Migrating from GPIB to LXI

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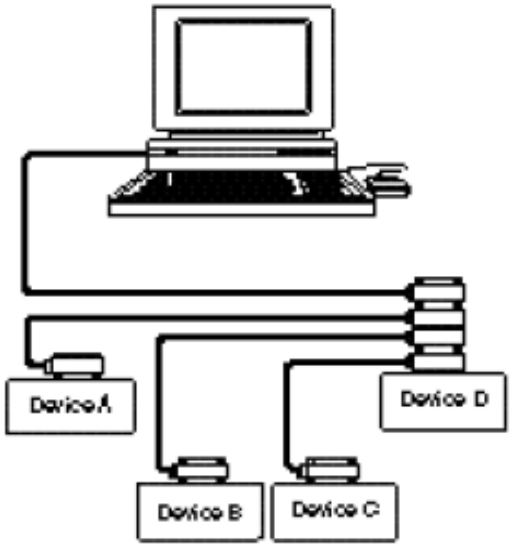
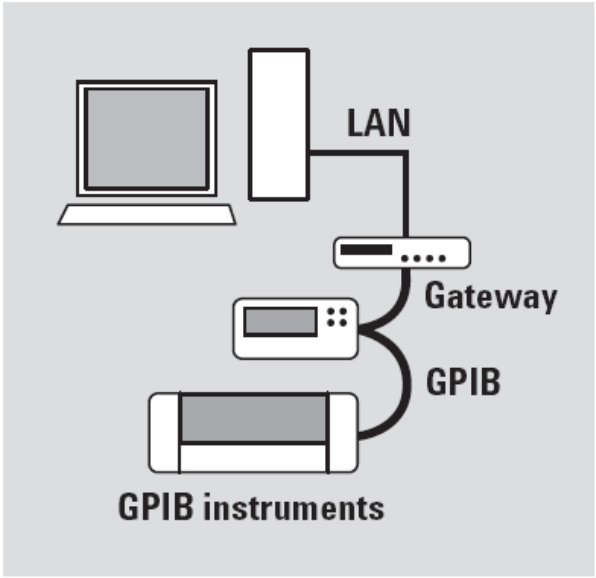
LAN eXtensions for Instruments

Test Systems Built with GPIB

- Guaranteed Interoperability
- Rugged
- Software techniques are well-defined
- They just work
- Easy to move instruments to LAN



LAN-to-GPIB Gateway

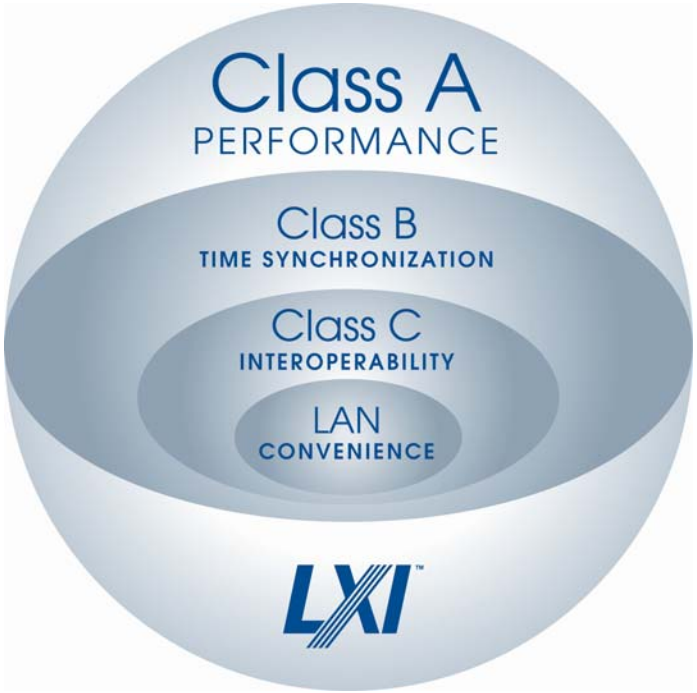


LXI™ LAN eXtensions for Instrumentation

LXI Consortium Objectives

- Leverage telecom industry infrastructure
- Lower test system costs
- Simplify system integration
- Ensure broad instrument availability
- Create local and distributed test systems
- Provide a successor to GPIB
- It's about *your* time…
  - LAN Triggering and Messaging
  - Time synchronization and characterization
  - Hardware Trigger Bus

LXI Classes



- **Class C: Base class**
  - Built upon LAN standard
  - Predictable LAN behavior
  - Built-in Web server
  - IVI driver API
- **Class B: Adds synchronization**
  - Class C plus
  - IEEE 1588 Precision Time Protocol (PTP)
  - Peer-to-peer messaging and multicast
  - Timestamp data and state changes
- **Class A: Adds a wired trigger bus**
  - Class B plus
  - A fast hardware trigger bus

Your product may already be LXI-Compliant

GPIB

Add LXI Compliant

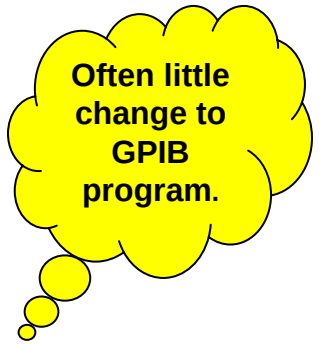
GPIB + LAN + LXI Behavior

LXI™ LAN eXtensions for Instrumentation

GPIB to LAN Migration

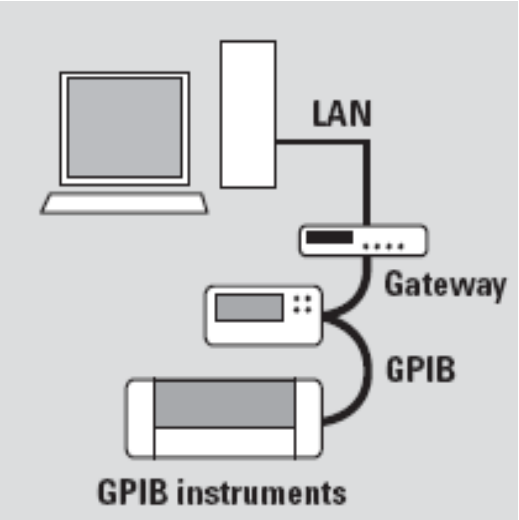
- **GPIB is emulated over LAN (VXI-11) to ease migration path for software**

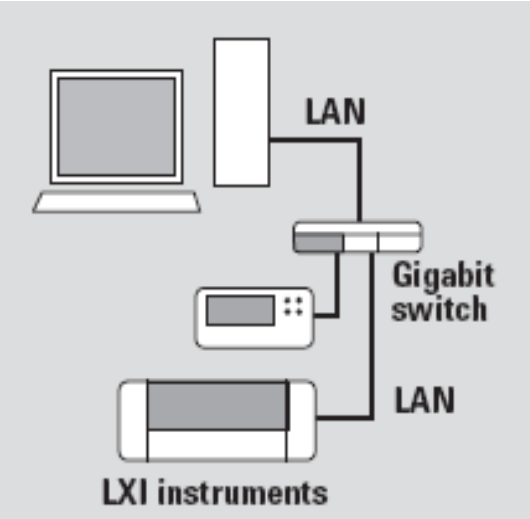
	GPIB	LAN
Function	**VISA/SICL GPIB**	**VISA/SICL VXI-11**
Write ASCII command	Yes	Yes
Read ASCII/binary data	Yes	Yes
Write ASCII/binary data	Yes	Yes
Device Clear	DCAS	DCAS
Serial Poll	SPOLL	SPOLL
Trigger	GET	GET
SRQ	SRQ	SRQ



- **Most GPIB instruments use ASCII- or SCPI-based languages**
- **LAN Sockets can also be used for ASCII- and SCPI-based languages**

Example of changes to programming code





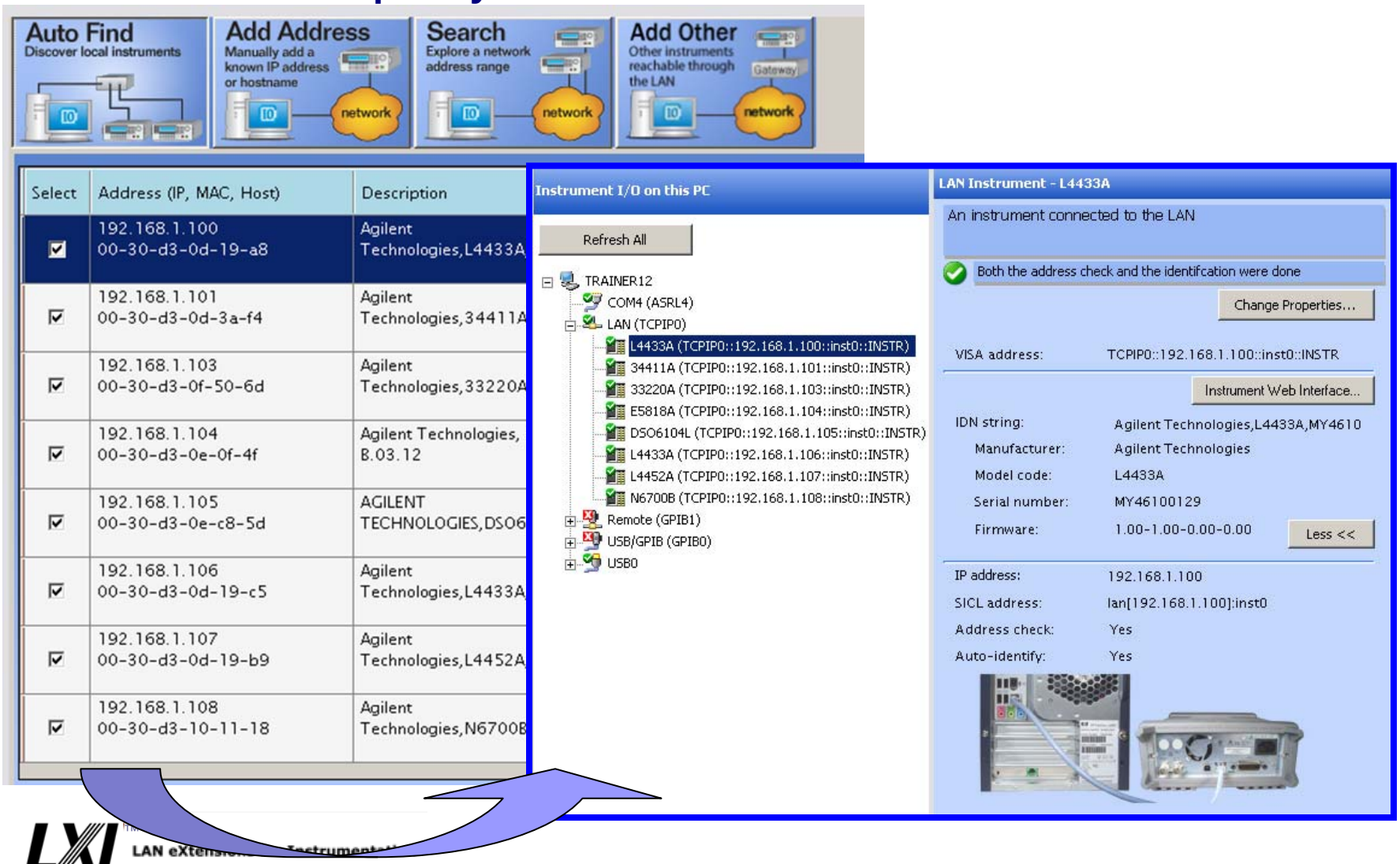
GPIB	DirectIO DMM = new DirectIO("GPIB0::22::INSTR"); DirectIO Switch = new DirectIO("GPIB0::9::INSTR");
LAN/GPIB gateway	DirectIO DMM = new DirectIO("GPIB2::22::INSTR"); DirectIO Switch = new DirectIO("GPIB2::9::INSTR");
VXI-11 via LAN	DirectIO DMM = new DirectIO("TCPIP0::169.254.4.10::inst0::INSTR"); DirectIO Switch = new DirectIO("TCPIP0::169.254.9.80::inst0::INSTR");
Sockets via LAN	DirectIO DMM = new DirectIO("TCPIP0::169.254.4.10::5025::SOCKET"); DirectIO Switch = new DirectIO("TCPIP0::169.254.9.80::5025::SOCKET");

LXI System – Discovery Tools

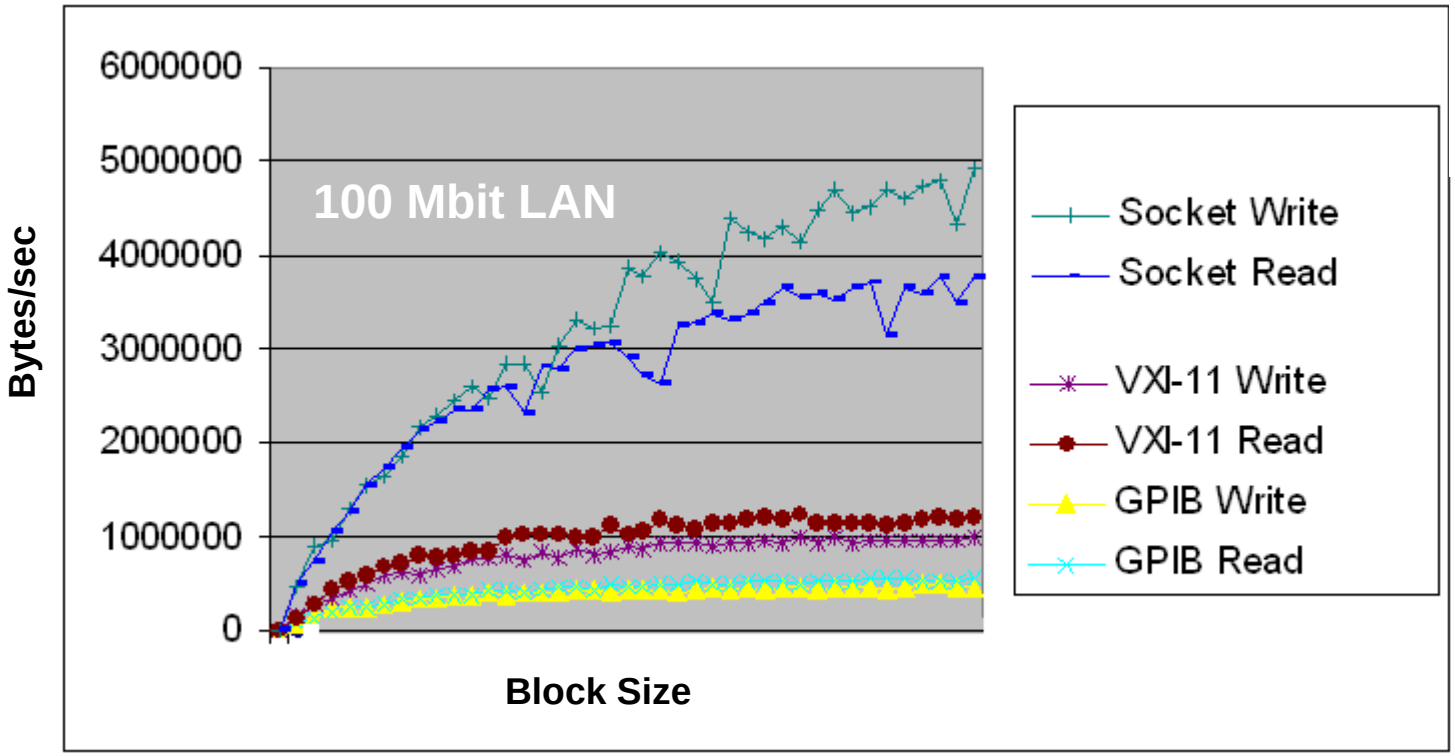
Find instruments quickly and get their VISA strings

LXI System – Discovery Tools

Find instruments quickly



LAN vs. GPIB Performance



Agilent 34411A DMM

270k rdgs/sec from memory

50k Rdgs/sec continuous

Performance often more dependent upon measurement hardware

LXI™ LAN eXtensions for Instrumentation

Troubleshooting

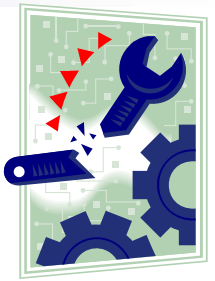
- Wrong measurement results – settling/setup problems?
- Wrong resolution – what range am I on?
- Noisy measurements – something interfering?

Software

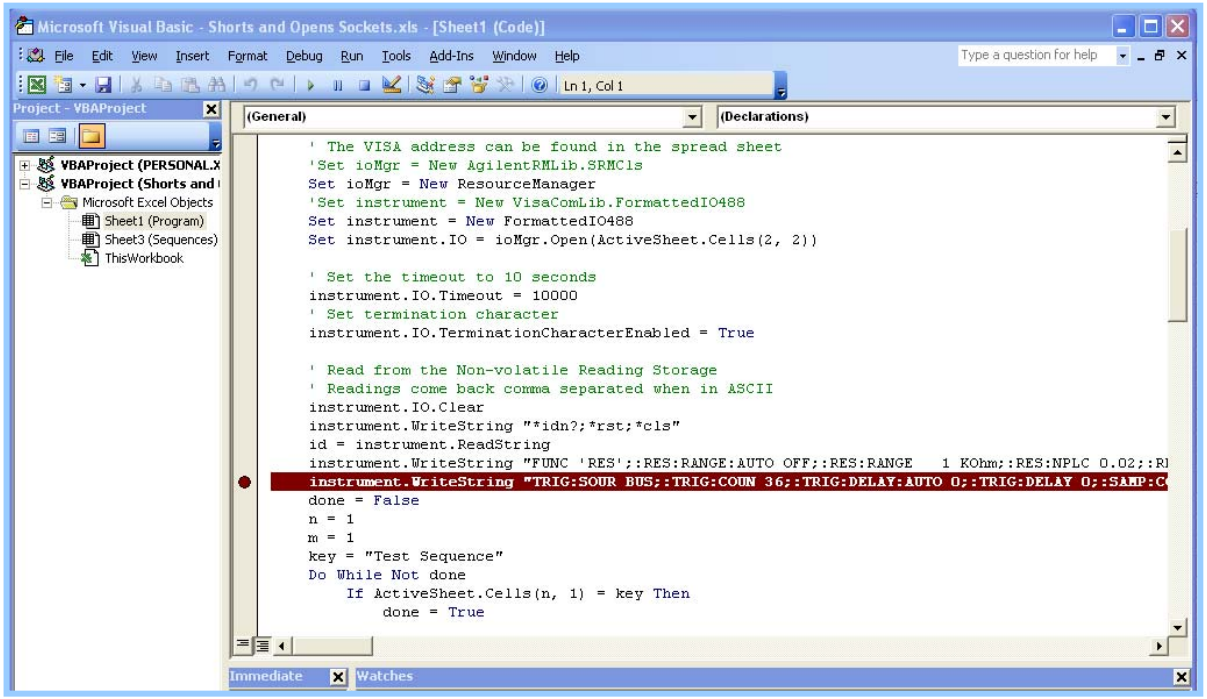
```
instrument.WriteString "TRIGger:" & param6 & ":SOURce " & "'" & param4 & "'"
instrument.WriteString "TRIGger:" & param6 & ":STATe 1"

instrument.WriteString "LXI:TRIGger:" & param4 & ":COUNT " & param3
instrument.WriteString "LXI:TRIGger:" & param4 & ":PERiod " & param2

instrument.WriteString "LXI:TRIGger:" & param4 & ":TIME " & param7

instrument.WriteString "LXI:TRIGger:" & param4 & ":ENABle 1"

instrument.WriteString "LXI:EVENt:LANSet0:IDENtifier " & "'" & param5 & "'"

instrument.WriteString "LXI:EVENt:LANSet0:STAT WOR"
```

Hardware

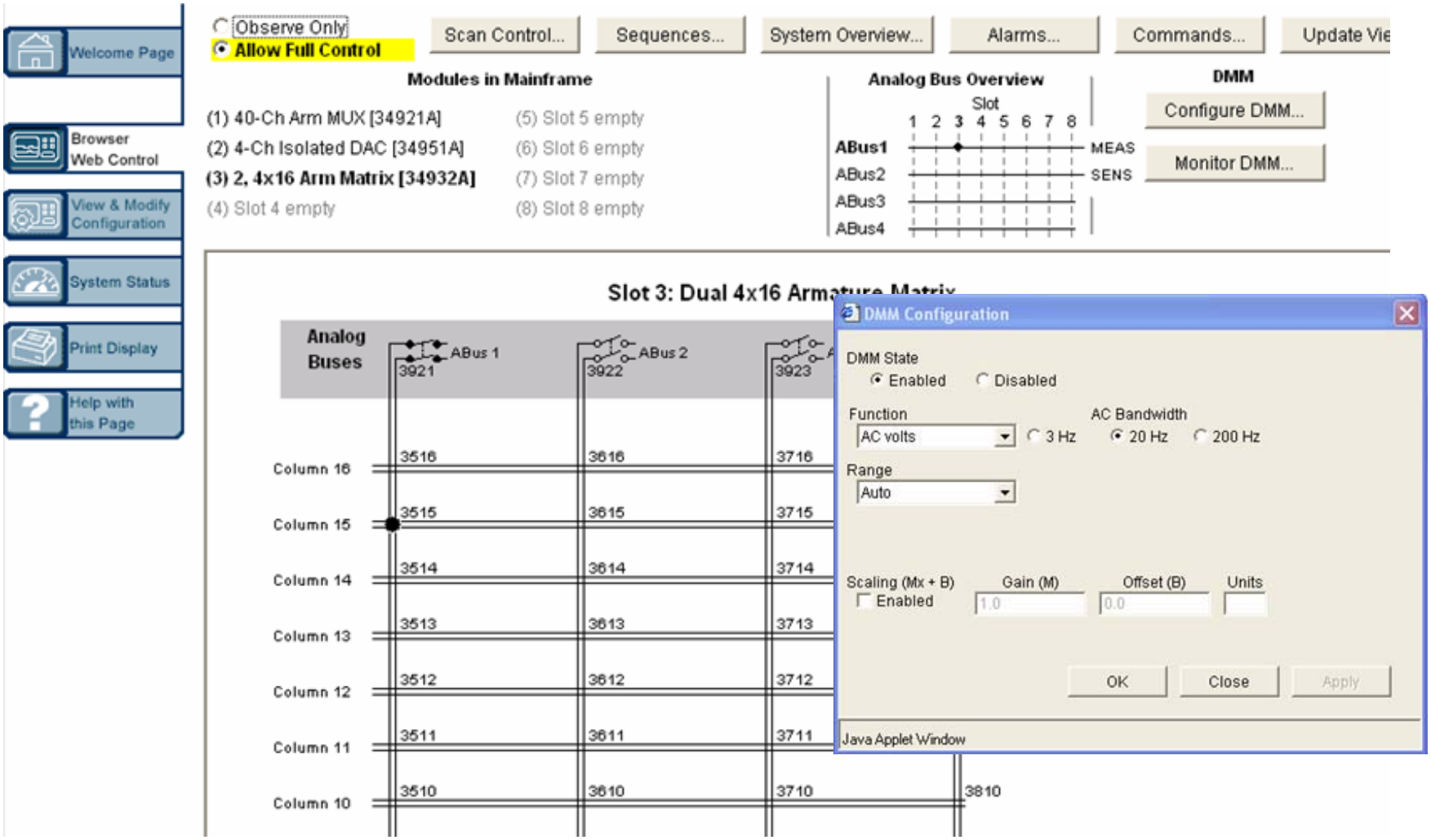
Troubleshooting Software



- Step through program or stop at breakpoint
- Be able to see state of instrument
- Be able to change state of instrument



Troubleshooting Software



LXI™ LAN eXtensions for Instrumentation

Where to go for more information…

- www.lxistandard.org
  - Specifications
  - Papers and presentations
    - …"Introducing LXI to your IT Department"
    - …"Getting to know LXI", "Getting started with LXI"
    - …"Migrating from GPIB to LXI", "What LXI Class B can do"
  - Products and vendors
- www.lxiconnection.com
  - Articles on all aspects of LXI
  - Includes multi-vendor cooperation
- Vendor Web sites – find links on the LXI Web site