



T E N T A T I V E

GENERAL CHARACTERISTICS

The X-390 is a single tube designed to convert UHF signals in the band from 853-1543 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-390 is a glass tube, mounted in an aluminum capsule. Solenoid focusing is required. A type TNC r-f input connector 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	853-1543 megacycles
Bandwidth of Input Section	10-25 megacycles
Noise Figure	20 db
I-F Output	50 megacycles
Conversion Gain	Unity
Image Rejection	35 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.

X-390  
 BACKWARD-WAVE  
 CONVERTER TUBE

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MECHANICAL DATA

Mounting Position	Horizontal (preferred)
Capsule Length	47-1/2 inches
Capsule Outside Diameter	3-1/2 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	-200 to -1450 Volts maximum	
Cathode Current	8 ma maximum	
Focus Voltage	0 to -10 Volts maximum)	
Anode No. 1 Voltage	+10 to +75 Volts maximum)	With respect to cathode
Anode No. 2 Voltage	+10 to +100 Volts maximum)	
Anode No. 3 Voltage	+30 to +300 Volts maximum)	
Anode No. 4 Voltage	+80 to +900 Volts maximum)	
Anode No. 5 Voltage	)	
Amplifier Helix No. 1 Voltage	)	
Amplifier Helix No. 2 Voltage	)	
Capsule Voltage	)	
Oscillator Helix Voltage	-50 to +55 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	600 Gauss maximum	

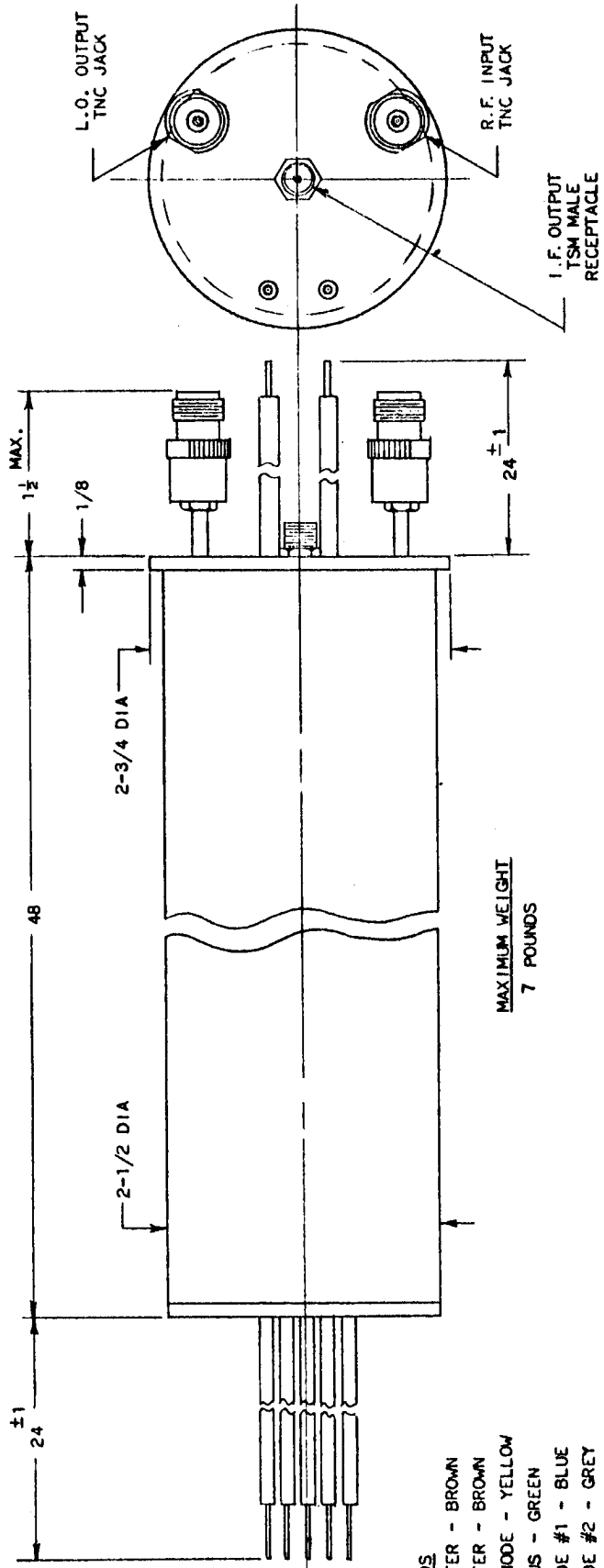
TYPICAL OPERATION

R-F Frequency	1200	megacycles	
L-O Frequency	1150	megacycles	
I-F Frequency	50	megacycles	
Conversion Gain	0	db	
Heater Voltage	7.0	Volts	
Heater Current	3.9	Amperes	
Cathode Voltage	-545	Volts with respect to ground	
Cathode Current	4.0	ma	
Focus Voltage	0	Volts )	
Anode No. 1 Voltage	39	Volts )	
Anode No. 2 Voltage	51	Volts )	With respect to cathode
Anode No. 3 Voltage	70	Volts )	
Anode No. 4 Voltage	230	Volts )	
Anode No. 5 Voltage		)	
Amplifier Helix No. 1 Voltage)			
Amplifier Helix No. 2 Voltage)	0	Volts (Ground)	
Capsule Voltage		)	
Oscillator Helix Voltage	-40	Volts )	
Collector Voltage	200	Volts )	with respect to ground
Focus Current	0	ma	
Anode No. 1 Current	.07	ma	
Anode No. 2 Current	.04	ma	
Anode No. 3 Current	.04	ma	
Anode No. 4 Current	.05	ma	
Anode No. 5 Current	.06	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	500	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





**LEADS**

- HEATER - BROWN
- HEATER - BROWN
- CATHODE - YELLOW
- FOCUS - GREEN
- ANODE #1 - BLUE
- ANODE #2 - GREY
- ANODE #3 - PURPLE
- ANODE #4 - WHITE
- ANODE #5
- AMPL. HELIX #1 - GROUND-BLACK
- AMPL. HELIX #2
- COLLECTOR - RED

OSCILLATOR HELIX-ORANGE

**BACKWARD WAVE CONVERTER**

**TYPE X-390**

**MAXIMUM WEIGHT**  
7 POUNDS