

STALKER[®] KA-2M RADIO ASSEMBLY SPECIFICATIONS

KA-2M Radio Assembly

The KA-2M radio assembly consists of an antenna, a turnstile duplexer/polarization converter, a Gunn diode oscillator and associated temperature compensated voltage regulator, a passive quadrature balanced mixer and low noise IF (base band) pre-amps.

The antenna is a round horn radiator with corrective lens that provides a half-power beam width of 12 degrees and a gain of +22.6 dBi. The circular polarized transmit and receive signals are converted to rectangular polarization by a turnstile duplexer which also provides isolation between the transmit and receive ports to prevent receiver overload from the high level transmit signal. The transmit and receive ports are short sections of rectangular WR-28 waveguide that connect respectively to the Gunn oscillator and quadrature balanced mixer. A high Q waveguide cavity resonator is the primary frequency-determining element in the Gunn oscillator. A mechanical ceramic-rod slug tuner is used to set the oscillator frequency, and to provide temperature compensation to correct frequency drift due to thermal expansion of the resonator cavity.

The voltage regulator for the Gunn oscillator is also temperature compensated to reduce variations in power output with temperature and maintain operation at the peak power point of the Gunn diode.

Frequency stability is 100 MHz from -30 to +70 degrees centigrade. Nominal power output is 25 milliwatts, and is specified and tested to be no less than 2 nor greater than 50 milliwatts over the full frequency and temperature range of the unit. No means is provided for adjusting power output except for setting the voltage regulator to the peak power point for the particular Gunn diode being used. DC power consumption is typically 5.0 volts at 350 mA, and is not adjustable beyond setting the peak power voltage.

The mixer is a passive quadrature balanced mixer using microstrip techniques. A branch coupler hybrid provides isolation between the received-signal port and the local oscillator port to prevent interaction, and provides two outputs with equal amplitudes and 180-degree phase difference to drive the two mixer diodes in each mixer. The two mixers operate with a 90-degree phase differential to produce the quadrature output signals required for direction sensing.

Local oscillator injection of approximately 1 milliwatt is provided to each mixer by a sampling probe in the waveguide section connected to the Gunn oscillator, and received signal is obtained from a waveguide to microstrip transition from the received-signal waveguide. Since the local oscillator injection is a sample of the transmitted signal, local oscillator leakage is not a problem. The demodulated Doppler signals have a bandwidth of 0 to approximately 20 kHz. These signals are amplified by a pair of low noise preamplifiers constructed on the same circuit board as the microstrip mixer.

KA-2M General Specifications

Type:	Direction Sensing Moving/Stationary Doppler Radar
Operating Frequency:	33.4 GHz - 36.0 GHz (Ka-Band)
Stability:	±100 MHz (Ka-Band)
Gunn Input Voltage:	5.0 to 7.5 VDC
Gunn Current (+6.0VDC):	0.350 A (Gunn on) 0.01 A (Gunn off)
Mixer Supply Voltage:	+/- 5VDC
Mixer Supply current:	+/-3.6mA
Environmental:	-30° C to +70° C, 90% Relative Humidity Operating -40° C to +85° C, non-operating
Mechanical:	Weight: 0.34 kg (0.75 lbs.) Size: 66.02 mm Dia. X 84.6 mm Length (2.60" Dia. X 3.33" Length)

KA-2M Microwave Specifications

Antenna:	Conical horn with corrective lens
Polarization:	Circular
3 db Beam Width:	12° ±1°
Microwave Source:	Gunn-Effect diode
Receiver Type:	Two Direct Conversion Homodyne receivers using four low-noise Schottky barrier mixer diodes
Power Output:	10 mW minimum, 25 mW nominal, and 50 mW maximum
Power Density:	2 mW/cm ² maximum at 5 cm from lens

FCC Rules

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Warning RF Exposure Compliance

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least **40 cm** from the human body. Users and installers must be provided with antenna installation and transmitter operating conditions for satisfying RF exposure compliance.