Model A-8/A-8LR

8 TRACK RECORDER/REPRODUCER

Service Manual

NOTICE

This Service Manual applies to the A-8 Series (not the A-8LR Series) with serial numbers from and after those listed below.

UK and AUS versions	0700464 ∿
FCA and CND versions	0201667 ∿
EUR versions	0601195 ∿
DM versions	1000632 ∿

* The content is slightly different for those with serial numbers younger than the above. A separate document (Order No. 8288010101) is available for the revised section of the manual.
* The Service Manual for A-8LR starts from page 71 .

FOSTEX®

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NOTES

* Adjustment procedures are given in this manual which also includes a Parts List and schematic diagrams to assist the service technician in maintaining the Model A-8 .
  Please feel free to contact the nearest Fostex Dealer and Distributor, or write directly to a Fostex office, the addresses of which are printed on the back cover of this manual.
* Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation. 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

CAUTION

⚠ Parts marked with this sign are safety critical components. They must always be replaced with identical components. Refer to the Fostex Parts List and ensure exact replacement.

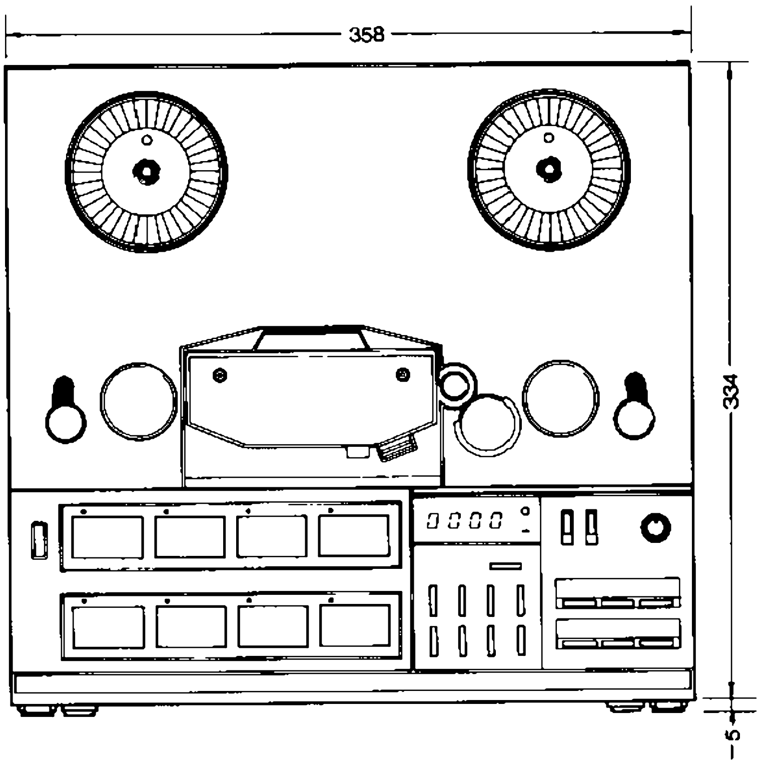
1. INTRODUCTION

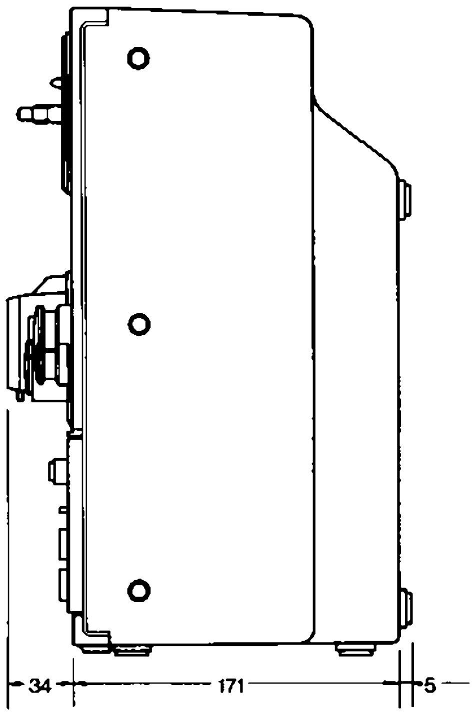
Fostex Model A-8 is a small size, lightweight, 8 track, 8 channel recorder/ reproducer for 1/4" tape.

It features simple switching between sync and record modes by combined action of the RECORD TRACK and MONITOR selectors, and simple switching of the monitor to these modes, punch in/out without any clicks in the recording, zero position return function of the tape counter in the rewind mode, pitch control function, and other features necessary in multi-track recording.

In addition, approximately 20dB of noise reduction is obtained by the built-in Dolby C Type noise reduction system. Other types of noise reduction system can also be used with this recorder by the front panel Noise Reduction Switch which allows patching in of external NR systems to jacks provided for this purpose.

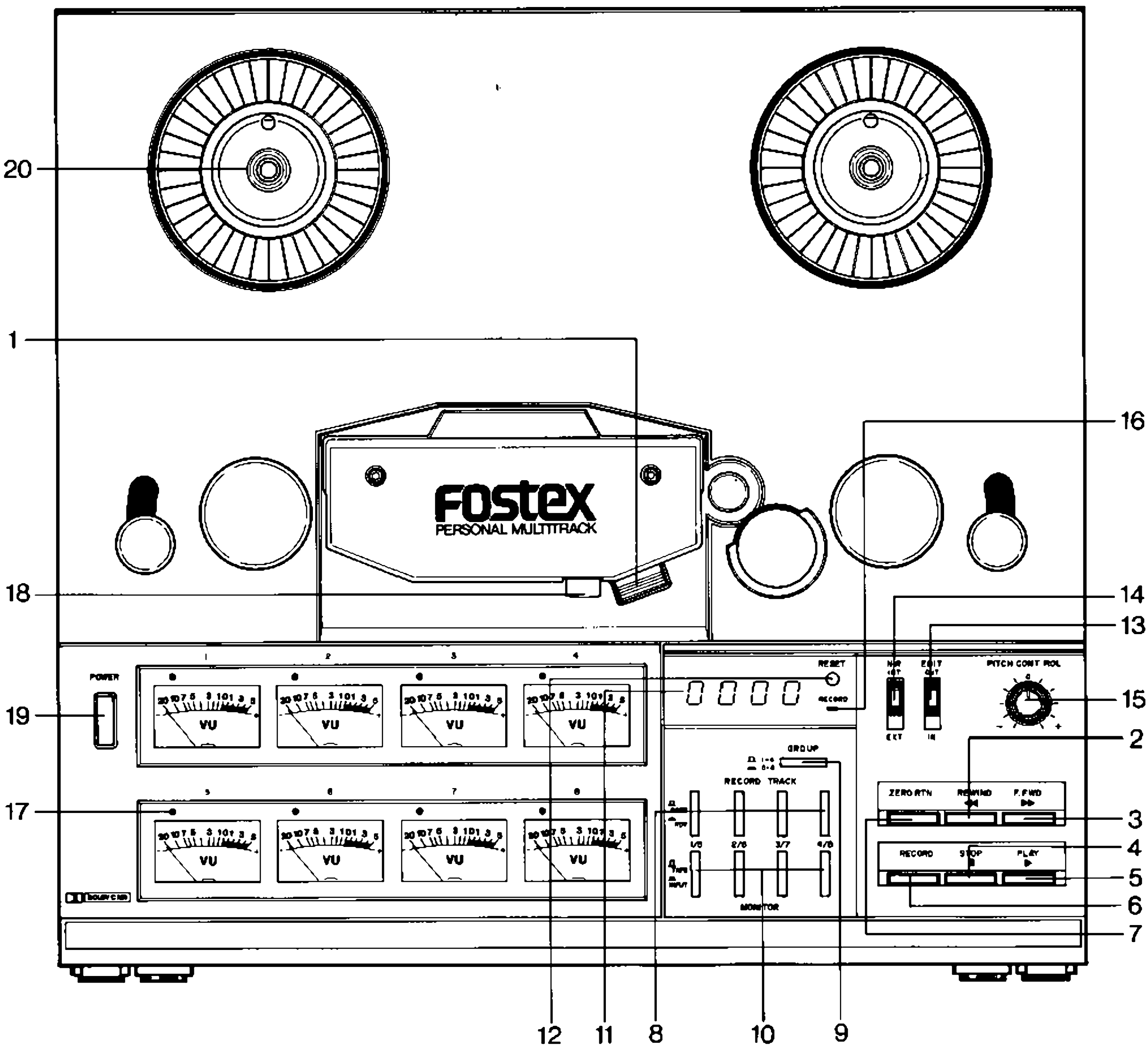
Maintenance of the transport is made by removing the front trim panel, and for checking and adjusting the record/reproduce amplifier, by removing the bottom cover.





2. SPECIFICATION

TAPE	1/4 inch tape width, 1 mil base
FORMAT	8 track, 8 channel (4 channel X 2 Record, 8 channel Reproduce)
REEL SIZE	7 inch
TAPE SPEED	15 ips (38cm/s), ±0.5%
PITCH CONTROL	±10%
LINE INPUT (X4)	-10dBV (0.3V), impedance: 15KΩ, unbalanced
LINE OUTPUT (X8)	-10dBV (0.3V), load impedance: 10KΩ or higher, unbalanced
RECORD LEVEL CALIBRATION	0 VU referenced to 250nWb/m of tape flux
EQUALIZATION	IEC (35 microsecs.)
WOW & FLUTTER	±0.06% peak (ANSI), weighted, measured with flutter tape
STARTING TIME	Less than 0.5 sec.
FAST WIND TIME	130 second for 1800 ft. of tape
OVERALL FREQUENCY RESPONSE	40Hz ∿ 18KHz, ±3dB
SIGNAL TO NOISE RATIO	72dB weighted, 60dB unweighted, referenced to 3% T H D level 10dB above 0 VU) at 1KHz
T H D	Less than 1% at 1KHz , 0 VU
ERASURE	Better than 70dB at 1 KHz
POWER REQUIREMENTS	120V AC, 60Hz, 60 W (U.S.A./Canada models) 220V AC, 50Hz, 60 W (European models) 240V AC, 50Hz, 60 W (UK/Australian models) 100/120/220/240V AC, W (General export models)
DIMENSIONS	14" (W) X 13-1/2"(H) X 6-3/4" (D)
WEIGHT	29 lbs. (13 kg.)


FOSTEX
PERSONAL MULTITRACK
POWER
RESET
RECORD
0000
PITCH CONTROL
ZERO RTN
REWIND
F.FWD
RECORD
STOP
PLAY
GROUP
RECORD TRACK
MONITOR
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2/6
3/7
4/8
VU
20
1
16
18
14
13
19
15
2
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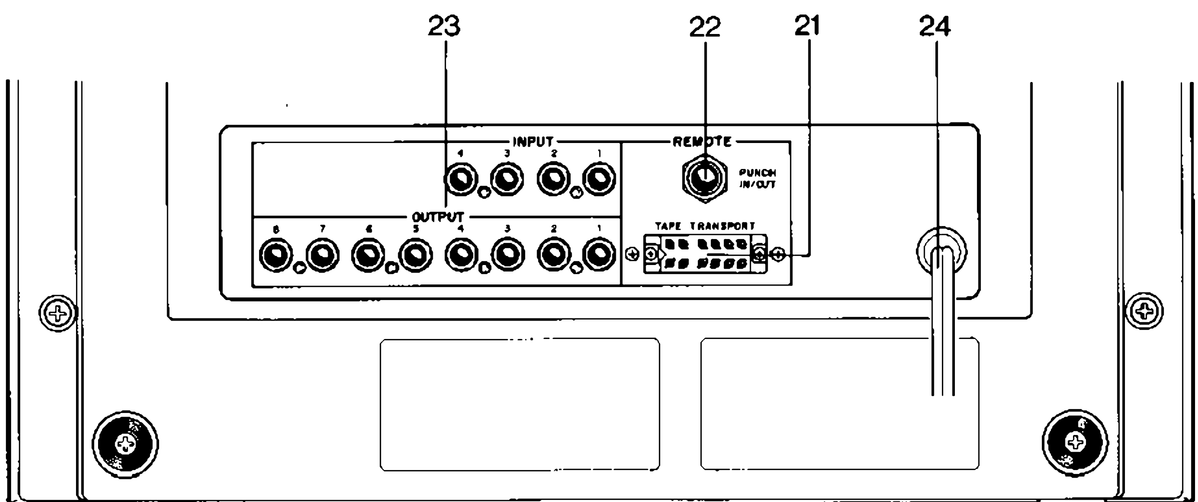

23
22
21
24
INPUT
REMOTE
PUNCH IN/OUT
OUTPUT
TAPE TRANSPORT

3. THE CONTROLS AND THEIR FUNCTIONS

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 its lock and the gate fully rise by spring action. To retract it, the gate is pressed down and will be locked at the limiting position.

2) Rewind button [REWIND]

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

3) Fast forward button [F.FWD]

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

4) Stop button [STOP]

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

5) Play button [PLAY]

   Depressing this button puts the recorder in the play mode.

6) Record button [RECORD]

   a) With more than one and up to four RECORD TRACK buttons depressed, simultaneous depressing both RECORD and PLAY buttons puts the tracks thus assigned in the record mode.

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

7) Return to zero position [ZERO RTN]

   Depressing this button puts the transport in the rewind mode, automatically rewind tape to "0000" of the tape index counter and then go to the STOP mode.

8) Record track selector [RECORD TRACK]

   Tracks to be recorded on are selected by combined depressing of the RECORD TRACK and GROUP select (9) buttons.

   This recorder can record on a maximum four channels in one recording pass but the remaining four channels can be recorded by using the GROUP select switch. Therefore, either tracks 1 or 5, 2 or 6, 3 or 7, and 4 or 8, are selected by the RECORD TRACK buttons and track groups of 1, 2, 3 and 4 or tracks 5, 6, 7 and 8 are selected by the GROUP select button.

   a) When the GROUP button and the RECORD TRACK button are assigned, the LED's located at upper left hand corner of each meter corresponding to the assigned tracks, will blink to indicate that these channels are in the record ready state.

While in this state, simultaneously depressing both RECORD and PLAY buttons put the tracks thus assigned to the record mode and the blinking LED's change to a constant lighting.

b) Should the PLAY and RECORD buttons be depressed at the same time with none of the RECORD TRACK buttons depressed, the RECORD LED located at right of the tape index counter (11) will blink to indicate record ready state of the recorder. Now, if any one of the RECORD TRACK button is depressed, the LED above the VU meter for the assigned channel will light and the RECORD LED also change from blinking to constant lighting.

Further, if all of the RECORD TRACK buttons are released, the RECORD LED will change to blinking again to indicate that the recorder have changed from record mode to the record ready state.

9) Group select button [GROUP]

Refer to 8) and 10).

10) Monitor select button [MONITOR]

When none of the MONITOR select buttons are depressed, the meter indications and the signal output will be for reproduce.

When any one of the MONITOR button is depressed, the input signal will be available at the line output and can be monitored with the VU meter.

In the same way as for the RECORD TRACK buttons, the channel to be monitored must be selected by the MONITOR select button in combination with the GROUP select button.

11) Counter display

Revolutions of the supply reel table is detected by two photo-interrupters and shown on a 4 digit display.

12) Reset button

The counter display reset button which clears the display to "0000".

13) Edit button [EDIT]

The EDIT switch is provided to facilitate precise splicing of tape after removing an unwanted section of tape.

When this slide switch is set to OUT (upper side), the transport will be in the normal operating mode, and when set to IN (lower side), it will be in the EDIT mode.

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

In the EDIT mode, the shut off switch linked to the right tension arm will be ineffective and therefore, the capstan motor will rotate upon switching on the power switch and 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 rotated easily 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 right tension arm is up, and then the PLAY button is depressed, the transport goes to normal play mode.

14) NR INT/EXT switch [NR]

The internal Dolby noise reduction system will be in operation when this NR switch is set to INT.

When any other type of NR system is to be used with this recorder, set the NR switch to EXT and connect the encoder to INPUT, and the decoder to OUTPUT of the RCA phono jack on the rear panel.

15) Pitch control knob [PITCH CONT]

The 12 o'clock click action stop of this knob is the normal speed (15 ips) position, and speed can be varied -10% at CCW rotation, and +10% at CW rotation, respectively, of this knob.

16) Record LED [RECORD]

This LED will either blink or glow continuously under the following conditions when the RECORD and PLAY buttons are depressed at the same time:

* Will blink if none of the four RECORD TRACK buttons are depressed.
* Will glow continuously if one or more RECORD TRACK buttons are depressed.

17) Record LED (Located above each VU meter)

These LED's will blink or glow continuously depending on what combination and sequence the RECORD TRACK buttons and the transport control RECORD button is depressed:

* If any RECORD TRACK button is depressed after the transport control RECORD and PLAY buttons are depressed (in the PLAY mode and record ready state), the LED of the channel corresponding to the depressed button, will glow continuously.
* With none of the four RECORD TRACK buttons depressed and while the transport is in the play mode record ready state, all four LED's of channels 1 ∿ 4 or

channels 5 ∿ 8 selected by the GROUP select button, will blink; under this condition, if any one or up to four of the RECORD TRACK buttons corresponding to the channels of the blinking LED's are depressed, the LED of the depressed channel only will glow continuously and the other LED's will be extinguished.

* If any RECORD TRACK button is depressed during ZERO RTN, REWIND, F.FWD, PLAY or STOP modes, the LED of the depressed channel will blink.

18) Cue lever [CUE]

The lifter mechanism lifts the tape away from the head in the ZERO RTN , 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.

19) Power switch [POWER]

AC power is applied to the unit and the VU meters lighted when this button is depressed.

The capstan motor will not rotate unless the takeup reel side tension arm is up, or in other words, unless the shut-off switch linked to the tension arm is on, but the capstan motor will rotate even though the tension arm is down only when in the EDIT mode.

20) Reel clamper

The reel is secured to the reel turntable by CW rotation of this clamper.

21) Transport function remote connector [REMOTE - TRANSPORT]

Remote operation of the transport function controls is possible by connecting the optional Model 8030 Remote Control Unit.

22) Punch In/Out remote jack [REMOTE - PUNCH IN/OUT]

This jack is used for punch in/out of the recording by a foot switch. Any one button among the four RECORD TRACK selector buttons is depressed and the transport put in the PLAY mode. Then, if the foot switch is depressed, the previously selected track goes to the record mode; if the foot switch is depressed again, the record mode is cancelled and the transport goes to the record ready play mode.

With none of the RECORD TRACK selector buttons depressed and the recorder in play mode, depressing the foot switch will make the record indicating LED to blink, indicating that the recorder is in the record ready state while in play mode. When any one of the RECORD TRACK selector button is depressed under this condition, the track of the depressed button will go to the record mode but will be cancelled, returning to the record ready state, when the foot switch is depressed again.

One word of caution - the foot switch can neither punch in nor out when the transport is put in the record mode by the control panel PLAY and RECORD buttons.

23) Input/output jack [INPUT/OUTPUT]

The number of input is four which are routed to the channels 1 ∿ 4 group or channels 5 ∿ 8 group by the GROUP select button on the front panel.

The number of output is eight and an RCA phono jack is provided for each channel.

24) Power cord

4. FUNCTION OF THE CONTROL CIRCUITS

4.1 SYSTEM CONTROL CIRCUITS

Control signals, which are the foundation of tape transport operation, are processed by the TTL type LSI, U9.

In the System Control of this Unit, the U9 output pins for PLAY, STOP, F.FWD, REWIND, REC and BRAKE are used in the various control circuits, and when a low level is input to the pin corresponding to the output for that function, a low level is obtained at that output pin.

4.2 PERIPHERAL CONTROL CIRCUITS OF THE LSI

1) CR 1 (U9-5)

This is the reset signal input pin of U9. At switch on of power, U9-5 goes to "L" level for the length of time that Q1 is on, thus resetting U9.
When power is switched on, C21 begins to be charged, during which time the base of Q1 goes to "H", thus switching on Q1. When C21 becomes fully charged, the base of Q1 goes to "L", thus switching off Q1.
When power is switched off, C21 is quickly discharged through D38 and thus becomes ready for the next switch on of power.

2) EBR IN(U9-4)

In this system, brake is applied electrically from REWIND or F.FWD before finally going into the STOP mode.
For example, if the STOP button is depressed during REWIND, the transport temporarily goes into F.FWD mode and then into STOP mode when an "L" level is applied to this EBR IN. For timing of "L" level application to EBR IN, refer to Tape Counter Detecting Circuit and Motion Sensing Circuit (Item 4.7).

3) EDIT

The "L" level signal from the EDIT switch when it is set to IN is not only applied to Q11, which is the circuit to stop the takeup reel (right side) motor (Refer to Item 4.6) but also to the exclusive OR gate U2-2.
When the EDIT switch is set from OUT to IN, an "L" level is applied to U2-2 and as U2-13 is also at "L", output U2-11 goes to "L" and as this is applied to U9-6, U9 goes to the STOP mode.
In the meantime, the input to U2-12 will go to "H" level after a certain delay introduced by the integration circuit of R12 and C3, and output pin U2-11 goes to "H" level.
One "L" level pulse is output from U2-11 when the EDIT switch is set from IN to OUT.

Under "H" level state of U2-2, U2-13 will also be at "H" level and consequently, U2-3 goes to "L" level. After a certain delay, U2-12 goes to "L" level and thus U2-11 goes to "H" level.

4) ZERO RETURN

The system goes to REWIND mode when the ZERO RTN button is depressed as U9-2 pin will be connected to zero volt via D32. On the other hand, an "H" level is applied to U4-7 (S input pin) via inverter U7.

U4 is a JK flip flop and pins Q and K are set to "H" when pin S is set to "H". At the instant the counter display changes from 0001 to 0000, the emitter of Q3 is held at zero volt for a length of about 200 ∿ 400msec. after which Q3 switches on, U9-6 (STP) goes to "L" and U9 goes to STOP mode.

The "L" output from the counter returns to "H" after about 200 ∿ 400msec, applied to U4-3 (C input) and the Q and K pins returns to "L" level.

U4-4 (R input) is the reset pin and the ZERO RTN is reset by the REWIND, F.FWD, STOP, PLAY and SHUT OFF signals.

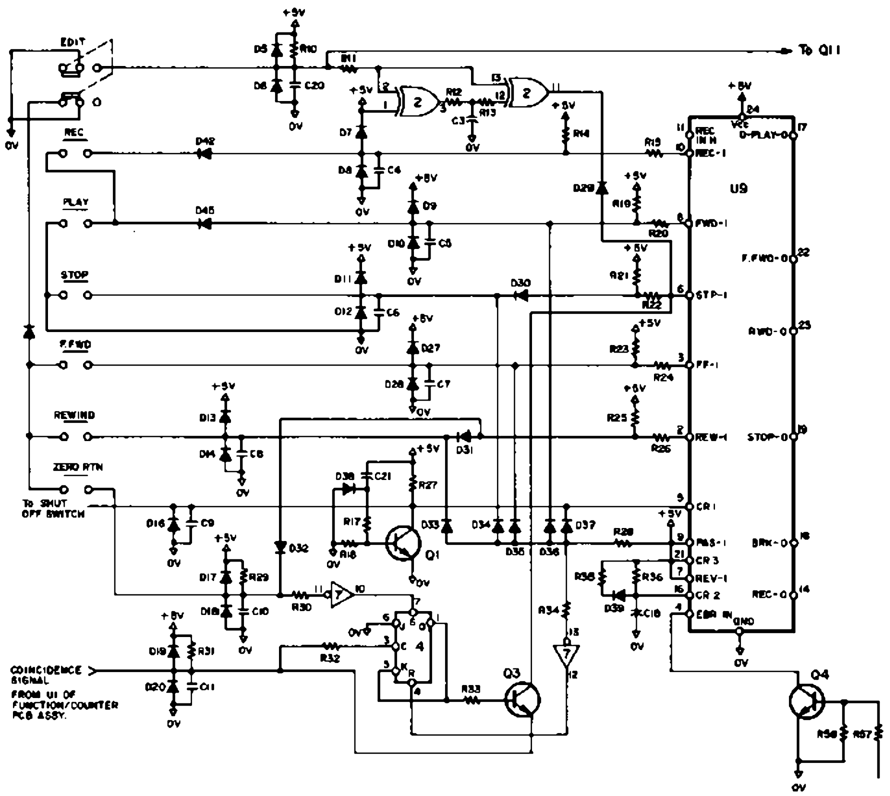


Fig. 4-1

4.3 REMOTE PUNCH IN/OUT [REMOTE PUNCH IN/OUT]

A latching type foot switch is plugged into the REMOTE PUNCH IN/OUT phone jack on the rear panel.

Each time the foot switch is depressed, C15 is repeatedly charged and discharged, producing waveforms shown below.

These signals are shaped by U1 and then input to the exclusive OR gate U2-10. When input pins #8 and #9 are in combinations of "L" and "H" levels, an "H" level is obtained from its output pin #10 whose waveform is shown below.

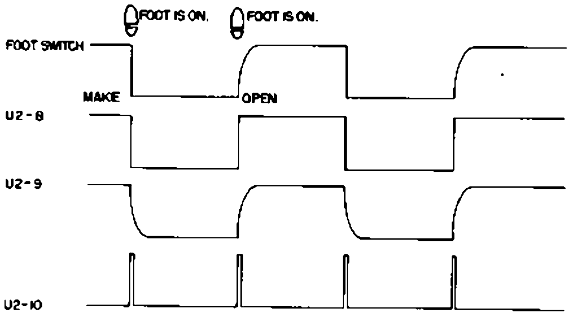


Fig. 4-2

U6 is a delayed flip flop which outputs signals shown below upon receiving a play mode "H" level from U3-10 and the signal from the foot switch.

U8 is a reset circuit, and when the play mode is cancelled, an "H" level is applied to pin R of U6 and the flip flop is reset. Also, when the GROUP select switch is manipulated, an "L" reset pulse is applied to U3-13 and the resulting "H" level from U8-11 applied to the R pin resets U6.

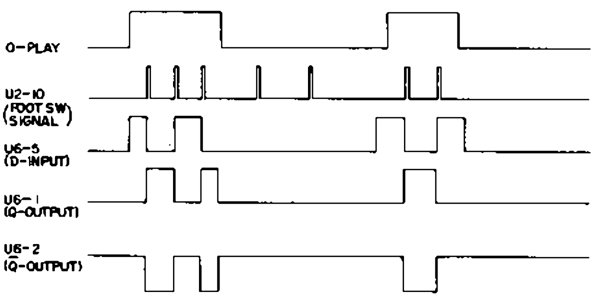


Fig. 4-3

The signals from U6-1 (Q output) and U9-14 (REC-0 output) passing through the OR gate of D41 and D40 is applied to the base of Q8 to switch it on if either of the above signals are of "H" level, and thus an "L" level representing the transport record signal is applied to the RECORD TRACK selector circuit.

4.4 CAPSTAN MOTOR DRIVE CIRCUITS

If the recorder is switched on with the tape loaded (with the left/right tension arm in the up position), the capstan motor begins to rotate at 1,000 rpm, and when put in the play mode, accelerates to 2,000 rpm.

Q18 is in the on state when power is switched on and this raises the DC level of U11-1 which then switches on Q19 to start the motor.

The 1,200Hz output from the TACH generator applied to U11-14 is amplified and a square wave is output from its pin #14. This square wave is differentiated by C25, R90, R91 and the plus side of this waveform switches on Q16. When the recorder is switched on, U8-1 goes to "L", Q14 and Q15 switches on and this output is applied to the integration circuit of R92, R93 and C47/C48. Therefore, a sawtooth waveform made by the signal from the integration circuit and on/off action of Q16, is applied to comparator U11-8. The rectified output from the integration circuit of R98, R99 and C27 passes through Q18 and DC amplifier U11-1 and applied to Q19 which controls the current to the capstan motor.

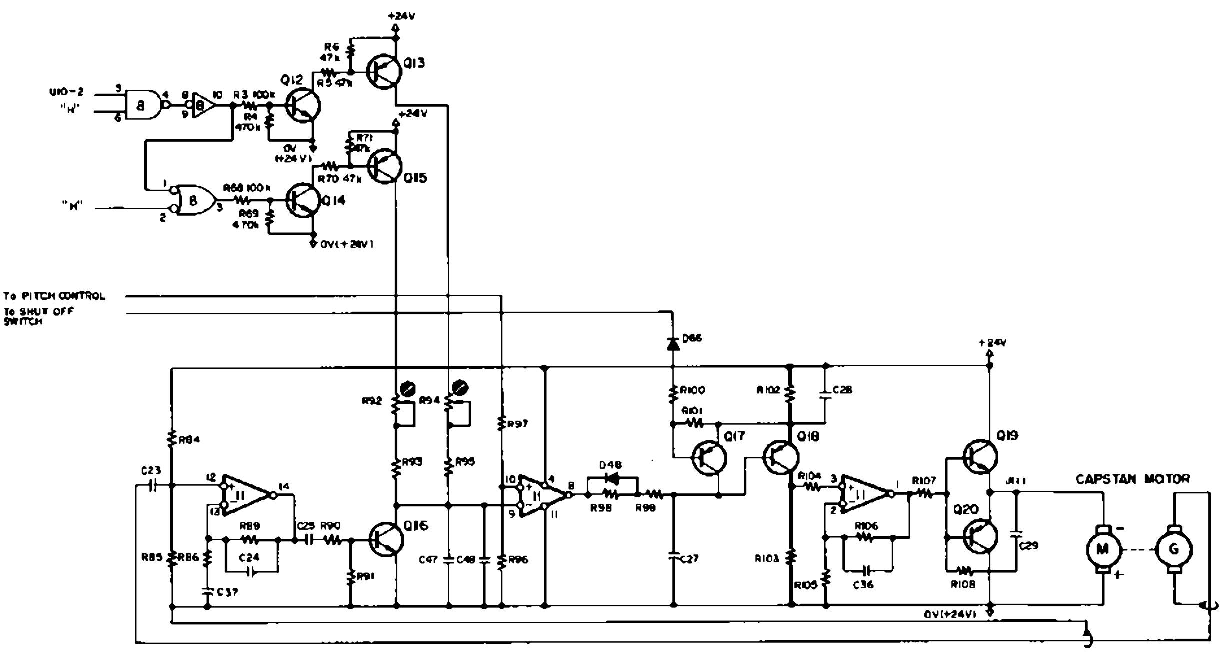


Fig. 4-4

Q20 switches on when Q19 is off, to act as a braking circuit by absorbing the counter electromotive force from the motor.

When the PLAY button is depressed, the "L" output from U9-17 is passed through an inverter and applied to U8-5; on the other hand, as the signal to U8-6 is also "H", the output of U8-4 is an "L" but on being inverted by U8-10, the "H" level output is applied to Q12.

Q12 and Q13 is then switched on and its output applied to the integration circuit of R94, R95 and C47/C48. At the same time, the "H" output of U8-10 makes the output of U8-3 go to "L" thus switching off Q15.

By this alternating switching of Q13 and Q15, the integration circuit constant is affected and output duty of comparator U11-8 is changed. As a result, the motor revolution changes from 1,000 rpm to 2,000 rpm, and consequently, the TACH output of 1,200Hz rises to 2,400Hz. The TACH output at 1,000 rpm is about 350mV.

When the shut off switch is on (left/right tension arm in down position), Q17 is switched on to force the U11-1 output to "L" which then switches off Q19 and the motor is stopped. However, the motor will continue to run in the EDIT mode, even if the shut off switch is on, as the EDIT switch is in series with the shut off switch.

4.5 INTERMITTENT SOLENOID DRIVE CIRCUIT

Two plunger solenoids are used in the tape transport mechanism. One is for activating the pinch roller in the play mode and releasing the brake, and the other for activating the lifter in the fast forward or rewind modes and also to release the brakes.

Output pins #17 and #18 of U9 goes to "L" when the PLAY button is depressed.

The "L" level from pin #17 is inverted to an "H" level by U10-4 and applied to Q44 to switch on both Q44 and Q45.

On the other hand, the "L" level from pin #18 switches off Q39 which then starts to charge C34 by D61, R172 and R171. This charging of C34 switches on Q40 but is switched off after a certain length of time which also switches off Q41. Therefore, when Q45 is switched on, the PLAY solenoid, L1, is energized by the +24V DC flowing through Q41, D64, L1 and Q45. When Q41 is switched off, the +24V DC drops to +16V DC as the current will now flow through D65, L1 and Q45.

When the F.FWD button is depressed, output pins U9-22 and U9-18 goes to "L" level; and when the REWIND button is depressed, pins U9-23 and U9-18 goes to "L" level. The signals from U9-22 and U9-23 are applied to Q42 via the OR gate of D46 and D47.

On the other hand, Q41 is switched off by the "L" level from U5-18 in the same way as for PLAY mode and the +24V DC applied to L2 (FAST SOL.) drops to +16V DC.

C45 is provided to drive the intermittent solenoid when the transport is put in either F.FWD or REWIND modes from the PLAY mode.

When the transport is put in either the F.FWD or REWIND mode, C45 is charged through D46 or D47 during which Q39 switches on, C34 is discharged, and when C45 reaches full charge, Q39 switches off, which in turn charges C34, and the intermittent solenoid drive circuit is activated as previously mentioned.

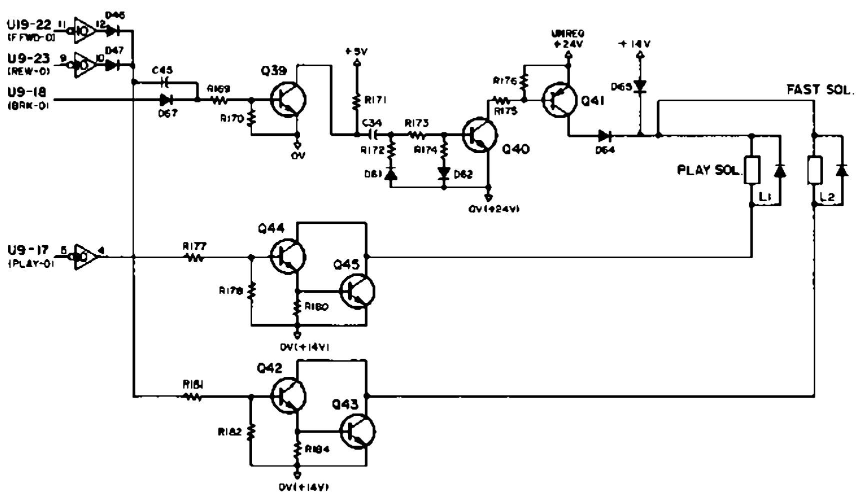


Fig. 4-5

4.6 REEL MOTOR DRIVE CIRCUIT

The left and right reel motor drive circuits are identical except for the additional Q28 and Q29 in the takeup reel motor circuit.

Q28 and Q29 act to stop the takeup reel motor when the PLAY button is depressed during the EDIT mode.

Setting the EDIT switch to IN shorts the emitter of Q11 to zero volt, and if the PLAY button is now depressed, the "L" level output of U9-17 inverted to "H" by the inverter, switches on Q11. Switching on of Q11 then switches off both Q27 and Q28. At this point, the +24V DC flows into the base of Q29 via R140, D55 and D56 to switch it on. This switch on of Q29 results in a short circuit across the motor terminals, thus electrically stopping it. Except for PLAY mode during EDIT, Q28 is always in the on state.

When the PLAY button is depressed in other than the EDIT mode, U9-17 goes to "L" but is inverted and applied to Q21 to switch it on which in turn switches on

Q26 and Q36.

Now, the takeup reel motor torque is adjusted to 320g.cm ±50g.cm by pot R129 (22KΩ), and the supply reel motor torque to 220g.cm ±50g.cm by pot R161 (22KΩ) which adjustments result in potentials of 14.5 ∿ 15V at pin #12 of U12-14, and 13.5 ∿ 14V at pin #3 of U12-1.

U12-14, Q30, Q31 and U12-1, Q37, Q38 are constant current output circuits and as the potential across R136 and R167 changes in accordance to the motor current, these potentials are fed back to the constant current circuits of U12-14 and U12-1.

The two circuits of U12-8, Q24 and U12-7, Q34 are provided to prevent a sudden high tape tension by gradually raising the voltage to the takeup reel motor at F.FWD or REWIND modes.

Taking for example the circuit of U12-8 and Q24, when power is switched on, the potential from the dividing resistors R131 and R132+R136 for +24V DC charges C30 via U12-8.

The integration circuits of Q2, C35 and C49, R87 are the boost circuits to prevent tape slacking at start up in the PLAY mode.

When an "H" level is applied to C49 from U10-4, an "H" level is applied to Q2 for a certain length of time during which Q2 switches on. This in turn, applies an "L" level to pins #13 and #2, respectively, of U12-14 and U12-1, thus raising the amplifier gain at each output which results in increase of motor currents and consequently, rise in motor torque. Then, when Q2 switches off after elapse of a certain length of time, C35 starts to charge, the voltages applied to pins #13 and #2, respectively, of U12-14 and U12-1 gradually rises, and each amplifier gain drops to their normal level.

Then, if the F.FWD button is depressed, the "L" level from U9-22 is inverted to an "H" level and applied to the base of Q22 which switches on both Q22 and Q23.

At switching on of Q23, the +24V DC passing through R116 and R119 further charges C30, and the voltage divided by R116 and R119 is applied to U12-14.

As the potential applied to U12-14 rises slowly in step with the charging rate of C30, the motor current also rises gradually, resulting in a smooth rise in torque of the takeup reel.

When the transport is put in the REWIND mode from F.FWD, the "L" level from U9-23 is inverted to switch on Q32 and Q33, but at the same time switch off Q22 and Q23. At switch on of Q33, the +24V DC flows through R148 and D50 to switch on Q24 which quickly discharges C30 down to the emitter potential of Q24, or in other words, the output potential of U12-8.

C30 is also discharged when the transport is put in the STOP mode from F.FWD.

In this case, the "L" level from U9-19 is inverted to an "H" level, applied to Q9 and Q10 to switch it on, thus feeding a base current to Q24 through R125 and D49 to switch it on, thus discharging C30.

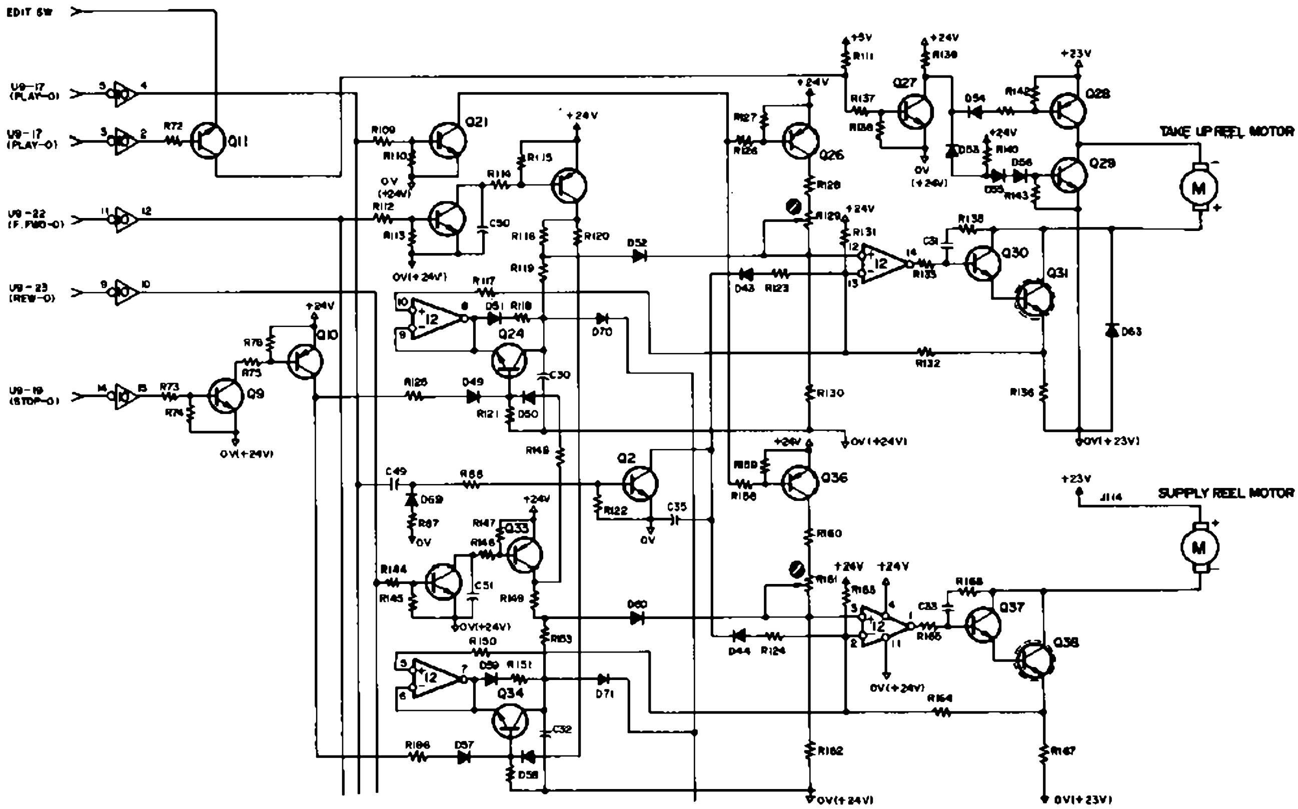


Fig. 4-6

4.7 TAPE COUNTER DETECTING CIRCUIT AND MOTION SENSING CIRCUIT

Rotation of the left side reel table is detected by two photo-interrupters and their outputs fed to the counter section. These outputs serve as the count pulse and up/down signal.

The signals from the two photo-interrupters are converted, as shown in the Signal Timing Chart of Fig. 4-7 and applied to the counter section as the count pulse and up/down signal.

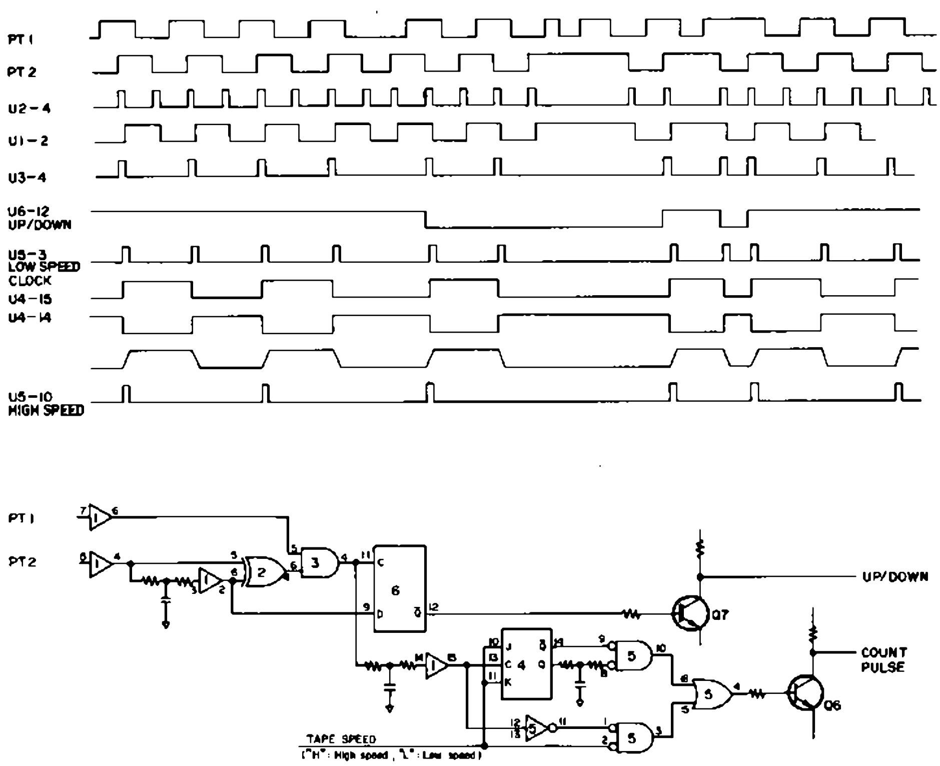


Fig. 4-7

4.8 COUNTER SECTION

U1 is the P-MOS type tape counter LSI which contain both a counter circuit and display driver. Display is of the static type.

* UP/DWN : Input pin for selecting up count or down count of the counter. An "H" level must be applied to this U1-12 pin for up count function. As shown by the timing chart in Item 4.7, above, these outputs go to "H" level in the PLAY or F.FWD modes and thus U1 goes to up count mode.
  In the ZERO RTN or REWIND modes, an "L" level is applied to U1-12 and the counter thus goes to the down count mode.
* COUNT PULSE : Thecount pulse is obtained from Q6 on the System Control PCB. The count pulse is about 4Hz at beginning of tape wind and about 8Hz near end of tape wind.
* DIRECT : Input pin for selecting the operating mode of the predivider, in the stage prior to the lowest digit of the counter, to 1/5 or 1/1. As the 1/5 mode is used in this system, this pin is open or at "L".

* RESET : The counter and display are reset to "all zero" by an "H" level to this pin.
* AC IN : The AC power line frequency (50/60Hz) is applied here for the reference frequency.
* OUT 1 : At the instant the counter register changes from 0001 to 0000, this driver output pin goes to "H" for a duration of 200 ∿ 400msec.
* SIX/DECADE : An "L" (or open pin) to this pin sets the counter to decimal counting or an "H" to modulo-six of digit two. This pin is kept at "L", or at open, in this system.
* SEG 1a ∿ 4g : The LED segments are directly driven by these pins.

4.9 RECORD TRACK SELECT (LED display circuit)

The LED corresponding to each track of the RECORD TRACK select buttons either blink or light continuously to indicate the mode of operation.

1) Blinking at depressing the RECORD TRACK button
   The output of multi-vibrator Q1 and Q2 are applied to Q3 which switches on/off Q3, Q4 and Q5 at about 1Hz ∿ 2Hz.
   The output of Q5 is connected to the LED anodes via the GROUP select switch and the cathode of the LED selected by the RECORD TRACK button is connected to 0V, and that LED will blink.
2) Blinking of the GROUP LED (TRK 1 ∿ 4 or TRK 5 ∿ 8)
   The transport goes to the record mode if both the RECORD and PLAY buttons are simultaneously depressed. Then, if none of the RECORD TRACK button is depressed, all four LED's for tracks 1 ∿ 4 or 5 ∿ 8, either of which is selected by the GROUP button, will blink. The +8V supply is applied to the LED through Q5 which is switched on by the record mode "L" level from the transport control circuitry. Q6 is switched on by the "L" applied to its base and an "H" is thus applied to the base of Q9 but as the emitter of Q9 is connected via D5 to the collector of Q4 which is constantly switching on and off, the four LED blinks.
   This blinking of all four LED's clearly indicate which group of tracks have been selected and when any one of the RECORD TRACK button is depressed while in this state, the base of Q9 drops to zero volt thus switching it off, and the +8V flows through D5, LED, D13 (or D14, D15, D16), then to zero volt. Therefore, the led of the selected track(s) only is lighted and the other blinking LED's will go off.
3) Constant lighting of the LED
   The LED will change to constant lighting when any one of the RECORD TRACK button is depressed during the RECORD mode or when this order of depressing the button

is reversed.

4.10 RECORD INDICATION

The RECORD indicating LED either blinks or lights constantly when the RECORD and PLAY buttons are simultaneously depressed.

1) Blinking

By switch on of Q6 by the "L" level transport record signal, an "H" level is applied to the base of Q8 to switch it on but as the emitter of Q8 is connected to the collector of Q4 via D5, Q8 will switch on and off in step with Q4 and the LED thus blinks.

2) Constant lighting

When any one of the RECORD TRACK button is depressed under the above 1) state, the emitter of Q7 is connected to zero volt by the selected button which switches it on and the LED is lighted in the constant state.

4.11 RECORD TRACK SELECT (Record/reproduce amplifier control circuit)

U6-11 is an exclusive OR gate. Each time the GROUP select switch is manipulated, the output of U6-11 goes to "H" to switch on Q3 and an "L" pulse is applied to the System Control LSI.

Due to this, the record mode is cancelled by switching of the GROUP selector even if the LSI is in the record mode.

An encode/decode switching, record relay control and bias on/off control signals are sent to the Record/Reproduce Amplifier from the RECORD TRACK select circuit.

As the circuits of track 1 through 8 are all identical, track 1 only will be taken as an example.

When GROUP 1 ∿ 4 is selected, input U6-9 is set to "H" and the output U6-10 goes to "L" level (if U6-9 is "L", then U6-10 goes to "H").

When inputs U7-8 and U7-9 are at "L", output U7-10 goes to "L", or in other words, when the RECORD TRACK 1 button is depressed and the transport is in the record mode.

By the "L" level of U7-10, U3-11 goes to "L", and the "L" from U3-10 applied to U1-2 makes output U1-3 go to "L" which is the encode mode signal. After a certain delay, introduced by the integration circuit of R14 and C5, U1-4 goes to "L" which makes both U1-11 and U1-10 go to "L" level.

When either U7-8 or U7-9 goes to "H" level, U7-10 will go to "H", then as U1-4 first goes to "H", U1-11 goes to "H" (bias off), then, after a delay introduced by R14 and C5, U1-10 goes to "H" (record relay off) and after another delay by R16 and C6, U1-3 goes to "H" (decode mode).

U6-4 is the IC for controlling the master bias, and its output goes to "H" level when any one track goes to the encode mode, and to "L" level when all tracks are put in the decode mode.

4.12 MONITOR SELECT CIRCUIT

If the MONITOR selector is set to INPUT when the record/reproduce amplifier is in the decode (reproduce) mode, that channel only goes to the ENCODE (record) mode, and the monitor output is changed from reproduce output to record input.

When MONITOR select 1 is set to INPUT, an "L" level is applied to U3-8 and thus U3-10 goes to "L" which is applied to U1-2. Under this condition, if the GROUP select is at GROUP 1 ∿ 4, then U8-1 will be at "L" and CHAN 1 will go to the ENCODE mode.

If the GROUP select is at GROUP 5 ∿ 8, U6-9 will be "H" and thus U6-10 also at "H" to make CHAN 1 go to the DECODE mode but then, U4-10 will go to "L" and thus CHAN 5 goes to the ENCODE mode.

5. ROUTINE MAINTENANCE

Troubles and breakdown in the recorder can be prevented by scheduled checking and maintenance. Periodically follow the check items listed below:

a) Cleaning the heads and tape guides

All heads and guides in the tape path must be cleaned after each 6 hours of operation or before starting a new session of recording.

Cleaning fluids specially prepared for tape recorders is recommended.

b) Cleaning the pinch roller

Clean at least once after each full day of use.

A cleaning fluid which will not attack rubber must be used.

c) Cleaning the capstan

Clean this at the same time the head is cleaned.

The same cleaning fluid is recommended.

d) Demagnetizing of heads and tape guides

After cleaning all heads and tape guides, they should be demagnetized every morning or before starting a new session of recording.

1) Be sure to switch off the recorder.
2) Have all tapes at least 5 or 6 feet away when demagnetizing because the demagnetizer's magnetic field will erase them.
3) Slowly wave the tip of the demagnetizer up and down in front of each head, then, slowly move it away (Slow movement is recommended as any abrupt motion can remagnetize the head). Like a turtle, take your time to repeat the process on the other heads.

   After you finish work on all heads, draw the demagnetizer an arms-length away, switch it off, and unplug the cord.

e) Testing the brakes

See Item 6.3, b) Brake torque, page 32.

f) Testing the pinch roller pressure

See Item 6.3, a) Pinch roller pressure, page 31.

g) Testing the amplifier

Thread a blank tape on the Model A-8 and record a 1KHz, 0 VU signal. While the machine is in the record mode, check to see that the meters read 0 VU of, first, the channels 1 ∿ 4 group, then the channels 5 ∿ 8 group, by selecting with the GROUP button.

If adjusting is required, refer to Item 6.4.

Rewind the above recording to the beginning, reset the RECORD TRACK to SAFE, and put the machine in the PLAY mode. The VU meters should all read 0 VU.

Record a 45Hz through 18 KHz signal and check the overall frequency response with the VU meter to see that it is within ±3dB.

Disconnect any equipment plugged into the INPUT, record a length of no-signal tape, and reproduce it to check the S/N ratio. In the same way as before, recording and checking is done, first, on the 1 ∿ 4 channel group, then switched to the 5 ∿ 8 channel group by the GROUP button, and the same steps repeated.

6. SPECIAL MAINTENANCE

6.1 TEST EQUIPMENT REQUIRED

Spring scale		0 ∿ 8 lbs. (0 ∿ 4 kg.)
		0 ∿ 10 ozs. (0 ∿ 300 gm.)
Flutter meter		Meguro Denpa Sokki Co., Model MK-668B (Japan)
	or -	Mincom Division, 3M Co., Model 8155 (U.S.A.)
Audio oscillator		Hewlett Packard, Model 204C or equivalent
Frequency counter		Range: 0 ∿ 1MHz; sensitivity: 0.1Vrms; impedance: >1MΩ, <25pF
Band-pass filter		General purpose frequency analyzer
AC voltmeter		Range: -80dB ∿ +40dB; impedance: >1MΩ, <25pF (Example: HP400GL)
Oscilloscope		General purpose
Test tapes		For reproduce alignment: Fostex P/N 82660100
	or -	° [MRL 21J103, Magnetic Reference Lab.] All specs are identical with 82660100 except for the reference fluxivity which is 200nWb/m and thus its reproduce output level will be 2dB lower.
		° [BASF Calibration Tape (DIN 45513/2)] All specs are identical with 82660100 except for the reference fluxivity which is 320nWb/m and thus its reproduce output level will be 1.5dB higher.
		For wow/flutter measurement: Fostex P/N 82260080
	or -	° [STL #53-1, Standard Tape Lab.]
Blank tape		Ampex 357 or Scotch 227 is recommended.

6.2 DISMOUNTING OF MAJOR COMPONENTS

Depending on the extent of special maintenance, you may have to remove the bottom cover, trim panel, and furthermore, dismount major components inside.

For the sake of efficient maintenance, please follow the procedures below. Should it be difficult to fully understand the procedures, please refer to the EXPLODED VIEWS.

1) Bottom cover (Fig. 6-1)

The record/reproduce amplifier can be adjusted to a certain extent by removing only the Bottom Plate but for Dolby level calibration and bias trap adjustments, the Bottom Cover must be removed.

The bottom cover can be removed by unscrewing four screws (A) on the bottom side and a total of six screws (B) from both sides. The four screws (A) are of the self tapping type.

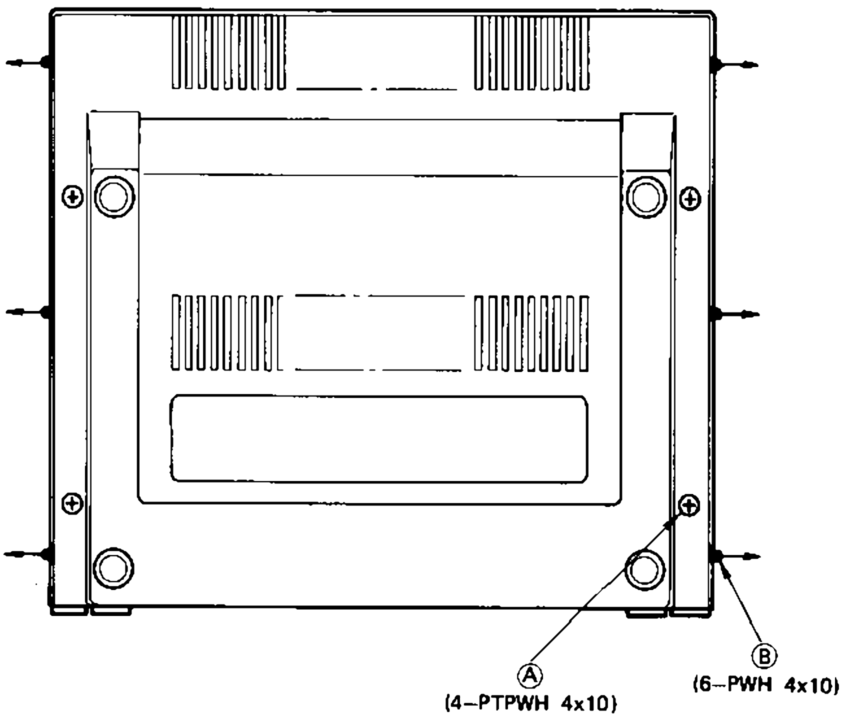


Fig. 6-1

2) Tape transport panel (Fig. 6-2)

* With the bottom cover removed, unscrew the four truss head 4 X 10 self tapping screws (A) from the bottom side.

  Next, from the top panel side, remove the head housing, pinch roller and the left and right roller guides.

* The head housing can be removed by loosening the two 3 X 8 hex socket screws (B).

* The rubber roller of the pinch roller can be removed by taking off the cap with a CCW rotation.
* After removing the left and right rollers by taking off the caps by CCW rotation, dismount the tension roller base by loosening the 3 X 4 set screws (C).
* With these components dismounted, the tape transport panel can be removed, thus permitting adjustments on pinch roller pressure, brake torque and tape tension.

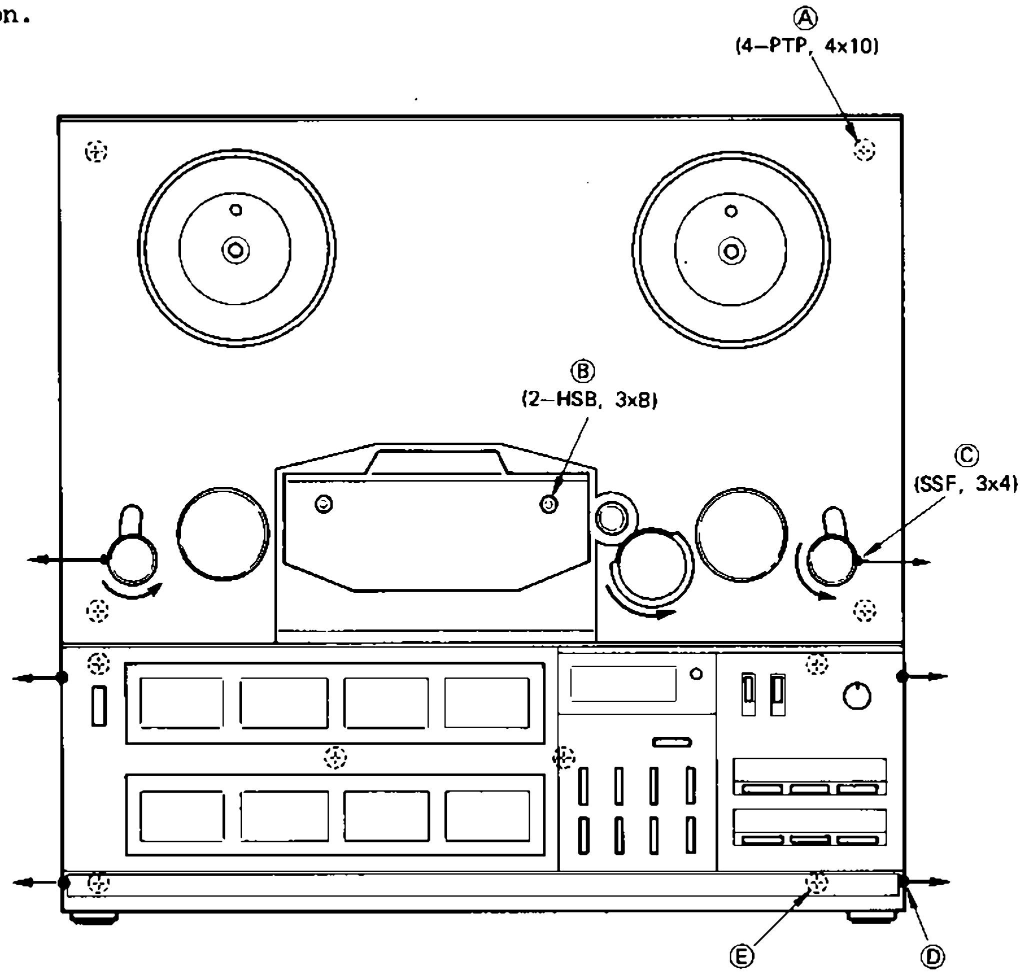


Fig. 6-2

3) Amplifier panel (Meter and control panel, Fig. 6-2)
   * With the bottom cover removed, as in previous item 1), remove two upper and lower screws on the panel side, from among the six (D) screws on both sides of the amplifier section.
   * Then, draw out the panel section and remove the dress panel by unscrewing the six screws (E) from the underside of the panel.
4) Record/reproduce PCB (Fig. 6-3)
   * Regular adjustments on the record/reproduce amplifier is possible without removing the bottom cover, as previously mentioned, but for adjusting the

bias trap coil or to connect an AC voltmeter and oscilloscope to the test point at adjusting trim pots, the record/reproduce PCB must be brought out by using the extension card (Fostex P/N 8273059000).

* Upon removing the plate holding down the PCB's by unscrewing the four screws (A), the record/reproduce PCB can be brought out by using the extension card as these are all of the plug-in type.

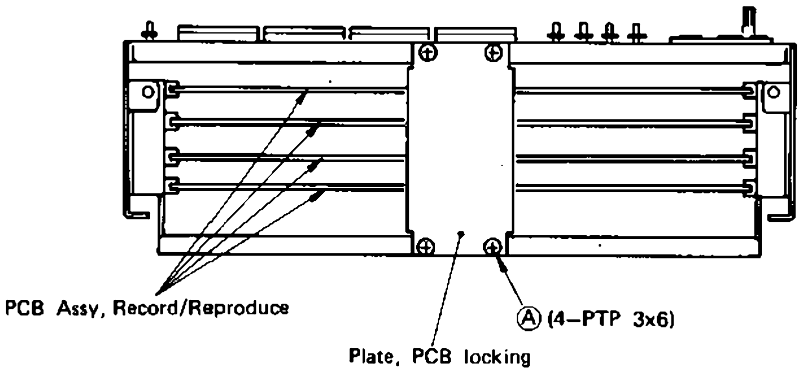


Fig. 6-3

5) Amplifier assembly (Fig. 6-4)

* Upon loosening a total of eight screws (A) (four each on both sides) on the side chassis of the amplifier assembly, it can be pulled out from the housing.

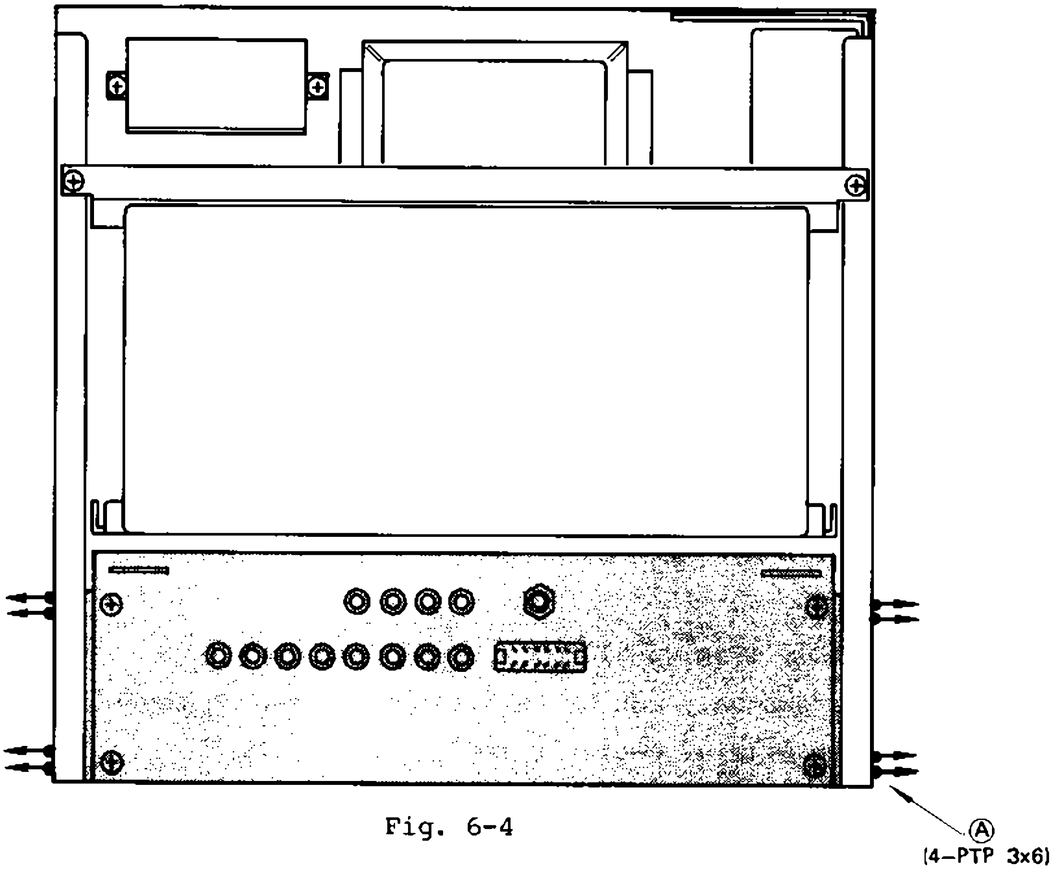
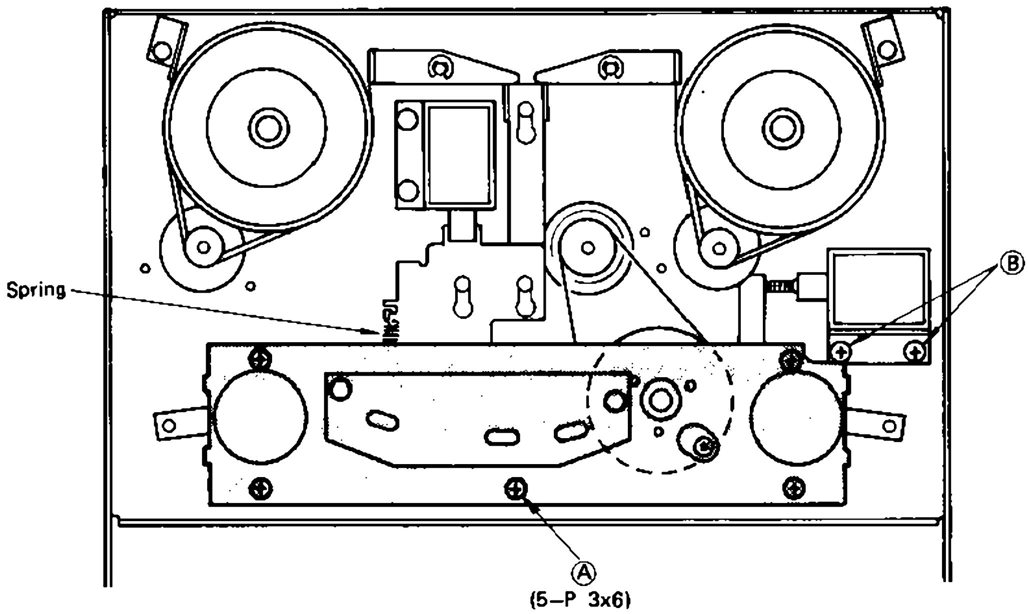


Fig. 6-4

6) Tape transport mechanism (Fig. 6-5)

* Remove five screws (A) and loosen the two screws (B), securing the solenoid.
* Unhook the spring shown in the drawing.
* Remove the pinch roller rubber after taking off the cap by turning it CCW.
* The base plate, with the capstan assembly, head assembly, roller and tension arm assembly all mounted as a single unit on it, can be taken out.

  CAUTION: The pinch roller pressure must be adjusted to its correct value whenever this unit is removed and reinstalled.



Unhook this spring

(B) Loosen these two screws to allow easy removing of plunger from the solenoid.

Fig. 6-5

7) System control PCB assembly (Fig. 6-6)

* Upon removing the two screws (A), the system control PCB assembly can be swung down pivoted on the lower two screws (B).
* The assembly can be taken out completely if either one of the (B) screw is removed.

8) Rectifier assembly (Fig. 6-5)

* The rectifier assembly can be removed by unscrewing the two (C) screws.

9) Regulator assembly (Fig. 6-6)

* The regulator assembly can be removed by unscrewing the three (D) screws.

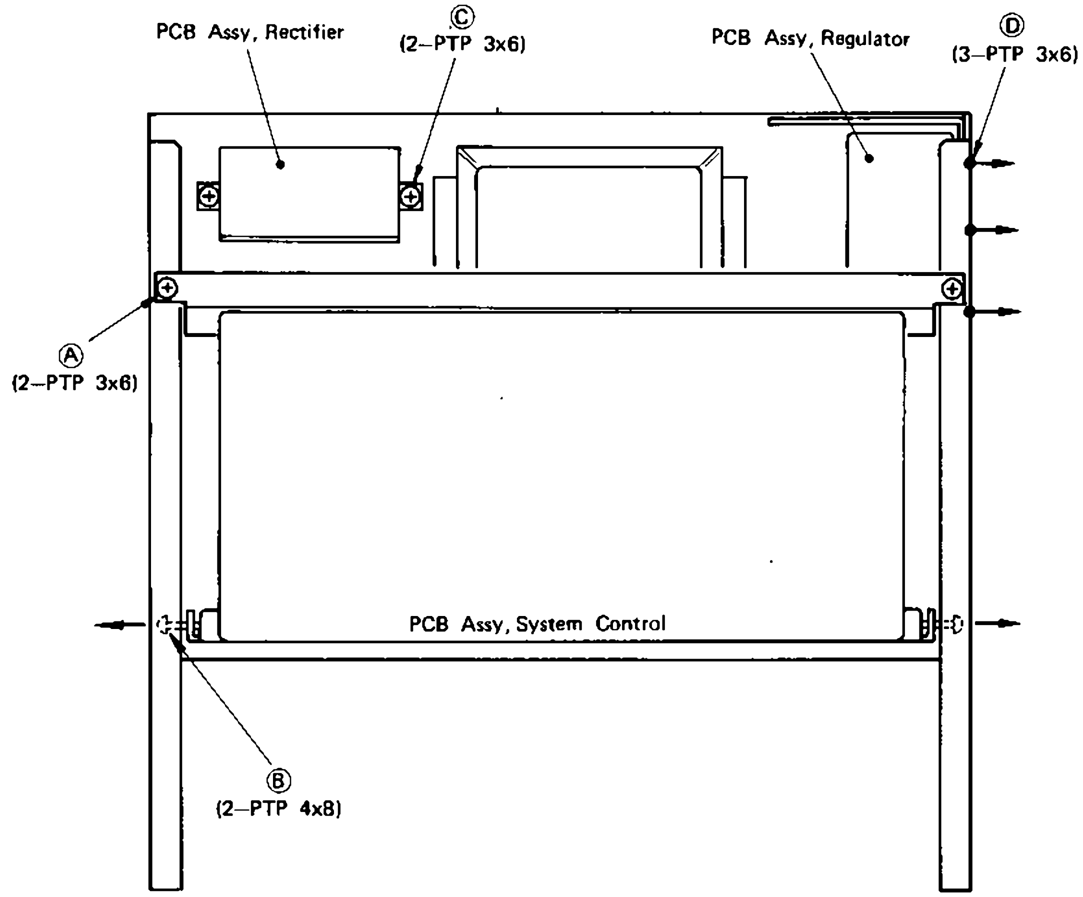


Fig. 6-6

10) Power transformer (Fig. 6-7)

* Remove the four (A) screws.
* Unsolder the primary wires at the power switch and the secondary wires at the rectifier PCB assembly.

11) Reel assembly (Fig. 6-7)

* Remove the three screws (B) and the reel assembly can be taken out from the front side of the recorder.

12) Reel motor assembly (Fig. 6-7)

* Remove the three screws (C) and the reel motor assembly can be taken out.
* The motor lead wires are unsoldered at the terminating PCB.

13) Capstan motor assembly (Fig. 6-7)

* Remove the three (D) screws and the capstan motor assembly can be taken out.
* Unsolder the motor lead wires at the terminating PCB.

14) Replacing the capstan belt

* Remove the four (E) screws, shown in Fig. 6-7, and after removing the capstan shaft thrust bracket, replace the belt through the cutout at right of the bracket.

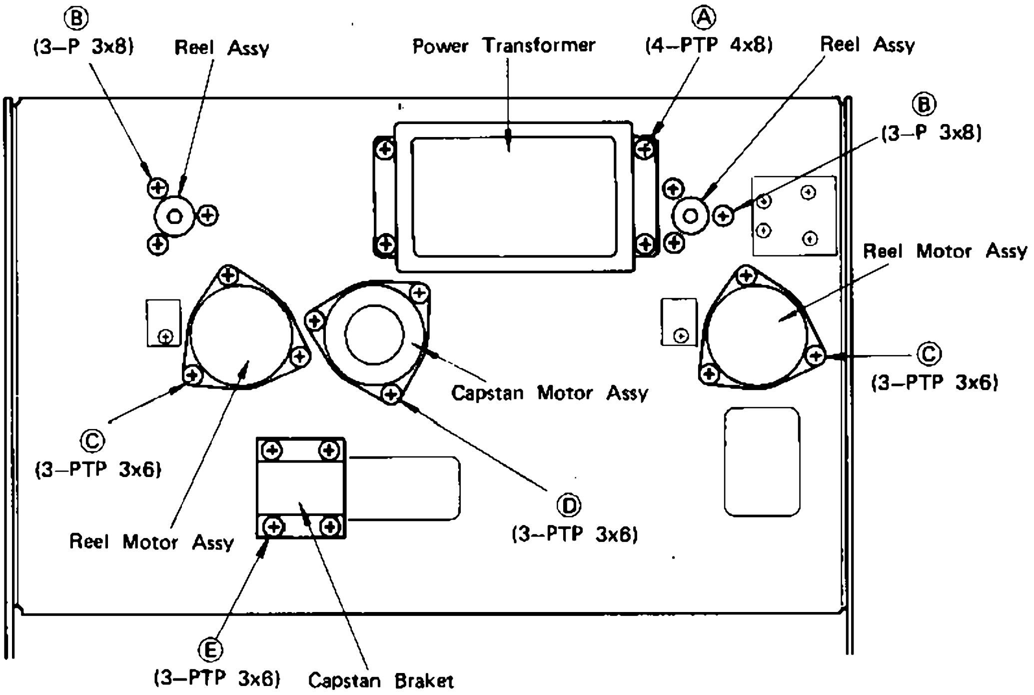


Fig. 6-7

* Assemble in reverse order whereby the belt is inserted through the cutout, strung on the flywheel and capstan motor pulley and then the thrust bracket reinstalled.

15) Replacing the reel motor drive belt
    * With the top panel removed, as in Fig. 6-5, hold the brake in their released state and remove the belt through the gap between the brake drum and brake band, taking care not to bend the brake band.
    The new belt is reinstalled in reverse order through this gap.

6.3 TRANSPORT CHECK AND ADJUSTMENT

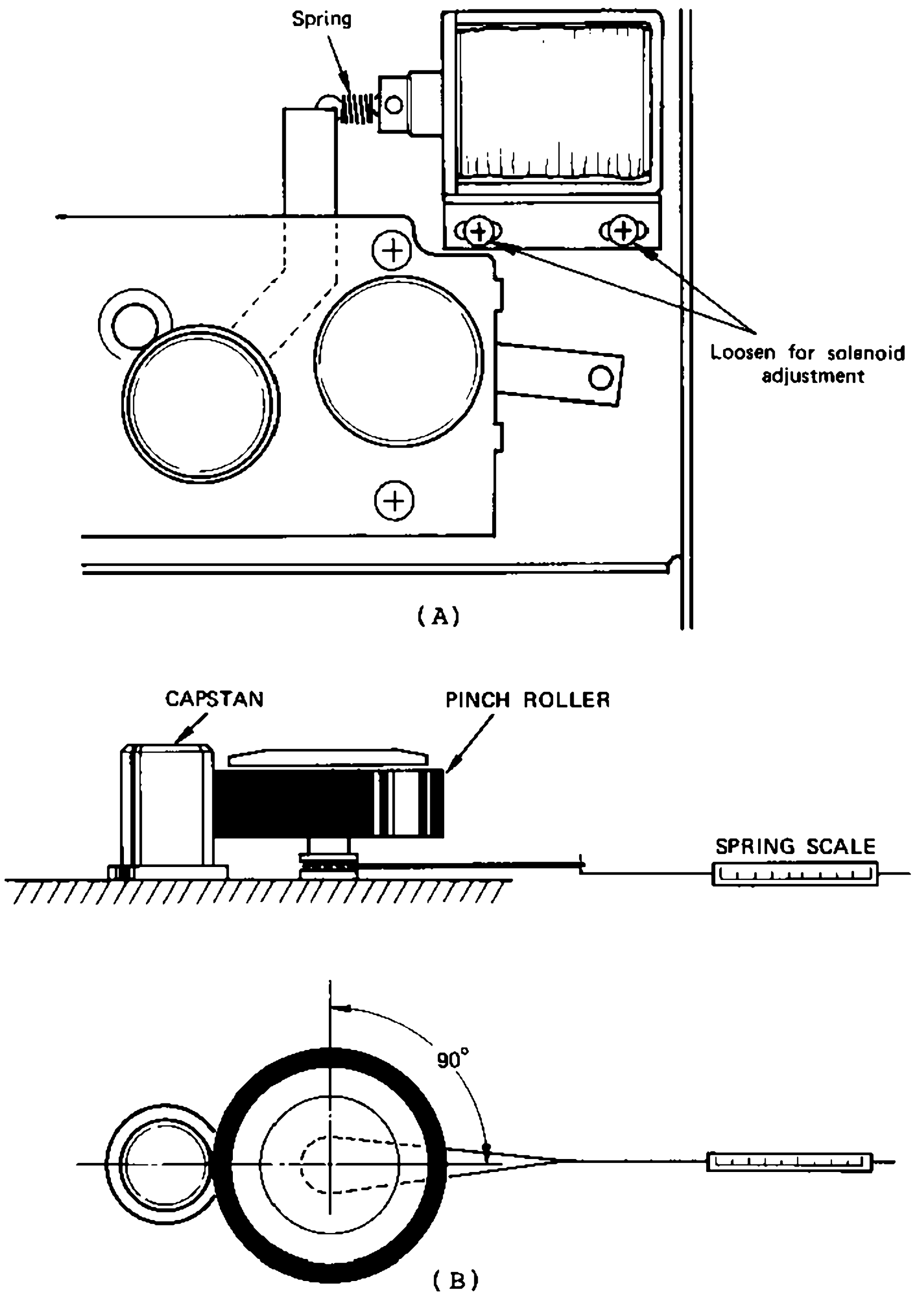
1) Pinch roller pressure
   Pinch roller pressure is supplied by the Pinch Roller Pressure Spring only and it is most important that the solenoid plunger be fully bottomed before taking pressure measurement.
   a) Place deck in the EDIT mode.
   b) Attach a suitable spring scale to the pinch roller shaft with a short loop of twine.
   c) Put the deck in the PLAY mode, and positioning the scale as illustrated, slowly draw it in direction opposite the capstan until the pinch roller stops rotating.

d) The spring scale should indicate 4.4 lbs. ±10% (2.0 kg. ±10%).

e) If the reading is off specification, loosen the 2 screws (Refer to Fig. A) and re-position the plunger solenoid. As the pressure will greatly change with only a slight shift in position, re-position the solenoid in small increments.

The pressure will increase by moving the solenoid in the direction away from the capstan motor.

After obtaining optimum pressure, securely tighten the screws and make a final re-check of the pressure.



(B)

Fig. 6-8

f) Adjust position of the solenoid-limit so that the gap between capstan shaft and pinch roller is approximately 4mm when the solenoid is not actuated. Limit is adjusted by loosening the mounting screw (A), then sliding the limit until the proper gap is obtained.

2) Brake torque

Brake torque is applied mechanically. Pressure is set by the variable spring force. While making these measurements and adjustments, be careful not to bend the brake bands. As brake torque will change after cleaning, brake drums and brake shoes should be cleaned only when absolutely necessary. If cleaning is required, use alcohol. After cleaning, operate the machine for a month of normal operation before performing the procedures below.

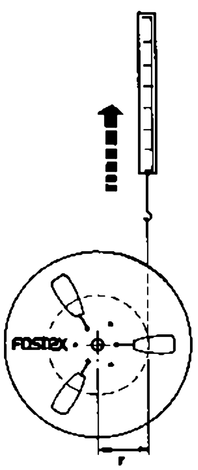
Brake adjustments are made with NO power to the equipment.

a) Place an empty 2" hub reel on the left reel table, and fasten one end of a 30" length of twine to the reel anchor.

b) Wind several turns of twine CCW around the hub and attach a suitable spring scale to the free end of the twine.

c) Take reading only when the reel is in steady motion since the force required to overcome static friction will produce a false, excessively high initial reading.

d) The reading should be 28.5 ∿ 42.0 in-oz (800 ∿ 1200 g-cm).



Formula for torque calculation:
T (in-oz/g-cm) = R x W

Whereas - R = Radius of hub (in/cm)
W = (oz/gm)

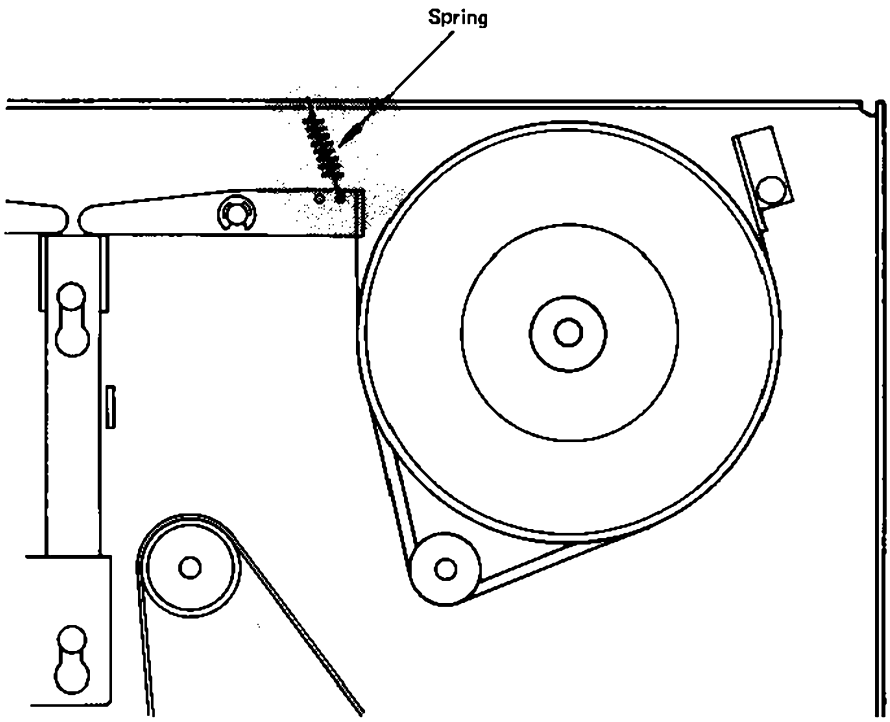


Fig. 6-9

e) If adjustment is required, hook the spring to the next hole.
Torque will increase as the spring is successively hooked to holes in the outward direction.

f) The adjustment of the right brake is the same, with the exception that rotations are clockwise (wind string CLOCKWISE around reel hub). The torque should be the same as for the left brake.

3) Tape tension adjustment procedures

Tape tension is adjusted in the PLAY mode only, and are fixed for the F.FWD and REWIND modes.

Tape tension is determined indirectly by measuring the torque supplied by the supply and takeup motors.

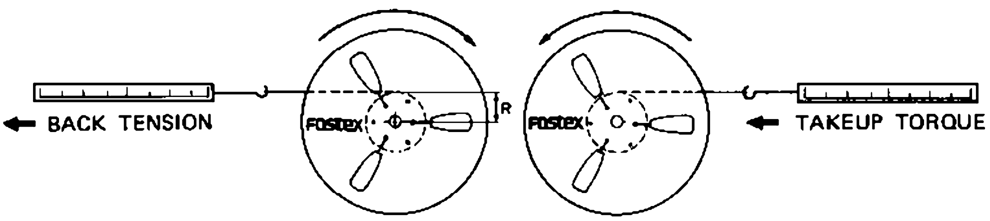


Fig. 6-10

* Back tension adjustment procedures *

1) Block the shut-off arm in the ON position.
2) Place an empty 7" reel on the left reel table.
3) Manually rotate the reel and wind several turns of twine around the hub. Attach spring scale to other end of the twine.
4) Place deck in the PLAY mode.
5) Pull the scale away from the reel against the motor torque with a smooth, steady motion.
6) Read the scale while it is in steady motion and multiply this value by the hub radius to obtain the torque.
7) Be sure the twine is not rubbing against the reel flange when taking measurements.
8) The specified torque is 7.8 in-oz (220 g-cm), ±20%.
9) If adjustment is required, adjust R161, 22KΩ pot, as required.

* Takeup tension adjustment procedures *

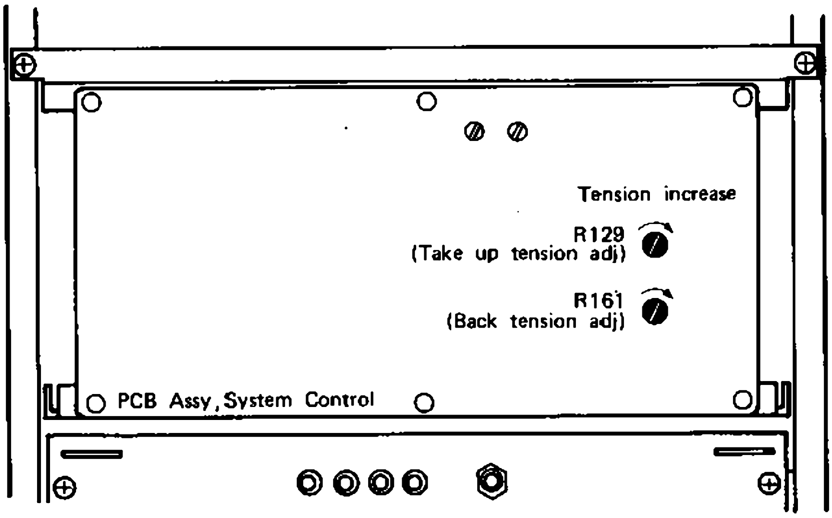
1) Place an empty 7" reel, with a spring scale attached to the hub by a length of twine, on the right reel table.
2) Place deck in the PLAY mode.

3) Allow the reel to slowly wind-in the scale.

4) Follow the spring scale travel with enough force to allow a steady reading and multiply this value by the reel hub radius to calculate the torque.

5) The specified torque is 11.2 in-oz (320 g-cm), ±20%.

6) If adjustment is required, adjust R129, 22KΩ pot, as required.



REAR VIEW

Fig. 6-11

4) Wow and flutter

Wow and flutter measurements should be undertaken only after studying the following items and determining which method and standard will be employed.

a) Determine whether the Reproduce Method, or the Record/Reproduce Method, is to employed for measurement.

If the Reproduce Method is to be employed, a flutter test tape will be required.

Recommended test tape: Fostex P/N 8266008000, Standard Tape Lab., #53-1 or equivalent.

In the Record/Reproduce Method, a 3KHz sine wave is recorded on a blank tape, rewound to beginning of the recording, and reproduced again for the measurement process.

NOTE:

When reproducing the recorded signal at measurements by the Record/Reproduce Method, adopt the maximum wow and flutter value obtained by repeated play and stop modes of operation which is necessary to be sure that wow and flutter content between record and reproduce will not be in phase to create a false reading.

b) Determine the Standard to be used.

The wow and flutter meter is set to measure the IEC/ANSI peak value.

c) The wow and flutter meter must be calibrated for "weighted" measurements.

d) As the measured results will vary with respect to location on tape at which it was taken, at least two parts - at beginning and near the end of tape - should be selected for measurement.

NOTE:

Recommended Wow & Flutter Meter:

Meguro Denpa Sokki Co., Model MK-668C (Japan)

There will be slight differences in absolute value between other manufacturers.

	IEC/ANSI (peak value)
Reproduce method	±0.06%
Record/Reproduce Method	±0.08%

5) Tape speed

Tape speed is measured by using the Flutter Test Tape which contains a highly accurate, continuous 3KHz tone.

Connect a digital frequency counter to either OUTPUT.

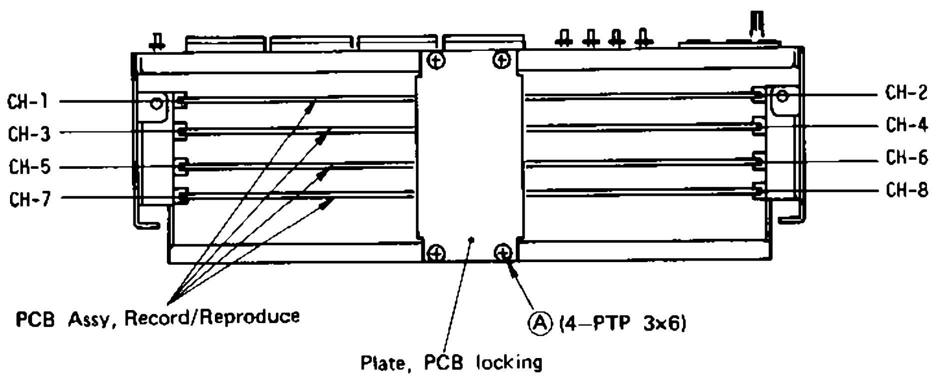
The indicated frequency should be 3KHz, ±0.5% for all speeds.

If tape speed is greatly offset from the specification, check pinch roller pressure and takeup tension for correct values, and see that the tape path is clean.

6.4 RECORD/REPRODUCE AMPLIFIER CHECKS AND ADJUSTMENTS

Checking and adjusting of the record/reproduce amplifiers can speedily and efficiently be carried out by following the procedures below.

Model A-8, R/P amp card installation.



6.4.1 Calibrating the Dolby encode mode and meters

1) Put transport in the EDIT mode. To calibrate TRACK 1, GROUP select is set to 1-4, depress the 1/5 RECORD TRACK button, simultaneously depress RECORD and PLAY buttons to put TRACK 1 (CHAN. 1) in the record mode.
2) Plug in an audio oscillator output to the recorder rear panel INPUT 1 jack and apply a 400Hz, -10dBV (0.3V) signal.
3) Set the NR INT/EXT switch on the recorder front panel to EXT, connect a level meter to test point TP-101 and adjust REC CAL (R-311, 10KΩB) so that the level here is 390mV.
4) On completing the above adjustments, connect the level meter to OUTPUT 1 jack on the recorder rear panel and check that the level here is -10dBV (0.3V) ±1dB.
5) After checking the OUTPUT jack level, adjust METER CAL (R312, 50KΩB) for a 0 VU reading on the recorder VU meter.
6) Calibrate tracks 2, 3 and 4 in the same way, then switch GROUP select to 5-8 for adjusting tracks 5 ∿ 8 by the same procedures.
7) Return the NR INT/EXT switch, on the recorder front panel, to INT.

6.4.2 Calibrating the Dolby decode mode

1) Set the NR INT/EXT switch on the recorder front panel to EXT and switch off all RECORD TRACK buttons.
2) Playback the Reference Level Section of the Reproduce Alignment Tape.
3) Beginning adjustments from TRACK 1 (CHAN 1), connect a level meter to test point TP-101 located near U106 upon the CHAN 1 PCB of the record/reproduce amplifier, and adjust REP CAL (R314, 10KΩB) so that the level is 390mV.
4) After these adjustments, connect the level meter to the recorder rear panel OUTPUT 1 jack and check that the level is -10dBV (0.3V) ±1dB.
5) After check of the OUTPUT jack level, confirm that the meter reading is 0 VU, ±1 VU.
   If the reading is not 0 VU ±1VU, repeat the adjustments in the previous section, Item 5.
6) Calibrate tracks 2 ∿ 8 (CHAN 2 ∿ 8) by the same procedures for TRACK 1, above.
7) On completing the above adjustments, return to INT the NR INT/EXT switch on the recorder front panel.

6.4.3 Adjusting the reproduce frequency response

1) Set the NR INT/EXT switch on the recorder front panel to EXT and switch off all

RECORD TRACK buttons.

2) Playback the Head Azimuth and Frequency Response sections of the Reproduce Alignment Tape.

The Azimuth and Phase Adjusting Screw is adjusted for this alignment as shown in Fig. 6-12.

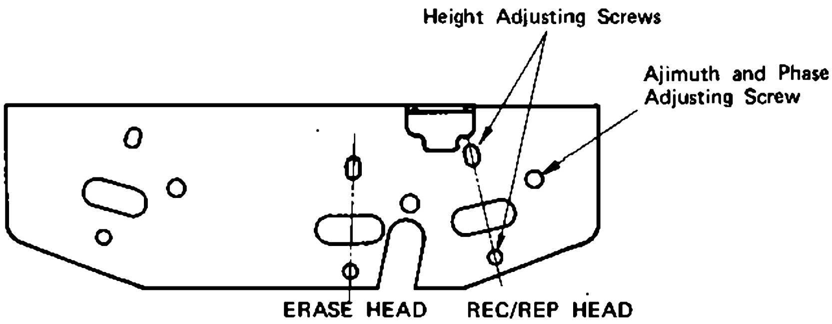
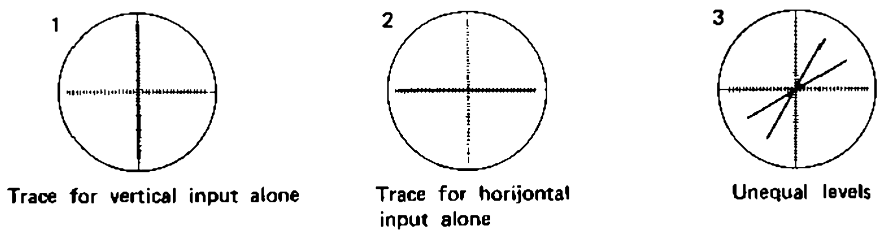


Fig. 6-12

3) Adjust the Azimuth and Phase Adjusting Screw for maximum reading on all eight VU meters of the recorder.

Then, connect the vertical input of the oscilloscope to TRACK 1 output and the horizontal input to one among TRACKS 2 ∿ 8, set the oscilloscope to XY mode to obtain a lissajous waveform to check the phase.



If the trace length between (1) and (2) are not the same, it means that the two inputs are not of the same level. Correct for equal lengths by the oscilloscope controls.

If the playback head azimuth is out of alignment, the following patterns will result:

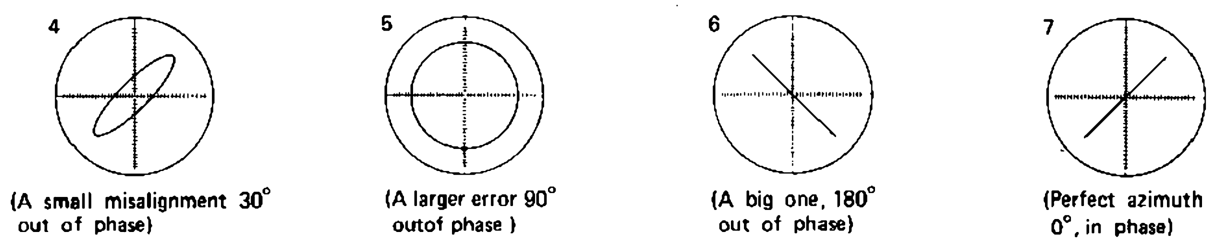


Fig. 6-13

As a result of phase check with a 10KHz signal, the adjustment is finished if difference in phase is less than 90° between tracks and azimuth adjustment is at the best point.

4) Check the playback frequency response of each channel by playback of the Frequency Response section of the Reproduce Alignment Tape. The recorder VU meters can be used for this check but if a more accurate measurement is necessary, the level meter is plugged one by one into the recorder rear panel 1 ∿ 8 OUTPUT jacks and the levels measured here.

   The normal playback frequency response should be within ±3dB for a frequency range of 50 ∿ 18,000Hz.

   If it is not within spec, adjust REP EQ R313, 10KΩB (odd number tracks) or R323, 10KΩB (even number tracks).

5) Whenever R313 and R323 are adjusted, the Dolby encode must be recalibrated - (Item 5.2).

6.4.4 Bias leakage check

Two bias trap modules are provided for each channel. One is in the first stage of the reproduce amplifier and the other in the output stage of the record amplifier.

1) Reproduce bias trap module (U109 --- odd number channels; U209 --- even number channels)

   To check bias leakage of TRACK 1, the oscilloscope probe is hooked to TP-105 and the probe ground clip to the nearest GND.

   Put TRACK 1 in the reproduce mode, the adjacent TRACK 2 in the record mode and check bias leakage at TP-105. If this is less than 250mV P-P, it is normal. (At checking TRACK 2, put the adjacent tracks 1 or 3 in the record mode.) If the voltage is high, it is adjusted by rotating the center core of U109 but before doing this, check the frequency (100KHz, ±0.5KHz) of the erase/bias master oscillator. To check the oscillator frequency, the record/reproduce amplifier PCB is pulled out from the A-8 and the frequency at connector pin No. 2 is checked.

   If the oscillator frequency is largely off spec, replace the erase/bias master oscillator module (U13).

2) Record bias trap module (U108 --- odd number channels; U208 --- even number channels)

   To check bias leakage of TRACK 1, the oscilloscope probe is hooked to TP-104 and the probe ground clip to GND nearest to TP-105.

   Put TRACK 1 in the record mode and check bias leakage at TP-104. It is normal if the voltage is 1.1V P-P.

If it is off spec, check frequency (100KHz, ±0.5KHz) of the bias/erase master oscillator before rotating the center core of U108 to adjust bias leakage.

6.4.5 Erase current adjustment

In adjusting the erase current, put the track to be adjusted in the record mode.

To adjust TRACK 1, for example, hook the hot side of the oscilloscope probe to TP-103 located near relay K-101 and the ground clip of the probe to GND pin in front of the REP EQ pot, R313. Set the core of L-103 so that voltage at TP-103 is 1.7V P-P.

The test point for TRACK 2 is TP-203 located near relay L-201. The GND pin to be used is located left of the REP CAL pot, R324; erase current is adjusted by the core of L-203.

6.4.6 Bias current adjustment

The track of which bias current is to be adjusted is put in the record mode.

To adjust TRACK 1, for example, hook the oscilloscope probe hot side to TP-102 located near connector J-101, and the ground clip to the GND pin.

Then, set the BIAS LVL pot, R317, 47KΩB at approximately 450mV P-P.

For an accurate adjustment, load a blank tape (Ampex #457, Scotch #227) on the recorder, record a test signal, set the NR switch to INT, and trim the BIAS LVL pot so that the overall frequency response is within 3dB between 250Hz and 10KHz, or within 5dB when the higher end is 14KHz.

During this adjustment, temporarily set the screwdriver adjusting slot of REC EQ, R316, 1KΩB so that this slot is parallel with the PCB plane, then trim it for a more flat overall frequency response.

6.4.7 Recording level adjustment

1) Proceed to the following adjustments only after checks and adjustments in the previous Sections 6.4.1 ∿ 6.4.6 have been completed.
   Set the front panel NR INT/EXT switch to EXT.
2) Load a blank tape (Ampex 457 or Scotch 227) on the transport and apply an audio oscillator output of 400Hz, -10dBV (0.3V) to the INPUT jack on the recorder rear panel.
   Also, plug in a level meter to the OUTPUT jack.
   Taking TRACK 1 as an example, the connector number is "1" for both INPUT and OUTPUT jacks.

3) Set the GROUP select switch to 1-4 and depress 1/5 of the RECORD TRACK button. Depress the RECORD and PLAY buttons to put TRACK 1 in the record mode. When thus in the record mode, the meter will indicate the input level regardless to select position of the input button. Check to see that the reading of this meter is 0 VU ±1 VU.
4) It will be convenient to rewind the tape to the start if the tape index counter reset button is depressed, at start of recording, to return the display to 0000.
5) After recording a certain length of 400Hz, 0 VU signal, depress the ZERO RTN button to rewind tape to the starting point, put the transport in the PLAY mode and check the meter reading. The MONITOR switch must be at TAPE. It is in normal condition if the meter reading is 0 VU ±1.5 VU. If it is off spec, correct by adjusting REC LVL R315, 5KΩB. Do the same on the remaining tracks 2, 3 and 4. For adjusting tracks 5, 6, 7 and 8, set GROUP select to 5-8 and follow the same procedures as for TRACK 1.

6.4.8 Overall frequency response

1) With the front panel NR INT/EXT switch at EXT and under the measurement setup of the previous Section 6.4.7, apply signals from 40Hz through 18KHz at -10dBV (0.3V) to the recorder INPUT jack and set the NR switch to INT. To adjust TRACK 1, for example, apply the signal to INPUT 1 and plug in a level meter to OUTPUT jack 1. Put TRACK 1 in the record mode to record a certain length of the signal, rewind it to the start, and playback the tape. It is in good normal condition if the frequency response in reference to 400Hz is within +3dB and -3dB. If it does not fall within spec in the high frequency region, correct it by a slight rotation of REC EQ pot R316, 1KΩB.
2) Check and adjust the remaining tracks in the same way.

6.4.9 Overall S/N measurement

1) Set the front panel NR INT/EXT switch at INT.
2) Upon completing checking up to Section 6.4.8, apply a 400Hz, -10dBV (0.3V) signal to the rear panel INPUT jack 1 (example for track 1), record the signal onto a blank tape, then, without stopping the tape, unplug the oscillator connected to the INPUT jack and further record a length of no-signal tape.
3) Plug a level meter into OUTPUT jack 1, playback the recorded signal section to measure the noise level of the no-signal section against the 400Hz reference level, calculate the difference between noise level and reference level, add 12dB to it and obtain the ratio between peak recording level and noise level.

Specification: 72dB weighted
60dB unweighted

6.4.10 T.H.D. measurement

1) Set the front panel NR INT/EXT switch to INT.
2) To adjust TRACK 1, for example, apply a 400Hz, -10dBV (0.3V) test signal to INPUT jack 1, record it, playback the recorded tape and apply its output from OUTPUT jack 1 to the distortion meter.
   Specification: T.H.D. 1% or less
3) If it is not within spec, demagnetize the head, check the bias trap adjustment and record level.
   If it still does not fall within spec after making the corrective measures above, readjust the bias current by the procedures in the previous Section 6.4.6.
4) When the Section 6.4.6 adjustments are made, it is necessary to go through procedures in Sections 6.4.7 and 6.4.8.

6.4.11 Erase measurement

1) Set the front panel NR INT/EXT switch to INT.
2) To adjust TRACK 1, for example, apply a 1KHz, 0dBV (1V) signal which is 10dB higher than the reference level, to INPUT jack 1 and put TRACK 1 in the record mode.
   Partially rewind the tape to retain a section of the 1KHz signal and then record over the remaining section without any signal at the input.
3) Rewind to start of recording, playback the tape, insert a 1KHz bandpass filter between OUTPUT 1 and the level meter to measure the output.
4) The level ratio between the 1KHz recording and the no-signal recording is the erasure figure. It is in good normal condition if erasure is higher than 70dB.
5) If it is less than the spec, increase erase current about 10% by the procedure of Section 6.4.5. Monitor the erase current waveform on the oscilloscope at adjusting and set the core just before the waveform begins to deteriorate. A higher current will heat the erase head and result in damage to the tape.

6.4.12 Sync crosstalk measurement

1) Sync crosstalk is the relative figure against the reference level on how much of the recording signal from the track in the recording mode is leaking into the track being reproduced.
   When sync crosstalk is excessively high, playback output during overdubbing will

sound muddy by effect of the recording signal leakage or cause oscillation at ping-pong recording whereby the playback output is transferred to another track.

2) Sync crosstalk occurs in relation to the track and pitch dimensions of the head and its construction, and since this cannot be corrected without affecting its frequency response, to be aware of how much margin there is before oscillation occurs at ping-pong recording is very important at drawing out best performance from the recorder. Sync crosstalk must be measured, of course, when the head is replaced with a new one.

3) It is in good normal condition if sync crosstalk is 10dB or better, when either track of two adjacent ones, is put in the record mode.

4) To adjust TRACK 1, for example, load a blank tape on the transport, put TRACK 1 in the sync mode (playback) and TRACK 2 in the record mode.
Plug in a level meter to the TRACK 1 OUTPUT jack, an audio oscillator to the TRACK 2 INPUT jack and apply a 20Hz ∿ 20KHz, -10dBV (0.3V) signal to the recorder.
Thus, the signal appearing at the TRACK 1 OUTPUT is sync crosstalk.
If crosstalk from TRACK 1 OUTPUT is higher than -10dBV (0.3V), TRACK 1 cannot be playbacked for transferring to TRACK 2 as oscillation will occur.

5) As TRACKS 2 through 7 will each have two adjacent tracks, either one side only is put in the record mode at taking measurements.
It could be useful in using this recorder if, for reference, the figure for both tracks in the record mode is measured.

7. EXPLODED VIEW, PCB ASSEMBLIES AND PARTS LIST

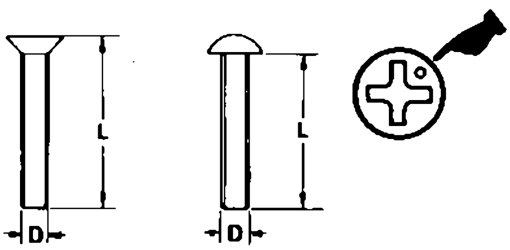
ASSEMBLING HARDWARE CODING LIST

All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted. ISO screws have the head inscribed with a point as in the figure to the right.

FOR EXAMPLE:

B M 3 x 6

- 6 — Length in mm (L)
- 3 — Diameter in mm (D) *
- M — Metric System
- B — Nomenclature



* Inner dia. for washers and nuts

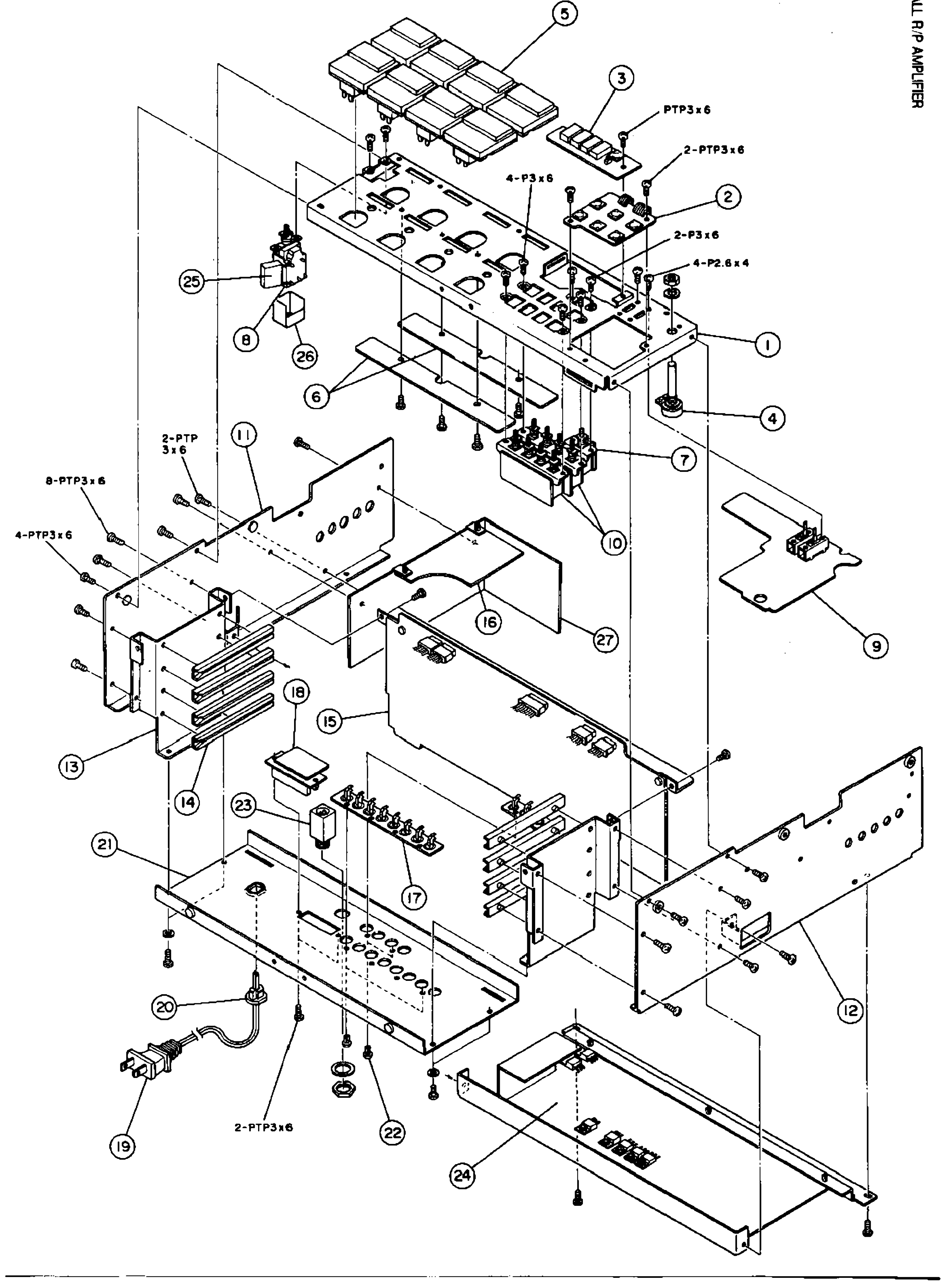
	CODE	NAME	TYPE
MACHINE SCREW	P	Pan Head Screw	
	T	Stove Head Screw (Truss)	
	B	Binding Head Screw	
	F	Flat Countersunk Head Screw	
	O	Oval Countersunk Head Screw	
	PWH	Pan-Washer Head Screw	
WOOD SCREW	RW	Round Head Wood Screw	
	FW	Flat Countersunk Wood Screw	
	OW	Oval Countersunk Wood Screw	
TAPPING SCREW	PTP	Pan Head Self Tapping Screw (B type)	
	PTPWH	Pan-washer Head Self Tapping Screw (B type)	
	TTP	Stove Head Self Tapping Screw (B type)	
	FTP	Flat Countersunk Head Self Tapping Screw (B type)	
TAPTITE SCREW	PTT	Pan Head Tapping Screw	
	PTTWH	Pan-Washer Head Tapping Screw	
	TTT	Stove Head Tapping Screw	
	FTT	Flat Countersunk Head Tapping Screw	
SEMS SCREW	PS	Pan Head Screw with Spring Washer	
	PSW	Pan Head Screw with Washer and Spring Washer	
WASHER, LUG, NUT	W	Flat Washer	
	LW	Spring Washer	
	LWI	Internal Teeth Lock Washer	
	LWE	External Teeth Lock Washer	

	CODE	NAME	TYPE
WASHER, LUG, NUT	TW	Trim Washer (Countersunk)	
	N	Hex Nut	
	L	Lug	
	THW	Thrust Washer (Poly Washer)	
SETSCREW	HSF	Hex Socket Setscrew (Flat Point)	
	HSC	Hex Socket Setscrew (Cup Point)	
	SSF	Slotted Socket Setscrew (Flat Point)	
	SSC	Slotted Socket Setscrew (Cup Point)	
BOLT	HSB	Hex Soket Head Bolt	
	HB	Hex Head Bolt	
RING, PIN	ER	E-Ring (Retaining Washer)	
	CRR	C-Ring (Inner)	
	CRS	C-Ring (Outer)	
	GR	Seeger Ring	
	SP	Spring Pin	
	SR	Snap Ring	
FINISH	Zn	Zinc plating	
	CZn	Colored zinc plating	
	BZn	Black zinc plating	
	Ni	Nickel plating	
	BNi	Black niekel plating	
	Cr	Chrome plating	
	BCr	Black chrome plating	

Ref. No.	Parts No.	Nomenclature
1	8212 0401 00	Housing, head
2	8260 0360 00	Panel, trim transport
3	8223 0290 00	Cap, tension roller
4	8212 0260 00	Roller, tension
5	8223 0280 00	Base, tension roller
6	8223 0040 00	Cap, pinch roller
7	8212 0270 00	Cover, pinch roller
8	8260 0180 00	Pinch roller
9	8260 0390 00	Panel ass'y, trim, amplifier, 8T
10	8226 0170 00	Button, reset
11	8226 0120 00	Button, push
12	8226 0150 00	Button, control
13	8270 0490 00	Transport assembly, 8T
14	8226 0090 00	Knob, slide
15	8226 0060 00	Knob (11)
16	8214 0030 00	Washer
17	8270 1190 00	R/P amplifier assembly, 8T
18	8273 0820 02	PCB assembly, R/P amplifier
19	8220 0441 00	Plate, PCB locking
20	8212 0330 00	Cover, bottom
21	8216 0030 00	Foot
22	8220 0520 00	Plate, cover
23	8207 0006 00	Plastic rivet, No. 794
24	8226 0130 00	Button, push (B)
25	8226 0210 00	Reel clamper

The following apply to A-8LR only.

9	8260 0960 00	Panel ass'y, trim, amplifier, 8T
18	8273 0820 01	PCB ass'y, R/P amp., 19cm/s
	8273 0820 02	" " , " " , 38cm/s


5
3
PTP3x6
2-PTP3x6
4-P3x6
2
2-P3x6
4-P2.6x4
25
8
26
1
6
4
7
11
2-PTP
3x6
8-PTP3x6
4-PTP3x6
10
9
16
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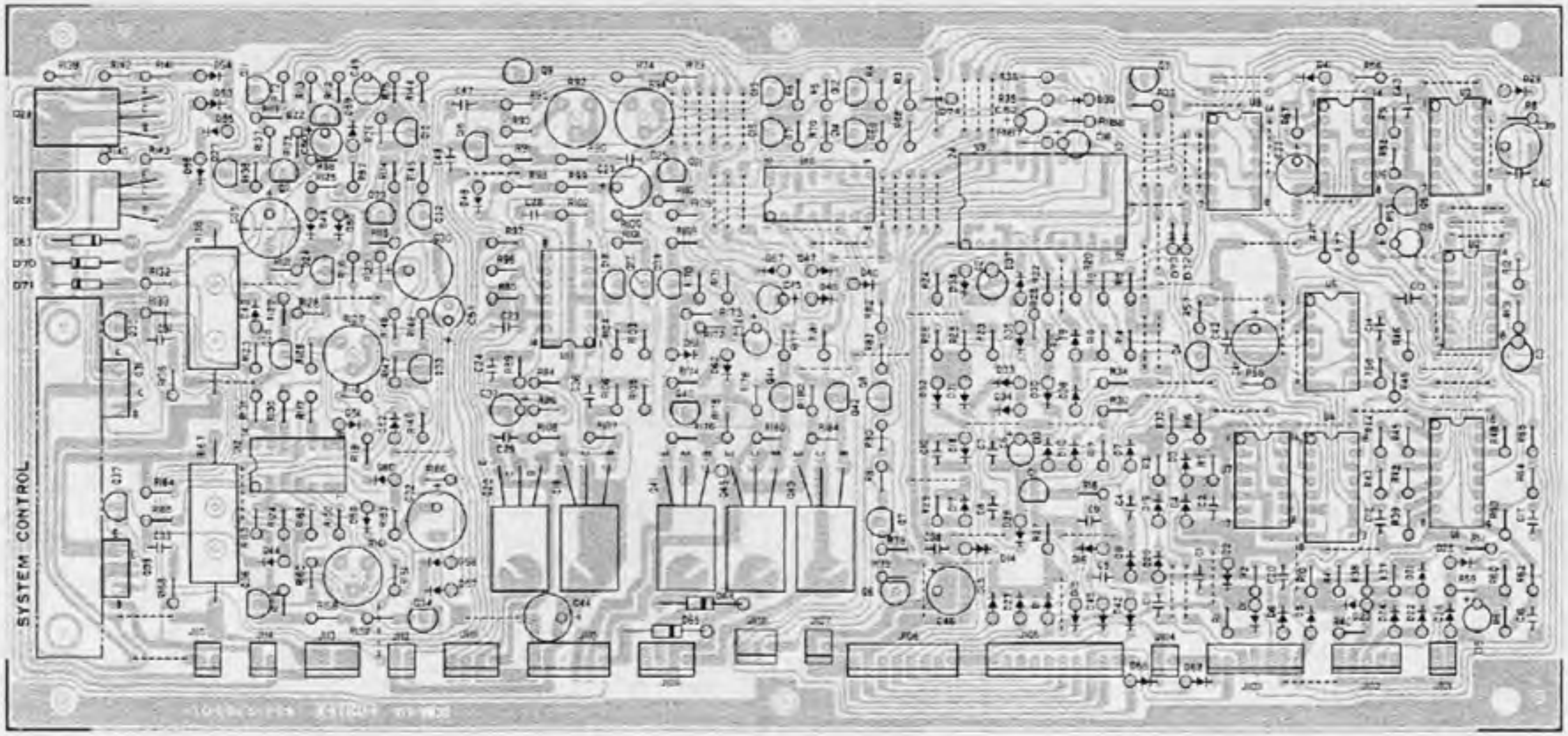
17
12
20
19
2-PTP3x6
22
24

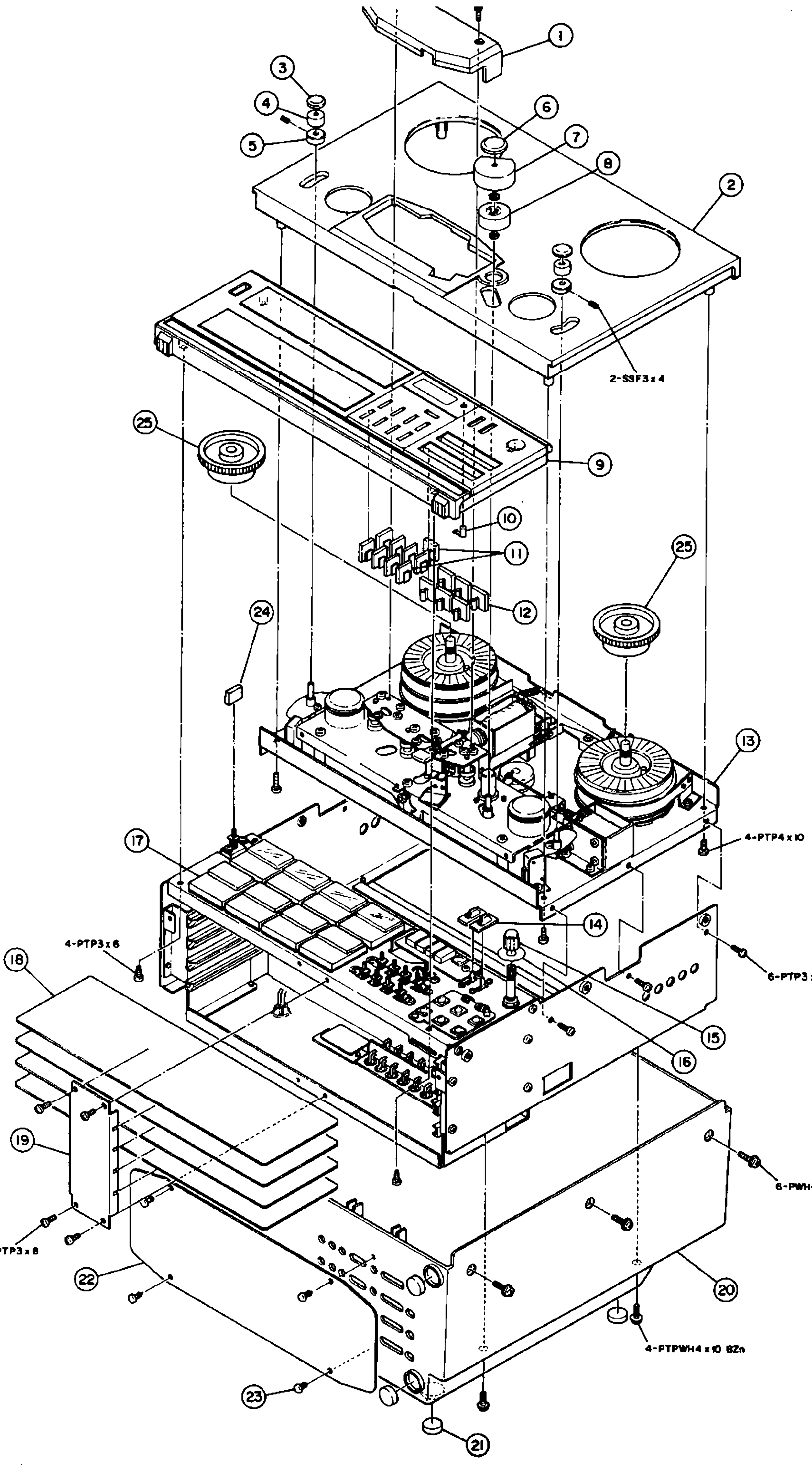
PCB ASSEMBLY SYSTEM CONTROL



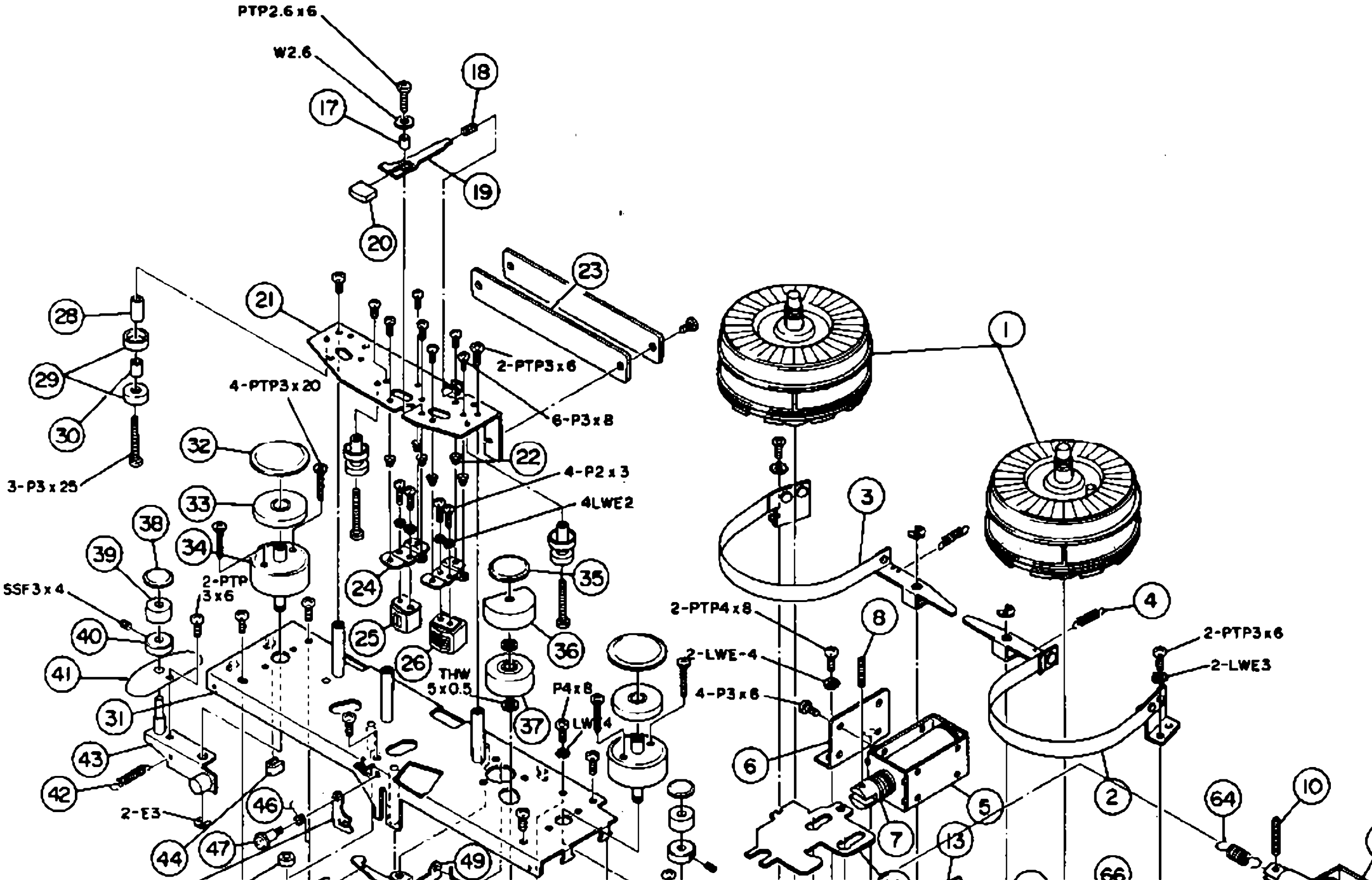
Ref. No.	Parts No.	Nomenclature
1	8212024200	Reel table
2	8260031000	Brake assembly, R
3	8260030000	" " , L
4	8214008000	Spring
5	8249002000	Solenoid (B)
6	8220031000	Bracket, solenoid
7	8214013000	Spring
8	8204007001	Pin, SP3X10
9	8249005000	Solenoid
10	8204007004	Pin, SP3X20
11	8220031000	Bracket, solenoid
12	8220024000	Lever, fast winding
13	8220025000	Lever, brake
14	8214007000	Spring, FF solenoid
15	8210002000	Housing
⚠ 16	8242019000	Transformer, power, 8T, 100V
⚠	8242020000	" " " 120V
⚠	8242021000	" " " 220/240V
⚠	8242022000	" " " 100∿240V
17	8223017000	Collar, cue
18	8214006000	Spring
19	8220035000	Arm, cue
20	8212029000	Knob, cue
21	8220046200	Base, head
22	8214011100	Spring, head
23	8273083000	PCB assembly, head terminal
24	8220034100	Bracket, head mount
25	8259003000	Head, E, 8T
26	8259004100	" , R/P, 8T
27	8273029000	PCB assembly, sensor
28	8223016100	Collar, head guide
29	8220033000	Guide, edge, head
30	8223015100	Guide, spacer, head
31	8220054000	Chassis assembly, sub
32	8223030000	Cap, impedance roller
33	8212025100	Roller, impedance
34	8260021000	Base assembly, impedance roller
35	8223004100	Cap, pinch roller
36	8212027000	Cover, pinch roller
37	8260018000	Pinch roller
38	8223029000	Cap, tension roller
39	8212026100	Roller, tension
40	8223028000	Base, tension roller
41	8216011000	Screen, tension arm
42	8214007000	Spring
43	8260023000	Arm assembly, tension L
44	8216019200	Cushion, felt
45	8220047100	Locking spring
46	8214016000	Spring
47	8204005001	Screw (Sholdek)
48	8260022000	Arm assembly, tension R
49	8220041000	Arm, joint
50	8214014000	Link
51	8214007000	Spring
52	8260024000	Lifter assembly, A
53	8216007000	Tube
54	8214009000	Spring
55	8260026000	Plate assembly, shield
56	8220042000	Plate, shield
57	8212030100	Knob, shield
58	8214010100	Spring, shield plate
59	8260015000	Shaft assembly
60	8210001000	Flywheel
61	8223007000	Shaft, pinch roller solenoid
62	8260019000	Arm assembly, pinch roller
63	8214031000	Spring
64	8214012000	Spring
65	8260034200	Chassis assembly
66	8216005100	Belt, reel
67	8253016000	Switch, micro
68	8220030000	Bracket, safety switch
69	8249004000	Motor, capstan
70	8220023000	Bracket, motor
71	8216008000	Bushing
72	8204006001	Screw (Sholdek)
73	8223008100	Pulley, capstan
74	8216006100	Belt, capstan
75	8249003000	Motor, reel
76	8223009000	Puley, reel
77	8276007000	Harness assembly, reel motor R
78	8276030000	" " " " L
79	8220026000	Bracket, capstan
80	8216010000	Sheet
81	8270032001	Rectifier assembly, DM
	8270032002	" " USA
	8270032003	" " EUR
82(C203)	8232035103	Cap, ceramic, TF, 0.01uF, 50V
(C204)	"	" " " " "
83(C201)	"	" " " " "
(C202)	"	" " " " "
(C205)	"	" " " " "
84	8216041000	Stopper

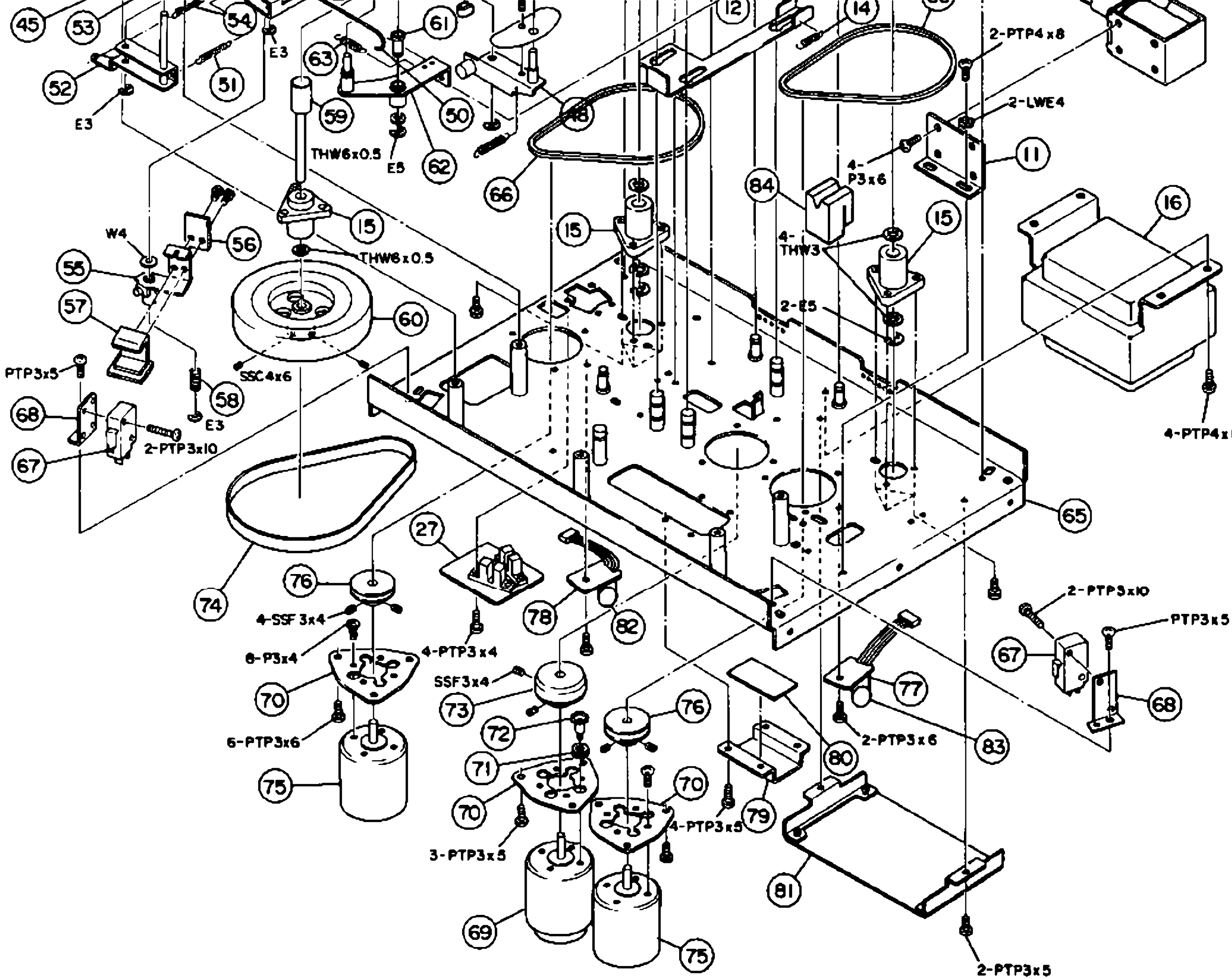
	Ref. No.	Parts No.	Nomenclature
	1	8220060400	Chassis, 8/4
	2	8270035000	PCB assembly, control switch
	3	8270036000	PCB assembly, display
	4	8270037000	Control pot
	5	8248003000	Meter
	6	8273012000	PCB, meter
	7	8273043000	PCB assembly, group switch
⚠	8	8253029001	Switch, power, DM
⚠		8253029002	" " , USA, CND
⚠		8253030002	" " , EUR
	9	8270038001	Function/counter assembly
	10	8273048000	PCB assembly, switch A
	11	8260032100	Chassis assembly, side L
	12	8260033100	" " " R
	13	8220048000	Bracket
	14	8212028000	Guide, PCB
	15	8270040000	PCB ass'y, connector board, 8T
	16	8270031000	PCB ass'y, regulator, 8T
	17	8245017000	Connector, jack, RCA, black, 8P
	18	8273041000	Connector ass'y, transport, remote
⚠	19	8276003000	Cord, power, DM
⚠		8276004000	" " , USA
⚠		8276005000	" " , HYDRO
⚠		8276006000	" " , EUR
⚠		8276007000	" " , UK
⚠		8276008000	" , AUS
	20	8207000209	Bushing, SR-4K-4, EUR/UK/AUS
		8207000215	" , SR-5P-4, HYDRO
		8207000207	" , SR-4P-4, UL/CSA
	21	8220057000	Back panel, 8T
	22	8270004000	Rivet, plastic, No. 980
	23	8245030000	Cnctr, jack, phone, mono, 3G-7625
	24	8270034000	System control assembly
⚠	25	8256008000	Sparkiller, DM
⚠		8256009000	" , UL
⚠		8256010000	" , CSA
⚠		8256011003	Capacitor, SEMKO
	26	8216027000	Cover, switch A, AUS
	27	8220045100	Heat sink, power

ALL EXPRODED VIEW



TAPE TRANSPORT ASSEMBLY EXPLODED VIEW





45
53
54
E3
61
63
12
14
2-PTP4x8
52
51
59
50
E3
48
2-LWE4
THW6x0.5
E5
62
11
66
4-
P3x6
84
16
15
15
15
W4
56
THW6x0.5
4-
THW3
55
60
2-E5
57
PTP3x5
SSC4x6
58
68
E3
4-PTP4x8
2-PTP3x10
67
65
74
27
76
4-SSF3x4
78
82
2-PTP3x10
PTP3x5
6-P3x4
4-PTP3x4
67
70
SSF3x4
77
73
68
76
6-PTP3x6
72
2-PTP3x6
83
80
71
70
75
70
79
4-PTP3x5
3-PTP3x5
81
69
75
2-PTP3x5

SYSTEM CONTROL PCB ASSEMBLY, ASSEMBLY No. 8273033000

Ref. No.	Parts No.	Nomenclature
	8251 0362 00	PCB, system control
	IC's	
U001	8236 0029 01	Digital, MC14050B
U002	8236 0032 01	" , MC14070B
U003	8236 0040 01	" , MC14081B
U004	8236 0018 01	" , MC14027B
U005	8236 0001 01	" , MC14001B
U006	8236 0007 01	" , MC14013B
U007	8236 0031 01	" , MC14069UB
U008	8236 0005 01	" , MC14011B
U009	8236 0190 00	" , AN6251
U010	8236 0028 01	" , MC14049UB
U011~012	8236 0259 02	Analog, LM324N
	TRANSISTORS	
Q001~009	8234 0002 03	2SC1815GR
Q010	8234 0003 03	2SA1015GR
Q011~012	8234 0002 03	2SC1815GR
Q013	8234 0003 03	2SA1015GR
Q014	8234 0002 03	2SC1815GR
Q015	8234 0003 03	2SA1015GR
Q016	8234 0002 03	2SC1815GR
Q017~018	8234 0003 03	2SA1015GR
Q019	8234 0008 02	2SD880Y
Q020	8234 0005 02	2SB834Y
Q021~022	8234 0002 03	2SC1815GR
Q023	8234 0003 03	2SA1015GR
Q024	8234 0002 03	2SC1815GR
Q025		Deleted
Q026	8234 0003 03	2SA1015GR
Q027	8234 0002 03	2SC1815GR
Q028	8234 0005 02	2SB834Y
Q029	8234 0008 02	2SD880Y
Q030	8234 0002 03	2SC1815GR
Q031	8234 0008 02	2SD880Y
Q032	8234 0002 03	2SC1815GR
Q033	8234 0003 03	2SA1015GR
Q034	8234 0002 03	2SC1815GR
Q035		Deleted
Q036	8234 0003 03	2SA1015GR
Q037	8234 0002 03	2SC1815GR
Q038	8234 0008 02	2SD880Y
Q039~040	8234 0002 03	2SC1815GR
Q041	8234 0005 02	2SB834Y
Q042	8234 0002 03	2SC1815GR
Q043	8234 0008 02	2SD880Y
Q044	8234 0002 03	2SC1815GR
Q045	8234 0008 02	2SD880Y

Ref. No.	Parts No.	Nomenclature				
	DIODES					
D001~062	8234 0018 00	MA-150				
D063~065	8234 0007 00	1N4002, flat mounting				
D066~069	8234 0018 00	MA-150				
D070~071	8234 0007 00	1N4002				
D072~074	8234 0018 00	MA-150				
	CARBON RESISTORS					
R001	8230 0044 72	Vertical	mounting,	¼ W,	4.7KΩ,	J
R002	8230 0041 03	"	"	"	10KΩ,	"
R003	8230 0041 04	"	"	"	100KΩ,	"
R004	8230 0044 74	"	"	"	470KΩ,	"
R005~006	8230 0044 73	"	"	"	47KΩ,	"
R007	8230 0044 72	"	"	"	4.7KΩ,	"
R008	8230 0041 03	"	"	"	10KΩ,	"
R009	8230 0044 70	"	"	"	47Ω,	"
R010	8230 0044 72	"	"	"	4.7KΩ,	"
R011	8230 0044 70	"	"	"	47Ω,	"
R012~013	8230 0042 23	"	"	"	22KΩ,	"
R014	8230 0044 72	"	"	"	4.7KΩ,	"
R015	8230 0041 01	"	"	"	100Ω,	"
R016	8230 0044 70	"	"	"	47Ω,	J
R017	8230 0041 04	"	"	"	100KΩ,	"
R018	8230 0044 74	"	"	"	470KΩ,	"
R019	8230 0044 72	"	"	"	4.7KΩ,	"
R020	8230 0041 01	"	"	"	100Ω,	"
R021	8230 0044 72	"	"	"	4.7KΩ,	"
R022	8230 0041 01	"	"	"	100Ω,	"
R023	8230 0044 72	"	"	"	4.7KΩ,	"
R024	8230 0041 01	"	"	"	100Ω,	"
R025	8230 0044 72	"	"	"	4.7KΩ,	"
R026	8230 0041 01	"	"	"	100Ω,	"
R027~028	8230 0041 03	"	"	"	10KΩ,	"
R029	8230 0044 72	"	"	"	4.7KΩ,	"
R030	8230 0041 03	"	"	"	10KΩ,	"
R031	8230 0044 72	"	"	"	4.7KΩ,	"
R032	8230 0041 03	"	"	"	10KΩ,	"
R033	8230 0041 04	"	"	"	100KΩ,	"
R034	2830 0041 03	"	"	"	10KΩ,	"
R035	8230 0041 01	"	"	"	100Ω,	"
R036	8230 0047 53	"	"	"	75KΩ,	"
R037	8230 0042 22	"	"	"	2.2KΩ,	"
R038	8230 0041 02	"	"	"	1KΩ,	"
R039	8230 0041 05	"	"	"	1MΩ,	"
R040	8230 0042 22	"	"	"	2.2KΩ,	"
R041	8230 0041 02	"	"	"	1KΩ,	"
R042	8230 0041 05	"	"	"	1MΩ,	"
R043~044	8230 0045 63	"	"	"	56KΩ,	"

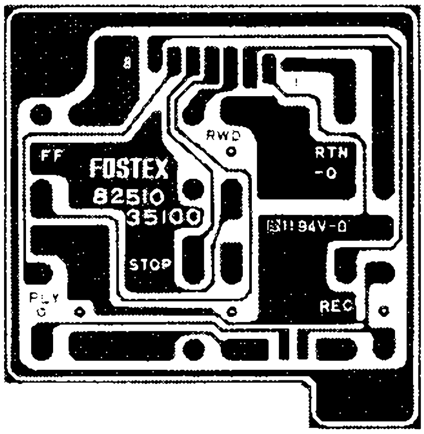
Ref. No.	Parts No.	Nomenclature
R045	8230004105	Vertical mounting, ¼W, 1MΩ, "
R046~047	8230004563	" " " 56KΩ, "
R048	8230004105	" " " 1MΩ, "
R049~050	8230004563	" " " 56KΩ, "
R051	8230004104	" " " 100KΩ, "
R052	8230004474	" " " 470KΩ, "
R053	8230004753	" " " 75KΩ, "
R054~056		Deleted
R057	8230004104	Vertical mounting, ¼W, 100KΩ, "
R058	8230004474	Vertical mounting, ¼W, 470KΩ, J
R059	8230004470	" " " 47Ω, "
R060	8230004681	" " " 680Ω, "
R061~062	8230004103	" " " 10KΩ, "
R063	8230004105	" " " 1MΩ, "
R064~065	8230004154	" " " 150KΩ, "
R066~067	8230004103	" " " 10KΩ, "
R068	8230004104	" " " 100KΩ, "
R069	8230004474	" " " 470KΩ, "
R070~071	8230004473	" " " 47KΩ, "
R072~073	8230004104	" " " 100KΩ, "
R074	8230004474	" " " 470KΩ, "
R075~076	8230004473	" " " 47KΩ, "
R077	8230004472	" " " 4.7KΩ, "
R078	8230004104	" " " 100KΩ, "
R079	8230004474	" " " 470KΩ, "
R080	8230004104	" " " 100KΩ, "
R081	8230004474	" " " 470KΩ, "
R082	8230004823	" " " 82KΩ, "
R083	8230004474	" " " 470KΩ, "
R084~085	8230004104	" " " 100KΩ, "
R086	8230004331	" " " 330Ω, J
R087	8230004472	" " " 4.7KΩ, "
R088	8230004473	" " " 47KΩ, "
R089	8230004753	" " " 75KΩ, "
R090~091	8230004103	" " " 10KΩ, "
R092	8231001333	VR, metal, flat mtg, B, 33KΩ, "
R093	8230004164	Vertical mounting, ¼W, 160KΩ, "
R094	8231001223	VR, metal, flat mtg, B, 22KΩ, "
R095	8230004753	Vertical mounting, ¼W, 75KΩ, "
R096	8230004752	" " " 7.5KΩ, "
R097	8230004123	" " " 12KΩ, "
R098	8230004103	" " " 10KΩ, "
R099	8230004102	" " " 1KΩ, "
R100~101	8230004104	" " " 100KΩ, "
R102~103	8230004472	" " " 4.7KΩ, "
R104	8230004103	" " " 10KΩ, "
R105	8230004472	" " " 4.7KΩ, J
R106	8230004103	" " " 10KΩ, "
R107	8230004821	" " " 820Ω, "
R108	8230004272	" " " 2.7KΩ, "
R109	8230004104	" " " 100KΩ, "
R110	8230004474	" " " 470KΩ, "
R111	8230004103	" " " 10KΩ, "
R112	8230004104	" " " 100KΩ, "

Ref. No.	Parts No.	Nomenclature
R113	8230004474	Vertical mounting, ¼W, 470KΩ, "
R114~116	8230004473	" " " 47KΩ, "
R117~118	8230004102	" " " 1KΩ, "
R119	8230004682	" " " 6.8KΩ, "
R120	8230004683	" " " 68KΩ, "
R121	8230004104	" " " 100KΩ, "
R122	8230004474	" " " 470KΩ, "
R123	8230004392	" " " 3.9KΩ, "
R124	8230004682	" " " 6.8KΩ, "
R125	8230004683	" " " 68KΩ, "
R126~127	8230004473	" " " 47KΩ, "
R128	8230004753	" " " 75KΩ, "
R129	8231003223	VR, carbon, flat mtg., B, 22KΩ, J
R130	8230004153	Vertical mounting, ¼W, 15KΩ, J
R131	8230004682	" " " 6.8KΩ,
R132	8230004102	" " " 1KΩ, "
R133	8230004433	" " " 43KΩ, "
R134		Deleted
R135	8230004272	Vertical mounting, ¼W, 2.7KΩ, J
R136	8230029030	Vitreous enamel, flat mtg, 3W, 3Ω
R137	8230004102	Vertical mounting, ¼W, 1KΩ, J
R138	8230004473	" " " 47KΩ, "
R139~140	8230004103	" " " 10KΩ, "
R141	8230004102	" " " 1KΩ, "
R142	8230004102	" " " 1KΩ, "
R143	8230004563	" " " 56KΩ, "
R144	8230004104	" " " 100KΩ, "
R145	8230004474	" " " 470KΩ, "
R146~147	8230004473	Vertical mounting, ¼W, 47KΩ, J
R148	8230004683	" " " 68KΩ, "
R149	8230004473	" " " 47KΩ, "
R150~151	8230004102	" " " 1KΩ, "
R152	8230004104	" " " 100KΩ, "
R153	8230004682	" " " 6.8KΩ, "
R154~157		Deleted
R158~159	8230004473	Vertical mounting, ¼W, 47KΩ, "
R160	8230004823	" " " 82KΩ, "
R161	8231003223	VR, carbon, flat mtg., B, 22KΩ
R162	8230004153	Vertical mounting, ¼W, 15KΩ, J
R163	8230004682	" " " 6.8KΩ, "
R164	8230004102	" " " 1KΩ,
R165	8230004433	" " " 43KΩ, "
R166		Deleted
R167	8230029030	Vitreous enamel, flat mtg, 3W, 3Ω
R168	8230004272	Vertical mounting, ¼W, 2.7KΩ, J
R169	8230004102	" " " 1KΩ, "
R170	8230004103	" " " 10KΩ, "
R171	8230004102	" " " 1KΩ, "
R172	8230004101	" " " 100Ω, "
R173	8230004222	" " " 2.2KΩ, "
R174	8230004103	" " " 10KΩ, "
R175~177	8230004102	" " " 1KΩ, "
R178	8230004104	" " " 100KΩ, "

Ref. No.	Parts No.	Nomenclature
R179		Deleted
R180	8230004473	Vertical mounting, 1/4W, 47KΩ, J
R181	8230004103	" " " 10KΩ, "
R182	8230004104	" " " 100KΩ, "
R183		Deleted
R184	8230004473	Vertical mounting, 1/4W, 47KΩ, J
R185		Deleted
R186	8230004683	Vertical mounting, 1/4W, 68KΩ, J
R187	8230004101	" " " 100Ω
R188	8230004472	" " " 4.7KΩ
	CAPACITORS	
C001~002	8232035103	Ceramic, HE70SJYF103Z
C003	8232003106	Electrolytic, 10uF, 16V, SMVB
C004~005	8232035103	Ceramic, HE70SJYF103Z
C006	8232006225	Electrolytic, 50V, 2.2uF, VB
C007~012	8232035103	Ceramic, HE70SJYF103Z
C013	8232027472	Mylar, 0.0047uF, 50V, K
C014	8232035103	Ceramic, HE70SJYF103Z
C015	8232006105	Electrolytic, 1uF, 50V, SMVB
C016~017	8232035103	Ceramic, HE70SJYF103Z
C018	8232064106	Electrolytic, 10uF, 16V, SHBVB
C019	8232006474	" , 0.47uF, 50V, SMVB
C020	8232035103	Ceramic, HE70SJYF103Z
C021	8232067225	Electrolytic, 2.2uF, 50V, SHBVB
C022	8232005475	" , 4.7uF, 35V, SMVB
C023	8232027682	Mylar, 0.0068uF, 50V, K
C024		Deleted
C025	8232031331	Mylar, 330pF, 100V, K
C026		Deleted
C027	8232065475	Electrolytic, 4.7uF, 25V, SHBVB
C028	8232027333	Mylar, 0.033uF, 50V, K
C029	8232027332	" , 0.0033uF, 50V, K
C030	8232003476	Electrolytic, 47uF, 16V, EUVB
C031	8232027333	Mylar, 0.033uF, 50V, K
C032	8232003476	Electrolytic, 47uF, 16V, EUVB
C033	8232027333	Mylar, 0.033uF, 50V, K
C034	8232002476	Electrolytic, 47uF, 10V, SMVB
C035	8232004107	" , 100uF, 25V, SMVB
C036	8232027152	Mylar, 1500pF, 50V, K
C037	8232006105	Electrolytic, 1uF, 50V, SMVB
C038	8232035103	Ceramic, HE70SJYF103Z
C039	8232002107	Electrolytic, 100uF, 10V, SMVB
C040	8232035103	Ceramic, HE70SJYF103Z
C041	8232002107	Electrolytic, 100uF, 10V, SMVB
C042~043	8232035103	Ceramic, HE70SJYF103Z
C044	8232005476	Electrolytic, 47uF, 35V, SMVB
C045	8232006474	" , 0.47uF, 50V, SMVB
C046	8232002107	" , 100uF, 10V, SMVB
C047	8232026822	Polypropylene, 0.0082uF, 50V, J
C048	8232031222	Polypropylene, 0.0022uF, 100V, J
C049	8232005475	Electrolytic, 4.7uF, 35V, SMVB
C050~051	8232067474	" , 0.47uF, 50V, SHBVB
C052	8232063476	" 47uF, 10V, "

Ref. No.	Parts No.	Nomenclature
	MISCELLANEOUS	
J101	8245024002	Connector, jack, 2P, W 5045-02F
J102	8245001005	" " 5P, W 5045-05A
J103	8245001007	" " 7P, W 5045-07A
J104	8245024022	" " 2P, RE 5045-02F
J105	8245001010	" " 10P, W 5045-10A
J106	8245001008	" " 8P, W 5045-08A
J107	8245024042	" " 2P, BL 5045-02F
J108	8245001003	" " 3P, W 5045-03A
J109	8245001004	" " 4P, W 5045-04A
J110	8245001006	" " 6P, W 5045-06A
J111	8245001024	" " 4P, RE 5045-04A
J112	8245024002	" " 2P, W 5045-02F
J113	8245001044	" " 4P, BL 5045-04A
J114	8245024022	" " 2P, RE 5045-02F
J115	8245024042	" " 2P, BL 5045-02F
	8220028000	Heat sink

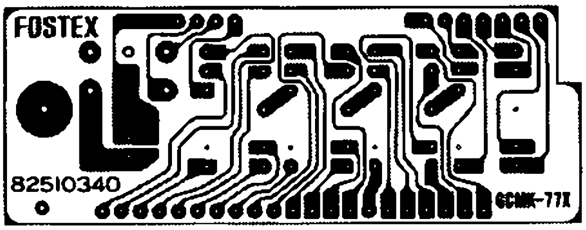
PCB ASSEMBLY CONTROL SWITCH



PCB ASSEMBLY, CONTROL SWITCH, ASSEMBLY No. 8273 0321 00

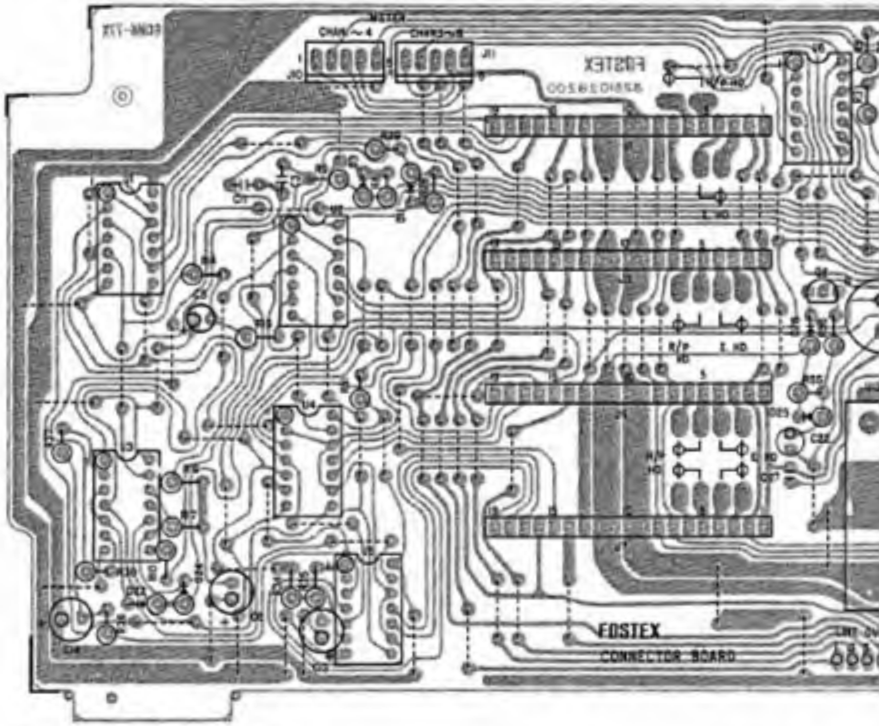
Ref. No.	Parts No.	Nomenclature
	8251 0350 00	PCB, control switch
S001~006	825 3004 0 00	Switch Tact, KHG10901

PCB ASSEMBLY DISPLAY



PCB ASSEMBLY, DISPLAY, ASSEMBLY No. 8273031000

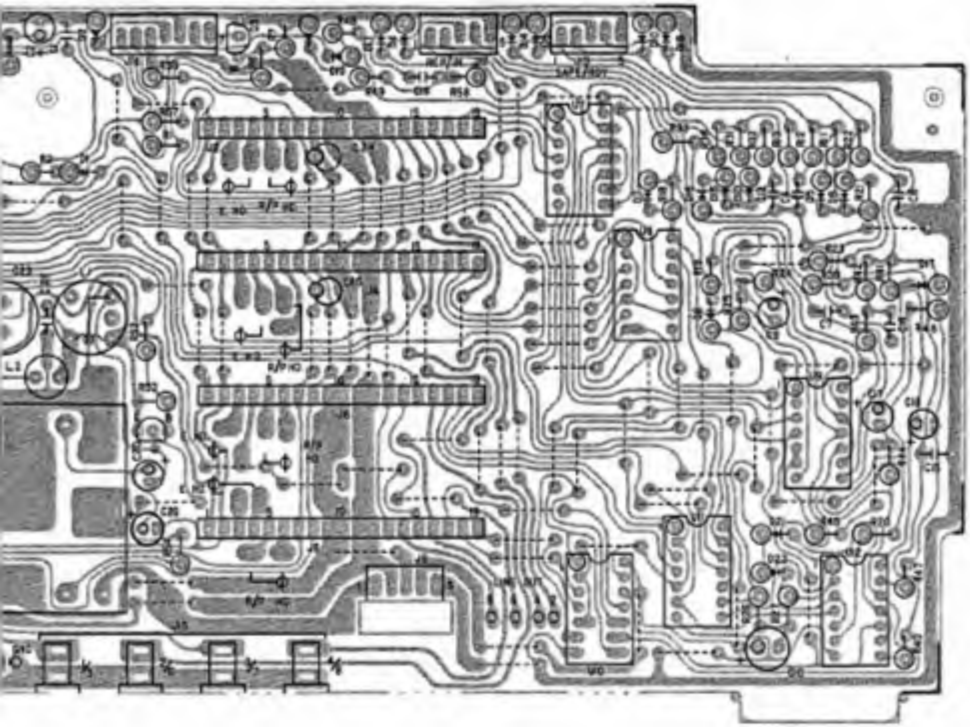
Ref. No.	Parts No.	Nomenclature
	8251 0341 00	PCB, display
	DIODES	
D001~004	8234 0023 00	LED, display, MAN74A
D005	8234 0015 01	LED, opto-, LN233RP
S001	8253 0040 00	Switch, Tact, KHG10901



B ASSEMBLY, CONNECTOR BOARD, ASSEMBLY No. 8273011000

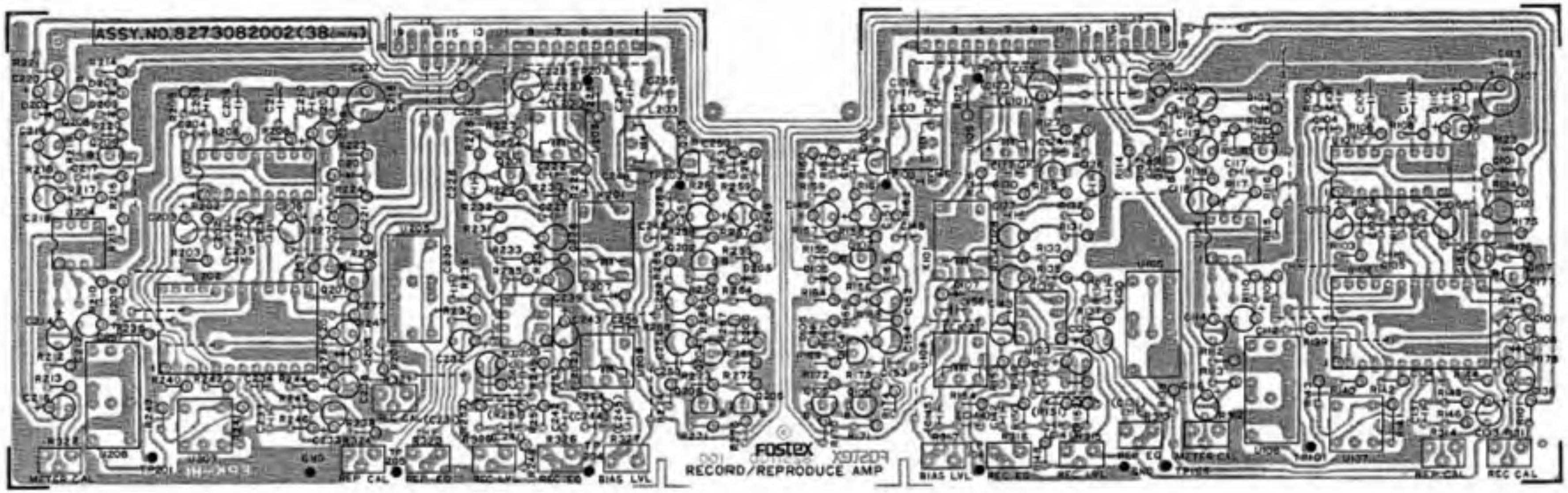
f. No.	Parts No.	Nomenclature
	8251028000	PCB, connector board
	IC's	
01~002	8236003501	Digital, MC14071B
03	8236004001	" MC14081B
04~005	8236003301	" MC14071B
06	8236003201	" MC14070B
07~011	8236003301	" MC14071B
12	8236004001	" MC14081B
13	8256016000	Oscillator unit
	TRANSISTORS	
01	8234000203	2SC1815GR
02	8234000303	2SA1015GR
03	8234000203	2SC1815GR
	DIODES	
01~025	8234001800	MA150
26	8234000700	1N4002
	CARBON RESISTORS	
01	8230004102	Vertical mounting, ¼W, 1KΩ, J
02~003	8230004103	" " " 10KΩ, "
04~005	8230004223	" " " 22KΩ, "
06	8230004103	" " " 10KΩ, "

Ref. No.	Parts No.	Nomenclature
R007	8230004473	Vertical mounting, ¼W, 47KΩ, J
R008	8230004472	" " " 4.7KΩ, "
R009~010	8230004103	" " " 10KΩ, "
R011	8230004472	" " " 4.7KΩ, "
R012~013	8230004103	" " " 10KΩ, "
R014	8230004223	" " " 22KΩ, "
R015	8230004123	" " " 12KΩ, "
R016	8230004333	" " " 33KΩ, "
R017	8230004123	" " " 12KΩ, "
R018	8230004472	" " " 4.7KΩ, "
R019~020	8230004103	" " " 10KΩ, "
R021	8230004472	" " " 4.7KΩ, "
R022~023	8230004103	" " " 10KΩ, "
R024	8230004223	" " " 22KΩ, "
R025	8230004123	" " " 12KΩ, "
R026	8230004333	" " " 33KΩ, "
R027	8230004123	" " " 12KΩ, "
R028	8230004472	" " " 4.7KΩ, "
R029~030	8230004123	" " " 10KΩ, "
R031	8230004472	" " " 4.7KΩ, "
R032~033	8230004103	" " " 10KΩ, "
R034	8230004223	" " " 22KΩ, "
R035	8230004123	" " " 12KΩ, "
R036	8230004333	" " " 33KΩ, "
R037	8230004123	" " " 12KΩ, "



Ref. No.	Parts No.	Nomenclature
R038	8230 0044 72	" " " 4.7KΩ, "
R039~040	8230 0041 03	" " " 10KΩ, "
R041	8230 0044 72	" " " 4.7KΩ, "
R042~043	8230 0041 03	" " " 10KΩ, "
R044	8230 0042 23	" " " 22KΩ, "
R045	8230 0041 23	" " " 12KΩ, "
R046	8230 0043 33	" " " 33KΩ, "
R047	8230 0041 23	" " " 12KΩ, "
R048	8230 0044 72	" " " 4.7KΩ, "
R049~050	8230 0041 03	" " " 10KΩ, "
R051	8230 0041 04	Vertical mounting, ¼W, 100KΩ, J
R052	8230 0041 03	" " " 10KΩ, "
R053	8230 0041 04	" " " 100KΩ, "
R054	8230 0040 10	" " " 1Ω, "
R055	8230 0043 94	" " " 390KΩ, "
R056	8230 0044 73	" " " 47KΩ, "
R057	8230 0044 72	" " " 4.7KΩ, "
R058	8230 0041 21	" " " 120Ω, "
	CAPACITORS	
C001	8232 0351 03	Ceramic, HE70SJYF103Z
C002	8232 0031 06	Electrolytic, 10uF, 16V, SMVB
C003~004	8232 0351 03	Ceramic, HE70SJYF103Z
C005~006	8232 0201 06	Electrolytic, 10uF, 16V, EUVB
C007~008	8232 0351 03	Ceramic, HE70SJYF103Z
C009~010	8232 0201 06	Electrolytic, 10uF, 16V, EUVB

Ref. No.	Parts No.	Nomenclature
C011~012	8232 0351 03	Ceramic, HE70SJYF103Z
C013~014	8232 0201 06	Electrolytic, 10uF, 16V, EUVB
C015~016	8232 0351 03	Ceramic, HE70SJYF103Z
C017	8232 0201 06	Electrolytic, 10uF, 16V, EUVB
C018	8232 0641 06	" " " , SHB-VB
C019	8232 0351 03	Ceramic, HE70SJYF103Z
C020	8232 0061 05	Electrolytic, 1uF, 50V, SMVB
C021	8232 0313 91	Polypropylene, 390pF, 100V, J
C022	8232 0721 06	Electrolytic, 10uF, 25V, LRVB
C023	8232 0044 77	" , 470uF, 25V, SMVB
C024~025	8232 0061 05	" , 1uF, 50V, SMVB
C026	8232 0033 36	" , 33uF, 16V, SMVB
C027	8232 0322 71	Ceramic, 270pF, 50V, J
	MISCELLANEOUS	
L001	8242 0090 00	Coil, bias
L002	8242 0440 00	" , 10mH , ±5%
J001~008	8245 0120 19	Connector, jack, 19P, W, 3022-19A
J009	8245 0070 05	" " 5P, W, 5129-05A
J010	8245 0010 05	" " " " 5045-05A
J011	8245 0010 25	" " " RE, 5045-05A
J012	8245 0010 45	" " " BL, "
J013	8245 0010 05	" " " W, "
J014	8245 0010 07	" " 7P, " 5045-07A
J015	8245 0310 00	" " RCA pin, 4P, black



R/P AMPLIFIER PCB ASSEMBLY, 8T(38cm/s), ASS'Y No. 8273 0820 02

Ref. No.	Parts No.	Nomenclature
	8251100100	PCB, R/P amplifier, 8T
		IC's
U101, 201	8236027600	Analog, Dolby, NE 652
U102, 202	8236027700	" " NE 654
U103, 203	8236021000	" , NJM 4559DD
U104, 204	8236020900	" , NJM 4559DF
U105, 205	8256013000	Module, low pass filter, 25KHz
U106, 206	"	" " " " "
U107, 207	8256012000	" , skewing
U108, 208	8256014000	" , trap, P, 100KHz
U109, 209	8256015000	" " , S, "
		TRANSISTORS
Q101, 201	8234000109	FET, 2SK117Y-3
Q102, 202	8234000203	2SC1815GR
Q103, 203	8234000602	2SC2878B
Q104, 204	8234000111	FET, 2SK117GR
Q105, 205	8234000203	2SC1815GR
Q106, 206	"	"
Q107, 207	"	"
Q108, 208	8234000602	2SC1878B
Q109, 209	8234000203	2SC1815GR

Ref. No.	Parts No.	Nomenclature
		DIODES
D101~106	8234003500	MA 150, FVS
D201~206	8234003500	MA 150, FVS
D108, 208	"	" "
D107, 207	8234000700	1N4002
		CARBON RESISTORS
		All resistors ¼W, 5% unless otherwise noted.
R101, 201	8230004273	Vertical mtg., 27KΩ
R102, 202	8230004473	" " 47KΩ
R103, 203	8230023123	" " , metal, 12KΩ, 1%
R104, 204	8230023753	" " " , 75KΩ, "
R105, 205	8230004334	" " 330KΩ
R106, 206	8230004394	" " 390KΩ
R107, 207	8230004334	" " 330KΩ
R108, 208	8230004394	" " 390KΩ
R109, 209	8230004123	" " 12KΩ
R110, 210	8230004822	" " 8.2KΩ
R111, 211	8230004473	Vertical mounting, 47KΩ, J
R112, 212	8230004104	" " 100KΩ
R113, 213	8230004201	" " 200Ω
R114, 214	8230004153	" " 15KΩ
R115, 215	8230004154	" " 150KΩ

Ref. No.	Parts No.	Nomenclature
R116, 216	8230004561	" " 560Ω
R117, 217	8230004103	" " 10KΩ
R118, 218	8230004562	" " 5.6KΩ
R119, 219	8230004333	" " 33KΩ
R120, 220	8230004223	" " 22KΩ
R121, 221	8230004562	" " 5.6KΩ
R122, 222	8230004103	" " 10KΩ
R123, 223	8230004682	" " 6.8KΩ
R124, 224	"	" " "
R125, 225	8230004101	" " 100Ω
R126, 226	"	" " "
R127, 227	8230004682	" " 6.8KΩ
R128, 228	8230004562	" " 5.6KΩ
R129, 229	8230004103	" " 10KΩ
R130, 230	8230004221	" " 220Ω
R131, 231	8230004273	" " 27KΩ
R132, 232	8230004331	" " 330Ω
R133, 233	8230004473	" " 47KΩ
R134, 234	8230004103	" " 10KΩ
R135, 235	8230004391	" " 390Ω
R136, 236	8230004394	" " 390KΩ
R137, 237	8230004332	" " 3.3KΩ

Ref. No.	Parts No.	Nomenclature
R138, 238	8230004153	Vertical mtg., 15KΩ
R139, 239	8230004332	" " 3.3KΩ
R140, 240	8230004562	" " 5.6KΩ
R141, 241	8230004102	" " 1KΩ
R142, 242	8230004682	" " 6.8KΩ
R143, 243	8230004103	" " 10KΩ,
R144, 244	8230023222	" " , metal, 2.2KΩ, 1%
R145, 245	8230004683	" " 68KΩ
R146, 246	8230023512	" " 5.1KΩ
R147, 247	8230004561	" " 560Ω
R148, 248	8230004392	" " 3.9KΩ
R149, 249	8230004912	" " 9.1KΩ
R150, 250	"	" " "
R151, 251		Deleted
R152, 252		"
R153, 253	8230004123	" " 12KΩ
R154, 254	8230004472	" " 4.7KΩ
R155, 255	8230004333	" " 33KΩ
R156, 256	8230004104	" " 100KΩ
R157, 257	8230004472	" " 4.7KΩ
R158, 258	8230004183	" " 18KΩ
R159, 259	8230004202	" " 2KΩ
R160, 260	"	" " "

1

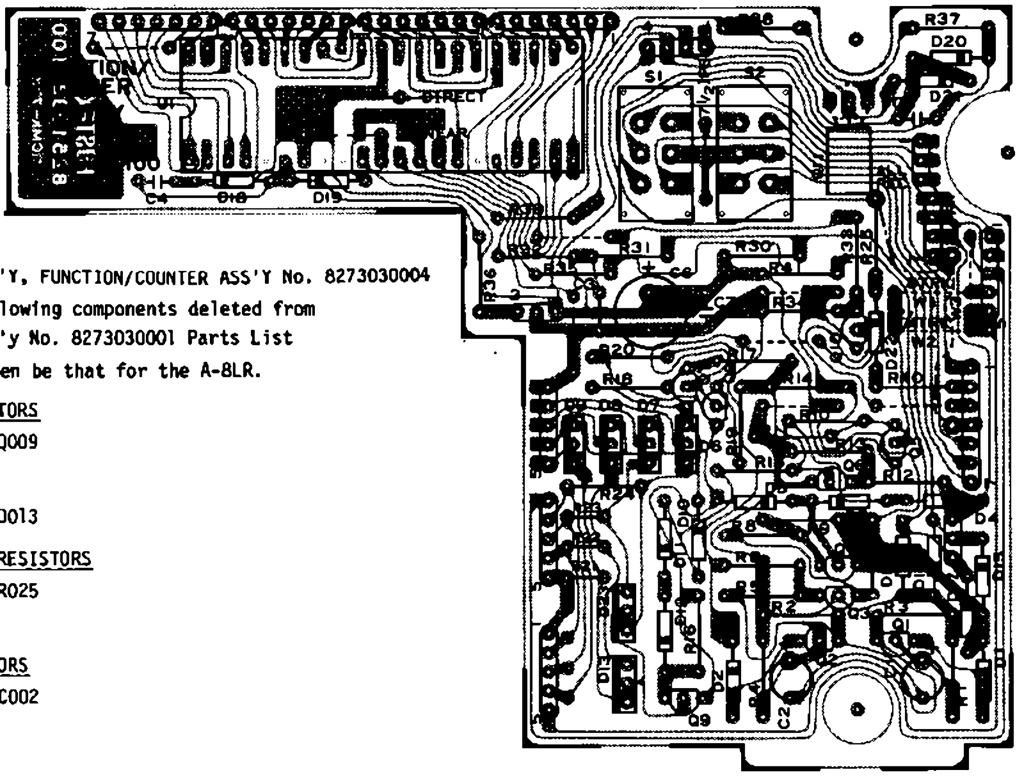
Ref. No.	Parts No.	Nomenclature
R161, 261	8230 0041 02	" " 1KΩ
R162, 262	8230 0042 00	" " 20Ω
R163, 263	8230 0042 23	" " 22KΩ
R164, 264	8230 0042 73	" " 27KΩ
R165, 265	8230 0048 22	" " 8.2KΩ
R166, 266	8230 0045 62	" " 5.6KΩ
R167, 267	8230 0041 05	" " 1MΩ
R168, 268	8230 0042 72	Vertical mtg., 2.7KΩ
R169, 269	8230 0042 23	" " 22KΩ
R170, 270	8230 0045 63	" " 56KΩ
R171, 271	8230 0041 04	" " 100KΩ
R172, 272	8230 0043 33	" " 33KΩ
R173, 273	8230 0041 04	" " 100KΩ
R174, 274	8230 0043 61	" " 360Ω
R175, 275	8230 0043 33	" " 33KΩ
R176, 276	8230 0041 04	" " 100KΩ
R177, 277	8230 0042 73	" " 27KΩ
R178, 278	8230 0043 34	" " 330KΩ

Ref. No.	Parts No.	Nomenclature
	CAPACITORS	
C101, 201	8232 0061 05	Electrolytic, 50V, 1uF, 20%, SM
C102, 202	8232 0264 72	PES, 50V, 0.0047uF, 5%, AMX
C103, 203	8232 0031 06	Electrolytic, 16V, 10uF, 20%, SM
C104, 204	8232 0264 73	PES, 50V, 0.047uF, 5%, SM
C105, 205	8232 0031 06	Electrolytic, 16V, 10uF, 20%, SM
C106, 206	8232 0182 24	" , 50V, 0.22uF, 20%, KA
C107, 207	8232 0024 77	" , 10V, 470uF, 20%, SM
C108, 208	8232 0263 33	PES, 50V, 0.033uF, 5%, AMX
C109, 209	8232 0261 04	" " , 0.1uF, 5%, AMX
C110, 210	8232 0263 33	" " , 0.033uF, 5%, AMX
C111, 211	8232 0261 04	" " , 0.1uF, 5%, AMX
C112, 212	8232 0033 36	Electrolytic, 16V, 33uF, 20%, SM
C113, 213		Deleted
C114, 214	8232 0711 06	Electrolytic, 16V, 10uF, 20%, LR-VB
C115, 215	8232 0351 03	Ceramic, 50V, 0.01uF, YF
C116, 216	8232 0054 75	Electrolytic, 35V, 4.7uF, 20%, SM
C117, 217	8232 0512 20	Ceramic, 50V, 22pF,10%, SL
C118, 218	8232 0054 75	Electrolytic, 35V, 4.7uF, 20%, SM
C119, 219	8232 0042 26	" , 25V, 22uF, 20%, SM
C120, 220	8232 0054 75	" , 35V, 4.7uF, 20%, SM
C121, 221	8232 0041 06	" , 25V, 10uF, 20%, SM
C122, 222	8232 0261 02	PES, 50V, 1000pF, 5%, AMX
C123, 223		Deleted
C124, 224	8232 0511 01	Ceramic, 50V, 100pF, 10%, SL
C125, 225	8232 0031 07	Electrolytic, 16V, 100uF, 20%, SM
C126, 226	8232 0851 05	" , 50V, 1uF, LR-BP
C127, 227	8232 0342 71	Ceramic, 50V, 270pF, 10%, YB
C128, 228	8232 0033 36	Electrolytic, 16V, 33uF, 20%, SM
C129, 229		Deleted
C130, 230	8232 0261 53	PES, 50V, 0.015uF, 5%, AMX
C131, 231	8232 0512 20	Ceramic, 50V, 22pF, 10%, SL
C132, 232	8232 0031 06	Electrolytic, 16V, 10uF, 20%, SM
C133, 233	8232 0061 05	" , 50V, 1uF, 20%, SM
C134, 234	8232 0514 70	Ceramic, 50V, 47pF, 10%, SL
C135, 235	8232 0303 33	PPR, 100V, 0.033uF, 2%, APS
C136, 236	8232 0264 72	PES, 50V, 4700pF, 5%, AMX
C137, 237	8232 0301 03	PPR, 100V, 0.01uF, 2%, APS
C138, 238	8232 0182 24	Electrolytic, 50V, 0.22uF, 20%, KA
C139, 239	8232 0033 36	" , 16V, 33uF, 20%, SM
C140, 240		Deleted
C141, 241		Deleted
C142, 242	8232 0263 32	PES, 50V, 3300pF, 5%, AMX
C143, 243	8232 0724 75	Elect, 25V, 4.7uF, 20%, LR-VB
C144, 244	8232 0031 06	Electrolytic, 10uF, 16V, SMVB
C145, 245	8232 0303 33	Polypropylene, 0.033uF, 100V, G
C146, 246	8232 0313 92	PPR, 100V, 3900pF, 5%, APS
C147, 247	8232 0312 72	" " , 2700pF, " "

Ref. No.	Parts No.	Nomenclature
C148, 248		Deleted
C149, 249	8232 0021 07	Electrolytic, 10V, 100uF, 20%, SM
C150, 250	8232 0261 83	PES, 50V, 0.018uF, 5%, AMX
C151, 251	8232 0054 75	Elect, 35V, 4.7uF, 20%, SM
C152, 252	8232 0031 06	Electrolytic, 16V, 10uF, 20%, SM
C153, 253	8232 0261 04	PES, 50V, 0.1uF, 5%, AMX
C154, 254	8232 0724 75	Electrolytic, 4.7uF, 25V, LRVB
C155, 255	8232 0276 83	PES, 50V, 0.068uF, AMX
C156, 256	8232 0351 03	Ceramic, 50V, 0.01uF, YF
C157, 257	8232 0721 06	Electrolytic, 10uF, 25V, LRVB
C158, 258	8232 0041 07	" , 100uF, 25V, SM
	CARBON TRIMMER POTS	
R311, 321	8231 0041 03	Vertical mounting, 10KΩ, B
R312, 322	8231 0045 03	" " , 50KΩ, "
R313, 323	8231 0045 02	" " , 5KΩ, "
R314, 324	8231 0041 03	" " , 10KΩ, "
R315, 325	8231 0042 02	" " , 2KΩ, "
R316, 326	"	" " " "
R317, 327	8231 0041 03	" " , 10KΩ, "
R318, 328		Deleted

Ref. No.	Parts No.	Nomenclature
	MISCELLANEOUS	
K101, 102	8248 0060 06	Relay, sub-mini, G2E-182P-H
L103, 203	8242 0040 00	Coil, 0.8mH
J101, 201	8245 0110 19	Cnctr, jack, 3024-19AH, white
	8276 0010 00	Pin, header, x12
	8276 0020 04	Wire, jumper, 10mm, IPS-1041-4, x39
TP	8276 0010 00	Pin, header (X 9)

PCB ASSEMBLY FUNCTION/COUNTER



PCB ASS'Y, FUNCTION/COUNTER ASS'Y No. 8273030004
The following components deleted from
the Ass'y No. 8273030001 Parts List
will then be that for the A-8LR.

TRANSISTORS
Q001 ∿ Q009

DIODES
D001 ∿ D013

CARBON RESISTORS
R001 ∿ R025
R040

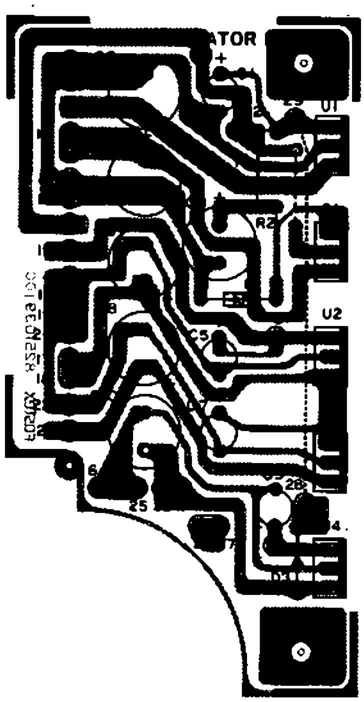
CAPACITORS
C001 ∿ C002

PCB ASSEMBLY, FUNCTION/COUNTER, ASS'Y No. 8273030001

Ref. No.	Parts No.	Nomenclature
	8251 0331 00	PCB, function/counter
	IC's	
U001	8236007100	Digital, LM8523
	TRANSISTORS	
Q001∿004	8234 0002 03	2SC1815GR
Q002∿004		Deleted
Q005∿006	8234 0003 03	2SA1015GR
Q007∿010	8234 0002 03	2SC1815GR
Q011	8234 0010 03	2SA684R
	DIODES	
D001∿005	8234 0018 00	MA 150
D006∿009	8234 0039 00	MA 154WK
D010∿012	8234 0018 00	MA 150
D013	8234 0039 00	MA 154WK
D014∿022	8234 0018 00	MA 150
D023	8234 0039 00	MA 154WK
	CARBON RESISTORS	
R001	8230 0062 23	Flat mounting, ¼W, 22KΩ, J
R002∿003	8230 0063 34	" " " 330KΩ, "
R004	8230 0062 23	" " " 22KΩ, "
R005	8230 0061 04	" " " 100KΩ, "
R006	8230 0064 74	" " " 470KΩ, "
R007	8230 0061 04	" " " 100KΩ, "

Ref. No.	Parts No.	Nomenclature
R008	8230 0061 03	" " " 10KΩ
R009	8230 0064 73	" " " 47KΩ
R010∿013	8230 0061 03	" " " 10KΩ, "
R014	8230 0062 23	" " " 22KΩ, "
R015	8230 0061 02	" " " 1KΩ
R016∿020	8230 0062 23	" " " 22KΩ
R021∿023	8230 0346 21	Flat mtg., 1/6W, 620Ω, J
R024∿029	8230 0066 21	" " , 1/4W, 620Ω, "
R030	8230 0064 72	" " " 4.7KΩ, "
R031	8230 0061 02	" " " 1KΩ, "
R032	8230 0061 02	" " " 1KΩ, "
R033	8230 0061 04	Flat mounting, ¼W, 100KΩ, J
R034	8230 0064 74	" " " 470KΩ, "
R035	8230 0061 03	" " " 10KΩ, "
R036	8230 0061 02	" " " 1KΩ, "
R037	8230 0063 31	" " " 330Ω, "
R038	8230 0064 71	" " " 470Ω, "
R039	8230 0064 72	" " " 4.7KΩ, "
R040	8230 0061 81	" " " 180Ω, "
R041	8230 0064 72	" " " 4.7KΩ, "
	CAPACITORS	
C001∿002	8232 0222 25	Electrolytic, 2.2uF, 50V, EUVB
C003∿005	8232 0351 03	Ceramic, HE70SJYF103Z
C006	8232 0031 07	Electrolytic, 100uF, 16V, SMVB
C007	8232 0351 03	Ceramic, HE70SJYF103Z

PCB ASSEMBLY   REGULATOR

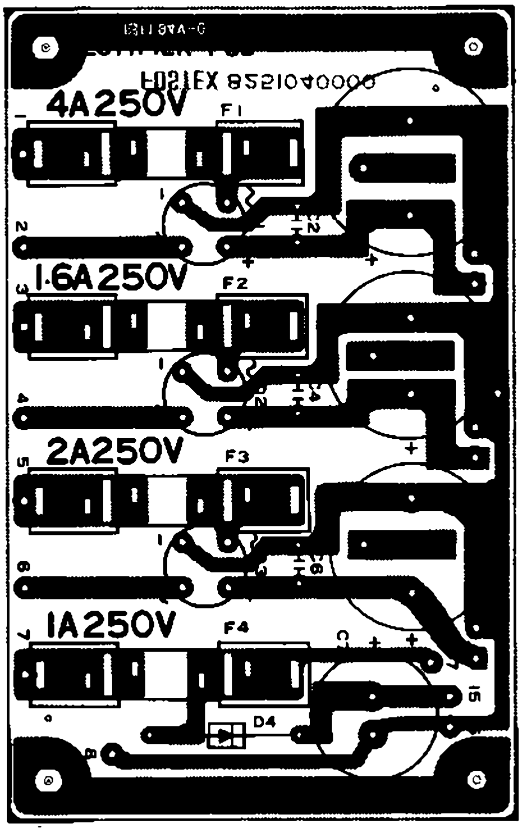


PCB ASSEMBLY, REGULATOR, ASSEMBLY No. 8273040001

Ref. No.	Parts No.	Nomenclature
	8251 0390 00	PCB, regulator
	IC's	
⚠U001	8236 0260 00	Analog, regulator, 7818A
⚠U002	8236 0261 00	" " , 7808A
⚠U003	8236 0262 00	" " , 7805A
⚠U004	8236 0263 00	" " , 7824A
	TRANSISTOR	
Q001	8234 0034 00	2SD686
	DIODE	
D001	8234 0019 57	Zener, WZ240
D002～003	8234 0007 00	1N4002
	CARBON RESISTORS	
R001, 002	8230 0062 21	Flat mounting, ¼W, 220Ω, J

Ref. No.	Parts No.	Nomenclature
	CAPACITORS	
C001	8232 0061 05	Electrolytic, 1uF, 50V, SMVB
C002	8232 0051 07	" , 100uF, 35V, SMVB
C003	8232 0064 76	" , 47uF, 50V, SMVB
C004	8232 0051 07	" , 100uF, 35V, SMVB
C005	8232 0061 05	" , 1uF, 50V, SMVB
C006	9232 0031 07	" , 100uF, 16V, SMVB
C007	8232 0061 05	" , 1uF, 50V, SMVB
C008	8232 0031 07	" , 100uF, 16V, SMVB
C009	8232 0061 05	" , 1uF, 50V, SMVB
C010	8232 0051 07	" , 100uF, 35V, SMVB

PCB ASSEMBLY RECTIFIER

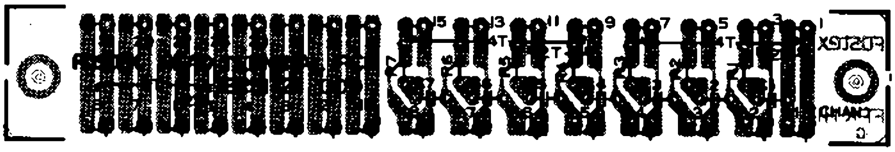


RECTIFIER PCB ASSEMBLY, ASSEMBLY No. 8273039000

Ref. No.	Parts No.	Nomenclature
	8251040000	PCB, rectifier
	DIODES	
⚠D001	8234001602	2W02
⚠D001~003	8234001703	W02
⚠D004	8234000700	1N4002
	CAPACITORS	
C001	8232078478	Electrolytic, 4700uF, 50V, SMVP
C002	8232035103	Ceramic, HE70SJYF103Z
C003	8232077338	Electrolytic, 3300uF, 35V, SMVP
C004	8232035103	Ceramic, HE70SJYF103Z
C005	8232079228	Electrolytic, 2200uF, 63V, SMVP
C006	8232035103	Ceramic, HE70SJYF103Z
C007	8232003108	Electrolytic, 1000uF, 16V, SNVP

Ref. No.	Parts No.	Nomenclature
	MISCELLANEOUS	
	8239000100	Holder, fuse, SN5051
	8239000200	" " SN5053
⚠F001	8239000540	Fuse, DM, 4A, 250V
⚠F001	8239000340	" , UL/CSA, 4A, 250V
⚠F001	8239000740	" , SEMKO, 4A, 250V
⚠F002	8239000515	" , DM, 1.5A, 250V
⚠F002	8239000316	" , UL/CSA, 1.6A, 250V
⚠F002	8239000716	" , SEMKO, 1.6A, 250V
⚠F003	8239000520	" , DM, 2A, 250V
⚠F003	8239000320	" , UL/CSA, 2A, 250V
⚠F003	8239000720	" , SEMKO, 2A, 250V
⚠F004	8239001110	" , DM, 1A, 250V
⚠F004	8239000610	" , UL/CSA, 1A, 250V
⚠F004	8239000710	" , SEMKO, 1A, 250V

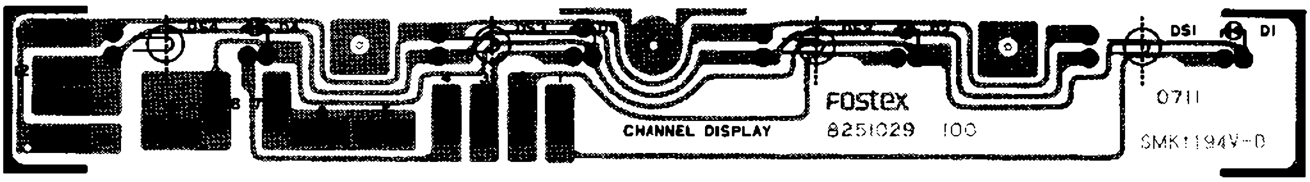
PCB ASSEMBLY HEAD TERMINAL



HEAD TERMINAL PCB ASSEMBLY, ASS'Y No. 8273 0830 00

Ref. No.	Parts No.	Nomenclature
	8251 121000	PCB, head terminal
		CARBON RESISTORS
R001~007	8230 034102	Flat mtg., 1/6W, 1KΩ, 5%
		CAPACITORS
C001~007	8232 026123	PES, 50V, 0.012uF, 5%, AMX

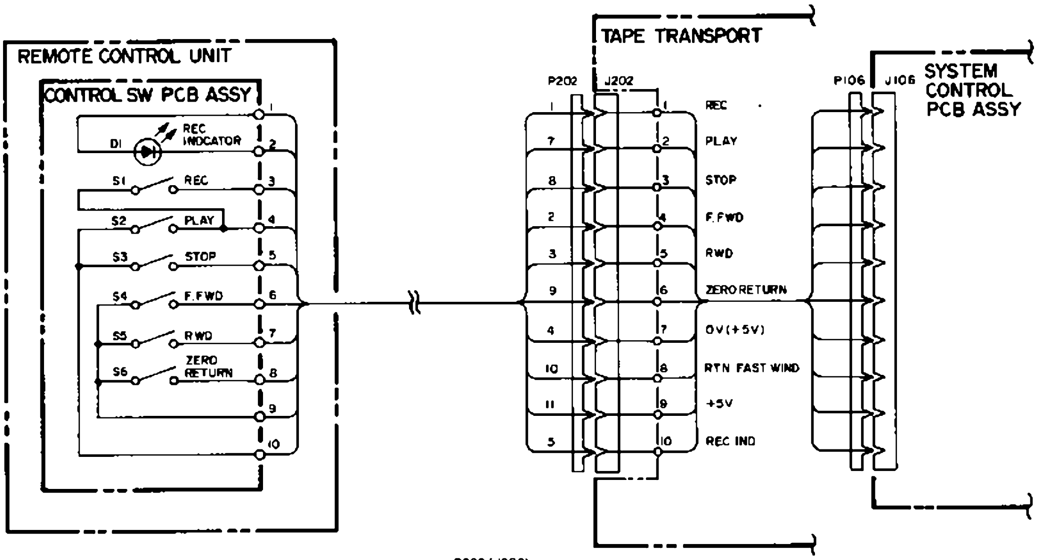
PCB ASSEMBLY CHANNEL DISPLAY



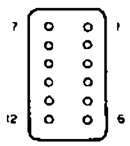
CHANNEL DISPLAY PCB ASSEMBLY, ASS'Y No. 8273012000

Ref. No.	Parts No.	Nomenclature
	8251 0291 00	PCB, channel display
	8276 1470 00	Cover, LED
		DIODES
D001~004	8234 0014 01	Opto, LED, LN222RP

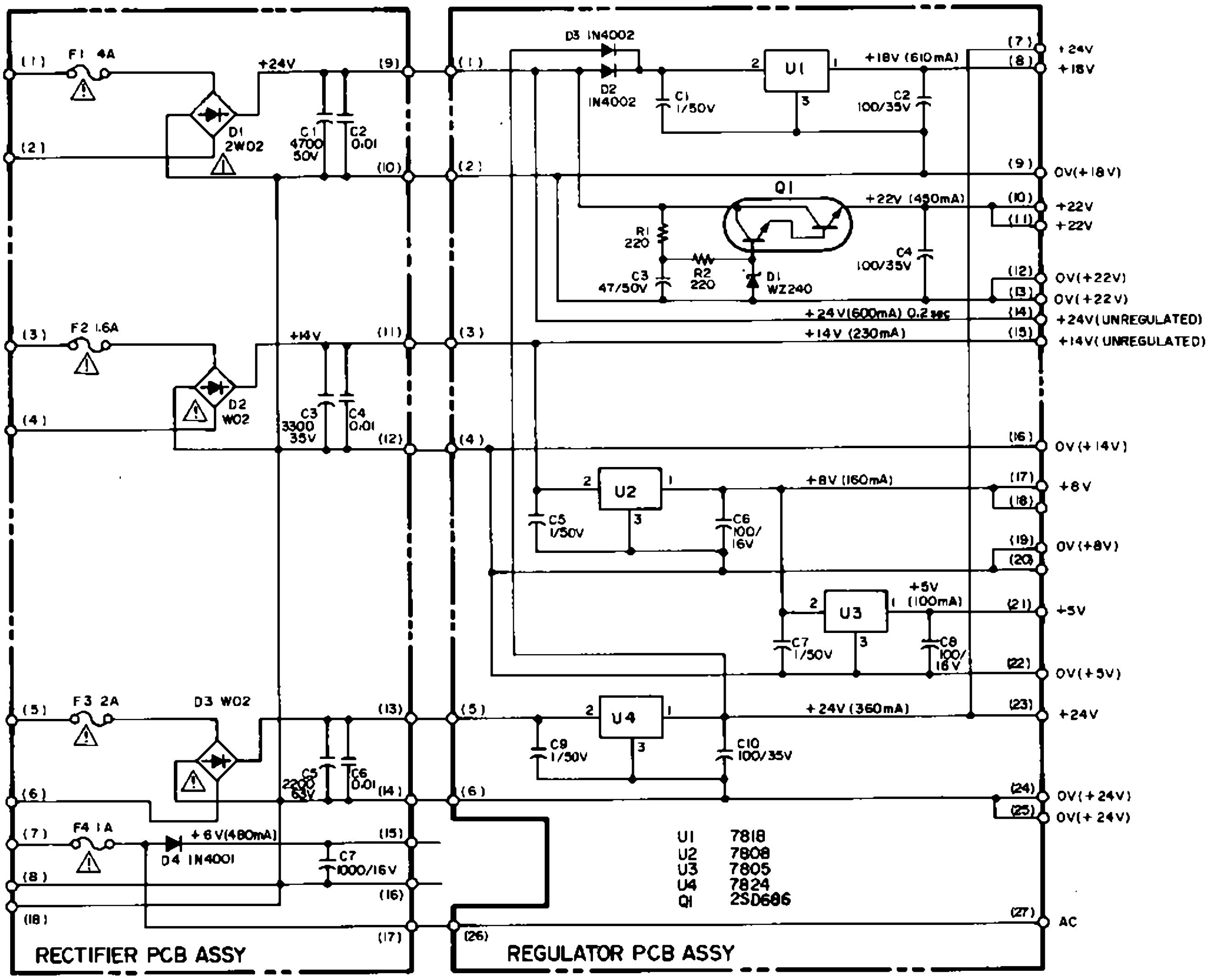
SCHEMATICS
Remote control



P202 (J202)



SCHEMATICS
Power supply

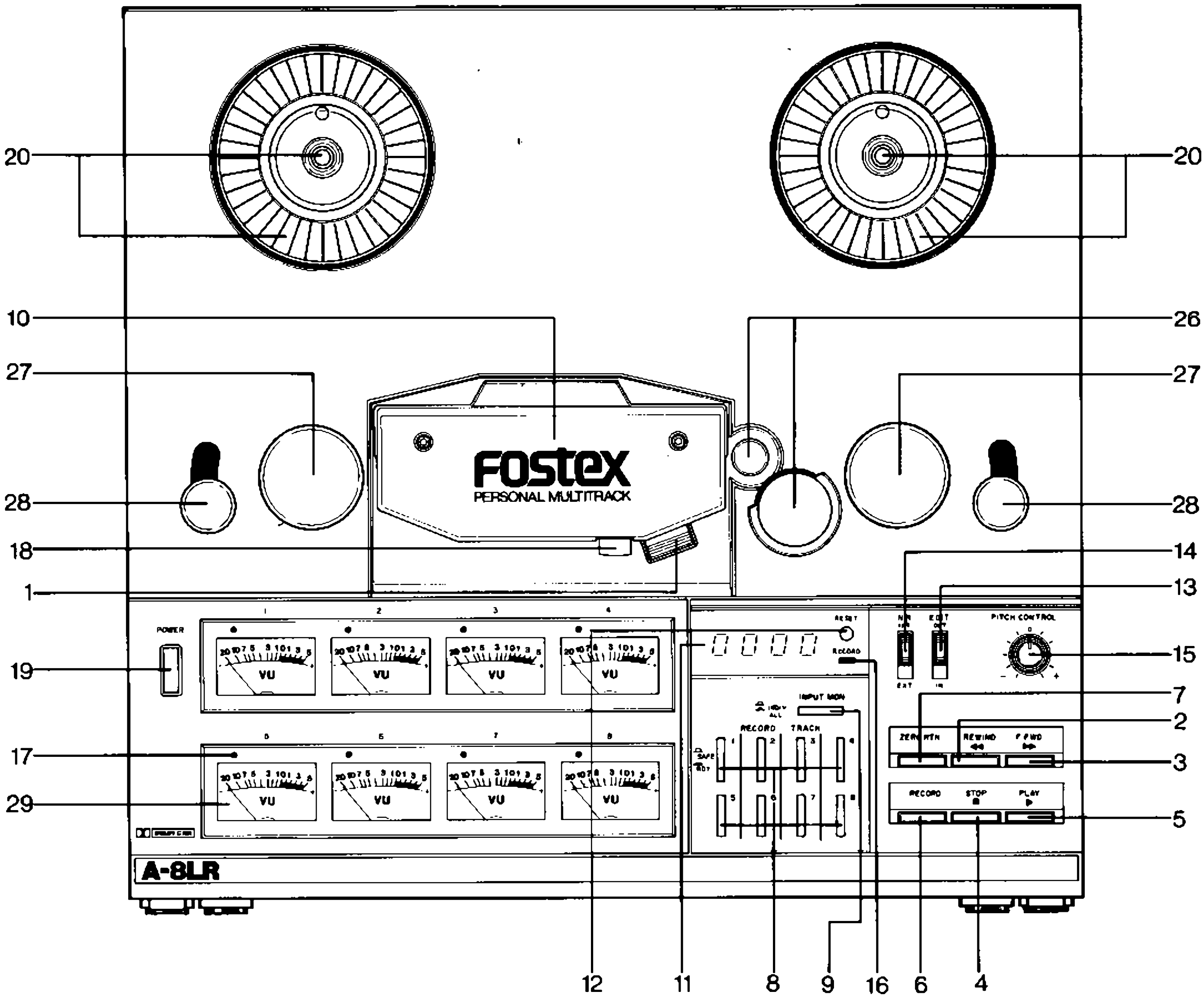


Model A-8LR

Service Manual

There are two types in the A-8 LR Series - the LOW SPEED 7-1/2 ips version and the HIGH SPEED 15 ips version.

The majority of adjusting methods for the A-8 LR are identical with the A-8 and the points and methods different from the A-8 only are detailed in the A-8 LR SERVICE MANUAL. Therefore, the A-8 SERVICE MANUAL should be referred to for other servicing data.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16
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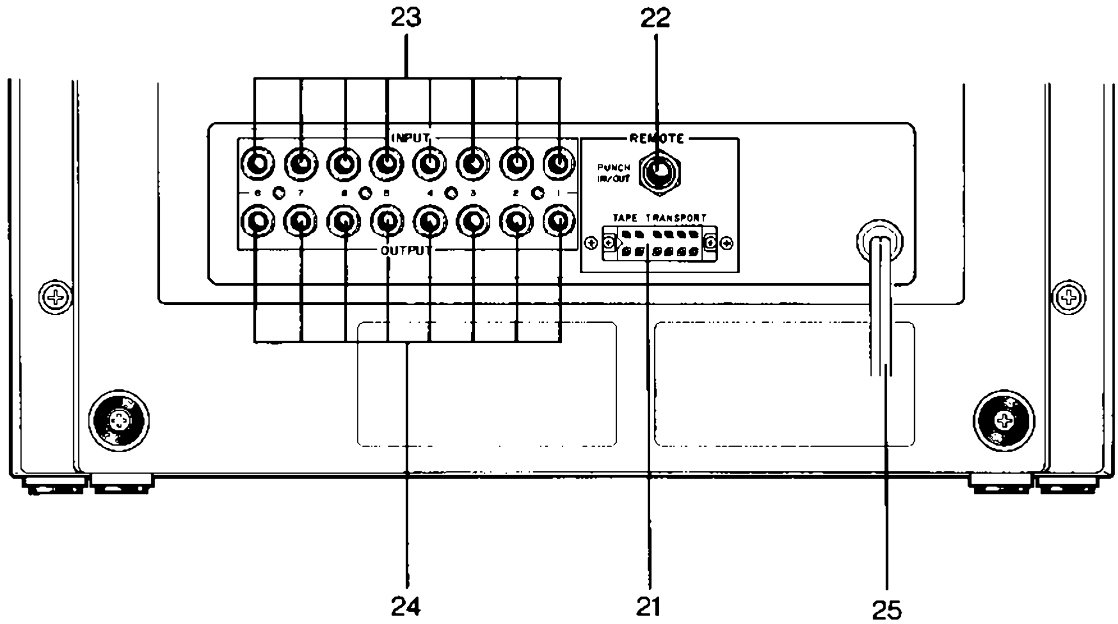
FOSTEX
PERSONAL MULTITRACK
POWER
RESET
RECORD
INPUT MON
RECORD TRACK
ZERO RTN
REWIND
F FWD
STOP
PLAY
PITCH CONTROL
VU
A-8LR


23
22
INPUT
REMOTE
PUNCH IN/OUT
TAPE TRANSPORT
OUTPUT
24
21
25

1. THE CONTROLS AND THEIR FUNCTIONS

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 its lock and the gate fully rise by spring action. To retract it, the gate is pressed down and will be locked at the limiting position.

2) Rewind button [REWIND]

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

3) Fast forward button [F.FWD]

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

4) Stop button [STOP]

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

5) Play button [PLAY]

Depressing this button puts the recorder in the play mode.

6) Record button [RECORD]

a) With more than one and up to four RECORD TRACK buttons depressed, simultaneous depressing both RECORD and PLAY buttons puts the tracks thus assigned in the record mode.

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

7) Return to zero position [ZERO RTN]

Depressing this button puts the transport in the rewind mode, automatically rewind tape to "0000" of the tape index counter and then go to the STOP mode.

8) Record track selector [RECORD TRACK]

These eight pushbuttons determine whether recording can commence on a given track.

The specific function also depends on whether or not 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 mode, and the LED above that track's meter [17] will blink.
If the RECORD button only is depressed, the VU 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 the record LED [16] will change to blinking.
This mode will be cancelled by depressing the STOP, PLAY or ZERO RTN buttons but will not be cancelled by depressing F.FWD or REWIND buttons.
If the RECORD and PLAY buttons are subsequently depressed, tape begins recording, the track's meter LED [17] stops blinking and remains on, and the record LED [16] also turns on.
Although the VU meter indications and signals from the output jacks will go to input signal monitor of the channels only which go to record mode by this operation, the other channels 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 VU meter indications and signals from the output jacks will be tape out signal monitor 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 [16] adjacent to the tape counter will blink and the LED's above each of the eight VU meters will not blink.
Subsequent depression of a RECORD TRACK button immediately causes that track to enter record mode; the record LED [16] now remains on (so does the LED associated with the track's VU meter [17].

9) INPUT MONITOR SELECTOR

When this button is depressed, signals at the line output jacks and the VU meter readings will be input monitor for all 8 channels. This means that while input monitor signals will be output from each channel output jacks whose number correspond with each channel input jacks at the rear panel, at the same time these levels will be indicated by each channel VU meter.

When this button is in the up position, any channel can be monitored by a combination of the desired RECORD TRACK SELECTOR number and the RECORD, PLAY buttons on the transport control. For instance, depress RECORD TRACK SELECTOR buttons 2 and 3 while in the STOP mode; then, depressing the RECORD button only puts channels 2 and 3 in the input monitor mode and the remaining channels will be for tape monitor.

From this condition, depressing the PLAY button only cancels the input monitor mode for channels 2 and 3, and the remaining channels will be for tape monitor.

When the PLAY and RECORD buttons are simultaneously depressed, channels 2 and 3 will go to the record mode and also in the input monitor mode for these two channels only.

10) Head assembly

11) Counter display

Revolutions of the supply reel table is detected by two photo-interrupters and shown on a 4 digit display.

12) Reset button

The counter display reset button which clears the display to "0000".

13) Edit button [EDIT]

The EDIT switch is provided to facilitate precise splicing of tape after removing an unwanted section of tape.

When this slide switch is set to OUT (upper side), the transport will be in the normal operating mode, and when set to IN (lower side), it will be in the EDIT mode.

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

In the EDIT mode, the shut off switch linked to the right tension arm will be ineffective and therefore, the capstan motor will rotate upon switching on the power switch and 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 rotated easily 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 right tension arm is up, and then the PLAY button is depressed, the transport goes to normal play mode.

14) NR INT/EXT switch [NR]

The internal Dolby noise reduction system will be in operation when this NR switch is set to INT.

When any other type of NR system is to be used with this recorder, set the NR switch to EXT and connect the encoder to INPUT, and the decoder to OUTPUT of the RCA phono jack on the rear panel.

15) Pitch control knob [PITCH CONT]

The 12 o'clock click action stop of this knob is the normal speed (15 ips) position, and speed can be varied -10% at CCW rotation, and +10% at CW rotation, respectively, of this knob.

16) Record LED [RECORD]

This LED will either blink or glow continuously under the following conditions when the RECORD and PLAY buttons are depressed at the same time:

* Will blink if none of the four RECORD TRACK buttons are depressed.
* Will glow continuously if one or more RECORD TRACK buttons are depressed.

17) Record LED (Located above each VU meter)

These LED's will blink or glow continuously depending on what combination and sequence the RECORD TRACK buttons and the transport control RECORD button is depressed:

* If any RECORD TRACK button is depressed after the transport control RECORD and PLAY buttons are depressed (in the PLAY mode and record ready state), the LED of the channel corresponding to the depressed button, will glow continuously.
* With none of the four RECORD TRACK buttons depressed and while the transport is in the play mode record ready state, all four LED's of channels 1 ∿ 4 or channels 5 ∿ 8 selected by the GROUP select button, will blink; under this condition, if any one or up to four of the RECORD TRACK buttons corresponding to the channels of the blinking LED's are depressed, the LED of the depressed channel only will glow continuously and the other LED's will be extinguished.
* If any RECORD TRACK button is depressed during ZERO RTN, REWIND, F.FWD, PLAY or STOP modes, the LED of the depressed channel will blink.

18) Cue lever [CUE]

The lifter mechanism lifts the tape away from the head in the ZERO RTN, 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.

19) Power switch [POWER]

AC power is applied to the unit and the VU meters lighted when this button is depressed.

The capstan motor will not rotate unless the takeup reel side tension arm is up, or in other words, unless the shut-off switch linked to the tension arm is on, but the capstan motor will rotate even though the tension arm is down only when in the EDIT mode.

20) Reel clamper

The reel is secured to the reel turntable by CW rotation of this clamper.

21) Transport function remote connector [REMOTE - TRANSPORT]

Remote operation of the transport function controls is possible by connecting the optional Model 8030 Remote Control Unit.

22) Punch In/Out remote jack [REMOTE - PUNCH IN/OUT]

This jack is used for punch in/out of the recording by a foot switch. Any one button among the four RECORD TRACK selector buttons is depressed and the transport put in the PLAY mode. Then, if the foot switch is depressed, the previously selected track goes to the record mode; if the foot switch is depressed again, the record mode is cancelled and the transport goes to the record ready play mode.

With none of the RECORD TRACK selector buttons depressed and the recorder in play mode, depressing the foot switch will make the record indicating LED to blink, indicating that the recorder is in the record ready state while in play mode. When any one of the RECORD TRACK selector button is depressed under this condition, the track of the depressed button will go to the record mode but will be cancelled, returning to the record ready state, when the foot switch is depressed again.

One word of caution - the foot switch can neither punch in nor out when the transport is put in the record mode by the control panel PLAY and RECORD buttons.

23) Input jack [INPUT]

24) OUTPUT JACKS [OUTPUT]

These 8 jacks carry the output from tracks 1 through 8 of the recorder.

With the INPUT MONITOR selector and RECORD TRACK selector buttons depressed, depressing the RECORD button only or both the RECORD and PLAY buttons at the same time makes the tape out signal change to input monitor signal.

25) Power cord

26) Capstan and Pinch roller

27) Supply idler roller

28) Tension arm

29) VU meter

2. SPECIFICATION

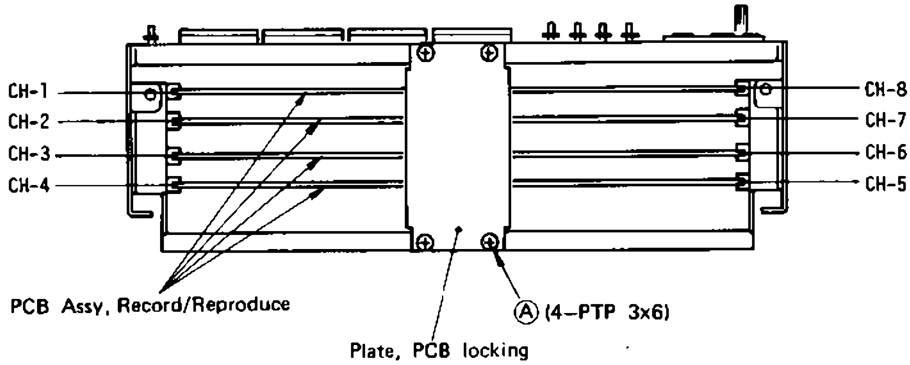
TAPE	1/4 inch tape width, 1 mil base
FORMAT	8 track, 8 channel (8 channel record, 8 channel reproduce)
REEL SIZE	7 inch
TAPE SPEED	15 or 7-1/2 ips (38 or 19 cm/s), ±0.5%
PITCH CONTROL	±10%
LINE INPUT	-10dBV (0.3V) Impedance: 30KΩ, unbalanced
LINE OUTPUT	-10dBV (0.3V) Load impedance: 10KΩ or higher, unbalanced
RECORD LEVEL CALIBRATION	0 VU referenced to 250 nWb/m of tape flux
EQUALIZATION	35 μsecs at 15 ips, 50 μsecs at 7-1/2 ips
WOW & FLUTTER	±0.06% peak (IEC/ANSI), weighted for 15 ips, ±0.10% peak (IEC/ANSI), weighted for 7-1/2 ips measured with flutter test tape
STARTING TIME	Less than 0.5 sec.
FAST WIND TIME	130 seconds for 1800 ft. of tape
FREQUENCY RESPONSE	40Hz ∿ 18KHz, for 15 ips ±3dB 40Hz ∿ 15KHz, for 7-1/2 ips ±3dB
SIGNAL TO NOISE RATIO	72dB weighted, 60dB unweighted for 15 ips, 72dB weighted, 60dB unweighted for 7-1/2 ips, referenced to 3% T.H.D. level (12dB above 0 VU) at 1 KHz
T.H.D.	Less than 1% at 1 KHz, 0 VU
ERASURE	Better than 70dB at 1 KHz
POWER REQUIREMENTS	120V AC, 60Hz, 60W (U.S.A./Canada models) 220V AC, 50Hz, 60W (European models) 240V AC, 50Hz, 60W (UK/Australian models) 100/120/220/240V AC, 60W (General export models)
DIMENSIONS, overall	14" (W) x 13-1/2" (H) x 6-3/4" (D)
WEIGHT	29 lbs. (13Kg.)

6. SPECIAL MAINTENANCE

6.4 RECORD/REPRODUCE AMPLIFIER CHECKS AND ADJUSTMENTS

Checking and adjusting of the record/reproduce amplifiers can speedily and efficiently be carried out by following the procedures below.

Model A-8LR, R/P amp card installation.



6.4.1 Calibrating the Dolby encode mode and meters

1) Put transport in the EDIT mode. To calibrate TRACK 1, depress the RECORD TRACK 1 button, simultaneously depress RECORD and PLAY buttons to put TRACK 1 (CHAN. 1) in the record mode.
2) Plug in an audio oscillator output to the recorder rear panel INPUT 1 jack and apply a 400Hz, -10dBV (0.3V) signal.
3) Set the NR INT/EXT switch on the recorder front panel to EXT, connect a level meter to test point TP-101 and adjust REC CAL (R-311, 10KΩB) so that the level here is 390mV.
4) On completing the above adjustments, connect the level meter to OUTPUT 1 jack on the recorder rear panel and check that the level here is -10dBV (0.3V) ±1dB.
5) After checking the OUTPUT jack level, adjust METER CAL (R-312, 50KΩB) for a 0 VU reading on the recorder VU meter.
6) Calibrate tracks 2 ∿ 8 in the same way.
7) Return the NR INT/EXT switch, on the recorder front panel, to INT.

6.4.2 Calibrating the Dolby decode mode

1) Set the NR INT/EXT switch on the recorder front panel to EXT and switch off all RECORD TRACK buttons.
2) Playback the Reference Level Section of the Reproduce Alignment Tape.
3) Beginning adjustments from TRACK 1 (CHAN 1), connect a level meter to test point TP-101 located near U106 upon the CHAN 1 PCB of the record/reproduce amplifier, and adjust REP CAL (R314, 10KΩB) so that the level is 390mV.
4) After these adjustments, connect the level meter to the recorder rear panel OUTPUT 1 jack and check that the level is -10dBV (0.3V) ±1dB.

5) After check of the OUTPUT jack level, confirm that the meter reading is 0 VU, ±1 VU.

   If the reading is not 0 VU ±1 VU, repeat the adjustments in the previous section, Item 5.

6) Calibrate tracks 2 ∿ 8 (CHAN 2 ∿ 8) by the same procedures for TRACK 1, above.

7) On completing the above adjustments, return to INT the NR INT/EXT switch on the recorder front panel.

6.4.3 Adjusting the reproduce frequency response

1) Set the NR INT/EXT switch on the recorder front panel to EXT and switch off all RECORD TRACK buttons.

2) Playback the Head Azimuth and Frequency Response sections of the Reproduce Alignment Tape.

   The Azimuth and Phase Adjusting Screw is adjusted for this alignment as shown in Fig. 6-12.

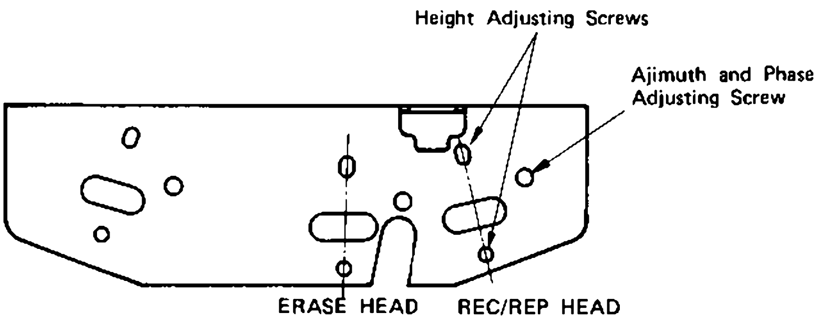
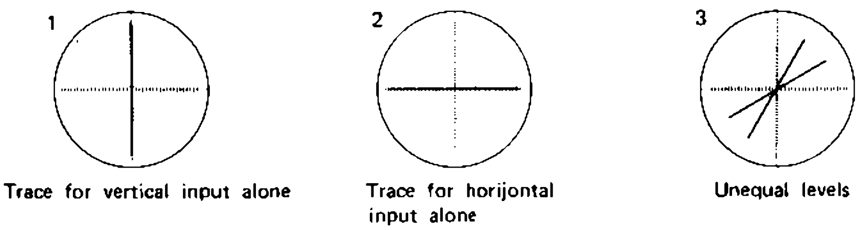


Fig. 6-12

3) Adjust the Azimuth and Phase Adjusting Screw for maximum reading on all eight VU meters of the recorder.

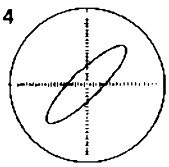
   Then, connect the vertical input of the oscilloscope to TRACK 1 output and the horizontal input to one among TRACKS 2 ∿ 8, set the oscilloscope to XY mode to obtain a lissajous waveform to check the phase.



If the trace length between (1) and (2) are not the same, it means that the two inputs are not of the same level. Correct for equal lengths by the oscilloscope controls.

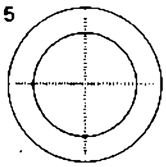
If the playback head azimuth is out of alignment, the following patterns will result:

4



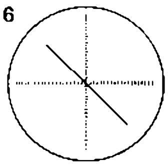
(A small misalignment 30° out of phase)

5



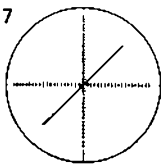
(A larger error 90° outof phase)

6



(A big one, 180° out of phase)

7



(Perfect azimuth 0°, in phase)

Fig. 6-13

As a result of phase check with a 10KHz signal, the adjustment is finished if difference in phase is less than 90° between tracks and azimuth adjustment is at the best point.

4) Check the playback frequency response of each channel by playback of the Frequency Response section of the Reproduce Alignment Tape. The recorder VU meters can be used for this check but if a more accurate measurement is necessary, the level meter is plugged one by one into the recorder rear panel 1 ∿ 8 OUTPUT jacks and the levels measured here.

   The normal playback frequency response should be within ±3dB for a frequency range of 50 ∿ 18,000Hz (15 ips) and 50 ∿ 15,000Hz (7-1/2 ips).

   If it is not within spec, adjust REP EQ R313, 10KΩB (odd number tracks) or R323, 10KΩB (even number tracks).

5) Whenever R313 and R323 are adjusted, the Dolby encode must be recalibrated - (Item 5.2).

6.4.4 Bias leakage check

Two bias trap modules are provided for each channel. One is in the first stage of the reproduce amplifier and the other in the output stage of the record amplifier.

1) Reproduce bias trap module (U109 --- odd number channels; U209 --- even number channels)

   To check bias leakage of TRACK 1, the oscilloscope probe is hooked to TP-105 and the probe ground clip to the nearest GND.

   Put TRACK 1 in the reproduce mode, the adjacent TRACK 2 in the record mode and check bias leakage at TP-105. If this is less than 250mV P-P (15 ips) and 700mV P-P (7-1/2 ips), it is normal. (At checking TRACK 2, put the adjacent tracks 1 or 3 in the record mode.) If the voltage is high, it is adjusted by rotating the center core of U109 but before doing this, check the frequency (100KHz, ±0.5KHz) of the erase/bias master oscillator. To check the oscillator frequency, the record/reproduce amplifier PCB is pulled out from the A-8 and the frequency at connector pin No. 2 is checked.

   If the oscillator frequency is largely off spec, replace the erase/bias master oscillator module (U13).

2) Record bias trap module (U108 --- odd number channels; U208 --- even number channels)

   To check bias leakage of TRACK 1, the oscilloscope probe is hooked to TP-104 and the probe ground clip to GND nearest to TP-105.

   Put TRACK 1 in the record mode and check bias leakage at TP-104. It is normal if the voltage is 1.1V P-P.

   If it is off spec, check frequency (100KHz, ±0.5KHz) of the bias/erase master oscillator before rotating the center core of U108 to adjust bias leakage.

6.4.5 Erase current adjustment

In adjusting the erase current, put the track to be adjusted in the record mode.

To adjust TRACK 1, for example, hook the hot side of the oscilloscope probe to TP-103 located near relay K-101 and the ground clip of the probe to GND pin in front of the REP EQ pot, R313. Set the core of L-103 so that voltage at TP-103 is 1.7V P-P (15 ips) and 1.5V P-P (7-1/2 ips).

The test point for TRACK 2 is TP-203 located near relay L-201. The GND pin to be used is located left of the REP CAL pot, R324; erase current is adjusted by the core of L-203.

6.4.6 Bias current adjustment

The track of which bias current is to be adjusted is put in the record mode.

To adjust TRACK 1, for example, hook the oscilloscope probe hot side to TP-102 located near connector J-101, and the ground clip to the GND pin.

Then, set the BIAS LVL pot, R317, 47KΩB at approximately 450mV P-P.

For an accurate adjustment, load a blank tape (Ampex #457, Scotch #227) on the recorder, record a test signal, set the NR switch to INT, and trim the BIAS LVL pot so that the overall frequency response is within 3dB between 250Hz and 10KHz, or within 5dB when the higher end is 14KHz.

During this adjustment, temporarily set the screwdriver adjusting slot of REC EQ, R316, 1KΩB so that this slot is parallel with the PCB plane, then trim it for a more flat overall frequency response.

6.4.7 Recording level adjustment

1) Proceed to the following adjustments only after checks and adjustments in the previous Sections 6.4.1 ∿ 6.4.6 have been completed.
   Set the front panel NR INT/EXT switch to EXT.
2) Load a blank tape (Ampex 457 or Scotch 227) on the transport and apply an audio oscillator output of 400Hz, -10dBV (0.3V) to the INPUT jack on the recorder rear panel.
   Also, plug in a level meter to the OUTPUT jack.
   Taking TRACK 1 as an example, the connector number is "1" for both INPUT and OUTPUT jacks.
3) Depress the RECORD TRACK 1 button, then, depress the RECORD and PLAY buttons to put TRACK 1 in the record mode.
   When thus in the record mode, the meter will indicate the input level regardless to select position of the input button.
   Check to see that the reading of this meter is 0 VU ±1 VU.
4) It will be convenient to rewind the tape to the start if the tape index counter reset button is depressed, at start of recording, to return the display to 0000.
5) After recording a certain length of 400Hz, 0 VU signal, depress the ZERO RTN

button to rewind tape to the starting point, put the transport in the PLAY mode and check the meter reading. The MONITOR switch must be at TAPE.
It is in normal condition if the meter reading is 0 VU ±1.5 VU.
If it is off spec, correct by adjusting REC LVL R315, 5KΩB.

Do the same on the remaining tracks 2 ∿ 8.

6.4.8 Overall frequency response

1) With the front panel NR IN/EXT switch at EXT and under the measurement setup of the previous Section 6.4.7, apply signals from 40Hz through 18KHz (15 ips) and 40Hz through 15KHz (7-1/2 ips) at -10dBV (0.3V) to the recorder INPUT jack and set the NR switch to INT.

   To adjust TRACK 1, for example, apply the signal to INPUT 1 and plug in a level meter to OUTPUT jack 1. Put TRACK 1 in the record mode to record a certain length of the signal, rewind it to the start, and playback the tape. It is in good normal condition if the frequency response in reference to 400Hz is within +3dB and -3dB.
   If it does not fall within spec in the high frequency region, correct it by a slight rotation of REC EQ pot R316, 1KΩB.
2) Check and adjust the remaining tracks in the same way.

6.4.9 Overall S/N measurement

1) Set the front panel NR INT/EXT switch at INT.
2) Upon completing checking up to Section 6.4.8, apply a 400Hz, -10dBV (0.3V) signal to the rear panel INPUT jack 1 (example for track 1), record the signal onto a blank tape, then, without stopping the tape, unplug the oscillator connected to the INPUT jack and further record a length of no-signal tape.
3) Plug a level meter into OUTPUT jack 1, playback the recorded signal section to measure the noise level of the no-signal section against the 400Hz reference level, calculate the difference between noise level and reference level, add 12dB to it and obtain the ratio between peak recording level and noise level.

   Specification: 72dB weighted
                  60dB unweighted

6.4.10 T.H.D. measurement

1) Set the front panel NR INT/EXT switch to INT.
2) To adjust TRACK 1, for example, apply a 400Hz, -10dBV (0.3V) test signal to INPUT jack 1, record it, playback the recorded tape and apply its output from OUTPUT jack 1 to the distortion meter.
   Specification: T.H.D. 1% or less
3) If it is not within spec, demagnetize the head, check the bias trap adjustment and record level.
   If it still does not fall within spec after making the corrective measures above, readjust the bias current by the procedures in the previous Section 6.4.6.
4) When the Section 6.4.6 adjustments are made, it is necessary to go through procedures in Sections 6.4.7 and 6.4.8.

6.4.11 Erase measurement

1) Set the front panel NR INT/EXT switch to INT.
2) To adjust TRACK 1, for example, apply a 1KHz, 0dBV (1V) signal which is 10dB higher than the reference level, to INPUT jack 1 and put TRACK 1 in the record mode.

   Partially rewind the tape to retain a section of the 1KHz signal and then record over the remaining section without any signal at the input.
3) Rewind to start of recording, playback the tape, insert a 1KHz bandpass filter between OUTPUT 1 and the level meter to measure the output.
4) The level ratio between the 1KHz recording and the no-signal recording is the erasure figure. It is in good normal condition if erasure is higher than 70dB.
5) If it is less than the spec, increase erase current about 10% by the procedure of Section 6.4.5. Monitor the erase current waveform on the oscilloscope at adjusting and set the core just before the waveform begins to deteriorate. A higher current will heat the erase head and result in damage to the tape.

6.4.12 Sync crosstalk measurement

1) Sync crosstalk is the relative figure against the reference level on how much of the recording signal from the track in the recording mode is leaking into the track being reproduced.
   When sync crosstalk is excessively high, playback output during overdubbing will

sound muddy by effect of the recording signal leakage or cause oscillation at ping-pong recording whereby the playback output is transferred to another track.

2) Sync crosstalk occurs in relation to the track and pitch dimensions of the head and its construction, and since this cannot be corrected without affecting its frequency response, to be aware of how much margin there is before oscillation occurs at ping-pong recording is very important at drawing out best performance from the recorder. Sync crosstalk must be measured, of course, when the head is replaced with a new one.

3) It is in good normal condition if sync crosstalk is 10dB or better, when either track of two adjacent ones, is put in the record mode.

4) To adjust TRACK 1, for example, load a blank tape on the transport, put TRACK 1 in the sync mode (playback) and TRACK 2 in the record mode.
Plug in a level meter to the TRACK 1 OUTPUT jack, an audio oscillator to the TRACK 2 INPUT jack and apply a 20Hz ∿ 20KHz, -10dBV (0.3V) signal to the recorder.
Thus, the signal appearing at the TRACK 1 OUTPUT is sync crosstalk.
If crosstalk from TRACK 1 OUTPUT is higher than -10dBV (0.3V), TRACK 1 cannot be playbacked for transferring to TRACK 2 as oscillation will occur.

5) As TRACKS 2 through 7 will each have two adjacent tracks, either one side only is put in the record mode at taking measurements.
It could be useful in using this recorder if, for reference, the figure for both tracks in the record mode is measured.

7. PCB ASSEMBLIES AND PARTS LIST

CONNECTOR BOARD PCB ASSEMBLY, Ass'y No. 8273 0870 00, 8TLR

Ref. No.	Parts No.	Nomenclature
	8251 1011 00	PCB, connector board
	IC's	
U001~003	8236 0033 01	Digital, MC14071B
U004	8236 0029 01	" , MC14050B
U005	8236 0040 01	" , MC14081B
U006, 007	8236 0035 00	" , MC14073B
U008	8236 0001 01	" , MC14001B
U009~011	8236 0033 01	" , MC14071B
U012	8236 0029 01	" , MC14050B
U013	8236 0040 01	" , MC14081B
U014	8236 0035 00	" , MC14073B
U015	8256 0170 00	Module, OSC, LR, 100KHz
	TRANSISTORS	
Q001	8234 0003 03	2SA1015GR
Q002~005	8234 0002 03	2SC1815GR
Q006	8234 0037 02	2SC2655Y
Q007	8234 0038 02	2SA1020Y
Q008	8234 0003 03	2SA1015GR
	DIODES	
D001~013	8234 0035 00	MA 150, FVS
D014	8234 0007 00	1N4002
D015	8234 0035 00	MA 150, FVS
	CARBON RESISTORS	

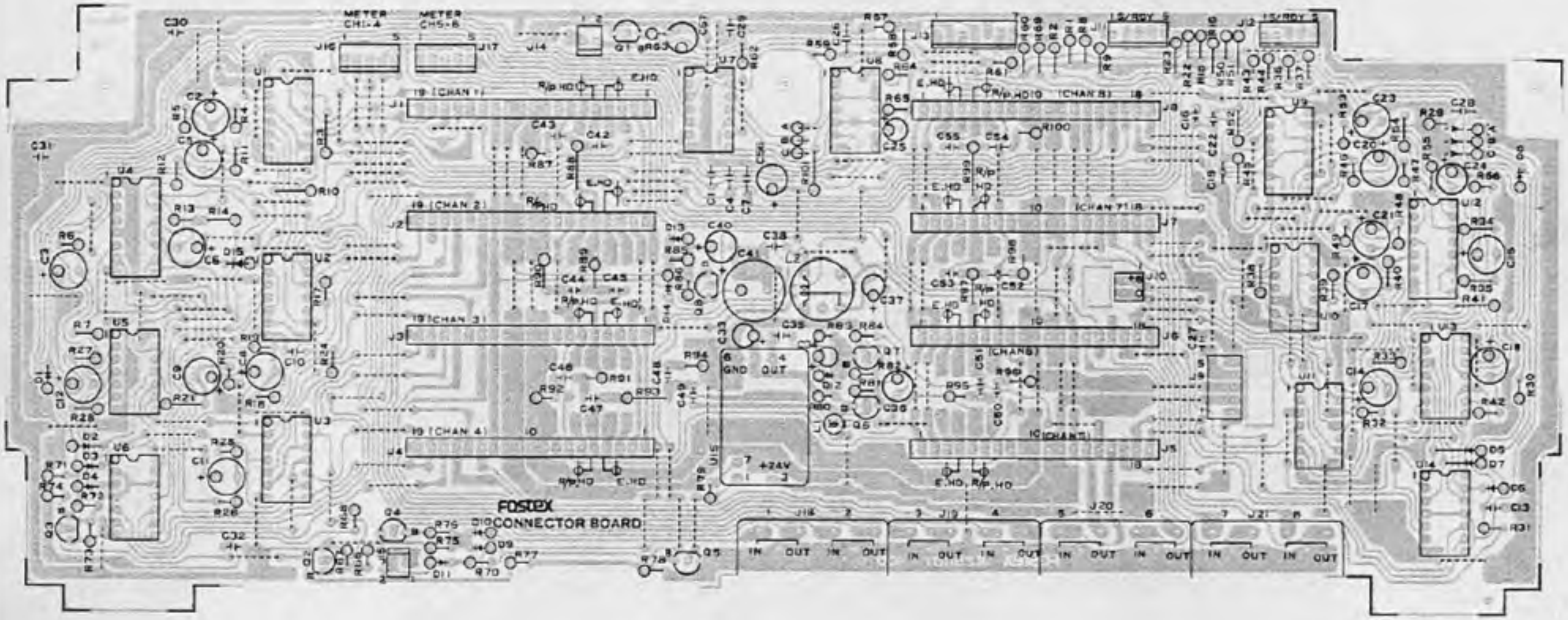
All resistors ¼W, ±5% unless otherwise noted.

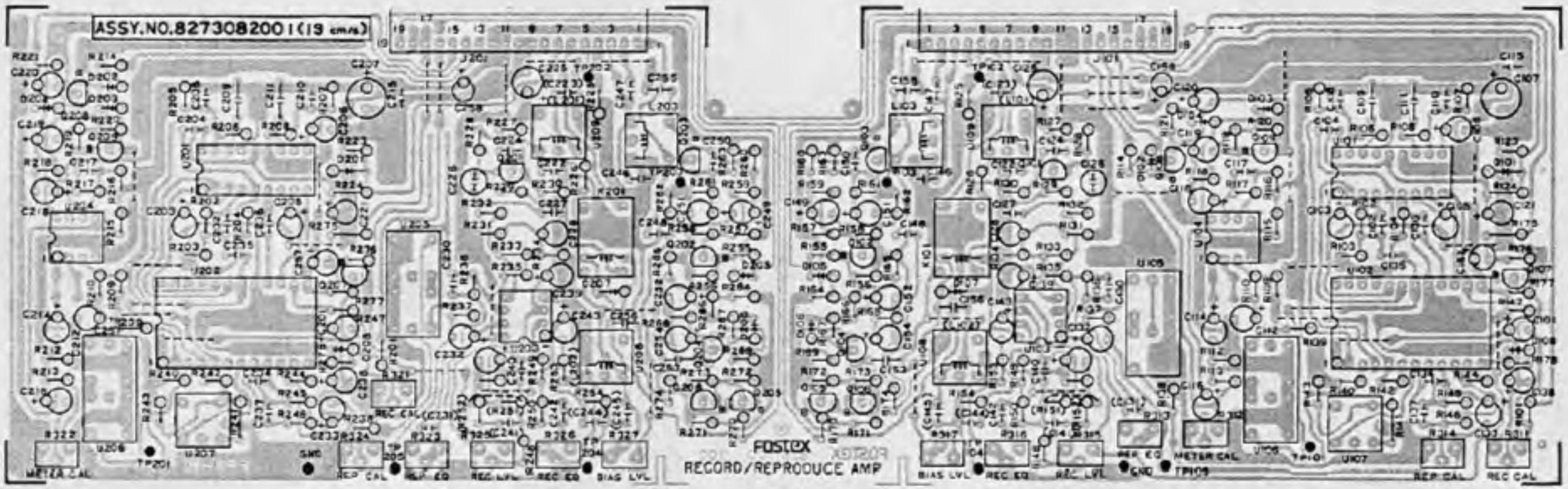
Ref. No.	Parts No.	Nomenclature
R001	8230 0044 72	Vertical mounting, 4.7KΩ, J
R002	8230 0001 03	" " , 10KΩ, "
R003	8230 0001 03	" " , 100KΩ, "
R004	8230 0042 43	" " , 24KΩ, "
R005	8230 0041 04	" " , 100KΩ, "
R006	8230 0003 33	" " , 33KΩ, "
R007	8230 0001 04	" " , 100KΩ, "
R008	8230 0004 72	" " , 4.7KΩ, "
R009	8230 0001 03	" " , 10KΩ, J
R010	8230 0001 04	" " , 100KΩ, "
R011	8230 0002 43	" " , 24KΩ, "
R012	8230 0001 04	" " , 100KΩ, "
R013	8230 0003 33	" " , 33KΩ, "
R014	8230 0001 04	" " , 100KΩ, "
R015	8230 0004 72	" " , 4.7KΩ, "
R016	8230 0001 03	" " , 10KΩ, "
R017	8230 0001 04	" " , 100KΩ, "
R018	8230 0002 43	" " , 24KΩ, "
R019	8230 0001 04	" " , 100KΩ, "
R020	8230 0003 33	" " , 33KΩ, "
R021	8230 0001 04	" " , 100KΩ, "
R022	8230 0004 72	" " , 4.7KΩ, "
R023	8230 0001 03	" " , 10KΩ, "
R024	8230 0041 04	" " , 100KΩ, "
R025	8230 0042 43	" " , 24KΩ, "
R026	8230 0001 04	" " , 100KΩ, "
R027	8230 0003 33	" " , 33KΩ, "
R028	8230 0001 04	Vertical mounting, 100KΩ, "
R029	8230 0004 72	" " , 4.7KΩ, "
R030	8230 0001 03	" " , 10KΩ, "
R031	8230 0001 04	" " , 100KΩ, "
R032	8230 0002 43	" " , 24KΩ, "
R033	8230 0001 04	" " , 100KΩ, "
R034	8230 0003 33	" " , 33KΩ, "
R035	8230 0001 04	" " , 100KΩ, "
R036	8230 0004 72	" " , 4.7KΩ, "
R037	8230 0001 03	" " , 10KΩ, "
R038	8230 0001 04	" " , 100KΩ, "
R039	8230 0002 43	" " , 24KΩ, "
R040	8230 0001 04	" " , 100KΩ, "
R041	8230 0003 33	" " , 33KΩ, "
R042	8230 0001 04	" " , 100KΩ, "
R043	8230 0004 72	" " , 4.7KΩ, "
R044	8230 0041 03	" " , 10KΩ, "
R045	8230 0041 04	Vertical mounting, 100KΩ, J
R046	8230 0002 43	" " , 24KΩ, "
R047	8230 0001 04	" " , 100KΩ, "
R048	8230 0003 33	" " , 33KΩ, "
R049	8230 0001 04	" " , 100KΩ, "
R050	8230 0004 72	" " , 4.7KΩ, "
R051	8230 0001 03	" " , 10KΩ, "
R052	8230 0001 04	" " , 100KΩ, "
R053	8230 0002 43	" " , 24KΩ, "
R054	8230 0001 04	" " , 100KΩ, "
R055	8230 0003 33	" " , 33KΩ, "
R056	8230 0001 04	" " , 100KΩ, "
R057	8230 0004 72	" " , 4.7KΩ, "
R058	8230 0001 03	" " , 10KΩ, "
R059	8230 0001 04	" " , 100KΩ, "
R060	8230 0004 72	" " , 4.7KΩ, "
R061	8230 0004 73	" " , 47KΩ, "
R062	8230 0004 72	" " , 4.7KΩ, "
R063	8230 0004 73	" " , 47KΩ, "
R064	8230 0041 64	" " , 160KΩ, "
R065	8230 0041 63	" " , 16KΩ, "
R066	8230 0001 04	" " , 100KΩ, "
R067	8230 0004 74	" " , 470KΩ, "
R068	8230 0001 03	" " , 10KΩ, "
R069	8230 0006 21	" " , 620Ω, "
R070	8230 0001 81	" " , 180Ω, "
R071	8230 0001 03	" " , 10KΩ, "
R072	8230 0001 04	" " , 100KΩ, "
R073	8230 0004 73	" " , 47KΩ, "
R074	8230 0004 72	" " , 4.7KΩ, "
R075	8230 0001 04	" " , 100KΩ, "
R076	8230 0001 02	" " , 1KΩ, "
R077	8230 0001 03	" " , 10KΩ, "
R078	8230 0001 04	" " , 100KΩ, "
R079	8230 0002 20	" " , 22Ω, "

Ref. No.	Parts No.	Nomenclature
R080	8230 0005 62	Vertical mounting, 5.6KΩ, J
R081, 082	8230 0001 09	" " , 1Ω, "
R083	8230 0005 62	" " , 5.6KΩ, "
R084	8230 0041 04	" " , 100KΩ, "
R085	8230 0043 94	" " , 390KΩ, "
R086	8230 0044 73	" " , 47KΩ, "
R087∿100		Deleted
R101	8230 0041 03	Vertical mounting, 10KΩ, "
	CAPACITORS	
C001	8232 0351 03	Ceramic, YF, 50Z, 103
C002, 003	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C004	8232 0351 03	Ceramic, YF, 50Z, 103
C005, 006	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C007	8232 0351 03	Ceramic, YF, 50Z, 103
C008, 009	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C010	8232 0351 03	Ceramic, YF, 50Z, 103
C011, 012	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C013	8232 0351 03	Ceramic, YF, 50Z, 103
C014, 015	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C016	8232 0351 03	Ceramic, YF, 50Z, 103
C017, 018	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C019	8232 0351 03	Ceramic YF, 50Z, 103
C020, 021	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C022	8232 0351 03	Ceramic, YF, 50Z, 103
C023, 024	8232 0031 06	Electrolytic, 16V, 10uF, SMVB
C025	8232 0032 26	" , " , 22uF, "
C026∿032	8232 0351 03	Ceramic, YF, 50Z, 103
C033	8232 0041 06	Electrolytic, 25V, 10uF, SMVB
C034	8232 0054 75	" , 35V, 4.7uF, "
C035	8232 0261 03	Mylar, 50V, 0.01uF, J
C036	8232 0034 76	Electrolytic, 16V, 47uF, SMVB
C037	8232 0031 06	" , " , 10uF, "
C038	8232 0313 91	Polypropylene, 100V, 390pF, J
C039		Deleted
C040	8232 0721 06	Electrolytic, 25V, 10uF, LRVB
C041	8232 0044 77	" , " , 470uF, SMVB
C042∿055		Deleted
C056	8232 0061 05	Electrolytic, 50V, 1uF, SMVB
C057	8232 0062 25	" , " , 2.2uF, SMVB

Ref. No.	Parts No.	Nomenclature
	MISCELLANEOUS	
L001	8242 0530 00	Inductor, 150uH
L002	8242 0090 00	" , bias
J001∿008	8245 0490 19	Cnctr, jack, 19P, W, 5256-19A
J009	8245 0070 05	" " , 5P, ", 5129-05A
J010		Deleted
J011	8245 0010 05	Cnctr, jack, 5P, W, 5045-05A
J012	8245 0010 45	" " " , BL, 5045-05A
J013	8245 0010 07	" " , 7P, W, 5045-07A
J014, 015	8245 0010 02	" " , 2P, ", 5045-02A
J016	8245 0010 25	" " , 5P, RE, 5045-05A
J017	8245 0010 05	" " , " , W, 5045-05A
J018∿021	8245 0500 00	" " , RCA. 4P, Blk
	8276 0020 04	Wire, jumper, 10mm pitch, x180
	8276 1600 17	Cable, flat, 3 cond., 170mm

CONNECTOR BOARD




ASSY.NO.827308200I(19 cm/s)
FOSTEX
RECORD/REPRODUCE AMP
METER CAL
REP CAL
REP EQ
REC LVL
REC EQ
BIAS LVL
GND
REC CAL

R/P AMPLIFIER PCB ASSEMBLY, 8T 19cm/s, Ass'y No. 8273 0820 01

Ref. No.	Parts No.	Nomenclature
	8251 1001 00	PCB, R/P amplifier, 8T
	IC's	
U101, 201	8236 0276 00	Analog, Dolby, NE 652
U102, 202	8236 0277 00	" " , NE 654
U103, 203	8236 0210 00	" , NJM 4559DD
U104, 204	8236 0209 00	" , NJM 4559DF
U105, 205	8256 0130 00	Module, low pass filter, 25KHz
U106, 206	"	" " " " "
U107, 207	8256 0120 00	" , skewing
U108, 208	8256 0140 00	" , trap, P, 100KHz
U109, 209	8256 0150 00	" , " , S, "
	TRANSISTORS	
Q101, 201	8234 0001 09	FET, 2SK117Y-3
Q102, 202	8234 0002 03	2SC1815GR
Q103, 203	8234 0006 02	2SC2878B
Q104, 204	8234 0001 11	FET, 2SK117GR
Q105, 205	8234 0002 03	2SC1815GR
Q106, 206	"	"
Q107, 207	"	"
Q108, 208	8234 0006 02	2SC2878B
Q109, 209	8234 0002 03	2SC1815GR
	DIODES	
D102∿106	8234 0035 00	MA 150, FVS
D201 206	8234 0035 00	MA 150, FVS
D108, 208	"	" "
D107, 207	8234 0007 00	1N4002
	CARBON RESISTORS	
All resistors ¼W, 5% unless otherwise noted.		
R101, 201	8230 0042 73	Vertical mtg., 27KΩ
R102, 202	"	" " "
R103, 203	8230 0231 23	" " , metal, 12KΩ, 1%
R104, 204	8230 0237 53	" " , " , 75KΩ, "
R105, 250	8230 0043 34	" " 330KΩ
R106, 206	8230 0043 94	" " 390KΩ
R107, 207	8230 0043 34	" " 330KΩ
R108, 208	8230 0043 94	" " 390KΩ
R109, 209	8230 0041 23	" " 12KΩ
R110, 210	8230 0048 22	" " 8.2KΩ
R111, 211	"	" " "
R112, 212	8230 0041 04	" " 100KΩ
R113, 213	8230 0042 01	" " 200Ω
R114, 214	8230 0041 53	" " 15KΩ
R115, 215	8230 1141 54	" " 150KΩ
R116, 216	8230 0045 61	" " 560Ω
R117, 217	8230 1141 03	" " 10KΩ
R118, 218	8230 0045 62	" " 5.6KΩ
R119, 219	8230 0043 33	" " 33KΩ
R120, 220	8230 0042 23	" " 22KΩ
R121, 221	8230 0045 62	" " 5.6KΩ
R122, 222	8230 0041 03	" " 10KΩ
R123, 223		Deleted
R124, 224	8230 0046 82	" " 6.8KΩ
R125, 225	8230 0041 01	" " 100Ω
R126, 226	"	" " "
R127, 227	8230 0046 82	" " 6.8KΩ
R128, 228	8230 0045 62	" " 5.6KΩ
R129, 229	8230 0041 03	" " 10KΩ
R130, 230	8230 0042 21	" " 220Ω
R131, 231	8230 0042 73	" " 27KΩ
R132, 232	8230 0043 31	Vertical mtg., 330Ω
R133, 233	8230 0044 73	" " 47KΩ
R134, 234	8230 0041 03	" " 10KΩ
R135, 235	8230 0043 91	" " 390Ω
R136, 236	8230 0043 94	" " 390KΩ
R137, 237	8230 0043 32	" " 3.3KΩ
R138, 238	8230 0041 53	" " 15KΩ
R139, 239	8230 0043 32	" " 3.3KΩ
R140, 240	8230 0045 62	" " 5.6KΩ
R141, 241	8230 0041 02	" " 1KΩ
R142, 242	8230 0046 82	" " 6.8KΩ
R143, 243	"	" " "
R144, 244	8230 0232 22	" " , metal, 2.2KΩ, 1%
R145, 245	8230 0046 83	" " 68KΩ
R146, 246	8230 0235 12	" " 5.1KΩ
R147, 247	8230 0045 61	" " 560Ω
R148, 248	8230 0043 92	" " 3.9KΩ
R149, 249	8230 0049 12	" " 9.1KΩ
R150, 250	"	" " "
R151, 251	8230 0042 22	" " 2.2KΩ
R152, 252	8230 0041 00	" " 10Ω
R153, 253	8230 0041 23	" " 12KΩ
R154, 254	8230 0044 72	" " 4.7KΩ
R155, 255	8230 0043 33	" " 33KΩ
R156, 256	8230 0041 04	" " 100KΩ
R157, 257	8230 0044 72	" " 4.7KΩ
R158, 258	8230 0041 83	" " 18KΩ
R159, 259	8230 0042 02	" " 2KΩ
R160, 260	"	" " "
R161, 261	8230 0041 02	" " 1KΩ
R162, 262	8230 0042 00	" " 20Ω
R163, 263	8230 0042 23	" " 22KΩ
R164, 264	8230 0042 73	" " 27KΩ
R165, 265	8230 0048 22	" " 8.2KΩ
R166, 266	8230 0045 62	" " 5.6KΩ
R167, 267	8230 0041 05	" " 1MΩ
R168, 268	8230 0042 72	Vertical mtg., 2.7KΩ
R169, 269	8230 0042 23	" " 22KΩ
R170, 270	8230 0045 63	" " 56KΩ

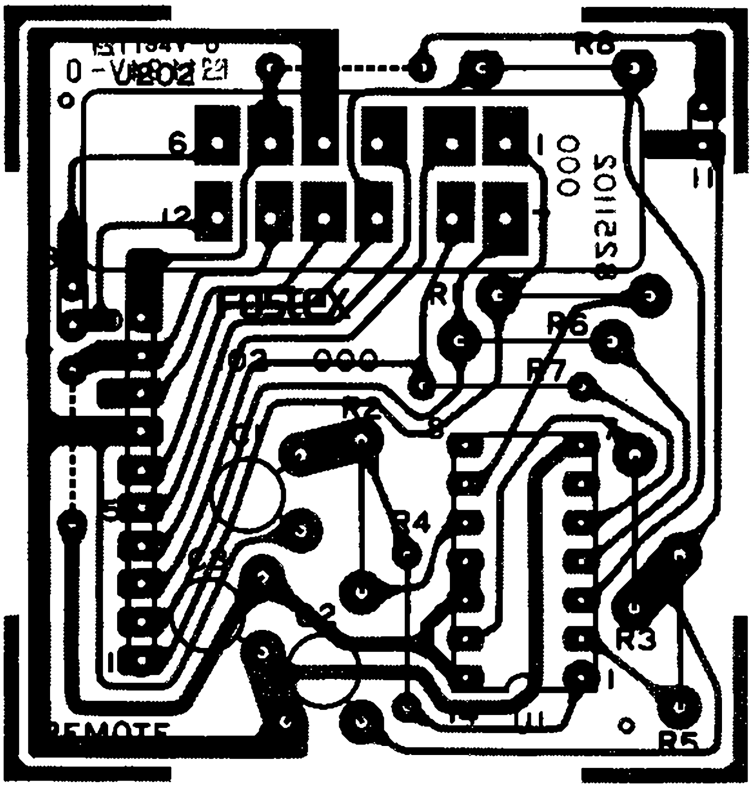
Ref. No.	Parts No.	Nomenclature
R171, 271	8230 0041 04	" " 100KΩ
R172, 272	8230 0043 33	" " 33KΩ
R173, 273	8230 0041 04	" " 100KΩ
R174, 274	8230 0043 61	" " 360Ω
R175, 275	8230 0043 33	" " 33KΩ
R176, 276	8230 0041 04	" " 100KΩ
R177, 277	8230 0042 73	" " 27KΩ
R178, 278	8230 0043 34	" " 330KΩ
	CAPACITORS	
C101, 201	8232 0061 05	Electrolytic, 50V, 1uF, 20%, SM
C102, 202	8232 0264 72	PES, 50V, 0.0047uF, 5%, AMX
C103, 203	8232 0031 06	Electrolytic, 16V, 10uF, 20%, SM
C104, 204	8232 0264 73	PES, 50V, 0.047uF, 5%, SM
C105, 205	8232 0031 06	Electrolytic, 16V, 10uF, 20%, SM
C106, 206	8232 0182 24	" , 50V, 0.22uF, 20%, KA
C107, 207	8232 0024 77	" , 10V, 470uF, 20%, SM
C108, 208	8232 0263 33	PES, 50V, 0.033uF, 5%, AMX
C109, 209	8232 0261 04	" " , 0.1uF, 5%, AMX
C110, 210	8232 0263 33	" " , 0.033uF, 5%, AMX
C111, 211	8232 0261 04	" " , 0.1uF, 5%, AMX
C112, 212	8232 0033 36	Electrolytic, 16V, 33uF, 20%, SM
C113, 213		Deleted
C114, 214	8232 0711 06	Electrolytic, 16V, 10uF, 20%, LR-VB
C115, 215	8232 0351 03	Ceramic, 50V, 0.01uF, YF
C116, 216	8232 0054 75	Electrolytic, 35V, 4.7uF, 20%, SM
C117, 217	8232 0512 20	Ceramic, 50V, 22pF,10%, SL
C118, 218	8232 0054 75	Electrolytic, 35V, 4.7uF, 20%, SM
C119, 219	8232 0042 26	" , 25V, 22uF, 20%, SM
C120, 220	8232 0054 75	" , 35V, 4.7uF, 20%, SM
C121, 221	8232 0041 06	" , 25V, 10uF, 20%, SM
C122, 222	8232 0261 02	PES, 50V, 1000pF, 5%, AMX
C123, 223		Deleted
C124, 224	8232 0511 01	Ceramic, 50V, 100pF, 10%, SL
C125, 225	8232 0031 07	Electrolytic, 16V, 100uF, 20%, SM
C126, 226	8232 0851 05	" , 50V, 1uF, LR-BP
C127, 227	8232 0342 71	Ceramic, 50V, 270pF, 10%, YB
C128, 228	8232 0033 36	Electrolytic, 16V, 33uF, 20%, SM
C129, 229		deleted
C130, 230	8232 0261 53	PES, 50V, 0.015uF, 5%, AMX
C131, 231	8232 0512 20	Ceramic, 50V, 22pF, 10%, SL
C132, 232	8232 0031 06	Electrolytic, 16V, 10uF, 20%, SM
C133, 233	8232 0061 05	" , 50V, 1uF, 20%, SM
C134, 234	8232 0514 70	Ceramic, 50V, 47pF, 10%, SL
C135, 235	8232 0303 33	PPR, 100V, 0.033uF, 2%, APS
C136, 236	8232 0264 72	PES, 50V, 4700pF, 5%, AMX
C137, 237	8232 0301 03	PPR, 100V, 0.01uF, 2%, APS
C138, 238	8232 0182 24	Electrolytic, 50V, 0.22uF, 20%, KA
C139, 239	8232 0033 36	" , 16V, 33uF, 20%, SM
C140, 240	8232 0321 51	Ceramic, 50V, 150pF, 5%, NPO

Ref. No.	Parts No.	Nomenclature
C141, 241	8232 0261 53	PES, 50V, 0.015uF, 5%, AMX
C142, 242	8232 0265 62	PES, 50V, 5600pF, 5%, AMX
C143, 243	8232 0724 75	Elect, 25V, 4.7uF, 20%, LR-VB
C144, 244		Deleted
C145, 245	8232 0303 33	Polypropylene, 0.033uF, 100V, G
C146, 246	8232 0313 92	PPR, 100V, 3900pF, 5%, APS
C147, 247	8232 0312 72	" " , 2700pF, " , "
C148, 248	8232 0321 21	Ceramic, 50V, 120pF, 5%, NPO
C149, 249	8232 0021 07	Electrolytic, 10V, 100uF, 20%, SM
C150, 250	8232 0261 83	PES, 50V, 0.018uF, 5%, AMX
C151, 251	8232 0054 75	Elect, 35V, 4.7uF, 20%, SM
C152, 252	8232 0031 06	" , 16V, 10uF, 20%, SM
C153, 253	8232 0261 04	PES, 50V, 0.1uF, 5%, AMX
C154, 254	8232 0054 75	Elect, 35V, 4.7uF, 20%, SM
C155, 255	8232 0276 83	PES, 50V, 0.068uF, 5%, AMX
C156, 256	8232 0351 03	Ceramic, 50V, 0.01uF, YF
C157, 257	8232 0721 06	Elect, 25V, 10uF, 20%, LR-VB
C158, 258	8232 0041 07	" , 25V, 100uF, 20%, SM
	CARBON TRIMMER POTS	
R311, 321	8231 0041 03	Vertical mtg., 10KΩB
R312, 322	8231 0045 03	" " 50KΩB
R313, 323	8231 0041 03	" " 10KΩB
R314, 324	"	" " "
R315, 325	8231 0045 02	" " 5KΩB
R316, 326	8231 0042 02	" " 2KΩB
R317, 327	8231 0064 73	" " , metal, 47KΩB
R318, 328		Deleted
	MISCELLANEOUS	
L103, 203	8242 0040 00	Coil, 0.8mH
K101, 102	8248 0060 06	Relay, sub-mini, G2E-182P-H
J101, 201	8245 0110 19	Cnctr, jack, 3024-19AH, white
	8276 0010 00	Pin, header, x12
	8276 0020 04	Wire, jumper, 10mm, IPS-1041-4, x39

The following parts list is for R/P AMPLIFIER PCB ASSEMBLY (38cm/s) (Ass'y No. 8273 0820 00)

R123, 223	8230 0046 82	Vertical mtg., 6.8KΩ
R151, 251		Deleted
R152, 252		"
C140, 240		"
C141, 241		"
C142, 242	8232 0263 32	PES, 50V, 3300pF, 5%, AMX
C148, 248		Deleted

PCB ASSEMBLY   REMOTE CONTROL



REMOTE CONTROL PCB ASSEMBLY, ASS'Y No. 8273086000

Ref. No.	Parts No.	Nomenclature
	8251 1020 00	PCB, remote
	IC's	
U001	8236 0006 00	Digital, CMOS, MC14012B
	CARBON RESISTORS	
R001~008	8230 0061 04	Flat mtg., 100KΩ, 1%
	CAPACITORS	
C001~003	8232 0351 03	Ceramic, 1000pF, 50V, YF

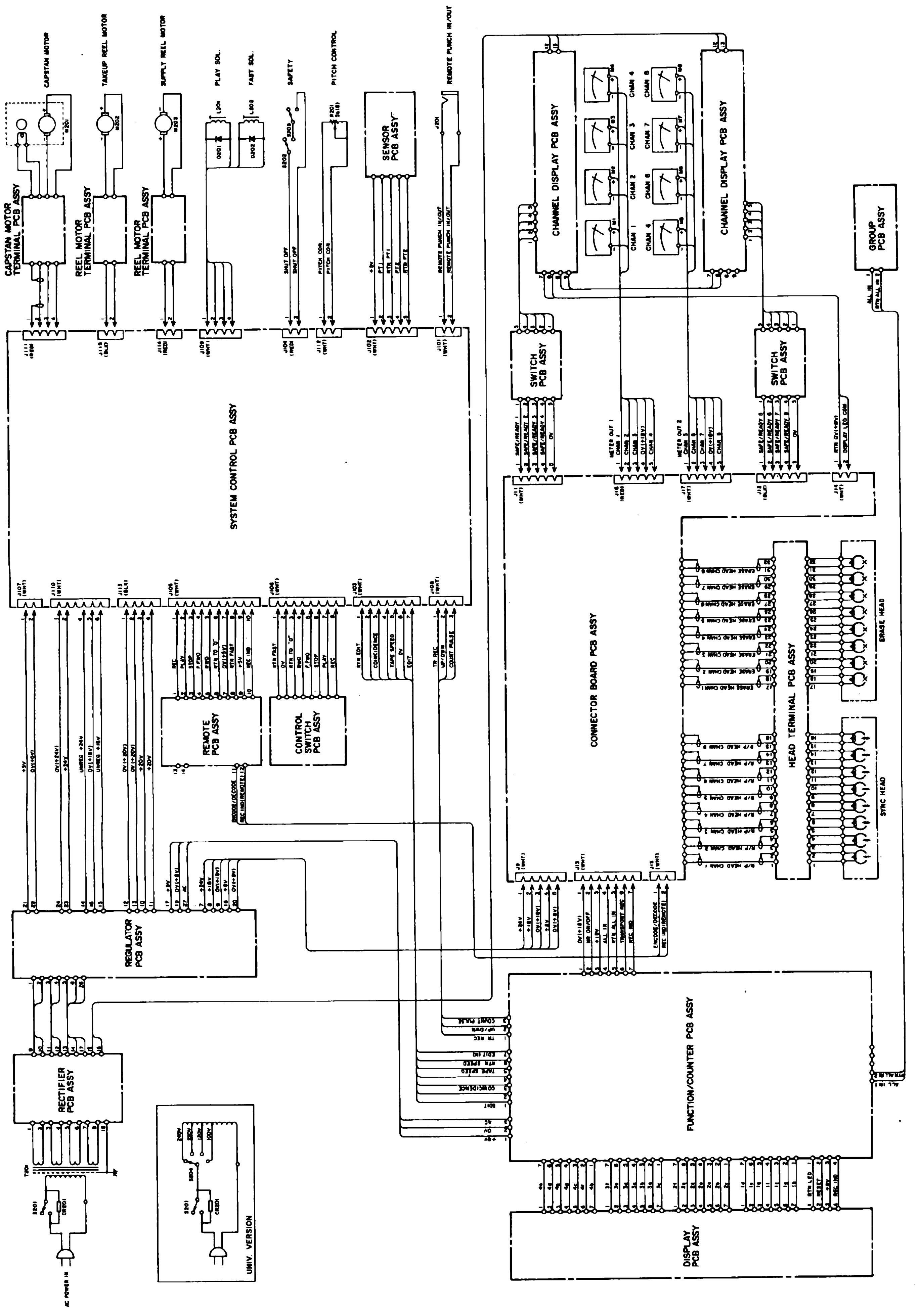
FOSTEX

FOSTEX CORPORATION 512, MIYAZAWACHO, AKISHIMA, TOKYO, JAPAN

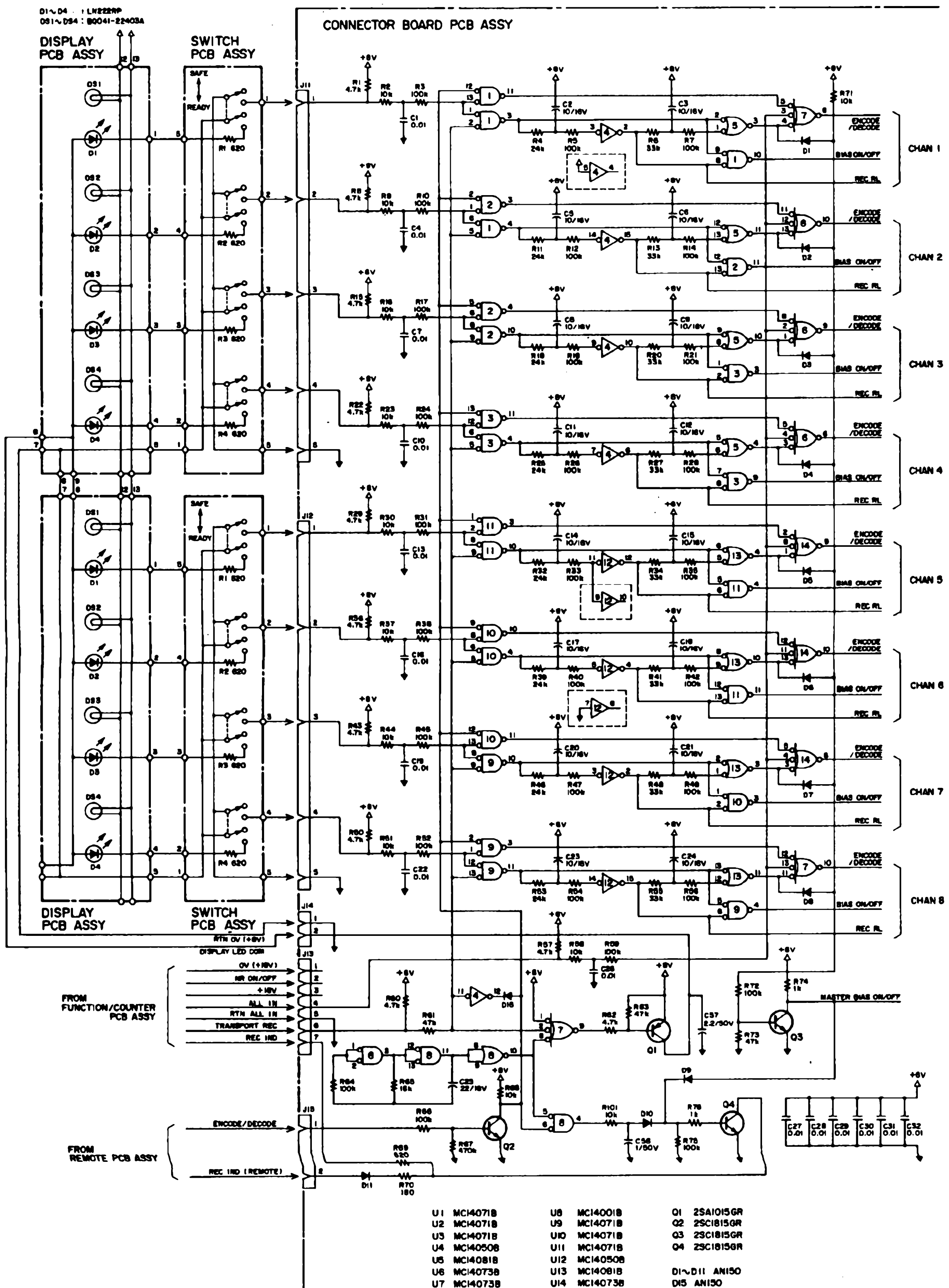
FOSTEX CORPORATION OF AMERICA 15431 BLACKBURN AVE., NORWALK, CA 90650, U.S.A.

C PRINTED IN JAPAN JAN. 1983 8288 0570 00

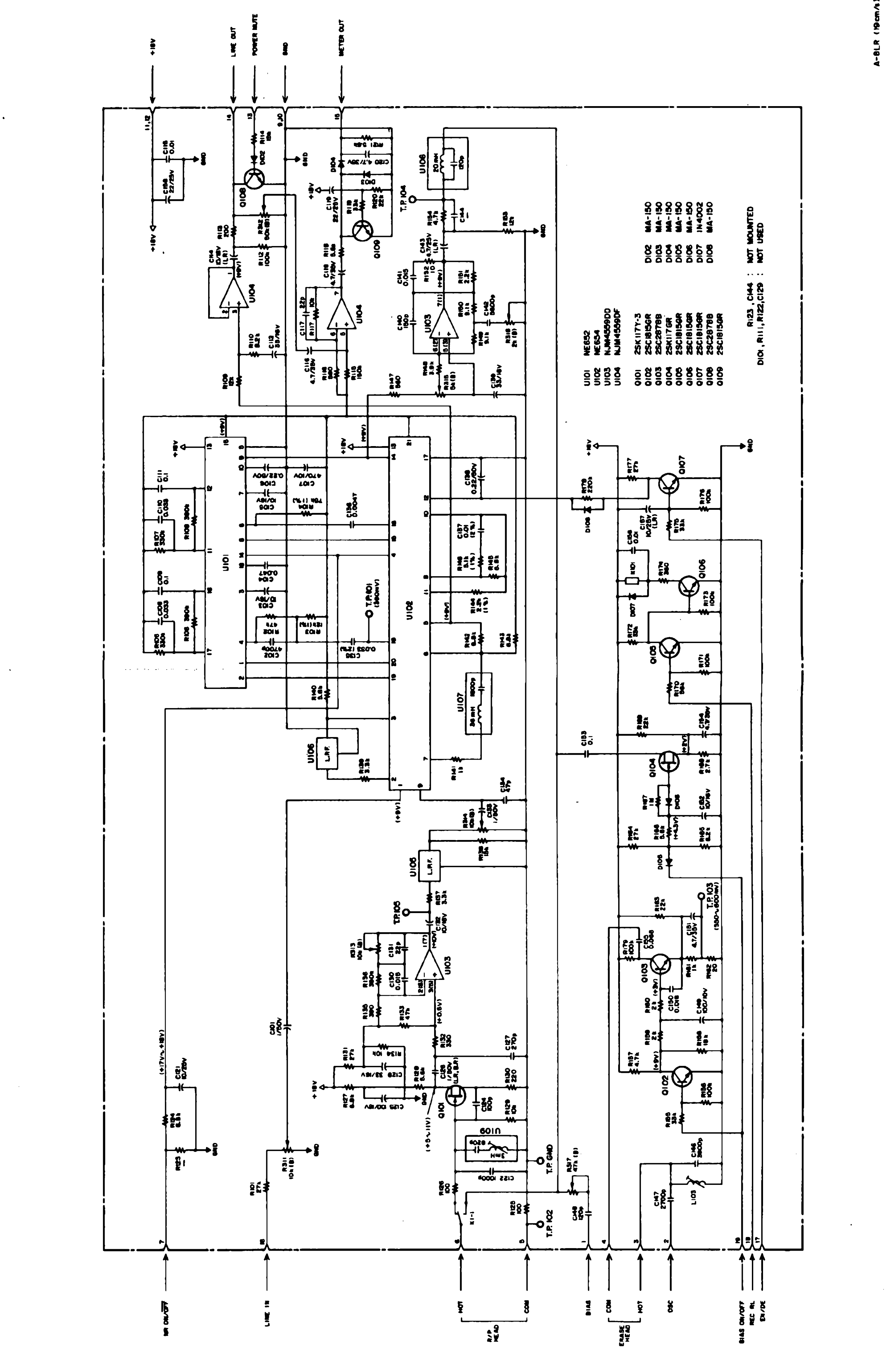
RECORDER A-Series A-8LR

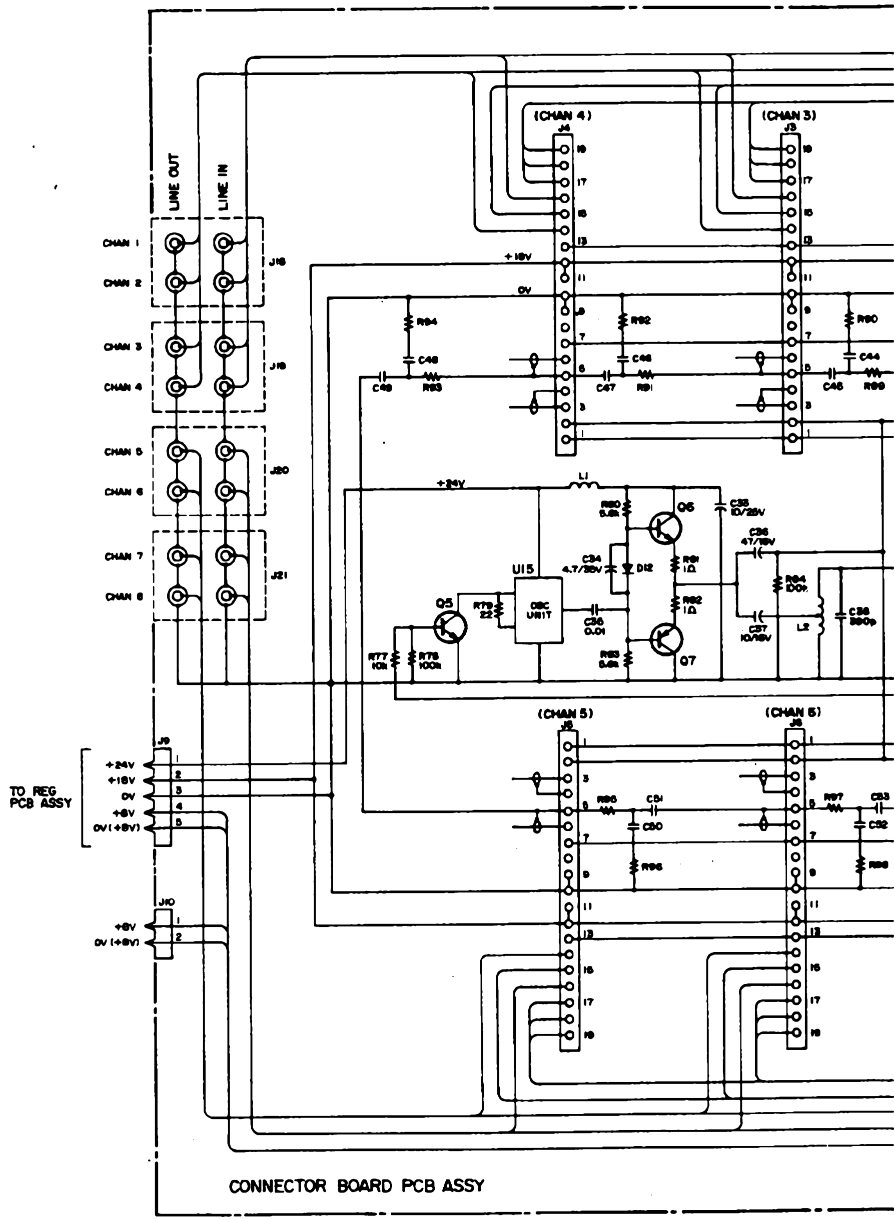


CHANNEL SELECTOR OF CONNECTOR BOARD A-8LR

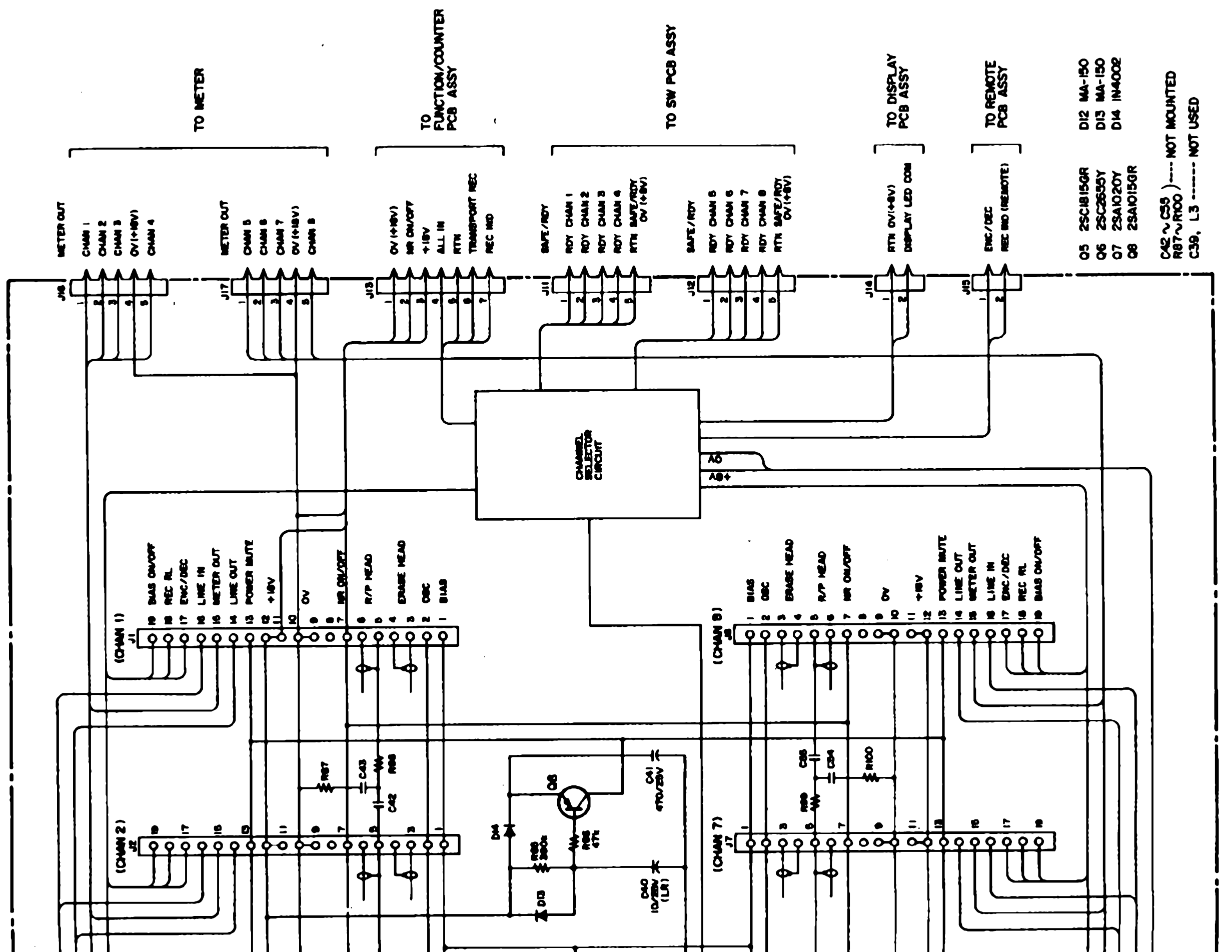


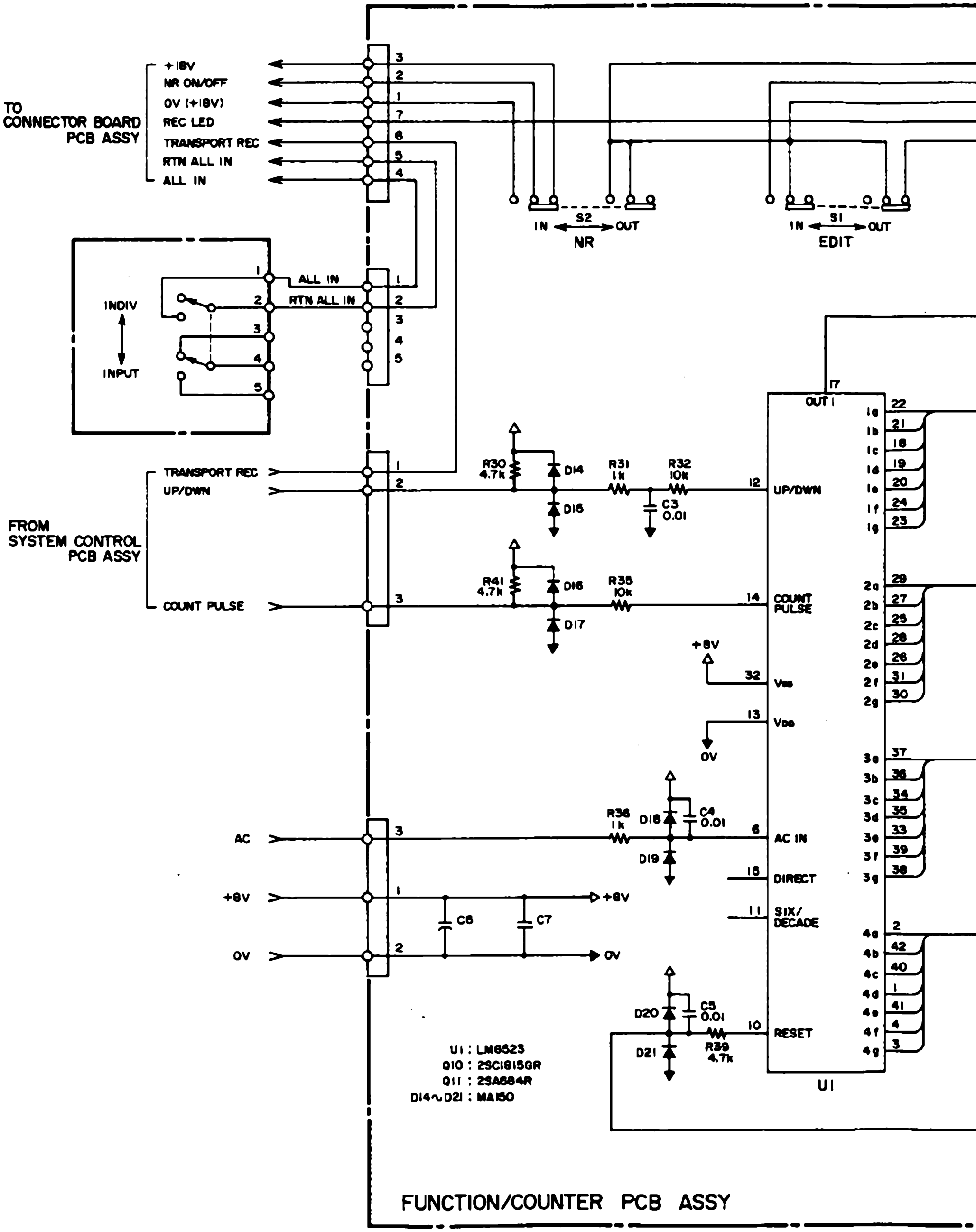
RECORD/REPRODUCE AMPLIFIER A-8LR



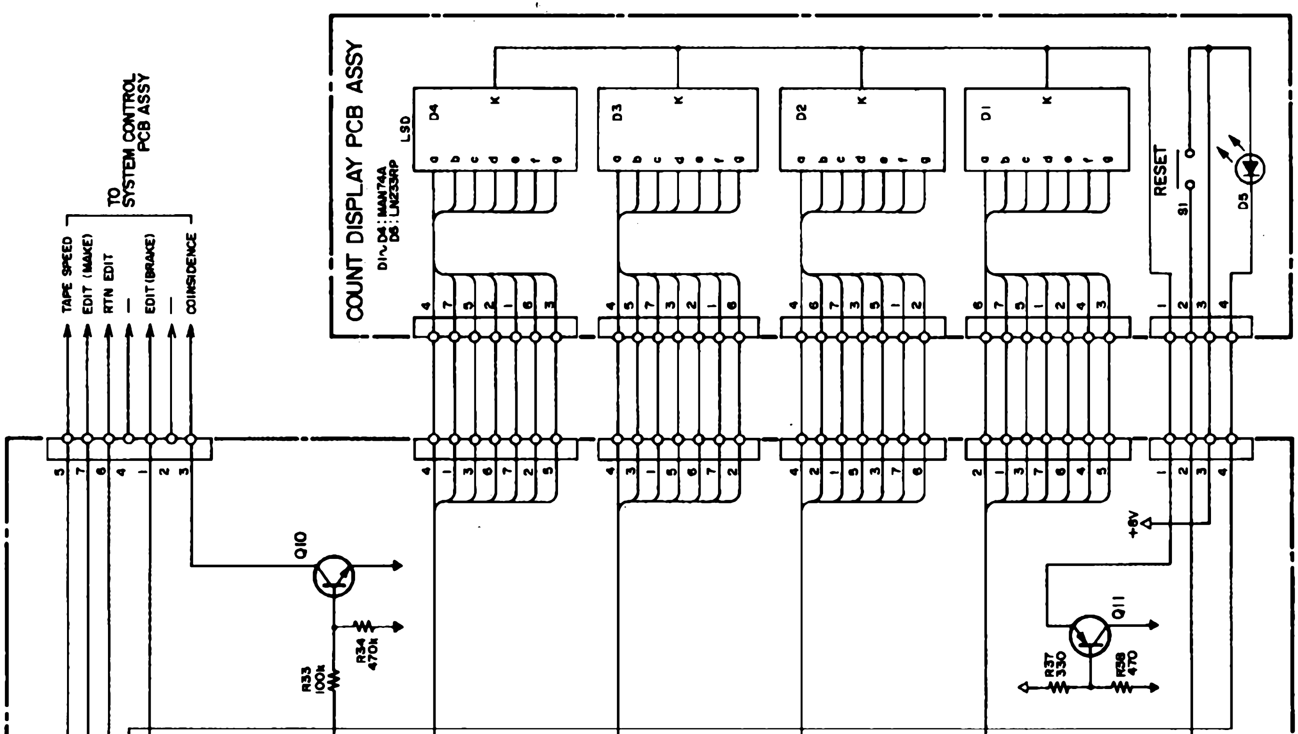

LINE OUT
LINE IN
CHAN 1
CHAN 2
CHAN 3
CHAN 4
CHAN 5
CHAN 6
CHAN 7
CHAN 8
J18
J19
J20
J21
(CHAN 4)
J4
(CHAN 3)
J3
(CHAN 5)
J5
(CHAN 6)
J6
+18V
0V
+24V
L1
L2
Q5
Q6
Q7
U15
OSC UNIT
D12
C34 4.7/35V
C35 10/25V
C36 47/16V
C37 10/16V
C38 390p
C36 0.01
R77 10k
R78 100k
R79 22
R80 5.6k
R81 1Ω
R82 1Ω
R83 5.6k
R84 100k
J9
+24V
+18V
0V
+8V
0V (+8V)
J10
+8V
0V (+8V)
TO REG PCB ASSY
CONNECTOR BOARD PCB ASSY

CONNECTOR BOARD A-8LR

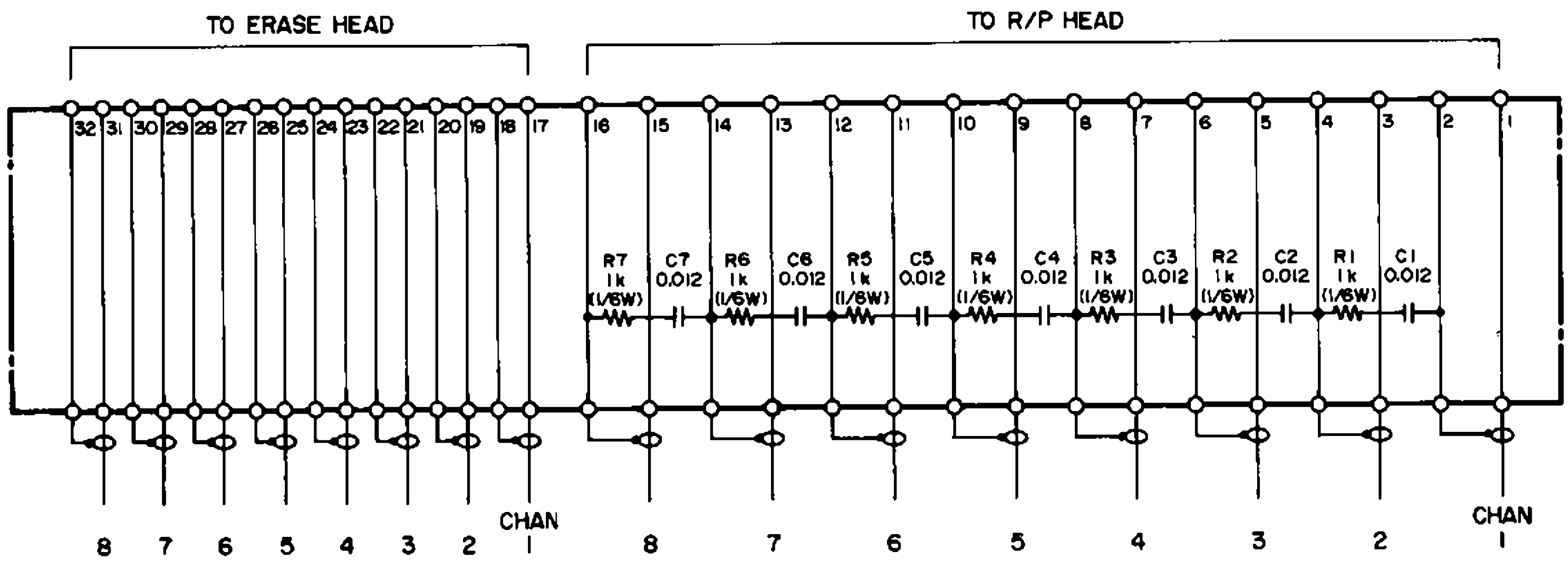



TO
CONNECTOR BOARD
PCB ASSY
+18V
NR ON/OFF
0V (+18V)
REC LED
TRANSPORT REC
RTN ALL IN
ALL IN
S2
NR
IN
OUT
S1
EDIT
INDIV
INPUT
ALL IN
RTN ALL IN
FROM
SYSTEM CONTROL
PCB ASSY
TRANSPORT REC
UP/DWN
COUNT PULSE
R30
4.7k
D14
D15
R31
1k
R32
10k
C3
0.01
R41
4.7k
D16
D17
R35
10k
+8V
0V
AC
R36
1k
D18
D19
C4
0.01
C6
C7
D20
D21
C5
0.01
R39
4.7k
OUT 1
UP/DWN
COUNT
PULSE
V_{SS}
V_{DD}
AC IN
DIRECT
SIX/
DECADE
RESET
U1
U1 : LM8523
Q10 : 2SC1815GR
Q11 : 2SA684R
D14～D21 : MA150
FUNCTION/COUNTER PCB ASSY

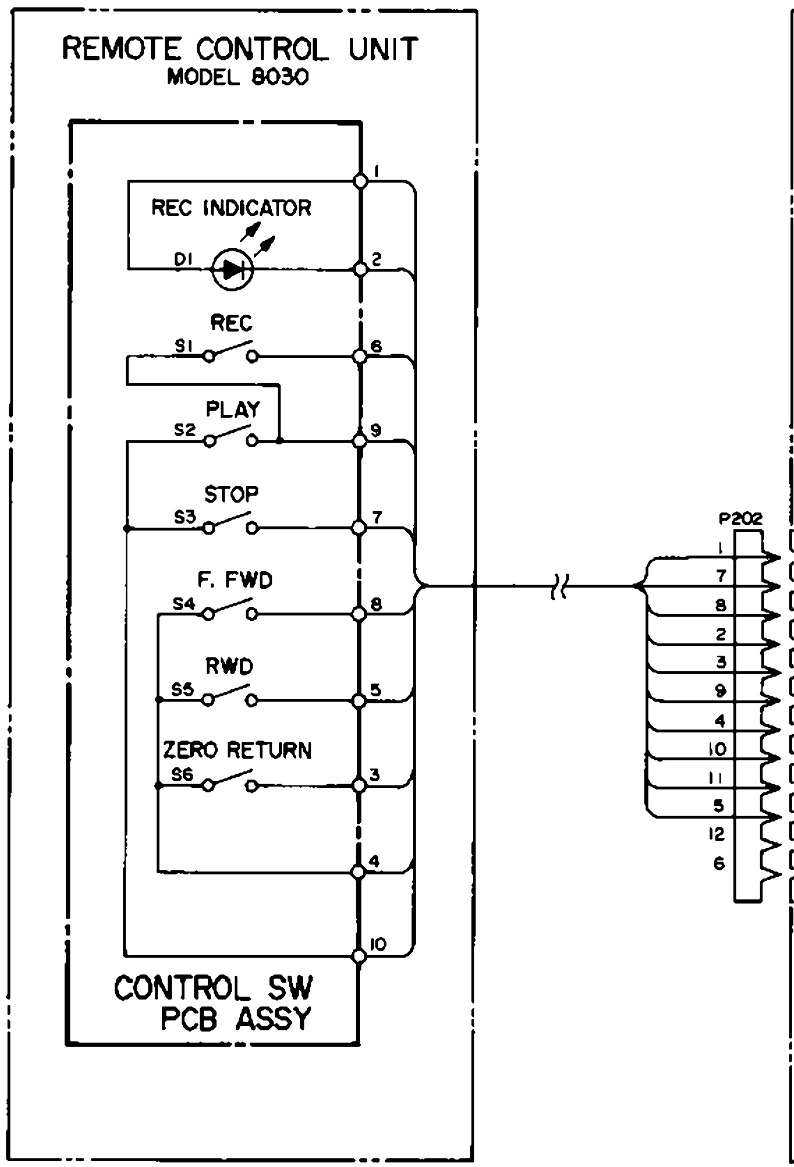
FUNCTION COUNTER DISPLAY A-8LR

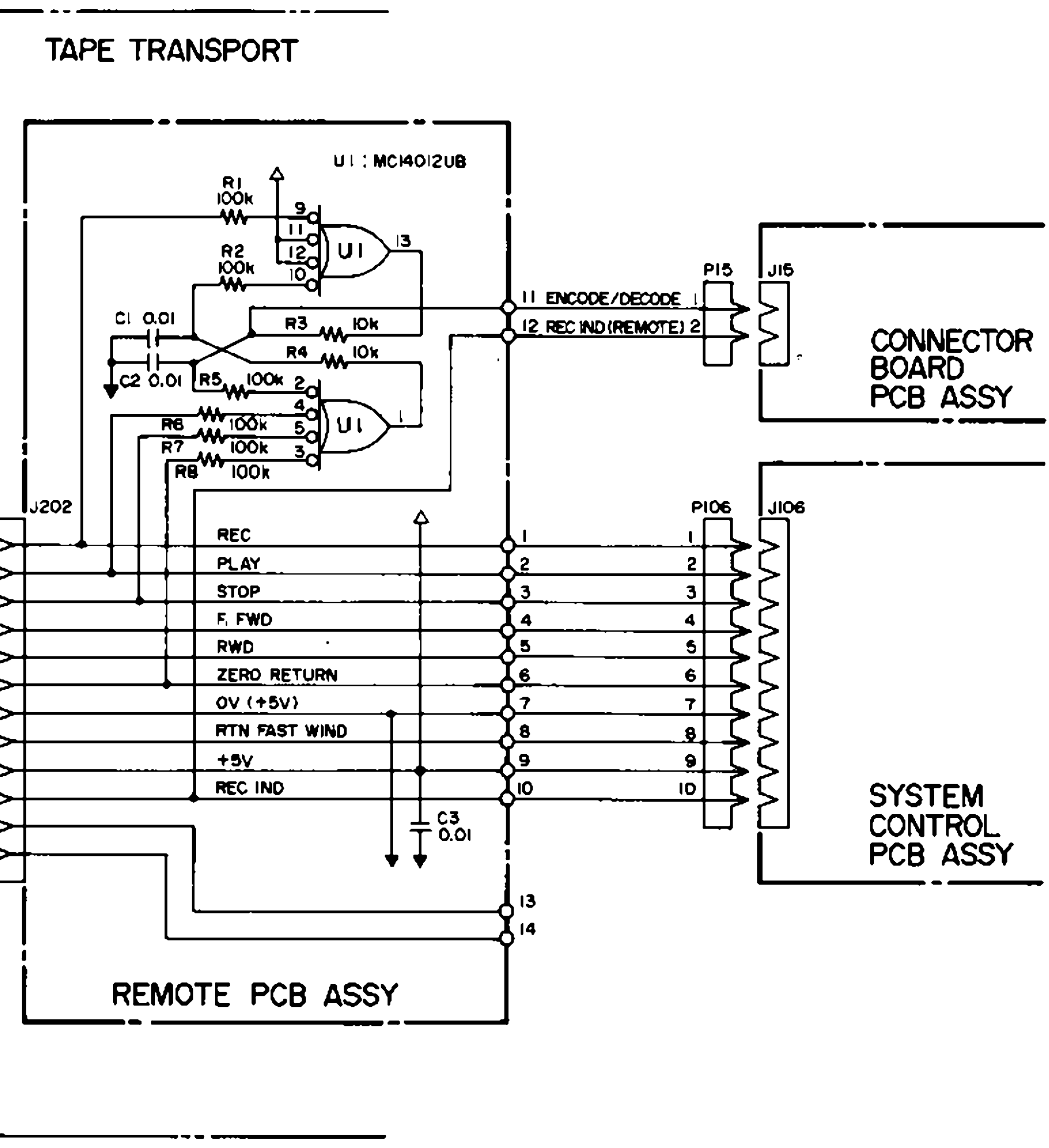


TERMINAL PCB A-8/A-8LR



REMOTE CONTROL A-8LR





TAPE TRANSPORT
U1 : MC14012UB
R1 100k
R2 100k
R3 10k
R4 10k
R5 100k
R6 100k
R7 100k
R8 100k
C1 0.01
C2 0.01
C3 0.01
U1
J202
11 ENCODE/DECODE 1
12 REC IND (REMOTE) 2
P15
J15
CONNECTOR BOARD PCB ASSY
P106
J106
REC
PLAY
STOP
F. FWD
RWD
ZERO RETURN
0V (+5V)
RTN FAST WIND
+5V
REC IND
SYSTEM CONTROL PCB ASSY
REMOTE PCB ASSY