Do You Need a Mixed-Signal ASIC or SoC

Many engineers spend much of their time tweaking and supporting existing products so when the time comes to develop a new product, it can mean that interesting and exciting times are ahead. Even though ASICs are quite common place nowadays, many engineers have had little involvement in their development in their career. They generally know about ASICs but are not sure whether their new product can justify the investment.

As one can expect, there are number factors to consider in making this choice and this article is intended to cover a few of these key points.

What differentiates engineers from scientists is that every project that an engineer touches involves an optimum combination of product features and performance, development schedule, and budget – both development and production costs. Few new products are funded that don't require meeting all of these criteria.

Let's start with product features and performance. Whether your project is a completely new product or an update to an existing product, you probably are starting with a feature list or hopefully some high-level product specs. If you have something like this, it is not too early to talk with ASIC vendors, especially if your design has some significant amount of analog.

Top ASIC vendors have a significant amount of system expertise and can help you partition your product into an ASIC if it makes sense or will tell you if it doesn't. You should be able to screen ASIC vendors quickly so that they can provide a relatively quick technical and financial assessment of your proposed project at a no cost to you. Of course, you need to talk to the right ASIC vendor to get meaningful answers. You usually can tell quickly if the proposed vendor is on the ball or not.

Most circuitry can be integrated very well. However, there are still advantages to discrete components and even the most complex mixed-signal chips require some amount of external circuitry. Therefore, the first test to determine if an ASIC is warranted is to determine if the performance will be enhanced with an ASIC implementation.

If you make it past step one, then your ASIC vendor can help you determine if the economics make sense. Assuming any reasonable amount of complexity, an ASIC development NRE will run into six figures, and seven figures for complex SoCs, and there should be compelling economics to justify this type of investment (assuming that the product is not a pure R&D effort). In order to determine the ASIC budget, your ASIC supplier can provide a budgetary NRE and recurring cost targets along with performance metrics and a proposed development schedule.

Once you have this information, you can make an intelligent choice of whether your ASIC makes sense or not. If it does, you can start the process of getting a budget approved internal to your organization (not usually the fun part of the project).

At Linear MicroSystems, our team has been developing and producing ASICs for many years and can quickly provide an assessment for you. Unfortunately, sometimes the answer is that an ASIC may not make economic sense or cannot be developed in the available schedule. But we are always appreciative to have the opportunity to join you in making the proper assessment.