GX3788

HIGH-PERFORMANCE, FPGA MULTI-FUNCTION PXI CARD

- User configurable FPGA with Digital and Analog I/O
- 32 Differential / 64 Single-ended Digital I/O lines
- 8 Differential / 16 Single-ended 75 kS/s A/D inputs
- 8 16-bit, 1 MS/s D/A outputs
- 8 MB of on-board SSRAM
- PXI hybrid slot compatible
- Integral DMA controller
- Fully compatible with Altera configuration files

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 32 differential/64 single-ended Digital I/O lines, 8 differential/16 single-ended 75 kS/s A to D inputs and (8) 16-bit, 1 MS/s, D to A outputs. The module's FPGA is pre-programmed, providing access to all digital and analog functions. Alternatively, users can program or modify the FPGA , allowing the 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 75 KS/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

FPGA

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SPECIFICATIONS

DIGITAL I/O CHANNELS	
Logic Families	LVTTL, LVDS, configurable for 1.2 / 2.5 / 3.3 V logic; 5 V compatible, programmable per pin via the FPGA
Output Current	±12.0 mA, max. Programmable per pin via the FPGA
Input Leakage Current	±10 µA
Power on State	Default is disconnected at power on (unprogrammed FPGA) or defined by FPGA program
Number of Channels	32 Differential Digital I/O lines or 64 Single-ended Digital I/O lines
FIFO Depth	4096 Samples
Maximum FIFO Clock Rate	10 MHz
Clock Sources	PXI triggers, Ext Trigger, Star X, PXI Clk10, PXI Clk100 (Express version), DSTAR (Express version), Local bus
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	1 Hz to 75 kHz (Using GX3788 AnalogInScanXXX() APIs and channel list
Sample Rate Accuracy	1 Hz to 20 kHz: ±0.5% 20 kHz to 50 kHz: ±1.5% 50 kHz to 75 kHz: ±3.0%
Bus Transfer Modes	DMA, Interrupt, Register I/O
Resolution	16-bits
Input Voltage Ranges (FS VDC)	± 13.60 V* ± 10.24 V ± 5.12 V ± 2.56 V ± 1.28 V ± 0.64 V * Uses the gain value for the 10.24 VDC range
Input Voltage Accuracy	± 13.60 V Range: ±7.5 mV ± 10.24 V Range: ±6.5 mV ± 5.12 V Range: ±4.5 mV ± 2.56 V Range: ±4.0 mV ± 1.28 V Range: ±2.0 mV ± 0.64 V Range: ±1.0 mV
Input Impedance	500 M Ohms
Analog BW (3 dB)	8 MHz
Over Voltage Protection	± 24 V
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	± 6.0 mV
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	Intel/Altera Stratix III, EP3SL50F780
Number of PLLs	4
Logic Elements	47.5 K
Internal Memory	1.836 Mb
On-Board Memory	256 K x 32 SSRAM
On-Board Flash	16 MB

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POWER	
3.3 VDC	3.6 A (typ); 4.9 A (max)
5 VDC	0.045 A (max)
User 3.3 V (@ J1, J2 connector)	1 A, max
User 5 V (@ J3.J4 connector)	1 A, max
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
Relative Humidity (operating)	5% to 80% RH, non-condensing Dew point -5°C - 20°C
Relative Humidity (non-operating)	5% to 95% RH, non-condensing 30°C max
Altitude (operating)	Up to 2000 M
CE Compliance	EN61010-1 EN61326
Size	3U PXI
Weight	200 g
Calibration Interval	1 year

Note: Specifications are subject to change without notice

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 ft. Shielded Cable for all 5xxx/35xx (68 Pin)
GT95022	3 ft Shielded Cable for all 5xxx/35xx (68 Pin)
GT95028	10 ft shielded cable for 5xxx/35xx products (68 Pin)
GT95031	6 ft Shielded Cable for all 5xxx/35xx (68 Pin)
CALIBRATION	
GX3788-CAL	GX3788 Calibration/Verification Service. Includes pre-verification data (post calibration data provided if applicable)
GX3788-CAL-3	GX3788 Calibration/Verification Service - 3 years. Includes pre-verification data (post calibration data provided if applicable)
GX3788-CAL-5	GX3788 Calibration/Verification Service - 5 years. Includes pre-verification data (post calibration data provided if applicable)
GX3788-CALKIT	Calibration cable kit for use with the GX3788 module & CalEasy
CalEasy-GX3788	CalEasy for the GX3788 (Single User License) with One Year Support and Subscription
CalEasy	CalEasy License for all Supported Marvin Test Solutions Products (Single User License) with One Year Support and Subscription
CalEasy-2Y	CalEasy License for all Supported Marvin Test Solutions Products (Single User License) with Two Year Support and Subscription
CalEasy-3Y	CalEasy License for all Supported Marvin Test Solutions Products (Single User License) with Three Year Support and Subscription

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