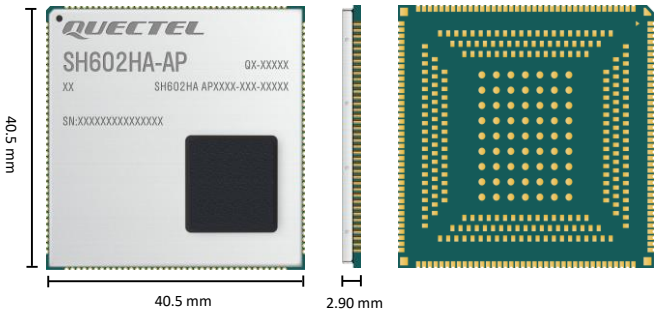
Quectel SH602HA-AP

Smart Robotic Computing Module

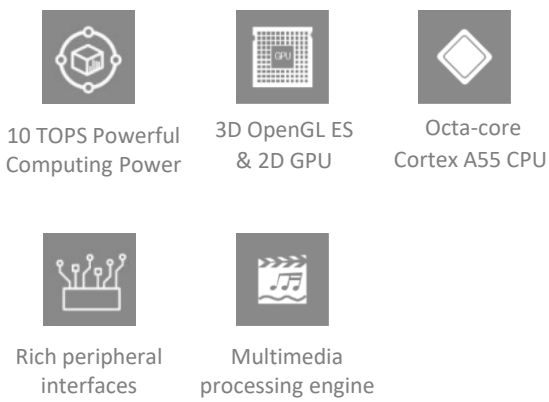


The SH602HA-AP module is Quectel's new-generation smart robotic computing module based on the D-Robotics chip platform Sunrise 5 (X5M). With the Ubuntu operating system integrated, the module features up to 10 TOPS of BPU computing power with excellent power efficiency. It not only supports end-to-end computing and complex LLMs (Large Language Models) such as Transformer, BEV and Occupancy, but also efficiently executes the full-stack computing tasks of robots. Additionally, the module supports the data input and fusion processing for multiple sensors, including Lidar, structured light, TOF and voice, fully meeting the requirements for AI and vision functions in robotic applications.

The SH602HA-AP module integrates abundant interfaces, including 1 × BT.1120, 1 × DSI, 1 × RGMII, 1 × USB 3.0, 1 × USB 2.0, 1 × SDIO, 7 × UART, 7 × I2C, 1 × QSPI, 2 × I2S, etc. The module supports a 4K @ 60 fps video encoder and decoder, binocular depth processing, AI + VSLAM, 3D point cloud computing, and other mainstream robot perception algorithms, as well as speech recognition. Additionally, the module can be used with Quectel's independent Cat 1/ 4, 5G, Wi-Fi 6, and GNSS modules, thus greatly expanding the module's applicability to the robotics field and many other use cases such as smart displays, express lockers, electricity equipment, industrial control terminals, and smart home appliances.

Key Features

- 10 TOPS computing power
- Octa-core Cortex A55 CPU @ 1.5 Ghz
- ISP 16M @ 30 fps
- 4K @ 60 fps video encoder and decoder
- HiFi 5
- Excellent power efficiency
- 3D OpenGL ES and 2D GPU
- Various mainstream robot perception algorithms
- USB 3.0 & 2.0/ SD 3.0



Quectel SH602HA-AP

Module	SH602HA-AP
Platform	X5M
Dimensions (mm)	40.5 × 40.5 × 2.90
Package	LCC + LGA
Weight (g)	TBD
OS	Ubuntu 22.04
CPU	Octa-core ARM Cortex-A55 @ 1.5 GHz
BPU	10 TOPS
Kernel	6.1.83
DSP	HiFi 5 Audio @ 812 MHz
ISP	Up to 4K @ 60 fps Up to 4096 × 3072 pixels resolution 3D-NR, WDR, HDR, RGB-IR and PDA
Video	**Encoder:** H.264/ H.265, with up to 4K @ 60 fps MJPEG, with up to 16M @ 30 fps **Decoder:** H.264/ H.265, with up to 4K @ 60 fps MJPEG, with up to 16M @ 30 fps
Memory	LP4/ LP4x, Default: 4 GB + 32 GB Optional: 2 GB + 8 GB, 2 GB + 16 GB or 4 GB + 16 GB
Temperature Range	
Operating Temperature	-25 °C ~ +85 °C
Electrical Features	
Supply Voltage Range	3.6–5 V; Typ. 3.8 V
Power Consumption	TBD
Interfaces	
LCM	1 × BT.1120, with up to 4K @ 30 fps 1 × 4-Lane MIPI DSI TX, with up to 2560 x 1440 @ 60 fps
Camera	MIPI CSI RX: 2 × 4-lane MIPI CSIs, which can be divided into 4 × 2-lane MIPI CSIs, with up to 2.5 Gbps/ lane data rate
USB	1 × USB 3.0 & USB 2.0, DRD 1 × USB 2.0, DRD
UART	Max. × 7
SD Card	Max. × 1, SD 3.0
SDIO	Max. × 1
RGMII	× 1
I2C	Max. × 7
I2S	Max. × 2
ADC	Max. × 4, 10 bits
SPI	Max. × 6, both slave and master modes
QSPI	Max. × 1
PWM	Max. × 8
LPWM	Max. × 8
PDM	Max. × 4
RTC*	Supported
Keypad	RESET_N/ BOOT
GPIO	Max. × 111

Notes:

1. *: Under development
2. TBD: To Be Determined

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