

# Using Asynchronous Simulation

With MPLAB Simulator



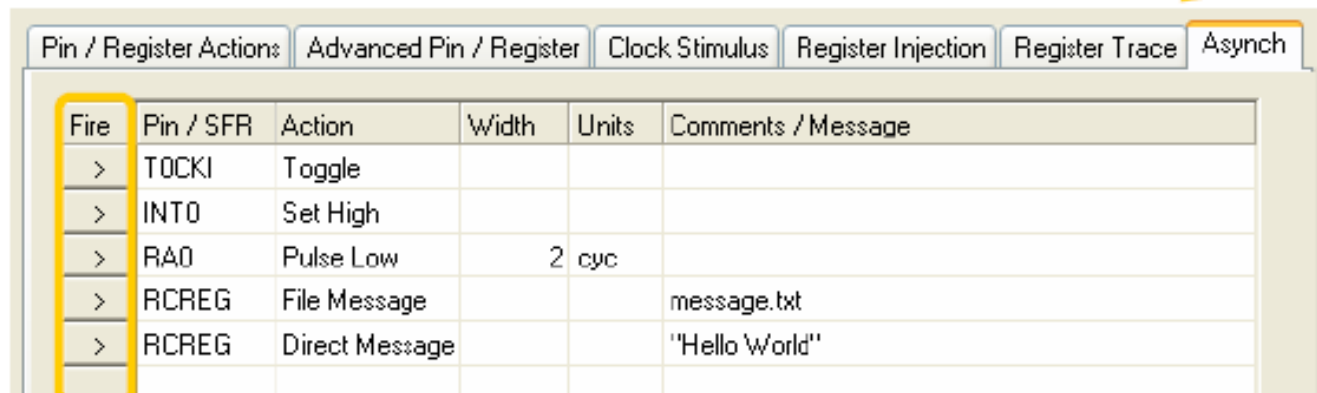
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## Steps to Use Asynch. Stimulus

- 1. Start Simulator**  
*Debugger>Select Tool>MPLAB SIM*
- 2. Bring up stimulus window**  
*Debugger>Stimulus>New Workbook*
- 3. Define stimulus on the last tab**
- 4. Save stimulus (optional)**  
*Debugger>Stimulus>Save Workbook*
- 5. Start simulation (Run/Step/Animate)**
- 6. Click the “Fire” stimulus buttons**

## Asynchronous Stimulus

- Last tab in Stimulus Window

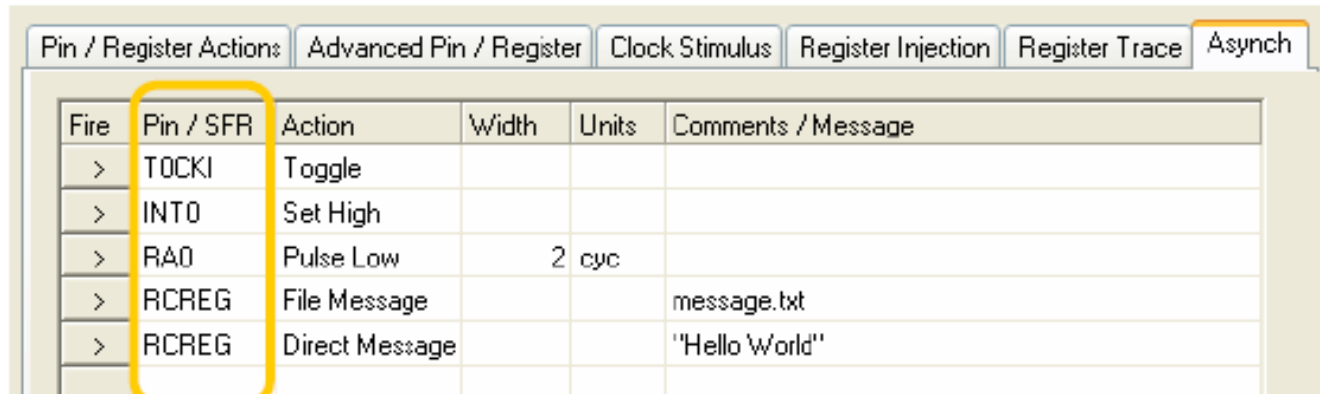


The screenshot shows the Stimulus Window interface with the 'Asynch' tab selected. The table below lists the stimulus actions:

Fire	Pin / SFR	Action	Width	Units	Comments / Message
>	T0CKI	Toggle			
>	INT0	Set High			
>	RA0	Pulse Low	2	cyc	
>	RCREG	File Message			message.txt
>	RCREG	Direct Message			"Hello World"

- Fire button for each row
  - Click on the “>” button to fire stimulus

## Asynchronous Stimulus



Fire	Pin / SFR	Action	Width	Units	Comments / Message
>	TOCKI	Toggle			
>	INT0	Set High			
>	RA0	Pulse Low	2	cyc	
>	RCREG	File Message			message.txt
>	RCREG	Direct Message			"Hello World"

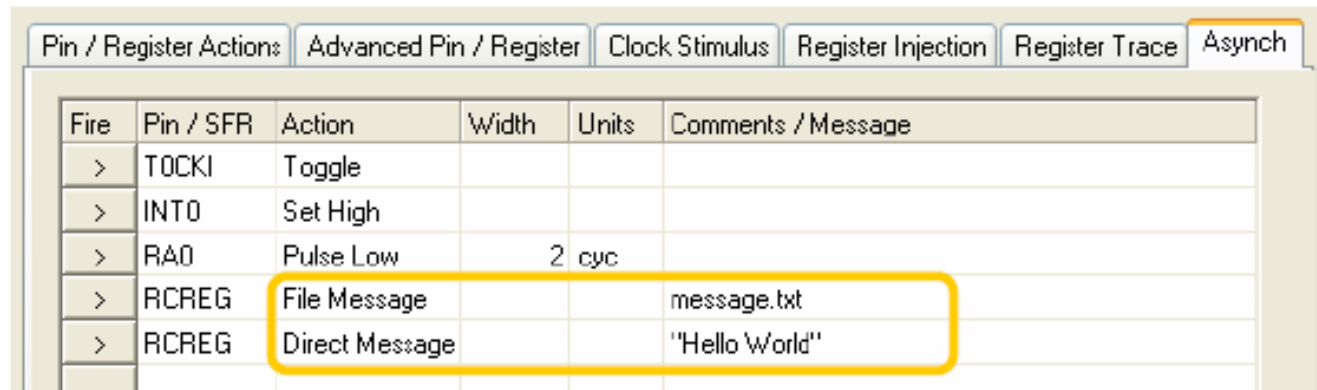
- **Destination**
  - **Drop down list of input pins**
  - **UART receive registers (RCREG)**

## Asynchronous Stimulus

Fire	Pin / SFR	Action	Width	Units	Comments / Message
>	TOCKI	Toggle			
>	INT0	Set High			
>	RA0	Pulse Low		2 cyc	
>	RCREG	File Message			message.txt
>	RCREG	Direct Message			"Hello World"

- **Action for I/O Pin:**
  - **Set High/Low**
  - **Toggle**
  - **Pulse High/Low for 2 cycles**

## Asynchronous Stimulus



Fire	Pin / SFR	Action	Width	Units	Comments / Message
>	T0CKI	Toggle			
>	INT0	Set High			
>	RA0	Pulse Low	2	cyc	
>	RCREG	File Message			message.txt
>	RCREG	Direct Message			"Hello World"

- **UART receive SFR (e.g. RCREG):**
  - Direct Message: defined in GUI, e.g.
    - string in quotes "Hello World"
    - sequence of hex: 48 65 6C 6C 6F 20 57 6F 72 6C 64
  - File Message: Inject from file, e.g. message.txt



## Where to Get More Information

- **Other webinars**  
<http://techtrain.microchip.com/webseminars/Archived.aspx>
- **Discussion board**  
<http://forum.microchip.com> >  
Development Tools > MPLAB Simulator
- **Support (Knowledge Base and Help Ticket)** <http://support.microchip.com>
- **Collaboration ICwiki**  
<http://www.microchip.com/ICwiki>

# Exercise

- Navigate to: C:\EET250\16F887\Lesson 2 Demo if Use of Asynchronous Inputs with Simulator\async sim
- Open project async sim.mcp
- Project is already setup
- The source code has some specific processor register setting to enable pin RB0 to be an input and PORTD ( full byte) to be an output
- The code counts RB0 input pulses and runs a counter that is outputted to PORTD
- Watch is set up for PORTD,PORTB and Counter
- Select Debugger -> animate ( green arrow automatically single step through the code)
- Use fire button to pulse RB0 and watch counter and animation

# Project Workspace

The screenshot displays the MPLAB IDE v8.00 interface. The main window is titled "async sim - MPLAB IDE v8.00" and contains several panes:

- Code Editor:** Shows the source code for "C:\...\counting.c". The code includes comments and logic for setting up portb pin 0 for input, initializing RBO=0 and TRISB0=1, and a main loop that delays 600 ms and toggles LED 0. A green arrow indicates the current execution point at line 94.
- Stimulus:** A window titled "Stimulus - C:\...\RBO pulse in.sbs" with tabs for "Pin / Register Actions", "Advanced Pin / Register", "Clock Stimulus", "Register Injection", "Register Trace", and "Asynch". The "Asynch" tab is active, showing a table with one entry: "RBO" with action "Pulse High", width "1", and units "cyc".
- Watch:** A window titled "Watch" showing a table of variables and their values:

Address	Symbol Name	Value
020	counter	0x0001
008	PORTD	0x01
006	PORTB	0x00

- Output:** A window titled "Output" showing the simulation output. The text reads: "Stimulus: Workbook 'C:\EET250\16F887\Lesson 2 Demo if Use of Asynchronous Inputs with Simulator\ SIM-N0001 Note: Asynchronous Stimulus RBO: input pulse for counting fired."

The status bar at the bottom indicates the simulation is running on a PIC16F887 at 20 MHz, with the program counter at pc:0x7f7. The taskbar shows the Start button and open applications including Microsoft PowerPoint and the MPLAB IDE.