 1 output for monitoring, and use EQ on the effect.*

About stereo effect devices



If your effect unit has two inputs, in most cases you need to connect from only ONE Aux Send to the left (mono) input of the effect unit, but you will still connect both the left and right outputs of the effect to the STEREO AUX RETURN.

You don't need to connect anything to the other input of the effect, because most effect units use the stereo inputs only to provide a path for the "dry" stereo signal when the effect is connected directly between an instrument and an amplifier. In mixing applications such as with the Studio 12R, you will set the effect's wet/dry balance all the way to "wet" (effects only, no direct signal). The effect device will generate an artificial stereo output from the signal input. Check the manual for your effect device for more information.

On the other hand, true dual-channel effects processors (such as the Alesis QuadraVerb 2) may be connected to two different sends to take advantage of the dual processing capability. Dual-channel processors allow the left and right inputs to be used for different kinds of effects (for example, the left input to a stereo chorus while the right input is used for a stereo reverb).

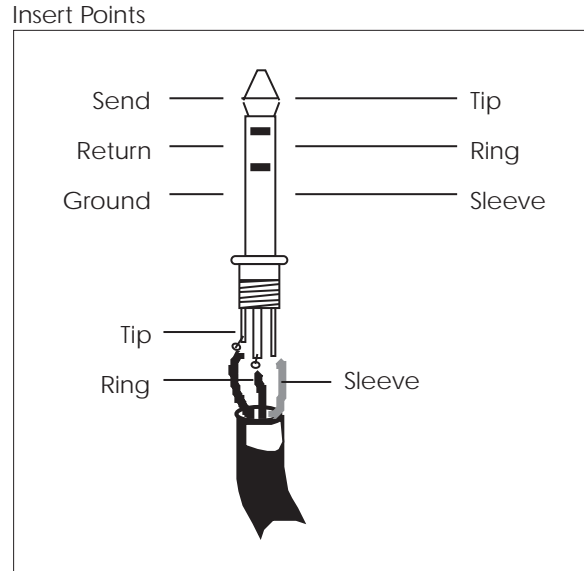
Using Aux 1 as an effects send

Note that [AUX 1] may also be used as an extra effects send. Although Aux 1 is a pre-fader send, and normally used for stage monitoring or a separate headphone mix while recording, it may also be used as an effects send so you can add different effects to different channels. Just remember that the "PRE" under [AUX 1] means that when you move a fader up or down you won't change the level going to an effect from Aux 1. If you change fader levels, you will need to adjust Aux 1 levels to maintain the same balance between dry and effected signal.

In-line processing using the INSERT jacks (compressors & equalizers)

Some signal processors are designed to be used on one signal at a time, with the entire signal being processed instead of a mix of effected and uneffected signal. The purpose of the INSERT jacks on channels 1-8 is to allow you to insert a compressor, equalizer, or other effect into the signal path of a single channel after its preamplifier and [TRIM] control, but before the Studio 12R's own EQ, aux sends, and fader. The INSERT jacks may also be used as direct outputs to a recorder.

The INSERT connector is a TRS (tip/ring/sleeve) 1/4" jack which consists of an insert send (the tip of the TRS plug) and an insert return (the ring of a TRS plug). A special Y-cable consisting of a TRS 1/4" plug on one end and two mono 1/4" plugs on the other end is required.



Note that you will not hear any signal through the Studio 12R if the INSERT jack is plugged in and the signal is interrupted in that loop (by the other cables being disconnected, the processor being turned off, or the volume turned off in the processor).

Connecting an in-line processor

1. Obtain a "stereo splitter" insert cable from your dealer.
2. Connect the stereo (TRS) end to the INSERT jack of the Studio 12R.
3. Connect the mono plug from the tip connector to the input of the processor.
4. Connect the mono plug from the ring connector to the output of the processor.

If you're not sure which mono plug is from the tip and which is from the ring, check to see if the cable is labeled. If not, simply try it one way and if the signal doesn't pass through, swap the input and output plugs the other way.

- *The [INSERT] jack may also be used as a direct output to a multitrack recorder such as the ADAT. The send from the insert jack is where the cleanest mic preamp signal may be obtained, without passing through the EQ or channel circuitry. Simply insert the plug to the first "click" (the ring connector) and it will not interrupt the flow through the mixer, while providing a direct output. Or, put the recorder into INPUT mode and insert the plug all the way, connecting the input and output of each track of the*

recorder into each channel path of the mixer. This will allow playback monitoring of the recorder. See the Applications chapter for more information.

For more information on using the AUX and INSERT systems, see the “Operating Instructions” chapter of this manual.

Outputs

To a stereo PA system or instrument amplifier

Balanced

Check to see if your amplifier can accept balanced inputs. If so, connect the [MAIN OUT BALANCED] jacks of the Studio 12R to the input of the amp using a 3-conductor cable, with a 1/4" TRS plug on one end, and the connector used by the amp (usually a 1/4" TRS connector; sometimes an XLR or terminal strip) on the other.

- *You may also connect the [MONITOR OUT] jacks of the mixer to your amplifier. This will allow you to switch between hearing 2-track playback and the stereo output of the mixer, using the front panel monitor switch.*

Unbalanced

If the amp is unbalanced, use a standard shielded "patch cord" with 1/4" connectors.

To a mono system

If your PA system or amplifier isn't stereo, connect either the left or right MAIN OUT jacks to the input of the system. Make sure that all [PAN] controls are in the center or turned to the side you're using.

To a stage monitor (foldback) system

If your PA system has a separate amplifier and speaker system for monitors, connect a cable from the [AUX 1 PRE AUX SENDS] jack to the amp input, in the same manner as above. The Aux 1 system is a pre-fader, post-EQ send with a balanced/unbalanced output. In most stage monitor situations, we recommend connecting a third-octave graphic equalizer such as the Alesis MEQ-230 between the mixer and the amp to control feedback.

The Aux 1 output may be connected in the same way for a number of different applications such as:

- Headphone cue feed for multitrack recording
- Separate broadcast mix from a PA system
- Zone feed for a separate region of a PA system

To another mixer

The main or monitor outputs of the Studio 12R may be connected to a larger mixing console. Consult the manual for the other mixer for more information. If the mixer has "SUB IN" jacks, connect to those. Alternatively, you may simply connect the MAIN OUT or MONITOR OUT jacks of the Studio 12R to two line-level inputs on the other mixer. If you do, check to see what level those inputs are designed for.

- If the inputs of the other mixer can handle +4 dBu balanced or -2 dBu unbalanced levels, simply connect the [MAIN OUT BALANCED] outputs to the other mixer's line inputs.
- If the inputs are designed for -10 dBV level inputs (such as most keyboard and guitar amplifiers, and consumer stereo amplifiers), connect the [MAIN OUT -10 dBV] outputs to the line inputs of the external mixer.

If the connection is made properly, the Studio 12R will not distort the input of the other mixer. You may need to adjust the input trim of the other mixer to get the best dynamic range.

To a stereo tape recorder

If you want to record the output of the mixer into a typical stereo cassette or DAT deck, connect the [MAIN OUT -10 dBV] phono jacks to the left and right inputs of the cassette deck using a standard stereo phono-to-phono (RCA) cable.

If your recorder is a professional type with balanced +4 inputs, in most cases you should connect the [MAIN OUT BALANCED] jacks of the mixer to the inputs of the recorder.

- If you connect the [MONITOR OUT] jacks to the recorder, the level will be affected by the [PHONES/MONITOR] level control on the front panel. However, if you're using the [TAPE IN] jacks to monitor playback, you run the risk of feedback if you press the MSTR/TAPE switch while in record mode.

To an ADAT multitrack recorder

The studio-grade microphone preamplifiers of the Studio 12R are designed to rival or exceed the sound quality of external microphone preamps costing many times more. A basic 8-track digital recording system with an ADAT-XT and a Studio 12R is portable, cost-effective, easy to use, and sonically transparent. There are two ways to use the Studio 12R with ADAT: a single mixer with the ADAT patched into the [INSERT] jacks, or using two Studio 12Rs, one for input and another for monitoring.

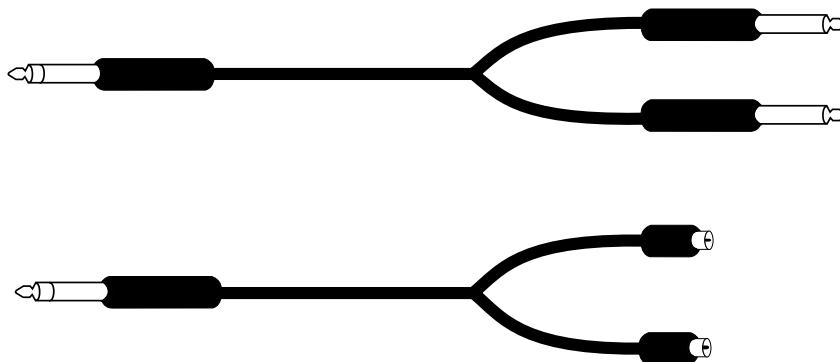
In-line ADAT recording:

In this hookup method, the ADAT is patched into the [INSERT] jacks of channels 1-8 as if each track of the recorder were a signal processor in each channel of the mixer. Since the ADAT is a unity-gain device, it will not affect the levels going through the mixer. The [TRIM] control is the only level control for the ADAT inputs; the channel faders, EQ, and aux sends of the Studio 12R are used for monitoring and will not affect multitrack recording levels.

This method is recommended by many audiophiles and engineers, since there is a minimum of circuitry between the original source and the recorder. Hooking a Studio 12R to an ADAT via the [INSERT] jacks is effectively the same as connecting studio-quality microphone preamps directly to the input of the tape deck.

NOTE: To hear the microphone or line input signal through the mixer, the ADAT track must be in **RECORD READY** or **INPUT** mode. See the ADAT manual for more details.

1. Obtain eight "stereo splitter" insert cables from your dealer. These cables feature a three-conductor TRS ("stereo") 1/4" phone plug at one end, and split out to two "mono" plugs at the other, as shown below. If you have an ADAT, use 1/4" TRS to 1/4" mono cables. If you have an ADAT-XT, use 1/4" TRS to phono cables.

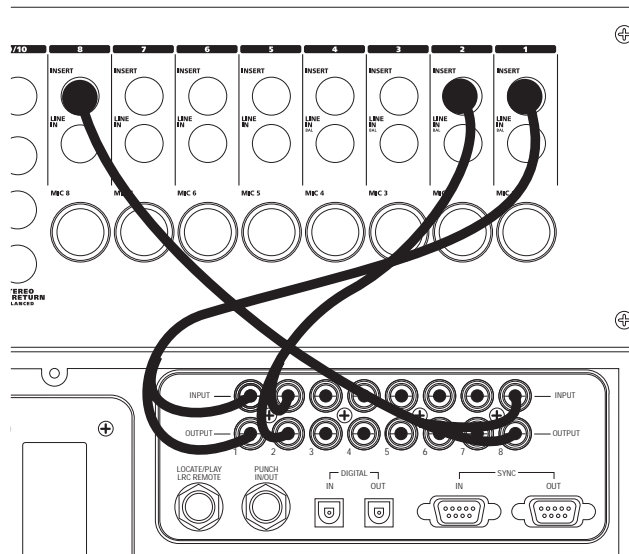


2. Connect the stereo/TRS end to the INSERT jack of channel 1 of the Studio 12R.

3. Connect the mono plug from the tip connector to the input of the ADAT. *NOTE: the ADAT's tracks are arranged from left to right on the back panel, and the mixer's channels are from right to left, so the wires will have to cross over.*
4. Connect the mono plug from the ring connector to the output of the ADAT.

If you're not sure which mono plug is from the tip and which is from the ring, check to see if the cable box has that information. If not, simply try it one way and play a prerecorded tape from the ADAT. If you can't hear output from the mixer with the faders and master up, swap the input and output plugs the other way.

5. Plug in channels 2-8 of the mixer to tracks 2-8 of the ADAT in the same way.



Using two Studio 12Rs for more flexibility:

The in-line method may be used for recording one source to a track. But if you want to record a mix of microphones or other sources onto a pair of tracks, two Studio 12Rs can do the job more quietly and in a smaller space than expensive dedicated recording consoles. One 12R is the "source" mixer which feeds the ADAT's inputs, and the other is the "monitor/mixdown" mixer which receives the ADAT's outputs.

1. Plug the -10 dBV MAIN OUT jacks of the "source" 12R to track inputs 1 and 2 of the ADAT.
- *Because the ADAT has normalised inputs, the stereo output of the source mixer may be recorded on other tracks without repatching. The left output of the mixer will appear at the inputs of tracks 1, 3, 5 & 7; the right output will appear at track 2,*

4, 6 & 8. On the ADAT-XT, press and hold [ANALOG INPUT] and the REC READY keys for track 1 or 2 to activate this "built-in patch bay" feature.

2. Plug track outputs 1-8 of the ADAT to LINE IN 1-8 of the "monitor/mixdown" 12R. *Note that output 1 is on the left of the ADAT, but on the right of the mixer, so the wires must cross over.*
3. To record more than two tracks at a time, plug a mono cable from the INSERT jack of any channels of the mixer to the input of any track. By plugging the cable all the way in the INSERT jack, and not returning the signal from the recorder, the individual channels will be removed from the stereo mix. This way, you can record a stereo mix of several inputs on any two tracks while simultaneously recording individual sources on other tracks.

Phones

The [PHONES] jack on the front panel is designed for most stereo headphones. The internal headphone amplifier outputs the maximum power allowed by safety standards. The impedance and efficiency of the headphones will determine the maximum volume available. Eight-ohm headphones may be louder at a given setting than 150-ohm or 600-ohm headphones; however, there should be enough gain to drive any dynamic headphone to reasonable levels, if the mixer is being run properly.

Note that the PHONES/MONITOR level control on the front panel affects both the headphone jack on the front panel and the [MONITOR OUT] balanced jacks on the back panel.

Monitor Out

The [MONITOR OUT] jacks give you a signal that will be the same as the MAIN OUT, as long as the front panel [MSTR/TAPE] switch is in the "MSTR" position. The only difference is that the MONITOR OUT signal is after the front panel PHONES level control. When that control is up full, the MONITOR OUT jack will be 10 dB louder than the MAIN OUT. The PHONES control may be lowered to the point where the MONITOR OUT is almost at microphone level, low enough to be patched into the microphone-level inputs of a camcorder or house PA system. However, connect the monitor output to line level inputs wherever possible.

OPERATING INSTRUCTIONS

Before turning the mixer on, "zero out" the controls

To avoid surprises while you're setting up a new system, set all controls to their "zeroed out" positions as follows before proceeding:

1. Make all connections to the Studio 12R, as described in the previous chapter.
2. Bring all channel faders and the [MASTER] fader down to minimum.
3. Set all [TRIM] controls to minimum (full counterclockwise).
4. Set all [AUX 1], [AUX 2], STEREO AUX RETURN, [PHONES/MONITOR] controls to minimum (full counterclockwise).
5. Set all [HIGH] and [LOW] EQ, [PAN], and [BAL] controls to "12 o'clock".

Setting input trim levels

- ★ Proper setting of the [TRIM] controls is crucial to low-noise, distortion-free operation. If the trim is set too high, there will be distortion even if the channel faders are low. If the trim is set too low and the channel faders are raised to get the signal loud enough, you will be amplifying the noise of the mixer.

Instead of doing this, get as much gain as possible as close to the signal source as possible. If you've plugged a synthesizer or other line-level source into the Studio 12R, set its output volume to maximum. If a microphone is the source, the Studio 12R's [TRIM] control will determine the gain of the system.

- ★ **The goal is to get the signal as loud as possible as early as possible in the signal path, without causing clipping (distortion) anywhere in the path or in the sound system.**

PEAK LED method

Each channel of the Studio 12R has its own [PEAK] indicator, which will light when the signal level rises to within 6 dB of clipping. In situations where the maximum signal-to-noise ratio is required (such as digital recording), use the PEAK LED as a guide for setting the [TRIM] control.

- ★ *When the PEAK LED is flashing, it does NOT necessarily mean that distortion has occurred. There is usually some headroom left if the PEAK LED is flashing momentarily on the loudest peaks.*

1. With the sound source active, and the channel fader down to minimum, raise the [TRIM] control until the PEAK LED flashes occasionally on the loudest transients.
2. If desired, lower the [TRIM] control slightly until the flashing stops.

Note for extremely high level line inputs in stereo channels: If the [TRIM] setting is set below unity (12 o'clock position) on a stereo channel, it is possible for the first input stage to clip without the PEAK LED coming on. If distortion is still heard after lowering the trim to its minimum setting, it means the source is extremely high (+22 dBu or higher). In this case you must lower the output level of the source, use an external pad, or repatch to a LINE IN on channels 1-8 (which can take up to +32 dBu levels before clipping).

Metering/Unity Gain method

This method gives you more headroom than the peak method, while maintaining a low noise floor which will be well below the noise of most PA or live recording environments.

1. With the mic or line level signal flowing through the channel, set the TRIM to minimum.
2. Set the CHANNEL FADER to 0 (about 2/3 up). Set all other channel faders to minimum (off).
3. Set the MASTER fader to 0 dB (all the way up).
4. Observe the Studio 12R's LED Meter. Adjust the [TRIM] knob until the average signal level on the meter is about 0 dB (highest green LED), or peaks do not exceed the +10 dB LED (or whatever maximum your system is designed for). If you ever see the channel's PEAK LED flash, you are within 6 dB of signal overload. Turn down the TRIM knob until the PEAK LED stops flashing.

Typical Fader and Control Levels

Ideally, after you have set the [TRIM] controls, both the Channel and Master faders should be run between the -10 dB and 0 dB position (about 1/2 to 3/4 of the way up the fader travel on the channels, and 3/4 to full on the master) if possible. This position gives the greatest amount of headroom and low noise. It also allows for any additional increase or decrease in level that might be required during mixing. Ultimately, the fader levels are dependent on the requirements of the mix; these suggestions are only a starting point.

Unity gain points

Unlike many other mixers, the Studio 12R's [MASTER] fader is designed for unity gain (0) when the fader is up full, not at 3/4 or 1/2 of the travel. This allows you greater control to use the fader for smooth, gradual fade-outs. It also discourages inexperienced operators from using the mixer incorrectly.

The channel faders' unity gain point is at the traditional 3/4 point, with 10 dB of gain at the full-up position.

Trim gain ranges

The amount of gain in the TRIM circuit is shown on the front panel. On channels 1-8, the LINE input ranges from 10 dB attenuation to 40 dB gain, a range that should cover almost any line signal. The MIC input ranges from +10 dB to +60 dB gain, since the very low output voltages of microphones need to be amplified a great deal. The stereo channels' TRIM controls can be set from -15 dB attenuation to +15 dB gain. See the Level Diagram near the end of this manual for a graphic display of the gain structure of the mixer.

Aux Send levels

The nominal or unity gain points of the Aux 1 and Aux 2 controls are at the "2 o'clock" position. At the full clockwise setting, they have 10 dB of gain. However, in most applications you won't need that gain, if the TRIM controls have been set properly. (See "How to Set Aux Send and Return Levels" later in this chapter for more information.)

Proper gain staging of other equipment

The total noise performance of your system depends on proper gain control of all the elements. A "noisy mixer" is usually a quiet mixer in a system whose gain structure is incorrect. As a good starting point, set most volume level controls of other equipment at 3/4 or 75% of full. This will decrease the possibility of overload distortion and keep the amount of background noise to a minimum.

Turn down amplifier levels: In particular, don't set the input controls of a power amplifier "wide open" if you have to run the faders of the mixer in the bottom half of the travel (and the meter of the Studio 12R well below the "0" mark) to keep the system from being too loud or feeding back. It's better to run the mixer at its normal level, and turn down the amplifier's controls for the desired level. By turning the amplifier's own volume controls down, you turn down the residual noise of everything that precedes it in the signal chain, resulting in a quieter, more controllable system.

However, if the mixer output is too loud, and the input stage of the amplifier being used is an active circuit (instead of a passive voltage divider type), it is possible to clip the preamp stage of the amplifier and cause nasty distortion even if the amp level is low. Use good judgment and consult the manual for your amplifier for more information.

Distortion caused by EQ: If a large amount of EQ is used, it may become necessary to decrease either the trim control, or the channel fader, or both. The EQ is capable of adding quite a bit of gain and is a frequent cause of overload distortion problems. The PEAK LEDs monitor the signal after the EQ circuit, both pre and post fader.

AUX System: Effects Send/Receive

The AUX 2 buss of the Studio 12R is a post-fader send. Usually, you will connect AUX 2 to the input of an effect device. Using a post-fader send means that when you fade a channel out, its effects will fade out also.

Using the aux send allows each channel to have its own level control feeding the aux output (and eventually the input of the effect device). You can make a mix of any channels you want to go to the effects by using the individual channels' aux send levels.

But *sending* signal to the effect device is only half the story. To be heard, the output of the effect device must be *returned* to the mixer and turned up in the mix before you can hear it. You have two options for returning the effected signal to the mix:

- connecting to the STEREO AUX RETURN jack, or
- connecting to the channel LINE IN or STEREO LINE IN jacks.

Connecting to channel inputs gives you the added bonus of panning and EQ on the effects, and the ability to send a “wet” or effected mix to AUX 1 for monitoring.

Wet/dry mix: No matter where you connect the output of the effect unit into the mixer, you are in control of the “wet/dry” balance between the mixer’s channel inputs (the uneffected or “dry” signal), and the effect returns coming from the effect device (the “wet” signal). The output of the effect device should only contain effected signal, and not have any uneffected or “dry” signal mixed with it (since the dry signal is already at the mixer). Consult the manual for the effect device to find out how to set the effect so that only effected (“wet”) signal is returned to the Studio 12R.

How to Set Aux Send and Return Levels

You must set correct levels on the mixer's individual Aux Sends and STEREO AUX RETURN and the effect device's own controls to get good, clean, quiet results.



Improper level setting is the most common cause of noise and distortion problems.

By having the correct level at every point in the send/return chain, you avoid distortion by overloading and avoid noise. *The most common mistake with effect units is to have too low a level at the send or input, then crank up the output of the processor or the Aux return to get the effects level desired.* This amplifies the noise and wastes headroom. Here is a procedure that will give good results with most standard equipment:

1. Set your mixer's input levels correctly, following the instructions earlier in this chapter.
2. Turn up the channels' [AUX 2] sends to the nominal level (marked by a heavy dot at the "2:00" position).
3. Play the source.
4. Turn up the input level control of the effect device until you see its meter or signal LED turn red on peaks; then reduce it slightly until the red doesn't flash. The ideal input level, for optimum noise performance, is just below clipping. But if other instruments will be added to the mix later, or levels are unpredictable (as in a live show), leave yourself additional headroom by turning the input level down a bit more.
5. The output level of the effect device should be set at or near its maximum in most cases, unless distortion occurs.
6. Turn up the [STEREO AUX RETURN] level until you get the desired level of effect in the mix. **The one control in the chain that may need to be set to a low level is the Aux Return (or channel) on the mixer.** Here is where you should increase or decrease the overall effect level in the mix, for best low-noise performance. **If you want "just a hint" of reverb, don't turn down the Aux 2 send; turn down the Aux Return.** Leave the input levels of the effect device where they were set in step 4, unless you see the device's overload indicator flash.

Using the meter

The meter of the Studio 12R is a fast peak type that reads in decibels, normally displaying the level of the [MAIN OUT] jacks. When the meter reads "0", the main outputs are at the nominal level: the phono jacks at -10 dBV (.316 volts) and the 1/4" jacks at +4 dBu (1.24 volts) balanced, or -2 dBu unbalanced.

Use this reference level to calibrate your system. The input controls of analog recorders should be set so that "0" on the mixer's meters equals "0 VU" on the recorder's meters. Digital recorders use a different reference; for example, an ADAT connected to the Studio 12R's outputs will read "-15 dB" at nominal output, if you connect to the proper input jacks (balanced to balanced, or unbalanced to unbalanced).

The meter follows the [MSTR/TAPE] switch, but not the PHONES/MONITOR level control. Whatever you hear in the headphone output, the master output (up position) or the 2-track tape input (down position) is what the meter is reading.

Output distortion

The Studio 12R has plenty of headroom, but eventually every electronic device reaches its limit. At +18 dB over nominal level, the top LED of the meter labeled PK will light; at this point there is 6 dB of headroom before the master electronics will clip. Final clipping is reached at 24 dB over nominal "0" on the meter; this represents a level of +28 dBu at the MAIN OUT jacks if balanced, +22 dBu if unbalanced, and +14 dBV at the MAIN OUT -10 dBV phono jacks. Even if no channel PEAK LEDs are on, with extreme settings of the faders it may be possible to overdrive the output to this level.



As long as the meter of the Studio 12R is below its top LED, and the PEAK LEDs of all channels are off, the mixer should not be causing distortion. If you hear distortion, check other devices in the signal chain for overload, and make sure the STEREO channels' PEAK LEDs do not come on when their TRIM is set to 12 o'clock.

Avoiding noise

If the Studio 12R is being run as suggested above, the noise of the mixer itself will not be a significant factor in the noise level of your system, since the Studio 12R generates much less noise than the typical source does. Noise is present in every system, analog or digital; as operator it's your job to run the system (and particularly the mixer) so that the noise isn't amplified unnecessarily. But the Studio 12R cannot remove noise that is already there. If a low-level source with a poor signal-to-noise ratio is amplified by the TRIM and channel fader, the noise will be amplified with the desired signal. A system is no quieter than its noisiest component.

System noise (ground loops, hum, induced noise)

In today's studio, with dozens of different pieces of equipment and computers, there are many opportunities for ground loop problems to occur. These show up as hums, buzzes or sometimes radio reception and can occur if a piece of equipment "sees" two or more different paths to ground, with one of the paths going down a signal line. While there are methods that can virtually eliminate ground loops and stray radio frequency interference, such as installing a separate power source just for the sound system, most problems are easier to solve. Here are some basic techniques that you should use to keep stray hums and buzzes to a minimum.

- ① **KEEP ALL ELECTRONICS OF THE SOUND SYSTEM ON THE SAME AC ELECTRICAL CIRCUIT.** Most 60-cycle hums happen because different components of a sound system are plugged into outlets of different AC circuits. If any noise-generating devices such as air conditioners, refrigerators, neon lights, etc., are already plugged into one of these circuits, you then have a perfect condition for stray buzzes as well. Since most electronic devices of a sound system don't require very much power (except for power amplifiers), it's usually safe to run a multi-outlet box or two from a *SINGLE* wall outlet and plug in all of the components of your system there.
- ② **KEEP AUDIO WIRING AS FAR AWAY FROM AC WIRING AS POSSIBLE.** Many hums come from audio cabling being too near AC wiring or the power transformers ("wall warts") used by equipment requiring an external supply. If a hum occurs, try moving the audio wiring around to see if the hum ceases or diminishes. If it's not possible to separate the audio and AC wiring, make sure that the audio wires don't run parallel to any AC wire (they should only cross at right angles, if possible).

- ③ TO ELIMINATE HUM IF THE ABOVE HAS FAILED:
- A) Disconnect the power from all outboard devices and tape machines except for the mixer and control room monitor power amp.
 - B) Plug in each tape machine and outboard effect device one at a time. If possible, flip the polarity of the plug of each device (turn it around in the socket) until the quietest position is found.
 - C) Make sure that all of the audio cables are in good working order. Cables with a detached ground wire will cause a very loud hum!!
 - D) Keep all cables as short as possible, especially in unbalanced circuits.

If these basic experiments don't uncover the source of the problem, consult your dealer or a technician trained in proper studio grounding techniques. In some cases, a "star grounding" scheme must be used, with the mixer at the center of the star providing the shield ground on telescoping shields, which do NOT connect to the chassis ground of other equipment in the system.

Note that the Studio 12R is grounded through its AC cable. Signal ground is connected to chassis ground, which in turn may be grounded again by the rack rails. But since almost all of the inputs and outputs of the Studio 12R are balanced, the ground does not have to be made part of the signal path unless you are connecting to unbalanced equipment. If the Studio 12R is mounted in a metal rack, the mixer shares a common ground with the other equipment in the same rack. In some cases (such as a star ground scheme), you may need to use nonconductive rack rails or rack isolators to avoid ground loops.



To avoid the possibility of electric shock, never defeat the safety ground found on other equipment in the system. When in doubt about proper electrical grounding schemes or the power to your system, consult a qualified, licensed electrician.

Telescoping shield: In fixed installations using balanced outputs where the amplifier is more than 20' from the mixer and on a different AC power panel, it may be advisable to disconnect (or "float") the shield at the amplifier end. This keeps the ground potential of the amp rack from being conducted back to the mixer. Even though the mixer-to-amp connection is balanced, any

unbalanced sources or effects plugged into the mixer may exhibit a hum when the amp's ground is carried back to the mixer.

APPLICATIONS

Multitrack recording

See the "Connections" chapter for information on how to connect the Studio 12R to an ADAT or other multitrack recorder.

In the most common setup, the ADAT is patched into the INSERT points of each channel. It receives signal directly from the [TRIM] control; no other controls will affect the level being recorded to tape.

Tracking/Overdubbing

1. Put the desired tracks of the ADAT into record ready mode. Press "Auto Input Monitor" or "All Input Monitor" depending on your situation (see the ADAT manual for more information).
2. With the signal source (microphone or line input) active, slowly increase the [TRIM] level of each input while watching the ADAT meter until the top red segment comes on. Then turn down the trim level so that the red LED does not light.
3. Set the EQ, aux, and channel faders for the desired control room mix. Note that none of these settings will affect the signal going to the ADAT.
4. For overdubbing, put the original tracks into safe mode. These tracks will play back through the same channels they were recorded on.
5. If necessary, repatch the microphone or line inputs to the next channels you want to record. NOTE: the ADAT and ADAT-XT can automatically "normal" the input to track 1 to any odd-numbered track, and the input to track 2 to any even-numbered track. Check the manual of the ADAT or XT for more information.

Mixdown

You may leave the ADAT connected to the INSERT jacks for mixdown; there's no need to repatch to the LINE IN jacks.

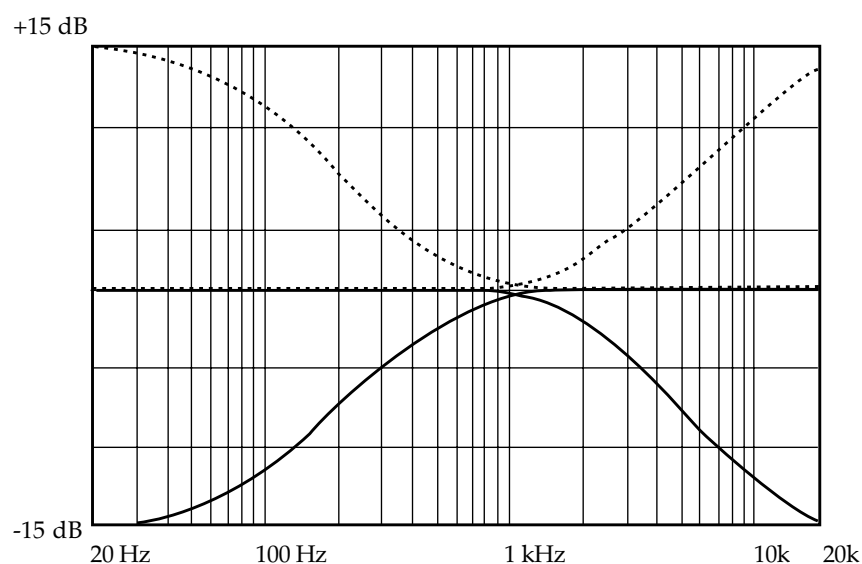
Make the connections according to the procedure in the "Connections" chapter.

1. Connect the MAIN OUTs (-10 dBV or +4 dBu, depending on the deck) to the inputs of the mixdown deck.
2. Connect the outputs of the mixdown deck to the TAPE IN jacks.
3. Connect the [MONITOR OUT] jacks to the inputs of your control room monitor amplifier.
4. Press the [PHONES/MONITOR] switch down so it is in the TAPE position.
5. Put the mixdown deck into record/pause mode, play the ADAT, and adjust the mix and level controls of the mixer for the desired level. Set the MASTER fader up to the maximum, and adjust the input controls of the mixdown deck until its meters give the desired reading. You will also be able to see the levels on the mixer itself; check to make sure the output of the mixdown deck is set to nominal (unity gain).

By monitoring through the mixdown deck, you'll be able to hear if there is any distortion in that deck's electronics.

Using the HIGH and LOW EQ controls

The Studio 12R provides standard shelving EQ controls on each channel. The HIGH knob range is ± 15 dB with a shelving frequency of 12 kHz. "Shelving" means that all frequencies above 12 kHz will be boost or cut by the same amount, and frequency response between 1 kHz and 12 kHz will gradually rise or fall to the shelving point. The LOW knob range is ± 15 dB at a shelving frequency of 80 Hz. This means that frequencies below 80 Hz will be boosted or cut by the same amount, and frequency response will gradually rise or fall from 80 Hz to about 1 kHz. The frequency response range is shown in the curve below:



The normal position for the EQ controls is "12 o'clock" or straight up. A "click" or detent will be felt at this position. At this position, the EQ does not affect the frequency response of the channel--it is "flat".

Use only the amount of EQ necessary to achieve the desired effect. Excessive boost on either EQ section may cause clipping in the channel electronics, and will amplify noise.

Monitoring AUX 1 in the PHONES jack

If you are using AUX 1 as a monitor feed, you may want to check that mix using the headphones. If you've connected the PA or recorder to the MAIN OUTPUTS, and are not using the TAPE IN jacks, use Y-cords to connect the AUX 1 SEND to the TAPE IN jack(s) at the same time it feeds the monitor amplifier. Use the front panel [PHONES/MONITOR] switch to select between the main and aux 1 feeds.

TROUBLESHOOTING

Troubleshooting Index

If you experience problems while operating the Studio 12R, please use the following table to locate possible causes and solutions before contacting Alesis Product Support or your dealer for assistance.

Symptom	Cause	Solution
The Power LED does not light when the unit is powered on.	No power.	Check that the power cable is plugged in properly.
Sound is distorted, red "PEAK" LED is lit.	Input level is too high.	Turn down the source volume, or turn down the TRIM control. Don't plug line level signals into the MIC jacks.
Sound is excessively noisy, faders must be raised to full to hear.	Input level is too low.	Turn up the TRIM control. Set the source(s) to a higher level.
Sound from effect is noisy.	AUX 2 send level is too low and Stereo Aux Return on mixer is up full.	Turn Output of effect device up and reduce Aux Return level on mixer. Increase Aux Send levels.
No audio is heard from PHONES or MONITOR output.	Monitor switch is set to "TAPE".	Set switch to "MSTR"
No audio on an individual channel.	INSERT jack is connected to a device that's off.	Check insert jack cables and device.
	TRIM level is too low.	Turn the TRIM control up.
	MIC IN and LINE IN jacks being used on the same channel.	Unplug one of the sources from the channel.
	Microphone requires phantom power.	Turn PHANTOM switch on (on rear panel next to POWER)

Hum or noise from output.	Ground loop, unshielded cables.	Try plugging the unit in to another power jack or different audio cables.
No meter, although audio is heard through main outputs.	Monitor switch is set to "TAPE"	Set switch to "MSTR"
Crackling sounds.	Dirty or corroding connections on back of mixer.	Unplug and replug connectors several times, clean plugs.
	A microphone cable has a small short or break.	Unplug the microphone cables from the mixer until the noisy one is found, and replace it.

Maintenance/Service

Exterior cleaning

Disconnect the AC cord, then use a damp cloth to clean the mixer's metal and plastic surfaces. For heavy dirt, use a non-abrasive household cleaner such as Formula 409 or Fantastik. **DO NOT SPRAY THE CLEANER DIRECTLY ONTO THE FRONT OF THE UNIT AS IT MAY DESTROY THE LUBRICANTS USED IN THE SWITCHES AND CONTROLS!** Spray onto a cloth, then use cloth to clean the unit.

Never spray any kind of cleaner into the faders, even if it claims to be safe for such use. Such electronic potentiometer cleaners may improve performance for a short time, but they cause the fader to wear out faster by attracting dirt.

Refer All Servicing to Alesis

We believe that the Studio 12R is one of the most reliable mixers that can be made using current technology, and should provide years of trouble-free use. However, should problems occur, **DO NOT** attempt to service the unit yourself. Service on this product should be performed only by qualified technicians. **NO USER-SERVICEABLE PARTS INSIDE.**

Obtaining Repair Service

Before contacting Alesis, check over all your connections, and make sure you've read the manual.

Customers in the USA and Canada: If the problem persists, call Alesis USA at 1-800-5ALESIS (525-3747) and request the Product Support department. Talk the problem over with one of our technicians; if necessary, you will be given a return order (RO) number and instructions on how to return the unit. All units must be shipped prepaid and COD shipments will not be accepted.

For prompt service, indicate the RO number on the shipping label. **Units without an RO number will not be accepted at the factory.** If you do not have the original packing, ship the Studio 12R in a sturdy carton, with shock-absorbing materials such as Styrofoam pellets (the kind without CFCs, please) or "bubble-pack" surrounding the unit. Shipping damage caused by inadequate packing is not covered by the Alesis warranty.

Tape a note to the top of the unit describing the problem, include your name and a phone number where Alesis can contact you if necessary, as well as instructions on where you want the product returned. Alesis will pay for standard one-way shipping back to you on any repair covered under the terms of this warranty. Express service is available for a surcharge.

Units may be serviced under warranty at any of our local service centers by providing the service center with your purchase receipt indicating the Studio 12R was purchased within the last year. There is a dealer search to find the service center nearest you on our web site in the customer service section at <http://www.alesis.com>

Field repairs are not normally authorized during the warranty period, and repair attempts by unqualified personnel may invalidate the warranty.

Service address for customers in the USA:

Alesis Product Support
3630 Holdrege Avenue
Los Angeles, CA 90016

Customers outside the USA and Canada:

Contact your local Alesis distributor for any warranty assistance. The Alesis Limited Warranty applies only to products sold to users in the USA and Canada. Customers outside of the USA and Canada are not covered by this Limited Warranty and may or may not be covered by an independent distributor warranty in the country of sale. Do not return products to the factory unless you have been given specific instructions to do so.

SPECIFICATIONS

All measurements taken with an Audio Precision System One. All noise measurements taken with trim at minimum and faders at unity gain with 22 Hz to 22 kHz bandwidth unless otherwise specified. All In & Out measurements made on balanced +4 dBu connectors. (+4 dBu into a line input with faders at unity and the meter reading "0" will yield +4 dBu into a balanced load or -2 dBu into an unbalanced load.)

Frequency Response

10 Hz – 65 kHz +0/-1 dB

-3dB Point:

(any input to any output at nominal operating levels)
125 kHz

Connectors

MIC IN jacks:

Female XLR
(Pin 1 ground, Pin 2 +, Pin 3 -)

LINE IN jacks:

Female 1/4" 3-conductor phone
(Tip = +, ring = -, sleeve = ground)

INSERT jacks:

Female 1/4" 3-conductor phone
(Tip = send, ring = return, sleeve = ground)
Inserting plug to first "click" allows direct output without breaking normal signal flow

STEREO LINE IN and
STEREO AUX RETURN jacks:

Female 1/4" 3-conductor x 2

MAIN OUT BALANCED,
MONITOR OUT, and
AUX SEND jacks:

Female 1/4" 3-conductor phone
(Tip = +, ring = -, sleeve = ground)

MAIN OUT -10 dBV jacks:
TAPE IN jacks:

Female phono ("RCA") jacks
Female phono ("RCA") jacks

Levels

MIC IN	-60 dBu to -10 dBu nominal, maximum level +12 dBu
LINE IN	-40 dBu to +10 dBu nominal, maximum level +32 dBu (balanced)
STEREO LINE IN	-15 dBu to +15 dBu nominal, maximum input level +22 dBu
MAXIMUM GAIN	+76 dB, MIC IN to MAIN OUT, balanced +80 dB, MIC IN to MONITOR OUT, balanced or unbalanced
CHANNEL PEAK LED ON: METER:	6 dB below channel clipping Peak type -24 dB to PK (+18 dB over reference at MAIN OUT, 6 dB before output clipping)
MAIN OUT LEVEL (1/4" phone jacks)	(when meter is at 0 VU) +4 dBu (1.24 volts) into a balanced load
MAIN OUT LEVEL (phono jacks)	-2 dBu into an unbalanced load
MAXIMUM OUTPUT LEVEL	-10 dBV (.316 volts) unbalanced +22 dBu unbalanced, +28 dBu balanced (6 dB above "PK" segment of main meter)
MONITOR OUT LEVEL	Same as above, but variable following MONITOR/PHONES control
INSERT/DIRECT OUT (tip)	Unity gain
INSERT IN (ring)	Maximum level +22 dBu
HEADROOM:	23.5 dB above nominal output

Impedance

MIC IN	50-150 Ω nominal source impedance (presents 4 k Ω balanced load impedance)
LINE IN	600 Ω -2 k Ω nominal (>20 k Ω load impedance)
OUTPUTS (MAIN, AUX and MON):	150 Ω unbalanced, 300 Ω balanced 1.1 k Ω at -10dBV MAIN OUTS

Noise performance (typical)

Measured at MAIN OUT +4 dBu jacks, unbalanced load, 22 Hz to 22 kHz, all channels panned to center.

MIC IN to INSERT OUT: -128.5 dBu Equivalent Input Noise at maximum gain

Residual output noise (MASTER fader at nominal, channel faders at minimum):

<-88 dBu

12 inputs, faders and trims at unity gain, inputs terminated 150Ω:

<-85 dBu unbalanced

(+22 dB max unbalanced out = 107 dB dynamic range)

Distortion (THD+N)

Measured with a 0 dBu signal coming into a MIC IN jack with trim set for a +15 dBu output from the insert jack.

At INSERT jack:

Better than 0.0010%

At MAIN OUT (+21 dBu balanced output level)

Better than 0.0015%

Power

U.S.A. model:

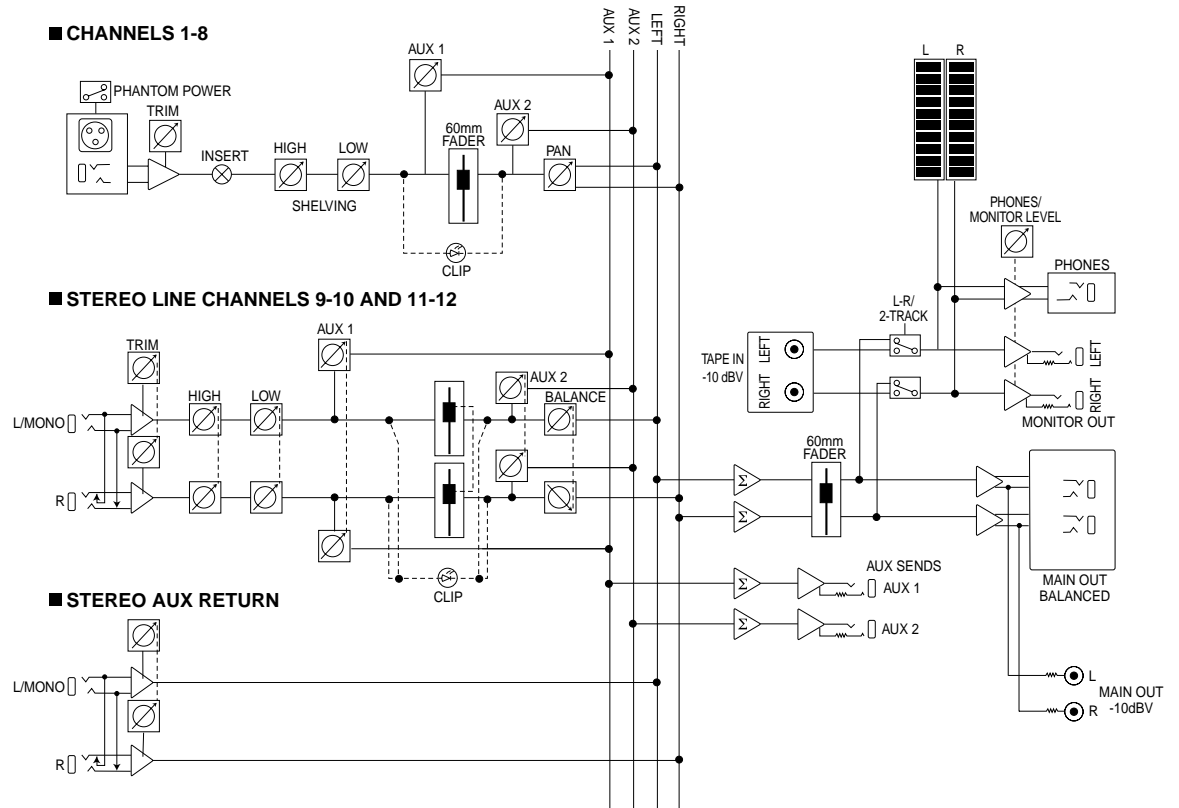
120 VAC, 60 Hz, 40 watts power consumption maximum

Mounting

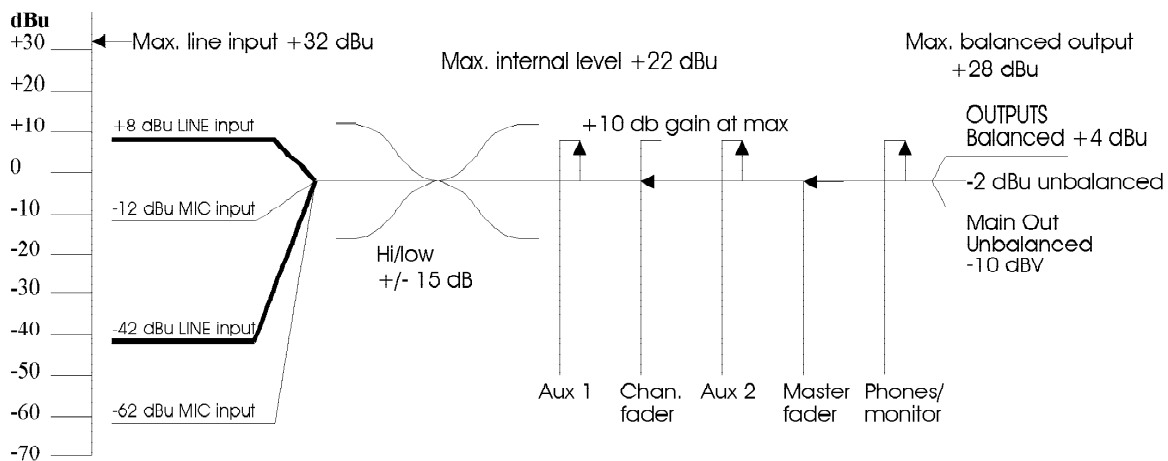
19" EIA rack mountable, 3 spaces

DIMENSIONAL DRAWING

BLOCK DIAGRAM

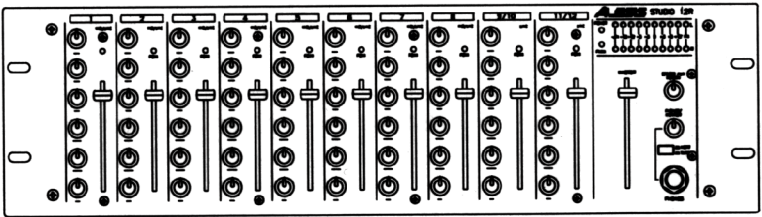
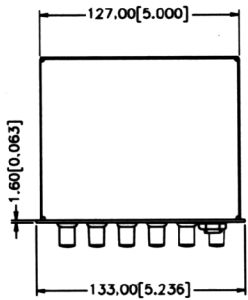
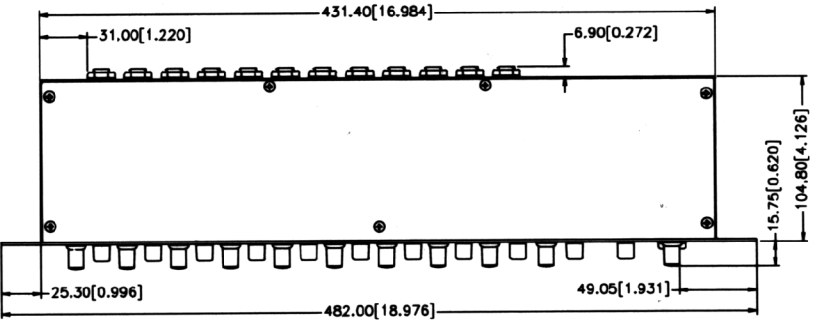


Level diagram



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UNITS: mm[in]