

How to Use IVI-COM Drivers in Agilent VEE Pro 8.0

Application Note 1595

IVI overview

IVI (Interchangeable Virtual Instrument) is a new driver standard created by the IVI Foundation (<http://www.ivifoundation.org>).

The IVI Foundation's goal is to create a standard that allows instrument interchangeability while still providing quality and high-performance. Interchangeability means you could write a program for a DMM from Fluke and substitute a DMM from Agilent or other manufactures. Your program would still work because the IVI standard for DMM drivers requires the drivers from different companies to support the same exact set of functions. This same exact set of functions for each instrument class (in this case, the DMM class) forms an interface called "Class Compliant Interface". Of course, sometimes a manufacture may also add a few

functions specific to their instrument. If your program calls any instrument specific function, this is where interchangeability would stop.

There are two types of drivers currently specified by the IVI Foundation. IVI-C drivers extend the *VXIplug&play* driver specification. IVI-COM drivers use Microsoft COM technologies and are similar to ActiveX Controls.

Agilent VEE Pro and IVI

Agilent has spent significant development to continually improve its Agilent VEE Pro (VEE) software to be more "open" to the software and hardware that their users prefer. Recently, COM and .NET have been the software technologies adopted by many users inside and outside of the test and measurement industry. IVI-COM drivers is the type of drivers that Agilent VEE Pro

chose to support seamlessly because its affinity to COM and .NET.

Agilent VEE Pro has started to support IVI-COM driver since version 7.0. In version 7.5, Agilent dramatically improved IVI-COM driver use model making it tightly integrated with the VEE's Instrument Manager. With version 8.0 which Agilent just introduced on January 31st 2007, the additional enhancements are making IVI-COM driver even easier and flexible to be used in VEE.

Agilent VEE Pro 8.0 new features

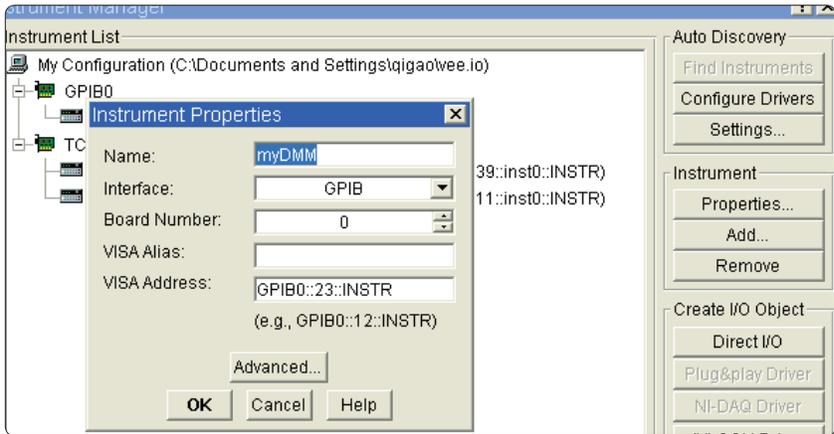
Agilent VEE Pro 8.0's core features include Watch Window with Edit and Continue for powerful and faster debugging, Programmatic Properties for writing better Operator GUI faster, Code Completion and Code Insight for reducing typing, reducing the need for memorization and external



documentation, Minimap for navigation, Multi-Transaction object enhancements, Standardization on VISA style devices and others. Each of these features works together to enable users to develop their test programs faster.

Using IVI-COM driver in Agilent VEE Pro 8.0 – Scenario 1

Agilent VEE Pro 8.0 supports all scenarios of using an IVI-COM driver, i.e., 1) use the instrument driver’s complete functionalities 2) use the instrument driver’s class compliant interface only 3) use the instrument session (i.e., its logical name) to access the instrument’s complete functionalities 4) use the instrument session to access the class compliant interface only. We will only talk about Scenario 1 and Scenario 4 in this paper. Please refer to Agilent VEE Pro 8.0’s online help for more details.



Let’s start exploring how to use IVI-COM driver in Agilent VEE Pro 8.0 by following an example. This example assumes that we use Agilent 34401 DMM and the Agilent 34401 driver has already been installed on your machine.

Start Agilent VEE Pro 8.0, under the menu item “I/O”, select “Instrument Manager”. If you’re connected to a live 34401, then just click the Find Instruments button and skip to step 4.

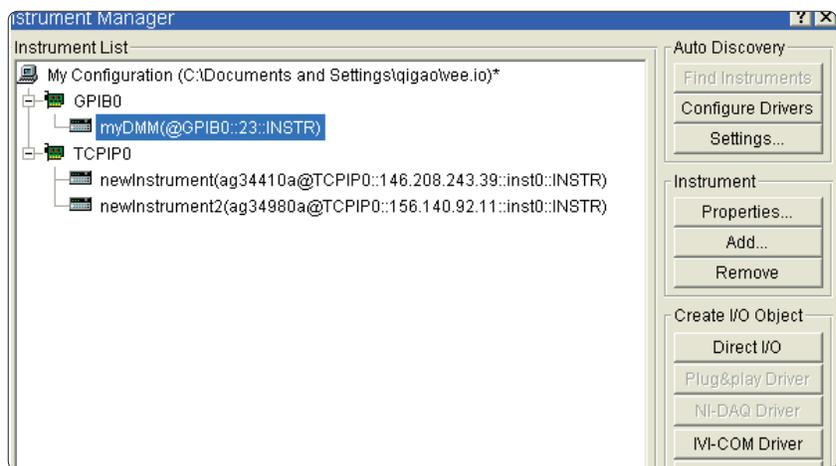
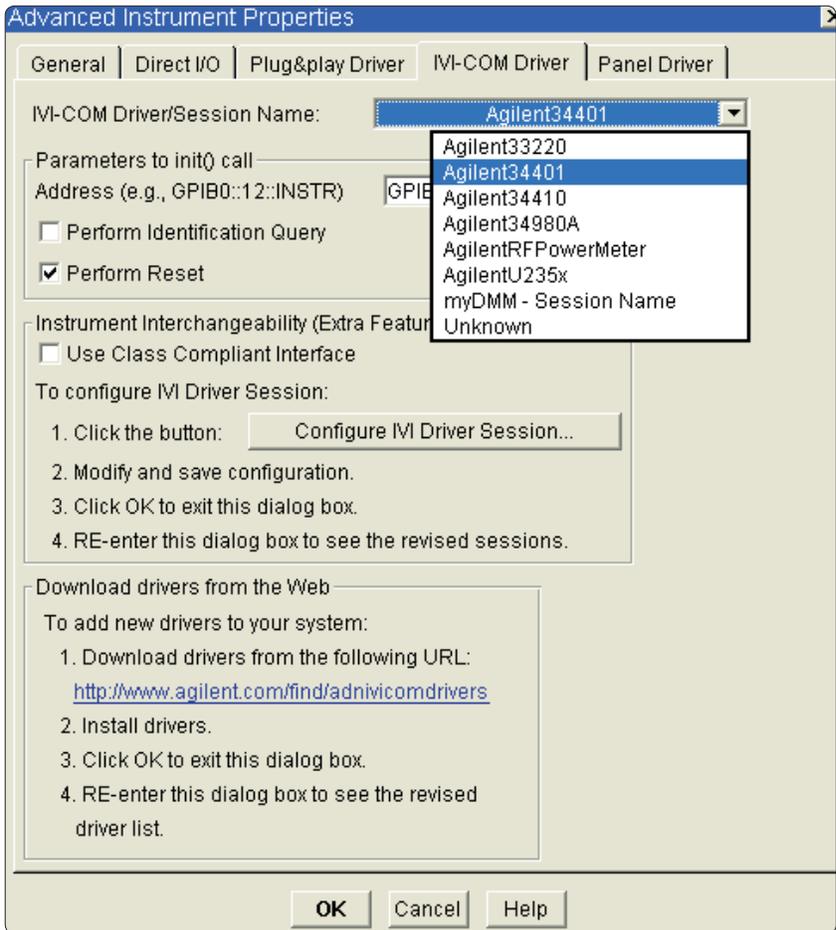
1. If you don’t have a live Agilent 34401, you can still add a non-live instrument by clicking the Add... button, and fill in the dialog box. You can give a name to your instrument such as “myDMM”. If you have a live instrument, the VISA address field is automatically filled by VEE.

Note: if you’re using a version before version 8.0, you would type in something like 723 for the instrument address. Agilent VEE Pro 8.0 is now standardized on VISA style devices.

2. Click the Advanced... button. In the Advanced Instrument Properties dialog, click the IVI-COM Driver tab. In the drop-down list box titled “IVI-COM Driver/Session Name”, select Agilent34401. Please note that the Address text box is automatically filled with whatever VISA address is in the Instrument Properties dialog box. The check boxes “Perform Identification Query” and “Perform Reset” are checked by default. You can uncheck the first checkbox as a practice. Click OK to exit from the Advanced Instrument Properties dialog box and click OK again to exit from the Instrument Properties dialog box.

3. At this point, the IVI-COM Driver button will become visible under the “Create I/O Object” section.

4. Click the IVI-COM driver button and place the To/From myDMM object onto your workspace. The “To/From myDMM” object is a “Multi-Transaction VEE objects”. This category of objects includes the frequently-used “To/From File”, “To/From String”, “Sequencer”, “Direct I/O”, “Plug&play Driver”, and many other VEE objects. Each “Multi-Transaction” object provides a clean way to hold any number of transactions or operations inside

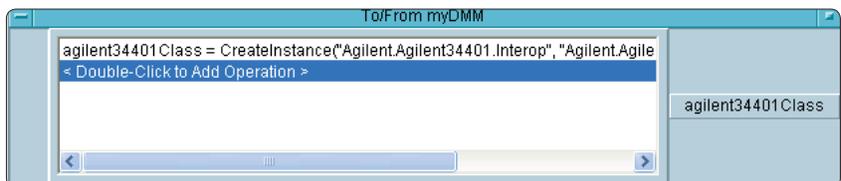
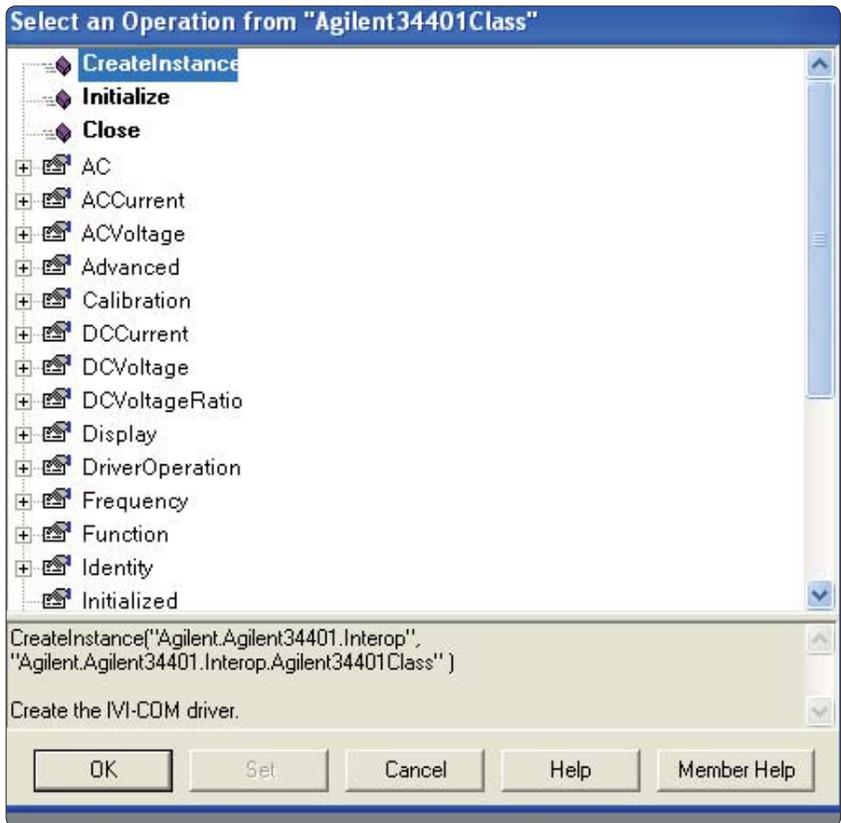
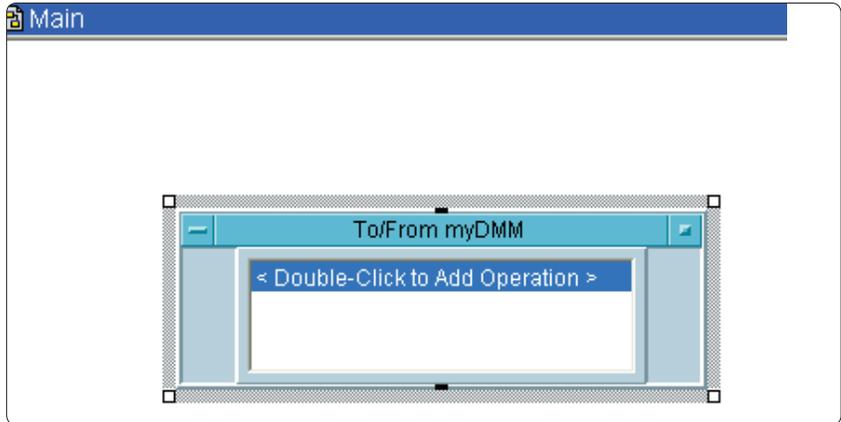


one clean VEE object. This feature provides the users a great benefit by avoiding cluttered workspace that has too many objects and wires connecting between the objects.

5. Double click the line that says “Double-Click to add Operation”. This brings up the “Select an Operation...” dialog box. Select CreateInstance and click OK. CreateInstance should be the first operation that you call before you call any other operations for this IVI-COM driver.

6. Click OK again at the “Edit CreateInstance” dialog box.

7. Your To/From myDMM object should now look like below. Double click on the highlighted line again.



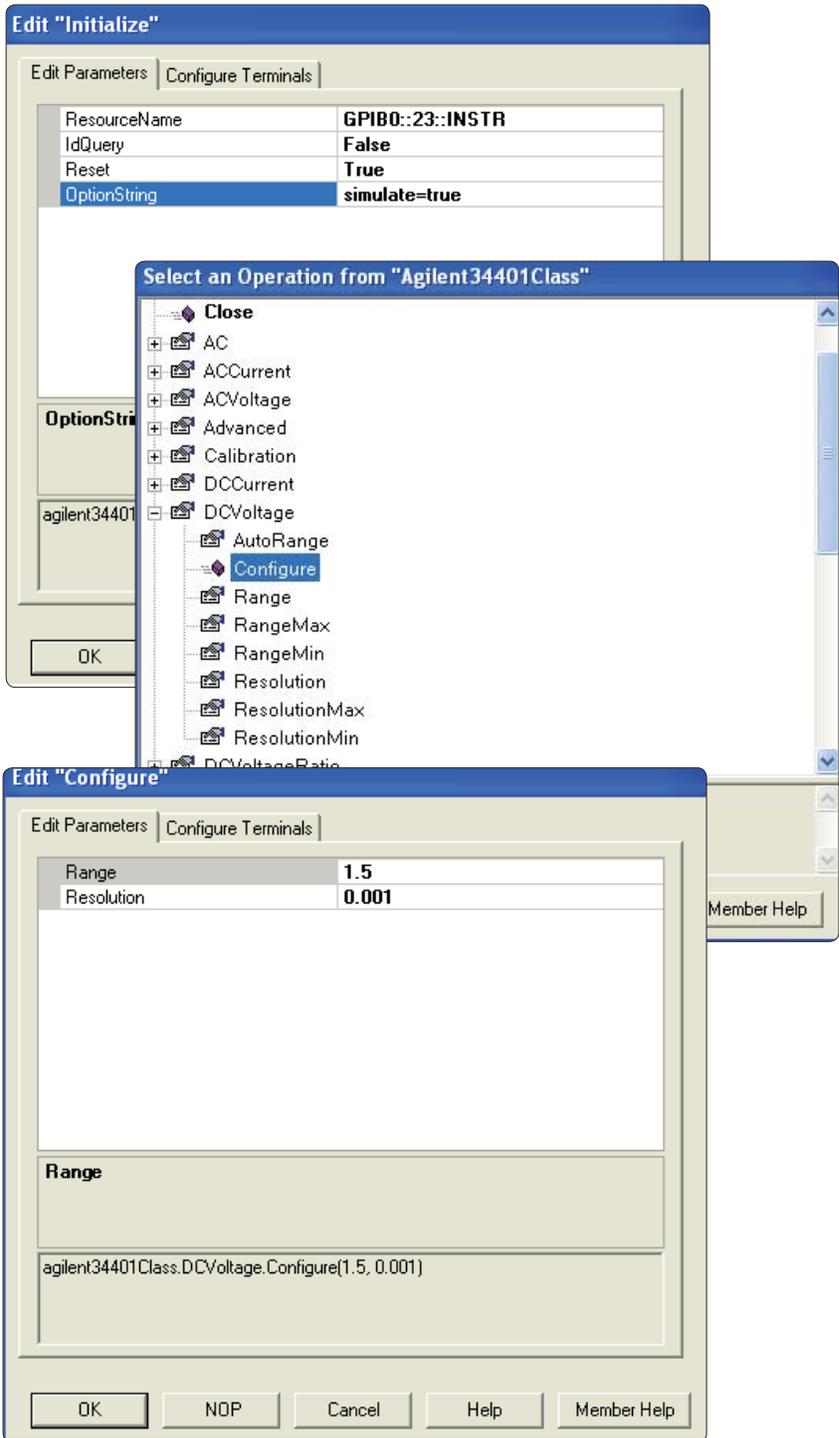
8. In the “Select an Operation...” dialog, select Initialize and click OK. In the “Edit Initialize” dialog box, notice most of the fields have already been filled by VEE automatically including ResourceName, IdQuery and Reset. In this case, let’s assume we do not have a live instrument attached, so we fill in the OptionString as “simulate=true”. This is an option string understood by all IVI drivers to try to generate some simulated results. The IdQuery and Reset are Boolean fields that can be easily toggled by double-clicking the value field.

9. Double click to add another operation again. This time, expand the treenode “DCVoltage”, and select “Configure”. Notice the Member Help button at the bottom of the dialog. Clicking it will bring you to the IVI-COM driver help page for the “Configure” operation.

10. In the “Edit Configure” dialog box, fill in the parameters at right:

11. Next add another operation by expanding “Trigger”, and select the “Delay” property. Set the Delay to 0.01

12. Next add another operation by expanding the “Measurement” treenode, and select “Read”. Set the timeout to 1000 milliseconds.

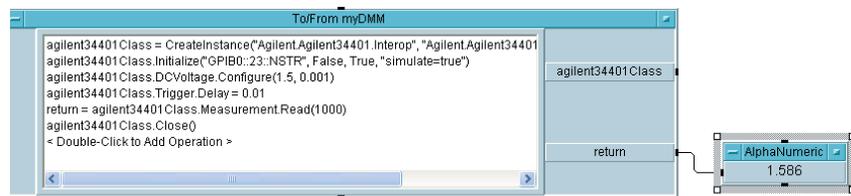
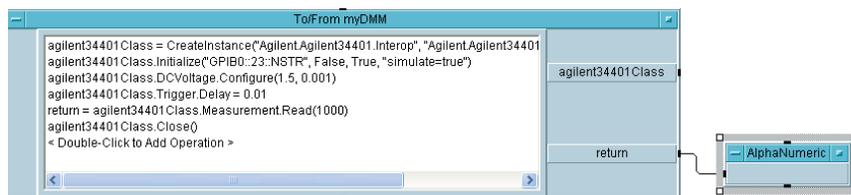
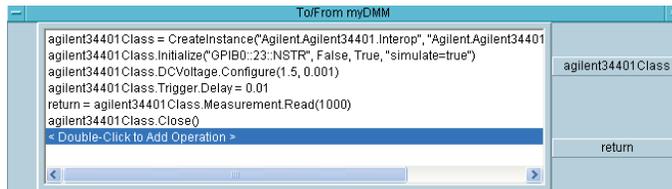


13. If this is your last operation, make sure you release all resources by selecting the Close operation.

14. Your To/From myDMM object should look like top right.

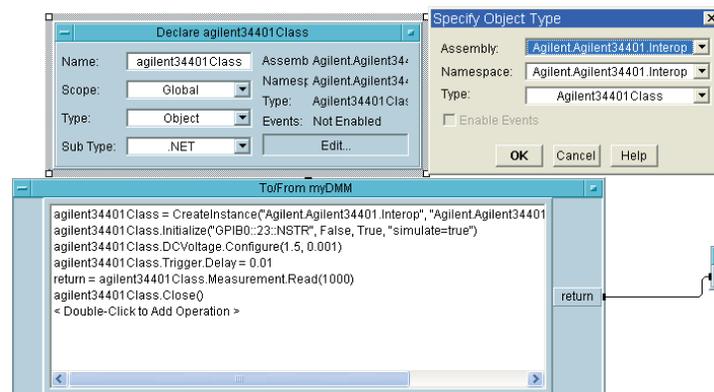
15. To display the return reading, select Display->Alphanumeric, place the Alphanumeric object on your workspace, and connect a wire between "return" output terminal to the input terminal of the alphanumeric object.

16. Hit F5 or the  button on the toolbar to run this VEE program. You should see a simulated result at third from top.

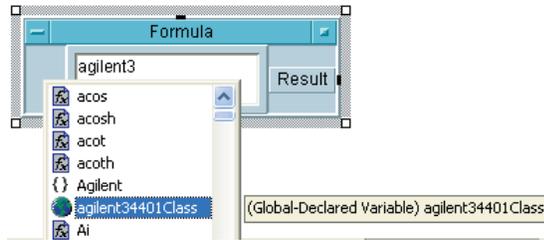


Alternatively, you can also declare a global variable named "agilent34401Class" (Data->Declare Variable) and set its type, see bottom right. Delete the "agilent34401Class" output terminal. This way, you can share this IVI-COM object with other To/From objects or use it in formula objects.

What if you want to switch the orders of these transactions? With version 8.0, you can easily re-arrange the transactions by using the ctrl-Up and ctrl-Down keys.



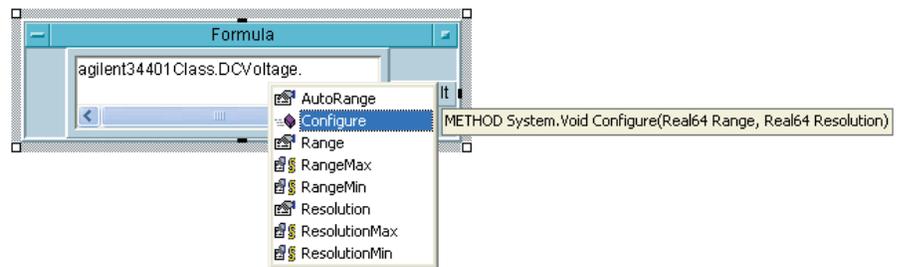
What if you prefer VEE's formula object? With version 8.0's Code Completion and Code Insight, you can also easily let VEE show you what variables and functions are available and let VEE complete most of the typing for you. You will find programming by only typing very few characters and hitting arrow and tab keys easy and fun!



Using IVI-COM driver in Agilent VEE Pro 8.0 – Scenario 4

In this scenario, you want to use an IVI-COM session with a Class Compliant Interface. This is the scenario if you want to guarantee complete instrument interchangeability. The session (i.e., a logical name of the in-strument driver) is defined in the IVI Configuration Store which contains the resource information about the instrument.

Use the Instrument Manager to add a new instrument. Similarly to Scenario 1, click "Properties" for the instrument and select the "Advanced" button. Select the IVI-COM Driver tab and choose an existing IVI-COM session name, e.g., "myDMM – Session Name" instead of a specific driver name from certain manufacture (see Step 2 in Scenario 1). Notice that the resource string is grayed out and an IVI-COM session name has "- Session Name" appended to the name. Check the box labeled "Use Class Compliant Interface". The rest of the steps are all similar to Scenario 1.



What if you do not have an IVI-COM session defined? You can define one by clicking the "Configure IVI Driver Session" button in the "Advanced Properties" dialog. The application that appears is used to manage your IVI Configuration Store information. The icon on the top left finds instruments that are directly connected to your computer and reads others that are identified in the IVI Configuration Store.

Once the instruments have been found, right click on one of them and choose Add Instrument Session to add an IVI session. The wizard that appears takes you through the short number of steps needed to create the IVI session. Save the configuration. This updates the IVI Configuration Store.

Conclusion

In this paper, we had an overview of how users can use the latest IVI-COM driver technology within Agilent VEE Pro 8.0. You can see that most of the work is done by following the wizards and filling in the blanks.

For more information, please check out Agilent VEE web site at <http://www.agilent.com/find/vee>. You can download an evaluation copy, read its online help and try out the features yourself.



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