Key Points in developing LXI instruments

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It was not difficult

- Utilized Off the shelf Ethernet to Serial adapter
- 10 man months development
  - 7 months for 1 Development Engineer
  - 3 months 2 Development engineers
- Subcontract
  - IVI driver
Our Experience

• C, C++ Embedded Design
• 0 experience in network Development
• 0 experience with HTML
• Platform used
  – NetBurner Module
• 2 man months used for testing of product.
Selection of platform

• Web Page support
  – Ability to insert POST and GET preprocessors
    • Allows creation of HTML based upon variables.

• Port support
  – Must have 5 open ports for VXI-11
    • Multiple connections on ports.
      – Two connections minimum.
    • Require.
      – Open close, device_write, device_read
      – Discovery
        » Adds do_cmd.
  – Sockets
    • Open, close part of Kernel
    • Write and read of data
Selection of Platform

• Protocol support
  – DCHP
    • Must be able to turn on and off
  – AutoIP
    • Enable disable
  – Duplicate IP support
    • Send Null probes when static
  – DNS
    • Verify host Name
  – MDNS
    • For the future
Speeding up development

- Membership
- Lan Status Indicator
- Web Pages
- Discovery
- Sockets
- IVI COM Driver
- Certification
Membership

• Attending a meeting first
  – Speeds up the development process.

• Join a group
  – Why
    • Provides ability to search for documents
    • Provides access to Plugfest testing
  – What Group
    • Technical committee
    • Lan WeB WG
Lan Status indicator

• Color
  – Green or Yellow.

• LED goes out
  – When cable is disconnected.
  – Upon detection of duplicate address.
  – When Lease is not renewed.
    • It stays off, even if new address is found.
Web Pages

- All are verified.
  - Even the instrument page and help pages
- Strict coding is not required.
  - Strict eliminates Center
    - Problems in look and feel with different browsers
- Verify The CSS
  - Not required by LXI
  - Improves operation with all browsers
Discovery

• VXI-11 is not required.
  – Full Implementation
    • 500+ lines of C code.
    • Many hours writing test code.

• device_docmd
  – Must return 8, not supported
    • Agilent tool uses command, NI does not.
Minimal Discovery

• Port 111 packet decode
  – UDP required for discovery

• Port 1024
  – create_link
  – device_write
  – device_read
  – destroy_link
  – do_cmd
  – TCPIP options (Buffer size)
Sockets

- If VXI-11 is not supported Sockets must be.
- IVI Uses Visa Driver
  - Command string is either
    - Instr – using VXI-11
    - Socket
IVI Driver

• Make It Yourself
  – Use a tool
    • Pacific Mindworks Nimbus – IVI Com or IVI-C
    • National Instruments CVI – IVI-C
  – Testing is ½ of the effort.
    • Testing was 2 months of the effort

• Subcontract.
  – Pacific Mindworks
  – Vektrex
  – National Instruments
Questions

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