SYZYGY®
by Opal Kelly

XEM7320
FPGA Development Module

Opal Kelly

- Founded 2004.

- Leading producer of powerful FPGA modules for high-performance data acquisition, instrumentation, and test & measurement

- Focus on lifecycle-managed modules for prototypes, proof-of-concept, and production use

- Modules include the FrontPanel SDK — a multi-platform, multi-language, FPGA-agnostic framework for professional-grade hardware / software connectivity

- Introduced SYZYGY connectivity standard in 2017

- ISO 9001:2015 QMS, certified 2019

Proof-of-Concept
Build fast. Build early.

Prototype
Focus on your core.

Production
Simplify your supply chain.

OUR CUSTOMERS

Over 2,000 corporate customers

Over 200 Universities worldwide

CUSTOMER SEGMENTS

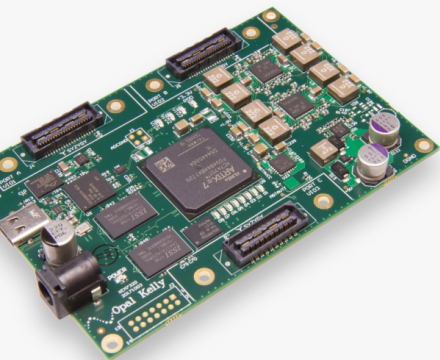Research Organizations

National Laboratories

Military / Aerospace

Scientific Instrumentation

Commercial

TEXAS INSTRUMENTS

QUALCOMM

CIRRUS LOGIC

Sandia National Laboratories

ANALOG DEVICES

Microsoft

MIT Massachusetts Institute of Technology

SAMSUNG

MICROCHIP

maxim integrated

National Semiconductor
The Sight & Sound of Information

Agilent Technologies
Innovating the HP Way
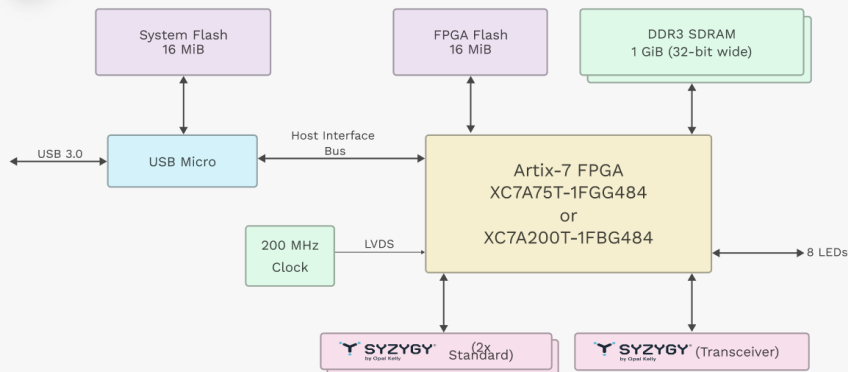
Google

intel

XEM7320

SYZYGY
by Opal Kelly

Xilinx Artix-7 XC7A75T / A200T

SuperSpeed USB 3.0 interface
1 GiB DDR3 memory
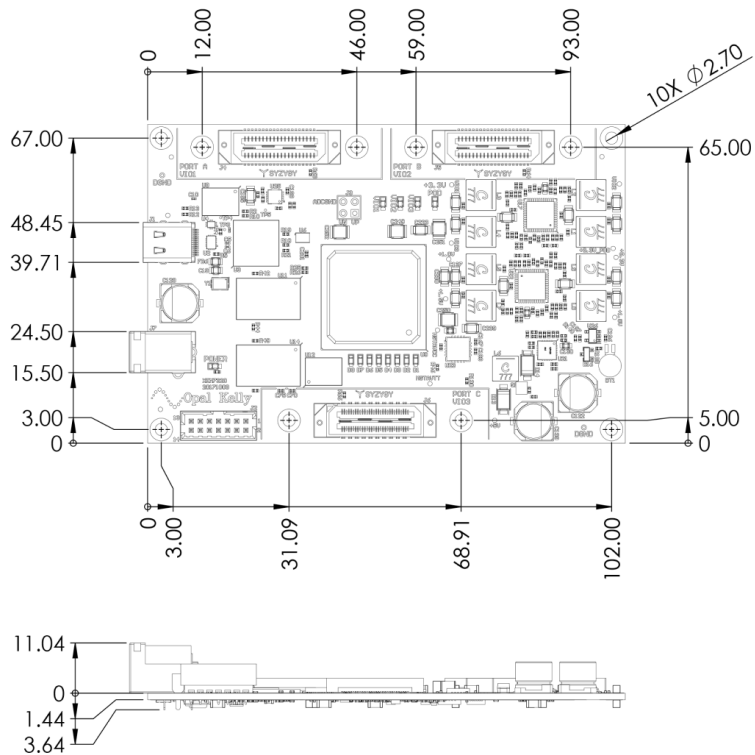2 SYZYGY Standard Ports
1 SYZYGY Transceiver Port

FrontPanel® SDK

2.0 3.0 USB FPOIP

Host Interface	USB 3.0 Type C, SuperSpeed FrontPanel Support
FPGA	XC7A75T-1FGG XC7A200T-1FBG
Memory	1 GiByte DDR3, 32-bit wide data interface
NV Memory	16 MiB System Flash 16 MiB FPGA Flash
Oscillator	200 MHZ
FPGA I/O Voltage	Up to +3.3V

	MINIMUM	TYPICAL	MAXIMUM	UNITS
DC Input	+4.5	+5.0	+5.5	VDC
DC Input Ripple	-	-	50	mVp-p
Operating Temperature	0	-	+70	ºC
Storage Temperature	-50	-	+100	ºC
Weight		28		grams
Oscillator Frequency		200		MHz
Oscillator Freq. Stability		± 50		ppm
Oscillator Jitter		2.5		ps RMS

FEATURE	XEM7320-A75	XEM7320-A200
FPGA	XC7A75T-1FGG	XC7A200T-1FBG
Slice Count	11,800	33,650
D Flip-Flops	94.400	269,200
Distributed RAM	892 Kib	2,888 Kib
Block RAM	3,780 Kib	13,140 Kib
DSP Slices	180	740
Clock Management Tiles	6	10

Block Diagram

- System Flash 16 MiB
- FPGA Flash 16 MiB
- DDR3 SDRAM 1 GiB (32-bit wide)
- USB 3.0 → USB Micro
- Host Interface Bus
- Artix-7 FPGA XC7A75T-1FGG484 or XC7A200T-1FBG484
- 200 MHz Clock — LVDS
- 8 LEDs
- SYZYGY by Opal Kelly (2x Standard)
- SYZYGY by Opal Kelly (Transceiver)

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XEM7320
Mechanical Drawings

10X Φ2.70

12.00
46.00
59.00
93.00
0

67.00
65.00
48.45
39.71
24.50
15.50
3.00
0
5.00
0

0
3.00
31.09
68.91
102.00
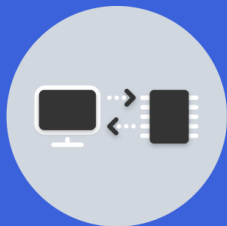
11.04
0
1.44
3.64

PORT A
U101
PORT B
U102
PORT C
U103

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All dimensions in millimeters (mm)

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FrontPanel ® System Components

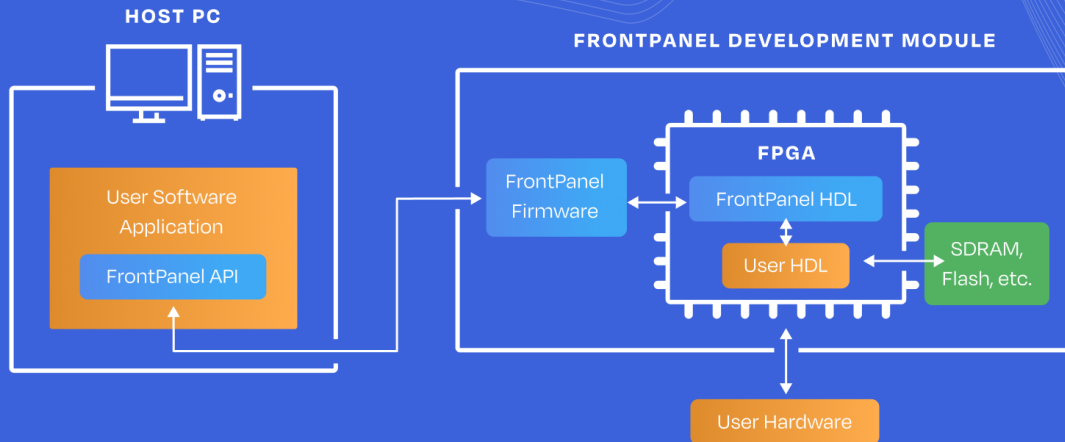Software API and a robust driver to communicate with your device over USB, PCI Express and the internet.

Proprietary device firmware to manage FPGA configuration and communication as well as other device management and monitoring.

Lightweight FPGA IP blocks that integrate with your HDL to make host communication simple and easy.

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FrontPanel ® System Architecture

HOST PC

FRONTPANEL DEVELOPMENT MODULE

User Software Application

FrontPanel API

FrontPanel Firmware

FPGA

FrontPanel HDL

User HDL

SDRAM, Flash, etc.

User Hardware

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Build high-performance software-connected FPGA applications for prototypes, proof-of-concept, and production

FrontPanel® SDK

- Multi-platform, multi-language

- Easy to use. High performance. Stable and reliable.

- USB 2.0, USB 3.0, PCI Express, and TCP/IP

- C++, C# (.NET), Python, Java, Ruby APIs

- Windows DLL / Shared Object for 3rd-party integration
  (e.g. MATLAB, LabView)

FrontPanel® over IP (FPoIP)

- Familiar API, extended over TCP/IP networks

- Protocol, server, and client implementations

- Server for USB-based devices: Windows, Linux, and macOS hosts

- Lua-based server-side scripting for latent conditions

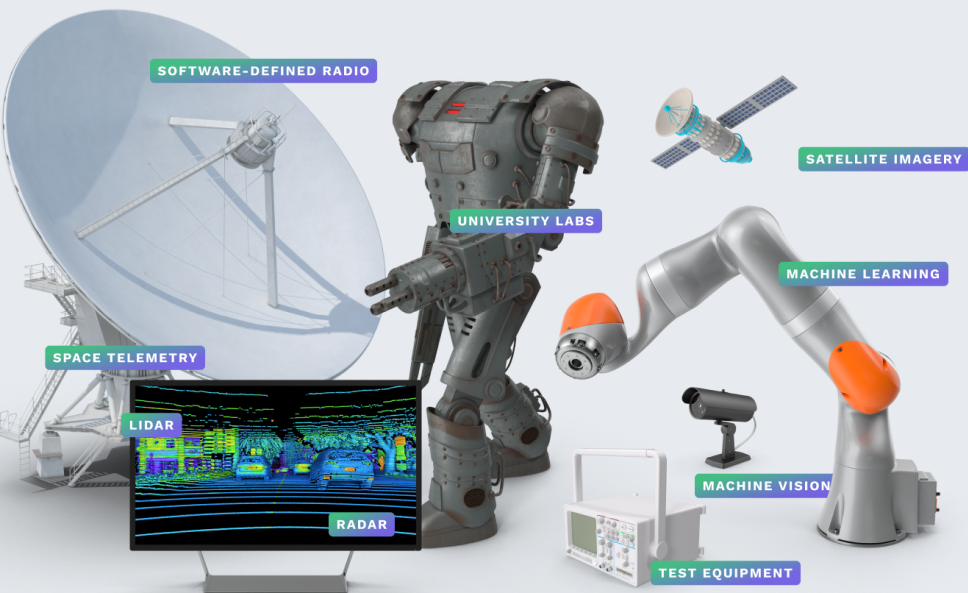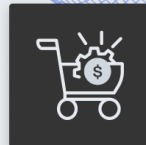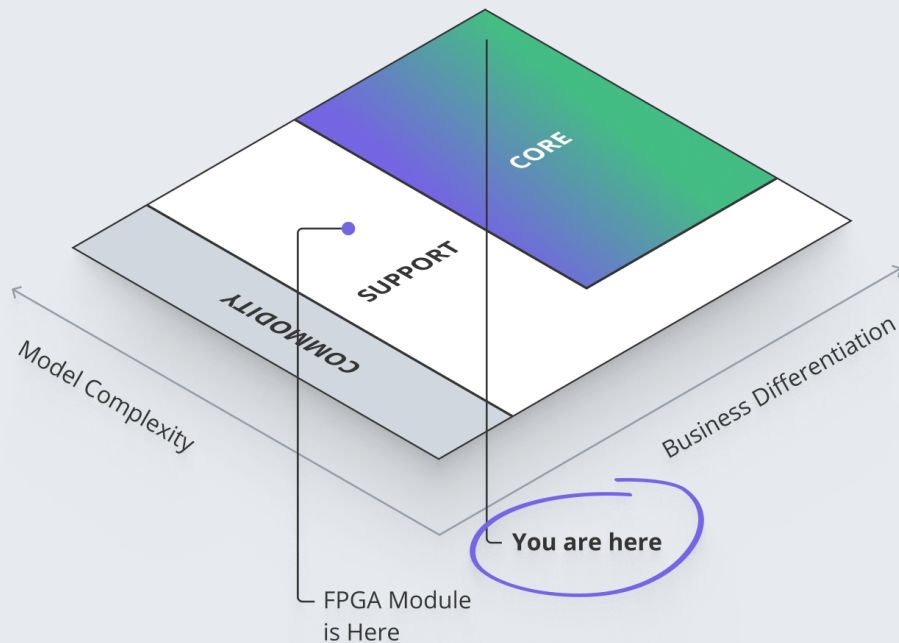- Javascript implementation for in-browser operation

2.0 3.0 FPOIP

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Applications & Deployments

SOFTWARE-DEFINED RADIO

SATELLITE IMAGERY

UNIVERSITY LABS

MACHINE LEARNING

SPACE TELEMETRY
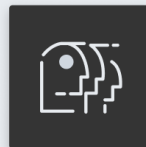
LIDAR

RADAR

MACHINE VISION

TEST EQUIPMENT

Data Acquisition

Instrumentation

Test & Measurement

Machine Vision

Software-Defined Radio

Education & Research

Machine Learing / AI

Networking

RADAR, LIDAR

Satellite Imagery

Advanced / Remote Sensing

Semiconductor Simulation, Test, and Debug

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Focus on Your Core Expertise

Model Complexity

Business Differentiation

COMMODITY

SUPPORT

CORE

FPGA Module is Here

You are here

Reduce time to market

Build a team that strengthens your core

Simplify your supply chain

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