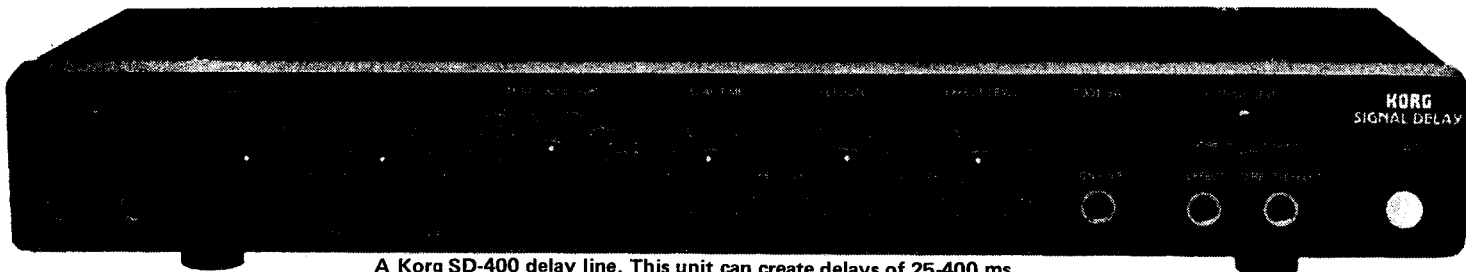


STUDIO TECHNIQUES

In the second part of his article, Steve Rimmer describes some basic sound effect techniques.



A Korg SD-400 delay line. This unit can create delays of 25-400 ms.

Effects

EFFECTS, signal processing and modification, are probably the most interesting and potentially ingenious bit of the studio. These can be subdivided into commercial effects, and homemade ones. The latter are, by far, the most useful because every commercial effect ever invented has been used by every musician on the planet at least once, while stuff you create yourself has at least some hope of being original. Homemade effects are not electronic in the spit and soldering iron sense of the word.

Commercial effects are usually found in the form of pedals, set up so that they can be switched on and off by means of foot dexterity, the crunch of an Earth Shoe upon the button, while both hands are occupied in playing. There are countless variations on the themes, but the following constitute most of what's kicking about at the moment.

Volume changers do their number, as one might expect, on the magnitude of the noise being fed through them. These include simple volume pedals, in which the angle of the foot in relation to the absoluteness of the floor determines the gain of an amp, and various sorts of envelope shapers. Sustainers keep turning up the gain of themselves as the note being fed through them dies off, creating the illusion of its hanging on much longer than it really does. There are also envelope shifters, to lengthen the attack of a note, and make it come up gradually.

The mighty fuzz box is just an amp which is designed to do heavy distortion at the very slightest provocation, availing even the meekest guitar of supreme raun-

chiness. All the heavy metal bands have them. Fuzzes are very overworked alone, but, because the distortion involves the generation of lots of nifty odd harmonics, they provide a nice source for further processing.

The mighty fuzz is certainly in the same league as the equally mighty wah-wah, which is a low pass filter that can be swept back and forth across the signal by means of a foot pedal. All the reggae bands have them. Straight wah is another well-worn effect, and generally well ignored.

Delay boxes come as a myriad of configurations, and constitute the most popular of the current crop of effects. They're sort of the marijuana of the electronic druggie scene. There are flangers, a swept comb filter, producing the all too familiar whooshing jet plane sound, echoes, which, yes, do echo, chorusing, which lays automatic flowing harmonies on a single track, and automatic double tracking, which does a short delay and feedback number to make a single voice sound like two.

Commercial pedals are really severely limited in what they can do, because they are designed to work in real time. Because of the temporal bending possible in the studio, these restrictions are not heavy upon us if we don't want them to be, and, thus, one need not succumb to the lure of the flanger. There are much wierder possibilities.

Tape manipulations offer all manner of really trippy effects. The easiest is just to flip the tape over, and run it through the machine the other way around. This will, of course, invert the

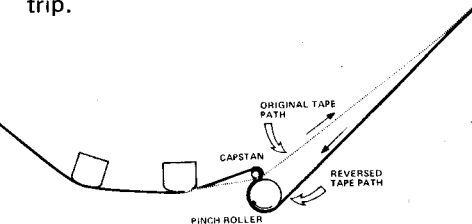
order of the tracks. Now, everything will come out sounding backwards. The characteristics of most musical acoustic sounds are that they have a short attack, and long delay, which, of course, will all be reversed. The "thump" will become "whoosh". Similarly, anything recorded when the tape is rolling like this will come out reversed when it's put back the right way. This can be a very startling effect, because the backwards sound is almost never heard naturally. It sounds like some reversed drum sounds are being used on "Let My Love Open The Door" on Townsend's "Empty Glass" disc, if you'd like a "fer instance".

Especially if you're using pancakes, flipping the tape can be a bit tricky, and will frequently result in a brown avalanche all over the floor. Therefore, I shall now impart to you a very rare and hitherto carefully guarded secret, once vouchsafed to me by a very old and venerated lama on the side of a mountain in Tibet, concerning how to make the tape go backwards without turning it over. Like, don't spread this around, so only you and thirty thousand other will know. We won't count the lama, since all he has is one of those Elcassette recorders, and he can't even get tape for the nasty thing anymore.

On a studio three motor transport, when the real motors have been properly adjusted, if the tape is slipped out of the headblock and capstan, and just stretched between the two reels with the thing in "Play", the tape will not move; the two opposing reel tensions should be perfectly balanced. Therefore, it is only the direction of the capstan that actually rolls the

tape. Now, if we could reverse the capstan direction we'd be all set, but few recorders have provision for this. However, the same effect can be achieved if the tape comes at the capstan in the opposite direction. Thus, thread the tape normally, and then remove it from between the capstan and the pinch roller. Bring it around the other side of the pinch roller, and across the capstan in the opposite direction. It should describe an "S" shape. When the machine is put in play, the tape will go in the opposite direction.

Now, this technique leads to one curious problem, that is, that the heads are now the wrong way around. The tape passes over the erase last, thereby wiping out what has just been recorded. It is therefore necessary to cover the erase with a bit of cardboard when doing this trip.



Play something backwards? You can turn it around or get unusual effects by doing this with your tape deck to reverse tape movement.

Random music backgrounds are another useful tape manipulation. It's frequently handy to be able to get a drone effect that sounds like a particular type of music, but not like an specific piece. You might want to have a string quartet going, for instance. The way to do this is to get several two track recordings of string quartets, and cut the tapes into small sections about three or four inches in length. Put the bits in a bag and shake vigorously, as if you were making synthetic fried chicken. Then splice the tape back together. Some of the bits will come out backwards, some out of place, and so on. After the initial re-assembly, it is usually necessary to reshuffle a few segments to get the whole thing fairly homogenous. A bit of reverb will smooth over the transitions. This can thereupon be dubbed onto the four track.

This probably sounds a bit nouveau to actually be good for anything, but, in fact, it is very frequently employed, even in pop piece. You'll find it done on "The Benefit of Mister Kite", on "Sergeant Pepper's Lonely Hearts Club Band" to name but one . . . (the only one that comes to mind at the moment, actually).

Vari-pitching the tape is something nobody does very much, but it does have quite a lot of potential, especially if you have limited resources, in terms of instru-

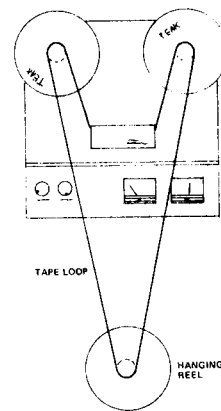
ments. It requires a low frequency sine wave oscillator, and an amplifier beefy enough to drive the tape machine's capstan motor through a step up transformer. Most studio transports have a plug for introducing an external sixty cycle power source for the capstan. The exception here is the crystal controlled capstan transports, such as the Studer Revoxes, in which the motors run at different frequencies. In this type of arrangement, the capstan speed is varied by padding the master oscillator.

If the tape speed is continuously variable, so are the pitches of the signals on it. Therefore for instance, you could record a guitar track, and then lay down a cello track using a violin, by increasing the speed of the tape. You can also obtain very realistic low sax sounds this way using a flute fed through a fuzz box. By making more delicate adjustments to the speed of the tape, it's possible to tune the music already recorded to a non-tunable instrument, like a recorder.

When varying pitch in this manner, the envelopes of sounds are also shifted accordingly. This can do supremely magical numbers on percussive noisemakers, like tongue drums or a clavichord. If the tape is rolled very fast on recording, the envelopes of the sounds recorded will be stretched considerably, producing a great deal more "tone" than would be experienced naturally.

Frequently repeated sounds are good sometimes, especially if you're doing a largely percussive bit. These can be obtained by using tape loops. Tape loops are really an art unto themselves.

To make a tape loop, record a sound of some sort, (the sixteen eyed, hound of halitosis snorting talcum powder, for example) on a two track. Cut out the bit of tape actually containing the sound, and splice the two ends together. Put it back on the tape recorder. If the sound is fairly long, and the loop extends more than a few feet, it will have to be supported, or it will transform itself into a plate of shiny brown Kraft dinner and get munched in the whirring machinery. If the tape recorder is vertical, this can be arrived at by letting the tape dangle down, and dropping a small empty plastic reel into the crook of the loop. When the tape is running, it will just sit there, spinning around as the tape goes by, and keeping the tension up. It's kind of interesting to watch, if you're a bit wrecked. If the transport is horizontal, the tape is brought out beyond the front of the machine, and looped around a mike stand, the back of a chair, or a python hanging from the ceiling. Boa constrictors are also suitable. Obviously, much longer tape loops can be accommodated with horizontal mac-



An inexpensive way to make a tape loop for repeated passages. The hanging reel shouldn't be too heavy or the tape will be stretched.

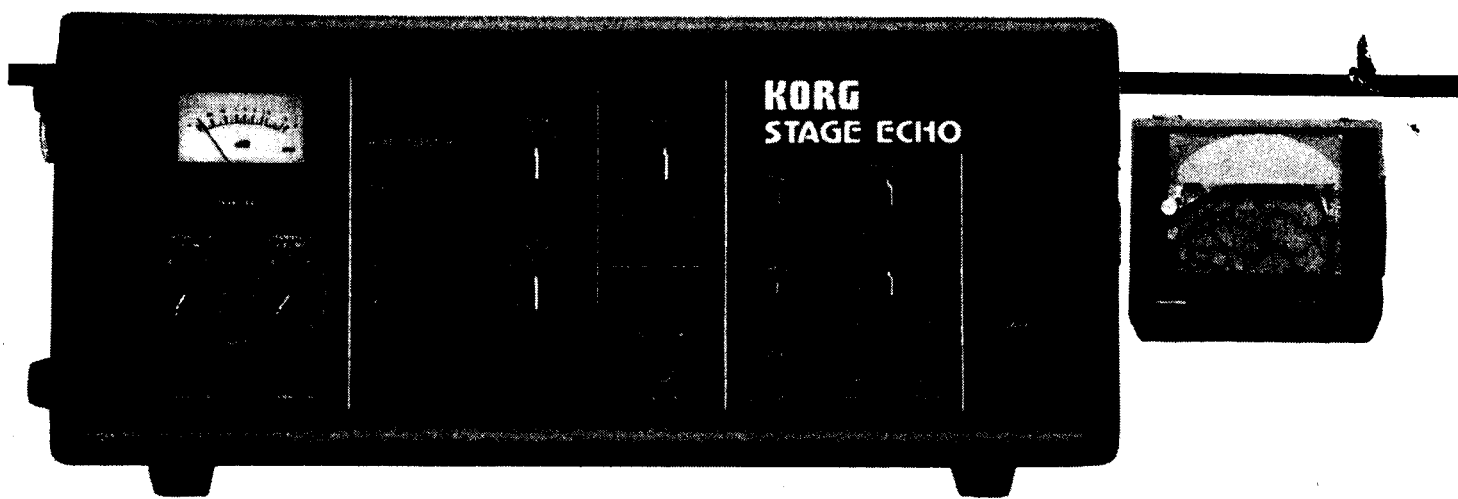
hines, unless your vertical one is sitting at the brink of an elevator shaft.

Really interesting textures can be arrived at by getting two tape loops going simultaneously and letting the sound interact. There was a piece a number of years ago, called "Come Out", by Steve Wright, in which the words "Come Out" were dubbed onto two identical bits of tape, and the two loops run through two machines, one vari-pitched down the very tiniest bit, so that they gradually went out of phase, producing a very strange flowing drone after a half hour or so.

Flanging

Curiously, almost nobody really knows what flanging is, anymore. Most guitarists think it comes out of a little box with three knobs and a pedal button. Actually, it's called flanging because it's a tape effect, or, at least, it once was . . . the flanges are the platters of tape reels. It was come upon over twenty years ago by Phil Spector, for a song called "The Big Hurt". How ignominious!

Tape flanging is much more interesting than CCD flanging, and isn't terribly difficult, either. To get the flanged effect, you'll need two identical dubs of the piece to be flanged, played back on two separate recorders. One can be dubbed onto a track of the four track, to eliminate the need for actually owning a pair of two track machines. The two dubs are played back simultaneously, and the phase relationship adjusted by placing a thumb, toe, or other available extremity (nose, perhaps?) on the flange of one of the feed reels to slow it down very slightly. This will result in the familiar waahing effect of the two signals interfering with each other. The rate of the waah is, of course, determined by the phase difference between the two tapes . . . a fair bit of thumb dexterity is required to gain sufficient control over the kingdom of flanges to make the techni-



The Korg SE-300 is an echo unit intended for stage use. The smaller photo shows how the tape is arranged in the unit.

que practical.

Echo

The last effect we'll look at is echo, or reverberation, of which there are four types, not counting the electronically synthesized versions.

Since we've been doing tape effects, we'll cover tape echo first. This can be further chopped up into short delay and long delay. Short delay is easily accomplished using any three headed transport and a mixer. Some recorders, like the Revoxes, have the effect built in. To do it externally, a signal is fed into the machine in the normal manner, and immediately monitored off the playback head: Because the two heads are a finite distance apart, there will be an interval of time between the instant the sound is recorded and that at which the tape it'd been recorded on arrives and the playback head, whereupon it is heard. The monitored sound is mixed back into the signal going into the machine at a much lower level . . . the exact level determining the length of the resulting reverberation.

The process can be meddled with by vari-pitching the recorder, and changing the capstan speed while the echo is happening. The results are . . . well, very bizarre, and not easily described.

To lengthen the reverb time past the fraction of a second available with the inter head spacing, long delay echoes can be set up. The principle is the same; the distance between heads is increased by using a tape loop . . . or just a reel of tape . . . strung between two recorders, in which one does the recording, and the second one the playing back.

The second type of echo is room echo, which is frequently employed by large studios that have nice, quiet rooms to use for it. Whereas tape echo is very hard, and choppy, the echo's being each a sharply defined distance apart, room reverb can contain many reflections, which gives it a feeling of spaciousness, but without any fixed delay time. It is ac-

complished by placing a monitor speaker at one end of a large room, and hanging mikes here and there. The sound to be reverberated is played into the bin, and mixed back into the original as heard by the mikes, which pick it up after it's bounced around a while. Obviously, a good, live room is needed, one with hard walls, floor and ceiling, in order that the sound is not muffled and absorbed. The room must also be large enough to provide an audible delay.

Pipe echo is very seldom used, but has the advantage of being quite cheap. In its simplest incarnation, it consists of a garden hose with a funnel at one end. A speaker is glomped over the funnel, and a mike is affixed to the opposite end of the hose. Sound played into the speaker must travel down the hose to reach the mike, thus contributing a delay. Really long delays can be obtained by using several hoses. The possibilities of building a combination delay unit and plumbing sculpture are staggering.

Unfortunately, pipe echo has two drawbacks, aside from sounding a bit peculiar. It's most susceptible to external sound, and it's very noisy, because the mike usually wants quite a bit of gain to get a decent level off the signal meandering down the hose. This isn't bad for short delays, but gets quite noticeable if a couple of those super economy family size ultra hoses are married.

Lastly, there is a spring reverb, with which most of us have probably had some contact. The delay system is a long, suspended spring, with a transducer at either end. There are actually reverbs of this type that are as big as the average human, and look like the slime dervish that devoured Greenwich Village, but most are tiny little things a foot and a half long.

Spring reverbs sound very twangy, and contribute quite a bit of noise. However, the sound they make is rather well loved, so they remain rather on top of the heap. One really neat thing to do with a spring reverb is to kick whatever

it is mounted in, at which point it will begin to generate some interesting, and possibly even useful, percussive effects.

Once you get everything down on the four track the way you want it, it must be dubbed onto a two track master. The usual speed for this is 15 ips . . . just in case you're planning to approach a label with your creation. The four signals from the four track are run back into the board, positioned on the stereo stage, EQ'd if necessary, and the whole mess dubbed into stereo.

The only wrinkle in mastering is something which has crept up of late, namely, half speed backwards dubbing. It's just what it sounds like; you can make your dubs at half the regular speed, and, to further, complicate matters, you can do them in reverse. There are, oddly enough, actual reasons for doing this.

As far as the half speed part goes, tape is happier with low frequencies. The higher a pitch gets, the less the system is able to deal with it. Up in the treble end, things are really bad, which is why there are Dolbys, and whatnot, to compensate for this sort of negativity. However, one can simply cheat the equipment by dubbing at seven and a half, instead of fifteen, thus moving all the notes down one octave. If the highest note was twelve kilohertz at fifteen, it will only be six now, where it won't cause anywhere near the problems it once did. Of course, the tape recorder's EQ will go to pot doing this. I get around this by using Telex multiple EQ dubbing electronics, but these are really awfully expensive. The other approach is to compensate for the misequalization with an outboard graphic equalizer.

The playing backwards part is a bit more like alchemy. It seems that tape responds better to sharp trailing edges than it does to sharp leading edges. Most acoustic sounds, as we've discussed, have sharp leading edges, which can be reversed if the tape is.