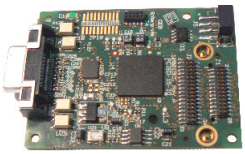
GEB Enterprise S.r.l.
General Electronics Business
Via Rocca di Papa, 21 –00179 Roma, Italy
Email: info@geb-enterprise.com - Web: www.geb-enterprise.com

SOPC
System On Programmable Chip

PCI Express on Cable Down Stream Board: PCIED-15-IO

Features

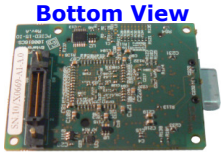
PCIe-Ram



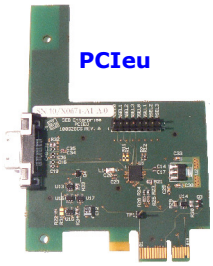
Top View

PCIed-15-IO

Bottom View



PCIeu



- Downstream PCI Express on Cable Interface
- 53 LVTTL 3V3 digital I/O user channels, each one with independent sense, drive, bi-directional, and tri-state capabilities
- 2 User LVTTL output clocks (1 output with dedicated PLL)
- 1 User LVTTL input clocks with dedicated PLL
- Single 3V3 Power Supply
- Connectors:
  - High density, 1 x Samtech QSH-030-01-L-DA-RT1 0.5mm pitch on bottom side of PCB
  - Medium density, 2 x Samtech FTS-1XX-02-F-DV 1,27mm pitch on top side of PCB
- Peripheral-to-host wake up support
- Remote host-to-peripheral power on support
- Hot insertion support
- User available FPGA resources in EP4CGX30 version [*1]:
  - Logic Element: 29440LE (1440LE)
  - Ram: 1080 Kbits (540Kbits)
  - PLLs: 4 (3)
  - 18x18 bit multipliers: 80 (none)
- Boot device
- Power on monitor and reset circuitry
  - Three power supply core domains
- One test access port (TAP) to control the I/O channels
- On board crystal oscillator
- Boundary-scan, JTAG/IEEE 1149.1 standard compatible
- Board size: 50 x 67 mm.
- Optional adapter to Altera Santa Cruz connectors set (J11-J12-J13) interface with 5V tolerant I/O

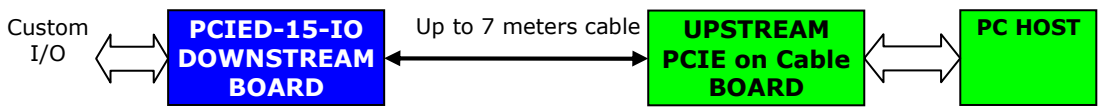
[*1] Number in parentheses are referred to low cost version equipped with EP4CGX15BF14C7N FPGA

Description

"PCI Express on cable" is the first architecture supporting high-end embedded applications is a PCI compatible expansion/extension cable. PCI Express (Peripheral Component Interconnect Express), officially abbreviated as PCIe (though generally written as PCI-E), is a computer expansion card standard designed to replace the older PCI, PCI-X, and AGP standards. PCIe 3.0 is the latest standard for expansion cards that is available on mainstream personal computers. PCI Express standard has been developed by PCI-SIG group.

This product allows to extending the host PCI Express bus through a high-speed cable. Using a PCIe compliant cable, the PCI Express bus can be extended approximately up to six to seven meters from the host CPU complex and without any equalization circuitry to suppress the inherent noise.

Transmitting the host bus over copper cables opens a new world in the embedded design area. The PCIe cabling solution allows a system configuration having a high-end computing core in a cooled area that is hosting an embedded and remote I/O subsystem, with different thermal environment. The host and I/O system may have different form factors, specifically suited for the environmental or performance requirements of each sub-system. For example, a high-end, dual Intel Xeon class host system provides the user with the computing power for an and a high-speed data link to a high-end embedded I/O subsystem based on MicroTCA, PC/104, 3U CompactPCI Express, or proprietary form factor.



A compelling application of PCI Express Cable includes an expansion system, a set of products that extends the host bus of a system to an arbitrary distance from the host enclosure to an expansion enclosure. This approach enables designers to insert more add-in boards into the system than the host system was originally designed for. A simple example of an expansion system uses a host interface board, cable, and 19-slot expansion chassis to extend a 4-slot ATX motherboard host system to a 20-slot system. Expanded systems in excess of 100 add-in boards are likely possible utilizing PCI Express expansion.
PCI Express Cable has a unique advantage over other expansion systems currently available in the market. Having PCI Express board acting as both the host bus and the cabled expansion protocol, drivers are not required. This avoids the

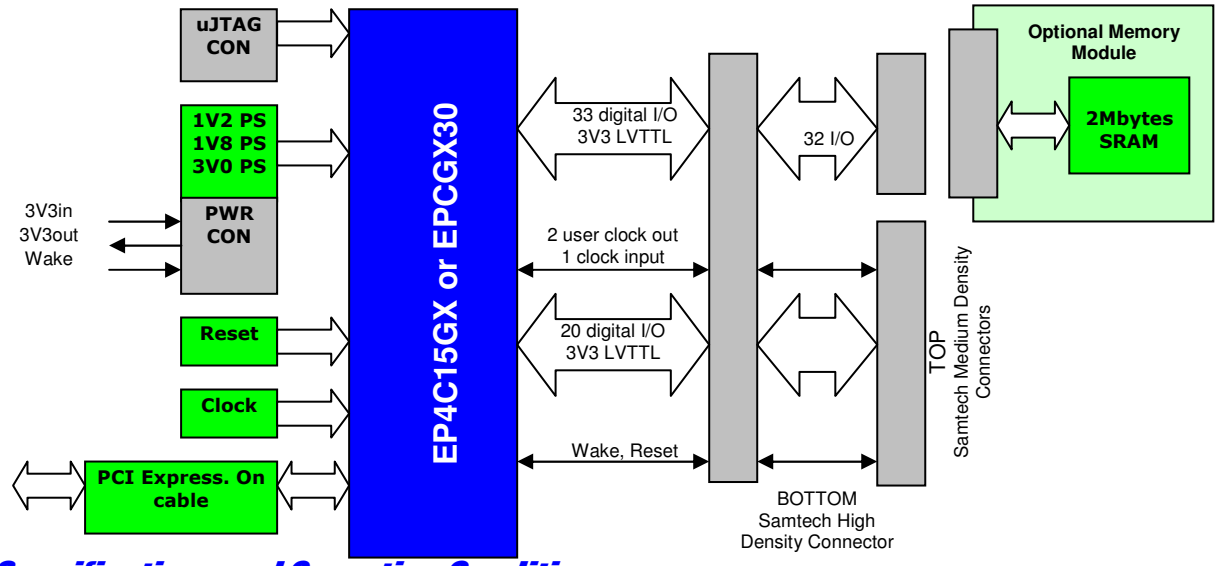
root cause of the throughput latency of the expansion link. PCI Express offers a level of software compatibility and performance scalability unparalleled even on the most modern generation of cabled expansion systems currently in the market.

Other embedded applications for the PCI Express Cable are available across virtual all embedded markets. For example a high-speed docking station link for a high-end handheld or portable device useful in medical services, inventory control applications, or commercial laptops could employ PCI Express Cable. PCIe cable based architecture is a cabled solution addressed in a noncontinuous backplane. This could take the form of several small backplanes in a nonconventional configuration, such as arranged in a circle or around a corner. In more traditional applications, an internal cable can replace the riser card of a 1U server where the add-in cards are mounted perpendicularly to the motherboard.

Board Description

GEB High Performance System On Card (Sopc-Card) includes, all-in-one, whatever needed to start using the advanced features of Altera CycloneIV-GX family and features a socketed board with an **EP4CGX15 or EP4CGX30** device in a BGA169 package. All technology FPGA, power management, distribution and decoupling, fine pitch or BGA package connection, multilayer PCB manufacturing, double side PCB mounting and testing requirements are met by Sopc-Card board.

One programming interface port, on the board support in-system programming (ISP), and using Altera Byte Blaster and JTAG programming and testing, is available as well.



Specifications and Operating Conditions

Digital I/O	Vol = 0.4V max., Voh = 2.4V min., Vil = 0.8V max., Vih=2.0V min.;
Power supply voltage (current)	3.3V +/- 5% (0.4A Typical, 0.9max) (*2)
Operative Temperature range	0°C/+70°C Commercial Temp.
Storage Temperature range	-40 +150°C

(*1) The operative temperatures assumes an FPGA Tja=15°C. Tja depends from FPGA power dissipation.
(*2) The current values depend from the configuration file loaded inside FPGA. The typical value was measured on typical application (100MHz system clock, 50% resource usage, 20% I/O switching at 10MHz). Maximum value was estimated using Altera tolls in many large and fast designs. The maximum current values allowed depends also from the thermal resistance of the package and/from the operating temperature

Ordering Information

Product Name	GEB Code	Description
PCIED-15-IO	100816A1	PCIe on cable downstream board, 53 I/O. Fpga EP4CGX15BF14C7N in Commercial range. Interface Connectors FTS-113-03 (J1) FTS-117-03 (J2) connectors on top side, they match to Samtech CLP connectors.
PCIED-15-IO	100816A2	PCIe on cable downstream board, 53 I/O. Fpga EP4CGX30BF14C6N in Commercial range. Interface Connectors FTS-113-03 (J1) FTS-117-03 (J2) connectors on top side, they match to Samtech CLP connectors.
PCIED-15-IO	100816A3	PCIe on cable downstream board, 53 I/O. Fpga EP4CGX15BF14C7N in Commercial range. J1 Connector FTS-113-01 match with Samtech FFSD Cable. J2 FTS-117-03 match with Samtech CLP Connectors.
PCIED-15-IO	100816A4	PCIe on cable downstream board, 53 I/O. Fpga EP4CGX30BF14C6N in Commercial range. J1 Connector FTS-113-01 match with Samtech FFSD Cable. J2 FTS-117-03 match with Samtech CLP Connectors.
PCIE-RAM	100996A1	2MBytes Memory module
PCIEU-1X	100926A1	PCI Express Desk Top PC Upstream Board

GEB Enterprise S.r.l.
General Electronics Business
Via Rocca di Papa, 21 –00179 Roma, Italy
Phone: 06 7827464 Fax: 06 7806894
Email: info@geb-enterprise.com
Web: www.geb-enterprise.com