

# **QS Family - QFN Style Solder-Down Computer-on-Modules**



# Processor

Industrial grade 650 MHz dual core ARM® Cortex®-A7 based STM32 MP157C

# Memory

512MB DDR3L 4GB eMMC

# Temperature

-25°C to 85°C

### Size

Baseboard:60mm x 90mmQSMP:27mm x 27mm x 2.3mm





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### QFN Style Computer On Module Advantages

#### **Defined Return Path**

The reason PCB layout becomes more and more important is because of the trend to faster, higher integrated, smaller formfactors, and lower power electronic circuits. The higher the switching frequencies are, the more radiation may occur on a PCB. With good layout, many EMI problems can be minimized to meet the required specifications.

When a module or component is used in a design, the supplier specifies the basis for such a layout. It's not only the pinout which should lead to an easy wiring without the need for crossings. He has also provide a proper solution for the signal path back to the module. If this return path, mostly the ground plane, cannot be connected near the signal pin, the return current has to take another way and this may result in a loop area. The larger the area, the more radiation and EMI problems may occur.

Ka-Ro QSCOM modules uses a large ground pad on the bottom side. With this a defined ground plane connection is available for all signals. In addition to have a good return path for all signals this large ground pad can be used for cooling.



# Easy Wiring - Even 2-layer printed circuit boards can be used.

With a solid ground plane on the bottom layer, high speed signals can be routed on the top layer at a defined impedance. However, this is only possible if a peripheral or plug can be connected directly without crossing the routing. Refer to fanout examples at the end of this document.

#### **Advanced Soldering**

Using a large solder pad underneath the component has not only electrical and thermal advantages. This is also used to hold the component at a defined height during soldering, without the solder being compressed by the weight, which could result in short circuits.

#### **Standard Contact Assignments**



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# QS Family QFN Style Solder-Down Computer-on-Modules

- Solder-down version
- 27mm square
- 2.3mm total height
- QFN type lead style
  - 1mm pitch
  - 100 pads
  - Thermal pad
- Visual solder joint inspection possible after soldering
- Single-sided assembly
- High speed design compliant

# **Key Features**

•	Processor	STM32MP1 Series
		Dual-Core Arm <sup>®</sup> Cortex <sup>®</sup> -A7 650MHz
		Cortex-M4 209MHz
•	RAM	128MB up to 512MB DDR3L
•	ROM	128MB SLC NAND or
		4GB eMMC
•	Grade	Industrial
•	Temperature	-25°C to 85°C (eMMC)
		-40°C to 85°C (NAND)

• Display support

Display Interface 24-bit RGB MIPI<sup>®</sup> DSI (2-lanes)

> 3D GPU: Vivante<sup>®,</sup> OpenGL<sup>®</sup> ES 2.0

Connectivity

GPU

- Ethernet, USB2.0, eMMC/SD
- UART, I<sup>2</sup>C, SPI, PWM, SAI, CAN

# **OS Support**

Linux



Dual cortex®-A7





### STM32MP1 Block Diagram

		Connectivity	Security
ARM <sup>®</sup> Dual Cortex <sup>®</sup> -A7	ARM® Cortex®-M4 209 MHz FPU MPU	10/100M or Gigabit Ethernet GMAC	TrustZone
650 MHz			SHA-256, MD5, HMAC
L1 32kB I L1 32kB D		Camera interface	3x Tamper Pins with 1 active
256kB L2 Cache		HDMI-CEC	
		3x USB 2.0 Host/OTG with 2x HS PHY	Secure RAMs
External Memories	Dual Quad-SPI	DFSDM	Secure Peripherals
		(8 channels/6 filters)	Secure RTC
3x SDMMC	DDR3L @ 533 Mhz	MDIO slave	Analog true RNG
Internal Memories		6x SPI / 3x I²S	96-bit unique ID
OTP fuse 3kB	MCU System RAM	6x I²C	AES 256, TDES
System RAM 256kB	384kB	4x UART + 4x USART	Secure Boot
Backup RAM 4kB	MCU Retention RAM 64kB	4x SAI	-
		SPDIF	System
Graphics	Control	2x CAN FD	5x LDOs
LCD-TFT controller	15x 16-bit timers		Internal and External Oscillators
MIPI-DSI controller	2x 32-bit timers	Analog	MDMA + 2x DMA
3D GPU OpenGL ES 2.0	2x 16-bit advanced motor control timers	2x 16-bit ADCs	Reset and Clock
@ 533 MHz		2x 12-bit DACs	
			3x watchdogs
STM32 MP157 only	n/a on STM32 MP151	STM32 MP15xC only	Up to 176 GPIOs

### **Ordering Information**

	QSMP-1510 STM32MP151A	QSMP-1530 STM32MP153A	QSMP-1570 STM32MP157C
Primary Arm <sup>®</sup> Core	1x Cortex <sup>®</sup> -A7 up to 650 MHz	2x Cortex <sup>®</sup> -A7 up to 650 MHz	2x Cortex <sup>®</sup> -A7 up to 650 MHz
Secondary Arm <sup>®</sup> Core	1x Cortex-M4 up to 200 MHz	1x Cortex-M4 up to 200 MHz	1x Cortex-M4 up to 200 MHz
RAM	128 MB	256 MB	512 MB
ROM	128 MB SLC NAND	128 MB SLC NAND	4GB eMMC
Display Interface	24-bit RGB	24-bit RGB	24-bit RGB + 2-lane MIPI-DSI
3D GPU	-	-	yes
CAN	-	2x FD-CAN	2x FD-CAN
Security	-	-	Secure Boot, Cryptography
Grade / Temp.	Industrial / -40°C to 85°C	Industrial / -40°C to 85°C	Industrial / -25°C to 85°C
Order Code	QSMP/151A/128S/128F/I	QSMP/153A/256S/128F/I	QSMP/157C/512S/4GF/E85