數位系統設計實習

Lecture 10

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實習課助教：鍾兆鋐

Outline

- VeriInstrument component: Key Board
  - Small / Regular Key Pad
- VeriInstrument component: Rotary Push Button

Key Board

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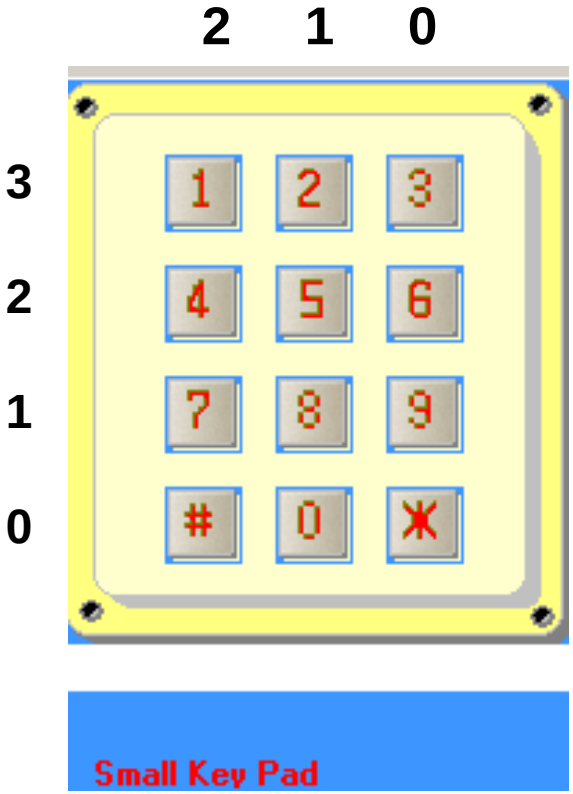
Small Key Pad

Input: Key button
Output: Row(4 bits), Col(3 bits)

Example:
Press “1” □ Output Row = 4’b1000,Col = 3’b100
Press “9” □ Output Row = 4’b0010,Col = 3’b001
Press “0” □ Output Row = 4’b0001,Col = 3’b010

Hardware define:
input [6:0] <name>; //{{Col/Row},{Row/Col}}
or
input [3:0] <nameR>; //Row
input [2:0] <nameC>; //Column



Key Pad (black)

Input: Key button
Output: Row(4 bits), Col(4 bits)

Example:
Press “1” □ input Row = 4’b0001,Col = 4’b0001
Press “0” □ input Row = 4’b0100,Col = 4’b0010
Press “E” □ input Row = 4’b1000,Col = 4’b0100

Hardware define:
input [7:0] <name>; //{{Col/Row},{Row/Col}}
or
input [3:0] <nameR>; //Row
input [3:0] <nameC>; //Column

Rotary Push Button

- VeriInstrument component: Key Board
  - Small / Regular Key Pad

- VeriInstrument component: Rotary Push Button

Rotary Push Buttom

Input: Rotary push button
Output: Array(11 bits)

Description:
Rotary Button 可旋轉 12 等份(12 ticks), 正中間點為 reset(所有output array為 ’0’)
順時針旋轉，array依次右移 1 bit。

Hardware define:
input [10:0] <name>;

Rotary Push Buttom

Input: Rotary push button
Output: Array(11 bits)

Example:

- Array = 11’b000_0000_0000

- Array = 11’b000_0000_0010

- Array = 11’b010_0000_0000