

PRODUCT BRIEF

820 Development Kit

OVERVIEW

The 820 Development Kit from Mistral is a powerful development platform built around the Qualcomm Snapdragon 820 (APQ8096) SoC. Based on a dual board architecture, the development kit consists of Mistral's 820 Nano SOM that comprises of the APQ8096 Application Processor with associated PMIC, Memory, components for Wireless Connectivity, Sensors and Audio and a Carrier Board that provides access to interfaces such as Gigabit Ethernet port, USB over Type-C, Camera and LCD among others.

The 820 Nano SOM is designed based on Qualcomm's 64-bit quadcore CPU, the Snapdragon 820 (APQ8096) SoC for realizing embedded applications. The Snapdragon 820 (APQ8096) processor with its cutting-edge processing capabilities and power efficient features, make it possible to support the ultimate in connectivity, graphics, image processing and efficiency.

The power of the Hexagon 680 DSP enables the CPU to offload many tasks for efficient processing making it possible to realize features like ultra-low power "always-on" sensors and advanced low power-image processing. The Adreno 530 GPU, with its next-generation visual processing technologies, along with the Kryo CPU are capable of generating photorealistic graphics for high quality gaming and next generation virtual reality applications. The hybrid auto-focus and multi-sensor fusion algorithms of the Spectra ISP makes it possible to capture a wide range of colors using a modern HDR sensor.

The 820 development kit is designed to exercise all features provided by the 820 Nano SoM. The presence of PCIe connectors and

custom expansion connectors make it possible to customize the development board to realize features beyond the existing hardware. The features supported on the development board include a Gigabit Ethernet port, Micro SD connector for extended storage, Type-C (with Display Port and dual role functions for Power Delivery and USB SS) and USB HS.

In addition, Mistral also provides optional adaptor boards that can be accommodated on the custom expansion connectors, making it possible to realize features specific to Camera, LCD and Battery charging.

Mistral's 820 Development Kit is an ideal choice to enable design, development and prototyping of high-resolution camera based solutions, multi-media terminals, media gateway devices, drones, medical assistive devices and lifestyle electronics products.





Type-C Functionality

Type-C solution condenses most connections to one standard, covering all devices and enhancing usability. It has reversible plug orientation and cable direction.

DisplayPort[™] (DP)

DisplayPort is the first AV protocol that delivers resolutions of 4K and beyond. Mistral's 820 Nano SOM supports DisplayPort (DP) over USB Type-C.

9-axis MEMS

The 9-axis MEMS sensor enables accurate acceleration, angular rate and geomagnetic measurement data. The 820 Nano SOM has an on-device 9-axis MEMS making it ideal for development of extremely small, yet powerful devices with motion-tracking.

UFS Memory

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UFS 2.0 internal memory replaces the common eMMC 5.0/5.1 standard & is designed for faster reading and writing allowing simultaneous read/write processes, boasting a substantial improvement in performance.

SPECIFICATIONS

820 Nano SOM

- Snapdragon 820 (APQ8096)
 - Quad Core Kryo 2.2 GHz 64-bit CPU
 - Adreno 530 GPU
 - Hexagon 680 DSP
 - Spectra ISP
- ► PMIC
 - PMI8996
 - PM8996
- Memory
 - 3/4 GB on-board PoP LPDDR4 @ 1866 MHZ
 - 32/64 GB UFS 2.0 (1-Lane)
- ▶ Wireless
 - Wi-Fi 802.11 b/g/n/ac 2.4/ 5.0 GHz 2x2 MU-MIMO
 - Bluetooth 4.2 HS
 - GPS Qualcomm IZat[™] Gen 8C
- Audio CODEC
- WCD9335
- ▶ 9-Axis MEMS Sensor
- ▶ Interfaces on Board-to-board Connectors
 - Display
 - 2x 4-Lane DSI
 - 1x HDMI 2.0 (4K)

3x 4-lane CSI

- Audio

• Camera

- 3x Analog MIC, 2x Digital MIC
- 1x Headphone out, 2x Analog Line Out
- 1x PDM, 1 x I2S
- BLSP
 - 5x BLSP (Configurable as I2C, SPI, UART, GPIO)
 - PWM
- Snapdragon Sensor Core (UART/I2C/SPI)
- Connectivity
 - 1x USB 3.0 OTG
 - 1x USB 2.0 Host
 - 1x 4-bit SD 3.0
 - 2x PCle V2.1
- Power
 - 3.5 to 4.2 V
- Dimension
 - 51mm x 26mm

BLOCK DIAGRAM



Carrier Board

- Type-C Integrated Peripheral
 - USB 3.0 (Dual Role Port)
 - Display Port (Source)
 - Power Delivery (Dual Role Port)
 - Display

- HDMI 2.0
- Extended Storage Memory
 - Micro SD Card Connector
- Audio
 - 3.5mm Audio Jack (Headset & Mic)
- Audio Expansion Header
 - 2x Digital MIC
 - 2x Analog MIC
 - 2x Analog Lineout
 - 1x PDM
- Connectivity
 - 2x USB 2.0 Host
 - Gigabit Ethernet Port
 - Mini PCle
 - Debug UART (MicroUSB)
- Sensor Expansion Header
 - SSC (UART/I2C/SPI)

- Camera Expansion Header (2)
 - MIPI-CSI (1x 4-Lane)
 - MIPI-CSI (2x 4-Lane)
- ▶ Display Expansion Header
 - MIPI-DSI (1x 4-Lane)
- BLSP Expansion Header
- Battery Expansion Header
 - Wireless Antenna
 - 2x Wi-Fi/BT
 - 1x GPS Receiver
- User Interface
 - Keys

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- RGB LED
- Dimension
- 180mm x 115mm

ADAPTOR BOARDS (Optional)

Additional Adaptor boards are available for the 820 Development Kit for accelerated product development that exercise various interfaces via the expansion connectors. These boards ensure easier customization and faster turnaround of the end product design.

Display

The display adaptor uses the expansion connectors present on the development board to realize support for display over LCD and user interface over touchscreen. Mistral provides a standard LCD interfaced to the APQ8096 over DSI and touchscreen panel interfaced over I2C with the display adaptor board.

ANDROID OREO .1

Android Application Framework

Android HAL

LINUX KERNEL (3.1)
System Calls/SYSFS Entries/Device Node Interface

20 Nano SOM

USB PCIe

ons Product Specific Applic

- ▶ 5.5" LCD panel at HD (720p) resolution
- MIPI-DSI interface to the processor

Camera

The camera adaptor uses the expansion connectors present on the development board of the 820 development platform to realize support for camera.

The camera module available on the camera adaptor board has the capability to capture images at 4K resolution.

- 13 MP CMOS Sensor
- MIPI-CSI2 interface to processor
- Supported image sizes 4K (4223 x 3136), 4K2K (3840 x 2160), Full HD (1080p)
- ▶ Supported output formats 12/10-bit RGB RAW

Customized Adaptor Boards

Some features have been tested and proven with prototype versions of the development kit. These features, though not present on the carrier board, can be realized through custom adaptor boards that can be built upon receiving specifications for the features.

Few of the custom adaptor board that can be built are:

- Sensor modules
- Battery charging and monitoring
- Audio Amplifier

These custom boards can be used for the proof-of-concept before prototyping the custom end product hardware.

SOFTWARE

The 820 Development Kit supports Android 8 (Oreo) and Yocto 2.0. The platform enables rapid software development as it supports all standard Application Programming Interfaces provided by Android Oreo and Yocto Linux 2.0.

BLOCK DIAGRAM

Android



The software available with the 820 Development Kit provides support for the following features

- Display
 - 4K Display over HDMI
 - Display Port over Type-C
 - Display over LCD (Optional Adaptor)
- Camera (Optional Adaptor)
 - 4K Image Capture
 - 4K Video Preview over HDMI
 - 4K Video Record
 - Video Streaming
- Connectivity
 - Wi-Fi
 - Bluetooth
 - Gigabit Ethernet
 - USB SS OTG
 - Mini PCIe
 - USB Host (MSC, HID)
- User Interface
 - Touchscreen
 - User Keys
- 9-Axis Sensor
- Extended storage with Micro SD
- Multimedia
 - Multi format video playback
 - Multi format Audio Record and Playback
- Efficient Power Management

DELIVERABLES

- 820 Nano SOM
- Carrier Board
- Android Oreo (programmed to 820 Nano SOM)
- Binary Images (Available online)
- Linux and Yocto
- Linux and Android Oreo
- Quick Start Guide (Available online)
- User Manual (Available online)

ACCESSORIES

The following accessories are required to enable software development with the platform. These are available through 3rd party vendors

- ▶ Power Supply (12V)
- ▲ USB Cable (Debug)
- ► Type-C Cable
- Any standard HDMI Display (Monitor/Television)

ORDERING

For ordering information please email us at sales@mistralsolutions.com or call +1-408-705-2240 for USA and +91-80-4562-1100 for rest of the world.

About Mistral

Mistral is a technology design and systems engineering company providing end-to-end solutions for product design and application deployment. Mistral focuses in two business domains: Product Engineering Services and Defense & Homeland Security. Mistral provides total solutions for a given requirement, which may include hardware board design, embedded software development, FPGA design, systems integration and customized turnkey solutions.

Mistral's strategic partnerships with leading technology companies help provide customers with a comprehensive package of end-to-end solutions.



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