

Low-Cost Glucose Meter Reference Design

Summary

Diabetes mellitus is a common health problem that is on the increase worldwide. Glucose meters are essential in assisting individuals with diabetes to adjust their medications and to better manage their health.

The PIC16LF1786-based Low-Cost Glucose Meter Reference Design from Microchip is an invasive device which uses the amperometric method for measuring glucose levels.

Highlights

The following are features of the PIC16F178X family as well as features highlighted in this demonstration:

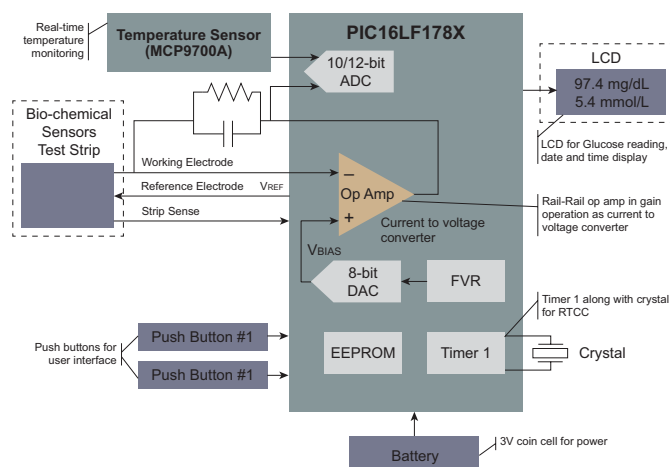
- eXtreme Low Power (XLP) operation
- Up to three operational amplifiers (rail-to-rail in and out)
- 8-bit Digital-to-Analog Converter (DAC)
- 12-bit SAR Analog-to-Digital Converter (ADC), up to 14 channels
- Up to 28 KB Flash, 2 KB RAM
- 256 Bytes of EEPROM
- Up to 4 × Programmable Switch Mode Controller (PSMC)
- Dedicated 16-bit PWM
 - Digital and/or analog feedback control of PWM frequency
 - Dead-band control/auto-shutdown and restart
- Up to 4 × fast comparators with selectable voltage reference
- I²C™/SPI/EUSART with auto baud
- Up to 3 × Compare-capture PWM
- MCP9700A temperature sensor



The analog front end—which incorporates an op amp, a precision ADC and a very accurate voltage reference—is embedded in the PIC16LF1786. Inbuilt DAC is used to properly bias the sensor. A Real-Time Clock/Calendar (RTCC) is used to record the time stamp, and the internal EEPROM stores up to 32 readings for later reference via the LCD. The XLP feature on this family of devices addresses the low power requirements.

This reference design enables you to develop a low-cost, low-power, handheld and portable glucose meter with user interface for everyday use.

Low-Cost Glucose Meter Block Diagram



Development Made Easy

Start with the FREE download of schematic and 'C' source code that can easily be modified to your specific application needs.

Downloads

- www.microchip.com/LowCostGlucoseMeter
- www.microchip.com/Medical
- www.microchip.com/PIC16F1786
- www.microchip.com/MCP9700A

Device	Program Memory Flash (words)	Data EEPROM (bytes)	Data SRAM (bytes)	I/Os ⁽²⁾	12-bit ADC (ch)	Comparators	Op Amps	DAC (8/5-bit)	Timers (8/16-bit)	Programmable Switch Mode Controllers (PSMC)	CCP	EUSART	MSSP (I ² C™/SPI)	Debug ⁽¹⁾	XLP
PIC16(L)F1782	2048	256	256	25	11	3	2	1/0	2/1	2	2	1	1	I	✓
PIC16(L)F1783	4096	256	512	25	11	3	2	1/0	2/1	2	2	1	1	I	✓
PIC16(L)F1784	4096	256	512	36	14	4	3	1/0	2/1	3	3	1	1	I	✓
PIC16(L)F1786	8192	256	1024	25	11	4	2	1/0	2/1	3	3	1	1	I	✓
PIC16(L)F1787	8192	256	1024	36	14	4	3	1/0	2/1	3	3	1	1	I	✓
PIC16(L)F1788	16384	256	2048	25	11	4	2	1/3	2/1	4	3	1	1	I	✓
PIC16(L)F1789	16384	256	2048	36	14	4	3	1/3	2/1	4	3	1	1	I	✓

Note 1: I - Debugging, integrated on-chip; H - Debugging, available using Debug Header
2: One pin is input only



MICROCHIP

www.microchip.com/LowCostGlucoseMeter

Visit our web site for additional product information and to locate your local sales office.

Microchip Technology Inc. • 2355 W. Chandler Blvd. • Chandler, AZ 85224-6199

Microcontrollers • Digital Signal Controllers • Analog • Memory • Wireless