

AIRLINE MODELS GAA-2640A,
GAA-2641A, GAA-2689B

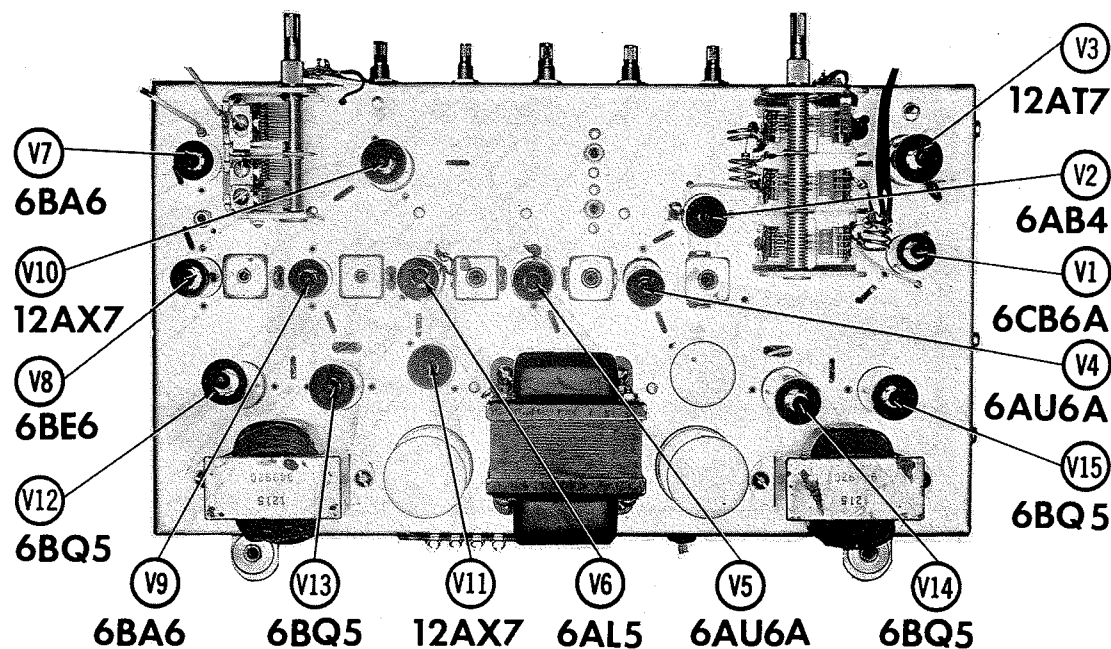


MODEL GAA-2640A

TRADE NAME	Airline Models GAA-2640A, GAA-2641A, GAA-2689B		
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago 7, Illinois		
TYPE SET	AC Operated 15 Tube FM-AM Receiver with 4 Speed Automatic Stereo Record Changer		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	103 Watts, 1 Amp. @ 117 Volts AC (FM)
TUNING RANGE	BROADCAST 540-1620KC	FREQ. MOD.	88-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE V-M 1201 - PHOTOFACT SET 436 FOLDER 18 OR RECORD CHANGER MANUAL RC-12

AIRLINE MODELS GAA-2640A,
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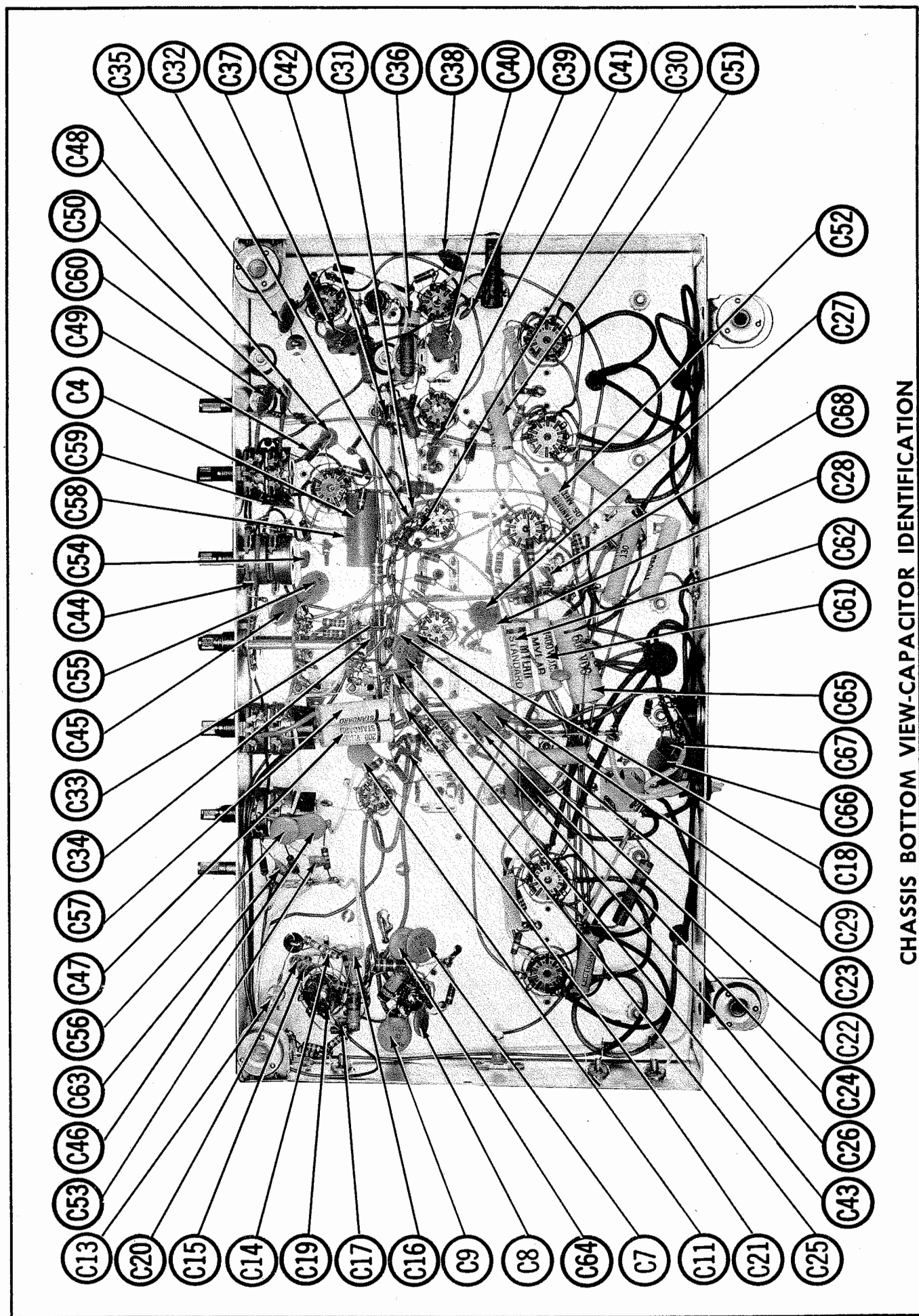


HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana



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CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA				
			AEROVOX PART No.	CENTRALAB PART No.	CORNIEL-DUBILIER PART No.	ELEMCO PART No.	MALLORY PART No.
C83	250		DI-250	DD-251	L10728	CCD-251	GP225
C84	10000		BP2D-01	DD-103	BT4081	CCD-103	PL-1
C85	10000		2P68N-1	DD-104	BT4081	CCD-104	5HK-50
C86	10000		BP2D-01	DD-103	BT4081	CCD-103	5HK-50
C87	10000		BP2D-01	DD-103	BT4081	CCD-103	5HK-50
C88	68	NT50	NT50-DI 68	DTN-68	C10680	CCTN-680	CNT-468

† Alternate Value. # Airline Part Number. Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA				INSTALLATION NOTES
			AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	
R1A	3meg	350K Tap	442	BT-180 *			Loudness, Channel 1
B	3meg	350K Tap		STR-180 *			Loudness, Channel 2
R2A	500K		438	B-40			Balance, Channel 1
R3A	100K		432	SR-613			Balance, Channel 2
B	100K						Base, Channel 1
C	Shatt.						Push-Pull AFC
R4A	7500Ω						Treble, Channel 1
B	7500Ω						Treble, Channel 2
C	Shatt.						Push-Pull, Off-On

* Do not use tap #2.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS
R5	6800Ω 1W		R21	1000Ω	
R6	150Ω		R22	1500Ω 1W	
R7	2200Ω		R23	6800Ω	
R8	580Ω		R24	6800Ω	
R9	10K		R25	68Ω	
R10	1000Ω		R26	68K 1W	
R11	580Ω		R27	2.2meg	
R12	150Ω		R28	33K 1W	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING					REPLACEMENT DATA					Triad PART No.
	PRI.	SEC. 1	SEC. 2	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.		
T1	117V ④ 1A	130V ④ 1A	6.3VCT ④ 3.7A	1109A ①							
	SEC. 3	SEC. 4	SEC. 5								
	6.3V ④ 2.9A										

① Alternate Part #1109.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES	
	PRI.	SEC.	AIRLINE PART No.	Halderson PART No.	Marli PART No.	Ram PART No.	Stancor PART No.	Thornderson PART No.		Tried PART No.
T2	8500Ω	6-4Ω	1215	22588	A-3027	AU-409	A-3870	22588	S-572	
T3	8500Ω	6-4Ω	1215	22588	A-3027	AU-409	A-3870	22588	S-572	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	QUAM PART No.	
SP1	12"	PM	3-4Ω	2843	12A4A	* May replace SP3 and SP6 in some versions of GAA-2689B * Alternate
SP2	6"	PM	14-16Ω	2844	6A21Z15.8	
SP3	3 1/2"	PM	6-8Ω	2845	3A15T27.8	
SP4	12"	PM	3-4Ω	2846	12A4A	
SP5	6"	PM	14-16Ω	2844	6A21Z15.8	
SP6	3 1/2"	PM	6-8Ω	2845	3A15T27.8	
	3 1/2"	PM	6-8Ω	2843 *	3A15T	
	8"	PM	14-16Ω	2850 ♦	3A15T	
	4"	PM		2847 ♦		
	8"	PM		2849 ♦		

RECTIFIERS

ITEM No.	REPLACEMENT DATA				NOTES
	RATING	AIRLINE PART No.	INTERNATIONAL PART No.	SARKES TARTZIAN PART No.	
M1	200A		584 *	RE504 *	
M2	200A		584 *	RE504 *	* Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA								
	AIRLINE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M3	60-66	137B	Not Req.	285	SI-1 & SI-3	53	E98X, E98XD	87A4-S	N-87A-S

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	AIRLINE PART No.	CLEVITE PART No.	WALCO PART No.	JENSEN PART No.	
M4	(78RPM)	W-101STS † or W-101STD †	E98 † or E98D †	† Jewel ♦ Diamond	
	(LF)	W-102MGS † or W-102MGD †	E98X † or E98XD †		

RESISTORS (cont)

ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS
R29	150Ω		R43	100K	
R30	22K		R44	6800Ω	
R31	33K 1W		R45	100K	
R32	2.2meg		R46	180K	
R33	33K 1W		R47	180K	
R34	270Ω		R48	180K	
R35	47K		R49	15K	
R36	100K		R50	15K	
R37	470K		R51	15K	
R38	470K		R52	2200Ω	
R39	68K		R53	2200Ω	
R40	220K		R54	470K	
R41	2200Ω		R55	100K	
R42	470K		R56	6800Ω	

COILS (RF-IF)

ITEM No.	USE	AIRLINE PART No.	REPLACEMENT DATA				NOTES
			Groner PART No.	Meissner PART No.	Miller PART No.	Ram PART No.	
L1	FM Ant. Coil	1303	19-1000	19-1000	BC-561		1uh ①
L2	RF Choke						
L3	FM RF Coil	1303	19-1000	19-1000	BC-561		1uh ①
L4	FM Osc. Coil						
L5	Cathode Choke						
L6	RF Choke						
L7	1st FM IF Trans.	1409	19-1000	19-1000	FM-254		1uh ①
L8	2nd FM IF Trans.	1413A	18-3487	18-3487	FM-254		1uh ①
L9	Radio Det.	1414A	17-3498	17-3498	FM-255		
L10	Loopstick	1512E	14-7002	14-7002	BC-418		
L11	AM Osc. Coil	1412	14-1072	14-1072	BC-388		
L12	1st AM IF Trans.	1401C	18-6758	18-6758	BC-353		RF-1
L13	2nd AM IF Trans.	1405	18-6758 †	18-6758 †	BC-353 †		RF-2 †
L14	2nd AM IF Trans.	1406A	19-1000	19-1000	BC-561		
L15	FL Choke	1303					

① IRC Part #CLA.

† Connect 100mm cap externally.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		AIRLINE PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M5	1N64 *		1N60	1N60	1N60	AM Detector (Pigtail)

* Alternate Type 1N481.

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M6	Tuning Cap.	1021	
M7	Tuning Cap.	1025	
M8	Switch	438	

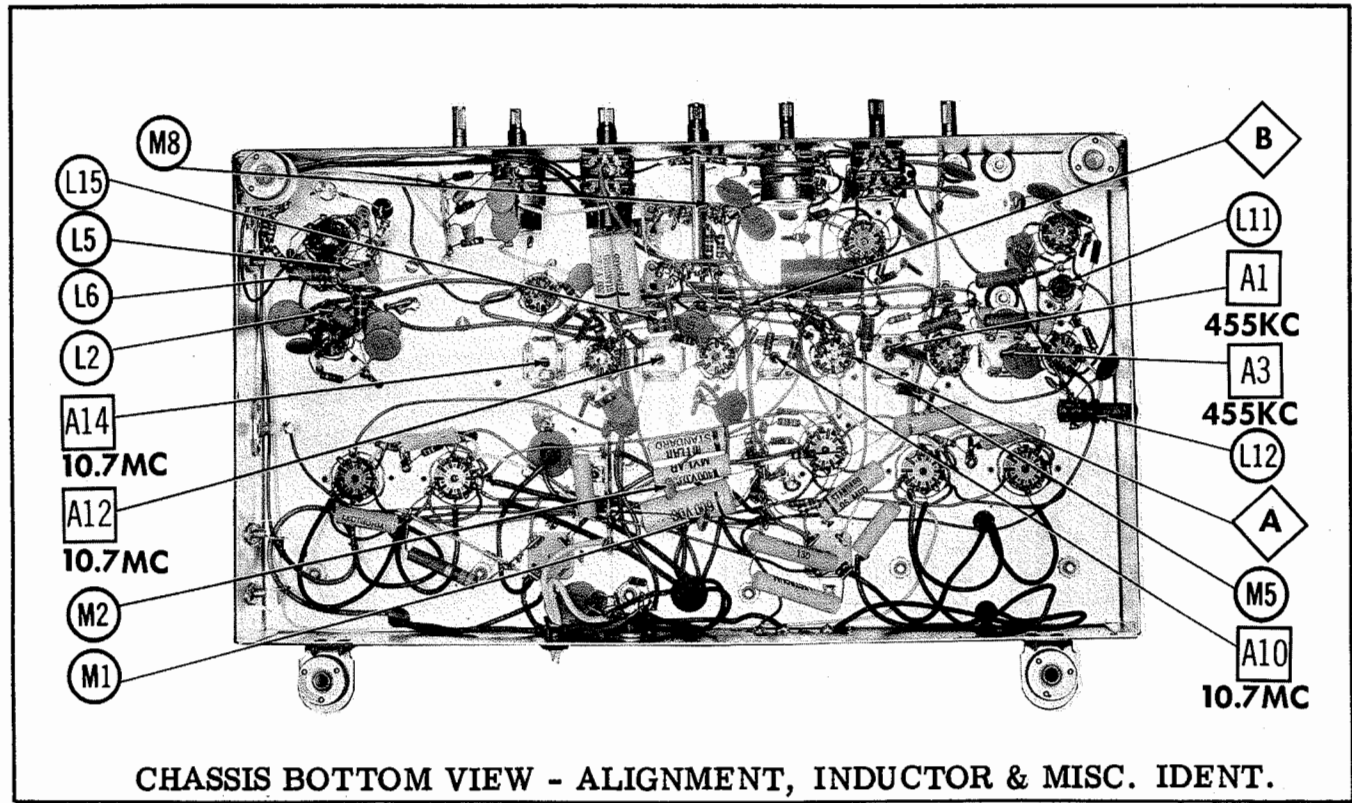
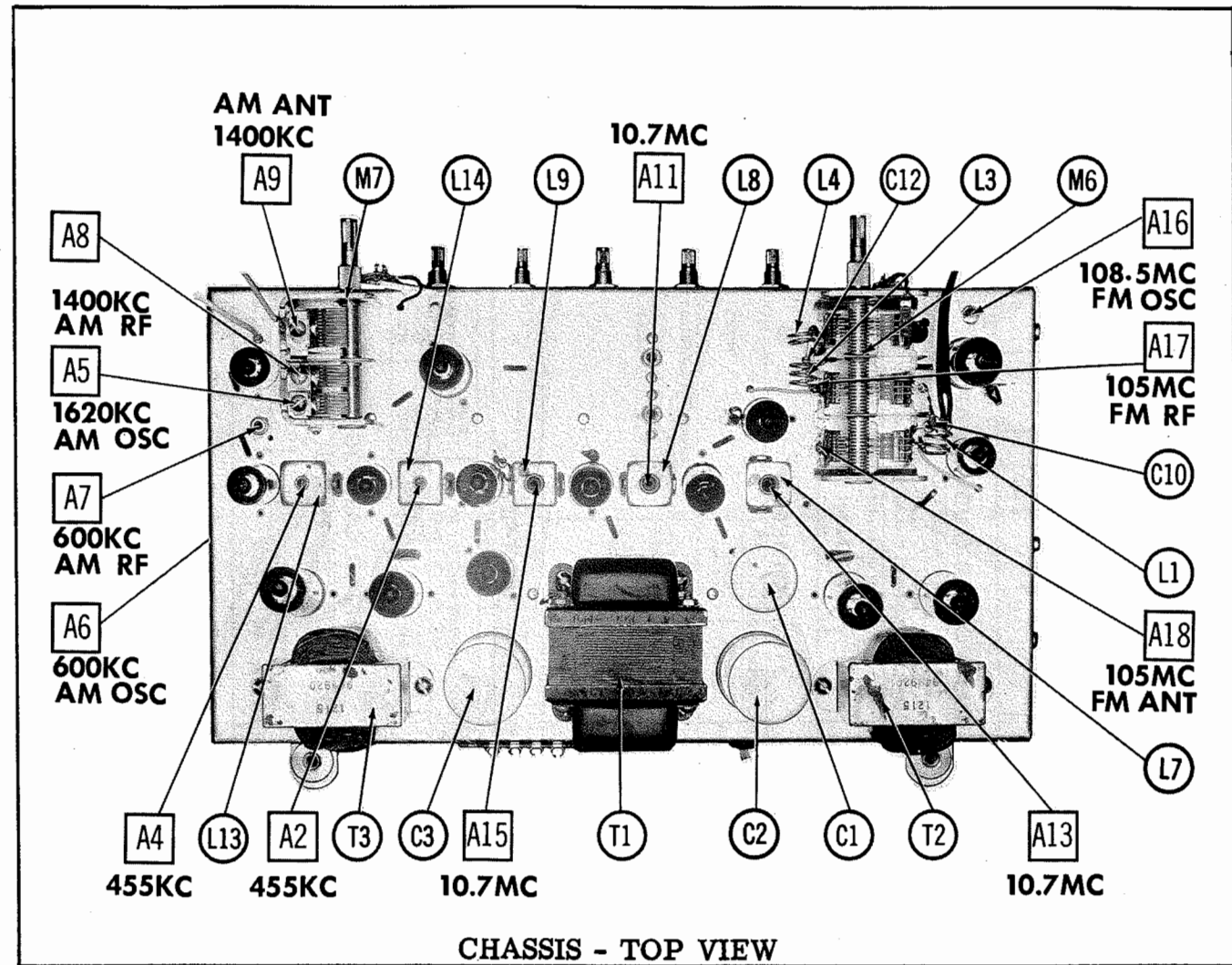
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	2439	FM, AM Tuning
Knob	2475	Loudness, Balance, Function
Knob	2476	Treble, Off-On
Knob	2477	Base, AFC

WIRING DATA

General-use Unshielded Hook-up Wire Use BELDEN No. 8530 (Solid) Available in Ten Colors
Power Cord Use BELDEN No. 8524 (Stranded) Available in Ten Colors
Low-Loss Shielded Lead (Interconnecting) Use BELDEN No. 1725-K (7 1/2 Ft. Length)
Phono Pick-up Arm Cable Use BELDEN No. 8401
 Use BELDEN No. 8430 (Two Conductor - Twisted)



PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	CBS	GENERAL ELECTRIC	RAYTHEON	SYLVANIA	ITEM No.	USE	TYPE
V1	FM RF Amplifier	6CB6A			V10	Channel 1 AF Amp. - Channel 2 AF Amp. - Channel 1 Phase Inv. - Channel 2 Phase Inv. - Channel 1 Output - Channel 2 Output	12AX7
V2	FM Mixer	6AB4			V11		12AX7
V3	FM Osc. - FM AFC	12AT7			V12		6BQ5
V4	FM IF Amplifier	6AU6A			V13		6BQ5
V5	FM IF Amplifier	6AU6A			V14		6BQ5
V6	Radio Detector	6AL5			V15		6BQ5
V7	AM RF Amplifier	6BA6					
V8	AM Converter	6BE6					
V9	AM IF Amplifier	6BA6					

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	AIRLINE	AEROVOX	CORNEILL	REPLACEMENT DATA	NOTES
C1	100	922	PR510	TC493	TD-100-150	TVLA-1420
C2A	120	1033	CO250	CO250	BER50-25	TVLS-3638.12*
C3A	50	1032	AFHA-79-10	DO480	TMQ58	TVL-4622.3
C4	10	916	PR5250	BER10-25	TD-10-25	TVLA-1204
C5	2	847	NP-PR57300	WMF1W2E	TCN502	TVANS-1202 *
C6	2	847	NP-PR57300	WMF1W2E	TCN502	TVANS-1202 *

① Some versions may use Part #630A (50V), or .5mfd 100V Part #649 in this application.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

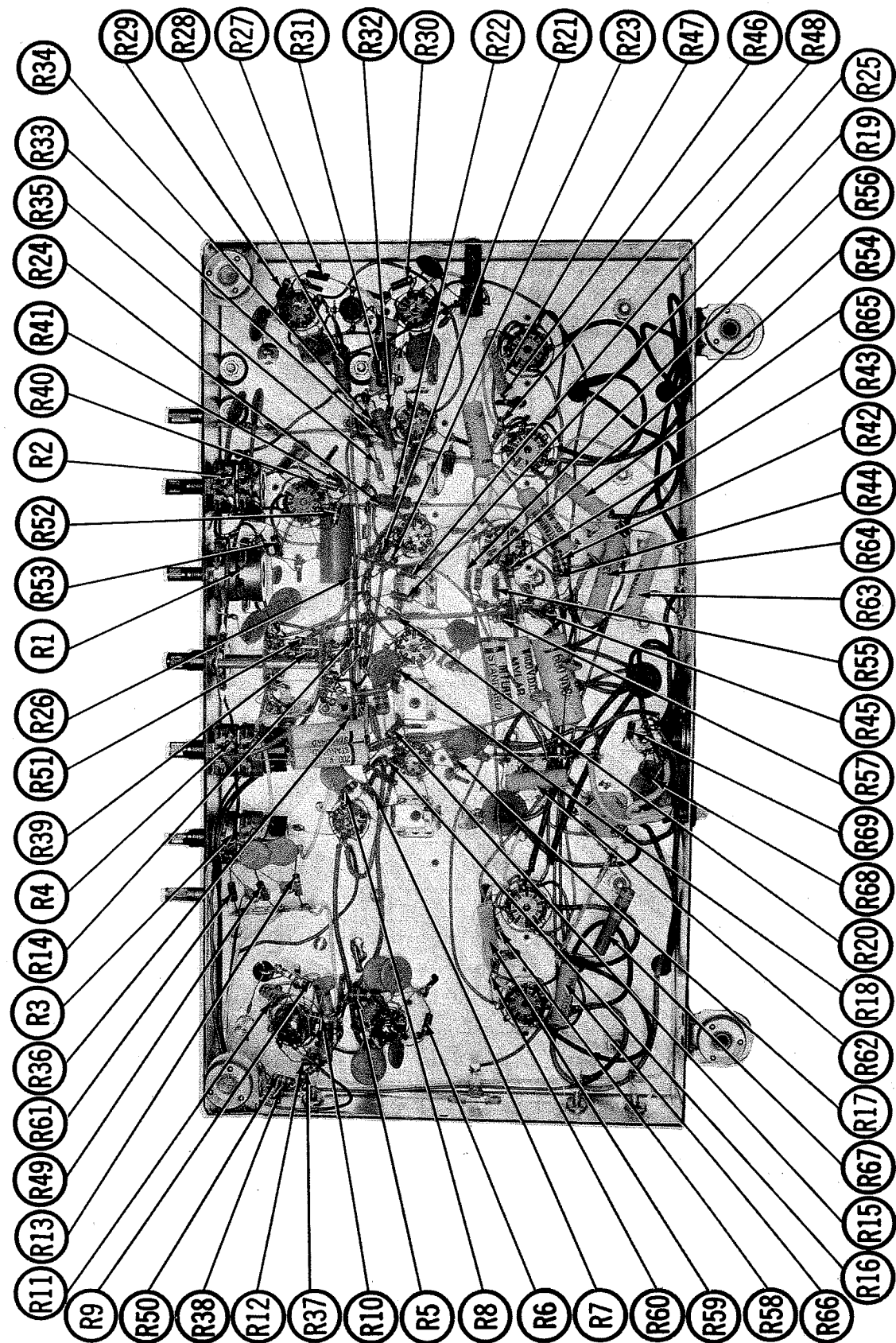
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	AEROVOX	CORNEILL	REPLACEMENT DATA	SPRAGUE
C7	10000		BPD-01	DD-103	BYA0D1	5HK-S10
C8	1500		BPD-0015	DD-152	BYA0D15	5HK-D15
C9	10000		BPD-01	DD-103	BYA0D1	5HK-S10
C10	1500		NFO-D1 47	DD-152	C10Q47C	10TCU-Q47
C11	1500		BPD-0015	DD-152	BYA0D15	5HK-D15
C12	1.5		NFO-S1 1.5	TC2-1R5	C10V15C	10TCC-V15

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	AEROVOX	CORNEILL	REPLACEMENT DATA	SPRAGUE
C14	100	N750 10%	N750-S1 100	TCN-100	TCN-100	10TCU-T10
C15	1000		BPD-001	DD-102	BYA0D1	5HK-D10
C16	7.5		BPD-001	DD-102	BYA0D1	5HK-D10
C17	10000		BPD-001	DD-102	BYA0D1	5HK-D10
C18	10000		BPD-001	DD-102	BYA0D1	5HK-D10
C19	7.5		BPD-001	DD-102	BYA0D1	5HK-D10
C20	1000		BPD-001	DD-102	BYA0D1	5HK-D10
C21	4700		BPD-0047	DD-472	BYA0D47M	5HK-D47
C22	4700		BPD-0047	DD-472	BYA0D47M	5HK-D47
C23	4700		BPD-0047	DD-472	BYA0D47M	5HK-D47
C24	4700		BPD-0047	DD-472	BYA0D47M	5HK-D47
C25	10000		NFO-D1 47	DD-103	BYA0D1	5HK-S10
C26	47		BPD-0047	DD-472	BYA0D47M	5HK-D47
C27	4700		BPD-0047	DD-472	BYA0D47M	5HK-D47
C28	4700		BPD-0047	DD-472	BYA0D47M	5HK-D47
C29	10000		BPD-00033	DD-103	BYA0D1	5HK-S10
C30	330		BPD-00033	DD-331	BYA0D1	5HK-S10
C31	330		BPD-00033	DD-331	BYA0D1	5HK-S10
C32	3300		BPD-00033	DD-331	BYA0D1	5HK-S10
C33	3300		BPD-00033	DD-331	BYA0D1	5HK-S10
C34	3300		BPD-00033	DD-331	BYA0D1	5HK-S10
C35	10000		BPD-00033	DD-331	BYA0D1	5HK-S10
C36	1	200V	BPD-001	DD-102	BYA0D1	5HK-S10
C37	10000		BPD-001	DD-102	BYA0D1	5HK-S10
C38	7.5	N750 10%	BPD-001	DD-102	BYA0D1	5HK-S10
C39	10000		BPD-001	DD-102	BYA0D1	5HK-S10
C40	10000		BPD-001	DD-102	BYA0D1	5HK-S10
C41	10000		BPD-001	DD-102	BYA0D1	5HK-S10
C42	100	N150 10%	BPD-001	DD-102	BYA0D1	5HK-S10
C43	3300		BPD-001	DD-102	BYA0D1	5HK-S10
C44	33	N750	BPD-0033	DD-332	BYA0D33	5HK-D33
C45	10000		N750-D1 33	DD-332	BYA0D33	5HK-D33
C46	5000		BPD-001	DD-103	BYA0D1	5HK-S10
C47	1	200V	BPD-001	DD-103	BYA0D1	5HK-S10
C48	100	N150	P288N-1	DD-104	CUB2P1	2TM-P1
C49	20000		BPD-02	DD-203	BYA0D2	5HK-S20
C50	20000		BPD-02	DD-203	BYA0D2	5HK-S20
C51	.05	400V	P488N-05	DD-503	CUB4S5	4TM-S5
C52	.05	400V	P488N-05	DD-503	CUB4S5	4TM-S5
C53	250		DL-250	DD-251	LI0725	10TS-T25
C54	33	N750	N750-D1 33	DD-333	C10Q33U	10TCU-Q33
C55	10000		BPD-01	DD-103	BYA0D1	5HK-S10
C56	5000		BPD-01	DD-103	BYA0D1	5HK-S10
C57	1	200V	BPD-01	DD-103	BYA0D1	5HK-S10
C58	100	N150	P288N-1	DD-104	CUB2P1	2TM-P1
C59	20000		BPD-02	DD-203	BYA0D2	5HK-S20
C60	20000		BPD-02	DD-203	BYA0D2	5HK-S20
C61	.05	400V	P488N-05	DD-503	CUB4S5	4TM-S5
C62	.05	400V	P488N-05	DD-503	CUB4S5	4TM-S5



AIRLINE MODEL GAA-2640A
CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

FOLDER 5

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools: A1 thru A4, A7 GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A5, A8, A9, A17, A18 .. GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A6, A10 thru A15 GENERAL CEMENT #8282, 8806, 8806-L, 9295, 9440
WALSCO #2528, 2543, 2544, 2545
A16 GENERAL CEMENT #8721, 8722
WALSCO #2519

AM ALIGNMENT - SELECTOR IN AM POSITION

SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1. High side thru .1mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455 KC (400v Mod.)	(AM) Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2. Loop	1620 KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3. "	600 KC	Tune to 600 KC signal	"	A6, A7	"
4. "	1400 KC	Tune to 1400 KC signal	"	A8, A9	Adjust for maximum output while rocking tuning gang.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM - SELECTOR IN FM POSITION

AFC "OFF"					
SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5. High side thru 5000mmf to pin 6 (grid) of FM Mixer. Low side to chassis.	10.7 MC (Unmod.)	(FM) Point of non-interference	DC probe to point A. Common to chassis.	A10, A11, A12, A13, A14	Adjust for maximum deflection.
6. "	"	"	DC probe to point B. Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE - SELECTOR IN FM POSITION

AFC "OFF"					
Use frequency modulated signal with 60% modulation and 450 KC sweep. Use 120v sawtooth voltage in scope for horizontal deflection.					
SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5. High side thru 5000mmf to pin 6 (grid) of FM Mixer. Low side to chassis.	10.7 MC (450 KC Swp)	(FM) Point of non-interference	Vert. Amp. to point A. Low side to chassis.	A10, A11, A12, A13, A14	Disconnect Stabilizing Capacitor C4. Adjust for maximum gain and symmetry of response similar to Fig. 1. Reconnect C4.
6. "	"	"	Vert. Amp. to point B. Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT - SELECTOR IN FM POSITION

AFC "OFF"					
SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7. Across FM antenna terminals with 120Ω in each lead.	108.5 MC (Unmod.)	(FM) Tuning gang fully open	DC probe to point A. Common to chassis.	A16	Adjust for maximum deflection.
8. "	105 MC	Tune to 105 MC signal	"	A17, A18	Adjust for maximum deflection while rocking tuning gang.

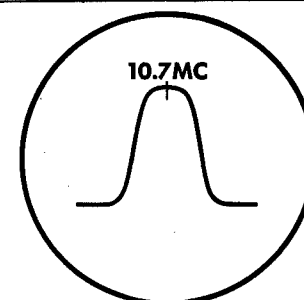


FIG. 1

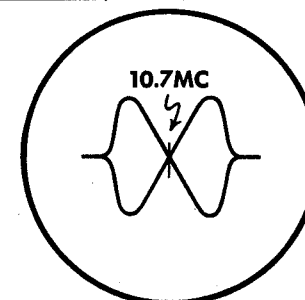
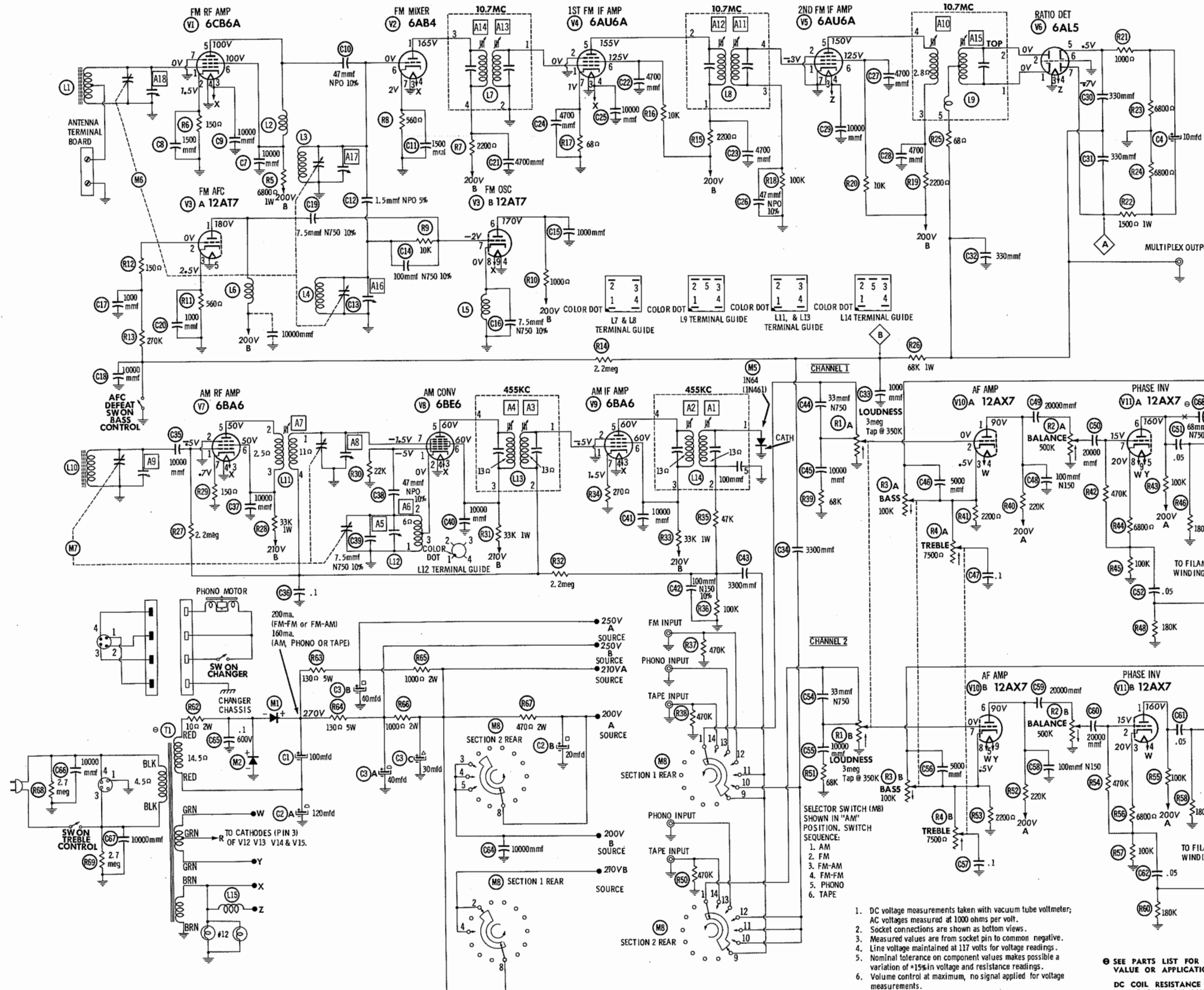


FIG. 2



A PHOTOFAC STANDARD NOTATION SCHEMATIC
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NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of $\pm 15\%$ in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

AIRLINE MODELS GAA-2640A,
 GAA-2641A, GAA-2689B