

# Top 10 Tips on Embedded Synchronization Solutions

Timing's  
**Perfect 10**

TOP 10 TIPS SERIES

The rapid migration from TDM-based legacy networks to packet-based Ethernet networks has created the need for networking equipment to provide synchronization. Embedded synchronization solutions enable network equipment providers to accelerate time to market, reduce development costs and lower risk by integrating proven technology designs onto an existing hardware platform.

Embedded solutions can take the form of an integrated PCB design that plugs directly into the existing host platform or a pure software-based design that leverages the existing platform's hardware (such as processing power, memory etc.).

Many of today's embedded solutions are limited to dedicated semiconductor chip designs that have strict cost, power and size reduction requirements. Symmetricom's embedded product portfolio is unique as it offers a broad range of embedded synchronization options while still providing industry-leading performance.

When choosing the appropriate embedded sync solution for your application, use the tips and resources below to ensure the best possible results. Plus, keep in touch with our embedded experts at [expertadvice@symmetricom.com](mailto:expertadvice@symmetricom.com)

## 1 Balance complexity and cost in your buy or build decision.

**Balance complexity and cost:** The decision whether to build or buy a timing module is primarily based on economics as well as the complexity of the technology requirements. When several timing technologies are involved and exacting specifications are required, as in the case of many base station designs, it is usually preferable to have the full solution designed and built for your particular application. For applications that require a simpler synchronization design, and cost is the primary constraint, integrating a software solution and leveraging existing hardware may be the most optimal option.

## 2 Flexibility and standards compliance is key.

**Keep it flexible:** As with all synchronization solutions, complying with new protocols and standards will yield the most flexibility in a diverse, rapidly evolving, heterogeneous network environment. Some applications drive the need for specific technologies to be used for synchronization. In addition, many of today's solutions are based on a collection of dedicated semiconductor chips, sometimes one per standard, and require complex integration. Symmetricom embedded solutions are based on a variety of technologies and comply with multiple protocols and standards. Symmetricom's software solutions, such as the SCi 2000 Embedded Software Clock, do not require dedicated silicon chips, leverage existing hardware and offer more design flexibility and cost-efficiencies.

## 3 Carefully consider space, cost and power constraints.

**When real estate is limited and cost is the prime concern, consider a soft clock solution:** The present trend in the world of communications is towards smaller network equipment. Equipment, such as cell site gateways, edge routers and switches, are faced with challenging cost, power and size constraints. A soft clock solution may be best suited to address these concerns. A software solution optimally utilizes the power and functionality of the CPU/NPU already existing in such systems while enabling a more compact, easy to manage design.

## 4 Choose a portable design that can support multiple platforms.

**Software portability is essential:** Soft clock designs should be able to operate on a wide range of processor, OS and FPGA designs. Choose a software solution with a well-designed architecture that is resilient and flexible and can be ported to run on a wide range of processors or on FPGAs with embedded processor cores.

## 5 Make sure you pick the right clock solution for your application.

**Choose the right client:** No two soft clock applications are exactly the same. The synchronization requirements for 2G, 3G, 4G and LTE (different flavors), as well as cell site routers, routers and switches, are all different. Each one requires a specialized soft clock design that is optimized to meet the stringent requirements of that application. Software clocks are a combination of technologies, and it's important to select the right solution that is designed to deliver the appropriate level of synchronization.

## 6 Include a robust set of performance metrics in your embedded solution.

**Don't forget the metrics:** Performance metrics are key to monitoring the robustness of any embedded network solution. Service providers must meet stringent SLA requirements for critical applications. Choosing an embedded solution that incorporates a rich set of metrics allows you to monitor basic clock operation and performance. Most IEEE 1588-2008 clocks support the basic standard management messages. However, new solutions, such as Symmetricom's SCi 2000 Embedded Software Clock, are unique in generating operational metrics to characterize both the frequency and time accuracies achieved by the recovered clock.

## 7 Go with a proven reference design to accelerate time to market.

**Make field proven performance an important criteria:** The transition to Ethernet packet-based networks is moving forward at light speed. The sooner an operator can provide the transition from TDM to packet, the sooner they can offer scalable network capacity for bandwidth-hungry applications and drive new revenue opportunities. Selecting a proven, well-designed embedded solution can accelerate TDM to Ethernet conversion by as much as 12-24 months, resulting in significant cost savings, better customer service and rapid return on investment.

## 8 Implement a comprehensive end-to-end network management platform.

**Management capabilities are vital:** Make end-to-end network management a key component of your sync solution. The ability to monitor the sync status of the network and of remote clients from a centralized system enables service providers to pre-empt potential network problems before they can negatively impact vital revenue generating services.

## 9 Engage with a sync expert and reduce your development risk.

**Work with a sync expert:** Designing an embedded sync solution from the ground up can be a challenging task even for the most experienced development team. Leveraging sync expertise can help speed up sync deployments by months or even years, resulting in increased revenue streams. Engaging with an embedded synchronization expert, such as Symmetricom, will greatly speed up development and reduce the level of risk required to deploy a next generation, packet-based embedded synchronization solution.

## 10 Start with the right resources.

**Leverage resources from the experts:** Getting started is usually the hardest part of any project. Use the resources below to take advantage of Symmetricom's expertise in advanced embedded synchronization technology.

- Symmetricom Embedded Solutions:  
<http://www.symmetricom.com/industry-solutions/network-equipment-manufacturers/>
- SCi 2000 Embedded Software Clock:  
<http://www.symmetricom.com/products/ieee-1588-ptp-solutions/ptp-clients/SCi-2000-Embedded-Software-Clock/>

Need more tips and expert advice? Contact [ExpertAdvice@symmetricom.com](mailto:ExpertAdvice@symmetricom.com) for more information on Symmetricom solutions and technology.