ULTRA LOW POWER NXP i.MX 8X SERIES
conga-SMX8-X

- NXP i.MX 8X processor series with ARM Cortex-A35 / M4F core complex
- Ultra low power architecture with 2-5W
- Highest reliability and improved virtualization
- Support for up to 2 independent HD displays
- Extended longevity up to 15 years
- Temperature range up to -40°C .. +85°C

Form factor  
SMARC Specification 2.1

CPU  
NXP i.MX 8X ARM Processor Cores

<table>
<thead>
<tr>
<th>NXP i.MX 8QuadXPlus</th>
<th>ARM Cortex-A35</th>
<th>ARM Cortex-M4F</th>
<th>GPU</th>
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<tr>
<td>i.MX 8QuadXPlus</td>
<td>4x Cortex-A35 @ 12GHz</td>
<td>1x Cortex-M4F @ 264MHz</td>
<td>1x GC7000Lite</td>
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DRAM  
Up to 4 GByte onboard LPDDR4 memory | 2400 MT/s

Ethernet  
Up to 2x Gbit Ethernet with IEEE 1588 support

I/O Interfaces  
Up to 5x USB 2.0 (1x shared with USB OTG client) | up to 2x USB 3.0 | 1x SDIO 3.0 | 1x PCIe 3.0 | 1x SPI | 1x QSPI | up to 4x UART (2x with Handshake (1x shared with FlexCAN)) | 2x FlexCAN | GPIOs | optional soldered M.2 1216 WiFi/BT

Mass Storage  
eMMC 5.1 up to 128 GByte

Sound  
Up to 2x I²S | optional processor with Tensilica® HiFi 4 DSP

Graphics  
Integrated in NXP i.MX 8X Series GT7000Lite multimedia GPU | VPU up to 4K h.265 dec / 1080p h.264 enc/dec | 3D Graphics with up to 4 high performance vec4 shaders and 16 execution units | up to 2 independent displays | OpenGL ES 3.1 | Vulcan VX extensions | OpenCL 1.2 EP | OpenVG 1.1

Video Interfaces  
1x dual channel or 2x single channel LVDS 24 bit | 2x MIPI-DSI with 4-lanes shared with LVDS | 1x MIPI-CSI 4-lanes

Features  
Watchdog Timer | I²C bus 400 kHz | Cortex-A35 Console | optional JTAG debug interface | High Precision Real Time Clock

Virtualization  
Hardware Virtualization with Domain Separation | Multiple Operating System Support

Security  
High Assurance Boot support, SHE | Inline Encryption Engine (AES-128) | TRNG, AES-128, AES-256, 3DES, ARCA, RSA4096, SHA-1, SHA-2, SHA-256, MD-5 | RSA-1024, 2048, 3072, 4096 and secure key storage

Boot Loader  
U-Boot boot loader

Operating Systems  
Linux | Yocto Linux | Android

Power Consumption  
Ultra low power Cortex-A35 | typ. application 2-5W @ 5V

Temperature Range  
Operating Temperature Range: 0 to +60°C commercial grade |
-40 to +85°C industrial grade
Storage Temperature Range: -40 to +85°C

Humidity  
Operating: 10 - 90% r. H. non cond. | Storage: 5 - 95% r. H. non condensing

Size  
82 x 50 mm (3.23” x 1.97”)
conga-SMX8-X | Block Diagram

NXP i.MX 8X Processor Series

Onboard LPDDR4 Memory

LPDDR4

LVDS0/DSI0

LVDS1/DSI1

JTAG

UART

eMMC

SDIO* PCIe* USB3* UART*

WiFi/ BT*

* Assembly Option

SMARC Connector

LPDS 0/DSI0

LVDS 1/DSI1

Ethernet 0

Ethernet 1

PCIe Gen 3

MIPI-CSI4 lane

SDIO

2x I2S Audio

1x USB 2.0 OTG

2x USB 3.0 / 2.0

2x USB 2.0

2x CAN Bus

1x UART 2-wire*

2x UART 4-wire

1x UART 2-wire

I2C

2x SPI

GPIO [0:6]

GPIO 7:11

Power

USB Hub

MUX

USB SS

USB 2.0

FlexCAN

GPIO

GPIO Expander

PMIC

Power Rail Control

2x UART 4-wire

1x UART 2-wire

I2C

2x SPI

GPIO [0:6]

GPIO 7:11

Power
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<td>conga-SMX8-X/QXP-4G eMMC16</td>
<td>051100</td>
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<td>051104</td>
<td>SMARC 2.0 module with ultra low power NXP i.MX 8QuadXPlus processor with 4x ARM Cortex-A35 and 1x ARM Cortex-M4F, 4GB onboard LPDDR4 memory and 16GB onboard eMMC. Commercial temperature range. With onboard Wifi/BT module.</td>
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<tr>
<td>conga-SMX8-X/i-QXP-4G eMMC16</td>
<td>051110</td>
<td>SMARC 2.0 module ultra low power NXP i.MX 8QuadXPlus processor with 4x ARM Cortex-A35 and 1x ARM Cortex-M4F, 4GB onboard LPDDR4 memory and 16GB onboard eMMC. Industrial temperature range.</td>
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<td>051113</td>
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<td>conga-SMX8-X/i-CSP-B</td>
<td>051150</td>
<td>Passive cooling solution for SMARC module conga-SMX8-X with lidded NXP iMX 8X ARM processor. All standoffs are with 2.7mm bore hole.</td>
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<tr>
<td>conga-SMX8-X/i-HSP-B</td>
<td>051151</td>
<td>Heat spreader solution for SMARC module conga-SMX8-X with lidded NXP iMX 8X ARM processor. All standoffs are with 2.7mm bore hole.</td>
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<td>SMARC/CSA-Adapter</td>
<td>051060</td>
<td>Active cooling solution adapter for SMARC modules used in combination with module heat spreader.</td>
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<td>conga-SEVAL</td>
<td>007010</td>
<td>Evaluation carrier board for SMARC 2.0 modules.</td>
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<tr>
<td>conga-SMC/VSMARC-ARM</td>
<td>020750</td>
<td>3.5” carrier board for congatec SMARC 2.0 modules based on NXP iMX ARM architecture.</td>
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