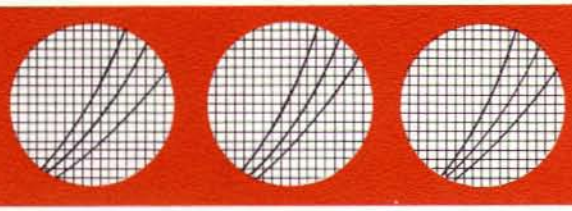
RAYTHEON

INDUSTRIAL AND MILITARY

CATHODE SUBMINIATURE

ELECTRON TUBE CHARACTERISTICS



In 1925 the nucleus of the present Industrial Components Division was formed with the development of the BH tube, the first gas-filled rectifier. This tube made ac-dc radio a reality. The development led to expansions into other receiving tube types and by 1930 Raytheon was a leading producer of receiving tubes. Today over 10,000 people, employed in Raytheon's six electron tube operations, offer over 35 years of electron tube manufacturing experience to Raytheon customers.

Originating in 1939 as the Hearing Aid Tube Department, the present Industrial Components Division is an example of growth and diversification in the manufacture of industrial, military and entertainment electron tubes. From the development of the old BH rectifier in 1925 to the present, many significant Raytheon developments in the area of electron tube design and manufacture have occurred. The first practical subminiature tubes were designed and developed by Raytheon. Primarily intended for hearing aid applications they provide maximum battery life from standard dry cells.

Government tests of the hearing aid tubes led to the first contracts for subminiature tubes for proximity fuses. Tubes developed for this purpose proved so rugged that inoperative failures became very rare. The use of oxide-coated tungsten filaments was one of the many Raytheon developments incorporated in these fuse tubes.

A notable achievement in the industry was the anode laminating techniques that revolutionized magnetron production and helped break the radar bottleneck in World War II. Raytheon was the first to manufacture heater-cathode tube types in subminiature size, a development which has earned the division a reputation for finest quality. Typical applications of these special tubes are those designed specifically for over twenty-five major U.S. missiles where resistance to shock and fatigue, low microphonic rating and high ambient temperature ratings are essential.

Today the Industrial Components Division produces a complete line of receiving tubes including miniature triodes, tetrodes and pentode amplifiers, rectifiers and power tubes. Industrial and military tubes include miniature and subminiature directly-heated twin diodes and indirectly-heated cathode tubes including lightweight low drain triodes and pentodes, cold cathode rectifiers, visual indicators, voltage regulators, thyratrons and cathode ray and storage tubes. The product scope also includes our expanding line of electro-mechanical, electro-optical and electro-chemical components.

The ability to successfully carry out assignments of major importance is typical of Raytheon's history and development. Raytheon, the largest company devoted exclusively to electronics, welcomes assignments in the interest of industry and national security. We are constantly exploring the expanding frontiers inherent in the application of electronic capabilities, especially in the electron tube field. One of the largest application engineering staffs in the electron tube industry is available to assist you.

RAYTHEON

RAYTHEON CATHODE SUBMINIATURE TUBES FOR INDUSTRIAL, MILITARY AND COMMUNICATIONS APPLICATIONS

For industrial and military applications Raytheon offers the widest line of cathode subminiatures currently available. Popular Raytheon industrial types and improved military versions meet a host of critical applications. Their long life and stability insure optimum performance in guided missiles, computers, communications and radar equipments and radiation measuring instruments. In high temperature and high radiation environments their reliable qualities overcome your most critical problems.

Recommended for New Equipment Design

The following are recommended provided required characteristics are fulfilled. All heater voltages 6.3 V.

Triodes
- 5703WB
- 5744WB
- 6247WA
- 6533WA
- 6814
- 7576

Twin Triodes
- 6021
- 6021WA
- 6111
- 6111WA
- 6112
- 6112WA
- 6832
- 7079
- 7327
- 7550

Diodes
- 5704WA
- 5829WA

Pentodes (Semi-remote)
- 6872

Pentodes (Sharp)
- 5639
- 5639WA
- 5702WB
- 7083

Pentodes (Power)
- 5902
- 5902WA

Mixers
- 5784WB

KEY TO BASE AND ENVELOPE CONNECTION DIAGRAMS

Diagrams show terminals viewed from the base or filament end of the type

BC = Base Sleeve
BS = Base Shell
F = Filament
F_M = Filament Mid-Tap
F_R = Filament Return
G = Grid
H = Heater
H_M = Heater Mid-Tap
I = Ignitor
IC = Internal Connection — Do Not Use
IS = Internal Shield
K = Cathode
K_R = RF Cathode
KS = Cathode Shield
NC = No Connection
P = Plate (Anode)
P_H = Holding Anode
S = Shell
• = Gas Type

SUBSCRIPTS

B = Beam Unit
D = Diode Unit
P = Pentode Unit
T = Triode Unit
TR = Tetrode Unit
W = Water Connection

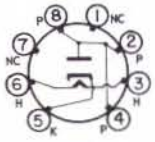
The data contained herein is compiled as a service to the field and is not intended to indicate type availability. Raytheon Company assumes no liability for information or applications derived from this book. Tube data supplied herein is believed to be accurate and reliable.

RAYTHEON

CATHODE SUBMINIATURE TUBES

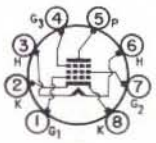
Type Number	Classification by Construction	Typical Application	Bulb	E.I.A. Outline Drawing	Base	Basing ϕ	Max Dimensions L	W	T	Capacitance pf C in	C out	C gp
6AK4	Medium mu Triode	UHF Amp.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.2	2.2	1.3
6AZ5	Twin Diode	HW Rectifier	T3	3-1	8 Lead Button	8DF	1.375	.400	.400			
6BA5	Sharp Cutoff Pentode	Class A Amp.	T3	3-1	8 Lead Button	8DY	1.375	.400	.400	3.4	3.6	0.065
6BF7	Medium mu Twin Triode	Class A Amp.	T3	3-2	8 Lead Button	8DG	1.500	.400	.400	2.0	1.6 2.0	1.5
6BF7W	Medium mu Twin Triode	Class A Amp.	T3	3-2	8 Lead Button	8DG	1.500	.400	.400	2.0	1.6 2.0	1.5
6K4	Medium mu Triode	Class A Amp.	T3	3-2	5 Lead Button	Fig. 1	1.500	.400	.400	2.4△	0.8△	2.4△
CK605CX	Replaced by Type 5702											
CK606BX	Replaced by Type 5704											
CK608CX	Replaced by Type 5703											
CK619CX	Replaced by Type 5744											
CK623CX	Replaced by Type 5702WA											
CK624CX	Replaced by Type 5784											
CK626CX	Replaced by Type 5995											
CK627CX	Replaced by Type 6245											
CK628CX	Replaced by Type 6247											
CK631CX	Replaced by Type 7083											
CK632CX	Replaced by Type 7079											
5633	Remote Cutoff RF Pentode	Class A Amp.	T3		Special	Fig. 2	1.66	.400	.400	4.0△	2.2△	0.015△‡
5634	Sharp Cutoff RF Pentode	Class A Amp.	T3		Special	Fig. 2	1.66	.400	.400	4.4△	2.2△	0.015△‡
5635	Medium mu Twin Triode	Class A Amp.♦	T3	3-1	8 Lead Button	8DB	1.375	.400	.400	2.6	1.6	1.2
5636	Dual Control RF Pentode	Gated Amp.	T3	3-1	8 Lead Button	8DC	1.375	.400	.400			
5637	High mu Triode	Class A Amp.	T3	3-2	5 Lead Button	Fig. 3	1.500	.400	.400	2.6△	0.7△	1.4△
5638	Amplifier Pentode	Class A Amp.	T3	3-2	6 Lead Button	Fig. 4	1.500	.400	.400	4.0	6.5	0.19
5639	Video Pentode	Video Amp.	T3	3-3	8 Lead Button	8DL	1.75	.400	.400	9.0	8.0	0.13‡
5639WA	Pentode	Video Amp.	T3	3-3	8 Lead Button	8DL	1.75	.400	.400	9.0	8.0	0.13‡
5640	Beam Power Amplifier	Class A Amp.	T3	3-4	8 Lead Button	Fig. 5	2.000	.400	.400	9.0	6.5	0.09
5641	Half Wave Rectifier	HW Rectifier	T3	3-3	8 Lead Button	6CJ	1.75	.400	.400			
5645	Medium mu Triode	Class A Amp.	T2		5 Lead Button	Fig. 6	1.300	.310	.310	2.2	3.0	1.7
5646	High mu Triode	Class A Amp.	T2		5 Lead Button	Fig. 6	1.300	.310	.310	2.2	1.0	1.3
5647	High Frequency Diode	HW Rectifier	T1		4 Lead Button	Fig. 7	1.25	.215	.215			
5702	RF Pentode	RF Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.4	3.5	0.03‡
5702WA	RF Pentode	RF Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.4	3.5	0.03‡
5702WB	RF Pentode	RF Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.4	3.5	0.03‡
5703	Medium mu Triode	VHF Oscillator	T3	3-6	Flat Press	Fig. 9	1.50	.400	.400	2.6	0.7	1.2
5703WA	Medium mu Triode	VHF Oscillator	T3	3-6	Flat Press	Fig. 9	1.50	.400	.400	2.6	0.7	1.2

Key to Symbols: § Approximate ♦ Per Section △ Without External Shield ‡ Maximum * Minimum
ϕ E.I.A. Designations. Where none exists Raytheon uses figure no.

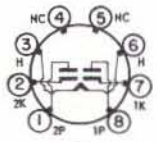


6CJ

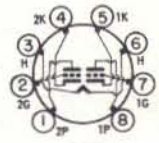
8DB



8DC



8DF



8DG

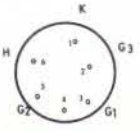


FIG. 2

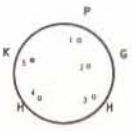


FIG. 3

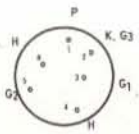


FIG. 4

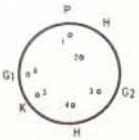
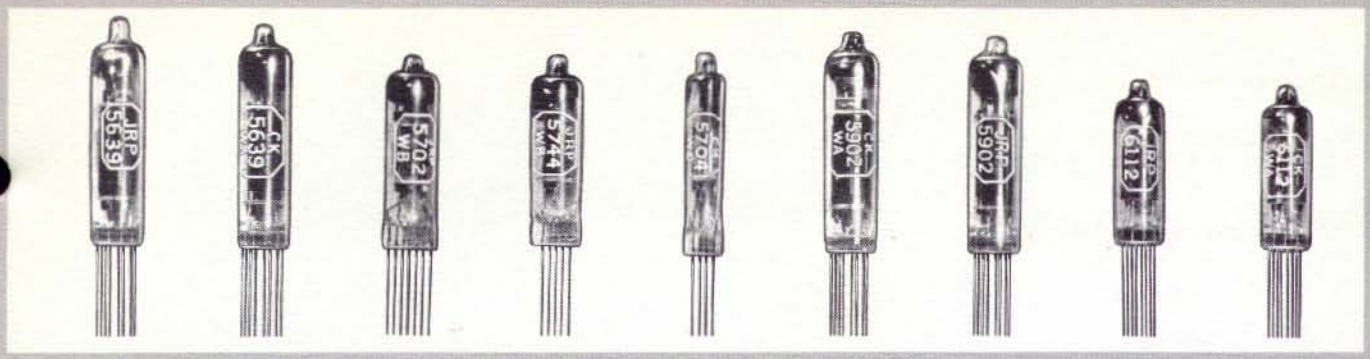


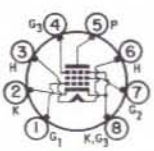
FIG. 5



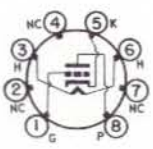
Cathode			Plate		Grid 1	Grid 2		Grid 3		Amplification Factor	G m μ mhos	Plate Resistance ohms	Load Resistance ohms	Output Watts	Type Number
Type	V	A	V	mA	V mA	V	mA	V	mA						
Htr.	6.3	0.150	200	9.5	R_K = 680					20	3800	5.3K§			6AK4
Htr.	6.3	0.150	Tube voltage drop * 10v at 15 ma dc			max dc output current per plate = 4 ma; peak inverse voltage = 420v max rms supply voltage per plate = 150v; max peak current per plate = 24 ma									6AZ5
Htr.	6.3	0.150	100	5.5	R_K = 270	100	2.0				2150	175K			6BA5
Htr.	6.3	0.300	100	8.0	R_K = 100					35	4800	7K§			6BF7
Htr.	6.3	0.300	100	8.0	R_K = 100					35	4800	7K§			6BF7W
Htr.	6.3	0.150	200	11.5	R_K = 680					16	3450	4.65K			6K4
															CK605CX
															CK606BX
															CK608CX
															CK619CX
															CK623CX
															CK624CX
															CK626CX
															CK627CX
															CK628CX
															CK631CX
															CK632CX
Htr.	6.3	0.150	100	7.0	R_K = 150	100	2.8				3400	200K			5633
Htr.	6.3	0.150	100	6.5	R_K = 150	100	2.5				3500	240K			5634
Htr.	6.3	0.450	100	4.8	R_K = 100*					38	3800	10K			5635
Htr.	6.3	0.150	100 100	5.3 4.0	R_K = 150 R_K = 150	100 100	3.6 5.8	G_3 tied to cathode Ec_3 = 1.0 volts			3200 1950	110K§ 50K			5636
Htr.	6.3	0.150	100	1.4	R_K = 820					70	2700	26K			5637
Htr.	6.3	0.150	100	4.8	R_K = 270	100	1.25				3300	150K			5638
Htr.	6.3	0.450	150	21.0	R_K = 100	100	4.0	0			9000	50K			**5639**
Htr.	6.3	0.450	150	21.0	R_K = 100	100	4.0	0			9000	50K			**5639WA**
Htr.	6.3	0.450	100	31†	−9.0	100	2.2†				5000	15K	3K	1.25	5640
Htr.	6.3	0.450	Tube voltage drop 23v at 18 ma dc			max dc output current = 10 ma□; max peak inverse voltage = 460v□ max rms supply voltage = 165v□; max peak current = 60 ma□									5641
Htr.	6.3	0.150	100	5.0	R_K = 560					20	2700	7.4K			5645
Htr.	6.3	0.150	100	1.4	R_K = 820					70	2400	29K			5646
Htr.	6.3	0.150	Tube voltage drop 2.8v at 18 ma dc			max dc output current = 10 ma□; max peak inverse voltage = 460v□ max rms supply voltage = 165v□; max peak current = 60 ma□									5647
Htr.	6.3	0.200	120	7.5	R_K = 200	120	2.5	0			5000	340K			5702
Htr.	6.3	0.200	120	7.5	R_K = 200	120	2.6	0			5000	340K			5702WA
Htr.	6.3	0.200	120	7.5	R_K = 200	120	2.6	0			5000	340K			**5702WB**
Htr.	6.3	0.200	120	9.0	R_K = 220					25	5000				5703
Htr.	6.3	0.200	120	9.4	R_K = 220					25.5	5100				5703WA

* For Both Sections † Zero Signal □ Absolute Maximum [1] Section 1 [2] Section 2 [3] Grounded Grid [4] Plate to Cathode

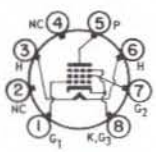
Types in bold face are Raytheon Preferred Types for new circuit designs. *Ratings are Typical Operating Characteristics.*



8DL



8DK



8DY

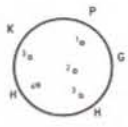


FIG. 1

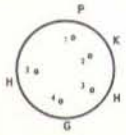


FIG. 6

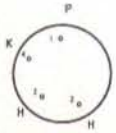


FIG. 7

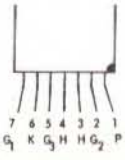


FIG. 8

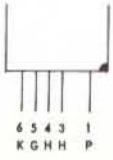


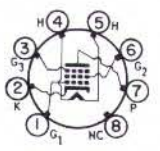
FIG. 9

RAYTHEON

CATHODE SUBMINIATURE TUBES

Type Number	Classification by Construction	Typical Application	Bulb	E.I.A. Outline Drawing	Base	Basing ϕ	Max Dimensions			Capacitance pf		
							L	W	T	C in	C out	C gp
5703WB	Medium mu Triode	VHF Oscillator	T3	3-6	Flat Press	Fig. 9	1.50	.400	.400	2.6	0.7	1.2
5704	Diode	Detector	T2		Flat Press	Fig. 10	1.50	.315	.315			
5704WA	Diode	Detector	T2		Flat Press	Fig. 10	1.50	.315	.315			
5718	Triode	UHF Oscillator	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.4	2.4	1.3
5719	High mu Triode	AF Amp.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	1.9	2.2	0.8
5744	High mu Triode	Amp.-HF Oscillator	T3	3-6	Flat Press	Fig. 11	1.50	.400	.400	2.7	2.4	0.8
5744WA	High mu Triode	Amp.-HF Oscillator	T3	3-6	Flat Press	Fig. 11	1.50	.400	.400	2.7	2.4	0.8
5744WB	High mu Triode	Amp.-HF Oscillator	T3	3-6	Flat Press	Fig. 11	1.50	.400	.400	2.7	2.4	0.8
5784	Dual Control RF Pentode	Mixer-Gated Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.5	3.6	0.03‡
5784WA	Dual Control RF Pentode	Mixer-Gated Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.5	3.6	0.03‡
5784WB	Dual Control RF Pentode	Mixer-Gated Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.5	3.6	0.03‡
5797	Semi Remote Cutoff RF Pentode	RF Amp.	T3	3-2	8 Lead Button	8CY	1.50	.400	.400	4.2	3.2	0.024
5798	Medium mu Twin Triode	Oscillator-Mixer	T3	3-2	8 Lead Button	8CZ	1.50	.400	.400	1.9	1.7	1.7
5829	Twin Diode	Detector	T2x3	2-3	Flat Press	Fig. 12	1.50	.410	.285			
5829WA	Twin Diode	Detector	T2x3	2-3	Flat Press	Fig. 12	1.50	.410	.285			
5840	Sharp Cutoff RF Pentode	RF Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.2	3.4	0.015‡
5873	Medium mu Twin Triode	Voltage Amp.	T3	3-2	8 Lead Button	Fig. 13	1.50	.400	.400	1.6△	1.0△	1.5△
5896	HF Twin Diode	Detector	T3	3-1	8 Lead Button	8DJ	1.375	.400	.400			
5897	Medium mu Triode	RF Oscillator-Amp.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.2	0.7	1.40
5898	High mu Triode	Class A Amp.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.4△	0.60△	0.70△
5899	Semi Remote Cutoff RF Pentode	RF Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.3	3.4	0.015‡
5900	Semi Remote Cutoff RF Pentode	Class A Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.4	3.4	0.015‡
5901	Sharp Cutoff RF Pentode	Class A Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.2	3.4	0.015‡
5902	Beam Power Amplifier	Power Amp.	T3	3-3	8 Lead Button	8DL	1.75	.400	.400	6.5	7.5	0.11
5902WA	Beam Power Amplifier	Power Amp.	T3	3-3	8 Lead Button	8DL	1.75	.400	.400	6.5	7.5	0.11
5903	HF Twin Diode	Detector	T3	3-1	8 Lead Button	8DJ	1.375	.400	.400			
5904	Medium mu Triode	Voltage Amp.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.2△	0.8△	1.8△
5905	Sharp Cutoff RF Pentode	RF Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.0	3.4	0.015‡
5906	Sharp Cutoff RF Pentode	RF Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.2	3.4	0.015‡
5907	Remote Cutoff RF Pentode	RF Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.0	3.4	0.015‡
5908	Dual Control RF Pentode	Mixer-Gated Amp.	T3	3-1	8 Lead Button	8DC	1.375	.400	.400	g_1 = All 4.0 p = All 4.6		0.06‡
5908B	Dual Control RF Pentode	Mixer-Gated Amp.	T3	3-1	8 Lead Button	8DC	1.375	.400	.400			
5916	Dual Control Pentode	Mixer-Gated Amp.	T3	3-1	8 Lead Button	8DC	1.375	.400	.400	G_3 tied to Cathode Ec_3 = −1 volt		
5975	Medium mu Triode	Amp.-Oscillator	T3	3-6	Flat Press	Fig. 14	1.50	.400	.400	2.75△	1.05△	1.2△

Key to Symbols: § Approximate ♦ Per Section △ Without External Shield ‡ Maximum * Minimum
ϕ E.I.A. Designations. Where none exists Raytheon uses figure no.



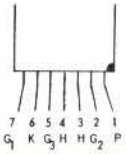
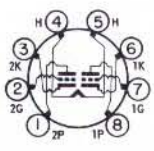


FIG. 8



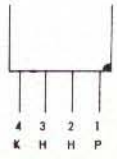
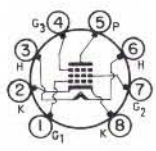


FIG. 10



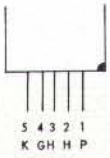
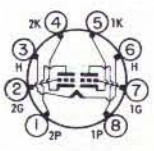


FIG. 11



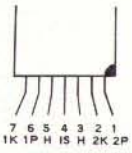
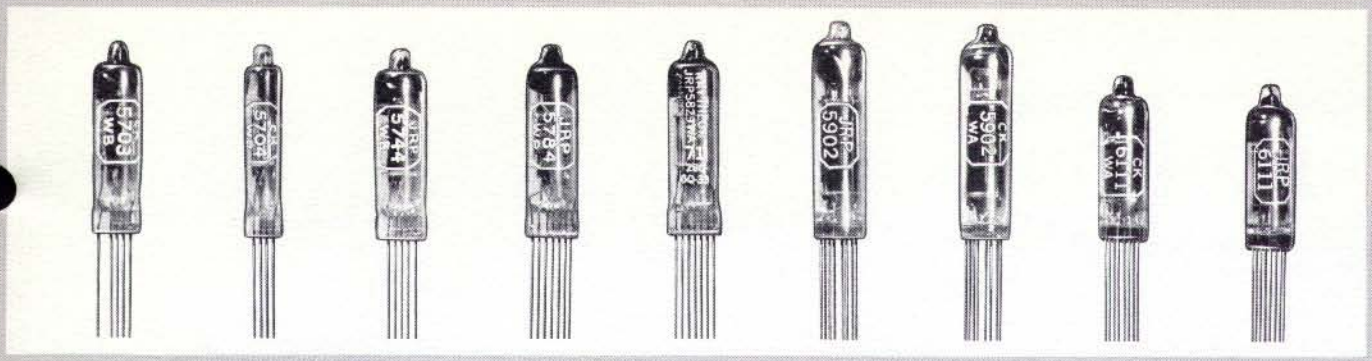


FIG. 12



Cathode			Plate		Grid 1		Grid 2		Grid 3		Amplification Factor	G m μ mhos	Plate Resistance ohms	Load Resistance ohms	Output Watts	Type Number
Type	V	A	V	mA	V	mA	V	mA	V	mA						
Htr.	6.3	0.200	120	9.4	R_K = 220						25.5	5100				**5703WB**
Htr.	6.3	0.150	max rms plate voltage = 165v□; max I_0 = 10 mA dc□									peak inverse voltage = 460v□; max peak current = 60 ma□				5704
Htr.	6.3	0.150	max rms plate voltage = 165v□; max I_0 = 10 mA dc□									peak inverse voltage = 460v□; max peak current = 60 ma□				**5704WA**
Htr.	6.3	0.150	100	8.5	R_K = 150						27	5800	4.65K§			5718
Htr.	6.3	0.150	100	0.73	R_K = 1500						70	1700	41K§			5719
Htr.	6.3	0.200	250	4.0	R_K = 500						70	4000				5744
Htr.	6.3	0.200	250	4.2	R_K = 500						70	4000				5744WA
Htr.	6.3	0.200	250	4.2	R_K = 500						70	4000				**5744WB**
Htr.	6.3	0.200	120	5.2	−2		120	3.5	0			3200				5784
Htr.	6.3	0.200	120	5.5	R_K = 230		120	4.1	0			3200				5784WA
Htr.	6.3	0.200	120	5.5	R_K = 230		120	4.1	0			3200				**5784WB**
Htr.	26.5	0.045	26.5	2.8	0		26.5	0.9				3450	70K§			5797
Htr.	26.5	0.090	26.5	2.0	0						24	3400	7.1K§			5798
Htr.	6.3	0.150	max inverse peak voltage = 360v□; max I_0 = 5 mA per plate□;									tube voltage drop 5v at 15 ma dc♦; max peak plate current 33 ma dc□				5829
Htr.	6.3	0.150	max inverse peak voltage = 360v□; max I_0 = 5 mA per plate□									tube voltage drop 5v at 15 ma dc♦; max peak plate current 33 ma dc□				**5829WA**
Htr.	6.3	0.150	100	7.5	R_K = 150		100	2.4				5000	260K			5840
Htr.	6.3	0.300	150	9.0	−3.0						22	2900				5873
Htr.	6.3	0.300	max inverse peak voltage = 460v□; max I_0 = 10 mA per plate □;									tube voltage drop 4.5v at 18 ma dc♦				5896
Htr.	6.3	0.150	100 150	8.5 20.0	R_K = 150 RF Oscillator Freq = 500 mc						27	5800			0.9	5897
Htr.	6.3	0.150	150	1.7	R_K = 680						70	2700				5898
Htr.	6.3	0.150	100	7.2	R_K = 120		100	2.0				4500	260K§			5899
Htr.	6.3	0.150	100	7.2	R_K = 120		100	2.2				4500	260K			5900
Htr.	6.3	0.150	100	7.5	R_K = 150		100	2.4				5000	230K			5901
Htr.	6.3	0.450	110	3.0	R_K = 270		110	2.2				4200	15K§		1.0	**5902**
Htr.	6.3	0.450	110	3.0	R_K = 270		110	2.2				4200	15K		1.0	**5902WA**
Htr.	26.5	0.075	max inverse peak voltage = 460v□; max I_0 = 10 mA per plate□; max peak current per plate = 60 ma□; tube voltage drop 4.5v at 18 ma dc♦.													5903
Htr.	26.5	0.045	26.5	3.0	Rg = 2.2 meg						20	5000	4.25K§			5904
Htr.	26.5	0.045	26.5	2.1	Rg = 2.2 meg		26.5	0.75				2850	150K			5905
Htr.	26.5	0.045	100	7.5	R_K = 150		100	2.4				5000	260K			5906
Htr.	26.5	0.045	26.5	2.7	Rg = 2.2 meg		26.5	1.1				3000	100K			5907
Htr.	26.5	0.045	26.5	3.3	Rg = 2.2 meg		26.5	2.0				2200	31K			5908
Htr.	26.5	0.045	26.5	3.3	Rg = 2.2 meg		26.5	2.0				2200	31K			5908B
Htr.	26.5	0.045	100 100	5.6 4.0	R_K = 150 R_K = 150		100 100	4.0 5.8				3200 1950	110K§ 50K§			5916
Htr.	6.3	0.175	100	10	R_K = 270						17.5	5100	3.4K§			5975

• For Both Sections † Zero Signal □ Absolute Maximum [1] Section 1 [2] Section 2 [3] Grounded Grid [4] Plate to Cathode

Types in bold face are Raytheon Preferred Types for new circuit designs. *Ratings are Typical Operating Characteristics.*

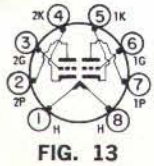
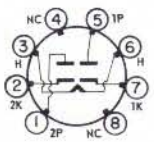


FIG. 13



8DJ

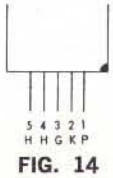
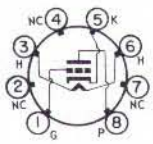


FIG. 14



8DK

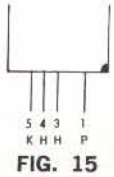
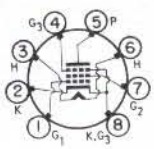


FIG. 15



8DL

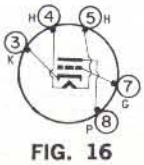
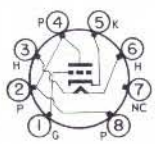


FIG. 16



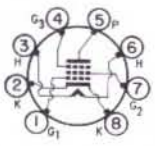
8DM

RAYTHEON

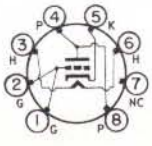
CATHODE SUBMINIATURE TUBES

Type Number	Classification by Construction	Typical Application	Bulb	E.I.A. Outline Drawing	Base	Basing ϕ	Max Dimensions L	W	T	Capacitance pf C in	C out	C gp
5977	Medium mu Triode	General Amp.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.0	2.2	1.3
5987	Low mu Triode	Power Amp.	T3	3-4	8 Lead Button	8DM	2.000	.400	.400	3.2	5.0	3.0
5995	Diode	HW Rectifier	T3		Flat Press	Fig. 15	1.75	.400	.400	Tube voltage drop 25v at 100 ma dc		
6021	Medium mu Twin Triode	Voltage Amp.	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	2.4△	0.28△ 0.32△	1.5△
6021WA	Medium mu Twin Triode	Voltage Amp.	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	2.4△	0.28△ 0.32△	1.5△
6026	Medium mu Triode	RF Oscillator	T3	3-2	5 Lead Button	Fig. 16	1.5	.400	.400	2.2△	0.38△	1.3△
6049	Semi Remote Cutoff RF Pentode	Class A Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	3.6	3.8△	0.009‡
6052	HF Twin Diode	Detector	T3	3-1	8 Lead Button	8DJ	1.375	.400	.400			
6053	HF Twin Diode	Detector	T3	3-1	8 Lead Button	8DJ	1.375	.400	.400			
6055	Medium mu Triode	Amp.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.2△	0.8△	1.8△
6056	Remote Cutoff RF Pentode	RF Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	4.4	3.4△	.015‡
6110	Twin Diode	Detector	T3	3-1	8 Lead Button	8DJ	1.375	.400	.400	Tube voltage drop 10v at 15 ma dc		
6111	Medium mu Twin Triode	Voltage Amp.	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	1.9△	0.28[1]△ 0.32[2]△	1.5△
6111WA	Medium mu Twin Triode	Voltage Amp.	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	1.9△	0.28[1]△ 0.32[2]△	1.5△
6112	High mu Twin Triode	Voltage Amp.	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	1.7△	0.23[1]△ 0.28[2]△	1.0△
6112WA	High mu Twin Triode	Voltage Amp.	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	1.7△	0.23[1]△ 0.28[2]△	1.0△
6152	Low mu Triode	Amp. Oscillator	T3	3-6	Flat Press	Fig. 14	1.50	.400	.400	2.9△	1.28△	1.32△
6184	UHF Twin Diode	FW Rectifier	T3	3-11	8 Lead Button	8EH	1.25	.400	.400	Tube voltage drop 5.0v at 8.0 ma♦		
6193	HF Twin Triode	Amp.	T3	3-3	8 Lead Button	8DG	1.750	.400	.400	2.75	2.20	1.46
6205	Sharp Cutoff RF Pentode	RF Amp.	T3	3-1	8 Lead Button	8DC	1.375	.400	.400	4.2	3.4	.015‡
6206	Semi Remote Cutoff RF Pentode	IF, RF Amp.	T3	3-1	8 Lead Button	8DC	1.375	.400	.400	4.2	3.4	.015‡
6221	Medium mu Triode	Voltage Amp.	T3	3-1	8 Lead Button	8HF	1.375	.400	.400	2.2△	0.9△	1.8△
6222	High mu Triode	Voltage Amp.	T3	3-1	8 Lead Button	8HF	1.375	.400	.400	2.0△	0.65△	1.3△
6223	Sharp Cutoff Pentode	Voltage Amp.	T3	3-1	8 Lead Button	8DE	1.375	.400	.400	4.2	3.4	.015
6224	Beam Power Pentode	Power Amp.	T3	3-3	8 Lead Button	8DE	1.750	.400	.400	6.5	7.5	0.2
6225	Semi Remote Cutoff Pentode	Voltage Amp.	T3	3-1	8 Lead Button	8DE	1.375	.400	.400	4.1	3.4	.015
6245	Sharp Cutoff Pentode	RF Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.8	3.5	.03‡
6247	High mu Triode	Cl. A Low Noise Amp.	T3	3-1	8 Lead Button	8FO	1.375	.400	.400	1.9△	0.65△	1.7△
6247WA	High mu Triode	Cl. A Low Noise Amp.	T3	3-1	8 Lead Button	8FO	1.375	.400	.400	1.9△	0.65△	1.7△
6320	High mu Twin Triode	Class A Amp.♦	T3		8 Lead Button	8DG	1.125	.400	.400	1.0	1.4	0.6

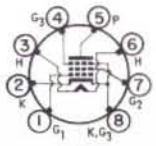
Key to Symbols: § Approximate ♦ Per Section △ Without External Shield ‡ Maximum * Minimum
ϕ E.I.A. Designations. Where none exists Raytheon uses figure no.



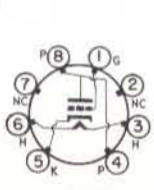
8DC



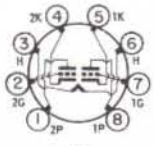
8FO



8DE



8HF



8DG

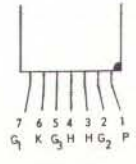
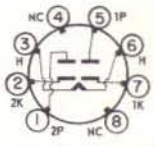
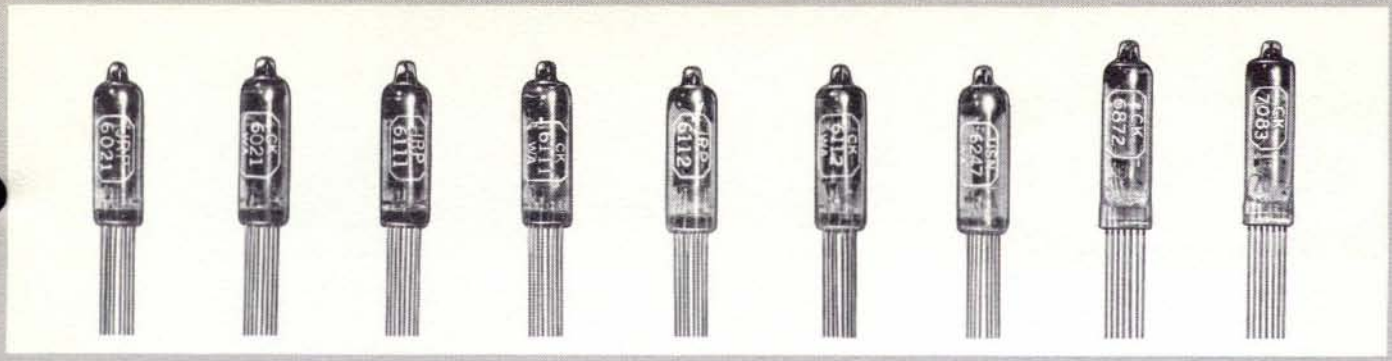


FIG. 8



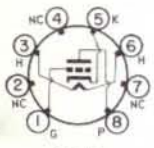
8DJ



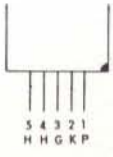
Cathode			Plate		Grid 1		Grid 2		Grid 3		Amplification Factor	G m μ mhos	Plate Resistance ohms	Load Resistance ohms	Output Watts	Type Number
Type	V	A	V	mA	V	mA	V	mA	V	mA						
Htr.	6.3	0.150	100	10	R_K = 270						16	4500				5977
Htr.	6.3	0.450	100	9.0	—18						4.1	1850				5987
Htr.	6.3	0.300	max dc output current = 45 ma; max inverse peak voltage = 850v; max rms supply voltage = 300v; max peak current = 275 ma													5995
Htr.	6.3	0.300	100	6.5	R_K = 150						35	5400	6.5K			**6021**
Htr.	6.3	0.300	100	6.5	R_K = 150						35	5400	6.5K			**6021WA**
Htr.	6.3	0.200	120	12	R_K = 220						24	5900	4K			6026
Htr.	6.3	0.150	100	7.5	R_K = 150	100	2.5					3550	400K§			6049
Htr.	6.3	0.300	max inverse peak voltage = 460v□; max I_0 = 10 mA per plate□; max peak current per plate = 60 ma□; tube voltage drop 10v at 50 ma dc♦													6052
Htr.	26.5	0.075	max inverse peak voltage = 460v□; max I_0 = 10 mA per plate□; max peak current per plate = 60 ma□; tube voltage drop 10v at 50 ma dc♦													6053
Htr.	26.5	0.045	26.5	3.0	Rg = 2.2 meg						19	5000				6055
Htr.	26.5	0.045	26.5	2.7	Rg = 2.2 meg	26.5	1.1					3000	125K			6056
Htr.	6.3	0.150	max peak inverse voltage = 460v□; max peak current per plate = 26.5 ma□; max rms supply voltage per plate = 165v□; max dc output current per plate = 4.4 ma□													6110
Htr.	6.3	0.300	100	8.5	R_K = 220						20	5000	4K			**6111**
Htr.	6.3	0.300	100	8.5	R_K = 220						20	5000	4K			**6111WA**
Htr.	6.3	0.300	100	0.8	R_K = 1500						70	1800	39K§			**6112**
Htr.	6.3	0.300	100	0.8	R_K = 1500						70	1800	39K§			**6112WA**
Htr.	6.3	0.200	100	10	R_K = 270						17.5	5100				6152
Htr.	6.3	0.150	max peak inverse voltage = 450v; max peak current per plate = 50 ma; max rms supply voltage per plate = 200v; max dc output current per plate = 20 ma													6184
Htr.	6.3	0.300	180 90	11.5 4.5	—1.0 —0.50						55 50	6500 5800	8.5K 9.0K			6193
Htr.	6.3	0.150	100	7.5	R_K = 150	100	2.4					5000	260K			6205
Htr.	6.3	0.150	100	7.2	R_K = 120	100	2.2					4000	260K			6206
Htr.	6.3	0.175	100	8.5	R_K = 150						27	5800	4.7K§			6221
Htr.	6.3	0.175	100	0.7	R_K = 1500						70	1700	41K§			6222
Htr.	6.3	0.175	100	7.5	R_K = 150	100	2.4					5000	175K*			6223
Htr.	6.3	0.450	110	30	R_K = 270	110	2.0					4200	10K			6224
Htr.	6.3	0.175	100	7.2	R_K = 120	100	2.0					4500	175K*			6225
Htr.	6.3	0.200	120 20	7.5 2.5	R_K = 200 0	120 30	2.6 1.5‡	0 0				5000 3275	Ec_3 = 0 volts Ec_3 = 0 volts			6245
Htr.	6.3	0.200	250	4.2	R_K = 500						60	2650	max noise output = 25 mV ac across 10,000 ohms			6247
Htr.	6.3	0.200	250	4.2	R_K = 500						60	2650	max noise output = 25 mV ac across 10,000 ohms			**6247WA**
Htr.	6.3	0.085	100		R_K = 680						60	1800	33K§			6320

• For Both Sections † Zero Signal □ Absolute Maximum [1] Section 1 [2] Section 2 [3] Grounded Grid [4] Plate to Cathode

Types in bold face are Raytheon Preferred Types for new circuit designs. *Ratings are Typical Operating Characteristics.*

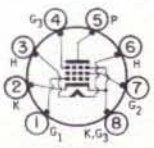


8DK

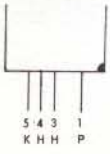


5 4 3 2 1
H H G K P

FIG. 14

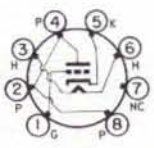


8DL



5 4 3 1
K H H P

FIG. 15



8DM

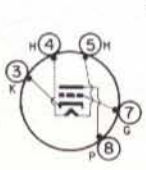
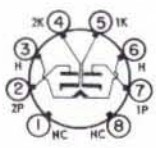


FIG. 16



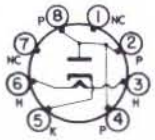
8EH

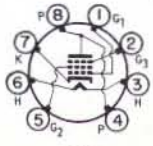
RAYTHEON

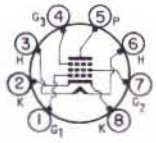
CATHODE SUBMINIATURE TUBES

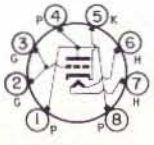
Type Number	Classification by Construction	Typical Application	Bulb	E.I.A. Outline Drawing	Base	Basing ϕ	Max Dimensions L	W	T	Capacitance pf C in	C out	C gp
6321	Low mu Twin Triode	Class A Amp.♦	T3		8 Lead Button	8DG	1.125	.400	.400	1.0	1.4	0.55
6487	Diode RF Pentode	Amp.	T3	3-2	8 Lead Button	8FW	1.50	.400	.400	4.5	4.7	.02‡
6488	Remote Cutoff RF Pentode	Amp.	T3	3-2	8 Lead Button	8FX	1.50	.400	.400	4.5	5.0	.15‡
6489	Diode	HW Rectifier	T2		5 Lead Button	Fig. 17	1.12	.218	.218	Tube voltage drop 3.1v at 18 ma dc		
6533	High mu Triode	Low Noise Amp.	T3	3-1	8 Lead Button	8FY	1.375	.400	.400	1.75△	0.6△	1.6△
6533WA	High mu Triode	Low Noise Amp.	T3	3-1	8 Lead Button	8FY	1.375	.400	.400	1.75△	0.6△	1.6△
6540	Sharp Cutoff Pentode	RF Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400			
6690	Medium mu Twin Triode	Class A Amp.♦	T3		8 Lead Button	8GQ	1.0	.400	.400	2.6△	1.4[1]△ 1.7[2]△	1.8△
6788	Sharp Cutoff Pentode	AF Amp.	T3	3-11	8 Lead Button	8DL	1.250	.400	.400	2.5	3.2	.032‡
6788A	Sharp Cutoff Pentode	AF Amp.	T3	3-11	8 Lead Button	8DL	1.250	.400	.400	2.5	3.2	.032‡
6814	Medium mu Triode	Computer Serv.	T3	3-1	8 Lead Button	8DK	1.375	.400	.400	2.4	2.4	1.3‡
6832	Medium mu Twin Triode	DC Amp.♦	T3	3-2	8 Lead Button	8DG	1.50	.400	.400			
6872	Semi Remote Cutoff RF Pentode	IF. RF Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	5	3.5	0.03
6943	Sharp Cutoff RF Pentode	RF Amp.	T3	3-11	8 Lead Button	8DC	1.250	.400	.400	3.0	3.0	.015‡
6944	Semi Remote Cutoff RF Pentode	IF. RF Amp.	T3	3-11	8 Lead Button	8DC	1.250	.400	.400	2.9	3.1	.015‡
6945	Beam Power Amplifier	Power Amp.	T3	3-3	8 Lead Button	8DL	1.750	.400	.400	5.0	5.5	0.13‡
6946	Medium mu Triode	General Purpose	T3	3-11	8 Lead Button	8DK	1.250	.400	.400	1.6△	0.75△	1.0△
6947	Medium mu Twin Triode	Class A Amp.♦	T3	3-11	8 Lead Button	8DG	1.250	.400	.400	1.6△	0.20[1]△ 0.25[2]△	1.2△
6948	High mu Twin Triode	Class A Amp.♦	T3	3-11	8 Lead Button	8DG	1.250	.400	.400	1.6△	0.20[1]△ 0.25[2]△	0.75△
7079	Medium mu Twin Triode	Voltage Amp.♦	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	1.9△	0.28[1]△ 0.32[2]△	1.5△
7083	RF Pentode	VHF Amp.	T3	3-6	Flat Press	Fig. 8	1.50	.400	.400	4.8	3.5	0.03‡
7327	Twin Triode	On-Off♦	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	1.9△	0.28[1]△ 0.32[2]△	1.5△
7432	RF Pentode	RF Amp.	T3	3-2	8 Lead Button	8DE	1.50	.400	.400	4	2.5	.015‡
7433	RF Pentode	RF Amp.	T3	3-2	8 Lead Button	8FX	1.50	.400	.400	5	4.5	.015‡
7434	Pentode	Amp.	T3	3-2	8 Lead Button	8FX	1.50	.400	.400	3.8	4.4	0.3‡
7435	Diode	Detector	T1½		5 Lead Button	5DC	1.1	.210	.210			
7436	HW Rectifier	Rectifier	T3		8 Lead Button	6CJ	1.6	.400	.400			
7437	Medium mu Triode	Amp.	T3	3-2	8 Lead Button	8JY	1.5	.400	.400	2.0	2.8	2.1
7438	Dual Control RF Pentode	Gated Amp.	T3	3-2	8 Lead Button	8JZ	1.5	.400	.400	4.2	3.1	.015‡
7550	Twin Triode	On-Off♦	T3	3-3	8 Lead Button	8DG	1.75	.400	.400	4△	0.24[1]△ 0.28[2]△	4△
7576	High mu Triode	RF Power Amp.	T3	3-3	8 Lead Button	Fig. 18	1.75	.400	.400	12[3]	5.3[3]	0.15[34]‡
7759	Medium mu Twin Triode	Amp.-Oscillator	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	2.1	1.3 1.4	1.4
7760	Medium mu Twin Triode	Amp.-Oscillator	T3	3-1	8 Lead Button	8DG	1.375	.400	.400	2.20△	0.34△ 0.30△	1.8△
7761	RF Pentode	Video Amp.	T3	3-3	8 Lead Button	8DL	1.75	.400	.400	8.5	8.0	0.18
7762	Beam Power Pentode	Amp.	T3	3-1	8 Lead Button	8DL	1.375	.400	.400	6.5	7.5	0.11

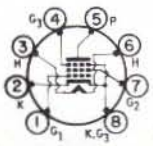
Key to Symbols: § Approximate ♦ Per Section △ Without External Shield ‡ Maximum * Minimum
ϕ E.I.A. Designations. Where none exists Raytheon uses figure no.

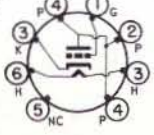

6CJ

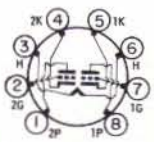

8FX

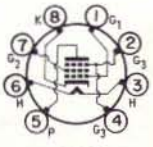

8DC

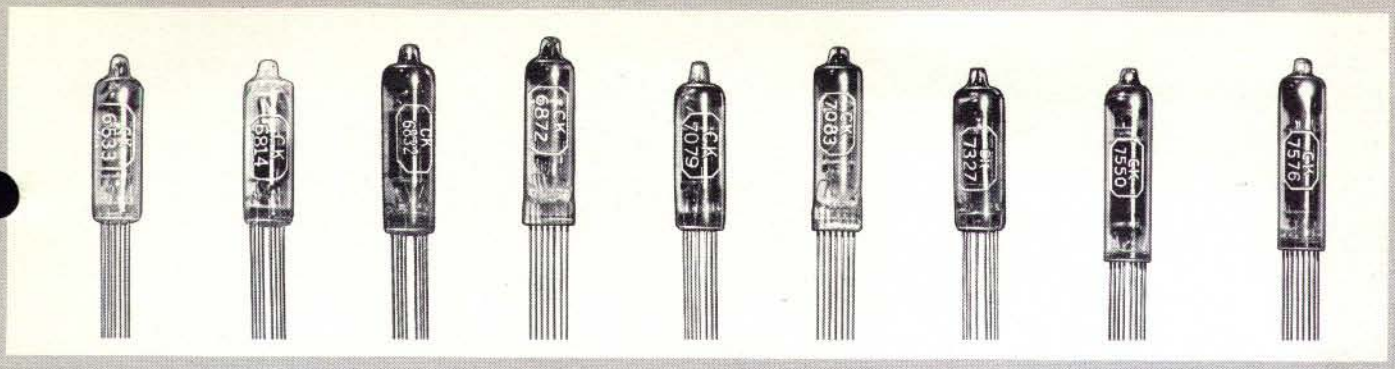

8FY


8DE


8JY


8DG

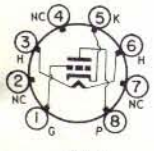

8JZ



Cathode			Plate		Grid 1		Grid 2		Grid 3		Amplification Factor	G m μ mhos	Plate Resistance ohms	Load Resistance ohms	Output Watts	Type Number
Type	V	A	V	mA	V	mA	V	mA	V	mA						
Htr.	6.3	0.085	100		R_K = 680						16	1700	9.4K§			6321
Htr.	6.3	0.200	100	3.0	−2.0		100	2.45				2500	100K			6487
Htr.	6.3	0.200	100	7.5	−2.0		100	2.5	0			5250	250K			6488
Htr.	6.3	0.150	max peak inverse voltage = 460v□; max dc output current = 10 mA□; max peak current = 60 ma													6489
Htr.	6.3	0.200	120	0.9	R_K = 1500						54	1750	max noise output = 1.0 mV ac across 10,000 ohms			6533
Htr.	6.3	0.200	120	0.9	R_K = 1500						54	1750	max noise output = 1.0 mV ac across 10,000 ohms			**6533WA**
Htr.	6.3	0.200	120	7.5	R_K = 220		120	2.6	0			5000	0.34 meg			6540
Htr.	6.3	0.300	100	8.0	R_K = 100						35	4800				6690
Htr.	6.3	0.175	100	0.8	R_K = 1500		100	0.09				1150	1.2 meg			6788
Htr.	6.3	0.175	100	0.8	R_K = 1500		100	0.09				1500	1.2 meg			6788A
Htr.	6.3	0.150	100	10	R_K = 150						29	6000	4.8K§			**6814**
Htr.	6.3	0.400	100	0.8	R_K = 3000						26	1050				**6832**
Htr.	6.3	0.200	120	7.75	R_K = 200		120	2.7	0			4100	340K			**6872**
Htr.	6.3	0.175	100	8.0	R_K = 150		100	2.3				3600	300K			6943
Htr.	6.3	0.175	100	7.0	R_K = 150		100	2.0				3200	280K			6944
Htr.	6.3	0.350	100	25	R_K = 270		100	1.5				3500	20K			6945
Htr.	6.3	0.175	100	9.0	R_K = 270						16.5	3800				6946
Htr.	6.3	0.350	150	6.5	R_K = 270						35	4000				6947
Htr.	6.3	0.35	100	0.8	R_K = 1500						70	1650				6948
Htr.	6.3	0.300	100	8.5	R_K = 220						20	5000	4K			**7079**
Htr.	6.3	0.200	120	7.5	R_K = 200		120	2.6	0			5000	340K			**7083**
Htr.	6.3	0.300	epk = 150v; Eg = −25 Vdc; egk = +50v; tp = 10 μsec; prr = 1000 pps; ik = 475 ma min													**7327**
Htr.	6.3	0.175	100	7	−1.4		100	2.2				5000				7432
Htr.	6.3	0.200	100	7.5	−2		100	2.5	0			5500				7433
Htr.	6.3	0.200	100	7	−1.4		100	2.4	0			3100				7434
Htr.	6.3	0.150	max inverse voltage = 460v□; max peak plate current = 60 ma dc□; I_0 = 10 mA dc													7435
Htr.	6.3	0.400	max peak inverse voltage = 930v□; max peak plate current = 300 ma dc□; I_0 = 50 mA dc													7436
Htr.	6.3	0.150	100	8	−3						20	4200				7437
Htr.	6.3	0.175	100	3.0	−2		100	2.25	0			2500				7438
Htr.	6.3	0.500	epk = 300v; Ec = −30 Vdc; egk = +40v; tp = 10 μsec; prr = 1000 pps; ik = 1400 ma min													**7550**
Htr.	6.3	0.450	200	15.5	R_K = 150						46	10,700				**7576**
Htr.	26.5	0.090	100	6.5	R_K = 150						35	5400				7759
Htr.	26.5	0.090	26.5	3.0	Rg = 2.2 meg						20	5000				7760
Htr.	26.5	0.110	150	21	R_K = 100		100	4.0				4200	15K			7761
Htr.	26.5	0.110	110	30	R_K = 270		110	2.2				4200	15K			7762

• For Both Sections † Zero Signal □ Absolute Maximum [1] Section 1 [2] Section 2 [3] Grounded Grid [4] Plate to Cathode

Types in bold face are Raytheon Preferred Types for new circuit designs. *Ratings are Typical Operating Characteristics.*



8DK

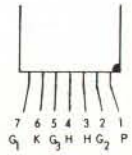
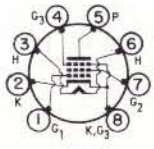


FIG. 8



8DL

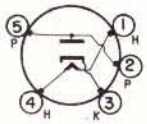
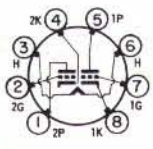
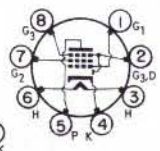


FIG. 17



8GQ

FIG. 18



8FW

REGIONAL SALES OFFICES

NEW ENGLAND
55 Chapel St.,
Newton 58, Mass.
Tel: BIgelow 4-7500

MID-ATLANTIC
210 Sylvan Ave.,
Englewood Cliffs, N. J.
Tel: LOwell 7-4911
NYC: WIsconsin 7-6400

SOUTH ATLANTIC
100 Roesler Rd.,
Glen Burnie, Md.
Tel: SOuthfield 1-0450

1612 East Colonial Drive,
Orlando, Florida
Tel: GArden 3-0518

WEST CENTRAL
9501 Grand Ave.,
Franklin Park, Ill.
Tel: NAtional 5-4000

3511 Hall Street
Dallas, Texas
Tel: LAkeside 6-7921

WESTERN
225 North Van Ness Ave.,
Hawthorne, California
Tel: PLymouth 7-3151

GOVERNMENT SALES
333 West First St.,
Dayton 2, Ohio
Tel: BAldwin 3-8128

1000 Sixteenth St., N.W.,
Washington 6, D. C.
Tel: MEtropolitan 8-5205

CANADA
Raytheon Canada, Ltd.
400 Philips St.,
Waterloo, Ontario, Canada

For small order and prototype quantities see your local Raytheon electronic parts distributor.

RAYTHEON

RAYTHEON COMPANY

INDUSTRIAL COMPONENTS DIVISION

SP-1041

5M-8-61-WEA

PRINTED IN U.S.A.