

LAN GPIB INTERFACE

9055

Ethernet-to-GPIB Instrument Interface

DESCRIPTION

ICS's 9055 is a Ethernet-to-GPIB Instrument Interface that adds a LAN interface to a GPIB instrument. The 9055 connects the GPIB instrument to any TCP/IP network and provides a VXI-11 service which is easily accessed by all popular test application languages. The 9055 maps VXI-11.3 and RPC requests into GPIB commands to control the GPIB instrument. The 9055 and instrument combination creates a virtual VXI-11.3 instrument. Adding a 9055 to a GPIB instrument makes it easy to run the instrument anywhere over a network or over the Internet without a GPIB Controller or to include the GPIB instrument in an LXI or Ethernet based test system.

VXI-11 Standard and the 9055

The VXI-11 Standard was created along with the VISA library specification as a way to control instruments over a TCP/IP network. The VXI-11 Specification has three sub-standards. The VXI-11.3 sub-standard describes how to control and communicate with IEEE-488.2 compatible LAN instruments. The Model 9055 Ethernet to GPIB Instrument Interface converts any IEEE-488.2 compatible GPIB Instrument into a VXI-11.3 compatible LAN instrument.

Windows Programming

The VXI-11.3 compatible 9055-instrument combination can be controlled by a very wide range of Windows applications and programming languages. The 9055-instrument combination can easily operate in Windows systems with VISA or SICL libraries. In many cases the programs that controlled the instrument through a GPIB controller can be easily adapted to control the instrument through the 9055. Applications like LabVIEW or VEE are written with VISA calls. Many later C and Visual Basic programs were written with



9055 Ethernet Instrument Interface

VISA calls. With these programs it is just a matter of changing the VISA Resource string to select a TCPIP device.

NI's Measurement and Automation Explorer treats the 9055 and your instrument as any other VXI-11.3 instrument. Agilent's Connection Expert also sees the 9055-instrument combination as a VXI-11.3 instrument. MATLAB and other speciality applications that use VISA can also control the 9055-instrument combination.

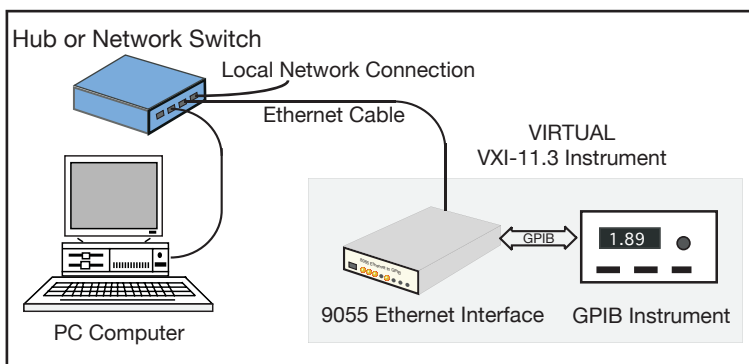
If the application program was making direct GPIB dll calls, it will need to be changed to make VISA or SICL calls. Visual Basic, VB.NET or C/C++/C# programs can be written to control the 9055-instrument combination with SICL or VISA calls.

If the companion GPIB instrument has an LabVIEW or IVI driver, it can be easily integrated into a LabVIEW test program.

UNIX/LINUX/OS X Programming

If you use Linux or any variation of Unix like SunOS, IBM-AIX, HP-UX, or Apple's OS

- Adds a versatile LAN interface to a GPIB Instrument *Adapts GPIB instruments for VXI-11 or LXI Test Systems.*
- Runs from any VXI-11 compliant VISA or SICL library. *Supports VEE, LabVIEW, C, and Visual Basic programs on Windows or HP-UX OS.*
- Runs with RPC calls *Easily controllable by UNIX, LINUX, SunOS, Apple OS X and similar operating systems.*
- Does not require special drivers for each operating system. *Eliminates driver problems.*
- Reuse existing instruments in Ethernet test systems. *Saves instrument replacement costs.*
- Configurable with a web browser, with a windows configuration program or RPC commands. *Easy setup from any computer.*
- Includes ICS's VXI-11 keyboard program. *The easy way to test IO configurations before writing a test program.*



9055 creating a virtual VXI-11.3 Instrument

CE Approved

RoHS

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X, you can communicate with your instrument through the 9055's network service with RPC calls. Special Drivers are not required. These operating systems include an RPCgen utility that converts the VXI-11 Specification's RPC library into a header file that can be called with a C language test program. There is nothing to become obsolete nor is a new driver ever required when the test computer or the operating system is updated or when the test program is ported to another UNIX/LINUX type system.

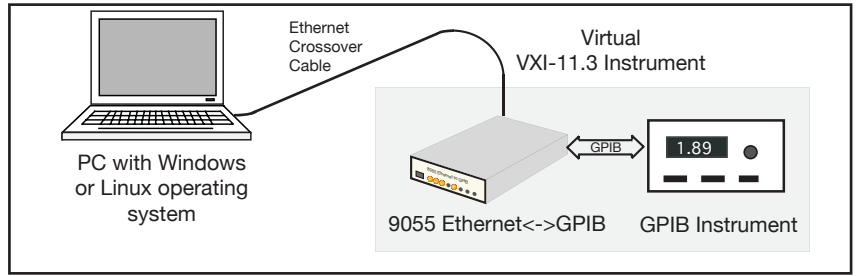


Figure 2 Laptop controlling the 9055-Instrument Combination

Connections

The 9055 can be used as an external box or embedded inside the instrument. In either case, users can connect to the instrument over the GPIB bus or through the 9055's Ethernet port. When connected to an active network, the 9055 checks the GPIB bus and stays in an idle state if another controller is connected to the GPIB bus. The 9055 only becomes the active controller if the GPIB bus is free.

9055's Operation

The 9055 transparently passes all device commands and IEEE-488.2 Common Commands onto the instrument and returns all instrument responses to the client application. The 9055 also does such familiar GPIB tasks as sending Selected Device Clears and Device Triggers to the instrument, pulses the IFC line, sets Local or Remote modes and performs Serial Polls.

Service Requests (SRQs) can be passed back to the test application if the application has created a Reverse Interrupt Channel. When the 9055 detects an SRQ, the *inst* personality with a Reverse Interrupt Channel is serial polled and a *device_int_srq* RPC sent to the test application.

Network Setup & Installation

ICS's 9055 is very easy to install. Plug the 9055 into a network access point or switch adjacent to your computer as shown in Figure 1 or use an Ethernet cable to connect the 9055 directly to a PC's network port as shown in Figure 2. Use a web browser or run ICS's Configuration Utility to configure the unit for your network. Set the remaining network parameters, save the settings and the 9055 is ready to be connected to the instrument and to the network. A rear panel LAN Reset button is provided to reset the 9055's network settings to the factory default settings in case the 9055's configuration needs to be reset.

GPIB Setup

The 9055 can be configured to work with virtually any IEEE-488.2/GPIB Instrument. Use ICS's Windows Configuration program to assign the instrument's GPIB addresses to *inst* personalities starting with *inst0*. The default setting is for instrument with a single primary address using personality *inst0*. An instrument with dual primary addresses would use *inst0* and *inst1*. A multi-channel instrument with 8 secondary addresses would use *inst0* through *inst7*.

At power turn-on, the 9055 looks for the instrument at its preset GPIB address. If the instrument's address has been changed, the 9055 automatically searches for an instrument with the correct GPIB address-personality pattern and links to it.

Keyboard Controller

The 9055 includes ICS's VXI-11 Keyboard program for Windows which provides interactive control of VXI-11 instruments from the computer keyboard without having to write a program. The VXI-11 Keyboard program is the ideal utility program for testing the 9055-instrument combination or for trying out device commands before using them in a program.

With the VXI-11 Keyboard program you can find and link to the 9055-instrument combination. Besides reading and writing data strings, the VXI-11 Keyboard has controls for sending Device Clear and Device Trigger, performing Serial Polls and for setting Local/Remote modes.

Easy Firmware Updates

The 9055 has a program download and store function which lets the 9055 receive program changes through its Ethernet interface. If a future firmware change is necessary, the new firmware and Upgrade Utility program can be downloaded from ICS's website. The 9055 validates the new code before saving it in its Flash memory.

Network Features

The 9055 uses the VXI-11 protocol or RPC over TCP/IP to communicate with the test program (client application). The TCP transportation layer and IP protocol guarantees error free communication with the 9055 over the network or Internet as long as the connection is maintained.

The 9055 has communication timeout and Keepalive capability to maintain the communication link with the client application. When the 9055 discovers that the channel is no longer active, or when a channel is closed, the 9055 closes that channel and releases all resources that were used by the client. This unlocks any instruments links, destroys the links and makes all resources available for the next user.

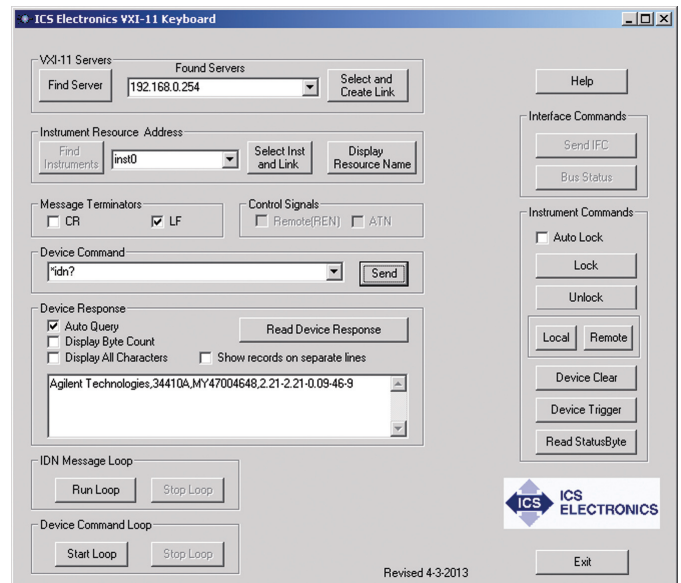


Figure 3 VXI-11 Keyboard Controller Panel

9055 SPECIFICATIONS

Supported Standards

IEEE 488.1 Capabilities:

The 9055 meets IEEE-STD-488.1 with the following capabilities:

- AH1, SH1, C1, C2, C3, C4, and C9
- E2 Drivers incorporate power up/down protection.

Companion Instrument

Companion instrument must be IEEE-488.2 compatible. Supports only one instrument.

488 Bus Performance

Long term GPIB transfer rates are limited by the LAN data transfer rate, the Client-computer performance and the GPIB device. Short term 9055 data rates are:

GPIB to 9055	>180 kbyte/s
9055 to GPIB	> 180 kbytes/s
Supports	single instrument
Device Address	16 addresses-a single primary or dual consecutive primary addresses from 1-30 or a primary and up to 16 secondary addresses from 0100 to 3030. [Single primary address 4]
Auto track	After configuration
9055 address	0 to 30 [0]

VXI-11 Capabilities

Fully VXI-11.3 compliant

VXI-11.3	Device Control
Clients	1 to 15
Channel types	Data, Abort and Interrupt
Instrument links	64 max
Locking	By instrument link

RPC Protocol

Conforms to ONC RPC Version 2

Ethernet Interface

Type	IEEE 802.3 compliant
Speeds	10BaseT (10 Mb/s) 100BaseT (100 Mb/s)
IP Address	Static or DHCP
Factory setting	192.168.0.254 static
Interface name	inst0-inst15 [inst0]

Internal WebServer

The internal WebServer provides HTML web pages for viewing and setting the 9055's network settings.

System Requirements

Computer with an IEEE 802.3 LAN interface. Requires RPC support or a VXI-11 compliant VISA layer installed.

Supported Software

The 9055 supports the following applications and any program language that makes VISA or RPC calls. A partial list is:

- NI LabVIEW (5.1 and later)
- Agilent VEE - IO Libraries 14.2 and later
- MathWorks MATLAB
- Visual Basic 6.0*
- Visual Basic .NET (2005-2012)*
- Visual C, C++ and C#*
- Java*

Controls and Indicators

CONTROLS

Power	Front-panel switch
LAN Reset	Rear-panel push-button

LEDs

PWR	Power on
RDY	Unit has passed self test
LAN	Unit connected to an active LAN
ACT	Network activity
TALK	Unit is addressed to talk on the GPIB bus.
LSTN	Unit is addressed to listen on the GPIB bus.
SRQ	SRQ asserted on GPIB bus
ERR	Unit has detected a soft error

Physical

Size 7.45" L x 5.57" W x 1.52" H
(18.92 cm L x 14.15 cm W x 3.86 cm H)

Weight	1.6 lbs. (0.73 kg.) plus power adapter
Construction	RoHS Compliant
Temperature	Operating -10 °C to +65 °C Storage -40 °C to +70 °C
Humidity	0-90% RH non-condensing
Shock/Vibration	Normal handling
Connectors	GPIB GPIB 24 pin ribbon with metric studs. Ethernet RJ-45
Power	9 to 32 Vdc @ 4 VA
RFI/EMI	CE Certified

Included Accessories

- Instruction Manual
- CD-ROM with VXI-11 Keyboard Controller program and Configuration Utility.
- LAN Cable.
- UL/CSA/VDE approved AC power Adapters provided for:
 - US - 115±10% Vac, 60 Hz (std.)
 - U - 100 to 230 Vac, 50/60 Hz with US/Japan, European, British, and Australian/China plugs.

NOTE

For more information and programming examples refer to the AB80 series Applications Notes at www.icselect.com

LabView is a trademark of National Instruments, Austin, TX.

VEE, IntuiLink and Benchlink are trademarks of Agilent Technologies, Palo Alto, CA.

The VXI-11 Specification is available from the VXI Consortium at <http://www.vxibus.org/specs.html> or from ICS's website at http://www.icselect.com/vxi_spec.html

ORDERING INFORMATION

Part Number

Ethernet - GPIB Controller with 115 VAC adapter, Manual and CD-ROM	9055
Ethernet - GPIB Controller with 100-230 VAC adapter, Manual and CD-ROM	9055-U
GPIB Accessory Cables	See separate data sheet
Rack Mounting Kits (holds one or two 9055s). See separate data sheet	Single - 114210, Dual - 114211