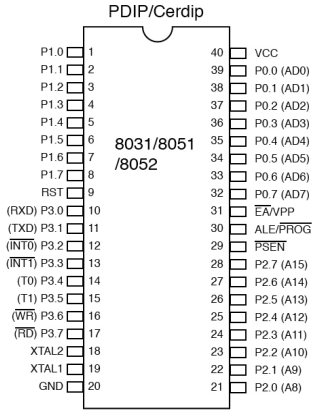
8051 Microcontroller:

Interfacing



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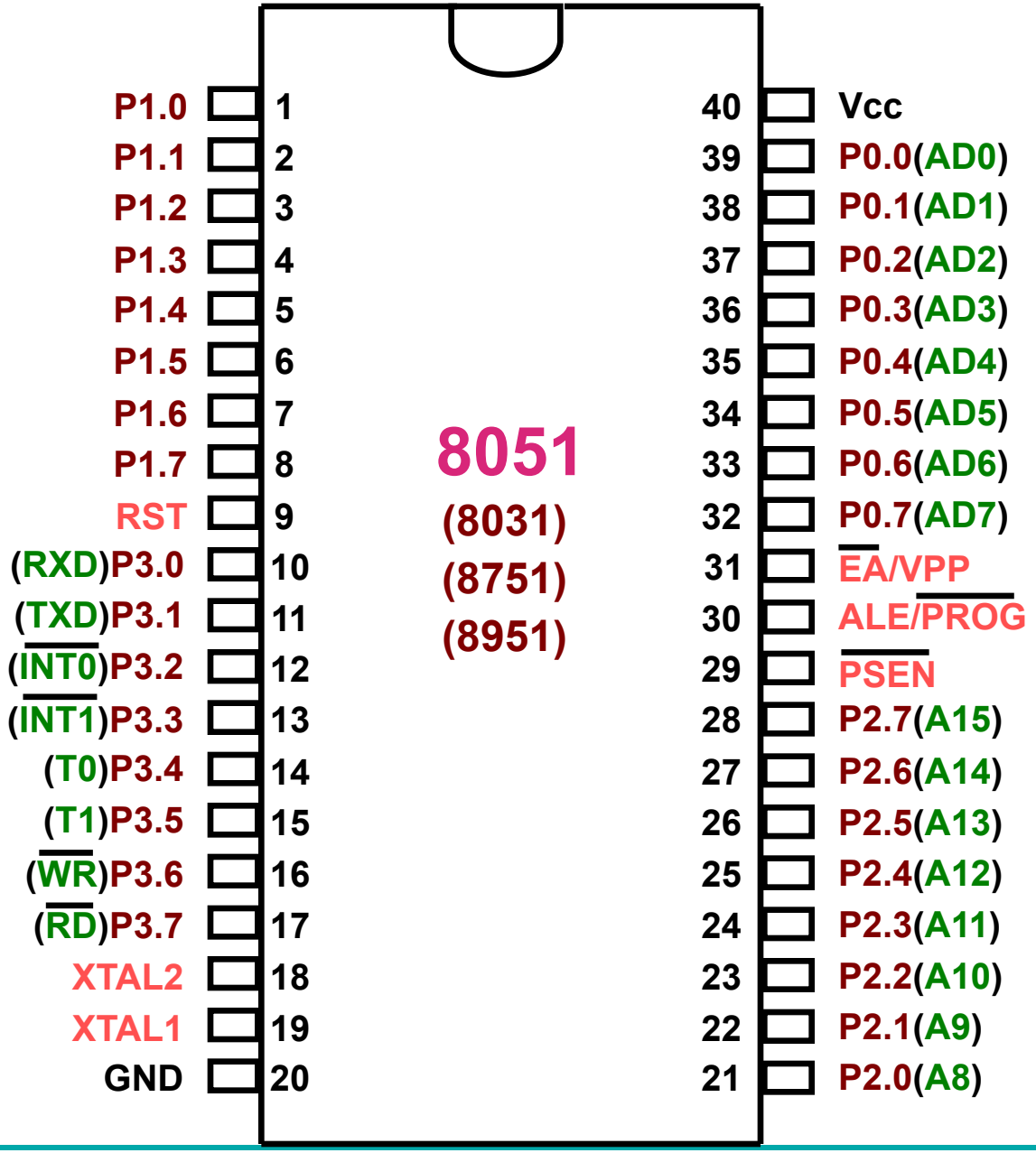
EE-309: Microprocessors

Lecture 12 (13 Aug 2015)

CADSL

8051 Pin Diagram



I/O Devices (Peripherals)

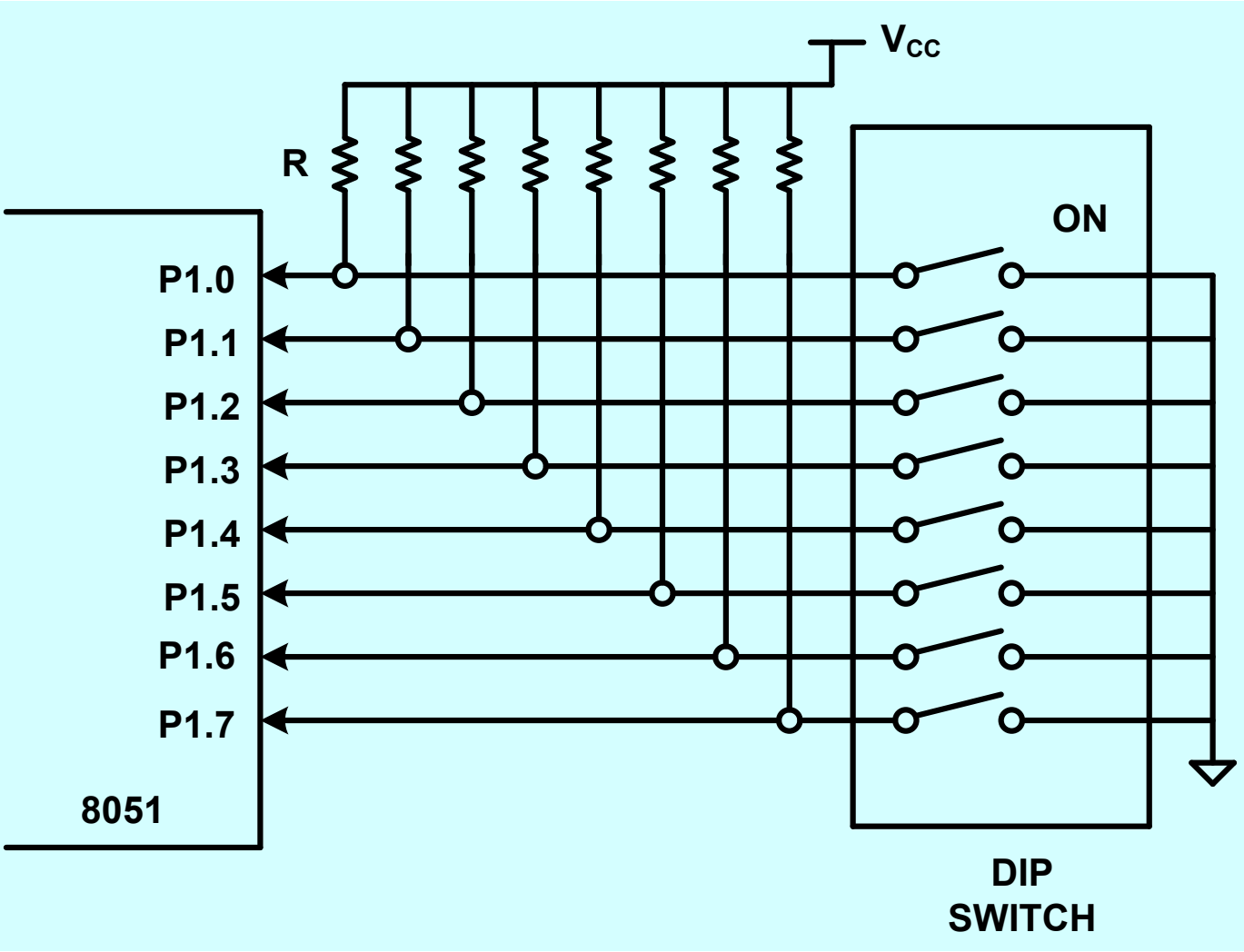
- Examples: switches, LED, LCD, printers, keyboard etc.
- Interface chips
  - are needed to resolve the speed problem
  - synchronizes data transfer between CPU and I/O device
- Connection of Interface and CPU
  - Data pins are connected to CPU data bus
  - I/O port pins are connected to I/O device
- CPU may be connected to multiple interface
- IO ports are simplest interface

I/O Interfacing

- Dedicated instructions for IO operations (Isolated I/O)
- Same instruction for memory and IO (memory-mapped I/O)
- 8051 is memory mapped

Keyboard Interfacing

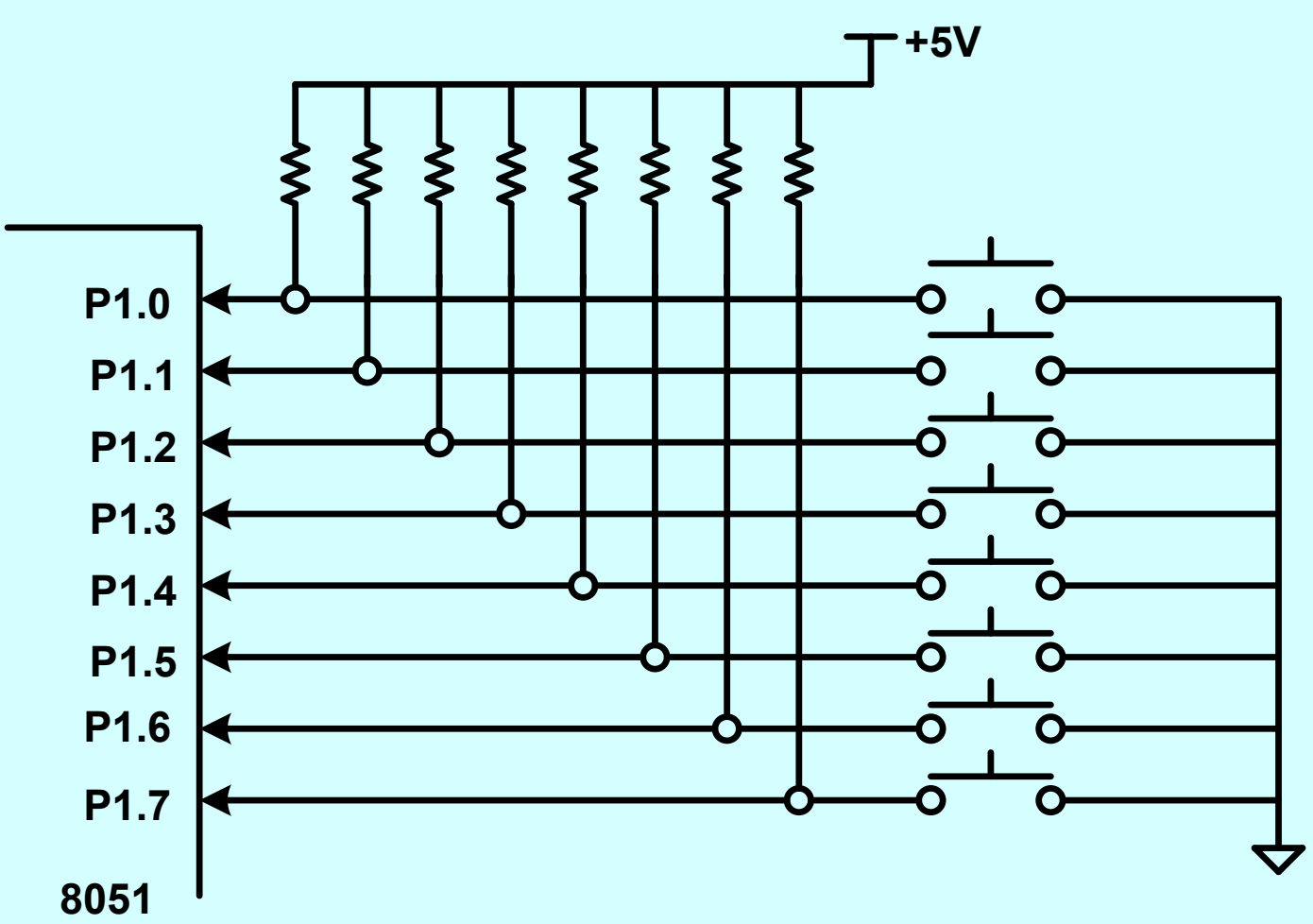
Interfacing Switches



Interfacing Keyboard

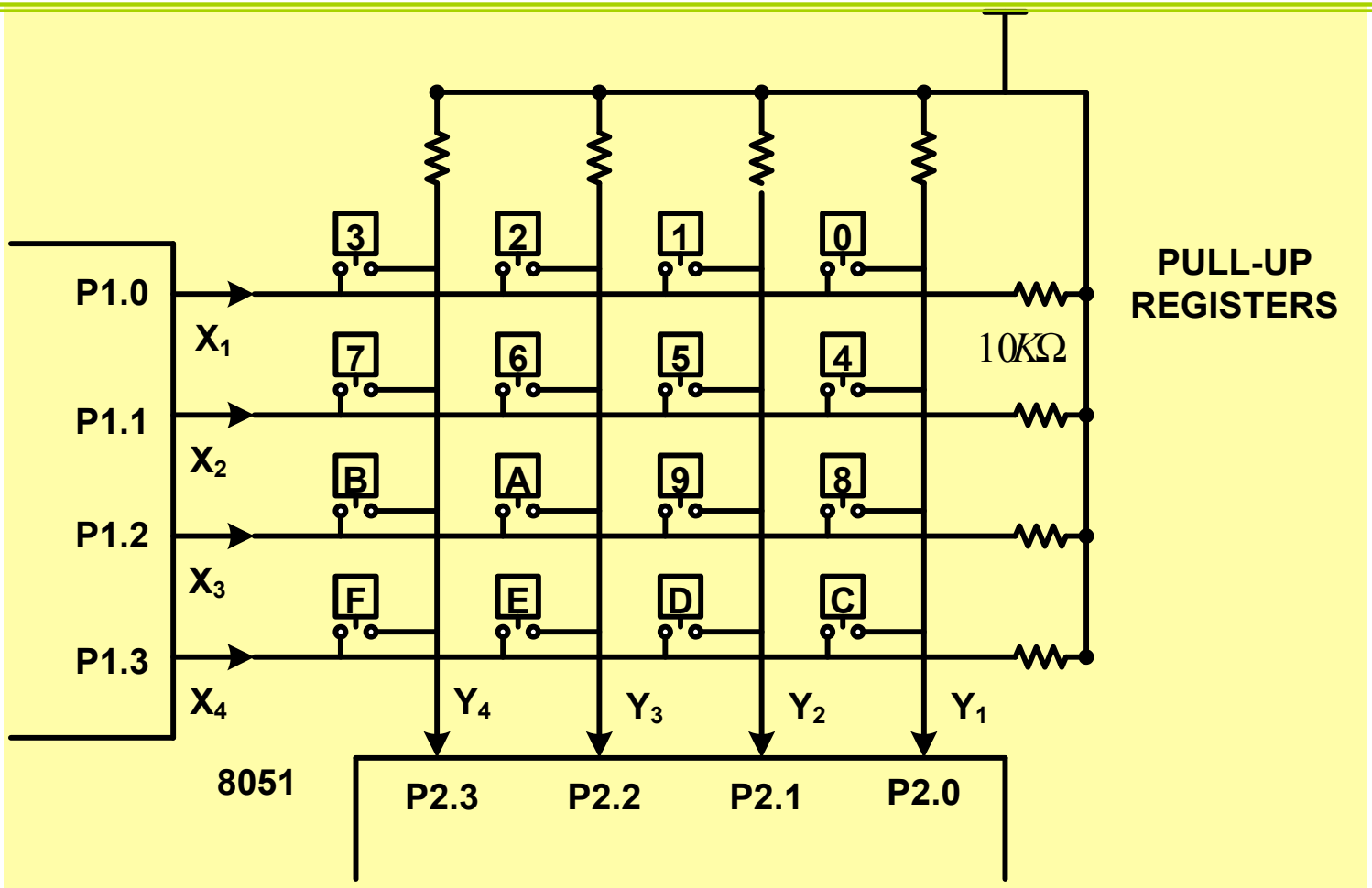
- Collection of keys interfaced to the microcontroller
- Arranged in the form of two dimensional matrix
- Matrix arrangement used for minimizing the number of port lines
- Junction of each row and column forms the key

Interfacing a Keyboard



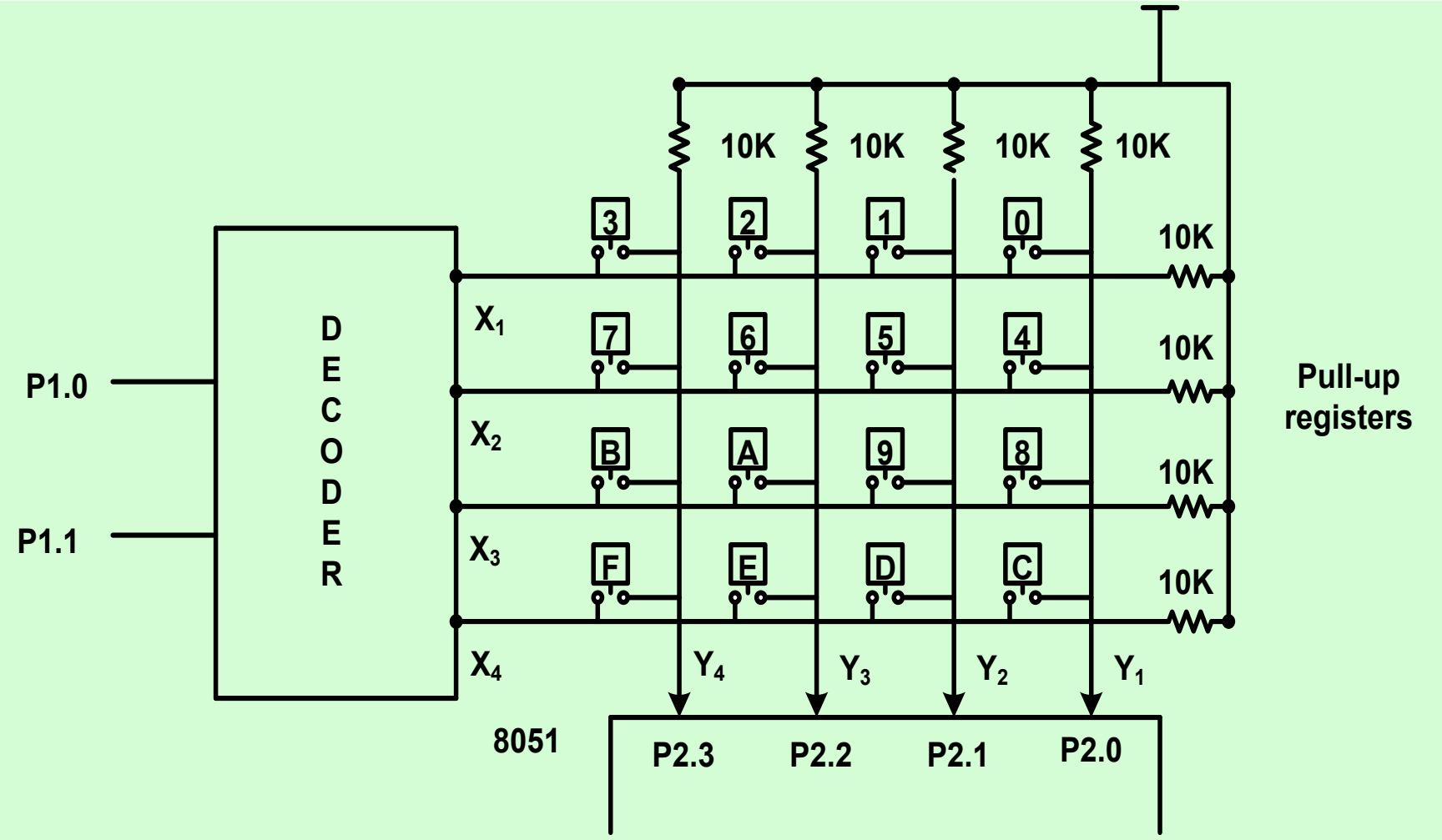
- One key per port line

Interfacing a Keyboard



- Keys are organized in two-dimensional matrix to minimize the number of ports required for interfacing

Interfacing a Keyboard



- Use of decoder further reduces the number of port lines required

Key Issues in Keyboard Interfacing

- Key bounce can be overcome using Software/Hardware approach
- Keyboard Scanning
- Multiple Key Closure

- Minimize Hardware Requirement:
  - Use of Keyboard Encoder
- Minimize Software Overhead

Thank You