



# PHOTOFACT<sup>®</sup> with

# CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index



MODEL GEN-1461A (62-1461)

## ALIGNMENT INSTRUCTIONS

Check for specified source voltage. Set volume control at maximum.  
Fashion loop of several turns of wire and connect generator across loop.  
Use only enough generator output to obtain a suitable indication.  
Suggested Alignment Tools:

A4, A5, A7, A8, A15-A20 ..... GENERAL CEMENT #8605  
A1-A3, A6, A9-A14 ..... GENERAL CEMENT #9087

WARDS AIRLINE MODEL GEN-1461A

SELECTOR IN AM

	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
1.	455KC 400 cycle modulation	Tuning gang fully open.	Output Meter across voice coil.	A1-A3	Adjust for maximum. Repeat until no further improvement can be made.
2.	1680KC	"	"	A4	Adjust for maximum.
3.	1400KC	Tune to signal	"	A5	"
4.	600KC	"	"	A6	Rock tuning gang and adjust for maximum. Repeat steps 2 thru 4 until no further improvement can be made.

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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## ALIGNMENT INSTRUCTIONS (Continued)

### SELECTOR IN MB

	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
5.	3400KC	3400KC	"	A7,A8	Adjust for maximum.
6.	1600KC	1600KC	"	A9	

### SELECTOR IN FM

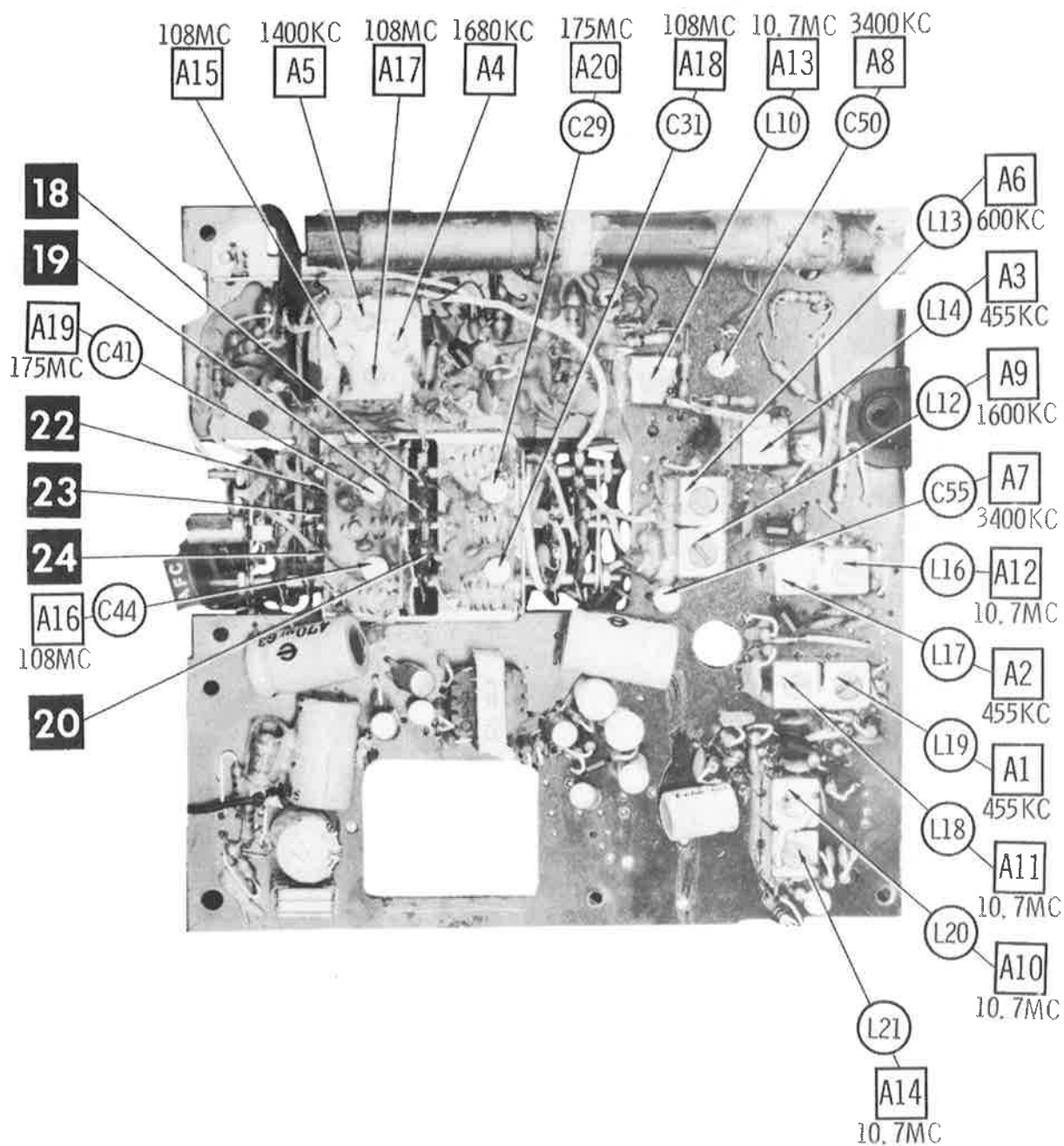
	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
7.	10.7MC Unmodulated	Point of non- interference	DC probe of VTVM to point $\diamond A$ , common to point $\diamond C$ .	A10-A13	Adjust for maximum
8.	"	"	DC probe of VTVM to point $\diamond B$ , common to point $\diamond C$ .	A14	Adjust for zero reading. A positive or negative reading will be obtained on either side of the correct setting.
9.	108MC	High freq. end.	DC probe of VTVM to point $\diamond A$ , common to point $\diamond C$ .	A15-A18	Adjust for maximum

### SELECTOR IN AIR

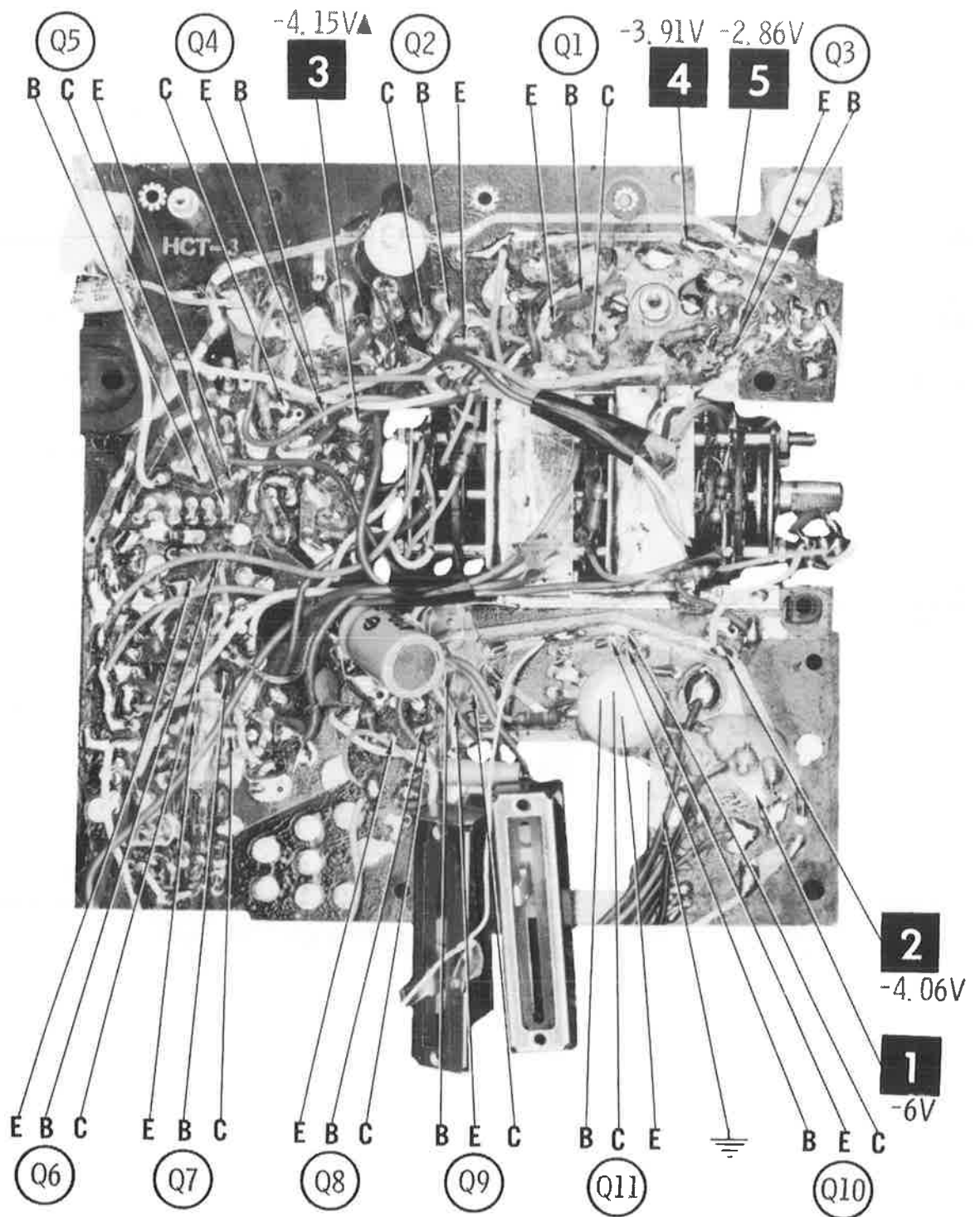
	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.	135MC	High freq. end.	DC probe of VTVM to point $\diamond A$ , common to point $\diamond C$ .	L4,L7	Adjust for maximum by expanding and compressing coils.

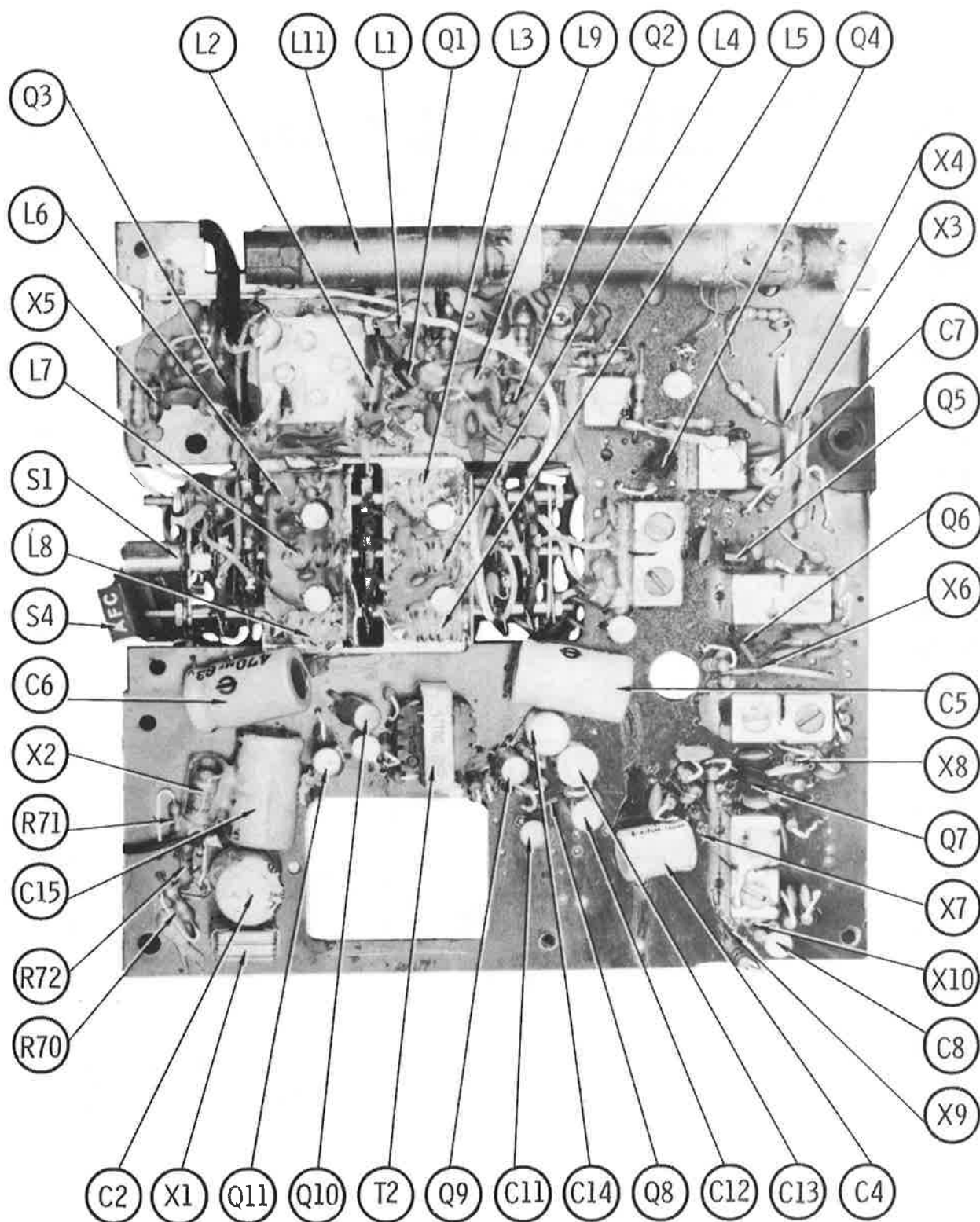
### SELECTOR IN POLICE

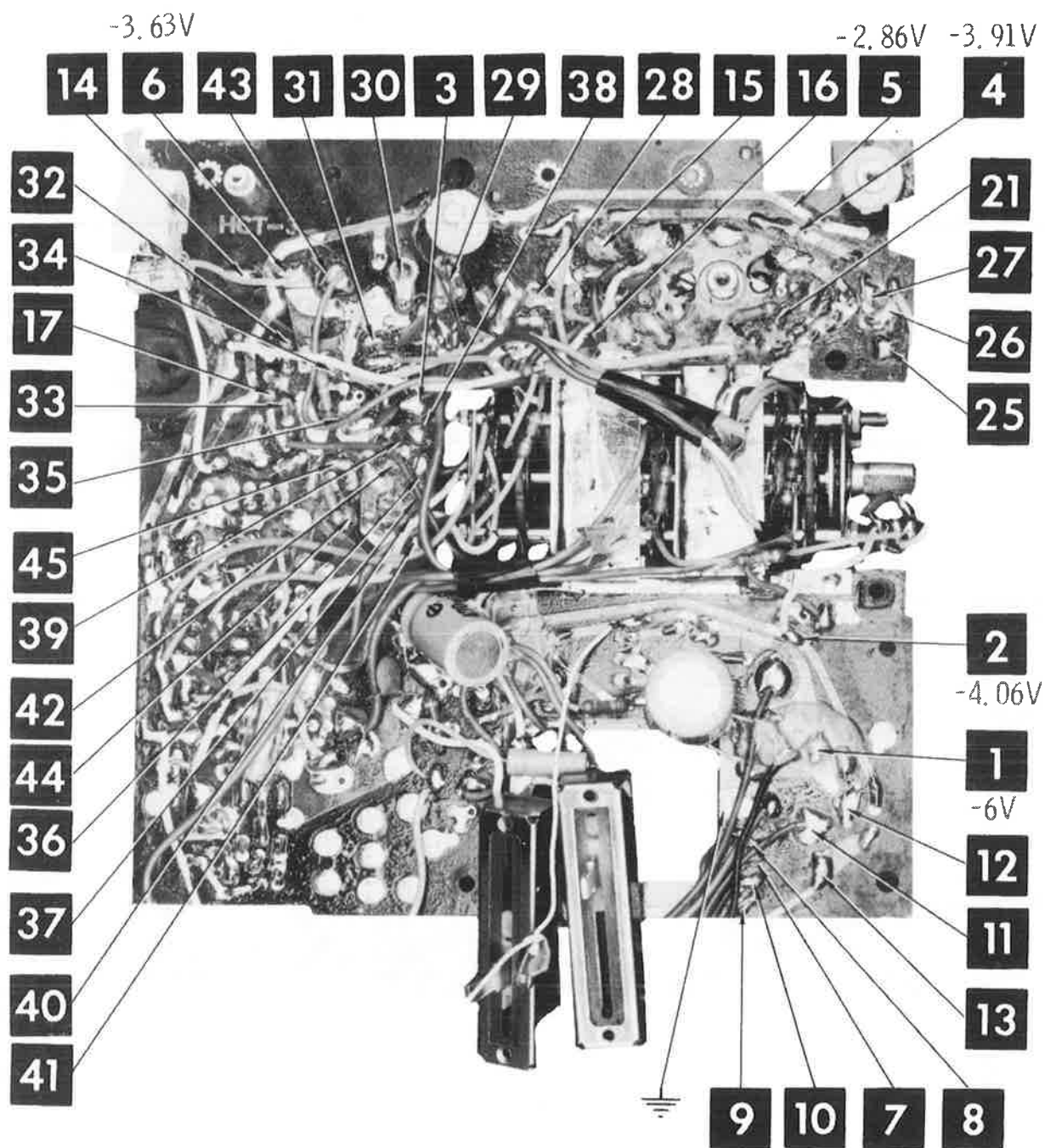
	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
11.	175MC	High freq. end.	DC probe of VTVM to point $\diamond A$ , common to ground.	A19,A20	Adjust for maximum



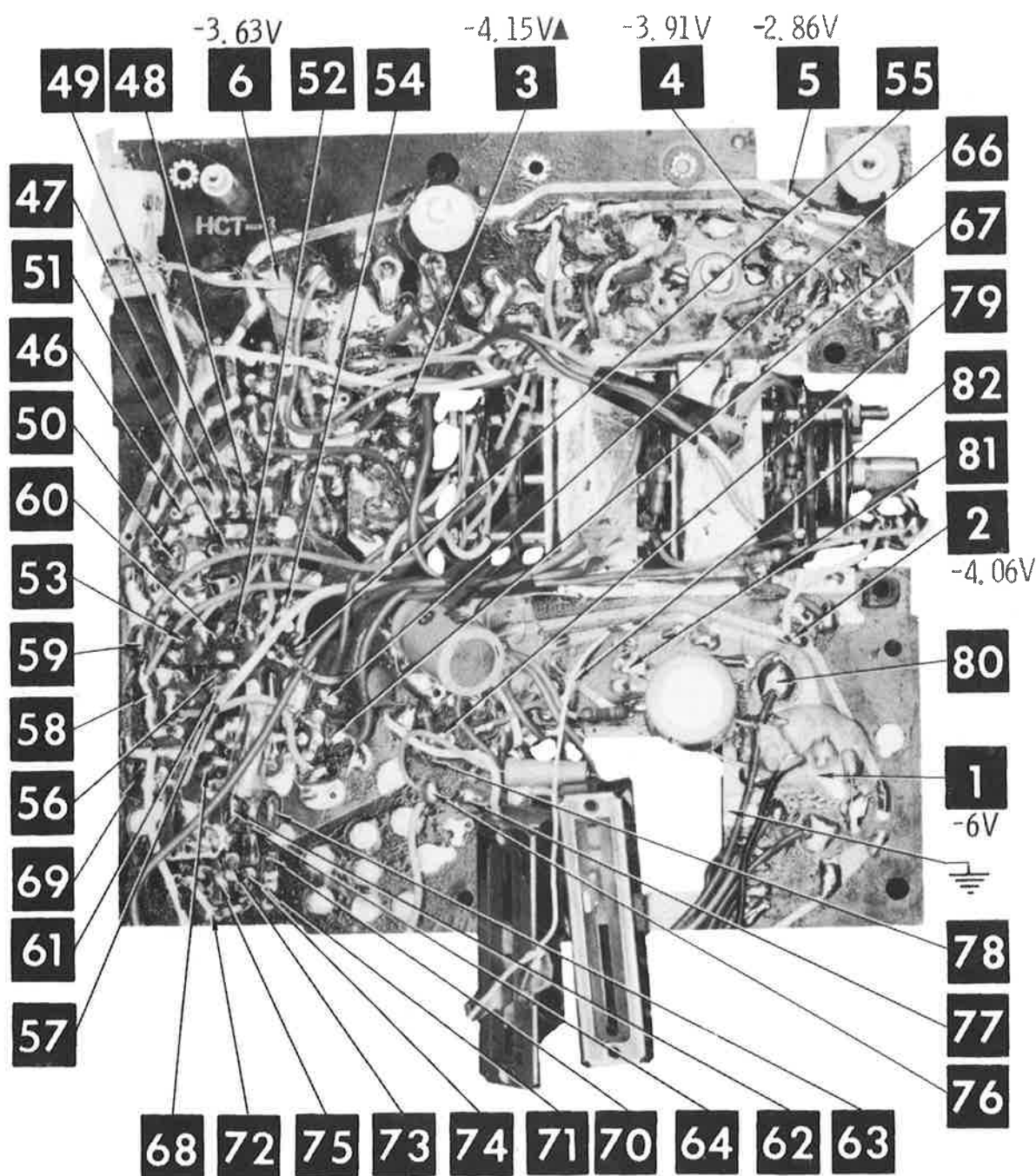
WARDS AIRLINE MODEL GEN-1461A

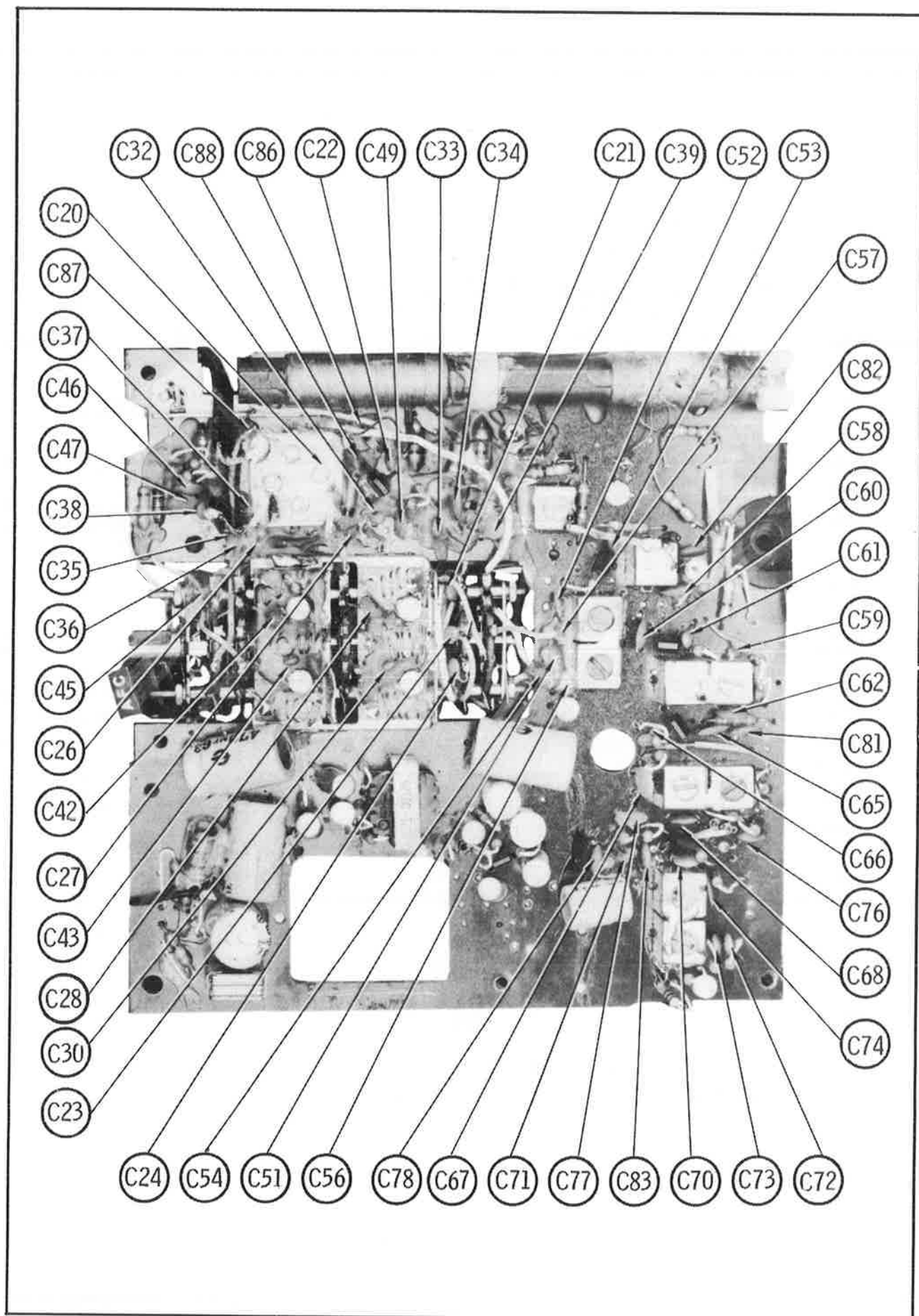




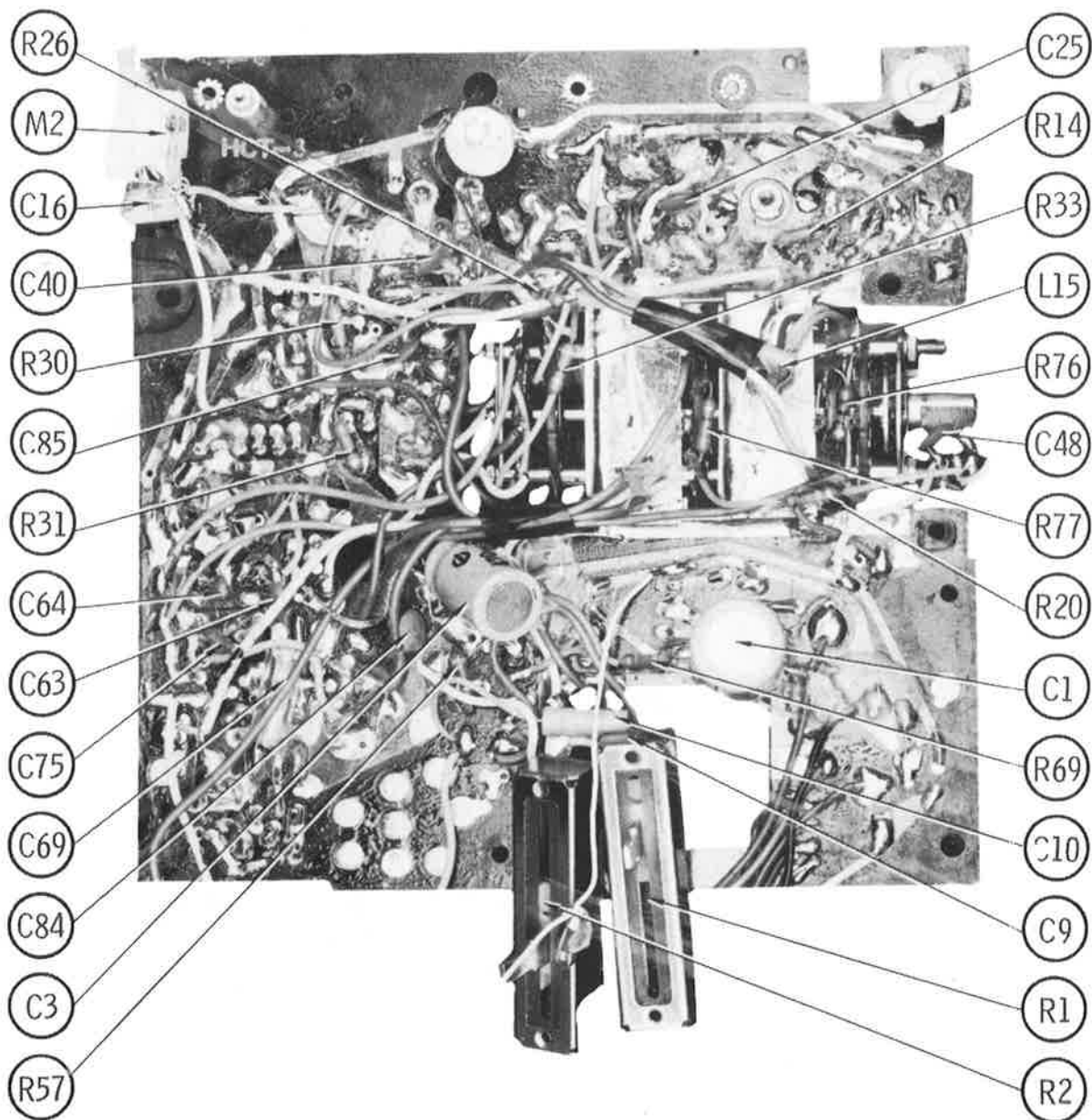


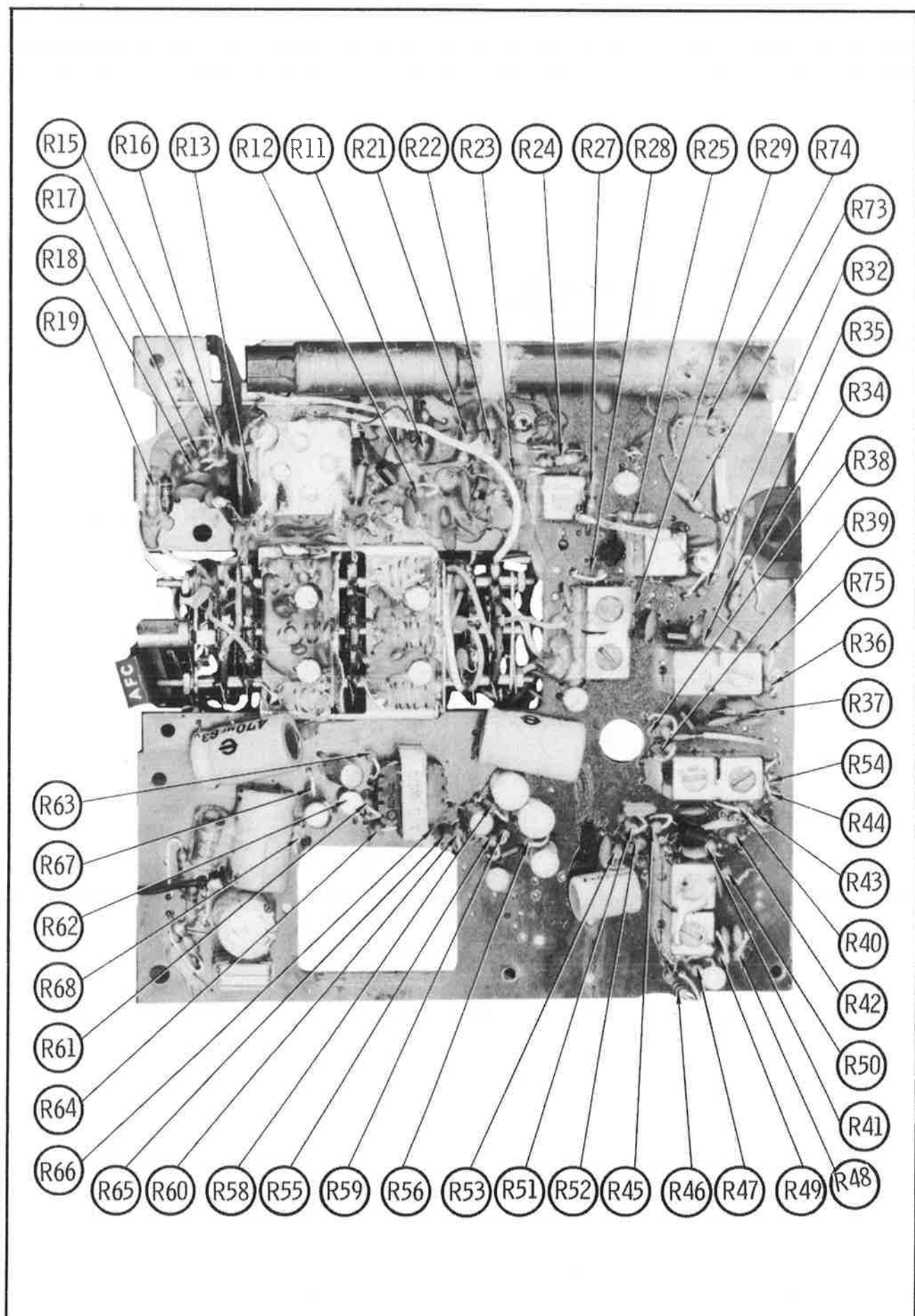












## PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

### WIRING DATA

General-use Unshielded Hook-up Wire .....	Use BELDEN No. 8530 (Solid 22AWG) 8524 (Stranded 22AWG) 8570 (Stranded 26AWG)	Available in 12 Colors
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### TRANSISTORS

ITEM No.	TYPE No.	FUNCTION	REPLACEMENT DATA					
			MFGR. PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MOTOROLA PART No.	RCA PART No.	SYLVANIA PART No.
Q1	2SC535C	FM RF Amp	24MW863	GE-17	TR-22	HEP56	SK3-18	ECG 107
Q2	2SC535C	FM Mixer	24MW863	GE-17	TR-22	HEP56	SK3018	ECG 107
Q3	2SC535B	FM Oscillator	24MW812	GE-17	TR-22	HEP56	SK3018	ECG 107
Q4	2SC460B	AM Conv.	24MW814	GE-20	TR-21	HEP53	SK3018	ECG 107
Q5	2SC460B	1st AM-FM IF Amp	24MW814	GE-20	TR-21	HEP53	SK3018	ECG 107
Q6	2SC460C	2nd AM-FM IF Amp	24MW815	GE-20	TR-21	HEP53	SK3018	ECG 107
Q7	2SC460C	3rd FM IF Amp	24MW815	GE-20	TR-21	HEP738	SK3004	ECG 102A
Q8	2SC458B	AF Amp	24MW855	GE-2	TR-14	HEP632	SK3004	ECG 102A
Q9	2SB75C	Driver	24MW856	GE-2	TR-14	HEP253	SK3004	ECG 102A
Q10	2SB156B	Output	24MW857	GE-2	TR-14	HEP253	SK3004	ECG 102A
Q11	2SB156B	Output	24MW857	GE-2	TR-14	HEP253	SK3004	ECG 102A

WARDS AIRLINE MODEL GEN-1461A

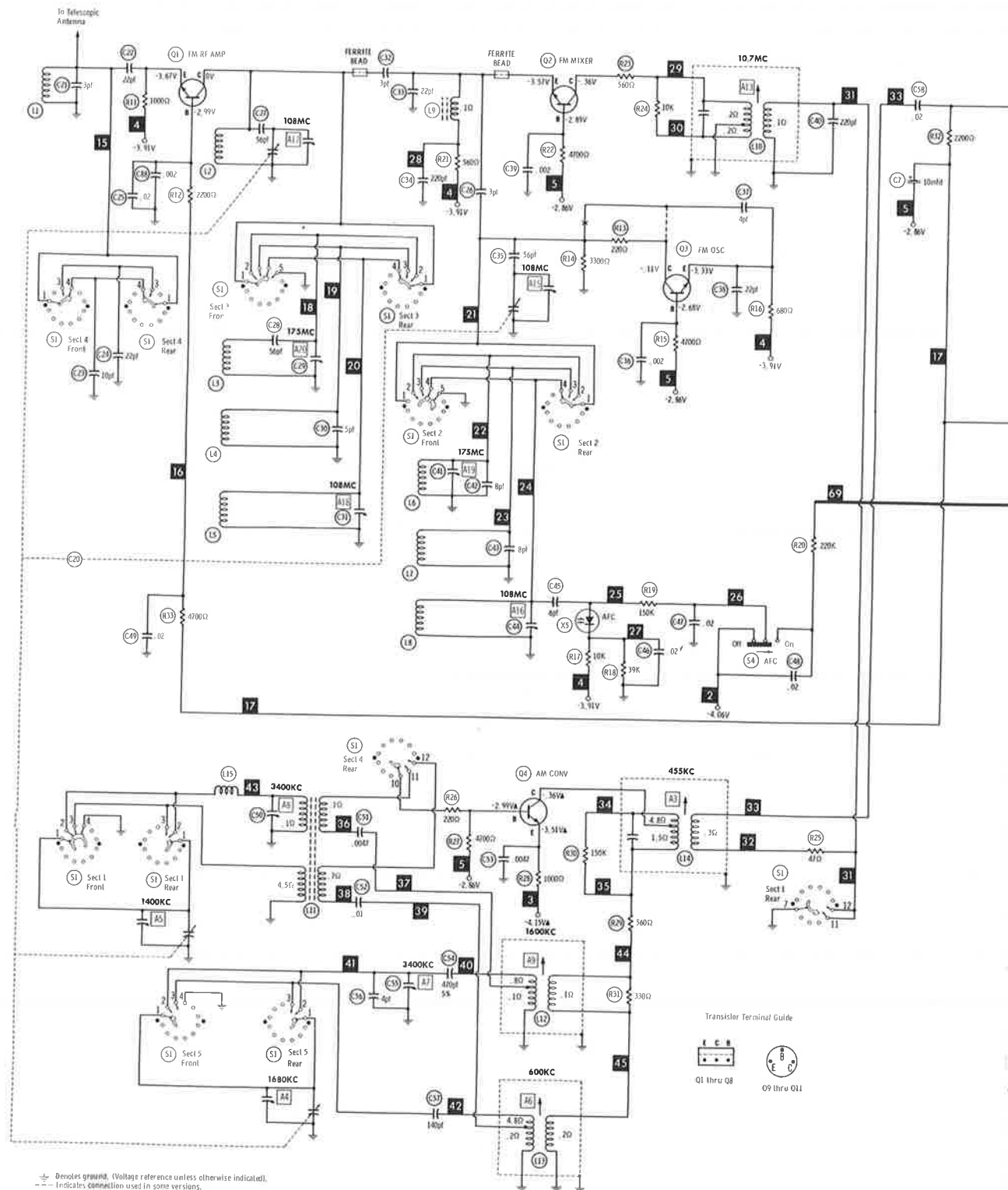
### POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MFGR. PART OR TYPE No.	REPLACEMENT DATA				NOTES
		GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	RCA PART No.	SYLVANIA PART No.	
X1	24MW862	GE-504A (1)	8D4 (1) or 5A4D (1)	SK3030 (1) or SK3031 (1)	ECG 116 (1) or ECG 117 (1)	(1) Four required.
X2	HV-15	GE-300	1N60	1N60	ECG 109	(6) Matched pair.
X3	1S1211					
X4	1S1211	GE-300	1N60	1N60	ECG 109	(6) Matched pair.
X5	1S85					
X6	1N60	1N60	1N60	1N60	ECG 109	(6) Matched pair.
X7	1N60					
X8	1N34A	1N60	1N34A	1N34A	ECG 109	(6) Matched pair.
X9	1N60P					
X10	1N60P	1N60	1N60	1N60	ECG 110 (6)	

### ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA						
		PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	1000 10V	32MW709	MCD-210	EA6-250	WBR250-16	MT1-23	MTV200CK10	TE-1104
C2	470 10V	32MW708						
C3	470 6.3V	32MW707						
C4	220 6.3V	32MW703						
C5	470 6.3V	32MW707	MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1128
C6	470 6.3V	32MW707						
C7	10 10V	32MW702						
C8	4.7 16V	32MW704						
C9	4.7 16V	32MW704	MCD-50	EP15-5	WBR5-50	MT1-3	MTV5CB50	TE-1152
C10	.1 10V	32MW777						
C11	4.7 16V	32MW714						
C12	33 6.3V	32MW710						
C13	100 6.3V	32MW706	MCD-170	EP6-100	WBR100-16	MT1-21	MTV100CB6	TE-1102
C14	100 6.3V	32MW706						
C15	470 10V	32MW708						
C16	33 6.3V	32MW710						

CONTINUED ON PAGE 118



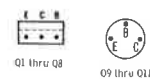
— Denotes ground. (Voltage reference unless otherwise indicated).  
 --- Indicates connection used in some versions.  
 — Indicates connection not used in some versions.  
 Measurements taken with switching in position shown unless otherwise indicated.  
 ▲ Measured with switching in "AM" position.  
 ■ Measured with switching in "AC" position.  
 Values shown in  $\mu$  are used in some applications.  
 Resistors are 10W or less, 10% or 20%, unless otherwise indicated.  
 Supply voltage maintained at rated value for measurements.  
 Voltage and resistance measured with VTM or equivalent meter, no signal applied and controls adjusted for normal operation.  
 Arrow on control indicates direction of advance.  
 Numbers assigned to terminals may not be found on the unit.  
 Transistor resistances very widely. No resistance measurements taken.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

with **CIRCUITACE**

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Transistor Terminal Guide





# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C20		#35MW346	NPO-DI 3.0					10TCC-V30
C21	3		NPO-DI 20	DTZ-20	NPO20	CCTO-200	CN0420	10TCC-Q20
C22	22		NPO-DI 10	DTZ-10	NP010	CCTO-100	CN0410	10TCC-Q10
C23	10		NPO-DI 25	DTZ-25			CN0425	10TCC-Q25
C24	22		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C25	.02		NPO-DI 3.0					10TCC-V30
C26	3		GPD X5F560K	DD-560		CCD-560	GP456	10TS-Q56
C27	56		GPD X5F560K	DD-560		CCD-560	GP456	10TS-Q56
C28	56							
C29		#35MW355						
C30	5		NPO-DI 5.0		NP05			10TCC-V50
C31		#35MW355						
C32	3		NPO-DI 3.0					10TCC-V30
C33	22		NPO-DI 25	DTZ-25			CN0425	10TCC-Q25
C34	220		GPD X5F221K	DD-221	GP220	CCD-221	GP322	10TS-T22
C35	56		GPD X5F560K	DD-560		CCD-560	GP456	10TS-Q56
C36	.002		GPD X5F202K	DM-202	GP2000	CCD-202	GP220	2SS-D20
C37	4				NP03P9			10TCC-V39
C38	22		NPO-DI 20	DTZ-20	NP020	CCTO-200	CN0420	10TCC-Q20
C39	.002		GPD X5F202K	DM-202	GP2000	CCD-202	GP322	2SS-D20
C40	220		GPD X5F221K	DD-221	GP220	CCD-221	GP322	10TS-T22
C41		E35MW355						
C42	8		NPO-DI 8.2		NP08P2			10TCC-V82
C43	8		NPO-DI 8.2		NP08P2			10TCC-V82
C44		#35MW355						
C45	6							10TCC-V56
C46	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C47	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C48	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C49	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C50		#35MW355						
C51	.0047		DBE6D5	CPR-5000J	DPMS6D5	1DP-1-502	PVC625	6PS-D50
C52	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C53	.0047		DBE6D5	CPR-5000J	DPMS6D5	1DP-1-502	PVC625	6PS-D50
C54	470			CPR-470J	CD15F471J50D	DM-15-471J	SX347	MS-347
C55		#35MW355						
C56	4				NP03P9			10TCC-V39
C57	140							
C58	.02	#31MW520	TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C59	2		NPO-DI 2.2	DTZ-2R2	NP02P2		CN0522	10TCC-V22
C60	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C61	1		NPO-DI 1.0	TCZ-1			CN0510	10TCC-V10
C62	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C63	1.5		NPO-DI 1.5	DTZ-1R5	NP01P5		CN0515	10TCC-V15
C64	1		NPO-DI 1.0	TCZ-1			CN0510	10TCC-V10
C65	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C66	15		NPO-DI 15	DTZ-15	NP015	CCTO-150	CN0415	10TCC-Q15
C67	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C68	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C69	1		NPO-DI 1.0	TCZ-1			CN0510	10TCC-V10
C70	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C71	15		NPO-DI 15	DTZ-15	NP015	CCTO-150	CN0415	10TCC-Q15
C72	470		GPD X5F471K	DD-471	GP470	CCD-471	GP347	10TS-T47
C73	470		GPD X5F471K	DD-471	GP470	CCD-471	GP347	10TS-T47
C74	220		GPD X5F221K	DD-221	GP220	CCD-221	GP322	10TS-T22
C75	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C76	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C77	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C78	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C79	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C80	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C81	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C82	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C83	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C84	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C85	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C86	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C87	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C88	.002		GPD X5F202K	DM-202	GP2000	CCD-202	GP220	2SS-D20

# Wards Airline Part Number.

## CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA				
			MFGR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.
R1	Volume	10K	25MW435 (103021)				
R2	Tone	10K	25MW434 (103031)				



## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.
R62	100 Ohms (Cold)	FS819	24MW822
R66	100 Ohms (Cold)	FS819	

ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.
R67	1 Ohm 1/4 W		CB11R0
R68	1 Ohm 1/4 W		CB11R0

### COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA			
		PART No.	MEISSNER PART No.	MILLER PART No.	WORKMAN PART No.
L1	FM Ant	61MW760			
L2	RF	61MW792			
L3	Police RF	61MW793			
L4	Air RF	61MW781			
L5	FM RF	61MW794			
L6	Police Osc	61MW795			
L7	Air Osc	61MW758			
L8	FM Osc	61MW796			
L9	FM IF Trap	61MW759			
L10	FM Input IF	62MW563	16-9031	2071	
L11	AM-MB Loopstick	61MW797			
L12	MB Osc	61MW798			
L13	AM Osc	61MW788			
L14	AM Input IF	62MW568	16-9026	2066	
L15	Choke	61MW759			
L16	FM Int IF	62MW564	16-9031	2071	
L17	AM Int IF	62MW569	16-9027	2067	
L18	FM Int IF	62MW565	16-9032	2072	
L19	AM Output IF	62MW570	16-9028	2068	
L20	Ratio Det (Pri)	62MW566			
L21	Ratio Det (Sec)	62MW570			

WARDS AIRLINE MODEL GEN-1461A

### TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	MFGR. PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	117VAC @ .03AAC	11.4VAC CT @ .1ADC	11MW314					
	SEC. 2	SEC. 3						
	15VAC CT @ .1ADC							

### TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA					NOTES
				MFGR. PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
	PRI.	SEC. 1	SEC. 2						
T2	2:1	1	1	11MW313					

### SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	3-1/2" PM 8 Ohms	10MW121	3A05Z8	

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### BATTERIES

ITEM No.	VOLTAGE	MFG. PART No.	REPLACEMENT DATA		NOTES
			EVEREADY		
M1	6V		1035 or E93		Four required

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M2	Meter	13MW7	Tuning
S1	Switch	12MW281	Selector
S2	Switch	12MW282	Dial Light
S3	Switch	12MW278	On/Off
S4	Switch	12MW278	AFC
	Antenna	60MW231	Telescopic

### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Cabinet - Front	98MW620	Knob - Volume, Tone	50MW594
Cabinet - Rear	98MW621	Knob - Tuning	50MW595
Knob - Selector	50MW593		

### ACCESSORIES

ITEM	MFG. PART No.	REMARKS
Earphone	63MW221	

### DIAL CORD STRINGING—FRONT VIEW

