

CIRCUIT ADJUSTMENTS

The instruction for adjusting the FM and AM circuit will be given in this section.

1. FM CIRCUIT

1-1. Test equipment required:

FM band signal generator : 400Hz, 30% modulation (22.5KHz deviation) 300 ohm output

FM IF Sweep generator : 10.7MHz \pm 500KHz

VTVM : low range AF

Oscilloscope : High sensitivity general purpose

Accurate audio generator (to 100KHz)

FM stereo signal generator: for MPX tests

1-2. IF amplifier alignment

Note: a) For safety, the output should be connected to loudspeaker or equivalent resistance loads.


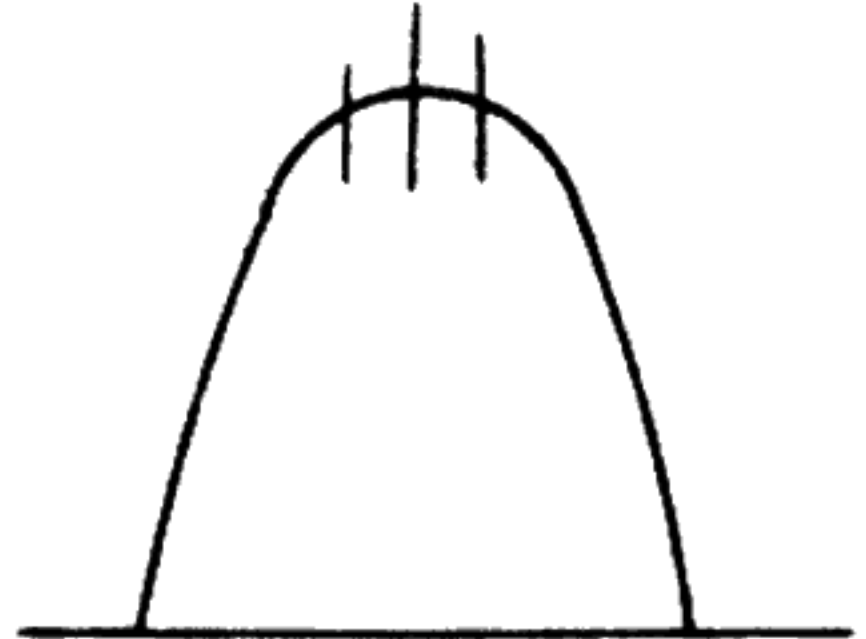
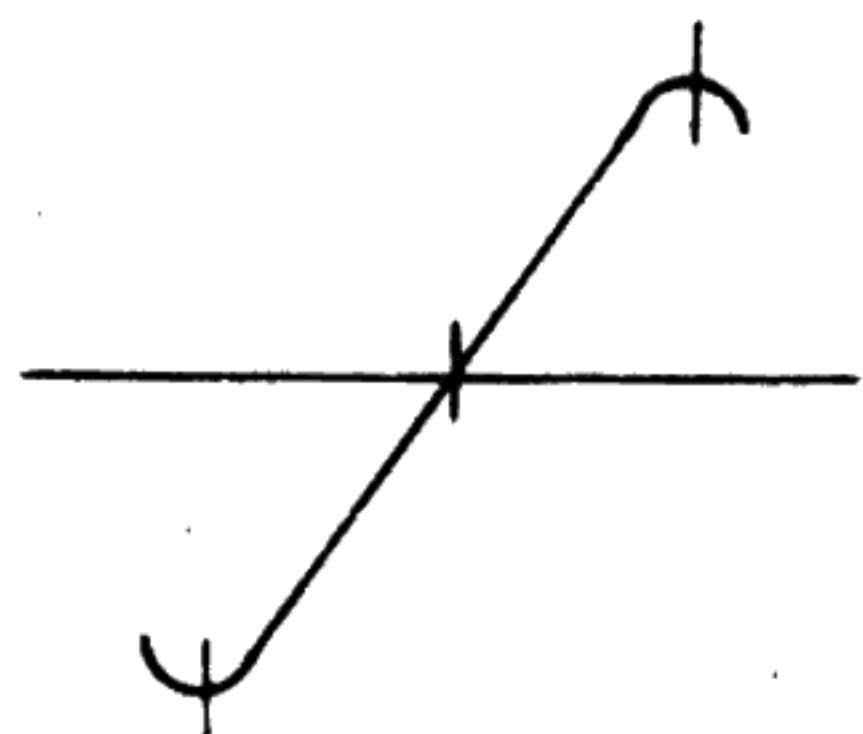
b) Set the panel controls as follows.

FUNCTION selector to FM

TAPE MONITOR/IN switch TAPE MON.

VOLUME control at minimum output position

c) The IF sweep generator is connected the test point 1 at the C208.

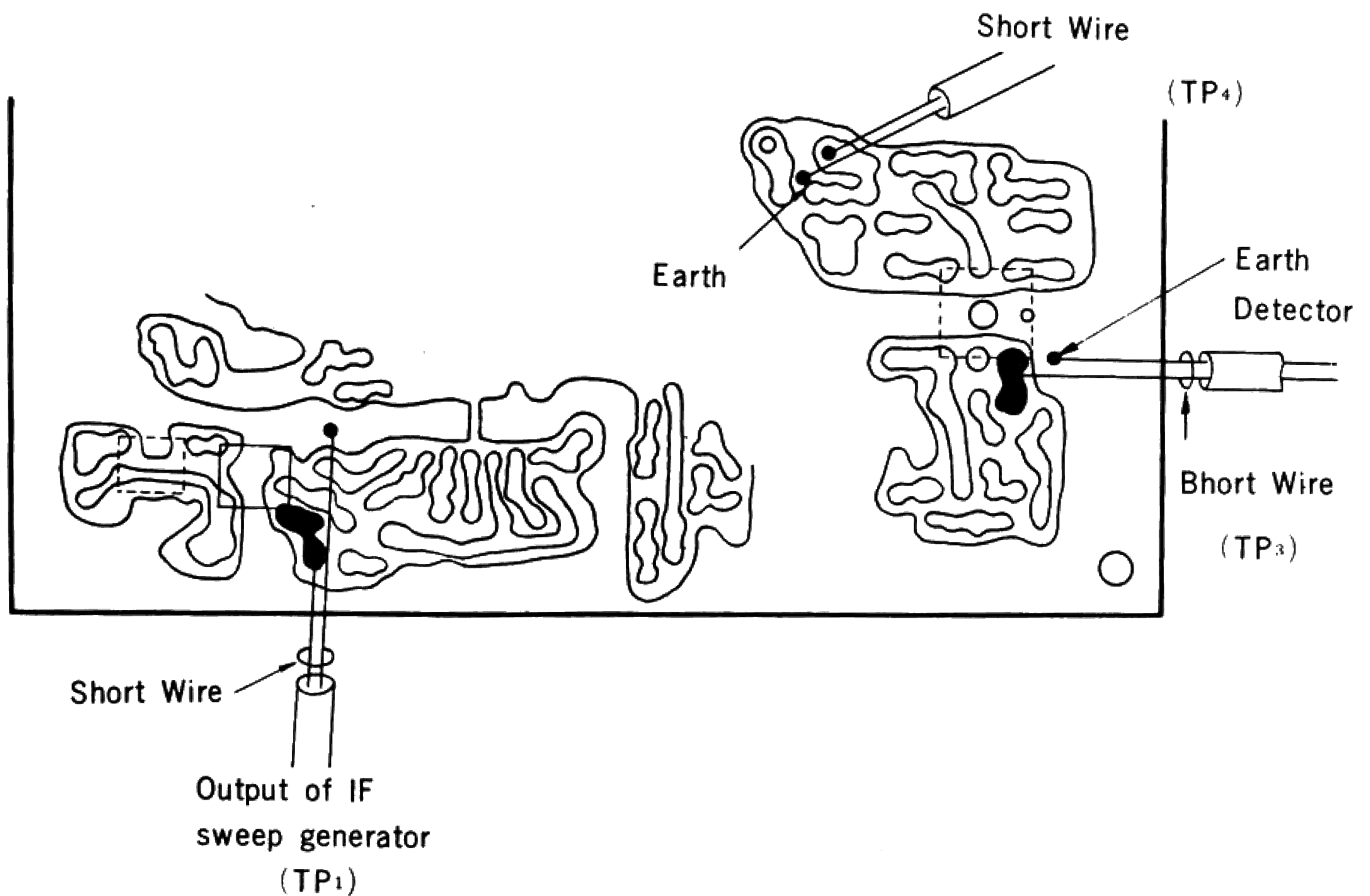
| Step | Adjust | Input Connection | Input Connection | Wave form |
|------|--------------------------|------------------|------------------|---|
| 1 | T204, T205 T206, T207 | TP1 | TP3 |  |
| 2 | T101, T102 | TP2 | TP3 |  |
| 3 | T208 | TP2 | TP4 |  |

d) The IF sweep generator is connected the test point 2 at the TR-2 gate.

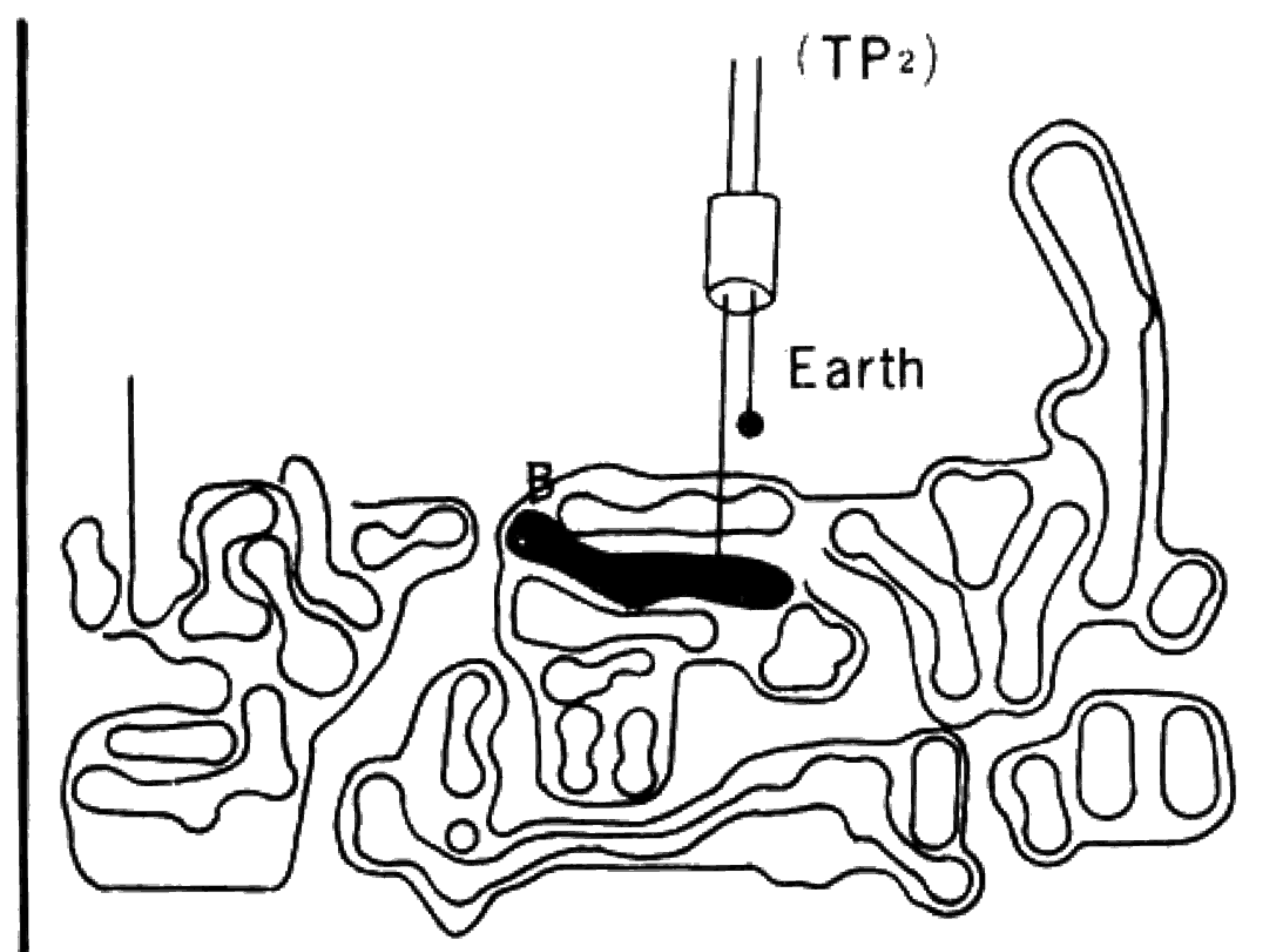
e) TP3 is connected to the R223.

TP4 is at the ratio detector output.

IF Base Bottom View



FM Tuner Base Bottom View



1-3. FM Tuner Pack:

The FM tuner may require adjustment when the signals are distorted or when the sensitivity has been lowered.

Set the FUNCTION selector to FM TAPE MON./IN switch to TAPE MON.

In the steps to follow the FM signal generator is set for 400Hz, 30% (22.5KHz dev.) modulation, for the output indication the V. T. V. M and the scope in parallel are connected to the RIGHT and LEFT speaker jacks.

Step 1. Set the generator output to 87.5MHz, and variable capacitor counter-clockwise

adjust the coil L106 for maximum output.

- Step 2. Set the generator output to 108MHz and variable capacitor clockwise. Adjust the trimmer FT3 for maximum output.
- Step 3. Set the generator output to 90MHz and tune the receiver to this signal. Adjust the coil L102 and L104 for maximum output.
- Step 4. Set the generator output to 106MHz and tune the receiver to this signal. Adjust the trimmer FT1 and FT2 for maximum output.
- Step 5. Repeat the adjustments in steps 1, 2, 3, and 4.

Note: In the above adjustment, do not forget to keep the generator output level as low as possible for the best results.

1-4. FM Multiplex Circuit

The panel controls are as follows.

- 1) FUNCTION selector to FM
- 2) STEREO/MONO switch to STEREO
- 3) TAPE MON./IN switch to TAPE MON
- 4) LOUDNESS/OUT switch to OUT
- 5) VOLUME control at fully counter clockwise

STEREO SIGNAL

| | | |
|--------------|--------------|---------------|
| Pilot signal | 19KHz (10%) | 7.5 KHz dev. |
| L signal | 400KHz (45%) | 33.75KHz dev. |
| R signal | 400KHz (45%) | 33.75KHz dev. |

1-4-1. 19KHz Amplifier

- Step 1. Connect the V. T. V. M (and scorp) to test point C305.
- Step 2. Adjust transformers T301, T302 and T303 for maximum indication.

1-4-2. Separation Adjustments

The general instructions supplied with the FM stereo generator should be followed in the tests. Set the FM signal generator to 98MHz, 1mV output modulated 100% with 1KHz (75KHz dev.) Set the stereo signal generator for 1KHz modulation composite signal in the 45%+45%+10% Main 33.75KHz, sub. 33.75KHz Pilot 7.5KHz, Proportion to modulate the FM signal generator.

- Step 1. The initial conditions are as follows:

Generator—300 ohm output to FM Ant. terminals, set for 98MHz, FM stereo generator set for Right output.

Receiver —FUNCTION selector to FM TAPE MON./IN switch TAPE MON. STEREO/MONO switch STEREO LOUDNESS/OUT switch LOUDNESS Right TAPE OUT to V. T. V. M (and scorp) tune the receiver to 98MHz.

- Step 2. Adjust the transformer T303 for maximum output.
- Step 3. Connect the V. T. V. M to the Left-tape out the reading should be approximately 20dB lower than that of the left output when R308 (semi-fixed type) is adjusted.
- Step 4. Set the FM stereo generator for the Left output. Adjust the transformer T303 for maximum output.
- Step 5. Connect the V. T. V. M to the Right-tape out the reading should be approximately 30dB lower than that of Left output when R301 (semi-fixed type) is adjusted.

Step 6. Repeat the Step 2 thru 5 several times until the minimum reading is more than 30dB below that of the input to the opposite channel.

1-4-3. Checking of Stereo Indicator Lamp when the separation is adjusted, check stereo indicator lamp to be switched on.

2. AM CIRCUIT

2-1. Test equipment required

AM standard signal generator covering the 455KHz, IF band and the medium wave band the modulation is set to 400Hz, 30%.

If available, a sweep generator for the 455KHz, band will speed up the alignment.

V. T. V. M : Low range AF

Oscilloscorp : General Purpose

2-2. IF Amplifier Alignment

Note: a) For safety, the output should be connected to loudspeakers or equivalent resistance loads.

b) Set the panel controls as follows.

1) FUNCTION selector to AM

2) STEREO/MONO switch to MONO

3) TAPE MON./IN switch to TAPE MON.

4) VOLUME control at fully clockwise

c) The modulated 455KHz signal is connected to test point C123 and should be kept at a low level consistent with good measurement.

Step 1. Connect the V. T. V. M to the speaker terminal (either channel)

Step 2. Adjust the IF transformers T201, T202 and T203 for maximum indication.

2-3. AM tuning Circuit

The panel control setting is the same as for the IF amplifier tests the V. T. V. M (and scorp) connection is the same as for the IF amplifier tests.

Step 1. Set the generator to 510KHz, and connect to the AM Ant. Set the variable capacitor fully Counter -clockwise.

Step 2. Adjust the oscillator coil T103 for maximum output.

Step 3. Set the generator to 1,650KHz, and variable capacitor fully clockwise.

Step 4. Adjust the oscillator trimmer AT2 for maximum output.

Step 5. Set the generator to 600KHz, and tune the receiver to this signal.

Step 6. Adjust the coil L107 maximum output.

Step 7. Set the generator to 1,400KHz, and tune the receiver to this signal.

Step 8. Adjust the trimmer AT1 for maximum output.

Repeat the Step 1 thru 8 until no improvement is obtained.

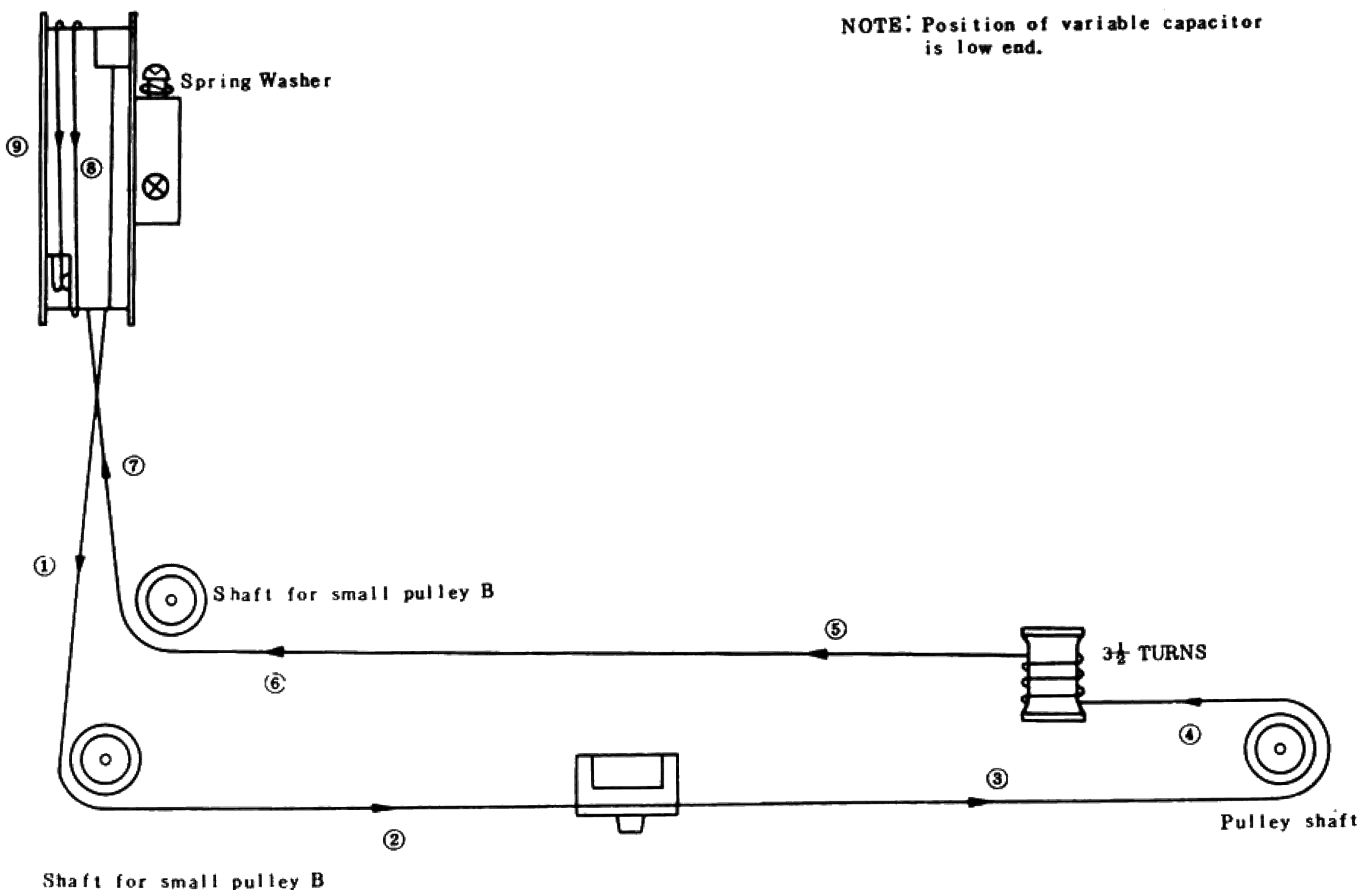
VOLTAGE ALIGNMENT

| | TR ₁ (2SK-19) | | | TR ₂ (LS-5486) | | | TR ₃ (LS-3001) | | |
|-----|----------------------------|----------------|----------------|-----------------------------|----------------|----------------|-----------------------------|----------------|----------------|
| | V _G | V _S | V _b | V _G | V _S | V _b | V _e | V _b | V _c |
| A M | 0 | | | 0 | 3.3 | 11.0 | 4.3 | 4.65 | 9.9 |
| F M | 0 | 0.5 | 9.0 | 0 | 3.3 | 11.0 | 4.3 | 4.65 | 9.9 |
| | TR ₄ (2SC929) | | | TR ₅ (LS-3001) | | | TR ₆ (LS-3001) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 0.5 | 1.0 | 4.0 | 1.7 | 2.3 | 10.5 | 1.7 | 2.5 | 8.75 |
| F M | 0.5 | 1.0 | 4.0 | 1.6 | 2.3 | 10.2 | 1.6 | 2.3 | 8.3 |
| | TR ₇ (SXN002) | | | TR ₈ (SX3391A) | | | TR ₉ (SX3391A) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 0 | 0.75 | 0.27 | 1.5 | 2.0 | 8.2 | 0 | 0.42 | 0 |
| F M | 0 | 0.75 | 0.26 | 1.4 | 2.0 | 7.9 | 0.35 | 0.9 | 0.5 |
| | TR ₁₀ (TIS-97A) | | | TR ₁₁ (E-4010) | | | TR ₁₂ (TIS-97A) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 0.03 | 0.5 | 6.15 | 5.6 | 6.15 | 11.0 | 0.035 | 0.5 | 6.15 |
| F M | 0.035 | 0.5 | 6.1 | 5.5 | 6.10 | 11.5 | 0.035 | 0.5 | 6.10 |
| | TR ₁₃ (SE-4010) | | | TR ₁₄ (TIS-97A) | | | TR ₁₅ (TIS-97A) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 5.55 | 6.1 | 11.0 | 4.4 | 4.85 | 11.5 | 4.4 | 5.0 | 12.0 |
| F M | 5.55 | 6.10 | 11.2 | 4.5 | 5.0 | 11.9 | 4.5 | 5.0 | 12.2 |
| | TR ₁₆ (TIS-97A) | | | TR ₁₇ (TIS-97A) | | | TR ₁₈ (LS-3705) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 3.9 | 4.5 | 1.0 | 3.9 | 4.4 | 9.7 | 0.39 | 1.0 | 13.5 |
| F M | 4.0 | 4.5 | 10.0 | 4.1 | 4.6 | 10.0 | 0.4 | 1.0 | 13.5 |
| | TR ₁₉ (LS-3705) | | | TR ₂₀ (TIS-92MG) | | | TR ₂₁ (TIS-92MG) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 0.36 | 19.5 | 14.0 | 14.3 | 14.9 | 28.0 | 13.8 | 13.2 | 0.4 |
| F M | 0.375 | 0.93 | 14.5 | 14.5 | 15.2 | 28.6 | 14.0 | 13.5 | 0 |
| | TR ₂₂ (TIS-97A) | | | TR ₂₃ (TIS-97A) | | | TR ₂₄ (2SD-313) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 15.0 | 15.5 | 28.0 | 14.5 | 14.0 | 0.45 | 14.0 | 14.5 | 29.0 |
| F M | 15.0 | 15.6 | 28.2 | 14.5 | 13.9 | 0 | 14.0 | 14.5 | 28.5 |
| | TR ₂₅ (2SD-313) | | | TR ₂₆ (2SD-313) | | | TR ₂₇ (2SD-313) | | |
| | V _e | V _b | V _c | V _e | V _b | V _c | V _e | V _b | V _c |
| A M | 0 | 0.39 | 14.2 | 14.5 | 15.0 | 28.5 | 0 | 0.4 | 14.6 |
| F M | 0 | 0.40 | 14.0 | 14.6 | 15.1 | 28.5 | 0 | 0.42 | 14.5 |

Note: Each Values are Voltage.

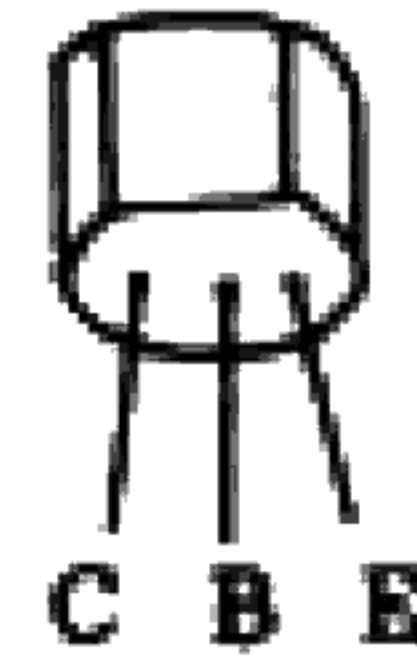
Typical Voltage shown in 10KΩ/V tester or V. T. V. M.

DIAL STRINGING

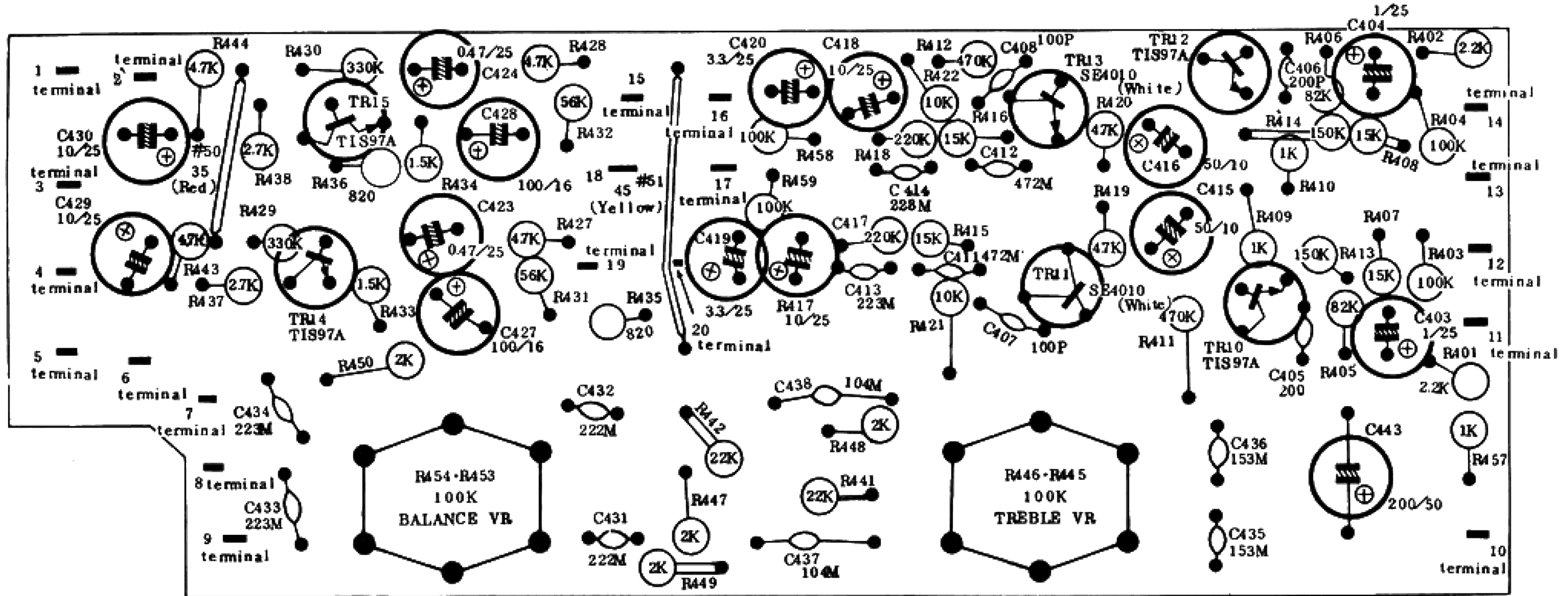


TRANSISTOR

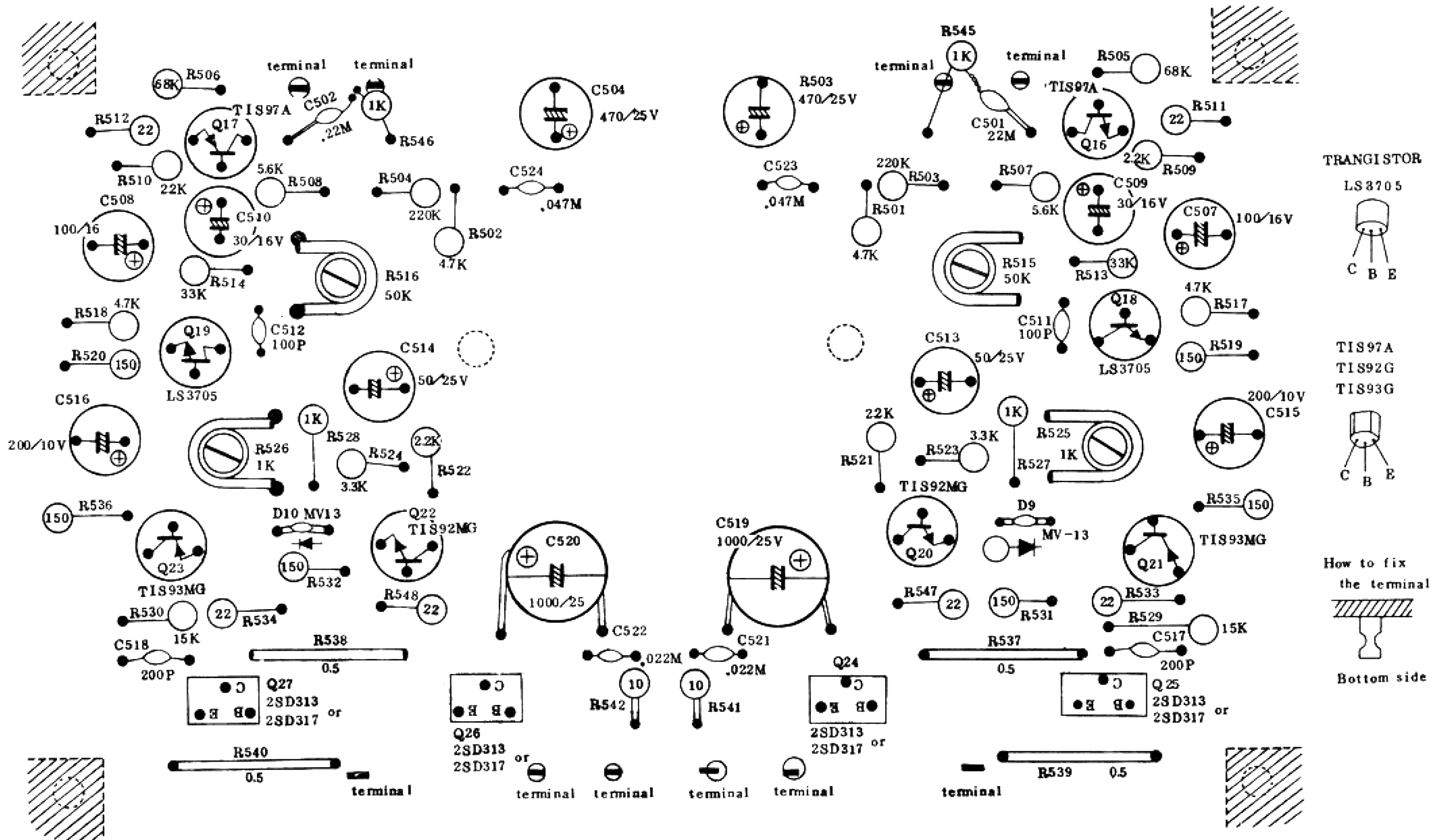
T1S97A



SE4010

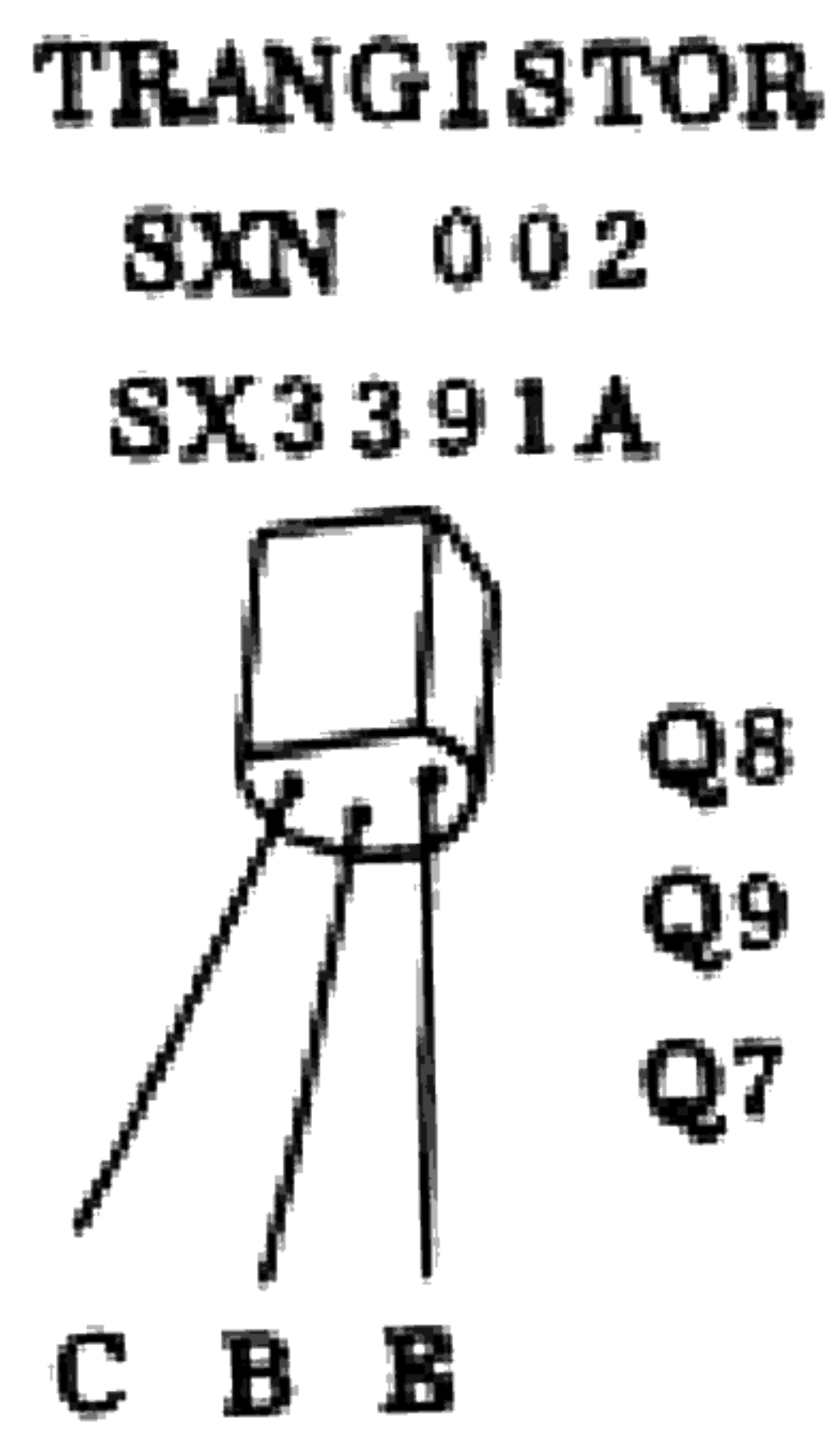
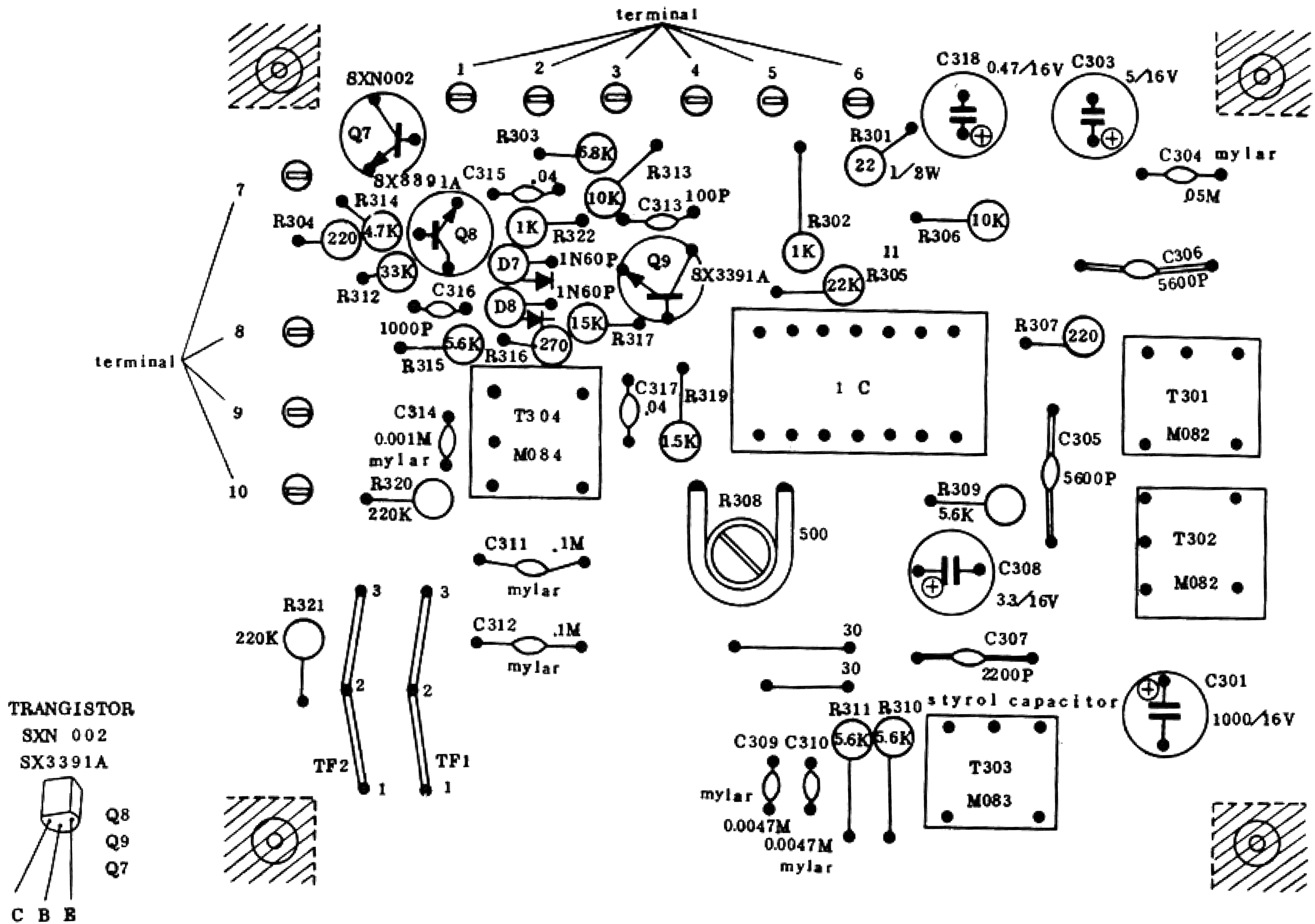


PRE BOARD



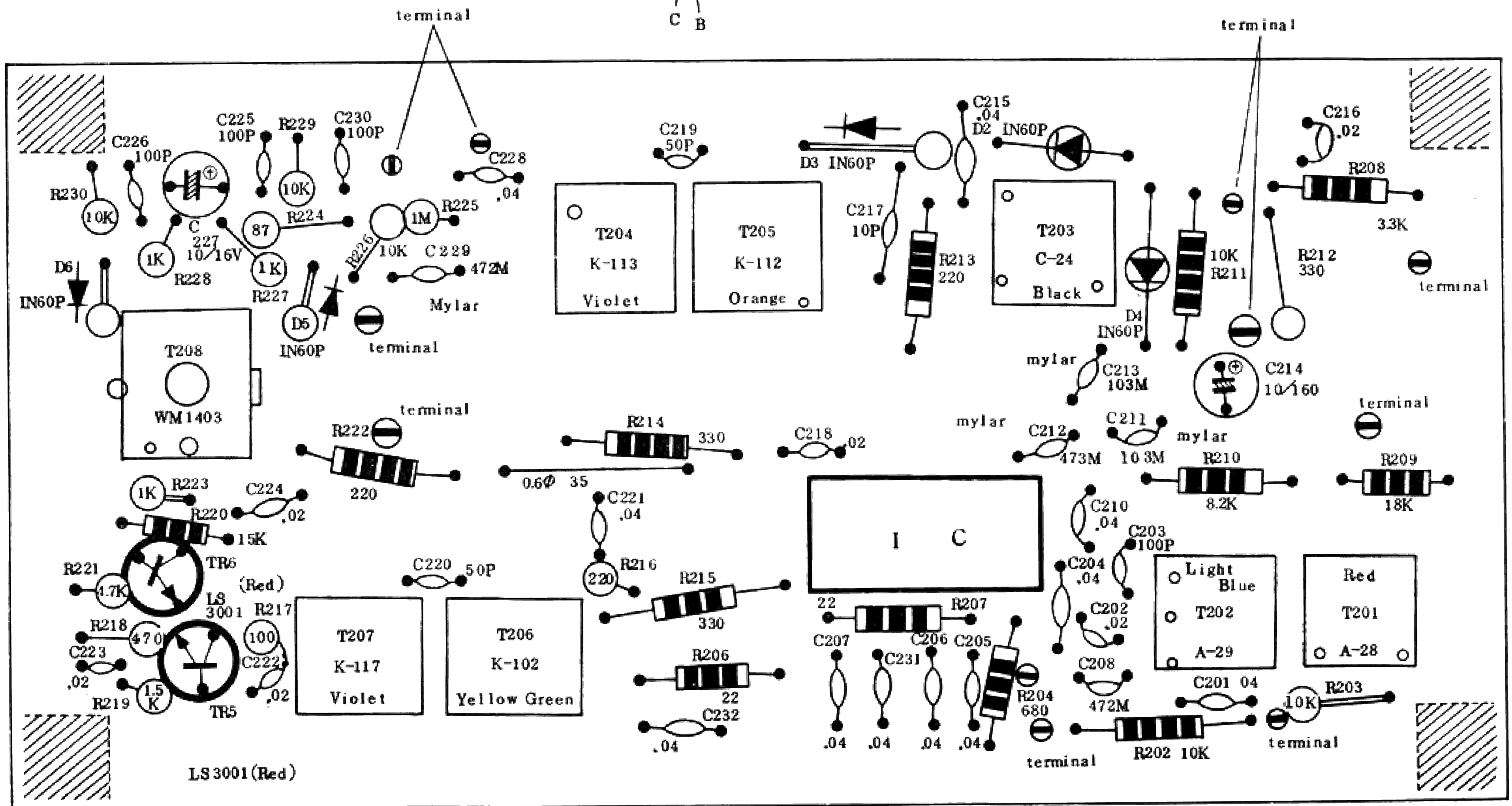
NOTE R545, 546, 509, 510, 508
505, 506, 504 and 503
USE low noise type resistors

MAIN-AMP PC BOARD (TOP VIEW)

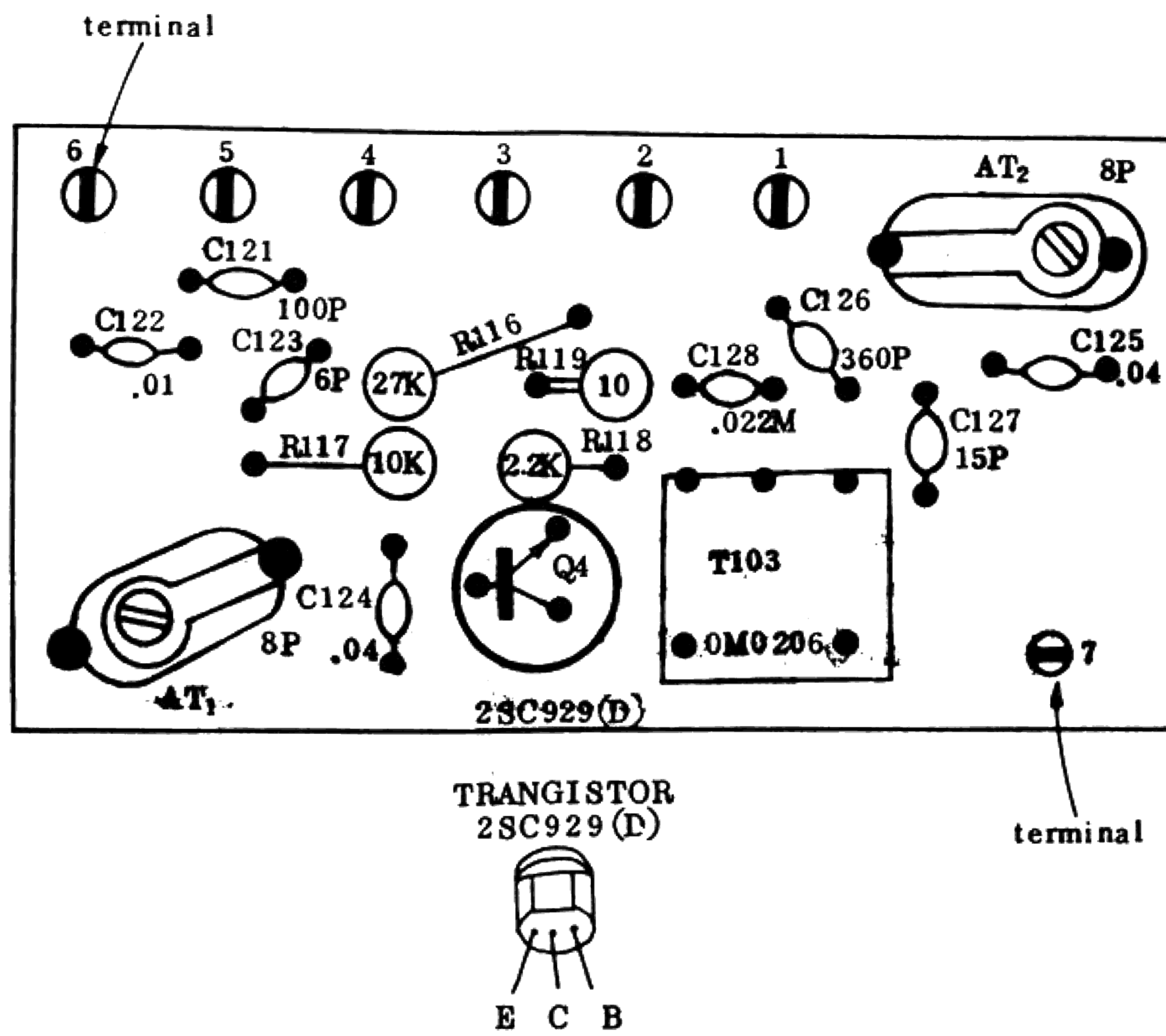


STA-18 MPX PC BOARD(TOP VIEW)

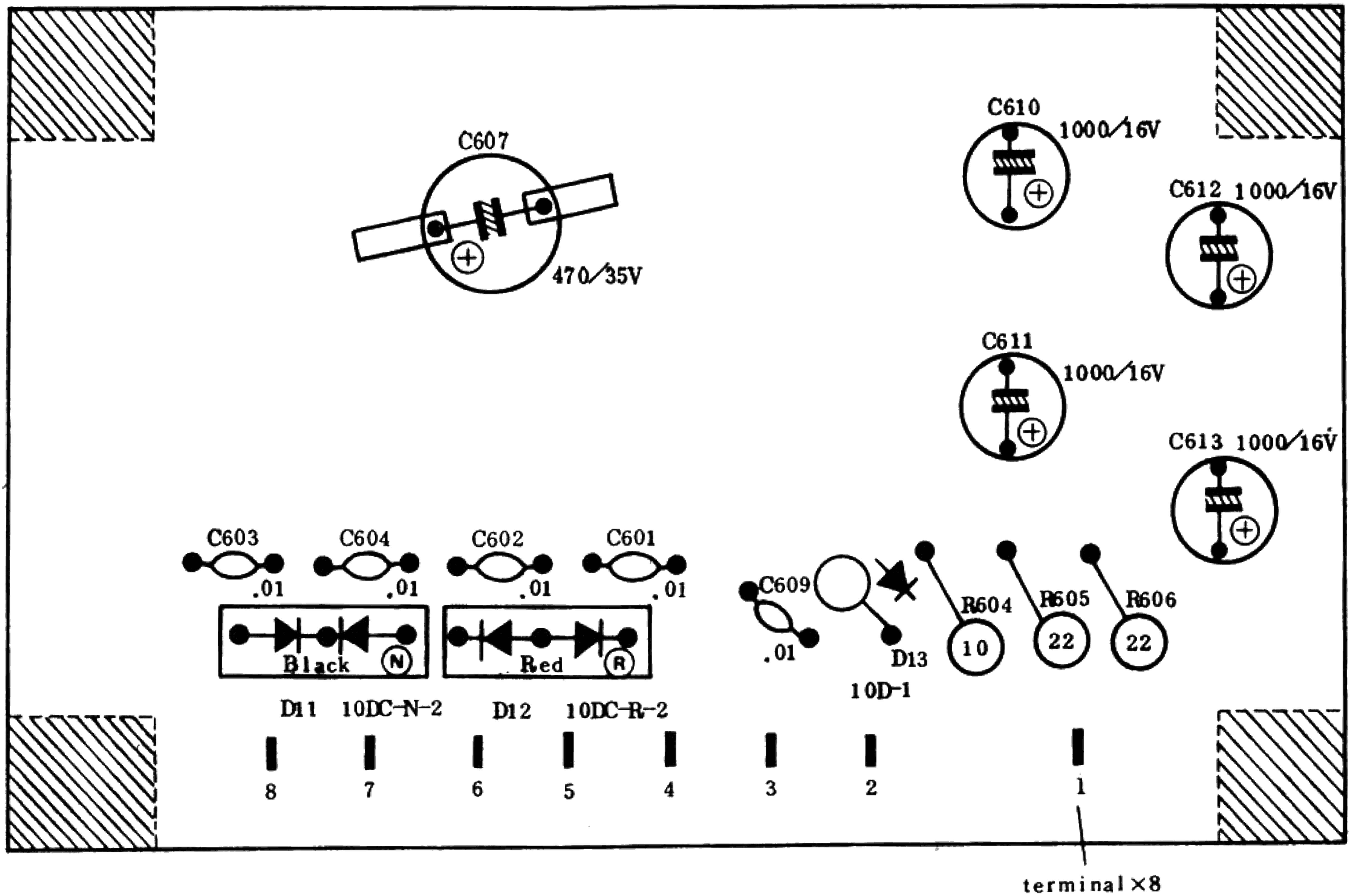
TRANSISTOR
LS-3001



IF PC BOARD (TOP VIEW)

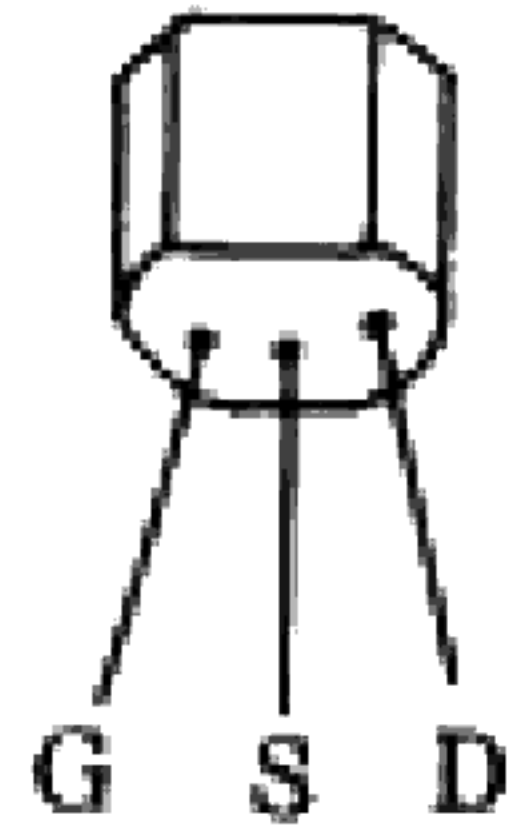


AM TUNER PC BOARD(TOP VIEW)



POWER SUPPLY PC BOARD(TOP VIEW)

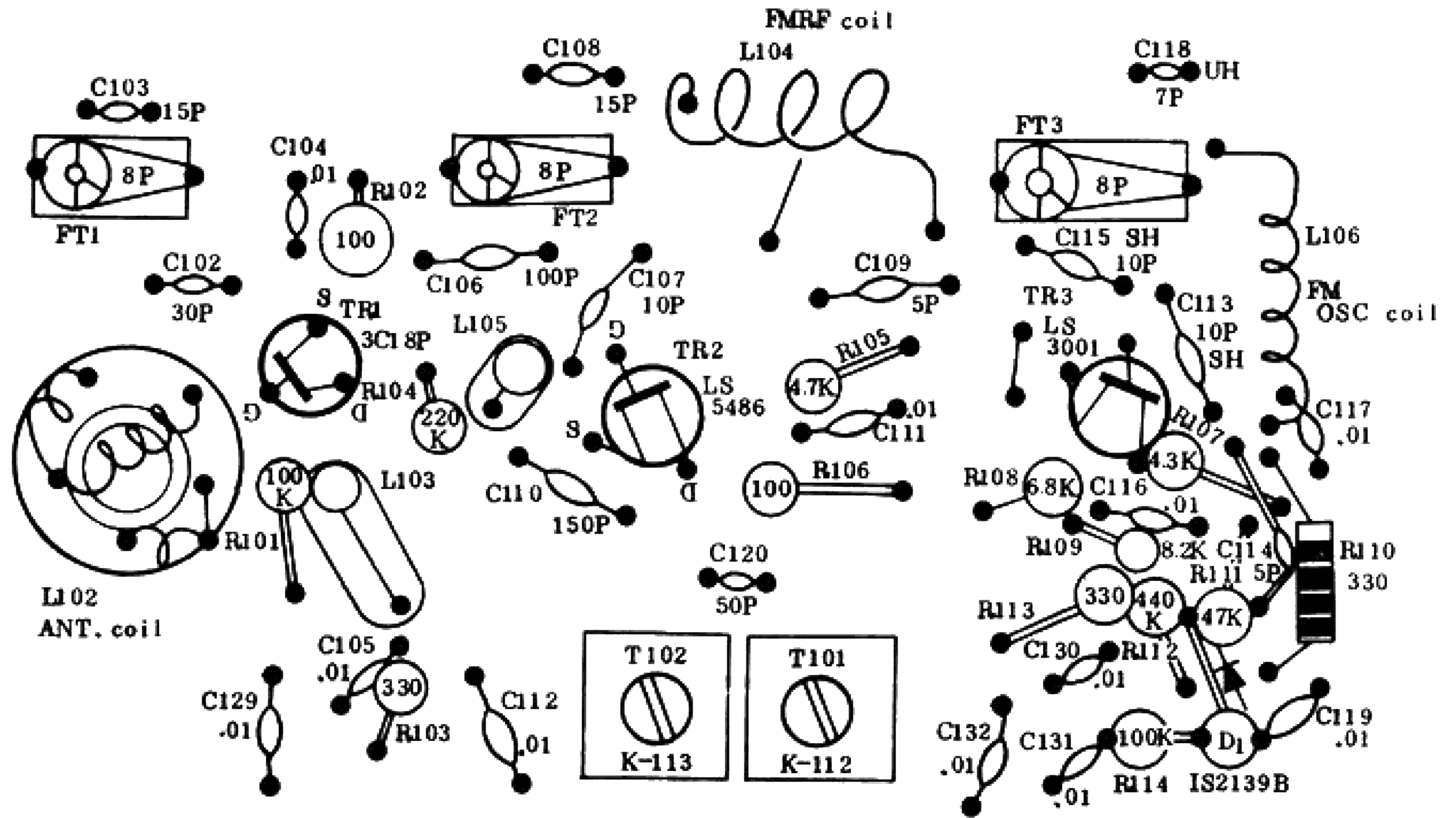
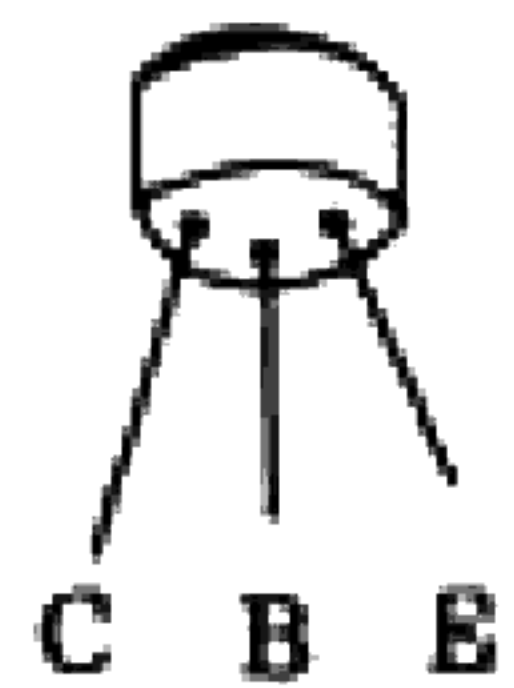
FET TRANSGISTOR
3C18P



LS5486

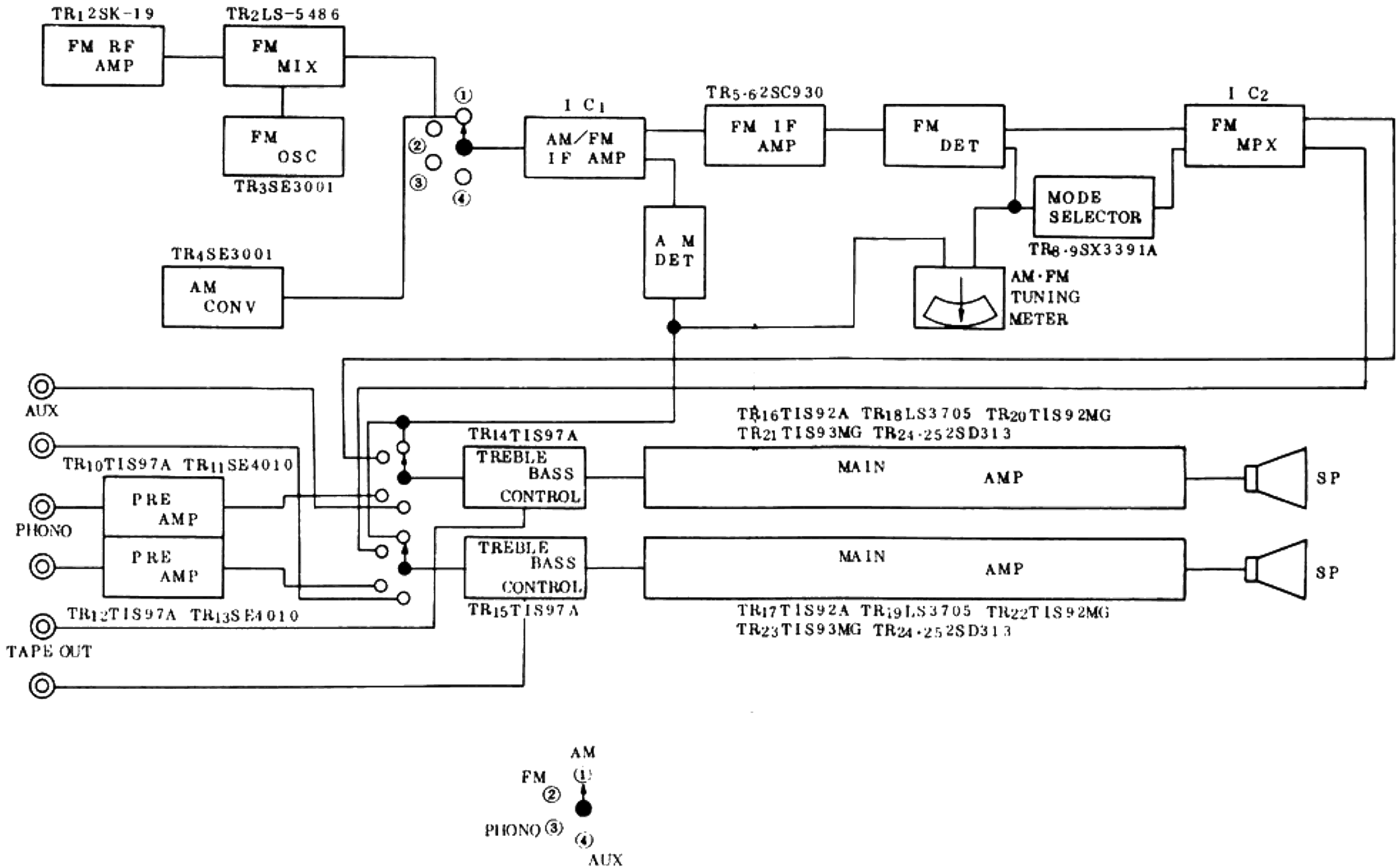


LS-3001



FM TUNER PC BOARD (TOP VIEW)

BLOCK DIAGRAM



SEMICONDUCTORS

| ITEM | TYPE NO. |
|------|-----------|
| D1 | 1S2139B |
| D2 | 1N60P |
| D3 | 1N60P |
| D4 | 1N60P |
| D5 | 1N60P |
| D6 | 1N60P |
| D7 | 1N60P |
| D8 | 1N60P |
| D9 | MV-13 |
| D10 | MV-13 |
| D11 | 10DC-N-2 |
| D12 | 10DC-N-2 |
| | 10DC-R-2 |
| D13 | 100-1 |
| IC1 | GN-1039D |
| IC2 | SN76105 |
| TR1 | 3C18P |
| TR2 | LS5486 |
| TR3 | LS3001 |
| TR4 | 2SC929(D) |

| | |
|------|----------------|
| TR5 | LS3001 |
| TR6 | LS3001 |
| TR7 | SX002 |
| TR8 | SX3391A |
| TR9 | SX3391A |
| TR10 | T1S97A |
| TR11 | SE4010 |
| TR12 | T1S97A |
| TR13 | SE4010 |
| TR14 | T1S97A |
| TR15 | T1S97A |
| TR16 | T1S97A |
| TR17 | T1S97A |
| TR18 | LS3705 |
| TR19 | LS3705 |
| TR20 | T1S92MG |
| TR21 | T1S93MG |
| TR22 | T1S92MG |
| TR23 | T1S93MG |
| TR24 | 2SD313, 2SD317 |
| TR25 | 2SD313, 2SD317 |
| TR26 | 2SD313, 2SD317 |
| TR27 | 2SD313, 2SD317 |

ELECTROLYTICS/VARIABLE CAPS

| ITEM | VALUE | PART NO. |
|--------|-------------|----------|
| AT1 | Trimmer | C-000211 |
| AT2 | Trimmer | C-000211 |
| C214 | 10uF 16V | |
| C227 | 10uF 16V | |
| C301 | 1000uF 16V | |
| C302 | 1000uF 16V | |
| C303 | 5uF 16V | |
| C308 | 3.3uF 16V | |
| C318 | .47uF 16V | |
| C403 | 1uF 25V | |
| C404 | 1uF 25V | |
| C415 | 50uF 10V | |
| C416 | 50uF 10V | |
| C417 | 10uF 25V | |
| C418 | 10uF 25V | |
| C419 | 3.3uF 25V | |
| C420 | 3.3uF 25V | |
| C421 | 3.3uF 25V | |
| C423 | .47uF 25V | |
| C424 | .47uF 25V | |
| C427 | 100uF 16V | |
| C428 | 100uF 16V | |
| C429 | 10uF 25V | |
| C430 | 10uF 25V | |
| C443 | 200uF 50V | |
| C503 | 470uF 25V | |
| C504 | 470uF 25V | |
| C507 | 100uF 16V | |
| C508 | 100uF 16V | |
| C509 | 30uF 16V | |
| C510 | 30uF 16V | |
| C513 | 50uF 25V | |
| C514 | 50uF 25V | |
| C515 | 200uF 10V | |
| C516 | 200uF 10V | |
| C519 | 1000uF 25V | |
| C520 | 1000uF 25V | |
| C605 | 2000uF 35V | |
| C606 | 500uF 50V | |
| C607 | 470uF 35V | |
| C608] | 500uF 50V | |
| C610 | 1000uF 16V | |
| C611 | 1000uF 16V | |
| C612 | 1000uF 16V | |
| C613 | 1000uF 16V | |
| FT1 | Trimmer | C-00212 |
| FT2 | Trimmer | C-00212 |
| FT3 | Trimmer | C-00212 |
| | Tuning Gang | C-004190 |

CONTROLS/SPECIAL RESISTORS

| ITEM | DESCRIPTION |
|------|-------------------------|
| R308 | 500 ohms, MPX Gain |
| R322 | 50K, Separation |
| R445 | 100K, Bass (Left) |
| R446 | 100K, Bass (Right) |
| R453 | 100K, Treble (Left) |
| R454 | 100K, Treble (Right) |
| R456 | 50K, Volume, (Left) |
| R457 | 50K, Volume (Right) |
| R458 | 100K, Balance |
| R515 | 50K, Level (Left) |
| R516 | 50K, Level (Right) |
| R525 | 1000 ohms, Gain (Left) |
| R526 | 1000 ohms, Gain (Right) |

COILS/TRANSFORMERS

| ITEM | PART NO. |
|-------------------|----------|
| T201 | CA-06816 |
| T202 | CA-06817 |
| T203 | CA-06818 |
| T204 | CA-06820 |
| T205 | CA-06819 |
| T206 | CA-06821 |
| T207 | CA-06823 |
| T208 | CA-06822 |
| T301 | CB-00054 |
| T302 | CB-00054 |
| T303 | CB-00053 |
| Power Transformer | TA-0225 |

MISCELLANEOUS

| NAME | PART NO. |
|-------------------------------|----------|
| Dial Pointer | D-1002 |
| Fuse Holder | F-01034 |
| Lamp, Dial (12V/150mA) | L-00208 |
| Lamp, Dial (Green) (12V/85mA) | L-00204 |
| Lamp, Dial (Red) (12V/85mA) | L-00204 |
| PCB, IF | X-03001 |
| Switch, Lever | S-5001 |
| Switch, Rotary | S-1001 |

CABINET PARTS

| NAME | PART NO. |
|----------------|----------|
| Cabinet | Z-000010 |
| Cabinet, Back | Z-000011 |
| Cabinet, Front | Z-00012 |
| Dial Plate | G-000008 |
| Knob | K-000665 |
| Knob, Selector | K-000667 |
| Knob, Tuning | K-000666 |