

V208 12AX7
MIC AMP

V209a 12AT7
VOX AMP

V209b 12AT7
RELAY CONTROL

V207 7360
B M

V201 6CB6
TRANS 1ST MIX

V3 6AH6
TRANS 2ND MIX

V4 6G5
DRIVER

V212 6U8
TONE OSC

V206 12AU7
CARRIER OSC

TROO1 2SC735
SHIFT

V211 6BA6
VFO BUFF

TR401 3SK22G
VFO OSC

TR202 2SC372

TR201 2SC504

V210 6BM8
AF AMP

V213 12AU7
SSB CW DET

V205 6BA6
REC 2ND IF

V204 6BZ6
REC 2ND IF
TRANS 1ST IF

V203 6B6
REC 2ND IF

J10 PATCH

MIC

J3 PHONES

J2 BU

J9 600N

PB-1001-2

TO RL-2b

TO C65-1

8700KHZ-9200KHZ

OFF FAST S2

AGC

ANL ON

OFF

* C2125

T 207

T 203

T 204

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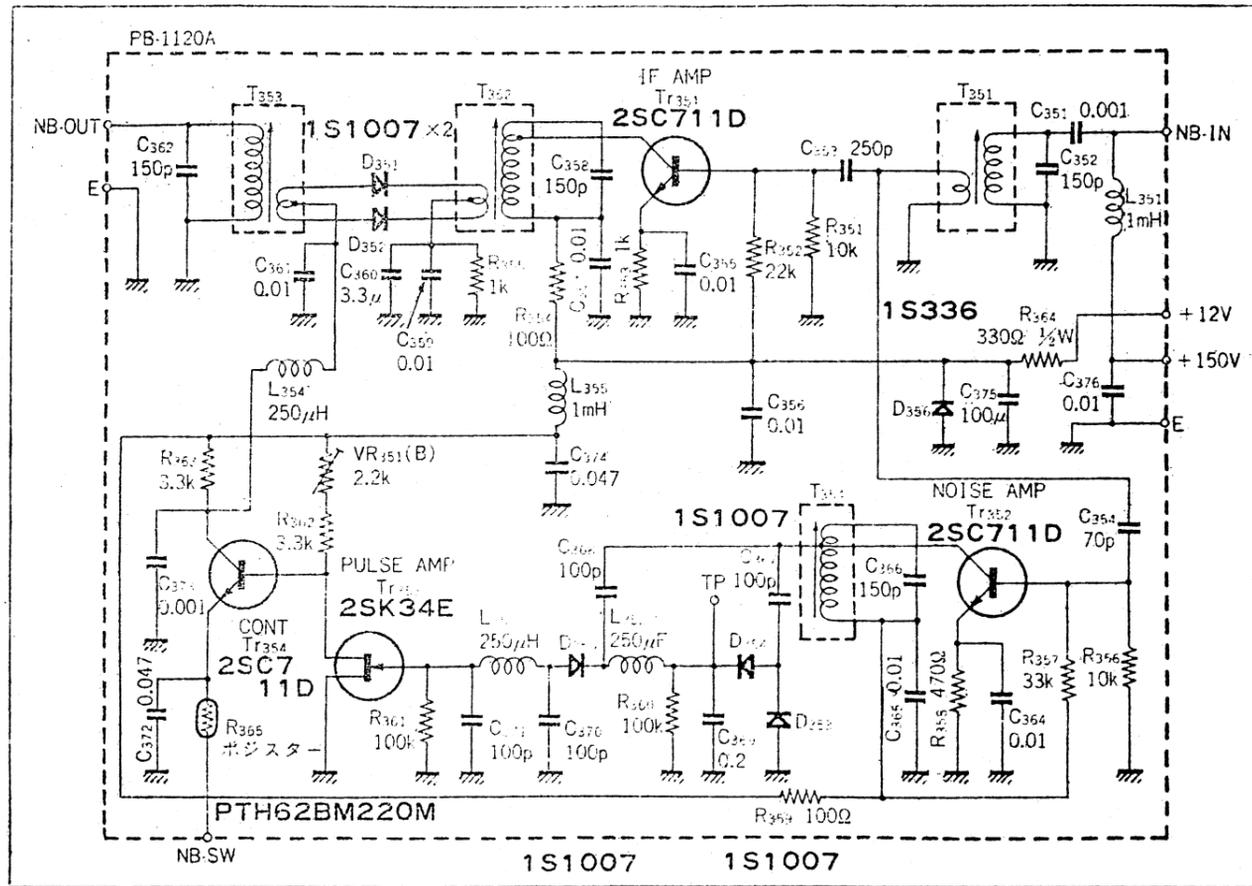
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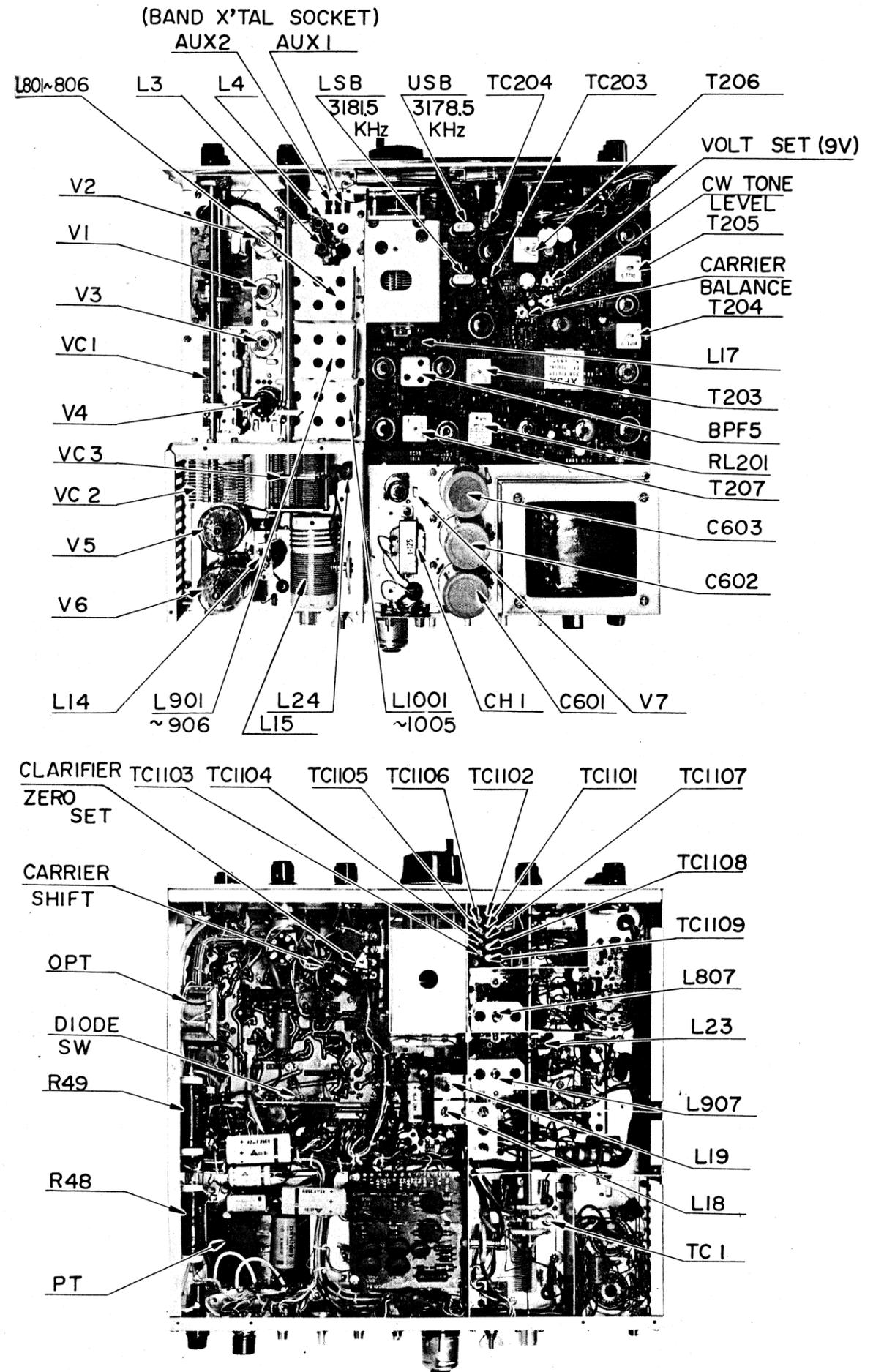
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FT-DX-401のノイズ・ブランカー回路

FT 560 DX



OPERATION

The two contact jack supplied with the accessory key as shown in the illustration. Most relay automatic keyers can be connected into the transceiver break-in operation without modification, but plug reed relay or transistorized automatic keyer place 390 ohm resistor in series with key

TUNING PROCEDURE - CW

Set up transceiver as described in transmitter tuning procedure adjusting CARRIER control to desired power output to maximum. After completion of final tuning, install key jack in rear of transceiver. Set MODE switch to CW and GAIN switch to MOX. The transceiver is now set for manual CW operation. After completing a transmission the VOX-GAIN switch must be returned to OFF position for receive operation. For break-in operation simply advance VOX-GAIN control.

DETONE ADJUSTMENT

CW sidetone level may be adjusted by rotating the level potentiometer (VR 203) located on the main circuit board under the top cover. NOTE: Do not disturb painting of adjacent paint marked controls.

SERVICE INSTRUCTIONS

WARNING

Dangerous voltages are present, therefore extreme care is essential. Be sure that all power is disconnected before working on the chassis. Check the high voltages in the capacitors by shorting the high voltage line to ground with an insulated screw driver. The transceiver has been aligned and calibrated at the factory with proper test instruments and should not require realignment. Service or replacement of a major component may require subsequent realignment, but do not attempt to make an alignment unless the operation of the transceiver is fully understood.

TEST EQUIPMENT REQUIRED

A signal generator, a vacuum tube volt ohm meter with RF probe, a general coverage communication receiver, and a 300 watt dummy load.

VOLTAGE AND RESISTANCE MEASUREMENTS

The table lists voltages and resistance at all tube sockets. These values are measured with a VTVM with all tubes installed in their respective sockets.

All measurements should be made from socket pins to ground.

Adjust transistor voltage regulator to exactly 9 volts with VR-202 on the printed board. Measure voltage at junction of R294 and R295.

TRANSMITTER ALIGNMENT

1. Disconnect the high voltage (600 volts) by unsoldering the lead at rectifier, and also the screen voltage by unsoldering the connection at pin 3 of the two tube sockets. (V5, V6)
2. Connect VTVM RF probe to pin 5 of V5.
3. Set the MODE switch to USB or LSB, and the VOX GAIN switch to MOX position. Adjust carrier balance potentiometer VR 201 on the main print board for minimum VTVM indication.
4. Advance MIC GAIN control two positions, and turn the MODE switch to CW/TUNE.
5. Adjust PRESEL control for maximum VTVM reading.
6. Adjust the MIC GAIN control during transmitter alignment to keep VTVM reading at 15 volts to avoid saturation of the circuits.
7. Start with upper slug of T203 nearly out and peak for peak VTVM reading.
8. Start with both slugs of T204 nearly out and adjust both slugs for peak VTVM reading.
9. Set the BAND switch to the 80 meter band, the main tuning dial to the center (250 KHz), and the PRESEL control at center. Adjust the slugs of L901 & L1001 for peak VTVM reading. Adjust the slugs on all appropriate bands from 40 to 15 meters using the same procedure. Set the BAND switch to 10B and the main tuning dial at upper edge, and adjust L905 and L1005 for peak VTVM readings.

10. Disconnect the VTVM from pin 5 of V5, and connect it to pin 2 of V202. Set the BAND switch to 10D and adjust slug L3 for peak VTVM reading. Set the BAND switch to 10C and adjust the TC1101 for peak VTVM reading. Adjust TC1102 for 10B, TC 1103 for 10A, TC1104 for 15 and TC1105 for the 20. Set the band switch to 40 and adjust L4 for peak VTVM reading. For 80 meter band, adjust TC1106 for peak VTVM reading. Disconnect VTVM.
11. It is not recommended to align BPF5 passband network unless proper measuring instrument is available.
12. Turn the FUNCTION switch to OFF. Restore unsoldered PA screen grid and high voltage wire.
13. Connect the transceiver output to a 50 or 75 ohms dummy load. Set the main tuning dial at center, and tune up the transceiver on 80 meter band as described. Adjust MIC GAIN control setting to keep PA current less than 100 ma. Readjust L1001 for peak meter reading. Readjust L1001 to L1005 for appropriate BAND settings.
14. Tune the transceiver to maximum output at 14,350 Kc. To measure spurious radiation, use the S-meter of another receiver and tune it to 14,520 Kc where a spurious signal can be heard. Adjust TC-205 for minimum S-meter reading without decreasing power output of the transceiver. Adjust L17 and L19 for minimum S-meter reading.

TRANSMITTER SIGNAL LEVEL

The following table shows voltage measuring points and normal signal levels. Before making measurements, set MODE switch to CW and unsolder the lead from pin 3 of V5, and V6 sockets. Set the VOX-GAIN switch to MOX. Plug-in key to key-Jack and close key to measure the signal level.

TEST POINT	FREQUENCY	RF VOLTAGE
V207 — pin 3	3,178.5 KHz	1 volt
V201 — pin 1	Variable	1.2 volts (Function STBY sw.)
V3 — pin 1	X-tal frequency selected	0.5-1 volts
V207 — pin 7	3,178.5 KHz	5.5 volts
V204 — pin 1	3,178.5 KHz	0.02 volts
V204 — pin 5	3,178.5 KHz	3.0 volts
V201 — pin 5	Variable IF	9.0 volts
V3 — pin 5	Transmit frequency	10.0 volts
V5 — pin 5	Transmit frequency	33.0 volts

Voltages given in the table are nominal and may vary $\pm 20\%$

FINAL AMPLIFIER NEUTRALIZATION

When replacing the final amplifier tubes necessary to reset the bias to 50 ma and check operation. Using the procedure outlined below will give maximum output and long tube life.

CAUTION:

HIGH VOLTAGES ARE PRESENT ON UNDERSIDE OF CHASSIS.

USE GREAT CARE WHILE MAKING ADJUSTMENTS WITH WIRING EXPOSED.

1. Locate TC-1 the neutralization variable capacitor shaft on the underside of chassis near the last switch wafer, in the final amplifier section.
2. Connect antenna to dummy load, set meter to I.C. position.
3. Check final amplifier bias in upper or lower Side position. If meter indicates other than 50 ma, reset to 50 ma.
4. Tune up the transceiver in the center of the 15 meter band.
5. After tune up place meter in I.C. position, switch in Tune position, and advance Mic Gain control until meter reads 150 ma.
6. Rotate Plate tuning control and observe dip as indicated on meter. (NOTE: If dip is not prominent, reduce loading control slightly for better indication. As the Plate control is rotated the meter should move equally and smoothly on either side of maximum indication.)
7. Determine which side of the dip rises abruptly. Rotate Plate control slightly to this side of dip keeping meter reading below 200 ma.
8. Using a non-metallic tuning wand, rotate neutralization capacitor shaft *very slightly* in the direction which reduces the current shown on the meter.
9. Repeat steps 7 and 8 until the meter indicates smooth, equal rise on either side of the maximum point.

RECEIVER CIRCUIT ALIGNMENT

When the transmitter circuits are aligned, the only element remaining for the receiver circuits are the last P stage transformer T205, antenna input transformer L801 to L805, trap coils L806, L906, L23 and S-meter zero set.

1. Connect signal generator output to the antenna terminal. Set the BAND switch to 80 meters, and receive 1750 Kc signal from signal generator. Adjust PRESEL control for peak S-meter reading. Adjust L801 for peak S-meter reading. Adjust coils L802 to L805 at 7,250, 14,250, 21,250, 29,000 KHz respectively for peak S-meter reading.

2. Tune the receiver circuit to 7,100 KHz incoming signal, and leave controls as is. Apply 5,920 KHz signal generator output to antenna terminal. Adjust L806, L906, for minimum S-meter reading. Then tune the receiver to 7,500 KHz and adjust L23 same as above at 5,520 KHz signal generator output.
3. Tune the receiver to incoming signal on any band, and adjust slugs of Lower slug of T203 and slugs of T205 for peak S-meter reading.

RECEIVER SIGNAL LEVEL

The following table shows test points and nominal signal level to produce S-9 reading on S-meter.

SIGNAL GENERATOR CONNECTION POINT	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR OUTPUT LEVEL
V205 — pin 1	3,180 HKz	100 db
V204 — pin 1	3,180 HKz	75 db
V203 — pin 7	5,770 KHz	77 db
V201 — pin 1	5,770 KHz	50 db
V1 — pin 1	14,255 KHz	47 db
Antenna Terminal	14,255 KHz	34 db
Oscillator injection voltages		
V213 — pin 7	3,178.5 KHz	4 volts
V203 — pin 1	Variable	3 volts
V202 — pin 1	Crystal Selected	1-2 volts

The receiver was tuned to 14,255 KHz for these measurements and the test signal injected at indicated test points. Signal generator output levels are taken from signal generator attenuator. All values are nominal and may vary $\pm 20\%$ without degrading performance.

TROUBLE SHOOTING GUIDE

DEFECT	POSSIBLE CAUSE
PA idling current unstable:	<ol style="list-style-type: none"> 1. Defective V5 and V6. 2. Defective Bias supply including bias potentiometer.
Insufficient load:	<ol style="list-style-type: none"> 1. PRESEL improperly tuned. 2. BAND switch improperly set. 3. Antenna not resonant at frequency. 4. Defective antenna or transmission line. 5. V3, V4, V5, V6 defective. 6. Defective rectifier.
Insufficient carrier suppression:	<ol style="list-style-type: none"> 1. Defective V207. 2. Carrier balance control improperly set. 3. Defective crystal X201 or X202. 4. Carrier frequency improperly set.
Distorted transmitted signal:	<ol style="list-style-type: none"> 1. Excessive MIC GAIN adjust. 2. V7 defective. 3. D2, D3 defective. 4. Incorrect neutralization.
Insufficient drive or no drive:	<ol style="list-style-type: none"> 1. Defective rectifier. 2. Defective V204, V201, V3, V4, V5. 3. Defective crystal.
Low receiver sensitivity:	<ol style="list-style-type: none"> 1. Antenna relay back contacts defective. 2. Defective V1, V201, V203, V204, V205.
VOX unstable:	<ol style="list-style-type: none"> 1. Defective V209. 2. Improper setting of VOX GAIN and ANTITRIP controls.