SERVICE INSTRUCTIONS

94X1660
1156

Communication Receiver Model SX104
Mark 1

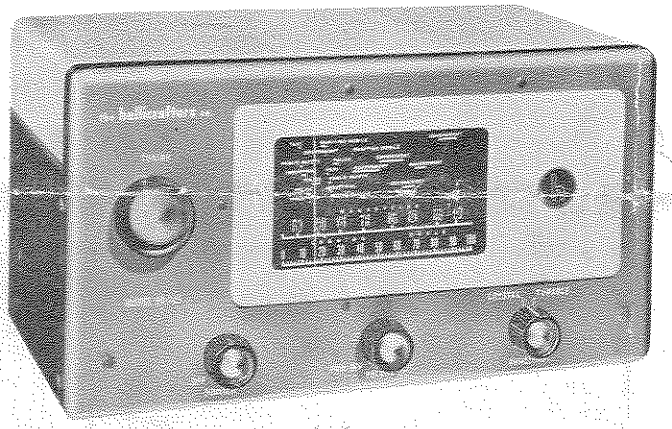

Fig. 1. Model SX104

SPECIFICATIONS

Tubes and Rectifiers. . .8 tubes and 1 selenium rectifier
Speaker ..... 5 inch PM
Voice Coil Impedance ..... 3.2 ohms
Headphone Output Impedance .....50-5000 ohms
Antenna Input Impedance ..... 300 ohms
Antenna. . . . . .Vertically polarized whip or doublet
Intermediate Frequency .....10.7 MC
Power Supply. . . . . 105-125 volts 60 cycle AC
Frequency Coverage .....30 to 50 MC
Dimensions (overall)..... 7-1/2" High x 13" Wide x 8-3/4" Deep
Net Weight.....11-1/2 Lb.
Shipping Weight .....13-1/2 Lb.

SQUELCH RANGE CONTROL ADJUSTMENT

The Squelch Range control (Figure 3) adjusts the operating point of the output section of the 12AU7 squelch tube (V-8). This control has been carefully adjusted at the factory for proper operation and will normally not require readjustment unless the squelch tube, relay, or components in the squelch circuit have been replaced. If adjustment is necessary, proceed as follows:

1. Connect a DC milliammeter (0-15 ma) in series with the squelch relay, RY-1, in the plate circuit of the squelch tube, V-8.
2. Set the Volume control at maximum, the Squelch Range control fully clockwise (minimum resistance) and the Squelch control on the front panel fully counterclockwise (maximum resistance) but not at "Off".
3. Tune the receiver to noisy part of the band where no signal is present.
4. With no signal tuned in, slowly rotate the Squelch Range control counterclockwise until the noise is just squelched (disappears). At this point the relay contacts are closed and the grid of the audio output tube is shorted to ground. Note the plate current reading of the squelch tube (should be anywhere from 6.5 to 10.25 ma), and then continue to advance the Squelch Range control until the plate current drops 2 ma from that obtained at the point of squelch. This is the proper setting of the Squelch Range control.

   If a milliammeter is not available, the Squelch Range control can be "roughly" set by adjusting the Squelch Range control to the point of squelch as outlined above and then advancing the control 65° farther counterclockwise.

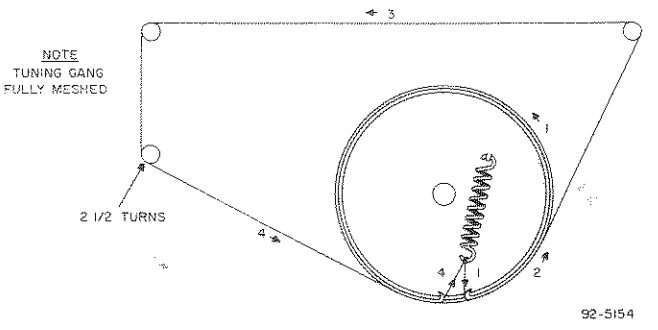

Fig. 2. Dial Cord Stringing Diagram

CRYSTAL OPERATION

The Hallicrafter Model SX104 is designed for crystal use, although crystals are not supplied with the receiver. It is advantageous to use this feature if considerable use of some particular frequency is expected. By selecting the proper crystal to cover the desired frequency, more stable reception of this frequency will be attained. Select the crystal you want, according to the formulas which follow, and insert it in the crystal socket located on the chassis base, just to the left of the autoformer near the front panel. Set the operation switch to the crystal position and tune in the frequency desired. The following formulas should be used for selecting the proper crystal:

SX104 Crystal Frequency = Signal frequency desired (MC) + 10.7 MC
3rd Mode Crystal - Low End 29 MC - High End 51 MC
Range of Crystal = 39.7 MC to 61.7 MC

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ALARM CONNECTIONS

On the back of your receiver are two terminals marked ALARM. Connecting a bell on light alarm circuit to these terminals will permit visual or audible notification when a signal is on the air. Whatever alarm circuit is used must be self-powered as the receiver provides only the necessary switching to actuate the alarm. The alarm circuit should be of low voltage (24 volts or less).

To turn the receiver off, rotate the Volume control fully counterclockwise, until a click is heard.

IF ALIGNMENT

- Use a 10.7 MC signal generator, either amplitude modulated or unmodulated.
- Connect high side of generator through a .01 mfd. capacitor to pin 7 of V-2; connect low side to chassis.
- Set function switch to tunable position
- Adjust generator output to maintain a one volt reading on VTVM.
- Set Volume control at maximum and Squelch control at "Off".
- See Figure 3 for location of alignment adjustments.

1. Connect DC probe of VTVM to pin 2 of V-5; common lead to chassis. Adjust B, C, D, E, and F for maximum output.
2. Connect two 470,000 ohm resistors in series between pin 2 of V-5 and the chassis. Connect DC probe of VTVM to junction of R-10 and C-16; common lead to center tap of the two 470,000 ohm resistors. Adjust A for zero reading between a positive and negative peak. The two peaks should have approximately the same amplitude. If not, readjust B slightly and then touch up A.

RF ALIGNMENT

- Use a signal generator either amplitude modulated or unmodulated which covers 33 MC and 49 MC.
- Connect high side of generator through a 270 ohm resistor to terminal "A" on antenna terminal strip on rear of chassis; low side to terminal "G".
- Use a non-metallic alignment tool.
- Set function switch to tunable position.
- Connect DC probe of VTVM to pin 2 of V-5; common lead to chassis.
- Adjust generator output to maintain a one volt reading on VTVM.
- Set Volume control at maximum and Squelch control at "Off".
- See Figure 3 for location of alignment adjustments.

1. Set generator and receiver dial to 49 MC and adjust G, then H, and then I for maximum output. When adjusting I, "rock" tuning capacitor slightly.
2. Check calibration at low end of receiver by setting generator and receiver dial to 33 MC. A calibration adjustment is usually not necessary and should not be made unless the oscillator coil on the top front of the tuning gang has been replaced. If adjustment is required, the oscillator coil lead connected to the chassis should be unsoldered and its length varied until maximum output is obtained at 33 mc.

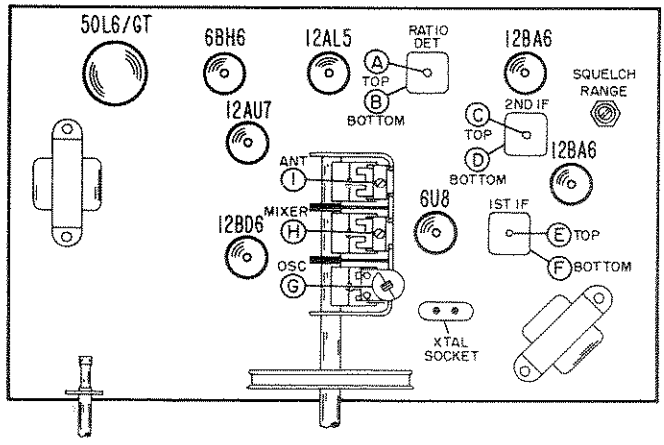
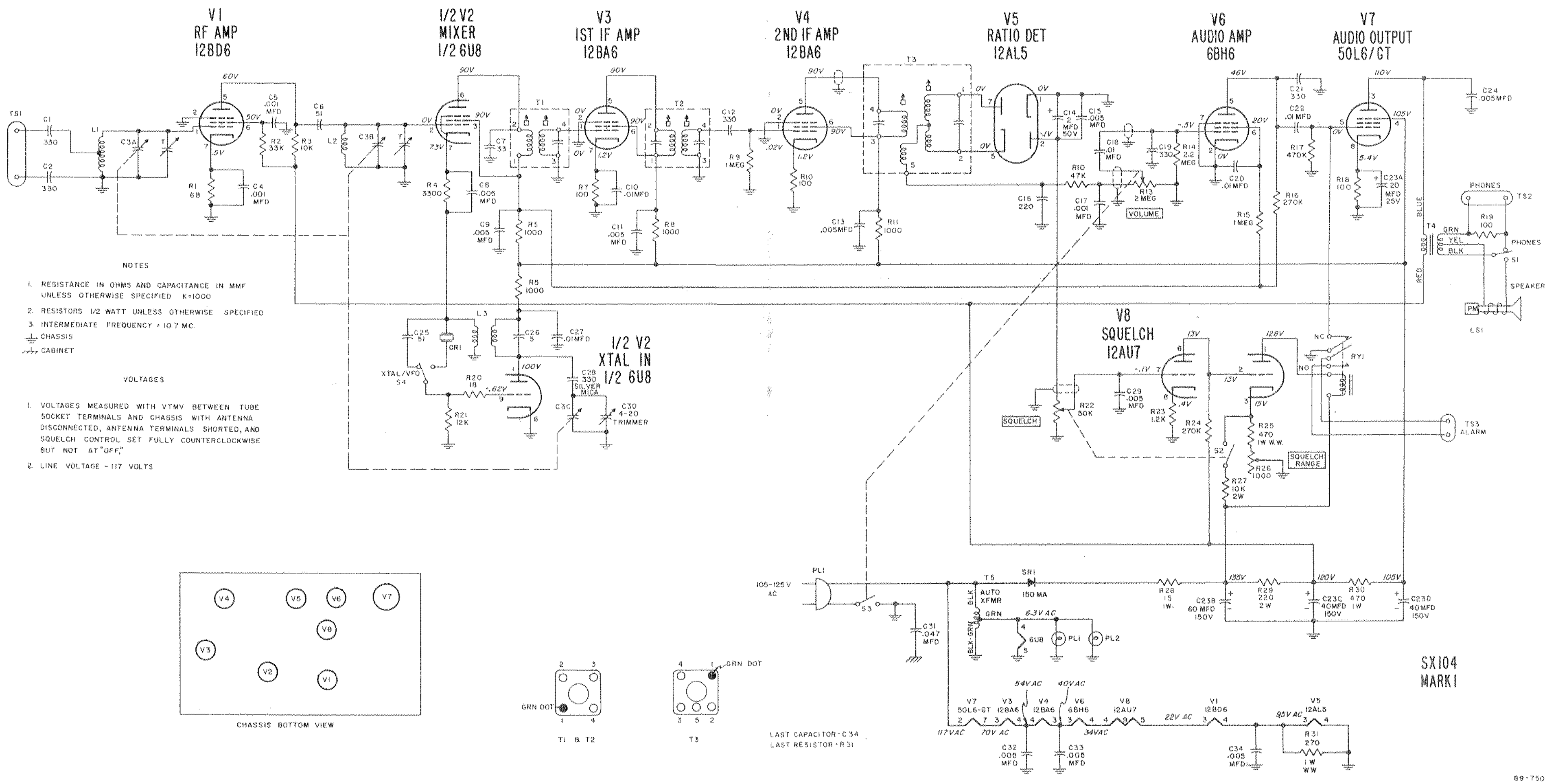


Fig. 3. Tube Location and Alignment Adjustments



NOTES

1. RESISTANCE IN OHMS AND CAPACITANCE IN MMF UNLESS OTHERWISE SPECIFIED K=1000
2. RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED
3. INTERMEDIATE FREQUENCY = 10.7 MC.

CHASSIS

CABINET

VOLTAGES

1. VOLTAGES MEASURED WITH VTMV BETWEEN TUBE SOCKET TERMINALS AND CHASSIS WITH ANTENNA DISCONNECTED, ANTENNA TERMINALS SHORTED, AND SQUELCH CONTROL SET FULLY COUNTERCLOCKWISE BUT NOT AT "OFF."
2. LINE VOLTAGE - 117 VOLTS

SERVICE PARTS LIST

Schematic Symbol	Description	Part Number
	CAPACITORS	
C-1, 2, 12, 19, 21	330 mmf. 10% N750... 500V, fixed ceramic, Durez dip	47CA25331K/D
C-3A, B, C	M. in Tuning Gang	48D391
C-4, 5, 17	.001 mfd. GMV ..... fixed ceramic disc	47B230
C-6, 25..	51 mmf. 10% N750,... fixed ceramic	47X20UK510K/D
C-7.....	33 mmf. 5% 500V,.... fixed ceramic	47X25CG330J
C-8, 9, 11, 13, 15, 24, 29, 32, 33, 34	.005 mfd. 20% ..... fixed ceramic disc	47A168
C-10, 18, 20, 22, 27	.01 mfd. GMV, ... fixed ceramic disc	47A224
C-14....	2 mfd. 50VDC,..... electrolytic	45B192
C-16....	220 mmf. 5% N750.... fixed ceramic	47X32UK221J
C-23A, B, C, D	60-40-40 mfd. @ ..... 150V, 20 mfd. @ 25V, electrolytic	45B091
C-26....	5 mmf. N750 ±120.... PPM, fixed ceramic	47-681
C-28....	330 mmf. 5% 300V,... fixed silver mica	47X20C331J
C-30....	4-20 mmf., variable.. ceramic trimmer	44A115
C-31....	.047 mfd. 600V, ... fixed tubular plastic	46BR473L6
	RESISTORS	
R-1.....	68 ohm 10% 1/2w, ... fixed comp	23X20X680K
R-2.....	33K ohm 10% 1/2w,... fixed comp	23X20X333K
R-3.....	10K ohm 10% 1/2w,... fixed comp	23X20X103K
R-4.....	3300 ohm 10% 1/2w, .. fixed comp	23X20X332K
R-5, 6, 8, 11	1000 ohm 10% 1/2w, .. fixed comp	23X20X102K
R-7, 10, 18, 19	100 ohm 10% 1/2w, ... fixed comp	23X20X101K
R-9, 15..	1 megohm 10% 1/2w, . fixed comp	23X20X105K
R-12....	47K ohm 10% 1/2w,... fixed comp	23X20X473K
R-13....	Variable, volume..... control	25A1425
R-14....	2.2 meg 10% 1/2w, ... fixed comp	23X20X225K
R-16, 24.	270K ohm 10% 1/2w,.. fixed comp	23X20X274K
R-17....	470K ohm 10% 1/2w,.. fixed comp	23X20X474K
R-20....	18 ohm 10% 1/2w, ... fixed comp	23X20X180K

Schematic Symbol	Description	Part Number
	RESISTORS (cont)	
R-21....	12K ohm 10% 1/2w,... fixed comp	23X20X123K
R-22....	Variable, squelch .... control	25B1114
R-23....	1200 ohm 10% 1/2w, .. fixed comp	23X20X122K
R-25....	470 ohm 10% 1/2w, ... fixed comp	23X20X471K
R-26....	Variable, Squelch adj.	25A1113
R-27....	10K ohm 10% 2w..... fixed comp	23X42X103K
R-28....	15 ohm 10% 1w..... fixed comp	23X30X150K
R-29....	220 ohm 10% 2w, ... fixed comp	23X42X221K
R-30....	470 ohm 10% 1w, ... fixed comp	23X30X471K
R-31....	270 ohm 10% 1w, ... fixed wirewound	24BW271E
	TRANSFORMERS AND COILS	
L-1.....	Coil, antenna	51B2232
L-2.....	Coil, R.F.	51B2233
L-3.....	Coil, oscillator	51B2212
T-1.....	Transformer, 1st I.F.	50C519
T-2.....	Transformer, 2nd I.F.	50C517
T-3.....	Transformer, Ratio .. det.	50C518
T-4.....	Transformer, output..	55A127
T-5.....	Autoformer.....	52C481
	TUBES AND RECTIFIERS	
SR-1....	Rectifier, Selenium... 150 MA	27A158
PL-1, 2 .	Lamp, pilot.....	39A003
V-1.....	Tube, Electron,..... type 12BD6r ₁	90X12BD6
V-2.....	Tube, Electron,..... type 6U8	90X6U8
V-3, 4...	Tube, Electron,..... type 12BA6	90X12BA6
V-5.....	Tube, Electron,..... type 12AL5	90X12AL5
V-6.....	Tube, Electron,..... Type 6BH6	90X6BH6
V-7.....	Tube, Electron,..... type 50L6/GT	90X50L6/GT
V-8.....	Tube, Electron,..... type 12AU7	90X12AU7
	MISCELLANEOUS	
	Baffle, Speaker	31B974
	Bracket, Dial plate...	67A4205
	Bracket, switch..... mounting	67A4368
	Bushing, tuning shaft .	77A1338
	Cabinet.....	66A1490
	Clip, dial glass	76A390
	Clip, pilot lamp.....	76A660
	Coupling, shaft.....	29A264

Schematic Symbol	Description	Part Number
	MISCELLANEOUS (cont)	
	Cover, cabinet.....	66A1489
	Dial glass & ..... calibration	22-543
	Escutcheon	7A657
	Foot, rubber.....	16A007
	Gasket, dial	12A042
	Gasket, cover.....	12A044
	Grommet, nylon plasti. (spacer, cabinet)	2B2432
	Grommet, nylon plasti. (spacer, front panel)	2B2462
	Grommet, nylon plasti. (spacer, dial plate)	2B2464
	Instruction book.....	94X1669
	Insulator, switch.....	8A1206
	Insulator strip ..... (chassis rear)	8C1628
	Insulator, mounting... board (squelch control)	8A3692
	Insulator, mounting... board (volume control)	8A3693
	Insulator feet	8A3710
	Insulator, dial plate .. back	8B3718
	Insulator, cabinet .... back	8C3720
	Knob, main tuning....	15B802
	Knob, control, volume squelch, crystal/ manual	15B816
	Line cord.....	87B4948
	Lock, Line Cord ..... (male)	76A397-1
	Lock, Line Cord ..... (female)	76A397-2
	Medallion, "h" ..... trademark	7A669
	Panel, front	68A546
	Plate, dial.....	63A2341
	Pointer, indicator....	82B321
	Pulley.....	28A052-7
	Receptacle AC line ...	10A975
RY-1 ...	Relay, D.C. (squelch) .	21B302
	Ring, retaining.....	76A1052
	Shaft, extension.....	74A1288
	Shaft, tuning.....	74A1254
	Shield, tube.....	69A232
	Shield, plate.....	69B611
	Shield, audio stage ...	69B694
	Socket, pilot lamp....	86B299
	Socket, 9 pin, wafer..	6A401
	Socket, 7 pin, wafer..	6B402
	Socket, crystal.....	6A417
	Socket, octal.....	6A296
	Spacer, dial clip	16A126
	Spring, dial cord.....	75A012
	Strip, sponge rubber.. (adhesive)	16A047-1
TS-1....	Strip, antenna	88A809
TS-3....	Strip, alarm.....	88A809
TS-2....	Strip, phone terminal .	88A510
S-1.....	Switch, slide (SPDT)..	60A243
S-2.....	Part of R-22 squelch..	------
S-3.....	Part of R-13 volume ..	------
S-4.....	Switch, crystal/..... manual tuning	60A823
LS-1....	Speaker 5" PM.....	85-196
	Plate, cabinet back....	63-2616