Boundary Devices
a Laird Connectivity™ company

Nitrogen8M Mini SMARC

i.MX 8M Mini + Wi-Fi 6/6E + Bluetooth 5.3/5.4
SMARC 2.1.1 Form Factor

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

MADE IN THE USA

Featuring **NXP i.MX 8M Mini** with optional **NXP** and **Infineon** based **Wi-Fi 6** or **Wi-Fi 6E** with **Bluetooth 5.3/5.4** wireless onboard

Up to 1.8 GHz quad-core Cortex-A53 and **400 MHz Cortex-M4**

GOLD PARTNER NXP

Infineon Premium Partner

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 WiFi 6/6E and Bluetooth 5.3/5.4 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.
- **Diversity of Interfaces:** Display, network, data, audio and camera interfaces.
- **SMARC 2.1.1 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 Laird Connectivity 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 6/6E** (802.11ax) and **Bluetooth 5.3/5.4**
  - 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 Temperate Range**
  - Commercial Rating (0° to +70 °C)
  - Industrial Rating (-40° to +85 °C)
- **Multiple high performance memory options**:

1GB LPDDR4 / 16GB eMMC	2GB LPDDR4 / 16GB eMMC	4GB LPDDR4 / 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 Laird Connectivity footprint, growing reach to EMEA & APAC regions
- **Diverse Software and Board Support Options:** Choose from Yocto Linux/Buildroot Linux/Android/Ubuntu for Cortex-A53s, Zephyr RTOS/FreeRTOS for the Cortex-M7
- **Secure and Encrypted Boot, Secure Enclave, and Secure File Storage:** Robust, secure, and optionally encrypted boot mechanism to ensure only trusted software boots on your device. Optionally store and use secure keys, certificates, and credentials in run-time isolated trusted environment.
- **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 hardware availability and software support:** Laird Connectivity's products are specifically designed to meet the needs of the industrial and medical markets, which typically require 10 year or more product lifecycles. Long-term software support includes LTS Yocto Linux and Zephyr RTOS support with vulnerability remediation.

Features at a Glance

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 i.MX 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, Android, and Ubuntu for the Cortex-A53s, Zephyr RTOS and FreeRTOS for the Cortex-M7

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 and Appliances
- Touchscreens and Displays
- Industrial IoT, Vision Systems
- Food and Beverage
- Medical Devices

Interesting in our Nitrogen8M Mini SMARC?
Visit us at **http://www.boundarydevices.com/nitrogen8m-mini-smarc**

KEY 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. *(For custom sizes, please contact Sales)*
Graphics and Video	Graphics Processing Unit	▪ 50 million triangles/sec ▪ 500 megapixel/sec ▪ 8 GFLOPs 32-bit ▪ OpenGL ES 2.0 ▪ 2D acceleration
	Video Processing Unit	**Video Decode** ▪ 1080p60 HEVC/H.265 ▪ 1080p60 VP9 Profile 0, 2 ▪ 1080p60 VP8 ▪ 1080p60 AVC/H.264 Baseline, Main, High decoder **Video Encode** ▪ 1080p60 AVC/H.264 encoder
	Display Interfaces	▪ 1x MIPI DSI, up to 1080p60 ▪ 1x LVDS, up to 1080p60 (Optional, MOQ required)
Vision	Camera	▪ 1x 4-lane MIPI CSI
Audio	Audio Interfaces	▪ 2x I2S (Optionally 1 as HDA) ▪ 1x PCM (for onboard optional Bluetooth)
Peripherals	Input/Output	▪ 1x PCIe Gen2 1-Lane Dual Mode with PHY ▪ 3x USB 2.0 with PHY ▪ 1x Gbit Ethernet including PHY with IEEE® 1588, AVB, EEE ▪ 3x UART ▪ 5x I2C ▪ 2x SPI ▪ 1x SDIO 3.0/eMMC 5.1 ▪ 14x GPIO
Optional Wireless Specification	Wi-Fi	Wi-Fi 6/6E (802.11ax)
	Frequency	Dual-Band 2.4GHz & 5GHz or Tri-Band 2.4GHz, 5GHz, & 6GHz
	Bluetooth	Bluetooth 5.3/5.4
Supply Voltage		5 V
Physical	Dimensions	SMARC 2.1.1 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.

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 +85C
8MM_SMARC_SOM_2r16e_i	SMARC SOM: i.MX8M MINI Quad / 2GB / 16GB eMMC / -40 to +85C
8MM_SMARC_SOM_4r16e_i	SMARC SOM: i.MX8M MINI Quad / 4GB / 16GB eMMC / -40 to +85C
SMARC_CAR_BRD	Universal Carrier Board - SMARC (Note - SOM sold separately)

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