Winbond Electronics Corp.

4-BIT MICROCONTROLLER

1. GENERAL DESCRIPTION

The W742C(E)811 [W742C811 is mask type, W742E811 is MTP(Multiple Time Program) type] is a high-performance 4-bit microcontroller (µC) that built in 640-dot LCD driver. The device contains a 4-bit ALU, two 8-bit timers, two dividers in dual-clock operation, a 40 × 16 LCD driver, ten 4-bit I/O ports (including 1 output port for LED driving), multiple frequency output, and one channel DTMF generator. There are also eleven interrupt sources and 16-level stack buffer. The W742C(E)811 operates on very low current and has three power reduction modes, hold mode, stop mode and slow mode, which help to minimize power dissipation.

2. FEATURES

- Operating voltage
  - 2.4V - 6.0V for mask type
  - 2.4V - 4.8V for MTP type
- Dual-clock operation
- Main oscillator
  - 3.58MHz or 400khz can be selected by code option
  - crystal or RC oscillator can be selected by code option
- Sub-oscillator
  - Connect to 32.768KHz crystal only
- Memory
  - 16384(16K) x 16 bit program ROM (including 64K x 4 bit look-up table)
  - 5120(5K) x 4 bit data RAM (including 16 nibbles x 16 pages working registers)
  - 40 x 16 LCD data RAM
- 40 input/output pins
  - Port for input only: 3 ports/12 pins
  - Input/output ports: 3 ports/12 pins
  - High sink current output port for LED driving: 1 port /4 pins
  - Port for output only: 1 port/ 4 pins
  - DC output port: 2 ports/ 8 pins (selected by code option)
- Power-down mode
  - Hold mode: no operation (main oscillator and sub-oscillator still operate)
  - Stop mode: no operation (main oscillator and sub-oscillator are stopped)
  - Slow mode: main oscillator is stopped, system is operated by the sub-oscillator (32.768KHz)

- Eleven interrupt sources
  - Four internal interrupts (Divider0, Divider1, Timer 0, Timer 1)
  - Seven external interrupts (RC.0-3, P1.2(/INT0), Serial Port, P1.3(/INT1))
- LCD driver output
  - 40 segments x 16 commons
  - 1/8 or 1/16 duty (selected by code option) 1/5 bias driving mode
  - Clock source should be the sub-oscillator clock in the dual-clock operation mode
  - 8 level software LCD contrast adjusting
  - LCD operating voltage source could come from Vdd or Vlcd1-pin input
- MFP output pin
  - Output is software controlled to generate modulating or nonmodulating frequency, normally as key tone generator
  - Works as frequency output specified by Timer 1
  - Key tone generator
- DTMF output pin
  - Output is one channel Dual Tone Multi-Frequency signal for dialling
- 8-bit Serial I/O Interface
  - 8-bit transmit/receive mode by internal or external clock source
- Two built-in 14-bit frequency dividers
  - Divider0: the clock source is the main oscillator (Fosc)
  - Divider1: the clock source is the sub-oscillator (Fs)
- Two built-in 8-bit programmable countdown timers
  - Timer 0: one of two internal clock frequencies (FOSC/4 or FOSC/1024) can be selected
  - Timer 1: with auto-reload function and one of two internal clock frequencies (FOSC or FOSC/64 or Fs) can be selected (signal output through MFP pin)
- Built-in 18/14-bit watchdog timer selectable for system reset determined by code option
- Powerful instruction set: 1XX instructions
- 16-level stack buffer
- Package type : 100-pin QFP