



## Characteristics

- NXP i.MX 8ULP applications processor  
1-2x Cortex®-A35- 800MHz & -M33- 216MHz  
HIFI4 DSP – 600MHz, 2D/ 3D GPU OpenGL/CL 3.1
- TFT MIPI-DSI, RGB 24 Bit
- 2D and 3D hardware acceleration
- up to 2GB LPDDR4 x32 RAM, 64GB eMMC, 2k EEPROM
- I2S
- 2x USB 2.0, MIPI-CSI
- RMII (Ethernet)
- 5V with 2W typ., 0°C - +70°C (-20°C/ -40°C - +85°C)
- OSM Size S
- Minimum availability: 2035

Original Size: 30x30mm



## Description

The SDT.05 standardization group was founded at SGET with the aim of defining a standard for a direct solder module. The founding members were IESY GmbH, F&S and Kontron, with many other members joining in the course of time. The advantages of OSM are machine assembly, a lot of performance and functions in a small space, and the costs as well as the risk of using connectors are eliminated. Both software and hardware interfaces are defined in the OSM standard. This makes it relatively easy to exchange OSM modules (different manufacturers, different CPUs, etc.). OSM is defined in four different sizes, wherever F&S has decided to focus in Size-S which is 30x30mm.

All F&S OSM modules are single side mounted PCBs.

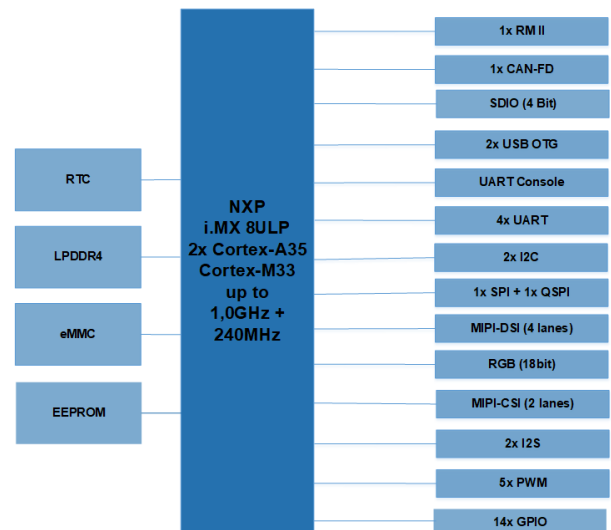
F&S has been developing and producing embedded boards in Germany for more than 25 years and offers a wide range of modules with NXP CPUs (i.MX 6, i.MX 8 and i.MX9) on different form factors (plug-on modules with connectors (PicoCore) or with finger contacts (efus/SMARC) and also SBC solutions (armStone).

FS-8ULP-OSM-SF is based on NXPs i.MX8ULP application processor. 8ULP is a ultra low power CPU with 2x Cortex-A35 + Cortex-M33 + HIFI4 DSP. To minimal power consumption the CPU has integrated 2D GPU and 3D GPU and the memory interface is 32bit. An integrated RISC-V dynamically handles frequencies and voltages. Besides it's outstanding low power and capabilities the module offers mean industrial interfaces like LAN, 2x USB, SDIO, UART, IS2C and GPIO. Displays can be connected via MIPI-DSI or RGB interface. Also a MIPI-CSI camera interface is available.

To increase robustness against security attacks, 8ULP has an integrated secure enclave called Edgelock. This is the preferred place to store your secrets (private key) and built a root of trust.

In addition to the OSM module, F&S also offers the development and production of a suitable carrier board. The complete unit can be shipped with pre-installed software to the customer.

## Block Diagram



## Starterkit

The starter kit consists of a carrier board with attached PicoCore™ MX8ULP, a cable set and access data to the download area of F&S.

The forum with over 4000 registered customers offers sample programs and is online 24/7 for your support requests.

In addition, there are various workshops (including security, asymmetric multiprocessing), so that a quick and easy development start is possible.

Documents for hardware and software development and free support by the experienced engineers of F&S Elektronik Systeme GmbH are available.



## On-Board Operating System



The operating system Linux (with support for Yocto) was ported by the experienced software team from F & S Elektronik Systeme.

The drivers have been adapted and tested for all interfaces. Different memory sizes and different displays are supported. Finished drivers exist for numerous touch controllers. An adapted FreeRTOS and various “bare metal” examples are available for the Cortex®-M33. Communication between Cortex®-M33 and Cortex®-A35 has been implemented and tested. The Cortex®-M33 can process real-time tasks shortly after switching on.

## Workshops

We offer various Linux workshops to get you started.

- Linux on F&S modules
- Linux - Qt workshop
- Linux - Asymmetric multiprocessing
- Linux - Secure Boot

You can find detailed information on our website.

## Standard Versions/ Order Notations

### FS-8ULP-OSM-SF-V11

i.MX 8ULP-Dual 800MHz Industrial 2D/3D GPU, 1GB RAM, 4GB eMMC, 64k EEPROM, RMII (Ethernet), 2x USB, UART, I2C, SPI, CAN, I2S (Audio), RGB, MIPI-DSI, RTC, -20°C +85°C, Linux

### FS-8ULP-OSM-SF-V21

i.MX 8ULP-Dual 800MHz Industrial 2D/3D GPU, 2GB RAM, 4GB eMMC, 64k EEPROM, RMII (Ethernet), 2x USB, UART, I2C, SPI, CAN, I2S (Audio), RGB, MIPI-DSI, RTC, -20°C +85°C, Linux

Minimum Order Quantity is **500pcs**

Minimum Order Quantity for Special Versions  
Assembly Variant: **1000 pcs**

## Technical Data

Power Supply:	5VDC
Power Consumption:	2W typ.
Processor:	Single/ Dual ARM® Cortex®-A35-800MHz & ARM® Cortex®-M33-216MHz & HIFI4 DSP-600MHz
Memory:	LPDDR4-32 up to 2GB eMMC up to 64GB, 64k EEPROM
Interfaces:	RMII (1x 10/100Mbit Ethernet) 1x SDIO, GPIO, RTC 2x USB 2.0 OTG, 1x CAN, 4x UART, 3x I2C, 2x SPI, I2S (Audio), 5x PWM
Display:	MIPI-DSI (4 lane), RGB
Camera:	MIPI-CSI (2 lane)
Temperature range:	-20°C - +85°C, (opt. - 40°C+85°C)
Size:	Size-S 30mm x 30mm x 3mm
Weight:	About 7g

## Standard Versions/ Order Notations

### FS-8ULP-OSM-SF-SKIT

To start development we recommend our starterkit with PicoCore8ULP.

### PicoCore™MX8ULP-SKIT-LIN

Starterkit with PicoCoreMX8ULP-V2-LIN, base board, cable kit, 3.5" MIPI display, access data to BSP and documentation