

were mixed to two outputs and these were monitored in stereo. In other words, the tape recorder was being used simply to store elementary information from the studio, the engineer at the session experimenting with various means of equalisation etc., at the record producer's request, without interfering with the basic recording. When I add that, besides this revolutionary thinking, both the studio and the control room had multi-coloured lighting [*Keith Wicks please note!—Ed.*], each with its own light mixing panel, and that a second control room specially for reduction had been constructed with identical dimensions to the studio control room (in order that the acoustics of the two rooms should be as similar as possible), we may appreciate what a competent engineer Tom Dowd is. No wonder the Atlantic label has had such tremendous commercial success in the pop field during the last few years. During the latter part of the 1960's, the majority of American and English pop recording studios advanced to 8-track recording. During the last three or four years, transistors have finally exploded into the professional audio scene to the extent that it is quite unusual today to come across multitrack recorders with valve amplifiers. Also, of course, the pop industry seems to have decided that eight tracks are no longer enough and the move is towards 16, 24 and even 32-track equipment. The interesting thing about this development is, however, that the original Atlantic philosophy has now become almost universal: as far as possible engineers are trying to maintain the principle of one microphone per track. It is remarkable though that, when the average engineer is faced with recording 'straight-stereo' (i.e. attaining the finished sound at the time of recording or compromising with three or four tracks, he is quite happy to mix many microphones together and commit himself at the session. Once the move is made to 8-track recording, which often calls for only two microphones to be mixed together on a given track, this gives the engineer the willies since he wishes that this kind of commitment did not have to be made at the time. Consequently, once the first step is made on the uphill (or downhill?) path to multitrack recording, the logical end seems to be to keep the master tape as a simple means of storing information directly from the microphones. Since monitoring all these tracks is a formidable problem in itself, requiring a comprehensive mixer to get all the tracks down to two (or at most four) loudspeakers, possible future studio installations will consist simply of variable gain microphone amplifiers feeding directly into the recorder, the whole of the studio mixing desk being used for the dual purposes of providing the monitor feed during the sessions, and reduction dubbing purposes thereafter.

Severe competition

Naturally, although Ampex were the pioneers in this field, they nowadays face severe competition (see last month's survey). Ampex, 3M and Scully made, I suppose, some 90% of multitrack equipment found in studios today. Studer are just about to bring an 8-track machine on the market with a 16-track recorder to follow very shortly. Also, the English Unitrack machine has now just become available in 16-track form, but is not yet in general

use. Perhaps this is the machine we have been waiting for and at last the great British Tape Recorder has arrived on the international scene. It's been a long time since the *BTR 2!* All these machines have the same switching facility as the selsync system but we have to be careful of our use of words since Ampex very sensibly made *Sel-Sync* their trademark many years ago, as in fact they did also with the word *Videotape*.

Artificial Reverberation

Many years ago, a friend of mine was making a pop record which featured the dulcet tones of one of our present day disc jockeys (it was such a long time ago I daren't mention his name, but I believe the song was called *Too Young!*) in mono of course. The engineer suggested that a small amount of artificial echo added to the voice was now the done thing. This he explained would help to round out the sound. Also, if done carefully, it would help make the voice stand out from the orchestral accompaniment. As the recording was being carried out in a comparatively small studio and the string section sounded a little cramped and dry, the producer suggested that perhaps some of this artificial echo stuff might be nice on the violins. Whereupon the engineer threw up his hands in horror. 'You can't do that—it will make them all swimmy', so the echo was never added to the strings. A year later the Mantovani sound was born. Ah well, it is sometimes difficult to be a pioneer.

The first time I was aware of artificial reverberation on a pop recording was in the late 1940's when some really excellent engineering was apparent on some of Stan Kenton's 78 RPM discs. I presumed at that time that the recordings were made in a large reverberant dance hall or somewhere similar, but was amazed at the clarity and presence of the rhythm section. Now, of course, we know how it was done.

Echo Chamber. This is probably the oldest system and consists of a small tiled or plaster-surfaced room housing a loudspeaker fed through the echo send panel on the studio mixer plus an omni-directional microphone which is connected to the echo return circuit. The main problems with this system are that the quality of the sound from the chamber is largely a matter of luck depending upon the inherent 'colour' in the chamber, also the decay period of the echo is hard to plan in advance. A modern studio complex may require something between eight and twelve echo devices and this means possibly the whole basement of a building would have to be set aside for the purpose, which is not very practical.

Tape Delays. This system has the merit of using a very small amount of space and in fact being portable. The system is well known and consists of using the record and play heads of a tape recorder simultaneously, the delay time being decided by the gap between the two heads and tape speed used. Simple repeat was common effect on the early rock-and-roll records and is quite useful for producing a very gimmicky voice from time to time, particularly if one is trying to simulate the effect of a public address system. If the signal from the replay head is mixed back to the record head, the resultant blurred effect is much more pleasing. Most studios refer to this as the

'tape-spin' effect. Although it is customary to use a standard tape recorder for this purpose, a much better system is to construct a recorder using a loop of tape with three or four replay heads plus some form of simple mixing in order to achieve the right amount of signal from each replay head.

Metal Plates and Springs. Without doubt, the most widely used artificial echo system to be found in professional circles today is the EMT, a 2.7 x 1.2 m steel plate 12 mm thick, which is suspended by springs from a metal frame. This system is without doubt the most flexible available in that the plate may be tuned when it is installed, by adjusting the suspension to produce a smooth peak-free response giving little coloration. A mechanical damping system allows reverberation to be varied from zero to six seconds. The system works by the echo send signal being amplified and exciting a drive unit at one end of the plate, the sound vibration passing along the plate and being monitored at the other end by a ceramic pickup which is fed back to the console. The reverberation period is adjusted by means of a special damping system which is mechanically operated but which can be driven by remote control from a mixing desk. It may, of course, be hundreds of metres away on a different floor of the building. A stereo version of the plate is available which, although retaining a single drive unit, has two pickups fitted, the shifting phase between the two pickups giving a life-like spatial effect. One of the greatest advantages of the unit, apart from its flexibility, is that the complete system in its mounting case is little over 30 cm thick, thereby allowing several plates to be stored adjacent to each other in the space that would be required for a single echo chamber. It can hardly be considered portable though. A simplified version of this principle is the reverberation spring. This was pioneered by the Hammond Organ Company as a means of providing a reasonable reverb facility on their electronic organs. The short length of spring is suspended between two posts, one post housing the exciter unit and the other housing the pickup. The problem with this system is that the majority of springs have a lot of coloration and that no suitable damping system has been produced commercially for adjusting the decay period. However, the Grampian system, which is available at moderate cost and is quite portable, is a very useful system to have on hand and if used carefully can be considered for professional work. A large number of these units are used today even in the most hallowed walls. Many a first class recording and (dare I say?) broadcast has gone out enhanced by the Grampian unit.

One of the problems in using any artificial reverberation system is that, as the amount of echo is increased, the performer appears to recede into the reverberation. Since it is customary in pop recording to retain 'presence' at all costs, some form of compromise has to be achieved. The most common method of combating this problem is to delay the echo send line via a tape recorder operating at 76 or 38 cm/s. Even at the higher speed, the time taken for the tape to pass from the record to the play head and thence to the echo device is sufficient to register the initial impact of the sound upon the ear before the echo becomes apparent.

To be continued