

- ▲ Available in XMC, CCXMC, PCIe formats
- ▲ Single 12-bit (1.5 Gbps) ADC
- ▲ AC or DC coupled analog inputs
- ▲ Fixed or variable frequency synthesizer
- ▲ Selectable triggers (HW, SW, TOD)
- ▲ Continuous, snapshot, periodic operation
- ▲ VITA 49 compliant data packet format
- ▲ Temperature and current monitors
- ▲ PCI Express (PCIe) x8 Gen 2 bus
- ▲ Scatter-gather DMA bus master
- ▲ Windows and Linux drivers with API
- ▲ Application example with source code

## Signal Acquisition

The *SigStream* product family performs general purpose signal acquisition for a broad range of applications (scientific, medical, industrial, communications).

The Model 276 is designed around the Texas Instruments ADC12D1000 12-bit ADC. The 1.5 Gbps channel rate is produced by a half rate (750 MHz) sample clock that is supplied by either the on-board frequency synthesizer or an external source. The frequency synthesizer can be phase locked to the local 10 MHz TCXO or an external reference can be used to achieve system-wide phase coherence.

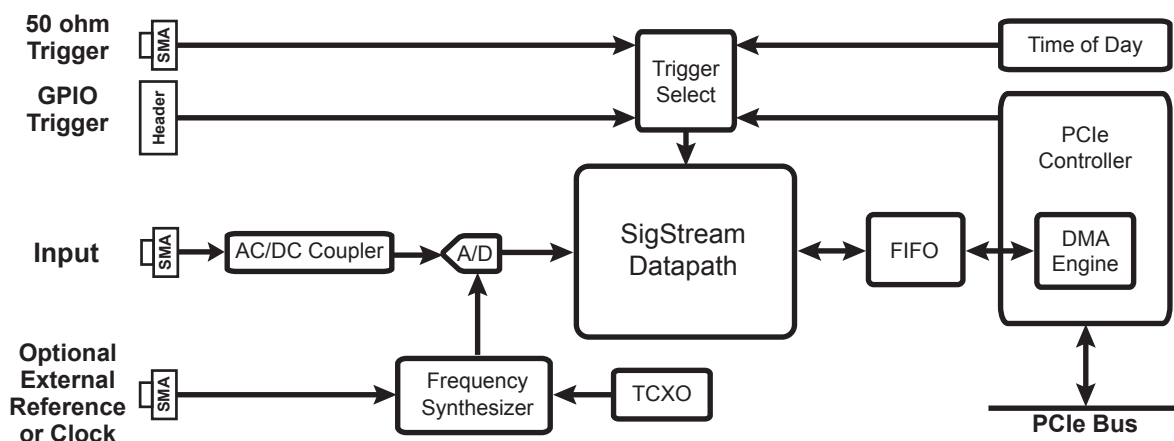
The on-board frequency synthesizer can be fixed to a specified sample rate for optimum phase noise and spurious performance, or it can be variable for maximum flexibility. The variable frequency synthesizer is programmed in 100 kHz step sizes.

The Model 276 is available as a PCI Express mezzanine card (XMC), conduction cooled mezzanine card (CCXMC), or half-length PCI Express (PCIe) adapter card. The CCXMC can be mounted to any VITA 20-2001 compliant host without modification. All form factors offer four lane (x4) or eight lane (x8) bus operation at Gen 2 performance.

All *SigStream* products include a rich set of software programmable features that include selectable operating modes (continuous, snapshot, periodic), external or timed event triggers, timestamped data samples, data sizing, and data packing. Data is sent to the host computer as a continuous stream of samples or in data packets defined by the VITA 49 specification.

Signal acquisition can be started by software command, software trigger, external hardware trigger, or preset time of day. These same options are available to stop a collection.

The start/stop events can be used to define the length of a snapshot, but there is also a feature to simply specify the number of samples to process following the start event.



The *SigStream* product can be programmed to repeat snapshots on a periodic interval. The length of each cycle is defined by the start/stop events described above, or a fixed length frame duration. Periodic operation is terminated by software command, preset time of day, or simply specifying the number of cycles to process.

A GPIO header provides separate hardware trigger connections for each channel. A 50 ohm terminated coaxial input offers a second trigger source that provides controlled impedance through the cable interconnect.

The Model 276 monitors both power consumption and temperature during normal operation. Current measurements are available on all of the primary voltage supplies. Temperature sensors monitor the DSP die temperature, ADC die temperature, and four other locations on the card.

A DMA engine assigned to each channel manages data transfers between the PCIe controller and host memory. The DMA engine allows the receiver to automatically initiate a PCIe burst transaction when data needs to be transferred. High performance DMA techniques are supported by both the hardware and software to optimize data transfer efficiency. Memory fragmentation problems are eliminated by supporting thousands of scatter-gather DMA buffers in host memory.

The progress of DMA transfers is tracked by polling the hardware or monitoring interrupts. The spacing of interrupts is variable, they are programmed to fire when the desired number of DMA pages are refreshed. The *SigStream* product includes an interrupt timer function to measure the response time of the host. This is used to establish an optimum interrupt frequency that will not overwhelm the software.

Demonstration software is provided with the hardware to quickly establish a path to end-user application code. The API is supported with drivers for Windows™ or Linux operating systems.

## Typical Applications

- ▲ **Wideband signal acquisition**
- ▲ **Electronic intelligence (ELINT) collection**
- ▲ **Software defined radio**
- ▲ **Algorithm prototyping**
- ▲ **Signal recorder**

## Specification Summary

### ▲ Receiver Performance

Measured characteristics:

Full power bandwidth: 2.8 GHz

SNR: 56 dB (First Nyquist typical)

SFDR: 66 dBc (First Nyquist typical)

Channel isolation: 80 dB (typical)

Phase noise: -100 dBc/Hz (10 kHz offset)

Internal reference: 10 MHz +/- 1.0 ppm

### ▲ Hardware

Format: XMC, CCXMC, half-length PCIe

PCIe: x4 or x8 Gen 2

Selectable internal or external sample clock

Selectable internal or external reference

Coaxial trigger (50 ohm terminated)

GPIO triggers (50 ohm terminated option)

Power dissipation: 15 Watts

### ▲ Software

Adapter driver: Linux, Windows

SigStream application example

### ▲ Build Options

Synthesizer frequency:

750 MHz (1.5 Gsps)

666 MHz (1.33 Gsps)

Programmable (Degraded phase noise)

Conformal coat for harsh environments

## Red Rapids

797 North Grove Rd, Suite 101

Richardson, TX 75081

Phone: 972-671-9570

Fax: 972-671-9572

[www.redrapids.com](http://www.redrapids.com)