

## Block Upconverters

### Introduction

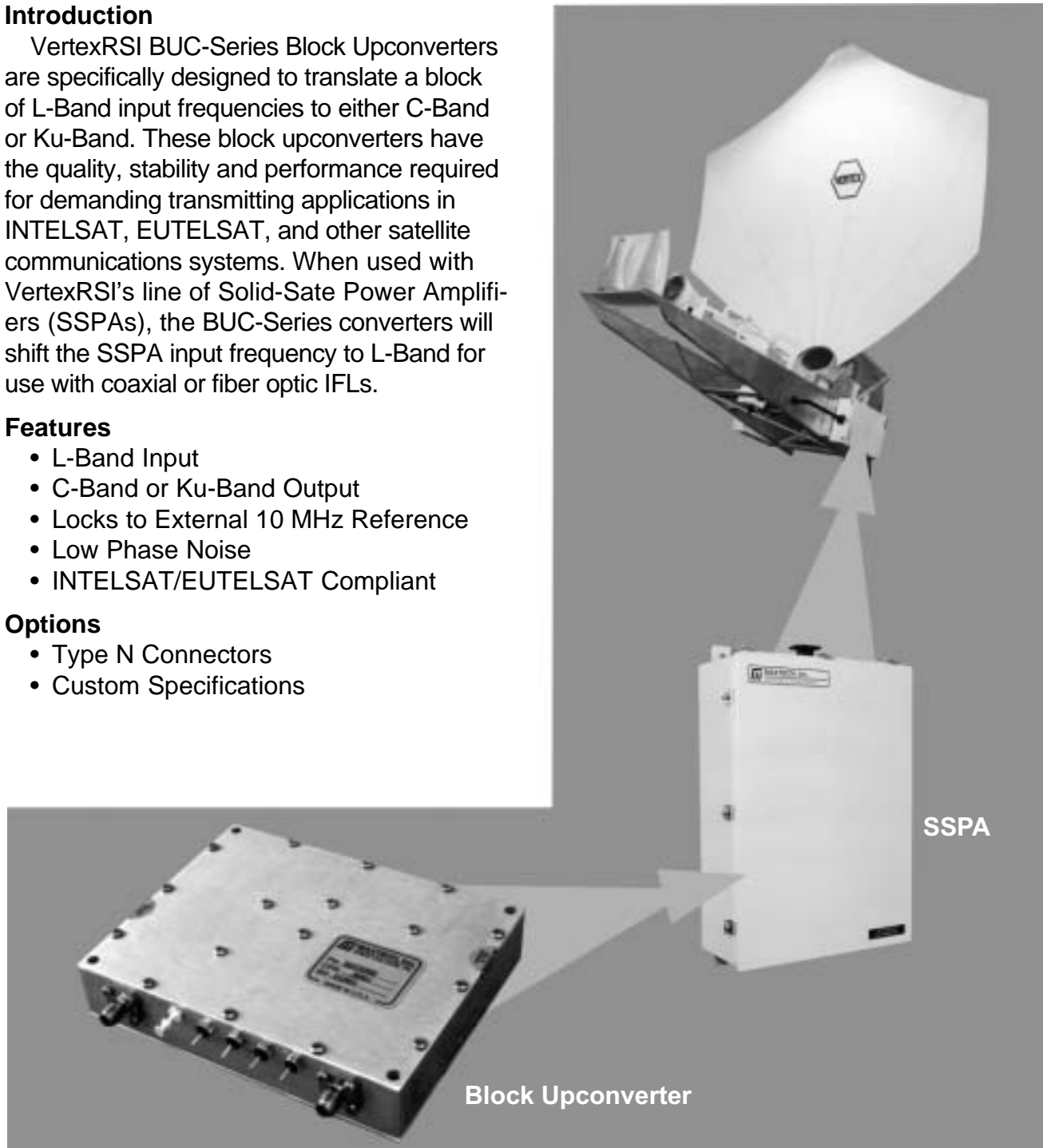
VertexRSI BUC-Series Block Upconverters are specifically designed to translate a block of L-Band input frequencies to either C-Band or Ku-Band. These block upconverters have the quality, stability and performance required for demanding transmitting applications in INTELSAT, EUTELSAT, and other satellite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

### Features

- L-Band Input
- C-Band or Ku-Band Output
- Locks to External 10 MHz Reference
- Low Phase Noise
- INTELSAT/EUTELSAT Compliant

### Options

- Type N Connectors
- Custom Specifications



**Table 1 — Part Number/Ordering Information**

**BUC-**

**Options**

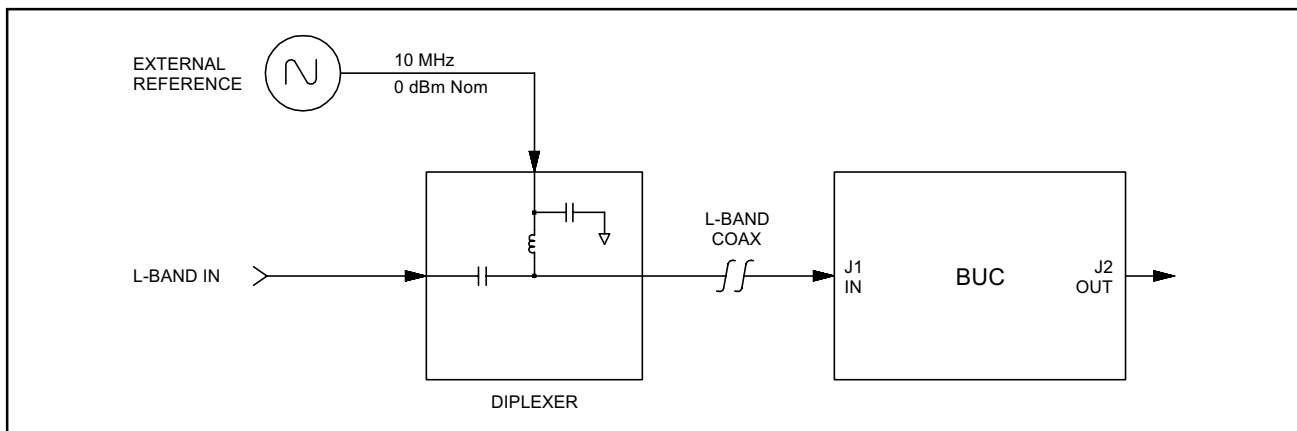
/7 = Type N Connectors  
/C = Custom Specifications

| Designator    | Input Frequency | Output Frequency  | LO Frequency |
|---------------|-----------------|-------------------|--------------|
| <b>6000A</b>  | 950 – 1525 MHz  | 5.85 – 6.425 GHz  | 4.90 GHz     |
| <b>6000B</b>  | 950 – 1825 MHz  | 5.85 – 6.725 GHz  | 4.90 GHz     |
| <b>14000A</b> | 950 – 1450 MHz  | 14.00 – 14.50 GHz | 13.05 GHz    |
| <b>14000B</b> | 950 – 1700 MHz  | 13.75 – 14.50 GHz | 12.80 GHz    |

**Table 2 — Reference Requirements**

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

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

**Figure 2 — How to Apply External Reference**


# SPECIFICATIONS

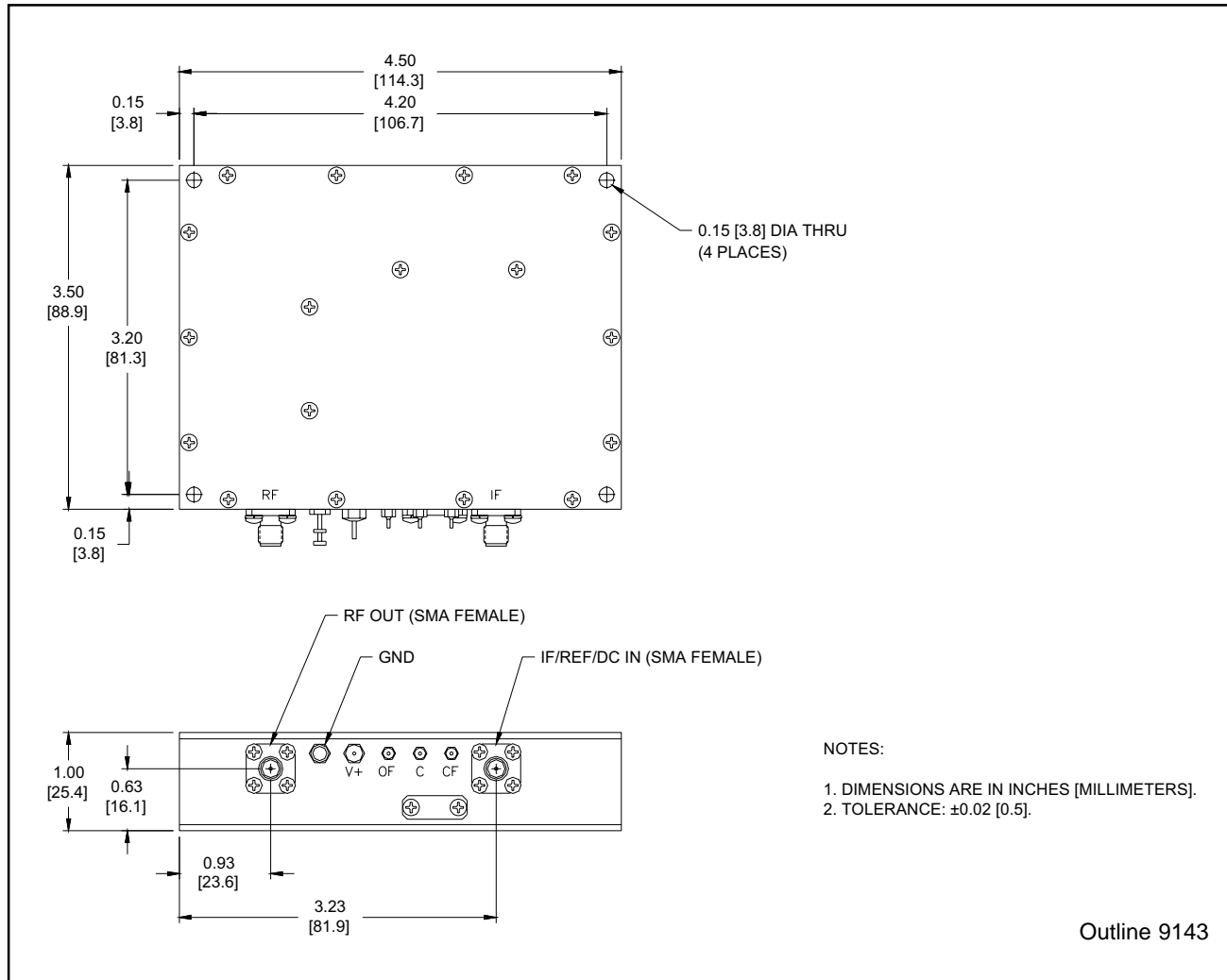
# BUC-Series

| Parameter                                                                  | Notes                                | Min                          | Nom./Typ.†   | Max   | Units  |
|----------------------------------------------------------------------------|--------------------------------------|------------------------------|--------------|-------|--------|
| Input Frequency                                                            |                                      | }                            | See Table 1  |       |        |
| Output Frequency                                                           |                                      |                              |              |       |        |
| Local Oscillator Frequency                                                 | Locked to reference                  |                              |              |       |        |
| Output Spectrum                                                            |                                      |                              | non-inverted |       |        |
| LO Phase Noise<br>(Using ext. reference<br>in accordance with<br>Table 2.) | 10 Hz                                |                              | -40          | -33   | dBc/Hz |
|                                                                            | 100 Hz                               |                              | -70          | -63   | dBc/Hz |
|                                                                            | 1 kHz                                |                              | -80          | -73   | dBc/Hz |
|                                                                            | 10 kHz                               |                              | -85          | -83   | dBc/Hz |
|                                                                            | 100 kHz                              |                              | -95          | -93   | dBc/Hz |
|                                                                            | 1 MHz                                |                              | -120         | -103  | dBc/Hz |
| Spurious                                                                   | In-band                              |                              |              | -60   | dBc    |
|                                                                            | Out-of-band; $P_{out} \leq -3$ dBm   |                              |              | -60   | dBm    |
|                                                                            | LO leakage                           |                              |              | -60   | dBm    |
| Gain                                                                       |                                      | 20                           | 23           | 25    | dB     |
| Gain Flatness                                                              | Full-band                            |                              |              | ±1    | dB     |
|                                                                            | Per 40 MHz                           |                              |              | ±0.25 | dB     |
| Gain Stability                                                             | Per week, constant temp<br>vs. temp. |                              |              | ±0.5  | dB     |
|                                                                            |                                      |                              |              | ±1    | dB     |
| Power Output                                                               | At 1 dB compression                  | +10                          | +12          |       | dBm    |
| 3rd Order Output<br>Intercept Point                                        | Two tones @ -3 dBm ea.               | +20                          | +22          |       | dBm    |
| Noise Figure                                                               |                                      |                              | 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                                                                 | L-Band/Ref/DC In                     | SMA (F)                      |              |       |        |
|                                                                            | RF Out                               | SMA (F)                      |              |       |        |
|                                                                            | DC In/Alarm Out                      | RFI Feedthrough              |              |       |        |
| Power Requirements                                                         | Voltage                              | +10.5                        |              | +18.0 | Vdc    |
|                                                                            | Current                              |                              | 390          | 450   | mA     |
| Operating Temperature                                                      | $T_{case}$                           | -40                          |              | +70   | °C     |

## NOTES

† 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



## Application Notes

The BUC-Series Converters may be powered by one of two methods. Either supply +10.5 to +18 Vdc between the center conductor and ground of the L-Band input cable (cable powered) or apply +10.5 to +18 Vdc to the DC power RFI and the ground lug.

The 10 MHz reference is applied to the L-Band input cable along with the L-Band signal, and should be applied using a diplexer. (See Figure 2.)

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

### OTHER VertexRSI PRODUCTS

- Low Noise Amplifiers and LNA Systems
- Solid-State Power Amplifiers and SSPA Systems

- General Purpose Converters
- Satellite Communications Equipment
- Custom Subsystems



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Specifications are subject to change at VertexRSI's discretion.