

MICROWAVE CIRCUIT MODULE (MCM) CAPABILITIES*

TYPE	FUNCTION	FREQ. (MHz)	POWER OUTPUT	DUTY FACTOR	TUNING RANGE (MHz)	BAND WIDTH (MHz)	PLATE VOLTAGE	PLATE CURRENT	FILA. POWER	SALIENT FEATURES
C-2002A*	OSC.-AMP.	1090	700W	.01	±10	—	1000	20mA (avg)	6.9w	GRID/CATHODE PULSED IFF TRANSMITTER
C-2003C*	OSC.-AMP.	1090	700w	.01	±10	—	1000	20mA (avg.)	6.9w	GRID/CATHODE PULSED IFF TRANSMITTER
C-2006C*	OSCILLATOR	600	100mW	CW	±25	—	60	20mA	1.5w	P/L BAND LOCAL OSCILLATOR
C-2007*	OSCILLATOR	9300	5.0w	.002	±100	—	350	350mA (peak)	1.1w	GRID PULSED X BAND TRANSMITTER
C-2013*	OSCILLATOR	1900	1500w	.005	±10	—	1750	3.5A	7.6w	GRID PULSED S BAND TRANSMITTER
C-2014*	OSCILLATOR	2500	1500w	.005	±10	—	1750	3.5A	7.6w	GRID PULSED S BAND TRANSMITTER
C-2015*	OSCILLATOR	6000	80w	.01	±20	—	500	0.7A	1.6w	GRID PULSED C BAND TRANSMITTER
C-2020A*	OSCILLATOR	1090	500	.01	±10	—	1400	1.0A	3.1w	GRID PULSED ATC TRANSPONDER TRANS.
C-2035C*	OSCILLATOR	9300	10w	.002	±100	—	450	0.9A	1.4w	GRID PULSED X BAND BEACON TRANSMITTER
C-2062*	OSCILLATOR	5650	400w	.001	±250	—	2000	2.8A	4.3w	PLATE PULSED C BAND BEACON TRANSMITTER
C-2064A	OSCILLATOR	4300	70	.001	±5	—	500	1.7A	2.5w	GRID PULSED ALTIMETER TRANSMITTER
C-2070J†	OSCILLATOR	10525	150mW	CW	±25	—	10.0	800mA	—	WAVE-GUIDEFLANGE-MOUNTED TRANSMITTER
C-2070K†	OSCILLATOR	10525	10mW	CW	±25	—	10.0	300mA	—	HIGH STABILITY INVAR.TRANS/L.O.
C-2070L†	OSCILLATOR	10525	25mW	CW	±25	—	9.0	300mA	—	FLANGE-MOUNTED TRANS/L.O.
C-2070M†	OSCILLATOR	10525	5mW	CW	±25	—	8.0	120mA	—	LOW COST, LOW POWER TRANSMITTER
C-2070N†	OSCILLATOR	10525	50mW	CW	±25	—	9.5	450mA	—	WAVE-GUIDEFLANGE-MOUNTED TRANSMITTER
C-2070P†	OSCILLATOR	10525	100mW	CW	±25	—	10.0	600mA	—	WAVE-GUIDEFLANGE-MOUNTED TRANSMITTER
C-2080	OSCILLATOR	1090	125w	.01	±10	—	1300	7.5mA	3.5w	CATHODE PULSED TRANSPONDER TRANS.
C-2080A	OSCILLATOR	1090	250w	.01	±10	—	1300	3.9mA	3.5w	CATHODE PULSED TRANSPONDER TRANS.
C-2093B†	OSCILLATOR	9350	5mW	CW	±250	—	10.0	350mA	—	COAXIAL OUTPUT LOCAL OSCILLATOR
C-2098	AMPLIFIER	1615	200w	.0002	—	8	1000	1.5A	6.3w	2 STAGE MINI CAS TRANSMITTER

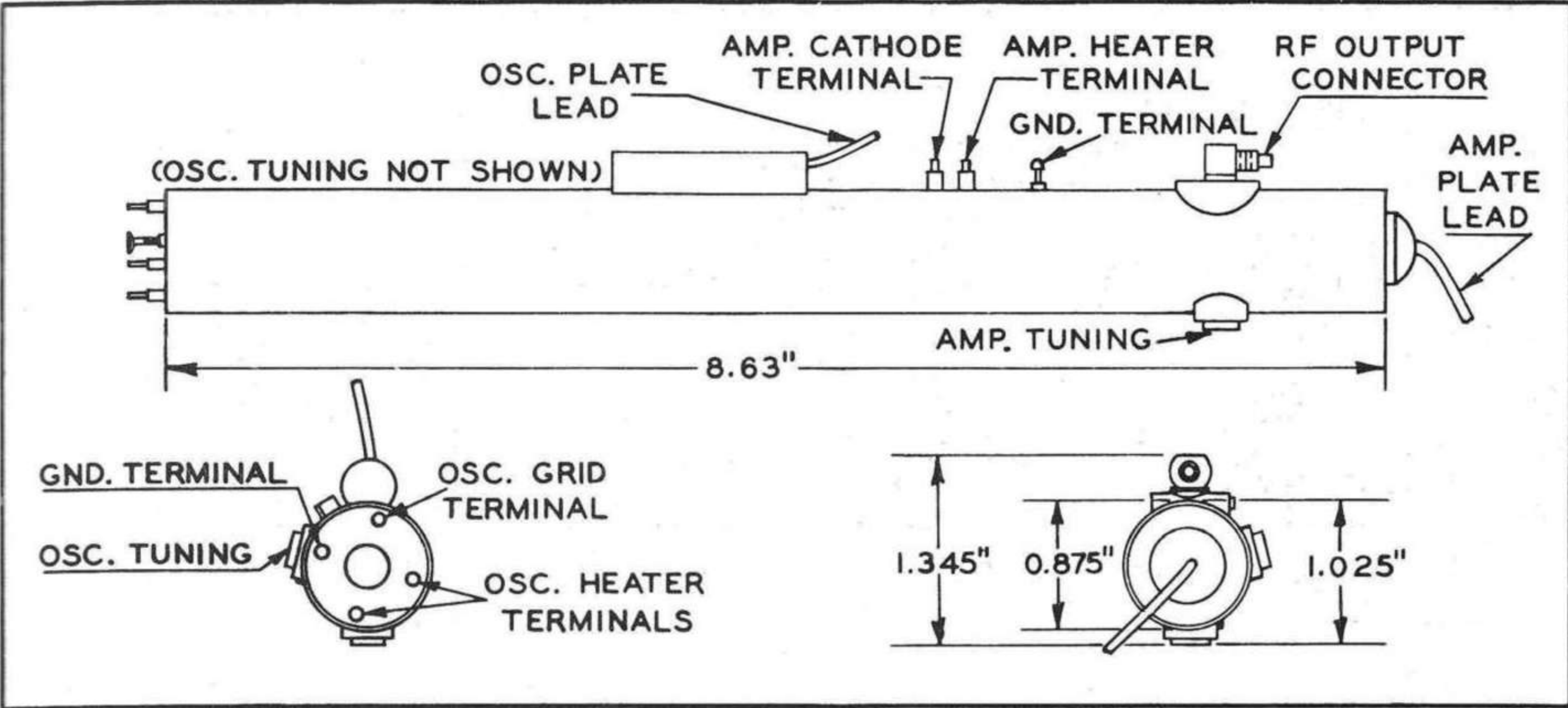
*Detailed data sheets for these types follow tab. All others available upon request. For more information, write General Electric, 316 E. 9th Street, Owensboro, Kentucky 42301.

†Indicates Solid-State Device.

C-2002A

MCM Oscillator—Amplifier

The C-2002A is a microwave circuit module containing a master oscillator and power amplifier using planar ceramic triodes. This tube-circuit combination is intended for pulsed transponder applications at 1090 MHz and features stable operation in adverse temperature environments, for wide ranges of duty factor and under severe load mismatch conditions. The oscillator stage is grid pulsed and the amplifier is RF drive pulsed with fixed cathode bias.



TYPICAL SPECIFICATIONS

		DESCRIPTION			
Frequency (Fixed)	1090	MHz	Oscillator Bias	-80	Vdc
Peak Power Output	700	w	Amplifier Bias	+25	Vdc
Plate Voltages	1000	Vdc	Duty Factor	1.0	%
Plate Current (Total)	.20	mA	Output Impedance	50	Ohms
Heater Voltage	6.3 ± 0.3	Vac	Output Connector		SMC
Heater Current	1.1	A	Coupling		Capacitance Probe

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-54 to +125 °C	VSWR	1.5:1
Vibration	15G from 20 to 500 Hz	Frequency Stability	±3 MHz
Shock	15G for 11 ms	Cooling	Conduction
Life	500 Hours (min)		

Note: Type C-2002A represents only one of several basic families of General Electric MCM's presently available. For special variations in electrical, physical and environmental characteristics, contact your nearest GE Sales Office for assistance.

WARNING

Personnel should not be exposed to the microwave energy which may radiate from this device if improperly used or connected. All input and output RF connections, waveguide flanges and gaskets

must be RF leak proof. Never operate this device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

The devices and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of devices by General Electric Company conveys any license under patent claims covering combinations of these devices with other devices or elements. In the

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MICROWAVE DEVICES

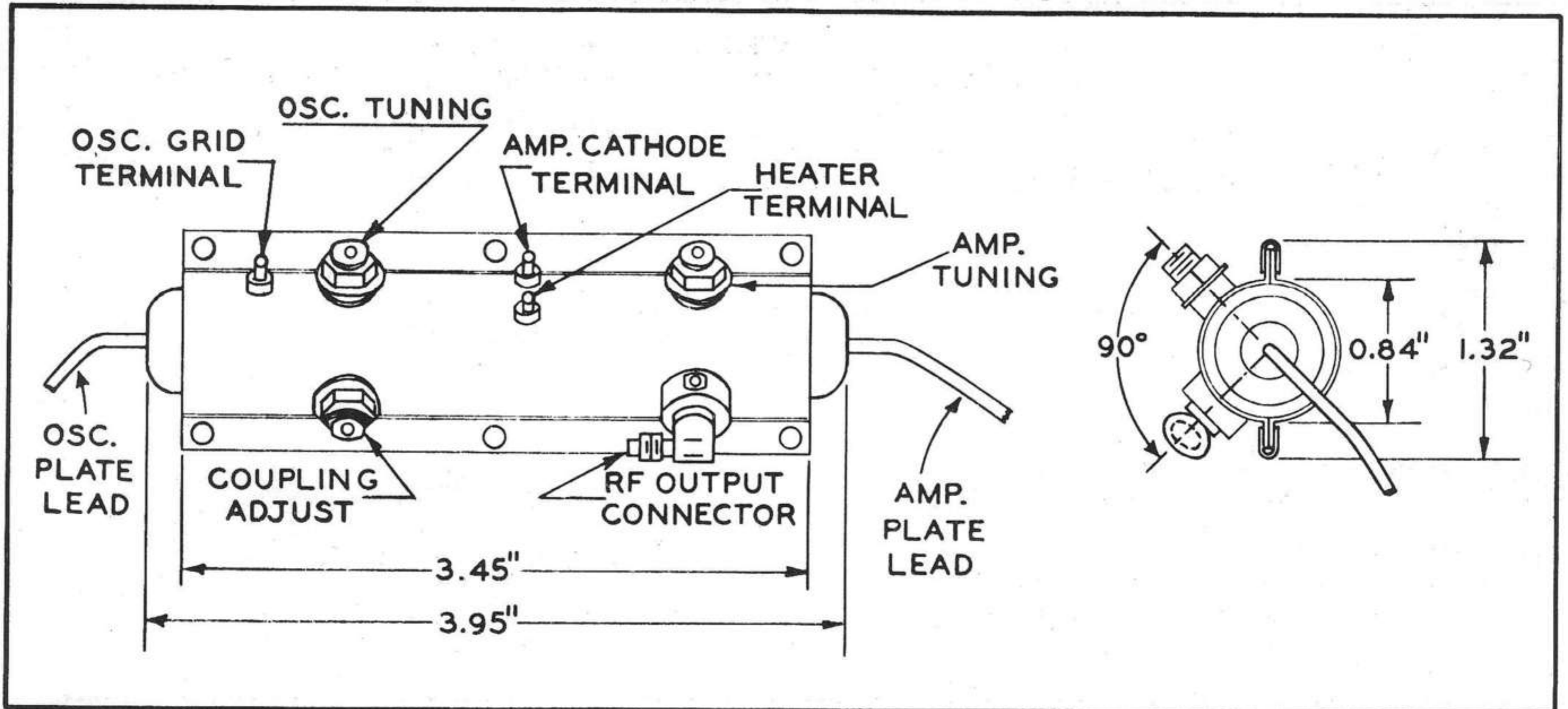
— PRODUCT INFORMATION —

C-2003C

MCM Oscillator — Amplifier

The C-2003C is a master oscillator - power amplifier using planar ceramic triodes. This microwave circuit module is intended for pulsed transponder applications at 1090 MHz and features stable operation in adverse temperature environments, for wide ranges of duty factor and under severe load mismatch conditions. The oscillator stage is grid pulsed and the amplifier is RF drive pulsed with fixed cathode bias.

The C-2003C features significant size reduction over earlier designs specified for the same application.



TYPICAL SPECIFICATIONS

		DESCRIPTION			
Frequency (Fixed)	1090	MHz	Oscillator Bias	-80	Vdc
Peak Power Output	700	w	Amplifier Bias	+25	Vdc
Plate Voltages	1000	Vdc	Duty Factor	1.0	%
Plate Current (Total)	20	mA	Output Impedance	50	Ohms
Heater Voltage	6.3 ± 0.3	Vac	Output Connector		SMC
Heater Current	1.1	A	Coupling		Capacitance Probe

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-54 to +125 °C	VSWR	1.5:1
Vibration	15G from 20 to 500 Hz	Frequency Stability	±3 MHz
Shock	15G for 11 ms	Cooling	Conduction
Life	500 Hours (min)		

Note: Type C-2003C represents only one of several basic families of General Electric MCM's presently available. For special variations in electrical, physical and environmental characteristics, contact your nearest GE Sales Office for assistance.

WARNING

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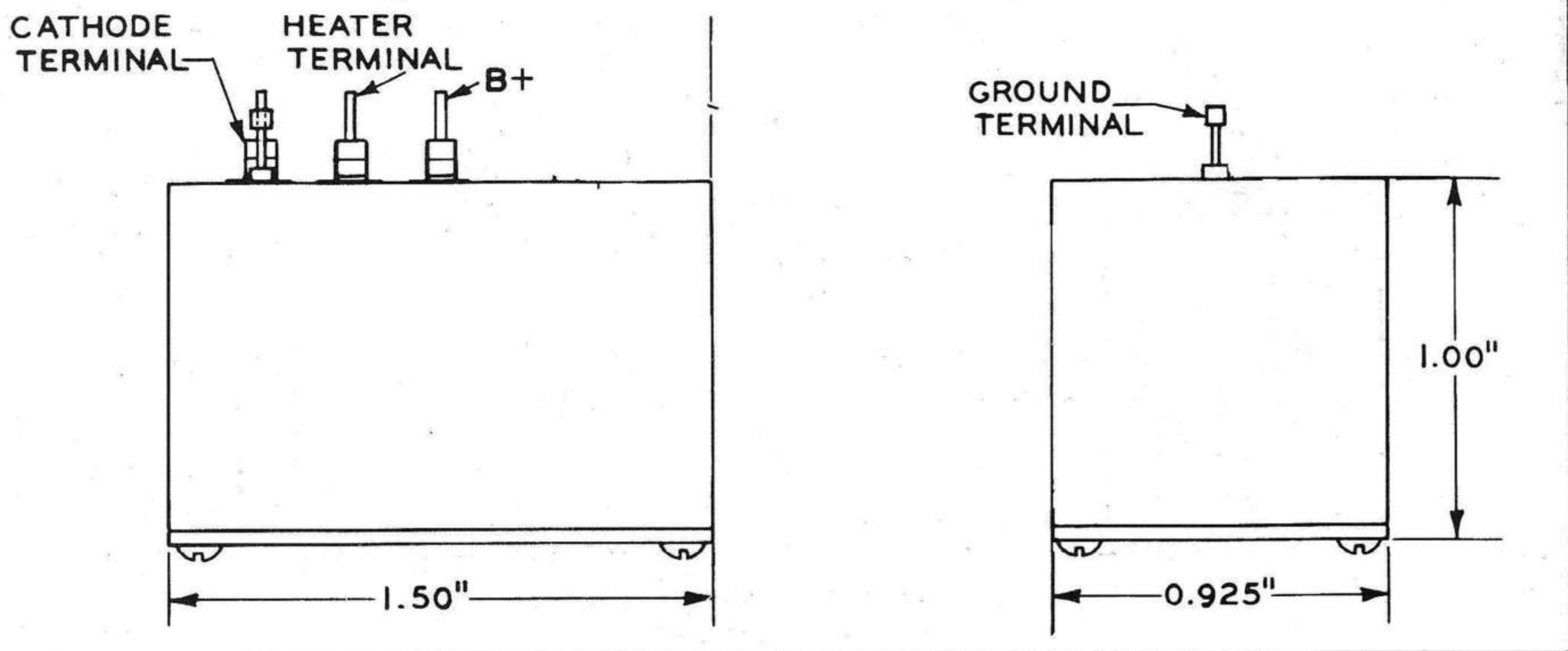
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C-2006C

MCM Oscillator

The C-2006C is a microwave circuit module designed as local and/or low power oscillators at P/L band frequencies. This tube-circuit combination uses lumped constant circuit components, a fast warm-up planar triode and potted construction. These features provide small size and weight, mechanical ruggedness and fast warm-up capabilities. The choice of components also permits operation over wide temperature ranges, in high nuclear radiation environments, and at relatively low voltages.



TYPICAL SPECIFICATIONS

		DESCRIPTION		
Frequency (Fixed)	600	MHz	Oscillator Bias	(External Rk)
Peak Power Output	100	mW	Duty Factor	CW
Plate Voltages	60	Vdc	Output Impedance	50 Ohms
Plate Current (Total)	20	mA	Output Connector	OSSM
Heater Voltage	6.3	Vac	Coupling	Inductive Loop
Heater Current	0.235	A	Weight	1.3 Ounces
Tuning (Trimmable)	±25	MHz		

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-54 to +125 °C	Frequency Stability	(-65 to +165°F) ±3 MHz
Vibration	20G from 50 to 2000 Hz	Cooling	Conduction
Life	500 Hours (min)	Warm-up Time	<5 Seconds
VSWR	Can Operate Into 1.5:1		

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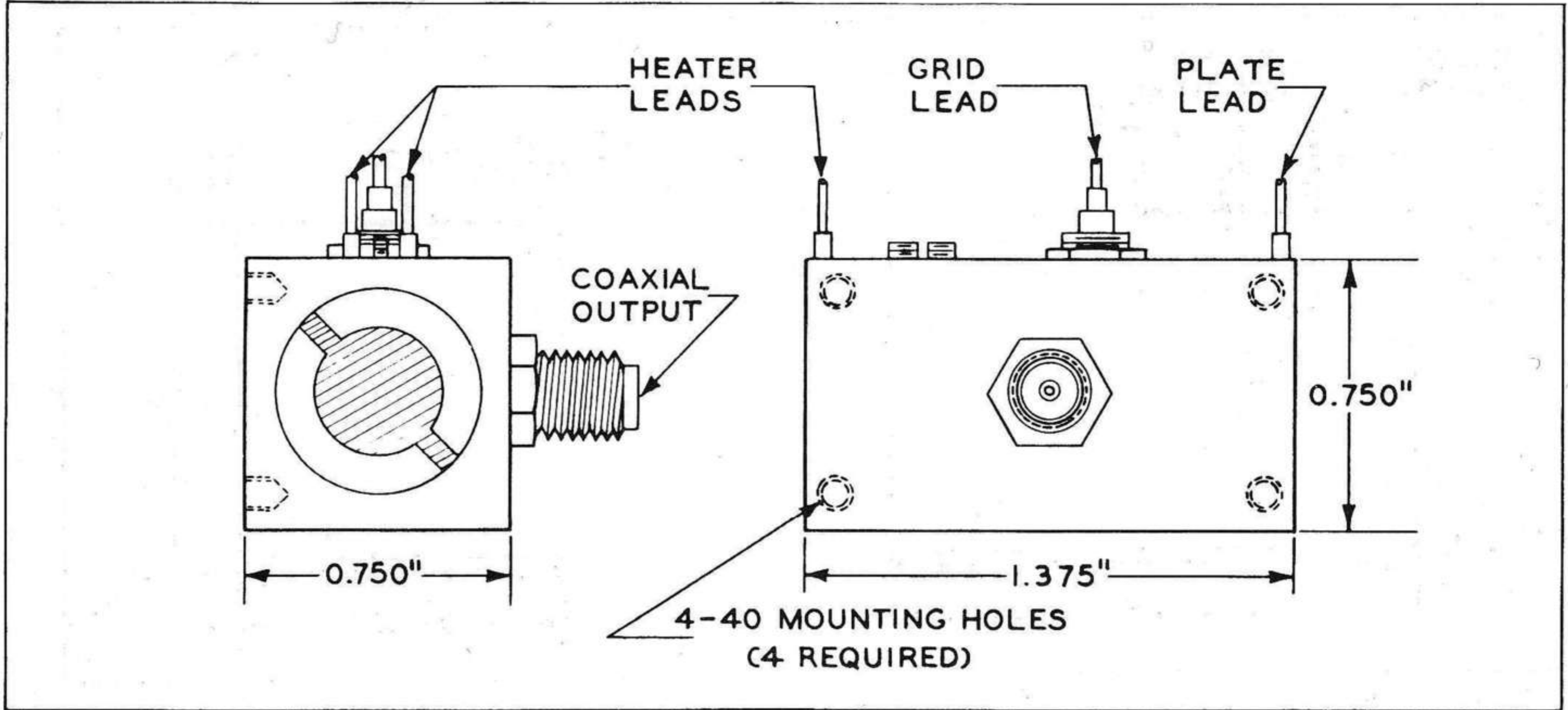
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MICROWAVE DEVICES

C-2007

MCM Oscillator

The C-2007 is a microwave circuit module designed for grid pulsed use at X-band. This MCM uses a fast warm-up X-band planar triode and features small size and weight plus tolerance to high levels of shock and vibration. The C-2007 consumes only about 1.2 watts of filament power and can be pulsed at short pulse durations of less than 50 nanoseconds. The output connection is adaptable to strip-line circuitry and/or isolator-circulators.



TYPICAL SPECIFICATIONS

DESCRIPTION

Frequency (Fixed Between)	9.2 to 9.4	GHz	Oscillator Bias	-20	Vdc
Peak Power Output	5.0	w	Pulse Duration	500	ns
Plate Voltage	350	Vdc	Duty Factor	0.2	%
Plate Current (Pulse)	350	mA	Output Impedance	50	Ohms
Heater Voltage	6.0	Vac	Output Connector		SMA
Heater Current	190	A	Coupling		Capacitance Probe
Tuning (Trimmable)	± 15	MHz	Weight	1.0	Ounces

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-54 to + 100 °C
Frequency Stability	50 kHz/°C
Cooling	Conduction

Note: Type C-2007 represents only one of several basic families of General Electric MCM's presently available. For special variations in electrical, physical and environmental characteristics, contact your nearest GE Sales Office for assistance.

WARNING

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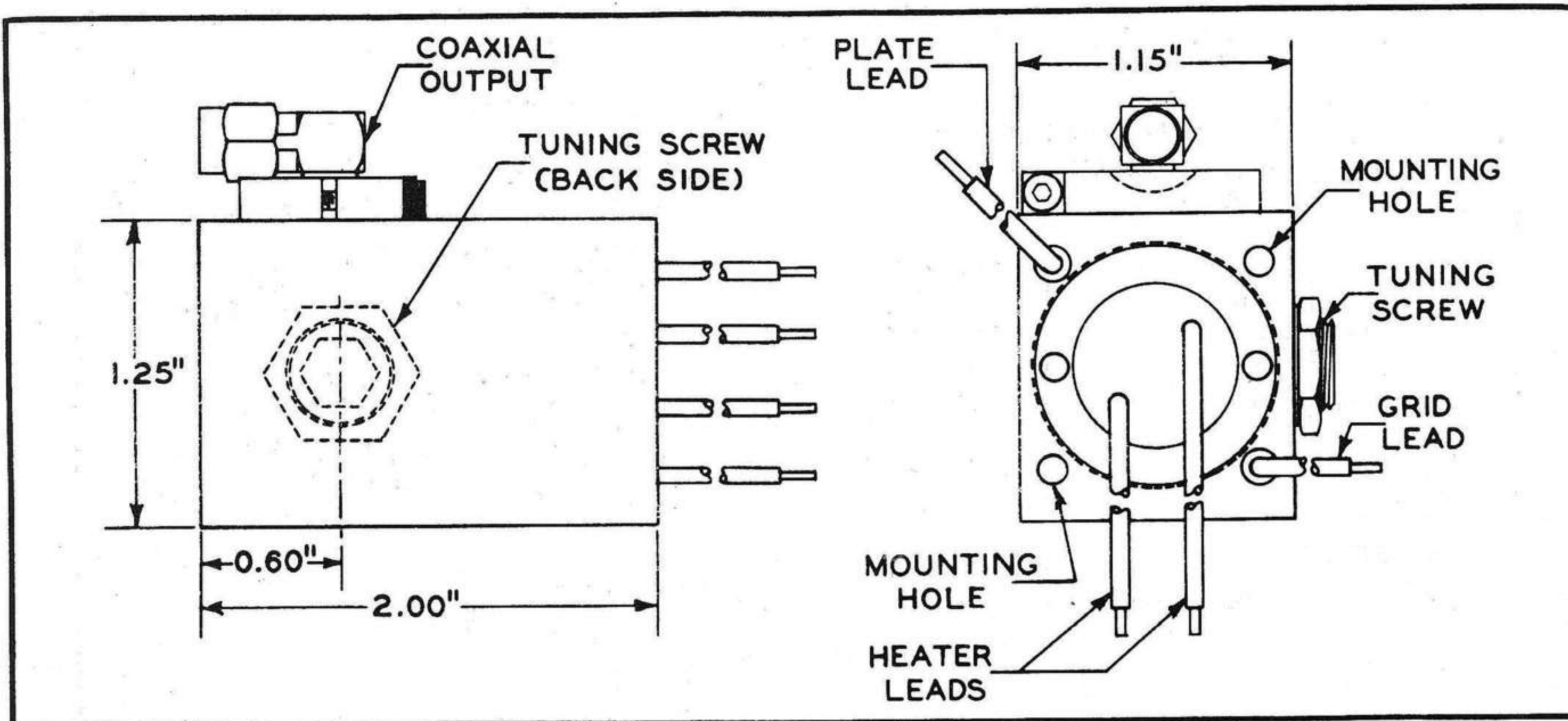
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MCM Oscillator

The C-2013 is a microwave circuit module designed for grid pulsed service at L-band. This tube-cavity combination features small size and weight and high pulsed power output. A bonded heater planar triode is used, resulting in fast warm-up, tolerance to high levels of shock and vibration, and a wide temperature range of operation. Grid pulsed operation minimizes modulating power requirements.



TYPICAL SPECIFICATIONS

		DESCRIPTION			
Frequency (Fixed)	1.9	GHz	Oscillator Bias	-80	Vdc
Peak Power Output	1500	w	Pulse Duration	500	ns
Plate Voltage	1750	Vdc	Duty Factor	0.50	%
Plate Current (Pulse)	3.5	A	Output Impedance	50	Ohms
Heater Voltage	6.3	Vac	Output Connector		SMA
Heater Current	1.2	A	Coupling		Capacitance Probe
Tuning (Trimmable)	±10	MHz	Weight	4.0	Ounces

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-40 to +75 °C	VSWR	Up to 1.5:1
Shock	200G for 11 ms	Cooling	Conduction
Life	50 Hours (min)	Warm-up Time, maximum	5 sec

Note: Type C-2013 represents only one of several basic families of General Electric MCM's presently available. For special variations in electrical, physical and environmental characteristics, contact your nearest GE Sales Office for assistance.

WARNING

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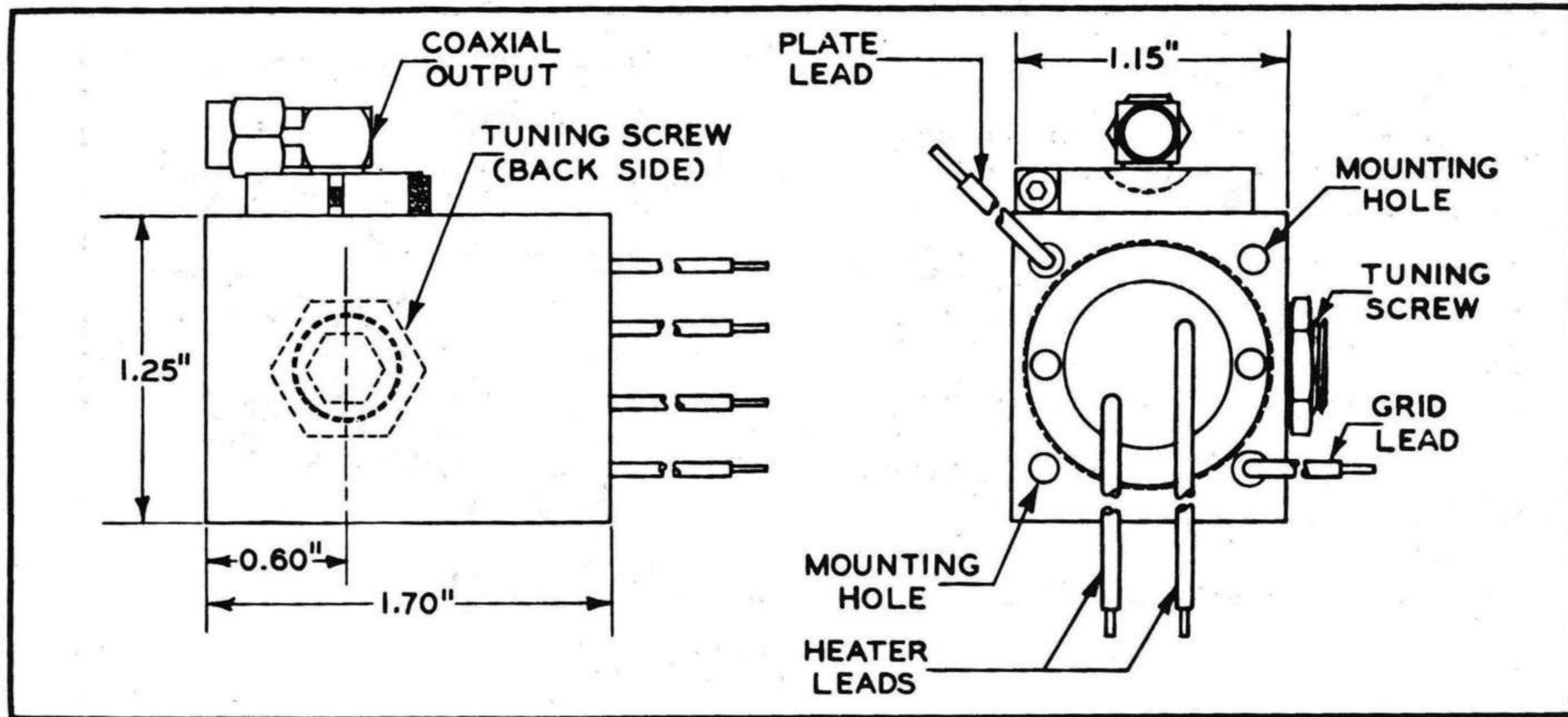
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MICROWAVE DEVICES

C-2014

MCM Oscillator

The C-2014 is a microwave circuit module designed for grid pulsed service at S-band. This tube-cavity combination features small size and weight and high pulsed power output. A bonded heater planar triode is used, resulting in fast warm-up, tolerance to high levels of shock and vibration, and a wide temperature range of operation. Grid pulsed operation minimizes modulating power requirements.



TYPICAL SPECIFICATIONS

		DESCRIPTION	
Frequency (Fixed)	2.5 GHz	Oscillator Bias	-80 Vdc
Peak Power Output	1500 w	Pulse Duration	500 ns
Plate Voltage	1750 Vdc	Duty Factor	0.50 %
Plate Current (Total)	3.5 A	Output Impedance	50 Ohms
Heater Voltage	6.3 Vac	Output Connector	SMA
Heater Current	1.2 A	Coupling	Capacitance Probe
Tuning (Trimmable)	±10 MHz	Weight	3.5 Ounces

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-40 to +75 °C	VSWR	Up to 1.5:1
Shock	200G For 6 ms	Cooling	Conduction
Life	50 Hours (min)	Warm-up Time, maximum	5 sec

Note: Type C-2014 represents only one of several basic families of General Electric MCM's presently available. For special variations in electrical, physical and environmental characteristics, contact your nearest GE Sales Office for assistance.

WARNING

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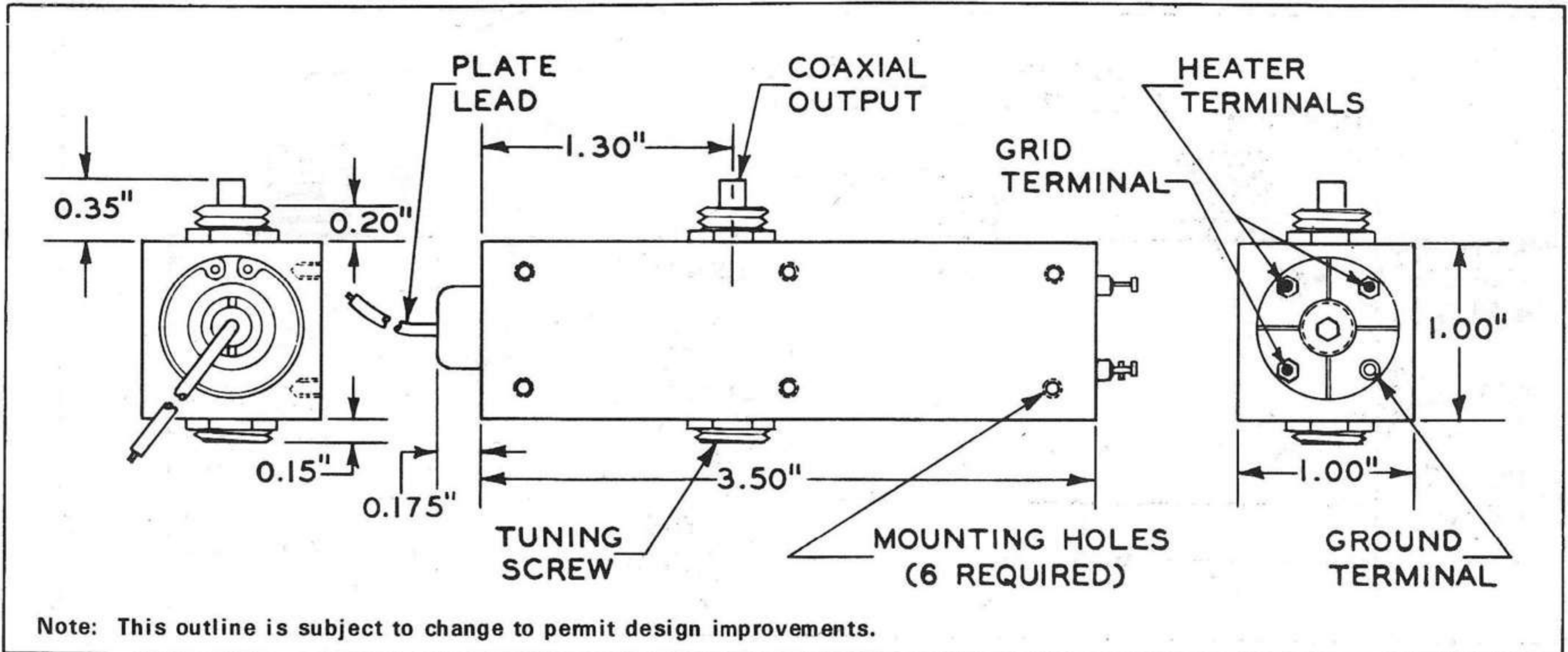
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MICROWAVE DEVICES

C-2020A

MCM Oscillator

The C-2020A is a microwave circuit module designed for use in general aviation transponders. This grid pulsed tube-cavity combination features stable output with temperature and altitude changes. The C-2020A is designed to provide long service life.



TYPICAL SPECIFICATIONS

		DESCRIPTION			
Frequency (Nominal)	1090	MHz	Oscillator Bias	-80	Vdc
Peak Power Output	500	w	Pulse Duration	0.5	μs
Plate Voltage	1400	Vdc	Duty Factor	1.0	%
Plate Current (Peak)	1.0	A	Output Impedance	50	Ohms
Heater Voltage	6.3	Vac	Output Connector		Optional
Heater Current	0.5	A	Coupling		Capacitance Probe
Tuning (Trimmable)	± 10	MHz	Weight	4.0	Ounces

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-54 to +85 °C	Frequency Stability	± 3 MHz (Max.)
Vibration	15G from 50 to 2000 Hz	Cooling	Conduction
Shock	100G for 11 ms	Altitude (Maximum)	30000 Feet
Life	500 Hours (min)		

Note: Type C-2020A represents only one of several basic families of General Electric MCM's presently available. For special variations in electrical, physical and environmental characteristics, contact your nearest GE Sales Office for assistance.

WARNING

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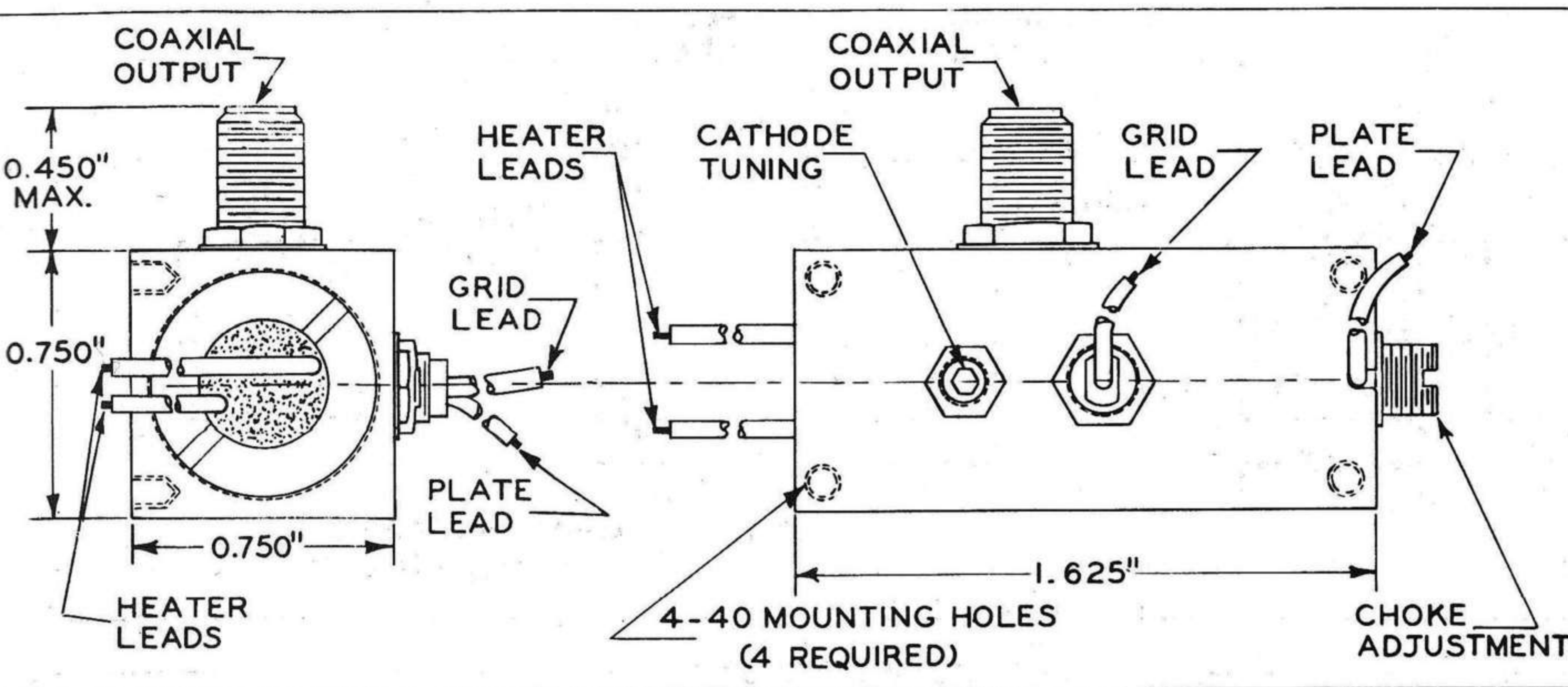
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C-2035C

MCM Oscillator

The C-2035C is a microwave circuit module designed for grid pulsed use at X-band. This MCM uses a fast warm-up X-band planar triode and features small size and weight plus tolerance to high levels of shock and vibration. The C-2035C consumes only about 1.4 watts of filament power and can be pulsed at short pulse durations of less than 50 nanoseconds. The output connection is adaptable to strip-line circuitry and/or isolator-circulators.



TYPICAL SPECIFICATIONS

		DESCRIPTION			
Frequency	9.3	GHz	Oscillator Bias	-20	Vdc
Peak Power Output	10	w	Pulse Duration	500	ns
Plate Voltage	450	Vdc	Duty Factor	0.2	%
Plate Current (Pulse)	900	mA	Output Impedance	50	Ohms
Heater Voltage	6.3	Vac	Output Connector		OSM
Heater Current	0.225	A	Coupling		Capacitance Probe
Tuning (Tuneable)	9.2 to 9.4	GHz	Weight		1.5 Ounces

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-54 to +85° C
Frequency Stability	50 kHz/°C
Cooling	Conduction

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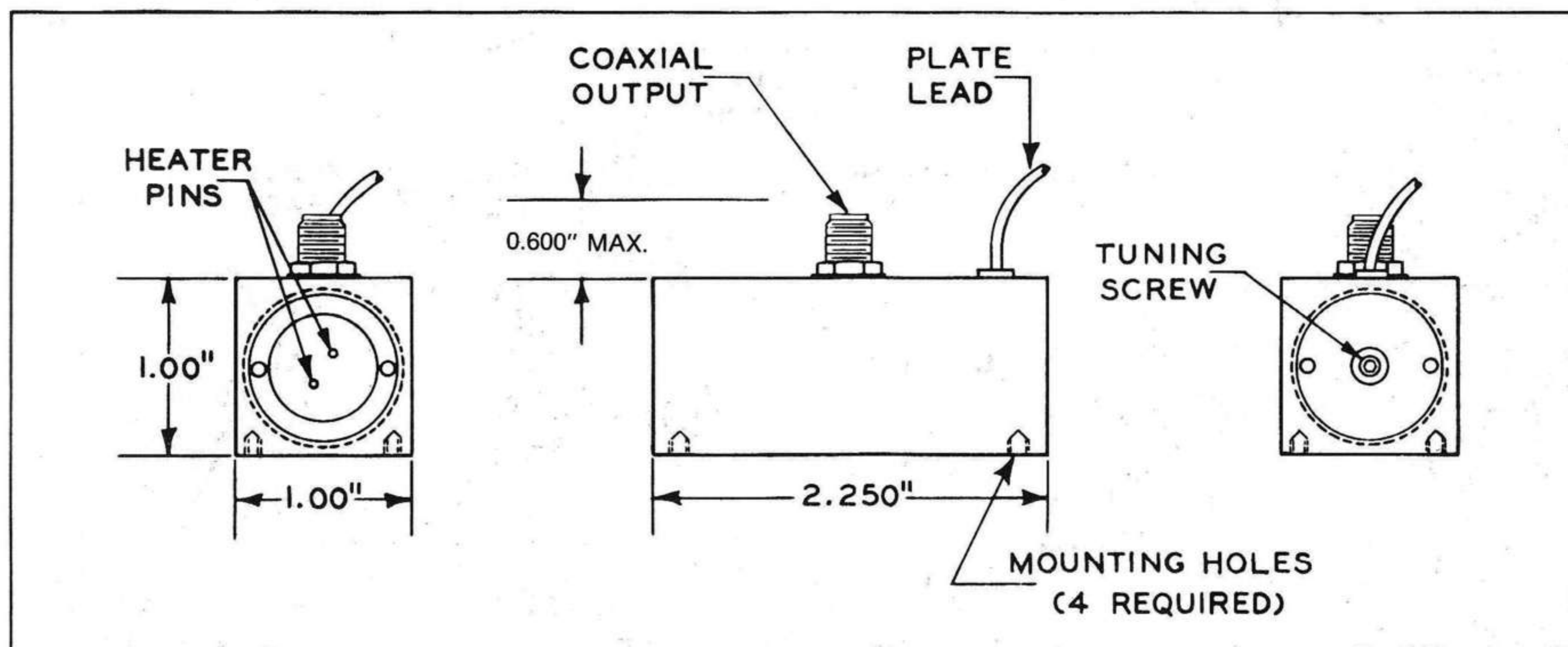
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MICROWAVE DEVICES

C-2062

MCM Oscillator

The 2062 is a microwave circuit module designed for plate-pulsed radar transponder use at C-band. This MCM features small size and weight, efficient operation, rugged construction, fast warm-up and in-line tuning over a 500 MHz range. Specific design and manufacturing efforts also provide stable operation with changes in temperature and duty factor.



TYPICAL SPECIFICATIONS

		DESCRIPTION	
Frequency	5.4 to 5.9	GHz	Self Bias (Internal Resistor)..... 68 Ohms (Typical)
Peak Power Output	400	w	Pulse Duration
Plate Voltage	2000	epy	0.5 μs
Plate Current (Peak)	2.8		Duty Factor..... 0.1 %
Heater Voltage	6.3	Vac	Output Impedance
Heater Current	0.71	A	50 Ohms
Tuning	500	MHz	Output Connector..... SMA
			Coupling
			Capacitance Probe
			Weight
			5 Ounces

ENVIRONMENTAL CHARACTERISTICS

Temperature Range	-40 to + 85 °C	Frequency Stability (Vibration).....	±1 MHz
Vibration	15G from 50 to 2000 Hz	Frequency Stability (Temperature).....	±3 MHz
Shock	100G for 11 ms	Frequency Stability (PRF 20-2600 Hz - 2 Sec.)	±3
Life	500 Hours (min)	Cooling.....	Conduction

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WARNING

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