NEC Authentic series

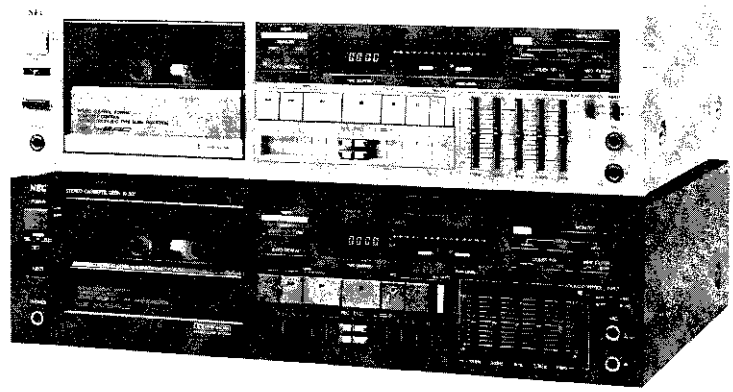
MODEL: K537E (SG)/(BG)

STEREO AMPLIFIER

SERVICE MANUAL

ORDER No. 499-91-0229

Better Service
Better Reputation
Better Profit



SPECIFICATIONS

Track Format	4-Track, 2-channel stereo
Head Configuration	Permalloy/ferrite combination
	Recording/Playback Head × 1
	Erasing Head × 1
Motor	Servo controlled DC Motor × 1
	Capstan DC Motor × 2 (reel and take-up)
Wow & Flutter	Less than 0.04% WRMS
Fast Forward/Response:	
Normal (at −20 dB)	20 – 19,000 Hz
CrO_2 (at −20 dB)	20 – 20,000 Hz
METAL (at −20 dB)	20 – 21,000 Hz
Signal to Noise Ratio	
(METAL TAPE)	57 dB (DOLBY NR OFF)
	65 dB (DOLBY NR B-type)
	72 dB (DOLBY NR C-type)
Distortion	Less than 1.0% (NORMAL TAPE)
Input Impedance;	
MIC	0.25 mV/10 kΩ
LINE	60 mV/47 kΩ
Output (load impedance):	
LINE	400 mV/47 kΩ
HEADPHONE	65 mV/8Ω
Power Supply	AC115/230V 50/60 Hz
Power Consumption	24W
Dimensions	430(W)×110(H)×310(D) mm
Weight	6.8 kg

Note: The above specifications are subject to change without notice for further improvement.

NEC Corporation
TOKYO, JAPAN

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OPERATION OF K537E

IMPORTANT ON POWER SUPPLY

For SG type

Your unit is factory preset for 230V. However every unit has a switch to select 115V (suitable for 110 – 120V) or 230V (suitable for 220 – 240V) to suit your local voltage. This can be easily done by changing the voltage selector dia. (See Fig. 1)

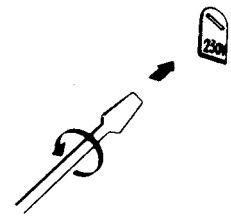


Fig. 1 For SG type

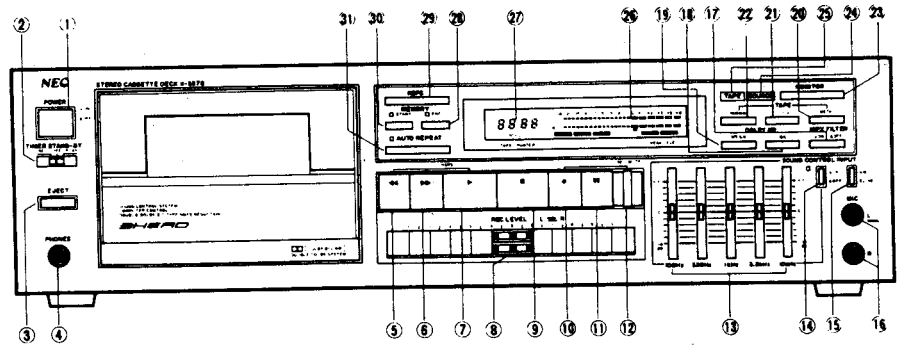


Fig. 2 Location of Controls and Indicators

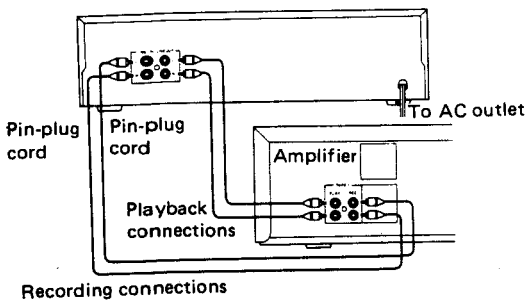


Fig. 3 Connection to an Amplifier

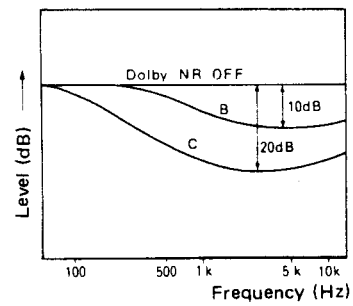
LOCATIONS AND FUNCTIONS OF PARTS (Fig. 2)

1. **POWER Switch**
   Turns the power on and off.
2. **TIMER STANDBY**
   For recording and playback with an accessory timer.
3. **EJECT Button**
   Depress to open the cassette compartment.
   Tape counter returns to zero and memory is reset.
4. **PHONES**
   For connection with a stereo headphone to monitor recording or playback.
5. **REW Button**
   Depress to rewind tape.
6. **FF(fast forward) Button**
   Depress for rapid tape advantage.
7. **PLAY Button**
   Depress to play back a tape.
8. **REC (Record) LEVEL Control Knob**
   Slide lever to adjust recording signal level; the Peak Level Meter will indicate the power of reponse.
9. **STOP Button**
   Depress to stop tape.
10. **REC (Record) Button**
    Depress for recording. The REC button (red lamp) and PLAY button (green lamp) will illuminate simultaneously, and recording will start at the touch of the button.
11. **PAUSE Button**
    Depress to stop the tape advance temporarily in both record and play modes; depress again to restart tape.
    MODE INDICATOR LAMPS: When you press any mode button other than STOP, the respective indicator lamp glows to indicate the mode of operation.
12. **REC (Record) MUTE Button**
    Automatically inserts a 4-second pause between selections or programs on a tape.
13. **SOUND CONTROL System**
    A built-in 5-band graphic equalizer enables control of sound frequencies to suit your playing environment.
14. **SOUND CONTROL Switch**
    Turns the graphic equalizer "sound control system" on and off.
15. **INPUT Selector Switch**
    Place the switch in LINE (switch released) position to record from program sources connected to the LINE IN jacks in the rear panel; place in the MIC position (switch depressed) for recording with microphones.
16. **MIC Jacks**
    Connects left and right microphone plugs for stereo recording with microphones; use left jack for mono recording.
17. **MPX FILTER Switch**
    Set to the ON position when recording FM stereo programs with the Dolby NR System activated.

18. **METAL Tape Selector Switch**
    Depress when using metal type tapes.
19. **MONITOR Selector Switch**
    Enables monitoring of either TAPE or SOURCE. Depress the switch to monitor SOURCE; release the switch for TAPE.
20. **DOLBY NR (Noise Reduction) B/C Type Selector**
    Depress switch for DOLBY C-type noise reduction; release for B-type Dolby noise reduction.
21. **CrO_2 Tape Selector Switch**
    Depress when using CrO_2 type tapes.
22. **SOURCE Indicator Lamp**
    Lights when MONITORS Switch is set for SOURCE.
23. **TAPE Indicator Lamp**
    Lights when the MONITOR Switch is set for TAPE.
24. **NORMAL Tape Selector Switch**
    Depress when using Normal type tapes.
25. **DOLBY NR (Noise Reduction) ON/OFF switch**
    Set the switch to ON for both recording and playback using either B or C type Dolby Noise reduction.
26. **Peak Level Meter**
    Indicates the recording level when the deck is in the recording mode, and level of recorded signals during playback. The lower portion of the level meter indicates the tape selector mode (NORMAL, CrO_2, METAL) and the Dolby NR B/C selector mode setting.
27. **Tape Counter**
    An electronic digital counter that indicates the tape count. When you depress the NSPS Button, the readout switches over to the NSPS display.
28. **MEMORY END Button**
    Used for automatic stop and rewind at the end of a preselected tape position; LED glows above the switch when activated.
29. **NSPS (NEC Search & Play System) Button**
    Depress to use the automatic program search. When the NSPS Button is depressed, the tape counter switches from the tape counter display to the NSPS count display.
30. **MEMORY START Button**
    Used to set a tape for automatic start at the beginning of a preselected tape position.
    LED glows above the switch when activated.
31. **AUTO REPEAT Switch**
    Used for activation of Memory Start, Memory End, Memory Repeat and Intermittent Memory Repeat functions.

FEATURES

- **3-Motor CC (Computer Control) Mechanism**
  The K-537's 3-Motor Computer control Mechanism does away with a plunger and clutch, thereby eliminating unstable factors during recording and playback such as clutch torque slippage and plunger shock.
  With computer control, smooth and stable tape transport is always assured.
- **Electronically controlled Motor in Head Mechanism**
  In locating the heads in the cassette portion of the K-537, a special electronic motor was employed that ensures smooth and shockless operation of the heads.
- **Combination 3-Head System with Nonoxidized Copper Coil**
  The K-537 utilizes a combination, 3-Head (record, playback and erasure) system which offers the advantages of monitoring during recording plus independent functioning of both the record and playback heads. It also offers the advantages of flexibility in terms of head-gap setting. In conventional systems, the head-gaps are situated so that the recording head gap is normally wider than the playback head gap to improve frequency characteristics and dynamic range.
  In contrast, the 3-head system used in the K-537 permits free setting of head gap width for both heads and was designed to offer additional advantages from the standpoint of timing. A six-layer laminated and highly wear resistant permalloy was used for the recording head to minize wear to one-forth of that of conventional heads.
  Sendust was also employed in the core of this head for improved durability. For the playback head, a high-density ferrite head was used which offers reduced friction and greater resistance to temperatures and has a granular magnetic diameter reduced to less than one-half of that of conventional heads.
  For the coiling, non-oxidized copper coiling with 99.99% purity was used to reduce transfer loss in high frequencies and to resolve frequency distortion, giving the K-537 its clear, sharp, distinct sound. For the erasing head, the high efficiency, double-gap type was used.
- **Built-in 5-Band Graphic Equalizer "Sound Control System"**
  A built-in 5-band graphic equalizer "sound control system" enables adjustment of the sound field to suit your listening environment. Centering on the frequencies of 100 Hz, 330 Hz, 1 kHz, 3.3 kHz and 10 kHz, it assures excellent sound reproduction from a wide variety of tape sources.
- **NSPS (NEC Search & Play System)**
  The handy, built-in Search & Play system developed by NEC enables you to search out up to 15 musical programs in advanced of and preceding your present tape position.
  Activate the search and play system and the tape advances automatically to the program sought and begins to play.
- **Memory System (Memory START/END, Auto Memory Repeat, Intermittent Memory Repeat)**
  K-537's memory system features a variety of different memory functions that enable you to pick out a section of a tape and automatically replay an entire tape or tape section up to six times.
- **Illuminating Peak-Level Meter**
  The illuminating peak level meter is easy to see, and offers a quick response for highly accurate sound level setting.
- **Easy to Operate REC. MUTE**
  The easy to operate Record Mute Control enables you to insert a 4-sec pause at the end of each recording. This facilitate search and play, and enables you to cut out unwanted portions of programs or commercial broadcasts.



B-Type and C-Type Dolby NR

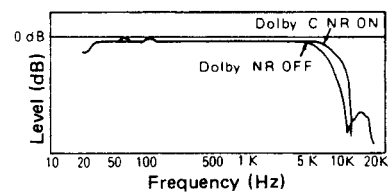


Fig. 3 Noise Reduction

DOLBY NR (NOISE REDUCTION) SYSTEM

The K-537 features both features both B-type and the latest C-type Dolby NR (Noise Reduction). Dolby NR (noise reduction) is the internationally accepted method of reducing the "hiss" noise that is generated when you playback a tape.

- Hiss noise is of very high frequencies, and becomes particularly obvious and annoying when mixing with weak (low-level) signals. Taking advantage of this fact, the Dolby NR system raises the level of high-frequency signals when recording low-level signals, thenproportionately reduces the level of such high-frequency signals during playback.
  Though this process the hiss noise is compressed and reduced.

Recording Level

Preset the recording levels the same as you would for recording without Dolby NR. IF you are recording with microphones or other sources with a wide dynamic range, however, set the recording levels somewhat lower.

For recording with the Dolby System:

Set the Dolby NR ON/OFF switch to ON, and set the Dolby NR B/C TYPE SELECTOR for B or C type as required.

For playback with Dolby NR:

To playback cassettes previously recorded with the Dolby NR System, set the Dolby NR ON/OFF Switch to ON, and set the B/C TYPE SELECTOR switch to match the Dolby type (B or C) used for the particular recording.

- Do not leave the Dolby system on when playing tapes that were recorded without Dolby NR, or forget to turn on the Dolby NR when recording tapes made with Dolby NR. In both instances and unnatural sound effect will be produced.

Dolby NR B-Type and C-Type

Both B-Type and the latest C-Type Dolby NR work on the principle of raising high frequency signals during recording and proportionally reducing playback to reduce "hiss" noise. However, Dolby C-Type provides twice as much noise reduction as the common Dolby B. To achieve this effect, two, 10 dB skewing processors constructed in two layers were used. In addition, spectral skewing and anti saturation network circuits were provided to improve high-frequency linearity. Other effects of Dolby C-type include better noise reduction than B-type at low frequencies and reduction of breathing noise without causing a noticeable change in the sound quality.

DOLBY NR SYSTEM * MPX FILTER SWITCH * TIPS FOR BETTER RECORDING

- **Amount of Noise Reduction**
  As shown in Fig. 10, Dolby B type NR improves the signal-to-noise ratio by 10 dB at 5 kHz, and the new C-type improves it by 20 dB at 5 kHz, in comparison to when the Dolby system is off. Dolby C-type also operates at lower frequencies than B-type to offer a noise reduction effect in the midrange of the lower frequencies.
- **Anti-saturation Network**
  Dolby C-type features an anti-saturation network to prevent sound saturation by raising weak signals during recording and restoring them to original levels during playback. The result is that whereas saturation will occur for high input levels with Dolby B-type, with C-type saturation it is not produced at high input levels (see Fig. 3).

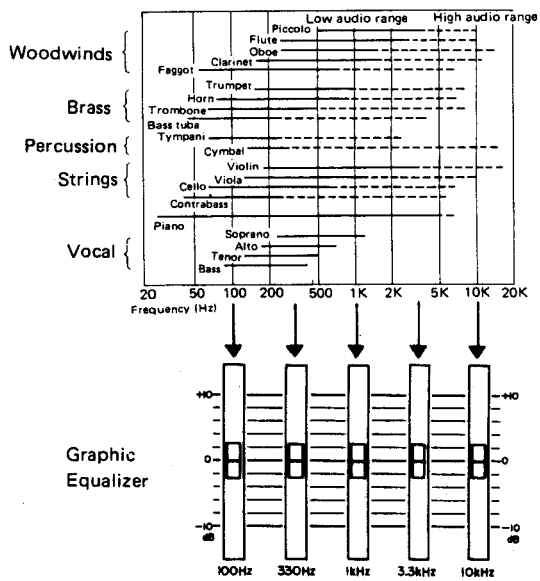


Fig. 4 Response Ranges for Instruments and Vocals

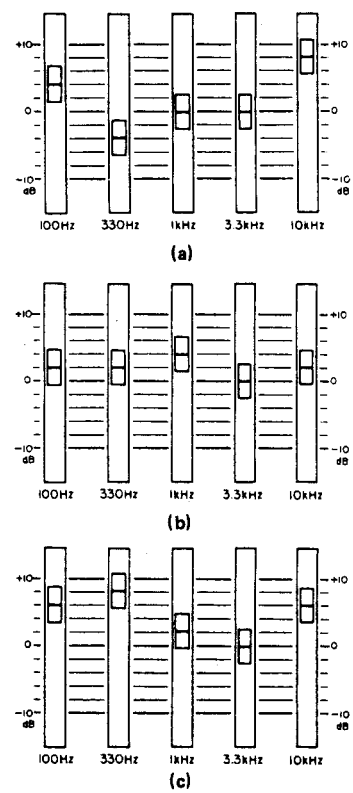


Fig. 5 Equalizer Settings

Proceed as follows:

1. Set the tape deck's monitor switch to SOURCE.
2. Set the REC Level Selector to the appropriate level.
3. Set the SOUND CONTROL Switch to ON.
4. Adjust the graphic equalizer Sound Control knobs to create the desired sound effect.

USING THE GRAPHIC EQUALIZER "SOUND CONTROL SYSTEM"(Fig. 4)

How to Use the Sound Control System

The sound control system consists of the built-in graphic equalizer which is operated by independent Sound Control Knobs.

The Graphic Equalizer

The K537's built-in graphic equalizer features 5-bands centering on frequencies of 100 Hz, 330 Hz, 1 kHz, 3.3 kHz and 10 kHz. By sliding the Sound Control Knobs upward the response is increased for a respective frequency, by sliding them downward the response is weakened. By thus manipulating the Sound Control Knobs for the respective frequency bands, the overall sound field can be controlled to suit your listening environment. This not only allows you to create a flatter sound, but also permits you to create the effect of a live recording. A "disco" effect can be added to tapes for playing with a car stereo, for example, or the equalizer can be used simply to reduce tape hiss. Through adjustment the five knobs of the graphic equalizer, you can enter a new world of sound recording.

100 Hz: Has the effect of stabilizing sound; ideal for livening the effect of bass guitar and drums.

330 Hz: The basic frequency for male vocals and musical playback.

1 kHz: The idel frequency around which piano and woodwinds (female vocals) should be adjusted.

3.3 kHz: Brings out the brilliance of violin and other string instrument solos; the most pleasing frequency for listening.

10 kHz: Strenthens the effect of cymbals, triangles and other sharp sounding instruments.

Creating Various Sound Effects

To give a car stereo the effect of your listening room:

Create a wide range and live effect by centering the mid-range frequencies and strengthening the high and low frequencies. (Fig. 5a)

To add a feeling of liveliness to a female vocal:

Increase the response in the mid-range frequencies to add a warmth to the overall sound, and highlight the vocal. (Fig. 5b)

To create an impressive sound with small speakers:

Strengthen the high and low frequencies to create a brilliant, impressive sound with small speakers. (Fig. 5c)

The Sound Control Switch

This is the main control for the graphic equalizer. When using the equalizer, set the switch to ON. Experiment with various sound effects with the switch both ON and OFF, to compare the effect of equalizer with the original sound.

Other Uses of the Graphic Equalizer

The K-537's built-in graphic equalizer need not only be used in conjunction with the tape deck. When not playing tapes, it can also be used solely as a graphic equalizer to create different sound effects for other stereo components.

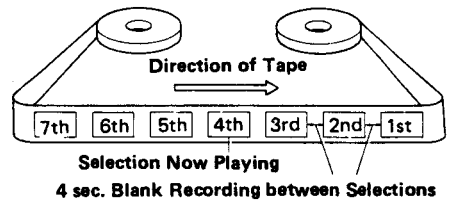


Fig. 6

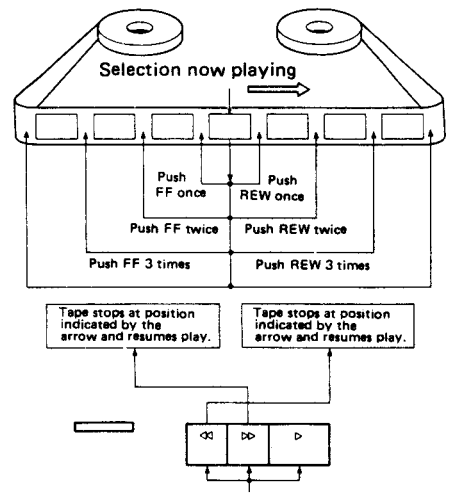


Fig. 7 Locating Selections in Advance of and Preceding the Present Tape Position

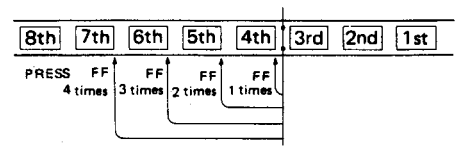


Fig. 8 Locating Selections in Advance With the Tape Positioned in between Selections

USING SPECIAL FEATURES

NSPS (NEC Search & Play System) (Fig. 6, 7)

The K-537 has a built-in search and play system (NSPS) which searches out the blank recording at the beginning of each selection, and starts the tape playback at the desired section, and starts the tape playback at the desired section. The system allows you to locate up to 15 selections in advance of or preceding your present tape position. The system works on the Principle of locating four-second blank spaces inserte at the beginning of each recording (to make 4-sec. blank recordings between selections, use the REC. MUTE system.)

Sample operation of the search and play system:

The NSPS works like this. If you are listening to selection 4, for example, and you wish to skip to selection 5:

1. Press the NSPS Button. The tape counter display will switch from the tape count display and display the NSPS count.
2. Press the fast forward button once. The NSPS count display will switch from "0" to "1", and the tape deck will begin locating the next selection (one blank space in advance of the present tape position). When it reaches the blank space before selection 5, the counter display will return to "0" and the selection will be played automatically.

If you wish to locate selection 7 from selection4:

As selection 7 is three blank spaces in advance of selection 4.(i.e., 4th – blank 1 – 5th – blank 2 – 6th – blank 3 – 7th), press the FF Button three times; the NSPS count display will indicate "3" and count down until it locates selection 7. When it locates the selection, the NSPS count returns to "0" and automatically plays the selection.

To locate the preceding selection:

As selection 3 is two blank spaces behind selection 4 (i.e., 4th – blank 1 – 3rd – blank 2), press the rewind button twice. When selection 3 is located, the counter display will return to "0" and the selection will play automatically.

To locate seledtion 1 from selection 4:

As selection 1 is four blank spaces behind selection 4, (i.e., 4th – blank 1 – 3rd – blank 2 – 2nd – blank 3 – 1st – blank 4), press REW four times. The NSPS count will display "4" and count down. When it reaches "0", the tape deck will automatically play selection 1.

To locate another selection with the tape positioned in between selections:

If the tape is positioned at the blank space before selection 4, for example, and you wish to locate selection 7, press the FF Button four times (once additionally to count the blank space before selection 4, see Fig. 8).

Correcting Errors:

1. If you press the FF or REW Button one time too many, you may correct error by pressing the opposite button. For example, if you've pressed the FF Button three times instead of two, press the REW Button once to correct the error, and visa versa.
2. If you should happen to accidentally press the Memory Start or Memory End Buttons while the NSPS is activated, the memory system cancels search and play operation and display. If this occurs, reactivate the NSPS.

Memory Start and Memory End Functions

The memory start and memory end system is used to search out preselected portions of the tape you wish to listen to. It enables you to automatically start or stop the tape at any position you desire.

A. Memory Start (Fig. 9)

1. Press the memory start button during recording or playback; the LED above the button lights to indicate that a memory start signal has been encoded for the tape.
2. Press the REW Button to rewind the tape when you reach the end of the section you are recording or playing back. When the tape reaches the point where the original memory start signal was encoded, it will stop automatically.
1. Press the AUTO REPEAT Button at this point; playback will automatically begin.

B. Memory End (Fig. 10)

1. Later, if you wish to encode the tape to stop automatically at a certain point during playback, press the Memory End Button when the tape reaches that point; the LED will light to indicate that a memory end signal has been encoded for the tape.
2. During subsequent playback, the tape will stop automatically at the point where you initially encoded the memory end signal.
3. Press the AUTO REPEAT Button at this point; the tape will automatically start to rewind.

Memory Repeat/Intermittent Memory Repeat

The K-537 also features memory repeat and intermittent memory repeat functions which allow you to repeat either the entire side of a tape up to six times or an preselected portion of the tape up to six times. These are used as follows.

A. Memory Repeat (Fig. 11)

1. Set the AUTO REPEAT Button to ON.
2. Press the Play button to start the tape.
3. When the tape reaches the end, it will automatically rewind and playback again from the beginning.

B. Intermittent Repeat (Fig. 12)

1. Set the AUTO REPEAT Switch to ON.
2. Press the Play button to start the tape.
3. When the tape reaches the point where you wish to have it start automatically for future use, press the MEMORY START Button; the LED will light above the button to indicate that a memory start signal has been encoded at this point.
4. When the tape reaches the end of the section you wish to have repeated, press the MEMORY END Button (LED above the button will light indicating that a memory end signal has been programmed at this point).
5. Press the REW Button to rewind the tape.
6. The tape will rewind until it reaches the point where the memory start button was originally pressed. From this point it will automatically replay up six times between the points where the memory start and memory end signals were encoded.

NOTE 1: If you activate the memory system while the tape is stopped, that tape position will not be memorized. If this occurs, operate the memory from the previously memorized tape position.

NOTE 2: The intermittent memory repeat functions only for sections of tape with a tape count of "14" or less. To program a section of tape with a count of less than 15 for automatic playback, program the memory end at a point where the count exceeds "14" beyond the end of the selection. (As shown in Fig. 13, program between points a and c, instead of a and b).

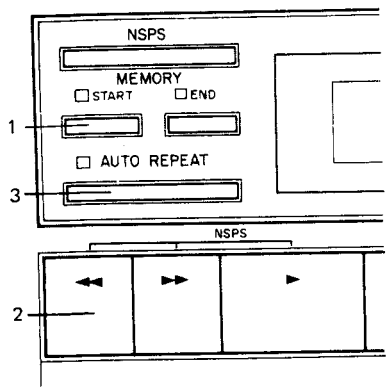


Fig. 9 Encoding a Memory Start Signal

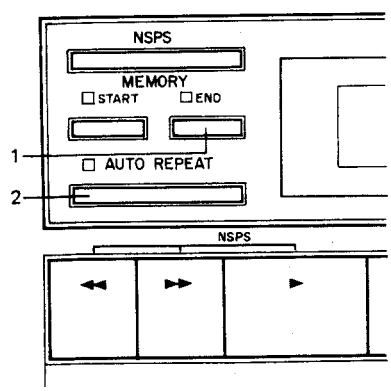


Fig. 10 Encoding a Memory End Signal

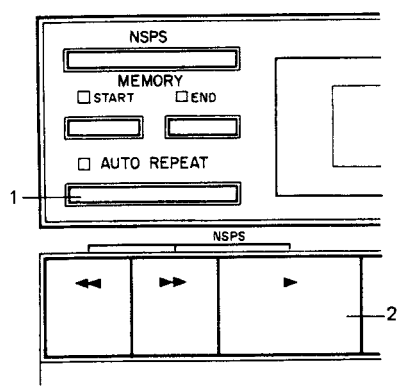


Fig. 11 Memory Repeat Procedure

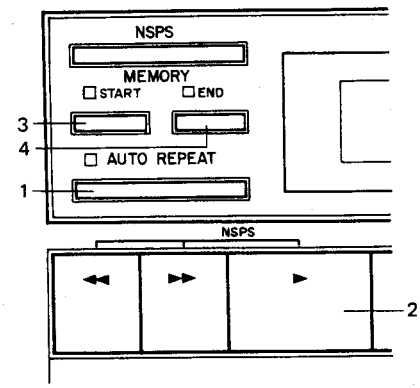
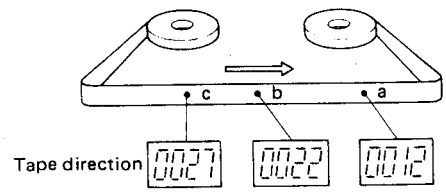


Fig. 12 Memory Repeat Procedure



Between points a and b: count is less than "14".
Between points a and c: count exceeds "14".

Fig. 13 Porgram auto memory repeat for sections of tape with a tape count of "14" or less

REC MUTE BUTTON (For Creating Blank Intervals between selections on the tape)(Fig. 14)

The REC MUTE (Record Mute) Button is used for automatically creating blank recording space between the selections on your tapes. When pressed at the end of a selection, it creates a blank interval of 4 seconds before the next selection. This feature is highly useful for creating the 4-second pause between selections that is necessary for the NEC Search and Play system to operate, and can also be used for cutting out unwanted talk and commercials when taping a broadcast.

To Create 4-second blank recordings automatically:

1. Press the REC Button to start the recording.
2. When you reach the end of the selection you are recording, immediately press the REC MUTE Button. This automatically inserts a 4-second blank recording at the end of the selection of the tape, and switches the deck over to the PAUSE (REC Stand-By) mode.
3. When you're ready to resume recording, press PAUSE manually; the deck will automatically record the next selection.

- The REC Button indicator flashes while the blank recording is being made.

To create blank recordings less than 4 seconds:

Blank recordings of less than 4 seconds may be created between selections by pressing the REC MUTE Button a second time, at the desired interval, before the initial 4 seconds have elapsed. In this instance, the tape deck bypasses the pause mode and immediately resumes recording.

To create blank recordings longer than 4 seconts:

To create blank intervals longer than four seconds on the tape, simply hold the REC MUTE Button depressed for the desired length of time. The deck automatically switches over to record standby mode, when you release you finger.

Double Automatic REC MUTE:

If you press the REC MUTE Button a second time while the deck is in the record standby mode (i.e., PAUSE and REC or PLAY indicators lit), the REC button will flash. When you press the PAUSE button point to advance the tape, and a second 4-second blank interval will be recorded on the tape. After the second blank recording, the deck automatically reverts again to record standby.

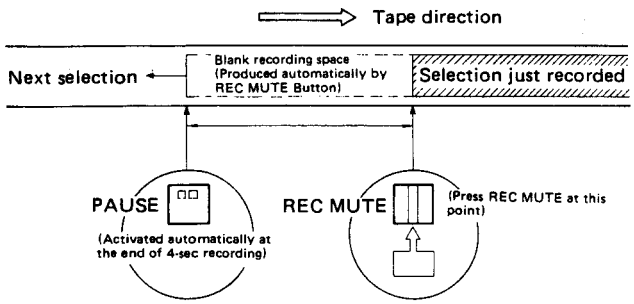
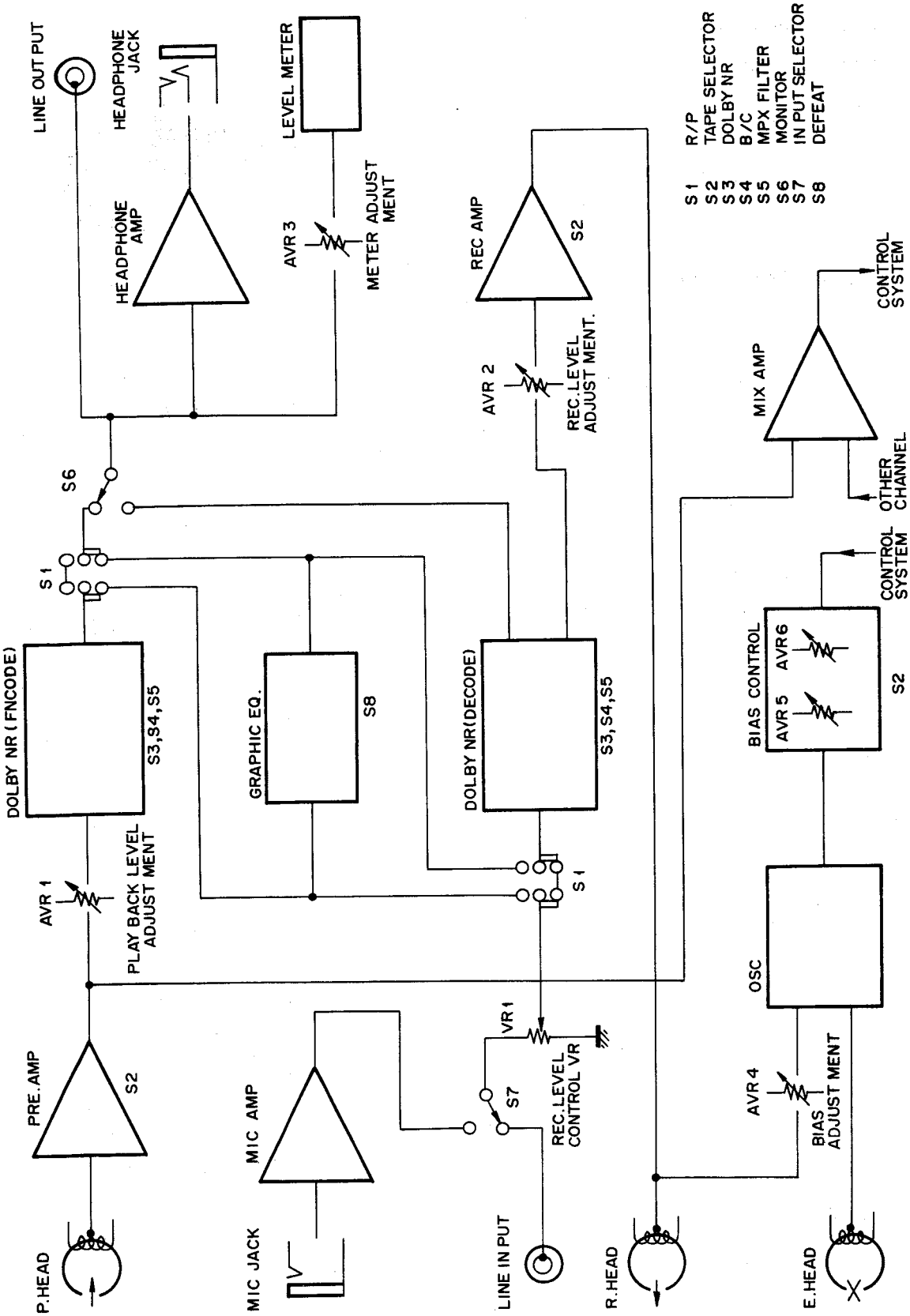


Fig. 22 Making Blank Recording with the REC MUTE Button

BLOCK DIAGRAM

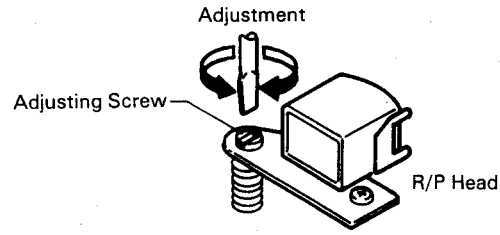


ALIGNMENT PROCEDURE

1. Head Azimuth Adjustment

Playback an azimuth adjusting tape (6.3 kHz or 10 kHz), and adjust the head adjusting screw to the maximum output level. (TEAC MTT-144)

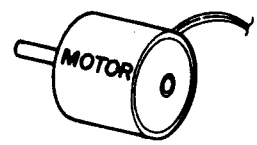
Setting:	Play
Input:	Tape (6.3 kHz or 10 kHz)
Output:	Line output (Connect voltmeter.)



2. Tape Speed Adjustment

Play back a standard test tape (3 kHz, TEAC MTT-111), and adjust the variable resistor on the motor so that the output will be 3 kHz ± 10 Hz while checking the output with the frequency counter.

Setting:	Play
Input:	Tape (3 kHz)
Output:	Line output (Connect frequency counter.)



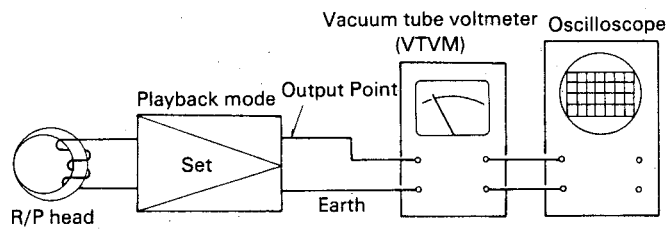
Tape Speed Control VR

3. Playback Sensitivity Adjustment

Playback a Dolby calibration tape (400 Hz, 200 pwb m/m), and adjust the semi-fixed AVRs so that the output will be 550 m V.

L CH: VR101
R CH: VR201

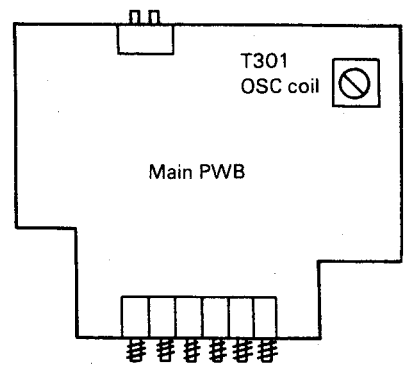
Setting:	Play (Dolby SW ON, tape Fe_2O_3)
Input:	Tape (TEAC MTT-150)
Output:	Line output



4. Oscillator Frequency Adjustment

Connect a frequency counter to both ends of the erase head, and adjust the OSC coil so that the oscillator frequency will be 87 kHz ± 5 kHz.

Setting:	Record
Output:	Both ends of erase head



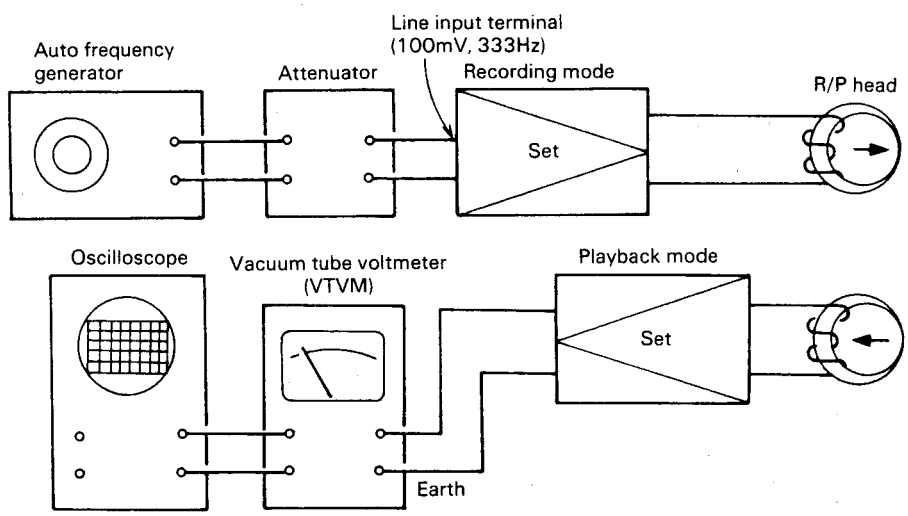
5. Record and Playback Sensitivity Adjustment

(a) Select the record mode, apply a 333 Hz, 100 mV input to the line input, and adjust the record control to 550 mV at the output terminal.

(b) Then Adjust VR103 (L CH) and VR203 (R CH) so that the current flowing to the head will be 63 μA. Make this adjustment in the metal tape mode.

(c) Make sure that the recorded or reproduced output after the above adjustments is 550 mV. If it is not, adjust the recording current again.

Setting:	Record
Input:	Line input
Output:	Line output



6. Bias Current Adjustment

(a) Record and playback and metal tape, and adjust the bias current controls (VR102 for L CH, VR202 for R CH) until the level difference between the recording and playback frequencies is 0 dB.

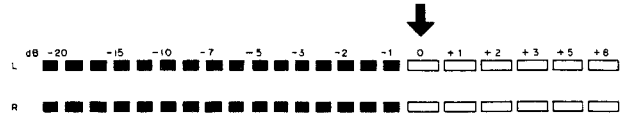
(b) Then record and play back a normal tape and chrome tape, and adjust VR303 and VR302 until the level difference between the recording and playback frequencies at 333 Hz and 10 kHz is less than $\pm$ 1.5 dB.

Setting:	Record, play
Input:	Line input (330 Hz or 10 kHz, 100 mV)
Output:	Line output

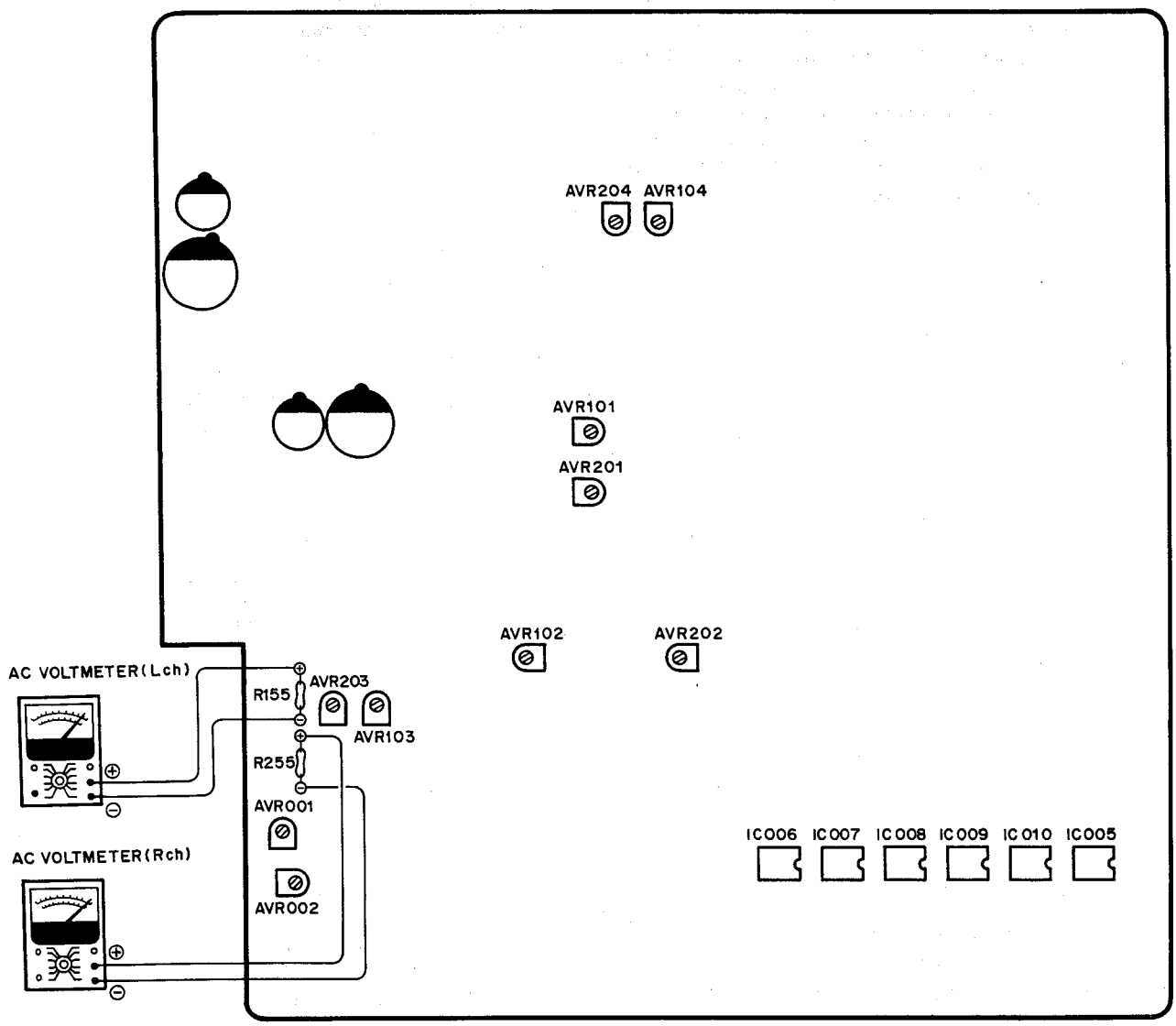
7. Level Meter Adjustment

Apply a 333 Hz 100 mV signal input to the line input (after adjusting the recording control to a line output of 400 mV), adjust AVR104 (L CH) and AVR204 (R CH) to a point where the 0 dB LED just begins to light.

Setting:	Record
Input:	Line input (333 Hz, 100 mV)
Output:	Line meter

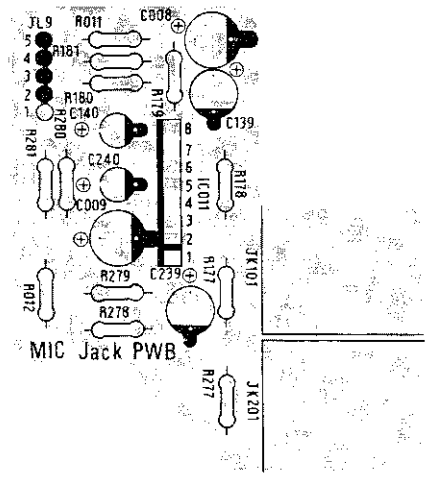


7. Alignment Location

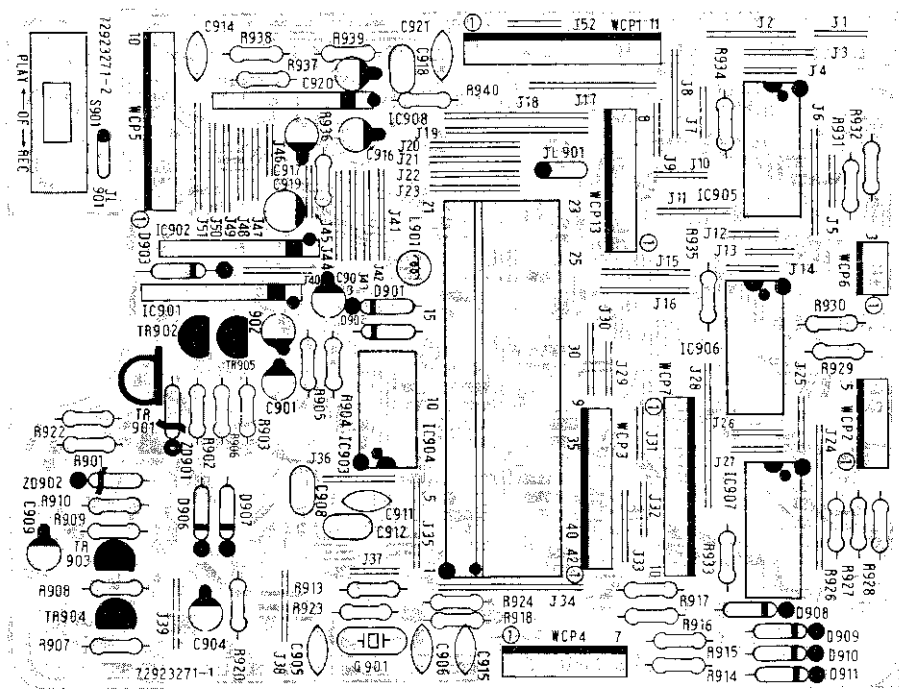


PWB ASSY

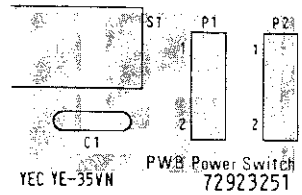
MIC JACK PWB ASSY (Solder Side)



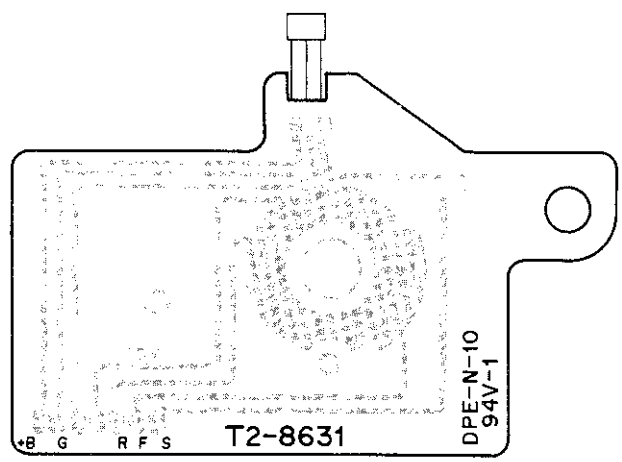
MECHA CONTROL PWB ASSY (Solder Side)



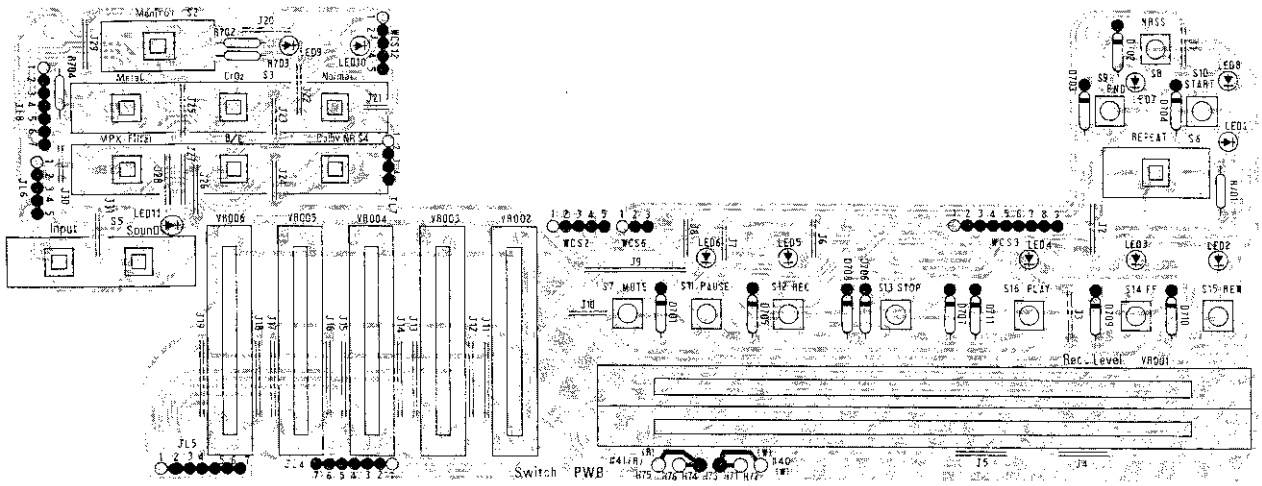
POWER SUPPLY PWB ASSY (Solder Side)



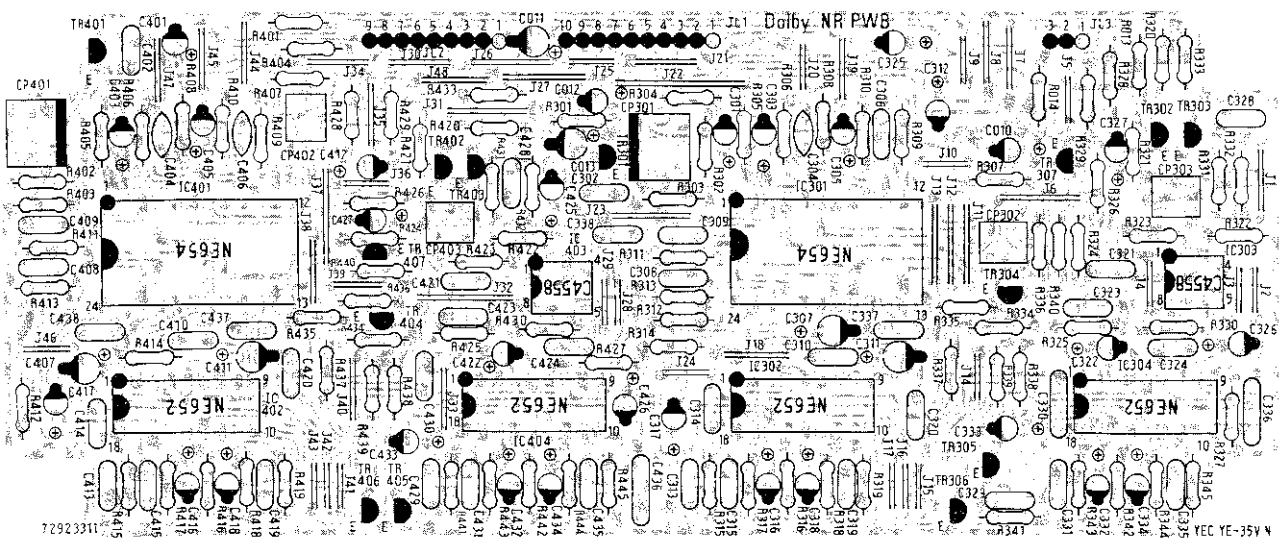
CAM PWB (Solder Side)



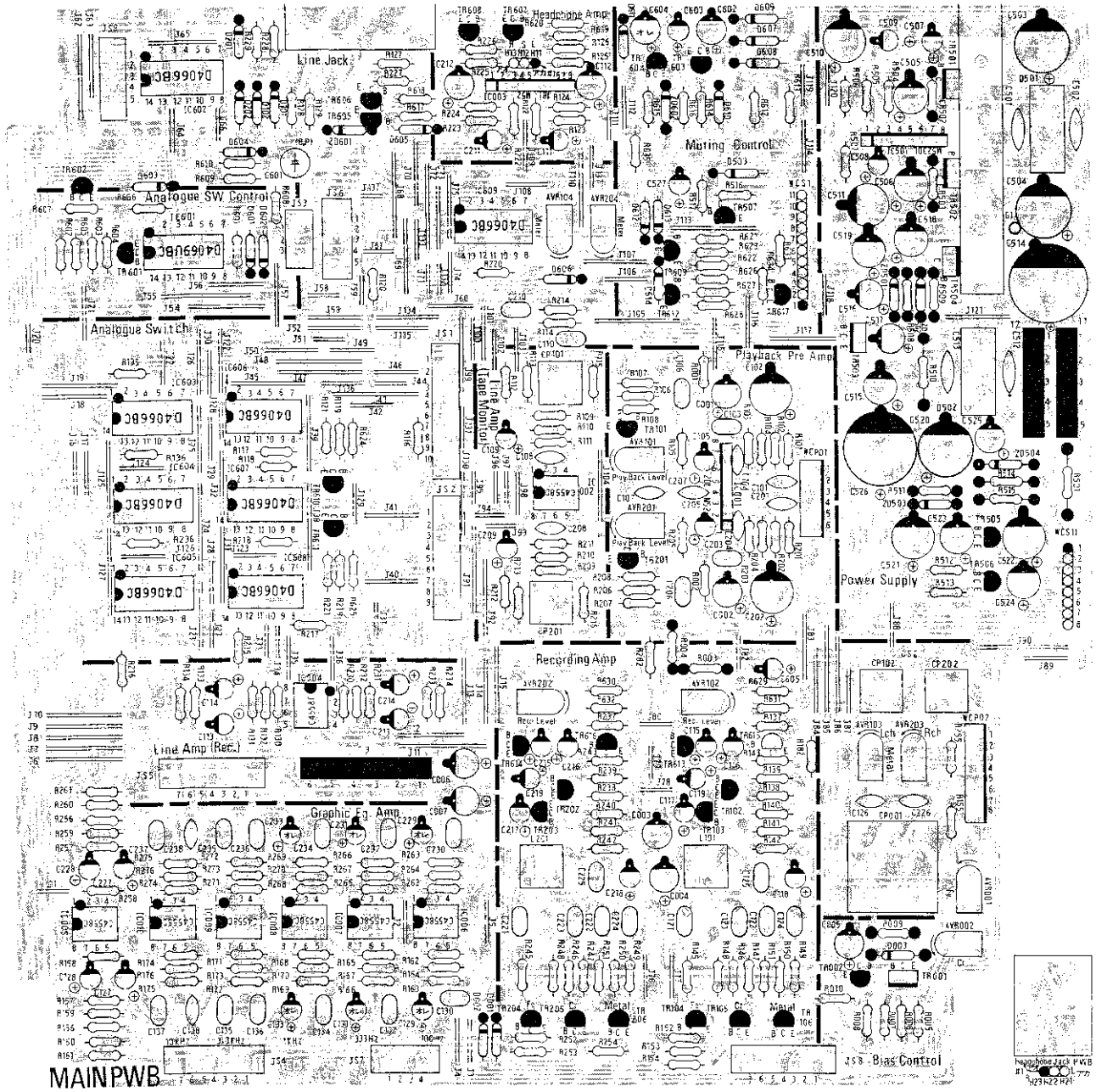
SWITCH PWB (Solder Side)



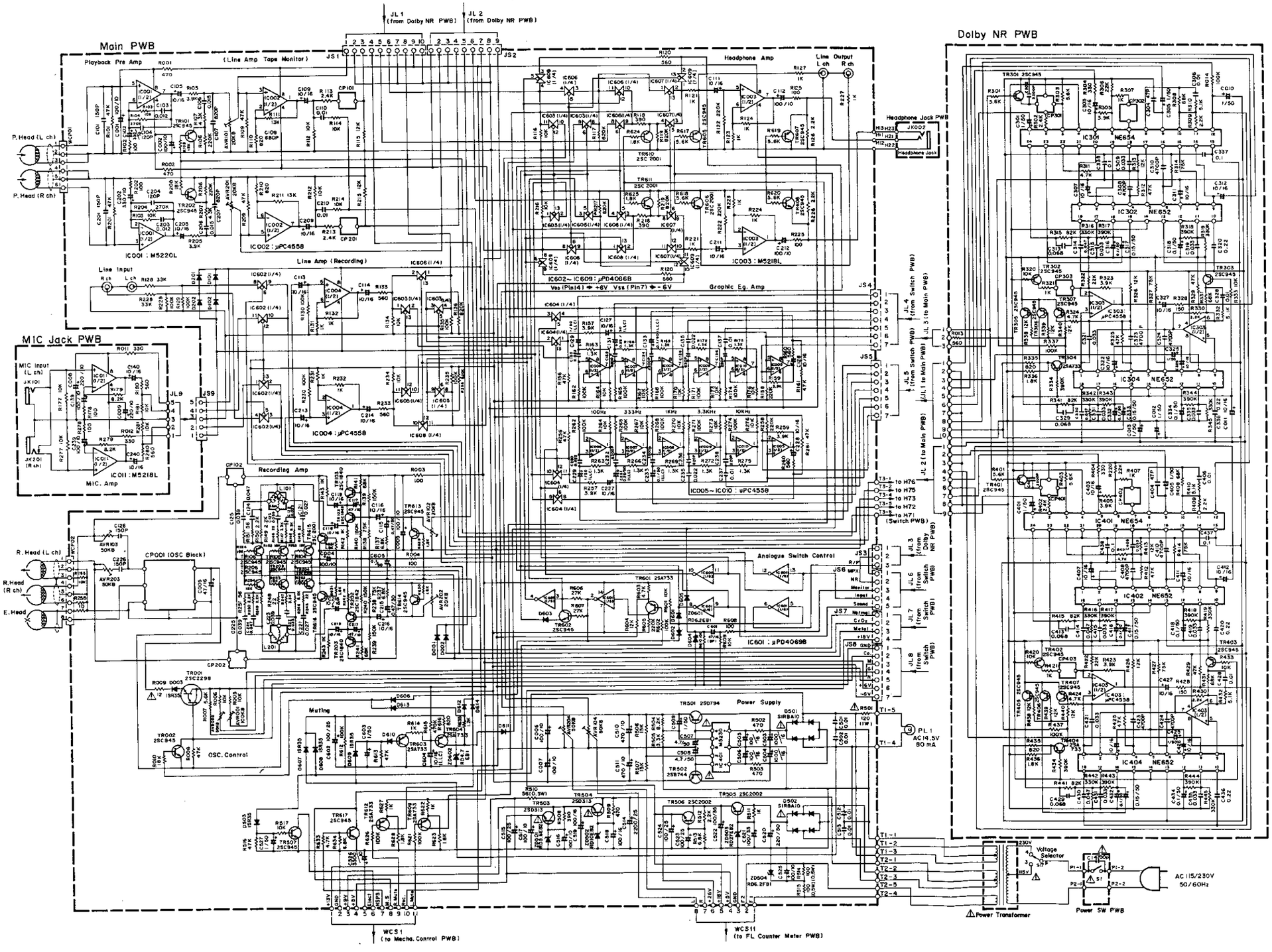
DOLBY PWB (Solder Side)



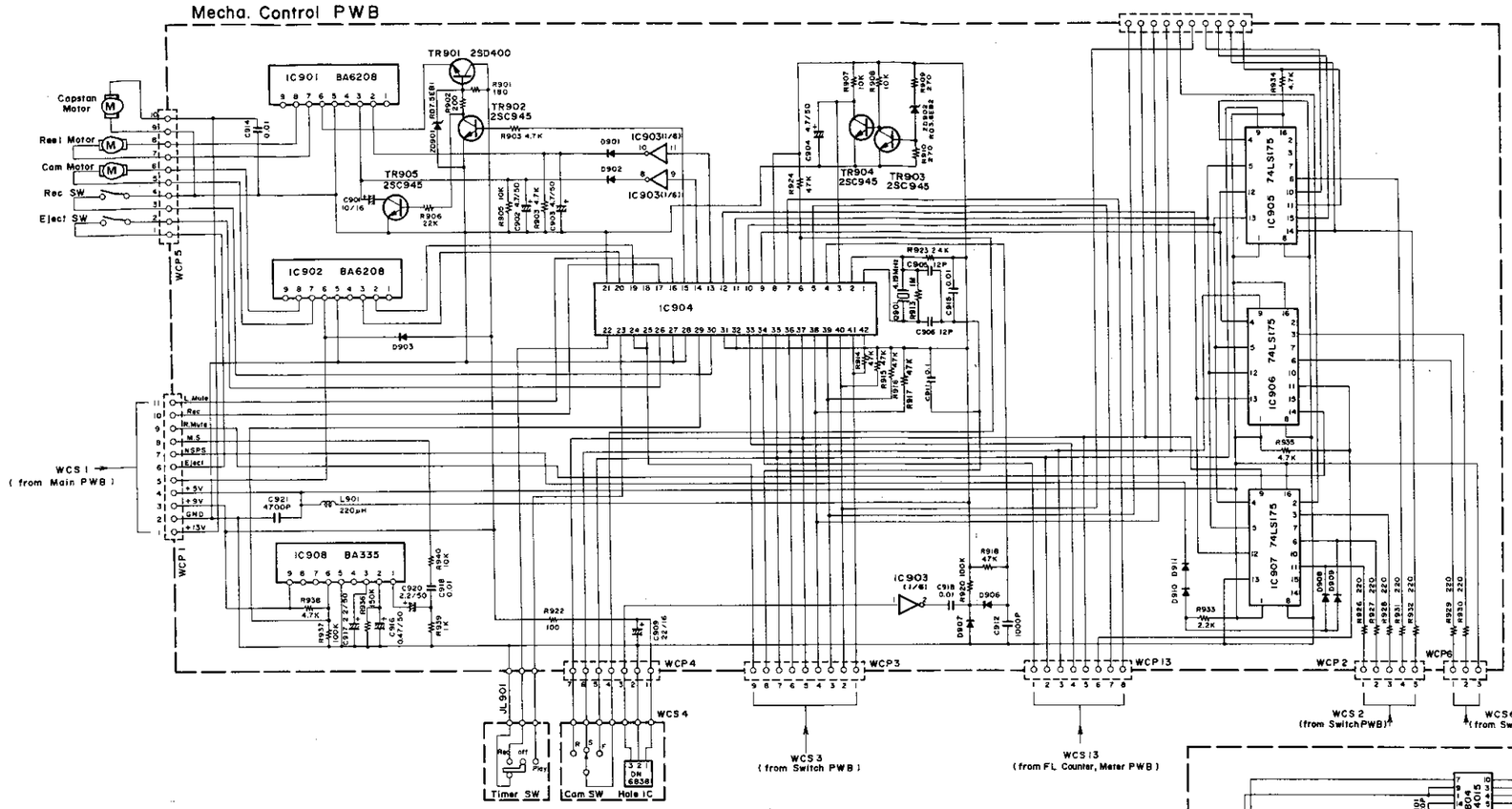
MAIN PWB (Solder Side)



SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM

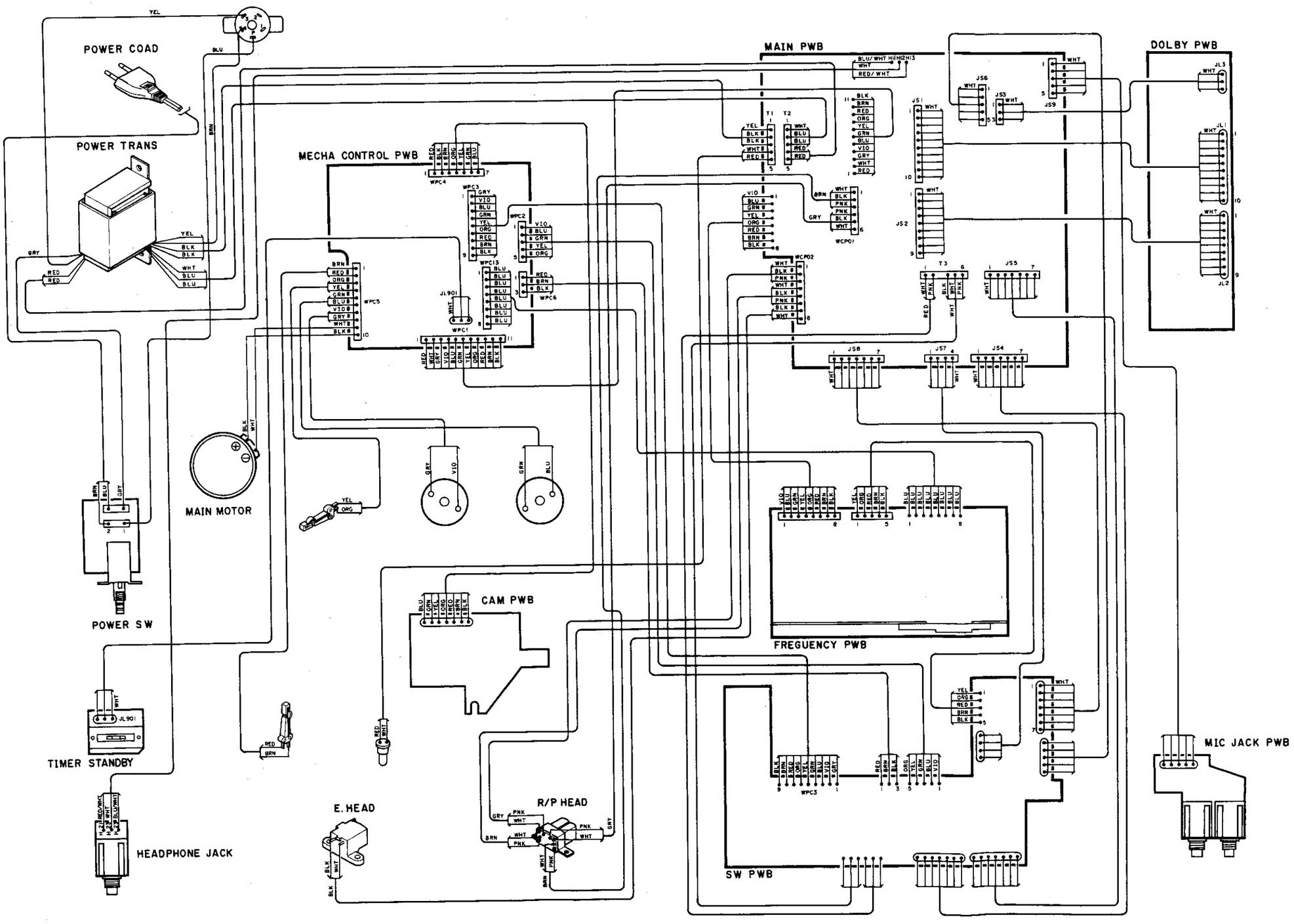


Notes

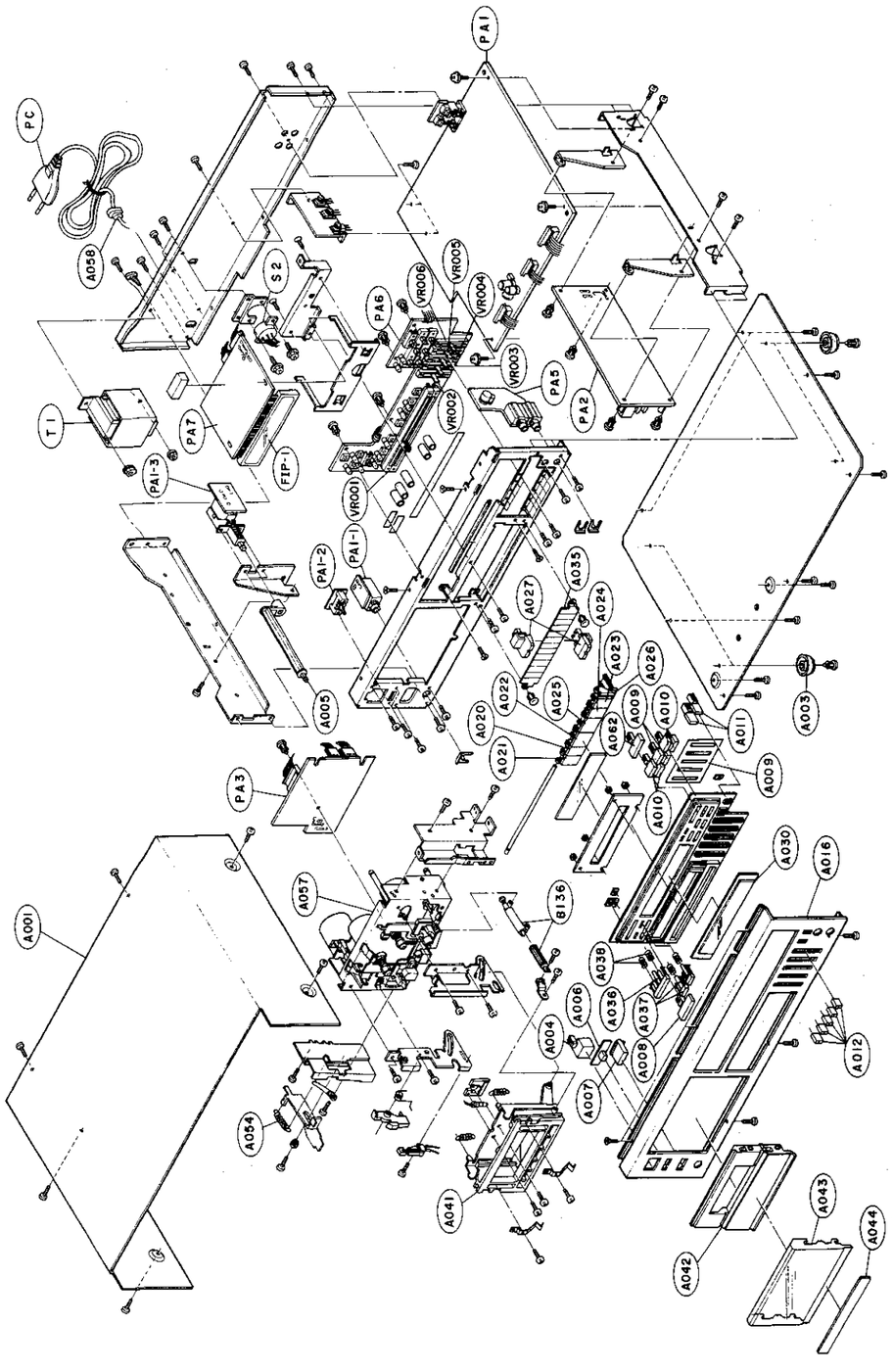
1. ⚠ Safety requirements components in accordance with present safety regulations. These components must only be replaced by original parts.
2. Resistor values are in ohms (K = 10^3 ohms, M = 10^6 ohms.) All resistors are 1/4 watt, ±5%, unless marked otherwise.
3. All capacitor values are in µF (Micro Farads) (P = 10^{-6} µF)
4. LLC = Low-Leak capacitor.
5. BP = Bi-polar capacitor.
6. All diodes are 1S953 or 1S2473, unless marked otherwise.

Switch No	Name	Position
1	Power	off
2	Monitor	Tape
3	Normal Tape	on
	CrO2 Tape	off
	Metal Tape	off
4	Dolby NR	off
	B/C	B
	MPX Filter	off
5	Sound Control	off
	Input	Line
6	Auto Repeat	off

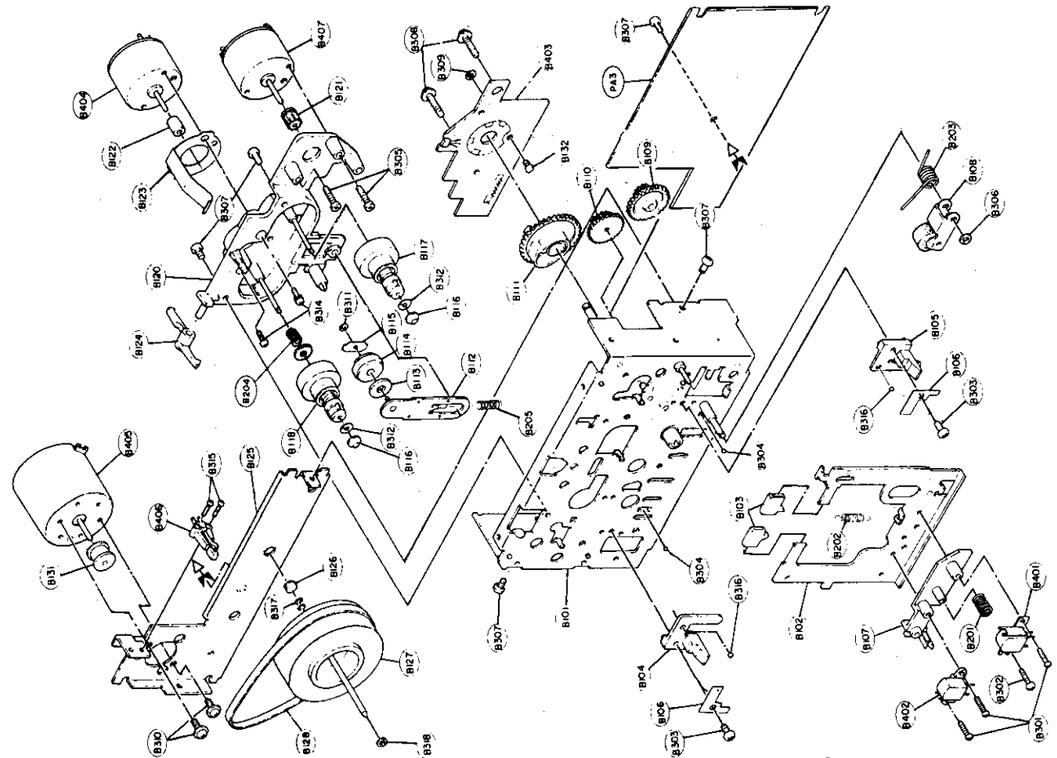
WIRING DIAGRAM

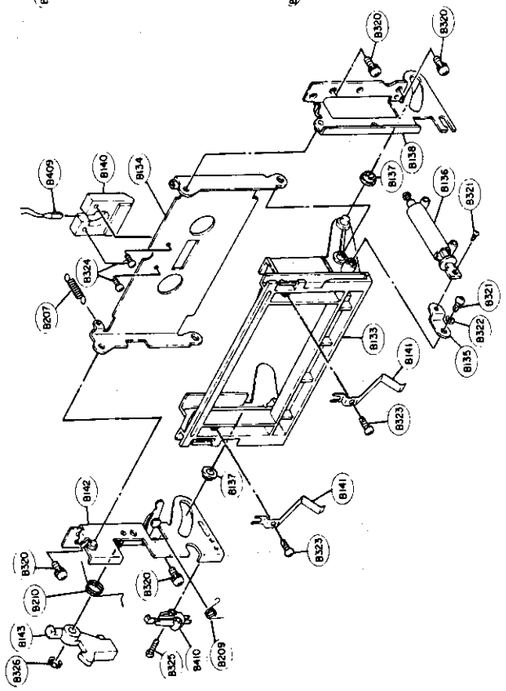


EXPLODED VIEW



EXPLODED VIEW OF MECHANISM UNIT





REPLACEMENT PARTS LIST

Note: The components identified by ⚠ mark or with the symbol Nos. shaded are critical for safety. Replace only with parts Number specified.

SYMBOL	PARTS NO	DESCRIPTION	QTY
**** ICS ****			
IC905 IC906 IC907	37051093	IC SN74LS175N (D-F.F)	3
IC002 IC004 IC005	37101034	IC UPC4558	10
IC006 IC007 IC008			
IC009 IC010 IC303			
IC403			
IC003 IC011	37901081	IC M5218L	2
IC001	37901119	IC M5220L	1
IC301 IC401	37901120	IC NE654 (DOLBY-C)	2
IC302 IC304 IC402	37901121	IC NE652 (DOLBY-C)	4
IC404			
IC908	37901122	IC BA335	1
IC909	37903049	IC DN6838	1
IC602 IC603 IC604	37903121	IC UPD4066B	8
IC605 IC606 IC607			
IC608 IC609			
IC904	37903147	IC,MB8841-422M	1
IC901 IC902	37903148	IC-BA6208	2
IC501	37903177	IC M5230L	1
IC601 IC903	37904036	IC,UPD4069BC	2
**** TRANSISTORS ****			
TR304 TR404 TR601	35003517	TR,2SA733/733A Q	7
TR603 TR604 TR609			
TR612			
TR502	35025517	TR,2SB744 Q	1
TR902 TR903 TR904	35047216	TR,2SC945 P	4
TR905			
TR002 TR101 TR104	35047217	TR,2SC945Q	32
TR105 TR106 TR201			
TR204 TR205 TR206			
TR301 TR302 TR303			
TR305 TR306 TR307			
TR401 TR402 TR403			
TR405 TR406 TR407			
TR507 TR602 TR607			
TR608 TR613 TR614			
TR617 TR902 TR903			
TR904 TR905			
TR605 TR606 TR610	35055312	TR 2SC2001 L	6
TR611 TR615 TR616			

SYMBOL	PARTS NO	DESCRIPTION	QTY
**** TRANSISTORS ****			
TR505 TR506	35947212	TR 2SC2002L	2
TR102 TR202	35951105	TR,2SC1842 E	2
TR103 TR203	35951705	TR,2SC1840 E	2
TR001	35952202	TRANSISTOR 2SC2298 (B)	1
TR501	35962616	TR 2SD794P	1
TR503 TR504	35964305	TR 2SD 313 E	2
TR901	35965005	TR,2SD400(E)-P2	1
**** DIODES ****			
D901 D902 D906	360K1009	DIODE,SI.1S2473	8
D907 D908 D909			
D910 D911			
D001 D002 D101	360K1522	DIODE IS 953	28
D102 D201 D202			
D601 D602 D603			
D604 D605 D606			
D610 D611 D612			
D613 D614 D701			
D702 D703 D704			
D705 D706 D707			
D708 D709 D710			
D711			
⚠ D501 D502	36902065	RECTIFIER BLOCK SIRBA10	2
D003 D503 D607	36902088	DIODE 1SR35100HM	6
D608 D609 D903			
LED6	36904184	LED SLR54YT20 13MMH	1
LED10 LED11 LED1	36904185	LED SLR54MT20 13MMH	9
LED2 LED3 LED4			
LED7 LED8 LED9			
LED5	36904186	LED SLR54VT20 13MMH	1
ZD902	36905030	ZENER,DIODE RD-3.6EB2-H	1
ZD602	36905042	ZENER,DIODE RD-5.6EB1-H	1
ZD501	36905043	ZENER,DIODE RD-5.6EB2-H	1
ZD601	36905045	ZENER,DIODE RD-6.2EB1-H	1
ZD901	36905051	ZENER,DIODE RD-7.5EB1-H	1
ZD502	36905061	ZENER,DIODE RD-10E B2-H	1
ZD503	36905093	ZENER,DIODE RD-27E B2-H	1
ZD504	36905342	DIODE RD6.2F B1	1

SYMBOL			PARTS NO	DESCRIPTION	QTY
** TRANSFORMERS **					
T1		⚠	45027125	TRANS POWER K537E	1
** VARIABLE RESISTORS **					
VR001			41940077	R,VARIABLE,SLIDE	1
VR002	VR003	VR004	41940078	R,VARIABLE,SLIDE	5
VR005	VR006				
AVR002	AVR104	AVR204	41950023	R,VARIABLE 50KB	3
AVR001			41950024	R,VARIABLE 100KH,B	1
AVR101	AVR102	AVR201	41950027	R,VARIABLE 20K,B	4
AVR202					
AVR103	AVR203		41952014	R,VARIABLE 50KB	2
** PWB ASSY **					
PA1			87767101	MAIN PWB FULL ASSY	1
PA2			87767201	DOLBY NR PWB FULL ASSY	1
PA5			87767301	MIC JACK PWB FULL ASSY	1
PA6			87767401	SWITCH PWB FULL ASSY	1
			87767701	POWER SWITCH PWB FULLASSY	1
** MISCELLANEOUS PARTS **					
A054			19532231	SPRING,EJECT LEVER	1
A038			19534651	COIL SPRING	4
CP302	CP303	CP402	39903026	COIL,SPECTRAL SKEWING	4
CP403					
CP001			39904005	OSC BLOCK (537)	1
CP301	CP401		39907022	FILTER,LOW-PASS	2
CP101	CP201		39907023	FILTER	2
CP102	CP202		39907024	FILTER,LOW-PASS	2
L101	L201		61911176	REC,EQ,COIL (537)	2
Q901			64920141	X,TAL 4.19MHZ	1
		⚠	65901053	SW,SELECTOR	1
S901			65902107	SLIDE SWITCH 2-3	1
S10	S11	S12	65904332	SW	10
S13	S14	S15			
S16	S7	S8			
S9					

SYMBOL			PARTS NO	DESCRIPTION	QTY
** MISCELLANEOUS PARTS **					
S1		⚠	65904336	POWER SW SDL	1
S2	S6		65904360	SWITCH,PUSH SEA-1	2
S5			65904361	SWITCH,PUSH SEA-2	1
S4			65904362	SWITCH,PUSH SEA-3	1
S3			65904372	SWITCH,PUSH BLOCK	1
PA7			67950287	METER CUNTER FL UNIT	1
			70599056	POWER ADAPTER S-I6115	1
PC		⚠	70803020	LINE,CORD CENELEC 1.8M	1
			70906092	PIN COAD	2
P1	P2		71905169	TERMINAL 2P	2
JK001			71905227	4P RCA PINJACK L-ｶﾗｰ	1
A057			72952331	MECHANISM UNIT C-248	1
** CABINET & KNOBS **					
A003			18290731	FOOT,RUBBER (H9.0)	4
A004			18469001	POWER,BUTTON	1
A007			18469011	EJECT,BUTTON	1
A006			18469141	KNOB TIMER	1
A036			18469371	KNOB,PUSH(A)	1
A037			18469381	KNOB,PUSH(B)	2
A008			18469391	KNOB,PUSH(C)	1
A009			18469401	KNOB,PUSH(D)	2
A010			18469411	KNOB,PUSH(E)	4
A011			18469421	KNOB,PUSH(F)	2
A012			18469431	KNOB,SLIDE POTS	5
A020			18469451	MECHANISM,BUTTON(FF)ASSY	1
A021			18469471	MECHANISM,BUTTON(REW)ASSY	1
A022			18469491	MECHANISM,BUTTON ASSY	1
A023			18469511	MECHANISM,BUTTON ASSY	1
A024			18469531	MECHANISM,BUTTON(REC)ASSY	1
A025			18469551	MECHANISM,BUTTON(STOP)	1
A026			18469561	MECHANISM,BUTTON(R,MUTE)	1
A027			18469611	CONTROLS KNOB ASSY	2
A062			18470421	KNOB PUSH (G)	1
A001			19350201	CABINET	1
A005			19408372	POWER SW LEVER	1
			88770701	FRONT PANEL S,ASSY	1

SYMBOL	PARTS NO	DESCRIPTION	QTY

** COILS & FILTERS **

L901	61052033	COIL,FILTER 220UH	1

** PACKING MATERILS **

	19806811	CARTON BOX	1
	78923801	INSTRUCTION BOOKLET K537E	1

** RESISTORS **

R510			40351141	R/METAL 47H 5% 1W	1
R501			40351151	R/METAL 120H 5% 1W	1
R009			40809772	R-FUSE/12H 1/4W 2%	1
R514	R515		40912149	R/CARBON 100H 5% 1/2W	2
R003	R004		40913149	R/CARBON 100H 5% 1/4W	2
R509			40913161	R/CARBON 330H 5% 1/4W	1
R502	R503		40913165	R/CARBON 470H 5% 1/4W	2
R143	R243	R511	40913173	R/CARBON 1.0K 5% 1/4W	3
R508			40913175	R/CARBON 1.2K 5% 1/4W	1
R178	R278		40982149	R/CARBON 100H 5% 1/4W	2
R011	R012		40982161	R/CARBON 330H 5% 1/4W	2
R160	R180	R280	40982167	R/CARBON 560H 5% 1/4W	3
R935			40982189	R/CARBON 4.7K 5% 1/4W	1
R179	R279		40982195	R/CARBON 8.2K 5% 1/4W	2
R177	R181	R277	40982197	R/CARBON 10K 5% 1/4W	5
R281	R941				
R156	R161		40982213	R/CARBON 47K 5% 1/4W	2
R155	R255		409H2625	R/CARBON 10H 5% 1/4W	2
R145	R148	R245	409H2633	R/CARBON 22H 5% 1/4W	4
R248					
R151	R251		409H2643	R/CARBON 56H 5% 1/4W	2
R102	R125	R182	409H2649	R/CARBON 100H 5% 1/4W	8
R202	R225	R282			
R608	R922				
R328	R428		409H2653	R/CARBON 150H 5% 1/4W	2
R901			409H2655	R/CARBON 180H 5% 1/4W	1
R902			409H2656	R/CARBON 200H 5% 1/4W	1
R701	R702	R703	409H2657	R/CARBON 220H 5% 1/4W	11
R704	R926	R927			
R928	R929	R930			
R931	R932				
R909	R910		409H2659	R/CARBON 270H 5% 1/4W	2

SYMBOL	PARTS NO	DESCRIPTION	QTY

** RESISTORS **

R304	R404		409H2661	R/CARBON 330H 5% 1/4W	2
R118	R218		409H2663	R-CARBON 390H 5% 1/4W	2
R001	R002		409H2665	R/CARBON 470H 5% 1/4W	2
R013	R120	R133	409H2667	R/CARBON 560H 5% 1/4W	6
R220	R233	R260	409H2667	R/CARBON 560H 5% 1/4W	6
R110	R210	R335	409H2671	R/CARBON 820H 5% 1/4W	5
R435	R616				
R121	R123	R124	409H2673	R/CARBON 1.0K 5% 1/4W	22
R127	R131	R132			
R142	R221	R223			
R224	R227	R231			
R232	R242	R307			
R321	R407	R421			
R614	R622	R627			
R939					
R635			409H2675	R/CARBON 1.2K 5% 1/4W	1
R163	R166	R169	409H2676	R/CARBON 1.3K 5% 1/4W	10
R172	R175	R263			
R266	R269	R272			
R275					
R336	R436	R623	409H2679	R/CARBON 1.8K 5% 1/4W	10
R624	R625	R628			
R629	R630	R631			
R632					
R126	R149	R150	409H2681	R/CARBON 2.2K 5% 1/4W	12
R226	R249	R250			
R309	R330	R409			
R430	R512	R933			
R113	R213	R302	409H2682	R/CARBON 2.4K 5% 1/4W	5
R402	R923				
R147	R247	R505	409H2685	R/CARBON 3.3K 5% 1/4W	3
R105	R157	R159	409H2687	R/CARBON 3.9K 5% 1/4W	10
R205	R257	R259			
R305	R323	R405			
R423					
R107	R207		409H2688	R/CARBON 4.3K 5% 1/4W	2
R311	R324	R411	409H2689	R/CARBON 4.7K 5% 1/4W	9
R424	R603	R633			
R903	R934	R938			
R310	R332	R410	409H2690	R/CARBON 5.1K 5% 1/4W	4
R432					
R007	R301	R303	409H2691	R/CARBON 5.6K 5% 1/4W	9
R401	R403	R617			
R618	R619	R620			
R137	R237	R513	409H2693	R/CARBON 6.8K 5% 1/4W	4
R634					
R146	R246	R504	409H2695	R/CARBON 8.2K 5% 1/4W	3
R005	R006	R103	409H2697	R/CARBON 10K 5% 1/4W	35
R112	R114	R116			

SYMBOL			PARTS NO	DESCRIPTION	QTY
** RESISTORS **					
R134	R164	R167	409H2697	R/CARBON 10K 5% 1/4W	35
R170	R173	R176			
R203	R212	R214			
R216	R234	R264			
R267	R270	R273			
R276	R320	R333			
R420	R433	R517			
R601	R609	R610			
R904	R905	R907			
R908	R940				
R115	R215	R313	409H2699	R/CARBON 12K 5% 1/4W	13
R326	R338	R339			
R340	R413	R426			
R438	R439	R440			
R604					
R111	R211		409H2700	R/CARBON 13K 5% 1/4W	2
R506	R507		409H2701	R/CARBON 15K 5% 1/4W	2
R010	R108	R152	409H2703	R/CARBON 18K 5% 1/4W	9
R153	R154	R208			
R252	R253	R254			
R306	R322	R406	409H2705	R/CARBON 22K 5% 1/4W	5
R422	R906				
R606	R607		409H2707	R/CARBON 27K 5% 1/4W	2
R128	R228		409H2709	R/CARBON 33K 5% 1/4W	2
R008	R101	R109	409H2713	R/CARBON 47K 5% 1/4W	21
R201	R209	R256			
R261	R312	R325			
R329	R412	R425			
R429	R516	R613			
R914	R915	R916			
R917	R918	R924			
R141	R241	R308	409H2717	R/CARBON 68K 5% 1/4W	6
R331	R408	R431			
R138	R238	R314	409H2718	R/CARBON 75K 5% 1/4W	6
R327	R414	R427			
R315	R341	R415	409H2719	R/CARBON 82K 5% 1/4W	4
R441					
R014	R129	R130	409H2721	R/CARBON 100K 5% 1/4W	25
R135	R162	R165			
R108	R171	R174			
R229	R230	R235			
R262	R265	R268			
R271	R274	R337			
R437	R602	R612			
R621	R626	R920			
R937					

SYMBOL			PARTS NO	DESCRIPTION	QTY
** RESISTORS **					
R139	R140	R239	409H2725	R/CARBON 150K 5% 1/4W	5
R240	R936				
R106	R122	R158	409H2729	R/CARBON 220K 5% 1/4W	7
R206	R222	R258			
R605					
R104	R204		409H2731	R/CARBON 270K 5% 1/4W	2
R316	R319	R342	409H2733	R/CARBON 330K 5% 1/4W	8
R345	R416	R419			
R442	R445				
R317	R318	R334	409H2735	R/CARBON 390K 5% 1/4W	10
R343	R344	R417			
R418	R434	R443			
R444					
R615			409H2737	R/CARBON 470K 5% 1/4W	1
R117	R119	R136	409H2743	R/CARBON 820K 5% 1/4W	6
R217	R219	R236			
R913			409H2745	R/CARBON 1.0M 5% 1/4W	1
** CAPACITORS **					
C501	C502	C512	42019575	C/CERAMIC 500V 0.01UF	4
C513					
C921			4211K421	C/CERAMIC 50V 4700PF	1
C914	C915		4211K425	C/CERAMIC 50V 0.01UF	2
C107	C207		421C0212	C/CERAMIC 50V 820PF	2
C905	C906		42311023	C/CERAMIC 50V 12PF	2
C104	C204		423A1047	C/CERAMIC 50V 120PF	2
C101	C201	C304	423A1049	C/CERAMIC 50V 150PF	4
C404					
C138	C238		423A1053	C/CERAMIC 50V 220PF	2
C126	C226		423A2102	C/CERAMIC 50V 150PF	2
C911			42910033	C/CERAMIC 25V 0.1UF	1
C1			42910036	C/CERAMIC 400V 4700	1
C912			42976701	C/FILM 50V 1000PF 5%	1
C908	C916		42976713	C/FILM 50V 0.01UF 5%	2
C337	C338	C437	42977275	C/FILM 63V 0.1UF	4
C438					
C320	C330	C420	42977279	C/FILM 63V 0.22UF	4
C436					
C330			4297F721	C/FILM 50V 0.047UF 5%	1
C136	C236		4297G143	C/FILM 100V 820PF	2
C134	C234	C302	429G6505	C/FILM 50V 2200PF	4

SYMBOL	PARTS NO	DESCRIPTION	QTY

** CAPACITORS **

C402			429G6505	C/FILM 50V 2200PF	4
C308	C310	C323	429G6509	C/FILM 50V 4700PF	8
C324	C408	C410			
C423	C424				
C132	C232		429G6512	C/FILM 50V 8200PF 5%	2
C110	C137	C210	429G6513	C/FILM 50V 0.01UF 5%	8
C237	C306	C328			
C406	C428				
C103	C203		429G6514	C/FILM 50V 12000PF 5%	2
C106	C206		429G6515	C/FILM 50V 0.015UF 5%	2
C130	C135	C230	429G6517	C/FILM 50V 0.022UF 5%	4
C235					
C121	C221		429G6518	C/FILM 50V 27000PF 5%	2
C122	C222	C309	429G6519	C/FILM 50V 0.033UF 5%	14
C315	C319	C321			
C331	C335	C409			
C415	C419	C421			
C431	C435				
C123	C125	C223	429G6520	C/FILM 50V 0.039UF 5%	4
C225					
C124	C224	C314	429G6521	C/FILM 50V 0.047UF 5%	5
C414	C430				
C313	C329	C413	429G6523	C/FILM 50V 0.068UF 5%	4
C429					
C601			43930023	C.ELEC 16V 47PF	1
C316	C332	C416	43980047	C/ELEC 50V 0.1UF	4
C432					
C139	C239	C919	43993015	C/ELEC 10V 100UF	3
C008	C009		43993016	C/ELEC 10V 220UF	2
C102	C202		43993017	C/ELEC 10V 330UF	2
C510	C511		43993018	C/ELEC 10V 470UF	2
C526			43993021	C/ELEC 10V 3300UF	1
C140	C240	C901	43993024	C/ELEC 16V 10UF	3
C909			43993025	C/ELEC 16V 22UF	1
C503	C504		43993032	C/ELEC 16V 1000UF	2
C514			43993046	C/ELEC 25V 2200UF	1
C521	C522		43993053	C/ELEC 35V 100UF	2
C115	C215	C916	43993059	C/ELEC 50V 0.47UF	3
C425			43993060	C/ELEC 50V 1UF	1
C917	C920		43993061	C/ELEC 50V 2.2UF	2
C902	C903		43993063	C/ELEC 50V 4.7UF	2
C303	C307		43993064	C/ELEC 50V 10UF	2
C520			43993069	C/ELEC 50V 220UF	1

SYMBOL	PARTS NO	DESCRIPTION	QTY

** CAPACITORS **

C317	C333	C417	43993103	C/ELEC 50V 0.15UF	4
C433					
C904			43993104	C/ELEC 50V 0.22UF	1
C604			439H0014	C/ELEC 16V 10UF	1
C133	C233	C318	439H0047	C/ELEC 50V 0.1UF	7
C334	C418	C434			
C605					
C131	C231		439H0049	C/ELEC 50V 0.22UF	2
C129	C229		439H0053	C/ELEC 50V 1.0UF	2
C117	C217		439J3014	C/ELEC 10V 47UF	2
C001	C002	C003	439J3015	C/ELEC 10V 100UF	11
C004	C006	C007			
C112	C212	C516			
C517	C525				
C005			439J3040	C/ELEC 25V 47UF	1
C505	C506	C515	439J3041	C/ELEC 25V 100UF	8
C518	C519	C523			
C524	C602				
C010	C012	C013	439J3060	C/ELEC 50V 1.0UF	11
C301	C305	C325			
C401	C405	C509			
C527	C603				
C507	C508		439J3063	C/ELEC 50V 4.7UF	2
C011	C105	C109	439J3064	C/ELEC 50V 10UF	33
C111	C113	C114			
C116	C118	C119			
C127	C128	C205			
C209	C211	C213			
C214	C216	C218			
C219	C227	C228			
C311	C312	C322			
C326	C327	C403			
C407	C411	C412			
C422	C426	C427			

MECHANICAL PARTS LIST

Symbol No.	Parts No.	Description	Q'ty
B103	19605281	Brake rubber	1
B104	19411121	Half guide E	1
B105	19411111	Half guide B	1
B106	19533651	Head base retaining spring	1
B107	19411911	Head support	1
B108	19533451	Pinch roller arm ass'y	1
B109	19411031	2nd wheel	1
B110	19411041	3rd wheel	1
B111	19410981	Main cam ass'y	1
B112	19533541	Idler plate ass'y	1
B113	19411051	Felt	1
B114	19411082	FR idler ass'y	1
B115	19533621	Reel swing ass'y	1
B116	19411021	Reel shaft cap	1
B117	19412121	Take-up reel disc ass'y	1
B118	19410941	Supply reel disc ass'y	1
B119		Spring hook	1
B120	19410921	Sub chassis ass'y	1
B121	19411001	Pinion	1
B122	19533601	Reel motor pulley	1
B123	19534011	Cassette pressure spring	1
B124	19411072	REC detection lever	1
B126	19411061	Flywheel adjusting screw	1
B127	19533491	Flywheel ass'y	1
B128	19605291	Main belt	1
B131	19533641	Main motor pulley	1
B132	19533631	Cam stopper	1
B133	19411181	Cassette holder ass'y	1
B134	19533981	Cassette support plate	1
B136	18292031	Damper arm ass'y	1
B140	19411101	Cassette nameplate	1

Symbol No.	Parts No.	Description	Q'ty
B141	19533611	Cassette pressure spring	1
B143	19411141	Cassette lock lever	1
B201	19533701	Lock-on head spring	1
B202	19533671	Head base slide spring	1
B203	19533661	Pinch roller spring	1
B204	19534881	Back tension spring	1
B205	19533691	Idler plate spring	1
B207	19533861	Cassette support plate spring	1
B209	19533471	Cassette lock lever spring	1
B210	19534021	Eject lever spring	1
B304		Steel ball (ϕ2)	1
B306		Split washer (2.5ϕ)	1
B309		Split washer (2ϕ)	1
B311		Split washer (1.5ϕ)	1
B312		Split washer (1.2ϕ)	1
B316		Steel ball (2.5ϕ)	1
B318		Nylon washer	1
B401	79751111	Recording/playback combination head	1
B402	79751110	Erase head	1
PA4	87767601	Cam PWB	1
B404	79752075	Reel motor	1
B405	79752062	Main motor	1
B406	65907110	Skeleton motor	1
B407	79752064	Mechanism motor	1
PA3	87773501	Mechanism control PWB main ass'y	1
PA4	87767101	Cam PWB main ass'y	1
B409	67910030	Pilot lamp	1
B410	65907109	Skeleton switch	1