



## Experiment #24b: Expanding Inputs

This experiment demonstrates further expansion of BASIC Stamp inputs by cascading two shift registers.

(Schematic on next page)

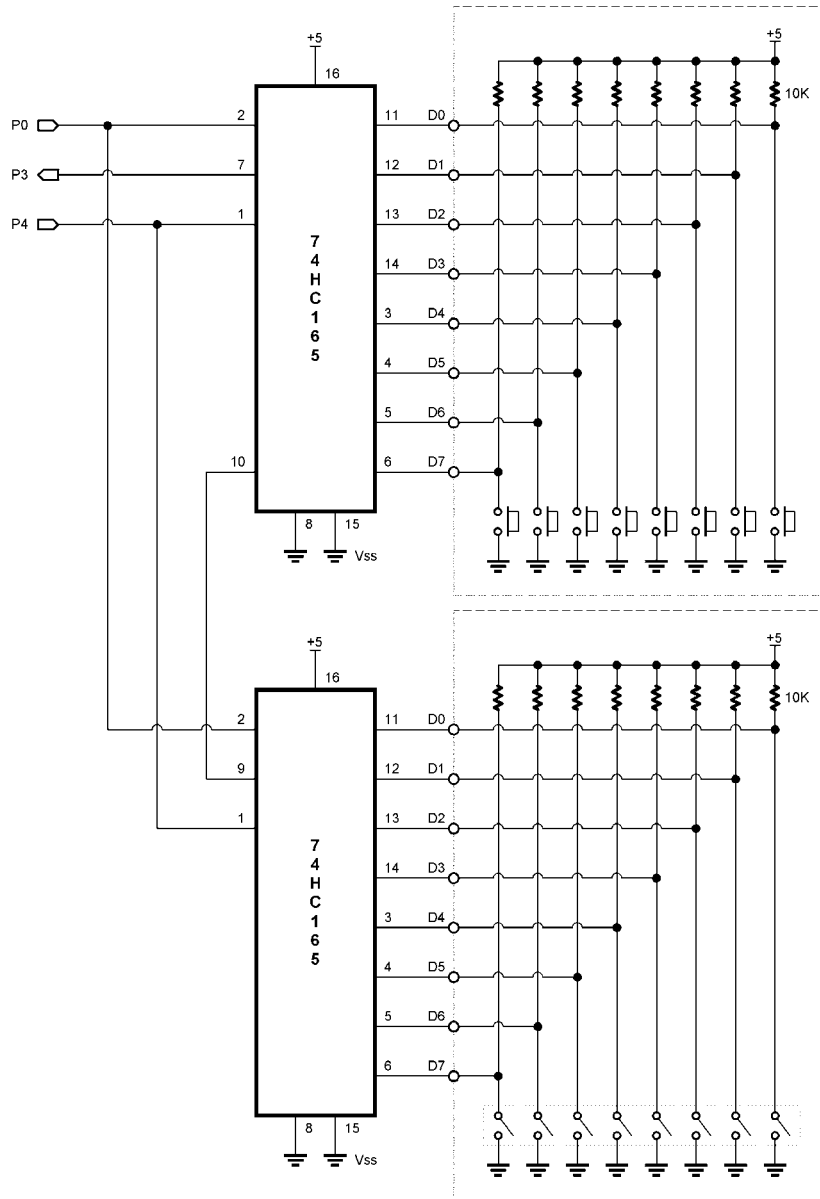
### Behind The Scenes

This program is very similar to 23b in that the Serial Output (pin 9) from one shift register is fed into the Serial input (pin 10) of the next device up the chain. Note that the non-inverted output is used on the second 74x165 because the inverted output of the device connected directly to the BASIC Stamp will take care of the inversion.

In the program the **Read\_165** subroutine has been updated to accommodate the second 74x165. The first **SHIFTIN** loads the data from the "buttons" shift register into the BASIC Stamp and transfers the contents from the "switches" shift register into the "buttons" shift register. The second **SHIFTIN** loads the "switches" data into the BASIC Stamp.

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### Building The Circuit (Note that schematic is NOT chip-centric)



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```
' =====
'
' File..... Ex24b - 74HC165 x 2.BS2
' Purpose... Input expansion with 74HC165
' Author.... Parallax
' E-mail.... stamptech@parallaxinc.com
' Started...
' Updated... 01 MAY 2002
'
'   {$STAMP BS2}
'
' =====
'
' -----
' Program Description
' -----
'
' This program shows how to read 16 inputs with just three Stamp pins using
' two 74HC165 shift registers.  The serial output (pin 9) from one 74HC165
' is fed into the serial input (pin 10) of the second.
'
' -----
' I/O Definitions
' -----
'
Clock          CON      0          ' shift clock (74x165.2)
DataIn         CON      3          ' shift data (74x165.7)
Load           CON      4          ' input load (74x165.1)
'
' -----
' Variables
' -----
'
switches       VAR      Byte       ' inputs switches
buttons        VAR      Byte       ' push button inputs
'
' -----
' Initialization
' -----
'
Initialize:
HIGH Load      ' make output; initialize to 1
```

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---

```
' -----  
' Program Code  
' -----  
  
Main:  
  GOSUB Read_165           ' read switches and buttons  
  DEBUG Home  
  DEBUG "Buttons = ", BIN8 buttons, CR   ' display binary mode  
  DEBUG "Swithces = ", BIN8 switches  
  PAUSE 100  
  GOTO Main              ' do it again  
  
' -----  
' Subroutines  
' -----  
  
Read_165:  
  PULSOUT Load, 5        ' latch inputs  
  SHIFTIN DataIn, Clock, MSBPre, [buttons] ' get buttons  
  SHIFTIN DataIn, Clock, MSBPre, [switches] ' get switches  
  RETURN
```