

Tape machines - part 1

The Fostex range



MANUFACTURER'S SPECIFICATIONS

Reel-to-reel recorders				Model 350 recording mixer
Parameter	A-2	A-4	A-8	
Tape	1/4in tape width, 1 mil base			Inputs: impedance 50kΩ; levels - 60dBV(1mV) mic, - 10dBV (0.3mV) line. Max + 12dBV(4V).
Format	2-track	4-track	8-track	Tape inputs: impedance 20kΩ; nominal input level - 10dBV, max + 12dBV.
Heads	Three	Three	Two (erase, rec/rep)	4-channel buss in: impedance 10kΩ; nominal input level - 10dBV.
Reel size	7in diameter 'cine'-style spools			2-channel buss in: impedance 20kΩ; nominal input level - 10dBV.
Tape Speeds	7 1/2, 15in/s ± 0.5%	7 1/2, 15in/s ± 0.5%	15in/s ± 0.5%	Phono in (x4): impedance 50kΩ; nominal input level - 54dBV(2mV), RIAA equalisation.
Varispeed	± 10%	± 10%	± 10%	Phono out (x4): load impedance 10kΩ or higher, at - 10dBV nominal.
Line in	- 10dBV (0.3V) 30kΩ unbalanced			4-channel and 2-channel busses out: load impedance 10kΩ or higher, at - 10dBV.
Line out	- 10dBV (0.3V), load impedance 10kΩ or higher, unbalanced			Monitor out (x2): output load impedance 10kΩ or higher, - 10dBV.
Record level cal	0VU referenced to 185nWb/m		0VU = 250 nWb/m	Stereo headphone output: 4Ω minimum, 8Ω or higher typical load impedance, 100mW into 8Ω.
Equalisation	NAB (IEC available in Europe)		IEC	Frequency response, 4-channel buss out: 20Hz to 20kHz ± 1dB; headphone: 50Hz to 15kHz ± 2dB.
Wow and flutter	± 0.06% peak (IEC/ANSI) weighted at 15in/s			Equivalent input noise: - 128dB, weighted.
Fast wind time	130s typical for 1,800ft of tape			S/N ratio: one mic input 68dB; eight mic inputs 58dB: one line in 75dB; eight line ins 58dB (all weighted).
Overall freq. response 15in/s	40Hz to 20kHz, ± 3dB		45Hz to 18kHz ± 3dB	Equaliser sections: 80Hz to 1.2kHz and 800Hz to 12kHz, both ± 12dB adjustment.
7 1/2in/s	40Hz to 18kHz, ± 3dB		—	Crosstalk: 65dB at 1kHz.
S/N ratio (sync/repro) ref 1kHz, 3% THD, wtd.	65dB	63dB	73dB (with Dolby-C)	THD overall: 0.03% at 1kHz nominal level.
THD	Better than 1% at 1kHz, 0VU			Power requirements: 120/220/240V AC, 14W.
Crosstalk (repro)	50dB at 1kHz		40dB at 1kHz	Dimensions: 18 1/2 x 3 3/4 x 16in/460 x 95 x 405mm (whd)
Erase	Better than 70dB at 1kHz			Weight: net 18lb/8kg.
Dimensions	14 x 13 1/2 x 6 3/4in/360 x 340 x 170mm (whd)			
Weight	29lb/13kg			

Manufacturer: Fostex Corp, 512 Miyazawacho, Akishima, Tokyo, Japan.

UK: Bandiv Ltd, 8 East Barnet Road, New Barnet, Herts EN4 8RW.

USA: Fostex Corporation of America, 15431 Blackburn Avenue, Norwalk, Cal 90650.

THE range of equipment under review comprehensively covers the need for a multitrack capability for musicians, small drama groups and others requiring up to 8-track recording equipment. The range includes a set of tape recorders with a matching mixer as well as a cassette-based multitrack machine (reviewed next month) and other ancillary units. In view of the low overall cost of the total system, as well as the many advanced features included as standard, it is quite conceivable that the advent of the Fostex range will cause many significant changes in the recording industry in general, as a substantial number of artists will be able to realise projects which up to now have been difficult or impossible to achieve due to the cost and complexity of 8-track recording.

The range has been conceived for recording at 'domestic' level for creative purposes. In view of

this, Fostex open-reel tape machines are designed to use 7in 'cine' spools and 1/4in 'long play' (1 mil) tapes so that a recording time of about 20min/reel at 15in/s is possible. All input and output 'line level' signals are unbalanced, of medium impedance and at a nominal level of - 10dBV. RCA phono jack connectors are used for the majority of audio connections, 1/4in mono jacks being used otherwise. Tape recorder remote leads use the only multiway connectors on the units.

There are three reel-to-reel recorders in the range, an 8-track 1/4in, a 4-track 1/4in, and a 2-track 1/4in. These all use the same transport, and measure 14 x 13 1/2 x 6 3/4in (whd) and weigh all of 29lb. The decks use three small DC motors, one for each reel and one to drive the capstan. The reel turntables are designed with one large prong to locate the reel and are supplied with clamp screws. They are indirectly driven by a healthy-looking rubber band

as is the large diameter capstan. The deck plate is a pressed metal design, although it is sturdy looking, and all functions are solenoid operated. Thus all the transport functions can be readily remote controlled, a boon for one man operation. Tape speeds of 15in/s and 7 1/2 in/s are offered on the 4-track and the 2-track machines although the 8-track only runs at 15in/s. All the tape machines have a built-in varispeed facility of up to ± 10% and have a claimed speed accuracy of better than 0.5%. Wow and flutter is claimed to be in the region of 0.06% weighted (IEC) at 15in/s.

Each tape deck is provided with a 4-digit turns counter working off the supply reel. A return-to-zero rewind feature is also built in, as well as a mechanical tape lifter defeat to simplify location of a place on the tape, a mechanically latching hum shield and an edit mode on the deck to facilitate editing. Fast wind through an 1,800ft reel of tape is

reviews

claimed to be a reasonable 130s. The pinch wheel is protected around most of its periphery by an easily removable plastic guard and bears on the capstan. The pinch wheel arm is located under the deck so that the head block is not obscured by it: thus threading and editing are easy.

The headblock itself has three height guides in it and is capable of carrying three tape heads although only two are used in the 8-track machine. Two large diameter stabilising guides are mounted on either side of the headblock, and beyond these there are two tension rollers, which provide tape tension sensing at either end of the tape path. The internal surfaces of all the above guides have rotating plastic inserts. The heads are hung from a pressed metal plate and are provided with a 3-screw mount allowing height and azimuth adjustment. The azimuth setting screw is spring loaded and does not appear to have an especially fine thread. Although motion sensing is not used, the deck control circuits infiltrate stop commands so that it is safe to go directly into play from fast wind in either direction.

Controls on the tape decks are very neatly laid out in the lower right hand corner and consist of six pushbuttons in two rows of three. The top row has the return to zero and the fast wind functions, while the bottom row has the stop button located in between the play and record buttons. Above these are two switches to enable the edit mode and the speed switch — this last is used to switch the noise reduction out of circuit on the 8-track — and the varispeed control pot. The varispeed control is very smooth in action and the pot has a detent to positively locate the nominal tape speed. The tape counter and its set zero button complete the tape transport controls.

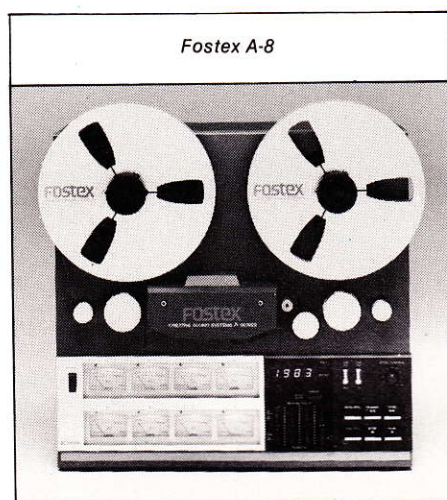
Record mode is enabled by simultaneously pressing play and record, at which point any track selected will go into record. Dropping out of record is achieved by releasing the appropriate track select switches. An excellent innovation, however, is the provision at the back of the machines of a 1/4in jack into which a normal guitar footswitch may be plugged. This may be used to initiate and terminate record functions on selected tracks when the deck is running in the play mode, thus freeing the hands of the operator. The edit mode switch disables the take-up reel motor and the tension arm micro-switch so that a long section of tape may be spilled without difficulty. A safety feature is incorporated in that when 'edit' is selected only the play mode can be entered. Furthermore, if the transport is in some other mode when edit is selected the transport will stop. This avoids accidental tape spills which could happen if this switch was used in fast forward.

Model A-8

The 8-track recorder, model A-8, as mentioned above, is provided with one speed (15in/s) and is a 2-head design, erase and record/replay. In view of the extremely narrow track widths used, the new Dolby-C system of noise reduction has been adopted as standard on this deck, although this may be switched out should some alternative external system be preferred. Only four record amplifiers are used, so that a maximum of four tracks may be recorded at any one pass of the tape. A further limitation is that the record amps are switched so that they relate either to the top or the bottom four tracks: thus, recording on tracks 1, 2,

7 and 8, for example, in one pass of the tape would not be possible. Eight VU-style meters are provided in two banks of four, and a record warning LED is mounted above the appropriate meter. When a track is selected as ready to record, the LED above the appropriate meter will flash, warning the operator. Also, this confirms that the right bank of tracks is in use. Record mode is enabled by pressing the record and play buttons simultaneously, at which point a warning LED under the tape counter reset button will light, as will those LEDs relating to any tracks selected. If no tracks have been selected all the LEDs on the selected bank of tracks will flash to signal that the recorder is in the 'record-ready' mode.

The controls provided on the 8-track recorder are extremely simple to use. Apart from the group of controls which relate to the transport functions of the machine, nine push switches are dedicated to the control of the recorder. These consist of four



track select switches, above which is the switch which routes the record function to either the top or the bottom group of four tracks. Below the record select switches are switches which select line in or replay for the group of tracks selected. On the 8-track Fostex, the group of tracks which is not being addressed by the record function is always in the replay mode. The other tracks (which are in the 'ready to record' state) remain in replay mode, being switched to line in when record is initiated. If one of the monitor select switches is set to line in, that track will remain in line in regardless of its record status. As the recorder is a 2-head design, replay is necessarily the same as sync replay. On the 8-track recorder, the erase head is close to the record/replay head so that rapid drop-ins are quite practical.

There are no level controls on the 8-track recorder for the user to worry about while recording. By removing a plate at the bottom of the recorder, all the trimmers necessary for a complete line up of the machine are revealed. Although only four tracks can be accessed at any one time, separate controls are provided for all eight. Obviously line up of the machine for a different tape is more difficult than it would be for a 3-head machine, but in the event it is quite a straightforward procedure. Apart from the lack of a

record EQ trimmer on the review machine (there is room for it on the board but that section has not been implemented) which made it difficult to optimise the top end performance, line-up to a completely different tape formulation presented no real problems. The frequency response of the machine was within the tolerances quoted in the specifications (IEC EQ is used on the 8-track), and rough measurements indicated that the S/N ratio without noise reduction was 50dB below the reference level of 250nWb/m. In view of the extremely narrow track width this performance is entirely credible, especially as the reference level is some 10dB below the 3% THD point of the tape. This would indicate that about -60dB of S/N is possible and that using the noise reduction provided, the hiss component, by far the most annoying, would be further reduced by about 20dB. However, in common with many other 'domestic' machines, the noise produced by the replay amp is only 5dB or so below the tape noise which is unimportant at the moment, but might avoid one being able to take full advantage of quieter tape formulations should these become available in the future.

If the cover of the machine is removed — with due regard to the warning notices in English and French about the wisdom of such an attempt — the extremely neat layout of the machine is revealed. The large mains transformer is mounted well away from the heads in between the reel turntables with the three small motors underneath it. The power supply boards for the machine with their fuses are easily accessible at the top of the chassis, and the transport and logic control board, which is the full width of the recorder, can be swung down for easy service. Below this is a motherboard for the record and replay electronic cards which has the master bias oscillator mounted on it. The plug in record/replay cards (each card contains two channels) hang from this motherboard, being held in place by an easily removable plate. The trimmer pots which are on the lower edge of these cards are easily accessible from the base of the recorder for line up, as mentioned above. It is impressive to note that plugs and sockets are used for all interconnections within the machine as well as number- and letter-coded ribbon cables. All the circuit boards are silk-screened on both sides with component numbers and the function of trimmers showing the high priority given to ease of maintenance during design.

Model A-4

The A-4 4-track tape recorder uses the same tape deck and has a similar structure to the 8-track recorder described above. At a first glance, the major difference is that the bottom row of four meters on the 8-track have been replaced by four input level controls, and on the back panel a 6-pin 240° DIN socket has been added to aid interfacing to an external noise reduction system. This recorder is more conventional in that it is a three head design and no internal noise reduction is provided (why not?). The other features of the A-8: varispeed; edit; return-to-zero; and the foot-switch drop-in control have been retained. In addition the A-4 has two speeds — 15in/s and 7 1/2in/s. The front panels of the machines are otherwise identical in appearance but obviously the various switches controlling the machines have new functions. The transport speed switch has

taken the place of the noise reduction switch in the A-8 and the switch that selected the bank of tracks for record is now the sync replay switch. This use of one switch to control all four tracks is a little restrictive as you cannot replay a track out of sync if you want to, for example when creating tape phasing effects or to restore synchronism when, by accident, an overdub has been made while still in replay mode.

Internally, the A-4 is similar in structure to the A-8 except for the record/replay boards, and as these only deal with one channel they are a lot less crowded. Once again, all the adjustments necessary to line the recorder up are accessible from the base of the machine, these adjustments including separate controls for replay and sync replay output level and EQ for each tape speed. This is a very good feature as it means that, if the machine is correctly lined up, disturbing level changes when dropping in should not occur, while level-sensitive noise reduction systems such as Dolby-B or -C can be used without severe mismatch problems. On the record side, no record EQ pot is fitted for the high speed once again (strange philosophy this) although the board has been designed for one and it is indeed fitted for $7\frac{1}{2}$ in/s line up. All other record adjustments are the same for both speeds so the record bias and level must be the same for 15in/s and $7\frac{1}{2}$ in/s. This is quite a common situation even in professional machines and should prove satisfactory in the A-4. Line up of the A-4 proved easy to perform (having the separate replay head helped a lot) and it was evident that an adequate range of adjustment was provided on the trimmers. This model, unlike the 8-track, uses the NAB equalisation curve and the line-up achieved was well within spec (± 3 dB) with the top end being maintained well up to 20kHz. A low frequency peak of around 3dB at about 120Hz seems to be characteristic of all these machines (the exact frequency of this peak varies from model to model and between sync and replay, so I would assume that it is something to do with the head configuration) and is the main deviation from a curve that is otherwise commendable. I was expecting to be impressed by the noise level of the A-4 after the good performance of the A-8 but in this I was disappointed: the noise level seemed worse than the A-8 and, on listening, had a harsher quality. Rough measurements indicated that the unweighted noise was about 8dB worse than on the A-8. As this seems an unlikely situation in view of the wider tracks, and as both sync and replay outputs gave a similar performance I must admit to being somewhat mystified. As with the A-8, the replay amp unweighted noise level was some 4dB below that of virgin tape so it seems unlikely that this should be the cause, nor does the adoption of the NAB characteristic fully explain this. The most probable explanation is that this particular machine had a noisy record amp.

Model A-2

The A-2 is the 2-track member of the set. Once again the same transport is used and the features of the 4-track are all present on this machine, although no internal noise reduction is provided and the noise reduction control socket provided on the A-4 is not present on this recorder (again, why not!). Once again the appearance of the recorder is similar to the others although in this case the four small meters of the A-4 have been replaced by two

larger ones. These

have been supplemented by peak overload LEDs which flash when the output level at the phono sockets is greater than +3dBV. Under the meter, input and output level controls have been provided. One of the control switches has been allocated to the output meter, such that in one position (CAL) it measures the output of the machine before the output level control, in the other the actual output level after the output controls is measured. The other switches are for record select on either track, and output select for either track. Each track can be switched so that line input, sync output or replay will appear on the output sockets.

Construction of the A-2 is very similar to that of the A-4 except that only two record/replay cards are mounted in the motherboard and, surprise, the high speed record EQ trimmer is actually there. Pity that it doesn't do much, though, as it only appears to affect the top end performance by about 5dB at 25kHz and little else. As the same motherboard is employed in the A-2 and the A-4 it might be possible to have the noise reduction control socket implemented on the A-2. The A-2 lined up well and, apart from the lift at about 100Hz mentioned before and the fact that the top end EQ on record could not be turned down enough, conformed quite well to the NAB characteristic. The noise level achieved with this recorder was altogether better than that obtained with the A-4: the replay amp residual noise was some 4dB worse than the noise level produced by tape which had been recorded on, while tape wiped on the machine had a noise level some 4 to 6dB higher than this. It was interesting to note that the sync output did not have a very much poorer noise performance than normal replay, although its top end response was not as good.

Model 350

An 8-channel recording mixer, model 350, was supplied for review with the machines. This, like all the other Foxtex equipment, is extremely small and neat, measuring $18\frac{1}{2} \times 3\frac{3}{4} \times 16$ in (whd) and weighing 18lb. The optional meter penthouse was also supplied; this contains six VU-style meters and is attached to the rear edge of the mixer at an angle chosen by the user. The unbalanced mic inputs have an input impedance of 50k Ω and use standard $\frac{1}{4}$ in jack sockets. The input level range is from 0.5mV to a maximum of 4V at this socket. External transformers could, of course, be used to accommodate professional mics or to provide more gain. Apart from the connector to the meter



Model 350

penthouse, all other connections use RCA phono sockets. Each channel has a tape input socket, a pair of phono sockets acting as a patch point which are linked when not in use, and a channel direct output. On the channel, the selector switch (mic/line, off, tape) is followed by an input gain trimmer with an overload LED (above the channel fader) monitoring the mic amp. The signal is then routed through the patch point to the channel fader which feeds the EQ unit. The output of the EQ unit feeds the channel direct output point and also the panpot, which is routed to either pair of output groups. These last are controlled by ganged faders and lead to the line-out sockets. A stereo auxiliary buss is also provided and is very cleverly organised so that its input may be selected to be from the channel pre-fader point, the channel post-fader point or the tape input jack. This means that it can be used as a stereo (or 2-mono) foldback buss, a reverb buss (in the post fader position) or a monitor buss while recording. As all line/tape switching is performed on the tape machines, this arrangement is eminently satisfactory. Each of the four main groups have an extra input point with a level control for such things as reverb return, and a similar input exists for the auxiliary buss although no level control is provided. The monitor output has no overall level control on the mixer, which I found a nuisance, and is controlled simply by five switches. One of these is allocated to each output group (A, B, C, D). Output groups A and B are treated as a pair, as are groups C and D. If monitor select switch A is used by itself, output A will appear from the centre of the monitor image; if both A and B are selected, however, A will appear from the left and B from the right. Monitor switches C and D act in a similar fashion. The remaining monitor switch selects the output of the auxiliary buss and takes precedence over the other switches. The monitor outputs have no level control on the mixer, and appear from two phono sockets at the back, ready to be plugged into your hi-fi. However, this monitor output is also routed through a level control to an internal amp which can drive the two headphone sockets ($\frac{1}{4}$ in stereo jack) provided on the front panel of the mixer. This useful amp provides a maximum of 100mW into 8 Ω .

The EQ provided on each channel of the mixer is interesting in that only two mid-band sweep sections are provided. Each has a maximum lift or

68 ►

reviews

cut of 12dB from 80Hz to 1.2kHz for the lower section and 800Hz to 12kHz for the upper. No bass or treble controls are provided. This was rather curious to work with, although a good range of sounds could be achieved with the system once 'thinking backwards' became a habit. Also provided on the mixer are two good quality stereo RIAA preamps, with floating inputs and outputs.

Manuals

The manuals provided for each unit were of a high standard, consisting of about a dozen pages of printed information and clear photographs. The manual for the A-4 tape recorder was not available, which is why the noise specification of that machine cannot be evaluated. Each manual has a fold-out front cover with detailed numbered photographs of the equipment followed by a brief description of the function of each item. This is expanded on within the remainder of the manual, which also includes detailed suggestions as to interconnection of the units and hints on how to get the best performance out of the system. A section in each of the recorder manuals gives a fairly detailed description on how to line up the machines and diagrams showing which pots to adjust and, more importantly, those which should be left strictly alone (for example, the trimmers which set up the internal operating levels of the Dolby-C system on the 8-track). This is supplemented by the fact that all the circuit boards are silk-screened with component numbers, polarities and, in the case of trimmers, function on both sides of the board. The maintenance section of the manual includes detailed instructions on demagnetising the heads and a recommendation that this should be done frequently.

Using the system

Installation of an 8-track system proved simplicity itself, although no leads were provided apart from the captive mains leads on the units. The manuals recommend that interconnecting leads should be kept as short as possible with a maximum length of 10ft to avoid top loss and hum pick-up. This is a penalty of the medium impedance circuitry used on these recorders but should not prove a serious problem in practice. Once the inputs and outputs of the A-8 were connected to the appropriate mixer sockets, the A-2 connected to the stereo buss output, and the monitor outputs connected to an amp and speaker system, mains was applied and recording could start. The tape recorders are normally mounted vertically, although feet are provided for them to be mounted in a horizontal position. Unfortunately, if they are mounted horizontally a hole must be cut in the table surface to accommodate the interconnecting leads and plugs. An optional rack-mounting kit is also available. The whole set-up, including some miniature monitor speakers, could be fitted on a surface area of 4ft x 2ft and used comfortably, which compared with other systems is nothing short of astonishing. I found that the mixer was easy and fun to use and quite surprisingly flexible. The varispeed facility on the 8-track was really impressive in that, with careful use, I was able to re-synchronise tracks from a second generation 4-track tape on to a copy of the first generation 4-track master to synthesise an 8-track recording. At first sight, I thought that this would be impossible as the two tracks did not remain in sync for long, but the precision and stability of the varispeed was such that I was able to accomplish this successfully. This is something that is unlikely

to work in even the best of studios, and I was very impressed that it proved possible with the Fostex machines. I was also most impressed by the quality of sound produced by the 8-track recorder: even without noise reduction the noise level was not unbearable and with noise reduction the system worked extremely well, the major contribution to the noise in the above example being that existing on the masters that had been copied. No crosstalk problems were encountered during mixdown, although a certain amount occurred while overdubbing.

I was especially impressed by the Dolby-C noise reduction system provided. Many musicians are unhappy with the Dolby system of noise reduction, which is possibly due to them using it in poorly-lined-up cassette recorders. The Dolby-C system



used on the A-8 provides far more noise reduction than would Dolby-B and I found it to have no apparent vices. (It should be noted that Dolby-C, like Dolby-B, only affects high frequencies — whereas Dolby-A introduces noise reduction across the whole frequency range.)

Recording and overdubbing on the A-8 proved that the system was extremely quick and easy to use, and that quite complex effects could be arranged with the mixer. To my surprise, despite warnings in the manual, adjacent track jumping was not completely ruled out although care and a good measure of luck was required. However, the headphone mix was very much altered by crosstalk in the tape heads, as it is in other semi-professional multitrack recorders. This is a pity although I imagine that, in view of the tape width, very little could be done to improve this. The restriction of only being able to record on a maximum of four tracks did not trouble me, nor did the track grouping. The more I have used the system, the more versatile and enjoyable I have found it. It is worth noting that a relatively inexperienced user should be able to use the system profitably with no other reference than the manuals provided. The results obtained with this setup were of a quality that was most impressive and reasonably noise free.

When testing the recorders for line-up I was impressed by the fact that, although the head block and deck are made of pressed steel rather than cast as in more expensive recorders, the stability of the transport did not seem to be affected by pressure on the headblock or even on the edges of the tape heads. This compares favourably with some professional machines, where merely replacing the

head cover can upset the azimuth settings! As ¼in transports are far easier to make than ½in or 1in ones, I would expect that the A-8 would prove to be adequately stable in the long term.

I must admit that I cannot feel quite as enthusiastic about the 4-track and 2-track machines. Perhaps they are bound to pall in comparison with the A-8. One of the notable features of the 8-track is the absence of level controls on the tape deck, thus avoiding unnecessary and possibly ill-advised adjustment. On the 4-track, input level controls were provided for which I could find no pressing need, while I would have far preferred to have Dolby-C on this machine, for example, especially as the complete complement of an A-8, A-4, A-2 and the mixer would still compare favourably in price with a competing 8-track machine, while the potential of such a system would be really extensive. However, it is a pity that in a situation where a mixdown of the 8-track on to the 4-track might be required to allow further overlays, the spectre of tape noise would once more rear its ugly head. And one of the delights of the A-8 is that it does not require bolt-on goodies to make it work! Still, the comprehensive set of line up adjustments on the A-4 is undoubtedly a good feature. I am surprised by the lack of a record EQ trimmer, as it is necessary to compromise the optimum bias setting to achieve the best frequency response, and in view of this it is no doubt best to stick to the recommended tape type. However, the range of the trimmer provided on the A-2 seems largely useless (it reminds me strongly of another make of recorder) and I think that the use of a lot of EQ to try and achieve a flat frequency response beyond 20kHz can only worsen the noise performance of the machine for little real benefit. This may be the explanation of the rather poor noise performance of the 4-track machine. The A-2 stereo recorder mystifies me to some extent. Once again I find that there are too many front panel controls, although this is understandable as the machine could also be sold as a stand-alone unit. I question the utility of an overdub mode on a 2-track recorder as the cassette-based multitrack system would prove more flexible, and once again I cannot understand the lack of a noise reduction system, the more so if overdubbing is to be attempted on the recorder. After all, if not required it can always be turned off. At least the control socket for a noise reduction system provided on the A-4 could have been implemented on the A-2. Last but not least, I cannot understand what conceivable use peak overload LEDs are on the output of a tape recorder (wisely the manual does not mention these at all).

It is important not to let the above criticisms cloud the fact that the overall concept and design of the Fostex system is quite exceptional. The number of features included as standard is staggering and includes some innovations (such as the footswitch to control record) that should be present in any recording studio. It is a pity that the A-2 and A-4 are not as 'taut' in concept as the A-8, but they are still commendable machines with a host of useful features. The model 350 mixer complements the tape machines very well and has great elegance and simplicity, although I would have liked to have had a monitor level control (or at least a 'dim' switch) on it as well as an oscillator, which would have been a very useful adjunct (to help set up all those input level controls!). As a final temptation, 7in tape reels fit on ordinary bookshelves; 10½in ones don't.

George Chkiantz