

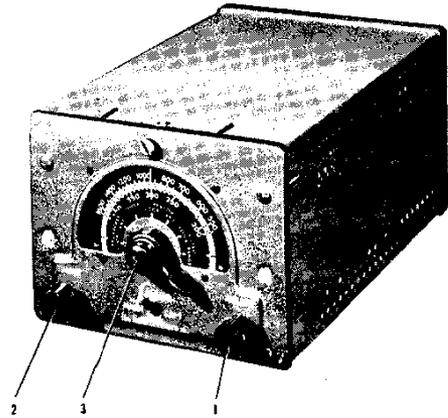
NOTE: SWITCH SHOWN IN EXTREME COUNTER CLOCKWISE POSITION AND VIEWED FROM FRONT.

NOTE: RESISTOR VALUES ARE IN OHMS. PAPER CAPACITOR VALUES ARE IN MFD. MICA CAPACITOR VALUES ARE IN MMFD. UNLESS OTHERWISE SPECIFIED.

**DETAILED SERVICE INFORMATION**

IF frequency	IF selectivity	Image ratio	Audio output	Transmitter output	Modulation
455 kc	4 to 5 kc at 6 db down	200:1 at 800 kc 5000:1 at 350 kc	300 milliwatts for headphones 3 watts for loud-speaker	10 watts	90%, Heising

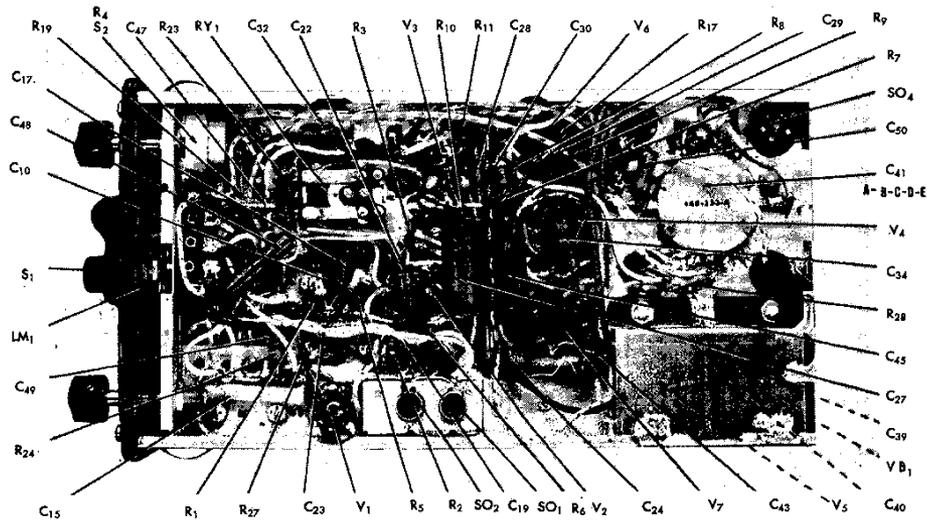
**KEY TO SELECTOR SWITCH S<sub>1</sub>**  
 POS.  
 1 - BROADCAST LOOP  
 2 - TOWER ANT.  
 3 - TOWER ANT.  
 4 - BEACON LOOP  
 5 - BEACON ANT.  
 6 - FILTER, VOICE  
 7 - FILTER, RANGE



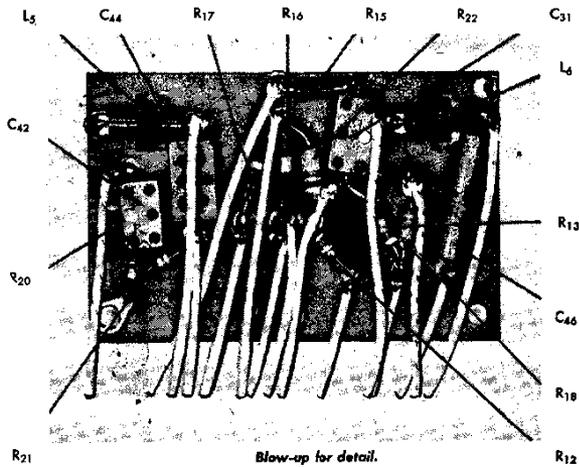
Model CA-2 front view

Controls: 1. Volume and on-off; 2. Receiver tuning;  
3. Master selector for following functions:

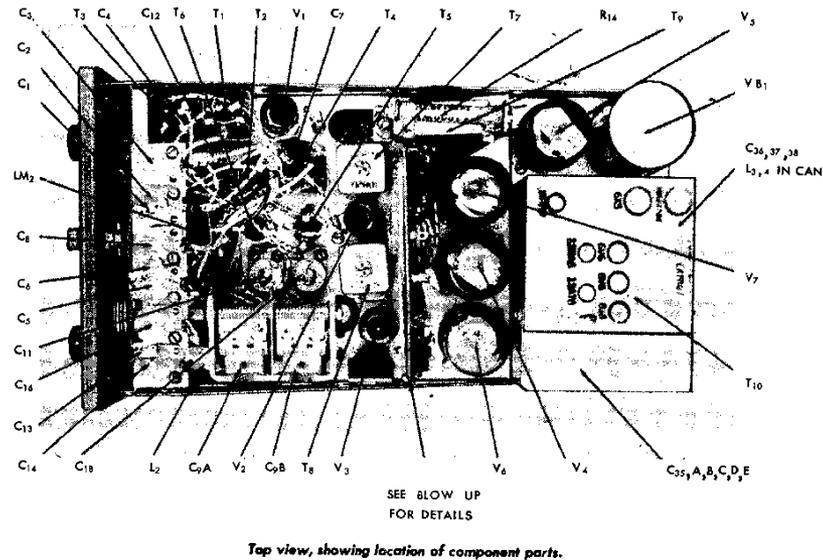
- |                                         |                        |
|-----------------------------------------|------------------------|
| a. Broadcast, loop.                     | d. Beacon, loop.       |
| b. Broadcast, antenna.                  | e. Beacon, antenna.    |
| c. Tower (pre-tuned to spot frequency). | f. Filter, voice only. |
|                                         | g. Filter, range only. |



Bottom view, showing location of component parts.



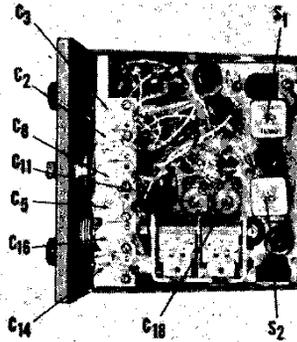
Blow-up for detail.



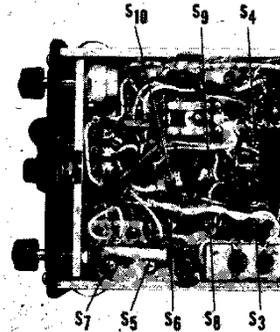
SEE BLOW UP  
FOR DETAILS

Top view, showing location of component parts.

# ALIGNMENT INSTRUCTIONS



Top view.



Bottom view.

## EQUIPMENT

**SIGNAL GENERATOR** capable of ranges indicated in the Alignment chart including a 400 cycle audio modulator.  
**OUTPUT METER** capable of handling 3 watts of audio power.  
**ANTENNA DUMMY LOAD** consisting of a 100 uuf condenser in series with the "hot" side of the signal generator bypassed with a 51 uuf condenser to ground on the load side of the series condenser.  
**LOOP DUMMY LOAD** consisting of a 20 uh coil ( $\frac{3}{4}$ " form,  $1\frac{1}{8}$ " winding of #22 dcc wire) bypassed by a 150 uuf condenser to ground.  
**AUDIO SIGNAL GENERATOR** capable of 1020 cps output.

## ALIGNMENT CHART

Step Number	Connection of Sig. Generator Output to Receiver	Signal Gen. Frequency Setting	Band Switch Setting	Receiver Dial Setting	Adjust Slugs, Padder, or Trimmer No.	Trimmer Description	Type of Adjustment
1	I-F ADJUSTMENT Pin No. 7 of V-1 (12BE6)	455 kc	Broadcast ant.	1000 kc	1 & 4	Input IF	Maximum output
2					2 & 3	Diode IF	Maximum output
3							Repeat steps 1 & 2
<b>BROADCAST BAND</b>							
4	SO-2	600 kc	Broadcast ant.	600 kc	S-10	Osc. slug	Maximum output
5	SO-2	1400 kc	Broadcast ant.	1400 kc	C-16	Osc. trimmer	Maximum output
6	SO-2	600 kc	Broadcast ant.	600 kc	S-9	Slug in T-4	Maximum output
7	SO-2	1400 kc	Broadcast ant.	1400 kc	C-8	Ant. trimmer	Maximum output
8	SO-2	2110 kc (image freq.)	Broadcast ant.	1200 kc		NOTE: Check for minimum image. If minimum image is not indicated, twist or untwist wire gimmick on top of coil until a minimum image is secured.	
9							Check and repeat steps 4, 5, 6, 7, & 8 if necessary
<b>BEACON BAND</b>							
10	SO-2	220 kc	Beacon ant.	220 kc	S-9	Osc. slug	Maximum output
11	SO-2	220 kc	Beacon ant.	220 kc	C-14	Osc. trimmer	Maximum output
12	SO-2	220 kc	Beacon ant.	220 kc	S-7	Beacon ant.	Maximum output
13	SO-2	380 kc	Beacon ant.	380 kc	C-5	Beacon ant. trimmer	Maximum output
14	SO-2	1260 kc (image freq.)	Beacon ant.	350 kc		NOTE: Check for minimum image. If minimum image is not indicated, twist or untwist wire gimmick on top of beacon antenna coil T-3 until a minimum image is received.	
15							Check steps 10, 11, 12, 13, & 14 and repeat adjustments if necessary
<b>TOWER</b>							
16	SO-2	278 kc	Tower		C-18	278 kc osc. trimmer	Adjust to frequency
17	SO-2	278 kc	Tower		C-11	278 kc ant. trimmer	Adjust to frequency
18							Repeat steps 16 & 17 for maximum output
<b>BROADCAST LOOP</b>							
19	Remove dummy antenna and connect dummy loop to loop socket SO-1 on unit. Dummy loop	600 kc	Broadcast loop	600 kc	S-6	Slug in broadcast loop trans. T-2	Maximum output
20	Dummy loop	1400 kc	Broadcast loop	1400 kc	C-3	Broadcast loop trimmer	Maximum output
21							Repeat steps 19 & 20 for maximum output
<b>BEACON LOOP</b>							
22	Dummy loop	220 kc	Beacon loop	220 kc	S-5	Slug in beacon loop trans. T-1	Maximum output
23	Dummy loop	380 kc	Beacon loop	380 kc	C-2	Beacon loop trimmer	Maximum output
24							Repeat steps 22 & 23 for maximum output
<b>FILTER VOICE ADJUSTMENT</b>							
25	*Same as for r-f alignment; connect audio oscillator to external modulation terminals on sig. gen. and set at 1020 C.P.S. 30% modulation. *This adjustment should be made with a 500 microvolt input. 1020 C.P.S. should be down approximately 18 db. from 400 C.P.S. level.	300 kc	Filter voice	300 kc	C-32	Range filter condenser	Minimum output of receiver

## TRANSMITTER ADJUSTMENT

Equipment required: Antenna loading coil, part #51B885-2, Capacitor, 27 mmfd, mica,  $\pm 10\%$ , Resistor, 6 ohm, 2 watt carbon,  $\pm 10\%$ , RF ammeter, 0-1 amp., Alignment tool, part #74A208, Transmission line part #87B1613-1, Microphone T-17 or M1-1. Series connect antenna loading coil to 27 mmfd capacitor, 6 ohm resistor and 0-1 RF ammeter to ground. Connect dummy antenna across transmission line with load coil to center conductor, plug transmission line into SO-1. Connect a 12 volt battery to power cable, turn on set and allow a few minutes warm-up period. Plug in microphone to jack, J-1. Set bandswitch to position No. 3 (Tower) and press microphone button. Tune antenna loading coil slug for maximum current reading on RF meter. For 12 volts DC power source, antenna current should be in the vicinity of .7 amperes. Whistling or talking in to the microphone should cause the antenna current to rise approximately 20%. Do not hold the press-to-talk microphone button down for more than 10 seconds at a time until all tuning adjustments are completed.

**GENERAL:** The Model CA-2 is a 7 tube Crystal controlled transmitter and a Superheterodyne receiver. The receiver incorporates two frequency ranges; 195 to 410 kc Beacon band and 540 to 1610 kc Broadcast band. The transmitter uses any one frequency range between 2 to 7 mc depending upon the crystal used—a 3105 kc crystal is provided.

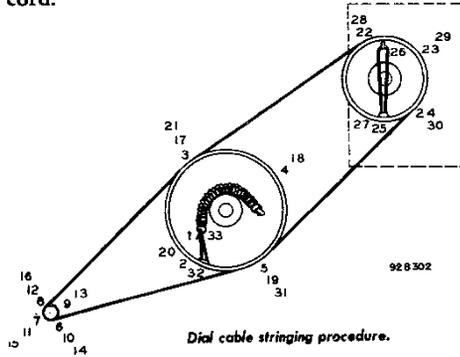
**CORD CONNECTIONS:** Consist of an audio and power cable, Antenna, and Direction finding loop antenna. All are located at the bottom of the set.

**POWER SUPPLY DATA:** Vibrator with rectifier, 12 volts DC, 13.75 volts nominal DC. Power drain is 3.5 amps on "Receive" and 5.3 amps on "Transmit."

**TUBE COMPLIMENT AND FUNCTIONS:** 12BE6 pentagrid converter, 12BA6 I.F. amplifier, 12AT6 detector, delayed AVC, and 1st audio, 6V6 output amplifier. The 12AT6 is used as a speech amplifier and the 6V6 as a Modulator when transmitting. The transmitter proper uses a 6J5 crystal oscillator and a 6V6 power amplifier.

**HOW TO RESTRING DIAL CORDS**

Cut a 30' length of 12 lb. test dial cord and tie one end to the tension spring on the pulley mounted on the hub of the bandswitch at position "1" on the diagram. Follow the numbers from "1" to "33," stretch the tension spring and tie cord securely. Cut off excess cord.



**TROUBLE SHOOTING CHART**

**SET IS DEAD**

Cause	Remedy
Defective power cable.....	Repair or replace cable.
Battery connections disconnected..	Check and make the connections.
Defective master switch on plane..	Repair or replace switch.
Blown fuse.....	Replace fuse.

**NO PLATE VOLTAGE**

Dead rectifier tube.....	Replace tube.
Defective vibrator.....	Replace vibrator.
Open plate circuit.....	Check continuity of plate circuit and repair.

**RECEIVER PERFORMS BUT TRANSMISSION IS DEAD**

Cause	Remedy
Inoperative crystal.....	Check and replace if necessary.
Defective microphone switch.....	Check and replace or repair if possible.
Defective relay or relay contacts.	Check and repair or replace if necessary.
Antenna not tuned properly.....	Retune

**FILAMENTS DO NOT LIGHT**

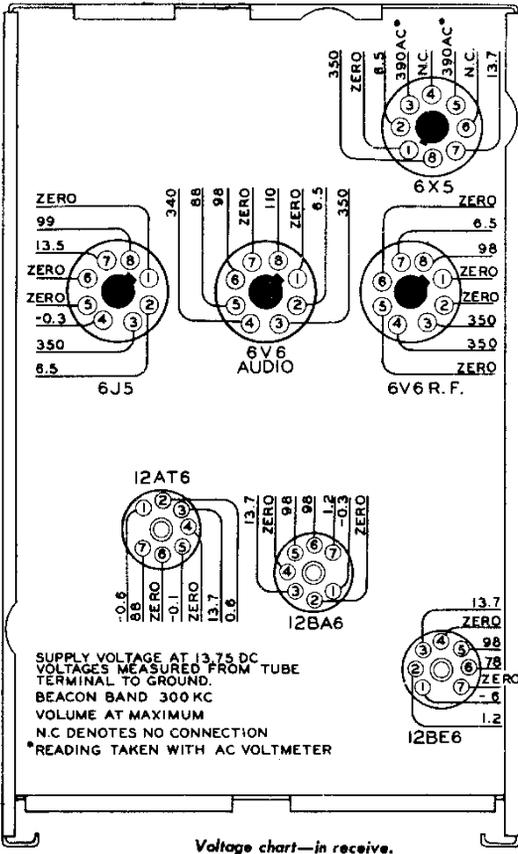
Defective filament circuit.....	Check filament wiring and repair.
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NOTE: Series parallel wiring on 6V6, 6X5 and 6J5 tubes.

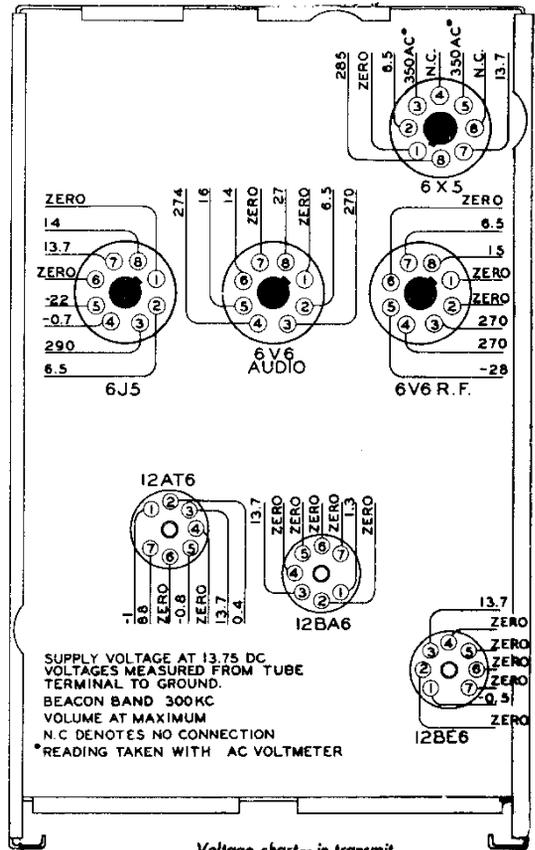
**SYMPTON:** Ignition Interference

**ANALYSIS:** Ignition noise is greatly reduced by inserting "damping" resistors in the grids of the oscillator mixer tube and a "limiting" resistor in the cathode circuit of the 2nd detector tube.

1. Install a 1500 ohm resistor in series with lead to pin no. 7 of V-1, 12BE6 tube. (R26)
2. Install a 1500 ohm resistor in series with lead to pin no. 1 of V-1, 12BE6 tube. (R27)
3. Install a 75 ohm resistor in series with lead to spark plate that is connected to pin no. 2 of socket, SO-4. (R28)



Voltage chart—in receive.



Voltage chart—in transmit.

REPLACEMENT PARTS LIST FOR MODEL CA-2 SKYFONE TRANSCEIVER

REF. NO.	DESCRIPTION	HALLICRAFTERS PART NUMBER	REF. NO.	DESCRIPTION	HALLICRAFTERS PART NUMBER
<b>CONDENSERS</b>			<b>RESISTORS—Continued</b>		
C-36, 37	.02 mfd; 600 vdcw; paper tubular	46AY2031	R-12, 13	470,000 ohm; 20%; 1/2 watt; carbon	RC20AE424M
C-45	.02 mfd; 1600 vdcw; paper tubular	46A098-1	R-5, 19	68 ohm; 20%; 1/2 watt; carbon	RC20AE680M
C-19, 22, 49, 45, 50	.01 mfd; 150 vdcw; paper tubular	46A099-2	R-16	100 ohm; 20%; 1 watt; carbon	RC30AE101M
C-23, 24	.1 mfd; 150 vdcw; paper tubular	46A099-4	R-17	220 ohm; 20%; 1 watt; carbon	RC30AE221M
C-39, 34	.05 mfd; 150 vdcw; paper tubular	46A099-3	R-19	39 ohm; 20%; 2 watt; carbon	RC40AE390M
C-30	.001 mfd; 150 vdcw; paper tubular	46A099-5	R-26, 27	1500 ohm; 20%; 1/2 watt; carbon	RC20AE152M
C-38	.25 mfd; 150 vdcw; paper tubular	46A099-6	R-28	75 ohm; 20%; 1/2 watt; carbon	RC20AE75M
C-33	.002 mfd; 600 vdcw; paper tubular	46A100-1	R-25	150 ohm; 20%; 1/2 watt; carbon	RC20AE151M
C-30	.0001 mfd; 600 vdcw; paper tubular	46A100-2	<b>TRANSFORMERS AND CHOKES</b>		
C-29	.0005 mfd; 600 vdcw; paper tubular	46A100-3	T-7	IF, 1st	50B206
C-9A, B	Variable main tuning condenser	48C182	T-8	IF, 2nd	50B207
C-47	5 mmf; 20%; 500 vdcw; mica	CM20A050M	T-3	Converter, "Beacon"	51B859
C-44, 28	100 mmf; 20%; 500 vdcw; mica	CM20A101M	T-4	Converter, Broadcast	51B860
C-10, 17	150 mmf; 20%; 500 vdcw; mica	CM20A151G	T-6	Osc., "Beacon"	51B861
C-42	47 mmf; 20%; 500 vdcw; mica	CM20A470M	T-5	Osc., Broadcast	51B862
C-31	470 mmf; 20%; 500 vdcw; mica	CM20A471M	T-1	Loop, "Beacon"	51B863
C-1, 6	75 mmf; 5%; 500 vdcw; ceramic	CC25UK7501	T-2	Loop, Broadcast	51B864
C-13	120 mmf; 5%; 500 vdcw; ceramic	CC30UK121J	T-9	Power Transformer	52C126
C-48	150 mmf; 10%; 500 vdcw; ceramic	CC36UK151K	T-10	Output Transformer	53A075
C-45	220 mmf; 10%; 500 vdcw; ceramic	CC36UK221K	L-3, 4	Hash choke	53A100
C-12	270 mmf; 2%; 500 vdcw; ceramic	CC41TK271G	L-5, 6	RF choke	53A101
C-15	620 mmf; 5%; 500 vdcw; ceramic	CC45UK621J	L-2	Range filter choke	56B072
C-2, 3, 5, 8, 11, 14, 16, 18	4-30 mmf trimmer; ceramic	44A103	<b>MISCELLANEOUS</b>		
C-37	2300 mmf trimmer; compression	44B108	LM-2	Lamp, pilot, No. 44	39A003
C-35A, B, C, D, E	Capacitor assembly	45C104	RV-1	Lamp, neon indicator	39A012
C-41A, B, C, D, E	Ignition filter assembly	46B133	VB-1	Octal, complete	21B072
<b>RESISTORS</b>			LS-1	Vibrator, nonsynchronous	17A139
R-14	3900 ohms; 10%; 10 watt; wire wound	24BG392E		Knob, volume and tuning	15A074-1
R-4 & S-2	VOLUME control including switch	25A568		Knob, bar, bandswitch	15A073-1
R-22	100 ohms; 20%; 1/2 watt; carbon	RC20AE101M		Antenna and loop socket assembly	10A247
R-10	1000 ohms; 20%; 1/2 watt; carbon	RC20AE102M		Bandswitch	60C260
R-21	10,000 ohm; 20%; 1/2 watt; carbon	RC20AE103M		Dial light socket	86A041-1
R-6	100,000 ohm; 20%; 1/2 watt; carbon	RC20AE104M		Octal, socket	6A273
R-8	1 megohm; 20%; 1/2 watt; carbon	RC20AE105M	SO-4	Socket, 6 prong, power	6A282
R-11	10 megohm; 20%; 1/2 watt; carbon	RC20AE106M	PL-4	Plug, 6 prong, power	10A241
R-15	15 ohm; 20%; 1/2 watt; carbon	RC20AE150M		Socket, 7 prong min.	6A254
R-9, 24	220 ohm; 20%; 1/2 watt; carbon	RC20AE221M	X-1	Cable, power, audio, Microphone—GENERAL	87G1567*
R-18	2200 ohm; 20%; 1/2 watt; carbon	RC20AE222M		Crystal, 3105 kc.	19A1210
R-1	22,000 ohm; 20%; 1/2 watt; carbon	RC20AE223M		Dial window	23B170
R-3	2.2 megohm; 20%; 1/2 watt; carbon	RC20AE225M		Dial scale	83C291
R-23	47 ohm; 20%; 1/2 watt; carbon	RC20AE470M			
R-2	4700 ohm; 20%; 1/2 watt; carbon	RC20AE472M			
R-7, 20	47,000 ohm; 20%; 1/2 watt; carbon	RC20AE473M			

\* Specify Aircraft Type and make when ordering.