



APPLICATION NOTE 1988

Circuit Enables PC-Based Voltage Measurements

Abstract: In its simplest form, the PC voltmeter consists of a 4-channel, 10-bit A/D converter (IC2) with a few passive components, connected to the PC printer port via a 25-pin male D-type connector.

In its simplest form, the PC voltmeter of **Figure 1** consists of section "A" alone: a 4-channel, 10-bit A/D converter (IC2) with a few passive components, connected to the PC printer port via a 25-pin male D-type connector. Power is derived from pins 2 and 3, and the circuit draws about 1mA.

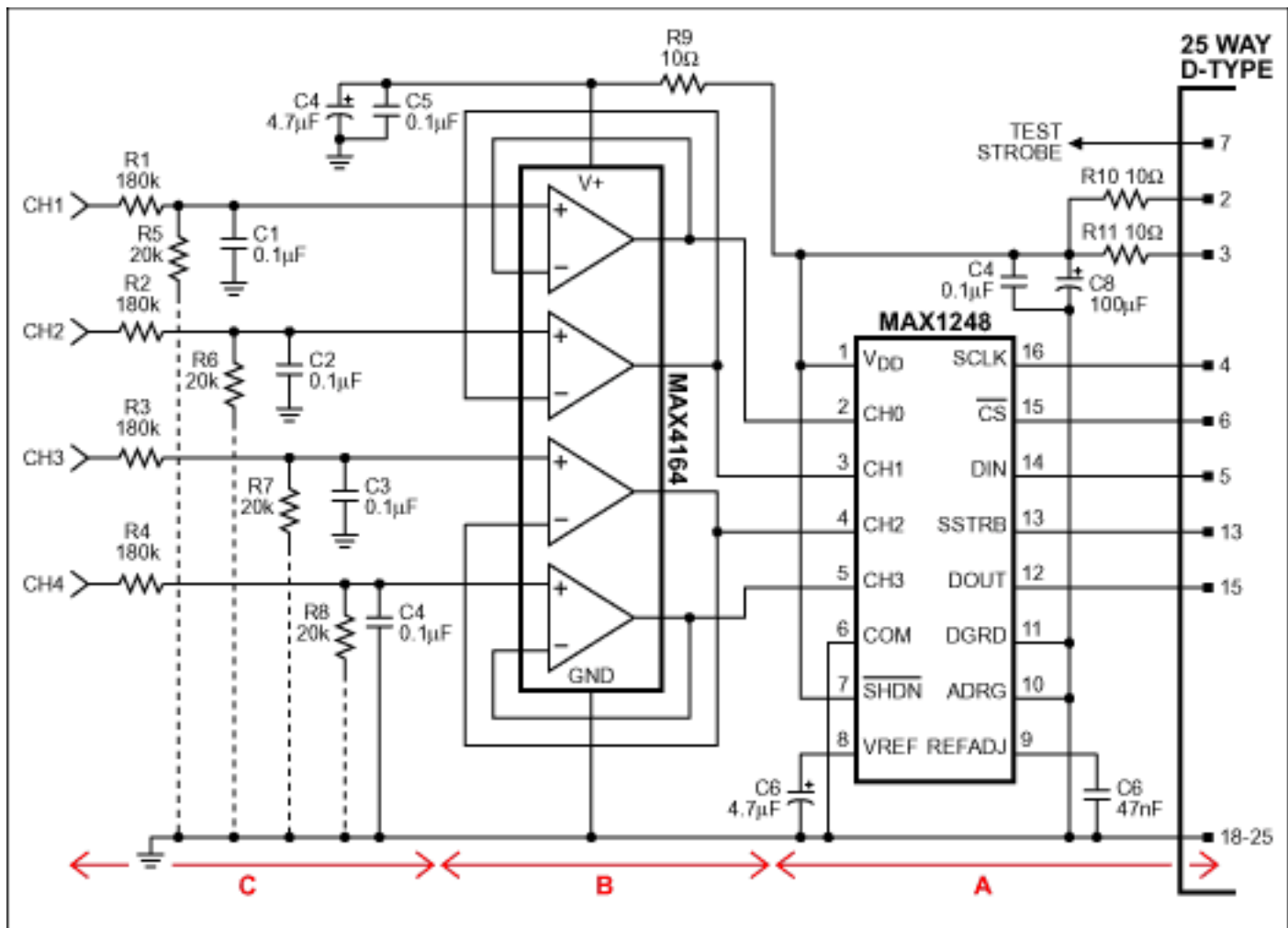


Figure 1. This circuit and the associated Q-BASIC listing enable a PC to monitor and measure the voltages on four input channels.

IC2's wide power-supply range (2.7V to 5.25V) allows operation from a variety of PC printer ports. The voltage at pins 2 and 3 is about 5V for a lot of desktop machines, but for portables it is more likely to be around 3V. IC2 handles them all. R10-R11 and C7-C8 filter the PC noise from this supply line. C6 and C9 decouple the 2.5V reference internal to IC2.

To maintain 10-bit accuracy, the source impedances driving the ADC inputs (pins 2-5) must be less than 3k Ω . If not, you can buffer these inputs by adding the "B" section to the circuit. This quad op amp (configured as four noninverting buffers) has rail-to-rail inputs and outputs, operates with supply voltages down to 2.7V, and draws about 25 μ A per amplifier.

To provide high-voltage protection, the op amps' very low bias current (1pA typical) allows 180k Ω resistors in series with each input without introducing excessive error (R1-R4 in section "C"). For additional (anti-aliasing) filtering you can add capacitors C1-C4, and to increase the full-scale range from 2.5V to 25V you can add R5-R8.

Other variations: You can substitute a 12-bit MAX1246 for IC2 in place of the 10-bit MAX1248, but for 12-bit accuracy you must restrict the supply voltage to the range 2.7V to 3.6V. Alternatively, you can substitute a 12-bit MAX1247 and add an external reference such as the MAX872, which gives a 2.5V output for input voltages down to 2.7V.

Two Q-BASIC listings are available, each written for the 12-bit circuit options. [Listing 1](#) scans the four channels and displays each input voltage on the screen. [Listing 2](#) displays the channel voltages, plots them vs. time on the screen, and lets you save the data to disk.

Application Note 1988: <http://www.maxim-ic.com/an1988>

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Related Parts

MAX1248: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

MAX4164: [QuickView](#) -- [Full \(PDF\) Data Sheet](#) -- [Free Samples](#)

AN1988, AN 1988, APP1988, Appnote1988, Appnote 1988

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