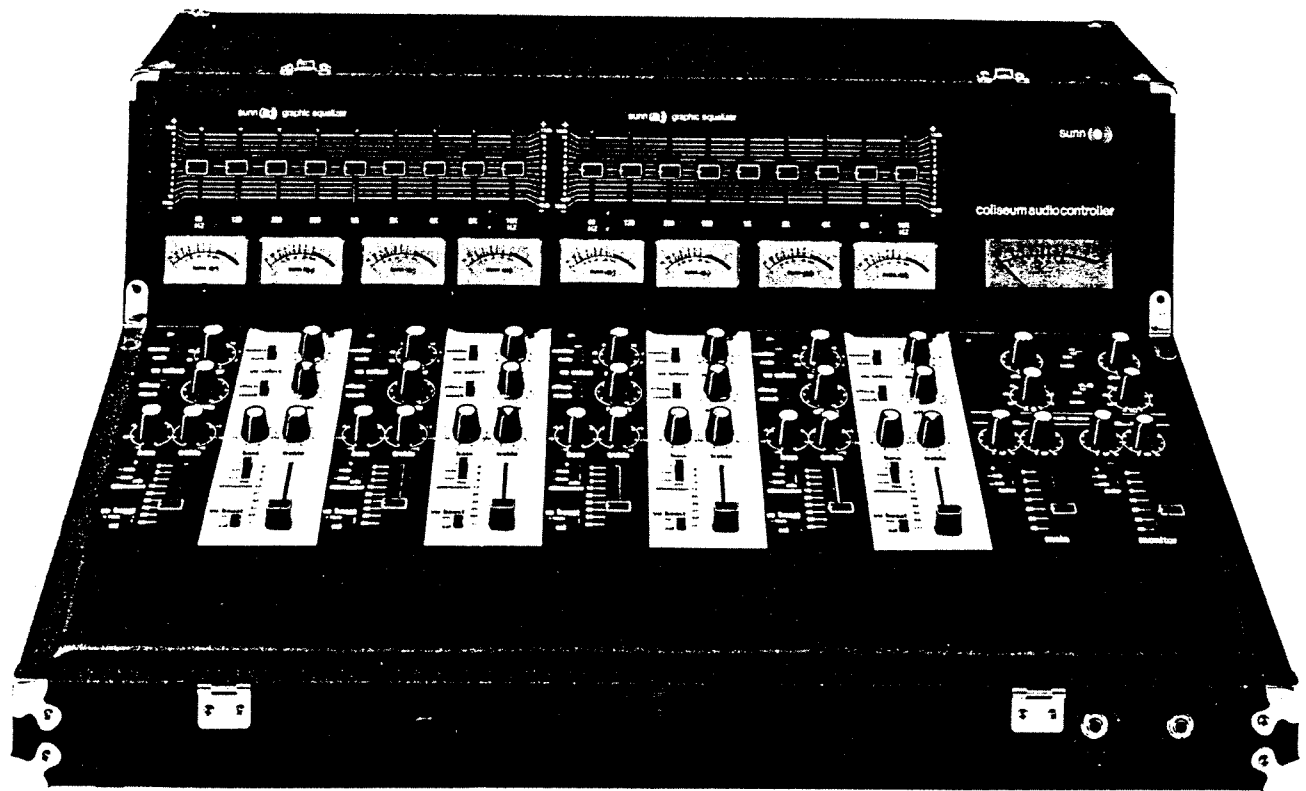


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Terminology

The Sunn Audio Controller is the most advanced audio control system available in portable size. It includes many of the control features found in modern recording studio equipment. This guide uses a number of terms and concepts that are part of the standard terminology in the recording industry. If you are not thoroughly familiar with these terms, read the following definitions before proceeding to the next section.

equalization—Control of frequency characteristics to improve clarity and intelligibility.

channel—Carries a single signal with individual control functions (mic 1 channel). Stereo would use 2 channels, left or right.

standard level or line level—The voltage level used to process and control the signal after its initial amplification in the pre amp.

level—Volume control.

select—Switch in or out.

compressor—A section of an amp which eliminates or compresses sudden bursts of signal to eliminate distortion. It stops the signal from overdriving the amp and allows full power without distortion.

db—An abbreviation for decibels. This term refers to the intensity, or volume of a given signal or frequency.

limiter—A device that limits sudden loud bursts of sound coming from a microphone. These bursts can cause distortion in the sound output of an audio system, and the limiter is used to eliminate this type of distortion.

System Functions

For practical purposes, the Sunn Audio Controller may be thought of as three different systems in one unit. First, there is the main system. In this system, the microphone signal goes through the main controls of each mic channel and then through the main master controls, where the combined signals from all the mic channels are modified at the same time. For stereo usage the main system becomes channel 1. (diagram A)

line in—Refers to an input jack that will accept a signal from another electronic sound source, such as a microphone mixing unit, etc.

main—Refers to all sound that is channeled into the main speaker section of the sound system (house system).

monitor—Refers to all sound that is channeled into the monitor speaker section of the sound system (on stage).

preamp—A device that modifies an audio signal to prepare it for actual amplification.

power amp—A device that receives a preamp signal and performs the actual amplification for speakers.

pad-mic attenuation—A process that allows you to adjust the strength of a microphone signal so that it is in the same relative range with other mic signals.

mixer—Combines signals from different sources into a single signal.

hz—An abbreviation for hertz, or cycles per second. This is a measure of frequency (pitch). For example, the musical note A (concert pitch) is 440 hz.

impedance—A measure of resistance, given in ohms. Different microphones have different impedance ratings, but can generally be divided into the general categories of hi and lo.

Second, there is the monitor system. In this system, the signal follows a path identical to that of the main system. For stereo usage the monitor system becomes channel 2. The final output signal from both the main and monitor systems is then sent to the power amplifiers and speaker systems.

Third, there is a common system, which consists of the tone controls and pads that act on both main monitor systems at the same time.

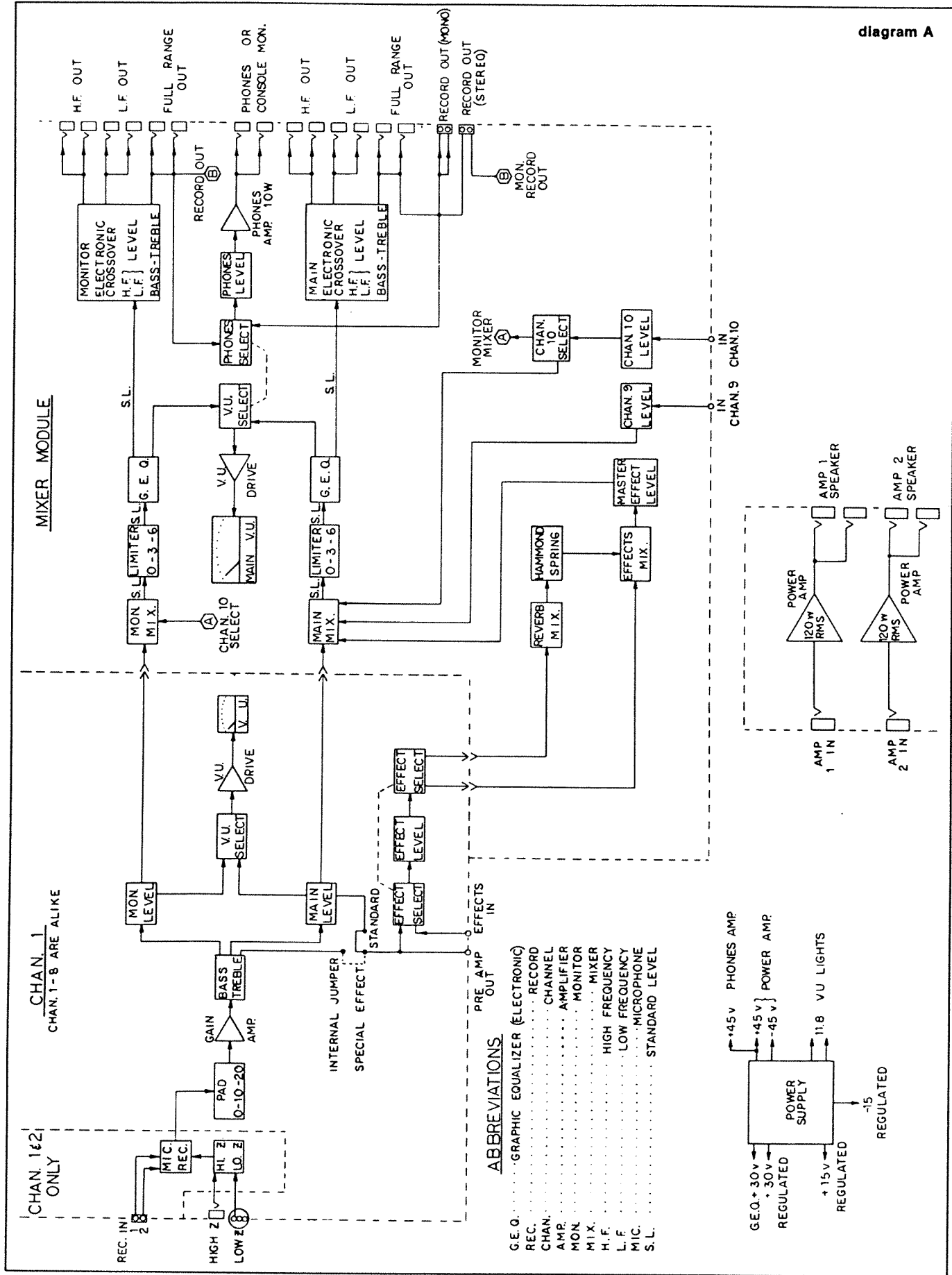
effects—Refers to different external devices that can be used to modify the sound coming through a microphone channel, such as an echo unit, etc.

electronic crossover—A circuit that separates high frequency and low frequency sounds at a given dividing point. This dividing point can usually be varied, thus system distortion is reduced.

graphic equalizer—This device divides the audio spectrum into a number of frequency ranges, from low bass to high treble. Each frequency range has an individual volume control which allows you to increase or decrease volume within that frequency range. So you can adjust your sound to suit the space and/or reduce feed back.

effects select—Selects internal or external effects.

diagram A



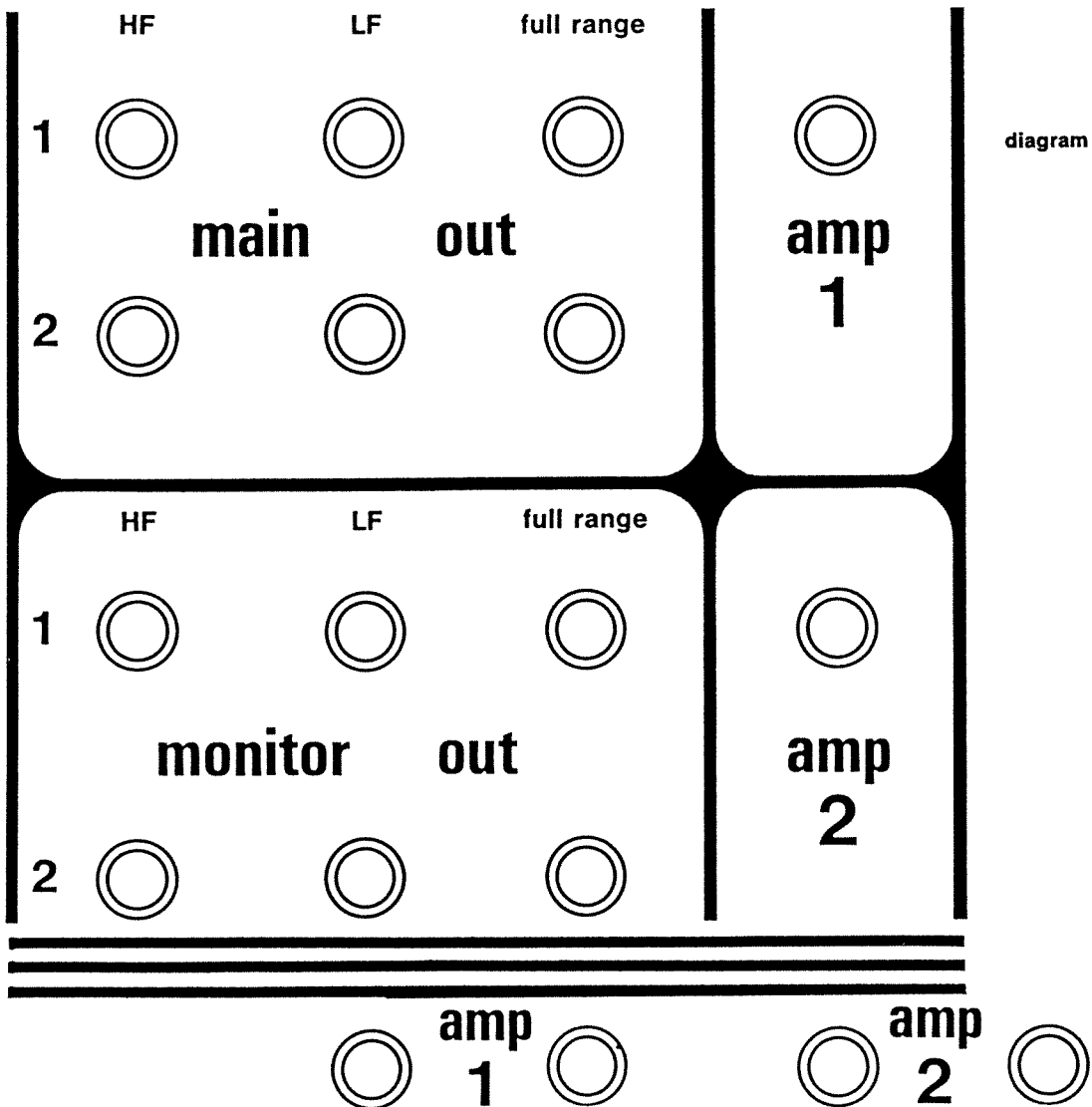
Normal Operation: Speaker and power amp connections.

The Sunn Audio Controller may have two built-in power amps. In normal operation these amps will probably be used along with other external power amps. The inputs for the internal power amps are marked **amp 1** and **amp 2** on the back panel of the unit. Most common P.A. setups will use at least one of these power amps to drive the monitor speaker system. The speaker outputs for these amps are located under the heat sink. There are two speaker outputs per amp.

Directly to the left of the power amp inputs are two sections marked **main out** and **monitor out**. These sections are the outputs for the master signals from the main and monitor controls on the front master panel. Each section has two rows of outputs marked 1 and 2. This allows you to run the signal from the main or monitor to two separate sets of power amps if desired. Each row has an **HF** (high frequency) output, an **LF** (low frequency) output, and a **full range** output. The HF-LF and full range can be used simultaneously.

(diagram 1) The HF and LF outputs in each section are hooked to the electronic crossover circuits on the front master panel. These outputs

give you the option to run all your bass sound (LF) through one power amp, and all your treble sound (HF) through another power amp. When the full range output is used the electronic crossover controls become treble and bass. As you can see, there are many different possibilities for power amp connections, depending on the equipment you are using in conjunction with the audio controller. At this point, **one** total connection will be described. By carefully studying this system, you will undoubtedly come up with some ideas on how to best utilize your own equipment in conjunction with the audio controller.



The following connection system will include:

1. Sunn Audio Controller w/ power amps
2. Two speaker systems, each with two bass cabinets and one horn (1)
3. Two speaker systems, each with one bass cabinet and a horn with the internal crossover network (2)
4. One external power amplifier

(diagram 2) The main part of the system will be connected first. Run a line from the first HF output (main section) to the input on internal power amp 1. Run a line from the output of this amp to the horns on speaker system 1. Run a line from the first LF output (main section) to the input on the external power amp. Run a line from the

output on the external power amp to the bass cabinets of speaker system 1. Run a line from the first full range output (monitor section) to the amp 2 input. Run lines from the speaker outputs of amp 2 to the bass cabinets on speaker system 2. Connect the horns to the bass cabinet.

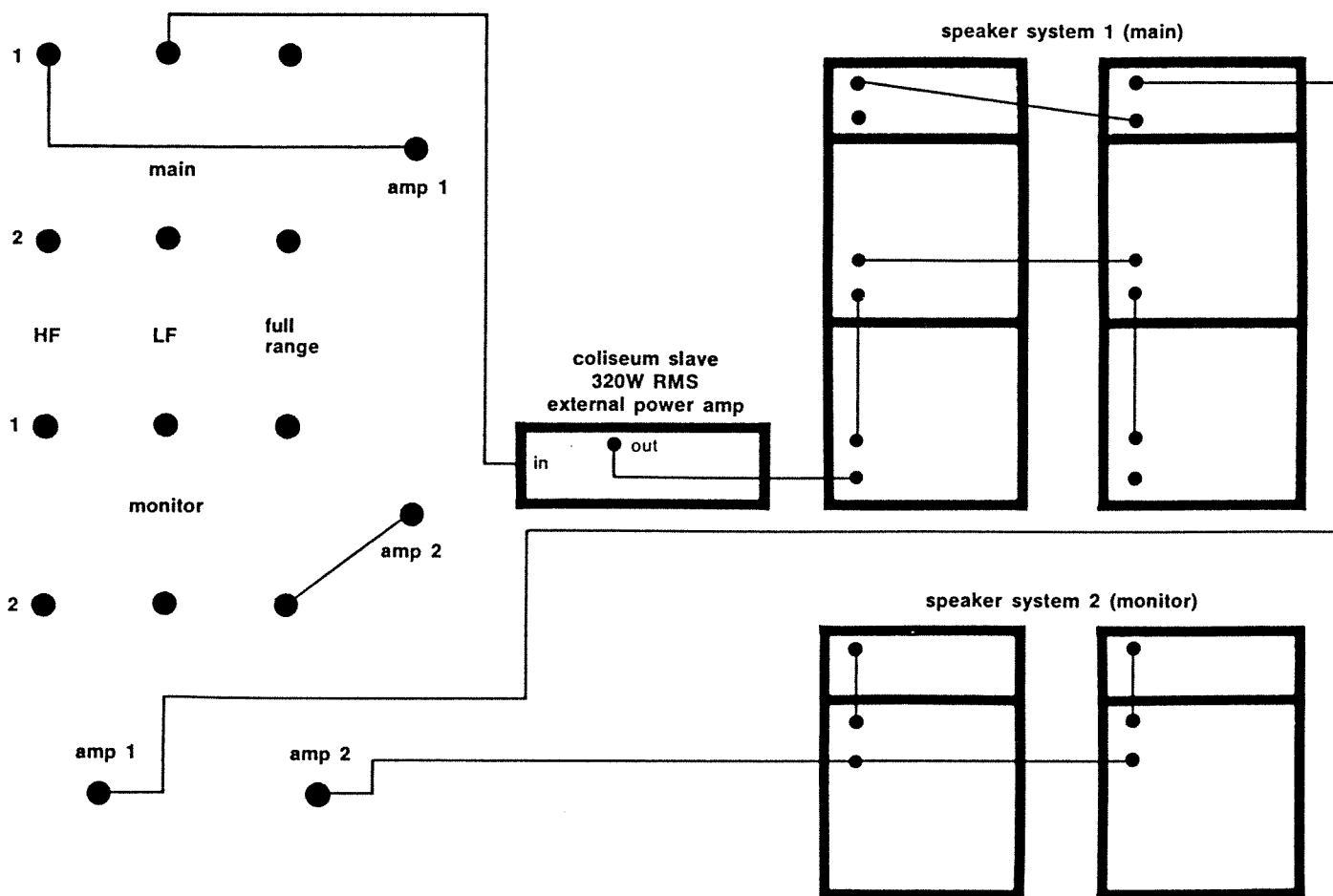
Let's look at the logic of this particular system.

First, you're diverting the most power and control to the main system, where it will probably be needed most. You are using two power amps, which gives a large amount of total power. In addition, you are utilizing the electronic crossover network, thereby giving yourself greater sound control in actual operation.

Second, you are using an internal power amp to run the monitor system. You're also utilizing the internal crossover networks in the monitor horns, since you don't have enough power amps to use the electronic crossover part of the monitor section.

When making power amp and speaker connections, first inventory all the equipment in your system, then evaluate all the different possibilities before making actual connections.

diagram 2



Special Effects Connections

To the right of sections marked amp 1 and amp 2 on the back panel are two sections marked **preamp out** and **effects in**. The numbers on each of the jacks in these two sections corresponds to a mic channel with the same number. In other words, **mic input 1, preamp 1, and effects in 1** are all part of the same circuit. Special effects can be hooked up to a given mic channel by using the **preamp output** and **effects input** with the same number.

The following is an example of an effect hooked up to run through mic channel 1 (diagram 3).

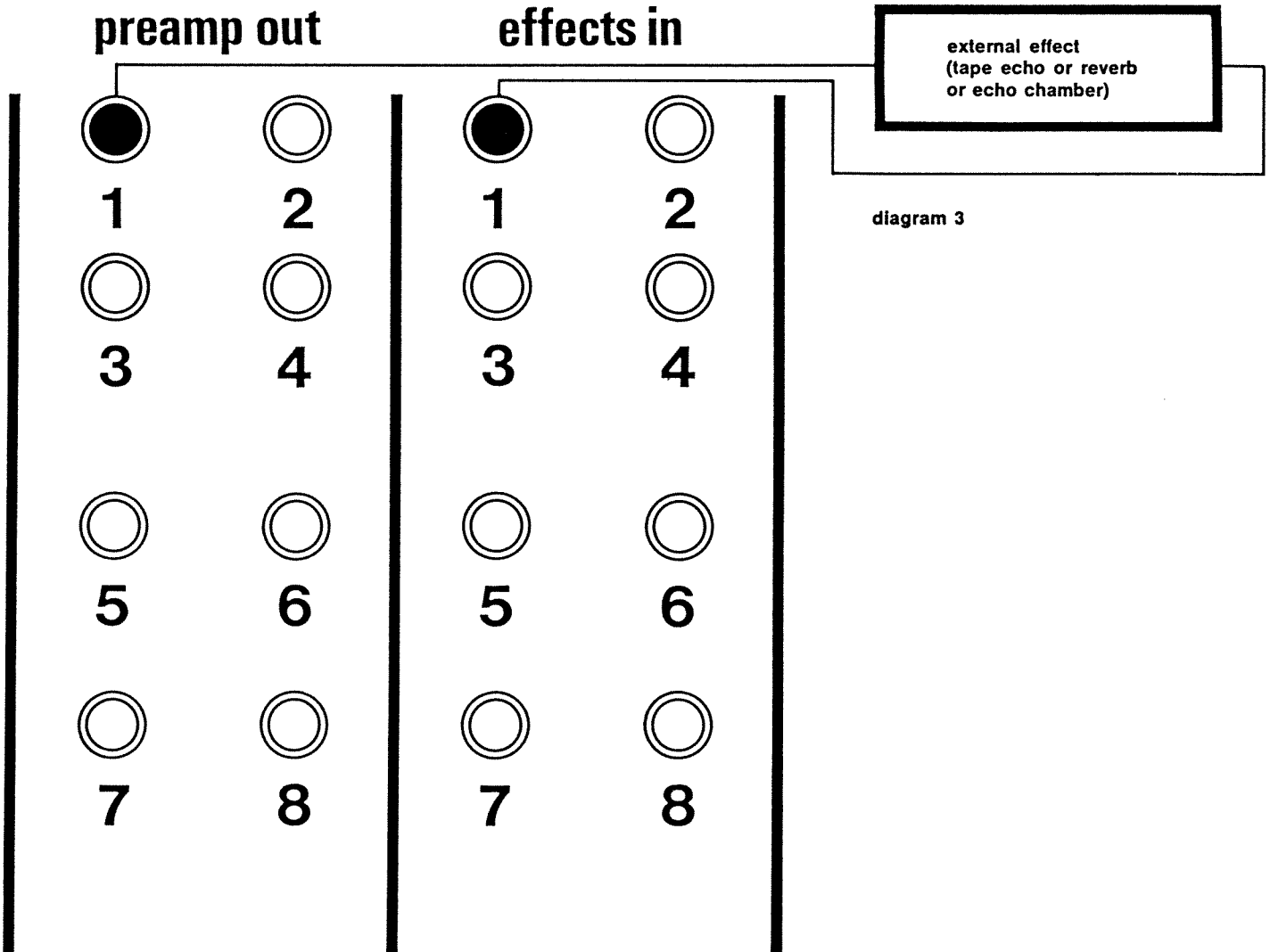
Always run your line from the preamp output to the input on the effect unit. Then run a line from the output on the effect unit to the appropriate jack in the **effects in** section. All channels are controlled individually by effects level. Effects select must be in effects position.

Mic Connections

Each mic channel has a hi (50K ohms) and lo (250 ohms) impedance input for microphone connections. If you are using mics with male cannon plugs, be sure that the plug is wired correctly for low impedance operation. You can check this by consulting the wiring diagrams in the individual mic manuals. Hi and lo impedance mics cannot be used in the same channel at the same time. For mic use on channel 1 and 2, be sure the **recorder in - mic in** switch is in the mic position.

Line Connections

To the right of the **effects in** section there is a **line in** section with two inputs marked 9 and 10. These inputs are controlled from the front master panel. To make a connection, simply run a line from the output of the external unit to one of the **line in** inputs. It should be noted at this point that **input 9** can only be used with the main system, while **input 10** can be used with either the main or monitor systems. A select switch is provided for changing line channel 10 to main or monitor.



Mic Channel Operation

Each audio controller has 4, 6, or 8 individual mic channels on the front panel. Each of these mic channels has an identical set of controls (diagram 4).

At the top of each mic channel, there is a vu meter that measures the intensity of the signal going from the mic through the channel.

The first switch on the top left is marked **vu select**. This switch enables you to switch the vu meter back and forth between the main and monitor systems. Next to it is the monitor level control, marked **monitor**.

With a microphone in operation, put the **vu select** switch in the monitor position and turn up the **monitor** level control. As you turn up the monitor level control, the vu meter will activate.

The next switch down on the left is the **effects-reverb** switch. In the reverb position, this switch will activate the audio controller's built-in reverb. In the effects position, this switch will cut in whatever effect you have connected to this channel on the back panel.

To the right of the **effects-reverb** switch is the effect level control, marked **effects**. This control regulates either the amount of reverb or the amount of effect running through the channel, depending on the position of the **effects-reverb** switch.

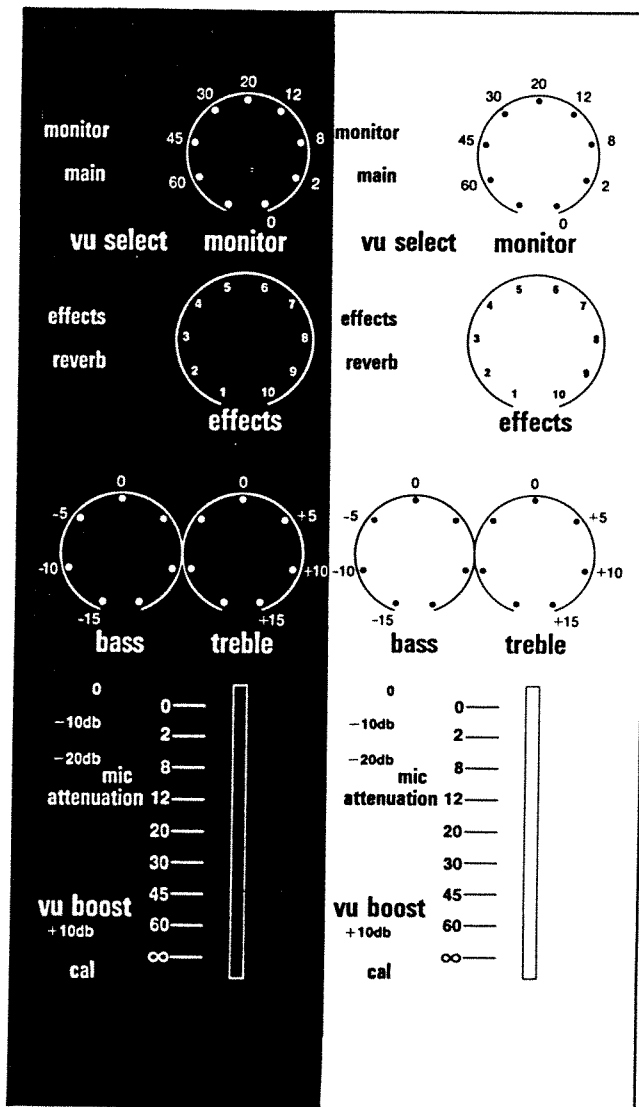
The next two controls down are the **bass** and **treble** controls. These controls are common to both the main and monitor systems. Both controls have an extremely wide range of tone variation. (± 15 db).

Directly down from the treble control is a slide pot, which is the **main level** control. This control regulates the volume going through the main system. If you put the **vu select** switch in the main position, you can boost the main level and view the signal intensity on the vu meter (when a microphone is in operation). This is also true of the monitor position.

To the left is the **mic attenuation** switch. This switch should be kept in the 0 position except when in use. The purpose of this switch is to cut down the intensity of an exceptionally strong signal coming through the mic channel so that it will be in the same range as signals coming through other mic channels. This makes the process of mixing the mic channels easier.

On the bottom left is the **vu boost** switch. This switch boosts the sensitivity of the vu meter when put in the +10 db position. The extra sensitivity makes it easier to get an accurate vu reading on a relatively weak signal coming into the channel.

diagram 4



Master Panel Operation

At the top of the master panel is a large **VU** meter. This meter measures the intensity of the final output of the combined mic channel signals. In the first row of controls, there is a **VU select** switch that lets you measure your final output either from the main or the monitor system. The intensity of this output is determined by the **main** and **monitor** level controls, which are the slide pots at the bottom of the panel (diagram 5).

The first control on the left is the **effects level**. This control regulates the overall amount of effect and/or reverb from the combined mic channels.

At the top right is **phones level**, for controlling head phone volume if head phones or console monitor speakers are used. The next control on the left is marked **9**, this is the level control for line input 9 on the back panel (remember that this line input will only go through the main system).

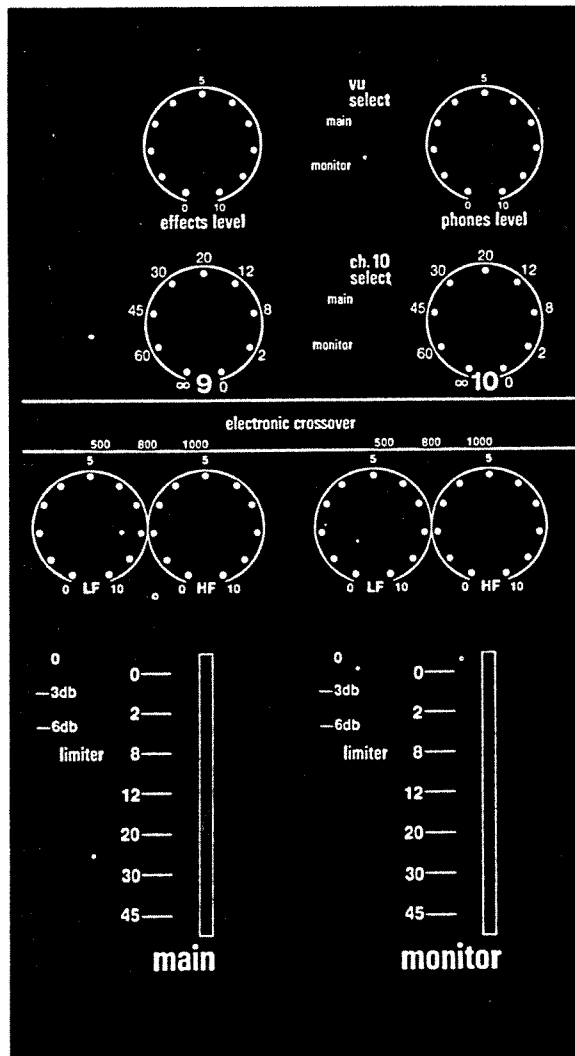
The next control over is a switch marked **ch. 10 select**, which allows you to decide whether line input 10 will go through the main or the monitor system. Next to it is control **10**, which regulates the level of line input 10. This can be used for accessory mixers or stacking boards.

In the next row down there are two sets of **electronic crossover** controls, each with a switch above and two knobs below marked **HF** and **LF**. The crossover controls above the main level control are for the main system, and the controls above the monitor level are for the monitor system. Each crossover switch has three positions, **500 hz**, **800 hz**, and **1000 hz**.

1000 hz. These numbers represent the crossover points between the high and low frequency portions of the signal. The low frequency portion goes through the **LF** control and the high frequencies go through the **HF** control. These controls allow you to achieve correct balance between the high sounds coming out of your horns and the low sounds coming out of your bass cabinets, as well as, being volume controls for the slave amps. The **LF** and **HF** controls correspond to the **LF** and **HF** outputs in the main and monitor sections on the back panel.

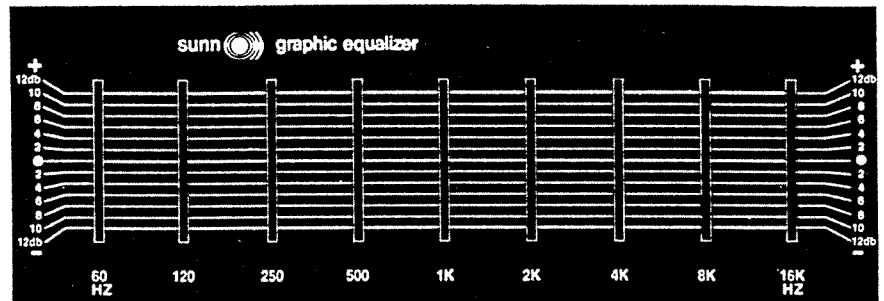
Next to the main and monitor level controls are **limiter** switches. These switches are used to suppress sudden bursts of sound that cause temporary distortion in the main or monitor systems. The switches are inactive in the **0** position. The amount of suppression (commonly called compression in the recording industry) increases in the **-3 db** and **-6 db** positions.

diagram 5



Graphic Equalizers

There are two graphic equalizers above the vu meter bank, one for the main system and one for the monitor system. The nine slide controls on each graphic equalizer span the audio spectrum from low to high (left to right). Primary function of the graphic equalizer is to adapt sound to the individual environment, and reduce feedback while improving overall sound quality.



Sound Mixing

Use the following procedure to obtain your initial sound mix for the entire system. Once you become familiar with the procedure you may want to make modifications that suit your particular situation.

1. Make all your external connections as previously discussed in the speaker and power amp connections.
2. Turn all controls to 0.
3. Turn power on for audio controller and external power amps.
4. Have the performing group play at their usual level.
5. Slide the monitor level control on the master panel up to about 20.

6. Turn the effects level on the master panel up to about 3.

The following steps are for each individual mic channel that is in use.

1. Turn vu select switches to monitor position. Put vu boost switches in cal position.
2. Adjust each monitor level control until a proper volume balance between the channels is achieved.
3. Put each effects-reverb switch in the appropriate position. Turn effects controls up to the proper level.
4. Adjust the bass and treble controls for each channel.
5. If you have one channel that is particularly loud, try using the mic attenuation switch to bring the signal down around the same level as the other channels.

The following steps are for the main/monitor mixing panel.

1. Adjust effects level to the proper point.
2. Turn the vu select switch to the monitor position.
3. Select the correct position for the electronic crossover switch on the monitor side. Make adjustments on the HF and LF controls on the monitor side.
4. Set the main level control to about 20.
5. Go back to the individual mic channels and adjust the main level controls until the proper balance is obtained for the main system.
6. Go to the master panel and make the necessary adjustments on the main electronic crossover controls.
7. Slide the main and monitor level controls on the master panel up to actual performance levels.

Special Applications Stereo

A stereo mode can be set up on the audio controller by "splitting" the mic channels between the main and monitor systems so that in effect, the main system is channel 1 and the monitor system is channel 2. For instance, if your unit has all eight mic channels, you can run the first 4 channels through the main system only and the second 4 channels through the monitor system only. This is done through the following procedure:

1. On the master panel slide the main level control up to about 8.
2. On the first 4 mic channels, turn the vu select switch to the main position.
3. Turn the monitor level controls on the first 4 mic channels to 0.
4. Make your volume balance on the first four channels by using the main level controls. Make appropriate adjustments on the effects and tone controls.
5. Slide the main level control on the master panel to 0. Slide the monitor level control to about 8.
6. On the second four mic channels, turn the vu select switch to the monitor position. Put the main level controls in the zero position.
7. Make your volume balance on the second four channels by adjusting the monitor level controls. Make your effects and tone control adjustments.
8. You can now set your stereo balance by adjusting the main and monitor level controls on the master panel.

Recording functions

The Sunn Audio Controller is equipped with recording inputs and outputs that allow use as a studio (or remote) recording console. The preamp outputs and/or monitor main outputs can be used for 8-16 track recorders. The recording outputs are located on the back panel under monitor output sections (diagram 6).

When recording in stereo, the front panel should be set up as described in the previous section. On the back panel, the recorder outputs are marked main and monitor to allow you to distinguish between

your stereo channels when making connections to a stereo recorder. Run lines from these 2 outputs to the left and right channel line inputs on your recorder.

When recording in mono, use only the main system on the front panel. You then run a line from the mono output on the back panel to the line input on your recorder.

(diagram 7) To run a stereo recorder into the Audio Controller, refer to the **recorder in** section on the lower right of the back panel.

There is a switch marked **mics in-recorder in**. Move this switch to the record-in position. You now run lines from the left and right line outputs on your recorder to the inputs marked 1 and 2. The left and right recorder channels will now play through mic channels 1 and 2, and may be adjusted by using the mic channel controls on the front panel.

diagram 6

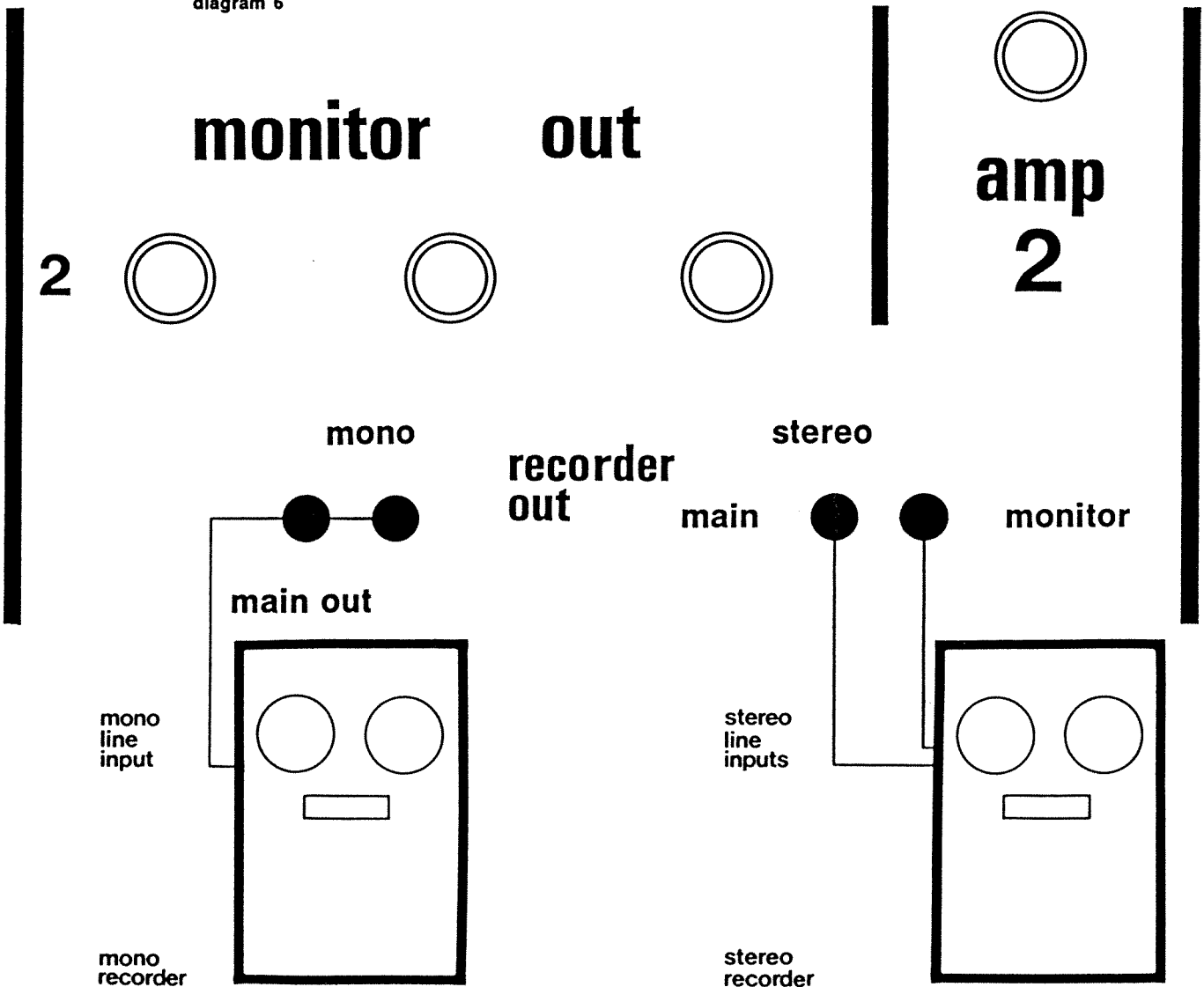


diagram 7

