

Eimac
EITEL-McCULLOUGH, INC.
 SAN BRUNO, CALIFORNIA

X481D
 KLYSTRON
 •
 X-BAND
 OSCILLATOR

The Eimac experimental tube type X481D is a ruggedized integral-cavity X-band reflex klystron intended for local oscillator service under conditions of severe shock, vibration, or sustained acceleration. The tube will operate satisfactorily at a resonator voltage of 250 volts, a repeller voltage of approximately -100 volts, and with loads having a standing wave ratio as high as 6 db.

The X481D is an experimental type. Samples may be used for experimental or preliminary design work, but should not be made the basis for the final design of equipment without further discussion with the manufacturer.

GENERAL CHARACTERISTICS

ELECTRICAL

Cathode: Coated Unipotential
 Heater Voltage - - - - - 6.3 volts
 Heater Current- - - - - 0.80 amp

Frequency - - - - - 8500-9600 Mc

MECHANICAL

Minimum Axial Acceleration Test- - - - - 200 g
 Minimum Axial Vibration Test- - - - - 10 g
 Base - - - - - Special three-hole flange

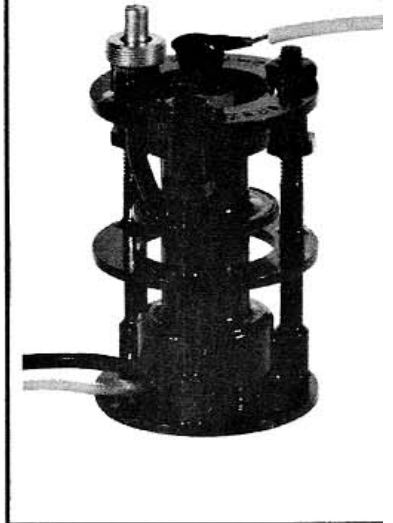
Connections:

Heater - - - - - Colored wire at base
 Heater and Cathode - - - - - Black wire at base
 Resonator- - - - - Shell of tube
 Repeller - - - - - Colored wire at top
 Output - - - - - Coaxial fitting at top

Mounting Position- - - - - Any
 Cooling- - - - - Convection and radiation

Maximum Overall Dimensions:

Length - - - - - 2.44 inches
 Diameter - - - - - 1.14 inches
 Net Weight - - - - - 1.5 ounces
 Shipping Weight (Average) - - - - - 4 ounces



MAXIMUM RATINGS

D-C RESONATOR VOLTAGE - - - - -	300 MAX. VOLTS
D-C CATHODE CURRENT - - - - -	35 MAX. MA
D-C REPELLER VOLTAGE	
Positive Limit - - - - -	0 MAX. VOLTS
Negative Limit - - - - -	-500 MAX. VOLTS

TYPICAL OPERATION (With 50-ohm load)

Mode - - - - -	A	B
D-C Resonator Voltage -	250	300 volts
D-C Cathode Current - -	18	24 ma
D-C Repeller Voltage- -	-95	-130 volts
Power Output - - - - -	20	50 mw
Frequency - - - - -	9000	9000 Mc.

APPLICATION

Mounting--The X481D is provided with a three-hole base flange for solid mounting directly to the equipment chassis or to an insulating support. No socket or tube clamp is required.

Cooling--No special provisions are ordinarily required for the cooling of the X481D. The resonator will dissipate 10 watts of power by radiation and convection in ambient temperatures up to 100°C.

Resonator--The resonator of the X481D is integral with the shell of the tube. For this reason it is often convenient to operate the resonator at chassis potential, with the repeller and cathode at appropriate negative potentials. All voltages given in the list of Maximum Ratings and in the Typical Operation data are measured with respect to the cathode of the tube.

Cathode--Heater voltage should be at the rated value of 6.3 volts. Variations should be kept within the range of 5.7 to 6.9 volts. The cathode is internally connected to one side of the heater. If the resonator is operated at chassis potential, the heater transformer must be insulated for the cathode-to-resonator potential.

Repeller--There will be an optimum repeller voltage for any given output frequency, and the range of electronic tuning or of frequency modulation under control of the repeller voltage will vary with output frequency. These relations are shown for a typical tube in the accompanying curves.

Repeller voltages must be negative with respect to the cathode at all times.

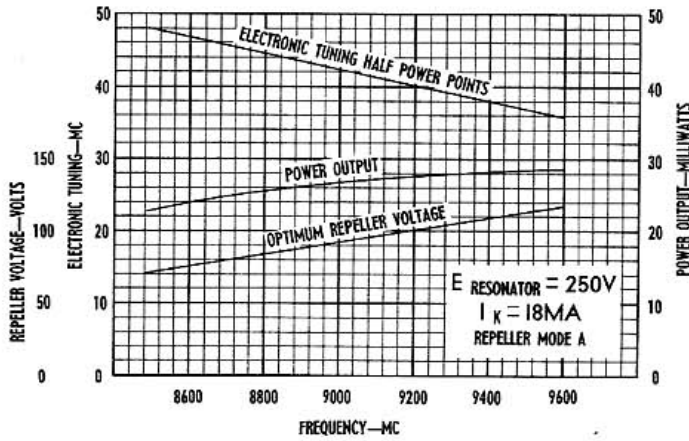
Mechanical Tuning--The mechanical tuning adjustment is rigidly locked in place by three sets of nuts on the tuning structure. Small adjustments in frequency, in the range of plus or minus 200 Mc., may be made with one set. Large frequency changes, however, must be made by equal adjustment of all three. UNDER NO CONDITIONS SHOULD ANY ATTEMPT BE MADE TO TUNE THE X481D BELOW 8300 MC.

Output--Curves illustrating the variation of Power Output with Operating Frequency for a typical tube are shown herewith. These curves assume a matched load and optimum repeller voltages at all frequencies.

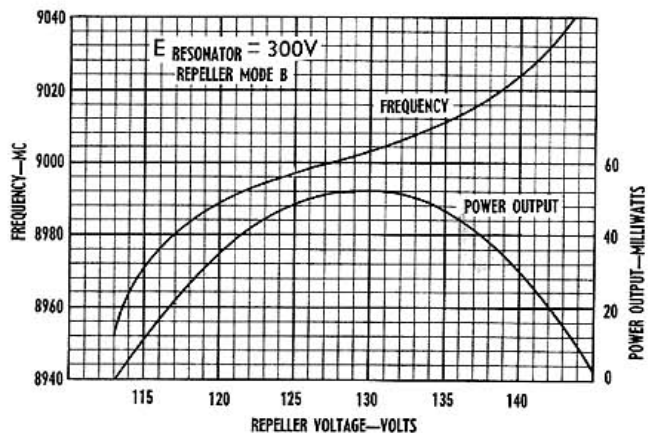
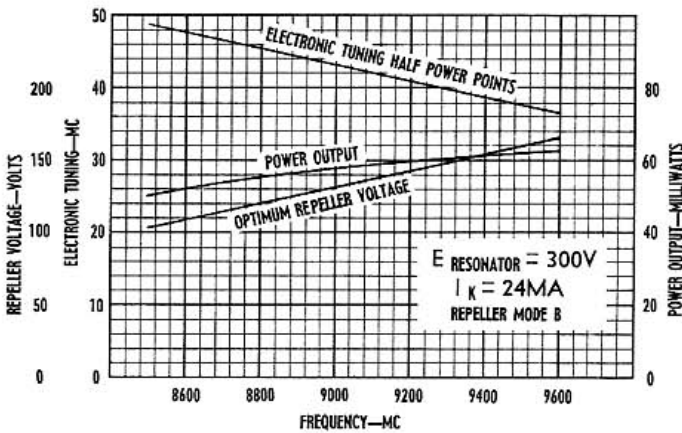
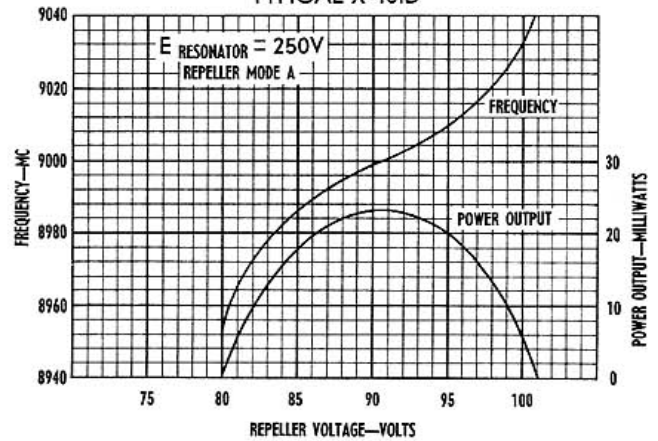
Frequency Stability--The frequency shift of the X481D under constant axial acceleration of 200g is less than 6 Mc. Under vibration of 10g maximum acceleration, the spectrum width is less than 1.0 Mc.

Frequency variations within the range of normal operating temperatures do not exceed ± 0.5 Mc/ $^{\circ}$ C.

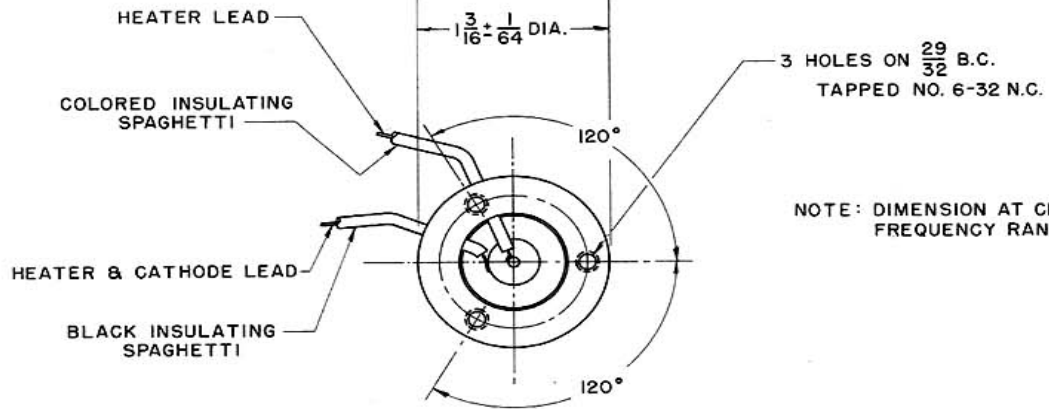
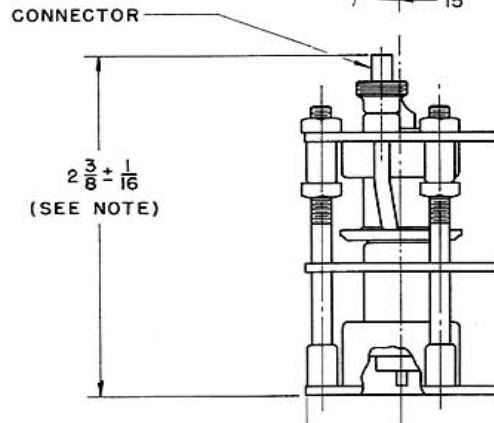
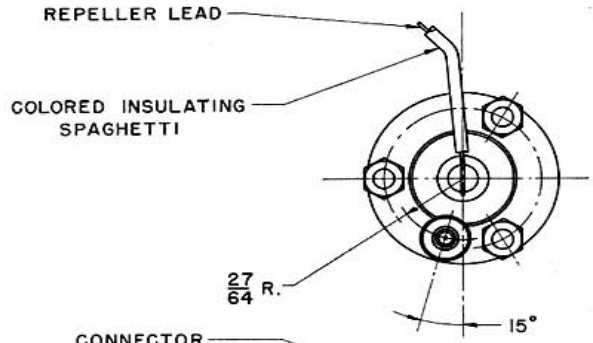
OPERATING CHARACTERISTICS
TYPICAL X-481D



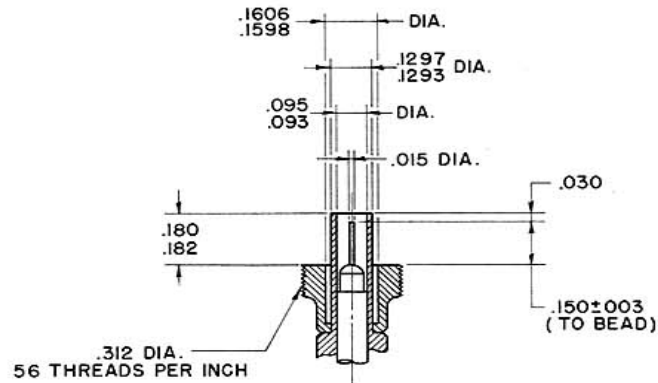
POWER OUTPUT AND FREQUENCY
VS. REPELLER VOLTAGE
TYPICAL X-481D



TOP VIEW



BOTTOM VIEW



CONNECTOR DETAIL