Transducer Measurement

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OVERVIEW
In many transducer types, quantitative changes in the input physical variable cause correspondent changes in output resistance or capacitance at the transducer electrical port, or in output signal directly (voltage or current). To convert those changes to digital values using the PIC12C5XX, the simplest and cheapest method is represented in measuring the frequency or the duration of the voltage ramp generated by charging and discharging external or transducer output capacitance. For faster measurements (to save energy, for example) ramp duration conversion is preferred. Conversion can be realized using the internal TMR0 timer, with internal clock (for lower cost). Conversion ends when the predetermined ramp voltage level is achieved (input pin change, provided by the analog comparator) or when timer overflow occurs. If the charging rate can be chosen to be sufficiently high, measurement speed is limited by the speed of software testing for the occurrence of any of those two ending events. This problem is more complicated by the absence of interrupt capabilities of PIC12C5XXs.

EXAMPLE 1: STRAIGHTFORWARD SOLUTION

WAIT: incfsz TMR0,W
btfsc GPIO, INPUT ; INPUT is '0' during conversion
goto EOC
goto WAIT

EOC: ...
APPENDIX A: SOFTWARE LISTING:

ORG 0x20

; incfsz TMR0,W
movf GPIO,W
movwf PCL
nop