

ADC-to-PC interface transfers data in nibbles

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THE CIRCUIT IN **Figure 1** uses a Centronics printer port to interface an eight-channel, 8-bit ADC to a PC. The circuit cuts the cost of addressing and decoder circuitry and saves one expansion slot for interfacing. The design uses three of the subport's various signals as control signals for channel selection, handshaking, and data transfer to the MAX158 ADC. These signals are programmable by means of a bit position in the control word of the respective port.

Two signals, P_Slct1 and P_Slct2, when high and low, respectively, select the MAX158 ADC. This arrangement overcomes any accidental-selection problem, which can happen when you use a single select bit. A falling edge at the RD and CS pins of the MAX158 initiates a conversion, and the read operation latches the

multiplexer address inputs, A₀ through A₂, for the channel selection. The level at the INT pin of IC₂ indicates the status of the conversion process. A low level at INT indicates that conversion process is over and that the converted digital data is available. The INT pin interfaces to the port through the D_Rdy signal. The corresponding software repeatedly samples this line to check its status. When D_Rdy is low, the PC reads the converted digital data through IC₁.

Only five input lines to the printer port are available, so the 8-bit data transfer occurs in two nibbles from IC₁. The higher or lower nibble is available when IC₁'s Pin 1 or Pin 19 is low, respectively. Under the control of the N_Slct signal, only one of these pins is low at once. The software then combines two nibbles to complete

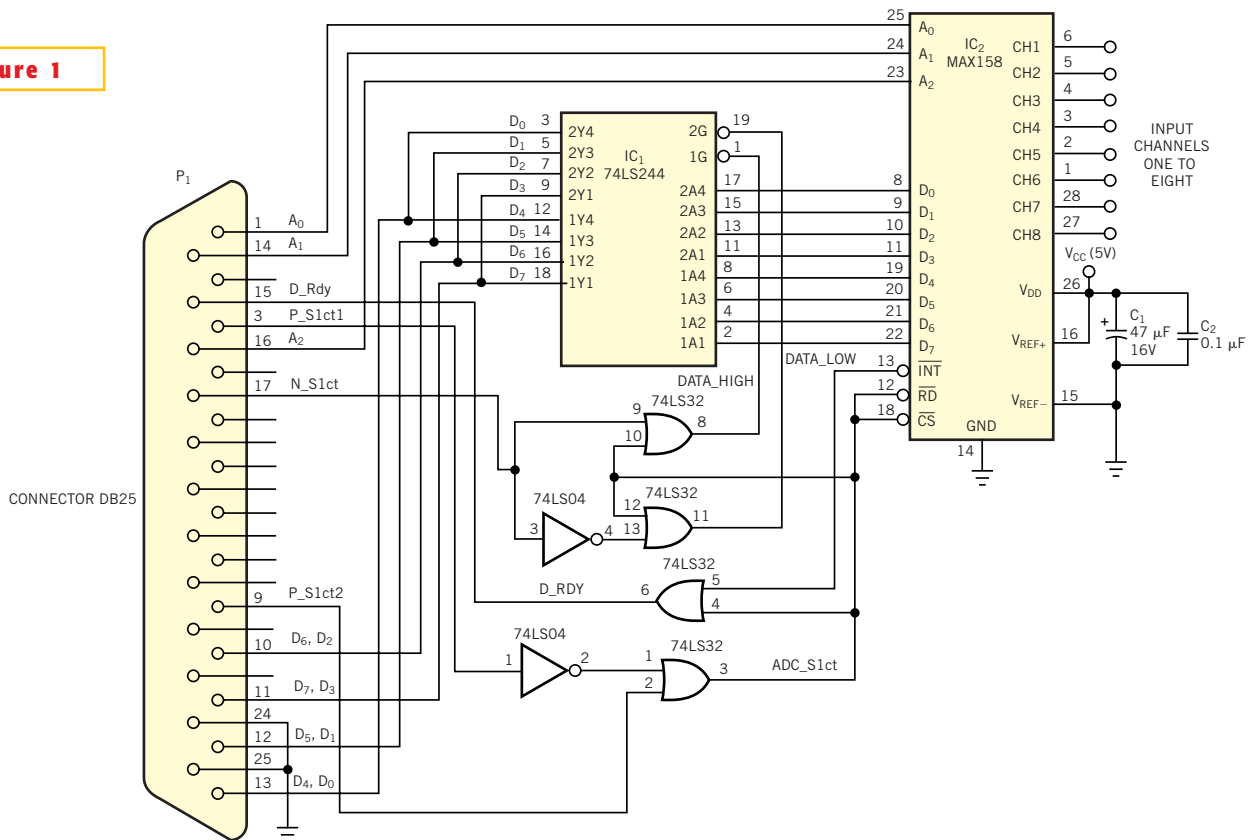
1 byte of data. The circuit uses the fifth input bit, which is the D_Rdy signal, to check the conversion status of IC₂.

V_{REF}⁺ and bypass capacitors C₁ and C₂ connect to a 5V input supply, which results in a full 0-to-5V conversion. A 7805 regulator (not shown) generates V_{CC}.

The accompanying C program works satisfactorily and can scan all the channels one after the other and print the converted data on the screen. You can download the program from EDN's Web site, www.ednmag.com. Click on "Search Databases" and then enter the Software Center to download the file for Design Idea #2448. (DI #2448)

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Figure 1



Only five input lines to the printer port are available, so the 8-bit data transfer from the ADC to the PC occurs in two nibbles from IC₁, under the control of the N_Slct signal from the PC.