INSTRUCTION MANUAL

FTV-107R

YAESU MUSEN CO , LTD.

TOKYO JAPAN.

IMPORTANT NOTE

Your Yaesu equipment is backed by a warranty that guarantees your set to be free of defects. Take a few minutes to read the warranty card carefully. Make certain that you fill out the card completely, and mail it at once, in order to qualify for warranty service.

Warranty service is to be performed by the dealer from whom the equipment was purchased. Do not return the equipment to Yaesu for servicing without first getting a service authorization from the Yaesu Service Center. Estimates of the approximate cost to repair are available upon request.

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SPECIFICATIONS

TRANSMITTER:

Input frequency:
28 MHz to 30 MHz

Input level:
0.22 volts (rms) max.

Input impedance:
50 ohms

Power input:
20 watts DC (SSB, CW, FSK)
5 watts DC (AM)

Transmit frequency range:
50 MHz to 54 MHz*
144 MHz to 148 MHz*
430 MHz to 440 MHz*

Output impedance:
50 ohms

Spurious radiation:
Better than 60 dB down

RECEIVER:

Receiver frequency range:
50 MHz to 54 MHz*
144 MHz to 148 MHz*
430 MHz to 440 MHz*

Antenna input impedance:
50 ohms

Sensitivity:
0.25 μV for S/N 10 dB (SSB, CW, FSK)**
1.0 μV for S/N 10 dB (AM)**

Output frequency range:
28 MHz to 30 MHz

Output impedance:
50 ohms

POWER SUPPLY:

Current consumption:
3.5 amps

GENERAL:

Size:
216 (W) x 129 (H) x 370 (D) mm

Weight:
4.5 kg. (with 2 units installed)

*50, 144, 430 MHz units optional. 430 MHz and 50 MHz or 144 MHz units may be installed. 50 MHz and 144 MHz units may not be installed together in FTV-107R.
**When used with FT-107M.

YAESU
FTV-107R
VHF/UHF TRANSVERTER

GENERAL

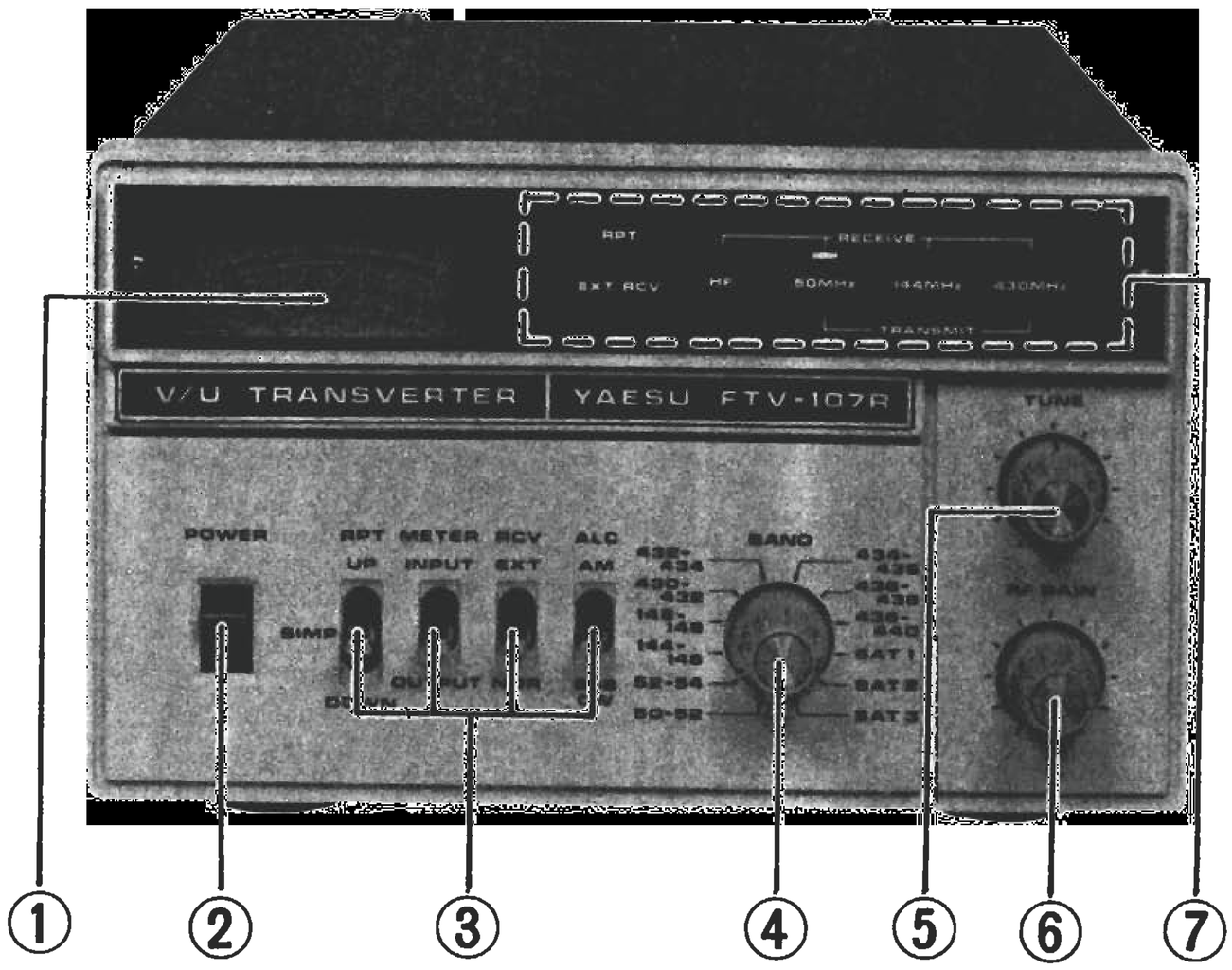
The FTV-107R is an all-new transverter for the FT-107M series, capable of operation on the 50, 144, and 430 MHz bands. The basic unit comes equipped with all control circuitry, and the 430 MHz and either the 50 MHz or 144 MHz unit may be installed as options. Power input is 20 watts DC on all bands.

For satellite operators, three satellite bands are provided, allowing full duplex operation through the transverter, using an external receiver in addition to the FT-107M. The operator may transmit on 145 MHz while listening on 29 MHz or 435 MHz, or transmit on 435 MHz while listening on 145 MHz.

The FTV-107R includes repeater split on all repeater bands within its operating range, for operation on the many SSB repeaters that are emerging. Fully solid state, the FTV-107R includes protection for the final amplifier transistors against damage caused by high SWR. Spurious radiation is at least 60 dB down.

The owner is urged to read this manual in its entirety, so as to become better acquainted with the exciting new FTV-107R. With proper care in operation, this equipment will provide many years of trouble-free operation.

FRONT PANEL CONTROLS AND SWITCHES



(1) METER

According to the position of the METER switch, the front panel meter displays either the input or output relative power level.

(2) POWER

This is the main power ON/OFF switch. When the switch is set to OFF, the HF antenna is automatically fed through to the transceiver.

(3) FUNCTION SWITCHES

SHIFT—This switch selects UP or DOWN repeater shift, or simplex operation. See the "OPERATION" section for details.

METER—The METER switch selects indication of the relative input or output power level on the front panel meter.

RCV—This switch allows selection of receive operation using the FT-107M transceiver (NOR) or an external receiver (EXT) (for satellite work, etc.).

ALC—This switch selects the proper ALC action for the mode in use. For SSB and CW, use the lower position, and for AM use the upper position.

(4) BAND

For six or two meter operation, two bands are provided. These allow 4 MHz of coverage in conjunction with the four 500 kHz ranges of the FT-107M 10 meter band. For 430 MHz operation, 5 bands are provided, allowing operation on 10 MHz of the band (430–440 MHz).

The SAT. 1 band is used for OSCAR Mode A, with TX on 145 MHz, and RX on 29 MHz. The SAT. 2 band is used for OSCAR Mode B, with TX on 435 MHz and RX on 145 MHz. The SAT. 3 band is for OSCAR Mode J, with TX on 145 MHz and RX on 435 MHz.

(5) TUNE

For 50 or 144 MHz operation, this control peaks the transmit and receive circuits for maximum performance. On 430 MHz, the tuned circuits of the transverter are preset, and no tuning is required.

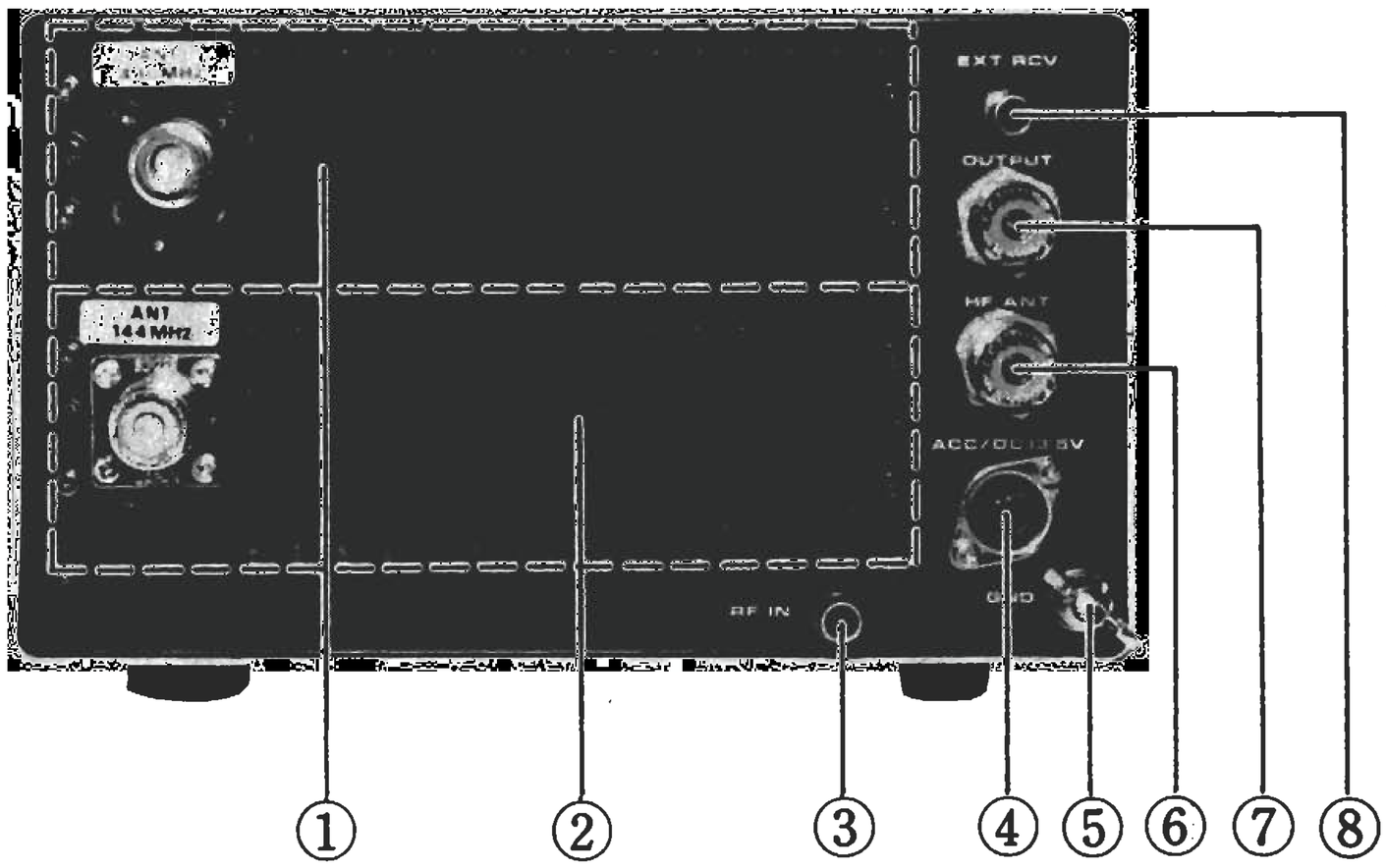
(6) RF GAIN

For 50 or 144 MHz operation, this control varies the gain of the RF amplifier stage.

(7) INDICATORS

These lamps indicate the band and mode of operation, in conjunction with the selection performed by the front panel switches.

REAR APRON



(1) 430 MHz UNIT (OPTION)

When the optional 430 MHz unit is obtained, it must be installed in the upper rack of the FTV-107R.

(2) 50/144 MHz UNIT (OPTION)

The bottom rack is for installation of either the 50 MHz Unit or the 144 MHz Unit. The 50 MHz Unit and the 144 MHz Unit cannot both be installed in the same FTV-107R.

(3) RF IN

This RCA jack is for connection to the FT-107R RF OUT jack. Use the supplied "Cable A" for

designed to handle the high power output from an amplifier.

(7) OUTPUT

This jack should be connected to the FT-107M ANT jack. When the transverter is turned off, the transceiver output will be fed through to the HF antenna.

(8) EXT RCV

This RCA jack is for connection to the antenna connector of an external receiver. When the RCV switch is set to EXT, the 28–30 MHz output from the receive converters will be fed through to the

INSTALLATION

Open the packing carton carefully, and save the packing material for possible use at a later date. Inspect the FTV-107R for any signs of damage in shipment. If there is visible damage, contact the shipping company immediately, and document the damage thoroughly.

Refer to the drawings for details of the proper interconnection procedure for the FTV-107R and your station equipment. Note that the input impedance for the FTV-107R is 50 ohms, and the maximum permissible input level is 0.22V RMS. Therefore, if you are using a transmitter other than the FT-107M, be certain not to exceed these specifications.

The transverter may be installed in any position without loss of performance. The only constraints regarding installation involve air circulation: the transverter should be located where there is free passage of air around the cabinet and heat sinks.

The FTV-107R must be connected to a good earth ground. Use the shortest possible lead for the connection to the station ground buss, and use only a heavy, braided cable for the ground connection. The supplied "Cable D" may be used for connection between the FTV-107R and the FT-107M. The transceiver may, in turn, be connected to the station ground buss.

When using a linear amplifier for HF operations, please use the relay contacts provided on the ACC 1 jack for relay control. The ACC 2 jack will then be used for transverter control, as shown in the drawings.

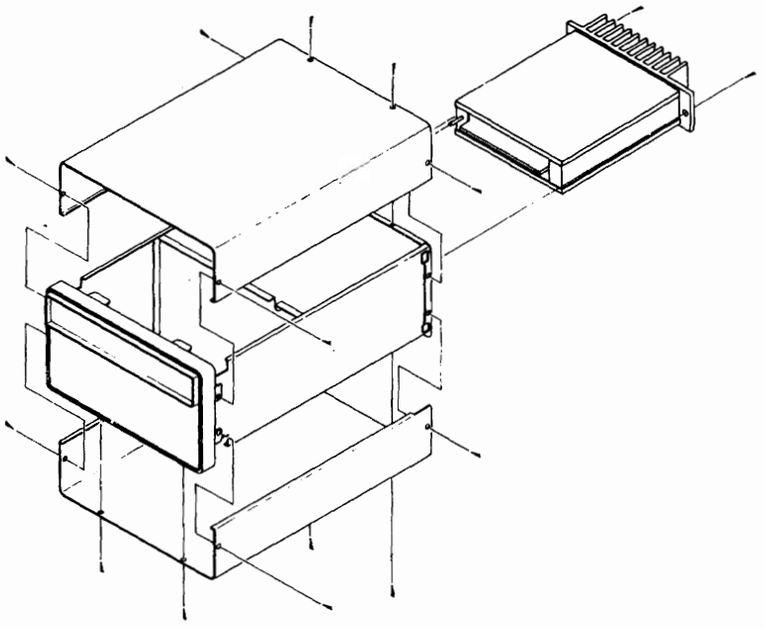
ANTENNA CONSIDERATIONS

The antenna installation is of critical importance in VHF and UHF installations. For satellite and moonbounce applications, height above ground is not as critical as is the case with local FM communications. A minimum distance of ten feet should be maintained between HF and VHF antennas. In all installations, the antenna should be clear of surrounding objects, if the desired pattern is to be obtained.

Do not economize on coaxial cable, as some "bargain" cables have very poor shield coverage. This may degrade performance significantly. For the 430 MHz antenna, please use a type N connector, as this type provides a constant impedance on the antenna line. For short coaxial runs, we recommend type RG8A/U coax. For very long runs, type RG-17A/U, aluminum-jacketed "foamflex" coax, or air-dielectric "heliax" cables may be used, owing to their very low losses. The SWR on the feedline should be kept below 2:1 at all times, to minimize feedline losses.

INSTALLATION OF OPTIONAL MODULES

1. Remove the top and/or bottom cover of the transverter, to allow precise insertion of the unit to be installed.
2. Carefully slide the module into the correct position Do not force the connection.
3. Replace the cabinet covers. Installation is now complete. The module has been carefully aligned at the factory.



OPERATION

The tuning procedure for the FTV-107R is not complicated. However, care should be observed in operation, so as not to exceed the ratings of the transverter and the HF transceiver. It is assumed that the proper interconnections have been performed, as described on page 7.

The following discussion is tailored to a fully-equipped FTV-107R, with both units installed. The reader should note that the plug-in units are optional on the standard FTV-107R. The word "option" will hereafter be omitted in the interest of brevity.

INITIAL CHECK

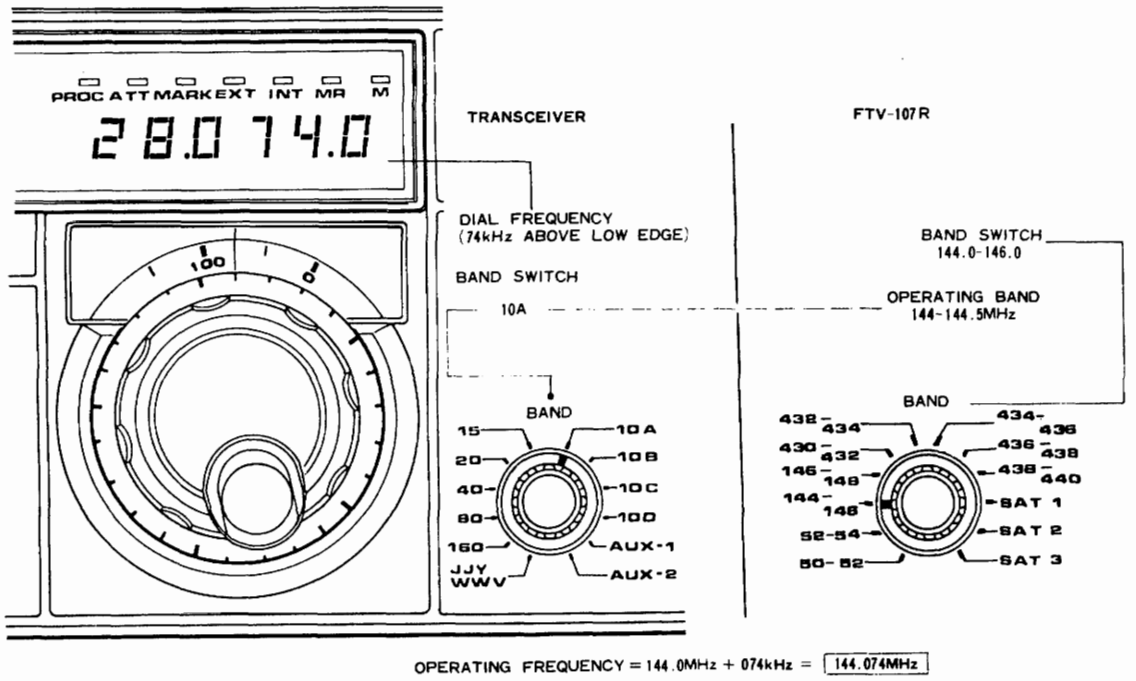
Before turning the FTV-107R and FT-107M on, check all switches for normal, smooth action. Recheck the interconnections between the HF equipment, the antenna system, and the transverter.

FREQUENCY SELECTION

The operating frequency is determined by the position of the main tuning dial and bandswitch of the transceiver, as well as the position of the transverter bandswitch. Please refer to the frequency chart below.

FREQUENCY COVERAGE CHART

FTV-107R BANDSWITCH	HF TRANSCEIVER BANDSWITCH		10A 28.0-28.5	10B 28.5-29.0	10C 29.0-29.5	10D 29.5-30.0	
	50-52		50.0-50.5	50.5-51.0	51.0-51.5	51.5-52.0	
	52-54		52.0-52.5	52.5-53.0	53.0-53.5	53.5-54.0	
	144-146		144.0-144.5	144.5-145.0	145.0-145.5	145.5-146.0	
	146-148		146.0-146.5	146.5-147.0	147.0-147.5	147.5-148.0	
	430-432		430.0-430.5	430.5-431.0	431.0-431.5	431.5-432.0	
	432-434		432.0-432.5	432.5-433.0	433.0-433.5	433.5-434.0	
	434-436		434.0-434.5	434.5-435.0	435.0-435.5	435.5-436.0	
	436-438		436.0-436.5	436.5-437.0	437.0-437.5	437.5-438.0	
	438-440		438.0-438.5	438.5-439.0	439.0-439.5	439.5-440.0	
	SAT. 1	TX	144.0-144.5	144.5-145.0	145.0-145.5	145.5-146.0	USB
		RX	28.0-28.5	28.5-29.0	29.0-29.5	29.5-30.0	USB
	SAT. 2	TX	432.0-432.5	432.5-433.0	433.0-433.5	433.5-434.0	USB
		RX	144.0-144.5	144.5-145.0	145.0-145.5	145.5-146.0	LSB
	SAT. 3	TX	144.0-144.5	144.5-145.0	145.0-145.5	145.5-146.0	USB
		RX	434.0-434.5	434.5-435.0	435.0-435.5	435.5-436.0	LSB



OPERATING FREQUENCY = 144.0MHz + 074kHz = 144.074MHz

CRYSTAL DATA : FTV-107R

FUNCTION		HOLDER	RANGE (MHz)	MODE	LOAD C	EFFECTIVE RESISTANCE	DRIVE LEVEL
50 MHz	X_{201}	HC-18/U	22.0	Fundamental	19 pF	15 Ω	2 mW
	X_{202}	"	24.0	"	"	"	"
	X_{203}	HC-25/U	23.0	"	"	"	"
	X_{205}	"	21.0	"	"	"	"
144 MHz	X_{601}	HC-18/U	38.666··	3rd overtone	15 pF	25 Ω	"
	X_{602}	"	39.333··	"	"	"	"
	X_{603}	HC-25/U	38.866··	"	"	"	"
	X_{604}	"	39.533··	"	"	"	"
	X_{605}	"	38.466··	"	"	"	"
	X_{606}	"	39.133··	"	"	"	"
430 MHz	X_{1601}	HC-25/U	67.000	"	23.5 pF	40 Ω	0.5 mW
	X_{1602}	"	67.333··	"	"	"	"
	X_{1603}	"	67.666··	"	"	"	"
	X_{1604}	"	68.000	"	"	"	"
	X_{1605}	"	68.333··	"	"	"	"
	X_{1606} (1.6MHz DOWN)	"	67.400	"	"	"	"
	X_{1606} (7.6MHz DOWN)	"	67.066··	"	"	"	"

BAND	50MHz			
RANGE	50–52	52–54	50–52 (1MHz DOWN)	52–54 (1MHz DOWN)
LOCAL FREQUENCY	22MHz (x1)	24MHz (x1)	23MHz (x1)	21MHz (x1)
OSC. FREQUENCY	22MHz ☆	24MHz ☆	23MHz ☆	21MHz ☆

BAND	144MHz					
RANGE	144–146	146–148	144–146 (600kHz UP)	144–146 (600kHz DOWN)	146–148 (600kHz UP)	146–148 (600kHz DOWN)
LOCAL FREQUENCY	116MHz (x3)	118MHz (x3)	116.6MHz (x3)	115.4MHz (x3)	118.6MHz (x3)	117.4MHz (x3)
OSC. FREQUENCY	38.666···MHz ▲	39.333···MHz ▲	38.866···MHz ▲	38.466···MHz ▲	39.533···MHz ▲	39.133···MHz ▲

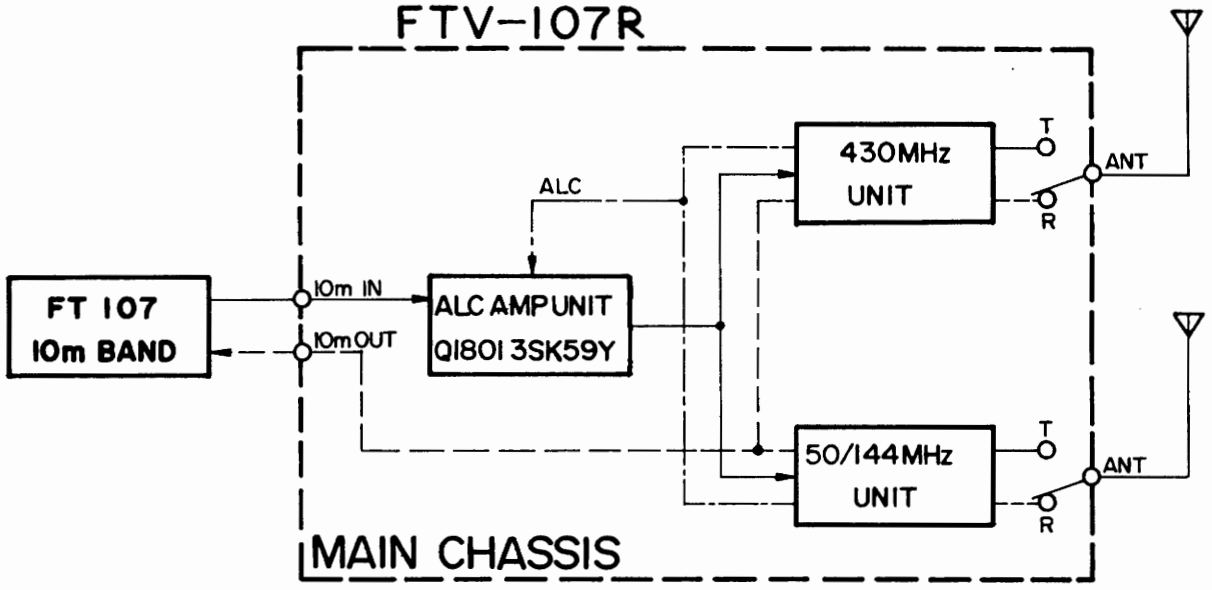
BAND	430MHz						
RANGE	430–432	432–434	434–436	436–438	438–440	434–436 (1.6MHz DOWN)	438–440 (7.6MHz DOWN)
LOCAL FREQUENCY	402MHz (x3x2)	404MHz (x3x2)	406MHz (x3x2)	408MHz (x3x2)	410MHz (x3x2)	404.4MHz (x3x2)	402.4MHz (x3x2)
OSC. FREQUENCY	67.000MHz ▲	67.333···MHz▲	67.666···MHz▲	68.000MHz ▲	68.333···MHz▲	67.400MHz ▲	67.066···MHz▲

☆ FUNDAMENTAL

▲ THIRD OVERTONE

CIRCUIT DESCRIPTION

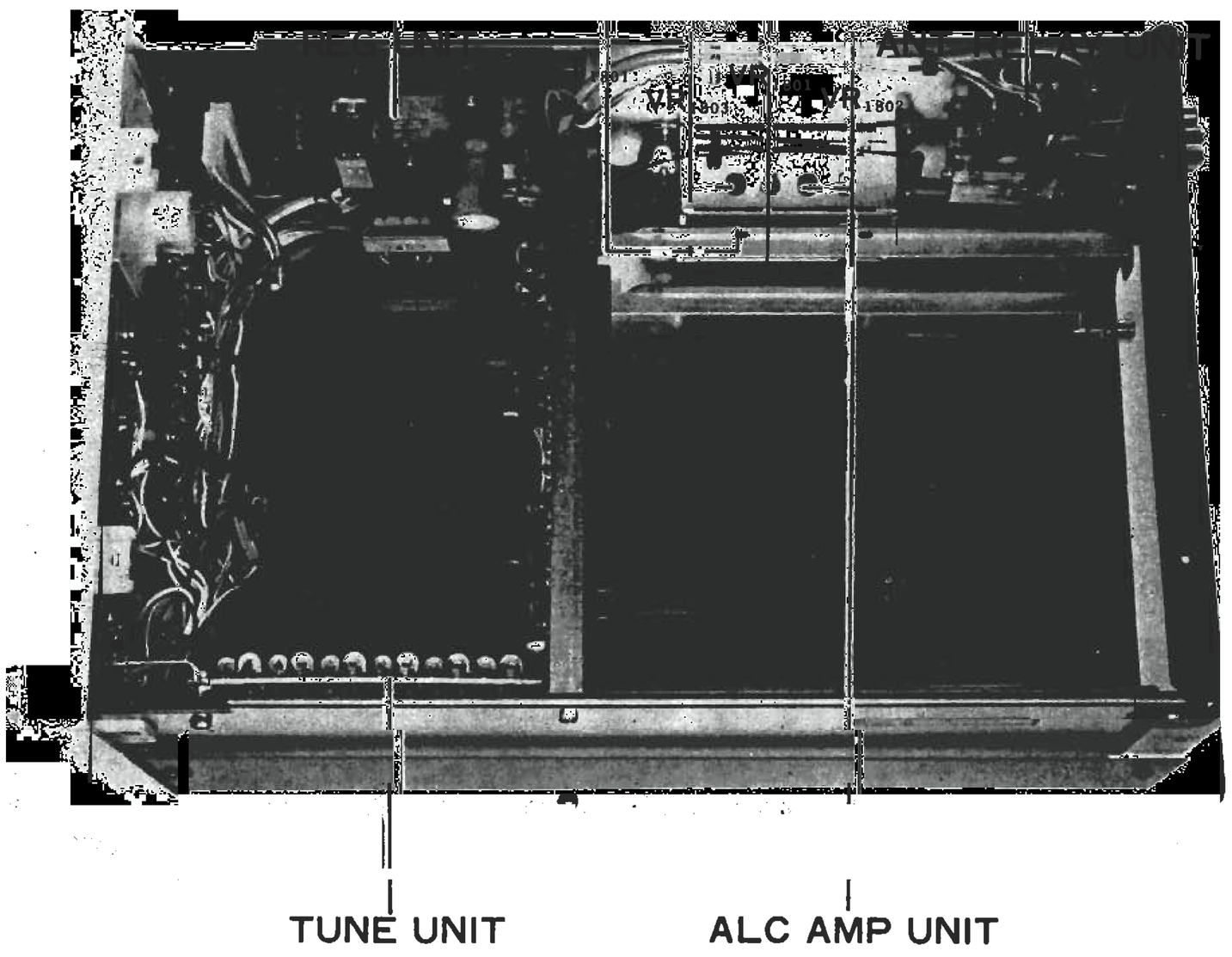
The circuit description to follow should help you understand the operation of the FTV-107R transverter. Follow the block diagrams while reading this discussion, and refer to the schematic dagram for specific details.

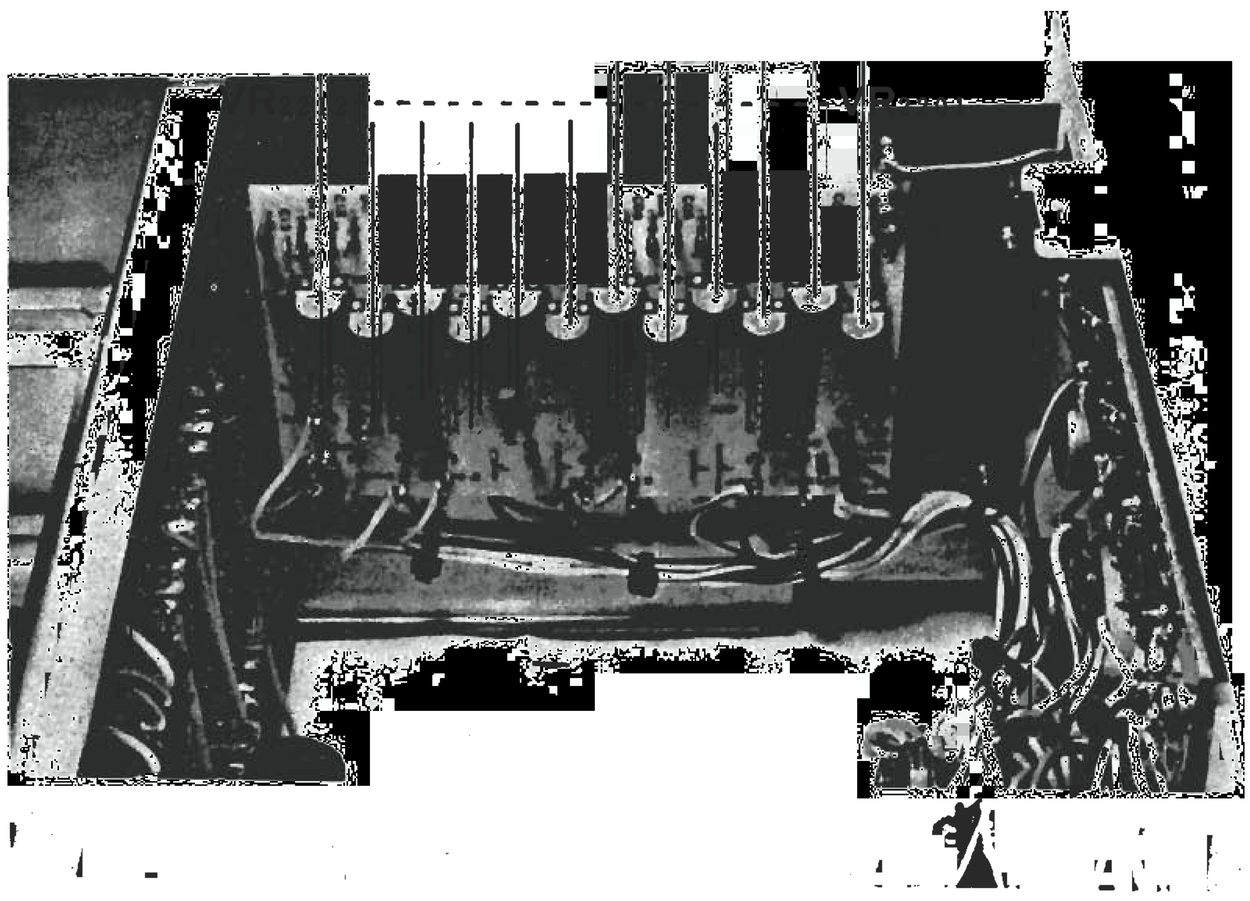


ALC CIRCUIT

The 28 MHz input signal from the transceiver is fed to the ALC AMP unit, where it is amplified by Q_{1801} (**3SK59Y**). Gate 1 receives the RF signal, while gate 2 is connected to the ALC voltage supplied from the various modules. The ALC voltage is used to control the gain of Q_{1801}. In the AM mode, the ALC level is fixed, and no connection is made to the modules for the individulal bands.

A portion of the input signal is detected by D_{1801} and D_{1802} (**1S1555**), for an indication of the input level on the meter.





MAINTENANCE AND ALIGNMENT

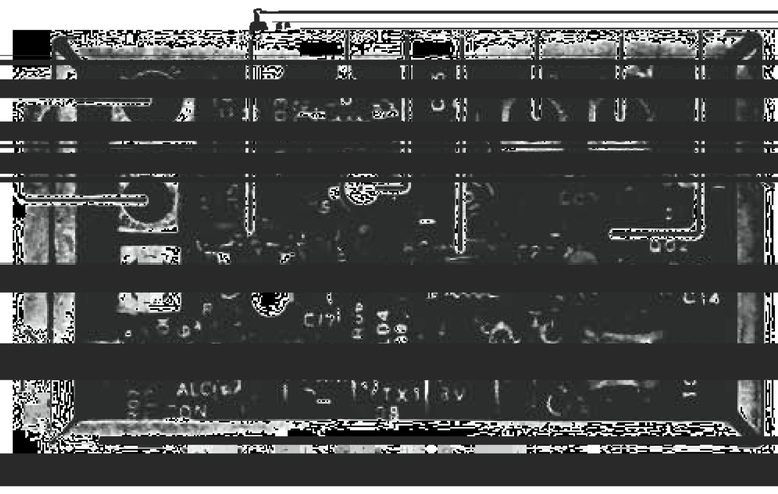
The FTV-107R has been carefully aligned and tested at the factory prior to shipment. With normal use, if the unit is not abused, the FTV-107R will provide many years of trouble-free operation.

Sudden difficulties are usually the result of parts failures, rather than alignment problems. There-

ALC AMP UNIT (PB-1946)

(1) Set the HF transceiver to 29 MHz, CW mode.

(2) Connect the RF probe of the VTVM to the input of the ALC AMP unit, and adjust the HF transceiver DRIVE or CARRIER control for an output of 0.22 volts RMS while



(12) Remove the dummy load from the antenna jack. While transmitting, confirm that the PO indication is .2 with no load applied. If not, check the AFR circuit for malfunction

(15) Set the TUNE control to the center of its range. Adjust the potentiometers for maximum power output while transmitting

part.

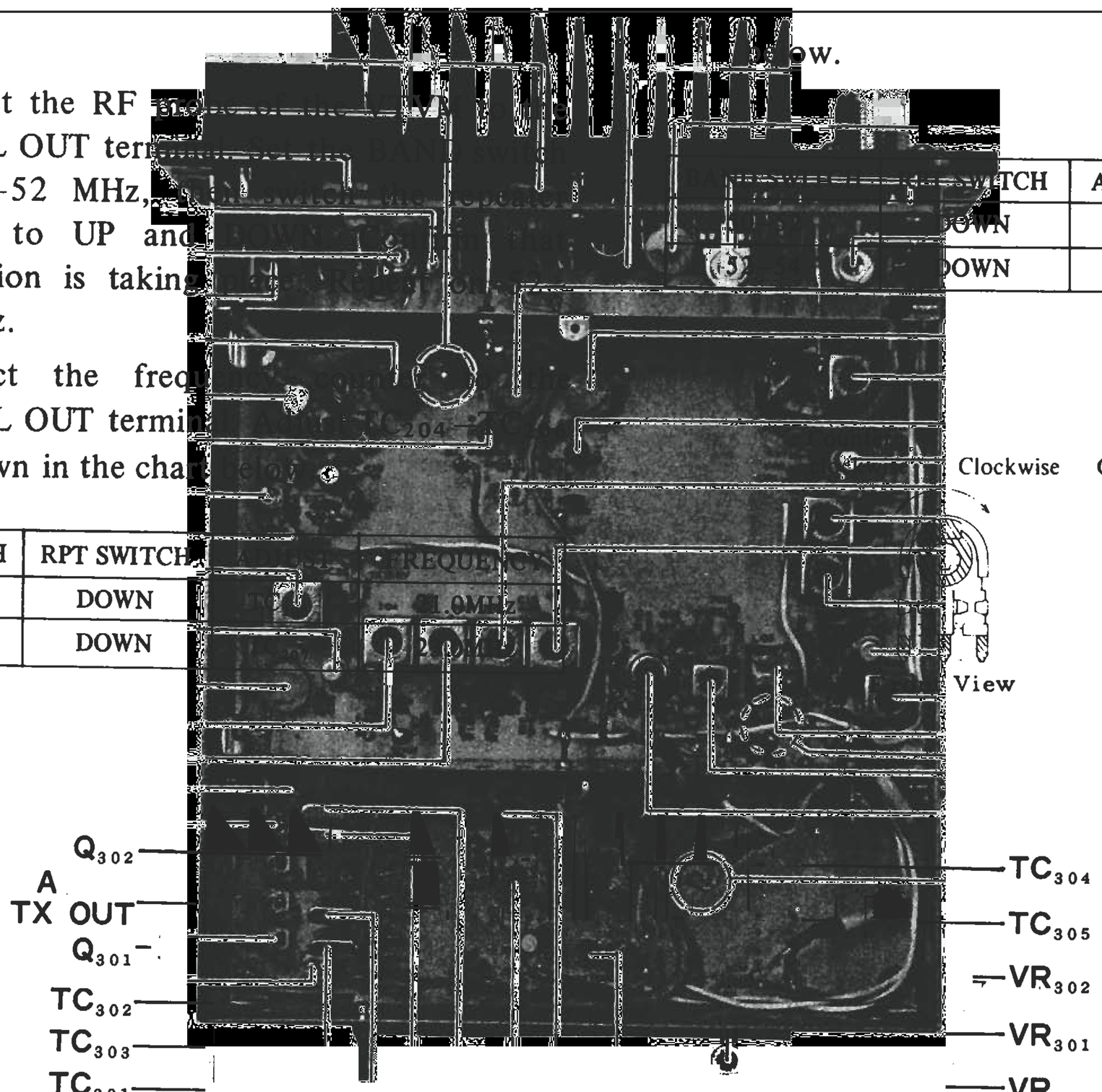
ow.

(13) Connect the RF
LOCAL OUT ter
to 50–52 MHz,
switch to UP and
oscillation is takin
54 MHz.

(14) Connect the freq
LOCAL OUT termi
as shown in the cha

BAND SWITCH	RPT SWITCH
50–52	DOWN
52–54	DOWN

TCH	ADJUST	RESULT
OWN	VR_{2205}	MAXIMUM
OWN	VR_{2206}	OUTPUT



Clockwise

View

Clockwise

Counter clockwise

Rear View

(12) Connect the RF probe of the VTVM to the LOCAL OUT terminal. Set the BAND switch to 144–146 MHz, then switch the repeater switch to UP and DOWN. Confirm that oscillation is taking place. Repeat on 146–148 MHz.

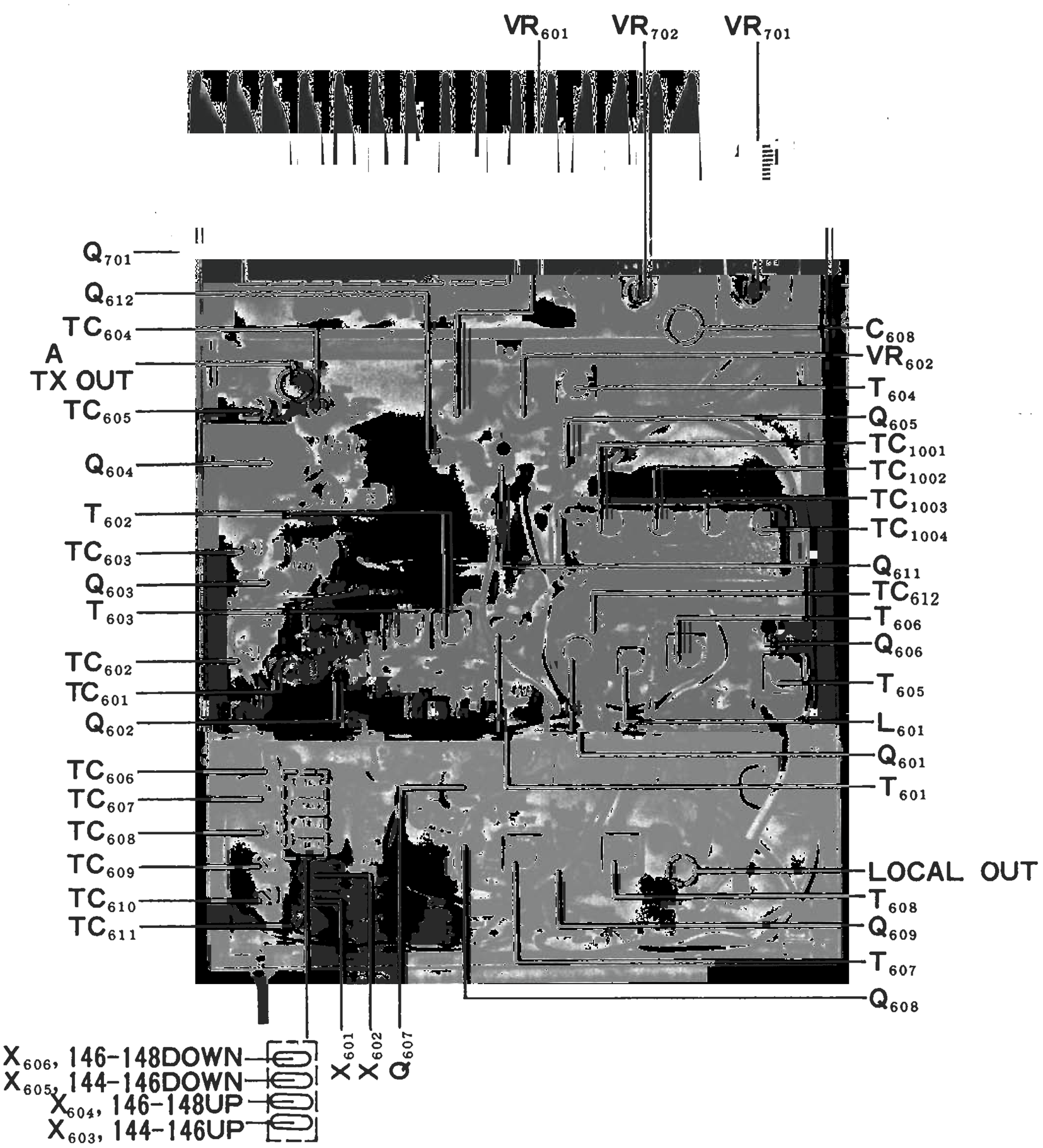
(13) Connect the frequency counter to the LOCAL OUT terminal. Adjust TC_{608}–TC_{611} as shown in the chart below.

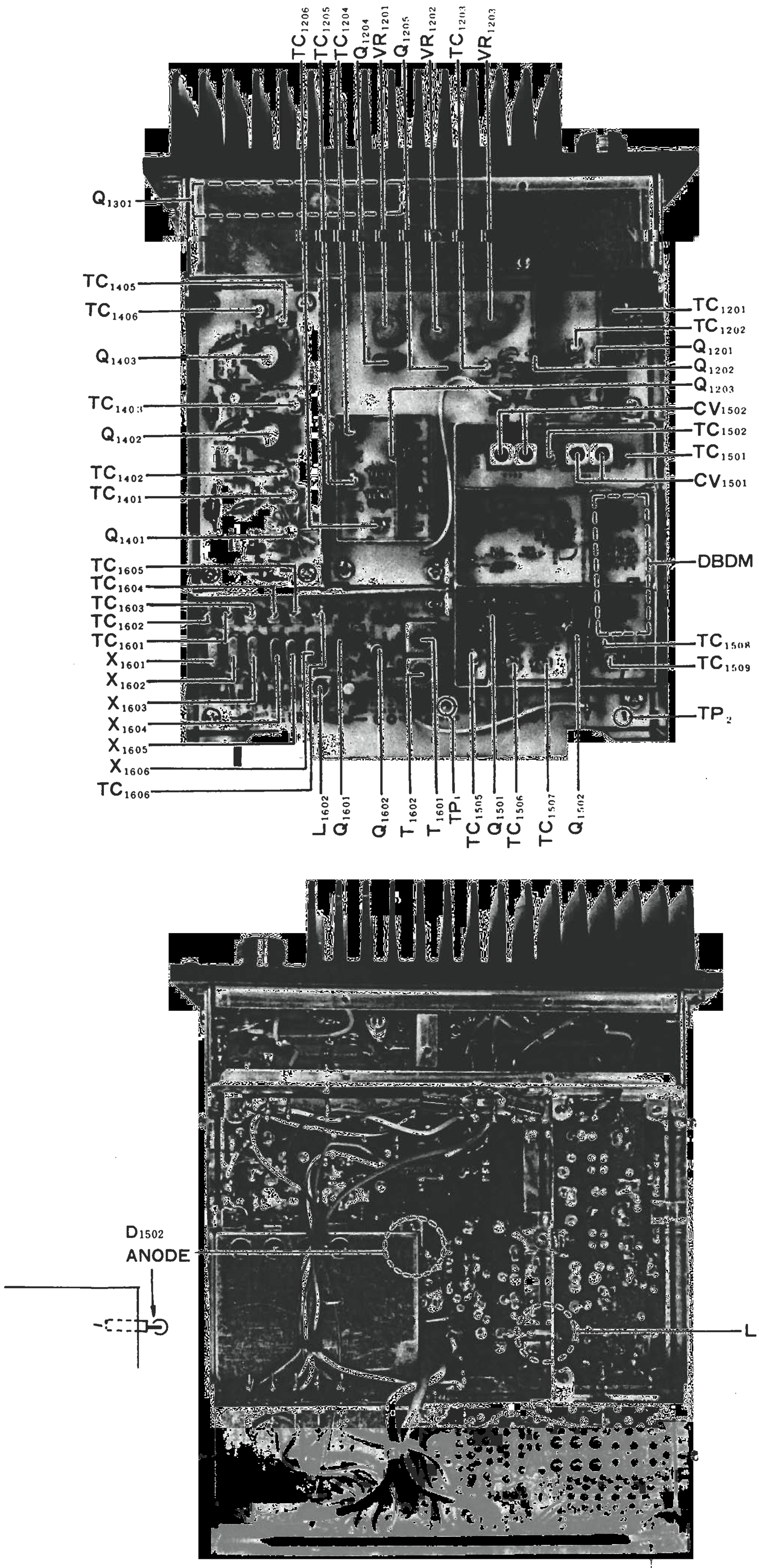
BAND SWITCH	RPT SWITCH	ADJUST	FREQUENCY
144–146	UP	TC_{608}	116.6MHz
	DOWN	TC_{610}	115.4MHz
146–148	UP	TC_{609}	118.6MHz
	DOWN	TC_{611}	117.4MHz

(14) Set the TUNE control to the center of its range. Adjust the potentiometers for maximum power output while transmitting into the dummy load, as shown in the chart below.

BAND SWITCH	RPT SWITCH	ADJUST	RESULT
144–146	UP	VR_{2209}	MAXIMUM OUTPUT
	DOWN	VR_{2211}	
146–148	UP	VR_{2210}	
	DOWN	VR_{2212}	

(15) Adjust T_{607} and T_{608} for identical power output with the RPT switch in the UP and DOWN positions.




TC1206
TC1205
TC1204
Q1204
VR1201
Q1205
VR1202
TC1203
VR1203
Q1301
TC1405
TC1406
Q1403
TC1403
Q1402
TC1402
TC1401
Q1401
TC1605
TC1604
TC1603
TC1602
TC1601
X1601
X1602
X1603
X1604
X1605
X1606
TC1606
TC1201
TC1202
Q1201
Q1202
Q1203
CV1502
TC1502
TC1501
CV1501
DBDM
TC1508
TC1509
TP2
L1602
Q1601
Q1602
T1602
T1601
TP1
TC1505
Q1501
TC1506
TC1507
Q1502
D1502
ANODE
L1213

R212,213, 215–217, 220,239,240	J00245104	Carbon film 1/4WVJ 100kΩ	T209	L0020166	R12-4180
R222,233	J01245104	" " " TJ 100kΩ			**INDUCTOR**
R218	J00245224	" " " VJ 220kΩ	L211,212	L1190004	Micro inductor FL-4H 0.68μH
R264	J01245334	" " " TJ 330kΩ	L214	L1190009	" " " 3.3μH
R236	J00245564	" " " VJ 560kΩ	L207,209	L1190013	" " " 6.8μH
R265	J00245335	" " " " 3.3MΩ	L213	L1190014	" " " 10μH
			L210	L1190017	" " FL-5H 1mH
			L208	L0020209	
			L202,204,206	L1020324	
			L203	L0020416A	
			L201	L0020535	
		POTENTIOMETER	L205	L0190003	IFT-51S10-H3
VR201–203	J51723473	SR19RS 47kΩB			
					FERRITE BEADS
		CAPACITOR		L9190001	Ri 3 x 3-1
C213,245	K00179001	Ceramic disc 50WV SL 0.5pF			
C222,242	K02279001	" " " CH 1pF			
C211,215,218, 236,243,246, 278	K02172050	" " " " 5pF		Q5000025	Wrapping terminal A
C203,210	K00173100	" " " SL 10pF			**HEAT SINK**
C237,247,251	K02173100	" " " CH 10pF		R5047915B	T0-5, L = 20 mm
C249	K02175150	" " " " 15pF			
C228	K00175180	" " " SL 18pF			
C216	K00179005	" " " " 20pF			
C219	K00175220	" " " " 22pF			
C260–265,269	K02179009	" " " CH 22pF			
C235	K00175330	" " " SL 33pF	★★★★★ 50 MHz BOOSTER BOARD ★★★★★		
C204,233,234	K00175470	" " " " 47pF	PB-1923	F0001923A	Printed circuit board
C212,214,217, 250	K02175470	" " " CH 47pF		C9019230A	PCB with components
C223,238,241, 244	K06175470	" " " UJ 47pF			**TRANSISTOR**
			Q301	G3321660	Transistor 2SC2166
C201,202	K00179013	" " " SL 91pF	Q302	G3319450D	" 2SC1945D
C225	K00175101	" " " " 100pF			
C207,208,267, 268	K02175101	" " " CH 100pF			
					DIODE
C273,275	K00175121	" " " SL 120pF	D301,302,308	G2090001	Silicon 10D1
C274	K00179020	" " " " 240pF	D307	G2001880F	Germanium 1S188FM
C232,252,266	K12171102	" " " " 0.001μF	D303–306	G2015550	Silicon 1S1555
C205,206,209, 220,221,224, 226,227,230, 231,239,240, 248, 253–259, 270–272, 283–288,292	K14170103	" " " " 0.01μF			
					RESISTOR
			R303	J10276560	Carbon composition 1/2WGK 56Ω
			R306	J10276101	" " " " 100Ω
			R305	J10276151	" " " " 150Ω
			R302	J10276221	" " " " 220Ω
C291	K50177473	Mylar 50WV 0.047μF	R301,304 (L302,305)	J10276471	" " " " 470Ω
C229,276,277, 290	K40120106	Electrolytic 16WV 10μF			
			R308	J01245102	Carbon film 1/4WTJ 1kΩ
			R307	J00245103	" " " VJ 10kΩ
					POTENTIOMETER
			VR301	J50702301	EVL-SOAA00B32 300ΩB
		TRIMMER CAPACITOR	VR302	J50702103	EVL-SOAA00B14 10kΩB
TC201–207	K91000029	ECV1ZW 20 x 53N 20pF			
					CAPACITOR
		TRANSFORMER	C334	K00179001	Ceramic disc 50WV SL 0.5pF
T201–208	L0020408		C316,335	K00172010	" " " " 1pF

		INDUCTOR	Q1201,1202	G3323690	Transistor 2SC2369
L707	L0020069				
L701,704	L1020324				
L706,708	L0020430				**DIODE**
L702,703	L1020469		D1203	G2090027	Silicon 1SS53
L705	L0020654		D1201	G2015550	Silicon 1S1555
		RELAY			**RESISTOR**
RL701	M1190006	FBR-221D012	R1215	J00245820	Carbon film 1/4WVJ 82Ω
			R1205,1210	J00245101	" " " " 100Ω
			R1204	J00245221	" " " " 220Ω
		RECEPTACLE	R1203(L1202), 1206(L1204), 1209(L1205), 1211(L1207), 1216–1218 (L1208–1210)	J10246471	Carbon composition " GK 470Ω
J701	P1090026	SO-239			
	Q5000025	Wrapping terminal A			
			R1212,1213	J00245102	Carbon film " VJ 1kΩ
			R1201,1207, 1223	J00245152	" " " " 1.5kΩ
			R1202,1208, 1214,1225	J00245103	" " " " 10kΩ
★★★★★ **RESONATOR BOARD** ★★★★★					
PB-1800	F0001800	Printed circuit board			
	C9018000	PCB with components			
					POTENTIOMETER
		CAPACITOR	VR1201–1203	J51723473	SR19RS 47kΩB
C1005–1008	K02172050	Ceramic disc 50WV CH5pF			
C1001–1004	K02175150	" " " " 15pF			
					CAPACITOR
			C1202,1203	K00172030	Ceramic disc 50WV SL 3pF
		TRIMMER CAPACITOR	C1216,1218	K02172050	" " " CH5pF
T1001–1004	K91000028	ECV-1ZW 10 x 53N 10pF	C1212	K02179008	" " " " 20pF
			C1201,1221, 1229	K12171102	" " " " 0.001μF
		INDUCTOR	C1204–1211, 1213,1215, 1228	K22170001	" HDC60E102M 0.001μF
L1001	L0020409				
			C1214,1226	K23140001	" Chip 25V 0.01μF
	R0044940A	Resonator case	C1231	K50177473	Mylar 50WV 0.047μF
			C1230	K40120106	Electrolytic 16WV TW 10μF
	Q5000011	Wrapping terminal C			
					TRIMMER CAPACITOR
			TC1201, 1204–1206	K91000059	ECV-1ZW 04 x 53N 4pF
			TC1202,1203	K91000028	ECV-1ZW 10 x 53N 10pF

430 MHz UNIT (OPTION)

Symbol No.	Parts No.	Description			
	C0019290	430MHz UNIT			**INDUCTOR**
★★★★★ **MAIN CHASSIS** ★★★★★			L1214	L1190014	Micro inductor FL-4H 10μH
C1101–1108, 1110–1115	K21170002	Ceramic feed thru ECK-Y1H102WE	L1202,1204, 1205, 1207–1210	L1020469	
			L1211,1212	L0020471	
			L1203,1206	L0020472	
			L1213	L0020474	
			L1201	L0020523	
★★★★★ **430 MHz RF BOARD** ★★★★★					
PB-1929	F0001929	Printed circuit board			
	C9019290	PCB with components		Q5000011	Wrapping terminal C
		TRANSISTOR			
Q1203	G3314240	Transistor 2SC1424			
Q1204,1205	G3318150Y	" 2SC1815Y			

R1502,1505	J00245331	Carbon film 1/4WVJ 330Ω			**CRYSTAL**
R1511(L1507), 1512(L1510), 1516(L1511)	J10246471	Carbon composition " GK 470Ω	X1601	H0101220	HC-18/U 67.000MHz
			X1602	H0101230	" 67.333MHz
			X1603	H0101240	" 67.666MHz
R1513	J00245561	Carbon film " VJ 560Ω	X1604	H0102251	HC-25/U 68.000MHz
R1501,1506	J01245102	" " " TJ 1kΩ	X1605	H0102252	" 68.333MHz
R1503,1507	J00245102	" " " VJ 1kΩ	★X1606(OPTION)	H0102253	" (1.6MHz DOWN) 67.400MHz
R1508	J00245222	" " " " 2.2kΩ	★X1606(OPTION)	H0102254	" (7.6MHz DOWN) 67.066MHz
R1514	J01245103	" " " TJ 10kΩ			**RESISTOR**
R1509	J01245223	" " " " 22kΩ	R1616	J00245101	Carbon film 1/4S VJ 100Ω
			R1618	J01245101	" " " TJ 100Ω
			R1614	J00245221	" " " VJ 220Ω
		CAPACITOR	R1601	J00245331	" " " " 330Ω
C1524,1525	K00179001	Ceramic disc 50WV SL 0.5pF	R1612,1615	J00245471	" " " " 470Ω
C1526	K02172020	" " " CH 2pF	R1607–1611	J01245681	" " " TJ 680Ω
C1513,1514	K02172030	" " " " 3pF	R1617	J00245272	" " " VJ 2.7kΩ
C1502–1505	K02173080	" " " " 8pF	R1602,1603, 1605,1606	J00245103	" " " " 10kΩ
C1515	K00173100	" " " SL 10pF			
C1523	K00175270	" " " " 27pF	R1604	J01245103	" " " TJ 10kΩ
C1506,1507	K02179017	" " " CH 62pF	R1613	J00245273	" " " VJ 27kΩ
C1511,1512, 1516	K22170001	" HDC60E102M 0.001μF			
C1517–1522	K21170002	" feed thru 50WV 0.001μF			**CAPACITOR**
C1501	K12171102	" disc 50WV 0.001μF	C1625	K00179001	Ceramic disc 50WV SL 0.5pF
C1508–1510	K13170103	" " " 0.01μF	C1631	K02173010	" " " CH 1pF
			C1623,1626	K02172040	" " " " 4pF
			C1602–1606	K02172050	" " " " 5pF
		TRIMMER CAPACITOR	C1613	K02173100	" " " " 10pF
TC1501–1504, 1509	K91000055	ECV-1ZW 06 x 53N 6pF	C1616	K02179011	" " " " 27pF
			C1601,1614	K02175470	" " " " 47pF
TC1505–1508	K91000028	ECV-1ZW 10 x 53N 10pF	C1607–1611, 1621,1622, 1624, 1627–1630	K12171102	" " " " 0.001μF
		INDUCTOR			
L1505,1513	L0020720	FKMA070PB01-BR	C1615,1617	K14170103	" " " " 0.01μF
L1507,1510, 1511	L1020469		C1620	K14170473	" " " " 0.047μF
			C1618,1619	K40120106	Electrolytic 16WV TW 10μF
L1506	L0020470				
L1501–1504, 1508,1509	L0020471				
					TRIMMER CAPACITOR
L1512	L0020476		TC1601–1605	K91000029	ECV-1ZW 20 x 53N 20pF
		HERMETIC SEAL			**INDUCTOR**
	Q4000001	A102	L1601	L1190005	Micro inductor FL-4H 1μH
			L1602	L0020417	TM-80160
					TRANSFORMER
			T1601,1602	L0020510	MB-80050
★★★★★ LOCAL BOARD ★★★★★					
PB-1934B	F0001934B	Printed circuit board			
	C9019340B	PCB with components		Q5000011	Wrapping terminal C
		IC, TRANSISTOR			
Q1603	G1090123	IC 78L08			
Q1601	G3307840R	Transistor 2SC784R			
Q1602	G3314240	" 2SC1424			
			POWER SUPPLY UNIT		
			Symbol No.	Parts No.	Description
		DIODE	PB-1945B	F0001945B	Printed circuit board
D1601–1605	G2090027	Silicon 1SS53		C0019450B	PCB with components
					IC & TRANSISTOR
			Q1706	G1090070	IC μPC14308

Q1708	G3107330	Tr	2SA733			**RESISTOR**	
Q1709,1710	G3309450P	"	2SC945P	R1801	J00245560	Carbon film 1/4W VJ	56Ω
Q1703,1704	G3318150Y	"	2SC1815Y	R1814	J00245101	" " " "	100Ω
				R1802,1809	J00245471	" " " "	470Ω
				R1815	J00245561	" " " "	560Ω
		DIODE		R1807	J00245102	" " " "	1kΩ
D1701,1713	G2090001	Silicon	10D1	R1805	J00245152	" " " "	1.5kΩ
D1708		Zener	WZ090	R1811	J00245682	" " " "	6.8kΩ
				R1808	J00245123	" " " "	12kΩ
				R1803	J00245153	" " " "	15kΩ
		RESISTOR		R1812,1813	J00245223	" " " "	22kΩ
R1714	J00245221	Carbon film	1/4W VJ 220Ω	R1806	J00245273	" " " "	27kΩ
R1713	J00245471	" "	" " 470Ω	R1804	J00245274	" " " "	270kΩ
R1709,1710	J00245102	" "	" " 1kΩ	R1810	J00245105	" " " "	1MΩ
R1708,1711	J00245472	" "	" " 4.7kΩ				
R1704,1705	J00245223	" "	" " 22kΩ				
						POTENTIOMETER	
				VR1801	J50702501	EVL-SOAA00B52	500ΩB
		CAPACITOR		VR1802	J50702103	"	10kΩB
C1703,1705	K14170103	Ceramic	50WV 0.01μF	VR1803	J50702503	"	50kΩB
C1704	K14170473	"	" 0.047μF				
C1706,1712	K40170105	Electrolytic	50WV 1μF				
C1711	K40120106	"	16WV 10μF			**CAPACITOR**	
C1702	K40140108	"	25WV 1000μF	C1810	K02175180	Ceramic	50WV CH 18pF
				C1801	K00175820	"	" SL 82pF
				C1802,1804, 1813	K02179019	"	" CH 91pF
		RELAY					
RL1701	M1190006	FBR221D012		C1811	K02179020	"	" " 110pF
				C1803,1812	K02179023	"	" " 180pF
				C1807	K14179001	"	" " 0.001μF
		PLUG		C1805,1806, 1808,1809, 1814,1815, 1817,1819, 1820,1828	K14170103	"	" " 0.01μF
P1701	P0090111	5066-11A					
		FUSE					
F1701	Q0000005	5A		C1816	K70167474	Tantalum	35WV 0.47μF
				C1827	K40170105	Electrolytic	50WV 1μF
				C1818	K40120106	"	16WV 10μF
		FUSE HOLDER		C1822−1826	K21170002	Ceramic feed thru	
FH1701	P2000004	F3265				ECK-Y1H102WE	
	Q5000011	Wrapping terminal C				**INDUCTOR**	
				L1803,1804	L1190029	Micro inductor FL-5H	47μH
	R0019510A	Heat sink		L1801,1802, 1805,1806	L0020535	LOW PASS COIL	
						TRANSFORMER	
				T1801	L0020180		
ALC AMP UNIT				T1802	L0020210		
Symbol No.	Parts No.	Description					
PB-1946B	F0001946B	Printed circuit board				**HERMETIC SEAL**	
	C0019460B	PCB with components			Q4000001	A102	
		FET & TRANSISTOR					
Q1801	G4800590Y	FET	3SK59Y		Q5000011	Wrapping terminal C	
Q1802	G3303800Y	Tr	2SC380TMY				
		DIODE					
D1801,1802	G2001880F	Germanium	1S188FM				
D1803	G9090005	Varistor	MV103				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