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Innovating the HP Way

82341C HPIB Installation and Troubleshooting
Windows® 95 and Windows® NT
CE, GC, LC and A/D ChemStation, Version A.05.0x and A.06.0x

This document will give you the background information that you need in order to prepare and install the 82341C HPIB card. You will have to verify that your PC meets the hardware and software requirements for the ChemStation and do the necessary adjustments where appropriate.

Please note that the ChemStation version A.05.01 and greater is <u>not</u> supported under Windows® 3.1. MS ChemStation G1701AA version A.03.00 is only supported on Windows® 95. G1701BA is supported only on Windows® NT 4.0 Workstation. All Windows NT 4.0 ChemStation Systems require Service Pack 3.

If you bought your ChemStation as a bundle from the Agilent Chemical Analysis Group, these steps have already been performed for you. In this case, PC hardware has already been set up for you, the HP-IB card has been installed and configured, the operating system and operating environment have been pre-loaded on your computer's hard-disk, and the ChemStation has been installed.

HP 82341C HP-IB Interface Card (Windows® 95 and Windows NT®)

The HP 82341C is supported with the ChemStation under Windows® 95 and Windows® NT. It uses an I/O address range and an interrupt (IRQ) line.
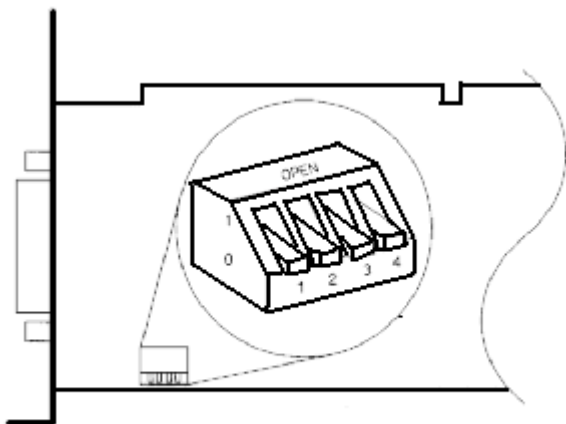
Figure 1 DIP-Switch Settings of the HP 82341 HP-IB Interface

The I/O base address settings are defined by DIP switch settings, see Figure 1. <u>In most cases, you will not need to change the default switch setting</u>. However, if the default setting conflicts with other interfaces you have in your computer, use Table 1 to select the desired address range to resolve the conflict.

To change the base address, you must power down your computer, remove the HP-IB interface card, reset the DIP switches, re-install the card, and power up your computer. You can then run **I/O Config** again to verify the configuration of the HP-IB interface. (See "Configuring the HP82341 HP-IB interface drivers" later in this document.)

Table 1. HP 82341C Switch Settings

Switches 1 2 3 4	I/O Base Address (Hexadecimal)	I/O Address Range Used (Hexadecimal)	
0 0 0 0	250 (default)	250 - 257	
1 0 0 0	270	270 – 277	
0 1 0 0	350	350 – 357	
1 1 0 0	370	370 – 377	0 = Down
0 0 1 0	220	220 – 227	1 = Up
1 0 1 0	280	280 – 287	
0 1 1 0	390	390 – 397	
1 1 1 0	380	380 - 387	

> **CAUTION:** The HP-IB board is static sensitive and should be handled with care so as not to damage it. Be sure to hold the board by the edges and do not touch the electrical components. Use anti-static equipment, such as a grounding mat and wrist-straps, during installation.

NOTE: The selected I/O address ranges must not conflict with other I/O interfaces installed in your computer, including products of other manufacturers (for example LAN interfaces). Refer to the documentation for the other interfaces and Table 1 to select unique addresses for all the interfaces in your computer.

HP-IB Communication

NOTE Because the HP 82341C interface is I/O port-mapped and not memory-mapped, it is not necessary to exclude address ranges for memory management software on your computer.

Installing an HP-IB Interface Board in the PC

Since these boards can be installed in several different computers, the following instructions are general. If you have difficulty during the installation, consult your computer manual or dealer.

WARNING Turn off and unplug your computer and all attached electrical devices before removing any covers.

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1. Turn off and unplug your computer, then remove the computer's cover(s).

2. Select any empty slot; however, it is best not to place the HP-IB board next to a VGA board. As the HP-IB connector is wider than a typical PC slot, you may have to leave the slot(s) adjacent to the HP-IB interface empty.

3. If you have more than one HP-IB board in your computer, or if some other system setting conflicts with the resources associated with the default factory setting for the HP-IB board, be sure to reset the switch settings to avoid resource conflicts as described above.

4. Write down the slot number you will use and store it for later use. Some EISA computers require slot number and board type information after installation. For computers that require this information, refer to the appropriate installation documentation.

5. Loosen the mounting screw and remove the selected empty slot's rear plate. Holding the board by its edges, insert the board into its slot. Make certain that the board's edge connector is fully seated. Lock the board into place with the mounting screw.

6. Replace the computer's cover(s). Plug in, and restart the computer.

HP-IB Cabling

When connecting HP-IB devices together, there are several basic rules that should be observed.

1. Whenever possible, turn off and unplug the computer and all attached devices before the HP-IB cables are installed.

2. Before connecting any analytical instrument to an HP-IB cable, consult the documentation supplied with each device and determine its HP-IB address. No two devices connected to the ChemStation may have the same address. Alter their addresses as necessary to avoid any duplication. Write down each HP-IB address. This information will be needed later.

3. Try to use shorter HP-IB cables that are two meters long or less.

   HP-IB cable (0.5 m) (10833D)
   HP-IB cable (1.0 m) (10833A)
   HP-IB cable (2.0 m) (10833B)
   HP-IB cable (4.0 m) (10833C)

4. Connect one end of an HP-IB cable to the computer's HP-IB connector.

5. Be certain that you properly tighten all HP-IB connectors. A poor connection causes errors which are difficult to diagnose.

6. Connect HP-IB devices in a *chain*. A chain occurs when an HP-IB device is connected to the next HP-IB device, and it is, in turn, connected to the next, and so on. Avoid *star* configurations (connecting all of the devices to a central point).

> **WARNING: According to the IEEE 488 specification for the General Purpose Instrument Bus (GPIB or HP-IB), the bus is not designed for dynamic configuration. Cycling power on an HP-IB instrument that is connected to the bus while other HP-IB instruments are actively communicating to the HP-IB controller can induce electrical spikes that may potentially corrupt the HP-IB protocol. In extreme cases, this may require cycling power on all instruments, including the HP-IB controller (i.e. typically the ChemStation).**

Installing the HP 82341 HP-IB Interface Drivers

After installing the HP 82341 HP-IB in the computer, it is necessary to install and configure the corresponding drivers. Details on starting the installation differ depending on whether you are installing drivers from the ChemStation Software CD or from the HP I/O libraries CD.

Installing from the ChemStation Software CD, the HPIB Drivers could be located on the ChemStation Software CD-ROM in either the `\HPIB` or `\Drivers\HP-IB` directory. In this case, the drivers are installed by executing the file `Hpiolibs.exe` found in one of the paths listed above.

If you purchased the 82341C card separately from HP, the **HP I/O Libraries CD-ROM** is supplied with the board. Setup will start automatically when this CD is inserted into the drive. If **Autostart** is turned OFF for your CD drive, select **Start … Run …** and type **X:\SETUP** where **X** is the drive letter of the CD reader. Installation from the I/O Libraries CD-ROM may allow selection from several versions of the I/O Libraries; the ChemStations require version F.01.02 of the HP I/O Libraries.

In either case, the HP-IB installation routine detects your operating system and installs the appropriate drivers.

Configuring the HP 82341 HP-IB Interface Drivers

After installing the software library and drivers, run the HP-IB configuration utility from the **Programs…HP I_O Libraries…I_O Config** menu of the Windows Task bar.
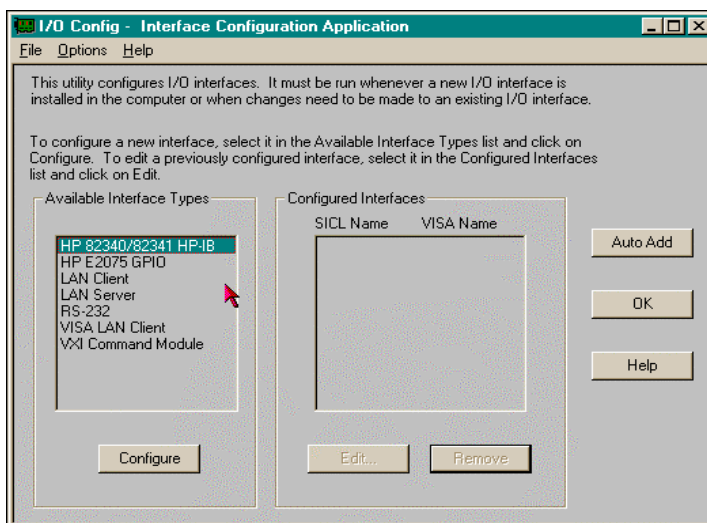

Figure 2. Configuring the HP 82341 HP-IB Interface Drivers

Select "HP 82340/82341 HP-IB" in the I/O Config Screen of I_O Config

The configuration utility, **I_O Config**, now attempts to detect the selected HP-IB interface in the PC in order to assign the correct resources to the card. If the HP 82341 HP-IB card is not detected in your PC although it is installed, proceed with the section on troubleshooting the HP-IB interface.

Configure the HP 82341 HP-IB Interface for Use with the ChemStation

Set the SICL Interface Name to "**hp82341**" (case sensitive – lower case only), the bus address to "**30**" and the "**System Controller**" flag. as shown in figure 3 below:
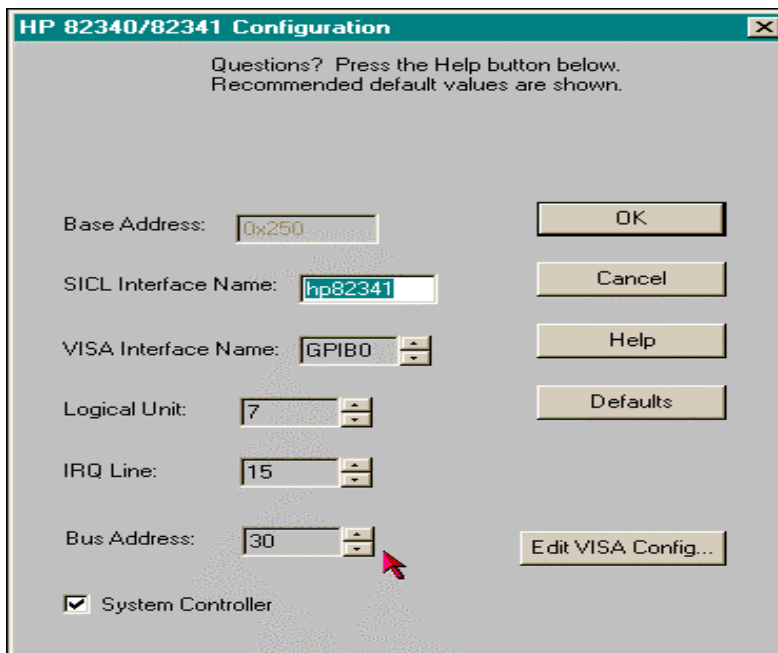
Figure 3. HP 82341 Configuration

The Interface Configuration Screen should now appear as above with the exception of the IRQ.
HP-IB I/O Configuration Application automatically chooses an available interrupt for the card.
If you add additional accessory cards after the HP-IB card was installed, you must make sure that
these cards do not use the resources reserved for the HP-IB card.

<Click> **OK**.

This completes the installation of the HP 82341 card and drivers.

Bus Address: The **Bus Address** determines the address of this HP-IB interface on the HP-IB bus.
The ChemStation uses Bus Address "30" for the System Controller.

System Controller: The **System Controller** determines which bus devices talk and listen. Each
device connected to the HP-IB bus must have a unique HP-IB bus address and one (and only one)
device acting as the System Controller. In ChemStation installations, the System Controller is always
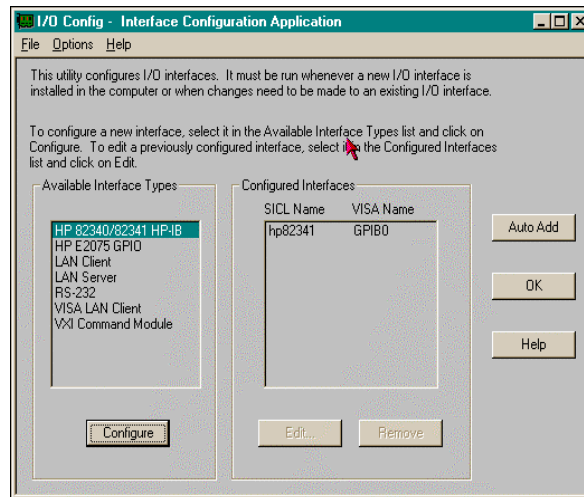the HP-IB board installed in the PC.

Figure 4. **Configuring the HP 82341 HP-IB Interface Drivers**

Troubleshooting HP 82341 Interface Problems

No HP-IB Interface was detected on the system.

The most common problem encountered when using I/O Config is that an interface is not found. For an HP 82341 HP-IB interface, this is due to one of the following reasons:

1. The interface was not installed in the PC before running I/O Config. Install the HP-IB interface card in your system and then run I/O Config again.

2. The interface is set up to use an I/O port address (Base Address) or interrupt request line (IRQ) that is already being used. To solve this problem, you need to resolve the I/O port address or IRQ conflict. See below for help with this.

The HP-IB interface has already been configured.

The interface may have already been configured by **I/O Config**. To solve this problem, you need to edit the existing configuration entry for the interface, rather than trying to add a new interface. In the main **I/O Config** window, click on the name of the interface configuration entry for the HP 82341 in the **Configured Interfaces** list box. Then click on the Edit button directly beneath the **Configured Interfaces** list box to edit the configuration entry for the HP 82341 HP-IB interface.

Resolving HP 82341 I/O Port Conflicts

If I/O Config does not find an HP 82341 HP-IB interface when you try to add a configuration entry for it, you may have an I/O port (Base Address) conflict with that interface. Neither I/O Config nor the

ChemStation will recognize the HP 82341 HP-IB interface if a conflict exists with the I/O port Base Address used by the interface.

To resolve this problem, select another I/O port address for the interface by changing its DIP switch settings. Refer to Figure 1 and Table 1. Note that the selected I/O port address ranges must not conflict with other I/O interfaces installed in your computer, including other manufacturer's products (such as LAN interfaces, etc.). Refer to the documentation for the other interfaces and the following section to select unique Base Addresses for all the interfaces in your computer.

Resolving HP 82341 IRQ Conflicts

The interrupt request line (IRQ) assigned for an HP 82341 HP-IB interface by I/O Config must be reserved for exclusive use by the interface. If this interrupt line is already being used by another interface, this will cause unpredictable behavior (such as system crashes, LAN problems, mouse tracking problems, etc.).

If you suspect an IRQ conflict exists between an HP 82341 interface and another interface on your system, edit the configuration entry for the HP 82341 interface and assign another IRQ for the interface.

Determining Available System Resources Under Windows 95

If you are using Windows 95, note that **I/O Config** will not let you choose an Interrupt Line (IRQ) that is already being used by another interface. However, if the same Interrupt Line is later assigned to another interface (for example, via the **Device Manager** in the **Control Panel**) after I/O Config is run, a conflict may occur.

In such a case, you can check the Interrupt Lines assigned for the various interfaces in your system via the **Device Manager** in the **Control Panel**.

Using Windows 95 Device Manager to View Used I/O Port Settings

Double-click on the **System** icon in **Control Panel**. Select the **Device Manager** tab. Which IRQ line is available depends on the configuration of your PC and may vary with different accessories used. Click on the device and press the **Properties** button to view the resources used by it.

Double-click the **Computer** icon to get a list of used resources on the computer.

Please note that it is not possible to assign system resources to the HP 82341 HP-IB interface in the **Windows Device Manager**. All configuration for this interface needs to be performed with **I_O Config.**

> **Use I_O Config to view or edit the resources of the HP 82341C Interface.**

Using NT Diagnostics to View Used I/O Port and IRQ settings

Under Windows NT, use **NT Diagnostics to check I/O port and IRQ settings**. The **NT Diagnostics** utility is available from the **Start…Programs…Administrative Tools (Common)…/Windows NT Diagnostics**" menu of the Windows NT Task Bar.

> **More tips on configuration and troubleshooting for Windows 95 systems. These will be most helpful to trained service personnel and very experienced users.**

If your 82341C card is not communicating, complete the following troubleshooting steps before assuming the card is defective.

1. **Confirm that the HPIB settings in HP I_O Config have the SICL interface set to 82341 and the bus address set to 30**. This problem is still the number one cause of 82341C cards failing to communicate. The default settings of the 82341C card will not communicate with the ChemStations. If the I_O Config settings are correct and you still cannot communicate, then try rebooting the PC, and power cycle all the instrument modules. Failure to power cycle any of these HPIB devices will hang the HPIB bus.

2. **Verify that the 82341C HPIB card is listed in the Windows 95 Device Manager**. If the 82341C card is listed in the Device Manager list of devices, then the 82341C card is working. Also, note that the ChemStation can only have one 82341C card. It is possible to configure a 82341C card multiple times. If the 82341C card is listed multiple times in device manager, this will prevent the HPIB card from talking to instruments. If you have multiple HPIB cards listed in the device manager, simply click on the card you wish to get rid of and press the delete key. You will need to reboot the PC and power cycle all the instrument modules after deleting the extra 82341C HPIB card.

3. **Double-check the HPIB addresses of all the devices on the HPIB device chain**. In several cases, a HPIB DIP switch was not completely set to the ON position. This will cause the SmartCard II+ to hang the HPIB and prevent any of the HPIB devices from talking to the new 82341C card.

4. **If the 82341C card is still not communicating, use the Edit VISA Config** panel to aid your troubleshooting. This button is located in the 82340/82341 Configuration panel. **WARNING:** Changing any of the settings inside of the VISA configuration will result in you having to de-install and reinstall the HPIB drivers. BE VERY CAREFUL WHEN ENTERING VISA CONFIG!!! Once in VISA configuration, press the **AutoAdd devices** button. An additional panel will appear that lists the devices on the HPIB chain. If no devices appear at this point, but the HPIB card appears in the device manager, the problem resides in the cabling of the HPIB devices. If devices appear, but one or more devices are missing, then power cycle the devices missing from the auto add panel. You may need to power those devices down and wait for their capacitors to bleed down before you power the instrument on again.

   NOTE: If an 82341C fails, Windows® 95 will report the following error message 82341C card not detected. This error message appears immediately upon bootup. If you look in **Device manager**,

the HPIB card will still be in device manager, but the card's icon will be red and clicking on the card will make the Windows® 95 system tell you that the card is not functioning correctly.

5. If, for any reason, you decide to reinstall the HPIB I/O Libraries (drivers), you must uninstall the program first using **Add/Remove Programs**. This is particularly true in Windows NT® 4.0 Workstation if Service Pack three is reinstalled for any reason.

The following is more contributed information as experienced by Agilent support engineers that include problems and solutions on PC's other than HP. It is included for interpretation and application by experienced engineers.

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HPIB SICL Drivers

If the 82341C card was ordered from HP, it could have the G drivers with the 82341C Card. The F.01.02 drivers are the only drivers that work with G1701AA, G1701BA, and G2710AA. *DO NOT USE the G drivers*.

HP 82341C HPIB with Dell Computers

Situation:

When installing the 82341C HPIB card on some Dell PC's running Windows NT®, there have been reports of a conflict between the I_O Config program that is used to configure the HPIB card and an audio driver that is enabled in the PC. When I_O Config is initiated either by itself or at the end of the HP IO Libraries installation, Windows NT® will completely hang-up or lock-up. This issue was reported with HP IO Libraries version F.01.02.

Solution:

The following steps should allow the I_O Config program to work:
1. First, the HP IO Libraries must be removed from the computer by going through Control Panel --> Add/Remove Programs.

2. The Dell Audio Driver named "cs32ba11" must be disabled in Windows NT by going to Control Panel --> Devices, then clicking on the cs32ba11 name, selecting Startup then Disable. Close the Devices windows and reboot the PC.

3. As the PC is rebooting, enter the system bios setup and also disable the audio driver in the bios. Once this is done, Shutdown and POWER OFF the PC.

4. Turn the PC back on and install the HP I/O Libraries.

5. The I_O Config should now function properly.

It has also been noted at this point that the I_O Config program reported no IRQ's available when using the **CONFIGURE** button. Also, when **AUTO ADD** was pressed, the HPIB card was added but with an IRQ of -1. To resolve this, delete the AUTO ADD'ed HPIB card entry and reboot the PC. Then you should be able to use CONFIGURE to manually add the card, adjusting the IRQ value as needed.

HP 82341C Card with Compaq DeskPro 6000, Pentium Pro

To get the Compaq DeskPro 6000, Pentium Pro to work with the 82341C HPIB card, use the following settings.

> SICL Interface Name: hp82341
> Bus Address: 30
> IRQ: 10
> LU: 7
> I/0: 250h

HP 82341C Card with Compaq DeskPro 6000 266MHz Pentium-II

We are currently NOT able to get a 82341C HPIB card to function with a Compaq DeskPro 6000, 266MHz Pentium-II.

HP 82341C Card with Gateway 2000 Model E3000-E3100

The following models of Gateway computers have been found to NOT work with 82341C HPIB cards.

> **Gateway 2000 Model E3000**
> **Gateway 2000 Model E3100**
> **Gateway 2000 Model E3200**

HP 82341C Card with HP Kayak PC

Care needs to be taken when installing the HPIB cards in Kayak PCs. It has been noticed that the connection between the HP-IB Board and the ISA Slot of the Kayak PCs does not have a lot of room. If the HP-IB board is not installed correctly, there may be communication problems. This has been reported by some of our field engineers.

HP 82341C Card with HP Vectra VL6/266

There are communication problems with the Vectra VL6/266 when using the 82341C card. This problem can be solved by changing the BIOS settings.

1. Enter the bios setup at startup by pressing the **F2** key when prompted.

2. set **'use pnp'** to **no**
3. set **'reset data configuration'** to **yes**
4. go to **advanced**
5. go **to ISA Resource Configuration** and reserve the **IRQ 9**
6. set the **memory hole** to **extended**
7. **Save** changes and **quit**.

Then you should be able to install or reinstall (after deleting) the I/O libraries and use the HP-IB installation utility.