

FCU3502 Embedded Control Unit

It is developed and designed based on the Rockchip RK3588 processor, featuring a 4×Cortex-A76 + 4×Cortex-A55 architecture. The A76 cores operate at a frequency of up to 2.4 GHz, while the A55 cores reach up to 1.8 GHz. It supports 8K encoding and decoding, delivers an NPU computing power of 6 TOPS, and is expandable with computing power cards, including support for the Rockchip RK1828 20 TOPS M.2 computing power card, enabling the deployment of large language models. It is applied in industries such as intelligent transportation, smart factories, and smart buildings, where it serves AI computing at the edge. Designed with active cooling, the product has undergone rigorous environmental and EMC testing to ensure stable and reliable operation.

Product Features:

- 4×A76+4×A55;
- 8K Video Simultaneous Editing and Decoding:
Decode up to 8K @ 60fps;
- Supports Docker, MySQL, FTP Server, ModBus-TCP, ModBus-RTU, OpenVPN, MQTT, OpenSSL, OpenSSH;
- FCC, CE, and RoHS certifications;
- Supports the RK1828 20 TOPS M.2 computing power card;
- Operating Temperature: 0°C to +70°C.



4×A76+4×A55 Architecture	2.4 GHz Clock	Large Language Model AI Capabilities:
0°C~+70°C Temperature	6TOPS NPU	RK1828 Computing Power Card

SoM Parameters:

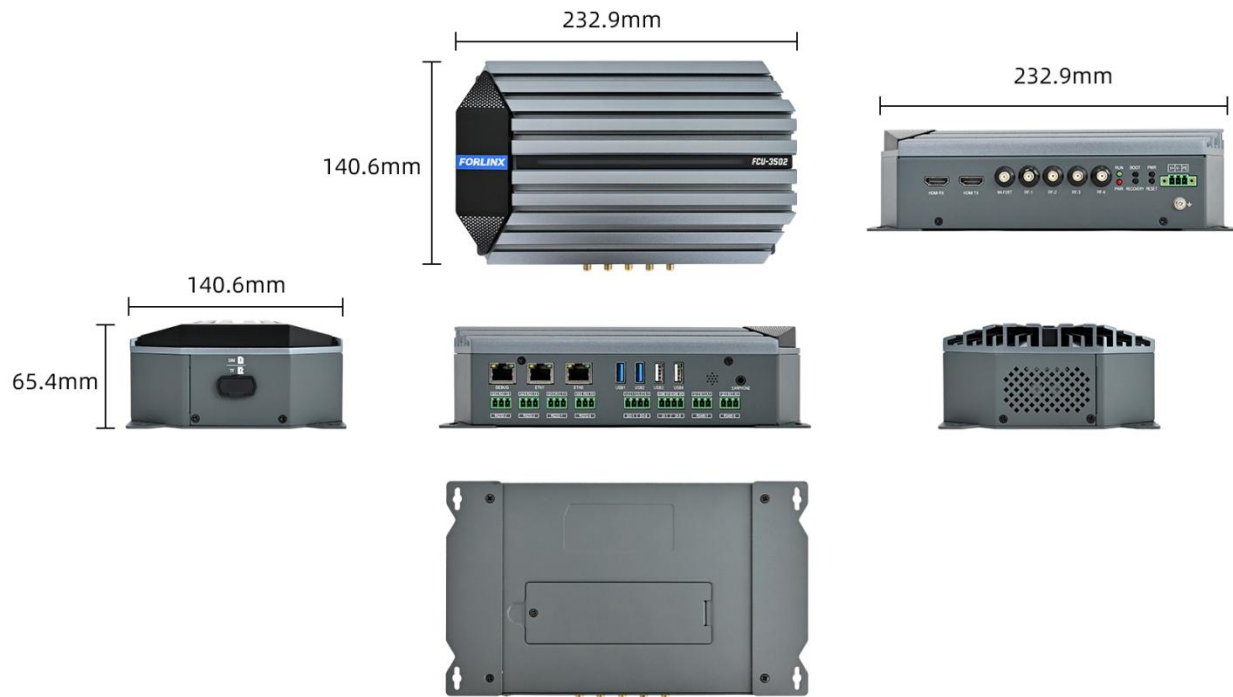
Processor	Rockchip RK3588/RK3588J RK3588 CPU: 4×Cortex-A76@2.4GHz+4×Cortex-A55@1.8GHz RK3588J CPU: 4×Cortex-A76@1.6GHz+4×Cortex-A55@1.3GHz NPU: 6 TOPS, supporting INT4/INT8/INT16/FP16 combined operations GPU: Mali-G610 MP4、OpenGL ES 1.1, 2.0, 3.2, OpenCL 2.2, Vulkan1.2 VPU: Hardware Decoding: •H.265, VP9: up to 8K@60fps •H.264: up to 8K@30fps •AV1: up to 4K@60fps Hardware Encoding: •H.265/HEVC, H.264/AVC: up to 8K@30fps
RAM	8GB
ROM	64GB eMMC
Computing Card	Rockchip RK1828 5GB 20TOPS
Ambient	0°C~+70°C

Temperature	
Working Voltage	The rated DC voltage is 24V, supporting a wide voltage range from 9V to 36V, with reverse - connection protection and over - current protection.
Overall Dimensions:	233mm×141mm×66mm
Cooling method	Active cooling, active fan
Overall Weight	2.04kg

■ Interface:

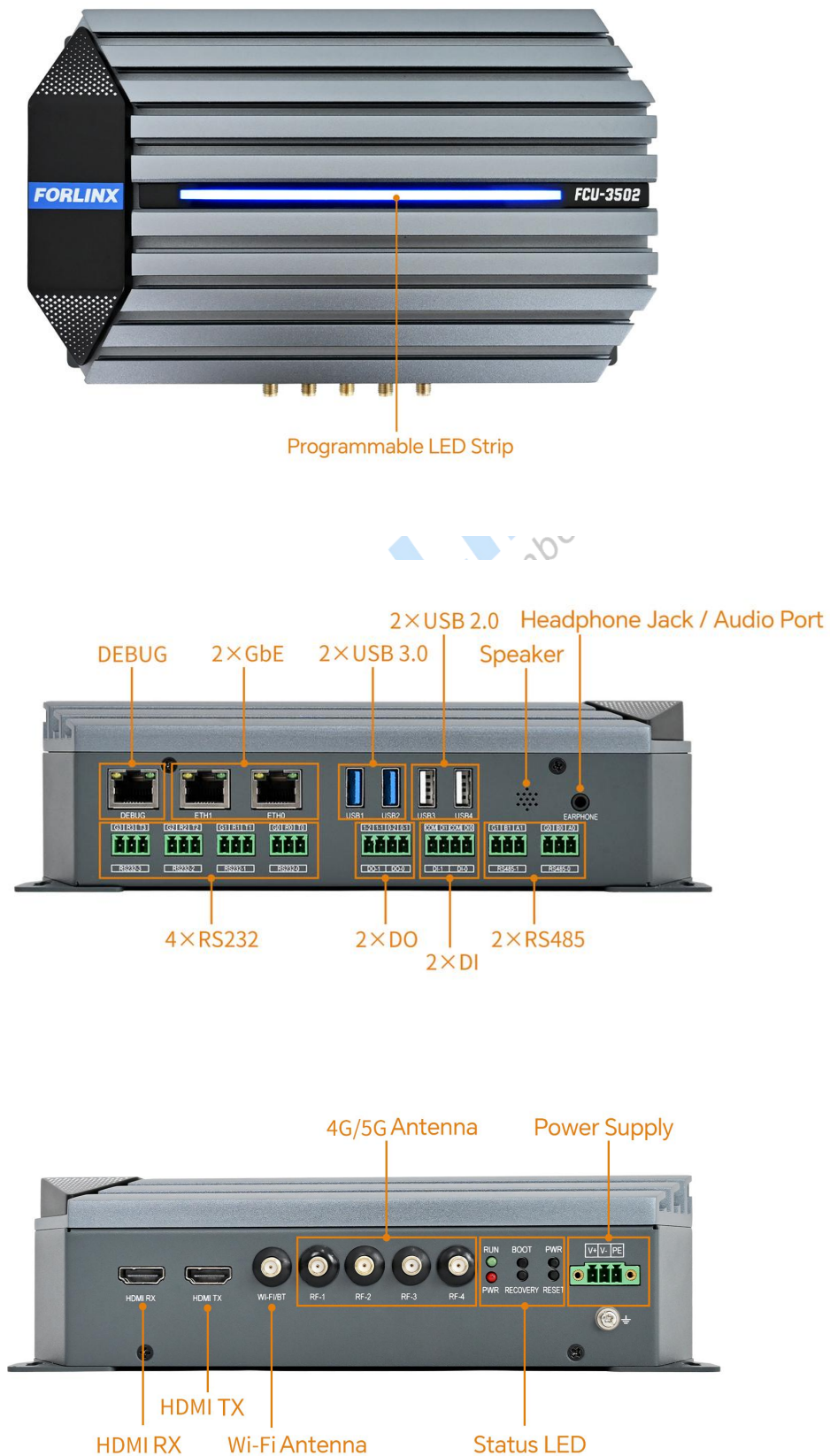
Function	Quantity	Description
Ethernet	2	Supports data transmission rates of 10/100/1000 Mbps;
USB2.0	2	Routed out via Type-A, 5V/0.5A output;
USB3.0	2	Routed out via Type-A, 5V/1A output;
HDMI TX	1	Connected via a standard HDMI socket; Supports up to 7680x4320@60Hz;
HDMI RX	1	Connected via a standard HDMI socket; Supports up to 4K@60Hz;
TF	1	Supports TF card to expand storage and flashing operating system;
DEBUG	1	RJ45 connector, RS232 level, connect to the computer through the console debugging line for debugging;
Audio	1	Built-in speakers and supports headphone output.
WiFi&BT	1	Supports WIFI4 & Bluetooth 4.2
M.2	1	4G/5G (EM05/RM500U)
M.2	1	M.2 solid-state drive
M.2	1	RK1828 computing power card.
RS485	2	Isolated RS485 level converter using a 3Pin 15EDGK-3.81 green terminal header.
RS232	4	Isolated RS232 level converter using a 3Pin 15EDGK-3.81 green terminal header.
DI	2	2 x optocoupler-isolated signal input, supporting dry contact connection.
DO	2	2 x relay-isolated output, supporting dry contact output.
KEY	4	4 functional keys: Reset, Power On/Off, MASKROM, and RECOVERY.
LED	2	1 always-on power supply status LED.

■ Appearance & Dimensions:



Note: The dimensional tolerance is $\pm 0.5\text{mm}$.

■ Interface Diagram:



■ Software Support:

OS	Forlinx Desktop 22.04 (Ubuntu22.04)
Software Support:	Docker
	MySQL
	FTP Server
	ModBus-TCP
	ModBus-RTU
	OpenVPN
	MQTT
	OpenSSL
	OpenSSH

■ Product Materials:

Materials List:	Installation User Manual, Software User Manual, Application Update Manual, AI Algorithm User Manual, Application Notes, Structural Data, Factory Images, Tools, DEMO *
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*: The documentation will be gradually provided and enriched after the product is released.

■ Ordering Model List:

Specification Model	Configuration Abbreviation	Temperature Range	RAM	ROM	Supply
FCU3502+3588J-C188GSE64GI	8GB+16GB	0°C~70°C	8GB	64GB	Under Development
FCU3502+3588J-C188GSE64GI+RK1828	8GB + 16GB with RK1828 computing card	0°C~70°C	8GB	64GB	Mass Production
FCU3502+3588J-C188GSE64GI+4G	8GB+16GB with 4G	0°C~70°C	8GB	64GB	Under Development
FCU3502+3588J-C188GSE64GI+RK1828+4G	8GB + 16GB with RK1828 computing card with 4G	0°C~70°C	8GB	64GB	Mass Production

Power adapter, 4G/5G modules, and 4G/5G antennas are optional accessories and must be purchased separately.

■ Power Consumption (Whole Device):

No.	Test Item	Device Power (W)
1	No-load startup peak power	15.5
2	No-load standby	8.5
3	CPU Usage 100%	14.6
4	Memory Usage 100%	15.6
5	Fully tested operational interface program.	32