

REALISTIC[®]

Service Manual

14-603

SCT-30
3 HEAD DUAL CAPSTAN
STEREO CASSETTE TAPE DECK
Catalog Number 14-603



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

FOR A COMPLETE DESCRIPTION OF THE OPERATION OF THIS DECK,
PLEASE REFER TO THE OWNER'S MANUAL.

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SPECIFICATIONS

GENERAL SPECIFICATIONS

| | |
|--------------------------------|---|
| POWER SUPPLY | AC 120V, 60 Hz (U.S.A., CANADA) AC 220—240V, 50 Hz (EUROPE) AC 240V, 50 Hz (U.K., AUSTRALIA) AC 100V, 50/60 Hz (JAPAN) |
| POWER CONSUMPTION | 17W |
| RECORDING SYSTEM | AC bias, 105 kHz |
| ERASING SYSTEM | AC erase, 105 kHz |
| INPUT IMPEDANCE | |
| MIC. | 500—5K ohms |
| AUX IN | 100K ohms |
| DIN | 1.5K ohms |

OUTPUT IMPEDANCE

| | |
|---------------------------|---|
| PREAMP OUT | 10K ohms |
| DIN | 20K ohms |
| HEADPHONE | 8 ohms |
| OUTPUT LEVEL | 0.55V (adjustable) (DIN : 0.25V High, 0.1V Low) |
| TAPE | Cassette tape |
| TAPE SPEED | 1-7/8 ips (4.75 cm/sec.) ±2% |
| DIMENSIONS | 5-11/16" (H) × 17-15/16" (W) × 10" (D) (14.4 × 45.6 × 25.4 cm) |
| WEIGHT | 16 lbs. 8 oz. (7.5 kg) |

PERFORMANCE SPECIFICATIONS

| FREQUENCY RESPONSE | Nominal | Limit |
|---|--|--|
| SUPERTAPE | 30—15,000 Hz | 40 Hz ⁺⁴ / ₋₆ dB—12 kHz ±5 dB |
| CrO₂ / FeCr | 30—16,000 Hz | 40 Hz ⁺⁴ / ₋₆ dB—14 kHz ⁺⁵ / ₋₆ dB |
| SIGNAL-TO-NOISE RATIO | | |
| SUPERTAPE | 55 dB (DOLBY NR IN) | 45 dB |
| | 51 dB (DOLBY NR OUT) | 40 dB |
| CrO₂ / FeCr | 57 dB (DOLBY NR IN) | 49 dB |
| | (CrO ₂ , CCIR weighted : 61 dB) | |
| | 53 dB (DOLBY NR OUT) | 45 dB |
| ERASE RATIO | 70 dB | 60 dB |
| CROSS TALK | 60 dB | 55 dB |
| WOW AND FLUTTER | 0.12% R.M.S. (0.06% W.R.M.S.) | 0.22% R.M.S. (0.08% W.R.M.S.) |
| DISTORTION at 0 VU | 0.9% | 3% |
| CHANNEL SEPARATION | 35 dB | 27 dB |
| FAST FORWARD OR REWIND TIME (C-60) | 100sec. | 125sec. |
| INPUT SENSITIVITY | | |
| MIC. | -68 dB m (0.3mV) | -68 dB m ⁺² / ₋₃ dB |
| AUX IN | -20 dB m (80mV) | -20 dB m ⁺² / ₋₃ dB |
| DIN | -68 dB m (0.3mV) | -68 dB m ⁺² / ₋₃ dB |
| OUTPUT LEVEL (1 kHz OVU) | 0.55V | 0.55V ±3 dB |
| HEADPHONE OUTPUT (TEST TAPE : | | |
| TEAC MTT-150) | 63mV | 63mV ±3 dB (8Ω LOAD) |
| TAKE-UP TORQUE (PLAY) | 50gr-cm | 35~70gr-cm |
| TAKE-UP TORQUE (FF & REW) | 90gr-cm | 75~120gr-cm |

NOTE : **Nominal** Specs represent the design specs ; all units should be able to approximate these. Some will exceed and some may drop slightly below these specs. **Limit** Specs represent the absolute worst condition which still might be considered acceptable ; in no case should a unit perform to less than within any Limit Spec.

BLOCK DIAGRAM

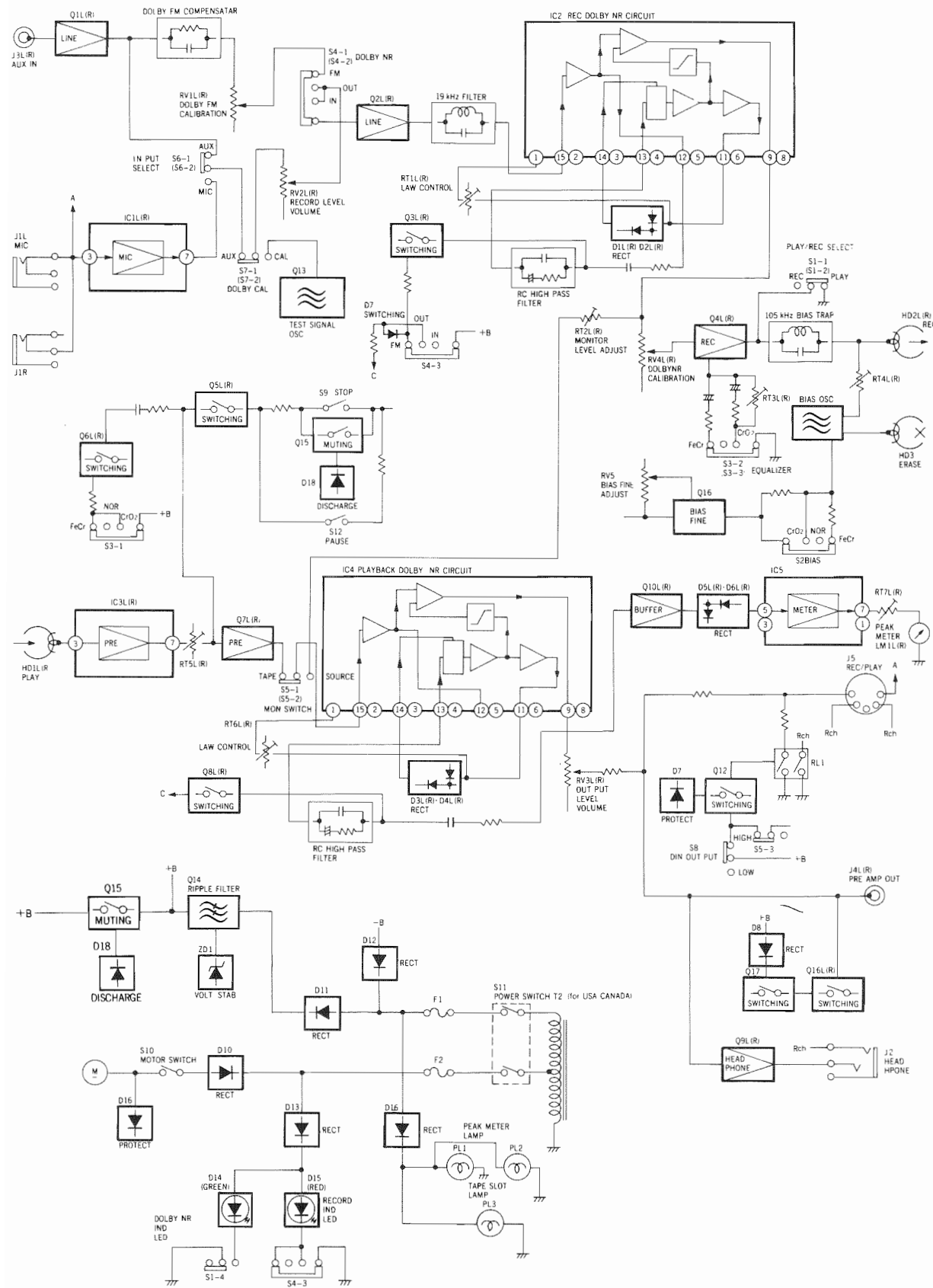


Figure 1

DOLBY NOISE REDUCTION SYSTEM

The REALISTIC SCT-30 incorporates a Dolby NR "B" system, which is designed to reduce noise and hiss by approximately 10 dB. In other words, to provide up to a 10 dB improvement in Signal-to-Noise ratio in the frequency spectrum responsible for noise. Before you attempt to service this unit, we suggest you read over the following introductory material, which is presented to aid you in understanding the principles of the Dolby NR system.

1. Principles of the Dolby NR System (Refer to Figure 2.)

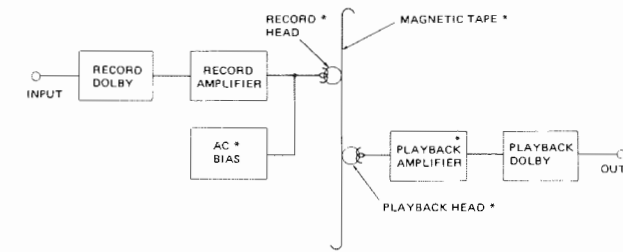


Figure 2

Figure 2 shows the block diagram of a tape recorder incorporating a Dolby NR circuit. "Hiss" noise (made up of predominantly high frequencies) is introduced into the system at the points noted with * (AC bias, record head, magnetic tape, playback head and playback amplifier).

This annoying noise can be reduced by passing the signal through a circuit with the characteristics shown in Figure 3 (a Dolby NR playback circuit). This illustration shows that high level and/or low frequencies (below approximately 1000 Hz) are not affected by the Dolby NR Playback circuit; however, low levels (where noise is most objectionable and noticeable) and high-frequencies (where noise components are) are suppressed by up to 10 dB at the lower levels and higher frequencies. Obviously, the result is an improvement in signal-to-noise ratio (and thus dynamic range also).

However, any original signal (music, etc.) also is modified by such a playback circuit—high frequency and low level signals are suppressed along with the noise components. Therefore, the original signal must be modified to the same extent in the opposite direction during the record function. That is, boost low levels and high frequencies by exactly the same amount as the playback circuit will suppress them. The end result is that the input signal will be boosted and suppressed (by equal amounts in the record and in the playback circuits) leaving the output signal an exact reproduction of the input signal, but the noise components (introduced into the circuit at the points noted with an*) are suppressed only. This produces up to a 10 dB improvement in Signal-to-Noise.

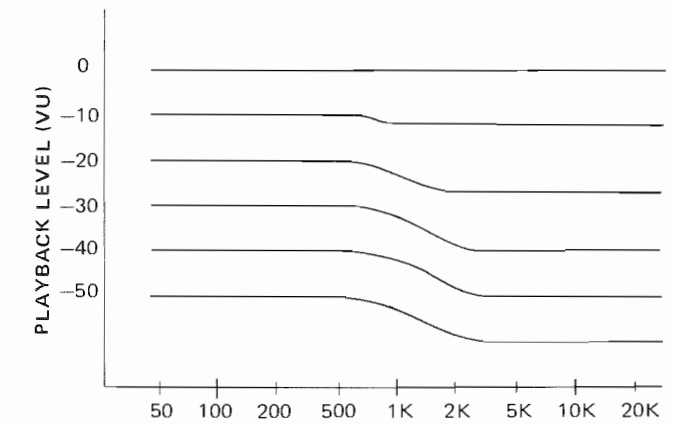


Figure 3

2. Record Circuit of SCT-30 (Refer to Figure 4.)

The record circuit consists of 7 sections : AUX IN amplifier, microphone amplifier, 19 kHz trap and high cut filter, record Dolby NR, record amplifier, phone monitor amplifier and bias oscillator.

2-1. AUX IN amplifier

This is an amplifier which amplifies input signals from AUX IN.

2-2. Microphone Amplifier

This is an amplifier with flat response over the entire audio spectrum, with a voltage gain of 30 dB.

2-3. 19 kHz Trap and High-cut Filter

This stage is incorporated to remove any 19 kHz pilot signal from an FM Multiplex broadcast and/or AC bias leakage. The presence of either of these signals would activate the Dolby NR circuit, thus upsetting the proper response characteristics of the Dolby NR function.

2-4. Figure 5 shows the frequency response characteristics of the circuit from AUX IN to C27.

[The noise level at C27 should be less than 5mV (including bias leakage, hum and noise) with all inputs disconnected. Such measurements are to be made for both positions of the Tape switch, with Record Level set at maximum.]

2-5. Recording Dolby NR Circuit

The output of Q2 is applied to terminals ② and ⑮ of IC2 via C27.

In IC2, this signal is amplified by 20 dB with flat amplification and is split into 2 signals. One signal is applied to the Adder and the other is input to terminals ④ and ⑬ via the RC high pass filter from terminals ⑤ / ⑫.

This input is also split into 2 signals, passing through the ATT amplifier.

One portion of the signal is applied to the Adder via the Limiter, thus boosting the output of the Adder.

The ATT is controlled by a DC voltage obtained from terminals ③ / ⑭.

A signal produced in Amplifier 1 is Amplified by Amplifier 2, and rectified by the rectifier/filter circuit (connecting C.R. to D1 & D2). Those circuits convert the signal to the DC voltage.

Also, this DC voltage is controlled by RT1; and ATT is controlled by the position of RT1. The boost amount and the Dolby operation point in the Adder are determined by this control.

In the Adder, the signal which passes through the Flat Amplifier, and the signal which passes through Amplifier 1 and the Limiter, are added (because the positions of 2 signals are same), and are supplied to terminals ⑧ / ⑨.

When the Dolby NR switch is in FM or OUT, a voltage is applied to the base of Q3 via S4-3, turning Q3 ON and the signal from terminals ⑤ / ⑫ of IC2 goes to ground via the collector of Q3 from the RC high pass filter and thus is not applied to the Adder. Therefore, the only input to the Adder is the signal which passes through the Flat Amplifier (not boosted). Hence, it is not Dolby encoded.

Refer to Figure 6 for the response characteristics of the Record Dolby NR circuit. The shaded area represents the amount of "boost" added when the Dolby NR switch is "IN". No "boost" is added when the Dolby NR switch is "out".

2-6. Record Amplifier

This amplifier consists of Q4 with associated components to compensate for record current requirements, boosting both high and low ends of the frequency range (commonly termed equalization).

High boost is obtained by the resonance of L3, C46, C51 and C50; low boost is obtained with R42 and C42. A section of the Tape switch is used to change components which alter the resonant frequency of the circuit and the gain of the amplifier—this provides optimum response for either Standard or Special tapes.

2-7. Bias Oscillator

A predetermined, fixed amount of bias current is applied to the Erase Head. But the Record Head receives higher or lower bias current depending on the position of the Tape switch (more for Special).

2-8. Phone Amplifier

The output of this amplifier is 0.5mW into 8Ω impedance when a test tape is played back.

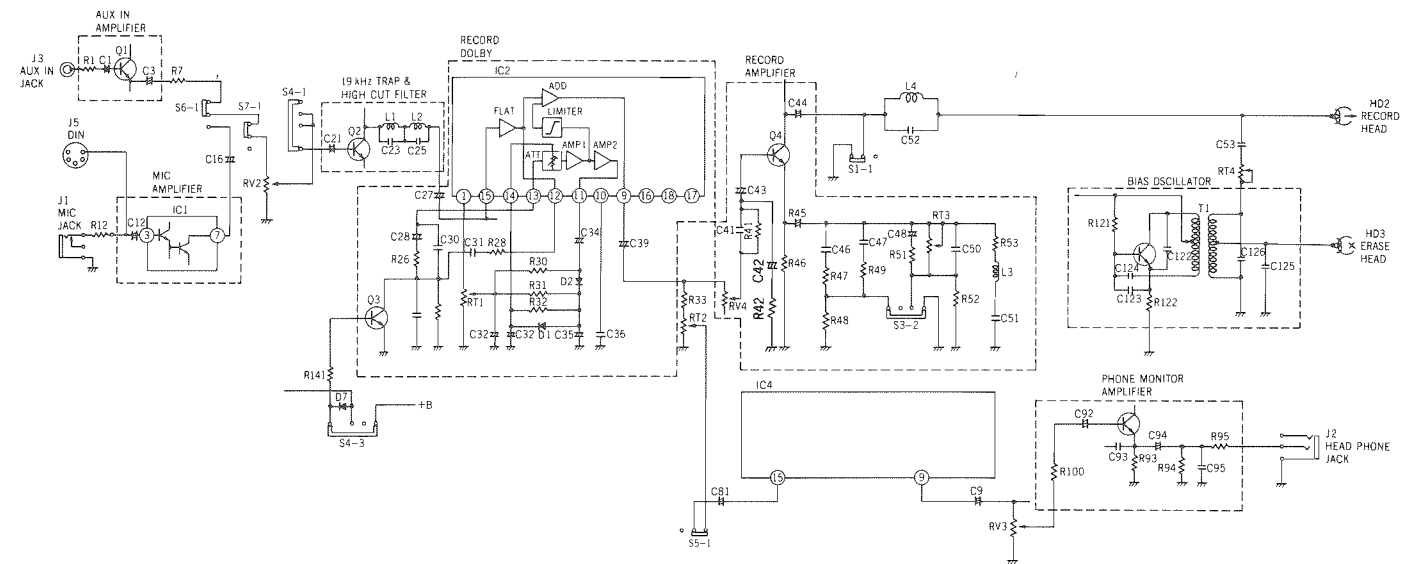


Figure 4

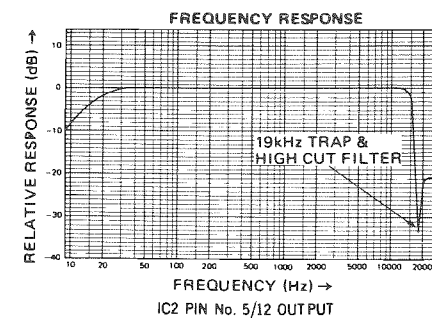


Figure 5

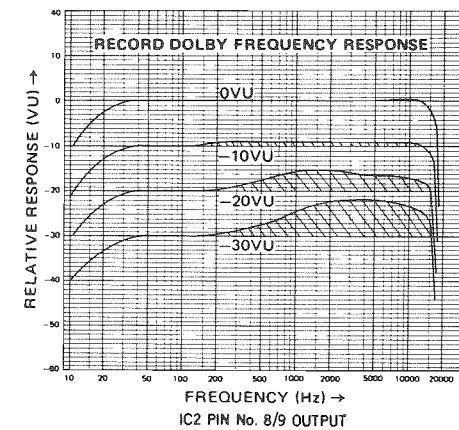


Figure 6

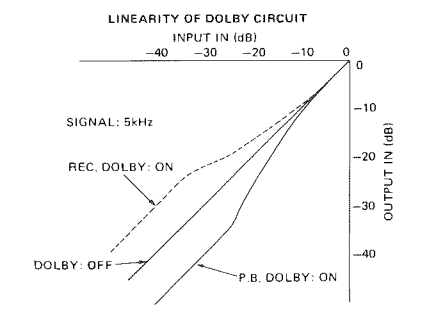


Figure 7

3. Playback Circuit of SCT-30 (Refer to Figure 8)

The playback circuit consists of 4 sections : playback equalization, 19 kHz trap & high cut filter, playback Dolby NR and phone amplifier.

3-1. Playback Equalization Circuit

This is the standard equalization circuit for cassette tapes, with 3180μ sec., 120μ sec. and 70μ sec. time-constants. The voltage gain at 400 Hz should be 53 dB.

3-2. 19 kHz Trap and High-cut Filter

This circuit operates exactly the same as that in the Record circuit, explained in 2-3.

3-3. Playback Dolby NR Circuit

The Playback Dolby NR circuit is the same as the Record Dolby NR circuit, except for the connection of the RC high pass filter.

During Playback, the signal (which is amplified in the flat amplifier) is output to terminals ⑧ / ⑨ via the adder without being divided, and is applied to terminals ④ / ⑬ via the RC high pass filter.

The Adder is provided with a function to

reverse the phase of the signal as it passes through this circuit. Therefore, the phase of the signal, which passes through the RC high pass filter (namely, the adder output) is shifted by 180°.

The phase of the signal which is applied to the Adder via the ATT, Amplifier 1 and Limiter, and the phase of the signal which passes through the Flat Amplifier, are reversed, so boosting is performed in the Adder during Record. but attenuation occurs during Playback. Thus, the output is boosted in the Record Dolby NR circuit and reduced in the Playback Dolby NR circuit.

In general, the level of the final output is not changed, but noise is decreased by the amount decreased during Playback.

3-4. Phone Amplifier

The output of this amplifier is 0.5mW into 8Ω impedance when a test tape is played back.

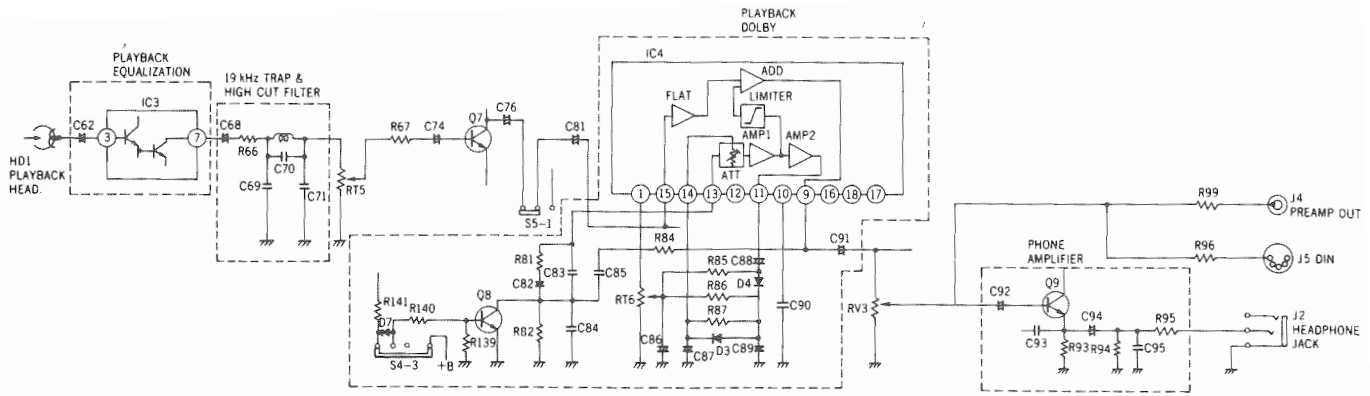


Figure 8

DOLBY FM

In conventional FM broadcasting, a signal having the characteristics shown in Figure 9 is transmitted to reduce noise during broadcasting.

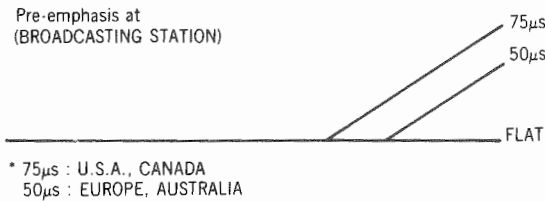


Figure 9

Such signals have characteristics of high-frequency emphasis due to the action of the respective time constants. When processed through a Receiver/Tuner with the correct de-emphasis time-constant (Figure 10), the resulting signal is essentially flat in frequency response (within the limitations of the FM broadcasting system).

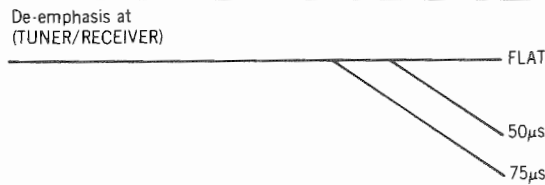


Figure 10

Since such a simple "noise reduction" system can be saturated easily, etc., the introduction of a DOLBY NOISE REDUCTION SYSTEM was considered for the FM Broadcast service: this is DOLBY FM.

DOLBY FM does not emphasize at 75µs or 50µs but emphasizes at only 25µs, and broadcast transmissions are with the DOLBY ENCODE superimposed.



Figure 11

A signal, which is transmitted with 25µs pre-emphasis must be received through a 25µs de-emphasized Tuner/Receiver. However, if the Tuner/Receiver still uses 75µs (50µs) de-emphasis, when a 25µs pre-emphasized broadcast is received, the resulting de-emphasis characteristic will be as shown in Figure 12.

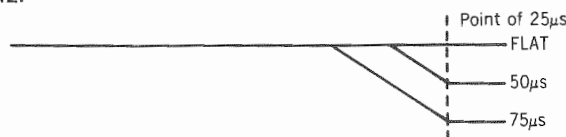


Figure 12

To make the de-emphasis characteristic flat, the signal must be passed through a circuit providing the characteristics shown in Figure 13.

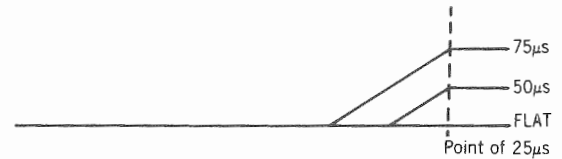
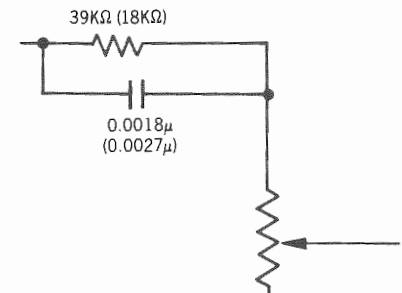


Figure 13

The SCT-30 incorporates the required de-emphasis characteristic as shown in Figure 13. This time-constant conversion circuit converts 75µs → 25µs (50µs → 25µs).



39kΩ, 0.0018µ : U.S.A., CANADA
18kΩ, 0.0027µ : EUROPE, AUSTRALIA
(TIME CONSTANT CONVERSION CIRCUIT)

With DOLBY NR, the audio level at the received end must match precisely with that at the transmission end. Even if these levels are matched initially, when Deck adjustments are changed, these levels would have to be re-matched.

A CALIBRATION CONTROL is provided on the SCT-30 to obtain this necessary re-adjustment.

Both 75µs (50µs) and 25µs de-emphasis are provided for in recent Tuners/Receivers; and use of 25µs is recommended for DOLBY FM.

A flat output is obtained when using a Tuner/Receiver with provision for 25µs de-emphasis; but when output from such a Tuner/Receiver is passed through the SCT-30, the frequency characteristic becomes as shown in Figure 12 by means of the time-constant conversion circuit previously described.

Thus, even with a Tuner/Receiver which incorporates the 25µs de-emphasis, **75µs (50µs) de-emphasis must be employed when using the SCT-30.**

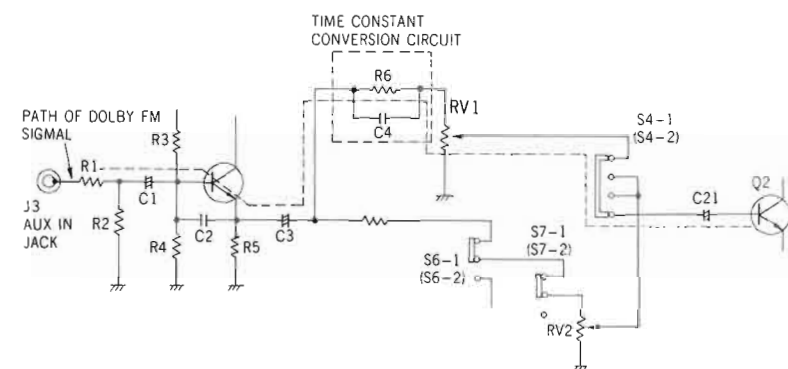


Figure 14

1. Calibration

When the Dolby NR switch S4 (S4-1—S4-3) is set to FM and MON switch S5 (S5-1—S5-3) is set to SOURCE, while the unit is in the Stop mode, the Dolby FM signal from AUX IN (J3), enters the amplifier via the time-constant conversion circuit and RV1L•R, S4-1•2.

Tune to the calibration signal from a Dolby FM broadcast station and adjust RV1L•R so that the pointer of the Level Meter is on the Dolby mark.

2. Dolby FM listen

Set the Dolby NR switch to FM and the MON switch to SOURCE in the STOP mode. Then, only the Dolby NR Playback circuit operates and the Dolby encoded signal (which is transmitted from the broad-

casting station) will be correctly decoded, and is output to the PRE AMP OUT as flat signals and the correct sound can be heard.

3. Dolby FM recording

In Dolby FM, the Dolby encoded signal at the broadcasting station is preemphasized for 25μs and then it is transmitted. Therefore, the recording is the same as for recording ordinary sound with the Dolby NR circuit operating while matching it to the customer's own tuner [converting 25μ to 75μ or 25μ to 50μ (For Europe)].

Prepare recordings with the Dolby NR switch set to FM and S1 to RECORD. Signals are output at the Pre Amp Out, and Dolby FM can be monitored while the recording is proceeding.

AUTO STOP MECHANISM

Auto-stop mechanism

1) Figure 15 shows the tape-end detector for the auto-stop mechanism.

In the recording, playback, fast forward and rewind modes, the Take-up belt, Pulley, Gears and Cam Gears rotate in the directions indicated by the arrows; and when the tape is not completely taken up, the Take-up reel rotates in the direction so that it will take-up the tape.

The Floating cam is provided on the same axis as the Take-up reel shaft, and it lightly touches the reel (by action of a spring). Utilizing the fact that when the Reel rotates, the floating cam faces in the direction of rotation, the floating movement of the Cam Gear and the Floating arm (which has its fulcrum at A) as shown in Figure 15) this movement is applied to this floating cam, to detect the end of the tape.

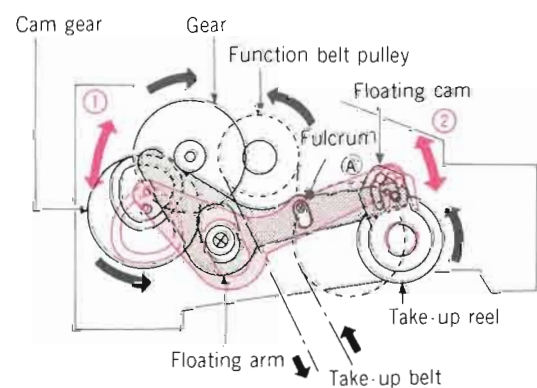


Figure 15

Method of detecting the tape-end

Shafts, which enter into the Cam of the Cam Gear and the shaft which in turn enters into the slide groove of the Floating cam, are provided at both ends of the Floating cam; the floating movement is carried out in the direction of arrow ① with its fulcrum at A as shown in Figure 15, by means of the rotation of the Cam Gear.

The shaft of the Floating Arm, which enters into the groove on the Floating Cam, operates to slide and relieve the floating movement which is caused by the Cam Gear by means of this groove. When the Cam of the Cam Gear rotates to the position shown in color in Figure 15, the shaft of the Floating Arm on the Floating Cam side goes into the mode shown in A of Figure 16.

Next, when the Cam Gear rotates to the position shown in black, the position of the shaft on the floating cam side goes into the mode shown in B of Figure 16, during playback or fast forward, and C during rewind. These slide grooves are determined by the direction of rotation of the reel.

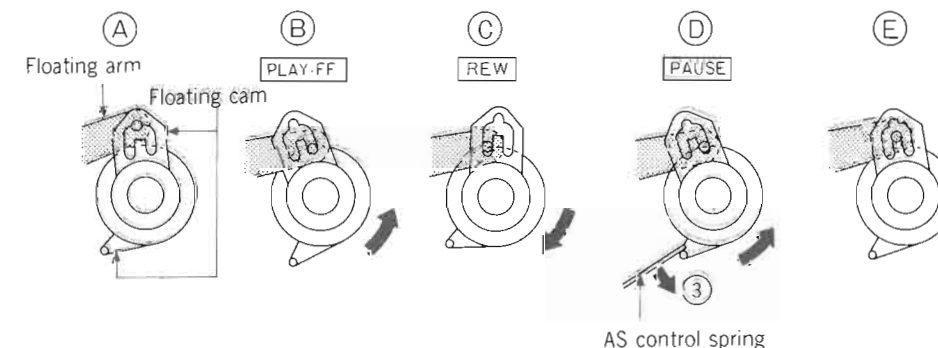


Figure 16

2) When the tape-end is detected and the Floating Arm slides, the AS Arm (as shown in Figure 17) slides in the direction of arrow ⑤ with its fulcrum at B.

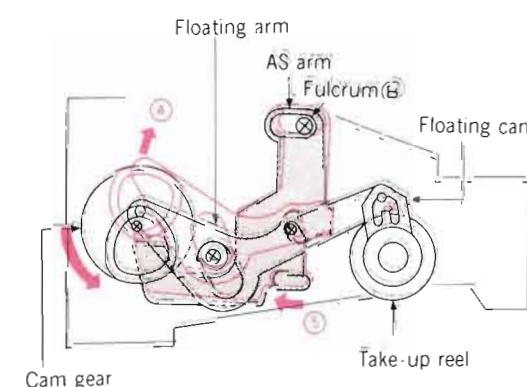


Figure 17

Incidentally, during Pause, since the reel is stopped, the auto-stop mechanism starts to operate. To prevent this, the Floating Cam is pressed in the direction of arrow ③ (take-up direction) by the auto-stop control spring as shown in D of Figure 16, during Pause and Stop. (The AS (auto-stop) control spring is operated by the sliding of the Brake Plate; it is so designed that the AS control spring is released from one end of the Floating Cam and the Floating Cam faces in the direction of rotation of the reel, except during the Pause and Stop modes.) When the tape is finished and the reel stops, the Floating Cam side shaft of the Floating Arm slides between A and E in Figure 16. The width in which it slides is smaller than that between A and B or A and C. When the Floating Arm slides up to point E in Figure 16, the Floating Arm slides in the direction of arrow ④ in Figure 17 with the Floating Cam as the fulcrum. The tape-end is detected by means of this sliding of the Floating Arm.

- 3) When the AS Arm slides into the position shown in black in Figure 18, it engages with the AS cam under the Cam Gear and slides in the direction of arrow ⑥ .
- 4) When the AS Arm slides into the position shown in color, the AS Lever rotates in the direction of arrow ⑦ and makes the Lock Plate move in the direction of arrow ⑧ . This sliding of the Lock Plate causes the same conditions as when the Stop button is depressed, and each slider goes into the stop mode.

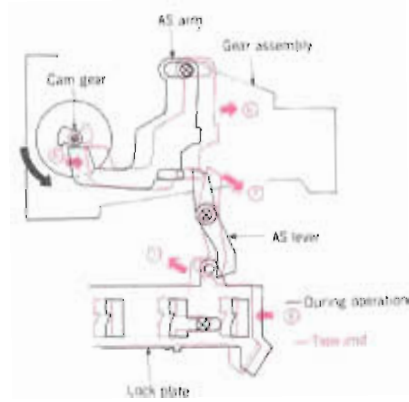


Figure 18

DISASSEMBLY

1. Removal of Case Top

- 1) Remove seven screws holding Case Top as shown in Figure 19.
- 2) Lift Case Top off.



Figure 19

2. Removal of Bottom Cover

- 1) Remove six screws holding Bottom Cover as shown in Figure 20.
- 2) Remove Bottom Cover.

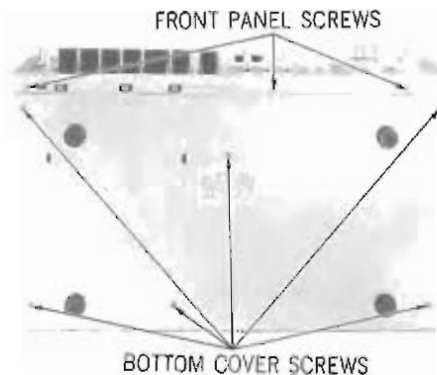
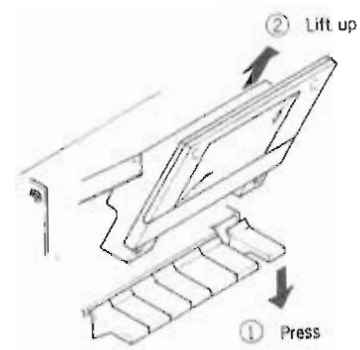


Figure 20

3. Removal of Front Panel

- 1) Remove seven knobs (Record/Output Level Control, DOLBY NR Calibration, BIAS, EQ, DOLBY NR).
- 2) Remove Cassette Lid.
 - ① Press the EJECT button and the cassette lid will open.
 - ② Lift up the cassette lid in the direction of arrow.



- 3) Remove seven screws holding Front Panel as shown in Figure 20 and 21.
- 4) Remove Front Panel.

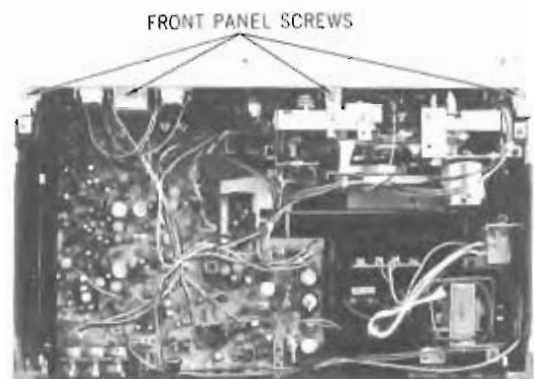


Figure 21

4. Removal of Main Circuit Board

Checking or replacement of the components can be done by removing the Bottom Cover. (Refer to Item 2, Bottom Cover).

When removing the printed circuit board, however, use the following procedure.

- 1) Remove BIAS FINE Knob.
- 2) Remove one screw holding Record Lever as shown in Figure 22.
- 3) Remove four screws holding Main Circuit Board as shown in Figure 22.
- 4) Unsolder the point shown in Figure 22.
- 5) Remove Main Circuit Board.

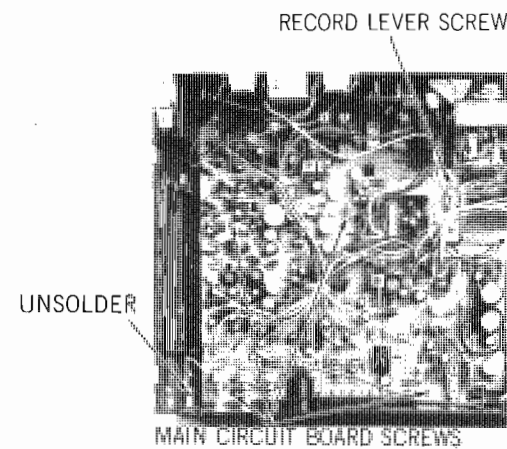


Figure 22

5. Removal of Chassis

Since the cassette deck chassis and the Main Circuit Board are interconnected with pin-connectors, remove the deck chassis after disconnecting these leads.

- 1) Remove two screws holding DOLBY CALIBRATE Circuit Board bracket.
- 2) Remove four screws holding Chassis as shown in Figure 23.
- 3) Remove Chassis.

DOLBY CALIBRATE CIRCUIT BOARD
BRACKET SCREWS

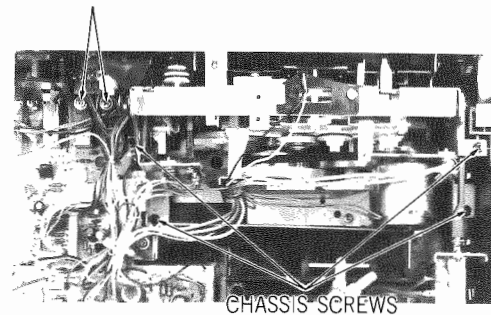


Figure 23

6. Removal of Cassette Holder

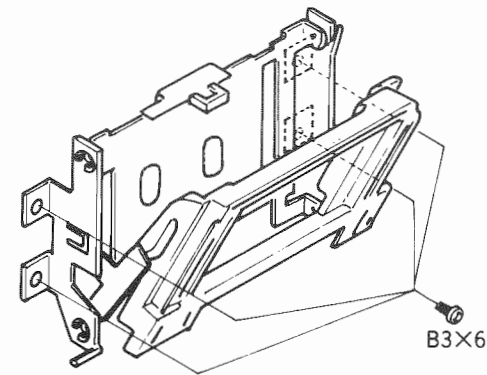


Figure 24

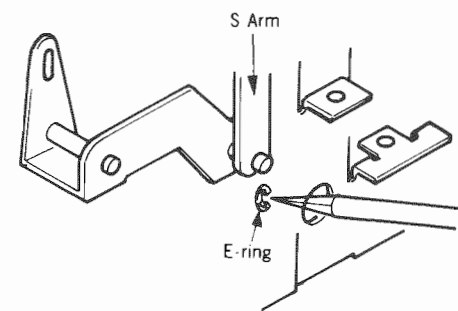


Figure 25

Installation of the Cassette Holder Assembly

Before installing the Cassette Holder Assembly, first check that the Eject slider, Eject arm and the Counter belt are as shown in the Figure 26.

Note: If the Eject slider and Eject arm are not as shown in the figure, the Eject operation may not be smooth or the tape may touch the recording prevention arm, making the cassette holder not fit properly.

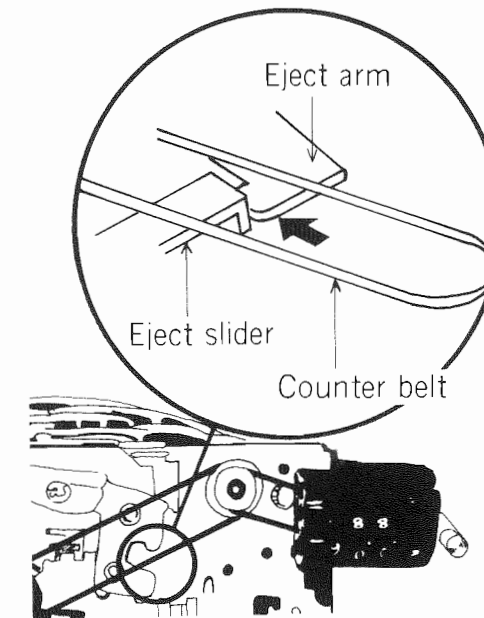


Figure 26

7. Flywheel & take-up belts

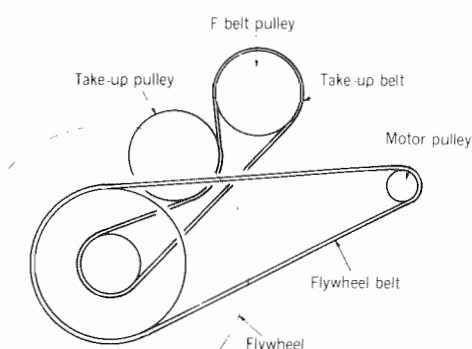


Figure 27

8. Removal of Gear Assembly

The Gear Assembly is composed of the gears, cams, clutches and reel, of the full auto-stop mechanism, Fast Forward/Rewind mechanism and take-up mechanism. It can be removed by removing the screws shown in Figure 28.

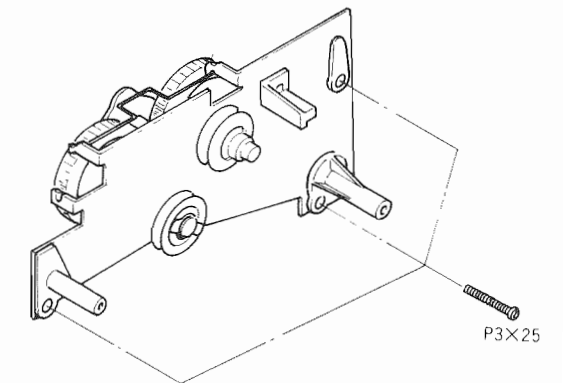


Figure 28

Installation of the Gear Assembly

Install the Gear Assembly after setting the chassis mechanism to the Fast Forward mode. Also, make sure the Gear Assembly is in the Fast Forward mode.

- ① Turn the F arm (shown in Figure 29) in the direction of the arrow ① until it touches the point shown by arrow ⑥ on the Take-up arm. The Reel, the Function gears and Function arm go into the mode shown in Figure 30.

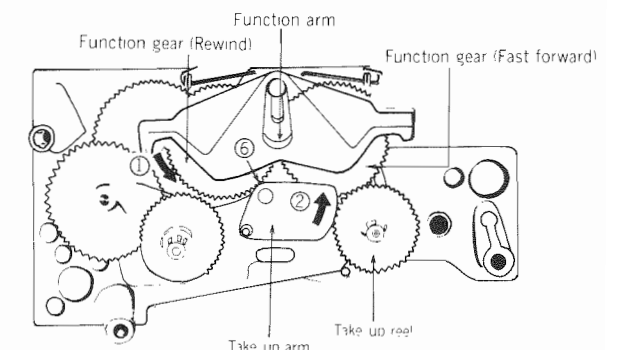


Figure 29

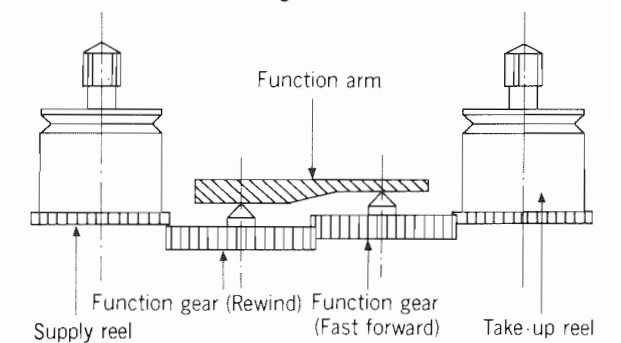


Figure 30

- ② Turn the Take-up Arm (shown in Figure 29) in the direction of the arrow ② until the Take-up Gear and Reel underneath separate from each other as shown in the Figure 31.

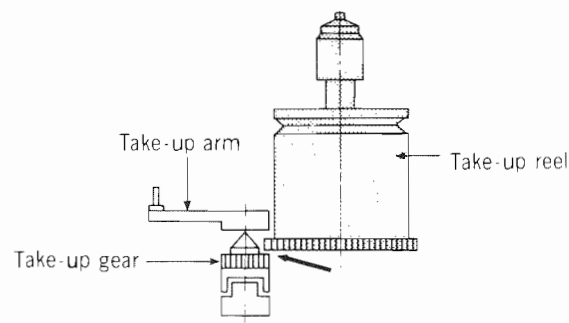


Figure 31

- ③ Lift out the Take-up Arm operating shaft (shown in Figure 31) from the hole on the Playback Plate as shown in Figure 32, and secure the Gear Assembly with screws.

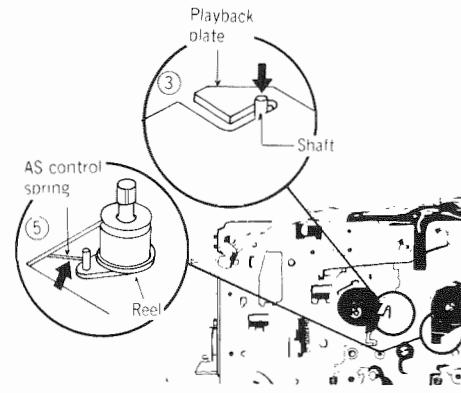


Figure 32

- ④ Place the Counter Belt onto the Reel (take-up side).
 ⑤ Press the STOP button to get it into the Stop mode, and check that the Auto-Stop control spring (shown in Figure 32) presses the Floating Cam under the Reel in the direction of the take-up side as shown in the Figure 32.

LUBRICATION

Before lubrication, thoroughly clean shafts and metallic parts of all rotating parts. During lubrication, be careful not to accidentally oil the tape contacting face of the Capstan, Belts and Idler. Thoroughly remove oil and grease from the Pressure Roller and Capstan by using trichlene

solution. One or two drops of machine oil may be applied to the points indicated by **P** (rotating parts) and grease may be applied to the points indicated by **W** (sliding surfaces) as shown in Figures 33, 34, 35, 36, 37 and 38.

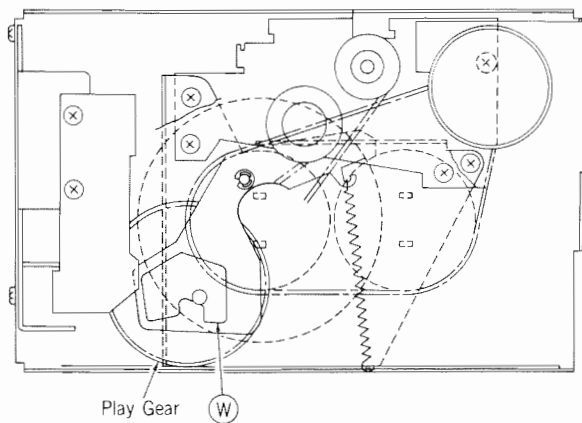


Figure 33

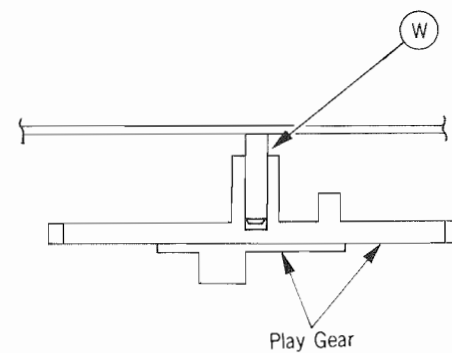


Figure 34

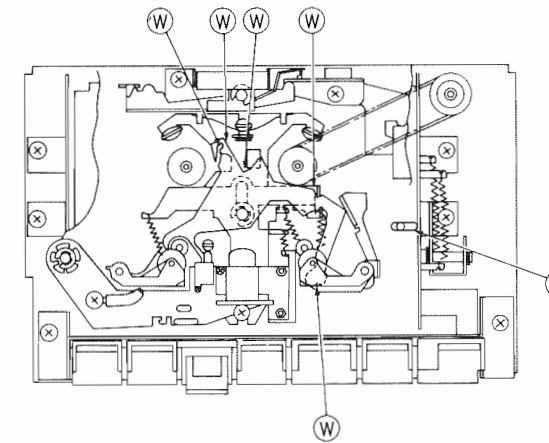


Figure 35

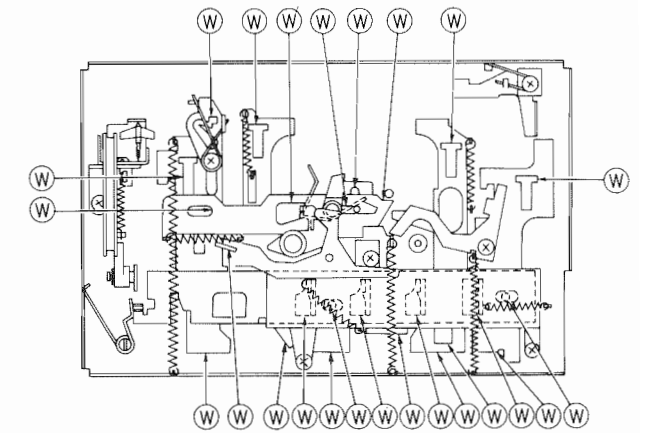


Figure 36

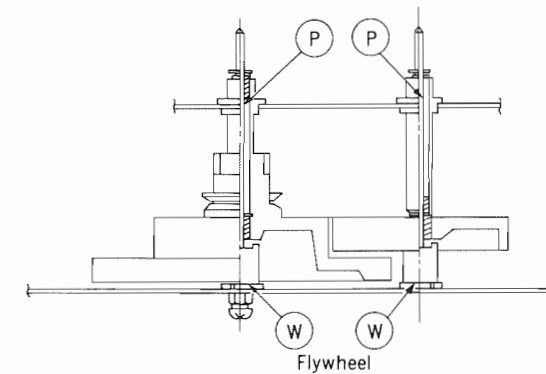


Figure 37

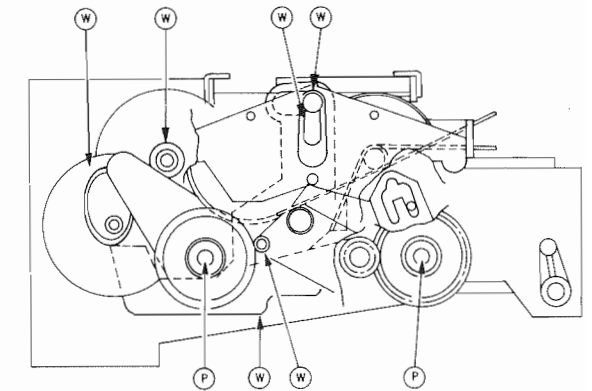


Figure 38

ADJUSTMENT OF ELECTRICAL PARTS

Set the Switches and Controls to the following positions (Unless otherwise specified).

| | |
|---------------------|---------------|
| RECORD LEVEL | : MAX |
| OUTPUT LEVEL | : MAX |
| INPUT select switch | : AUX. |
| MON switch | : TAPE |
| DOLBY NR switch | : OFF |
| TAPE select switch | |
| EQ switch | : Norm |
| BIAS switch | : 120 μ S |
| DIN OUTPUT switch | : LOW |
| BIAS FINE | : 0 (center) |

Clean the Head and Pinch-Roller before making any adjustments.

1. Tape Speed Adjustment

Play back a tape speed test tape (TEAC MTT-111, etc. 3 kHz) and within 30 sec after doing this test, run for more than 20 minutes, adjusting the semifixed VR in the Motor so that frequency at the PRE AMP OUT (J4) terminal is 3000 Hz ± 10 Hz.

Note ; The tape is at the center.

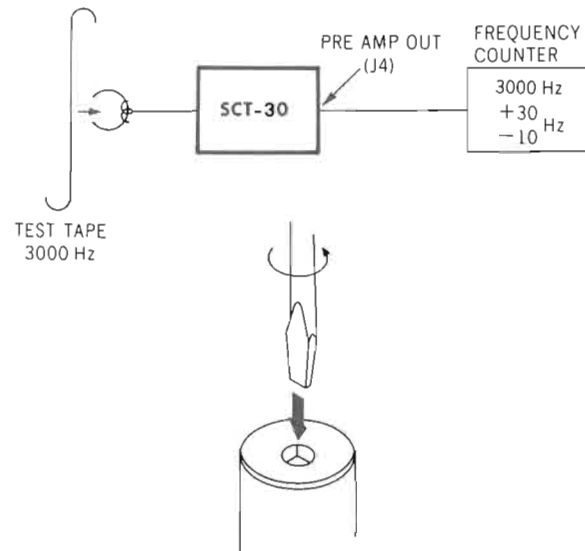
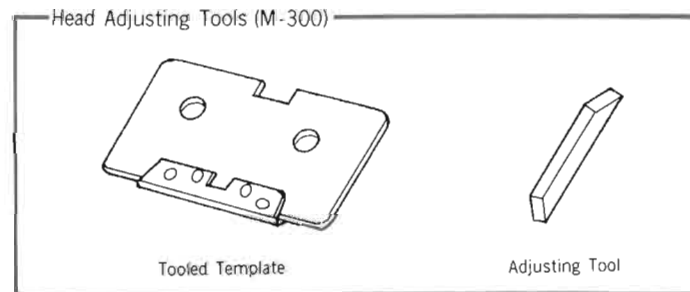


Figure 39

2. R & P Head Height Adjustment

Preparation

a. When adjust the height and tilt of the R & P head, use head adjusting tools (Information Terminals' M-300) as below.



b. Fix a metal or plastic sheet of which thickness is less than 0.2mm on the Tooled Template as shown in Figures A and B.

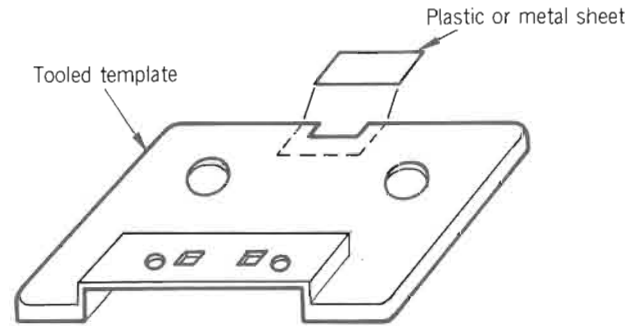


Figure A

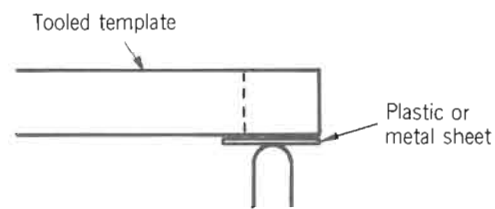


Figure B

c. All adjustments should be done in PLAY-BACK mode. Move the Adjusting Tool carefully so that the front of the head is not damaged.

1) Height adjustment

Insert the Tooled Template, place the Adjusting Tool and adjust the Adjusting Nut (b) so that the Adjusting Tool enters into the tape guide of the R & P head smoothly.

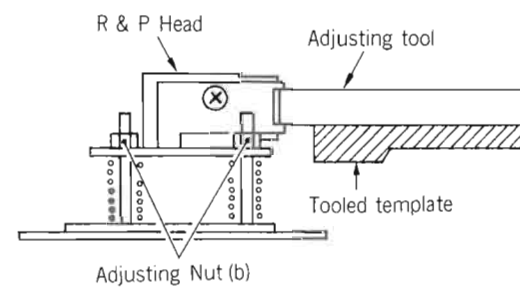


Figure 40

2) Tilt adjustment

Insert the Tooled Template and apply the Adjusting Tool to the front of the R & P head while placing the Adjusting Tool vertically, and perform adjustment using the Adjusting Nut (c) so that the lower part of the head closes tightly and the upper part closes with a gap of 0.2-0.3mm.

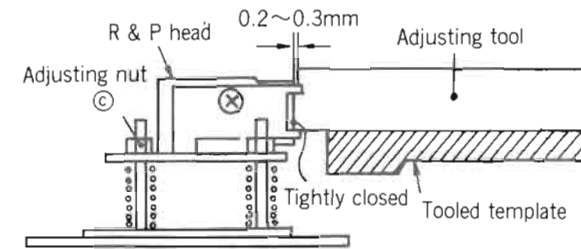


Figure 41

3) Azimuth adjustment

Playback the azimuth adjustment tape (TEAC MTT-116K or MTT-114, etc. 10 kHz) and adjust the screw so that the output is at a maximum.

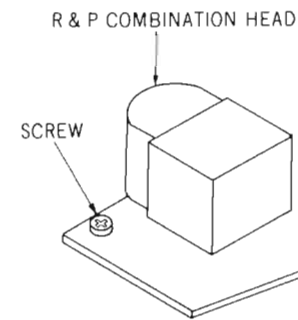
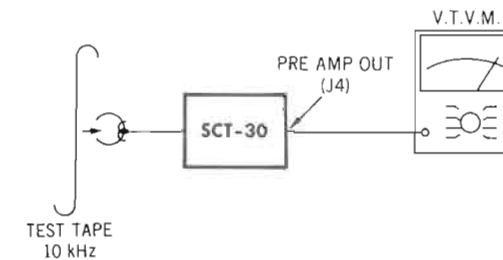


Figure 42

4) After completing adjustment of the above, check tape running using both A and B sides of C-120 cassette tape. When the tape is curled, adjust it again using adjusting screw and nut respectively.

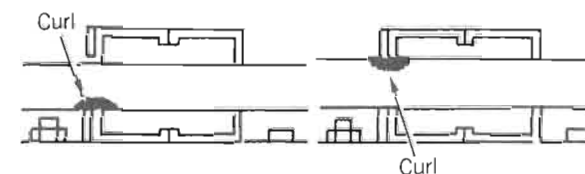


Figure 43

Note : Perform adjustment of the height within ± 0.3 mm (3/4 rotation of adjusting screw).

3. SOURCE Monitor Level Adjustment

Apply a 400 Hz signal to the AUX IN (J3) jacks from an Audio Oscillator and adjust the output of the Audio Oscillator L/R so that 0.775V is output at TP1 of IC2. Then set MON switch (S5) to SOURCE and adjust RT2 L/R so that 0.775V is output at TP3 of IC4.

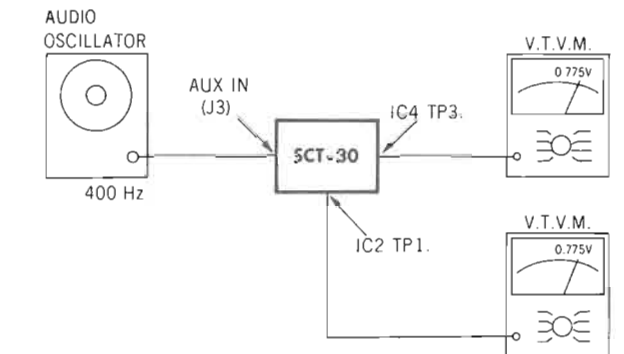


Figure 44

4. Playback Output Adjustment (Adjustment of meter)

After the SOURCE Monitor Level is adjusted, adjust RT7 L/R using the same connections so that the pointer of the L/R Meter is on the \square mark. Next, set MON switch to TAPE and playback a TEAC MTT-150 Test Tape and adjust RT5 L/R so that the pointer of the L/R Meter is on the \square mark.

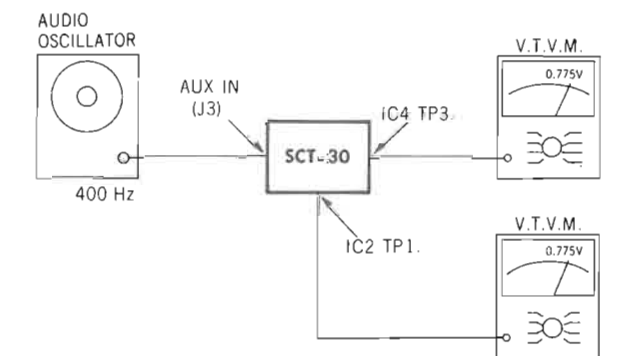


Figure 45

5. Bias Trap Adjustment

Set the Bias switch to CrO₂ in the recording mode.

Adjust L4 L/R so that bias leakage measured at the connection of R54 L/R and L4 L/R is at minimum.

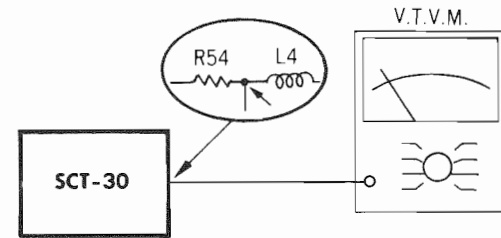


Figure 46

6. 19 kHz Trap Adjustment

Apply a 19 kHz ± 10 Hz signal to AUX IN (J3) from an Audio Oscillator and set MON switch to SOURCE. Adjust L2 L/R for a minimum output at TP1 of IC2.

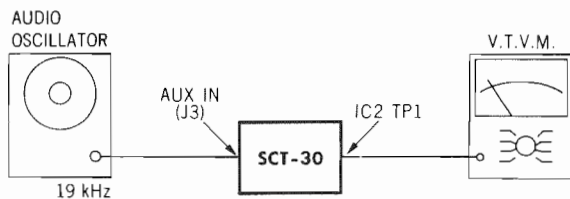


Figure 47

7. Adjustment of Bias Current and Recording Amp Gain

1) Set the Dolby calibration control (RV4 L/R) to the central position and the TAPE switch to NORM (BIAS switch : NORM EQ switch : 120 μ s).

Apply 1.2 kHz and 12 kHz signals (level on Peak level meter : -20 dB) alternately to AUX IN (J3) from the AUDIO Oscillator with MON switch set to SOURCE, and record them on tape (TEAC MTT-502 (C-90), Supertape Gold, UD-XL1C-90 (Maxell)

or other such top-quality "Standard" tape). Next, set MON switch to TAPE and adjust RT4 L/R so that the difference between the 2 frequency output levels is 0 dB ± 1.5 dB indicated VTVM.

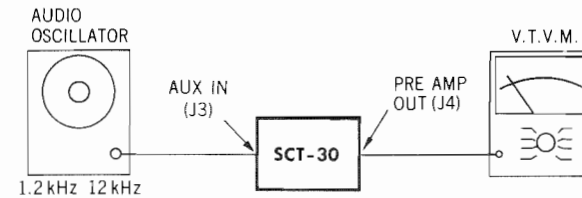


Figure 48

Next, set the MON switch to SOURCE and change the signal applied to AUX IN to 400 Hz (level on Peak level meter : 0 dB) and record it on the tape. Then set MON switch to TAPE and adjust RV4 L/R (Dolby Calibration controls) so that the peak level meters read 0 dB.

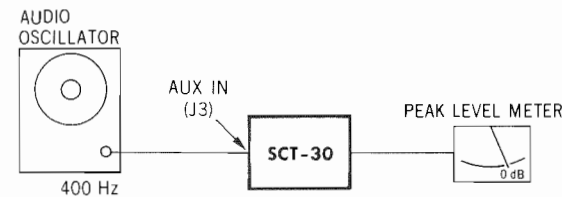


Figure 49

2) Set the TAPE switch to CrO₂ (Bias switch : CrO₂, EQ switch : upper 70 μ s) and the MON switch to SOURCE, and apply a 400 Hz signal (Peak level meter reading : 0 dB) to AUX IN (J3) from the Audio Oscillator and record it on CrO₂ tape BASF TP-18C401R (Realistic, UD-XL2C-90 (Maxell) or equivalent). Set MON switch to TAPE, and adjust RT3 L/R so that the peak level meters read 0 dB.

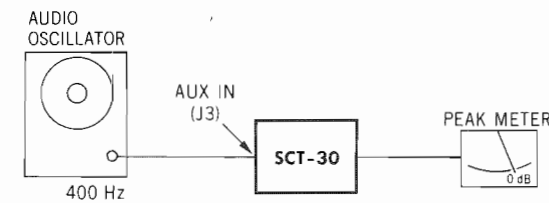


Figure 50

Next, set MON switch to SOURCE and apply a 1.4 kHz and 14 kHz signals (level on Peak level meter : -20 dB) to AUX IN (J3) from the Audio Oscillator and record them. Then set MON switch to TAPE and check that the difference between the 2 frequency output levels is 0 dB $\begin{matrix} +5 \\ -6 \end{matrix}$ dB.

If output levels are not within the specification, go back and adjust RT4 L/R so that it is within the range of the specification for "Standard" tape.

NOTE : If there is a difference in the output levels with the MON switch set to TAPE and SOURCE, readjust RT4 L/R, RV4 L/R and RT3 L/R.

8. Dolby NR Adjustment

1) Recording circuit

Apply a 2 kHz signal to AUX IN (J3) from the Audio Oscillator and adjust the level so that the output at TP1 of IC2 is -20 dB. Next, set the DOLBY NR switch to IN and adjust RT1 L/R so that the level at TP2 (\ominus side of C37) is -15.7 dB.

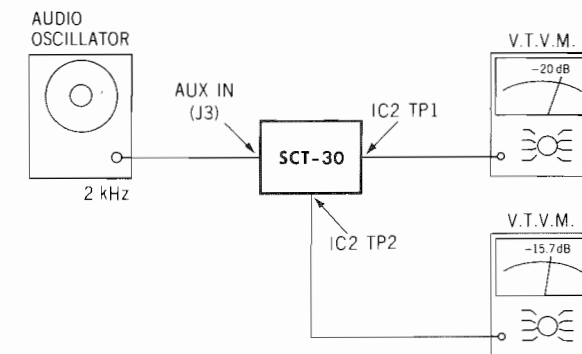


Figure 51

2) Playback circuit

Set the MON switch to TAPE and apply a 2 kHz signal to the \ominus side of C74 and adjust the level so that the output at TP3 of IC4 is -15.7 dB.

Next, set the DOLBY NR switch to IN and adjust RT6 L/R so that the level at PRE AMP OUT (J4) is -20 dB.

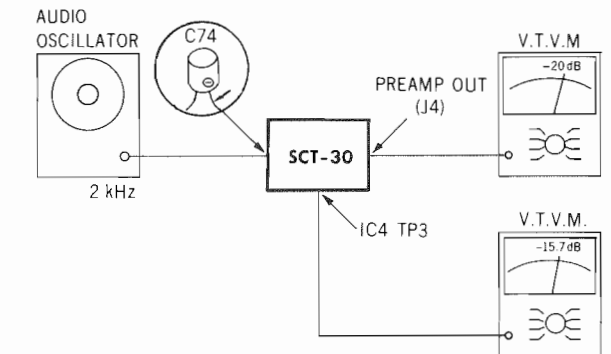


Figure 52

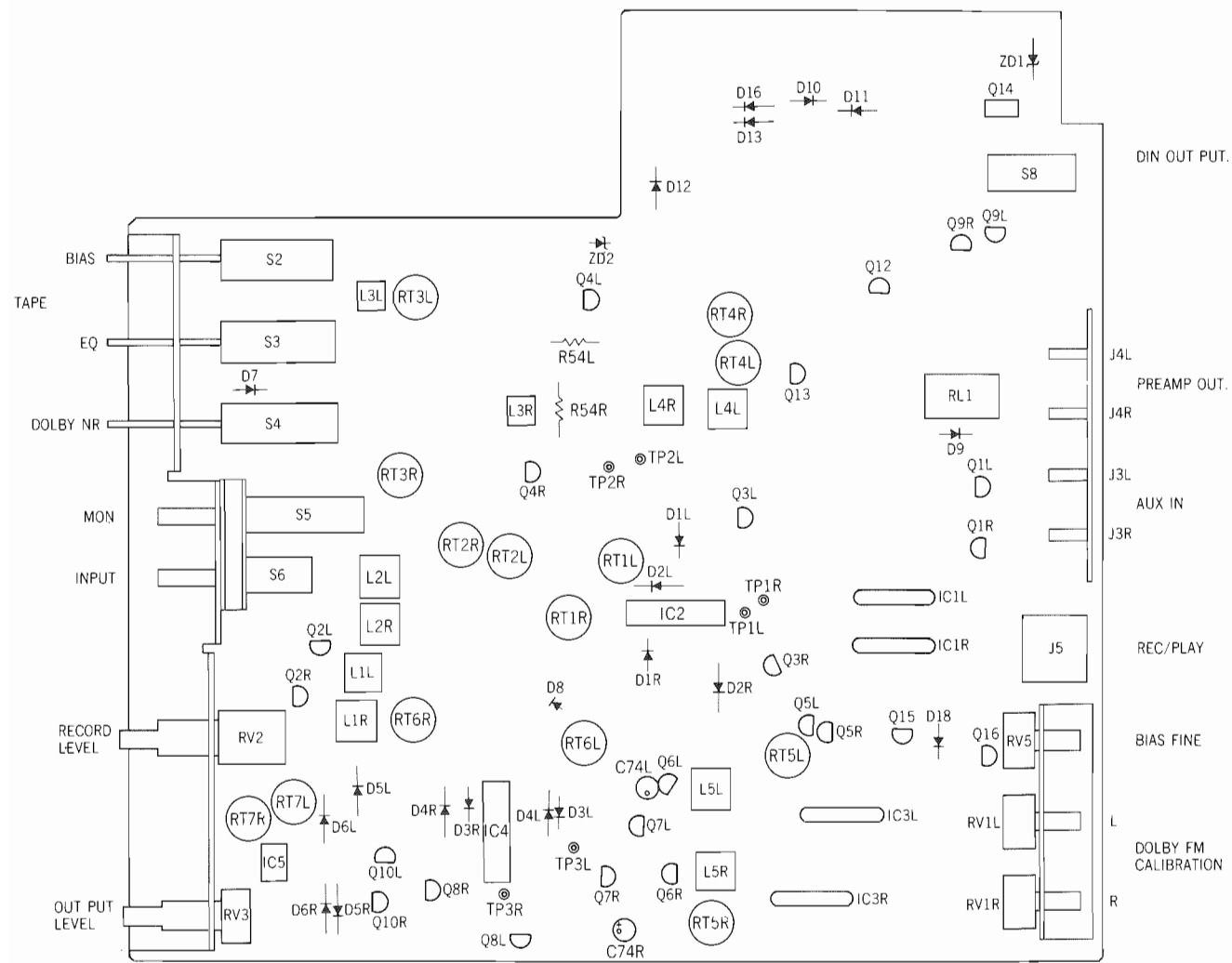


Figure 53

ADJUSTMENT OF MECHANICAL PARTS

1. Force and Torque

A. In playback

1. Pressure of pressure roller :

Take-up side : 280—450gr

Supply side : 280—410gr (See Figure 54.)

Measurement Method : With the Deck set to Playback function, apply a tension gauge and obtain the reading when the pressure roller just separates from the flywheel shaft.

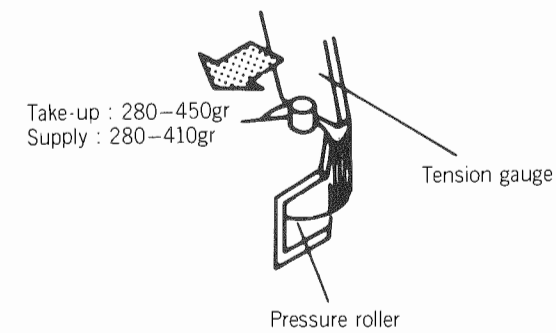


Figure 54

2. Take-up torque : 35—70g-cm

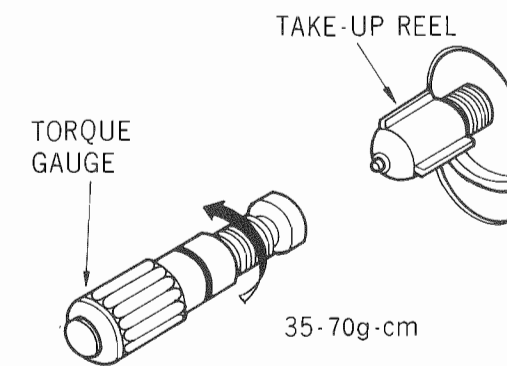


Figure 55

3. Supply reel back tension : 8—12g-cm

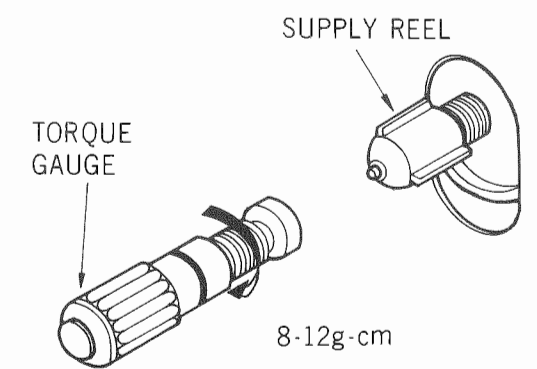


Figure 56

B. In rewind

1. Rewind torque : 75—120g-cm

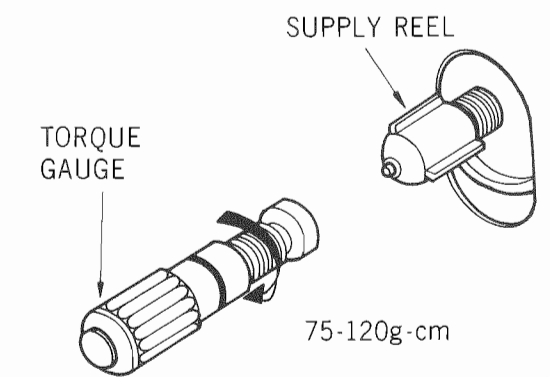


Figure 57

2. Take-up reel back tension : 4g-cm or less

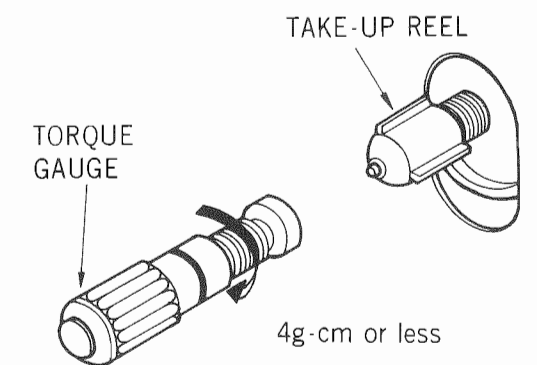


Figure 58

C. In fast forward

Fast forward torque : 75—120g-cm

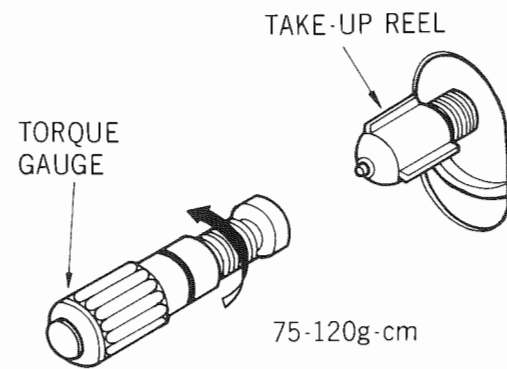


Figure 59

2. Operating force of keys

Measure at the tip of key

| | |
|--------------|---------------|
| STOP..... | 800gr or less |
| F.FWD | 800gr or less |
| PAUSE..... | 1.2kg or less |
| PLAY..... | 800gr or less |
| REC..... | 800gr or less |
| REWIND | 800gr or less |
| EJECT | 800gr or less |

TROUBLESHOOTING

| SYMPTOM | CAUSE | REMEDY |
|--|--|--|
| Capstan does not revolve. | Belt is broken. Power switch is broken. Bearing is binding. Motor does not operate. | Replace belt. Replace power switch. Clean bearing and lubricate. Check the motor circuit wiring and replace motor. |
| Tape cuts, tears and jams. | Misalignment of erase head | Adjust erase head. |
| Tape does not wind properly. | Take-up torque is too low. Pressure of take-up roller is improper. The cassette is defective. | Replace take-up mechanism. Clean oil and dirt from turntable and take-up roller. Check whether spring is unhooked. Try a good cassette. |
| Tape speed is unstable. | Head position is misaligned. | Adjust head position. |
| Tape speed is too slow. | Belt is slipping. | Clean or replace belt. |
| Wow | Cassette is defective (worn). Pressure roller and capstan shaft are dirty. Take-up torque is too high. Belt is dirty. Belt is twisted. Belt is worn. Flywheel bearing needs lubricating. Pressure of pressure roller is improper. | Use a good cassette. Clean pressure roller and capstan shaft. Replace take-up mechanism. Clean belt with alcohol. Straighten belt or replace. Replace belt. Lubricate. Adjust for normal pressure of Take-up side : 280—450gr Supply side : 280—410gr |
| Rewind speed is slow. | Slipping at the roller and belt | Clean oil from driving surfaces. |
| Motor operates, but tape does not wind up. | Rewind torque is too low. | Clean oil from turntable or roller, and clean or replace belt. If the pressure is not sufficient, replace the spring. |
| Motor does not operate. | No contact at leaf switch | Check and adjust switch position. |
| Motor operates, but the tape does not wind up in fast-forward. | Fast forward torque is not sufficient. | Clean oil from turntable on the fast-forward roller and/or replace belt. If the pressure of the fast-forward is not sufficient, replace the spring. |
| No sound, only noise comes from speaker | R & P head open | Replace. |
| No sound or noise from speaker | Coupling capacitor open in input of some stage Defective transistors or bias resistors | Replace. Check bias voltage and replace defective components. |
| Weak sound | R & P head dirty Defective transistors or bias resistors | Clean head. Check bias voltages and replace defective components. |
| Auto Stop Mechanism does not operate. | Belt is broken. Auto stop block is broken. | Replace belt for auto stop. Replace auto stop block assembly. |
| Auto Stop Mechanism trips before end of tape. | Auto stop block is broken. | Replace auto stop block assembly. |

| SYMPTOM | Cause | Remedy |
|--|--|---|
| POWER-ASSISTED CONTROL MECHANISM | | |
| Pressure roller does not rotate. | Spring for pressure roller has been disconnected or faulty. | Check the spring. Attach or replace it, if required. |
| Head plate and pressure roller arm do not operate (Power-assisted control mechanism does not operate). | 1) Motor does not rotate. | 1) Check the power switch for motor ; replace it, if required. |
| | 2) Drive-belt has been detached or is faulty. | 2) Check the drive-belt. Attach or replace it, if required |
| | 3) Spring for gear-drive arm has been detached or is faulty. | 3) Check the spring. Attach or replace it, if required. |
| | 4) Rotation angle of gear-drive arm is short. | 4) Check the cause of shortage of rotation. Lubricate it or replace spring. |
| | 5) Gears of playback section have been damaged. | 5) Replace playback gear. |
| | 6) Shaft (A) or (B) of playback gear is damaged. | 6) Replace playback gear. |
| | 7) Playback gear is caught on chassis. | 7) Correct. |
| | 8) Connection with playback plate of playback arm has been disconnected, or damaged. | 8) Check the connection. Connect or replace the playback arm. |
| | 9) Playback arm has been deformed. | 9) Replace the playback arm. |
| | 10) Playback arm touches chassis or lever. | 10) Correct. |
| | 11) The press-in section of the shaft which connects to the playback arm of the playback plate is damaged. | 11) Replace the playback plate. |
| | 12) Wiring of the head is crimped or broken. | 12) Correct wiring. |
| | 13) Playback plate is hung-up on chassis. | 13) Correct and/or lubricate. |
| | 14) Head plate is hung-up on chassis. | 14) Correct and/or lubricate. |
| Head plate & pressure roller are not locked, but repeat stop & playback. | 1) Spring of the playback plate has been detached, or is faulty. | 1) Check spring. Attach or replace it, if required. |
| | 2) Playback lock plate is hung-up on chassis. | 2) Correct and/or lubricate. |
| | 3) Faulty locking of the playback lock plate and shaft of playback plate. | 3) Lubricate the sliding section of chassis & playback lock plate or replace spring. |
| | 4) Playback plate has been deformed. | 4) Replace the playback arm. |
| Occasionally the unit goes into stop mode during record or playback, and returns to playback by means of the power-assisted control mechanism. | Faulty locking of the playback lock plate & shaft of playback plate. | Lubricate the sliding section of chassis & playback lock plate or replace the spring. |

| STOP MECHANISM | | |
|---|--|--|
| Stop mode is not activated by pressing stop button while the unit is operating. | 1) Contact section of stop button with the lock plate is damaged. | 1) Replace the button assembly. |
| | 2) Lock plate and chassis are touching. | 2) Correct and/or lubricate the section. |
| | 1) Playback lock plate & chassis are touching. | 1) Correct and/or lubricate the section. |
| | 2) The stop arm has been detached from playback lock plate & lock plate, or damaged. | 2) Check stop arm. Attach or replace it, if required. |
| Every operation button returns to stop mode, but head plate & pressure roller do not return. | 3) Spring of the playback arm has been detached or faulty. | 3) Check the spring. Attach or replace it, if required. |
| | 4) The shaft for playback arm is hung-up on the playback plate. | 4) Correct the section hung-up on playback plate. Lubricate the L-type groove. |
| PAUSE MECHANISM | | |
| Pause mechanism does not operate. | 1) The contact point of pause button to the pause slider has been damaged. | 1) Replace the button assembly. |
| | 2) The pause slider is caught by chassis. | 2) Correct the section caught by chassis or lubricate it. |
| | 3) The playback plate is hung-up on chassis. | 3) Replace the pause slider. |
| | 4) The shaft, which makes the playback lock plate of the pause slider slide, is damaged. | 4) Replace the pause slider. |
| When Pause button is pressed, during record or playback, the head & pinch roller go through stop mode once, but immediately return to playback or record mode (faulty operation of the power assisted mechanism). | 1) The operation tab, which drives the gear-drive arm of pause slider is damaged. | 1) Replace the pause slider. |
| | 2) The operation tab (which drives the gear-drive arm of pause slider) and gear-drive are not engaged. | 2) Check the engaging section or repair it. |
| Pause button does not lock. | The pause lock plate or pause spring is disconnected. | Correct the pause lock plate or pause spring. |
| TAKE-UP MECHANISM | | |
| The power-assisted mechanism operates properly but the take-up mechanism does not operate. | 1) Shaft of take-up arm has been removed from the L-type groove. | 1) Detach the cassette holder assembly to insert the shaft into the L-type groove. |
| | 2) Shaft of take-up arm is damaged. | 2) Replace the gear assembly. |
| | 3) The take-up arm is hung-up on chassis. | 3) Repair the take-up arm. |

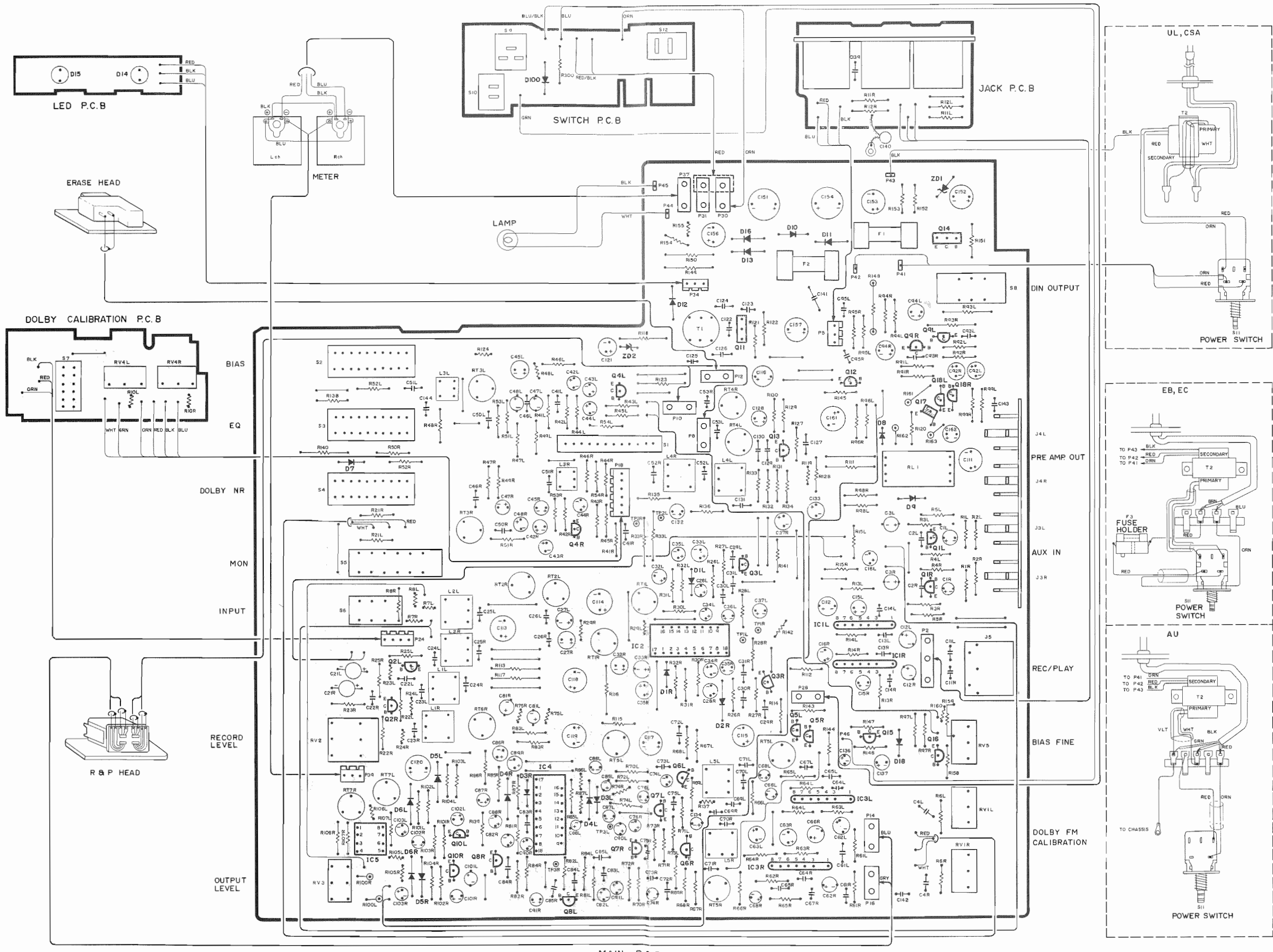
| SYMPTOM | Cause | Remedy | |
|---|---|---|--|
| | 4) Gears of take-up gear are damaged. | 4) Replace the gear assembly. | |
| | 5) Gear section of take-up reel is damaged. | 5) Replace the gear assembly. | |
| | 6) The spring, which lifts up the take-up gear, is weak. | 6) Replace the spring. | |
| | 7) The take-up belt is disconnected or faulty. | 7) Attach the belt or replace it, if required. | |
| | 8) The clutch mechanism of the take-up pulley has become loose, and the pulley is slipping. | 8) Replace the gear assembly. | |
| | Take-up operation is unstable (stops or delays occasionally). | 1) Engagement of take-up gear and the gear of reel is incomplete or part of gears is damaged. | 1) Check the take-up mechanism or replace the gear assembly. |
| | | 2) Take-up pulley and take-up belt are slipping. | 2) Replace the take-up belt, or clean with alcohol. |
| | | 3) The clutch mechanism of take-up pulley has become loose causing slippage. | 3) Replace the gear assembly. |
| FAST FORWARD/REWIND MECHANISM | | | |
| Playback functions, but can not Fast Forward or Rewind. | 1) The section where the button and the slider contact, is damaged. | 1) Replace the button assembly. | |
| | 2) Take-up belt is disconnected or faulty. | 2) Attach take-up belt or replace it. | |
| | 3) F gear (R) does not rotate by means of the slip mechanism of F belt pulley. | 3) Replace the gear assembly. | |
| | 4) F gear (R) is slipped out from the F belt pulley. | 4) Position F gear (R) to the F belt pulley. | |
| | 5) The operation of F arm is incomplete and the F gear (R) or (F) does not engage the gear section of the reel. | 5) Check the operation of F arm. | |
| | 6) Gears of the F gear (R) or (F) are damaged. | 6) Check gear assembly. | |
| | 7) Gear section of the reel is damaged. | 7) Replace the gear assembly. | |
| | 8) The spring, which lifts up the gear (R) or (F) is weak and is not engaged with the reel. | 8) Replace the gear assembly. | |
| | 9) Rewind or fast forward slider is hung-up on chassis and does not slide. | 9) Correct and/or lubricate. | |
| When Stop button is pressed during fast forward or rewind mode, stop mode will not activate. | 1) F arm is caught and stop mode is not restored. | 1) Check and correct F arm. | |
| | 2) The spring for F arm is disconnected or weak. | 2) Connect the spring for F arm or replace the gear assembly. | |

| AUTOSTOP MECHANISM | | |
|--|---|---|
| Auto-stop does not function. | 1) The take-up belt is slipping or faulty. | 1) Attach the take up belt or replace it. |
| | 2) Teeth of small & large gear sections of F belt pulley are damaged. | 2) Replace the gear. |
| | 3) The teeth of the gear (large) and cam gear are damaged. | 3) Replace the gear assembly. |
| | 4) The shaft, which enters into the cam groove of the cam gear on the floating arm, is out of the cam or damaged. | 4) Check the floating arm. |
| | 5) The floating arm is deformed and the AS arm and the cam do not engage each other when the tape reaches its end. | 5) Check the floating arm. |
| | 6) The spring for the AS arm is off position or faulty. | 6) Attach the spring or replace the gear assembly. |
| | 7) The AS control spring is detached from the brake plate and presses the floating cam toward the take-up direction. | 7) Remove the cassette holder assembly to attach the AS control spring. |
| | 8) Contact of the AS arm and AS lever is incomplete. | 8) Correct the AS lever. |
| | 9) Contact of the AS lever and lock plate is incomplete. | 9) Correct the AS lever. |
| | 10) The cam of the AS arm and the cam of the cam gear are not engaging each other or are faulty. | 10) Check the cam gear or replace the gear assembly. |
| When the Pause button is pressed during record or playback, the "clicking" sound is heard. | 1) The AS control spring is off the floating cam, or hung-up on chassis and does not press the floating cam toward the take-up direction. | 1) Remove the cassette holder assembly and correct the installation condition of the AS control spring. |
| | 1) The spring for the floating arm is disconnected or faulty. | 1) Connect the spring or replace it, if required. |
| The auto-stop mechanism operates improperly during playback, fast forward and rewind. | 2) The floating arm is hung-up. | 2) Check the floating cam. |
| | EJECT MECHANISM | |
| The air-damper mechanism does not operate. When Eject button is pressed, the cassette lid opens abruptly. | 1) The rubber plate, which is attached to the S arm of the air damper mechanism is weak. | 1) Replace the rubber plate. |
| | 2) Contact of the gears of the air damper mechanism and the rubber plate is insufficient. | 2) Replace the spring which makes gear and rubber plate contact. |

| AUTOSTOP MECHANISM | |
|--|--|
| Auto-stop does not function. | <p>1) The take-up belt is slipping or faulty.</p> <p>2) Teeth of small & large gear sections of F belt pulley are damaged.</p> <p>3) The teeth of the gear (large) and cam gear are damaged.</p> <p>4) The shaft, which enters into the cam groove of the cam gear on the floating arm, is out of the cam or damaged.</p> <p>5) The floating arm is deformed and the AS arm and the cam do not engage each other when the tape reaches its end.</p> <p>6) The spring for the AS arm is off position or faulty.</p> <p>7) The AS control spring is detached from the brake plate and presses the floating cam toward the take-up direction.</p> <p>8) Contact of the AS arm and AS lever is incomplete.</p> <p>9) Contact of the AS lever and lock plate is incomplete.</p> <p>10) The cam of the AS arm and the cam of the cam gear are not engaging each other or are faulty.</p> |
| When the Pause button is pressed during record or playback, the "clicking" sound is heard. | <p>1) The AS control spring is off the floating cam, or hung-up on chassis and does not press the floating cam toward the take-up direction.</p> <p>2) The spring for the floating arm is disconnected or faulty.</p> <p>3) The floating arm is hung-up.</p> |
| The auto-stop mechanism operates improperly during playback, fast forward and rewind. | <p>1) The spring for the floating arm is disconnected or faulty.</p> <p>2) The floating arm is hung-up.</p> |
| EJECT MECHANISM | |
| The air-damper mechanism does not operate. When Eject button is pressed, the cassette lid opens abruptly. | <p>1) The rubber plate, which is attached to the S arm of the air damper mechanism is weak.</p> <p>2) Contact of the gears of the air damper mechanism and the rubber plate is insufficient.</p> |

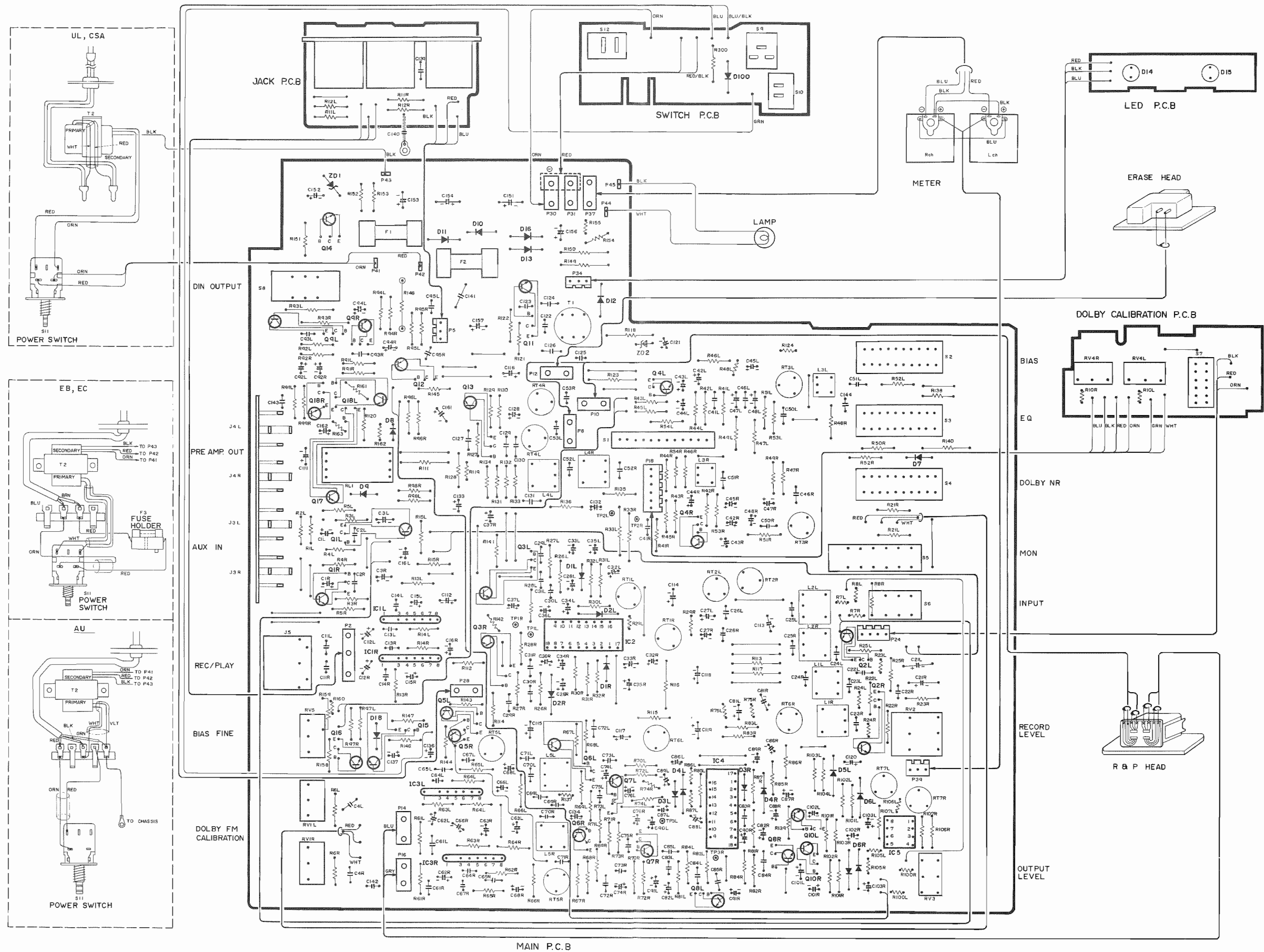
| SYMPTOM | Cause | Remedy |
|---|---|---|
| The cassette lid does not open when the Eject button is pressed. | <p>3) Engagement of the gear of the air damper mechanism and the pinion gear of the mold is incomplete or they are damaged.</p> <p>4) Contact of the gear of the mold of the air damper mechanism and the worm gear of the wind-wheel is incomplete or they are damaged.</p> <p>5) Securing screw of the governor (air damper assembly) is loose.</p> | <p>3) Replace the governor (air damper assembly).</p> <p>4) Replace the governor (air damper assembly).</p> <p>5) Tighten the screw.</p> |
| The cassette lid cannot be closed. | <p>1) The head plate or mechanical section is completely stopped.</p> <p>2) The contact section of the Eject button to the eject slider is damaged.</p> <p>3) The spring for eject has slipped off or is faulty.</p> <p>4) The eject slider and chassis are touching.</p> <p>5) The air damper is hung-up on chassis.</p> | <p>1) Turn on the power and press the eject button after the stop button is pressed.</p> <p>2) Replace the button assembly.</p> <p>3) Attach the spring or replace it.</p> <p>4) Correct and/or lubricate.</p> <p>5) Correct.</p> |
| The cassette lid cannot be locked. | <p>1) The cassette tape is inserted in reverse.</p> <p>2) The recording prevention arm is caught by the tape.</p> <p>3) The head is in playback mode.</p> | <p>1) Take out the cassette tape, and insert in again with its surface facing the head side.</p> <p>2) Check installation of the recording prevention arm. And, check that the recording prevention arm is released from the recording prevention groove of the tape when the cassette lid opened. If it is not released, check the installation of the eject slider and eject arm.</p> |
| The cassette lid cannot be locked. | <p>1) The spring for the eject slider is not in position or is faulty.</p> <p>2) The eject slider and chassis are touching.</p> | <p>3) Turn on the power and close the cassette lid after pressing Stop button.</p> <p>1) Position the spring correctly or replace it, if required.</p> <p>2) Correct and/or lubricate.</p> |

CIRCUIT BOARD DIAGRAM (TOP VIEW)

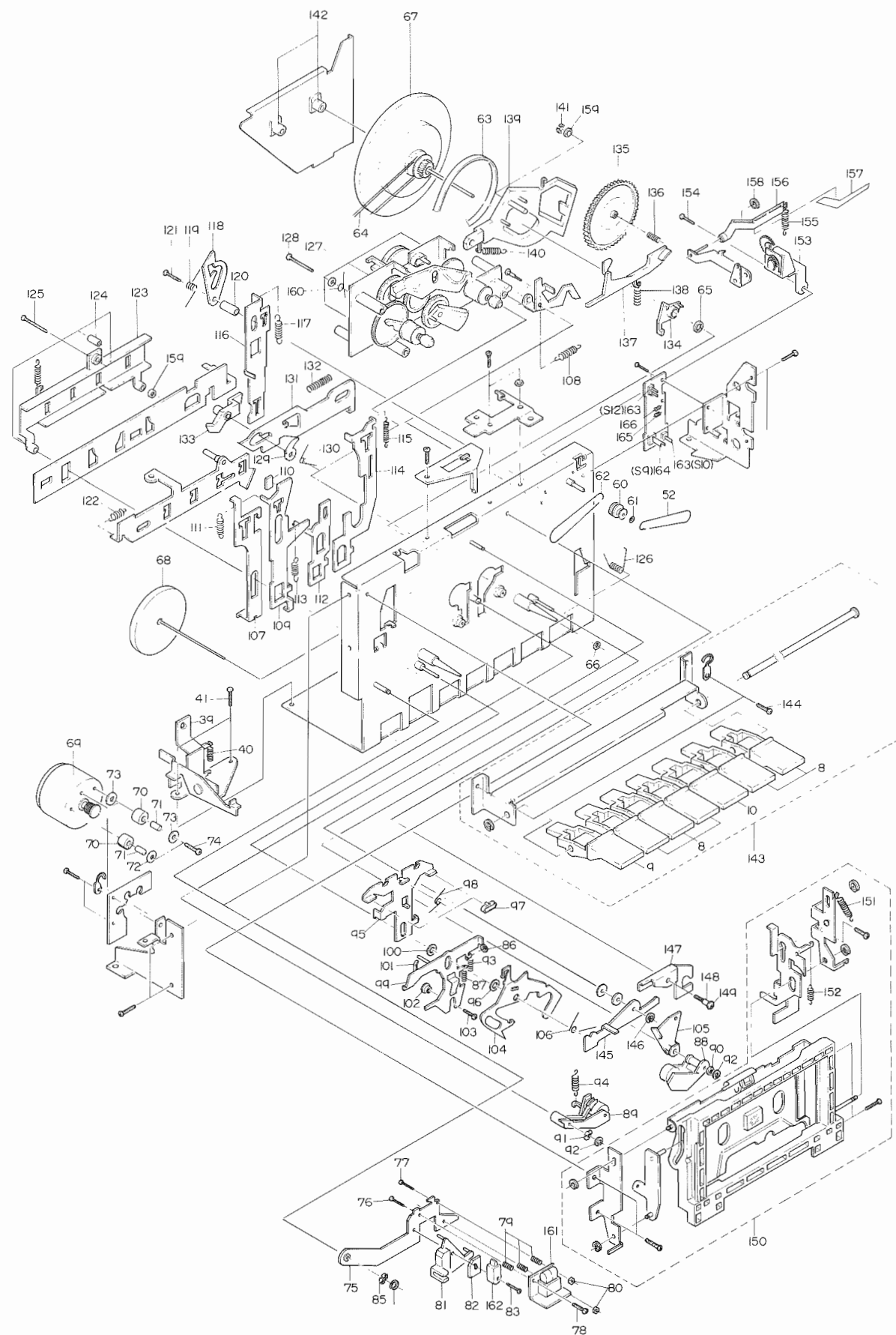


MAIN P.C.B

CIRCUIT BOARD DIAGRAM (BOTTOM VIEW)



EXPLODED VIEW—MECHANISM



REPLACEMENT PARTS—ELECTRICAL

| Ref. No. | Description | R.S. PART No. | MFR.S PART No. | Ref. No. | Description | R.S. PART No. | MFR'S PART No. |
|-------------------|--|---------------|----------------|--------------------|---|---------------|----------------|
| CAPACITORS | | | | | | | |
| C 1LR | Electrolytic 1.0μF 50V | | 0252811 | C113 | Electrolytic 100μF 16V | | 0252531 |
| C 2LR | Ceramic disc 470pF±10% | | 0249723 | C114 | Electrolytic 470μF 16V | | 0252535 |
| C 3LR | Electrolytic 3.3μF 25V | | 0252613 | C115 | Electrolytic 470μF 16V | | 0252535 |
| C 4LR | Ceramic disc 0.0027μF±10% (EUROPE, U.K. AUSTRALIA) | | 0221378 | C116 | Electrolytic 100μF 16V | | 0252531 |
| | Mylar 0.0018μF±5% (U.S.A. CANADA) | | 0268430 | C117 | Electrolytic 100μF 16V | | 0252531 |
| C 11LR | Ceramic disc 0.0022μF±10% | | 0249733 | C118 | Electrolytic 470μF 16V | | 0252535 |
| C 12LR | Electrolytic 3.3μF 25V | | 0252613 | C119 | Electrolytic 470μF 16V | | 0252535 |
| C 13LR | Ceramic disc 0.0022μF±10% | | 0249733 | C120 | Electrolytic 47μF 16V | | 0252525 |
| C 14LR | Ceramic disc 9pF±10% | | 0248649 | C121 | Electrolytic 470μF 16V | | 0252535 |
| C 15LR | Electrolytic 47μF 10V | | 0256114 | C122 | Ceramic disc 0.01μF±10% | | 0249737 |
| C 16LR | Electrolytic 1.0μF 50V | | 0252811 | C123 | Mylar 0.022μF±10% | | 0275013 |
| C 21LR | Electrolytic 1.0μF 50V | | 0252811 | C124 | Ceramic disc 0.0068μF±10% | | 0249736 |
| C 22LR | Ceramic disc 470pF±10% | | 0249723 | C125 | Mylar 0.0033μF±10% | | 0268427 |
| C 23LR | Ceramic disc 68pF±10% | | 0248720 | C126 | Ceramic disc 220pF±10% | | 0248732 |
| C 24LR | Ceramic disc 0.0033μF±10% | | 0249734 | C127 | Mylar 0.068μF±10% | | 0275016 |
| C 25LR | Mylar 0.0022μF±5% | | 0268426 | C128 | Electrolytic 47μF 10V | | 0256114 |
| C 26LR | Ceramic disc 0.0022μF±10% | | 0249733 | C129 | Mylar 0.047μF±10% | | 0275015 |
| C 27LR | Electrolytic 3.3μF 25V | | 0252613 | C130 | Mylar 0.047μF±10% | | 0275015 |
| C 28LR | Electrolytic 0.33μF 25V | | 0256523 | C131 | Mylar 0.047μF±10% | | 0275015 |
| C 29LR | Mylar 0.015μF±10% | | 0275012 | C132 | Electrolytic 3.3μF 25V | | 0252613 |
| C 30LR | Mylar 0.0047μF±10% | | 0274015 | C133 | Electrolytic 47μF 16V | | 0252525 |
| C 31LR | Mylar 0.015μF±10% | | 0275012 | C134 | Electrolytic 3.3μF 25V | | 0252613 |
| C 32LR | Electrolytic 10μF 25V | | 0252621 | C135 | Electrolytic 3.3μF 25V | | 0252613 |
| C 33LR | Electrolytic 0.33μF 25V | | 0256523 | C136 | Electrolytic 3.3μF 25V | | 0252613 |
| C 34LR | Electrolytic 10μF 25V | | 0252621 | C137 | Electrolytic 3.3μF 25V | | 0252613 |
| C 35LR | Electrolytic 0.1μF 25V | | 0256520 | C138 | Ceramic disc 0.001μF±10% | | 0249731 |
| C 36LR | Electrolytic 0.1μF 25V | | 0256520 | C139 | Ceramic disc 0.01μF±10% | | 0249737 |
| C 37LR | Electrolytic 10μF 25V | | 0252621 | C140 | Ceramic disc 0.01μF±10% | | 0249737 |
| C 41LR | Ceramic disc 0.0022μF±10% | | 0249733 | C141 | Ceramic disc 0.001μF±10% | | 0249731 |
| C 42LR | Electrolytic 0.68μF 25V | | 0256525 | C142 | Ceramic disc 0.001μF±10% | | 0249731 |
| C 43LR | Electrolytic 3.3μF 25V | | 0252613 | C143 | Ceramic disc 0.001μF±10% | | 0249731 |
| C 44LR | Electrolytic 10μF 25V | | 0252621 | C144 | Ceramic disc 0.001μF±10% | | 0249731 |
| C 45LR | Electrolytic 10μF 25V | | 0252621 | C151 | Electrolytic 2200μF 25V | | 0256110 |
| C 46LR | Mylar 0.047μF±10% | | 0275015 | C152 | Electrolytic 470μF 16V | | 0252535 |
| C 47LR | Electrolytic 0.1μF 25V | | 0256520 | C153 | Electrolytic 100μF 25V | | 0252631 |
| C 48LR | Mylar 0.068μF±10% | | 0275116 | C154 | Electrolytic 2200μF 25V | | 0256110 |
| C 50LR | Mylar 0.022μF±10% | | 0275013 | C156 | Electrolytic 47μF 16V | | 0252525 |
| C 51LR | Mylar 0.033μF±10% | | 0275014 | C157 | Electrolytic 470μF 16V | | 0252535 |
| C 52LR | Ceramic disc 68pF±10% | | 0248720 | C161 | Electrolytic 100μF 16V | | 0252531 |
| C 53LR | Ceramic disc 100pF±10% | | 0248724 | C162 | Electrolytic 10μF 25V | | 0252621 |
| C 61LR | Ceramic disc 220pF±10% | | 0248732 | RESISTORS : | | | |
| C 62LR | Electrolytic 10μF 25V | | 0252621 | R 1LR | Carbon film 82Kohm±5% 1/8W | | 0123956 |
| C 63LR | Electrolytic 47μF 16V | | 0252525 | R 2LR | Carbon film 470Kohm±5% 1/8W | | 0123965 |
| C 64LR | Ceramic disc 0.001μF±10% | | 0249731 | R 3LR | Carbon film 330Kohm±5% 1/8W | | 0123963 |
| C 65LR | Mylar 0.01μF±10% | | 0275011 | R 4LR | Carbon film 820Kohm±5% 1/8W | | 0123968 |
| C 66LR | Electrolytic 100μF 6.3V | | 0252231 | R 5LR | Carbon film 15Kohm±5% 1/8W | | 0123947 |
| C 67LR | Ceramic disc 27pF±10% | | 0248710 | R 6LR | Carbon film 18Kohm±5% 1/8W (EUROPE, U.K. AUSTRALIA) (U.S.A. CANADA) | | 0123948 |
| C 68LR | Electrolytic 10μF 25V | | 0252621 | | Carbon film 39Kohm±5% 1/8W | | 0123952 |
| C 69LR | Ceramic disc 0.0047μF±10% | | 0249735 | R 7LR | Carbon film 5.6Kohm±5% 1/4W | | 0137860 |
| C 70LR | Ceramic disc 68pF±10% | | 0248720 | R 8L | Carbon film 2.2Kohm±5% 1/4W | | 0137855 |
| C 71LR | Ceramic disc 0.0047μF±10% | | 0249735 | R 8R | Carbon film 2.2Kohm±5% 1/8W | | 0123937 |
| C 72LR | Ceramic disc 0.0068μF±10% | | 0249736 | R 10LR | Carbon film 2.2Kohm±5% 1/4W | | 0137855 |
| C 73LR | Ceramic disc 680pF±10% | | 0249725 | R 11LR | Carbon film 15Kohm±5% 1/8W | | 0101947 |
| C 74LR | Electrolytic 3.3μF 25V | | 0252613 | R 12LR | Carbon film 1.8Kohm±5% 1/8W | | 0101936 |
| C 75LR | Ceramic disc 470pF±10% | | 0249723 | R 13LR | Carbon film 18Kohm±5% 1/8W | | 0123948 |
| C 76LR | Electrolytic 3.3μF 25V | | 0252613 | R 14LR | Carbon film 2.7Kohm±5% 1/8W | | 0123938 |
| C 81LR | Electrolytic 3.3μF 25V | | 0252613 | R 15LR | Carbon film 22Kohm±5% 1/8W | | 0123949 |
| C 82LR | Electrolytic 0.33μF 25V | | 0256523 | R 15LR | Carbon film 22Kohm±5% 1/4W | | 0137905 |
| C 83LR | Mylar 0.0047μF±10% | | 0274015 | R 21LR | Carbon film 100Kohm±5% 1/8W | | 0123957 |
| C 84LR | Mylar 0.015μF±10% | | 0275012 | R 22LR | Carbon film 330Kohm±5% 1/8W | | 0123963 |
| C 85LR | Mylar 0.015μF±10% | | 0275012 | R 23LR | Carbon film 150Kohm±5% 1/8W | | 0123959 |
| C 86LR | Electrolytic 10μF 25V | | 0252621 | R 23L | Carbon film 150Kohm±5% 1/4W | | 0137953 |
| C 87LR | Electrolytic 0.33μF 25V | | 0256523 | R 24LR | Carbon film 3.3Kohm±5% 1/4W | | 0137857 |
| C 88LR | Electrolytic 10μF 25V | | 0252621 | R 25LR | Carbon film 390ohm±5% 1/8W | | 0123928 |
| C 89LR | Electrolytic 0.1μF 25V | | 0256520 | R 26LR | Carbon film 47Kohm±5% 1/8W | | 0123953 |
| C 90LR | Electrolytic 0.1μF 25V | | 0256520 | R 27LR | Carbon film 3.9Kohm±5% 1/8W | | 0123940 |
| C 91LR | Electrolytic 10μF 25V | | 0252621 | R 28LR | Carbon film 220ohm±5% 1/8W | | 0123925 |
| C 92LR | Electrolytic 3.3μF 25V | | 0252613 | R 29LR | Carbon film 6.8Kohm±5% 1/4W | | 0137861 |
| C 93LR | Ceramic disc 0.0022μF±10% | | 0249733 | R 30LR | Carbon film 12Kohm±5% 1/8W | | 0123946 |
| CR94LR | Electrolytic 47μF 16V | | 0252525 | R 31LR | Carbon film 270Kohm±5% 1/8W | | 0123962 |
| C 95LR | Ceramic disc 0.001μF±10% | | 0249731 | R 32LR | Carbon film 270Kohm±5% 1/8W | | 0123962 |
| C101LR | Electrolytic 3.3μF 25V | | 0252613 | R 33LR | Carbon film 22Kohm±5% 1/8W | | 0123949 |
| C102LR | Electrolytic 10μF 25V | | 0252621 | R 41LR | Carbon film 6.8Kohm±5% 1/8W | | 0123943 |
| C103LR | Electrolytic 3.3μF 10V | | 0256304 | R 42LR | Carbon film 4.7Kohm±5% 1/8W | | 0123941 |
| C111 | Electrolytic 100μF 16V | | 0252531 | R 43LR | Carbon film 220Kohm±5% 1/8W | | 0123961 |
| C112 | Electrolytic 100μF 16V | | | | | | |

REPLACEMENT PARTS—ELECTRICAL

| Ref. No. | Description | R.S. PART No. | MFR.S PART No. | Ref. No. | Description | R.S. PART No. | MFR.S PART No. |
|-------------------|---|---------------|----------------|--------------------|--|---------------|----------------|
| CAPACITORS | | | | C113 | Electrolytic 100 μ F 16V | | 0252531 |
| C 1LR | Electrolytic 1.0 μ F 50V | | 0252811 | C114 | Electrolytic 470 μ F 16V | | 0252535 |
| C 2LR | Ceramic disc 470pF \pm 10% | | 0249723 | C115 | Electrolytic 470 μ F 16V | | 0252535 |
| C 3LR | Electrolytic 3.3 μ F 25V | | 0252613 | C116 | Electrolytic 100 μ F 16V | | 0252531 |
| C 4LR | Ceramic disc 0.0027 μ F \pm 10% (EUROPE, U.K., AUSTRALIA) | | 0221378 | C117 | Electrolytic 100 μ F 16V | | 0252531 |
| | Mylar 0.0018 μ F \pm 5% (U.S.A., CANADA) | | 0268430 | C118 | Electrolytic 470 μ F 16V | | 0252535 |
| C 11LR | Ceramic disc 0.0022 μ F \pm 10% | | 0249733 | C119 | Electrolytic 470 μ F 16V | | 0252535 |
| C 12LR | Electrolytic 3.3 μ F 25V | | 0252613 | C120 | Electrolytic 47 μ F 16V | | 0252525 |
| C 13LR | Ceramic disc 0.0022 μ F \pm 10% | | 0249733 | C121 | Electrolytic 470 μ F 16V | | 0252535 |
| C 14LR | Ceramic disc 9pF \pm 10% | | 0248649 | C122 | Ceramic disc 0.01 μ F \pm 10% | | 0249737 |
| C 15LR | Electrolytic 47 μ F 10V | | 0256114 | C123 | Mylar 0.022 μ F \pm 10% | | 0275013 |
| C 16LR | Electrolytic 1.0 μ F 50V | | 0252811 | C124 | Ceramic disc 0.0068 μ F \pm 10% | | 0249736 |
| C 21LR | Electrolytic 1.0 μ F 50V | | 0252811 | C125 | Mylar 0.0033 μ F \pm 10% | | 0268427 |
| C 22LR | Ceramic disc 470pF \pm 10% | | 0249723 | C126 | Ceramic disc 220pF \pm 10% | | 0248732 |
| C 23LR | Ceramic disc 68pF \pm 10% | | 0248720 | C127 | Mylar 0.068 μ F \pm 10% | | 0275016 |
| C 24LR | Ceramic disc 0.0033 μ F \pm 10% | | 0249734 | C128 | Electrolytic 47 μ F 10V | | 0256114 |
| C 25LR | Mylar 0.0022 μ F \pm 5% | | 0268426 | C129 | Mylar 0.047 μ F \pm 10% | | 0275015 |
| C 26LR | Ceramic disc 0.0022 μ F \pm 10% | | 0249733 | C130 | Mylar 0.047 μ F \pm 10% | | 0275015 |
| C 27LR | Electrolytic 3.3 μ F 25V | | 0252613 | C131 | Mylar 0.047 μ F \pm 10% | | 0275015 |
| C 28LR | Electrolytic 0.33 μ F 25V | | 0256523 | C132 | Electrolytic 3.3 μ F 25V | | 0252613 |
| C 29LR | Mylar 0.015 μ F \pm 10% | | 0275012 | C133 | Electrolytic 47 μ F 16V | | 0252525 |
| C 30LR | Mylar 0.0047 μ F \pm 10% | | 0274015 | C134 | Electrolytic 3.3 μ F 25V | | 0252613 |
| C 31LR | Mylar 0.015 μ F \pm 10% | | 0275012 | C135 | Electrolytic 3.3 μ F 25V | | 0252613 |
| C 32LR | Electrolytic 10 μ F 25V | | 0252621 | C136 | Electrolytic 3.3 μ F 25V | | 0252613 |
| C 33LR | Electrolytic 0.33 μ F 25V | | 0256523 | C137 | Electrolytic 3.3 μ F 25V | | 0252613 |
| C 34LR | Electrolytic 10 μ F 25V | | 0252621 | C138 | Ceramic disc 0.001 μ F \pm 10% | | 0249731 |
| C 35LR | Electrolytic 0.1 μ F 25V | | 0256520 | C139 | Ceramic disc 0.01 μ F \pm 10% | | 0249737 |
| C 36LR | Electrolytic 0.1 μ F 25V | | 0256520 | C140 | Ceramic disc 0.01 μ F \pm 10% | | 0249737 |
| C 37LR | Electrolytic 10 μ F 25V | | 0252621 | C141 | Ceramic disc 0.001 μ F \pm 10% | | 0249731 |
| C 41LR | Ceramic disc 0.0022 μ F \pm 10% | | 0249733 | C142 | Ceramic disc 0.001 μ F \pm 10% | | 0249731 |
| C 42LR | Electrolytic 0.68 μ F 25V | | 0256525 | C143 | Ceramic disc 0.001 μ F \pm 10% | | 0249731 |
| C 43LR | Electrolytic 3.3 μ F 25V | | 0252613 | C144 | Ceramic disc 0.001 μ F \pm 10% | | 0249731 |
| C 44LR | Electrolytic 10 μ F 25V | | 0252621 | C151 | Electrolytic 2200 μ F 25V | | 0256110 |
| C 45LR | Electrolytic 10 μ F 25V | | 0252621 | C152 | Electrolytic 470 μ F 16V | | 0252535 |
| C 46LR | Mylar 0.047 μ F \pm 10% | | 0275015 | C153 | Electrolytic 100 μ F 25V | | 0252631 |
| C 47LR | Electrolytic 0.1 μ F 25V | | 0256520 | C154 | Electrolytic 2200 μ F 25V | | 0256110 |
| C 48LR | Mylar 0.068 μ F \pm 10% | | 0275116 | C156 | Electrolytic 47 μ F 16V | | 0252525 |
| C 50LR | Mylar 0.022 μ F \pm 10% | | 0275013 | C157 | Electrolytic 470 μ F 16V | | 0252535 |
| C 51LR | Mylar 0.033 μ F \pm 10% | | 0275014 | C161 | Electrolytic 100 μ F 16V | | 0252531 |
| C 52LR | Ceramic disc 68pF \pm 10% | | 0248720 | C162 | Electrolytic 10 μ F 25V | | 0252621 |
| C 53LR | Ceramic disc 100pF \pm 10% | | 0248724 | RESISTORS : | | | |
| C 61LR | Ceramic disc 220pF \pm 10% | | 0248732 | R 1LR | Carbon film 82Kohm \pm 5% 1/8W | | 0123956 |
| C 62LR | Electrolytic 10 μ F 25V | | 0252621 | R 2LR | Carbon film 470Kohm \pm 5% 1/8W | | 0123965 |
| C 63LR | Electrolytic 47 μ F 16V | | 0252525 | R 3LR | Carbon film 330Kohm \pm 5% 1/8W | | 0123963 |
| C 64LR | Ceramic disc 0.001 μ F \pm 10% | | 0249731 | R 4LR | Carbon film 820Kohm \pm 5% 1/8W | | 0123968 |
| C 65LR | Mylar 0.01 μ F \pm 10% | | 0275011 | R 5LR | Carbon film 15Kohm \pm 5% 1/8W | | 0123947 |
| C 66LR | Electrolytic 100 μ F 6.3V | | 0252231 | R 6LR | Carbon film 18Kohm \pm 5% 1/8W | | 0123948 |
| C 67LR | Ceramic disc 27pF \pm 10% | | 0248710 | | (EUROPE, U.K., AUSTRALIA) (U.S.A., CANADA) | | |
| C 68LR | Electrolytic 10 μ F 25V | | 0252621 | | Carbon film 39Kohm \pm 5% 1/8W | | 0123952 |
| C 69LR | Ceramic disc 0.0047 μ F \pm 10% | | 0249735 | R 7LR | Carbon film 5.6Kohm \pm 5% 1/4W | | 0137860 |
| C 70LR | Ceramic disc 68pF \pm 10% | | 0248720 | R 8L | Carbon film 2.2Kohm \pm 5% 1/4W | | 0137855 |
| C 71LR | Ceramic disc 0.0047 μ F \pm 10% | | 0249735 | R 8R | Carbon film 2.2Kohm \pm 5% 1/8W | | 0123937 |
| C 72LR | Ceramic disc 0.0068 μ F \pm 10% | | 0249736 | R 10LR | Carbon film 2.2Kohm \pm 5% 1/4W | | 0137855 |
| C 73LR | Ceramic disc 680pF \pm 10% | | 0249725 | R 11LR | Carbon film 15Kohm \pm 5% 1/8W | | 0101947 |
| C 74LR | Electrolytic 3.3 μ F 25V | | 0252613 | R 12LR | Carbon film 1.8Kohm \pm 5% 1/8W | | 0101936 |
| C 75LR | Ceramic disc 470pF \pm 10% | | 0249723 | R 13LR | Carbon film 18Kohm \pm 5% 1/8W | | 0123948 |
| C 76LR | Electrolytic 3.3 μ F 25V | | 0252613 | R 14LR | Carbon film 2.7Kohm \pm 5% 1/8W | | 0123938 |
| C 81LR | Electrolytic 3.3 μ F 25V | | 0252613 | R 15LR | Carbon film 22Kohm \pm 5% 1/8W | | 0123949 |
| C 82LR | Electrolytic 0.33 μ F 25V | | 0256523 | R 15LR | Carbon film 22Kohm \pm 5% 1/4W | | 0137905 |
| C 83LR | Mylar 0.0047 μ F \pm 10% | | 0274015 | R 21LR | Carbon film 100Kohm \pm 5% 1/8W | | 0123957 |
| C 84LR | Mylar 0.015 μ F \pm 10% | | 0275012 | R 22LR | Carbon film 330Kohm \pm 5% 1/8W | | 0123963 |
| C 85LR | Mylar 0.015 μ F \pm 10% | | 0275012 | R 23LR | Carbon film 150Kohm \pm 5% 1/8W | | 0123959 |
| C 86LR | Electrolytic 10 μ F 25V | | 0252621 | R 23L | Carbon film 150Kohm \pm 5% 1/4W | | 0137953 |
| C 87LR | Electrolytic 0.33 μ F 25V | | 0256523 | R 24LR | Carbon film 3.3Kohm \pm 5% 1/4W | | 0137857 |
| C 88LR | Electrolytic 10 μ F 25V | | 0252621 | R 25LR | Carbon film 390 ohm \pm 5% 1/8W | | 0123928 |
| C 89LR | Electrolytic 0.1 μ F 25V | | 0256520 | R 26LR | Carbon film 47Kohm \pm 5% 1/8W | | 0123953 |
| C 90LR | Electrolytic 0.1 μ F 25V | | 0256520 | R 27LR | Carbon film 3.9Kohm \pm 5% 1/8W | | 0123940 |
| C 91LR | Electrolytic 10 μ F 25V | | 0252621 | R 28LR | Carbon film 220ohm \pm 5% 1/8W | | 0123925 |
| C 92LR | Electrolytic 3.3 μ F 25V | | 0252613 | R 29LR | Carbon film 6.8Kohm \pm 5% 1/4W | | 0137861 |
| C 93LR | Ceramic disc 0.0022 μ F \pm 10% | | 0249733 | R 30LR | Carbon film 12Kohm \pm 5% 1/8W | | 0123946 |
| CR94LR | Electrolytic 47 μ F 16V | | 0252525 | R 31LR | Carbon film 270Kohm \pm 5% 1/8W | | 0123962 |
| C 95LR | Ceramic disc 0.001 μ F \pm 10% | | 0249731 | R 32LR | Carbon film 270Kohm \pm 5% 1/8W | | 0123962 |
| C101LR | Electrolytic 3.3 μ F 25V | | 0252613 | R 33LR | Carbon film 22Kohm \pm 5% 1/8W | | 0123949 |
| C102LR | Electrolytic 10 μ F 25V | | 0252621 | R 41LR | Carbon film 6.8Kohm \pm 5% 1/8W | | 0123943 |
| C103LR | Electrolytic 3.3 μ F 10V | | 0256304 | R 42LR | Carbon film 4.7Kohm \pm 5% 1/8W | | 0123941 |
| C111 | Electrolytic 100 μ F 16V | | 0252531 | R 43LR | Carbon film 220Kohm \pm 5% 1/8W | | 0123961 |
| C112 | Electrolytic 100 μ F 16V | | 0252531 | | | | |

| Ref No | Description | R.S. PART No. | MFR'S PART No. | Ref No | Description | R.S. PART No. | MFR'S PART No. |
|--------------------|-----------------------------|---------------|----------------|--------------------------|-----------------------------|---------------|----------------|
| RESISTORS : | | | | R135 | Carbon film 47Kohm±5% 1/8W | | 0123953 |
| R 44LR | Carbon film 47Kohm±5% 1/8W | | 0123953 | R136 | Carbon film 47Kohm±5% 1/8W | | 0123953 |
| R 45LR | Carbon film 3.9Kohm±5% 1/8W | | 0123940 | R137 | Carbon film 470Kohm±5% 1/4W | | 0137959 |
| R 46LR | Carbon film 820ohm±5% 1/8W | | 0123932 | R138 | Carbon film 100Kohm±5% 1/8W | | 0123957 |
| R 47LR | Carbon film 82ohm±5% 1/8W | | 0123920 | R139 | Carbon film 470Kohm±5% 1/8W | | 0123965 |
| R 48R | Carbon film 220Kohm±5% 1/8W | | 0123961 | R140 | Carbon film 10Kohm±5% 1/8W | | 0123945 |
| R 48L | Carbon film 220Kohm±5% 1/8W | | 0137955 | R141 | Carbon film 10Kohm±5% 1/8W | | 0123945 |
| R 49LR | Carbon film 820ohm±5% 1/8W | | 0123932 | R142 | Carbon film 220Kohm±5% 1/4W | | 0137955 |
| R 51LR | Carbon film 2.2Kohm±5% 1/8W | | 0123937 | R143 | Carbon film 10Kohm±5% 1/8W | | 0123945 |
| R 52LR | Carbon film 100Kohm±5% 1/8W | | 0123957 | R144 | Carbon film 6.8Kohm±5% 1/8W | | 0123945 |
| R 53LR | Carbon film 100ohm±5% 1/8W | | 0123921 | R145 | Carbon film 10Kohm±5% 1/8W | | 0123945 |
| R 53LR | Carbon film 56ohm±5% 1/8W | | 0123918 | R146 | Carbon film 3.3Kohm±5% 1/8W | | 0123939 |
| R 54LR | Carbon film 1Kohm±5% 1/8W | | 0123933 | R147 | Carbon film 4.7Kohm±5% 1/8W | | 0123941 |
| R 61LR | Carbon film 39Kohm±5% 1/8W | | 0123952 | R148 | Carbon film 22ohm±5% 1/4W | | 0114375 |
| R 62LR | Carbon film 330Kohm±5% 1/8W | | 0123963 | R149 | Carbon film 1Kohm±10% 1/2W | | 0113365 |
| R 63LR | Carbon film 56Kohm±5% 1/8W | | 0123954 | R150 | Carbon film 270ohm±10% 1/2W | | 0113292 |
| R 64LR | Carbon film 2.7Kohm±5% 1/8W | | 0123938 | R151 | Carbon film 10ohm±5% 1/8W | | 0123909 |
| R 65LR | Carbon film 12Kohm±5% 1/8W | | 0123946 | R152 | Carbon film 1Kohm±5% 1/8W | | 0123933 |
| R 66LR | Carbon film 2.2Kohm±5% 1/8W | | 0123937 | R153 | Carbon film 1Kohm±5% 1/8W | | 0123933 |
| R 67LR | Carbon film 6.8Kohm±5% 1/8W | | 0123943 | R154 | Carbon film 82ohm±10% 1/2W | | 0113228 |
| R 68LR | Carbon film 12Kohm±5% 1/8W | | 0123946 | R155 | Carbon film 22ohm±10% 1/2W | | 0113221 |
| R 69LR | Carbon film 470Kohm±5% 1/8W | | 0123965 | R158 | Carbon film 1.8Kohm±5% 1/8W | | 0123936 |
| R 70LR | Carbon film 470Kohm±5% 1/8W | | 0123965 | R159 | Carbon film 3.3Kohm±5% 1/8W | | 0123939 |
| R 71LR | Carbon film 68Kohm±5% 1/8W | | 0123955 | R160 | Carbon film 390ohm±5% 1/4W | | 0137808 |
| R 72LR | Carbon film 5.6Kohm±5% 1/8W | | 0123942 | R161 | Carbon film 2.2Kohm±5% 1/4W | | 0137855 |
| R 73LR | Carbon film 1.2Kohm±5% 1/8W | | 0123934 | R162 | Carbon film 22Kohm±5% 1/4W | | 0137905 |
| R 74LR | Carbon film 22Kohm±5% 1/4W | | 0137905 | R163 | Carbon film 5.6Kohm±5% 1/4W | | 0137860 |
| R 75LR | Carbon film 22Kohm±5% 1/4W | | 0137905 | RT1LR | Semi variable 10Kohm | P0652 | 0151886 |
| R 81LR | Carbon film 47Kohm±5% 1/8W | | 0123953 | RT2LR | Semi variable 47Kohm | P0652 | 0151886 |
| R 82LR | Carbon film 3.9Kohm±5% 1/8W | | 0123940 | RT3LR | Semi variable 4.7Kohm | P6112 | 0151885 |
| R 83LR | Carbon film 5.6Kohm±5% 1/8W | | 0123942 | RT4LR | Semi variable 220Kohm | P6125 | 0151890 |
| R 84LR | Carbon film 220ohm±5% 1/8W | | 0123925 | RT5LR | Semi variable 10Kohm | P0652 | 0151886 |
| R 85LR | Carbon film 12Kohm±5% 1/8W | | 0123946 | RT6LR | Semi variable 10Kohm | P0652 | 0151886 |
| R 86R | Carbon film 270Kohm±5% 1/8W | | 0123962 | RT7LR | Semi variable 47Kohm | P0657 | 0151888 |
| R 86L | Carbon film 270Kohm±5% 1/4W | | 0137956 | RV1LR | Variable 20Kohm (B) | P1884 | 5000307 |
| R 87L | Carbon film 270Kohm±5% 1/4W | | 0137956 | RV2LR | Variable 10Kohm (B) | P1885 | 5000344 |
| R 87R | Carbon film 270Kohm±5% 1/8W | | 0123962 | RV3LR | Variable 10Kohm (B) | P1886 | 5000142 |
| R 91LR | Carbon film 33Kohm±5% 1/8W | | 0123951 | RV4LR | Variable 10Kohm (B) | P1887 | 0151435 |
| R 92LR | Carbon film 820Kohm±5% 1/8W | | 0123968 | RV5 | Variable 5Kohm (B) | P1888 | 5000435 |
| R 93LR | Carbon film 330ohm±10% 1/2W | | 0113293 | SEMI-CONDUCTORS : | | | |
| R 94LR | Carbon film 10Kohm±5% 1/8W | | 0123945 | Q 1LR | Transistor 2SC458D-LG | | 5320024 |
| R 95LR | Carbon film 100ohm±5% 1/8W | | 0123921 | Q 2LR | Transistor 2SC458D-LG | | 5320024 |
| R 96LR | Carbon film 39Kohm±5% 1/8W | | 0123952 | Q 3LR | Transistor 2SD467B | | 5321192 |
| R 97LR | Carbon film 33Kohm±5% 1/8W | | 0123951 | Q 4LR | Transistor 2SC1740LN-E | | 5321295 |
| R 98LR | Carbon film 12Kohm±5% 1/8W | | 0123946 | Q 5LR | Transistor 2SD467B | | 5321192 |
| R 99LR | Carbon film 2.7Kohm±5% 1/8W | | 0123938 | Q 6LR | Transistor 2SD467B | | 5321192 |
| R100LR | Carbon film 220ohm±5% 1/4W | | 0137805 | Q 7LR | Transistor 2SC1740LN-E | | 5321295 |
| R101LR | Carbon film 120Kohm±5% 1/8W | | 0123958 | Q 8LR | Transistor 2SD467B | | 5321192 |
| R102LR | Carbon film 68Kohm±5% 1/8W | | 0123955 | Q 9LR | Transistor 2SC1740LN-E | | 5321295 |
| R103LR | Carbon film 2.2Kohm±5% 1/8W | | 0123937 | Q10LR | Transistor 2SC1740LN-E | | 5321295 |
| R104LR | Carbon film 4.7Kohm±5% 1/8W | | 0123941 | Q11 | Transistor 2SC1162WT | | 5320643 |
| R105LR | Carbon film 390Kohm±5% 1/4W | | 0137958 | Q12 | Transistor 2SA673C | | 5320593 |
| R106L | Carbon film 12Kohm±5% 1/4W | | 0137902 | Q13 | Transistor 2SC1740LN-E | | 5321295 |
| R106R | Carbon film 12Kohm±5% 1/8W | | 0123946 | Q14 | Transistor 2SC1061C | | 5320433 |
| R107LR | Carbon film 12Kohm±5% 1/8W | | 0123946 | Q15 | Transistor 2SC1740LN-E | | 5321295 |
| R111 | Carbon film 2.2Kohm±5% 1/8W | | 0123937 | Q16 | Transistor 2SC1740 | | 5321192 |
| R112 | Carbon film 1Kohm±5% 1/8W | | 0123933 | Q17 | Transistor 2SA673C | | 5320593 |
| R113 | Carbon film 2.2Kohm±5% 1/8W | | 0123937 | IC1LR | IC HA1406 | | 5350251 |
| R114 | Carbon film 82ohm±10% 1/2W | | 0113228 | IC2 | IC HA11226 | | 5350561 |
| R115 | Carbon film 680ohm±5% 1/8W | | 0123931 | IC3LR | IC HA1406 | | 5350251 |
| R116 | Carbon film 82ohm±10% 1/2W | | 0113228 | IC4 | IC HA11226 | | 5350561 |
| R117 | Carbon film 270ohm±5% 1/8W | | 0123926 | IC5 | IC HJM4558 | | 5350601 |
| R118 | Carbon film 470ohm±5% 1/4W | | 0170239 | O1LR | Diode IS2473HC | | 5330572 |
| R119 | Carbon film 4.7Kohm±5% 1/4W | | 0137859 | O2LR | Diode IN34A-TF1 | | 5330721 |
| R120 | Carbon film 120ohm±5% 1/8W | | 0123922 | O3LR | Diode IS2473HC | | 5330572 |
| R121 | Carbon film 6.8Kohm±5% 1/8W | | 0123943 | O4LR | Diode IN34A-TF1 | | 5330721 |
| R122 | Carbon film 10ohm±5% 1/8W | | 0123909 | O5LR | Diode IN34A-TF1 | | 5330721 |
| R123 | Carbon film 220ohm±5% 1/8W | | 0123925 | O6LR | Diode IN34A-TF1 | | 5330721 |
| R124 | Carbon film 330ohm±5% 1/4W | | 0137807 | D7 | Diode IS2473HC | | 5330572 |
| R127 | Carbon film 68Kohm±5% 1/8W | | 0123955 | D8 | Diode IS2473VE | | 5330571 |
| R128 | Carbon film 12Kohm±5% 1/8W | | 0123946 | D9 | Diode IS2473HC | | 5330572 |
| R129 | Carbon film 100ohm±5% 1/8W | | 0123921 | D10 | Diode V06C | | 5330101 |
| R130 | Carbon film 4.7Kohm±5% 1/8W | | 0123941 | D11 | Diode V06C | | 5330101 |
| R131 | Carbon film 12Kohm±5% 1/8W | | 0123946 | D12 | Diode W06A | | 5330341 |
| R132 | Carbon film 12Kohm±5% 1/8W | | 0123946 | D13 | Diode W06A | | 5330341 |
| R133 | Carbon film 12Kohm±5% 1/8W | | 0123946 | D14 | Diode LEDSLP-24B | | DX0988 |
| R134 | Carbon film 12Kohm±5% 1/8W | | 0123946 | | | | 5380101 |

| Ref. No. | Description | R.S. PART No. | MFR'S PART No. | Ref. No. | Description | R.S. PART No. | MFR'S PART No. | |
|----------------------------|--|---------------|----------------|--|--|------------------|----------------|---------|
| D15 | Diode LEDSLP-24B | DX0989 | 5380111 | 29 | Bind tapping screw-3mmφ×10mm | | 8788410 | |
| D16 | Diode W06A | | 5330341 | 30 | (6 req'd) for bottom cover mounting | | | |
| D18 | Diode IS2473HC | | 5330572 | | Rating metal (U.S.A.) | | 6653246 | |
| D100 | Diode W06A | | 5330341 | | Rating metal (CANADA) | | 6653244 | |
| ZD1 | Zener diode HZ-15 | | 5330541 | | Rating metal (EUROPE) | | 6653247 | |
| ZD2 | Zener diode HZ-12A | | 5330531 | | Rating metal (U.K., AUSTRALIA) | | 6653248 | |
| TRANSFORMERS : | | | | 31 32 33 | Rating metal (JAPAN) | | 6653249 | |
| T 1 | Bias osc coil | CA3941 | 5260231 | | DIN metal | HB7752 | 6629662 | |
| PT | Power trans. (U.S.A.) | | 5212031 | | Knob (DIN OUTPUT) | K2986 | 6262182 | |
| PT | Power trans. (CANADA) | TA0675 | 5211906 | | Knob (BIAS FINE) | K2987 | 6287281 | |
| | Power trans. (EUROPE) | | 5211777 | for Chassis Assembly | | | | |
| | Power trans. (AUSTRALIA) | | 5211776 | 34 | Mold chassis ass. | | 6742157 | |
| | Power trans. (JAPAN) | | 5211771 | 35 | Bind tapping screw-3mmφ×12mm | | 8798412 | |
| COILS : | | | | 36 37 38 39 40 | (4 req'd) for chassis mounting | | | |
| L1LR | Choke coil 33mH | CB2400 | 5120304 | | Lock washer-3mmφ | | 8815114 | |
| L2LR | Choke coil 33mH | CB2290 | 5260215 | | Pan head screw-3mmφ×5mm | | 8711405 | |
| L3LR | Choke coil 2.5mH | CB2289 | 5120274 | | (2 req'd) for push switch mounting | | | |
| L4LR | Choke coil 33mH | | 5260215 | | Bind tapping screw-3mmφ×10mm | | 8788410 | |
| L5LR | Choke coil 33mH | | 5120304 | (4 req'd) for min P.C.B., mounting | | | | |
| for P.C.B. Assembly | | | | 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 | Record holder ass. | RT1386 | 7291034 | |
| PL3 | Pilot lamp | L0912 | 5762036 | | Record spring | RB6180 | 6300373 | |
| JK1, 2 | Jacks (Mic. & Headphone) | J0967 | 5679402 | | FT bind screw-3mmφ×6mm | | 8741406 | |
| JK3, 4 | Pin jack assembly(AUX IN & PREAMP OUT) | J0749 | 5676082 | | (2 req'd) for record holder mounting | | | |
| JK5 | DIN socket | J6205 | 5651141 | | Record arm | RT1387 | 7295721 | |
| S1 | Slide switch (for Rec./Play) | S2456 | 5623371 | | Guide collar | HB7753 | 7574352 | |
| S2, 3, 4 | Lever switch (Bias, Equalizer, Dolby NR) | S0854 | 5604211 | | Pan head screw with washer-3mmφ×6mm | RB6181 | 8660406 | |
| S5, 6 | Push switch (Monitor, Input) | S7373 | 5634133 | | Record rod | HB7754 | 7295731 | |
| S7 | Push switch (Dolby calibrate) | S7374 | 5630837 | | Counter holder | HB7755 | 6741982 | |
| S8 | Push switch (DIN output) | S7375 | 5633161 | | FT bind screw-3mmφ×8mm | | 8641408 | |
| S11 | Push switch (Power) | S7376 | 5633271 | | (1 req'd) for counter holder mounting | | | |
| RL1 | Reed relay | R8098 | 5641111 | | Washer-3mmφ | D2078 | 5559022 | |
| F1, 2 | Fuse 630mA | | 5720174 | | Counter | | 8660406 | |
| F3 | Fuse 250mA (EUROPE) | | 5721012 | | Pan load screw with washer-3mmφ×6mm | B6372 | 6354481 | |
| for Final Assembly | | | | | 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 | Belt for counter | RT1388 | 6746171 |
| 1 | Front panel ass. (U.S.A., CANADA, EUROPE, U.K., AUSTRALIA) | Z4105 | 6221351 | | | Meter frame | M0388 | 5554551 |
| 2 | Front panel ass. (JAPAN) | | 6221352 | | | Level meter | | 5746441 |
| 3 | (2 req'd) for jack plate mounting | | 8788408 | Power cord (U.S.A., CANADA) | | | 5740653 | |
| 4 | Bind screw-3mmφ×8mm | | | Power cord (EUROPE) | | | 5746451 | |
| 5 | Bind screw-3mmφ×6mm | | | Power cord (U.K., AUSTRALIA) | | | 5740653 | |
| 6 | (3 req'd) for front panel mounting | | | Power cord (JAPAN) | | | 5740508 | |
| 7 | Lock washer-3mmφ | | | Bushing | | HB7756 | 6794081 | |
| 8 | Bind screw-3mmφ×25mm | HD2071 | 8745425 | Bushing (U.K., AUSTRALIA) | | | 6794031 | |
| 9 | (2 req'd) for front panel mounting | | | FT bind screw-3mmφ×8mm | | | 8641408 | |
| 10 | Bind screw-3mmφ×8mm | HD2057 | 8745408 | (2 req'd) for power trans. mounting | | | | |
| 11 | (1 req'd) for front panel mounting | | | Washer-3mmφ | | 8811114 | | |
| 12 | Cassette lid ass. | DA0244 | 6091291 | Switch lever | HB7757 | 6746191 | | |
| 13 | Function knob (REW, PLAY, FF, PAUSE, EJECT) | K2975 | 6255951 | for Cassette Deck Assembly | | | | |
| 14 | Function knob (RECORD) | K2976 | 6256481 | 60 | Relay pulley | RA2618 | 6421321 | |
| 15 | Function knob (STOP) | K2977 | 6256491 | 61 | Polyester washer | | 7778851 | |
| 16 | Marker ass. (REC VOL) | HB7749 | 6464401 | 62 | Belt | B6373 | 6354381 | |
| 17 | Marker (OUTPUT) | HB7750 | 6747911 | 63 | Flywheel belt | B6374 | 6357141 | |
| 18 | Knob ass. (RECORD LEVEL, L) | K2978 | 6287252 | 64 | Belt for take up | B6375 | 6354031 | |
| 19 | Knob ass. (RECORD LEVEL, R) | | | | | | | |

| Ref. No. | Description | R.S. PART No. | MFR'S PART No. | Ref. No. | Description | R.S. PART No. | MFR'S PART No. |
|--------------------------------|--|---------------|----------------|---------------|-----------------------------------|---------------|----------------|
| 85 | Spring washer for head plate | | 7189545 | 127 | Gear plate assembly | RA1303 | 7127937 |
| 86 | Poly slider washer for head plate | | 7786115 | 128 | Pan head screw-3mmφ×25mm | | 8711425 |
| 87 | Spring for play plate | | 6301423 | | (3 req'd) for gear plate mounting | | |
| 88 | Pressure roller arm assembly (R) | | 6743588 | 129 | AS prevention plate | HB7771 | 7295951 |
| 89 | Pressure roller arm assembly (L) | | 6743584 | 130 | Spring for AS prevention plate | RB6196 | 6308301 |
| 90 | Poly slider washer | | 7778856 | 131 | Pause lock plate assembly | RT1393 | 7287413 |
| 91 | Spring washer | | 7189547 | 132 | Spring for pause lock plate | RB6197 | 6323732 |
| 92 | "E" ring for pressure roller arm | | 7230901 | 133 | AS lever | HB7772 | 6741521 |
| 93 | Spring for pressure roller arm | RB6184 | 6301731 | 134 | Stop arm | HB7773 | 6741702 |
| 94 | Spring for pressure roller arm | RB6185 | 6301735 | 135 | Play gear | RA2619 | 6348665 |
| 95 | Brake plate | HB7760 | 7297242 | 136 | Spring for play gear | RB6198 | 6303112 |
| 96 | Polyester washer | | 0020784 | 137 | Gear moving arm | HB7774 | 6741516 |
| 97 | Brake rubber | HB7761 | 6586071 | 138 | Spring for gear moving arm | RA5555 | 6324811 |
| 98 | Brake spring | RB6186 | 6308072 | 139 | Play arm | RT1394 | 6741497 |
| 99 | Play plate assembly | RT1390 | 7296067 | 140 | Spring for play arm | RA5807 | 6324591 |
| 100 | Poly slider washer | | 7786113 | 141 | "E" ring for play arm | | 7230901 |
| 101 | Felt | | 7740392 | 142 | Thrust support | HB7775 | 6741551 |
| 102 | Collar for play plate | HB7762 | 7574355 | 143 | Button holder assembly | K2988 | 6255947 |
| 103 | FT bind screw-3mmφ×6mm | | 8641406 | 144 | FT bind screw-3mmφ×6mm | | 8641406 |
| for play plate mounting | | | | 145 | Recording arm | | 7290493 |
| | | | | 146 | "E" ring for recording arm | | 7230902 |
| 104 | Pause lever | HB7763 | 7297259 | 147 | Eject arm | | 7287462 |
| 105 | Pause change arm | HB7764 | 7297225 | 148 | Spacer for eject arm | | 7574832 |
| 106 | Spring for pause lever | RB6187 | 6308361 | 149 | FT bind screw-3mmφ×12mm | | 8641412 |
| 107 | Recording slider assembly | RT1391 | 7287064 | | (1 req'd) for eject arm mounting | | |
| 108 | Spring for pause lever | RB6188 | 6301011 | 150 | Cassette holder assembly | Z4108 | 7107052 |
| 109 | Rewind slider | HB7765 | 7287114 | 151 | Spring for tray arm | RB6199 | 6319693 |
| 110 | Spring support | HB7766 | 7661777 | 152 | Spring for eject slider | RB6200 | 6325061 |
| 111 | Spring for rewind slider | RB6189 | 6300982 | 153 | Governor | RT1395 | 7290501 |
| 112 | Play slider | HB7767 | 7287104 | 154 | Pan head screw-2.6mmφ×5mm | | 0711305 |
| 113 | Spring for play slider | RB6190 | 6325842 | | (1 req'd) for governor mounting | | |
| 114 | F. F. slider | HB7768 | 7287095 | 155 | Spring for stop arm | RB6201 | 6300843 |
| 115 | Spring for F. F. slider | RB6189 | 6300982 | 156 | Stop arm | HB7776 | 6744101 |
| 116 | Pause slider assembly | RT1392 | 7287138 | 157 | Rubber for stop arm | HB7777 | 6560234 |
| 117 | Spring for pause slider | RB6192 | 6300074 | 158 | "E" ring for stop arm | | 7230901 |
| 118 | Pause lock arm | HB7769 | 7286962 | 159 | Polyester washer | | 7771761 |
| 119 | Spring for pause lock arm | RB6193 | 6307933 | 160 | Ground spring | RB6202 | 6309832 |
| 120 | Spacer | | 7574665 | 161 | R & P combination head | H4346 | 5444511 |
| 121 | FT bind screw-3mmφ×12mm | | 8641412 | 162 | Erase head | H4347 | 5445161 |
| 122 | Spring | RB6194 | 6300142 | 163(S10, S12) | Leaf switch (MOTOR, PAUSE) | S8166 | 5603091 |
| 123 | Slider cover | HB7770 | 6741485 | 164 (S9) | Leaf switch (STOP) | S8167 | 5632712 |
| 124 | Spacer for slider cover | HB2959 | 7574591 | 165 | Diode W06A | | 5330341 |
| 125 | FT bind screw-3mmφ×10mm for slider cover mounting | | 8641410 | 166 | Carbon film 22Kohm±5% 1/8F | | 0123949 |
| 126 | Spring for lock plate | HB6195 | 6307871 | | | | |

RADIO SHACK  **A DIVISION OF TANDY CORPORATION**

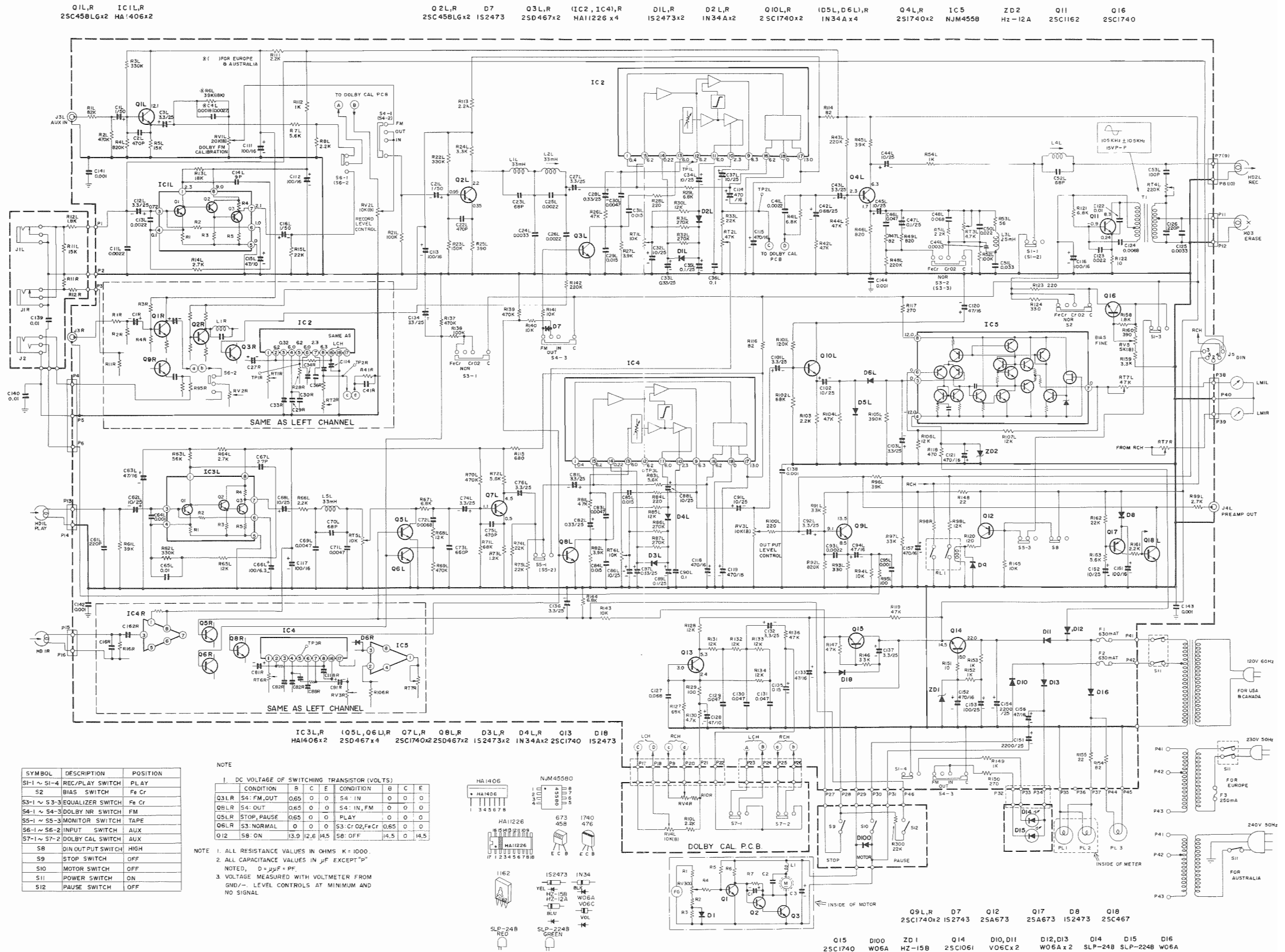
U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO, L4M 4W5

TANDY CORPORATION

AUSTRALIA
280-316 VICTORIA ROAD
RYDALMERE, N.S.W. 2116

BELGIUM
PARC INDUSTRIEL DE NANINNE
5140 NANINNE

U. K.
BILSTON ROAD
WEDNESBURY, WEST MIDLANDS WS10 7JN



| SYMBOL | DESCRIPTION | POSITION |
|-------------|-------------------|----------|
| S1-1 ~ S1-4 | REC/PLAY SWITCH | PLAY |
| S2 | BIAS SWITCH | Fe Cr |
| S3-1 ~ S3-3 | EQUALIZER SWITCH | Fe Cr |
| S4-1 ~ S4-3 | DOLBY NR SWITCH | FM |
| S5-1 ~ S5-3 | MONITOR SWITCH | TAPE |
| S6-1 ~ S6-2 | INPUT SWITCH | AUX |
| S7-1 ~ S7-2 | DOLBY CAL SWITCH | AUX |
| S8 | DIN OUTPUT SWITCH | HIGH |
| S9 | STOP SWITCH | OFF |
| S10 | MOTOR SWITCH | OFF |
| S11 | POWER SWITCH | ON |
| S12 | PAUSE SWITCH | OFF |

NOTE 1. DC VOLTAGE OF SWITCHING TRANSISTOR (VOLTS)

| CONDITION | B | C | E | CONDITION | B | C | E |
|------------------|------|------|------|------------------|------|---|------|
| Q3L,R S4: FM_OUT | 0.65 | 0 | 0 | S4: IN_FM | 0 | 0 | 0 |
| Q8L,R S4: OUT | 0.65 | 0 | 0 | S4: PLAY | 0 | 0 | 0 |
| Q5L,R S3: NORMAL | 0 | 0 | 0 | S3: Cr O2, Fe Cr | 0.65 | 0 | 0 |
| Q12 S8: ON | 13.9 | 12.6 | 14.5 | S8: OFF | 14.5 | 0 | 14.5 |

- NOTE 1. ALL RESISTANCE VALUES IN OHMS K = 1000.
 2. ALL CAPACITANCE VALUES IN μF EXCEPT "P"
 NOTED, D = μF, F = PF.
 3. VOLTAGE MEASURED WITH VOLTMETER FROM GND/- LEVEL CONTROLS AT MINIMUM AND NO SIGNAL

