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

X-396* BACKWARD WAVE CONVERTER TUBE

TENTATIVE

GENERAL CHARACTERISTICS

The X-396 is a single tube designed to convert SHF signals in the band from 3850-6000 megacycles toa 280 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. It is then mixed with the oscillator signal 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 280 megacycle i-f.

The X-396 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 connection can be supplied if required.

ELECTRICAL DATA

Operating Frequency	3850-6000 megacycles
Bandwidth of Input Section	12-60 megacycles
Noise Figure	20 db
I-F Output	280 megacycles
Conversion Gain	Unity
Image Rejection	35 db

Note: The image rejection is dependent upon the intermediate frequency selected. This tube utilizes a 280 megacycle i-f, an increase in the i-f would result in a higher level of image rejection.

*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.

MECHANICAL DATA

Mounting Position	Any
Capsule Length	24 inches
Capsule Outside Diameter	1-1/8 inches
R-F Input Connector	Type "TNC" coaxial, female
I-F Output Connector	Type "TSM" coaxial, male
L-O Output Connector	Type "TNC" coaxial female
D-C Connections	Color coded flying leads

MAXIMUM RATINGS

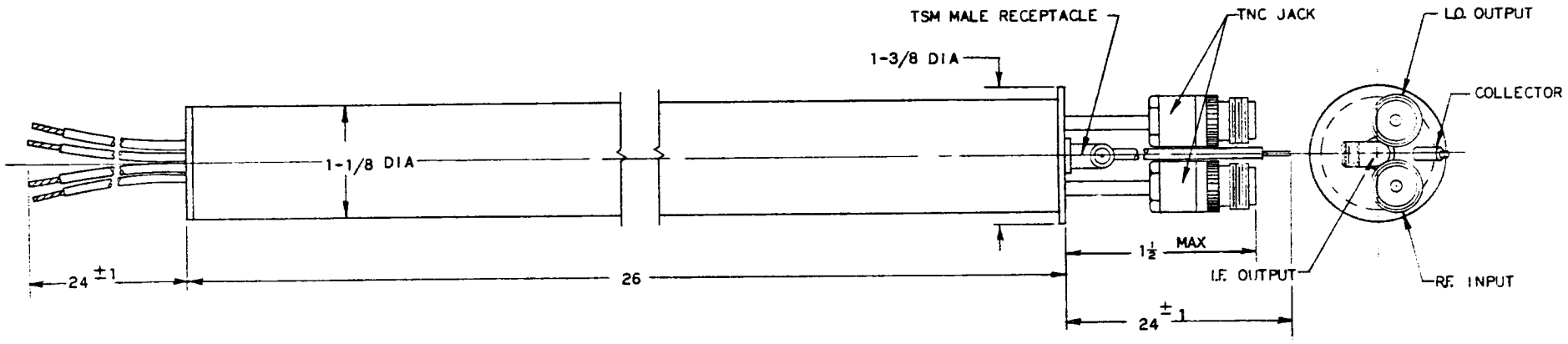
Heater Voltage	6.5	Volts dc maximum	
Heater Current	2	Amperes maximum	
Cathode Voltage	-300 to -1300	Volts maximum	
Cathode Current	8	ma maximum	
Focus Voltage	0 to -10	Volts maximum)	
Anode No. 1 Voltage	+15 to +75	Volts maximum)	
Anode No. 2 Voltage	+15 to +100	Volts maximum)	With respect to
Anode No. 3 Voltage	+30 to +300	Volts maximum)	cathode
Anode No. 4 Voltage	+100 to +800	Volts maximum)	
Anode No. 5 Voltage)			
Amplifier Helix No. 1 Voltage)			
Amplifier Helix No. 2 Voltage)	Zero Volts (Ground)		
Capsule Voltage)			
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	800	Gauss maximum	

TYPICAL OPERATION

R-F Frequency	5000	megacycles
L-O Frequency	4720	megacycles
I-F Frequency	280	megacycles
Conversion Gain	+2	db
Heater Voltage	6.3	Volts dc
Heater Current	1.9	Amperes
Cathode Voltage	-610	Volts with respect to ground
Cathode Current	4.5	ma
Focus Voltage	0	Volts)
Anode No. 1 Voltage	40	Volts)
Anode No. 2 Voltage	50	Volts) With respect to cathode
Anode No. 3 Voltage	120	Volts)
Anode No. 4 Voltage	240	Volts)
Anode No. 5 Voltage) Amplifier Helix No.1 Voltage) Capsule Voltage)	0	Volts (Ground)
Oscillator Helix Voltage	-10	Volts)
Collector Voltage	200	Volts) with respect to ground
Focus Current	0	ma
Anode No. 1 Current	.1	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) Capsule Current)	.12	ma
Oscillator Helix Current	.04	ma
Collector Current	4.0	ma
Solenoid Magnetic Field	700	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



MAXIMUM WEIGHT

2 POUNDS

LEADS

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

BACKWARD WAVE CONVERTER

TYPE X-396