X-388*
BACKWARD WAVE CONVERTER TUBE

TENTATIVE

GENERAL CHARACTERISTICS:

The X-388 is a single tube designed to convert UHF signals in the band from 496-897 megacycles to a 50 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 50 megacycle i-f.

The X-388 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	496-897 megacycles
Bandwidth	10-25 megacycles
Noise Figure	20 db
I-F Output	50 megacycles
Conversion Gain	Unity
Image Rejection	40 db

Note: The image rejection is dependent upon the intermediate frequency selected. This tube utilizes a 50 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	Horizontal (preferred)
Capsule Length	54 inches
Capsule Outside Diameter	3-1/4 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

MAXIMUM RATINGS:

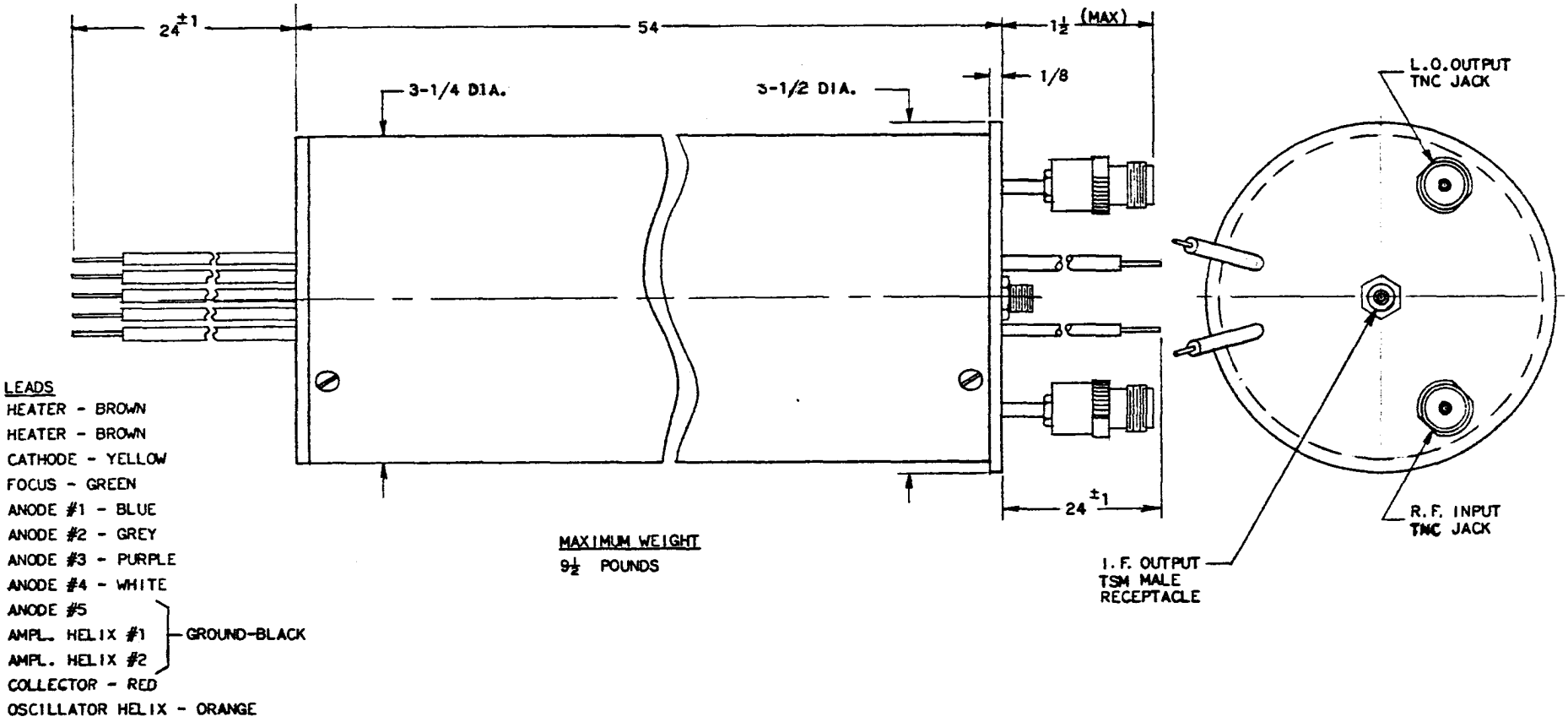
Heater Voltage	7.5 Volts maximum	
Heater Current	4.5 Amperes maximum	
Cathode Voltage	-100 to -1200 Volts maximum	
Cathode Current	8 ma maximum	
Focus Voltage	0 to -10 Volts maximum	With respect to cathode
Anode No. 1 Voltage	15 to 80 Volts maximum	With respect to cathode
Anode No. 2 Voltage	15 to 100 Volts maximum	With respect to cathode
Anode No. 3 Voltage	30 to 300 Volts maximum	With respect to cathode
Anode No. 4 Voltage	100 to 500 Volts maximum	With respect to cathode
Anode No. 5 Voltage	Zero Volts (Ground)	
Amplifier Helix No. 1 Voltage	Zero Volts (Ground)	
Amplifier Helix No. 2 Voltage	Zero Volts (Ground)	
Capsule Voltage	Zero Volts (Ground)	
Oscillator Helix Voltage	-100 to +50 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	.5 ma maximum	
Amplifier Helix No. 2 Current	.5 ma maximum	
Capsule Current	.5 ma maximum	
Oscillator Helix Current	.3 ma maximum	
Collector Current	8 ma maximum	
Solenoid Magnetic Field	500 Gauss maximum	

TYPICAL OPERATION:

R-F Frequency	750 megacycles
L-O Frequency	700 megacycles
I-F Frequency	50 megacycles
Conversion Gain	0 db
Heater Voltage	7.0 Volts dc
Heater Current	3.9 Amperes
Cathode Voltage	-410 Volts with respect to ground
Cathode Current	3.0 ma
Focus Voltage	0 Volts)
Anode No. 1 Voltage	42 Volts)
Anode No. 2 Voltage	49 Volts) with respect to cathode
Anode No. 3 Voltage	56 Volts)
Anode No. 4 Voltage	164 Volts)
Anode No. 5 Voltage)	
Amplifier Helix No. 1 Voltage)	0 Volts (Ground)
Amplifier Helix No. 2 Voltage)	
Capsule Voltage)	
Oscillator Helix Voltage	-55 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	2.6 ma
Solenoid Magnetic Field	450 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



BACKWARD WAVE CONVERTER

TYPE X-388