

# Wi-Fi 6, BLE 5 & 802.15.4 MCU Modules xPico® 610/620/670/690/691

PRELIMINARY



## HIGHLY-INTEGRATED IOT CONTROL & COMMUNICATIONS

The Lantronix® xPico® 600 M.2 Series low-power wireless microcontroller (MCU) modules integrate Wi-Fi 6 + Bluetooth Low Energy (Bluetooth LE/BLE) 5 + 802.15.4 radios into a small and highly-integrated embedded IoT gateway solution, allowing you to deliver and manage secure connected products with reduced complexity and risk.

### Turnkey Embedded Networking Solution

Designers can utilize the SDK for the xPico 600 Series to compile applications that leverage Lantronix's integrated secure connectivity network and cloud service enablement capabilities or completely offload IoT communications by leveraging the embedded microcontroller as a network coprocessor.

The modules deliver a complete network and IoT connectivity solution running on a low-power FreeRTOS® operating system. The robust networking stack includes production-ready essential IoT connectivity firmware, cloud-based management, and an integrated device security framework. TruPort serial technology supports transparent passthrough of hundreds of proprietary serial and standard Fieldbus protocols, and TruPort Socket technology enables complete control over multiple connections via TCP, UDP, or TLS. Configure and control the gateway operation from the host microcontroller side using command mode or the network side with Web Service APIs and XML configuration data.

### Secure Computing at the Edge

The xPico 600 M.2 Series (xPico 610/620/670/690/691) modules provide intelligent edge compute capabilities for low-latency systems:

- 260 MHz Arm® Cortex®-M33 core with TrustZone™-M
- 1.2 MB on-chip SRAM
- On-the-fly decryption engine with DMA support for securely accessing up to 8 MB PSRAM (xPico 690/691 only) and 32 MB of on-board execute-in-place (XIP) flash memory
- Secure boot, debug, firmware updates, and lifecycle management
- Hardware cryptography and Physically Unclonable Function (PUF) for secure key management
- Root of trust and credential management for secure authentication and connectivity

### Always-on Tri-Radio Connectivity

The xPico 600 M.2 Series modules deliver always-on connectivity for critical assets with 1x1 dual-band (2.4 GHz/5 GHz) 20 MHz enterprise Wi-Fi 6 (802.11ax), BLE 5.4 and IEEE 802.15.4-2015 compliant radio communication in the 2.4 GHz band†. The Wi-Fi 6 supports high-density use cases requiring higher throughput, better networking efficiency, lower latency, and improved range over previous generation Wi-Fi standards. Bluetooth LE or Thread over 802.15.4 can be utilized to aggregate sensor device data or communicate with peripherals and mobile devices. The BLE radio supports 2 Mbps high-speed data rate, long range, BLE audio and extended advertising. In addition, the software stack can support Matter applications running over Wi-Fi, Ethernet, or Thread to offer a common, interoperable application layer across ecosystems and products. The module can operate as a Matter controller as well as a Thread border router.

†See table on next page for details on different versions



### Device Management: We Built It So You Don't Have To

- Over-the-air updates
- Zero-touch provisioning
- Automated monitoring & notifications
- Custom dashboards

### Data & Application Management

Lantronix's on-premise or off-premise PercepXion® service enables you to scale by providing optional management of connection credentials, API-based web connectors, ready-to-use data lakes and pre-integrated analytics services to enable you to quickly capitalize on the value in your data.

### xPico® 601 SIP Key Benefits

-  Faster Time to Market
-  Industrial-grade Security
-  Always-on Connectivity
-  Highly Integrated

LANTRONIX®

	Compute SIP		Wireless MCU Modules			
Family	xPico 601 SIP	xPico 610	xPico 620	xPico 670	xPico 690	xPico 691
Form Factor	LGA, 20x21 mm	M.2 2230 Key E	M.2 2230 Key E	M.2 2230 Key E	M.2 2230 Key E	M.2 2230 Key E
Electrical	Proprietary	M.2 Key E	M.2 Key E	Proprietary	Proprietary	Proprietary
Functionality Notes	Additional configurable I/Os; ADC/DAC/LCD, external XIP flash	UART/I2C/USB 2.0/SDIO 3.0 & I2S/PCM per M.2 spec; No 802.15.4	UART/I2C/USB 2.0/SDIO 3.0 & I2S/PCM per M.2 spec; No 802.15.4	Adds IEEE 1588 RMII/Fast Ethernet interface; SPI master	Adds IEEE 1588 RMII/Fast Ethernet interface; SPI master; passive NFC	Adds IEEE 1588 RMII/Fast Ethernet interface; SPI master; passive NFC
RF Coexistence	WCI-2 / 5-pin PTA	None	WCI-2 / 3-pin PTA	WCI-2 / 5-pin PTA	WCI-2 / 5-pin PTA	WCI-2 / 5-pin PTA
Secure Element	No	No	No	No	SE051C2	SE052F2
PSRAM	External via Quad FlexSPI	No	No	No	8 MB	8 MB
U.FL Antennas	External	1	2	2	2	2

## Features and Specifications

### Wireless LAN

- 1x1, 20 MHz, 2.4 GHz / 5 GHz Wi-Fi 6 (IEEE 802.11 a/b/g/n/ac/ax)
- UL/DL OFDMA, 256 QAM (MCS9) with up to 114.7 Mbps peak
- Integrated power amplifier (PA), LNA, and T/R Switch
- Simultaneous AP and client (STA), AP only, client (STA) only modes
- Support for up to 5 simultaneous client connections to Soft AP interface
- Wi-Fi 6 Extended Range (ER) and Dual Carrier Modulation (DCM)
- Wi-Fi 6 Target Wake Time (TWT)
- WPA2/WPA3-Personal, WPA2-Enterprise, and WPA3-Enterprise Wi-Fi Security (WPA3 supported in both AP and STA mode)
- Matter over Wi-Fi

### Bluetooth LE and 802.15.4 Radio

- Integrated PA, LNA, Switch
- Bluetooth LE/BLE 5.4 Certified (xPico 620/670/690/691)
  - BLE 2 Mbps high-speed mode, long range (125/500 kbps) and advertising extensions
  - Support for Bluetooth LE Generic Access Profile (GAP), Generic Attribute Profile (GATT), Device ID Profile
  - Isochronous channels (ISOC) supporting BLE Audio with I2S and PCM audio protocol interface option
- IEEE 802.15.4-2020 radio at 2.4 GHz (xPico 670/690/691)
  - 802.15.4 with support for Thread and Zigbee
  - Matter over Thread protocol stack

### Wireless Features (not applicable to xPico 610)

- Dual U.FL antennas with either Wi-Fi + Bluetooth LE 5.3/802.15.4 or dual Wi-Fi antenna diversity configurations
- Advanced coexistence design for multi-radio arbitration (3 internal, 1 external) using a two-wire WCI-2 or (up to) five-wire PTA interface

### Ethernet (xPico 670/690/691)

- IEEE 802.3 10/100 Mbps Fast Ethernet MAC host interface (RMII)
- IEEE 1588 time-stamping protocol for precise time synchronization
- Bridge Ethernet to Wi-Fi STA or to Soft AP

### Data Communication

- TruPort® Serial Technology— TCP and UDP Server Mode, TCP and UDP Client Mode, Multi-host Connect; TLS Client and Server
- TruPort® Socket— Multi-host Client and Server Modes, HTTP(S), Sockets, TLS
- Authenticated SMTP Support— Send email directly from device
- Modbus TCP to Modbus RTU/ASC11 gateway

### Protocol Support

- DHCP Client, Server (Soft AP), HTTP Server/Client, MQTT Client
- IPv4, IPv6, TCP/IP, UDP/IP, ARP, ICMP, Auto-IP, DNS
- SNMP

## Security and Authentication

- InfiniShield™ Security Software
- Secure Boot, Secure Firmware-Over-the-Air (FOTA) Updates
- Secure Key Storage, Encrypted Configuration
- Secure Connections with SSL/TLS, HTTPS
- Software Controlled Network Service Ports Enable/Disable
- Role Based Access Control
- SSLv3/TLS 1.3 with PKI and X.509 Certificates (up to 4096-bit Keys)
- MCU chip security sensors monitor for fault detection
- Random number generators (TRNG/DRBG)
- Hardware encryption including AES 256-bit, 192-bit, 128-bit
- Various ECC and RSA encryption algorithms & additional key derivation functions for multilayered encryption (xPico 690/691 only)
- Secure element meets Common Criteria EAL6+ AVA\_VAN.5, IEC62443-4-2, and NIST SP800-90B, AIS31 (TRNG) and AIS20 (DRBG) compliance (xPico 690/691 only)
- FIPS-140-3 certified, level 3 OS and level 4 physical (xPico 691 only)

## Management Interfaces

- PercepXion™ Software Management Platform (optional)
- Lantronix Discovery Protocol (77FE)
- Serial Port, Internal Web Server (HTTP/HTTPS)
- XML Configuration and XML Status (CLI, API)
- Secure Firmware Upgrade via HTTP

## Certifications Pending

- Modular RF certification (US, Canada, EU/UKCA, Japan, Korea, Taiwan, Australia, New Zealand, Thailand, Hong Kong, Malaysia, Singapore, Brazil, UAE, Israel, South Africa, China, Chile, Colombia, Argentina) as well as RF certification in Mexico and India Approvals/Compliance: FCC, Industry Canada, EU (RED), AU/NZS, India, Taiwan, Mexico
- Wi-Fi Alliance Wi-Fi 6 Certified
- Safety: EN/IEC/UL 62368-1, EN 62311
- RoHS, REACH

## Ordering Information

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**Learn More About xPico 600 Series**  
For more information, go to [www.lantronix.com](http://www.lantronix.com)

