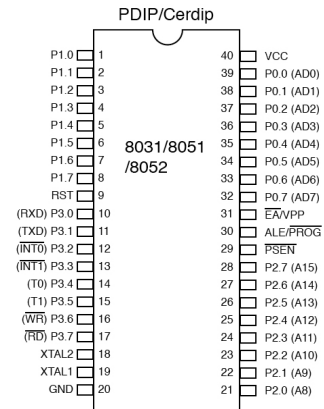


8051 Microcontroller: Timers & Ports



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EE-309: Microprocessors



Lecture 8 (04 Aug 2015)

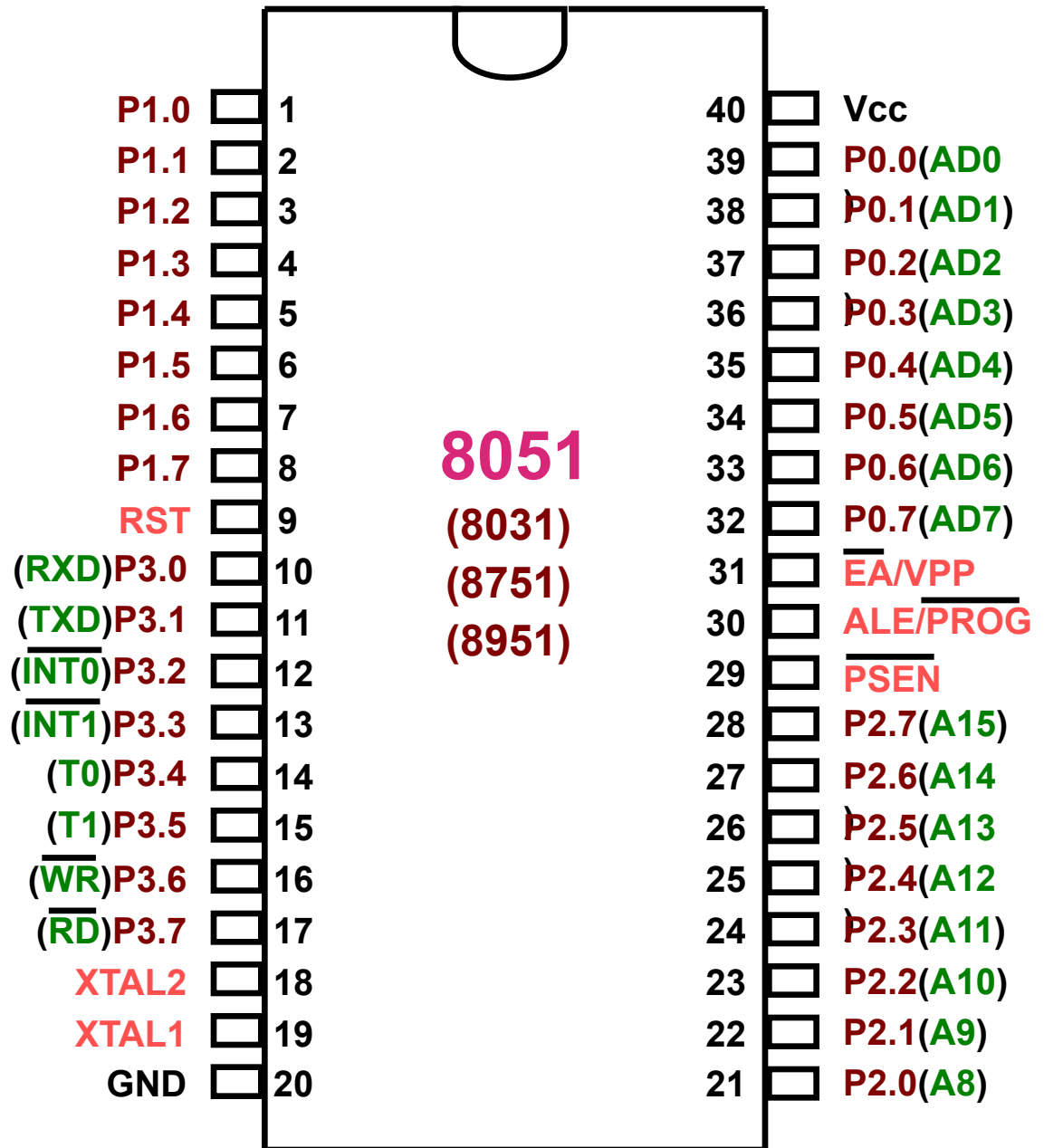
CADSL

8051 Timer/Counter Operation

- Software based
- Hardware based
- Hybrid (Software and Hardware)



8051 Pin Diagram



Hybrid Approach

- Two 16 bit timer/counter section



– MOV TL0, #FEH

- TCON Register



- TMOD Register



Application: Square wave Generator

```
                                MOV TMOD, #01
LOOP:                          MOV TLO, #0EEH
                                MOV TH0, #0FFH
                                CPL P1.0
                                ACALL DELAY
                                SJMP LOOP
DELAY:                          SETB TR0
AGAIN:                         JNB TF0, AGAIN
                                CLR TR0
                                CLR TF0
                                RET
```



Timer Implementation

- Load the TMOD register to set in timer mode
- Load register TL and TH with initial value
- Start the timer – by setting TR
- Keep monitoring the timer flag TF
- Stop the timer – by clearing TR
- Clear TF flag for the next round
- Go back to step 2 to load TL and TH again



Application: Measurement of Execution Time

- Timers are often used to measure the execution time of a program

ORG 0H

MOV TMOD, #16H ;initialization

SETB TR0 ;starting timer 0

... ;main

... ;program

CLR TR0 ; stop timer 0

MOV R7, TH0 ; reading timer 0

MOV R6, TL0



Thank You

