Migrating your application software from the 34970A to the 34972A

White Paper

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Introduction

The Agilent Technologies 34970A Data Acquisition/Switch unit has been deployed in thousands of applications world-wide. If you're one of the users of the 34970A, you may be considering using the new 34972A for your next project. And if you've developed software to control the 34970A, you naturally are concerned about impacts to your software when migrating to the 34972A.

This white paper discusses how to migrate from existing applications that use the 34970A to the new 34972A Data Acquisition/Switch unit.

Summary

Changing from 34970A to 34972A can be as simple as an address change when using VISA I/O library software. For example, VISA address (A) shown below points to a 34970A on a GPIB address. VISA address (B) points to a 34972A on LAN. Changing from the 34970A to the 34972A can be as simple as changing just one address line.

VISA address (A):	GPIB0::9::INSTR
VISA address (B):	TCPIP0::156.140.77.230::inst0::INSTR

Also, if needed the 34972A can respond to a *IDN? query with a product number of 34970A. So, there is no problem in the event you hard coded the software to only accept only a 34970A response. This white paper describes how simple it is to migrate to the new 34972A.

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Overview

Table 1 outlines the major differences between the 34970A and the 34972A. These two products are closely related, and the 34972A has been carefully designed to seamlessly work in your existing 34970A applications.

The 34972A configuration and measurement commands are a superset of the 34970A. That means that the existing commands you've used to make measurements with the 34970A also work with the 34972A.

When using the 34970A, you used either RS-232 or GPIB for instrument communication. The 34972A modernizes the communications I/O by supporting USB and LXI (instead of RS-232 and GPIB).

In particular, notice that the BenchLink Data logger is supported on both the 34970A and the 34972A. If you use BenchLink Data logger as your application software with the 34970A, you can be assured your same configuration files will work fine with the 34972A simply by selecting the new 34972A instrument address.

Table 1. Comparison of 34970A and 34972A features

Feature	34970A	34972A
Supports 8 plug-in modules: Agilent P/N 34901 through 34908	✔	✔
LabView drivers	✔	✔
IVI-C, IVI-COM drivers	✔	✔
BenchLink DataLogger/PRO software	✔	✔
Built-in 50,000 reading non-volatile reading memory	✔	✔
USB flash memory support for extended reading memory		✔
Graphical web LXI interface		✔
Instrument communications		
GPIB	✔	
RS-232	✔	
LAN (LXI)		✔
USB		✔

Programming Command Set Similarities

If you've created your own application software using SCPI commands or IVI calls, you'll be glad to hear that except for a few interface specific commands, all of the other commands that you have used to control the 34970A can used on the 34972A.

For example, on the 34970A the command SYSTem:INTerface selects either GPIB or RS232 interface. The 34972A does not need to have the interface specified (either USB or LAN), so this command is unnecessary and thus not supported on the 34972A. If you previously used these commands you will need to remove those from your program. All of the other commands that you have used to control the 34970A can be used on the 34972A.

Using Agilent I/O libraries, either direct I/O or IVI drivers

The transition to a 34972A is easy if you used the VISA I/O libraries when writing your software. That's because VISA manages the I/O connection, so commands can be sent to different interfaces simply by changing the VISA address string. For example, the Agilent Connection Expert (ACE) I/O library window as shown in figure 1 shows two different instruments, a 34972A connected on LAN (TCPIP0) and a 34970A connected via USB/GPIB (GPIB0). Notice the VISA addresses:

- 34972A with VISA address TCPIP0::156.140.77.230::inst0::INSTR
- 34970A with VISA address GPIB0::9::INSTR

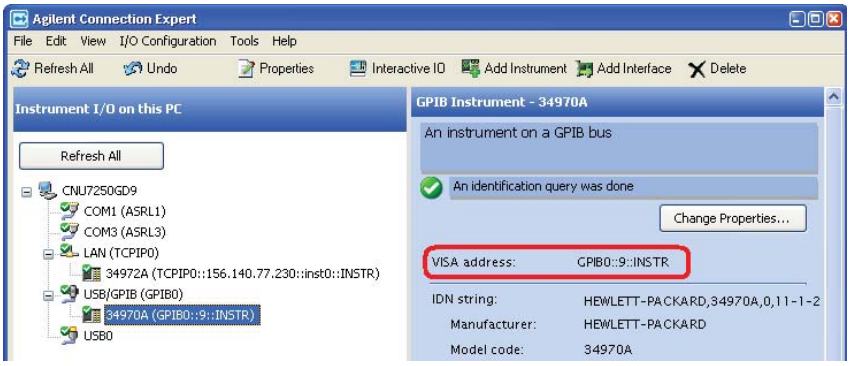

Figure 1. Agilent ACE Instrument window. Notice VISA address (red box)

Programming using direct SCPI I/O over VISA

The VISA address string is used to access instruments via the VISA libraries. The code snippet below shows an example of how an instrument can be accessed through the VISA libraries, and changed between two different addresses by simply changing the VISA address. This example is coded in visual basic for applications (VBA) which is an implementation of Microsoft's® event-driven programming language Visual Basic 6®. A similar approach can be taken for other programming environments.

```
'************************************************************************
'** Communcate using VISA and direct I/O (SCPI)
'************************************************************************

    'VISAAddr = "GPIB0::9::INSTR"                          'older 34970A using USB/GPIB 82357A
    VISAAddr = "TCPIP0::156.140.77.230::inst0::INSTR"      'new 34972A via LAN
    'VISAAddr = "USB0::0x0957::0x2007::ALFREDO114::0::INSTR"    'new 34972A via USB

    Set IO_mgr = New ResourceManager
    Set Agt34970A_VISA = New FormattedIO488

    Set Agt34970A_VISA.IO = IO_mgr.Open(VISAAddr)
    Agt34970A_VISA.IO.TerminationCharacterEnabled = True
    Agt34970A_VISA.IO.Clear

    'complete simple I/O to instrument as example
    Agt34970A_VISA.WriteString "*IDN?"
    StrResult = Agt34970A_VISA.ReadString()

    'any SCPI command can be sent to instrument
    Agt34970A_VISA.WriteString "MEASure:VOLTage:DC? (@101)"
    StrResult = Agt34970A_VISA.ReadString()
    Agt34970A_VISA.IO.Close
```

Figure 2. Migrating from 34970A to 34972A using VISA com driver & direct I/O

Likewise when using the IVI driver changing the VISA address string will direct the IVI commands to the 34972A as shown in figure 3.

```
'*********************************************************************
'** Communcate using IVI driver, select interface of choice
'*********************************************************************

    'VISAAddr = "GPIB0::9::INSTR"                              'older 34970A using USB/GPIB 82357A
    VISAAddr = "TCPIP0::156.140.77.230::inst0::INSTR"          'new 34972A via LAN
    'VISAAddr = "USB0::0x0957::0x2007::ALFRED0114::0::INSTR"   'new 34972A via USB

    Agt34970A.Initialize VISAAddr, True, True, "DriverSetup= Model=34972A"
    StrResult = Agt34970A.Identity.Identifier

    Agt34970A.Utility.Reset
    StrResult = Agt34970A.Identity.InstrumentModel
    Agt34970A.Voltage.DCVoltage.Configure "101:110", 10, 0.01
    Agt34970A.Scan.IntervalScanSetup "101:110", 1, 3
    Agt34970A.System.WaitForOperationComplete (10000)
    StrResult = Agt34970A.Scan.Fetch

    Agt34970A.Close
```

Figure 3. Migrating from 34970A to 34972A using IVI com driver

34970A *IDN? query response

Problems could arise if your software is hardcoded to accept only a 34970A response. To address this, the 34972A supports a method to respond to a *IDN? as if it were a 34970A. Use the SCPI command **SYSTem:LANGuage "34970A"** to place the 34972A into a 34970A compatibility mode. When in the compatibility mode the 34972A will respond to a *IDN? as a 34970A.

Programming using Agilent Benchlink Data Logger software

Agilent Benchlink Data Logger software has been updated to support both the 34970A and the 34972A. Scan configurations written to target the 34970A will also run when using a 34972A.

In order to re-target the Benchlink Data Logger to control a 34972A, follow these steps:

1. Include the 34972A in the ACE configuration as shown in figure 1.
2. Verify the 34972A has the same module set (or a superset) of the original scan configuration. This can be determined by looking at the **Modules** column as shown in figure 4.
3. Install the latest Benchlink Data Logger software (available from the Agilent website).
   Use either:
   a. Benchlink Data Logger-3 Rev 4.00 or greater or
   b. Benchlink Data Logger Pro Rev 3.00 or greater.

4) After opening Benchlink Data Logger, select the **Modify Instrument Address...** button, then the **Modify** Icon followed by the **Find** button to start a search for the new 34972A. Once the 34972A is discovered, select the checkbox. Next, be sure to select the **Modify Address...** button to complete the address change.

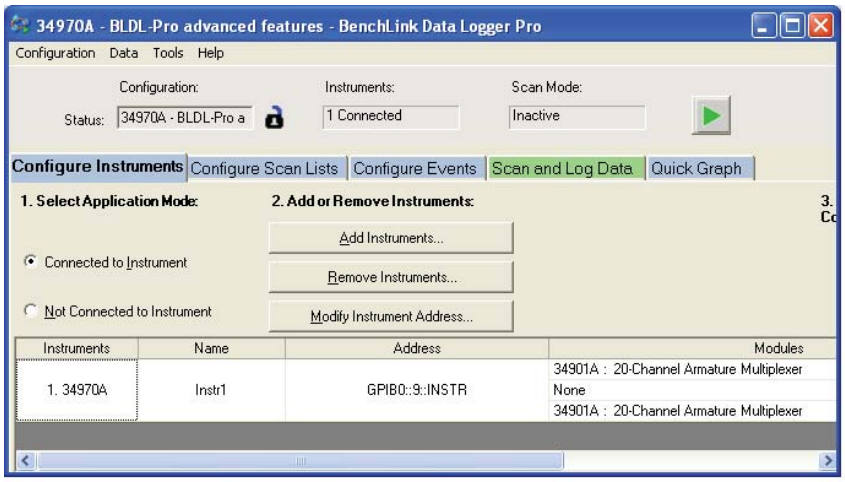

Figure 4. Select Modify Instrument Address... to change target 34970A to 34972A

Since the features of the 34972A are a superset of the 34970A, all of the scan configurations created for the 34970A will run on the 34972A.

Conclusions

The 34972A is a refreshed and improved version of the 34970A.
New features of the 34972A include both a USB 2.0 and LAN interface, which result in dramatic usability improvements.

Except for a few interface specific commands, the 34972A commands are a superset of the 34970A. This means the commands used to control the 34970A will work on the 34972A. In addition, the Agilent I/O libraries can be used to re-direct commands from the previous GPIB or RS-232 interface to the new USB or LAN interface. As a result, the software you've created to control the 34970A can be used to control the new 34972A with little or no modification.

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