Not Recommended for New Installations.
Please contact Technical Support for more information.

Port-Powered Frequency Counter

Model 232FC

Introduction

The 232FC allows frequency measurements to be made with any RS-232 port. The unit can be powered from the port handshake lines making it a convenient, low-cost data acquisition tool. Software is included with the 232FC that allows sampling, data logging, and many plotting features.

Operation

The 232FC uses a counter to measure the pulse width of the input signal. The counter checks the state of the input signal approximately once every 1.3 μs. The values returned by the 232FC are actually counts of how many 1.3 μs timer ticks passed during each portion of the input signal. These values must be converted to "real time." Both the widths of the high and low states of the input signal are measured in units of timer ticks.

Four bytes are used to represent the signal. The first two bytes are the length of the high portion of the signal. The second pair of bytes are the length of the low portion of the signal. All values are measured in timer ticks and transmitted in hexadecimal format, lower byte first.

With this type of fixed resolution measurement, error increases with input frequency. In order to extend the maximum frequency range and decrease measurement error, the 232FC uses two modes of operation: Direct mode and Prescale mode.

Direct mode uses the 1.3 μs resolution to make frequency *and* duty cycle measurements at frequencies from 6 Hz - 50 KHz.

Prescale mode divides the input signal by a programmable divisor from 2 - 256. This greatly extends the frequency range, but duty cycle measurements are no longer possible as the signal is "squared up" by the divider. Measurements in this mode can be made from 24 Hz - 2 MHz.

Measurement Error

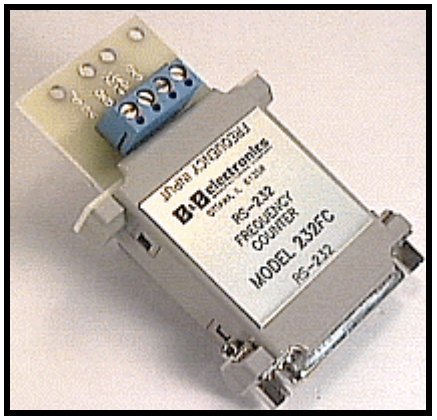
The measurement error or uncertainty of the 232FC is based on the sampling rate. The input signal is sampled every 1.3 μs. The maximum error possible is then equal to the sampling rate, or 1.3 μs. This is true regardless of input frequency or measurement mode. As the input frequency increases, 1.3 μs becomes a more significant fragment of the desired signal. So, while the measurement error remains constant, the percent error increases as the input frequency increases. Although this is true in both direct and prescale mode, prescale mode offers a large advantage in that the input frequency is reduced by the divisor (2 - 256).

Sample Programs

Sample programs are provided with the 232FC demonstrating the operation of the unit in QuickBASIC, Pascal, and C.

Specifications

Communications:
RS-232 DCE interface, 9600 baud, no parity, 8 data bits, 1 stop bit
Measurement Response Time:
One full period after the command is issued
Frequency Input Range: 6 Hz - 2 MHz
Input Low Voltage Maximum: 0.75V Divide Mode, 1.0V Direct Mode
Input High Voltage Minimum: 4.25V Divide Mode, 2.0V Direct Mode
Maximum Input Voltage: 20 V
Signal Input Current: $V_{in} \leq 5V$ $I_{in} = 4\ \mu A$
$V_{in} \geq 5V$ $I_{in} = (V_{in} - 5V) / 220\Omega$
Power Requirements:
Port powered: 15 mA maximum @ 5V
External power: 40 mA maximum @ 12V



NOTE: When using an external supply, the supply should be connected only to specifically labeled power inputs (power jack, terminal block, etc.). Connecting an external power supply to the handshake lines may damage the unit. Contact technical support for more information on connecting an external power supply to the handshake lines.

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