The Rugged Vision Platform (RVP) with TI TDA4Vx Automotive Processor

SPEED DEVELOPMENT OF AUTONOMOUS VISION-BASED NAVIGATION SYSTEMS

The DesignCore RVP Development Kit features the TDA4VM SOM, a customizable baseboard, an expansion interface, a personality card for multiple SerDes configurations, and multiple IO options for high-speed sensor interfaces. The RVP enables simple vehicle integration for development of ADAS, sensor fusion, and deep learning applications.

The Development Kit is based on TI’s advanced automotive processor, Processor-SDK vision, and D3’s software framework. It provides simultaneous capture, processing, and analysis of up to 8 high-speed SerDes data streams with serial back channel data, and storage to the local memory. The system is designed to support IP64 environmental ratings, with a path to IP67. The system is targeted to meet ASIL ratings, with the main processor targeting ASIL-B, and the MCU safety island targeting ASIL-D. Validation testing for IPx ratings and safety ratings is needed, design intent only.

FEATURES

Texas Instruments® TDA4VM SoC
- Internal ISP capable of processing 8 2MP cameras streams
- DisplayPort with MST or FPD-Link III display options
- Interface support for Dual Ethernet Ports, USB 3.1/C, and 6x CAN-FD Bus ports (2 with wake options)
- Multiple storage options including UFS, PCIe SSD, External PCIe, and USB
- Sensor input support for up to 8x high speed cameras, 6x RADAR units via CANFD or Ethernet, Ultrasonic units via serial port, and LIDAR units via Ethernet or USB
- CSI2-TX Port enables Hardware In the Loop (HIL) development support for algorithm verification
- Compact, rugged packaging

APPLICATIONS

Advanced Driver Assistance Systems (ADAS)
- Automated Valet Park (AVP)
- Deep Learning and Analytics
- Object Identification and Tracking
- Collision Avoidance
- Driver Notification
- Multi-Camera Display
- Mirror Replacement
- Driver and Cabin Monitoring
- Infotainment and Telematics

Autonomous Guided Vehicles
- Industrial Vehicle Systems
- Sensor Fusion
- RADAR, Ultrasonic, and LIDAR
- High MP cameras
- Safety and Security Critical Systems

SPECIFICATIONS

TDA4VM/J721 SoC

- A72 Cores: 2x, 64 bit ARM Cortex, up to 1.8 GHz
- RSF Cores: 4x, general compute partition
- Safety Island MCU RSF Cores: 2x, floating point coprocessor and lock step, targeted to meet ASIL-D safety requirements/certification
- DSP Cores: 1x, C7x Floating Point Vector DSP up to 10 GHz, 80 GFLOPS, 256 GOPS
- 2x C66x Floating Point DSP, up to 1.35 GHz, 40GFLOPS
- GPU: 1x PowerVR Rogue BXE GE8430 GPU for 3D and 2D acceleration up to 750MHz, 96 GFLOPS, 6 Gpix/sec
- DDR: LPDDR4 4GB + ECC
- eMMC FLASH: 16GB
- OSPI: 64MB HyperFLASH/HyperRAM + 64MB OSPI FLASH
- UFS: 32GB
- Ethernet Gbit (DP83867): 2x 1 MCU Island, 1 Main
- Video Port Capture: 2x 4-Lane CSI-2 channels, up to 2.5Gbps/lane with support for: 8 channel FPD Link III, 8 channel FPD Link IV, 8 channel GMSL-2, 2x2 channel RAW MIPI CSI-2
- Vision Processing: Vision Processing Accelerators with Image Signal Processor (ISP) up to 720 Mpix/sec
- Deep Learning: Matrix Multiply Accelerator (MMA) up to 8 TOPS (8b) at 10 GHz
- Display: 1x Mini DisplayPort supports up to 3 Full HD 1080p displays via MST, 1x FPD Link III, Interface is alternately used for Hardware In the Loop (HIL) data
- Video Port Output: 1x 4-Lane MIPI CSI-2-TX
- CAN: 6x CAN-FD (total) 2x CAN-FD with Wake (1x MCU MCAN, 1x Main MCAN)
- UART: 4x through USB 2.0 Hub, 1x RS232, 1x One Wire Interface, 1x LVCMOS
- uSD Card: 1x external
- External IO: Isolated: 2 in / 2 out (3.3V – 22V) 5V tolerant buffered: 2 in / 2 out
- USB: 1x USB 3.1/C – configurable as DRP, DRP, UF
- PCIe: 1x internal PCIe 2.0 M 2 slot (M key) for optional SSD/1x external PCIe 2.1, supporting HyperLink (separate cable required), configurable as Root or Endpoint complex
- IMU: 1x 6 axis accelerometer/gyro
- Expansion: 1x RGM, 1x SSMI, 10x GPIO, 1x i3C, 1x UART, 5V (up to 1A), 3.3V (up to 1A), Regulated 12V (up to 1A)
- Debug: XDS110 support via USB 2.0, JTAG via 60 pin MIPI header, 10 pin with adapter
- Access Panel: JTAG, 2x USB2UART, Mini Display Port, uSD card (SD3.0), USB 3.1C, PCIe
- Enclosure: Rugged Aluminum
- Ambient Temperature: TBD – Design Intent of -40C to 85C
- Component Temperature: -40C to 85C
- Power: 9V to 40VDC with reverse battery protection
The RVP Development Kit features an optimized SOM board with advanced vision processor, firmware, and a customizable baseboard with IO, power, expansion interface, and more. We use the Development Kit to rapidly develop your Engineering Verification Test (EVT) unit or A-sample.
HOW TO GET STARTED WITH TDA4Vx

LOWER YOUR RISK WITH DESIGNCORE® SOLUTIONS

DesignCore® Solutions are platforms, reference designs, and development tools available from D3 Engineering to lower the risk of your next product development project. They contain tested and reliable hardware, software, algorithms, design documentation, and more. D3 Engineering can quickly work with your team to customize these platforms for your application. They allow you to rapidly move from prototype to design, and then to production.

DesignCore Solutions lower risk in three important areas:

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**Schedule Risk:** DesignCore Solutions consist of reliable and tested components for your design. Accelerate your time to market by 6-9 months.

**Cost Risk:** DesignCore Solutions have been designed for market specific applications.

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**Define**
We start by working with you to develop product requirements and specifications.

**YOU RECEIVE**
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Engineering prototype based on our DesignCore® Platforms.

**Design**
Next we design hardware and firmware using a structured design-for-manufacture (DFM) process.

**YOU RECEIVE**
DESIGN VERIFICATION TEST UNIT
Fit/form/function prototype that demonstrates all features using production components.

**Deploy**
Then we transfer the complete hardware and software design to you as well as support any production needs.

**YOU RECEIVE**
PRODUCT VERIFICATION TEST UNIT
Flexible: may be built by D3 or client. D3 assists with validation and manufacturing optimization.

GET STARTED WITH D3

ORDERING INFORMATION
This development kit is available when you engage D3 Engineering for a product development project.

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