GX3788

HIGH-PERFORMANCE, FPGA MULTI-FUNCTION PXI CARD

- User configurable FPGA with digital & analog I/O
- 96 digital I/O
- 8, 16-bit differential, 250 KS/s A/D inputs
- 8, 16-bit, 1 MS/s D/A outputs
- Module software is fully compatible with Altera configuration files
- Integral DMA controller
- 8 MB of on-board SSRAM

DESCRIPTION

The GX3788 is a user configurable, FPGA-based, 3U PXI multi-function card which supports digital and analog test capabilities. The card employs the Altera Stratix III FPGA which features over 45,000 logic elements and 1.836 Kb of memory. The GX3788 is based on the GX3700 FPGA card and includes an integral daughter board which provides (8) differential input, 16-bit, 250 MS/s A to D converters and (8), 16-bit, 1 MS/s, D to A converters. The module's FPGA is pre-programmed, providing access to all digital and analog functions. Alternatively, users can program or modify the FPGA , allowing user to adapt the module to their own specific test needs. The design of the FPGA is done by using Altera's free Quartus II Web Edition tool set. Once the user has compiled the FPGA design, the configuration file can be loaded into the FPGA directly or via an on-board EEPROM.

FEATURES

The GX3788's digital I/O signals are TTL compatible and can be programmed as inputs or outputs. The A to D channels can be configured as 8 differential or 16 single ended inputs and support a sampling rate of up to 250 KS/s. Alternately, two channel operation can support a sampling rate of 1 MS/s. The D to A channels support a simultaneous sampling rate of 1 MS/s. The FPGA device supports up to four phase lock loops for clock synthesis, clock generation and for support of the I/O interface. An on-board 80 MHz oscillator is available for use with the FGPA device or alternatively, the PXI 10 MHz clock can be used as a clock reference by the FPGA.

The FPGA has access to all of the PXI bus resources including the PXI 10 MHz clock, the local bus, and the PXI triggers; allowing the user to create a custom instrument which incorporates all PXI bus resources. Control and access to the FPGA is provided via the GX3788's driver which includes DMA and interrupt support tools for downloading the compiled FPGA code as well as register read and write functionality. Additionally, dedicated interface logic supports the PCI bus, eliminating the need to incorporate the PCI bus interface into the user's FPGA design.

PROGRAMMING AND SOFTWARE

The board is supplied with the GXFPGA library, a software package that includes a virtual instrument panel, and a Windows 32/64-bit DLL driver library and documentation. The virtual panel can be used to interactively program and control the instrument from a window that displays the instrument's current settings and status. In addition, interface files are provided to support access to programming tools and languages such as ATEasy, LabView, LabView/Real-Time, C/C++, Microsoft Visual Basic®, Delphi, and Pascal. An On-Line help file and PDF User's Guide provides documentation that includes instructions for installing, using and programming the board.
A separate software package - GtLinux - provides support for Linux 32/64 operating systems.

APPLICATIONS

- Automatic Test Equipment (ATE)
- Mixed-signal test
- Semiconductor test
- Custom interface emulation
- Custom instrumentation

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SPECIFICATIONS

DIGITAL I/O CHANNELS	
Logic Families	LVTTL, configurable for 1.2 / 2.5 / 3.3 V logic; 5 V compatible
Output Current	±24.0 mA
Input Leakage Current	±10 µA
Power on State	Default is disconnect at power on (unprogrammed FPGA) or defined by FPGA program
Number of Channels	96 I/O signals Direction is configurable on a per channel basis
FIFO Depth	2047 Samples
Maximum FIFO Clock Rate	10 MHz
Clock Sources	PXI Triggers, Ext Trigger, Star X
Protection	Overvoltage: -0.5 V to 7.0 V (input) Short circuit: up to 8 outputs may be shorted at a time
ANALOG INPUT CHANNELS	
Number of Channels	8 differential or 16 single-ended
Sample Rate	250 KS/s (simultaneous) or 1 MS/s (two channels)
Bus Transfer Modes	DMA, Interrupt, Register I/O
Resolution	16-bits
Accuracy (uncalibrated)	± 6.7 mV, 13.6 V range ± 5.5 mV, 10.24 V range ± 2.8 mV, 5.12 V range ± 1.4 mV, 2.56 V range ± 0.75 mV, 1.28 V range ± 0.38 mV, 0.64 V range
Input Voltage Ranges (FS VDC)	± 13.6* ± 10.24 ± 5.12 ± 2.56 ± 1.28 ± 0.64 * Uses the gain value for the 20.48 VDC range
Input Impedance	500 M ohms
Analog BW (3 dB)	8 MHz
Over Voltage Protection	± 24V
CMRR, DC to 60 Hz	90 dB
Channel to Channel Crosstalk	-120 dB (adj. ch.), Fin = 10 KHz
Triggering	Trigger in / Trigger out (FPGA controlled)
ANALOG OUTPUT CHANNELS	
Number of Channels	8
Conversion Rate	1 MS/s (simultaneous)
Resolution	16-bits
Output Accuracy	0.2 mV (@ FS)
Output Range	± 10 V
Output Drive Current	3 mA
Short Circuit Current	8 mA
Output Slew Rate	6 V/us
TIMING SOURCES	
PXI Bus	10 MHz
Internal	80 MHz oscillator, ±20 ppm
FPGA AND MEMORY	
FPGA Type	Altera Stratix III, EP3SL50F780
Number of PLLs	Four
Logic Elements	47.5 K
Internal Memory	1.836 Mb
On-Board Memory	256 K x 32 SSRAM
On-Board Flash	16 MB
POWER	
3.3 VDC	3.6 A (typ); 4.9 A (max)
5 VDC	0.045 A (max)
12 VDC	TBD
ENVIRONMENTAL	
Operating Temperature	0 °C to +50 °C
Storage Temperature	-20 °C to +70 °C
Operational Shock	30G, ½ sine, 11 ms pulse
Vibration (operating)	2G @ 500 Hz
Size	3U PXI
Weight	200 g

Note: Specifications are subject to change without notice

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ORDERING INFORMATION

GX3788	High-Performance, FPGA Multi-Function PXI Card
GX3788-M	High-Performance, FPGA Multi-Function PXI Card, (Ruggedized and Conformally Coated)
ACCESSORY	
GT95021	2' shielded cable for 5xxx/35xx products (68 Pin)
GT95022	3' shielded cable for 5xxx/35xx products (68 Pin)
GT95028	10' shielded cable for 5xxx/35xx products (68 Pin)
GT95031	6' shielded cable for 5xxx/35xx products (68 Pin)

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MARVIN TEST SOLUTIONS

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