

# ENGINEERING DATA

## STROMBERG-CARLSON NO. 402 RADIO RECEIVERS

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY  
ROCHESTER, NEW YORK

### IDENTIFICATION TABLE

Model	Type of Batteries	Chassis	Cabinet	Speaker
402 Portable Battery Receiver	1—1.5 V. Dry "A" Battery 2—45 V. "B" Batteries	30990	31002	31001

### SPECIFICATIONS

Voltage Rating.....	"A", 1.5 Volts; "B", 90 Volts
Type of Circuit.....	Superheterodyne
Tuning Range.....	550 to 1580 Kc.
Number of Tubes.....	Four
Type of Tubes.....	1—1A7GT, Modulator and Oscillator 1—1N5GT, I. F. Amplifier 1—1H5GT, Demodulator, A. V. C. and Audio 1—1Q5GT, Output
Intermediate Frequency.....	455 Kilocycles
Permanent Magnet Speaker Voice Coil Impedance at 400 Cycles.....	Approximately 2.5 Ohms

### FEATURES

This is a four tube battery operated portable Receiver. A loop antenna is built in so that no connections whatsoever are required. However, antenna and ground binding posts are provided on the bottom of the cabinet so that the set can be used with a regular antenna (a single wire about 75 feet long should be most satisfactory).

In order to avoid battery drain the dial is so designed that no pilot light is necessary and an indicator which shows "red" when the set is turned on and reads "off" when the set is turned off is provided.

### SPECIAL INSTRUCTIONS

#### Batteries

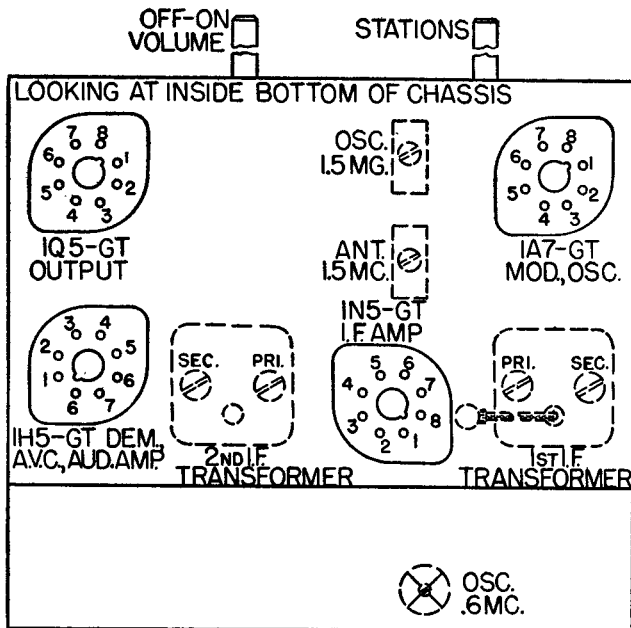
One Eveready No. 741 "A" Battery and two Eveready No. 727 "B" Batteries or equivalent batteries of size suitable for installation in space provided should be used with this Receiver. Always be sure set is "off" before changing batteries or removing tubes.

Batteries are installed by removing the back of the cabinet and the loop antenna. To remove the loop the two mounting screws need only be loosened and the loop can be raised and slipped over the heads of the screws. A wooden block holds the batteries in place and this must be removed to permit installation of batteries. The batteries are equipped with sockets and it is only necessary to plug into them in accordance with the illustration shown on Page 2.

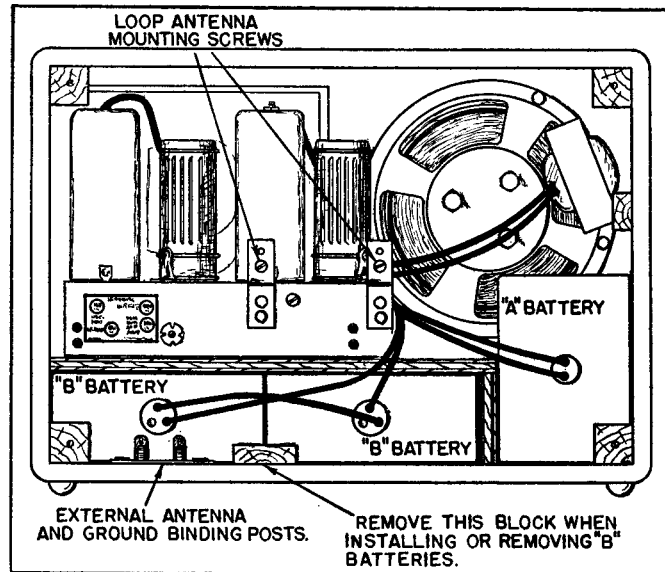
The battery drain is very low so that the life of the batteries should be sufficient to make possible a long period of use before it is necessary to replace them.

#### Antenna

A loop antenna such as is installed in these receivers is quite directional and the set should be turned in such a way that reception is best from the station tuned in.



Location Chart



View Showing Installation of Batteries (With Back of Cabinet and Loop Antenna Removed)

### ALIGNING INFORMATION

NEVER REALIGN UNLESS ABSOLUTELY NECESSARY.

Use a good modulated signal generator (test oscillator) with variable output voltage and a sensitive output meter across the voice coil of the speaker.

Always align using the smallest possible input from the signal generator. A strong signal makes adjustments inaccurate.

Always have receiver volume control "full on".

See Location Chart above for location of all the aligning adjustment screws.

#### Aligning Procedure (follow this order exactly)

##### I. Dial Pointer Adjustment.

With the plates of the gang tuning capacitor fully engaged, set the dial pointer directly on the horizontal line below 550 Kc. at the low frequency end of the dial.

##### II. Intermediate Frequency Adjustments.

1. Tune set to extreme low frequency position. (.54 megacycles on dial scale.)
2. Connect the ground terminal of the signal generator to the ground binding post of the receiver.
3. Introduce a modulated signal of 455 kilocycles, using a 0.1 microfarad capacitor in series with the lead from the signal generator to the grid cap of the 1A7GT tube. (Do not remove the grid clip from this tube.)
4. Adjust the I. F. Aligners for maximum output in the following order:
  - a. Secondary of Second I. F. Transformer.
  - b. Primary of Second I. F. Transformer.
  - c. Secondary of First I. F. Transformer.
  - d. Primary of First I. F. Transformer.

##### III. Radio Frequency Adjustments.

1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator with a 200 micro-microfarad capacitor.
2. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles.

3. Adjust the iron core in the oscillator coil for maximum signal.
4. Set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles.
5. Adjust the "Osc. 1.5 Mc." and the "Ant. 1.5 Mc." aligning capacitors for maximum signal.
6. Reset both the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles and repeat operation 3.
7. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation 5.

NOTE. Operation 6 and 7 may be repeated as often as necessary to obtain maximum sensitivity.

### NORMAL VOLTAGE READINGS

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt.

Take all voltage readings on the 500 volt scale except where an asterisk appears.

Take all readings with chassis operating and tuned to 1000 Kc.—no signal.

Read from indicated socket terminals to chassis base.

See Location Chart on Page 2 for position of terminals.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
1A7GT	Mod.—Osc.	0	0	+1.4*	+84	+35	-3*	+58	0	0	2-7	+1.4*
1N5GT	I. F. Amp.	0	0	+1.4*	+84	+84	0	0	0	0	2-7	+1.4*
1H5GT	Dem.—A. V. C. —Audio	0	0	+1.4*	+30	0	0	0	0	0	2-7	+1.4*
1Q5GT	Output	—	0	+1.4*	+82	+84	0	+5.5*	0	0	2-7	+1.4*

\*Read on lowest possible scale of voltmeter.

### CONTINUITY TEST

**CAUTION:** Remove all tubes and disconnect the receiver from the batteries before making continuity test.

Use a good meter capable of measuring accurately up to several megohms.

The resistances given are often approximate, owing to Electrolytic Capacitors in the circuit. When this is the case, be sure to reverse the test leads and read the highest resistance.

Read from indicated terminals to chassis base except when an asterisk appears.

See Location Chart on Page 2 for position and numbering of socket terminals.

TERMINALS OF SOCKETS										
Tube	Circuit	Cap	1	2	3	4	5	6	7	8
1A7GT	Mod.—Osc.	4M	4M	10M	1M	1M	22000 $\Omega$	1M	S	4M
1N5GT	I. F. Amp.	1.5M	O	10M	1M	1M	O	O	S	O
1H5GT	Dem.—A. V. C. —Audio	10M	O	10M	3M	10M	800000 $\Omega$	O	S	O
1Q5GT	Output	—	O	10M	1M	1M	2.2M	500 $\Omega$	S	O

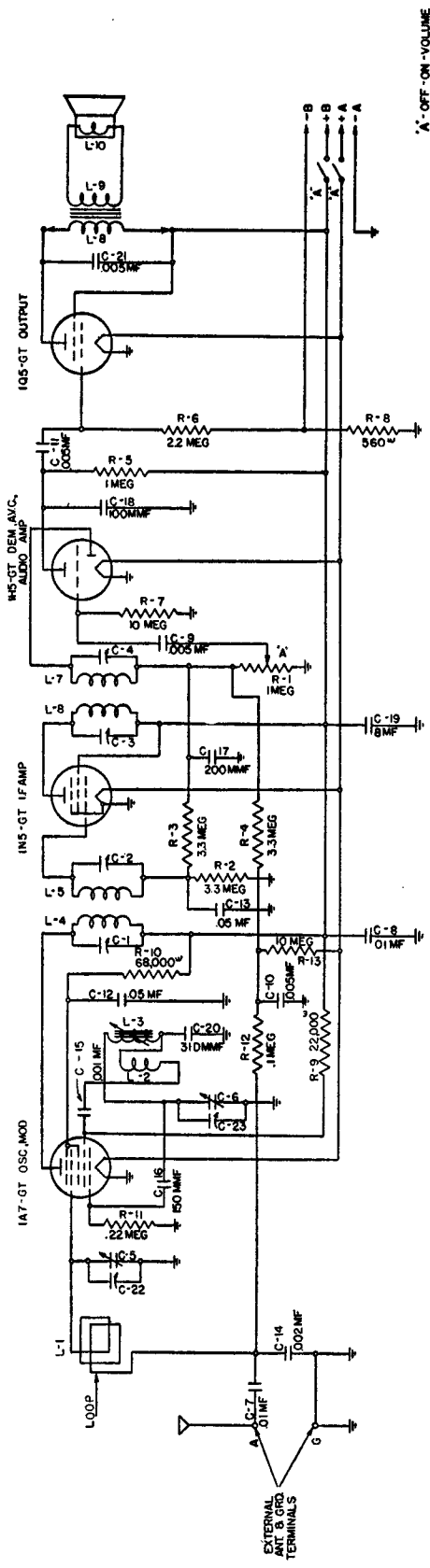
Symbols used are as follows:  $\Omega$ —ohms; M—megohms; S—short; O—open.

### Other Tests Not Shown on Chart

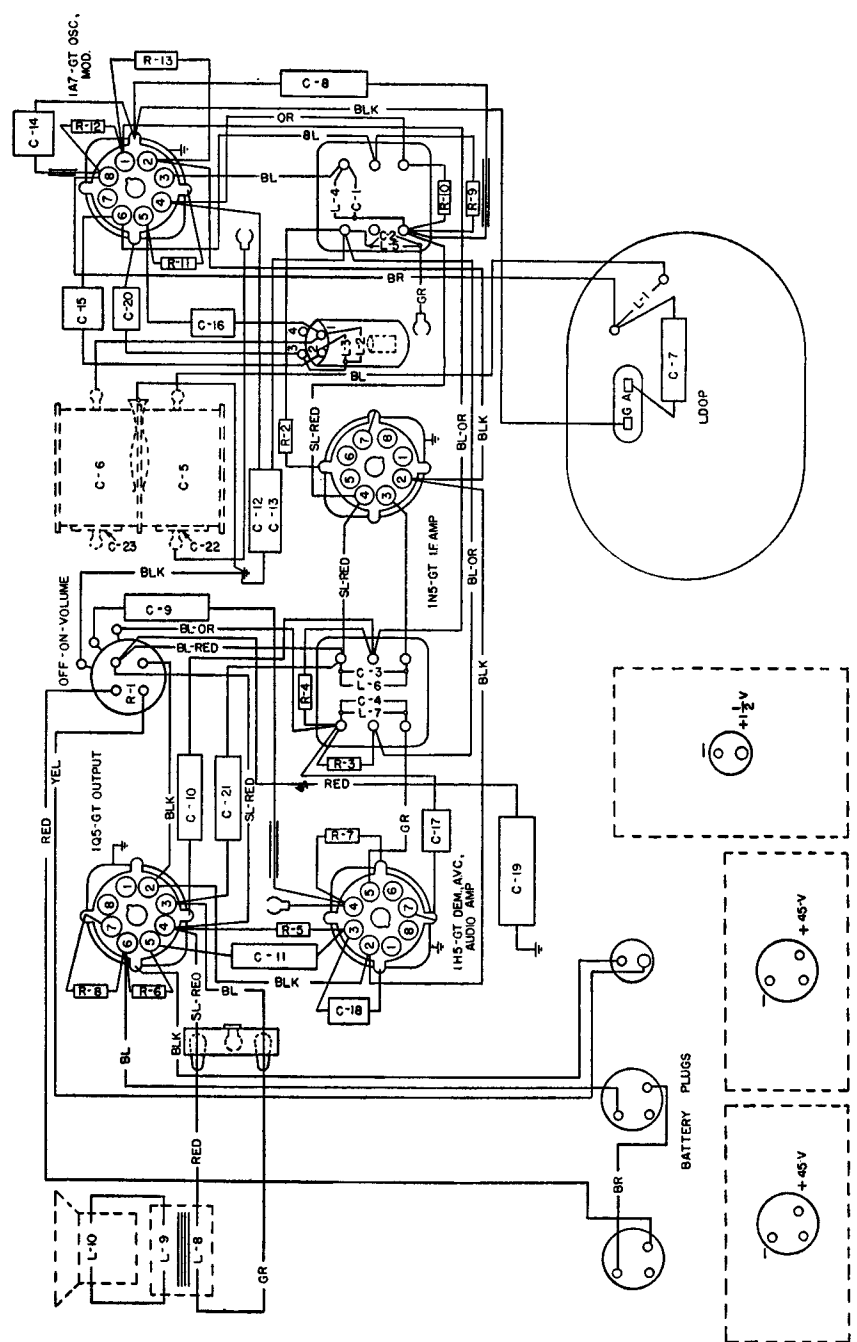
Antenna terminal to chassis base; "open".

Ground terminal to chassis base; "short".

R. F. coil tests, measured directly across R. F. coil terminals (see wiring diagram on Page 5 for location of R. F. coil terminals): L1—.8 ohm; L2—7 ohms; L3—3 ohms.



Schematic Circuit



Wiring Diagram

## REPLACEMENT PARTS

Use genuine Stromberg-Carlson parts. It will be to your advantage. They are made for use in Stromberg-Carlson receivers. The specifications are correct and the same high quality material and workmanship is used as in the whole radio receiver. Don't ruin a good receiver with an inferior part.

### Capacitors

Piece Number	Circuit Designation	Part
25054	C-16	50 mmf.
25149	C-7, 8	.01 mf.
25487	C-15	1000 mmf.
27101	C-17	200 mmf.
27108	C-12, 13	2—.05 mfs.
28568	C-18	100 mmf.
29366	C-14	.002 mf.
31025	C-20	290 mmf.
30322	C-9, 10, 11, 21	.005 mf.
31024	C-19	Electrolytic Capacitor 8 mf.
31020	C-5, 6, 22, 23	Variable Capacitor (2 gang)

### Coils, Transformers and Speaker

31018	L-1	Coil Assembly (Loop)
30121	L-2, 3	Oscillator Coil
30996	L-4, 5; C-1, 2	1st I. F. Transformer
30997	L-6, 7; C-3, 4	2nd I. F. Transformer
31001		Speaker

### Controls and Knobs

31022		Dial Drive Shaft
31026	R-1	Off-On Switch and Volume Control
31018		Knob

### Resistors

26330	R-8	560 Ohms—Type E
26349	R-9	22,000 Ohms—Type E
26355	R-10	68,000 Ohms—Type E
26357	R-12	.1 Megohm—Type E
26361	R-11	220,000 Ohms—Type E
26369	R-5	1 Megohm—Type E
26373	R-6	2.2 Megohm—Type E
26375	R-2, 3, 4	3.3 Megohm—Type E
26381	R-7, 13	10 Megohm—Type E

### Miscellaneous

SD-67		Dial Drive Cord
SD-74		Rubber Foot for Cabinet
26122		Antenna and Ground Terminal Strip
270SS		Spring Washer for Mtg. Coils
27668		"C" Washer for Dial Drive Shaft
29627		Spring for Dial Drive Cord
30151		8-Prong Tube Socket
31009		Dial Scale
31014		Dial Lens
31023		Dial Pointer
31028		Battery Cable Complete
31029		3-Prong Battery Plug
31030		2-Prong Battery Plug
31031		"Off-On" Indicator

### Tools

SD-29		Phillips No. 1 Screw Driver
24608		Aligning Tool