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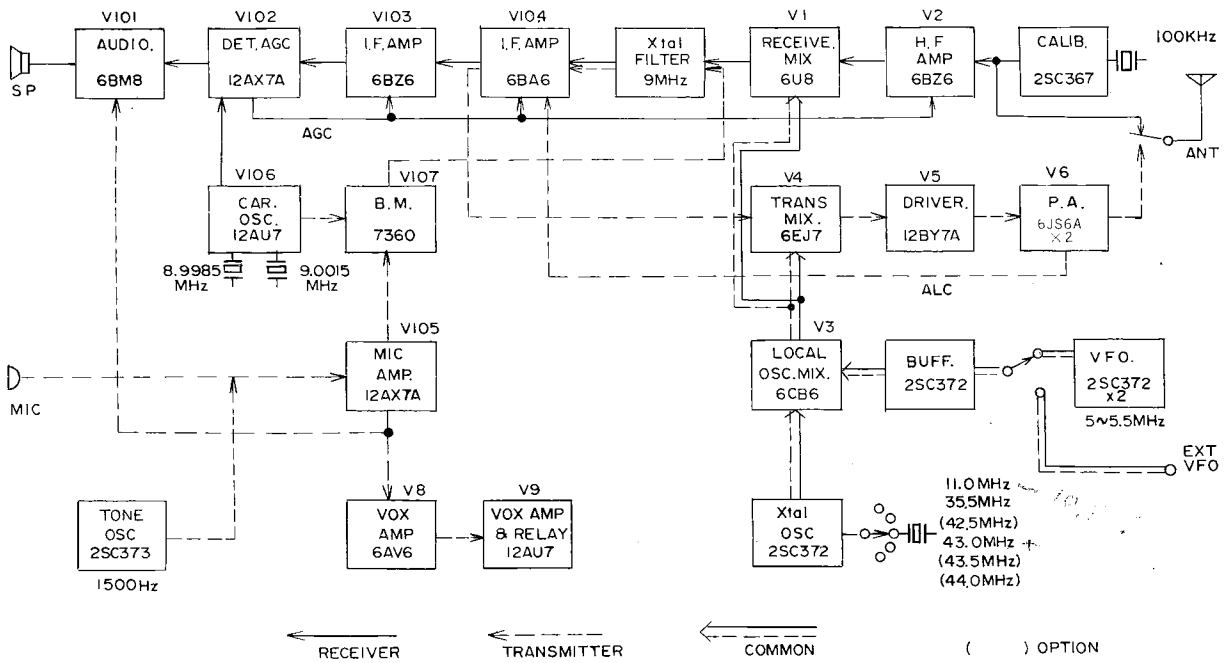
INSTRUCTION MANUAL

FT-250

SOMMERKAMP ELECTRONICS GMBH

FT-200/250 BLOCK DIAGRAM



42.5 MHz

43.5 "

44.0 "

FT-200/250 SSB TRANSCEIVER

The FT200/250 Transceiver, for HF amateur bands 80 through 10 meters, is a precision built high performance transceiver providing SSB (USB and LSB selectable), CW and AM modes of operation, with a single-tone power of 240W (approx. 300W speech peak input).
High stability is obtained by use of a well designed heterodyne VFO, and the specially designed 9 MC crystal filter ensures good voice quality.
Its compact size, light weight, and attached carrying handle make it very suitable and convenient for both home, portable, and mobile use.
Other features include VOX, 100 kc calibrator, ±5 kc receiver offset (clarifier) tuning and easy connection for use of a Linear Amplifier.
FP-200/250 matching AC power supply with built-in speaker is especially designed for use with the Transceiver, A 12V DC supply; the DC-200/250 provides for mobile or field use.

GENERAL SPECIFICATIONS

Modes	SSB (USB–LSB), CW, AM
Input power	240W
Frequency range	3.5–4; 7–7.5; 14–14.5; 21–21.5; 28.5–29. (crystals optionally available for ranges 28–28.5; 29–29.5; 29.5–30 MC)
Antenna impedance	50-100 ohms
Frequency stability	After warm-up, within 100 cps/ every 30 minutes
Carrier suppression	–40 dB
Sideband suppression	–50 dB at 1000 cps
Third order intermodulation products	–30 dB (P.E.P.)
A.F. bandwidth	300–2700 cps
Receiver sensitivity	0.5 uV input S/N 10 dB
Selectivity	2.4 kc (–6 dB), 4 kc (–60 dB)
I.F. interference ratio	50 dB
Image ratio	50 dB
Audio output	1W at 10% distortion
Audio output impedance	8 ohms
Power supply	AC or DC with separate power supplies
Tubes & semiconductors	16 tubes, 15 diodes, 7 transistors
Dimensions	13¼" wide, 5½" high, 11" deep
Weight	17.5 lbs. (8kg)

FP-200/250 SPECIFICATIONS

Semiconductors	9 diodes
Dimensions	8" wide, 5½" high, 11" deep
Weight	Approx. 22 lbs. (10kg)
Speaker (built-in)	5" x 3", 8 ohms
Supply voltage	100V/110V/117V/200V/220V/234V 50–60 cps

DC-200/250 SPECIFICATIONS

Matching DC power supply	
Semiconductors	4 transistors, 9 diodes
Dimensions	8" wide, 2¾" high, 8 7/8" deep
Weight	Approx. 6.6 lbs. (3kg)
Power source	DC-12V, 12.5A (receive), 15A (transmit), 27A (transmit 100W peak)

CIRCUIT DESCRIPTION

It can be seen from the block diagram that many sections are common for both receiving and transmitting. For an easier understanding of the operation, the receiving and transmitting sections will be described separately.

Receiving Section

Signal from ANT terminal passes through antenna RX/TX relay to ANT input tuned circuit to grid 1 of RF amplifier tube V2, 6BZ6. Signal is amplified and through the next tuned circuit on the grid of receiver mixer tube V1, 6U8, pentode section. Local oscillator signal is applied to cathode of this mixer and the I.F. signal appears at mixer plate. The I.F. signal then passes through the 9 MC crystal filter to the two stage amplifier V104, 6BA6, V103, 6BZ6 and thence to V102A, ½12AX7 power grid detector. This detector acts as a product detector, with BFO signal applied to its cathode, when receiving CW and SSB. V102B, ½12AX7 functions as an anode detection type amplifier of AGC. With no signal applied, plate current is zero with plate voltage zero. When signal is applied, plate current develops, resulting in a negative plate voltage which is applied through diode D103 to AGC line. Circuit provides suitable AGC characteristics of fast attack, slow decay for SSB and CW. Internal resistance of diode is low in forward direction and high in reverse direction. AGC voltage is applied to RF and IF stages so that a wide range of signal levels can be handled. Detector output is fed to silicon diodes D101, D102, ANL, then via AF gain control, through 6BM8 AF output tube to speaker or headphones.

Transmitting Section

Output of carrier oscillator V106, 12AU7 is injected to first grid of V107, 7360 balanced modulator and audio signal from mic. Amp. to modulating grid of BM. Suppressed carrier

DSB is developed at plate of BM. This signal then passes through the crystal filter XF101, which eliminates one sideband, thus resulting in a SSB signal, 9 MC.

For AM transmission (sideband with carrier insertion) the BM becomes unbalanced because of switching circuitry, permitting carrier to pass through, and also carrier frequency is

1. **Carrier crystal oscillator**

V106, 12AU7 double triode with crystals 8998.5 kc and 9001.5 kc, one in each triode section. With sideband selector switch at NORMAL, carrier crystal 8998.5 is operative for 7 and 14 MC band and 9001.5 for 3.5, 21 and 28 MC. When the selector switch is in REVERSE position, then the carrier crystal oscillator sections are changed.

Carrier oscillator operates like the BFO when in receive mode.

On AM & CW, crystal 9001.5 is used and its frequency is lowered 200 cps by diode switch D104, 1S1007, bringing carrier into filter passband.

2. **Bandswitched heterodyne oscillator**

This is a crystal oscillator using silicon type 2SC372 transistor, and it is operative on bands 7, 21 and 28 MC. 10 M band crystal is included for 28.5–29 MC, and positions are available for other three optional ranges for full coverage of 10 M.

3. **VFO self-oscillator**

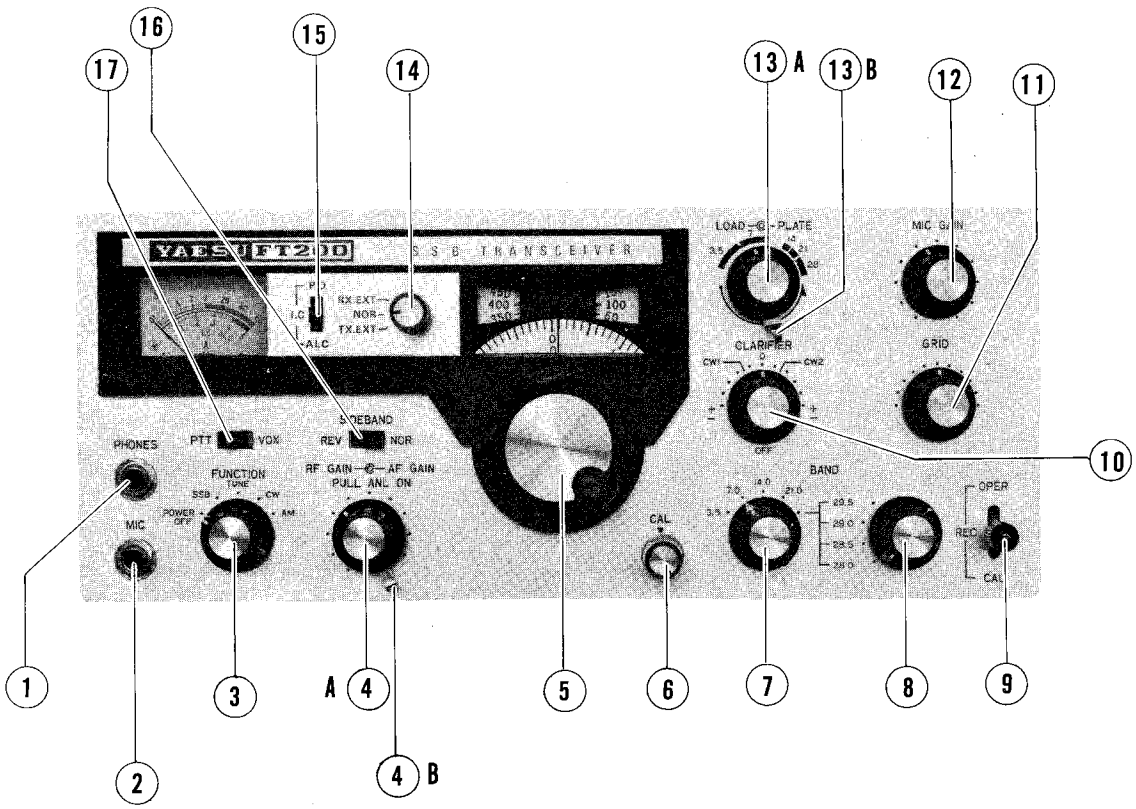
The VFO is a transistorized Colpitts circuit with 2SC372 oscillator and 2SC372 buffer. It has linear tuning over the range 5 – 5.5 MC. A passband filter circuit at output is tuned to

Meter is automatically switched by relay RL101, on transmitting, to indicate relative power output (PO) PA cathode current (IC) and ALC voltage. Meter scale is fully calibrated, and transmitter metering functions PO, IC and ALC, are selected by panel mounted slide switch.

VOLTAGE REGULATOR CIRCUIT

The voltage regulator circuit, mounted on a print board, provides 9 volts for all transistor oscillators. Two transistors are used, 2SC372 and 2SC367, together with two zener diodes, 1S331 and 1S336, and voltage level can be set by adjustment of variable resistor VR501.

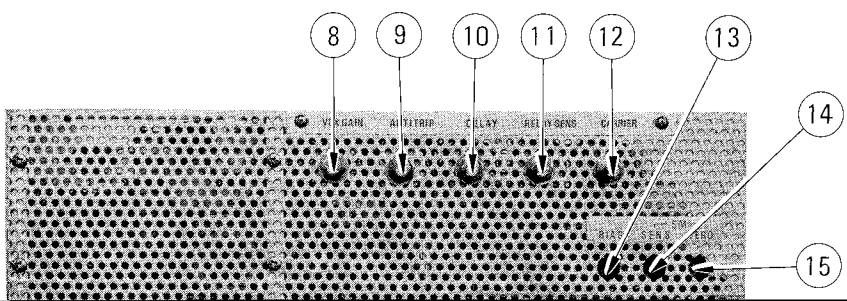
FRONT PANEL CONTROLS



1.	Phones	Headphone socket. Impedance 600 ohms. When plug is inserted into socket, speaker is automatically disconnected.
2.	Mic.	Microphone socket. Standard ¼" 3 contact T.R.S. type. High impedance. Tip relay control. Ring microphone audio. Sleeve ground.
3.	Function	Function switch. OFF — AC power removed from power supply. SSB — Selects SSB operation. TUNE — Places TX in tune-up condition. CW — Selects CW operation. AM — Selects AM operation.
4A.	AF Gain, Pull-ANL-On	Knob
4B.	RF Gain	Level control
5.	VFO	Control knob and vernier drive. One revolution of knob covers approx. 15 kc. Upper windows give 50 kc points with 0–500 markings. The vernier scale is

11.	Grid	Controls RF tuning of receiver and drive tuning of transmitter.
12.	Mic. Gain	Controls microphone amp. level. On TUNE it becomes a tuning level control.
13A.	Plate	Knob. Adjusts PA plate tuning.
13B.	Loading	Lever. Adjusts PA plate loading.
14.	VFO Select	For switching from internal to external VFO. NOR is transceive on internal VFO. RX EXT is receive on external VFO, transmit on internal VFO. TX EXT is transmit on external VFO, receive on internal VFO.
15.	PO–IC–ALC	Meter selector switch. Switches meter functions for transmitter metering.
16.	Sideband	Sideband selector slide switch. In the NORMAL position, LSB is produced on 3.5 and 7 MC, and USB on 14, 21 and 28 MC. In the REV position, USB is produced on 3.5 and 7 MC and LSB on 14, 21 and 28 MC.
17.	PTT–VOX	Slide switch. Selects PTT or VOX functions.

REAR PANEL CONTROLS & CONNECTIONS



1.	R.F. Out	Provides low level R.F. drive for VHF transverter.
2.	ANT	Antenna coax socket.
3.	Power Supply Connector	(see P. 15 for details)
4.	Speaker Socket	8 ohms
5.	Accessory Socket	(see P. 15 for details)
6.	Earth Terminal	
7.	Key Socket	
8.	VOX Gain	Adjusts VOX sensitivity.
9.	Anti-Trip	Adjusts VOX anti-trip level.
10.	Delay	Adjusts "hold-in" time of VOX
11.	Relay Sens	Adjusts operating level of VOX relay.
12.	Carrier	Adjusts level of re-inserted carrier for AM/CW operation.
13.	Bias	Adjusts bias on PA tubes.
14.	Meter Sens	S-meter sensitivity control.
15.	Meter Zero	Adjusts S-meter zero setting.
16.	Aux	External VFO socket.

OPERATION

Step 1 of Operation

FUNCTION	POWER OFF
RF–AF–GAIN	RF maximum clockwise
	AF about half on
BAND	Set to desired band
CLARIFIER (Receiver offset tuning)	OFF
PLATE	Set to desired band
LOADING	Minimum loading
METER SWITCH	IC
OPER–REC	REC
SIDEBAND	NORMAL
MIC GAIN	OFF
CAL	In released position
VFO SELECT	NOR

1. **Set controls as shown below**

First check that all cable connections are correct and that antenna of correct frequency and impedance within the range of the Pi-net (50 100 ohms) (coax output) is connected to the transceiver. AC power plug should not be connected until all preliminary checks are carried out. Aux plug provided should be inserted in auxilary VFO socket if external

3. Transmission

SSB

Insert microphone plug of PTT microphone. (If microphone does not have a PTT switch, then short out PTT terminals on plug and control transceiver with REC–OPER panel switch.) Turn REC–OPER switch to OPER.

While speaking, adjust MIC gain for correct IC meter "kick-up". Switch meter to ALC and check that needle does not rise above limit of green section of scale on speech peaks. Indicated IC will be about half the tuning IC, i.e. about 150 MA on peaks. Attempting to obtain more power by "forcing" or overdriving the transmitter will obtain only an insignificant increase in strength and will result in a distorted signal with possible radiation of spurious emissions. Keep MIC gain down, speak fairly close to microphone to reduce background noise pick up, and try to maintain an even level of speech.

Do not have VOX gain control set too high; otherwise operation will be unstable. If anti-trip control is advanced too far, then VOX will lose sensitivity. Set anti-trip to a position where it is just preventing speaker noise from "triggering" the VOX. If VOX fails to

ALIGNMENT

The FT-200/250 has been correctly aligned at factory and, under normal circumstances, realignment should not be necessary except after a long period of use. The alignment of such modern, sophisticated equipment as this requires the correct test instruments and should not be attempted unless one has had a reasonable amount of experience in such alignment techniques.

CAUTION – Before any work is attempted, remember that high voltages are employed in this equipment, so – TAKE CARE!

1. **Equipment required**

   VTVM with RF probe
   RF standard signal generator
   AF signal generator
   Circuit tester
   Frequency meter
   Dummy load 50 ohms
   Suitable alignment tools

2. **Voltage and resistance measurement**

   Refer to tables on Page 17

   Note that measurement figures obtained could vary slightly from those shown, particularly if a low resistance testing meter is used. Always turn off power, remove AC plug, and completely discharge all filter condensers before taking measurements.

3. **Voltage regulator**

   The V.R. is mounted on a printed circuit board and supplies a regulated output of 9V, adjustable by the pre-set type miniature pot VR501. If output cannot be brought up to the 9V, level it may be due to a fault in components on the printed circuit board, e.g. transistors or zener diode, or supply voltage below 11V.

4. **VFO alignment**

   On the red scale, "O" –5 MC and "500" = 5.5 MC.

   Switch off crystal heterodyne oscillator by placing bandswitch on 3.5 or 14 MC band. (Receiver offset tuning) OFF.

   Use frequency meter for alignment, although this can be done, with care, if beats are heard every 100 kc using the crystal calibrator.

   Coarse alignment is by adjustment of trimmer TC401.

   The piston type trimmer TC402 is for adjustment of temperature compensation. If turned clockwise, then compensation becomes greater. If TC402 is adjusted, then TC401 must be re-adjusted to maintain calibration.

   For precise adjustment of dial linearity, careful adjustment (by bending) of end rotor plates of main tuning condenser is necessary.

VFO injection to grid 1 of V3, 6CB6 should be 0.5V or more over full VFO range, measured with VTVM and RF probe. To obtain same frequency of clarifier at "O" as at "OFF", adjust VR7.

5. **Heterodyne crystal oscillator**

Apply RF probe to Pin 2 of V3, and with bandswitch at 28.5, adjust L202 for maximum meter reading.

On 21 MC band adjust TC202.

On 7 MC band adjust TC201

If optional 10 meter range crystals are added, use type HC18U crystals with wire leads soldered into marked positions on heterodyne oscillator print board.

Adjust appropriate trimmer condensers for 10 meter crystals.

6. **Calibrator 100 kc**

Adjust frequency with TC301 by checking against WWV, with aid of separate receiver.

7. **Pre-mixer (VFO mixer)**

This is V3, with output plate tuned circuit to select resultant beat of VFO and heterodyne oscillator (or VFO frequency in case of 3.5 and 14 MC bands).

This alignment should be carefully done as other frequencies can appear at output, VFO, etc. This alignment is explained in transmitter alignment section. Refer to chart, below, for correct output frequencies.

Band	Mixed Frequency
3.5	5 – 5.5 MHz
7.0	16 – 16.5 MHz
14.0	5 – 5.5 MHz
21.0	30 – 30.5 MHz
28.0	37.0 – 37.5 MHz
28.5	37.5 – 38 MHz
29.0	38 – 38.5 MHz
29.5	38.5 – 39 MHz

RECEIVER ALIGNMENT

1. **Audio output stage**

Connect audio generator with 1000 cps output of 0.1V level to moving arm terminal of AF gain control, and with control at maximum volume, an output of 1 watt should be obtained from the 6BM8, V101.

2. **AGC**

Function switch to AM, RF gain maximum, then S-meter should read "O" with antenna socket shorted. Set VR102 (AGC adjust) so that it is at a point just before S-meter needle commences to rise above "O". Now adjust meter sensitivity control so that, with S.G. 50 uV signal to antenna socket, meter will read S9. Open circuit output

of S.G. will be 100 uV, dropping to 50 uV when S.G. is connected to antenna socket, because of loading effect of receiver. Now set function switch to SSB, short out antenna socket, and meter should read "O"; but if not, then adjust the compensation capacitance (C165) between pin 2 and pin 8 of V102 to make meter read minimum deflection.

3. **I.F. amplifier**

Connect signal generator at 9,000 kc and adjust tuning for maximum S-meter reading at center of filter passband by observing S-meter at same time as tuning S.G. frequency. Now adjust L101, L102, L103, L104 for maximum meter reading.

4. **Receiver mixer**

This is V1 6U8 (alternative types 6EA8, 6GH8). Connect RF probe to pin 8, cathode of triode section, and adjust grid tuning. Oscillator injection should read greater than 0.5V on every band. Adjust trap coil L22 for minimum beat at 21.3 MC. This adjustment should occur within one turn of the core slug. L1 is trap coil for 3.5 and 14 MC bands and should be adjusted so that no oscillation occurs in these bands. Use a plastic alignment tool so that no damage will result to the internal hexagon type slugs.

5. **RF amplifier**

Connect S.G. to antenna. On 3.5 MC band set VFO to "O" on black scale and GRID to second point up from its counterclockwise position. Apply 3500 kc signal and adjust L7 and L12 for maximum S-meter reading. Use plastic alignment tool. 7 MC band, VFO to "O" on red scale, GRID at same point as for 3.5 MC, S.G. at 7000 kc. Adjust TC1 and TC2 for maximum.

14 MC band, VFO to 250, GRID at center position, S.G. at 14250 kc. Adjust L10 and L15 for maximum.

21 MC band, VFO to 250, GRID at center, S.G. at 21250 kc. Adjust L9 and L14 for maximum.

28.5 MC band, VFO to 500, GRID at center, S.G. at 29,000 kc. Adjust L3, L8 and L13 for maximum.

On 7 MC band, VFO to 500, apply 9 MC signal of sufficient level to give an S-meter reading; then adjust L2 for minimum dip in S-meter reading.

TRANSMITTER ALIGNMENT

The transmitter uses many common receiver circuits; therefore it is necessary to first correctly align the receiver section. A 50–75 ohms dummy load must be used on the transceiver during transmitter alignment. Take care to avoid touching H.V. points!

1. **Balanced modulator**

Function switch to TUNE, meter to P.O., tune transmitter for maximum reading. (Keep IC down by use of MIC gain).

Now function to SSB, MIC gain to zero, and adjust VR106 for minimum reading. For most sensitive indication, connect RF probe to dummy load, or use another receiver and observe its S-meter reading.

Then switch to opposite sideband position, and readjust VR106. Repeat several times for best result. If there is a marked difference between the two positions, then adjustment of carrier oscillator or crystal filter may be required.

2. **Crystal filter**

The filter is aligned once in receiver alignment, but further alignment in this section (transmitting) is necessary.

At the TUNE position adjust L103, L104 and L105 for maximum output. Keep drive reduced to a fairly low level for the most accurate determination of the maximum peak. In order to examine filter characteristics, set function to SSB and connect an A.F. generator to MIC jack, then take a curve of the A.F. response (in effect, the filter passband), by plotting between 300–2500 cps. If output level changes no more than 3 dB, then it is OK. Repeat on reverse sideband. If the two curves do not match, then a slight adjustment of each carrier crystal frequency is necessary to bring the two curves together in their frequency limits. If carrier is too close to 9000 kc filter center frequency, then high audio frequencies will be attenuated. If carrier is too far removed,

(5) Rotate PLATE tuning control and observe dip as indicated on the meter. If the dip is not prominent, reduce loading control slightly for better indication. As the PLATE control is rotated the meter should rise equally and smoothly on either side of maximum dip indication.

(6) Determine which side of the dip rises abruptly. Set PLATE control slightly to this side of dip keeping the meter reading below 150 MA.

(7) Using no metallic tuning wand, rotate neutralization capacitor shaft very slightly in the direction which reduces the current shown on the meter. Repeat steps 6 and 7 until the meter indicates a smooth and equal rise on either side of the maximum dip point.

The final compartment cover must be in place to supply the RF shielding required during the neutralization procedure.

IMPORTANT:

Heater voltage to final tubes 6JS6A is supplied through a jumper wire between pin 1 and 2 of accessory plug, so the accessory plug must be placed in the accessory socket to provide this heater voltage.

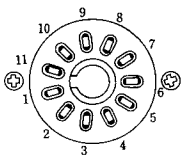
Auxiliary VFO plug provided must be placed in the auxiliary VFO socket when external VFO, FV-200 is not used.

Plug connection

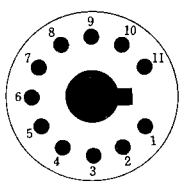
ACCESSORY SOCKET CONNECTIONS

1. 6JS6A heater
2. 12.6V heater
3. +150V
4. +300V
5. +600V
6. −100V
7. ALC input
8. Ground
9. Relay close on transmit −use to control linear amplifier
10. Relay common
11. Relay close on receive

ACC OUT

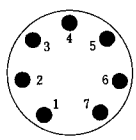


Power socket connections



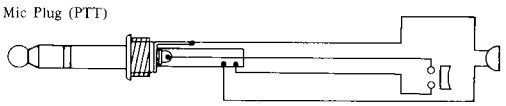
1. −100V
2. E
3. +300V
4. +600V
5. H COMMON
6. H AC 12.6V
7. SPEAKER
8. H AC 12.6V
9. LINE
10. LINE
11. +150V

EXT VFO

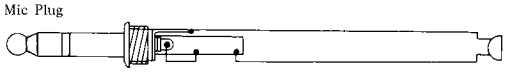


1. 12VAC
2. GROUND
3. EXT VFO INPUT
4. GROUND
5. INT VFO CONTROL
6. 9VDC OUT
7. 9VDC OUT

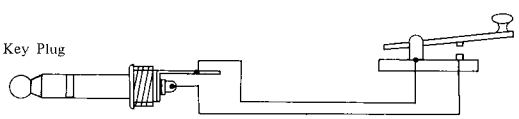
Mic Plug (PTT)



Mic Plug



Key Plug

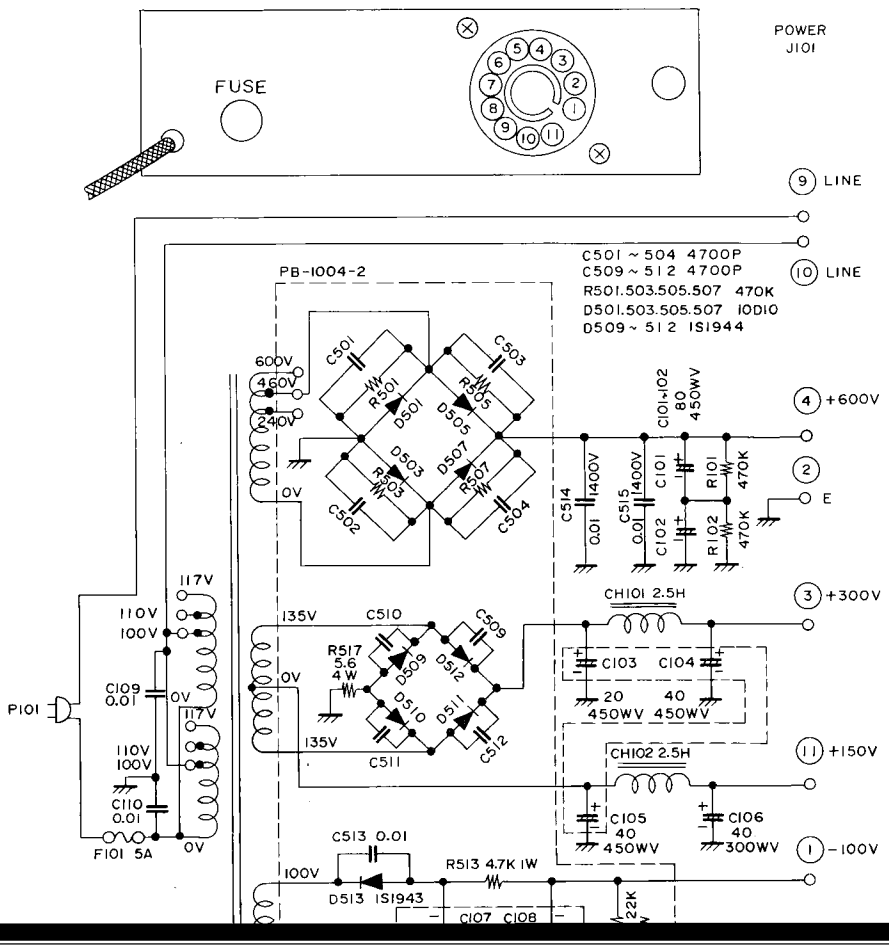


FP-200/250 POWER SUPPLY WITH SPEAKER

The FP-200/250 power supply is designed especially for the FT-200/250 Transceiver. A dynamic speaker is included within the power supply cabinet. Refer to circuit diagram below for details. Note that the major HT winding is tapped 240, 460 and 600, providing DC output of 300V, 600V or 800V to the final tubes. However, for the FT-200/250, 600V DC is sufficient for rated output. If 800V is used, then the input will be excessive —use only on 600V DC maximum.

Bias section has only half wave rectifier as current drain is very small.

Heater winding, 2 x 6.3V, 6A is connected in series to provide 12.6V at 6A.



RECEIVE 7MHz SSB NORMAL

(V)

	PIN / TUBE	1	2	3	4	5	6	7	8	9	10	11	12
V 1	6U8	150	−1.8	33	AC 6.3	0	145	1	14.5	13.5			
V 2	6BZ6	−0.1	0.8	AC 12.6	AC 6.3	140	60	0					
V 3	6CB6	−0.2	2	AC 6.3	0	145	40	0					
V 4	6EJ7	0	−90	0	AC 12.6	AC 6.3	0	145	0	0			
V 5	12BY7A	0	−90	0	AC 12.6	0	—	350	320	0			
V 6	6JS6A	AC 6.3	0	150	0	−90	—	—	—	−90	0	150	AC 12.6
V 7	6JS6A	0	0	150	0	−90	—	—	—	−90	0	150	AC 6.3
V 8	6AV6	0	1	0	AC 6.3	—	—	110					
V 9	12AU7	25	−0.5	0	AC 6.3	AC 6.3	140	0.35	55	AC 12.6			
V101	6BM8	0	10	0	AC 6.3	AC 12.6	330	140	1	65			
V102	12AX7	−0.2	−95	−95	AC 12.6	0	150	−1.5	0	—			
V103	6BZ6	−0.1	1	AC 6.3	AC 12.6	145	100	1					
V104	6BA6	−0.1	1.2	0	AC 6.3	145	110	1.2					
V105	12AX7	110	0	1	AC 12.6	0	140	0	0	—			
V106	12AU7	0	3.5	6	0	0	130	0.15	6	AC 6.3			
V107	7360	0	150	−95	AC 6.3	0	150	150	30	30			

TRANSMIT 7MHz SSB NORMAL

(V)

	PIN / TUBE	1	2	3	4	5	6	7	8	9	10	11	12
V 1	6U8	150	−80	145	AC 6.3	0	150	0	0	−60			
V 2	6BZ6	−60	0	AC 12.6	AC 6.3	145	0	0					
V 3	6CB6	−0.2	2	AC 6.3	0	145	40	0					

C-CAPACITOR

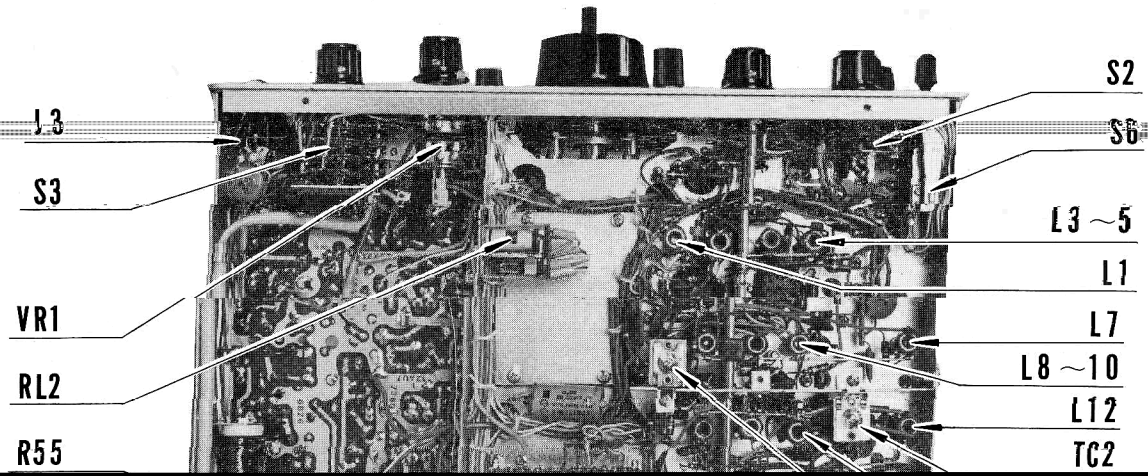
63, 161	FM-MICA	500WV	5P	±10%
402		〃	8P	〃
12, 17, 42, 44, 112, 139, 201, 306		〃	10P	〃
11, 119, 132, 141, 403, 417		〃	20P	〃
406		〃	30P	〃
602, 99		〃	40P	〃
22, 23, 36, 138, 1016		〃	50P	〃
28, 91, 92, 604		〃	60P	〃
38		〃	70P	〃
134, 1015		〃	80P	〃
16, 20, 31, 35, 49, 89, 90, 113 116, 117, 122, 123, 127, 142 154, 166		〃	100P	〃
39, 148, 149, 204, 305		〃	150P	〃
605		〃	170P	〃
32, 40		〃	200P	〃
408		〃	250P	〃

R-RESISTOR

117, 123, 137, 138, 139, 148, 502			
29, 122, 504, 602	½W	1.5KΩ	±10%
3, 27, 43, 54, 59, 134, 160, 405, 409	〃	2.2KΩ	〃
402, 802	〃	3.3KΩ	〃
102, 126, 147, 159, 201 505, 509	〃	4.7KΩ	〃
406	〃	8.2KΩ	〃
1, 9, 46, 52, 62, 64, 72, 73 111, 114, 118, 163, 302, 401	〃	10KΩ	〃
403	〃	18KΩ	〃
130, 168, 202, 512	〃	22KΩ	〃
801	〃	27KΩ	〃
36, 38, 404, 506, 511, 154	〃	33KΩ	〃
37, 39, 40, 42, 47, 119, 143 144, 146, 149, 151, 152, 153 164, 165, 166, 507	〃	47KΩ	〃
2, 5, 6, 19, 44, 56, 65, 110 112, 128, 131, 132, 133, 136	〃	100KΩ	〃

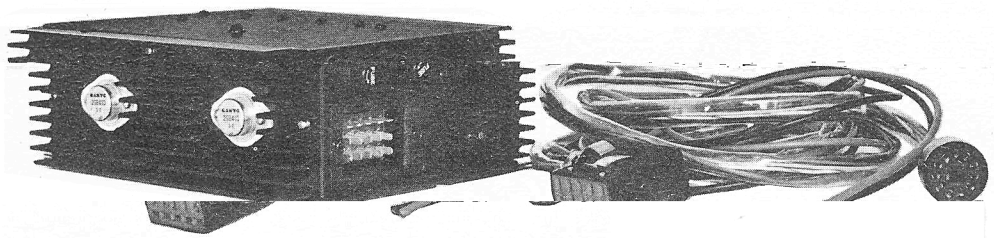
	RL-RELAY	
1	(ANT)	AE3254 DC100V
2		AE3218 DC12V
101	(VOX)	AE3254 DC100V
	XF-CRYSTAL FILTER	
101		XF-9 9MHz
	X-CRYSTAL	
101	(LSB)	HC/18U 9001.5KHz
102	(USB)	〃 8998.5KHz
201	7.0	HC/18U 11MHz
202	21.0	〃 33.5MHz
203	28.0 (OPTION)	〃 42.5MHz
204	28.5	〃 43.0MHz
205	29.0 (OPTION)	〃 43.5MHz
206	29.5 (〃)	〃 44.0MHz
301	CALIB	HC/13U 100KHz
	PL-PILOT LAMP	
1, 2		15V SWAN
	T-TRANSFORMER	
1	(OPT)	5K; 600 8Ω
	M-METER	
1		TYPE 45 500μA (SHUNT)
	PB-PRINTED BOARD	
PB-1046		GENERATOR
〃 1061		VFO
〃 1068		CALIBRATOR
〃 1044		VFO BPF
〃 1066		VOLT REG+ TONE OSC
〃 1041		HETERODYNE OSC
〃 1093		BUFF
	S-SWITCH	
1	BAND 1	5-10-5
2	〃 2	1-2-4
3	FUNCTION	4-8-5
4	SIDE BAND	MS-102-1
5	PTT/VOX	〃
6	OPER/REC/CAL	

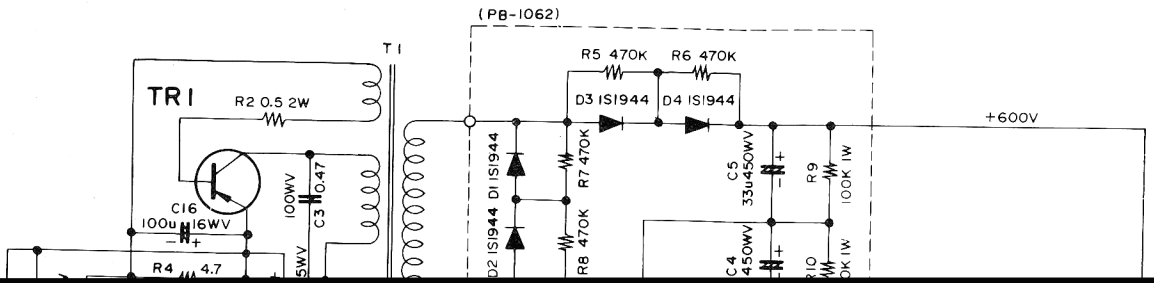
	L-INDUCTOR	
1	TRAP (9MHz)	USTC 0.06/4 40T
2	〃	〃
3	10M (LOCAL OSC / BPF COIL)	0.6φ 3T, S
4	15M 〃	0.6φ5T; 5¾T
5	40 〃 〃	0.4φ8T; 8¾T
6	80/20〃 〃	0.06/4 97T;½W1.5KΩ
7	80/40〃 RF COIL	0.06/4 23T
8	10 〃 〃	0.6φ 5T, S
9	15 〃 〃	0.3φ 8T
10	20 〃 〃	0.3φ 8T
11	RFC	TV-245
12	80/40M RF COIL	0.06/4 23T; 0.3φ5T
13	10 〃 〃	0.4φ 5T
14	15 〃 〃	0.3φ 8T
15	20 〃 〃	0.3φ 8T
16, 18, 24	PARASTIC COIL	½W56Ω 4TS 0.6φ
17, 19	〃	1W 56Ω 4TS 1φ
20	PLATE RFC	0.29φ 12φ×75
21	TANK COIL	1.2φ 30φ×65
101	IFT (9MHz)	0.3φ 15T 9.5TAP
102	〃 〃	0.3φ 15T
103	FILTER OUT	0.16φ 8T; 0.3φ 17T
104	〃 IN	0.3φ 13T
105	BM-T	0.16φ 4T; 0.3φ 18T
23, 106, 107, 201, 403		MICRO INDUCTOR 250μH
202		HET OSC OUT
401		VFO OSC (15φ×32)
601, 607		BAND PASS (VFO) 0.08 50T
301		4mH
	(AC POWER SUPPLY)	
	C-CAPACITOR	
101, 102		ELECTROLYTIC 450WV 47μ×2 or (40μ×2)

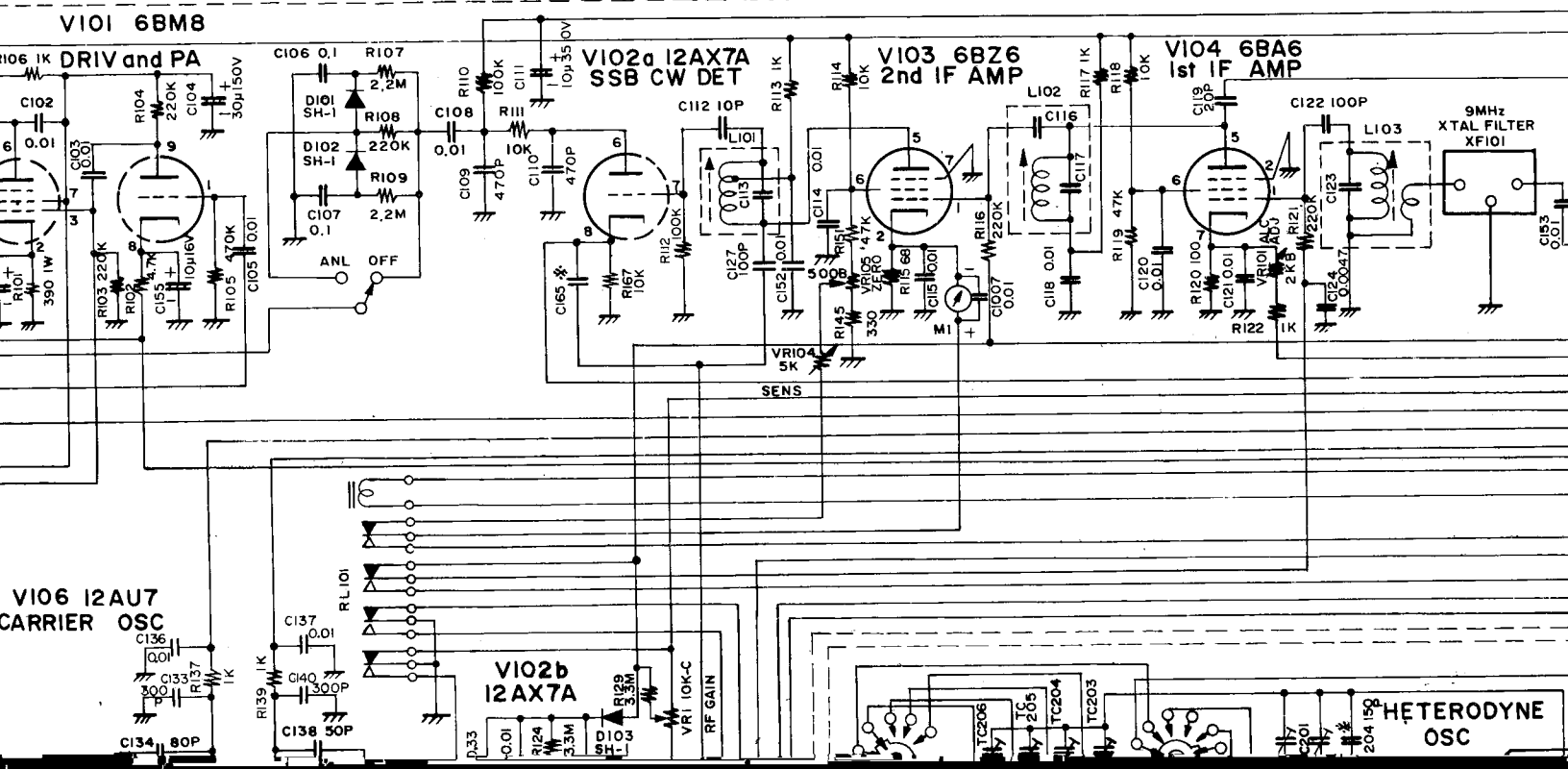

L3
S3
VR1
RL2
R55
S2
S6
L3～5
L1
L7
L8～10
L12
TC2

DC-200/250 DC POWER SUPPLY

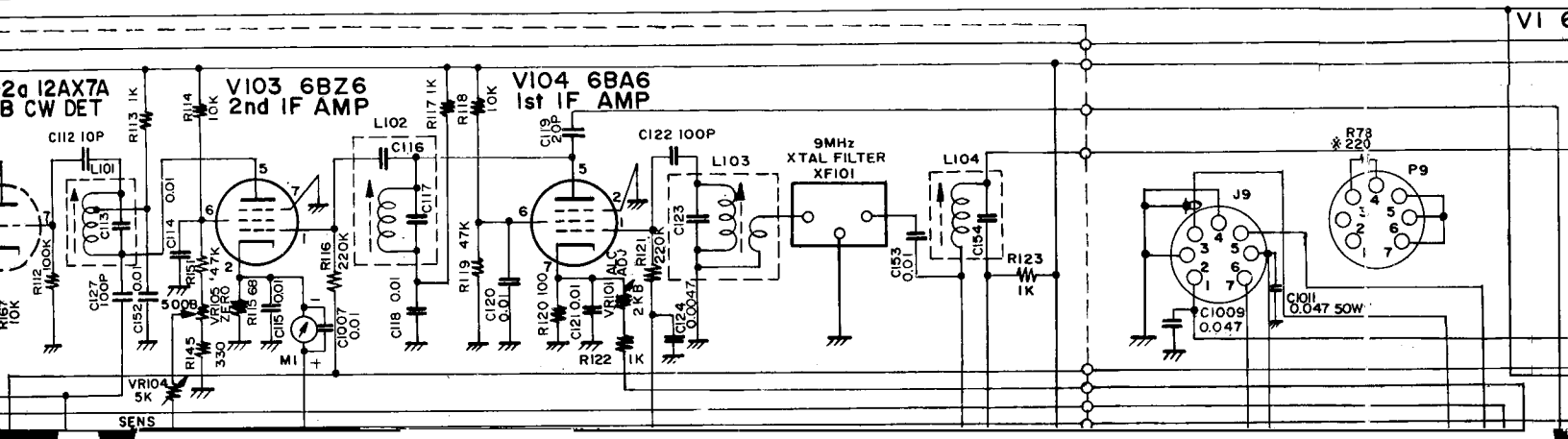
The DC-200/250 DC mobile supply is designed for the FT-200/250 Transceiver. This supply provides all necessary voltages from 12 volt battery for mobile operation.

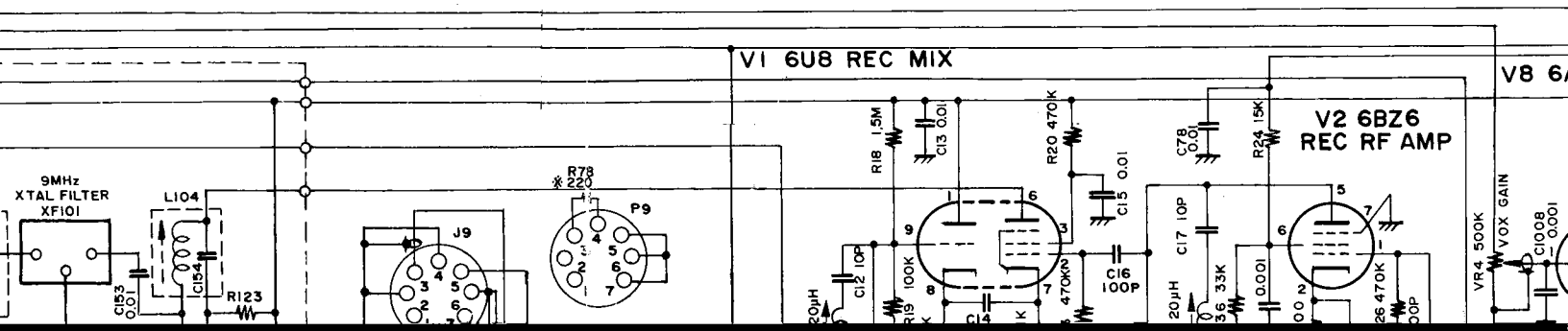


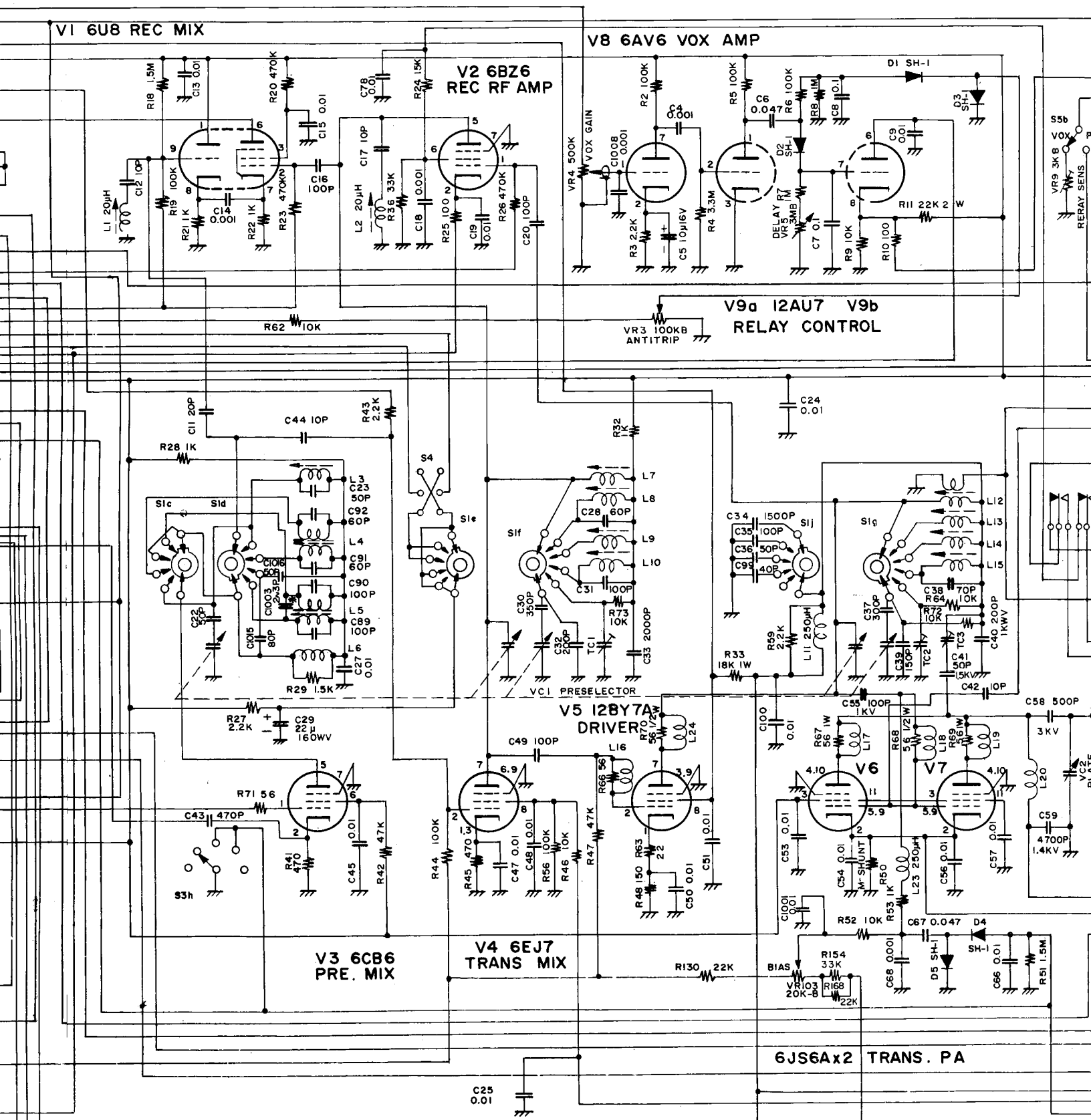


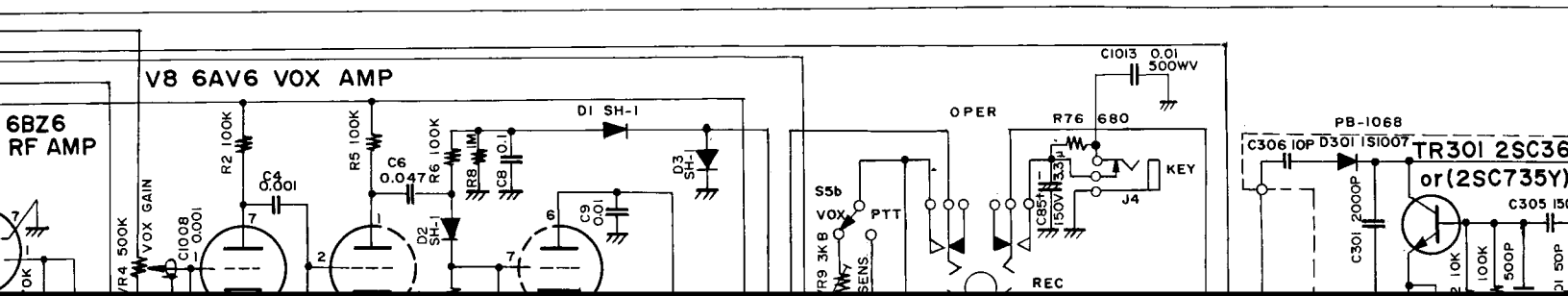

V101 6BM8
DRIV and PA
V102a 12AX7A
SSB CW DET
V103 6BZ6
2nd IF AMP
V104 6BA6
1st IF AMP
9MHz
XTAL FILTER
XF101
ANL OFF
SENS
RF GAIN
M1

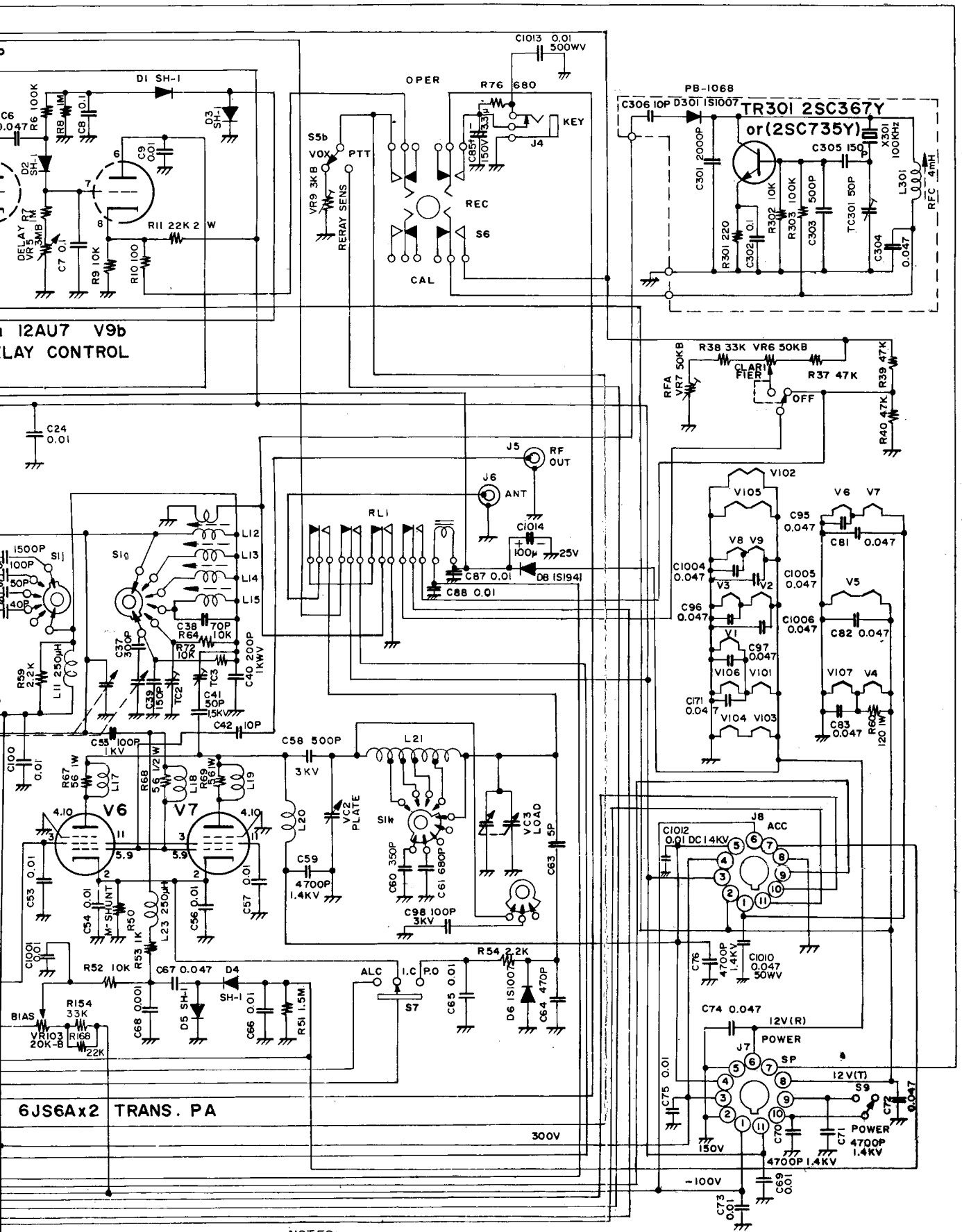
V106 12AU7
CARRIER OSC
V102b
12AX7A
HETERODYNE
OSC


2d 12AX7A
B CW DET
V103 6BZ6
2nd IF AMP
V104 6BA6
1st IF AMP
9MHz
XTAL FILTER
XF101
L101
L102
L103
L104
C112 10P
C113
C114 0.01
C116
C117
C118 0.01
C119 20P
C122 100P
C123
C124 0.0047
C127 100P
C152 0.01
C153 0.01
C154
C115 .001
C1007 0.01
C120 0.01
C121 0.01
C1009 0.047
C1011 0.047 50W
R112 100K
R113 1K
R114 10K
R115 68
R116 220K
R117 1K
R118 10K
R119 47K
R120 100
R121 220K
R122 1K
R123 1K
R145 330
R78 220
VR101 ALC ADJ 2KB
VR104 5K
SENS
M1
J9
P9


V1 6U8 REC MIX
V8 6A
V2 6BZ6
REC RF AMP
9MHz
XTAL FILTER
XF101
L104
C153
0.01
C154
R123
J9
R78
*220
P9
R18 1.5M
C13 0.01
R20 470K
C15 0.01
C78
0.01
R24 1.5K
C12 10P
R19 100K
C14
C16
100P
C17 10P
20μH
36 33K
0.001
26 470K
VR4 500K
VOX GAIN
C1008
0.001


V1 6U8 REC MIX
V2 6BZ6 REC RF AMP
V8 6AV6 VOX AMP
V9a 12AU7 V9b RELAY CONTROL
VR3 100KB ANTITRIP
R62 10K
VC1 PRESELECTOR
V5 12BY7A DRIVER
V3 6CB6 PRE. MIX
V4 6EJ7 TRANS MIX
V6
V7
6JS6Ax2 TRANS. PA
S4
S3h
S5b
VOX
RERAY SENS
BIAS
D1 SH-1
D2 SH-1
D3 SH-1
D4
D5 SH-1
D1 ~ D5
D101 ~ D103
D106
SH-1 or 1S1941
NOTES:
1. ALL RES
UNLESS
2. ALL CAPA
UNLESS
3. ※ VALUE


V8 6AV6 VOX AMP
6BZ6
RF AMP
R2 100K
C4
0.001
R5 100K
C6
0.047
R6 100K
R8
C8 0.1
D1 SH-1
D2
SH-1
D3
SH-1
C9
0.001
C1008
0.001
R4 500K
VOX GAIN
C1013 0.01
500WV
OPER
R76 680
S5b
VOX
PTT
R9 3K B
SENS
C85
150V
KEY
J4
REC
PB-1068
C306 10P
D301 1S1007
TR301 2SC36
or(2SC735Y)
C301 2000P
C305
10K
100K
500P



D1 ~ D5, D101 ~ D103, D106 } SH-1 or 1S1941

NOTES:

1. ALL RESISTORS IN OHM 1/2W ± 10% UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS IN μF UNLESS OTHERWISE NOTED.
3. ※ VALUE IS NOMINAL.

FT200/FT250

CIRCUIT DIAGRAM

335001