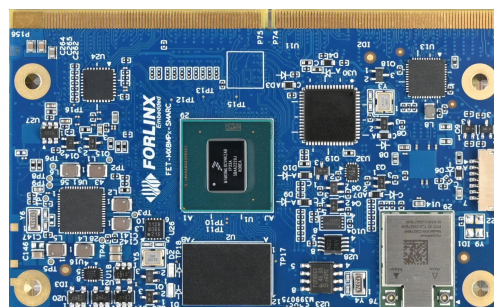


FET-MX8MPQ-SMARC SoM

FET-MX8MPQ-SMARC System on Module (SoM) is powered by NXP i.MX8M Plus processor which can be widely used in machine learning, machine vision, advanced media and industrial automation related applications. It contains 4 Cortex-A53 cores at speed up to 1.6GHz and a built-in NPU up to 2.3 TOPS. Integrated ISP and two CSI make it appropriate for advanced vision system related applications. And co-processor M7 could be used for real time tasks processing. Besides, it provides additional computing resources and peripherals such as CAN-FD, TSN enabled Gigabit Ethernet, USB3.0, PCIe3.0, SDIO3.0 and other high-speed interfaces.

Features:

- Complies with SMARC standard;
- Dual Gigabit Ethernet with one available for TSN;
- Advanced multi-media capability, supports 3D/ 2D;
- Built-in NPU up to 2.3 TOPS;
- The vision engine is composed of two camera inputs and a HDR-capable ISP;



4x A53+ 1x M7	1.6GHz	2.3TOPS
Architecture	Clock	NPU
CAN-FD	TSN	-40~85°C
2-	Ethernet	Operating

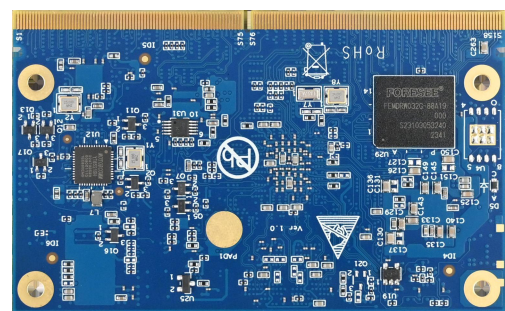
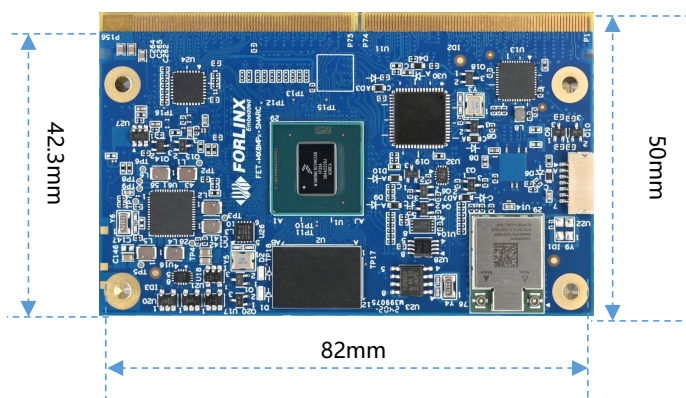
SoM features:

CPU	NXP i.MX8MPQ CPU: quad-core Cortex-A53@ 1.6GHz+ single-core Cortex-M7@ 800MHz NPU: 2.3TOP GPU: 3D/ 2D, supports OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan VPU: Hard decode: •HEVC/H.265, VP9, VP8, AVC/H.264: up to 1080p@60fps Hard encode: •H.265/HEVC, H.264/AVC: up to 1080p@60fps
RAM	2GB/4GB
ROM	16GB eMMC
Power input	DC 5V
Operating temp	-40~85°C
Package	MXM3.0(314pin, Body Height-7.8mm, Stack Height-5mm)

■ SoM Features

Interface	QTY	Spec.
USB3.0	2	2x USB3.0/2.0 controller integrated with PHY
USB2.0	5	Supports Highspeed (HS), Full-speed (FS), and Low-speed (LS)
MIPI-CSI	2	2x 4-lane MIPI-CSI, up to 1.5Gbps
MIPI-DSI	1	1x 4-lane MIPI-DSI, up to 1.5Gbps; 1080 p60 • WUXGA (1920x1200) at 60 Hz 1920x1440 at 60 Hz UWHD (2560x1080) at 60 Hz WQHD (2560x1440) by reduced blanking mode
LVDS	2	Up to 1920x 1200@60FPS;
HDMI	1	Up to 4K@30FPS
Ethernet	2	EMAC, 10/100/1000 Mbps, one supports TSN
PCIe	1	PCI Express Gen 3
CAN-FD	2	CAN2.0B, ISO 11898-1
SDIO	1	SDIO 3.0
I2S	2	SAI, supports I2S, AC97, tdM and codec/DSP
SPI	2	52Mbit/s, master/ slave configurable
I2C	5	Up to 320kbps
UART	4	Up to 4Mbps
PWM	3	16-bit counter
GPIO	>14	
WiFi & BT	1	Supports WiFi 5 MIMO and Bluetooth 5.3. Pinned out by SDIO3.0 and UART
JTAG	1	IEEE 1149.1 testability (JTAG)

■ Exterior and dimensions:



■ OS:

OS	Linux 6.1.36
Firmware installation	USB OTG

■ Driver list:

Linux6.1.36 Driver List	Interface	Function	Chipset
	SDIO	WiFi-BT	AW-CM276NF
	UART	BT	
	IIS	Audio	NAU8822
	IIC	RTC	PCF8563
	MIPI-DSI	Display	FIT-LCD7.0_MIPi V2.1, 1024x600
	I2C	FT5306	
	LVDS	10.1’’	FIT_LVDS10.1C 1280x800
	I2C	GT928	
	USB	4G(M.2)	EM05
	USB	5G(M.2)	RM500U, RM500Q
	USB	Camera	C270
	PCIe	NIC	INTEL E1000
	MIPI-CSI	Camera	OV5645
	MIPI-CSI	Camera	daA3840-30mc

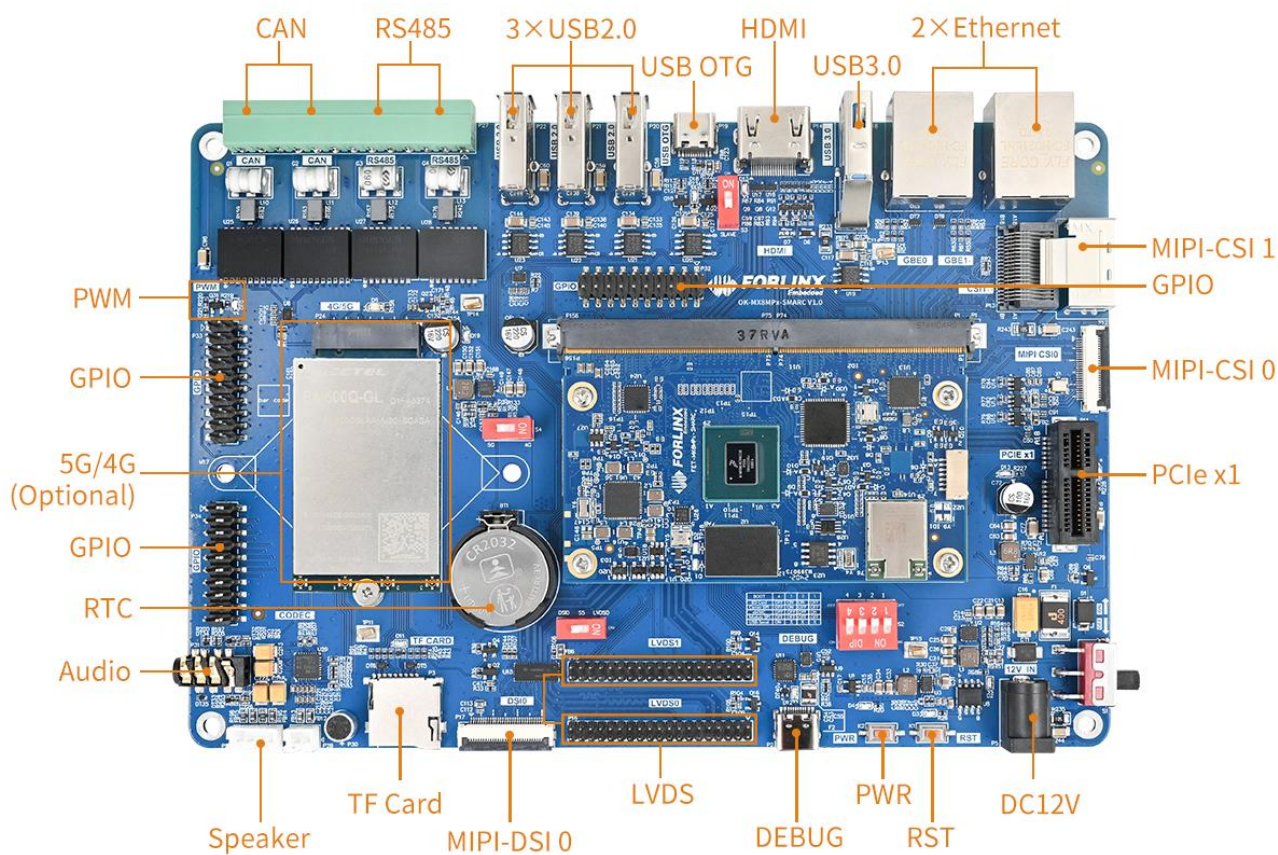
■ Provided technical files

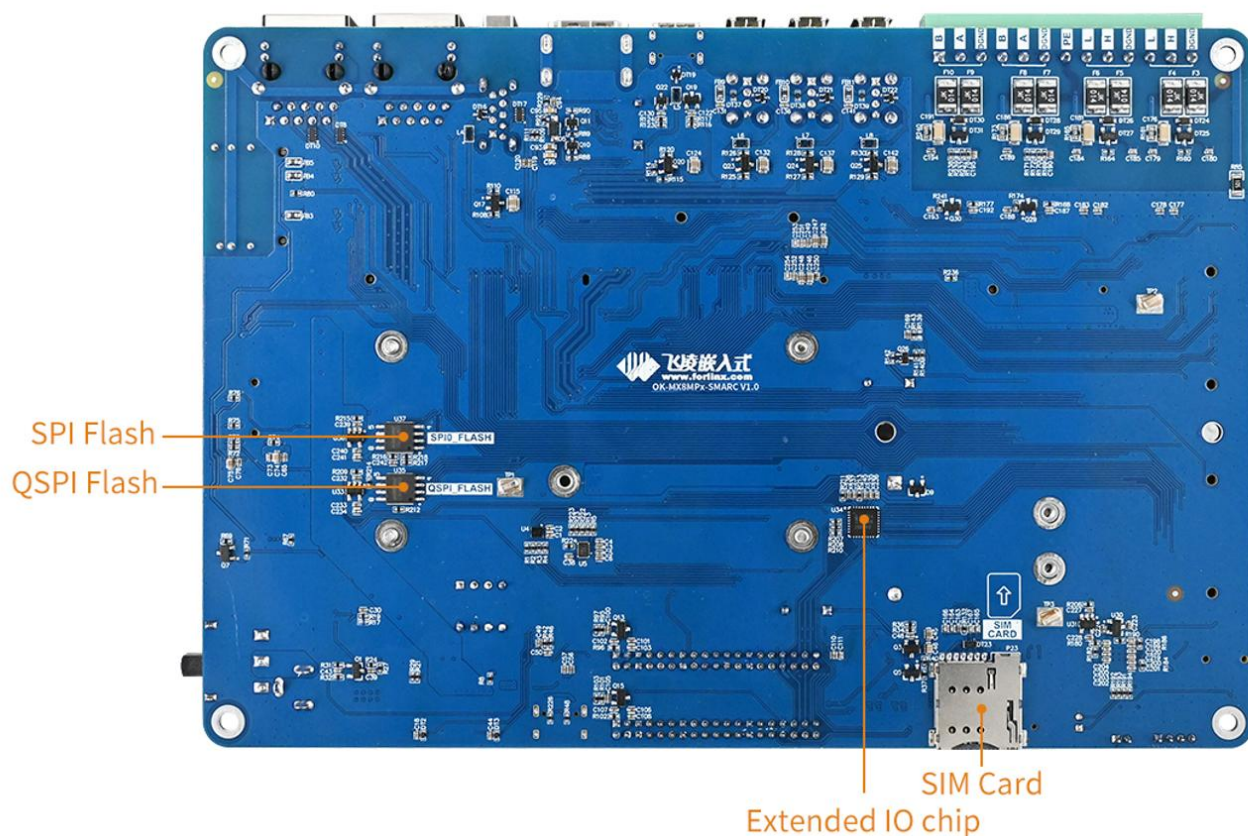
Firmware	User manual, compiling guideline, kernel source code, file system, OS image, Flash tool
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■ Order options:

Model	Core number	Clock	RAM	Flash	Working temp	Status
FET-MX8MPQ-SMARC+162GSE16GIxxx: xx	4x A53+ 1x M7	A53@1.6GHz	2GB	16GB	-40~85°C	Mass production
FET-MX8MPQ-SMARC+164GSE32GIxxx: xx	4x A53+ 1x M7	A53@1.6GHz	4GB	32GB	-40~85°C	Mass production

■ Development board/ kit





■ Carrier board features:

Interface	QTY	Spec.
USB3.0	1	USB Type-A, only for Host, with over-voltage/current protection circuit
USB2.0	3	USB Type-A, only for Host, with over-voltage/current protection circuit
USB2.0 OTG	1	USB Type C, HOST / SLAVE switchable by DIP, with over-voltage and over-current protection; For OS image flashing
MIPI-CSI	2	CSI1: daA3840-30mc, 3840X2160; CSI2: OV5645, by 26-pin FPC connector
MIPI-DSI	1	DSI0 mode and LVDS0 mode controlled by Switch; 4-lane MIPI-DSI by FPC connector; Forlinx 7'' MIPI-DSI(1024x 600) module can be well supported
LVDS	2	DSI0 mode and LVDS0 mode controlled by Switch; 2x 4-lane LVD with 1080, LVDS0 and DSI0 share the same data lanes; Forlinx 10.1'' LVDS module can be well supported
HDMI 2.0	1	HDMI2.0a up to 3840 x 2160@30fps
Ethernet	2	10/100/1000Mbps, RJ45, one is available for TSN; Based on PCIe X1, complies with PCI Express Gen3.
TF Card	1	1x SDIO, supports UHS-I TF card, up to 104MB/ s
4G/ 5G	1	M.2 B-KEY, 4G and 5G are alternative Recommended 4G module: EC20, recommended 5G module: RM500Q; On-board MicroSIM card slot

IIS	2	1x I2S connected to CODEC for audio; 1x I2S by pin headers for user's expanding
Audio	1	On-board NAU88C22YG, I2S; Supports Phone and MIC, by 1x 3.5mm jack; Supports 2x 1W 8Ω speaker, by XH2.54 whiter header;
CAN-FD	2	Industrial isolated CAN FD chip, up to 8Mbps; Complies with CAN2.0B, by DG128 green header;
QSPI	1	2x 16MB FLASH, one based on QSPI;
SPI	1	2x 16MB FLASH, one based on SPI; Can be configured to SPI booting mode;
RTC	1	Complies with SMARC standard, equipped with one CR2032 cell
I2C	4	Can be mounted with audio, camera, TP and other related devices
Debug UART	2	2 UARTs converted to 1 USB for debug device; UART1 and UART2 on carrier board are used as Debug ports
RS485	2	UART0 and UART3 on carrier board are used for RS485; Industrial isolated RS485 chip, up to 4Mbps, by DG128 green header;
PWM	5	For display backlight control and LED breathing
GPIO	\	By pin headers, contains some special functional pins defined according to SMARC standard

