Product
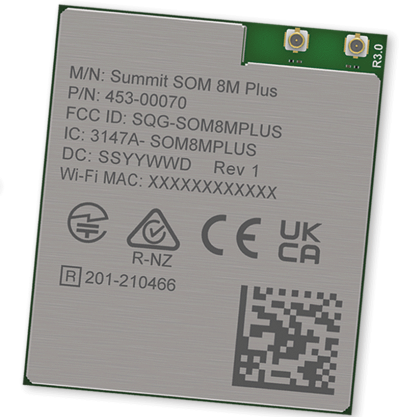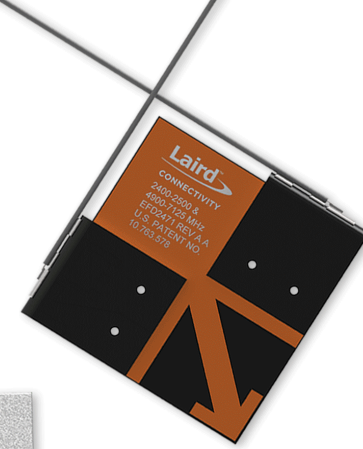# Portfolio:

Modules, IoT Devices, SOMs & Antennas

Feature-Rich Product Ranges to Support
All of Your Design Needs.

Laird™
CONNECTIVITY

Q3 2023

Connected No Matter What.

Laird Connectivity simplifies wireless connectivity with innovative IoT solutions and world class customer support. We offer the industry's broadest spectrum of products spanning SOMs and single-board computers, Wi-Fi, Bluetooth/Bluetooth LE, LoRaWAN, Cellular, sensor and gateway implementations, antennas, and more. Bring innovative wireless designs to market with our IoT devices and certified RF modules that enable secure, reliable wireless connectivity in the harshest RF environments.

P/N:453-00090
Model:LYRA-P
FCC ID:SQG-LYRAP
IC:3147A-LYRAP
KC ID:R-C-L7C-LYRAP
Laird Connectivity
209-J00456

453-00091
LYRA-S
YYWWTTTTTT

M/N: Summit SOM 8M Plus
P/N: 453-00070
FCC ID: SQG-SOM8MPLUS
IC: 3147A- SOM8MPLUS
DC: SSYYWWD   Rev 1
Wi-Fi MAC: XXXXXXXXXXXX
201-210466

Laird CONNECTIVITY
i-FlexPIFA
EFG2400A
2.4 GHz i-FlexPIFA
U.S. Patent No: 9,450,307

750-03375-R3.0
R3.0
Laird CONNECTIVITY
M/N: Sona IF573
P/N: 453-00118
DC: SSYYWWD   Rev X
Wi-Fi MAC: XXXXXXXXXXXX
FCC ID: SQG-SONAIF573
IC: 3147A-SONAIF573
201-220656
UK CA
Laird Connectivity
453-00120

BL653µ Series
Bluetooth™ v5 + 802.15.4 + NFC
Trace Pin Option
Industry Canada
Laird CONNECTIVITY

Laird CONNECTIVITY
Sentrius™ MG100
LTE-M   NB-IoT™

Laird CONNECTIVITY

Wi-Fi Line Card

Laird CONNECTIVITY

Laird Connectivity offers certified Wi-Fi modules that enable secure and reliable wireless connectivity, even in the harshest environments. Our modules are ideal for robust, business-critical connectivity in medical, industrial, and commercial settings where excellent RF performance, lower power consumption, simplified application development, and fast time to market are a must.

Modules not actual size.

	Sona™ MT320 (Coming Soon)	Sona™ NX611 (Coming Soon)	Sona™ IF573
Chipset	MEDIATEK — MediaTek Genio 700	NXP — NXP IW611	Infineon — Infineon AIROC™ CYW55573
802.11 Standards	2x2 802.11a/b/g/n/ac/ax (WI-FI 6)	1X1 802.11a/b/g/n/ac/ax (WI-FI 6)	2x2 802.11a/b/g/n/ac/ax (Wi-Fi 6E)
BT Standards	Bluetooth 5.3 - Dual Mode Classic (EDR) & BLE	Bluetooth 5.3 - Dual Mode Classic (EDR) & BLE	Bluetooth 5.4 - Dual Mode Classic (EDR) & BLE
Type	M.2 1216 SMT M.2 2230 E-Key Module	SIP M.2 1216 SMT M.2 2230 E-Key Module	M.2 1318 SMT M.2 2230 E-Key Module
Size (mm)	14 x 20 (M.2 1318) 22 x 30 (M.2 2230 E-Key)	11 mm x 11 mm (SIP) 12 mm x 16 mm (M.2 1420 SMT Module) 22 mm x 30 mm (M.2 E-Key Module)	13 x 18 x 0.43 (M.2 1318) 22 x 30 x 2.7 (M.2 2230 E-Key)
Tx Power (dBm)	TBD	TBD	Up to +18 dBm
Rx Sensitivity (dBm)	TBD	TBD	TBD
Temp. Range	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
OS Support	Android, Linux	Android, Linux	Android, Linux
Wi-Fi Security	WPA2-Personal, WPA2-Enterprise, WPA3-Personal, WPA3-Enterprise	WPA2-Personal, WPA2-Enterprise, WPA3-Personal, WPA3-Enterprise	WPA2-Personal, WPA2-Enterprise, WPA3-Personal, WPA3-Enterprise
Certifications	FCC, IC, CE, UKCA, Bluetooth SIG	FCC, IC, CE, UKCA, RCM, MIC Bluetooth SIG	FCC, IC, CE, UKCA, MIC, RCM, Bluetooth SIG
Board Support Package	Kernel Backports, NetworkManager, Summit Supplicant — broad kernel, BSP, and MPU compatibility.	Kernel Backports, NetworkManager, Summit Supplicant — broad kernel, BSP, and MPU compatibility.	Kernel Backports, NetworkManager, Summit Supplicant — broad kernel, BSP, and MPU compatibility.

SUMMIT SUITE
SECURITY SOLUTIONS
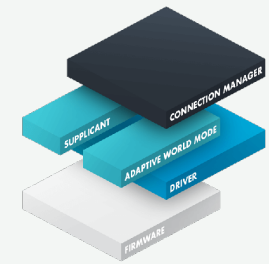
Secure Connectivity Stack

Wireless for harsh environments

Sleep when inactive and save power

Improved and optimized supplicant

Adaptive world mode for easier deployment

Endlessly customizable to your needs

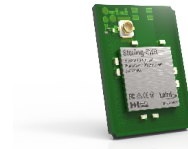**Industry-leading support**

Learn more at:
lairdconnect.com/iot-software/ summit-suite/secure-connectivity

Wi-Fi Line Card

Laird Connectivity offers certified Wi-Fi modules that enable secure and reliable wireless connectivity, even in the harshest environments. Our modules are ideal for robust, business-critical connectivity in medical, industrial, and commercial settings where excellent RF performance, lower power consumption, simplified application development, and fast time to market are a must.

Modules not actual size.

	Sterling-LWB5+	Sterling-LWB+	Sterling-EWB	60 Series
Chipset	Infineon CYW4373E	Infineon CYW43439	Infineon CYW4343W + STM32F412 Cortex M4 MCU	NXP 88W8997
802.11 Standards	802.11a/b/g/n/ac (2.4 and 5 GHz)	802.11a/b/g/n (2.4 GHz)	802.11 b/g/n	802.11 a/b/g/n/ac (2.4 and 5 GHz)
BT Standards	Bluetooth 5.2 - Dual Mode Classic (EDR) & BLE	Bluetooth 5.2 - Dual Mode Classic (EDR) & BLE	Bluetooth 5.1 - Dual Mode Classic (EDR) & BLE	Bluetooth 5.1 - Dual Mode Classic (EDR) & BLE
Type	Surface Mount Module, M.2 2230 E-Key, USB-A Dongle	SiP Package, Surface Mount Module, M.2 2230 E-Key	SiP Package or Surface Mount Module	SiP Package, M.2 2230-E Module with USB, SDIO, and PCIE variants
Size (mm)	12 x 17 x 2.2 mm (SMT PCB) 22 x 30 x 2.9 mm (M.2 E-Key) 17.5 x 47 x 11.7 mm (USB)	12 x 12 x 3 mm (SiP) 21 x 15 x 4 mm (PCB) 22 x 30 x 2.3 (M.2 PCB)	10 x 10 mm (SIP) 16 x 21 mm (PCB)	14 x 13 mm (SIP) 22 x 30 x 3.3 mm (M.2 E-Key)
Tx Power (dBm)	+ 18 dBm (maximum)	+ 18 dBm (maximum)	Wi-Fi: 12.5 to 17.5 BT/BLE: 4 to 8.5	Wi-Fi: 10 to 18 BT/BLE: 7 to 10
Rx Sensitivity (dBm)	Wi-Fi: -96 BT/BLE: -94	Wi-Fi: -89 to -94 BT/BLE: -83 to -91	Wi-Fi: -72 to -88 BT/BLE: -87 to -94	Wi-Fi: -55 to -95 BT/BLE: -88 to -95
Temp. Range	-40°C to +85°C	-40°C to +85°C	-40° to +85° C	-30°C to +85°C
OS Support	Android, Linux, RTOS	Android, Linux, RTOS	On-board RTOS with WICED	Android, Linux
Wi-Fi Security	WPA2-Personal, WPA2-Enterprise, WPA3-Personal, WPA3-Enterprise	WPA2-Personal, PA2-Enterprise, WPA3-Personal, WPA3-Enterprise	WPA2-Personal	WPA2-Personal, WPA2-Enterprise, WPA3-Personal, WPA3-Enterprise
Certifications	FCC, IC, CE, UKCA, MIC, KCC, TW, AUS, BR, Bluetooth SIG	FCC, IC, CE, UKCA, MIC, KCC, RCM, BR, Bluetooth SIG	FCC, IC, CE, UKCA, MIC, RCM, Bluetooth SIG	FCC, IC, CE, UKCA, MIC, AU/NZ, KCC, RCM, Bluetooth SIG
Board Support Package	Kernel Backports, NetworkManager, and Yocto layer for Linux ensures broad kernel, BSP, and MPU compatibility.	Kernel Backports, NetworkManager, and Yocto layer for Linux ensures broad kernel, BSP, and MPU compatibility.	WICED SDK and AT Command Set	Kernel Backports, NetworkManager, Summit Supplicant and Yocto layer for Linux — broad kernel, BSP, and MPU compatibility.

To learn more, visit l**airdconnect.com/wi-fi** or contact us at **lairdconnect.com/contact**

Bluetooth LE Line Card

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Nordic Semiconductor

Modules not actual size.

	BL5340 Series	BL5340PA Series
Chipset	Nordic nRF5340 SoC	Nordic nRF5340 SoC + Nordic nRF21540 FEM
Wireless	BT 5.2 LE + NFC + Thread	BT 5.2 LE + NFC + Thread
Type (Flash/RAM)	SMT w/ dual Cortex M33 (App processor 1MB/512KB. Network processor 256KB/64KB)	SMT w/ dual Cortex M33 (App processor 1MB/512KB. Network processor 256KB/64KB)
Size (mm)	15 x 10 x 2.2	2.5 x 21 x 10
Antenna Options	Internal Antenna OR External via trace pin	Internal Antenna OR External (MHF4)
Data/Control	USB, UART, QSPI, GPIO, ADC, PWM, PDM, QDEC, FREQ output, I²S, I²C, SPI, Comparator, Low Power Comparator	USB, UART, QSPI, GPIO, ADC, PWM, PDM, QDEC, FREQ output, I²S, I²C, SPI, Comparator, Low Power Comparator, Power Amplifier
Tx Power (dBm)	Up to +3 dBm	Up to +18.5 dBm
Rx Sensitivity (dBm)	Up to -98 dBm	Up to -108.5dBm
Temp Range	-40°C to +105°C	-40°C to +105°C
Software/Firmware	Zephyr RTOS, Nordic nRF Connect	Zephyr RTOS, Nordic nRF Connect
Profiles / Services Supported	Any services available via Nordic/Zephyr	Any services available via Nordic/Zephyr
Additional Features	BLE Mesh, AoA/AoD, LE Audio / Isochronous Channels, LE Coded (Long Range)	BLE Mesh, AoA/AoD, LE Audio / Isochronous Channels, LE Coded (Long Range)
Certifications	FCC, IC, CE, RCM, MIC, Bluetooth SIG	FCC, IC, RCM, Bluetooth SIG

	BL654 Series (includes USB adapter)	BL654PA Series	BL653/ BL653µ Series
Chipset	Nordic nRF52840	Nordic nRF52840 + Skyworks PA SKY66112-11	Nordic nRF52833
Wireless	BT 5.1 LE + NFC + Thread	BT 5.1 LE + NFC + Thread	BT 5.1 LE + NFC + Thread
Type (Flash/RAM)	SMT with onboard MCU (ARM Cortex M4F, 1MB/256k)	SMT with onboard MCU (ARM Cortex M4F, 1MB/256k)	SMT with onboard MCU (ARM Cortex M4F, 512KB/128KB)
Size (mm)	15 x 10 x 2.2 (module) 18.4 x 50.7 x 11 (USB)	22 x 10 x 2.2	15x10x2.2 (BL653) 6.3x5.6x1.6 (BL653µ/trace pad) 6.3x8.6x1.6 (BL653µ/int. antenna)
Antenna Options	Internal Antenna OR External (MHF4)	Internal Antenna OR External (MHF4)	Internal Antenna OR External (trace pin)
Data/Control	USB, UART, GPIO, ADC, PWM, PDM, FREQ output, I²S, I²C, SPI	UART, GPIO, ADC, PWM, PDM, FREQ output, I2S, I2C, SPI, QSPI	UART, GPIO, ADC, PWM, PDM, FREQ output, I2C, I2S, SPI, NFC, USB
Tx Power (dBm)	Up to +8 dBm	Up to +18 dBm	Up to +8 dBm
Rx Sensitivity (dBm)	Up to -103 dBm	Up to -107 dBm	Up to -103 dBm (BL653) Up to -103 dBm (BL653µ)
Temp Range	-40°C to +85°C	-40° to +85° C	-40°C to +105°C
Software/Firmware	AT Command Set, smartBASIC OR use Nordic SDK, Zephyr	AT Command Set, smartBASIC OR use Nordic SDK, Zephyr	AT Command Set, smartBASIC OR use Nordic SDK, Zephyr
Profiles / Services Supported	Any available via smartBASIC/Nordic SDK/Zephyr	Any available via smartBASIC/ Nordic SDK/Zephyr	Any available via smartBASIC/ Nordic SDK/Zephyr
Additional Features	BLE Mesh Packaged USB Adapters	BLE Mesh Ultra Long Range	BLE Mesh Extended Temp Range
Certifications	FCC, IC, CE, MIC, RCM, Bluetooth SIG	FCC, IC, RCM, KCC, Bluetooth SIG	FCC, IC, CE, MIC, RCM, Bluetooth SIG

Bluetooth LE Line Card

Laird™ CONNECTIVITY

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Silicon Labs

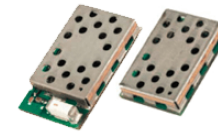Modules not actual size.

	Lyra 24 Series	Lyra Series
Chipset	SILICON LABS	SILICON LABS
	Silicon Labs EFR32BG24 SoC	Silicon Labs EF32BG22 SoC
Wireless	BT 5.3 LE	BT 5.3 LE
Type (Flash/RAM)	SMT or USB with onboard MCU (ARM Cortex-M33, 1536 KB flash, 256 KB RAM)	SMT with onboard MCU (ARM Cortex-M33, 512 KB flash, 32 KB RAM)
Size (mm)	7 x 7 x 1.18 (SiP) 12.9 x 15.0 x 2.15 (PCB) 12 x 50.74 x 11 (USB)	6 x 6 x 1.1 (SiP) 12.9 x 15 x 2.2 (PCB)
Antenna Options	Integrated (PCB and USB), Integrated or external (SiP)	Integrated (PCB), Integrated or external (SiP)
Data/Control	UART, EUART, I2C, SPI, ADC, GPIO, PWN, Counter, Timer, Watchdog, PRS (module)	UART, I2C, SPI, ADC, GPIO, PWM, PDM, Counter, Timer, Watchdog, PRS
Tx Power (dBm)	Up to +10 or +20 (PCB) Up to +10 (SiP) +20 (USB)	Up to +8 dBm (PCB) Up to +6 dBm (SiP)
Rx Sensitivity (dBm)	Up to -106.5 dBm (PCB) Up to -105.1 (SiP) TBD (USB)	Up to -98.9 dBm (PCB) Up to -98.6 dBm (SiP)
Temp Range	-40°C to +105°C	-40°C to +105°C
Software/Firmware	AT Command Set or full C Code	AT Command Set, Wireless Xpress, or full C Code
Profiles / Services Supported	AT Commands, or any supported via Silicon Labs SDK	AT Commands, or any supported via Wireless Xpress / Silicon Labs SDK
Additional Features	Intelligent power schemes, deep sleep mode, secure boot, ARM TrustZone, HW cryptographic accelerator	Intelligent power schemes, deep sleep mode, secure boot, ARM TrustZone, HW cryptographic accelerator
Certifications	FCC, IC, CE, UKCA, MIC, KC, RCM, and Bluetooth SIG	FCC, IC, CE, UKCA, MIC, KC, RCM, and Bluetooth SIG

Simplify Your Bluetooth Support

With more than fifteen years of experience in the development and production of Bluetooth wireless modules and associated development kits, we are the ideal Bluetooth technology partner to help you simplify your next Bluetooth design. Our certified Bluetooth modules speed time to market with the minimum development time required.

Range

With the widest range of high-performance Classic Bluetooth and BLE modules, adapters, and development kits in an assortment of data rates, ranges (power), and configurations, there is a solution to meet your needs.

Customization

Every design is different and comes with its own unique challenges. As a leader in designing connectivity solutions, we offer solutions that can be readily customized to your precise requirements.

Support

Whether you need help with your Bluetooth integration or designing an app, we have the tools and expertise to get your product to market.

Bluetooth Dual Mode Line Card

Implementing a Bluetooth solution for your product has never been this easy. Our Bluetooth module portfolio is designed to provide robust performance, easy global certification and simple implementation to accelerate your entire new product development cycle. We are the ideal Bluetooth/Bluetooth Low Energy (BLE) partner to help you simplify your next Bluetooth design. For more than 15 years, we have developed and produced Bluetooth modules, products and associated development kits.
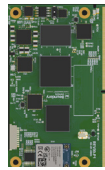
Modules not actual size.

	Vela IF820 Series (Coming Soon)	BT850/BT860 Series	BT851 USB Adapter	BT900 Series (includes USB adapter)
Chipset	Infineon CYW20820 A2	Infineon CYW20704 A2	Infineon CYW20704 A2	QCA CSR8811
Wireless Standards	Dual-Mode BT 5.2	Dual-Mode BT5	Dual-Mode BT5	Dual-Mode BT v4.0
Type (Flash/RAM)	SMT or USB Adapter (256 kb Flash/176 kB RAM/ 1 MB ROM)	SMT with HCI Interface	USB HCI Adapter	SMT with onboard MCU (ARM Cortex M3)
Size (mm)	7.5 x 7.5 x 2.15 mm (External Antenna) 9.3 x 12.5 x 2.15 mm (Chip Antenna) 18.39 x 50.74 x 11 mm (USB Adapter)	8.5 x 12.9 x 2.2	50.7 x 18.4 x 11	12.5 x 19 x 2.5 (module) 50.7 x 18.4 x 11 (USB)
Antenna Options	Chip Antenna, MHF4 Connector, or packaged USB adapter	Internal Antenna OR External via trace pad	Internal Antenna	Internal Antenna OR External via U.FL
Data/Control	?	USB, HCI (BT850) UART, HCI (BT860)	USB, HCI	UART, GPIO, SPI, I²C, ADC
Tx Power (dBm)	EIRP up to +10 dBm	Up to +8 dBm	Up to +8 dBm	Up to +8 dBm
Rx Sensitivity (dBm)	Up to -93.0 dBm	-94 dBm	-94 dBm	-90 dBm typ.
Temp Range	-40°C to +85°C	-30°C to +85°C	-30°C to +85°C	-40°C to +85°C
Software/Firmware	EZ-Serial, HCI UART, or C Code via Modus ToolBox	Any external BT software stack via HCI	Any external BT software stack via HCI	Hosted or hostless with *smart*BASIC
Profiles / Services Supported	Any supported by chosen BT stack	Any supported by chosen BT stack	Any supported by chosen BT stack	SPP. HID, any custom BLE Service via *smart*BASIC
Additional Features	Simultaneous BT and BLE connections. Packaged USB Adapters	Support for Searan Dotstack.	Support for Searan Dotstack.	Simultaneous BT and BLE connections. Packaged USB Adapters
Certifications	FCC, IC, CE, UKCA, MIC, KCC, RCM, Bluetooth SIG	FCC, IC, CE, UKCA, MIC, KCC (BT850 only), MIC (BT850/860), RCM, Bluetooth SIG	FCC, IC, CE, UKCA, MIC, MIC, Bluetooth SIG	FCC, IC, CE, UKCA, MIC, Bluetooth SIG

Bluetooth Classic Line Card

Laird™ CONNECTIVITY

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Modules not actual size.

	BT730 Series	BT740 Series	BTM4xx	BL652 Series
Chipset	Qualcomm CSR BC04	Qualcomm CSR BC04	Qualcomm CSR BC04	NORDIC SEMICONDUCTOR Nordic nRF52832
Wireless Standards	Bluetooth 2.0	Bluetooth 2.1	Bluetooth 2.0 / 2.1 + EDR	BT5 + NFC
Type (Flash/RAM)	SMT PCB	SMT PCB	SMT PCB	SMT with onboard MCU (ARM Cortex M4F, 512k/64k)
Size (mm)	28.71 x 15.29 x 3	28.71 x 15.29 x 3	12.5 x 22 x 3.4 (BTM411/431/441/443)	14 x 10 x 2.1
Antenna Options	Integrated or external via U.FL	Integrated or external via U.FL	Integrated Antenna	Internal Antenna OR External via IPEX MHF4
Data/Control	UART, GPIO, ADC	UART, GPIO, ADC	UART (host interface) GPIO (user interface)	UART, GPIO, ADC, PWM, FREQ output, I²C, SPI
Tx Power (dBm)	Up to +18 dBm	Up to +18 dBm	Up to +4 dBm	-40 to +4
Rx Sensitivity (dBm)	-87 dBm	-87 dBm	Better than -84 dBm	-96 dBm typ.
Temp Range	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
Software/Firmware	AT Command Set, Multipoint Protocol API	AT Command Set, Multipoint Protocol API	AT Command Set, Multipoint Protocol API	AT Command Set, *smart*BASIC OR use Nordic SDK, Zephyr
Profiles / Services Supported	SPP, DUN, FTP Client, HFP, Partial HSP	SPP, HID, HDP	On-module support for SPP, HID, HDP	Any available via *smart*BASIC/Nordic SDK/Zephyr
Additional Features	Firmware support for multi-point applications (up to 3 bidirectional simultaneous connections). Up to 1km range.	Firmware support for multi-point applications (up to 7 bidirectional simultaneous connections) Up to 1km range.	Bluetooth 2.1 + EDR includes support for secure simple pairing	NFC
Certifications	FCC, IC, CE, UKCA, Bluetooth SIG	FCC, IC, CE, UKCA, Bluetooth SIG	FCC, IC, CE, UKCA, Bluetooth SIG	FCC, IC, ETSI, Giteki, KCC, RCM, Bluetooth SIG

System-on-Modules (SOMs)

Laird Connectivity embedded system-on-module (SOM) development platforms deliver highly scalable embedded processing solutions with 802.11a/b/g/n/ac and Bluetooth wireless. Built on the latest processors and wireless, and utilizing our long term software support, our SOM solutions give developers a secure, smart, connected IoT platform for deployment in the most demanding applications.

Modules not actual size.

	Tungsten700 SMARC (Coming Soon)	Nitrogen93 SMARC (Coming Soon)	Nitrogen8M Plus SMARC	Nitrogen8M Plus
Processor	MEDIATEK	NXP	NXP	NXP
	MediaTek Genio 700	i.MX 93	i.MX 8M Plus	i.MX 8M Plus
MPU	2x Cortex-A78 @ 2.2 GHz 6x Cortex-A55 @ 2.0 GHz	2x Cortex-A55 @ up to 1.7 GHz	4x Cortex®-A53 @ up to 1.8 GHz	4x Cortex®-A53 @ up to 1.8 GHz
MCU	N/A	1x Cortex®-M33 core @ 250 MHz	1x Cortex®-M7 core @ 800 MHz	1x Cortex®-M7 core @ 800 MHz
Wireless Onboard	Sona MT320: Wi-Fi 6, Bluetooth 5.3	Sona NX611: Wi-Fi 6, Bluetooth 5.3	LWB5+: Wi-Fi 5, BT 5.2	Wi-Fi 5, BT 5 (standard)
RAM	4GB or 8 GB LPDDR4	2GB LPDDR4	2GB or 4GB LPDDR4 Up to 8GB (MOQ required)	2GB or 4GB LPDDR4
Storage	16GB	16GB	16GB	16GB
Display	MIPI-DSI, LVDS	MIPI-DSI, LVDS	MIPI-DSI, HDMI, LVDS	MIPI-DSI, HDMI, LVDS
Camera	1xMIPI-CSI	1x MIPI-CSI	2x MIPI-CSI	2x MIPI-CSI
Co-Processors	3D GPU, NPU	2D GPU, NPU	3D/2D GPU, VPU, NPU, Audio	3D/2D GPU, VPU, NPU, Audio
Audio	2x I2S	2x 12S	2x 12S	Input/Output
Form Factor	SMARC	SMARC	SMARC	Board to Board
Additional Interfaces	1x PCI3, 2x USB3/USB2, 3x USB2, CAN? 1x SDIO/eMMC, I2C, SPI, UART, GPIO	2x USB 2, 2x GbE, 2x CAN/CAN FD 1x SDIO/eMMC 12C, SPI, UART, GPIO	1x PCIe, 2x USB3/USB2, 2x USB2, 2x GbE, 2x CAN/CAN FD 1x SDIO/eMMC 12C, SPI, UART, GPIO	1x PCIe, 2x USB3/USB2, 2x GbE, 2x CAN/CAN FD 1x SDIO/eMMC 12C, SPI, UART, GPIO
Size	82 x 50 mm	82 x 50 mm	82 x 50 mm	48 x 38 mm
Operating Temperature	0 to +70 °C -40 to +85 °C (coming soon)	0 to +70 °C OR -40 to +85 °C	0 to +70 °C OR -40 to +85 °C	0 to +70 °C OR -40 to +85 °C

System-on-Modules (SOMs)

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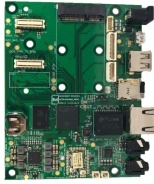
Modules not actual size.

	Summit SOM 8M Plus	Nitrogen8M	Nitrogen8M Mini	60 Series SOM
Processor	NXP	NXP	NXP	MICROCHIP
	i.MX 8M Plus	i.MX 8M	i.MX 8M Mini	SAMA5D36
MPU	4x Cortex®-A53 cores @ 1.6 GHz	4x Cortex®-A53 @ up to 2.0 GHz	4x Cortex®-A53 @ up to 1.8 GHz	1x Cortex®-A5 @ 536 MHz
MCU	1x Cortex®-M7 core @ 800 MHz	Cortex-M4 @ 266 MHz	1x Cortex®-M4 @ 400 MHz	N/A
Wireless Onboard	Wi-Fi 5, BT 5.3 (NXP 88W8997)	N/A	N/A	Wi-Fi 5, BT 5.1 (NXP 88W8997)
RAM	512MB, 1GB, 2GB, 4GB	2GB or 4GB LPDDR4	2GB or 4GB LPDDR4	128 MB or 256 MB LPDDR2
Storage	8GB, 16GB, or 32GB	16GB or 128GB	8GB, 16GB, 32GB, or 128GB	256 MB or 512 MB
Display	MIPI-DSI, HDMI, LVDS	MIPI-DSI, HDMI	MIPI-DSI	Parallel
Camera	2x MIPI-CSI	2x MIPI-CSI	MIPI-CSI	Parallel
Co-Processors	3D/2D GPU, VPU, NPU, Audio	3D/2D GPU, VPU	3D/2D GPU, VPU	2D GPU
Audio	SPDIF in/out, 6x SAI, 8 channel PDM	Input/Output	Input/Output	2x SSC
Form Factor	SMT	Edge connector	Edge connector	SMT
Additional Interfaces	2x USB3/USB2, 2x GbE 2x CAN/CAN FD, 1x SDIO/eMMC 12C, SPI, UART, GPIO	2x PCIe, 2x USB3/USB2, 1x GbE, I2C, SPI, UART, GPIO	1x PCIe, 2x USB2, 1x GbE, 1x SDIO/eMMC, 12C, SPI, UART, GPIO	3x USB2 2x Ethernet, 1x CAN, 1x SD/MMC 12C, SPI, UART
Size	40 x 47 mm	67.6 x 48.4 mm	69.6 x 40 mm	30 x 30 mm
Operating Temperature	-30 to +85 °C	0 to +70 °C OR -40 to +85 °C	0 to +70 °C OR -40 to +85 °C	-30 to +85 °C

SMARC Carrier & SBCs

Carrier Development Boards and Single Board Computers from Laird Connectivity provide the host platform for your device. Providing many external interfaces, including data, audio/video, camera, wired and wireless networking, power supply connectors and more, SBCs and Carriers provide the complete platform for your embedded design.

Modules not actual size.

	SMARC Carrier	**SBCs**		**SBCs**	
	New: Universal SMARC Carrier	**Nitrogen 8M Mini SBC**		**Nitrogen 8M SBC**	**Nitrogen6 MAX**
Chipset	Chipset onboard SMARC SOM	NXP i.MX 8M Mini		NXP i.MX 8M Quad Core	NXP i.MX 6
MPU	MPU onboard SMARC SOM	4x Cortex®-A53 @ up to 1.8 GHz		4x Cortex®-A53 @ up to 1.5 GHz	Up to 4x Cortex®-A9 @ up to 1 GHz
MCU	MCU onboard SMARC SOM	1x Cortex®-M4 @ 400 MHz		Cortex®-M4F @ 266 MHz	N/A
Wireless Protocol	Wireless onboard SMARC SOM	Wi-Fi 5 / Bluetooth 5.0		Wi-Fi 5 / Bluetooth 5.0	Wi-Fi 5 / Bluetooth 5.0
Interfaces	x2 4-lane MIPI display, 2 x 4-lane MIPI camera, x2 GB Ethernet, PCIe, USB 3.0/2.0, Stereo Audio (headphone/speaker) I2C, SPI, CAN, GPIO	4-lane MIPI display, 4-lane MIPI camera, GB Ethernet, Optional PoE, PCIe, USB 2.0, Stereo audio (headphone/speaker), 12C, SPI, GPIO		4-lane MIPI display, 2x 4-lane MIPI camera, HDMI 2.0, GB Ethernet, 2x PCIe, 4x USB 3.0, Stereo audio (headphone/speaker), 12C, SPI, GPIO	MIPI camera, 4x display (PRGB, 2x LVDS, HDMI), GB Ethernet, 1x PCIe, 3x USB 2.0, Stereo audio (headphone/speaker), 12C, SPI, GPIO, 2x RS232
Size (mm)	168 x 87 mm	114.3 x 88.9 mm		87 x 136.7 mm	136.7 x 87 mm
Operating Temperature	0 to +70 °C	0 to +70 °C (-40 to +85 optional)		0 to +70 °C (-40 to +85 optional)	0 to +70 °C

Internal Antennas

Laird Connectivity offers the most innovative portfolio of cost-effective internal antenna solutions that provide unmatched connectivity for your wireless IoT devices. Whether for Wi-Fi/Bluetooth or Multiband/Cellular IoT applications, the small size and form factor of Laird Connectivity antennas make them easily concealable within a product's enclosure, eliminating any negative impact on product aesthetics.

Most antennas available at 80, 100, and 120mm cable lengths with MHF1/U.FL, MHF4L, and other connectors. Additional connectors and cable lengths available on request.

RF Requirements

Technology	Family Name	Operating Freq.	Unique Advantage	Dimensions (mm)	VSWR	Peak Gain	Average Gain	Efficiency, %	Image
Wi-Fi, Bluetooth, 802.15.4	FlexPIFA Single Band	2.4 GHz	Industry-first patented, flexible, adhesive-backed PIFA-style antenna with single, dual, and 6E solutions.	11 x 40.1 x 2.5	< 2.0:1	2.0	> -1.5	--	
	FlexPIFA Dual Band	2.4/5 GHz		12.7 x 38.6 x 2.5	<2.5:1, <3.0:1	2.5, 3.0	>-2.5, >-3.4	--	
	FlexPIFA 6E	2.4/5/6 GHz		16 x 36 x 2.5	<2.5:1, <3.0:1, <3.0:1	2.2, 3.9, 3.8	--	59, 60, 60	
	i-FlexPIFA Single Band	2.4 GHz	Inverted FlexPIFA, radiates in the diredtion of the adhesive for mounting inside top of product enclosures	2.9 x 11 x 40.9	<2.5:1	3.1	--	--	
	FlexMIMO	2.4/5 GHz	The world's first and only MIMO PIFA antenna in dual-band and Wi-Fi 6E.	33.25 x 33.25 x 4.44	<2.3:1	2.0, 3.0	1.7, 2.5	--	
	FlexMIMO 6E	2.4/5/6 GHz		39.5 x 39.5 x 4.7	<2.5:1	2.2, 3.8, 3.3	--	64.7, 62.3, 52.2	
	mFlexPIFA, peel-and-stick on metal	2.4 GHz	Industry-first patented, flexible, adhesive-backed PIFA-style Antenna optimized for placement on metal.	25.4 x 23.4 x 2.5	< 3.0:1	2.0	> -4.2 dBi	--	
		2.4/5 GHz		29.5 x 26.5 x 2.6	<2.5:1, < 3.0:1	2.0, 5.8	1.9 dBi, 5.2 dBi	--	
	Mini NanoBlade Flex	2.4/5 GHz	Flexible omnidirectional PCB Mini NanoBlade with Wi-Fi 6E offering. Excellent efficiency for size.	12 x 36 x 0.1	<2.0:1	--	2.8, 3.4	68, 59	
	Mini NanoBlade Flex 6E	2.4/5/6 GHz		12 x 36 x 0.3	<2.0:1	2.4, 4.4, 5.2	2.0, 3.5, 4.6	68, 76, 74	
	Mini NanoBlade	2.4/5 GHz	Dual-band, vertically-polarized flexible omni antenna PCB at a smaller size than the Nanoblade.	12.1 x 36.1	<2.0:1	2.5, 4.8	2.25, 3.65	--	
	NanoBlue	2.4 GHz	Patented Microsphere PCB technology. Integrated ground plane.	12.7 x 44.45 x 0.81	<2.5:1	--	2	--	
	NanoBlade	2.4/5 GHz	Dual-band, 0.1mm thick, for wearable, thin devices. Easy integration.	50.8 x 1.65 x 0.1	(2:1)	--	2, 3.9, 4	--	
	FlexNotch	2.4 GHz	The only adhesive-backed, flexible notch antenna that can be custom-trimmed for maximum range within your enclosure.	21.1 x 32	<2.5:1	2.0	> -1.6	--	
ISM, 868/915 MHz, 2G/3G	Revie Prime (PCB)	824-960 1710-2170	Dual Band ISM; Axial cable.	20 x 70 x 0.8	3.0:1, 2.5:1	--	2.2, 3.8	55, 69	
	FlexPIFA 868/915	863-870 902-928	Sub-GHZ flexible PIFA antenna for applications like LoRaWAN.	40 x 88 x 6.2	<2.5:1	-1.1 (868 MHz) -0.3 (915 MHz)	--	--	
	i-FlexPIFA 868/915	863-870 902-928	Inverted flexible FlexPIFA antenna for LoRaWAN. Radiates on the adhesive side for mounting inside top of product enclosures.	40 x 88 x 6.2	<2.5:1	-0.4 (868 MHz) +1.9 (915 MHz)	--	--	
LTE, Cat M1, NB-IoT, 5G (2G, 3G, 4G)	Revie 700 (Flex)	698-6000	96 mm long antenna for 5G sub-6GHz devices.	21 x 96 x 0.2	2.5, 2.5, 2.0, 2.5	--	--	51, 80	
	Revie 600 (Flex)	600-5925	Powerful, full-spectrum antenna to support global cellular network operators' 5G networks. Some of the highest efficiencies in the market.	30 x 130 x 0.3	2.5, 2.0, 2.0, 2.2	4.3, 3.4, 3.3, 6.0	--	62, 82, 85, 74	
	Base Revie(Flex)	698-875, 1710-2500	Built specifically to support LTE-M and NB-IoT.	20 x 90 x 0.16	2.5:1	1.9, 3.7	--	51, 80	

IoT Devices

Laird Connectivity's IoT Devices extend our industry-leading wireless expertise to off-the-shelf sensors and gateways. Our solutions help customers quickly, reliably, and securely deploy industrial, medical, or smart building IoT applications. Choose from a variety of battery-powered, wireless, environmental, or probe sensors using LoRaWAN or Bluetooth 5, and keep control of your data from sensor to cloud with our gateways' native integrations to your cloud platform, including AWS, Azure, The Things Network, Actility, and others.

Bluetooth Gateways

Bluetooth Sensors

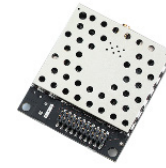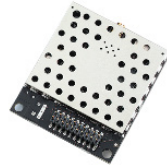|	Sentrius™ IG60-BL654 / IG60-BL654-LTE	MG100 Micro Gateway	Sentrius™ BT610 I/O Sensor	Sentrius™ BT510 Sensor	Sentrius™ BT7x0 Tracker
Chipset	NORDIC SEMICONDUCTOR nRF52840, Microchip SAMA5D36 Cortex, Marvell 88W8997/88PG823, (LTE version: Gemalto PLS62-W)	NORDIC SEMICONDUCTOR nRF52840, Sierra Wireless HL7800, Cortex-M4F Microcontroller	NORDIC SEMICONDUCTOR nRF52840	NORDIC SEMICONDUCTOR nRF52840	NORDIC SEMICONDUCTOR nRF52833
Wireless Protocol	Wi-Fi + BT5 (dedicated co-processor) LTE Available (IG60-BL654-LTE)	LTE-M, Bluetooth LE, NFC	Bluetooth 5	Bluetooth 5	Bluetooth 5
Sensor Type	—	—	Generic I/O + Temp, AC Current, Ultrasonic, Pressure (via ext. assemblies)	Temp, Acceleration, Proximity, Magnetic Reed Switch	Proximity to other BT7x0 with TruePoint Diversity Antenna System (TDAS)
Size (mm)	85 x 22 x 100	110.28 x 99.16 x 35.32	126.5 x 81.5 x 40	80 x 51 x 19	46 x 62 x 20
Operating Temperature Range	-30° to +85°C (-22° to +185° F)	-40° to +80°C	-40°C to +85°C (ext. probe supports -40°C to +125°C)	-20 to 60°C (w/ alternate battery supports -40 to 85°C)	-10° to +60°C
Software	Laird Linux, AWS IoT Greengrass, Smartphone app	Open Development Device based on nRF Connect SDK / Zephyr RTOS SDK for custom application development	Open development for custom applications with Nordic SDK / Zephyr RTOS	Open development for custom applications with board reference for Zephyr RTOS	Smartphone app for config and monitoring
Certifications	FCC, IC, CE, UL/IEC62368	FCC, ISED, CE, PTCRB, GCF, AT&T	FCC, IC, CE and RCM, MIC and BT SIG	FCC, IC, CE, MIC, RCM, BT SIG	FCC, ISED, CE (pending)

IoT Devices

Laird Connectivity's IoT Devices extend our industry-leading wireless expertise to off-the-shelf sensors and gateways. Our solutions help customers quickly, reliably, and securely deploy industrial, medical, or smart building IoT applications. Choose from a variety of battery-powered, wireless, environmental, or probe sensors using LoRaWAN or Bluetooth 5, and keep control of your data from sensor to cloud with our gateways' native integrations to your cloud platform, including AWS, Azure, The Things Network, Actility, and others.

	LoRaWAN Gateway	**LoRaWAN Sensors**	**LoRaWAN Sensors**		
	Sentrius™ RG1xx Gateway and RG191 + LTE (US only)	**Sentrius™ RS1xx Temp Sensor**	**Sentrius™ RS1xx and External Temp Probe**	**Sentrius™ RS1xx and RTD Temp Probe**	**Sentrius™ RS1xx and Open/ Close Sensor**
Chipset	SEMTECH Sx1301/1257, CSR8811, QCA6004 (LTE version: Quectel EG91-NA)	SEMTECH Sx1272 Nordic nRF51822	SEMTECH Sx1272 Nordic nRF51822	SEMTECH Sx1272 Nordic nRF51822	SEMTECH Sx1272 Nordic nRF51822
Wireless Protocol	LoRaWAN + BT/BLE + Wi-Fi (Optional LTE Cat 1, US only)	LoRaWAN	LoRaWAN	LoRaWAN	LoRaWAN
Sensor Type	—	Integrated Temperature & Humidity	Temperature (via external temp probe)	Temperature (via RTD Temp Probe)	Door Open/Closed (via external assembly)
Size (mm)	133 x 275 x 30	116 x 91 x 34	116 x 91 x 34	116 x 91 x 34	116 x 91 x 34
Operating Temperature Range	-30° to +70°C	-25° to +50°C	-25° to +50°C (ext. probe supports -55 to +125°C)	-25° to +50°C (ext. probe supports -40 to +180°C)	-25° to +50°C
Software	Onboard configuration and management software	Smartphone app for config and monitoring	Smartphone app for config and monitoring	Smartphone app for config and monitoring	Smartphone app for config and monitoring
Certifications	FCC, IC, CE, ASNZS, NCC	FCC, IC, CE, ASNZS, NCC, and BT SIG	FCC, IC, CE, ASNZS, NCC, and BT SIG	FCC, IC, CE, ASNZS, NCC, and BT SIG	FCC, IC, CE, ASNZS, NCC, and BT SIG

RAMP

Range Amplified MultiPoint (RAMPTM) modules provide the perfect solution for machine-to-machine (M2M) applications where the need is to transmit serial data or sensor data over long distances, wirelessly, with the highest degree of reliability. RAMP modules utilize FHSS technology to provide immunity to interference and multipath in industrial applications. They are capable of operating in a point-to-point or point-to-multipoint network and can support a virtually unlimited number of nodes in a network.

Laird™ CONNECTIVITY

Modules not actual size.

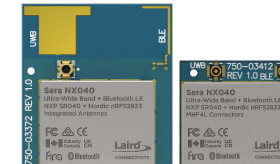|	RM024	AC4490	AC4790	LT1110
Chipset	TI CC2510	TI CC1010	TI CC1010	TI CC1110
Technology	FHSS	FHSS	FHSS	FHSS
Protocol	Server/Client (P2P & P2MP)	Server/Client (P2P & P2MP)	Masterless (P2P & P2MP)	Server/Client (P2P & P2MP)
Physical Interface	SMT or Pluggable	Pluggable	Pluggable	Pluggable
Frequency	2.4 GHz	915 MHz	915 MHz	915 MHz
Range (Line of Sight)	Up to 4 km (US) Up to 1 km (EU)	Up to 5 km (-200 version) Up to 30 km (-1000 version) *via optional high-gain antenna	Up to 5 km (-200 version) Up to 30 km (-1000 version) *limited by masterless protocol	Up to 5 km *via 2 dBi antenna
Size	25.4 x 39 x 3.6 mm (min)	49 x 42 x 5 mm	49 x 42 x 5 mm	25 x 30 x 4 mm
RF Rate	280 kbps/500 kbps	76.8 kbps	76.8 kbps	230 kbps/500 kbps
Output Power	Up to 21 dBm (US) 10 dBm (EU)	Up to 23 dBm (-200 version) Up to 30 dBm (-1000 version)	Up to 23 dBm (-200 version) Up to 30 dBm (-1000 version)	Up to 23 dBm
Receiver Sensitivity	500 kbps -88 dBm 280 kbps -92 dBm FEC 500 kbps -91 dBm FEC 280 kbps -95 dBm	AC4490-1000:-100 dBm AC4490LR-1000: -110 dBm	AC4790-1000: -100 dBm AC4790LR-1000: -110 dBm	-89 dBm
Temp. Range (Operational)	-40° to +85°C	-40 to +80°C	-40 to +80°C	-40 to +80°C
Software	Laird Config and Test Utility	Laird Config and Test Utility	Laird Config and Test Utility	Laird Config and Test Utility
Certifications	FCC, IC, RCM* (125 mW) CE, MIC, KC, NCC, UKCA, RCM* (10 mW)	FCC, IC, RCM*	FCC, IC, RCM*	FCC, IC
Interface Buffer	N/A	256 bytes	256 bytes	N/A
Supply Voltage	2.3-3.6 V ± 50 mV ripple	200 Variant: VCC: 3.3 – 5.5 V, ±50 mV VPA: 3.3 – 5.5 V, ±50 mV 1000 Variant VCC: 3.3 – 5.5 V ±50 mV VPA: 3.3 ±3%, ±100 mV	200 Variant: VCC: 3.3 – 5.5 V, ±50 mV VPA: 3.3 – 5.5 V, ±50 mV 1000 Variant VCC: 3.3 – 5.5 V ±50 mV VPA: 3.3 ±3%, ±100 mV	2.0-3.6 VDC Logic level matches supply voltage

LoRaWAN

Our growing LoRaWAN ecosystem leverages years of RF expertise to enable secure, low-power, long-range IoT sensor and gateway deployment easily using LoRaWAN technology. The LoRaWAN protocol targets key IoT requirements such as bi-directional communication, end-to-end security, mobility, and localization services. Our portfolio of LoRaWAN solutions delivers high performance with unparalleled design flexibility.

Ultra-Wideband (UWB)

Our line up of innovative new UWB modules seamlessly integrate cutting edge UWB silicon from NXP, with the processing and Bluetooth LE capabilities of Nordic Semiconductor's nRF52 SoC. The combination of the two enables significant advancements in granularity of location that improves existing Bluetooth LE beaconing and RSSI-based ranging. They're optimised for battery-powered implementations and integrate additional memory, crystals and components to simplify your overall BOM and drive down the cost of integration.

Modules not actual size.

	New: RM126x Series
Chipset	Silicon Labs EFR32 SOC Semtech SX126x radio
Technology	LoRaWAN
Protocol	LoRaWAN A/B/C / LoRa P2P
Physical Interface	SMT
Frequency	RM1262: 902-928 MHz RM1261: 863-870 MHz
Range (Line of Sight)	Up to 15km
Size	14 x 13 x 2.5
RF Rate	LoRa: 125/250/500kHz, FSK 50kbps
Output Power	RM1262 – Up to 22dBm RM1261 – Up to 14dBm
Receiver Sensitivity	-125.6 dBm (SF7, 125kHz, 903.0MHz) -139.2 dBm (SF12, 125kHz, 863.1MHz) -122.7 dBm (SF7, 250kHz, 869.9MHz) -130.8 dBm (SF12, 500kHz, 923.3MHz)
Temp. Range (Operational)	-40° to +85°C
Software	AT Command Set or Simplicity Studio
Certifications	RM1262: FCC, ISED, AS/NZS RM1261: EU, UKCA, NCC, MIC, IN
Interface Buffer	N/A
Supply Voltage	2V-3.6V (Nominal 3.3V)

Sera NX040 (Coming Soon)	
NXP – Trimension™ SR040 Nordic Semiconductor – nRF52833	Chipset
Ultra-Wideband Bluetooth LE 5.4 NFC	Technology
UWB: Channel 5 (6.4896GHz) and 9 (7.9872 GHz) Bluetooth LE: 2.4 GHz NFC: 13.56 MHz	Frequency
Hosted or Hostless	System Architecture
Integrated Antenna External vis 2x MHF4L Connector	Antenna Options
UWB: Up to +10 dBm BLE: Up to +8 dBm	Transmit Power (Max)
UART, USB, GPIO, ADC, PWM, SPI, I2C	Interfaces - General
512 kB Flash / 128 kB RAM	Memory
-40 to +85 °C (-40 to +185° F)	Operating Temp (°C)
Python-based scripting engine, AT Command Set, or nRF Connect SDK. Mobile app for configuration and data view	Software
1.6 to 3.6 V	Voltage
FCC, EU, UKCA, ISED, RCM, MIC, KCC Bluetooth SIG, FiRa Consortium	Certifications

To learn more, visit **lairdconnect.com/lorawan-modules** or contact us at **lairdconnect.com/contact**

To learn more, visit **lairdconnect.com/uwb** or contact us at **lairdconnect.com/contact**

CANVAS™
DEVICE MANAGER

Remote Device Management Platform

Introducing Canvas™ Device Manager, powered by EdgeIQ, our device management platform that simplifies workflows for configuration and maintenance of IoT device deployments. Easily setup your devices, monitor performance, and keep software up-to-date across your entire IoT device fleet.
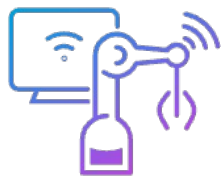
Why You Need Device Management

Control your devices

Remotely manage device parameters and monitor performance, keeping your IoT-driven services and revenue streams online.

Deliver end-to-end solutions

View and organize large numbers of devices to quickly build and maintain IoT solutions for your enterprise customers.

Cut the cost of ownership

Reduce time-to-market with pre-provisioned devices, remotely apply software updates and rapidly scale up your solutions.

SUMMIT SUITE
SECURITY SOLUTIONS

Secure Connectivity

Enterprise-grade Wi-Fi software suite that uses includes industry standard WPA2-Enterprise and TLS 1.2 and next generation WPA3-Enterprise and TL 1.3.

FIPS Cryptographic Modules

FIPS 140-2 Level 1 Validated software and hardware with a roadmap to FIPS 140-3 Level 1. Enable Wi-Fi communications, provide end-to-end TLS data-in-transit, and data-at-rest.

Chain of Trust

Verify device and software authenticity from bootloader to user applications. Leverage hardware root of trust, device encryption, and secure key storage.

Software Vulnerability Monitoring and Remediation

Monitor for vulnerabilities in the software packages your devices use. Detect, assess, and remediate vulnerabilities via regular CVE scanning and updated software releases.

At every step of your design, we can help.

Antennas

We solve complex antenna challenges.

- Antenna selection
- Antenna placement
- Tuning and matching
- Custom antenna design

Industrial Design

Designers that care about UX creating innovative solutions.

- Design research and strategy
- Industrial design
- User interface design
- Prototyping
- Mechanical engineering

Hardware

Full hardware, BOM, and specialized IC design for manufacture.

- CB design and layout
- Component replacements
- Hardware reviews
- Specialized circuitry
- Design-for-manufacture

EMC Compliance

A full-compliance solutions provider, all under one roof.

- 2 Semi-anechoic chambers
- Automated antenna chamber
- Accredited to ISO / IEC 17025
- On-site FCC/ISED/CE/Japan/RCM certifications
- EMC, medical, and intentional radiator specialists

Embedded Software

Comprehensive software solutions from device to cloud.

- Embedded firmware development
- Cloud architecture development
- Connected product customization
- Mobile app development

Laird Connectivity has all the capabilities necessary to realize your IoT strategy. We are the leading IoT Solution provider offering modules, antennas, IoT devices, design services, and global certifications services – all under one roof. By working with a single partner, you will significantly accelerate your time to market, reduce risk, and minimize costs.

Learn more at www.lairdconnect.com/services