

# quad VUS 440 Prototyping System

## Product Summary

The proFPGA quad VUS 440 system is a complete and modular multi FPGA solution, which meets highest requirements in the area of FPGA based Prototyping. It addresses customers who need a scalable and flexible high speed ASIC Prototyping solution for early software development and real time system verification. The innovative system concept offers highest flexibility and reusability, reconfigurability for several projects, which guarantees the best return on invest.

## Highest Flexibility

The system architecture is based on a modular and scalable system concept. The FPGAs are assembled on dedicated FPGA modules, which will be plugged on the proFPGA uno, duo or quad motherboard. This offers the highest flexibility to use for example different FPGA types in one system or to scale a system in increments of one FPGA. The user has nearly 100% access to all available I/Os of the FPGA, which gives him maximum freedom regarding the FPGA interconnection structure. This way the prototyping system can be adapted in the best way to any user design. Furthermore the system offers a total of 40 extension sites on the top and bottom site for standard proFPGA or user specific extension boards like DDR-4 memory, PCIe gen1/2/3, Gigabit Ethernet, USB 3.0 or other high performance interface and interconnection boards.

## Maximum Performance

The well designed boards of the proFPGA system are optimized and trimmed to guarantee best signal integrity and to achieve highest performance. The high speed boards together with specific high speed connectors allow a maximum point to point speed of up to 1.0 Gbps single ended over the standard FPGA I/O and up to 12.5 Gbps differential over the high speed serial transceivers of the FPGA. This performance combined with the high interconnection flexibility allows the designer to run his design at maximum speed in the proFPGA system.

## Biggest Capacity

Equipped with up to 4 Xilinx Virtex UltraScale 440 FPGA modules, the proFPGA quad system can handle up to 120 M ASIC gates on only one board. Due to the fact, that multiple proFPGA quad or duo systems can be connected to an even larger system, there is an unlimited scalability and no theoretical maximum in capacity.

## Very User Friendly

The proFPGA prototyping system provides an extensive set of features and tools, like remote system configuration, integrated self and performance test, automatic board detection, automatic I/O voltage programming, system scan and safety mechanism, which simplifies the usage of the FPGA based system tremendously.




## Key Features

- 120 M ASIC gates capacity on one board
- 5308 signals for I/O and inter FPGA connection
- 192 dedicated high speed serial I/O transceivers
- 40 individually adjustable voltage regions
- Up to 1.0 Gbps single ended point to point speed
- proFPGA FPGA Mixing Technology (FMT)
- Smart Stacking Technology (SST)
- High performance host interface (DMBI)
- Advanced Clock Management (ACM)

## Innovative Technologies



### Smart Stacking Technology

- ❖ Board detection when boards are plugged
- ❖ Automatic and right I/O voltage setting and programming with conflict detection
- ❖ Integrated interconnection self- and performance test
- ❖ Smart I/O resource management. No I/O resources get lost or get blocked by connectors



### FPGA Mixing Technology

- ❖ Easy plugging and unplugging of FPGA modules on motherboards
- ❖ Various FPGAs from different vendors can be mixed
- ❖ Automatic scanning and detection of FPGA modules, when plugged
- ❖ Different FPGA configurations are controlled by proFPGA Builder Software



### Device Message Box Interface

- ❖ High speed, low latency data exchange system
- ❖ Enables various use modes and functionalities like remote system configuration and monitoring, debugging, application level programming and co-simulation
- ❖ Up to 3.5 Gbps data transfer rate
- ❖ Runs over USB, Ethernet or PCIe



### Advanced Clock Management

- ❖ Run-time configurable local clocks
- ❖ Each clock with sync signals
- ❖ 8 global clock and sync signals per motherboard

profpga quad VUS 440 Specification	
FPGAs	- 4 x Xilinx Virtex XCVU440 FPGA Modules
Capacity	- Up to 120 M ASIC gates on one board (30 M ASIC gates per FPGA Module)
FPGA-internal memory	- Up to 354,400 kbits on one board (88,600 kbits per FPGA Module)
Signaling rate	- Up to 1.0 Gbps (standard I/O)/ up to 12.5 Gbps (MGT)
Extension sites	- Up to 40 Extension sites with high speed connectors
I/O resources	- Overall 5308 signals for I/O and inter FPGA connection - 1327 free I/Os per FPGA Module - 4x153 I/Os to top side connectors - 1x52 and 1x51 I/Os top side connectors - 4x153 I/Os to bottom side connectors
High speed I/O transceivers	- 192 dedicated MGTs running up to 12.5 Gbps - 48 MGTs (up to 12.5 Gbps) per FPGA Module - 4x8 MGTs to top side connectors - 2x8 MGTs to bottom side connectors
FPGAs interconnections	- Flexible via high-speed interconnection boards or cables
Voltage regions	- 40 individually adjustable I/O voltage regions - 10 individually adjustable voltage regions per FPGA Module - Stepless from 1.0V up 1.8V on 9 extension sites - Stepless from 1.0V up 3.3V on one extension site - Automated detection of daughter card and adjustment of right voltage
Clocking	- 288 differential external clock inputs - 72 differential clock inputs per FPGA Module - 8 differential clock inputs per connector - Run-time configurable local clocks - 8 global clock and sync signal inputs per motherboard - Fully synchronous derived clocks with sync signals
Configuration	- With host software via Ethernet, USB, PCIe or Xilinx JTAG interface
Data exchange	- On board DMBI (Device Message Box Interface) - Data exchange rate: - Ethernet (up to 100 Mbps), USB (480 Mbps), PCIe (up to 3.5 Gbps)
Power	External (optional) ATX Power Supply (12 V, 24 - 35 A output)
Dimensions	- 11.81" x 0.95" x 12.20" / 300 mm x 24 mm x 310 mm (width x height x depth) - 2.5 kg weight

### profpga quad VUS 440 I/O and Clock Architecture

