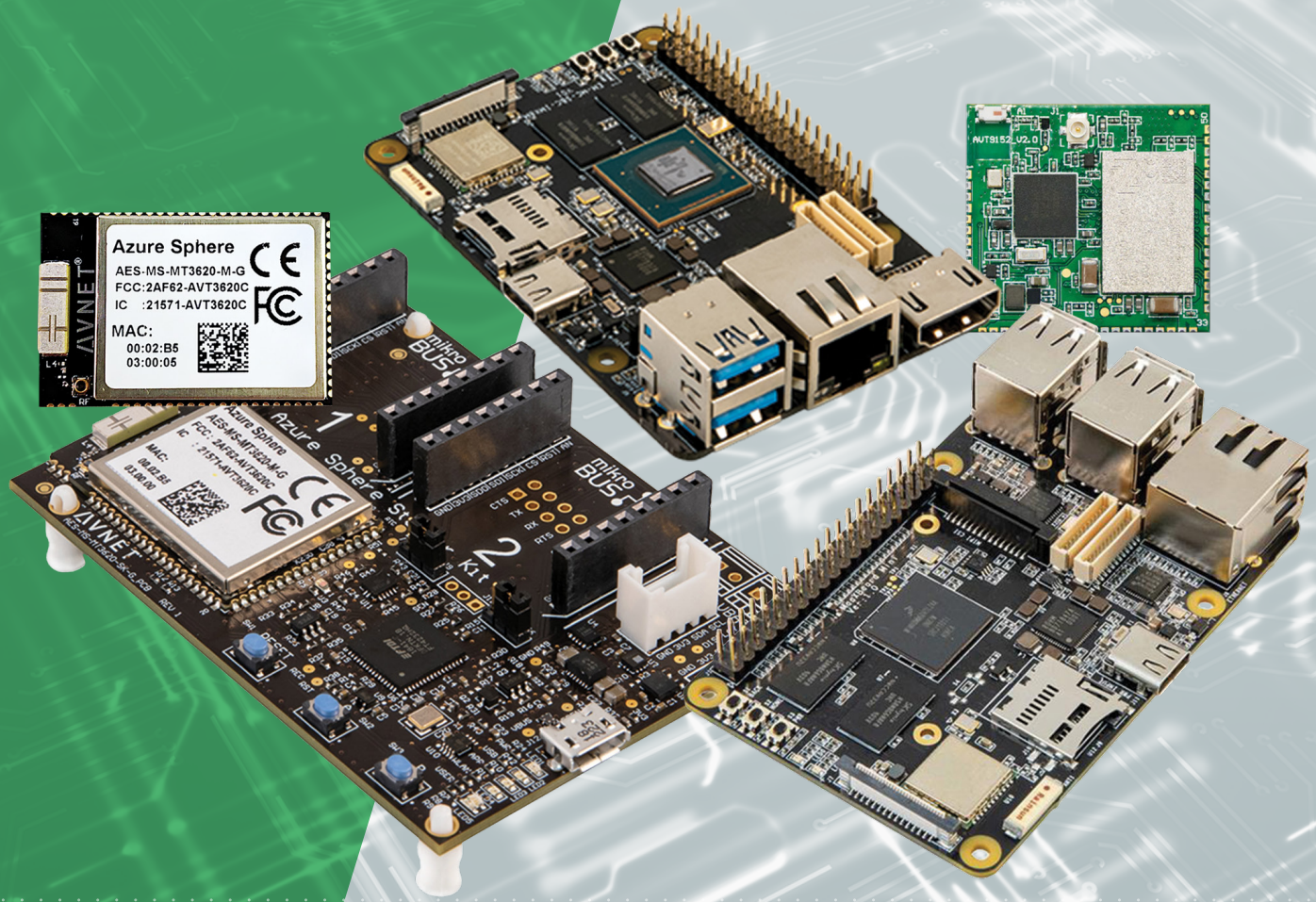
AVNET®

AVNET BOARDS

MPU / MCU Solutions Guide



DESIGNED BY AVNET

DESIGN IT OR BUY IT?

Avnet's ready-made SoC modules will shorten your development cycle

Today's quick time-to-market demands are forcing you to rethink how you design, build, and deploy your products. Typically, it's faster, less costly, and lower risk to incorporate an off-the-shelf solution instead of designing from the beginning. Avnet's System-On-Module (SOM) and Single-Board Computer (SBC) solutions for NXP, Microsoft and Nordic Semiconductors can reduce development times by more than twelve months, allowing you to focus your efforts on adding differentiating features and unique capabilities.

Avnet's SoC modules offer the following benefits:

- Reduce risk by building your application upon a known working system
- Get running quickly with example designs, tutorials, and board support packages
- Start software development immediately
- Eliminate costly board re-spins
- Start with proven Carrier designs
- SOM and carrier customization through Avnet Design Services

With over fifteen years of experience building SOM products, we've helped many companies attain a jump start on their products and get to market faster. Contact us today to get started!

Table of Contents

MAAXBOARD

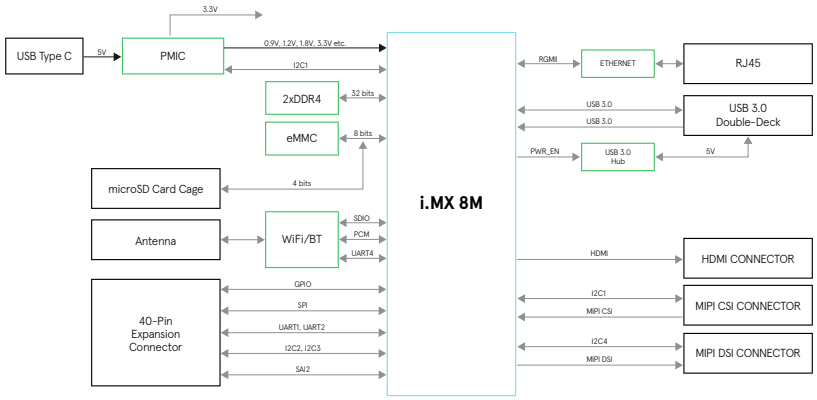
The MaaXBoard is a low-cost, NXP i.MX 8M processor-based, single board computer ideal for embedded computing and smart edge IoT applications. The i.MX 8M family of application processors are based on the Arm® Cortex®-A53 and Cortex-M4 cores which provide industry-leading audio, voice, and video processing for applications that scale from consumer home audio to industrial building automation and embedded computers. The MaaXBoard is production ready, FCC, CE, and RoHS certified. It is available in quantities from one to thousands.

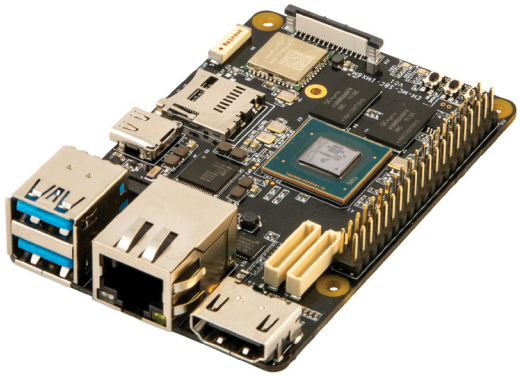
The MaaXBoard contains everything necessary to support and create a Linux, Android, Windows 10 IoT Core, or other OS based system. The platform offers several on-board peripherals including 2 GB of DDR4 memory, a Gigabit Ethernet port, dual USB 3.0 host ports, HDMI output, MIPI-DSI, MIPI-CSI, WiFi, Bluetooth Low Energy, and MicroSD card slot. A Raspberry Pi hat compatible expansion connector also provides interfaces for UART, SPI, I2C, and GPIO. These combined capabilities make it an ideal platform for investigating AI, IOT, and multimedia applications.

Parts

Part number	Description	Resale
AES-MC-SBC-IMX8M-G	MaaXBoard i.MX 8M single board computer	$139.95 USD
AES-MC-SBC-IMX8M-D2E16QC-G	MaaXBoard, 16GB eMMC, Commercial	TBD
AES-MC-SBC-IMX8M-D2E16QI-G	MaaXBoard, 16GB eMMC, Industrial	$149.95 USD
AES-MC-SBC-IMX8M-D2SDQI-G	MaaXBoard, SD Card, Industrial	TBD

*All of these parts have a minimum order quantity of 100





Features

Processor

- NXP i.MX 8M Processor with Quad Arm Cortex-A53 and single Cortex-M4F

Memory

- 2GB DDR4 SDRAM
- MicroSD Slot
  - Supports eMMC Boot

Communications and user interface

- Gigabit Ethernet
- Dual USB 3.0
- MIPI-DSI
- MIIP-CSI
- HDMI – Supports up to 4k resolution
- Wi-Fi 802.11 b/g/n/ac
- Bluetooth 4.2 (Bluetooth Low Energy)
- Onboard Ceramic Antenna (Default)
  - External Antenna supported
- Audio Expansion

User I/O

- 40 Pin Low Speed Expansion Interface
  - Raspberry Pi Hat Compatible
  - Digital I/O voltage: 3.3V

Other

- Voltage Regulators
- USB Type C 5V/3A Power input
- Operating temperature: Commercial (0~70C) and Industrial (-40~+85C) versions are available

Mechanical

- 85mm x 56mm x 12mm form factor

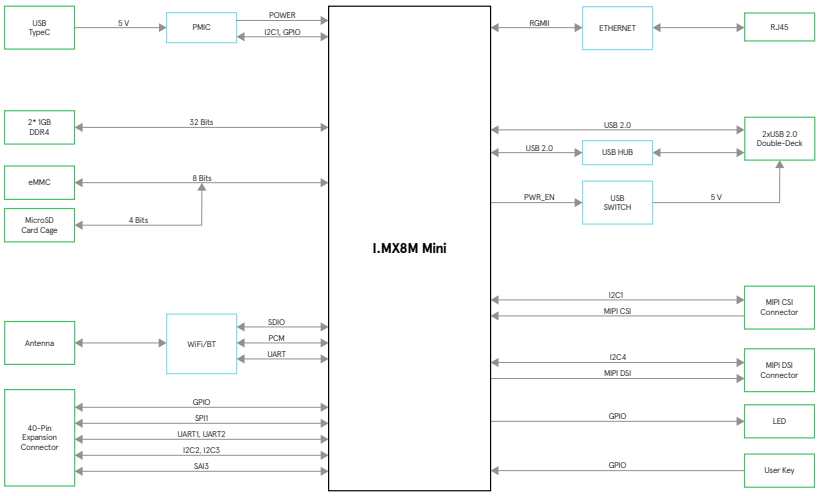
MAAXBOARD MINI

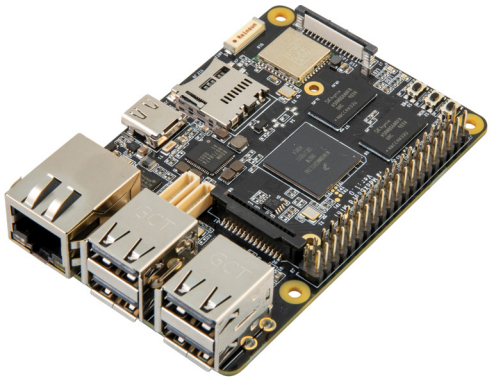
The MaaXBoard Mini is a low-cost, NXP i.MX 8M Mini processorbased, single-board computer ideal for embedded computing and smart edge IoT applications. The i.MX 8M Mini family of application processors are based on the Arm® Cortex®-A53 and Cortex-M4 cores, which provide industry-leading audio, voice and video processing for applications that scale from consumer home audio to industrial building automation and embedded computers. The MaaXBoard Mini is production ready, FCC, CE and RoHS certified. It is available in quantities from one to thousands.

The MaaXBoard Mini contains everything necessary to support and create Linux, Android or other OS-based systems. The platform offers several onboard peripherals including 2GB of DDR4 memory, a gigabit Ethernet port, quad USB 2.0 host ports, MIPI-DSI, MIPI-CSI, WiFi, Bluetooth low energy and a MicroSD card slot. A Raspberry Pi HAT compatible expansion connector also provides interfaces for UART, SPI, I2C and GPIO. These combined capabilities make it an ideal platform for investigating AI, IoT, Industrial and multimedia applications.

Parts

Part number	Description	Resale
AES-MC-SBC-IMX8MINI-G	MaaXBoard i.MX 8M Mini single board computer	$124.95 USD





Features

Processor

- NXP i.MX 8M Mini Processor
  - Quad Arm Cortex-A53 @1.8GHz
  - Single Cortex-M4F @400MHz

Memory

- 2GB DDR4 SDRAM
- MicroSD Slot
  - Supports eMMC Boot (not populated by default)

Communications and user interface

- Gigabit Ethernet
- Quad USB2.0 Host
- MIPI-DSI Display Interface
- MIIP-CSI Camera Interface
- Wi-Fi 802.11 b/g/n/ac
- Bluetooth 4.2 (Bluetooth Low Energy)
- Onboard Ceramic Antenna
  - External Antenna supported (not populated by default)
- Audio Expansion

User I/O

- 40 Pin Low Speed Expansion Interface
  - Raspberry Pi HAT Compatible
  - Digital I/O voltage: 3.3V
- 2 x User Buttons
- 1 x Power Button
- 2 x User Leds

Other

- Voltage Regulators
- USB Type C 5V/3A Power input
- Operating Temperature: 0~70°C

Mechanical

- 85mm x 56mm form factor

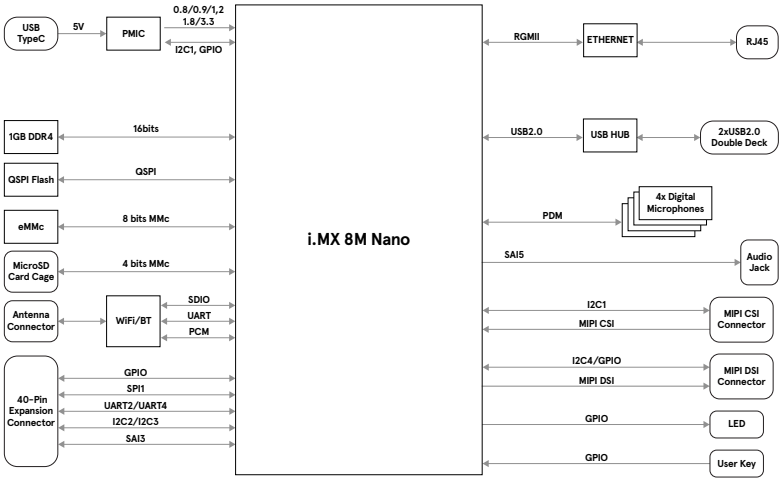
MAAXBOARD NANO

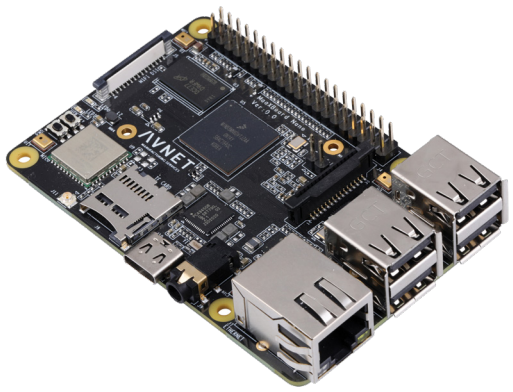
The MaaXBoard Nano is a low-cost, NXP i.MX 8M Nano processor-based, single board computer ideal for embedded computing and smart edge IoT applications. The i.MX 8M Nano family of application processors is based on the Arm® Cortex®-A53 and Cortex-M7 cores which provide industry-leading audio, voice and video processing for applications that scale from consumer home audio to industrial building automation and embedded computers. The MaaXBoard Nano is available in quantities of five hundred or greater.

The MaaXBoard Nano contains everything necessary to support and create a Linux, Android or other OS-based systems. The platform offers several on-board peripherals including 1 GB of DDR4 memory, a Gigabit Ethernet port, quad USB 2.0 host ports, MIPI-DSI, MIPI-CSI, WiFi, Bluetooth, MicroSD card slot, four on-board microphones and an audio jack. A Raspberry Pi hat-compatible expansion connector also provides interfaces for UART, SPI, I2C and GPIO. These combined capabilities make it an ideal platform for investigating AI, IOT and multimedia applications.

Parts

Part number	Description	Price
AES-MC-SBC-IMX8NANO-G	MaaXBoard i.MX 8M Nano single board computer	Call





Features

Processor

- NXP i.MX 8M Nano Processor
  - Quad Arm Cortex-A53 @1.5GHz
  - Single Cortex-M7F @750MHz

Memory

- 1GB DDR4 SDRAM
- 256mB QSPI Flash
- MicroSD Slot
- 16GB eMMC

Communications and user interface

- Gigabit Ethernet
- Quad USB2.0 Host
- MIPI-DSI Display Interface
- MIPI-CSI Camera Interface
- Wi-Fi 802.11 b/g/n/ac
- Bluetooth 4.2 and 5
- External Antenna Connector
- Four on-board Microphones
- Audio Jack

User I/O

- 40 Pin Low Speed Expansion Interface
  - Raspberry Pi Hat Compatible
  - Digital I/O voltage: 3.3V
- 2 x User Buttons
- 2 x User Leds

Other

- PMIC
- Type C 5V/3A Power input
- Operating Temperature: 0~70°C

Mechanical

- 85mm x 56mm form factor

MAAXBOARD RT

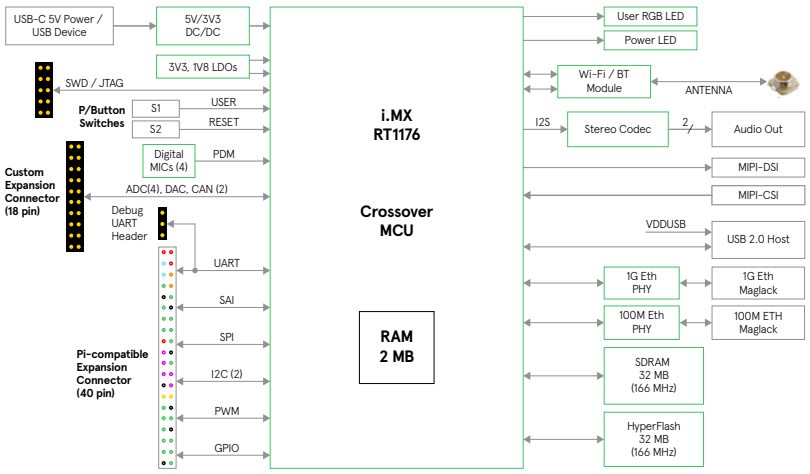
MaaXBoard RT is a dual-purpose SBC board based on NXP's i.MX RT1176 processor. Optimized for use as low-cost development board and to embed in OEM products, it provides advanced security, high-performance low-latency real-time operation, with a versatile set of peripheral interfaces ideal for implementation of eg. industrial automation and power-efficient audio/visual AI-enabled applications.

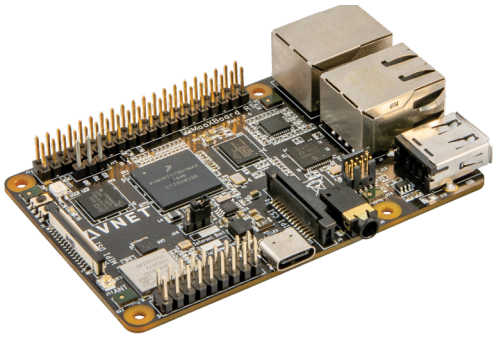
Software enablement includes a comprehensive NXP RT1170 SDK that accelerates application development with drivers, middleware, code snippets and FreeRTOS based examples (AzureRTOS support will follow soon). Out-of-box Avnet example reference designs are also provided to jump-start development.

MaaXBoard RT ships with a quick start guide to ensure that hardware and software application development can commence efficiently. The user is responsible for providing an SWD/JTAG debug probe (inexpensive NXP MCU-LINK or equivalent) as well as a suitable 5V/3A USB power adapter with USB-C connector.

Parts

Part number	Description	Resale
AES-MC-SBC-IMXRT1176-G	MaaXBoard i.MX RT1176 single board computer	Call





Features

- NXP i.MX RT1176 Processor
  - Arm Cortex-M7 @1GHz, 32KB/32KB L1 Cache
  - Arm Cortex-M4F @400MHz, 16KB/16KB L1 Cache
  - Fast Real-time, low-latency response (12ns)
  - 2D GPU and Graphics Accelerator
  - Advanced Security
  - 2MB of Fast On-Chip SRAM (includes 512KB of A7 TCM and 256KB M4 TCM)
- 256 Mb Onboard SDRAM
- 256 Mb Onboard HyperFlash

Interfaces and connectivity

- 10/100 Mbps Ethernet (IEEE 1588 Time Sync.)
- 10/100/1000 Mbps Ethernet (TSN Time Sync.)
- USB 2.0 Host (type-A connector)
- USB 2.0 Device (type-C connector)
- MIPI-DSI Display (2-Lane, 1280x800, 60fps)
- MIPI-CSI Camera (2-Lane)
- Wi-Fi 5 (802.11 b/g/n/ac)
- Bluetooth 5
- External Antenna (U.FL connector)
- Four Onboard Digital Microphones
- Stereo Codec with on-board Audio Jack
- 10 Pin SWD/JTAG Debugger Header
- Boot Mode Selection Header

Expansion, power and mechanical

- 40 Pin Pi HAT Compatible Header
- 18 Pin Custom Expansion Header
- User/Reset Button and RGB LED
- Efficient DC/DC Voltage Regulator
- USB Type-C Power Input (Rated for 5V/3A)
- Operating Temperature: 0~70°C
- Raspberry-Pi Form-Factor (85mm x 56mm)

To purchase this kit, visit avnet.me/maaxboard-rt

MAAXBOARD ACCESSORIES

MIPI-DSI 7-inch Capacitive Touch Display

Part number	Resale	SURL
AES-ACC-MAAX-DISP1	$95.00 USD	avnet.me/maax-disp1-buy

This MIPI-DSI 7-inch capacitive touch display enables user to prototype end applications such as tablets, infotainment systems and embedded projects. This display is compatible with all MaaXBoard platforms. The display's active area is 152mm by 89mm featuring a resolution of 1280*(RGB)*720. The display connects to the MaaXBoard via an adapter board which handles power and signal conversion to the standardize MaaXBoard 30-pin connector. This display enables out-of-box examples on the MaaXBoard product line featuring virtualized desktops. **Note**: Only compatible with the MaaXBoard Platforms.

MaaXBoard MIPI-CSI Camera

Part number	Resale	SURL
AES-ACC-MAAX-CAM1	$31.95 USD	avnet.me/maax-cam1-nxp

The MaaXBoard MIPI CSI camera features a high quality 5 megapixel OV5640 image sensor designed to be compatible with the MaaXBoard and Raspberry Pi platforms. The image sensor supports 1080p30, 720p60 and 640x480p90 video. It attaches to the MaaXBoard or Raspberry Pi platform by the MIPI CSI socket, designed especially for interfacing to cameras. The board itself is tiny, at around 24mm x 25mm x 9mm. It connects to MaaXBoard or Raspberry Pi by way of a ribbon cable to allow for camera application positioning.

USB Type-C power supply

Part number	Resale	SURL
AES-ACC-MAAX-PWRUL	$8.25 USD	avnet.me/maax-pwrul-buy

External 5V/3A USB Type-c power supply compatible with the MaaXBoard

Monarch Go Pi HAT

Part number	Resale	SURL
AES-SQN-MNRCHGO-HT1-G	$72.95 USD	avnet.me/monarchgo-hat-buy

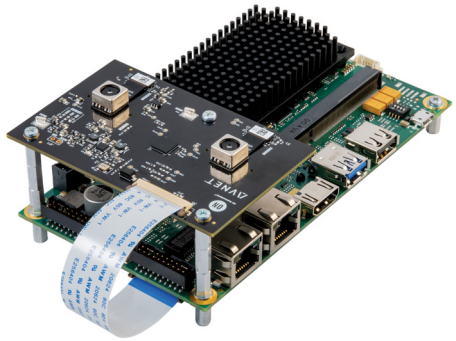
The Monarch Go Pi HAT enables engineers to connect Raspberry Pi HAT-capable SBCs to the Monarch Go LTE Cat-M1 modem. The Monarch Go Pi HAT supports both the Monarch Go and Monarch Go-GPS modems. In addition to Monarch Go support, the Pi HAT includes a shuttle click expansion connector that enables 3.3V I/O I2C, SPI, UART, and GPIO-based click modules from MikroElektronika. Having access to the large array of click module offerings permits prototyping of various LTE-based applications.

Debug Tool for ARM Cortex-M based Microcontroller

Part number	Resale	SURL
MCU-Link	$10.99 USD	avnet.me/mcu-link

Jointly developed by NXP and Embedded Artists, MCU-Link is a powerful and cost effective debug probe that can be used seamlessly with MCUXpresso IDE, and is also compatible with 3rd party IDEs that support CMSIS-DAP protocol. MCU-Link also includes a USB to UART bridge feature (VCOM) that can be used to provide a serial connection between the target MCU and a host computer. MCU-Link is based on the LPC55S69 microcontroller, and features a high-speed USB interface for high performance debug.

AVNET I.MX 8M PLUS EDGE AI KIT



The Avnet i.MX 8M Plus Edge AI Kit consists of a SMARC System-on-Module(SOM) and an Industrial Carrier board bundled together with a dual camera adapter to provide a complete embedded computing system for prototyping new industrial systems and evaluating the capabilities of the NXP i.MX 8M device family. The high-performance NPU of the i.MX 8M Plus processor allows machine learning and Artificial Intelligence implementations with heavy compute demands to be pushed from the cloud down to the edge where low latency response can be critical for achieving end application goals.

System designers can simply design their own carrier card, plug-in the Avnet SMARC SOM, and start their application development with proven i.MX 8M Plus hardware. Available with NXP 14nm FinFET technology to allow high computing, graphics, and image processing performance at very low power consumption and combined with a high degree of functional integration device, the Avnet SMARC SOM enables designers to build industrial, medical, retail, and other embedded vision applications with confidence and ease. The integrated Neural Network Accelerator provides up to 2.25TOPS for boosting AI applications at the edge (without High Performance CPU/GPU) enabling emerging applications like Access Control based on Face Recognition to become more easily deployed without complete reliance upon cloud computing resources.

When combining this development kit with the NXP eIQ™ Machine Learning Software Development Environment, many options for Inference Engines, Vision Libraries, and ML workflow can be used to quickly deploy applications needing the following types of model capabilities:

- Classification
- Object Detection
- Face Recognition
- Sequence Analysis

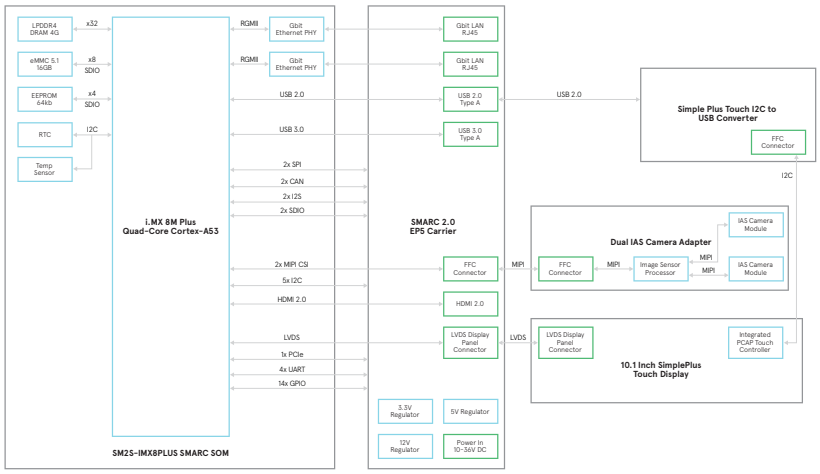
New eIQ capabilities are added on a regular basis as the underlying model libraries and tools evolve over time.

Features

- Quad Core Arm Cortex-A53 ARM applications processor
- 2GB (up to 4GB options available) LPDDR4 memory (inline ECC)
- 16GB (up to 256GB option available) eMMC 5.1 flash storage
- 64Mb QSPI flash (option available)
- Yocto Linux BSP available for download
- Wi-Fi/Bluetooth/NFC module (option available)
- HDMI 2.0 up to 4K (3840x2160@30FPS)
- 2 x LVDS display panel support
- Two ON Semiconductor AR1335 IAS camera modules
- ON Semiconductor AP1302 ISP
- Dual MIPI-CSI host interfaces
- 1x USB 3.0, 1x USB 2.0 type A ports
- Machine learning accelerator (2.3 TOPS)
- Image sensor processor 12MP@30fps
- 146mm x 80mm form factor
- -40C to +85C industrial temperature rated

Parts

Part number	Description	Resale
AES-IMX8MPLUS-AI-DEV-KIT-G	SMARC Industrial Embedded Computing Kit with Edge AI Acceleration	$699.00 USD



To purchase this kit, visit http://avnet.me/imx8mplus-edgeai

AZURE SPHERE MT3620 STARTER KIT 2.0

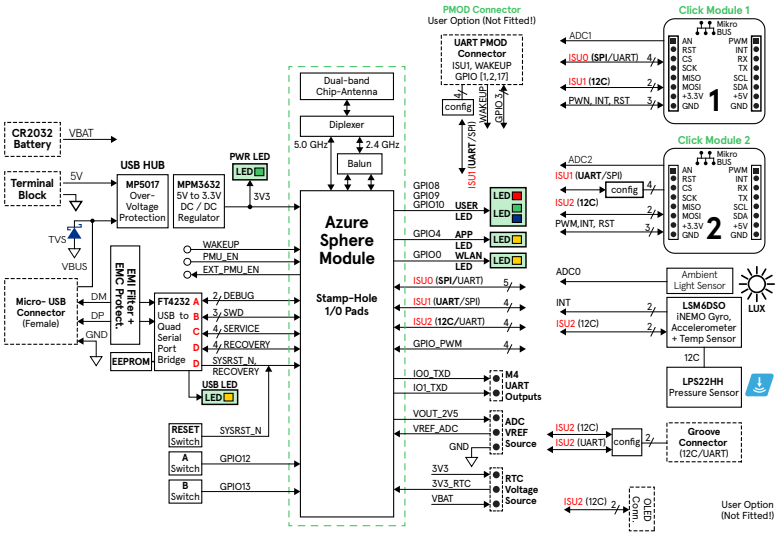
The Azure Sphere MT3620 Starter Kit 2.0 is an enhanced version of Avnet's popular Azure Sphere Starter Kit. It supports rapid prototyping of highly secure, end-to-end IoT implementations based on Microsoft Azure Sphere. This small form-factor carrier board includes a production-ready MT3620 Sphere module with WiFi connectivity, along with multiple expansion interfaces facilitating easy integration of sensors, displays, motors, relays and more. Key features of this version are its ability to support a wired Ethernet network connection (requires MikroE ETH click adapter to be fitted) as well as more flexibility in how ISUs can be used. Downloadable documentation and tutorials guide developers through all steps, from board setup to application coding.

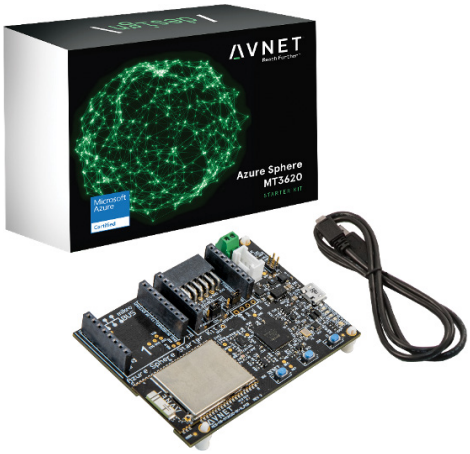
Parts

Part number	Description	Resale
AES-MS-MT3620-SK-G-2	Azure Sphere MT3620 Starter Kit 2.0	$99.95 USD

Related parts

Part number	Description	Resale
AES-MS-MT3620-M-G-2	Azure Sphere MT3620 Module (Certified)	$29.95 USD
AES-MS-MT3620-UFL-M-G-2	Azure Sphere UFL MT3620 Module (Pending)	CALL
AES-PMOD-NRF-BLE-G	BLE-Pmod for the Azure Sphere Starter Kit	$59.00 USD
1461530050	Molex 2.4GHz/5GHz Flexible Wi-Fi Antenna (50mm 50 ohm RF cable, U.FL connector)	CALL
MikroE Click boards	https://www.mikroe.com/click	





Features

Carrier Board 2.0

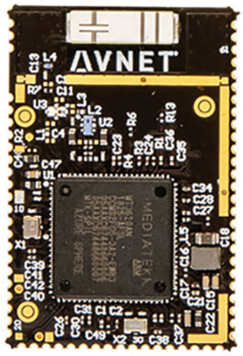
- Azure Sphere MT3620 Module 2.0 (dual-band WiFi)
- Two MikroE click board expansion sockets
- Grove expansion connector (configured as I2C)
- On-board sensors
  - 3-axis accelerometer and gyro
  - Ambient light sensor
  - Temperature (die not ambient)
  - Pressure/barometric sensor
- Interface for optional OLED 128x64 display
  - USB-based program/debug & recovery interfaces
- User push button switches and LEDs
- 5V to 3.3V power regulation
- DC supply inputs:
  - USB 5V from host computer
  - External 5V via terminal-block
  - VBAT supply from optional coin-cell battery

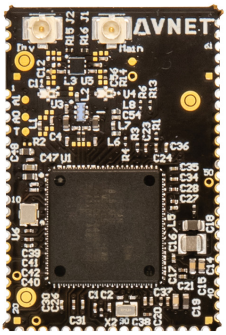
Azure Sphere MT3620 Module 2.0

- MT3620AN SoC multicore device
- 1x 500MHz Arm Cortex A7, 4MB SRAM
- 2x 200MHz Arm Cortex M4F, 64KB SRAM
- 3x ISU interfaces (configured as UART, SPI, I2C)
- ADC/GPIO: 3x 12-bit ADC inputs (or 3 GPIOs)
- PWM/GPIO: 9x PWM outputs (or up to 24 GPIOs)
- RTC: Requires coin cell battery for VBAT voltage
- Wi-Fi: Dual-band 2.4/5GHz 802.11 b/g/n radio
- Antenna: Dual-band 2.4/5GHz chip antenna

To purchase this kit, visit avnet.me/azure-sphere-family

AZURE SPHERE MT3620 MODULES





The Avnet Azure Sphere MT3620 Modules support Microsoft's Azure Sphere end-to-end solution for highly secured, Wi-Fi connected Microcontroller (MCU) devices. The production-ready, certified modules come in two versions: an on-board chip antenna module for cost-optimized systems and an external U.FL antenna module supporting two external antennas for applications requiring higher performance, external antennas. Both modules are pin and footprint compatible, allowing for easy design migration and end-product enhancements.

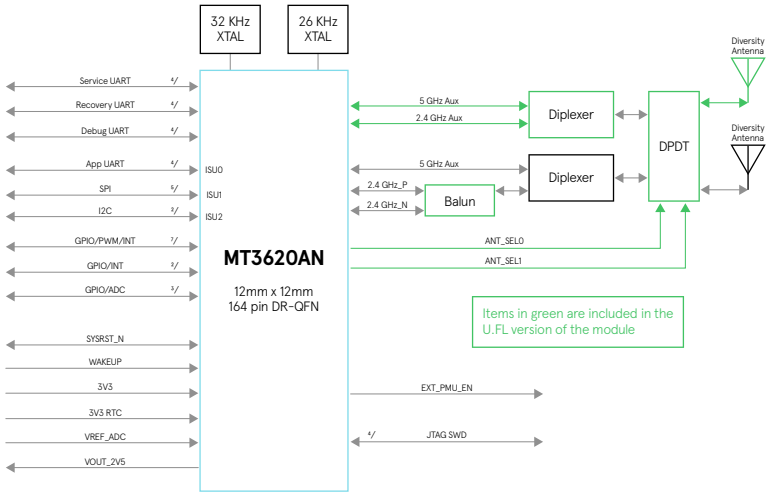
By integrating all the necessary support and RF front end circuitry onto the small 33 mm x 22 mm module, Avnet has reduced the design time for implementing Sphere-based solutions. More importantly, developers can leverage the modules wireless certifications (pending) for their end product, saving considerable certification costs and testing time.

Parts

Part number	Description	Price
AES-MS-MT3620-M-G-2	Azure Sphere MT3620 Module with Chip Antenna	$29.95 USD
AES-MS-MT3620-UFL-M-G-2	Azure Sphere UFL MT3620 Module (Pending)	CALL

Related parts

Part number	Description	Resale
AES-MS-MT3620-SK-G-2	Azure Sphere MT3620 Starter Kit 2.0	$99.95 USD
AES-PMOD-NRF-BLE-G	BLE-Pmod for the Azure Sphere Starter Kit	$59.00 USD
1461530050	Molex 2.4GHz/5GHz Flexible Wi-Fi Antenna (50mm 50 ohm RF cable, U.FL connector)	CALL



Features

- On-board (chip) or external (U.FL) antenna module versions
- Pin and footprint compatible
- Based on the MT3620AN SoC
  - 1x 500MHz ARM Cortex A7, 4MB SRAM
  - 2x 200MHz ARM Cortex M4F cores, 64KB SRAM
  - Dual-band 2.4/5GHz 802.11 a/b/g/n WiFi
- Module I/O peripheral support
  - 3x ISU interfaces pre-configured for UART, SPI, I2C
  - ADC/GPIO: 3x 12-bit ADC inputs (or 3 GPIOs)
  - PWM/GPIO: 9x PWM outputs (or up to 24 GPIOs)
  - RTC (requires VBAT supply)
  - Programming & recovery interface
- Chip antenna version
  - Dual-band 2.4/5GHz chip antenna (Pulse W3006)
  - Operating temperature: -30~85°C
- External UFL antenna version
  - Supports full TX and RX antenna diversity
  - Two U.FL connectors for external 2.4/5GHz flex antennas
  - Operating temperature: -40C~85°C industrial rating
- Dimensions: 33mm x 22mm x 3mm
- Certification: FCC / IC / CE / RoHS (pending)

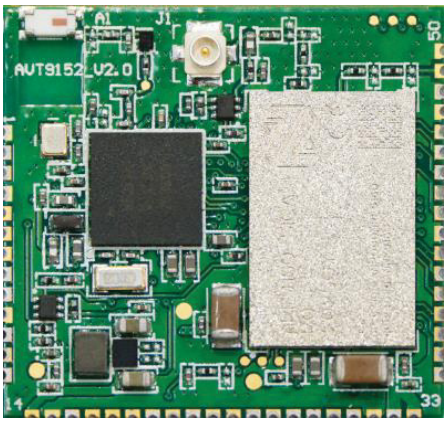
To purchase this kit, visit avnet.me/azure-sphere-family

AVT9152 MODULE

Avnet AES-CELLIOT-AVT9152MOD combines all three LTE-M (Cat M1)/NB-IoT (Cat NB), GPS and BLE wireless technologies into a module targeting broad range of IoT applications globally where low power and small size matters. This module uses industry-leading low power devices from Nordic Semiconductor, the nRF9160 LTE-M/NB-IoT and nRF52840 BT5.0.

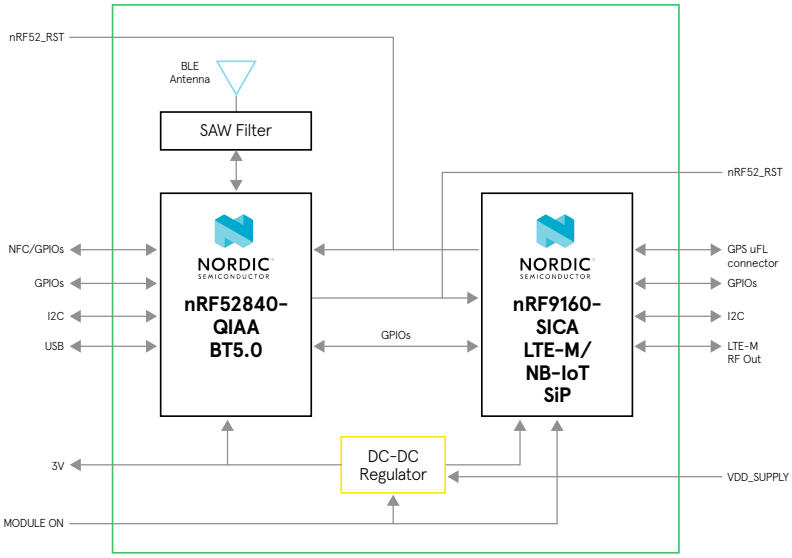
Completing an IoT design now, can be as simple as connecting a power source like battery, sensors and antenna to the module. The two powerful application processors in the module along with the rich peripherals made available, give you the maximum versatility to go after the IoT market today.

The extensive regulatory certification obtained gives you risk free and significant saving on your overall product development cost to address the worldwide market.



Parts

Part number	Description	Price
AES-CELLIOT-AVT9152MOD	AVT9152 module samples	$47.95 USD
AES-CELLIOT-AVT9152MOD-TR	AVT9152 module in tape & reel	$45.50 USD



Features

- nRF91 with LTE-M/NB-IoT global carrier certification
- BLE for short range communication
- Support power save mode, PSM and eDRX
- ARM® TrustZone® security isolation
- OTA support on both nRF91 and nRF52
- Rich in peripherals support – UART, SPI, I2C, NFC, USB and GPIOs
- Flexible LTE and GPS antenna options
- AT commands modem architecture supporting UDP/TCP protocols
- Two powerful M4 processors dedicated for application development packed into a tiny 26 x 28 x 3 mm module
- 3V@200mA power supply for external peripherals
- FCC, CE, RCM and BQB certified

To purchase this kit, visit avnet.me/avt9152-module

AVT9152 EVALUATION KIT

AES-CELLIOT-AVT9152KIT is a handy kit that supports both evaluation and development with AVT9152 module. This sensor rich kit comes complete with SDK, eUICC SIM card with free subscription plan and Avnet's always ready backend IoT Connect cloud platform with dashboard offers unprecedented end-to-end IoT out of box connection experience over LTE-M/NB-IoT network.

Already onboard sensor from TE Connectivity, MS4 Series AmbiMate sensor module offers temperature, relative humidity, motion and ambient light sensing. In addition, there are barometric pressure, accelerometer and gyroscope sensors available too. This serves as an enabling platform for IoT applications development that saves significant development time and money.

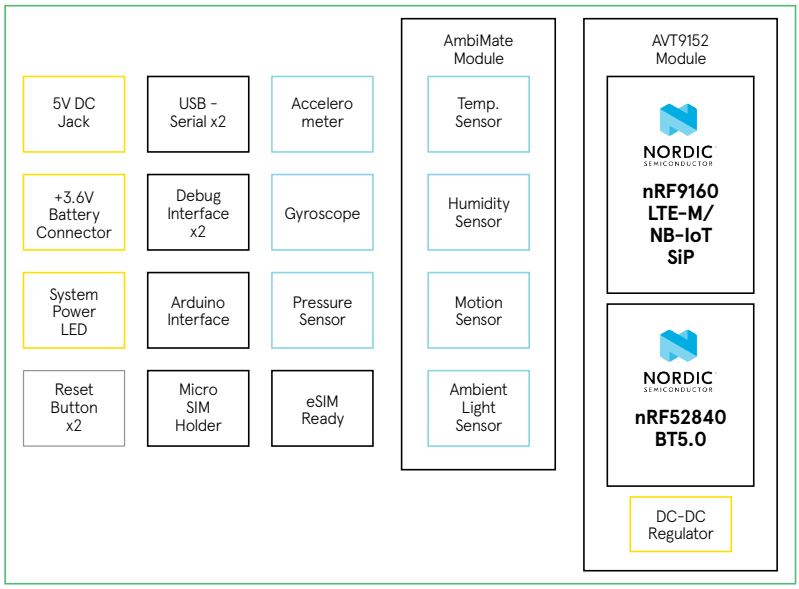
The kit has onboard antenna for BLE; SMA or µ.FL connectors for LTE-M/NB-IoT antenna and µ.FL connector for passive or active GPS antenna. Wide range of target antenna can be evaluated easily during product development.

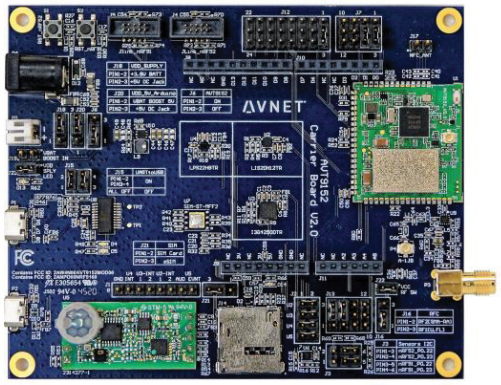
Developer has the extra flexibility to customize their applications, be it adding of new sensors, wired connectivity or user interfaces by using the Arduino connectors in the evaluation kit.

The development kit is low power mode ready where actual system power consumption can be easily measured and analyzed.

Parts

Part number	Description	Price
AES-CELLIOT-AVT9152KIT	AVT9152 evaluation kit	$239 USD





Features

- nRF91 with LTE-M/NB-IoT global carrier certification and nRF52 BT5.0
- Power save mode, PSM and eDRX
- ARM® TrustZone® security isolation
- OTA support on both nRF91 and nRF52
- Arduino interface for scalability
- Onboard sensors - temperature, relative humidity, pressure, accelerometer, gyroscope, ambient light and motion
- Low power design
- eUICC SIM card with free subscription plan for out of box network connection
- SDK connecting to free Avnet IoT Connect platform for evaluation
- Production ready with FCC, CE, RCM and BQB certified

To purchase this kit, visit avnet.me/avt9152-kit

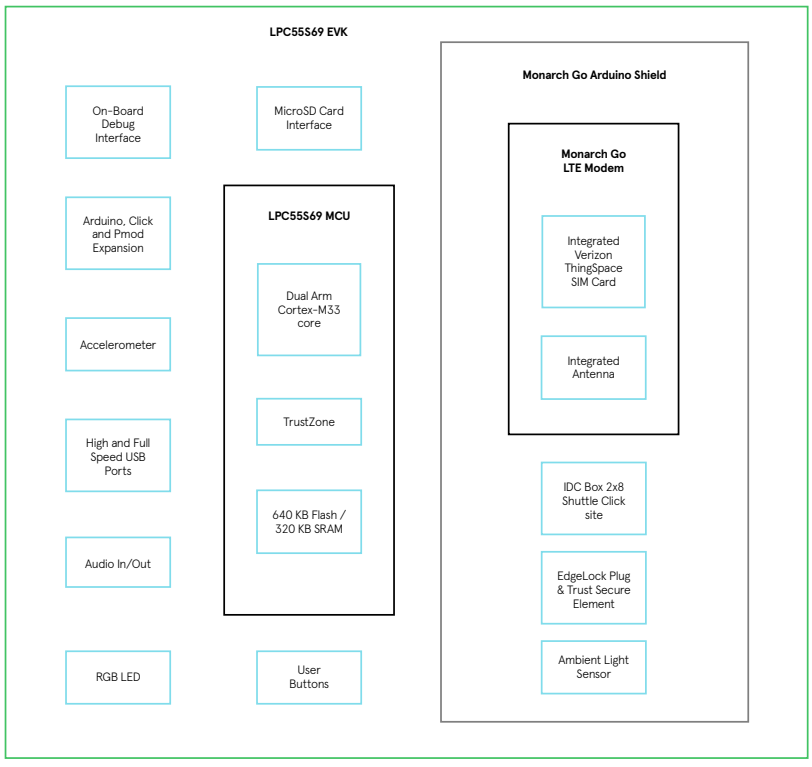
MONARCH LTE-M DEVELOPMENT KIT

The Monarch LTE-M Development Kit is a cellular IoT enablement platform featuring the NXP LPC55S69-EVK and the Monarch Go Arduino Shield. This kit is an ideal entry point for starting your next LTE IoT application development. The LPC55S69 dual-core Arm Cortex-M33 microcontroller chipset with the production-certified Monarch Go modem allows for easy transition from development to production.

Out of box, the Monarch LTE-M Development Kit is enabled with Microsoft Azure and AWS cloud support. This includes an Azure IoT Central and Avnet IoTConnect cloud example. Having these examples available for user development out of box will save the user hundreds of hours in application development cost in addition to providing a time-to-market advantage.

Parts

Part number	Description	Price
AES-NXP-MNRCH-M1-DK-G	Monarch LTE-M Development Kit that features the NXP LPC55S69-EVK paired along with the Monarch Go Arduino Shield	$119.00 USD



Features

Monarch Go Arduino Shield

- Arduino Form Factor Enables Use with NXP EVK and third-party boards
- Monarch Go Modem (Sequans)
  - LTE Cat-M1 Connectivity
  - Integrated LTE Antenna
  - Pre-installed ThingsSpace IoT SIM Card (Verizon)
  - Production-Ready, Certified Solution
- SE050 EdgeLock Plug & Trust Secure Element (NXP)
- VEML6030 Ambient Light Sensor (Vishay)
- I/O Voltage Level-Shifters (1.8V to 3.3V)
- Shuttle Expansion Connector (for expansion via MikroE Click boards)
  - I2C, SPI, GPIO, PWM, ADC, UART (3.3V I/O)

LPC55S69-EVK

- NXP LPC55S69 MCU
  - Arm Cortex-M33 core @ 150 MHz
  - 2nd co-processor M33 core
  - TrustZone
  - 640 KB Flash / 320 KB SRAM
- High and full speed USB ports
- MMA8652FCR1 accelerometer
- RGB LED, reset, ISP, user push buttons
- MicroSD card interface
- Audio In/Out
- On-board debug interface
- Arduino UNO Rev3, Click, and Pmod expansion

To purchase this kit, visit avnet.me/monarchgo-dev-kit

MONARCH GO PI HAT

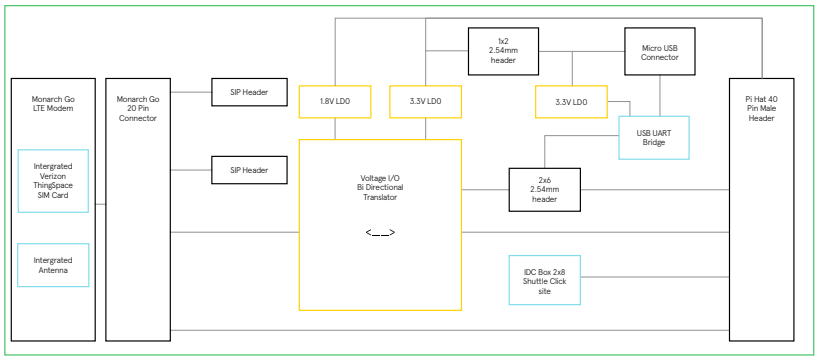
The Monarch Go Pi HAT is a cellular connectivity add-on card for SBCs with a Raspberry Pi HAT-compatible connector. Fitted with a Sequans Monarch Go (or Monarch Go-GPS) LTE Cat-M1 modem, this HAT board also facilitates expansion via click boards using a compact onboard shuttle click connector. An integrated onboard USB-UART bridge interface allows the HAT to be used with other platforms.

In addition to Monarch Go support, the Pi HAT includes a shuttle click expansion connector that enables 3.3V I/O, I2C, SPI, UART and GPIO-based click modules from MikroElektronika. Having access to the large array of click module offerings permits prototyping of various LTE-based applications.

The Monarch Go Pi HAT can operate in two modes. The first mode works with a SBC over the Pi HAT 40-pin UART interface. In this mode, the SBC performs the communication over the UART interface with the Monarch Go. The second operating mode for the Monarch Go Pi HAT is standalone. In standalone operation, the Monarch Go Pi HAT's power and UART communication to the modem occur through the micro USB interface. In standalone operation, it functions like the Monarch Go Starter Kit and can be evaluated on many other platforms over the USB-UART interface.

Parts

Part number	Description	Price
AES-SQN-MNRCHGO-HT1-G	Pi HAT Adapter with socketed Monarch Go LTE Modem	$72.95 USD



Features

- Raspberry Pi HAT compatible
- Monarch Go LTE modem
  - Cat-M1
  - Pre-installed Verizon ThingSpace IoT SIM
  - Production ready
- MikroElektronika shuttle click site
  - 3.3V I/O
  - I2C
  - SPI
  - GPIO
  - UART
- Voltage I/O translator
  - 1.8V to 3.3V
- Micro USB port
  - Debug and programming UART

To purchase this kit, visit avnet.me/monarchgo-hat

MONARCH GO ARDUINO SHIELD

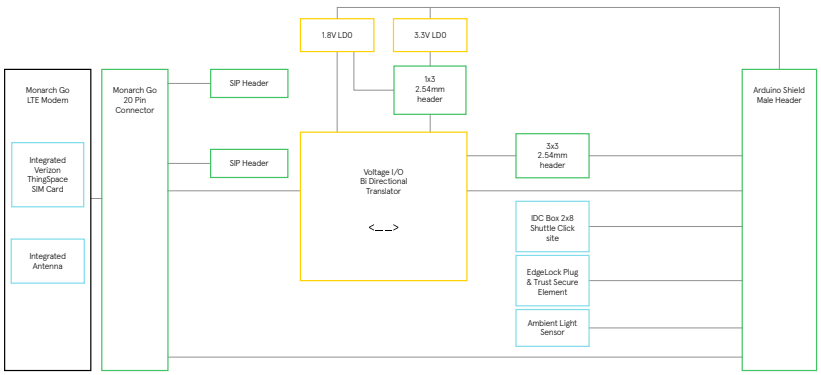
The Monarch Go Arduino Shield is a cellular IoT enablement platform featuring the Sequans Monarch Go modem. This shield is an ideal starting point for LTE IoT application development. The production-certified Monarch Go modem is end application certified allowing for easy transition from development to production.

Out of box, the Monarch Go Arduino Shield in conjunction with the LPC55S69-EVK is enabled with Microsoft Azure and AWS cloud support. This includes an Azure IoT Central and Avnet IoTConnect cloud example. Having these examples available for user development out of box will save the user hundreds of hours in application development cost in addition to providing a time-to-market advantage.

In addition to providing Monarch Go LTE connectivity, the Monarch Go Arduino Shield is fitted with a MikroElektronika shuttle click expansion connector for click module ecosystem enablement. The click module ecosystem enables over 700 3.3V I/O, I2C, SPI, UART and GPIO-based click modules. This click module ecosystem enables sensors, interfaces, displays, motor controls and more to allow for thousands of LTE IoT development applications.

Parts

Part number	Description	Price
AES-SQN-MNRCHGO-SHLD1-G	Implementation of the Monarch Go production-ready modem in an Arduino shield form factor	$69.95 USD



Features

- Arduino form factor enables use with NXP EVK and third-party boards
- Monarch Go modem (Sequans) LTE Cat-M1 connectivity
- Integrated LTE antenna
- Pre-installed ThingsSpace IoT SIM card (Verizon)
- Production-ready, certified solution
- SE050 EdgeLock Plug & Trust Secure Element (NXP)
- VEML6030 ambient light sensor (Vishay)
- I/O Voltage level-shifters (1.8V to 3.3V)
- Shuttle expansion connector (for expansion via MikroE click boards)
  - I2C, SPI, GPIO, PWM, ADC, UART (3.3V I/O)

To purchase this kit, visit avnet.me/monarchgo-shield

RENESAS ZMOD AIR QUALITY HATS FOR RASPBERRY PI

Avnet's Renesas ZMOD4410 and ZMOD4510 Air Quality HATs for Raspberry Pi are evaluation, development and quick-prototyping tools intended for professionals developing a wide variety of Air Quality monitoring capabilities.

Avnet's Renesas ZMOD4410 Indoor Air Quality HAT

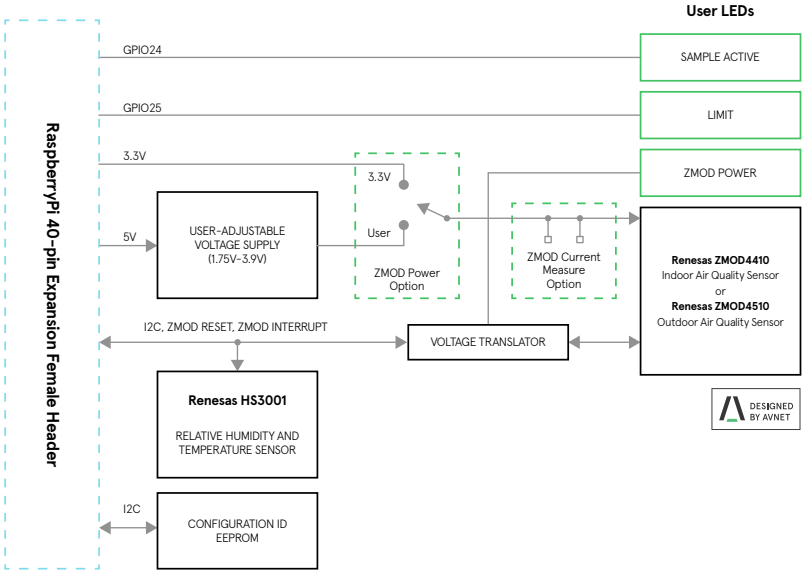
Avnet's Renesas ZMOD4410 Indoor Air Quality HAT for Raspberry Pi is intended for professionals developing a wide variety of wall-powered and battery-powered products with indoor air quality monitoring capability. The HAT features an on-board calibrated ZMOD4410 sensor that measures the concentrations of Total Volatile Organic Compounds (TVOC) and can estimate carbon dioxide (eCO2) levels. These are important indicators for monitoring indoor air quality.

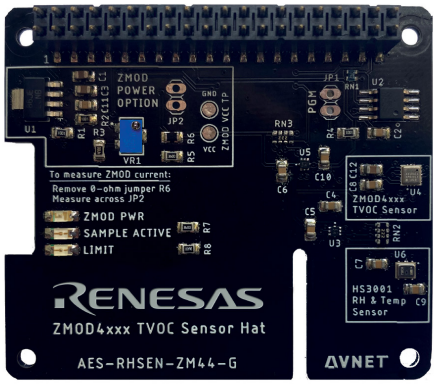
In addition to the ZMOD4410 sensor, the HAT incorporates a Renesas HS3001 Precision Relative Humidity and Temperature Sensor, along with software-controlled status LEDs.

In certain applications, it may be desirable to shift the ZMOD4410 sensing element's chemical selectivity and sensitivity, or to model its operation at supply voltages other than 3.3V. The HAT facilitates this with a user-adjustable power supply; a jumper selects the default fixed 3.3V supply or one which can be set from 1.75V to 3.9V. The HAT also provides connection points to measure the ZMOD4410 current consumption. This may be useful when integrating the sensor and its software into an extended-life battery-powered product.

Parts

Part number	Description	Price
AES-RHSEN-ZM44-G	ZMOD4410 Indoor Air Quality HAT for Raspberry Pi	$49.95 USD
AES-RHSEN-ZM45-G	ZMOD4510 Outdoor Air Quality HAT for Raspberry Pi	$49.95 USD





Features

- Convenient Raspberry Pi HAT form factor for evaluation, development and quick prototyping of products that monitor air quality
- Sensors are chemically tested and factory calibrated
- On-board user-adjustable power supply option and current measurement connection points
- Configurable alarm/interrupt output
- Supplied with pre-compiled Raspberry Pi OS test / validation application
- Licensed downloadable compiled code offered by Renesas

Avnet's Renesas ZMOD4510 Outdoor Air Quality HAT

Avnet's Renesas ZMOD4510 Outdoor Air Quality HAT for Raspberry Pi is intended for professionals developing applications for monitoring and reporting Outdoor Air Quality (OAQ) based on gases present.

The ZMOD4510 includes non-selective measurement of nitrogen dioxide (NO2) and ozone (O3), as well as selective ozone measurement using ultra-low power. It supports international standards for air quality (such as the US EPA), is excellent for low-volage and low power battery applications (ultra-low power consumption down to 0.2 mW). Water and dustproof versions are available, and can be customized for mobile, industrial and consumer applications.

To purchase this kit, visit avnet.me/zmod-family

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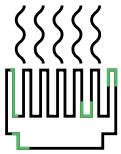
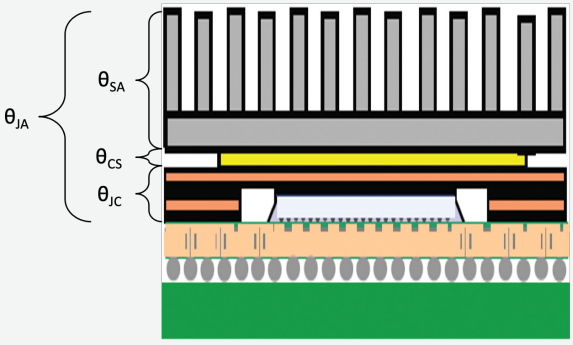
LOOKING FOR THERMAL SOLUTIONS?

Semiconductors require thermal relief - the importance of the thermal solution will continue to be a critical piece of any design

Thermal solutions are not just "fans", the largest component to proper thermal management is the heatsink and interface material which for most high-performance devices is semi-custom to full custom.



Avnet is focused helping customers manage their thermal performance by helping in the selection and design of thermal relief solutions.



Diagram

- Junction to Ambient – Θ_{JA}
- Sink to Ambient – Θ_{SA}
- Case to Sink – Θ_{CS}
- Junction to Case – Θ_{JC}

CONTACT US

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United States of America
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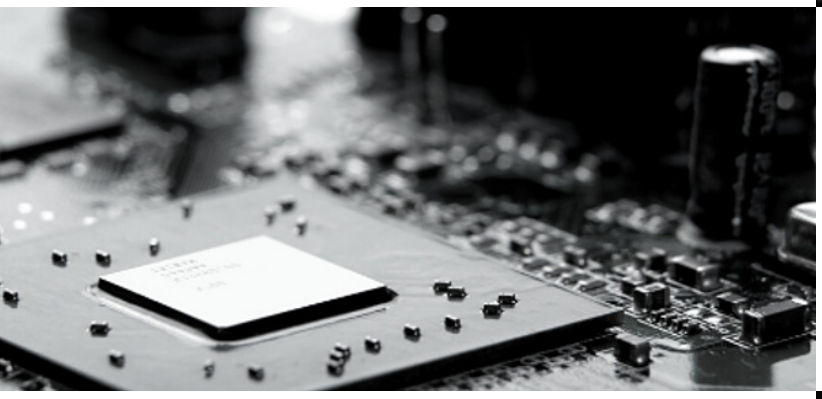

We master NXP's Microprocessors

- A **Gold certified partner** to NXP for over 15 years.
- Numerous of our projects are based on the **i.MX 6 through i.MX 8 processor** family.
- Our software development on the NXP product family ranges from customizing the **Linux kernel**, adding **security** and **OTA** features, integrating **device drivers**, writing **custom applications**, UI and **cloud integration**.

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