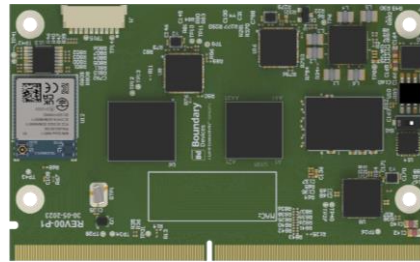


NEXT GENERATION SECURE, SMART, STANDARDIZED, AND CONNECTED IOT: POWERFUL NXP EDGE PROCESSING WITH NXP Wi-Fi 6 AND BLUETOOTH 5.3

Featuring **NXP i.MX 93**
and Sona NX611 (**NXP IW611**)

Up to 1.7 GHz dual-core Cortex-A55
and **250 MHz Cortex-M33**

Optional dual-band **Wi-Fi 6 (802.11ax)**
and **Bluetooth 5.3**



Our customers asked for a peripheral rich and 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 Nitrogen93 SOM is powered by **NXP's next generation i.MX 93** processor, **NXP PMIC PCA9451A**, and our Sona NX611 Wi-Fi 6 / Bluetooth 5.3 radio based on **NXP's IW611**. It features high performance LPDDR4 RAM, and eMMC storage. We combine this with our common SMARC carrier board; together they 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 1.7 GHz dual-core Cortex-A55 microprocessor and 250 MHz Cortex-M33 microcontroller allow you to run Linux and an RTOS on dedicated, hardware-firewalled subsystems.
- **Dedicated Machine Learning:** High-performance edge machine learning via an integrated Arm Ethos™-U65 microNPU, delivering up to 2.3 TOPS.
- **Diversity of Interfaces:** Multiple 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 PHYs**. 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, CAN, I2C, SPI, UART, and more. Use in development, as an SBC equivalent in a product, or as reference designs for your carrier board design.

- Optional **Wi-Fi 6 (802.11ax)** and **Bluetooth 5.3** Classic & Low Energy (LE)
- **Operating Temperature Range**
 - Commercial Rating (0° to +70 °C)
 - Industrial Rating (-40° to +85 °C)
- **Multiple high performance memory options:**

2GB LPDDR4 /	4GB LPDDR4 /
16GB eMMC	16GB eMMC
- Extensive range of **pre-certified antennas** for Sona NX611
- **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/Ubuntu for Cortex-A55s, Zephyr RTOS/FreeRTOS for the Cortex-M33.
- **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 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 AND BT 5.3

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.



ML, GRAPHICS, VISION, AUDIO, AND INDUSTRIAL PERIPHERALS

1 TOPS Machine Learning NPU, MIPI-DSI, LVDS, or parallel display, MIPI-CSI camera interface, I2S audio interfaces, 2x CAN/CAN-FD, 2x Gbit Ethernet, and more



SECURE ENCLAVE AND SECURE BOOT POWERED BY I.MX 93

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, and Ubuntu for the Cortex-A55s, Zephyr RTOS and FreeRTOS for the Cortex-M33



GLOBAL RADIO APPROVALS

SKUs with Sona IW611 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



Energy Meters, Energy Storage
Smart Electrical Panels



Smart City, Smart Camera



Smart Building Control, HVAC



Industrial Human Machine
Interface (HMI)



Industrial IoT, Vision Systems



Commercial Food and Beverage
Equipment

KEY SPECIFICATIONS

CATEGORY	FEATURE	SPECIFICATION
Processors	Microprocessor	2x Cortex®-A55 cores @ up to 1.7 GHz
	Microcontroller	1x Cortex®-M33 core @ 250 MHz
	Graphics	2D Engine
	Machine Learning	Arm Ethos™-U65 microNPU Neural Processing Unit (NPU) with up to 1 TOP/s
Memory	RAM	2GB and 4GB
	Storage	16GB. <i>(For custom sizes, please contact Sales)</i>
Machine Learning	Neural Processing Unit	<ul style="list-style-type: none"> Keyword detect, noise reduction, beamforming Speech recognition Human pose detection and gesture recognition Image recognition and beautification Object detection and classification
Graphics and Video	Graphics Engine	<ul style="list-style-type: none"> 2D Engine
	Display Interfaces	<ul style="list-style-type: none"> 1x MIPI DSI, up to 1920x1200p60 1x LVDS Tx, up to 1366x768p60 or 1280x800p60 1x Parallel Display, up to 1366x768p60 or 1280x800p60
Vision	Camera	1x 2-lane MIPI CSI
Audio	Audio Interfaces	2x I2S
Peripherals	Input/Output	<ul style="list-style-type: none"> 2x USB 2.0 with PHY 2x Gbit Ethernet with PHY and support for Energy Efficient Ethernet, IEEE® 1588, AVB (One also supports TSN) 2x CAN/CAN-FD 4x UART 5 Mbit/s 5x I2C 2x SPI 1x SDIO 3.0/eMMC 5.1 14x GPIO
Optional Wireless Specification	Wi-Fi	Wi-Fi 6 (802.11ax)
	Frequency	Dual-Band 2.4GHz & 5GHz
	Bluetooth	Bluetooth 5.3
	Transmit Power	+ 18 dBm (maximum)
	Antenna Options	Onboard shared Wi-Fi/BT, 1 MHF4 connector shared Wi-Fi/BT, or 2 MHF4 separate Wi-Fi and BT
Key Wi-Fi Features	Raw Data Rates (Air)	Wi-Fi 6 600.5Mbit/s – MCS11, 80MHz, 1024QAM, SGI
	Wi-Fi 6 (802.11ax)	<ul style="list-style-type: none"> IEEE 802.11 a/b/g/n/ac/ax 20, 40 & 80MHz bandwidth support OFDMA
Key Bluetooth Features	Bluetooth	<ul style="list-style-type: none"> Classic Bluetooth – BR / EDR LE Secure Connections Central / Peripheral Modes Up to 16 Bluetooth LE connections LE Long Range (Coded PHY) LE isochronous channels
Supply Voltage		5 V
Physical	Dimensions	SMARC 2.1 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/KCC

For full specifications on the Nitrogen93, please see the appropriate datasheet.

Part # (Tentative)	Description
N93_SMARC_SOM_1r16e	Nitrogen93 SMARC SOM: i.MX 93 Dual / 1GB / 16GB eMMC / 0 to +70°C / Without Wireless
N93_SMARC_SOM_2r16e	Nitrogen93 SMARC SOM: i.MX 93 Dual / 2GB / 16GB eMMC / 0 to +70°C / Without Wireless
N93_SMARC_SOM_1r16e_i	Nitrogen93 SMARC SOM: i.MX 93 Dual / 2GB / 16GB eMMC / -40 to +85°C / Without Wireless
N93_SMARC_SOM_2r16e_i	Nitrogen93 SMARC SOM: i.MX 93 Dual / 2GB / 16GB eMMC / -40 to +85°C / Without Wireless
SMARC_CAR_BRD	Universal Carrier Board - SMARC (Note - SOM sold separately)

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