TC-230W

Specifications

Power requirements : AC 100,110,117,125,220,240V ; 50/60 Hz ; 60W
Tape speeds : 7½ ips, 3¾ ips and 1⅞ ips (19 cm/s, 9.5 cm/s and 4.75 cm/s) with automatic switch for equalization changes.
Reel size : Up to 7″ (18 cm)
Recording system : 4-track stereophonic or monophonic
Recording time : 4-track stereo
(with 1,800 ft tape)
1 hr 30 min at 7½ ips (19 cm/s)
3 hrs at 3¾ ips (9.5 cm/s)
6 hrs at 1⅞ ips (4.75 cm/s)
Frequency response : 40~18,000 Hz at 7½ ips (19 cm/s)
40~12,000 Hz at 3¾ ips (9.5 cm/s)
40~ 6,000 Hz at 1⅞ ips (4.75 cm/s)
Signal-to-noise ratio : Better than 46 db (at peak recording level)
Flutter and wow : Less than 0.17% at 7½ ips (19 cm/s)
Less than 0.3% at 3¾ ips (9.5 cm/s)
Less than 0.4% at 1⅞ ips (4.75 cm/s)
Harmonic distortion : Less than 3% at 0 dbs (0.775 mV) line output
Inputs :
Microphone input ..... (2)
−75 dbs (0.14 mV)
Impedance: low (will accommodate any microphone with 250Ω~1KΩ impedance)
Auxiliary (Tuner) input ..... (2)
−25 dbs (44 mV)
Impedance: approx. 100KΩ
Phono input ..... (2)
−52.5 dbs (2 mV)
DIN Connector input ..... (1)
Input Level: −47 dBs (3.4 mV)
Impedance: 10KΩ

Outputs :
DIN Connector output ..... (1)
Output Level: 0 dBs (0.775 V)
Impedance: 3.5KΩ
Line output ..... (2)
Output Level: Playback 3 dbs (1.1V)
Recording 1 dbs (0.87V)
Impedance: will accommodate any amplifier with not less than 10KΩ
Binaural output ..... (1)
Impedance: will accommodate any head phone with not less than 8Ω
Ext-S.P. output ..... (1)
Output Level: 11.3 dbs (2.83V)
Impedance: for 8Ω speaker
Speaker : 5.2″ (13 cm), 8Ω ..... (2)
Power output : Max. 4 Watts, each channel
Transistors : 2SC402×12, 2SD28×4, 2SC401×6, 2SB383×2
Diodes : FR-1P ×2 1T22 ×2
Dimensions : Model 230 .....17 (W)×9⅝ (H)×14″ (D) (430×245×355 mm)
Model 230W...15¾(W)×7½(H)×13½″(D) (400×190×340 mm)
Weight : Model 230 ..... 29 lbs. (13 kg)
Model 230W..... 22 lbs. (10 kg)
Optional accessories : Speaker System SS-23

SONY®
SERVICING GUIDE

Technical Feature

SONY Model TC-230W is Four Track Complete Stereo Tapecorder installed in walnut cabinet, which can be used as a Stereo Amplifier System.

Muting Circuit

The muting circuits (X_{112}, X_{212} for DIN Connector Amplifier and X_{111}, X_{211} for Power Amplifier) eliminate click noise caused by turning the Input Selector Switch. When switching over, the contacts S-102-3 built in the Input Selector Switch are closed for a moment and DC bias voltage is applied to the base of X_{111}, X_{112}, X_{211} and X_{212}. Therefore the respective circuit is grounded by decreased Collector-Emitter resistance of the Transistor.

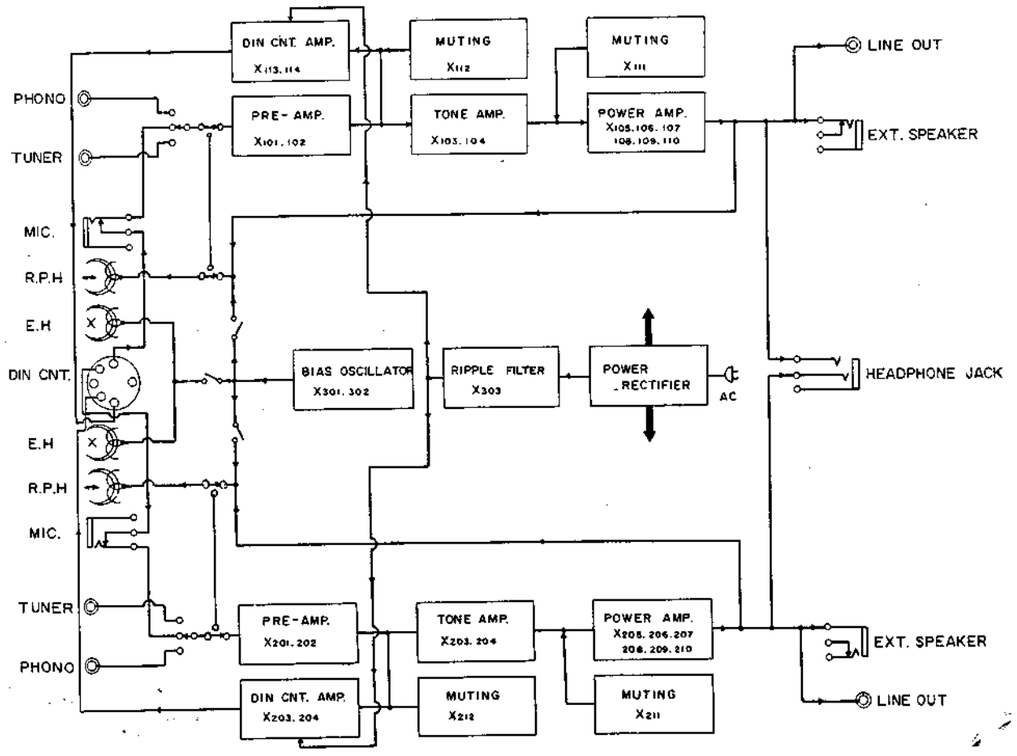
Ripple Filter

DC power source of DIN Connector Amplifiers (X_{113}, X_{114}, X_{213} and X_{214}) is applied through the Ripple Filter (X_{303}), which is available for obtaining less ripple with lower voltage drop and occupying less space.

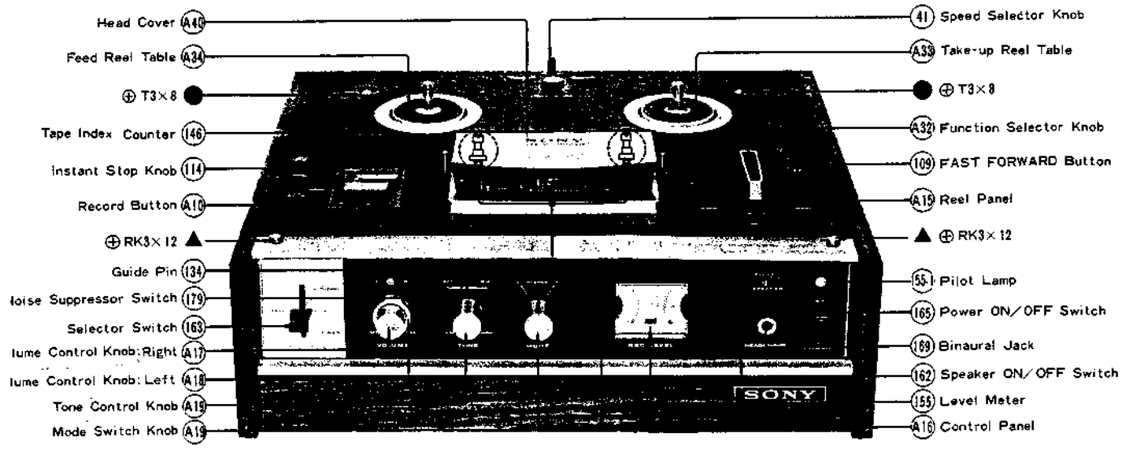
Drive Motor

The drive motor is a four pole vibration-proofed Induction Motor which is fixed to the chassis through vibration absorvers.

Block Diagram

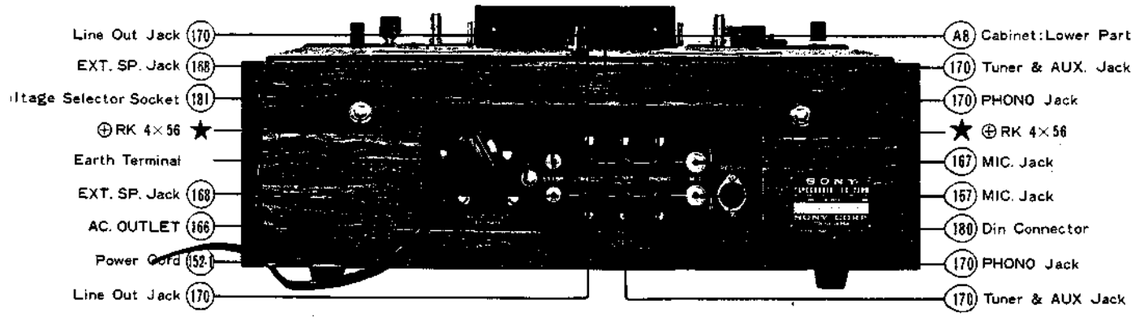


Cabinet Front View



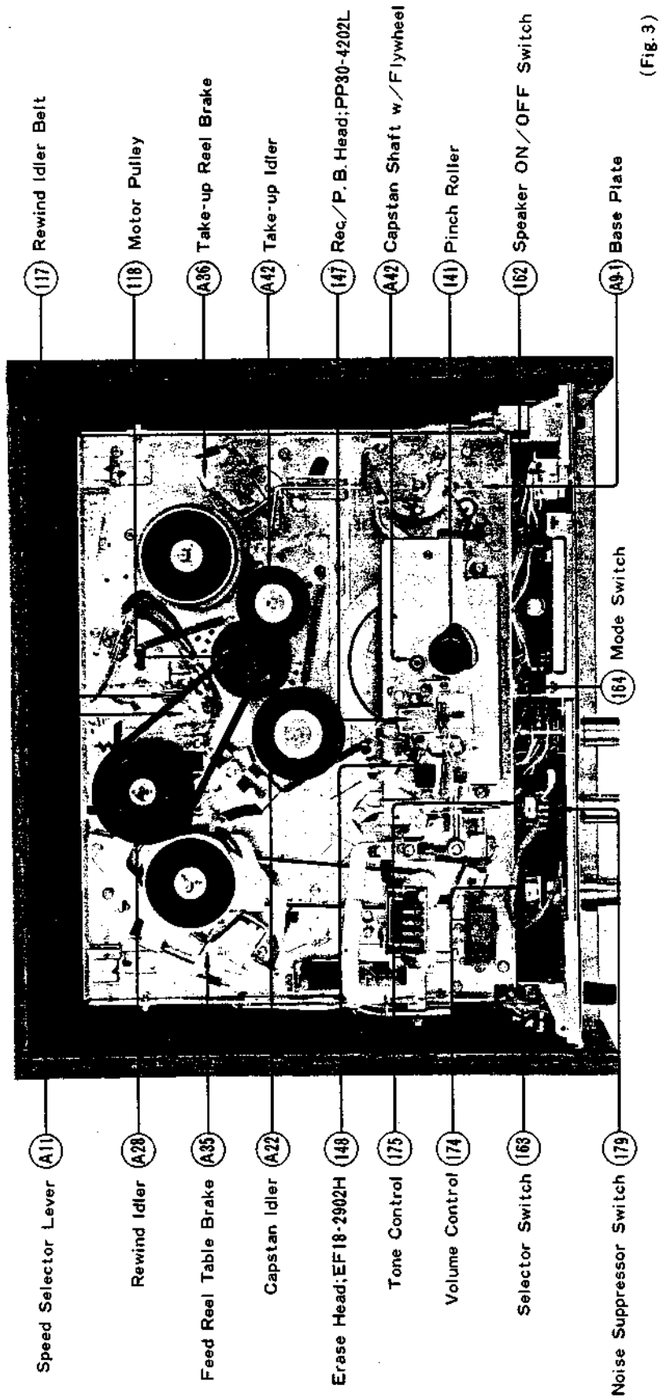
(Fig. 1)

Cabinet Back View



(Fig. 2)

Chassis Top View



(Fig. 3)

Removal of Reel Panel

(1) Remove the Function Selector Knob by unscrewing its setting screw.
(2) Remove the TAPE SPEED Knob and INST STOP Knob by pulling straight up.
(3) Unscrew the two setting screws fastening Head Cover and remove the Head Cover.
(4) Remove the two Guide Pins, two Screws (▲ in Fig. 1 & 3) fastening the Sash and two Screws (● in Fig. 1 & 3) fastening Reel Panel.
(5) Remove the Sash and Reel Panel

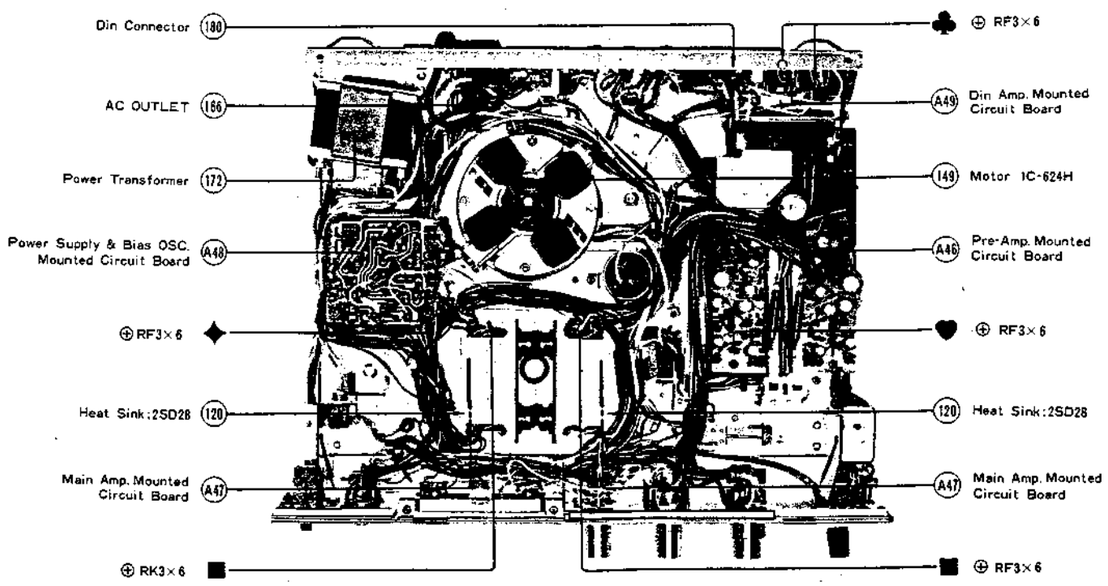
Removal of Chassis

(1) Remove the four Screws fastening Rubber Feet on the bottom of Cabinet.
(2) Remove the two Screws marked with ★ in Fig. 2 & 4 on the rear side of Cabinet.
(3) Remove the Chassis by lifting up carefully.

Removal of Printed Circuit Boards

Circuit Board	Remove Screws marked with
Pre-Amplifier Circuit Board	♥ in Fig. 7
Main Amplifier Circuit Board	■ in Fig. 7
Power Supply and Osc. Circuit Board	◆ in Fig. 7
DIN Connector Amplifier	♣ in Fig. 4

Chassis Bottom View

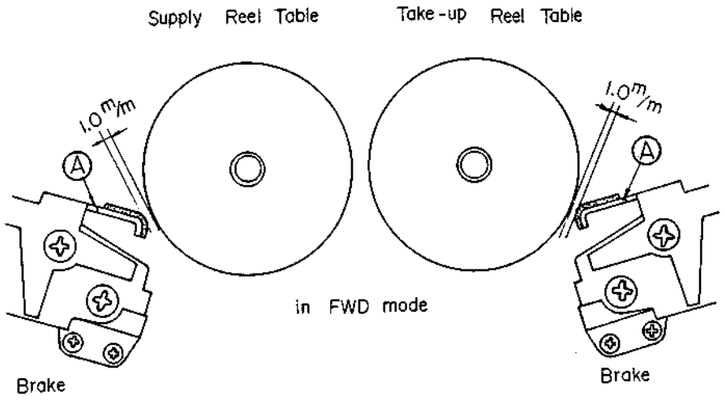


(Fig. 4)

Mechanical Adjustment

Brake Adjustment

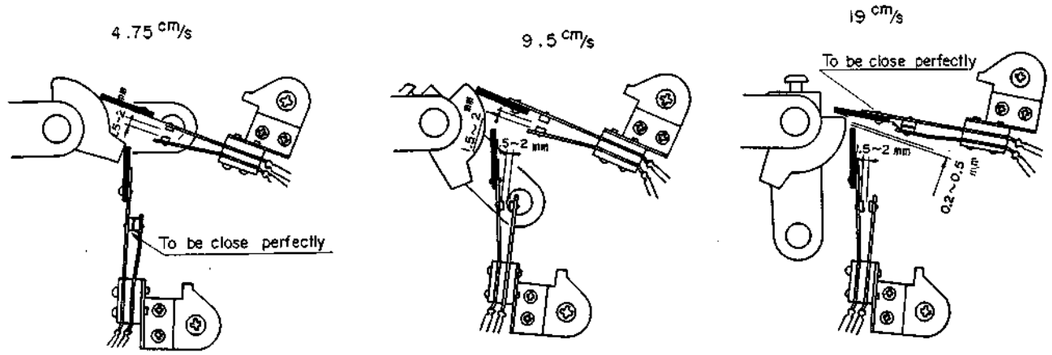
In the FORWARD mode, the clearance between Reel Table and Brake Shoe (both SUPPLY and TAKE-UP sides) should be approximately 1.0 mm. When adjusting, bend portion A in Fig. 5.



(Fig. 5)

Equalizer Switch Adjustment

The contacts of Leaf Switches should be as shown in Fig. 6 for each tape speed. When adjusting, unscrew the Screws fixing the switch holder and adjust the position of the holder. After adjustment, tighten the Screws.



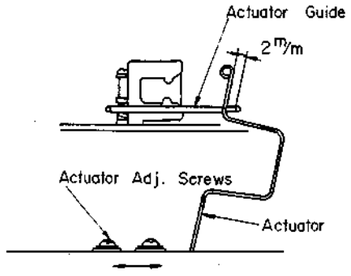
(Fig. 6)

Actuator Adjustment

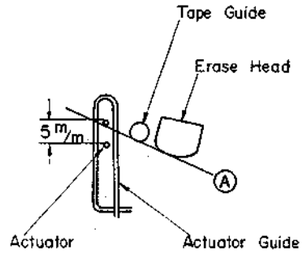
(1) Actuator Switch should be off at 2 mm from the end of Actuator Guide. (Fig. 7-A)

(2) Actuator Switch should be on at the outer position more than 5 mm from Line A. (Fig. 7-B)

When adjusting, unscrew the Actuator Adjusting Screws (Fig. 7-A) and adjust the position of Actuator. After adjustment, tighten the Screws.



(Fig. 7-A)



(Fig. 7-B)

Caution

☆ In case Recorder for 60 Hz Power Line is modified to for 50 Hz or vice versa. Replace only Motor Pulley.

☆ Can of Transistor 2SD28 in output stage is common to Collector, therefore +24V is applied there. Do not contact the can to Heat Sink or other metal parts with tools.

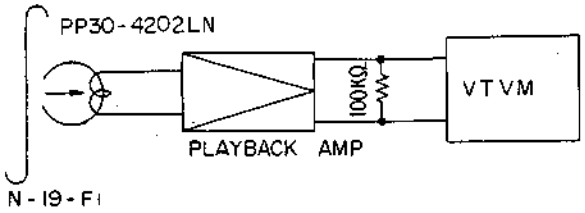
Electrical Adjustment

The adjustment is to be performed at 19 cm/sec (7-1/2 ips) tape speed. Connect a VTVM and 100K ohm load resistor to LINE OUT Jack.

Azimuth Alignment

(1) Playback a 10KHz tone on the first section of SONY Alignment Tape N-19-F1.

(2) Adjust the Azimuth Alignment screw located on the right side of Playback Head for maximum reading on the VTVM.

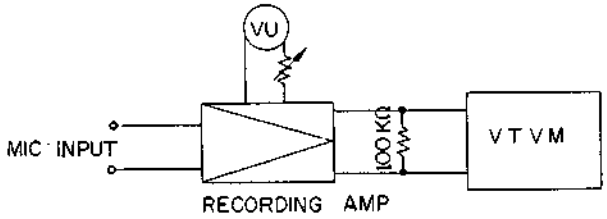


Recording Level Alignment

(1) In the RECORD mode, deliver an 1,000 Hz signal of -60 dBs (0.75 mV) to MIC Jack.

(2) Adjust the Volume Controls so that the VTVM connected to LINE OUT Jack reads +1.0 dBs(0.85 V).

(3) Adjust the Adjustable Resistors R_{151} and R_{251} located on Pre-Amplifier Circuit Board so that the pointer of Level Meter is just at the boundary between the Red portion and the Black portion.



Bias Oscillator Check

In RECORD mode with MODE Selector set to STEREO, measure voltage at each channel terminal of Erase Head and Record/Playback Head with V. T. V. M.

The voltage values should be:

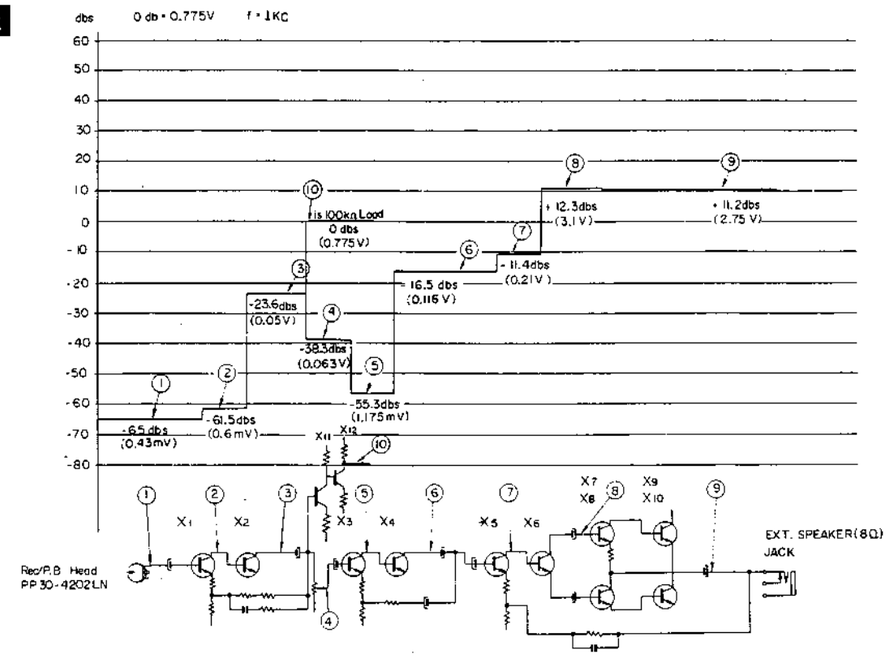
Erase Head : More than 30V

Record/Playback Head: 15V±2V

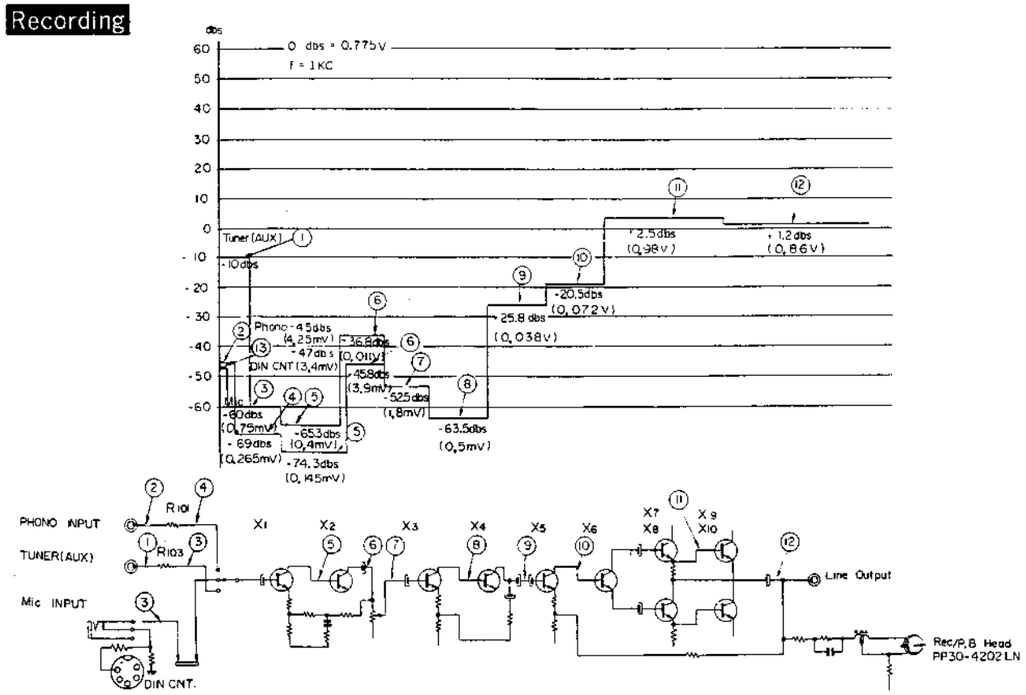
When getting out of the values specified above, adjust by changing taps of Bias Oscillator Transformers T_{302} and T_{303}.

Level Diagram

Playback



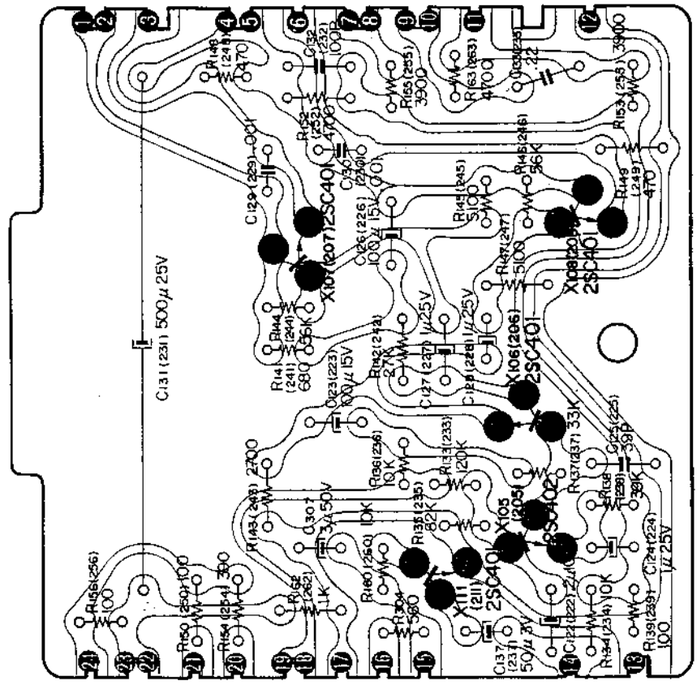
Recording



Mounting Diagram

Main Amplifier Section

—Conductor Side—



P3

1 RED. P3 29 (RED. P3 30)
2 RED X109 Base (RED X209 Collector)
3 YEL. X109 Base (YEL. X209 Base)
4 GRN. X109 Emitter (GRN. X209 Emitter)
5 RED X110 Collector (RED X210 Collector)
6 YEL. X110 Base (YEL. X210 Base)
7 GRY. P3 18 (BLU. P3 24)
8 GRY. P1 24 (BLU. P1 26)
9 VLT. P1 32 (GRN. P1 33)
10 VLT. J105 (GRN. J205)
11 BLU. J105 (GRY. J205)
12 BLK. P3 6 (BLK. P3 7)

P2

13 ORG. J104 (YEL. J204)
14 WHT. S105 (RED. S205)
15 WHT. P1 5 (RED P1 55)
16 WHT./VLT. P1 47 (WHT./GRN. P1 48)
17 ORG. J301 (YEL. J301)
18 BRN. P1 17 (BRN. P1 18)
19 BRN. P3 28 (BRN. P3 28)
20 WHT. S102-3
21 BLU. P2 Ch2 15

P1

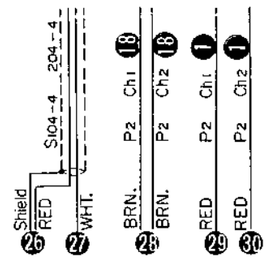
22 WHT. S104-1 (RED. S204-1)
23 BLK. P2 Ch2 13
24 BLK. P2 Ch2 13
25 BLK. P1 27

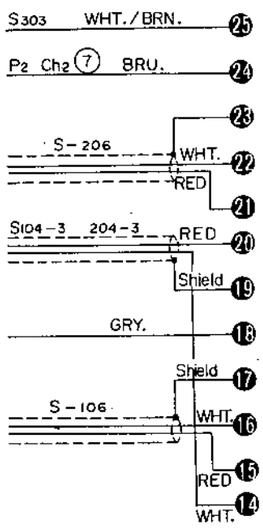
( ) ; Ch2

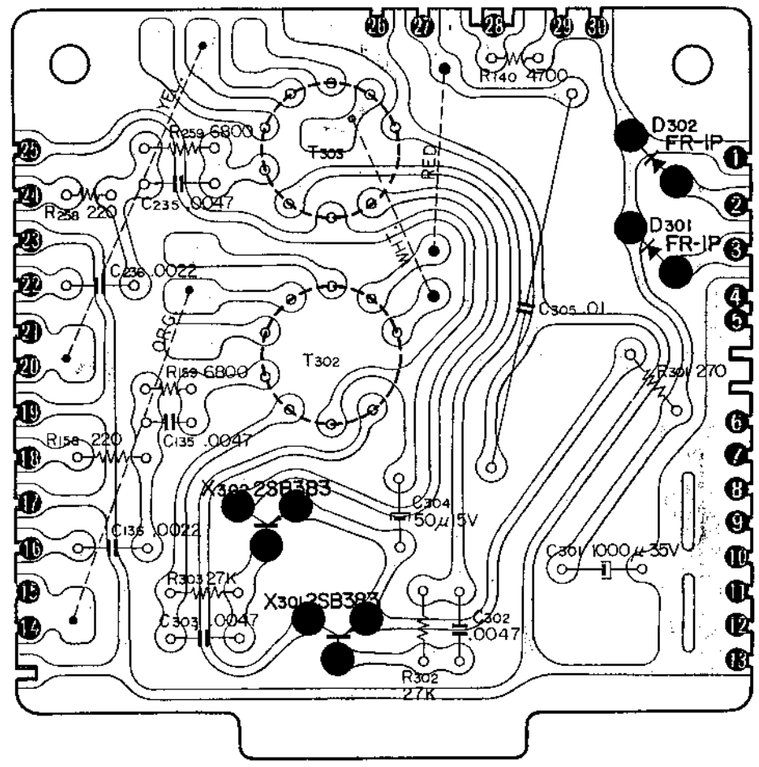
R304 & C307 ; Ch1 Only

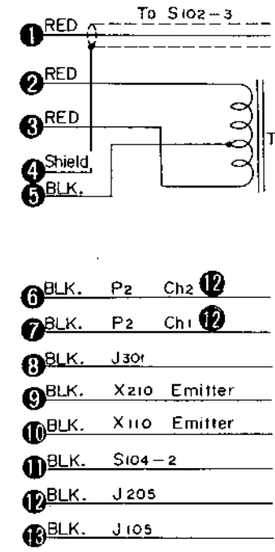
Mounting Diagram

Power Supply & Bias OSC Section
—Conductor Side—
P_3



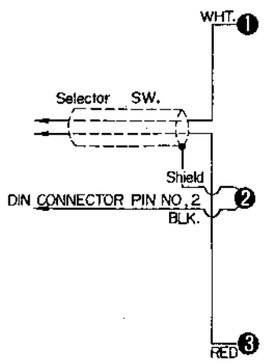


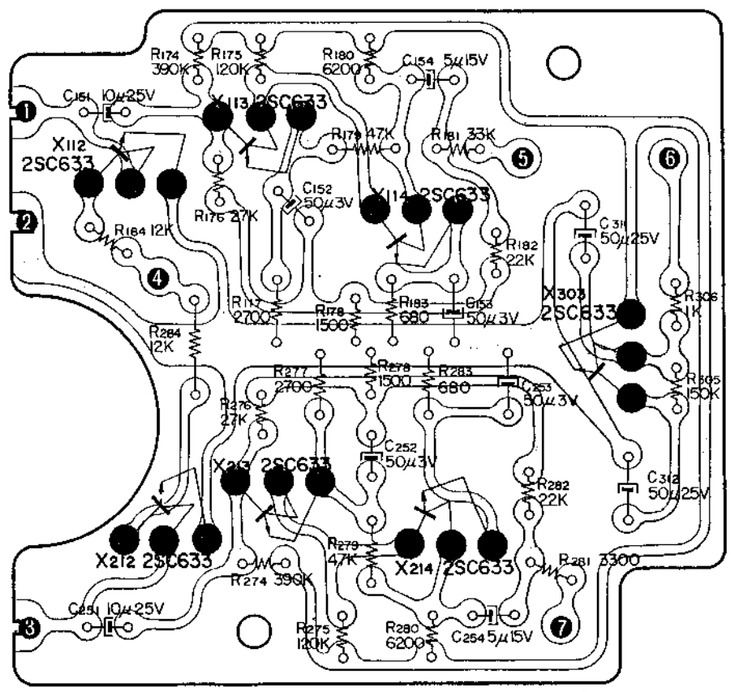


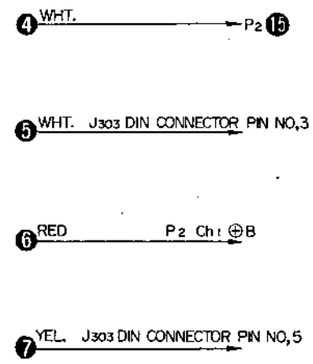


Mounting Diagram

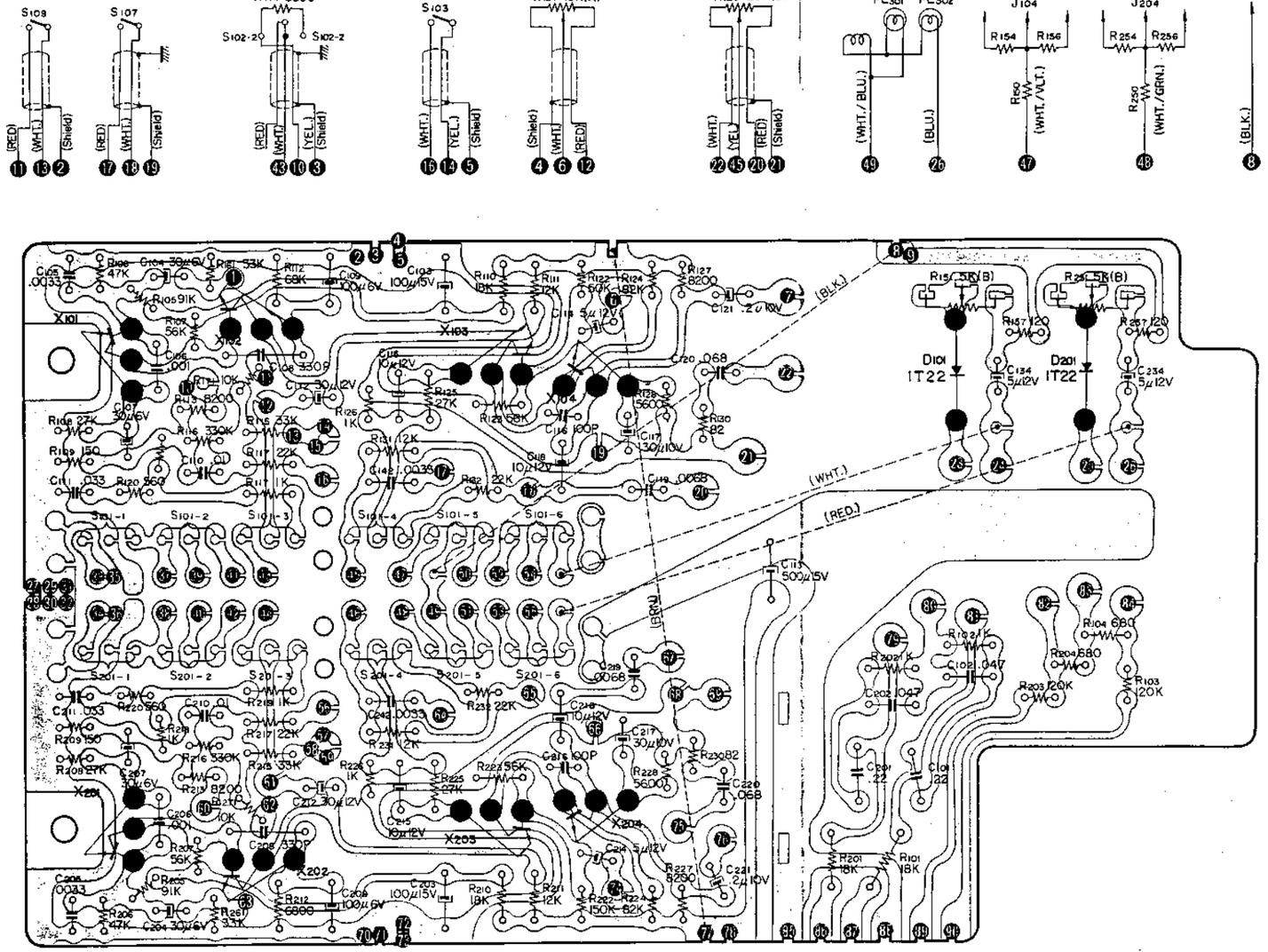
DIN Connector Amplifier Section
—Conductor Side—
P_1



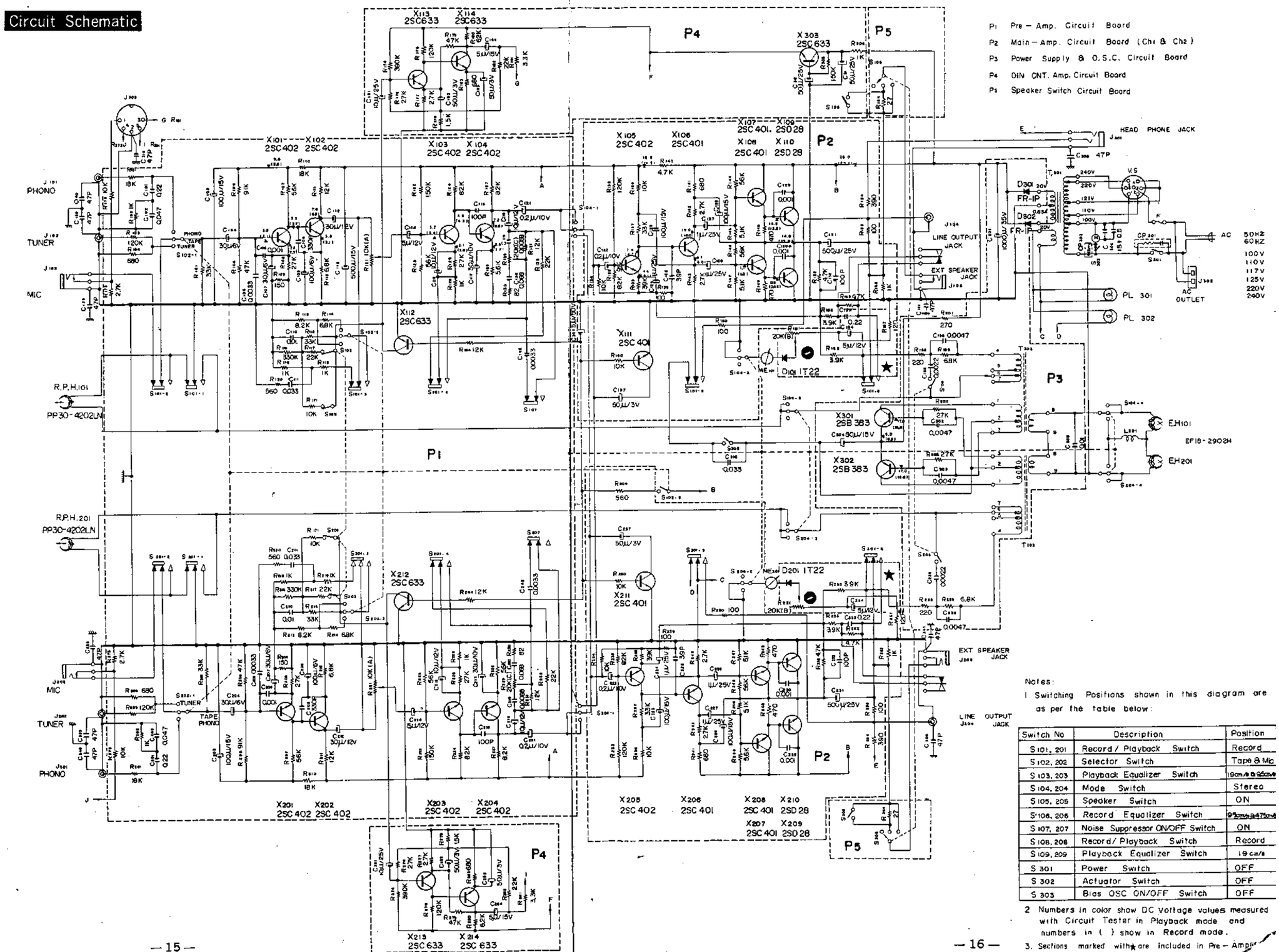




Mounting Diagram
Per-Amplifier Section
—Conductor Side—
P_1



Circuit Schematic



Notes:

1 Switching Positions shown in this diagram are as per the table below:

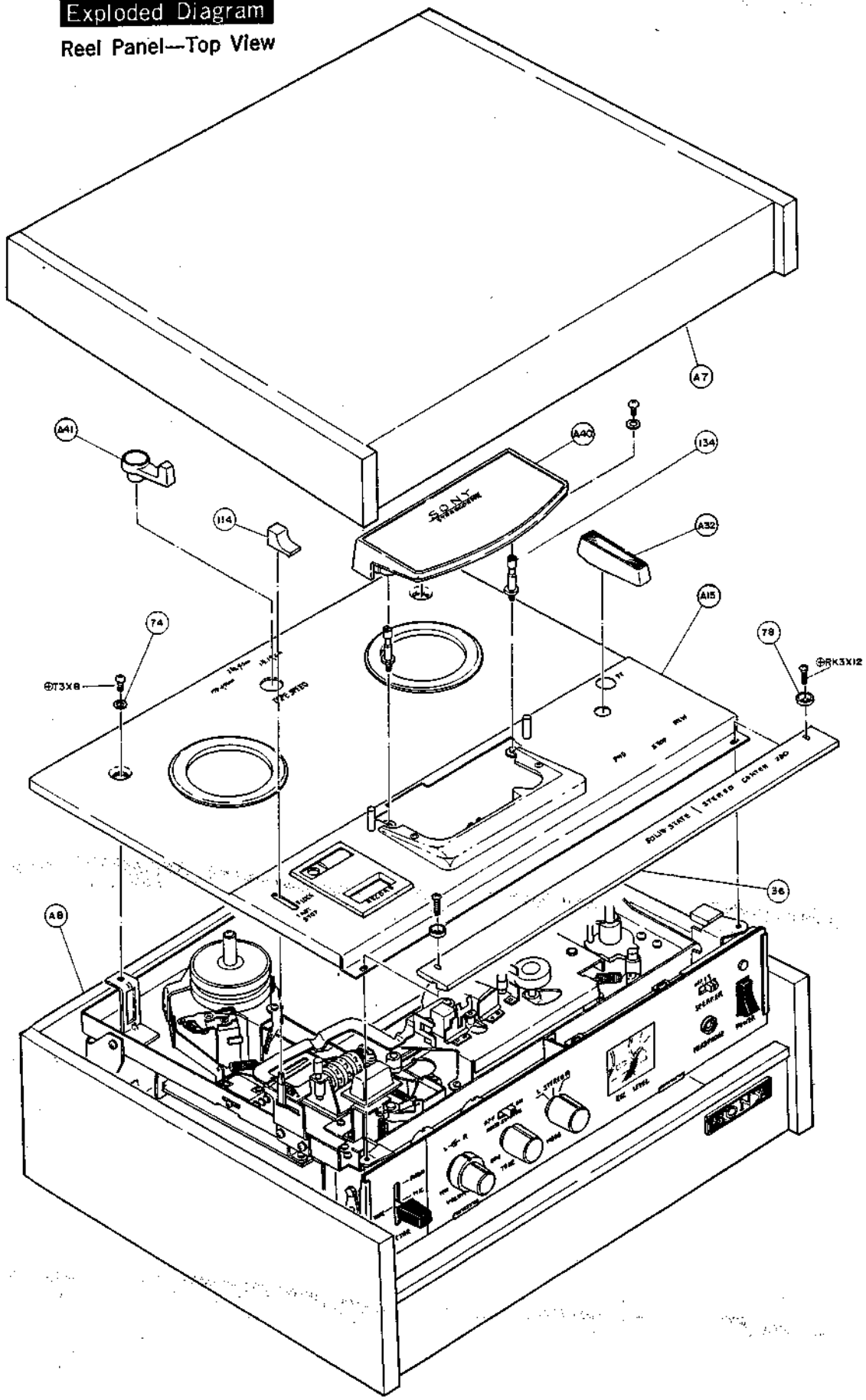
Switch No	Description	Position
S 101, 201	Record / Playback Switch	Record
S 102, 202	Selector Switch	Tape & Mic
S 103, 203	Playback Equalizer Switch	19cm/s & 9.5cm/s
S 104, 204	Mode Switch	Stereo
S 105, 205	Speaker Switch	ON
S 106, 206	Record Equalizer Switch	9.5cm/s & 4.75cm/s
S 107, 207	Noise Suppressor ON/OFF Switch	ON
S 108, 208	Record/ Playback Switch	Record
S 109, 209	Playback Equalizer Switch	19 cm/s
S 301	Power Switch	OFF
S 302	Actuator Switch	OFF
S 303	Bias OSC ON/OFF Switch	OFF

2 Numbers in color show DC Voltage values measured with Circuit Tester in Playback mode and numbers in ( ) show in Record mode.

3. Sections marked with ★ are included in Pre – Amp

Exploded Diagram

Reel Panel—Top View



STEREO TAPECORDER

TC-230/230W

686

TC Service Bulletin

No. 68-0005

TC-230 Serial No.	23,580 and after, for USA 11,700 and after, for Canada 15,701 and after, for other market	DATE: Feb, 1968
TC-230W Serial No.	11,000 and after, for USA 5,100 and after, for Canada 13,401 and after, for other market	

Subject: Change of Transistors and Resistor

Reason: High quality Semiconductors are newly developed.

Description:

Transistors

Symbol	Former Type	New Type	Symbol	Former Type	New Type
X101, 201	2SC401-6 -7 2SC402-6 -7	2SC631-61 -71 2SC632-61 -71	X106, 206	2SC401-5～7	2SC633-5～7 2SC634-5～7
X102, 202	2SC401-6 -7 2SC402-6 -7	2SC631-61 -71 2SC632-61 -71	※X107, 207	2SC401-5～7	2SC634-5～7
X103, 203	2SC401-5～7 2SC402-5～7	2SC633-5～7 2SC634-5～7	※X108, 208	2SC401-5～7	2SC634-5～7
X104, 204	2SC401-5～7 2SC402-5～7	2SC633-5～7 2SC634-5～7	X111, 211	2SC401-3～7 2SC401-3～7	2SC633-5～7 2SC634-5～7
X105, 205	2SC402-5～7 2SC402-5～7	2SC633-5～7 2SC634-5～7	———	———	———

* In case of replacing X107, X207, X108 or X208, never fail to change the resistors together refering to the table below.

Resistors

Transistor	Resistor to be changed	Former Type		New Type	
		Part Number	Description	Part Number	Description
X107, 207	R145, 245	1-242-690-$^{11}_{12}$	5.1 KΩ, RD¼UR, ±5%	1-242-689-$^{11}_{12}$	4.7 KΩ, RD¼UR, ±5%
X108, 208	R147, 247	1-242-690-$^{11}_{12}$	5.1 KΩ, RD¼UR, ±5%	1-242-689-$^{11}_{12}$	4.7 KΩ, RD¼UR, ±5%

Remarks: Transistors of former type are interchangeable with of new type without changing the circuits, except X107, X207, X108 and X208.

SONY®
SERVICE MANUAL

Sony Corporation

9-954-148-81

5J0603-4
Printed in Japan