

Xilinx Industrial Networking

Networked devices and machines are essential in today's automated factory floors, and deterministic communication is key for high throughput and quality in a production line. Xilinx solutions combine the technology for true real time connectivity with protocol implementations from leaders in industrial communication. Included protocols are Profinet, Profibus, EtherCAT, Powerlink, EtherNet/IP and more.

Xilinx FPGA, System on Chip (SoC), IP Cores and reference designs provide a complete platform for developing the right networking solution needed for industrial automation.

Device Table

Device Name	Product #	Logic	CPU	MHz	Package Size
Artix®-7	A35T – A200T	35kLC – 200kLC	Microblaze	100MHz	10x10 – 17x17
Zynq® All Programmable SoC	7010 – 7030	28kLC – 125kLC	Dual Cortex™ A9 + Neon and Microblaze	Max 667MHz - 866 MHz for Cortex A9	13x13 – 19x19
Spartan®-6	LX16, LX75	16kLC – 75kLC	Microblaze	80MHz	8x8 – 19x19

Selected Development Kits

Development boards and versatile extension cards for network ports form the backbone for reference systems. A special focus is given to Ethernet-based solutions with multiple external ports.

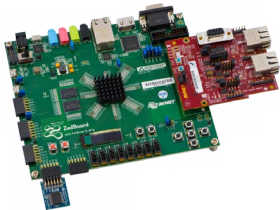
Xilinx Development Kits	Features	Cost	Source
Xilinx EK-A7-AC701-G	Artix-7 FPGA Evaluation Kit featuring the XC7A200T FPGA with 215k LC	\$1,295	Avnet
Avnet AES-A7EV-7A50T-G	Avnet Artix-7 50T FPGA Evaluation Kit with two on-board Ethernet network ports	\$239	Avnet
Xilinx EK-Z7-ZC702-G	Zynq-7000 All Programmable SoC Evaluation Kit featuring the Zynq-7020 SoC FPGA and dual ARM® Cortex A9 CPUs with 85k Programmable Logic	\$895	Avnet
Avnet Zedboard AES-Z7EV-7Z020-G	Zynq-7000 All Programmable SoC Development Kit featuring the Zynq-7020 SoC FPGA, dual ARM Cortex A9 CPUs with 85k LC Programmable Logic	\$395	Avnet
Avnet AES-S6EV-LX16-G	Avnet Spartan-6 LX16 FPGA Evaluation Kit	\$225	Avnet
FMC Cards for networking			
Avnet AES-FMC-ISMNET-G	Avnet ISM Networking FMC Module with two individual 10/100 BaseT Ethernet ports for Industrial Networking	\$250	Avnet
Trenz	Two-port Gigabit Ethernet Networking daughter board with FMC connector		
SOMs			
Avnet PicoZed	Zynq-7000 based module with compatible migration between the Zynq-7010 and Zynq-7030. Carrier Board with FMC available from Avnet (AES-PZCC-FMC-G).	\$299 - \$459	Avnet
Avnet MicroZed	Zynq-7000 based module with compatible migration between Z-7010 and Z-7020. Comes with Ethernet port for host IF and SD card slot. Carrier Board with FMC available from Avnet (AES-MBCC-FMC-G).	\$189 - \$279	Trenz Electronic
Enclustra Mercury ZX family (ME-ZX1-xx-xx-xxx)	System on Module with one Gigabit Ethernet and two Fast Ethernet ports, based on the Zynq-7030/35/45.	EUR 440 (Carrier board: EUR)	Enclustra
SMARTzynq	Zynq-7000 based 5 Port Gigabit Ethernet Industrial Embedded Switch Module.		SoC-e

IP Libraries for Motor Control

Xilinx Alliance Members offer powerful communication solutions for industrial applications on Xilinx devices and tailor them to any application's need for making most of the flexibility of All Programmable architectures.

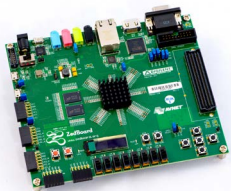
Name	Protocol	Type	Provider	Availability	Device Family Support	
Multiprotocol Solutions						
Anybus IP	<ul style="list-style-type: none"> - Profinet RT/IRT - EtherNet/IP - EtherCAT 	<ul style="list-style-type: none"> - Powerlink - Modbus-TCP 	Slave	HMS Industrial Networks	Available (Note: EtherCAT release in Q4/2015)	Zynq-7000 2016: Artix-7
Single Protocol Solutions						
Profinet RT/IRT	Device	Enclustra		Available	Zynq-7000, Artix-7	
Profinet RT/IRT	Device	Softing		Available	Artix-7	
Profinet IO	Device	Port GmbH		Available	Zynq-7000, Spartan-6	
Ethernet/IP	Adapter	Enclustra		Q1/2016	Zynq-7000, Artix-7	
EtherCAT	Slave	Beckhoff		Available	Zynq-7000, Artix-7, Spartan-6	
EtherCAT	Master	HMS, based on acontis		Available	Zynq-7000	
SERCOS III	Slave + Master	Sercos International e.V. / Cannon Automata		Available	Spartan-6	
CC-Link IE	Slave	inrevium		On Request	Zynq-7000	
Mechatrolink III	Slave + Master	inrevium		On Request	Zynq-7000	
Profibus DP	Device	Adescom		On request	Device independent HDL IP	
CANopen	SW protocol	HMS		On Request		

Reference Designs



Anybus IP from HMS

- Avnet Zedboard, uses the Zynq-7020 All Programmable SoC
- Avnet ISMNET with two networking ports
- PMOD Flash
- Reference design with Anybus IP, Anybus EDK (drivers) and a simple example application
- Runs with commercial network controllers as well as software-based controllers



Profinet RT/IRT on Zynq-7000 from Enclustra

- Avnet Zedboard, uses the Zynq-7020 All Programmable SoC
- Avnet ISMNET industrial networking FMC module with two Ethernet network ports
- Reference design with a demo application
- Utilizes Profinet protocol stack from Moxel
- Runs with Siemens S7 controllers



Fast EtherCAT Drive on Xilinx ZC702 from QDESYS

- Xilinx ZC702, uses the Zynq-7020 All Programmable SoC and can host two FMC boards
- Avnet FMC MC1, dual motors, 3 phases power stage board
- Avnet ISMNET Industrial Networking FMC module with two Ethernet network ports
- Reference design implements a 2 motor drive, controlled via EtherCAT™
- Implements diagnostic interface to API running on PC (with Beckhoffs TwinCat™) or PLC, supporting LabVIEW, Mathworks, SciLab, C++ and Visual Basic



Profinet RT/IRT on Artix-7 from Softing

- Xilinx AC701, uses Artix-7 200T FPGA
- Avnet ISMNET industrial networking FMC module with two Ethernet network ports
- Reference design with a demo application

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Design Tools & Methodologies

Vivado Design Suite

The Vivado® Design Suite delivers a SoC-strength, IP-centric and system-centric, next generation development environment that has been built from the ground up to address the productivity bottlenecks in system-level integration and implementation.

Digital Design Using Vivado IPI

Xilinx has developed a basic functional IP blocks library which can be used to create digital designs in a schematic view. The tutorial and laboratory exercises are created and available for use with the Xilinx University Program supported boards.

SDSoC Development Environment

The SDSoC™ development environment provides a greatly simplified ASSP-like C/C++ programming experience including an easy to use Eclipse IDE and a comprehensive design environment for heterogeneous Zynq® All Programmable SoC and MPSoC deployment. Complete with the industry's first C/C++ full-system optimizing compiler, SDSoC delivers system level profiling, automated software acceleration in programmable logic, automated system connectivity generation, and libraries to speed programming.

Partner Profiles

Cannon Automata

AUTOMATA is the official "SERCOS III FPGA solution center" of SERCOS International, the world wide user organization of the FPGA based real-time Ethernet standard SERCOS III. AUTOMATA is responsible for the maintenance and further development of the SERCOS III technology and technical support for users.

Beckhoff Automation

Beckhoff is focused on providing advanced control solutions based upon proven COTS technologies to allow users to design high performance automation systems at a lower overall cost in systems and engineering - by simplifying the overall architectures and engineering processes.

Enclustra

Enclustra provides services covering the whole range of FPGA-based system development: From high-speed hardware or HDL firmware through to embedded software, from specification and implementation through to prototype production.

HMS Industrial Networks

HMS products, solutions and know-how enable industrial machinery to get connected to systems and networks.

Port

Port GmbH develops and distributes progressive, high-quality IP products and engineering services in the area of industrial communications especially for CAN, CANopen, DeviceNet and Industrial Ethernet.

Qdesys

QDESYS designs, develop and produces industrial embedded systems. Specialized in motor control, control systems, and industrial networking. QDESYS produces original design and custom designs.

SoC-e

SoC-e develops IP cores, SoMs and boards and delivers Design Services for the application in Energy, Industrial Automation, and Transportation.

Softing

Softing is a worldwide leading specialist in industrial data communication such as fieldbus technologies and industrial Ethernet.

Tokyo Electron Device Ltd

Inrevium is the Design Service brand of Tokyo Electron Device, which offers FPGA platform solutions, market specific IPs, Technical Support and Design Services to our worldwide customers through our global sales and distribution partners. Tokyo Electron Device's portfolio is complemented by FMC daughter cards, customized IP and Kits.