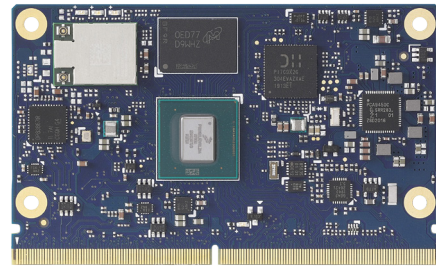


# LEC-IMX8MP

## SMARC 2.1 Short Size Module with NXP i.MX8M Plus

### Features

- NXP i.MX8M Plus with Quad Cortex-A53
- Optional in-SoC 2.3 TOPS NPU
- SMARC revision 2.1 compliant
- LVDS, DSI, HDMI graphic output interfaces
- Dual CAN bus / USB 2.0 / USB 3.0 interfaces
- Dual GbE ports (one TSN capable)
- I<sup>2</sup>S audio codec interface
- Rugged operating temperature (optional): -40°C to +85°C
- 15 year product availability



### Specifications

#### • Core System

##### SoC

NXP i.MX8M Plus with Quad core ARM Cortex-A53  
TrustZone technology supports ARMv8 Cryptography Extensions  
2.3 TOPS Neural Processing Unit (optional)

##### Memory

2/4/8GB LPDDR4L-4266

##### L2 Cache

512KB system L2 cache (ECC)

##### Security

Resource Domain Controller (RDC) supports 4 domains and up to 8 regions of DDR  
Arm® TrustZone® (TZ) architecture: Cortex®-A53 MPCore TrustZone® support  
On-chip RAM (OCRAM) secure region protection using OCRAM controller  
High Assurance Boot (HAB)  
Cryptographic Acceleration and Assurance Module (CAAM)  
Capable to support Widevine and PlayReady content protection  
Public Key Cryptography (PKHA) with RSA and Elliptic Curve (ECC) algorithms  
Real-time integrity checker (RTIC)  
DRM support for RSA, AES, 3DES, DES  
Side channel attack resistance  
True random number generation (RNG)  
Manufacturing protection support / Secure Non-Volatile Storage (SNVS)

##### MIPI-DSI

1x MIPI-DSI 4 lanes

##### Cameras

1x MIPI-CSI dual lane interface  
1x MIPI-CSI quad lane interface

#### • Video

##### GPU Core

Vivante GC7000UL  
GPU Feature Support  
GC7000UL (2 shaders), OpenGL ES 2.0/3.0/3.1, Vulkan,  
OpenCL 1.2; GC380 (2D)

##### VPU Feature Support

1080p60 VP9 Profile 0, 2 (10 bit) decoder (Hantro G2),  
input video stream can be 10-bit, the output decoded  
video is always 8-bit after post-processing in G2 core  
1080p60 HEVC/H.265 decoder (Hantro G2)  
1080p60 AVC/H.264 Baseline, Main, High decoder (Hantro G1)  
1080p60 VP8 decoder (Hantro G1)  
The video encoding features include:  
1080p60 AVC/H.264 Encoder  
1080p60 HEVC/H.265 Encoder

##### HDMI

HDMI 2.0a

##### MIPI-DSI

1x MIPI-DSI 4 lanes

##### Cameras

MIPI-CSI RX Interface  
- Compatible with the MIPI Alliance Interface specification v1.0  
- Up to 4 data lanes, 1.0Gbps maximum data rate per lane  
- Supports MIPI-HS, MIPI-LP mode

## Specifications

### • System Storage

#### SDIO

1x SDIO (4-bit) compatible with SD/SDIO standard, up to version 3.0

#### eMMC

16, 32, 64 or 128 GB (build option)

Compatible with eMMC specifications 4.41, 4.51, 5.0 and 5.1

### • SEMA® Board Controller

Voltage/current monitoring, boot configuration, logistics and forensic information, flat panel control, watchdog timer

### • Debug Header

30-pin multipurpose flat cable connector for use with optional DB-30 debug module

Provides JTAG, BMC access; UART, power test points; diagnostic LEDs, Power, Reset, Boot configuration

### • Audio

#### Audio Codec

I<sup>2</sup>S audio codec (located on carrier)

### • Dual Ethernet

#### Primary LAN

MAC 10/100/1000 Ethernet Controller on SoC (TSN capable)

#### Secondary LAN

MAC 10/100/1000 Ethernet Controller on SoC

### • Wireless Communication

#### Wi-Fi

IEEE 802.11 2X2 MIMO ac/a/b/g/n Wireless LAN

#### Bluetooth

Bluetooth 5.0 compliant with Bluetooth 2.1+Enhanced Data Rate (EDR)

### • Expansion Busses

#### PCIe

2x PCIe x1 Gen3

#### USB

CT 2x USB 3.0, 3x USB 2.0, 1x USB 2.0 OTG

ER 1x USB 3.0, 1x USB 2.0/OTG

#### UART

Three UART interfaces SER1 and SER 2 (CTS/RTS) / SER0 (TX/RX/CTS/RTS)

#### CAN

2x CAN2.0B only or mixed CAN2.0B and CAN FD mode, data bit rate up to 8 Mbps

#### SPI

2x SPI

#### I<sup>2</sup>S

2x I<sup>2</sup>S interfaces with audio resolution from 16-bits to 32-bits and sample rate up to 192KHz (see Audio Codec support)

#### I<sup>2</sup>C

Four I<sup>2</sup>C interfaces

- Support for 7-bit and 10-bit address mode

- Software programmable clock frequency of 100 kbit/s in Standard-mode, 400 kbit/s in the Fast-mode or 1 Mbit/s in Fast-mode Plus

#### GPIO

14x GPIO with interrupt, one GPIO with PWM

### • Storage

#### SDIO

1x SDIO (4-bit) compatible with SD/SDIO standard, up to version 3.0

### • Power

#### Input

5Vdc +/- 5%

### • Mechanical and Environmental

#### Form Factor

SGET SMARC Specifications 2.1

#### Dimensions

SMARC short size module 82 mm x 50 mm

#### Operating Temperature

Standard: 0°C to +60°C

Rugged: -40°C to +85°C (optional)

#### Humidity

5-90% RH operating, non-condensing

5-95% RH storage (and operating with conformal coating)

#### Shock and Vibration

IEC 60068-2-64 and IEC-60068-2-27, MIL-STD-202 F,

Method 213B, Table 213-I, Condition A and Method 214A,

Table 214-I, Condition D

#### HALT

Thermal Stress, Vibration Stress, Thermal Shock and Combined Test

### • Operating Systems

#### Standard Support

Yocto Linux BSP, Android

#### Extended Support (BSP)

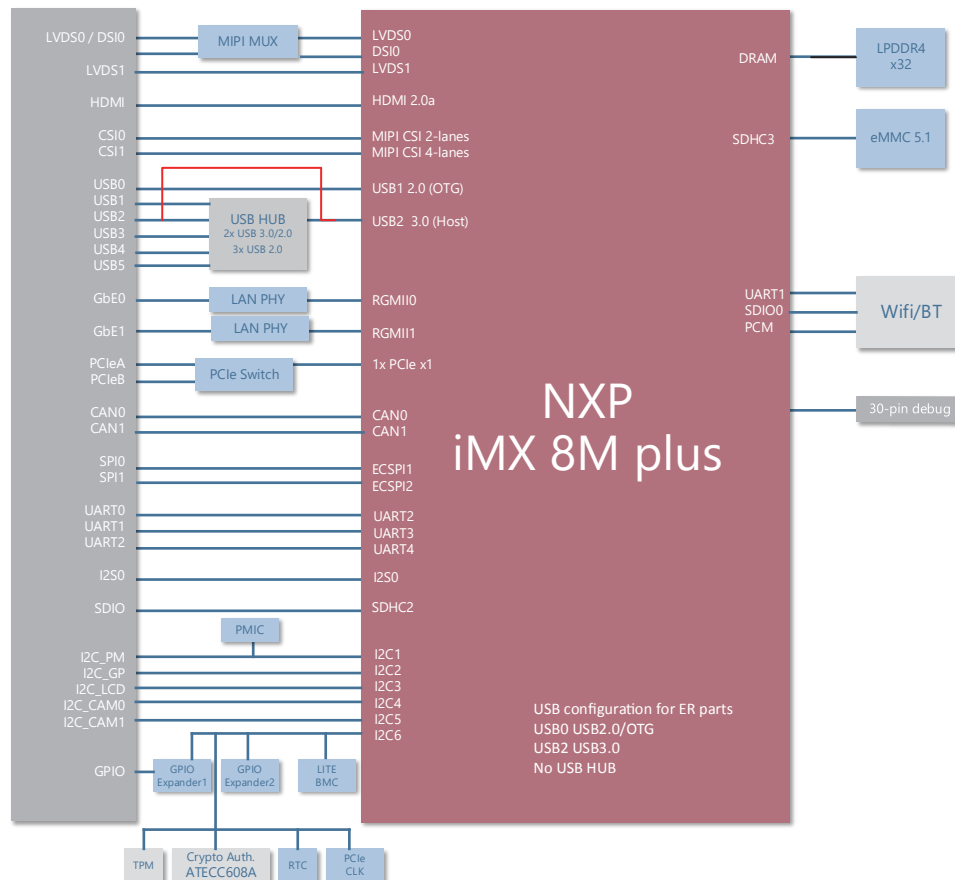
VxWorks

# LEC-IMX8MP

## Ordering Information

- LEC-IMX8MP-Q-N-2G-32G-CT**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, NPU, 2 GB LPDDR4, 32 GB eMMC, 0°C to 60°C
- LEC-IMX8MP-Q-N-2G-32G-ER**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, NPU, 2 GB LPDDR4, 32 GB eMMC, -40°C to 85°C
- LEC-IMX8MP-Q-N-4G-32G-CT**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, NPU, 4 GB LPDDR4, 32 GB eMMC, 0°C to 60°C
- LEC-IMX8MP-Q-N-4G-32G-ER**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, NPU, 4 GB LPDDR4, 32 GB eMMC, -40°C to 85°C
- LEC-IMX8MP-Q-2G-32G-CT**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, 2 GB LPDDR4, 32 GB eMMC, 0°C to 60°C
- LEC-IMX8MP-Q-2G-32G-ER**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, 2 GB LPDDR4, 32 GB eMMC, -40°C to 85°C
- LEC-IMX8MP-Q-4G-32G-CT**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, 4 GB LPDDR4, 32 GB eMMC, 0°C to 60°C
- LEC-IMX8MP-Q-4G-32G-ER**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS, 4 GB LPDDR4, 32 GB eMMC, -40°C to 85°C
- LEC-IMX8MP-QL-2G-16G-CT**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS Quadlite, 2GB LPDDR4, 16 GB eMMC, 0°C to 60°C
- LEC-IMX8MP-QL-2G-16G-ER**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS Quadlite, 2GB LPDDR4, 16 GB eMMC, -40°C to 85°C
- LEC-IMX8MP-QL-2G-16G-C**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS Quadlite, 2GB LPDDR4, 16 GB eMMC, 0°C to 60°C
- LEC-IMX8MP-QL-2G-16G-ER**  
 SMARC 2.1 Short Size Module with Quad Core NXP i.MX8M-PLUS Quadlite, 2GB LPDDR4, 16 GB eMMC, -40°C to 85°C

## Block diagram



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