Digital I/O XMC

Advanced 32-Channel RS485/422 Differential XMC

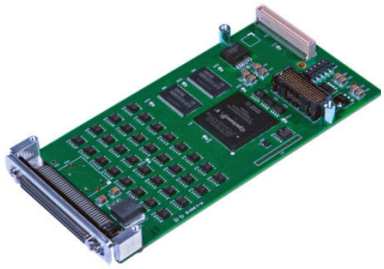
The P/N 7757 Advanced 32-channel RS485/422 XMC is a third generation successor to Technobox PMC solutions 2674 and 4289, both having been in continuous production since their introduction in the late 1990s. Whereas the 2674 and 4289 offered 4K and 12K Logic Elements (LEs) respectively, the 7757 provides the approximate equivalent of 50K LEs within its Altera® Cyclone® V GX FPGA (5CGXFC4C6F2717N). The Cyclone V also provides considerably more internal SRAM and several PLLs, as well as multipliers that are typically used for DSP applications.

Many key features of the 2674/4289 designs are retained such as asynchronous SRAM, 32 differential RS485 pairs, the facility to download FPGA code via PCI/PCI Express®, a local sensor to monitor board temperature, and JTAG programming via an Altera USB-Blaster™. Also carried over are FPGA-driven user LEDs, silicon delay lines for critical asynchronous FPGA circuits, serial EEPROM for user data, and an option for a precision oscillator. The 7757 preserves a 68-pin connector for its front panel interface and a PN4 connector for the rear.

The 7757 supports up to two GEN-1 (2.5 Gb/s) PCI Express lanes to a host processor via its P15 connector (either VITA 42 or VITA 61 style). Furthermore, the PCIe interface is built into the Altera Cyclone V GX as a hard core block, greatly simplifying access to PCIe resources.

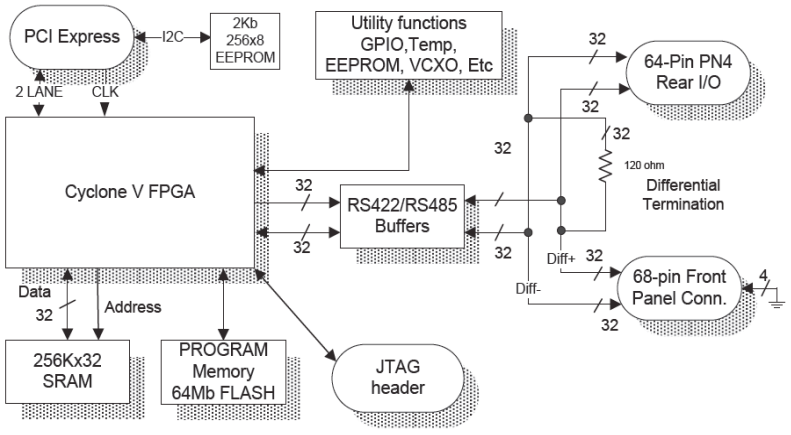
FPGA design programming is performed using Altera's Quartus® FPGA design software tools. A free web edition is available from Altera. Technobox provides sample FPGA and C code as a foundation for end user designs. Generally, designers will use Altera's Qsys to implement internal FPGA buses for hooking up the PCIe core to user application blocks.

Three configuration options can be used to load a design into the Cyclone V FPGA. The first method is downloading code using Altera's Configuration via Protocol (CvP) over a single lane, an arrangement that allows configuring of



7757

- **FPGA-based, 32-Channel General-purpose Digital I/O XMC (VITA 42 or VITA 61)**
- **Altera® Cyclone® V architecture (5CGXFC4C6 standard population)**
- **Front I/O via 68-pin SCSI**
- **Rear I/O via PN4 connector**
- **External SRAM (256k x 32b)**
- **GEN-1 PCIe®, 2 lanes (2.5 Gb/s each); CvP mode limits operation to 1 lane**
- **Programmable from host via PCIe, on-board Flash, or direct via Altera USB Blaster**
- **User defined LEDs**
- **User accessible temperature sensor**
- **Silicon delay lines**
- **Serial EEPROM**
- **Flexible termination scheme**
- **Separate direction control for each RS485 channel**
- **Sample FPGA design and host C code**
- **Industrial temperature design**
- **Lead-free**



BLOCK DIAGRAM

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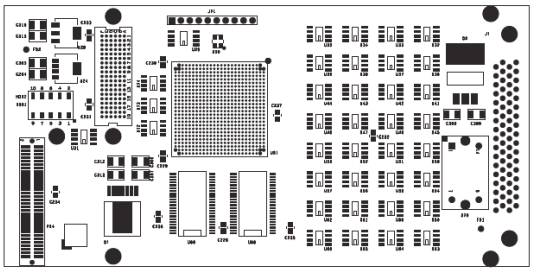
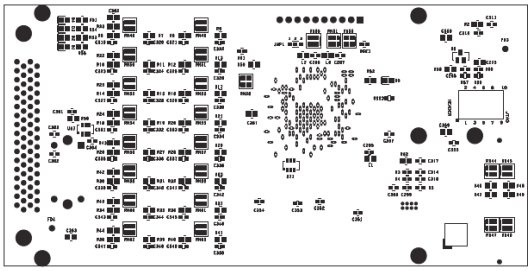


COMPONENT PLACEMENT VIEW - SIDE #1



COMPONENT PLACEMENT VIEW - SIDE #2

the FPGA via the PCIe interface. In this case, an initial ring design is loaded from on-board FLASH memory, affording the FPGA some fundamental PCIe access. Subsequently, the host can load application code to the FPGA. (NOTE: CvP restricts operation of the 7757 to a single lane.) Using the second initialization method, application code is transferred from FLASH memory to the FPGA on power up. A third method can be used to initialize the 7757 directly via a cable connection to a USB Blaster.

Both front and rear I/O interfaces support thirty-two (32) RS485/422 differential pairs (64 signals) from an array of 65LHV10 transceivers, each able to support rates up to 25 Mb/s. Directionality of each pair is controlled by a separate signal from the FPGA. Termination is 120 ohm parallel. R/C termination with failsafe biasing can be used as a population option to accommodate specific end-user termination requirements.

Standard fast/wide differential SCSI cables can be purchased from Technobox or through other resources. Also, Technobox transition panels are available to break out the SCSI cables into DB9, RJ45, or discrete wiring interfaces.

SPECIFICATIONS

Temperature (Operating): -40 to +85 degrees C

Temperature (Storage): -55 to +105 degrees C

Altitude: Not specified or characterized. Typical similar equipment is at 15,000 ft.

Humidity (Operating/Storage): 5% to 95% non-condensing.

Vibration: Not specified or characterized

Shock: Not specified or characterized.

MTBF: Can be calculated upon request

PCI Express: GEN-1 (2.5 Gb/s)

Voltages Required: +3.3 V, VPWR (+12V or +5V)

Power: Application dependent

Weight: 87.9 grams

ORDERING INFORMATION

7757: Enhanced 32-Channel RS485/422 Differential XMC. ALTERA Cyclone 5CGXFC4C6F27I7N based. Reconfigurable digital I/O module with 256Kx32b SRAM, PCIe core in FPGA. 32 RS485 I/O out front and rear of XMC.

4988: Transition Panel w/68-pin to eight DB9 connectors 6Ux2VMEbus slots wide

5100: Transition Panel w/68-pin to eight DB9 connectors; 6Ux2VMEbus slots wide; 68-pin connector on both sides

1866: Transition panel w/68-pin to sixteen 6-Pin RJ11 modular jacks

1868: Transition panel w/68-pin to 64-screw contacts for discrete wiring applications

5909: 10/ 11/ and 12: Cable Assemblies - 68 connector, terminated each end with SCSI-style connector with jackscrews; Respective lengths 1.5 / 3 / 6 / and 10 ft.

9403: P/N 7757 populated with VITA 61 connector instead of VITA 42

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Technobox, Inc.
154 Cooper Road, Suite 901
West Berlin, NJ 08091
Phone: 856-809-2306 • **Fax:** 856-809-2601
Email: sales@technobox.com
Website: www.technobox.com