Owner's Manual

Model 80

8 TRACK RECORDER/REPRODUCER

FOSTEX®

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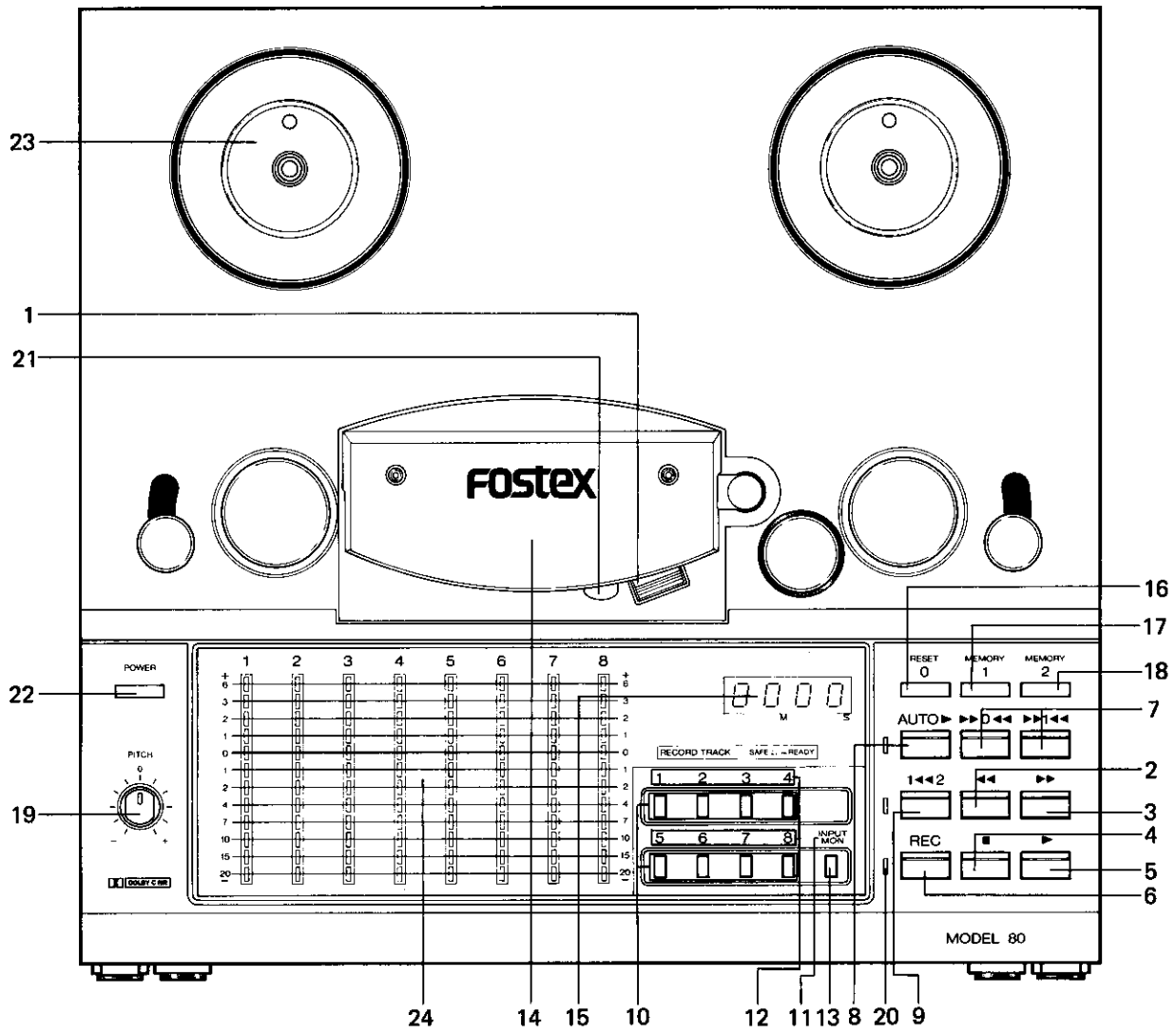
WARNING: To avoid possible electric shock hazard, do not expose this appliance to rain or moisture. There are no user-serviceable parts inside. Refer servicing to qualified service personnel.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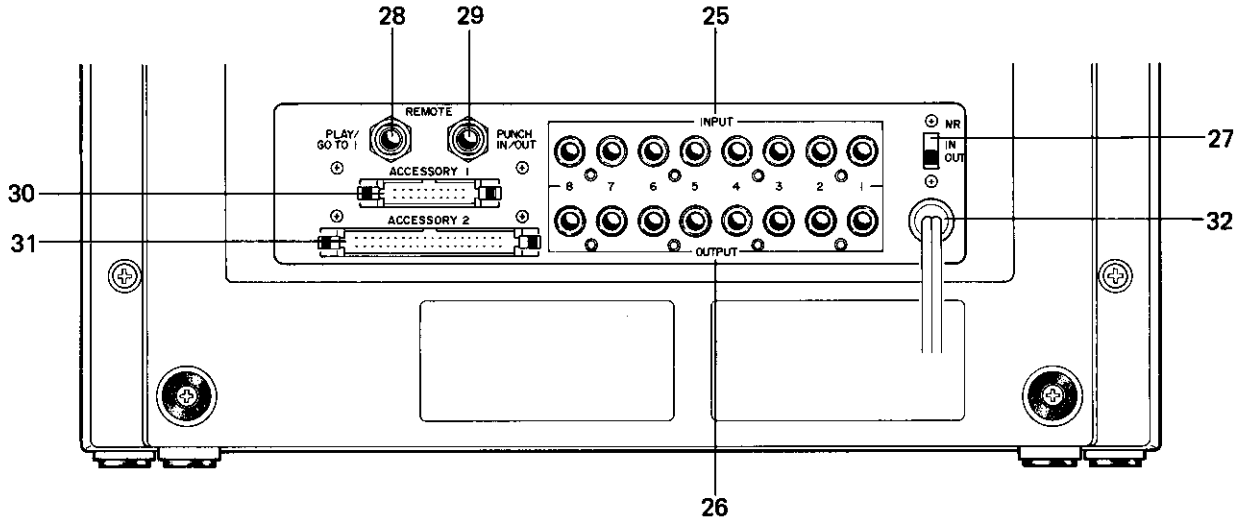
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SECTION 1 FEATURE DESCRIPTIONS

1. HEAD SHIELD GATE
The head shield gate is manually operated. If the gate is retracted down, a short downward push of its top edge will release the lock and the gate rises by spring action. To retract it, press down until it locks.

2. REWIND BUTTON [◀◀]
Spools tape at high speed from the right reel to the left reel.

3. FAST FORWARD BUTTON [▶▶]
Spools tape at high speed from the left reel to the right reel.

4. STOP BUTTON [■]
All modes of REWIND, F.FWD, RECORD, PLAY, LOCATE 0 and LOCATE 1 will be cancelled when the stop mode is engaged.

5. PLAY BUTTON [▶]
15 ips ± variable speed control (±10%).

6. RECORD BUTTON [REC]
a) With more than one and up to 8 RECORD TRACK buttons depressed, simultaneously depressing both RECORD and PLAY puts the tracks thus assigned in the record mode.
b) With more than one and up to 8 RECORD TRACK buttons depressed, and with the transport in the PLAY mode, simultaneously depressing both RECORD and PLAY puts those tracks thus assigned to the record mode (punch in).

7. LOCATE 0 [▶▶0◀◀] AND LOCATE 1 [▶▶1◀◀] BUTTON
When either the LOCATE 0 or LOCATE 1 button is depressed, the tape will search at F.FWD or RWD to the zero second position on the timer; when LOCATE 0 is depressed, or when a tape position has been put into the memory by depressing the MEMORY 1 button, then the transport will enter the STOP mode upon reaching the selected position.

8. AUTO PLAY [AUTO ▶] BUTTON
When this button is depressed, the LED at left of this button will be lit, and the transport automatically enters PLAY after coming to a stop by the function of LOCATE 0, LOCATE 1 or the REPEAT button.

9. REPEAT [1◀◀2] BUTTON
When this button is depressed the LED at left of this button will be lit, and when the tape is in the PLAY mode between MEMORY 1 and MEMROY 2, it will automatically enter RWD upon reaching the MEMORY 2 position, and then stop at the MEMORY 1 position.
If the Auto Play button has also been depressed, the tape will automatically enter PLAY from the above stop mode.

NOTE: *The MEMORY 1 tape position will normally be located ahead of MEMORY 2. If this relationship is reversed and the REPEAT button is depressed, the tape timer LED will blink to indicate an error.*

10. RECORD TRACK SELECTOR
These 8 pushbuttons determine whether recording can commence on a given track.
The specific function also depends on whether the tape is stopped, or is advancing in the record ready mode.
a) If tape is stopped, depressing a RECORD TRACK button places the corresponding track in the record ready mode, and the LED above that RECORD TRACK button will blink.
If the RECORD button only is depressed, the meter indications and signals from the OUTPUT jacks will change from tape out to input monitor only for those channels whose RECORD TRACK buttons are depressed, and if the INPUT MON switch is set to INDIV, the INPUT MON LED will change to blinking. This mode will be cancelled by depressing the RECORD button again, but will not be cancelled by depressing any other button.
If the RECORD and PLAY buttons are subsequently depressed, the tape begins recording, the RECORD TRACK LED stops blinking and remains on, and the RECORD LED also lights.
Meter indications and signals from the output jacks will, carry the input signal of the channel(s) which are in the record mode by this operation; the other channel(s) will remain in the tape out signal monitor mode.
b) If tape is rolling in the PLAY mode, depressing a RECORD TRACK button has the same effect as in a), above; it readies the track for recording.
In this condition, the meter indications and signals from the output jacks will be tape out for all channels.
c) If tape is rolling in the record ready mode (i.e. RECORD and PLAY buttons have been depressed), the RECORD LED adjacent the RECORD button will be a green light.
Subsequent depression of a RECORD TRACK button immediately causes that track to enter record mode; the RECORD LED (now lights red) and the RECORD TRACK LED now remains on.

11. INPUT MONITOR LED

12. RECORD LED (TRACK 1~8)

13. INPUT MONITOR SELECTOR
a) If the ALL button of this switch is depressed, all channels will carry the input signal and LED (11) will light.
b) If this switch is at INDIV, individual channels will monitor the input signal in the following way:
When the RECORD TRACK selector (10) is set to READY and when LED (12) is blinking, depressing the REC (6) button only will cause LED (11) to blink and the 80 output for that channel only will change from TAPE OUT to INPUT.
c) Subsequent depressing of the REC (6) button will change the output signal from INPUT to TAPE OUT.
d) Should the REC button only be depressed when the RECORD TRACK selector (10) is at SAFE, LED (11) will blink but the output signal will not change to INPUT.

NOTE: *While a given channel is in the RECORD mode, depressing the RECORD TRACK selector button for another channel will put that channel in the record mode and the output signal will change to INPUT.*

14. HEAD ASSEMBLY

15. TAPE TIMER
A four digit counter displays minutes and seconds. For negative position display (below the zero point), a "—" is displayed in front of the minute position.

16. RESET [0] BUTTON
The counter display is returned to zero by depressing this button.

17. MEMORY 1 BUTTON
The present time shown in the tape timer is stored in Memory 1 by depressing this button.

18. MEMORY 2 BUTTON
The present time shown in the tape timer is stored in Memory 2 by depressing this button.

19. PITCH CONTROL KNOB [PITCH]
The 12 o'clock click action stop of this knob is the normal speed position (15 ips. 38 cm/s); speed can be varied −10% with full CCW rotation, and +10% with full CW rotation.

20. RECORD LED [REC]
This LED will light green or red depending on the following conditions:

* With none of the RECORD TRACK buttons depressed, this RECORD LED will light green (record ready) when the RECORD and PLAY buttons are simultaneously depressed.
* With one or more RECORD TRACK buttons depressed, this RECORD LED will light red (recording) when the RECORD and PLAY buttons are simultaneously depressed.
  This LED does not light during playback/search modes.

21. CUE LEVER
The lifter mechanism lifts the tape away from the head in the REWIND and F.FWD modes, in order to prevent undue head wear.
The cue lever is provided to allow tape cueing by defeating the lifter mechanism. Engaging the cue lever moves the lifter pins toward the head until the tape touches the head.

22. POWER SWITCH [POWER]
AC power is applied to the unit and the tape timer will indicate zero when this button is depressed.
The capstan motor will not rotate unless the takeup reel side tension arm is up, — unless the shut-off switch linked to the tension arm is on — but the capstan motor will rotate in the edit mode even though the tension arm is down.

23. REEL CLAMP
The reel is secured to the reel turntable by CW rotation of this clamp.

24. LED BAR GRAPH METER
These are peak reading meters. 0 dB on the meter corresponds to a tape flux of 320 nWb/m.

25. INPUT JACK

26. OUTPUT JACK

27. NR INT/EXT SWITCH [NR]
The internal Dolby noise reduction system operates when this switch is set to INT. The EXT position is for use with outbord noise reduction.

28. GO TO 1/PLAY
The Model 8051 Foot Switch is plugged in here to control the 80. When the 80 is in the stop mode, stepping on the foot pedal puts the transport in PLAY mode.
When in modes other than stop, the function is the same as LOCATE 1, (7) above, whereby the Memory 1 tape position is searched in F.FWD or RWD and stopped at the selected position.

29. PUNCH IN/OUT SWITCH
This switch is used with the Model 8051 Foot Switch to control the 80 record mode. When the 80 is in the PLAY mode, stepping on the foot pedal once induces Punch-in; stepping on it again induces Punch-out.
With the Model 8051 plugged in and the transport is in the RECORD mode, stepping on the foot pedal induces Punch-out.

30. ACCESSORY 1
The receptacle for connecting the Synchronizer.
Please inquire at your nearest Fostex dealer or service station for details on the Synchronizer.
The Model 8031 Remote Tape Control Unit is also connected here.

31. ACCESSORY 2
This receptacle is for connecting an external operating switch for controlling the 80.
Please inquire at your nearest Fostex dealer or service station for details.

32. AC POWER CORD

SECTION 2 INTRODUCTION

The Fostex Model 80 is the latest evolution of the A-8, the world's first 8-track recorder to use 1/4" tape. The 80 features a sophisticated microprocessor for transport control functions, designed specifically for multitrack recording. It's the ideal 8-track recorder/reproducer for an inhouse production/post-production facility and it's tailor-made for the songwriter or artist who prefers to work out musical ideas alone. Punch-in/out and locate 1 and play can be done with a footswitch, the transport can be programmed to shuttle automatically between two memory positions, and the monitor logic is so uncomplicated that operating the machine won't distract you from the music.

For optimum performance, tape play/record speed is 15 inches per second (38 cm/s). This ensures very low wow and flutter, and a high signal-to-noise ratio. In addition, built-in Dolby C Type noise reduction further improves S/N ratio by about 20 dB. The wide dynamic range thus provided makes it easier to obtain noise-free recordings at moderate record levels, while simultaneously reducing the chance of distortion on peaks in the high frequency region. If you wish to bypass the Dolby system, use the rear panel NR EXT-INT switch, and make the appropriate connections at the rear panel jacks.

Fostex's engineers, who pioneered the development of narrow track, wide bandwidth professional tape formats, designed the 80 to meet the special needs of the serious small studio or production facility. It combines ease of operation, excellent flexibility and low operating costs in an extremely reliable package. Your 80 will provide years of top audio performance with a minimum of service. Routine maintenance takes less time because Fostex provides easy access to the transport and record/reproduce amplifiers.

HOW TO USE THIS MANUAL

While it may be possible to "get by" without reading this manual, the utmost in creative results can only be obtained when one is thoroughly acquainted with the 80 and its full capabilities. We suggest quickly reading this manual once before using the 80, then re-reading the manual later, after becoming familiar with the basic functions of the machine.

Section 1 contains brief descriptions of each feature. This is handy for quick reference, although for a more detailed step-by-step guide to connection, recording and playback, consult Sections 3 and 4. The rest of the manual deals with more specialized areas such as editing (Section 5), creative use of the pitch control (Section 6), and maintenance (Section 7).

Routine maintenance procedures, such as degaussing and cleaning, should be done on a regular basis. Alignment can be done regularly, or may be needed less often, depending on the demands of the application, environmental factors, and whether tape formulations change. Servicing should be referred only to qualified service personnel.

SECTION 3 INSTALLATION

Unpack the unit, and, before making any electrical connections, inspect for any evidence of possible shipping damage. Save all packing materials at least until you have verified that the unit is working properly. If there is any evidence of damage due to rough handling, consult your Fostex dealer before connecting or operating the unit.

CABLES

The 80 has high impedance unbalanced inputs and outputs. It is recommended that all cables be kept to the shortest practical length, with a maximum of 10 feet (3 meters). Use only high quality cables with tightly braided shields, multiple-stranded center conductors, and low internal capacitance, such as Fostex, Models 5044-5049.

Such cables minimize high frequency losses, and reduce susceptibility to hum. Separate input cables from output cables by at least a few inches, and keep all signal cables away from AC power cords by the greatest practical distance. If AC and signal cables must intersect, they should cross at right angles.

Microphones cannot be connected directly to the 80 unless a microphone preamplifier is used to increase the signal level. However many electronic musical instruments (e.g., electronic piano, synthesizer, etc.) can be connected directly to the recorder inputs.

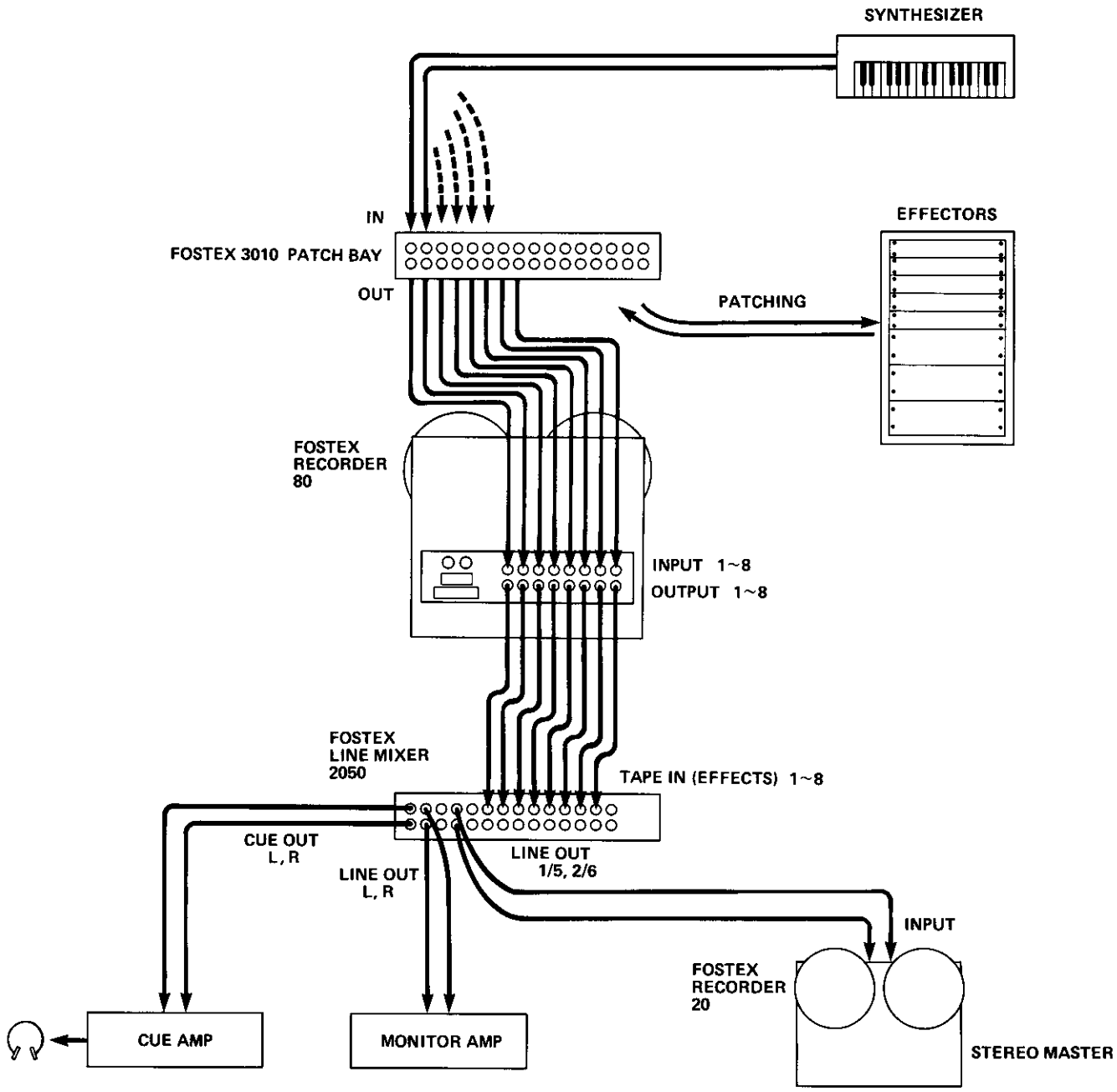
RECORD INPUTS

The eight 80 INPUT jacks are unbalanced, high impedance RCA type phono jacks which accept nominal −10 dBV (0.3 V) line level signals from a low or high impedance source. For +4 dBm interface, we recommend the Fostex Model 5030.

> **CAUTION:** Never connect a speaker-level output, such as the output of a power amplifier or guitar amplifier, to the 80 INPUT jacks unless a suitable direct box is used. The direct box should attenuate the signal to a suitable −10 dBV level, which prevents overdriving the recorder. The direct box also should include an isolation transformer, which avoids hum by preventing ground loops, and also avoids electrical shock hazard.

For synth players and programmers of electronic musical instruments, a line level 8x8x2 mixer like the Fostex Model 2050 and a 16-point normalled patch bay like the 3010 will prove to be incredibly functional and flexible. Once your system is patched, you'll be able to layer tracks, transfer, edit, ping-pong and mix — just by using jumper cables on the patch bay as you would assign switches on an expensive mixer. (Drum machines and many electronic instruments may be patched directly to the 80.)

Figure 3-1 Hook-up suggestion for synthesizers and electric instruments.



Using the Model 80 with drum machines and keyable synths.

Most of the better drum machines available today offer "sync-to-tape." This feature allows the drum machine to put a sync pulse onto one track of your recorder (usually recorded on an edge track-#1 or #8). After this pulse is recorded, the output of this track goes to the drum machine "tape sync input" jack. Now, when the recorder is played back, it will automatically start the drum machine at the same point each time. This technique offers two advantages:

a) It is much easier to modify the drum track as you compose and edit your song. If you record the drum track without a sync track, you will have to re-do all of your other vocal and/or instrumental tracks because without the sync pulse, you won't have a reference starting point for the drum machine. Using the sync pulse allows you to re-do your drum parts while keeping the rest of your tracks intact.

b) Using the sync pulse enables you to have more than 8

tracks happening at mixdown. You can run the separate drum sound outputs (kick, snare, toms, etc.) from the drum machine to extra inputs of the mixing board, giving you 12 or more tracks for mixdown.

Here's how to hook-up your system (Model 80 & 450) with a drum machine to let you monitor the drum machine, but not record it onto the tape. Please check the instruction manual for the drum machine for that particular unit's sync-to-tape details.

Figure 3-2

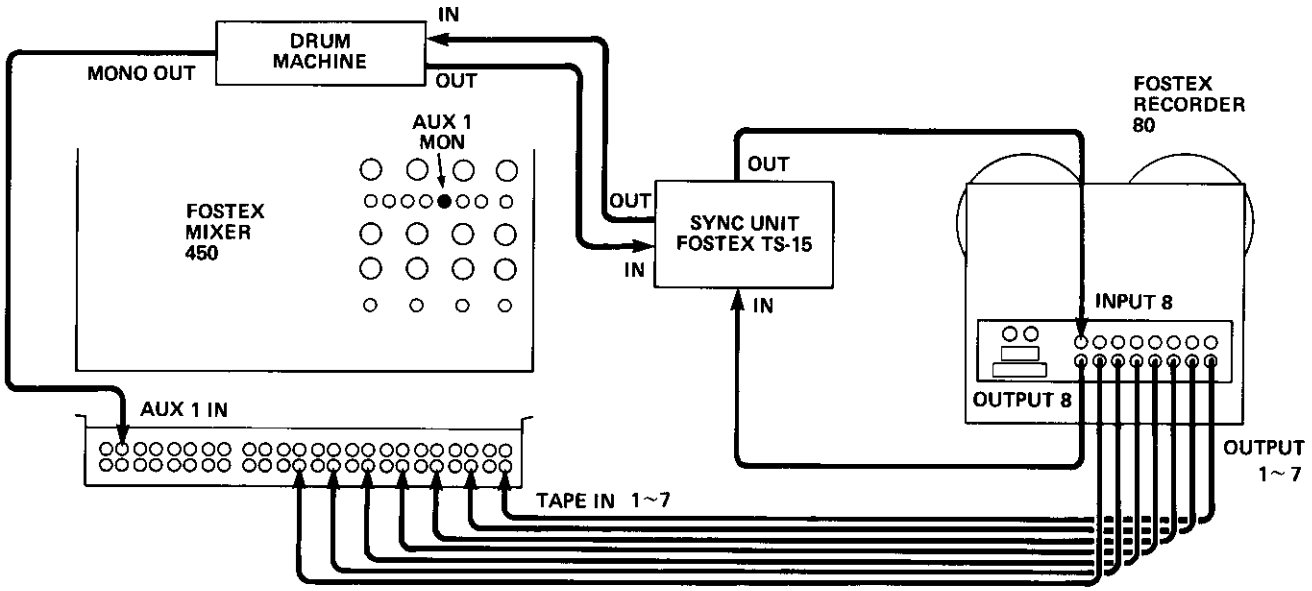
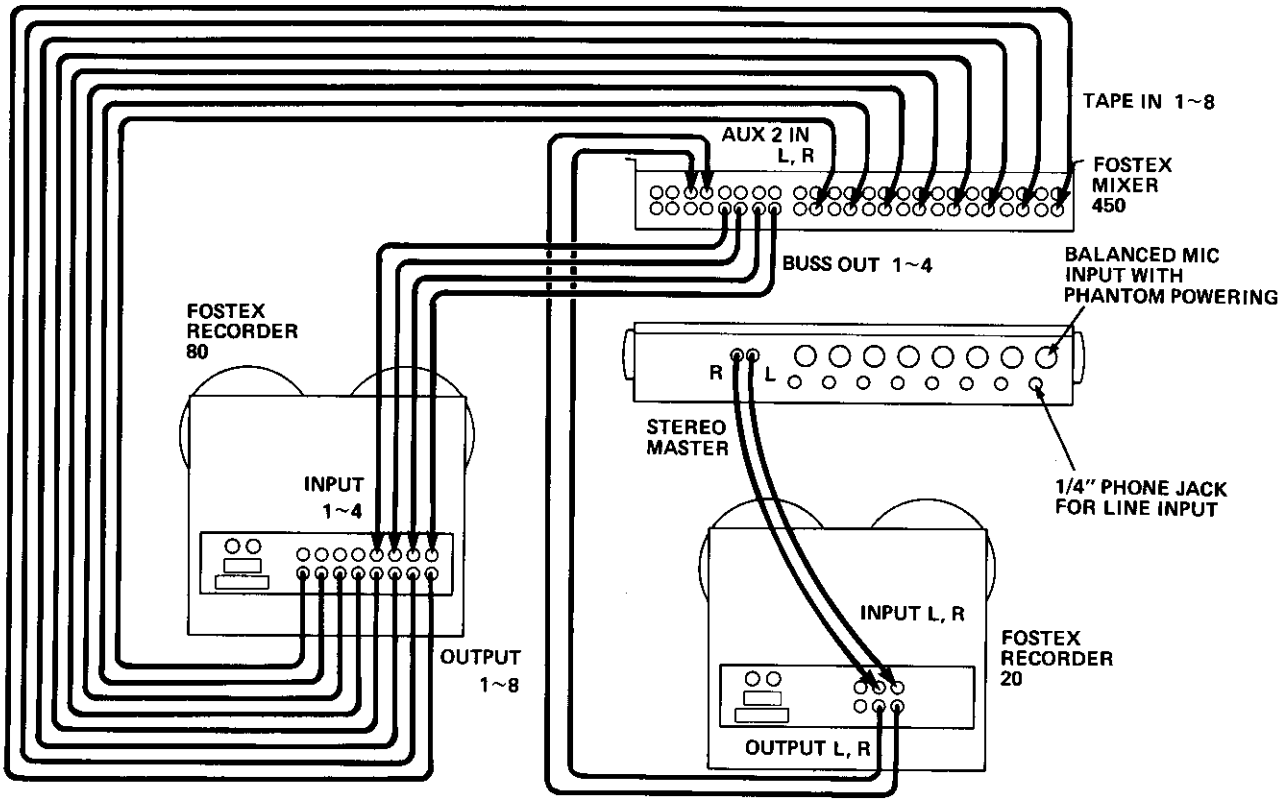


Figure 3-3 Typical system patch M-80/450/M-20.

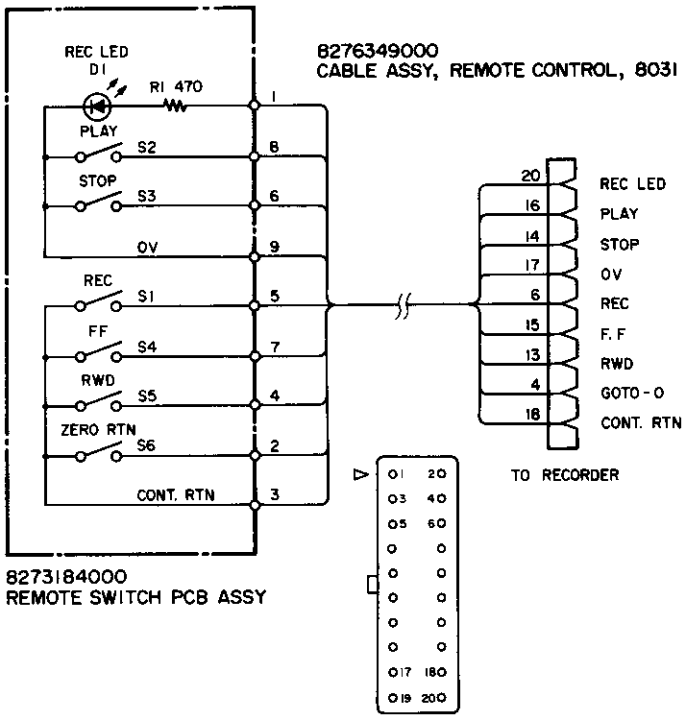


NOTE: *LINE IN jacks for channels 5 through 8 of the 80 are normalled, respectively, with channels 1, 2, 3 and 4. Therefore, when a cable is plugged into any jack of channels 5 through 8, that channel will be disconnected from the corresponding channels 1 through 4.*

REMOTE CONTROL CONNECTION

The optional Model 8031 Remote Control Unit plugs into the multi-pin connector on the 80 rear panel. This hand-held unit provides remote control of transport functions (RECORD, STOP, PLAY, F.FWD, REWIND, ZERO RETURN).

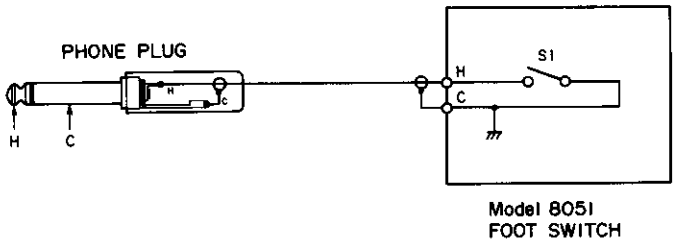
Figure 3-4



REMOTE PUNCH-IN/OUT AND LOCATE 1 AND PLAY

A standard phone jack accepts the cable from the 80 remote punch in/out and locate 1 and play switch. As an alternative to the foot switch, a convenient panel-mounted or hand-held switch can be constructed. Some people like to build such switches into the mixer; the optional remote control unit is ideal, since it also contains full transport control capability. However, in the absence of the remote control unit, a low-cost remote punch-in switch can be constructed using any good quality switch (momentary type switch). Wire it to a standard 1/4" tip-sleeve phone plug as shown in figure 3-5, and plug it into the 80 foot switch jack.

Figure 3-5. Schematic for a panel mounted remote punch-in switch.



AC CONNECTIONS

Before plugging the recorder into an AC outlet, make sure the voltage and frequency are correct. It is usually a good idea to connect the mixer and the recorder to the same AC outlet, or at least the same leg of the AC service, as this minimizes any potential difference between chassis grounds in the equipment and thus minimizes hum. This is especially important if the mixer and recorder both have grounded (3-prong) AC cords.

PLACEMENT AND MOUNTING CONSIDERATIONS

The 80 can be operated in a vertical, horizontal or tilted position. Be sure that it is firmly supported, however, and that adequate ventilation space is provided. Also, be sure there is adequate clearance of the tape reels.

SECTION 4 RECORDING AND PLAYBACK

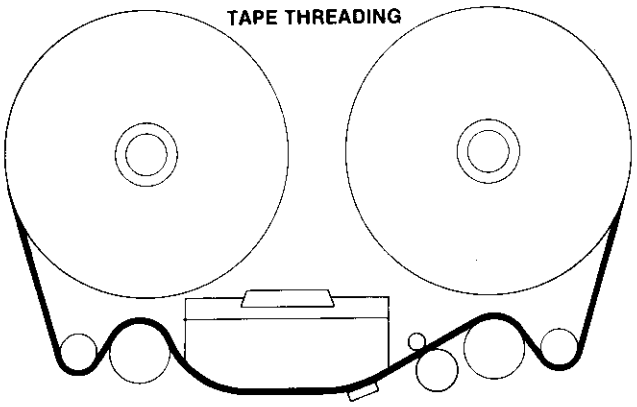
WHAT KIND OF TAPE TO USE

A 7" reel of 1 mil tape, which is about 1800 feet long (550 meters), plays for 22 minutes at the standard 15 ips (38 cm/s) speed of the Model 80. Tapes thinner than 1 mil are not recommended since they are more susceptible to wear, stretching and breakage.

LOADING TAPE ON THE TRANSPORT

Thread a blank tape on the transport (refer to figure 4-1). We recommend using Ampex 457, Scotch 227, or an equivalent tape formulation; the bias and EQ are factory aligned for these premium quality tapes. If another tape is used, it will be necessary to realign the electronics (refer to service manual).

Figure 4-1. Tape threading path.



TAPE IDENTIFICATION AND REFERENCE TONES

It is a good idea to use the first minute or two of recording time to record an identifying label (ID), stating the title, date, artist, noise reduction, and other pertinent information. Do this on all tracks. Whether or not a voice identification (ID) is recorded, many engineers like to record standard level reference tones so that during future playback of the tape, the recorder, this same unit or any other 1/4" 8-track, can be precisely aligned to yield identical frequency response and track-to-track levels. Follow the same steps outlined in the recording procedure (next) but before beginning to record the actual program, record the voice and/or tones. Use any suitable test oscillator (it can be routed through one of the mixer's input for easy assignment to all tracks). We suggest recording 20 seconds of each of the following tones at 0 dB level:

1 kHz	(for checking the reproduce amp level)
10 kHz or 15 kHz	(for checking the high frequency EQ)
100 Hz or 50 Hz	(for checking the low frequency EQ)

RECORDING INITIAL TRACKS

1. Typically, you'll record basic tracks as a reference for the overdubs.
2. Choose the specific track or tracks to be recorded by depressing the appropriate RECORD TRACK button(s). The LEDs above the track meter(s) will blink.
3. When the RECORD button is depressed, the INPUT MON indicator will blink and input signal of the channel whose RECORD TRACK button is depressed, can be monitored at the recorder output and by the meter.
4. Press the RESET button to zero the counter so it will be easy to return to the beginning of the recording.
5. Set levels with the mixer's master fader or buss output control so that the meters of those tracks to be recorded show peaks at +3 dB to +6 dB.
6. When ready to begin recording, simultaneously press the PLAY and RECORD buttons. (Alternately, press the PLAY button, then step on the REMOTE foot switch.)
7. To end the recording, press the STOP button.

NOTE: *One generally listens to the tracks as they are being recorded. This can be accomplished by monitoring the output from the mixer to the recorder, but a better approach is to set up the mixer so that it is monitoring all 8 outputs from the recorder. Then set up the recorder so that its outputs carry the signal(s) being recorded, as well as any previously recorded tracks. The recorder settings necessary are included in the following procedures.*

CHECKING THE INITIAL TRACKS

1. Press the LOCATE 0 button to rewind the tape.
2. Release the RECORD TRACK button(s) to prevent accidental erasure of the track(s). The meters and output jacks will now carry the reproduce signal.
3. Press the PLAY button and listen to the recording. If the initial track(s) is acceptable, go on to the next procedure. If the initial track must be redone, simply repeat the initial recording procedure; re-recording on the same track will erase the previous "take." It is not usually necessary to re-record any identification or reference tones; just begin recording after the ID and/or tones.

RECORDING ADDITIONAL TRACKS (OVERDUBBING)

1. Return tape to zero position by depressing the LOCATE 0 buttons.
2. Select the track(s) to be recorded using the RECORD TRACK selector button(s).
3. When the RECORD button only is depressed during STOP mode or PLAY mode, the signal at the OUTPUT jack and the meter reading will be input monitor only for the track(s) selected in 2, above.
   To cancel this mode, depress the RECORD button only.
4. Set levels with the mixer's master fader or bus output control so that the meters of those tracks to be recorded show peaks at +3 dB to +6 dB.
5. When ready to begin recording, simultaneously press the PLAY and RECORD button. (Alternately, press the PLAY button, then activate the REMOTE foot switch.)
6. To end the recording, press the STOP button.

Punch-in procedure

1. Rewind to a point prior to where the punch-in will take place.
2. Release all RECORD TRACK selector buttons except for the track on which the punch-in is to be made; depress that RECORD TRACK button. The LED above that track's RECORD TRACK button should blink.
3. If input monitor is desired, depress the RECORD button only. The input monitor signal is then carried by the output

jack and its level indicated by the meter of the channel whose RECORD TRACK selector button is down.

4. Punch-in mode can be induced by either simultaneously depressing RECORD and PLAY buttons or stepping on the foot pedal for punch IN/OUT during PLAY mode.
5. Punch-out is induced, when in the RECORD mode, by stepping again on the foot pedal or by releasing the RECORD TRACK button.

PING PONG

"Ping Pong" means the transfer of program material from one track to another on the tape to make room for later recordings. In its most common form, ping pong involves mixing together of two previously recorded tracks and simultaneous re-recording of that mix onto another unused track; the original two tracks may then be erased or used for subsequent overdubs. In a different form of ping pong technique, one or more "live" sources are mixed with one or two existing tracks, and this mix is re-recorded onto an unused track; once again, the original track(s) can then be erased.

CAUTION: There are a few limitations to which tracks can be transferred in any given ping pong. The limiting factor is signal leakage in the record/play head which could cause feedback (howling). PLAYBACK AND RECORD BETWEEN IMMEDIATELY ADJACENT TRACK(S) WITH MUCH CARE TO AVOID HOWLING.

OVER AND OVER

Whether in a Ping Pong recording, or any overdub, you're likely to encounter a section where you have to go back and forth, over and over, until it's right. In this case, take advantage of the 80's multi-function transport control circuitry.

Let's say you've recorded your basics and now you're ready to record background vocals (harmony parts, doubles) for the chorus. Simply set the Memory 1 mark at the beginning of the chorus, the Memory 2 at the end; then push the 1◀◀2 button. Whether before or after the selected chorus, press AUTO and the transport will find the beginning; play till the end, and then shuttle back and forth automatically until you tell it to stop.

You end up spending almost all of your time concentrating on your music, while your 80 takes predictable care of the cueing, all by itself.

MIXDOWN

Mixdown is the process whereby the 8 track master tape is combined to stereo and transferred to a 2 track recorder. At this point, it is assumed that all 8 tracks have been recorded, although you don't have to use all tracks.

The procedure, insofar as the 80 is concerned, is the same as normal playback. Be sure, however, that all RECORD TRACK selectors are released (SAFE mode).

SYNCHRONIZER USE

The Model 80 can be used with the majority of synchronizers on the market today, such as—BTX Shadow, EECO, Adams-Smith, Audio-Kinetic's Q-Lock, and the SMPL System. In addition, many of the video editors can control the Model 80. The synchronizer port pin-out information is shown in the back of the Model 80 service manual. If you want to make your own cables, the connectors are available from our parts department.

The SMPTE time code is normally recorded on an edge track (usually track 8), at about −4 to −6 on the Model 80 bar graph meters. For proper time code reading, we cannot over-emphasize the importance of keeping the heads and the tape guides as clean as possible!

SECTION 5 EDITING

Once a tape has been recorded, it may be necessary to rearrange the order of some takes, splice two different reels of tape together, or, to add leader tape between takes on a given tape. All these operations are considered to be editing. To edit a tape, one should have the following materials available:

1. A splicing block. Such as Fostex Model 7930. This is usually made of aluminum, with a groove to hold the tape, and one or more grooves cut across the length of the block to guide the cutter.
2. A sharp, non-magnetic single-edged razor blade. To be sure the blade has no residual magnetism, it can be demagnetized in much the same way that the head assembly is demagnetized (Section 7). Be sure to hold the blade securely, however, since a demagnetizer may pull strongly on the blade.

   NOTE: *A magnetized razor blade will cause an audible "click" or "pop" at the point of the splice. Do not use scissors.*

3. A sharp white or yellow grease pencil to mark the intended splice point on the back of the tape.
4. A roll of 1/2" wide (1.3 cm) splicing tape. Splicing tape is specially manufactured for joining magnetic tape; it is thin, and has an adhesive that will adhere to the tape backing, yet not seep out of the splice under the typical pressures and temperatures encountered.

   CAUTION: Never use conventional cellophane tape or packaging tapes for splicing. Some of the adhesive on such tapes may ultimately contaminate the recording tape, and may leave deposits on the tape heads and guides.

5. A supply of plastic or paper leader tape; plastic is stronger, but paper is easier to write upon with a pen or pencil, and is thus handy for making notes.

HIGH SPEED SEARCHING FOR AN EDIT POINT

You can search for the end of a take or the beginning of another take in either fast forward or rewind mode.

1. Turn down the monitor amplifier volume most of the way.
2. Press the REWIND or F.FWD button, and press the CUE lever toward the head assembly so that the tape lightly rests on the record/play head.
3. A high-pitched screech will be heard during the program, with a moment of silence at the end of the program; at that point, hit the STOP button. Since the tape will probably overshoot the intended edit point, it may be necessary to use the opposite fast wind mode momentarily, then press STOP again.
4. For more precise location of the edit point, rewind slightly, then use PLAY to find the exact edit point and press STOP. (NOTE: Return the monitor volume to normal once fast-winding in cue mode has been completed. This procedure will protect your tweeters.)

SECTION 6 CREATIVE USE OF THE PITCH CONTROL

The PITCH control can be used during recording or playback. Normally, these operations should be done with PITCH centered for two reasons, (a) tapes are made at calibrated speeds, and (b) the record/play equalization and the Dolby circuitry are properly aligned only at the normal running speed. There are instances when different speeds are useful.

RETIMING

If a recording has been made, say for a 60-second advertisement, and the overall program is a few seconds too short or too long, the PITCH control can be used during remixing to adjust the overall play time. The shift up or down in the frequency of the program should not be disturbing so long as a relatively small correction is used, say less than 5% (less than half the maximum speed deviation). A 5% speed change on a 60 second tape will add or subtract 3 seconds. In a longer program, say a 20 minute segment, a 5% change in length will amount to a full minute.

RETUNING

Suppose the initial track is recorded with the performer out-of-tune. During subsequent overdubs, it may be impractical or impossible to re-tune the instruments to match the detuned original track. In this case, adjust the PITCH control up or down so that the playback pitch equals the pitch of the instrument which cannot be retuned. Then make the overdub at that speed. Subsequent overdubs and/or the mixdown can be done either at standard speed or the modified speed, as desired.

SPEEDING UP A PERFORMANCE WITHOUT CHANGING THE PITCH

When a performer wishes to play a complex passage at a tempo that would normally be difficult, if not beyond his ability, the PITCH control can be put to good use.

The technique is best used during an overdub, where at least one recorded track is available for a frequency reference. When making the overdub, set the PITCH control so it slows down the tape (rotate CCW). The performer then plays in tempo with the slowed down tape. During this operation, be sure the instrument is tuned to the lower pitch heard in the monitors. For playback, return the PITCH control to the normal setting (centered). The overdub will now be heard in-tune, at normal pitch, and at a faster tempo than it was actually performed.

SECTION 7 ROUTINE MAINTENANCE

Cleaning the heads and other parts in the tape path, demagnetizing this area, and checking the electronic alignment (bias, level and equalization) are necessary procedures, and should be done on a regular basis. Periodically, check the brake torque and pinch roller pressure.

CLEANING

Magnetic recording tape, no matter how good in quality, will always shed some of its oxide coating as it travels past the tape guides and head assembly. Whenever a small particle of oxide (or dust, dirt, hair, etc.) comes between the head and the tape, audible performance can be degraded, especially at high frequencies.

If the oxide should be scraped off a portion of the tape backing, there will be a momentary loss of sound (a drop out). Drop-outs are permanent flaws in the tape, and must be avoided. Clean guides and heads are less apt to scratch the tape.

Fostex makes special cleaning solvents available from most Fostex dealers. An ideal solvent consists of 100% pure isopropyl alcohol. Rubbing alcohol *should not* be used; even though it is isopropyl, it usually contains water and oils which will leave an unwanted residue after cleaning.

> **CAUTION:** Never use organic solvents such as methylethyl ketone (MEK), lacquer thinner, acetone, etc. These can dissolve the materials that bind the heads together, and, if spilled, can mar or deform plastic parts.

Wipe the heads, tension arm rollers, tape guides, pinch roller, and capstan with a common cotton swab, moistened with the head cleaning fluid or alcohol. Allow the parts to air dry before threading a tape. (The process should be repeated until the swab no longer shows evidence of the reddish-brown oxide, and until the heads are shiny and clean.)

The exterior of the 80 can be wiped with a cloth that is moistened with a weak detergent and water solution. Do not use solvents, oils, waxes or spray-on cleaners.

DEMAGNETIZATION

When a recording is made, the record/play head applies a powerful magnetic field to the tape. Iron oxide or similar magnetic particles in the recording tape store a portion of that magnetic field (this is the recording). It is a necessary law of physics that, as the recorded tape is subsequently played, some of the tape's magnetic field will be transferred to nearby metal parts. This residual magnetism is undesirable because it, in turn, can partially erase a tape. The purpose of demagnetization (degaussing) is to neutralize residual magnetism in the vicinity of the tape path.

Demagnetizing with a device such as the Fostex Model 8180 is accomplished by bringing a strong alternating magnetic field (created by a demagnetizer) near the head area, then withdrawing the field slowly. It is very important that this procedure be done carefully, and that no tapes be within 2 feet (0.6 meters) of the demagnetizer when it is operating. It is also important to turn off the 80 when the demagnetizer is turned on. Demagnetize after every 8 hours of use.

> **CAUTION:** Demagnetizers are not dangerous devices but if used improperly they can instantly erase a valuable tape, and can permanently magnetize metal parts—the opposite of the desired result. NEVER TURN ON OR EVEN PLUG IN A DEMAGNETIZER UNLESS IT IS AT LEAST 3 FEET (1 METER) AWAY FROM THE 80. ALSO, NEVER TURN THE DEMAGNETIZER OFF UNTIL IT IS WITHDRAWN TO AN EQUAL DISTANCE OF AT LEAST 3 FEET. If the demagnetizer should be turned on or off nearby the 80, it may impart a magnetic charge to the heads or tape guides which is too strong to be removed by the same demagnetizer.

CHECKING REPRODUCE ALIGNMENT

1. After cleaning and demagnetizing the transport, set the NR INT/EXT switch on the rear panel of the recorder to EXT, and thread a reproduce alignment tape on the recorder.
   Reproduce alignment tape: FOSTEX Model 9100A or—
   •[MRL 21J103, Magnetic Reference Lab.] All specs are identical with Model 9100A except for the reference fluxivity which is 200 nWb/m and thus its reproduce output level will be 3.5 dB lower.
   •[BASF Calibration Tape (DIN 45513/2)] All specs are identical with Model 9100A.
2. Be sure all RECORD TRACK selectors are released (safe mode), and INPUT MON selector is in UP position. Then play the tape.
3. All 8 meters should indicate 0 dB levels during the reference 1 kHz tone playback. If not, adjust the reproduce amplifier level (REP CAL) (Figure 8). Access to these adjustments is obtained by removing the bottom plate of the recorder.
4. Similarly during playback of the 100 Hz and 10 kHz tones, the meters should all indicate the level specified for the alignment tape. If not, adjust the playback equalization (REP EQ) (Figure 8).

CHECKING RECORD ALIGNMENT

1. After performing the reproduce check, thread a blank recording tape on the transport.
2. Depress all RECORD TRACK selectors (ready mode), and release INPUT MON switch.
3. Apply a 1 kHz signal to the recorder inputs at nominal −10 dBV level. The meters corresponding to the input should indicate 0 dB. If not, adjust the record level calibration (REC CAL), accessible by removing the bottom plate (see Figure 7-2).
4. Record a length of 1 kHz tone, then play it back. If the level is not 0 dB, adjust the record level (REC LEVEL) as required.
5. Reset the oscillator and record tones from 20 Hz to 20 kHz.
6. Playback the recording and check the frequency response; if it is not within the specified performance, adjust the recording equalization (REC EQ), and fine tune the bias (BIAS LEVEL) as necessary.
7. Repeat the procedure for the other tracks.

> **CAUTION:** Do not touch unmarked pots. These can be adjusted only by qualified technicians.

Figure 7-1 Reproduce alignment

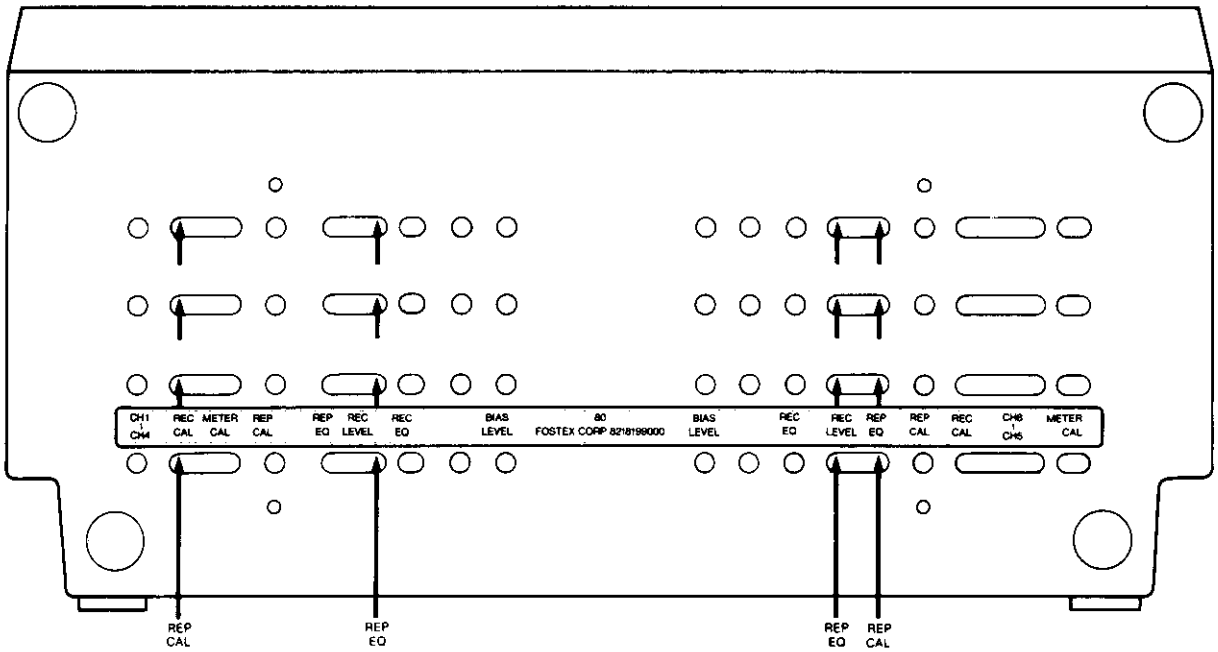
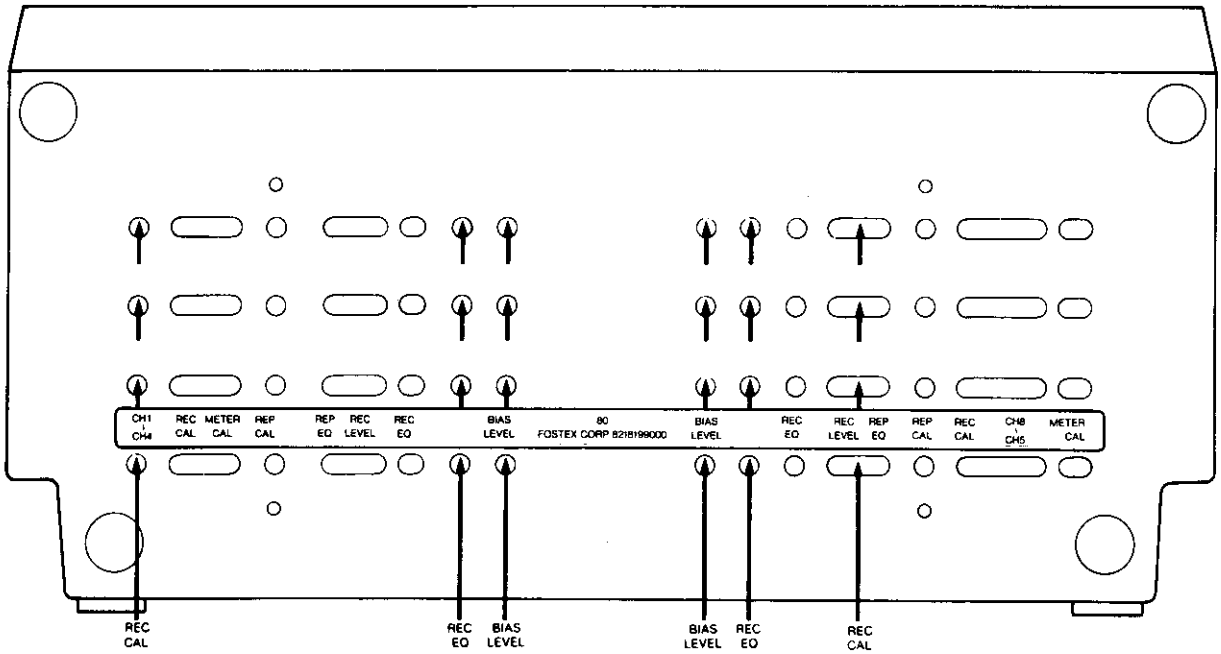


Figure 7-2 Record alignment



SECTION 8 SPECIFICATION

TAPE	1/4 inch tape width, 1 mil base
FORMAT	8 track, 8 channel (8 ch. record, 8 ch. reproduce)
REEL SIZE	7 inch
TAPE SPEED	15 ips, ±0.5%
PITCH CONTROL	±10%
LINE INPUT	−10 dBV (0.3 V), impedance: 30KΩ, unbalanced
LINE OUTPUT	−10 dBV (0.3 V), load impedance: 10kΩ, or higher, unbalanced
RECORD LEVEL CALIBRATION	0 dB referenced to 320 nWb/m of tape flux
EQUALIZATION	35 micro secs at 15 ips
WOW & FLUTTER	±0.06% peak (IEC/ANSI), weighted for 15 ips, measured with flutter test tape
STARTING TIME	Less than 0.5 sec,
FAST WIND TIME	140 seconds for 1800 ft. of tape
FREQUENCY RESPONSE	40 Hz ~ 18 kHz, for 15 ips ±3dB
SIGNAL TO NOISE RATIO	72 dB weighted, 60 dB unweighted for 15 ips, referenced to 3% T.H.D. level (10 dB above 0 dB) at 1 kHz
T.H.D.	Less than 1% at 1 kHz, 0 VU
ERASURE	Better than 70 dB at 1 kHz
POWER REQUIREMENTS	120 V AC, 55 Hz, 60 W (U.S.A./Canada models) 220 V AC, 55 Hz, 60 W (European models) 240 V AC, 55 Hz, 60 W (UK/Australian models)
DIMENSIONS, overall	14"(W) x 13-1/2"(H) x 6-3/4"(D)
WEIGHT	29 lbs. (13 kg)

SAFETY INSTRUCTIONS

WARNING
"READ BEFORE OPERATING"

1. Read Instructions—All the safety and operating instructions should be read before the appliance is operated.

2. Retain Instructions—The safety and operating instructions should be retained for future reference.

3. Heed Warnings—All warnings on the appliance and in the operating instructions should be adhered to.

4. Follow Instructions—All operating and use instructions should be followed.

5. Water and Moisture—The appliance should not be used near water—for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

6. Ventilation—The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

7. Heat—The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.

8. Power Sources—The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

9. Power-Cord Protection—Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

10. Cleaning—The appliance should be cleaned only as recommended by the manufacturer.

11. Nonuse Periods—The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

12. Object and Liquid Entry—Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

13. Damage Requiring Service—The appliance should be serviced by qualified service personnel when:

    A. The power-supply cord or the plug has been damaged; or

    B. Objects have fallen, or liquid has been spilled into the appliance; or

    C. The appliance has been exposed to rain; or

    D. The appliance does not appear to operate normally or exhibits a marked change in performance; or

    E. The appliance has been dropped, or the enclosure damaged.

14. Servicing—The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

FOSTEX

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