AD8403 Demo Board Instructions

Introduction:

This document describes the AD8403 Demo Board hardware and software for Windows 3.1. The board contains two units of the 10K ohm AD8403AR10, with associated circuitry, configured in different applications which can be controlled by a PC running Windows. The computer controls the variable resistor settings of the units from its printer port using the supplied cable. This allows easy programming of the serial data interface of the AD8403. The programmable resistor function of these parts demonstrates replacement of the mechanical potentiometer function on this evaluation board. The user must supply the main 5V power supply, signal sources, and measurement instruments.

Eight programmable resistors are controlled on this board. The first is configured with an op-amp to provide a non-inverting gain block. The second is used in an inverting amplifier. All three terminals of the third and fourth are available to users to try in their applications. The final four are used in an active filter block.

Hardware Setup:

The board is connected to the computer parallel-printer port using the cable supplied. A 5V power supply must be connected between the VDD and GND pins on the left side of the board, see *Figure 1&2*. A signal source, (AC or DC), must be connected to VIN for the amplifier and filter sections. This must be referenced to the on-board 2.5V level available on the left side of the board, which is used as the system ground reference level. Measurement of the outputs of the amplifier and filter sections are made by connecting voltmeters, scopes, etc. to the output pins on the right side of the board.

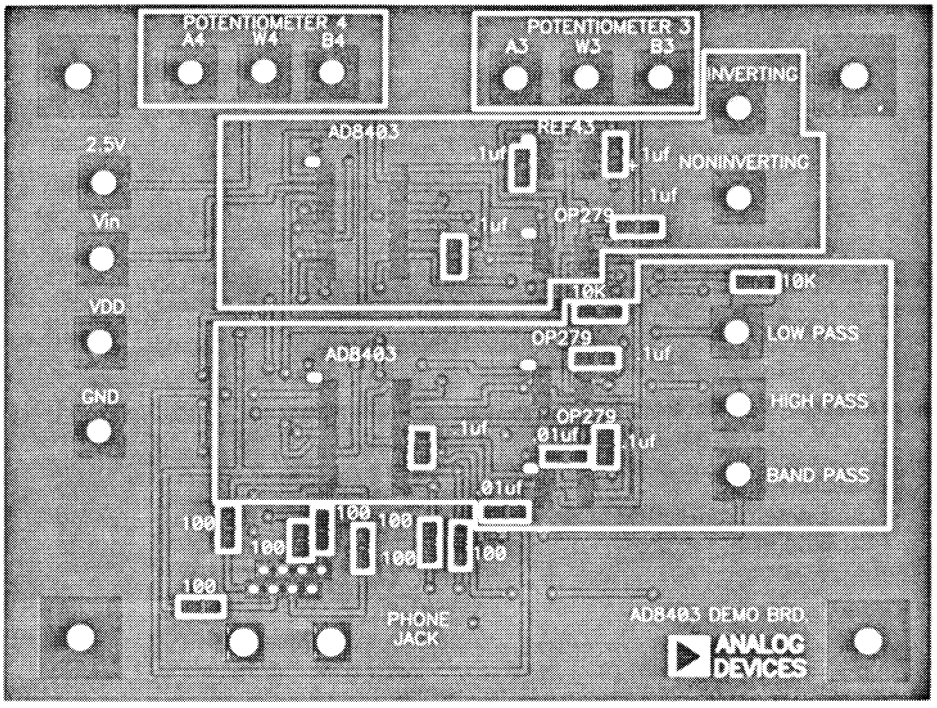


Figure 1 AD8403 Demonstration Board Layout

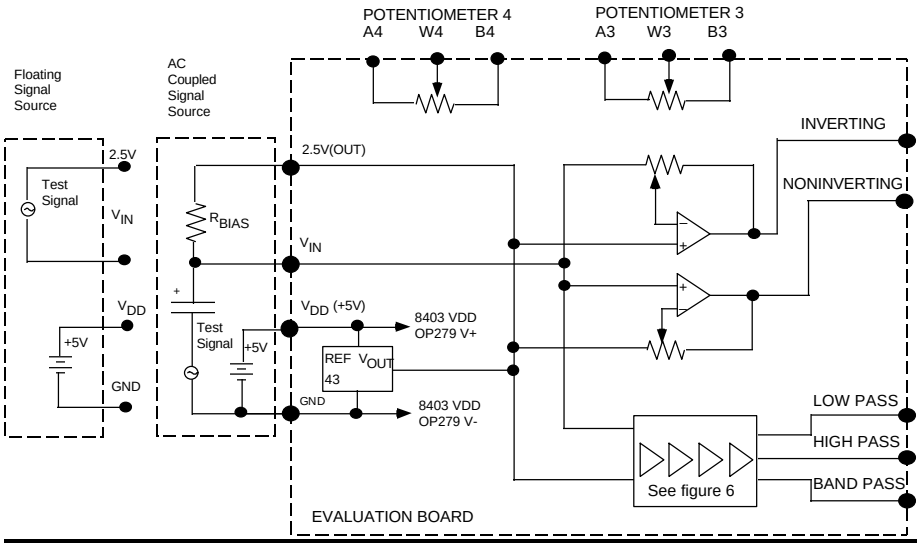


Figure 2 AD8403 Demonstration Board Schematic

Software Setup:

The software requires 850 Kbytes of hard disk space. Insert the diskette into the appropriate drive and run SETUP either from the File Manager or using the Run command in the File menu. For example, if the diskette is in drive a: type **a:\setup** at the Run prompt or double click on the SETUP.EXE file in the a: drive from the File Manager. The system prompts the user for the name of the directory which will contain the demo software. The default is AD8403. Press Enter if this is acceptable. A group called AD8403 will be created in Windows with a single icon.

Running the Demo:

Double click on the AD8403 icon to start the demo. This produces the default application which is a non-inverting amplifier, see *Figure 3*. The display consists of slider controls and buttons which set the resistor values, push buttons which control the shutdown and reset functions, displays of circuit parameters, and the circuit diagram. The screen also has pull down menus with the following functions:

Port: Directs control signals to LPT1 (address 378H), LPT2 (278H), or LAPTOP (3BCH) whichever is used by the user for this demo.

Demo: User selects which function he wishes to address; choices are Non-Inverting Gain, Inverting Gain, Potentiometer 3, Potentiometer 4, and Filter. The appropriate demo can be selected here, or by clicking in any of the R-1 to R-4 sliders when in that display selects that application.

Help: Displays the phone number for Applications Information.

Non-Inverting Gain:

This is the first application displayed (*Figure 3*) or it can be accessed from the Demo pull down menu. The R-1 slider controls the resistor setting. Dragging the blinking slider allows the user to set any setting between 0 and 255. Code setting can also be done by clicking on the PUSH button at the top of the slider. This produces a dialog box where the code in decimal is directly entered. Clicking on the arrows at the top and bottom of the slider decrements and increments the code respectively. Also clicking the mouse in the body of the slider moves the code in that direction.

The amplifier block gain in absolute and relative terms is displayed over the sliders. The SHDN button is a toggle switch. Clicking on this once places the unit in shutdown, while clicking again returns the unit to active. Clicking on the RS button resets the resistor to mid-scale. The slider symbol in the circuit diagram moves to indicate the position programmed by the digital data.

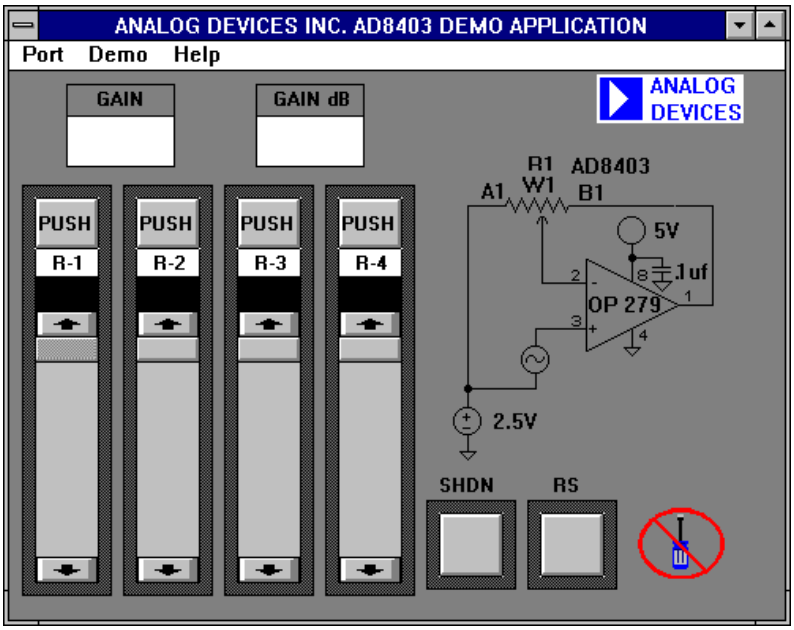
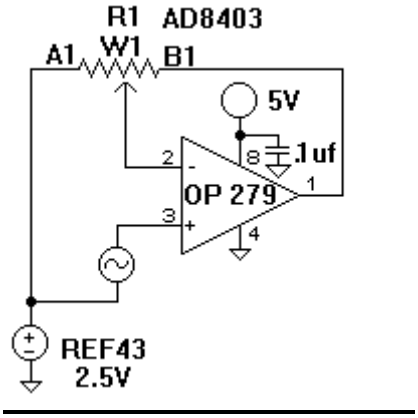


Figure 3 AD8403 Non-inverting Opamp Control Screen



Inverting Gain:

The R-2 slider controls this application (*Figure 4*). Controls are the same as the previous section.

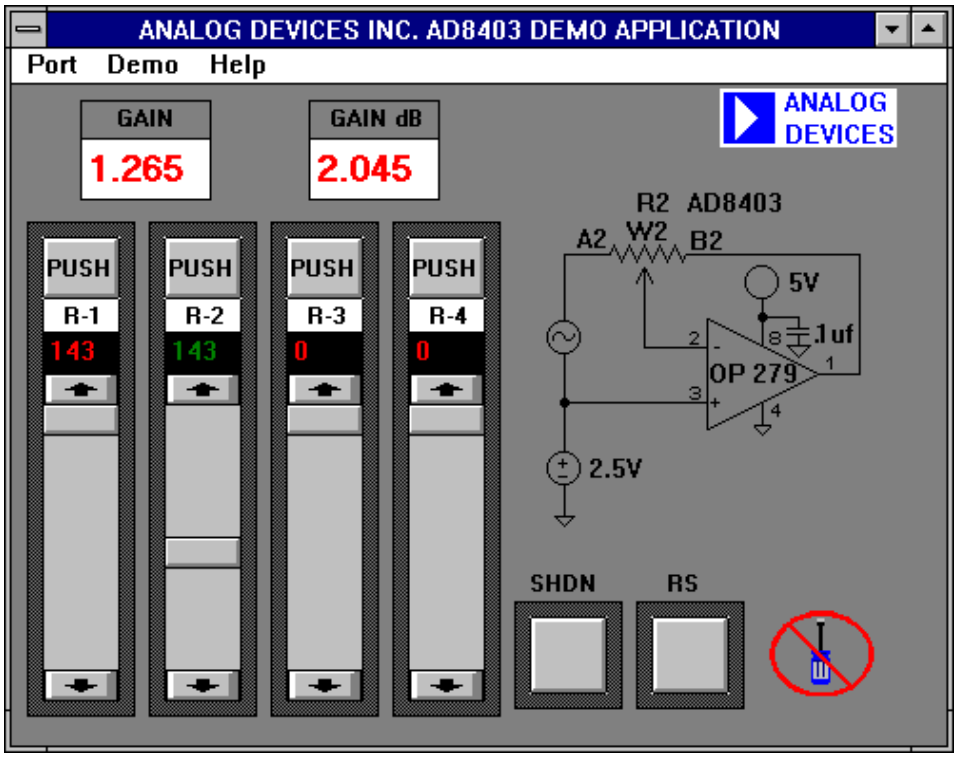
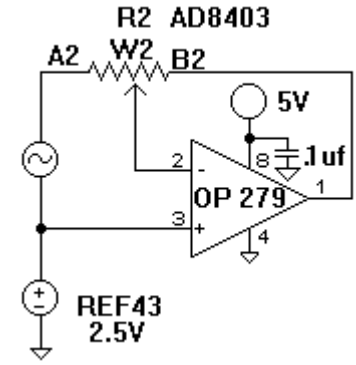


Figure 4 AD8403 Inverting Opamp Control Screen



Potentiometer 3 and 4:

R-3 and R-4 sliders control these settings (*Figure 5*). These are included to allow users to apply the part in their applications. Connection to the three terminals of these two variable resistors is available at the top of the board, see terminals labeled A3, W3, B3 and A4, W4, B4. When using these terminals the analog signals must remain between ground and the VDD supply voltage for proper operation.

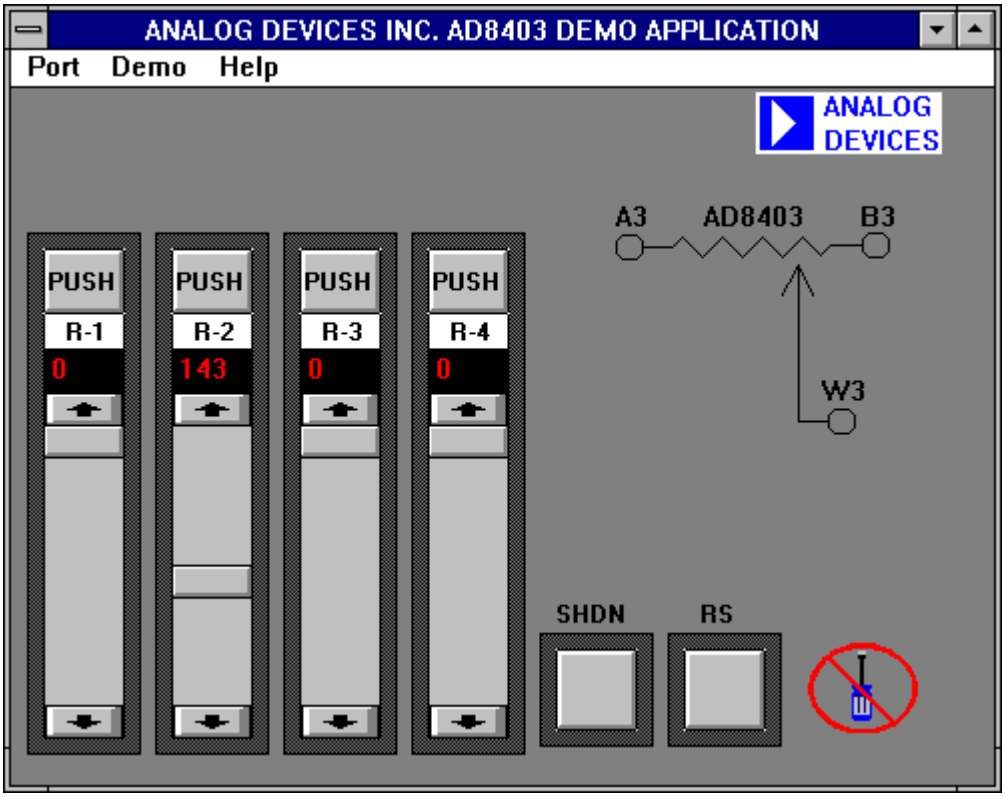


Figure 5 AD8403 Uncommitted Potentiometer Control Screen (#3 shown)

Filter:

Figure 6 shows the control panel of the state variable active filter. This is accessed from the Demo pull down menu. This circuit provides three forms of filtering low pass, high pass and bandpass to an externally provided signal connected to Vin. Three circuit parameters, gain, Q, and center frequency can be set by clicking on the appropriate push buttons and entering the values. The range of acceptable values are given in the dialog box.

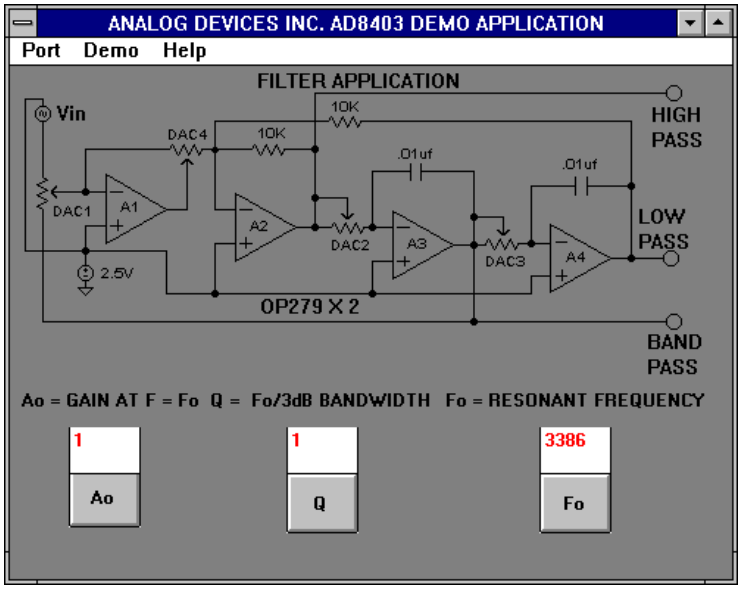


Figure 6 AD8403 State Variable Active Filter Control Screen