Block Upconverters

BU Series

Introduction

BU-Series Block Upconverters are designed to translate a block of L-Band IF input frequencies to C-Band, X-Band, or Ku-Band. These block upconverters have the quality, stability and performance required for demanding transmitting applications in INTELSAT, EUTELSAT, and other satellite communications systems. When used with Solid-State Power Amplifiers (SSPAs) the BU-Series converters will shift the SSPA input frequency to L-Band for use with coaxial or fiber-optic IFLs.

Application Notes

BU-Series converters may be powered by one of two methods: Either supply +Vdc between the center conductor and ground of the L-Band input 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

- L-Band input
- C-, X-, or Ku-Band output:
  C-Band = 575 or 875 MHz BW
  X-Band = 500 MHz BW
  Ku-Band = 500 or 750 MHz BW
- Phase-locked oscillator locks to external 10 MHz reference
- INTELSAT/EUTELSAT-compliant phase noise

Options

- External reference may be diplexed with IF input or supplied via separate coaxial connector.

Table 1 — Part Number/Ordering Information

Block Upconverters **BU□□S□–□**

Frequency Band

C-Band	0 6
X-Band	0 8
Ku-Band	1 4

Frequency Range (IF In / RF Out / Local Osc.)

C-Band (950–1525 MHz / 5.850–6.425 GHz / 4.900 GHz)	A
C-Band (950–1825 MHz / 5.850–6.725 GHz / 4.900 GHz)	B
X-Band (950–1450 MHz / 7.900–8.400 GHz / 6.950 GHz)	A
Ku-Band (950–1450 MHz / 14.00–14.50 GHz / 13.05 GHz)	A
Ku-Band (950–1700 MHz / 13.75–14.50 GHz / 12.80 GHz)	B

10 MHz Reference Frequency (Required) Input Options

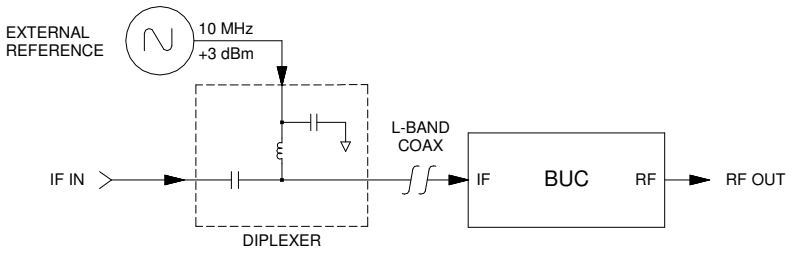
Diplexed with IF Input	D
Supplied via separate coaxial connector	E

Table 2 — External Reference Requirements

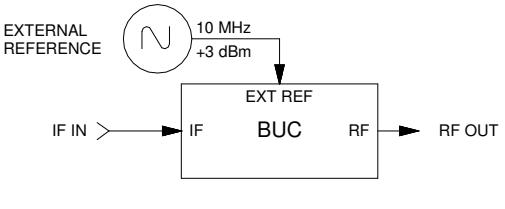
For proper operation, the BU-Series converters require an externally applied reference with the following characteristics:

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			-105	dBc/Hz
	100 Hz			-135	dBc/Hz
	1 kHz			-145	dBc/Hz
	10 kHz			-150	dBc/Hz

How to Apply External Reference:



Diplexed with IF Input (Option D)



Via separate connector (Option E)

Specifications

BU06Sx-x (C-Band)

Parameter	Notes	Min.	Typ. †	Max.	Units
IF/RF/LO Frequencies			See Table 1		
Output Spectrum			Non-Inverted		
LO Phase Noise (Using external reference reference per Table 2.)	10 Hz			-33	dBc/Hz
	100 Hz			-63	dBc/Hz
	1 kHz			-73	dBc/Hz
	10 kHz			-83	dBc/Hz
	100 kHz			-93	dBc/Hz
	1 MHz			-103	dBc/Hz
LO Leakage	At RF output (4.90 GHz)			-60	dBm
Spurious	In band			-60	dBc
	Out of band; $P_{OUT} \leq$ -3 dBm			-60	dBm
Gain Level,		20	23	25	dB
Gain Flatness	Full-band			±1.0	dB
	Per 40 MHz			±0.25	dB
Gain Stability	Per week, constant temp			±0.50	dB
	Vs. temperature			±1.5	dB
Power Output	At 1 dB compression	+10	+12		dBm
3rd Order Output Intercept	Two tones at -3 dBm each	+20	+22		dBm
Noise Figure	At +23 ℃		15	18	dB
VSWR	Input (50 ohms)			1.35	:1
	Output (50 ohms)			1.35	:1
Fault Alarm	Phase lock		Form-C Contact (100 V/50 mA)		
Connectors	IF In/DC In, RF Out		SMA (F)		
	DC In/Alarm Out		RFI Feedthrough		
	Ext. Ref. In (Option E)		SMA (F)		
Power Requirements	Voltage	+10.5		+18.0	Vdc
	Current		390	450	mA
Operating Temperature	Ambient	-40		+70	℃

† 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

BU08SA-x (X-Band)

Parameter	Notes	Min.	Typ. †	Max.	Units
IF/RF/LO Frequencies			See Table 1		
Output Spectrum			Non-Inverted		
LO Phase Noise (Using external reference reference per Table 2.)	10 Hz			-33	dBc/Hz
	100 Hz			-63	dBc/Hz
	1 kHz			-73	dBc/Hz
	10 kHz			-83	dBc/Hz
	100 kHz			-93	dBc/Hz
	1 MHz			-103	dBc/Hz
LO Leakage	At RF output (6.95 GHz)			-60	dBm
Spurious	In band			-60	dBc
	Out of band; $P_{OUT} \leq$ -3 dBm			-60	dBm
Gain Level,		20	23	25	dB
Gain Flatness	Full-band			±1.0	dB
	Per 40 MHz			±0.25	dB
Gain Stability	Per week, constant temp			±0.50	dB
	Vs. temperature			±1.5	dB
Power Output	At 1 dB compression	+10	+12		dBm
3rd Order Output Intercept	Two tones at -3 dBm each	+20	+22		dBm
Noise Figure	At +23 ℃		15	18	dB
VSWR	Input (50 ohms)			1.35	:1
	Output (50 ohms)			1.35	:1
Fault Alarm	Phase lock		Form-C Contact (100 V/50 mA)		
Connectors	IF In/DC In, RF Out		SMA (F)		
	DC In/Alarm Out		RFI Feedthrough		
	Ext. Ref. In (Option E)		SMA (F)		
Power Requirements	Voltage	+10.5		+18.0	Vdc
	Current		390	450	mA
Operating Temperature	Ambient	-40		+70	℃

† 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.

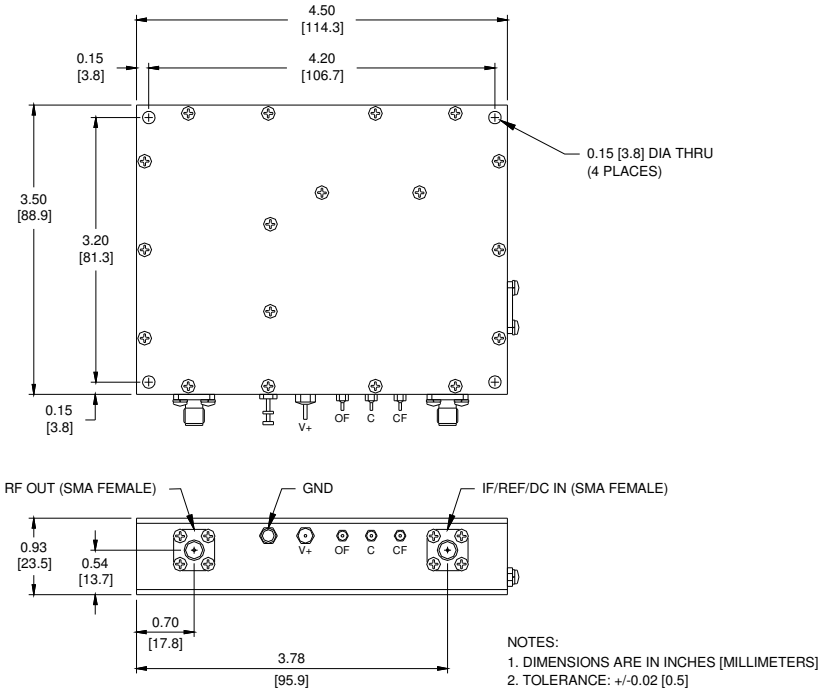
Specifications

BD14Sx-x (Ku-Band)

Parameter	Notes	Min.	Typ. †	Max.	Units
IF/RF/LO Frequencies			See Table 1		
Output Spectrum			Non-Inverted		
LO Phase Noise (Using external reference reference per Table 2.)	10 Hz			-33	dBc/Hz
	100 Hz			-63	dBc/Hz
	1 kHz			-73	dBc/Hz
	10 kHz			-83	dBc/Hz
	100 kHz			-93	dBc/Hz
	1 MHz			-103	dBc/Hz
LO Leakage	At RF output (A, 13.05 GHz; B, 12.80 GHz)			-60	dBm
Spurious	In band			-60	dBc
	Out of band; $P_{OUT} \leq$ -3 dBm			-60	dBm
Gain Level,		20	23	25	dB
Gain Flatness	Full-band			±1.0	dB
	Per 40 MHz			±0.25	dB
Gain Stability	Per week, constant temp			±0.50	dB
	Vs. temperature			±1.5	dB
Power Output	At 1 dB compression	+10	+12		dBm
3rd Order Output Intercept	Two tones at -3 dBm each	+20	+22		dBm
Noise Figure	At +23 ℃		15	18	dB
VSWR	Input (50 ohms)			1.35	:1
	Output (50 ohms)			1.35	:1
Fault Alarm	Phase lock		Form-C Contact (100 V/50 mA)		
Connectors	IF In/DC In, RF Out		SMA (F)		
	DC In/Alarm Out		RFI Feedthrough		
	Ext. Ref. In (Option E)		SMA (F)		
Power Requirements	Voltage	+10.5		+18.0	Vdc
	Current		390	450	mA
Operating Temperature	Ambient	-40		+70	℃

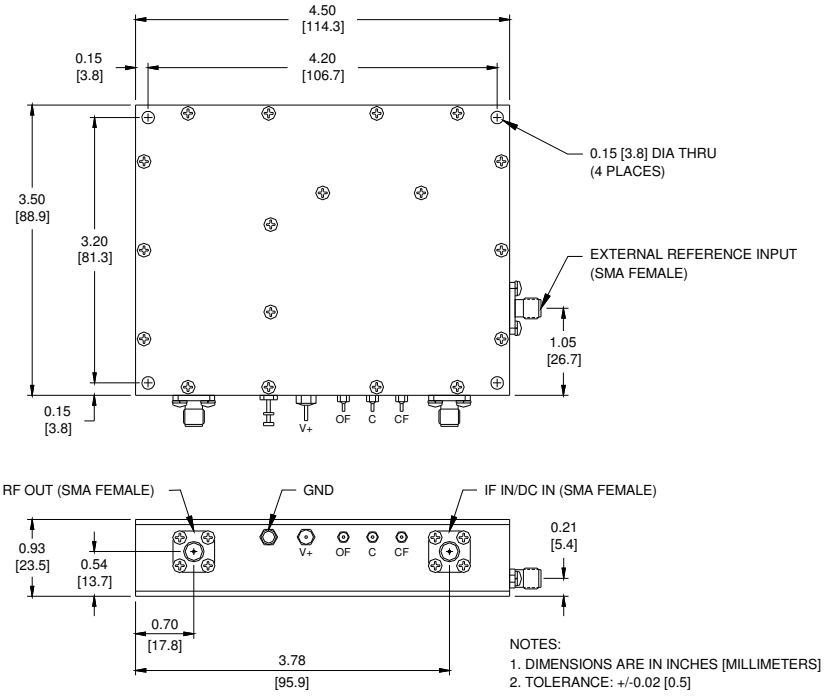
† When there is only one entry on a line, the Nom./Typ. column is a nominal value; otherwise it is a typical value. Typical values are intended to illustrate typical performance, but are not guaranteed.

Outline Drawing, C-Band, Option D



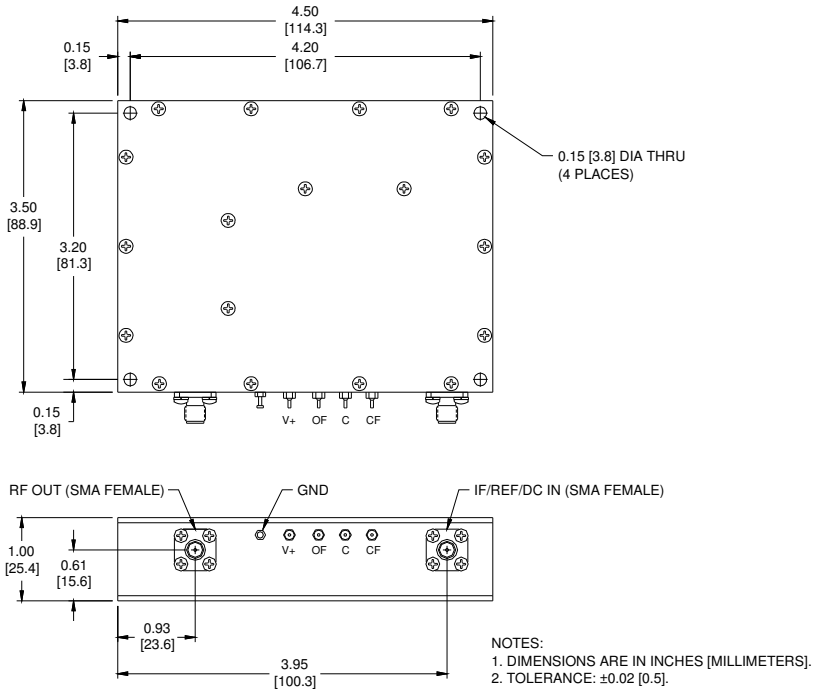
NOTES:
1. DIMENSIONS ARE IN INCHES [MILLIMETERS]
2. TOLERANCE: +/-0.02 [0.5]

Outline Drawing, C-Band, Option E



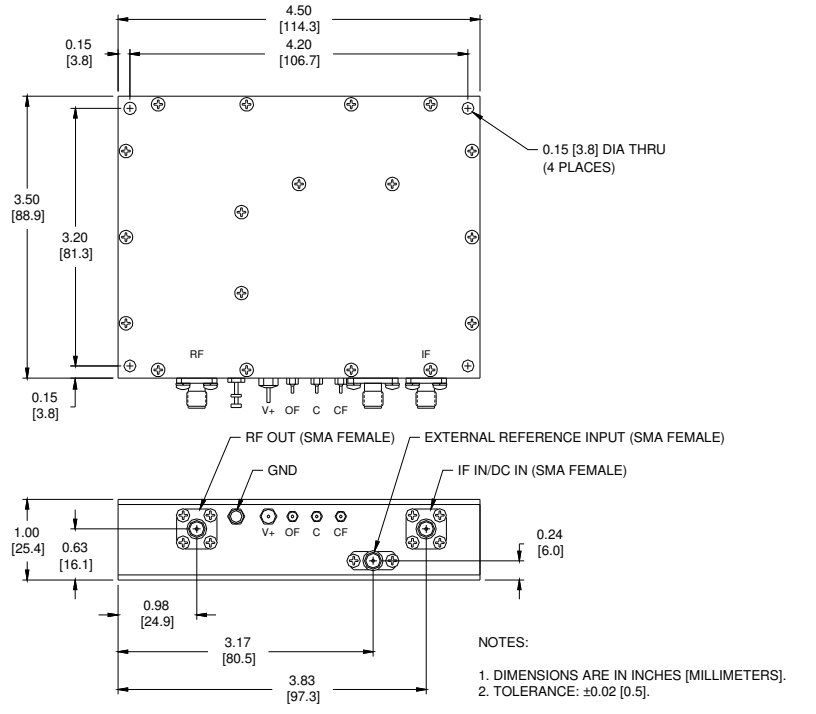
NOTES:
1. DIMENSIONS ARE IN INCHES [MILLIMETERS]
2. TOLERANCE: +/-0.02 [0.5]

Outline Drawing, X-Band, Option D



NOTES:
1. DIMENSIONS ARE IN INCHES [MILLIMETERS].
2. TOLERANCE: ±0.02 [0.5].

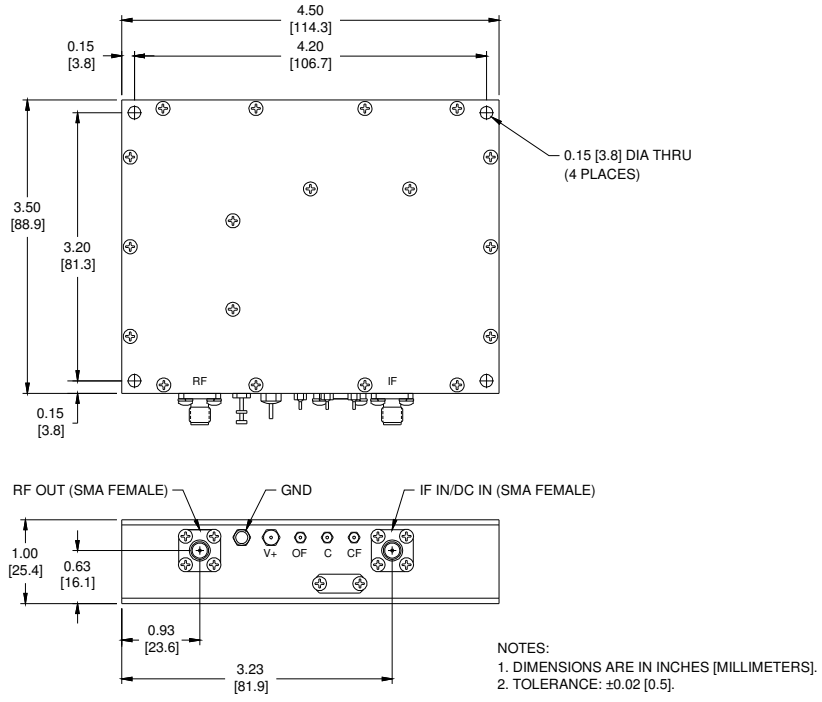
Outline Drawing, X-Band, Option E



NOTES:

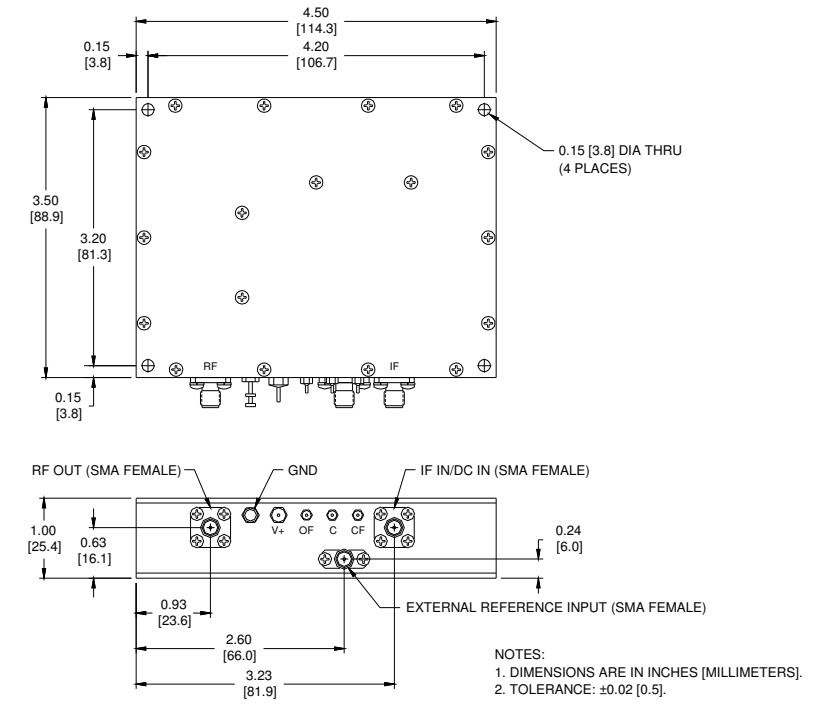
1. DIMENSIONS ARE IN INCHES [MILLIMETERS].
2. TOLERANCE: ±0.02 [0.5].

Outline Drawing, Ku-Band, Option D



NOTES:
1. DIMENSIONS ARE IN INCHES [MILLIMETERS].
2. TOLERANCE: ±0.02 [0.5].

Outline Drawing, Ku-Band, Option E



NOTES:
1. DIMENSIONS ARE IN INCHES [MILLIMETERS].
2. TOLERANCE: ±0.02 [0.5].

GENERAL DYNAMICS
SATCOM Technologies

60 Decibel Road, Suite 200 • State College, PA 16801 USA • Tel. +1-814-238-2700 • FAX +1-814-238-6589
Email: satcom@gd-ms.com • www.gdsatcom.com/electronics.php