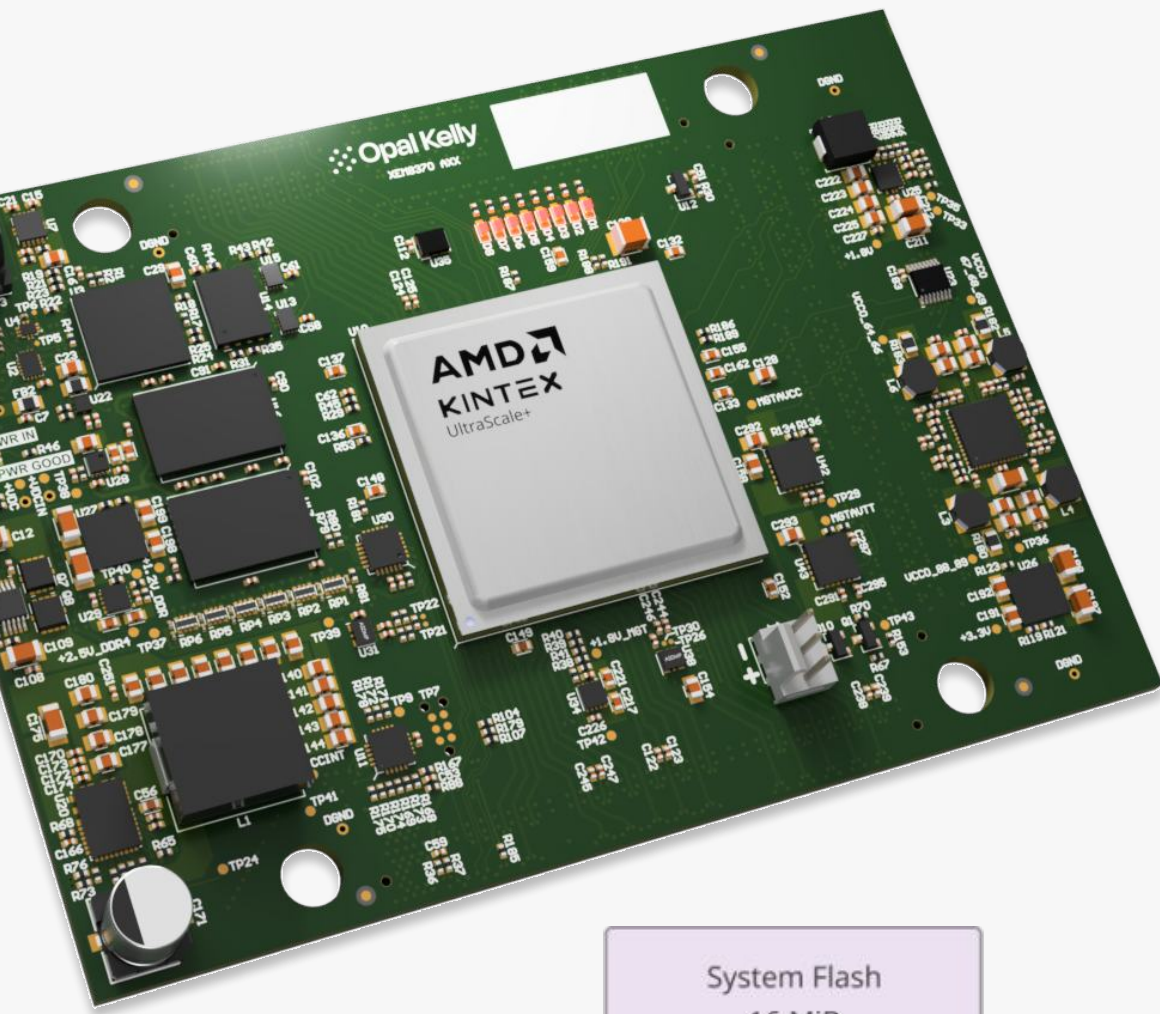# XEM8370

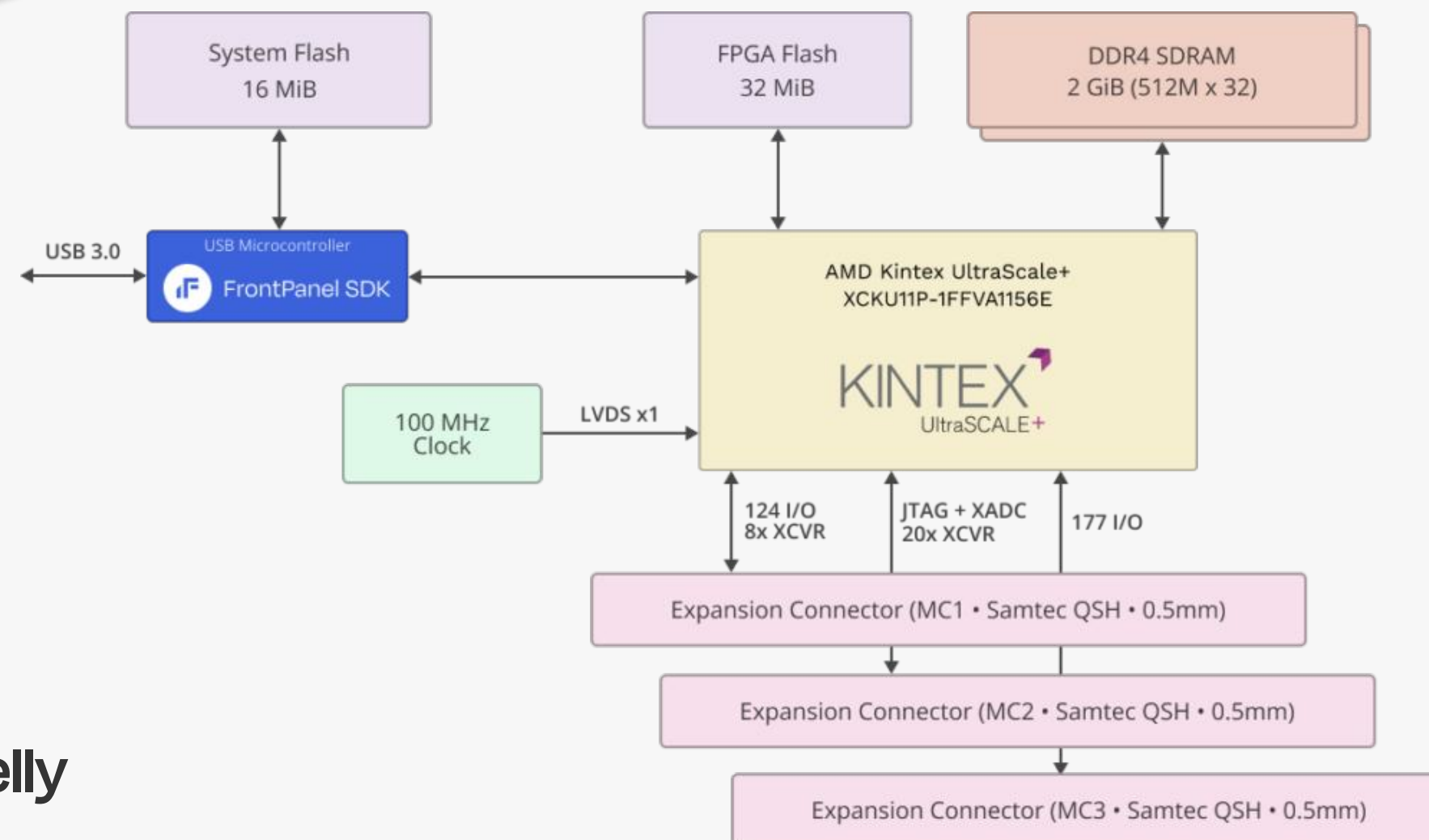FPGA Development Board and Integration Module

Opal Kelly

XEM8370

Xilinx Kintex UltraScale+
XCKU11P-1FFVA1156E

SuperSpeed USB 3.0 interface
2 GiB DDR4 memory
32 MiB FPGA Flash
16 MiB Serial Flash
Adjustable Voltage I/O

FrontPanel® SDK

2.0 3.0 · USB · FPOIP

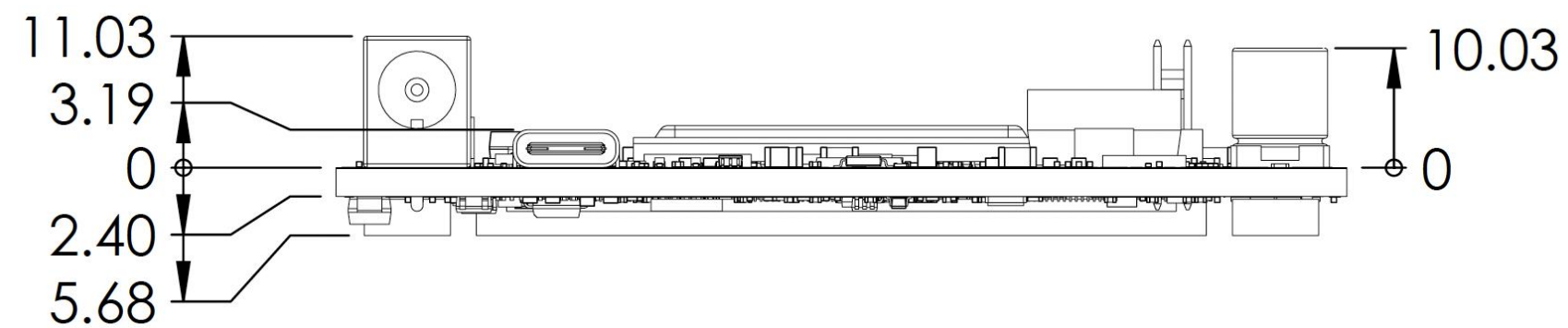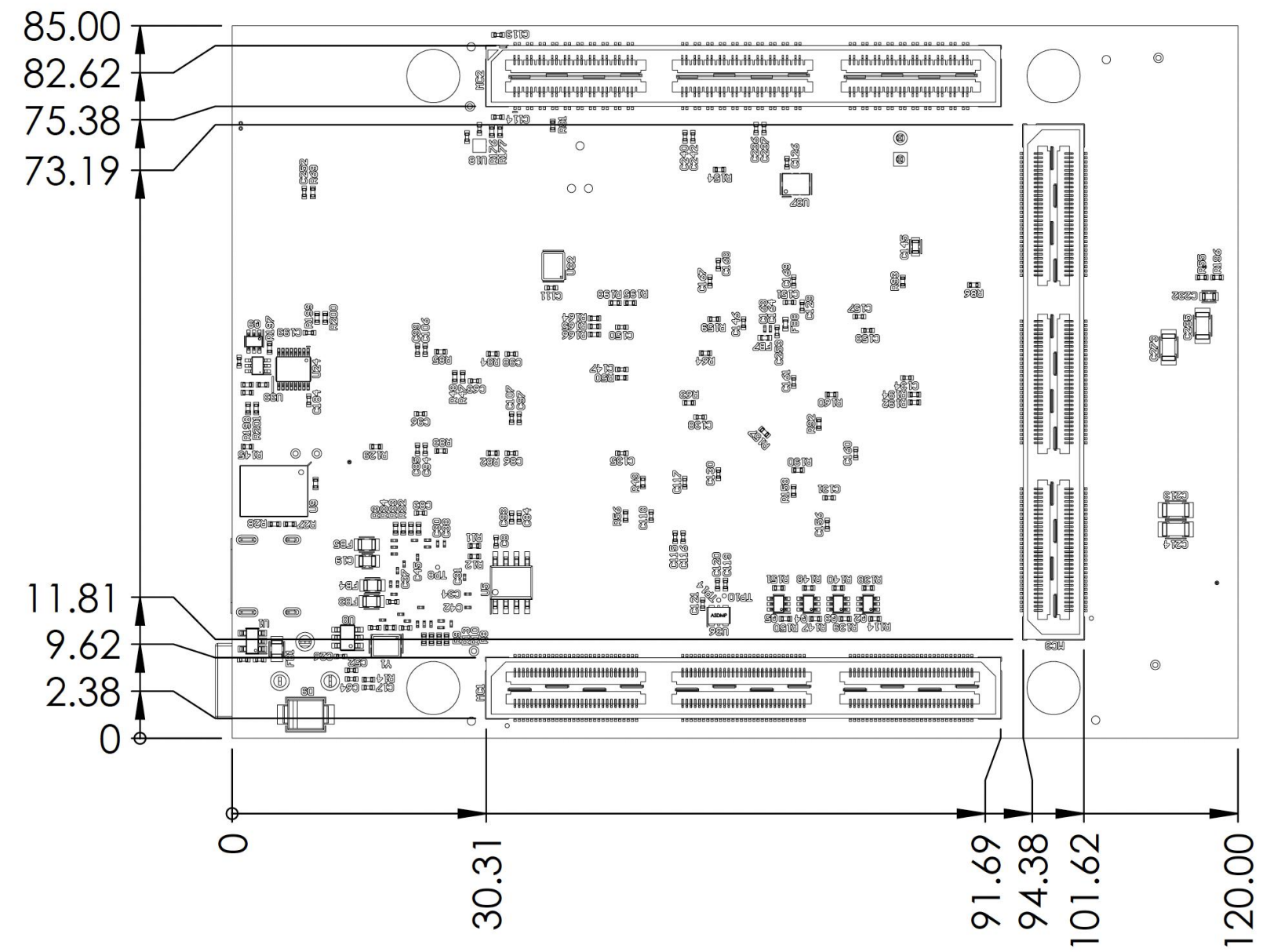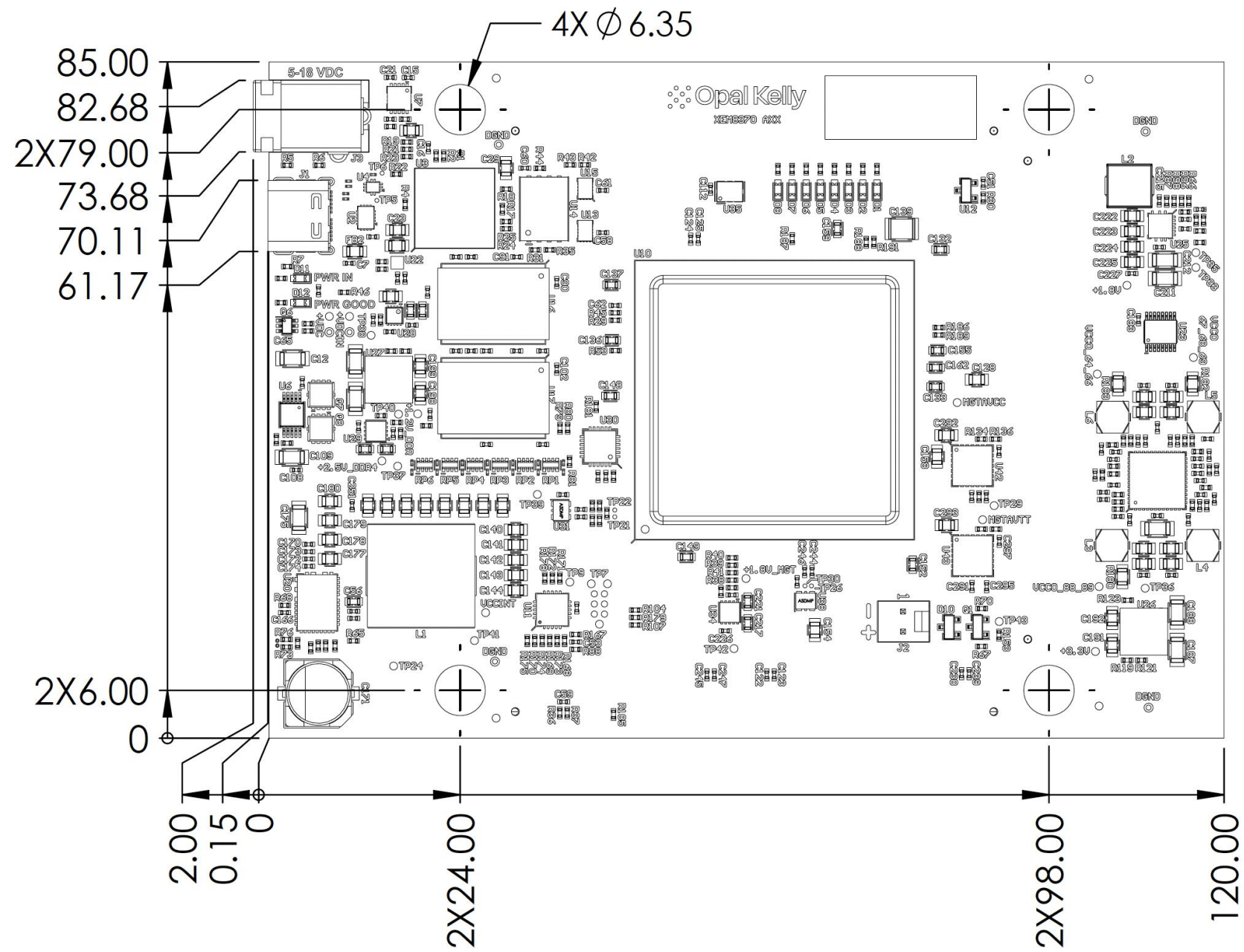| Host Interface	USB 3.0 Type C, SuperSpeed FrontPanel Support
FPGA	XCKU11P-1FFVA1156E XCKU11P-3FFVA1156E (optional)
Memory	2 GiByte DDR4, 32-bit wide data interface
NV Memory	16 MiB System Flash 32 MiB FPGA Flash
Oscillator	100 MHz fixed fabric oscillator 6 pin 2.5×2.0mm or 2.5×3.2mm
FPGA I/O Voltage	Up to +3.3V

	MINIMUM	TYPICAL	MAXIMUM	UNITS
DC Input	+5.0		+180	VDC
DC Input Ripple	-	-	50	mVp-p
Operating Temperature	0	-	+70	ºC
Storage Temperature	-50	-	+100	ºC
Weight		91.5		grams
Oscillator Frequency		100		MHz
Oscillator Period Jitter		2.5		ps RMS
Oscillator Stability		±25		ppm

FEATURE	XCKU11P
FPGA	XCAU11P
System Logic Cells	653,100
CLB Flip-Flops	597,120
CLB LUTs	298,560
Distributed RAM (max)	9.1 Mb
Block RAM	600 blocks (21.1 Mb)
UltraRAM	80 blocks (22.5 Mb)
DSP Slices	2,928
GTY Transceivers (16.375 Gbps)	8

Block Diagram

System Flash 16 MiB

FPGA Flash 32 MiB

DDR4 SDRAM 2 GiB (512M x 32)

USB 3.0 — USB Microcontroller FrontPanel SDK

AMD Kintex UltraScale+ XCKU11P-1FFVA1156E
KINTEX UltraSCALE+

100 MHz Clock — LVDS x1

124 I/O 8x XCVR | JTAG + XADC 20x XCVR | 177 I/O

Expansion Connector (MC1 • Samtec QSH • 0.5mm)

Expansion Connector (MC2 • Samtec QSH • 0.5mm)

Expansion Connector (MC3 • Samtec QSH • 0.5mm)

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XEM8370
Mechanical Drawings

4X Ø 6.35

85.00
82.68
2X79.00
73.68
70.11
61.17

2X6.00

0

2.00
0.15
0

2X24.00

2X98.00

120.00

85.00
82.62
75.38
73.19

11.81
9.62
2.38

0

0

30.31

91.69
94.38
101.62

120.00

11.03
3.19
0
2.40
5.68

10.03
0

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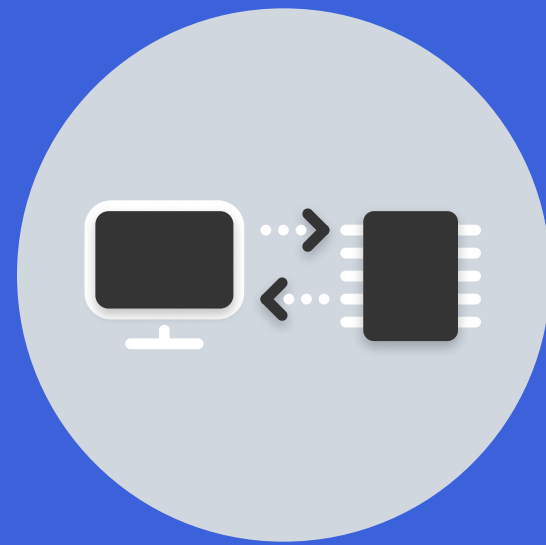
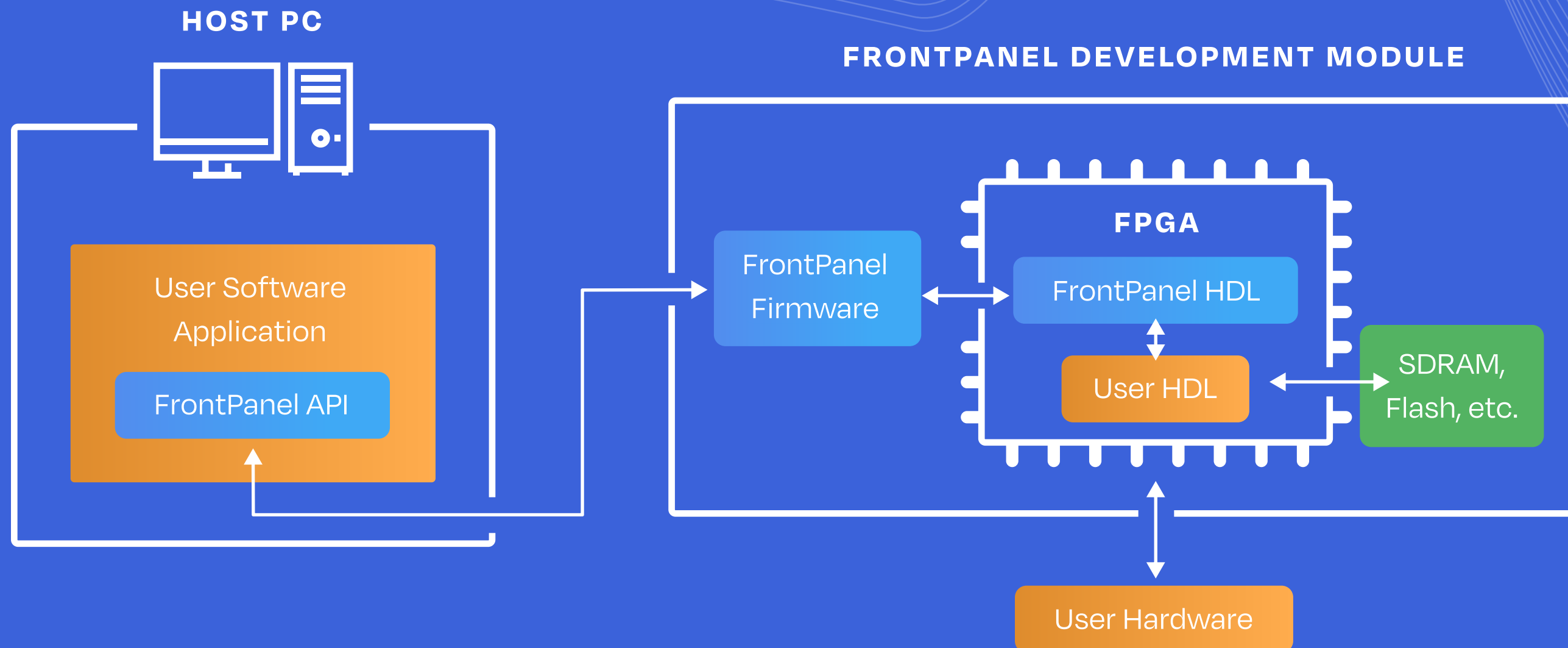Software API and a robust driver to communicate with your device over USB, PCI Express and the internet.

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.

Opal Kelly

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

Opal Kelly

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)
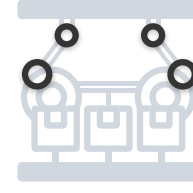
FrontPanel® over IP (FPoIP)

- 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

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
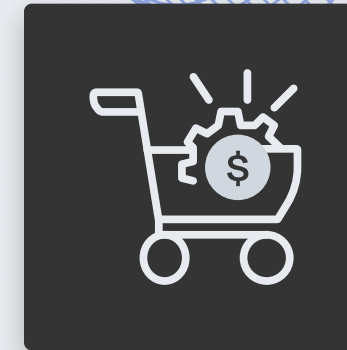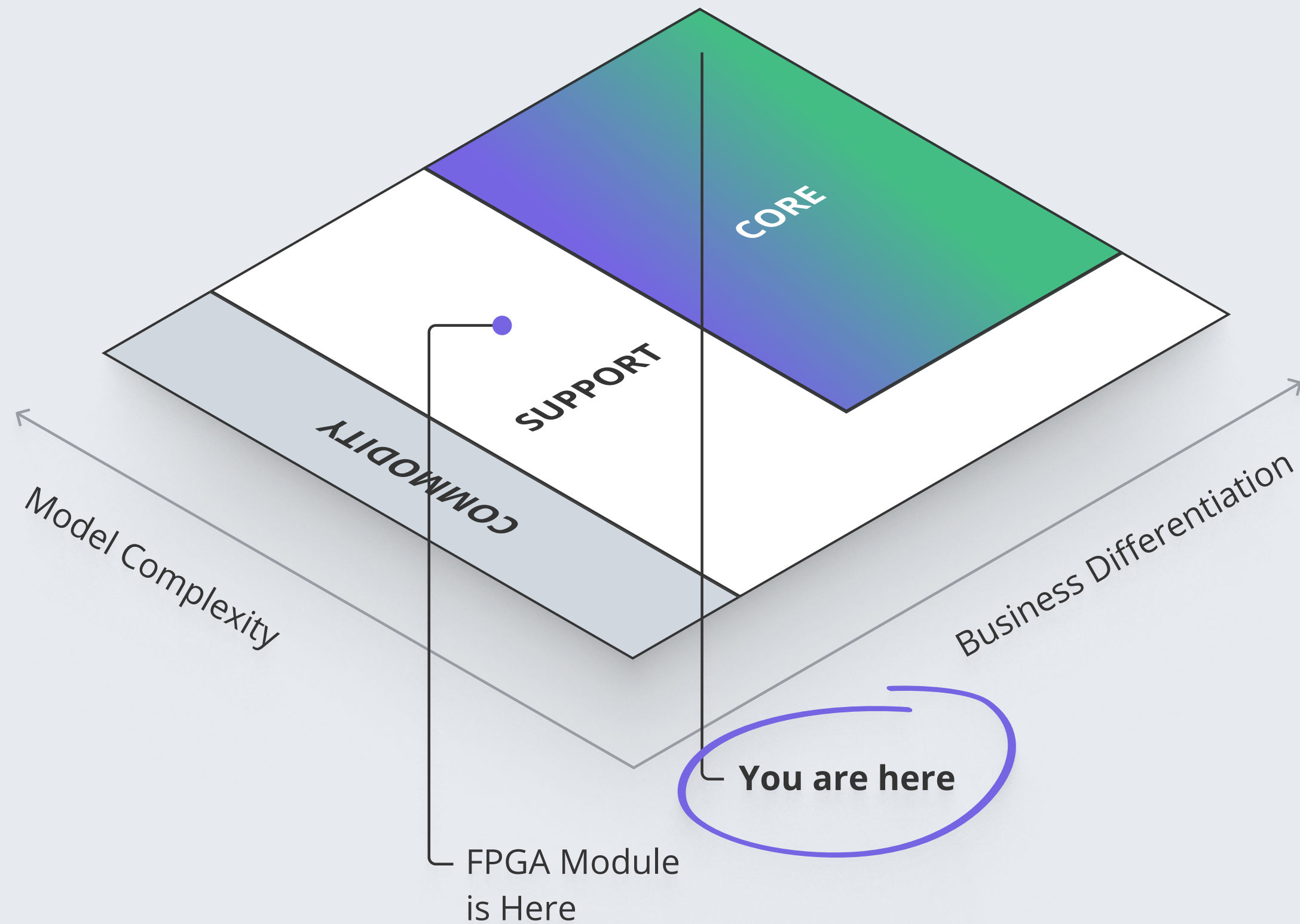
Scientific Instrumentation

Commercial

TEXAS INSTRUMENTS · QUALCOMM · CIRRUS LOGIC · Sandia National Laboratories · ANALOG DEVICES

Microsoft · Massachusetts Institute of Technology · SAMSUNG · MICROCHIP · maxim integrated

Leland Stanford Junior University · National Semiconductor (The Sight & Sound of Information) · Agilent Technologies (Innovating the HP Way) · Google · intel

Applications & Deployments

SOFTWARE-DEFINED RADIO

SATELLITE IMAGERY

UNIVERSITY LABS

MACHINE LEARNING

SPACE TELEMETRY
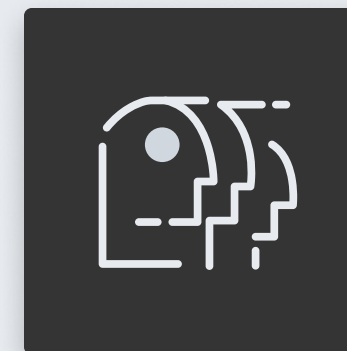
LIDAR

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

Opal Kelly
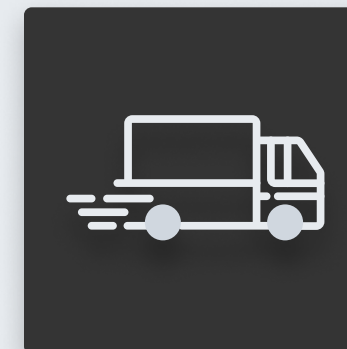
Focus on Your Core Expertise

Model Complexity

Business Differentiation

CORE

SUPPORT

COMMODITY

You are here

FPGA Module is Here

Reduce time to market

Build a team that strengthens your core

Simplify your supply chain

Opal Kelly