
CHAPTER 5:

MULTITRACK RECORDING APPLICATIONS

Recording

Setting Levels

Your job as operator is to set the audio levels in order to ensure the cleanest signal with the least amount of background noise (hiss or hum). To do this, it's important to set proper levels not only within the Studio 32 itself, but throughout the entire audio system. Here are some procedures to follow when you're operating the Studio 32 to achieve a *gain structure* (the signal level within each part of the system) that will give you professional results.

Maintain Proper TRIM and Input Levels

To set proper input levels on either a mic or line level signal:

- 1 With the mic or line level signal flowing through the Channel, depress the Channel's SOLO button. If there are any volume controls on the instrument itself, they should be set to maximum.
- 2 Set the SOLO SIP/PFL switch to PFL (the MASTER SOLO LED will turn red). It doesn't matter if the channel fader is up or assigned to anything at this point.
- 3 Observe the level on the MASTER LED Meter. Adjust the TRIM knob until the signal is above 0 (the top green LED) but below the yellow LED (labeled +10). It's OK if the top yellow lights during the loudest peaks, but if you ever see the CHANNEL PEAK LED flash, you are within 5 dB of signal overload. Turn down the TRIM knob until the PEAK LED stops flashing.

Note: There is no TRIM control for the TAPE IN jack, because it is designed to handle the full range of inputs generated by modern tape recorders.

Maintain Proper Fader Levels

In typical operation, the Channel, Group and Master FADERS should be run at about the "0 dB" or "nominal" position. **NOTE: that's about 2/3 of the way up the channel fader travel, but all the way up on the Group and L/R faders.** This position gives the best balance between maintaining adequate headroom and lowest noise. It also allows for any additional increase or decrease in level that might be required during mixing. Ultimately, the channel fader levels are dependent on the requirements of the mix; the nominal level is only a starting point.

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 Studio 32 has been designed with plenty of headroom on the internal summing amplifiers (23 dB of headroom above a +4 dBu balanced output level). It is only possible to clip the mixer internally if several channels are at or near their maximum clipping point (with PEAK indicators flashing) and then sent at maximum gain to an output. You are in danger of this if:

- the meter is hitting the top of its range ("PK") with the GROUP MASTER FADER set to nominal level, or
- the GROUP or MASTER FADER is set to -20 or lower, and the meter is reading 0 dB or above.

Once again, it may be necessary to decrease either the TRIM control, the Channel FADERS, or both, of each of the Channels assigned to the Group.

Maintain Proper System Levels

As a good rule of thumb, try to run most volume level controls of other equipment receiving signal from the Studio 32 (amplifiers, effect devices) at 3/4 or 75% of full, as well. This will decrease the possibility of overload distortion and keep the amount of background noise to a minimum.

How to Record a Single Source to One Track

When recording a single source appearing on one Channel onto a single tape track, it is usually best to use the DIRECT OUT of the Channel. This provides the most direct connection between the Studio 32 Mixer and the multitrack.

To record a single source to a single track:

- 1 With a microphone or instrument connected to the desired input channel, set the TRIM and fader level correctly (see page 45, *Setting Levels*). Make sure the channel's FADER SOURCE switch is up.
- 2 Connect the channel's DIRECT OUT to the Input of the desired tape track (see page **Error! Bookmark not defined.**, *Connecting to a Multitrack Recorder*).
- 3 Place the track you want to record into the "source" or "input" mode (usually by arming the track for recording). At this point, you may see the channel meter of the recorder respond to the microphone or instrument. Adjust the fader for the proper recording level.
- 4 To monitor (listen to) the signal through the multitrack tape machine, make sure the TAPE/ML switch of MONITOR 1/2 is up and raise the Monitor 1/2 LEVEL of the track being recorded.

Note that this Monitor control may be in a different channel strip, if you're recording onto a different-numbered track.

- 5 To hear MONITOR 1/2 in the control room, raise the MONITOR 1/2 MASTER control, select MON 1/2 as the control room source (by making sure all other Control Room Select switches are up), and raise the control room level. To hear it in the headphones, you may select MON 1/2 directly as the headphone source.



Be sure the L/R and Group Assign buttons of the Channel being recorded are in the "Off" position (up). Otherwise, this will cause the monitoring to be false since the signal will be heard from two sources: the Channel (source) and the Tape Monitor (return).



NEVER select tape as the source of the channel (by pushing the upper FADER SOURCE switch down) when the tape recorder is in input or record mode and the DIRECT OUT is connected to the track input. This will cause feedback, since the tape will be trying to record its own output.

Recording Multiple Sources to One Track

When more than one Channel is to be recorded onto the same track of a multitrack recorder, it is necessary to assign all desired Channels to a Group, and connect the Group Output jack to the input of the multitrack.

If you're recording no more than 4 tracks at a time, you may find it easier to use the Groups even if you're recording one source per track, since you won't have to repatch as you would if you use the Direct Outs.

To record two or more sources to a single track:

- 1 With microphones or instruments connected to the desired input channels, set the input level correctly (see page 45, *Setting Levels*).
- 2 Assign each of the Channels you wish to record onto the same track to GROUPS 1 and 2 by pressing the 1/2 button situated next to the Channel FADERS.
If you want to record effects or other devices from a Stereo Aux Return, you may also press the ASSIGN keys in the Stereo Aux Return section.
- 3 Use the PAN control on each of the assigned Channels to position the signals either fully to the left or fully to the right. If the panning is fully left, the Channel will be routed to Group 1. If the panning is fully right, the Channel will be routed to Group 2.
- 4 The GROUP FADER will now control the level going to tape. Raise the GROUP FADER to its maximum position. To check the level of the group on the Studio 32's meter, press the GRP 1/2 switch in the control room section.
- 5 Be sure that the Group's TO L/R switch is in the "Off" position (up). Otherwise the signal will be assigned to the Main L/R Output directly, instead of monitoring what's coming back from the multitrack via the MONITOR 1/2 section.
- 6 To monitor the track through the multitrack tape machine, place the tape machine track you are recording on into record or "input" mode, and raise the MONITOR 1/2 control the track's output is connected to.



Be sure the L/R buttons are in the "Off" position (up) for the Channels being recorded. Otherwise, this will cause the monitoring to be false since the signals will be heard from two sources: the Channels and MONITOR 1/2.

Recording Multiple Sources to Two Tracks (Stereo)

Recording multiple sources onto two tape tracks is simple--you just use two Groups. Pan hard left all channels going to the odd-number Group, and pan hard right all channels going to the even-number Group. You can pan each channel to obtain the proper stereo positioning between left and right.

To record multiple sources to two tracks in stereo:
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- 1 With microphones or instruments connected to the desired input channels, set the input level correctly (see page 45, *Setting Levels*).
- 2 Assign each of the Channels or Aux Returns you wish to record onto the same track of tape to GROUPS 1 and 2 by pressing the 1/2 button situated next to the Channel FADER.
- 3 Use the PAN control on each of the assigned Channels to position the signals as desired between the left (Group 1) and right (Group 2).
- 4 The GROUP 1 and GROUP 2 FADERS will now control the levels going to tape. Raise them to the full up position (0).
- 5 Be sure that the Groups' TO L/R buttons are in the "Off" position (up). Otherwise the signals will be assigned to the Main Output directly, instead of monitoring what's coming back from the multitrack on the small fader.
- 6 To monitor the tracks through the multitrack tape machine, place the tape machine tracks you wish to record on into the record-ready or "input" mode, and raise the MONITOR 1/2 LEVEL controls the tracks' outputs are connected to. Set the Monitor PAN controls to hard left and right to hear the proper stereo image in the control room.

If you don't perform this last step, the main PAN settings you make on the channels you're recording in step 3 will be incorrect in the final stereo image.



Be sure the L/R buttons are in the "Off" position (up) for the Channels being recorded. Otherwise, this will cause the monitoring to be false since the signals will be heard from two sources: the Channels and the Tape Monitors.

Recording Tips

For the cleanest possible recording, the Group FADERS (or Channel FADERS if the DIRECT OUTS are being used) should be adjusted so that the level going to tape averages 0 VU on the meters of a typical analog multitrack tape machine, or peaks just below MAX or 0 dBFS on a digital multitrack machine such as the Alesis ADAT.

About Metering

The meters of the Studio 32 are the instantaneous peak reading type, which are preferred in digital recording where the “ideal” recording level comes close to, but never exceeds the point where all the bits are filled (called 0 dBfs, for full scale). Note that “0 dB” on the Studio 32’s meters means that the output of the Studio 32 is at “nominal” level (either +4 dBu balanced or -2 dBu unbalanced, depending on the connector), as opposed to “0 dB” on a digital recorder like ADAT which means “maximum” level (+19 dBu balanced, +5 dBV unbalanced). Peaks well above the “0 dB” level on the Studio 32’s meters should be common at normal operating levels for almost all types of tape deck. Analog tape decks typically have between 10 and 13 dB of headroom above the nominal level, depending on the tape type and any noise reduction being used, and ADAT has 15 dB of headroom above nominal. Other digital decks have anywhere from 12 to 20 dB of headroom.

Meters of the tape deck will not necessarily match those of the Studio 32 on dynamic program material. With typical metering, analog VU meters may only read 0 dB, even though the Studio 32’s peak meters are reading levels between +5 and +10. However, a steady-state tone (such as that from the built-in oscillator) will read 0 dB on both the Studio 32 and most VU meters. Readings on combined peak/VU meters, such as those found on semiprofessional multitracks, will vary. Take the time to learn the relationship between the Studio 32’s meters and your deck’s meters, using both steady-state tones and dynamic material.

If signal peaks cause the record meter to vary by more than 10 dB, a limiter or compressor such as the Alesis 3630 Stereo Compressor may be used on that channel to even out the peaks. In general, things will sound better if the meters remain at roughly the same level throughout the recording.

The two LED ladder meters of the Studio 32 will follow the Control Room source switch and SOLO system. Pressing MONO or changing the Control Room Level control will not affect the meters.

Overdubbing

Using MONITOR 1/2 to Monitor the Multitrack

Once you have recorded onto the multitrack tape machine, you'll need to hear the playback of those tracks, as you record new tracks in sync with the material already on tape (see next section, *Getting the Mix to Headphones*). The signals coming back from the multitrack tape machine connect to the TAPE IN connectors of each channel, and during the overdubbing stage you'll usually hear them via the MONITOR 1/2 system.

To listen to tape tracks via MONITOR 1/2:
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- 1 Place the tracks of the tape machine you wish to monitor into the "Tape" or "Playback" position.
- 2 Make sure the MIC-LINE/TAPE switches above the MONITOR 1/2 PAN pots are **up** (TAPE position). Raise the MONITOR 1/2 LEVEL controls being used for the tape tracks you want to hear.
- 3 Select MON 1/2 as the Control Room Source and turn the CONTROL ROOM control up to the desired listening level.

Alternatively, you may select L/R as the Control Room source, and press the "LINK TO L/R" switch under the MONITOR 1/2 MASTER. This will allow you to hear other sources from the channel faders if they are assigned to L/R.

- 4 Play the tape and raise the MONITOR 1/2 MASTER until the peaks of the signal briefly light the yellow LEDs in the meters.

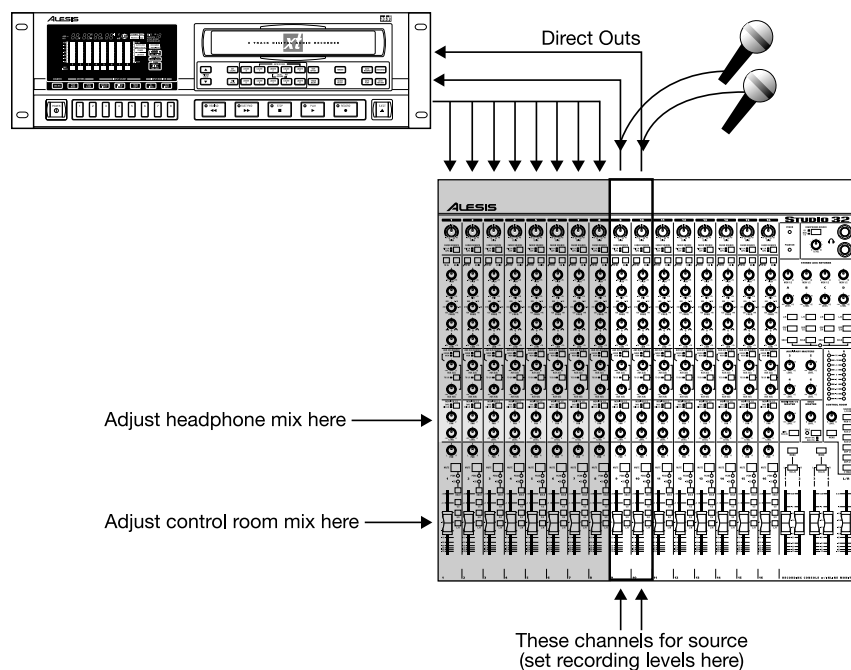
Using the Channel Faders to Monitor the Multitrack

If you're only recording a few inputs at a time, you may want to use a different technique for monitoring. Monitoring on the channel faders gives you a head start on your mixdown, and also allows you to start using the parametric EQ. Another advantage of using the L/R mix for monitoring in the control room is that it frees the MONITOR 1/2 mix to provide an independent mix for musicians' headphones.

Keep in mind, however, that you will not be able to record any Mic or Line source that's plugged into a channel being used to monitor a tape return.

To listen to tape tracks on the Channel faders:
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- 1** On the multitrack, set the tracks you want to monitor into playback mode (Record switched OFF).
- 2** Make sure the Group Assign 1-4 switches of the tracks you want to hear are all UP (off).
- 3** Press the FADER SOURCE switch at the top of the channel (below TRIM) down (to the TAPE position), for all tape tracks you want to hear. This makes the tape input jack the source of the large Channel FADER. *Note: to avoid confusion, make sure you're not simultaneously monitoring the tape return via MONITOR 1/2 in the same channel.*
- 4** Assign the tape track channels to L/R (the switch lowest on the channel strip).
- 5** Raise the Channel FADERS being used for the tape tracks you wish to listen to.
- 6** Raise the L/R MASTER FADER, make sure all CONTROL ROOM SOURCE switches are UP (L/R) and adjust the CONTROL ROOM settings, as in the previous section.



Once you have the tape tracks returning to the mixer, it is simple to create a cue mix for the musicians to listen to over headphones while overdubbing. The cue mix is created using MONITOR 1/2 on the Studio 32, because it is a pre-fader mix that is independent from all other mixes. Follow the instructions in the previous pages to get a monitor mix if you have not already done so.

Built-in headphone amp

The simplest solution for headphone monitoring is to simply plug into the headphone jacks at the upper right hand side of the Studio 32. You may run stereo extension cables from these jacks; they will power most standard headphones. (If the phones aren't loud enough, consider trying some more efficient headphones with a lower impedance and a closed-cup design.)

The HEADPHONES SOURCE switch may be set to either position:

CR: The headphones will hear exactly what's heard in the Control Room, as set by the CONTROL ROOM SOURCE switch. Pressing SOLO will also affect the headphones. Only the CONTROL ROOM LEVEL pot will not affect the headphones.

MON 1/2: In this position, the headphones will hear only the MONITOR 1/2 mix, regardless of how the control room is set.

The HEADPHONES SOURCE switch is usually set to MON 1/2 while tracking and overdubbing, so the engineer can solo and change things without affecting the headphone mix. Then, if you want the headphones to hear the 2 track or L/R mix, set it to the CR position.

Using an external headphone amp

AUXILIARY OUTPUTS 1 and 2 (MON is labeled underneath) may be connected directly to the inputs of a headphone amplifier (see page **Error! Bookmark not**

defined., *Connecting to a Headphone Amp*). In this case, the MONITOR 1/2 MASTER control will set the overall level going to the headphones.



Turn down the input controls (if provided) of the headphone amplifier itself so that average levels from the monitor section (up to +10 on the meter) do not make the headphones too loud.

Option: You may use a standard “stereo splitter” cable with the TRS 3-conductor end plugged into the Headphone output jack and connect it to an amplifier, with the headphone level set to about 12 o’clock.

Monitoring MIDI Virtual Tracks

If you are using a MIDI sequencer, the tracks being played “live” from sound modules in synchronization with the tape are effectively the same as additional tracks on tape -- which is why they are called “virtual tracks.”

Synthesizers and drum machines are normally plugged into the LINE IN jacks of the channels, and can be monitored on the Channel FADER or MONITOR 1/2, using the procedures above. Since the point of virtual tracks is not to use up a track of tape, just make sure that when the synthesizer is on the Channel FADER, that its Group Assign switches are OFF, so it doesn't get recorded. Assign virtual tracks to L/R only.

If you are using Monitors and Channels simultaneously for tape return and virtual track monitoring, the L/R mix should be used for the performers' headphone mix, not MON 1/2.

- 1 Set the Control Room source to L/R (all CR Select buttons up).
- 2 Press the LINK TO L/R switch. This mixes the MON 1/2 mix onto the L/R buss.
- 3 Set the HEADPHONES SOURCE switch to CR (up).
- 4 Set the MONITOR 1/2 SOURCE switches for the channels with virtual tracks to MIC/LN (down).
- 5 Set the FADER SOURCE switches to TAPE (down).
- 6 Set the MONITOR 1/2 MASTER LEVEL control to its nominal position (about “2 o'clock”). Adjust all other levels to taste. If you want to turn all the virtual tracks up or down in the mix simultaneously, use the MONITOR 1/2 MASTER LEVEL control.

Bouncing Tracks

Sometimes it is necessary to combine several tracks onto another track, particularly when you are running out of tape tracks. *Example:* Once you've recorded the vocal harmonies on four different tracks, you could bounce them all over to one track, or two tracks for a stereo mix, thereby freeing up the original four tracks.

When bouncing tracks, you must control the tape tracks being bounced with the Channel FADERS, instead of hearing them through MONITOR 1/2. You then route the signals to a Group which corresponds to the track(s) you wish to bounce to.

Example: If we were bouncing those four vocal tracks to track 5, we would press the FADER SOURCE button for those channels (TAPE position), route them to Group 1 (which is "normalled" to the input of track 5 on the tape deck), create a desirable mix, and place track 5 in record. Here's the recipe:

To bounce tracks to a single track (mono):

- 1 For each Channel (tape track) you wish to bounce, press the FADER SOURCE button so it is down.
This selects the TAPE IN jacks as the source of the Channel FADERS.
- 2 Assign the Channels to Group 1 by pressing the 1/2 button next to the long fader. *Make sure none of these channels is assigned to L/R. Also make sure that no unwanted channels or Aux Returns are assigned to Group 1/2, and that none are being heard through the MONITOR 1/2 mix.*
- 3 Turn each Channel's PAN knob hard left.
This routes the signals to Group 1 only.
- 4 Place track 5 into record-ready, and adjust the Group 1 MASTER FADER to maximum.
If you have an ADAT-XT, press and hold ANALOG INPUT and one of the first four track keys, so that Input 1 will "normal" to Input 5. For other multitrack recorders, check to see if they have normalling or electronic patching.
- 5 In the Control Room section, press the GRP 1/2 switch and make sure all other switches are off.
This will allow you to hear Group 1 in the left Control Room monitor, and bring it up in the Studio 32's meter. If you wish, you may press the MONO switch so it's in both speakers.
- 6 Adjust each Channel FADER to achieve a desirable mix.
If necessary, you may adjust the Group Fader down to avoid clipping the tape track.
- 7 Rewind the tape, and record onto track 5 those portions you wish to bounce.
- 8 Tracks 1-4 are now available for recording new parts.

Monitoring through the recorder: Instead of monitoring the GRP 1/2 feed in the control room, you may want to use MON 1/2, turning off all other monitor level controls except the track you're bouncing to (track 5, in this example). This method ensures that the patching, track arming, and levels are correct.

To bounce multiple tracks to two tracks (stereo):

- 1** For each Channel (tape track) you wish to bounce, press the FADER SOURCE button so it is down.
This sends the tape tracks to the Channel (long) FADERS.
- 2** Assign the Channels to Groups 1 and 2 by pressing the 1/2 buttons next to the channel faders.
- 3** Raise the Group 1 and Group 2 MASTER FADERS to the maximum position.
- 4** Place tracks 5 and 6 into record-ready, and select either GRP 1/2 or MON 1/2 as the Control Room source. If you're using MON 1/2, turn the monitor pan (the upper black knob, not the one next to the MUTE key) for track 5 hard left, and the monitor pan for track 6 hard right.
- 5** Adjust each Channel's PAN knob and FADER to achieve a desirable mix.
- 6** Rewind the tape, and record onto tracks 5 and 6 those portions you wish to bounce.
- 7** Tracks 1-4 are now available for recording new parts.

Playback/Mixdown

Getting the Mix to the 2-Track Deck

Once you have established a satisfactory mix, it's time to get it over to the tape deck. This involves connecting the L/R MAIN OUT jacks to the mixdown tape deck's left and right inputs. For more information on connecting the Studio 32 to a two-track mixdown deck, see page **Error! Bookmark not defined.**

Assign all Channels, Monitors, Stereo Aux Returns and Groups being used to the L/R MASTER FADER, by making sure the L/R buttons for each is down. Then create a mix using the Faders for the selected channels.



Make sure the L/R switches of all unused channels, monitors or aux returns are UP, to keep the noise floor to a minimum.

Mixdown Basics

Here is a simplified step-by-step way to establish a mix:

- 1** On the channels where you want to hear tape track, press the FADER SOURCE switch down. *Now the TAPE IN will appear at the channel input.*
- 2** Make sure the channel L/R switches are down. Set the Main L/R fader at full and raise the channel FADERS being used as tape returns to the desired levels.
- 3** Add the amount of effects desired by adjusting the AUX levels of each Channel. If required, adjust the AUX MASTERS to avoid overloading outboard effects.
- 4** Assign the STEREO AUX RETURNS to L/R.
- 5** Raise the level of the STEREO AUX RETURNS. For quietest operation with the greatest amount of headroom, it's best to run the individual channel AUX Sends at about the "2 o'clock" level, the AUXILIARY MASTERS at the same position, and if the effects are too loud, turn down the AUX RETURNS, not the sends.
- 6** Adjust the input of the mixdown deck, or if necessary the Master L/R FADER, so that the desired level is sent to the mixdown tape machine.
- 7** Press 2 TRACK as the source in the CONTROL ROOM section. This assures that you are hearing only what is actually reaching the mixdown deck, and that it is in RECORD mode when you want it to be.

Guidelines for a rough mix

Creating a mix is easy; creating a great mix (one that jumps off the tape) is a lot harder. There are those engineers who are in demand just for mixing because of their sense of balance between instruments causes the mix to come alive with excitement. Although outboard effects and tonal adjustments are important, you'd be surprised at how good a dry (meaning no EQ or effects) mix can be if the balances between parts are right. When you add effects and EQ, it will sound that much better.

Since much of the art of mixing is totally subjective and up to the taste of the engineer, a basic balance between instruments is necessary first before any tonal or effect enhancements can really become effective. Here's a method to help you quickly create a "dependable" mix; one that sounds good no matter what speakers you mix or play back on. Although our example involves mixing the instruments found in popular music, this method can be applied to any type of music regardless of the instruments being used. *Note:* This is only a reference or starting point. Each song is unique and calls for different balances.

To create a dependable mix:

- 1 Begin with all the Channel FADERS in the "-∞" (down) position.
- 2 Set the L/R MASTER FADER to the "0 dB" point (all the way up).
- 3 Raise the Kick Drum Channel FADER until the LED meters read "-3."
- 4 Mute the Kick Drum Channel by switching the MUTE button to the "On" (down) position, so that the Kick can no longer be heard. DO NOT MOVE THE FADER! Just mute the Kick Channel.
- 5 Raise the Snare Drum Channel FADER until the LED meter reads "0." Mute the Snare Drum Channel, the same as the Kick.
- 6 Raise the Hi-Hat Channel FADER until it reads "-12" on the LED meter. If any cymbals (ride or crashes) occur in the song, set those Channels to "-12." Mute the Hi-hat and Cymbals Channels.
- 7 Raise the Toms Channel FADERS. Set them so that the LED meter indicates "0." Mute the Toms Channels.
- 8 Bring up the Bass Guitar Channel FADER so that the LED meter reads "-6." Mute the Bass Channel.
- 9 Raise the Channel FADERS with the rhythm guitar and/or keyboards so that the LED meters read "-12," unless percussion instruments are involved (such as cowbell, triangle or shaker), in which case the meters should read "-18." Mute these Channels.
- 10 Raise the Channel FADERS with the keyboard pads, strings and/or organ so that the LED meters read "-24 ." Mute these Channels.
- 11 Raise the Channel FADERS with the melody and solo instruments (such as

lead vocal, solo guitar, etc.) so that the LED meters read “-8.” Mute these Channels.

12 Raise the Channel FADERS with the background vocals and/or incidental instruments so that the LED meters read “10.”

13 Unmute all Channels and make balance adjustments as necessary.

The above process can be accomplished very quickly once you get the hang of it. Usually, it is done at least twice when “getting up” a mix. The first time is without effects or EQ to see what (if anything) the mix needs. The second time is after all the effects and EQ have been added.