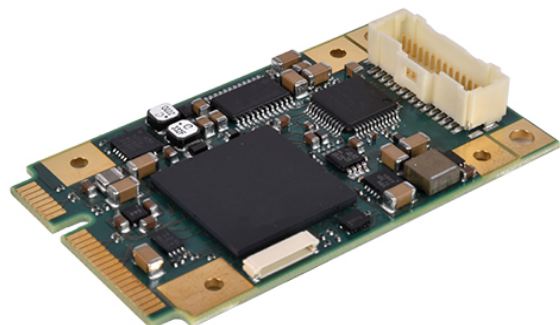


IO397

Simulink-Programmable FPGA and Configurable FPGA I/O Module



Included in the Delivery

- I/O module installed in the real-time target machine
- Cable
- Terminal board
- Simulink driver blocks
- Test models
- Comprehensive documentation

Capabilities

The IO397 I/O module is a mPCIe - compatible, Simulink-programmable FPGA and configurable FPGA I/O module offering 50k logic cells, 4 ADC input channels, 4 DAC output channels, 14 ESD-protected TTL I/O lines and a Xilinx® Artix®-7 chip.

The 4 ADC input channels each have a 16-bit resolution and can work with up to 200 ksps. The analog input circuit is designed to allow software-selectable input voltages of 0-5.12 V, 0-10 V, 0-10.24 V, ± 5 V, ± 5.12 V, ± 10 V and ± 10.24 V.

The 4 DAC output channels also each offer a 16-bit resolution and a settling time of 10 μ s. The analog input circuit is designed to allow software-selectable output voltages of 0-5 V, 0-10 V, 0-10.8 V, ± 5 V, ± 10 V or ± 10.8 V.

For customer-specific I/O extensions or inter-module communication, the IO397 also provides 14 ESD-protected TTL I/O lines, each of which have a pull resistor to a common programmable pull voltage that can be set to +3.3 V, +5 V and GND.

The user FPGA is configured by a SPI flash and an in-circuit debugging option is available via a JTAG header for read back and real-time debugging of the FPGA design.

This I/O module is ideal for closed-loop controls and hardware-in-the-loop (HIL) simulations using MATLAB® and Simulink.

Common Applications

- Rapid control prototyping
- Hardware-in-the-loop (HIL) simulation

Supported Target Machines

- Baseline
- Unit

Key Features

14 ESD-protected TTL I/O lines with pull-resistors. Voltage levels of +3.3 V, +5 V, or ground, and input/output directions that are software configurable by I/O line

4x 16-bit analog inputs, 200 ksps, ADC

4x 16-bit analog outputs with a 10 μ s settling time, DAC

Programmable FPGA workflow for Simulink Real-Time™ supported by Speedgoat custom implementation bitstreams and the Speedgoat I/O Blockset

Configurable FPGA workflow for Simulink Real-Time™ supported by Speedgoat custom implementation bitstreams and the Speedgoat I/O Blockset

Configuration Package

Configuration Package (Optional)	
IO397 Rapid Control Prototyping Configuration	3x PWM, 1x Quadrature Decoder, 3x digital I/O, and 1x Interrupt line. All I/Os can be used as digital I/O
IO397 Hardware in-the-loop Configuration	6x CAP, 1x Quadrature Encoder, 3x digital I/O and 1x Interrupt line. All I/Os can be used as digital I/O
IO397 Communication Configuration	2x SPI Master/Slave, 1x I2C Master, 1x I2C Slave and 1x Serial (UART). All I/Os can be used as digital I/O

Technical Specifications

Physical	
Form factor	mPCIe
Power requirements	+3.3 Vaux: 650 mA typical
Bus	PCI Express
Connectors	Digital 1: 17-pin M12 male Cable connector: Phoenix Contact M12 17-pos female connector Board connector: Phoenix Contact part no. 1442078 Digital 2: 17-pin M12 female Cable connector: Phoenix Contact M12 17-pos male connector Board connector: Phoenix Contact part no. 1442081
Environmental	
Operating temperature	-40 °C to +85 °C
Relative humidity	5 to 95 %, non-condensing
FPGA	
FPGA chip	Xilinx Artix-7 XC7A50T
No. of logic cells available	50k
I/O	
Digital	14 ESD-protected TTL I/O lines with pull-resistors. Voltage levels of +3.3 V, +5 V, or ground, and input/output directions that are software configurable by I/O line
Analog inputs	4x 16-bit, 200 ksps, simultaneous sampling, differential/single-ended, and software -selectable voltage ranges: 0-5.12 V, 0-10 V, 0-10.24 V, ± 5 V, ± 5.12 V, ± 10 V and ± 10.24 V
Analog outputs	4x 16-bit, 10 μ s settling time, and software-selectable voltage ranges: 0-5 V, 0-10 V, 0-10.8 V, ± 5 V, ± 10 V or ± 10.8 V
Reliability	
Mean time between failures (MTBF)*	987,000 hours
* MTBF values shown are based on calculation according to MIL-HDBK-217F and MIL-HDBK-217F Notice 2. Environment GB 20 °C. The MTBF calculation is based on component FIT rates provided by the component suppliers. If FIT rates are not available, MIL-HDBK-217F and MIL-HDBK-217F Notice 2 formulas are used for the FIT rate calculation.	

Order and Contact Information

Item ID	Product Name	Components
2A397X*	IO397	1x IO397 FPGA I/O module
		2x 17-pin male M12 to 17-pin female M12 Cable, (3 ft/0.91 m)
		1x 2-way 17-Pin M12 Terminal Board
		Driver block library for Simulink Real-Time
		Simulink test models
		Comprehensive documentation and Simulink example models
		Installation into the real-time target machine
Configuration Package		
20397Z	IO397 Configuration Package	Configuration files for: <ul style="list-style-type: none">■ Rapid control prototyping■ Hardware-in-the-Loop■ Communication

* Please replace the X with the code number of the specific target machine for the I/O module installation:

7 = Unit real-time target machine

8 = Baseline real-time target machine

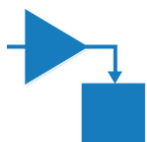
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Benefits of Speedgoat Solutions



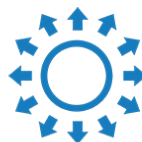
Made for Simulink



Vast Range of I/O & Protocols



Built for Speed



Scales with Your Projects



Configured to Your Needs



With Quality Services