

Using The IB78 RS232 Interface Accessory For Automated Instrument Control

The IB78 allows you to control any computer-compatible Sencore instrument using the convenient RS232 serial port available on any computer without the added expense of a controller card. This method allows you to control one instrument at a time (two at a time if your computer has two serial ports). Plus, serial operation means you can use modems for remote site testing.

This Tech Tip reviews the equipment and software you need for automated instrument control using the IB78 and helps you get started testing with your automated test equipment.

Equipment Needed

The equipment you'll use for automated testing includes the Sencore computer-compatible instrument you wish to test with, the IB78 interface accessory, a cable to connect the IB78 to your computer, and your computer with a serial port. If you wish to perform remote tests over a phone line, you'll also need two modems.

Software Needed

You have a choice of three types of software to use with your IB78 serial interface to control your Sencore instrument. They are communications terminal programs, user-written programs, and commercially available instrument-control programs.

The first, and easiest to use, is a communications terminal program. This is the same type of program you would use with a modem for accessing electronic computer services or other computers over phone lines. You can use this software for instrument control whether or not you are using modems for remote interface.

Terminal programs are widely available, inexpensive, and generally easy to use. Some of the more popular programs include PROCOMM, CROSSTALK, MIRROR, and PC-TALK for MS-DOS machines; and RED RYDER for the Macintosh. Some integrated software packages such as Microsoft WORKS, and some word processors include communications capability. There

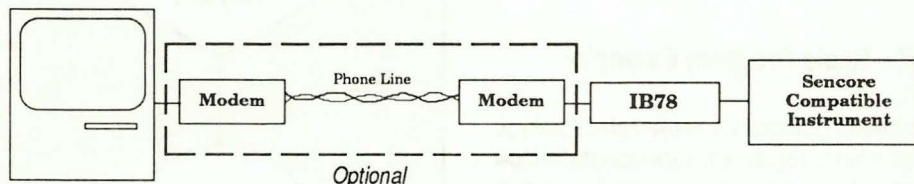
is also a wide variety of public domain communications software available, either on-line or through local computer groups.

Since terminal programs are readily available and easy to use, they are a good first choice of software to use to familiarize yourself with automated instrument control. This is the type of program to use for remote testing if you don't need the computer to automatically cycle the instrument through a predetermined test sequence.

When you need automatic program control for specific test routines, you will need either a user-written or commercial instrument-control program. If your automated test routine won't be changing often, writing your own control program may be your best alternative.

If the type of automated tests you need to make change often, you may want to consider a commercially available control program. Those programs make it easy to set up automated test routines and to change them without the time involved in writing your own control program.

Commercial instrument-control programs can be purchased from a number of vendors and be put to use almost immediately. The main drawback of this approach is the cost of the programs, which range upward from \$500. Programs with RS232 interface capability are available from National Instruments and Tektronix.



The IB78 allows you to easily connect your computer to your Sencore instrument for automated control.

Using The IB78 With A Terminal Program

Following is a simplified procedure you can follow to set up your Sencore instrument and IB78 interface with a terminal program.

1. Plug the IB78's attached cable into the accessory jack on the rear of your Sencore instrument.

2. Connect the IB78 to the serial port of your computer with either a straight thru or a null modem cable (same type used with a serial printer or modem).

3. Set all the IB78 rear panel DIP switches to their down position.

4. Select the baud rate on the IB78 (start at 1200 baud or lower on your first attempt).

5. Turn on your computer and boot your terminal software at the same baud rate.

6. Apply power to the IB78 and Sencore instrument. If you notice continuous clicking from the IB78, your computer port needs to be activated.

7. Hold in the TEST MESSAGE button. If the test message "Sencore model IB78" prints legibly on the screen, skip to step 12.

8. Press both the TEST MESSAGE and RESET buttons, then release the RESET button while continuing to hold the TEST MESSAGE BUTTON.

9. Watch for output activity, either on the computer's screen or on the DATA OUT indicator LED.

10. Release the TEST MESSAGE button and read the computer's screen for setup information.

11. Set the IB78's DIP switches to match any of the legible readings.

12. Type instrument commands on the computer keyboard. Switch the IB78's ECHO switch "on" if commands aren't displayed on the screen.

Once your equipment and program are running you simply type in the special three-letter control code for the test function you wish to activate. The results from your Sencore instrument will be returned to the computer and printed on the monitor.

Each time you send a command, one test result will be returned. If you wish to receive repeated readings from the instrument, send a Ctrl-R (type R while holding down the Control key). To return to single reading send a Ctrl-O.

Writing Your Own Instrument-Control Program

The programming language you choose for an instrument-control program is not critical. Any language you are familiar with, including assembly, Basic, C, Pascal, or others, will work as long as it gives you the capability to send to and receive from your computer's serial port.

Program Flowchart Example

To the right is a flowchart for an example control program to illustrate the basic parts of a program that you might write. This flowchart is for a simple program that commands an instrument to make one or more tests, print results to the screen, and repeat the tests if desired. Following are notes to explain the importance of each flowchart block.

Initialize Computer - Set up screen parameters and close any files that happen to be open yet.

Print Program ID - Print program identification to screen to aid user.

Set Parameters - Set serial port parameters.

Perform Tests - Send commands to instrument and receive test data back.

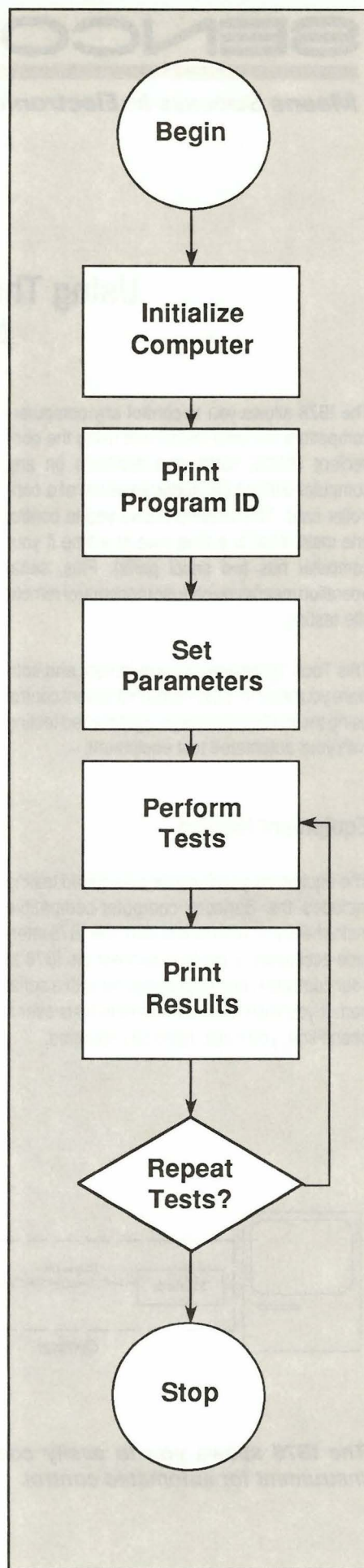
Print Results - Print test data to screen.

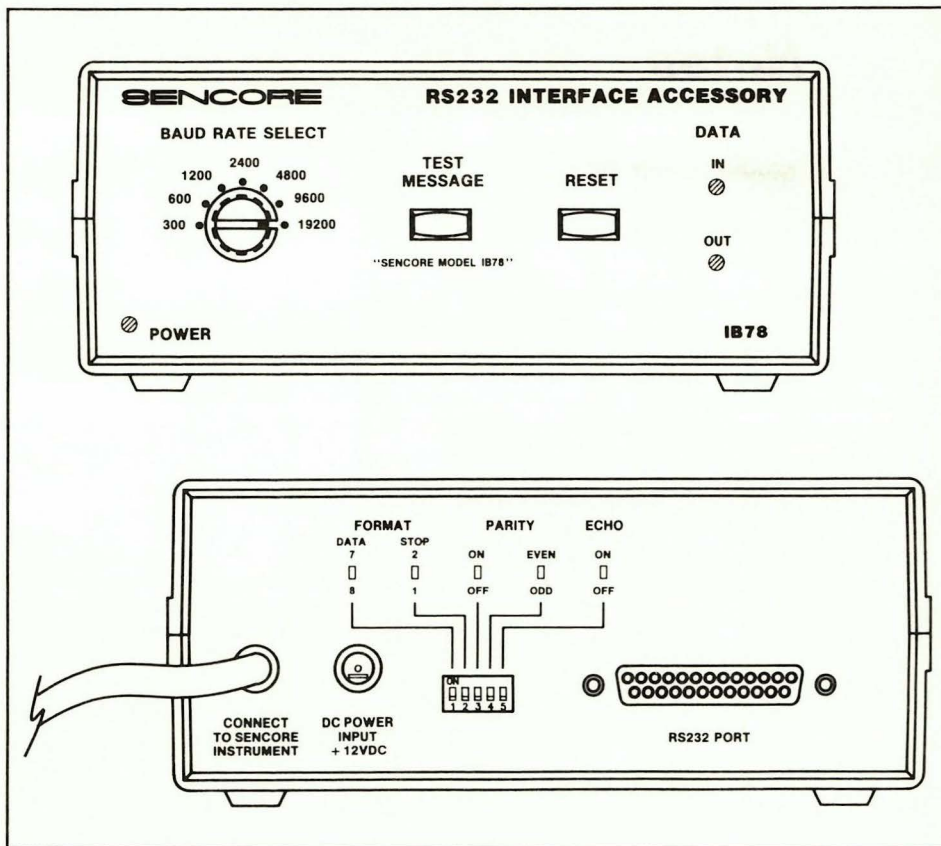
Repeat Tests? - Provide a choice to repeat the tests, with same or new commands.

Stop - Terminate program

GW—Basic Program Example

The following program is an example of how you would write a program corresponding to the flow chart just reviewed. The program is written in GW-BASIC, which runs on any computer using MS or PC-DOS. Immediately following the program listing are notes on each program line to help explain the purpose of each part of the program. Your own program will differ from this example depending on the type of tests you wish to perform and how you want to handle the test data you obtain.





140 Waits until the input buffer contains data

150-190 As long as data continues coming into input buffer, input data to variable and print to screen

210-220 Checks whether to repeat tests

230 Turns on function key display, clears screen, and closes files

240 Ends program

Using The IB78 With A Commercial Instrument-Control Program

Operation with a commercial control program depends on the design of the particular program you purchase. In most cases, after entering the commands for the Sencore instrument you wish to control, it is a simple matter to designate test sequences you want to have performed. Some programs are specially designed that the test data you obtain can be imported directly into your computer spreadsheet for analysis or reports.

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10 SCREEN 0,0 :KEY OFF :CLS
   :CLOSE
20 REM Program uses serial
   port COM1 and runs at
30 REM 1200 Baud, 8 Data Bits,
   1 Stop Bit, No Parity,
   Echo Off
40 LOCATE 4,30 :PRINT "IB78
   Program Example"
50 LOCATE 15,19 :PRINT "At the
   prompts, input valid
   commands for"
60 LOCATE 16,16 :PRINT "the
   Sencore instrument the
   IB78 is connected to."
70 LOCATE 20,1 :INPUT "First
   Control Command?";CTRL1$
80 LOCATE 22,1 :INPUT "Second
   Control Command?";CTRL2$
90 OPEN "COM1:1200,N,8" AS #1
100 CLS :IF NOT EOF(1) THEN
   A$=INPUT$(LOC(1),#1)
110 FOR X=1 TO 2
120 IF X=1 THEN X$=CTRL1$ ELSE
   X$=CTRL2$
130 PRINT #1,X$
140 IF EOF(1) THEN 140
150 WHILE NOT EOF(1)
160 A$=INPUT$(LOC(1),#1)
170 PRINT A$
180 FOR T=1 TO 6000 :NEXT
190 WEND
200 NEXT

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210 PRINT :INPUT "Repeat
   Tests?";R$
220 IF LEFT$(R$,1) = "Y" OR
   LEFT$(R$,1) = "y" THEN
   100
230 KEY ON :CLS :CLOSE
240 END

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10 Sets the screen to black and white alpha mode, turns off function key display, clears screen, and closes any open files

20-60 Identifies program

70-80 Inputs two control commands to be used

90 Opens serial port COM1 as file #1 with parameters of 1200 baud, no stop bits, and 8 data bits

100 Clears screen and clears serial input buffer

110-200 Sets up loop to send two commands and take readings from instrument

120-130 Sends commands to instrument

Notes

