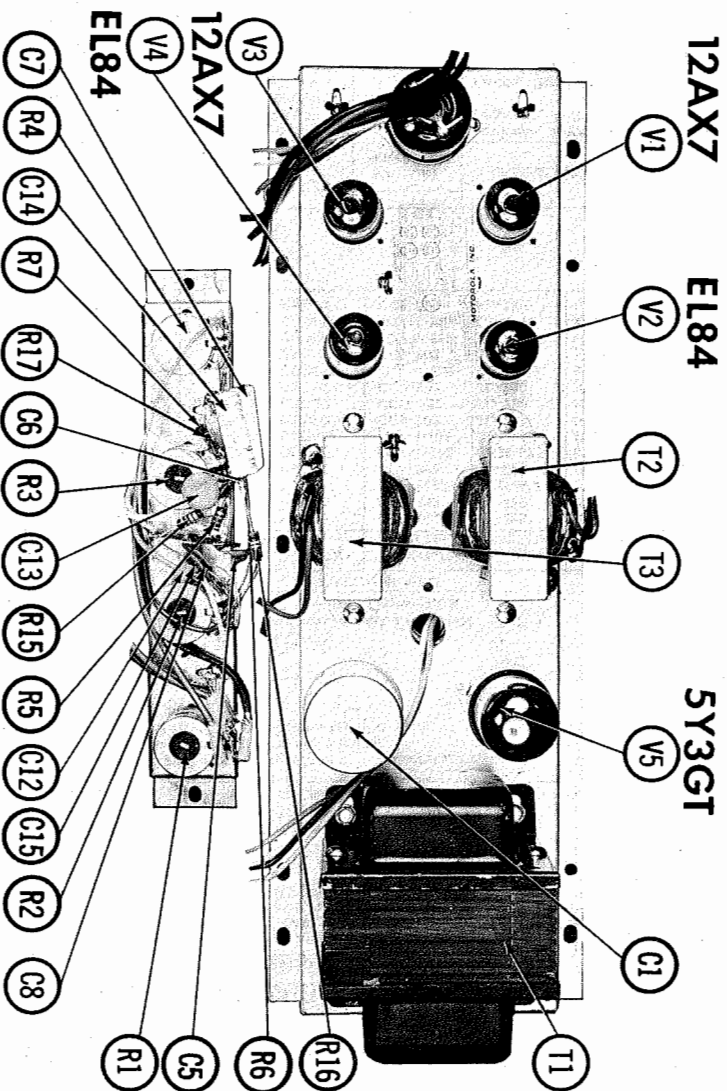


**MOTOROLA
MODELS SH12E, N, S (Ch. HS-704)**

TRADE NAME Motorola Models SH12E, SH12N, SH12S (Ch. HS-704)
MANUFACTURER Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET AC Operated 5 Tube Stereo Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY 110-120 Volts AC, 60 Cycles RATING 70 Watts, .67 Amp. @ 117 Volts AC (Less Motor)
FOR SERVICE INFORMATION ON RECORD CHANGER VM20RC, VM21RC or VM25RC - SEE SIMILAR V-M 1201 -
PHOTOFACT SET 436 FOLDER 18



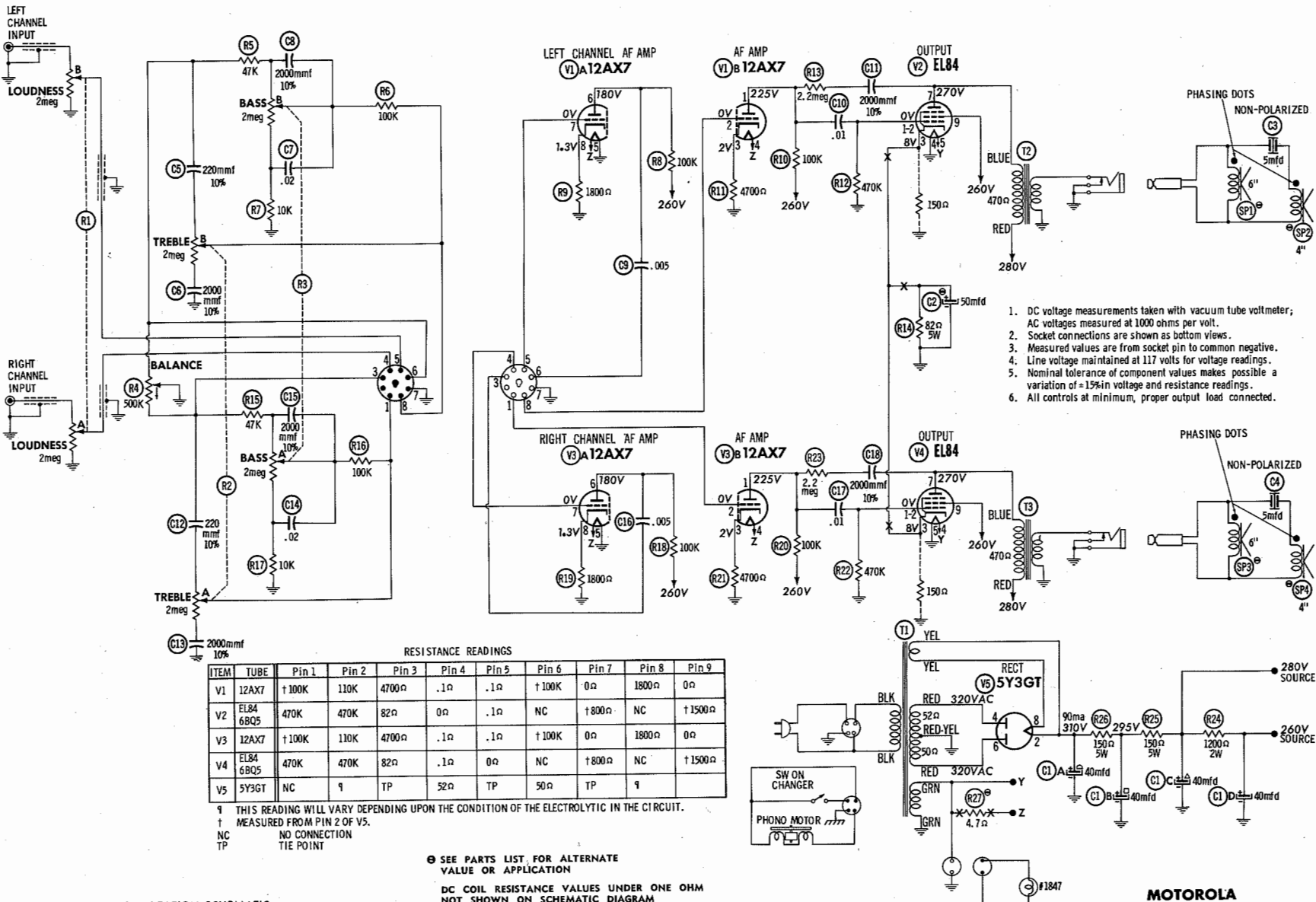
HOWARD W. SAM'S & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of J1559

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	100K	110K	4700Ω	.1Ω	.1Ω	100K	0Ω	1800Ω	0Ω
V2	EL84 6BQ5	470K	470K	82Ω	0Ω	.1Ω	NC	1800Ω	NC	1500Ω
V3	12AX7	100K	110K	4700Ω	.1Ω	.1Ω	100K	0Ω	1800Ω	0Ω
V4	EL84 6BQ5	470K	470K	82Ω	.1Ω	0Ω	NC	1800Ω	NC	1500Ω
V5	5Y3GT	NC	1	TP	52Ω	TP	50Ω	TP	1	

1 THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE C1 RCUIT.
↑ MEASURED FROM PIN 2 OF V5.
NC NO CONNECTION
TP TIE POINT

RESISTANCE READINGS



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 of component values makes possible a variation of ±1% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

PARTS LIST AND DESCRIPTIONS

TUBES

CBS			GENERAL ELECTRIC			RAYTHEON			SYLVANIA		
ITEM No.	USE		TYPE			ITEM No.	USE		TYPE		
V1	Left Channel AF Amp.		12AX7			V4	Right Channel Output		EL84/ 6BQ5		
V2	Left Channel Output		EL84/ 6BQ5			V5	Rectifier		5Y3GT		
V3	Right Channel AF Amp.		12AX7								

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	350	23K642239	AFH4-04-50	D0034	FP420. 38	TMQ-120	TVL-4635. 3	①
B	40	350							
C	40	350							
D	40	350							
C2	50	10	23B636685	PRS1265	BBR50-25	TC29	TD-50-25	TVA-1206	
C3	5	10VNP	23A632250	PRS7405	BBR10-25 †	TCN105		TVAS-1110 *	
C4	5	10VNP	23A632250	PRS7405	BBR10-25 †	TCN105		TVAS-1110 *	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Some versions may use 25mfd in this application, when replacing use 50mfd@10V.
† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

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	REPLACEMENT DATA						
	CAP.	VOLT.		AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	220	10%		DI-220	DD-221	L10T22	CCD-221	JL-322	10TS-T22	
C6	2000	10%		DI-2000		PM6D2	CCS-202	JL-220	10TS-D20	
C7	.02	400V		P488N-02	DF-203	CUB4S2	4DP-2-203	GEM-412	4TM-S2	
C8	2000	10%		DI-2000		PM6D2	CCS-202	JL-220	10TS-D20	
C9	.005	400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-625	6TM-D5	
C10	.01	400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1	
C11	2000	10%		DI-2000		PM6D2	CCS-202	JL-220	10TS-D20	
C12	220	10%		DI-220	DD-221	L10T22	CCD-221	JL-320	10TS-T22	
C13	2000	10%		DI-2000		PM6D2	CCS-202	JL-220	10TS-D20	
C14	.02	400V		P488N-02	DF-203	CUB4S2	4DP-2-203	GEM-412	4TM-S2	
C15	2000	10%		DI-2000		PM6D2	CCS-202	JL-220	10TS-D20	
C16	.005	400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-625	6TM-D5	
C17	.01	400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S1	
C18	2000	10%		DI-2000		PM6D2	CCS-202	JL-220	10TS-D20	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg	1/2	18B642659	B-76	AD47-2meg-Z	Q13-139	■ UE1874	{ Loudness, Right Channel Loudness, Left Channel
B	2meg	1/2		SR-76	Not Req.	M13-139		
C	Shaft	1/2		Not Req.	FS-3	Not Req.		
R2A	2meg	1/2	18B642659	B-76	AD47-2meg-Z	Q13-139	■ UE1874	{ Treble, Right Channel Treble, Left Channel
B	2meg	1/2		SR-76	Not Req.	M13-139		
C	Shaft	1/2		Not Req.	FS-3	Not Req.		
R3A	2meg	1/2	18B642659	B-76	AD47-2meg-Z	Q13-139	■ UE1874	{ Bass, Right Channel Bass, Left Channel
B	2meg	1/2		SR-76	Not Req.	M13-139		
C	Shaft	1/2		Not Req.	FS-3	Not Req.		
R4A	500K	1/2	18B642660	B-59	A47-500K-S	Q11-133	U50 Not Req.	Balance
B	Shaft	1/2		Not Req.	FS-3	Not Req.		

■ "STA-LOC" equivalent: FA26A, RU26A, CS3500.

RESISTORS

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

ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS
R5	47K		R13	2. 2meg		R21	4700Ω	
R6	100K		R14	82Ω 5W	#17K634893	R22	470K	
R7	10K		R15	47K		R23	2. 2meg	
R8	100K		R16	100K		R24	1200Ω 2W	
R9	1800Ω		R17	10K		R25	150Ω 5W	
R10	100K		R18	100K		R26	150Ω 5W	
R11	4700Ω		R19	1800Ω		R27	4. 7Ω	Note 1
R12	470K		R20	100K				

Note 1. Not used in some versions. Some versions may use 1. 8Ω (Part #17K742915).

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MOTOROLA PART No.	Halldorsen PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .87A	640 VCT @ .090A	5V @ 2A	25C642399	22R05U				P-8177 ①	22R05 U
	SEC. 3	SEC. 4	SEC. 5							
	6. 3V @ 1. 1A									

① Drill New Mounting Holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorsen PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω	6-8Ω	25B641660	22S58	A-2902 ①	AU-609	A-3337 ①	22S58	S-55X	① Drill New Mounting Holes
T3	5000Ω	6-8Ω	25B641660	22S58	A-2902 ①	AU-609	A-3337 ①	22S58	S-55X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω	50K642464 ①	8A31Z6. 7 ①	① Parallel & Phase
SP2	4"	PM	10-12Ω	50C636446 ①	4A1TZ10. 6 ①	
SP3	6"	PM	6-8Ω	50K642464 ①	8A31Z6. 7 ①	
SP4	4"	PM	10-12Ω	50C636446 ①	4A1TZ10. 6 ①	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA									
	MOTOROLA PART No.		ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		SONOTONE PART No.	
			CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M1			13T	Not Req.	66 *	Not Req.			8TA4-S	N-8TA-S

* Use PT-3 Mount.

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	MOTOROLA PART No.	CLEVITE PART No.	WALCO PART No.	
M2	(78 RPM)	* W-101STS † or	E98 † or	† Jewel ♦ Diamond * Includes Cartridge
		* W-101STD † *	E98D ♦	
	(LP)		E98X † or	
			E98XD ♦	

CABINETS & CABINET PARTS

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

NAME	PART NO.	DESCRIPTION
Knob	36K642652	Loudness
Knob	36K642656	Balance
Knob	36K642654	Bass & Treble
Cabinet	16K643320	Complete, Model SH-12E
Cabinet	16K643325	Less Right & Left Speaker Housings, Model SH-12E
Cabinet	16K643090	Complete, Model SH-12N
Cabinet	16K643215	Less Right & Left Speaker Housings Model SH-12N
Cabinet	16K643321	Complete, Model SH-12S
Cabinet	16K643329	Less Right & Left Speaker Housings, Model SH-12S
Housings	1K643331	Left Speaker, Includes Baffle & Grille, Model SH-12E
Housings	1K643252	Left Speaker, Includes Baffle & Grille, Model SH-12N
Housings	1K643333	Left Speaker, Includes Baffle & Grille, Model SH-12S
Housings	1K643330	Right Speaker, Includes Baffle & Grille, Model SH-12E
Housings	1K643251	Right Speaker, Includes Baffle & Grille, Model SH-12N
Housings	1K643332	Right Speaker, Includes Baffle & Grille, Model SH-12S
Handle	55K643003	Cabinet, Models SH-12E, N
Handle	55K643326	Cabinet, Models SH-12S

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. 1765-B (6 Ft. Length)
Phono Pick-up Arm Cable	Use BELDEN No. 1725-K (7½ Ft. Length)
	Use BELDEN No. 8401
	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW

