Snapdragon 410E and 600E Processors - From Evaluation to Production

Qualcomm Technologies Inc. recently announced the availability of Qualcomm® Snapdragon™ 410E and 600E processors for embedded and IoT applications. The Snapdragon 410E and 600E processors come with a minimum 10-year availability guarantee from commercial sample of the mobile version (until 2025) through Arrow Electronics. This is the first time stand-alone Snapdragon processors are available to the general market through the distribution channel. By making these processors available to manufacturers at any volumes, Qualcomm is positioning itself as a key player in the highly fragmented embedded market.

Snapdragon mobile processors, a family of application processors from Qualcomm Technologies, Inc., are at the core of many mobile devices. Their high-performing multi-core processors, low power consumption, connectivity options and advanced graphics features like 3D graphics have made them the component of choice for mobile hardware designers. With the introduction of the Snapdragon 410E and 600E processors and their global availability through Arrow Electronics, Qualcomm Technologies, Inc. is expanding its offering and bringing greater flexibility to design Snapdragon solutions into a wide range of smart products and connected devices, including robotics, industrial devices, medical imaging, point-of-sale (POS) systems, smart home and digital signage.

Contents

Snapdragon Candidate Applications

Like all hardware development efforts, Snapdragon-based development requires an extensive ecosystem of partners, development tools and service providers. More than in mobile device development, smart and connected device development relies on domain expertise, local support, and unique considerations. To facilitate this support Qualcomm Technologies, Inc. is collaborating with Arrow. Arrow brings a full range of parts and engineering services to complement Snapdragon embedded solutions. More important, Arrow services can help embedded and IoT device makers successfully commercialize their Snapdragon-based offering.

This article summarizes the Snapdragon 410E and 600E processor features and ecosystem, and provides guidance on design options and tools available to successfully migrate from prototype to production.

From Prototype to Production

Designing systems with fully featured SoCs like Snapdragon require significant hardware and software expertise. For hardware – PCB and schematic design, implementing high-speed memory interfaces, integrating camera functionality and a host of wireless connectivity features can all pose challenges. Similarly on software – partitioning of the code, loading and unloading applications, enabling inter-processor communications, balancing performance with power consumption, implementing security,

**Robotics:
Powerful processing**

Robot Operating System (ROS) support for integrated, low-power solution for advanced robotics applications

**Industrial and home appliances:
Attached connectivity**

Companion Wi-Fi/WLAN, Bluetooth and precision GNSS (GPS + GLONASS) for portable applications

**Digital media and TV dongles:
3D graphics and multimedia**

Qualcomm® Adreno™ 3xx GPU supports OpenGL ES 1.1/2.0 and DirectX9.3 for next-generation media players

**Smart surveillance cameras:
HD video encode and decode**

Multiple camera support with support for image stabilization, zero shutter lag and High Dynamic Range for combining different exposures

Figure 1: Snapdragon Solution Applications

customized camera drivers and tuning, HMI, etc. are all crucial to the overall functioning and reliability of systems.

To help OEMs navigate the complexities of multi-core SoC design discussed above, Qualcomm Technologies, Inc. is collaborating with Arrow Electronics to provide a tiered

offering that include development boards, commercial-ready modules and single board computers as well as stand-alone processors for chip-on board designs. Further, design service and turn-key solution providers offer expertise and offer cost-optimized and quick-to-market products. The figure

600 Dev Kits
• Inforce 6401™ DevKit
• eInfochips Eragon™ 600 DevKit

410 Dev Kits
• Arrow DragonBoard™ 410c
• Inforce 6301™ Dev Kit
• Intrinsyc Open-Q™ 410 Dev Kit
• Variscite DART-SD410
• eInfochips Eragon™ 410 Dev Kit

Design Process

Which Processor is Right for You? ①

Evaluate and Prototype ②

Production ③

Chip-Level
(Ideal for very high-volume applications)

Module or SBC
(Ideal for applications with short design cycle or low-volumes)

Snapdragon 600E
• Product Page
• Product Brief
• Tools & Resources

Snapdragon 410E
• Product Page
• Product Brief
• Tools & Resources

SBCs/SOM
• Inforce 6410Plus™
• Variscite VAR-SD600
• eInfochips Eragon™ 600
• Intrinsyc Open-Q™ 600
SOMs
• Inforce 6401™ SOM
• eInfochips Eragon™ 600 SOM
• Intrinsyc Open-Q™ 600
• Variscite VAR-SOM-SD600

SBCs
• Inforce 6309™
SOMs
• Intrinsyc Open-Q 410™
• eInfochips Eragon™ 410
• Variscite DART-SD410
• Inforce 6301™

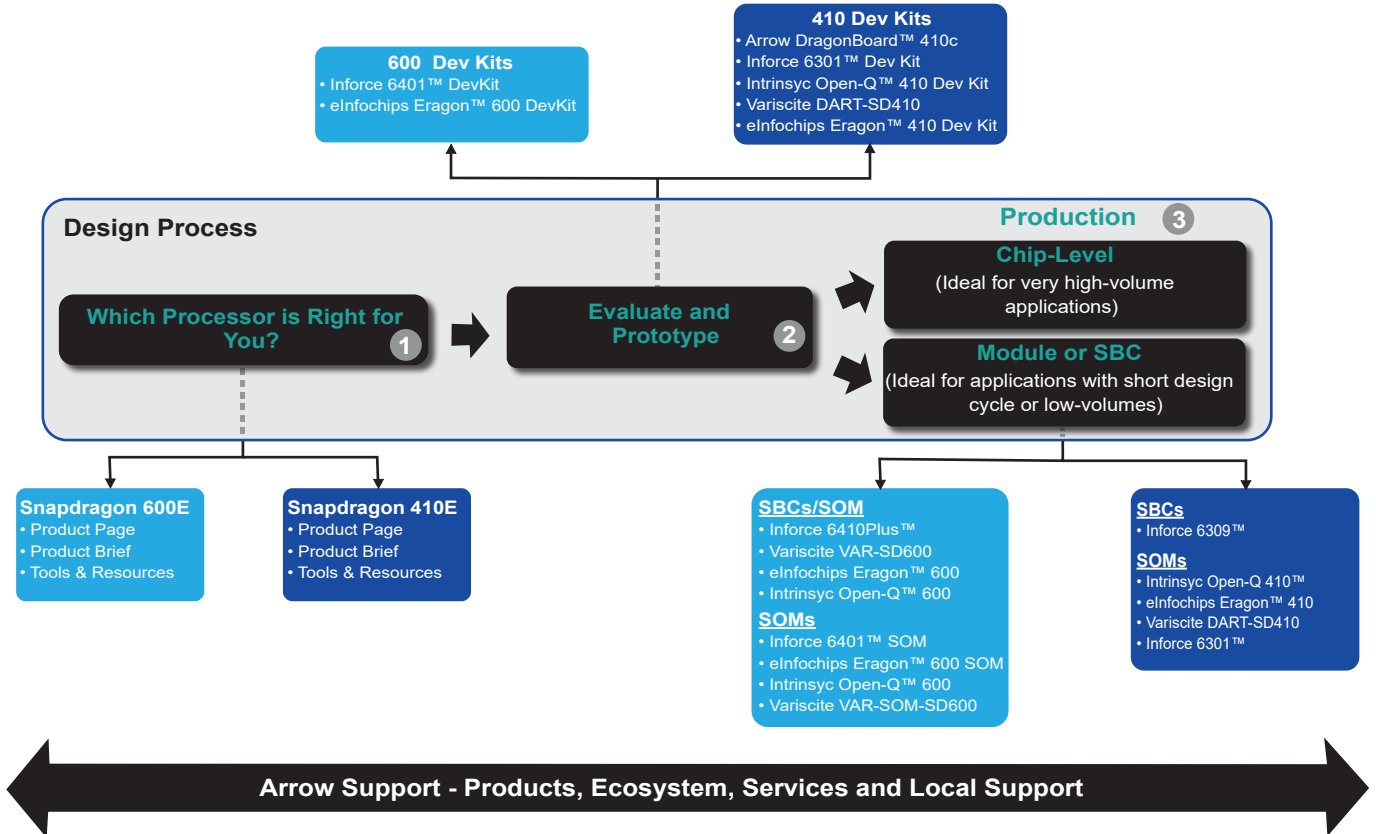**Arrow Support - Products, Ecosystem, Services and Local Support**

Figure 2: From Prototype to Production - Design Options and Resources (click on the text to open in a new browser)

below outlines the 3-step process for progressing designs from processor evaluation to production. At each step, the design choices and resources available are also delineated.

Snapdragon 410E and 600E Features and Capabilities

The three core components of the Snapdragon 410E and 600E processors are – (1) Quad core CPUs optimised to balance performance and power consumption, (2) the Qualcomm® Adreno™ Graphic Processing Unit (GPU) to deliver advanced graphics capabilities and (3) a Qualcomm® Hexagon™ DSP core for real-time processing and low-latency application performance.

Both the Snapdragon 410E and 600E processors are quad-core and can handle 1080p video recording and playback. The Snapdragon 410E is a quad-core ARM® Cortex®-A53 clocked at 1.2 GHz and can support 1080p displays and up to 13-megapixel cameras, while the 600E is a 1.5GHz quad-core custom Qualcomm® Krait™ CPU and

supports 2K panels and up to 21-megapixel cameras. The Snapdragon 600E and 410E bring together advanced connectivity and compute technologies to meet the needs of a large range of embedded and IoT applications. A summary of the features is illustrated in the figure below.

Documentation, links to hardware and software tools such as SDKs, profilers and debuggers are available at the Qualcomm Developer Network site. For those developing with Snapdragon embedded solutions resources include chipset device specifications, processor design guidelines, user guides, application notes and supported SW details. There are also a multitude of published projects with sample code to inspire designs, from home automation to robotics.

DragonBoard 410c from Arrow Electronics

The DragonBoard™ 410c is the first development board based on the 64-bit Qualcomm® Snapdragon™ 410 processor. It features advanced processing power, Wi-Fi,
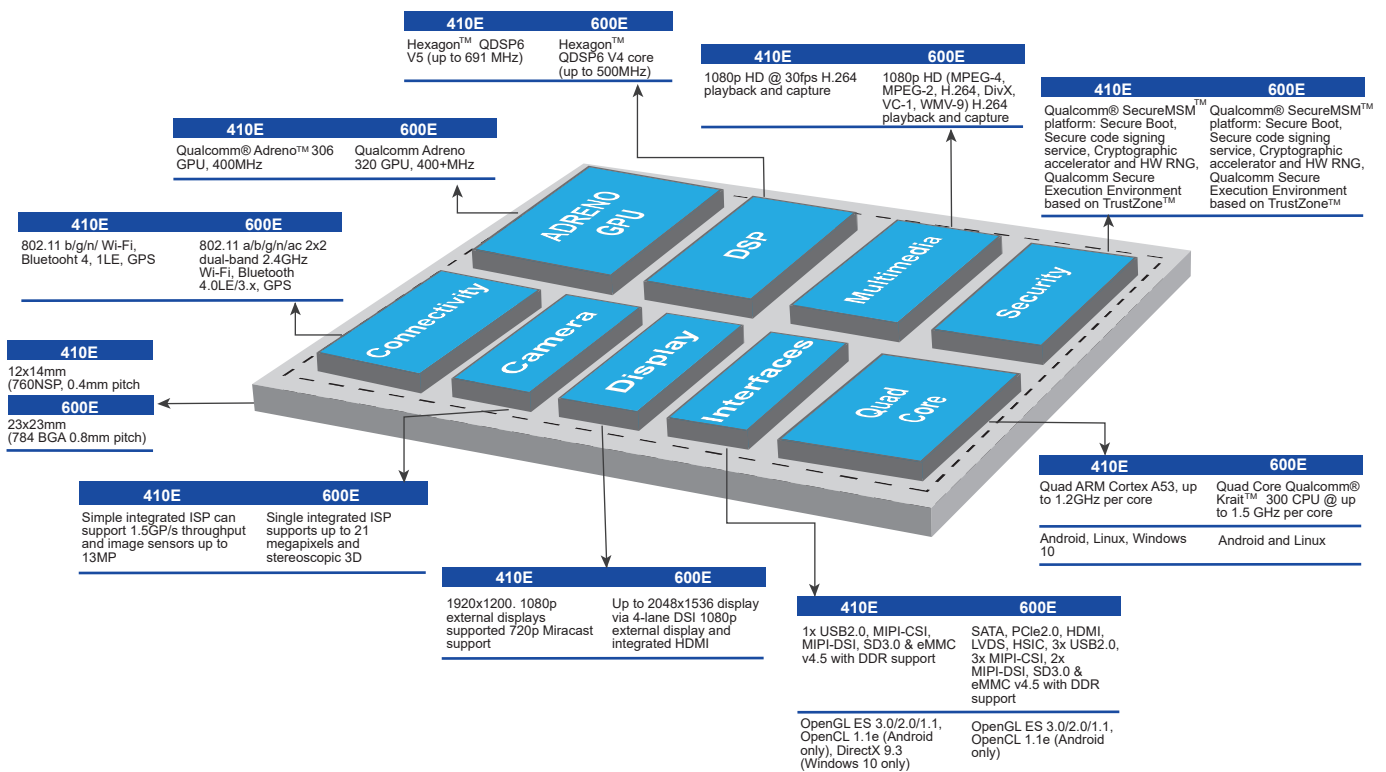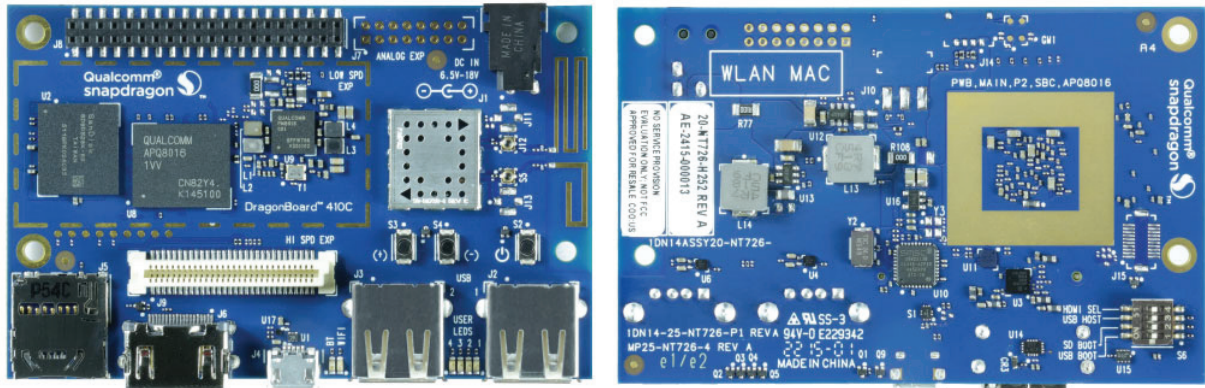

Figure 3: Snapdragon 410E and 600E Features

Figure 4: DragonBoard 410c for Evaluation and Software Development

Bluetooth connectivity, and GPS, all packed into a board the size of a credit card. The DragonBoard 410c supports rapid software development, education and prototyping, and complies with the 96Boards Consumer Edition specification.

Key Features

> OS Support: Android 5.1 (Lollipop) on Linux Kernel 3.10, Linux based on Debian 8.0, and Windows 10 IoT Core
> CPU: Quad-core ARM® Cortex®-A53 at up to 1.2 GHz per core with both 32-bit and 64-bit support
> DSP: Hexagon™ QDSP6 V5 core (up to 691 MHz)
> Memory/storages: 1GB LPDDR3 533MHz / 8GB eMMC 4.5 / SD 3.0 (UHS-I)
> Graphics: Qualcomm Adreno 306 GPU with support for advanced APIs, including OpenGL ES 3.0, OpenCL, DirectX, and content security
> Video: 1080p@30fps HD video playback and capture with H.264 (AVC), and 720p playback with H.265 (HEVC)
> Camera Support: Integrated ISP with support for image sensors up to 13MP
> Connectivity and Location: Wi-Fi 802.11 b/g/n 2.4GHz, Bluetooth 4.1, Qualcomm® IZat™ location technology Gen8C, on-board Wi-Fi, BT and GPS antenna
> I/O Interfaces: HDMI Full-size Type A connector, one micro USB (device mode only), two USB 2.0 (host mode only), micro SD card slot
> Ordering Information: Part # DRAGONBOARD 410C

Summary

The announcement to make the Snapdragon 410E and 600E processors available for a minimum of 10 years makes them an attractive option for many embedded and IoT applications. These products can be purchased only through Arrow Electronics. To enable easy adoption of Snapdragon processors in embedded and IoT applications, Qualcomm Technologies, Inc. has collaborated with Arrow to build a rich ecosystem of product and service providers and offer products ranging from development boards, to off-the-shelf

modules and boards, to stand-alone processors for chip-on board designs. To get started, go to
> Arrow.com for DragonBoard
> Qualcomm Developer Network
> 96boards for community

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