FT-102

TECHNICAL SUPPLEMENT

YAESU MUSEN CO., LTD.
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TOKYO, JAPAN

~ CONTENTS ~

FT-102
HF ALL MODE TRANSCEIVER

PREFACE

The purpose of this manual is to provide a technical supplement to the Instruction Manual supplied with the FT-102 from the factory. Detailed information regarding installation, operation and alignment, as well as the circuit description, has been provided in the Instruction Manual, and is not reprinted here. Therefore, this Technical Supplement is not intended to serve as an independent reference, but to be used in conjunction with the information provided in the Instruction Manual.

Every effort has been made to include all of the modifications and updates that have been developed during production of the FT-102. However, certain custom modifications that are not of general interest have not been included, and Yaesu reserves the right to carry out additional modifications without notifying owners.

So far, the FT-102 has proven to be extremely reliable in the field, with only a few common problems having required modifications. These have all been incorporated into the later production lots, but details of the modifications are included here for those who may need to update earlier models.

We trust that technically-minded owners and service technicians of the FT-102 will find this manual useful as a supplement to the FT-102 Instruction Manual. Although Yaesu can not assume liability for any damages that may occur because of possible errors in this Supplement or the Instruction Manual, we do invite readers to call our attention to errors or inconsistencies that we might have overlooked.

~ CONTENTS ~

Pages 17-25 have been deleted from the Supplement, as they describe procedures for band conversions that are not authorized in certain countries. This material is available from Yaesu representatives in those countries where such operation and modifiction of the FT-102 is legal. Contact you nearest authorized Yaesu dealer for details.

ERRATA
FOR THE FT-102 INSTRUCTION MANUAL

These errata apply to early printings of the Instruction Manual, up to the present. Only those of possible technical significance are listed here, although there were a few other minor typographical errors. The following pages 3 and 4 are completely updated replacements for pages 15 and 44, respectively, in all early editions of the FT-102 Instruction Manual.

Page 30, line 4:

Q2011 should be noted as a type 2SC1815Y transistor.

Page 30, fifth paragraph:

Only D6004 should be mentioned as a noise detector. Also, the DC squelch control signal from the SQL control is passed to the squelch control section of Q6008, and not to Q6010 and Q6011. D6004, Q6010 and Q6011 have been deleted from the AM/FM Unit.

Page 35, FT-102 FREQUENCY RELATIONSHIPS

The frequency of the carrier signal input to the Balanced Modulator (at the upper right corner of the diagram) should show LSB as 456.6 kHz and USB as 453.4 kHz. This was reversed in the first printing of the manual.

Also in the same diagram, the small table at the upper left should show the IF as 8.2134 MHz for LSB, and 8.2166 MHz for USB. LSB was not mentioned in the original printing.

Page 36, line 2:

Q4026 is a fixed crystal oscillator, and not a VCXO.

Page 38, TOP VIEW:

Later printings of the manual include an indication of the location of PO ADJ potentiometer VR5 in the labelling of this photo. The location of this potentiometer is also indicated in the rear panel photograph on page 10, as the upper lefthand control in the dashed box numbered 12 .

Page 40, Upper left photo:

The title of this photo, RECT. A UNIT, was inadvertently omitted from earlier printings of the manual.

Also on this page, in step 2 of the PO Meter Adjustment, VR7 appeared as the adjustment potentiometer number. This should read VR5, indicating the PO ADJ potentiometer.

Page 41, Carrier Balance Procedure:

Step 3 should read, "Press the MOX switch." (only).

Pages 42 and 43, SSB Carrier Point Procedure:

This procedure has been revised from that appearing in early editions of the Instruction Manual, and should read as follows:

SSB Carrier Point

1. Set the MODE selector to USB, and connect the frequency counter to TP_{4007}.
2. Key the transmitter and adjust potentiometer VR_{4003} for 10.5466 MHz on the counter.
3. Now connect the frequency counter to TP_{4006}, key the transmitter, and adjust potentiometer VR_{4002} for 19.2166 MHz on the counter.
4. Set the MODE selector to LSB and check TP_{4007} for 10.5434 MHz and TP_{4006} for 19.2134 MHz with the counter during transmission.
5. Connect the audio signal generator to pin 8 of the MIC jack (pin 7 is ground), and connect the oscilloscope to the TP_{3005} on AF Unit. Set the AG for 1 kHz @ 2 mV, MIC gain to 9 o'clock, and HEATER off. Key the transmitter and note the amplitude of the scope display. Now change the AG frequency to 300 Hz (2 mV) and adjust VR_{3002} for the same amplitude on the scope.

6. Retune the AG to 1 kHz, and switch the HEATER on, 14 MHz band. Tune up the transmitter for 100 watts output, adjusting the signal generator output level to obtain this power output with the MIC GAIN control at the 12 o'clock position.

7. Now adjust the audio generator frequency to 300 Hz while maintaining a constant generator output level. If the ALC indication on METER II does not change during this audio frequency change, check the output power level, which should now be 25 watts. If necessary, adjust VR_{4005} for 25 watts output. If the ALC indication changes, repeat step 5 with the MIC GAIN control set lower and the signal generator level correspondingly higher.

8. Return to receive, switch the MODE selector to USB and repeat step 6, adjusting VR_{4006}, if necessary, to obtain 25 watts output.

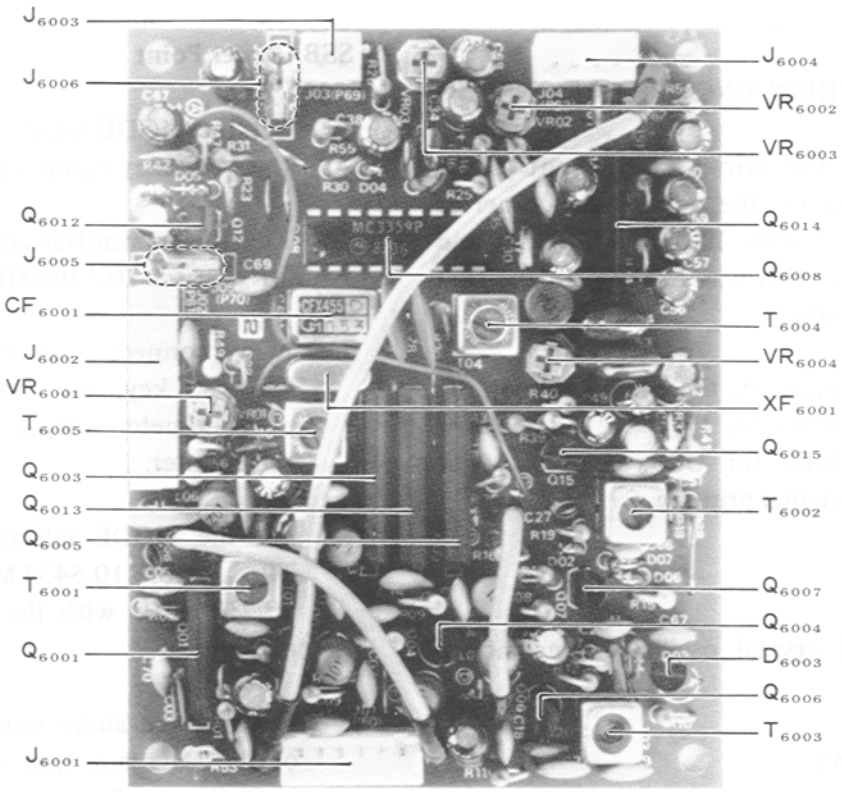
Page 47, AM/FM UNIT (photo):

This photo was replaced from the second printing of the manual with the photo of the updated Unit, shown below. Also, the Varactor Pinout diagram was denoted as D6003 in later printings.

Page 52, AM/FM Unit Installation:

Step 3 of the procedure was corrected as follows:

3. Remove the plastic covers from the two conectors and connect the six connectors to the AM/FM Unit as shown in Figure 2.



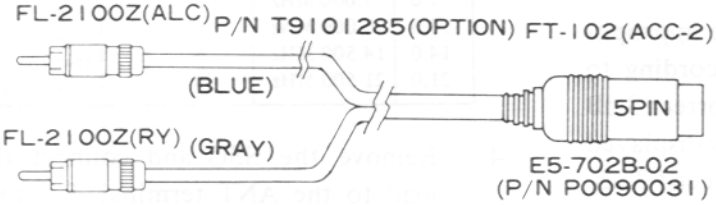
AM/FM UNIT

INTERCONNECTION CABLE INFORMATION

A

P/N T9100160A (65 cm)
T9100161 (1 m)

B

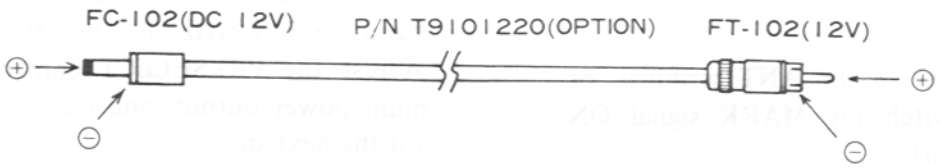


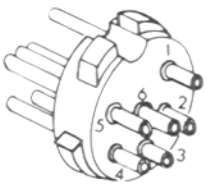
E5-702B-02
(P/N P0090031)

1. ALC inner conductor
2. ALC/RY outer conductor
3. RY inner conductor
4. ALC/RY outer conductor
5. ——

C

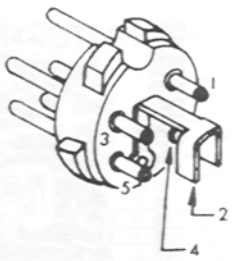
D





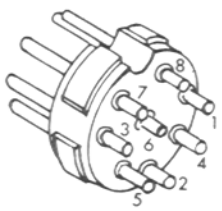
PIN No.
1. TX GND
2. KEY-1
3. 100kHz(REF) OUT
4. N.C.
5. RX GND
6. GND
Shell GND

ACC-1



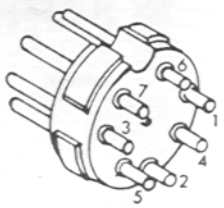
PIN No.
1. ALC
2. GND
3. TX GND
4. GND
5. RX GND
Shell GND

ACC-2



PIN No.
1. +8V
2. +12V
3. +500kHz
4. TX 12V
5. CW 8V
6. EXT VFO IN
7. GND
8. SAMPLE IN

EXT VFO/RCVR A



PIN No.
1. UP
2. FAST
3. GND
4. DWN
5. MUTE
6. SIDE TONE OUT
7. 100kHz (REF) OUT

EXT VFO/RCVR B

RF UNIT ALIGNMENT (PB-2342)

Bandpass Filters

1. Connect the sweep generator output to J_{1001} (TX IN), and connect the oscilloscope to RF OUT jack J_5 on the rear panel. Turn the HEATER switch OFF.

2. Key the transmitter and adjust the appropriate transformer for each band according to the following chart to obtain the correct 3 dB bandwidth with minimum ripple, as displayed on the scope. Ripple should not exceed 3 dB.

Band	Adjust	Passband (-3 dB)
1.8	T_{1011}, T_{1022}	1.8– 2.0 MHz
3.5	T_{1013}, T_{1014}	3.5– 4.0 MHz
7.0	T_{1015}, T_{1016}	7.0– 7.3 MHz
10.0	T_{1017}, T_{1018}	10.0–10.5 MHz
14.0	T_{1019}, T_{1020}	14.0–14.5 MHz
18.0	T_{1021}, T_{1022}	18.0–18.5 MHz
21.0	T_{1023}, T_{1024}	21.0–21.5 MHz
24.5	T_{1025}, T_{1026}	24.5–25.5 MHz
28/29	T_{1027}, T_{1028}	28.0–29.9 MHz

Preselector

1. Connect the SSG to the ANT terminal, or alternatively, switch the MARK signal ON (rear panel switch).

2. Set the FT-102 to the band and frequency shown in the following chart, and set the PRESELECT control to the position indicated. Switch the RF AMP ON.

3. Adjust the transformer indicated in the chart for maximum S-meter reading.

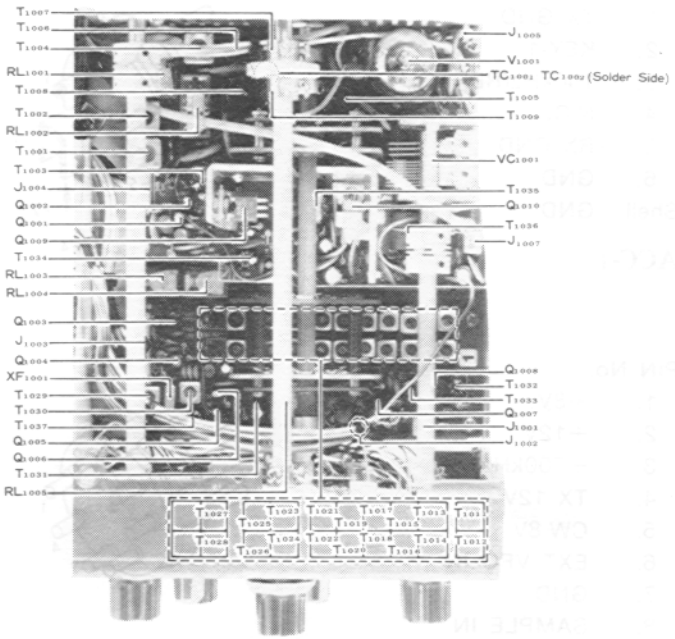
Band	Frequency	Preselect	Transformer	S-meter Reading
3.5	4.000 MHz	8	T_{1004}	Maximum
7.0	7.000 MHz	5	T_{1005}	
10.0	10.000 MHz	6	T_{1006}	
14.0	14.500 MHz	8	T_{1007}	
21.0	21.500 MHz	8	T_{1008}	

4. Remove the SSG and connect the dummy load to the ANT terminal. Set to 29.5 MHz band, 30.000 MHz, PRESELECT to 8, key the transmitter and adjust T_{1009} for maximum power output.

5. Reconnect the SSG to the ANT terminal and adjust TC_{1001} for maximum RX S-meter indication.

6. Remove the SSG and connect the dummy load to the ANT terminal. Set to 28.5 MHz band, 28.500 MHz, and key the transmitter. Adjust the PRESELECT control for maximum power output, and leave at this setting for the next step.

7. Repeat step 5, adjusting TC_{1002}.



RF UNIT

SOLDERING AND DESOLDERING TECHNIQUE ON PRINTED CIRCUIT BOARDS

The FT-102 circuit boards are tough, but mishandling during soldering can cause circuit traces to "lift." While this does not cause permanent damage to the board, much servicing trouble can result, because of the tendency for this lifted trace to break. A few simple precautions will keep your circuit boards in A-1 condition.

1. Use only a 12 to 30-watt chisel-tip soldering iron, with the tip arounded or isolated from AC and DC potential. Voltage at the tip can easily destroy CMOS components.

2. Use only the minimum amount of heat necessary to remove a component, or to cause the solder to "flow" when installing a new component.

3. USE ONLY 60/40 ROSIN CORE SOLDER.

4. Use solder removing braid and flux to absorb excess solder before installing a new component. A solder sucker can also be used, but most be handled with care to avoid lifting traces.

5. Do not attempt to remove DIP ICs without first cutting all of the pins on the component side of the board, unless you have the correct desoldering equipment (spring-loaded clamp and all-pin desoldering tip).

   If you do lift a trace, don't worry! Read on to find out how to repair traces like a pro.

NOTES ON USE OF CMOS COMPONENTS:

As CMOS devices are extremely sensitive to damage from static electricity, special precautions must be observed.

In storage, use only conductive sponge specially designed for CMOS components.

When installing a CMOS part in a socket, or on a circuit board, be certain that the power is off. In addition, the technician should rest his hand on the chassis as the component is inserted, so as to place his hand at the same potential as the chassis (better to discharge small amounts of static electricity through your fingers than through a $5 IC !).

When soldering a CMOS part onto a circuit board, use a low-wattage iron, and be sure to ground the tip with a clip lead, if the tip is not grounded through a three-wire power cord.

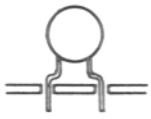
INSERTION OF PARTS ON CIRCUIT BOARDS

All of the below are acceptable ways of inserting components into circuit board mounting holes.

(a) Bend leads slightly

(b) Straight-in mounting

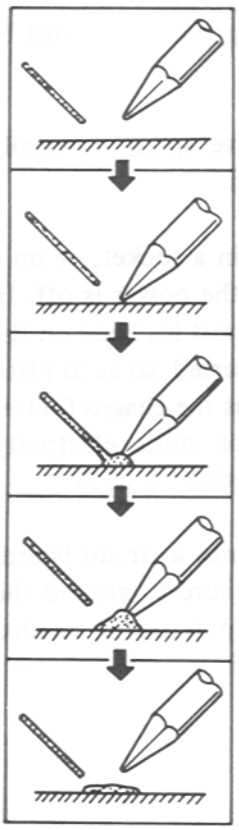
(c) Vertical mounting



(d) Preformed disc ceramic capacitor

(e) Preformed resistor, diode, etc.

BASIC SOLDERING PRACTICE



(1) Prepare soldering iron and solder. The tip of the iron should be thoroughly tinned and wiped clean of excess solder.

(2) Apply soldering iron to surface to be soldered. Do not press the iron into the surface.

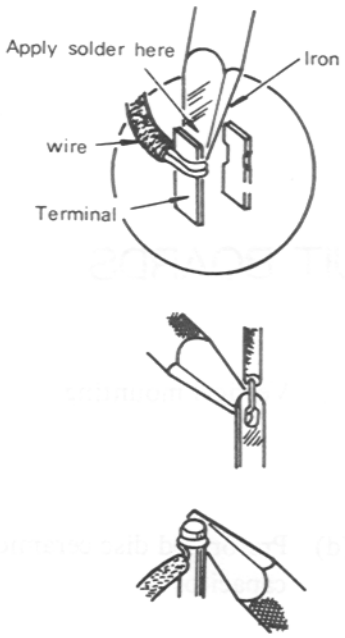
(3) Apply solder to junction of iron and heated surface.

(4) When enough solder is applied, remove solder. Continue to apply heat just until solder flows cleanly.

(5) Remove iron from work. Do not apply more heat than necessary for good solder flow.

Soldering to terminal posts:

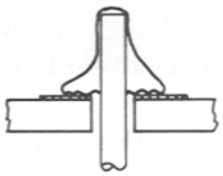
(Be certain to apply heat to both post and wire.)



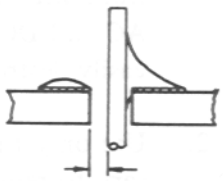
EXAMPLES OF POOR SOLDERING PRACTICE

Unwanted solder bridge connecting two tracks (caused by use of too much solder)

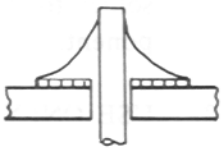
"Cold joint" (caused by insufficient heat to part of work, resulting in poor solder flow)



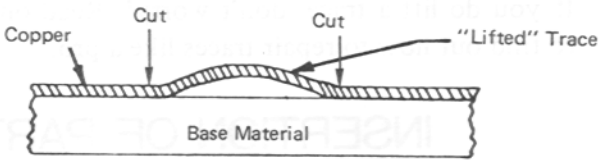
Unstable joint (caused by insufficient heat or solder)

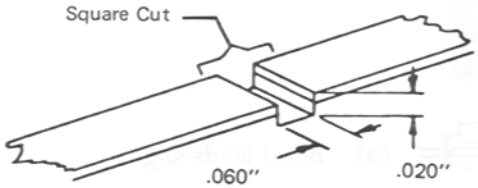


Proper soldering:
A smooth fillet of solder surrounds the lead and just covers the foil pad.



If you have previously lifted a trace, make an etch cut on each side of the lifted trace as shown in the drawing, and install a wire bridge.





Coat Cut Area With Eastman 910
After Soldering Wire Bridge

TYPICAL PART FAILURES, CAUSES AND SYMPTOMS

PARTS	CAUSE OF TROUBLE	SYMPTOMS
Semiconductors (IC, FET, TR)	High supply voltage Open circuit Excessive drive High temperature	Short or open circuit Output decreases to 1/2 at 80°C Internal noise Instability
MOS FET MOS IC	Static electricity	Total failure Short or open circuit
Crystal Crystal filter	Shock High temperature Aging	No oscillation Off frequency Frequency drift Filter bandpass change
Resistor	Excessive power High temperature	Component burned Value changed Open circuit
Potentiometer	Excessive power Shock Dust or oil Wear	Component burned Open circuit Noise Unsmooth rotation
Capacitor	Excess voltage High temperature Aging	Shorted Leakage Open/decreased capacitance
Variable capacitor Trimmer capacitor	Ratings exceeded Dust between plates Shock, forced rotation	Shorted Leakage Unsmooth rotation
Coils	Ratings exceeded Misadjusted Core or bobbin broken	Open or short circuit Leakage or shorted turns Detuned
Switch	Ratings exceeded Aging Dust or oil	Poor contact Unsmooth operation Open circuit
Relay	Ratings exceeded Humidity Dust or oil on contacts	Coil open Poor or intermittent contact Noise

MODIFICATION PROCEDURES

This section includes modifications that were developed for the FT-102 for special operating requirements, as well as for improved transceiver performance. Also included are modifications that must be made in accessory equipment for use with the FT-102.

Modifications to improve transceiver performance have been incorporated into the production line at some point in time, so that those transceivers produced after that time do not require the modification. Each procedure indicates the range of serial numbers that were not modified when they left the factory. Serial numbers are composed of a letter and a number, indicating the date of manufacture, followed by six digits. The first two digits (closest to the date code) are the Production Lot number. So, for example, serial number 0C123456 is from Production Lot 12, set number 3456. Before making any modification, make sure that the procedure to be followed applies to the Lot number of the particular transceiver being modified.

In some cases, the need for a modification did not exist originally, but became necessary later due to other changes in the transceiver circuitry made during the course of production. In such situations, the modification procedures which follow indicate a certain production lot prior to which the modification should not be performed. If any of the modifications are carried out on sets from production lots other than those specified, performance may be degraded.

Also, before making any modification, check to see if the intended modification has already been carried out by a Yaesu agent, dealer or previous owner.

Most of the following modifications require removal of the transceiver covers, and some require access to the RF Unit. These procedures are detailed here:

Cover Removal

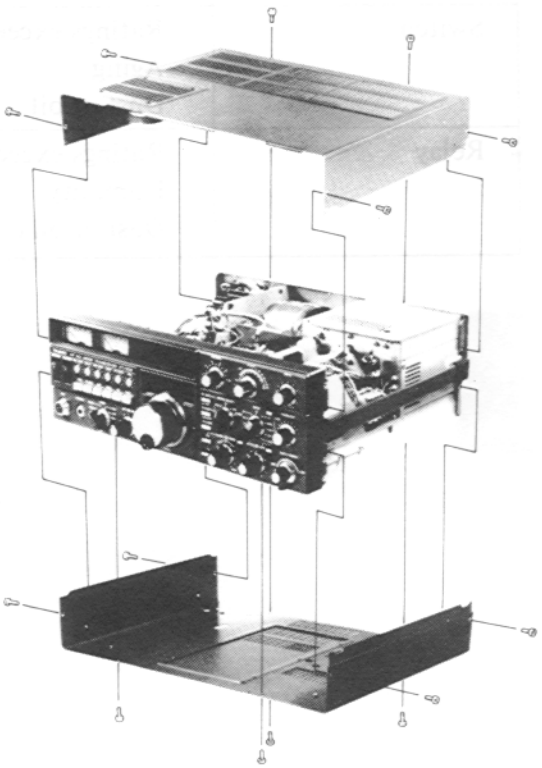
Disconnect the transceiver from the power source. Remove the two screws affixing the carrying handle, and then the fourteen screws affixing the top and bottom covers, as shown on this page. Remove the handle and covers, and stand the transceiver on its left side.

RF Unit Access (Solder side)

Disconnect and remove the optional AM/FM Unit, if installed. Referring to page 38 of the Instruction Manual for Unit locations, remove the four screws from the AF Unit (PB-2344), and gently fold it over the VFO. Then remove the two machine screws affixing the shield panel that was behind the AF Unit, and remove the panel from the main chassis, using care to avoid bending the 7-lug terminal strip that also mounts under one of the panel screws. The solder side of the RF Unit is now accessible.

WARNING

HIGH VOLTAGE IS PRESENT INSIDE THE TRANSCEIVER, AND IS RETAINED IN THE HIGH VOLTAGE CAPACITORS EVEN WHEN THE POWER IS OFF AND THE POWER SOURCE DISCONNECTED. BEFORE REMOVING THE COVERS TO WORK ON THE TRANSCEIVER, ALWAYS DISCONNECT THE POWER CORD AND ALLOW A FEW MINUTES FOR THE CAPACITORS TO DISCHARGE. DURING ALIGNMENT, USE EXTREME CAUTION TO AVOID TOUCHING ANY METAL PARTS INSIDE THE CHASSIS WITH FINGERS OR METAL TOOLS.



Keyclick

This modification is provided to remedy possible keyclick trouble with FT-102s having serial numbers between XX030001 and XX069999. Keyclicks were not a problem in the first two production lots, but appeared after certain other modifications were carried out in production. This modification has already been incorporated in later production lots (after Lot 6).

1. On the component side of the RF Unit, install a 1 μF, 50 WV electrolytic capacitor, as shown in Figures 1 and 2. The positive lead of the capacitor is soldered to the lead of R1045, and the negative lead to the TEST PIN (G1).

2. Referring to Figures 3 and 4, cut the white wire connected to J4017 on the Local Unit, and wrap the end of the white wire with insulating tape to prevent it from shorting to other parts.

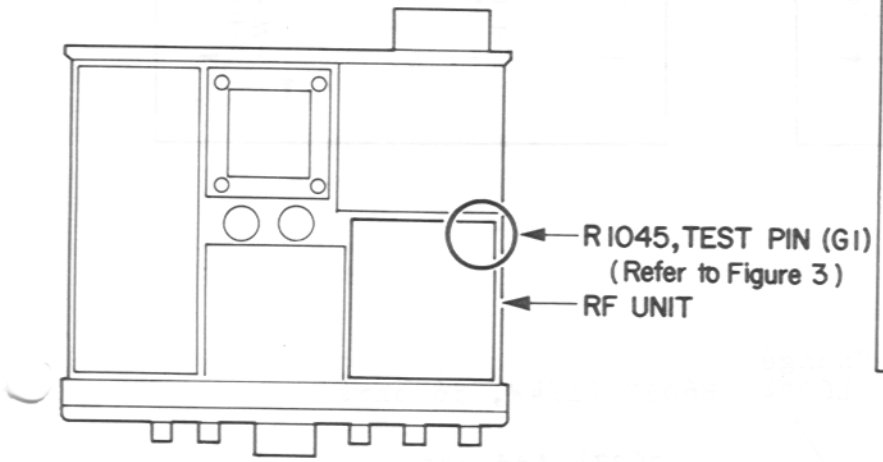


Figure 1 TOP VIEW

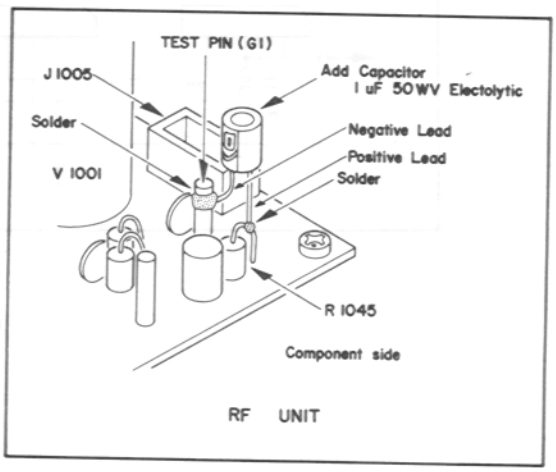


Figure 2

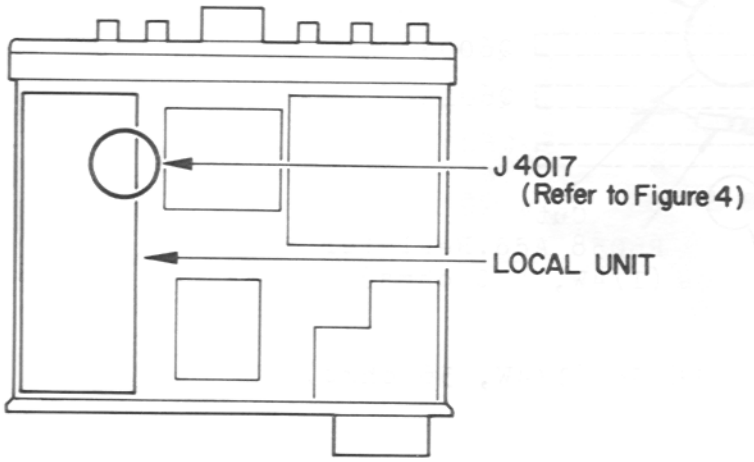


Figure 3 BOTTOM VIEW

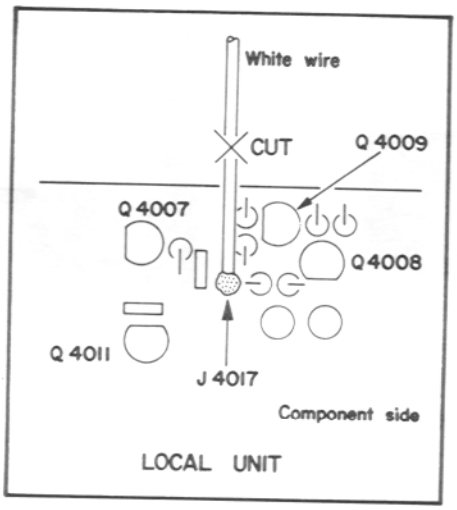


Figure 4

FM Unit Protection

This modification can be adopted in the early models of the FM Unit in the FT-102, in order to prevent damage to the TC5081AP used in the Unit.

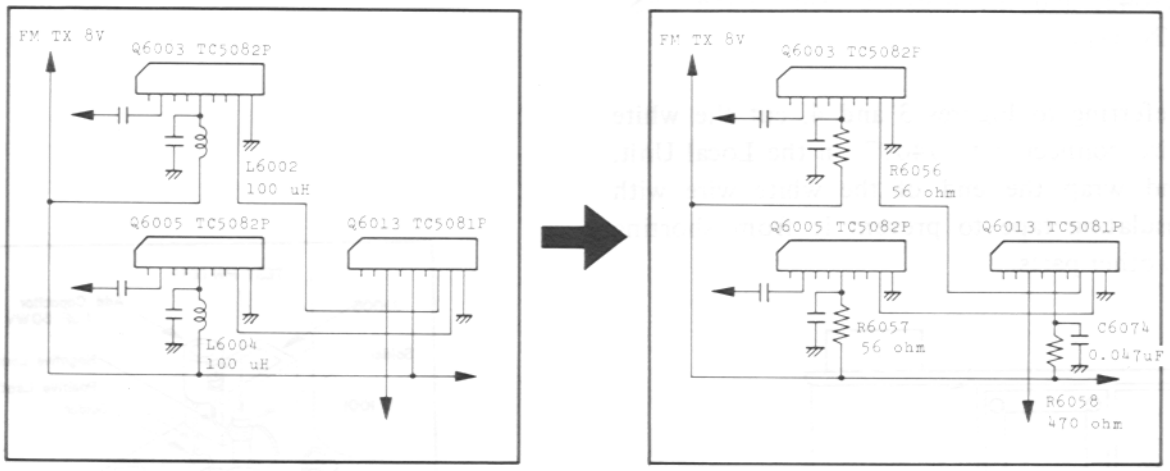
1. Remove the FM Unit from the transceiver, and L6002 and L6004 from the Unit.

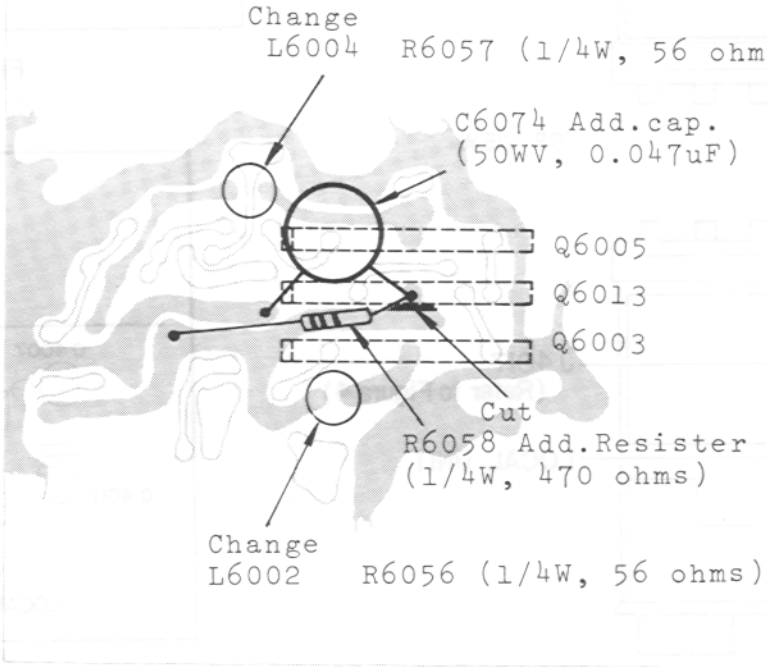
2. Install 56-ohm resistors in the same locations where L6002 and L6004 were installed.

3. On the solder side of the Unit, cut the copper pattern connected to pin 5 of Q6013, and solder a 470-ohm resistor across the cut.

4. Solder a 0.047μF disc ceramic capacitor between pin 5 of Q6013 and ground.

5. Replace the FM Unit in the transceiver and reconnect all plugs.





VIEWED FROM SOLDER SIDE

24.5 MHz ALC Reduction

This modification increases the drive level during transmission on the 24.5 MHz band in those transceivers having serial numbers under XX-080001. Later sets have this modification already incorporated.

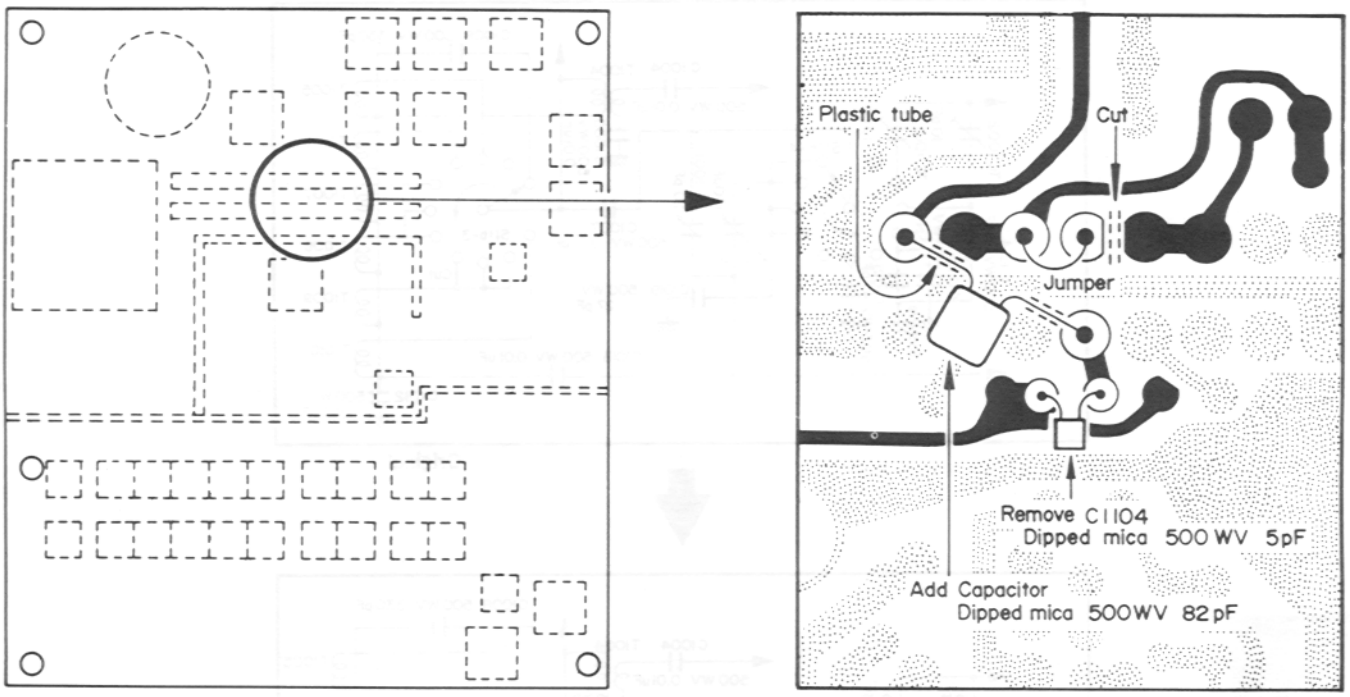
1. Referring to the diagrams below, locate the places on the solder side of the RF Unit where the terminals from the stationary contacts of bandswitch wafers S11b-3 and S11b-4 are soldered to the RF Unit. Carefully cut the foil pattern to isolate the 24.5 MHz pad of wafer S11b-3 as shown. Make sure it is the right place before cutting.

2. Install a small jumper between the 24.5 MHz pad isolated in the previous step and the 21 MHz pad on the opposite side from the cut.

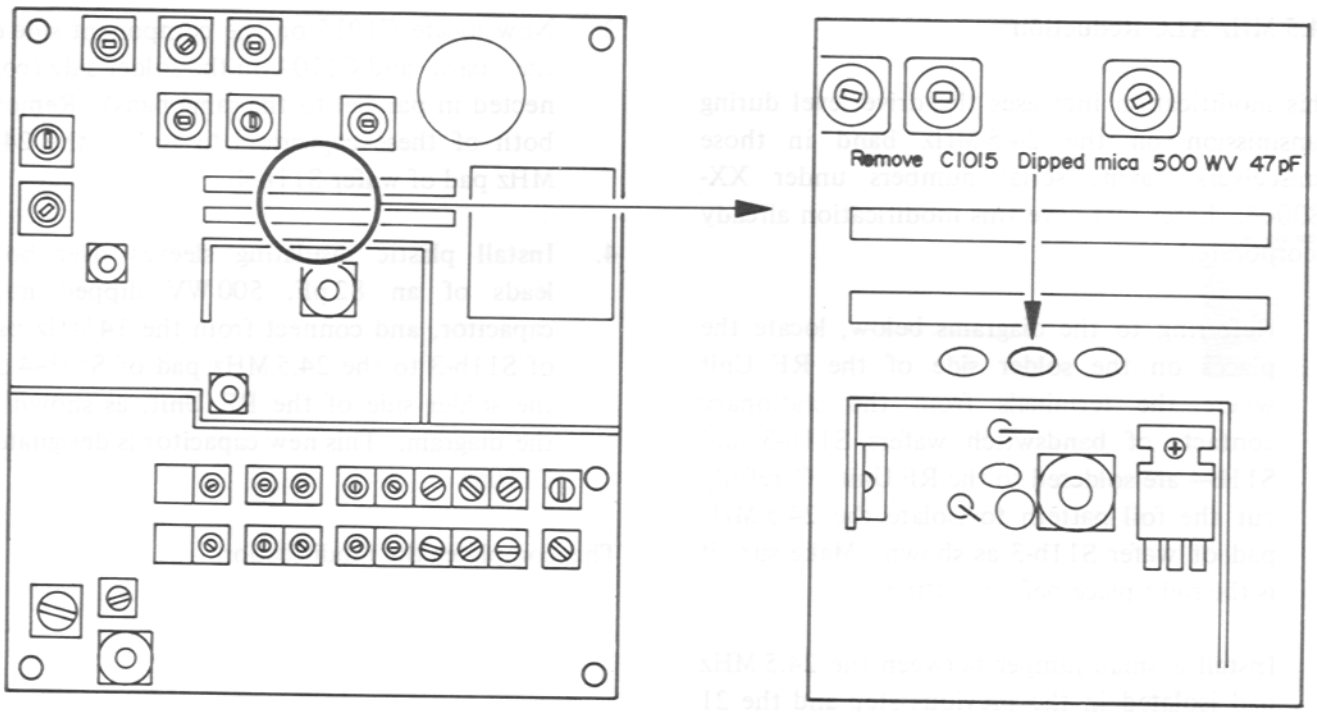
3. Now locate C1015 on the component side of the board, and C1104 on the solder side (connected in parallel to the same pads). Remove both of these capacitors to isolate the 24.5 MHz pad of wafer S11b-4.

4. Install plastic insulating sleeves over both leads of an 82 pF, 500 WV dipped mica capacitor, and connect from the 14 MHz pad of S11b-3 to the 24.5 MHz pad of S11b-4 on the solder side of the RF Unit, as shown in the diagram. This new capacitor is designated C1108.

This completes the modification.

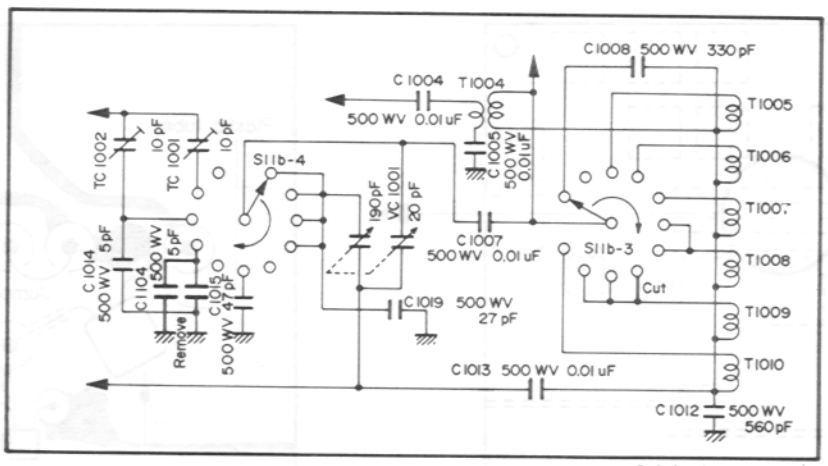


RF UNIT

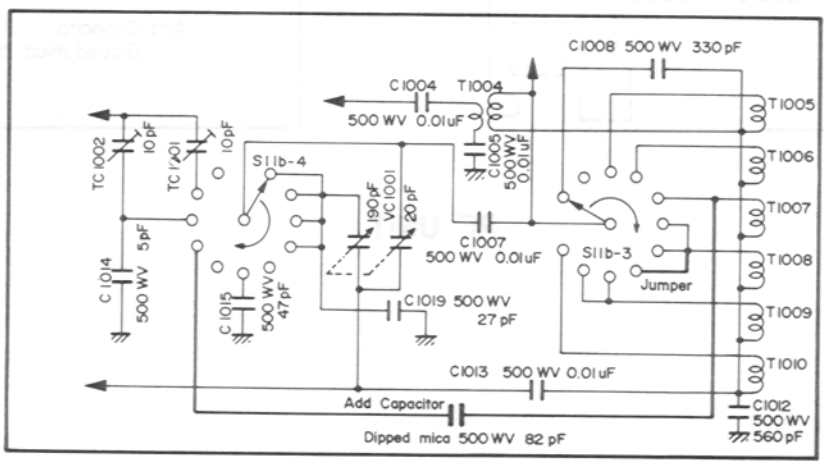


Component side

RF UNIT



Original



After modification

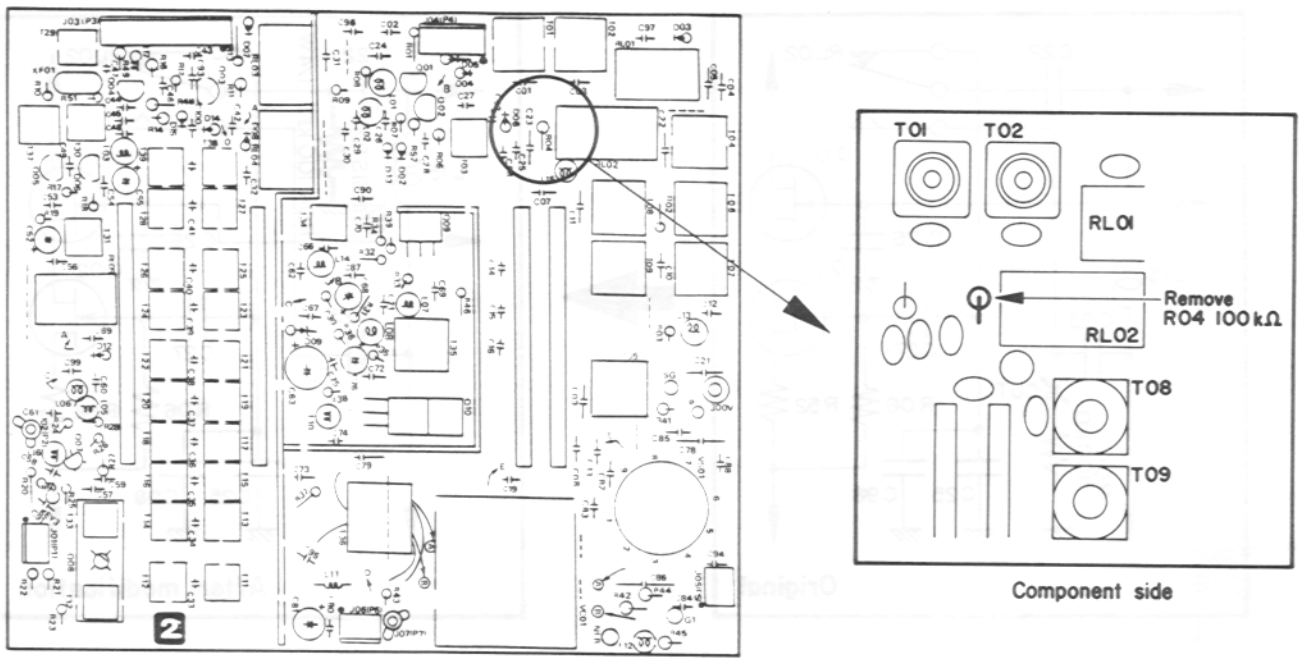
Receiver RF Amplifier Protection

This modification provides better protection for the RF amplifier FETs from spikes that may appear at the input for those FT-102s having serial numbers below XX040000. It has been incorporated in all transceivers from Lot 4.

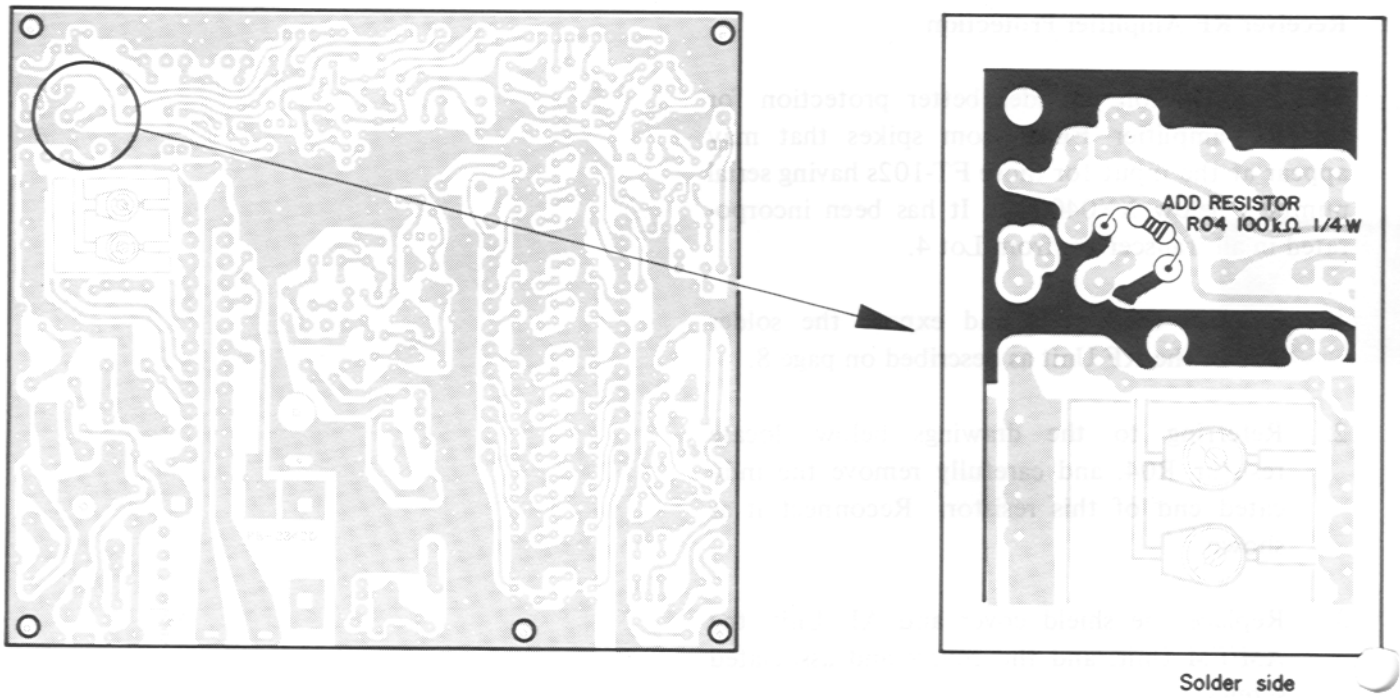
1. Remove the covers and expose the solder side of the RF Unit as described on page 8.

2. Referring to the drawings below, locate resistor R04, and carefully remove the indicated end of this resistor. Reconnect it as shown.

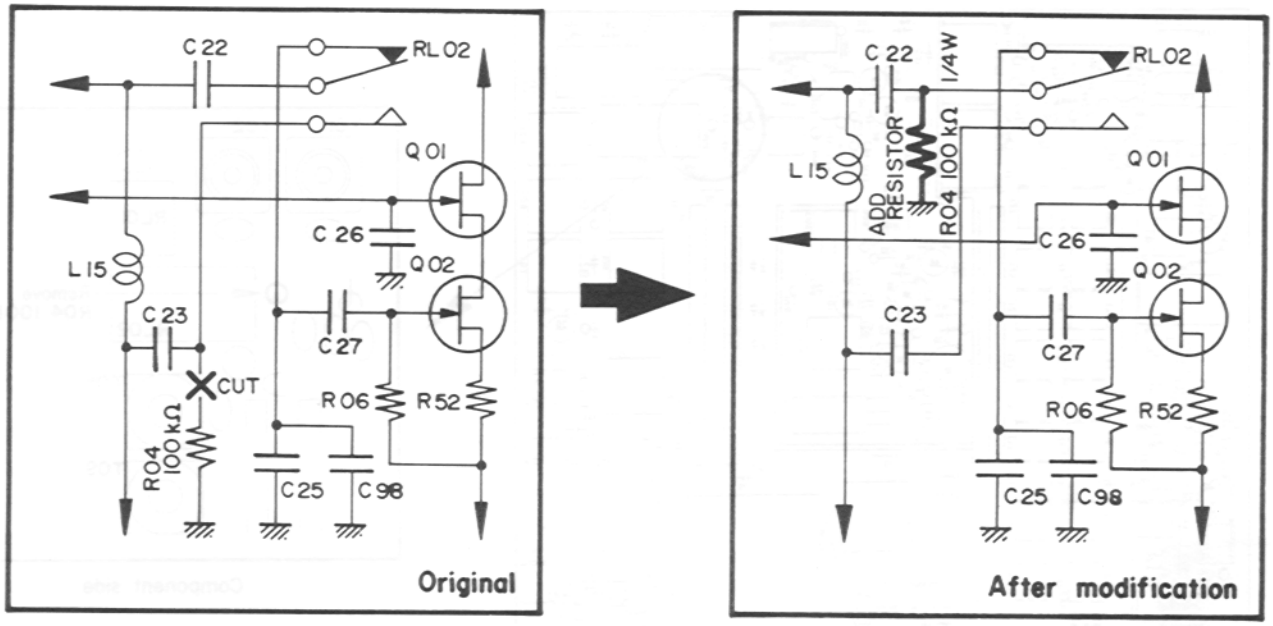
3. Replace the shield cover and AF Unit, the AM/FM Unit, and the covers and associated screws.



RF UNIT


ADD RESISTOR
R04 100kΩ 1/4W
Solder side

RF UNIT


C22
RL02
Q01
C26
Q02
L15
C23
C27
CUT
R06
R52
R04
100kΩ
C25
C98
Original
C22
1/4W
RL02
L15
ADD
RESISTOR
R04 100kΩ
Q01
C26
Q02
C23
C27
R06
R52
C25
C98
After modification

Receiver Spurious Reduction

This modification serves to reduce the spurious signals of the receiver in the amateur bands in those FT-102s having serial numbers below XX040000.

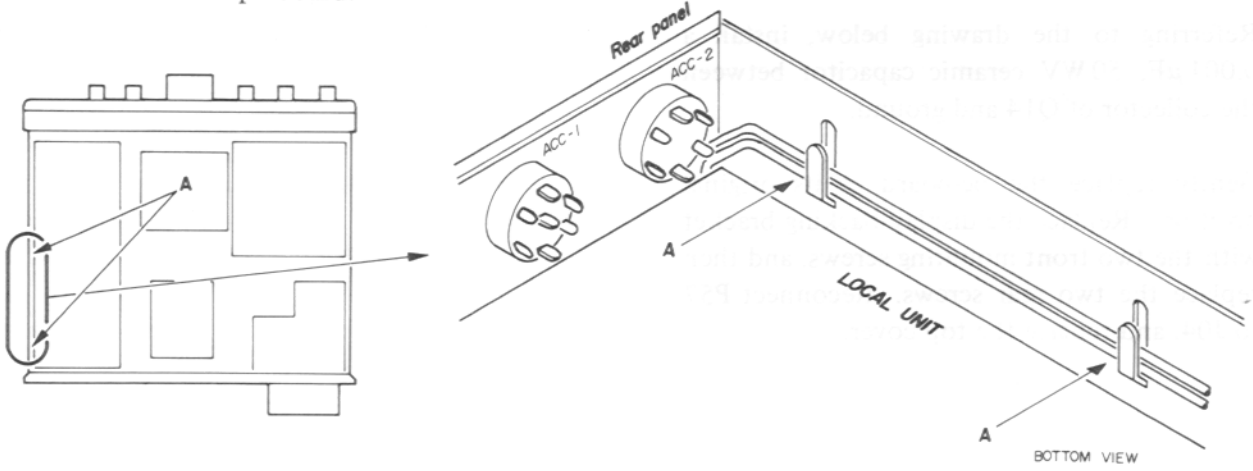
1. Lay the transceiver upside down on the work surface, and remove the bottom cover.

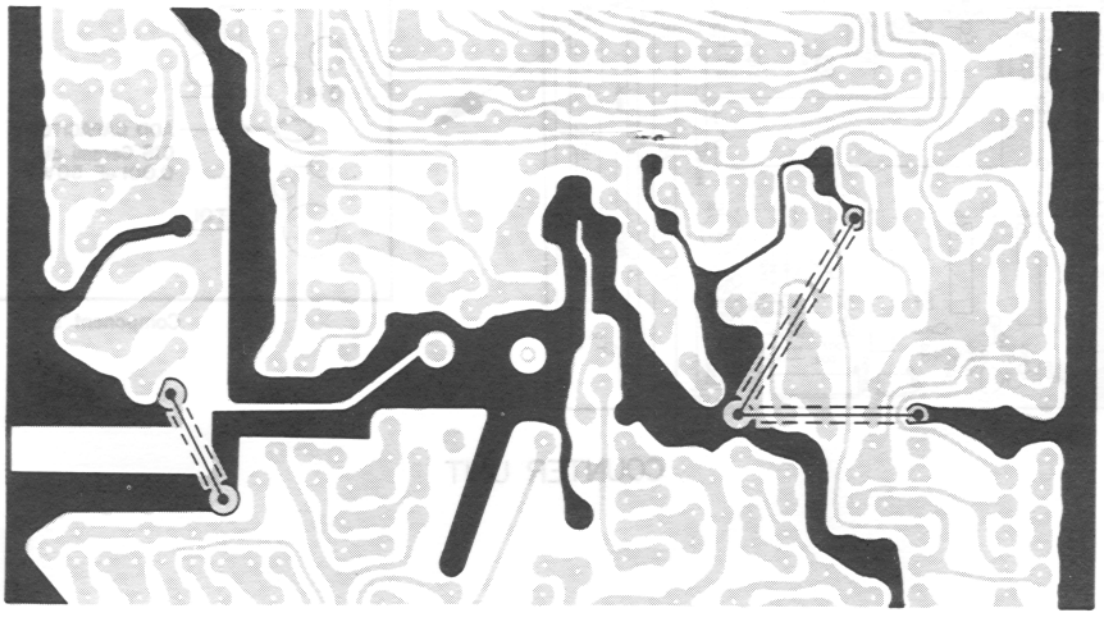
2. Referring to the diagrams below, carefully bend the two chassis clips (marked A) slightly inwards about 5 mm, so that the two gray shielded cables can be removed from the clips. It is not necessary to disconnect these cables from the pc-board.

3. Remove the seven screws affixing the Local Unit (PB-2345), and carefully lift the outer edge of the board, folding it towards the middle of the transceiver so that the solder side is exposed.

4. Referring to the local unit diagram below, install heavy wire or copper straps insulated with plastic sleeving in the three locations shown, connecting the ground patterns on the Local Unit.

5. Replace the Local Unit and its screws, reinstall the gray cables in the chassis clips and bend them back into place, and replace the cover.





Solder side

LOCAL UNIT

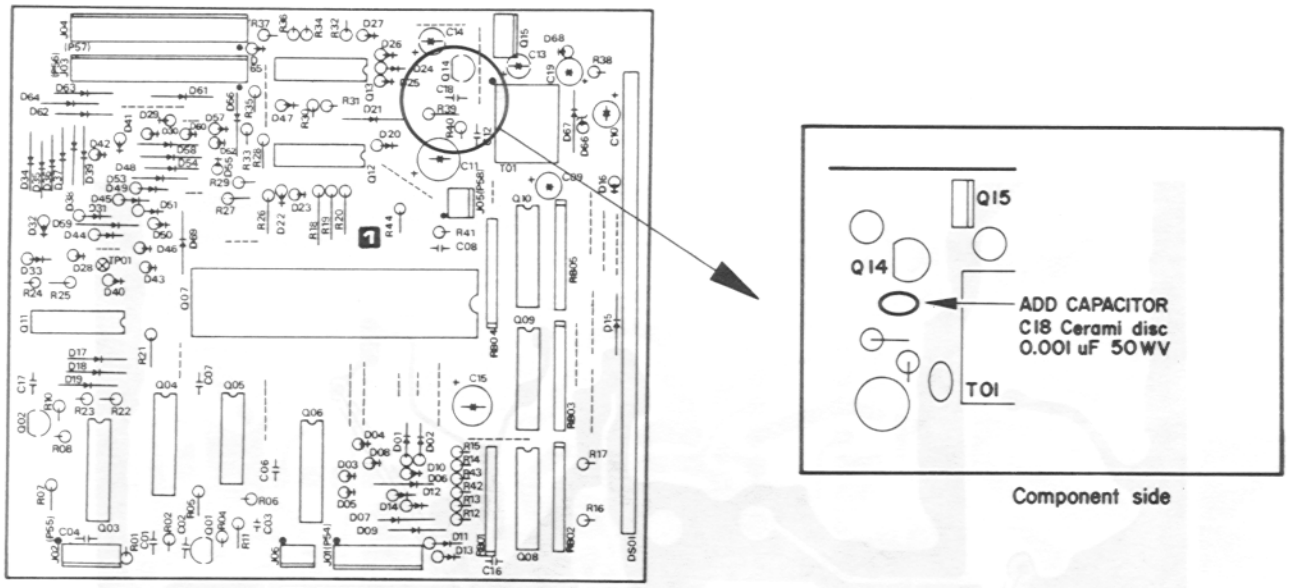
Counter Noise Reduction

This modification will reduce drifting counter noise that may appear on the lower frequency bands in those FT-102s having serial numbers below XX040000. It has been incorporated into production from Lot 4.

1. Remove the top cover, and without pulling on the wires, remove P57, the 13-pin connector plug nearest the edge of the Counter Unit (PB-2346A). Then remove the four screws affixing the Unit, and slide the pc-board back so that it can be tipped up to expose the solder side.

2. Referring to the drawing below, install a 0.001 μF, 50 WV ceramic capacitor between the collector of Q14 and ground.

3. Gently replace the pc-board in its original position. Replace the display-backing bracket with the two front mounting screws, and then replace the two rear screws. Reconnect P57 to J04, and replace the top cover.



COUNTER UNIT

B. 10-meter Band Modification

The procedure for this modification is the same for all models. DO NOT perform this modification if Modification A has been performed.

It requires the sacrifice of all but one existing 10-meter 500 kHz segment. The new segment will be selected when the BAND selector and switch are set to the same position as used for the 10-meter segment being replaced.

1. Perform steps 1, 2 and 3 of the previous modification procedure.
2. Install 1SS53 diodes (white band) on the solder side of the Local Unit at the locations shown in Figure 5, making sure that the banded ends of the diodes are aligned as indicated. Install D_D for 28.0 – 28.5 MHz, or D_E for 28.5 – 29.0 MHz (DO NOT INSTALL BOTH). Then perform step 5 of the previous modification procedure.

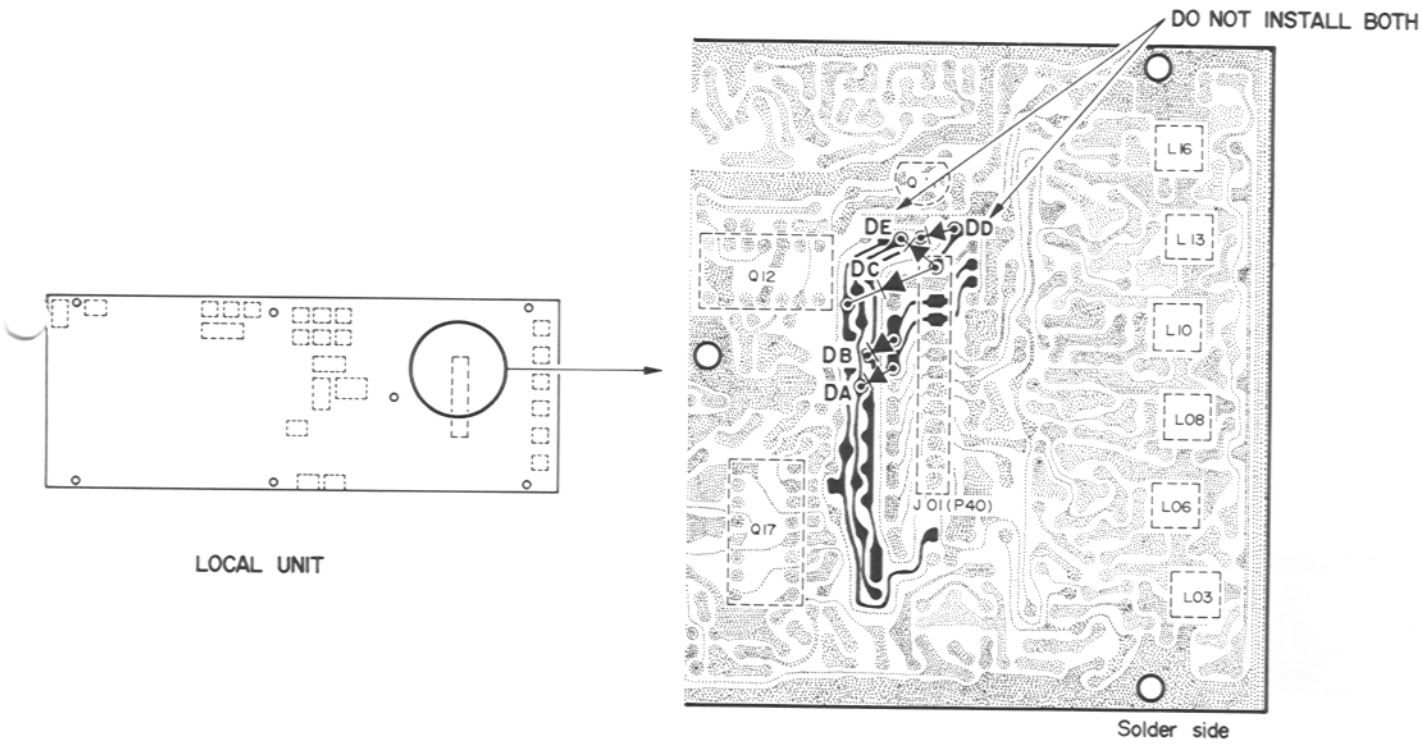


Figure 5

MEMO

— MEMO —

MODIFICATION OF THE FTV-901R TRANSVERTER FOR USE WITH THE FT-102 TRANSCEIVER

This modification enables the FTV-901R to be used with those FT-102s having serial numbers above 030000 for VHF and/or UHF operation. Earlier FT-102s should first be modified by an authorized Yaesu agent.

Parts required:

One ALC AMP Unit, Part No. C022940
One Connection Cable E, Part No. T9101282, shown in Fig.
One 24-centimeter length of hookup wire

1. Remove the twelve screws affixing the top and bottom covers of the FTV-901R, and remove the covers (Figure 1).

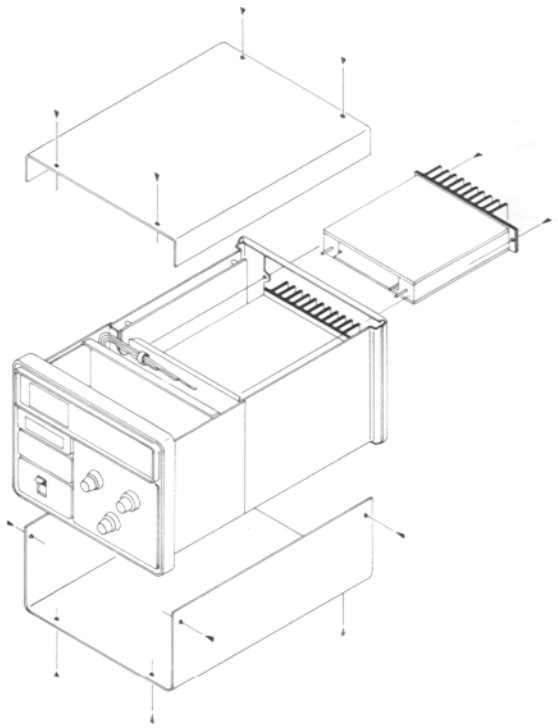


Figure 1

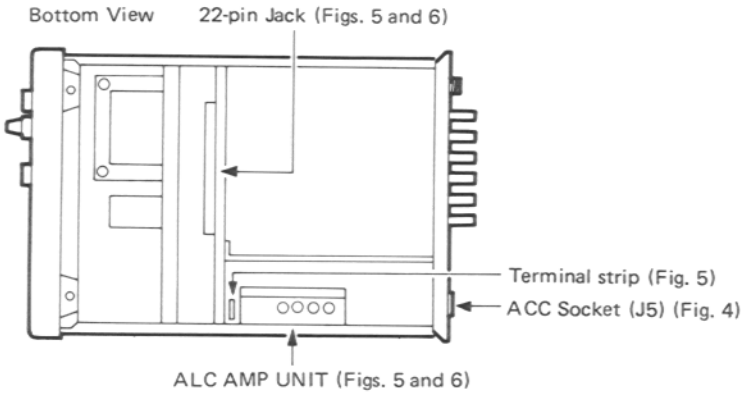


Figure 2

2. On POWER switch S2a, disconnect the blue wire from the OFF terminal, and reconnect this wire to the ON terminal, as shown in Figure 3.

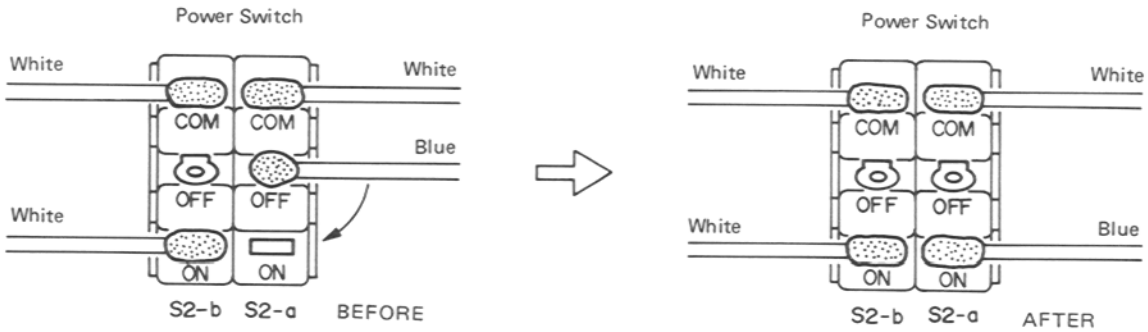


Figure 3

3. On the ACC socket (J5), disconnect the large white wire from pins 2 and 5, and reconnect this wire to the ground terminal at the socket, as shown in Figure 4. Also, if a diode is connected to pins 1 and 4 of the ACC socket (early models), remove this diode from the transverter.

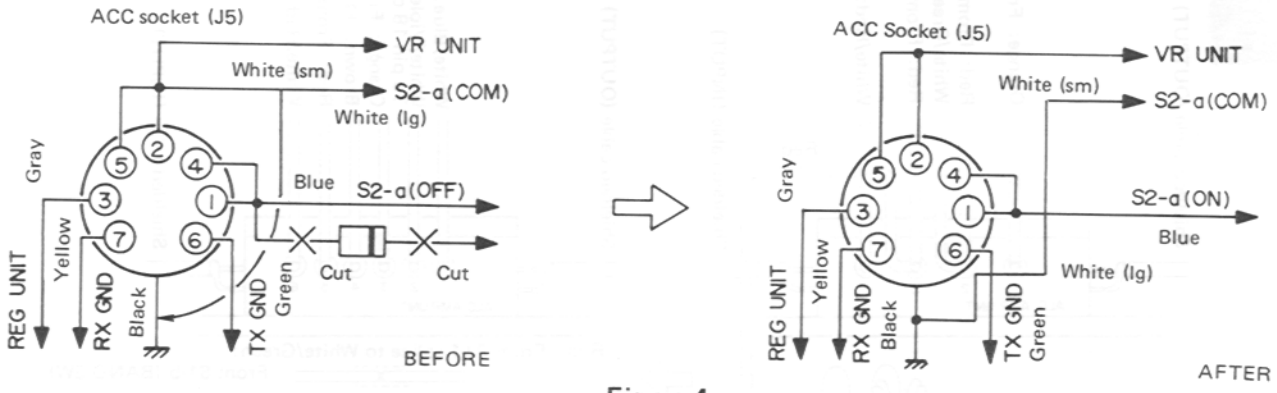


Figure 4

4. If the serial number of the FTV-901R is below 030000, perform the following procedure and skip part 5. Otherwise, skip this part and proceed directly to part 5.

   a. Note on tags the connection point of each red wire connecting to the ALC AMP Unit and tape a tag to each of these wires. Then disconnect all wires (two shielded, three red, and one each orange, white/green and white/red).

   b. Remove the four screws in the side of the chassis affixing the ALC AMP Unit, and replace the original Unit with the new ALC AMP Unit (Part No. C022940).

   c. Reconnect the wires to the new Unit as shown in Figure 5 and described below:

      1. Connect the input shielded wire to the input terminal, and the output shielded wire to the output terminal of the ALC AMP Unit.

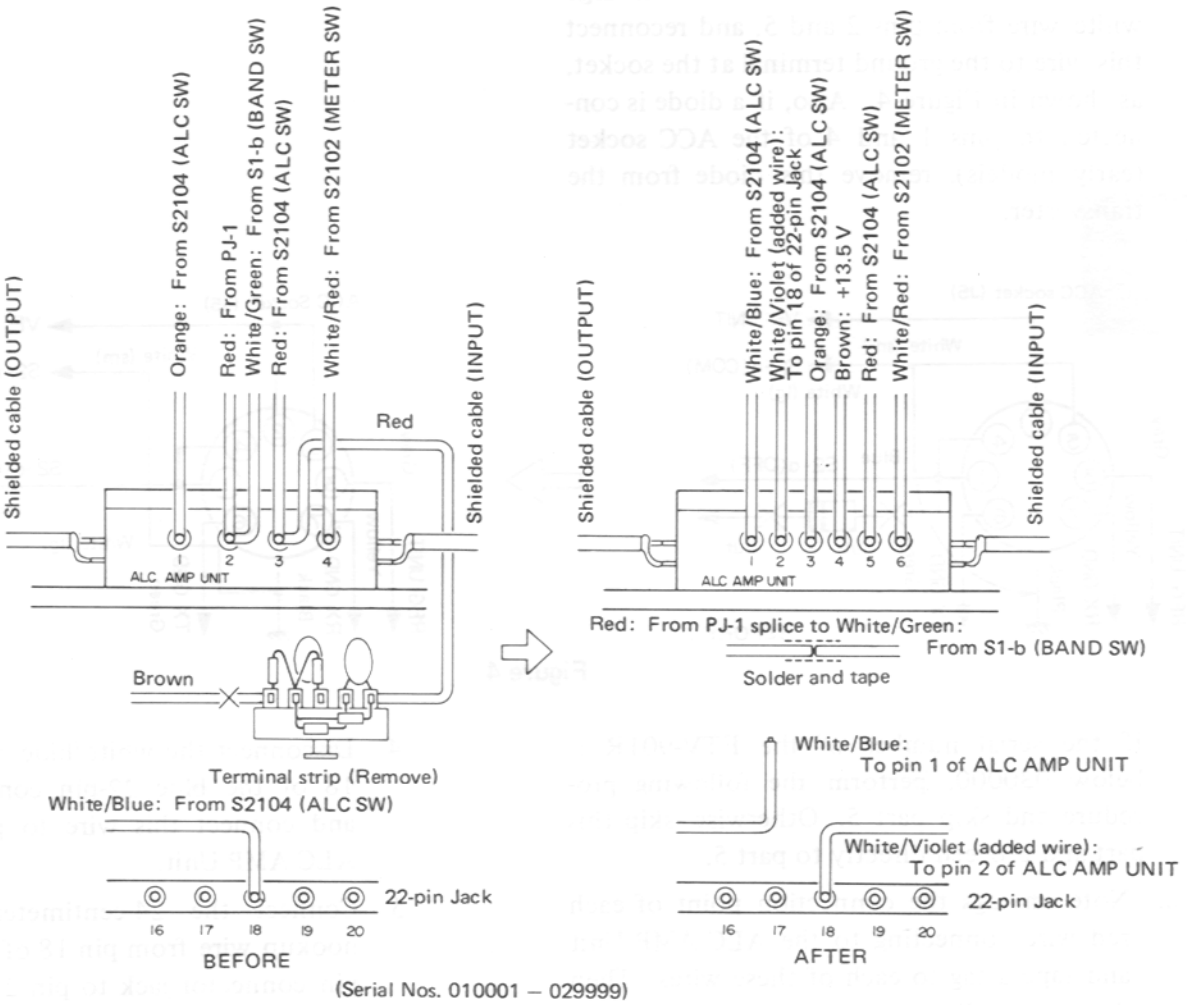
      2. Disconnect the brown wire from the terminal strip, and connect this wire to pin 4 of the ALC AMP Unit. Now remove the terminal strip, together with its components and red wire, from the transverter.

      3. Splice the red wire removed from pin 2 of the old ALC AMP Unit directly to the white/green wire, and carefully insulate the splice with plastic tape.

      4. Disconnect the white/blue wire from pin 18 of the blue 22-pin connector jack, and connect this wire to pin 1 of the ALC AMP Unit.

      5. Connect the 24-centimeter length of hookup wire from pin 18 of the blue 22-pin connector jack to pin 2 of the ALC AMP Unit.

      6. Connect the orange wire, removed from pin 1 of the old ALC AMP Unit, to pin 3 of the new Unit. Then connect the red wire removed from pin 3 of the old Unit to pin 5 of the new Unit. Finally, connect the white/red wire, removed from pin 4 of the old Unit, to pin 6 of the new ALC AMP Unit. Skip the next part and proceed to part 6.

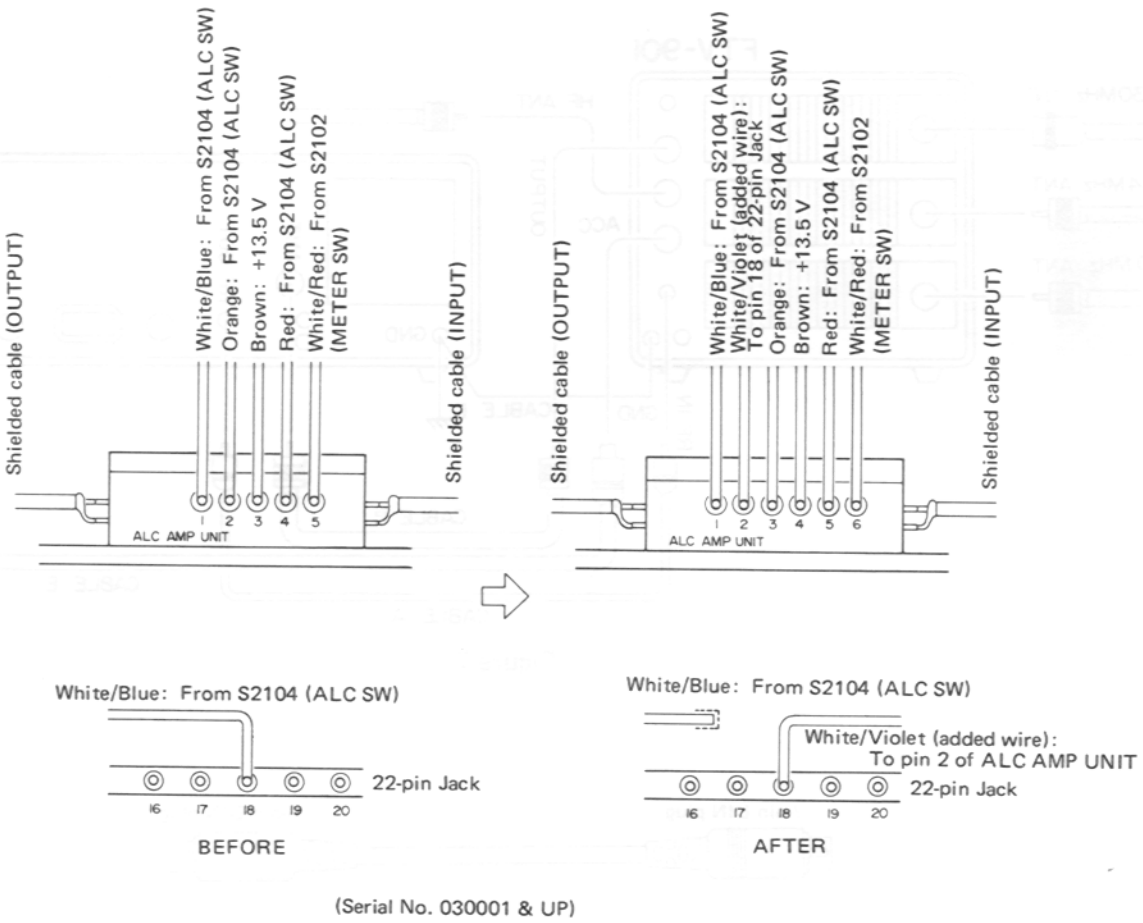


(Serial Nos. 010001 – 029999)

Figure 5

5. For those FTV-901Rs with serial number above 030000, perform the following procedure.
   a. Disconnect all wires from the ALC AMP Unit (two shielded, and one each orange, brown, red, white/blue and white/red).
   b. Remove the four screws in the side of the chassis affixing the ALC AMP Unit, and replace the original Unit with the new ALC AMP Unit (Part No. C022940).
   c. Reconnect the wires to the new Unit as shown in Figure 6 and described below:
      1. Connect the input shielded wire to the input terminal, and the output shielded wire to the output terminal of the ALC AMP Unit.
      2. Connect the wires removed from the old ALC AMP Unit to the new Unit: white/blue to pin 1, orange to pin 3, brown to pin 4, red to pin 5, and white/red to pin 6.
      3. Disconnect the white/blue wire from pin 18 of the blue 22-pin connector jack, and carefully insulate the end of this wire with plastic tape.
      4. Connect the 24-centimeter piece of hookup wire from pin 18 of the 22-pin jack to pin 2 of the new ALC AMP Unit.

6. Modification is now complete. Replace the top and bottom covers of the FTV-901R and their twelve screws, and connect the transverter to the FT-102 as shown in Figure 7.



(Serial No. 030001 & UP)

Figure 6

CAUTION

ONCE THE FTV-901R HAS BEEN MODIFIED IT MUST NOT BE USED WITH ANY MODEL TRANSCEIVER OTHER THAN THE FT-102, OR SEVERE DAMAGE TO THE EQUIPMENT MAY RESULT.

WHENEVER USING THE FTV-901R WITH THE FT-102 BE ABSOLUTELY CERTAIN THAT THE HEATER SWITCH ON THE FT-102 IS OFF, AND THAT THE TUBES HAVE HAD AT LEAST 30 SECONDS TO COOL.

WHEN USING THE FTV-901R WITH THE FT-102, THE IF MONITOR OF THE FT-102 WILL NOT FUNCTION NORMALLY. ALTHOUGH IT MAY SOUND DISTORTED, THIS IS NOT AN INDICATION OF DISTORTION OF THE OUTPUT OF THE FTV-901R.

ALSO, WHEN TRANSMITTING WITH THE FT-102 AND FTV-901R, THE IC, PO AND ALC METER FUNCTIONS IN THE FT-102 ARE DISABLED, AS WELL AS THE PLATE AND LOAD CONTROLS.

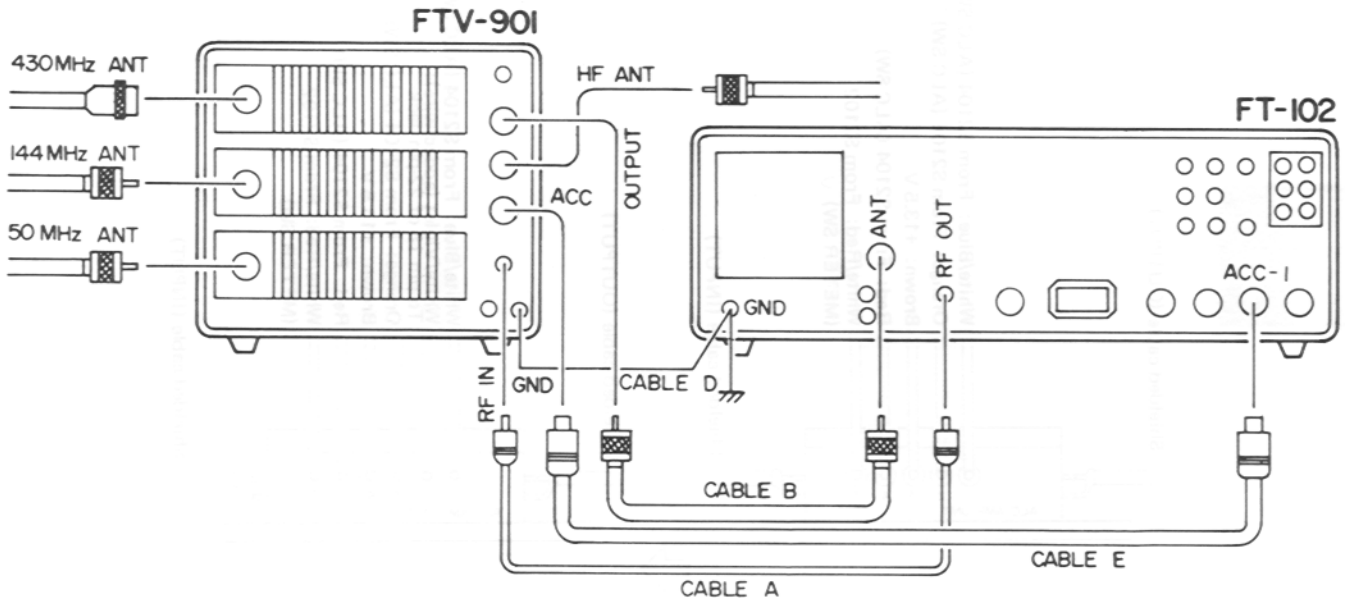


Figure 7

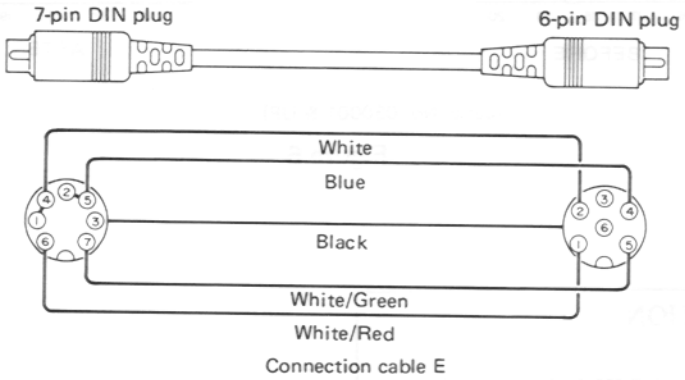


Figure 8

MODIFICATION OF THE FTV-107 TRANSVERTER FOR USE WITH THE FT-102 TRANSCEIVER

This modification enables the FTV-107 to be used with those FT-102s having serial numbers above 030000 for VHF and/or UHF operation. Earlier FT-102s should first be modified by an authorized Yaesu agent.

Parts required:

One Connection Cable E, Part No. T9101283, shown in Fig. 4
One 47-ohm, 2-watt wire-wound resistor, part No. J31336470
One piece of hookup wire, approximately 20 centimeters long
One piece of vinyl insulation sleeve

1. Remove the fourteen screws affixing the top and bottom covers of the FTV-107, and remove the covers. (Figure 1.)
2. Rewire POWER switch S02 as described below and shown in Figure 2.
   a. Disconnect the yellow wire from the COM terminal of switch section S02-b and insulate the end of this wire with plastic tape.
   b. Connect the 20 cm piece of hookup wire from this COM terminal to the ground terminal of the meter.
   c. Disconnect the yellow wire from the ON terminal of the switch, and also insulate the end of this wire with plastic tape.
   d. Disconnect the red wire from the ON terminal of the S02-a section of the switch, and connect this wire to the ON terminal of the S02-b section, as shown in the Figure.
   e. Cut the insulation sleeve in half, and install over each lead of the 47-ohm resistor. Then connect the resistor from the ON terminal of S02-a to the meter lamp.
3. Replace the top and bottom covers and their screws, and connect the FT-102 to the FTV-107 as shown in Figure 3. This completes the modification.

CAUTION

ONCE THE FTV-107 HAS BEEN MODIFIED IT MUST NOT BE USED WITH THE FT-107, FT-ONE, OR ANY TRANSCEIVER OTHER THAN THE FT-102, OR SEVERE DAMAGE TO THE EQUIPMENT MAY RESULT.
WHENEVER USING THE FTV-107 WITH THE FT-102 BE ABSOLUTELY CERTAIN THAT THE HEATER SWITCH ON THE FT-102 IS OFF, AND THAT THE TUBES HAVE HAD AT LEAST 30 SECONDS TO COOL.
WHEN USING THE FTV-107 WITH THE FT-102, THE IF MONITOR OF THE FT-102 WILL NOT FUNCTION NORMALLY. ALTHOUGH IT MAY SOUND DISTORTED, THIS IS NOT AN INDICATION OF DISTORTION OF THE OUTPUT OF THE FTV-107. ALSO, WHEN TRANSMITTING WITH THE FT-102 AND FTV-107, THE IC, PO AND ALC METER FUNCTIONS IN THE FT-102 ARE DISABLED, AS WELL AS THE PLATE AND LOAD CONTROLS.

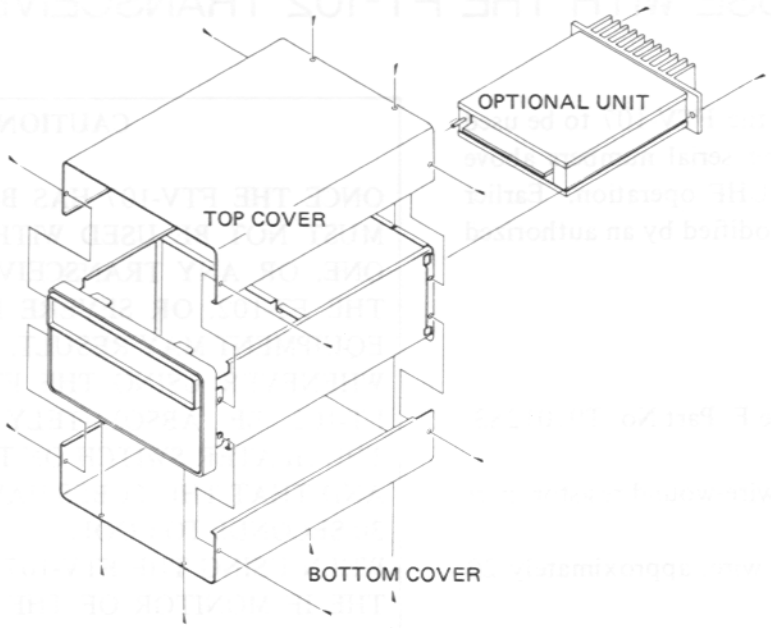
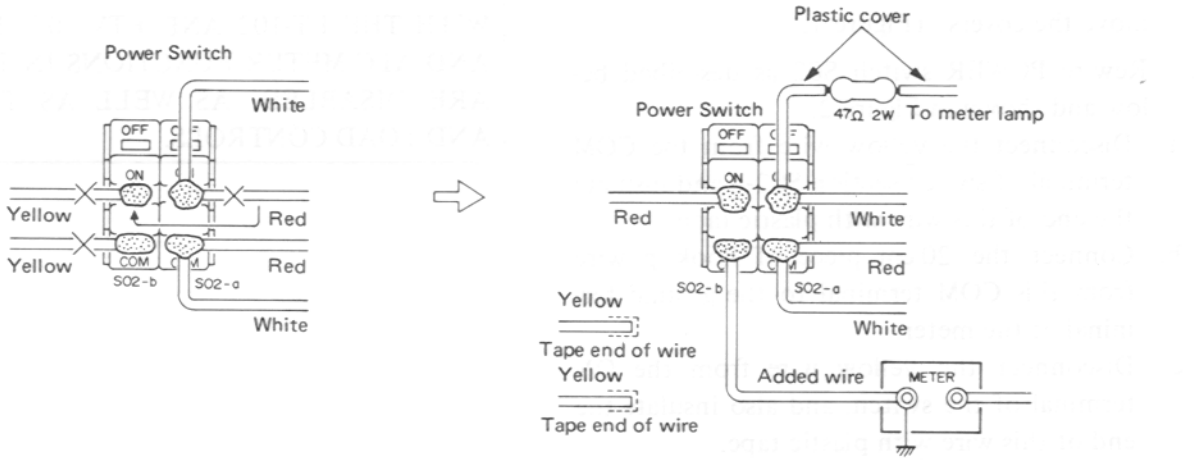


Figure 1



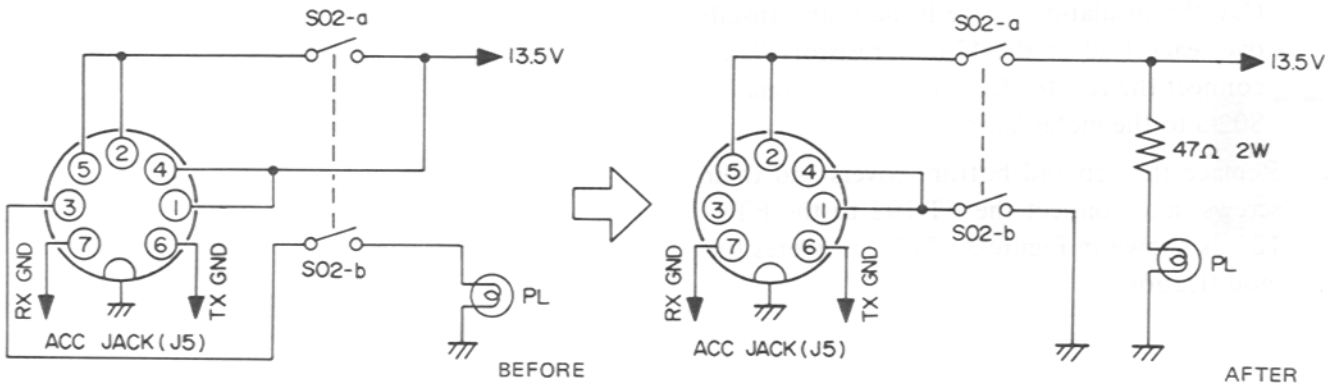


Figure 2

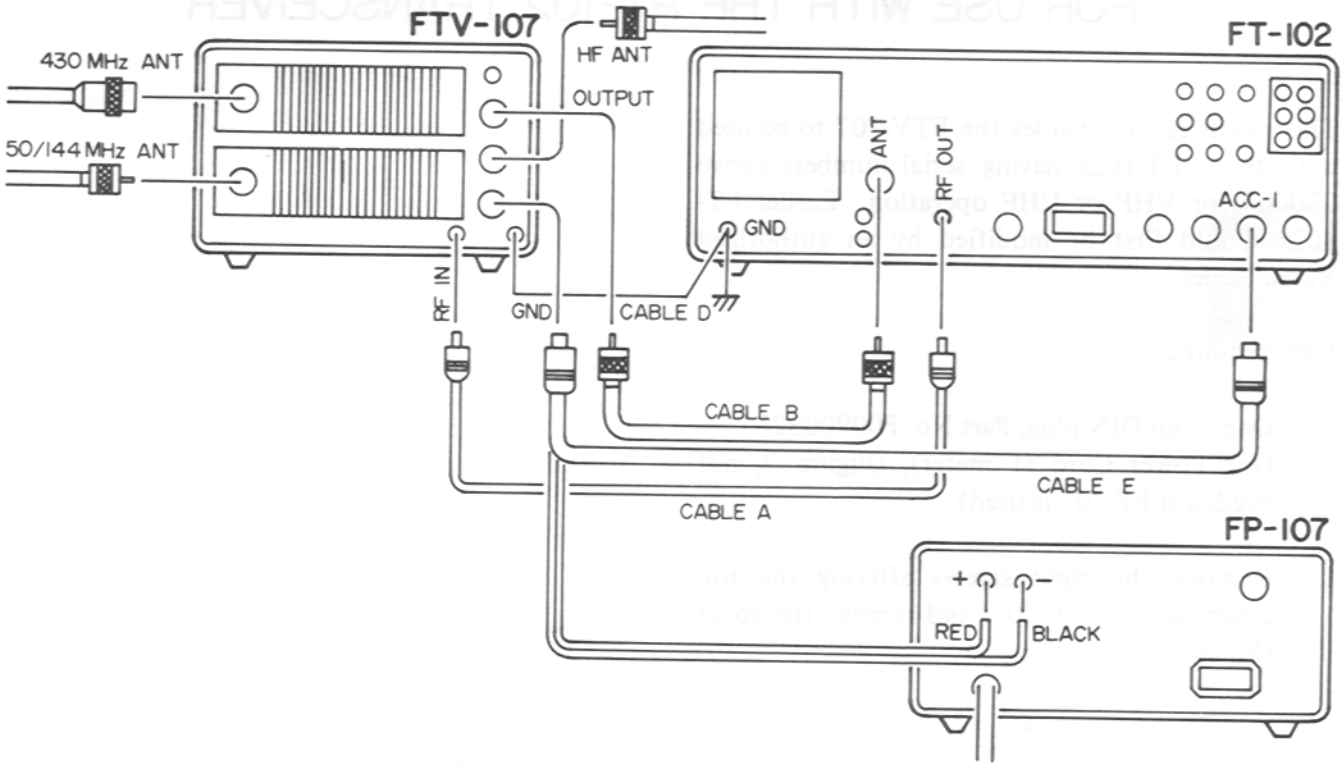


Figure 3

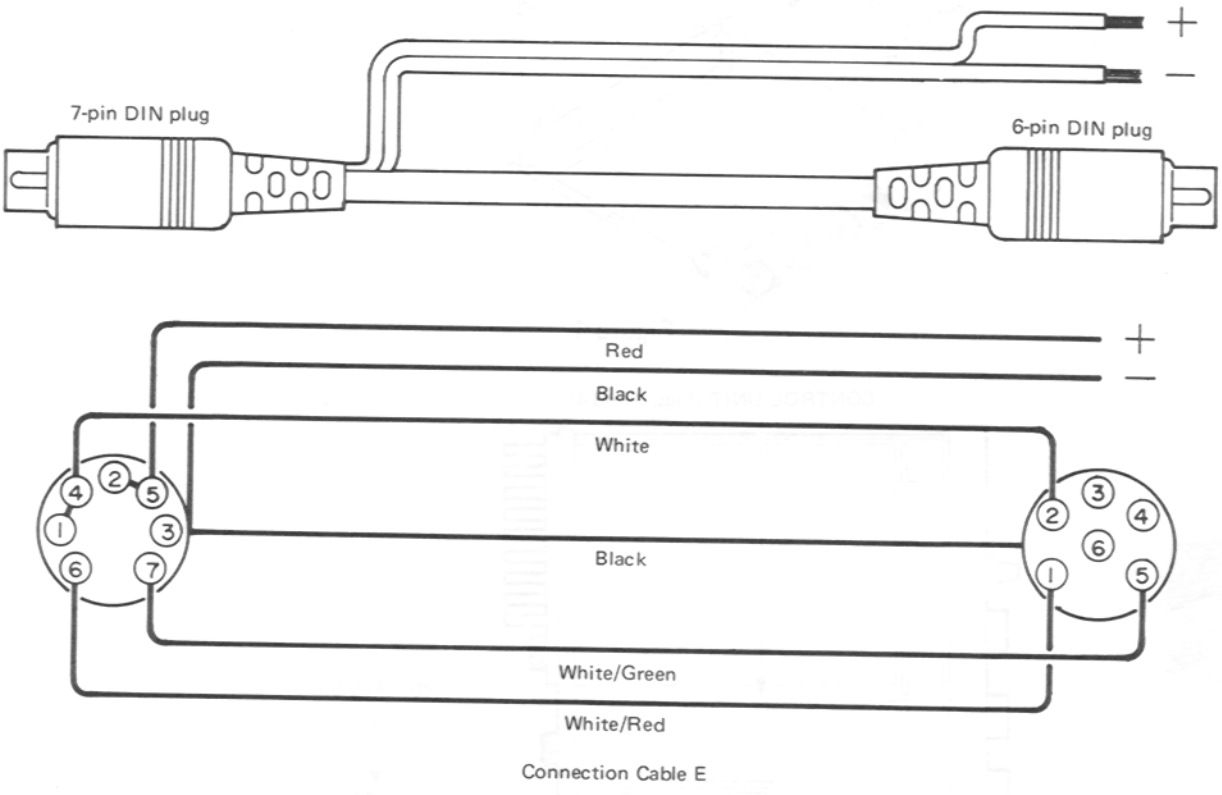


Figure 4

MODIFICATION OF THE FTV-707 TRANSVERTER FOR USE WITH THE FT-102 TRANSCEIVER

This modification enables the FTV-707 to be used with those FT-102s having serial numbers above 030000 for VHF or UHF operation. Earlier FT-102s should first be modified by an authorized Yaesu dealer.

Parts required:

One 6-pin DIN plug, Part No. P0090032
One Power Cord (1 meter), (Figure 7, not needed if FP-707 is used)

1. Remove the eight screws affixing the top cover of the FTV-707, and remove the cover (Figure 1).

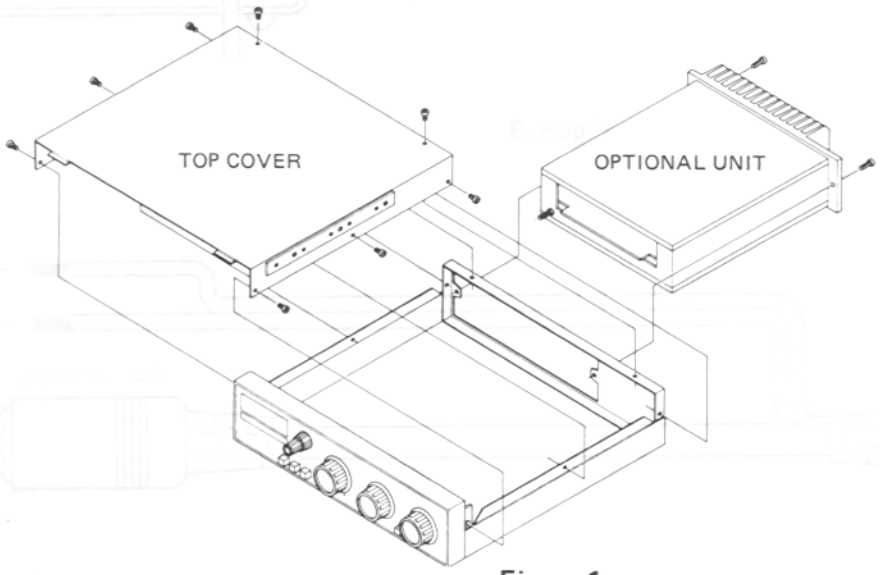


Figure 1

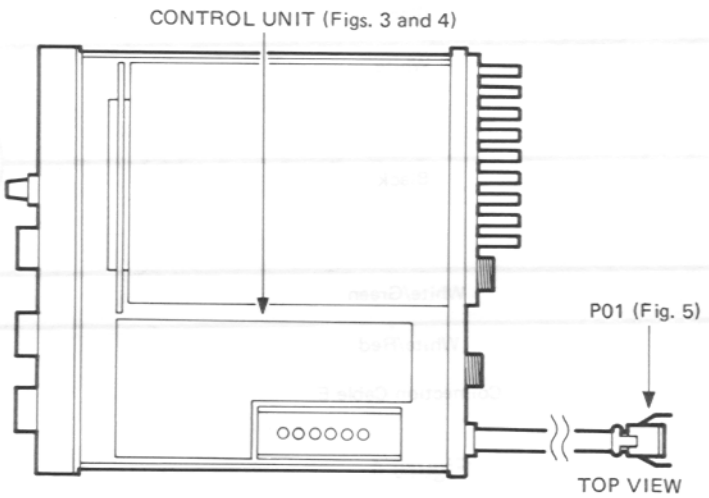


Figure 2

2. Referring to Figures 2 and 3, disconnect all wires and connectors from the Control Unit as described in the following steps:

   a. Disconnect 8-pin connector P02 from J01, and 9-pin connector P03 from J02.

   b. Disconnect the following wires by carefully sliding their connectors off of the contact pins on the Control Unit:

      1. the orange wire at the DC 13.5 V OUT terminal
      2. the small red wire at the S3 terminal
      3. the large red wire at pin 3
      4. the white/brown wire at the PO SW terminal
      5. the brown wire at the Sla terminal
      6. the white/orange wire at the RX HF terminal

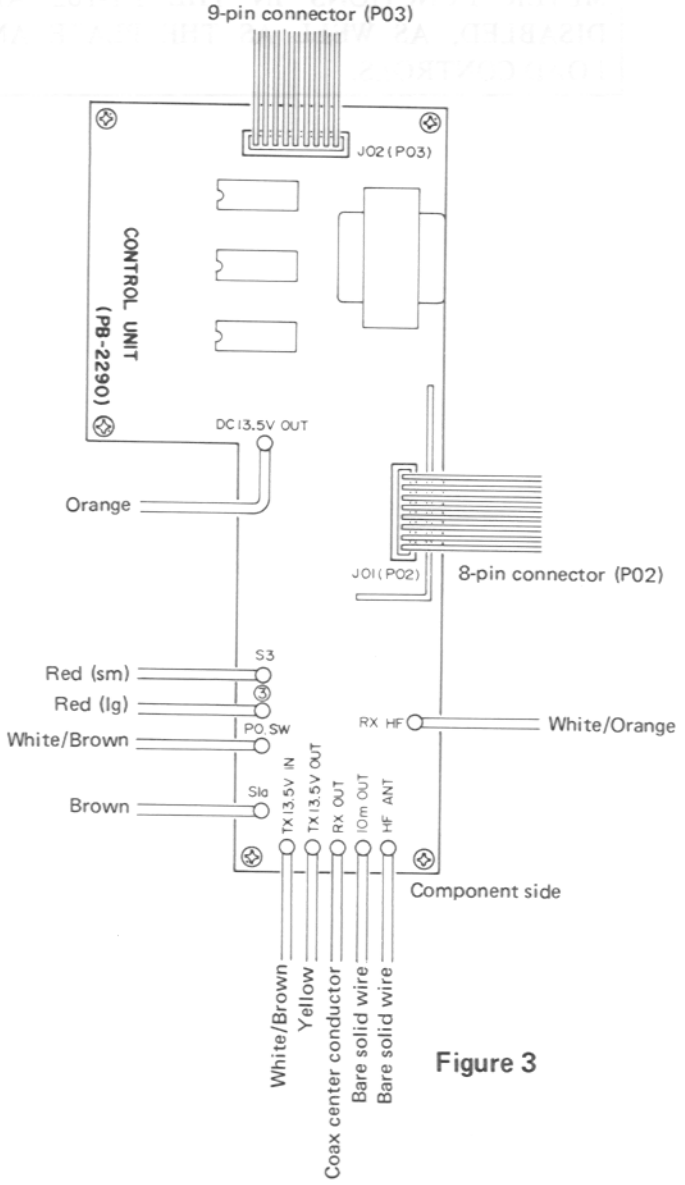


Figure 3

   c. Disconnect the next set of wires by unsoldering their connections at the Control Unit:

      1. the white/brown wire at the TX 13.5 V IN terminal
      2. the yellow wire at the TX 13.5 V OUT terminal
      3. the center conductor of the coax at the RX OUT terminal
      4. the bare solid wire at the 10 m OUT terminal
      5. the bare solid wire at the HF ANT terminal

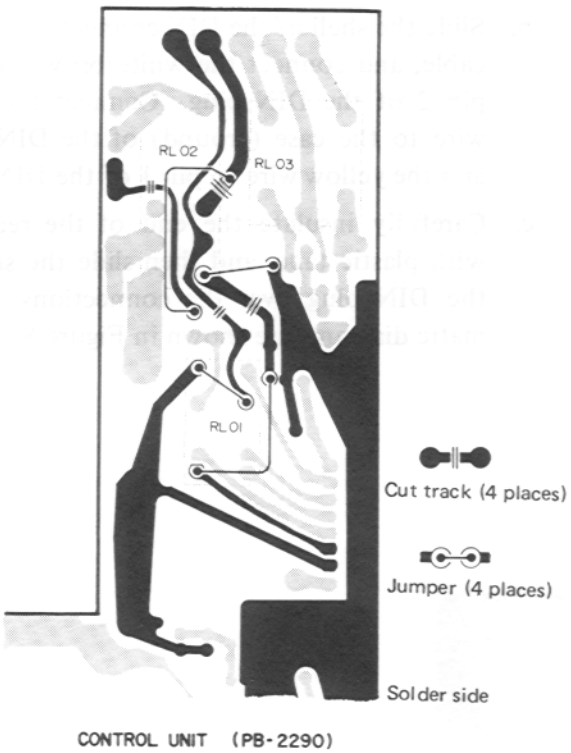


Figure 4

3. Now remove the five screws from the Control Unit, and remove the Unit from the transverter.
4. Referring to Figure 4, carefully cut the four tracks on the solder side of the Control Unit, and install four jumpers as illustrated.
5. Replace the Control Unit and its five screws, and reconnect each connector and wire in the same order that they were removed in part 2, above; i.e. connect P02 to J01 first, and solder the bare wire to the HF ANT terminal last.
6. Replace the top cover of the transverter, and replace the eight screws.
7. Replace the 4-pin connector (P01) at the end of the connection cable on the FTV-707 with the 6-pin DIN plug as shown in Figure 5 and described below:
   a. Remove the four screws on the 4-pin connector, and slide the black metal cover back to expose the wire connections to the pins. Unsolder the wires and remove the 4-pin connector parts.
   b. Slide the shell of the DIN connector over the cable, and connect the white/brown wire to pin 2 of the DIN plug. Connect the black wire to the case (ground) of the DIN plug, and the yellow wire to pin 1 of the DIN plug.
   c. Carefully insulate the end of the red wire with plastic tape, and then slide the shell of the DIN plug over the connections. Schematic diagrams are shown in Figure 8.

CAUTION

ONCE THE FTV-707 HAS BEEN MODIFIED IT MUST NOT BE USED WITH ANY MODEL TRANSCEIVER OTHER THAN THE FT-102, OR SEVERE DAMAGE TO THE EQUIPMENT MAY RESULT.
WHENEVER USING THE FTV-707 WITH THE FT-102, BE ABSOLUTELY CERTAIN THAT THE HEATER SWITCH ON THE FT-102 IS OFF, AND THAT THE TUBES HAVE HAD AT LEAST 30 SECONDS TO COOL.
WHEN USING THE FTV-707 WITH THE FT-102, THE IF MONITOR OF THE FT-102 WILL NOT FUNCTION NORMALLY. ALTHOUGH IT MAY SOUND DISTORTED, THIS IS NOT AN INDICATION OF DISTORTION OF THE OUTPUT OF THE FTV-707.
ALSO, WHEN TRANSMITTING WITH THE FT-102 AND FTV-707, THE IC, PO AND ALC METER FUNCTIONS IN THE FT-102 ARE DISABLED, AS WELL AS THE PLATE AND LOAD CONTROLS.

Connect the FTV-707 to the FT-102 as shown in Figure 6. If the FP-707 supply is not being used, connect 12 V DC to the FTV-707 using the Power Cord mentioned under "Parts required", after connecting the 4-pin connector left from part 7, as shown in Figure 7.

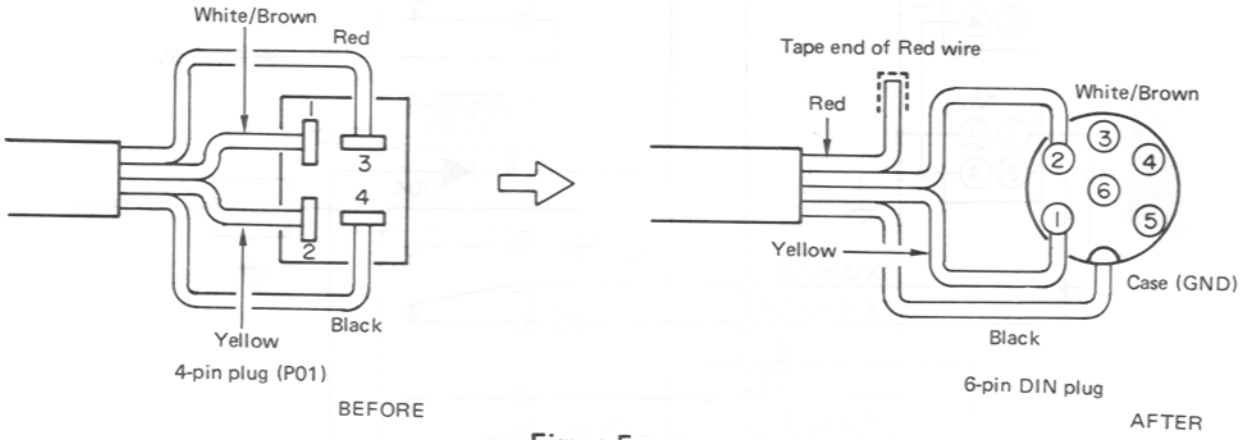


Figure 5

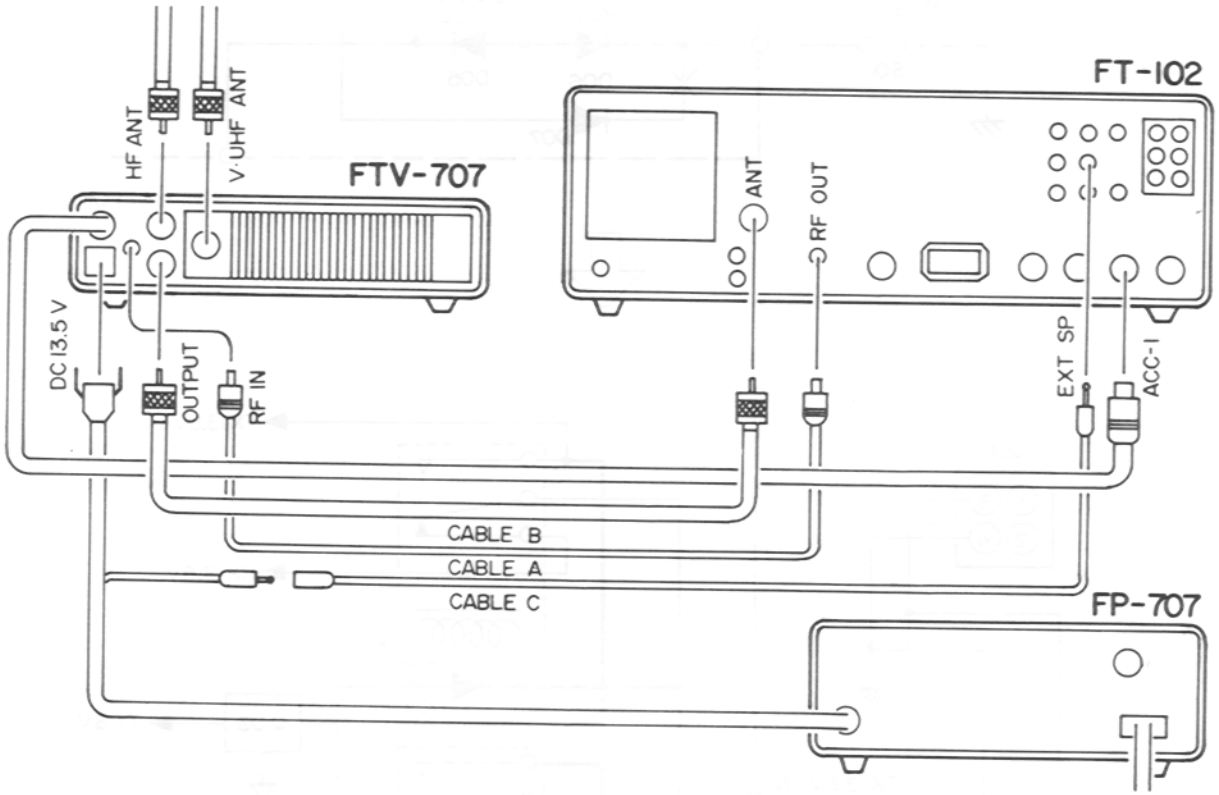


Figure 6

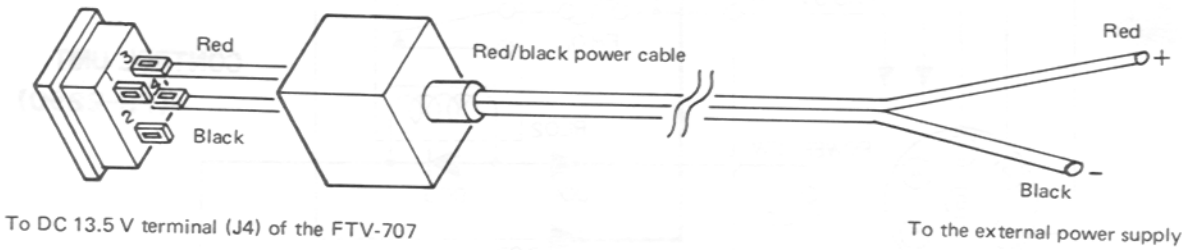
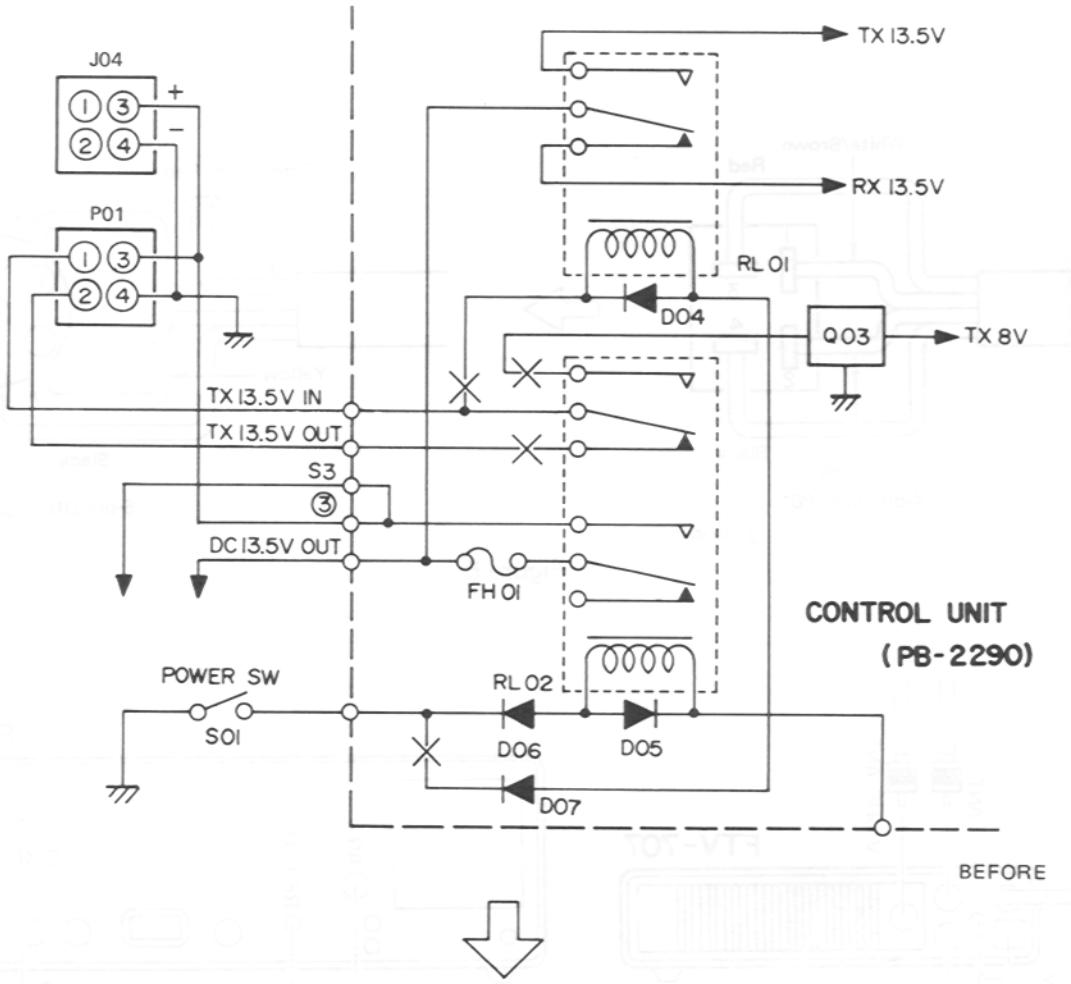


Figure 7


J04
P01
TX 13.5V
RX 13.5V
RL 01
D04
Q03
TX 8V
TX 13.5V IN
TX 13.5V OUT
S3
③
DC 13.5V OUT
FH 01
CONTROL UNIT
(PB-2290)
POWER SW
S01
RL 02
D06
D05
D07
BEFORE

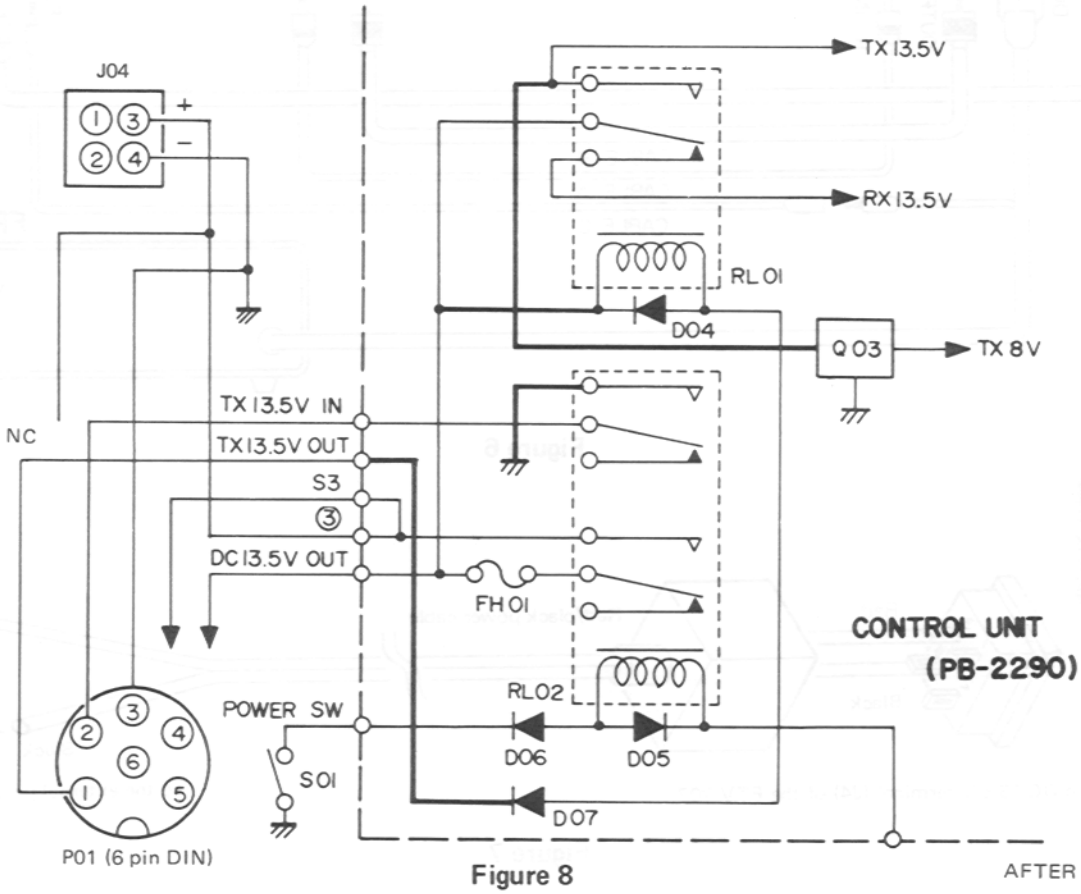

J04
TX 13.5V
RX 13.5V
RL 01
D04
Q03
TX 8V
TX 13.5V IN
NC
TX 13.5V OUT
S3
③
DC 13.5V OUT
FH 01
CONTROL UNIT
(PB-2290)
RL 02
POWER SW
D06
D05
S01
D07
P01 (6 pin DIN)
AFTER

Figure 8

COMPONENT APPLICATIONS

MAIN CHASSIS

PART NO.	DEVICE	TYPE	FUNCTION
Q1	2SB705R	Transistor	Regulator
Q2	μPC7808H	IC	〃
Q3	μPC7812H	〃	〃
Q4	〃	〃	〃
D1	S4V10	Si Diode Bridge	Rectifier
D2	1S1555	Si Diode	Switch
D5	1S1555	Si Diode	Switch
D6	Not Used		
D7	〃		
D8	1S1555	Si Diode	Switch
D9	〃	〃	〃
D10	Not Used		
D11	1S1555	Si Diode	Switch
D12	〃	〃	〃
D13	〃	〃	〃
D14	10D1	〃	Back Pulse Canceling Diode
D15	1S1555	Si Diode	Switch
D19	1S1555	Si Diode	Switch
D20	10D1	〃	〃
D21	1S1555	〃	〃

RF UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q1001	2SK125Y	Junction FET	RX RF Amplifier
Q1002	〃	〃	〃
Q1003	2SC1815Y	Transistor	RX Buffer Amplifier (for IF OUT-2)
Q1004	2SK125Y	Junction FET	RX Buffer Amplifier (for FM, N.B)
Q1005	〃	〃	RX 1st Mixer
Q1006	〃	〃	〃
Q1007	2SC2407	Transistor	TX RF Amplifier
Q1008	ND487C2-3R	IC (Ring Module)	TX 2nd Mixer
Q1009	2SC1589	Transistor	TX RF Amplifier
Q1010	2SC1971	〃	〃
D1001	Not Used		
D1002	1S1555	Si Diode	Regulator
D1003	〃	〃	Back Pulse Canceling Diode
D1004	〃	〃	Switch
D1005	〃	〃	〃
D1006	〃	〃	Back Pulse Canceling Diode
D1007	〃	〃	〃
D1008	〃	〃	〃
D1009	HZ3C1	Zener Diode	Regulator
D1010	10D10	Si Diode	Temperature Compensator
D1011	〃	〃	〃
D1012	1S1555	〃	Back Pulse Canceling Diode
D1013	〃	〃	Regulator
D1014	〃	〃	Switch
D1015	〃	〃	〃
V1001	12BY7A	Vacuum Tube	TX Driver Amplifier
XF1001	8.2M20A	Monolithic Filter	RX 1st IF Filter

IF UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q2001	2SK125Y	Junction FET	RX 1st IF Amplifier
Q2002	〃	〃	〃
Q2003	3SK73GR	Dual Gate MOS FET	RX 1st IF Amplifier TX 2nd IF Amplifier (for CW, AM, FM)
Q2004	〃	〃	RX 2nd Mixer
Q2005	2SK19TM-GR	Junction FET	TX 1st IF Buffer Amplifier (for SSB)
Q2006	2SC1815Y	Transistor	RX Q Multiplier
Q2007	〃	〃	〃
Q2008	〃	〃	RX 2nd IF Buffer Amplifier
Q2009	〃	〃	Regulator
Q2010	3SK73GR	Dual Gate MOS FET	RX 2nd IF Amplifier TX 1st IF Amplifier (@ Processor ON)
Q2011	2SC1815Y	Transistor	RX 2nd IF Buffer Amplifier (for IF OUT-1)
Q2012	2SC1815GR	〃	RX AGC Amplifier
Q2013	2SK19TM-GR	Junction FET	RX S-Meter Amplifier
Q2014	2SA564AR	Transistor	〃
Q2015	2SC1815Y	〃	TX 1st IF Amplifier (@ Processor ON)
Q2016	TA7060AP	IC	TX RF Speech Processor Amplifier
Q2017	3SK73GR	Dual Gate MOS FET	TX 1st Mixer
Q2018	2SC1815GR	Transistor	RX N.B. Controller
Q2019	2SC1583	〃	RX N.B. Amplifier
Q2020	〃	〃	〃
Q2021	2SC380Y	〃	〃
Q2022	2SC1815GR	〃	RX N.B. AGC Amplifier
Q2023	〃	〃	TX COMP. Meter Amplifier
Q2024	2SC380Y	〃	TX MONI. Buffer Amplifier (for CW, SSB, AM)
Q2025	2SK19TMY	Junction FET	TX MONI. Mixer (for CW, SSB)
Q2026	〃	〃	TX MONI. Demodulator (for CW, SSB)
Q2027	2SC380Y	Transistor	TX MONI. Buffer Amplifier (for AM)
Q2028	〃	〃	TX MONI. Amplifier
Q2029	2SK19BL	Junction FET	TX ALC Meter Amplifier
Q2030	2SC1815Y	Transistor	TX ALC Meter Peak Hold Controller
Q2031	2SK19TM-GR	Junction FET	TX ALC Meter Amplifier
Q2032	2SA564AR	Transistor	〃
Q2033	2SC1815Y	〃	TX ALC Meter Peak Hold Controller
Q2034	2SA564AR	〃	〃
Q2035	〃	〃	〃

D2001	1SS97	Schottky Barrier Di.	RX N.B. GATE
D2002	〃	〃	〃
D2003	FC63	Varactor Diode	〃
D2004	1S1555	Si Diode	Switch
⋮	⋮	⋮	⋮
D2010	1S1555	Si Diode	Switch
D2011	1SS97	Schottky Barrier Di.	Switch
⋮	⋮	⋮	⋮
D2020	1SS97	Schottky Barrier Di.	Switch
D2021	1S1555	Si Diode	〃
D2022	1SS97	Schottky Barrier Di.	〃
D2023	1S1555	Si Diode	〃
D2024	1SS97	Schottky Barrier Di.	Switch
⋮	⋮	⋮	⋮
D2028	1SS97	Schottky Barrier Di.	Switch
D2029	1S1555	Si Diode	〃
D2030	〃	〃	〃
D2031	FC-53M-4	Varactor Diode	RX Notch Filter Rejection Frequency Controller
D2032	1S1555	Si Diode	Switch
⋮	⋮	⋮	⋮
D2036	1S1555	Si Diode	Switch
D2037	Not Used		
D2038	1N60	Ge diode	RX AM Detector
D2039	1N270	〃	RX AGC Detector
D2040	〃	〃	〃
D2041	1S1555	Si Diode	Switch
⋮	⋮	⋮	⋮
D2045	1S1555	Si Diode	Switch
D2046	1SS97	Schottky Barrier Di.	TX ALC Detector
D2047	1S1555	Si Diode	Back Pulse Canceling Diode
D2048	HZ9C1	Zener Diode	〃
D2049	1S1555	Si Diode	Switch
D2050	〃	〃	〃
D2051	〃	〃	〃
D2052	〃	〃	〃
D2053	1N60	Ge Diode	RX N.B. Noise Detector
D2054	〃	〃	〃
D2055	〃	〃	RX N.B. AGC Detector
D2056	〃	〃	〃
D2057	1S1555	Si Diode	TX COMP M Detector
D2058	〃	〃	〃
D2059	1SS97	Schottky Barrier Di.	Logarithmic Compensator
D2060	1S1555	Si Diode	Switch
D2061	〃	〃	〃
D2062	1N60	Ge Diode	TX MONI. AM Detector
D2063	Not Used		
D2064	1S1555	Si Diode	Back Pulse Canceling Diode
D2065	Not Used		
D2066	1S1555	Si Diode	Switch
D2067	1S1555	Si Diode	Switch
D2068	〃	〃	Threshold Level Compensator
D2069	Not Used		
D2070	〃		
D2071	1S1555	Si Diode	Switch
D2072	〃	〃	〃
D2073	BZ090	Zener Diode	Regulator
D2074	〃	〃	〃
D2075	1S1555	Si Diode	Switch
D2076	1S1555	Si Diode	Switch
⋮	⋮	⋮	⋮
D2078	1S1555	Si Diode	Switch
D2079	Not Used		
D2080	1N60	Ge Diode	RX AM Detector
D2081	1S1555	Si Diode	Switch
D2082	〃	〃	〃
TH2001	D33A	Thermistor	Temperature Compensator
XF2001	XF-8.2HS	Crystal Filter	RX 1st IF Filter (for SSB, CW) TX SSB Filter
XF2002	XF-8.2GA	〃	RX 1st IF Filter (for AM; Option)
XF2003	XF-8.2HC	〃	RX 1st IF Filter (for CW(W); Option)
XF2003	XF-8.2HCN	〃	RX 1st IF Filter (for CW(N); Option)
XF2004	XF-8.2HSN	〃	RX 1st IF Filter (for SSB(N); Option)
XF2005	XF-455C	〃	RX 2nd IF Filter (for CW(W); Option)
XF2005	XF-455CN	〃	RX 2nd IF Filter (for CW(N); Option)
CF2001	CFM-455J1	Ceramic Filter	RX 2nd IF Filter (for SSB(W), (N), CW(W)) TX SSB Filter

AF UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q3001	2SC732TM-GR	Transistor	TX MIC Amplifier
Q3002	2SC1815GR	〃	〃
Q3003	2SC1815BL	〃	〃
Q3004	2SC732TM-GR	〃	TX MIC Tone Controller
Q3005	2SC1815Y	〃	TX CW Side Tone Oscillator
Q3006	〃	〃	TX ANTI-TRIP Amplifier
Q3007	〃	〃	TX ANTI-TRIP DC Amplifier
Q3008	2SA733AQ	〃	〃
Q3009	〃	〃	Switch
Q3010	2SC1815Y	〃	TX VOX Amplifier
Q3011	〃	〃	TX VOX DC Amplifier
Q3012	2SA733AQ	〃	Switch
Q3013	2SC1815Y	〃	Relay Driver
Q3014	〃	〃	〃
Q3015	2SA496Y	〃	Relay Controller
Q3016	2SC1815Y	〃	TX AF OUT Buffer Amplifier
Q3017	〃	〃	TX Carrier Buffer Amplifier
Q3018	〃	〃	RX Carrier Buffer Amplifier

Q3019	MC14066B	IC	Switch
Q3020	2SC1815Y	Transistor	RX AF Active L.P.F. (for CW)
Q3021	〃	〃	RX AF Buffer Amplifier (for CW)
Q3022	2SC1815GR	〃	RX AF Active L.P.F. (for AM, SSB)
Q3023	〃	〃	RX AF Buffer Amplifier (for AM, SSB)
Q3024	AN6551	IC	RX AF A.P.F.
Q3025	μPC2002V	〃	RX Audio Amplifier
Q3026	2SK19TMY	Junction FET	Carrier Oscillator (for CW, AM, FM)
Q3027	2SC380Y	Transistor	Carrier Buffer Amplifier (for CW)
Q3028	〃	〃	Carrier Frequency Controller
Q3029	〃	〃	Carrier Buffer Amplifier (for AM, FM)
Q3030	2SC1815Y	〃	MUTE Switch
D3001	1S1555	Si Diode	Switch
D3002	1SS97	Schottky Barrier Di.	TX Balanced Modulator
D3005	1SS97	Schottky Barrier Di.	TX Balanced Modulator
D3006	1S1555	Si Diode	Switch
D3007	1N270	Ge Diode	〃
D3008	HZ3C1	Zener Diode	〃
D3009	1N270	Ge Diode	〃
D3010	1S1555	Si Diode	〃
D3011	1N60	Ge Diode	TX ANTI-TRIP Detector
D3012	1S1555	Si Diode	Switch
D3013	〃	〃	〃
D3014	1N60	Ge Diode	TX VOX Detector
D3015	10D1	Si Diode	Back Pulse Canceling Diode
D3016	1S1555	Si Diode	Switch
D3020	1S1555	Si Diode	Switch
D3021	1N60	Ge Diode	RX Balanced Demodulator
D3024	1N60	Ge Diode	RX Balanced Demodulator
D3025	1S1555	Si Diode	Switch
D3028	1S1555	Si Diode	Switch
D3029	Not Used		
D3030	1S1555	Si Diode	Switch
D3031	〃	〃	〃
D3032	〃	〃	〃
D3033	Not Used		
D3034	〃		
D3035	1S1555	Si Diode	Switch
X 3001	8.2159 MHz	Crystal	Carrier Oscillator (for CW, AM, FM)

LOCAL UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q4001	2SC945AQ	Transistor	RX 1st Local VCO. TX 2nd Local VCO. (for 1.9, 3.5 MHz)
Q4002	〃	〃	RX 1st Local VCO. TX 2nd Local VCO. (for 7, 10 MHz)
Q4003	〃	〃	RX 1st Local VCO. TX 2nd Local VCO. (for 14 MHz)
Q4004	〃	〃	RX 1st Local VCO. TX 2nd Local VCO. (for 18 MHz)
Q4005	〃	〃	RX 1st Local VCO. TX 2nd Local VCO. (for 21, 24.5 MHz)
Q4006	〃	〃	RX 1st Local VCO. TX 2nd Local VCO. (for 28 MHz, AUX)
Q4007	2SC535B	〃	RX 1st Local Buffer Amplifier, TX 2nd Local Buffer Amplifier
Q4008	2SC2407	〃	〃
Q4009	2SC945AQ	〃	PLL UNLOCK Switch
Q4010	〃	〃	〃
Q4011	2SC535B	〃	RX 1st Local Buffer Amplifier, TX 2nd Local Buffer Amplifier
Q4012	SN76514N	IC	PLL Mixer
Q4013	2SC535B	Transistor	PLL IF Buffer Amplifier
Q4014	〃	〃	〃
Q4015	〃	〃	〃
Q4016	2SA733AQ	〃	PLL UNLOCK Amplifier
Q4017	SN74LS192	IC	PLL Programmable Divider
Q4018	MC4044	〃	PLL Phase Detector
Q4019	SN74LS90	〃	PLL Reference 1/5, 1/10 Divider
Q4020	MC14518BCP	〃	PLL Reference 1/2, 1/40 Divider
Q4021	2SC945AQ	Transistor	PLL Reference Buffer Amplifier
Q4022	2SC732GR	〃	PLL Active L.P.F.
Q4023	〃	〃	〃
Q4024	SN76514N	IC	PLL Mixer
Q4025	3SK73GR	Dual Gate MOS FET	〃
Q4026	2SC945AQ	Transistor	PLL Reference Oscillator
Q4027	〃	〃	PLL Reference Buffer Amplifier
Q4028	〃	〃	〃
Q4029	〃	〃	PLL Reference Doubler
Q4030	3SK73GR	Dual Gate MOS FET	PLL Mixer
Q4031	2SC945AQ	Transistor	PLL Buffer Amplifier
Q4032	〃	〃	RX 2nd, TX 1st Local Frequency Controller
Q4033	〃	〃	RX 2nd, TX 1st Local VCX
Q4034	〃	〃	RX 2nd, TX 1st Local Buffer Amplifier
Q4035	〃	〃	〃
Q4036	〃	〃	Carrier VCXO (for CW, SSB)
Q4037	〃	〃	VCXO Buffer Amplifier
Q4038	3SK73GR	Dual Gate MOS FET	RX 2nd, TX 1st Local Mixe
Q4039	2SC945AQ	Transistor	RX 2nd, TX 1st Local Buffer Amplifier
Q4040	3SK73GR	Dual Gate MOS FET	Carrier Mixer
Q4041	2SC945AQ	Transistor	Carrer Buffer Amplifier
Q4042	〃	〃	Switch

D4001	1SS53	Si Diode	Switch
〃	〃	〃	〃
D4041	1SS53	Si Diode	Switch
D4042	FC-52M	Varactor Diode	RX 1st Local VCO. TX 2nd Local VCO. (for 1.9, 3.5 MHz)
D4043	1SS53	Si Diode	Switch
D4044	〃	〃	〃
D4045	〃	〃	〃
D4046	FC-52M	Varactor Diode	RX 1st Local VCO. TX 2nd Local VCO. (for 7, 10 MHz)
D4047	1SS53	Si Diode	Switch
D4048	FC-52M	Varactor Diode	RX 1st Local VCO. TX 2nd Local VCO. (for 14 MHz)
D4049	1SS53	Si Diode	Switch
D4050	FC-52M	Varactor Diode	RX 1st Local VCO. TX 2nd Local VCO. (for 18 MHz)
D4051	1SS53	Si Diode	Switch
D4052	〃	〃	〃
D4053	〃	〃	〃
D4054	FC-52M	Varactor Diode	RX 1st Local VCO. TX 2nd Local VCO. (for 2l, 24.5 MHz)
D4055	1SS53	Si Diode	Switch
D4056	〃	〃	〃
D4057	〃	〃	〃
D4058	FC-52M	Varactor Diode	RX 1st Local VCO. TX 2nd Local VCO. (for 28 MHz, AUX)
D4059	1SS53	Si Diode	Switch
D4060	〃	〃	〃
D4061	〃	〃	〃
D4062	HZ5C2	Zener Diode	Regulator
D4063	1SS53	Si Diode	Switch
D4074	1SS53	Si Diode	Switch
D4075	1SS97	Schottky Barrier Di.	Switch
D4076	Not Used		
D4077	1SS53	Si Diode	Switch
D4078	〃	〃	〃
D4079	1SV50	Varactor Diode	RX 2nd, TX 1st Local VCXO
D4080	1SS53	Si Diode	Switch
D4081	〃	〃	〃
D4082	1SV50	Varactor Diode	Carrier VCXO (for CW, SSB)
D4083	10D1	Si Diode	Back Pulse Canceling Diode
D4084	1SS97	Schottky Barrier Di.	Switch
D4085	1SS53	Si Diode	〃
D4086	1S1555	Si Diode	Switch
D4089	1S1555	Si Diode	Switch
X4001	10.0 MHz	Crystal	PLL Reference Oscillator
X4002	19.215 MHz	〃	RX 2nd, TX 1st Local VCXO
X4003	10.5434 MHz	〃	Carrier VCXO (for LSB)
X4004	10.5466 MHz	〃	Carrier VCXO (for USB)

COUNTER UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q5001	2SC1815Y	Transistor	Counter Buffer Amplifier
Q5002	〃	〃	〃
Q5003	MC14518B	IC	Counter Divider
Q5004	〃	〃	〃
Q5005	MC14011B	〃	Counter Mixer
Q5006	MC14022	〃	Counter Divider
Q5007	TC5070	〃	Counter
Q5008	TC5066	〃	Frequency Display Driver
Q5009	〃	〃	Frequency Display Digit Driver
Q5010	〃	〃	Frequency Display Segment Driver
Q5011	MC14011	〃	Counter Encoder
Q5012	MC14081B	〃	〃
Q5013	〃	〃	〃
Q5014	2SC1815GR	Transistor	Oscillator (for DC-DC Converter)
Q5015	78L05	IC	Regulator
D5001	1S1555	Si Diode	Switch
D5065	1S1555	Si Diode	Switch
D5066	HZ5C2	Zener Diode	Regulator
D5067	1S1554	Si Diode	Switch
D5068	Not Used		
D5069	1S1555	Si Diode	Switch
DS5001	FIP9E8	Fluorescent Tube	Frequency Display

FM/AM UNIT (OPTION)

PART NO.	DEVICE	TYPE	FUNCTION
Q6001	TA7069P	IC	TX AM Modulator
Q6002	2SK19TM-GR	Junction FET	TX 2nd IF Buffer Amplifier
Q6003	TC5082P	IC	TX 2nd IF $1/2^8$ Divider
Q6004	2SK19TM-GR	Junction FET	VCO Buffer Amplifier
Q6005	TC5082P	IC	VCO $1/2^8$ Divider
Q6006	2SK19TM-BL	Junction FET	VCO (for FM TX Carrier)
Q6007	2SC380Y	Transistor	VCO Buffer Amplifier
Q6008	MC3359	IC	RX FM Mixer, Limiter Amplifier, Discriminator, Noise Amplifier, Squelch Switch
Q6009	Not Used		
Q6010	2SC1815GR	Transistor	RX Squelch Switch
Q6011	〃	〃	〃
Q6012	〃	〃	RX Mute Switch
Q6013	TC5081P	IC	Phase Detector
Q6014	μPC577H	〃	TX MIC Limiter Amplifier (for FM)
Q6015	2SC1815GR	Transistor	Active L.P.F.
D6001	1S1555	Si Diode	Switch
D6002	〃	〃	〃
D6003	MV104	Varactor Diode	TX FM Modulator
D6004	1N60	Ge Diode	RX FM Noise Detector
D6005	〃	〃	〃

D6006	1S1555	Si Diode	TX IDC.
D6007	〃	〃	〃
XF6001	8.2M20A	Crystal Filter	RX FM 1st IF Filfter
CF6001	CFX455D	Ceramic Filter	RX FM Discriminator
TH6001	Not Used		
TH6002	D33A	Thermistor	Temperature Compensator

VFO UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q7001	VFO-01	IC	Oscillator, Buffer Amplifier
D7001	1S2236	Varactor Di	Clarifier Frequency Controller

RECT A UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q8001	2SA733AQ	Transistor	KEY Switch
Q8002	2SC1815Y	〃	〃
Q8003	2SA639Q	〃	〃
Q8004	2SC2229	〃	TX ALC DC Amplifier
D8001	SM1-12	Si Diode	Rectifier
D8002	10D10	〃	〃
D8003	〃	〃	〃
D8004	〃	〃	Back Pulse Canceling Diode
D8005	〃	〃	〃
D8006	〃	〃	Rectifier
D8007	1S1555	〃	Switch
D8008	〃	〃	〃
D8009	Not Used		
D8010	〃		
D8011	1S1555	Si Diode	Temperature Compensator
D8012	〃	〃	〃
D8013	〃	〃	KEY Switch
D8014	〃	〃	〃
D8015	〃	〃	TX ALC Detector
D8016	〃	〃	Switch
D8017	〃	〃	Temperature Compensator
D8018	〃	〃	Switch

RECT B UNIT

PART NO.	DEVICE	TYPE	FUNCTION
Q8501	2SA733AQ	Transistor	Regulator
Q8502	μPC78L12	IC	〃
Q8503	2SC496Y	Transistor	〃
Q8504	2SC1815Y	〃	Switch
Q8505	μPC78L15	IC	Regulator
D8501	10D10	Si Diode	Rectifier
⋮	⋮	⋮	⋮
D8504	10D10	Si Diode	Rectifier
D8505	V06B	〃	〃
D8506	HZ6C1	Zener Diode	Regulator
D8507	AW01-24	〃	〃

VR UNIT

PART NO.	DEVICE	TYPE	FUNCTION
D9001	1S1555	Si Diode	Switch

SW UNIT A

PART NO.	DEVICE	TYPE	FUNCTION
D9201	1S1555	Si Diode	Switch
D9202	〃	〃	〃
D9203	GD4-203SRD	LED	Clarifier Indicator
D9204	〃	〃	〃

SW UNIT B

PART NO.	DEVICE	TYPE	FUNCTION
D9401	1S1555	Si Diode	Switch
⋮	⋮	⋮	⋮
D9405	1S1555	Si Diode	Switch

RELAY UNIT A

PART NO.	DEVICE	TYPE	FUNCTION
D9601	1S1555	Si Diode	Back Pulse Canceling Diode
D9602	1N60	Ge Diode	TX PO. Meter Voltage Detector

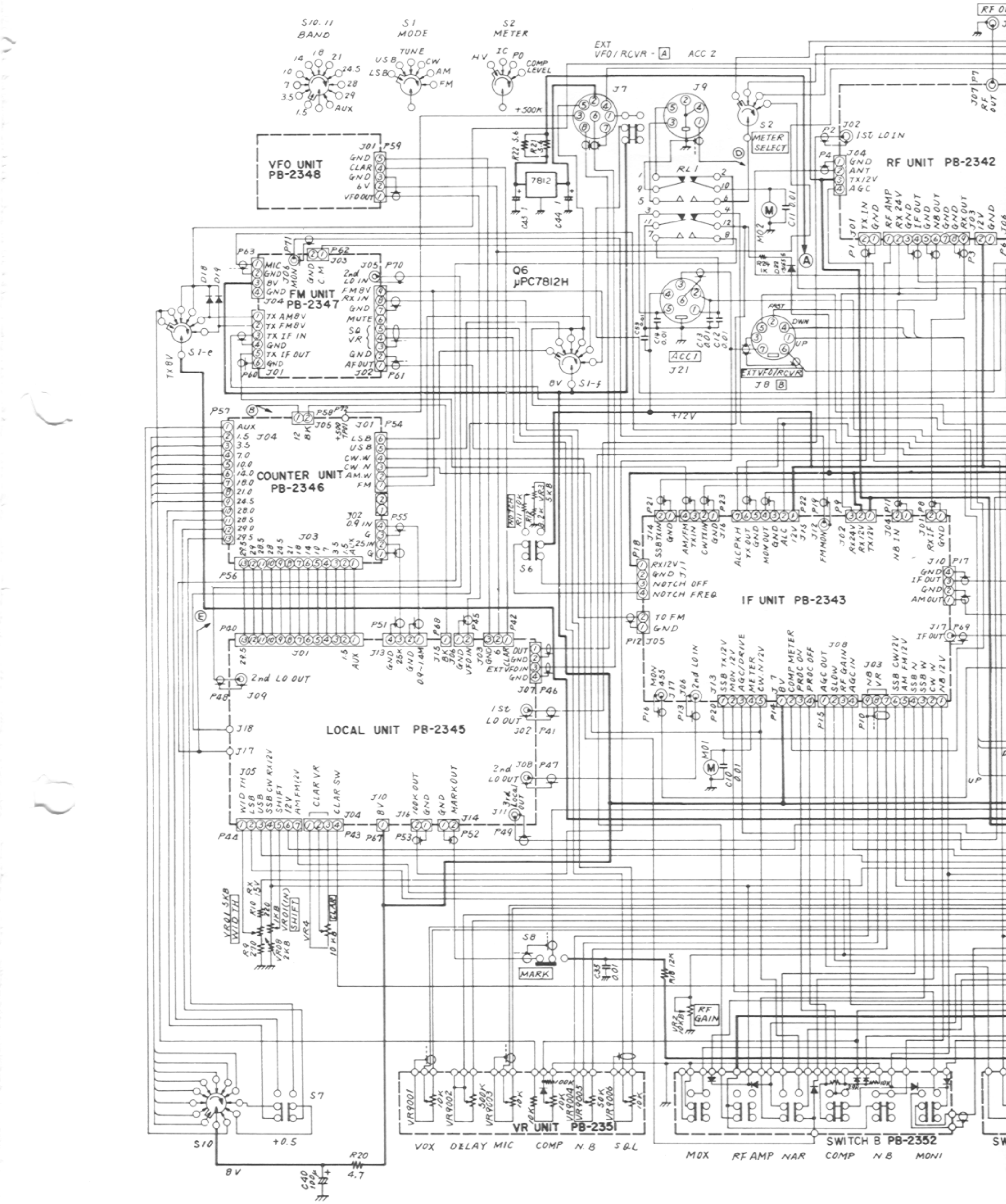
FINAL BOARD

PART NO.	DEVICE	TYPE	FUNCTION
V9801	6146B	Vacuum Tube	TX Final Amplifier
V9802	〃	〃	〃
V9803	〃	〃	〃
	(V9801, V9803: 100W Type)		

RELAY UNIT B

PART NO.	DEVICE	TYPE	FUNCTION
D9901	1S1555	Si Diode	Switch
D9902	10D10	〃	Back Pulse Canceling Diode

— MEMO —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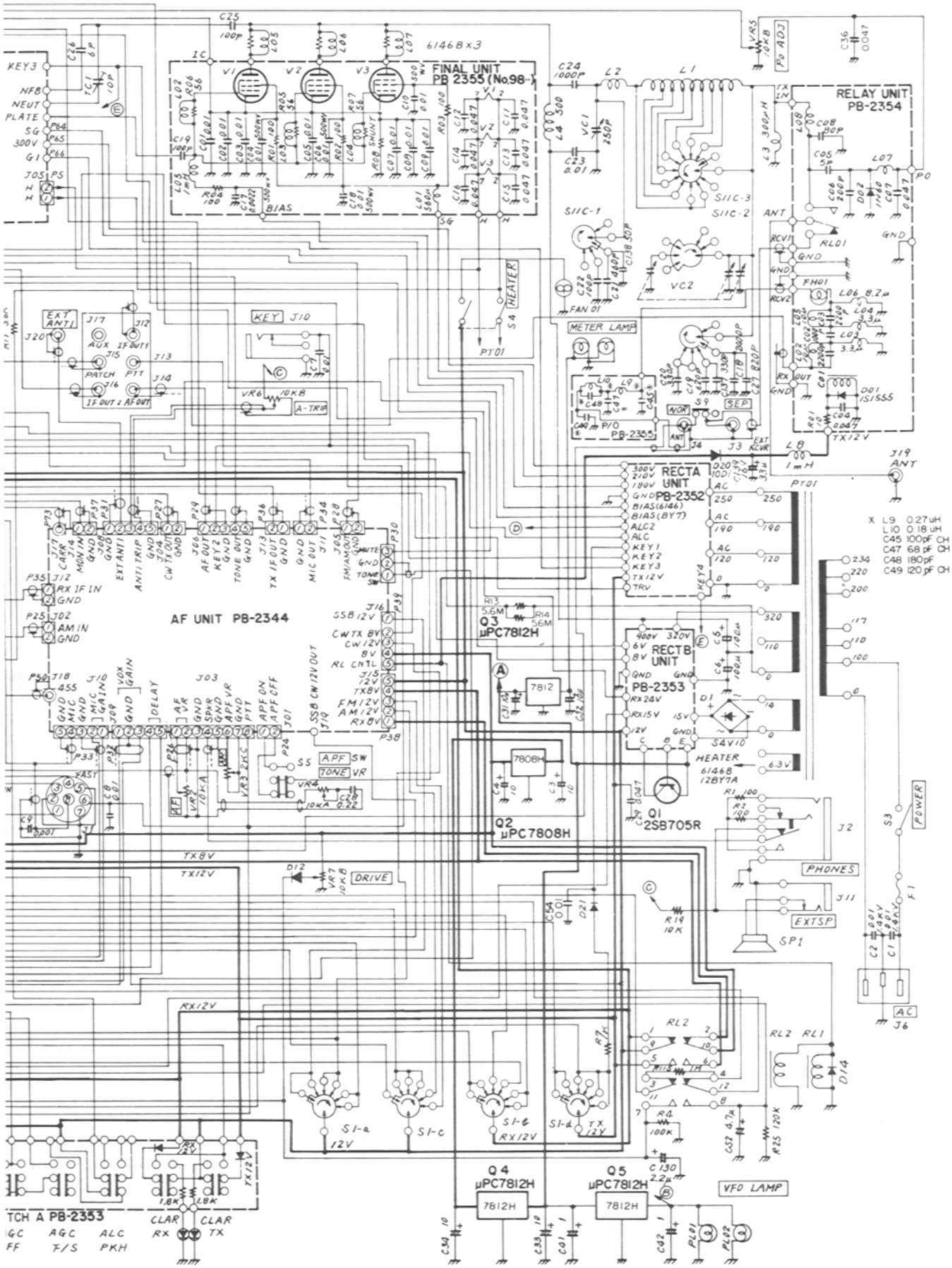
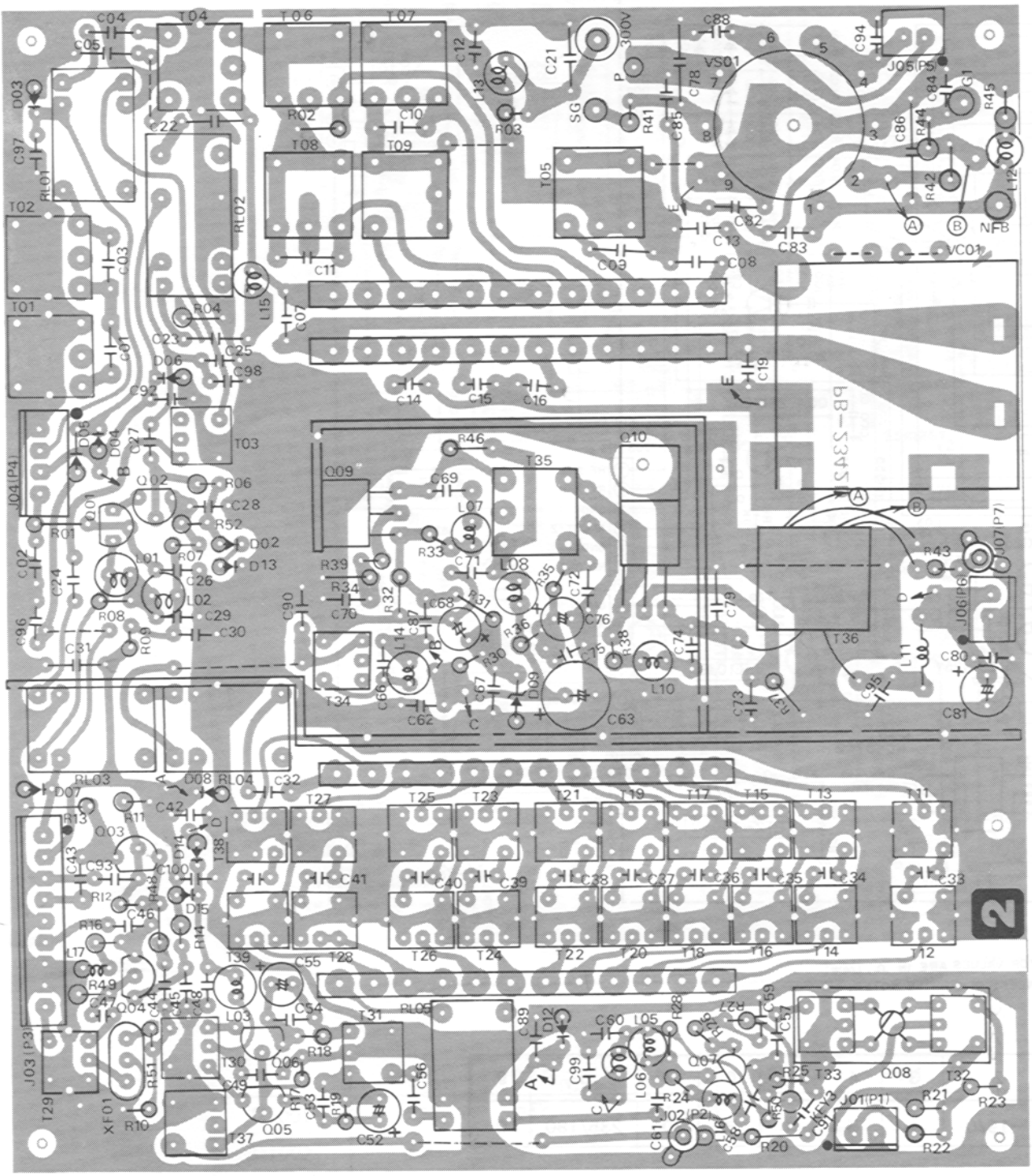
S2 METER
VFO UNIT PB-2348
FM UNIT PB-2347
Q6 μPC7812H
COUNTER UNIT PB-2346
RF UNIT PB-2342
IF UNIT PB-2343
LOCAL UNIT PB-2345
VR UNIT PB-2351
SWITCH B PB-2352
METER SELECT
EXT VFO/RCVR
ACC 2
ACC 1
MARK
RF GAIN
VOX
DELAY
MIC
COMP
N.B
SQL
MOX
RF AMP
NAR
MONI

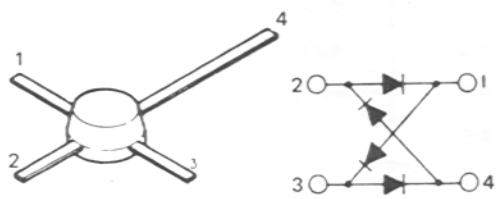


FT-102
WIRING DIAGRAM

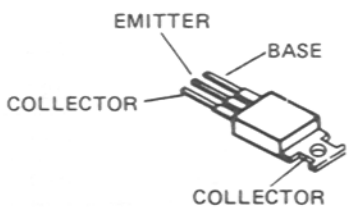
RF UNIT PARTS LAYOUT



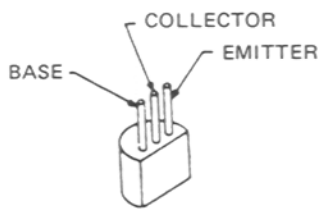
Viewed from Component Side



ND487C2-3R

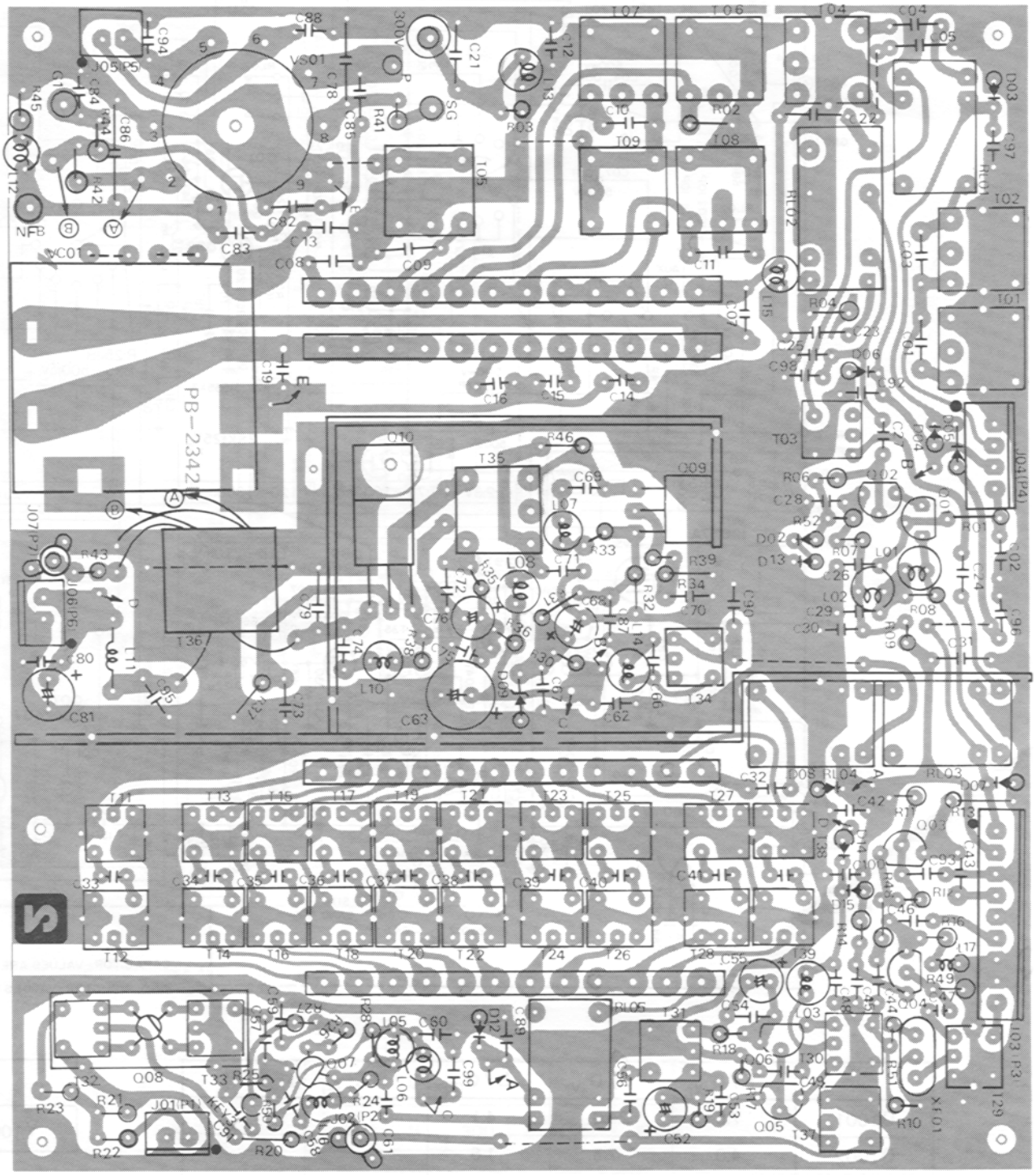


2SC1589

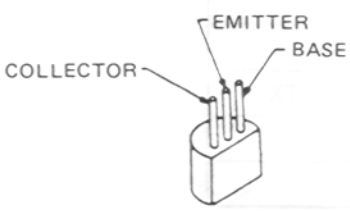


2SC1815Y

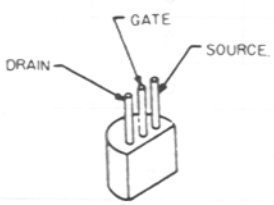
RF UNIT PARTS LAYOUT



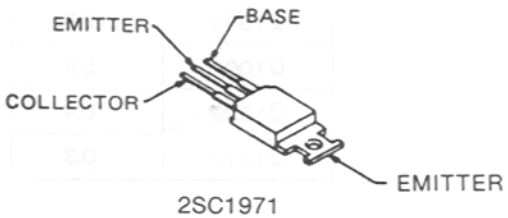
Viewed from Solder Side



2SC2407

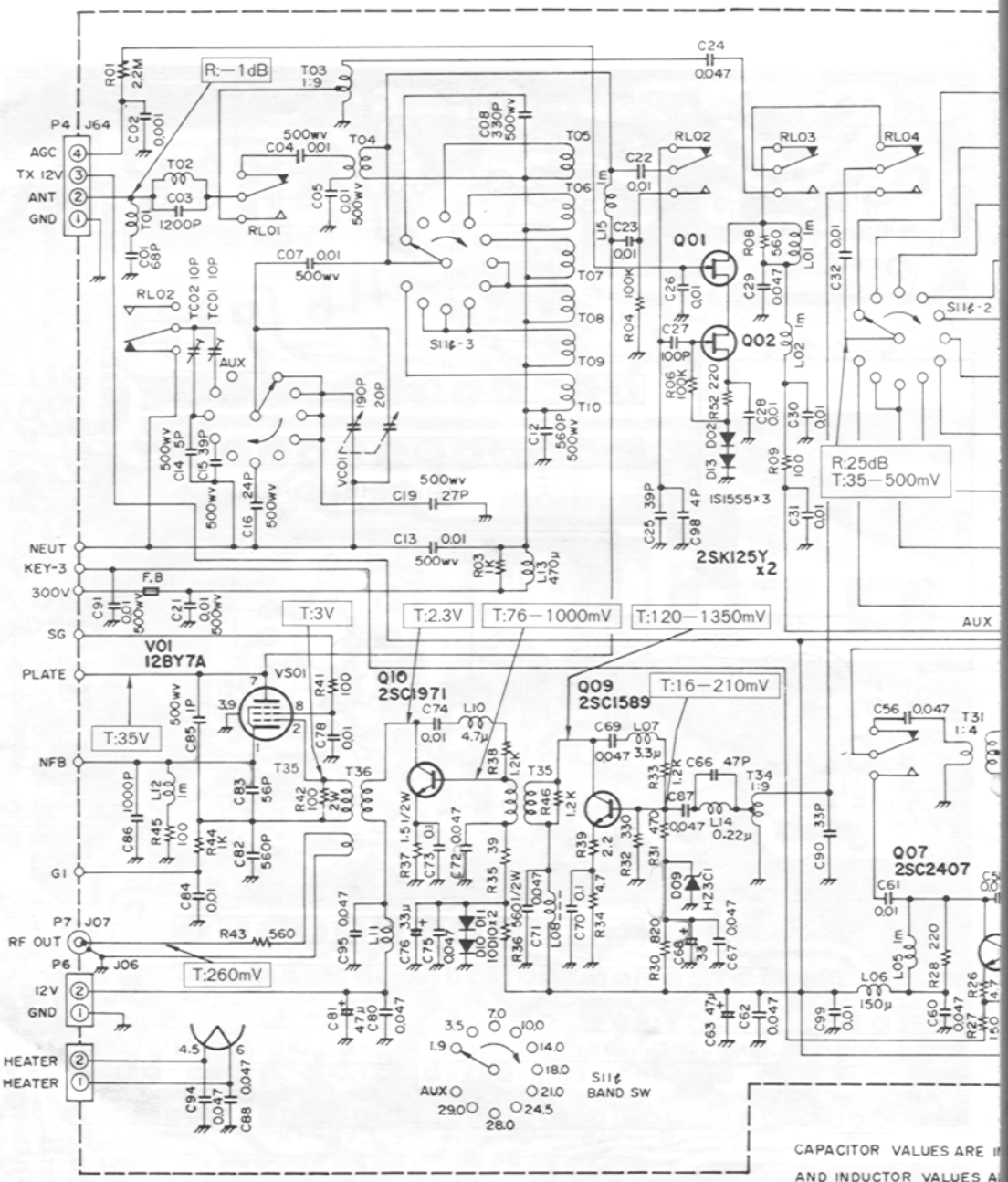


2SK125Y



2SC1971

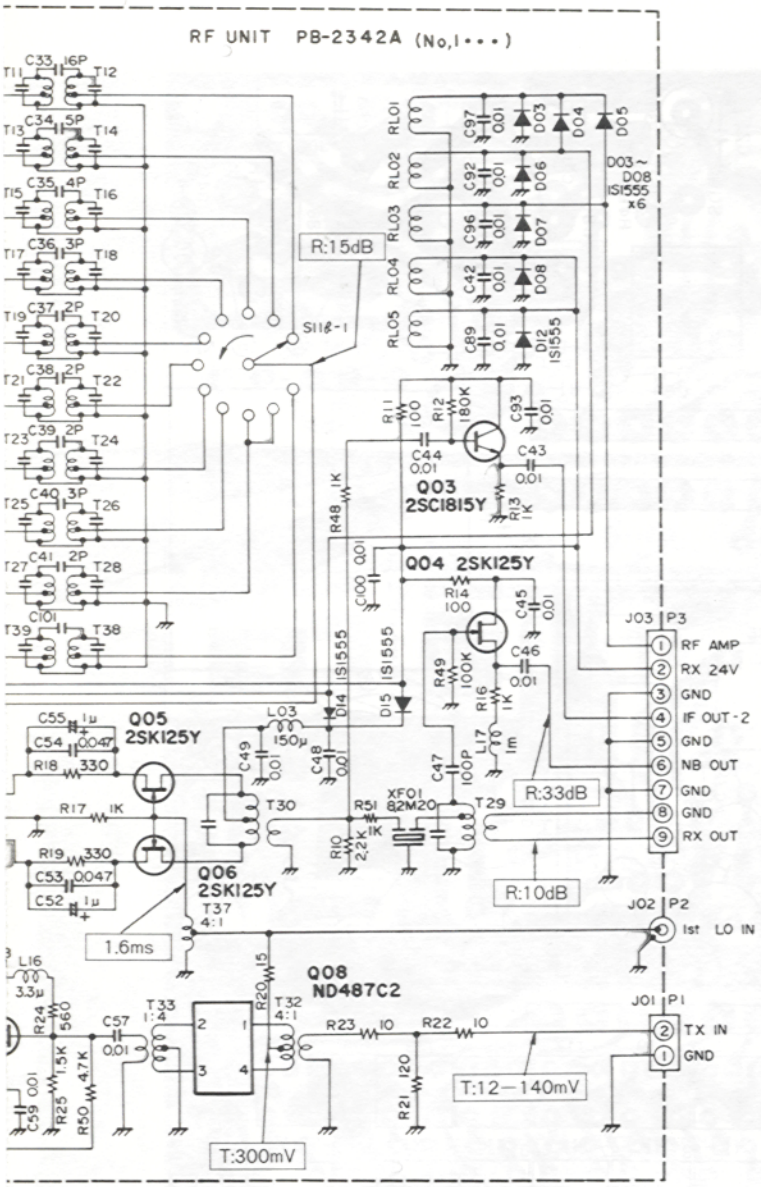
RF UNIT



CAPACITOR VALUES ARE I
AND INDUCTOR VALUES A

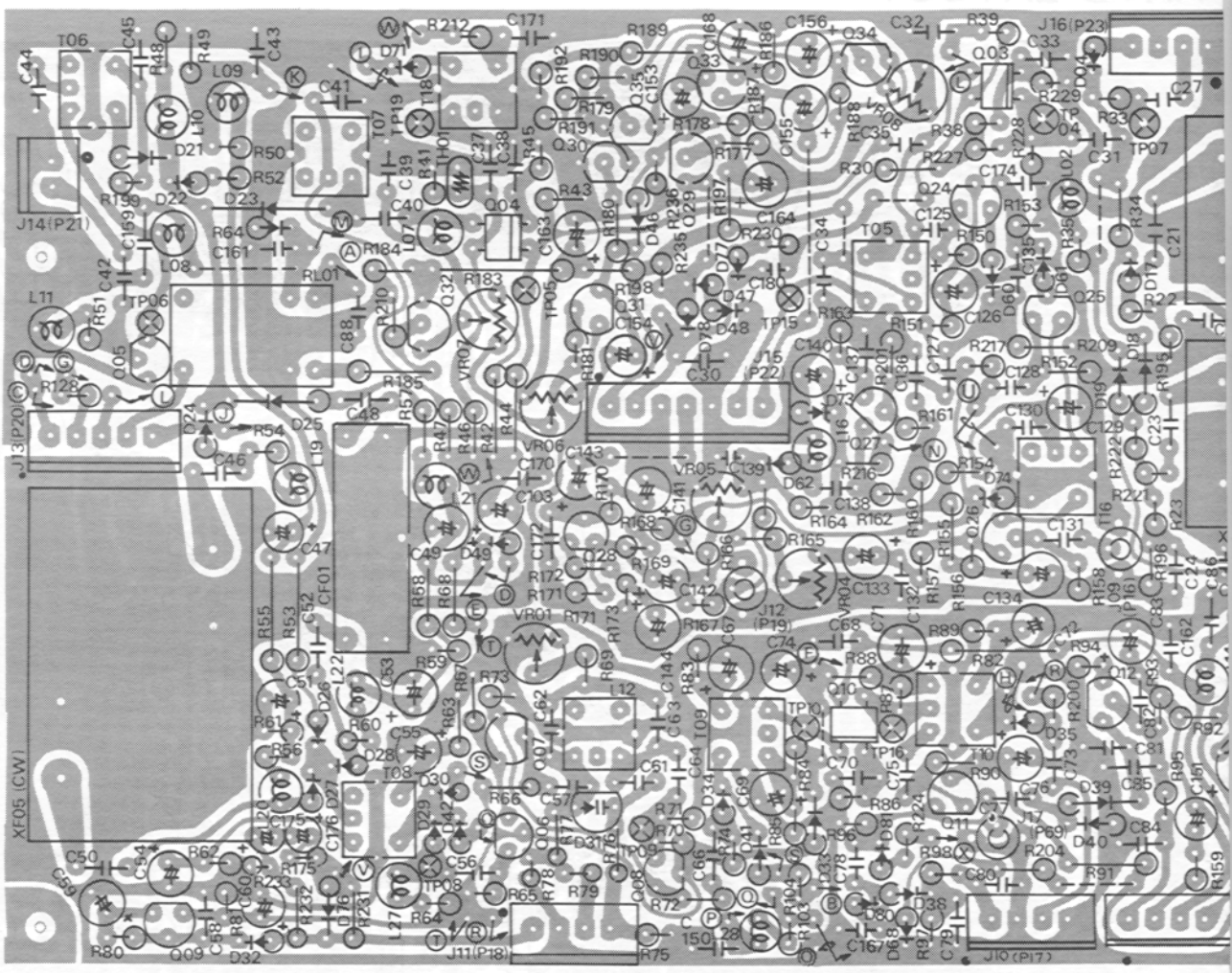
	E / S (V)	C / D (V)	B / G (V)	G_2 (V)	REM
Q1001	7.5	24.0	4.1		
Q1002	4.0	7.5	1.6		
Q1003	12.0	24.0	12.8		
Q1004	3.4	24.0	0		
Q1005	2.8	23.5	0		
Q1006	2.8	23.5	0		
Q1007	5.9	12.0	6.4		TX
Q1009	0.4	12.0	1.2		
Q1010	0.3	12.0	1.2		

V100	



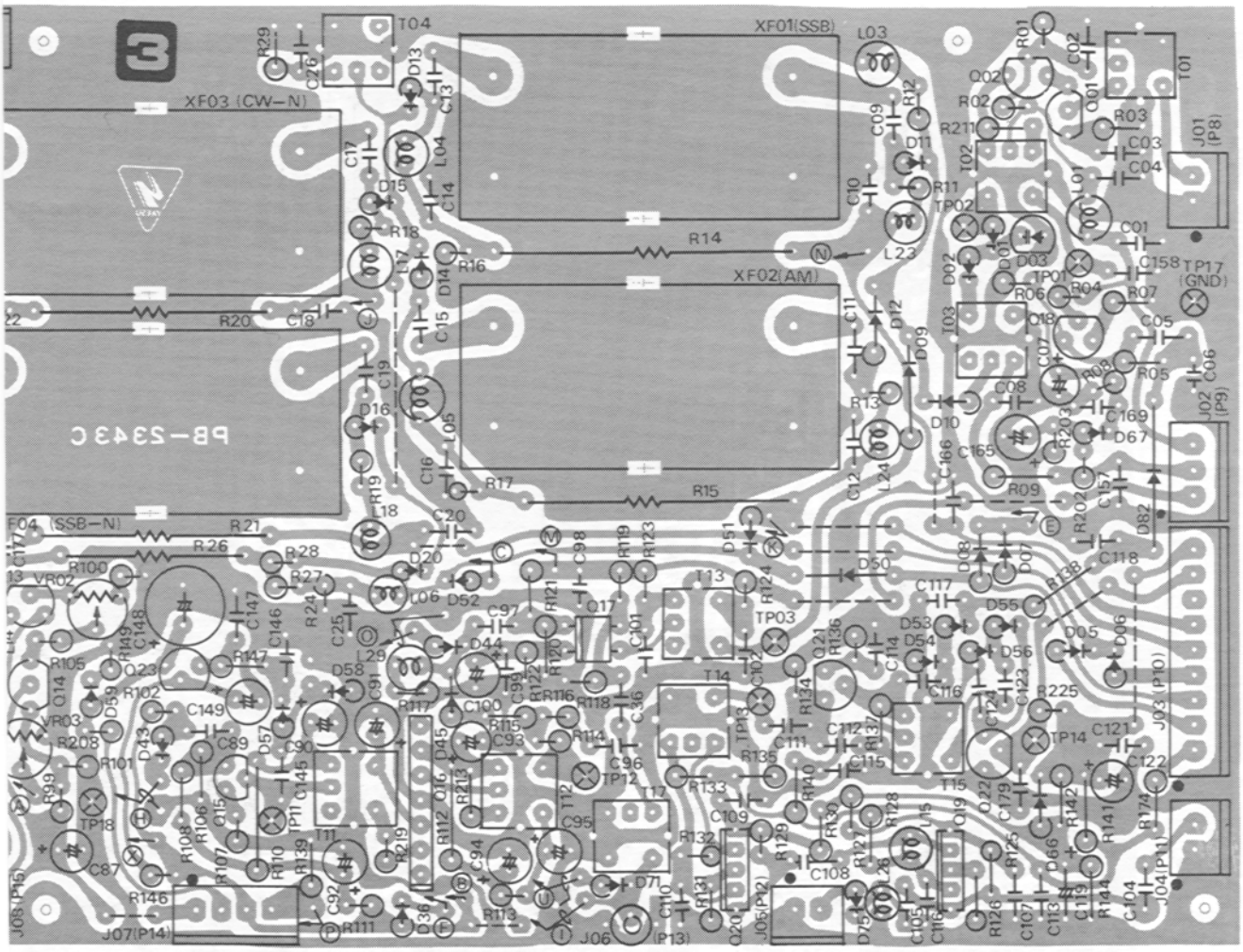
μF, 50wv; RESISTOR VALUES ARE IN Ω, 1/4W;
RE IN HENRIES UNLESS OTHERWISE NOTED.

	1	2	3	4	5	6	7	8	9
I	0	—19/0	0	H	H	H	300	235/180	0



	E / S	C / D	B / G	G_2	REM		E / S	C
Q2001	2.2	9.6	0			Q2019	1.0	C_1 C_2
Q2002	9.6	24.0	7.5			Q2020	1.0	C_1 C_2
Q2003	1.0	12.0	1.4	4.6		Q2021	2.0	1
Q2004	2.3	8.6	2.0	3.6		Q2022	0	
Q2005	0.4	12.0	0		T	Q2023	0	1
Q2006	3.0	9.8	3.6			Q2024	5.3	
Q2007	3.0	9.7	3.7			Q2025	1.1	
Q2008	3.7	9.8	4.3			Q2026	7.0	
Q2009	9.8	11.5	10.3			Q2027	1.2	
Q2010	2.3	8.3	2.2	5.3		Q2028	1.1	
Q2011	4.0	7.8	4.6			Q2029	1.6	
Q2012	0	4.8	0			Q2030	0	
Q2013	7.0	8.0	5.2			Q2031	4.2	1
Q2014	4.8	0	5.0			Q2032	11.5	
Q2015	2.2	12.0	2.8		T COMP ON	Q2033	0.3	
Q2016	③ 0	④⑤12.0			T	Q2034	11.8	
Q2017	2.0	11.8	2.4	4.2	T	Q2035	4.3	
Q2018	0	8.2	0					

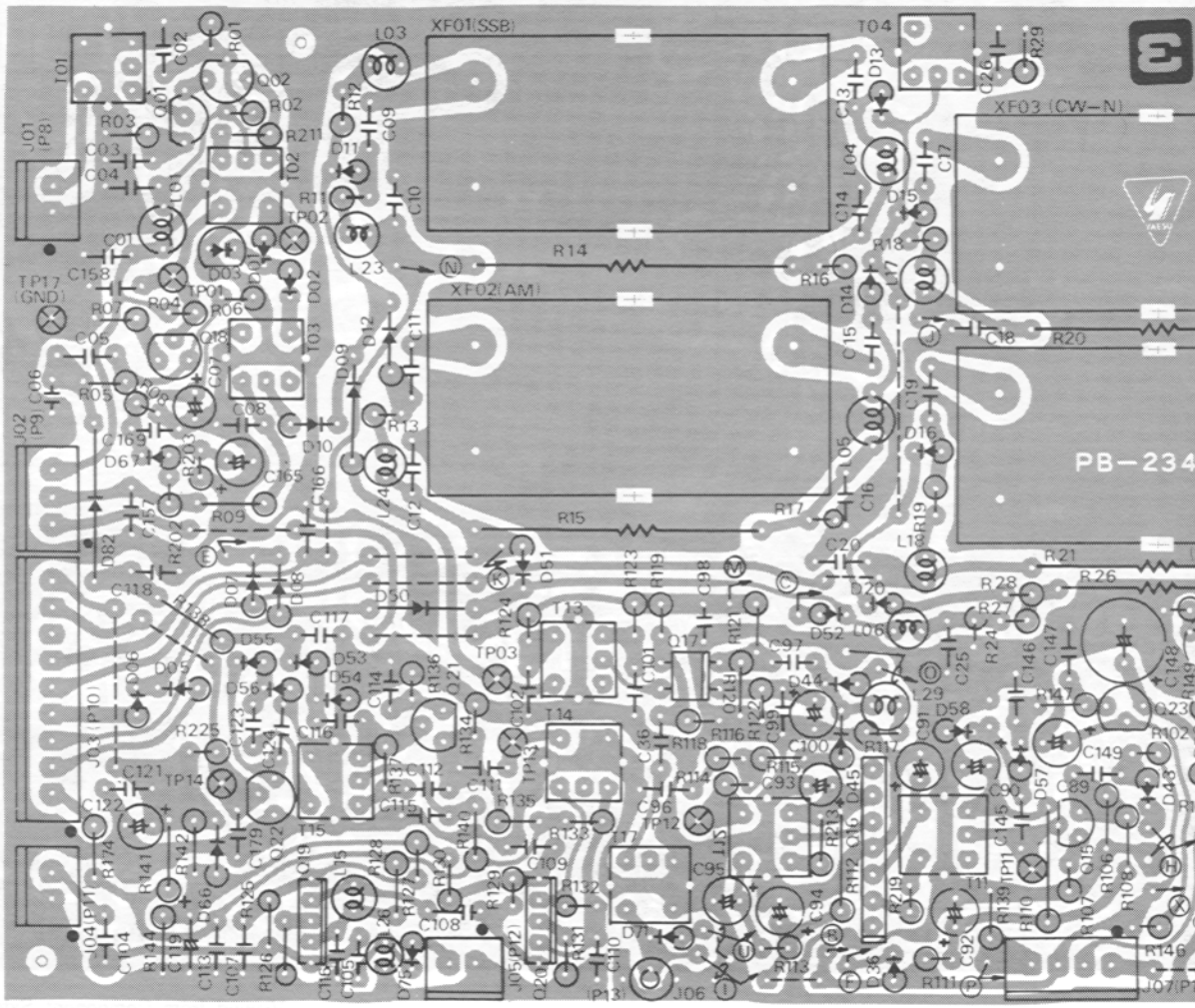
ARTS LAYOUT

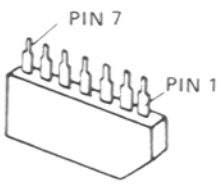


Viewed from Component Side

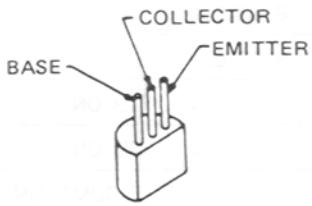
/D	B / G	G_2	REM
7.8	B 2.2	B 1.2	
7.8	B 1.6	B 1.5	
1.8	2.6		NB ON
3.0	0		NB ON
2.0	0		T COMP ON
9.0	6.0		T MONI ON
9.2	0		T MONI ON
2.5	0		T MONI ON
3.5	2.0		T MONI ON
4.8	1.6		T MONI ON
3.1	0.7		T
0.1	0.5		T
0.0	3.0		T
0	11.0		T
3.3	0.7		T
3.7	11.5		T
4.2	3.7		T

IF UNIT

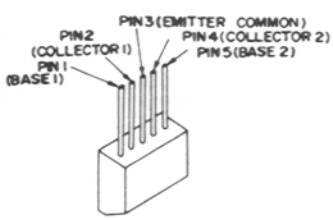




TA7060AP

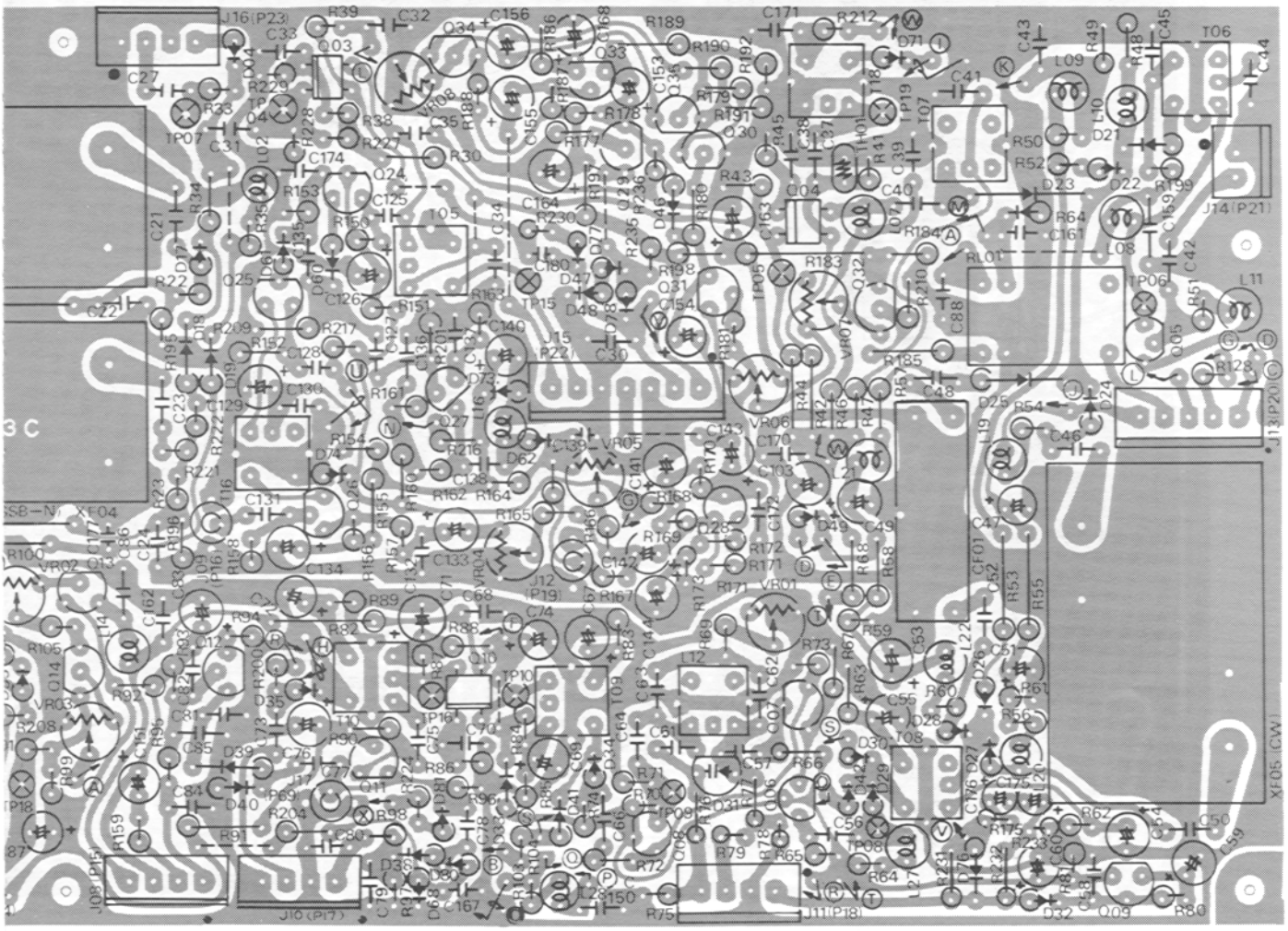


2SA564AR
2SC380Y
2SC1815GR
2SC1815Y

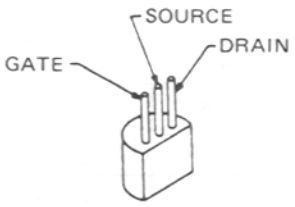


2SC1583

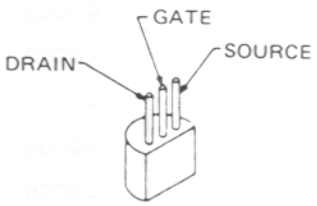
PARTS LAYOUT



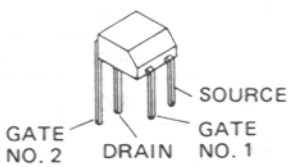
Viewed from Solder Side



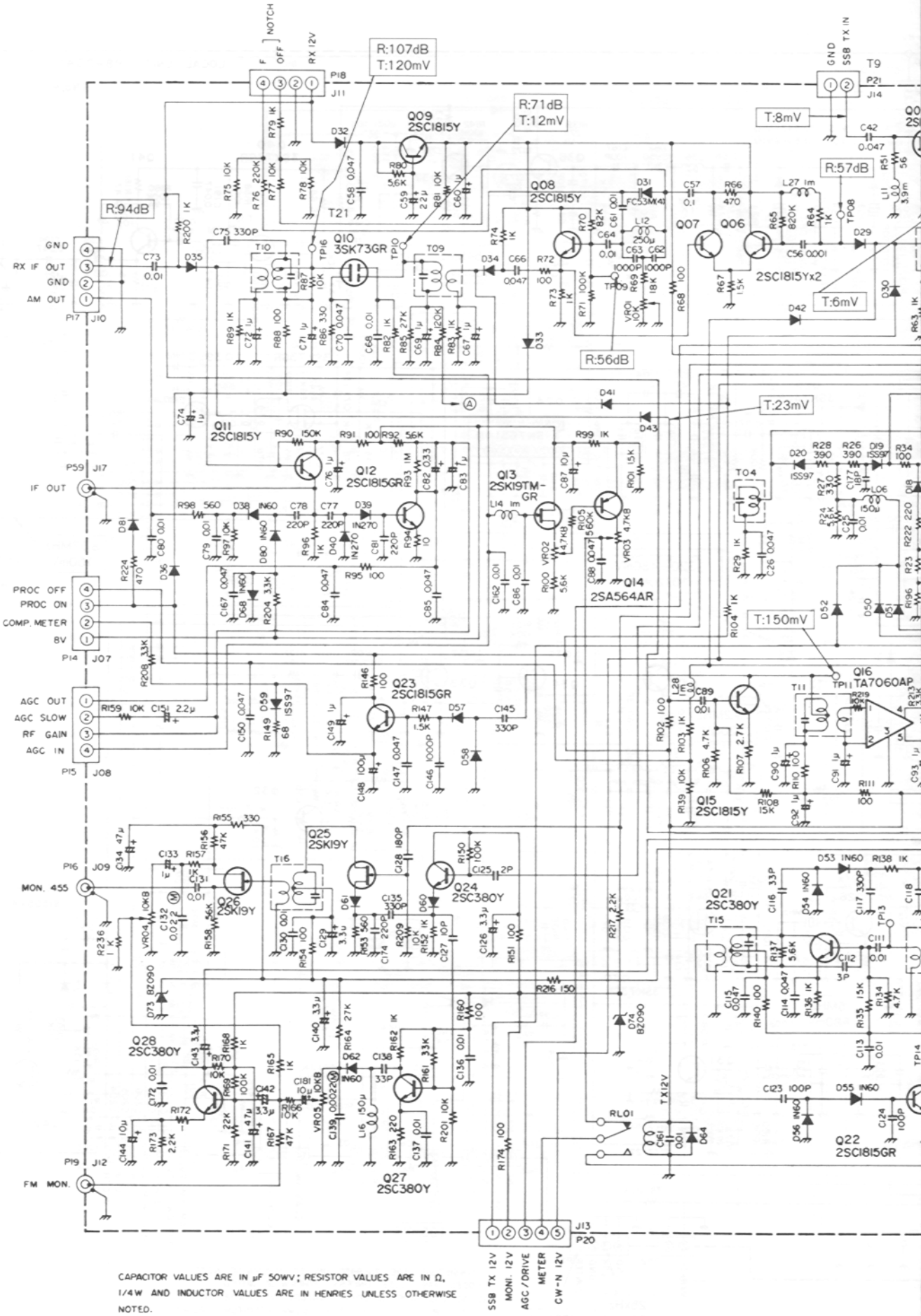
2SK19BL
2SK19GR
2SK19Y



2SK125 Y

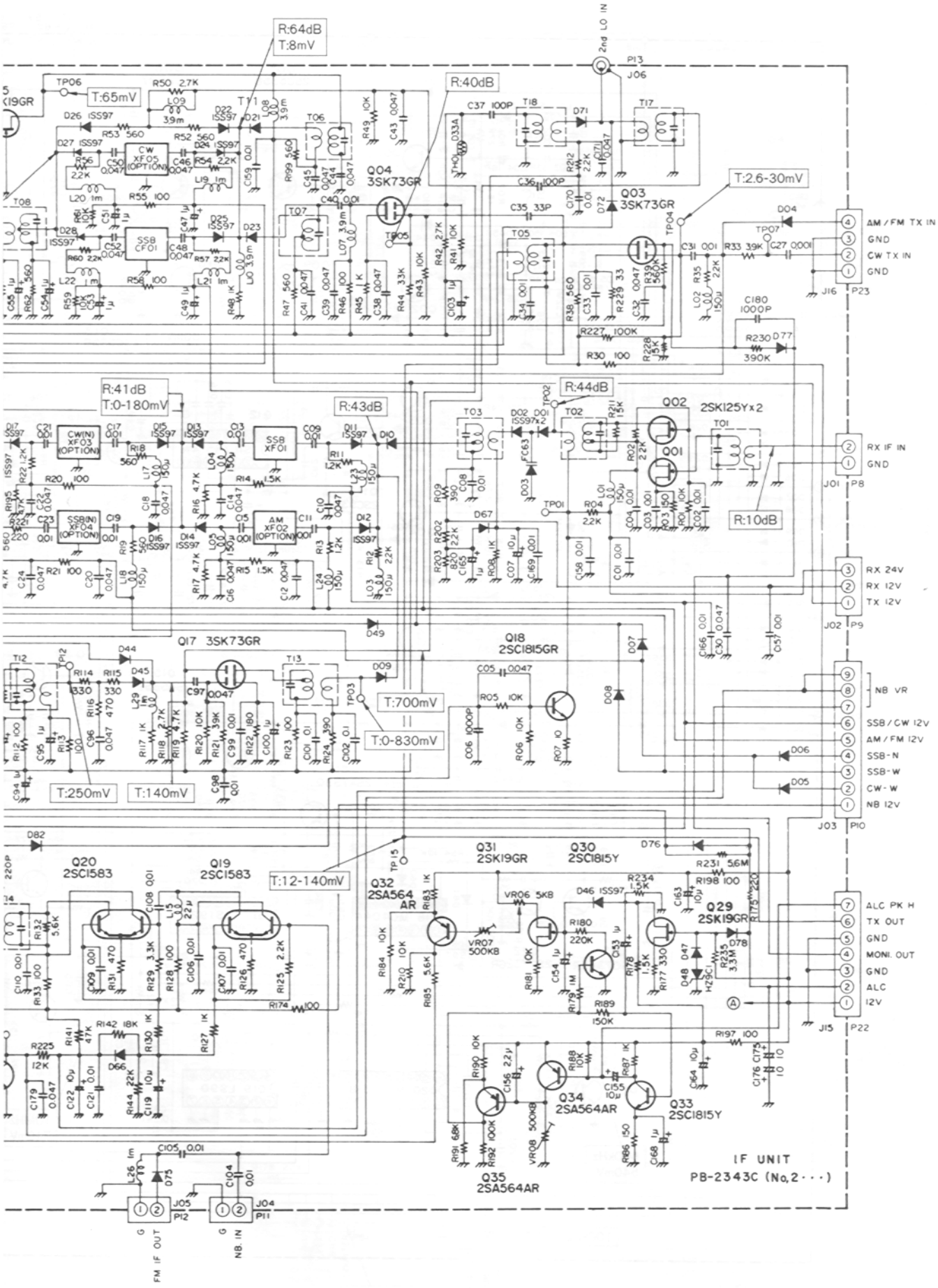


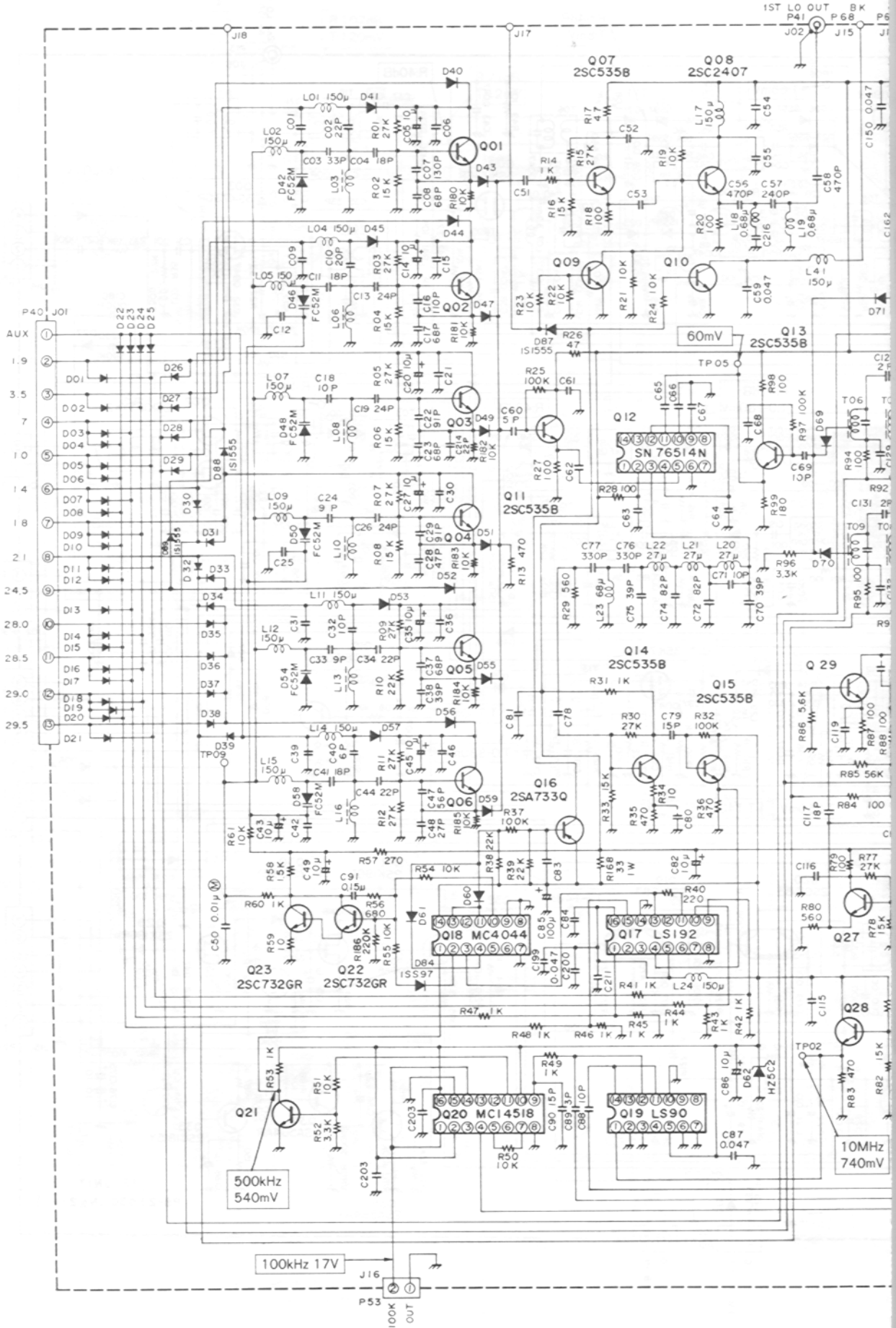
3SK73GR



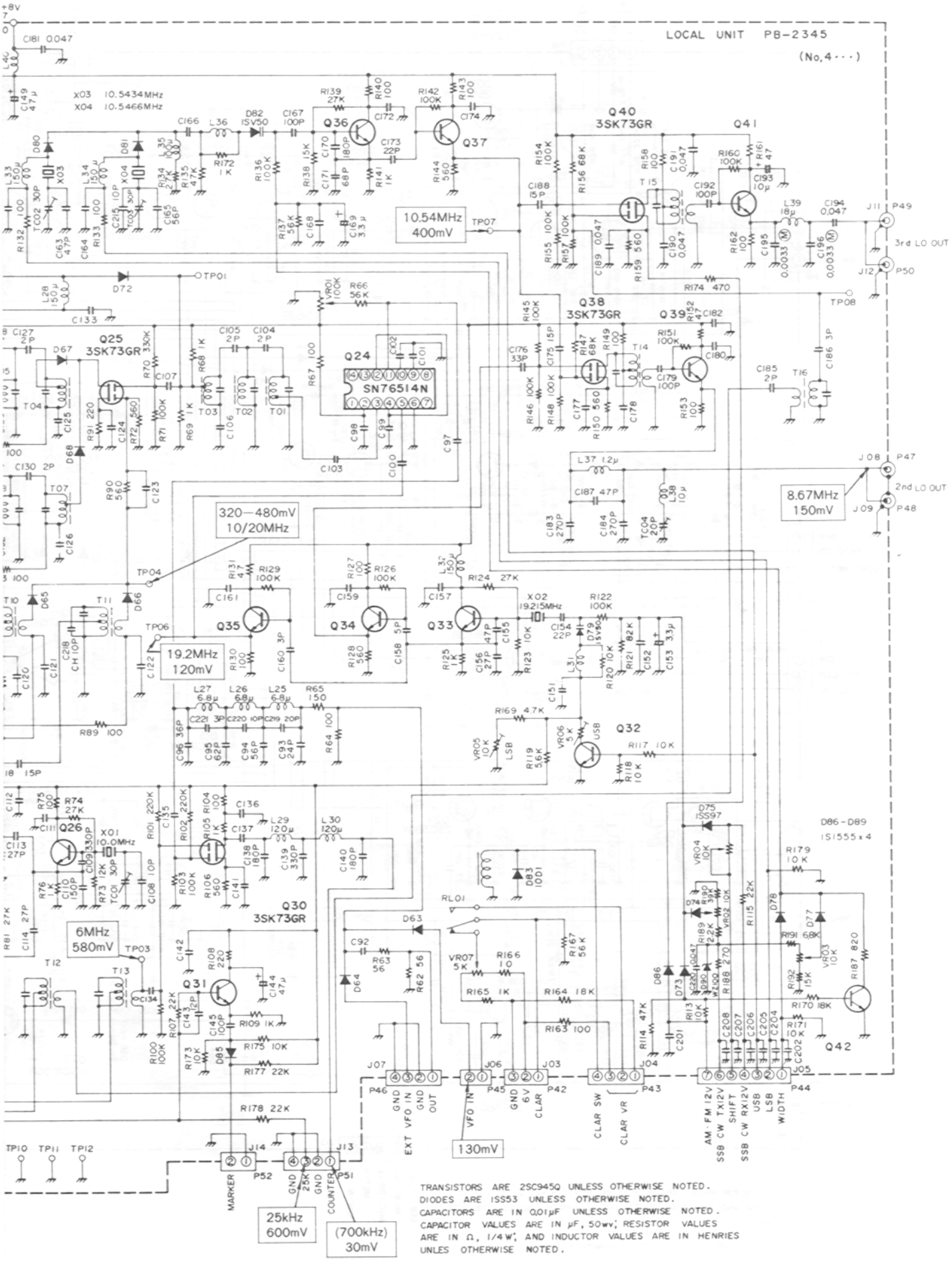
CAPACITOR VALUES ARE IN μF 50WV; RESISTOR VALUES ARE IN Ω, 1/4W AND INDUCTOR VALUES ARE IN HENRIES UNLESS OTHERWISE NOTED.

DIODES ARE 1S1555 UNLESS OTHERWISE NOTED.


R:64dB
T:8mV
2nd LO IN
P13
J06
T:65mV
R:40dB
T:2.6-30mV
Q04
3SK73GR
Q03
3SK73GR
CW
XF05
(OPTION)
SSB
CF01
AM / FM TX IN
GND
CW TX IN
GND
J16
P23
R:41dB
T:0-180mV
R:43dB
R:44dB
Q02
2SK125Y x 2
Q01
CW(N)
XF03
(OPTION)
SSB
XF01
SSB(N)
XF04
(OPTION)
AM
XF02
(OPTION)
RX IF IN
GND
J01
P8
R:10dB
RX 24V
RX 12V
TX 12V
J02
P9
Q17 3SK73GR
Q18
2SC1815GR
T:700mV
=
T:0-830mV
T:250mV
T:140mV
NB VR
SSB / CW 12V
AM / FM 12V
SSB-N
SSB-W
CW-W
NB 12V
J03
P10
T:12-140mV
Q20
2SC1583
Q19
2SC1583
Q31
2SK19GR
Q30
2SC1815Y
Q32
2SA564
AR
Q29
2SK19GR
ALC PK H
TX OUT
GND
MONI. OUT
GND
ALC
12V
J15
P22
Q34
2SA564AR
Q33
2SC1815Y
Q35
2SA564AR
IF UNIT
PB-2343C (No.2···)
J05
P12
J04
P11
FM IF OUT
N.B. IN

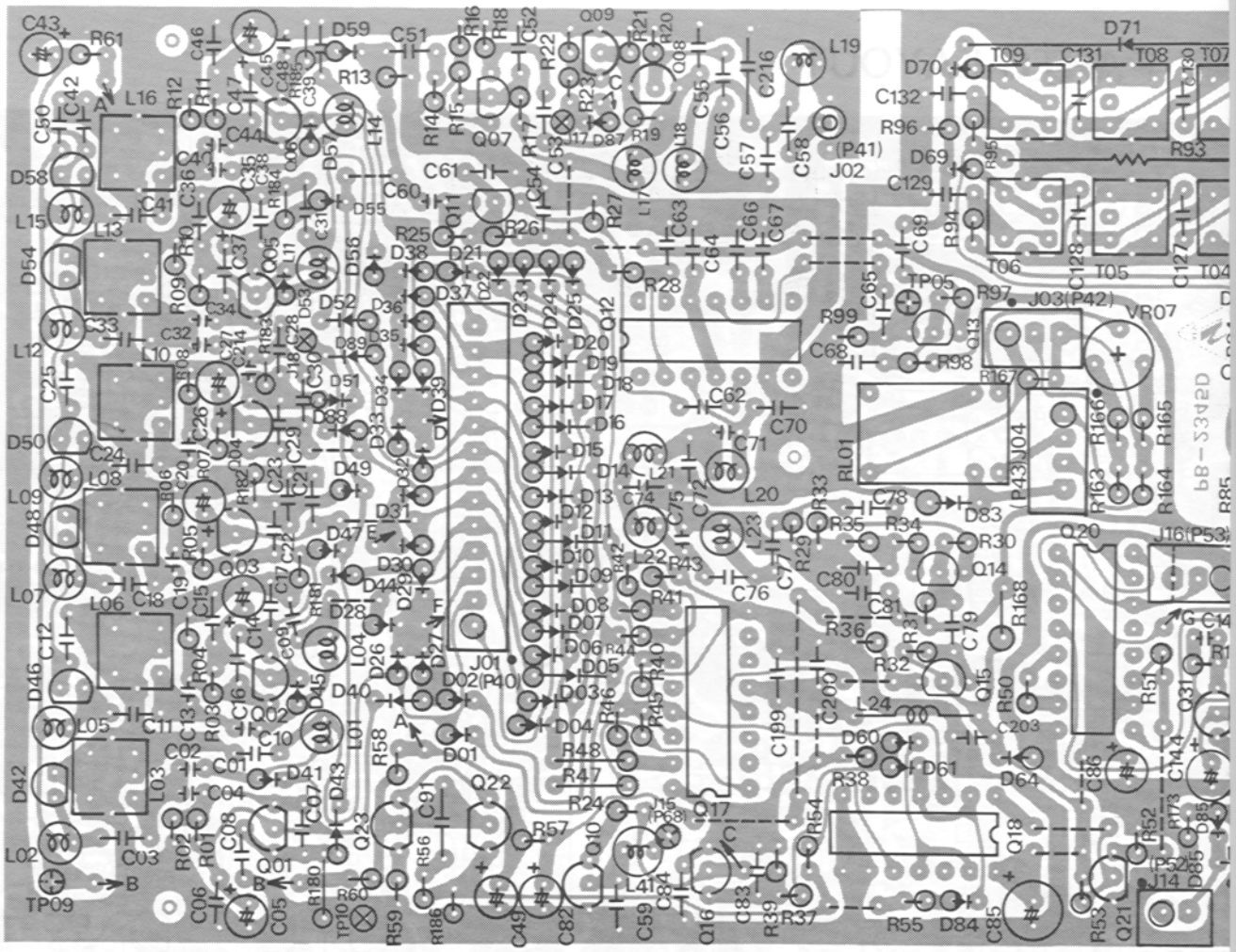

1ST LO OUT
P41
P68
J02
J15
J18
J17
Q07
2SC535B
Q08
2SC2407
Q01
Q02
Q03
Q04
Q05
Q06
Q09
Q10
Q11
2SC535B
Q12
SN 76514N
Q13
2SC535B
Q14
2SC535B
Q15
2SC535B
Q16
2SA733Q
Q17 LS192
Q18 MC4044
Q19 LS90
Q20 MC14518
Q21
Q22
2SC732GR
Q23
2SC732GR
Q27
Q28
Q29
P40
J01
AUX
60mV
TP05
TP09
TP02
500kHz
540mV
10MHz
740mV
100kHz 17V
J16
P53
100K
OUT

L UNIT

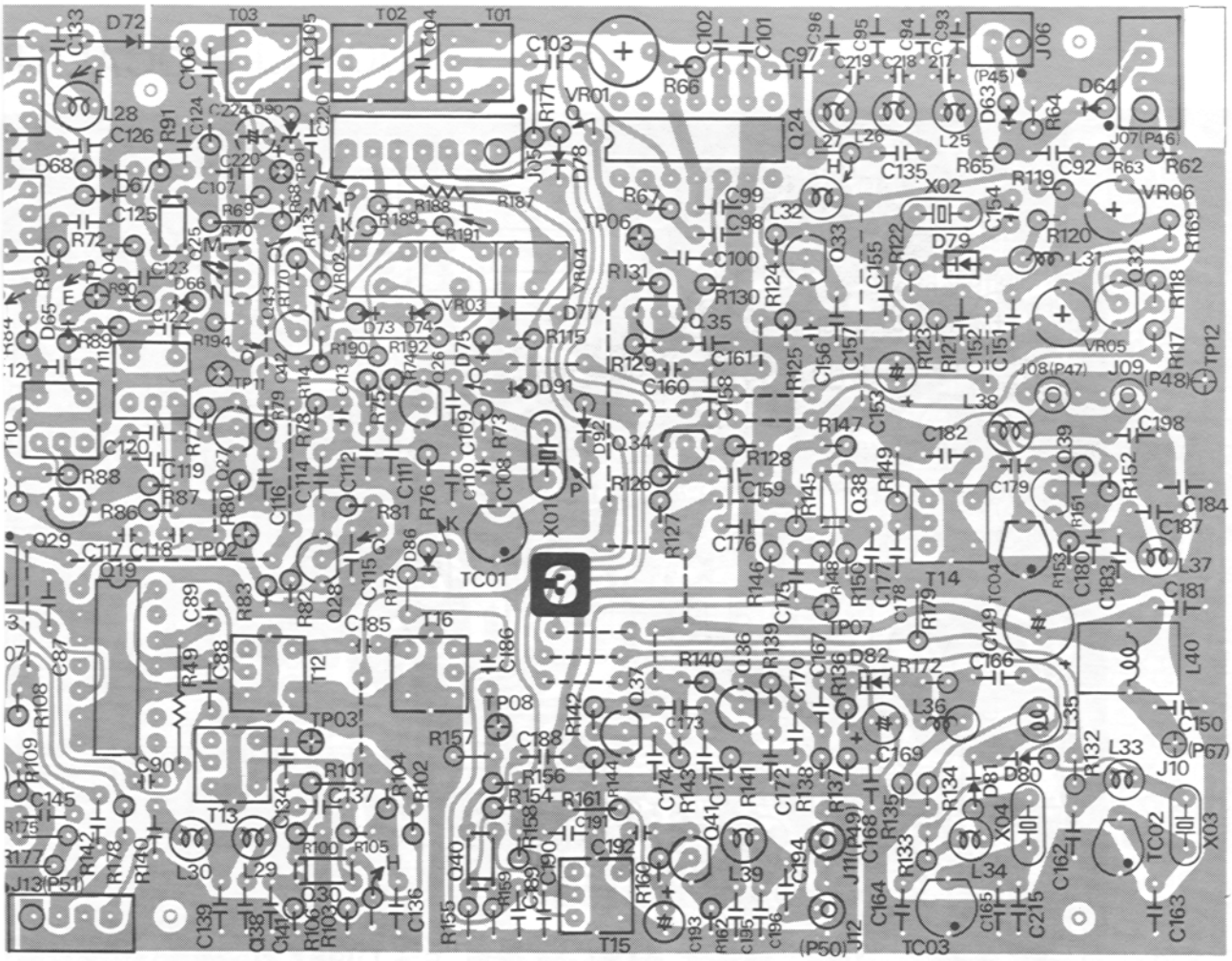


TRANSISTORS ARE 2SC945Q UNLESS OTHERWISE NOTED.
DIODES ARE 1SS53 UNLESS OTHERWISE NOTED.
CAPACITORS ARE IN 0.01μF UNLESS OTHERWISE NOTED.
CAPACITOR VALUES ARE IN μF, 50wv; RESISTOR VALUES ARE IN Ω, 1/4W; AND INDUCTOR VALUES ARE IN HENRIES UNLES OTHERWISE NOTED.

LOCAL UNIT PARTS LAYOUT



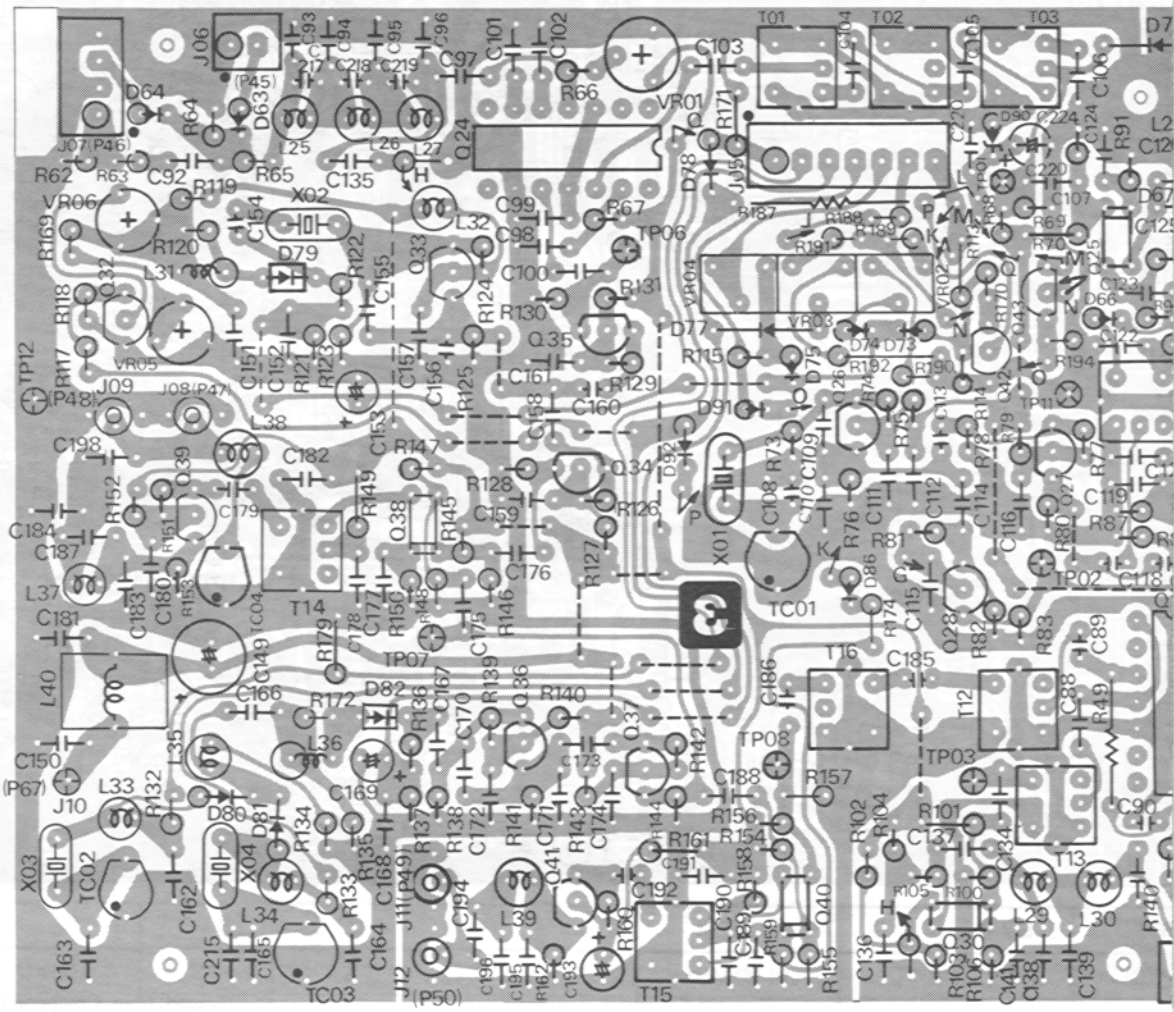
	E / S	C / D	B / G	G_2	REM		E / S
Q4001	2.3	7.2	2.6		1.8MHz	Q4022	0.8
Q4002	2.3	7.2	2.6		7 MHz	Q4023	0
Q4003	2.3	7.2	2.6		14 MHz	Q4024	⑥ 0
Q4004	2.3	7.2	2.6		18 MHz	Q4025	1.7
Q4005	3.0	7.2	3.0		21 MHz	Q4026	2.5
Q4006	2.7	6.5	3.1		28 MHz	Q4027	2.2
Q4007	0.9	7.8	1.8			Q4028	1.7
Q4008	2.0	7.8	2.6			Q4029	0.3
Q4009	0	2.6	0			Q4030	2.2
Q4010	0/0	5.2/0	0/0.7		UNLOCK	Q4031	2.0/4.0
Q4011	0.7	7.8	1.5			Q4032	0/0
Q4012	⑥ 0	② 7.8				Q4033	2.1
Q4013	1.0	7.8	1.8			Q2034	3.5
Q4014	1.1	5.2	1.8			Q2035	1.0
Q4015	2.0	5.2	2.7			Q2036	2.2
Q4016	5.2	5.5	4.7			Q2037	3.5
Q4017	⑧⑭0	⑤⑯5.2				Q2038	4.2
Q4018	⑦⑧⑨0	⑭ 5.2				Q2039	1.3
Q4019	②③⑥⑦⑩0	⑤ 5.2				Q2040	4.2
Q4020	⑧⑮0	②⑩⑯5.2				Q2041	1.1
Q4021	0	2.0/5.2	0.5/0.9		/⎍⎍⎍ 29MHz	Q2042	0/0

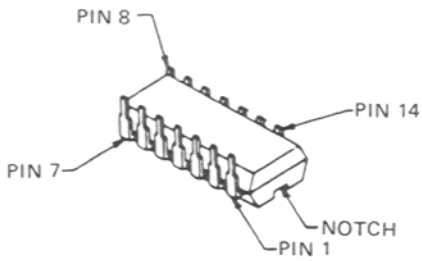


C / D	B / G	G_2	REM
(VCV)	(VCV)		21MHz
(VCV)	(0.8)		
8.0			
5.7	1.8	3.0	
7.8	2.6		
7.8	2.6		
5.2	1.8		
6.5	2.5		21MHz
4.0	0.6	2.5	
7.8/—	1.8/4.5		—/⊓⊓⊔25kHz
5.8/0	0/0.7		LSB/USB
8.0	2.3		
7.3	3.6		
7.8	1.7		
7.8	2.7		
7.8	4.2		
7.8	4.3	5.1	
7.8	1.8		
7.8	4.3	5.1	
7.8	1.8		
4.8/0	0/0.7		SSB/AM

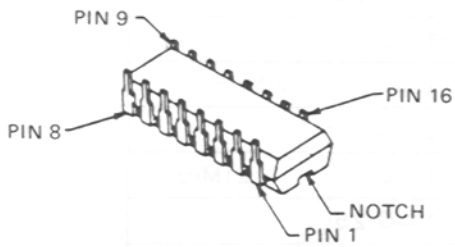
Viewed from Component Side

LOCAL UN





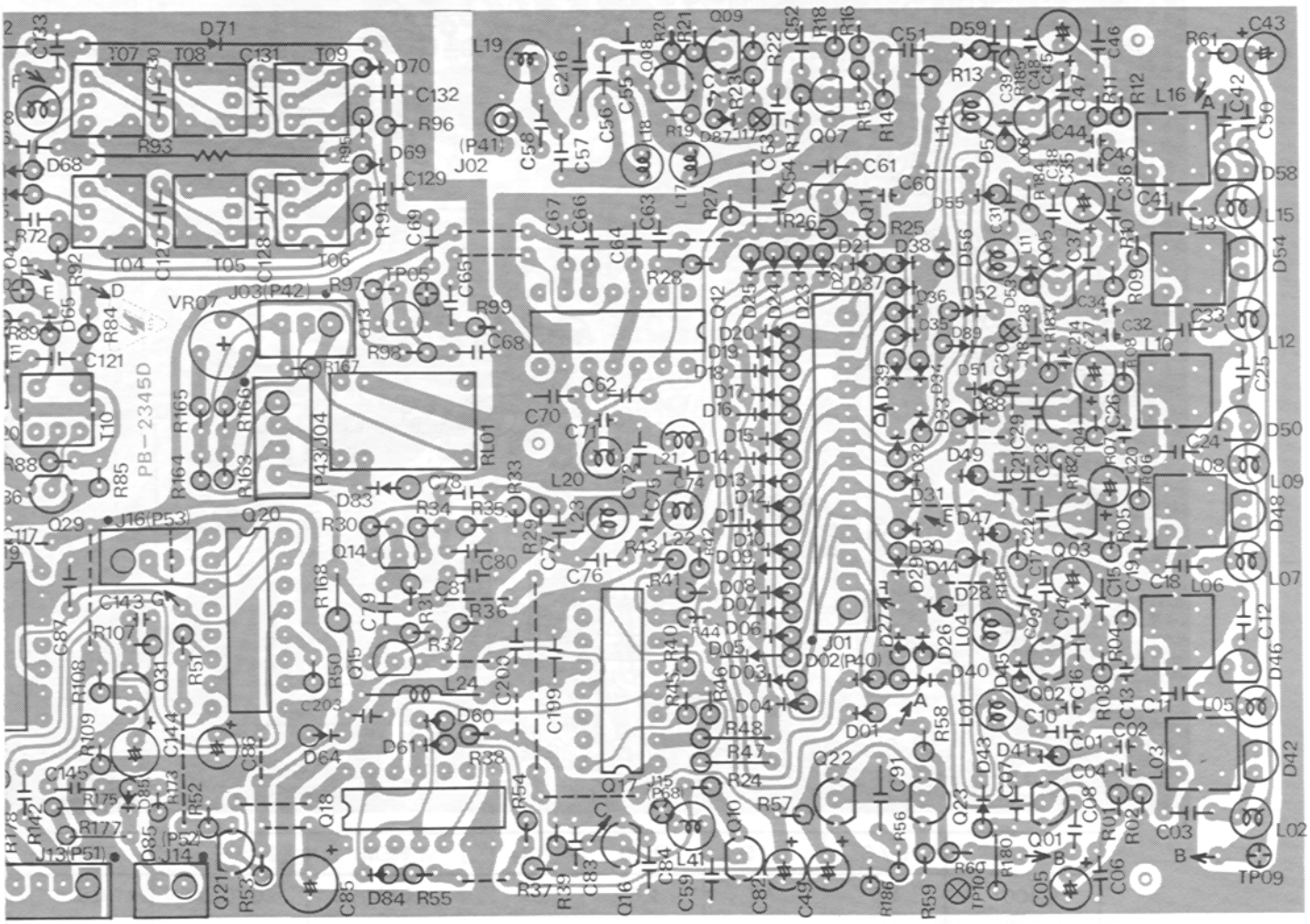
MC4044
SN76514N



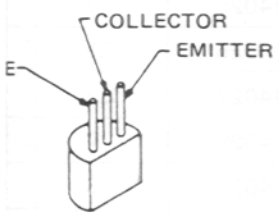
MC14518BCP
SN74LS192

BAS

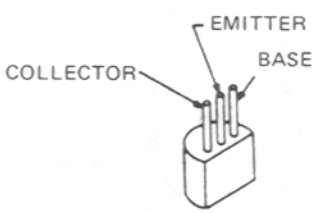
NIT PARTS LAYOUT



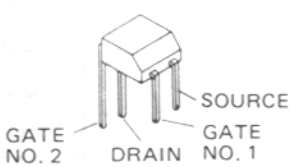
Viewed from Solder Side



2SA733Q
2SC535B
2SC732GR
2SC945Q

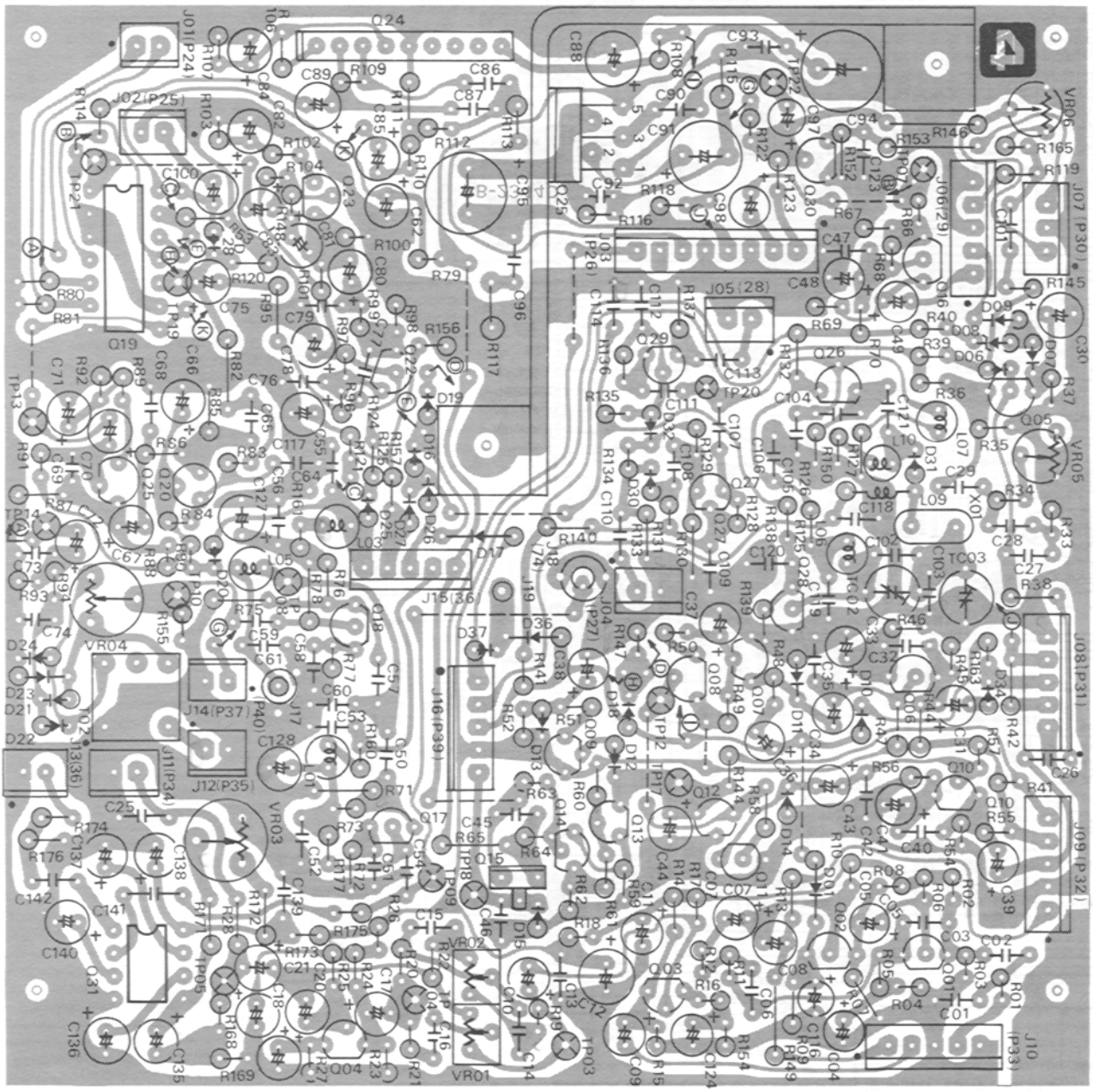


2SC2407

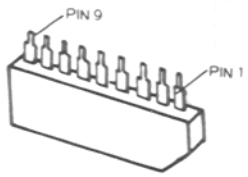


3SK73GR

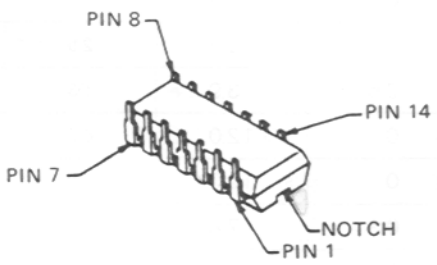
AF UNIT PARTS LAYOUT



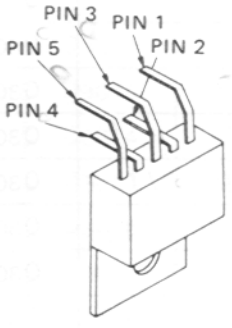
Viewed from Component Side



AN6551

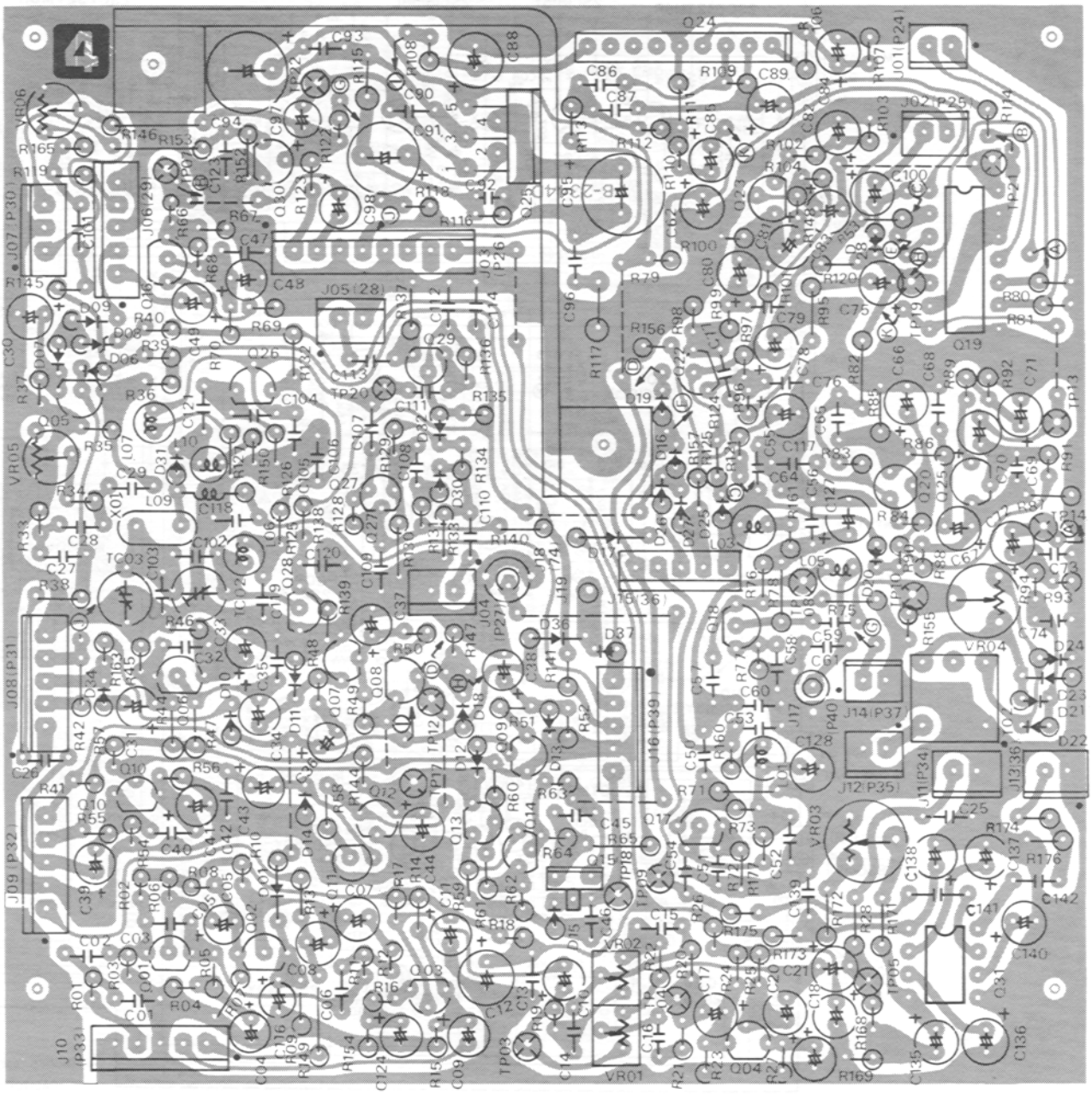


MC14066B

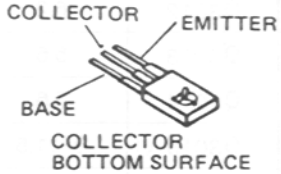


μPC2002V

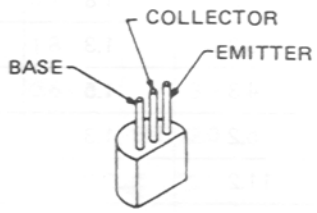
AF UNIT PARTS LAYOUT



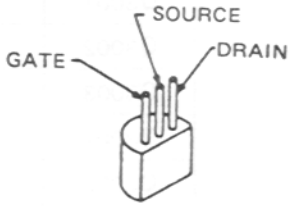
Viewed from Solder Side



2SA496Y

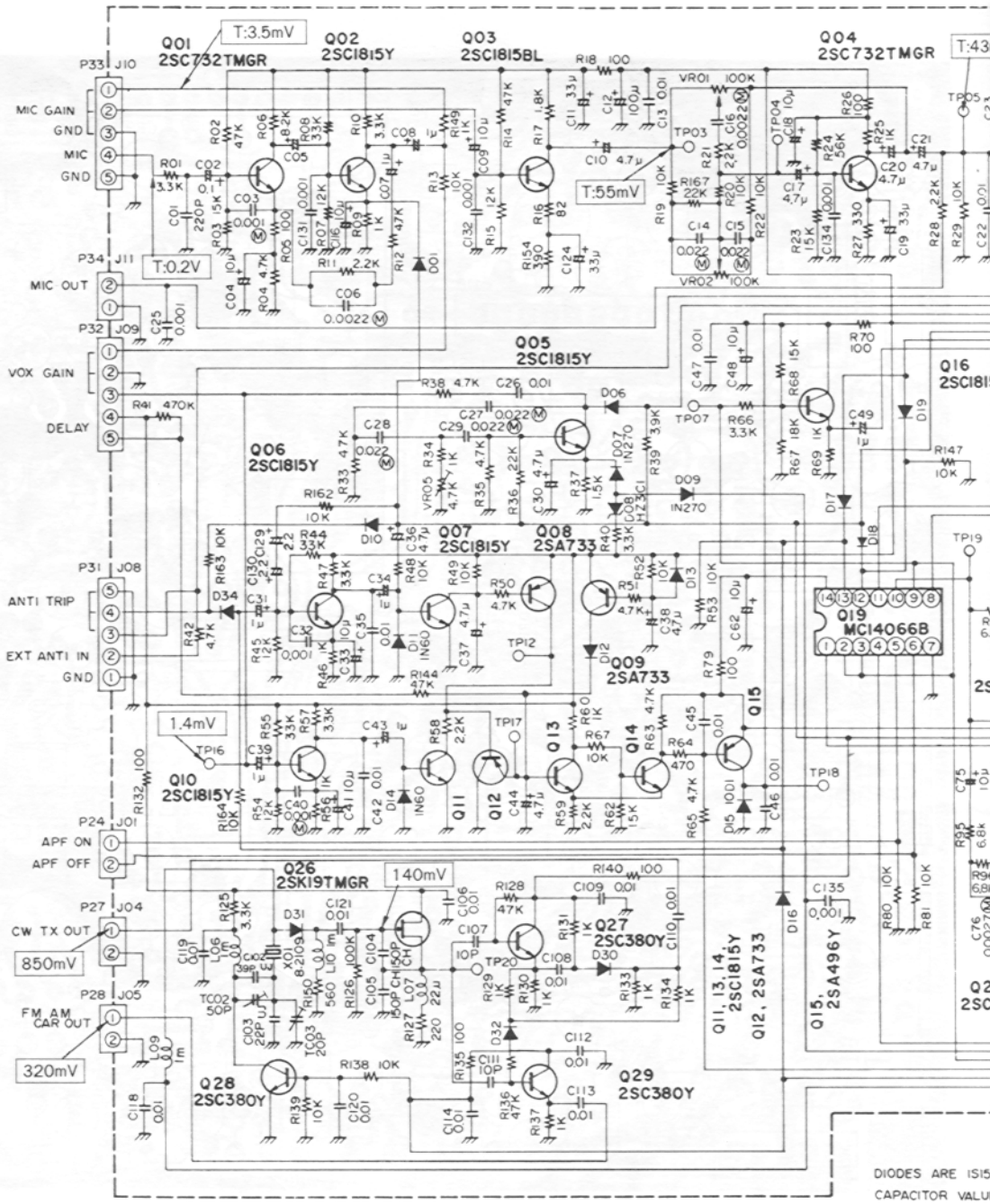


2SA733Q
2SC380Y
2SC732TM-GR
2SC1815BL
2SC1815GR
2SC1815Y



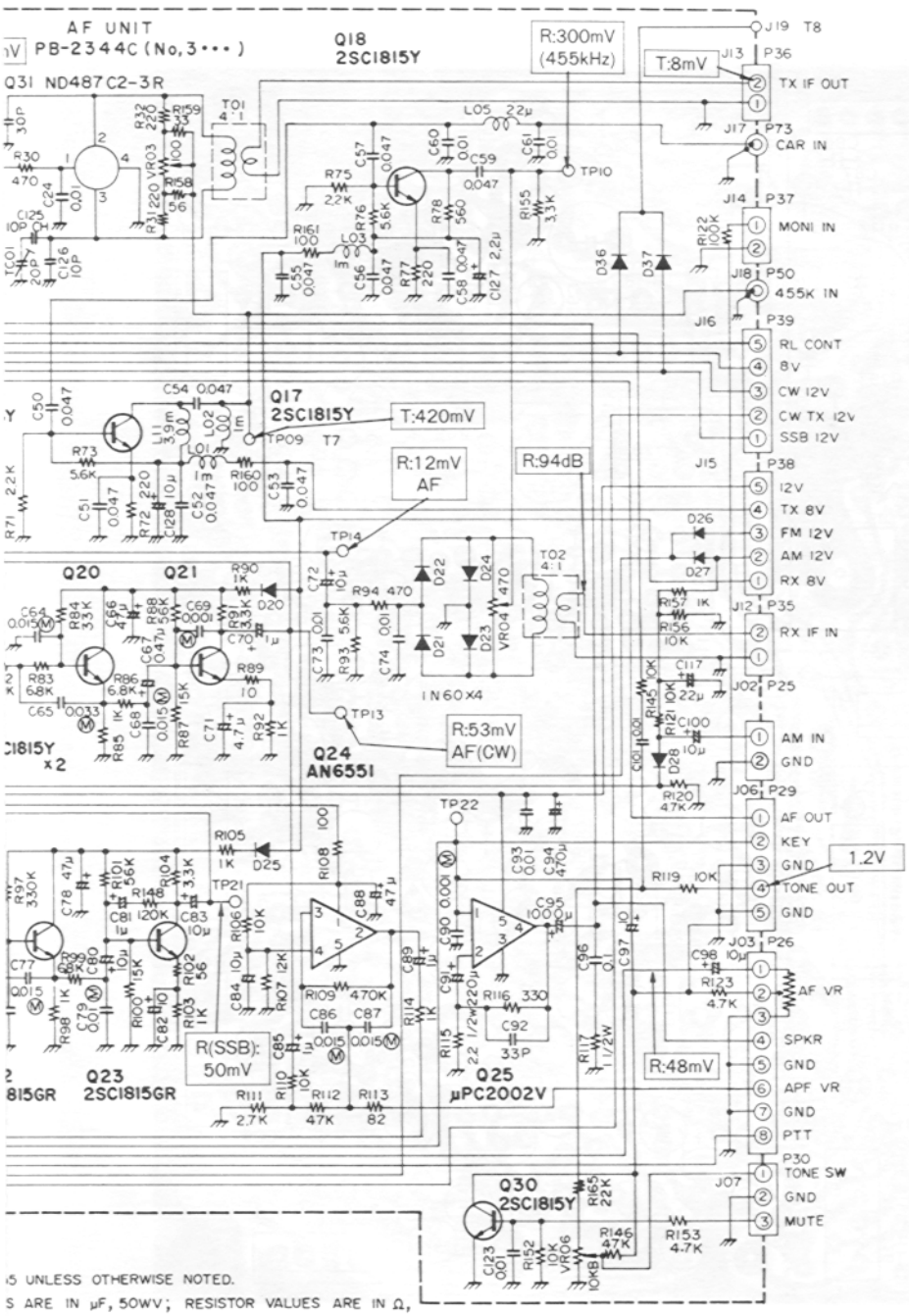
2SK19Y

AF UN



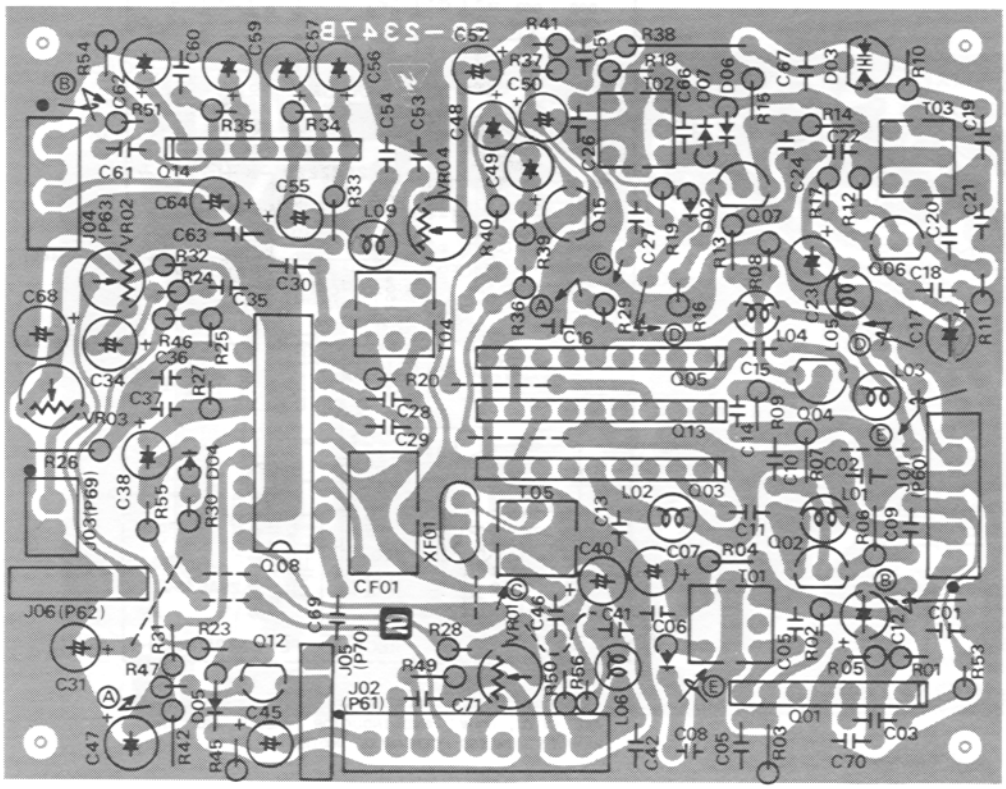
	E / S	C / D	B / G1	REM		E / S	C / D
Q3001	1.2	4.5	1.8		Q3011	0	7.8
Q3002	2.0	3.3	1.3		Q3012	6.2	0
Q3003	0.9	4.3	1.5		Q3013	5.6	5.6
Q3004	0.8	5.2	1.3		Q3014	5.6	12.0
Q3005	1.7	11.2	2.2	CW	Q3015	0/11.5	12.0/1
Q3006	1.3	3.2	2.1		Q3016	3.5	7.8
Q3007	0	7.8	0		Q3017	1.5	7.5
Q3008	8.0	0	7.5		Q3018	1.5	4.2
Q3009	8.0	0	7.8		Q3019	⑦ 0	⑭ 12.0
Q3010	1.3	3.2	2.1		Q3020	1.3	5.7

IIT

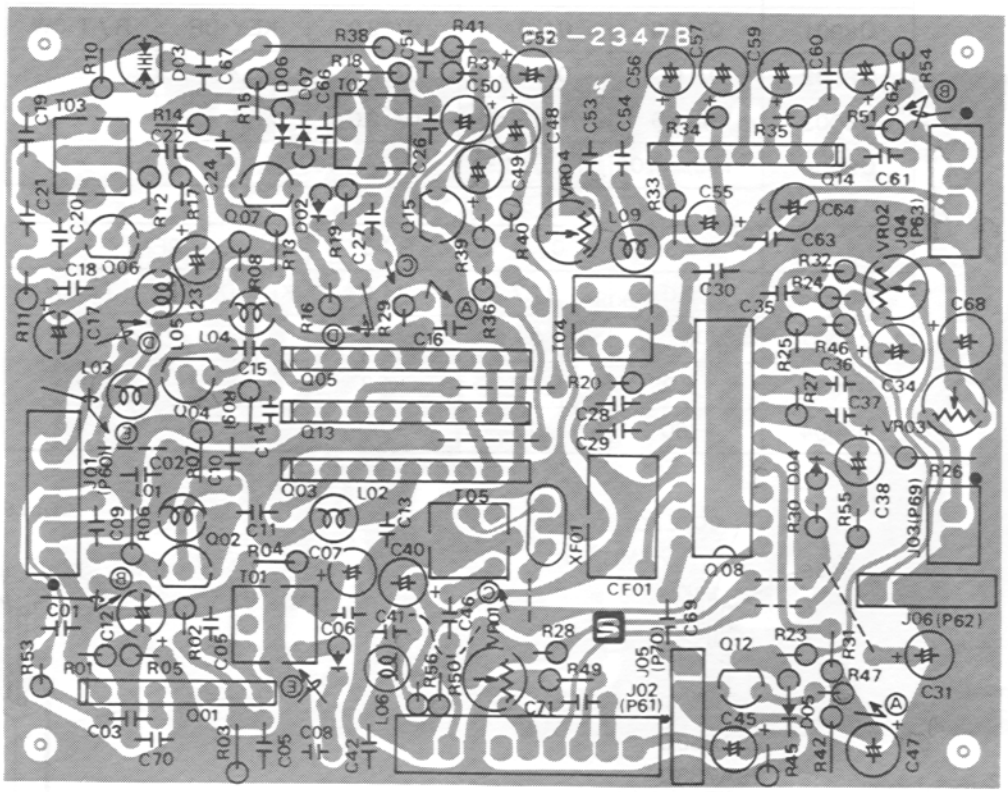


	B / G_1	REM		E / S	C / D	B / G_1	REM
	0		Q3021	0.7	3.9	1.3	
	0		Q3022	1.8	5.3	2.5	
	6.2		Q3023	0.6	3.9	1.3	
	1.8		Q3024	⑤ 0	①⑨12.0	④ 6.2	CW
2.0	12.0/11.3	R / T	Q3025	③ 0	⑤ 12.0		
	4.2		Q3026	0.8	7.8	0	CW
	2.3	T	Q3027	8.4	12.0	9.5	CW
	2.2		Q3028	0	8.0	0.7	AM
			Q3029	7.2	10.5	7.8	AM
	2.0		Q3030	0	0	0	

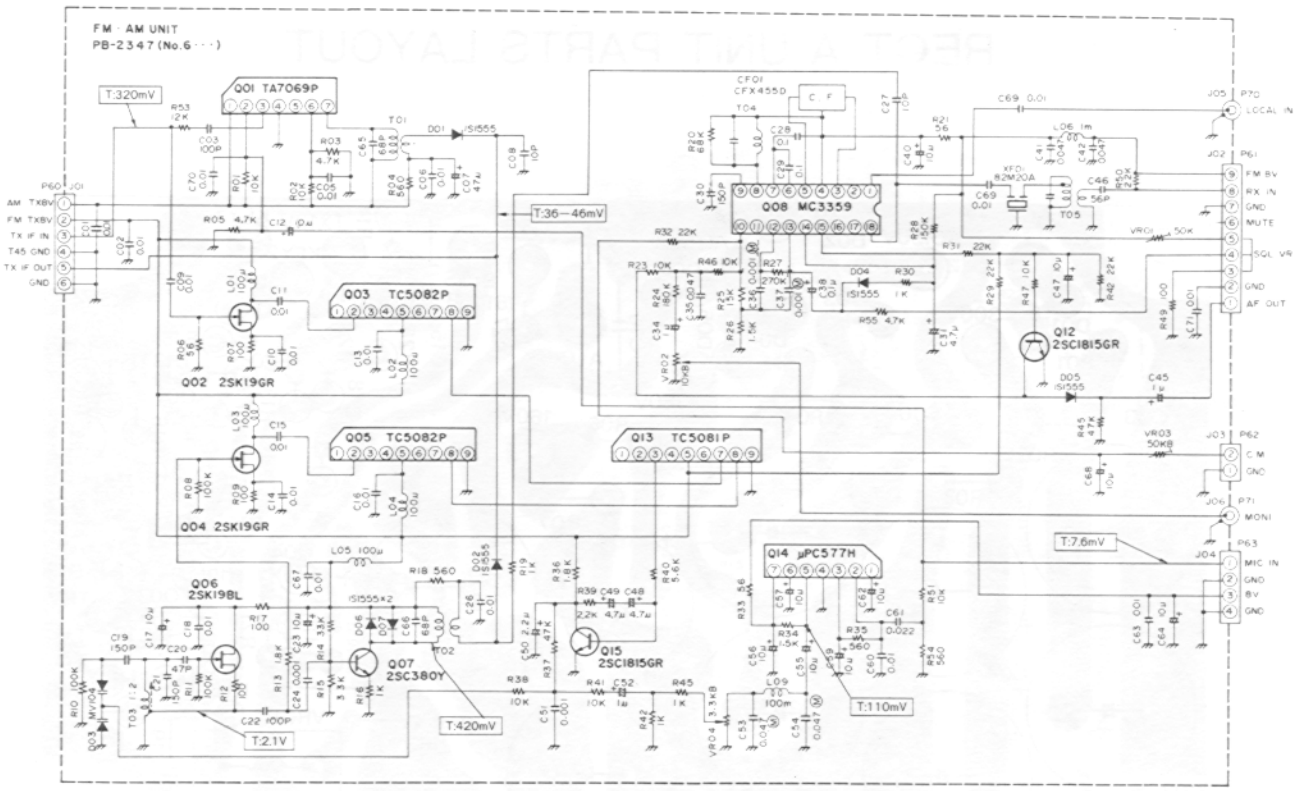
AM/FM UNIT PARTS LAYOUT



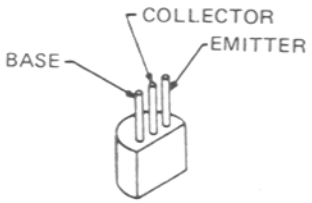
Viewed from Component Side



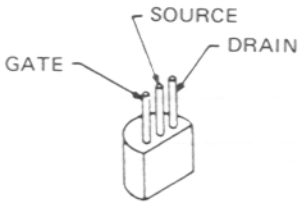
Viewed from Solder Side



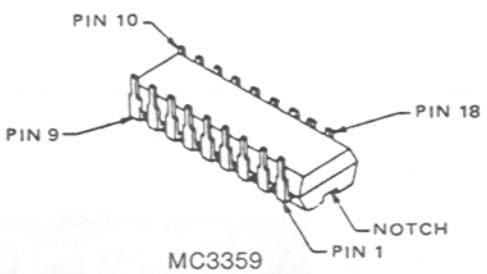
CAPACITOR VALUES ARE IN μF, 50WV ; RESISTOR VALUES ARE IN Ω, 1/4W ;
AND INDUCTOR VALUES ARE IN HENRIES UNLESS OTHERWISE NOTED.



2SC380Y
2SC1815GR

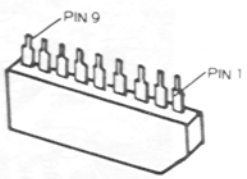


2SK19BL
2SK19TMGR

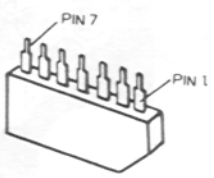


MC3359

	E / S	C / D	B / G	G_2	REM
Q6001	④ 0	①⑦ 8.0			AM - T
Q6002	0.5	8.0	0		FM - T
Q6003	⑨ 0	⑤ 8.0			FM - T
Q6004	0.7	8.0	0		FM - T
Q6005	⑨ 0	⑤ 8.0			FM - T
Q6006	1.0	7.2	0		FM - T
Q6007	0.8	8.0	0.7		FM - T
Q6008		④⑧ 8.0			FM
Q6012	0	0	0/0.7		R / T
Q6013	⑨ 0	⑤ 8.0			FM - T
Q6014	④ 0	⑦ 8.0			
Q6015	0	(VCV)	(VCV)		
Q6016					
Q6017					

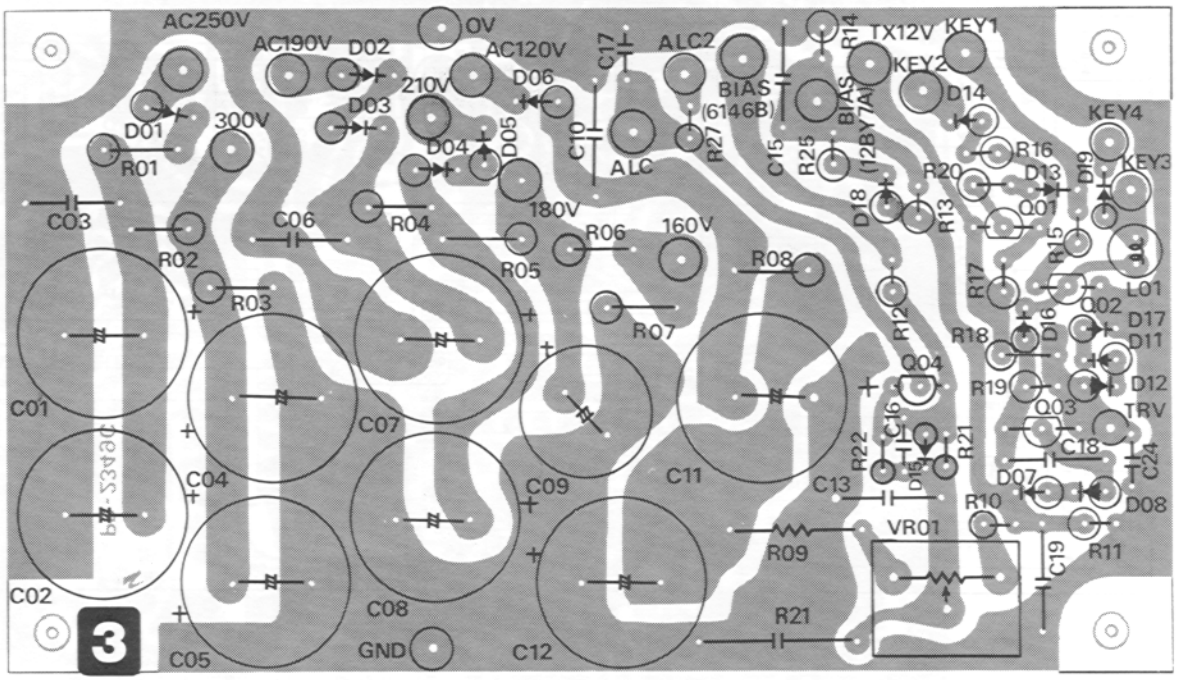


TC5081P
TC5082P

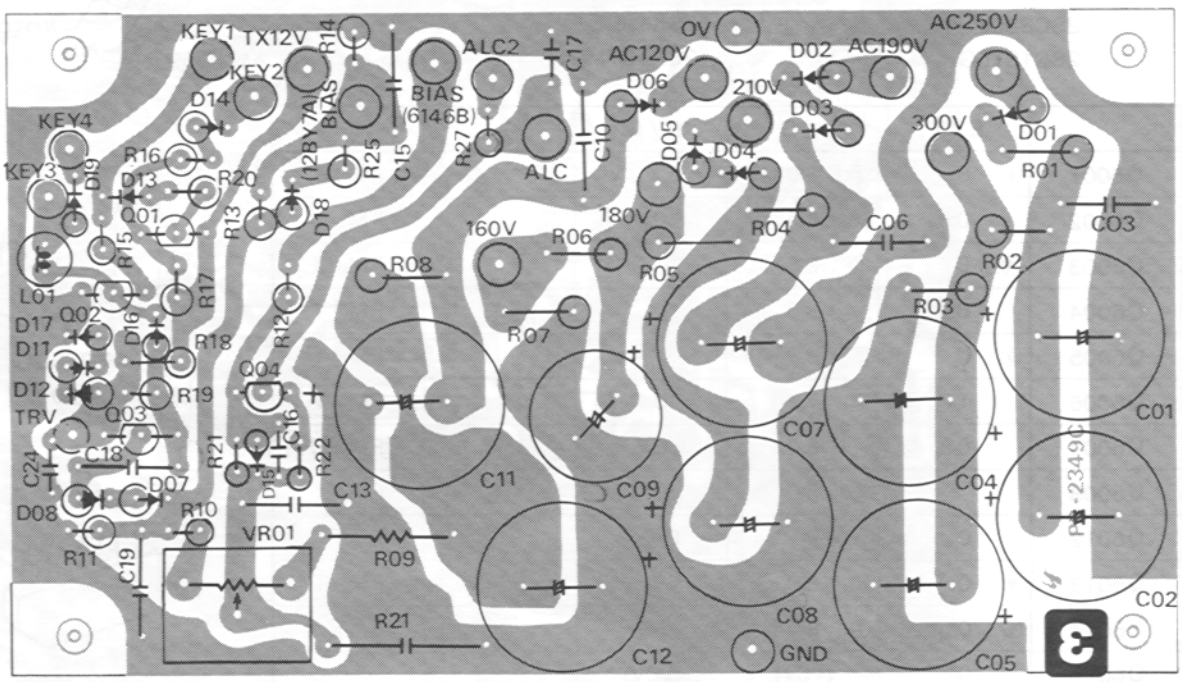


TA7069P
μPC577H

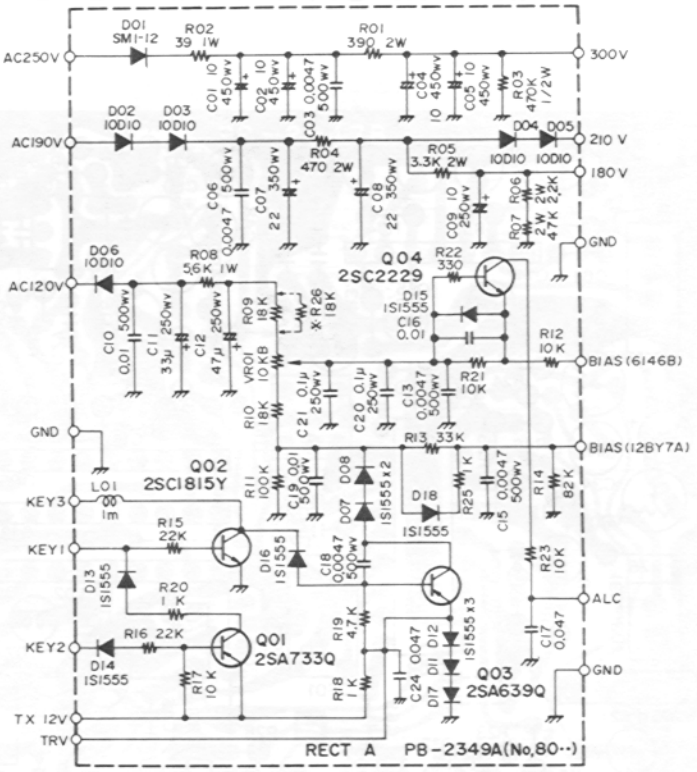
RECT A UNIT PARTS LAYOUT



Viewed from Conponent Side



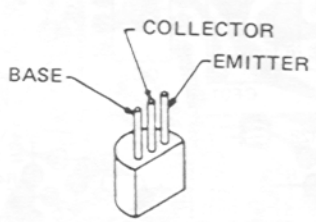
Viewed from Solder Side



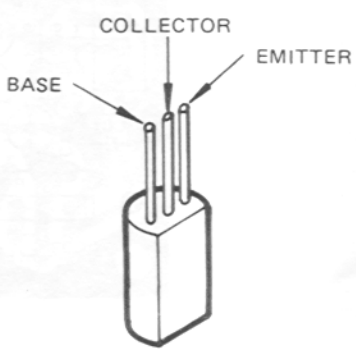
CAPACITOR VALUES ARE IN μF, 50wv; RESISTOR VALUES ARE IN Ω, 1/4W; AND INDUCTOR VALUES ARE IN HENRIES UNLESS OTHERWISE NOTED.

	E / S	C / D	B / G	REM	
Q8001	0/12.0	0/ 0	0/12.0	KEY UP	R / T CW
Q8002	0/ 0	0/10.5	0/ 0	〃	〃
Q8003	0/ 2.0	−65/−65	0/ 2.0	〃	〃
Q8004	−100/−100	11.5/11.5	−100/−100	〃	〃

	E / S	C / D	B / G	REM	
Q8001	12.0	11.7	11.3	KEY DOWN	T CW
Q8002	0	0	0.7	〃	〃
Q8003	2.0	2.0	1.3	〃	〃
Q8004	−60	0.3	−60	〃	〃

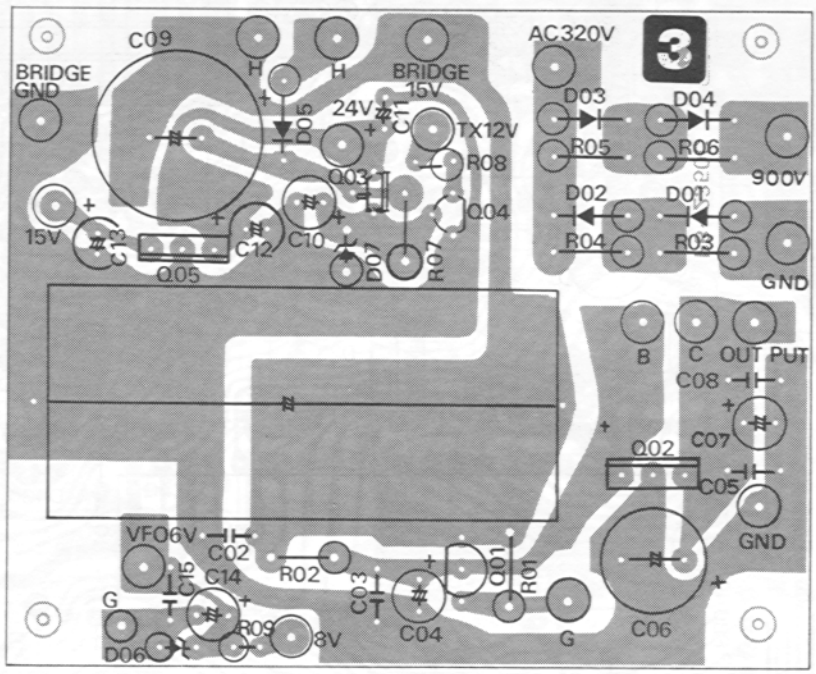


2SA639Q
2SA733Q
2SC1815Y

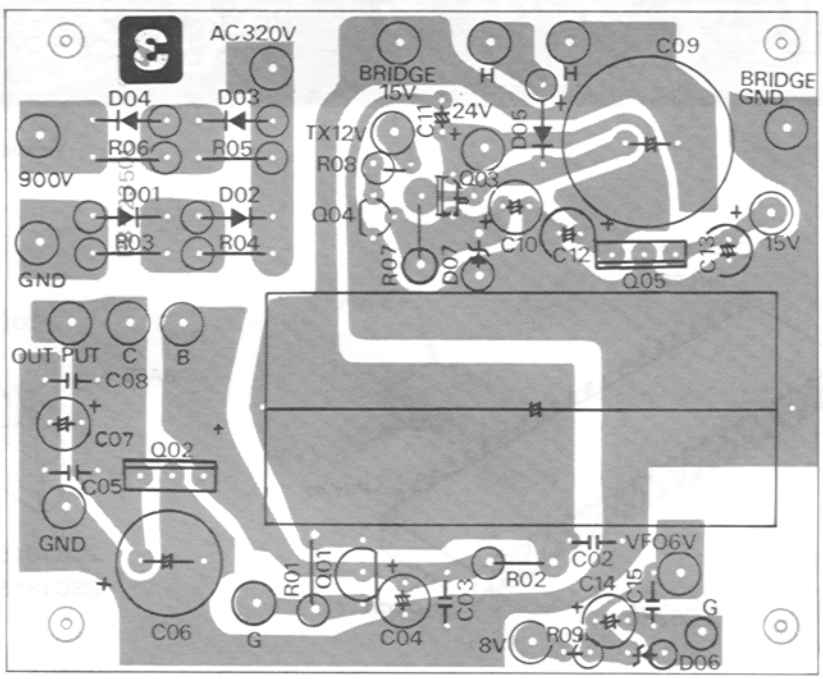


2SC2229

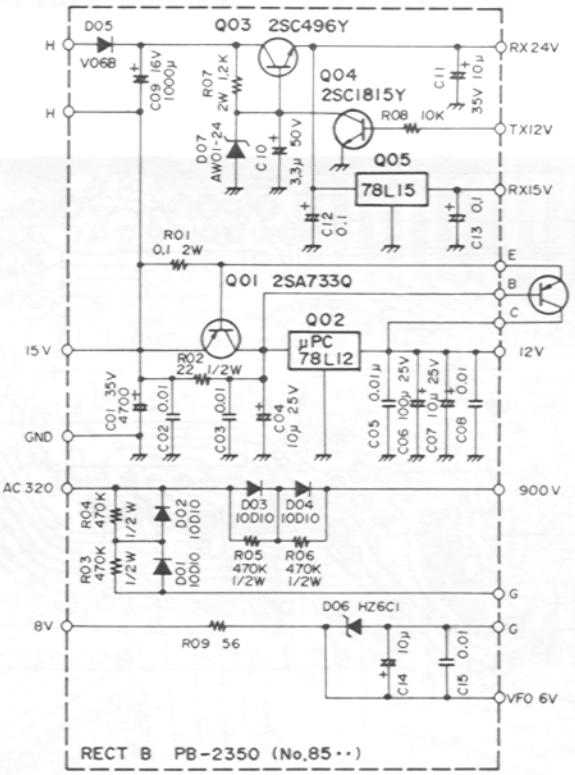
RECT B UNIT PARTS LAYOUT



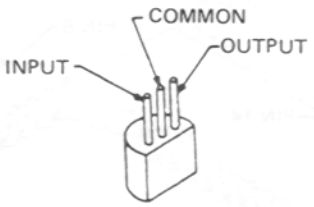
Viewed from Component Side



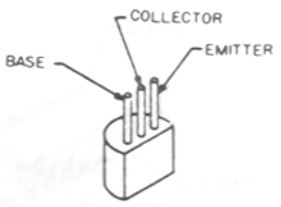
Viewed from Solder Side



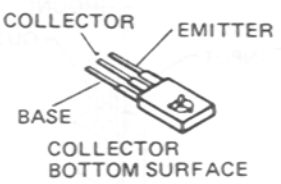
	E	C	B
Q8501	24.0	23.3	24.0
Q8502	IN 13.3	OUT 12.0	—
Q8503	24.0	32.0	24.5
Q8504	0	24.5	0.7



μPC78L12
μPC78L15

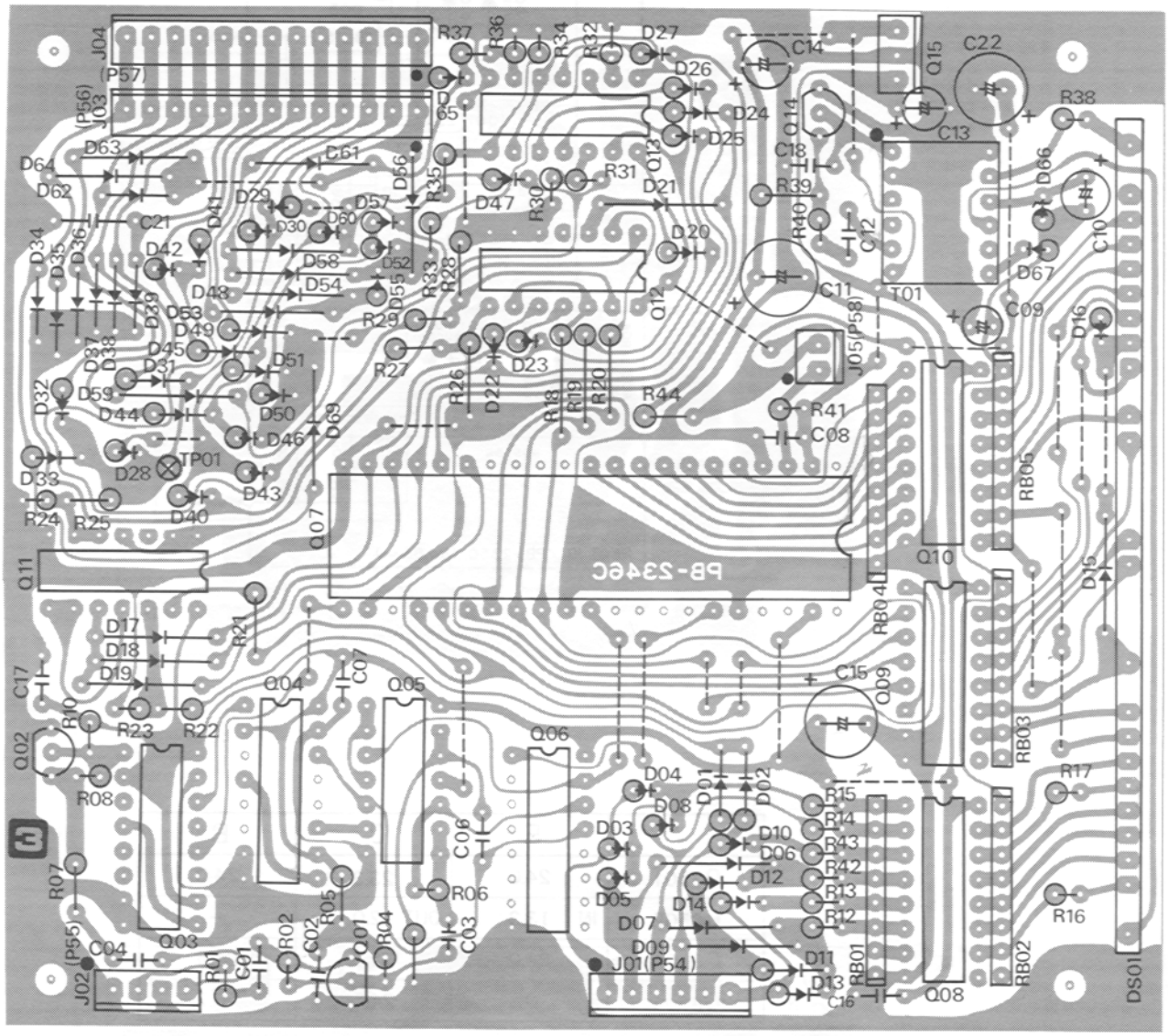


2SA733Q
2SC1815Y

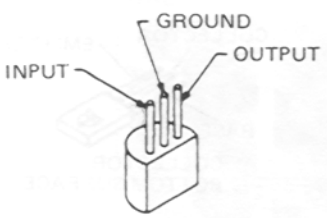


2SC496Y

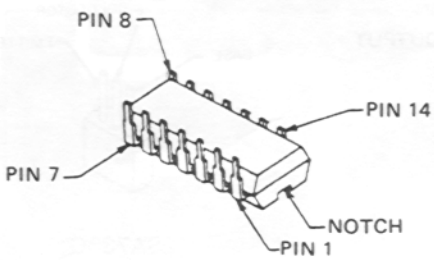
COUNTER UNIT PARTS LAYOUT



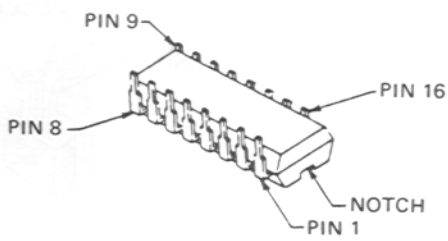
Viewed from Component Side



78L05

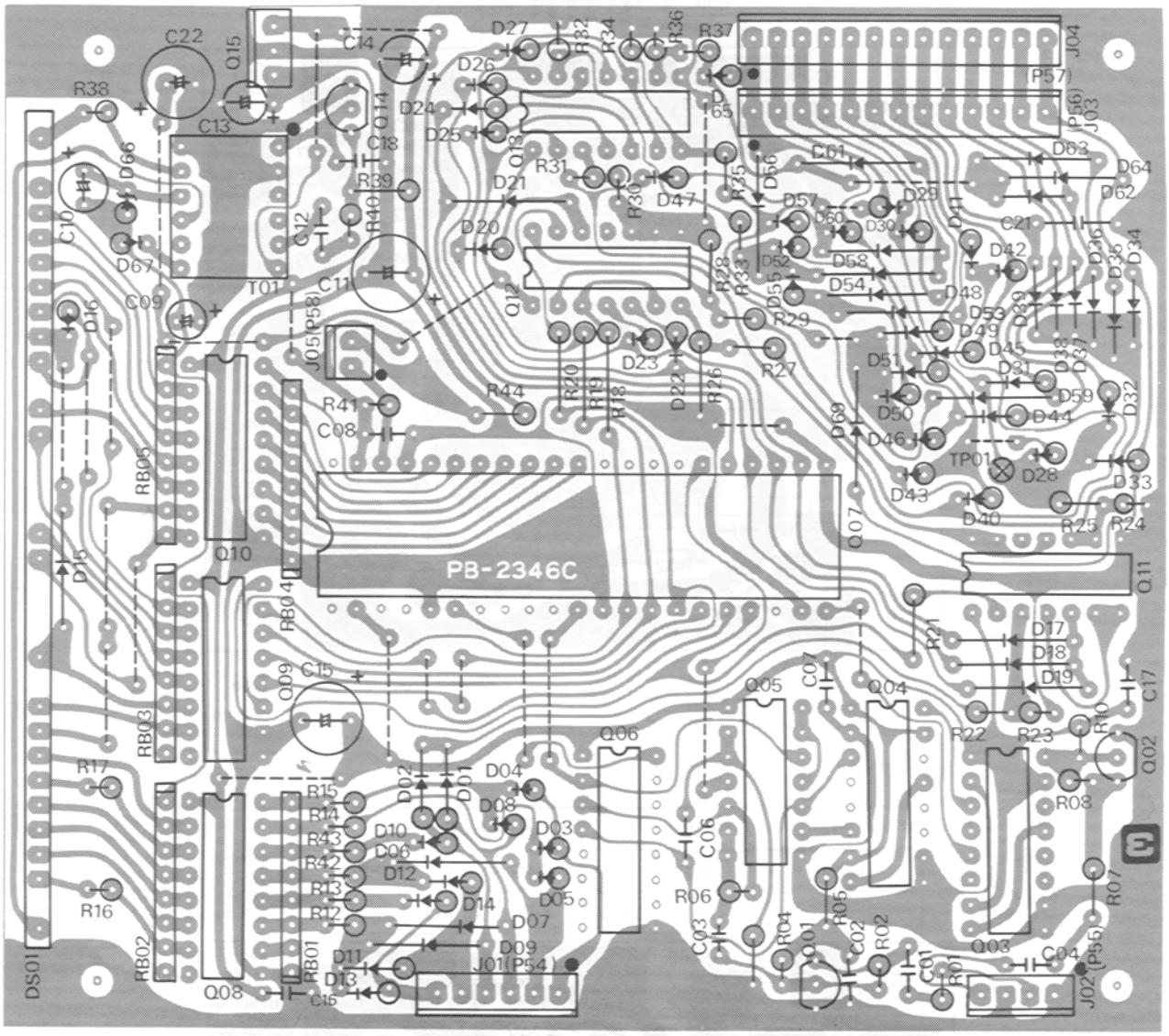


MC14011
MC14081B

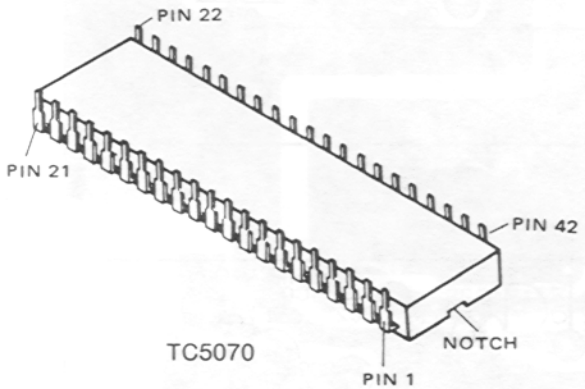


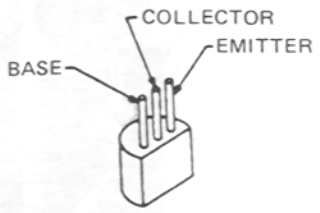
MC14022
MC14518B
TC5066

COUNTER UNIT PARTS LAYOUT



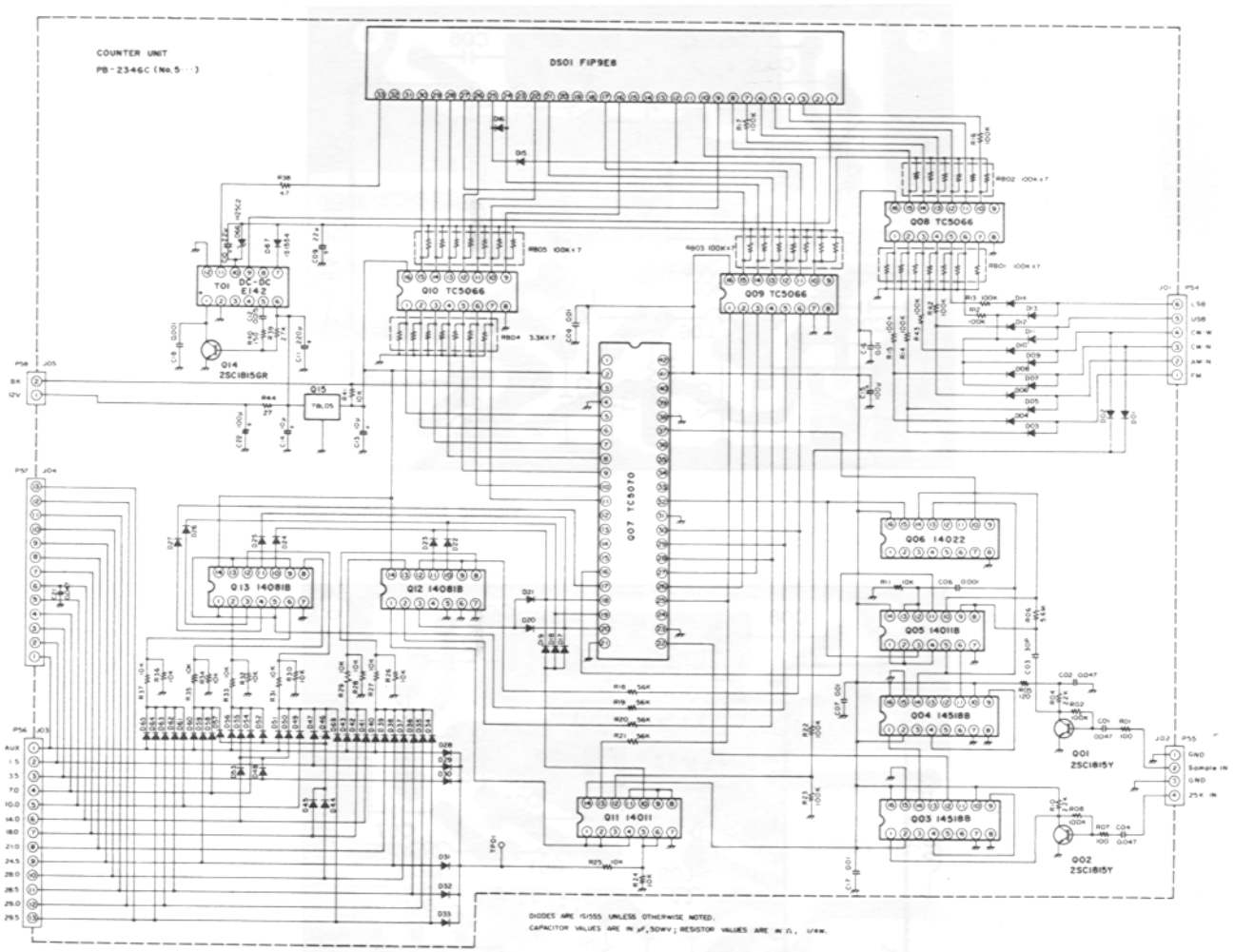
Viewed from Solder Side





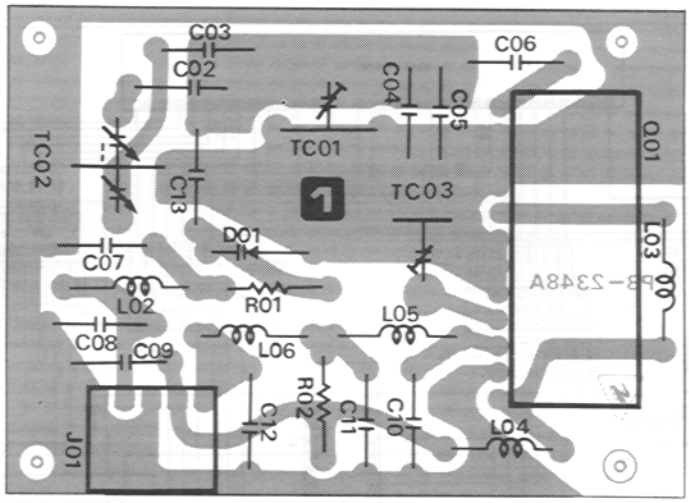
2SC1815GR
2SC1815Y

COUNTER UNIT

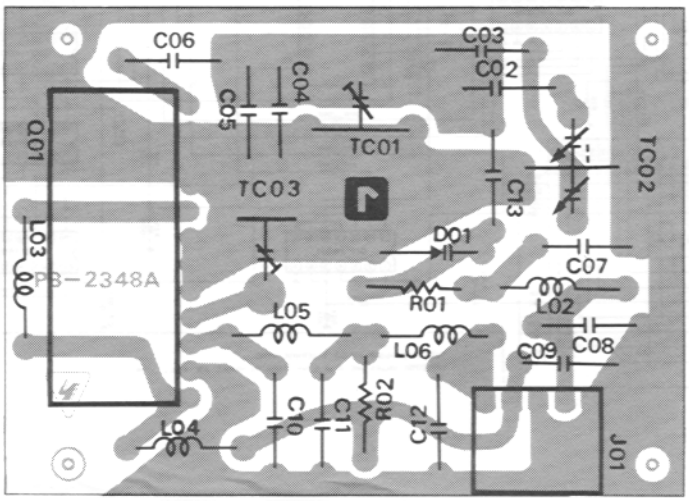


	E/S	C/D	B/G
Q5001	0	1.8	0.6
Q5002	0	1.8	0.6
Q5014	0	—	—
Q5015	IN 10.5	OUT 5.0	

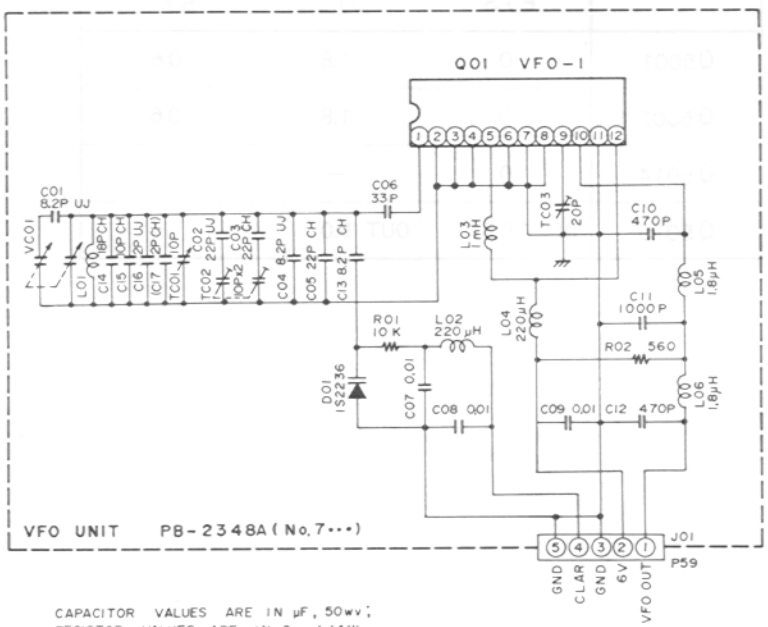
VFO UNIT PARTS LAYOUT



Viewed from Component Side

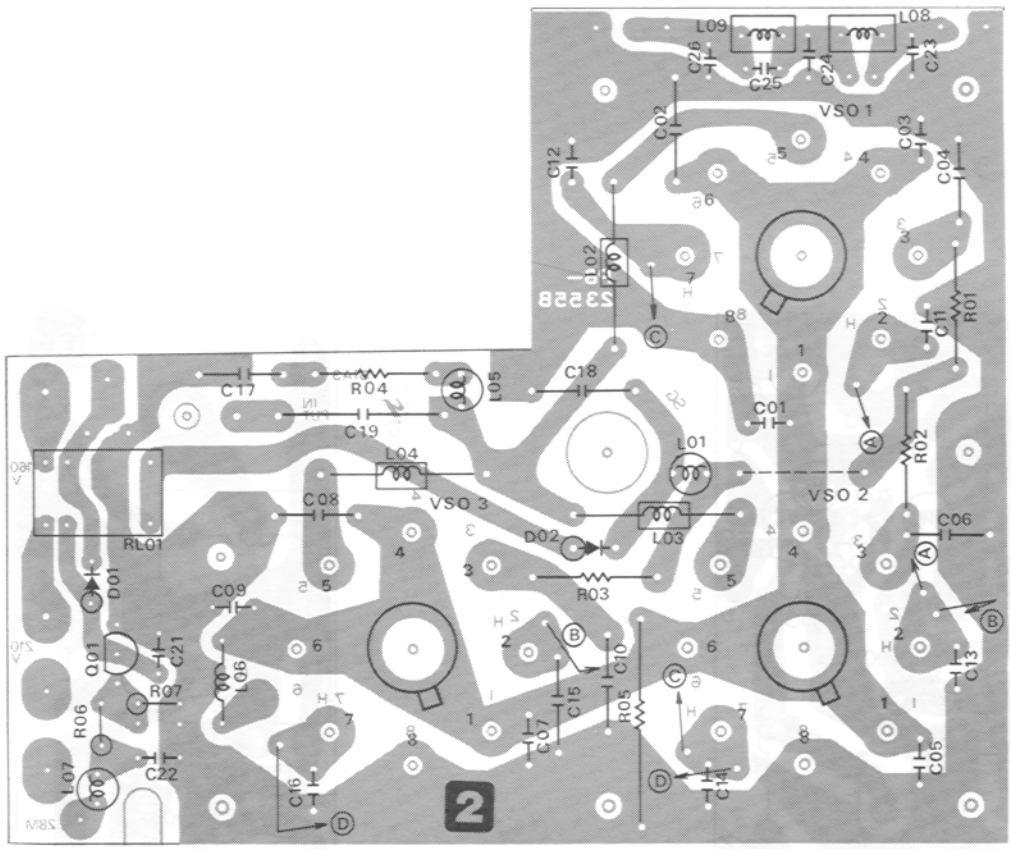


Viewed from Solder Side



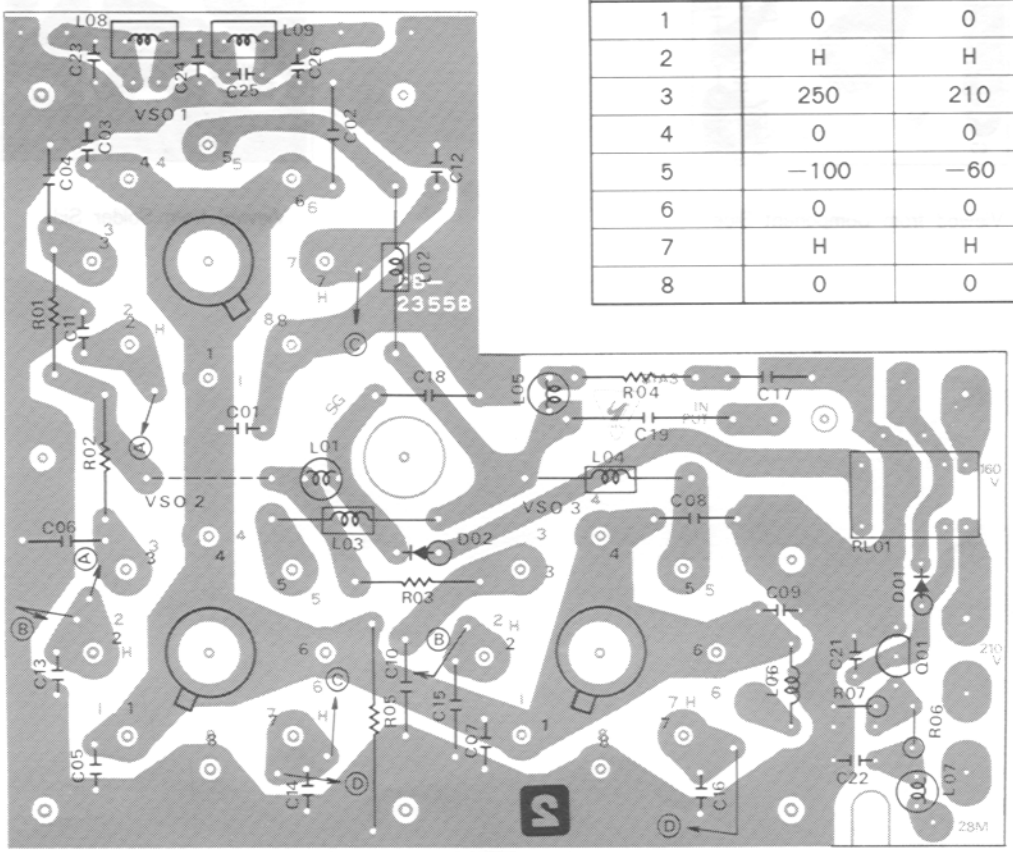
CAPACITOR VALUES ARE IN μF, 50wv;
RESISTOR VALUES ARE IN Ω, 1/4W.

FINAL UNIT PARTS LAYOUT



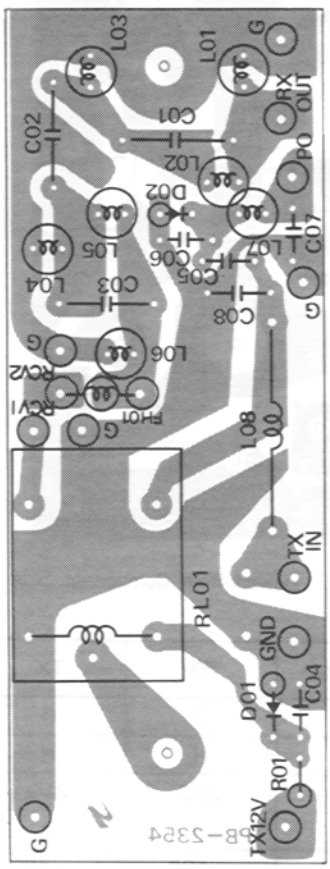
Viewed from Component Side

V01, 02	RX	TX
1	0	0
2	H	H
3	250	210
4	0	0
5	−100	−60
6	0	0
7	H	H
8	0	0

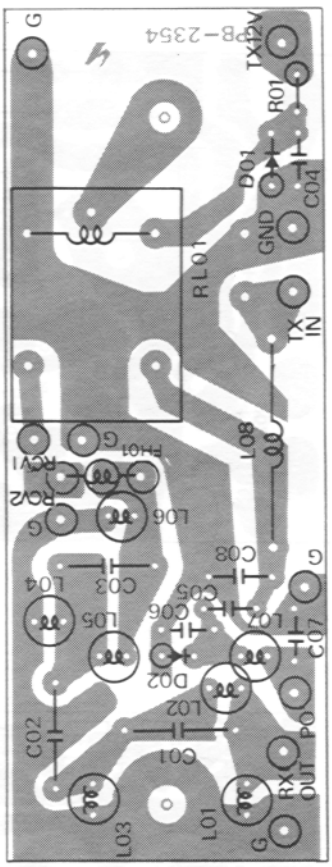


Viewed from Solder Side

RELAY UNIT PARTS LAYOUT

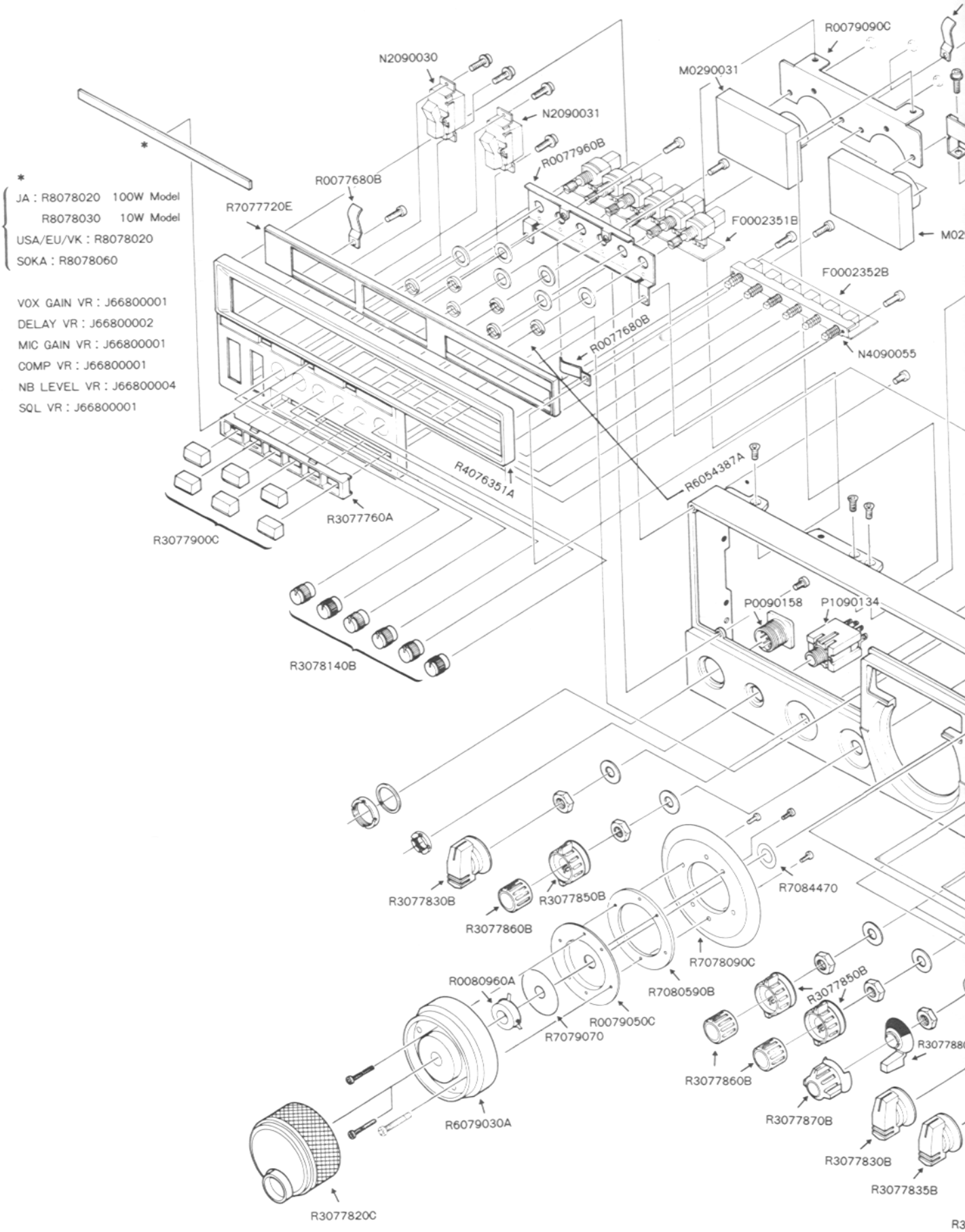


Viewed from Component Side



Viewed from Solder Side

FRONT PAN


*
JA : R8078020 100W Model
R8078030 10W Model
USA/EU/VK : R8078020
SOKA : R8078060
VOX GAIN VR : J66800001
DELAY VR : J66800002
MIC GAIN VR : J66800001
COMP VR : J66800001
NB LEVEL VR : J66800004
SQL VR : J66800001
R0079090C
N2090030
M0290031
N2090031
R0077960B
R0077680B
R7077720E
F0002351B
F0002352B
N4090055
R4076351A
R6054387A
R3077760A
R3077900C
R3078140B
P0090158
P1090134
R3077830B
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R7084470
R7078090C
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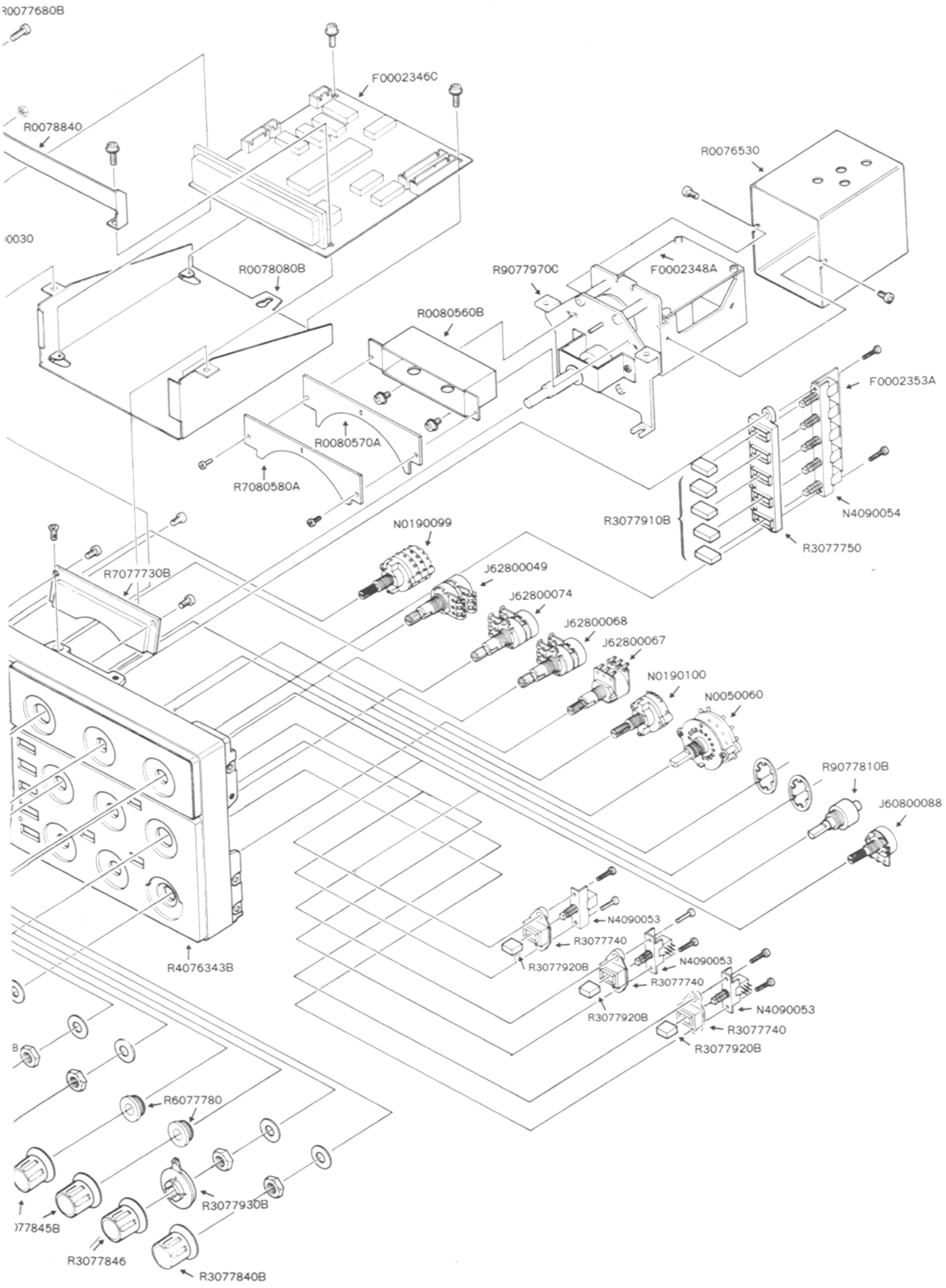
R6079030A
R3077820C
R3077870B
R3077835B

EL REMOVAL


R00776808
F0002346C
R0078840
0030
R0076530
R0078080B
R9077970C
F0002348A
R0080560B
F0002353A
R0080570A
R7080580A
N4090054
R3077910B
R3077750
N0190099
R7077730B
J62800049
J62800074
J62800068
J62800067
N0190100
N0050060
R9077810B
J60800088
N4090053
R3077740
R3077920B
R4076343B
R6077780
R3077930B
R3077846
R3077840B

PARTS LIST

MAIN CHASSIS

Symbol No.	Part No.	Name & Description
		VACUUM TUBE
V1, 2, 3	G6090001	6146B
		IC
Q2	G1090294	μPC7808H
Q3, 4, 5, 6	G1090301	μPC7812H
		TRANSISTOR
Q1	G3207050R	2SB705R
		DIODE
D12(9701), 18, 19, 21(9702), 22(9703)	G2015550	Si 1S1555
D14, 20	G2090001	" 10D1
D1	G2090031	" S4V10
		RESISTOR
R1, 2	J01275101	Carbon Film 1/2W TJ 100Ω
R20(R9703)	J01245479	" " 1/4W " 4.7Ω
R10	J01245221	" " " " 220Ω
R9	J01245271	" " " " 270Ω
R7(9702), R23(9704)	J01245102	" " " " 1kΩ
R13, 17	J01245562	" " " " 5.6kΩ
R12	J01245822	" " " " 8.2kΩ
R11, 19	J01245103	" " " " 10kΩ
R16	J02245103	" " " SJ 10kΩ
R18	J01245123	" " " TJ 12kΩ
R4(9705)	J01245104	" " " " 100kΩ
R25(9701)	J01245124	" " " " 120kΩ
R15	J02245104	" " " SJ 1MΩ
R13, 14	J01245563	" " " TJ 5.6MΩ
R21	J20336569	Metallic Film 2W 5.6Ω
		POTENTIOMETER
VR1	J62800067	K16B2-5KB/1KB
VR2	J62800049	DM10A638A10KB/10KA
VR3	J62800068	K16BA-2KC/5KB
VR4	J62800074	K16BA004C 10KA/10KB
VR5, 6	J60800084	UM10A654A-10KB
VR7	J60800088	K1611 10KB
VR8(9701)	J51724202	PN822H 202KH 2kΩB
		CAPACITOR
	K02179009	Ceramic Disc 50WV 22 pF (DD104CH220J50V02)
	K02175680	" " " 68 pF (DD107CH680J50V02)
	K02175101	" " " 100 pF (DD107CH101J50V02)
	K02175121	" " " 120 pF (DD107CH121J50V02)
	K30175181	Dipped Mica " 180 pF (LCQ17181J05)
C26	K00359005	Ceramic Disc 3KWV 9 pF (CC45SL3F090DY)
C38	K00329005	" " 1.5KWV 51 pF (DE0707SL510J)
C22, 25	K00359001	Ceramic Disc 3KWV 100 pF (CC45SL3F101KY)
C21	K00329002	" " 1.5KWV 460 pF (MD25WK461J1.5KV)
C24	K12359001	" " 3KWV 1000 pF (CK45E3F102KY)
C20	K30279039	Dipped Mica 500WV 330 pF (DM19D331K5)
C37	K30276331	" " 330 pF (LCQ17331K5)
C19	K30279046	" " " 620 pF (DM19D621K5)
C27	K30279049	" " " 820 pF (DM19D821K5)
C18	K30279127	" " " 2400 pF (DM19D242K5)
C9, 51	K12171102	Ceramic Disc 50WV 0.001μF (DD104E102P50V)
C1, 2, 23	K12329001	" " 1.4kV 0.01μF (ECK DAL 103)
C7, 8, 10–15, 35, 50, 53, 54 (9703)	K13179008	" " 50WV 0.01μF (DD106F103Z50V)
C29, 36	K13179009	" " 0.047μF (DD110F473Z50V)
C28	K50177224	Mylar 50WV 0.22μF (50F2U224M)
C31, 34, 41–43	K40179013	Electrolytic " 1μF (50RE1RO)
C30(9704)	K40170225	" " 2.2μF (50RL2R2)
C52(9702)	K40140475	" 25WV 4.7μF (25RL4R7)
C3, 4	K40149008	" " 10μF (25RE10)
C39	K40129008	" 16WV 33μF (16RE33)
C5, 6	K43270002	" 500WV 100μF (CE62L500L100)
C40(9701), 55	K40129007	" 16WV 100μF (16RE100)
		VARIABLE CAPACITOR
VC1	K90000026	YB-250 250 pF
VC2	K90000016	C134E12
		TRIMMER CAPACITOR
TC1	K91000007	TSN120C10PX2
		INDUCTOR
L1	L0021167C	
L2	L0021168A	
L3	L1020064	
L4	L1020690	500μH
L5–7	L1020308B	
L8	L1190017	FL5H102K 1 mH
	L0190032	RF3855-R27K
	L0190030	RF3855-R18K
		POWER TRANSFORMER
PT1	L3030100	

		METER	P24 (with wire)	T9204377	
M1	M0290030	Y38-01	P26 (")	T9204382B	
M2	M0290031	Y38-02	P29 (")	T9204378A	
			P30 (")	T9204401	
			P34 (")	T9204390	
		SPEAKER	P40 (")	T9204380	
SP1	M4090044	SE-92BYM2 8Ω 2W	P41 (")	T9302301A	
			P42 (")	T9204381B	
			P46 (")	T9204383A	
		RELAY	P51 (")	T9204384A	
RL1, 2	M1190004	FRC-203D012/04CS01 DC 12V	P52 (")	T9204385	
			P53 (")	T9204386A	
			P54 (")	T9204393	
		RELAY SOCKET	P57 (")	T9204387	
RLS1, 2	M1490010	263H204	P58 (")	T9204388B	
			P62 (")	T9024389	
		TERMINAL BOARD			
	Q6000003	1L2PS (0-1-0)			**CONNECTION CABLES**
	Q6000012	1L4PS (3-0-1)		T9302200B	
	Q6000006	1L3PS (1-0-2)		T9302300C	
		SWITCH			
S1	N0190099	SRN-3066			**FUSE**
S2	N0190100	SRN-1034	F1	Q0000012	6A (100V–117V)
S3	N2090030	EST-159R		Q0000004	3A (200V–234V)
S4	N2090031	EST-157R			
S5–7	N4090053	SUJ 12A			
S8	N6090004	SSF-22-08b			**DC FUSE HOLDER**
S9	N6090043	SSF-12-045	FH1	P2000012	SN2059
S10	N0050060	BAND SW A			
S11	N0050061A	BAND SW C			
		JACK			**COOLING FAN**
J9	P1090031	D5-701B-00	FAN1	M2090003	FB-08B12LY
J21	P1090033	D6-701B-00			
J8	P1090034	D7-701B-00			*** CONNECTION UNIT ***
J7	P1090152	D8-703B-11		F0002476	Printed Circuit Board
J1	P0090158	FM214-8SS		C024760A	PCB with D9701–9703, R9701–9705, VR9701, C9701–9704
J2	P1090134	SG-7627			
J10	P1090004	SG-7814		R3077830B	FT-22VK MODE, METER SELECT
J11	P1090230	SG-8022		R3077835B	FT-22VF BAND
J6	P0090094	NC-174-PA125		R3077840B	FT-22WK DRIVE
J3–5, 20, 24	P1090133	STR-01-H		R3077845B	FT-22WF (W/WHITE LINE) LOADING, PRESELECT
J12-17	Q9000195	JACK BOARD ASSY			
J19	P1090194	FM-MR-M2		R3077850B	FT-22WDNS RF, TONE, APF
				R3077860B	FT-15WK AF, CLAR, NOTCH
		CONNECTOR		R3077870B	FT-22WNAK SHIFT/WIDTH
P1 (with wire)	T9204376A			R3077880B	FT-22WS (Lever) "
P2 (")	T9302301A			R3078140B	FT-10SAK VOX, DELAY, MIC, COMP, NB, SQL
P3 (")	T9204367				
P4 (")	T9204368B			R3077846	FT-22WF (W/O WHITE LINE) PLATE
P5 (")	T9204369A				
P6 (")	T9204370			R3077900C	Push knob A MDX, RF AMP, NAR, MONI, NB, PROC
P9 (")	T9204371A				
P10 (")	T9204372B			R3077910B	Push knob G AGC, FAST/SLOW, ALC M, RX, TX
P12 (")	T9204379B				
P17 (")	T9204373A			R3077920B	Push knob H +0.5, APF, NOTCH
P18 (")	T9204374A				
P21 (")	T9204375				

RF UNIT

Symbol No.	Part No.	Name & Description
PB-2342D	F0002342D	Printed Circuit board
	C0023420	PCB with Components
		VACUUM TUBE
V1001	G6090002	12BY7A
		VACUUM TUBE SOCKET
VS1001	P3090022	SB-9403
		IC
Q1008	G2090135	ND487C2-3R
		TRANSISTOR
Q1009	G3315890	2SC1589
Q1003	G3318150Y	2SC1815Y
Q1010	G3319710	2SC1971
Q1007	G3324070	2SC2407
		FET
Q1001, 1002 1004–1006	G3801250Y	2SK125Y
		DIODE
D1002–1008 1112–1115	G2015550	Si 1S1555
D1010, 1011	G2090002	" 10D10
D1009	G2090217	Zener HZ3C1
		CRYSTAL FILTER
XF1001	H1102050	8.2M20A
		RESISTOR
R1037	J01275159	Carbon Film 1/2W TJ 1.5Ω
R1039	J02245229	" " 1/4W SJ 2.2Ω
R1026, 1034	J02245479	" " " " 4.7Ω
R1022, 1023	J02245100	" " " " 10Ω
R1020	J02245150	" " " " 15Ω
R1035	J02245390	" " " " 39Ω
R1007, 1011 1014, 1041 1042, 1045	J02245101	" " " " 100Ω
R1021	J02245121	" " " " 120Ω
R1027	J02245151	" " " " 150Ω
R1028, 1052	J02245221	" " " " 220Ω
R1018, 1019 1032	J02245331	" " " " 330Ω
R1031	J02245471	" " " " 470Ω
R1008, 1024 1043	J02245561	" " " " 560Ω
R1036	J01275561	" " 1/2W TJ 560Ω
R1030	J02245821	" " 1/4W SJ 820Ω
R1003, 1013 1016, 1017 1044, 1048 1051	J01215102	" " 1/8W TJ 1kΩ
R1033, 1038 1050	J02245122	" " " SJ 1.2kΩ
R1025	J02245152	" " " " 1.5kΩ
R1010, 1054	J02245222	" " " " 2.2kΩ
R1046	J02245472	" " " " 4.7kΩ
R1053	J01215103	" " 1/8W TJ 10kΩ
R1006, 1049	J02245104	" " 1/4W SJ 100kΩ
R1004	J01215104	" " 1/8W TJ 100kΩ
R1012	J02245184	" " 1/4W SJ 180kΩ
R1001	J02245225	" " " " 2.2MΩ
		CAPACITOR
C1037–1040	K02179003	Ceramic Disc 50WV CH 2 pF (DD104CH020C50V02)
C1036, 1041 1102	K02179004	" " " " 3 pF (DD104CH030C50V02)
C1035	K02172040	" " " " 4 pF (DD104CH040C50V02)
C1098	K00172040	" " " SL 4 pF (DD104SL040C50V02)
C1101	K02172050	" " " CH 5 pF (DD104CH050C50V02)
C1034	K02173070	" " " " 7 pF (DD104CH070D50V02)
C1033	K02173160	" " " " 16 pF (DD104CH160J50V02)
C1090	K02173330	" " " SL 33 pF (DD104SL330J50V02)
C1025	K02175390	" " " CH 39 pF (DD105CH390J50)
C1027, 1047	K00175101	" " " SL 100 pF (DD105SL101J50V02)
C1085	K30273010	Dipped Mica 500WV 1 pF (LCQ11010D5)
C1106	K30173010	" " " 1 pF (LCQ11010D05)
C1107	K30173020	" " " 2 pF (LCQ11020D05)
C1014	K30273050	" " 500WV 5 pF (LCQ11050D5)
	K30276240	" " " 24 pF (LCQ17240K5)
C1019	K30276270	" " " 27 pF (LCQ12270K5)
C1016	K30276390	" " " 33 pF (LCQ12330K5)
C1066	K30176470	" " " 47 pF (Z11C470K05)
C1083	K30276560	" " " 56 pF (LCQ12560K5)
C1001	K30176680	" " 50WV 68 pF (Z11D680K05)
C1108	K30276820	" " 500WV 82 pF (LCQ12820K5)
C1008	K30276331	" " " 330 pF (LCQ18331K5)
C1026, 1082	K30276561	" " " 560 pF (LCQ18561K5)

C1086	K30276102	Dipped Mica 500WV 1000 pF (LCQ21102K5)			**TRANSFORMER**
			T1001	L0020294	
C1003	K30279095	" " " 1200 pF (DM19D122J5)	T1002	L0020418	
			T1003	L0020789A	
C1002	K10179016	Ceramic Disc 50WV 0.001μF (DB201YB102K5L5)	T1004	L0020170	
			T1005	L0021169A	
C1004, 1005 1007, 1013 1021, 1022 1023, 1077 1078, 1084	K12279007	" " 500WV 0.01μF (CD110E103P500)	T1006, 1007	L0021170A	
			T1008	L0021172A	
			T1009	L0021173A	
			T1011	L0021175	BPF 160B
			T1012	L0021174	BPF 160A
C1026, 1028 1030–1032 1042, 1043 1045, 1046 1048, 1049 1057, 1058 1059, 1061 1074, 1092–1094 1096, 1097 1099, 1100	K13179008	" " 50WV 0.01μF (DD106F103Z50V)	T1013	L0021177	BPF 80B
			T1014	L0021176	BPF 80A
			T1015	L0021179	BPF 40B
			T1016	L0021178	BPF 40A
			T1017	L0021181	BPF 30B
			T1018	L0021180	BPF 30A
			T1019	L0021183	BPF 20B
			T1020	L0021182	BPF 20A
			T1021	L0021185	BPF 17B
			T1022	L0021184	BPF 17A
			T1023	L0021187	BPF 15B
C1024, 1029 1044, 1053 1054, 1056 1060, 1062 1069, 1071 1072, 1075 1087, 1088	K13179009	" " " 0.047μF (DD110F473Z50V)	T1024	L0021186	BPF 15A
			T1025	L0021189	BPF 12B
			T1026	L0021188	BPF 12A
			T1027	L0021191	BPF 10B
			T1028	L0021190	BPF 10A
			T1029	L0021192	
			T1030	L0021193	
C1103	K19149001	Semiconductor Ceramic 25WV 0.01μF (UAT04X102K-L05AE)	T1031–1034	L0020788A	
			T1035	L0021194	
C1070	K19149005	" " " 0.0022μF (UAT04X222K-L05AE)	T1036	L0021195	
			T1037	L0020788A	
C1067, 1080 1095	K19149021	" " " 0.047μF (UAT08X473L45AE)			
C1073, 1089	K19149025	" " " 0.1μF (UAT13X104K-L46AE)			
C1068, 1076	K40129008	Electrolytic 16WV 33μF (16RE33)			
					RELAY
C1063, 1081	K40129002	" " 47μF (16RE47)	RL1001, 1003	M1190002	FBR211AD012
			RL1004, 1005	M1190037	FBR211AD024
C1105	K70120003	Tantalum 16WV 47μF (489D476X0016F1)	RL1002	M1190006	FBR221D012M
		VARIABLE CAPACITOR			
VC1001	K90000038	20P/190P C121D113			
		TRIMMER CAPACITOR			**FERRITE BEADS**
TC1001, 1002	K91000028	ECV-1ZW10X53		L9190024	FB-101
		INDUCTOR			
L1001, 1002 1005, 1015	L1190017	FL5H102K 1 mH			
L1003, 1006	L1190020	FL5H151K 150μH			
L1007, 1016	L1190009	FL4H3R3M 3.3μH			
L1010	L1190011	FL4H4R7M 4.7μH			**SWITCH**
L1012, 1017 1018	L1190090	LAL04102K-NA 1 mH	S1001	N0050062A	CSP4-4-11
L1013	L1190120	FL5H471K 470μH			
L1008	L0021214A			Q5000025	Wrapping terminal A
L1011	L1020032			Q5000011	" " C

IF UNIT

Symbol No.	Part No.	Name & Description
PB-2343C	F0002343C	Printed Circuit Board
	C00023430	PCB with Components
		IC
Q2016	G1090381	TA7060AP
		TRANSISTOR
Q2014, 2032 2034, 2035	G3105641R	2SA564AR
Q2021, 2024 2027, 2028	G3303800Y	2SC380Y
Q2019, 2020	G3315830	2SC1583
Q2012, 1018 2022, 2023	G3318150G	2SC1815GR
Q2006–2009 2011, 2015 2030, 2033	G3318150Y	2SC1815Y
		FET
Q2029	G3800190G	2SK19GR
Q2005, 2013 2031	G3090035	2SK19GR-1
Q2025, 2026	G3090034	2SK19Y
Q2001, 2002	G3801250Y	2SK125Y
Q2003, 2004 2010, 2017	G4800730G	3SK73GR
		THERMISTOR
TH2001	G9090003	D-33A
		DIODE
D2038, 2053–2056 2062, 2080	G2090029	Ge 1N60
D2039, 2040	G2090093	" 1N270
D2004, 2010 2021, 2023 2029, 2030 2032–2036 2041–2045 2047, 2049– 2052, 2057 2058, 2060 2061, 2064 2066–2069 2071, 2072 2075–2078 2081, 2082	G2015550	Si 1S1555
D2026–2028 2046, 2059	G2090118	Schottky 1SS97
D2031	G2090179	Varactor FC-53M-(5)
D2073, 2074	G2090030	Zener BZ090
D2048	G2090218	" HZ9C1

		CRYSTAL FILTER
XF2001	H1102051	XF-8.2HS
		CERAMIC FILTER
CF2001	H3900290	CFJ-455K13
		RESISTOR
R2172	J02245010	Carbon Film 1/4W SJ 1Ω
R2007, 2094	J02245100	" " " " 10Ω
R2226, 2229	J02245330	" " " " 33Ω
R2003	J02245470	" " " " 47Ω
R2051	J02245560	" " " " 56Ω
R2149	J02245680	" " " " 68Ω
R2020, 2021 2055, 2218	J01245101	" " " TJ 100Ω
R2030, 2034 2046, 2058 2068, 2072 2088, 2091 2095, 2102 2110–2113 2123, 2028 2133, 2140 2151, 2154 2160, 2174 2197, 2198	J02245101	" " " SJ 100Ω
R2216	J01245151	" " " TJ 150Ω
R2186	J02245151	" " " SJ 150Ω
R2122, 2221	J02245181	" " " " 180Ω
R2163, 2222	J02245221	" " " " 220Ω
R2175	J01245221	" " " TJ 220Ω
R2114, 2115 2117, 2155	J02245331	" " " SJ 330Ω
R3026	J01245391	" " " TJ 390Ω
R2009, 2028 2124	J02245391	" " " SJ 390Ω
R2066, 2166 2126, 2131 2177, 2224 2038, 2047 2052, 2062 2098, 2153 2199	J02245471	" " " " 470Ω
R2053	J01245561	" " " TJ 560Ω
R2203	J02245821	" " " SJ 820Ω
R2008, 2029 2045, 2048 2063, 2064 2073, 2074 2079, 2082 2083, 2089 2096, 2099 2103–2104 2117, 2127 2130, 2136 2138, 2146 2152, 2157 2162	J02245102	" " " " 1kΩ

2168, 2187 2200						2150, 2169 2192, 2227		
R2236	J01245102	Carbon Film	1/4W	TJ	1kΩ	R2084	J02245124	Carbon Film 1/4W SJ 120kΩ
R2011, 2013 2022	J02245122	" "	"	SJ	1.2kΩ	R2090, 2189	J02245154	" " " " 150kΩ
						R2076, 2180	J02245224	" " " " 220kΩ
R2014, 2015 2067, 2101 2147, 2178 2234	J01245152	" "	"	TJ	1.5kΩ	R2230	J02245394	" " " " 390kΩ
						R2039, 2105	J02245564	" " " " 560kΩ
						R2065	J02245824	" " " " 820kΩ
						R2039, 2179	J02245105	" " " " 1MΩ
R2004, 2012 2035, 2054 2056, 2057 2060, 2125 2173, 2202	J02245222	" "	"	SJ	2.2kΩ	R2235	J02245335	" " " " 3.3MΩ
						R2231	J02245565	" " " " 5.6MΩ
								POTENTIOMETER
						VR2002, 2003 2006	J51752502	RGS6-FAN 5KB 5kΩB
R2212, 2217	J01215222	" "	1/8W	TJ	2.2kΩ			
R2042, 2050 2107, 2118	J02245272	" "	1/4W	SJ	2.7kΩ	VR2001, 2004 2005	J51752103	RGS6-FAN 10KB 10kΩB
R2129, 2204 2208	J02245332	" "	"	"	3.3kΩ	VR2007, 2008	J51752504	RGS6-FAN 500KB 500kΩB
R2213	J01215332	" "	1/8W	TJ	3.3kΩ			
R2033	J02245392	" "	1/4W	SJ	3.9kΩ			**CAPACITOR**
R2016, 2017 2106, 2119 2134, 2195 2196	J02245472	" "	"	"	4.7kΩ	C2125	K00175180	Ceramic Disc 50WV SL 2 pF (DD104SL020C50V02)
						C2112	K00172030	" " " " 3 pF (DD104SL030C50V02)
R2024, 2080 2092, 2100 2132, 2137 2185	J02245562	" "	"	"	5.6kΩ	C2127	K10176102	" " " " 10 pF (DD104SL100D50V02)
						C2177	K00175180	" " " " 18 pF (DD104SL180J50V02)
R2192	J02245682	" "	"	"	6.8kΩ	C2035, 2116 2138	K00175330	" " " " 33 pF (DD104SL330J50V02)
R2001, 2005 2006, 2041 2043, 2049 2059, 2061 2075, 2077 2078, 2081 2087, 2097 2120, 2139 2159, 2165 2166, 2170 2181, 2183 2184, 2188 2190, 2101 2209, 2210	J02245103	" "	"	"	10kΩ	C2036, 2037 2123, 2124	K00175101	" " " " 100 pF (DD105SL101J50V02)
						C2128	K00175181	" " " " 180 pF (DD104SL181D50V02)
						C2077, 2078 2081, 2118 2174	K00175221	" " " " 220 pF (DD107SL221J50V02)
						C2075, 2117 2135, 2145	K00175331	" " " " 330 pF (DD107SL331J50V02)
						C2062, 2063	K51176102	Styrol 1000 pF (50SU102K)
						C2006, 2027 2056, 2146 2180	K10176102	Ceramic Disc 50WV 0.001μF (DD104B102K50V02)
R2219	J01215103	" "	1/8W	TJ	10kΩ			
R2225	J02245123	" "	1/4W	SJ	12kΩ	C2001–2004 2008, 2009 2011, 2013 2015, 2017 2019, 2021 2023, 2025 2031, 2033 2034, 2040 2061, 2064 2068, 2073 2079, 2080 2086, 2089 2098, 2099 2104–2111 2113, 2121	K13179008	" " " 0.01μF (DD106F103Z50V)
R2108, 2135 2228	J02245153	" "	"	"	15kΩ			
R2211	J01215153	" "	1/8W	TJ	15kΩ			
R2069, 2142	J02245183	" "	1/4W	SJ	18kΩ			
R2002, 2144 2171	J02245223	" "	"	"	22kΩ			
R2085, 2164	J02245273	" "	"	"	27kΩ			
R2044, 2101	J02245333	" "	"	"	33kΩ			
R2121	J02245393	" "	"	"	39kΩ			
R2141, 2156 2167	J02245473	" "	"	"	47kΩ			
R2158	J02245563	" "	"	"	56kΩ			
R2070	J02245823	" "	"	"	82kΩ			
R2071	J02245104	" "	"	"	100kΩ			

2130, 2131 2137, 2157– 2159, 2161 2162, 2166 2169, 2170 2172		
C2005, 2010 2012, 2014 2016, 2018 2020, 2022 2024, 2026 2039, 2058 2097, 2114 2115, 2147 2179	K13179009	Ceramic Disc 50WV 0.047μF (DD110F473Z50V)
C2139	K50177222	Mylar 50WV 0.0022μF (50F2U222M)
C2132	K50177223	" " 0.022μF (50F2U223M)
C2030, 2032 2038, 2041–2046 2048 2050, 2052 2066, 2070 2084, 2085 2088, 2096 2150, 2167 2171	K19149021	Semiconductor Ceramic " 0.047μF (UAT08X473–L45AE)
C2057, 2101 2102, 2132	K19149025	" " 25WV 0.1μF (UAT13X104K-L46AE)
C2047, 2049 2051, 2053–2055 2060, 2067 2069, 2071 2072, 2074 2076, 2083 2090–2095 2100, 2103 2133, 2149 2153, 2165 2168	K40179013	Electrolytic 50WV 1μF (50RL1)
	K40179001	" " 1μF (50RC21)
C2151, 2157	K40179009	" " 2.2μF (50RL2R2)
C2126, 2129 2140, 2142 2143	K40179011	" " 3.3μF (50RE3R3)
C2008, 2087 2119, 2122 2144, 2155 2163, 2164	K40129004	" 16WV 10μF (16RE10)
C2059	K40129016	" " 22μF (16RL22)
C2134, 2141	K40129002	" " 47μF (16RE47)
C2148	K40129007	" " 100μF (16RE100)
C2182	K70167334	Tantalum 35WV 0.33μF (CS15E1VR33M)
C2154	K70140008	" 25WV 1μF (489D105X0025A1)
	K70120001	" 16WV 4.7μF (489D475X0016B1)
C2175, 2176 2182	K70120002	" " 10μF (489D106X0016C1)
		INDUCTOR
L2001–2006 2016–2018 2023, 2024	L1190020	FL5H151K 150μH
L2007–2011 2022	L1190035	FL7H392J 3.9 mH
L2014, 2019–2021 2026–2029	L1190017	FL5H102K 1 mH
	L1190090	LAL04102K-NA 1 mH
L2015	L1190023	FL5H220K 22μH
L2012	L0021196	250μH
		TRANSFORMER
T2001, 2005	L0021192	
T2002–2004 2013–2015	L0021199	
T2006–2008 2010–2012 2016	L0020422	R12-7947
T2009	L0020420	R12-7943
T2017, 2018	L0021294	
		RELAY
RL2001	M1190002	FBR211AD012
		TP TERMINAL
	Q5000037	TP-H

AF UNIT

Symbol No.	Part No.	Name & Description
PB-2344D	F0002344D	Printed Circuit Board
	C0023440	PCB with Components
		IC
Q3024	G1090248	AN6551
Q3019	G1090257	MC14066B
Q3025	G1090284	μPC2002V
Q3031	G1090012	SN16913P
		TRANSISTOR
Q3015	G3104960Y	2SA496Y
Q3008, 3009 3012	G3107331Q	2SA733Q
Q3027–3029	G3303800Y	2SC380Y (2SC380 TMY)
Q3001, 3004	G3307320G	2SC732TM-GR
Q3003	G3318150B	2SC1815BL
Q3022, 3023	G3318150G	2SC1815GR
Q3002, 3005–3007, 3010 3011, 3013 3014, 3016–3018, 3020	G3318150Y	2SC1815Y

3021, 3030							R3017	J02245182	" " " " 1.8kΩ
							R3011, 3021 3059, 3071 3075, 3121	J02245222	" " " " 2.2kΩ
		FET					R3111	J02245272	Carbon Film 1/4W SJ 2.7kΩ
Q3026	G3090034	2SK19Y					R3001, 3010 3040, 3047 3057, 3066 3091, 3104 3125, 3155	J02245332	" " " " 3.3kΩ
		DIODE							
D3015	G2090001	Si	10D1				R3039	J02245392	" " " " 3.9kΩ
D3011, 3014 3021–3024	G2090029	Ge	1N60				R3004, 3012 3033, 3035 3038, 3042 3050, 3051 3063, 3065 3120, 3123	J02245472	" " " " 4.7kΩ
D3007, 3009	G2090093	"	1N270						
D3001, 3006 3010, 3012 3013, 3016 3020, 3025– 3028, 3030– 3032, 3034 3036, 3037	G2015550	Si	1S1555				R3153	J01245472	" " " TJ 4.7kΩ
							R3073, 3076 3093	J02245562	" " " SJ 5.6kΩ
	G2090118	Schottky	1SS97				R3082, 3083 3086, 3095 3096, 3099	J02245682	" " " " 6.8kΩ
D3008	G2090217	Zener	HZ3C1						
		CRYSTAL					R3006	J02245822	" " " " 8.2kΩ
X3001	H0102449	8.2159MHz					R3013, 3019 3020, 3022 3028, 3048 3052, 3053 3061, 3080 3081, 3082 3106, 3110 3119, 3121 3138, 3139 3145, 3147 3152, 3162– 3164, 3172	J02245103	" " " " 10kΩ
		RESISTOR							
R3115	J01275229	Carbon Film		1/2W	TJ	2.2Ω			
	J00245330	"	"	1/4W	VJ	33Ω			
R3102	J02245560	"	"	"	SJ	56Ω			
R3016, 3113	J02245820	"	"	"	"	82Ω			
R3005, 3018 3026, 3070 3079, 3089 3108, 3132 3135, 3140 3160, 3161 3173	J02245101	"	"	"	"	100Ω	R3156	J00215103	" " 1/8W VJ 10kΩ
							R3007, 3015 3045, 3054 3107	J02245123	" " 1/4W SJ 12kΩ
R3072, 3077 3127	J02245221	"	"	"	"	220Ω	R3003, 3023 3062, 3068 3087, 3100	J02245153	" " " " 15kΩ
R3027, 3116	J02245331	"	"	"	"	330Ω			
R3154	J02245391	"	"	"	"	390Ω			
R3064, 3094	J02245471	"	"	"	"	470Ω	R3067	J02245183	" " " " 18kΩ
R3078, 3150 3174, 3177	J02245561	"	"	"	"	560Ω	R3036, 3165 3167	J02245223	" " " " 22kΩ
R3009, 3025 3034, 3046 3056, 3060 3069, 3085 3090, 3092 3098, 3103 3105, 3114 3129–3131 3133, 3134 3137, 3149 3168	J02245102	"	"	"	"	1kΩ	R3008, 3044 3055, 3084	J02245333	" " " " 33kΩ
							R3002, 3014 3112, 3128 3136, 3144 3146	J02245473	" " " " 47kΩ
							R3024, 3088 3101	J02245563	" " " " 56kΩ
							R3122, 3126 3171	J02245104	" " " " 100kΩ
							R3097	J02245334	" " " " 330kΩ
R3157	J00215102	"	"	1/8W	VJ	1kΩ	R3041, 3109	J02245474	" " " " 470kΩ
R3175	J02245122	"	"	1/4W	SJ	1.2kΩ	R3117	J31276010	Wire Wound 1/2W 1Ω
R3037	J02245152	"	"	1/4W	SJ	1.5kΩ			

		POTENTIOMETER			
VR3003	J51727103	CR19R101	10kΩ		
VR3004	J51723471	SR19R471	470Ω		
VR3005	J51752502	RGS6FAN	5kΩ		
VR3006	J51752103	RGS6FAN	10kΩ		
VR3001, 3002	J51752104	RGS6FAN	100kΩ		
		CAPACITOR			
C3107, 3111	K02173100	Ceramic Disc 50WV CH (DD104CH100D50V02)	10 pF		
	K06175120	" " " UJ (DD104UJ120J50V02)	12 pF		
	K02173180	" " " CH (DD104CH180J50V02)	18 pF		
C3103	K06175220	" " " UJ (DD105UJ220J50V02)	22 pF		
C3144	K02175270	" " " CH (DD105CH270J50V)	27 pF		
C3092	K00175330	" " " SL (DD104SL330J50V02)	33 pF		
C3102	K06175390	" " " UJ (DD105UJ390J50V02)	39 pF		
	K06175510	" " " " (DD106UJ510J50V02)	51 pF		
C3104, 3105	K02175151	" " " CH (DD109CH151J50V02)	150 pF		
C3001	K00175221	" " " SL (DD107SL221J50V02)	220 pF		
	K23170002	Ceramic Chip " (GR43Y5V103Z)	0.001μF		
C3025	K12171102	Ceramic Disc " (DD104E102P50V)	0.001μF		
C3131–3134 3143	K10176102	" " " (DD104B102K50V02)	0.001μF		
C3013, 3026 3035, 3042 3045–3047 3073, 3074 3093, 3101 3106, 3108–3110, 3112–3114, 3118–3121, 3123 3139	K13179008	" " " (DD106F103Z50V)	0.01μF		
C3060, 3061	K19149013	Semiconductor Ceramic 50WV (UAT05X103K-L05AE)	0.01μF		
C3050–3059 3141, 3142	K19149021	" " " (UAT08X473-L45AE)	0.047μF		
C3096	K19149025	" " " (UAT13X104K-L46AE)	0.1μF		
C3003, 3032 3040, 3069 3090	K50177102	Mylar " (50F2U102M)	0.001μF		
C3006, 3016	K50177222	" " (50F2U222M)	0.0022μF		
C3076	K50177272	" " (50F2U272M)	0.0027μF		
C3079	K50177103	" " (50F2U103M)	0.01μF		
C3064, 3068 3077, 3086 3087	K50177153	" " (50F2U153M)	0.015μF		
C3014, 3015 3027–3029	K50177223	Mylar 50WV (50F2U223)	0.022μF		
C3065	K50177333	" " (50F2U333M)	0.033μF		
C3002	K40179002	Electrolytic " (ECE-A1HK0R1)	0.1μF		
C3067	K40179010	" " (50RER47)	0.47μF		
C3005, 3007 3008, 3031 3034, 3039 3043, 3049 3070, 3081 3085, 3089 3136, 3137 3140	K40179013	" " (50RE1)	1μF		
C3127	K40179009	" " (50RE2R2)	2.2μF		
C3010, 3017 3020, 3021 3030, 3036, 3037 3044, 3071	K40149001	" 25WV (25RE4R7)	4.7μF		
C3004, 3009 3018, 3033 3041, 3048 3062, 3072 3075, 3080 3082–3084 3097, 3100 3116, 3128 3135–3138	K40129004	" 16WV (16RE10)	10μF		
C3117	K40129016	" " (16RE22)	22μF		
C3011, 3019 3124	K40129008	" " (16RE33)	33μF		
C3066, 3067	K40109002	" 10WV (10RE47)	47μF		
C3088, 3138	K40129002	" 16WV (16RE47)	47μF		
C3012	K40129020	" " (16RC100)	100μF		
C3091	K40129033	" " (16RC220)	220μF		
C3094	K40129006	" " (16RE470)	470μF		
C3095	K40129021	" " (16R102S)	1000μF		
C3129, 3130	K70127225	Tantalum " (CS15E1C2R2M)	2.2μF		
C3098	K70120002	" " (489D106X0016C1)	10μF		
		TRIMMER CAPACITOR			
TC3003	K9100086	CTZ51E 20P			
TC3002	K9100089	CTZ51G 50P			
	K9100091	CT81E 20p			

		INDUCTOR	
L3001, 3003 3006, 3010	L1190017	FL5H102K	1 mH
L3005, 3007	L1190023	FL5H220	22μH
	L1190035	FL7H392J	3.9 mH
L3002	L1190040	S-4	1 mH
L3009	L1190090	LAL04-102K	1 mH
		TRANSFORMER	
T3002	L0020883		
		CONNECTOR	
	P0090191	B2B-XH-A	2P
	P0090194	B5B-XH-A	5P
	P0090197	B8B-XH-A	8P
	P0090192	B3B-XH-A	3P
		TP TERMINAL	
	Q50000037	TP-H	

		DIODE	
D4083	G2090001	Si	10D1
D4086–4089 4093, 4094	G2015550	"	1S1555
D4001–4041 4043–4045 4047, 4049 4051–4053 4055–4057 4059–4061 4063–4074 4077, 4078 4080, 4081 4085, 4092	G2090027	"	1SS53
D4075, 4084	G2090118	Schottky	1SS97
D4079, 4082	G2090023	Varactor	1SV50
D4042, 4046 4048, 4050 4054, 4058	G2090073	"	FC52M
D4062	G2090185	Zener	HZ5C2
D4090	G2090240	"	WZ105
		CRYSTAL	
X4001	H0102450	10.0MHz	
X4003	H0102452	10.5434MHz	
X4004	H0102453	10.5466MHz	
X4002	H0102451	19.5434MHz	

LOCAL UNIT

Symbol No.	Part No.	Name & Description
PB-2345 D	F0002345 D	Printed Circuit Board
	C0023450	PCB with Components
		IC
Q4018	G1090087	MC4044
Q4020	G1090108	MC14518BCP
Q4017	G1090019	SN74LS192N
Q4012, 4024	G1090062	SN76514N
		TRANSISTOR
Q4016, 4043	G3107331Q	2SA733AQ
Q4007, 4011 4013–4015	G3305350B	2SC535B
Q4022, 4023	G3307320G	2SC732GR
Q4001, 4006 4009, 4010 4021, 4026– 4029, 4031– 4037, 4039 4041, 4042	G3309451Q	2SC945Q
Q4008	G3324070	2SC2407
		FET
Q4025, 4030 4038, 4040	G4800730G	3SK73GR

		RESISTOR		
R4034, 4059 4166	J02245100	Carbon Film	1/4W SJ	10Ω
R4017, 4026 4131, 4152 4161	J02245470	" "	" "	47Ω
R4062, 4063	J02245560	" "	" "	56Ω
R4018, 4020 4027, 4028 4064, 4067 4075, 4079 4084, 4087– 4089, 4092 4094, 4095 4098, 4104 4127, 4130 4132, 4133 4140, 4143 4149, 4153 4158, 4162 4163	J02245101	" "	" "	100Ω
R4093	J01245101	" "	" TJ	100Ω
	J01245151	" "	" "	150Ω
R4065	J02245151	" "	" SJ	150Ω
R4099	J02245181	" "	" "	180Ω
R4040, 4091 4108	J02245221	" "	" "	220Ω
R4057, 4188	J02245271	" "	" "	270Ω
R4013, 4035 4036, 4083 4174	J02245471	" "	" "	470Ω
R4029, 4072 4080, 4090	J02245561	" "	" "	560Ω

4106, 4128 4144, 4150 4159							
R4056	J02245681	Carbon Film	1/4W	SJ	680Ω		
R4187	J01245821	" "	"	TJ	820Ω		
R4014, 4022 4031, 4041– 4048, 4053 4060, 4068 4069, 4076 4105, 4109 4125, 4141 4165, 4172	J02245102	" "	"	SJ	1kΩ		
R4049	J01245102	" "	"	TJ	1kΩ		
R4058	J02245152	" "	"	SJ	1.5kΩ		
	J00215222	" "	1/8W	VJ	2.2kΩ		
R4134	J02245272	" "	1/4W	SJ	2.7kΩ		
R4052, 4096	J02245332	" "	"	"	3.3kΩ		
	J02245472	" "	"	"	4.7kΩ		
R4023, 4086 4119	J02245562	" "	"	"	5.6kΩ		
R4191	J00215682	" "	1/8W	VJ	6.8kΩ		
R4019, 4021, 4024, 4050 4051, 4054 4055, 4061 4113, 4117 4118, 4120 4123, 4169 4171, 4173 4199	J02245103	" "	1/4W	SJ	10kΩ		
R4179, 4180–4185	J00215103	" "	1/8W	VJ	10kΩ		
R4175, 4193	J01215103	" "	"	TJ	10kΩ		
R4073	J02245123	" "	1/4W	SJ	12kΩ		
R4002, 4004 4006, 4008 4016, 4033 4078, 4082 4138	J02245153	" "	"	"	15kΩ		
R4192	J00215153	" "	1/8W	VJ	15kΩ		
R4164, 4170	J02245183	" "	1/4W	SJ	18kΩ		
	J01215223	" "	1/8W	TJ	22kΩ		
R4010, 4038 4039, 4107 4115, 4177 4178	J02245223	" "	1/4W	SJ	22kΩ		
R4001, 4003 4005, 4007 4009, 4011 4012, 4015 4030, 4074 4077, 4081 4124, 4139	J02245273	" "	"	"	27kΩ		
R4190	J00215393	" "	1/8W	VJ	39kΩ		
R4135	J02245473	" "	1/4W	SJ	47kΩ		
R4066, 4085 4137, 4167	J02245563	" "	"	"	56kΩ		
R4032, 4147 4156	J02245683	" "	"	"	68kΩ		
R4121	J02245823	" "	"	"	82kΩ		
R4025, 4037 4071, 4097 4100, 4103 4122, 4126 4129, 4136 4142, 4145 4146, 4148 4151, 4154 4155, 4157 4160	J02245104	" "	"	"	100kΩ		
R4101, 4102	J02245224	Carbon Film	1/4W	SJ	220kΩ		
R4186	J00215224	" "	1/8W	VJ	220kΩ		
R4070	J02245334	" "	1/4W	SJ	330kΩ		
R4168	J20306330	Metallic Film	1W		33Ω		
		POTENTIOMETER					
VR4006, 4007	J51724502	PN822H502H			5kΩB		
VR4002–4005	J51724103	PN822H103H			10kΩB		
VR4001	J51752104	RGS6FAN	100KB		100kΩB		
		CAPACITOR					
C4217	K02182059	Ceramic Disc	50WV	CH	0.5 pF (RD870-1CG0R5C)		
C4101, 4105 4127, 4128 4130, 4131 4185, 4221	K13170103	Ceramic Disc	50WV	SL	2 pF (DD104SL020C50V02)		
C4089, 4160 4186	K00172030	" "	"	"	3 pF (DD104SL030C50V02)		
C4060, 4158	K00172050	" "	"	"	5 pF (DD104SL050C50V02)		
C4040	K02173060	" "	"	CH	6 pF (DD104CH060D50V02)		
C4024, 4033	K02173090	" "	"	"	9 pF (DD104CH090D50V02)		
C4018, 4032 4108, 4163 4215	K02173100	" "	"	"	10 pF (DD104CH100D50V02)		
C4069, 4071 4088, 4220	K00173100	" "	"	SL	10 pF (DD104SL100D50V02)		
C4143	K00175120	" "	"	"	12 pF (DD104SL120J50V02)		
C4090, 4118 4175, 4188	K00175150	" "	"	"	15 pF (DD104SL150J50V02)		
C4226	K00189012	" "	"	63WV	15 pF (RD870-2SL150J63V)		
C4004, 4011	K02175180	" "	"	CH	18 pF (DD104CH180J50V02)		
C4041	K06175180	" "	"	UJ	18 pF (DD104UJ180J50V02)		
C4117	K00175180	" "	"	SL	18 pF (DD104SL180J50V02)		
C4010	K02179008	" "	"	CH	20 pF (DD104CH200J50V02)		
C4219	K00179005	" "	"	SL	20 pF (DD104SL200J50V02)		
C4002, 4034 4044	K06179009	" "	"	UJ	22 pF (DD104UJ220J50V02)		
C4154	K02179009	" "	"	CH	22 pF (DD104CH220J50V02)		

C4173, 4214	K00175220	" " " SL 22 pF (DD104SL220J50V02)	C4183, 4184	K00175271	" " " " 270 pF (DD107SL271J50V02)
C4093	K00179006	Ceramic Disc 50WV SL 24 pF (DD104SL240J50V02)	C4076, 4070 4139	K00175331	" " " " 330 pF (DD107SL331J50V02)
C4019	K02179010	" " " CH 24 pF (DD104CH240J50V02)	C4056, 4058	K00175471	Ceramic Disc 50WV SL 470 pF (DD109SL471J50V02)
C4013, 4026	K06179010	" " " UJ 24 pF (DD104UJ240J50V02)	C4109	K30176331	Dipped Mica 50WV 330 pF (LCQ17331K05)
C4048, 4156	K02179011	" " " CH 27 pF (DD105CH270J50V02)	C4216	K30176681	" " " 680 pF (LCQ18681K05)
C4113, 4114	K00175270	" " " SL 27 pF (DD104SL270J50V02)	C4001, 4006 4009, 4012 4015, 4021 4025, 4030 4031, 4036 4039, 4042 4046, 4051– 4055, 4061– 4068, 4078 4080, 4081 4083, 4092 4097–4103 4106, 4107 4111, 4112 4115, 4116 4119–4126 4129, 4132– 4134, 4136 4137, 4141 4142, 4151 4152, 4157 4159, 4161 4162, 4164 4166, 4168 4172, 4174 4177, 4178 4180, 4182 4198, 4200 4203	K13179008	Ceramic Disc " 0.01μF (DD106F103Z50V)
C4003	K02179013	" " " CH 33 pF (DD105CH330J50V02)			
C4079, 4176	K00175330	" " " SL 33 pF (DD107SL330J50V02)			
C4038	K02175390	" " " CH 39 pF (DD105-257CH390J50V02)			
C4070, 4075	K00175390	" " " SL 39 pF (DD104SL390J50V02)			
C4028, 4155	K02175470	" " " CH 47 pF (DD106CH470J50V02)			
C4165,4223	K06175470	" " " UJ 47 pF (DD104UJ470J50V02)			
C4187	K00175470	" " " SL 47 pF (DD104SL470J50V02)			
C4047	K02175560	" " " CH 56 pF (DD106CH560J50V02)			
C4096	K00179008	" " " SL 36 pF (DD104SL360J50V02)			
C4094	K00179011	" " " " 62 pF (DD104SL620J50V02)			
C4095	K00175560	" " " " 56 pF (DD104SL560J50V02)			
C4008, 4037 4171	K02175680	" " " CH 68 pF (DD107CH680J50V02)			
C4017, 4023	K06175680	" " " UJ 68 pF (DD105-257UJ680J50V02)			
C4135	K00175680	" " " SL 68 pF (DD104SL680J50V)	C4201, 4202–4208	K23140001	MKH Chip 25WV 0.01μF (GR42Y5V103Z25V)
C4072	K00175820	" " " SL 82 pF (DD105SL820J50V02)	C4211	K14189002	Ceramic Disc 63WV 0.01μF (RD871-2FZ-103Z63V)
C4022	K06179019	" " " UJ 91 pF (DD106UJ910J50V02)	C4059, 4087 4150, 4189– 4191, 4194 4199	K13179009	" " 50WV 0.047μF (DD110F473Z50V)
C4029	K02179019	" " " CH 91 pF (DD107CH910J50V02)			
C4167	K02175101	" " " " 100 pF (DD107CH101J50V02)	C4195, 4196	K50177332	Mylar " 0.0033μF (50F2U332M)
C4145, 4179 4192	K00175101	" " " SL 100 pF (DD104SL101D50V02)	C4050	K50177103	" " 0.01μF (50F2U103M)
C4016	K06179020	" " " UJ 110 pF (DD106UJ111J50V02)	C4153	K40179013	Electrolytic 50WV 1μF (50RE1)
C4007	K02179021	" " " CH 130 pF (DD109CH131J50V02)	C4169	K40179011	Electrolytic " 3.3μF (50RE3.3)
C4110	K02175151	" " " " 150 pF (DD109CH151J50V02)	C4005, 4014 4020, 4027 4035, 4043 4045, 4049 4082, 4086	K40129004	" 16WV 10μF (16RE10)
C4138, 4040	K00175181	" " " SL 180 pF (DD106SL181J50V02)			
C4057	K00179020	" " " " 240 pF (DD107SL241J50V02)			

4193			
C4224	K40129008	" " (16RE33)	33μF
C4144, 4149	K40129002	" " (16RE47)	47μF
C4085	K40129007	Electrolytic 16WV (16RE100)	100μF
C4091	K5420000	MKH 100WV ((32560A1154K)	0.15μF
C4225	K70127225	Tantalum 16WV (CS15E1C2R2M)	2.2μF
		TRIMMER CAPACITOR	
	T91000075	TZ03R200E	20 pF
TC4001–4003	K91000081	TZ03R300E	30 pF
		INDUCTOR	
L4001, 4002 4004, 4005 4007, 4009 4011, 4012 4014, 4015 4017, 4024 4028, 4032–4034	L1190020	FL5H151K	150μH
L4018, 4019	L1190004	FL4HR68M	0.68μH
L4020–4022	L1190073	FL5H270K	27μH
L4023	L1190031	FL5H680K	68μH
L4026, 4027	L1190013	FL4H6R8K	6.8μH
L4029, 4030	L1190018	FL5H121K	120μH
L4035	L1190016	FL5H101K	100μH
L4037, 4038	L1190006	FL4H1R2M	1.2μH
L4039, 4026 4027	L1190021	FL5H180K	18μH
L4041	L1190096	LAL04151K-NA	150μH
L4003	L0021200		
L4006	L0021201		
L4008	L0021202		
L4010	L0021203		
L4016	L0021205		
L4031	L0020145		
L4036	L0021206B		
L4040	L2190001		
		TRANSFORMER	
T4001–4003	L0021207		
T4004–4006	L0021208		
T4007–4009	L0021209		
T4010	L0020801		
T4011	L0021295		
T4012, 4016	L0020638		
T4013	L0021210		
T4014	L0021197		
T4015	L0020421		
		RELAY	
RL4001	M1190002	FBR211AD012	
		TERMINAL	
	Q5000029	Terminal A	
	Q5000037	TP-H	

COUNTER UNIT

Symbol No.	Part No.	Name & Description
PB-2346C	F0002346C	Pinted Circuit Board
	C0023460	PCB with Components
		IC
Q5015	G1090084	78L05
Q5005, 5011	G1090068	MC14011
Q5006	G1090385	MC14022
Q5012, 5013	G1090053	MC14081B
Q5003	G1090476	TC4518BP or μPC4518C
Q5004	G1090108	MC14518B
Q5008–5010	G1090387	TC5066
Q5007	G1090386	TC5070
		TRANSISTOR
Q5014	G3318150G	2SC1815GR
Q5001, 5002	G3318150Y	2SC1815Y
		DIODE
D5067	G2015540	Si 1S1554
D5061–5064 5069	G2015550	" 1S1555
D5066	G2090185	Zener HZ5C2
		FCD
DS5001	G6090027	FIP9E8
		TRANSFORMER
T5001	L3030077	E-142
		RESISTOR
R5038	J02245479	Carbon Film 1/4W SJ 4.7Ω
R5044	J02245270	" " " " 27Ω
R5001	J02215101	" " 1/8W " 100Ω
R5007	J02245101	" " 1/4W " 100Ω
R5005	J02245121	" " " " 120Ω
R4040	J02245151	" " " " 150Ω
R4004, 4010	J02245222	" " " " 2.2kΩ
R4039	J02245272	" " " " 2.7kΩ
R5011, 5024 5037, 5041	J02245103	" " " " 10kΩ
R5018–5021	J02245563	" " " " 56kΩ
R5002, 5008 5012–5017 5022, 5023 5042, 5043	J02245104	" " " " 100kΩ
		BLOCK RESISTOR
RB5004	J40900028	RK1/16B-7E 3.3kΩ x 7
RB5001–5003 5005	J4090003	RK1/16B-7E 100kΩ x 7

		CAPACITOR			CRYSTAL FILTER
C5003	K06179006	Ceramic Disc 50WV UJ 30 pF (DD104UJ300J50V02)	XF6001	H1102050	8.2M20A
C5007, 5008 5016, 5017	K13179008	" " " 0.01μF (DD106F103Z50V)			CERAMIC FILTER
C5001, 5002 5004, 5021	K13179009	" " " 0.047μF (DD110F473Z50V)	CF6001	H3900270	CFX455D 455kHz
C5006, 5018	K50177102	Mylar " 0.001μF (50F2U102M)			RESISTOR
C5012	K50177153	" " 0.015μF (50F2U153M)	R6006, 6021 6033, 6056 6057	J02245560	Carbon Film 1/4W SJ 56Ω
C5010	K40179009	Electrolytic " 2.2μF (50RE2R2)	R6007, 6009 6012, 6017 6049	J02245101	" " " " 100Ω
C5013, 5014	K40129004	" 16WV 10μF (16RE10)	R6058	J02245471	" " " " 470Ω
C5009	K40129016	" " 22μF (16RE22)	R6004, 6018 6035	J02245561	" " " " 560Ω
C5015, 5022	K40129007	" " 100μF (16RE100)	R6054	J02245561	" " " " 560Ω
C5011	K40129009	" " 220μF (16RE220)	R6016, 6019 6030, 6034	J02245102	" " " " 1kΩ
				J01245102	" " " TJ 1kΩ
			R6026	J02245152	" " " SJ 1.5kΩ
			R6013, 6036	J02245182	" " " " 1.8kΩ
			R6039, 6050	J02245222	" " " " 2.2kΩ
		TP TERMINAL	R6015	J02245332	" " " " 3.3kΩ
	Q5000036	TP-G	R6003, 6005 6055	J02245472	" " " " 4.7kΩ
			R6040	J02245562	" " " " 5.6kΩ
			R6001, 6002 6023, 6041 6046, 6047 6051	J02245103	" " " " 10kΩ
AM/FM UNIT (OPTION)					
Symbol No.	Part No.	Name & Description	R6038	J01245103	" " 1/8W TJ 10kΩ
PB-2347 B	F0002347 B	Printed Circuit Board	R6053	J02245123	" " " SJ 12kΩ
	C0023470	PCB with Components	R6025	J02245153	" " " " 15kΩ
			R6029, 6031 6032	J02245223	" " 1/4W " 22kΩ
		IC	R6042	J02215223	" " 1/8W " 22kΩ
Q6001	G1090388	TA7069P	R6014	J02245333	" " 1/4W " 33kΩ
Q6008	G1090389	MC3359	R6024, 6037 6045	J02245473	" " " " 47kΩ
Q6013	G1090048	TC5081P		J01215473	" " 1/8W TJ 47kΩ
Q6003, 6005	G1090239	TC5082P	R6020	J02245683	" " 1/4W SJ 68kΩ
Q6014	G1090072	μPC577H	R6008, 6010 6011	J02245104	" " " " 100kΩ
			R6028	J02245154	" " " " 150kΩ
		TRANSISTOR	R6027	J02245274	" " " " 270kΩ
Q6007	G3303800Y	2SC380Y			
Q6012, 6015	G3318150G	2SC1815GR			
					POTENTIOMETER
		FET	VR6004	J51752102	RGS6-FAN1KB 1KB
Q6006	G3090036	2SK19BL	VR6001, 6003	J51752503	RGS6-FAN50KB 50KB
Q6002, 6004	G3090035	2SK19TMGR	VR6002	J51752103	RGS6-FAN10KB 10KB
		DIODE			CAPACITOR
D6001, 6002 6004–6007	G2015550	Si 1S1555	C6008, 6027	K00173100	Ceramic Disc 50WV SL 10 pF (DD104SL100D50V02)
			C6020	K05185470	" " 63WV " 47 pF (RD871-1N220-470J63V)

C6046	K02175560	Ceramic Disc 63WV CH 56 pF (DD106CH560J50V02)
C6065, 6066	K00175680	" " " " 68 pF (DD104SL680J50V02)
C6003, 6022	K00175101	" " " " 100 pF (DD105SL101J50V02)
C6030	K02175151	" " " " 150 pF (DD109CH151J50V02)
C6019, 6021	K05185151	" " " RH 150 pF (RD8742N220151J63V)
C6024, 6051	K10176102	" " " 0.001μF (DD104B102K50V02)
C6001, 6002 6005, 6006 6009–6011 6013–6016 6018, 6026 6060, 6063 6067, 6069–6071	K13179008	" " " 0.01μF (DD106F103Z50V)
C6041, 6074	K13179009	" " " 0.047μF (DD110F473Z50V)
C6061	K19149017	Semiconductor Ceramic 25WV 0.022μF (UAT06X223K)
C6035, 6042	K19149021	" " " 0.047μF (UAT08X473-L45AE)
C6028, 6029	K19149025	" " 50WV 0.1μF (UAT13X104L46AE)
C6036, 6037	K50177102	Mylar 50WV 0.001μF (50F2U102M)
	K23140001	Ceramic Chip 25WV 0.01μF (GR42Y5V103Z25V)
	K50177223	Mylar 50WV 0.022μF (50F2U223)
C6053, 6054	K50177473	" " 0.047μF (50F2U473)
C6038	K40179002	Electrolytic " 0.1μF (50RC2-R1)
C6048, 6049	K40179010	" " 0.47μF (50RER47)
C6034, 6045 6052	K40179013	" " 1μF (50RE1)
C6050	K40179009	" " 2.2μF (50RE2.2)
C6031, 6059	K40149001	" 25WV 4.7μF (25RE4R7)
C6012, 6017 6023, 6040 6047, 6055–6057, 6062 6024, 6068	K40129004	" 16WV 10μF (16RE10)
C6007	K40129002	" " 47μF (16RE47)
		INDUCTOR
L6001, 6003–6005	L1190016	FL5H101K 100μH
L6006	L1190017	FL5H102K 1 mH
L6009	L1190102	S-104K

		TRANSFORMER
T6001, 6002	L0020892	
T6003	L0021212	
T6004	L0020422	R12-7947
T6005	L0021199	

VFO UNIT

Symbol No.	Part No.	Name & Description
PB-2348 A	F0002348 A	Printed Circuit Board
	C0023480	PCB with Components
		IC
Q7001	G1090390	VFO-1
		DIODE
D7001	G2022360	Varactor 1S2236
		RESISTOR
R7002	J01245561	Carbon Film 1/4W TJ 560Ω
R7001	J01245103	" " " " 10kΩ
		CAPACITOR
C7017	K6172020	Ceramic Disc 50WV UJ 2 pF (DD104UF020C50V02)
C7016	K06172040	" " " " 4 pF (DD104UJ040C50V)
C7001, 7004	K06179052	" " " " 8.2 pF (UP125UJ8R2K-NA)
C7013	K02179062	" " " CH 8.2 pF (UP125CH8R2-NA)
C7015	K02173080	" " " " 8 PF (DD104CH080D50V02)
C7014	K02179065	" " " " 18 pF (UP125CH180-NA)
C7002	K06179053	" " " UJ 22 pF (UP125UJ220K-NA)
C7003, 7005	K02179063	" " " CH 22 pF (UP125CH220J-NA)
C7006	K02179064	" " " " 33 pF (UP125CH330J-NA)
C7010, 7012	K10179034	" " " 470 pF (UP125B471K-NA)
C7011	K10179035	" " " 1000 pF (UP125SB102K-NA)
C7007–7009	K15179001	" " " 0.01μF (TP125X103N-NA)
		VARIABLE CAPACITOR
VC7001	K90000024	C521R112
		TRIMMER CAPACITOR
TC7002	K91000090	PS100 10 pF x 2
TC7001	K91000103	PSS-100-10P 10 pF
TC7003	K91000116	CTZ81F 30 pF

		INDUCTOR	
L7002, 7004	L1190132	LAL04NA221K	220μH
L7003	L1190090	LAL04NA102K	1 mH
L7005, 7006	L1190131	LAL04NA1R8M	1.8 mH
		CONNECTOR	
	P0090149	PI021-05M 5 pF	
		VFO LAMP	
PL7001, 7002	Q1000049	K0320.Z.1 12V	100 mA

RECT A UNIT

Symbol No.	Part No.	Name & Description
PB-2349C	F0002349C	Printed Circuit Board
	C0023490	PCB with Components
		TRANSISTOR
Q8003	G3106390Q	2SA639Q
Q8001	G3107331Q	2SA733AQ
Q8002	G3318150Y	2SC1815Y
Q8004	G3322290	2SC2229
		DIODE
D8002–8006	G2090002	Si 10D10
D8007, 8008 8011–8019	G2015550	" 1S1555
D8001	G2090081	" SM1-12
		RESISTOR
R8022	J02245331	Carbon Film 1/4W SJ 300Ω
R8017, 8018 8020, 8025 8027	J02245102	" " " " 1kΩ
R8028	J01245222	" " " TJ 2.2kΩ
R8016	J02245332	" " " SJ 3.3kΩ
R8019	J02245472	" " " " 4.7kΩ
R8012, 8021	J02245103	" " " " 10kΩ
R8014	J02245153	" " " " 15kΩ
R8009	J01245183	" " " TJ 18kΩ
R8010	J02245183	" " " SJ 18kΩ
R8015	J02245223	" " " " 22kΩ
R8013	J02245393	" " " " 39kΩ
R8011	J02245274	" " " " 270kΩ
R8003	J10276474	Carbon Composition 1/2W GK 470kΩ
R8001	J20306390	Metallic Film 1W 39Ω
R8002	J20336391	" " 2W 390Ω
R8004	J20336471	" " 2W 470Ω
R8006	J20336222	" " 2W 2.2kΩ
R8005	J20336332	" " " 3.3kΩ
R8008	J20336562	" " " 5.6kΩ
R8007	J20336473	" " " 47kΩ

		POTENTIOMETER
VR8001	J50753103	EVTJ6A505B14 10kΩB
		CAPACITOR
C8003, 8006 8013, 8018	K12279004	Ceramic Disc 500WV 0.0047μF (ECK-D-2H-472-PE)
C8010, 8016 8019	K12279002	" " " 0.01μF (ECK-D-2H-103-PE)
C8017, 8024	K19149021	Semiconductor Ceramic " 0.047μF (UAT08X473K-L45AE)
C8001, 8002 8004, 8005	K40270106	Electrolytic 450WV 10μF (450RH10)
C8009	K40240106	" 250WV 10μF (250RH10)
C8007, 8008	K40260226	" 350WV 22μF (350RH22)
C8011	K40240336	" 250WV 33μF (250RH33)
C8015	K40179009	" 50WV 2.2μF (50RE2R2)
	K52240002	Metallized Film 250WV 0.1μF (MD1-2E104M)
C8021	K52240003	" " " 0.22μF (MD1-2E224M)
		INDUCTOR
L8001	L1190090	LAL04-102K 1 mH
		TP TERMINAL
	Q5000038	TP-I

RECT B UNIT

Symbol No.	Part No.	Name & Description
PB-2350C	F0002350C	Printed Circuit Board
	C0023500	PCB with Components :
		IC
Q8502	G1090507	μPC78L12A
Q8505	G1090391	μPC78L15
		TRANSISTOR
Q8501	G3107331Q	2SA733AQ
Q8503	G3304960Y	2SC496Y
Q8504	G3318150Y	2SC1815Y

		DIODE
D8501–8504	G2090002	Si 10D10
D8505	G2090003	" V06B
D8507	G2090224	Zener AW01-24
D8506	G2090111	" HZ6C1
		RESISTOR
R8509	J02245560	Carbon Film 1/4W SJ 56Ω
R8508	J02245103	" " " " 10kΩ
R8503–8506	J10276474	Carbon Composition 1/2W GK 470kΩ
R8502	J20336220	Matallic Film 2W 22Ω
R8507	J20336122	" " " 1.2kΩ
R8501	J31336019	Wire Wound " 0.1Ω
		CAPACITOR
C8502, 8503 8505, 8508 8515	K13179008	Ceramic Disc 50WV 0.01μF (DD106F103Z50V)
C8510	K40179011	Electrolytic " 3.3μF (50RE3R3)
C8504, 8507	K40149008	" 25WV 10μF (25RL10)
C8514	K40129004	" 16WV 10μF (16RE10)
C8506	K40149003	" 25WV 100μF (25RL100)
C8509	K40129021	" 16WV 1000μF (16R102S)
C8501	K41160478	" 35WV 4700μF (35TL4700)
C8512, 8513	K70160003	Tantalum " 0.1μF (35SC0.1μF)
		TP-TERMINAL
	Q5000038	TP-I

VR UNIT

Symbol No.	Part No.	Name & Description
PB-2351B	F0002351B	Printed Circuit Board
	C0023510	PCB with Components
		DIODE
D9001	G2015550	Si 1S1555
		RESISTOR
R9002	J02245223	Carbon Film 1/4W SJ 22kΩ
R9001	J02245104	" " " " 100kΩ

		POTENTIOMETER
VR9001, 9003 9004	J66800001	K1213000310KB 10KB
VR9005	J66800003	K12130004-10KA 10KA
VR9002	J66800002	K12130003500KB 500KB

SW UNIT A

Symbol No.	Part No.	Name & Description
PB-2353A	F0002353A	Printed Circuit Board
	C0023530	PCB with Components
		DIODE
D9201, 9202	G2015550	Si 1S1555
D9203, 9204	G2090060	LED GD-4-203SR-D
		RESISTOR
R9201, 9202	J02245182	Carbon Film 1/4W SJ 1.8kΩ
		SWITCH
S9201	N4090053	SUJ52A
		TP TERMINAL
	Q5000020	MS60121

SW UNIT B

Symbol No.	Part No.	Name & Description
PB-2352C	F0002352C	Printed Circuit Board
	C0023520	PCB with Components
		DIODE
D9401, 9403–9407	G2015550	Si 1S1555
		RESISTOR
R9403	J02245392	Carbon Film 1/4W SJ 3.9kΩ
R9401, 9402	J02245103	" " " " 10kΩ
		SWITCH
S9401	N4090055	SUJ62A

RELAY UNIT

Symbol No.	Part No.	Name & Description
PB-2354	F0002354	Printed Circuit Board
	C0023540	PCB with Components
		DIODE
D9602	G2090029	Ge 1N60
D9601	G2015550	Si 1S1555

		RESISTOR	
R9601	J02245100	Carbon Film 1/4W SJ	10Ω
		CAPACITOR	
C9605	K30273050	Dipped Mica 500WV (LCQ11050D5)	5 pF
C9608	K31306800	Mica 1KV (CML1-800K10)	80 pF
C9606	K00179019	Ceramic Disc 50WV SL (DD106SL201J50V02)	200 pF
C9602	K30279051	" " 500WV (DM19D102K5)	1000 pF
C9601, 9603	K30279058	" " " (DM19D202K5)	2000 pF
C9604, 9607	K13179009	" " 50WV (DD110F473Z50V)	0.047μF
		INDUCTOR	
L9602, 9605	L1190014	FL5H100	10μH
L9603, 9604	L1190009	FL5H3R3	3.3μH
L9606	L1190070	FL4H8R2	8.2μH
L9607	L1190024	FL5H221	220μH
L9608	L0021293		
		RELAY	
RL9601	M1190043	G2U112P-14 10V	
		LAMP FUSE	
FH9601	Q1000010	BQ041-22803A	
	Q5000021	Wrapping Terminal C	

		CAPACITOR	
C9820	K30275270	Dipped Mica 500WV (LCQ12270J5)	27 pF
C9823	K02175121	" " 50WV CH (DD109CH121J50V02)	120 pF
C9824	K30175181	" " " (LCQ17181J05)	180 pF
C9819	K02309003	Ceramic Disc 3KWV (CC45CH3F101KY)	100 pF
C9825	K02175680	" " 50WV CH (DD107CH680J50V02)	68 pF
C9826	K02175101	" " " " (DD107CH101J50V02)	100 pF
C9817	K12279003	" " 500WV (ECKD2H222PE)	0.0022μF
C9804, 9806 9810	K12279002	" " " (ECKD2H103PE)	0.01μF
C9801, 9802 9803, 9805 9807, 9808 9809, 9821 9822	K13179008	" " 50WV (DD106F103Z50V)	0.01μF
C9811, 9812 9813, 9814 9815, 9816	K13179009	" " " (DD110F473250V)	0.047μF
		INDUCTOR	
L9807	L1190020	FL5H151K	150μH
L9805	L1190024	FL5H221K	220μH
L9801	L1190039	FL5H561K	560μH
L9802, 9803 9804	L1020307		
	L1190017	FL5H102K	1 mH
L9806	L1190090	LAL04102K	1 mH
L9808	L0190032	RF3855-R27K	
L9809	L0190030	RF3855-R18K	
		RELAY	
RL9801	M1190002	FBR211AD012	

FINAL BOARD

Symbol No.	Part No.	Name & Description	
PB-2355 B	F0002355 B	Printed Circuit Board	
	C0023550	PCB with Components	
		TRANSISTOR	
Q9801	G3318150Y	2SC1815Y	
		DIODE	
D9802	G2090002	Si 10D10	
D9801	G2015550	" 1S1555	
		VACUUM TUBE SOCKET	
VS9801, 9802 9803	P3090024	SB3606	
		RESISTOR	
R9801, 9802 9803, 9804	J01275101	Carbon Film 1/2W TJ	100Ω
R9806, 9807	J02245103	" " 1/4W SJ	10kΩ
R9805	J32009014	Meter Shunt	0.67Ω

ACCESSORIES

Symbol No.	Part No.	Name & Description	
		AC POWER CORD	
	T9000482	YFC-03K 3 wire, 3 prong plug (UL)	
	T9013284	EC-4007-007 3 wire, 2 prong EU plug	
	T9013283	SC-4111-001 3 wire, 3 prong Australian plug	
		FUSE	
	Q0000012	6A (100V-117V)	100W
	Q0000004	3A (200V-234V)	"
	Q0000004	3A (100V-117V)	10W
	Q0000003	2A (200V-234V)	"
		PLUG	
	P0090018	STP-58	RCA PLUG
	P0090007	SH3001	KEY PLUG
	P0090034	P2240	SP PLUG
	P0090031	E5-702B-02	DIN PLUG (5P)
	P0090032	E6-701B-02	DIN PLUG (6P)