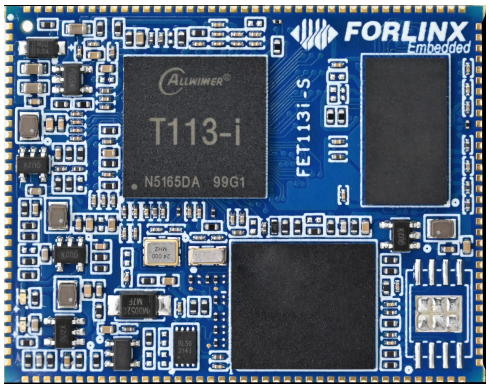
FET113i -S SoM

FETT113i-S system on module carries Allwinner's T113-i an advanced application processor. It integrates dual-core Cortex™-A7 CPU and single-core HiFi4 DSP to provide the high efficient computing power. It supports full format decoding and encoding. Integrated multi ADCs/DACs and I2S/PCM/DMIC/OWA audio interfaces can provide the perfect voice interaction solution. T113-i comes with extensive connectivity to facilitate product expansion, such as USB, SDIO, UART, SPI, CAN, Ethernet, and so on.



Highlights:

- Industrial operating temperature width -40℃~+85℃;
- RAM 256MB/ 512MB optional;
- Combination of ARM+RISC-V+DSP, meeting complex application requirements;
- Advanced video codec performance;

ARM+ RISC-V+ DSP	1.2GHz	Half-hole
Architecture	Clock	Packaging
Linux5.4.61	2x Cortex-A7	C906
OS	ARM	RISC-V

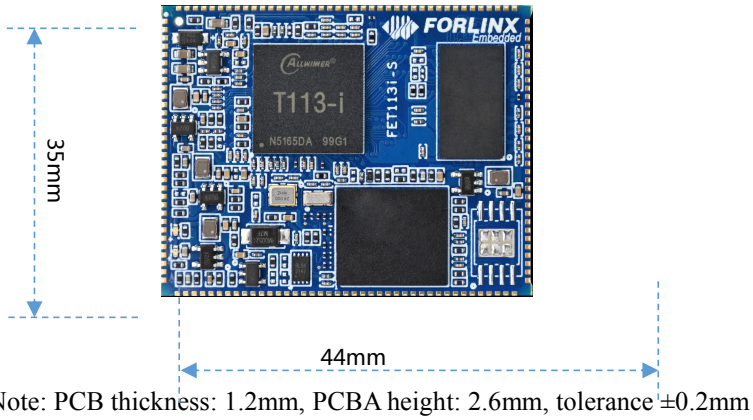
SoM features：

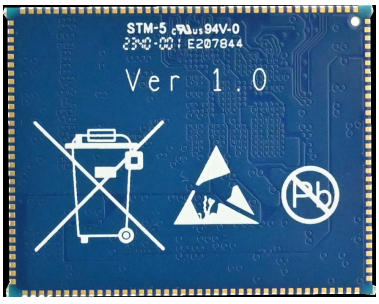
CPU	Allwinner T113-i **CPU:** T113-i **VPU:** •Video Decoding: H.265 up to 4K@30fps, H.264 up to 4K@24fps, H.263,MPEG-1/2/4,JPEG,Xvid,Sorenson Spark，up to 1080p@60fps •Video Encoding: JPEG/MJPEG up to 1080p@60fps **RISC-V:** C906@1008MHz **DSP:** 600MHz
RAM	512MB/256MB DDR3
ROM	8GB eMMC/256MB SPI Nand Flash
Voltage input	DC 5V
Operating temp	-40℃~+85℃
Package	Half-hole soldering(146 pins, 1mm pitch)

SoM specifications:

Peripheral	NUM	Spec.	
RGB_LCD	1	DE/SYNC, up to 1920x1080@60fps	Muliti-plexed and alternative
LVDS	1	Single link, up to 1366×768@60fps; Dual link, up to 1920×1080@60fps	
MIPI-DSI	1	4-lane, up to 1920×1200@60fps	
CVBS_OUT	1	Supports NTSC and PAL, 10-bit pixel depth, YUV444 and HV output forms, up to 4K@60Hz	
CSI	1	8-bit digital camera, up to 148.5MHz	
CVBS IN	2	Supports NTSC and PAL, 10-bit video ADCs	
Audio out	2	A pair of stereo headphone output, a pair of differential Lineout	
Audio in	5	Three differential/ single MIC, a stereo LINEIN input, a stereo FMIN input	
IIS	≤3	Host/ slave mode optional, sampling rate 8kHz to 384kHz	
DMIC	1	PDM MIC, sampling rate 8kHz to 48kHz	
OWA	1	S/PDIF	
USB DRD	1	Host mode up to 480Mbit/s, slave mode up to 480Mbit/s	
USB Host	1	Host mode up to 480Mbit/s	
EMAC	1	10/100/1000 Mbit/s, supports RGMII and RMII	
UART	≤5	Up to 4Mbit/s, except for DEBUG UART, there are 5 UART for users	
SPI	1	SPI0-SPI1, SPI0 is used by SoM, so only SPI1 can be used by users, SPI1 supports both SPI mode and DBI mode	
TWI	≤3	TWI0-TWI3, compatible with I2C, up to 400 kbit/s, TWI3 is used by SoM and not available	
CIR	1	Supports 1x infrared RX and 1x infrared TX	
PWM	≤7	PWM0-PWM7, PWM7 is used by SoM, output rating from 0 to 24MHz or 100MHz	
GPADC	≤2	SAR ADC, 12-bit resolution, 8-bit accuracy, sampling rate up to 1MHz, sampling power up to 1.8V	
TPADC	1	4-wire resistive touching panel input detecting	
LRADC	1	Low speed ADC input, for key detecting	
CAN	2	CAN2.0B	
SD	2	SDC0 is only available for 3.3V IO, it's configured to SD card, SDC1 is only available for 3.3V IO	
JTAG	1	2x 5 pin headers with pitch of 2.0mm	

Exterior and dimensions:





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

OS:

OS version	Linux5.4.61
Firmware installation	• TF card • USB OTG

Driver list:

	Peripheral	Function	Chipset
Linux5.4.61	USB	WiFi& BT	BL-M8723DU
	IIC	RTC	PCF8563 and RX8010
	USB	USB to 4x UART	USB mini, DB9 header(RS232)
	USB	TVIN	Supports PAL and NTSC
	USB	4G modem	EC20/EC25
	LCD	Display	FIT-LCD7.0(1024×600), TP gt911
	MIPI-DSI	7’’	FIT-LCD7.0_MIPI V2.1 V3.0(1024×600), TP FT5316
	CVBS	TVout	FIT_LVDS_10.1_C(1280×800), TP GT928
	CAN	CAN	supported
	SPI	SPI	supported
	RGMII	Gigabit Ethernet	YT8521S
	Headphone & MIC	Audio	Built-in
	JTAG	JTAG	Supported

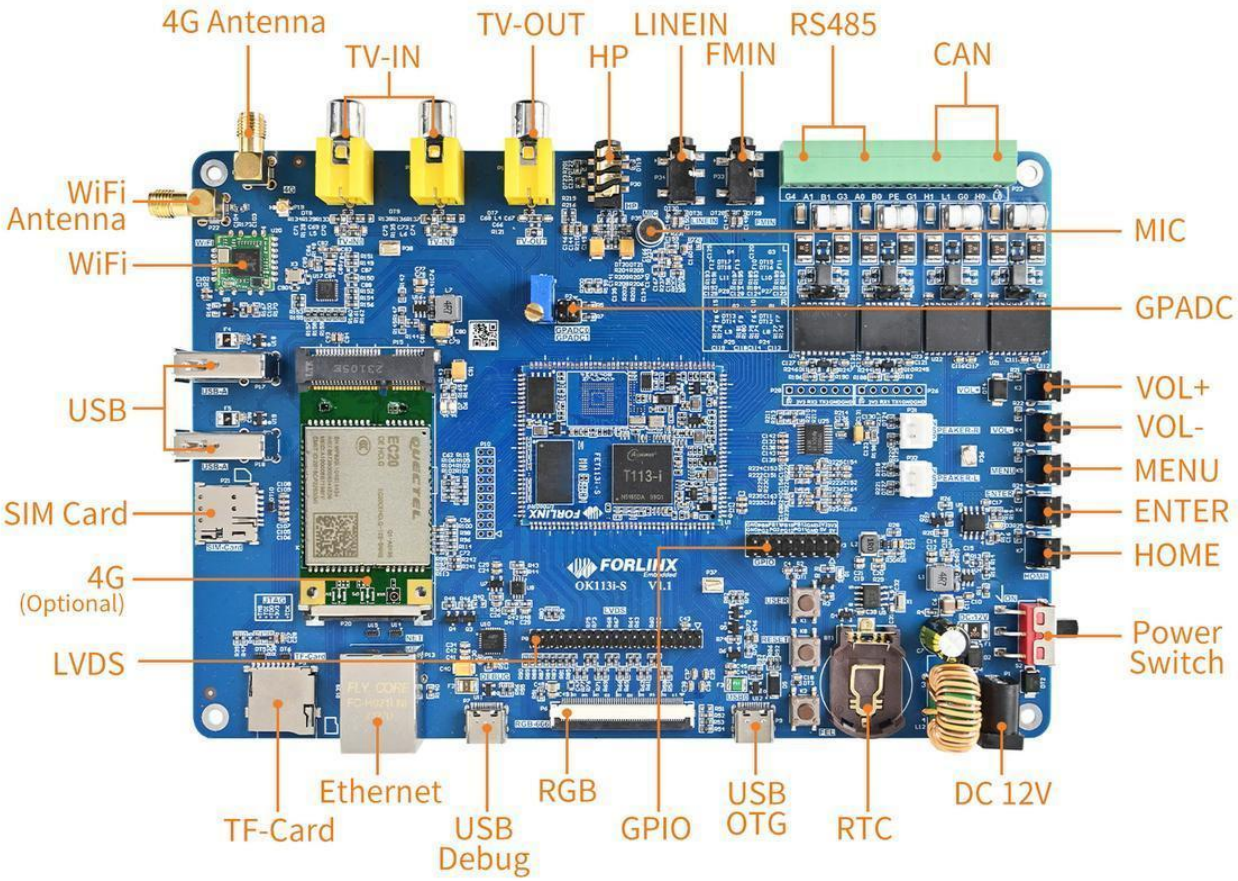
Provided technical files

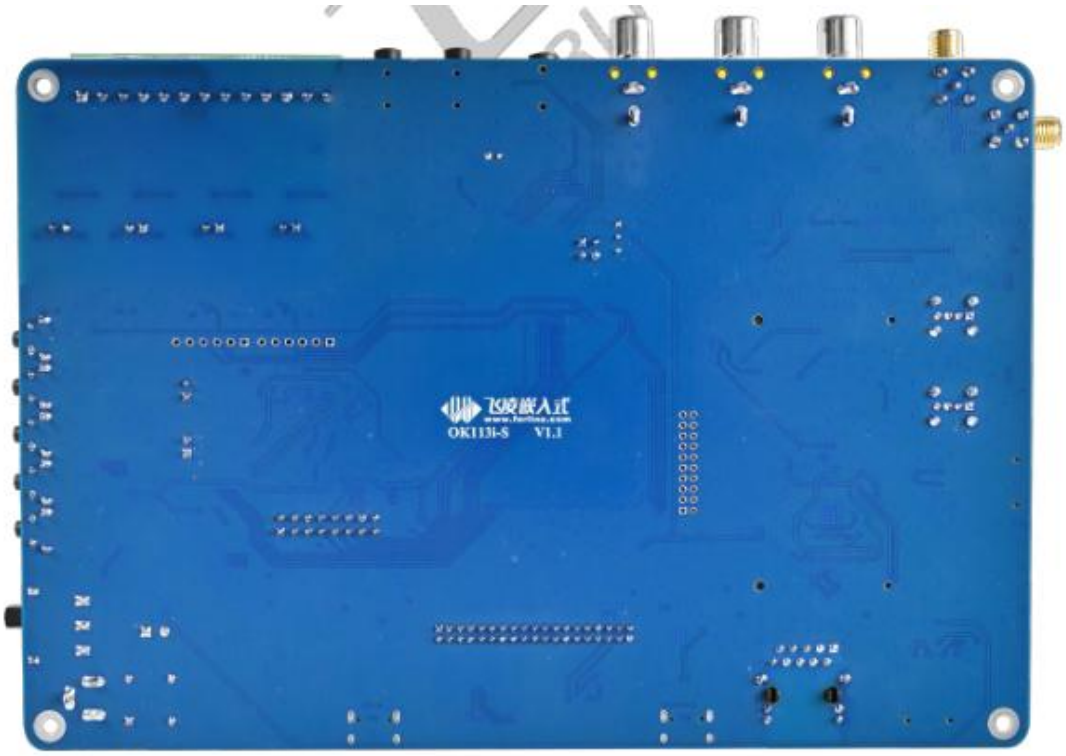
Linux5.4.61	User manual, compiling guideline, GIT source, 3P tool and lib, reference files from StarFive, kernel source code, file system, OS image, VM ubuntu image, SD card making tool
Hardware	User manual, carrier board schematic, carrier board PCB(CAD), datasheet, carrier board and SoM DXF files, pinmux sheet

Ordering options:

Model	A7 Core Clock	RAM	Flash	Working temp	Phase
FET113i-S+12512SE8GIBxx:xx	1.2GHz	512MB	8GB	-40~+85℃	Mass production
FET113i-S+12256SN256IAxx:xx	1.2GHz	256MB	256MB	-40~+85℃	Mass production

Development board/ kit





Carrier board features

Peripheral	NUM	Spec.
RGB_LCD	1	RGB666, both capative and resistive touching are supported, backlight is adjustable
LVDS	1	Dual asynchronous channels(8x data, 2x clock), capactive touching is supported, backlight is adjustable
TV-OUT	1	RCA jack
TV-IN	1	RCA jack
Audio	/	A 4-position headphone jack, CTIA, stereo, contains MIC; An on-board electret MIC; A LineIN jack; An DMIN jack; two stereo speaker up to 4Ω 1.9W
Audio in	5	Three differential/ single MIC, a stereo LINEIN input, a stereo FMIN input
Ethernet	1	10/100/1000Mbps adaptive, RJ45
TF card	1	For OS image flashing
4G	1	Mini-PCIe slot, compliant with USB2.0, on-board SMA antenna; Nano-SIM card slot
WiFi&BT	1	Wi-Fi: IEEE 802.11 a/b/g/n WIFI, up to 150Mbps; BT: v2.1+EDR/4.2, up to 3Mbps
GPADC	2	Pin headers, can be tested by sliding rheostat
KEYADC	5	
RTC	1	
UART	1	Pin headers with pitch of 2.54mm
SPI	1	Pin headers with pitch of 2.54mm
CAN	2	Electrical isolation, CAN2.0B
RS485	2	Electrical isolation, auto-control transceiving direction
KEY	3	1 for OS image flashing, 1 for reset, one for user's definition
LED	1	Blue, user defined LED
USB Type-A	2	USB2.0, only for USB Host
USB Type-C	1	USB2.0, host/ slave adaptive
USB Debug	1	USB type-C port, default baud rate 115200
JTAG	1	2x 7-pin headers with pitch of 2.0mm for A7 and RISC-V debugging

Power Consumption

No.	Testing	Power input	SoM Consumption(w)	Evk Consumption(w)
1	Standby mode, no loading	5±5%	0.4	1.24
2	Boot without loading, peak	5±5%	3.25	9.01
3	CPU+ RAM+ eMMC stress testing	5±5%	1.05	1.89
4	7'' LCD+4G+U-disk+video decoding	5±5%	0.7	3.82
5	7'' LCD+4G+U-disk+video encoding	5±5%	0.75	3.75

