# 301

GENERAL INFORMATION
SCHEMATIC DIAGRAM
PARTS LIST
ALIGNMENT MANUAL

**NIKKO**

*am-fm-multiplex stereo receiver model sta* **301**



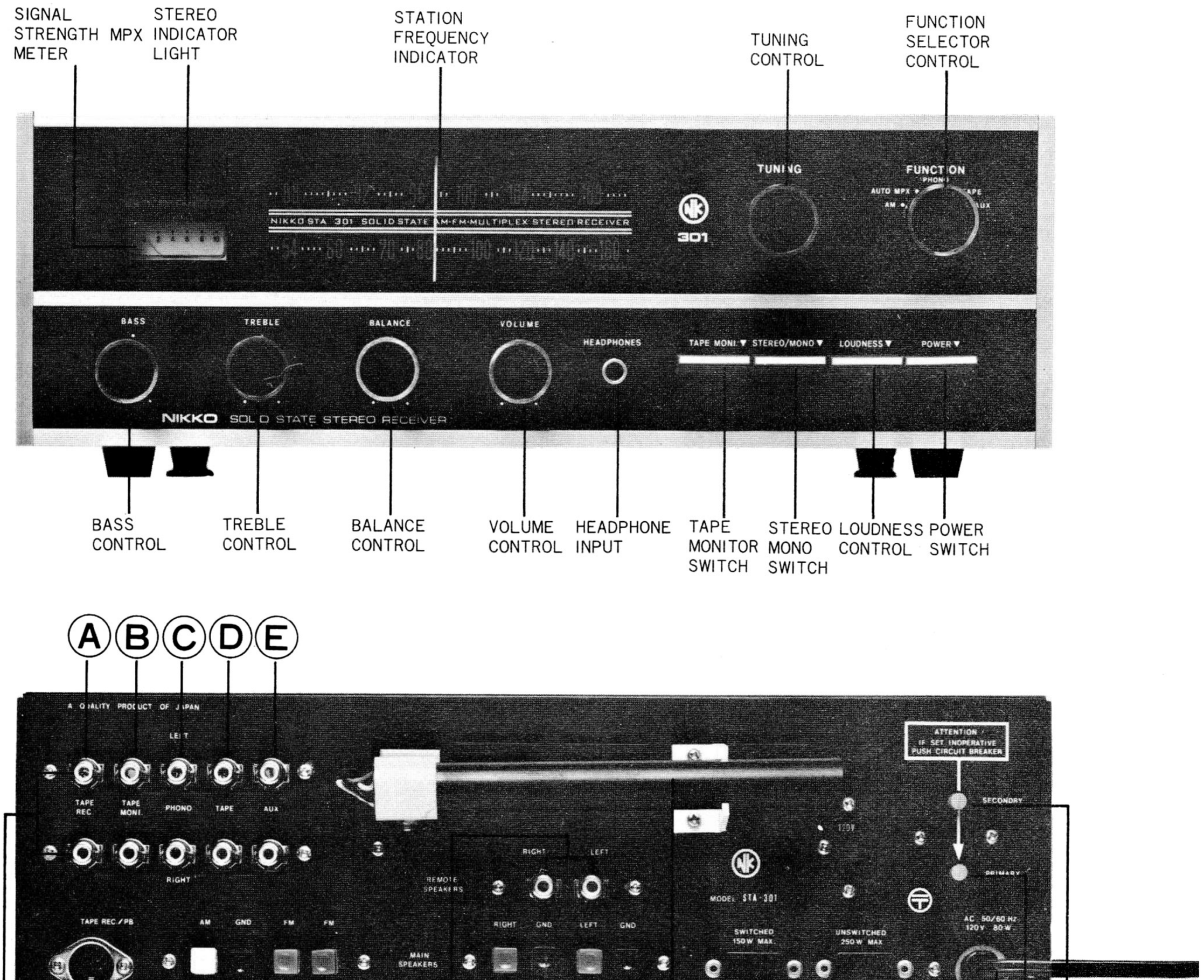

NIKKO ELECTRIC MFG. CO., LTD. 4-1, 3-CHOME, TAMAGAWA OKUSAWA-CHO, SETAGAYA-KU, TOKYO, JAPAN.

NIKKO ELECTRIC CORPORATION OF AMERICA 5001 LANKERSHIM BIVD., NORTH HOLLYWOOD, CALIF. 91601

S3010A01

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# EXPLANATION OF BACK PANEL

1. **INPUT TERMINAL BOARD.**
   - **A.** To record programs on tape recorder, connect audio cables from tape unit input to this connection.
   - **B.** TAPE MONITOR: Plug audio cables in here from output of Tape Recorder. Can be used With TAPE REC. (G) for monitoring purposes.
   - **C.** PHONO: Plug in audio cables from manual or automatic turntable... magnetic type cartridge.
   - **D.** Input for Tape Playback Head.
   - **E.** AUX: Auxiliary Input — to be used with crystal type or ceramic type cartridge, tape recorder with per-amplifier, tuner, television output, microphone, etc.
2. **DIN TYPE CONNECTOR:**
   For European DIN Type Tape Recorder. Function is the same as (# 18D).
3. **ANTENNA TERMINALS:**
   AM ANT: For external AM antenna.
   GND: For earth ground (cold water pipe).
   FM ANT: (Two terminals) For external FM antenna.
   Connect enclosed dipole antenna or an outdoor antenna.
4. **NIKKO SPEAKER OUTPUT JACK:**
   (Extension Speaker Terminal)
   For NIKKO SS-83 speakers. Left terminal for left speakers, right terminal for right speakers.
5. **SPEAKER TERMINAL BOARD:**
   - **A.** Connect the Right Speaker wires to terminal A.
   - **B.** Connect the Left Speaker wires to terminal B.
6. **BAR ANTENNA:**
   Adjust this bar for strongest AM reception, with minimum noise.
7. **AC OUTLET: (Switched)**
   Accessory power outlet. This outlet is connected to the POWER SWITCH (# 15). Provides additional power up to 150 watts.
8. **AC OUTLET: (Unswitched)**
   Accessory power outlet. Provides AC power for accessories, without requiring receiver to be "On". It is not governed by POWER SWITCH (# 15).
   Maximum capacity is 250 watts.
9. **POWER SUPPLY CORD:**
   Plugs into 120/220/240V AC electrical receptacle.
10. **CIRCUIT BREAKER:**
    Primary circuit breaker that protects the STA-301 Receiver from major internal damage due to overload or short circuit.
11. **CIRCUIT BREAKER:**
    Secondary Circuit Breaker that protects all secondary circuits from major internal damage due to overload or short from speaker terminals.



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# 1. GENERAL

## 1.1 GENERAL

The STA-301 AM/FM Multiplex Solid State Stereo Receiver was first introduced on the market in December of 1968. The STA-301 and the STA-501 are sister models and there are many common parts found in both models. The output power of the STA-301 is 30 watts IHF Music power at 8 ohm or 36 watts output power at 4 ohm.

Chassis Construction: The audio power supply and tuner section are all independently mounted on a common chassis. To keep circuit signal interference to a minimum, each has been mounted and shielded in a manner in keeping with good audio practice.

Audio Section: This section has excellent high heat temperature characteristics because it uses silicon transistors (note: some of the initial units used a PNP germanium transistor in the audio stage.) The driver stage is designed not to overdrive the power transistors because the signal is fed from the emitter circuit, in a direct coupled manner between a 150 ohm and a 22 ohm resistance, to the power transistors. This configuration causes the 22 ohm resistor to act as a signal current limiter, eliminating the possibility of overdriving the power transistor.

Power Output Section: The power output section consists of four (two for each channel) triple diffused mesa silicon transistors. This type transistor has an extremely high cut off frequency while maintaining excellent linearity of *hfe* for collector current. See the comparison in figure 1 between this type silicon transistor and that of types used in other manufacturer's high fidelity receivers.

Pre Amplifier Section: A Nikko thin film Linear IC (hy-brid integrated circuit) is being used in the pre-amplifier section. This type IC greatly improves the reliability, low noise, and cross talk characteristics. See characteristics noted in figure number 2.

FM Tuner Section: The FM front end uses a dual gate FET transistor that gives a stable signal input. It is the same type as that used in the STA-501.

Multiplex Section: It has two functions first as a stereo multiplex decoder and second as the driving circuit for the stereo indicator lamp which only glows when a broadcast is being received. The multiplex circuit used in the STA-301 is simplified than that used in the STA-501 or STA-701B. However, it incorporates automatic monophonic/stereophonic switching which has a stereo separation of over 32dB.

AM Section: An indoor AM antenna is located on the rear of the set and is constructed of a ferrite material. It has a 90° maximum swing and should be adjusted for best signal reception.

IF Section: The five stage IF section is common to both AM and FM, and uses high gain silicon transistors which afford the circuitry excellent limiter characteristics.

Voltage Regulator: This circuit feeds the tuner, IF and MPX sections and is approximately 12 volts. It consists of voltage regulation by a transistor further stabilized by a zener diode. The voltage supply to these section will remain constant even if the main power supply changes as much as plus or minus 15%. This type of stability reduces drift and in effect increases sensitivity.

Power Supply: This consists of a high quality Nikko power transformer and a full wave rectifier circuit followed by four large electrolytic capacitors for voltage regulation.

Circuit Breakers: There are two circuit breakers used in the receiver. The primary circuit breaker trips when trouble occurs inside the receiver and protects the power transformer, rectifier, and all major component parts. The secondary circuit breaker will trip if a short circuit of the output stage occurs. This is due to the breaker being in series with the ground side of the D.C. supply current. The breakers used have been developed by Nikko to respond quickly to a current overload condition. Their characteristics are similar to that of a quick action fuse. However, they are more convenient because they can reset and need not be replaced like a fuse. See figure number 2 for characteristics.



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## 1.2 STA 301 STANDARD SPECIFICATION

This standard specification is a guide line whether the unit is good or not . When you repair the unit and if the specifications undermentioned would be satisfied, the said unit suppose to be in good condition.

### TUNER SECTION

| 1. FM | NOMINAL | LIMIT |
|---|---|---|
| Sensitivity IHF (at 98 MHz) | 2.5 μV | 4.5 μV |
| Image rejection (at 98 MHz) | 50dB | 40dB |
| IF rejection (at 98 MHz) | 80dB | 65dB |
| Limiting level (−10db) | 3μV | 5.5μV |
| MPX Separation(1000 Hz) | 32dB | 27dB |
| Meter Indication (100,00 μV Input 100% Mod) | 10.5 | 9 |
| Meter Indication (316 μV Input 100% Mod) | -- | 4 |

| 2. AM | | |
|---|---|---|
| Sensitivity(S/N=20db at 1MHz) | 200 μV/M | 800 μV/M |
| Image Rejection | 45dB | 30dB |
| IF Rejection | 45dB | 33dB |
| AGC (−10db) | 500μV/m | 1 mV/m |
| Meter Indication (5mV/m Input 30% Mod) | -- | 4 |

### AMPLIFIER SECTION

| 1. Input Sensitivity | | |
|---|---|---|
| Tape | 1.8mV | ±3dB |
| Phono | 2.8mV | ±3dB |
| AUX | 300mV | ±3dB |
| Tape Moni | 230mV | ±3dB |

2. Gain Unbalance (at Tape Moni.) ····· ±2dB

3. Output (single channel driven)

Continuous (at 8 ohm 1.0% Distortion) ····· 12W

Distortion (at 1W Output) ····· 0.5%

Tape Out ····· 230mV ····· ±3dB

4. Frequency Response (over all)

30Hz−20KHz ····· ±2dB

| | NOMINAL | LIMIT |
|---|---|---|
| 5. Noise Level (Volume control minimum) | 1.0mV | 3mV |

| 6. Control | | | |
|---|---|---|---|
| Bass at 70Hz | Boost | +12dB | ±3dB |
| | Cut | −12dB | ±3dB |
| Treble at 10KHz | Boost | +12dB | ±3dB |
| | Cut | −12dB | ±3dB |

| 7. Loudness (−30dB) | | | |
|---|---|---|---|
| | 70Hz | +10dB | ±3dB |
| | 10KHz | + 8dB | ±3dB |

| 8. Equalizer | | | |
|---|---|---|---|
| Tape HD. | 70Hz | +20dB | ±2dB |
| | 10KHz | −10dB | ±2dB |
| Phono | 70Hz | +15dB | ±2dB |
| | 10KHz | −14dB | ±2dB |

| 9. S/N (for Frequency Flat) | | |
|---|---|---|
| Tape HD. | 55dB | 45dB |
| Phono | 60dB | 47dB |
| AUX | 65dB | 55dB |

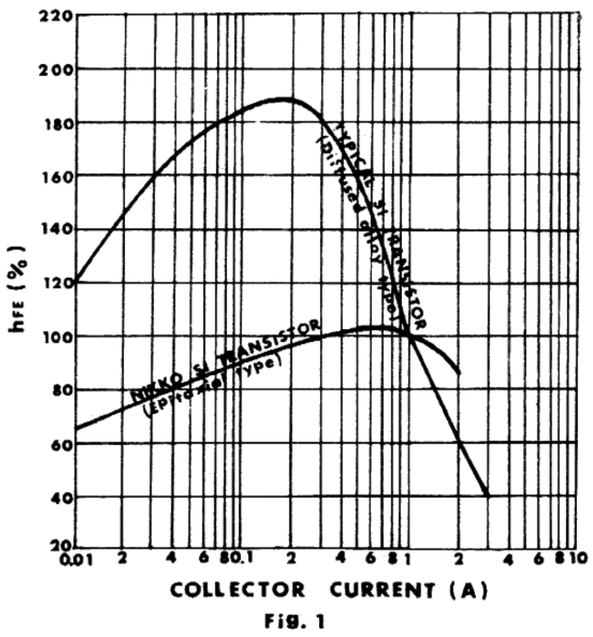


Fig. 1

Type NW-1

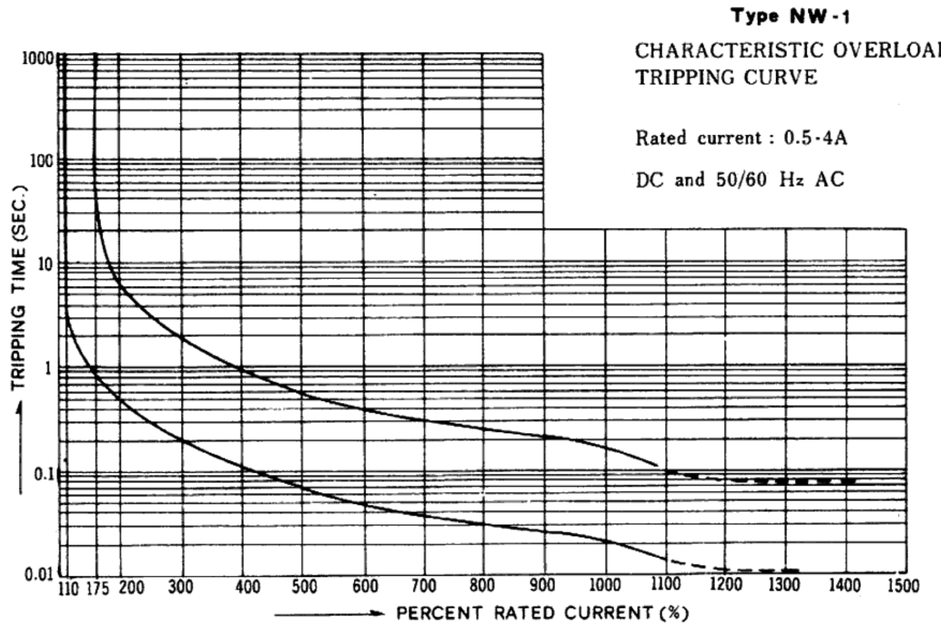


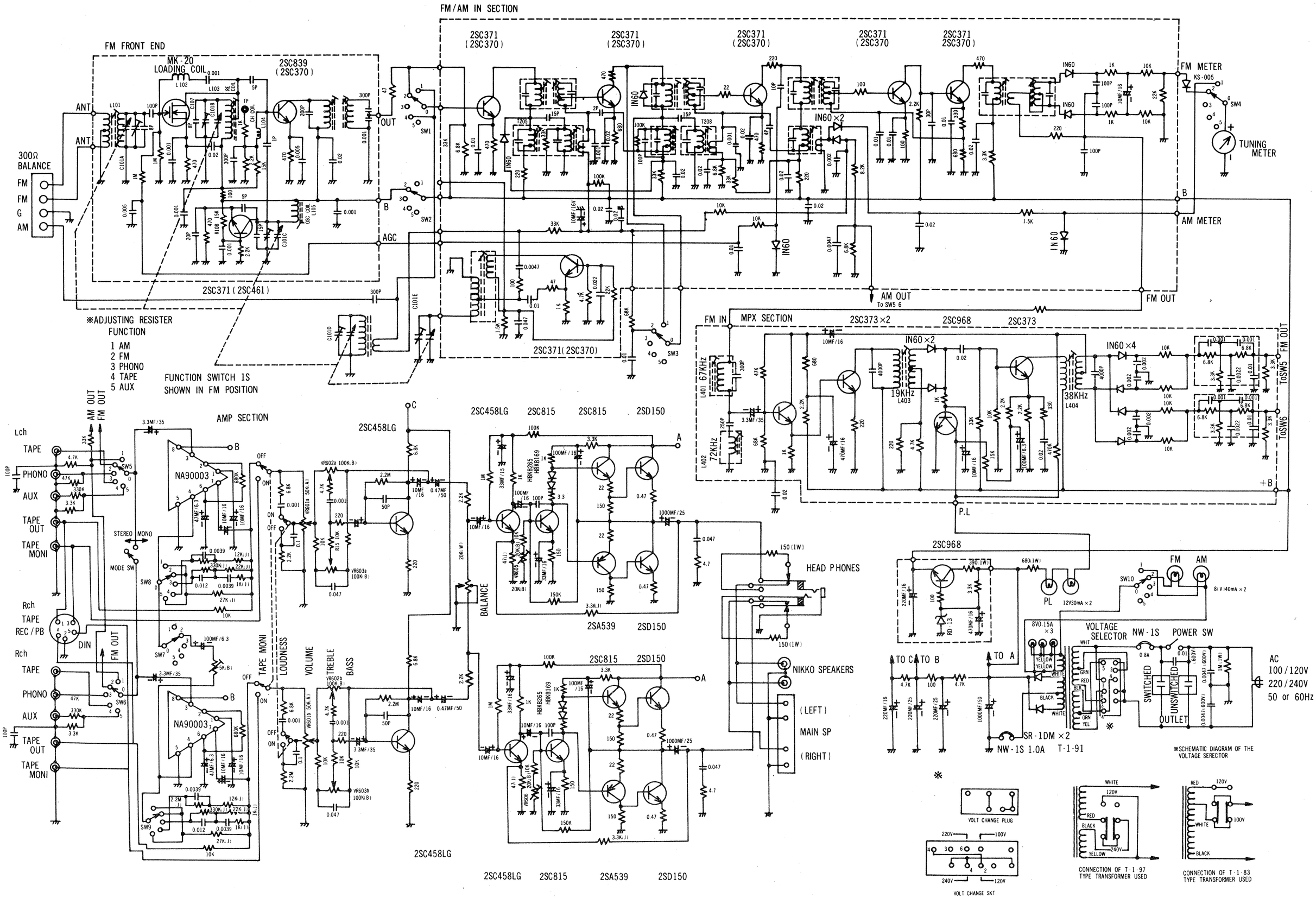
Fig. 2





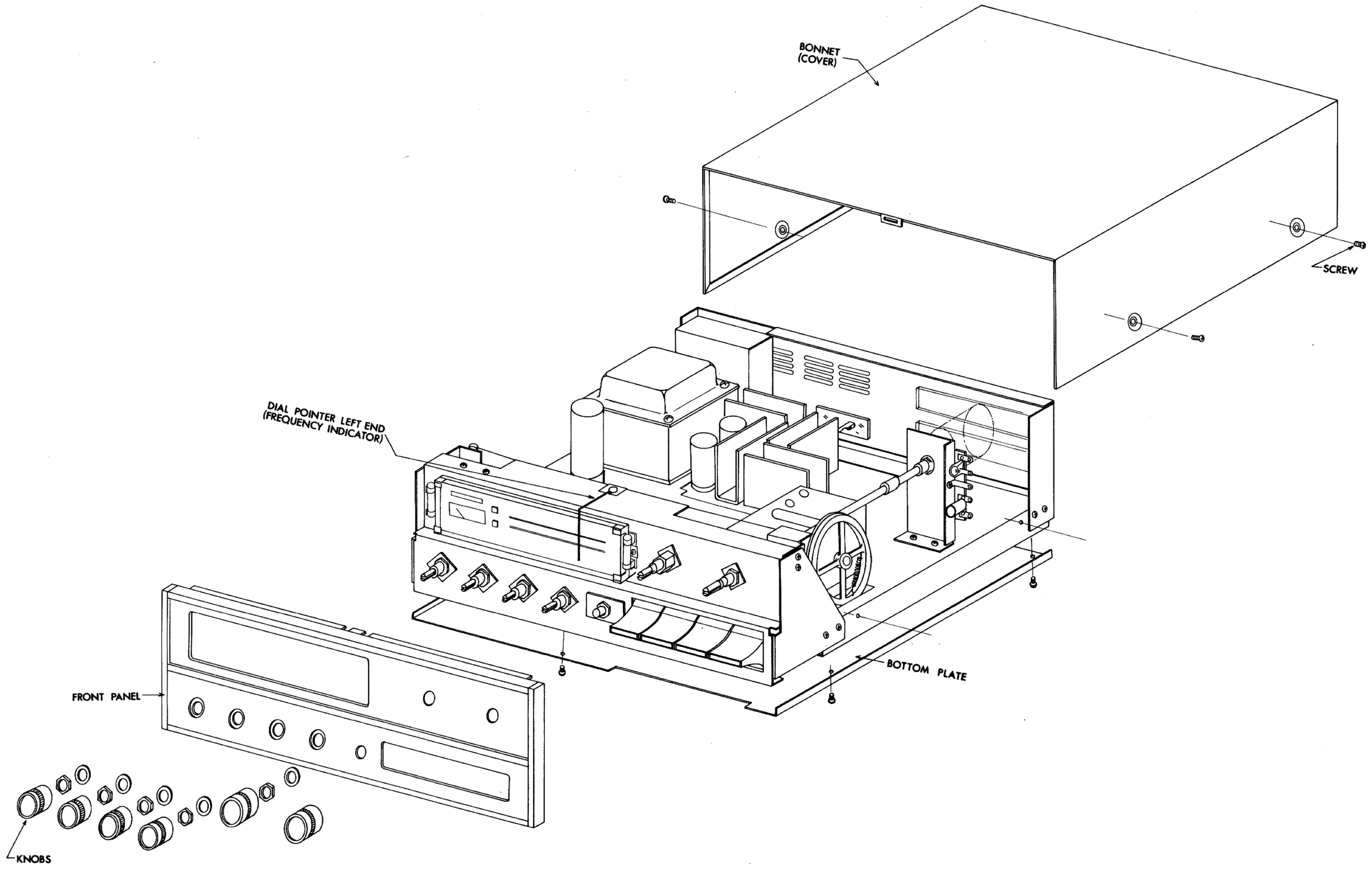
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# SCHEMATIC DIAGRAM STA-301



# STA 301 DISASSEMBLY PROCEDURE

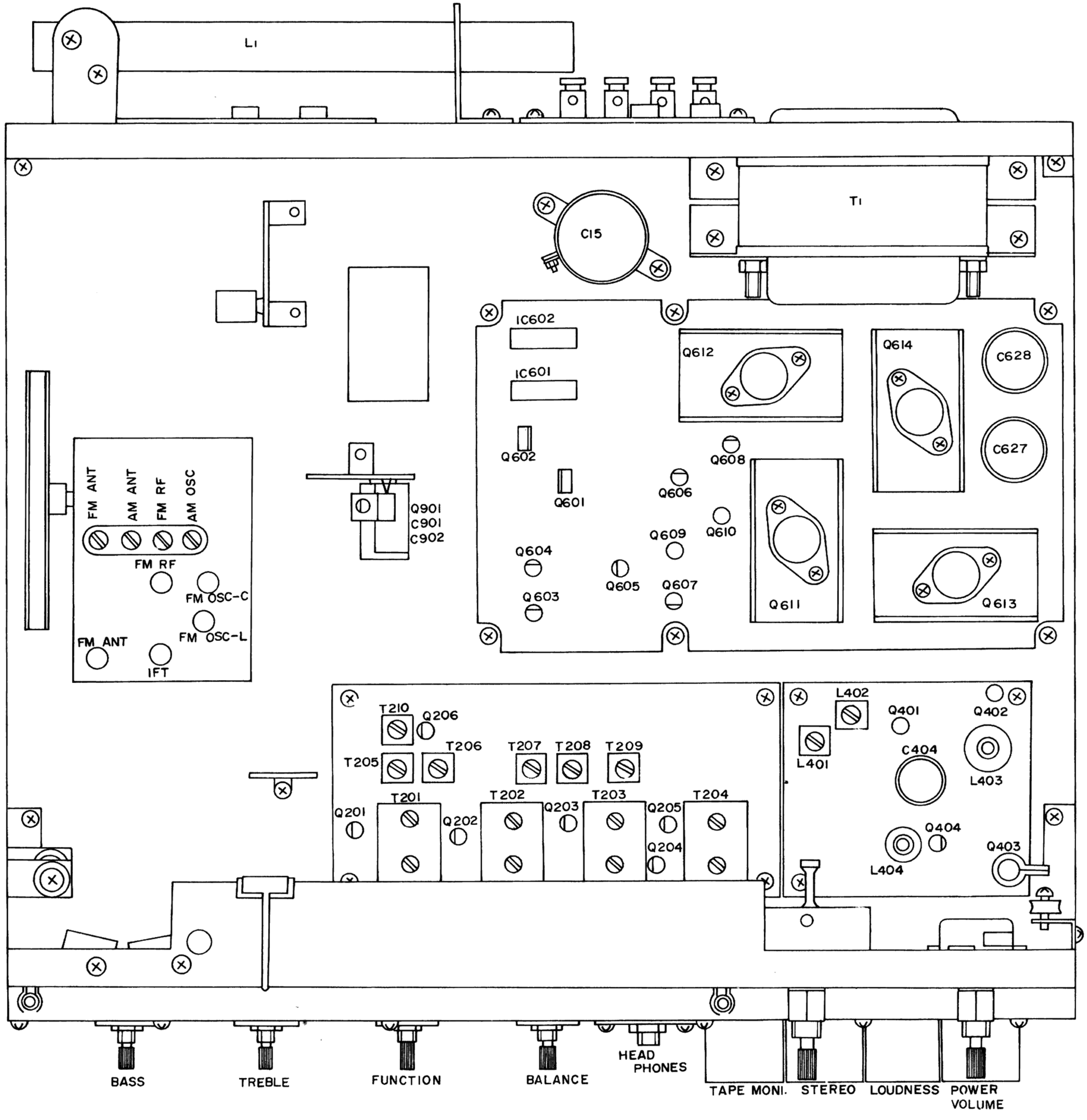
## REMOVING THE FRONT PANEL BONNET AND BOTTOM PLATE






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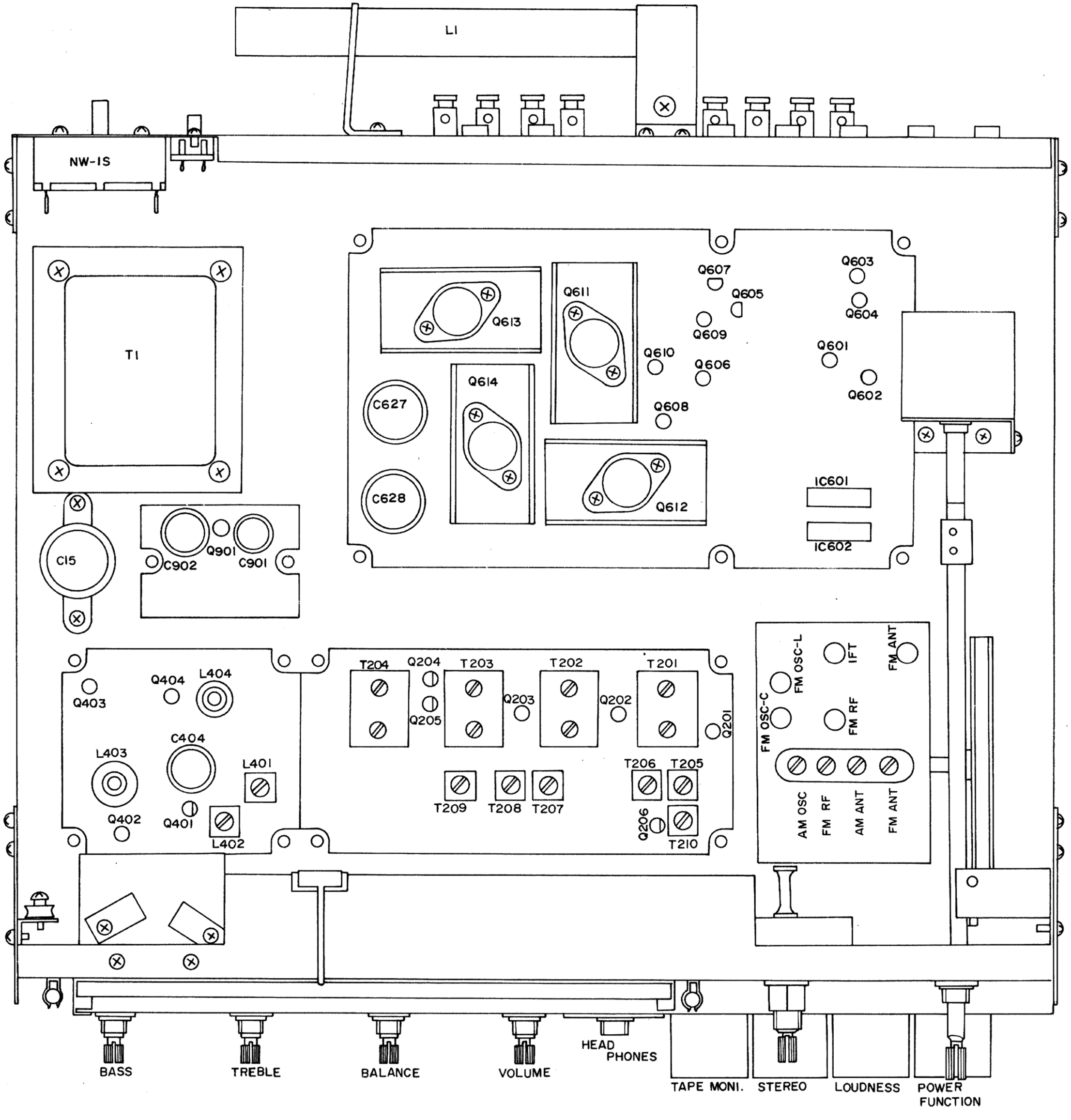
# COMPONENT DIAGRAM






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# COMPONENT DIAGRAM

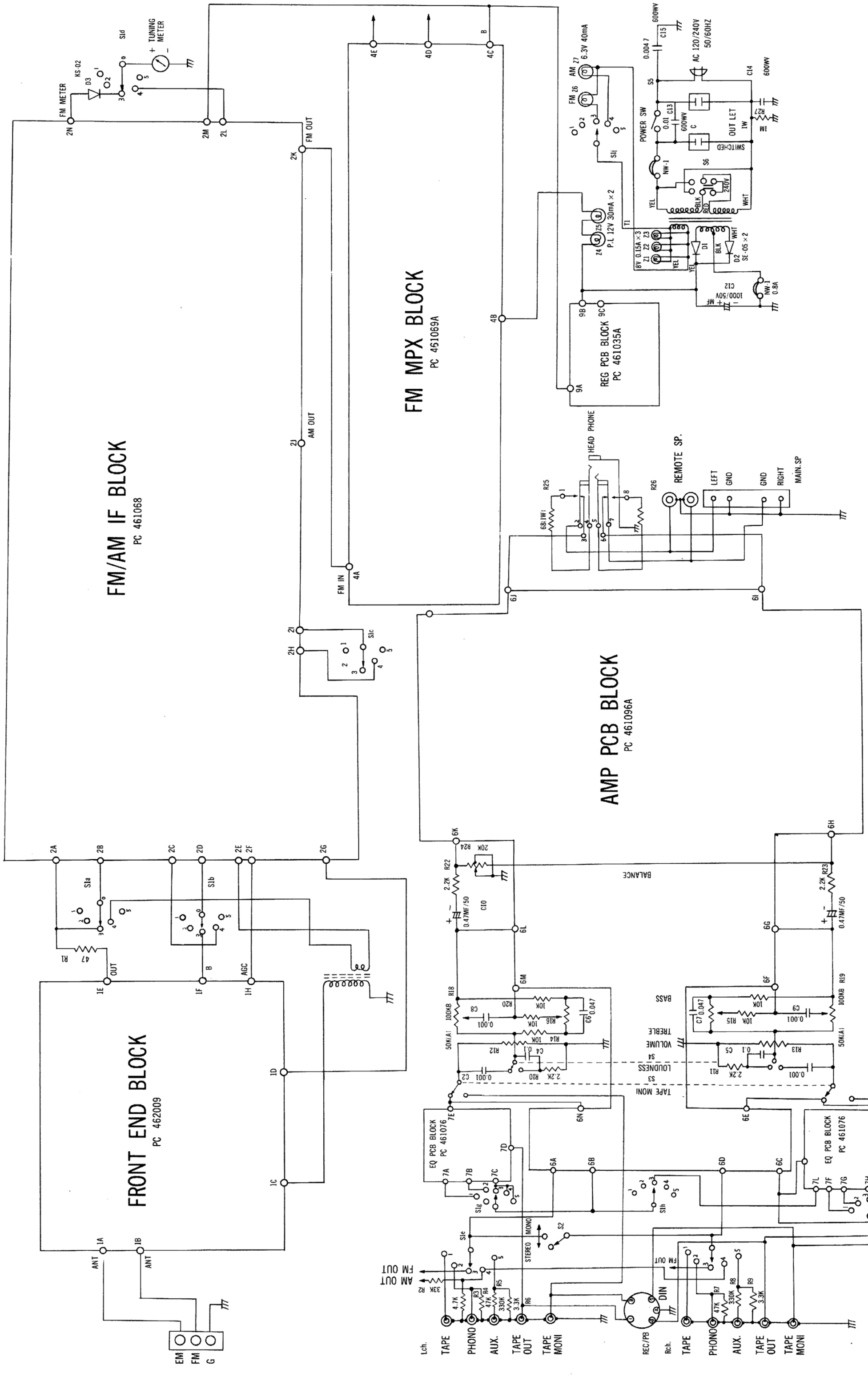



Serial No. 33201 as well as 1000001 after

S3010A10

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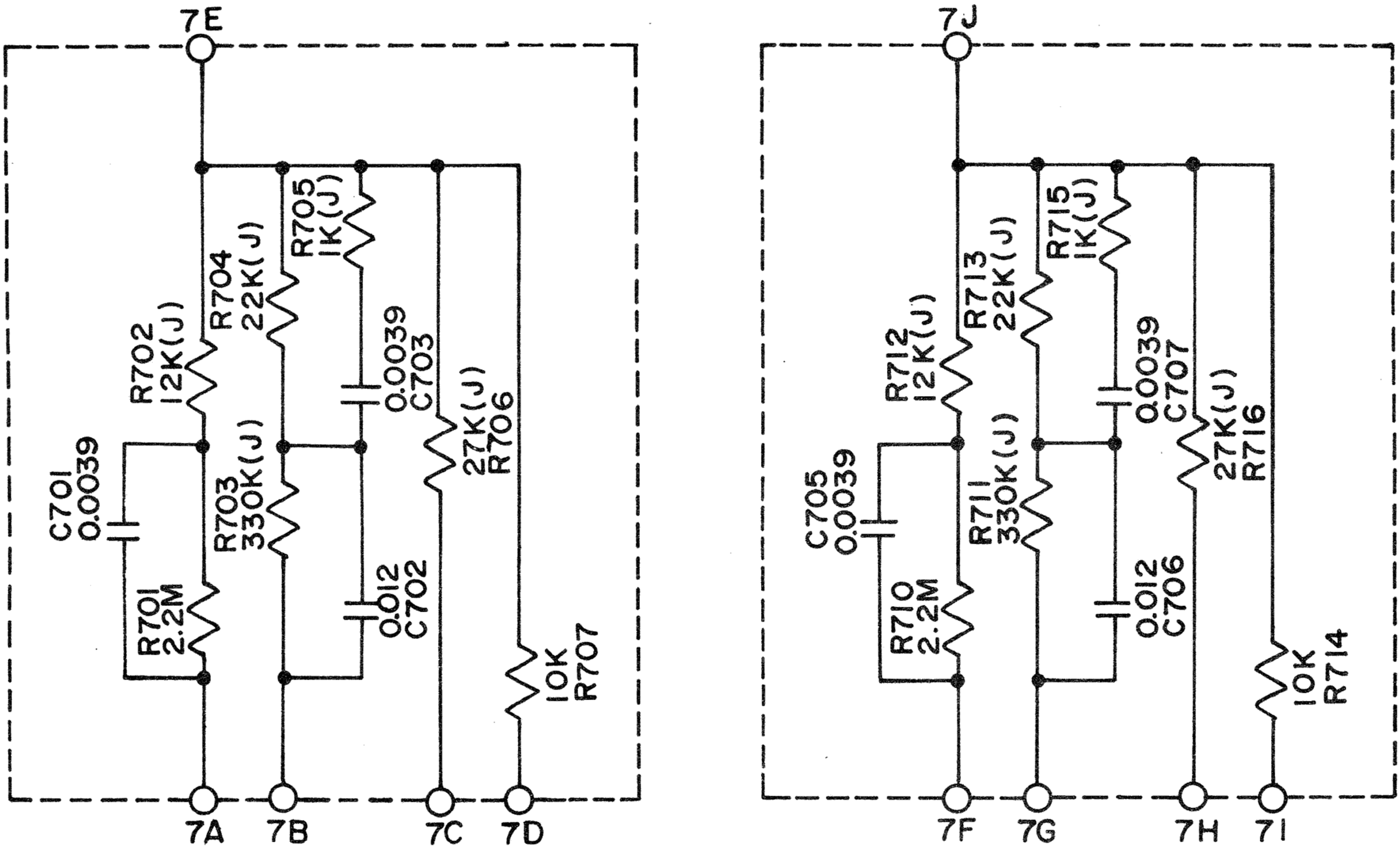
# SCHEMATIC DIAGRAM (BLOCK)



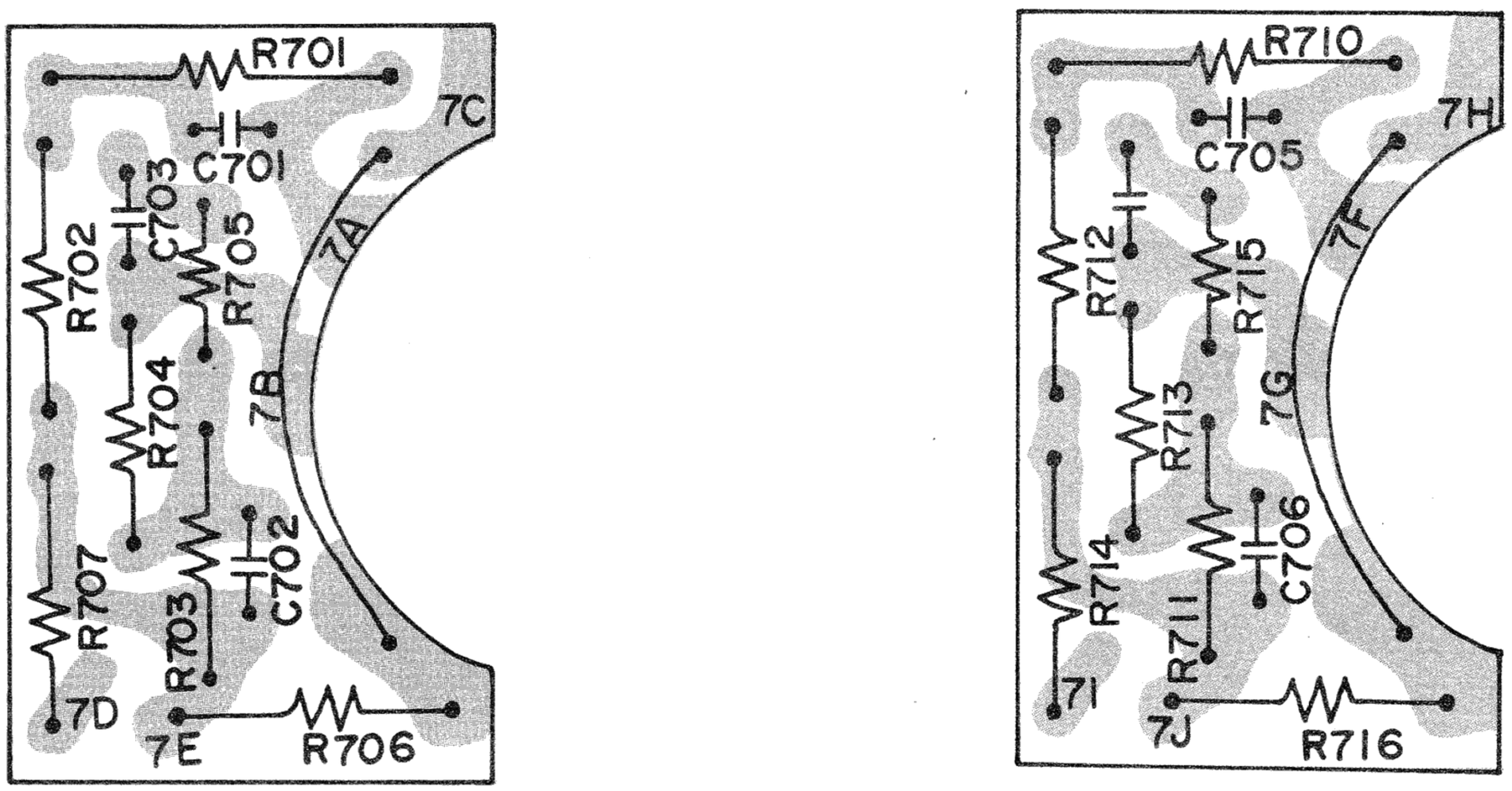



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## EQUALIZER CIRCUIT DIAGRAM




## EQUALIZER PRINTED CIRCUIT BOARD



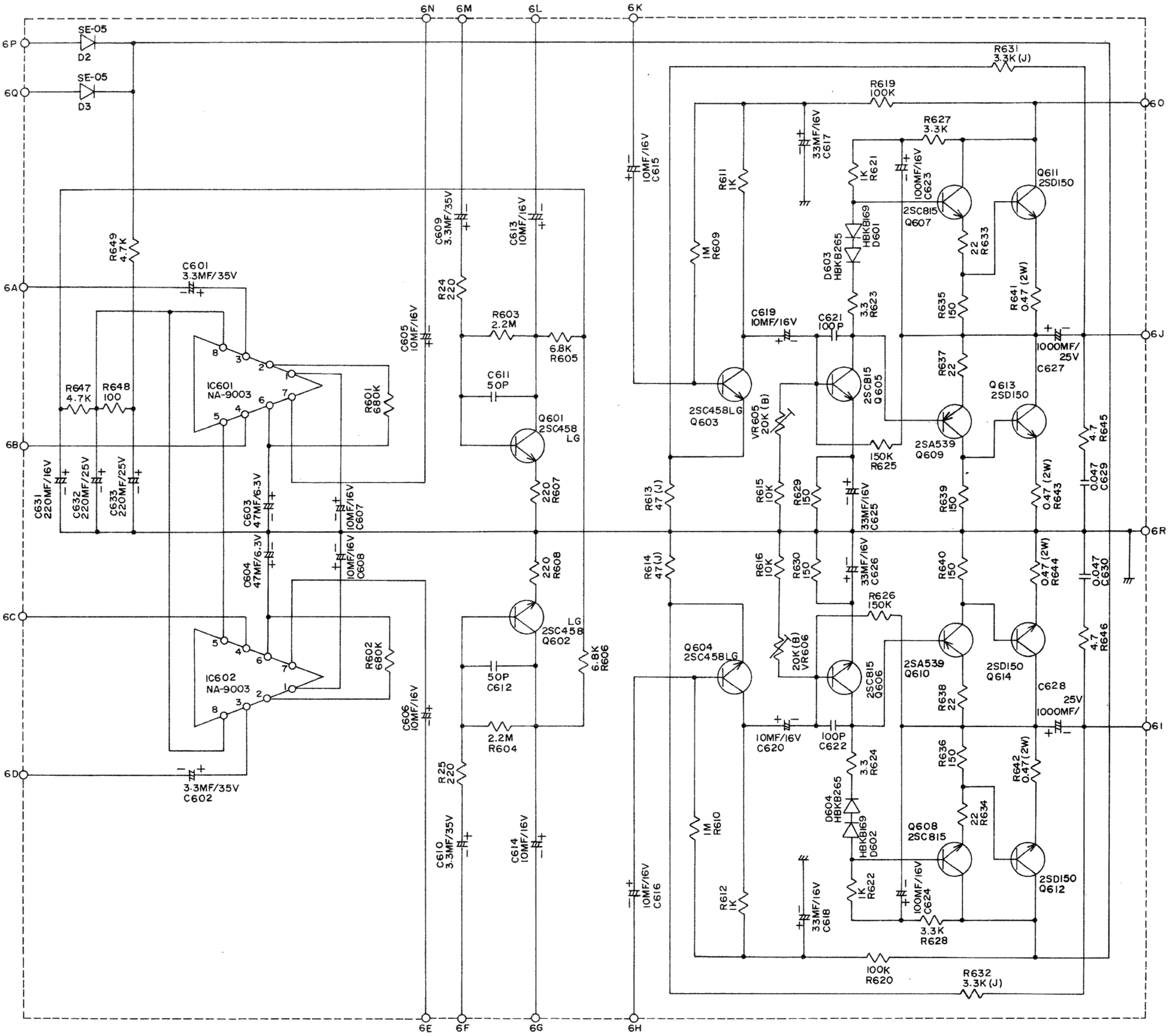

TOP VIEW



S3010A12

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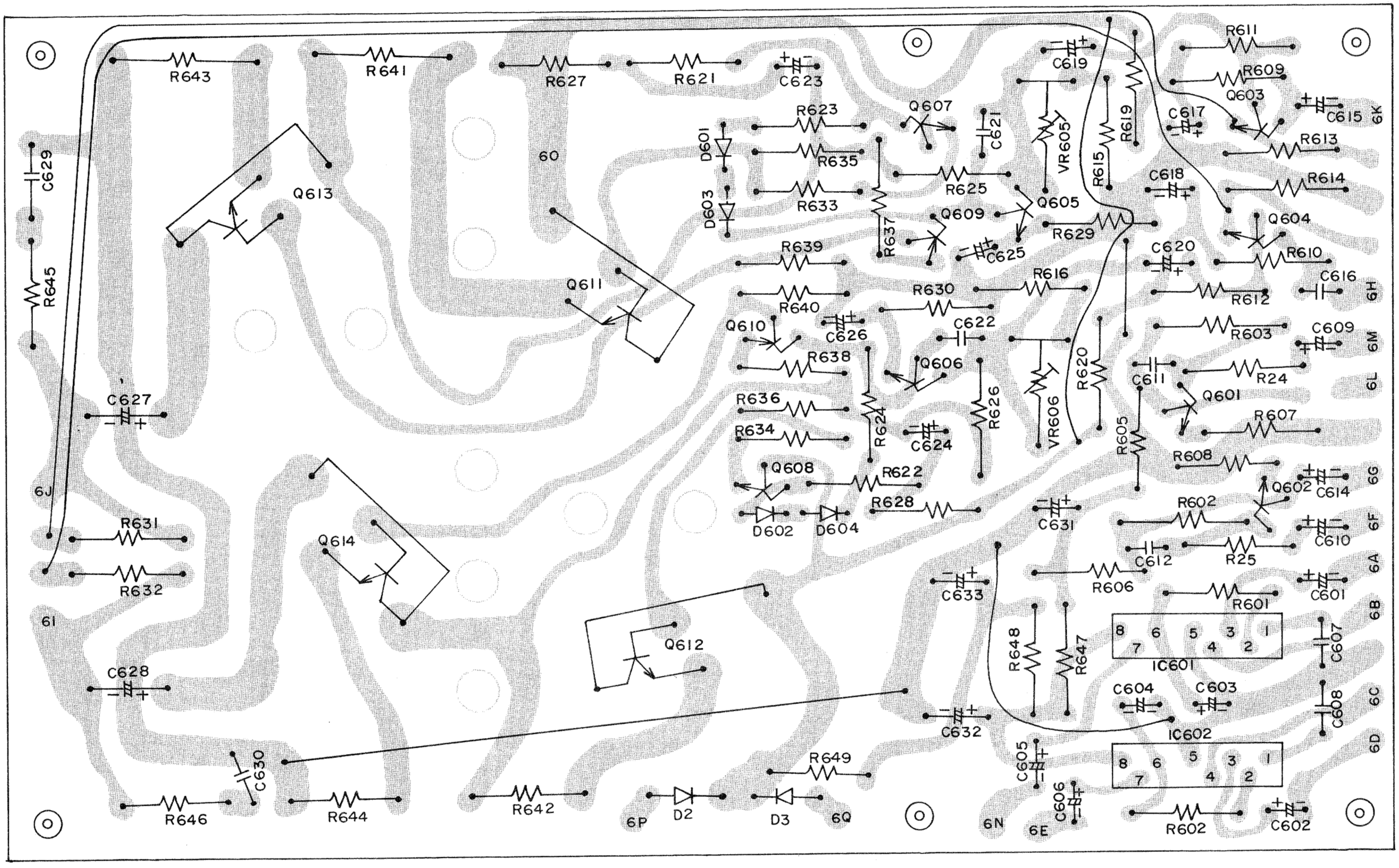
# AUDIO AMPLIFIER CIRCUIT DIAGRAM






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# AUDIO AMPLIFIER PRINTED CIRCUIT BOARD

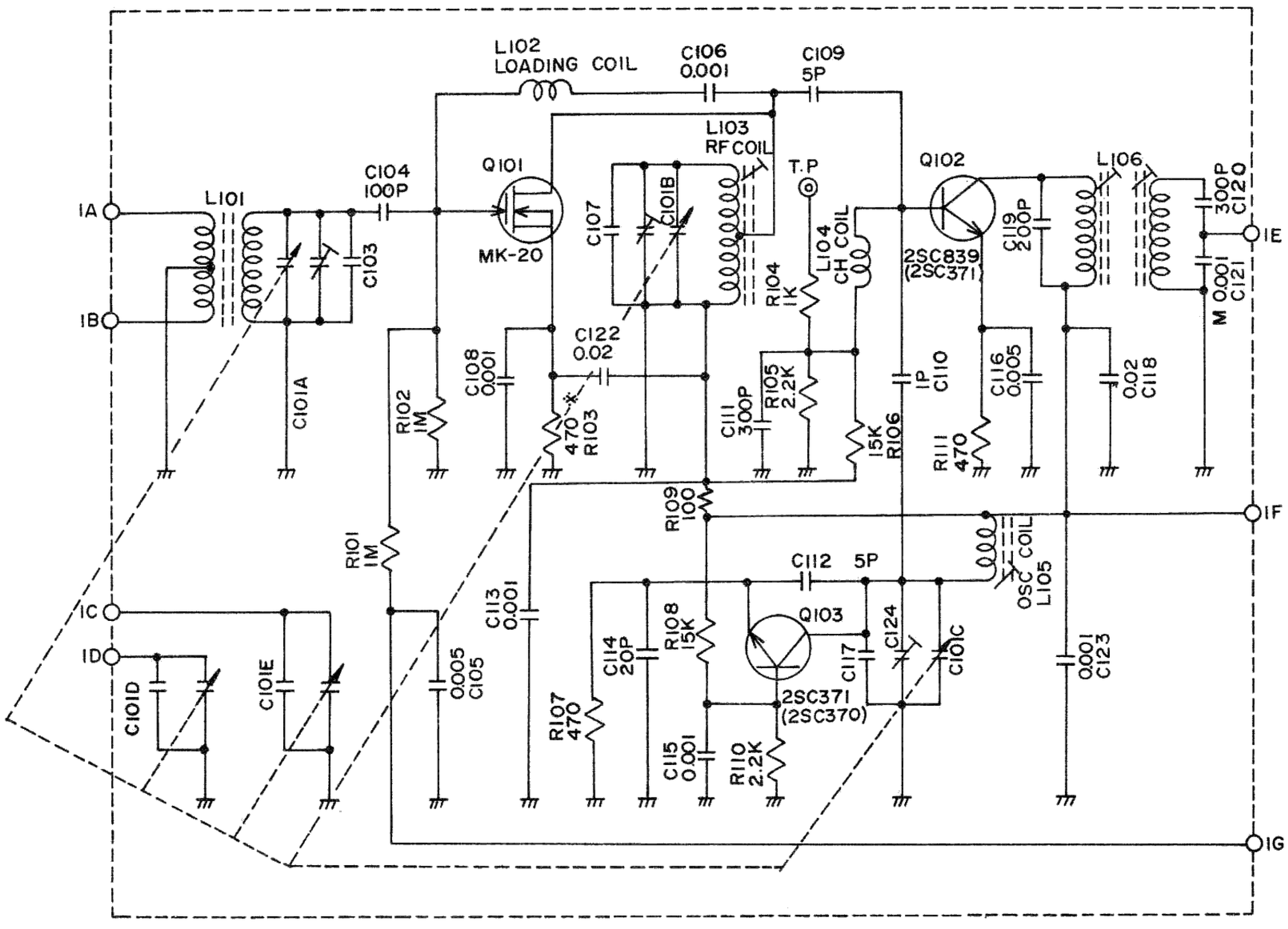



TOP VIEW

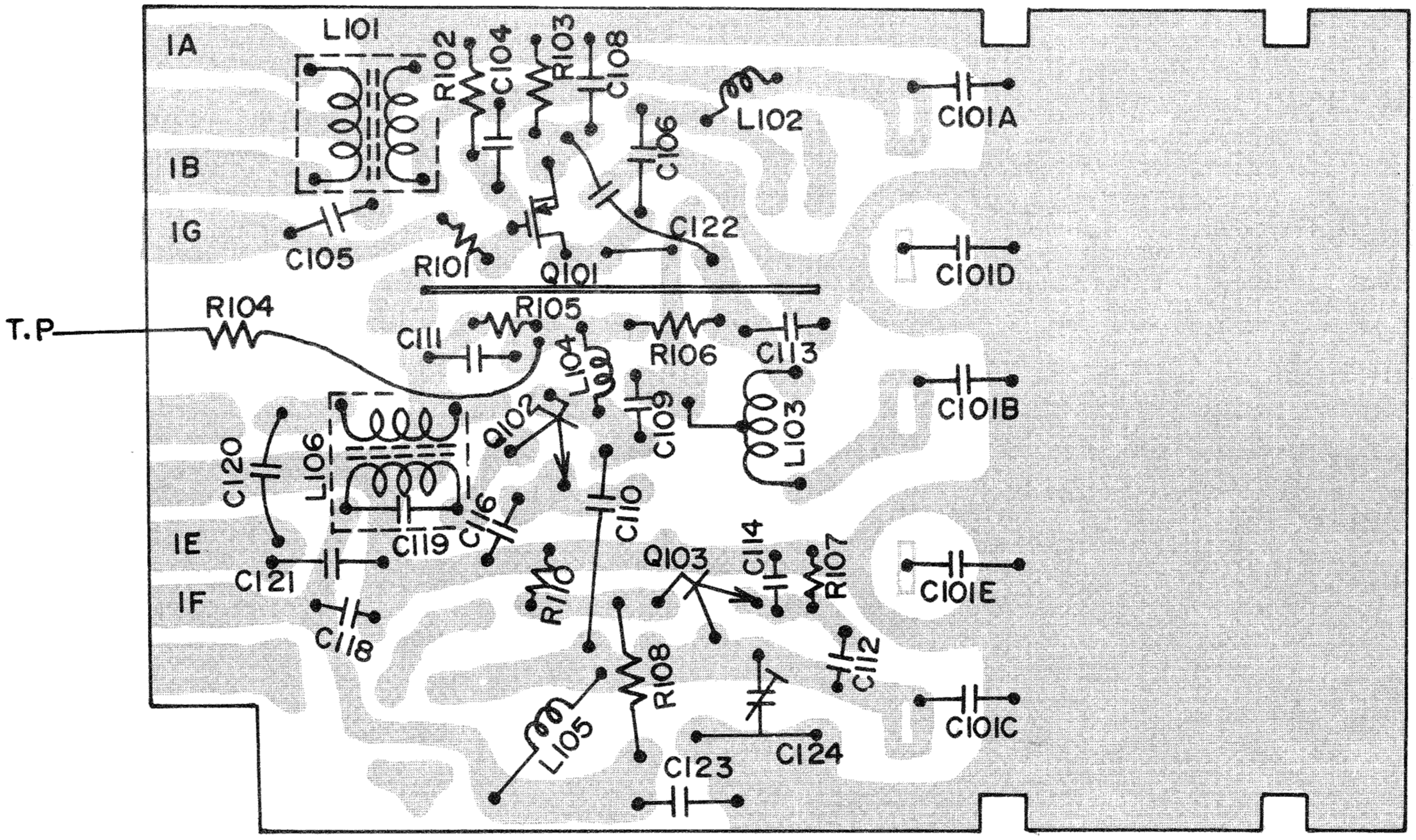


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# FRONT END CIRCUIT DIAGRAM




# FRONT END PRINTED CIRCUIT BOARD

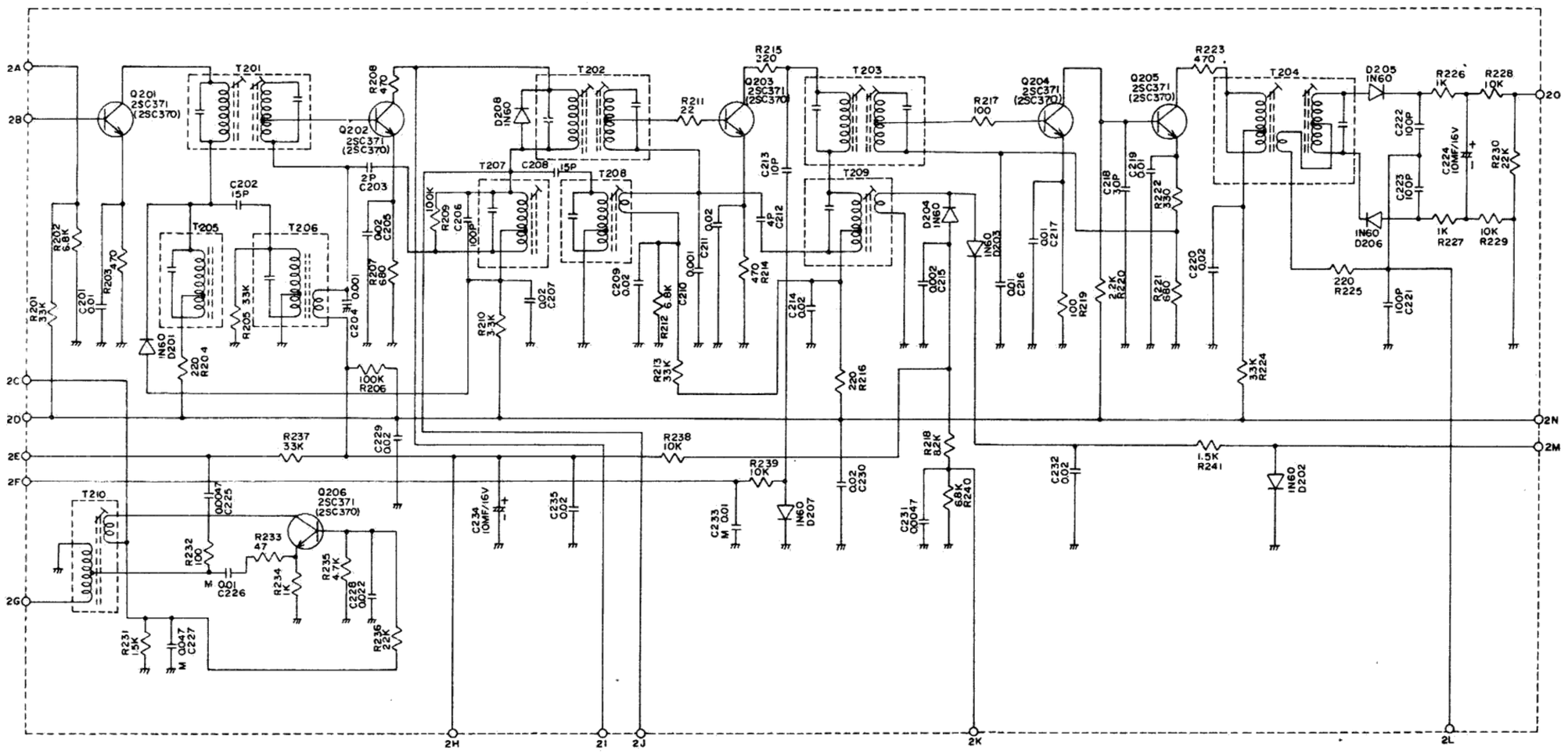



TOP VIEW

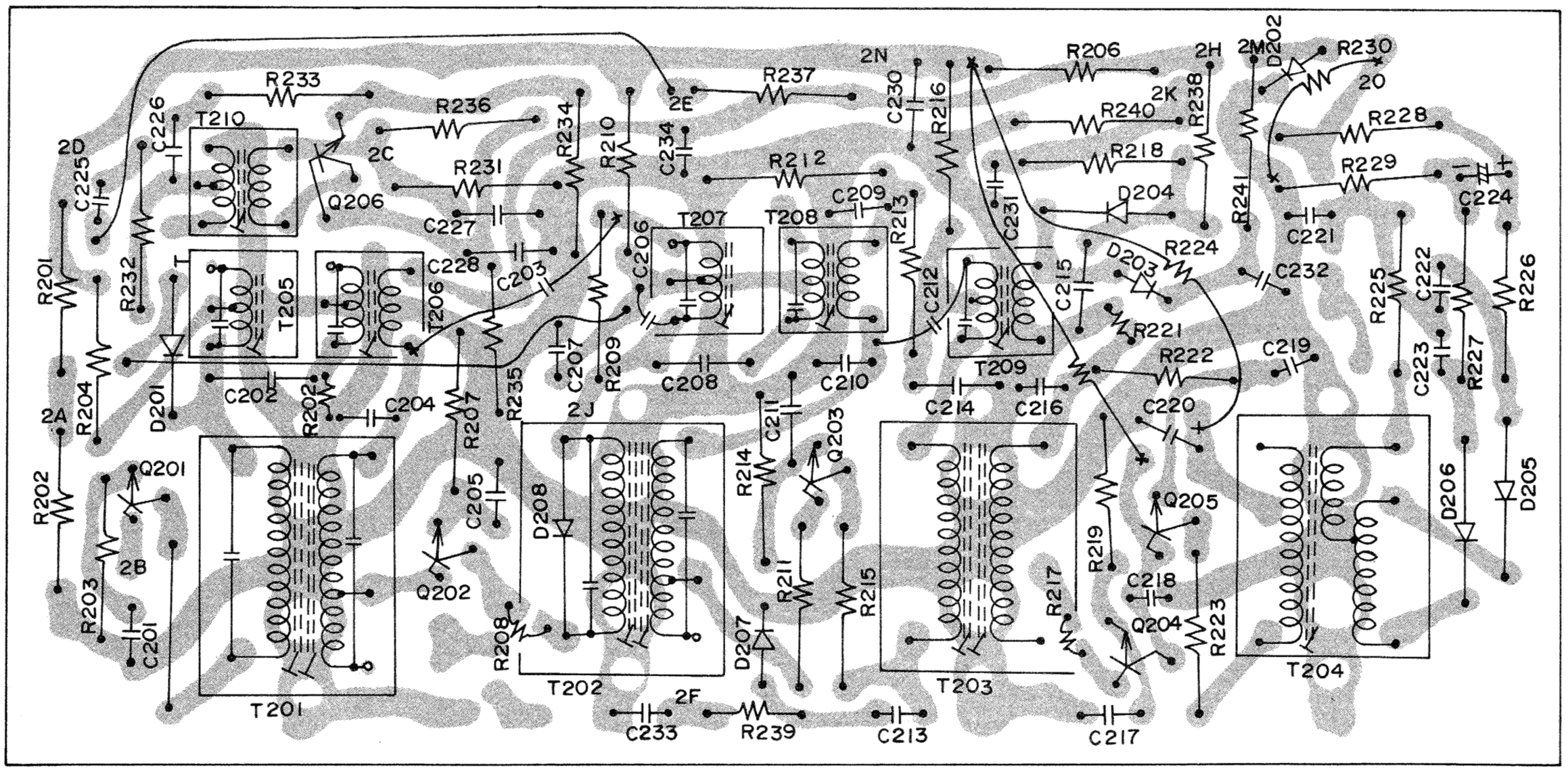


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# FM/AM IF CIRCUIT DIAGRAM




# FM/AM IF PRINTED CIRCUIT BOARD

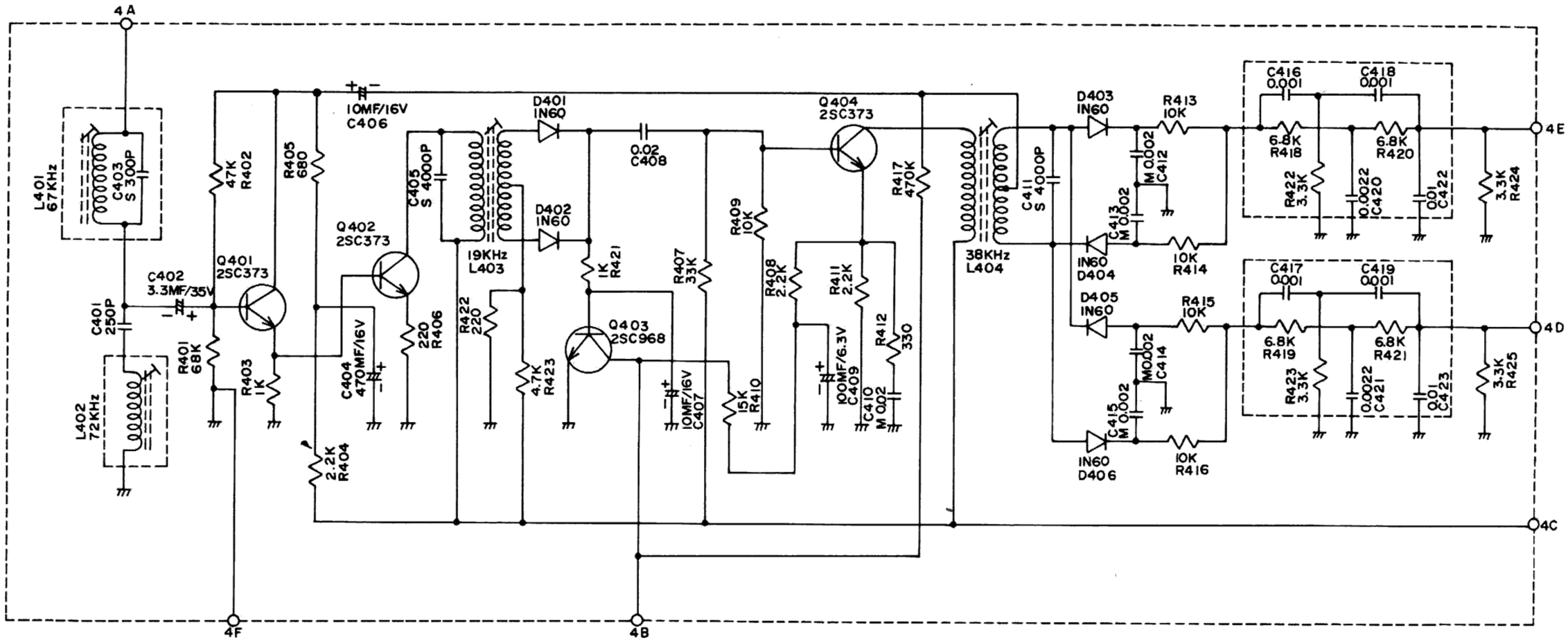



TOP VIEW

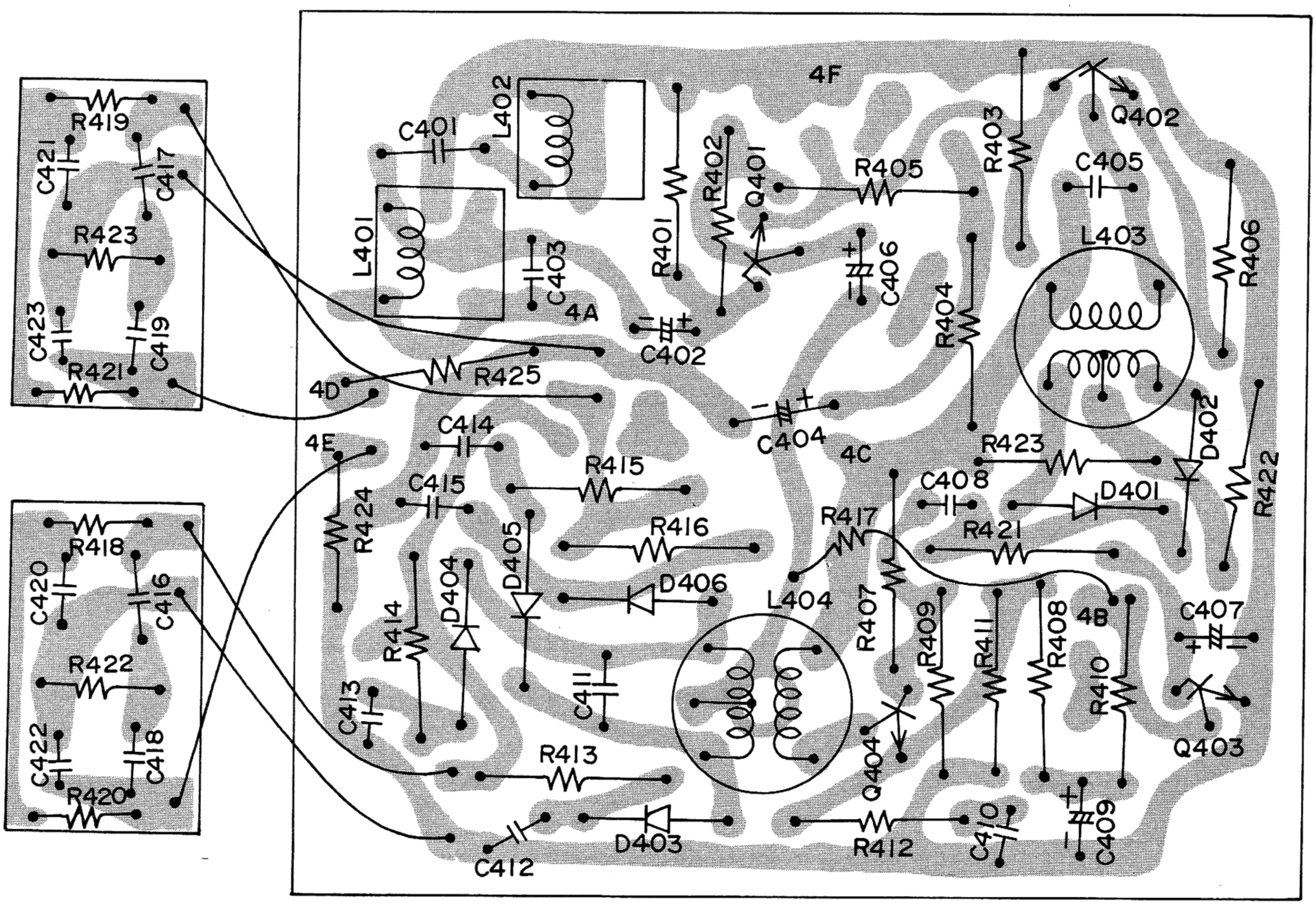


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# FM MULTIPLEX CIRCUIT DIAGRAM




# FM MULTIPLEX PRINTED CIRCUIT BOARD

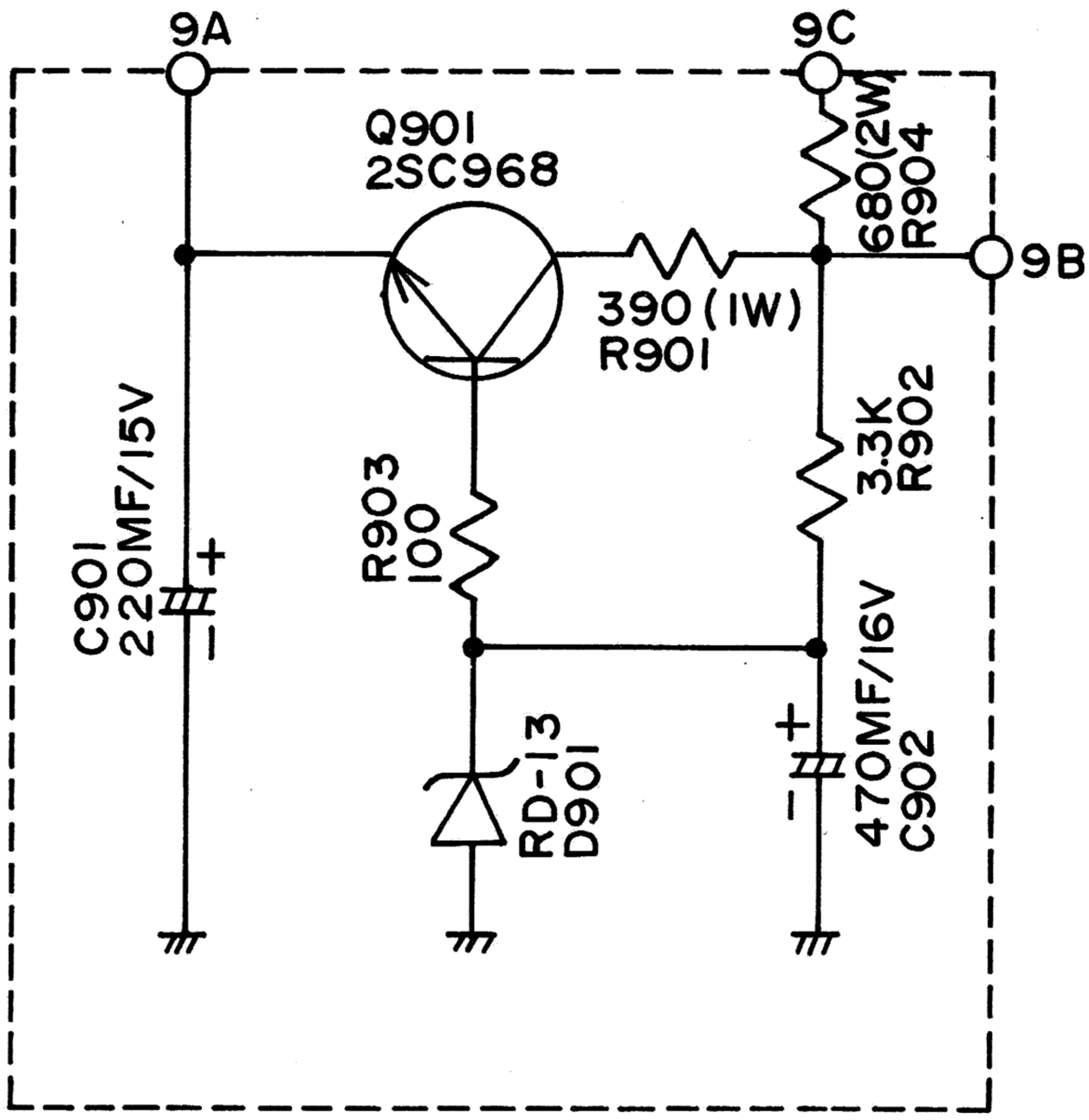



TOP VIEW

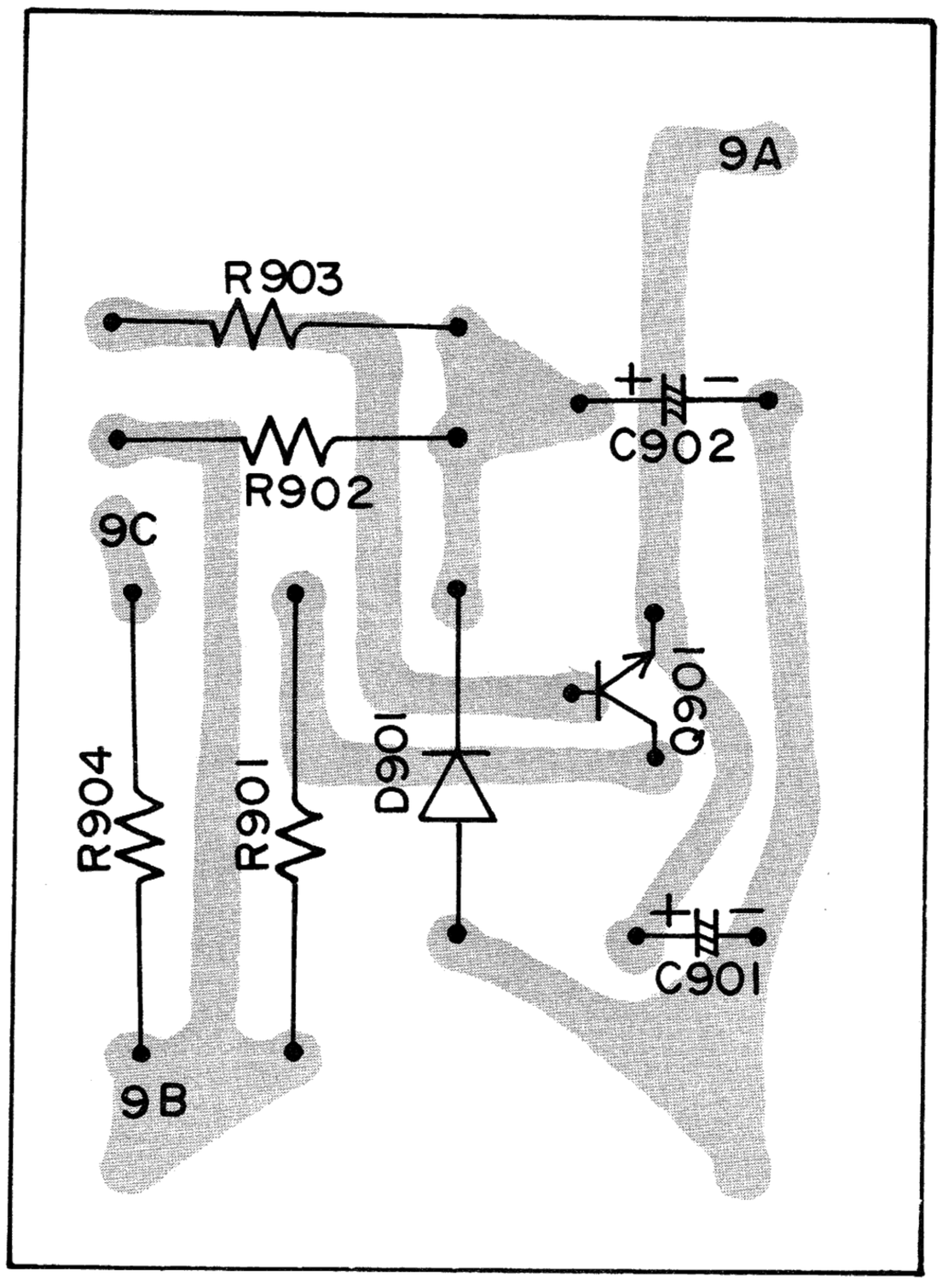


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REGULATOR CIRCUIT DIAGRAM




REGULATOR PRINTED
CIRCUIT BOARD




TOP VIEW





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## 2.2 TRANSISTOR AND COMPLEMENT

### μA-703E
### FAIRCHILD LINEAR INTEGRATED CIRCUITS

GENERAL DESCRIPTION :

Applications include FM-IF limiter amplifier, TV around IF amplifier, chroma reference osscillator for color TV, and fixed gain amplifier to 100 MHz.

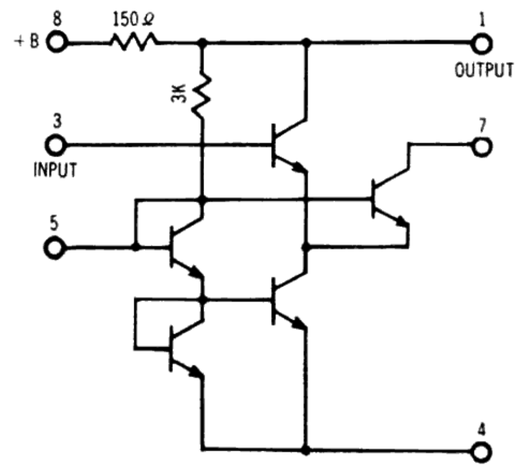
ABSOLUTE MAXIMUM RATINGS :

| | |
|---|---|
| Supply Voltage | 20V |
| Output Collector Voltage | 24V |
| Voltage Between Input Terminals | ± 5V |
| Internal Power Dissipation | 200 mW |
| Operating Temperature Range | 0°c to +70°c |
| Storage Temperature Range | −65°c to +150°c |
| Lead Temperature (Soldering 60 seconds) | 300°c |

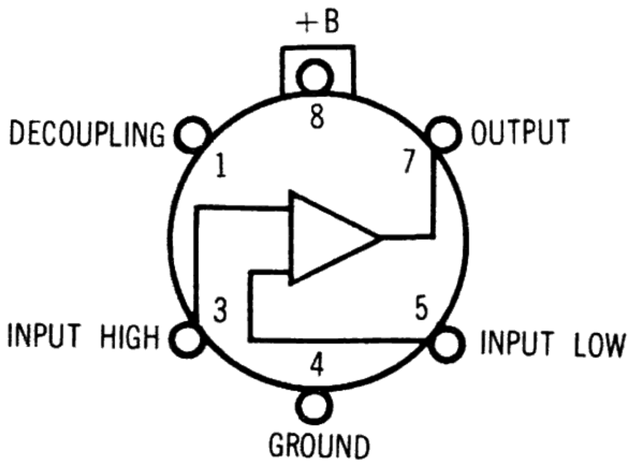
ELECTRICAL CHARACTERISTICS :
(TA = 25°c V = +12V f = 10.7 MHz)

| Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Power Consumption | e = 0 | | 110 | 170 | mW |
| Forward Transadmittance | e = 10 mV | .23 | 33 | | mυ |
| Rerese Transadmittance | | | 0.002 | | mυ |
| Input Conductance | e ≦ 10 mV | | 0.33 | 1 | mυ |
| Input Capacitance | e ≦ 10 mV | | 9 | | PF |
| Output Conductance | | | 0.05 | 0.1 | mυ |
| Output Capacitance | | | 2.6 | | PF |
| Maximum Stable Gain | | | 43 | | db |
| Maximum Stable Gain | f = 100 MHz | | 28 | | db |

SCHEMATIC DIAGRAM




CONNECTION DIAGRAM
(TOP VIEW)

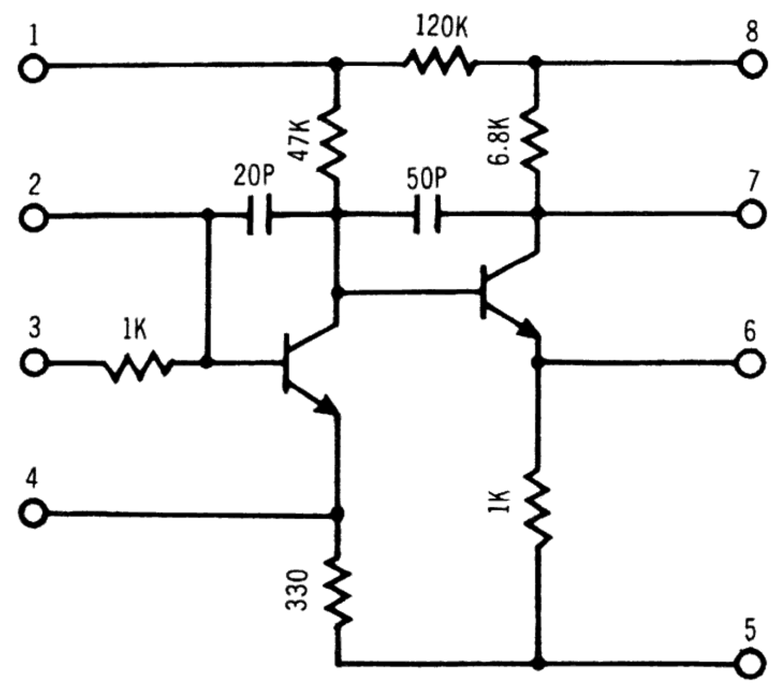



### NA-90003
### LINEAR HYBRID INTEGRATED CIRCUITS
### GENERAL DESCRIPTION
### AF AMPLIFIER

ELECTRICAL CHARACTERISTICS
(Vcc = 24v f = 1 KHz)

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Power Consumption | | | 1.8 | | mA |
| Maximum Stable Gain | | 63 | 66 | 69 | dB |
| Maximum Stable Gain | | 39 | 40 | 41 | dB |
| Noise Output Level | | | 2.0 | | mv |
| Nonclip Output Voltage | | | 4.5 | | v |
| Frequency Response at 10 KHz (odb = 1 KHz level) | Rnf = ∞ | | −9 | −11 | −13 dB |

SCHEMATIC DIAGRAM




CONNECTION DIAGRAM



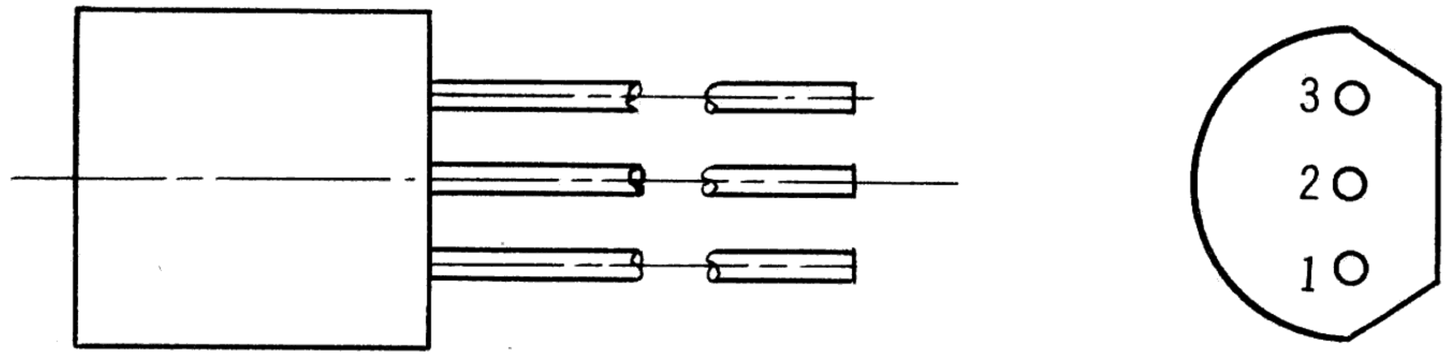



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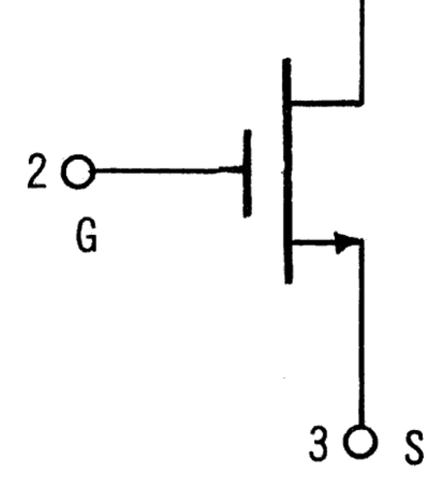
# FIELD EFFECT TRANSISTOR AND COMPLEMENT

| Type | Description | Structure | Maximum Ratings | | | | | | Electrical Characteristics | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | VDSX (V) | VGDX (V) | ID (mA) | PT (mW) | Tstg (°C) | Tch (°C) | IGSS Condition | IGSS (nA) | IDSS Condition | IDSS (mA) | VGSC Condition | VGSC (V) | VDSX Condition | VDSX (V) | Yfs Condition | Yfs (m℧) | Yos Condition | Yos (m℧) | Cis Condition | Cis (PF) | PG Condition | PG (dB) | NF Condition | NF (dB) |
| MK-101<br>MK-102 | Audio Low Noise Amp FM Mixer | Si N-Channel | 20 | −30 | 20 | 150 | −55 ~ 125 | 125 | VGS=−10V VDS= 0V | 0.1 (Typ.) 100 (max) | VGS = 0V Vps=10V | 1.0 ~ 6.0<br>5.0 ~ 12.0 | VDS=10V IDS=10μA | −4 (max)<br>−5 (max) | VGS=−10V ID=10μA | 20 (min)<br>30 (Typ.) | VGS = 0V VDS =10V f =1KHz<br>VDS =10V ID = 5mA f =1KHz | 1.0 (min) 3.5 (Typ.)<br>3.0 (min) 4.0 (Typ.) | VGS = 0V VDS =10V f =1KHz<br>VDS =10V ID =5mA f =1KHz | 0.05 (Typ.)<br>0.05 (Typ.) | VGS = 0V VDS = 0V f =1MHz<br>VDS =100 VDS =5mA f =1MHz | 7 (Typ.)<br>3.5 (Typ.) | VDS =10V ID =5mA f =1KHz | (Typ.)<br>20 (Typ.) | VDS =10V ID =0.5mA Rg=1MΩ f =100MHz<br>VDS =10V ID =25mA f =100MHz | 2 (Typ.)<br>3.5 (Typ.) |
| 2SK33 (MK-20) | FM RF Amp | Si Dual Gate N-Channel | 18 | −18 | 35 | 150 | −55 ~ 125 | 125 | VGS =−1V VDS = 0V | 0.1 (max) | VGS =10V VDS = 0V | 5.0 ~ 35.0 | VDS =10V IDS =10μA | −18 (max) | | | | | | | | | | | | |

## FET. OUTLINE DRAWING




## SYMBOL




## CONNECTION

1. Drain
2. Gate
3. Source

# SILICON RECTIFIER COMPLEMENT

| Type | Peak Inverse Voltage (V) | AC Input Voltage (V) | Output Current (max mA) | Inverse Current (A/Hz) | Surge Current (A/Hz) | Junction Temperature (°C) | CES Type | |
|---|---|---|---|---|---|---|---|---|
| SE-05 | 400 | 120 | 500 | 10 | 15 | −55 ~ +130 | 1S1021 | (O) |
| S-2E | 200 | 75 | 500 | 35 | 40 | 120 | 1S1221 | (S) |
| SPN-01 | 100 | 36 | 1A | Full Wave Bridge Stack | | | | (O) |
| SR-1-DM | 100 | 50 | 1A | | 50 | 40 ~ +100 | | (M) |
| S-2A-20 | 200 | 75 | 1.5A | | 80 | 150 | 1S921 | (S) |

(O) ORIGIN
(S) SHINDENGEN
(M) MITSUBISHI



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# TRANSISTOR COMPLEMENT

| TYPE | DESCRIPTION | CLASS OF SERVICE | Maximum Ratings(Ta=25°C) (Absolute Values) | | | | | | Electrical characteristics(Typical Value) (Ta=25°C) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Collector to Base Voltage $V_{CBO}$(V) | Emitter to Base Voltage $V_{EBO}$(V) | Collector Current $I_C$(mA) | Emitter Current $I_E$(mA) | Collector Dissipation PC(mw) | Junction temperature Tj °C | Condition of Measurement $V_{CE}$(V) | Condition of Measurement $I_E$(MA) | hfe (hFE) | NF dB | f$\alpha$b (fT) MHz | cob PF | hie (real) Ω | Collector Cut-off Current $I_{CBO}$(max μA) | Collector Cut-off Current @$V_{CB}$ V | Emitter Cut-off Current $I_{EBO}$(max μA) | Emitter Cut-off Current @$V_{EB}$ V | ※ Manufacture Name |
| 2SA12 | *PNP Ge Alloyed* | 455KHz IF Amp. | −16 | −0.5 | −15 | 15 | 80 | 85 | −6 | 1 | 60 | — | 8 | 10 | 70 | −6 | −12 | −12 | −0.5 | (H) |
| 2SA15 | *PNP Ge Alloyed* | MW Conv. | −16 | −0.5 | −15 | 15 | 80 | 85 | −6 | 1 | 60 | — | 12 | 10 | 70 | −5 | −12 | −10 | −0.5 | (H) |
| 2SA49 | *PNP Ge Alloyed* | 455KHz IF Amp. | −18 | −12 | −5 | 5 | 60 | 75 | −6 | 1 | 26 | — | 6 | 10 | 90 | −10 | 18 | – | – | (T) |
| 2SA234 | *PNP Ge Mesa* | 10.7 MHz IF Amp. | −20 | −0.5 | −10 | 10 | 80 | 85 | −6 | 1 | 70 | — | 120 | 2.1 | 55 | −30 | −20 | −50 | −0.5 | (H) |
| 2SA235 | *PNP Ge Mesa* | FM RF Amp. Conv. | −20 | −0.5 | −10 | 10 | 80 | 85 | −6 | 1 | 90 | — | 135 | 2.1 | 50 | −30 | −20 | −50 | −0.5 | (H) |
| 2SA350 | *PNP Ge Drift* | SW RF Amp. Conv. | −20 | −0.5 | −10 | 10 | 80 | 85 | −9 | 1 | 90 | — | 40 | 2.5 | 30 | −10 | −12 | −50 | −0.5 | (H) |
| 2SA354 | *PNP Ge Drift* | MW Converter | −25 | −0.5 | −10 | 10 | 80 | 85 | −9 | 1 | 70 | — | 30 | 2.5 | 30 | −10 | −12 | −15 | −0.5 | (H) |
| 2SA562 | *PNP Si Epitaxial Planar* | Small Signal Amp. | −30 | −5 | −400 | 400 | 300 | 125 | −1 | 100(Ic) | | — | 70 | – | – | −0.1 | 18 | −0.1 | 5 | (T) |
| 2SB54 | *PNP Ge Alloyed* | Small Signal Amp/Driver | −30 | −12 | −150 | 150 | 150 | 75 | −6 | 1 | 140 | 10 | 1 | 35 | – | −14 | −30 | – | −12 | (T) |
| 2SB56 | *PNP Alloyed* | Small Signal Amp. | −30 | −12 | −150 | 150 | 150 | 75 | −1 | −50(Ic) | 80 | — | 1 | 35 | 120 | −14 | −30 | 14 | 12 | (T) |
| 2SB73 | *PNP Ge Alloyed* | Low Noise Small Signal Amp. | −10 | −10 | −2 | 2 | 20 | 85 | −4 | 0.5 | 65 | 6 | – | – | – | −7 | −10 | −7 | −10 | (H) |
| 2SB75 | *PNP Ge Alloyed* | Small Signal Amp Driver | −25 | −12 | −100 | 100 | 150 | 85 | −6 | 1 | 55 | 7 | 2 | – | – | −14 | −25 | −12 | −12 | (H) |
| 2SB77 | *PNP Ge Alloyed* | Small Signal Amp. | −25 | −12 | −100 | 100 | 150 | 85 | −1.5 | 50 | 85 | – | 2 | – | – | −12 | −25 | −12 | −12 | (H) |
| 2SB328 | *PNP Ge Alloyed* | Audio Driver Medium | −25 | −10 | −200 | −200 | 150 | 85 | −1.0 | −20 | 70 | 6 | 2 | – | – | −10 | −15 | – | – | (N) |
| 2SB337 | *PNP Ge Alloyed* | Hi-Fi Power Amp. | −40 | −10 | −7A | 7A | 30W | 100 | −4 | 1A | 90 | – | 300KHz | – | – | −1.5mA | −30 | −2mA | −10 | (H) |
| 2SB361 | *PNP Ge Drift* | Hi-Fi Power Amp. | −80 | −1 | −5A | 5A | 12W | 100 | −2 | 1 | 85-230 | — | 5 | – | – | −500 | −40 | −100 | 1.0 | (H) |
| 2SB443 | *PNP Ge Alloyed* | Low Noise Small Signal Amp. | −18 | −12 | −10 | 10 | 100 | 100 | −6 | 1 | 150 | 4 | 3 | – | 110 | −10 | −12 | −10 | | (H) |
| 2SB474 | *PNP Ge Alloyed* | Hi-Fi Power Amp. | −35 | −6 | −2A | 2A | 12W | 85 | −1.5 | −0.2A(Ic) | 100 | – | 700KHz | – | – | 200 | −25 | 200 | −6 | (S) |
| 2SC281 | *NPN Si Passivated Mesa* | Low Level Small Signal Amp. | 30 | 5 | 100 | −100 | 200 | 175 | 6 | −10 | 170 | 4 | 80 | 7 | 65 | 0.1 | 20 | – | – | (H) |
| 2SC350 | *NPN Si Epitaxial Mesa* | Low Noise Small Signal Amp. | 30 | 5 | 100 | −100 | 200 | 175 | 6 | 0.1 | 80～300 | — | 80 | 10 | – | 0.1 | 20 | 0.1 | 5 | (H) |
| 2SC370 | *NPN Si Epitaxial Planar* | FM RF Amp. 10.7MHz IF Amp. | 30 | 4 | 100 | −100 | 200 | 125 | 10 | − 1 | 30 | — | 200 | 3.5 | – | 0.5 | 18 | 1 | 2 | (T) |
| 2SC371 | *NPN Si Epitaxial Planar* | FM RF Amp. 10.7MHz IF Amp. | 30 | 4 | 100 | −100 | 200 | 125 | 10 | −1 | 60 | — | 200 | 3.5 | – | 0.5 | 18 | 1 | 2 | (T) |
| 2SC373 | *NPN Si Epitaxial Planar* | 455KHz IF Amp. AF Amp. | 30 | 4 | 100 | −100 | 200 | 125 | 10 | −1 | 280 | — | 200 | 3.5 | – | 0.5 | 18 | 1 | 2 | (T) |
| 2SC454 | *NPN Si Epitaxial Planar* | MW Converter | 30 | 5 | | −100 | 200 | 125 | 12 | −2 | 60-320 | 8 | 230 | 1.8 | – | 0.5 | 18 | 0.5 | 2 | (H) |
| 2SC458 | *NPN Si Epitaxial Planar* | Small Signal Amp 455KHz IF Amp. | 30 | 5 | 100 | −100 | 200 | 125 | 12 | −2 | 160 | 8 | 230 | 1.8 | – | 0.5 | 18 | 0.5 | 2 | (H) |
| 2SC460 | *NPN Si Planar* | 10.7 MHz IF Amp. | 30 | 5 | 100 | −100 | 200 | 125 | 12 | −2 | 35-250 | 5 | 230 | 1.5 | – | 0.5 | 18 | 0.5 | 2 | (H) |
| 2SC461 | *NPN Si Planar* | FM Mixer. FM Converter | 30 | 5 | 100 | −100 | 200 | 125 | 12 | −2 | 35-200 | — | 230 | 1.5 | – | 0.5 | 18 | 0.5 | 2 | (H) |
| 2SC490 | *NPN Si Triple Diffused* | Hi-Fi Power Amp. | 100 | 5 | 3A | −3A | 16W | 150 | 5 | −0.5A | 200 | — | 10 | 130 | – | 3(mA) | 5 | 30 | 5 | (T) |
| 2SC493 | *NPN Si Triple Diffused* | Hi-Fi Power Amp. | 80 | 5 | 5A | −5A | 50W | 150 | 5 | 1A | 20～200 | — | 10 | 130 | – | 10(mA) | 50 | – | – | (T) |
| 2SC968 | *NPN Si Epitaxial Planar* | Small Signal Amp. | 50 | 5 | 500 | −500 | 500 | – | 4 | −10 | – | — | 70 | | – | – | – | – | – | (F) |
| 2SC815 | *NPN Si Epitaxial Planar* | Audio Driver | 60 | 5 | 200 | −250 | 250 | 125 | 2 | 150(Ic) | 70 | — | — | — | — | 0.1 | 45 | – | – | (N) |
| 2SC1030 | *NPN Si Triple Diffused* | Hi-Fi Power Amp. | 150 | 6 | 6A | −6A | 50W | 150 | – | – | 80 | — | 10 | – | – | 1 | 30 | – | – | (H) |
| 2SD150 | *NPN Si Epitaxial Planar* | Hi-Fi Power Amp. | 50 | 5 | 2A | −2A | 15W | 150 | – | – | | – | 10 | – | – | 0.1(mA) | 40 | – | – | (N) |
| 2SD154 | *NPN Si Epitaxial Planar* | Hi-Fi Power Amp. | 80 | 5 | 3A | – | 20W | 150 | – | – | 80 | – | – | – | – | 1 | 60 | – | – | (N) |

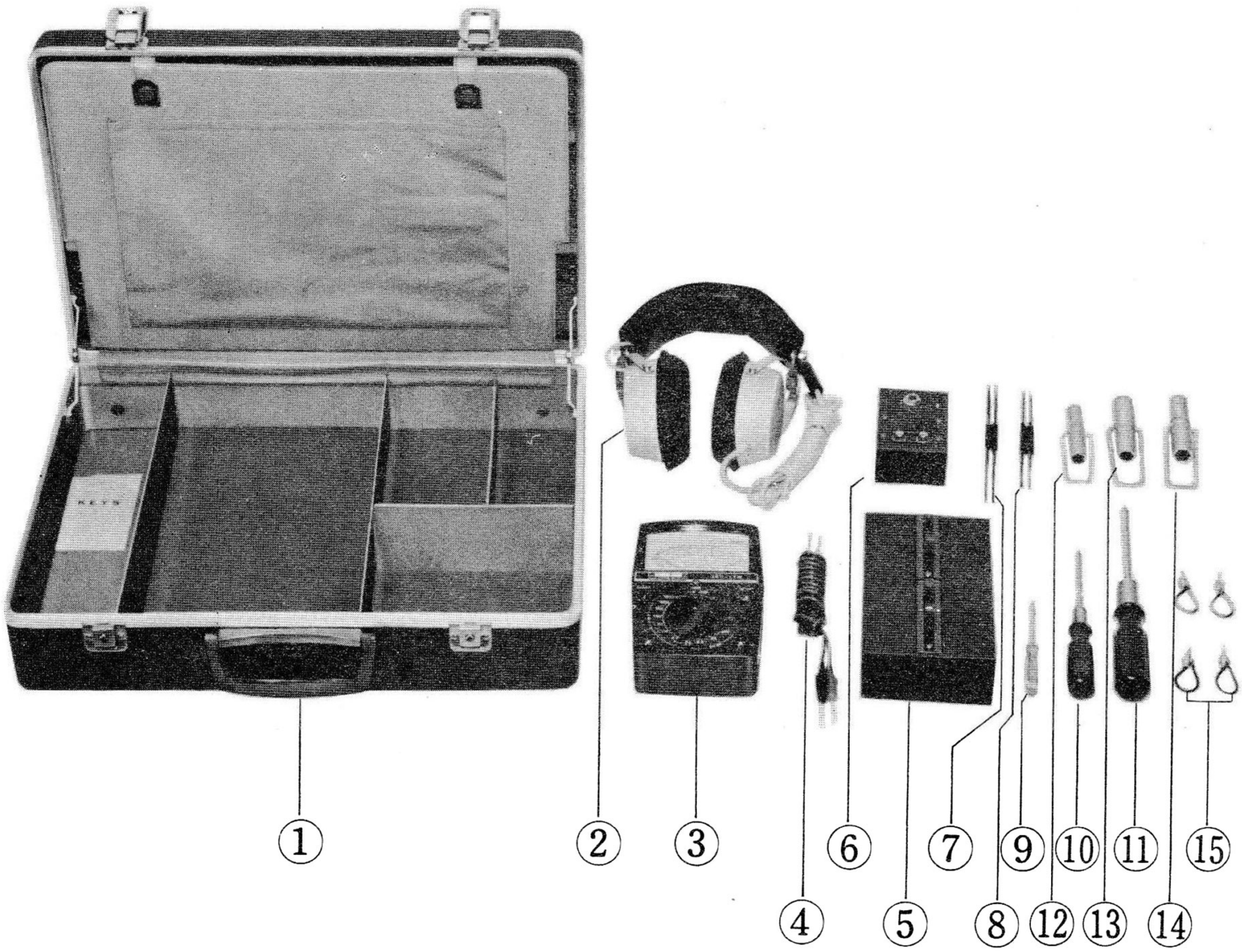
※ (H) HITACHI (T) TOSHIBA (S) SANYO (N) NEC (F) FUJITSU





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# 4. SERVICE TOOL




| | | |
|---|---|---|
| 1 | TOOL BOX | 1 |
| 2 | HEAD PHONES | 1 |
| 3 | CIRCUIT TESTER | 1 |
| 4 | TEST LEADES | 2 |
| 5 | DUMMY LOAD BOX | 1 |
| 6 | HEAEPHONE CONVERTER | 1 |
| 7 | ALIGNMENT TOOL(M. P. X.) | 2 |
| 8 | ALIGNMENT TOOL(FRONT. END) | 2 |
| 9 | TINY SCREW DRIVER | 1 |
| 10 | SMALL SIZE CROSS SCREW DRIVER | 1 |
| 11 | MEDIAM SIZE CROSS SCREW DRIVER | 1 |
| 12 | VOLUME WRENCH (8— 10) | 1 |
| 13 | VOLUME WRENCH (11— 12) | 1 |
| 14 | VOLUME WRENCH (13— 14) | 1 |
| 15 | SHORTED PIN JACK | 4 |



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# 4. PARTS LIST FOR STA301

## 4.1 FRONT END

| Parts No. | Description | Symbol | | Parts No. | Description | Symbol |
|---|---|---|---|---|---|---|
| | FET FE ASSY | | | | | |
| 940002 O | FET FE Assy | | | 245301 M | C-CAP 300PF | C111 |
| 462009 O | PC 462009 | | | 243102 Z | C-CAP 0.001MF | C106,108,113,115 |
| 423506 O | VC B 1553 DT-144 | | | | | C123 |
| 702225 O | Shield Plate | | | 243502 Z | C-CAP 0.005MF | C105,116 |
| 424104 O | TRM CV-07-10P | C124 | | 243203 Z | C-CAP 0.02MF | C118,122 |
| 121011 O | FM RF Coil Sassy | L103 | | 245809 Z | C-CAP 8PF | C103,107 |
| 121012 O | FM OSC Coil Sassy | | | 311101 K | RES 100ohm R1/4 | R109 |
| 121019 O | FM CH Coil | L104 | | 311471 K | RES 470ohm R1/4 | R103,107,111 |
| 121010 O | FM Loading Coil Sassy | L105 | | 311102 K | RES 1Kohm R1/4 | R104 |
| 124014 O | FM IFT W-Tuning | L106 | | 311222 K | RES 2.2Kohm R1/4 | R105,110 |
| 125004 O | FM ANT Coil | L101a-e | | 311153 K | RES 15Kohm R1/4 | R106,108 |
| 515037 S | TR 2SC 839 | Q102 | | 311105 K | RES 1Mohm R1/4 | R101,102 |
| 515035 S | TR 2SC 370 | Q103 | | 702419 O | Front End Case | |
| 516009 S | FET MK 20 | Q101 | | 702400 O | FE Cover(Upper) | |
| 235301 K | S-CAP 300PF | C120 | | 702420 O | FE Cover (Lower) | |
| 225102 K | M-CAP 0.001MF | C121 | | 790013 O | Tun Bushing | |
| 245109 C | C-CAP 1PF | C110 | | 249509 B | C-CAP 5PF | C112 |
| 245509 C | C-CAP 5PF | C109 | | 249150 G | C-CAP 15PF | C117 |
| 245101 M | C-CAP 100PF | C104 | | 249200 A | C-CAP 20PF | C114 |

## 4.2 FM-AM-IF BLOCK

| Parts No. | Description | Symbol | | Parts No. | Description | Symbol |
|---|---|---|---|---|---|---|
| | FM AM IF PCB ASSY | | | | | |
| 941005 O | FM AM IF PCB Assy | | | 225472 M | M-CAP 0.0047 MF | C225,231 |
| 461068 O | PC 461068 C | | | 225103 M | M-CAP 0.01 MF | C226,233, |
| 515035 S | TR 2SC 370 | Q201,202,203,204 | | 225223 M | M-CAP 0.022 MF | C209,211,214,228 |
| | | Q205,206 | | | | C229 |
| 500001 G | D IN60 P | D201,202,203,204 | | 225473 M | M-CAP 0.047MF | C227 |
| | | D205,206,207,208 | | 311220 K | RES 22ohm R1/4 | R211 |
| 124013 O | FM IFT (2) | | | 311470 K | RES 47ohm R1/4 | R233 |
| 124016 O | FM DET | | | 311101 K | RES 100ohm R1/4 | R217,219,232 |
| 123003 O | AM IFT(Yellow) | | | 311221 K | RES 220ohm R1/4 | R204,215,216,225 |
| 123009 O | AM IFT(Yellow) | | | 311331 K | RES 330ohm R1/4 | R222 |
| 123008 O | AM IFT(Black) | | | 311471 K | RES 470ohm R1/4 | R203,208,214,223 |
| 122004 O | AM OSC(Red) | | | 311681 K | RES 680ohm R1/4 | R207,221 |
| 202106 W | E-CAP 16R10 | C234,224 | | 311102 K | RES 1Kohm R1/4 | R226,227,234 |
| 245209 D | C-CAP 2PF | C203 | | 311152 K | RES 1.5Kohm R1/4 | R231,241 |
| 245409 D | C-CAP 4PF | C212 | | 311222 K | RES 2.2Kohm R1/4 | R220 |
| 245100 D | C-CAP 10PF | C213 | | 311332 K | RES 3.3Kohm R1/4 | R210,224 |
| 245150 D | C-CAP 15PF | C202,208 | | 311472 K | RES 4.7Kohm R1/4 | R235 |
| 245300 D | C-CAP 30PF | C218 | | 311682 K | RES 6.8Kohm R1/4 | R202,212,240 |
| 245101 M | C-CAP 100PF | C206,222,223,221 | | 311822 K | RES 8.2Kohm R1/4 | R218 |
| 243103 Z | C-CAP 0.01MF | C201,219,216,217 | | 311103 K | RES 10Kohm R1/4 | R228,229,238,239 |
| 243203 Z | C-CAP 0.02MF | C235, | | 311223 K | RES 22Kohm R1/4 | R230,236 |
| | | | | 311333 K | RES 33Kohm R1/4 | R201,205,213,237 |
| 225102 M | M-CAP 0.001MF | C204,210 | | 311104 K | RES 100Kohm R1/4 | R206,209 |
| 225222 M | M-CAP 0.0022MF | C215 | | | | |



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## 4.3 FM M.P.X BLOCK

| Parts No. | Description | Symbol | | Parts No. | Description | Symbol |
|---|---|---|---|---|---|---|
| | MPX PCB ASSY | | | | | |
| 942009 0 | MPX PCB Assy | | | 225102 M | M-CAP 0.001MF | C416,417,418,419 |
| 461011 0 | PC DF-1 | | | 225223 M | M-CAP 0.022MF | C408,410 |
| 461069 0 | PC 461069A | | | 311221 K | RES 220ohm R1/4 | R406,422 |
| 515012 S | TR 2SC 373(H) | Q401,402,404 | | 311331 K | RES 330ohm R1/4 | R412 |
| 515039 S | TR 2SC 968 | Q403 | | 311681 K | RES 680ohm R1/4 | R405 |
| 500001 G | D IN60(P) | D401,402,403,404 | | 311102 K | RES 1Kohm R1/4 | R403,421 |
| | | D405,406 | | 311222 K | RES 2.2Kohm R1/4 | R404,408,411 |
| 126005 0 | 67KC FIL | L401,402 | | 311332 K | RES 3.3Kohm R1/4 | R424,425 |
| 127006 0 | 38KC (WHT) | L404 | | 311472 K | RES 4.7Kohm R1/4 | R423 |
| 127007 0 | 19KC DET(BLU) | L403 | | 311103 K | RES 10Kohm R1/4 | R409,413,414,415, |
| 235251 K | S-CAP 250PF | C401 | | | | R416 |
| 235301 K | S-CAP 300PF | | | 311333 K | RES 33Kohm R1/4 | R407 |
| 235402 K | S-CAP 4000PF | C405,411 | | 311473 K | RES 47Kohm R1/4 | R402 |
| 204335 W | E-CAP 35R3.3 | C402 | | 311683 K | RES 68Kohm R1/4 | R401 |
| 202106 W | E-CAP 16R10 | C406,407 | | 311682 K | RES 6.8Kohm R1/4 | R418,419,420,421 |
| 200107 W | E-CAP 6.3R100 | C409 | | 311153 K | RES 15Kohm R1/4 | R410 |
| 202477 W | E-CAP 16R470 | C404 | | 311474 K | RES 470Kohm R1/4 | R417 |
| 225103 M | M-CAP 0.01MF | C422,423 | | | | |
| 225222 M | M-CAP 0.0022MF | C412,413,414,415 | | | | |
| | | C420,421 | | | | |

## 4.4 EQUALIZER PCB BLOK

| Parts No. | Description | Symbol | | Parts No. | Description | Symbol |
|---|---|---|---|---|---|---|
| | EQ PCB ASSY | | | | | |
| 949009 0 | EQ PCB Assy | | | 311273 J | RES 27Kohm R1/4 | R706,716 |
| 461090 0 | PC 461090 | | | 311225 J | RES 2.2Mohm R1/4 | R701,710 |
| 311123 J | RES 12Kohm R1/4 | R702,712 | | 311334 J | RES 330Kohm R1/4 | R703,711 |
| 311103 K | RES 10Kohm R1/4 | R707,714 | | 225392 K | M-CAP 0.0039MF | C703,707 |
| 311102 K | RES 1Kohm R1/4 | R705,715 | | 225123 K | M-CAP 0.012MF | C702,706 |
| 311223 J | RES 22Kohm R1/4 | R704,713 | | | | |



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## 4.5 AUDIO PCB BLOCK

| Parts No. | Description | Symbol | | Parts No. | Description | Symbol |
|---|---|---|---|---|---|---|
| | AMP PCB ASSY | | | | | |
| 944006 0 | AMP PCB Assy | | | 225473 M | M-CAP 0.047MF | C629,630 |
| 461096 A | PC 461096A | | | 334479 K | W-RES 0.47ohm R1/4 | R641,642,643,644 |
| 515003 S | TR 2SC 458 LG | Q601,602,603,604 | | 311338 K | RES 3.3ohm R1/4 | |
| 515012 S | TR 2SC 373 | | | 311478 K | RES 4.7ohm R1/4 | R645,646 |
| 515006 S | TR 2SC 815 | Q605,606,607,608, | | 311220 K | RES 22ohm R1/4 | R633,634,637,638 |
| 514066 S | TR 2SA 539(2SB 328) | Q609,610 | | 311470 J | RES 47ohm R1/4 | R613,614 |
| 513017 S | TR 2SD 150 | Q611,612,613,614 | | 311101 K | RES 100ohm R1/4 | R648 |
| 560016 S | D SR-1DM | D2,3 | | 311151 K | RES 150ohm R1/4 | R629,630,635,636 |
| 505010 S | D KB-169(IS 1212) | D601,602 | | | | R639,640 |
| 505011 S | D KB 265(IS 1212) | D603,604 | | 311221 K | RES 220ohm R1/4 | R24,25,607,608 |
| 518003 0 | IC NA-90003 | IC 601,602 | | 311102 K | RES 1Kohm R1/4 | R611, 612,621,622 |
| 204335 W | E-CAP 35R3.3 | C601,602,609,610 | | 311332 J | RES 3.3Kohm R1/4 | R631,632 |
| 202106 W | E-CAP 16R10 | C605,606,607,608, | | 311332 K | RES 3.3Kohm R1/4 | R627,628 |
| | | C613,614,615,616 | | 311472 K | RES 4.7Kohm R1/4 | R647,649 |
| | | C619,620 | | 311682 K | RES 6.8Kohm R1/4 | R605,606 |
| 202336 W | E-CAP 16R33 | C617,618,625,626 | | 311103 K | RES 10Kohm R1/4 | R615,616 |
| 200476 W | E-CAP 6.3R47 | C603,604 | | 311104 K | RES 100Kohm R1/4 | R619,620 |
| 202107 W | E-CAP 16R100 | C623,624 | | 311154 K | RES 150Kohm R1/4 | R625,626 |
| 202227 W | E-CAP 16R220 | C631 | | 311684 K | RES 680Kohm R1/4 | R601,602 |
| 203227 W | E-CAP 25R220 | C632,633 | | 311105 K | RES 1Mohm R1/4 | R609,610 |
| 203108 V | E-CAP 25MLI000 | C627,628 | | 311225 K | RES 2.2Mohm R1/4 | R603,604 |
| 245500 M | C-CAP 50PF | C611,612 | | 430016 0 | VIOK 742 B20K | VR605,606 |
| 245101 M | C-CAP 100PF | C621,622 | | | | |

## 4.6 REGULATOR PCB BLOCK

| Parts No. | Description | Symbol | | Parts No. | Description | Symbol |
|---|---|---|---|---|---|---|
| | REG PCB ASSY | | | | | |
| 945006 0 | REG PCB Assy | | | 202227 W | E-CAP 16R220 | C901 |
| 461123 0 | REG PCB | | | 311101 K | RES 100ohm R1/4 | R903 |
| 515039 S | TR 2SC 968(2SC 881) | Q901 | | 311332 K | RES 3.3Kohm R1/4 | R902 |
| 502014 S | ZD RD-13A | D901 | | 373681 K | M-RES 680ohm 1P | |
| 202477 W | E-CAP 16R470 | C902 | | 373391 K | M-RES 390ohm 1P | R901 |

## 4.7 CHASS ASSEMBLEY

| Parts No. | Description | Symbol | | Parts No | Description | Symbol |
|---|---|---|---|---|---|---|
| | CHASS ASSY | | | | | |
| 953013 0 | Chass Assy | | | 205108 U | E-CAP 50L1000 | C15 |
| 405035 0 | Rotary Switch 5-10-5 | | | 200107 M | E-CAP 6.3R100 | C704 |
| 110091 0 | P.T T-1-91 | | | 245101 M | C-CAP 100PF | C3,4 |
| 313105 K | RES 1Mohm | R26 | | 243203 Z | C-CAP 0.02MF | C19 |
| 273103 M | P-CAP 0.01MF | C2,17 | | 311470 K | RES 47ohm R1/4 | R1 |
| 273472 M | P-CAP 0.0047MF | C16,18 | | 311332 K | RES 3.3Kohm R1/4 | R9,11 |
| 458038 0 | Dial Drum 80φ | | | 311472 K | RES 4.7Kohm R1/4 | R5 |
| 458043 0 | Dial Cord | | | 311333 K | RES 33Kohm R1/4 | R4 |
| 744003 0 | Spring | | | 311473 K | RES 47Kohm R1/4 | R6,7 |
| 890250 B | Eyelet | | | 311334 K | RES 330Kohm R1/4 | R8,10 |
| 702338 0 | Needle | | | 311683 K | RES 68Kohm R1/4 | R2 |
| 702149 0 | Slide | | | 311102 K | RES 1Kohm R1/4 | R709 |
| 505009 S | Diode SR 1K | | | 430011 0 | HVR B5K V12K | R708 |



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## 4.8 FRONT PANEL ASSEMBLEY

| Parts No. | Description | Symbol | | Parts No | Description | Symbol |
|---|---|---|---|---|---|---|
| | FRONT PLATE ASSY | | | | | |
| 952008 0 | Front Plate Assy | | | 225102 M | M-CAP 0.001MF | C5.9 |
| 780007 0 | Dial Scale | | | 225473 M | M-CAP 0.047MF | C11,12 |
| 780036 0 | Dial Scale(J) | | | 225104 M | M-CAP 0.1MF | C6,8 |
| 455001 0 | Earphone Jack 3P | | | 205474 M | E-CAP 0.47MF | C13,14 |
| 431023 0 | VR PS 20K | VR601 | | 373151 K | M-RES 150ohm | R22,23 |
| 432017 0 | VR OS 50K x 2 | VR601a | | 311222 K | RES2.2Kohm R1/4 | R12,13,20,21 |
| 432018 0 | VR B 100K x 2 | VR602a-b,603a-b | | 311103 K | RES 10Kohm R1/4 | R14,15,16,17,18 |
| 580805 0 | Fuse Lamp PL-3 | | | | | R19 |
| 580101 0 | Lamp PL-12 | | | 311472 K | RES 4.7Kohm R1/4 | R28,29 |
| 580807 0 | Lamp PL-8 | | | 311682 K | RES 6.8Kohm R1/4 | R26,27 |

## 4.9 REAR PANEL ASSEMBLEY

| Parts No. | Description | Symbol | | Parts No | Description | Symbol |
|---|---|---|---|---|---|---|
| | REAR PANEL ASSY | | | | | |
| 951001 0 | Rear Panel Assy | | | 490051 0 | NW-IS Breaker | |
| 606002 J | Plug Cord | | | 490044 0 | NW-1S Breaker | |
| 458001 0 | Cord Stopper (S) | | | 444051 0 | Pin Terminal 5P | |
| 7021660 | Cord Braket(A) | | | 446042 0 | 4P Push Terminal | |
| 458016 0 | Cord Stopper(L) | | | 444022 0 | Pin Terminal 2P | |
| 702167 0 | Cord Braket(B) | | | 446041 0 | 4P Push Terminal | |
| 458016 0 | Cord Stopper(L) | | | 120010 ) | AM Antena Coil | |
| 450006 0 | UL Soket(B) | | | 453022 0 | Pin Conector | |

## 5.1.0 FINAL ASSEMBLEY

| Parts No. | Description | Symbol | | Parts No. | Description | Symbol |
|---|---|---|---|---|---|---|
| | FINAL ASSY | | | | | |
| 950010 0 | Final Assy | | | 458076 0 | FM ANT(EX) | |
| 984009 0 | Styrol Box | | | 788116 0 | Panel Sassy | |
| 982313 0 | Carton Box | | | 784051 0 | Knob 3LI | |
| 963102 0 | Carton Lavel | | | 784053 0 | Knob 3L3 | |

Remark: ( ) Serial No. 30200 before to Transistor



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# 5. NIKKO RECEIVER ALIGNMENT MANUAL

This manual concerns NIKKO Hi-Fidelity or stereo equipment and is published by Nikko Electric Mfg. Co., Ltd. It is for use by electronic engineers or technicians who are qualified to work on Transistorized Circuits, Printed Circuit Boards, decrete components and where hazardous voltages may be present ; although most voltages are well below those considered dangerous (below 50V) There are tie points where 110V to 120VAC are present and therefore caution should be exercised when working on trouble shooting live sets.

## 5.1 EQUIPMENT REQUIRED for TESTING and ALIGNMENT

High Impedance Voltohmmeter: AC.DC. 4Kohm/V, 10KOhm/V (Below 2.5V range)

AC.DC. 1.5 volt - 500 Volt Scale Resistor 0-10 MEG ohm.

Audio Vacuum Tube Voltohmmeter :

Frequency character 5 Hz to 100 KHz ±1dB 5mV - 50 Volt Scale

Oscilloscope:

Frequency character DC to 400 KHz ±1dB

Multiplex alignment ; Minimum 5 MHz

Inter modulation Distortion analyzer :

Hamonic Distortion analyzer :

AM : Modulation 0—50% continuously adjustable

FM : Deviation 0—100KHz continuously adjustable.
inter modulation frequency 400Hz and 1000Hz.

Audio Generator

10Hz - 100 KHz below 0.3% Distortion

Intermodulation Distortion Analyzer
Harmonic Distortion Analyzer 20-20,000Hz

AM-FM Signal generator
AM 520 - 1650 KHz ; FM 87 - 109 MHz

Stereo Multiplex Generator

10.7 MHz FM-IF Sweep Generator

455 KHz AM-IF Sweep Generator

Line Voltage Autotransformer 0-130V 5A or Voltage Regulator 120V ±5% (or 240V ±5%) Voltage Range, Capacity over 500W.

2- Load Resistors, 8 Ohm 50 Watt

2-- Speakers for Listening Tests

Input Source - Turntable & Tape Deck for Listening Tests

Soldering Iron with Small Tip

When soldering be sure receiver is disconnected from power line.

*Example :*

FM-AM Signal Generator : MODEL MSG-278F
MEGURO DENPA SOKKI. K.K.

AM Signal Generator : MODEL MSG-230E
MEGURO DENPA SOKKI. K.K.

FM STEREO Signal Generator : MODEL MSG-215A
MEGURO DENPA SOKKI. K.K.

Audio Generator : MODEL 311
METORONIX CORP.

Oscilloscope : MODEL 557A
KIKUSUI ELECTRONICS CORP.

Vacuum : Tube Voltometer : MODEL 107A
KIKUSUI ELECTRONICS CORP.

FM Sweep Generator : MODEL LSW-412
LEADER ELECTRONICS CORP.

AM Sweep Generator : MODEL RS-4 & RS-3
TRIO CORPORATION
MODEL LSW-424 & 413
LEADER ELECTRONICS CORP.





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## 5.2 TUNER SECTION ALIGNMENT and ADJUSTMENT

### 5.2.1. FRONT END ALIGNMENT

1. START with FM-IF ALIGNMENT for the Front End Alignment.
2. Set tuning dial Pointer to ZERO(0) Position on the dial glass panel If the dial pointer does not coincide with the ZERO(0) Position at the left end Knob rotation. reposition the dial pointer by sliding if from the staring.
3. Connect Audio V.T.V.M. and Oscilloscope to AF output point(2K) of AM-FM-IF Block or TAPE Monitor out.
4. Connect FM signal generator to FM antenna Terminals.
   Adjust balance of the output Impedance of Generator 300 ohm (see figure 1.). The modulation should be 400 Hz or 1000 Hz (Daviation to 75 KHz).
5. Repeat alignment in accordance with the figure.2.
   Keep the Generator output signal as possible, so that the AF output will not be saturated.

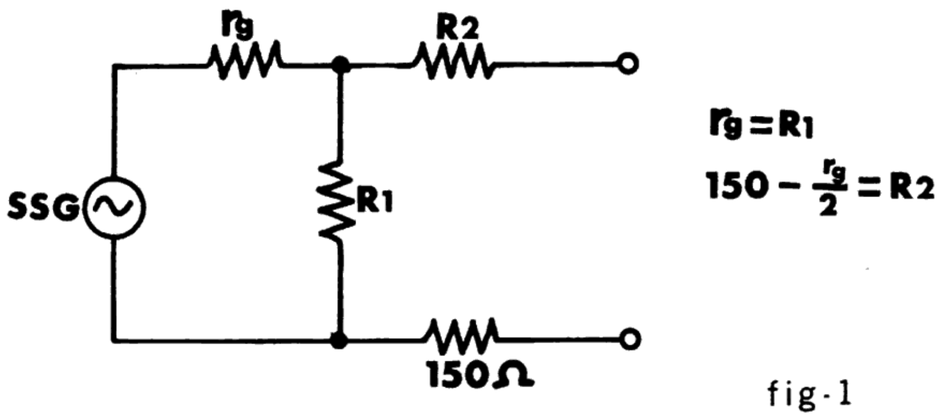
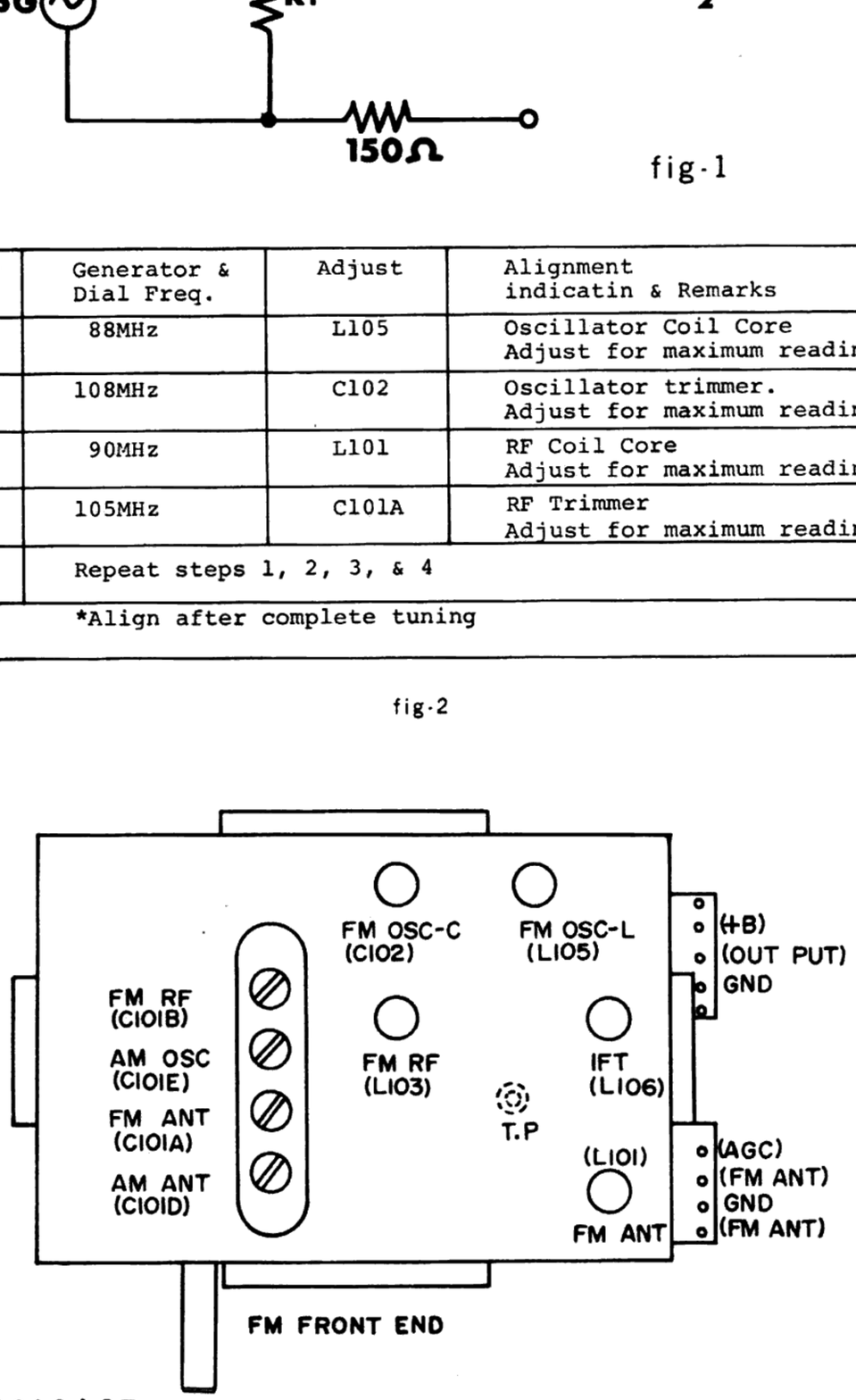



fig-1

| STEP | Generator & Dial Freq. | Adjust | Alignment indicatin & Remarks |
|---|---|---|---|
| 1 | 88MHz | L105 | Oscillator Coil Core Adjust for maximum reading. |
| 2 | 108MHz | C102 | Oscillator trimmer. Adjust for maximum reading. |
| 3 | 90MHz | L101 | RF Coil Core Adjust for maximum reading. |
| 4 | 105MHz | C101A | RF Trimmer Adjust for maximum reading. |
| 5 | Repeat steps 1, 2, 3, & 4 | | |
| | *Align after complete tuning | | |

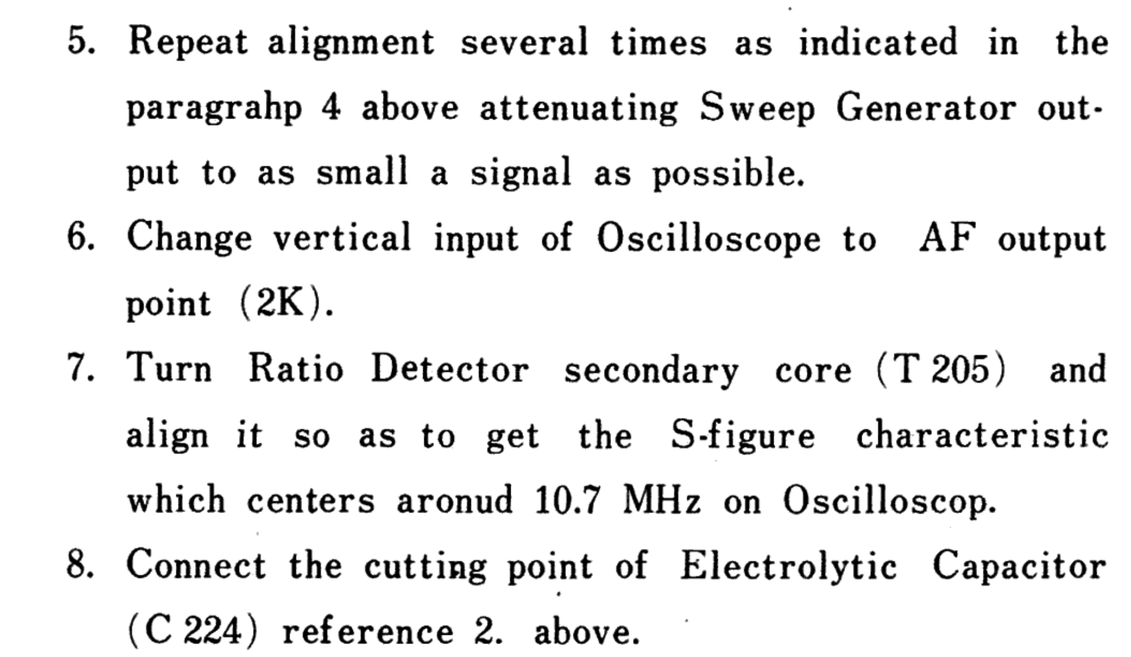
fig-2




S3010A27

### 5.2.2. FM-IF ALIGNMENT

1. Connect 10.7 MHz Sweep Generator with Test Point Terminal at the Front End.
   Note : Sweep Generator output of the Small Capring as large possible and output level as possible (see figure 2).
2. Disconnect soldering point Electrolytic Capacitor (C 224) 10 MF 16 WV in AM-FM-IF Block and connect itwith vertical input of Oscilloscope at the side of the Capacitor(C 224).
3. Set Gang Condenser where no signal is present.
4. Turn IF Transformer top and bottom cores (L 106) in the Front End and top cores (T 201, T 202, T 203) and Radio Detector Primary core (T 205) in the AM-FM-IF Block and adjust to make double hang characteristic, which centers around 10.7 MHz to the maximum amplitude on Oscilloscpe.
5. Repeat alignment several times as indicated in the paragrahp 4 above attenuating Sweep Generator output to as small a signal as possible.
6. Change vertical input of Oscilloscope to AF output point (2K).
7. Turn Ratio Detector secondary core (T 205) and align it so as to get the S-figure characteristic which centers aronud 10.7 MHz on Oscilloscop.
8. Connect the cutting point of Electrolytic Capacitor (C 224) reference 2. above.




AM FM IF AMPLIFIER

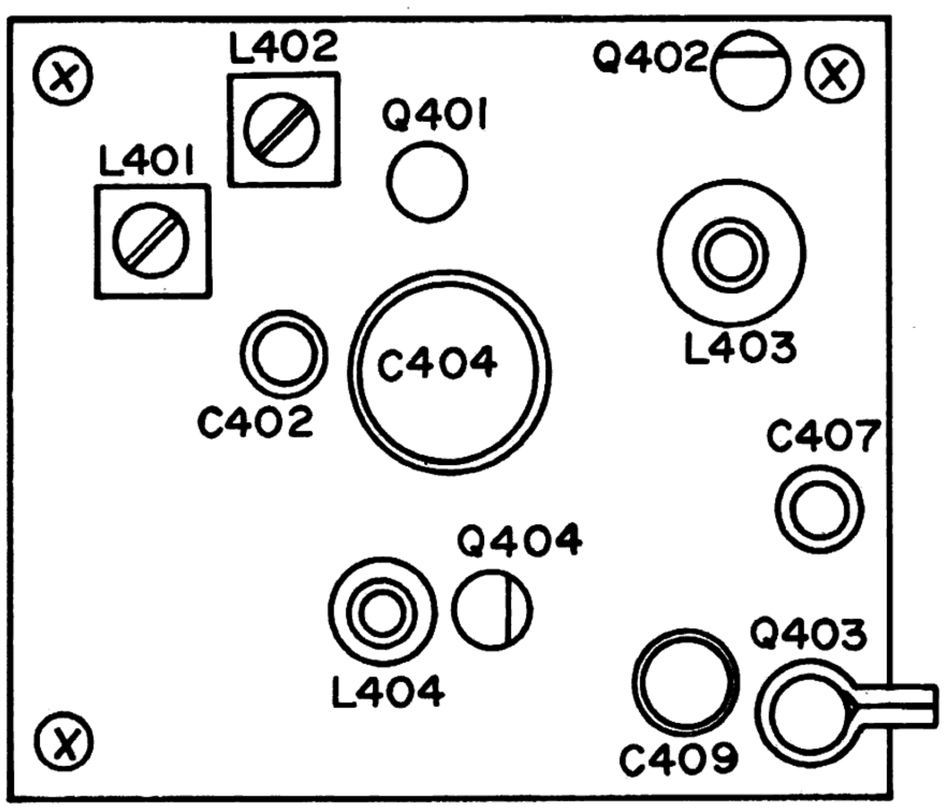
### 5.2.3. MULTIPLEX ALIGNMENT

1. To complete Multiplex Alignment, especially the characteristic should be normal. Accordingly, start with FM-IF Alignment for the MULTIPLEX ALIGNMENT.



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2. As indicated in the first (1) paragraph, this alignment should be done with multiplex. Generator with RF signal.
   IF necessary, composite multiplex signal, should be used for checking only.
   To connect the signal, disconnect the AF output terminal 2K on the FM-IF circuit board, then give the composite multiplex signal.
3. Before alignment the multiplex Generator should be completely adjusted (Ex. 19KHz phase, pilot level and signal level etc.); then connected with FM Antenna terminals. Adjust the output Impedance of Generator to 300 Ohm Balance (see Figure at front end alignment.) For Modulation follow the direction steps in the figure.
4. Connect Audio T.V.M. to M.P.X. Block terminals (4E, 4D, TP.) by following the steps in the figure.
5. Adjust RF output level of Multiplex Generator to 500$\mu$V (54dB) and make alignment by following the figure 3. Perfecfly using an unobstructed frezency.




MULTIPLEX

## 5.2.4. AM-RF ALIGNMENT

1. Start with IF Alignment for AM-RF alignment.
2. TEST LOOP or several turns of wire in loop from connected to AM signal Generator Output connection will be 30% of either 400Hz or 1000Hz.
3. Couple Generator Loop to the AM Antenna as loosely as possible.
4. Connect audio V.T.V.M. and Oscilloscope with Monitor out.
5. To control, follow the figure. Keep the generator output terminal signal as attenuate as possible so that the AF output will not be saturated.

## 5.2.5. AM-IF ALIGNMENT(See AM FM IF AMPLIFIFR)

1. TEST LOOP or several turns of wire in loop from connected to 455KHz Sweep Generator Output Connection.
2. Couple Generator Loop to the AM Antenna as loosely as possible.
3. Connect AF output terminal (2J) on the AM-FM-IF Circuit board to vertical input of Oscilloscope.
4. Set Gang Condenser at the point where Gang is fullyopen (1650KHz).
5. Turn IF Transformer top cores (T 205, T 206, T 207, T 208, T 209) in the AM-FM-IF Block and make alignment so as to double hang characteristic, which centers around 4555KHz, should be the maximum amplitude on oscilloscope.
6. Repeat alignment several times as indicated in the paragraph 5 above attenuating output of Sweep Generator as little as possible.

## 5.2.6. TUNINIG METER CHECK

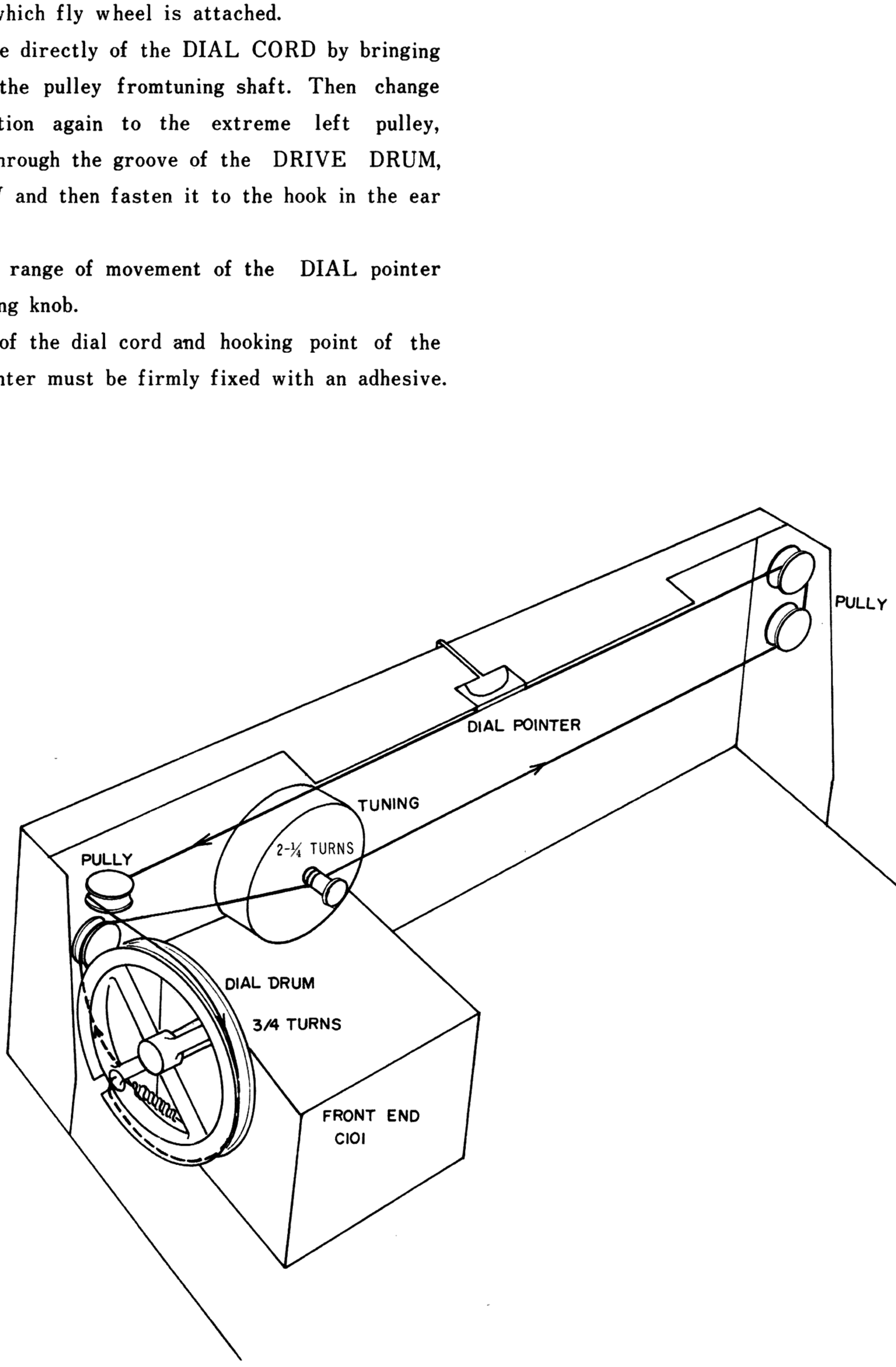
1. Connect FM Signal Generator to FM Antenna Terminals. Note : Adjust output impedance of Generator to 300 Ohm Blance (see Figure 1.).
2. Adjust FM Generator frequency and tuning dial position to 98MHz Note : Tune Receiver to 98MHz. FM Generator output to 10MV (80dB).



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## 5.3. DIAL STRING PROCEDURES

1. Connect dial pointer to the minimum frequency position (extreme left).
2. Rotate Gang Condenser counter clockwise on the Front (maximum capacity).
3. As indicated in the figure of DIAL STRINGING PROEDURE, fix the DRIVE DRUM so that the ear inside of the DRIVE DRUM and the slide on the DIAL POINTER are in Line.
4. Attach the dial cord to spring and hook it to the ear inside of the DIAL DRUM. Guide the dial cord to the pully the ear of the DIAL DRUM through the groove, then turn three times round the tuning shaft to which fly wheel is attached.
5. Change the directly of the DIAL CORD by bringing it round the pulley fromtuning shaft. Then change its direction again to the extreme left pulley, guide it through the groove of the DRIVE DRUM, turn CCW and then fasten it to the hook in the ear inside.
6. Check the range of movement of the DIAL pointer with Tuning knob.
7. The knot of the dial cord and hooking point of the DIAL pointer must be firmly fixed with an adhesive.




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## 5.4 ALIGNMENT PROCEDURES

| STEP | GENERATOR & DIAL FREQ. | ALIGNMENT | |
|---|---|---|---|
| | | ADJUST | INDICATION & REMARKS |
| 1 | 1650KHz | C101E | Oscillator trimmer Adjust for maximum reading |
| 2 | 1400KHz | C101D | Antenna trimmer as above |
| 3 | 520KHz | T210 | Oscillator coil core as above |
| 4 | 600KHz | L1 | Antenna coil as above |
| 5 | | | Repeat step 1, 2, 3, & 4 |

*Repeat steps 3 thorugh 4 to obtain best tracking

fig-3

| STEP | GENERAOTR & DIAL FREQ. | ALIGNMENT | |
|---|---|---|---|
| | | ADJUST | INDICATION & REMARKS |
| 1 | 520KHz | T301 | Oscillator coil core Adjust for Maximum reading |
| 2 | 1650KHz | C101E | Oscillator trimmer Adjust for Maximum reading |
| 3 | 600KHz | L1 | Antenna Coil Adjust for Maximum reading |
| 4 | 1400KHz | C101D | Antenna trimmer Adjust for Maximum reading |
| 5 | Repeat Steps 1 through 4 to obtain best tracking | | |

fig-4



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## 5.5 CURRENT DRAIN

### STA 301

| SYMBOL | TRANSISTOR | VC(V) (+10%) | Ve(V) (+10%) | Ie (mA) (+10%) |
|---|---|---|---|---|
| Q101 | MK-20 | 12.0 | 1.5 | 3.2 |
| Q102 | 2SC 839(2SC 370) | 12.5 | 0.9 | 1.9 |
| Q103 | 2SC 371 | 12.5 | 1.0 | 2.1 |
| Q201 | 2SC 371(2SC 370) | 12.5(12.0) | 1.41(0.43) | 3.0(1.0) |
| Q202 | 2SC 371(2SC 370) | 6.2 | 1.13 | 1.7 |
| Q203 | 2SC 371(2SC 370) | 11.5 | 1.15 | 2.5 |
| Q204 | 2SC 371(2SC 370) | 2.4 | 0.48 | 4.8 |
| Q205 | 2SC 371(2SC 370) | 6.0 | 1.75 | 1.7 |
| Q206 | 2SC 371(2SC 370) | (12.5) | (1.7) | (1.7) |
| Q401 | 2SC 373 | 5.5 | 2.5 | 2.5 |
| Q402 | 2SC 373 | 12.0 | 1.8 | 8.0 |
| Q403 | 2SC 968 | 20.0 | 0 | 3.0 |
| Q404 | 2SC 373 | 12.5 | 2.5 | 1.1 |
| Q601 | 2SC 458 LG | 8.5 | 0.15 | 0.7 |
| Q602 | 2SC 458 LG | 8.5 | 0.15 | 0.7 |
| Q603 | 2SA 458 LG | 1.8 | 0.03 | 0.65 |
| Q604 | 2SA 458 LG | 1.8 | 0.03 | 0.65 |
| Q605 | 2SC 815 | 17.0 | 0.8 | 5.5 |
| Q606 | 2SC 815 | 17.0 | 0.8 | 5.5 |
| Q607 | 2SC 815 | 41.5 | 18.5 | 4.5 |
| Q608 | 2SC 815 | 41.5 | 18.5 | 4.5 |
| Q609 | 2SA 539 | 18.0 | 0.65 | 4.5 |
| Q610 | 2SA 539 | 18.0 | 0.65 | 4.5 |
| Q611 | 2SD 150 | 41.5 | 18.2 | 8.5 |
| Q112 | 2SD 150 | 41.5 | 18.2 | 8.5 |
| Q113 | 2SD 150 | 18.16 | 0.04 | 8.5 |
| Q114 | 2SD 150 | 18.16 | 0.04 | 8.5 |
| Q901 | 2SC 968 | 26.0 | 12.7 | 3.8 |

Remarks: Value of each current and voltage are measured without signal against ground side.
( ) AM Received.



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