Developing an LXI OEM

A brief introduction to adding LXI to new or existent equipment

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LXI tm
LAN eXtensions for Instrumentation

Testforce Systems provides industry leading solutions through its 4 divisions;

- **Test and Measurement**
- **Tele/Fiber**
- **Integrated Systems**
- **Technical Services**

For over 16 years the company's dynamic approach has allowed them to serve diverse markets and meet the needs of unique applications.

Agenda

INFINEPATH

A custom RF switch solution

- Goal; USB to LXI migration for the INFINEPATH
- Resources
- Strategy
  - Choices; requirements, form factors, make or buy
- Conclusions

Resources: LXI website

- Current standard
- Links to papers and articles with practical information on implementing LXI.
- A link to LXI ConneXion magazine has past articles by hardware and software designers sharing ideas and experience on LXI.
- White papers, blogs, and other links

April 2008

Programming Preliminaries
By Paul G. Schreier, LXI ConneXion Editor, and Brian H. Powell, National Instruments

Class C Can Be Quick and Easy
By Bill Yonkers and Stephen Kugler, Kepco

February 2008

PlugFest Offers More Than Conformance Testing
By Paul G. Schreier, Editor

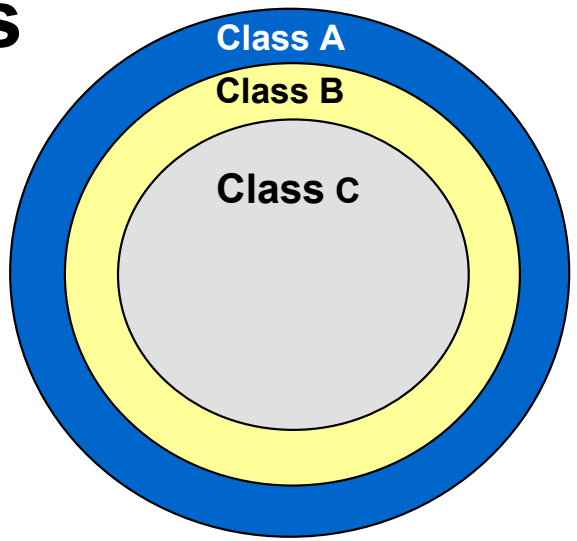
LXI 1.2 Improves Discovery and Identification
By Nick Barendt, VXI Technologies

LXI System Setup Is Quick and Easy
By Tim Ludy, Data Translation

Strategies

- Design scope, hardware, software, etc
- Make (new design) or buy
- LXI certification

Requirements: Class Options



LXI provides three trigger mechanisms

- Triggering over the LAN, (ABC)
- IEEE 1588 Precision Time Protocol running over the LAN interface, (AB)
- Wired trigger interface, LXI Trigger Bus (8 channel Multipoint LVDS). (A)
- …. each trigger mechanism's trigger functions can be performed by any of the methods and can be connected together

We chose to start with Class C

Requirement: Form factor

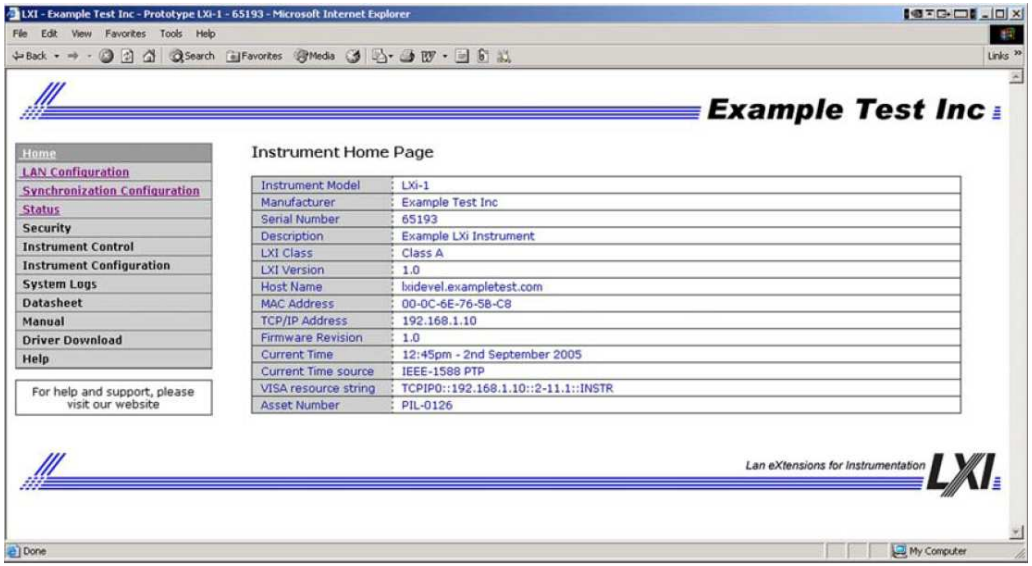
- Many LXI devices will provide only minimal manual user interfaces to reduce device complexity and space.

- Devices can conform to the Physical Specifications in four categories:
  - Non-rack mounted devices
  - Full width rack mounted devices built to IEC 60297 standards
  - Half-width rack mounted devices built to de facto standards
  - LXI Units built to the specifications defined in this document

- We chose full width rack mount based on existent chassis and typical usage

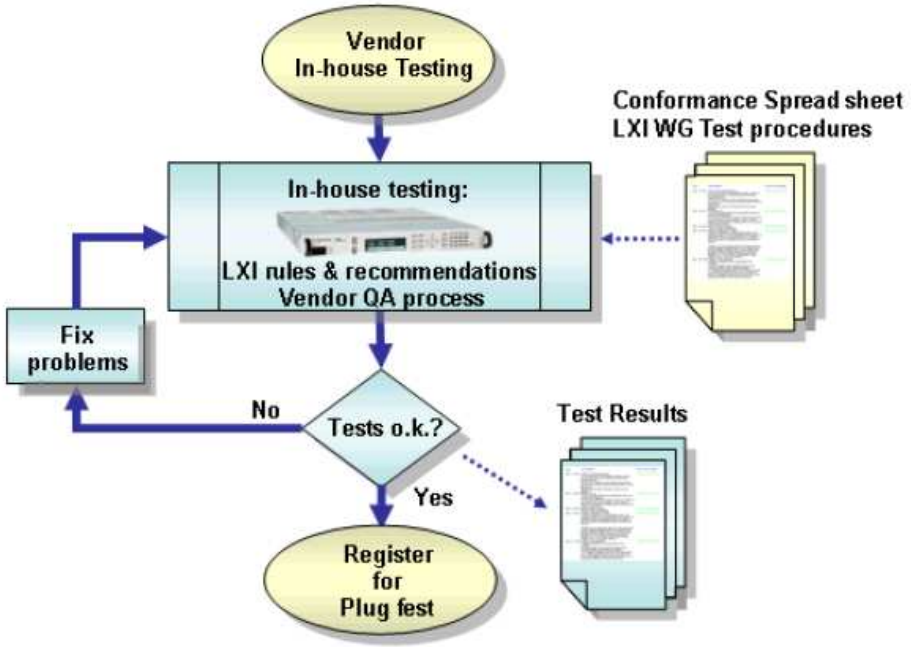
Requirements: Software

- Software requirements (resources, ConneXions articles on getting started)
  - IVI driver
  - Discovery
    - 1 Second response
    - Response to SCPI *IDN?
  - Web interface



Requirements: Certification

- Test to the standard using the written procedure,
- Test at one PlugFest to gain experience
- Obtain compliance at the next PlugFest.

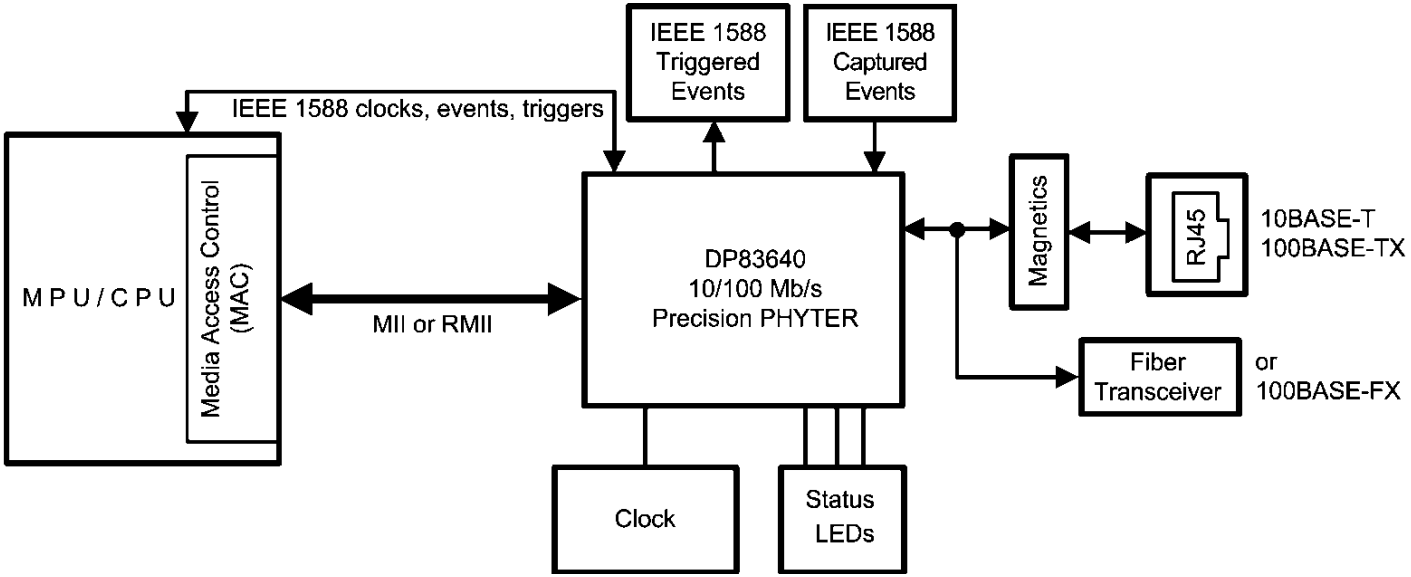


Strategy Option 1

New Design with DSP

National Semiconductor DP83640 Precision PHYTER - IEEE® 1588 Precision Time Protocol Transceiver .

The industry's first Ethernet transceiver with integrated hardware support for the IEEE 1588 Precision Time Protocol



Strategy Option 2

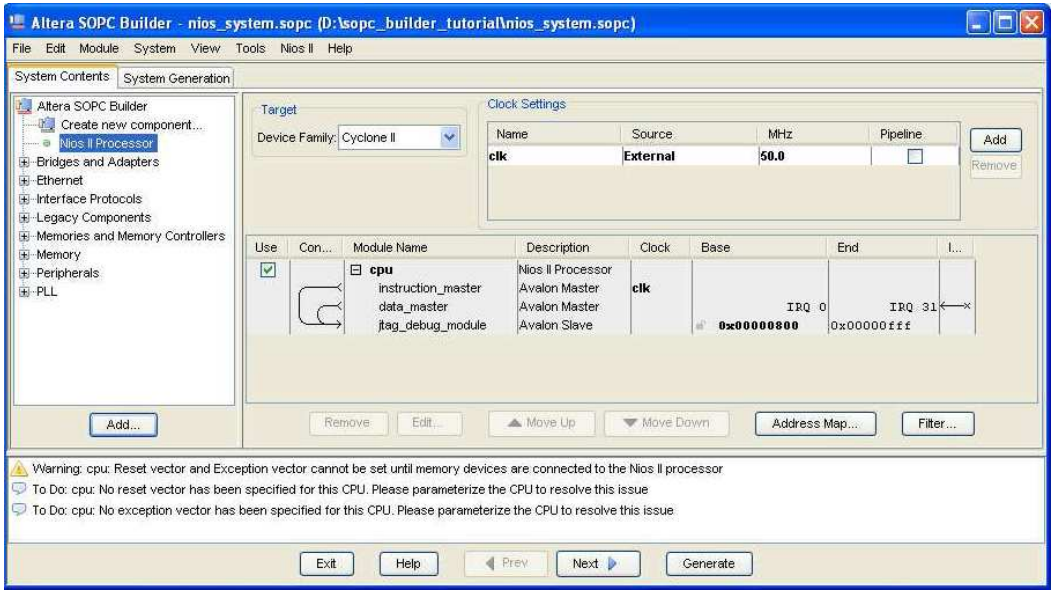
Designing Class A,B, or C using an FPGA and IP cores for Ethernet and triggering

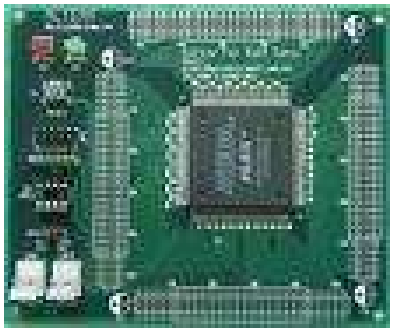
An LXI bus interface hardware design method with the SOPC (system on a programmable chip)

The NIOSII **core from Altera™** →**LXI C-Class** interface

The **DPE-1588IP core** →**LXI B-class interface**

The **SN65MLVD200A** →**LXI A-Class**



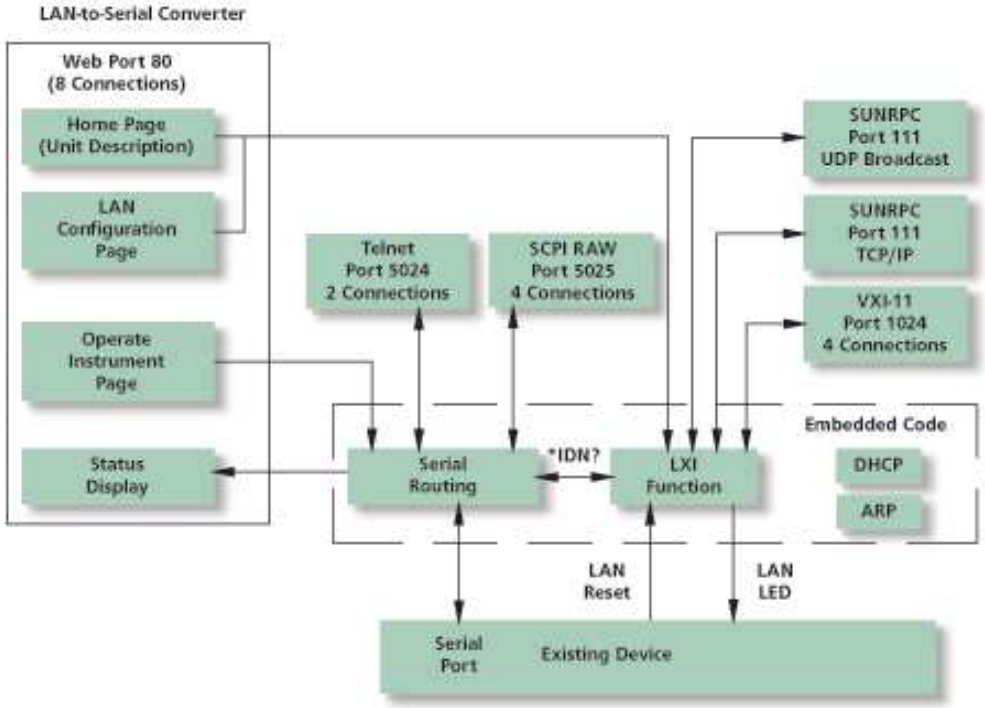


Strategy Option 3

Using an Ethernet to serial convertor

An example of this approach can be found in;
Class C Can Be Quick and Easy
By Bill Yonkers and Stephen Kugler, Kepco

The LXI protocol offers a multitude of interfaces for communications with test equipment, including LAN Web pages, VISA sockets, and VISA VXI-11 interfaces. Converting an existing serial instrument to an **LXI Class C device can be done quickly and economically using an off-the-shelf Ethernet-to-serial converter**.



Strategy Option 4

Designing with a COT (commercial off the shelf) module for RF and Power switching applications, Class A,B, or C

The EX7000-OEM family is the first scalable series of microwave subsystems built on an open architecture Ethernet/LXI platform.

- Simplified certification process
- Provided with IVI drivers
- Conforms to LXI LAN discovery
- Web interface, no development required
- LXISync (Class B), and distributed backplane (Class A)

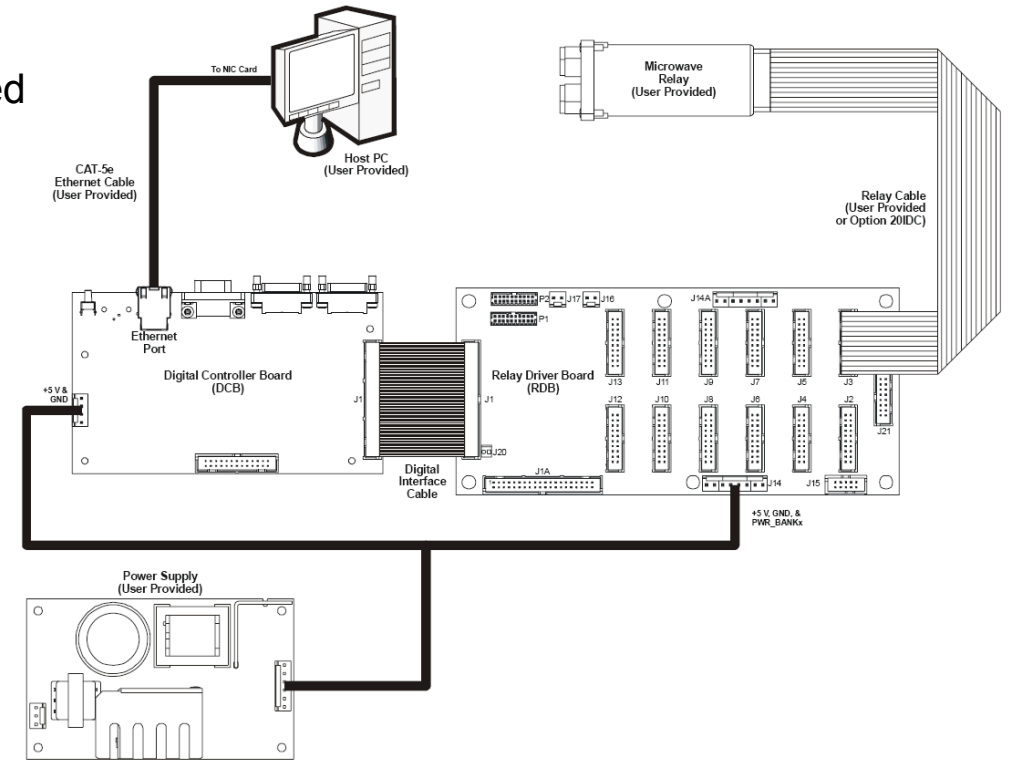


FIGURE 2-1: EX7000-OEM CABLING DIAGRAM

Conclusions for Test Force Infinipath

- Convert an existent product
- Start with Class C
- Full rack form factor
- COT package (EX7000)
- Certification, probably, at least a plug fest