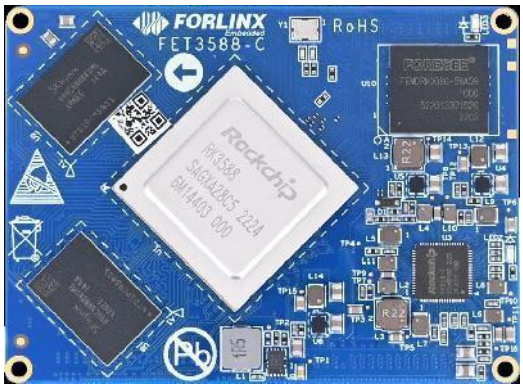
FET3588-C SoM

FET3588-C System on Module (SoM) carries Rockchip's advanced hybrid processor RK3588 contains quad-core Cortex-A76 and Cortex-A55 cores, A76 core runs up to 2.4GHz, and A55 core clock up to 1.8GHz. It has a super advanced engine can support up to 8K output, quad-screen with different content output; The SoM has been subjected to rigorous ambient temperature testing, which approve that it could be a trusted and best option for your high-end applications and products.



Features:

- 8K video codec, can support various codec forms;
- ISP3.0 up to 48MP;
- Various video outputs up to 8K@60Hz;
- 4 PCIe3.0 and 3 PCIe2.1, up to 8Gbps
- Multiple USB3.1 Type-C, can support SATA3.1;
- The SoM designed with 4x 100-pin ultra thin connectors, combined connector height is only 1.5mm ;
- All processor sources are available on the SoM with good signal integrity and power integrity.

4x A76+ 4x A55	Up to 2.4GHz	6TOPS
Architecture	Speed	NPU
Mail-G610 MP4	8nm	64-bit
GPU	Processing	Processor

SoM Overview：

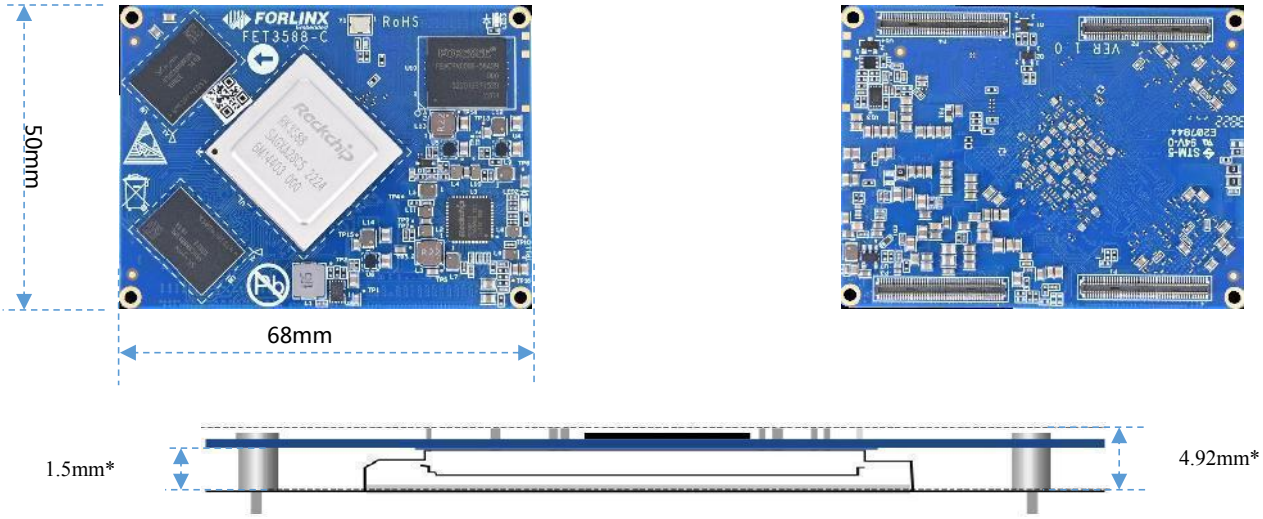
Processor	Rockchip RK3588 **CPU:** quad-core Cortex-A76@2.4GHz+ quad-core Cortex-A55@1.8GHz **NPU:** 6TOPS, supports INT4/INT8/INT16/FP16 mixed operating; **GPU：** • Mail-G610 MP4 • OpenGLES 1.1, 2.0, 3.2, OpenCL 2.2, Vulkan1.2 **VPU:** Decode: • H.265, VP9: up to 8K@60fps • H.264 up to 8K@30fps • AV1 up to 4K@60fps Encode: • H.265/HEVC, H.264/AVC: up to 8K@30fps
RAM	4GB/8GB LPDDR4x
ROM	32GB/64GB eMMC
Power input	DC 12V
Operating temp	0℃ ~ +80℃
Package	Board-to-board connector(4*100-pin, 0.4mm pitch, combined height 1.5mm)

SoM Features

Interface	Type	QTY	Spec.	
Video input	MIPI DC PHY(DPHY/CPHY)	2	• Supports DPHY or CPHY; • 4-lane MIPI DPHY V2.0m, each line up to 4.5Gbps; • 3-lane MIPI CPHY V1.1, each line up to 2.5Gsps;	Supported MIPI-CSI combo: 2 MIPI DCPHY+ 4 x 2-lane MIPI CSI DPHY 2 MIPI DCPHY+1 x 4-lane MIPI CSI DPHY 2 MIPI DCPHY+2 x 4-lane MIPI CSI DPHY
	MIPI CSI DPHY	4	• 2-lane MIPI DPHY V1.2, each line up to 2.5Gsps; • two 2-lane DPHY can be combined to a 4-lane DPHY	
	DVP	1	• 8/10/12/16-bit standard DVP up to 150MHz input; • Supports BT.601/BT.656 and BT.1120 VI	
	HDMI RX	1	• Supports 3.4Gbps~6Gbps HDMI 2.0; • Supports 250Mbps~3.4Gbps HDMI 1.4b; • Supports HDCP2.3 and HDCP1.4	
Video output	HDMI/eDP TX	≤2	• HDMI/eDP TX are multiplexed, each interface supports x1, x2 and x4; • HDMI up to 7680x4320@60Hz, supports 3, 6, 8, 10, 12Gbps band widths, supports HDCP2.3; • eDP is up to 4K@60Hz, supports 1.62Gbps, 2.7Gbps and 5.4Gbps band widths, supports HDCP1.3	
	DP TX	2	• Supports 2 DP TX 1.4a, which is available for USB3.1 Gen1, supports 1/ 2/ 4 lanes; • Up to 8192x4320@30Hz; • Supports HDCP2.3, HDCP 1.3	
	MIPI DSI	2	• Supports 2 MIPI DPHY2.0 or CPHY 1.1, up to 4K@60Hz; • Supports left/ right mode dual MIPI-DSI, available for RGB/ YUV up to 10-bit ;	
	BT.1120	1	• Supports RGB up to 8-bit and rating up to 150MHz; • Up to 1920x1080@60Hz ;	
Audio	I2S	≤4	• 8 lanes I2S0/I2S1: supports both TX and RX, audio resolution 16~32 bits, sampling rate up to 192KHz; • 2 lanes I2S2/I2S3: supports both TX and RX, audio resolution 16~32 bits, sampling rate up to 192KHz	
	SPDIF	2	• Supports 2x 16-bit data storing; • Supports biphasic stereo output	
	PDM	2	• Up to 8 channels, resolution 16~24 bits, sampling rate up to 192KHz; • Supports PDM primary receive mode	
	DSM PWM	1	Convert PCM data to bitstream digital directly to 1-bit data output, the output digital signal will be filtered to audio signal	
Network	Ethernet	2	2x GMAC by RGMII / RMII, 10/100/1000Mbps	
Others	USB3.1 Gen1	3	• USB3.1 Gen1 up to 5Gbps; • 2 USB3.1 OTG, multiplexed with DP TX(USB3OTG_0 and USB3OTG_1), USB3OTG_o and USB3OTG_1 support USB Type-C and DP Alt; • 1 USB3.1 Host, multiplexed with PIPE PHY2(USB3OTG_2)	
	USB 2.0 Host	2	2x USB 2.0 Host	
	PCIe 2.0	≤3	Each PCIe2.1 can support 1 lane, up to 5Gbps	
	PCIe 3.0	2	• supports RC and EP, up to 8Gbps; • support 4 combinations: 1 x4, 2 x2, 4 x1, 1 x2+ 2 x1	
	SPI	≤5	• each controller supports two chip select output; • Serial master mode and serial slave mode are configurable	
	I2C	≤9	• support 7-bit and 10-bit address mode; • standard mode data transferring rate up to 100K bits/s, and high-speed mode up to 400K bits/s.	
	UART	≤10	• built-in 2 64-bit FIFO, can be used for TX and RX respectively; • supports 5-bit, 6-bit, 7-bit and 8-bit serial data transceiving, baud rate up to 4Mbps; • all 10 UART can support auto flow control	

	CAN	≤3	• 3 CAN2.0B; • can support CAN standard frame and expanding frame transceiving
	SATA	≤3	• 3 SATA3.0 controllers, PIPE PHY0/1/2 is multiplexed by PCIe and USB_HOST2; • supports eSATA up to 6Gbps
	PWM	≤16	Up to 16 on-chip PWM, supports capturing mode
	ADC	≤8	8x 12-bit single-end input SAR-ADC, sampling rate up to 1MS/s

Exterior and dimensions:



Height diagram after installation

* tolerance ±0.2mm

OS:

OS	Android12.0, Ubuntu[TBD], Linux[TBD]
Firmware installation	• TF card • USB OTG

Driver list:

Linux4.19 Driver List

Interface	Function	Chipset
IIC	Capacitive touching	FT5x06
IIC	Capacitive touching	GT9xx
IIC	RTC	rx8010
SDIO	Wi-Fi	AW-CM276MA and AW-XM458
UART	BT	AW-CM276MA and AW-XM458
USB	UVC camera	Logitech C270
USB	4G	Quectel EM05-CE R2.0(compatible with EC20-CEHDLG)
USB	5G	Quectel RM500U, RM500Q
MIPI-CSI	Camera	OV13850
MIPI-DSI	7’’ MIPI-DSI	FIT-LCD7.0C V2.1 1024x600
eDP	12.5’’	BOE NV125FHM-N82, 12.5-inch, 1920*1080
RGMII	Gigabit Ethernet	RTL8211FSI-CG
PWM	LCD backlight	/
UART	Generic	Generic
SPI	Generic	Generic
GPIO	Generic	Generic

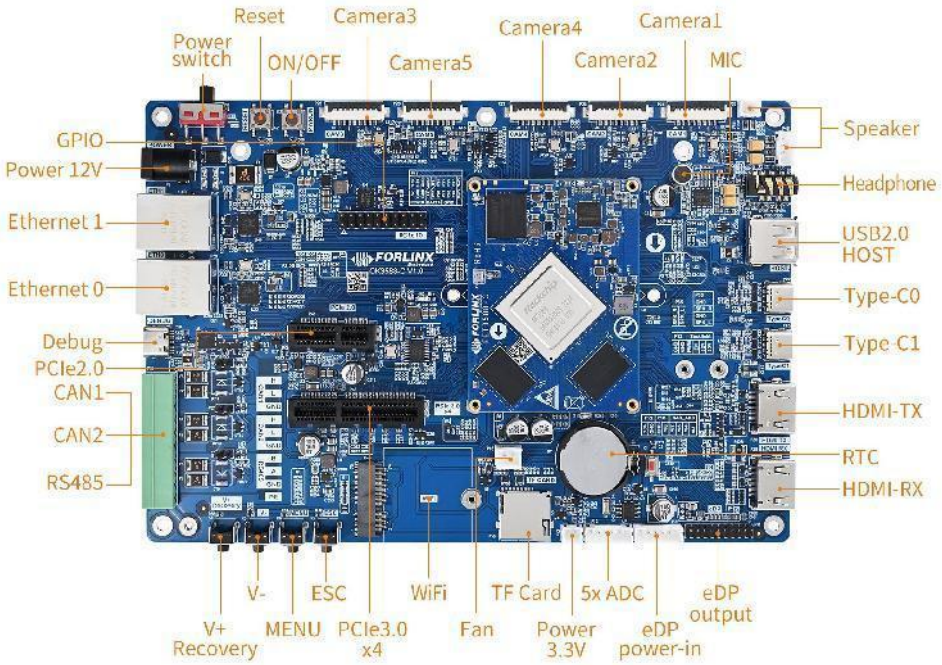
Provided technical files

Android12	User manual, compiling guideline, kernel source code, file system, OS image, VM ubuntu image, TF card tool, USB OTG tool, QT demos and source code
Hardware	User manual, carrier board schematic, carrier board PCB(AD), datasheet, carrier board and SoM DXF files, pinmux sheet

Order options:

Model	Core number	CPU speed	RAM	Flash	Working temp	Status
FET3588-C+244GSE32GCC11	4 x A76+4 x A55	A76@2.0GHz A55@1.8GHz	4GB	32GB	0~+80℃	Small batch
FET3588-C+248GSE64GCD11	4 x A76+4 x A55		8GB	64GB	0~+80℃	Small batch
FET3588-C+2416GSE128GCE11	4 x A76+4 x A55		16GB	128GB	0~+80℃	In planning

Development board/ kit



Carrier board features:

Interface	QTY	Spec.
MIPI CSI	5	• 2x MIPI DPHY V2.0 4 lanes, each lane up to 4.5Gbps; Available on carrier board by 2 26-pin FPC connectors, OV13850 is the default and recommended camera model; • 2x MIPI DPHY V1.2 2 lanes, each lane up to 2.5Gbps; Available on carrier board by 3 26-pin FPC connectors, OV5645 is the default and recommended camera model; • 1 x MIPI DPHY V1.2 4 lanes, each lane up to 2.5Gbps
MIPI DSI	2	• Each MIPI-DSI supports 4 lanes output, up to 4K@60fps; • Forlinx default option: 7'' MIPI DSI module, 1024x 600@30FPS
HDMI RX	1	Standard HDMI connector, up to 4K@60Hz
HDMI	1	Standard HDMI connector, up to 7680x4320@60Hz
eDP TX	1	Can fit 1080p@60Hz display; Up to 4K@60Hz
DP TX	2	• 2 DP used together with USB3.1 Gen1, available on carrier board by Type-C connector; • up to 7680x4320@30Hz；
USB3.1 Gen1	2	• available on carrier board by Type-C connector; • used together with DP TX, up to 5Gbps
USB2.0 Host	1	• available on carrier board by Type-A USB connector; • supports high-speed(480Mbps), full-speed(12Mbps) and low-speed(1.5Mbps)
PCIe3.0	1	•1x4 lanes PCIe signal is available on carrier board by PCIe x 4 slot; • supports 2.5Gbps(PCIe1.1), 5Gbps(PCIe2.1), 8Gbps(PCIe3.0)
PCIe2.0	1	By PCIe x 1 slot, up to 5Gbps
Ethernet	2	RJ 45 connector, 10/100/1000 Mbps
TF card slot	1	Up to 150MHz, supports SDR104 mode
Audio	1	On-board codec chip, supports earphone output, MIC input and Speaker
CAN	2	CAN2.0B
RS485	1	
UART	1	Headers with pitch of 2.54mm, baud rate up to 4Mbps
4G/5G	1	M.2 4G/ 5G module
WiFi& BT	1	M.2, supports WI-FI 6 SU and MU-MIMO + Bluetooth 5.3
ADC	5	PH2.0 connector, up to 12-bit resolution and 1MS/ s sampling rate
RTC	1	
FAN	1	
GPIO	9	Pin headers with pitch of 2.54mm(3.3V) for 9 GPIO and power of 5V/ 3.3V/ 1.8V

