SOLITON developed

Ultra-high speed data processing engine

EXpresso G4

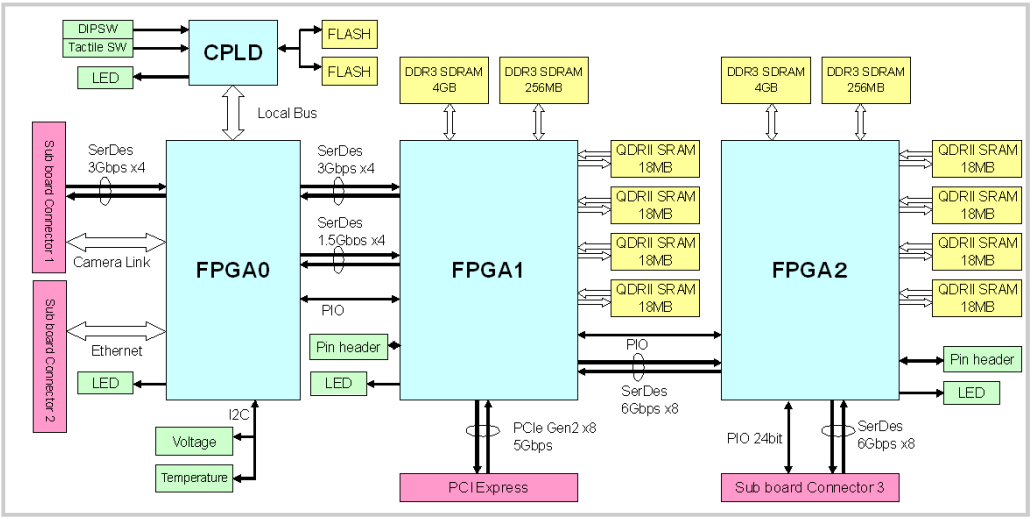
OUTLINE

This board is a ultra-high speed hardware accelerator with the most up-to-date FPGA and the best memory configuration for image processing, NGN(Next Generation Network) and so on. It has very large memory space by DDR3 memory. And QDRII on-board memory that is effective on random access realizes surprising performance. Two FPGAs are available for user application to implement large scale design. The connector interface on this board is common with other EXpresso series products to be able to equip the same daughter cards. The architecture of this board is ideal for ASIC proto-typing, 3D image processing to big data, semi-conductor inspection, medical image processing, signal data processing, etc. The algorithm for those application can be stored in FPGAs. The upload/download transfer rate between this board and the host PC is totally 6G byte/sec by PCI Express x8 Gen2 interface. This board can run independently of the host PC. We can execute a program in this board and execute other program in the host PC in parallel. So performance as a system will be very high.

APPLICATION EXAMPLE

Application for Image data parocessing

This board can be used with high-performance cameras over 600M byte/sec transfer speed, and also support multi-cameras. For example, 4 line-scan-sensors with 8,192 lines each are available simultaneously. It can store 1 million lines in its memory and it can run on 64-bit OS. The image processing applications like stereovision processing with 4M pixel color-area-scan-cameras need big data handling and high performance. Up to now it was difficult to execute application like these on even a high-end PC and a usual FPGA board. Now we can do it without stress by use of this valuable product.



EXpressoG4
Block Diagram

Ultra-high speed data processing engine

EXpresso G4

Other application examples

- Simulation with heavy processing
- Communication traffic processing
- Robot control

SPECIFICATION and HARDWARE CONFIGURATION

FPGA configuration

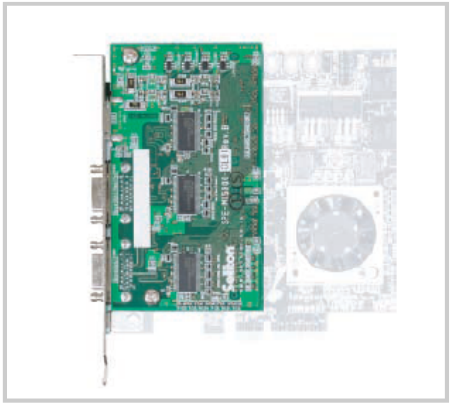
There are 3 FPGA chips (FPGA0, FPGA1 and FPGA2) on the EXPressoG4. FPGA1 and FPGA2 are free for application developers. The developers can choose each FPGA from StratixIV EP4SGX230 and EP4SGX530. FPGA0 is reserved for camera interface and other control logic.

Memory configuration

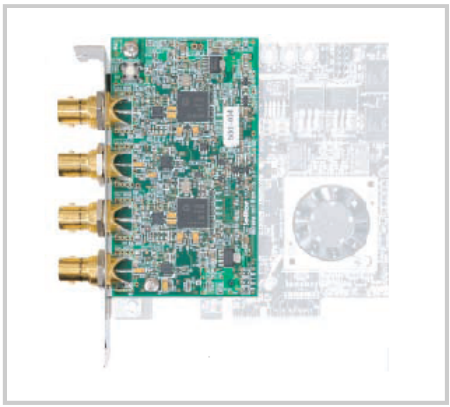
- DDR3 SDRAM memory (Both FPGA1 and FPGA2 have this memory)
  - DDR3-SDRAM memory 4G bytes SO-DIMM x 1 bank
  - 256M bytes component x 1 bank
  - over 6G byte/sec access speed
- QDRII SRAM memory (Both FPGA1 and FPGA2 have this memory)
  - QDRII SRAM: 18M bytes x 4 banks (total 72M bytes)
  - read/write independent port

Interface

- Host PC interface
  - PCI Express x8 Gen2
  - Driver software and API included
- CameraLink interface (OPTION)
  - Base/Medium/Full configuration: 1 channel
  - Base configuration: 2 channels
  - Base configuration: 4 channels
  - [Interface specification]
    - Many kinds of trigger signal input
      for example: A-Phase, B-Phase and Z-Phase
    - Encoder logic, timer logic
    - 4-bit input, 2-bit output PIO (200KHz)
    - Isolation by photo-coupler
- HD-SDI interface (OPTION)
  - HD-SDI hi-vision image input x 2
  - HD-SDI loop-back output x 2



CameraLink (OPTION)
*daughter card



HD-SDI (OPTION)
*daughter card

EXpresso series products

- **EXpresso G4**
- **EXpresso FPGA**
- **EXpresso G2**
- **EXpresso**

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