Digi ConnectCore 8M Nano: Developer Resources, Security, Scalability

Charlie Watson, Product Marketing Manager, Digi International
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Digi International recently announced availability of the Digi ConnectCore 8M Nano Development Kit. The Digi ConnectCore® 8M Nano is designed to meet the needs of organizations developing industrial, medical, agricultural and transportation products that require advanced connectivity and multimedia capabilities.

Digi is pleased to support the developer community with this advanced embedded SOM platform. In this blog post, we highlight some of the features that help dev.

Features of the Digi ConnectCore 8M Nano platform

The Digi ConnectCore 8M Nano, based on the NXP® i.MX 8M Nano processor, features up to 4x power-efficient Arm® Cortex®-A53 cores and 1x Cortex-M7 core.

This highly integrated, cost-effective SOM platform optimizes power consumption while maintaining a standard of high-performance, making it suitable for a wide range of industrial and medical applications including Internet of Things (IoT), human-machine interface (HMI), equipment monitoring, audio/voice, edge computing and machine learning (e.g. anomaly detection).

Organizations can get to market faster with lower development costs by leveraging Digi ConnectCore 8M Nano platform's pre-certified wireless connectivity, integrated device security framework, remote management, cloud integration and a complete Linux software platform based on Yocto Project®.

To build or to buy – that is the question!

As you begin to think about the development of your industrial or medical product, key product design aspects should be accounted for during the planning phase that will help you accelerate product development cycles. While your first inclination may be to analyze the capabilities of a chip and then account for the per-unit purchase price, there are other critical factors to consider, such as security, software development support and pre-certification.

The Digi ConnectCore 8M Nano system-on-module is part of a family of SOMs that designed to short-cut development and enhance the functionality of your end product. Each of these products comes with a built-in security framework, a range of software enhancements and pre-certified connectivity. In turn, these enhancements support more stable and predictable product development and maintenance costs.

In the next section we'll talk about some key considerations in selecting a System-on-Module for your future product development — a process that involves evaluating the complete offering of the manufacturer.

Considerations in selecting your SOM partner

Here are a few critical factors that should be carefully considered during the due diligence phase of selecting an embedded module partner.

Accelerate development with 8M Nano developer resources
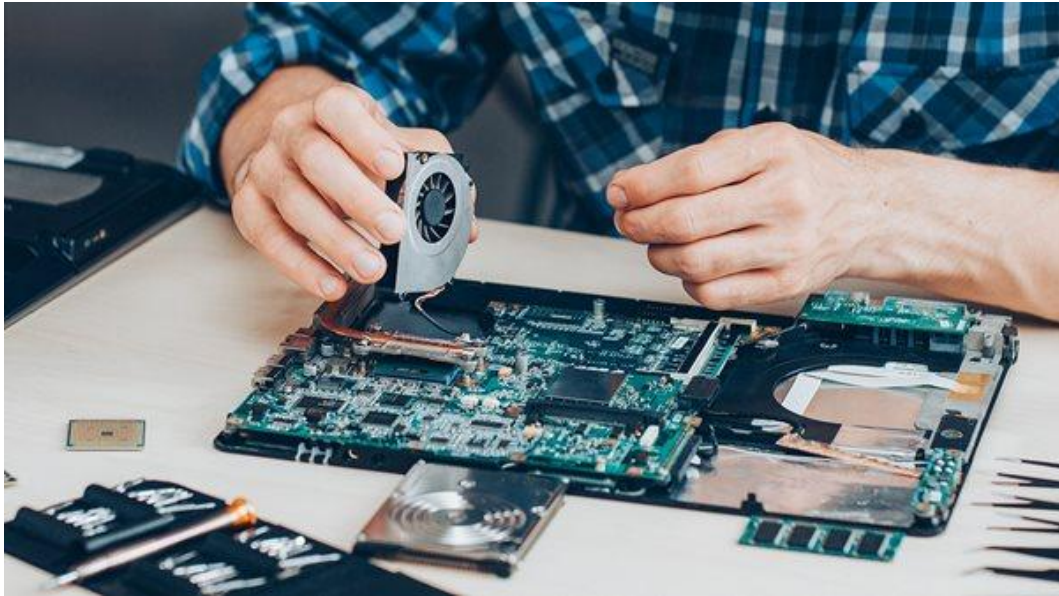
The embedded development cycle comes with hurdles that can slow your team's development cadence. Therefore it is critical to work with a solution that comes with the critical support needed to accelerate development, such as 8M Nano developer resources.

All Digi ConnectCore SOMs and single-board computers, including the 8M Nano, come with Digi Embedded Yocto (DEY). DEY is an open-source, production-ready Yocto Project™ based embedded Linux distribution with fully tested and maintained BSPs and APIX software extensions for security, power management and wireless connectivity. As a distribution, DEY provides the following:

- **Digi BSP**. DEY provides precompiled images that are ready to use, but you can also compile the whole distribution from source. The distribution contains the following components, which have been customized and tested for the ConnectCore module.
- A **U-Boot**-based bootloader customized for the ConnectCore module to boot the Linux image. You can configure U-Boot at boot time, and it integrates a useful set of commands so you can program your own scripts. Digi provides source code that can be tailored to your design requirements as well as integrated within the build system. When the Yocto image is built, the U-Boot image is also built with it.
- A **Linux kernel** customized for ConnectCore products. DEY includes the kernel source as well as device tree configuration files.
- Reference **root file system** images using the DEY reference distribution. The DEY distribution makes the following choices:
  - The default selection of packages through the supported images
  - systemd as initialization manager
  - Framebuffer and XWayland support
  - Bluez5 support
  - QT5 support
  - Pre-compiled framebuffer images (dey-image-qt-fb) or XWayland images (dey-image-qt-xwayland)
  - Multimedia enabled (using the gstreamer open source framework)
  - Standard Linux networking tools NetworkManager and ModemManager

You can further customize it by creating your own DEY-based distribution.

- **SDK**. DEY includes a precompiled C/C++ toolchain. You can use it to cross-compile applications to run on Digi embedded platforms.
- **Precompiled images**. DEY includes pre-built reference images to accelerate your development process.
- **Documentation**. DEY comes with comprehensive documentation covering all the development and technical aspects of the ConnectCore products.
- **Software extensions**. DEY is designed to improve your time to market with common and simple to use software features that work out of the box.

You can learn more about the Digi tools for accelerating embedded development with DEY in our article titled, Development Accelerators: Digi Embedded Yocto Software Extensions.

In future Digi ConnectCore-focused blogs, we'll talk more about Digi Microcontroller Assist™, an on-board subsystem that assists with advanced power management, security, peripheral support and system reliability operations as well as Digi Remote Manager®, a remote device manager with over-the-air update capability. Your takeaway for now is this — Digi is a partner with a wide-breadth of software solutions that you can lean on to solve problems and maintain support throughout your product's lifecycle.

Think about security up front

As the number of IoT devices continues to grow exponentially, it's critical to make security a top priority for virtually any application – particularly if you're transmitting sensitive data. The troubling fact is, an estimated 70 percent of IoT devices are vulnerable to attack, so it is essential for developers to factor in this critical requirement from the beginning.

Digi TrustFence® is the security framework for Digi ConnectCore solutions. Digi TrustFence is an integrated, tested, and complete Linux device security framework that simplifies building secure connected products. Designed for the long product lifecycles of embedded devices, Digi TrustFence allows customers to easily integrate device security, device identity, and data privacy capabilities.

The built-in security of Digi TrustFence gives you immediate access to critical features including secure connections, authenticated boot, encrypted data storage, access-controlled ports, secure software updates, and seamless integration of the dedicated on-module Secure Element.

Simplify development of secure connected products with Digi TrustFence. Let Digi TrustFence handle security for you with a full range of built-in features including:

- **Secure Boot**: Ensures only signed software images can run on a device
- **Encrypted Storage**: Local file system encryption keeps internal device data safe
- **Protected Ports**: Access-controlled internal and external ports prevent unwanted "back doors"
- **Device Identity**: Root of trust, certificate management, and secure key storage identity protection
- **Device Integrity**: Tamper-proofing and device-integrity monitoring with low-power support protect against physical intrusion
- **Secure Connections**: Enterprise-level data encryption for wired and wireless network privacy
- **Lifecycle Longevity**: Rely on a Digi-maintained future-proof platform architecture

Read more about Digi TrustFence for embedded designs in this brochure.

Design for future scalability with the 8M Nano SOM platform

Companies are pushing hard to be first to offer IoT solutions in their respective markets. That emphasis on time-to-market often leads to some short-term design decisions with a narrower technology focus. While this may get you to market faster, it ignores the

hard reality that technologies, customer needs, and market dynamics are always changing.

The Digi ConnectCore 8M Nano SOM is based on the NXP i.MX8, the newest in a line of applications processors for superior hardware and software integration trusted by leading companies in smart cities, transportation, energy, healthcare and other highly regulated industries. The Digi ConnectCore family of SOMs are designed with longevity in mind to meet the future requirements of products with 10+ year lifespans.

Digi ConnectCore provides functional scalability from the single-core i.MX 6UL to dual/quad-core versions of the Digi ConnectCore 8M Nano system-on-module and 8X SOM. In addition to various processor core options, Digi ConnectCore includes upgradable memory up to 16 GB eMMC flash and up to 2 GB LPDDR4 to meet a range of deployment options. Digi provides the ability to scale with increased processor cores and memory to future-proof your designs.

Think about the total cost of ownership

In both the short- and long-term, the module or chipset you choose becomes a key component in your product. That's why it is critical to base your buying decision on more than what is on the datasheet or in the price quote. In many ways, your selection process extends beyond the component to include each vendor's maintenance and support that stands behind the module. It includes the features and robustness of the SOM, the development and management support, and the ability to get assistance with your product along the way, on into the future.

Digi International's "hardware enabled, software defined" strategy can give you the confidence you need to streamline your team's product development process, maintain products over the long-term and redeploy existing applications to new business cases.

Don't underestimate the certification process

Product development teams sometimes view certifications as a one-time cost, not realizing that every entry into a new geographic region can lead to design changes to meet new certification. Even if you are not entering into a new region, certification bodies may change their standards that require you to re-certify products. Purchasing a pre-certified module can eliminate many of the headaches associated with wireless certifications for the FCC, Industry Canada (IC), and CE Mark in Europe.

Like all Digi ConnectCore SOMs, the 8M Nano SOM platform comes with integrated pre-certified dual-band Wi-Fi 802.11 ac and Bluetooth 5 as well as enterprise Wi-Fi capabilities not typically supported by other SOMs, all of which are critical in certain medical and transportation applications.

Note: If you need help prototyping or developing your design to ensure you pass certifications the first time, Digi Wireless Design Services can help.

Get started with a Digi ConnectCore 8M Nano Development Kit

Digi ConnectCore 8M Nano Development Kits are available through Digi distribution partners. With the 8M Nano Development Kit, you have the opportunity to completely explore the platform, test features, integrate your planned functionality, and run trials. The kits are the best way to try before you buy, and learn how the Digi ConnectCore 8M Nano developer resources will support your full development cycle.

Need wireless connectivity? Digi ConnectCore 6UL, 8X and 8M Nano development kits are designed for Digi XBee® integration. The Digi XBee ecosystem extends wireless connectivity options with a global, pre-certified family of modules spanning popular IoT protocols including 2.4 GHz mesh (Zigbee, 802.15.4, DigiMesh), long-range (868/900 MHz) and cellular (3G, LTE Cat-1, LTE-M, NB-IoT). The ConnectCore 8M Nano development kit also includes Digi XBee SDK libraries and examples for Yocto Linux to assist with integration.

With the Digi ConnectCore line of SOMs, SBCs and dev kits, you can find the product that meets the specific requirements of your application. Reach out to an IoT expert today and ask about Digi ConnectCore solutions or development support for your next embedded design — contact us!