

# ICS-1640

## 16-Channel, 2.5 MHz, 24-bit ADC PCI Express x4 Slot Card

Designed for demanding acoustic and ultrasound requirements, the ICS-1640 offers an unprecedented capability for applications in sonar, vibration analysis, and test and measurement. The PCI Express 4-lane short form factor card provides high channel density and excellent performance.

The 24-bit Delta-Sigma converters used on the product provide programmable oversampling ratios, giving a wide range of sampling frequencies. The exceptional dynamic range provided by these converters enables the ICS-1640 to directly sample the analog signals, without the inherent performance degradation of a complex signal conditioning stage.

The flexible clocking scheme provides for programming of the sampling frequency over the entire sampling range of the converters with a resolution of 1 Hz or better. The clock can be locked to a very stable on-board 10 MHz TCXO, or to an externally supplied reference clock (such as that provided by a GPS receiver). The external clock can also be provided at the desired sampling rate or at the oversampling clock frequency.

The ICS-1640 provides the capability for multiple board synchronization for applications that require more than 16 channels, or that require synchronization between receive and transmit elements of the

system. The ICS-1620 provides a DAC product complementary to the ICS-1640; the two products are designed to work together in systems requiring both receive and transmit elements.

The PCI Express x4 host interface allows the ICS 1640 to be utilized in the latest generation of high-end PC servers for control and data processing using the capabilities of multi-core CPUs. The x4 interface provides the necessary data bandwidth to support the full capabilities of the module. The scatter/gather mode of DMA implemented on the ICS-1640 allows for interrupt driven data transfer architectures, or for demand mode data transfer.

The ICS-1640 also includes 16 MBytes of high speed on-board storage in a swing buffer configuration. The swing buffer is programmable in depth allowing an application to fine tune system latencies to achieve optimal performance.

Another feature of the swing buffer is that it supports both continuous and capture modes of operation. The capture mode has two sub-modes, one in which a single contiguous data sequence is acquired within the programmed swing buffer length on each application of a trigger, and another in which multiple contiguous sequences are acquired within the programmed swing buffer length, one for each application of the trigger. In the latter mode, the programmed length of the swing buffer must be a multiple of the programmed acquisition count.

### FEATURES:

- 16-Channel, 2.5 MHz Sigma-Delta 24-bit ADC
- Short form factor
- Fully differential inputs
- Better than 100 dB dynamic range
- Simultaneous sampling on all channels
- Multiple-board synchronization
- PCIe x4 interface
- Internal/external clock
- Internal clock programmable with resolution of <1 Hz
- 10 MHz on-board TCXO reference
- 16 MB on-board storage
- Windows® and Linux® Software Development Kits

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## Specifications

### Analog Input

- Sixteen differential inputs
- 4 kOhm input impedance
- 44-pin high density D-subminiature connector (male) for analog inputs, ext. clock, ext. trigger
- Sample resolution 24 bits
- Full scale input voltage 20 Vpp differential
- Input signal bandwidth 0.4 x sample output rate
- Oversampling clock ratios from 8 to 256
- Oversampling clock maximum 40 MHz
- Oversampling clock minimum 1.0 MHz
- Maximum sample output rate 2.5 MHz
- Minimum sample output rate 1.95 kHz
- Internal sample clock oscillator programmable in steps of <1 Hz
- On board TCXO clock reference 10 MHz ±5ppm
- Sampling on rising edge of internal or external clock
- External trigger LVTTTL/LVCMOS, software selectable rising/falling edge
- External clock LVTTTL/LVCMOS
- 112 dB SNR at 78 kHz sample output rate
- 100 dB SNR at 2.5 MHz sample output rate
- SFDR 114 dBc @ 1 MHz

### General

- Short Form Factor PCIe x4

### Environmental

- 0° to +55°C Operating
- -40° to +85°C Storage
- Humidity <95% non-condensing

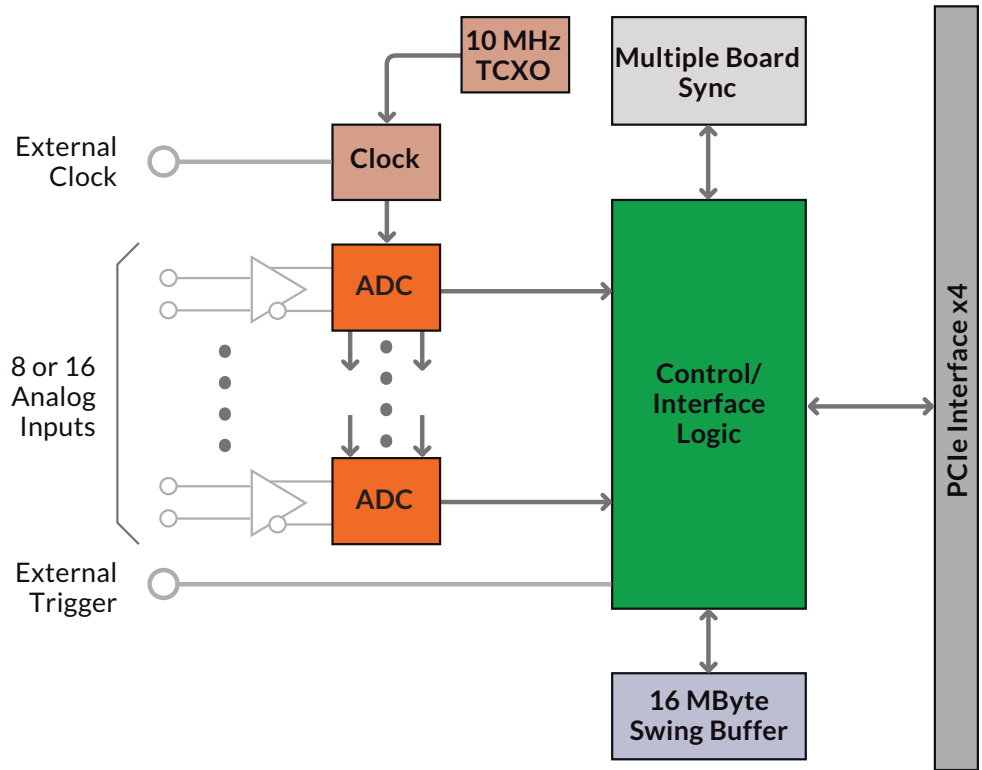
### Power

- 30W

### Software

- Windows and Linux Software Development Kits
- Software Development Kits (SDK) include API and application examples

## Block diagram



## Ordering information

ICS-1640A-000	16-channel 2.5 MHz ADC PCIe x4 module
ICS-1640A-001	8-channel 2.5 MHz ADC PCIe x4 module
ICS-1640A-002	16-channel, 625 kHz ADC PCIe x 4 module
ICS-1640A-003	8-channel, 625 kHz ADC PCIe x4 module
CN-P44-F	Analog mating connector kit for ICS-1640 (one required per board)
ICS-1640-SDK-WIN	Software development kit for Windows XP and Vista operating system
ICS-1640-SDK-LX	Software development kit for Linux operating system

Cable options are available. Contact your sales representative for details.

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