



# BLOCK UPCONVERTERS FOR INTEGRATION IN HIGH POWER AMPLIFIERS



**Ka-Band Model**



**C-, X-, Ku- and  
DBS-Band Models**

## FEATURES

- 32 dB attenuation control
- 10 MHz reference input on RF input or external reference input connector
- Analog and RS485 remote control
- RF output power detector
- Mute for external command or excess output power
- Extended operating temperature
- Low phase noise

This series of block upconverters are designed to be used in place of the typical solid state pre-amplifier found in a high power amplifier. Status and control can be accomplished either by discrete lines for existing controllers or by RS485.



## SPECIFICATIONS

Model Number	Input Frequency (GHz)	Output Frequency (GHz)	LO Frequency (GHz)
UPBA-6.25	0.95 – 1.75	5.85 – 6.65	4.9
UPBA-8.15	0.95 – 1.45	7.9 – 8.4	6.95
UPBA-13	0.95 – 1.45	12.75 – 13.25	11.8
UPBA-14.25	0.95 – 1.45	14 – 14.5	13.05
UPBA-14.125	0.95 – 1.7	13.75 – 14.5	12.8
UPBA-17.85	0.95 – 2.05	17.3 – 18.4	16.35
Ka-Band Models			
UPBA-28.475	0.95 – 1.2	28.35 – 28.6	27.4
UPBA-29.375	0.95 – 1.2	29.25 – 29.5	28.3
UPBA-29.5	1 – 2	29 – 30	28
UPBA-29.625	0.95 – 1.7	29.25 – 30	28.3
UPBA-29.75	0.95 – 1.45	29.5 – 30	28.55
UPBA-30.5	1 – 2	30 – 31	29

Type.....	Single conversion
Frequency sense.....	No inversion
Input characteristics	
Impedance .....	50 ohms
VSWR .....	1.25:1 maximum
Non-damage .....	+15 dBm minimum
External reference characteristics	
Location.....	Input center conductor or reference connector
Frequency .....	10 MHz
Level.....	-5 to +7 dBm
Output characteristics	
Impedance .....	50 ohms
VSWR .....	1.25:1 maximum
Power output (1 dB compression).....	+13 dBm minimum,
Ka-Band models .....	+16 dBm minimum
Transfer characteristics	
Noise figure .....	15 dB typical (minimum attenuation)
Gain.....	26 ±1 dB at 23°C,
Ka-Band models .....	30 ±2 dB at 23°C
Gain flatness .....	±0.2 dB/any 40 MHz, ±0.25 dB/any 80 MHz, ±0.5 dB/RF-band
Gain stability	
Constant temperature .....	±0.25 dB/24 hours
-40 to +80°C.....	2 dB maximum after 1/2 hour warm-up
Attenuation control .....	32 dB/0.1 dB step remote control or 0 to 10 volts DC
Group delay	
Slope (any 80 MHz segment) .....	0.0125 ns/MHz
Parabolic (any 80 MHz segment).....	0.000625 ns/MHz <sup>2</sup>
Ripple (any 80 MHz segment) .....	0.5 ns
Total .....	1 ns peak-to-peak over RF-band
Spurious output	
Signal related.....	65 dBc minimum
Ka-Band models .....	60 dBc minimum
IF signal second harmonic (Ka-Band models).....	-55 dBc maximum at 0 dBm output power
Signal independent (inband) .....	-100 dBm maximum
Signal independent (out-of-band) .....	-70 dBm maximum,
Ka-Band models .....	-65 dBm maximum
Image rejection.....	60 dB minimum
Second harmonic output (P1 dB) .....	-40 dBc maximum
Intermodulation distortion .....	With two inband output signals at 0 dBm, third order intermodulation products are less than 46 dBc
Mute.....	60 dB minimum

## SPECIFICATIONS (CONT.)

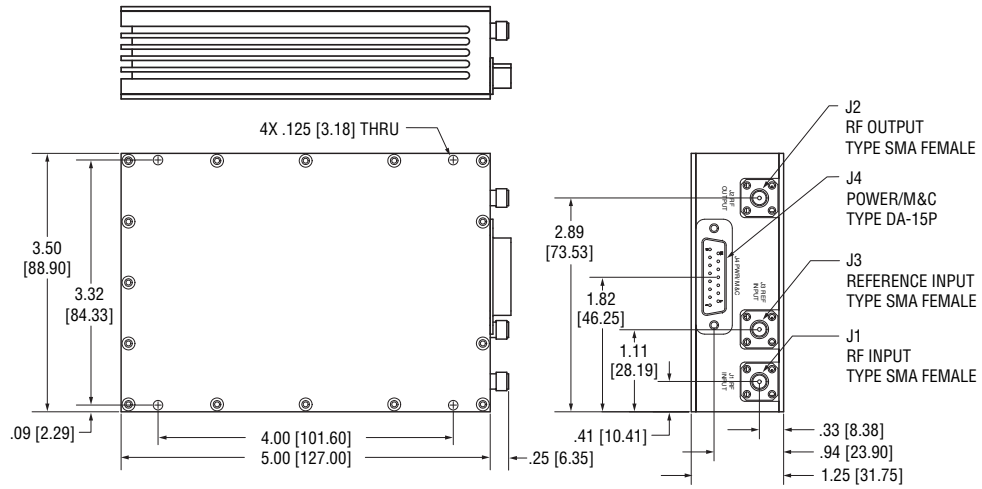
Maximum phase noise .....	Offset (Hz)	Local Oscillator (dBc/Hz)			
		10 MHz	Below 10 GHz	Above 10 GHz	Above 27 GHz
	10	-113	-51	-45	-34
	100	-135	-73	-67	-64
	1K	-145	-83	-77	-74
	10K	-150	-93	-87	-84
	100K	-150	-103	-97	-94
	1M	-150	-103	-97	-104

**Output power monitor**

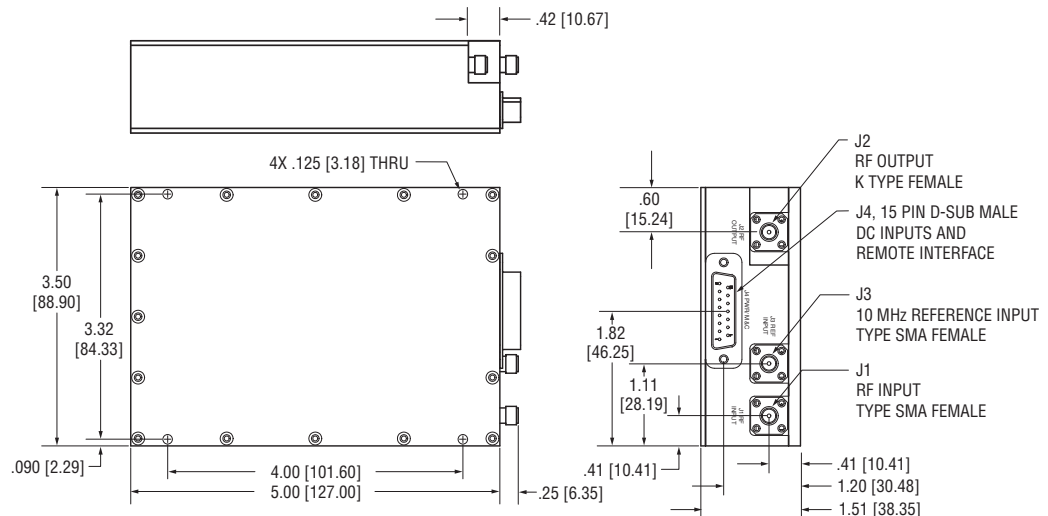
DC voltage based on output level typical.....	Output Power (dBm)	Monitor Level (VDC)
	13	0.85 – 1.50
	10	0.60 – 0.84
	7	0.38 – 0.59
	3	0.12 – 0.28
	No input signal	0.01 maximum

Control/monitor..... Discrete analog and RS485 provided,  
refer to MITEQ's Technical Note 25T058 for details.

## OUTLINE DRAWINGS



### Ka-Band



NOTE: Dimensions shown in brackets [ ] are in millimeters.

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## GENERAL SPECIFICATIONS

### PRIMARY POWER REQUIREMENTS

Voltage ..... 12–18 VDC  
Voltage ripple/noise ..... 50 mV peak-to-peak, typical (20 MHz BW)  
Current ..... 650 mA typical  
Ka-Band models ..... 1.3A typical

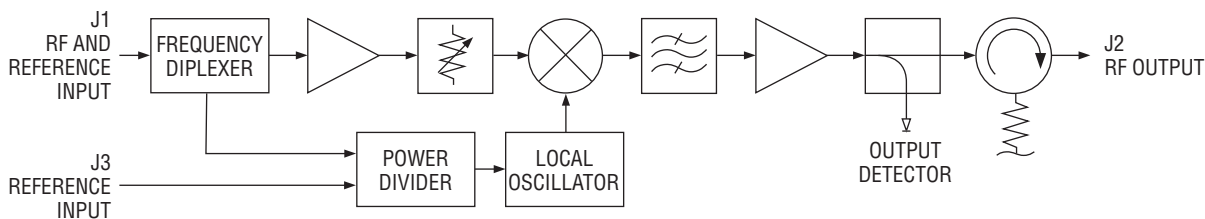
### PHYSICAL

Weight ..... 1.5 pounds nominal  
Connectors  
RF ..... SMA female  
Power/monitor and control interface ..... 15 pin D-type male

### ENVIRONMENTAL

Operating  
Ambient temperature ..... -40 to +80°C  
Relative humidity ..... Up to 95% at 30°C  
Atmospheric pressure ..... Up to 10,000 feet  
Nonoperating  
Ambient temperature ..... -40 to +85°C  
Relative humidity ..... Up to 95% at 40°C  
Atmospheric pressure ..... Up to 50,000 feet  
Shock ..... 30 g's, 10 rms  
Vibration ..... 20 to 2000 Hz random to 0.04G<sup>2</sup>/Hz

## BLOCK DIAGRAM



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