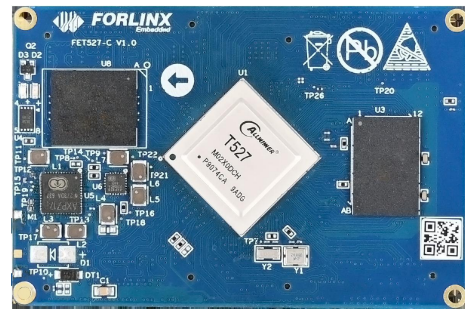


FET527N-C SoM

FET527N-C system on module carries Allwinner’s T527 an advanced application processor. It integrates 8 Cortex™-A55 cores, a RISC-V core and a HiFi4 DSP, besides, it has an built-in NPU up to 2TOPS for AI computing. The SoM is with four ultra thin connectors on its back for connecting with carrier board.



Highlights:

- 22nm processing;
- High scalability by 4x 80-pin ultra thin connectors;
- Various display interface: MIPI-DSI, RGB, LVDS, eDP, HDMI, and supports dual-screen with different contents;
- Multiple high-speed peripherals: PCIe2.1, USB3.1, CAN, etc.;
- High-definition 4K hard decoding;
- Lifespan: 10~ 15 years

8x Cortex-A55	1.8GHz	HiFi4 600MHz
Architecture	Main Clock	DSP
ARM G57 MC1	2TOPS	H.265@4Kp60
GPU	NPU	Encode

SoM features:

CPU	<p>Allwinner T527</p> <p>CPU: T527M02X0DCH</p> <p>ARM: 4×Cortex-A55@1.8GHz + 4×Cortex-A55@1.4GHz</p> <p>RISC-V: 200MHz</p> <p>DSP: 600MHz HiFi4</p> <p>NPU: 2TOPS, supports INT8/INT16, supports 40 types of operators such as Conv, Activation, Pooling</p> <p>GPU: ARM G57 MC1</p> <p>VPU:</p> <ul style="list-style-type: none"> •Hard Decoding: H.264, 4K@25fps •Hard Encoding: H.265, 4K@60fps; H.264, 4K@30fps
RAM	2GB/4GB LPDDR4
Flash	16GB/32GB eMMC
Voltage input	DC 5V
Operating temp	-40°C~+85°C
Package	Board to board connector(4x 80 pins, 0.5mm pitch, combined height: 2.0mm)

SoM specifications:

Peripheral	NUM	Spec.
RGB_LCD ¹	≤2	TCON_LCD0 supports DE/SYNC mode, 1920×1080@60fps TCON_LCD2 supports DE/SYNC mode, 1280×720@60fps
LVDS ¹	≤2	supports dual link 1920×1080@60fps
MIPI-DSI ¹	≤2	supports 4-lane MIPI DSI, 1280×720@60fps, 1920×1200@60fps supports 4+4lane MIPI DSI, 2560×1600@fps, 3840×2160@45fps, 4096×2160@45fps
HDMI2.0	1	Supports 2D up to 4K@ 60fps and 3D up to 4K@ 30fps
eDP1.3	1	Supports 2.5K@ 60fps and 4K@ 30fps
MIPI-CSI	≤4	8M@30fps RAW12 2F-WDR, maximum 3264(H)×2448(V) Supports combination of 4+4-lane, 4+2+2-lane, or 2+2+2+2-lane
Parallel CSI	1	8/10/12/16-bit width ITU-R BT.656 up to 4*720P@30fps ITU-R BT.1120 up to 4*1080P@30fps
Ethernet	≤2	GMAC, supports RMI/ RGMII with 10/100/1000Mbit/s
UART	≤10	16450/16550, 8 of them up to 1.5 Mbit/s, and 2 of them up to 10 Mbit/s
CAN	≤2	1Mbps
USB2.0	≤2	USB0: USB2.0 OTG, 480Mbps USB1: USB2.0 Host, 480Mbps
USB 3.1 ²	≤1	USB3.1 DRD mode, 5 Gbit/s
PCIe2.1 ²	≤1	Only supports RC mode, 1-lane, 5Gbps
SDIO ³	≤2	SDC0: for SD card, up to SDR with 200MHz SDC1: SDIO3.0, up to SDR with 200MHz
SPI ⁴	≤4	SPI0: supports host/ slave mode, up to 100MHz SPI2: supports host/ slave mode, up to 100MHz S_SPI0: supports host/ slave mode, up to 100MHz SPI1: supports SPI mode and DBI mode(display bus interface)
TWI ⁵	≤8	Compatible with I2C, standard mode 100kbit/s, fast mode 400kbit/s
Audio Codec	1	Built inCodec, supports a stereo earphone, two differential LINEOUT and three differential MIC
I2S/PCM	≤4	Sampling rate from 8KHz to 384KHz
DMIC	1	8-lane, sampling rate from 8KHz to 48KHz
OWA IN/OUT	1	Single-lane
GPADC	14	12-bit sampling resolution and 10-bit accuracy, sampling rate up to 1MHz
LRADC	2	6-bit sampling resolution, sampling rate 3KHz, for key detect
PWM	≤30	Output 0~24MHz or 0~100MHz
CIR TX/RX	1	IrDA

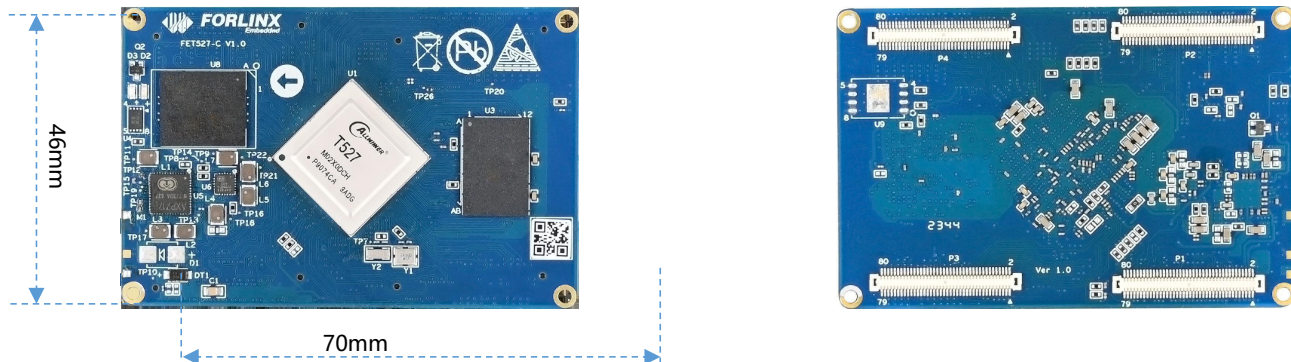
Notes:

1. RGB, LVDS, and DSI all belong to the TCON_LCD module in T527 with pin multiplexing relationships. Please refer to chip data sheet or pin multiplexing table in detail.
2. USB2 consists of a 2.0 controller and a 3.0 controller, USB3.1, which can be used separately, but could not be used separately at the same time; the 3.0 pins of USB2 and the PCIe interface are multiplexed, and only one of the two can be used. When using PCIe, 2.0 of USB2 will be not available.
3. SDC2 is occupied by eMMC on SoM.
4. The SoM is reserved with SPI0 of the PC group to connect to the Flash storage. It's not welded. When using SPI0 on

the carrier board, please be careful to avoid configuration conflicts.

5. The processor supports 9 TWI, of which S-TWI0 is occupied by the SoM and it's not available on carrier board

Exterior and dimensions:



Note: PCB thickness: 1.2mm, PCBA height: 2.6mm, tolerance ±0.2mm



OS:

OS version	Linux 5.15.104+QT 5.12.5, Android ^{TBD}
Firmware installation	<ul style="list-style-type: none"> • TF card • USB OTG

Driver list:

	Peripheral	Function	Chipset
Linux5.15	SDIO	WiFi	AW-CM358
	UART	BT	
	IIC	RTC	PCF8563, RX8010
	IIC	TP	FT3427, ft5x06, tsc2007, GT928
	MIPI-DSI	7"	1024x 600, TP FT3427
	RGB	7" resistive LCD	FIT-LCD7.0(1024× 600), TP ft5x06
		7" capacitive LCD	FIT-LCD7.0(800x 480), TP tsc2007
	LVDS	10.1"	FIT_LVDS_10.1_C(1280×800), TP GT928
	PCIe	PCIe to Ethernet	INTEL E1000, 1GbE
	MIPI-CSI	Camera	OV5645(auto-focusing is not available, 5.0MP)
	MIPI-CSI	Camera	TP2815(4x AHD to MIPI-CSI)
	RGMII	Ethernet	YT8521 PHY
	USB	USB to UART	XR21V1414
	USB	4G	EC20/ EC25
	UART	universal	LCD backlight, buzzer
CAN	universal		
PWM	universal		
ADC	universal		

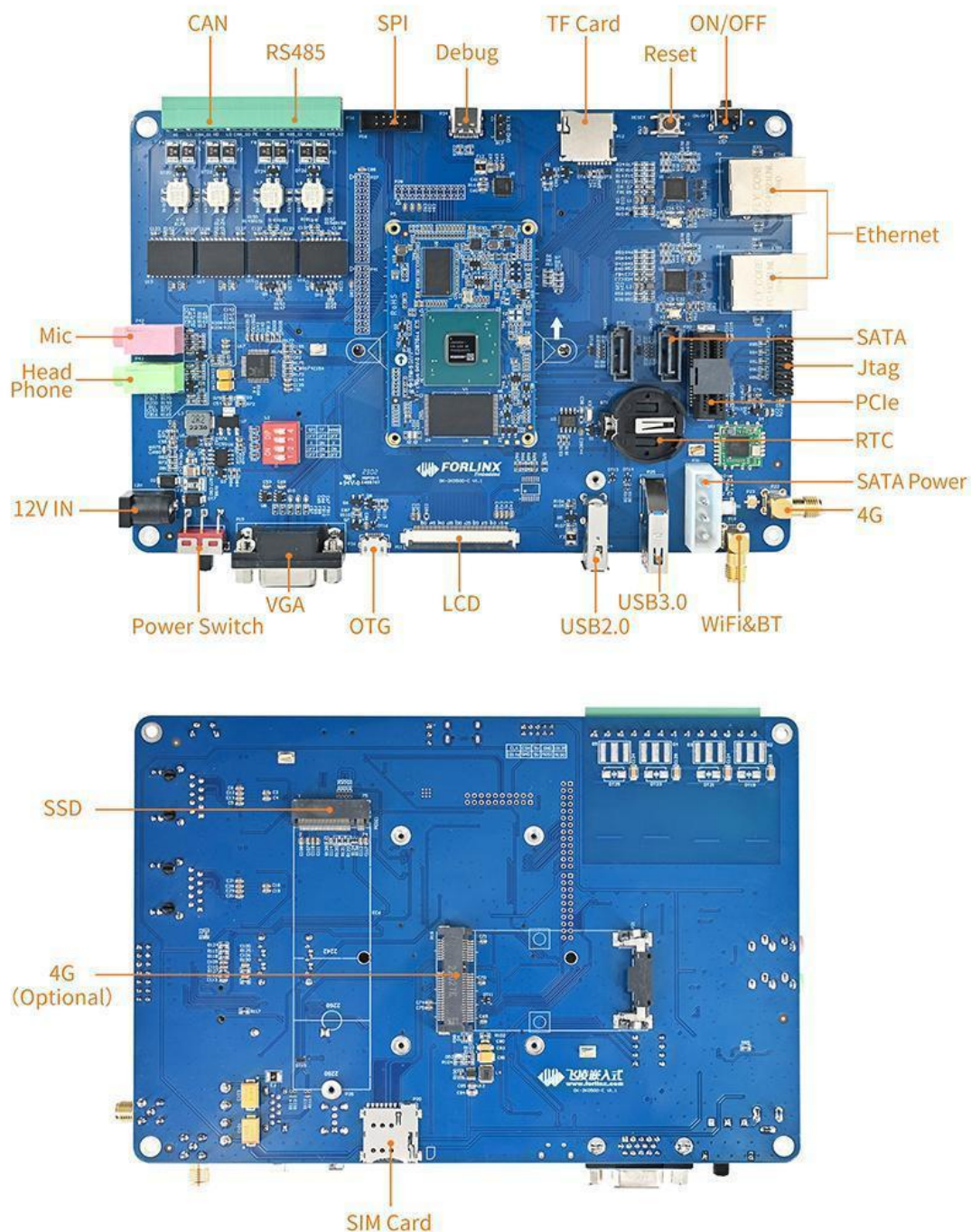
Provided technical files

Linux5.15	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 NUM	Clock	RAM	Flash	Working temp	Phase
FET527N-C+182GSE16GIAxx: xx	8x Cortex-A55	1.8GHz	2GB	16GB	-40~+85°C	R& D
FET527N-C+184GSE32GIBxx: xx	8x Cortex-A55	1.8GHz	4GB	32GB	-40~+85°C	R& D

Development board/ kit



Carrier board features

Peripheral	NUM	Spec.
RGB_LCD	1	RGB666, Can support up to RGB888, 1080P@ 60fps
LVDS	1	Dual 8-bit, up to 1080p@60fps
MIPI-DSI	1	Converted board is needed, 4-lane, up to 1080p@60fps SoM supports 4+ 4-lane, up to 2.5K@60fps or 4K@45fps
eDP	1	eDP1.3, standard DP connector, up to 2.5K@60fps or 4K@30fps
HDMI	1	HDMI2.0, supports HDCP1.4, up to 4K@60fps to 2D, 4K@30fps to 3D
Ethernet	2	10/100/1000Mbps adaptive, RJ45
Type-C(Debug)	1	Convert UART to USB for CPUS and CPUX debug
Type-C(USB0)	1	Supports OTG
USB Host	3	Expanded by HUB, USB2.0(up to 480Mbps)
USB3.1	1	USB-A
PCIe2.1	1	PCIex 1 slot
OWA	1	One Wire Audio by pin headers, complies with IEC-60958, up to 24-bit data
TF card	1	SD3.0
MIPI-CSI	4	OV5645 and AHD to MIPI
WiFi& BT	1	AW-CM358SM, 2.4G/ 5G dual-bandm BT5.0 with audio supporting 1x SDIO for WiFi 1x UART for BT 1x IIS for audio
LED	2	2 separate controllable GPIO for LED
IIS	1	Pin headers
TWI	1	TWI3, IIC by pin headers
UART	2	UART2/UART3 by pin headers
SPI	1	SPI0, pin headers
RTC	1	CR2032
Buzzer	1	Controlled by PWM, FM is supported
Audio	3	Contains one four-segment headphone with builtin HP and MIC 1 on-board separate electret MIC 1 dual-channel speaker
Key	9	Contains reset, flashing, power on/ off, user defined, VOL+, VOL-, HOME, ENTER and MENU
DMIC	1	Up to 8 digital MIC, sampling rate from 8KHz to 48KHz
GPADC	14	1.8V, on-board slide rheostat
CAN	2	Isolated CAN2.0B, up to 1Mbps
RS485	2	With transceiver, isolated
IR	1	IR_RX, sampling rate from 1MHz, 64x 8-bit cache
CPUX-JTAG	1	box header
DSP-JTAG	1	box header

■ Power Consumption

No .	Testing	SoM		Evk	
		Power in(V)	Work& power(w)	Power in(V)	Work& power(w)
1	Boot without loading	5	6.15	12	8.74
2	Stand by, no loading	5	1.76	12	2.94
3	Sleeping	5	0.05	12	0.65
4	CPU+ RAM+ eMMC stress testing	5	3.50	12	4.04
5	7" LCD+ 4G+ video decoding	5	3.03	12	6.2
6	7" LCD+4G+ camera+video encoding	5	2.40	12	6.40