



Alif Semiconductor's Conductor Tool



One of the biggest challenges when launching a new design with new processors or microcontrollers is properly configuring it for initial set up. Allocating resources, configuring and assigning pins, and setting up clock trees can be like navigating a maze with a complicated puzzle of cross-referenced datasheets, user manuals, FAQs, and white papers. Add in a poorly designed AI chatbot or impossible to reach field application engineers (FAEs), and the new user is left with a mess.

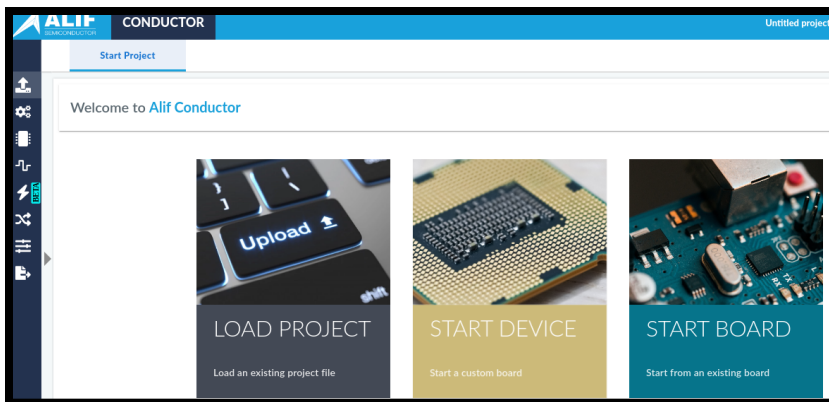
Enter Alif Semiconductor's Conductor Tool — a convenient and comprehensive tool for configuring the Ensemble® and Balletto™ families of processors and microcontrollers.

The Ensemble family of fusion processors and microcontrollers from Alif Semiconductor represents a spectrum of highly integrated processors for use in intelligent embedded edge device applications. The Balletto family of MCUs offers strong performance in audio and sensor functions thanks to its broad scalability and AI/ML capabilities and large on-die memory.

The Conductor Tool makes getting started with these Alif processors and microcontrollers easy, even for complicated configurations. New designers have a leg up thanks to this tool, and returning users know their configuration setup will be fast and pain free.

What is the Conductor Tool?

The main purpose of the tool is to facilitate users in their application work with Alif Semiconductor families of processors and microcontrollers. The Conductor Tool manages software configurations of device resources, pins, clocks, memories, DMA, IRQs, and various other additional settings. The Conductor Tool can also give useful power estimates and show how different choices affect power consumption.



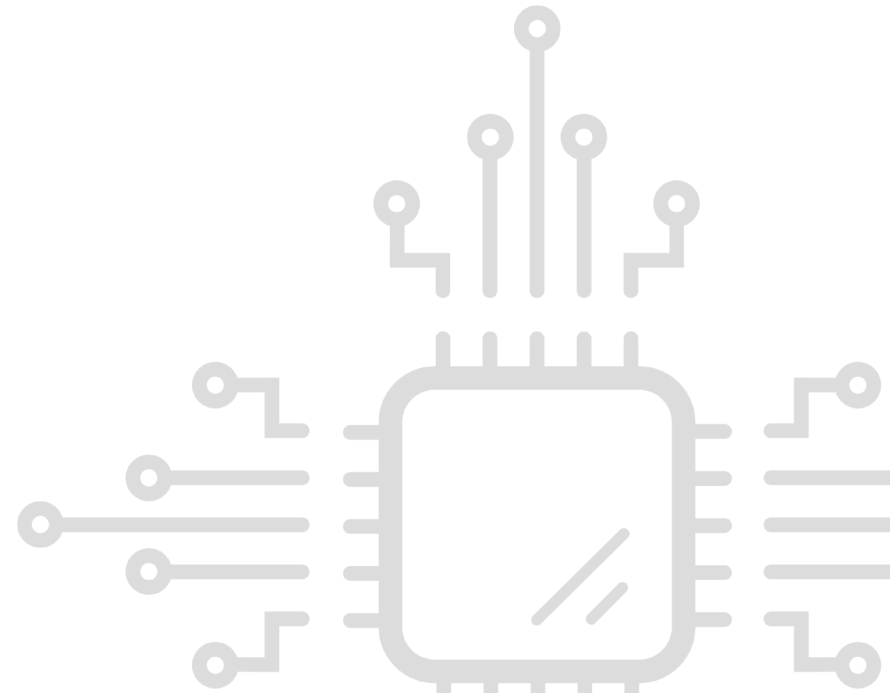
Alif's Conductor Tool offers a simple, intuitive —and powerful tool for configuring new processors and microcontrollers.

In devices with multiple cores, it is recommended that the user defines the SRAM and MRAM memory map layout during the development process, that details which MCU cores will have dedicated access or shared access to regions of these memories, and individual peripherals. The online Alif Conductor Tool is designed to assist with this process. The Conductor Tool also assists in configuring device system clocks and the peripheral Pin Mux settings.

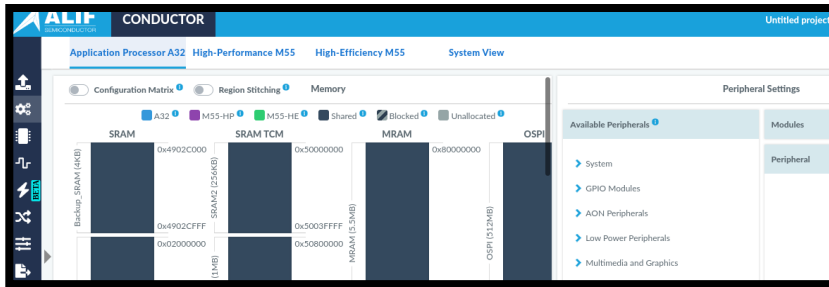
The Alif Conductor Tool saves a user's device configuration into a file that can be installed into the device using provisioning tooling provided by Alif. The configuration is read and implemented by the Secure Enclave in the chip before the main application boots. All of the configuration details generated by Conductor are text based, and can be stored in standard version control systems.

Key Features

The online Alif Conductor Tool is designed to assist with the process of identifying and configuring the processor memory map layout, assigning memory blocks and peripherals to specific MCU cores. The Conductor Tool also assists in configuring device system clocks and the peripheral Pin Mux settings. Beyond that, additional support for DMA settings and a tool to estimate power usage round out the feature set.

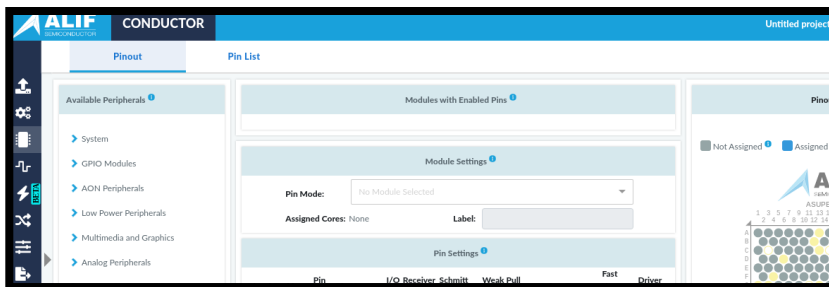


Resources



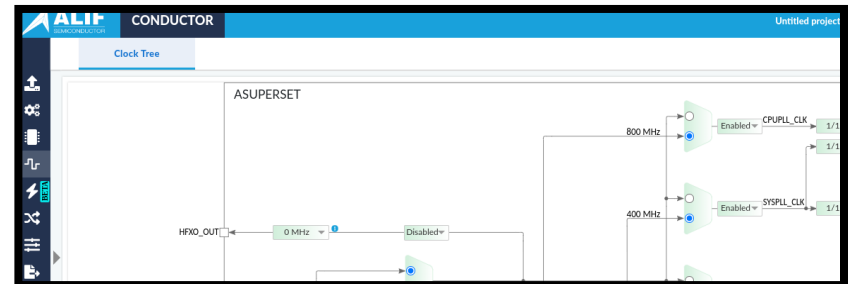
In the Resources feature, the user can configure the processor cores, assign memory regions, and grant access to peripherals for the device. The resources can be viewed and assigned by individual processor or microcontroller core, or they can be viewed at the system level. All of the shared system memory can be divided into custom regions, and then assigned by region to different cores as desired. Meanwhile, for each processor, the Conductor Tool provides a list of available compatible peripherals that can likewise be assigned to different cores as desired.

Pins



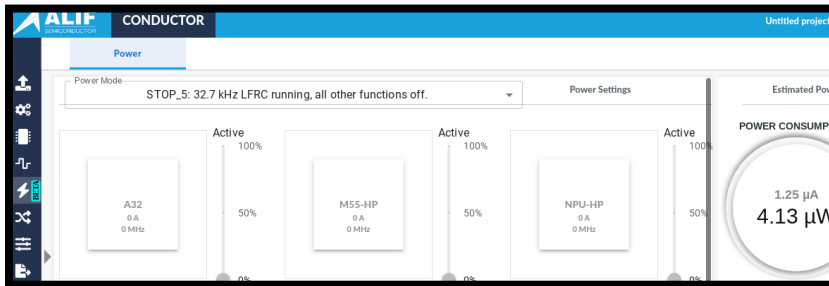
The Pins configuration user area has two different ways to view and edit the pin configurations depending on user preference: the Pin ut view (module view) and the Pin List view (table view). In either view, any peripheral resources that use external pins and were assigned in the Resources feature will appear as modules with enabled pins. From there, this section of the Conductor Tool can be used to precisely configure each pin, with either the proper defaults per the given peripheral, or with manually set options (such as I/O, trigger type, pull-up strength, drive strength, and so on).

Clocks



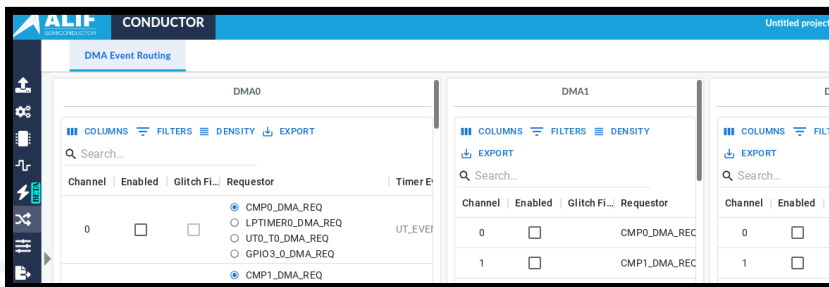
The Clocks feature provides a device clock tree diagram and allows you to configure various clock settings, such as: mux input selection, programmable divider value, clock gating control (enable/disable) and end-clock frequency selection. The clocks are assigned and configured in accordance with the peripherals enabled previously in the Resources feature. The Clocks feature provides both a graphical interface with which to clearly view the device clock tree, and a simple interface for changing the clock settings to the user's desired values.

Power



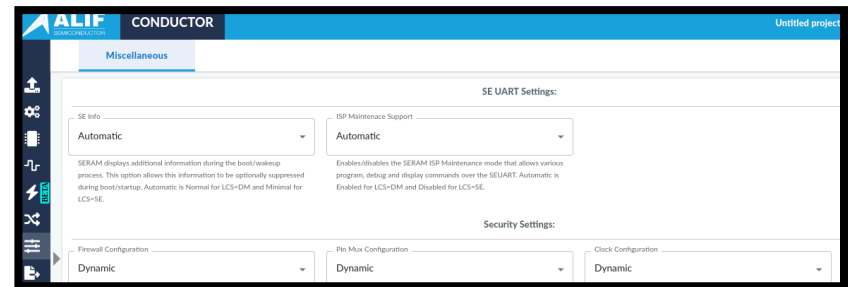
The Power feature provides estimation reference points for the power consumption of the user's device, given the specific configuration settings applied to the Resources and Clocks, as well as a user-supplied approximation of the duty cycle (on/off) of the specific peripheral. As the estimation is based on static data, it will likely not be an exact, definitive measurement of power, but it will provide a reasonable estimation with almost no set-up effort for the user, as it is able to approximate the power usage based on data already provided elsewhere in the tool. Even more usefully, this feature provides insight on relative power consumption changes that can be realized by changing resource usage, power mode, and/or clock speeds. There are multiple views and graphical representations of the power estimations for the user's insights.

DMA



The DMA feature allows the user to quickly configure the routing of the different Direct Memory Access requests to the desired DMA controllers. Depending on the selected device, it will show tables with available DMA requests under the respective DMA controller. Using this feature, the user can change the default DMA routing path, enable or disable a particular request / controller pairing, or enable the glitch filter on a particular DMA input.

Miscellaneous



The Miscellaneous section of the Conductor Tool has a collection of less commonly used configuration items related to the SE UART, Security settings, and Board fine-tuning, all if applicable.

Key Advantages

The Conductor Tool contains a great feature set, as described, combining to offer a few key advantages over other configuration tools on the market today: it is convenient, comprehensive, and has a unique Power Estimation feature.

Convenient

The Conductor Tool provides a convenient, accessible, and straightforward process for configuring MCUs and processors. It is accessible online, in a browser agnostic application, making it operating system agnostic. As an online application, there is nothing to download and install, and no software updates or revisioning to track. Every time the user accesses the Conductor Tool, they are accessing the latest, most up to date version of it. New features implemented in the tool are immediately available to every user, and any bugs or errors discovered in the tool code are repaired universally for all users at once. For security-sensitive developers, there is also an offline version that trades off some of this convenience for security — yet another convenience.

Comprehensive

The Conductor Tool provides a comprehensive processor configuration tool, integrating all the tools necessary for a full user configuration. Gone are the days of separate configuration guides and spreadsheet tools for memory allocation, pin configuration, clock settings, and so on. With the Conductor Tool, all of the features are not just combined, they are interwoven into a single interactive tool. Pins and Clocks are assigned and configured according to the peripherals set up in the Resources feature. At the same time, changes made in the Pins or Clocks features direct the user back to the needed resource reconfigurations to properly implement them.

Power Estimation

The Power feature in the Conductor Tool is uniquely integrated into the rest of the system configuration settings to provide realistic estimates of power usage given those settings. The Power feature shows the user both passive power consumption and active power consumption, i.e., consumption when the configured processors, memories, and peripherals are active. The tool permits the user to adjust the processor's active load (duty cycle) and clock frequencies to observe how the power consumption changes with those variables.

Conclusion

As mentioned earlier, Alif Semiconductor offers scalable and secure AI-enabled 32-bit microcontrollers that are power efficient. The Conductor Tool was designed to help users maximize the potential of that offering. As a convenient and comprehensive tool for configuring these microcontrollers, the Conductor tool represents best in class integration of all the features needed to set up Alif Semiconductor parts for success.

Get started today by exploring the Conductor Tool [HERE](#). Simply sign up to request an account, and begin configuring a sample design, or a design of your own. It's online, powerful, and ready to help you launch a new design today.

