

# THE MIXING DESK.

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### 1 An overview.

Modern day mixers are quite marvellous things when you think of the almost endless number of configurations they can handle. Signals can be sent from any channel or combination of channels to devices that add echo or flange, or almost any other effect you care to name.

The role of the mixer is to control all of the signals on their journeys either to and from the tape machines, or to and from the outboard gear, and usually there are many combinations of each in operation at one and the same time.

Mixers have not only the capability to send sub mixes along various routes, but they can also alter the tonal character of the signal as it passes through.

In this article I will attempt to clarify some of the jargon associated with mixers, and also explain some of the mysteries surrounding these essential lumps of metal that we sound engineers sit at for so many hours of the day and night.

### 2 To begin.

What is the difference between a semi pro and a so called professional mixer? Well believe it or not the main differences are size and price, let me explain. All mixers do the same basic job, they all accept signals from either mic or line level inputs, these signals are then sent to some destination or other via faders or knobs, and that's more or less it.

Of course the more you pay for a mixer the more you get, usually in the form of more channels, or outputs, but usually the pro mixers have much more elaborate ways of achieving the same thing as the cheap ones.

Better noise and distortion figures also come with the higher priced mixers, but this doesn't mean that you can't make some very fine recordings with just the most simple and basic of recording setups.

So lets move on to some of the jargon and terms commonly used on mixers. We'll start at the top of a typical channel on an average priced mixer.

At the top of most channels is the input gain section, according to price this can have several items that need explanation. The word gain refers to the amount of amplification being applied to the incoming signal, most mixers have a plus or minus facility to allow you to attenuate the signal if it is to loud, or amplify the signal if it is to weak. So the word gain means volume.

Most gain controls are calibrated in db's, some are the rotary 'pot' type, and some on the more expensive mixers are of the rotary switch type. Both do the same job, but the switch type can be more accurately reset than the 'pot' type, remember that an increase of 6db makes the signal twice as loud, and a decrease of 6db makes the signal half as loud.

Some mixers have two gain controls, 1 for mic, and 1 for line, with a switch to select which one is operational, if the mixer is fitted with only one gain control then the selector switch is wired in front of it and selects which input is fed through the channel. On most mixers priced upwards of £1000 or so you will usually find 3 extra switches.

**PAD.** The pad switch is usually in the mic circuit, and wired ahead of the gain control, it allows very loud signals, say from a mic in a bass drum, to be turned down by a fixed amount, normally 20db but sometimes 10db, it is most useful for stopping the mic pre-amp from distorting.

**Phantom.** Phantom power is a DC voltage usually 48v dc that is supplied by each channel in the mixer to its mic input socket. This phantom power is used by any condenser mic that maybe plugged in. Some 'DI' boxes now utilise this phantom power instead of having to use batteries. While this phantom power is mainly harmless to mics of the dynamic type, that is mics that do not require any power to operate, it is sometimes advantageous to be able to turn the phantom power off, and that's where the phantom switch comes in. It removes the 48v dc from the mic input socket.

**PHASE.** The phase switch, (sometimes marked as a circle with a line through it at 45 degrees) is also a very useful switch, which can reverse the positive and negative wires in the channel thus reversing the phase of the signal as it passes through. On a well designed mixer the phase switch will be wired after the mic/line selector switch thus allowing both mic and line signals to be treated, but some manufacturers still put the phase switch in the mic circuit

allowing only signals from the mic to be treated. As a buying guide, look for this kind of built in limitation, if found don't buy the mixer, it shows that the manufacturer hasn't done his homework properly, and there will probably be other bad design points in the mixer. Flexibility is paramount, who needs built in limitation...

To get familiar with the phase switch and what it can do try this little experiment. Run a stereo signal through 2 channels of the mixer, a record or cassette will do, stand in the middle of your speakers (as you normally would), and balance the sound so that you have good stereo, now press the phase switch on 1 of the channels, you should notice that something is drastically wrong. What you are now hearing is called out of phase, it should be rather unpleasant, a sort of a physical sensation, you may even find yourself tilting your head to one side, this happens with me every time I hear something out of phase. Get to know this feeling, it will come in very handy in years to come, and you'll be amazed how many times you will walk into someone's house and hear the stereo with one of the speakers wired up wrong.

If when you pressed the phase switch seemingly nothing happened then don't worry, not everyone is as sensitive to phase anomalies, we all are to some degree, just some more than others. Whilst on the subject of phase, nearly all of the big mixers have a phase meter fitted, so that signals can be compared and visually checked for phase problems. These devices are most useful when mixing down a multi track tape, drum overhead mics and tom mics can do terrible things to a mix if one of them should be out of phase, especially when the mix is played in mono.

Some mixers will also have a TRIM pot sunk into the channel, these usually need a small screw driver to adjust them. In essence they are still only volume controls, but differ slightly in that they usually work in conjunction with the surface mounted gain control. As a rule of thumb don't touch 'em unless something is very wrong volume wise.

### **3 The Equalizer.**

No this is not an American TV show !. Most good mixers have the 'EQ' section below the input section, you will mainly alter the EQ in the record stage of a session, that is to say when you record things onto tape, and also when mixing down. Both of these situations are slow, what I mean is that you can take your time over selecting the right EQ, and are not under pressure to change it at some split second interval in the piece of music/speech or whatever. Whereas the auxiliary send controls may need the odd rapid tweak in order to get that echo effect on the lead voice. The point to remember here is that the aux' sends are closer to you than the EQ controls, so that you can reach them easier. Another point to lookout for when buying.

Back to the EQ section and what it does. Anyone who is into recording whether it be in the home or studio will know that the EQ section is where the tonal character of the signal can be modified, in other words it is the tone control section.

Equalizers come in many different guises, but once again they all do to a greater or lesser degree the same job. Think of a graphic equalizer with only 6 sliders, and then think of one with 31 sliders, and you'll get the picture.

Mixers have moved on from the days of simple treble and bass controls, to 5 or even 6 band parametric EQ these days, but for our purposes, and also because it is the most common, we'll talk about 4 band EQ, (we will look at parametric EQ later). This usually takes the form of a fixed HF or high frequency control, around the 10k (or ten thousand cycles per second) mark, followed by a sweepable upper mid control, (sweepable meaning that the control is continuously variable over a range of frequencies) from say 2khz (2 thousand cycles per second), to 8khz, and sometimes called MF1. The frequency range covered is usually printed onto the channel. Also associated with this frequency sweeper is a cut and boost type volume control, this control is capable of amplifying or attenuating whatever frequency has been selected on the sweep control, usually in the order of 12 to 15 db. Some manufacturers give you as much as 21 db, and some only give you 10db.

This in itself is already quite a flexible equalizer, but remember I said 4 band, so what you have now is the same set up again, but this time the sweeper might work in the range 300hz (300 cycles per second) to 6 or 7 thousand cycles per second. That just leaves the bass control which would be like the treble control except that the fixed frequency would be somewhere around 60 to 100 hz.

Again, many of today's mixers go a bit further even than this and give you 2 extra switches, one for the selection of 2 treble frequencies, and the other for the selection of 2 bass frequencies. So a 4 band EQ section can be a very flexible tool in the hands of a good pair of ears!

Some equalizers have switched frequency selectors instead of the sweepable type, these are found on the more expensive mixers, and are very good for quickly setting up a favourite vocal or piano sound.

The word parametric has been attached to EQ systems for quite some time now. It started out in life as a specialised tool used only for really complex problem solving, but has since become so popular that some manufacturers now include it as standard channel EQ. So what is it? I hear you ask? Well, in principal it is similar to our 4 band equalizer as just discussed, but with one almighty difference. The sweepable control is the same and has the same range, but there is now an extra control, this extra control can take the form of a switch in the cheaper systems, or a rotary control in the more expensive systems. What this control does is to alter the 'Q' of the equalizer, simple isn't it? In ordinary English what the control does is this...

Imagine the range of our sweepable control as a straight line, with the lower frequencies to the left, and the higher frequencies to the right. Now imagine our sweeper control to be a pyramid, the base of our pyramid sits on the straight line the cut and boost control represents the height of the pyramid, if the control were set to minimum, or full attenuation, the pyramid would hang underneath our straight line, but for this demo we'll have it full up, clear so far? Right, as we rotate the sweeper control the pyramid moves from left to right and we hear the change in sound accordingly. This would be a pictorial representation of our MF1 sweep control, but with a parametric equalizer we have this extra control which gives us control over the width of the base of our pyramid, (ah so that's it).

The point of the pyramid is the actual frequency selected, and receives the most treatment but as you slide down the sides of the pyramid you affect a gradually wider chunk of the spectrum, so with an ordinary equalizer you affect by degree frequencies both above and below the selected frequency, and as the level decreases so the width or 'Q' of the equalizer widens. That's where our extra control comes in, by narrowing the 'Q' (base of the pyramid) we affect less of the frequencies surrounding the frequency we have selected, and so have more precise control over what we alter. The 'Q' control can make our pyramid into a pencil.

If we make the 'Q' as narrow as we can, what we end up with is a NOTCH FILTER. This allows very precise control over the frequencies that we alter, most useful for getting rid of amplifier buzz, or any other type of narrow band noise that may get onto our tapes. Some DEESSERS work on this principal, having a fixed frequency of 5khz, but the more sophisticated ones have the ability to sweep through the frequency spectrum until they find the offending 'S' before 'NOTCHING' it down in level.

#### **4 AUX SENDS.**

Below the EQ section of the channel lies the aux send section, on most mixers this will consist of at least 2, and probably 4 sends. Indeed some of the big mixers can manage 10 sends per channel, but not in the price range that we are talking about. An aux send is used to feed the signal passing through the channel to an auxiliary device such as a reverb unit, or a flanger, this does not affect the signals normal path through the channel in any way. One of the most common uses for an aux send is 'FOLDBACK', this is the sending of information from the mixer to a set of headphones, for instance, sending the music to someone whilst they are singing, this information would also include foldback of the singers voice (make them suffer too). Reverb could also be sent to the foldback, most singers prefer it 'WET' as opposed to 'DRY'. Wet being with reverb and dry without it.

A typical aux send would consist of a volume control, a MUTE switch and a 'PRE/POST' switch. The volume control does what volume controls normally do, that is, set the level of the signal that is being sent out from the channel to the external device. The mute switch is used to turn the aux send off without having to turn the volume down. Turning the volume down on a large number of channels can be a pain, but pressing 8 or 10 switches is fairly easy. The per/post switch is basically a selector switch, which determines where the aux send gets its signal from. The usual two options being, just before the channel fader (per), or just after the channel fader (post). The difference should be fairly obvious, a signal taken per- fade will not be affected by any change in the fader level,(this would be preferable for foldback), and a signal taken post fade would be altered by any change in fader level,(this would be preferable for reverb effects etc).

All the aux sends would probably be the same, (except for the destination of the signal passed through them), one possible exception might be aux send 1, being dedicated for use as the foldback send, it might then be configured as a stereo send, which would entail the addition of a 'PAN POT'. A pan pot is simply two volume controls mounted on the same spindle, with one of them wired backwards, so that when it is turned clockwise it makes the signal quieter instead of louder. The channel signal is wired to both controls, and the output of one control goes to the left, and the output of the other control goes to the right. Now by turning the knob one side gets louder and the other side gets quieter. With the knob in a central position both outputs receive the same

level.

## 5 The fader section.

The fader section is where we find all the odds and ends associated with the general functions of the channel. On the type of mixer we would encounter in the £7000 bracket and below, this is where we would come across the channel routing section. If the mixer is only stereo, that is to say it only has two outputs, then the channel routing would simply consist of a pan pot for left or right, but if it has 4 or more outputs then there will be an appropriate number of switches to select which output(s) the channel goes to. Most mixers in this category have 1 switch per pair of outputs, hence a 4 output mixer would have 2 switches, 1 labelled 1-2, and the other labelled 3-4. The pan pot is used to move the signal between odd and even numbered outputs, so to get to output 3 you would press the switch labelled 3-4, and turn the pan pot hard left. This system of routing has its limitations however, try routing to 1 and 4 but not 2 and 3.

A much better system (which can be found on some cheaper mixers) is to have a switch for each output, so our 4 output mixer now has 4 switches labelled 1 to 4. The pan pot works in the same way, but it is now possible to rout to any combination of outputs. In addition to these switches there would also be (except on a stereo mixer) a pan inject switch, this switch simply puts the pan pot in or out of circuit as necessary.

A common format for the modern day mixer is to have another switch at the top of the routing section labelled 'MIX' or 'STereo', this is a 'DIRECT' switch, and its job is to rout the output of the channel directly to the main stereo output of the mixer. On nearly all mixers in our price range the main stereo output feeds the mix down machine, and also doubles as the main monitor output. We'll discuss the word monitor later on, but for now it means the feed for the speakers.

Just about any mixer worth its salt has some kind of 'SOLO' switch, this maybe labelled 'PFL' or 'AFL' or simply 'SOLO'. Pfl stands for per fade listen, what this switch does is to rout the signal from in front of the channel fader (per fade remember?), to a special output, it then, usually via a relay, sends this special output to the main mixer output, thus seeming to mute all other channels except the ones with their pfl switches pressed, so you hear your selected channel solo. In reality it doesn't actually mute the other channels, so it is safe to press the pfl switch whilst you are recording, but not whilst mixing down. Afl stands for after fader listen, and the switch does exactly the same thing as a pfl switch except that the signal is taken after the channel fader, and usually after the channel pan pot, so with this type of solo switch you get what is called solo 'IN PLACE'. This type of solo system is more useful than the pfl type. If the switch is just marked 'SOLO' then it is probably of the pfl type, but the end result will be the same, push the switch and you will only hear whatever signal is going through that channel.

Because, when mixing down the tape machine and speakers are listening to the same output, it would destroy the mix if a solo switch were accidentally pressed, so some of the more expensive mixers have a solo safe switch, which is usually situated on the mixers main monitor or output module. This switch inhibits the more sophisticated type of solo system for a safer pfl type, but you have to remember to press it before you start mixing.

Lastly the channel would have a mute switch, the job of this switch is to kill the output from the channel without having to pull the fader down. It will usually kill all the aux sends as well, and the afl switch. Quite a few mixers in our price range would also be fitted with a programmable mute system. This would involve a master channel mute switch, situated at some convenient place on the mixer, and a selector switch on each channel to tell the channel which mute switch to listen to (channel or master). Any number of channels could be routed to the master switch, and muted in an instant by just hitting the master switch. If you are really lucky your mixer might have 2 such master mutes labelled 'A' and 'B', and 2 selector switches on each channel to select between the A and B mute systems.

## 6 The master module.

The master module will be found on every mixer in the price range that we have been looking at. It may be situated between the input channels and the mixers outputs, or it may be the last module fitted into the mixer, this last option can be a bit awkward if the mixer has 12 or 16 outputs, it can be a long way to reach for the master faders to do a fade. This module is the heart of the mixer, and all of the mixers global operations will be fitted to it, talkback systems, machine and loud speaker select switches etc. These modules vary greatly with different manufacturers, but once again the job they do is basically the same. In no particular order lets look at some of the things that you would find on a typical master module.

The monitor section is very important to everything that a mixer does, it controls not only the level of the signal being fed to the speakers, but also the source of that signal. A typical master monitor section could comprise of the following, a master level control for the control room, probably 2 speaker select switches, a number of switches for the monitor source IE mix output, stereo machine playback etc, some may even have facilities to listen to the aux sends, but this is more likely to be done by solo switches on the aux send master module (discussed later).

A 'DIM' switch, which does the same job as the pad switch discussed earlier, that is, it lowers the level of the monitor output by a fixed amount, usually 20db, and finally a 'MONO' switch which sums the left and right outputs together to give you a mono signal in the speakers. A monitor mute switch is sometimes fitted, this maybe labelled 'L/S MUTE' or monitor mute, but it will only be found on the more expensive mixers.

Also on the more up market mixers you may find a studio playback system, this may simply consist of a volume control for the speakers in the studio area, the control having the same input source as the control room level control, but on the real up market mixers the studio playback system would have its own separate set of selector switches for the studio level control, allowing a different item to be monitored in the studio speakers to that being monitored in the control room speakers. Most useful if the band in the studio want to play along to a cassette to get the feel right whilst the engineer listens to the mics and things he's set up to do the recording. The selector switches would probably be 'MIX', to enable the monitoring of the mixers main output (stereo), 'TAPE 1', 'TAPE 2', for monitoring the playback of 2 different tape machines, again in stereo, and sometimes a switch marked 'USER', which is just the same as the tape switches, but the designation is left to the user.

## **7 The Talkback System.**

Virtually all mixers designed for recording will have a talkback system. You might think it strange that in an environment such as a recording studio where there are mics and speakers literally hanging from the ceiling that communication could be a problem, well it usually is. How often the poor drummer has to scream down the snare drum mic to make himself heard, but drummers are a funny bunch and scream a lot anyway, back to business. The talkback or COMMS section as it is sometimes called allows the engineer to get through to the people in the studio or games room if you are lucky enough to have one.

On a really good mixer you might find a reverse talk switch, allowing a remote mic, say in the games room for instance, to be switched into a speaker in the control room. This is good for summoning the drummer to do that vital overdub. So what you will probably find in the comms section is a talk switch, with a level control, and a selection of destinations to talk to. 'Studio' allows you to talk via a speaker into the studio, 'Aux' allows you to talk to the aux sends, which usually means headphones, and 'Tape' or 'Slate', which allows you to talk direct to the tape machines, as in 'take one', or in the case of a really bad band 'take 25'.

A word about SLATE. The name slate evolves from the film world as do the words booth and box for the control room, when the poor sound man had to work in a tiny box like thing with no ventilation so that the wax disks he was recording on wouldn't cool down. That's what you call dedication. The slate is that thing with writing on that is used to mark the scenes as they are shot, CLAPPER BOARD is another name for it? Anyway, the word slate is linked with naming individual scenes, so we recordist's link the word slate to naming each item recorded on the tape.

What the slate system does is to output a low frequency sine wave, usually 30 hz, but I can recall one that used 18hz. The frequency is of no great consequence but what it does is mark the tape as you are talking. At normal speed on playback, the sine wave is quite quiet, but when it passes the heads in fast wind it sounds like a beep, and so gives you an audible location point at the start of each item on the tape.

The whole idea of the slate system is somewhat out dated in this day and age with autolocators and computers to do the job for us, but remember fancy technology has a habit of breaking down, usually when you need it most, so there may be hope yet for the humble slate. A word of warning about using the slate, as I said, when you put the machine into record and press the slate button, a sine wave hits the tape along with your voice, and if the tape machine is of the multi track variety with say 8 or more tracks in record at once then the accumulative effects of this sine wave can do 'orrible things to your speakers, not to mention headphones and eardrums.

## **8 General layout.**

Mixers come in many guises, and often have a series of numbers attached to their name IE, 24-16-16, or 36-16-32. All that these numbers relate to is the size of the mixers frame, and to how many modules of what type are fitted. The first number is always the number of channels, so 24

means 24 channels. The next number is usually the number of outputs (sometimes called busses) fitted, so 24- 16, means 24 channels that feed 16 outputs. The next number will be the number of monitors, in this instance the word monitors means points or sections of the mixer that are dedicated to listening to the playback of the various tracks of a multi track machine. Hence 24- 16-16, means that our 24 into 16 mixer can monitor up to 16 audio tracks without having to use any of the input channels. So, inputs, outputs, monitors.

You might think that there would always be the same number of monitors as outputs, but this is not the case. In order to keep costs down most of the mixers that are made for the lower price bracket have only half the number of outputs fitted in relation to monitors, I suppose when you think about it it's not very often that a smaller type 16 track studio records on all 16 tracks in one go, so the need for 16 outputs is a costly and not very often used luxury, so we get mixers with configurations of 24-8-16.

A mixer of this type has 24 channels that can be routed to 8 outputs, but can monitor the playback of 16 tape tracks, the 8 outputs are usually wired in parallel to 2 sets of sockets on the back of the mixer, thus allowing output 1 to feed track 1 and also track 9 on the tape machine. On nearly all of the mixers in the price range that we have been talking about there is now another number to consider, the number 2, it has made its appearance in the last few years or so, and refers to the stereo output from the mixer, the one that feeds both the mix down machine and also the control room loud speakers. So we now have mixers with numbers like 24-8-16-2, I'm sure you can work it out for yourself by now, the only thing left to clarify is when you have a number like 12-8-2, in this case it simply means that the mixer does have the same number of outputs as monitors.

## **9 Meters.**

All mixers are fitted with some kind of metering, whether it is the VU type or the PEAK reading type, or just a simple peak indicating LED, the meter is there to be used as a guide (only) as to how much level is passing through the mixer. In general the peak reading type is better, as it shows you the loudest signals as they pass through, and yet all the expensive tape machines have VU meters fitted, why is this? Well, VU stands for volume unit, and the dial is calibrated in db's. What you really get from a vu meter is an average level reading. It could be said that this type of meter is better for recording as it allows you to record at a higher average level than a PPM (peak programme meter), but this is only true at low and midrange frequencies, at hi frequencies, or with sounds of short duration a vu can simply not react fast enough to give you a useful reading.

## **10 Aux send masters.**

On every mixer that has aux sends fitted to it's channels you will find aux masters, one for each available send. This is the one instance where you will probably find a better facility fitted to a cheaper mixer than a very expensive one. In the studio where I work we have a mixer that cost in the region of £50,000 when it was new, and it's aux masters consist of a volume control. Whereas in the small studio we have an ancient Soundcraft mixer that is equipped with volume and treble and bass controls. The job of the aux master is to sum the total level from all the same numbered aux sends on the channels, thus giving us a master level control. There will be many occasions when EQ will be a very handy thing to have fitted to the aux send masters, so if ever you need to buy a mixer try to make sure that it has this facility. A solo switch of some type will almost certainly be fitted to each aux master, again a very useful tool to have.

## **11 Aux returns.**

Aux returns, sometimes called echo returns, will be found on most mixers you will come across. This is a way of getting signals into the mixer from say a reverb unit, that doesn't require any special treatment such as EQ or further echo FX. So in essence the aux return is a very much scaled down channel. You will certainly find the same routing switches as fitted to the main channels also a pan pot and level control, but what you may or may not find depending on the price of the mixer is EQ, solo switch, mute switch, a channel type fader, even a couple of aux sends is possible, these being valuable for sending reverb to headphones. As to the number of these returns fitted to the mixer, this again depends on price. Most so called modular mixers give you the option to specify how many modules of what type you want fitted to the mixer, but as a rule there will usually be 2 or 4 of these returns available 6 if you are lucky.

## **12 The monitors.**

The word monitor crops up several times in the world of recording, even more in the world of

TV, but always it means the same thing. A monitor is where you check something for quality. In TV the monitors are visual (screens), but in sound recording monitors are audible checks for sound quality.

The ultimate item in the monitor chain is believe it or not the room in which you place your speakers. The speakers are of secondary importance to the room. I don't intend to get involved in the very complex subject of room acoustics here, suffice it to say that a moderate pair of speakers will give you a good representation of the quality of sound in a good room, and a brilliant pair of speakers have very little chance of telling you anything meaningful in a bad room. Remember it is the acoustics of the rooms in a studio complex that give it its own characteristic sound, life would be ever so dull if every studio sounded the same.

Back to our middle of the range type of mixer. We have already discussed the main monitor module of the mixer, the one that controls the speakers, now lets turn our attention to the monitor modules fitted to our mixer, the ones that give us the third figure in the mixers configuration numbers. Lets assume that our mixer is an 18-8- 16-2, that's 18 channels, 8 outputs (busses), 16 monitors, down to 2 or stereo outputs. This type of configuration is quite commonly used for the more budget type of 16 track studio, and very flexible it is too. It has a slight limitation in that it can only handle 8 separate signals at once (not allowing for the ingenuity of the engineer of course), but this will only become a problem on very rare occasions.

The module will consist of a volume control, usually rotary, a pan pot, a signal source selection switch, an aux send section which should be the same as the main channels, and if you are lucky some EQ. So what is the role of the module? Well it has three, in the record situation it allows via its selector switch the monitoring of the signals that are leaving the mixer on their way to the multi track machine, at this point you would use the aux sends to feed a mix to the headphones, and maybe add some monitor echo.

In the playback mode you would again via the selector switches be able to check the quality of the signals as they are played back into the mixer from the multi track machine, at this point it should become obvious why you use the monitor aux sends to feed the headphones and not the channels, as the same mix is now being sent to both the headphones and the monitor echo device without the need for any alterations to the channel settings.

The third use is less known and is operational only in the mix down mode. What we have in fact is an extra set of channels, even though they are less sophisticated than the main channels the monitors can be used in exactly the same way, so in mix mode our 18 channel mixer becomes a 34 channel mixer, which is rather impressive.

In reality the 8 outputs of the mixer could be used as sub groups, this is when you route a bunch of channels, lets assume 6 channels of drums down to say groups 1 and 2, and then via the monitor level control 1 and 2 are sent back into the mix, this gives us control of the whole drum kit just using 2 faders. So we can have 18 main channels, 8 subgroups, and still have 8 spare channels for the odd kitchen sink....! This is flexibility.

### **13 In line mixers.**

In home recording circles there seems to be some kind of mystique surrounding the in line type of mixer, well to be honest there is nothing strange or even very unusual about them. They are simply mixers with the monitor level controls (monitor as in buss out/tape return) situated in the main channels instead of being mounted separately on one side of the mixer. This kind of approach does have its good points, for instance, mixers can be made smaller, you don't need the extra width that a monitor section takes up. Also it means that the monitor level controls are closer to hand so you don't have to lean over to adjust them, (perish the thought). On the other hand there are some definite disadvantages too, for example, I don't know of a single in line mixer at any price that offers EQ on the monitors, normally there just isn't room on the channel to fit it in. The major manufacturers offer instead the option to switch the main channel EQ into the monitor signal path, but this deprives the channel of its EQ. The same can also be said of the aux sends, again it will be possible to switch them between monitor and channel, but in the mix down mode all of those extra channels we talked about earlier will have no EQ and no aux send facilities available to them, unless the particular channel has no need of those facilities, not so bad in a large studio that has extra EQ to patch in, but could be a problem in the smaller studio with less outboard gear to rely on.