C8051F120 Timer & Counter Operation Modes (read text for details)

1. Dual Free Running Counters – TH0, TL0 (0x8C, 0x8A) TH1, TL1 (0x8D, 0x8B)
   8, 13, or 16 bits, counts SYSCLK cycles (divided by PRESCL value)
   [Random # Generator, BAUD Rate generator for UART0 & UART1]

2. Timer Overflow Interrupts & with Auto Reload or Manual Reload, T0 & T1
   Interrupt vector 0x000B (#1), TF0 (TCON.5); 0x001B (#3), TF1 (TCON.7)

3. Timer Output Compare: Programmable Counter Array
   6 channels available
   When 16 bit Counter matches 16 bits in Output Compare Register, a Flag, TFLGn, is set
   6 Sources available as an input to the 16-bit counter: SYSCLK, SYSCLK/4, SYSCLK/12, Timer 0 Overflow, External Clock/8, and ECI
   [Works as an alarm clock]

4. Timer Input Capture
   3 channels available: Timer 2, 3, & 4 (same as in 3 – shared resources)
   Several sources for clock: SYSCLK (with ÷2, ÷8, ÷12), External Clock, Another Counter, or an External Event
   Value save into specified register with TnEX pulse and a Flag, EXFn, is set
   Interrupt vector 0x002B (#5), TF2; 0x0073 (#14), TF3; 0x0083 (#16), TF4
   [May be used to measure period of a signal, save the time an event occurred (split)]
   6 Programmable Counter Array channels provide additional Capture options
   High-speed direct hardware output signals available

5. Pulse Accumulator
   Pulses input on crossbar Tn counted in 16-bit counter T2, T3, & T4
   Event counter
      Count pulses on T2 & T4

6. Timer 0 Overflow & PCA counters combined for 24- or 32-bit counters

7. Pulse Width Modulator: PCA0 on Programmable Counter Array PCA0CPMn
   6 channels of PCM output
   Operates in 8-bit & 16-bit PCM mode
   [Continuously variable control of DC Motors, Heaters, Lights, etc.]

Gated timer accumulator – NOT IMPLEMENED ON 8051
   Count (SYSCLK pulses gated by external signal (only count when signal is on)

Real-Time Interrupt – NOT IMPLEMENTED ON 8051
   Similar to Timer Overflow Interrupt except that the rate is programmable
   Separate Interrupt vector & priority number
   [Adjustable interval timer]