



**Features**

- Accepts RF signals from 400 MHz to 4000 MHz
- Accepts RF input levels from -60 dBm to -20 dBm
- Baseband IF output with up to 390 MHz bandwidth
- Internal OCXO or external 10 MHz frequency reference

**General Information**

The Bandit® Model 7820 is a two-channel, high-performance, stand-alone analog RF wideband downconverter. Packaged in a small, shielded PCIe board with front-panel connectors for easy integration into RF systems, the board offers programmable gain, high dynamic range and a low noise figure.

With an input frequency range from 400 to 4000 MHz and a wide IF bandwidth of up to 390 MHz, the 7820 is an ideal solution for amplifying and downconverting antenna signals for communications, radar and signal intelligence systems.

**Programmable Input Level**

The 7820 accepts RF signals on two front-panel SSMC connectors. LNAs (Low Noise Amplifiers) are provided, along with two programmable attenuators allowing downconversion of input signals ranging from -60 dBm to -20 dBm in steps of 0.5 dB. Higher level signals can be attenuated prior to input.

**Input Filter Options**

An optional five-stage lowpass or bandpass input filter can be included with several available frequency and attenuation characteristics for RF image rejection and harmonic suppression.

**Quadrature Mixers**

The 7820 features a pair of Analog Devices ADL5380 quadrature mixers. The ADL5380's are capable of excellent accuracy

with amplitude and phase balances of ~0.07 dB and ~0.2°, respectively.

**Tuning Accuracy**

The 7820 uses an Analog Devices ADF4351 low-noise, on-board frequency synthesizer as the LO (Local Oscillator). Locked to an external input reference for accuracy with a fractional-N phase-locked loop, its frequency is programmable across the 400 to the 4000 MHz band with a tuning resolution of better than 100 kHz.

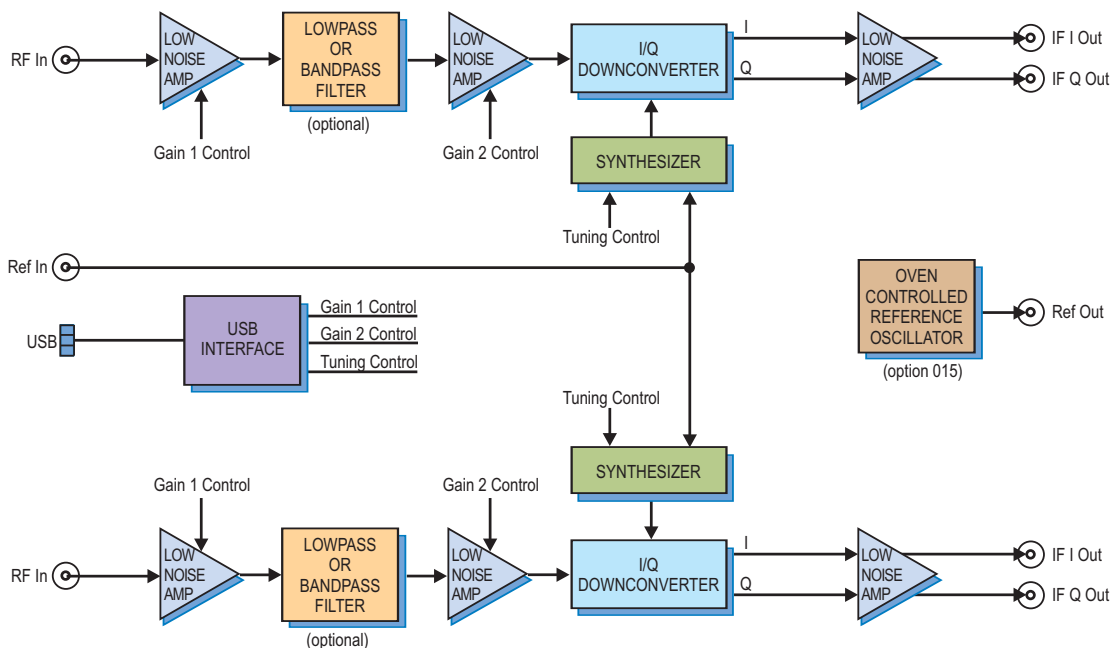
**On-board Reference Clock**

In addition to accepting a 10 MHz reference signal on the front panel, the 7820 includes an on-board 10 MHz crystal oscillator which can be used as the reference to lock the internal LO frequency synthesizer.

This reference is an OCXO (Oven Controlled Crystal Oscillator), which provides an exceptionally precise frequency standard with excellent phase noise characteristics.

**Wideband Output**

Output is provided as baseband I and Q signals at bandwidths up to 390 MHz. Alternatively, either I or Q output can be used at some intermediate offset frequency convenient to the application. User-provided in-line output IF filters allow customizing the output bandwidth and offset frequency to the specific application requirements. This output is suitable for A/D conversion using Pentek high-performance signal acquisition products, such as those in the Cobalt and Onyx families. ➤



### ► Specifications

#### RF Input

Connector Type: SSMC

Input Impedance: 50 ohms

Input Level Range: -60 dBm to -20 dBm

Flatness:  $\pm 2$  dB from 400 MHz to 1 GHz,  
 $\pm 3$  dB from 1 GHz to 3 GHz,  $\pm 5$  dB from  
3 GHz to 4 GHz

RF Attenuator: Programmable from 0 to  
63 dB in 0.5 dB steps

#### LO Synthesizer Tuning

Frequency range: 400-4000 MHz,

Resolution: < 10 kHz

Tuning Speed: < 500  $\mu$ sec

Phase-Locked Loop Bandwidth: 100 kHz

#### Phase Noise

1 kHz: -90 dBc/Hz

100 kHz: -110 dBc/Hz

1 MHz: -130 dBc/Hz

#### Noise Figure (referred to input)

60 dB gain: 2.6 dB

#### Inband Output IP3

20 dB gain: +10 dBm

60 dB gain: +42 dBm

#### Reference Input/Output

Connector Type: SSMC

Input/Output Impedance: 50 ohms

#### Reference Input Signal

Frequency: 10 MHz

Level: 0 dBm, sine wave

#### Reference Output Signal

Frequency: 10 MHz

Level: 0 dBm, sine wave

#### OCXO Reference

Center Frequency: 10 MHz

Frequency Stability vs. Change in

Temperature:  $\pm 50.0$  ppb

Frequency Calibration:  $\pm 1.0$  ppm

#### Aging

Daily:  $\pm 10$  ppb/day

First Year:  $\pm 300$  ppb

#### Total Frequency Tolerance

(20 years):  $\pm 4.60$  ppm

#### Phase Noise

1 Hz Offset: -67 dBc/Hz

10 Hz Offset: -100 dBc/Hz

100 Hz Offset: -130 dBc/Hz

1 KHz Offset: -148 dBc/Hz

10 KHz Offset: -154 dBc/Hz

100 KHz Offset: -155 dBc/Hz

#### IF Output

Connector Type: SSMC

Output Impedance: 50 ohms

Center Frequency: User definable

Output Level: 0 dBm, nominal

#### Programming

Functions: RF Atten, IF Atten, Int/Ext

Reference Select, LO Synthesizer Frequency

Interface: USB

Connector Type: MicroUSB

#### Power

Voltage: +12 VDC

Current: 1.5 A

#### PCI-Express Interface

PCI Express Bus: x4 or x8, power only

#### Environmental

Operating Temp: 0° to 50° C

Storage Temp: -20° to 90° C

Relative Humidity: 0 to 95%, non-cond.

Size: Half length PCIe card, 4.38 in. x 7.13 in.

### Ordering Information

Model	Description
7820	Bandit Two-Channel Analog RF Wideband Downconverter - PCIe

Option	Description
-015	Oven Controlled Reference Oscillator
-145	1.45 GHz lowpass input filter
-280	2.80 GHz lowpass input filter