Designing a custom SoC: 9 next steps after downloading your Arm IP

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The [Arm DesignStart program](#) provides fast, low cost access to Arm IP so you can start to design and prototype your system-on-chip (SoC). It offers fast access to Arm processor IP including verified, configurable and modifiable subsystems pre-integrating a processor with the most suitable system components.

By downloading and evaluating Arm DesignStart IP, you'll join over 4000+ companies that are already on their journey to creating a custom chip. But then what do you do once you download the IP? We've broken it down into nine key steps from initial IP download to design, software creation and commercialization.

Before we dive in - what if design expertise is a concern? It doesn't need to be – you can outsource some or all of your chip design to one of our Arm Approved Design Partners, a global network of design service companies with a wealth of experience in Arm-based design. No matter your technical expertise, you can get the right level of design support you need to take advantage of the benefits of custom chips.

And if you haven't yet, here's a quick overview of DesignStart, and how to access Arm IP quickly and easily: DesignStart Eval enables evaluation and prototyping access to Arm Cortex-M0 and Cortex-M3 processors, two of the industry's most widely-used embedded cores used for Internet of Things (IoT) applications. The packages come with full subsystem RTL, available for download instantly.

This step-by-step guide will focus on DesignStart Eval for CPU prototyping, but it's key to mention that there is a commercial track of DesignStart to help speed up licensing when you're ready to manufacture and commercialize your custom SoC design. You can now access the Linux-capable Arm Cortex-A5 processor for the lowest cost through DesignStart Pro – learn more in this blog.

Arm invests in companies' success by reducing both risk and initial investment. It is a great choice for both Internet of Things (IoT) start-ups and established companies looking to develop a workable proof-of-concept.Here's how to get started on your design once you've

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downloaded your Arm IP from DesignStart.

Nine Step Guide to Creating a Custom SoC:

1. Register for Arm DesignStart Eval

Log in with your Arm account credentials – if you don't yet have a login, you can register for one. DesignStart Eval currently offers a choice of two CPU designs. You'll find more information on the IP most suitable for your project on this page.

2. Discover the DesignStart

Community and training courses

As well as exploring the Arm IP on offer, it is good to familiarize yourself with the extensive free support through the Arm DesignStart Community – a forum for discussing your design challenges and solutions. You can also pay for an online training course, providing a technical introduction to DesignStart.

3. Download a DesignStart Eval IP package

You'll be asked to agree to an End User License Agreement; this explains what you can do with Arm IP. Once you've accepted, you'll download a file containing Arm processor blueprints and an example SoC through CMSDK that provides a great starting point for design. You'll be sent download details, product serial numbers for Keil MDK Essential (more on that later) and, if you chose to evaluate Cortex-M3, the product serial number for the Cortex-M3 Cycle Models.

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4. Tool-up

To work with the processor files, you'll need various tools. There is a wide range available, from free open source options to fully-featured commercial packages. Arm has partnered with two EDA (Electronic Design Automation) suppliers – Cadence and Mentor - to provide simplified and expedited access to chip development tools for DesignStart users. Each EDA tool is slightly different, so we recommend following your software supplier's instructions to set up and configure your tools.

5. Run a simulation

Simulation is a critical step in ensuring your SoC functions how you want it to. You can use the obfuscated register transfer level (RTL) description to run the simulation; alternatively, the Cortex-M3 package includes a processor Cycle Model, which enables quick trade-off analysis to make architectural decisions. You'll be provided with the serial number for this in your registration email.

Watch this video to understand how to run a simple simulation test.

6. Run it in the real world

To move from simulation to real world testing, you'll need a physical FPGA (field programmable gate array). The Versatile Express Cortex-M Prototyping System, or V2M-MPS2+, is a FPGA board built specifically for Cortex-M processors. Its low-cost, feature-rich design means it's perfect for DesignStart Eval users.

Watch the video here to find out how to prototype on an FPGA

7. Download Arm Keil MDK Essential

Software brings your processor to life. Arm Keil MDK is the most comprehensive software development solution for Arm-based microcontrollers, enabling you to create, build, and debug embedded applications. DesignStart Eval users get free 90-day access to Arm Keil MDK Essential.The serial number in your registration email authorizes the software.

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8. Develop software to run on your SoC

We're not going to tell you what to create – the sky is the limit! If you need help getting set up, Software Packs offer device support and software components that give you application building blocks. MDK includes CMSIS libraries, such as CMSIS-DSP and CMSIS-compliant RTX RTOS, ideal for a microcontroller-based device. Third-party software packs provide components for IoT, security, encryption and networking applications.

9. Move to DesignStart Pro to commercialize your chip

Ready to take your design forward to production? Traditionally, this has been where the costs start to mount up. But now, you can start developing your commercial chip by upgrading to a fast-access DesignStart Pro license for no upfront fee. And going to production on a mature silicon process has never been cheaper – and all of our Arm Approved Design Partners have close relationships with foundries across the world to ease the transition. While DesignStart Eval gives you access to a fixed-configuration processor and subsystem RTL for evaluation, DesignStart Pro unlocks the full flexibility of your Arm processor and offers the System Design Kit RTL and Keil MDK Professional for the development and manufacturing of commercial SoCs.

Why wait? Get started on your custom chip today, no matter which design route you choose to take. Take advantage of the benefits of a custom SoC, and ensure you design with confidence on both the most

proven foundation and the fastest path - with Arm.

Get started with DesignStart

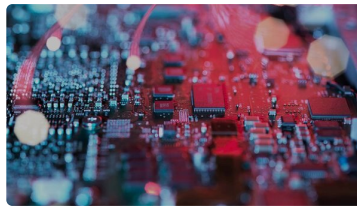🗨 0 comments   👤 0 members are here

DesignStart blog

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