



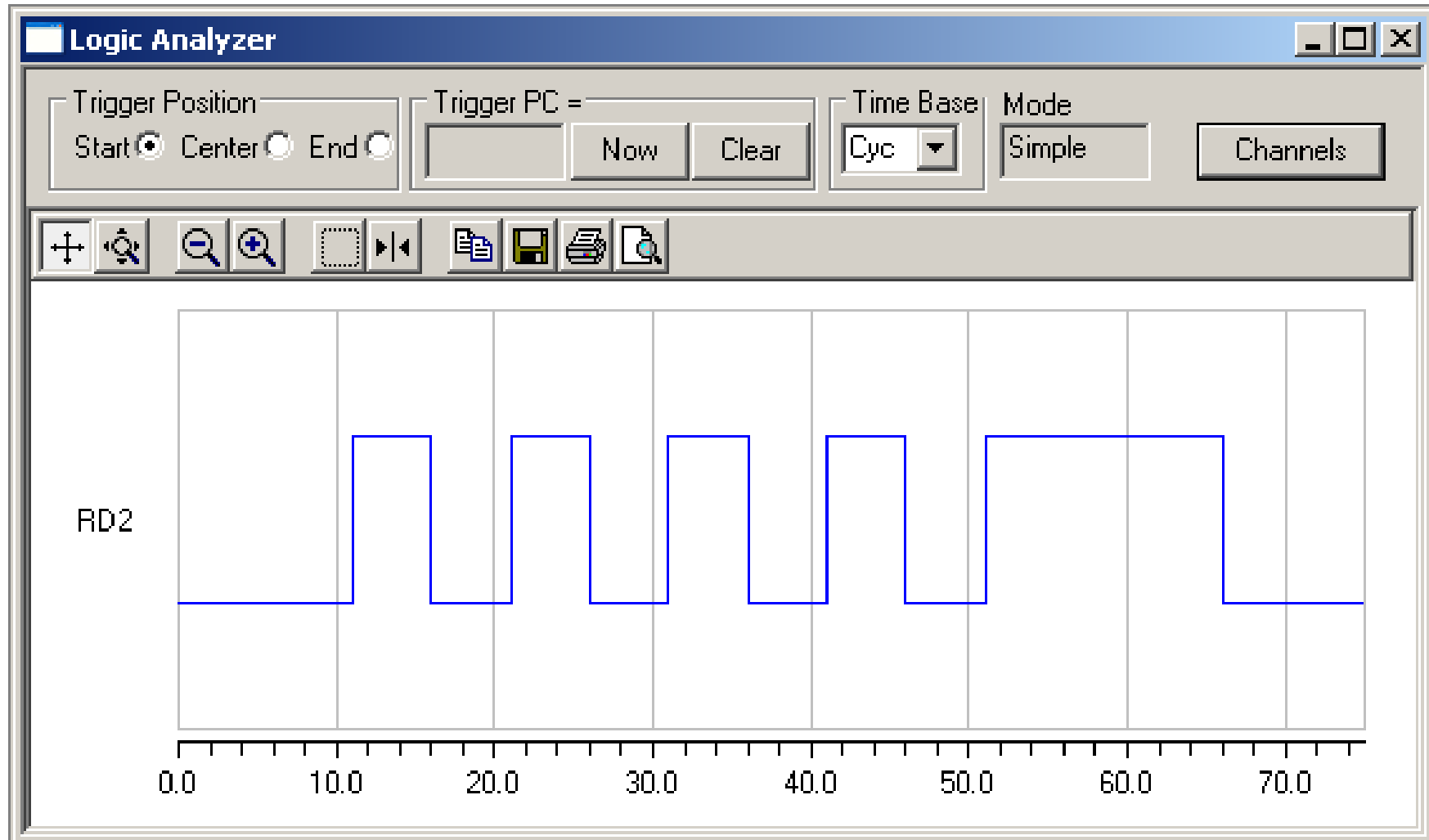
11015_MS2

MPLAB Simulators Advanced Stimulus

Lab 1

Key Bounce Lab 1

- Objective: Create pulse train triggered by Asynch stimulus





Key Bounce Lab 1

- **Open MPLAB® IDE**
 - Select menu item “Configure>Select Device”
 - Select a “pic18C442” device “OK”
 - Select menu item “Debugger>Select Tool>MPLAB SIM”

- **Open Stimulus window. ASYNCH event**
 - Select “Debugger>Stimulus>New Workbook”
 - Select “Asynch” tab
 - Select pin with drop down list “RD2” (Port D bit 2)
 - Select action “Pulse High”
 - Enter pulse width “60” cycles



Key Bounce Lab 1

- **Stimulus. SYNCH event**
 - Select the “Clock Stimulus” tab at the top
 - Enter an optional label if desired
 - Select the “RD2” pin from drop down under “Pin” column
 - Select “Low” from drop down under “Initial” state column
 - Set “Low Cycles” to “5”. Set “High Cycles” to “5”
 - Select the “Begin” box on the stimulus row. By default this will be set to “At Start”
 - Move down to the “Begin” dialog edit area (lower left)
 - Change from the “At Start” to the “Pin” option (radio button)
 - Select “RD2” in drop down list for the “Pin” to use



Key Bounce Lab 1

- **Stimulus. SYNCH event cont...**
 - Select “High” in the adjacent drop down box
 - The clock will begin when RD2 goes to a high state and the selections in the Begin area will be reflected within the “Begin” column above
 - Select the “End” box on the stimulus row. By default this will be set to “Never”
 - Move to the “End” dialog edit area (lower right)
 - Select the option to end on “Cycle” (radio button)
 - Set cycles to “50”
 - Select “from clock start” in the adjacent drop down box
 - The clock will end 50 cycles after the starting trigger and the selections in the End area will be reflected within the “End” column above
 - Optionally enter a comment within the stimulus row



Key Bounce Lab 1

- **Apply Synchronous Stimulus**
 - Select the “Apply” button at the bottom of the stimulus window
 - Select the “Asynch” tab in preparation to fire the asynchronous stimulus.
 - You are now ready to test



Key Bounce Lab 1

- **Testing. Write code for animation (simple loop)**
 - Open a new file, “File>New”. No real code needed for testing
 - Enter a tab then a “nop” on the first line
 - Enter a tab then a “goto 0” on the second line
 - Enter a tab then “end” directive on the third line
 - Select “Save”, give the file a name with an ‘asm’ extension
 - Select the menu “Project>Quickbuild” (file must be in focus)
- **Testing. Enable trace**
 - Select “Debugger>Settings” and check the box “Trace All”
 - Select the “Animation / Realtime Updates” tab. Set “animate step time” to 100 ms
 - Select OK at the bottom to close the settings dialog
 - This allows tracing of IO pin data so we can view it in the logic analyzer



Key Bounce Lab 1

○ Testing. Execution

- Select reset and then animate (double arrow icon in toolbar)
- Fire the Asynch stimulus “RD2 pulse high 60 cycles” from the Asynch tab in the Stimulus window
- Due to the animate speed being 0.1 seconds per step halt after about 6 seconds to allow the synch clock to complete

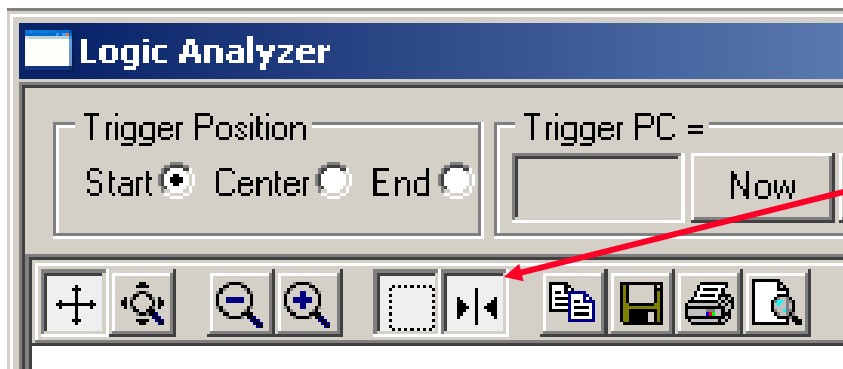
○ Testing. Verify input pulses

- Open the Logic Display “*View>Simulator Logic Analyzer*”
- Select the “Channels” button and select the “RD2” signal
- Press the “Add” button to add it to selected signals
- Click OK



Key Bounce Lab 1

- **Testing. Verify input pulses**
 - View the output of the RD2 wave form
 - If the Logic Analyzer is already open, you will see it update on each step during animation
- **Extra Objective**
 - Turn the cursors on within the Logic Analyzer and measure between the first and last rising edges
 - Is it what you expect?



Cursors