TI TDA4VM SMARC – Accelerated Computing

conga-STDA4

- SMARC Module based on TI TDA4VM application processor and DRA829J Arm® networking processor
- Heterogenous architecture with dual Arm® Cortex®-A72, DSP and accelerators for deep learning and multimedia
- Arm® Cortex®-R5F MCUs to offload real-time communication
- Highest reliability for harsh environment applications
- Industrial temperature range -40°C to +85°C

<table>
<tr><td>Form factor</td><td>SMARC Module Specification 2.1</td></tr>
<tr><td>SoC</td><td>TI TDA4VM and DRA829J Arm® Application and Networking Processors
<table>
<tr><th></th><th>Arm Cortex-A72</th><th>ARM Cortex-R5F</th><th>DSP Cores</th><th>MMA</th><th>GPU</th></tr>
<tr><td>TDA4VM88</td><td>2x @ 2.0 GHz</td><td>6x @ 1.0 GHz</td><td>1x C7x up to 80 GFLOPs &</td><td>Deep Learning</td><td>3D PowerVR</td></tr>
<tr><td>DRA829JM</td><td>2x @ 2.0 GHz</td><td>6x @ 1.0 GHz</td><td>2x C66 up to 40 GFLOPs</td><td>Up to 8 TOPS</td><td>Rogue 8XE GE8430</td></tr>
</table></td></tr>
<tr><td>DRAM</td><td>Up to 8 GB onboard LPDDR4x memory | 3733 MT/s | inline ECC | 8 MB of on-chip L3 RAM with ECC and coherency | 512KB on-chip SRAM in MAIN domain, protected by ECC</td></tr>
<tr><td>Ethernet</td><td>2x Gbit Ethernet with IEEE 1588 support</td></tr>
<tr><td>I/O Interfaces</td><td>1x dual-role USB 2.0 | 2x USB 2.0 | 2x USB 3.0 | 1x SDIO 3.0 | 2x PCIe 3.0 x1 + 1x PCIe 3.0 x2 or up to 4x PCIe 3.0 x1 | 2x I^{2}C | 2x SPI | 4x UART (2x with Handshake) | 2x CAN FD | 14x GPIO | optional full industrial onboard Ublox WiFi/BT module</td></tr>
<tr><td>Mass Storage</td><td>eMMC 5.1 up to 128 GB optional pseudo-SLC</td></tr>
<tr><td>Sound</td><td>2x I^{2}S</td></tr>
<tr><td>Graphics</td><td>Integrated in SoC | Graphics Accelerator 3D GPU PowerVR Rogue 8XE GE8430 | up to 1x Ultra-HD or 4x Full-HD 60fps display resolution | Up to 4 concurrent displays | VPU up to 4k60p H.264/H.265 decode / 1080p60 H.264 encode | OpenGL ES 3.1 | OpenVX | OpenCL</td></tr>
<tr><td>Video Interfaces</td><td>1x dual channel 24-bit LVDS | 1x Display Port 1.4 supports up to 4 1080p60 displays via MST | optional 1x MIPI-DSI 4-lane shared with LVDS | 2x MIPI-CSI | up to 2x integrated Image Signal Processor (ISP) for MIPI-CSI camera on TDV4VM</td></tr>
<tr><td>Features</td><td>Watchdog Timer | Console Port | High Precision Real Time Clock</td></tr>
<tr><td>AI & Deep Learning</td><td>Deep-learning Matrix Multiply Accelerator Accelerators (MMA) with up to 8 TOPS (8b) | C7x floating point, vector DSP with up to 80 GFLOPs | Vision Processing Accelerators (VPAC) with Image Signal Processor (ISP) and multiple vision assist accelerators | Depth and Motion Processing Accelerators (DMPAC)</td></tr>
<tr><td>Security</td><td>Customer programmable root key, up to RSA-4K or ECC-512 | Crypto hardware accelerators, PKA with ECC, AES, SHA, RNG, DES and 3DES | Secure boot with secure runtime support | SHE, Encryption Engine AES-128, AES-256, TRNG, SHA-1, SHA-2, SHA-256, MD-5 | RSA-1024, 2048, 3072, 4096 and secure key storage</td></tr>
<tr><td>Boot Loader</td><td>U-Boot boot loader</td></tr>
<tr><td>Operating Systems</td><td>Linux | QNX | RTOS</td></tr>
<tr><td>Power Consumption</td><td>Typ. application 5-10W @ 5V</td></tr>
<tr><td>Temperature Range</td><td>Operating Temperature Range: -40 to +85°C industrial grade
Storage Temperature Range: -40 to +85°C</td></tr>
<tr><td>Humidity</td><td>Operating: 10 - 90% r. H. non cond. Storage: 5 - 95% r. H. non cond.</td></tr>
<tr><td>Size</td><td>82 x 50 mm (3,23” x 1,97”)</td></tr>
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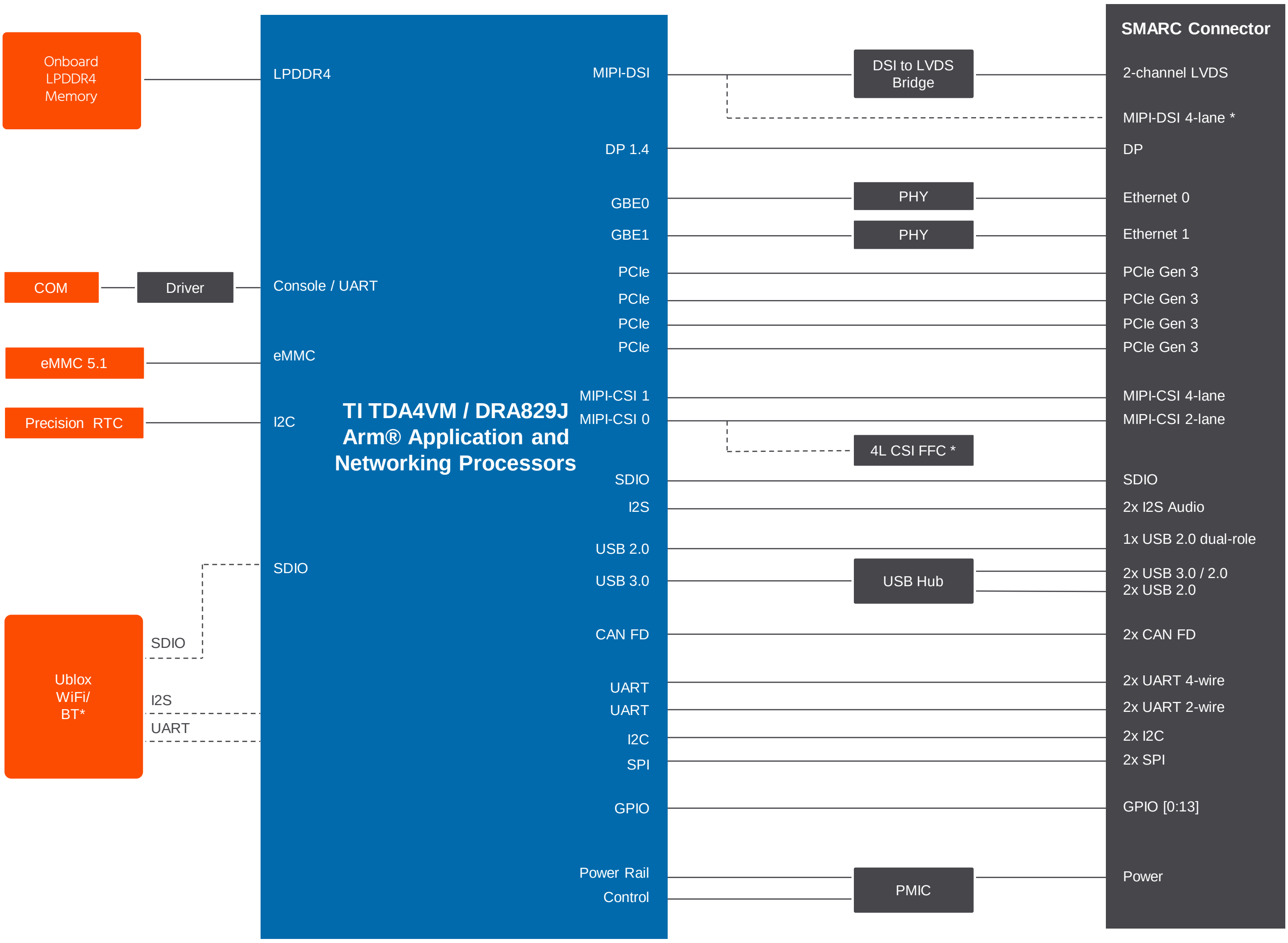
conga-STDA4 | Block Diagram



* Assembly Option

conga-STDA4 | Order Information

Article	PN	Description
conga-STDA4/i-TDA4VM-4G eMMC32	051510	SMARC Module based on high-performance industrial TI TDA4VM Arm® Application processor. Features 2x ARM Cortex-A72 @ 2.0GHz + 6x ARM Cortex-R5F + 8 TOPS MMA (deep-learning matrix multiply accelerator), 4GB onboard LPDDR4x memory and 32GB onboard eMMC. Industrial grade temperature range from -40°C to +85°C.
conga-STDA4/i-TDA4VM-2G eMMC32	051511	SMARC Module based on high-performance industrial TI TDA4VM Arm® Application processor. Features 2x ARM Cortex-A72 @ 2.0GHz + 6x ARM Cortex-R5F + 8 TOPS MMA (deep-learning matrix multiply accelerator), 2GB onboard LPDDR4x memory and 32GB onboard eMMC. Industrial grade temperature range from -40°C to +85°C.
conga-STDA4/i-DRA829J-4G eMMC32	051512	SMARC Module based on high-performance industrial TI DRA829J Arm® Networking processor. Features 2x ARM Cortex-A72 @ 2.0GHz + 6x ARM Cortex-R5F + 8 TOPS MMA (deep-learning matrix multiply accelerator), 4GB onboard LPDDR4x memory and 32GB onboard eMMC. Industrial grade temperature range from -40°C to +85°C.
conga-STDA4/i-DRA829J-2G eMMC32	051513	SMARC Module based on high-performance industrial TI DRA829J Arm® Networking processor. Features 2x ARM Cortex-A72 @ 2.0GHz + 6x ARM Cortex-R5F + 8 TOPS MMA (deep-learning matrix multiply accelerator), 2GB onboard LPDDR4x memory and 32GB onboard eMMC. Industrial grade temperature range from -40°C to +85°C
conga-STDA4/i-TDA4VM-2G eMMC32 MAYA-W160	051520	SMARC Module based on high-performance industrial TI TDA4VM Arm® Application processor. Features 2x ARM Cortex-A72 @ 2.0GHz + 6x ARM Cortex-R5F + 8 TOPS MMA (deep-learning matrix multiply accelerator), 4GB onboard LPDDR4x memory and 32GB onboard eMMC. Features Ublox Wifi/BT module MAYA-W260. Industrial grade temperature range from -40°C to 85°C.
conga-STDA4/CSP-B	051550	Passive cooling solution for SMARC Module conga-STDA4 based on TI TDA4VM and DRA829J Arm® processors. All standoffs are with 2.7 mm bore hole.
conga-STDA4/HSP-B	051551	Standard heatspreader for SMARC Module conga-STDA4 based on TI TDA4VM and DRA829J Arm® processors. All standoffs are with 2.7 mm bore hole.
SMARC/CSA Adapter	050060	Active cooling solution adapter for SMARC modules used in combination with module heat spreader.
conga-SEVAL	007010	Evaluation carrier board for SMARC modules.
conga-SMC1/SMARC-ARM	020750	3.5" carrier board for congatec SMARC modules based on ARM architecture.

Draft Rev. 0.4, January 10, 2023