theobroma
SYSTEMS

A **CHERRY** COMPANY

TIGER SOM-RK3588-Q7

Performant **System-on-Module**
enabling real-time scene recognition
featuring the **Rockchip RK3588** cutting-edge processor

70 x 70 mm	Secure Element

ARMv8	4x 2.4 GHz 4x 1.8 GHz	NPU up to 6 TOPs

up to 16 GB LPDDR4x	1x MIPI-DSI 1x eDP	4x MIPI-CSI 1x HDMI in	1x HDMI 8K / 60 fps

Gigabit Ethernet	PCIe 2.1	3x USB 3.0 1x USB 2.0	CAN

Cutting-edge computational performance

Based on Rockchip's RK3588 processor, **TIGER SOM-RK3588-Q7** ensures cutting-edge computational performance, connects multiple high-resolution cameras, and provides deep learning capabilities to apply computer vision algorithms. The combination of the CPU, with its GPU and NPU enables real-time object detection and scene recognition.

RK3588 is a low-power, octa-core processor for Internet of Thing (IoT) devices with Artificial Intelligence (AI). It features four ARM Cortex-A76 and four ARM Cortex-A55 cores, a Mali G610 GPU, and a NPU with up to 6 TOPs. The 64-bit-capable ARMv8 cores support both ARM Cryptographic Extension (for wire-rate AES cryptography) and AdvSIMD vector processing.

TIGER provides up to 16 GB of LPDDR4X memory and up to 256 GB of eMMC storage on board, and interfaces for optional external storage media such as NVMe/SSD, and SD card.

Native support of five high-resolution cameras

TIGER SOM-RK3588-Q7 has four MIPI-CSI and one HDMI interface for five high-resolution cameras. Using a MIPI-CSI interface not only reduces the costs of camera modules, but also provides a continuous stream of raw video data into the processor – regardless of USB or Ethernet protocol. The HDMI input allows for capturing 4K at 60 frames per second.

In addition to the video input signal, two camera ports can also receive the signals of Inertial Measurement Units (IMU) integrated in the cameras, enabling the tracking of accelerations and turns.

Real-time object detection and scene recognition

The Neural Processing Unit is Rockchip's next-generation NPU for AIoT and Deep Learning. Its three NPU cores support triple core collaboration, dual core collaboration, and independent work of each core. As a result, the NPU supports multi-task and multi-scenario operation and accelerates machine learning algorithms. In addition, it supports a multitude of deep learning frameworks including TensorFlow, Caffe, Tflite, Pytorch, Onnx NN and Android NN.

The resulting deep learning capabilities enable to apply computer vision algorithms required for real-time object detection and scene recognition in various applications. This allows, for example, smart surveillance systems to monitor their environment and trigger an alarm when certain events, activities and behaviors are detected.

State-of-the-art security for your assets

The **TIGER SOM** module features a Secure Element in addition to the capability to enable a Secure Boot mechanism. This Secure Element is based on the GlobalPlatform 2.2.1-compliant JavaCard environment. Secure Boot guarantees that only signed images can run on the device.
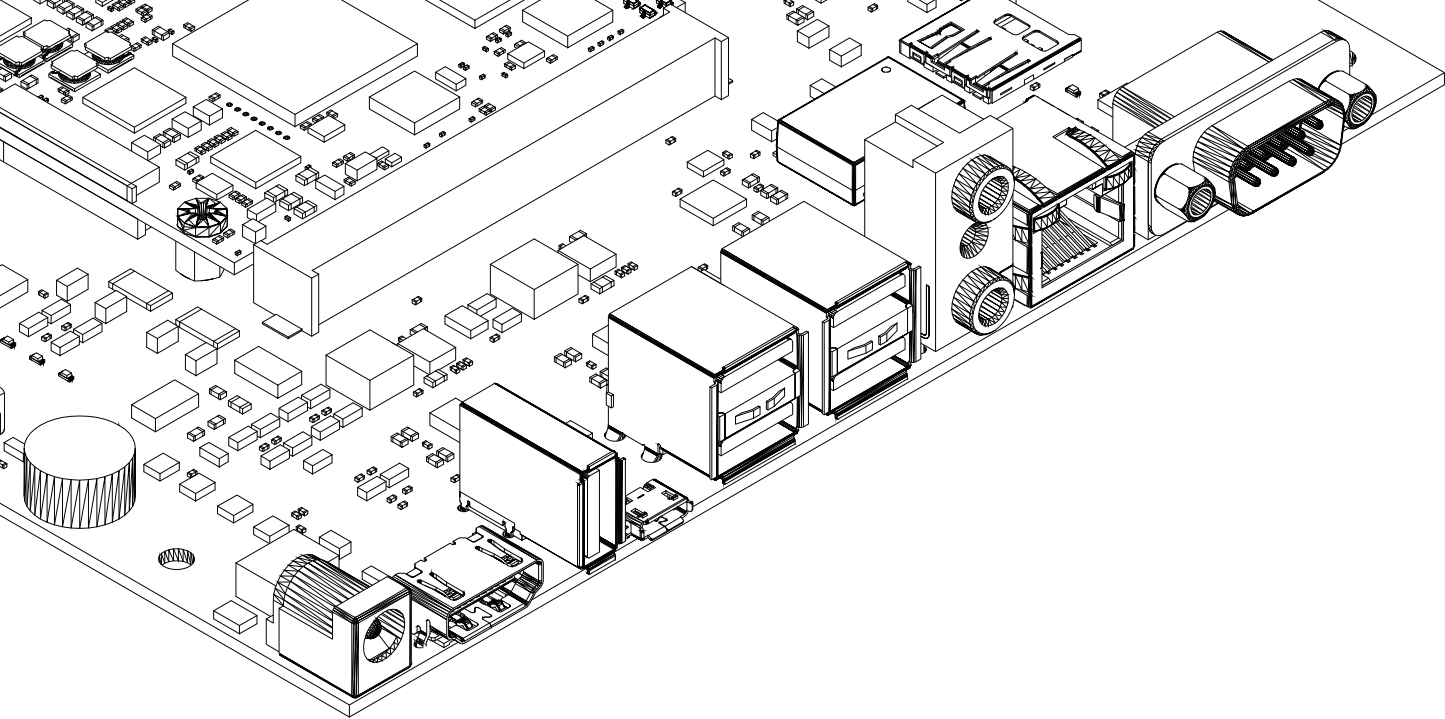
Enjoy the peace of mind that comes with a government-grade security solution for all identification, key-storage and asset-protection requirements. The Common Criteria (EAL6+) certified security module ensures that you never have to sacrifice security for performance again.

Designed and supported in Vienna, Austria

Every module we design is based on our expertise in system-level design, embedded software engineering and performance engineering. Our experienced engineering team provides engineering services to complement your in-house design resources and shorten your time to market.

Technical Summary

Form Factor	Q7

Processor	Rockchip RK3588
	Octa-Core ARM Cortex-A76/A55 up to 2.4 GHz
	    4x Cortex-A76 (4x 64 KB + 64 KB L1 cache + 512 KB L2 cache)
	    4x Cortex-A55 (4x 32 KB + 32 KB L1 cache + 128 KB L2 cache)
	3x Cortex-M0 co-processors

GPU	ARM Mali-G610 MP4 GPU
VPU	Video decoder: H.264, H.265 & VP9 up to 8K / 60 fps Video encoder: H.264 & H.265 up to 8K / 30 fps
NPU	up to 6 TOPs
Memory	LPDDR4X, up to 16 GB on-module
Storage	up to 256 GB eMMC on-module, SD Card slot
Ethernet	10/100/1000 Mbps with an on-module triple-speed GbE PHY
USB	1x USB 3.0 SuperSpeed OTG 2x USB 3.0 SuperSpeed host 1x USB 2.0 host
Display	1x HDMI 2.1, up to 8K / 60 fps 1x MIPI-DSI, up to 4K / 60 fps 1x eDP, up to 4K / 60 fps
Camera	1x MIPI CSI, 4 lanes with 4.5 Gb/s per lane, on Q7 connector 1x MIPI CSI, 4 lanes with 4.5 Gb/s per lane, on slim 34 pin connector 2x MIPI CSI, 2 lanes with 2.5 Gb/s per lane, on slim 34 pin connector HDMI in with 4K / 60 fps on slim 34 pin connector
CAN	1x CAN on-module provided by SoC
PCI-Express	1x PCIe 2.1 Gen3, 4 lanes with up to 5 Gb/s per lane 1x PCIe 2.1 Gen1, 2 lanes with up to 5 Gb/s per lane
Additional Interfaces	UART, GPIO, I2S, I2C, SMBus, SPI, FAN, RTC
Security	ARMv8 Cryptography Secure Element with Global Platform 2.2.1 compliant JavaCard environment (EAL6+ certified)
Operating System	Linux (Debian and Yocto)
Power Management	Dynamic frequency and voltage scaling for thermal and power management
Power Supply	Operates directly from a single 5 V supply
Consumption	≤18W
Operating Environment	Commercial 0ºC to +60ºC Industrial -20ºC to +85ºC
Dimensions	70mm x 70mm (2.75" x 2.75")

Theobroma Systems Design und Consulting GmbH

Seestadtstrasse 27
1220 Vienna, Austria

phone	+43-1-2369893-0
web	www.theobroma-systems.com
email	sales@theobroma-systems.com