

NATIONAL UNION

OFFICIAL

HAND BOOK

of

Radio Tube

Characteristics

Interchangeability

Base Connections

J. V. DUNCOMBE Co.

DISTRIBUTOR

Radio Parts, Tubes and Specialties
1011 West 8th Street Erie, Penna.

The data in this booklet covers over 310 radio tube types. It has been compiled and published by the makers of NATIONAL UNION RADIO TUBES, for the assistance of radio experts who operate under the sign of efficiency.

Type Number	Replaced By	Description	Base Connection	Filament Volts	Filament Amps.	Filament Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Conductance In Micromhos	Power Output In Milliwatts	Lead Resistance In Ohms	Manufactured By
00	00A-01A-01AA	Triode Detector-Gas	4D	5.0	0.250	F(T)	45 max.	—	0	—	—	—	—	—	—	Replace with NU00A
00A	40	Triode Detector-Gas	4D	5.0	0.250	F(T)	45 max.	—	0	1.5	—	20	666	—	—	NU
01	01A-01AA	Triode Detector-Amplifier	4D	5.0	0.250	F(T)	90	—	-4.5	2.5	—	8	—	—	—	Replace with NU01A
01A	01-01AA	Triode Detector-Amplifier	4D	5.0	0.250	F(T)	135	—	-4.5	2.5	—	8	725	—	—	NU
01AA	01A	Triode Detector-Amplifier	4D	5.0	0.250	F(O)	90	—	-4.5	2.2	—	8	850	—	—	NU
01B	01A(A)	Triode Detector-Amplifier	4D	5.0	0.1250	F(T)	90	—	-4.5	2.5	—	8	725	—	—	Replace with NU01A
I	6Z3-1V	Half Wave Rectifier	4G	6.3	0.300	C	350 max.	—	—	50	—	—	—	—	—	Replace with NU1V
KRI	1V-6Z3	Half Wave Rectifier	4G	6.3	0.300	C	350 max.	—	—	50	—	—	—	—	—	Replace with NU1V
RA1	—	Amplifier	4D	15.0	0.350	C	90	—	-4.5	4.5	—	11	1185	—	—	Obsolete-Sonera
RE1	80	Full Wave Rectifier	4C	5.0	2.000	F(O)	350 max.	—	—	125	—	—	—	—	—	Replace with NU80
RE2	81	Half Wave Rectifier	4B	7.5	1.250	F(O)	700 max.	—	—	85	—	—	—	—	—	Replace with NU81
SD1	—	Amplifier	4D	15.0	0.400	C	180	—	-40.6	21	—	3	1500	—	—	Obsolete-Sonera
SD2	50-585	Amplifier	4D	7.5	1.250	F(O)	450	—	-84	55	—	3.8	2100	4600	4350	Replace with NU50
IA4	—	Super Control R.F. Amplifier	4K	2.0	0.060	F(O)	180	67.5	-3.0	2.3	0.70	720	750	—	—	NU
IA6	—	Pentagrid Converter	6L	2.0	0.060	F(O)	180	67.5	-3.0	1.2	2.5	—	275	—	—	NU
IB1	—	Ballast Tube	4A	0.7	0.360	F	—	—	—	—	—	—	—	—	—	NU
IB4-951	—	Screen Grid R.F. Amplifier	4K	2.0	0.060	F(O)	180	67.5	-3.0	1.7	0.4	780	650	—	—	NU
IB5-258	258	Duplex Diode Triode	6G	2.0	0.060	F(O)	135	—	-3.0	0.8	—	20	575	—	—	NU
IC6	—	Pentagrid Converter	6L	2.0	0.120	F(O)	180	67.5	-3.0	1.3	2.0	—	300	—	—	NU

IE1	—	Ballast Tube	4A	0.7	0.480	F	—	—	—	—	—	—	—	—	—	NU	
IF1	—	Ballast Tube	4A	0.7	0.720	F	—	—	—	—	—	—	—	—	—	NU	
IG1	—	Ballast Tube	4A	0.7	0.420	F	—	—	—	—	—	—	—	—	—	NU	
IV	6Z3	Half Wave Rectifier	4B	6.3	0.300	C	350	—	—	50	—	—	—	—	—	Phileo	
2	—	Ballast Tube	4A	9.0	0.300	F	—	—	—	—	—	—	—	—	—	—	
2A3	—	Power Amplifier Triode	4D	2.5	2.500	F(O)	250	300	Push-Pull	-45	60	—	4.2	5250	3500	2500	NU
2A3H	2A3	Power Amplifier Triode	4Q	2.5	2.500	C	300	300	Push-Pull	-62	40	—	—	15000	3000	3000	Replace with NU2A3
2A5	—	Power Amplifier Pentode	6B	2.5	1.750	C	250	250	—	-16.5	34	6.5	220	3000	7000	NU	
2A6	—	Duplex Diode Triode	6G	2.5	0.800	C	250	—	—	2.0	0.8	—	100	—	100,000	NU	
2A7	2A7S	Pentagrid Converter	7C	2.5	0.800	C	250	100	—	-3.0	3.5	2.2	—	520	—	—	
2A7S	2A7	Pentagrid Converter with Shield	7C	2.5	0.800	C	100	50	—	-1.5	1.3	2.5	—	350	—	—	
2B6	—	Power Amplifier Direct Coupled	7J	2.5	2.250	C	250	250	Input Output	-24.0	4	—	7.2	600	—	8000	Triad
2B7	2B7S	Duplex Diode Pentode	7D	2.5	0.800	C	250	100	—	-3.0	9.0	2.3	730	1125	—	—	
2B7S	2B7	Duplex Diode Pentode with Shield	7D	2.5	0.800	C	100	100	—	-3.0	5.8	1.7	285	950	—	—	
B2-G2S	56-27(A)	Duplex Diode	5D	2.5	1.750	C	—	—	—	—	—	—	—	—	—	Sylvania	

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Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Condus-tance In Micromhos	Power Output In Milliwatts	Lead Resistance In Ohms	Manufactured By
Z2-G84		Half Wave Rectifier	4B	2.5	1.500	F	350	—	—	50	—	—	—	—	—	NU
3	—	Ballast Tube	4A	128.0	0.300	F	—	—	—	—	—	—	—	—	—	Philco
4	—	Ballast Tube	4A	115.0	0.300	F	—	—	—	—	—	—	—	—	—	Philco
34-G4S	56-27(A)	Duplex Diode	5D	2.5	1.000	C	—	—	—	—	—	—	—	—	—	Sylvania
5	—	Ballast Tube	4A	115.0	0.460	F	—	—	—	—	—	—	—	—	—	Philco
KR5	6A4	Power Amplifier Pentode	5B	6.3	0.300	F	135	135	— 9.0	14	2.5	100	1900	700	9500	Replace with NU6A4
5Y3	5Z4	Full Wave Rectifier ◦	5L	5.0	2.000	F (O)	400	—	—	110	—	—	—	—	—	NU
5Z3	83	Full Wave Rectifier	4C	5.0	3.000	F (O)	500	—	—	250	—	—	—	—	—	NU
5Z4	5Z4MG	Full Wave Rectifier ◦	5L	5.0	2.000	C	400	—	—	125	—	—	—	—	—	NU
5Z4MG	5Z4	Full Wave Rectifier ◦	5L	5.0	2.000	C	400	—	—	125	—	—	—	—	—	NU
6	—	Ballast Tube	4A	1.0	0.695	F	—	—	—	—	—	—	—	—	—	Philco
6A3	—	Power Amplifier Triode	4D	6.3	1.000	F (O)	250 300	— Push-Pull	—45 —62	60 40	— —	4.2	5250 —	3500 15000	2500 3000	— Sylvania
6A4-LA	—	Power Amplifier Pentode	5B	6.3	0.300	F (O)	180 100	180 100	—12.0 — 6.5	22 8	3.9 1.6	100 100	2200 1200	1400 310	8000 11000	— NU
6A6	—	Class B Twin Amplifier	7B	6.3	0.800	C	294 300	Class A Class B	— 6.0 0	7 17.5	— —	35	3200 —	— 10000	— 10000(2)	— NU
6A7	6A7S	Pentagrid Converter	7C	6.3	0.300	C	250 100	100 50	— 3.0 — 1.5	3.5 1.3	2.2 2.5	— —	520 350	— —	— —	— NU
6A7S	6A7	Pentagrid Converter	7C	6.3	0.300	C	250 100	100 50	— 3.0 — 1.5	3.5 1.3	2.2 2.5	— —	520 350	— —	— —	— NU
6A8	6A8G-6A8MG	Pentagrid Converter ◦	8A	6.3	0.300	C	250 100	100 50	— 3.0 — 1.5	3.3 1.2	3.2 1.5	— —	500 350	— —	— —	— NU
6A8G	6A8-6A8MG	Pentagrid Converter ◦	8A	6.3	0.300	C	250 100	100 50	— 3.0 — 1.5	3.3 1.2	3.2 1.5	— —	500 350	— —	— —	— NU
6A8MG	6A8-6A8G	Pentagrid Converter ◦	8A	6.3	0.300	C	250 100	100 50	— 3.0 — 1.5	3.3 1.2	3.2 1.5	— —	500 350	— —	— —	— NU
6B5	—	Power Amplifier Direct Coupled	6D	6.3	0.800	C	300 300	Input Output	0 0	8 45	— —	— 58	2400 2400	4000 4000	7000	— NU
6B6	6Q7	Duplex Diode Triode ◦	6S	6.3	0.3000	C	250	—	— 2.0	0.8	—	100	1100	—	—	— Areturus
6B7	6B7S	Duplex Diode Pentode	7D	6.3	0.300	C	250 100	125 100	— 3.0 — 3.0	9.0 5.8	2.3 1.7	730 285	1125 950	— —	— —	— NU
6B7S	6B7	Duplex Diode Pentode	7D	6.3	0.300	C	250 100	125 100	— 3.0 — 3.0	9.0 5.8	2.3 1.7	730 285	1125 950	— —	— —	— NU
6C5	6C5G-6C5MG	Triode Detector-Amplifier ◦	6Q	6.3	0.300	C	250	—	— 8.0	8	—	20	2000	—	—	— NU
6C5G	6C5-6C5MG	Triode Detector-Amplifier ◦	6Q	6.3	0.300	C	250	—	— 8.0	8	—	20	2000	—	—	— NU
6C5MG	6C5-6C5G	Triode Detector-Amplifier ◦	6Q	6.3	0.300	C	250	—	— 8.0	8	—	20	2000	—	—	— NU
6C6	77	Triple Grid Detector-Amplifier	6F	6.3	0.300	C	250 100	100	— 3.0 — 3.0	2 2	0.5 0.5	1500+ 1185	1225 1185	— —	— —	— NU
6C7	—	Duplex Diode Triode	7G	6.3	0.300	C	250	—	— 9.0	4.5	—	20	1250	—	—	— NU
6D5	6D5G-6D5MG	Power Amplifier Triode ◦	6Q	6.3	0.700	C	275	—	—40.0	31	—	4.7	2100	1400	7200	— NU
6D5G	6D5-6D5MG	Power Amplifier Triode ◦	6Q	6.3	0.700	C	275	—	—40.0	31	—	4.7	2100	1400	7200	— NU
6D5MG	6D5-6D5G	Power Amplifier Triode ◦	6Q	6.3	0.700	C	275	—	—40.0	31	—	4.7	2100	1400	7200	— NU
6D6	78	Super Control R.F. Amplifier	6F	6.3	0.300	C	250	100	— 3.0	8.2	2.0	1280	1600	—	—	— NU

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6D7	—	Triple Grid Detector-Amplifier		7H	6.3	0.300	C	250	100	— 3.0	2	0.5	1500+	1275	—	—	NU
6E5	—	Electron Ray Tuning Indicator		6 Pr. Spec.	6.3	0.300	C	250	—	0 to —8	—	—	—	—	—	—	NU
6E6	—	Power Amplifier Duplex Triode		7B	6.3	0.600	C	250	—	—27.5	18	—	6	1700	1600(2)	14000(2)	NU
6E7	—	Super Control R. F. Amplifier		7H	6.3	0.300	C	250	100	— 3.0	8.2	2	1280	1600	—	—	NU
6F5	6F5G-6F5MG	Triode-High Mu °		5M	6.3	0.300	C	250	—	— 2.0	0.9	—	100	1500	—	—	NU
6F5G	6F5-6F5MG	Triode-High Mu °		5M	6.3	0.300	C	250	—	— 2.0	0.9	—	100	1500	—	—	NU
6F5MG	6F5-6F5G	Triode-High Mu °		5M	6.3	0.300	C	250	—	— 2.0	0.9	—	100	1500	—	—	NU
6F6	6F6G-6F6MG	Power Amplifier Pentode °		7S	6.3	0.300	C	250	250	—16.5	34	6.5	200	2500	3000	7000	NU
6F6G	6F6-6F6MG	Power Amplifier Pentode °		7S	6.3	0.300	C	250	250	—16.5	34	6.5	200	2500	3000	7000	NU
6F6MG	6F6-6F6G	Power Amplifier Pentode °		7S	6.3	0.300	C	250	250	—16.5	34	6.5	200	2500	3000	7000	NU
6F7	6F7S	Triode-Pentode		7E	6.3	0.300	C	100 250	(Triode) 100	— 3.0 — 3.0	3.5 6.5	— 1.5	8 900	450 1100	—	—	NU
6F7S	6F7	Triode-Pentode		7E	6.3	0.300	C	100 250	(Triode) 100	— 3.0 — 3.0	3.5 6.5	— 1.5	8 900	450 1100	—	—	NU
6H6	6H6G-6H6MG	Duplex Diode °		7Q	6.3	0.300	C	100	—	— 2	—	—	—	—	—	—	NU
6H6G	6H6-6H6MG	Duplex Diode °		7Q	6.3	0.300	C	100	—	— 2	—	—	—	—	—	—	NU
6H6MG	6H6-6H6G	Duplex Diode °		7Q	6.3	0.300	C	100	—	— 2	—	—	—	—	—	—	NU
6J7	6J7G-6J7MG	Triple Grid Detector-Amplifier °		7R	6.3	0.300	C	250 100	100	— 3.0 — 3.0	2	0.5	1500+ 1185	1225 1185	—	—	NU
6J7G	6J7-6J7MG	Triple Grid Detector-Amplifier °		7R	6.3	0.300	C	250 100	100	— 3.0 — 3.0	2	0.5	1500+ 1185	1225 1185	—	—	NU
6J7MG	6J7-6J7G	Triple Grid Detector-Amplifier °		7R	6.3	0.300	C	250 100	100	— 3.0 — 3.0	2	0.5	1500+ 1185	1225 1185	—	—	NU
6K7	6K7G-6K7MG	Super Control R.F. Amplifier °		7R	6.3	0.300	C	250 90	100 90	— 3.0 — 3.0	7.0 5.4	1.7 1.3	1160 400	1450 1275	—	—	NU
6K7G	6K7-6K7MG	Super Control R.F. Amplifier °		7R	6.3	0.300	C	250 90	100 90	— 3.0 — 3.0	7.0 5.4	1.7 1.3	1160 400	1450 1275	—	—	NU
6K7MG	6K7-6K7G	Super Control R.F. Amplifier °		7R	6.3	0.300	C	250 90	100 90	— 3.0 — 3.0	7.0 5.4	1.7 1.3	1160 400	1450 1275	—	—	NU
6L7	6L7G-6L7MG	Pentagrid Mixer Amplifier °		7T	6.3	0.300	C	250	100	— 3.0	5.3	5.5	880	1100	—	—	NU
6L7G	6L7-6L7MG	Pentagrid Mixer Amplifier °		7T	6.3	0.300	C	250	100	— 3.0	5.3	5.5	880	1100	—	—	NU
6L7MG	6L7-6L7G	Pentagrid Mixer Amplifier °		7T	6.3	0.300	C	250	100	— 3.0	5.3	5.5	880	1100	—	—	NU
6P7	—	Triode-Pentode °		7U	6.3	0.300	C	100 250	(Triode) 100	— 3.0 — 3.0	3.5 6.5	— 1.5	8 900	450 1100	—	—	Arcturus
6Q7	6Q7MG	Duplex Diode-Triode °		7V	6.3	0.300	C	250	—	— 3.0	1.1	—	70	1200	—	—	Replace with NU6Q7MG
6Q7MG	—	Duplex Diode-Triode °		6S	6.3	0.300	C	250	—	— 3.0	1.1	—	70	1200	—	—	NU
6Y5	6Y5V	Full Wave Rectifier *		6J	6.3	0.800	C	350	—	—	50	—	—	—	—	—	NU
6Y5V	6Y5	Full Wave Rectifier		6J	6.3	0.800	C	350	—	—	60	—	—	—	—	—	NU
6Z3	1V	Half Wave Rectifier		4G	6.3	0.300	C	350	—	—	50	—	—	—	—	—	Replace with NU1V
6Z4-84	—	Full Wave Rectifier		5D	6.3	0.500	C	350	—	—	50	—	—	—	—	—	NU
6Z5-12Z5	—	Full Wave Rectifier		6K	6.3	0.600	C	230	—	—	60	—	—	—	—	—	NU

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7	—	Ballast Tube	4A	176.0	0.300	F	—	—	—	—	—	—	—	—	—	Philco
8	—	Ballast Tube	4A	132.0	0.300	F	—	—	—	—	—	—	—	—	—	Philco
9	—	Ballast Tube	4A	50.0	0.300	F	—	—	—	—	—	—	—	—	—	Philco
10	—	Power Amplifier Triode	4D	7.5	1.250	F (OT)	425	—	-39.0	18	—	8	1600	1600	10200	NU
WD11	—	Triode Detector-Amplifier	4F	1.1	0.250	F (O)	135	—	-10.5	3	—	6.6	440	—	—	Obsolete
WX12	—	Triode Detector-Amplifier	4D	1.1	0.250	F (O)	135	—	-10.5	3	—	6.6	440	—	—	NU
12A	—	Triode Detector-Amplifier	4D	5.0	0.250	F (O)	90	—	-13.5	7.7	—	8.5	1800	1285	10650	NU
									-4.5	5.0	—	8.5	1575	35	5000	
12A5	—	Power Amplifier Pentode	7F	6.3	0.600	C	180	180	-27.0	38	8	90	2300	2600	3800	NU
		Pentode and Half Wave Rectifier	7K	12.6	0.300	C	125	135	-13.5	9	2.5	100	975	—	—	NU
12A7	—	Half Wave Rectifier	4G	12.6	0.300	C	250	—	—	30	—	—	—	—	—	NU
12Z3	—	Half Wave Rectifier	4G	12.6	0.300	C	250	—	—	60	—	—	—	—	—	NU
12Z5	—	Voltage Doubling Rectifier	7L	12.6	0.300	C	225	—	—	60	—	—	—	—	—	NU
2Z5-6Z5	—	Full Wave Rectifier	6K	12.6	0.300	C	225	—	—	60	—	—	—	—	—	NU
14	—	Screen Grid R.F. Amplifier	5E	14.0	0.300	C	250	90	-3.0	4	1.5	525	1050	—	—	Sylvania
14Z3	12Z3	Half Wave Rectifier	4G	14.0	0.300	C	250	—	—	60	—	—	—	—	—	Replace with NU12Z3
15	—	Screen Grid R.F. Amplifier	5F	2.0	0.220	C	67.5	67.5	-1.5	1.8	0.3	450	710	—	—	NU
17	—	Triode General Purpose	5A	14.0	0.300	C	180	—	-13.5	5	—	9	1000	—	—	Sylvania
18	—	Power Amplifier Pentode	6B	14.0	0.300	C	250	250	-16.5	34	7.5	185	2350	3400	7000	Sylvania
19	—	Class B Twin Amplifier	6C	2.0	0.260	F (O)	135	—	0	10	—	—	—	2100(2)	10000(2)	NU
20	—	Power Amplifier Triode	4D	3.3	0.192	F (O)	135	—	-22.5	6.5	—	3.3	525	110	6500	NU
KR20	—	Special Detector	6N	2.5	1.000	C	250	—	0	3.5	—	14	1400	—	—	Kenrad
22	—	Screen Grid R.F. Amplifier	4K	3.3	0.132	F (O)	135	67.5	-1.5	3.7	1.3	160	500	—	—	NU
A22	—	Screen Grid R.F. Amplifier	4D	15.0	0.350	C	135	45	-1.5	2.0	0.4	300	600	—	—	Arcturus
AC22	24A-24S	Screen Grid R.F. Amplifier	5E	2.5	1.750	C	250	90	-3.0	4	1.7	630	1050	—	—	Replace with NU24A
KR22	—	Special Detector	6N	6.3	0.400	C	250	—	0	3.5	—	14	1400	—	100,000	Kenrad
K24	24A-24S	Screen Grid R.F. Amplifier	5E	2.5	1.750	C	180	75	-1.5	2	—	—	800	—	—	Replace with NU24A
24A	24S	Screen Grid R.F. Amplifier	5E	2.5	1.750	C	250	90	-3.0	4	1.7	630	1050	—	—	NU
24S	24A	Screen Grid R.F. Amplifier	5E	2.5	1.750	C	250	90	-3.0	4	1.7	630	1050	—	—	NU
25-25S	1B5	Duplex Diode Triode	6M	2.0	0.080	F	135	—	-3.0	1	—	20	475	—	—	NU
KR25	2A5	Power Amplifier Pentode	6B	2.5	1.750	C	250	250	-16.5	34	6.5	220	2200	3000	7000	Replace with NU2A5
25Y5	—	Voltage Doubling Rectifier	6E	25.0	0.300	C	250	—	—	85	—	—	—	—	—	NU
25Z3	—	Half Wave Rectifier	4G	25.0	0.300	C	250	—	—	50	—	—	—	—	—	—
25Z5	—	Voltage Doubling Rectifier	6E	25.0	0.300	C	125	—	—	100	—	—	—	—	—	NU
25Z5MG	—	Voltage Doubling Rectifier		25.0	0.300	C	125	—	—	100	—	—	—	—	—	Triad
26	—	Triode Amplifier	4D	1.5	1.050	F (O)	180	—	-14.5	6.2	—	8.3	1150	—	—	NU
27	56	Triode Detector-Amplifier	5A	2.5	1.750	C	250	—	-21.0	5.2	—	9.0	975	—	—	NU
K27	56-27	Triode Detector-Amplifier	5A	2.5	1.750	C	90	—	-4.5	3.0	—	9.0	1000	—	—	Replace with NU27
27HM	56-27	Triode Detector-Amplifier	5A	2.5	1.750	C	180	—	-13.5	5.0	—	13.0	1350	—	—	Replace with NU27
27S	56-27	Triode Detector-Amplifier	5A	2.5	1.750	C	250	—	-21.0	5.2	—	9.0	975	—	—	NU
A28	—	Triode Detector-Amplifier	4D	15.0	0.350	C	90	—	-1.5	7.5	—	10.5	1165	—	—	Arcturus

Type Number	Replaced By	Description	Base Connection	Filament Volts	Filament Amps.	Filament Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (mA)	Screen Current (mA)	Amplification Factor	Mutual Conductance in Micromhos	Power Output in Milliwatts	Lead Resistance in Ohms	Manufactured By
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Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Conductance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
KR28	84-6Z4	Full Wave Rectifier *	5D	6.3	0.500	C	350	—	—	50	—	—	—	—	—	Replace with NU84-6Z4
29	—	Special Detector	6N	2.5	1.000	C	180	—	—3.0	4.5	—	30	1450	—	—	Sylvania
30	—	Triode Detector-Amplifier	4D	2.0	0.060	F(O)	180	—	—13.5	3.1	—	9.3	900	—	—	NU
A30	—	Power Amplifier Triode	4D	15.0	0.350	C	180	—	—27.0	22.0	—	3.8	1085	—	—	Arcturus
31	—	Power Amplifier Triode	4D	2.0	0.130	F(O)	180	—	—10.0	12.3	—	3.8	1050	375	5700	NU
KR31	—	Half Wave Rectifier *	4G	10.0	0.500	C	350	—	—	100	—	—	—	—	—	Kenrad
32	1B4	Screen Grid R.F. Amplifier	4K	2.0	0.060	F(O)	180	67.5	—3.0	1.7	0.4	780	650	—	—	NU
A32	—	Triode Amplifier	4D	15.0	0.350	C	135	—	—3.0	1.5	—	30	940	—	—	Arcturus
33	—	Power Amplifier Pentode	5K	2.0	0.260	F(O)	180	180	—18.0	22	5	90	1700	1400	6000	NU
34	1A4	Super Control R.F. Amplifier	4M	2.0	0.060	F(O)	180	67.5	—3.0	2.8	1.0	620	620	—	—	NU
35-51	35S-51S	Super Control R.F. Amplifier	5E	2.5	1.750	C	250	90	—3.0	6.5	2.5	420	1050	—	—	NU
35S-51S	35-51	Super Control R.F. Amplifier	5E	2.5	1.750	C	250	90	—3.0	6.5	2.5	420	1050	—	—	NU
36-36A	—	Screen Grid R.F. Amplifier	5E	6.3	0.300	C	250	90	—3.0	3.2	1.7	595	1080	—	—	NU
37-37A	—	Triode Detector-Amplifier	5A	6.3	0.300	C	250	—	—18.0	7.5	—	9.2	1100	—	—	NU
38-38A	—	Power Amplifier Pentode	5F	6.3	0.300	C	250	250	—25.0	22	3.8	120	1200	2500	10000	NU
39/44	—	Super Control R.F. Amplifier	5F	6.3	0.300	C	250	90	—3.0	5.8	1.4	1050	1050	—	—	NU
39A/44A	—	Triode Voltage Amplifier	4D	5.0	0.250	F(T)	180	—	—3.0	0.2	—	30	200	—	—	NU
A40	—	Power Amplifier Triode	4D	15.0	0.400	C	180	—	—40.5	21	—	3	1500	—	—	Arcturus
41	42	Power Amplifier Pentode	6B	6.3	0.400	C	250	250	—18.0	32	5.5	150	2200	3400	7600	NU
42	41	Power Amplifier Pentode	6B	6.3	0.700	C	250	250	—16.5	34	6.5	220	2200	3000	7000	NU
42A1	—	Ballast Tube		42.3	—	—	—	—	—	—	—	—	—	—	—	Champion
42A2	—	Ballast Tube		42.3	—	—	—	—	—	—	—	—	—	—	—	Champion
42B1	—	Ballast Tube		42.3	—	—	—	—	—	—	—	—	—	—	—	Champion
43	—	Power Amplifier Pentode	6B	25.0	0.300	C	180	135	—20.0	40	8	96	2400	2750	5000	NU
43MG	—	Power Amplifier Pentode		25.0	0.300	C	180	135	—20.0	40	8	96	2400	2750	5000	Triad
44	39-44	Super Control R.F. Amplifier	5F	6.3	0.300	C	250	90	—3.0	5.8	1.4	1050	1050	—	—	NU
45	45A	Power Amplifier Triode	4D	2.5	1.500	F(O)	250	—	—50	34	—	3.5	2175	1600	3900	NU
45A	—	Power Amplifier Triode	4D	2.5	1.500	F(O)	325	—	—68	43	—	3.5	2370	3000	3200	NU
46	—	Power Amplifier Dual Grid	5C	2.5	1.750	F(O)	A250 B400	—	—33 0	22 6	—	5.6	2350 1250	1250 20000(2)	6400 5800(2)	NU
46A1	—	Ballast Lamp		46.1	0.400	F	—	—	—	—	—	—	—	—	—	Sylvania
46B1	—	Ballast Lamp		46.1	0.300	F	—	—	—	—	—	—	—	—	—	Sylvania
47	—	Power Amplifier Pentode	5B	2.5	1.750	F(O)	250	250	—16.5	31	6	150	2500	2700	7000	NU
48	—	Power Amplifier Tetrode	6A	30.0	0.400	C	125 90	100 96	—20.0 —19.0	56 52	9.5 9.0	—	3900 3800	2500 2000	1500 1500	NU
A48	—	Triode Detector-Amplifier	4D	15.0	0.350	C	90	—	—4.5	4.5	—	11	1185	—	—	Arcturus
49	—	Power Amplifier Dual Grid	5C	2.0	0.120	F(O)	A135 B180	—	—20.0 0	6 2	—	4.7	1125 170	170 3500(2)	11000 12000(2)	NU
49A1	—	Ballast Lamp		48.6	—	—	—	—	—	—	—	—	—	—	—	Champion
49A2	—	Ballast Lamp		48.6	—	—	with Tap	—	For	One Pilot Light	—	—	—	—	—	Champion
49B2	—	Ballast Lamp		48.6	—	—	with Tap	—	For	Two Pilot Lights	—	—	—	—	—	Champion
50	—	Power Amplifier Triode	4D	7.5	1.250	F(O)	450	—	—84	55	—	3.8	2100	4600	4350	NU

Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Conductance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
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Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Conductance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
HZ50	12Z3	Half Wave Rectifier	4G	12.6	0.300	C	250	—	—	60	—	—	—	—	—	Replace with NU12Z3
51	35	Super Control R.F. Amplifier	5E	2.5	1.750	C	250	90	— 3.0	6.5	2.5	420	1050	—	—	Replace with NU35
51S	35S	Super Control R.F. Amplifier	5E	2.5	1.750	C	250	90	— 3.0	6.5	2.5	420	1050	—	—	Replace with NU35S
52	—	Power Amplifier Dual Grid	5C	6.3	0.300	F	110(A) 180(B)	110	0	43	—	5.2	3000	1500	2000	Raytheon
53	—	Class B Twin Amplifier	7B	2.5	2.000	C	300	—	0	17.5	—	—	—	10000(2)	10000(2)	NU
55	—	Duplex Diode Triode	6G	2.5	1.000	C	250	—	—20	8	—	8.3	1100	350	20000	NU
55S	—	Duplex Diode Triode	6G	2.5	1.000	C	250	—	—20	8	—	8.3	1100	350	20000	NU
55A1	—	Ballast Lamp		54.9	—	—	—	—	—	—	—	—	—	—	—	Champion
55A2	—	Ballast Lamp		54.9	—	—	with	Tap	For	One	Pilot	Light	—	—	—	Champion
55B2	—	Ballast Lamp		54.9	—	—	with	Tap	For	Two	Pilot	Lights	—	—	—	Champion
56	27(A)	Triode Detector-Amplifier	5A	2.5	1.000	C	250	—	—13.5	5	—	13.8	1450	—	—	NU
56A	56AS-76	Triode Detector-Amplifier	5A	6.3	0.400	C	250	—	—13.5	5	—	13.8	1450	—	—	Replace with NU76
56AS	76	Triode Detector-Amplifier	5A	6.3	0.400	C	250	—	—13.5	5	—	13.8	1450	—	—	NU
56S	56	Triode Detector-Amplifier	5A	2.5	1.000	C	250	—	—13.5	5	—	13.8	1450	—	—	NU
57	—	Triple Grid Detector Amplifier	6F	2.5	1.000	C	250	100	— 3.0	2	0.5	1500	1225	—	—	NU
57A	57AS-77-6C6	Triple Grid Detector Amplifier	6F	6.3	0.400	C	250	100	— 3.0	2	0.5	1500	1225	—	—	Replace with NU77
57AS	77-6C6	Triple Grid Detector Amplifier	6F	6.3	0.400	C	250	100	— 3.0	2	0.5	1500	1225	—	—	NU
57S	57	Triple Grid Detector Amplifier	6F	2.5	1.000	C	250	100	— 3.0	2	0.5	1500	1225	—	—	NU
58	—	Super Control R.F. Amplifier	6F	2.5	1.000	C	250	100	— 3.0	8.2	2.0	1280	1600	—	—	NU
58A	58AS-6D6-78	Super Control R.F. Amplifier	6F	6.3	0.400	C	250	100	— 3.0	8.2	2.0	1280	1600	—	—	Replace with NU78

58AS	78-6D6	Super Control R.F. Amplifier	6F	6.3	0.400	C	250	100	— 3.0	8.2	2.0	1280	1600	—	—	NU
58S	58	Super Control R.F. Amplifier	6F	2.5	1.000	C	250	100	— 3.0	8.2	2.0	1280	1600	—	—	NU
59	—	Power Amplifier Pentode	7A	2.5	2.000	C	250	250	—18.0	35	9	100	2500	3000	6000	NU
59B	59(See Note)	Power Amplifier Pentode	7M	2.5	2.000	F(O)	250	250	—28.0	26	—	6	2600	1250	5000	Majestic
64-64A	36	Screen Grid R.F. Amplifier	5E	6.3	0.400	C	180	90	— 3.0	3.1	1.5	525	1050	—	—	NU
65-65A	39-44	Super Control R.F. Amplifier	5E	6.3	0.400	C	180	90	— 3.0	4.5	1.3	750	1000	—	—	NU
67-67A	37	Triode Detector-Amplifier	5A	6.3	0.400	C	180	—	—13.5	4.3	—	9.2	900	—	—	NU
68-68A	38	Power Amplifier Pentode	5E	6.3	0.400	C	135	90	—13.5	14	3	90	1400	650	7500	NU
69	70-92	Detector-Double Grid	6N	6.3	0.300	C	180	—	— 3.0	4.5	—	30	1450	—	—	Sylvania
70	69-92	Detector-Double Grid	6N	6.3	0.300	C	180	—	— 6.0	2.3	—	15	500	—	—	Spartan
71	71A	Power Amplifier Triode	4D	5.0	0.500	F(T)	180	—	—40.5	20	—	3	1700	790	4800	Replace with NU71A
71A	—	Power Amplifier Triode	4D	5.0	0.250	F(O)	180	—	—40.5	20	—	3	1700	790	4800	NU
71B	71A(A)	Power Amplifier Triode	6G	5.0	—	—	180	—	—40.5	20	—	3	1700	790	4800	Replace with NU71A
75	—	Duplex Diode Triode	6G	6.3	0.300	C	250	—	— 2.0	0.8	—	100	1100	—	—	NU
75S	75	Duplex Diode Triode	6G	6.3	0.300	C	250	—	— 2.0	0.8	—	100	1100	—	—	NU
76	37-67A	Triode Detector-Amplifier	5A	6.3	0.300	C	250	—	—13.5	5	—	13.8	1450	—	—	NU
77	6C8	Triple Grid Detector-Amplifier	6F	6.3	0.300	C	250	100	— 3.0	2.3	0.5	1500	1250	—	—	NU
78	6D6	Super Control R.F. Amplifier	6F	6.3	0.300	C	250	100	— 3.0	7.0	1.7	1160	1450	—	—	NU
79	—	Class B Twin Amplifier	6H	6.3	0.600	C	250	—	0	10.5	—	—	—	8000(2)	14000(2)	NU
80	—	Full Wave Rectifier	4C	5.0	2.000	F(O)	400	—	—	110	—	—	—	—	—	NU

Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Conductance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
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Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Conductance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
80M	80	Full Wave Rectifier *	4C	5.0	2.000	F(O)	450	—	—	125	—	—	—	—	—	Replace with NU80
80A1	—	Ballast Lamp		79.7	—	—	—	—	—	—	—	—	—	—	—	Champion
80A2	—	Ballast Lamp		79.7	—	—	with Tap	—	For	One	Pilot	Light	—	—	—	Champion
80B2	—	Ballast Lamp		79.7	—	—	with Tap	—	For	Two	Pilot	Lights	—	—	—	Champion
81	—	Half Wave Rectifier	4B	7.5	1.250	F(O)	700	—	—	85	—	—	—	—	—	NU
81M	81	Half Wave Rectifier	4B	7.5	1.250	F(O)	750	—	—	85	—	—	—	—	—	Replace with NU81
82	—	Full Wave Rectifier *	4C	2.5	3.000	F(O)	500	—	—	125	—	—	—	—	—	NU
83	5Z3	Full Wave Rectifier *	4C	5.0	3.000	F(O)	500	—	—	250	—	—	—	—	—	NU
83V	83-5Z3	Full Wave Rectifier	4L	5.0	2.000	C	400	—	—	200	—	—	—	—	—	NU
84	6Z4	Full Wave Rectifier	5D	6.3	0.500	C	350	—	—	60	—	—	—	—	—	NU
G-84	2Z2	Half Wave Rectifier	4B	2.5	1.500	F	350	—	—	50	—	—	—	—	—	Replace with NU2Z2
85	—	Duplex Diode Triode	6G	6.3	0.300	C	250	—	-20.0	8	—	8.3	1100	350	20000	NU
85AS	—	Duplex Diode Triode	6G	6.3	0.300	C	250	—	-9.0	4.5	—	20	1250	—	—	NU
85S	85	Duplex Diode Triode	6G	6.3	0.300	C	250	—	-20.0	8	—	8.3	1100	350	20000	NU
86A1	—	Ballast Lamp		86.0	—	—	—	—	—	—	—	—	—	—	—	Champion
86A2	—	Ballast Lamp		86.0	—	—	with Tap	—	For	One	Pilot	Light	—	—	—	Champion
86B2	—	Ballast Lamp		86.0	—	—	with Tap	—	For	Two	Pilot	Lights	—	—	—	Champion
88	83V	Full Wave Rectifier	4C	5.0	2.000	F(O)	450	—	—	125	—	—	—	—	—	Replace with NU83V
89	—	Power Amplifier Pentode	6F	6.3	0.400	C	250	250	-25.0	32	5.5	125	1800	3400	6750	NU
90	—	Detector-Double Grid	6N	2.5	1.000	C	—	—	0	3.5	—	14	1400	—	100,000	Kenrad

92	69-72	Detector-Double Grid	6N	6.3	0.400	C	—	—	0	3.5	—	14	1400	—	100,000	Kenrad
92A1	—	Ballast Lamp		92.3	—	—	—	—	—	—	—	—	—	—	—	Champion
92A2	—	Ballast Lamp		92.3	—	—	with Tap	—	For	One	Pilot	Light	—	—	—	Champion
92B2	—	Ballast Lamp		92.3	—	—	with Tap	—	For	Two	Pilot	Lights	—	—	—	Champion
95	2A5	Power Amplifier Pentode	6B	2.5	1.750	C	315	315	-22.0	42	8	220	2300	5000	7000	Replae with NU2A5
96	—	Half Wave Rectifier *	4G	10.0	0.500	C	350	—	—	100	—	—	—	—	—	—
KR98	84-6Z4	Full Wave Rectifier *	5D	6.3	0.500	C	350	—	—	50	—	—	—	—	—	Replace with NU84
V99	—	Triode Detector-Amplifier	4E	3.3	0.063	F(T)	90	—	-4.5	2.5	—	6.6	425	—	—	NU
X99	—	Triode Detector-Amplifier	4D	3.3	0.063	F(O)	90	—	-4.5	2.5	—	6.6	425	—	—	NU
140R	—	Ballast Lamp		42.3	—	—	—	—	—	—	—	—	—	—	—	Champion
140R4	—	Ballast Lamp		42.3	With	Tap	For One	Pilot	Light	—	—	—	—	—	—	Champion
140R8	—	Ballast Lamp		42.3	With	Tap	For Two	Pilot	Lights	—	—	—	—	—	—	Champion
165R	—	Ballast Lamp		48.6	—	—	—	—	—	—	—	—	—	—	—	Champion
165R4	—	Ballast Lamp		48.6	With	Tap	For One	Pilot	Light	—	—	—	—	—	—	Champion
165R8	—	Ballast Lamp		48.6	With	Tap	For Two	Pilot	Lights	—	—	—	—	—	—	Champion
181	—	Power Amplifier Triode		3.0	1.350	C	180	—	-30.0	16	—	3	1050	—	—	Sparton
182A	71A-482B	Power Amplifier Triode	4D	5.0	0.800	F(O)	200	—	-45.0	18	—	3	1500	1500	4500	Replace with NU71A
182B	483	Power Amplifier Triode	4D	5.0	1.250	F(O)	250	—	-35.0	18	—	5	1500	1750	—	Replace with NU483
183	483-182B	Power Amplifier Triode	4D	5.0	1.250	F(O)	250	—	-60.0	25	—	3.2	1800	2000	—	Replace with NU483

Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplification Factor	Mutual Conductance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
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Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Ampli- fication Factor	Mutual Conduc- tance in Micromhos	Power Output in Milliwatts	Lead Resistance in Ohms	Manufactured By
185R	—	Ballast Lamp		54.9	—	—	—	—	—	—	—	—	—	—	—	Champion
185R4	—	Ballast Lamp		54.9	—	With	Tap for One	—	Pilot	Light	—	—	—	—	—	Champion
185R8	—	Ballast Lamp		54.9	—	With	Tap for Two	—	Pilot	Lights	—	—	—	—	—	Champion
213	80	Full Wave Rectifier	4C	5.0	2.000	F (T)	220	—	—	65	—	—	—	—	—	Replace with NU80
216	81	Half Wave Rectifier	4B	7.5	1.250	F (T)	550	—	—	65	—	—	—	—	—	Replace with NU81
257	—	Power Amplifier Pentode	5B	5.0	0.300	F	110	110	-21.5	20	7	55	1350	800	—	Tungsol
264	WX12-864	Triode-Non Microphonic	4D	1.1	0.250	F (O)	135	—	-9.8	3.5	—	8.2	645	—	—	Replace with NU-WX
291	—	Triple Twin Amplifier	5G	12.3	0.300	F (O)	120	120	-11.0 +11.0	3 30	—	—	—	1250	3000	Speed
293	—	Triple Twin Amplifier	5G	6.3	0.600	F (O)	180	173.5	-6.5 +6.5	4 17.5	—	—	—	1250	8000	Speed
295	—	Triple Twin Amplifier	5G	2.5	4.000	F (O)	250	250	-14.0 -3.0	4 52	—	—	—	4500	4000	Speed
401	—	Triode Detector-Amplifier	4D	3.0	1.350	C	90	—	-3.0	5	—	9.5	1000	—	—	NU
401A	—	Triode Detector-Amplifier	4D	5.0	0.250	F	45	—	-9.0	1.5	—	8.0	800	55	20000	Replace with NU01A
402-403	—	Power Amplifier Triode	4D	3.0	1.500	F (O)	180	—	-40.0	20	—	3	1000	—	—	Kellogg
450	50	Power Amplifier Triode	4D	7.5	1.250	F (O)	450	—	-84.0	55	—	3.8	2100	4600	4350	Replace with NU50
482A	71A	Power Amplifier Triode	4D	5.0	0.800	F (O)	200	—	-45.0	18	—	3	1500	1500	4500	Replace with NU71A
482B	—	Power Amplifier Triode	4D	5.0	1.250	F (O)	250	—	-35.0	18	—	5	1500	1750	4500	Sparton
483	182B	Power Amplifier Triode	4D	5.0	1.250	F (O)	250	—	-65.0	20	—	3	1500	2000	4500	NU
484	485	Triode Detector-Amplifier	5A	2.8	1.600	C	180	—	-9.0	6	—	12.5	1350	—	—	Replace with NU485
485	—	Triode Detector-Amplifier	5A	3.0	1.250	C	180	—	-9.0	6	—	12.5	1350	—	—	NU
486	—	Triode Amplifier	5S	3.0	0.250	F	90	—	-3.0	3	—	8.2	610	—	—	Sparton
585	50	Power Amplifier Triode	4D	7.5	1.250	F (O)	450	—	-84.0	55	—	3.8	2100	4600	4350	Replace with NU50
586	50	Power Amplifier Triode	4D	7.5	1.250	F (O)	450	—	-84.0	55	—	3.8	2100	4600	4350	Replace with NU50
840	—	R.F. Pentode	5J	2.0	0.130	F (O)	180	67.5	-3.0	1.0	0.7	400	400	—	—	R. C. A.
P861	84-6Z4	Full Wave Rectifier	5D	6.3	0.500	C	225	—	—	50	—	—	—	—	—	Replace with NU84
864	WX12	Triode Non-Microphonic	4D	1.1	0.250	F (O)	135	—	-9.0	3.5	—	8.2	645	—	—	R. C. A.
866	—	Half Wave Rectifier	4P	2.5	5.0	F (O)	7500	—	—	600	—	—	—	—	—	R. C. A.
874	—	Voltage Regulator	4H	—	—	—	90	—	—	10-50	—	—	—	—	—	R. C. A.
876	—	Ballast Tube	—	40-60	1.700	F	—	—	—	—	—	—	—	—	—	R. C. A.
886	—	Ballast Tube	—	40-60	2.050	F	—	—	—	—	—	—	—	—	—	R. C. A.
950	33	Power Amplifier Pentode	5B	2.0	0.125	F (O)	135	135	-16.5	5.5	2	100	950	—	—	NU
951	1B4	Screen Grid R.F. Amplifier	4K	2.0	0.060	F (O)	180	67.5	-3.0	1.7	0.4	780	650	—	—	Replace with NU-1A4
985	—	Full Wave Rectifier *	5D	5.0	0.500	F (O)	250	—	—	50	—	—	—	—	—	—
986	83	Full Wave Rectifier *	4C	5.0	1.000	F (O)	400	—	—	150	—	—	—	—	—	Replace with NU-83
AD	1V-6Z3	Half Wave Rectifier	4G	6.3	0.300	C	350	—	—	50	—	—	—	—	—	Replace with NU-1V
AF	82	Full Wave Rectifier *	4C	2.5	3.000	F (O)	500	—	—	125	—	—	—	—	—	Replace with NU-82
AG	83-83V	Full Wave Rectifier *	4C	5.0	3.000	F (O)	500	—	—	250	—	—	—	—	—	Replace with NU-83
AX	01A-01AA	Triode Detector-Amplifier	4D	5.0	0.250	F (T)	135	—	-9.0	3	—	8	800	55	20000	Replace with NU-01A
B	V89	Triode Detector-Amplifier	4E	3.3	0.063	F (T)	90	—	-4.5	2.5	—	6.6	425	—	—	Replace with NU-V89

Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Ampli- fication Factor	Mutual Conduc- tance in Micromhos	Power Output in Milliwatts	Lead Resistance in Ohms	Manufactured By
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Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplifi-cation Factor	Mutual Conduc-tance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
BA	—	Full Wave Gaseous Rectifier	4J	Cold	—	—	350	—	—	350	—	—	—	—	—	Raytheon
BH	BA	Full Wave Gaseous Rectifier	4J	Cold	—	—	350	—	—	125	—	—	—	—	—	Raytheon
BR	—	Half Wave Gaseous Rectifier	4H	Cold	—	—	300	—	—	50	—	—	—	—	—	Raytheon
D½	81	Half Wave Rectifier	4B	7.5	1.250	F(O)	700	—	—	85	—	—	—	—	—	Replace with NU-81
DI	80	Full Wave Rectifier	4C	5.0	2.000	F(O)	350	—	—	125	—	—	—	—	—	Replace with NU-80
DEI	27	Triode Detector	5A	2.5	1.750	C	250	—	-21.0	5.2	—	9	975	300	34000	Replace with NU-27
E	20	Power Amplifier Triode	4D	3.3	0.132	F(O)	135	—	-22.5	6.5	—	3.3	525	110	6500	Replace with NU-20
G	40	Triode Voltage Amplifier	4D	5.0	0.250	F(T)	180	—	-3.0	0.2	—	30	200	—	—	Replace with NU-40
GA	—	Pentode	5B	5.0	0.250	F(T)	180	180	-10.0	25	7.5	60	2000	800	7000	Arcturus
H	00A-01A	Triode Detector	4D	5.0	0.250	F(T)	45	—	0	1.5	—	20	666	—	—	Replace with NU-01A
LA	6A4	Power Amplifier Pentode	5B	6.3	0.300	F(O)	180	180	-12.0	22	3.9	100	2200	1400	8000	Replace with NU-6A4
OZ3	—	Full Wave Gaseous Rectifier	5N	—	—	Cold	350	—	—	75	—	—	—	—	—	Raytheon
OZ4	—	Full Wave Gaseous Rectifier	—	—	—	Cold	350	—	—	75	—	—	—	—	—	Raytheon
PZ	47	Power Amplifier Pentode	5B	2.5	1.750	F(O)	250	250	-16.5	31	6	150	2500	2700	7000	Replace with NU-47
PZH	2A5	Power Amplifier Pentode	6B	2.5	1.750	C	250	250	-16.5	34	6.5	220	2200	3000	7000	Replace with NU-2A5
Wunderlich A Auto	—	Special Detector	6N	6.3	0.400	C	250	—	-16.5	7	—	9.2	900	—	—	Arcturus
Wunderlich A	—	Special Detector	5H-6N	2.5	1.000	C	250	—	-16.5	7	—	9.2	900	—	—	Arcturus
Wunderlich B	—	Special Detector	6P	2.5	1.000	C	250	—	—	17	—	—	—	—	—	Arcturus

NOTES

A—Provided filament circuits will accommodate change in filament current.

*—Mercury vapor rectifier.

o—Octol Base.

59-59B—Tie Suppressor grid terminal of socket to cathode terminal.

Majestic Types, 57AS-58AS 6.3 volt tubes not replaceable by regular types 57 and 58 which are 2.5 volt tubes.

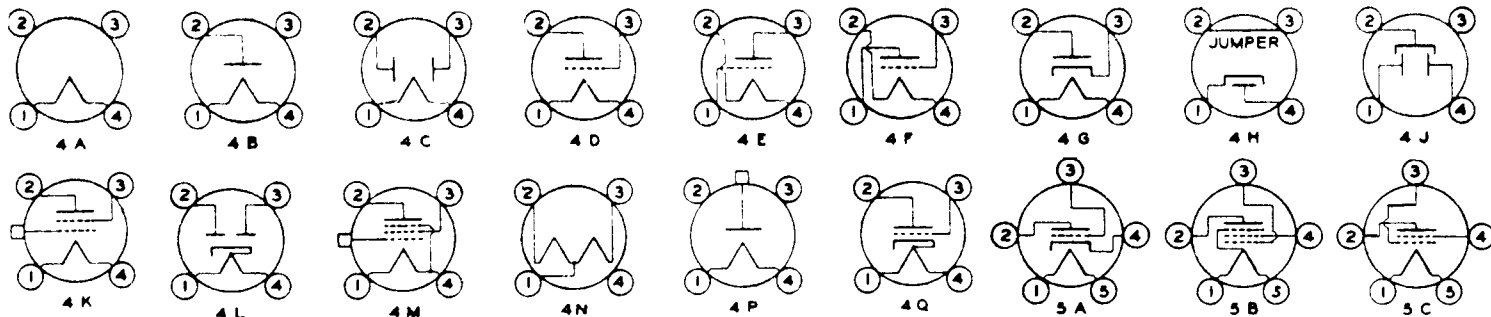
Some Servicemen have found that 56S substitutes quite satisfactorily for 64S—since the 64S and 62S are quite similar it may be possible the same substitution can be made with the 62S.

Type 78 may be used to replace 36-67A for greater sensitivity in most cases without circuit changes.

Spartan Type 182B. This type replaceable by NU483 only when all 182B are removed and replaced by NU Type 483.

National Union Types 64-67-68-65 are not manufactured by any other company, being replaced by National Union types as follows only when used in Automobile Sets. (64A 236), (67A 237), (68A 238), (65A 239).

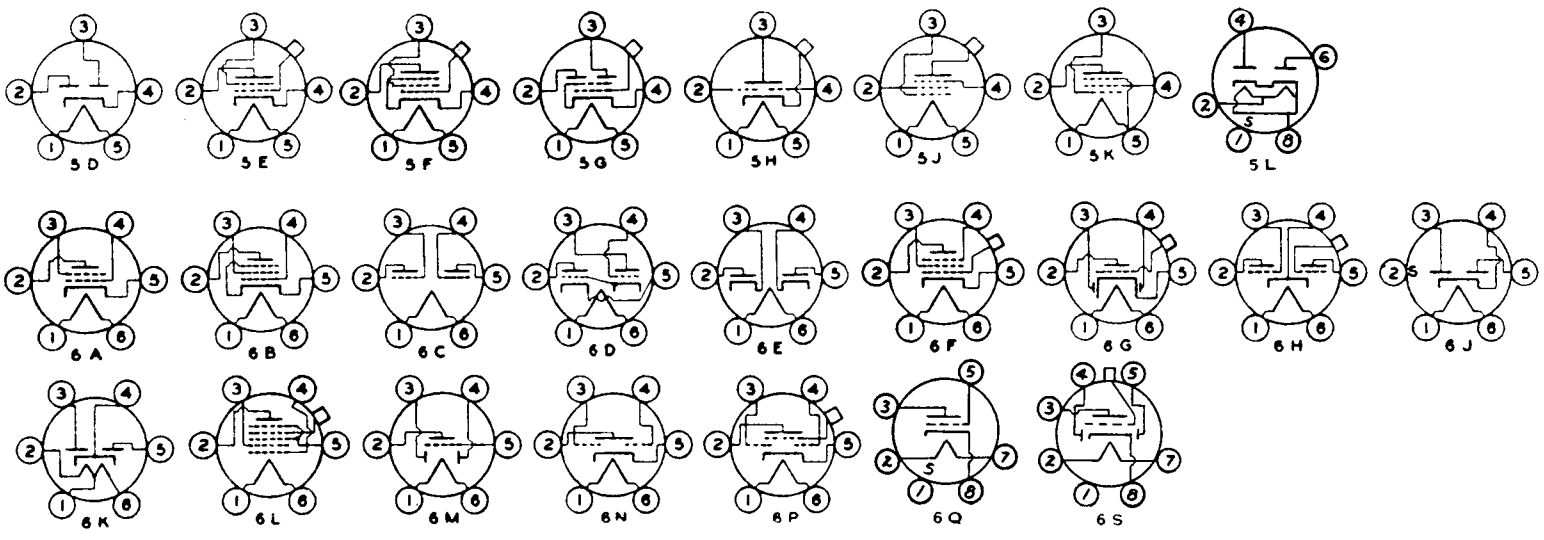
TUBE BASE PIN CONNECTIONS (Bottom View)



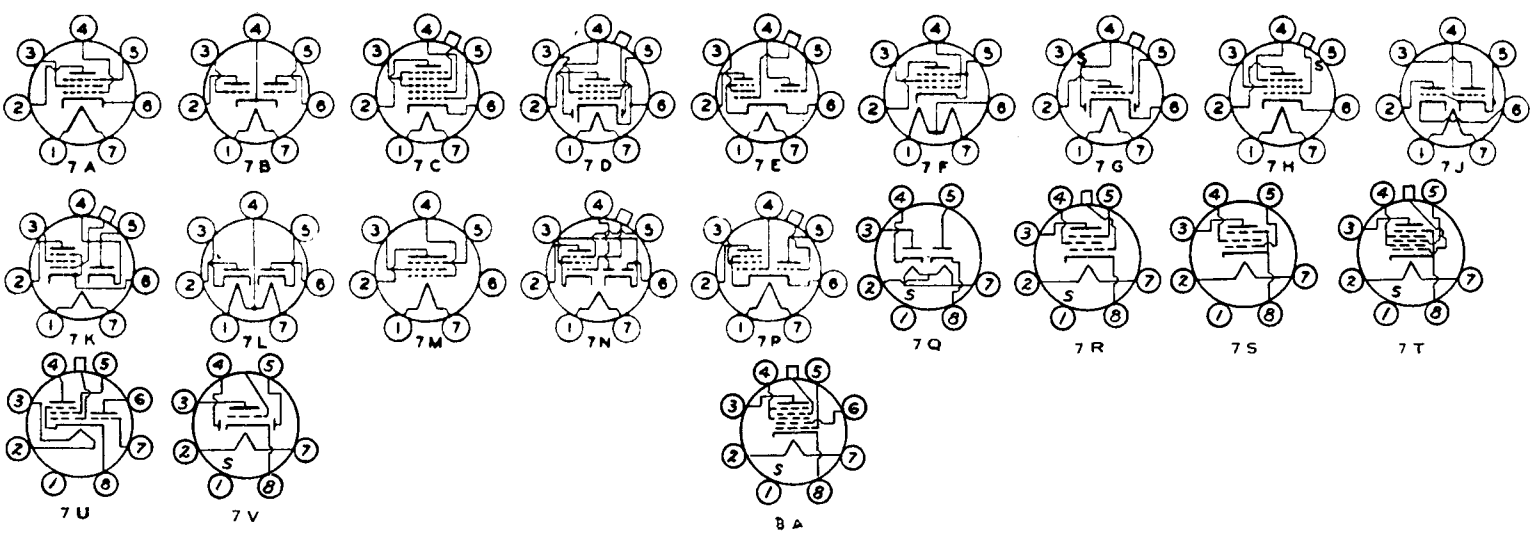
Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Amplifi-cation Factor	Mutual Conduc-tance in Micromhos	Power Output in Milliwatts	Load Resistance in Ohms	Manufactured By
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Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Ampli- fication Factor	Mutual Conduc- tance in Micromhos	Power Output in Milliwatts	Lead Resistance in Ohms	Manufactured By
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TUBE BASE PIN CONNECTIONS (Bottom View)



TUBE BASE PIN CONNECTIONS (Bottom View)



Type Number	Replaced By	Description	Base Connection	Fila-ment Volts	Fila-ment Amps.	Fila-ment Type	Plate Volts	Screen Volts	Control Grid Volts	Plate Current (MA)	Screen Current (MA)	Ampli- fication Factor	Mutual Conduc- tance in Micromhos	Power Output in Milliwatts	Lead Resistance in Ohms	Manufactured By
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WHY YOU SHOULD SELL N. U. RADIO TUBES

A BRIEF HISTORY OF METAL RADIO TUBES

Quality Tubes

The consistent superior quality of National Union tubes is recognized by thousands of service experts. This factor means fewer call backs, more good will, more profit.

Complete Line

National Union distributors maintain complete stock of all types of tubes for immediate delivery, including Sparton and Majestic types. This means time saved when odd types are needed.

Higher Price — Profit

List prices of National Union tubes are 10c higher on all types. This selling price edge gives service dealers fair profit returns.

Maintained Prices

National Union tubes are not sold in Cut-Rate stores. This means that service dealers can sell at full list and not incur customer ill-will.

Shop Equipment

Service dealers who obtain modern shop equipment with National Union tube purchases have double insurance of fine instruments; the guarantee of the instrument manufacturer and the backing of National Union.

Sales Helps

Sales literature and business forms supplied to National Union service dealers are practical, designed to build the service dealers business, not simply to sell radio tubes.

Price Decline Protection

National Union affords complete inventory protection to service dealers against List Price decline. This means no loss when prices drop.

Consistent Policies

National Union is noted for its fair business dealings. Policies do not vary. The service dealer knows he will get the same fair handling, no matter when he does business with N. U.

It is easy to understand why radio tubes were first made of glass. When radio tubes were first invented, the engineers cast about for some form of air tight envelope in which to enclose the tube elements. It is quite natural for them to have thought first of the incandescent lamp, since it had the same general characteristics and requirements. Many of the processes involved in making glass tubes were thus taken directly from the incandescent lamp industry.

For many years radio tube engineers have felt that some material other than glass would be desirable, due to the fact that glass is not well adapted to high speed automatic machinery. Two major items have prevented the use of metal shells for radio tubes until the present time—a satisfactory method of making a vacuum tight joint between two fairly large metal surfaces, and a satisfactory glass to metal seal.

Several years ago in England a metal tube was introduced, known as the Catkin tube. This tube did not prove successful because at that time the only method known for making a glass to metal seal was the so-called "feather-edge" method. In this process very thin glass is fused to metal which has been spun down to a thin feather edge. This method proved to be both expensive and fragile so that it is not surprising that the tube was not a success. In the U. S. A. where high production and low price are vital factors it was, of course, out of the question.

Two recent engineering developments removed the major stumbling blocks from the path of metal as a shell for radio tubes. The development of thyatron controlled electric spot welding machines now make possible in production, vacuum tight metal seals. The development of a new metal alloy "Fenico" having the same co-efficient of expansion as glass now makes possible a satisfactory metal to glass seal.

The basis for the present metal tube is a steel disc called a header, which takes the place of the stem in the glass tube. Holes are punched in this disc for the leads to be brought out.

Fenico alloy eyelets are welded into each of these holes. A lead wire together with a small bead of glass is inserted into each eyelet and the whole fused into one solid seal on an automatic stem machine. The metal exhaust tube is welded into a hole in the center of the header.

The various tube elements, filament, cathode, grids, and plate are then rigidly assembled to this header.

The metal shell is then placed over the mount, and welded to the header in a specially designed welding machine. The time and temperature for welding are very accurately controlled by large thyatron tubes. The welding operation takes about 1/20 of a second and uses a current of 75,000 amperes.

The tube is then exhausted on an automatic exhaust machine. In glass tube manufacture, it is customary to heat the various

Type Number Replaced By Description Base Connection Filament Amps. Type Filament Volts Filament Amps. Type Plate Volts Screen Volts Control Grid Volts Plate Current (MA) Screen Current (MA) Plate Current (MA) Faster Mutual Condensance in Microhenries Milliwatts Power Output in Milliwatts Load Resistance in Ohms

Type Number Replaced By Description Base Connection Filament Amps. Type Filament Volts Filament Amps. Type Plate Volts Screen Volts Control Grid Volts Plate Current (MA) Screen Current (MA) Plate Current (MA) Faster Mutual Condensance in Microhenries Milliwatts Power Output in Milliwatts Load Resistance in Ohms

A PEEK INTO N. U. FACTORIES

tube elements to degassify them by the use of high frequency electric induction furnaces. This method is not possible with the metal tube because the metal shell acts as a shield to the high frequency current. With metal tubes the various parts are heated during exhaust by playing gas flames on the metal shell. After exhaust the metal exhaust tube is pinched shut and welded.

Among advantages claimed for the metal tubes are:—

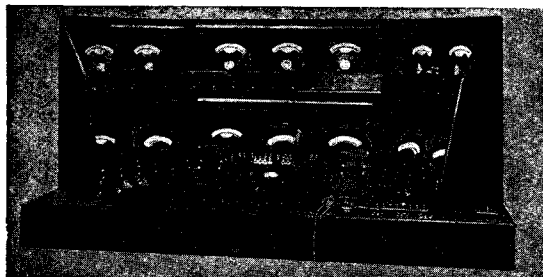
- 1—Smaller size
- 2—More complete shielding
- 3—More rugged
- 4—Better at high frequencies due to more perfect shielding.
- 5—Universal octal base for all types



Grid Winding—Another delicate and accurate step in National Union tube making conducted under close expert supervision.



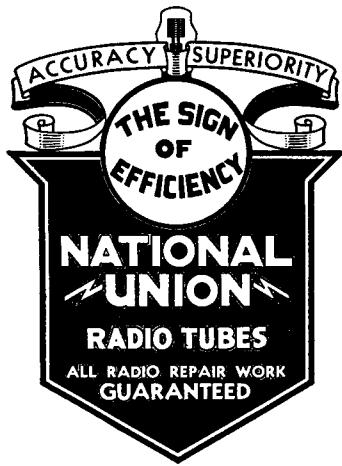
Filament Spraying—Accurately timed spraying machines used to apply chemical coatings developed in the National Union Chemical Laboratory.



Characteristics Tester—This tester designed and built by National Union engineers is used to completely test all tube characteristics. Samples from production are constantly subjected to complete analysis on this meter.

Type Number
 Replaced By
 Description
 Base Connection
 Filament Voltage
 Filament Amperage
 Filament Type
 Plate Voltage
 Screen Voltage
 Control Grid Voltage
 Plate Current (MA)
 Screen Current (MA)
 Mutual Condensance in Micromhos
 Power Output in Milliwatts
 Load Resistance in Ohms
 Manufactured By

Type Number
 Replaced By
 Description
 Base Connection
 Filament Voltage
 Filament Amperage
 Filament Type
 Plate Voltage
 Screen Voltage
 Control Grid Voltage
 Plate Current (MA)
 Screen Current (MA)
 Mutual Condensance in Micromhos
 Power Output in Milliwatts
 Load Resistance in Ohms
 Manufactured By



...the dealer who displays this emblem is cooperating with the National Union plan for efficient radio service through use of better instruments and equipment and more complete technical data on all types of radio sets. He guarantees and accepts full responsibility for his workmanship.