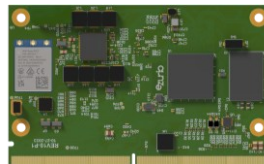


## Secure, Smart, Standardized, and Connected IOT: Powerful NXP Edge Processing with Wi-Fi 6 or Wi-Fi 6E

Our customers asked for a high performance, robust SoM that simplifies their BOM, has reliable connectivity, uses a standard form factor, and is globally certified. One with multiple software options, a proven security architecture, long term software support, and security fixes.

Our new Nitrogen8M Mini SMARC is powered by NXP's class-leading i.MX 8M Mini processor, NXP PMIC PF8121, and our Sona Wi-Fi 6 or 6E and Bluetooth 5.4 wireless module families based on leading NXP and Infineon solutions, high performance LPDDR4 RAM, and eMMC storage. We combine this with our common SMARC carrier board; together they can serve as a single board computer (SBC) that can speed your product to market. Alternately, work with us to create a custom carrier that fits your mechanical, environmental, temperature, and interface requirements.

- **Powerful Heterogenous Multiprocessing:** Up to 1.8 GHz quad-core Cortex-A53 microprocessor and 400 MHz Cortex-M4 microcontroller allow you to run Linux and an RTOS on dedicated, hardware-firewalled subsystems.
- **Diverse Interfaces:** Display, network, data, audio, camera, and more.
- **SMARC 2.2 Standard Form Factor:** 82mm x 50mm SMARC edge connector form factor which includes onboard ethernet PHY and a USB hub controller. One design supports multiple processor, memory, and wireless configurations.
- **Hardware Upgrade Roadmap:** Build a product design that can easily be upgraded to the latest processors and wireless options as future Ezurio SOMs based on the SMARC standard are released.
- **Advanced Common Carrier/Development Board:** Display, camera, audio, Ethernet, USB, PCI-Express, I2C, SPI, UART, and more. Use in development, as an SBC equivalent in a product, or as reference designs for your carrier board design.



- **Multiple options for Wi-Fi 6 or 6E** (802.11ax) and **Bluetooth 5.3 or 5.4**
  - Sona NX611 (**NXP IW611**) dual-band Wi-Fi 6 and Bluetooth 5.3
  - Sona IF573 (**Infineon CYW55573**) tri-band Wi-Fi 6E and Bluetooth 5.4
- **Operating Temperature Range:** Commercial Rating (0° to +70 °C) and Industrial Rating (-40° to +85 °C)
- **Multiple high performance memory options:**

|              |              |              |
|--------------|--------------|--------------|
| 1GB LPDDR4 / | 2GB LPDDR4 / | 4GB LPDDR4 / |
| 16GB eMMC    | 16GB eMMC    | 16GB eMMC    |
- Extensive range of **pre-certified antennas** for optional Sona wireless modules
- **US based manufacturing with Global Options:** Manufacture in USA for local customer base and US market needs. Global manufacturing capability as part of Ezurio footprint, growing reach to EMEA & APAC regions.
- **Diverse Software and Board Support Options:** Yocto Linux / Buildroot Linux / Android for Cortex-A53s, Zephyr RTOS/FreeRTOS for the Cortex-M4
- **Power Efficient:** NXP PMIC, power optimized LPDDR4 and eMMC memory, core shut off, clock/voltage scaling, low power interfaces, power optimized single stream Wi-Fi mode enable highly optimized power consumption.
- **Long Term Software Support:** Choose from Yocto Linux, Buildroot Linux, Android for the Cortex-A53s and Zephyr RTOS/ FreeRTOS for Cortex-M4. Our **EZ BSP** ensures your Yocto and Buildroot SBOMs stay up to date with the latest security fixes.
- **Device Security:** **EZ BSP** also enables our **Chain of Trust** service includes secure and encrypted boot architecture, secure programming of the hardware root of trust and device image, secure generation and provisioning of customers specific keys and certificates, and a secure signing service for generating new firmware and certificates.

## Key Features



**Reliable Connectivity: Optional Wi-Fi 6/6E and BT 5.3/5.4** Excellent Wi-Fi and BT Classic / LE connectivity in difficult environments, plus enterprise Wi-Fi support via WPA3-Enterprise for more secure and robust connections.



### Graphics, Video, Vision, and Audio

MIPI-DSI or LVDS display up to 1080p60, GPU, 1080p60 multi codec encode and decode VPU, MIPI-CSI camera interface, I2S audio interfaces



### Secure Enclave and Secure Boot Powered by LMX 8M Mini

Dedicated on-board security hardware, secure boot Linux, and high-performance and flexible secure storage system for passwords, certificates, and data storage.



### Robust Software and Speed to Market

Choose from Yocto Linux, Buildroot Linux, or Android for the Cortex-A53s, Zephyr RTOS and FreeRTOS for the Cortex-M4



### Global Radio Approvals

Sona wireless modules carry several modular FCC, IC, CE, UKCA, RCM, MIC, KC, and Bluetooth SIG approvals.



### Personal Support from Design to Manufacture

Our industry-renowned support and field application engineering team is passionate about helping you speed your design to market.

## Application Areas



**Smart Buildings & Appliances**



**Touchscreens and Displays**



**Industrial IoT, Vision Systems**



**Food and Beverage**



**Medical Devices**

## Specifications

| Category                        | Feature                  | Specification                                                                                                                                                                                           |
|---------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Processors                      | Microprocessor           | 4x Cortex®-A53 cores @ up to 1.8 GHz                                                                                                                                                                    |
|                                 | Microcontroller          | 1x Cortex®-M4 core @ 400 MHz                                                                                                                                                                            |
|                                 | Graphics                 | GC7000NanoUltra for 3D and GC520L for 2D                                                                                                                                                                |
| Memory                          | RAM                      | 1GB, 2GB, and 4GB                                                                                                                                                                                       |
|                                 | Storage                  | 16GB. <i>(For custom sizes, please contact Sales)</i>                                                                                                                                                   |
| Graphics and Video              | Graphics Processing Unit | <ul style="list-style-type: none"> <li>50 million triangles/sec</li> <li>500 megapixel/sec</li> </ul>                                                                                                   |
|                                 | Video Processing Unit    | <b>Video Decode</b> <ul style="list-style-type: none"> <li>1080p60 HEVC/H.265</li> <li>1080p60 VP9 Profile 0, 2</li> <li>1080p60 VP8</li> <li>1080p60 AVC/H.264 Baseline, Main, High decoder</li> </ul> |
|                                 | Display Interfaces       | <ul style="list-style-type: none"> <li>1x MIPI DSI, up to 1080p60 (Optional, MOQ required)</li> <li>1x LVDS, up to 720p60</li> </ul>                                                                    |
| Vision                          | Camera                   | <ul style="list-style-type: none"> <li>1x 4-lane MIPI CSI</li> </ul>                                                                                                                                    |
| Audio                           | Audio Interfaces         | <ul style="list-style-type: none"> <li>2x I2S (Optionally 1 as HDA)</li> <li>1x PCM (for onboard optional Bluetooth)</li> </ul>                                                                         |
| Peripherals                     | Input/Output             | <ul style="list-style-type: none"> <li>1x PCIe Gen2 1-Lane Dual Mode with PHY</li> <li>3x USB 2.0 with PHY</li> <li>1x Gbit Ethernet including PHY with IEEE® 1588, AVB, EEE</li> </ul>                 |
|                                 |                          | <ul style="list-style-type: none"> <li>3x UART</li> <li>5x I2C</li> <li>2x SPI</li> <li>1x SDIO 3.0/eMMC 5.1</li> <li>14x GPIO</li> </ul>                                                               |
| Optional Wireless Specification | Wi-Fi                    | Wi-Fi 6 or Wi-Fi 6E                                                                                                                                                                                     |
|                                 | Frequency                | Dual-Band 2.4GHz & 5GHz or Tri-Band 2.4GHz, 5GHz, & 6GHz                                                                                                                                                |
|                                 | Bluetooth                | Bluetooth 5.4                                                                                                                                                                                           |
| Supply Voltage                  |                          | 5 V                                                                                                                                                                                                     |
| Physical                        | Dimensions               | SMARC 2.2 Standard - 82mm x 50mm                                                                                                                                                                        |
| Environmental                   | Temp Range               | 0°C to +70°C (Commercial) and -40° to +85 °C (Industrial)                                                                                                                                               |
| Miscellaneous                   | Lead Free                | Lead-free and RoHS-compliant                                                                                                                                                                            |
|                                 | Carrier Board            | Carrier board, accessories, and evaluation software                                                                                                                                                     |
| Qualifications                  | Bluetooth® SIG           | Bluetooth SIG Qualified Listing                                                                                                                                                                         |
| Regulatory                      | Approvals                | FCC/IC/CE/MIC/RCM on optional Sona wireless modules                                                                                                                                                     |

*For full specifications on the Nitrogen8M Plus SMARC, please see the appropriate datasheet.*

## Ordering Information

| Part                           | Description                                                           |
|--------------------------------|-----------------------------------------------------------------------|
| 8MM_SMARC_SOM_1r16e            | SMARC SOM: i.MX8M MINI Quad / 1GB / 16GB eMMC                         |
| 8MM_SMARC_SOM_2r16e            | SMARC SOM: i.MX8M MINI Quad / 2GB / 16GB eMMC                         |
| 8MM_SMARC_SOM_4r16e            | SMARC SOM: i.MX8M MINI Quad / 4GB / 16GB eMMC                         |
| 8MM_SMARC_SOM_1r16e_i          | SMARC SOM: i.MX8M MINI Quad / 1GB / 16GB eMMC / -40° to +85°C         |
| 8MM_SMARC_SOM_2r16e_i          | SMARC SOM: i.MX8M MINI Quad / 2GB / 16GB eMMC / -40° to +85°C         |
| 8MM_SMARC_SOM_4r16e_i          | SMARC SOM: i.MX8M MINI Quad / 4GB / 16GB eMMC / -40° to +85°C         |
| 8MM_SMARC_SOM_1r16e_NX611_1M   | SMARC SOM: i.MX8M MINI Quad / 1GB / 16GB eMMC / NX611                 |
| 8MM_SMARC_SOM_1r16e_NX611_1M_i | SMARC SOM: i.MX8M MINI Quad / 1GB / 16GB eMMC / NX611 / -40 to +85C   |
| 8MM_SMARC_SOM_2r16e_NX611_1M   | SMARC SOM: i.MX8M MINI Quad / 2GB / 16GB eMMC / NX611                 |
| 8MM_SMARC_SOM_2r16e_NX611_1M_i | SMARC SOM: i.MX8M MINI Quad / 2GB / 16GB eMMC / NX611 / -40 to +85C   |
| 8MM_SMARC_SOM_4r16e_NX611_1M   | SMARC SOM: i.MX8M MINI Quad / 4GB / 16GB eMMC / NX611                 |
| 8MM_SMARC_SOM_4r16e_NX611_1M_i | SMARC SOM: i.MX8M MINI Quad / 4GB / 16GB eMMC / NX611/ -40 to +85C    |
| 8MM_SMARC_SOM_1r16e_IF573_3M   | SMARC SOM: i.MX8M MINI Quad / 1GB / 16GB eMMC / IF573                 |
| 8MM_SMARC_SOM_1r16e_IF573_3M_i | SMARC SOM: i.MX8M MINI Quad / 1GB / 16GB eMMC / IF573 / -40° to +85°C |
| 8MM_SMARC_SOM_2r16e_IF573_3M   | SMARC SOM: i.MX8M MINI Quad / 2GB / 16GB eMMC / IF573                 |

| Part                           | Description                                                           |
|--------------------------------|-----------------------------------------------------------------------|
| 8MM_SMARC_SOM_2r16e_IF573_3M_i | SMARC SOM: i.MX8M MINI Quad / 2GB / 16GB eMMC / IF573 / -40° to +85°C |
| 8MM_SMARC_SOM_4r16e_IF573_3M   | SMARC SOM: i.MX8M MINI Quad / 4GB / 16GB eMMC / IF573                 |
| 8MM_SMARC_SOM_4r16e_IF573_3M_i | SMARC SOM: i.MX8M MINI Quad / 4GB / 16GB eMMC / IF573 / -40° to +85°C |
| SMARC_CAR                      | Universal Carrier Board Kit - SMARC (Note: SOM sold separately)       |

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