

ELECTRONIC TUBE REFERENCE

1B58

Specialized - Switching Tube electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

MICROWAVETR SWITCH

Band-pass TR gas-switching tube for microwave radar duplexing. Gas-discharge action protects the receiver and controls the RF path during transmitter pulses.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	— / —	PARALLEL HEATER	— / —
HEATING	Indirect; cold cathode	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1	MicrowaveTRSwitch
No fixed ratings recorded.	
Special microwave/gas-discharge section; published electrical data retained as section parameters.	

1B58 Band Pass TR Tube

The **1B58** is a band pass transmit-receive (TR) gas switching tube designed for microwave radar applications. Sponsored by Sperry Gyroscope Co., Inc. and registered in October 1945 under RMA Release No. 444, the device is engineered to protect sensitive receiver components from high-power transmitter pulses while allowing received signals to pass with minimal attenuation during the off-period.

Construction and Mechanical Design

The 1B58 is constructed as a waveguide-integrated device, allowing it to be inserted directly into a microwave transmission line. Its mechanical configuration includes the following features:

- **Ionizable Medium:** The internal envelope contains a mixture of argon and water vapor. This gas mixture is selected to provide rapid ionization under high-power RF conditions and rapid deionization (recovery) once the pulse ends.
- **Electrode Configuration:** The tube contains three primary electrodes along with two keep-alive electrodes. The keep-alive electrodes maintain a continuous auxiliary discharge to ensure immediate breakdown of the main gap when the transmitter fires.
- **RF Windows:** The structure features entrant and exit windows to facilitate the coupling of radio-frequency energy through the tube.
- **Mounting and Installation:** The tube can be mounted in any position. It is equipped with flange mounts for waveguide attachment, which feature mounting holes with a 7/32-inch diameter and a #10-32 tap.
- **Physical Dimensions:** The overall height of the tube is 6.670 ± 0.015 inches. Electrical connection to the keep-alive circuit is made via a miniature cap, which has maximum dimensions of 1 inch by 5/8 inch.

Electrical and High-Frequency Performance

The 1B58 is designed for operation in the 10-centimeter wavelength band. Its high-frequency characteristics and power-handling capabilities are defined by several key parameters:

- **Center Frequency (f_2):** 10.7 cm
- **Band Pass Range:** 10 to 11.3 cm
- **Voltage Standing Wave Ratio (V.S.W.R.):** 1.65 maximum across the specified band pass range
- **Transmitter Average Power:** 1000 watts maximum
- **Leakage Energy:** 0.4 ergs maximum (representing the transient energy that passes to the receiver before the gas discharge fully clamps the line)
- **Keep-Alive Firing Time (T):** 5 seconds maximum
- **Keep-Alive Interaction (f_2):** 0.1 dB maximum (the signal attenuation at the center frequency caused by the presence of the keep-alive discharge)

Several operational parameters, including the insertion loss at the center frequency (f_2), the keep-alive arc drop, and the recovery time, are designated to be specified under standardized measurement conditions.

Technical Summary

The 1B58 is a waveguide-mounted, band pass TR tube designed for 10-centimeter radar systems. Utilizing an argon and water vapor gas mixture, three primary electrodes, and two keep-alive electrodes, it provides automatic receiver protection and low-loss signal routing. It features a robust mechanical design with flange mounts, a height of 6.670 inches, and a miniature cap for keep-alive connections. Operating across a band pass range of 10 to 11.3 cm with a maximum V.S.W.R. of 1.65 and a power rating of 1000 watts average, the 1B58 is a key component for mid-1940s microwave radar systems.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1945 Sperry

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1945 SPERRY

Section 1 · MicrowaveTRSwitch

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transmitter average power	1000 W	Published datasheet value
Transmitter average power	1000 W	Published datasheet value
Keep alive firing time	5 s	Published datasheet value
Keep alive firing time	5 s	Published datasheet value
Leakage energy	4 erg	Published datasheet value
Leakage energy	4 erg	Published datasheet value

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