

# Owner's Manual

Model

# E-2 E-22

2 TRACK RECORDER/REPRODUCER



# Fostex®

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## 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.

**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.**

## 1. INTRODUCTION

This Owners Manual is common to both the Model E-2 and E-22 Master Recorder/Reproducer.

The operating procedures are in Section 3 through 6 and, for checking and repairing, refer to the Service Manual.

Although E-2 is for 1/4" tape at 15 ips and 7-1/2 ips (38/19 cm/s) and E-22 is for 1/2" tape at 30 ips and 15 ips (76/38 cm/s), all other features are the same.

The procedures in Section 6 have been limited to adjusting of the pots and therefore, electrical measuring instruments, special jigs and tools are not required. Should further adjusting and repairs become necessary, it is suggested you contact your nearest Fostex dealer or service station.

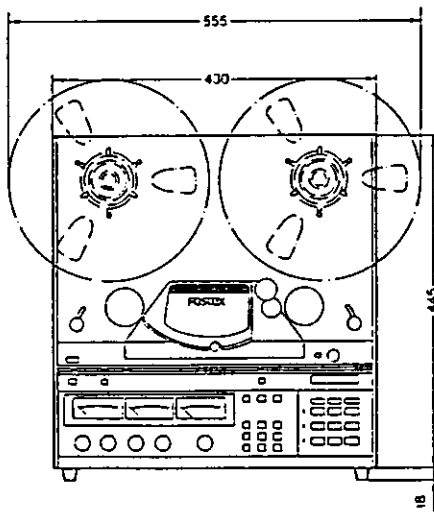
## 2. SPECIFICATIONS

### Model E-2

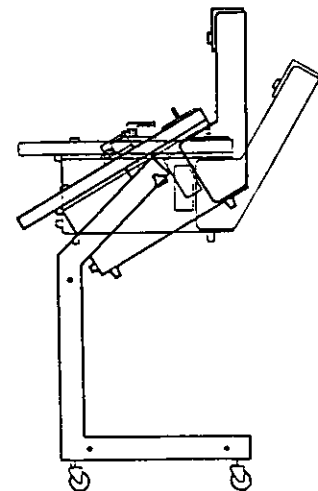
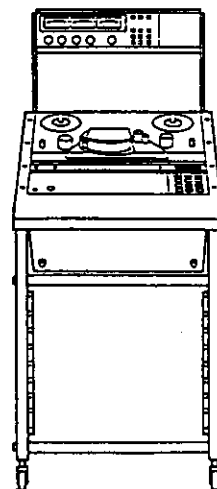
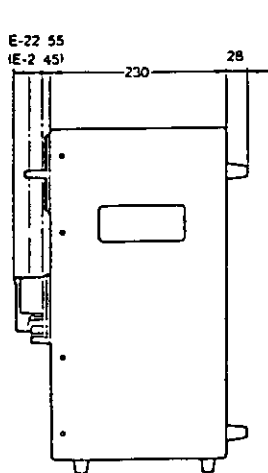
Tape	1/4" (6.3mm), 1.5 mil base
Format	2 track, 2 channel w/center track
Head	Three in-line heads (Erase, Rec/Play and Play)
Reel size	Up to 10-1/2" (270mm), NAB or EIA/CINE
Tape speed	15 and 7.5 ips (38 and 19 cm/s), $\pm 0.1\%$
Pitch control	$\pm 15\%$
Line input	+4dBm nominal, balanced and floating, imp. 40Kohms, max. input level +24dBm, -10dBV/0.3V nominal, unbalanced, imp. 40Kohms
Line output	+4dBm nominal, balanced and floating, imp. 40 ohms, max. output level +24dBm, 600 ohms load, -10dBV/0.3V nominal unbalanced, load imp. 10Kohms or higher
Equalization	15/7.5 ips; NAB (3180 <sup>+35<math>\mu</math>S</sup> )
Record level calibration	OVU referenced to 250 nWb/m of tape flux
Wow and flutter	15 ips; $\pm 0.05\%$ WTD, $\pm 0.10\%$ UNWTD 7.5 ips; $\pm 0.08\%$ WTD, $\pm 0.12\%$ UNWTD
Starting time	0.5 sec. or less
Fast wind time	140 sec. for 2500 ft (762m) of tape
Frequency response	15 ips (SYNC/REPRO); 30Hz $\sim$ 26KHz, $\pm 3$ dB 7.5 ips (REPRO) ; 30Hz $\sim$ 20KHz, $\pm 3$ dB 7.5 ips (SYNC) ; 30Hz $\sim$ 12.5KHz, $\pm 3$ dB 15/7.5 ips (CUE SYNC); 50Hz $\sim$ 12.5KHz, $\pm 3$ dB
Signal to noise ratio	15 ips (SYNC/REPRO); 69dB WTD, 66dB UNWTD 7.5 ips (SYNC/REPRO); 70dB WTD, 67dB UNWTD 15/7.5 ips (CUE SYNC); 62dB WTD, 58dB UNWTD
T.H.D.	Less than 1% at 1KHz, OVU
Erasure	Better than 70dB at 1KHz
Crosstalk	CUE $\rightarrow$ L,R track, better than 77dB/1KHz from max. peak recording level (all tracks in REC mode)
Power requirements	120VAC, 60Hz, 115W 220VAC, 50Hz, 115W 240VAC, 50Hz, 115W
Dimensions	430(W)x 463(H)x 303(D) (mm)
Weight	30Kg. (standard version)

Model E-22

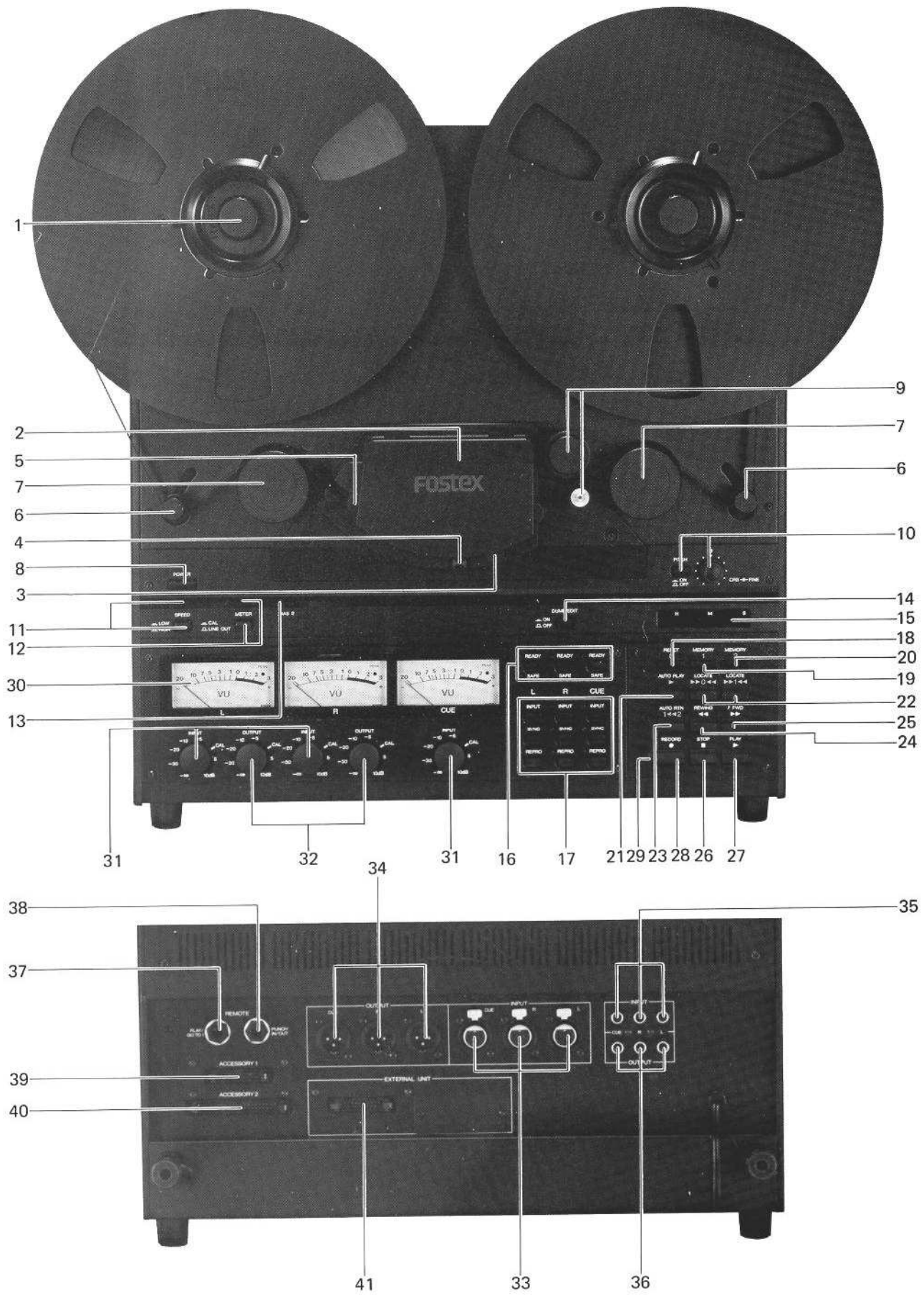
Tape	1/2" (12.7mm), 1.5 mil base
Format	2 track, 2 channel w/center track
Head	Three in-line heads (Erase, Rec/Play and Play)
Reel size	10-1/2" (270mm), NAB hub
Tape speed	30 and 15 ips (76 and 38 cm/s), $\pm 0.1\%$
Pitch control	$\pm 15\%$
Line input	+4dBm nominal, balanced and floating, imp. 40Kohms, max. input level +24dBm, -10dBV/0.3V nominal, unbalanced, imp. 40Kohms
Line output	+4dBm nominal, balanced and floating, imp. 40 ohms, max. output level +24dBm, 600 ohms load -10dBV/0.3V nominal unbalanced, load imp. 10Kohms or higher
Equalization	30 ips; AES/IEC-2 ( $\infty + 17.5\mu S$ ) 15 ips; IEC-1 ( $\infty + 35\mu S$ )
Record level calibration	OVU referenced to 250 nWb/m of tape flux
Wow and flutter	30 ips; $\pm 0.05\%$ WTD, $\pm 0.08\%$ UNWTD 15 ips; $\pm 0.05\%$ WTD, $\pm 0.10\%$ UNWTD
Starting time	30 ips; 1.0 sec, or less; 15 ips; 0.5 sec. or less
Fast wind time	140 sec. for 2500 ft (762m) of tape
Frequency response	30 ips (SYNC/REPRO); 40Hz $\sim$ 30KHz, $\pm 3dB$ 15 ips (SYNC/REPRO); 30Hz $\sim$ 26KHz, $\pm 3dB$ 30/15 ips (CUE SYNC); 50Hz $\sim$ 12.5KHz, $\pm 3dB$
Signal to noise ratio	30/15 ips (REPRO) ; 74dB WTD, 70dB UNWTD 30/15 ips (SYNC) ; 74dB WTD, 68dB UNWTD 30/15 ips (CUE SYNC); 64dB WTD, 58dB UNWTD
T.H.D.	Less than 1% at 1KHz, OVU
Erasure	Better than 70dB at 1KHz
Crosstalk	CUE $\rightarrow$ L,R track, better than 80dB/1KHz from max. peak recording level (all tracks in REC mode)
Power requirements	120VAC, 60Hz, 125W 220VAC, 50Hz, 125W 240VAC, 50Hz, 125W
Dimensions	430(W) $\times$ 463(H) $\times$ 313(D) (mm)
Weight	30Kg. (standard version)



Standard version



Rack mount and meter bridge



### 3. FEATURE DESCRIPTIONS

- 1) Reel clamper  
In the Model E-2, the 7 inch reel is secured by the reel clamper center knob.
- 2) Head assembly  
Three heads - Erase, Record/Play and Playback - are provided. Each is an in-line 2 track head.
- 3) Cue lever  
The lifter mechanism lifts the tape away from the head in the REWIND and F.FWD modes.  
The cue lever is provided to allow tape cueing when the tape is thus lifted from the head. Shifting the cue lever moves the lifter pins toward the head and the tape will touch the head. The cue lever will lock in position when it is fully shifted toward the head or the lock disengaged when it is pulled in the opposite direction.
- 4) Head shield gate  
The head shield gate is manually operated. The key lever will lock when pressed toward the head housing and lock disengaged when pressed away from the head.
- 5) Tape presence sensor  
If tape is completely wound onto the other reel or if it is broken during operation, this sensor will be activated to put the transport in the STOP mode whether it may be in any tape control mode.
- 6) Tension roller  
A shut off switch is linked with the left/right tension roller.  
If both the left and right tension rollers are at their extreme low positions, the transport will remain in the STOP mode even though the tape presence sensor detects that tape is loaded.
- 7) Idler roller  
Tach pulse for the tape counter is obtained from the left side idler roller.
- 8) POWER switch
- 9) Capstan and pinch roller  
The capstan is driven by a direct drive PLL servo capstan motor.
- 10) PITCH control switch and knob  
Tape speed can be varied approximately  $\pm 15\%$  by the pitch control knob when the pitch control switch button is in the down position (left hand LED is lit).  
Coarse adjustment is by the outer knob and fine adjustment by the inner knob.
- 11) TAPE SPEED selector and LED  
A 2 speed selector. In the E-2, high speed is 38 cms (15 ips) and low speed 19 cm/s (7.5 ips). In the E-22, high speed is 76 cm/s (30 ips) and low speed 38 cm/s (15 ips).
- 12) METER selector and LED  
Selects CAL (calibration) or LINE OUT. The LED is lit in the CAL position (button depressed). As the input signal to the meter circuit CAL position is obtained from the point before the output level control, the line output level of the INPUT/SYNC/REPRO signals will differ from the meter indications depending on the output knob position.
- 13) BIAS 2 indicator  
A 2 position bias selector. Use the BIAS 2 position for tapes other than the recommended Ampex 456 tape. Refer to Page 12 for details.
- 14) Dump edit switch  
The EDIT switch is provided to facilitate splicing of tape after remov-

ing any unwanted section of tape.

When this switch is set to UP, the transport will be in normal operating mode, and when set to DOWN, the LED above the EDIT button will indicate the EDIT mode.

When in the EDIT mode, the transport will not go into any other mode except PLAY and STOP.

The capstan motor will rotate upon switching on the EDIT switch but the takeup reel remain stationary when the PLAY button is depressed. In this case, the mechanical brakes will be released but no power is applied to the takeup reel motor and the takeup reel can be easily rotated by hand. If EDIT is switched ON during the PLAY mode, tape will stop but if the PLAY button is depressed again, the tape will be transported at the play speed but will not be wound by the takeup reel. If EDIT is switched OUT under this condition, the transport goes to the stop mode. At this point, if tape slack is taken up so that the left and right tension arm is up, and then the PLAY button is depressed, the transport goes to normal play mode.

15) Counter display and tape speed display

A five digit counter to display the hour, minute and second. For position display below the zero point, a "-" is displayed in the hour digit.

Furthermore, as long as the pitch control knob (10) is touched by your finger, the display will change from tape counting to tape speed and the percentage against normal speed will be indicated.

16) Record track selector

The buttons for selecting the channel to be recorded and L is for left channel, R for right channel and CUE for time code channel.

\* If, for example, the "L" REC TRACK button is depressed, the red LED above the RECORD TRACK button, will blink to indicate the record ready state.

Under this condition, if the PLAY and RECORD buttons are simultaneously depressed, the channel (track) of the depressed REC TRACK button will go into the record mode and the red LED change from blinking to steady lighting.

\* If the PLAY and RECORD buttons are simultaneously depressed without either of the REC TRACK buttons or CUE REC TRACK button being depressed, the RECORD LED at left of the RECORD button will light in green to indicate the record ready state.

Under this condition, if the REC TRACK button is depressed, the LED above the RECORD TRACK button which correspond to the depressed channel, will light and the RECORD LED change color from green to red. If both L and R REC TRACK buttons or CUE REC TRACK button is released (cancelled) in the next step, the RECORD LED will change color to green thus changing from record mode to the record ready mode.

With both L and R channels and CUE channel in record mode, and then, record mode of L channel only is cancelled, the RECORD LED will remain in steady lighting but the LED above the L channel RECORD TRACK button will be extinguished.

17) Monitor selector [INPUT/SYNC/REPRO]

\* If the INPUT button is depressed, input signals of channels L, R and CUE will go to the rear panel OUTPUT jacks and also be monitored by the meter.

\* If the SYNC button is depressed, depending on whether the recorder is in the record mode or not, either the input signal or sync output is obtained at the OUTPUT jack and monitored by the meter.

\* If the REPRO button is depressed, playback output of the reproduce head goes to the OUTPUT jack and the meter.

18) RESET [0] BUTTON

The counter display is returned to zero by depressing this button.

19) MEMORY 1 BUTTON

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

20) MEMORY 2 BUTTON

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

21) AUTO PLAY [AUTO ►] button

When this button is depressed, the LED at left of this button will be lit. When this LED is lit, the transport automatically enters PLAY mode at coming to a stop by the functions of the LOCATE 0, LOCATE 1 or the AUTO RTN button.

22) LOCATE 0 [►►0◄◄] AND LOCATE 1 [►►1◄◄] button

When either the LOCATE 0 or LOCATE 1 button is depressed, the tape will search at FF or RWD, the tape timer zero second position when LOCATE 0 is depressed, or the tape position previously put into memory by depressing the MEMORY 1 button, then enter the STOP mode upon reaching the objective point.

23) AUTO RTN [1◄◄2] button

The LED at left of this button will be lit when it is depressed. When this LED is lit, the tape in the PLAY mode in the section between MEMORY 1 and MEMORY 2 positions, will automatically go into RWD upon reaching the MEMORY 2 position and stop at arriving at the MEMORY 1 position. If the Auto Play button also is depressed beforehand, it will automatically enter PLAY mode 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.

24) REWIND [◄◄] button

Depressing this button transports tape at high speed from the right reel to the left reel.

25) F.FWD [►►] button

Depressing this button transports tape at high speed from the left reel to the right reel.

26) STOP [■] button

All modes of REWIND, F.FWD, RECORD, PLAY, LOCATE 0 and LOCATE 1 will be cancelled and tape stopped when this button is depressed.

27) PLAY [►] button

Depressing this button puts the recorder in the play mode.

28) RECORD [REC] button

a) With either L, R, both or CUE [RECORD TRACK SELECTOR (16)] depressed, simultaneous depressing of both RECORD and PLAY buttons puts the tracks thus assigned in the record mode.

b) With either L, R, both or CUE [RECORD TRACK SELECTOR (16)] depressed and with the transport in the PLAY mode, simultaneously depressing of both RECORD and PLAY buttons puts those tracks thus assigned to the record mode (punch in).

29) Record LED [REC]

This LED will be lit in green or red depending on the following conditions. It will not be lit in other conditions.



- \* With none of the RECORD TRACK buttons depressed, this RECORD LED will be lit in green when the RECORD and PLAY buttons are simultaneously depressed.
- \* When any one or more RECORD TRACK buttons are depressed, this RECORD LED will be lit in red when the RECORD and PLAY buttons are simultaneously depressed.

30) VU meter

It will indicate OVU when a test tape with a reference fluxivity of 250 nWb/m is played back. The overload indicator (PEAK) is lit at a +10dB level over OVU.

31) INPUT level control [INPUT L, R & CUE]

These controls are for setting the input signal levels for the L, R and CUE channels. When a level of +4dBm (1.23V) or -10dBV (0.3V) is applied to the input, the INPUT knob should be at CAL position on the knob scale.

CAUTION: When setting the input level control be sure the METER selector (12) is at the CAL position.

32) OUTPUT level control [OUTPUT L & R]

These controls are for setting the output signal levels for the L and R audio channels. The OUTPUT knob should point to CAL on the knob scale at reproducing the test tape reference level.

When the METER selector is in the UP position, the meter circuits are inserted at a point after the OUTPUT level control, its indications will coincide with the output level. In other words, if the meter is indicating OVU, the rated output level of -10dBV (0.3V) is obtained at the rear panel output jack.

When the METER selector is depressed to the DOWN position, the meter circuits are inserted at a point before the output level control.

33) XLR type INPUT connectors

These INPUT connectors are rated at +4dBm (1.23V), input impedance 40K ohms, balanced line. Pin designations are as shown in Fig. 1.

34) XLR type OUTPUT connectors

These OUTPUT connectors are rated at +4dBm (1.23V), output impedance 40 ohms, balanced line. Pin designations are as shown in Fig. 2.

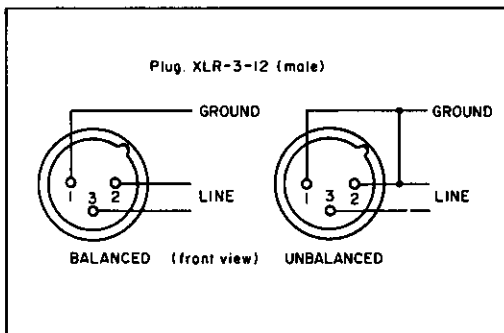


Fig. 1

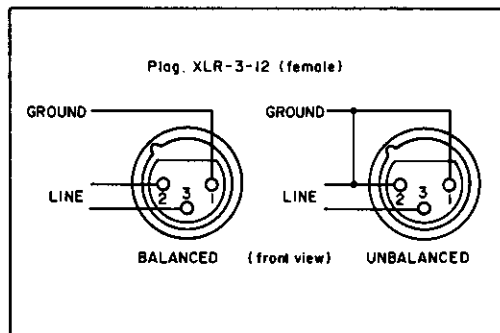


Fig. 2

35) RCA phono type INPUT jacks

These INPUT jacks are rated at -10dBV (0.3V), input impedance 40K ohms, unbalanced line.

36) RCA phono type OUTPUT jacks

These OUTPUT jacks are rated at -10dBV (0.3V), output load impedance 10K ohms or higher, unbalanced line.

37) LOCATE 1/PLAY

The Model 8051 Foot Switch is plugged in here to control the Model

E-2/E-22. When the Model E-2/E-22 is in the stop mode, stepping on the foot pedal puts the transport in PLAY mode.

When in other than the stop mode, the function is same as LOCATE 1 (22), above, whereby the Memory 1 tape position is searched in F.FWD or RWD and stopped at the objective point.

38) PUNCH IN/OUT SWITCH

This switch is used with the Model 8051 Foot Switch to control the Model E-2/E-22. When the Model E-2/E-22 is in the PLAY mode, stepping on the foot pedal once induces Punch-in and stepping on it again induces Punch-out.

With the Model 8051 plugged in and transport in the RECORD mode, stepping on the foot pedal induces Punch-out.

39) ACCESSORY 1 connector

The receptacle for connecting the Fostex Model 4030 Synchronizer using the Model 8540 cable.

40) ACCESSORY 2 connector

The receptacle for connecting the Fostex Model 4050 Auto Locator using the Model 8440 cable.

41) EXTERNAL UNIT connector

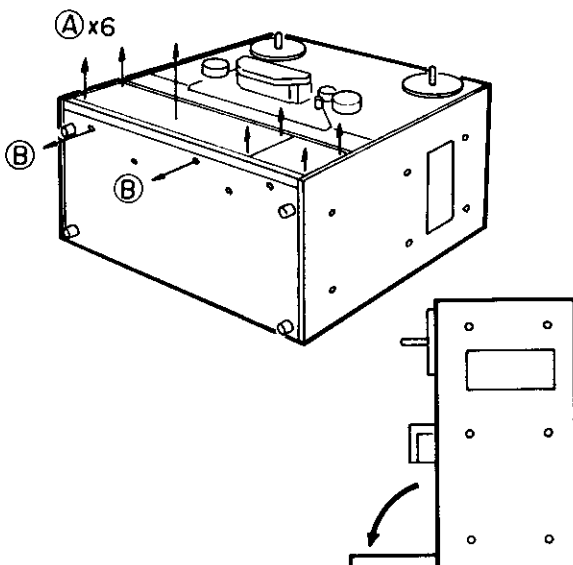
The receptacle for interconnections between E-2/E-22 and the Meter Bridge when the meter panel section of E-2/E-22 is mounted on the Model MB-2 Meter Bridge.

## 4. 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.

### 4.1 Installing the MB-2 Meter Bridge

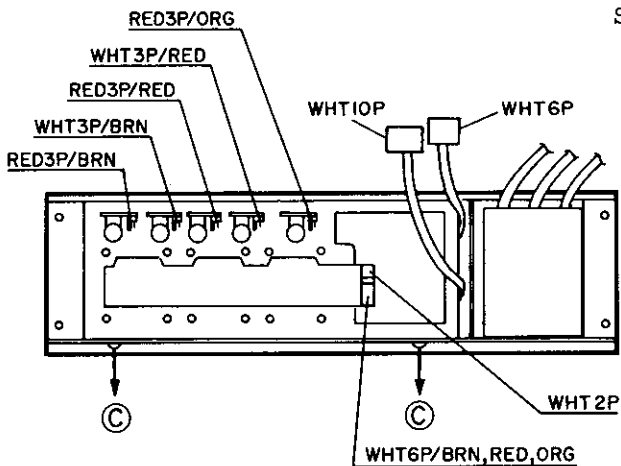
If the E-2/E-22 is used horizontally, the meter can be viewed more easily by removing the meter section and mounting it on the Fostex MB-2 Meter Bridge as explained in the following.



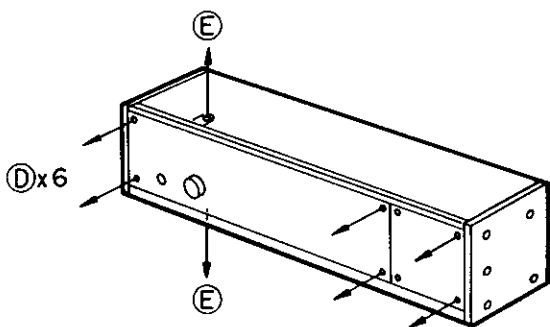
Step 1: Dismounting the E-2/E-22 meter section

\* Using the hex wrench included with the E-2/E-22, remove the six cap screws (A), two self-tapping screws (B) and the meter panel can be removed.

\* Swing the amplifier panel forward to 90 degrees.

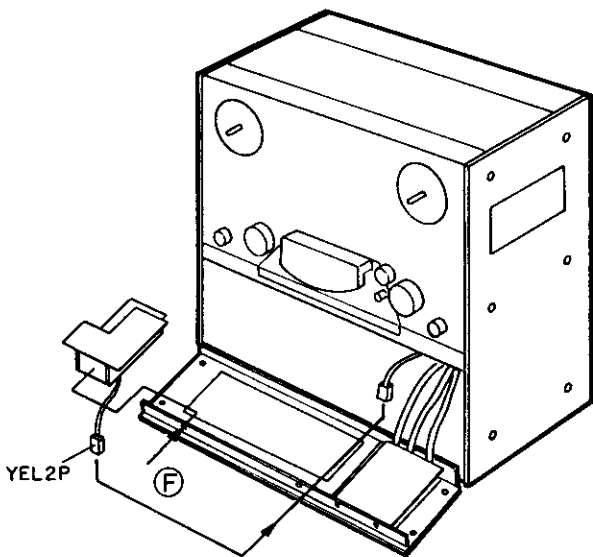


Step 2: Disconnect the nine plugs inside the meter section, remove the two self-tapping screws (C), and lift out the meter section.



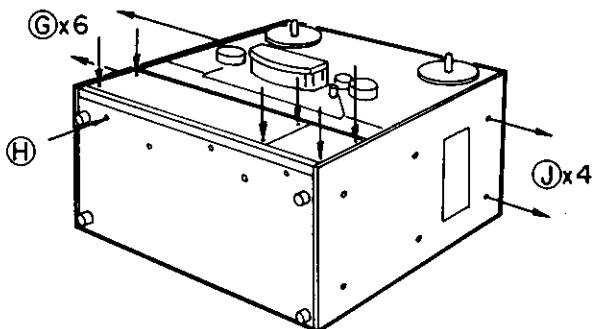
Step 3: Prepare the MB-2 Meter Bridge to accommodate the E-2/E-22 meter Section by removing the monitor amplifier section mounted inside the Meter Bridge.

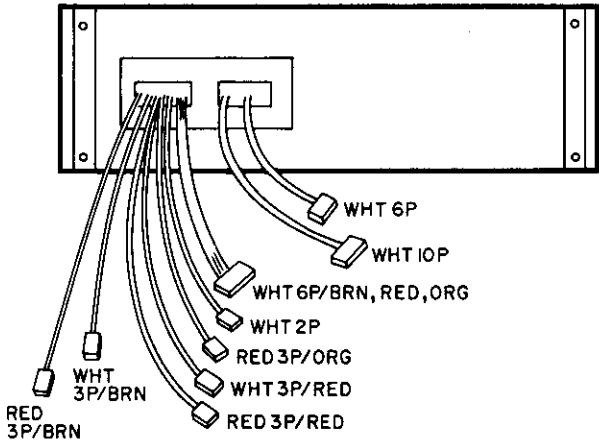
- \* Remove the panel and panel unit by unscrewing the six cap screws (D).
- \* Remove the monitor amplifier unit by unscrewing the self-tapping screws (E) at the top and bottom of the Meter Bridge.



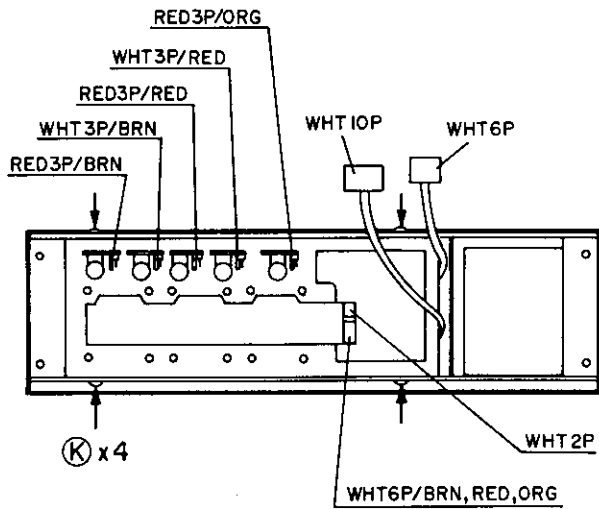
Step 4: The monitor amplifier unit dismantled from the MB-2 is reinstalled in the E-2/E-22 in the space which had been occupied by the meter section.

- \* Plug-in the 2P yellow connector and secure the monitor amplifier unit by the single self-tapping screw.
- \* Reinstall the six cap screws (G) and the single self-tapping screw (H).
- \* Unscrew the four screws (J) from the side panel.

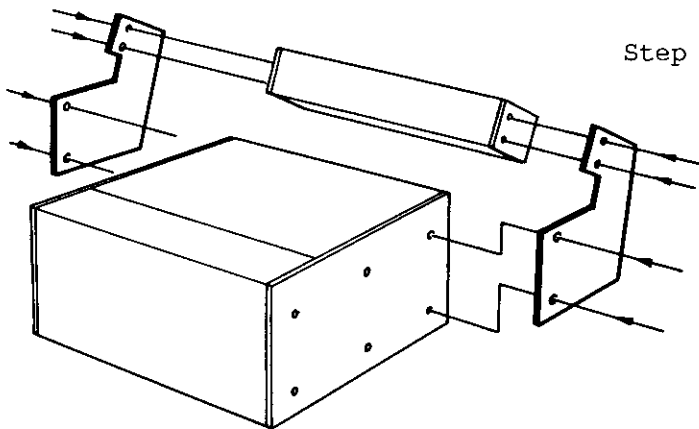
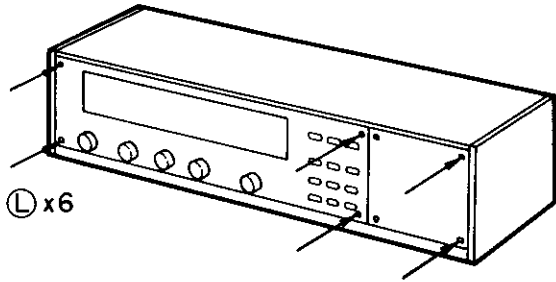




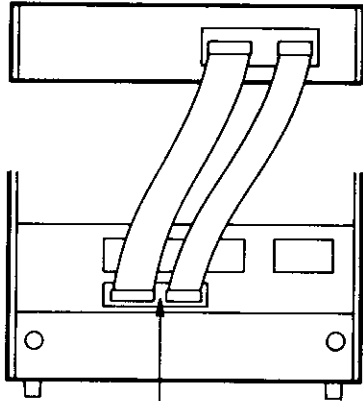
Step 5: The meter section from the E-2/E-22 is mounted on the MB-2 frame by the four self tapping screws (K) and interconnections made between the meter section and the MB-2.



Step 6: The meter section is mounted in the MB-2 by the six cap screws (L).



Step 7: After mounting the MB-2 on the E-2/E-22, the exclusive cable included with the MB-2 is used to interconnect between MB-2 and E-2/E-22.



The cover plate can be removed by unscrewing the two screws.

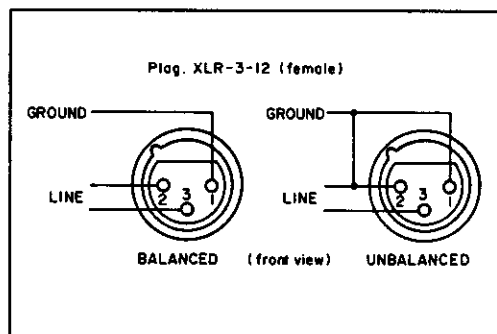
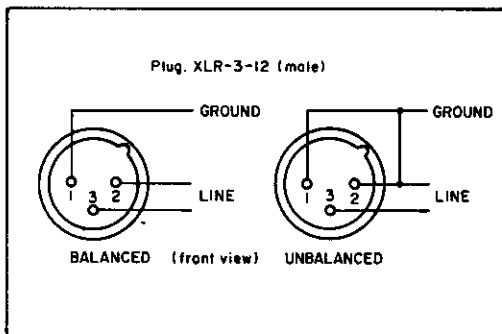
#### 4.2 Rack mounting

The Fostex Model 9905B Rack Mount Adaptor is recommended when mounting the E-2/E-22 in the Fostex Model 9081 Console Rack and standard 19 inch racks.

The rack mount adaptor is installed on the E-2/E-22, using the four screws packaged with the adaptor, through the four holes in the side panel and front panel side of the E-2/E-22. The four holes in the E-2/E-22 side panel are blind but can be easily pierced by pressing in the screw.

NOTE: The Fostex Model 9907B Filler Panel will cover the space for the upper portion of the reel when the transport is mounted on a 19 inch rack.

4.3 Pin designations for the INPUT/OUTPUT XLR connectors are as shown below.



#### 4.4 Adjusting of BIAS 2

E-2/E-22 can use two types of tape by switching the tape selector. Of the two types of tape, one is adjusted (BIAS 1) for the Ampex #456 tape and the other is not adjusted.

The bias current and record equalizer are adjusted for the tape to be used by the following procedures after setting BIAS 2 (13) LED in the lit state.

- 1) Loosen the four screws located on both sides of the meter section and tape control panel, swing down the panel and set to the left side the BIAS select slide switch, at left of the METER selector. The BIAS 2 LED will be lit.
- 2) If it becomes necessary to set BIAS 2, follow the procedures below.  
 First, load a blank tape to be used at the BIAS 2 position and set tape speed to LOW. Then, set the bias selector to BIAS 2 (LED will be lit).  
 The remaining procedures are the same as explained in "BIAS LEVEL AND RECORD LEVEL ADJUSTMENTS" but in this case, BIAS 2 (C102) is trimmed, and the recording equalizer HIGH REC EQ 2 (R204, 1K $\Omega$ B) and/or LOW REC EQ 2 (R205, 1K $\Omega$ B) is adjusted.  
 It must be noted here that, as the level setting pot REC LVL (R206, 5K $\Omega$ B) is common for both BIAS 1 and BIAS 2, when a tape with a large difference in sensitivity is used, this REC LVL pot must be readjusted when the bias selector is reset to BIAS 1.  
 The meter panel is closed and secured by the original screws after all three tracks have been adjusted. On closing the meter panel, be careful not to pinch any of the internal cables and wiring.

## 5. OPERATIONS

Practice each procedure by referring to the numbers of each control which are same with those in Section 3, FEATURE DESCRIPTIONS.

### 5.1 Tape threading

Thread the tape as shown in Fig. 5.1 making sure the tape passes through the slit of the Tape Presence Sensor (5), and that the Head Shield Gate (4) is in the lowered position.

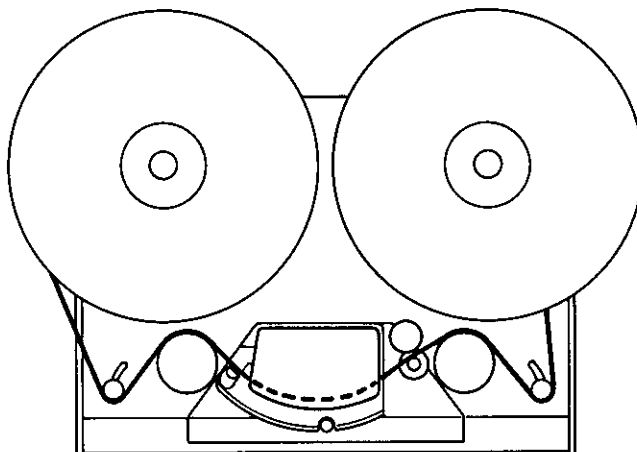


Fig. 5.1

NOTE 1: The E-2 and E-22 are shipped from the plant with reel clampers already mounted. When using the 7 inch reel on the E-2, remove the reel clamber, install the reel, then replace the reel clamber and tighten it on the turntable shaft by the center clamber knob.

The 10 inch reel clamber will firmly lock the reel by rotating it about 60 degrees CW as shown in Fig. 5.2

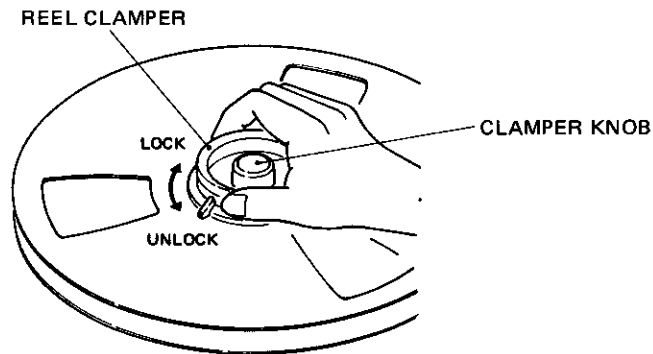


Fig. 5.2

CAUTION: Before putting the tape in motion, be sure the tape is taut with both left and right tension arms fully lifted.

### 5.2 Transport tape motion operation

- 1) When the PLAY button (27) is depressed, the capstan will begin to rotate, the pinch roller will be pulled against the capstan and tape will be transported at constant speed.

CAUTION: If the red LED at left of the PITCH control switch is blinking, this means the transport is NOT set to 15 ips normal speed but is set at "variable speed."

- 2) When the STOP button (26) is depressed, the pinch roller swings away from the capstan, the brakes are applied and the tape stops.
- 3) If the STOP button is depressed again, the left and right brakes are released, the tape will be stopped by balanced tension from both reels and thus, manual editing becomes possible by using CUE lever (3).
- 4) When the F.FWD (24) (REWIND/25) button is depressed, the tape lifter will push the tape away from the head surface and the tape will be transported at high speed from right (left) reel to the left (right) reel.

If the F.FWD (24) (REWIND/25) button is held down, tape will be transported at about 15 ips thus allowing fast forward/rewind shuttling of tape at editing work. It will return to the normal fast winding mode when your finger is released from the button.

Furthermore, the tape will be transported at about half speed of fast forward or rewind if the F.FWD (24) or REWIND (25) button and the PLAY button (27) are simultaneously depressed which is very suitable in neatly winding the tape.

- 5) If the AUTO PLAY button, then the LOCATE 0 (or LOCATE 1) button is depressed, the tape will momentarily stop at the ZERO position, then go into the PLAY mode.
- 6) The zone between MEMORY 1 and 2 can be put in the repeat mode if the AUTO PLAY (21) and AUTO RTN (23) buttons are depressed beforehand. Care must be taken to maintain the MEMORY 1<MEMORY 2 relationship in the tape position memory when depressing the MEMORY 1 or 2 buttons. The counter display will blink to indicate an error when the relationship is MEMORY 1>MEMORY 2.
- 7) When the PLAY and RECORD (22) buttons are simultaneously depressed, any channel of the RECORD TRACK button that is depressed and in the READY mode, will enter the record mode and the RECORD LED will be lit. If all channels of the RECORD TRACK selector are set to SAFE, the RECORD

LED will be lit in green and tape will be transported in the record ready state.

### 5.3 Recording

- 1) Set each MONITOR selector (17) to INPUT and check for proper input levels applied to the E-2/E-22 with the VU meter.
- 2) Depress the RECORD TRACK selector (16) button for the channel to be recorded to put that track in the RECORD READY mode. When the button is depressed, the RECORD TRACK LED will blink.  
Depress the RESET button (18) of the counter display (15) to set the record starting point to ZERO display.
- 3) The PITCH control switch (10) is set to NORMAL.
- 4) Simultaneously depress the PLAY (24) and RECORD (22) buttons and the channel whose RECORD TRACK selector button is depressed will enter record mode and the RECORD TRACK LED will be lit.  
The output for the channel in the record mode will change to input signal but the other channels will remain at reproduce output.

### 5.4 Overdub

- 1) Set the MONITOR selector (17) to SYNC and depress the RECORD TRACK selector (16) button for the channel to be recorded to put that track in the RECORD READY state. The RECORD TRACK LED for the channel whose (16) button is depressed, will blink.
- 2) In this state, if the RECORD button (28) only is depressed, the green RECORD LED (29) will blink, and the output of the channel whose RECORD TRACK LED is blinking will change to input signal.  
The meter (18) indication will also be for input levels.
- 3) If the RECORD button is depressed again, the green RECORD LED will go off and all channels will be in the SYNC state.
- 4) Simultaneously depressing the RECORD (28) button and the PLAY (26) button puts the deck in the record mode. The output of the channel in the record mode will be for input signal and the meters will also indicate the input signal level. The output for other channels will be SYNC playback signal and the meter will indicate the SYNC playback level.

### 5.5 Punch In/Out

- 1) The channel for punch-in is put to record READY by depressing the RECORD TRACK selector (16) button. The RECORD TRACK LED for that track will blink.
- 2) Set the MONITOR selector (14) to SYNC.
- 3) Depress the PLAY button (26).  
Playback signals for all channels, including that for punch-in, can be monitored.
- 4) While in this state, depress the RECORD button (29) only.  
The green RECORD LED (29) will blink and the input signal for the channel to be punched-in only can be monitored.  
Depressing the RECORD button once again cancels input monitor for the channel to be punched-in and all channels will change to SYNC playback signal monitor.  
Consequently, the output of the channel put in the record READY state for punch-in by depressing the RECORD TRACK selector, and the VU meter indications, are alternately switched between input signal and playback signal each time the RECORD button only is depressed which allows free access to tape cue and rehearsal monitoring for the musicians during punch-in.



- 5) Punch-in is accomplished by simultaneous depressing the RECORD and PLAY buttons when the tape reaches the point for punch-in. Punch-out is done by either releasing the RECORD TRACK selector button set to READY or depressing the STOP button.
- 6) A REMOTE PUNCH IN/OUT jack (38) is provided on the E-2/E-22 rear panel. The Model 8051 Foot Switch is plugged in here and, as mentioned before, when the tape reaches the desired point, the foot switch is stepped on for punch-in and stepped on once again for punch-out.
- 7) There is another method for punch in/out. The RECORD and PLAY buttons are simultaneously depressed while all channels of the RECORD TRACK selector are in SAFE. The green LED at left of the RECORD button will light. Outputs of all channels will be OSYNC and the SYNC playback signal is indicated by the VU meter. Now, if the RECORD TRACK selector button is depressed for READY, the signal will be punched-in and punched-out when it is released. During this operation, the MONITOR should be set to SYNC.

#### 5.6 Reproduce

- 1) Set all RECORD TRACK selector (16) buttons to SAFE (all buttons released).
- 2) Set the MONITOR selector (17) to REPRO.
- 3) Set the PITCH control switch (10) to NORMAL.
- 4) Depress the PLAY button and the reproduce signal is obtained at OUTPUT jacks (34) and (36). The VU meter will indicate the reproduce level.
- 5) Reproduce of tape between the MEMORY 1 position and MEMORY 2 position can be repeated by depressing the AUTO PLAY and AUTO RTN buttons.

## 6. 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 scrape 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, idler roller, 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 E-2/E-22 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 Fostex Model HD-10 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 E-2/E-22 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 E-2/E-22. If the demagnetizer should be turned on or off near-by the E-2/E-22, 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, thread a reproduce alignment tape on the recorder.

Reproduce alignment tape (NAB) for E-2: Fostex Model 9101 15 ips/38  
cm/s and 7-1/2 ips/19 cm/s

or •[MRL 21J205 (15 ips/38 cm/s)]  
[MRL 21T204 (7-1/2 ips/19 cm/s)], Magnetic Reference Lab. All specs are identical with Model 9101.

Wow/flutter measurement for E-2: Fostex Model 9102A (15 ips/38 cm/s) and  
(7-1/2 ips/19 cm/s)

or •[STL #53-1 (15 ips/38 cm/s)]  
[STL #52-1 (7-1/2 ips/19 cm/s)], Standard Tape Lab.

Reproduce alignment tape (IEC) for E-22: Fostex Model 9200A (15 ips/38 cm/s)

or •[MRL 31J129 (15 ips/38 cm/s)], Magnetic Reference Lab. All specs are identical with Model 9200A except for reference fluxivity which is 200 nWb/m and thus its reproduce output level will be 2.0dB lower.

NOTE: Alignment for 30 ips/76 cm/s will be by playback of 9200A at 30 ips.

Wow/flutter test tape for E-22: Fostex Model 9201 (15 ips/38 cm/s)

or •[STL #63-1 (30 ips/76 cm/s)]  
[STL #62-1 (15 ips/38 cm/s)] Standard Lab.

The following check and alignment methods, pot numbers are the same for E-2 and E-22.

- 2) Be sure all selectors are released (safe mode), all REPRO buttons depressed, SPEED selector set to HIGH, and METER selector set to CAL. Then, thread the 15 ips alignment tape on the recorder and play the tape.
- 3) All meters should indicate OVU levels during reproduce of the 1KHz reference tone. If not, adjust the reproduce amplifier level for a OVU reading by the REP LEVEL pot (R203, 10K $\Omega$ B). These pots of the reproduce amplifier PCB assembly are accessible by opening the meter panel of the E-2.
- 4) Similarly, during playback of the 100Hz and 10KHz tones, both meters should indicate levels specified for the alignment tape. If not, adjust the playback equalization by the REP EQ HI pot (R201, 5K $\Omega$ B, L, R CHAN; 20K $\Omega$ B, CUE CHAN/E-2; R201, 2K $\Omega$ B, L, R CHAN; 5K $\Omega$ B, CUE CHAN/E-22).
- 5) Set the INPUT/SYNC/REPRO selector to SYNC but all other controls as set in above Item 2, and play the alignment tape again.
- 6) As before, all meters should indicate OVU levels during reproduce of the 1KHz reference tone. If not, adjust the reproduce amplifier level for OVU, in the same way as for above REPRO mode checking and adjusting, by the SYNC LEVEL pot (R208, 10K $\Omega$ B). Then, adjust the reproduce frequency response by the SYNC EQ HI pot (R206, 10K $\Omega$ B).
- 7) Switch tape speed to LOW (7-1/2 ips), reproduce the 7-1/2 ips NAB alignment tape and check in same way as for high speed (15 ips). If meter reading is off spec, set MONITOR selector to REPRO and adjust reproduce frequency response by the REP EQ LO pot (R202, 5K $\Omega$ B/L & R CHAN; 20K $\Omega$ B/CUE CHAN).  
Then, set the MONITOR selector to SYNC and adjust the reproduce frequency response again by the SYNC EQ LO pot (R207, 10K $\Omega$ B).

NOTE: After adjusting the EQ pots, reproduce the reference level to check for a OVU reading, if necessary, readjust the pots.

#### BIAS LEVEL AND RECORD LEVEL ADJUSTMENTS

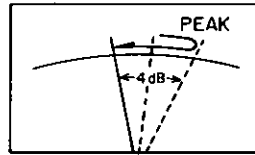
Switch tape SPEED to LOW and thread a blank tape on the transport.

Apply a 10KHz signal of approximately -20dBV (0.1V) to the INPUT XLR connector and connect an AC voltmeter to the OUTPUT RCA phono jack corresponding to the above INPUT jack.

Switch the INPUT/SYNC/REPRO selector to REPRO and depress the RECORD TRACK selector for the channel whose bias current is to be adjusted. Put

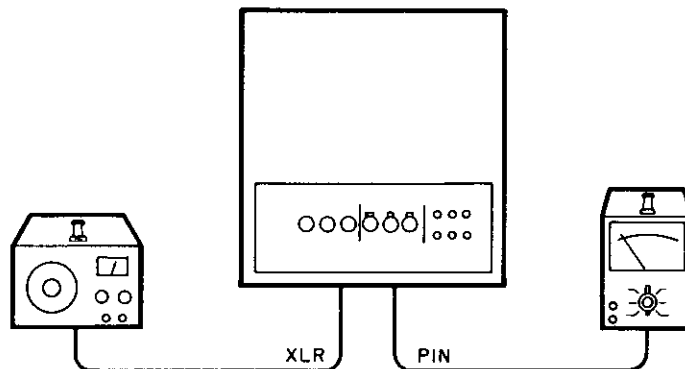
transport in record mode, and after temporarily rotating the BIAS 1 trimmer (C101, 150PF) fully CCW, slowly rotate it CW while watching the AC voltmeter. Fix the pot when the reading passes the peak and reaches 4dB below peak level.

After completing bias level adjustments, check the overall frequency response for 15 ips and 7-1/2 ips speeds.



#### CHECKING RECORD ALIGNMENT

- 1) After performing the reproduce check, thread a blank recording tape on the transport (Ampex 456 is recommended) and set speed selector to HIGH (15 ips).
- 2) Depress all RECORD TRACK selectors (READY mode), depress all INPUT buttons (INPUT mode), set METER selector to CAL and all INPUT level controls also to the CAL position.
- 3) Apply a 1KHz signal to the recorder XLR connector inputs at nominal +4dBm level. All meters should indicate 0VU. If not, adjust to 0VU by the INPUT control knob on the trim panel.
- 4) Depress both REPRO buttons of the INPUT/SYNC/REPRO selectors, put transport in the record mode and adjust the REC LEVEL pot (R206, 5KΩB) in the Record Amplifier PCB Assembly for a 0VU meter reading.



#### OVERALL FREQUENCY RESPONSE CHECK

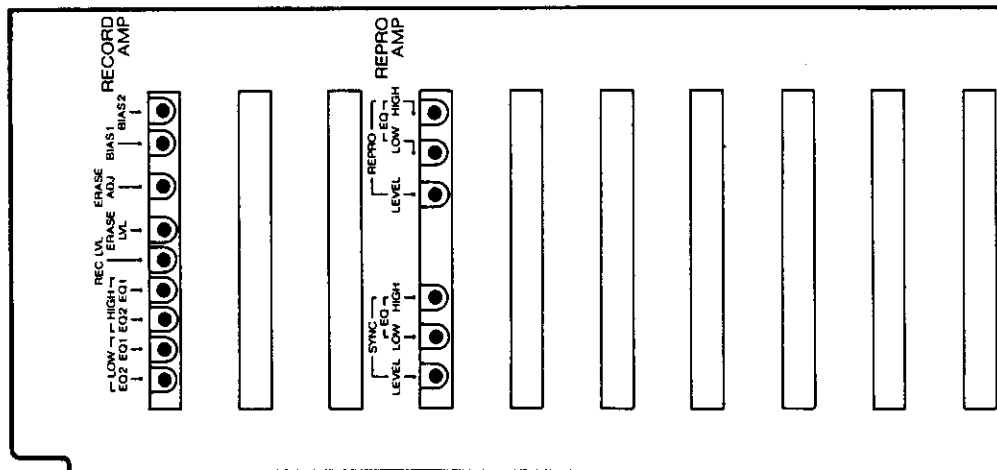
- 1) Apply the input signal to INPUT L XLR connector and connect an AC voltmeter to OUTPUT L (RCA phone jack). Then, put channel L in the record mode, and set the INPUT/SYNC/REPRO selector to REPRO. Switch tape SPEED selector to HIGH, apply a -6dBm signal of 30Hz through 26KHz to the INPUT connector, put transport in record mode, and check the overall frequency response. Normal response, with reference to 1KHz, the response is within  $\pm 3$ dB throughout the range of 30Hz through 26KHz (50Hz  $\sim$  20KHz  $\pm 3$ dB, for CUE

channel).

If necessary, adjust the REC EQ 1 HI pot (R202, 1K $\Omega$ B). Repeat for channels R and CUE.

- 2) Switch tape SPEED to LOW, apply a -16dBm signal of 30Hz through 20KHz to the INPUT jack, put transport in record mode, and check the overall frequency response. Normal response, with reference to 1KHz, should be within  $\pm 3$ dB throughout the range of 30Hz through 20KHz (50Hz  $\sim$  16KHz,  $\pm 3$ dB for CUE channel).

If necessary, adjust the REC EQ 2 LO pot (R203, 1K $\Omega$ B). Repeat on channels R and CUE.



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