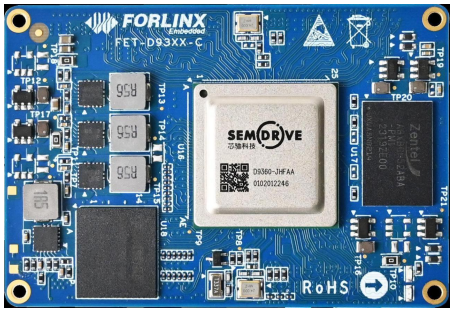
FET-D9360-C SoM

FET-D9360-C system on module is powered by SemiDrive's D9-Pro application processor that consists of 6 Cortex-A55 and 1 Cortex-R5. The SoM is based on 10-layer ENIG PCB with 44x 65mm, and it could be connected to carrier board via 4 ultra thin 4x 100-pin connectors which can maximize the processor's power. Besides, the designing is compatible with all D9 series processors.



Highlights:

- R5 core for real-time tasks processing;
- 16nm processing technology;
- Connection between SoM and carrier board based on four ultra thin 100-pin connectors, combined height only 1.5mm;
- Multiple high-speed peripherals, such as dual Gigabit Ethernet supported with TSN, USB3.0, CAN-FD, UART, etc;
- Supports dual LVDS displays, dual MIPI-CSI and triple-displaying;
- 3D GPU, AI accelerator and H.264 coder

6x Cortex-A55	2.0GHz	Cortex-R5
Architecture	Clock	Dual-core lock-step
16	4	-40~+85℃
UART	CAN-FD	Operating temp

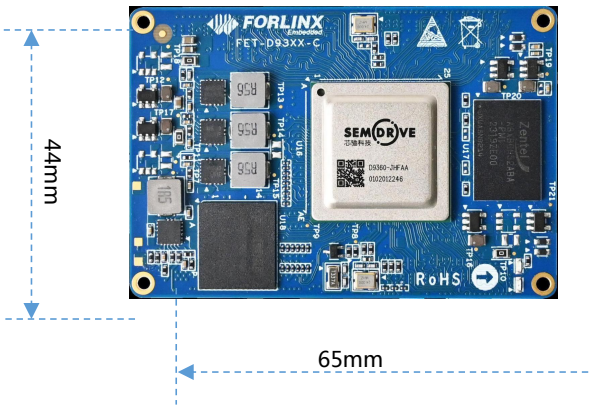
SoM features：

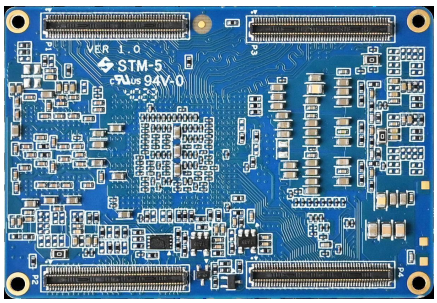
CPU	SemiDrive D9 Pro **CPU:** D9360-JHFAA **Architecture:** 6×Cortex-A55+1×Cortex-R5 **Clock:** 2.0GHz+ 800MHz **NPU:** 0.4TOPS INT8(0.8TOPS INT4) **GPU:** PowerVR 9XM 3D GPU, 100GFLOPS **VPU:** H.264 video codec, 4Kp30, H.265 video decoding 4Kp30
RAM	2GB/4GB LPDDR4x
ROM	16GB/32GB eMMC
Voltage input	DC 12V
Operating temp	-40℃~+85℃
Package	Board-to-board connector(4x 100-pin, pitch 0.4mm, combined height 1.5mm)

SoM specifications:

Peripheral	NUM	Spec.
LVDS	2	2x 8-lane dual LVDS, up to 2K; 4x 4-lane single LVDS, up to 1080P
MIPI-DSI	2	Up to 2K, fit with Forlinx 7'' MIPI-DSI module(1024x 600)
MIPI-CSI	2	Supports 4 analog camera Supports 4 1080P@ 30FPS camera input
Ethernet	2	2x RGMII GMAC, rating 10/ 100/ 1000Mbps Supports 1.8V/ 2.5V RGMII mode Supports 3.3V RMII mode
PCIe	2	2x PCIe 3.0x1(or 1x PCIe3.0x2), supports RC/ EP
USB3.0	2	
CAN-FD	4	
OSPI	2	Supports SDR and DDR modes Supports data bit width defining, and supports 1bit/2bit/4bit/8bit mode
SDIO	2	Supports DS and HS Supports SDR 12/SDR 25/SDR 50/SDR 104/DDR 50
IIS	≤6	Supports 4 single channel I2S/ TDM, supports multiple data align mode; Supports 2 multi-channel I2S and multiple data align mode
ADC	4	12bit SAR ADC
SPI	≤8	Both host mode and slave mode are supported
UART	≤16	
IIC	≤12	
JTAG	1	

Exterior and dimensions:





Note: tolerance ±0.2mm

It's suggested to use double-pass copper pillars with M2* 5mm, and mating screw with M2* 4mm

OS:

OS version	Linux 4.14.61+Qt 5.15.2
Firmware installation	• TF card • USB device

Driver list:

	Peripheral	Function	Chipset
Linux5.4.61	SDIO	WiFi	AW-CM358
	UART	BT	
	I2S	Audio	NAU8822, 24bit, audio record: 8K-48K, playback 8K-96K
	I2C	RTC	PCF8563
	MIPI-DSI	7’’	FIT-LCD7.0_MIPI V2.1, 1024×600, TP: FT3427
	LVDS	10.1’’	IT_LVDS_10.1_C, 1280×800, TP: GT928
	USB	4G modem	EM05, M.2
	USB	5G modem	RM500U, RM500Q, M.2
	USB	USB to 4x UART	USB-TO-4-UARTS
	PCIe	NIC	INTEL E1000, 1000M wired NIC
	MIPI-CSI RGMII	camera Ethernet	YT8521S

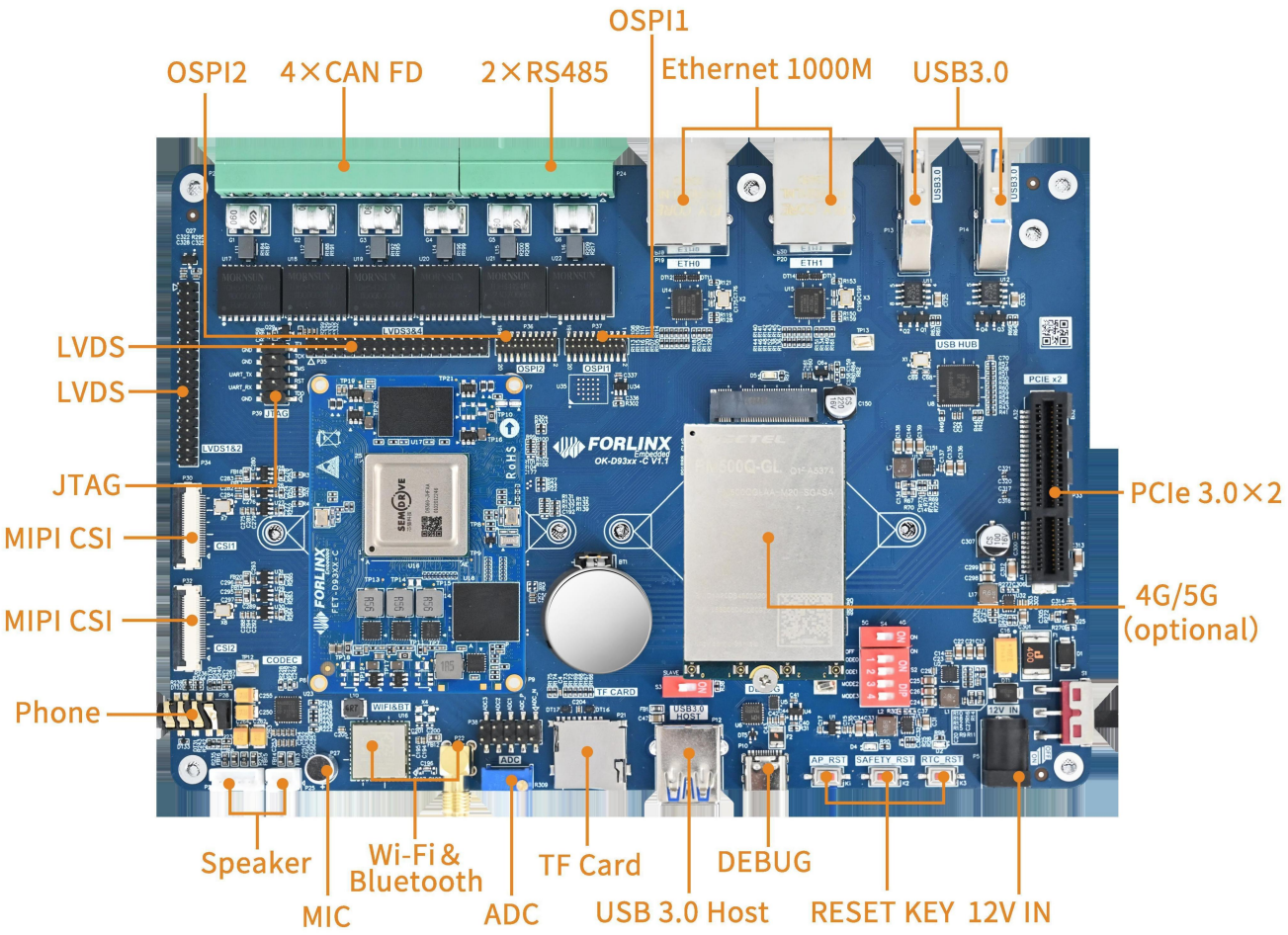
Provided technical files

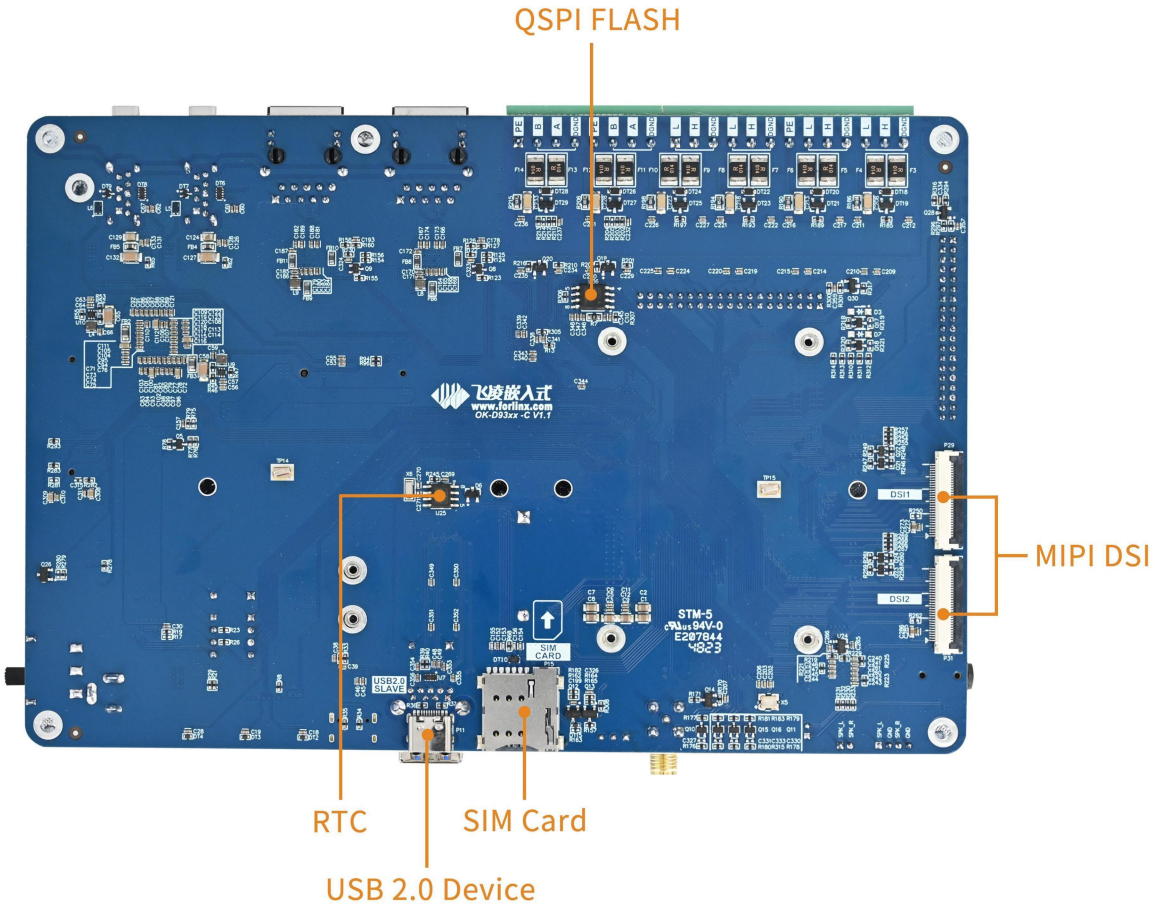
Linux4.14.61	User manual, compiling guideline, GIT source, 3P tool and lib, reference files from StarFive, kernel source code, file system, OS image, VM ubuntu image, SD card making tool
Hardware	User manual, carrier board schematic, carrier board PCB(CAD), datasheet, carrier board and SoM DXF files, pinmux sheet

Ordering options:

Model	Core Number	Clock	RAM	Flash	Working temp	Phase
D9360-C+202GSE16GIA11: xx-x	6×A55	2.0GHz	2GB	16GB	-40~+85℃	Mass production
D9360-C+204GSE32GIB11: xx-x	6×A55	2.0GHz	4GB	32GB	-40~+85℃	Mass production

Development board/ kit





Carrier board features

Peripheral	NUM	Spec.
USB3.0	4	1 separate high-speed USB3.0 Type-A connector The carrier board is configured with one USB HUB for extra 3 USB3.0 expanding, 2 of them connected to USB3.0 Type-A, and 1 connected to M.2 B-KEY slot for 4G/ 5G
USB Device	1	USB 2.0 Device Type-C(up to 480Mbps), it shares one USB2.0 with USB3.0 Type-A for OS image flashing
4G/ 5G	1	1 M.2 B-KEY slot is available on carrier board for 4G/ 5G
Ethernet	2	10/100/1000Mbps, RJ45
Audio	1	On-board NAU88C22YG; Supports earphone output and MIC input, they are integrated into one 3.5mm jack; Supports 2 1W 8Ω speaker output, available on carrier board by XH2.54 white headers
MIPI-DSI	2	2x 4-lane MIPI-DSI are available on carrier board by FPC connector Fit with Forlinx 7'' MIPI-DSI module with resolution of 1024x 600
MIPI-CSI	2	2x 4-lane MIPI-CSI are available on carrier board, OV5645 could be well supported
PCIe	1	1x PCIe3.0 x4 slot, only available for PCIe3.0 x1 or PCIe3.0 x2 device
LVDS	2	2x LVDS by headers with pitch of 2.0mm are available, can support below two solutions 2x 8-lane LVDS, each one up to 1080P; 4x 4-lane LVDS, each one up to 720P
CAN-FD	4	Isolated, CAN-FD is well supported and available on carrier board by DG128 terminal
RS485	2	Isolated
WiFi	1	Model: AW-CM358 IEEE 802.11a/b/g/n/ac WLAN with Bluetooth 5.2 Combo LGA Module WiFi is based on SDIO 3.0; BT is based on UART
BT	1	
TF Card	1	SD, SDHC, SDXC(UHS-I)
OSPI	2	Pin headers with pitch of 1.27mm
I2C	4	For carrier board audio, RTC, camera, TP and other related devices
PWM	5	For backlight control
ADC	4	By 2.54mm pin headers, SDC-CH4 is connected with a sliding rheostats
JTAG	1	By 2.54mm pin headers
RTC	1	
UART Debug	3	On-board USB to UART chip, for A55 serial debug and R5 debug
USB Debug	1	USB type-C port, default baud rate 115200

Power Consumption

No.	Testing	Power input	SoM Consumption(w)	Evk Consumption(w)
1	Boot without loading, peak	12±5%	6.05	8.2
2	Standby mode, no loading	12±5%	4.38	6.45
3	CPU+ RAM+ eMMC stress testing	12±5%	6.2	8.3
4	2x 10.1'' LVDS+OV5645+7'' MIPI-DSI+ video decoding	12±5%	/	18
5	2x 10.1'' LVDS+OV5645+7'' MIPI-DSI +video encoding	12±5%	/	17.7

