

# FPGA Based Prototyping Solution

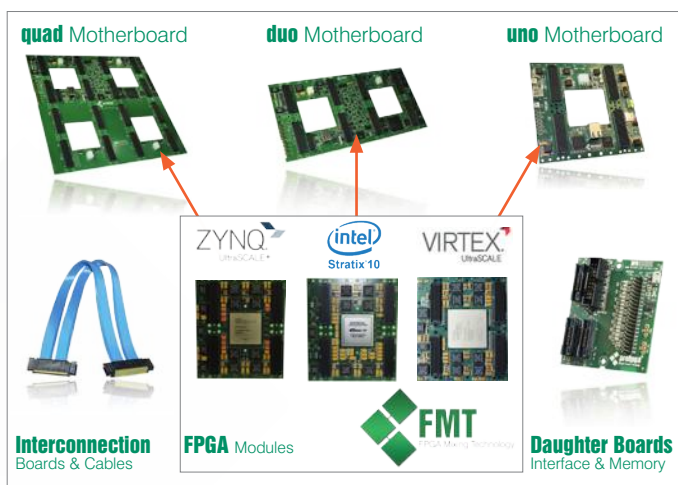
Modular, Flexible and Scalable - offering Highest System Performance



- Highest System Speed
- Largest Capacities
- Highly Modular and Scalable Architecture
- Best I/O and Routing Flexibility
- Very User Friendly
- Support of Xilinx<sup>®</sup> and Intel<sup>®</sup> FPGAs in one System

## Product Summary

The proFPGA product family is a complete and modular multi FPGA solution, which meets highest requirements in the area of FPGA based Prototyping. The proFPGA product family consists of three types of motherboards (uno, duo, quad), different kinds of FPGA Modules (Xilinx® Virtex® UltraScale™/UltraScale+™, Virtex® 7, Kintex®, Zynq®, Zynq® UltraScale+™ and Intel® Stratix® 10 and Arria®), a set of interconnection boards/cables, various daughter boards, like memory boards or high speed interface boards. It addresses customers who need a scalable high speed ASIC Prototyping and IP verification solution for early software development and real time system verification. The innovative system concept and technologies offer highest flexibility and reuseability for several projects, which guarantees the best return on invest.

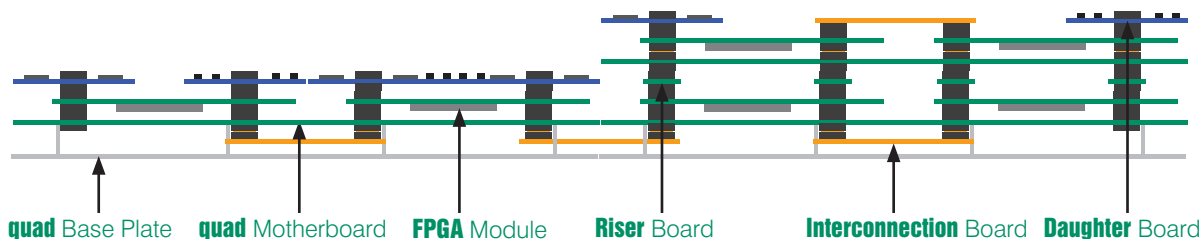


proFPGA product portfolio and concept

## 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 on the market. For example you can use different FPGA types in one system or scale your 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 up to 10 extension sites on the top and bottom site of each FPGA Module for standard or user specific extension boards like DDR4 memory, PCIe gen1/2/3/4, Gigabit Ethernet, USB 3.0 or other high performance interface and interconnection boards. The system can be scaled horizontally and vertically, by connecting boards side by side or stacking several boards on top of each other.

### proFPGA - highest flexibility through modular system architecture



proFPGA modular and scalable concept

## Largest Capacity

Equipped with up to 4 x Xilinx Virtex® UltraScale™ 440 FPGA modules, the proFPGA quad system can handle up to 120 M ASIC gates on one board alone. Multiple proFPGA quad or duo systems (up to 5 systems) can be easily connected together to scale it to an even larger system with a capacity of up to 600 M ASIC gates.



Best in class expandability - 4 x proFPGA quad systems connected together

## Best in Class Expandability

The modular concept allows an easy expansion of the system capacity by adding additional FPGA modules. Besides, users can create project specific prototypes in the quickest and easiest way. Interface, memory, or customer specific application boards can simply be plugged as daughter cards on the extension sites of the proFPGA system.

## Maximum Routing Flexibility

The open system architecture makes nearly all FPGA I/Os available to the user and enables highest interconnection flexibility between all FPGAs and extension sites. It assists in adjusting the connection architecture to the design in the best possible way.

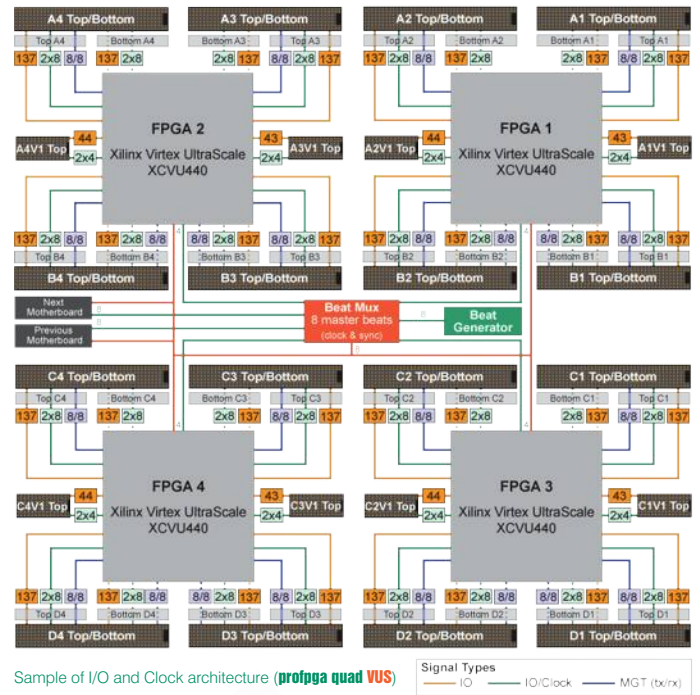
## Maximum Performance

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 16 Gbps 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.



## Advanced Clock Management

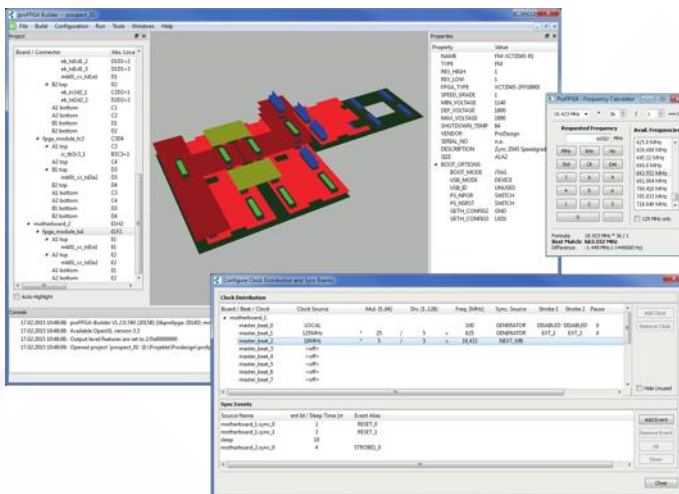
The proFPGA system uses an innovative dual-stage clock generator architecture. Each proFPGA motherboard is capable of distributing up to 8 individual master beats. Each master beat may be used to derive a virtually unlimited number of clock domains inside the FPGAs. With the unique and patented proFPGA synchronization scheme, clock domains and associated reset signals can be generated fully phase-synchronous over all FPGAs on the motherboard even over multiple motherboards.



## 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.

## profpga Builder Software



profpga builder software for system management, configuration, monitoring and much more

The proFPGA Builder software provides a powerful environment to create, test and run the proFPGA system architecture. It is capable of automatically detecting the physical board assembly and generating the complete code framework for multi-FPGA HDL designs, including all scripts for simulation, synthesis, and running the design. It also can generate automatically the required board description files and board architecture information for partitioning tools.

It offers easy-to-use visual help during pin resource planning. With the secure system launch mode, the proFPGA Builder automatically confirms compatibility between actual and intended physical board assembly. The natural 3D visualization helps locating physical origins of system information and checking results.

## profpga DMBI (MMI64)



The proFPGA DMBI (Device Message Box Interface) is the gate to the proFPGA prototyping system. It supports various high-speed communication standards, like PCI, Ethernet and USB2.0. With its simple script based system configuration and launch technique, it allows quick and reproducible test runs.

The flexible DMBI Communication System offers a high bandwidth and low latency integration of both, user software applications and user HDL designs. DMBI is shipped with a large toolbox for debugging and data exchange with user designs. It supports full integration into HDL simulators, making debugging of whole applications easy.

## profpga SST



With the proFPGA Smart Stacking Technology, all interconnection boards/cables, daughter boards and FPGA modules will be automatically detected by the system and the I/O voltages will be set automatically with the right values. In addition to this the system offers a conflict detection and the user can only boot the system, when all boards are plugged correctly. Besides, the technology offers the user a complete system scan, system self-test and a performance test, to determine the maximum speed the system can run. On top of this the SST provides a smart I/O resource management, which allows the user to stack several daughter boards without blocking or losing any I/Os.

## profpga Motherboards

### profpga uno Motherboard

Order Code: PROF-UNO-MO

The proFPGA uno Motherboard is the basis for a scalable, and modular IP Prototyping solution, which fulfills highest needs in the area of FPGA based Prototyping. It addresses customers who need a most flexible high performance FPGA Prototyping solution for early software development and IP verification.



### profpga duo Motherboard

Order Code: PROF-DUO-MO

The proFPGA duo Motherboard is the basis for a scalable, and modular multi FPGA Prototyping solution, which fulfills highest needs in the area of FPGA based Prototyping. The proFPGA duo motherboard, which is optimized to achieve highest performance, offers 16 extension sites for up to 2 proFPGA FPGA modules, standard proFPGA daughter boards or cables or customer specific application boards.



### profpga quad Motherboard

Order Code: PROF-QUAD-MO

The proFPGA quad Motherboard is the basis for a scalable, and modular multi FPGA Prototyping solution, which fulfills highest needs in the area of FPGA based Prototyping. The proFPGA quad motherboard, which is optimized to achieve highest performance, offers 32 extension sites for up to 4 proFPGA FPGA modules, standard proFPGA daughter boards or cables or customer specific application boards.



### profpga quad Motherboard 2.0

Order Code: PROF-QUAD-MO-R2

The proFPGA quad Motherboard 2.0 has key improvements compared to previous generation. It is equipped with a ZYNQ-7000 (FPGA + ARM Cortex-A9 dual-core) Controller FPGA and offers ethernet speed of 1 Gbit/s. The Motherboard 2.0 is fully backwards compatible to the generation 1 Motherboards and all designs (MMI64, ACM, etc.) will work 1:1 on the Motherboard 2.0.



## profpga FPGA Modules

### profpga Stratix® 10 GX 10M FPGA Module

Order Code: PROF-FM-10GX10M

The proFPGA 10 GX 10M FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Intel® Stratix® 10 FPGA technology it offers a maximum capacity of up to 60 M ASIC gates in only one FPGA. The module provides with its 8 extension sites up to 2076 user I/Os and 16 high speed serial transceivers.



### profpga Arria® 10 GX1150 FPGA Module

Order Code: PROF-FM-10AX115

The proFPGA A10 GX1150 FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Arria® 10 FPGA technology it offers a maximum capacity of up to 8 M ASIC gates in only one FPGA. The module provides with its 6 extension sites up to 646 user I/Os and 48 high speed serial transceivers.



### profpga Virtex® UltraScale™ XCVU440 FPGA Module

Order Code: PROF-FM-XCVU440

The proFPGA XCVU440 FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Virtex® UltraScale™ FPGA technology it offers a capacity of up to 20 M ASIC gates in only one FPGA. The module provides with its 9 extension sites up to 674 user I/Os and 52 high speed serial transceivers (MGTs).



### profpga Virtex® UltraScale+™ XCVU13P FPGA Module

Order Code: PROF-FM-XCVU13P

The proFPGA XCVU13P FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Virtex® UltraScale+™ FPGA technology it offers a maximum capacity of up to 14 M ASIC gates in only one FPGA. The module provides with its 6 extension sites up to 585 user I/Os and 64 high speed serial transceivers (64 x GTY).



### profpga Virtex® UltraScale+™ XCVU9P FPGA Module

Order Code: PROF-FM-XCVU9P

The proFPGA XCVU9P FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Virtex® UltraScale+™ FPGA technology it offers a maximum capacity of up to 14 M ASIC gates in only one FPGA. The module provides with its 6 extension sites up to 585 user I/Os and 64 high speed serial transceivers (64 x GTY).



## profpga FPGA Modules

### profpga Zynq® UltraScale+™ ZU19EG FPGA Module

Order Code: PROF-FM-XCZU19EG

Equipped with a Xilinx Zynq™ ZU19EG FPGA which combines a user FPGA with a Quad-core ARM® Cortex™-A53 and Dual-core ARM® Cortex™-R5 and several on board interfaces like USB UART or SDIO, the proFPGA Zynq® UltraScale+™ ZU19EG FPGA Module offers a complete embedded processing platform. Further the board offers a capacity of 6.2 M ASIC Gates.



### profpga Zynq® UltraScale+™ ZU17EG FPGA Module

Order Code: PROF-FM-XCZU17EG

Equipped with a Xilinx Zynq™ ZU17EG FPGA which combines a user FPGA with a Quad-core ARM® Cortex™-A53 and Dual-core ARM® Cortex™-R5 and several on board interfaces like USB UART or SDIO, the proFPGA Zynq® UltraScale+™ ZU17EG FPGA Module offers a complete embedded processing platform. Further the board offers a capacity of 5 M ASIC Gates.



### profpga Zynq® UltraScale+™ ZU11EG FPGA Module

Order Code: PROF-FM-XCKU11EG

Equipped with a Xilinx Zynq™ ZU11EG FPGA which combines a user FPGA with a Quad-core ARM® Cortex™-A53 and Dual-core ARM® Cortex™-R5 and several on board interfaces like USB UART or SDIO, the proFPGA Zynq® UltraScale+™ ZU11EG FPGA Module offers a complete embedded processing platform. Further the board offers a capacity of 3.5 M ASIC Gates.



### profpga Virtex® UltraScale™ XCVU190 FPGA Module

Order Code: PROF-FM-XCVU190

The proFPGA XCVU190 FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Virtex® UltraScale™ FPGA technology it offers a maximum capacity of up to 12,7 M ASIC gates in only one FPGA. The module provides with its 6 extension sites up to 585 user I/Os and 64 high speed serial transceivers (24 x GTY, 40 x GTH).



### profpga Virtex® UltraScale™ XCVU160 FPGA Module

Order Code: PROF-FM-XCVU160

The proFPGA XCVU160 FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Virtex® UltraScale™ FPGA technology it offers a maximum capacity of up to 11 M ASIC gates in only one FPGA. The module provides with its 6 extension sites up to 585 user I/Os and 64 high speed serial transceivers (24 x GTY, 40 x GTH).



### profpga Kintex® UltraScale™ XCKU115 FPGA Module

Order Code: PROF-FM-XCKU115

The proFPGA XCKU115 FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Kintex® UltraScale™ FPGA technology it offers a maximum capacity of up to 7.9 M ASIC gates in only one FPGA. The module provides with its 6 extension sites up to 585 user I/Os and 52 high speed serial transceivers (GTH).



### profpga Virtex® XC7V2000T FPGA Module

Order Code: PROF-FM-XC7V2000T

The proFPGA XC7V2000T FPGA module is the logic core for the scalable and modular multi FPGA proFPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. With its Virtex® 7 FPGA technology it offers a maximum capacity of up to 12 M ASIC gates alone in only one FPGA. The module provides with its 8 extension sites up to 1084 user I/Os and 16 high speed serial transceivers (MGTs).



### profpga Virtex® XC7VX690T FPGA Module

Order Code: PROF-FM-XC7VX690T

The proFPGA XC7VX690T FPGA module offers a capacity of up to 4.2 M ASIC gate and up to 738 user I/Os on 6 extension sites. The highlight of this module is, that it offers 36 high speed serial transceivers (MGTs) for high speed interfaces like PCIe Gen2, Gen3, USB 3.0, or DDR3 memories. All of the 6 extension sites offer individually and stepless adjustable voltage regions from 1.2V up to 1.8V.



### profpga XC7Z100 FPGA Module

Order Code: PROF-FM-XC7Z100

Equipped with a Xilinx Zynq™ XC7Z100 FPGA which combines a user FPGA with an ARM Core Processor (Dual ARM® Cortex™-A9 MPCore™ with CoreSight™) and several on board interfaces like USB 2.0 OTG, Gigabit Ethernet or ARM JTAG debug interface the proFPGA Zynq™ 7000 FPGA Module offers a complete embedded processing platform. Further the board offers 1 GB on board DDR3 and dual quad SPI flash memory.



### profpga XC7Z045 FPGA Module

Order Code: PROF-FM-XC7Z045

Equipped with a Xilinx Zynq™ XC7Z045 FPGA which combines a user FPGA with an ARM Core Processor (Dual ARM® Cortex™-A9 MPCore™ with CoreSight™) and several on board interfaces like USB 2.0 OTG, Gigabit Ethernet or ARM JTAG debug interface the proFPGA Zynq™ 7000 FPGA Module offers a complete embedded processing platform. Further the board offers 1 GB on board DDR3 and dual quad SPI flash memory.



## profpga Interconnection Boards & Cables

### profpga Interconnectboard East-West

Order Code: PROF-A-IC-EW

The proFPGA Interconnectboard East-West connects two adjacent extension site connectors (East-West direction). Over the length matched high-performance board up to 150 I/Os can be connected with the maximum point to point performance depending on the used FPGA type. The board can be used with single ended and differential connections.



### profpga Interconnectboard North-South

Order Code: PROF-A-IC-NW

The proFPGA Interconnectboard North-South connects two adjacent extension site connectors (North-South direction). Over the length matched high-performance board up to 150 I/Os can be connected with the maximum point to point performance depending on the used FPGA type. The board can be used with single ended and differential connections.



### profpga Interconnectboard 4-WAY

Order Code: PROF-A-IC-4W

The proFPGA Interconnectboard 4-WAY connects four adjacent extension site connectors (North-South and East-West directions). The board connects the same I/O pins of all 4 connectors allowing up to 148 4-way connections.



### profpga Riser Interconnect Board

Order Code: PROF-A-IC-RIS

The proFPGA Riser Interconnect Board provides a proFPGA Bottom and a proFPGA Top Connector. It is used wherever due to height incompatibility two different extension boards cannot be plugged on-top of each other.



### profpga Breakout Interconnect Board

Order Code: PROF-A-IC-BOB

The proFPGA Breakout Interconnect Board provides the ability to spread a single proFPGA - Connector up to three proFPGA - V1 - Connectors.



### profpga TA1V1/TAV2 Adapter Board

Order Code: PROF-A-IC-TA1TA2

The proFPGA TA1V1/TAV2 Adapter Board kit consists of two boards which allow to convert the proFPGA V1 connectors on the FM-XCVU400 FPGA modules to regular proFPGA V0 connectors. One of the two board is dedicated to the TA1V1 connector and the second board is dedicated to the TA2V1 connector.



### profpga Interconnect Cable

Order Code: PROF-A-IC-C

The proFPGA Interconnect Cable connects any 2 extension site connectors of the proFPGA system together. Over the length matched high-performance cables up to 147 I/Os can be connected with a maximum point to point performance depending on the used FPGA type. The board can be used with single ended and differential connections. It is available in 400 mm or 800 mm length.



### profpga Interconnect Cable (70pin)

Order Code: PROF-A-IC-C-70P

The proFPGA Interconnect Cable connects any 2 extension site connectors of the proFPGA system together. Over the length matched high-performance cables up to 52 I/Os can be connected with a maximum point to point performance depending on the used FPGA type. The board can be used with single ended and differential connections. It is available in 400 mm or 800 mm length.



## profpga Memory Boards

### profpga DDR4 SDRAM Memory Board

Order Code: PROF-A-M-DDR4

The proFPGA DDR4 SDRAM Board occupies one extension site of the proFPGA system and offers 2.5 GB or 5 GB DDR4 SDRAM memory and can be accessed with a data width of up to 80 bit. Due to the length matched board design, it can be used with a performances of 1600 Mbps. Besides, the board offers 10 user LEDs and 3 push buttons, which can be used for debugging purposes.



### profpga LPDDR2 Memory Board

Order Code: PROF-A-M-LPDDR2

The proFPGA LPDDR2 Board occupies one extension site of the proFPGA system and offers 2x two GBit Winbond W97BH2KBQX memory devices which can be accessed over a 32bit databus. Due to the length matched board design, the daughter boards can be used with performances of up to 800 Mbps.



### profpga Flash Memory Board

Order Code: PROF-A-M-ONFL

The proFPGA Flash Board occupies one extension site of the proFPGA system and 128 Gbit ONFI flash, 512 Mbit quad SPI flash, 1 Mbit NVSRAM, 1 Mbit quad SPI MRAM, Debug interface or for ONFI flash with 38-pin MICTOR connector, debug interface for all SPI signals of all SPI devices, 2x I<sup>2</sup>C 64 kbit EEPROMs, 1x debug interface for each I<sup>2</sup>C EEPROM, etc.



### profpga SRAM Memory Board

Order Code: PROF-A-M-SREB

The proFPGA SRAM Board occupies one extension site of the proFPGA system and offers up to 144 Mbit memory depth per SRAM accessed over a 18 bit databus. The proFPGA SRAM Board is available in three different configurations. Depending on the used SRAM type you can run with 250 MHz, 300 MHz or 333 MHz. Further the board offers 5 LEDs for debugging.



### profpga DDR3 SDRAM Memory Board

Order Code: PROF-A-M-DDR3

The proFPGA DDR3 SDRAM Adapter Board occupies one extension site of the proFPGA system and offers 1 GB, 2 GB or 4 GB DDR3 SDRAM memory and can be accessed over a 64 bit or 72 bit databus. Due to the length matched board design, it can be used with a performance of up to 1600 Mbps. Besides, the board offers 10 user LEDs, which can be used for debugging purposes.



### profpga DDR3 SO-DIMM Memory Adapter Board

Order Code: PROF-A-M-DDR3-SOD

The proFPGA DDR3 SO-DIMM Adapter Board occupies one extension site of the proFPGA system and offers a SO-DIMM socket for standard DDR3 memory modules. Due to the length matched board design, the daughter boards can be used with a performance of up to 650 Mbps. Besides, the board offers 10 user LEDs, which can be used for debugging purposes.



## profpga Interface Boards

### profpga Multi Interface Board

Order Code: PROF-A-I-MIF

The proFPGA Multi Interface Board occupies one extension site of the proFPGA system and provides 1x SGPIO connector, 2x MiniUSB UART connectors, 1x EJTAG connector, 8 GPIO pins available, 2x DIP sockets, 1x I<sup>2</sup>C Connector, I<sup>2</sup>C Fan Control Unit, PMBus 6-channel Power-Supply Manager, PMBus Isolated Power-Supply Controller, 2x I<sup>2</sup>C EEPROM, 2x 128M SPI Flash, 8 RGB LEDs and one proFPGA top connector



### profpga Multi Interface Board 2

Order Code: PROF-A-I-MIF2

The proFPGA Multi Interface Board2 occupies two extension site of the proFPGA system and provides CAN Controller (SPI Interface) and CAN Transceiver, LIN Transceiver, QSPI Flash 500 Mb/1 Gb, I2S Audio CoDec, Stereo Audio Input & Output via 3.5 mm Jack, 2x I<sup>2</sup>C EEPROM, SD Card Slot, Full Size, UHS-I capable, quad USB to UART converter, Lauterbach ARM JTAG/ETM Debugger connection.



### profpga Adapter Board for Juno ARM Development Platform

Order Code: PROF-A-I-EAB

The proFPGA Adapter Board provides a method of interconnecting the proFPGA prototyping systems with the ARM Juno Development Platform, is a software development platform for ARMv8-A. It includes the Juno Versatile Express board and an ARMv8-A reference software port available through Linaro.



## profpga Interface Boards

### profpga PCIe gen1 8-lane Kit

**Order Code: PROF-A-I-PCIe-8-Kit-U**

This kit contains all required components to prototype and verify user designs, which have a PCIe gen1 interface. The kit consists of a proFPGA PCIe gen1 8-lane daughter card, which will be plugged on a free extension site of the proFPGA FPGA Module, which provides the required high speed serial transceivers (MGTS), a PCIe gen1 8-lane host interface card and a dedicated high performance cable.



### profpga PCIe gen2 4-lane Kit

**Order Code: PROF-A-I-PCIe-4-Kit-U**

This kit contains all required components to prototype and verify user designs, which have a PCIe gen2 interface. The kit consists of a proFPGA PCIe gen2 dual 4-lane daughter card, which will be plugged on a free extension site of the proFPGA FPGA Module, which provides the required high speed serial transceivers (MGTS), 1x PCIe gen2 4-lane host interface card and a dedicated high performance cable.



### profpga PCIe gen3 8-lane Kit

**Order Code: PROF-A-I-PCIe-Gen3-8-Kit-U**

This kit contains all required components to prototype and verify user designs, which have a PCIe gen3 interface. kit consists of a proFPGA PCIe gen3 8-lane daughter card, which will be plugged on a free extension site of the proFPGA FPGA Module, which provides the required high speed serial transceivers (MGTS), 1x PCIe gen3 8-lane host interface card and a dedicated high performance cable.



### profpga PCIe gen3 Root Complex Board

**Order Code: PROF-A-I-PCIe-RC**

The proFPGA PCIe gen3 Root Complex Board has a PCIe x16 socket where 8 MGT lanes are connected and an M.2 socket with Key M where 4 MGT lanes are connected. In addition to this it offers a 12V power connector if the PCIe card draws too much current, 3 LEDs and one push button for user usage.



### profpga Mini PCIe Host Interface Card

**Order Code: PROF-A-MI-MPCIHIC**

The proFPGA mini PCIe host interface card provides 1-lane PCIe gen2 cable connection to a subsystem. It is designed to fit into a mini PCIe slot. It is used to build up a PCIe connection between a Mini PCIe subsystem and the proFPGA system in combination with a PCIe extension board. Further the board offers one PCIe ReDriver, a Mini PCIe Edge connector for installation in a Mini PCIe Slot and a PCI Express™ Jitter Attenuator.



### profpga SATA Interface Board

**Order Code: PROF-A-I-SATA**

The proFPGA SATA Interface Board occupies one extension site of the proFPGA system and provides 8 channels which run up to 12.5 Gbps on 8 SATA connectors (4x HOST, 4x DEVICE) and which support SATA Host and Device connections. The board offers Pericom PI3EQX1204 SATA redrivers to enable a flexible high speed connection using SATA cables with a length of up to 1 m and more.



### profpga DVI Interface Board

**Order Code: PROF-A-I-DVI**

The proFPGA DVI Interface Board occupies one extension site of the proFPGA system and provides 1x DVI Transmitter (TI TFP410) and 1x DVI Receiver (TI TFP403) and runs with up to 165 MHz pixel rates (including 1080p and WUXGA @ 60 Mhz). Further the board provides 8x general purpose LEDs and one Mictor-38 debug connector.



### profpga MIPI Interface Board

**Order Code: PROF-A-I-MIPI**

The proFPGA MIPI Interface Board occupies one extension site of the proFPGA system and provides 2x camera interfaces, each with one clock lane and up to four data lanes which offer transfer rates of up to 2.5 Gbps (HS mode) and 20 MBps (LPDT mode). Further the board provides 8x GPIO, I2C, and a reference clock is available for each camera Interface and one proFPGA top connector to make unused I/Os available.



### profpga QSFP+ Interface Board

**Order Code: PROF-A-I-QSFP**

The proFPGA QSFP+ Interface Board occupies one extension site of the proFPGA system and provides 2x QSFP+ connectors. Further the board provides a programmable clock generator for MGT\_REFCLK pins, a fixed frequency clock generator (100 MHz) for MGT\_REFCLK pins and one proFPGA top connector to make unused I/Os available.



### profpga Gigabit Ethernet Interface Board

**Order Code: PROF-A-I-GETH**

The proFPGA Gigabit Ethernet Interface Board occupies one extension site of the proFPGA system and provides two Gigabit PHYs supporting 10M/100M/1G and MMI/GMI/RGMII. Further the board provides 5x status LEDs per PHY (duplex, 1G, 100M, 10M, activity) and one proFPGA top connector to make unused FPGA signals available.





## profpga Interface Boards

### profpga USB 2.0 & 3.0 Interface Board

Order Code: PROF-A-I-USB2-3

The proFPGA USB 2.0 & 3.0 Interface Board occupies one extension site of the proFPGA system and provides two USB ports. 3.0 A female connectors which can be used either in host or in device mode. The USB 3.0 connection is provided with the TUSB1310A from Texas Instruments.



### profpga USB 3.0 Interface Board

Order Code: PROF-A-I-USB3

The proFPGA USB 3.0 Interface Board occupies one extension site of the proFPGA system and provides two USB ports. One USB port is available through a mini USB connector and is connected to a USB3250 (Microchip). The USB3250 is a hi-speed USB device transceiver with UTMI interface. This USB port can be used to implement a USB 2.0 device in the FPGA with UTMI interface



### profpga Soft Touch Debug Board

Order Code: PROF-A-I-STD

The proFPGA SoftTouch Debug Board occupies one extension site of the proFPGA system and offers various connectors and interfaces for debugging purposes. It provides 3x SoftTouch Connectors to interface the proFPGA system to standard Logic Analyzers, one 16x2 pin connector for general purpose IOs, one USB-UART debug interface over a micro USB connector, one CPUARM JTAG interface and 16 LEDs.



### profpga LAB & Debug Board

Order Code: PROF-A-I-LB

The proFPGA LAB & Debug Board occupies one extension site of the proFPGA system and offers various connectors and interfaces for debugging purposes. It provides 3x Mictor connectors to connect the proFPGA system to standard Logic Analyzers or other measurement equipment.



### profpga MGT Debug Board

Order Code: PROF-A-I-MGT

The proFPGA MGT Debug Board occupies one extension site of the proFPGA system and offers various MMCX connectors and interfaces for debugging purpose. It provides 2x 125 MHz differential (LVDS) clock outputs via MMCX connectors, 12 differential MGT TX outputs via MMCX connectors, 12 differential MGT RX inputs via MMCX connectors and 4 differential MGT REFCLK inputs via MMCX connectors.



### profpga ADC Interface Board

Order Code: PROF-A-I-ADC

The proFPGA ADC Interface Board occupies one extension site of the proFPGA system and has two 16-bit 250MSPS ADCs. Each ADC has one channel. The two input channels of the ADCs are connected with an input filtering stage to MMCX connectors. Both ADCs are connected to the bottom connector. Each ADC channel has its own analog ground and a shielding. The shielding is removable for customizing the filtering circuit.



### profpga DAC Interface Board

Order Code: PROF-A-I-DAC

The proFPGA DAC Interface Board occupies one extension site of the proFPGA system and provides a dual, 16bit digital-to-analog converter that supports sample rates up to 1600MSPS. Both DAC outputs are connected via analog filter stages to MMCX connectors. A programmable clock generator is available to provide clocks to the DAC and optionally to the FPGA and MMCX connectors.



### profpga FMC LPC Mezzanine Adapter Board

Order Code: PROF-A-MI-PFMCLP

The proFPGA FMC LPC Mezzanine Adapter Board occupies one extension sites of the proFPGA system and provides a LPC (low pin count) connector which is compliant to the FMC standard [FMC] and supports a wide portfolio of FMC Mezzanine boards. Beside it provides 68 FMC bank A signals (34 differential signals), 2x differential unidirectional clk signals, 1x differential REFCLK signals for MGT signal (1RX and 1 TX).



### profpga FMC HPC Mezzanine Adapter Board

Order Code: PROF-A-MI-PFMC

The proFPGA FMC HPC Mezzanine Adapter Board occupies two extension sites of the proFPGA system and provides a HPC (high pin count) connector which is compliant to the FMC standard [FMC] and supports a wide portfolio of FMC Mezzanine boards. Beside others it provides 1 FMC connector on the top side, 116 FMC bank A signals (58 differential signals) and 44 FMC bank B signals (22 differential signals).



### profpga FMC Carrier Card Adapter

Order Code: PROF-A-MI-FMCP

The proFPGA FMC Carrier Card Adapter occupies one extension site of the proFPGA system and provides a connection between a FMC carrier card and the proFPGA system. It provides 2 proFPGA cable connectors (top-side), 1 FMC HPC (high pin count) connector (bottom side), 40 MMCX connectors for MGT signals (10 MGT RX and TX pairs), 4 MMCX connectors for MGT REFCLK signals (2 MGT Refclk pairs).



## profpga Miscellaneous

### profpga PCIe DMBI Kit

**Order Code: PROF-A-MI-PCIe-DMBI-Kit**

The proFPGA PCIe DMBI Interface Kit significantly increases the data exchange performance with up to 2.4 Gbps, which is 24 times faster than over the Ethernet interface. The kit consists of a proFPGA PCIe gen2 DMBI connector board, which will be plugged on a dedicated connector of the proFPGA duo or quad system, a PCIe gen2 4-lane host interface card and a dedicated high performance cable.



### profpga duo/quad Casing

**Order Code: PROF-A-MI-DQH**

The proFPGA housing holds a complete proFPGA duo or quad ASIC Prototyping system including daughter boards, cables and power supply. The casing offers full access to all sides of proFPGA prototyping system via removable side walls and cover plates. The proFPGA duo or quad system can easily be mounted into the proFPGA casing which is designed to fit into a 19" rack.



### profpga uno Casing

**Order Code: PROF-A-MI-UNH**

The proFPGA uno casing holds a complete proFPGA uno FPGA system including daughter boards, cables and power supply. The casing offers full access to all sides of proFPGA prototyping system via removable side walls and cover plates. The proFPGA uno system can easily be mounted into the proFPGA casing.



### profpga Rack

**Order Code: PROF-A-MI-RD/RQ**

The proFPGARack holds up to 4 fully assembled proFPGA duo or quad systems. It has been designed to fit into a 19" rack and to realize large scale FPGA and complete clusters. In addition it offers full access to all sides of the proFPGA System.



### profpga Transport Case

**Order Code: PROF-A-MI-TC**

The proFPGA Transport Case was specially designed, that 2 x proFPGA duo systems or 1 x proFPGA quad system incl. the power supply, cables and extension boards fit in. The case contains a special antistatic ESD conform foam inlay, which provides perfect protection for the proFPGA system during transportation and storage.



### profpga Transport Box

**Order Code: PROF-A-MI-TB-UNO/-DUO/-QUAD**

The proFPGA Transport Box was specially designed for all three type of systems. The box stores the quad, duo and uno motherboard, the power supply, cables and extension boards. The box contains special antistatic ESD conform foam inlay, which provides perfect protection for the proFPGA system during transportation and storage.



## profpga Complete Prototyping Systems

### profpga uno VUS FPGA Prototyping System

**Order Code: PROF-UNO-VUS**

The proFPGA uno VUS system fulfills highest needs in the area of FPGA based Prototyping for IP development and verification. Equipped with one Xilinx Virtex® UltraScale™ XCVU440 FPGA module, the proFPGA uno system can handle up to 30 M ASIC gates on only one board. Furthermore the system offers a total of 10 extension sites with up to 1327 I/Os and up to 48 high speed serial transceivers (MGTs).



### profpga uno V7 FPGA Prototyping System

**Order Code: PROF-UNO-V7**

The proFPGA uno V7 system fulfills highest needs in the area of FPGA based Prototyping for IP development and verification. Equipped with one Xilinx Virtex® 7 XCVU2000T FPGA module, the proFPGA uno system can handle up to 12 M ASIC gates alone on one board. Furthermore the system offers a total of 8 extension sites with up to 1084 I/Os and up to 36 high speed serial transceivers (MGTs).



### profpga uno VUS FPGA Prototyping System

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## profpga Complete Prototyping Systems

### profpga uno V7 FPGA Prototyping System

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### profpga uno Stratix® 10 SG 280 FPGA Prototyping System

Order Code: PROF-UNO-ASG

The proFPGA uno SG 280 system fulfills highest needs in the area of FPGA based Prototyping for IP development and verification. Equipped with one Intel® Stratix® 10 SG 280 FPGA module, the proFPGA uno system can handle up to 20 M ASIC gates alone on one board. Furthermore the system offers a total of 8 extension sites with up to 1026 I/Os and up to 24 high speed serial transceivers.



### profpga uno Arria® 10 GX1150 FPGA Prototyping System

Order Code: PROF-UNO-10AX115

The proFPGA uno A10 GX1150 system fulfills highest needs in the area of FPGA based Prototyping for IP development and verification. Equipped with one Intel® Arria® 10 GX1150 FPGA module, the proFPGA uno system can handle up to 8 M ASIC gates alone on one board. Furthermore the system offers a total of 24 extension sites with up to 646 I/Os and up to 24 high speed serial transceivers.



### profpga duo VUS FPGA Prototyping System

Order Code: PROF-DUO-V7

The proFPGA duo VUS system is a complete, scalable, and modular multi FPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. Equipped with up to 2 Xilinx Virtex® UltraScale™ XCVU440 FPGA modules, the proFPGA duo system can handle up to 60 M ASIC gates on only one board. Furthermore the system offers a total of 20 extension sites with up to 2654 I/Os and 96 high speed serial transceivers (MGTs).



### profpga duo V7 FPGA Prototyping System

Order Code: PROF-DUO-ASG

The proFPGA duo V7 system is a complete, scalable, and modular multi FPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. Equipped with up to 2 Xilinx Virtex® 7 XCV2000T FPGA modules, the proFPGA duo system can handle up to 24 M ASIC gates alone on one board. Furthermore the system offers a total of 16 extension sites with up to 2168 I/Os and 32 high speed serial transceivers (MGTs).



### profpga duo Stratix® 10 SG 280 FPGA Prototyping System

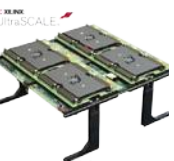
Order Code: PROF-QUAD-VUS

The proFPGA duo SG 280 system is a complete, scalable, and modular multi FPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. Equipped with up to 2 Intel® Stratix® 10 SG 280 FPGA modules, the proFPGA duo system can handle up to 40 M ASIC gates alone on one board. Furthermore the system offers a total of 16 extension sites with up to 2052 I/Os and 48 high speed serial transceivers.



### profpga quad VUS FPGA Prototyping System

The proFPGA quad VUS system is a complete, scalable, and modular multi FPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. Equipped with up to 4 Xilinx Virtex® UltraScale™ XCVU440 FPGA modules, the quad system can handle up to 120 M ASIC gates on only one board. Furthermore the system offers a total of 40 extension sites with up to 5308 I/Os and 192 high speed serial transceivers (MGTs).



### profpga quad V7 FPGA Prototyping System

Order Code: PROF-QUAD-V7

The proFPGA quad V7 system is a complete, scalable, and modular multi FPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. Equipped with up to 4 Xilinx Virtex® 7 XCV2000T FPGA modules, the proFPGA quad system can handle up to 48 M ASIC gates on only one board. Furthermore the system offers a total of 32 extension sites with up to 4336 I/Os and 64 high speed serial transceivers (MGTs).



### profpga quad Stratix® 10 GX 10M FPGA Prototyping System

Order Code: PROF-QUAD-10GX10M

The proFPGA quad 10 GX 10M system is a complete, scalable, and modular multi FPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. Equipped with up to 4 Intel® Stratix® 10 GX 10M FPGA modules, the proFPGA quad system can handle up to 240 M ASIC gates alone on one board. Furthermore the system offers a total of 32 extension sites with up to 8304 I/Os and 192 high speed serial transceivers.



### profpga quad Arria® 10 FPGA Prototyping System

Order Code: PROF-QUAD-A10GX115

The proFPGA quad A10 GX1150 system is a complete, scalable, and modular multi FPGA solution, which fulfills highest needs in the area of FPGA based Prototyping. Equipped with up to 4 Intel® Arria® 10 GX1150 FPGA modules, the proFPGA quad system can handle up to 32 M ASIC gates alone on one board. Furthermore the system offers a total of 24 extension sites with up to 2584 I/Os and 96 high speed serial transceivers.





Innovative Technologies



FPGA Mixing Technology

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

Smart Stacking Technology

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

Device Message Box Interface

- ✦ High speed, low latency data exchange system
- ✦ Enables various use modes 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



About PRO DESIGN

The privately held company was founded in 1981 and has around 100 employees, with various facilities for research, design and sales in Germany, France and North America. PRO DESIGN has more than 35 years of experience as provider in the E<sup>2</sup>MS market and has built extensive knowledge in the areas of electrical engineering, PCB design, production, assembly, measuring and testing - decades of experience that customers can benefit from.

The company's products and services include the proFPGA family of ASIC Prototyping and FPGA systems. The proFPGA 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 an scalable and most flexible high performance ASIC Prototyping or IP verification solution for early software development and real time system verification.

Key Features and Benefits

- ✦ Highest System Performance  
up to 1.0 Gbps standard I/Os single ended point to point speed
- ✦ Largest Capacity  
up to 600 M ASIC gates with 5 x quad VUS systems
- ✦ Highly Modular and Scalable Architecture  
unlimited scalability in increments of one FPGA
- ✦ Highest I/O and Routing Flexibility  
availability of nearly all FPGA I/Os for routing
- ✦ Very User Friendly  
remote access, automatic board detection, self test, etc.
- ✦ proFPGA FPGA Mixing Technology (FMT)  
support of Xilinx® and Intel® FPGAs in one system

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