

Royal R. Rife's
MODEL AZ - 58
F R E Q U E N C Y I N S T R U M E N T

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Specifications:

Frequency audio range	20 to 6000 cps, in five ranges
Modulated carrier range	4680 KC ± 20 KC per FCC
Distortion	Less than 0.6% ± 50 cps calibrated
Power Requirements (input)	350 watts - full power to 200 watts 105 - 125 volts, 60 cycles AC
Dimensions	14 7/8 high, 21 9/16 wide, 13" deep

Notes on Assembly and Wiring of the Frequency Instrument :

The model AZ-58 Frequency Instrument, when properly constructed, will offer to the user a laboratory type of instrument capable of years of satisfactory service. Crimp all leads tightly to the terminal before soldering. Be sure both the lead and terminal are clean of wax, corrosion, or other foreign substances. Use rosin core solder only. Resistors and controls generally have a tolerance rating of plus or minus 20% unless otherwise stated in the parts list. Tolerances on condensers are generally even greater. Limits of plus 100% and minus 50% are common for electrolytic condensers. Parts listed will not adversely affect the operation of the completed instrument.

STEP BY STEP ASSEMBLY INSTRUCTIONS

CAUTION: The two gang variable condenser should be kept fully meshed at all times until the instrument is completed and in its cabinet. Any distortion of the plates of the condenser may seriously affect the calibration of the generator, or render it inoperative. See Pictorial A.

- () 1. Start by setting the chassis H121 on a table. Mount all tube sockets - H116 thru H119. Chassis should be pre-drilled & deburred.
- () 2. Assemble S102 by soldering R102 thru R106 in place. Install S102 and S103 dial plate and S104 knob. Do not tighten nuts.
- () 3. Next install C115 and C114. Fasten H101 (3 Req.) to side shown.
- () 4. Mount RT106 and R109. Attach S112 to H121. Mount H124 lug.
- () 5. Mount C106 in 2 places and mount R113 resistor.
- () 6. Attach H107 and H108 jacks. Mount H111 lug terminal strip & H124.
- () 7. Mount H113 feedthru insulator (2 places). Mount H114 corrugated insulator (2 places) on opposite side of chassis.
- () 8. Mount C112 2.0 mfd condensers in 2 places. Mount H103 fuse holders
- () 9. Mount RT 103 filament transformer, H101 lamp base, and 2 of S101 snap switches through H123 rack panel. Tighten nut on S102 rotary switch. Adjust knob S104 to S103 dial plate to No. 1 on dial plate. Mount H112 in 3 places.

STEP BY STEP ASSEMBLY INSTRUCTIONS

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- (3)
- () 10. Mount C113 filter choke to H121. Mount RT102 filament transformer.
 - () 11. Rotate the chassis and mount S107 in 2 places. Mount 3 couplings S108 on S111. Insert S109 in S108 coupling, and attach to S106 Dial complete with knob. Mount S105 knob on adjacent S107.
 - () 12. Mount S110 (3 req.) on S111 and attach to H121. See pictorial B
 - () 13. Mount RT101, RT105, and RT104. Attach H130.
 - () 14. Attach H110 interlock plug.
 - () 15. Mount H104 red and black plugs as shown.
 - () 16. Install H120 air inductor. Bend wires to suit H114 mounts.
 - () 17. Install H125 tube with cellophane tape or Walsco glue.

The chassis is now ready for wiring.

STEP BY STEP WIRING INSTRUCTIONS

Refer to pictorial A. Note that each terminal on the chassis bears a code designation. See also pictorial B & C. Pictorial C is the wiring diagram. NS means no solder. S means solder. Unless otherwise indicated all wire used is insulated.

- () 18. Begin by running a wire from H110 to H103-2 (NS). Attach C111 to H103-2 and S all. Run C111 to ground.
- () 19. Run a wire from H103-1 to S101-3 (S).
- () 20. Connect a wire from S101-4 (S) to H103-4 (S).
- () 21. Connect a wire from S101-1 to S101-3.
- () 22. Connect a black wire from RT105 to H103-3 (S).
- () 23. Connect a wire from S101-2 to junction of wires from black RT104, black RT102, and black RT103 (S) and tape junction.
- () 24. Connect a wire from H110-2 (S) to C113-1 (S).
- () 25. Connect a wire from C113-2 to (S) a junction of black RT103, black RT102, black RT105, and black RT104 (S).
- () 26. Connect black and white stripe wires from RT105 to top of T101 tube connectors. (S). Connectors are H116 - ceramic grid caps.
- () 27. Connect a wire from H119-3 (S) to H119-7(NS). Use sleeving.
- () 28. Connect a wire from H119-4 (S) to H119-8(NS). Use sleeving.
- () 29. Connect green wires from RT102 to H119-7 & -8 (S). Use sleeving.

STEP BY STEP WIRING INSTRUCTIONS

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- () 30. Connect yellow & green stripe wire from RT102 to C112-1.
 - () 31. Connect a black wire from RT101 to C112-1. Connect other black wire from RT101 to C112-4.
 - () 32. Connect C112-4 to C104 to H113-2 (S).
 - () 33. Connect a wire from C112-3 to C112-2 to ground.(on chassis). Connect red and yellow stripe wire from RT105 to same ground. (S).
 - () 34. Tape off two red leads from RT105. (not used).
 - () 35. Twist green sleeved wires from RT103 and connect to H119-11 & -12 (NS). Connect C107 .05mfd 600V capacitor to H119-12. Use sleeving (S). Tape off green and yellow stripe lead from RT103. From H119-12- continue wire to ground (S) on other end of C107 to and thru H108-2 (S).
 - () 36. Connect a wire from H119-11 (S) to H108-1 (S).
 - () 37. Connect a bare wire from H119-9 (S) to C104 thru and on to H113-1.
 - () 38. Connect a wire from C104 (S) to R1133(S). Adjust R113 to 1500 ohms. Connect a wire of C108 .25mfd 600V capacitor to R113-2 (NS) and attach C108 to H107-2 (S). Connect C106 to R113-2 (S). Connect H113-1 to ground with bare wire. (S). Sleeve C108 to R113.
 - () 39. Connect two wires twisted from H119-11 & -12 to H101-1 & -2 (S).
 - () 40. Connect a sleeved wire from C106 to H117 pin 5 (NS).
 - () 41. Connect a sleeved wire from H118 pin 8 to C110 and run C110 to ground (NS). C110 is 10 mfd 450 V capacitor.
 - () 42. Connect C110 to ground and sleeve other end to R109-1 (NS). Adjust R109-1 to -2 to 2900 ohms. Connect a wire from R109-1 (S) to H124 terminal lug (NS).
 - () 43. Connect a wire from R109-2 (S) to H124 (NS). Connect a wire from H124 (NS) to C114-1 (NS). Connect a wire from H124 of R110 to (NS) H117 pin 5 (NS). Connect R108 47K to H124 (S) and to H117 pin 6 (NS). Connect a bare wire from H109-3 to ground (S).
 - () 44. Connect two red wires from RT104 to H118 pin 3 & 5 (S).
 - () 45. Connect red and yellow stripe wire from RT104 to ground. Connect two green wires from RT104 to H118 pin 2 & 7 (NS). Tape off tan and green and yellow stripe wires from RT104. Connect one black wire to H118 pin 8 (S)..from RT106 - also black wire to R109-1 (S).
 - () 46. Connect a wire from H118 pin 7 (S) to H117 pin 4 (NS). Connect a wire from H118 pin 2 (S) to H117 pin 3 (NS).
 - () 47. Connect a shielded wire from H117 pin 1 (S) to C115-2 (S). Ground shielding to C115-3 (S).

STEP BY STEP ASSEMBLY INSTRUCTIONS

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- () 10. Mount C113 filter choke to H121. Mount RT102 filament transformer.
 - () 11. Rotate the chassis and mount S107 in 2 places. Mount 3 couplings S108 on S111. Insert S109 in S108 coupling, and attach to S106 Dial complete with knob. Mount S105 knob on adjacent S107.
 - () 12. Mount S110 (3 req.) on S111 and attach to H121. See pictorial B
 - () 13. Mount RT101, RT105, and RT104. Attach H130.
 - () 14. Attach H110 interlock plug.
 - () 15. Mount H104 red and black plugs as shown.
 - () 16. Install H120 air inductor. Bend wires to suit H114 mounts.
 - () 17. Install H125 tube with cellophane tape or Walsco glue.

The chassis is now ready for wiring.

STEP BY STEP WIRING INSTRUCTIONS

Refer to pictorial A. Note that each terminal on the chassis bears a code designation. See also pictorial B & C. Pictorial C is the wiring diagram. NS means no solder. S means solder. Unless otherwise indicated all wire used is insulated.

- () 18. Begin by running a wire from H110 to H103-2 (NS). Attach C111 to H103-2 and S all. Run C111 to ground.
- () 19. Run a wire from H103-1 to S101-3 (S).
- () 20. Connect a wire from S101-4 (S) to H103-4 (S).
- () 21. Connect a wire from S101-1 to S101-3.
- () 22. Connect a black wire from RT105 to H103-3 (S).
- () 23. Connect a wire from S101-2 to junction of wires from black RT104, black RT102, and black RT103 (S) and tape junction.
- () 24. Connect a wire from H110-2 (S) to C113-1 (S).
- () 25. Connect a wire from C113-2 to (S) a junction of black RT103, black RT102, black RT105, and black RT104 (S).
- () 26. Connect black and white stripe wires from RT105 to top of T101 tube connectors. (S). Connectors are H126 - ceramic grid caps.
- () 27. Connect a wire from H119-3 (S) to H119-7(NS). Use sleeving.
- () 28. Connect a wire from H119-4 (S) to H119-8(NS). Use sleeving.
- () 29. Connect green wires from RT102 to H119-7 & -8 (S). Use sleeving.

STEP BY STEP WIRING INSTRUCTIONS

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- () 48. Connect R101 1800 ohm resistor to H117 pin 2 (S) to ground (S). Connect a wire from H117 pin 3 (S) to H116 pin 4 & 5 (S). Connect a wire from H117 pin 4 (S) to H118 pin 7 (NS).
- () 49. Connect a wire from H117 pin 5 (S) to C109 (S) to and from C109 to H111 (NS). At same lug of H111 connect R111 (S) to H124 lug (S). Solder R112 to both lugs of H111 with neon glow light H127 on each lug also.
- () 50. Connect sleeved wire from C106 (from C115) (S) to C114-2 (NS). Connect a wire from C114-2 (S) to H116 pin 1 (NS). Connect a wire from H116 pin 9 (S) to ground (S).
- () 51. Connect a wire from H116 pin 8 (S) to H112 (NS) as shown. Connect R101 to same point on H112 (S). Run R101 to ground (S). Connect a wire between H112 and H112 as shown in two places (S). Connect R101 to H112 (NS) on opposite side and run to ground (S). Connect a wire from H112 (S) to H116 pin 3 (S).
- () 52. Connect a wire from H116 pin 1 (S) to S102 (S).
- () 53. Connect a wire from H116 pin 3 (S) to H112 as shown (S).
- () 54. Connect a wire from S102 (S) to H116 pin 2 (S) to H116 pin 9 (S).
- () 55. Connect a wire from H116 pin 6 (S) to C114-1 (S). Connect a wire from H116 (S) to the base screw on S107 (S). Connect R102 thru R106 as shown to S107 (S).
- () 56. Connect C116 from H117 pin 6 (S) to ground (S).
- () 57. Connect a wire from S107 (S) to ground (S) as shown. Rotate chassis for top side access. See Pictorial B.
- () 58. Connect H127 to (S) H113 with screw on lug (S). Connect two of C105 .002 mfd capacitors from H113 to H114 (S) on lugs. Connect C101 on opposite end of H120 coil to H113 and H114 (S) on lugs. Connect a wire from coil no. 7 counting from end of C101 capacitor (S) to ground (S). (on bottom of coil.) Use woven wire on H127.
- () 59. Connect C103 (S) to clip to no. 13 coil from rear Same as (No. 58) above to a wire (S) and connect to red H104 (S). Connect another wire 5/8" from wire of C103 as shown (S) and connect to S107 on rear of front panel and run to both lugs as shown (S) all.
- () 60. Connect a wire from S107 to black H104 (S) both connections. This grounds out the circuit.
- () 61. See view D for hook up of C102, S110, to S107. Connect wires and (S) as shown.
- () 62. Connect two wires (10,000 volt shielded) from H104 red and black plugs and wires (S) to ray tube (S) after inserting handles. See front view next to Pictorial C. Ray tube is T106.

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STEP BY STEP WIRING INSTRUCTIONS

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- () 63. Insert S113 3 watt lamps in H112 in 3 places. Insert S114 6 volt dial lamp in H101. Insert two H102 fuses in H103 holders. Attach H109 cord to H110. Insert tubes in sockets as follows:
- | | |
|---------------------------------------|-------------------------|
| 12AT7 as T102 in H116 | 816 as T101 (P) in H119 |
| 6AQ5 as T103 in H117 | 6X5GT as T104 in H118 |
| 812A as T105 in H119 center position. | |

This completes the wiring of the Frequency Instrument. Before applying power, carefully recheck each step in the wiring. Dress all leads so that there are no shorts between bare wires and other components or terminals. Remove all loose solder and wire clippings from the chassis. With chassis in normal position connect power to 110 volt AC source 60 cycle. The pilot light and all tube filaments should light on activation of switch No. 1. Wait 5 minutes and turn on switch No. 2. The ray tube should light.

CALIBRATION PROCEDURE

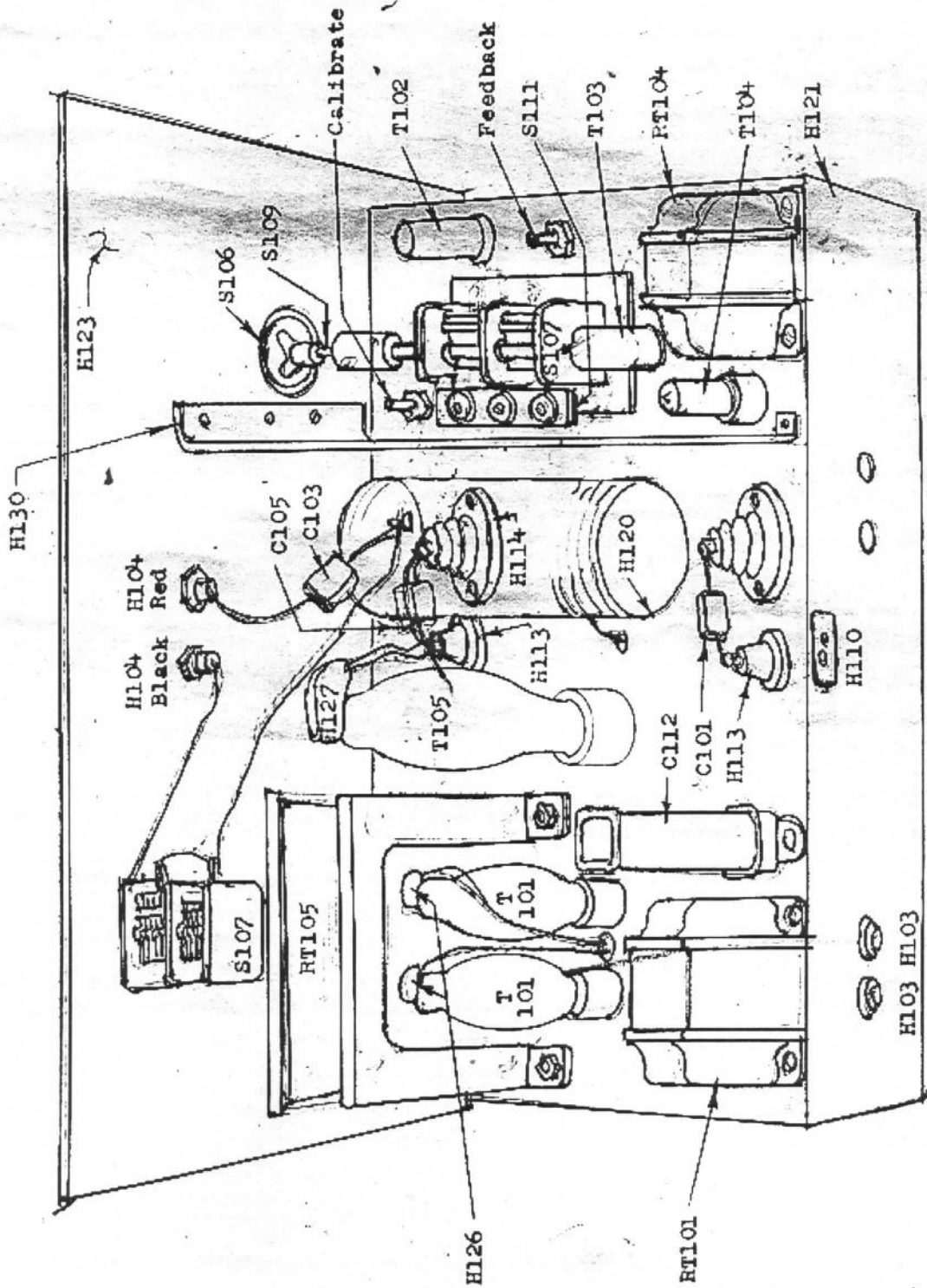
- () 64. Allow the instrument to warm up for 15 minutes. Plug in the Frequency Counter on jack H107 or use outside probe. Calibrate instrument from 100 to 6000 cps maximum. Adjust all trimmers.
- () 65. The instrument should be checked at all tube points for voltage conformance to standard tube values. See Table I. Mount the instrument next in the cabinet after disconnecting the power input cord. Attach with screws on each side. This completes the calibration and construction of the Frequency Instrument

TABLE I

Socket	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8, Pin 9	T - No.
12AT7 H116	200 VDC	NR	4.25 VDC	NR	NR	290 VDC	NR	6 VDC 6.5 VAC	T102
6AQ5 H117	4 VAC	4.25 VDC	6.2 VAC	NR	140 VDC	105 VDC	4 VAC		T103
6X5GT H118	NR	300 VAC	NR	300 VAC	NR	NR	800 VAC		T104
812-A H119	6 VAC	NR	195 VAC	6 VAC	(Pin 3 is H119-9)(1&4 is H119-11,-12) Plate = 2900 VDC			T105	
816 H119	Heater = 6.6 VDC, Plate in = 3500 VAC, Pin 1 & 4 = 2500 VDC. T101 Ref. Pin 1 & 4 is H119-3, -4, -7, -8.								

NR: Not readable or no connection

Miscellaneous hardware and wire comes from free stock and is not specified as to individual lengths etc.



PICTORIAL B . . . COMPONENT LOCATIONS

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FREQUENCY INSTRUMENT
PARTS LIST

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When ordering replacement parts, be sure to specify the part number shown below. Equivalent parts may be substituted.

Part No.	Parts Per Kit	Vendors No.	Approved Vendor	Description
RT101	1	C-3181	Merit	Filter smoothing choke
RT102	2	F-3X	Triad	Filament transformer
RT103	1	P-2947	Merit	Filament transformer
RT104	1	R-9A	Triad	Power transformer
RT105	1	P-3158	Merit	Plate transformer
RT106	1	C-2995	Merit	8 Hy 100 Ma Choke 3750
C101	1	YFM-31	Sprague	.0001 1200 volt mica
C102	2	BFC-12	Hammelund	variable capacitor
C103	1	YFM-25	Sprague	.005 1200 volt mica
C104	2	R-154-U	National Co	RF Choke
C105	2	C-220	Sangamo	.002 1500 volt mica
C106	2	Budroc	Cornell Dub'r	.5mfd 600 Volts D.C.
C107	1	PT-615	Mallory	.05 mfd 600 Volts D.C.
C108	1	PT-6025	Mallory	.25 mfd 600 Volts D.C.
C109	1	PT-412	Mallory	.02 mfd 400 Volts D.C.
C110	2	TC-72	Mallory	10 mfd 450 Volts D.C.
C111	1	3304C1	Sangamo	.1 mfd 400 Volts D.C.
C112	2	TJU-15020J	Cornell Dub'r	2.0 mfd 1500 Volts DC
C113	1	7825-5	Miller	5 amps Line filter choke
C114	1	U29	Mallory	25M ohms Midgetrol
C115	1	U48	Mallory	500M ohms Midgetrol
C116	1	TC-32	Mallory	10 mfd 60 Volts D.C.
R101	3	Little Devil	Ohmite 2W	1800 ohm resistor 10%
R102	2	Carbon	Dalohm 1/2W	200K ohm resistor 1%
R103	2	Carbon	Dalohm 1/2W	1 Megohm resistor 1%
R104	2	Carbon	Dalohm 1/2W	2 Megohm resistor 1%
R105	2	Carbon	Dalohm 1/2W	10 Megohm resistor 1%
R106	2	Carbon	Dalohm 1/2W	20 Megohm resistor 1%
R107	1	Little Devil	Ohmite 1W	39K ohm resistor 10%
R108	1	Little Devil	Ohmite 2W	47K ohm resistor 10%
R109	1	0965	Ohmite 25W	10,000 ohm resistor Adj.
R110	1	Brown Devil	Ohmite 10W	10,000 ohm resistor
R111	1	Little Devil	Ohmite 1/2W	3 Megohm resistor 10%
R112	1	Little Devil	Ohmite 1/2W	220K ohm resistor 10%
R113	1	0377	Ohmite 25W	2000 ohm resistor adj.
T101	2	816	RCA	Tube
T102	1	12AT7	RCA	Tube
T103	1	6A25	G.E.	Tube
T104	1	6X5 GT	G.E.	Tube
T105	1	812A	RCA	Tube
T106	1	Ray tube	San Diego Scientific Glass Apparatus Co.	Tube

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PARTS LIST CONTINUED

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Part No.	Parts Per Kit	Vendors No.	Approved Vendor	Description
S101	2	SPST	Arrow	Toggle switch 5 amp 250V
S102	1	PA-1002	Centralab	2 Pole 5 Pos switch rotary shorting phenolic Knob
S103	1	365	Mallory	Dial Plate 1 to 5
S104	1	380	Mallory	Knob
S105	1	HRT	National	Knob
S106	1	ACN	National	Dial 0 to 100
S107	2	2112	Miller	Variable condenser
S108	1	39003	Millen	Coupling
S109	1	1/4" dia.	Stock	Plastic rod x 1/8" Lg.
S110	1	APC-25	Hammarlund	Capacitor
S111	1	1/4 x .87	Plexiglas Stock	Plate x 4" Lg.
S112	1	1/4 x 3/4"	Plexiglas Stock	Plate x 4" Lg.
S113	3	3 watt	G.E.	120 Volt lamp
S114	1	#46 .25 amp	Tung Sol	6 Volt blue bead screw
H101	1	810M-431	Dialco	Bayonet base for lamp
H102	2	MDV 125V	Fusetron 7 amp	Fuse slow blow type
H103	2	HKP	Fusetron	Panel mtd. fuse holder
H104	2	392B	Birnbach (red & blk)	Insul. giant plug
H105	1	393	Birnbach	Insul. giant jack red
H106	1	393	Birnbach	Insul. giant jack black
H107	1	257	Birnbach	Jack open 2 conductor
H108	1	A2A	Mallory	Jack circuit closing
H109	1	815	Birnbach	6' safety cord
H110	1	813	Birnbach	Male AC interlock plug
H111	1	1382A	Birnbach	Lug terminal strip
H112	3	109CH	Drake	Min. scr. light base
H113	2	478	Birnbach	Feedthru Insulator
H114	2	867	Birnbach	Corrugated insulator
H115	1	9S2	Cinch-Jones	Tube shield
H116	1	9XM	Cinch-Jones	9 pin shield base socket
H117	1	7EM	Cinch-Jones	7 pin bottom mounted
H118	1	49RSS8	Amphenol	8 pin octal S type socket
H119	3	49RSS4	Amphenol	4 pin S type socket
H120	1	3906-1	Barker & Williamson	Air Inductor X 1/4" Lg.
H121	1	AC-416	Bud	Chassis - aluminum
H122	1	C-1552	Bud	Cabinet - aluminum
H123	1	PA-1108-B	Bud	Rack panel 1/8" aluminum
H124	2	1382B	Birnbach	Lug terminal strip
H125	1	1/4" dia.	Flexiglas	X 1" Lg. Drill one end, & bore .40 x 15/16 deep.
H126	2	36002	Millen	Ceramic grid cap. 3/8
H127	1	36001	Millen	Ceramic grid cap 9/16
H128	6	NO. 4	Walsco	Vinyl grommet for 1/2" hole.
H129	1	717 NE-T2	General Cement	Neon glow lamp.
H130	1	Shielding	Aluminum	.04 x 8 x 10" lg.

