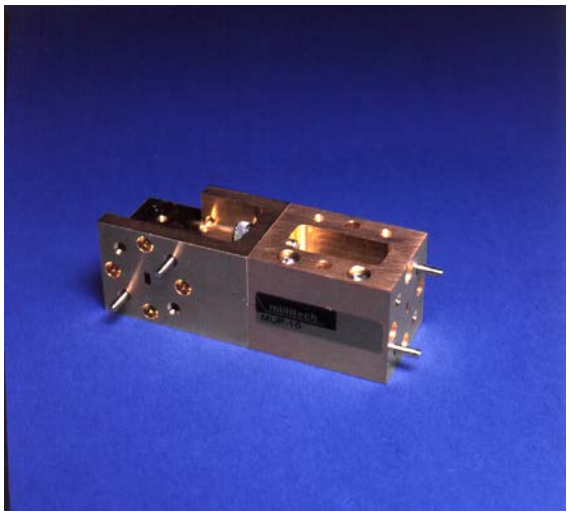
UPCONVERTERS



FEATURES:

- Low conversion loss
- High output power (1mW) SSB
- Supplied with filter for SSB application
- Available with integral local oscillator (consult Millitech)

APPLICATIONS:

- Radar, communication subsystems
- EW/ELINT systems
- Millimeter-wave sources
- Test equipment, instruments

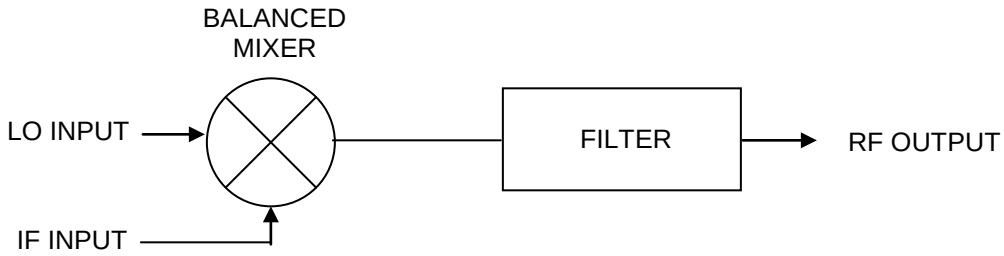
DESCRIPTION

Millitech series MUP upconverters translate a microwave or low frequency signal into the millimeter-wave region. Series MUP upconverters are available with output from 18 through 110 GHz in seven waveguide bands. The units are available with input intermediate frequencies from 1 through 18 GHz depending on the RF band. These upconverters consist of a balanced mixer and include an appropriate waveguide filter.

When two signals (IF and LO) are applied to the upconverter, an RF output is produced which contains the sum and difference of the IF and LO frequencies $\left(f_{RF} = f_{LO} \pm f_{IF}\right)$.

Single sideband operation (SSB) is achieved by incorporating a Millitech filter to eliminate the undesired sideband. Power outputs of 0 dBm SSB are guaranteed when the upconverters are driven by 10 dBm IF and a 17 dBm LO signal. A conversion flatness of ± 1 to 2 dB is typical depending on bandwidth. Small signal conversion loss ranges from 6 to 10 dB depending on LO and IF power levels.

SSB Upconverter Schematic



ELECTRICAL SPECIFICATIONS

Performance Parameter		Specification
RF Output Performance		
Frequency range and bandwidth (GHz)*1		See filter specifications
Output power level (dBm) (min)*2		0
Image frequency (undesired sideband) rejection (dB) (typ)		30
LO Requirements		
LO frequency range (GHz)*3		Anywhere in full waveguide band (at least 2 GHz from desired RF band edges)
LO power level (dBm) (typ/min)*4		+17/+13
LO bandwidth (GHz)*3		5% of LO center frequency
IF Requirements		
Minimum IF		2 GHz
IF bandwidth (GHz)		See filter specifications
IF input power (dBm) (typical for maximum RF output power in dBm)*5		+10
Conversion Characteristics		
Conversion flatness over RF band (dB) (max)	< 2 GHz	---
	2 to 4 GHz	±1.5
	> 4 GHz	±2.0
1 dB output compression point at +17 dBm LO power		-3 dBm
LO input power (dBm)*4		13 to 17
LO to RF isolation (dB) (typ)		30
VSWR (narrowband) (typ)	LO port	2:1
	IF port	2:1
	RF port	2:1

*1 - Minimum filter bandwidth is 2% of RF center frequency. See filter specification, series FNP, FLP, FHP, and FIB.
*2 - Output power level depends on LO and IF power levels. These RF levels are typical maximum power levels obtained at +13 to +17 dBm LO and +10 dBm IF power levels.
*3 - LO bandwidth is typically 1 to 5 GHz. High bandwidth is possible using special designs.
*4 - Lo power level of +13 to +17 dBm required to maintain good conversion loss and high RF power output.
*5 - Upconverter operates at all IF power levels. Maximum RF power output requires +10 dBm IF power. Linear operation at low IF power levels.

MECHANICAL SPECIFICATIONS

Model Number	MUP-42	MUP-28	MUP-22	MUP-19	MUP-15	MUP-12	MUP-10
Flange MIL.F-3922	/54-001*	/54-003*	/67B-006	/67B-007	/67B-008	/67B-009	/67B-010

*With #4-40 threaded holes.

HOW TO ORDER

Specify Model Number* **MUP-XX-ABCØØ**
XX = Waveguide Band **WR** – number
A = Flange Type **R** – round (WR-22 through WR-10 only) **S** – square (WR-42 and WR-28 only)
B = RF Output **S** – SSB (with filter)
C = Local Oscillator Waveguide Band (see electrical specifications table) **R** – same as RF band
***Please specify RF, LO, and IF frequency ranges**