

ICS-8553

Rugged 4/2-channel, 1.5/3 GHz ADC XMC Module with Virtex-4 FPGA and PCI Express

Features

- Four transformer-coupled analog Inputs
- $F_s \leq 1.5$ GHz 4-channel, or 3 GHz 2 channel (software selectable), 8 bit
- Xilinx Virtex-4 FPGA User Programmable FPGA (FX60)
- TCXO @ 10 MHz
- 8 Individual MMCX Coaxial Connectors
- PCI 2.2 64-bit, 66 MHz Master/Target Burst Mode DMA capable
- VITA 42 (XMC) high-speed serial interface (single connector, 8 lanes)
- PCI Express 8-lane interface available
- Pn4 LVDS or LVTTTL signal levels
- ANSI/VITA 20-2001 conduction cooled PMC
- VxWorks, Linux and Windows software drivers

The ICS-8553 is a rugged two- and four-channel, 1.5/3 GHz ADC XMC module intended for Software Defined Radio (SDR) applications such as communications and radar in benign and hostile environments.

The analog inputs are coupled to the ADCs by means of baluns, providing a characteristic input impedance of 50 ohms.

The combination of high performance ADC and FPGA resources allows VHF and UHF signals to be digitized and processed directly on the XMC module. Algorithms such as digital down conversion, FFT, and filtering can be developed to execute in the Virtex 4 FPGA, using the included Hardware Development Kit (HDK). The module is available in five levels of ruggedization, three for air-cooled environments and two for conduction cooled environments. Details of the environmental specifications are available from our web site.

The ICS-8553 HDK includes a default logic core, designed to provide minimum occupancy of the FPGA and to provide a basis for customers to program their own functionality. It includes an A/D interface and data buffering to the high-speed serial outputs and PCI Bus. Functions such as time stamping, digital down-conversion, filtering and Fast Fourier Transform

can be implemented in the FPGA. For customers not wishing to implement their own DSP functions, we can provide either off-the-shelf DSP functions or our FPGA development team can design and implement specific functions to the customer's specification.

The ICS-8553 provides the user with up to eight lanes of high-speed serial I/O for communication with XMC equipped carrier cards at rates up to 3.125 GBytes/s. An optional 8-lane PCI Express end point may be installed in the FPGA for carriers which connect the XMC P15 port through a PCI Express bridge. Using this interface sustained aggregate data rates exceeding 1 GByte/s are possible. The exact data rate achieved will be determined by the overall system details.

The 64/66 PCI interface provides sustained data rates in excess of 400 MBytes/s, while the Pn4 user I/O port allows the user to define direct point to point connections to the FPGA, eliminating interrupt latencies. The latter two interfaces may be used for applications in which the XMC interface cannot be used.

The analog connections are made by means of eight individual MMCX miniature co-axial connectors.



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Specifications

Analog Input

- Four transformer-coupled analog inputs
- 50 ohm input impedance
- Software selectable full scale input, -0.24 dBm (615 mVpp) or -2.8 dBm (460 mVpp)
- Input signal bandwidth of 30 MHz - 1.7 GHz (-3 dB point)
- Maximum sample rate of 1.5 GSPS/channel in 4 channel mode or 3.0 GSPS/channel in 2 channel mode
- Minimum sample rate of 200 MSPS
- Internal Sample Clock VCO locked to onboard 10 MHz TCXO or External Source
- Analog to digital resolution 8 bits
- Sampling on rising or falling edge of internal or external sample clock
- External Clock LVTTTL or Sinewave compatible 0 dBm min., 20 dBm max.
- External trigger LVTTTL
- External sync LVTTTL
- External user LVTTTL
- SINAD > 40 dB @ 748 MHz input frequency
- SFDR > 45 dB @ 748 MHz input frequency

General Specifications

- IEEE Std. P1386.1-2001 compatible PCI mezzanine card
- ANSI/VITA 20-2001 conduction-cooled PMC
- VITA 42.0-200x XMC compatible (single connector)
- VxWorks®, Linux® and Windows® software device drivers

Onboard Resources

- Xilinx Virtex-4 FPGA FX60
- TCXO @ 10 MHz
- 8 individual MMCX Coaxial Connectors

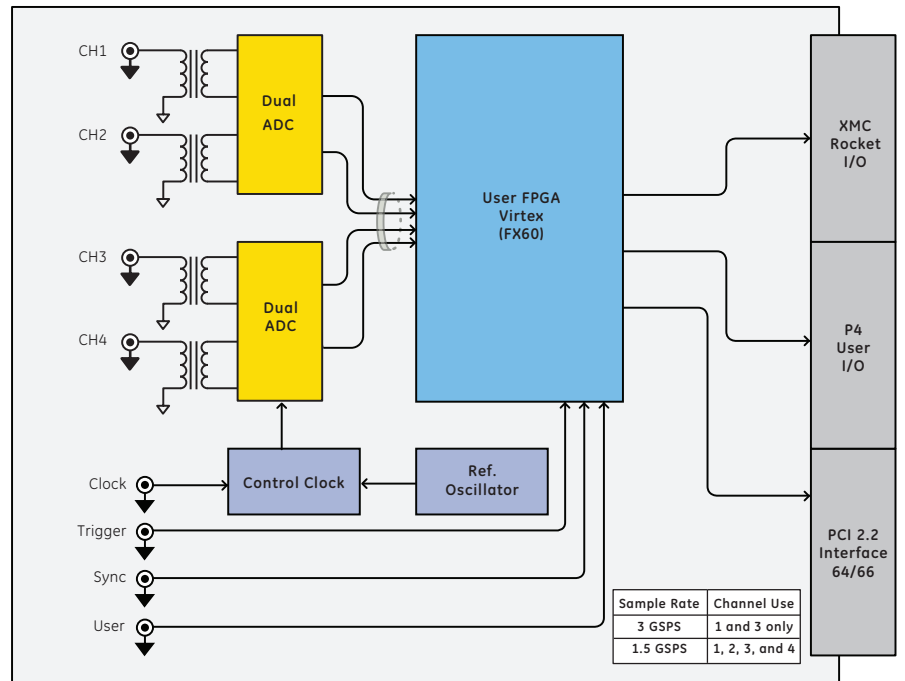
I/O Specifications

- PCI 2.2 64-bit, 66 MHz master/target burst mode DMA capable
- XMC interface, two channels, each with four lanes @ 3.125 GBytes/s VITA 42.0-200x
- 8 lane PCI Express interface, on XMC connector, VITA 42.3-200x
- All 64 user programmable I/O via Pn4 connector routed directly to FPGA
- Pn4 user definable LVDS or LVTTTL signal levels

Environmental

- Five build levels available. Air and conduction cooled versions
- -40°C to +85°C operating temperature
- 95% non-condensing humidity

Block Diagram



Ordering Information

- ICS-8553A-x00** ICS-8553 with Virtex-4 FX60 FPGA [*x* = ruggedization level (1-5)]
- ICS-8553A-x07** ICS-8553 with Virtex-4 FX60 & PCI Express [*x* = ruggedization level (1-5)]
- DRV-8553-VXW** Software device driver for VxWorks operating system
- DRV-8553-LX** Software device driver for Linux operating system
- DRV-8553-WIN** Software device driver for Windows operating system

About GE Intelligent Platforms

GE Intelligent Platforms, a General Electric Company (NYSE: GE), is an experienced high-performance technology company and a global provider of hardware, software, services, and expertise in automation and embedded computing. We offer a unique foundation of agile, advanced and ultra-reliable technology that provides customers a sustainable advantage in the industries they serve, including energy, water, consumer packaged goods, government and defense, and telecommunications. GE Intelligent Platforms is a worldwide company headquartered in Charlottesville, VA and is part of GE Home and Business Solutions. For more information, visit www.ge-ip.com.

GE Intelligent Platforms Contact Information

Americas: 1 800 433 2682 or 1 434 978 5100

Global regional phone numbers are listed by location on our web site at www.ge-ip.com/contact

www.ge-ip.com/sensorprocessing

