

Block Downconverters

BD Series

Introduction

BD Series Block Downconverters are designed to translate a block of C-Band, X-Band, or Ku-Band RF input frequencies to L-Band. These block downconverters have the quality, stability and performance required for demanding receiver applications in today's diverse satellite communications systems.

Application Notes

BD Series converters may be powered by one of two methods: Either supply +Vdc between the center conductor and ground of the L-Band output cable (cable powered), or apply +Vdc to the DC power RFI and the ground lug.

The alarm RFIs provide a Form 'C' contact set which indicates a fault if phase lock is lost. The alarm circuit is rated at 100 V at 50 mA.

Features

- C-Band, X-Band, or Ku-Band input
- L- Band output:
 - C-Band = 800 MHz BW
 - X-Band = 500 MHz BW
 - Ku-Band = 750, 800 or 1050 MHz BW
- Phase-locked oscillator
- INTELSAT/EUTELSAT-compliant phase noise

Options

- Stable internal reference (20 MHz) or externally referenced (10 MHz)
- 13 dB or 23 dB (minimum) conversion gain

Table 1 — Part Number/Ordering Information

Block Downconverters	BD S - 	
Frequency Band		
C-Band	0 4	
X-Band	0 7	
Ku-Band	1 2	
Frequency Range (RF In / IF Out / Local Osc.)		
C-Band (3.40–4.20 GHz / 950–1750 MHz / 5.150 GHz)		D
X-Band (7.25–7.75 GHz / 950–1450 MHz / 6.30 GHz)		A
Ku-Band (10.70–11.75 GHz / 950–2000 MHz / 9.75 GHz)		F
Ku-Band (10.95–11.70 GHz / 950–1700 MHz / 10.00 GHz)		B
Ku-Band (11.70–12.75 GHz / 950–2000 MHz / 10.75 GHz)		J
Ku-Band (12.20–13.00 GHz / 950–1750 MHz / 11.25 GHz)		C
Reference Frequency Options		
Internally Supplied (20 MHz)		I
Externally Required (10 MHz)		E
Gain Level Options		
13 dB Minimum		X
23 dB Minimum		2

Table 2 — External Reference Requirements (Option E)

For proper operation, the BD-Series converters with Option E (External Reference Input) require an externally applied reference with the following characteristics:

Parameter	Notes	Min.	Typ.	Max.	Units
Frequency			10.00		MHz
Input Level		-5	+3	+10	dBm
Input Impedance			50		ohms
Phase Noise at Offset Frequency (fm)	10 Hz 100 Hz 1 kHz 10 kHz			-105 -135 -145 -150	dBc/Hz dBc/Hz dBc/Hz dBc/Hz

How to Apply External Reference:

The diagram illustrates the connection for an external reference. An 'EXTERNAL REFERENCE' source, represented by a circle with a sine wave, provides a 10 MHz signal at +3 dBm Nom. to the 'EXT REF' input of the 'BDC' block. The 'RF BAND IN' is connected to the 'RF' input of the 'BDC' block. The 'IF' output of the 'BDC' block is labeled 'IF BAND OUT'.

Specifications

BD04SD-xx (C-Band)

Parameter	Notes	Min.	Typ. [†]	Max.	Units
RF/IF/LO Frequencies			See Table 1		
Output Spectrum			Inverted		
LO Stability (Option I)	Over temperature		±2.0	±2.5	ppm
LO Frequency Set Tolerance (Opt. I only)	At midband (4.15 GHz in)		1.0 ± 5150		GHz ± Hz
LO Phase Noise	100 Hz 1 kHz 10 kHz 100 kHz 1 MHz			-60 -70 -80 -90 -100	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz
LO Leakage	At IF output (5.150 GHz)			-50	dBm
Spurious	Signal related; IF Band Non-signal related; IF Band			-60 -80	dBc dBm
Gain Level, Median = (Max + Min)/2	Standard Option 2	13 23	14 25	15 27	dB dB
Gain Flatness	Full-band Per 40 MHz			±1.0 ±0.25	dB dB
Gain Stability	Per week, constant temp Vs. temperature			±0.50 ±1.5	dB dB
Power Output	At 1 dB compression	+8	+10		dBm
3rd Order Intercept	Output (OIP ₃)	+18	+20		dBm
Noise Figure	At +23 °C		13	15	dB
VSWR	Input (50 ohms) Output (50 ohms)		1.35 1.35	1.5 1.5	:1 :1
Image Rejection		40			dB
Fault Alarm	Phase lock		Form-C Contact (100 V/50 mA)		
Connectors	RF In, IF Out/DC In DC In/Alarm Out Ext. Ref. In (Option E)		SMA (F) RFI Feedthrough SMA (F)		
Power Requirements	Voltage Current	+11.5	350	+25 450	Vdc mA
Operating Temperature	Ambient	-40		+70	°C

[†] When there is only one entry on a line, the Nom./Typ. column is a nominal value; otherwise it is a typical value. Typical values are intended to illustrate typical performance, but are not guaranteed.

Specifications

BD07SA-xx (X-Band)

Parameter	Notes	Min.	Typ. †	Max.	Units
RF/IF/LO Frequencies			See Table 1		
Output Spectrum			Non-Inverted		
LO Stability (Option I)	Over temperature		±2.0	±2.5	ppm
LO Frequency Set Tolerance (Opt. I only)	At midband (7.30 GHz in)		1.0 ± 6300		GHz ± Hz
LO Phase Noise	100 Hz 1 kHz 10 kHz 100 kHz 1 MHz			-60 -70 -80 -90 -100	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz
LO Leakage	At IF output (6.30 GHz)			-50	dBm
Spurious	Signal related; IF Band Non-signal related; IF Band			-60 -80	dBc dBm
Gain Level, Median = (Max + Min)/2	Standard Option 2	13 23	14 25	15 27	dB dB
Gain Flatness	Full-band Per 40 MHz			±1.0 ±0.25	dB dB
Gain Stability	Per week, constant temp Vs. temperature			±0.50 ±1.5	dB dB
Power Output	At 1 dB compression	+8	+10		dBm
3rd Order Intercept	Output (OIP ₃)	+18	+20		dBm
Noise Figure	At +23 °C		13	15	dB
VSWR	Input (50 ohms) Output (50 ohms)		1.35 1.35	1.5 1.5	:1 :1
Image Rejection		40			dB
Fault Alarm	Phase lock		Form-C Contact (100 V/50 mA)		
Connectors	RF In, IF Out/DC In DC In/Alarm Out Ext. Ref. In (Option E)		SMA (F) RFI Feedthrough SMA (F)		
Power Requirements	Voltage Current	+11.5	350	+25 400	Vdc mA
Operating Temperature	Ambient	-40		+70	°C

† When there is only one entry on a line, the Nom./Typ. column is a nominal value; otherwise it is a typical value. Typical values are intended to illustrate typical performance, but are not guaranteed.

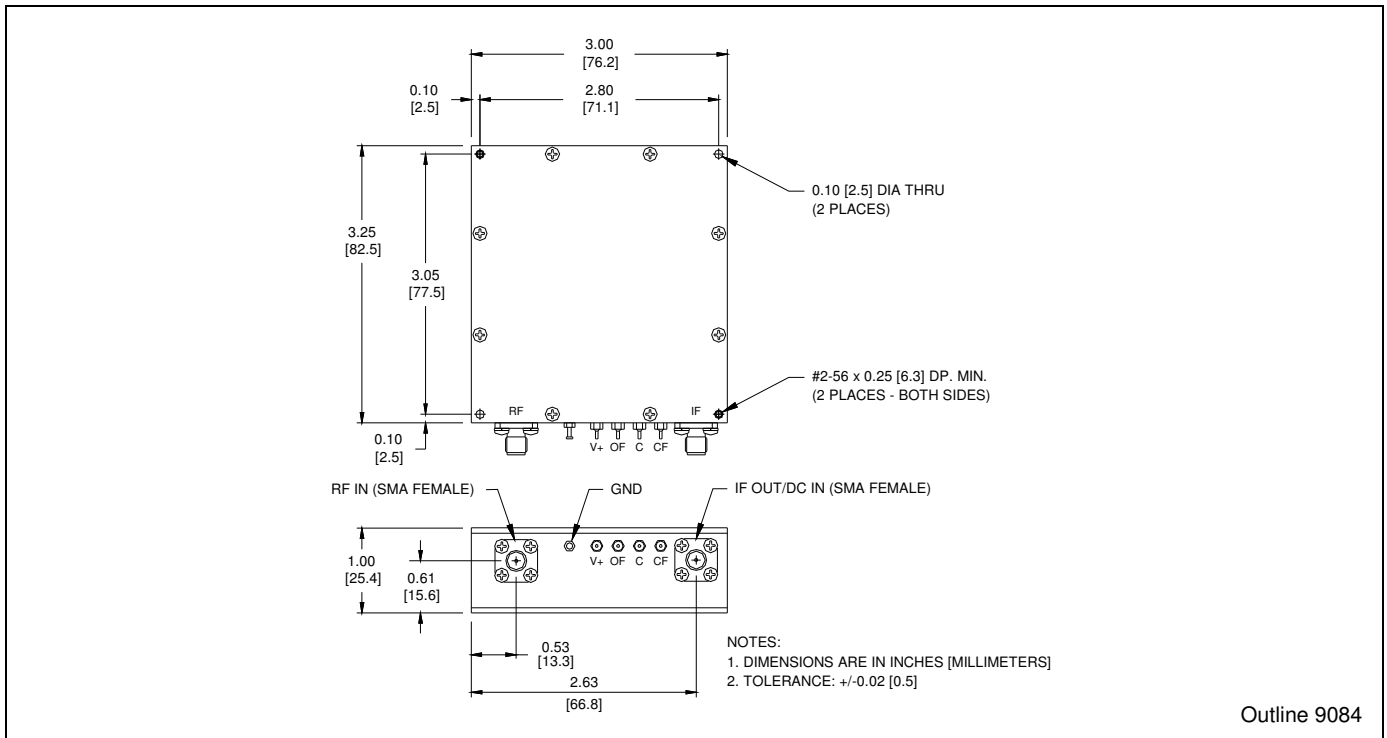
Specifications

BD12Sx-xx (Ku-Band)

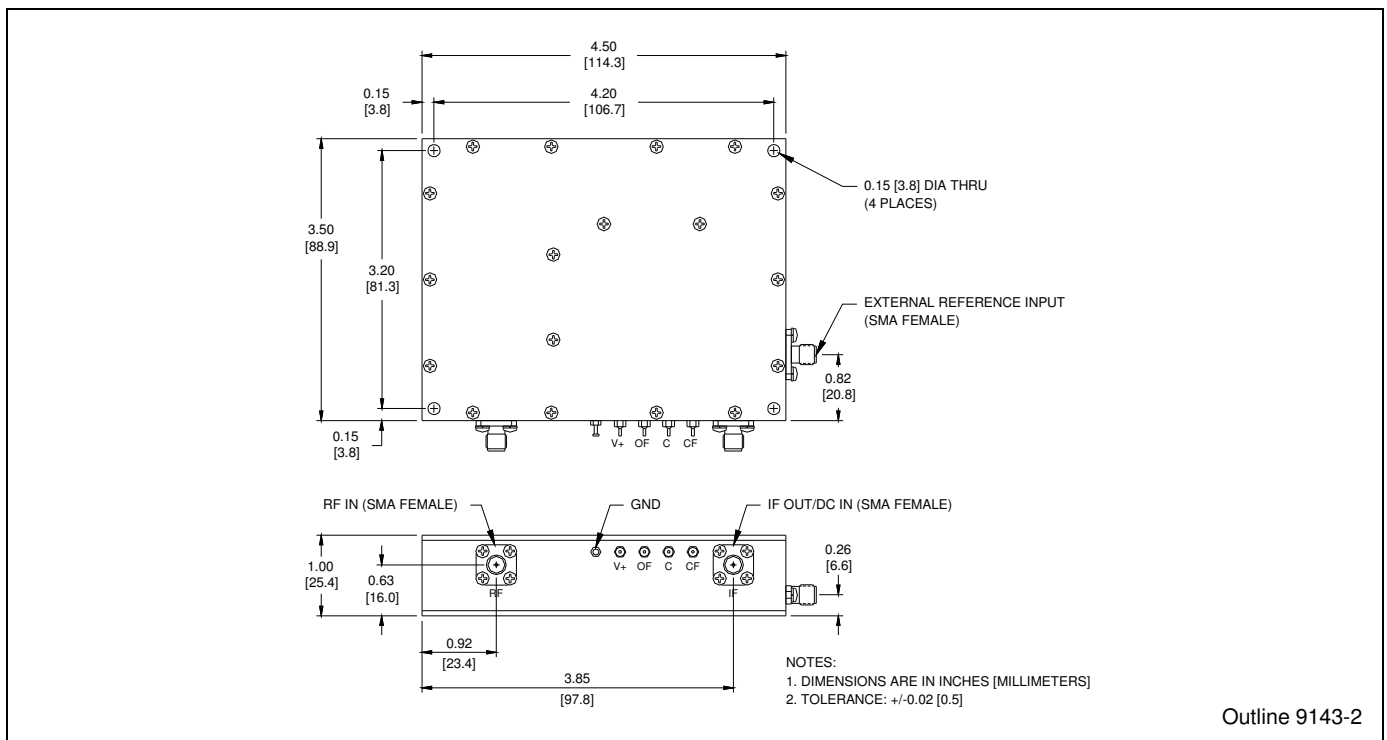
Parameter	Notes	Min.	Typ. †	Max.	Units
RF/IF/LO Frequencies			See Table 1		
Output Spectrum			Non-Inverted		
LO Stability (Option I)	Over temperature		±2.0	±2.5	ppm
LO Frequency Set Tolerance (Opt. I only)	At midband: F, 10.75 GHz in B, 11.00 GHz in J, 11.75 GHz in C, 12.25 GHz in		1.0 ± 9750 1.0 ± 10000 1.0 ± 10750 1.0 ± 11250		GHz ± Hz GHz ± Hz GHz ± Hz GHz ± Hz
LO Phase Noise	100 Hz 1 kHz 10 kHz 100 kHz 1 MHz			-60 -70 -80 -90 -100	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz
LO Leakage	At IF output F, 9.75 GHz; B, 10.00 GHz; J, 10.75 GHz; C, 11.25 GHz			-50	dBm
Spurious	Signal related; IF Band Non-signal related; IF Band			-60 -80	dBc dBm
Gain Level, Median = (Max + Min)/2	Standard Option 2	13 23	14 25	15 27	dB dB
Gain Flatness	Full-band Per 40 MHz			±1.0 ±0.25	dB dB
Gain Stability	Per week, constant temp Vs. temperature			±0.50 ±1.5	dB dB
Power Output	At 1 dB compression	+8	+10		dBm
3rd Order Intercept	Output (OIP3)	+18	+20		dBm
Noise Figure	At +23 °C		13	15	dB
VSWR	Input (50 ohms) Output (50 ohms)		1.35 1.35	1.5 1.5	:1 :1
Image Rejection		40			dB
Fault Alarm	Phase lock		Form-C Contact (100 V/50 mA)		
Connectors	RF In, IF Out/DC In DC In/Alarm Out Ext. Ref. In (Option E)		SMA (F) RFI Feedthrough SMA (F)		
Power Requirements	Voltage Current	+11.5		+25 450	Vdc mA
Operating Temperature	Ambient	-40		+70	°C

† When there is only one entry on a line, the Nom./Typ. column is a nominal value; otherwise it is a typical value. Typical values are intended to illustrate typical performance, but are not guaranteed.

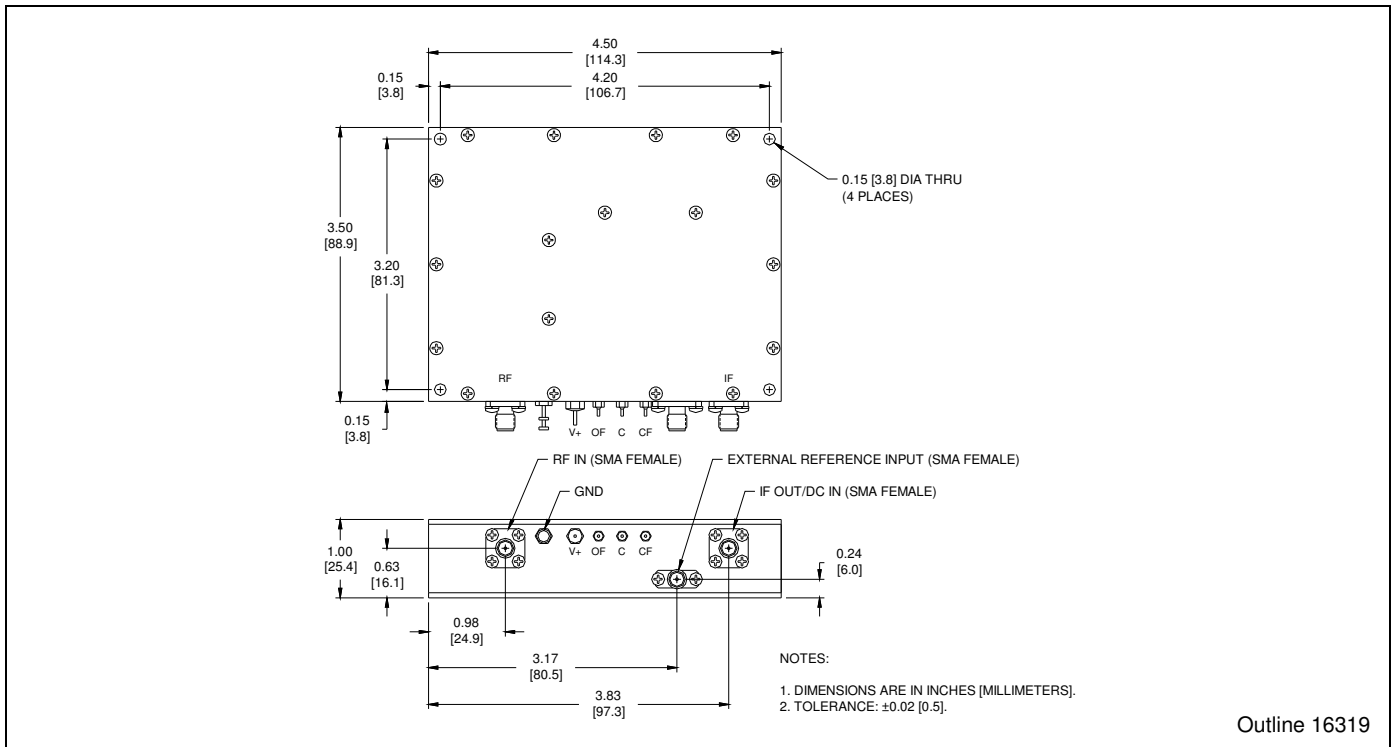
Outline Drawing, C-, X-, Ku-Bands with Option I



Outline Drawing, C-Band with Option E

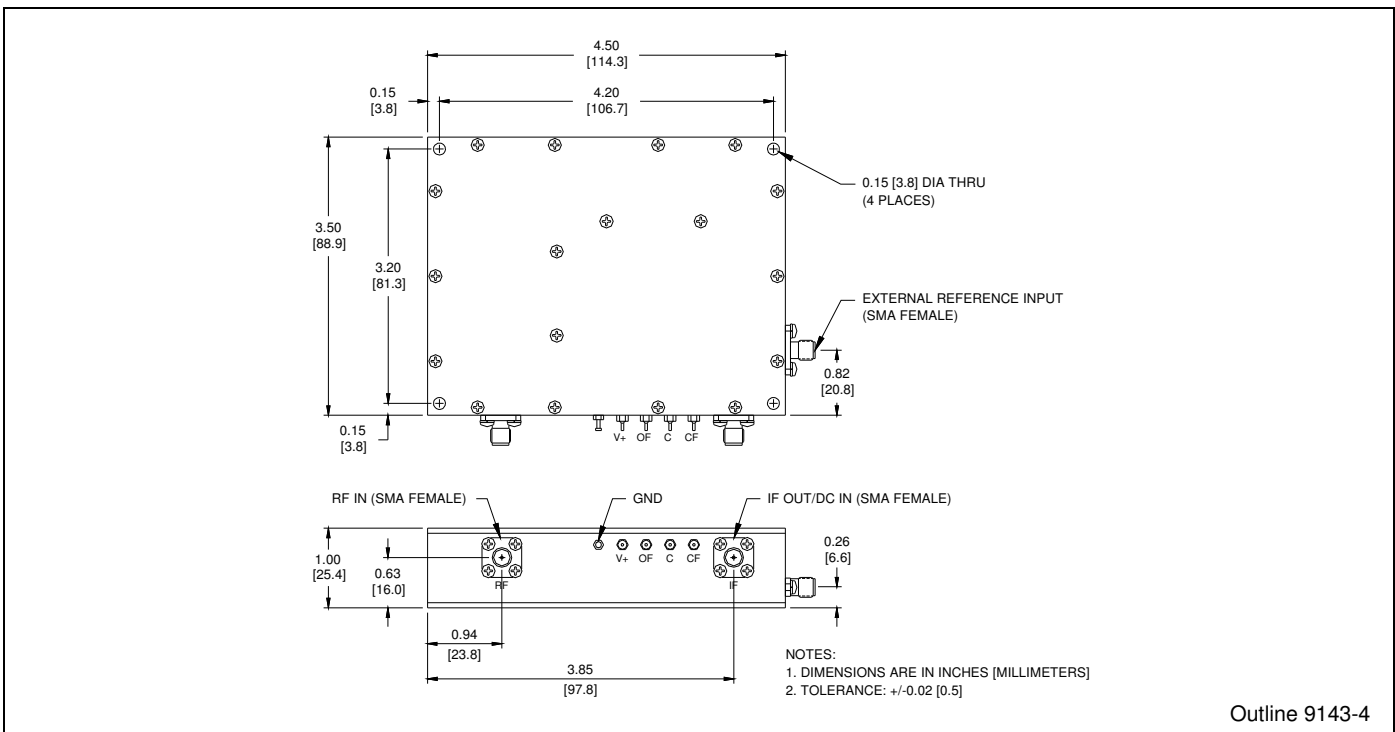


Outline Drawing, X-Band with Option E



Outline 16319

Outline Drawing, Ku-Band with Option E



Outline 9143-4



Other Products

- Solid-State Power Amplifiers and SSPA Systems
- Solid-State Power BUCs and SSPB Systems
- Low Noise Amplifiers and LNA Systems
- Low Noise Block Converters and LNB Systems
- Block Up and Block Down Converters
- Synthesized Converters
- Line Drive Amplifiers
- Power Supply Monitors
- Redundant Control Panels for SSPAs, SSPBs, and LNAs

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