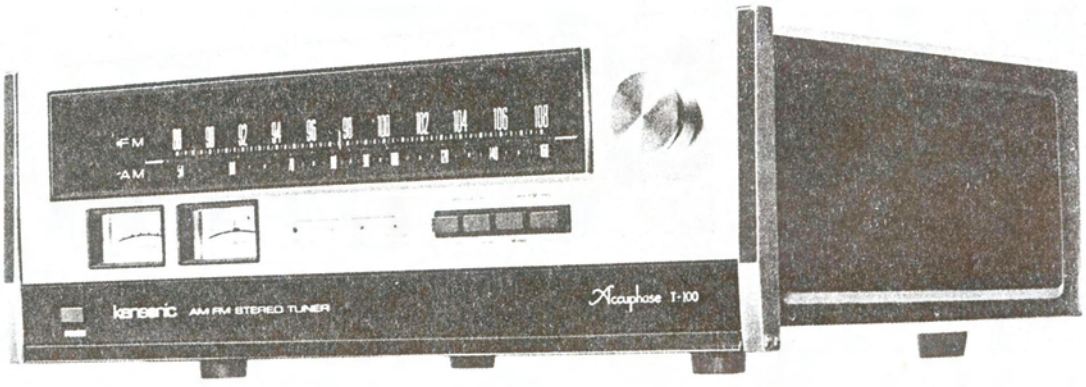
# Accuphase

## STEREO TUNER T-100




# Service Information

STARTING WITH SERIAL NO.13Y001

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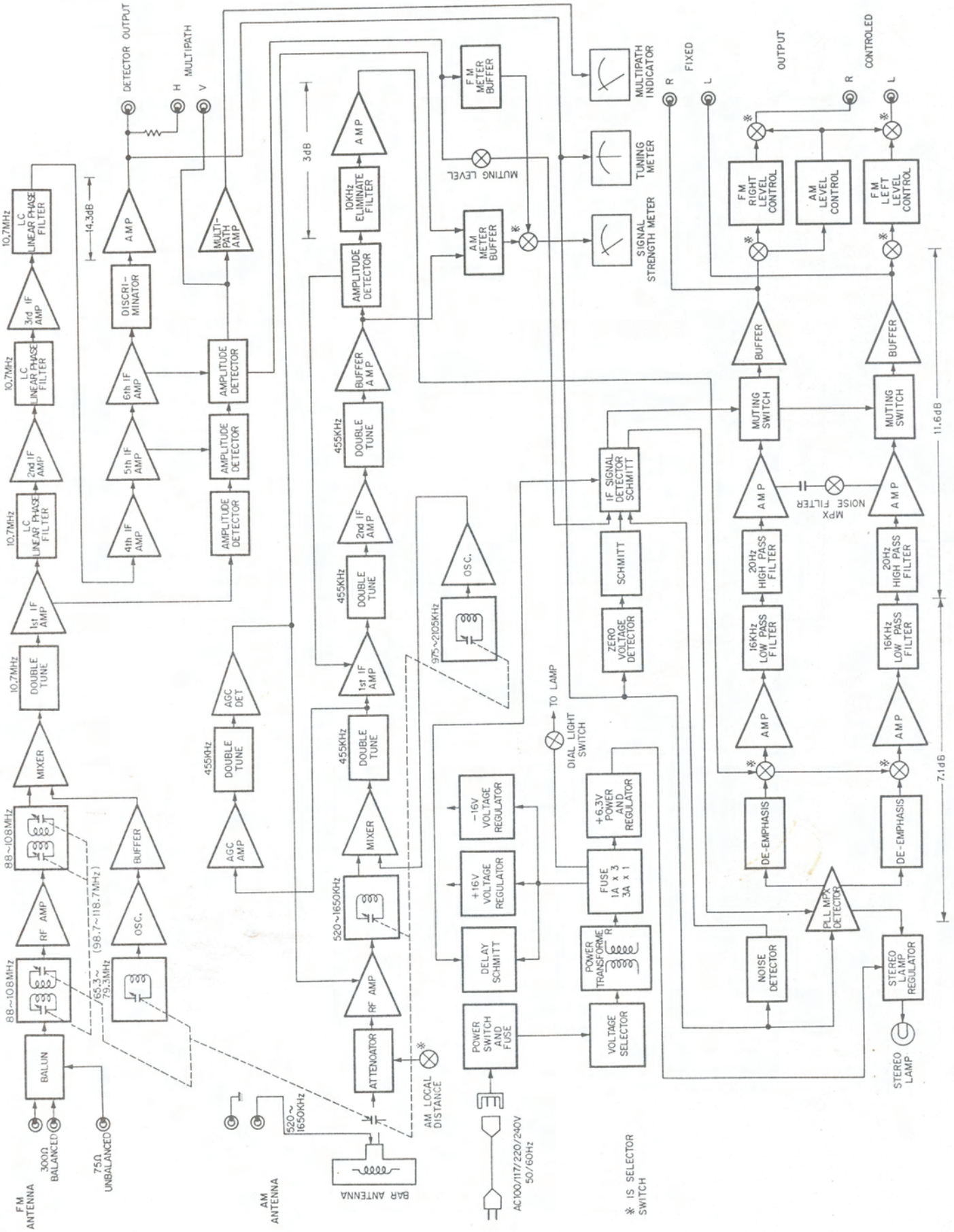
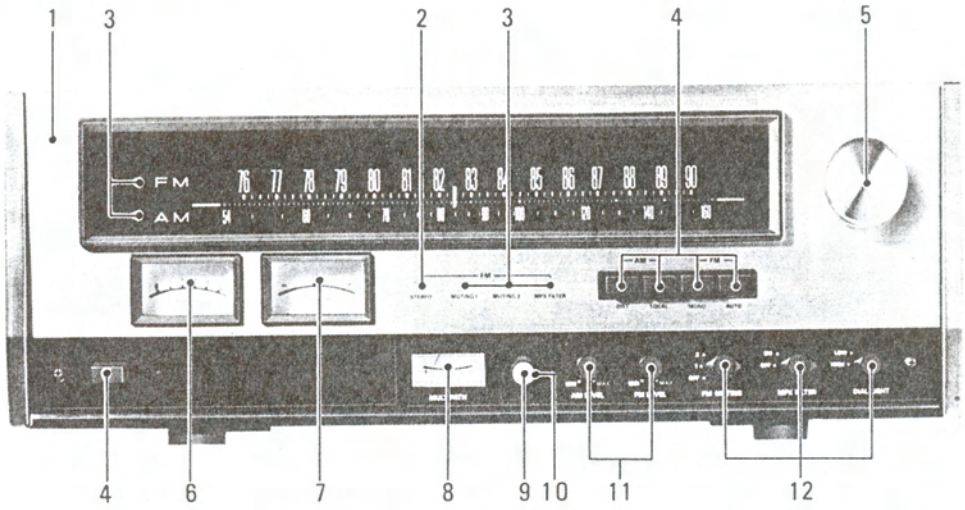
# BLOCK DIAGRAM

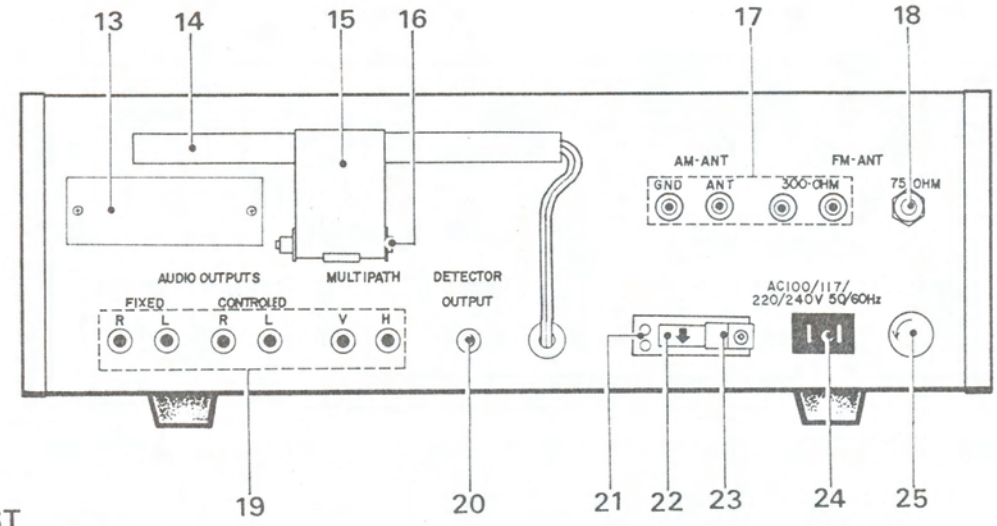


# EXTERNAL VIEW

FRONT




REAR

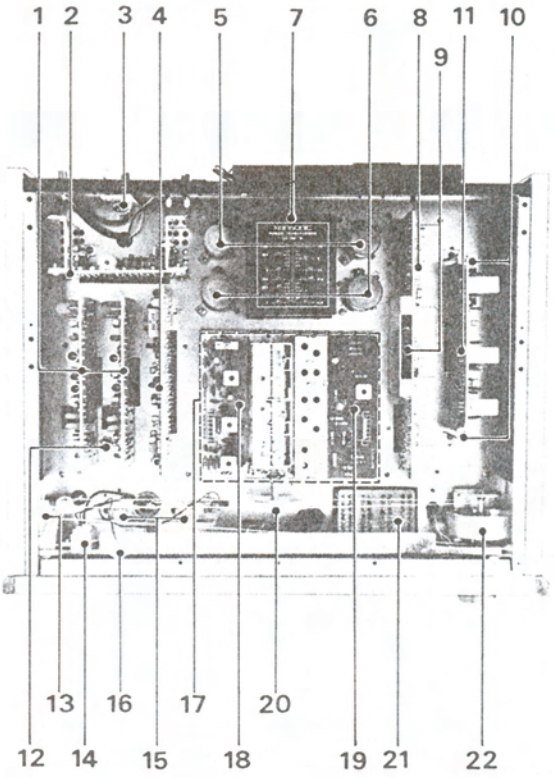



## PARTS LIST

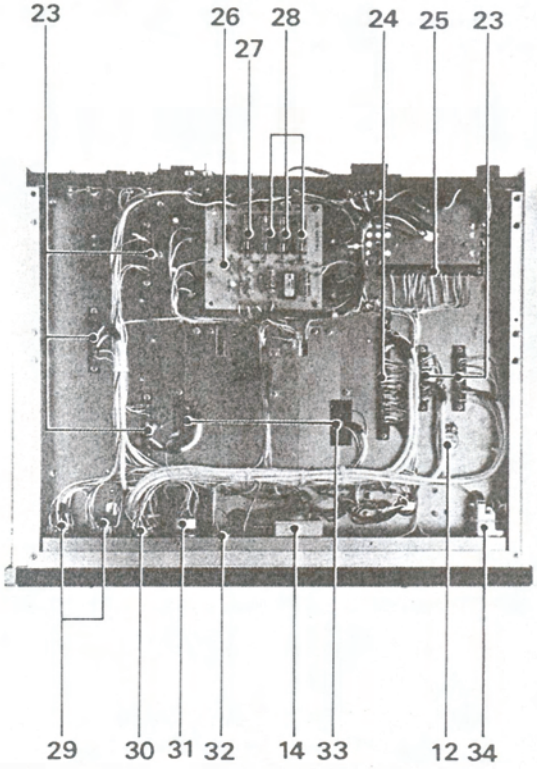
| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| 1 | Front Panel Assembly | 130-0003-02 | |
| 2 | Position Indicator | 173-0201-14 | Red FM STEREO |
| 3 | Position Indicator | 173-0901-14 | White AM FM MUTING 1, 2 MPX FILTER |
| 4 | Push button | 389-5001-14 | for Power Switch Push Button Assembly |
| 5 | Knob | 381-4004-04 | Tuning |
| 6 | SIGNAL Meter | 178-0001-10 | |
| 7 | TUNING Meter | 178-1001-10 | |
| 8 | MULTIPATH Meter | 178-9001-10 | |
| 9 | Magnet | 271-0001-04 | |
| 10 | Push button | 389-1202-04 | with Magnet |
| 11 | Knob | 384-1201-04 | AM, FM LEVEL |
| 12 | Knob | 384-1101-04 | FM MUTING, MPX FILTER DIAL LIGHT |
| 13 | Set Name Plate | 181-0003-14 | |
| 14 | AM Loop Stick Antenna | 508-0001-00 | |
| 15 | Antenna Holder | 249-0001-00 | for AM Loop Stick Antenna |
| 16 | Fixed Bracket | 247-0013-03 | for AM Loop Stick Antenna |
| 17 | Antenna Terminal | 313-0021-00 | for AM, FM 300 Ω |
| 18 | Coaxial Connector, Receptacle | 302-7001-00 | for 75 Ω Coaxial cable |
| 19 | Pin Jack 2-pin | 302-0201-00 | for Output Terminal: FIXED CONTROLED, MULTIPATH |
| 20 | Pin Jack 1-pin | 302-0101-00 | for DETECTOR OUTPUT |
| 21 | Voltage Selector Jack | 302-4001-00 | |
| 22 | Voltage Selector Plug | 301-4001-00 | |
| 23 | Voltage Selector Fixed Bracket | 248-0001-14 | |
| 24 | AC Connector Plug | 301-3201-00 | |
| 25 | Fuse Holder | 306-0101-00 | for MAIN fuse |

# INTERNAL VIEW

## TOP SIDE



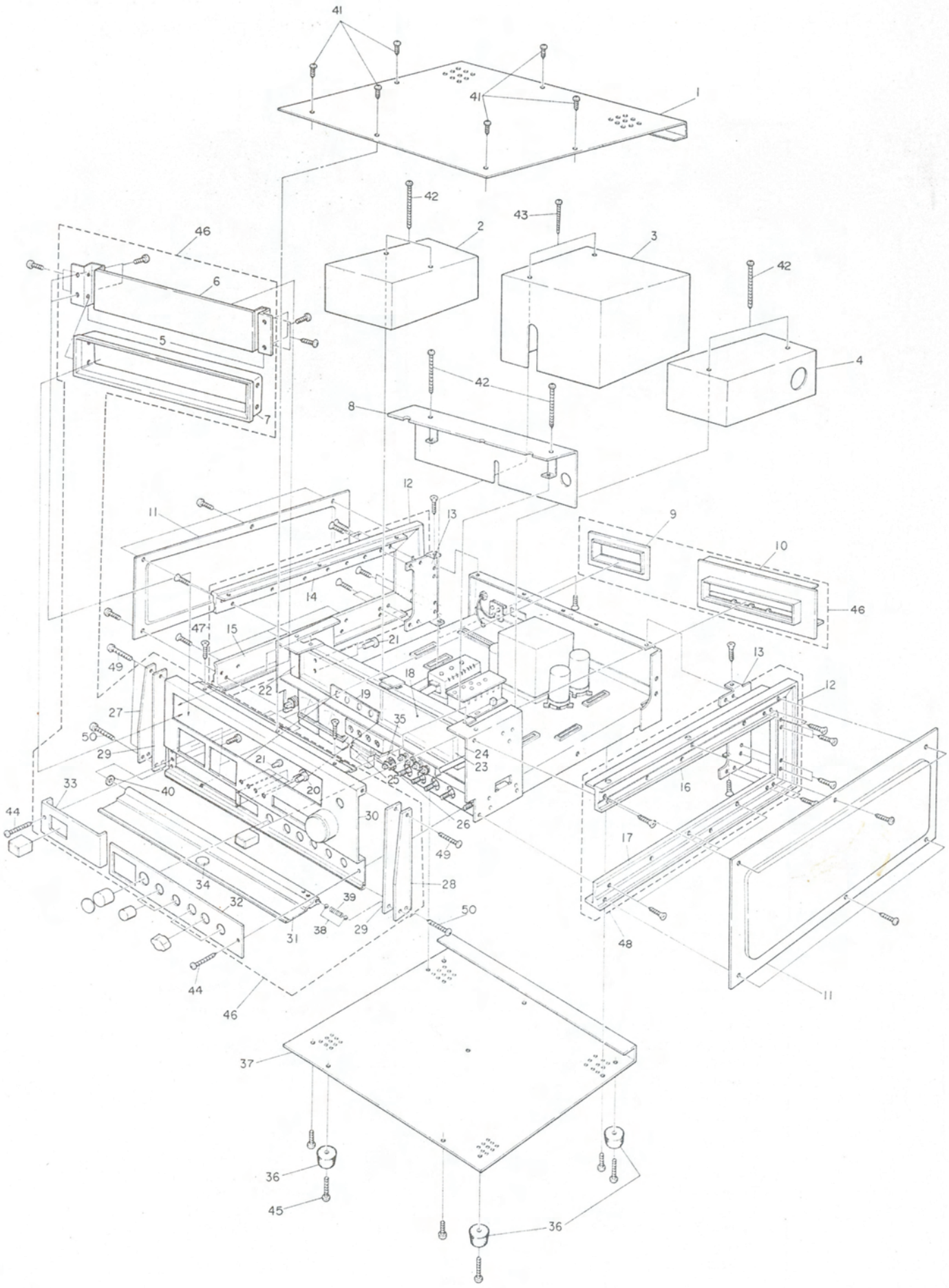

## BOTTOM SIDE




## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| 1 | Filter AMP. Assembly | 714-0003-00 | Outside (L), Inside |
| 2 | Power AMP. Assembly | 719-0003-00 | |
| 3 | Balun Transformer Assembly | 708-0001-00 | |
| 4 | MPX and Sub Circuit Assembly | 706-0001-00 | |
| 5 | Electrolytic Capacitor 3300μF 25WV | CE62W1E332 | C5, 6 |
| 6 | Electrolytic Capacitor 3300μF 35WV | CE62W1V332 | C3, 4 |
| 7 | Power Transformer | 510-0001-00 | T1 |
| 8 | FM IF AMP. Assembly | 703-0001-00 | |
| 9 | Printed Circuit Board Fixed Bracket | 248-0009-04 | for FM IF Assembly |
| 10 | Printed Circuit Board Fixed Bracket | 248-0004-14 | for AM IF Assembly |
| 11 | AM IF AMP. Assembly | 704-0001-00 | |
| 12 | Variable Resistor 500kΩ B | 570-1801-00 | for VR3: MPX separation adjust |
| 13 | Small Pulley | 201-1401-00 | |
| 14 | Pilot Lamp 8V 150 mA | 176-4401-00 | for AM FM position, MULTIPATH STEREO, MUTING, MPX, FILTER |
| 15 | Pilot Lamp 8V 300 mA | 176-5401-00 | for SIGNAL, TUNING meter |
| 16 | Dial pointer Assembly | 206-0001-10 | |
| 17 | AM FM front-end Assembly | 702-0001-00 | |
| 18 | AM, Front-end | 709-1001-00 | AM FM Front-end Assembly |
| 19 | FM, Front-end | 709-0001-00 | AM FM Front-end Assembly |
| 20 | Tuning Capacitor Drum | 200-5401-00 | with Tension Spring |
| 21 | Push button Assembly | 716-0010-00 | |
| 22 | Tuning Shaft Assembly | 203-0001-23 | included Flywheel |
| 23 | Printed Circuit Board Connector | 303-1001-00 | 10-pin |
| 24 | Printed Circuit Board Connector | 303-2201-00 | 22-pin |
| 25 | Printed Circuit Board Connector | 303-1801-00 | 18-pin |
| 26 | Delay Fuse Assembly | 716-0005-00 | |
| 27 | Fuse 3A | 310-0301-00 | Delay Fuse Assembly |
| 28 | Fuse 1A | 310-0101-00 | Delay Fuse Assembly |
| 29 | Rotary Switch | 332-2001-10 | for MPX-FILTER, DIAL LIGHT |
| 30 | Rotary Switch | 332-3002-10 | for FM MUTING |
| 31 | Variable Resistor 10kΩ B×2 | 573-210-00 | for VR2: FM LEVEL |
| 32 | Variable Resistor 10kΩ B | 573-1102-00 | for VR1: AM LEVEL |
| 33 | Connector Plug | 304-0401-00 | for AM, FM Front-end Assembly |
| 34 | Push button Switch | 354-1003-00 | S6: POWER switch |

# EXPLODED VIEW



## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| 1 | Top Plate | 150-0001-02 | |
| 2 | Shield Case (L) | 231-0004-13 | |
| 3 | Front end Shield Case | 231-0006-03 | |
| 4 | Shield Case (R) | 231-0005-03 | |
| 5 | Front Glass Fixed Bracket | 248-0010-04 | |
| 6 | Front Glass | 172-0001-03 | Front Panel Assembly |
| 7 | Dial Frame | 112-6001-00 | Front Panel Assembly |
| 8 | Dial Shield Cover | 230-0005-02 | Front Panel Assembly |
| 9 | Meter Frame | 113-0005-03 | Front Panel Assembly |
| 10 | Push Button Frame | 113-0003-03 | Front Panel Assembly |
| 11 | Side Plate | 151-0001-02 | |
| 12 | Frame (C) | 112-1003-04 | Frame Assembly (L, R) |
| 13 | Frame Fixed Bracket | 244-0001-04 | Frame Assembly (L, R) |
| 14 | Frame (A) | 112-1001-13 | Frame Assembly(L):for Upper |
| 15 | Frame (B) | 112-1002-13 | Frame Assembly(L): for Bottom |
| 16 | Frame (D) | 112-1004-13 | Frame Assembly(R): for Upper |
| 17 | Frame (E) | 112-1005-13 | Frame Assembly(R): for Bottom |
| 18 | Dial Glass | 175-2001-03 | |
| 19 | Position Indicator Fixed Bracket | 248-0011-04 | Front panel Assembly |
| 20 | Position Indicator | 173-0901-04 | |
| 21 | Position Indicator | 173-0201-04 | Front panel Assembly: Red for MPX |
| 22 | Dial Glass Fixed Bracket (L) | 248-0005-04 | Fixed for Left Side } *Dial Glass Holder |
| 23 | Dial Glass Fixed Bracket (R) | 248-0006-04 | Fixed for Right Side } 249-0003-14 |
| 24 | Pilot Lamp | 176-2301-00 | for Dial Light 300mA 6, 3V |
| 25 | Meter Fixed Bracket (A) | 248-0007-04 | for SIGNAL, TUNING meter |
| 26 | Meter Fixed Bracket (B) | 248-0008-04 | for MULTIPATH |
| 27 | Panel End Cap (L) | 132-0003-00 | Front panel Assembly : for Left Side |
| 28 | Panel End Cap (R) | 132-0004-00 | Front panel Assembly : for Right Side |
| 29 | Panel End Spacer | 250-1001-14 | Front panel Assembly |
| 30 | Front Panel | 131-0003-02 | Front panel Assembly |
| 31 | Sub Panel | 134-0003-12 | Front panel Assembly |
| 32 | Panel Name Plate | 180-1003-14 | Front panel Assembly |
| 33 | Meter Cover | 254-2001-03 | Front panel Assembly Cach |
| 34 | Cacher | 272-0001-04 | Front panel Assembly for Sub Panel Magnet |
| 35 | Push button Switch | 354-1201-00 | for Sub Panel Magnet Opener Opener |
| 36 | Rubber Foot | 238-0001-04 | |
| 37 | Bottom Plate | 155-0001-02 | |
| 38 | Ball Bearing | 220-0301-00 | Front panel Assembly |
| 39 | Coil Spring | 285-1001-04 | Front panel Assembly |
| 40 | Nylon Washer | 637-1031-05 | Front panel Assembly |
| 41 | Binding Head B type Selftapping Screw | 600-0306-02 | 3x6mm Fixed for Top, Side, Button, Plats |
| 42 | Pan Head ISO Metric Screw | 614-0390-01 | 3x90mm Fixed for Shield Cover |
| 43 | Pan Head ISO Metric Screw | 600-0375-01 | 3x75mm Fixed for Shield Cover |
| 44 | Binding Head B type Self Tapping Screw | 600-0310-00 | 3x10mm Fixed for Front Panel Assembly |
| 45 | Pan Head ISO metric Screw | 600-0414-01 | 4x10mm Fixed for Plastic Foot |
| 46 | Front Panel Assembly | 130-0003-00 | |
| 47 | Frame Assembly(L) | 112-0001-02 | |
| 48 | Frame Assembly(R) | 112-0002-02 | |
| 49 | Pan Head B type Self Tapping Screw | 610-0314-01 | Fixed for Front-end Cap Rear Side |
| 50 | Pan Head ISO Metric Screw | 615-0312-01 | Front Panel Assembly: 3x12mm Fixed for Panel End Cap Front Side |

# SUPPLEMENT

| Description | Part No. | Remarks |
|---|---|---|
| Tuning Shaft Assembly (New type) | 203-0002-03 | |
| Fixed Bracket | 247-0062-04 | |
| Tuning Shaft Assembly (Old type) | 203-0001-23 | |
| Push Switch for | | |
| POWER | 354-1003-00 | |
| Sub Panel Opener | 354-1201-01 | |
| Push Switch Assembly | 354-4002-00 | |
| Pilot Lamp for | | |
| Dial Glass | 176-2301-00 | 300mA/6.3V |
| Indicator | 176-4401-00 | 150mA/8V |
| Meter | 176-5401-00 | 300mA/8V |
| Rear Panel | 135-0003-32 | |
| Dial Back Plate | 180-9004-03 | |
| Silicon Diode | 1N60 | D1 |

| Description | Part No. | Remarks |
|---|---|---|
| Electrolytic Capacitor 3300μF/35WV | CE62W1V332 | C3, 4 |
| Electrolytic Capacitor 3300μF/25WV | CE62W1E332 | C5, 6 |
| Ceramic Capacitor 0.047μF$^{+80}_{-20}$% 50WV | CK45F1H473Z | C8, 9 |
| Power Supply Cord | 680-1201-00 | 2-Conductor |
| Power Supply Cord for UL & CSA | 680-2201-00 | 2-Conductor |
| Power Supply Cord for CEE, VDE etc. | 680-3401-00 | 3-Conductor |
| Owners Manual | 820-2003-10 | |
| Shipping Carton | | |
| Outer Carton | 800-0003-10 | |
| Inner Carton | 801-0003-10 | |
| Front Protector | 803-0010-00 | |
| Rear Protector | 803-0009-00 | |
| For Power Supply Cord | 801-0010-03 | |

## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| 1 | Top Plate | 150-0001-02 | |
| 2 | Shield Case (L) | 231-0004-13 | |
| 3 | Front end Shield Case | 231-0006-03 | |
| 4 | Shield Case (R) | 231-0005-03 | |
| 5 | Front Glass Fixed Bracket | 248-0010-04 | |
| 6 | Front Glass | 172-0001-03 | Front Panel Assembly |
| 7 | Dial Frame | 112-6001-00 | Front Panel Assembly |
| 8 | Dial Shield Cover | 230-0005-02 | Front Panel Assembly |
| 9 | Meter Frame | 113-0005-03 | Front Panel Assembly |
| 10 | Push Button Frame | 113-0003-03 | Front Panel Assembly |
| 11 | Side Plate | 151-0001-02 | |
| 12 | Frame (C) | 112-1003-04 | Frame Assembly (L, R) |
| 13 | Frame Fixed Bracket | 244-0001-04 | Frame Assembly (L, R) |
| 14 | Frame (A) | 112-1001-13 | Frame Assembly(L):for Upper |
| 15 | Frame (B) | 112-1002-13 | Frame Assembly(L): for Bottom |
| 16 | Frame (D) | 112-1004-13 | Frame Assembly(R): for Upper |
| 17 | Frame (E) | 112-1005-13 | Frame Assembly(R): for Bottom |
| 18 | Dial Glass | 175-2001-03 | |
| 19 | Position Indicator Fixed Bracket | 248-0011-04 | Front panel Assembly |
| 20 | Position Indicator | 173-0901-04 | |
| 21 | Position Indicator | 173-0201-04 | Front panel Assembly: Red for MPX |
| 22 | Dial Glass Fixed Bracket (L) | 248-0005-04 | Fixed for Left Side } *Dial Glass Holder |
| 23 | Dial Glass Fixed Bracket (R) | 248-0006-04 | Fixed for Right Side } 249-0003-14 |
| 24 | Pilot Lamp | 176-2301-00 | for Dial Light 300mA 6, 3V |
| 25 | Meter Fixed Bracket (A) | 248-0007-04 | for SIGNAL, TUNING meter |
| 26 | Meter Fixed Bracket (B) | 248-0008-04 | for MULTIPATH |
| 27 | Panel End Cap (L) | 132-0003-00 | Front panel Assembly : for Left Side |
| 28 | Panel End Cap (R) | 132-0004-00 | Front panel Assembly : for Right Side |
| 29 | Panel End Spacer | 250-1001-14 | Front panel Assembly |
| 30 | Front Panel | 131-0003-02 | Front panel Assembly |
| 31 | Sub Panel | 134-0003-12 | Front panel Assembly |
| 32 | Panel Name Plate | 180-1003-14 | Front panel Assembly |
| 33 | Meter Cover | 254-2001-03 | Front panel Assembly Cach |
| 34 | Cacher | 272-0001-04 | Front panel Assembly for Sub Panel Magnet |
| 35 | Push button Switch | 354-1201-00 | for Sub Panel Magnet Opener Opener |
| 36 | Rubber Foot | 238-0001-04 | |
| 37 | Bottom Plate | 155-0001-02 | |
| 38 | Ball Bearing | 220-0301-00 | Front panel Assembly |
| 39 | Coil Spring | 285-1001-04 | Front panel Assembly |
| 40 | Nylon Washer | 637-1031-05 | Front panel Assembly |
| 41 | Binding Head B type Selftapping Screw | 600-0306-02 | 3x6mm Fixed for Top, Side, Button, Plats |
| 42 | Pan Head ISO Metric Screw | 614-0390-01 | 3x90mm Fixed for Shield Cover |
| 43 | Pan Head ISO Metric Screw | 600-0375-01 | 3x75mm Fixed for Shield Cover |
| 44 | Binding Head B type Self Tapping Screw | 600-0310-00 | 3x10mm Fixed for Front Panel Assembly |
| 45 | Pan Head ISO metric Screw | 600-0414-01 | 4x10mm Fixed for Plastic Foot |
| 46 | Front Panel Assembly | 130-0003-00 | |
| 47 | Frame Assembly(L) | 112-0001-02 | |
| 48 | Frame Assembly(R) | 112-0002-02 | |
| 49 | Pan Head B type Self Tapping Screw | 610-0314-01 | Fixed for Front-end Cap Rear Side |
| 50 | Pan Head ISO Metric Screw | 615-0312-01 | Front Panel Assembly: 3x12mm Fixed for Panel End Cap Front Side |

# SUPPLEMENT

| Description | Part No. | Remarks |
|---|---|---|
| Tuning Shaft Assembly (New type) | 203-0002-03 | |
| Fixed Bracket | 247-0062-04 | |
| Tuning Shaft Assembly (Old type) | 203-0001-23 | |
| Push Switch for | | |
| POWER | 354-1003-00 | |
| Sub Panel Opener | 354-1201-01 | |
| Push Switch Assembly | 354-4002-00 | |
| Pilot Lamp for | | |
| Dial Glass | 176-2301-00 | 300mA/6.3V |
| Indicator | 176-4401-00 | 150mA/8V |
| Meter | 176-5401-00 | 300mA/8V |
| Rear Panel | 135-0003-32 | |
| Dial Back Plate | 180-9004-03 | |
| Silicon Diode | 1N60 | D1 |

| Description | Part No. | Remarks |
|---|---|---|
| Electrolytic Capacitor 3300μF/35WV | CE62W1V332 | C3, 4 |
| Electrolytic Capacitor 3300μF/25WV | CE62W1E332 | C5, 6 |
| Ceramic Capacitor 0.047μF $^{+80}_{-20}$% 50WV | CK45F1H473Z | C8, 9 |
| Power Supply Cord | 680-1201-00 | 2-Conductor |
| Power Supply Cord for UL & CSA | 680-2201-00 | 2-Conductor |
| Power Supply Cord for CEE, VDE etc. | 680-3401-00 | 3-Conductor |
| Owners Manual | 820-2003-10 | |
| Shipping Carton | | |
| Outer Carton | 800-0003-10 | |
| Inner Carton | 801-0003-10 | |
| Front Protector | 803-0010-00 | |
| Rear Protector | 803-0009-00 | |
| For Power Supply Cord | 801-0010-03 | |

# MISCELLANEOUS

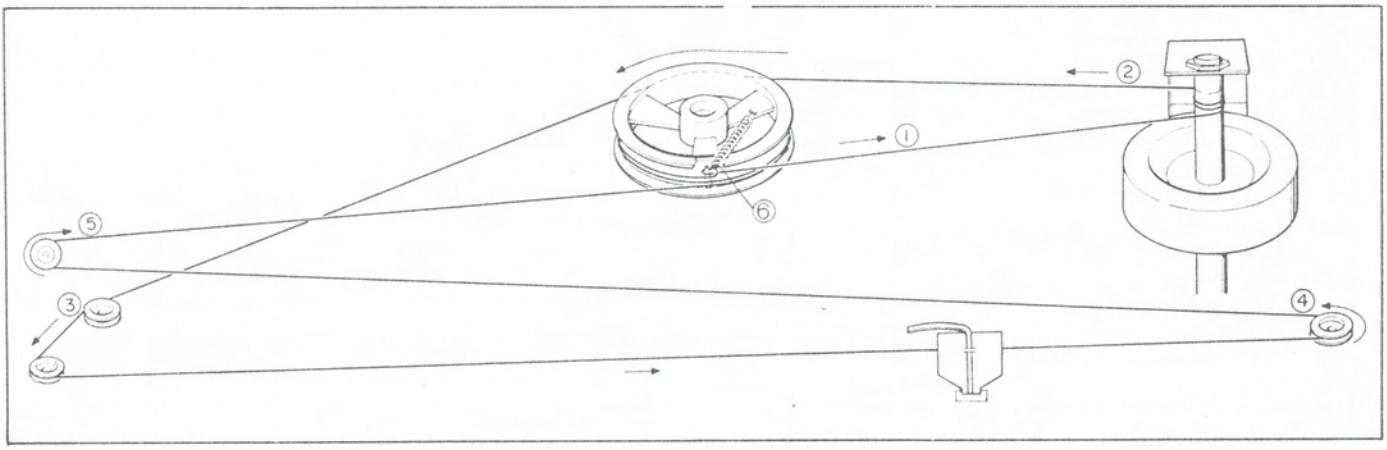
## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| | Meter Filter | 179-0004-24 | for MULTIPATH |
| | Meter Filter | 179-0016-04 | for SIGNAL TUNING meter |
| | Dial Glass Filter | 179-0017-04 | for Dial Glass |
| | Tuning Shaft Assembly | 203-0001-23 | |
| | Dial String | 210-0001-00 | |
| | Pulley Bushing | 221-0601-04 | |
| | Coaxial Connector Plug | 301-7001-00 | for 75 Ω Coaxial cable |
| | Pilot Lamp Socket | 305-2201-00 | |
| | Fuse 0.5A SLO-BLO | 310-1051-00 | for Main fuse at 100V, 117V |
| | Fuse 1/4A SLO-BLO | 310-1141-00 | for Main fuse at 220V, 240 V |
| | Terminal Strip | 314-0101-00 | |
| | Lug Strip | 315-1011-00 | |
| | Lug Strip | 315-2021-00 | |
| | Power Supply Cord | 680-1201-00 | |
| | Stereo Cord | 685-0402-00 | 4-plug |
| | Carbon Film Resistor 8.2kΩ ±5% 1/2W | RD142HA822J | R1 |
| | Carbon Film Resistor 13kΩ ±5% 1/2W | RD142HA133J | R2 |
| | Carbon Film Resistor 100kΩ ±5% 1/2W | RD142HA104J | R4 |
| | Metal Film Resistor 3.3Ω ±5% 1W | RN143AA3R3J | R3 |
| | Electrolytic Capacitor 4.7μF 35WV | CE02W1V4R7 | C2 |
| | Mylar Film Capacitor 82000pF ±5% 50WV | CQ93M1H823J | C1 |
| | Mylar Film Capacitor 0.01 μF 250 WV | CQ93M2E103MUL | C7 |
| | Balun Transformer | 509-0001-00 | |
| | Carbon Film Resistor 10Ω ±5% 1/2W | RD142H100J | R5 |

# HOW TO RE-STRING THE DIAL MECHANISM

**FOLLOW THE DIRECTIONS BELOW IN THE ORDER OUTLINED.**

1. Prepare a dial string about 2.5 meters long (8 feet 6 inches).
2. Tie one side of the string to the tension spring, leaving about 10 cm (4 inches) of the string end free.
3. Set the tuning capacitor to fully open position (minimum capacity, plates unmeshed). Then lock the tuning capacitor drum to the shaft at a point where the grooved slit for hooking the tension spring (see diagram) is about 10 degrees to the left of the top of the drum.
4. Hook the free end of the tension spring to the hole in one of the drum spokes as shown. Now fully extend the tension spring and hook its stringed end to the grooved slit.
5. Lead the string in the direction of 1 (see diagram), wind it three times around the tuning shaft as shown, and guide the string along 2 to 5, passing it through the bottom groove of the variable capacitor drum on the way.
6. The string should then be led back to the top side of the drum and wound around it twice just behind the string from 5. Then tie the two ends of the string together.
7. Unhook the stringed end of the tension spring from the grooved slit. This will cause the tension spring to contract and tighten up the string circuit.
8. Set the variable capacitor to maximum capacity (plates fully meshed) and temporarily line up the dial pointer with the marker at the left hand of the dial glass.
9. Tune in a station and then permanently attach the pointer to the string so that it indicates the frequency of that station accurately.



# HOW TO REPLACE THE METERS

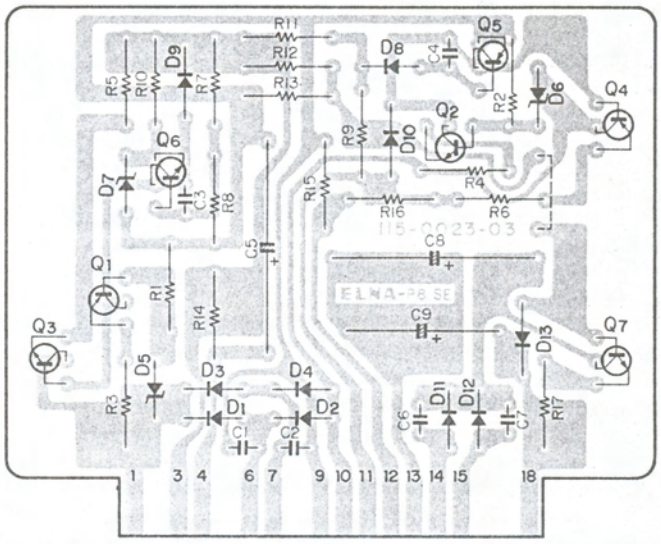
When necessary, the SIGNAL, TUNING or MULTI-PATH meters can be removed for repair or replacement as follows.

1. Remove all knobs from the front panel of the T-100. (TUNING plus 5 others on the sub-panel).
2. Remove the Top Plate. (Do not misplace the nylon washers).
3. Remove one screw each from the left and right side panels. These screws are located at the upper end, adjacent to the front side. These are the screws that hold up the front panel assembly.
4. Remove the two front panel screws No. 44 (Exploded view: page 4) which hold the front panel assembly in place from the frontside.
5. Remove the two screws that are affixed to the front panel assembly from the bottomside.
6. Now remove the front panel assembly itself.
7. Remove the metal plate holding the meter in place. This is No. 25 for the Signal meter and No. 26 for the Multipath meter on the assembly Exploded view on page 4.
8. Replace or repair meter.
9. Reattach meter and front panel assembly in reverse order, as explained above, starting from step 7.

# POWER SUPPLY ASSEMBLY (719-0003-00)

## PRINTED CIRCUIT BOARD

*Printed circuit board as seen from the reverse side.



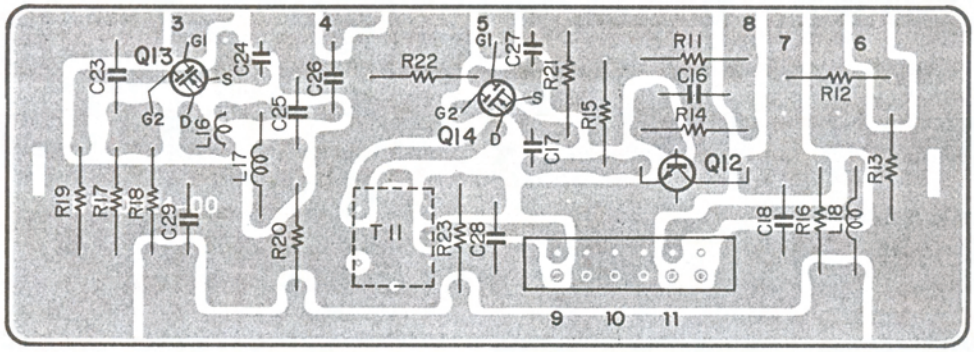

## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| | Heatsink | 240-1006-04 | for 2SB435, 2SD235 |
| | Transistor Insurator | 381-0201-00 | for 2SB435, 2SD235 |
| | Transistor Insuration washer | 318-1102-00 | for 2SB435, 2SD235 |
| Q1, 5 | Transistor PNP | 2SA661, O. Y. or GR | |
| Q4 | Transistor PNP | 2SB435, O or Y | |
| Q2, 6 | Transistor NPN | 2SC1166, O. Y or GR | |
| Q3 | Transistor NPN | 2SD235O or Y | |
| D1, 2, 3, 4, 11, 12 | Silicon Diode | 1BZ61 | |
| D8 | Silicon Diode | 1S1555 | |
| D5, 6 | Silicon Diode | XZ-053 | |
| D7 | Zener Diode | XZ-060 | |
| D9, 10, | Silicon Varistor | SV-02 | |
| R14 | Carbon Film Resistor 150Ω ±5% 1/2W | RD142HA151J | |
| R3 | Carbon Film Resistor 560Ω ±5% 1/2W | RD142HA561J | |
| R12 | Carbon Film Resistor 620Ω ±5% 1/2W | RD142HA621J | |
| R4, 10, 13 | Carbon Film Resistor 1kΩ ±5% 1/2W | RD142HA102J | |
| R8 | Carbon Film Resistor 1.5kΩ ±5% 1/2W | RD142HA152J | |
| R7 | Carbon Film Resistor 2kΩ ±5% 1/2W | RD142HA202J | |
| R1, 2 | Carbon Film Resistor 2.4kΩ ±5% 1/2W | RD142HA242J | |
| R9 | Carbon Film Resistor 3kΩ ±5% 1/2W | RD142HA302J | |
| R11 | Carbon Film Resistor 3.3kΩ ±5% 1/2W | RD142HA332J | |
| R15 | Carbon Film Resistor 6.2kΩ ±5% 1/2W | RD142HA622J | |
| R16 | Carbon Film Resistor 10kΩ ±5% 1/2W | RD142HA103J | |
| R5 | Metal Film Resistor 2.2Ω ±5% 1W | RN143AA2R2J | |
| R6, | Metal Film Resistor 3.3Ω ±5% 1W | RN143AA3R3J | R18 Metal Film Resistor 18Ω ±5% 1W RN143AA180J |
| C9 | Electrolytic Capacitor 330μF 10WV | CE02W1A331 | |
| C8 | Electrolytic Capacitor 1000μF 10WV | CE02W1A102 | |
| C5 | Electrolytic Capacitor 1000μF 16WV | CE02W1C102 | |
| C1, 2, 3, 4, 6, 7 | Ceramic Capacitor 10000pF +80%, −20% 50WV | CK45F1H103Z | |

# AM FM FRONT-END (702-0002-00)

## FM PRINTED CIRCUIT BOARD (709-0001-00)

*Printed circuit board as seen from the reverse side.

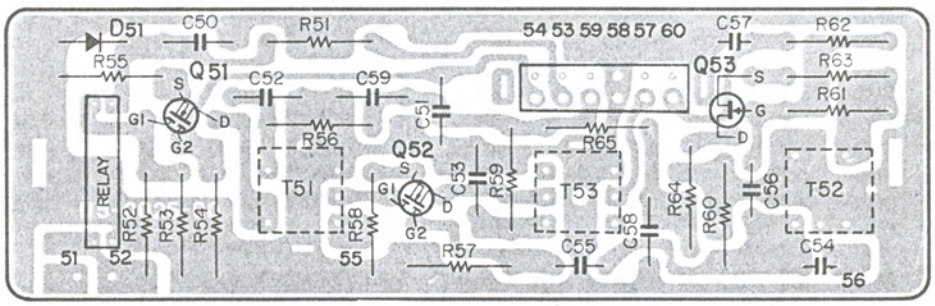



## PARTS LIST

| Ref. No. | Description | | | | Part No. | Remarks |
|---|---|---|---|---|---|---|
| Q13 | MOS FET | | | | 3SK41 | |
| Q14 | MOS FET | | | | 3SK35GR | |
| Q11, 12 | Transistor | | | | 2SC785-R | |
| R19 | Carbon Film Resistor | 22Ω | ±5% | 1/2W | RD142HA220J | |
| R22 | Carbon Film Resistor | 220Ω | ±5% | 1/2W | RD142HA221J | |
| R20, 23 | Carbon Film Resistor | 470Ω | ±5% | 1/2W | RD142HA471J | |
| R16 | Carbon Film Resistor | 460Ω | ±5% | 1/2W | RD142HA561J | |
| R11, 15 | Carbon Film Resistor | 1kΩ | ±5% | 1/2W | RD142HA102J | |
| R17 | Carbon Film Resistor | 4.7kΩ | ±5% | 1/2W | RD142HA472J | |
| R14 | Carbon Film Resistor | 8.2kΩ | ±5% | 1/2W | RD142HA822J | |
| R13 | Carbon Film Resistor | 10kΩ | ±5% | 1/2W | RD142HA103J | |
| R12, 18 | Carbon Film Resistor | 12kΩ | ±5% | 1/2W | RD142HA123J | |
| R21 | Carbon Film Resistor | 100kΩ | ±5% | 1/2W | RD142HA104J | |
| C31 | Minic Capacitor | 0.68pF | | | | |
| C30 | Minic Capacitor | 1pF | | | | |
| C12, 16 | Ceramic Capacitor | 10pF | ±0.5pF | 50WV | CC45CH1H100D | Black (TC) |
| C14 | Ceramic Capacitor | 12pF | ±5% | 50WV | CC45CH1H120J | Black (TC) |
| C11 | Ceramic Capacitor | 12pF | ±5% | 50WV | CC45PH1H120J | Orange (TC) |
| C20, 21, 22 | Ceramic Capacitor | 15pF | ±5% | 50WV | CC45RH1H150J | Yellow (TC) |
| C17 | Ceramic Capacitor | 22pF | ±5% | 50WV | CC45CH1H220J | Black (TC) |
| C19 | Ceramic Capacitor | 22pF | ±5% | 50WV | CC45RH1H220J | Yellow (TC) |
| C13 | Ceramic Capacitor | 47pF | ±5% | 50WV | CC45CH1H470J | Black (TC) |
| C24, 26, 27 | Ceramic Capacitor | 0.01μF | +80%, −20% | 50WV | CK45F1H103Z | |
| C18, 23, 25, 28, 29 | Ceramic Capacitor | 0.022μF | +80%, −20% | 50WV | CK45F1H223Z | |
| T11 | IFT | | | | 500-0001-00 | |
| L16 | Choke Coil | 0.18μH | | | 506-0002-00 | |
| L17 | Choke Coil | 0.86μH | | | 506-1001-00 | |
| L18 | Choke Coil | 1.0μH | | | 506-1002-00 | |
| | Printed Circuit Board Assembly | | | | 709-0001-00 | with Parts |

## AM PRINTED CIRCUIT BOARD (709-1001-00)

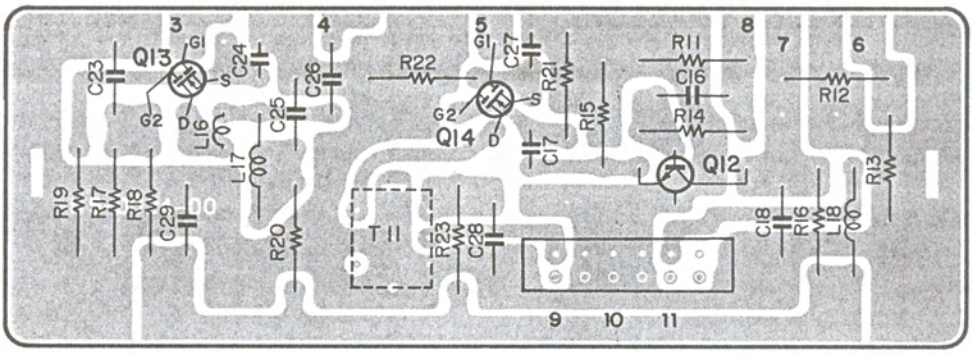
*Printed circuit board as seen from the reverse side.



# AM FM FRONT-END (702-0002-00)

## FM PRINTED CIRCUIT BOARD (709-0001-00)

*Printed circuit board as seen from the reverse side.

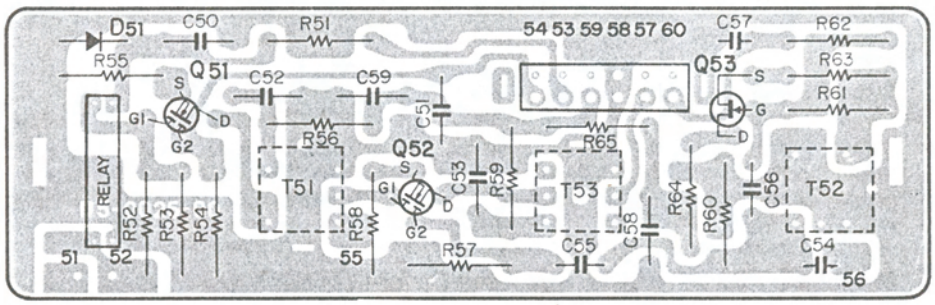



## PARTS LIST

| Ref. No. | Description | | | | Part No. | Remarks |
|---|---|---|---|---|---|---|
| Q13 | MOS FET | | | | 3SK41 | |
| Q14 | MOS FET | | | | 3SK35GR | |
| Q11, 12 | Transistor | | | | 2SC785-R | |
| R19 | Carbon Film Resistor | 22Ω | ±5% | 1/2W | RD142HA220J | |
| R22 | Carbon Film Resistor | 220Ω | ±5% | 1/2W | RD142HA221J | |
| R20, 23 | Carbon Film Resistor | 470Ω | ±5% | 1/2W | RD142HA471J | |
| R16 | Carbon Film Resistor | 460Ω | ±5% | 1/2W | RD142HA561J | |
| R11, 15 | Carbon Film Resistor | 1kΩ | ±5% | 1/2W | RD142HA102J | |
| R17 | Carbon Film Resistor | 4.7kΩ | ±5% | 1/2W | RD142HA472J | |
| R14 | Carbon Film Resistor | 8.2kΩ | ±5% | 1/2W | RD142HA822J | |
| R13 | Carbon Film Resistor | 10kΩ | ±5% | 1/2W | RD142HA103J | |
| R12, 18 | Carbon Film Resistor | 12kΩ | ±5% | 1/2W | RD142HA123J | |
| R21 | Carbon Film Resistor | 100kΩ | ±5% | 1/2W | RD142HA104J | |
| C31 | Minic Capacitor | 0.68pF | | | | |
| C30 | Minic Capacitor | 1pF | | | | |
| C12, 16 | Ceramic Capacitor | 10pF | ±0.5pF | 50WV | CC45CH1H100D | Black (TC) |
| C14 | Ceramic Capacitor | 12pF | ±5% | 50WV | CC45CH1H120J | Black (TC) |
| C11 | Ceramic Capacitor | 12pF | ±5% | 50WV | CC45PH1H120J | Orange (TC) |
| C20, 21, 22 | Ceramic Capacitor | 15pF | ±5% | 50WV | CC45RH1H150J | Yellow (TC) |
| C17 | Ceramic Capacitor | 22pF | ±5% | 50WV | CC45CH1H220J | Black (TC) |
| C19 | Ceramic Capacitor | 22pF | ±5% | 50WV | CC45RH1H220J | Yellow (TC) |
| C13 | Ceramic Capacitor | 47pF | ±5% | 50WV | CC45CH1H470J | Black (TC) |
| C24, 26, 27 | Ceramic Capacitor | 0.01μF | +80%, −20% | 50WV | CK45F1H103Z | |
| C18, 23, 25, 28, 29 | Ceramic Capacitor | 0.022μF | +80%, −20% | 50WV | CK45F1H223Z | |
| T11 | IFT | | | | 500-0001-00 | |
| L16 | Choke Coil | 0.18μH | | | 506-0002-00 | |
| L17 | Choke Coil | 0.86μH | | | 506-1001-00 | |
| L18 | Choke Coil | 1.0μH | | | 506-1002-00 | |
| | Printed Circuit Board Assembly | | | | 709-0001-00 | with Parts |

## AM PRINTED CIRCUIT BOARD (709-1001-00)

*Printed circuit board as seen from the reverse side.



## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| Q51, 52 | MOS FET | 3SK35-GR | |
| Q53 | MOS FET | 2SK30A-O | |
| D51 | Silicon Diode | 1S1555 | |
| R55, 56, 58, 59 | Carbon Film Resistor 220Ω ±5% 1/2W | RD142HA221J | |
| R51 | Carbon Film Resistor 820Ω ±5% 1/2W | RD142HA821J | |
| R57 | Carbon Film Resistor 22kΩ ±5% 1/2W | RD142HA223J | |
| R60 | Carbon Film Resistor 56kΩ ±5% 1/2W | RD142HA563J | |
| R61 | Carbon Film Resistor 100kΩ ±5% 1/2W | RD142HA104J | |
| R52 | Carbon Film Resistor 330kΩ ±5% 1/2W | RD142HA334J | |
| R53, 54 | Carbon Film Resistor 1MΩ ±5% 1/2W | RD142HA105J | |
| C55 | Ceramic Capacitor 3pF ±0.25pF 50WV | CC45CH1H030C | Black (TC) |
| C57 | Ceramic Capacitor 0.001μF +80%, −20% 50WV | CK45F1H103Z | |
| C50, 51, 52, 53, 58, 59 | Ceramic Capacitor 0.047μF +80%, −20% 50WV | CK45F1H473Z | |
| C54 | Mica Capacitor 390pF ±5% 100WV | CM93D2A391J | |
| C56 | Mica Capacitor 690pF ±5% 100WV | CM93D2A681J | |
| TCA-3 | Trimmer Capacitor 20pF | 552-2001-00 | OSC |
| T51 | RF Coil | 502-3001-00 | |
| T52 | OSC Coil | 501-3001-00 | |
| T53 | IFT | 500-3001-00 | |
| L51 | Choke Coil 1μH | 506-1002-00 | |
| | Reed Relay | 363-1101-00 | |
| | Connector Plug | 304-0401-00 | |
| | Connector Jack | 304-5401-00 | |
| | Connector Holder | 248-0012-00 | Connector Jack Stopper with Parts |
| | Printed Circuit Board Assembly | 709-1001-00 | |

# DELAY FUSE ASSEMBLY (716-0005-00)

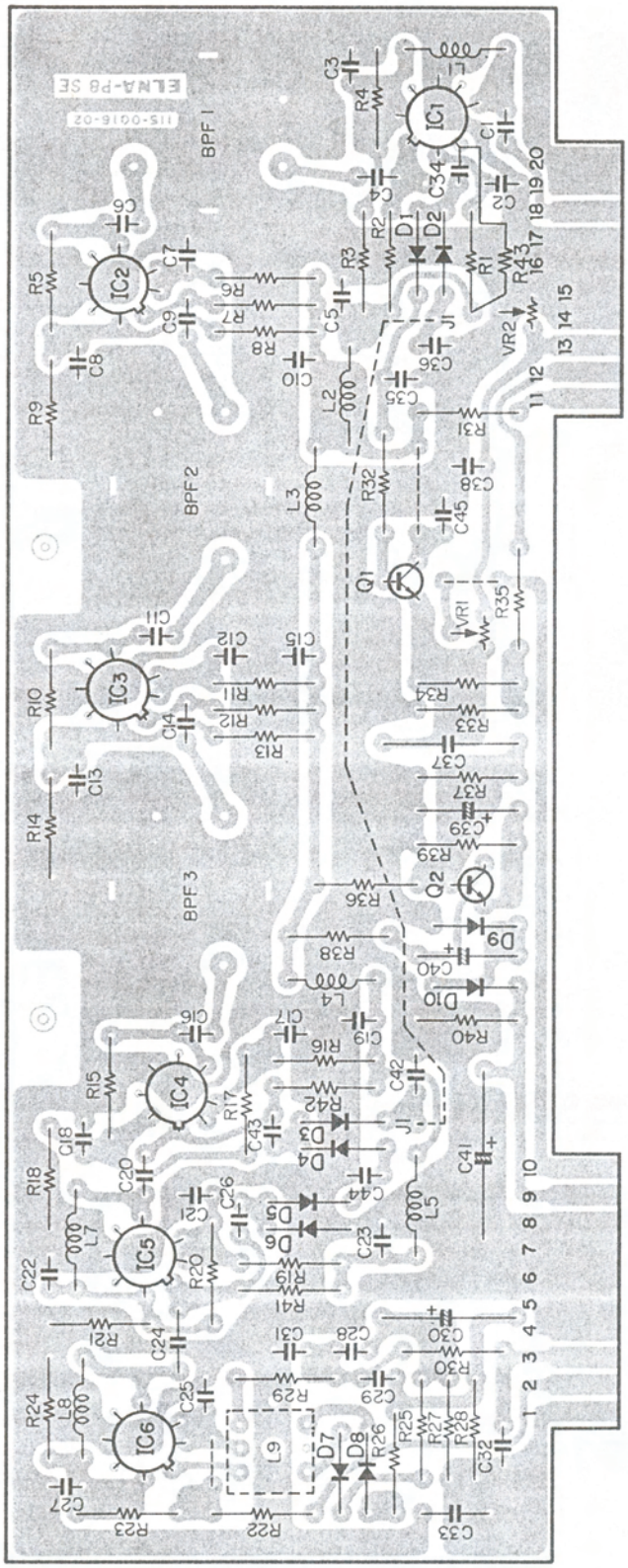
## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| | Fuse Holder | 306-1001-00 | |
| F1, 2, 3 | Fuse 1A | 310-0101-00 | |
| F4 | Fuse 3A | 310-0301-00 | |
| | Reed Relay | 363-1201-00 | |
| Q1, 2 | Transistor NPN | 2SC1416GR or BL | |
| D1, 2 | Silicon Diode | 1S1555 | |
| R2 | Carbon Film Resistor 47Ω ±5% 1/2W | RD142HA470J | |
| R6 | Carbon Film Resistor 150Ω ±5% 1/2W | RD142HA151J | |
| R3 | Carbon Film Resistor 1.2kΩ ±5% 1/2W | RD142HA122J | |
| R4, 5 | Carbon Film Resistor 10kΩ ±5% 1/2W | RD142HA103J | |
| R1 | Carbon Film Resistor 47kΩ ±5% 1/2W | RD142HA473J | |
| R8 | Carbon Film Resistor 560Ω ±5% 1/2W | RD142HA561J | |
| R7 | Metal Film Resistor 1.0Ω ±5% 1/2W | RN143AA1ROJX | |
| C2 | Electrolytic Capacitor 220μF 16WV | CE02WIC221 | |
| C1 | Electrolytic Capacitor 220μF 6.3WV | CE02WOJ221 | |

# FM IF and METER CIRCUIT ASSEMBLY (703-0001-00)

## PRINTED CIRCUIT BOARD

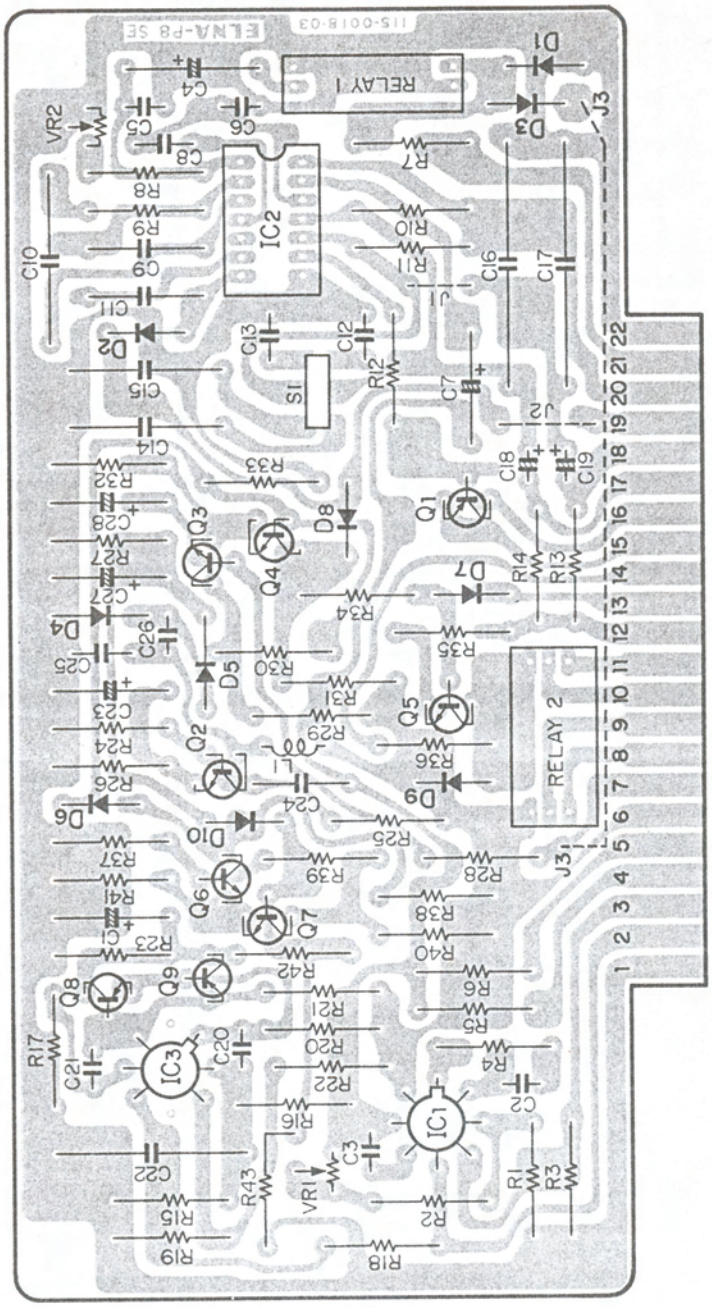
*Printed circuit board as seen from the reverse side.



# MPX and SUBCIRCUIT ASSEMBLY (706-0001-00)

## PRINTED CIRCUIT BOARD

*Printed circuit board as seen from the reverse side.




## PARTS LIST

| Ref. No. | Description | | Part No. | Remarks |
|---|---|---|---|---|
| | IC Socket | | 300-1141-00 | for MC1310P |
| S1 | Slide Switch | | 350-0201-00 | for DEEMPHASIS |
| RELAY1 | Reed Relay | | 363-1101-00 | for MPX |
| RELAY2 | Reed Relay | | 363-1201-00 | for MUTING |
| L1 | Choke Coil | 1mH | 506-1021-00 | |
| VR1 | Potentiometer | 10kΩ | 581-0141-00 | for FM output adjust |
| VR2 | Potentiometer | 5kΩ | 583-0531-00 | for 19kHz adjust |

## PARTS LIST

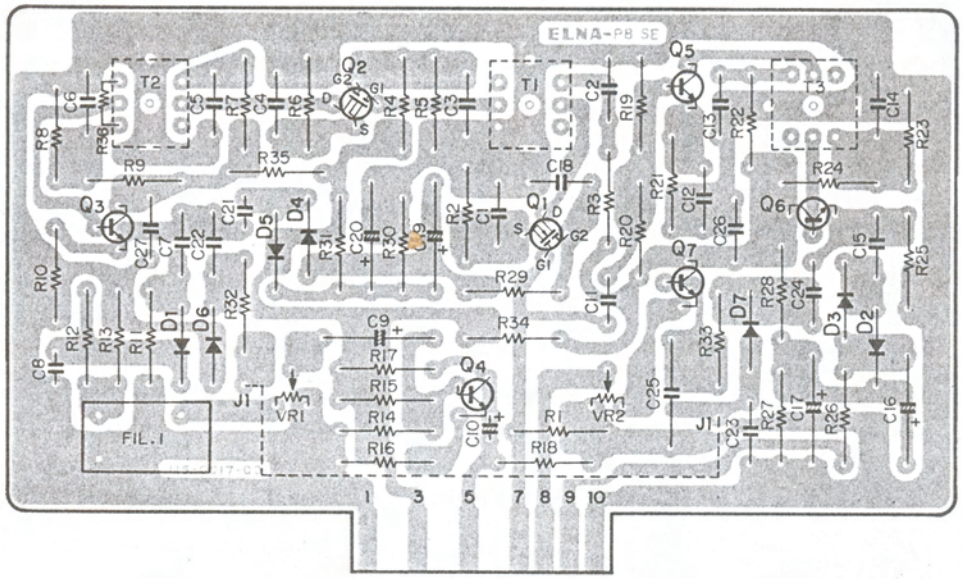
| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| L9 | FM Discri-Transformer | 505-0001-00 | |
| L2, 3, 4, 5 | Choke Coil | 506-1101-00 | |
| L1, 7, 8 | Choke Coil | 506-1201-00 | |
| BPF1, 2, 3 | FM IF Band Pass Filter | 520-0001-00 | |
| VR2 | Potentiometer 1kΩ | 581-0132-00 | for SIGNAL Meter adjust |
| VR1 | Potentiometer 4.7kΩ | 581-0531-00 | for MUTING Level adjust |
| Q1, 2 | Transistor NPN | 2SC1416GR or BL | |
| IC1, 2, 3, 4, 5, 6 | IC | TA7045M-R | |
| D2 | Silicon Diode | 1S1555 | |
| D1, 3, 4, 5, 6, 7, 8, 9, 10 | Gelmanum Diode | 1N60 | |
| R1, 6, 11, 16, 19 | Carbon Film Resistor 10Ω ±5% 1/2W | RD142HA100J | |
| R31 | Carbon Film Resistor 75Ω ±5% 1/2W | RD142HA750J | |
| R29, 30 | Carbon Film Resistor 100Ω ±5% 1/2W | RD142HA101J | |
| R40 | Carbon Film Resistor 220Ω ±5% 1/2W | RD142HA221J | |
| R22 | Carbon Film resistor 360Ω ±5% 1/2W | RD142HA361J | |
| R5, 10, 15 | Carbon Film Resistor 560Ω ±5% 1/2W | RD142HA561J | |
| R2, 4, 7, 9, 12, 14, 18, 21, 24, 25, 26, 41, 42 | Carbon Film Resistor 1kΩ ±5% 1/2W | RD142HA102J | |
| R3, 8, 13, 17, 20, 23, 39 | Carbon Film Resistor 2kΩ ±5% 1/2W | RD142HA202J | |
| R27, 28 | Carbon Film Resistor 3.3kΩ ±5% 1/2W | RD142HA332J | |
| R38 | Carbon Film Resistor 4.7kΩ ±5% 1/2W | RD142HA472J | |
| R32 | Carbon Film Resistor 10kΩ ±5% 1/2W | RD142HA103J | |
| R33, 34 | Carbon Film Resistor 47kΩ ±5% 1/2W | RD142HA473J | |
| R35, 37 | Carbon Film Resistor 56kΩ ±5% 1/2W | RD142HA563J | |
| R36 | Carbon Film Resistor 100kΩ ±5% 1/2W | RD142HA104J | |
| R43 | Carbon Film Resistor 390Ω ±5% 1/2W | RD142HA391J | |
| C26 | Ceramic Capacitor 5pF ±0.25pF 50WV | CC45SL1H050C | |
| C34 | Ceramic Capacitor 33pF ±10% 50WV | CC45SL1H330K | |
| C31, 36, 42 | Ceramic Capacitor 100pF ±5% 50WV | CC45SL1H101J | |
| C28, 29, 35, 44 | Ceramic Capacitor 220pF ±5% 50WV | CC45SL1H221J | |
| C32 | Ceramic Capacitor 470pF ±10% 50WV | CK45B1H471K | |
| C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 38, 45 | Ceramic Capacitor 0.01μF +80%, −20% 50WV | CK45F1H103Z | |
| C33 | Ceramic Capacitor 1000pF +80%, −20% 50WV | CK45F1H103Z | |
| | Ceramic Capacitor 0.047μF +80%, −20% 50WV | CK45F1H473Z | |
| C34 | Ceramic Capacitor 33pF ±5% 50WV | CC45SL1H330J | |
| C39, 40 | Electrolytic Capacitor 1μF 50WV | CE02W1H010 | |
| C30 | Electrolytic Capacitor 10μF 16WV | CE02W1C100 | |
| C41 | Electrolytic Capacitor 100μF 10WV | CE02W1A101 | |
| C37 | Bipolar Electrolytic Capacitor 1μF 50WV | CE02D1H010 (BP) | |
| C43 | Ceramic Capacitor 10PF ±5% 50WV | CC45SL1H100D | |

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| D4, 5, 7 | Germanum Diode | 1N60 | |
| D1, 2, 6, 8, 9, 10, 3 | Silicon Diode | 1S1555 | |
| Q1 | Transistor PNP | 2SA497 O or Y | |
| Q8, 9 | Transistor PNP | 2SA776 GR or BL | |
| Q2, 3, 4, 5, 6, 7 | Transistor NPN | 2SC1416GR or BL | |
| IC2 | IC | MC1310P | |
| IC1 | IC | LM709CH or TA7502M | |
| IC3 | IC | TA7045M R or BL | |
| R10, 11 | Metal Film Resistor 7.5kΩ ±2% 1/2W | RN142HA7501GO | |
| R32 | Carbon Film Resistor 82Ω ±5% 1/2W | RD142HA820J | |
| R17 | Carbon Film Resistor 820Ω ±5% 1/2W | RD142HA821J | |
| R41 | Carbon Film Resistor 220Ω ±5% 1/2W | RD142HA221J | |
| R35 | Carbon Film Resistor 390Ω ±5% 1/2W | RD142HA391J | |
| R36 | Carbon Film Resistor 470Ω ±5% 1/2W | RD142HA471J | |
| R6 | Carbon Film Resistor 620Ω ±5% 1/2W | RD142HA621J | |
| R7 | Carbon Film Resistor 330Ω ±5% 1/2W | RD142HA331J | |
| R9 R15 | Carbon Film Resistor 1kΩ ±5% 1/2W | RD142HA102J | |
| R4, 1 | Carbon Film Resistor 1.5kΩ ±5% 1/2W | RD142HA152J | |
| R16 | Carbon Film Resistor 9.1kΩ ±5% 1/2W | RD142HA912J | |
| R3, 12 | Carbon Film Resistor 2.2kΩ ±5% 1/2W | RD142HA222J | |
| R18 | Carbon Film Resistor 2.7kΩ ±5% 1/2W | RD142HA272J | |
| R19, 20, 21 | Carbon Film Resistor 3.3kΩ ±5% 1/2W | RD142HA332J | |
| R22 | Carbon Film Resistor 3.9kΩ ±5% 1/2W | RD142HA392J | |
| R2 | Carbon Film Resistor 4.7kΩ ±5% 1/2W | RD142HA472J | |
| R 43 | Carbon Film Resistor 5.6kΩ ±5% 1/2W | RD142HA562J | |
| R23 | Carbon Film Resistor 6.2kΩ ±5% 1/2W | RD142HA622J | |
| R26, 27, 28, 29, 31, 33, 34, 37, 38, 40, 42 | Carbon Film Resistor 10kΩ ±5% 1/2W | RD142HA103J | |
| R30, 39 | Carbon Film Resistor 27kΩ ±5% 1/2W | RD142HA273J | |
| R24, 25 | Carbon Film Resistor 150kΩ ±5% 1/2W | RD142HA154J | |
| R13, 14 | Carbon Film Resistor 240kΩ ±5% 1/2W | RD142HA244J | |
| R5 | Carbon Film Resistor 15kΩ ±5% 1/2W | RD142HA153J | |
| R8 | Carbon Film Resistor 16kΩ ±5% 1/2W | RD142HA163J | |
| C29 | Ceramic Capacitor 0.01μF +80%, −20% 50WV | CK45F1H103Z | |
| C3 | Ceramic Capacitor 10pF ±5% 50WV | CC45SL1H100D | |
| C24 | Ceramic Capacitor 220pF ±5% 50WV | CC45SL1H221J | |
| C2 | Ceramic Capacitor 680pF ±5% 50WV | CK45B1H681K | |
| C1 | Electrolytic Capacitor 3.3μF 35WV | CE02W1V3R3 | |
| C23, 27, 28 | Electrolytic Capacitor 1.0μF 50WV | CE02W1H010 | |
| C4 | Electrolytic Capacitor 47μF 10WV | CE02W1A470 | |
| C22 | Bipolar Electrolytic Capacitor 1μF 50WV | CE02W1H1R0(BP) | |
| C14, 15 | Polystyrene Film Capacitor 3900pF ±2% 125WV | CQ08S2B392G | |
| C16, 17 | Polystyrene Film Capacitor 6800pF ±2% 125WV | CQ082SB682G | |
| C26 | Mylar Film Capacitor 1000pF ±10% 50WV | CQ93M1H102K | |
| C8 | Mylar Film Capacitor 0.047μF ±10% 50WV | CQ93M1H473K | |
| C9, 11 | Mylar Film Capacitor 0.22μF ±5% 50WV | CQ93M1H224J | |
| C5 | Polystyrene F Capacitor 470pF ±5% 125WV | CQ08S2B 471J | |
| C10 | Metallized Film Capacitor 0.47μF ±20% 250WV | CQ93M2E474M | |
| C7 | Tantalume Solid Capacitor 22μF ±20% 16WV | CS15E1C220M | |
| C18, 19 | Tantalume Solid Capacitor 1.0μF 25WV | CS15E1E010M | |
| C6 | Mica Capacitor 470pF ±5% 100WV | CM93D2A471J | |
| C25 | Mica Capacitor 1000pF ±5% 100WV | CM39D2A102J | |
| R28 | Carbon Film Resistor 47kΩ ±5% 1/2W | RD142HA473J | |
| R44, 45 | Carbon Film Resistor 30kΩ ±5% 1/2W | RD142HA303J | |

# AM IF ASSEMBLY (704-0001-00)

## PRINTED CIRCUIT BOARD

*Printed circuit board as seen from the reverse side.



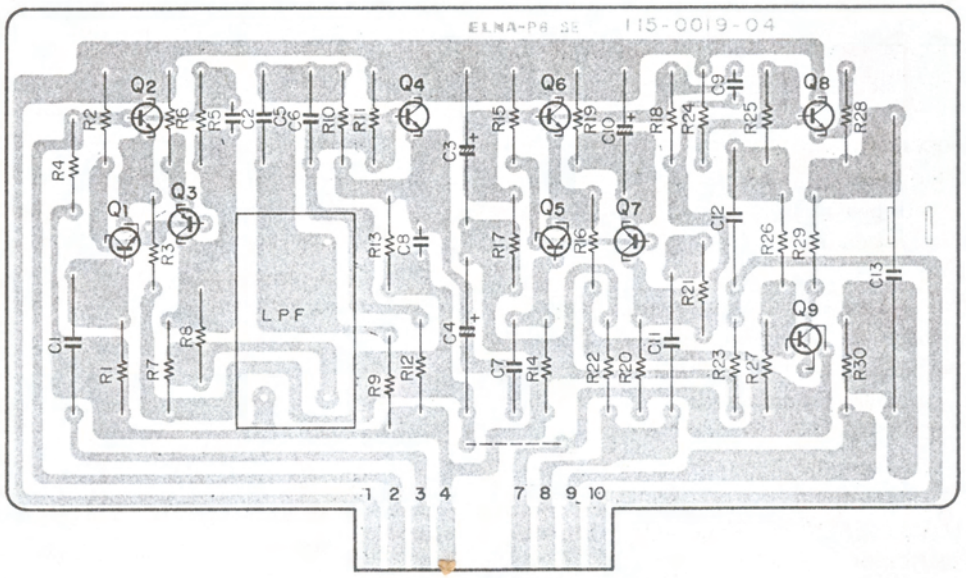

## PARTS LIST

| Ref. No. | Description | Part No. | Remarks |
|---|---|---|---|
| T1, 2, 3 | AM IFT | 500-3001-00 | |
| FIL1 | 10kHz Trap Block | 520-8001-00 | |
| VR2 | Potentiometer 4.7kΩ | 581-0531-00 | for adjust SIGNAL meter |
| VR1 | Potentiometer 100kΩ | 581-0151-00 | for adjust AM output |
| Q3, 4, 5, 6, 7 | Transistor NPN | 2SC1416BL | |
| Q1, 2 | MOS FET | 3SK35GR or BL | |
| D1, 2, 3, 4, 5, 6, 7 | Gerumanum Diode | 1N60 | |
| R34 | Carbon Film Resistor 10Ω ±5% 1/2W | RD142HA100J | |
| R2, 3, 6, 7, 22, 35 | Carbon Film Resistor 220Ω ±5% 1/2W | RD142HA221J | |
| R21 | Carbon Film Resistor 1kΩ ±5% 1/2W | RD142HA102J | |
| R16 | Carbon Film Resistor 1.8kΩ ±5% 1/2W | RD142HA182J | |
| R27 | Carbon Film Resistor 7.5kΩ ±5% 1/2W | RD142HA752J | |
| R30 | Carbon Film Resistor 3.3kΩ ±5% 1/2W | RD142HA332J | |
| R5, 17 | Carbon Film Resistor 3.9kΩ ±5% 1/2W | RD142HA392J | |
| R9, 24 | Carbon Film Resistor 5.1kΩ ±5% 1/2W | RD142HA512J | |
| R10, 25 | Carbon Film Resistor 6.8kΩ ±5% 1/2W | RD142HA682J | |
| R8, 11, 23, 31 | Carbon Film Resistor 10kΩ ±5% 1/2W | RD142HA103J | |
| R4 | Carbon Film Resistor 12kΩ ±5% 1/2W | RD142HA123J | |
| R13 | Carbon Film Resistor 13kΩ ±5% 1/2W | RD142HA133J | |
| R28 | Carbon Film Resistor 16kΩ ±5% 1/2W | RD142HA163J | |
| R12, 19 | Carbon Film Resistor 47kΩ ±5% 1/2W | RD142HA473J | |
| R26, 29, 36, 37 | Carbon Film Resistor 100kΩ ±5% 1/2W | RD142HA104J | |
| R14, 20 | Carbon Film Resistor 220kΩ ±5% 1/2W | RD142HA224J | |
| R15 | Carbon Film Resistor 470kΩ ±5% 1/2W | RD142HA474J | |
| RJ, 32, 33, 18 | Carbon Film Resistor 1MΩ ±5% 1/2W | RD142HA105J | |
| C10 | Tantalum Capacitor 0.1μF ±20% 35WV | CS15E1V0R1M | |
| C11 | Ceramic Capacitor 47pF ±10% 50WV | CC45SLH470K | |
| C 21 | Ceramic Capacitor 330pF ±5% 50WV | CC45SLH331J | |
| C1, 2, 3, 4, 5, 6, 12, 13, 14, 15, 18, 22, 23, 24, 26, 27 | Ceramic Capacitor 0.047μF +80%, −20% 50WV | CK45F1H473Z | |
| C9, 19 | Electrolytic Capacitor 1μF 50WV | CE02W1H01C | |
| C17, 20 | Electrolytic Capacitor 4.7μF 35WV | CE02W1V4R7 | |
| C16 | Electrolytic Capacitor 3.3μF 35WV | CE02W1V3R3 | |
| C25 | Mylar Film Capacitor 0.22μF ±5% 50WV | CQ93M1H224J | |
| C7 | Tantalum Capacitor 1μF ±20% 25WV | CS15E1E010M | |
| C8 | Mylar Film Capacitor 0.0022μF ±5% 50WV | CQ93M1H222J | |

# AUDIO AMP. ASSEMBLY (714-0003-00)

## PRINTED CIRCUIT BOARD

*Printed circuit board as seen from the reverse side.




## PARTS LIST

| Ref. No. | Description | | | | Part No. | Remarks |
|---|---|---|---|---|---|---|
| | Low Pass Filter | | | | 520-5001-10 | |
| Q3, 7, 9 | Transistor PNP | | | | 2SA776 Y or GR | |
| Q1, 2, 4, 5, 6, 8 | Transistor NPN | | | | 2SC1416A GR or BL | |
| R30 | Carbon Film Resistor | 47 | ±5% | 1/2W | RD142HA470J | |
| R28, 29 | Carbon Film Resistor | 100 | ±5% | 1/2W | RD142HA101J | |
| R6, 19, 21 | Carbon Film Resistor | 220 | ±5% | 1/2W | RD142HA221J | |
| R8 | Carbon Film Resistor | 2.2k | ±5% | 1/2W | RD142HA222J | |
| R7, 20 | Carbon Film Resistor | 2.7k | ±5% | 1/2W | RD142HA272J | |
| R9, 13 | Carbon Film Resistor | 3.3k | ±5% | 1/2W | RD142HA332J | |
| R23 | Carbon Film Resistor | 10k | ±5% | 1/2W | RD142HA103J | |
| R25, 26 | Carbon Film Resistor | 16k | ±5% | 1/2W | RD142HA163J | |
| R10 | Carbon Film Resistor | 22k | ±5% | 1/2W | RD142HA223J | |
| R2, 15 | Carbon Film Resistor | 33k | ±5% | 1/2W | RD142HA333J | |
| R4, 17 | Carbon Film Resistor | 36k | ±5% | 1/2W | RD142HA363J | |
| R14 | Carbon Film Resistor | 56k | ±5% | 1/2W | RD142HA563J | |
| R5, 18, 22 | Carbon Film Resistor | 100k | ±5% | 1/2W | RD142HA104J | |
| R24, 27 | Carbon Film Resistor | 330k | ±5% | 1/2W | RD142HA334J | |
| R3, 16 | Carbon Film Resistor | 82k | ±5% | 1/2W | RD142HA823J | |
| R1 | Carbon Film Resistor | 110k | ±5% | 1/2W | RD142HA114J | |
| R12 | Carbon Film Resistor | 160k | ±5% | 1/2W | RD142HA164J | |
| R11 | Carbon Film Resistor | 270k | ±5% | 1/2W | RD142HA274J | |
| C2, 9 | Ceramic capacitor | 2pF | ±0.25pF | 50WV | CC45SL1H020C | |
| C10 | Electrolytic capacitor | 220μF | | 10WV | CE02W1A221 | |
| C3, 4 | Electrolytic capacitor | 100μF | | 25WV | CE02W1E101 | |
| C11 | Bipolar Electrolytic Capacitor | 4.7μF | | 50WV | CE02D1H4R7(BP) | |
| C8 | Mica Capacitor | 470pF | ±5% | 100WV | CM93D2A471J | |
| C5, 6, 7 | Mylar Film Capacitor | 0.22μF | ±5% | 50WV | CQ93M1H224J | |
| C13 | Metallized Film Capacitor | 4.7μF | | 250WV | CQ91M2E475(M) | |
| C1, 12 | Metallized Film Capacitor | 0.47μF | | 250WV | CQ91M2E474(M) | |

# CIRCUIT DESCRIPTION

### T-100 ALIGNMENT INSTRUCTIONS

All ACCUPHASE tuners are carefully aligned and tested at the factory using the finest available test equipment.
All ACCUPHASE tuners will meet their published specifications when shipped from the factory.

After extensive operation, or servicing, it may be desirable to realign the tuner circuits for best performance. The alignment charts give complete information on the circuit realignment procedure for the T-100.

The test equipment listed (or it's equivalent) is necessary to properly align a T-100. The accuracy of the alignment will be directly related to the accuracy and calibration of the test equipment used.

If the necessary test equipment is not available, alignment should not be attempted. For additional information contact Technical Service Department of our ACCUPHASE Distributor.

### TEST EQUIPMENT REQUIRED

1. FM Signal Generator (Measurements 188 or equivalent)
2. AM Signal Generator (Measurement 65B or equivalent)
3. VTVM
4. Multiplex Generator (Radio meter SMG 1, or equivalent)
5. 10.7MHz Generator (Preferably crystal controlled)
6. Oscilloscope (Commercial Grade or equivalent)
7. Harmonic Distortion Analyzer (Hewlett-Packard 333A or equivalent)

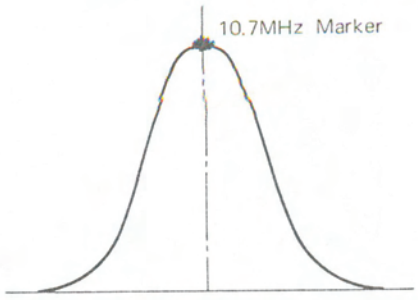



Fig. 1 FM IF CURVE

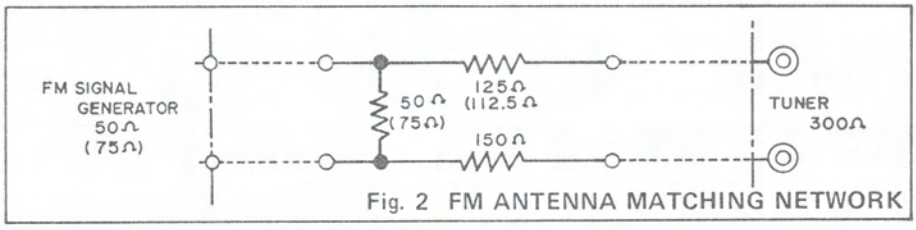



Fig. 2 FM ANTENNA MATCHING NETWORK

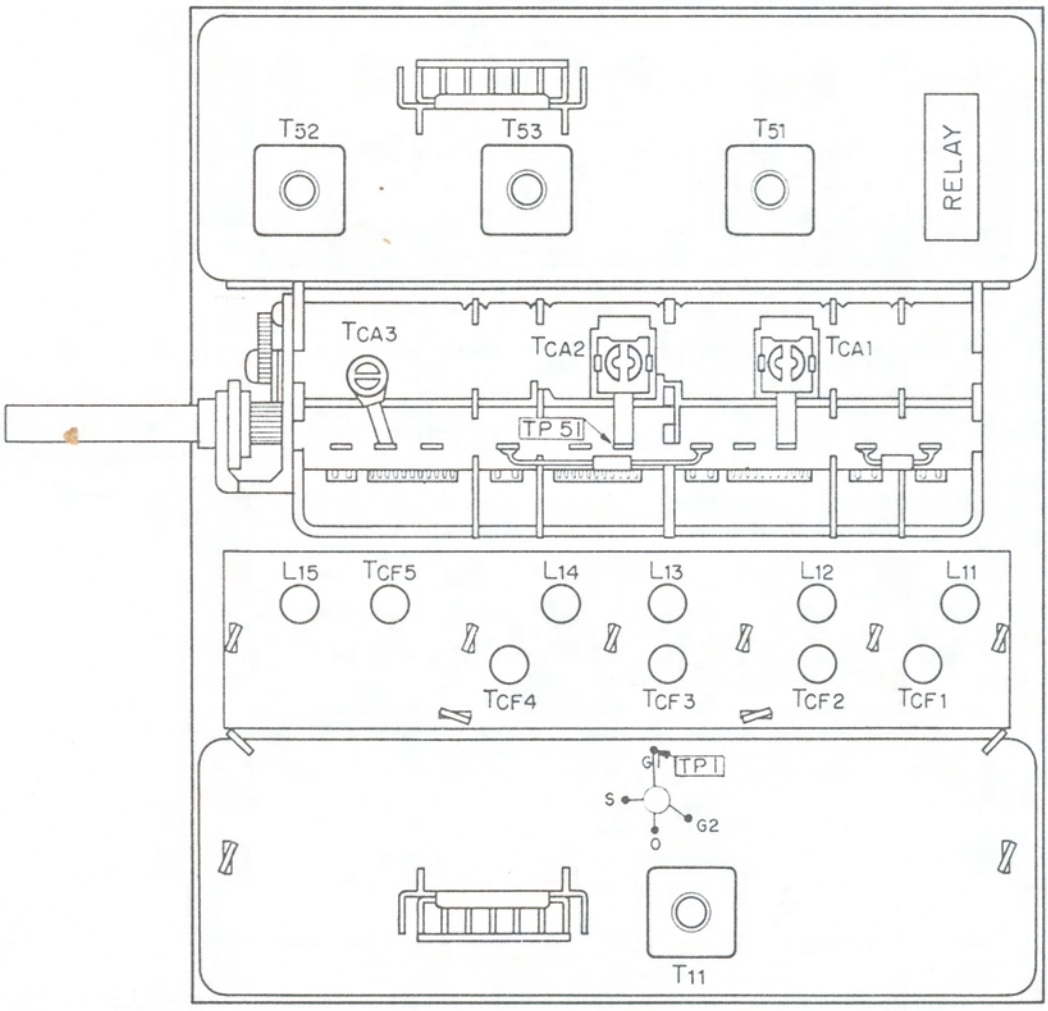



Fig. 3
ADJUST POINT ON AM FM FRONT-END ASSEMBLY

## FM/MULTIPLEX ALIGNMENT

| STEP | ADJUST ITEM | TUNER DIAL SETTING | SIGNAL GENERATOR | | | |
|---|---|---|---|---|---|---|
| | | | TYPE | FREQ. | COUPLING | MODULATIO |
| 1 | I F | Point of no interference | SWEEP Generator | 10.7MHz | Through external IPF capacitor to TP 1 (Q14G1) on Front end assembly (702-0001-00) | LINE Sweep |
| 2 | DETECTOR | Same | Received FM noise | | | |
| 3 | SIGNAL METER | 106MHz | FM signal Generator | 106MHz OUTPUT 96dB | Through antenna matching network to 300Ω ANT terminals | CW |
| 4 | DETECTOR | Same | Same | 106MHz | Same | 400Hz ±75kH deviation |
| 5 | AUDIO OUTPUT | Same | Same | 106MHz OUTPUT 66dB | Same | Same |
| 6 | CALIBRATION | Same | Same | 106MHz | Same | Same |
| 7 | Same | 90MHz | Same | 90MHz | Same | Same |
| 8 | TRACKING | 106MHz | Same | 106MHz OUTPUT 12dB | Same | Same |
| 9 | Same | 90MHz | Same | 90MHz OUTPUT 12dB | Same | Same |
| 10 | MUTING LEVEL | Same | Same | 90MHz OUTPUT 32 ~ 38dB | Same | 400Hz ±22.5k deviation |
| | NOTE: Since the ANT and RF circuits are double tuned, an RF sweep generator is necessary for realignment. A available when an oscilloscope is connected to the DETECTOR OUTPUT. If so, it will be an indication 50μS or 75μS whichever conforms with the practice in the country in which this tuner is used. | | | | | |
| 11 | MULTIPLEX | 100MHz | MULTIPLEX Generator FM signal Generator | 100MHz OUTPUT 66dB | Same | 400Hz, L-R |
| 12 | SEPARATION | Same | Same | Same | Same | 400Hz, L-R |

## FM/MULTIPLEX ALIGNMENT

| STEP | ADJUST ITEM | TUNER DIAL SETTING | SIGNAL GENERATOR | | | |
|---|---|---|---|---|---|---|
| | | | TYPE | FREQ. | COUPLING | MODULATIO |
| 1 | I F | Point of no interference | SWEEP Generator | 10.7MHz | Through external IPF capacitor to TP 1 (Q14G1) on Front end assembly (702-0001-00) | LINE Sweep |
| 2 | DETECTOR | Same | Received FM noise | | | |
| 3 | SIGNAL METER | 106MHz | FM signal Generator | 106MHz OUTPUT 96dB | Through antenna matching network to 300Ω ANT terminals | CW |
| 4 | DETECTOR | Same | Same | 106MHz | Same | 400Hz ± 75kHz deviation |
| 5 | AUDIO OUTPUT | Same | Same | 106MHz OUTPUT 66dB | Same | Same |
| 6 | CALIBRATION | Same | Same | 106MHz | Same | Same |
| 7 | Same | 90MHz | Same | 90MHz | Same | Same |
| 8 | TRACKING | 106MHz | Same | 106MHz OUTPUT 12dB | Same | Same |
| 9 | Same | 90MHz | Same | 90MHz OUTPUT 12dB | Same | Same |
| 10 | MUTING LEVEL | Same | Same | 90MHz OUTPUT 32 ~ 38dB | Same | 400Hz ±22.5kH deviation |
| | NOTE: Since the ANT and RF circuits are double tuned, an RF sweep generator is necessary for realignment. A available when an oscilloscope is connected to the DETECTOR OUTPUT. If so, it will be an indication 50μS or 75μS whichever conforms with the practice in the country in which this tuner is used. | | | | | |
| 11 | MULTIPLEX | 100MHz | MULTIPLEX Generator FM signal Generator | 100MHz OUTPUT 66dB | Same | 400Hz,L-R |
| 12 | SEPARATION | Same | Same | Same | Same | 400Hz,L-R |

| | INDICATOR | | | | |
|---|---|---|---|---|---|
| ON | TYPE | CONNECTED TO | ADJUST | TEST LIMITS | REMARKS |
| | Oscilloscope | TP2 on IF assembly (703-0001-00) | Top (secondary) and buttom (primary) of T11 on Front end assembly (702-0002-01) | Maximum height of 10.7MHz marker and best symmetry curve as Fig. 1 | Keep sweep generator output as low as possible to prevent IF waveform from over shooting the scope screen. |
| | TUNING METER | | Top (secondary) of L9 on IF assembly (703-0001-00) | Midpoint indication of TUNING METER | Keep TUNER in MONO mode with MUTING at OFF for step 2 through step 9. |
| | SIGNAL METER | | VR2 on IF assembly (703-0001-00) | "5" Point indication of SIGNAL METER | About 1/3 clockwise turn should produce a METER reading of "5". If unattainable repeat this step after completing step 9. |
| Hz | Oscilloscope VTVM Distortion meter | FIXED AUDIO OUTPUT | Bottom (primary) of L9 On IF assembly (703-0001-00) | Maximum audio output and minimum distortion | Adjust FM signal generator output to obtain reading of "2.5' on the SIGNAL METER at Perfect resonance, indicated by the maximum deflection of the SIGNAL METER and midpoint indication of the TUNING METER. Distortion will be less than 0.2% if a high quality FM signal generator is used. |
| | Same | Same | VR1 on MPX assembly (700-0001-00) | 2.0V audio output | Same |
| | Same | Same | Oscillator trimmer $T_{CE}$ 5 on Front end assembly (704-0001-00) | Maximum SIGNAL METER. Midpoint TUNING METER | Keep FM signal generator output level the same as in step 4. |
| | Same | Same | Oscillator coil LI5 on Front-end assembly (704-0001-00) | Same | Keep repeating step 6 and 7 back and forth, until dial accurately indicates 90MHz and 106MHz daring resonance with FM signal generator. Also check accuracy of other frequency reading. |
| | Same | Same | $T_{CF}$ 1, 2, 3, 4 on Front-end assembly (704-0001-00) | Ajust for minimum noise and distortion | S/N will be more than 40dB, Distortion less than 3%. |
| | Same | Same | L11, 12, 13, 14 on Front-end assembly (704-0001-00) | Same | Same as above. Repeat step 8 and Check again. |
| Hz | | | VR1, on IF assembly (703-0001-00) | ON/OFF audio output | Set MUTING switch to "2", and VR1 to maximum clockwise position. Then back off VR1 slowly in counterclockwise direction until audio output is obtained. Next set MUTING switch to "1". Reduce FM signal generator output by about 20dB around which point audio output ON/ OFF should now occur. Check this. |
| Avoid touching parts in the cavity except for replacing parts thereof. If not audio output is obtained during step 4, see if it becomes of some trouble within the MPX assembly. The DE-EMPHASIS switch S1 within the MPX assembly (706-0001-00) should be set to | | | | | |
| | Same | Same | VR2 on MPX assembly (706-0001-00) | Maximum audio output and minimum distortion | Tune for perfect resonance. |
| | Same | Same | VR3 on the chassis | Ajust for Maximum separation | Inverse signal and check both channels. |

## FM/MULTIPLEX ALIGNMENT

| STEP | ADJUST ITEM | TUNER DIAL SETTING | SIGNAL GENERATOR | | | |
|---|---|---|---|---|---|---|
| | | | TYPE | FREQ. | COUPLING | MODULATIO |
| 1 | I F | Point of no interference | SWEEP Generator | 10.7MHz | Through external IPF capacitor to TP 1 (Q14G1) on Front end assembly (702-0001-00) | LINE Sweep |
| 2 | DETECTOR | Same | Received FM noise | | | |
| 3 | SIGNAL METER | 106MHz | FM signal Generator | 106MHz OUTPUT 96dB | Through antenna matching network to 300Ω ANT terminals | CW |
| 4 | DETECTOR | Same | Same | 106MHz | Same | 400Hz ± 75kHz deviation |
| 5 | AUDIO OUTPUT | Same | Same | 106MHz OUTPUT 66dB | Same | Same |
| 6 | CALIBRATION | Same | Same | 106MHz | Same | Same |
| 7 | Same | 90MHz | Same | 90MHz | Same | Same |
| 8 | TRACKING | 106MHz | Same | 106MHz OUTPUT 12dB | Same | Same |
| 9 | Same | 90MHz | Same | 90MHz OUTPUT 12dB | Same | Same |
| 10 | MUTING LEVEL | Same | Same | 90MHz OUTPUT 32 ~ 38dB | Same | 400Hz ±22.5kH deviation |
| | NOTE: Since the ANT and RF circuits are double tuned, an RF sweep generator is necessary for realignment. A available when an oscilloscope is connected to the DETECTOR OUTPUT. If so, it will be an indication c 50μS or 75μS whichever conforms with the practice in the country in which this tuner is used. | | | | | |
| 11 | MULTIPLEX | 100MHz | MULTIPLEX Generator FM signal Generator | 100MHz OUTPUT 66dB | Same | 400Hz, L-R |
| 12 | SEPARATION | Same | Same | Same | Same | 400Hz, L-R |

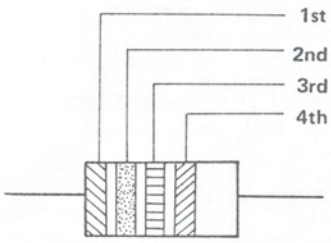
| STEP | ADJUST ITEM | TUNER DIAL SETTING | SIGNAL GENERATOR | | | | |
|---|---|---|---|---|---|---|---|
| | | | TYPE | FREQ. | COUPLING | MODULATION | TYP |
| 1 | I F | Point of no interference | SWEEP Generator | 455kHz | TP51 on Front-end assembly (702-0001-01) | LINE Sweep | Oscillo |
| 2 | AGC | 1,000kHz | AM signal Generator | 1,000kHz OUTPUT 80dB | Through external 250Ω resistor to ANT terminals. | CW | MULT TESTE |
| 3 | CALIBRATION | 1,400kHz | Same | 1,400kHz | Same | 30% | Oscillo VTVM Distort meter |
| 4 | Same | 600kHz | Same | 600kHz | Same | Same | Same |
| 5 | TRACKING | 1,400kHz | Same | 1,400kHz | Same | Same | Same |
| 6 | Same | 600kHz | Same | 600kHz | Same | Same | Same |
| 7 | AUDIO OUTPUT | 600kHz | Same | 600kHz OUTPUT 60dB | Same | Same | Same |
| 8 | SIGNAL METER | 600kHz | Same | 600kHz OUTPUT 90dB | Same | CW | SIGNA METE |

NOTE: Sensitivity will drop about 20dB if the AM LOCAL button is depressed in place of the DIST button.

# RESISTOR COLOR CODE

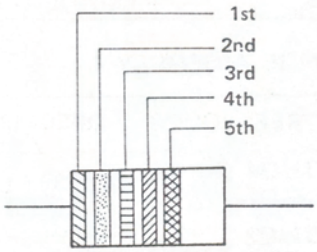
## 4 COLOR CODE RESISTOR

| COLOR (Meaning) | 1st (Value) | 2nd (Value) | 3rd (Multiplier) | 4th (Tolerance) | Remarks |
|---|---|---|---|---|---|
| Black | 0 | 0 | $10^0$ | | |
| Brown | 1 | 1 | $10^1$ | ± 1% | |
| Red | 2 | 2 | $10^2$ | ± 2% | |
| Orange | 3 | 3 | $10^3$ | | |
| Yellow | 4 | 4 | $10^4$ | | |
| Green | 5 | 5 | $10^5$ | | |
| Blue | 6 | 6 | $10^6$ | | |
| Purple | 7 | 7 | $10^7$ | | |
| Grey | 8 | 8 | $10^8$ | | |
| White | 9 | 9 | $10^9$ | | |
| Gold | – | – | $10^{-1}$ | ± 5% | |
| Silver | – | – | $10^{-2}$ | ±10% | |
| Non-Color | – | – | – | ±20% | |

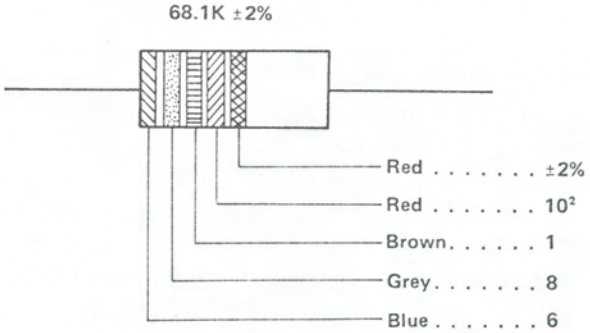



## 5 COLOR CODE RESISTOR

| COLOR (Meaning) | 1st (Value) | 2nd (Value) | 3rd (Value) | 4th (Multiplier) | 5th (Tolerance) | Remarks |
|---|---|---|---|---|---|---|
| Black | 0 | 0 | 0 | $10^0$ | | |
| Brown | 1 | 1 | 1 | $10^1$ | ± 1% | |
| Red | 2 | 2 | 2 | $10^2$ | ± 2% | |
| Orange | 3 | 3 | 3 | $10^3$ | | |
| Yellow | 4 | 4 | 4 | $10^4$ | | |
| Green | 5 | 5 | 5 | $10^5$ | | |
| Blue | 6 | 6 | 6 | $10^6$ | | |
| Purple | 7 | 7 | 7 | $10^7$ | | |
| Grey | 8 | 8 | 8 | $10^8$ | | |
| White | 9 | 9 | 9 | $10^9$ | | |
| Gold | – | – | – | $10^{-1}$ | ± 5% | |
| Silver | – | – | – | $10^{-2}$ | ±10% | |
| Non-Color | – | – | – | – | ±20% | |




EXAMPLE



# SEMI-CONDUCTOR LEADS

### AM FM FRONT-END ASSEMBLY

| REF. NO. | DESCRIPTION | PICTURE 1 |
|---|---|---|
| Q11, Q12 | 2SC785 – R | B |
| Q13 | 3SK41 | A |
| Q14, Q51, Q52 | 3SK35 – GR | A |
| Q53 | 2SK30A – O | J |

### FM IF and METER ASSEMBLY

| REF. NO. | DESCRIPTION | PICTURE 1 |
|---|---|---|
| Q1, Q2 | 2SC1746 – GR or BL | F |
| IC1, IC2, IC6, | TA7045 M – R | H |
| IC2, IC4, IC5 | TA7045 M–BL | |

### MPX and SUBCIRCUIT ASSEMBLY

| REF. NO. | DESCRIPTION | PICTURE 1 |
|---|---|---|
| Q1 | 2SA497-O or Y | G |
| Q8, Q9 | 2SA856-GR or BL | F |
| Q2, Q3, Q4, Q5, Q6, Q7 | 2SC1746-GR or BL | |
| ICI | LM709CH | H |
| IC3 | TA7045M-BL | |
| IC2 | LM709CH | I |

### AM IF ASSEMBLY

| REF. NO. | DESCRIPTION | PICTURE 1 |
|---|---|---|
| Q3, Q4, Q5, Q6, Q7 | 2SC1746-BL | F |
| Q1, Q2 | 3SK35 – GR or BL | A |

### AUDIO AMP. ASSEMBLY

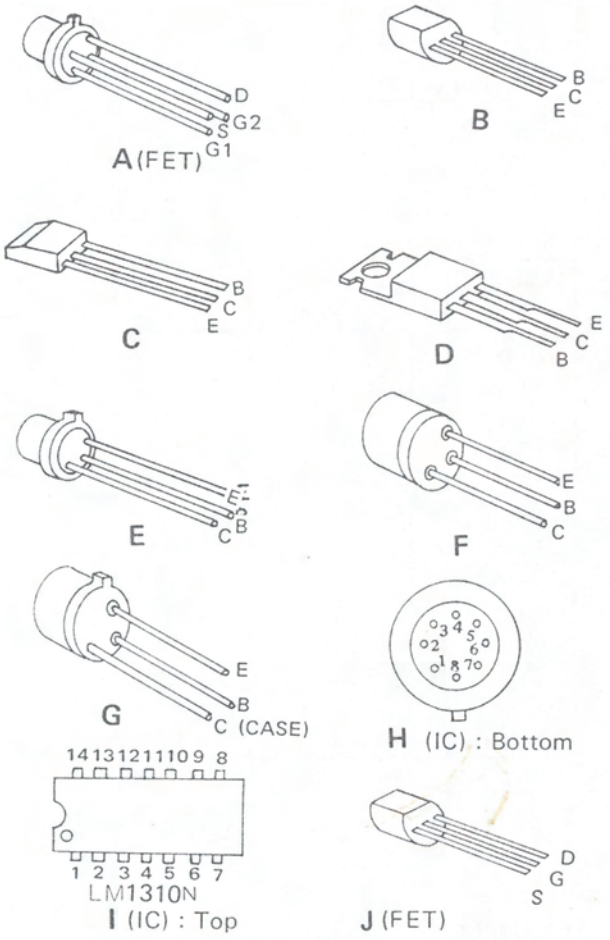
| REF. NO. | DESCRIPTION | PICTURE 1 |
|---|---|---|
| Q3, Q7, Q9 | 2SA856-GR or BL | F |
| Q1, Q2, Q4, Q5, Q6, Q8 | 2SC1746A-GR or BL | |

### POWER SUPPLY ASSEMBLY

| REF. NO. | DESCRIPTION | PICTURE 1 |
|---|---|---|
| Q1, Q5 | 2SA661-O, Y or GR | C |
| Q4 | 2SB435-O or Y | D |
| Q2, Q6 | 2SC1166-O, Y or GR | C |
| Q3, Q7 | 2SD235-O or Y | D |

### DELAY FUSE ASSEMBLY

| REF. NO. | DESCRIPTION | PICTURE 1 |
|---|---|---|
| Q1, Q2 | 2SC1746-GR or BL | F |




PICTURE 1

Use of transistors other than specified will adversely affect performance and should be avoided.

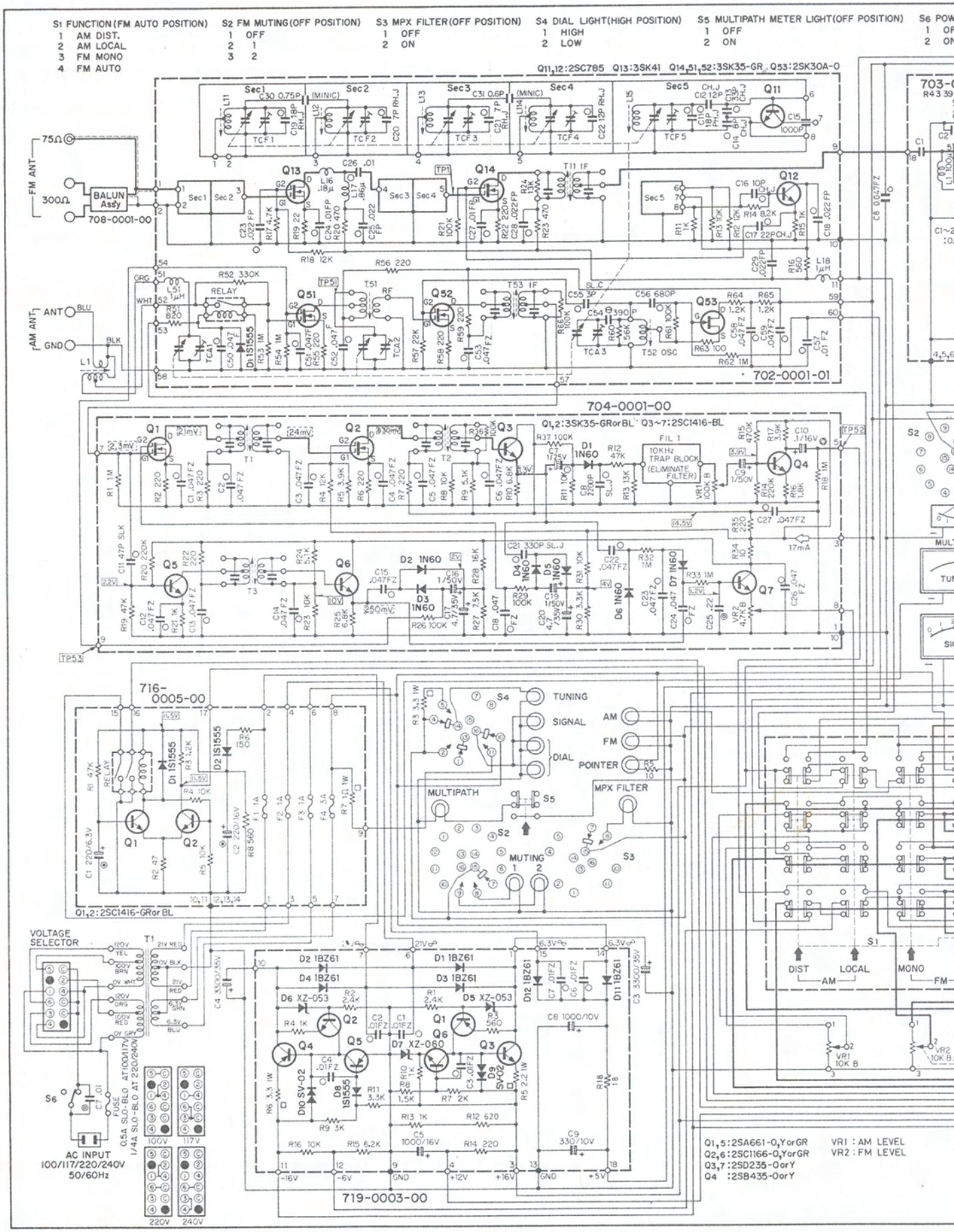
### THE MARK OF CAPACITOR AND RESISTORS ON THE SCHEMATIC DIAGRAM

- ○: CERAMIC CAPACITORS
- ⊖: MICA CAPACITORS
- ⊘: TANTALUME SOLID CAPACITORS
- ●: METALLIZED FILM CAPACITOR
- ⊕: POLYSTYRENE FILM CAPACITORS
- ⊙: MYLAR FILM CAPACITORS
- □: METAL FILM RESISTORS
- ■: OXED METAL FILM RESISTORS
- ▨: CEMENT COATED WIRE WOUND RESISTORS
- ▩: CEMENT COATED METAL PLATE RESISTORS

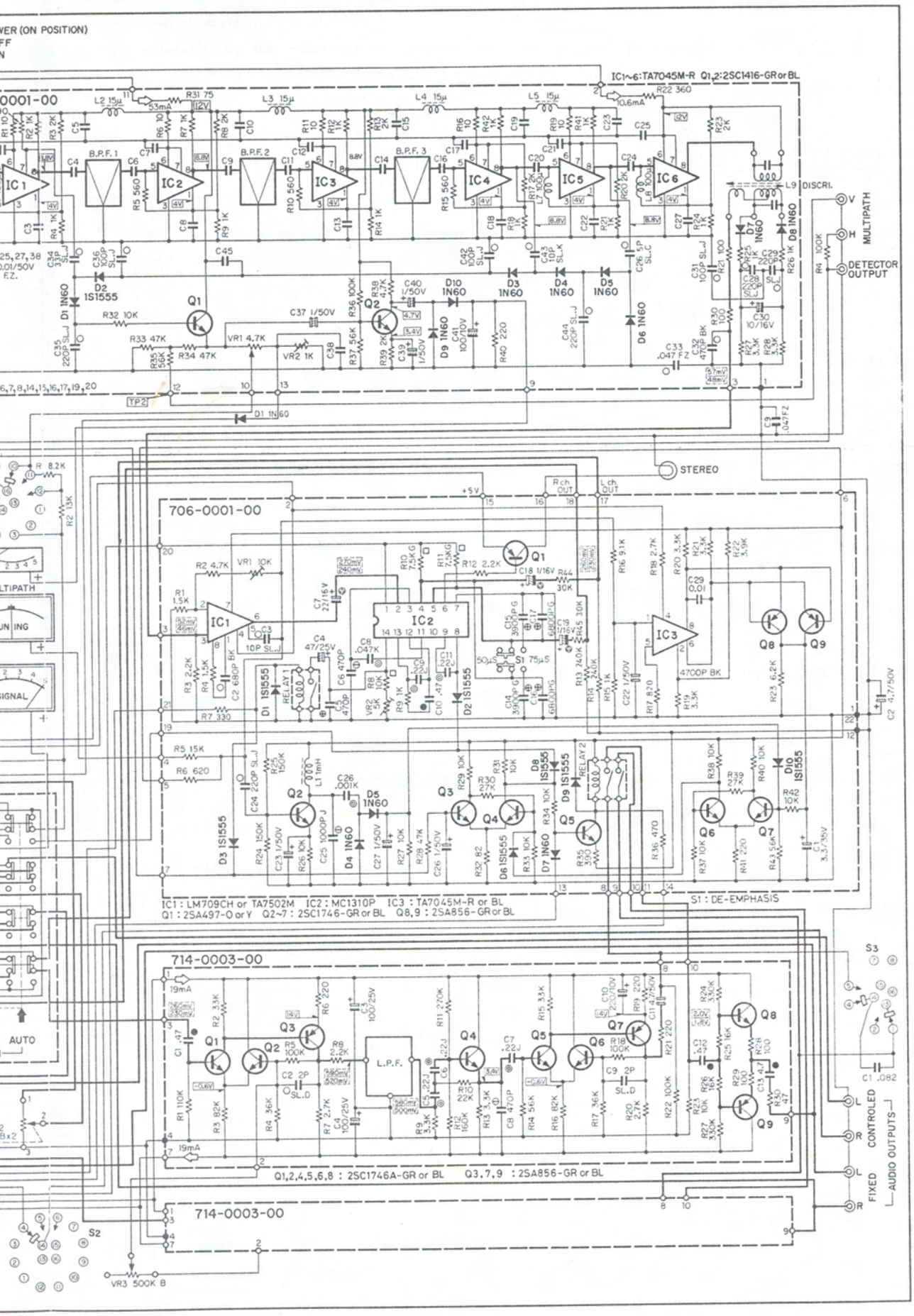
Unless other wise specified: Capacitors are ELECTROLYTIC Types: Resistors are CARBON FILM Types, 1/2 watt, and ±5% tolerance;

Indicated values of parts in the schematic diagram may be changed in case of performance improvement.

# T-100 REVISED SCHEMATIC DIAGRAM

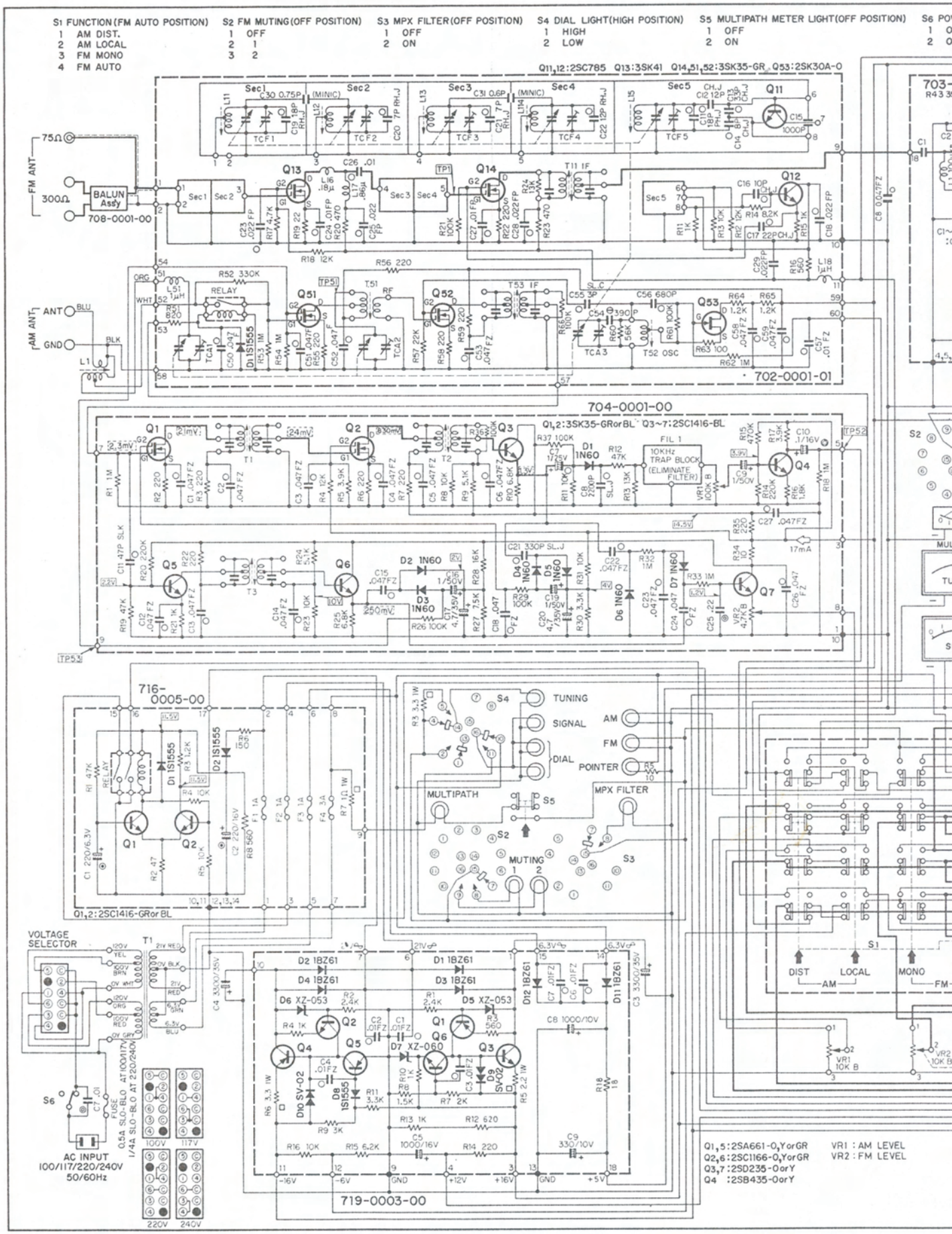


s the new Schematic Diagram as of July, 1976.
e note that it includes slight changes from the Printed Board pattern and Parts List which appear in the foregoing pages.




(822-2003-10)

# T-100 REVISED SCHEMATIC DIAGRAM



Accuphase
KENSONIC LABORATORY INC.
2124-6 MOTOISHOKAWA-CHO,
MIDORIKU, YOKOHAMA, JAPAN

0776-500 861-2003-10 PRINTED IN JAPAN

# Carrozzeria Service Information No. COM-011

MODEL

Issued AUG. 1982.

SUBJECT : Improvement of Relays at low level signal stage.

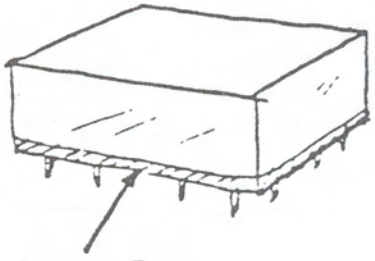
Effective Serial No.

Details;

Following new, high-reliable, closed type relays are currently employed for use of low-level signal path.

- For parts order, please refer to new numbers.

| | | Part No. | |
|---|---|---|---|
| 362-2403-00 | ⟶ | 362-2404-00 | or 362-2404-10 |
| 362-2205-00 | ⟶ | 362-2212-00 | or 362-2212-10 |
| 362-2208-00 | ⟶ | 362-2208-10 | |



Closed Type

# Service Information No. COM-009

MODEL

Issued Aug. 1982

SUBJECT : Re Substitution of Transistors

Effective Serial No.

Details; **Substitutions**

C-220 Power Supply Circuit
Q1,2,16,17,28,29 : 2SK30A-O ⟶ 2SK117-O
Q13 : 2SK30A-GR ⟶ 2SK30A-Y
Q18 : 2SB435-O or Y ⟶ 2SB834-O
Q19 : 2SD235-O or Y ⟶ 2SD880-O
R11 : 470 ohms ⟶ Jumper Wire (to be changed)

E-202/P-250
Power Supply Circuit — 2SC1451-G or B ⟶ 2SC2229-O or Y

P-20 Protection Circuit — 2SC1596-V/003 ⟶ 2SC2229-O or Y

P-300S/ P-300/ E-202
Final Stage
2SA679-R ⟶ 2SB555-R
2SC1079-R ⟶ 2SD425-R

P-300/ E-202
Main Drive Circuit
2SA809-V/002, 2SA931-V/002 ⟶ 2SA939-B or V
2SC1451-V/004, 2SC1596-V/003 ⟶ 2SC2071-B or V

E-202 Equalizer Circuit
2SC1451-V/004, 2SC2229 ⟶ 2SC2071-B or V

P-300S Main Drive Circuit
2SA810-B ⟶ 2SB648A-C
2SC1452-B ⟶ 2SD668A-C

M-60 Main Drive Circuit
Q5,8,10,12 : 2SA809-V/002 ⟶ 2SA970-BL
Q6,7,9,11 : 2SC1451-V/004 ⟶ 2SC2240-BL

**Q9,10,11,12 — with Heat Sink (240-2006-00)

Q13 : 2SA810-B/101 ⟶ 2SA818-O or Y
Q14 : 2SC1452-B/101 ⟶ 2SC1628-O or Y

D15,16 : CZ-060 ⟶ RD6.2F-B

For All Models
2SA856A-GR or BL ⟶ 2SA970-BL
2SC1746-GR or BL ⟶ 2SC2240-BL

# Service Information No. COM-010

MODEL

Issued AUG. 1982

SUBJECT : RE Substitution of Transistors

Effective Serial No.

Details; SUBSTITUTION

2SA489 ⟶ 2SB596
2SA679 ⟶ 2SB555

2SC789 ⟶ 2SD526
2SC1079 ⟶ 2SD425

2SB435 ⟶ 2SB834
2SD235 ⟶ 2SD880

2SK30A ⟶ 2SK117

2SA809, 2SA931 ⟶ 2SA939-B,V or 2SA949-Y

2SC1451, 2SC1596 ⟶ 2SC2071-B,V or 2SC2229-Y

(for signal path use exclusively 2SA939 and 2SC2071. )