ECE3120: Computer Systems Chapter 7: Interfacing with I/P Devices

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    - LEDs
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  - Interfacing with I/P devices
    - Switches
    - Keypad

Interfacing with DIP Switches

- Switches are often grouped together. It is most common to have four or eight switches in a DIP (Dual Inline Package) package.
- DIP switches are often used to provide setup information to the microcontroller. After power is turned on, the microcontroller reads the settings of the DIP switches and performs accordingly.

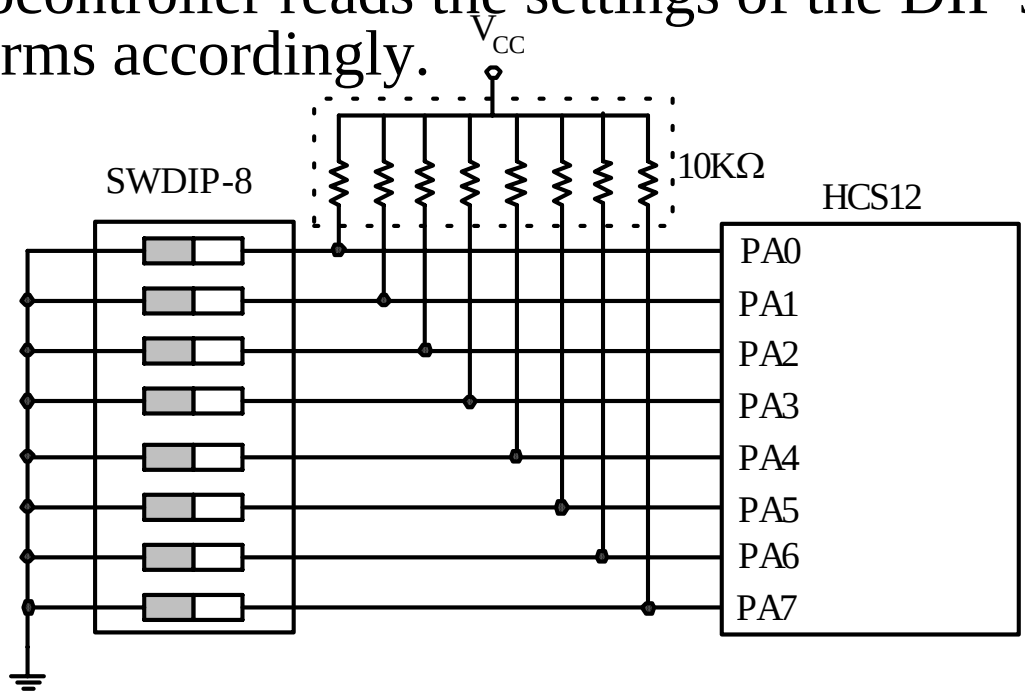

Figure 7.39 Connecting a set of eight DIP switches to Port A of the HCS12

Interfacing with DIP Switches

- Example 7.9 Write a sequence of instructions to read the value from an eight-switch DIP connected to PORTA of the HCS12 into accumulator A.
- Solution

```
#include “c:\miniide\hcs12.inc”
movb  #0,DDRA        ; configure Port A for input
ldaa   PTA           ; read Port A
```

Interfacing to a Keyboard

- A keyboard is arranged as an array of switches, which can be mechanical, membrane, capacitors, or Hall-effect in construction.
- Mechanical switches are most popular for keyboards.
  - Mechanical switches have a problem called contact bounce. Closing a mechanical switch generates a series of pulses because the switch contacts do not come to rest immediately.
  - In addition, a human cannot type more than 50 keys in a second. Reading the keyboard more than 50 times a second will read the same key stroke too many times.
- A keyboard input is divided into three steps:
  - Scan the keyboard to discover which key has been pressed.
  - Debounce the keyboard to determine if a key is indeed pressed. Both hardware and software approaches for key debouncing are available.
  - Lookup the ASCII table to find out the ASCII code of the pressed key.

Next…

- Interfacing with KeyPad
- Read Chapter 7.6