

Progressing the LXI Standard Reference Design

By [David Owen](#)
Technical Chair, LXI Consortium
[Pickering Interfaces](#)

The current Version 1.4 of the [LXI specification](#) has been in place since 2011. It differs from Version 1.3 (released 2008) mainly in the way it treats optional features (Extended Functions), so it has been a remarkably stable standard.

Since Version 1.4 was introduced, two new Extended Functions have been introduced: one standardizing how HiSLIP -- a standard published by the IVI Foundation in 2011 -- should be used on LXI products to provide faster control of instrumentation; and a second Extended Function to provide a framework for supporting IPv6, an issue that will become more important as the use of IPv6 becomes more prevalent, and organizations specify that Ethernet-connected products should support it.

Since those additions to the specifications, we have embarked on another major effort, the creation of an LXI Reference Design. This is the first time that a test and measurement (T&M) standard has embarked on such an ambitious project; but -- given a very stable specification for instrument control based on the most widely used interconnection standard, Ethernet -- the LXI Consortium believes this to be in the best interest of both vendors and users of Ethernet controlled test equipment. It is time for an LXI Reference Design.

What does a Reference Design do?

The Reference Design essentially will implement the core functions of the LXI Specification; it will provide “hooks” to vendor-specific hardware that implements the wanted instrumentation functions. It clearly means that vendors still have to do work to create their products, but they no longer have to worry so much about ensuring their behaviour on the Ethernet connection conforms to the way of working defined by LXI. The design is intended to be able to run a wide variety of hardware platforms, it is not just aimed at high end control systems.

What are the Benefits?

The LXI Consortium believes this effort will benefit everyone who is involved in LXI.

For vendors clearly it can help reduce the cost of designing LXI products. It particularly lowers the design entry barriers to the smaller vendors, but even larger vendors stand to make massive productivity gains if they can use the Reference Design to standardize their LXI designs across different platforms – making re-use more common and providing a highly structured framework for their development projects.

Users stand to benefit as well. The lowered entry barriers for new LXI vendors mean that there should be more new vendors, more variety of solutions and more competition. Those users, who have to contend with non-LXI products, should find it easier to insist on LXI interfaces that will lead to fewer conflicts compared to less well managed Ethernet products that are not LXI-compliant.

For the LXI Consortium there are strong gains as well. The consortium is funded by its members. Use of funds to help make our members more productive is clearly good use of the funds they have

provided. There is also a less obvious gain, as the standard goes forward and changes. The Reference Design should provide a vehicle for proving those changes. In some cases new additions may well require the creation of an extension to the Reference Design, in addition to the current requirement of providing a test procedure to check product compliance.

It also opens up the possibility of the Reference Design being used in an educational environment: for example, for the creation LXI-compliant interfaces in project work. That creates the possibility of engineers having experience of the design of LXI-interfaced products before they leave the educational phase of their career.

How is the Reference Design Being Created?

The effort is far too big for the Consortium to use its normal “volunteer” methods. Instead “volunteers” are helping to manage a third party company, TSEP, who are responsible for the creation of the design. TSEP is funded by the Consortium on behalf of their membership.

How will the Reference Design be delivered?

LXI members will have access to the source code for the Reference Design. Our intent is to offer this “free” under a licence to its membership. Our intent is also to provide a limited amount of support with their implementation to get them started. We are also discussing User Forums, support contracts and any other issues that will help the Reference Design be used.

It will not just be source code. We also intend to apply that source code to a low end and high end hardware platform to demonstrate the Reference Design.

After the Reference Design

The Reference Design is scheduled to be available in 2015. Once available we do not expect the design to be just published and work to stop. A Reference Design will enable us to create new functions and support them through incremental developments in the Reference Design. We also expect that a few issues may be highlighted by the Reference Design which we might need to clarify in the specifications, or to change in the Reference Design. It has to be an evolving implementation.

We already have intentions to migrate the specification in minor ways, for example making the VXI-11 optional in favour of the more effective and IPv6-capable mDNS discovery mechanisms. Our members are already aware of that intention. We will have the opportunity to take on more challenging opportunities, and provide the framework to make it happen for users.

Summary

LXI has achieved a great deal since the first products in 2005. In the intervening time it has achieved by far the widest availability penetration into the T&M market compared with any of the newer control standards, since the introduction of the venerable GPIB standard. I have no doubt that on successful implementation of a Reference Design the standard will be much better placed for even wider adoption than we have already achieved, and it will help ensure we continue to explore the use of the ubiquitous Ethernet standard for T&M applications.

