UNITED ELECTRONICS

TYPE 949-A

MODULATOR, A-F AND R-F POWER AMPLIFIER, OSCILLATOR

ENGINEERING INFORMATION

GENERAL RATINGS

Number of Electrodes	3
Filament Voltage	11 volts
Current	7.7 amperes
Type	Thoriated Tungsten
Average Characteristic Values Calculated at: Eb = 3000, Ec = —130, Ef = 11 A-C	
Plate Current	0.120 amperes
Amplification Factor	19
Plate Resistance @ 200 ma.	2500 ohms
Mutual Conductance @ 200 ma.	7600 micromhos
Average Direct Interelectrode Capacities:	
Grid to Plate	11.5 uuf
Grid to Filament	14.0 uuf
Plate to Filament	1.7 uuf
Maximum Overall Dimensions:	
Length	14 3/8 inches
Diameter	4 1/16 inches
Bulb	T-32
Cap	Skirted Large
Base	Jumbo 3-Pin
Type of Cooling	Air
Net Weight	23 oz.

MAXIMUM RATINGS

Maximum D-C Plate Voltage Modulated	3500	volts
Maximum D-C Plate Voltage Unmodulated	4000	volts
Maximum A-C Plate Voltage R. M. S.	4000	volts
Maximum D-C Plate Current Modulated	500	ma.
Maximum D-C Plate Current Unmodulated	500	ma.
Maximum Plate Dissipation	500	watts
Maximum D-C Grid Current	110	ma.
Maximum R-F Grid Current	10	amp.

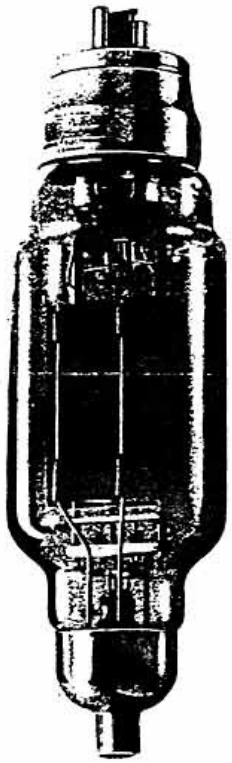
Frequency Rating for Operating Conditions with Maximum Rated Power Input and Nominal Output:

Below	5 megacycles
Above	60 meters

*Maximum Frequency Rating and Reduced Power Input and Output:

Below	*15 megacycles
Above	*20 meters

* For operation at the higher frequencies, the plate voltage, and plate input should not exceed 50% of the Maximum Ratings and Typical Operation Conditions. The R-F grid current should never exceed the maximum rated value.



INTERCHANGES WITH TYPE 849-A

Typical UNITED ELECTRONICS refinements of design are revealed in the above illustration of type 949-A. Individually supported and isolated grid-filament assembly gives this tube the necessary separation between elements for its heavy input ratings. The large anode and wide spacing are design features contributing to the modern efficiency standards which this tube exemplifies.

INSTALLATION

The base of the UNITED 949-A is designed for mounting in a standard Jumbo 3-Pin socket. The tube may be mounted either in a vertical position with the filament base up, or in a horizontal position with the plate on edge. Ample air space should be provided for ventilation.

The filament of the 949-A should be operated at the rated value of 11 volts. Operation at other than rated value may result in loss of filament emission and short life. Except in cases where freedom from hum is essential, the filament of the 949-A should be operated from an a-c source.

The plate dissipation of the 949-A should never exceed the values given under Maximum Ratings and Typical Operation Conditions.

GRAPHITE ANODE

A specially processed graphite anode is used in this tube type because of several specific advantages over metals such as tantalum, molybdenum, and nickel. The radiating area of graphite is approximately twice the projected anode area because of its surface porosity and it will dissipate at least four times more heat than metal.

Graphite, being infusible will not warp or twist. The exact form of graphite is maintained under all temperatures; hence constant inter-element relationships and uniform characteristics result. The inherent advantages of graphite over metal are of primary importance in designing tubes of this type for long and satisfactory service.

All ratings given are for continuous service. Higher ratings are permissible for intermittent operation. Additional data will be furnished upon request.

United

A-F POWER AMPLIFIER AND MODULATOR—CLASS A

Maximum D-C Plate Voltage			4000	volts
Maximum Plate Dissipation			400	watts
Maximum Plate Input			400	watts
Typical Operation:				
Filament Voltage	11	11	11	a-c volts
D-C Plate Voltage	2500	3000	4000	volts
D-C Grid Voltage	—100	—130	—185	volts
Peak A-F Grid Voltage	94	125	180	volts
D-C Plate Current	135	120	100	ma.
Mutual Conductance	5750	5000	4000	umhos
Plate Resistance	3300	3400	3900	ohms
Load Resistance	12000	18000	30000	ohms
U. P. O. (5% 2nd harmonic)	82	105	150	watts

A-F POWER AMPLIFIER AND MODULATOR—CLASS B

Maximum D-C Plate Voltage			4000	volts
Maximum D-C Plate Current	Averaged over		500	ma.
Maximum Plate Dissipation	any audio		500	watts
Maximum Plate Input	freq. cycle		1350	watts
Typical Operation (2 tubes):				
Filament Voltage	11	11	11	a-c volts
D-C Plate Voltage	2500	3000	3000	volts
D-C Grid Voltage	—118	—140	—140	volts
Zero-Sig. Plate Cur. (per tube)	60	100	100	ma.
Max.-Sig. Plate Cur. (per tube)	293	265	450	ma.
Load Resistance (per tube)	2000	3200	2000	ohms
Load Res. (plate to plate)	8000	12800	8000	ohms
Driving Power	6	12	40	watts
Power Output (2 tubes)	840	1100	1900	watts

R-F POWER AMPLIFIER—CLASS B TELEPHONY

(Carrier Conditions—Modulation Factor = 1.0)

Maximum D-C Plate Voltage			3500	volts
Maximum D-C Plate Current			500	ma.
Maximum Plate Dissipation			500	watts
Maximum Plate Input			750	watts
Maximum R-F Grid Current			8	amp.
Typical Operation:				
Filament Voltaage	11	11	11	a-c volts
D-C Plate Voltage	2000	2500	3000	volts
D-C Grid Voltage	—80	—110	—140	volts
Peak R-F Grid Voltage	110	135	160	volts
D-C Plate Current	187	216	250	ma.
Driving Power†	9	12	18	watts
Power Output	132	190	270	watts

PLATE MODULATED R-F POWER AMPLIFIER CLASS C TELEPHONY

(Carrier Conditions—Modulation Factor = 1.0)

Maximum D-C Plate Voltage			3000	volts
Maximum D-C Plate Current			500	ma.
Maximum Plate Dissipation			400	watts
Maximum Plate Input			1250	watts
Maximum D-C Grid Current			100	ma.
Maximum R-F Grid Current			8	amp.
Typical Operation:				
Filament Voltaage	11	11	11	a-c volts
D-C Plate Voltage	2500	2500		volts
D-C Grid Voltage	—300	—300		volts
Peak R-F Grid Voltage	475	520		volts
D-C Plate Current	335	500		ma.
D-C Grid Current†	48	70		watts
Driving Power†	22	35		ma.
Power Output	680	960		watts

R-F POWER AMPLIFIER AND OSCILLATOR CLASS C TELEGRAPHY

(Key-down Conditions)

Maximum D-C Plate Voltage			3500	volts
Maximum D-C Plate Current			500	ma.
Maximum Plate Dissipation			500	watts
Maximum Plate Input			1750	watts
Maximum D-C Grid Current			100	ma.
Maximum R-F Grid Current			8	amp.
Typical Operation:				
Filament Voltaage	11	11	11	a-c volts
D-C Plate Voltage	2500	3000		volts
D-C Grid Voltage	—300	—300		volts
Peak R-F Grid Voltage	—520	—500		volts
D-C Plate Current	500	500		ma.
D-C Grid Current†	70	50		ma.
Driving Power†	35	25		watts
Power Output	960	1180		watts

† Subject to wide variations depending on the impedance of the load circuit. The driver stage should have a tank circuit of good regulation and should be capable of delivering considerably more than the required driving power.