



T E N T A T I V E

GENERAL CHARACTERISTICS

The X-400 is a single tube designed to convert SHF signals in the band from 8000-12,700 megacycles to a 480 megacycle intermediate frequency output signal.

The tube consists of a backward-wave amplifier and a backward wave oscillator in the same vacuum envelope. The r-f input signal is fed to the amplifier section where its level is increased and it mixes with the oscillator signal. Mixing is accomplished in the common electron beam that interacts with both r-f structures, to yield an i-f output signal which can be adjusted over a fairly large frequency range. This tube uses a 480 megacycle i-f.

The X-400 is a glass tube, mounted in an aluminum capsule. Solenoid focusing is required. A type "TNC" r-f input connector and a "TSM" i-f output connector are included as an integral part of the capsule. A type "TNC" l-o output connector can be supplied if required.

ELECTRICAL DATA

Operating Frequency	8000-12,700 megacycles
Bandwidth of Input Section	25-127 megacycles
Noise Figure	20 db
I-F Output	480 megacycles
Conversion Gain	Unity
Image Rejection	35 db

Note: The image rejection is dependent upon the intermediate frequency selected. This tube utilizes a 480 megacycle i-f, an increase in the i-f would result in a higher level of image rejection.

MECHANICAL DATA

Mounting Position	Any
Capsule Length	17 inches
Capsule Outside Diameter	7/8 inches
R-F Input Connector	Type "TNC" Coaxial, female
I-F Output Connector	Type "TSM" Coaxial, male
L-O Output Connector (if required)	Type "TNC" Coaxial, female
D.C. Connections	Color coded flying leads

*This number identifies a particular experimental tube design, such number and identification data being subject to change without notice. This tube is for experimental purposes only, carries no obligation for future manufacture, and should not be used for design purposes without prior arrangement.

MAXIMUM RATINGS

Heater Voltage	6.5 Volts dc maximum
Heater Current	2 Amperes maximum
Cathode Voltage	-250 to -1500 Volts maximum
Cathode Current	8 ma maximum
Focus Voltage	0 to -10 Volts maximum)
Anode No. 1 Voltage	5 to 100 Volts maximum) With respect
Anode No. 2 Voltage	10 to 150 Volts maximum) to cathode
Anode No. 3 Voltage	30 to 300 Volts maximum)
Anode No. 4 Voltage	70 to 900 Volts maximum)
Anode No. 5 Voltage	
Amplifier Helix No. 1 Voltage	
Amplifier Helix No. 2 Voltage	
Capsule Voltage	Zero Volts (Ground)
Oscillator Helix Voltage	-50 to +100 Volts maximum
Collector Voltage	250 Volts maximum
Focus Current	.3 ma maximum
Anode No. 1 Current	.3 ma maximum
Anode No. 2 Current	.3 ma maximum
Anode No. 3 Current	.3 ma maximum
Anode No. 4 Current	.3 ma maximum
Anode No. 5 Current	.3 ma maximum
Amplifier Helix No. 1 Current	
Amplifier Helix No. 2 Current	.5 ma maximum
Capsule Current	
Oscillator Helix Current	.3 ma maximum
Collector Current	8 ma maximum
Solenoid Magnetic Field	1000 Gauss maximum

TYPICAL OPERATION

R-F Frequency	10,000 megacycles
L-O Frequency	9,520 megacycles
I-F Frequency	480 megacycles
Conversion Gain	0 db
Heater Voltage	6.3 Volts dc
Heater Current	1.9 Amperes
Cathode Voltage	-650 Volts with respect to ground
Cathode Current	4.0 ma
Focus Voltage	0 Volts)
Anode No. 1 Voltage	+40 Volts)
Anode No. 2 Voltage	+55 Volts) with respect to cathode
Anode No. 3 Voltage	+90 Volts)
Anode No. 4 Voltage	+250 Volts)
Anode No. 5 Voltage	0 Volts (Ground)

X-400
BACKWARD WAVE
CONVERTER TUBE

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Amplifier Helix No. 1 Voltage)	0 Volts (Ground)
Amplifier Helix No. 2 Voltage)	
Capsule Voltage)	
Oscillator Helix Voltage	-40 Volts)
Collector Voltage	200 Volts) with respect to ground
Focus Current	0 ma
Anode No. 1 Current	.06 ma
Anode No. 2 Current	.05 ma
Anode No. 3 Current	.05 ma
Anode No. 4 Current	.06 ma
Anode No. 5 Current	.04 ma
Amplifier Helix No. 1 Current)	
Amplifier Helix No. 2 Current)	.08 ma
Capsule Current)	
Oscillator Helix Current	.02 ma
Collector Current	3.6 ma
Solenoid Magnetic Field	900 Gauss

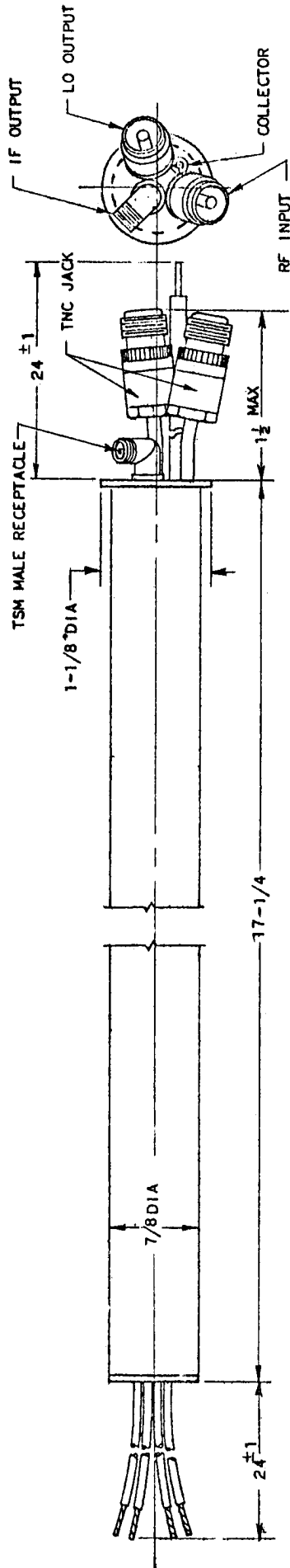
Additional information for specific application can be obtained from the

Electron Tube Application Section
ITT Components Division
P.O. Box 412
Clifton, New Jersey

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ELECTRON TUBE DEPARTMENT ■ **COMPONENTS DIVISION**
INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION, CLIFTON, NEW JERSEY



MAXIMUM WEIGHT
1 POUND

LEADS

- BROWN
- YELLOW
- GREEN
- BLUE
- GREY
- PURPLE
- WHITE
- ANODE NO. 1
- ANODE NO. 2
- ANODE NO. 3
- ANODE NO. 4
- ANODE NO. 5
- AMPL. HELIX NO. 1 - GROUND-BLACK
- AMPL. HELIX NO. 2 - RED
- COLLECTOR
- OSCILLATOR HELIX - INNER CONDUCTOR OF L O OUTPUT JACK

BACKWARD WAVE AMPLIFIER

TYPE X-400