Overview

Once you have determined that QuickUSB is the correct solution for your project you need to determine what is the best way to integrate QuickUSB into your design. QuickUSB may be integrated into your design in a number of ways, each having its own benefits and drawbacks. This application note will discuss the integration options and help you determine which is the best for your design.

QuickUSB Modules

QuickUSB Modules are standalone devices that implement the QuickUSB circuit and are designed to be plugged into QuickUSB supporting hardware, such as the QuickUSB Adapter Board, the QuickUSB Evaluation Board, and custom hardware. Each module shipped from Bitwise Systems comes with preloaded firmware so that no additional licensing is required.

QuickUSB Modules are great for lab prototyping and may be used without the need for any custom hardware. With a QuickUSB Module and a QuickUSB Adapter Board or QuickUSB Evaluation Board, you are able to wire up devices in the lab to any of the available IO Ports QuickUSB has to offer. It is highly recommended to use a QuickUSB Module for prototyping before moving the QuickUSB circuit into custom hardware.

The QuickUSB Module itself may be designed into custom hardware as to prevent the need to design the entire QuickUSB circuit into your custom hardware. Doing so lowers the risk of introducing design errors into the USB circuit and can lead to a faster turn time. Designing a module into hardware requires only a QuickUSB Module and a QuickUSB Mating Connector Kit per unit, and since each module is already individually licensed there is no need to worry about firmware licensing. If you intend to create production runs of your hardware or require a smaller form factor than what the QuickUSB Module has to offer, then it may be more cost effective to design the QuickUSB circuit into your hardware and use either QuickUSB iChipPack licenses or QuickUSB ChipPack EEPROMs.

iChipPack Licenses

Licensing QuickUSB through use of iChipPack Licenses is recommended for production runs of custom hardware where the cost of designing the QuickUSB Module into your custom hardware becomes more than designing the QuickUSB circuit into your custom hardware and licensing per circuit. For larger production runs of custom hardware the cost savings in using iChipPack licenses can become quite high, but at the cost of added complexity and risk in your custom design. However, if good design practices are used and all of the recommendations in the QuickUSB User Guide and supplemental Application Notes are followed correctly the risk of failure falls substantially. Whatever the design choice, it still is highly recommended that you first prototype out your design using a QuickUSB Module before committing to a design to ensure that your interface and overall design architecture are correct.

iChipPack Licenses themselves are entirely electronic. Each purchased license allows you to program firmware into an unprogrammed EEPROM. To design for using iChipPack Licenses, you need to design the QuickUSB circuit into your hardware then source and assemble all parts on your design. After the QuickUSB circuit has been implemented and fabricated in your custom hardware you can plug your QuickUSB enabled hardware into a USB port just as you normally would. Since the EEPROM component in the QuickUSB circuit is blank, the device will not enumerate as a QuickUSB Module but instead as an Unprogrammed QuickUSB Module. The device will be visible to the QuickUSB

Programmer and QuickUSB Customizer tools so that you may use an iChipPack License to program firmware into the device. Once your hardware contains valid firmware it will enumerate as a QuickUSB Module and perform exactly as a QuickUSB Module would.

ChipPack EEPROMs

ChipPack EEPROMs are packs of EEPROMs sold by Bitwise Systems that contain preloaded firmware. Each EEPROM contains a copy of licensed QuickUSB firmware that may be used in a QuickUSB circuit. To design for QuickUSB ChipPack EEPROMs, you need to design the QuickUSB circuit into your custom hardware exactly as you would using iChipPack licenses except that you no longer need to source the EEPROMs and program them—you instead use the ones provided in the ChipPack. Using ChipPack EEPROMs in a design is useful for production runs of custom hardware where the cost of designing the QuickUSB Module into your custom hardware becomes more than designing the QuickUSB circuit into your custom hardware and licensing per circuit, and you prefer to not have to perform the initial programming of firmware yourself. When ordering ChipPack EEPROMs, be sure to note the IO Model and version of firmware that you would like to have programmed into the EEPROMs to avoid having to reprogram the EEPROMs yourself, which negates the benefit of using ChipPack EEPROMs over iChipPack licenses.