



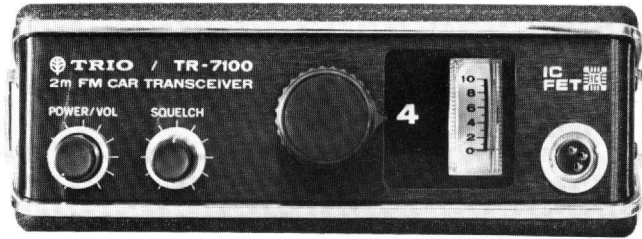
**TRIO**

# SERVICE MANUAL

**TR-7100**



**2 METER FM CAR TRANSCEIVER**



## TRANSMITTER UNIT

TRANSMITTING FREQUENCY:	12 channel frequencies in the 144 MHz band.
TYPE OF EMISSION:	F3
TRANSMITTING POWER OUTPUT:	10 W
MODULATION SYSTEM:	Phase modulation
MAXIMUM FREQUENCY DEVIATION:	$\pm 15$ kHz
FREQUENCY MULTIPLICATION:	24
FUNDAMENTAL OSCILLATOR FREQUENCY:	6 MHz band
UNWANTED RADIATION:	Less than $-60$ dB
ANTENNA IMPEDANCE:	$50 \Omega$
MICROPHONE:	Dynamic microphone with $500 \Omega$ press-to-talk switch

## RECEIVER UNIT

RECEIVING FREQUENCY:	Same as transmitting freq.
TYPE OF EMISSION:	F3
TYPE OF RECEPTION:	Double superheterodyne
SENSITIVITY:	More than 26 dB S/N for $1 \mu\text{V}$ input
SELECTIVITY:	More than $\pm 12.5$ kHz at $-6$ dB
FILTER:	Ceramic filter
INTERMEDIATE FREQUENCY:	1st IF: 10.7 MHz 2nd IF: 455 kHz
AF OUTPUT:	0.7 W (under 10% distortion)

## GENERAL SPECIFICATION

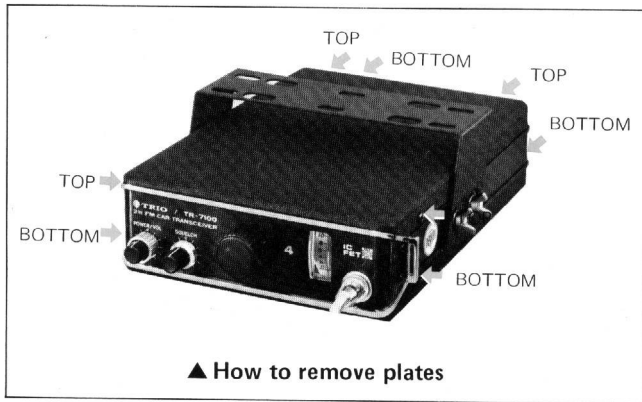
SEMICONDUCTORS	FET	1	IC	3
COMPLEMENT:	Transistor	25	Diode	14
	Thyristor	1		
POWER REQUIREMENTS				
OPERATING VOLTAGE:	DC	$11.6 \sim 15.0$ V.		
	Reference voltage:	13.8 V		
GROUNDING SYSTEM:	Grounding at negative side			
	grounding at positive side is also practicable by changing the installation method.			
POWER CONSUMPTION				
DURING TRANSMISSION:	Approx.	2.3A (at 13.8 V supply voltage)		
DURING RECEPTION:	Approx.	0.35A (at 13.8 V supply voltage)		
DIMENSIONS:	170W x 60H x 230D (mm)			
	6-11/16"W x 2-3/8"H x 9-1/16"D (inches)			
WEIGHT:	4.62 lbs. (2.1 kg)			

## BEFORE ADJUSTMENT

### HOW TO REMOVE PLATES

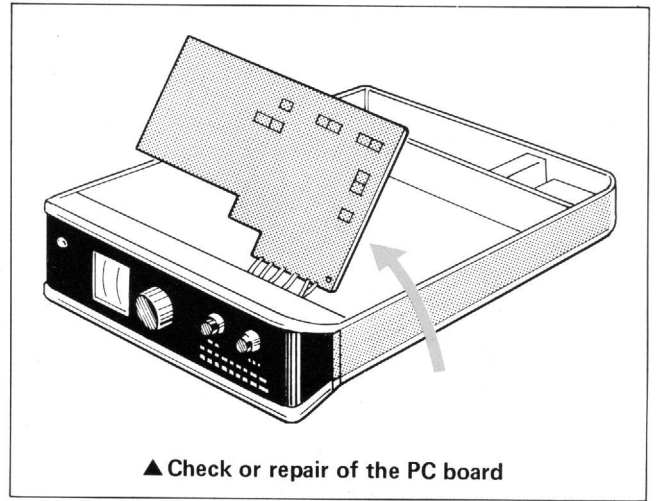
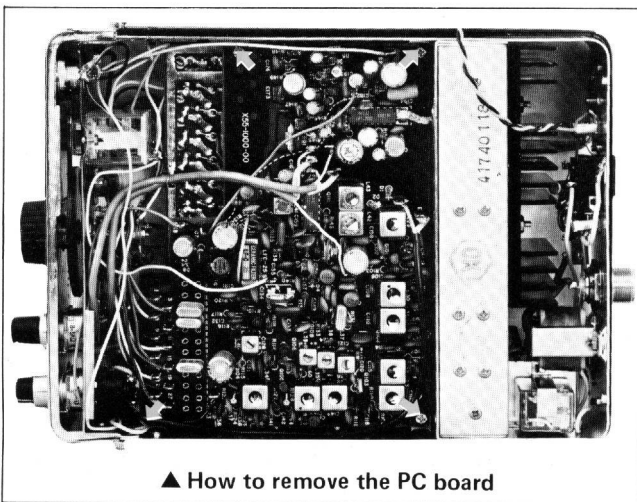
To remove the top or bottom plate from the transceiver for adjustment, proceed as follows.

For adjustment of transmitter unit . . . . . Unscrew 4 setscrews from the top side of the transceiver and remove the top plate. For adjustment of receiver unit . . . . . Unscrew 4 setscrews from the bottom side of the transceiver and remove the bottom plate.



### CHECK OR REPAIR OF PC BOARD

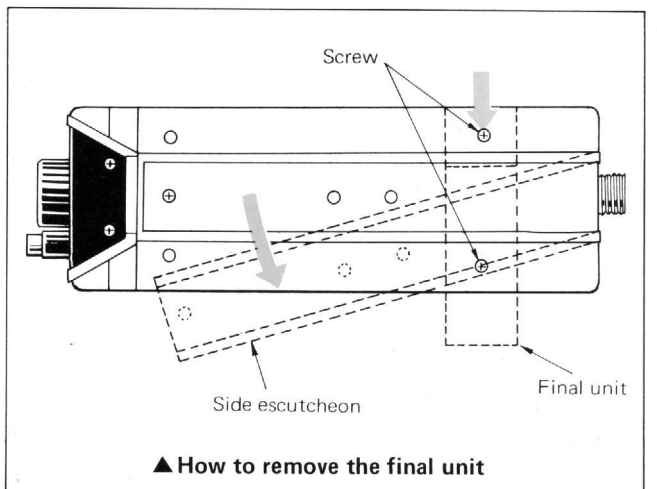
To check or repair the PC board proceed as follows: Remove the top and bottom plates from the transceiver case. Unscrew 4 setscrews from the receiver PC board (X55-1000-00). With the receiver PC board opened frontwards as shown below, proceed to check or repair of the transmitter PC board (X56-1000-00) and receiver PC board (X55-1000-00).



**NOTE:** Don't try to remove the transmitter PC board (X56-1000-00) from the chassis.

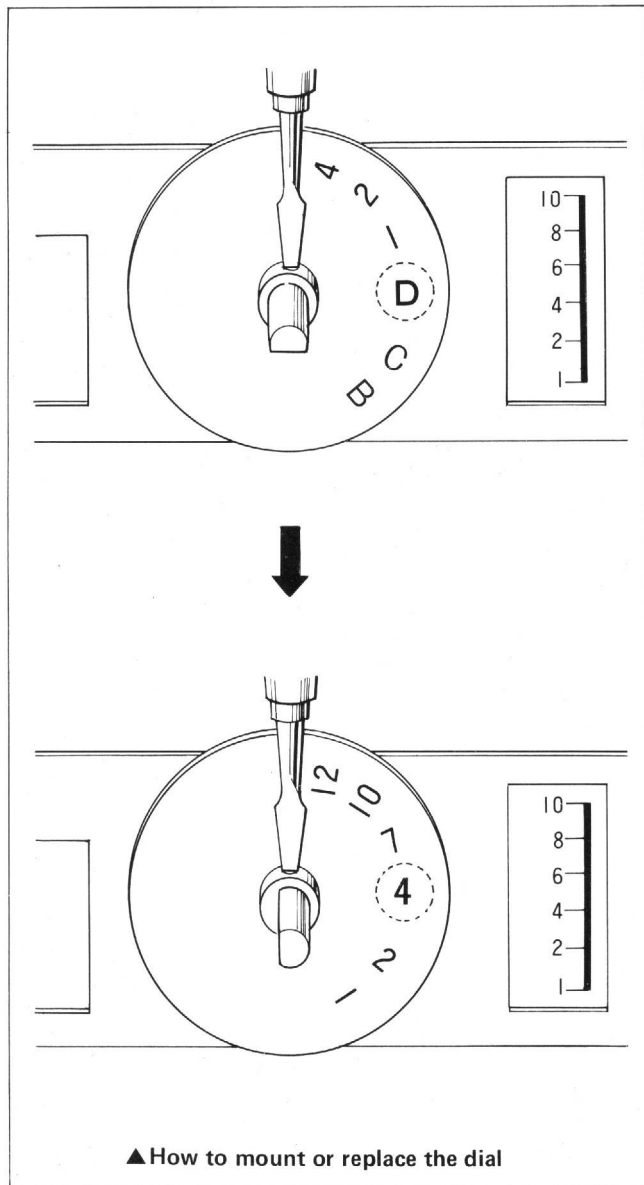
### HOW TO REMOVE THE FINAL UNIT

Remove the top and bottom plates. Unsolder leads connected to the final unit. Next, unscrew the both sides escutcheon screws pushing down the one end of the escutcheon, and then do the 4 screws final unit. Finally push the final unit down.



## HOW TO MOUNT OR REPLACE THE DIAL

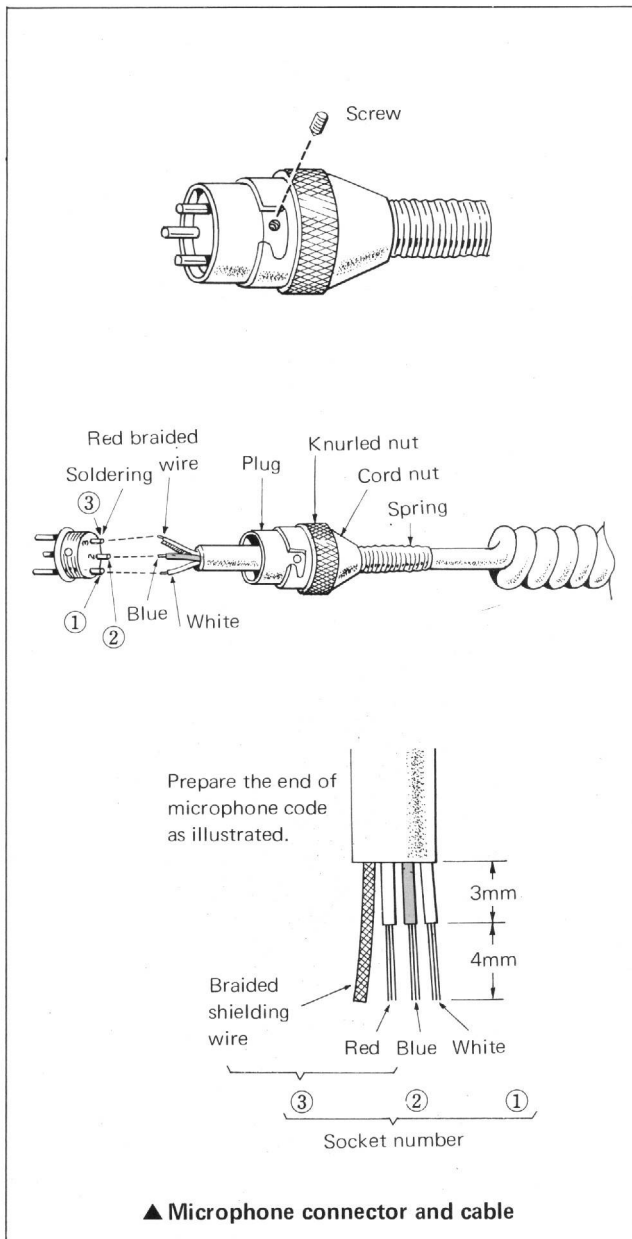
Front panel is fixed by 4 setscrews being on the sides. Turn the CHANNEL selector until the cut of its shaft is positioned as shown below. In this time, dial number (namely CHANNEL number) is D. Unscrew the screw. Next turn the CHANNEL selector until the number 4 and unscrew the other.



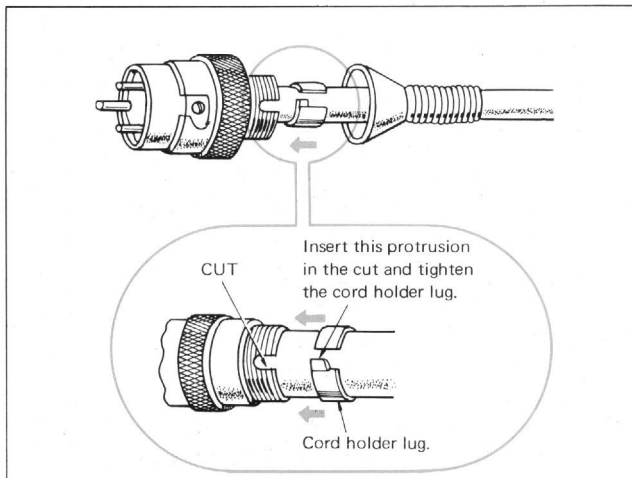
**NOTE:** Black knob of POWER/VOL is fixed with screw. White knob of that is ornamental nut. On SQUELCH knob, is push-type. CHANNEL selector is fixed with screw.

## CONNECTION AND REPAIR OF MICROPHONE CONNECTOR

Remove the screw. Insert the plug into the connector socket. Remove the plug by turning it counterclockwise. Pass the microphone cord through the plug. Solder the conductors of the microphone cord to the terminals as illustrated right above.



**NOTE:** Be careful to correct the color conductors to their proper socket terminals numbered.



Screw the cord socket into the connector body socket and fix it to the latter with the screw.

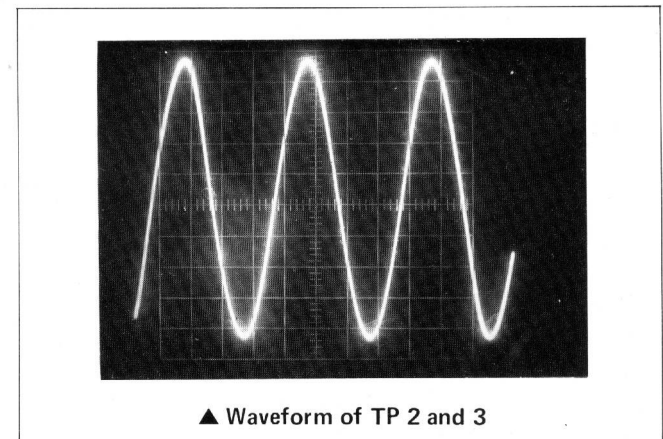
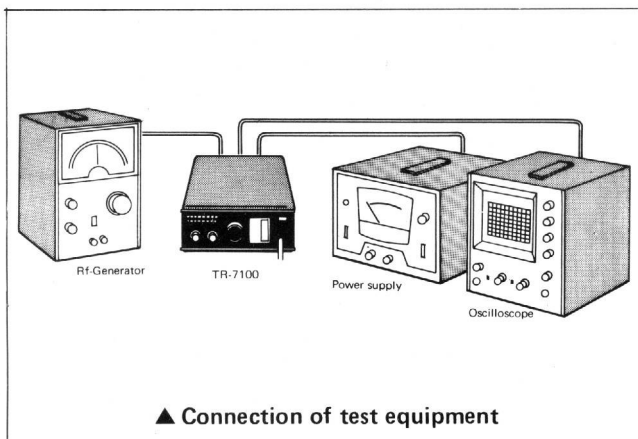
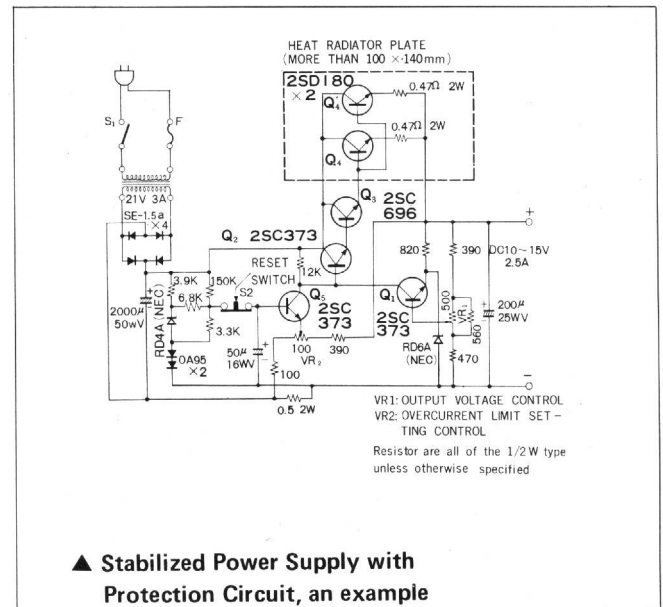
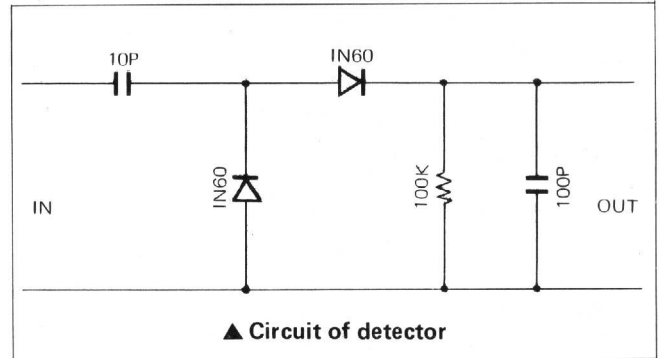
# ADJUSTMENT OF RECEIVER UNIT

## TEST EQUIPMENTS

1. Oscilloscope
2. Rf-generator
3. Power supply . . . . 13.8 volt, more than 2.5 ampere.
4. Insulated screwdriver
5. Power meter
6. Frequency counter
7. VTVM or tester
8. Sweep generator
9. Marker generator
10. Detector . . . . refer to the figure.

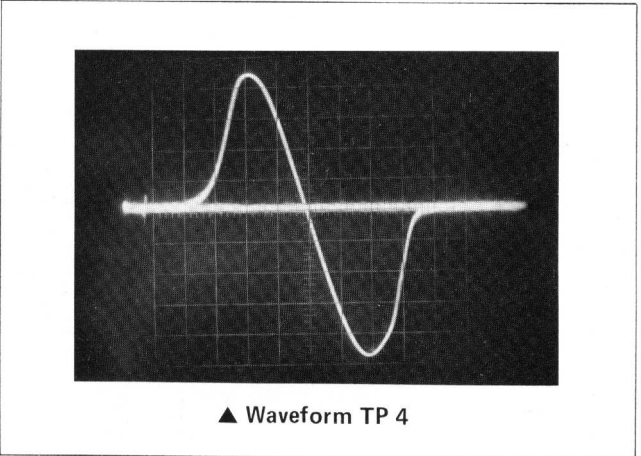
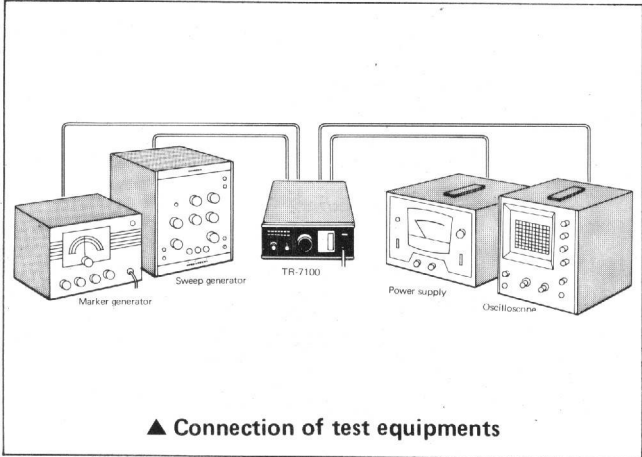
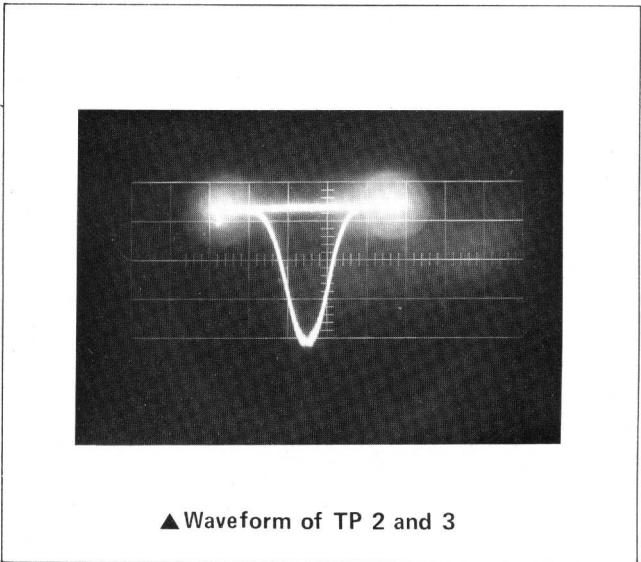
## ADJUSTING THE RECEIVER UNIT (X55-1000-00)

1. Check the supply voltage to be 13.8 volt.
2. Connect the rf-generator (145MHz, 1kHz-modulation, 10kHz-deviation) to TP1 through the capacitor 0.01 $\mu$ F.
3. Connect the oscilloscope to TP2 through the detector.
4. Turn the cores of coils L37~L40 so that the waveform is proper.
5. Change the oscilloscope to TP3 through the detector.
6. Turn the core of coil L41 so that the waveform is proper.
7. Change the oscilloscope to TP4,
8. Turn the core of coil L42, 43 so that the waveform is proper. (see the page 6)
9. Set the attenuator of rf-generator at 30 db.
10. Change the rf-generator to TP5.
11. Turn the pc trimmer potentiometer VR1 so that the S-meter is maximum deflection.



**When using the sweep generator and marker generator . .**

1. Check the supply voltage to be 13.8 volt.
2. Connect the output of sweep generator (10.7MHz) and marker generator (10.7MHz) to TP 1.
3. Connect the oscilloscope to TP 2 through the capacitor 5 pF.
4. Turn the core of coils L37~L40 so that the waveform is proper.
5. Change the frequency of marker and sweep generators to 455 kHz.
6. Connect the sweep and marker generators to TP 2.
7. Connect the oscilloscope to TP 3.
8. Turn the core of coil L41 so that the waveform is proper.
  
9. Change the oscilloscope to TP 4.
10. Turn the core of coil L42, 43 so that the waveform is proper.

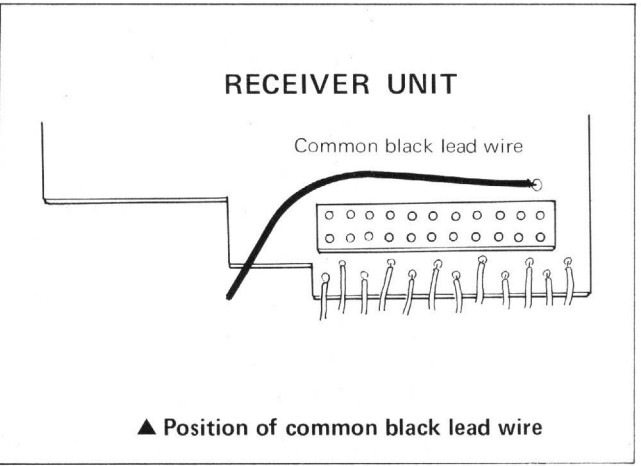


**KEY POINTS ON REPAIR OF RECEIVER UNIT**

**Problem on Adjoining Channels**

It sometime happens that the receiver unit receives an input signal from an idle channel for which no crystal oscillator is inserted. This is due to the induction of the output of the crystal oscillator for the adjoining channel to the lead wire to the idle channel. In sure case, take the following.

Arrange "the common black lead wire" of rotary switch so as to run along the crystal holder at the opposite side that accommodating lead wire terminals. Then, keep "the common black lead wire" away from all channel crystal lead wire. Also, arrange the crystal lead wires so as to keep them away from each other.



**Poor sensitivity due to improper relay contact**

Check a relay for any stains or lowered contact pressure. If the relay is left as it is with its stains unremoved and its contact pressure improperly adjusted, the receiver unit may suffer from a sensitivity reduced by approx. 10 dB.

# ADJUSTMENT OF TRANSMITTER UNIT

## CAUTIONS ON TRANSMITTER UNIT ADJUSTMENT

Use always an insulated rod (made of such material as bakelite) when making adjustments of the trimmers and the protection circuit. Never fail to use parafin or lacquer when fixing the core of coil in position.

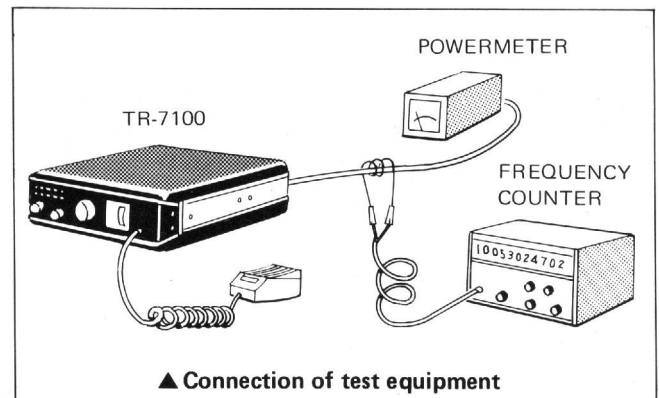
## ADJUSTING OF TRANSMITTER UNIT

### Adjustment of transmitting power

1. Connect a  $50\Omega$  power meter to the ANT terminal and a microphone to the MIC terminal. Proceed to the coarse adjustment of the transmitting power with the power supply at 12 to 12.5V. Then, make the fine adjustment with the supply voltage set at 13.8V.
2. Prepare 3 crystals for a transmitting frequency of 144 MHz (6000 kHz), 145 MHz (6041.6 kHz) and 146 MHz (6083.3 kHz) or their near frequencies respectively. Insert these crystals in the sockets for idle channels.
3. With the CHANNEL selector switch set at the 145 MHz position, place the transmitter unit in the transmitting condition. Adjust trimmer TC17 for the output terminal on the transmitter unit (X56-1000-00) until the power meter reads a maximum output power.
4. Then, finely adjust trimmer TC401~404 in order until the power meter reads a maximum output.
5. With the CHANNEL selector switch turned to the 144 MHz position and then to the 146 MHz position, check to see that the transmitter unit delivers an output power above specified value.
6. Set the power supply voltage at 11.6V and adjust trimmer TC13~17 in order until the transmitter unit provides the outputs with less level differences for transmitting frequencies 144, 145 and 146 MHz. If the outputs provide a conceivable level difference between them, it means the multiplier coils (L1~L13) within the shielded case to set improper adjustments. In this case, readjust the multiplier coils.
7. With the power supply voltage set at 13.8V, check to see that the transmitter unit draws an overall current within 2.1 ~ 2.4 A during transmission. If the transmitter unit fulfills the above, there is no need of having the unit deliver an extremely high output. If the current in unit draws more than 2.4 A owing to an excessive power output, adjust trimmer capacitors TC401 and TC402 to decrease drive to the FINAL UNIT.

### Adjustment of transmitting frequency

1. Approach a detector coil to the frequency counter input.
2. Place the transmitter unit in the transmitting condition with the CHANNEL selector switch set at 4 channel. While observing the frequency counter positioned close to the antenna feeder, adjust trimmer TC3 until the counter reads a frequency of 144.48 MHz. Repeat the above step with the switch set at positions channel 7 and channel 25 until the counter reads frequencies 144.60 and 145.32 MHz, respectively.



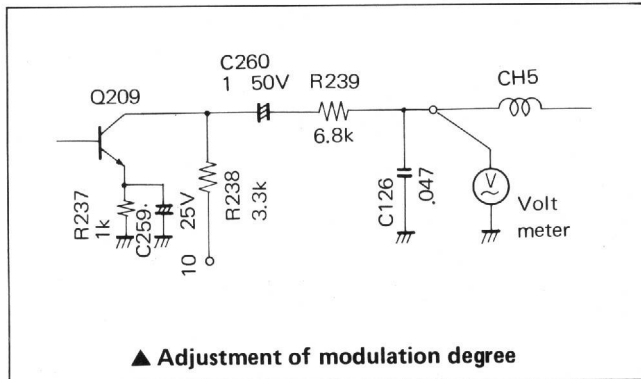
### Adjustment of RF Meter

Place the transmitter unit in the transmitting condition with its power supply voltage at 13.8V. Adjust variable resistor VR202 under the above condition until the S meter gives an indication of 8 to 8.5. If adjustment of variable resistor VR202 fails to make the meter read a value of 8 to 8.5 within the movable range of the resistor, proceed as follows: Take the final unit out of the transceiver case. Try to position the RF detection lead wire closer or away from the low pass filter coil until the meter is coarsely adjusted so that it gives an indication of 8 to 8.5. Then, finely adjust variable resistor VR202 until the meter deflection is set to the above value. (Refer to page 21)

### Adjustment of modulation degree

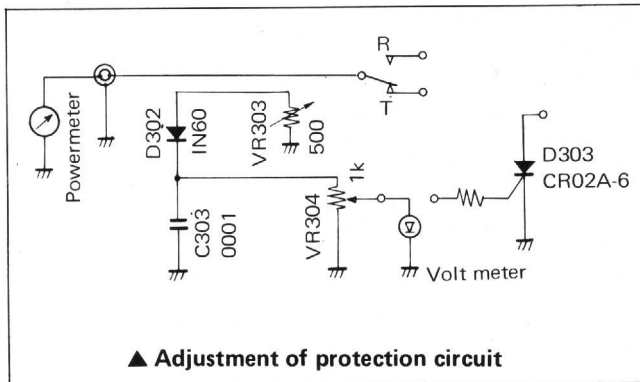
The adjustment of the transmitter unit about its modulation degree depends on the operational conditions of the unit and the individual character of the user. In general, however, the modulation degree of the transmitter unit is adjusted as follows:

First, set up a measuring circuit as shown below with an voltmeter connected to the terminal designated. With the transmitter unit set up so as to diable the carrier oscillator and apply 1 kHz, 4 mV input to the MIC input terminal. Adjust variable resistor VR201 until the meter reads a 100 mV under the above condition.



### Adjustment of protection circuit

Set up a measuring circuit shown below as follows:



1. Disconnect the lead wires soldered from variable resistor VR304 ( 1 k $\Omega$  ) and the check coil respectively. Connect a DC VTVM or a tester to the mid-terminal of variable resistor VR304. Set the VTVM or the tester for a measuring range of 3 ~ 5V.
2. Operate the transmitter unit from a power supply voltage of 12V. With the unit placed in its transmitting condition, adjust variable resistor VR303 (500 $\Omega$ ) until the voltmeter reads the minimum DC voltage developed across diode D302.
3. Then, disconnect the POWER METER from the measuring circuit and open the ANT terminals. With the transmitter unit placed in its transmitting condition, adjust variable resistor VR304 (1 k $\Omega$ ) until the voltmeter reads 1V precisely.

**NOTE:** Note that the above adjustment should be completed within 30 seconds.

4. Solder the disconnected lead wires to the choke coil (L301) and the mid-terminal of variable resistor VR304.
5. While opening and closing the ANT terminals, check to see that the protection circuit operates normally.

## KEY POINTS ON REPAIRS OF TRANSMITTER UNIT

### No transmitting power output

The coil in the final unit (X45-0004-00) brought in touch with the chassis when the final unit is placed in the chassis. (See the page 21)

Improperly contacted relay.

**Voltage values of coils that may be used as a measure for repair of multiplier stage.**

Secondary side of L1	0.3V
Tap of L3 winding	0.7V
Tap of L5 winding	1.1V
Secondary side of L7	1.3V

The above voltage values are those measures at the points specified using an RF vacuum tube voltmeter. (These values are changed if the transmitter circuit is adjusted down to the output stage because of the RF superposed on the above coils.)

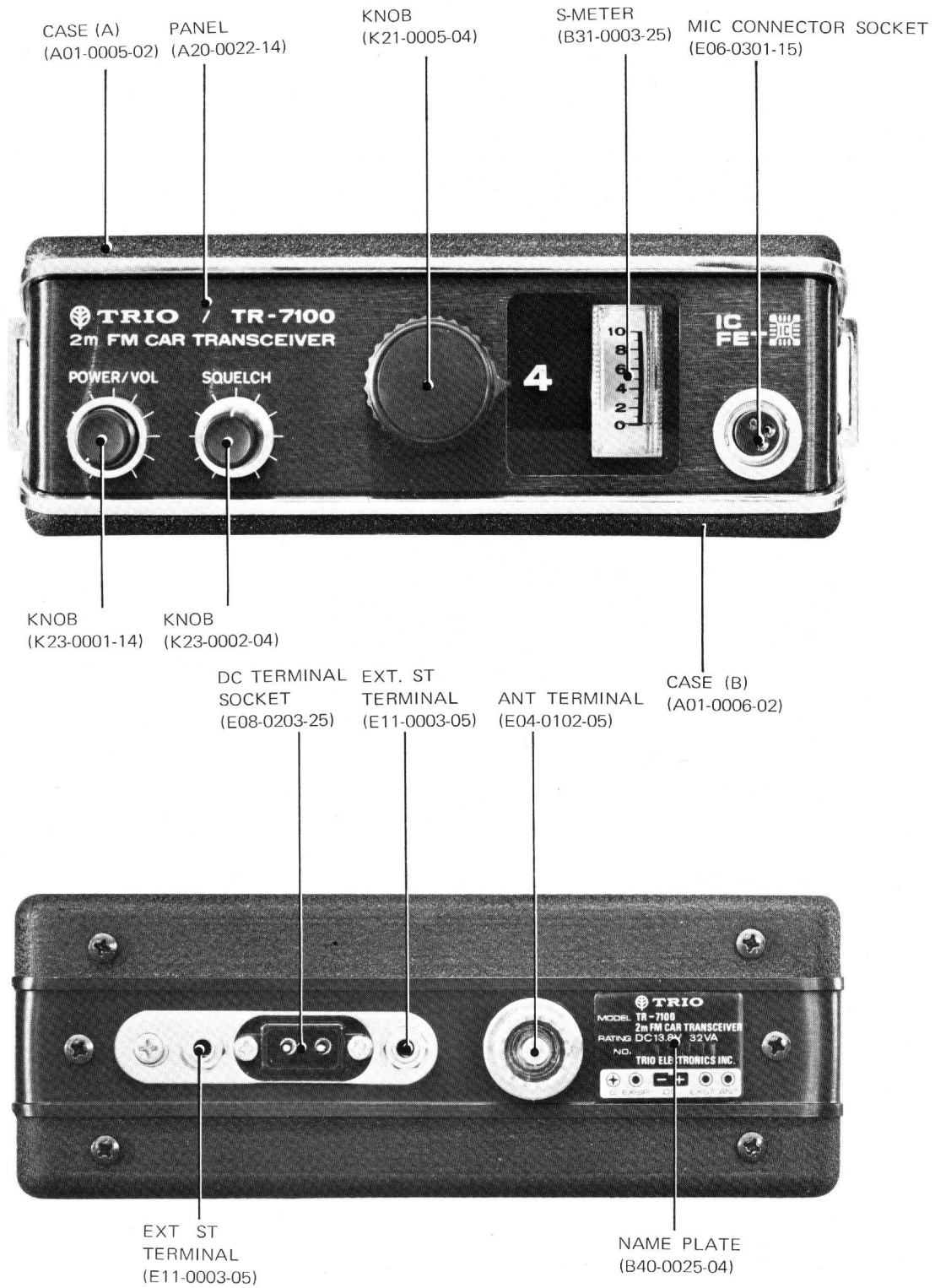
### 144 MHz amplifier unit

Live side of L10	6.2V
Live side of L18	5.6V
Live side of L20	3.2V

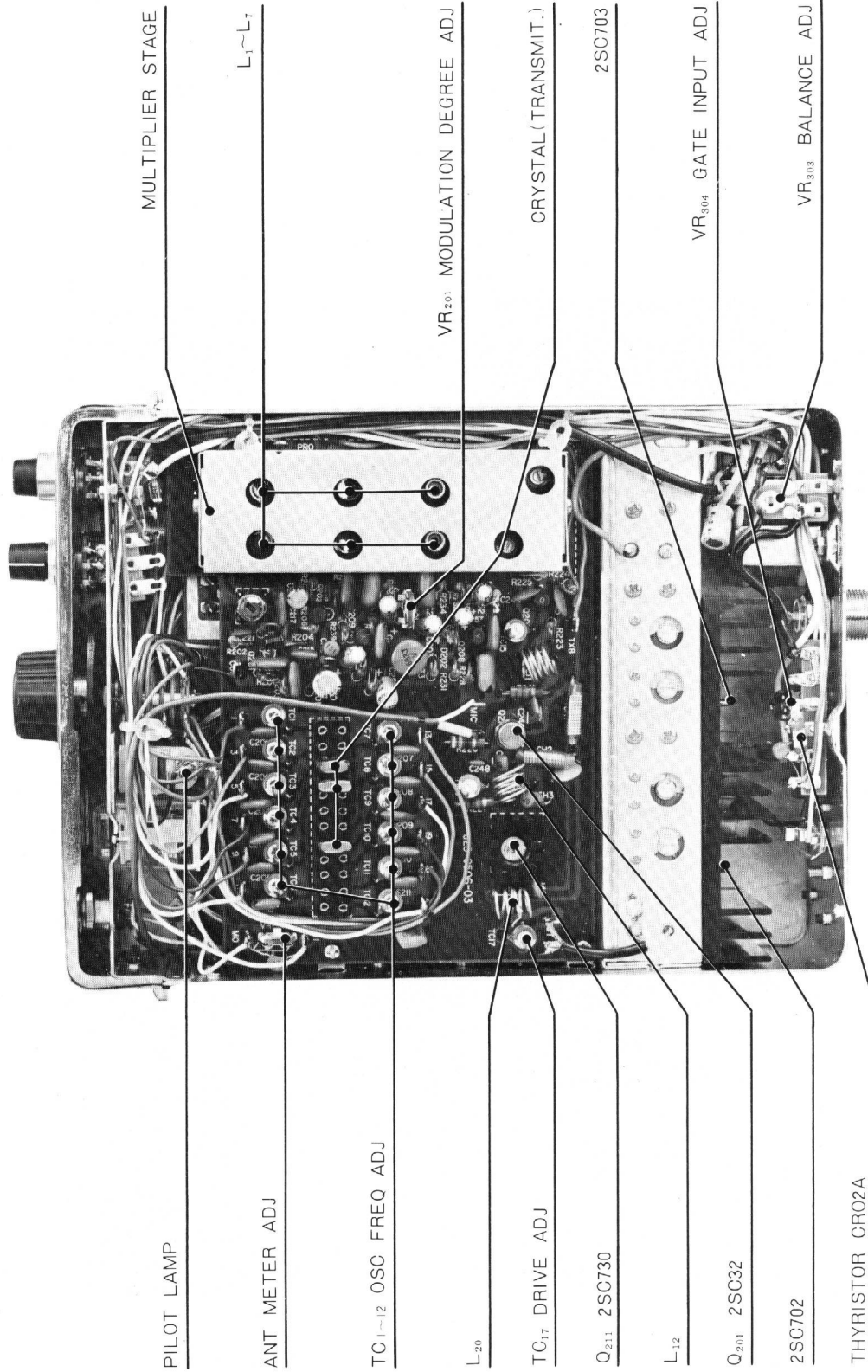
The above voltage values are those measured at the open OUT terminal on X56-1000-00 using an RF vacuum tube voltmeter.



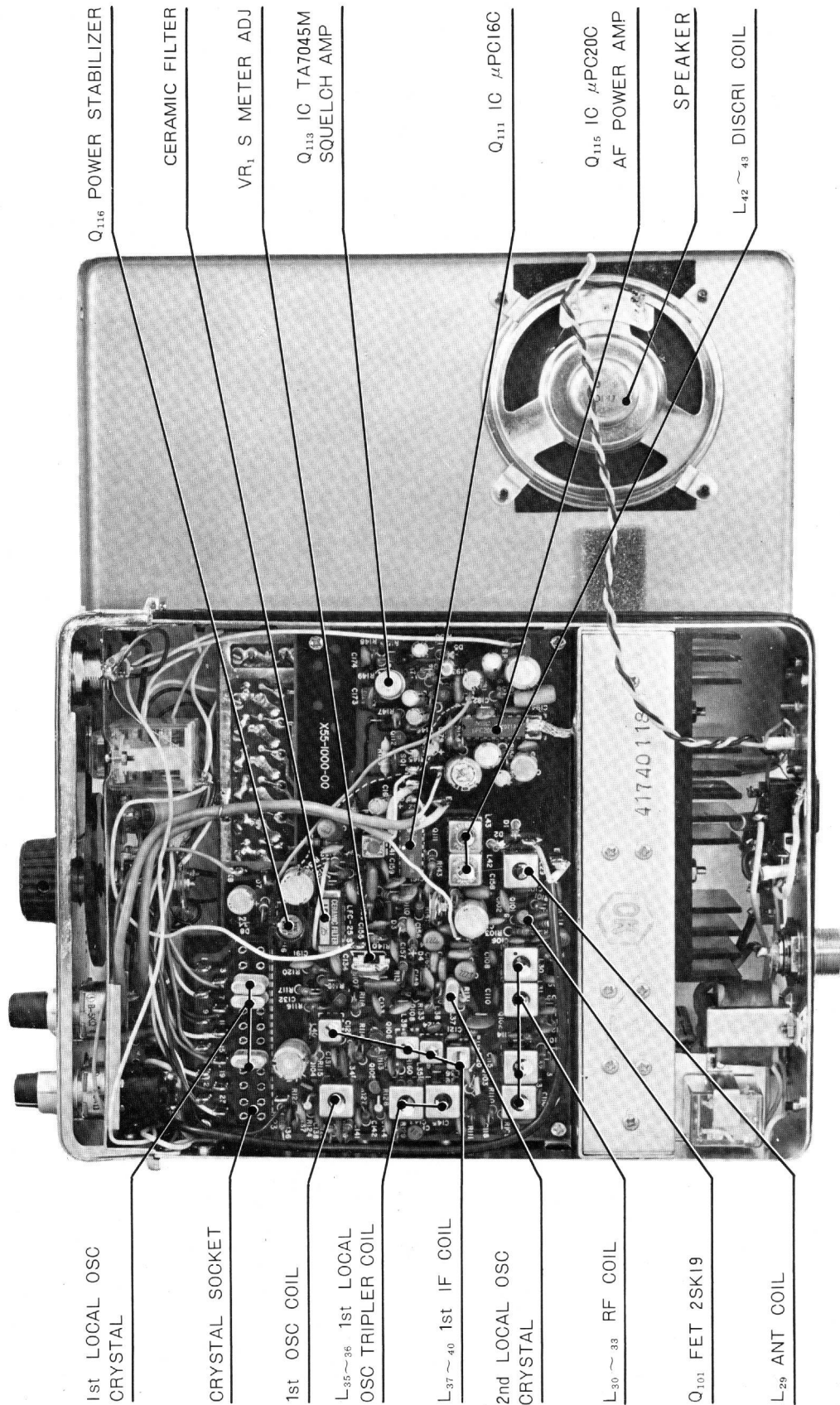
# EXTERNAL VIEW



# TOP CHASSIS VIEW



# BOTTOM CHASSIS VIEW



1st LOCAL OSC  
CRYSTAL

CRYSTAL SOCKET

1st OSC COIL

L-35~36 1st LOCAL  
OSC TRIPLER COIL

L-37~40 1st IF COIL

2nd LOCAL OSC  
CRYSTAL

L-30~33 RF COIL

Q<sub>101</sub> FET 2SK19

L-29 ANT COIL

Q<sub>116</sub> POWER STABILIZER

CERAMIC FILTER

VR<sub>1</sub> S METER ADJ

Q<sub>113</sub> IC TA7045M  
SQUELCH AMP

Q<sub>111</sub> IC  $\mu$ PC16C

Q<sub>115</sub> IC  $\mu$ PC20C  
AF POWER AMP

SPEAKER

L<sub>42</sub>~<sub>43</sub> DISCRI COIL

# RECEIVER UNIT (X55-1000-00) PARTS LIST

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C101	CM92D2H030J	Mica	3pF ±5%
C102	CK94YX1H102K	Ceramic	0.001μF ±10%
C103~105	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C106	CM92D2H070J	Ceramic	7pF ±5%
C107	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C108	CC94SL1H010C	Ceramic	1pF ±0.25pF
C109	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C110	CM92D2H070J	Mica	7pF ±5%
C111~113	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C114	CM92D2H070J	Mica	7pF ±5%
C115	CC94SL1H010C	Ceramic	1pF ±0.25pF
C116	CM92D1H070J	Mica	7pF ±5%
C117,118	CK94YX1E103Z	Ceramic	0.01μF +80% -20%
C120	CK94YX1E103Z	Ceramic	0.01μF +80% -20%
C121	CC94SL1H010C	Ceramic	1pF ±0.25pF
C124	CC94SL1H010C	Ceramic	1pF ±0.25pF
C126	CK94YG1E403Z	Ceramic	0.04μF +80% -20%
C127	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C128	CC94SL1H020C	Ceramic	2pF ±0.25pF
C129	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C131, 132	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C133	CK94YX1H202K	Ceramic	0.002μF ±10%
C134,135	CK94YX1H102K	Ceramic	0.001μF ±10%
C136	CM92D2H470J	Mica	47pF ±5%
C137,138	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C139	CM92D2H220J	Mica	22pF ±5%
C140	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C141,142	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C143	CM92D2H030J	Mica	3pF ±5%
C144	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C145	CC94SL1H020C	Ceramic	2pF ±0.25pF
C146	CM92D2H050J	Mica	5pF ±5%
C147	CM92D2H030J	Mica	3pF ±5%
C148	CK94YX1H102K	Ceramic	0.001μF ±10%
C149	CM92D2H470J	Mica	47pF ±5%
C150	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C151	CM92D2H221J	Mica	220pF ±5%
C152	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C153	CQ92M1H153K	Mylar	0.015μF ±10%
C154	CM92D2H221J	Mica	220pF ±5%
C155	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C156	CK94YX1H102K	Ceramic	0.001μF ±10%
C157~161	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C162,163	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C164	CQ92M1H472K	Mylar	0.0047μF ±10%
C165,166	CQ92M1H682K	Mylar	0.0068μF ±10%
C167,168	CQ92M1H472K	Mylar	0.0047μF ±10%
C169	CE04W1C4R7	PC electrolytic	4.7μF 16WV
C170	CE04W1C101	PC electrolytic	100μF 16WV
C171	CQ92M1H223K	Mylar	0.022μF ±10%
C172	CE04W1C4R7	PC electrolytic	4.7μF 16WV
C173	CQ92M1H223K	Mylar	0.022μF ±10%
C174	CK94YX1H731K	Ceramic	730pF ±10%
C175	CE04W1HR47	PC electrolytic	0.47μF 50WV
C177	CQ92M1H223K	Mylar	0.022μF ±10%
C178	CQ92M1H103K	Mylar	0.01μF ±10%
C179	CE04W1C4R7	PC electrolytic	4.7μF 16WV
C180	CE04W1A470	PC electrolytic	47μF 10WV
C181	CE04W1E100	PC electrolytic	10μF 25WV
C182	CK94YX1H731K	Ceramic	730pF ±10%
C183	CE04W1C101	PC electrolytic	100μF 16WV

## RECEIVER UNIT (X55-1000-00) PARTS LIST

Circuit No.	Parts No.	Description	Remarks
C184	CE04W1A470	PC electrolytic	47 $\mu$ F 10WV
C185	CQ92M1H104K	Mylar	0.1 $\mu$ F $\pm$ 10%
C186	CE04W1E100	PC electrolytic	10 $\mu$ F 25WV
C187	CE04W1C101	PC electrolytic	100 $\mu$ F 16WV
C188	CK94YX1H731K	Ceramic	730pF $\pm$ 10%
C189,190	CE04W1C101	PC electrolytic	100 $\mu$ F 16WV
C191	CK94YG1E203Z	Ceramic	0.02 $\mu$ F +80% -20%
C192	CE04W1C470	PC electrolytic	47 $\mu$ F 16WV
C193	CE04W1H010	PC electrolytic	1 $\mu$ F 50WV
C194	CK94YG1E403Z	Ceramic	0.04 $\mu$ F +80% -20%
C195	CE04W1A100	PC electrolytic	10 $\mu$ F 10WV
C196,197	CK94YG1E203Z	Ceramic	0.02 $\mu$ F +80% -20%
C198	CK94YG1E403Z	Ceramic	0.04 $\mu$ F +80% -20%
C199	CE04W1C4R7	PC electrolytic	4.7 $\mu$ F 16WV
<b>RESISTOR</b>			
R101	PD14CY2E104J	Insulated carbon film	100k $\Omega$ $\pm$ 5% 1/4W
R102	PD14CY2E101J	Insulated carbon film	100 $\Omega$ $\pm$ 5% 1/4W
R103	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R104	PD14CY2E221J	Insulated carbon film	220 $\Omega$ $\pm$ 5% 1/4W
R105	PD14CY2E223J	Insulated carbon film	22k $\Omega$ $\pm$ 5% 1/4W
R106	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R107,108	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R109	PD14CY2E223J	Insulated carbon film	22k $\Omega$ $\pm$ 5% 1/4W
R110	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R111	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R112	PD14BY2E222J	Insulated carbon film	2.2k $\Omega$ $\pm$ 5% 1/4W
R113	PD14CY2E393J	Insulated carbon film	39k $\Omega$ $\pm$ 5% 1/4W
R114,115	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R116	PD14CY2E333J	Insulated carbon film	33k $\Omega$ $\pm$ 5% 1/4W
R117	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R118	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R119	PD14CY2E332J	Insulated carbon film	3.3k $\Omega$ $\pm$ 5% 1/4W
R120,121	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R122	PD14CY2E332J	Insulated carbon film	3.3k $\Omega$ $\pm$ 5% 1/4W
R123	PD14CY2E153J	Insulated carbon film	15k $\Omega$ $\pm$ 5% 1/4W
R124	PD14CY2E561J	Insulated carbon film	560 $\Omega$ $\pm$ 5% 1/4W
R125	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R126	PD14CY2E473J	Insulated carbon film	47k $\Omega$ $\pm$ 5% 1/4W
R127	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R128	PD14CY2E561J	Insulated carbon film	560 $\Omega$ $\pm$ 5% 1/4W
R129	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R130	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R131	PD14CY2E183J	Insulated carbon film	18k $\Omega$ $\pm$ 5% 1/4W
R132,133	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R134	PD14CY2E333J	Insulated carbon film	33k $\Omega$ $\pm$ 5% 1/4W
R135	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R136,137	PD14BY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R138	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R139	PD14CY2E333J	Insulated carbon film	33k $\Omega$ $\pm$ 5% 1/4W
R140	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R141	PD14CY2E472J	Insulated carbon film	4.7k $\Omega$ $\pm$ 5% 1/4W
R142	PD14CY2E471J	Insulated carbon film	470 $\Omega$ $\pm$ 5% 1/4W
R143	PD14CY2E103J	Insulated carbon film	10k $\Omega$ $\pm$ 5% 1/4W
R145	PD14CY2E562J	Insulated carbon film	5.6k $\Omega$ $\pm$ 5% 1/4W
R146	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R147	PD14CY2E103J	Insulated carbon film	10k $\Omega$ $\pm$ 5% 1/4W
R148,149	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R150	PD14CY2E222J	Insulated carbon film	2.2k $\Omega$ $\pm$ 5% 1/4W
R151	PD14CY2E102J	Insulated carbon film	1k $\Omega$ $\pm$ 5% 1/4W
R152	PD14CY2E222J	Insulated carbon film	2.2k $\Omega$ $\pm$ 5% 1/4W
R153	PD14CY2E473J	Insulated carbon film	47k $\Omega$ $\pm$ 5% 1/4W
R154	PD14CY2E104J	Insulated carbon film	100k $\Omega$ $\pm$ 5% 1/4W

# RECEIVER UNIT (X55-1000-00) PARTS LIST

Circuit No.	Parts No.	Description	Remarks
R155	PD14BY2E222J	Insulated carbon film 2.2k $\Omega$ $\pm$ 5% 1/4W	
R156	PD14CY2E102J	Insulated carbon film 1k $\Omega$ $\pm$ 5% 1/4W	
R157	PD14CY2E471J	Insulated carbon film 470 $\Omega$ $\pm$ 5% 1/4W	
R158	PD14CY2E102J	Insulated carbon film 1k $\Omega$ $\pm$ 5% 1/4W	
R159	PD14BY2E333J	Insulated carbon film 3.3k $\Omega$ $\pm$ 5% 1/4W	
R160	PD14CY2E472J	Insulated carbon film 4.7k $\Omega$ $\pm$ 5% 1/4W	
R161	PD14BY2E221J	Insulated carbon film 220 $\Omega$ $\pm$ 5% 1/4W	
<b>SEMICONDUCTOR</b>			
Q101		2SK19 (GR)	
Q102,103		2SC388A (O)	
Q104		2SC535 (B)	
Q105		2SC388A (O)	
Q106,107		2SC371 (O)	
Q108~110		2SC460 (B)	
Q111		$\mu$ PC-16C	
Q112		2SC371 (O)	
Q113		TA7045M	
Q114		2SC371 (O)	
Q115		$\mu$ PC-20C	
Q116		2SD204 (L) or (M)	
D1~6		1N60	
D7		S-1.5-01	
D8		WZ-090	
<b>IFT/COIL</b>			
L29	L34-0009-05	VHF coil (ANT)	
L30	L34-0010-05	VHF coil (RF-A)	
L31	L34-0011-05	VHF coil (RF-B)	
L32	L34-0010-05	VHF coil (RF-A)	
L33	L34-0012-05	VHF coil (RF-C)	
L34	L32-0002-05	OSC coil (44.5MHz)	
L35	L34-0014-05	Trip coil (133.5MHz)	
L36	L34-0013-05	Trip coil (133.5MHz)	
L37~40	L30-0005-05	IFT (10.7MHz)	
L41	L30-0199-05	IFT (455 kHz)	
L42	L30-0200-05	Descri. coil (455kHz)	
L43	L30-0201-05	Descri. coil (455kHz)	
CH1, 2	L33-0086-05	Ferri-inductor	
CH3	L33-0108-05	Ferri-inductor	
CH4, 5	L33-0110-05	Ferri-inductor	
<b>CRYSTAL/FILTER</b>			
XL	L77-0005-05	Crystal oscillator (11.155MHz)	
X1	L77-0006-05	Crystal oscillator (144.48MHz)	
X3	L77-0007-05	Crystal oscillator (144.60MHz)	
X15	L77-0008-05	Crystal oscillator (145.32MHz)	
-	L72-0013-05	Ceramic filter (CFM-455C)	
<b>POTENTIOMETER</b>			
VR1	R12-4006-05	PC trimmer potentiometer 50k $\Omega$ (B)	
VR2	R12-2007-05	PC trimmer potentiometer 5k $\Omega$ (B)	
<b>MISCELLANEOUS</b>			
-	F02-0002-05	Heat sink	
-	E18-2401-05	Crystal holder	

# TRANSMITTER UNIT (X56-1000-00) PARTS LIST

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C201~212	CM92D2H560J	Mica	56pF ±5%
C213,214	CM92D2H471J	Mica	470pF ±5%
C215	CM92D2H680J	Mica	68pF ±5%
C216	CM92D2H331J	Mica	330pF ±5%
C217	CM92D2H050J	Mica	5pF ±5%
C218	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C219	CE04W1E100	PC electrolytic	10μF 25WV
C220	CE04W1C330	PC electrolytic	33μF 16WV
C221	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C222	CM92D2H151J	Mica	150pF ±5%
C223	CK94YX2H102K	Ceramic	0.001μF ±10%
C224,225	CK94YG1E203Z	Ceramic	0.02μF +80% -20%
C226,227	CM92D2H820J	Mica	82pF ±5%
C228	CM92D2H101J	Mica	100pF ±5%
C229,230	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C231,232	CM92D2H330J	Mica	33pF ±5%
C233	CM92D2H101J	Mica	100pF ±5%
C234,235	CK94YX2H102K	Ceramic	0.001μF ±10%
C236	CM92D2H150J	Mica	15pF ±5%
C237	CC94SH1H020C	Ceramic	2pF ±0.25pF
C238	CM92D2H100J	Mica	10pF ±5%
C239	CM92D2H560J	Mica	56pF ±5%
C240,241	CK94YX2H102K	Ceramic	0.001μF ±10%
C243~245	CK94YX2H102K	Ceramic	0.001μF ±10%
C246	CM92D2H330J	Mica	33pF ±5%
C247	CM92D2H120J	Mica	12pF ±5%
C248	CM92D2H050J	Mica	5pF ±5%
C249	CK94YX2H102K	Ceramic	0.001μF ±10%
C250	CQ92M1H473K	Mylar	0.047μF ±10%
C251	CM92D2H101J	Mica	100pF ±5%
C252	CE04W1E3R3	PC electrolytic	3.3μF 25WV
C253,254	CE04W1H010	PC electrolytic	1μF 50WV
C256	CQ92M1H473K	Mylar	0.047μF ±10%
C257	CE04W1H010	PC electrolytic	1μF 50WV
C258	CM92D2H101J	Mica	100pF ±5%
C259	CE04W1E100	PC electrolytic	10μF 25WV
C260	CE04W1H010	PC electrolytic	1μF 50WV
C261	CQ92M1H473K	Mylar	0.047μF ±10%
C262,263	CK94YX2H102K	Ceramic	0.001μF ±10%
C264	CK94YG1E103Z	Ceramic	0.01μF +80% -20%
C265	CE04W1C221	PC electrolytic	220μF 16WV
<b>RESISTOR</b>			
R201	PD14CY2E223J	Insulated carbon film	22kΩ ±5% 1/4W
R202	PD14CY2E472J	Insulated carbon film	4.7kΩ ±5% 1/4W
R203	PD14CY2E102J	Insulated carbon film	1kΩ ±5% 1/4W
R204	PD14CY2E332J	Insulated carbon film	3.3kΩ ±5% 1/4W
R205	PD14CY2E682J	Insulated carbon film	6.8kΩ ±5% 1/4W
R206	PD14CY2E473J	Insulated carbon film	47kΩ ±5% 1/4W
R207,208	PD14CY2E471J	Insulated carbon film	470Ω ±5% 1/4W
R209	PD14CY2E333J	Insulated carbon film	33kΩ ±5% 1/4W
R210	PD14CY2E332J	Insulated carbon film	3.3kΩ ±5% 1/4W
R211	PD14CY2E221J	Insulated carbon film	220Ω ±5% 1/4W
R212	PD14CY2E471J	Insulated carbon film	470Ω ±5% 1/4W
R213	PD14CY2E473J	Insulated carbon film	47kΩ ±5% 1/4W
R214	PD14CY2E472J	Insulated carbon film	4.7kΩ ±5% 1/4W
R215,216	PD14CY2E471J	Insulated carbon film	470Ω ±5% 1/4W
R217	PD14CY2E682J	Insulated carbon film	6.8kΩ ±5% 1/4W
R218	PD14CY2E681J	Insulated carbon film	680Ω ±5% 1/4W
R219	PD14CY2E221J	Insulated carbon film	220Ω ±5% 1/4W
R220	PD14CY2E471J	Insulated carbon film	470Ω ±5% 1/4W

# TRANSMITTER UNIT (X56-1000-00) PARTS LIST

Circuit No.	Parts No.	Description	Remarks
R221	PD14CY2E151J	Insulated carbon film 150Ω ±5% 1/4W	
R222	PD14CY2E330J	Insulated carbon film 33Ω ±5% 1/4W	
R223	PD14CY2E682J	Insulated carbon film 6.8kΩ ±5% 1/4W	
R224	PD14CY2E471J	Insulated carbon film 470Ω ±5% 1/4W	
R225	PD14CY2E470J	Insulated carbon film 47Ω ±5% 1/4W	
R226	RC05GF2H470J	Carbon composition 47Ω ±5% 1/2W	
R227	RC05GF2H101J	Carbon composition 100Ω ±5% 1/2W	
R228	PD14CY2E473J	Insulated carbon film 470kΩ ±5% 1/4W	
R229	PD14CY2E562J	Insulated carbon film 5.6kΩ ±5% 1/4W	
R230	PD14CY2E102J	Insulated carbon film 1kΩ ±5% 1/4W	
R231	PD14CY2E472J	Insulated carbon film 4.7kΩ ±5% 1/4W	
R232	PD14CY2E103J	Insulated carbon film 10kΩ ±5% 1/4W	
R233	PD14CY2E224J	Insulated carbon film 220kΩ ±5% 1/4W	
R234	PD14CY2E103J	Insulated carbon film 10kΩ ±5% 1/4W	
R235	PD14CY2E472J	Insulated carbon film 4.7kΩ ±5% 1/4W	
R236	PD14CY2E223J	Insulated carbon film 22kΩ ±5% 1/4W	
R237	PD14CY2E102J	Insulated carbon film 1kΩ ±5% 1/4W	
R238	PD14CY2E332J	Insulated carbon film 3.3kΩ ±5% 1/4W	
R239	PD14CY2E682J	Insulated carbon film 6.8kΩ ±5% 1/4W	
R240	PD14CY2E103J	Insulated carbon film 10kΩ ±5% 1/4W	
R241	RC05GF2H221J	Carbon composition 220Ω ±5% 1/2W	
<b>SEMICONDUCTOR</b>			
Q201		2SC460 (B)	
Q202~204		2SC373	
Q205~207		2SC384	
Q208,209		2SC733 (Y)	
Q210		2SC32 (4)	
Q211		2SC730	
D201		WZ-090	
D202,203		1N60	
<b>COIL</b>			
L1	L31-0003-04	Tuning coil (6MHz)	
L2	L31-0004-15	Tuning coil (12MHz)	
L3	L31-0005-15	Tuning coil (12MHz)	
L4	L31-0006-25	Tuning coil (24MHz)	
L5	L31-0007-05	Tuning coil (24MHz)	
L6	L31-0008-04	Tuning coil (72MHz)	
L7	L31-0009-04	Tuning coil (72MHz)	
L8, 9	L34-0004-05	VHF coil (A)	
L10	L34-0005-05	VHF coil (B)	
L11	L34-0006-05	VHF coil (C)	
L12, 13	L34-0005-05	VHF coil (B)	
CH1, 2	L33-0074-04	Choke coil	
CH3	L33-0086-05	Ferri-inductor	
CH4	L33-0138-05	Ferri-inductor	
CH5	L33-0098-05	Ferri-inductor	
<b>CRYSTAL</b>			
X1	L77-0002-05	Crystal oscillator (144.48MHz)	
X3	L77-0003-05	Crystal oscillator (144.60MHz)	
X15	L77-0004-05	Crystal oscillator (145.32MHz)	
<b>POTENTIOMETER</b>			
VR201	R12-3012-05	PC trimmer potentiometer 10kΩ (B)	
VR202	R12-5013-05	PC trimmer potentiometer 100kΩ (B)	
<b>MISCELLANEOUS</b>			
-	E18-2401-05	Crystal holder	
-	F02-0001-05	Heat sink hardware	
-	F10-0006-03	Shield plate	
-	F10-0017-04	Shield plate (B)	



# TOTAL PARTS LIST (Y54-0013-01)

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C301	CE04W1C330	PC electrolytic 33 $\mu$ F 16WV	
C302	CK94YG1E103Z	Ceramic 0.01 $\mu$ F +80% -20%	
C303,309	CK94YY1H102M	Ceramic 0.001 $\mu$ F $\pm$ 20%	
<b>RESISTOR</b>			
R301	RC05GF2H6R8J	Carbon composition 6.8 $\Omega$ $\pm$ 5% 1/2W	
<b>SEMICONDUCTOR</b>			
D301		S-1.5-01	
D302		1N60	
D303		CR02A-6	
D304,305		SR1FM2	
<b>POTENTIOMETER</b>			
VR301	R02-2007-05	Potentiometer 5k $\Omega$ (A) with switch	
VR302	R02-2001-05	Potentiometer 5k $\Omega$ (B)	
VR303	R12-0039-05	PC trimmer potentiometer 500 $\Omega$ (B)	
VR304	R12-1012-05	PC trimmer potentiometer 5k $\Omega$ (B)	
<b>MISCELLANEOUS</b>			
-	A01-0005-02	Case (A)	
-	A01-0006-02	Case (B)	
-	A10-0014-12	Chassis	
-	A20-0022-14	Panel	
-	A22-0010-05	Sub panel	
-	A30-0005-33	Dial board	
-	B01-0004-13	Escutcheon	
-	B19-0003-04	Acryl board	
P. L	B30-0002-05	Pilot lamp (12V 3W)	
M	B31-0003-25	S-meter	
-	B40-0025-04	Name plate	
-	B42-0009-04	Passed sticker	
-	B50-0100-00	Instruction manual	
-	D 32-0010-04	Relay stopper	
-	E04-0102-05	ANT terminal	
J5	E06-0301-15	MIC connector socket	
-	E07-0301-25	MIC connector plug	
J4	E08-0203-25	DC terminal socket	
-	E09-0203-15	DC terminal plug	
J2	E11-0003-05	EXT SP terminal	
J3	E11-0003-05	EXT ST terminal	
-	E12-0001-05	Phone plug x 2	
-	E18-0801-05	Relay socket	
F	F05-3022-05	Fuse (3A) x 3	
-	J13-0001-05	Fuse holder	
-	J19-0011-03	7100 holder	
-	J19-0018-04	Mic. hook	
-	K21-0005-04	Knob (SELECTOR)	
-	K23-0001-14	Knob (POWER/VOL)	
-	K23-0002-04	Knob (SQUELCH)	
CH	L15-0001-05	Choke coil	
L301	L33-0025-05	Choke coil	
S1	S01-3010-05	CHANNEL SELECTOR (rotary)	

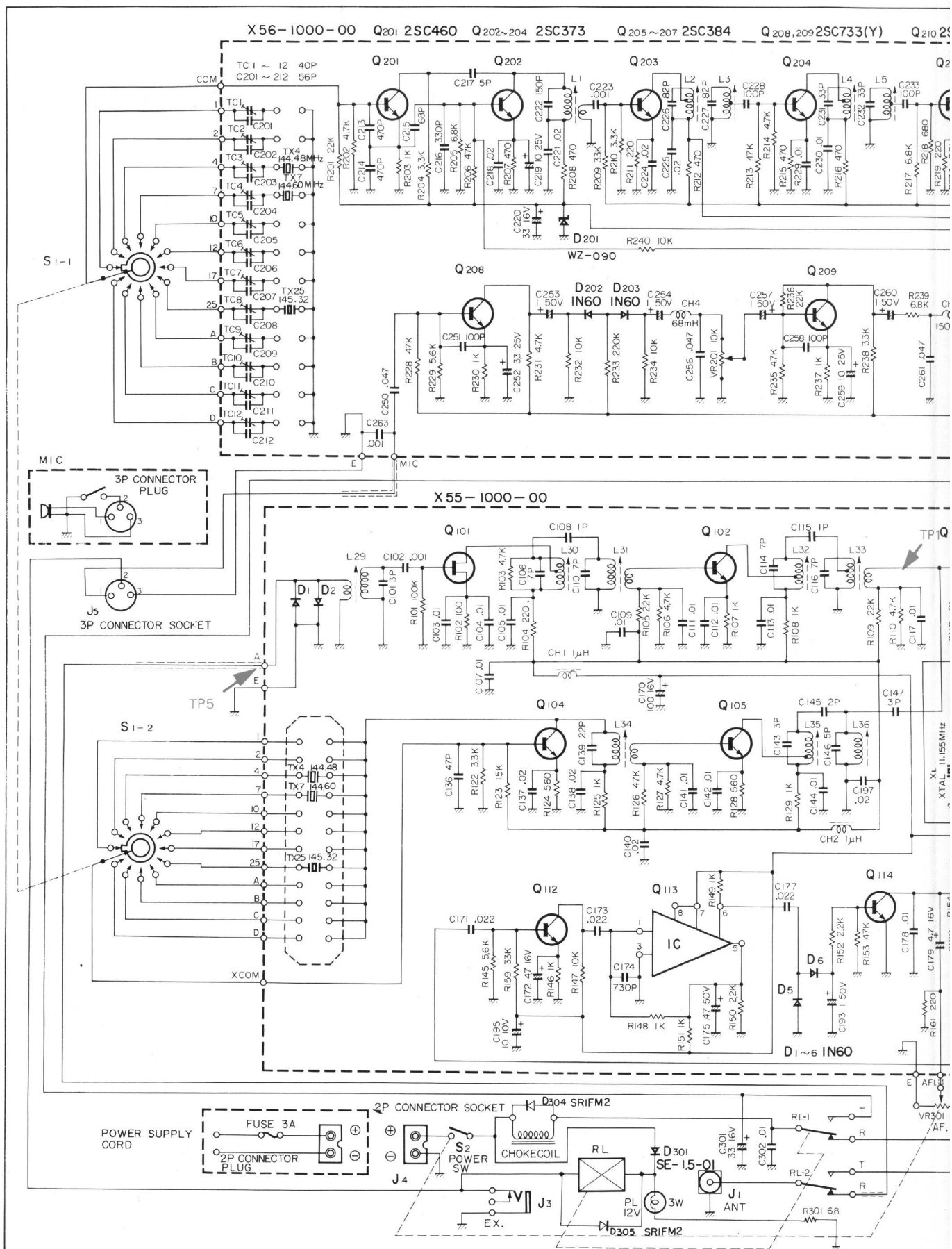
## TOTAL PARTS LIST (Y54-0013-01)

Circuit No.	Parts No.	Description	Remarks
RL	S51-2002-05	Relav	
SP	T03-0003-05	Speaker	
MIC	T91-0001-25	Microphone	
—	X45-0001-00	Final unit	
—	X55-1000-00	Transmitter unit	
—	X56-1000-00	Receiver unit	

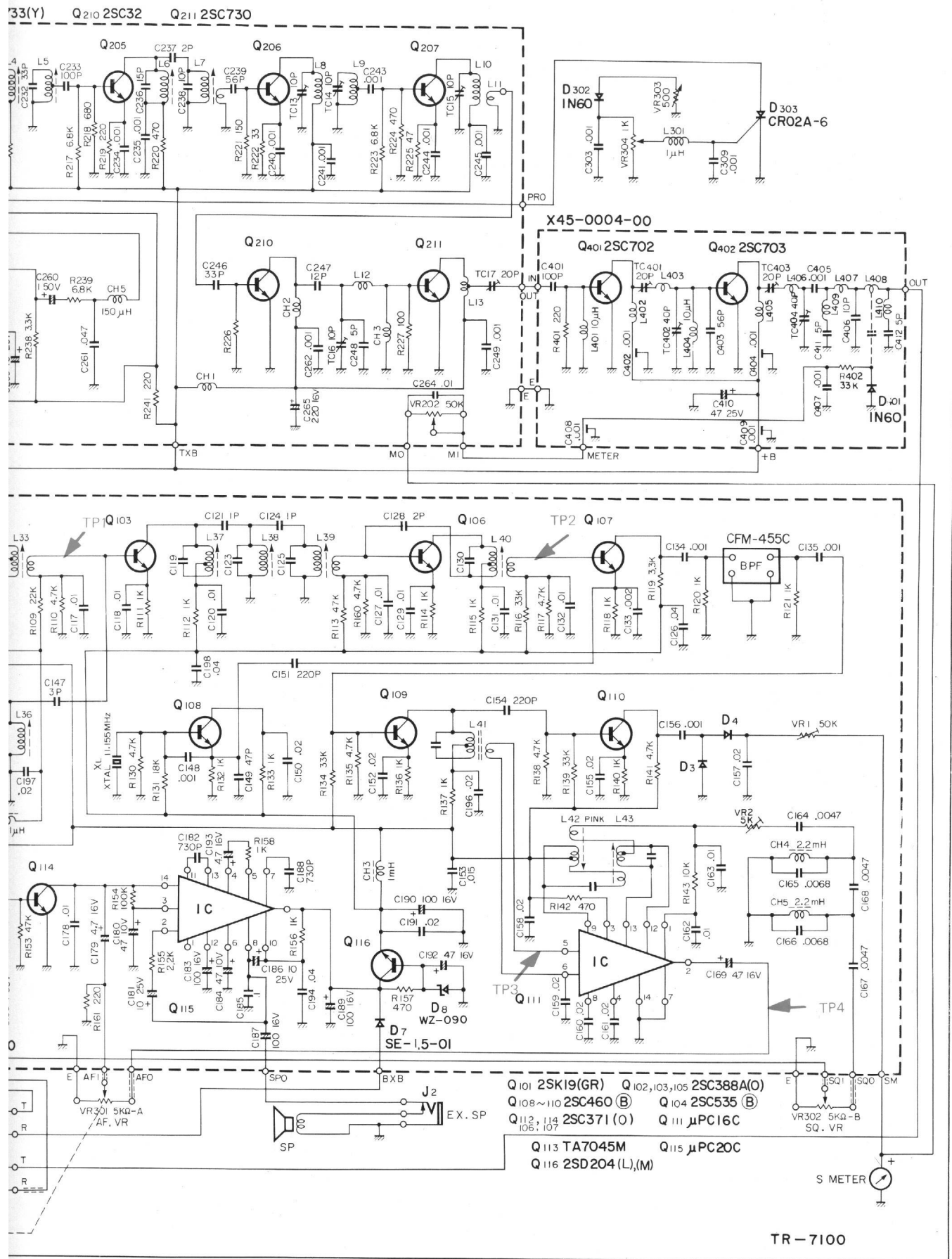
## FINAL UNIT (X45-1000-00) PART LIST

Circuit No.	Parts No.	Description	Remarks
<b>CAPACITOR</b>			
C401	CM93D2H101J(Z)	Mica 100pF ±5%	
C402	CK41Y2Z2H102P	Ceramic 0.001μF +100% -0%	
C403	CM93D2H560J(Z)	Mica 56pF ±5%	
C404	CK41Y2Z2H102P	Ceramic 0.001μF +100% -0%	
C405	CK94YR2H102K	Ceramic 0.001μF ±10%	
C406	CC94SL2H 100D	Ceramic 10pF ±0.5pF	
C407	CK94YR2H102K	Ceramic 0.001μF ±10%	
C408,409	CK41Y2Z2H102P	Ceramic 0.001μF +100% -0%	
C410	CE04W1E470	PC electrolytic 47μF 25WV	
C411,412	CC94SL2H050D	Ceramic 5pF ±0.5pF	
<b>RESISTOR</b>			
R401	RC05GF2H221K	Carbon composition 220Ω ±10% 1/2W	
R402	RC05GF2H333K	Carbon composition 33kΩ ±10% 1/2W	
<b>SEMICONDUCTOR</b>			
Q401		2SC702	
Q402		2SC703	
D401		1N60	
<b>TRIMMER</b>			
TC401	C05-0001-05	Trimmer (20pF)	
TC402	C05-0002-05	Trimmer (40pF)	
TC403	C05-0001-05	Trimmer (20pF)	
TC404	C05-0002-05	Trimmer (40pF)	
<b>COIL</b>			
L401	L33-0089-05	Ferri-inductor	
L402	L33-0074-05	Choke coil	
L403	L34-0007-05	VHF coil	
L404	L33-0089-05	Ferri-inductor	
L405	L33-0074-05	Choke coil	
L406	L34-0007-05	VHF coil	
L407,408	L34-0008-15	VHF coil	
L409,410	L34-0052-05	VHF coil	
<b>MISCELLANEOUS</b>			
—	A11-0002-23	Chassis	
—	F01-0002-04	Heat sink	
—	F10-0007-24	Shield plate	

# SCHEMATIC



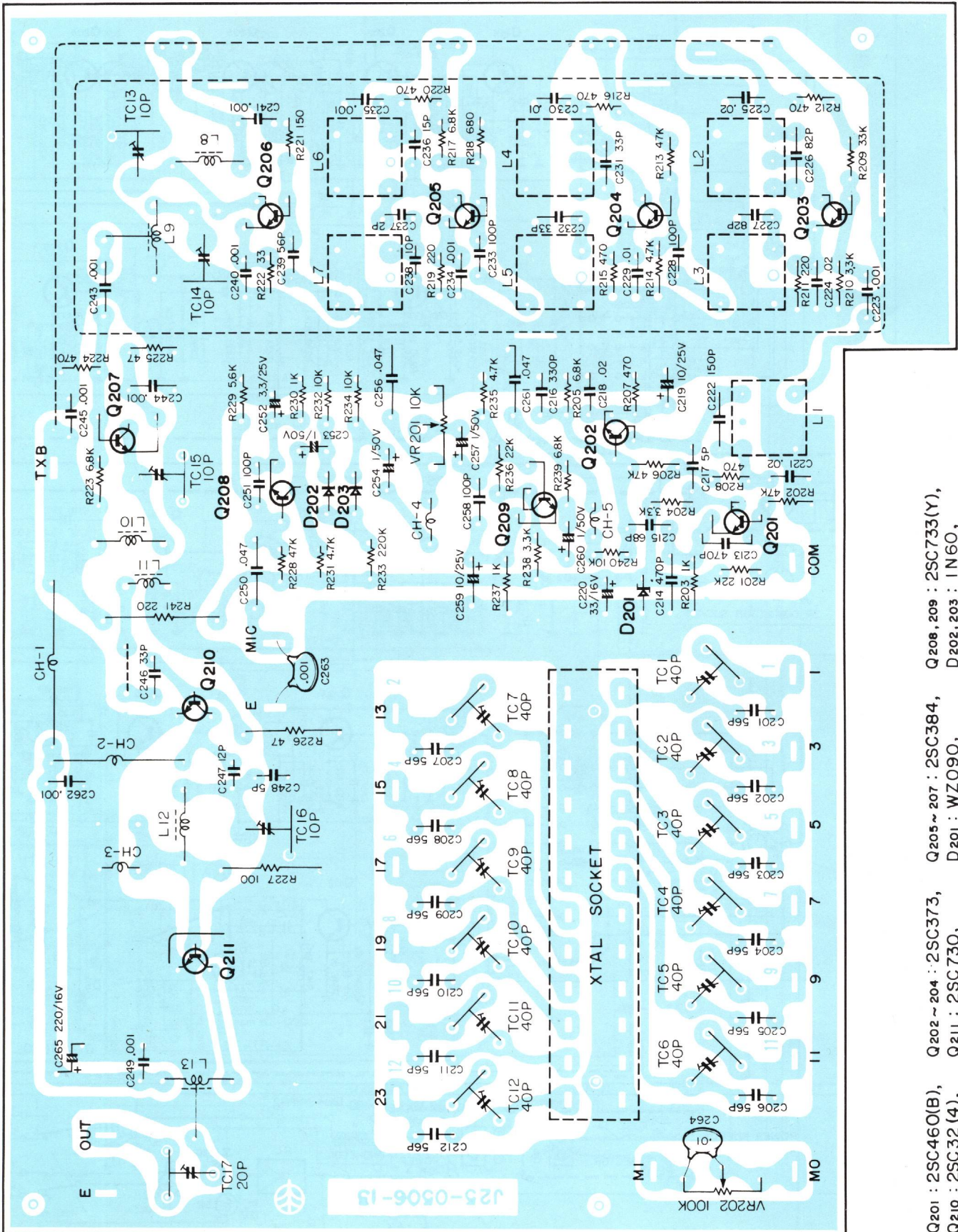
# SCHEMATIC DIAGRAM



TR-7100

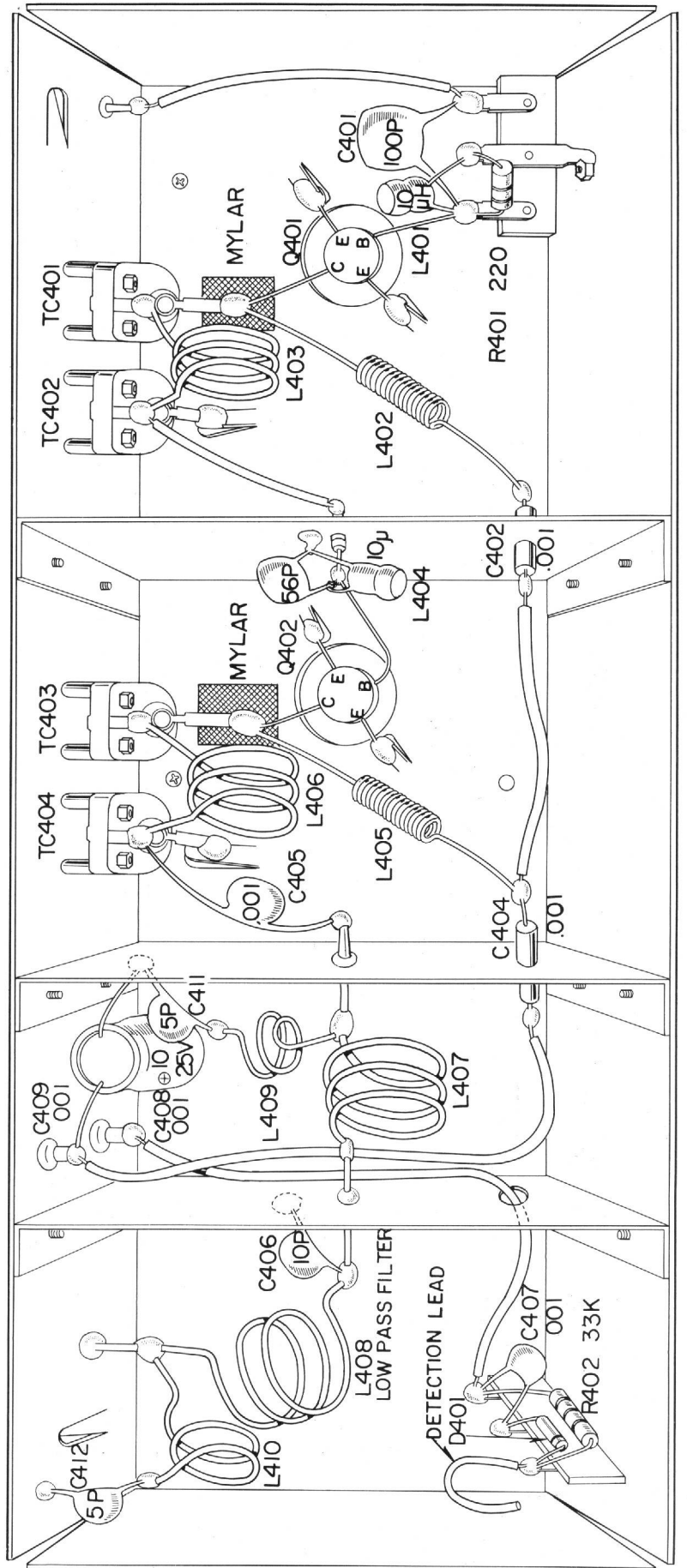


▼ Transmitter unit (X56-1000-00)

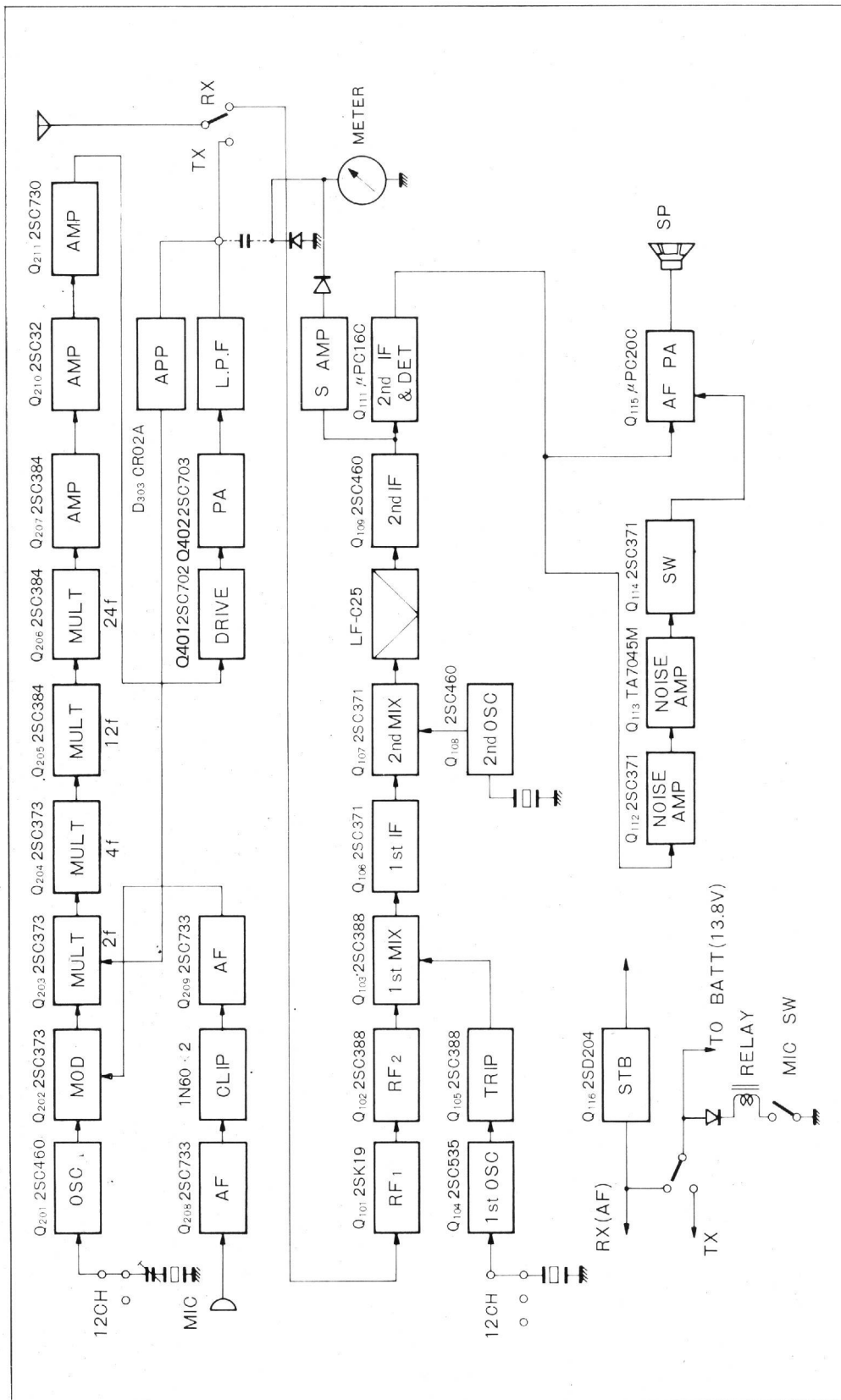


Q201 : 2SC460(B), Q202~204 : 2SC373, Q205~207 : 2SC384, Q208, 209 : 2SC733(Y),  
 Q210 : 2SC32(4), Q211 : 2SC730, Q212 : WZ090, D201, 203 : 1N60,

► Final unit (X45-0004-00)



# BLOCK DIAGRAM







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Manufactured by TRIO ELECTRONICS INC., TOKYO, JAPAN.