



4-BIT MICROCONTROLLER

1. GENERAL DESCRIPTION

The W742E81A is a high-performance 4-bit microcontroller (μ C) that provides an LCD driver. The device contains a 4-bit ALU, two 8-bit timers, two dividers (for two oscillators) in dual-clock operation, a 40×4 LCD driver, six 4-bit I/O ports (including 1 output port for LED driving), and one channel DTMF generator. There are also five interrupt sources and 16-levels subroutine nesting for interrupt applications. The W742E81A operates on very low current and has one power reduction modes, that is the dual-clock slow operation, which help to minimize power dissipation.

2. FEATURES

- Operating voltage: 2.4V - 3.8V
- Dual-clock operation or single-clock operation (By option)
- Main-oscillator
 - Connect to 3.58MHz crystal or 400KHz that can be selected by option code
 - crystal or RC oscillator can be selected by code option
- Sub-oscillator
 - Connect to 32768 Hz crystal only
- Memory
 - 16384 x 16 bits program flash EEPROM (including 64K x 4 bit look-up table)
 - 2048 x 4 bits data RAM (including 16 nibbles x 16 pages working registers)
 - 40 x 4 LCD data RAM
- 24 input/output pins
 - Port for input only: 1 ports/4 pins(RC)
 - Input/output ports: 3 ports/12 pins(RA, RB & RD)
 - High sink current output port for LED driving: 1 port /4 pins(RE)
 - Port for output only: 1 port/ 4 pins(RF)
- Power-down mode
 - Hold function: no operation (main-oscillator and sub-oscillator still operate)
 - Stop function: no operation (main-oscillator is stopped but sub-oscillator still operates)
 - Dual-clock slow operation mode: system is operated by the sub-oscillator ($F_{OSC}=F_s$ and F_m is stopped)
- Five types of interrupts
 - Four internal interrupts (Divider0, Divider1, Timer 0, Timer 1)
 - One external interrupts (RC Port)
- LCD driver output
 - 40 segments x 4 commons
 - 1/4 duty 1/3 bias driving mode
 - Clock source should be the sub-oscillator clock in the dual-clock operation mode



- MFP output pin
 - Output is software selectable as modulating or nonmodulating frequency
 - Works as frequency output specified by Timer 1
- DTMF output pin
 - Output is one channel Dual Tone Multi-Frequency signal for dialling
- Two built-in 14-bit frequency dividers
 - Divider0: the clock source is the output of the main-oscillator
 - Divider1: the clock source is the output of the sub-oscillator or the $F_{osc}/128$
- Two built-in 8-bit programmable countdown timers
 - Timer 0: one of two internal clock frequencies ($F_{osc}/4$ or $F_{osc}/1024$) can be selected
 - Timer 1: with auto-reload function and one of three internal clock frequencies (F_{osc} , $F_{osc}/64$ or F_s) can be selected by MR1 register; and the specified frequency can be delivered to MFP pin
- Built-in 18/15-bit watchdog timer selectable for system reset; enable the watch dog timer or not is determined by code option
- Powerful instruction set: 1XX instructions
- 16-levels subroutine (include interrupt) nesting