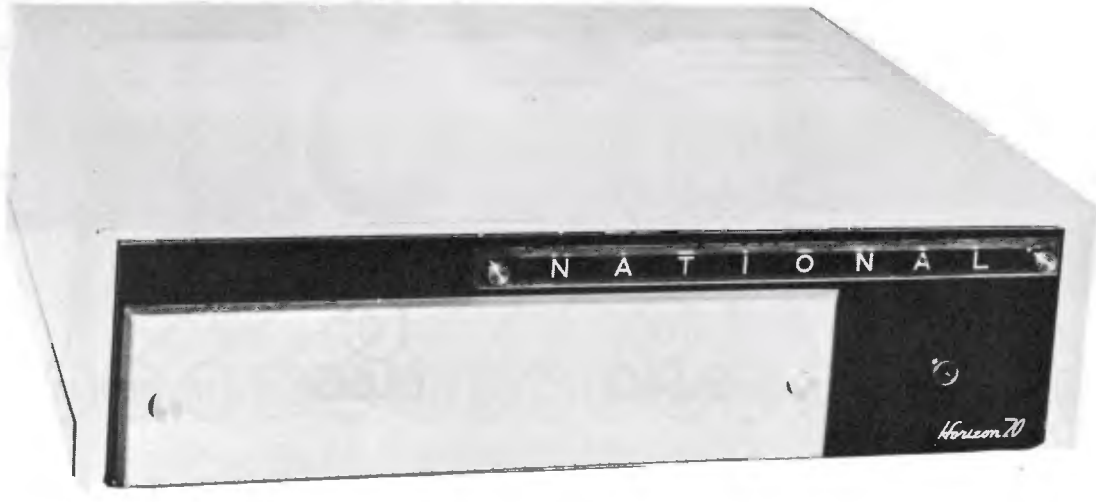
NATIONAL
MODELS Horizon 20, 20A



NATIONAL
MODELS Horizon 20, 20A

TRADE NAME	National Model "Horizon" 20, 20A
MANUFACTURER	National Co., Inc., 61 Sherman St., Malden 48, Mass.
TYPE SET	AC Operated Five Channel 20 Watt Audio Amplifier
TUBES (Four)	Types 12AX7 AF Amp-Phase Inv., (2) 6L6G Output, 5U4G Rectifier
POWER SUPPLY	110-120 Volts AC - 50/60 Cycles RATING 2.08 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, 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 the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

NATIONAL
MODEL "Horizon"20

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		NATIONAL PART No.	STANDARD REPLACEMENT		
V1	AF Amp. - Phase Inverter	12AX7	12AX7	9A	
V2	Output	6L6G	6L6G	7S	
V3	Output	6L6G	6L6G	7S	
V4	Rectifier	5U4G	5U4G	5T	

CAPACITORS

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

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	NATIONAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■40	450		AFH3-46		C037		FP378	TVL-3792	
B	▬80	450								
C	▲20	450								
C2	4	450		PRS450/4		BR445		TC70	TVA-1702	
C3	20	450		PRS450/20		BR2045		TC75	TVA-1709	
C4	20	450		PRS450/20		BR2045		TC75	TVA-1709	
C5	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C8	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C9	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C10	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1000Ω	½	T013-5	Q11-108	A47-1000-S	AB-5	U-4	Hum Balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R1A
R2A	500KΩ	½	T013-1	Q13-133	A47-500K-Z	AB-60		Gain
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1		Attach to R2A

RESISTORS

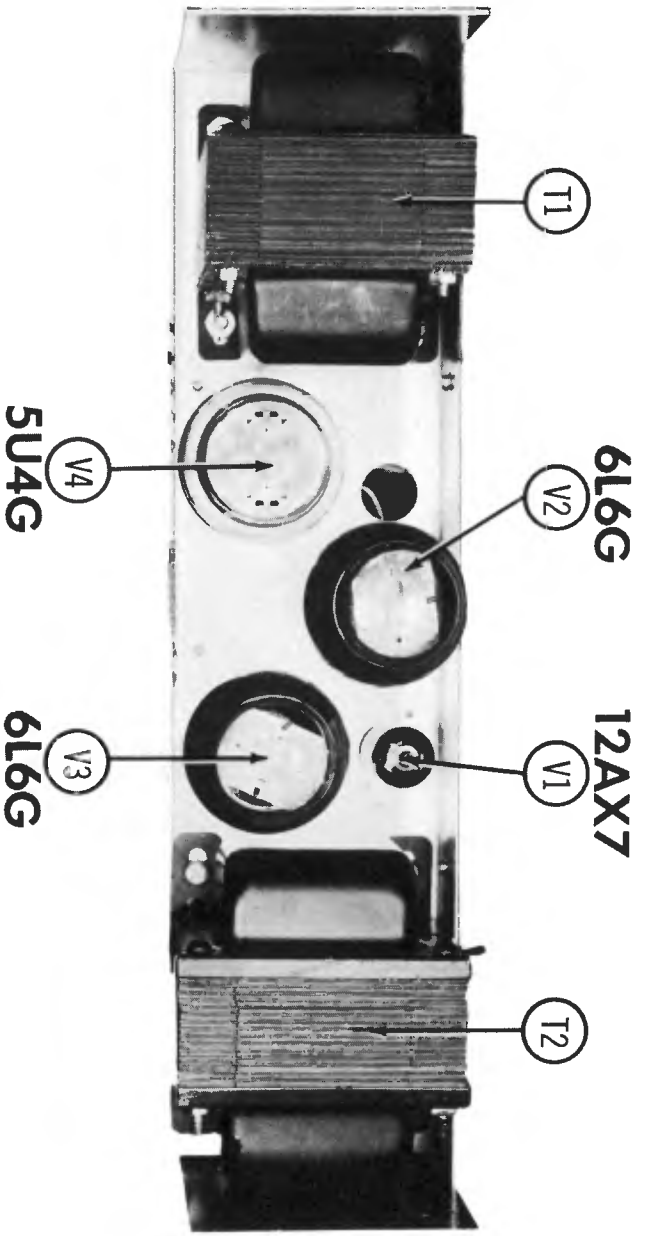
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	NATIONAL PART No.	IRC PART No.	
R3	330Ω	½		BTS-330	
R4	470KΩ	½		BTS-470K	
R5	68KΩ	2		BTB-68K	
R6	1Meg	½		BTS-1Meg	
R7	1200Ω	½		BTS-1200	
R8	33KΩ 5%	½		BTS-33K 5%	
R9	33KΩ 5%	½		BTS-33K 5%	
R10	4.7Meg 5%	½		BTS-4.7Meg 5%	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	NATIONAL PART No.	IRC PART No.	
R11	4.7Meg 5%	½		BTS-4.7Meg 5%	
R12	470Ω	½		BTS-470	
R13	430KΩ 5%	½		BTS-430K 5%	
R14	470Ω	½		BTS-470	
R15	470KΩ 5%	½		BTS-470K 5%	
R16	3900Ω	½		BTS-3900	
R17	22KΩ	½		BTS-22K	
R18	5600Ω	1		BTA-5600	
R19	100KΩ	1		BTA-100K	
R20	10KΩ	½		BTS-10K	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	NATIONAL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 2.08A	684VCT .141ADC	5VAC @ 3A	6.3VAC @ 2.34A						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.1	SEC.	NATIONAL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	1.42K PRI 2 1.42KΩ	16Ω Tap @ 8Ω							

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	NATIONAL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L1	.141A	83Ω	1.7HY		C-2327	C-2994		C5040	26C41

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	NATIONAL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.005		323D8490	V-17HP			026-25H-Q	

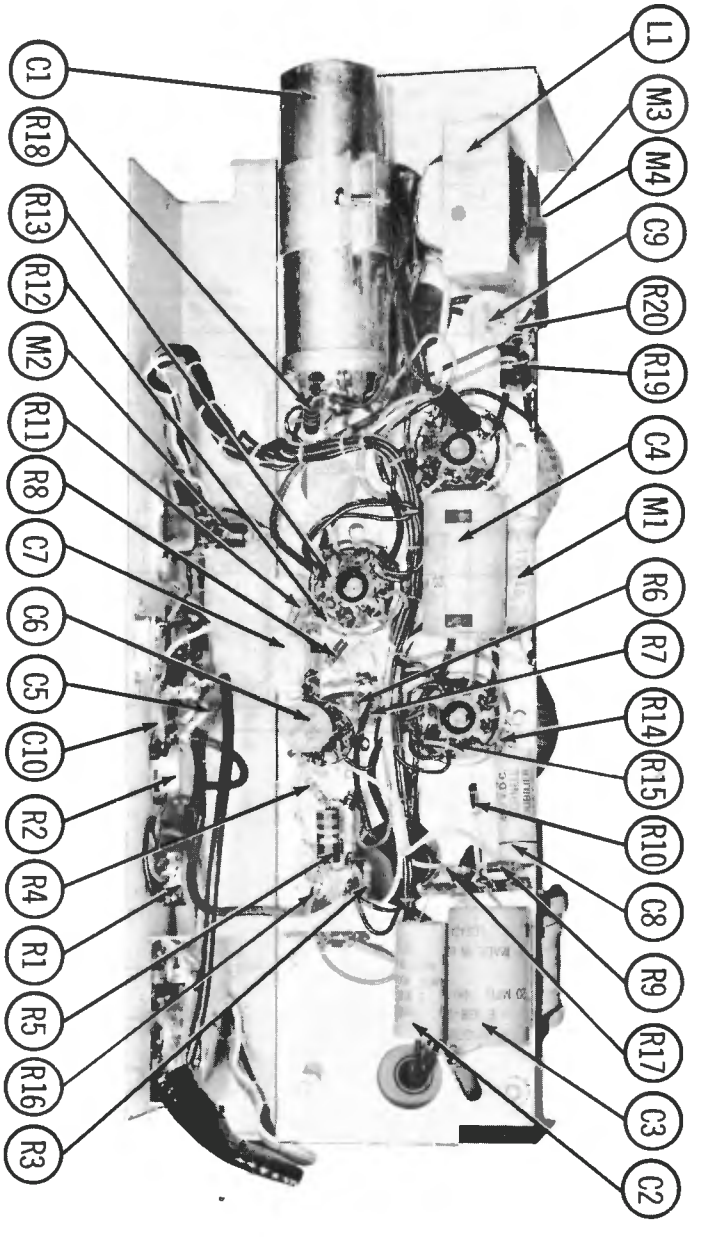
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			NATIONAL PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	2A 250V		E510-1	312002 (3AG-2A-250V)	342001	AGC2	HKP

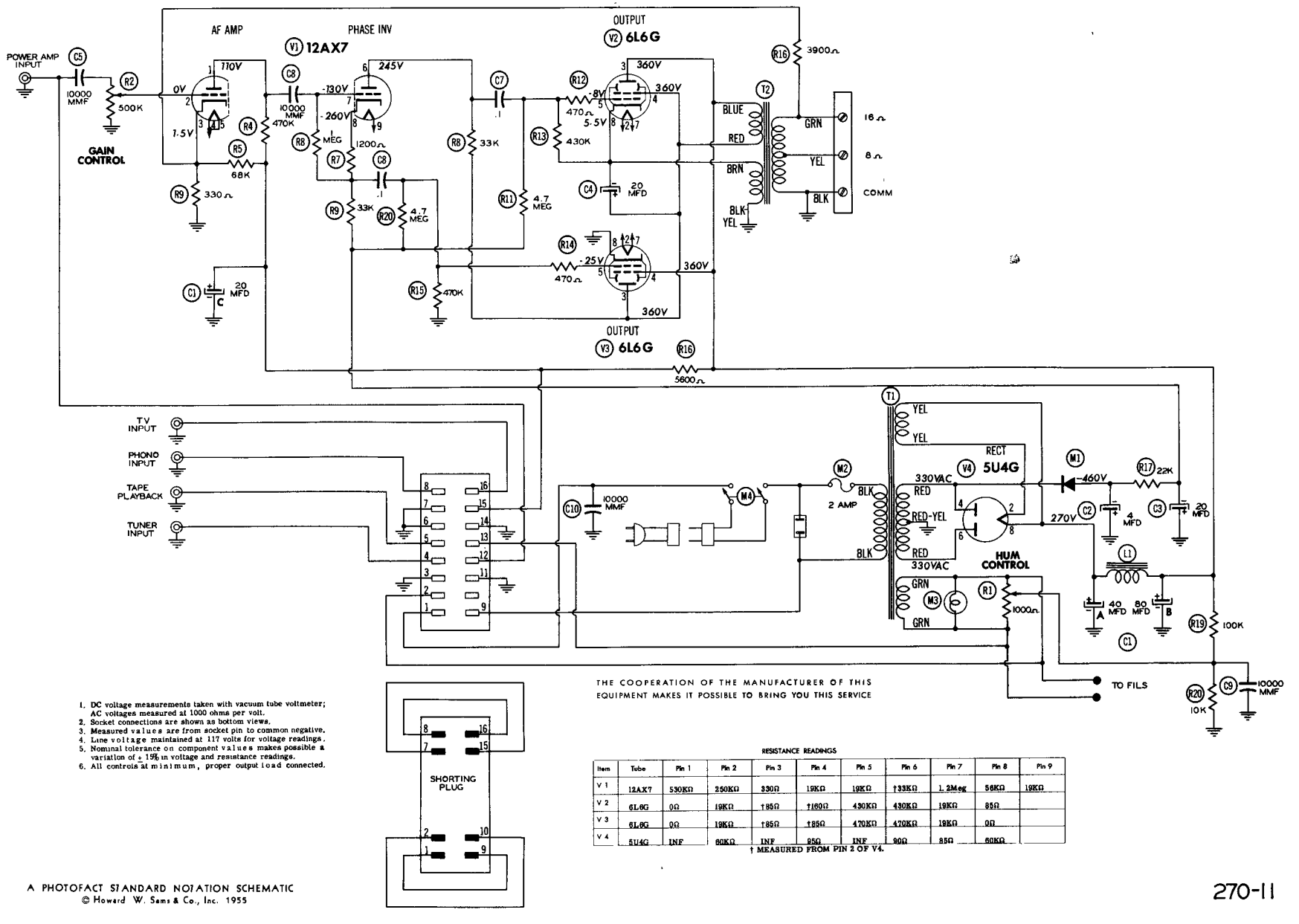
MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
M3	Panel Light		#47, Bayonet
M4	Switch	T755-1	Interlock

CHASSIS—BOTTOM VIEW



NATIONAL MODEL "Horizon" 20



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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 ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	530KΩ	250KΩ	330Ω	19KΩ	19KΩ	†33KΩ	1.2Meg	56KΩ	19KΩ
V 2	6L6G	0Ω	19KΩ	†85Ω	†160Ω	430KΩ	430KΩ	19KΩ	85Ω	
V 3	6L6G	0Ω	19KΩ	†85Ω	†85Ω	470KΩ	470KΩ	19KΩ	0Ω	
V 4	5U4G	INF	80KΩ	INF	85Ω	INF	90Ω	85Ω	80KΩ	

† MEASURED FROM PIN 2 OF V4.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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