

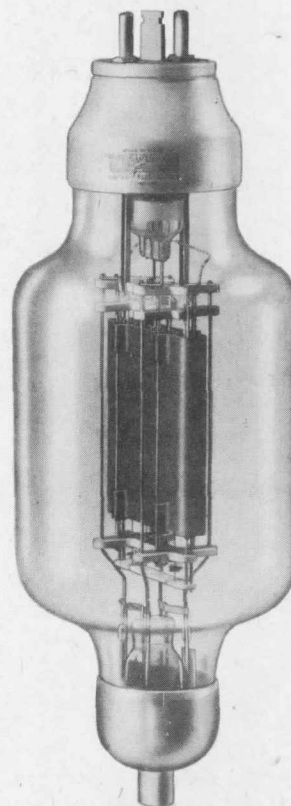
**TYPE 851**
MODULATOR, A-F AND R-F POWER AMPLIFIER, OSCILLATOR
ENGINEERING INFORMATION
GENERAL RATINGS

Number of Electrodes	3
Filament Voltage	11 volts
Current	15.5 amperes
Type	Thoriated Tungsten
Average Characteristic Values Calculated at:	
Ep = 2000 Ec = -65 Ef = 11 A-C	
Plate Current	.270 amperes
Amplification factor	20.5
Plate Resistance	1500 ohms
Mutual Conductance	13700 micromhos
Average Direct Interelectrode Capacities:	
Grid to Plate	47.0 uuf
Grid to Filament	25.5 uuf
Plate to Filament	4.5 uuf
Maximum Overall Dimensions:	
Length	17 $\frac{5}{8}$ inches
Diameter	6 $\frac{1}{8}$ inches
Bulb	T-48
Cap	Skirted Large
Base	Jumbo 3-Pin
Net Weight	2 lb. 5 oz.

MAXIMUM RATINGS

Maximum D-C Plate Voltage Modulated	2500 volts
Maximum D-C Plate Voltage Unmodulated	3000 volts
Maximum A-C Plate Voltage R. M. S.	3000 volts
Maximum D-C Plate Current Modulated	1.0 amp.
Maximum D-C Plate Current Unmodulated	1.0 amp.
Maximum Plate Dissipation	750 watts
Maximum D-C Grid Current	200 ma.
Maximum R-F Grid Current	10 amp.
Frequency Rating for Operating Conditions with Maximum Rated Power Input and Nominal Output:	
Below	3 megacycles
Above	100 meters
*Maximum Frequency Rating with 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 UNITED type 951

INSTALLATION

The base of the UNITED 851 is designed to fit the standard "250 watt" mounting. The tube may be mounted either in a vertical position with the filament base end up, or in a horizontal position with the plate on edge. Ample air space should be provided for ventilation.

The filament of the 851 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. The filament of the 851 should be operated preferably from an a-c source.

The plate dissipation of the 851 should never exceed the values given under Maximum Ratings and Typical Operation Conditions.

GRAPHITE ANODE

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

Graphite, being infusible, will not warp or twist. Therefore, it maintains its exact form under all temperatures, the result being constant inter-element relationship. The low operating temperature of the graphite anode tends to keep the grid cool, reduces overload hazards, and prevents gas current. The inherent qualities of graphite over metal as outlined above, are advantages of primary importance in designing tubes of this type for long and satisfactory service life.

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

A-F POWER AMPLIFIER AND MODULATOR—CLASS A

Maximum D-C Plate Voltage	2500	volts
Maximum Plate Dissipation	600	watts
Maximum Plate Input	600	watts

Typical Operation:

Filament Voltage	11	11	11	a-c	volts
D-C Plate Voltage	1500	2000	2500		volts
D-C Grid Voltage	-49	-65	-92		volts
Peak A-F Grid Voltage	44	60	87		volts
D-C Plate Current	175	270	240		ma.
Mutual Conductance	11400	13700	12800		umhos
Plate Resistance	1800	1500	1600		ohms
Load Resistance	3700	3100	5000		ohms
U. P. O. (5% 2nd harmonic)	46	100	160		watts

A-F POWER AMPLIFIER AND MODULATOR—CLASS B

Maximum D-C Plate Voltage	3000	volts
Maximum D-C Plate Current	Averaged over 1.0	amp.
Maximum Plate Dissipation	any audio 750	watts
Maximum Plate Input	freq. cycle 2250	watts

Typical Operation (2 tubes):

Filament Voltage	11	11	11	a-c	volts
D-C Plate Voltage	2000	2500	3000		volts
D-C Grid Voltage	-85	-111	-135		volts
Zero-Sig. Plate Cur.	120	120	110		amp.
Max. Sig. Plate Cur.	1.7	1.4	1.2		amp.
Load Resistance (per tube) ..	650	1000	1400		ohms
Load Res. (plate to plate) ..	2600	4000	5600		ohms
Driving Power	20	12	6		watts
Power Output	2.2	2.3	2.4		kw

R-F POWER AMPLIFIER—CLASS B TELEPHONY

(Carrier Conditions — Modulation Factor = 1.0)

Maximum D-C Plate Voltage	2500	volts
Maximum D-C Plate Current	0.75	amp.
Maximum Plate Dissipation	750	watts
Maximum Plate Input	1100	watts
Maximum R-F Grid Current	8.0	amp.

Typical Operation:

Filament Voltage	11	11	11	a-c	volts
D-C Plate Voltage	1500	2000	2500		volts
D-C Grid Voltage	-60	-85	-110		volts
Peak R-F Grid Voltage	150	140	135		volts
D-C Plate Current	0.62	0.475	0.39		amp.
Driving Power†	40	25	20		watts
Power Output	275	300	325		watts

**PLATE MODULATED R-F POWER AMPLIFIER
CLASS C TELEPHONY**

(Carrier Conditions — Modulation Factor = 1.0)

Maximum D-C Plate Voltage	2000	volts
Maximum D-C Plate Current	1.0	amp.
Maximum Plate Dissipation	500	watts
Maximum Plate Input	1800	watts
Maximum D-C Grid Current	0.2	amp.
Maximum R-F Grid Current	8.0	amp.

Typical Operation:

Filament Voltage	11	11	a-c	volts
D-C Plate Voltage	1500	2000		volts
D-C Grid Voltage	-250	-300		volts
Peak R-F Grid Voltage	475	525		volts
D-C Plate Current	0.90	0.85		amp.
D-C Grid Current†	0.150	0.125		amp.
Driving Power†	75	65		watts
Power Output	900	1250		watts

**R-F POWER AMPLIFIER AND OSCILLATOR
CLASS C TELEGRAPHY**

(Key-down Conditions)

Maximum D-C Plate Voltage	2500	volts
Maximum D-C Plate Current	1.0	amp.
Maximum Plate Dissipation	750	watts
Maximum Plate Input	2500	watts
Maximum D-C Grid Current	0.2	amp.
Maximum R-F Grid Current	10.0	amp.

Typical Operation:

Filament Voltage	11	11	11	a-c	volts
D-C Plate Voltage	1500	2000	2500		volts
D-C Grid Voltage	-150	-200	-250		volts
Peak R-F Grid Voltage	375	425	450		volts
D-C Plate Current	0.9	0.9	0.9		amp.
D-C Grid Current†	0.15	0.12	0.10		amp.
Driving Power†	55	50	45		watts
Power Output	900	1250	1700		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.

