



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

X-392*
BACKWARD WAVE
CONVERTER
TUBE

T E N T A T I V E

GENERAL CHARACTERISTICS

The X-392 is a single tube designed to convert UHF signals in the band from 1470-2670 megacycles to a 130 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 130 megacycle i-f.

The X-392 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	1470-2670 megacycles
Bandwidth of Input Section	10-30 megacycles
Noise Figure	20 db
I-F Output	130 megacycles
Conversion Gain	Unity
Image Rejection	35 db

NOTE: The image rejection is dependent upon the intermediate frequency selected. This tube utilizes a 130 megacycle i-f, an increase in the i-f would result in a higher level of image rejection.

MECHANICAL DATA

Mounting Position	Horizontal (preferred)
Capsule Length	39 inches
Capsule Outside Diameter	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

*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-392
BACKWARD-WAVE
CONVERTER TUBE

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MAXIMUM RATINGS

Heater Voltage	6.5 Volts dc maximum	
Heater Current	4 Amperes maximum	
Cathode Voltage	-200 to -1400 Volts maximum	
Cathode Current	8 ma maximum	
Focus Voltage	0 to -10 Volts maximum)	
Anode No. 1 Voltage	+10 to +70 Volts maximum)	With respect to cathode
Anode No. 2 Voltage	+10 to +150 Volts maximum)	
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	700 Gauss maximum	

TYPICAL OPERATION

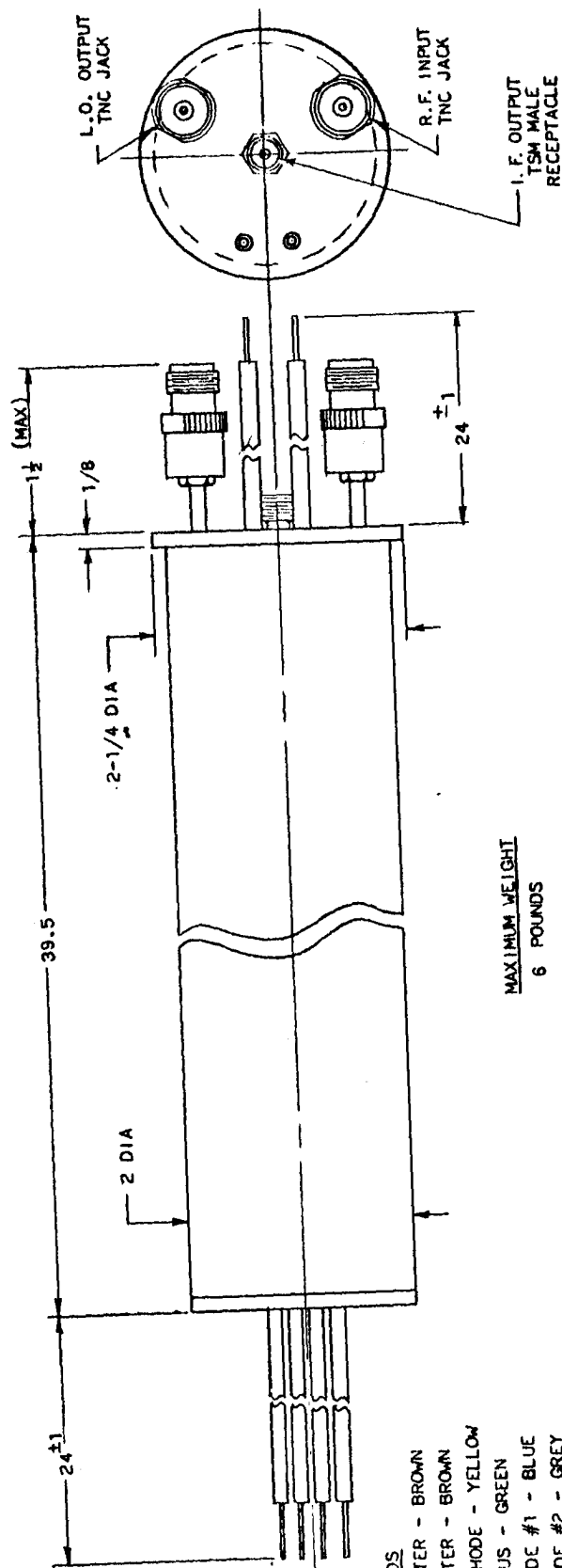
R-F Frequency	2200 megacycles
L-O Frequency	2070 megacycles
I-F Frequency	130 megacycles
Conversion Gain	+3 db
Heater Voltage	6.3 Volts dc
Heater Current	3.5 Amperes
Cathode Voltage	-680 Volts with respect to ground
Cathode Current	4.0 ma
Focus Voltage	0 Volts)
Anode No. 1 Voltage	35 Volts)
Anode No. 2 Voltage	47 Volts) With respect to cathode
Anode No. 3 Voltage	230 Volts)
Anode No. 4 Voltage	550 Volts)
Anode No. 5 Voltage	
Amplifier Helix No. 1 Voltage)	
Amplifier Helix No. 2 Voltage)	0 Volts (Ground)
Capsule Voltage	
Oscillator Helix Voltage	-30 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	650 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
6 POUNDS

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-392