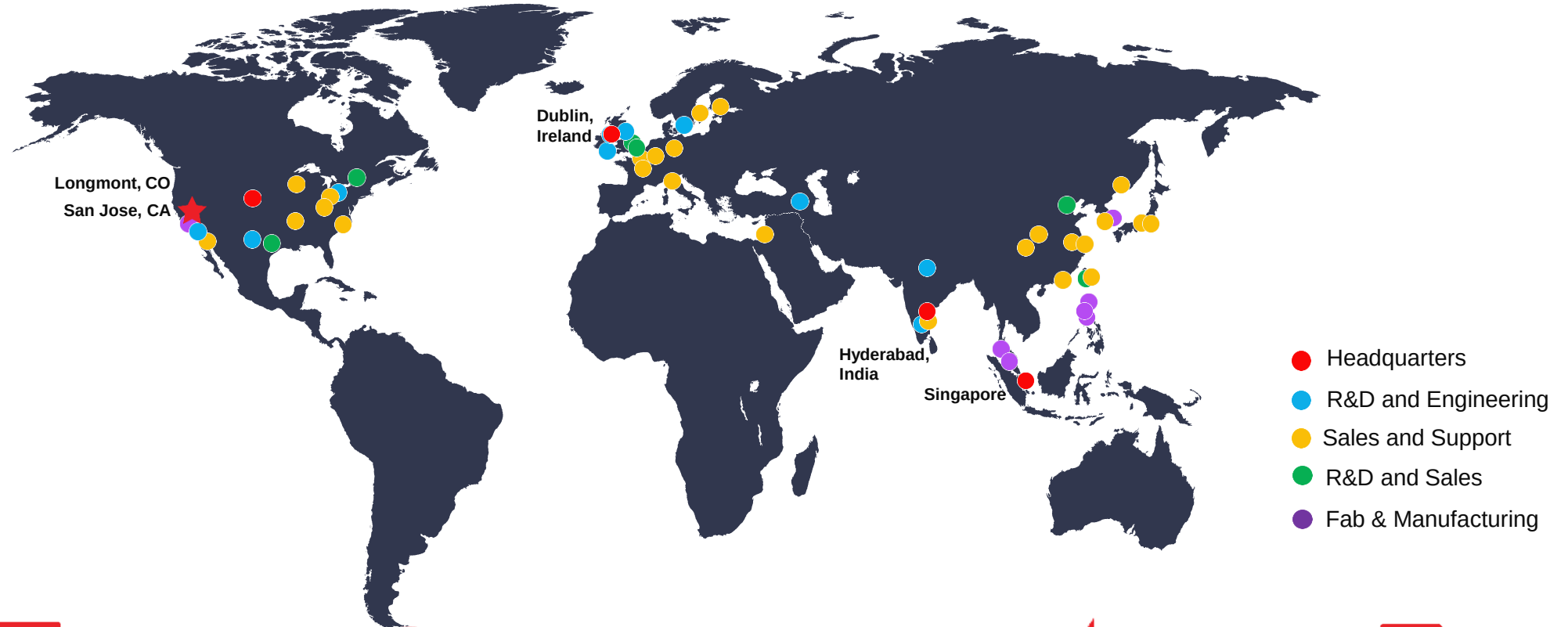




Решения Xilinx в системах автономного вождения (Autonomous Driving) и интеллектуальных системах помощи водителю (ADAS), презентация нового решения от Xilinx для видеообработки - системы на модуле KRIA SoM K26

Xilinx

Компания основана в 1984



\$3.06B

Прибыль
(FY19)



5,000

Сотрудников по
всему миру



60K+

Заказчиков



60+

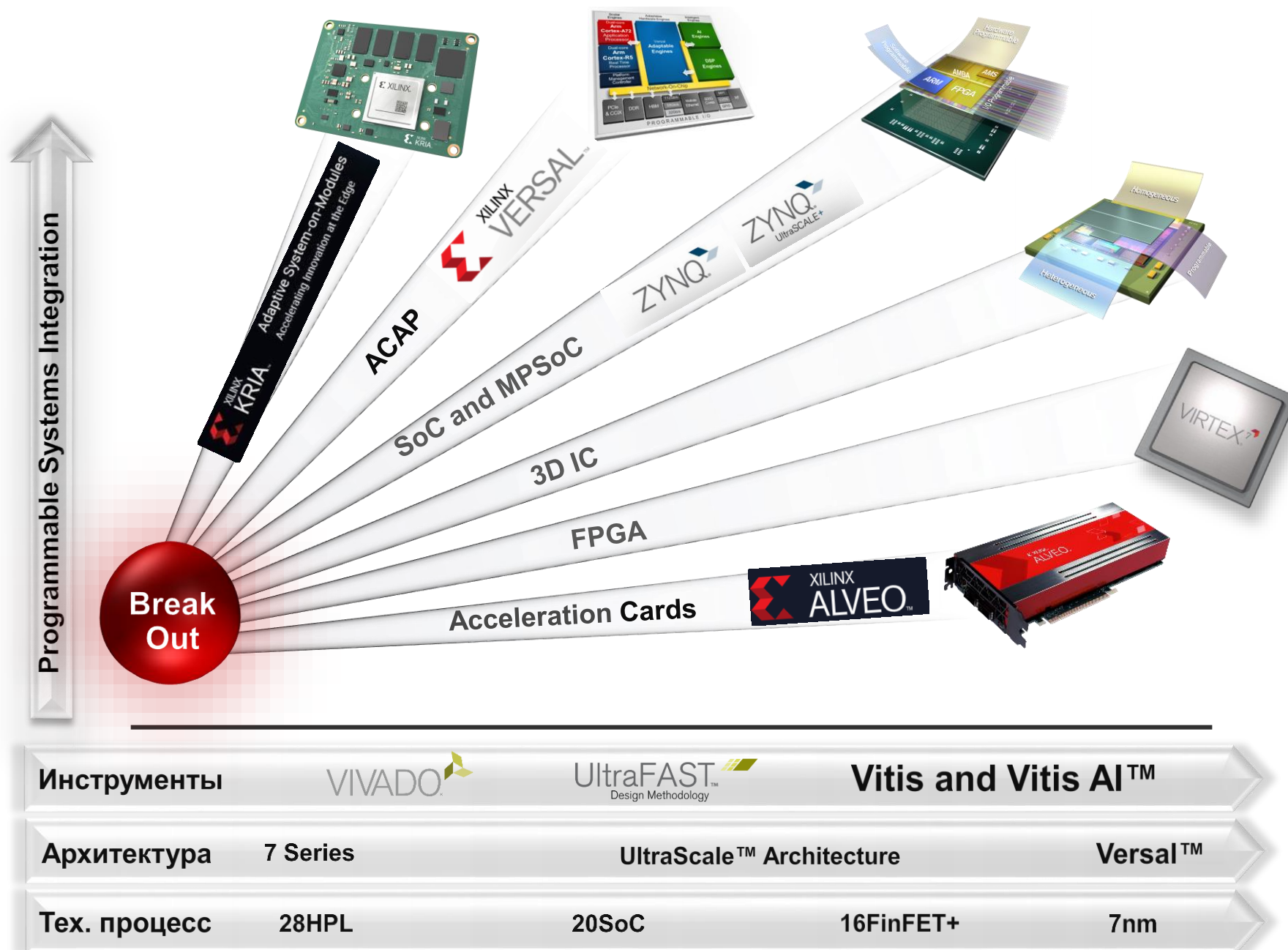
Нововведений



4,400+

Патентов

Диаграмма развития

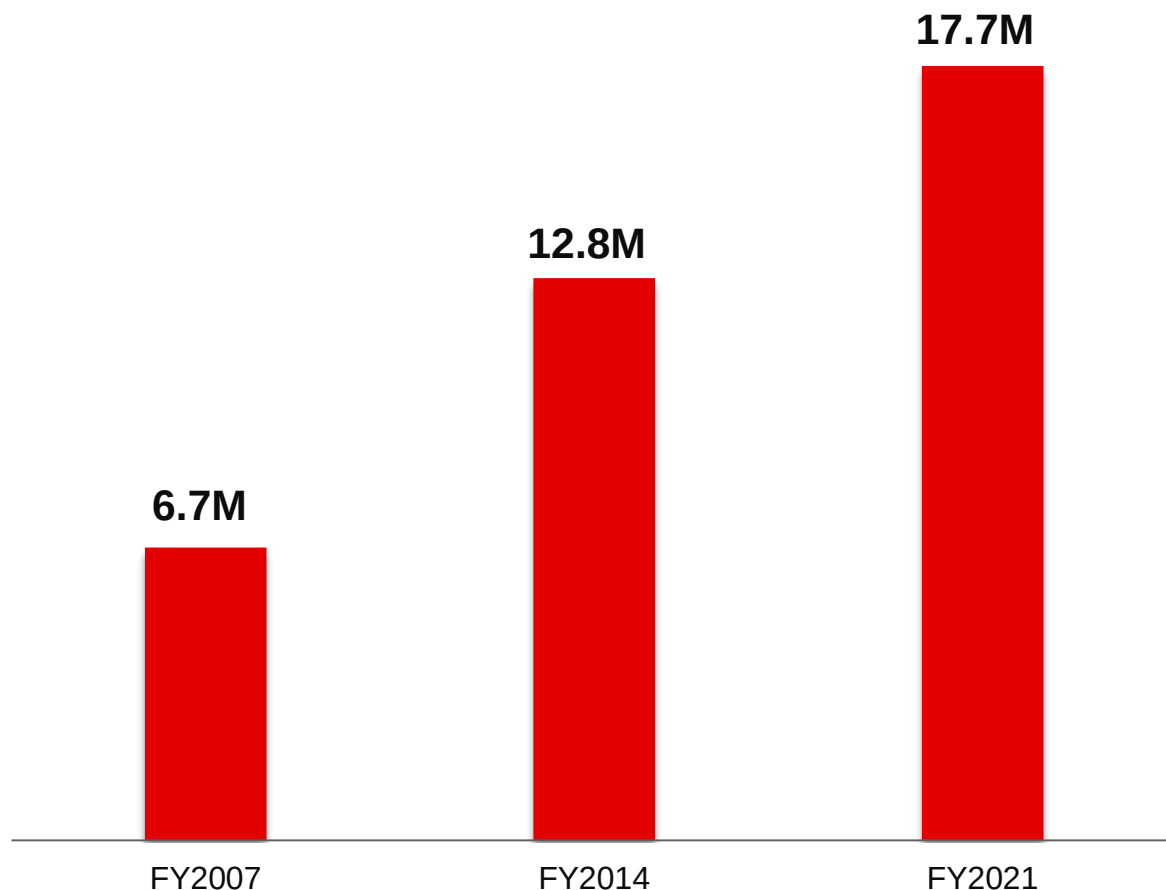




Решения Xilinx в системах автономного вождения (Autonomous Driving) и интеллектуальных системах помощи водителю (ADAS)

Хilinx демонстрирует устойчивый рост в области производства микросхем для автомобильного рынка

Unit Shipments



Последовательный рост

- ▶ Двукратный рост продаж за последние **15** лет
- ▶ Более **209M** устройств отгружено
- ▶ Более **85M** устройств отгружено для ADAS

Tier-1s



OEMs



Startups



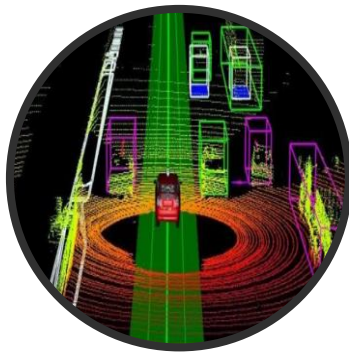
Note: Only showing publicly-announced customer collaborations

Основные задачи ADAS и AD

ADAS Applications



Front Camera



LiDAR



Full Display Mirror



Surround View Camera

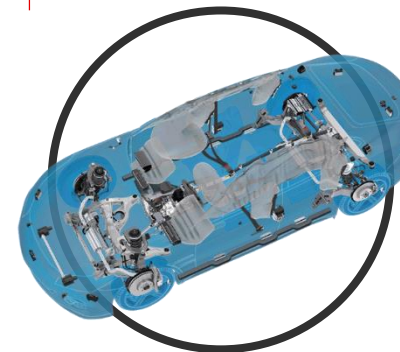


RADAR

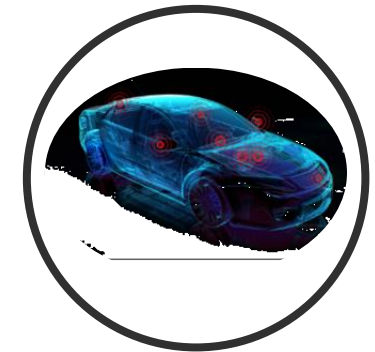


Driver Monitoring System

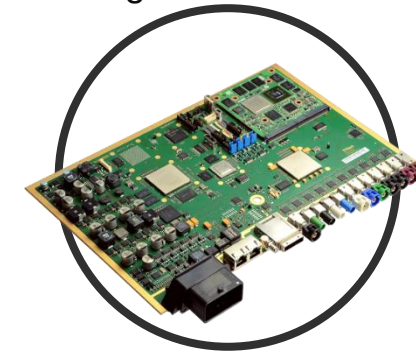
AD Central Module Functions



Data Aggregation &
Pre-processing

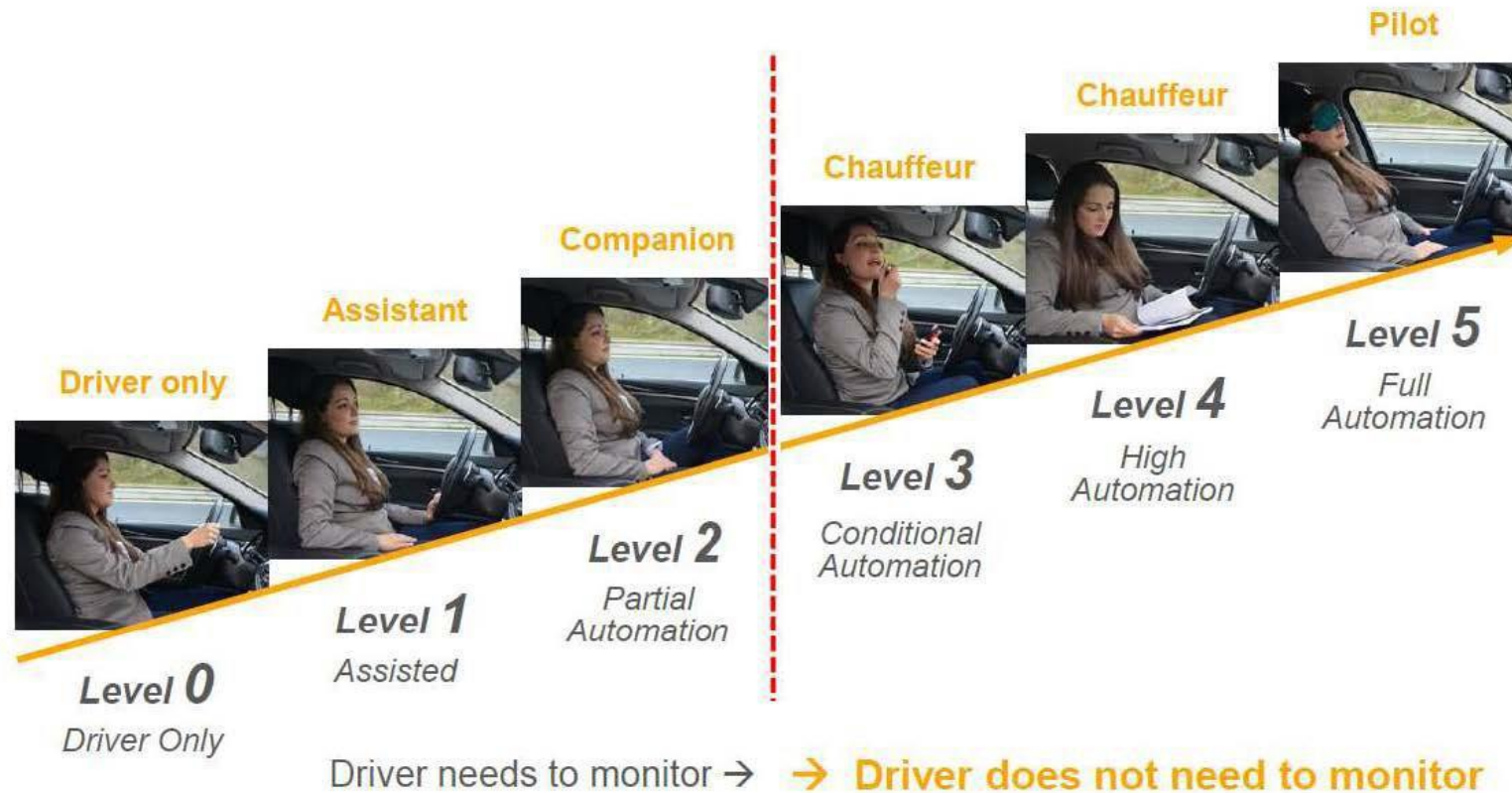


Sensor Fusion



Compute Acceleration

Классификация ADAS и тенденция развития



Purchasing Automotive Category Memories
September 2015

Тренды: Сенсоры для ADAS

Камера переднего обзора по прогнозам станет “стандартной функцией” в 2022-2023

Увеличение разрешения камер и Field of View (FoV) для ML

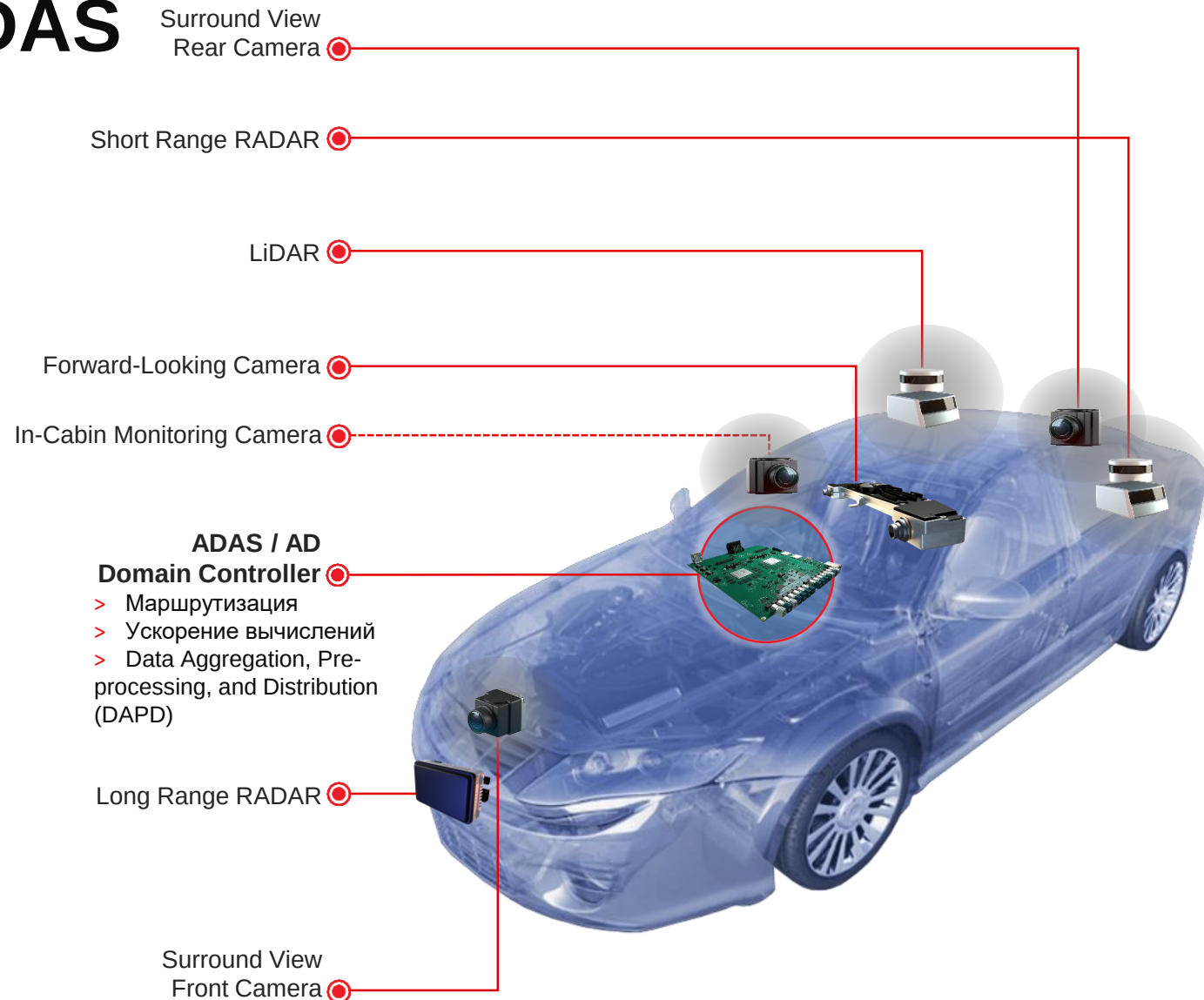
- >> Forward Camera 1.7M Pixel ▶ 8M Pixel
- >> Surround View 1.0M Pixel ▶ 2-4M Pixel
- >> Automated Driving 4.0M Pixel ▶ 8-20M Pixel

Переход от 2D RADAR к Imaging RADAR

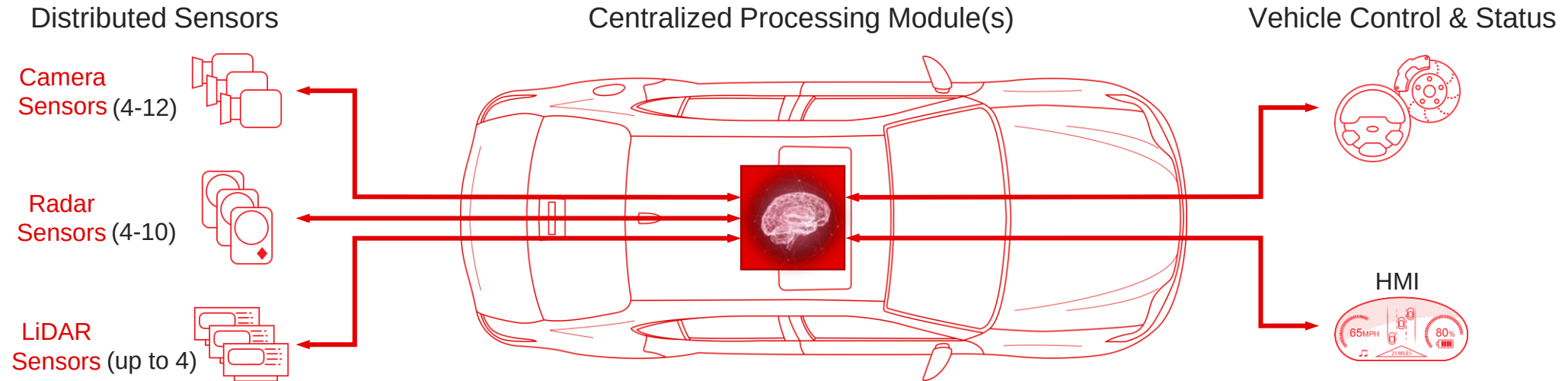
Развитие технологий LiDAR

Датчики нацелены на дальность >300 м

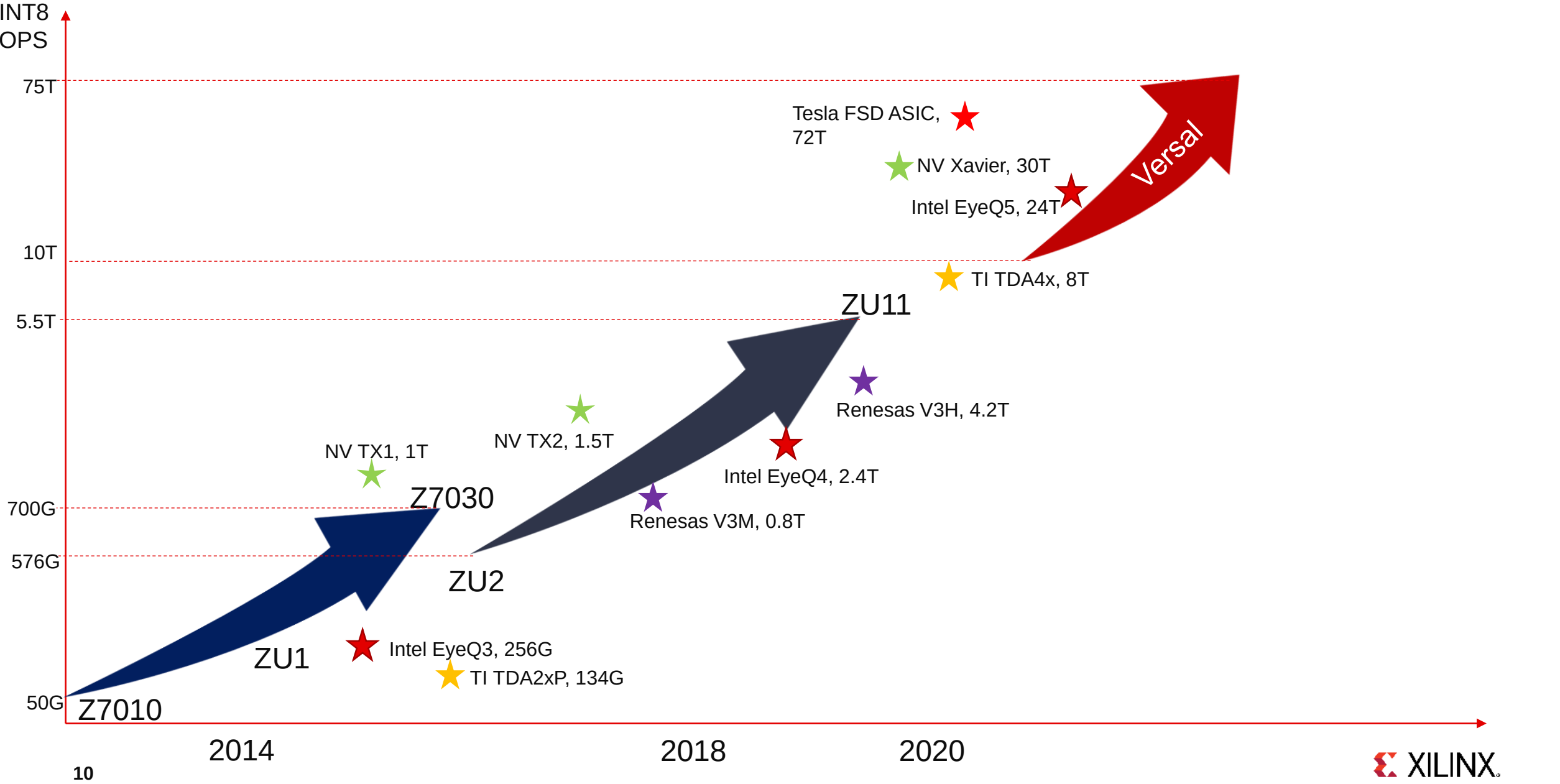
Переход на сложные центральные процессорные модули (контроллеры домена)



Комплексный подход для всех задач



XA Device Roadmap – AI Scalability



Низкая задержка критична в ADAS

Преимущества технологии аппаратного ускорения Xilinx в системах реального времени

Driving Event: Car Stopped Ahead

GPU/CPU/DSP

Высокая пропускная
способность **ИЛИ**
Низкая задержка



49-320ms

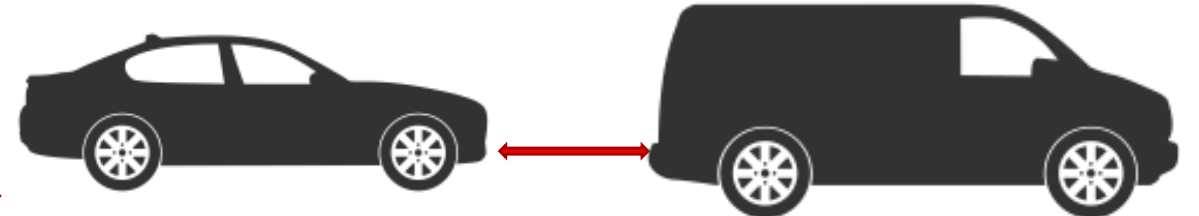


Xilinx

Высокая пропускная
способность **И**
Низкая задержка



2.7ms



Notes:

- Xilinx: ZU9 running GoogLeNet @ batch = 1
- Nvidia TX1: 256 Cores; running GoogLeNet @ batch = 8
- Assuming the car was driving at 65 mph

Forward Looking Camera Powered by Xilinx



The new generation EyeSight
in production starting with Subaru Levorg

*“... Xilinx technology plays an important role in this. Because Xilinx automotive devices contain built-in capabilities that allow us to meet strict ASIL requirements, **they are unquestionably the best technology to implement Subaru’s new ADAS vision system.**”*

Tetsuo Fujinuki, CTO, Subaru Corporation



Value Proposition:

- ▶ Meet strict ASIL requirements
- ▶ Ultra-low latency on AEB
- ▶ Scalability on camera evolution
- ▶ High performance on AI/ML

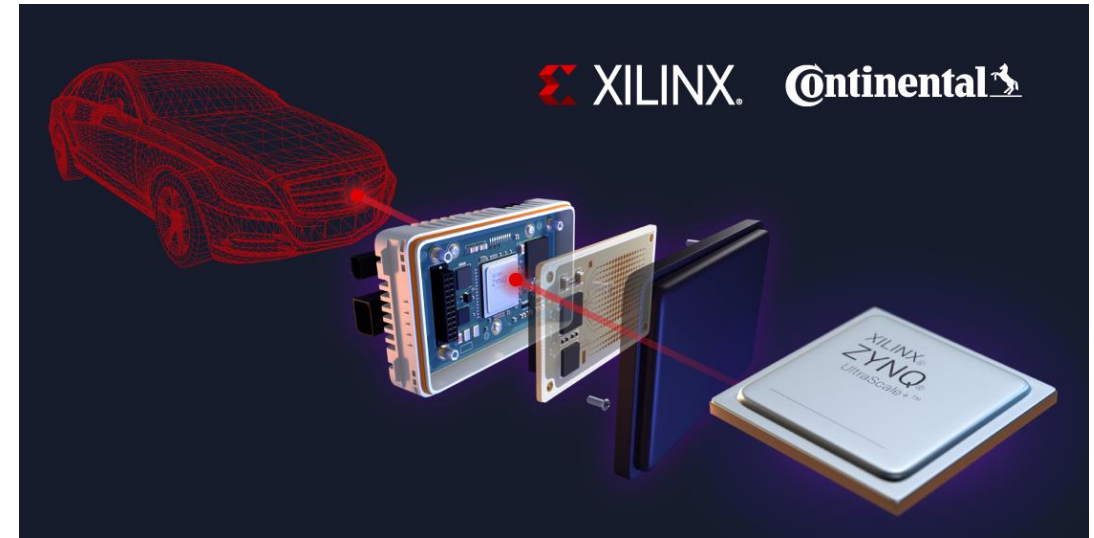
4D Radar Powered by Xilinx

“The Xilinx Zynq UltraScale+ MPSoC platform delivers the high performance and advanced DSP capabilities we needed to realize the ARS540, combined with adaptability and a market-leading selection of network interfaces capable of handling the wide array of antenna data at extremely high aggregate transfer rates.”

Norbert Hammerschmidt, Head of Program Management for Radar, Continental



The ARS540 has been selected by leading European and U.S. OEMs



Value Proposition:

- ▶ Powering L2-L5 ADAS and AD systems
- ▶ High performance by advanced DSP capabilities
- ▶ High speed transceivers for extremely high aggregate transfer rates

LiDAR Powered by Xilinx



RoboSense chose a Xilinx device enabled with point-cloud AI object recognition over a mature NVIDIA/Jetson TX2-based solution. They valued our throughput and latency advantages, as well as cost efficiency. What's more, their RS-LiDAR-M1 (with point cloud object recognition using the Xilinx DPU) won the CES 2020 Innovation Award!



Value Proposition:

- ▶ Advanced DSP capabilities produce rich point cloud images
- ▶ DPU accelerates point cloud processing
- ▶ Enable real hardware-based processing pipeline for multiple sensor RX channels
- ▶ Classic AutoSAR in Arm® Cortex-R5 to meet functional safety requirements

Sensor Fusion Powered by Xilinx



*Using Xilinx technology, the **Pony.ai team said** that they had been able to achieve zero discrepancy in sensor-fusion output for real-time reactions on the road, which was described as a 'marked improvement' from previous efforts.*

Value Proposition:

- ▶ Data collection from disparate sensors
- ▶ Optimal partitioning between system software and hardware accelerators
- ▶ Sensor data synchronization
- ▶ Programmable I/O with high-speed data transfer
- ▶ Power efficient, high utilization



Популярные модели ADAS/AD поддерживаемые в Vitis AI



▸ Classification

- Resnet ✓
- Inception ✓
- Mobilenet ✓



▸ Object Detection

- Mobilenetv2 SSD ✓
- Inceptionv2 SSD ✓
- YOLOv3 ✓
- Retinanet ✓
- VPGNet ✓



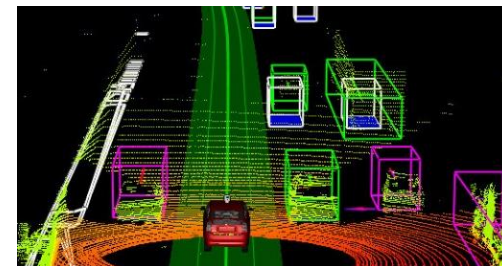
▸ Segmentation

- FPN ✓
- ESPNet ✓
- ENet ✓



▸ DMS/ICMS

- Hourglass ✓
- Openpose ✓
- Densebox ✓



▸ LiDAR

- Segnet ✓
- Pointpillar ✓



Презентация нового решения от Xilinx для видеообработки и систем видеонаблюдения - системы на модуле KRIA SoM K26

Представление нового решения от Xilinx – системы на модуле Kria K26 SOM



Pre-Built HW Acceleration

- Application designs included for common AI functions
- 'Out-of-the-box' ready for SW developers



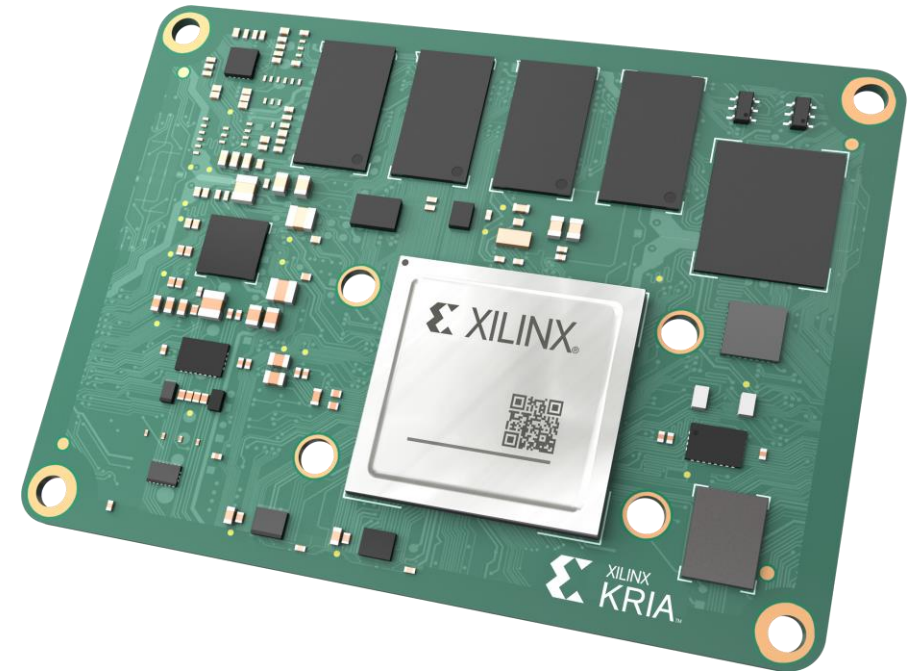
3X Performance¹

- AI at half the power with low latency
- Accelerates the whole application from AI to control



Future Proof

- Adaptable to changing AI and sensor requirements
- Ruggedized for industrial life cycles
- Path from concept to production to design revisions



Embedded Design Simplicity with System Flexibility

1: Xilinx Benchmarks vs. Jetson Nano published data (<https://www.nvidia.com/en-us/autonomous-machines/embedded-systems/jetson-nano/>)

Xilinx SOM - Портфолио

Kria KV260 Vision AI Starter Kit

For Evaluation and Development Use



Разработка



Kria K26

Production Module
Fully Qualified and Certified



C-Grade

For Commercial Environments
Operating Temp 0°C to 85°C
2 Year Warranty

I-Grade

For Rugged Environments
Operating Temp -40°C to 100°C
3 Year Warranty

Использование

Основные области применения Kria K26 SOM



Security Cameras



Smart City



Retail
Analytics



Machine Vision



Vision-Guided
Robotics

Kria KV260 Vision AI Starter Kit

Carrier Card Features & Capabilities



Carrier Card Optimized for Kria SOM

- 240-pin connectivity to SOM
- Targeting vision applications



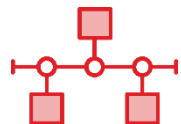
Vision Ready

- 3 MIPI sensor interfaces, USB cameras
- Built-in ISP component (OnSemi)
- HDMI, DisplayPort outputs



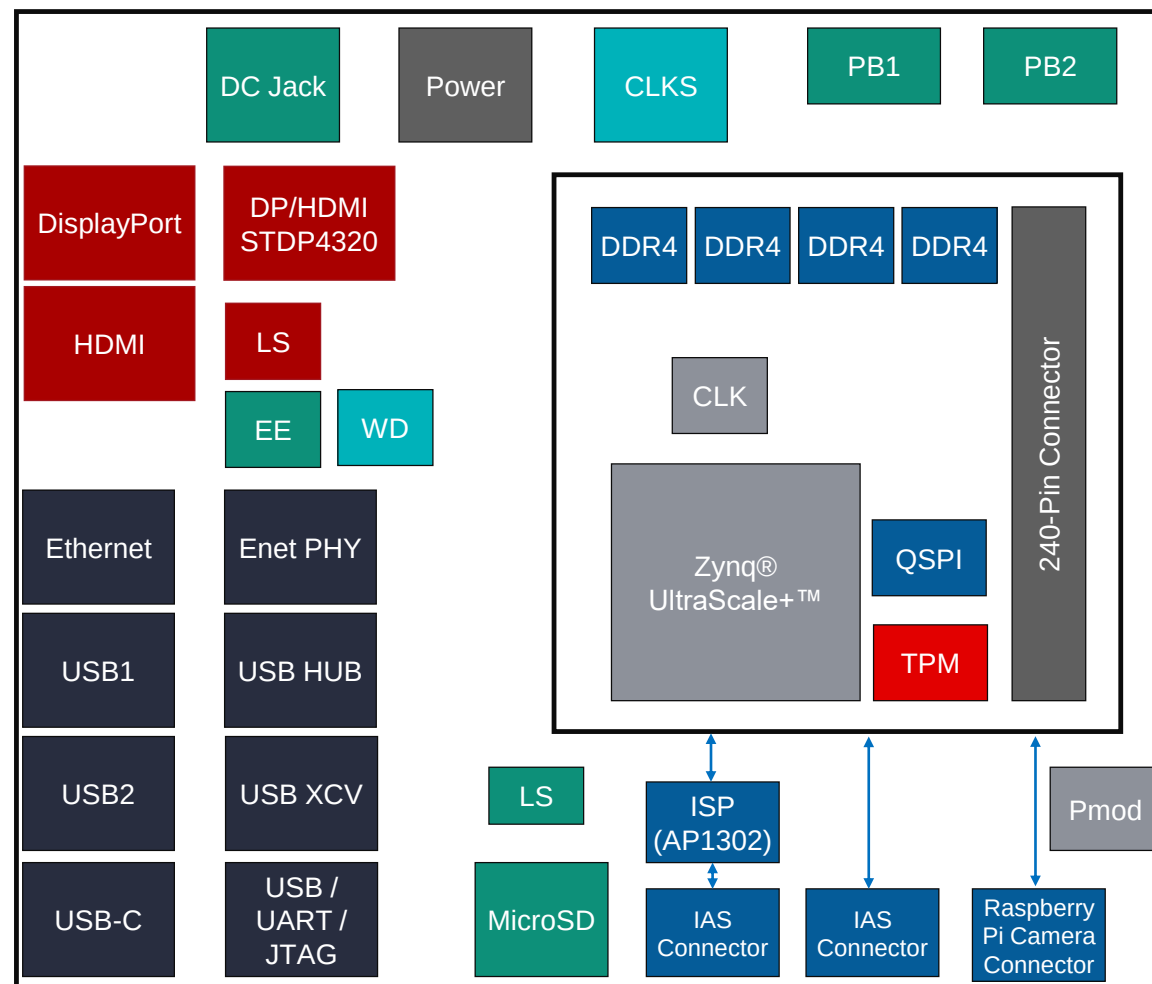
Network & General Connectivity

- 1Gb Ethernet
- USB 3.0 / 2.0



Pmod Expansion

- Extend to any sensor or interface
- Access Pmod ecosystem



119mm x 140mm x 36mm
(SOM + Carrier Card + Heatsink)

Production SOM includes eMMC and additional 240-pin connector

К26 SOM Обзор характеристик

Модуль построен на базе Zynq® UltraScale+™ MPSoC архитектуры



COMPUTE

Application Processor	64-bit Quad-Core Arm® Cortex®-A53
Real-Time Processor	32-bit Dual-Core Arm Cortex-R5F
Graphics Processor	Arm Mali™-400MP2
Programmable Logic	256K System Logic Cells
Deep Learning Processor	4K INT8 (upgradable to INT4)
Video Codec (H.264/H.265)	Up to 32 Streams (total resolution ≤ 4Kp60)
Memory	26.6Mb On-Chip SRAM
Security	IEC62443 Security w/HW Root-of-Trust

INTERFACES

Camera	11 x4 Full MIPI or sub-LVDS Interfaces 1 x4 SLVS-EC Interfaces
USB	4x USB 2.0 / 3.0
Multi-Media	DisplayPort, HDMI
Network	1Gb up to 40Gb Ethernet (w/GigE Vision)
Memory Interface	4GB 64-bit DDR4
Transceivers	4x 12.5Gb/s, 4x 6Gb/s
Mechanical	77 x 60 x 11mm w/ dual 240-pin connectors

1.4 TOPs

Kria K26 SOM общие технические характеристики

Area	Parameter	K26
Form Factor	Dimensions (with heat spreader)	77 x 60 x 11 mm
Processor Unit & Acceleration	Application Processor	Quad-core Arm® Cortex®-A53 MPCore™ up to 1.5GHz
	Real-Time Processor	Dual-core Arm Cortex-R5F MPCore up to 600MHz
	Graphics Processing Unit	Mali™-400 MP2 up to 667MHz
	Video Codec Unit (VCU)	1 - up to 32 streams (total resolution ≤ 4Kp60)
	Trusted Platform Module (TPM)	Infineon 2.0
Memory	On-Chip*	26.6Mb On-Chip SRAM
	On-SOM	4GB 64-bit DDR4 (non-ECC) and 16GB eMMC
Connectivity	High-Speed PS Connectivity (GTR)	PCIe® Gen2 x4, 2x USB3.0, SATA 3.1, DisplayPort, 4x Tri-mode Gigabit Ethernet
	General PS Connectivity (MIO)	2x USB 2.0, 2x SD/SDIO, 2x UART, 2x CAN 2.0B, 2x I2C, 2x SPI, 4x 32b GPIO
Transceivers	GTH 12.5Gb/s Transceivers	4 (PCIe Gen3 x4, SLVS-EC, HDMI 2.0, DisplayPort 1.4)
	GTR 6Gb/s Transceivers	4
I/O Count	PS MIO (1.8V)	52
	PL High-density (HD) I/O (3.3V)	69
	PL High-performance (HP) I/O (1.8V)	116
Programmable Logic	System Logic Cells (K)	256
	DSP Slices	1,248
Power & Thermal	Typical Power	7.5W
	Maximum Power**	15W
	Thermal Interface	Passive (Heat spreader)
Speed and Temp Grade	Commercial	-2 speed grade, low voltage and 0 to 85°C temperature range
	Industrial	-2 speed grade, low voltage and -40 to 100°C temperature range

*On-Chip Memory (Mb) = Max. Distributed RAM + Total Block RAM + UltraRAM

**Estimated and subject to change based on actual hardware evaluation

Kria K26 SOM Мультимедийные функции

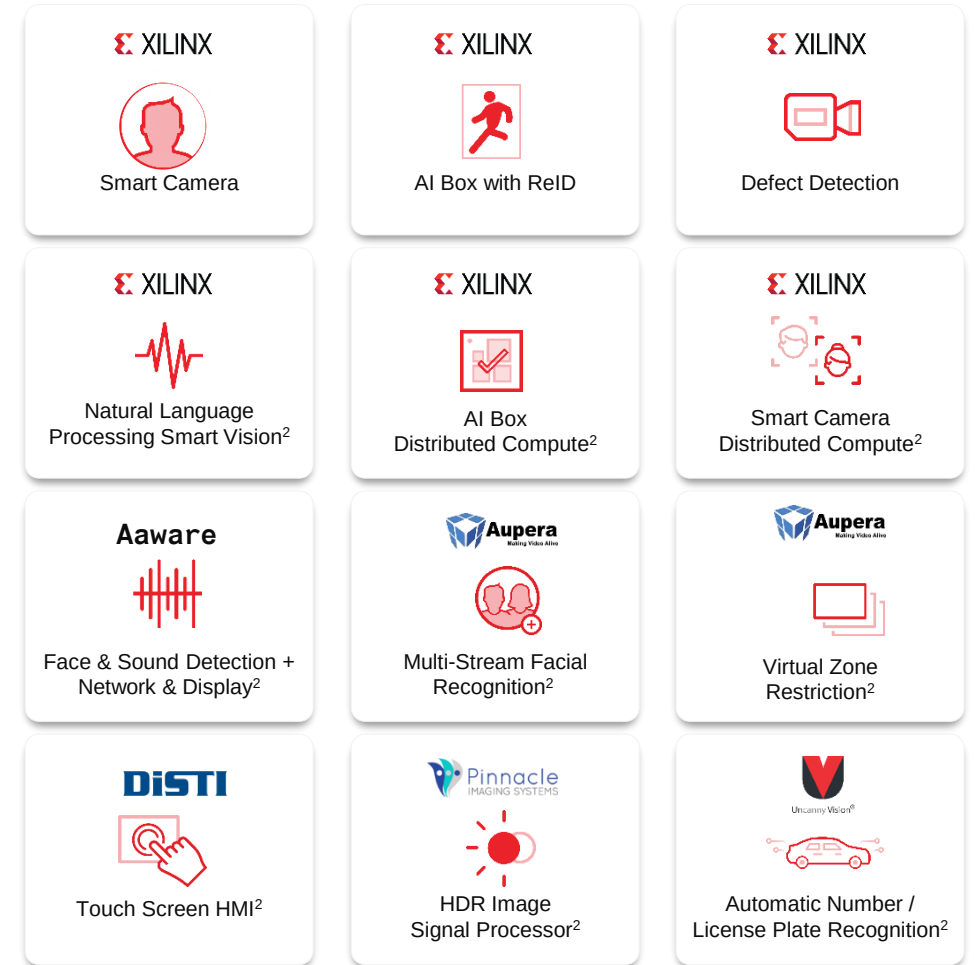
		K26 SOM	KV260 Vision AI Starter Kit
Video CODEC	Encode	4K@60 422 /420 10bpc/8bpc (total BW < 4K@60fps) H.264 or H.265 Simultaneous encode up to 32 streams Ultra-low latency and low latency modes ROI encoding	4K@30 422 /420 10bpc/8bpc (total BW < 4K@60fps) H.264/H.265 Simultaneous encode up to 32 streams Ultra-low latency and low latency modes ROI encoding
	Decode	4K@60 422 /420 10bpc/8bpc (total BW < 4K@60fps) H.264 or H.265 Simultaneous decode up to 32 streams Ultra-low latency and low latency modes ROI decoding	4K@30 422 /420 10bpc/8bpc (total BW < 4K@60fps) H.264/H.265 Simultaneous decode up to 32 streams Ultra-low latency and low latency modes ROI decoding
Camera Inputs	MIPI	Up to 11 x4 DPHY2.0 interfaces Each interface supports up to 10Gb/s BW (>16MP) Configurable as x1 or x2 or x4 DPHY lanes Up to 16 virtual channels per interface	3x MIPI DPHY interfaces 2 x4 lanes MIPI CSI with IAS camera connectors One IAS interface includes OnSemi AP1302 4K HDR ISP 1x 2 lanes MIPI CSI with RaspberryPI camera connector
	SLVS-EC	One x4 5Gbs/lane	Not bonded out
	LVDS/SLVS	11 x4 LVDS or SLVS camera interfaces	10 lanes of LVDS or SLVS interfaces over IAS or Rpi connectors
Display Out		1x DP1.2, x2 lane up to 4K@30 1x HDMI 2.0 (over GTs) 1x DP1.4 (over GTs) MIPI DSI display out over DPHY lanes	1x DP1.2, up to 4K@30 1x HDMI 1.4 up to 4K@30
GPU		Mali™-400 MP2	Mali-400 MP2
ISP		FPGA programmable logic allows multiple instantiations of flexible, customized ISP implementations	One IAS interface includes OnSemi AP1302 4K HDR ISP Additional ISPs can be instantiated in programmable logic
Vision Accelerator		Open-source XfOpenCV accelerated vision processing functions	Open-source XfOpenCV accelerated vision processing functions
Multimedia Stack		V4L and DRM framework support for all video functions with GStreamer plugins	V4L and DRM framework support for all video functions with GStreamer plugins

Широкий выбор готовых приложений для KRIA SOM, доступных на App Store

Vision accelerated applications
“do the work for you”

Production-ready applications now
available from both Xilinx and partners

App Store model encourages partners to
deliver high quality applications



First Embedded App Store for Edge Applications

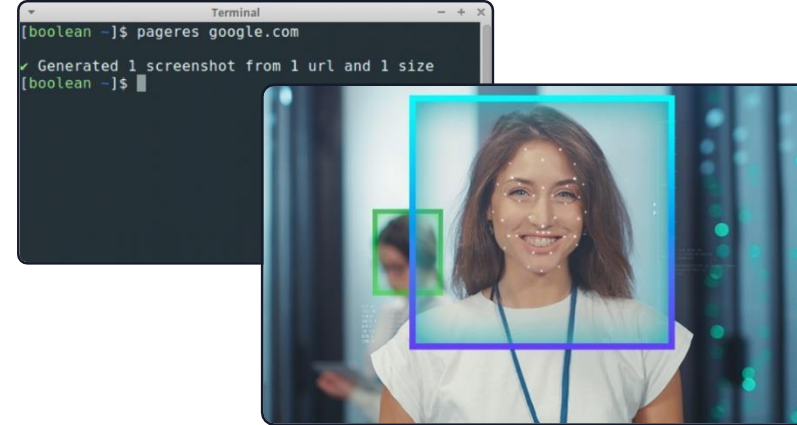
1: Supports face detection and other models in Xilinx Model Zoo

2: App coming soon

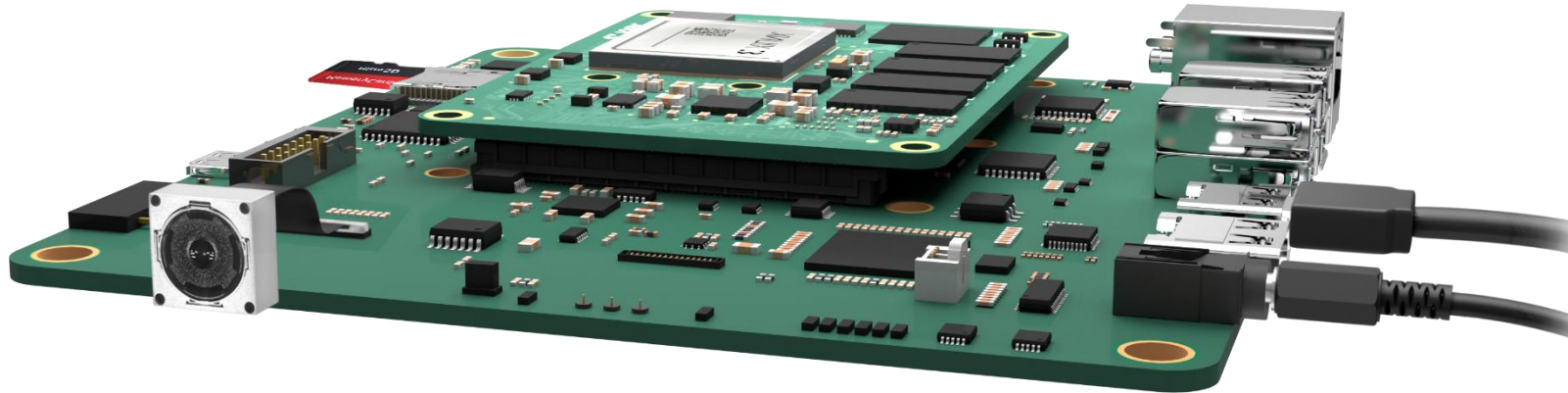
Out-of-the-Box Ready for Application Development

Starter Kit + Peripherals + Accelerated Application

1. Connect camera, cables, and monitor
2. Insert the programmed microSD card
3. Power-on the board
4. Load accelerated application of your choice
5. Run accelerated application



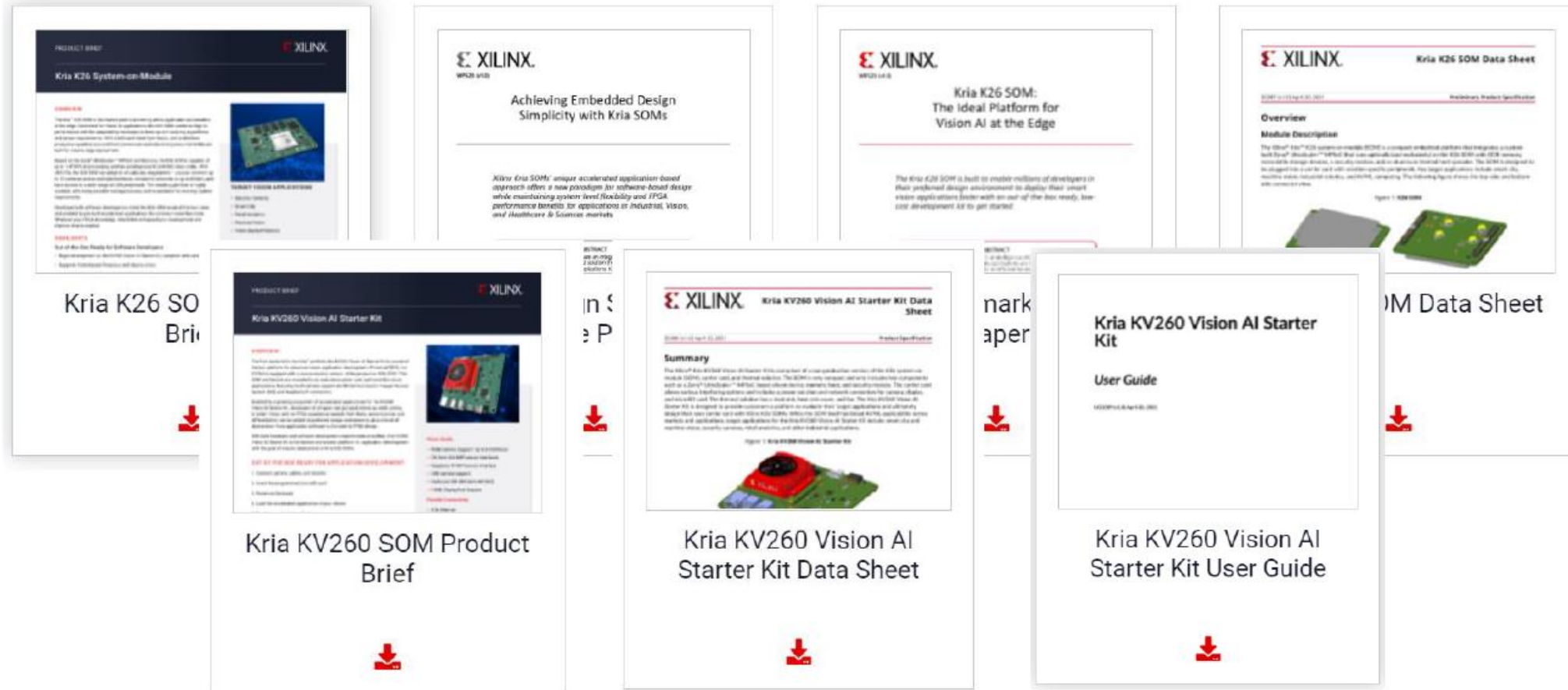
GETTING STARTED WEB PAGE



Up and Running in Less Than **1 Hour**, No FPGA Experience Needed

Документация для KRIA SOM доступна на специализированной странице на сайте Xilinx

Available Kria docs. More is coming. Check updates on Kria [web page](#)



Документ с таблицами сравнения производительности и KRIA SOM и конкурирующими решениями – WP529

Table 1: K26 SOM vs. Nvidia Jetson Features Comparison

No.	Feature	Xilinx's K26 SOM	Nvidia Jetson Nano ⁽¹⁾	Nvidia Jetson TX2 ⁽¹⁾
1	Application Processor	Quad-core Arm® Cortex®-A53 MPCore™ up to 1.5GHz	Quad-Core Arm Cortex-A57 MPCore processor	Dual-Core Nvidia Denver 2 64-Bit CPU and Quad-Core Arm Cortex-A57 MPCore processor
	Real-time Processors	Dual-core Arm Cortex-R5F MPCore up to 600MHz		
2	GPU	Mali™-400 MP2 up to 667MHz (primarily used for graphics rendering)	128-core Nvidia Maxwell GPU	256-core Nvidia Pascal GPU
3	Machine Learning Throughput	1.36TOPS ⁽²⁾	472GFLOPs (FP16)	1.33TFLOPs (FP16) 1.26TFLOPs for TX2i
4	Camera Interfaces	MIPI: Up to 44 DPHY2.0 lanes, Up to 11 Cameras, Max BW 10Gb/s BW per interface, Up to 16 virtual channels per interface	12 DPHY1.1 x 4 lanes Up to 4 Cameras Max BW 6Gb/s per interface	12 DPHY 1.1 lanes Up to 6 cameras Max BW 6Gb/s per camera
		SLVS, LVDS: 11 x4 SLVS or LVDS cameras interfaces	NA	NA
		SLVS-EC: 4 lane, 5Gb/s /lane	NA	NA
5	Display Interface	DP1.2 x 2 lane	2x HDMI 2.0, DP 1.2, eDP 1.2, 2x MIPI DSI x2 lanes (1.5Gb/s /lane)	2x HDMI 2.0, DP 1.2, eDP 1.2, 2x MIPI DSI
		Additional HDMI 2.0 (GTs), DisplayPort 1.4 (GTs) with Soft IPs, MIPI DSI x4 lane (2.5Gb/s /lane) w/ Soft IPs	NA	NA
6	Video Encode H.264/H.265	Up to 32 simultaneous streams, Max resolution 4K @60FPS Color format: 422 8/10 bpc and 420 8/10bpc	Up to 9 streams; Max resolution 4K @30 FPS 420 8bpc	Up to 8 streams H.265, 14 streams of H.264, Max resolution 4K @60FPS 420 8bpc
7	Video Decode H.264/H.265	Up to 32 simultaneous streams, Max resolution 4K @60FPS Color format: 422 8/10bpc and 420 8/10bpc	Up to 9 streams; Max resolution 4K @60 FPS 420 8bpc	Up to 32 streams H.265, 16 streams of H.264, Max resolution 4K @60FPS 420 8bpc

Table 1: K26 SOM vs. Nvidia Jetson Features Comparison (Cont'd)

No.	Feature	Xilinx's K26 SOM	Nvidia Jetson Nano ⁽¹⁾	Nvidia Jetson TX2 ⁽¹⁾
8	Wireless	GTR M.2/SATA	M.2 Key-E site on carrier	802.11a/b/g/n/ac 2x2 867Mb/s Bluetooth 4.1 BCM4354 on module
9	Ethernet	4x 10/100/1000 Base-T Ethernet Additional Ethernet ports with Soft IP in HP I/Os	10/100/1000 Base-T Ethernet	10/100/1000 Base-T Ethernet
10	USB	2xUSB3.0, 2x USB2.0	4x USB 3.0 + Micro-USB 2.0	USB 3.0 + USB 2.0
11	PCIe®	PCIe Gen2 x 4 PCIe Gen3 x4 in with Soft IP on GTs	PCIe Gen2 x4 lanes	PCIe Gen2 x5 lanes
12	High-speed I/O (GTs) Provides Additional Interface Support	4x GTH transceivers in programmable logic can be configured to support a plethora of high-speed protocols such as SLVS - EC, PCIe Gen 3, HDMI, 10GE and many more	NA	NA
13	I/O Flexibility	69 3.3V I/Os, 116 1.8V I/Os allows users to create highly flexible and configurable I/O interfaces in programmable logic	NA	NA
14	Programmable Logic	256K System Logic Cells, 1248 DSPs, 26.6Mb on-chip memory allows users to implement custom accelerators for vision and ML functions	NA	NA
15	DRAM	4GB 64-bit DDR4	4GB 64-bit DDR4	8GB 128-bit LPDDR4?
16	eMMC	16GB	16GB	32GB
17	Flash	512MB QSPI	NA	NA
18	Socket Carrier Card Interface	Two 240-pin connectors	260-pin edge connector	400-pin board-to-board connector

Table 2: Deep Learning Models Performance Comparison

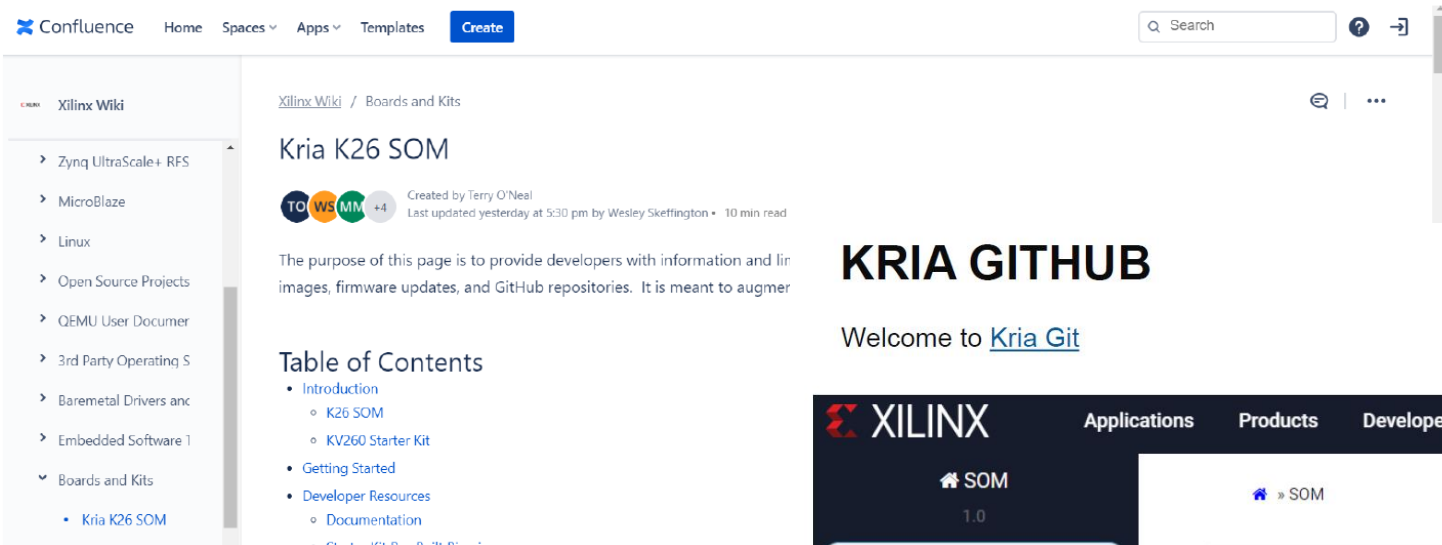
No.	Model	Image Size	Xilinx K26 B3136 DPU		Xilinx K26 B4096 DPU		Nvidia Jetson Nano		Nvidia Jetson TX2	
			FPS (Latency Optimized) ⁽¹⁾	FPS (Throughput Optimized) ⁽²⁾	FPS (Latency Optimized)	FPS (Throughput Optimized)	FPS (Latency Optimized)	FPS (Throughput Optimized)	FPS (Latency Optimized)	FPS (Throughput Optimized)
1	Inception V4	299x299	19	19.1	30.3	30.4	11	13	24	32
2	VGG-19	224x224	17.9	17.9	17.4	17.4	10	12	23	29
3	Tiny Yolo V3	416x416	88.2	92.6	148.0	161.3	48	49	107	112
4	ResNet-50	224x224	49	49.1	75.6	75.9	37	47	84	112
5	SSD Mobilenet-V1	300x300	129.6	133.4	192.1	200.4	43	48	92	109
6	SSD ResNet34	1200x1200	1.6	1.6	2.5	2.5	1	1	3	2

https://www.xilinx.com/support/documentation/white_papers/wp529-som-benchmarks.pdf

Много информации о процессе проектирования Kria SOM есть на соответствующих страницах Xilinx WIKI и GITHAB

XILINX WIKI

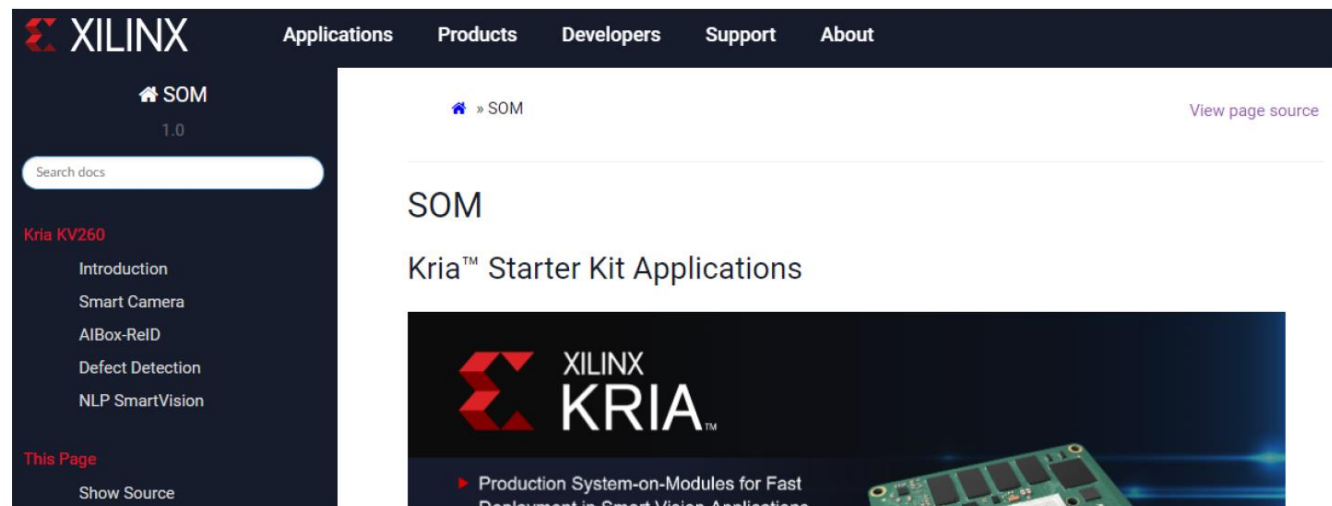
The purpose of the [wiki](#) is to provide you with the tools you need to complete projects and tasks which use Xilinx products.



The screenshot shows the Xilinx Wiki interface. The left sidebar contains a navigation menu with categories like 'Zynq UltraScale+ RFS', 'MicroBlaze', 'Linux', 'Open Source Projects', 'QEMU User Documer', '3rd Party Operating S', 'Baremetal Drivers anc', 'Embedded Software I', and 'Boards and Kits'. The 'Boards and Kits' category is expanded, showing 'Kria K26 SOM'. The main content area displays the 'Kria K26 SOM' page, which includes a 'Table of Contents' with links to 'Introduction', 'K26 SOM', 'KV260 Starter Kit', 'Getting Started', 'Developer Resources', 'Documentation', and 'Kria K26 SOM'. The page also mentions it was created by Terry O'Neal and last updated yesterday at 5:30 pm by Wesley Skeffington.

KRIA GITHUB

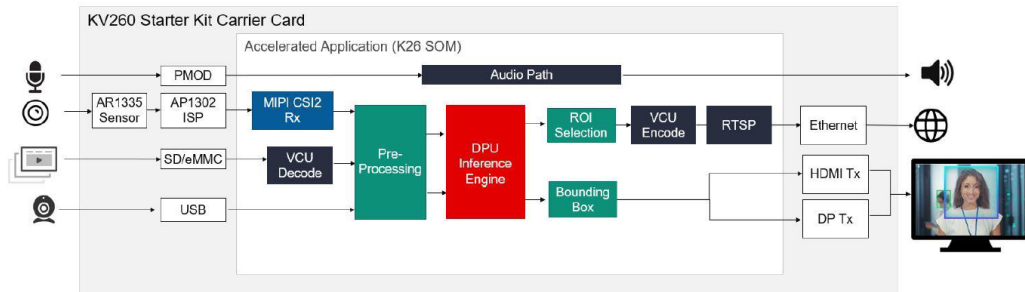
Welcome to [Kria Git](#)



The screenshot shows the Xilinx Kria SOM GitHub page. The top navigation bar includes 'Applications', 'Products', 'Developers', 'Support', and 'About'. The main content area features a search bar, a list of documents, and a section titled 'Kria KV260' with links to 'Introduction', 'Smart Camera', 'AlBox-RelD', 'Defect Detection', and 'NLP SmartVision'. The page also includes a 'This Page' section with a 'Show Source' link. The bottom of the page features a large banner with the Xilinx Kria logo and the text 'Kria™ Starter Kit Applications' and 'Production System-on-Modules for Fast Deployment in Smart Vision Applications'.

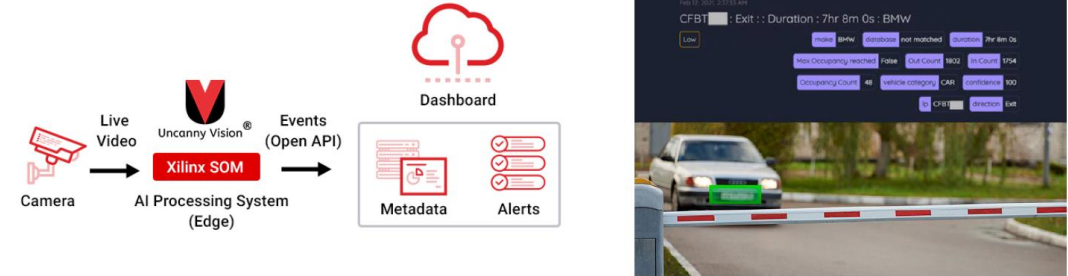
Примеры готовых решений “из коробки” доступных на Xilinx App Store

Smart Camera



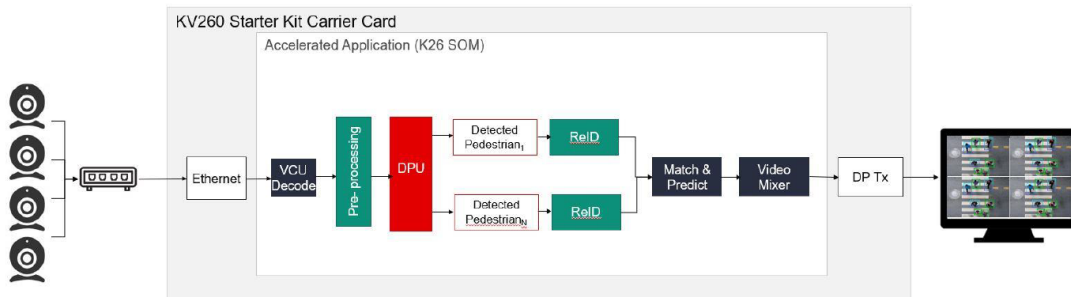
- 4k resolution images from a sensor
- H.264/H.265 encode/decode
- HDMI or DisplayPort or RTSP out
- User programmable Deep Learning models

AI Box for Auto License Plate Recognition (ALPR) Accelerated Application



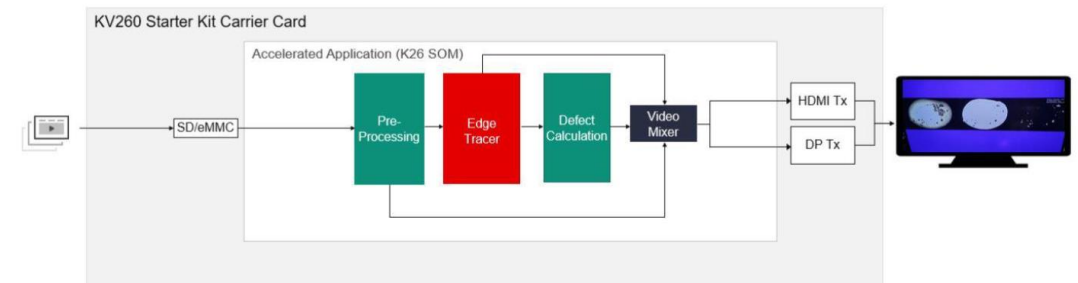
- Video pipeline with multiple AI models for detection of vehicles, license plates, vehicle classification, and license plate recognition
- Up to 2 streams of H.264/H.265 decode at 1080p resolutions
- End-to-End LPR solution including dashboards, remote monitoring, blacklist and whitelist of vehicles
- Open REST APIs for custom integration
- Complete application with including hardware design

AIBox-ReID



- Upto 4 input streams from IP cameras
- H.264/H.265 decoding capability at 1080p resolution
- Pedestrian detection and tracking on individual streams
- HDMI or DisplayPort out
- User programmable Deep Learning Models

Defect Detection



- Monochrome images from a file source
- Defect detection and sorting of mangoes
- HDMI or DisplayPort out from the various stages
- User programmable CV Models

Основные ссылки на материалы для Kria SOM

Основная страница на сайте Xilinx с основной информацией по Kria K26 SoM модулю и соответствующему стартовому комплекту – <https://www.xilinx.com/products/som/kria.html>

Ссылка на страницу, посвящённую модулю Kria K26 SoM на сайте Avnet:

<https://www.avnet.com/wps/portal/silica/products/product-highlights/2021/xilinx-systemonmodules/>

Общая презентация System-on-Modules Xilinx:

<https://www.xilinx.com/publications/ebooks/introducing-adaptive-system-on-modules.pdf>

Брошюры с общим описанием Kria K26 SoM:

<https://www.xilinx.com/publications/product-briefs/xilinx-k26-product-brief.pdf>

https://www.xilinx.com/support/documentation/white_papers/wp528-simplified-som.pdf

Datasheet на модуль Kria K26:

https://www.xilinx.com/support/documentation/data_sheets/ds987-k26-som.pdf

Основные показатели и таблицы сравнения Kria K26 SoM с модулями Nvidia приведены в этом документе:

https://www.xilinx.com/support/documentation/white_papers/wp529-som-benchmarks.pdf

Брошюра с общим описанием Kria KV260 Vision AI Starter Kit:

<https://www.xilinx.com/publications/product-briefs/xilinx-kv260-product-brief.pdf>

Datasheet на Kria KV260 Vision AI Starter Kit:

https://www.xilinx.com/support/documentation/data_sheets/ds986-kv260-starter-kit.pdf

User Guide Kria KV260 Vision AI Starter Kit:

https://www.xilinx.com/support/documentation/user_guides/som/1_0/ug1089-kv260-starter-kit.pdf

Ссылки на соответствующие видеоматериалы на сайте Xilinx:

[New Video: Getting Started with the KV260 Starter Kit](#)



Thank You

