3 A/D Converters

This section covers the basic installation instructions for our A/D converters: ADC500[1], ADC1000-ISA (and AVS-PC2000), ADC-1000-USB, AVS-USB2000/HR2000, ADC-2000-PCI, DAQ700 and SAD500[2]. Because A/D converter installation goes hand-in-hand with software installation, you will find directions for installing AvaSoft-Basic Spectrometer Operating Software included in this section. The A/D converters we offer are:

- **ADC1000 ISA-BUS A/D CONVERTER** is a high-speed, 12-bit, 8-channel, single-ended, half-length card that fits into a slot in a desktop PC and has 1000 kHz sampling frequency.
- **AVS-PC2000 PC PLUG-IN** is an AVS-S2000 mounted on an ADC1000 A/D card. This combination fits easily into an ISA-bus slot in the PC; has 1000 kHz sampling frequency.
- **ADC-1000-USB** 12-bit USB interface AD converter, 8-channel for USB and serial port connection for interfacing to desktop or notebook PCs and has 1 MHz sampling frequency.
- **AVS-USB2000/HR2000 USB interface** is a 12-bit, 8-channel A/D converter for USB and serial port connection for interfacing to desktop or notebook PCs and has 1 MHz sampling frequency.
- **ADC-2000 PCI-BUS A/D CONVERTER** is a high-speed, 12-bit, 8-channel, single-ended, half-length card that fits into a PCI slot in a desktop PC and has 2 MHz sampling frequency.
- **DAQ-700 PCMCIA A/D CONVERTER** from National Instruments is a 12-bit, 16-channel, single-ended card that fits into a credit card-size slot in a notebook PC and has 100 kHz sampling frequency.
- **SAD500 SERIAL PORT INTERFACE** is a 12-bit, 8-channel A/D converter for serial port connection for interfacing to desktop or notebook PCs and has 500 kHz sampling frequency.

3.1 ADC1000 ISA-bus A/D Converter (and AVS-PC2000)

The **ADC1000 ISA-BUS A/D CONVERTER** is a 12-bit, 8-channel, single-ended A/D card that connects our spectrometers to desktop PCs. The AVS-PC2000 has a 2048-element linear CCD-array fiber optic spectrometer mounted onto an ADC1000. This sturdy combination fits easily into a slot in the PC. The following are directions for installing your ADC1000 and AVS-PC2000. Because A/D converter installation goes hand-in-hand with software installation, you will find directions for installing AvaSoft Spectrometer Operating Software included in this section as well.

Each device in or connected to your computer is assigned specific settings; it's similar to giving each device its own name so that your computer will know what to call and how to recognize the device. In order for your ADC1000 or AVS-PC2000 to work as a device in your computer, it has to be assigned a Base Address setting and an IRQ setting. The default settings for each are:

<div align="center">

Base Address (I/O Range): 768 decimal (300 hexadecimal)

IRQ (Interrupt Request): 07

</div>

These default values are set on the A/D converter. There are dipswitches on the A/D board and their positions determine the values. These default values are set in the operating software as well. Most of the time, these default settings will work with your computer. However, if you have many devices installed in your computer, you may have a conflict; other devices may be using these settings. If there is a conflict with another device in your computer, you must change the positions of the switches on the A/D board. For the ADC1000 and PC2000, there is only one bank of switches on the A/D board: the Base Address may be changed via the first 6 switches and the IRQ may be changed via the last 3 switches. To first check your computer to see which settings are available, follow the instructions for the Windows system that you use.

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[1] Discontinued since August 2000

[2] Discontinued since January 2001

ADC-1000/AVS-PC2000 installation

For Windows 95 and Windows 98 Users: Find Available Base Address and IRQ Settings

1. Go to **Start | Settings | Control Panel** and double-click on the **System** icon.
2. Choose the **Device Manager** tab and double-click on "Computer" at the top of the list.
3. Under **View Resource**s, find available settings -- numbers unassigned to hardware. Note these available settings for both the Interrupt request (IRQ) and the Input/output (Base Address). When you first run AvaSoft, you must enter these values in the "Setup Hardware" dialog box. (Remember that Input/output settings are expressed in hexadecimal.)
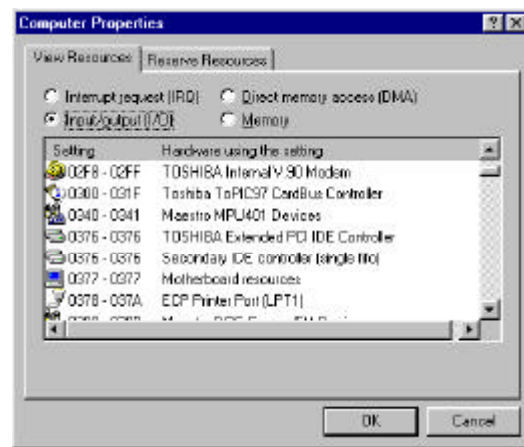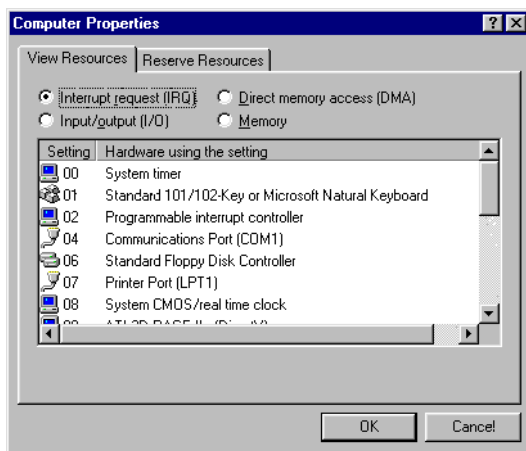
For most computers, the default settings work well. In the picture above left, it appears that the Printer occupies IRQ 07, so the IRQ needs to be changed to 05. All computers have multiple Base Address (Input/output) settings from which to choose.

### For Windows NT Users: Find Available Base Address and IRQ Settings

1. Go to **Start | Programs | Administrative Tools (Common) | Windows NT Diagnostic**s.
2. In the "Windows NT Diagnostics" dialog box, click on the **Resources** tab.
3. Select the **IRQ** button. Find an available IRQ -- a number unassigned to a device.
4. Select the **I/O Port** button. Find an available I/O Range (Base Address) -- a number or range of numbers unassigned to a device. (The number is in hexadecimal.)
5. Note these available settings. When you first run AvaSoft, you must enter these values in the "Setup Hardware" dialog box. With Windows NT, devices cannot share IRQ 's; each device must be assigned a unique IRQ.

For Windows 2000 Users: Find Available Base Address and IRQ Settings

1. Go to **Start | Programs | Accessories | System tools | System Information**.
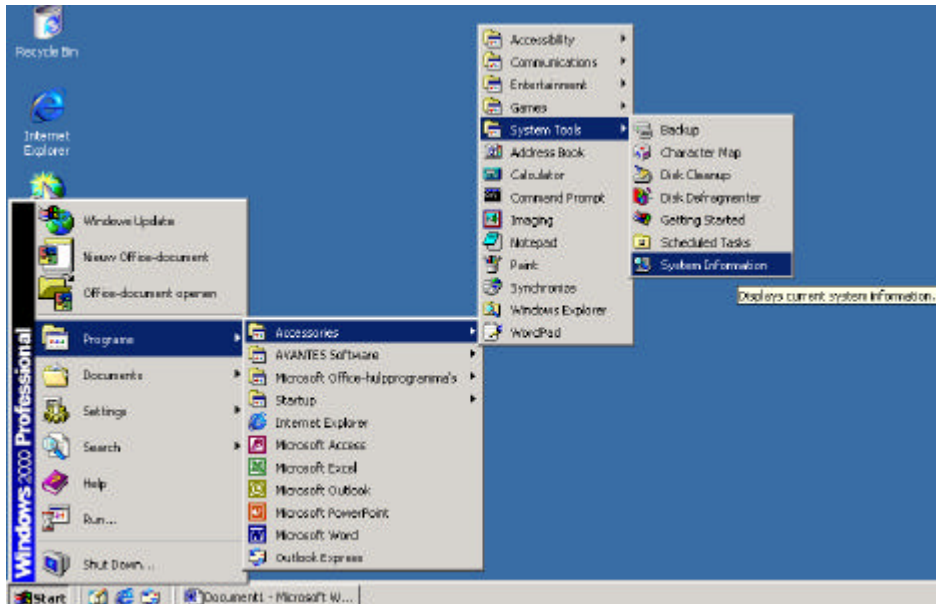
2. Click on the **Hardware Resources** folder.
3. Select the **IRQ** folder. Find an available IRQ -- a number unassigned to a device.
4. Select the **I/O** folder. Find an available I/O Range (Base Address). -- a number or range of numbers unassigned to a device. (The number is in hexadecimal.)
5. Note these available settings. When you first run AvaSoft, you must enter these values in the "Setup Hardware" dialog box. With Windows NT, devices cannot share IRQ 's; each device must be assigned a unique IRQ.

ADC-1000-ISA/AVS-PC2000-ISA hardware installation

Installation of the ADC1000-ISA is similar to that of any PC card installation:
1. Ground yourself to the computer chassis or power supply.
2. Turn off and unplug the computer. Then take off the computer cover.
3. Remove the ADC1000-ISA from its static-shielded bag.
4. If necessary, change the position of the switches on the A/D board. Position the switches to match the available settings you found in the previous section -- numbers not being used by other hardware devices. The Base Address may be changed via the bank of switches labeled SW1 and the IRQ may be changed via the bank of switches labeled SW2.
5. See Table below for switch setting positions
6. Find an open ISA-bus slot and remove the slot protector.
7. Insert the ADC1000-ISA into an available expansion slot on the motherboard connector by *gently* rocking the card into the slot. Make sure the ADC1000-ISA is fully seated in the motherboard before screwing the tab on the ADC1000-ISA to the computer.
8. Reinstall the cover and reconnect the computer power cord.
9. For the ADC-1000-ISA: Connect the D37 end of the interface cable to the ADC1000-ISA and the D25 end of the interface cable to the spectrometer.

Base Address (SW1)

To change the Base Address settings on the ADC1000-ISA board, see the bank of 6 dip switches labeled SW1. Switches in the ON position have a value of zero. Switches in the OFF position have the decimal values shown. The Base Address is the sum of the values of the switches. In the default setting, switches 5 and 6 are added to give a total of 768. A few of the many combinations for Base Address settings are below.

Example: 768 decimal = Hex300 = 0x300 (Default Setting)

Switch #	1	2	3	4	5	6
on	■	■	■	■		
off					■	■

Example: 784 decimal = Hex310 = 0x310

Switch #	1	2	3	4	5	6
on		■	■	■		
off	■				■	■

Example: 800 decimal = Hex320 = 0x320

Switch #	1	2	3	4	5	6
on	■		■	■		
off		■			■	■

Example: 816 decimal = Hex330 = 0x330

Switch #	1	2	3	4	5	6
on			■	■		
off	■	■			■	■

Switch is in the on-upward position ■

IRQ Interrupt Request Settings (SW2)

To change the IRQ settings on the ADC1000-ISA/AVS-PC2000-ISA board, see the bank of 3 dipswitches labeled SW2. In the default setting, the IRQ is set to 7. Other combinations for IRQ settings follow.

IRQ 7 (Default Setting)

Switch #	7	8	9
on	■	■	
off			■

IRQ 3

Switch #	7	8	9
on			
off	■	■	■

IRQ 4

Switch #	7	8	9
on	■		
off		■	■

IRQ 5

Switch #	7	8	9
on		■	
off	■		■

IRQ 9

Switch #	7	8	9
on			■
off	■	■	

IRQ 10

Switch #	7	8	9
on	■		■
off		■	

IRQ 11

Switch #	7	8	9
on		■	■
off	■		

Switch is in the on-upward position ■