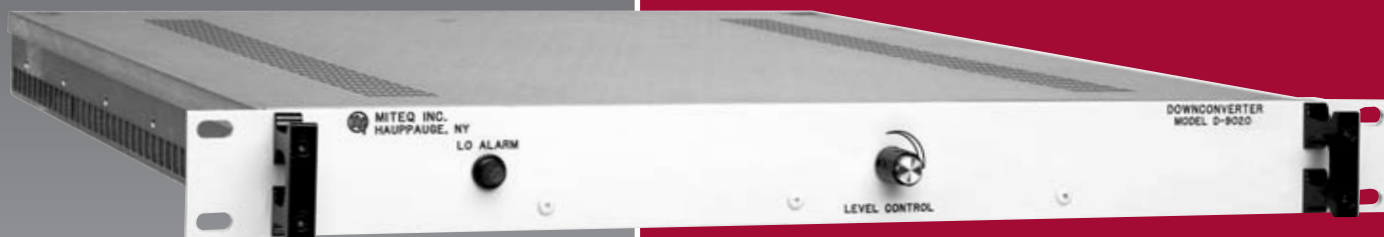




9000 SERIES

COMMUNICATION CONVERTERS

Single Conversion Crystal Oscillator Reference



OPTIONS

- Output amplifier for increased dynamic range (upconverters)
- Higher frequency stability reference
- Fully redundant operation
- RF signal monitor
- Increased RF/IF gain (downconverters)

This series of single-conversion converters operates in the standard communication bands. Crystal oscillator options offer a wide range of frequency stabilities.

FEATURES

- Single conversion with phase-locked mechanically tunable oscillator
- Low intermodulation distortion
- No spectral inversion
- Low phase noise
- Status monitors
- Summary alarm
- Remote mute via contact closure (upconverters only)
- Gain control, 30 dB
- IF signal monitor



UPCONVERTERS

Model Number	Output Frequency (GHz)
U-9068-1	0.95–1.75
U-9069	2.2–2.3

Note: Frequency of operation must be specified at time of order. The operational bandwidth of the unit is 40 MHz (80 MHz optional). For example, if model number U-9068-1 is ordered with a 1.425 GHz frequency of operation, the operating bandwidth will be 1.425 GHz \pm 20 MHz (or 1.425 GHz \pm 40 MHz with Option 4). There is no frequency tuning in this series of converters.

GENERAL SPECIFICATIONS

Type.....	Single conversion
Tunability	None
Frequency sense	No inversion
Input characteristics	
Frequency.....	70 \pm 20 MHz (140 \pm 40 MHz, Option 4)
Impedance.....	75 ohms (50 ohms, Option 15)
Return loss	26 dB minimum (20 dB minimum, 140 \pm 40 MHz)
Output characteristics	
Frequency.....	Refer to model number and table
Impedance.....	50 ohms
Return loss	18 dB minimum
Power output (1 dB compr.)	-5 dBm nominal (up to +10 dBm with optional output amplifiers, refer to options)
Transfer characteristics	
Gain	11 dB nominal (at minimum attenuation)
Image rejection	70 dB minimum
Level stability	\pm 0.25 dB/day maximum at constant temperature
Bandwidth (0.5 dB)	40 MHz minimum (25°C \pm 10°C), 10 MHz minimum (0 to 50°C)
(0.75 dB)	80 MHz minimum (25°C \pm 10°C, Option 4)
Intermodulation distortion	
(third order)	At -20 dBm output, 50 dBc minimum
AM/PM conversion	0.1°/dB maximum to -15 dBm output
Gain slope	0.02 dB/MHz maximum
LO radiation	-60 dBm maximum (output)
Gain adjustment	30 dB minimum, continuously variable
Frequency stability.....	\pm 1 \times 10 ⁻⁷ , 0 to 50°C (higher stability options available) 1 \times 10 ⁻⁸ /day typical (fixed temperature)
Upconverter mute	60 dB minimum

Note: Local oscillator frequency is 70 MHz below output carrier frequency.

DOWNCONVERTERS

Model Number	Input Frequency (GHz)
D-9020-3	0.95–1.75
D-9020-2	1.5–1.8
D-9020	2.2–2.3

Note: Frequency of operation must be specified at time of order. The operational bandwidth of the unit is 40 MHz (80 MHz optional). For example, if model number D-9020 is ordered with an 2.295 GHz frequency of operation, the operating bandwidth will be 2.295 GHz \pm 20 MHz (or 2.295 GHz \pm 40 MHz with Option 4). There is no frequency tuning in this series of converters.

GENERAL SPECIFICATIONS

Type.....	Single conversion
Tunability	None
Frequency sense	No inversion
Input characteristics	
Frequency.....	Refer to model number and table
Impedance.....	50 ohms
Return loss	18 dB minimum
Output characteristics	
Frequency.....	70 \pm 20 MHz (140 \pm 40 MHz Option 4)
Impedance.....	75 ohms (50 ohms, Option 15)
Return loss	26 dB minimum (20 dB minimum, 140 \pm 40 MHz)
Power output (1 dB compr.)	+15 dBm typical, +10 dBm minimum
Transfer characteristics	
Noise figure	15 dB maximum
Gain	30 dB nominal (higher gain optional)
Image rejection.....	70 dB minimum
Level stability	\pm 0.25 dB/day maximum at constant temperature
Bandwidth (0.5 dB)	40 MHz minimum (25°C \pm 10°C), 10 MHz minimum (0 to 50°C)
(0.75 dB)	80 MHz minimum (25°C \pm 10°C, Option 4)
Intermodulation distortion	
(third order).....	With two -10 dBm output signals, 60 dBc minimum
AM/PM conversion	0.1°/dB maximum to +5 dBm output
Gain slope	0.02 dB/MHz maximum
LO radiation	-60 dBm maximum (input)
Gain adjustment	30 dB minimum, continuously variable
Frequency stability.....	\pm 1 \times 10 ⁻⁷ , 0 to 50°C (higher stability options available) 1 \times 10 ⁻⁸ /day typical (fixed temperature)
Frequency stability.....	\pm 2 \times 10 ⁻⁸ , 0 to 50°C (higher stability options available) \pm 5 \times 10 ⁻⁹ /day typical (fixed temperature after 24 hour on time)
Automatic reference configuration	External 5 or 10 MHz at +4 \pm 3 dBm. If external reference is below +1 dBm nominal, the converter will automatically lock to the internal reference.

OPTIONS

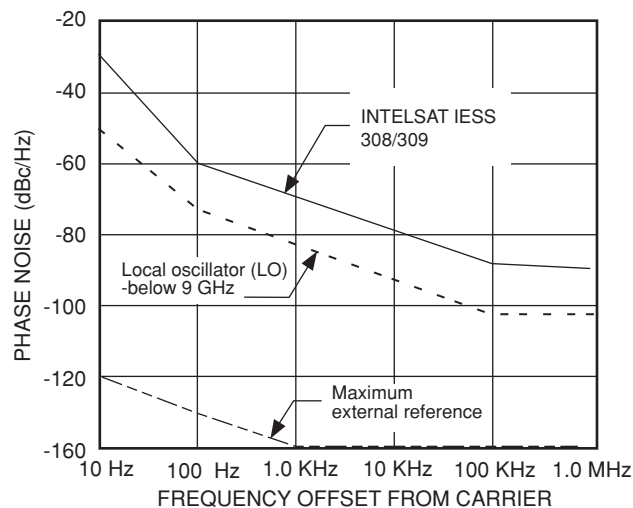
- 1.** High performance phase noise (dBc/Hz) (maximum/typical).

LO Frequency	OFFSET (Hz)					
	10	100	1K	10K	100K	1M
$6.7 \leq \text{LO} \leq 8 \text{ GHz}$	53/55	77/80	107/112	114/119	117/125	134/143

- 2. A.** RF Signal monitor.
- 4.** 140 MHz IF frequency.
Return loss (140 ±40 MHz): 20 dB minimum
- 6.** Redundant operation. Refer to separate data sheet for switchover unit with local/remote and auto/manual control features.
- 10.** Higher frequency stability reference.
B. $\pm 5 \times 10^{-9}$, 0 to 50°C,
 1×10^{-9} /day typical (fixed temperature after 24 hour on time).
C. $\pm 2 \times 10^{-9}$, 0 to 50°C,
 1×10^{-9} /day typical (fixed temperature after 24 hour on time).
- 11.** Increased output power (upconverters).
A. +5 dBm minimum power output (1 dB compression).
B. +10 dBm minimum power output (1 dB compression).
- 15.** 50 ohm IF impedance.
- 16.** Higher gain option (downconverters).
A. 40 dB RF/IF gain.
C. 50 dB RF/IF gain.

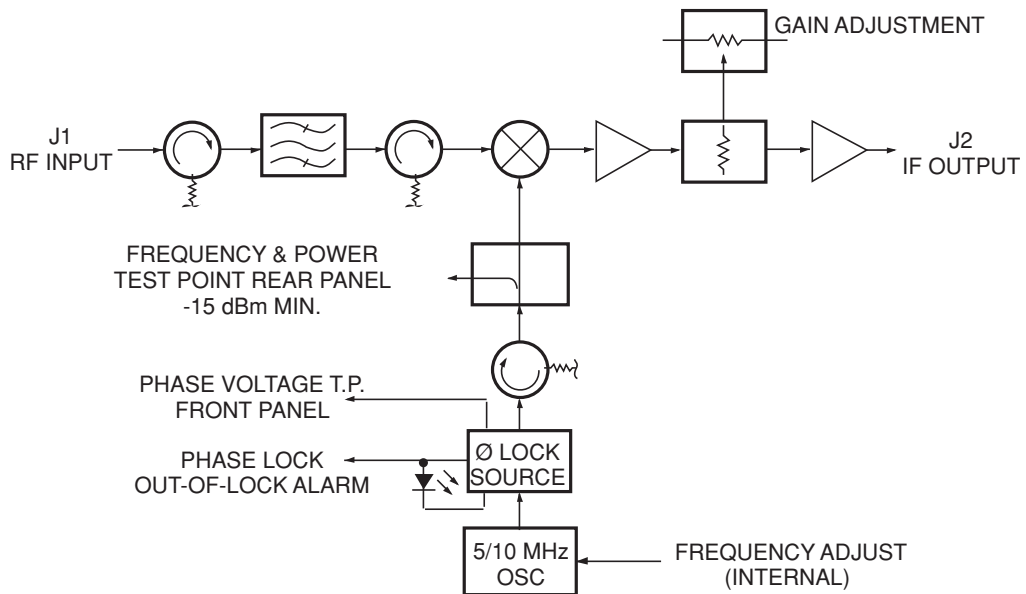
Notes: Missing option numbers are not applicable for this product.

PHASE NOISE CHARACTERISTICS (1.0 Hz BANDWIDTH)

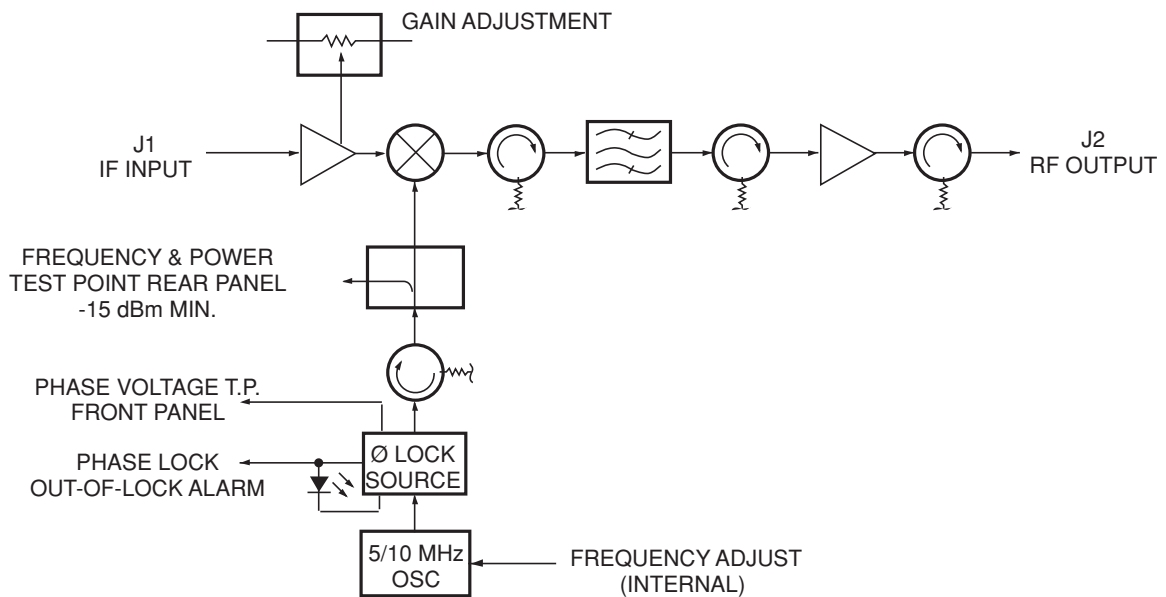


TYPICAL BLOCK DIAGRAMS

DOWNCONVERTER



UPCONVERTER



COMMUNICATION CONVERTERS

PRIMARY POWER REQUIREMENTS

Voltage 90–250 VAC
Frequency..... 47–63 Hz
Power consumption 80 W typical

SUMMARY ALARM

Contact closure/open for DC voltage alarm
Contact closure/open for DC voltage and/or LO alarm

PHYSICAL

Weight 25 pounds nominal
Overall dimensions 19" x 1.75" panel height x 22" maximum (chassis depth 20")
Rear panel connectors
RF N female
IF BNC female
Summary alarm DE-9P
Redundancy alarm DE-9P
Test points LO frequency/power monitor (SMA female),
LO phase-lock voltage (jack),
DC voltage (jack)

Remote mute
(upconverters only)..... DE-9P

ENVIRONMENTAL

Operating
Ambient temperature Standard operating bandwidth of ± 5 MHz minimum, 0 to 50°C,
 ± 20 MHz minimum, 25°C ± 10 °C
Relative humidity Up to 95% at 30°C
Atmospheric pressure Up to 10,000 feet
Nonoperating
Ambient temperature -50 to +70°C
Relative humidity Up to 95% at 40°C
Atmospheric pressure Up to 40,000 feet
Shock and vibration Normal handling by commercial carriers



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