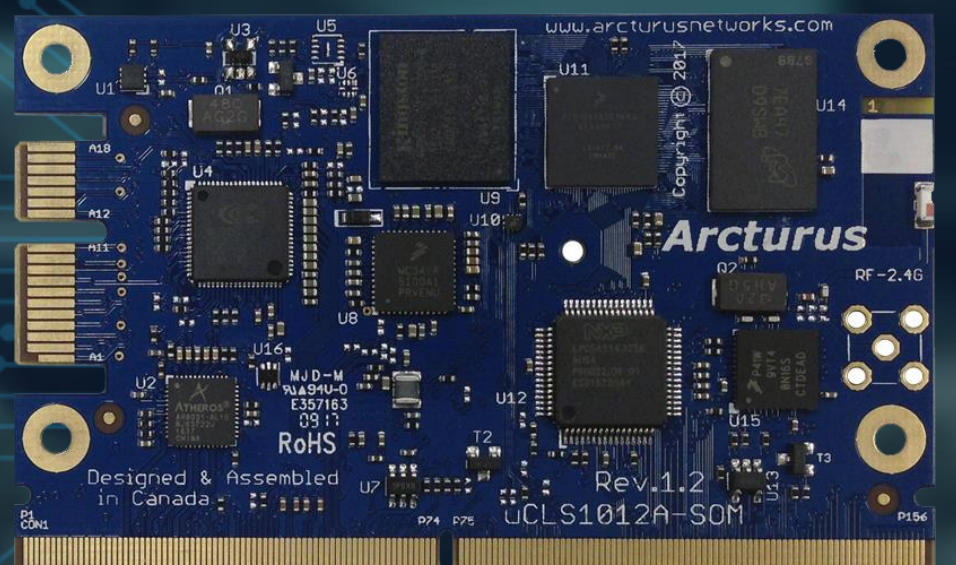


FACTSHEET

uCLS1012A-IoT

Edge IoT Devices and Gateways





OVERVIEW

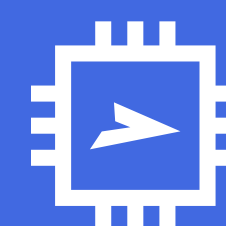
The uCLS1012A-IoT is a 82 x 50mm System-on-Module (SoM) for intelligent edge IoT devices and gateways. It uses an NXP QorIQ® LS1012A communications processor with a single 64-bit Arm® Cortex® -A53 core running at 800MHz. The LS1012A features dual Ethernet, USB3.0, packet processing and security accelerators. The CPU is Arm V8 compliant, making it fully supported by the Docker® ecosystem.

The uCLS1012A-IoT module implements LS1012A CPU, SPI NOR flash, DDR3-SDRAM, 2x 1Gb Ethernet, PCIe, USB 3.0, SDHC, SATA, I2C, SPI, UART, reset and power management functions. Optional controllers on-board the module support low-power BLE (PAN) and Thread® mesh (6LoWPAN) wireless networking, audio and up to 16x voltage tolerant general purpose I/O. The module integrates using a 314-pin SMARC (MXM3.0) compatible edge connector and requires minimal external circuitry for basic applications.

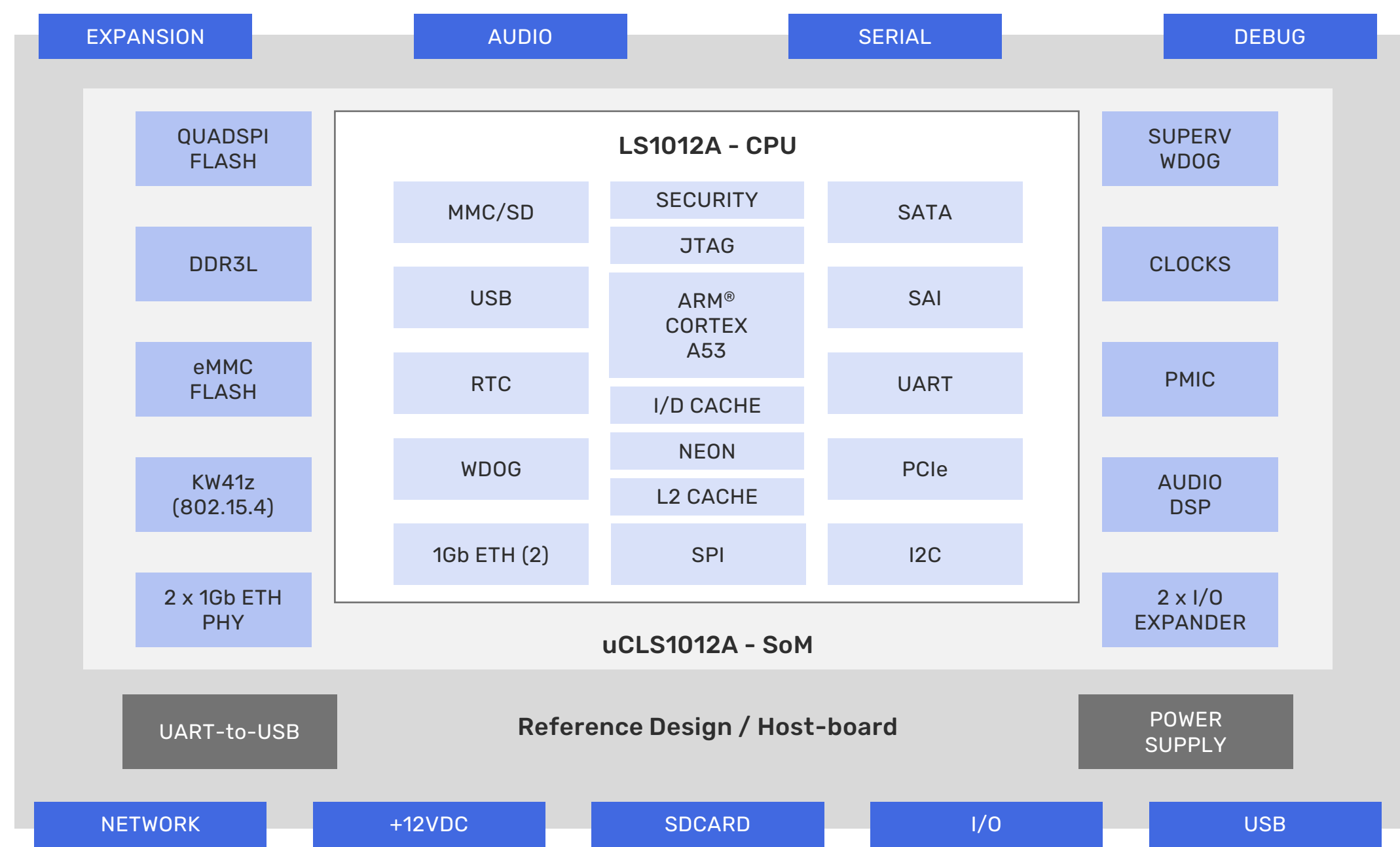
The uCLS1012A-IoT includes Mbarx™ Secure IoT software for secure management, OTA firmware updates and integration via a host protocol. A “call home” feature automatically originates a secure connection from the device to a predefined location, providing assured connectivity. For deeper integration, custom application code can be added using the Linux BSP and dedicated filesystem partition.

The uCLS1012A-IoT is available as a development kit or an OEM module. The development kit includes access to Linux OS and Mbarx secure IoT software. Additional gateway or SIPxstream voice/video communications software stacks are available along with engagement packages for support, customization and system solutions.

- ✓ 800MHZ, 64-BIT NXP LS1012A CPU
- ✓ ARM CORTEX-A53 CORE (ARMV8)
- ✓ OPTIONAL LOW POWER/MESH WIRELESS
- ✓ LINUX BSP / DOCKER SUPPORT
- ✓ MBARX SECURE IOT SOFTWARE



PLATFORM BLOCK DIAGRAM



SOFTWARE AND SOLUTIONS

Arcturus offers several levels of software, solutions and support, starting with a development kit for evaluation and enablement.

Development kit

A cost-effective development kit is available for evaluation of module hardware. The development kit includes access to a dedicated support site for documentation, Mbarx tools and Linux BSP download. Installation support is provided with the development kit.

Application Software Enablement

Arcturus provides specialized software including Mbarx Secure IoT endpoint or gateway stacks and SIPxstream hardened voice/video communications. Demos are available along with compile-time integration options for host applications, customization and support. Arcturus software is bundled easily with hardware and can be factory programmed to simplify production.

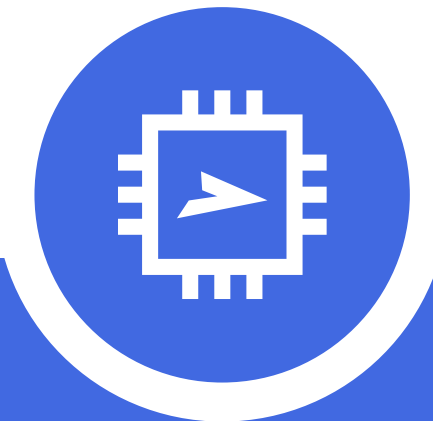
Mbarx Secure IoT Gateways

[Mbarx Site Controller](#) gateway stack is for the secure management of remote IoT sites. A demonstration of this capability is built into Mbarx System Manager tool, allowing secure management of devices at a remote Arcturus test lab. Mbarx components work with each other to form a system-level, end-to-end, chain-of-trust architecture for connected devices.

[Mbarx Operations Controller](#) gateway stack is for interactive workflow systems that require users, groups, notifications and device operational control. It is ideal for developing applications such as patient care systems or building access controllers. It supports workflow control of voice, video, SMS and provides interactive html5 presentation.

System Solutions

System Solutions engagements combine Arcturus hardware, software and expertise to create turn-key systems for OEMs. Packages are tailored to specific project needs and leverage a broad portfolio of software and tools.



FEATURES

CPU Complex

- NXP QorIQ LS1012A CPU
- 64-bit, 800MHz, Arm v8, Cortex-A53 core
- NEON co-processor and DP FPU
- 256 KB L2 cache with ECC

Memory

- 512MByte DDR3-SDRAM (up to 128GByte)
- 64 MByte Quad SPI NOR flash (up to 128MByte)
- 4 GByte eMMC Flash (up to 32GByte optional)

CPU Peripherals

- 2x 1Gb Ethernet (PHYs on module)
- PCI Express Gen2
- SATA Gen3
- USB 3.0
- SD 3.0/SDIO/eMMC
- SPI, UART, I2C, I2S,/SAI
- UART(Tx/Rx)
- Additional UART with RTS/CTS flow control*
- Additional 1xI2S**

I/O Expander (optional)

- Up to 2x NXP PCA9575 I/O expanders
- Up to 16x GPIO (flexible voltage range)

Wireless Peripheral Controller (optional)

NXP Kinetis KW41z microcontroller

- Integrated multiprotocol 2.4GHz radio
- Thread (6LoWPAN), IEEE 802.15.4 MAC/PHY
- Bluetooth Low Energy (BLE) v4.2
- Concurrent Thread and BLE operation
- Optional FSK and SMAC modes
- Ceramic or external antenna options
- 5x ADC, SPI, I2C, 5x GPIO

* module configuration without KW41zconnected

** module configuration without CX20703 connected

Audio Subsystem (optional)

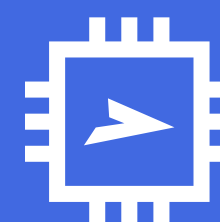
- Conexant CX20703 audio subsystem with DSP
- 16-bit PCM with 16KHz sample rates
- Audio intelligibility enhancements (AEC, AGC, noise reduction)
- Far-field mic, beam forming (optional)
- Line input (differential pair) – 1.0 Vrms (2.8Vp-p) @ 5-15 k Ω
- Line output – (differential pair) – 1.0 Vrms (2.8Vp-p) @ 5-15 k Ω
- Digital microphone input
- Optional digital I2S output
- Low-power mono class-D amp up to 1W (4/8 Ω)

Connectivity and Physical

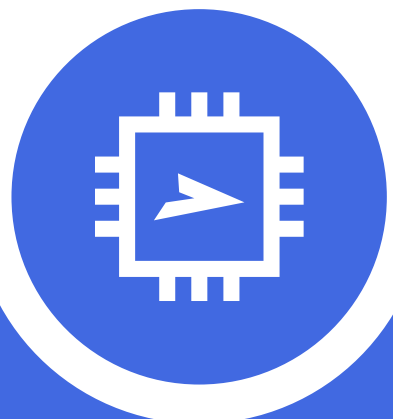
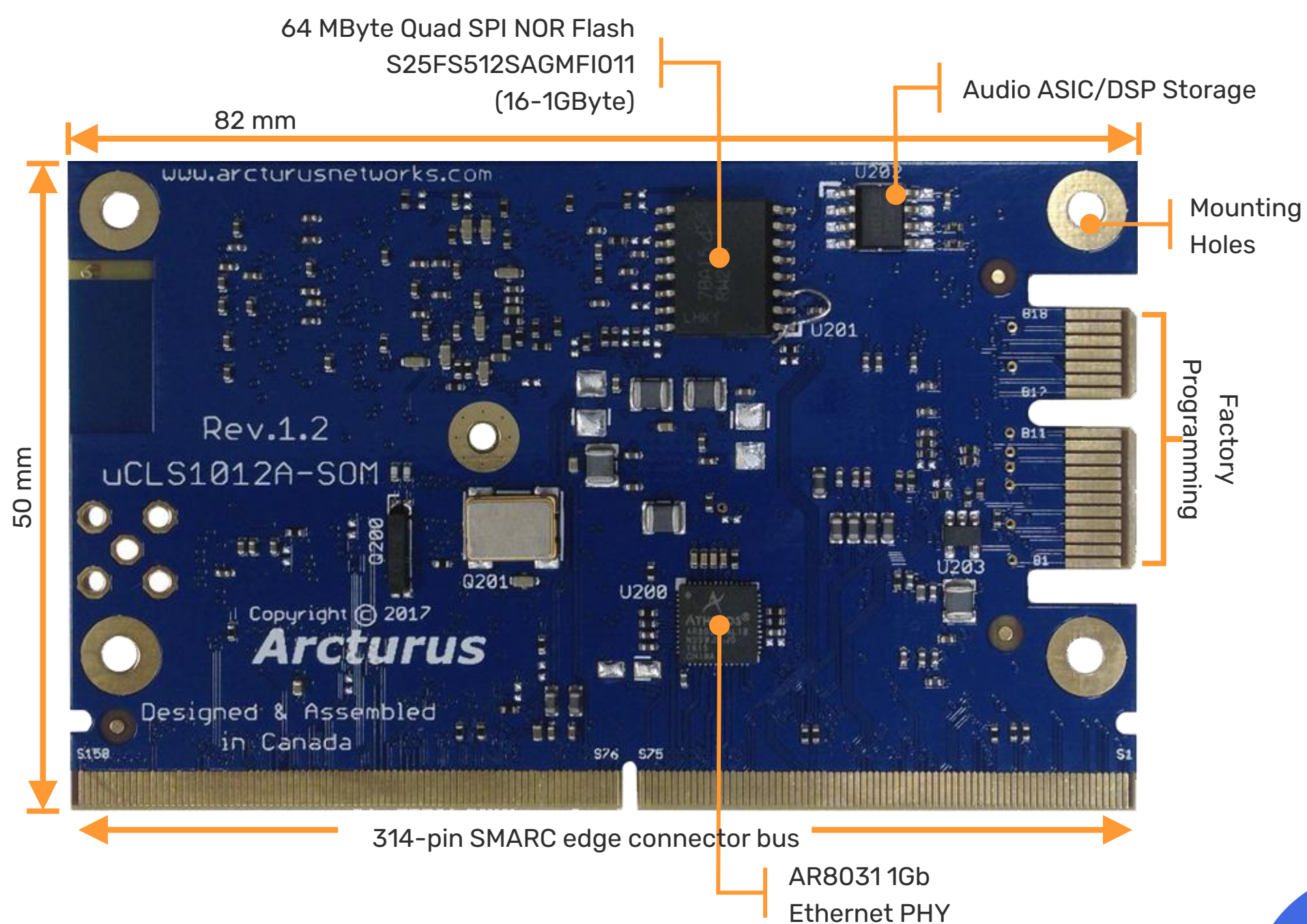
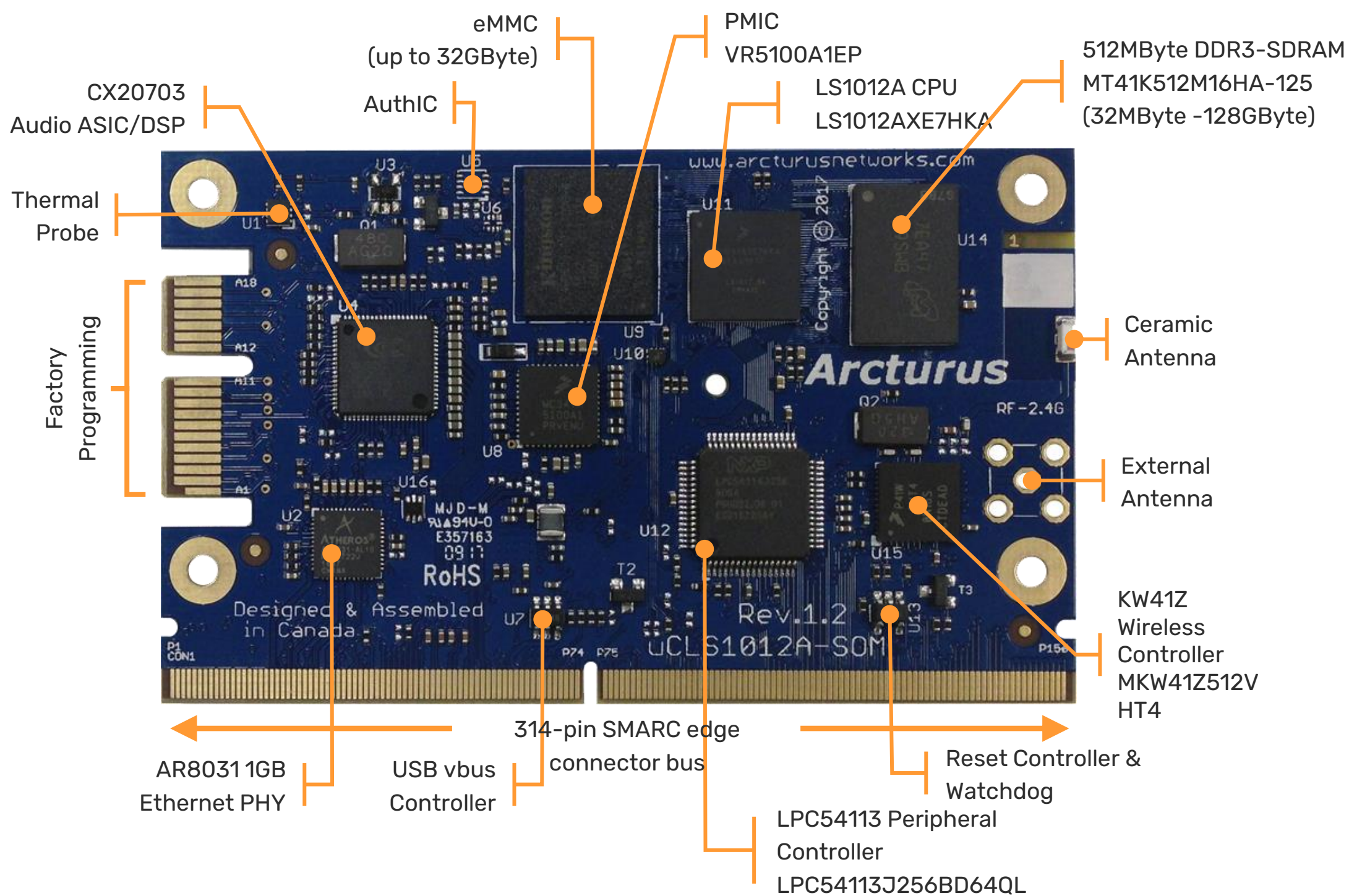
- 314-pin SMARC (MXM3.0) edge connector form-factor
- 82x50mm
- 3.3 VDC power input
- -40 to +105°C operating range (Tj)

Host Board and Reference

- 12VDC power supply input
- Board level power supply and connectors
- USB CONSOLE connector
- 2x RJ45 Ethernet connectors
- USB 3.0 hub with USB connectors
- mPCIe connector
- Digital and analog audio connectors
- Class-D audio power amp with speaker output
- 8x inputs (push buttons) and 8 outputs (LEDs)
- Isolation on dedicated I/O



CONNECTIVITY



Component	Connectivity	Alt Function	Note
LS1012A CPU			No
	I2C1	Serial or I/O	Shared with PMIC, CX20703 and Temp probe
	USB3	-	VBUS control provided, external VBUS power required
	SDHC1		Available when not used for on board eMMC or SDCARD
	GPIO	-	Dedicated factory reset
	SERDES	-	PCIe or SATA
	UART1 (console)	-	Tx and Rx only
	UART2	I/O	CTS and RTS flow control - connected to KW41z by default
	SPI (SDHC2)	I/O	Two chip selects available (CS_1, CS_2)
LPC54113 Peripheral Expander			
Host Interface	LS1012A - SPI (SDHC2, CS_0)	-	optional component
	2x UART	I2C, SPI, I2S, I/O	CTS / RTS flow control
	UART	I2C, SPI, I2S, I/O	Tx and Rx only
	I2C	UART, SPI, I2S, I/O	
	SPI	UART, I2C, I2S, I/O	
	8x Inputs	UART, I2S, SPI, I2C	
	8x Outputs	UART, I2S, SPI, I2C	
KW41Z Wireless Controller			
Host Interface	LS1012A - UART2	-	optional component
	802.15.4 Radio	-	
	Thread / BLE stack	-	additional software
	external antenna	-	SMA coaxial connector option
	onboard antenna	-	ceramic antenna option
	4x ADC	-	
	SPI	-	
	5x GPIO	-	
	I2C	-	

Component	Connectivity	Alt Function	Note
CX20703 Audio Subsystem			
Host Interface	LS1012A - SAI2, I2C1	-	optional component
	SPI Flash	-	Required by CX20703
	D-to-A / A-to-D	-	8 and 16 KHz sample rates
	1W low-power audio amplifier	-	Low power class-D
	digital audio in/out	-	I2S out, digital microphone in
	analog balanced audio in/out	-	
	audio intelligibility enhancements	-	AEC, noise reduction...
	GPIO	-	
ETH A Transceiver / Phy			
Host Interface	LS1012A - SGMIIA	-	Link, speed, activity LED outputs
ETH B Transceiver / Phy			
Host Interface	LS1012A - SGMIIIB	-	optional component link, speed, activity LED outputs

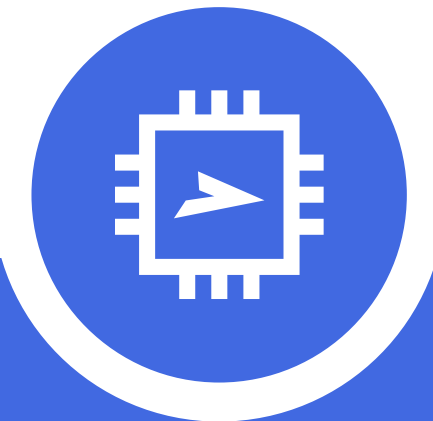
RATINGS AND PHYSICAL

Powered Direct	Specification
Supply voltage	3.3VDC (nominal)
Normal Operation	~8W
Operating Range	-40 to +105°C operating range (Tj)

Physical	Specification
Dimensions (Module)	82mm (l) x 50mm (w)
Recommended Mating Connector	314 pin 0.5mm pitch R/A memory socket style connector JAE Electronics - MM70-314 e.g.: MM70-314-310B1-2-R300

ORDERABLE PARTS

Part Number	Specification
uCLS1012A Development Kit	uCLS1012A Development Kit
uCLS1012A-IoT	uCLS1012A Module with 64MByte flash, 512MByte DDR-SDRAM, 2x ETH, 16x 3.3VDC I/O
uCLS1012A-VoIP	uCLS1012A Module with 64MByte flash, 512MByte DDR-SDRAM, 2x ETH, Audio, 16x 3.3VDC I/O



SOFTWARE

Mbarx IoT Endpoint

- MDNS service discovery announcement
- Announce name, type, location, firmware, template
- Simple Host protocol over TCP/IP (TLS) or UART
- Configuration of services; NTP, DHCP, VoIP, rsyslog...
- Configuration of network, administrative and control settings
- Operation of I/O, bi-directional,
- UART-to-net telemetry data pass-through
- Secure OTA firmware management
- Secure "Call Home" automatic connection origination
- Compatibility with ecosystem of Mbarx tools

Mbarx System Manager Tool

- Secure site-wide device management
- Compatible with Mbarx endpoints and gateways
- Active monitoring of devices
- GUI management of devices
- Configuration templates and repository
- Firmware repository
- OTA firmware updates
- Automatic "call home" firmware update service
- Windows® and Mac® compatible
- Free evaluation



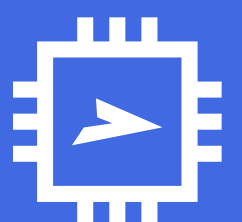
Mbarx Virtual Control Panel

- Windows based development tool
- Assists with experimentation using Mbarx ASD host protocol
- GUI driven operation of device
- Console window
- Remote connection service (Call Home server)
- Virtual push-buttons, LEDs and other
- Built using websockets, QT and python
- Source code framework available

DEVELOPMENT KIT

Development Kit Includes

- uCLS1012A-VoIP Module
- uCLS1012A module host board
- Cable Kit, headset with microphone, power supply
- Dedicated support site access (1 year)
- Documentation and reference schematics (download)
- Mbarx System Manager - (evaluation Windows / Mac)
- Mbarx Virtual Control Panel (Windows / Mac)
- Mbarx Site Controller Demo (provided in System Manager)
- Arcturus VoIP demo (preinstalled)
- Arcturus management middleware and webUI (preinstalled)
- Arcturus camera controller and video server demo (preinstalled)
- Linux BSP (download)
- Installation support (email)



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