Lab2: Logic Analyzer

Lab 2: Logic Analyzer

- **Objective: Using Logic Analyzer**
  - Same program and stimulus as in Lab 1
  - Logic Analyzer

- **Open MPLAB IDE**
  - Double-click MPLAB icon on desktop

- **Bring up Lab 2 workspace**
  - Select menu item "*File>Open Workspace...*"
  - Choose "c:\masters\11014\Lab2\Lab2.mcw"
  - Select menu "*Project>Make*" to make the project

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Lab 2: Logic Analyzer

- **Use Logic Analyzer**

    - Select "*Debugger>Settings...*" and check the box "Trace All" in the "Osc / Trace" tab, then click OK

    - Select "*View>Simulator Logic Analyzer*"

    - Click the "Channels" button on the top right corner and go to the "Configure Channels" window

    - Select RA0 and T0CKI signals from the "Available Signals" column on left, then click "Add =>" button

    - Click OK

- **Use Stimulus**

    - Select "*Debugger>Stimulus>Open Workbook*" and choose Lab2.sbs to load the predefined stimuli
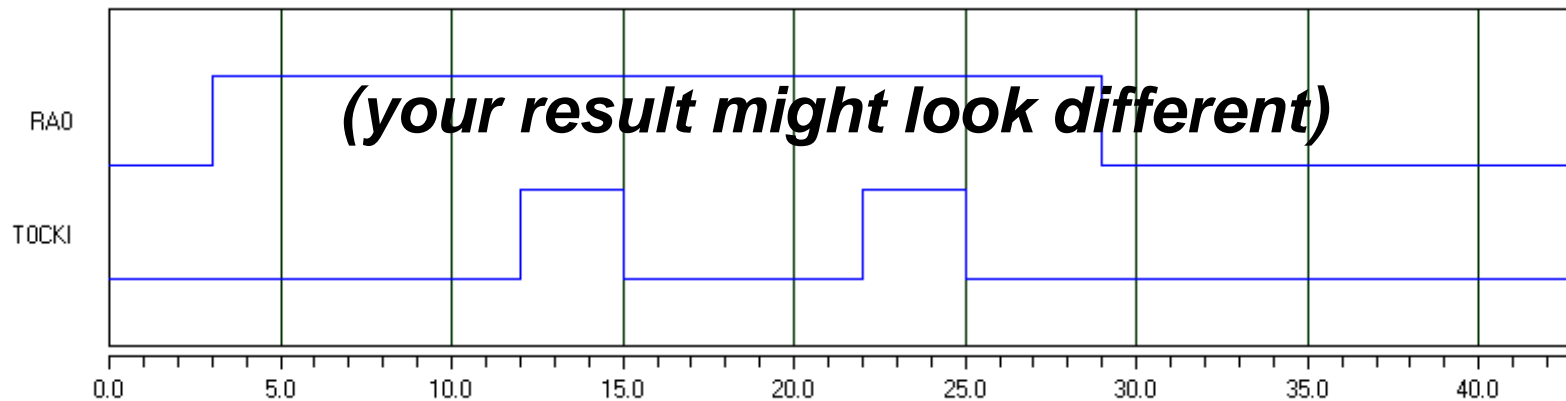
Lab 2: Logic Analyzer

- **Using Asynch Stimulus with Logic Analyzer**
    - Click "Reset" ▣ on the debug toolbar
    - Click "Animate" ▶▶ on the toolbar
    - On the "Asynch" tab of Stimulus window, click the "Fire" button for the <u>RA0 stimulus</u> and <u>T0CKI stimulus</u> once
    - Watch the Logic Analyzer Display
    - Do you see the lines for RA0 and T0CKI change?
    - Try a few more asynchronous stimuli by clicking the "fire" buttons for the <u>RA0 stimulus</u> and <u>T0CKI stimulus</u> a few more times
    - Observe the changes in RA0 and T0CKI
    - Click "Halt" ❚❚ to stop the simulation

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- ## The Logic Analyzer should look like this

(your result might look different)

- ## Click on the cursor button ▶◀ to measure the width of the T0CKI pulse

  - Drag the vertical lines to the edges of T0CKI pulse to measure

  - **Question**: how wide is each T0CKI pulse?

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- **Signals can be added to Logic Analyzer *after* the execution**

  - In the Logic Analyzer, click the "Channels" button and add "RA4"

  - Immediately you should see RA4 and its pattern

  - Comparing RA4 and T0CKI confirms the fact that these are the same pin

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Lab 2: Logic Analyzer

- **(Extra) Bus in Logic Analyzer**

  - Want to show RB0...RB7 as a bus

  - Go to the Logic Analyzer window

  - Click the "Channels" button on the top right corner

  - Click "Configure Bus(s)" button

  - Click "New Bus" button, enter "PORTB", then OK

  - In the "Available Signals" column, select RB0 to RB7 (using either shift-select or control-select), then click on the "Add =>" button

  - Click OK to return to "Configure Channels" window

  - Select "PORTB" from the "Available Signals" column on left, then click "Add =>" button, then OK

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- **(Extra) Testing with synchronous stimuli**
  - Select the Stimulus Window
  - Click the "Apply" button to use the synchronous stimulus defined in the "Pin / Register Actions"
  - Note: only synchronous stimulus tabs need "apply" button
  - Click "Reset" then "Animate" on the debug toolbar
  - On the "Async" tab, click the "Fire" button for the RA0 stimulus and T0CKI stimulus randomly during simulation for a few times
  - the synchronous stimulus to PORTB will be injected at time = 10, 20, 30, 40 cycle
  - Click "Halt" to stop the simulation

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- **(Extra) Verify the signal in Logic Analyzer**
  - Move to the Logic Analyzer Display
  - Observe the changes in RA0 and T0CKI and Bus PORTB graphically
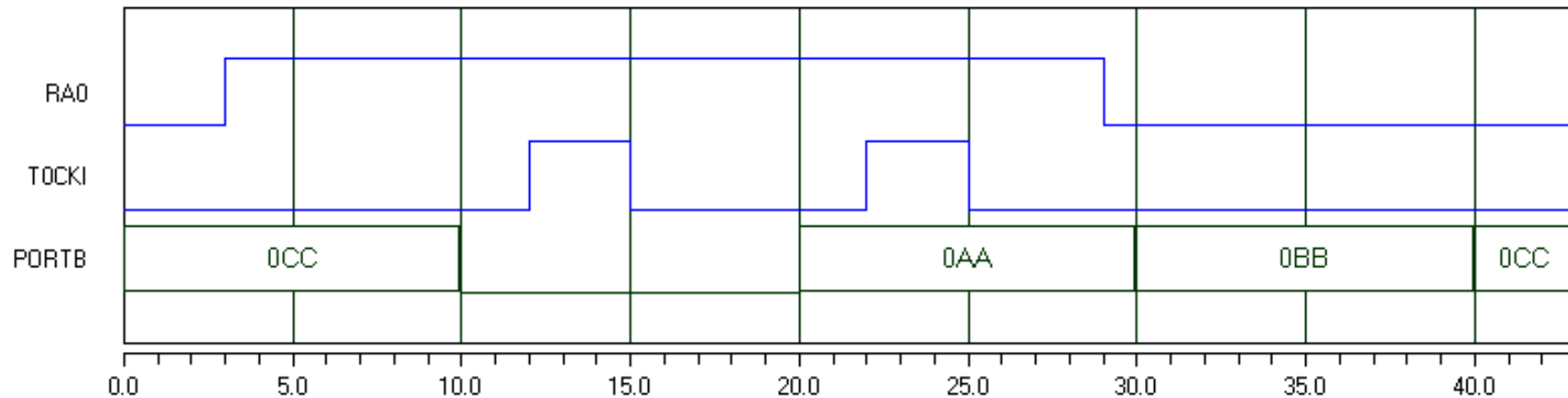
- **Close Workspace**
  - Select "*File>Close Workspace*"

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