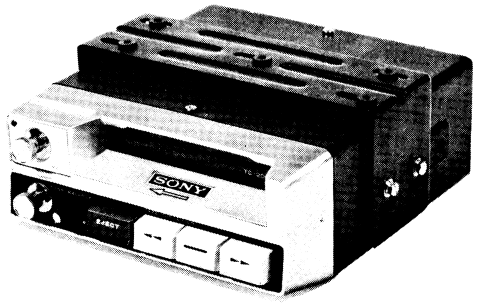
TC-20



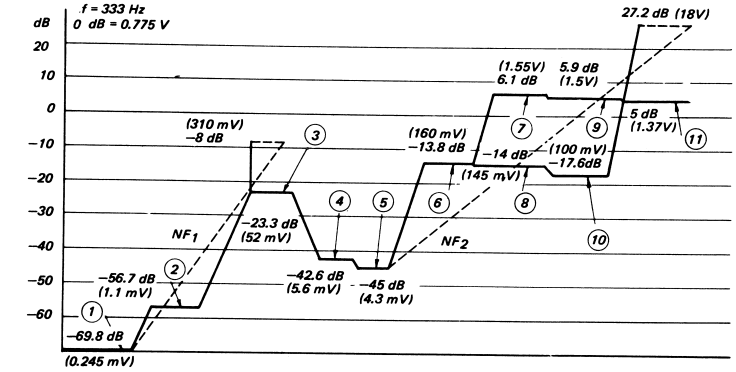
SPECIFICATIONS

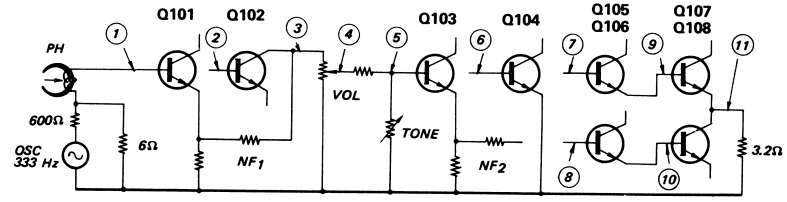
Input Power Requirements:	Car battery DC 12 V, 15 W, positive or negative ground
Track System:	Four-track stereo or two-track mono
Tape:	SONY tape cassette or equivalent
Tape Speed:	1-7/8 ips (4.8 cm/s)
Playing Time:	1.0 hr with SONY tape cassette C-60
	1.5 hrs with SONY tape cassette C-90
Fast Forward and Rewind Time:	100 sec. with C-60
Frequency Response:	50 – 10,000 Hz
Signal-to-Noise Ratio:	Better than 45 dB
Flutter and Wow:	Less than 0.28 %
Power Output:	6 W per channel with 3.2Ω load
Output:	External speaker output leads
Semiconductors:	25 transistors, 7 diodes and 1 thermistor
Dimensions:	7 3/16 (W) x 2 7/8 (H) x 8 1/4" (D) (186 x 73 x 210mm)
Weight:	7 lb (3.2 kg)

SONY®
SERVICE MANUAL

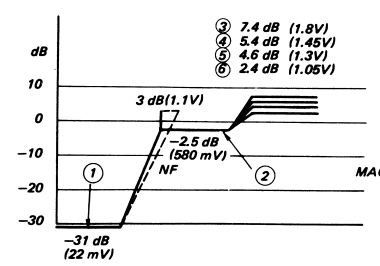
11. LEVEL DIAGRAM

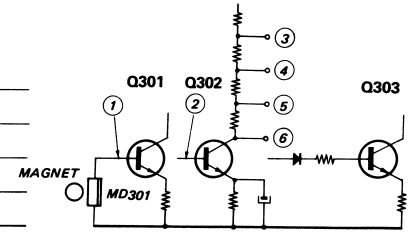
AUDIO AMP



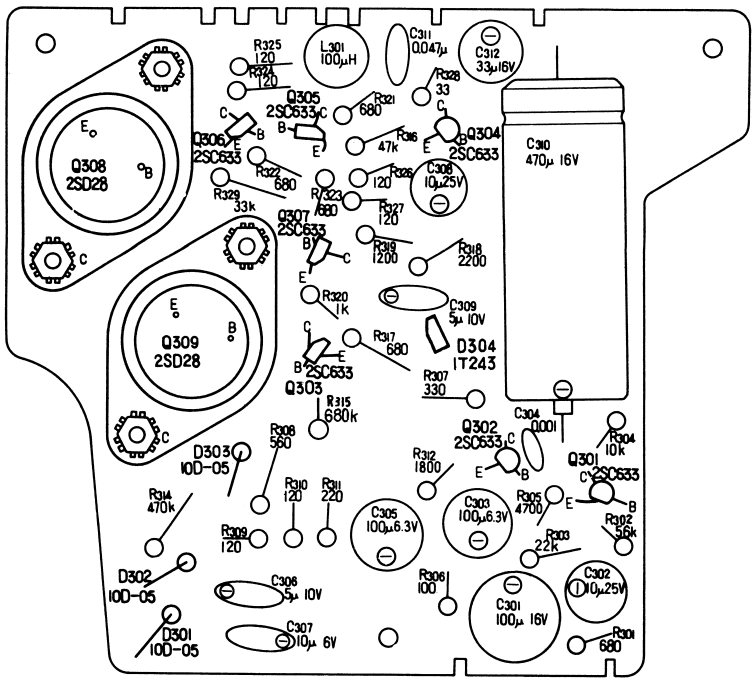


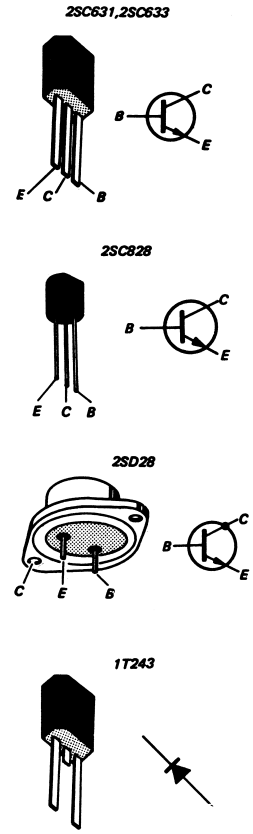
AUTOMATIC EJECT AMP





– Component Side –

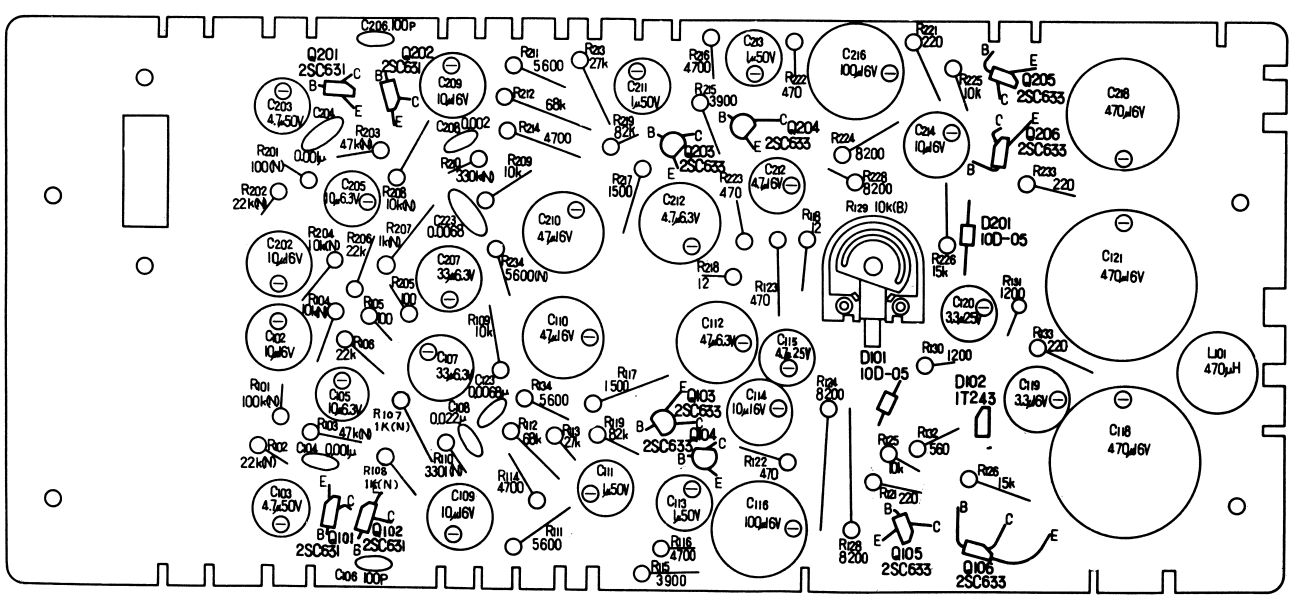




AUTOMATIC EJECT AMP CIRCUIT BOARD

– PART NO. 1-539-379-11 –

Q301~302, 304 : 2SC633 or 2SC828



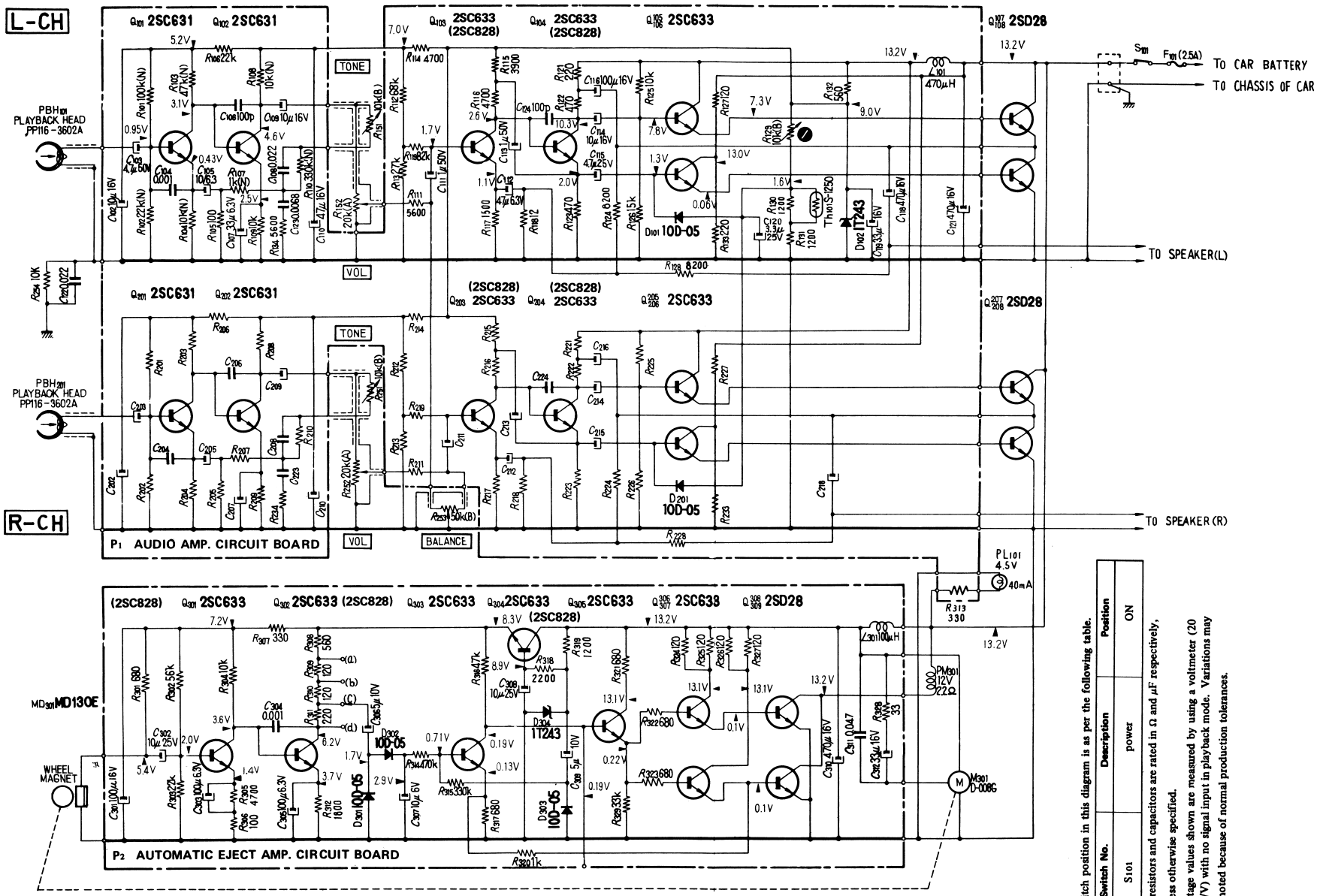
AUDIO AMP CIRCUIT BOARD

– PART NO. 1-539-378-13 –

Note: C124, C224, R127 & R227 are mounted on the conductor side.

Q103~104, 203~204 : 2SC633 or 2SC828

12. SCHEMATIC DIAGRAM



Notes:

(1) Switch position in this diagram is as per the following table.

Switch No.	Description	Position
S101	power	ON

(2) All resistors and capacitors are rated in Ω and μF respectively, unless otherwise specified.

(3) Voltage values shown are measured by using a voltmeter (20 kΩ/V) with no signal input in playback mode. Variations may be noted because of normal production tolerances.

10. ELECTRICAL ADJUSTMENT

Adjustments

Item	Signal Source	Output Connection	Mode	Adjusting Position	Remarks
1. Playback Head Azimuth Adjustments	SONY adjustment tape (P-4-A81), 6,300 Hz	oscilloscope, VTVM and 3.2 Ω resistor in parallel to speaker leads (See Fig. 10-2)	Playback	azimuth adjusting screw (See Fig. 10-1)	1. Set the TONE control to position "H" and the BALANCE control to mid position. 2. Adjust the screw to obtain maximum reading on VTVM. 3. Adjust the screw to obtain the Lissajous figure as shown in Fig. 10-2 on the oscilloscope.
2. Magnetodiode Position Adjustment	no signal	VTVM across magnetodiode MD-301	Playback	positioning screw (See Fig. 10-3)	1. Adjust the screw to obtain -35 dB ~-25 dB (14 mV ~ 43 mV) reading on VTVM. 2. After the adjustment, confirm that the gap between magnetodiode and wheel magnet is more than 1/64" (0.5 mm).
3. Eject Time Adjustment	no signal	no connection	Playback	automatic eject amplifier circuit board (See Fig. 10-4)	Bridge one of the cut portion marked ⓐ to ⓓ in Fig. 10-4 so that the eject time is within the range of 8 to 20 seconds. ⓐ shortest ⓓ longest
4. Current Drain Adjustment	no signal	no connection	Playback	R129 (See mounting diagram on page 15)	1. Disconnect the motor circuit and the eject amplifier circuit from audio circuit board. (Unsolder the lead marked with "x" on page 16.) 2. Connect a 500-mA full-scale ammeter in series to the lead indicated on 16. 3. Adjust the R129 so that the current drain of audio amplifier circuit board is 230 mA.

Note:

1. Before making adjustments, be sure to clean heads with a soft cloth dampened with alcohol.
2. The adjustments should be made on DC 13.2 V power supply.
3. After adjustments, apply lock paint to the adjusted positions.
4. The following test equipment is to be provided for the adjustments.
   VTVM
   Oscilloscope
   Two resistors, 3.2Ω 5W
   SONY adjustment tape P-4-A81, P-4-L81
   Ammeter, 500mA

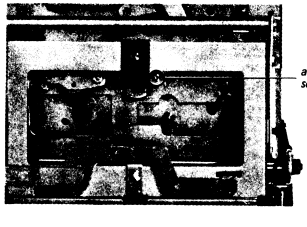


Fig. 10-1 Adjusting position

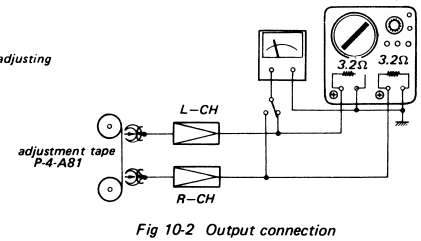


Fig 10-2 Output connection

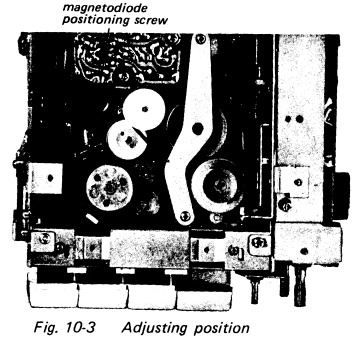


Fig. 10-3 Adjusting position

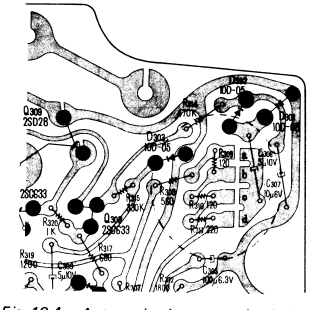


Fig. 10-4 Automatic eject amp. circuit board

10-2. After the adjustment, confirm the VTVM reading specified in the following table.

Note: Following adjustments should be made on both channels.

Item	Controls	Procedures	VTVM
1. Maximum Output	TONE ..... H BALANCE .... mid position	1. Play back the SONY adjustment tape (P-4-L81).	more than +14 dB(3.8V)
2. Frequency Response	TONE ..... H BALANCE .... mid position	1. Play back the SONY adjustment tape (P-4-L81), and turn the VOL control so that the VTVM indicates +5 dB (1.4V). 2. Play back the SONY adjustment tape (P-4-A81). 3. Turn the TONE control L position.	+5 dB(1.4V) 0 ± 3 dB (0.5~1.1V) -15 ± 3 dB (0.09~0.19V)
3. Playback S/N Ratio	TONE ..... H BALANCE .... mid position	1. Play back the SONY adjustment tape (P-4-L81), and turn the VOL control so that the VTVM indicates +5 dB (1.4V). 2. Put the empty cassette in the set.	+5 dB(1.4V) less than -45 dB (4.4mV)
4. Level Balance	TONE ..... H BALANCE .... mid position	1. Connect the VTVM to R-CH output. 2. Play back the SONY adjustment tape (P-4-L81), and turn the VOL control so that the VTVM indicates +5 dB (1.4V). 3. Change the VTVM connection to L-CH output.	+5 dB(1.4V) +5 ± 2 dB (1.1~1.7V)

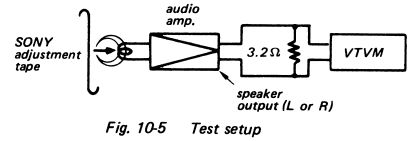
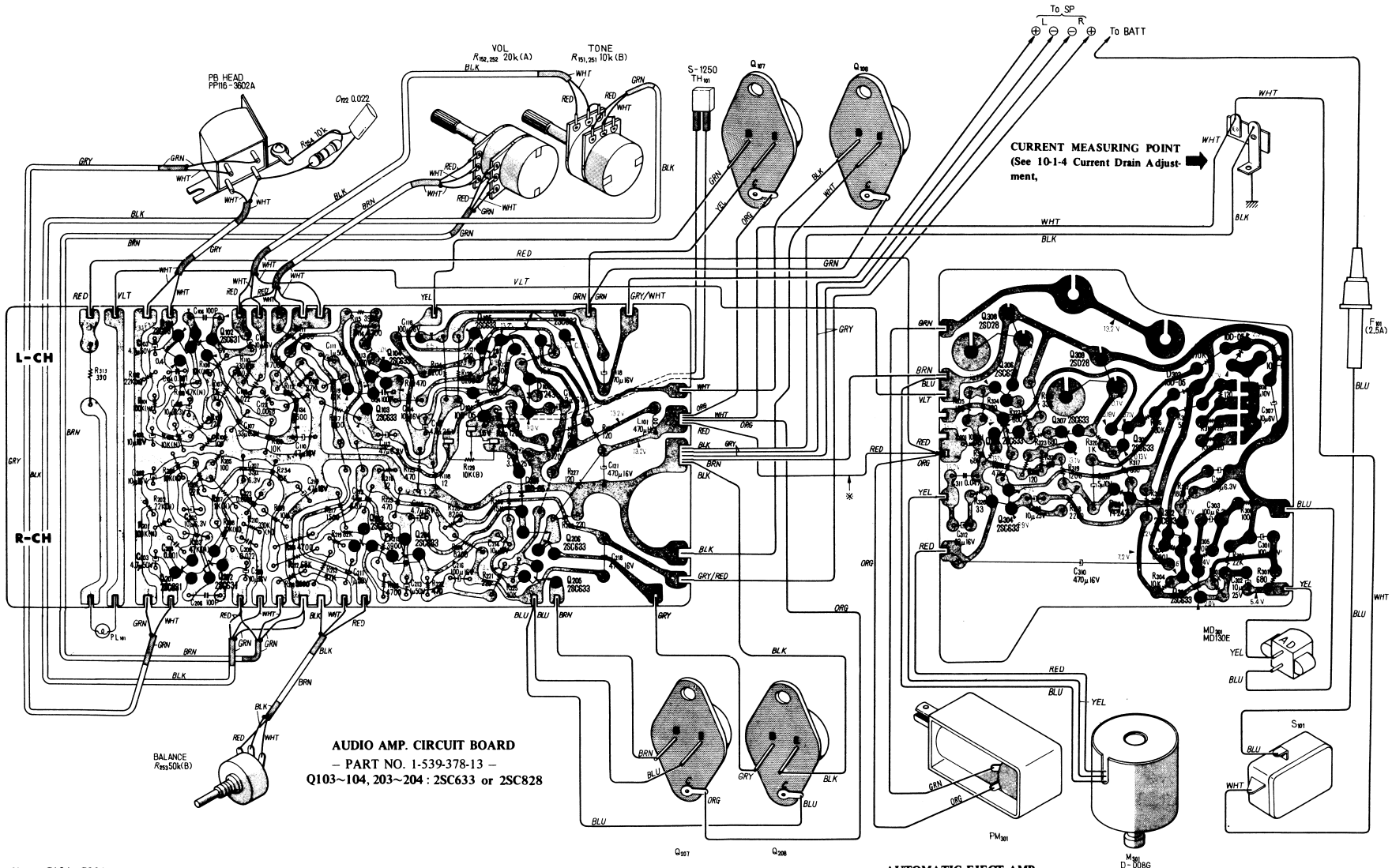


Fig. 10-5 Test setup

13. MOUNTING DIAGRAM

– Conductor Side –



Note: C124, C224, R127 & R227 are mounted on the conductor side.

AUTOMATIC EJECT AMP CIRCUIT BOARD
– PART NO. 1-539-379-11 –
Q301~302, 304 : 2SC633 or 2SC828