**The lecture 10**

**Working with signal groups**

The Signal Builder block allows you to create interchangeable groups of signal sources and quickly switch the groups into and out of a model. Signal groups can greatly facilitate testing a model, especially when used in conjunction with Simulink assertion blocks and the optional Model Coverage Tool.

**Creating a Signal Group Set**

To create an interchangeable set of signal groups:

1 Drag an instance of the Signal Builder block from the Simulink Sources library and drop it into your model. By default, the block represents a single signal group containing a single

signal source that outputs a square wave pulse.



2Use the block’s signal editor to create additional signal groups, add signals to the signal

groups, modify existing signals and signal groups, and select the signal group that the block outputs.

3Connect the output of the block to your diagram.

The block displays an output port for each signal that the block can output.

**The Signal Builder Dialog Box**

The Signal Builder block’s dialog box allows you to define the waveforms of the signals output by the block. You can specify any waveform that is piecewise linear. To open the dialog box, double-click the block. The Signal Builderdialog box appears. The **Signal Builder** dialog box allows you to create and modify signal groups represented by a Signal Builder block. The **Signal Builder** dialog box includes the following controls.

**Group Panes**

Displays the set of interchangeable signal source groups represented by the block. The pane for each group displays an editable representation of the waveform of each signal that the group contains. The name of the group appears on the pane’s tab. Only one pane is visible at a time. To display a group that is invisible, select the tab that contains its name. The block outputs the group of signals whose pane is currently visible.

**Signal Axes**

The signals appear on separate axes that share a common time range. This allows you to easily compare the relative timing of changes in each signal. The Signal Builder automatically

scales the range of each axis to accommodate the signal that it displays. Use the Signal Builder’s Axesmenu to change the time (T) and amplitude (Y) ranges of the selected axis.

**Signal List**

Displays the names and visibility of the signals that belong to the currently selected signal group. Clicking an entry in the list selects the signal. Double-clicking a signal’s entry in the list hides or displays the signal’s waveform on the group pane.

**Selection Status Area**

Displays the name of the currently selected signal and the index of the currently selected waveform segment or point.

**Waveform Coordinates**

Displays the coordinates of the currently selected waveform segment or point. You can change the coordinates by editing the displayed values.

**Name**

Name of the currently selected signal. You can change the name of a signal by editing this field.

**Index**

Index of the currently selected signal. The index indicates the output port at which the signal appears. An index of 1 indicates the topmost output port, 2 indicates the second port from the top, and so on. You can change the index of a signal by editing this field.

**Help Area**

Displays context-sensitive tips on using **Signal Builder** dialog box features.



**Editing Signal Groups**

The Signal Builder dialog box allows you to create, rename, move, and delete signal groups from the set of groups represented by a Signal Builder block.

**Creating and Deleting Signal Groups**

To create a signal group, you must copy an existing signal group and then modify it to suit your needs. To copy an existing signal group, select its tab and then select **Copy** from the Signal Builder’s **Group** menu. To delete a group, select its tab and then select **Delete** from the **Group** menu.

**Renaming Signal Groups**

To rename a signal group, select the group’s tab and then select **Rename** from the Signal Builder’s **Group** menu. A dialog box appears. Edit the existing name in the dialog box or enter a new name. Click **OK**.

**Moving Signal Groups**

To reposition a group in the stack of group panes, select the pane and then select **Move right** from the Signal Builder’s **Group** menu to move the group lower in the stack or **Move left** to move the pane higher in the stack.

**Editing Waveforms**

The **Signal Builder** dialog box allows you to change the shape, color, and line style and thickness of the signal waveforms output by a signal group.

**Reshaping a Waveform**

The **Signal Builder** dialog box allows you to change the shape of a waveform by selecting and dragging its line segments and points with the mouse or arrow keys or by editing the coordinates of segments or points.

**Selecting a Waveform.** To select a waveform, left-click the mouse on any point on the waveform.



The Signal Builder displays the waveform’s points to indicate that the waveform is selected.



**Selecting points.** To select a point of a waveform, first select the waveform. Then position the mouse cursor over the point. The cursor changes shape to indicate that it is over a point.



**Moving Waveforms.** To move a waveform, select it and use the arrow keys on your keyboard to move the waveform in the desired direction. Each key stroke moves the waveform to the next location on the snap grid or by 0.1 inches if the snap grid is not enabled.

**Dragging Segments.** To drag a line segment to a new location, position the mouse cursor over the line segment. The mouse cursor changes shape to show the direction in which you can drag the segment.



Press the left mouse button and drag the segment in the direction indicated to the desired location. You can also use the arrow keys on your keyboard to move the selected line segment.