

GoldSim Dashboard Authoring Module



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Chapter 1: Introduction

He that is taught only by himself has a fool
for a master.

Ben Jonson

Chapter Overview

GoldSim is a user-friendly, highly graphical, object-oriented program for carrying out dynamic, probabilistic simulations to support management and decision-making in engineering, science and business.

The GoldSim Dashboard Authoring Module allows you to create a “shell” around your GoldSim model (in the form of a graphical user interface that you design), such that the model can be easily used by someone without requiring them to be familiar with either the GoldSim modeling environment or the details of the specific model.

This document provides a complete description of the features and use of the GoldSim Dashboard Authoring Module.



Note: This document only describes the Dashboard Authoring Module, and assumes that you are familiar with the basic capabilities of GoldSim (described in the **GoldSim User's Guide**).

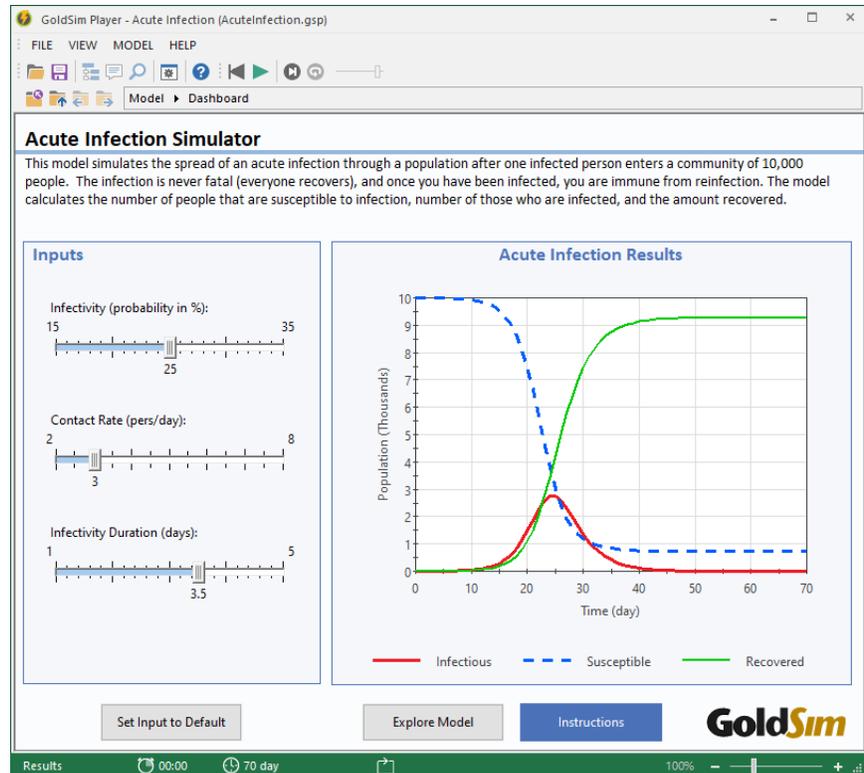
In this Chapter

This introductory chapter discusses the following topics:

- What is Dashboard Authoring?
- How the GoldSim Documentation is Organized
- Conventions Used in this Document
- Using Help
- Technical Support, User Resources and Software Upgrades

What is Dashboard Authoring?

The GoldSim Dashboard Authoring Module allows a GoldSim modeler to design and construct a "dashboard" interface for models. The interfaces can be designed to look like "dashboards" or "control panels", with buttons, input fields, sliders and result displays, and the author can embed text, tool-tips and graphics to provide instructions on the use of the model:



Such an interface allows a model to be easily used by someone *without requiring them to be familiar with either the GoldSim modeling environment or the details of the specific model.*

The Dashboard Authoring Module in GoldSim enables you to create a “shell” around your GoldSim model (in the form of a graphical user interface that you design), exposing only those inputs and outputs that you feel are necessary to allow the user to use your model in a constructive way. You can choose to hide all the computational details of the model, or if desired, provide a mechanism by which the user can leave the Dashboard and “look under the hood” of the model. In effect, the Dashboard Authoring Module turns GoldSim into a high-level programming language, which you can use to create custom simulation applications for distribution to end users who may not necessarily be modelers.



Note: The Dashboard Authoring Module is included with all GoldSim licenses, and does not need to be activated in any way (it is always active and available).

Models with Dashboards can be saved as Player files and subsequently viewed and run using the GoldSim Player, which can be downloaded for free from the GoldSim website (www.goldsim.com).

Hence, GoldSim models that you have created using the Dashboard Authoring Module can be viewed and run by others without requiring them to have a licensed version of GoldSim.



Note: The GoldSim Player is also automatically installed on your machine when you install GoldSim, and is added to the Start menu along with the GoldSim executable.

How the GoldSim Documentation is Organized

The GoldSim Documentation Suite

The Dashboard Authoring Module provides a specialized set of features that augment the basic GoldSim simulation framework. The document you are reading only describes the GoldSim Dashboard Authoring Module, and assumes that you are familiar with the basic capabilities of GoldSim.

The basic capabilities of GoldSim are described in the **GoldSim User's Guide**. That document provides a complete description of the features and capabilities of the GoldSim simulation framework.

How this Manual is Organized

This document is organized into four chapters:

- **Chapter 1: Introduction.** The remainder of this chapter discusses the information required for you to get started using the GoldSim Dashboard Authoring Module, including conventions used in the manual, using online help, and obtaining technical support.
- **Chapter 2: Dashboard Authoring Overview.** This chapter provides an overview of the features and capabilities of the Dashboard Authoring Module, and outlines the steps required to create models with Dashboards.
- **Chapter 3: Creating Dashboards.** This chapter describes the details of adding Dashboard controls to your models, and creating Player files which use Dashboards.
- **Chapter 4: Creating and Viewing Player Files.** This chapter describes the details of creating Player files which use Dashboards. It also discusses how your model will appear in the GoldSim Player.

The manual also includes a Glossary of Terms and an Index.

As will be discussed below, nearly all of the information available in the printed documentation can also be accessed via an extensive online help system.

Conventions Used in this Document

The following conventions are used in this manual:

Convention	Description
<i>Important Terms</i>	New and important terms are presented in <i>bold italics</i> . These terms all appear in the Glossary of Terms at the end of the document.
File Open...	Menus and menu selections are separated by a vertical bar. File Open... means "Access the File menu and choose Open"
CTRL+C	Key combinations are shown using a "+" sign.. CTRL+C means press the Control and C keys simultaneously.
	Warning: This means watch out! Warnings typically alert you to potential pitfalls and problems that may occur if you perform (or fail to perform) a certain action.
	Note: Notes highlight important information about a particular concept, topic or procedure, such as limitations on how a particular feature can be used, or alternative ways of carrying out an action.

In describing various mouse actions, the following conventions are used:

Mouse Action	Definition
Click	Press and release the left mouse button once.
Double-click	Press and release the left mouse button twice in rapid succession.
Right-click	Press and release the right mouse button once.
Drag	Press the left mouse button, and while keeping it depressed, move the cursor to another location, then release the button.

Using Help

GoldSim has an extensive in-product help facility that describes the basic GoldSim features, which can be used to supplement this manual. The Help system can be accessed by selecting **Help | Help Topics** from the main GoldSim menu or the Help button (the question mark) on the standard toolbar. Pressing the **Help** button within any of the dialogs also provides access to Help (in a context-sensitive manner).

All of the information in the **GoldSim User's Guide**, the **GoldSim Dashboard Authoring User's Guide**, and other extension module user guides (e.g., the **GoldSim Distributed Processing Module User Guide**) is accessible via GoldSim Help. Note, however, that information included in the appendices of the various user guides is not included in the Help system.

Technical Support, User Resources and Software Upgrades

The GoldSim Technology Group is dedicated to providing complete solutions for our customers. We pride ourselves in providing prompt and extensive support and resources to our users, and are committed to ensuring that each installation of our software is successful and adds value to the customer.

GoldSim Maintenance Program

When you purchase GoldSim software, you receive one year of Software Maintenance, entitling you to the following:

- Free software upgrades so that you always have the latest version of the GoldSim software.
- Basic Technical Support via email and phone. Basic support covers installation and licensing questions, as well as questions about GoldSim's features and capabilities.

After the first year, if you wish to continue to have access to new versions and technical support, Software Maintenance can be extended each year with payment of an annual fee.

Details regarding the GoldSim Maintenance Program can be found at www.goldsim.com/Web/Products/BuyGoldSim/Pricing/MaintenanceProgram/.

Getting Technical Support

Users with active Software Maintenance can submit questions directly to the GoldSim support team. Evaluation users are also welcome to contact us with questions on GoldSim functionality. The **GoldSim Help Center** (<https://goldsim.zendesk.com>) is the primary portal for technical support. You can submit your questions directly from the Help Center. If you register and log in through the Help Center, you will be able check the status and view a history of all of your support requests.

The Help Center also includes:

- The **GoldSim Forum**, where you can post questions to the GoldSim community, or just browse existing messages;
- Articles on licensing questions and modeling tips; and
- An archive of past webinars (which demonstrate GoldSim features and capabilities).

Free Basic Technical Support does not include consulting, model troubleshooting or detailed assistance with applying GoldSim to a particular problem. Assistance of this nature is defined as Advanced Technical Support. Users may purchase Advanced Technical Support in pre-paid 10 hour blocks.

Details regarding Advanced Technical Support can be found at www.goldsim.com/Web/Resources/TechnicalSupport/.

Other GoldSim Resources

In addition to the GoldSim Help Center, additional resources are also available. These three resources can be accessed directly from the GoldSim website (www.goldsim.com):

- A free **Online Training Course** that will provide you with a thorough understanding of the key concepts on which GoldSim is based and all of the fundamentals required to build complex models of nearly any kind of system.
- The **GoldSim Model Library**, which contains a collection of example models to allow you to see how specific features of GoldSim can be used and/or how GoldSim can be used for specific applications.
- The **GoldSim Blog**, which provides an informal mechanism for GoldSim staff to share their knowledge, point out some of the more advanced (and perhaps overlooked) GoldSim features, share and discuss common mistakes we see in GoldSim applications, discuss interesting applications, and keep you abreast of our plans for further GoldSim developments.

You can stay up to date on the latest GoldSim news through these resources:

- The GoldSim LinkedIn Group, which is primarily used for announcements (e.g., new versions, interesting applications). You can join the Group here: www.linkedin.com/groups/1798413
- Periodic email newsletters are sent two to three times per year. To be added to the newsletter list, contact us via the GoldSim Help Center (<https://goldsim.zendesk.com>).



Note: When you purchase GoldSim, you are entitled to a free one hour, live web-based training session in which one of our analysts provides an interactive training session via the Internet and telephone. You are strongly encouraged to take advantage of this free training.

Chapter 2: Dashboard Authoring Overview

A little learning is a dangerous thing.

Alexander Pope, *An Essay on Criticism*

Chapter Overview

This chapter provides a brief introduction to the Dashboard Authoring Module. It discusses how and why you would want to add Dashboards to your models, and describes how models with Dashboards can be used by others using the GoldSim Player.

The chapter closes by summarizing the steps required to create a Player file (a file which can be read by the GoldSim Player) which incorporates Dashboard features.

In this Chapter

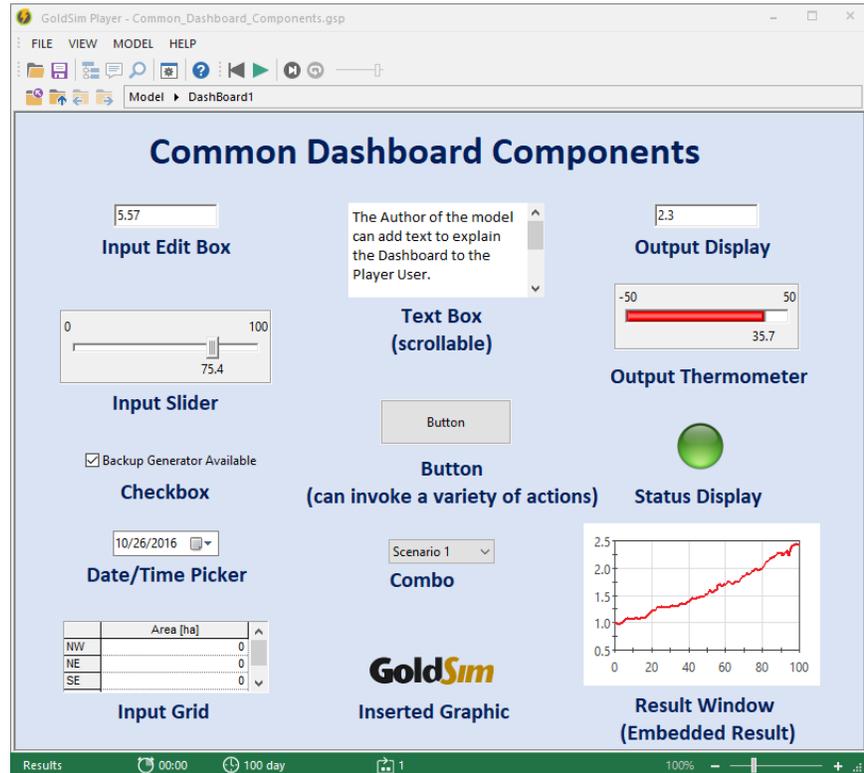
This chapter discusses the following topics:

- Dashboard Authoring in a Nutshell
- Steps for Creating Player Files with Dashboards

What Can I Do With the Dashboard Authoring Module?

Dashboard Authoring in a Nutshell

The GoldSim Dashboard Authoring Module allows a GoldSim modeler to design and construct a "*dashboard*" interface for models. The interfaces can be designed to look like "dashboards" or "control panels", with buttons, input fields, sliders and result displays, and the author can embed text, tool-tips and graphics to provide instructions on the use of the model. Some of the components which can be added to a Dashboard are shown below:



Models created using the Dashboard Authoring Module can be saved as Player files and subsequently viewed and run using the GoldSim Player, which can be downloaded for free from the GoldSim website (www.goldsim.com). Hence, GoldSim models that you have created using the Dashboard Authoring Module can be viewed and run by others without requiring them to have a licensed version of GoldSim.

Moreover, by creating an interface to your model using these components, your model can subsequently be viewed and run by someone *without requiring them to be familiar with either the GoldSim modeling environment or the specific details of the model*.

Basic Features of the Dashboard Authoring Module

The Dashboard Authoring Module allows you to insert one or more Dashboards (control panels) into a model to create an interface for users viewing your model using the GoldSim Player.

Within a Dashboard, you can do the following:

- You can connect Dashboard *input controls* (such as edit fields, sliders, check boxes, combo boxes, and input grids) directly to GoldSim elements, so that the user can modify the linked elements in a simple and direct manner without having to be familiar with the GoldSim

interface. You can assign customized tool-tips to the controls to explain their function.

- You can connect the outputs of GoldSim elements to Dashboard *output controls* (e.g., display fields, result display windows, thermometers and dynamic status displays) so that key results can be easily displayed. You can assign customized tool-tips to these controls to explain their function.
- You can add customized buttons to a Dashboard. These buttons can have any name, can have a customized tool-tip, and can trigger a number of actions, including running and closing the file, viewing a specific result chart or table, jumping to a Container, an element, or another Dashboard, opening another application (e.g., PowerPoint), and viewing a web page (i.e., a hyperlink).
- You can add a Scenario control to a Dashboard. This allows the user to create, edit, view and compare multiple scenarios.
- You can define a tab order for the various controls, so that users can easily tab between the fields.
- You can add scrollable text boxes with explanatory text to a Dashboard.
- You can insert graphics, images and text (using the tools on the GoldSim Drawing toolbar) anywhere on a Dashboard.

By using multiple Dashboards, you can expose as many inputs as required to the model user. You can choose to hide all the computational details of the model, or if desired, you can provide a mechanism (e.g., an action button) by which the user can leave the Dashboard and “look under the hood” of the model.

Although any GoldSim model can be saved as a Player file and subsequently *viewed* using the GoldSim Player, a Player file that includes Dashboards can also be *modified and run* by the Player.

When Would I Want to Use the Dashboard Authoring Module?

The Dashboard Authoring Module allows you to make Player files that can be modified and run. While Dashboards are not required to create a Player file, without them the Player file can only be viewed, and cannot be edited in any way.

The Dashboard Authoring Module allows you to create a simple interface to your model that allows others to edit selected inputs and view selected results in a straightforward and controllable manner. As a result, they do not need to know anything about the GoldSim user interface or the underlying structure of the model.

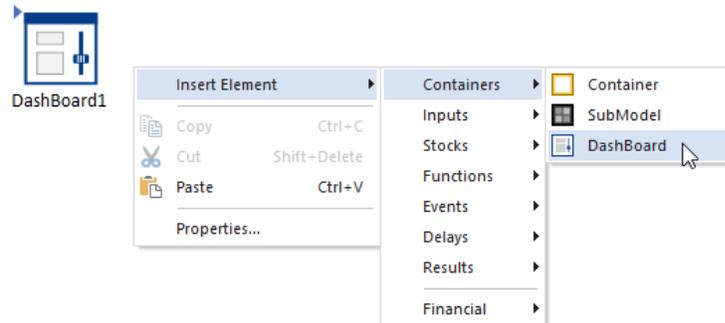
In effect, the Dashboard Authoring Module enables you to use GoldSim as a high-level programming language to create custom simulation applications for distribution to end users who may not necessarily be modelers. This allows others (e.g., clients, customers, reviewers, regulators) to experiment with your simulator and play “what if” games in a controlled manner.

Moreover, since Player files are run using the free GoldSim Player, users do not need to have a licensed version of GoldSim in order to view and run a “dashboarded” model.

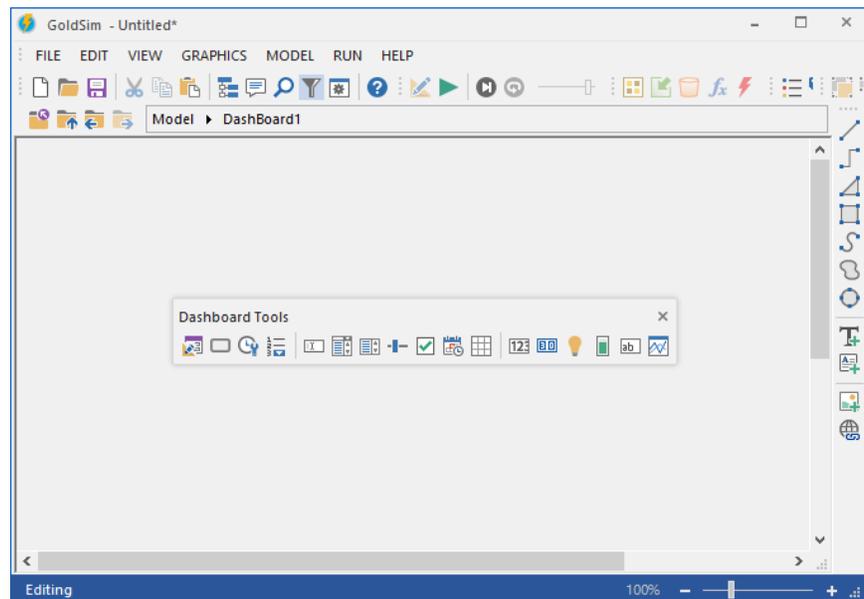
Hence, the primary use of the Dashboard Authoring Module is to allow you to create customized interfaces to your simulation models so that they can be edited and run by others in the GoldSim Player.

How Do I Create Dashboards in My Models?

Dashboards are GoldSim elements, and you add them to your model just as you do so for other elements, by inserting them using the context menu in the graphics pane, the main menu or the Element toolbar (they can be found under the “Containers” category):



Like Containers, you “look inside” a Dashboard by clicking on the small triangle in the upper left-hand corner of the icon. The “interior” of a Dashboard looks like this:



The various Dashboard controls are added via the Controls toolbar. The toolbar is typically docked on the lower right side of the window, but it can be undocked (as shown here).

You cannot insert GoldSim elements inside a Dashboard. Rather, you can only insert various Dashboard controls (using the Controls toolbar) and graphics (using the Drawing Tools toolbar).

The Dashboard itself can be thought of as the canvas on which you are creating the interface to your model.

The details of creating Dashboards and adding the various controls are discussed in Chapter 3.

Steps for Creating Player Files with Dashboards

In order to provide you with a quick overview of what is required to create Player files with Dashboards, a summary of the key steps is provided below.

1. **Add one or more Dashboards to your model.** This is carried out in the same way as any other kind of GoldSim element is inserted.
2. **Add various controls to the Dashboards.** Controls are added to a Dashboard by dragging and dropping from the Dashboard toolbar. The input and output controls are linked to elements in the underlying GoldSim model.
3. **Add graphics and text to the Dashboards.** Graphics and text are added to a Dashboard by dragging and dropping from the Drawing Tools toolbar (just as in Containers). Although this is not required, adding appropriate graphics and text to your Dashboards is important in order to ensure their transparency and usability.
4. **Create a Player file.** This is done by selecting **File|Save Player File...** from the main menu. This will invoke a wizard presenting various options for specifying how the Player file can be used by others.

These four steps are discussed in detail in Chapter 3.

Chapter 3: Creating Dashboards

I would have to ask the questioner. I haven't had a chance to ask the questioners the question they've been questioning.

George W. Bush, 43rd U.S. President

Chapter Overview

This chapter describes the details of creating Dashboards. It discusses how to add Dashboards to your model, and how to add controls and graphics to the Dashboards.

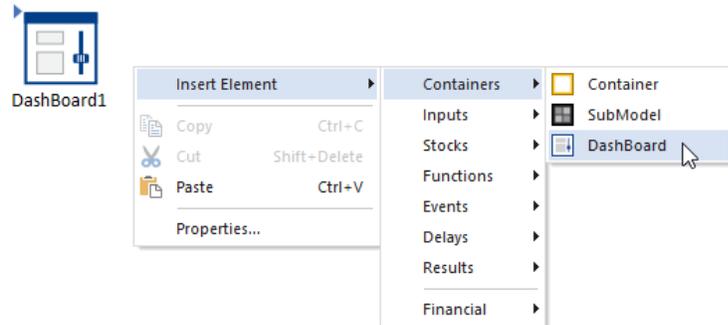
In this Chapter

This chapter discusses the following topics:

- Adding Dashboards to Your Model
- Input Controls
- Output Controls
- Using the Button Control
- Using the Simulation Time Control
- Using the Scenario Control
- Dynamically Disabling and Hiding Dashboard Controls
- Controlling the Tab Order in a Dashboard
- Aligning and Positioning Dashboard Controls
- Copying and Moving Dashboards and Controls
- Adding Backgrounds, Text and Graphics to Dashboards

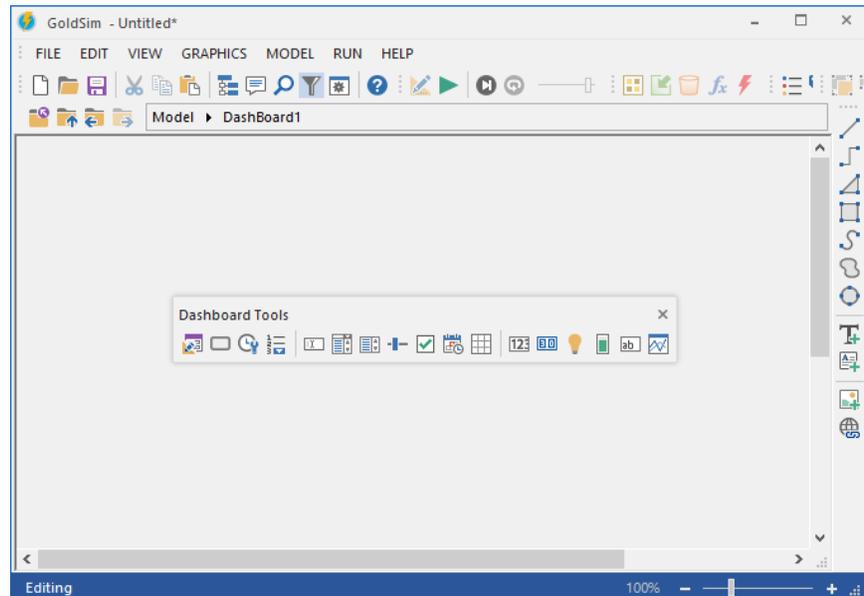
Adding Dashboards to Your Model

Dashboards are a type of GoldSim element, and like other elements, multiple Dashboards can be inserted into a model. You add them to your model just as you do so for other elements, by inserting them using the context menu in the graphics pane, the main menu or the Element toolbar (they can be found under the “Containers” category):



Dashboards can be thought of as a specialized type of Container. Like Containers, they have “contents”, and you can “look inside” a Dashboard and view the contents by clicking the small triangle in the upper left-hand corner of the icon (or Ctrl+double-clicking on the Dashboard).

The “interior” of a Dashboard looks like this:



By default, the Dashboard toolbar is docked on the right side of the screen. Here, it is shown to be floating.

The Dashboard itself can be thought of as the canvas on which you are creating the user interface to your model. You insert various Dashboard controls (using the Controls toolbar) and graphics (using the Drawing Tools toolbar) in order to build the user interface.



Note: You cannot insert any GoldSim elements inside a Dashboard. Only Dashboard controls and graphics can be placed inside a Dashboard.

Like other elements, you can cut, copy and paste Dashboard elements, resize the Dashboard icon in the graphics pane, add a Note to the element, and view its properties by double-clicking on it. The Properties dialog for a Dashboard looks like this:

The **Element ID** is the name of the Dashboard.



Note: With one exception, Dashboard elements follow the same rules as other GoldSim elements regarding their names (e.g., can only include letters, numbers and the underscore character). Unlike other elements in GoldSim, however, the **Element ID** of a Dashboard element can contain spaces.

By default, the **Title** is the same as the element ID. (The **Title** is not currently used by GoldSim, but will be used by a new feature in a future version).

The **Dashboard size** input field determines the size (in pixels) of the canvas on which the controls and graphics are placed, and subsequently the size of the Dashboard window when viewed in the Player. If the Dashboard size is too large to fit on the Player user's screen, scroll bars appear, allowing the user to scroll around the Dashboard.

Read more: [Understanding How Your Model Will Appear in the Player](#) (page 113).

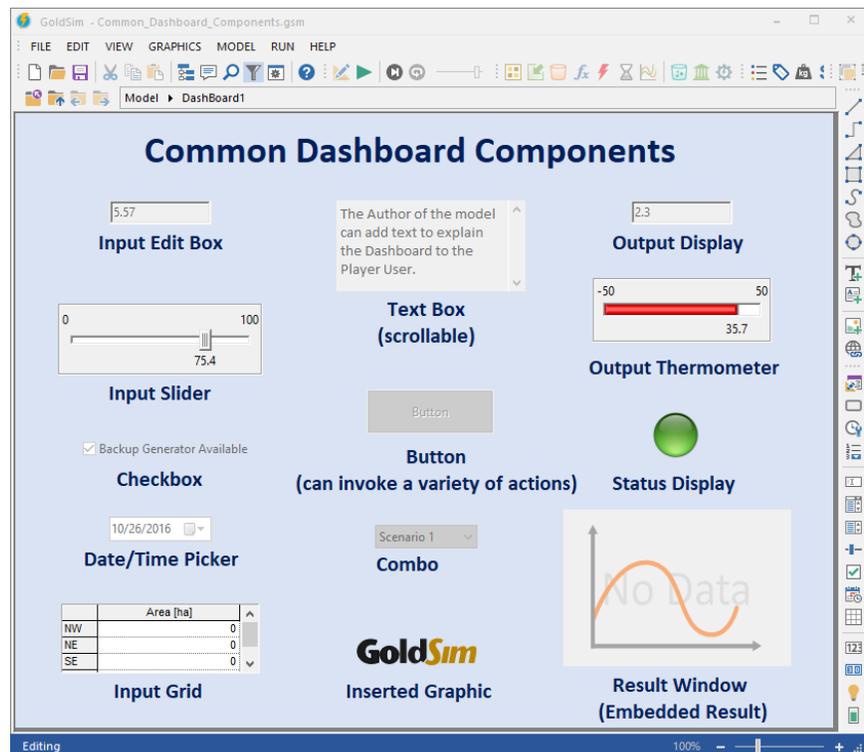
The **Background Color** allows you to choose a background color for the Dashboard.

Read more: [Adding Backgrounds, Text and Graphics to Dashboards](#) (page 105).

Adding Controls to Dashboards

The key components of a Dashboard are the Dashboard controls. These controls can, among other things, connect to elements within your GoldSim model, allowing the Dashboard to be used as the interface that “drives” the model.

The following Dashboard is in Design view:



When a Dashboard is in Design view, you will note the following:

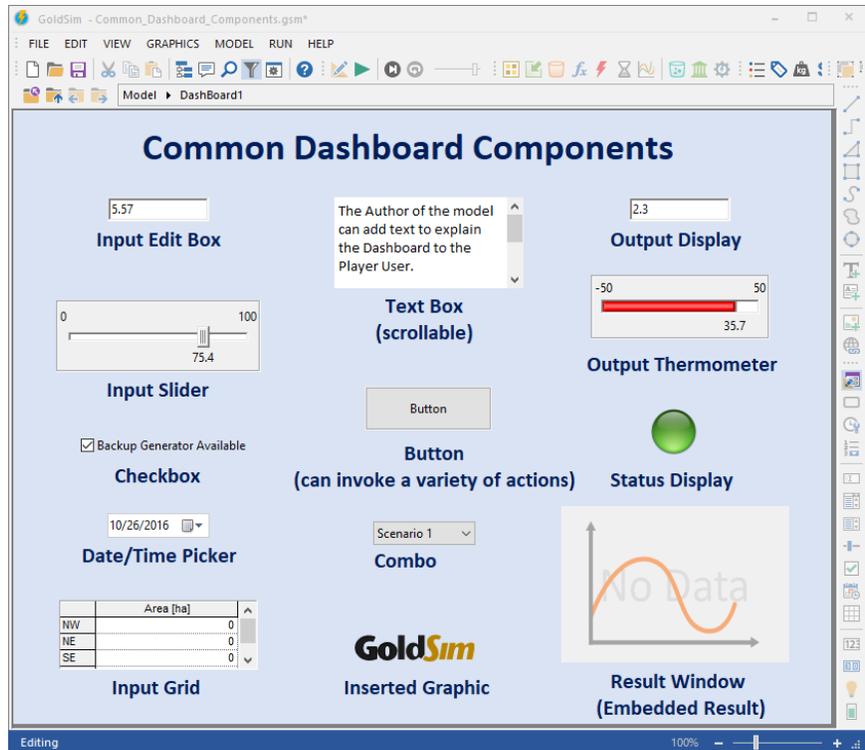
- The Drawing Tools toolbar is available for adding new objects such as text and images;
- The Dashboard toolbar is available for adding new controls; and
- All controls on the Dashboard are grayed out and inactive. You can edit the properties of the controls by double-clicking on them.

While you are designing and editing a Dashboard, you will occasionally want to see how the Dashboard will appear when it is viewed in the Player. You can do this by placing the Dashboard into Active View. You can do this by pressing the Dashboard Active button in the Dashboard toolbar (the first button at the top (or left) of the toolbar, right-clicking inside the Dashboard and selecting **Dashboard Active** from the context menu, or pressing the **Ctrl-D** shortcut key.

In Active view, the various controls can be used, and the Dashboard appears as it will when viewed within the GoldSim Player. When in Active view, the controls cannot be resized, their properties cannot be edited, and new controls (or graphics and text) cannot be added.

To return to Design View (so that the Dashboard can be edited), toggle the Dashboard Active button in the Dashboard toolbar, right-click in the Dashboard and de-select **Dashboard Active** from the context menu, or press the **Ctrl-D** shortcut key.

The following Dashboard is in Active view:



When a Dashboard is in Active view, you will note the following:

- The Drawing Tools toolbar is grayed out and can not be used to add new objects;
- The Dashboard toolbar is grayed out (except for the button to toggle the Dashboard between Active and Design view) and can not be used to add new controls; and
- The controls on the Dashboard are active and can be used. You can no longer edit the properties of the controls by double-clicking on them.

Active view only applies to Dashboards. If you navigate out of the Dashboard to a Container, you will be able to edit the contents of the Container. If you then return to a Dashboard, it will remain in Active view.



Note: When your model enters *Run Mode* within GoldSim, Dashboards are automatically placed into Active View. After you run a model such that the file is in *Result Mode*, the Dashboard controls remain active (they are not grayed out), but they are locked (e.g., you cannot move sliders or modify edit fields). You can, however, modify input controls under some circumstances when a model is in Scenario Mode.

Read more: [Understanding How Your Model Will Appear in the Player](#) (page 113); [Using the Scenario Control](#) (page 90).

Overview of Dashboard Controls

The Dashboard controls can be divided into two main categories:

- **Input controls** (such as edit fields, combo boxes, sliders and check boxes). These can be linked directly to GoldSim Data elements, so that the user can modify the linked elements in a simple and direct manner without being familiar with the GoldSim interface.

- **Output controls** (e.g., display fields, result display windows, thermometers). You can connect the outputs of elements to these controls so that key results can be easily displayed. You can also connect Distribution Result elements to these controls in order to display statistical results.

There are also three additional special controls:

- **Button control.** This control consists of a customized *button* which can trigger a large number of actions (such as running and closing the file, viewing a web page, jumping to another location).
- **Simulation Time Control.** This control allows the user to enter either the Duration (for Elapsed Time simulations) or the Start Date and End Date (for Calendar Time simulations).
- **Scenario control.** This control consists of a drop list and several buttons. It allows the user to add, delete, select, run and compare scenarios.

All controls (except the Scenario control) have property pages that (when in Design view) are accessed by double-clicking on the control. These property pages are used to specify the appearance and behavior of the control.

Each of the controls is discussed in detail below.

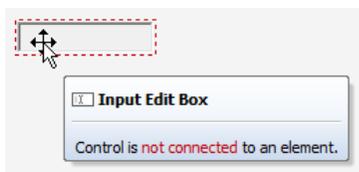
Input Controls

Input controls provide a mechanism by which users can use the Dashboard to modify inputs to a GoldSim model. This is done by linking the control to a Data element within the model. There are seven input controls:

- Input Edit Box;
- Slider;
- Check Box;
- List Box;
- Combo Box;
- Input Grid; and
- Date-Time Picker.

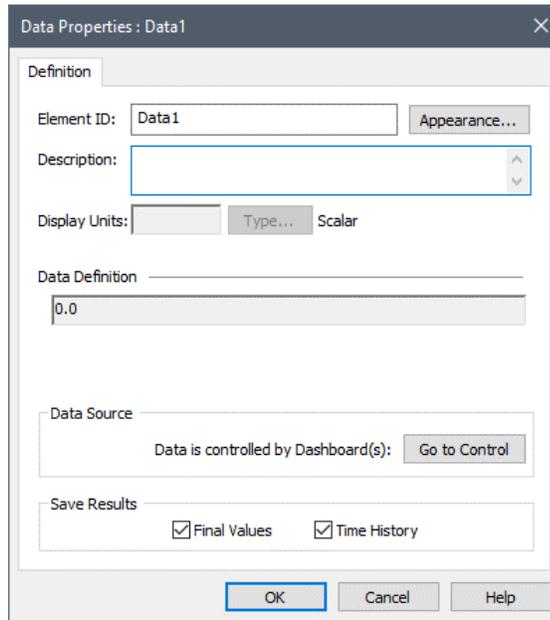
Although each of these controls has a different functionality (which is described in detail below), they have some common properties with respect to how they link to elements in GoldSim. First and foremost, *input controls can only be linked to Data elements*.

If a control is not yet connected to an element, GoldSim indicates this by outlining the control with a dashed red line:



When viewed in the Player, a control that is not connected to an element is simply grayed out.

Once a control is linked to a Data element, this is clearly indicated in the Data Source section of the Data element's property page:

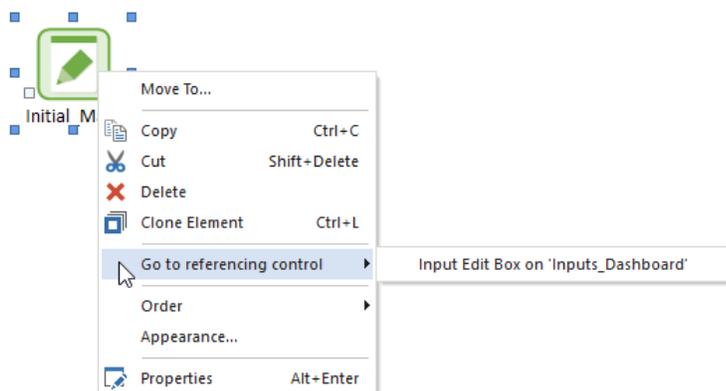


As can be seen, the dialog indicates that the element is “Controlled by Dashboard(s)”. Clicking on the **Go to Control** button takes you directly to the control that references the Data element.

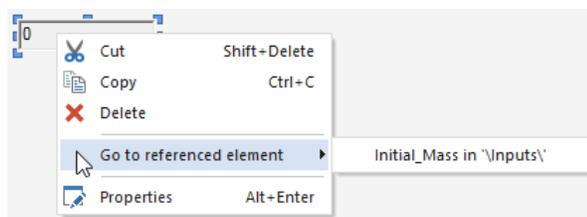


Note: Once a Data element is connected to a control, it can no longer be edited from the element's property dialog (the Definition field is grayed out), and can only be edited using the control.

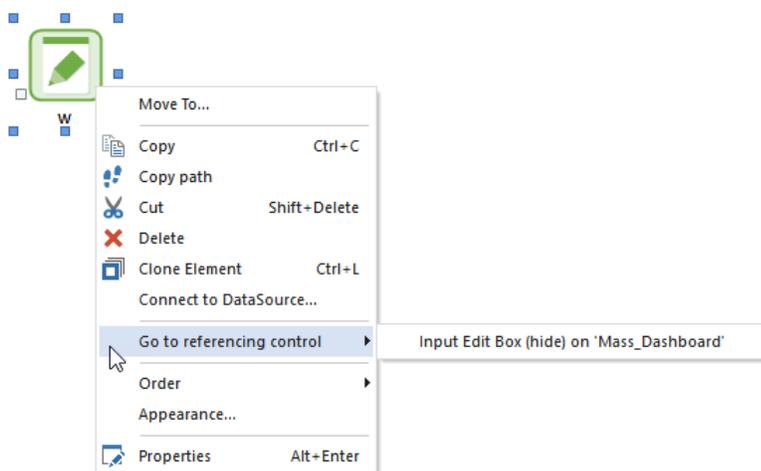
If you right-click on an element that is controlled by one or more input controls, you can immediately jump to those controls from the context menu for the element:



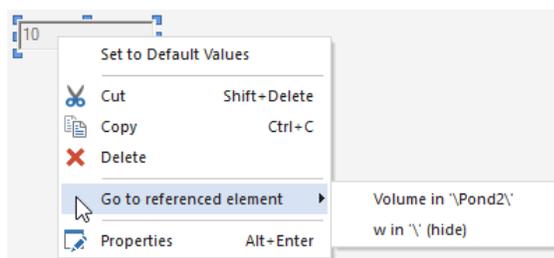
Similarly, after an input control is linked to an element, you can jump to the connected element from the control's context menu:



Note that if an element is not directly controlled by an input control, but is referenced by the control in order to hide and/or disable it, this is also indicated in the context menu for the element:



Similarly, if a control has specified attributes that reference outputs for hiding and/or disabling the control, the element(s) associated with these outputs are also displayed in the context menu for the control:



Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

The property dialogs for the various input controls are described in detail below.

Input Edit Box Control

The most basic and versatile of the input controls is the Input Edit Box control. This control provides a mechanism for typing values directly into an input field.

The toolbar button looks like this:



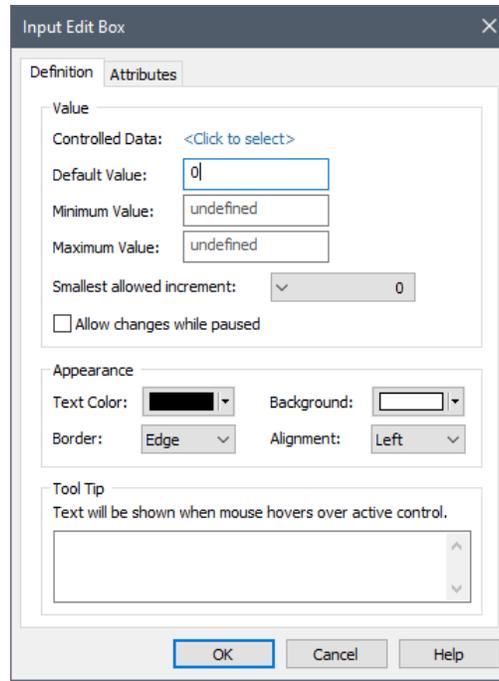
Input Edit Box Control Toolbar Button

The Input Edit Box control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shift key, the change is 5 pixels).

Double-clicking on the control displays the following properties dialog:



Within the Value portion of the dialog, the Data element to which the control is to be linked is specified. You do this by pressing **<Click to select>**. This will display a browser which shows all of the scalar value Data elements in the model (condition Data elements are not listed).

Once you have linked the control to an element, the linked element will be listed:

Controlled Data: [Data1](#) X

You can remove the linkage (by clicking the red X button), or reassign the linkage (by clicking the name of the element itself).

The **Default** value can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

The **Minimum** and **Maximum** values define the range of values that the input field will accept. (By default they are undefined, which means that the range of values is unrestricted). If the Dashboard user enters a value outside of this range, an error will be displayed, and the value will not be accepted. Note that you cannot specify a link or expression in the **Default**, **Minimum** and **Maximum**

fields. In fact, *these fields only accept numbers without units*. If the Data element has dimensions, these fields assume that the value is being specified in the display units of the Data element (which are displayed directly to the right of the three fields):

Controlled Data: [Mass](#)

Default Value: kg

Minimum Value: kg

Maximum Value: kg

You can set a field to “undefined” by simply leaving it blank.



Warning: If the Data element to which the control is linked has dimensions, the Input Edit Field control assumes that the value is being entered in the display units of the Data element. Hence, as an author, it is your responsibility to inform the user of the units of the input (e.g., in the control’s tool tip and/or text surrounding the control).

The **Smallest allowed increment** is a drop list that lets you control the precision of the values that are entered into the field in the Dashboard. For example, if you select 0.1 in this field, the user can only enter values that are multiples of 0.1; if you enter 100 in this field, the user can only enter values that are multiples of 100. If the Dashboard user enters a value that does not meet the requirements, an error will be displayed, and the value will not be accepted. The default value of 0 puts no constraints on the value.

The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the field in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the field prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the field while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

The **Appearance** section of the properties dialog allows you to modify the Text Color, Background (color), text Alignment, and type of Border for the input box. These options are self-explanatory, and you may want to experiment with them to see how they change the control’s appearance. The size of the numbers entered in the box is controlled by the size of the box (GoldSim scales up the font size to match the input box size).



Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User’s Guide**.



Note: You cannot select the font for an input edit box control. GoldSim always uses the default GUI font used by the operating system. The font is dynamically scaled based on the height of the edit box.

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Slider Control

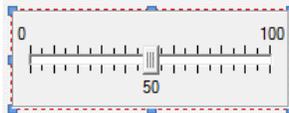
The Slider control allows the user to select a value using a slider. The thermometer can be oriented vertically or horizontally.

The toolbar button looks like this:



Slider Control Button

The Slider control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

Note, however, that as discussed below, resizing the control does not resize the labels. The label font size is fixed (it uses the default GUI font specified by the operating system).

Double-clicking on the control displays the following properties dialog:

Within the Value portion of the dialog, the Data element to which the control is to be linked is specified. You do this by pressing **<Click to select>**. This will display a browser which shows all of the scalar value Data elements in the model (condition Data elements are not listed).

Once you have linked the control to an element, the linked element will be listed:

Controlled Data: [Data1](#) X

You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

The **Default** value can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

The **Minimum** and **Maximum** values define the range of values allowed in the Slider. Note that you cannot specify a link or expression in the **Default**, **Minimum** and **Maximum** fields. In fact, *these fields only accept numbers without units*. If the Data element has dimensions, these fields assume that the value is being specified in the display units of the Data element (which are displayed directly to the right of the three fields):

Controlled Data: [Data1](#)
Default Value: kg
Minimum Value: kg
Maximum Value: kg



Warning: If the Data element to which the control is linked has dimensions, the Slider control assumes that the value is being entered in the display units of the Data element. Hence, as an author, it is your responsibility to inform the user of the units of the input. The easiest way to do this is to specify the units in either the Header or Footer label for the control (see below).

The **Smallest allowed increment** is a drop list that lets you control the precision of the values that can be entered into the Slider. For example, if you select 0.1 in this field, the Slider will only jump between values that are multiples of 0.1; if you enter 100 in this field, the slider will only jump between values that are multiples of 100. The default value of 0 puts no constraints on the value.

When using a Slider control in the Player, the user can specify a value exactly by right-clicking on the slider control handle. This will display a small edit control which allows the user to type in a value directly. Pressing Enter or Esc closes this edit control. Note, however, that if the Dashboard user enters a value that does not meet the Smallest allowed increment, the value will be rounded to the nearest valid value.



Note: In order to make the user aware of the feature to specify values exactly when using a Slider control, you may want to discuss this in the tool-tip for the slider control (or in text somewhere on the Dashboard).

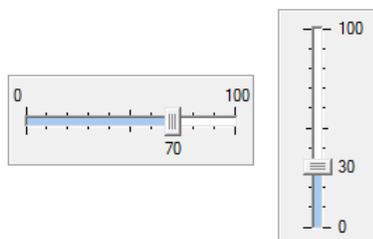
The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the field in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the field prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the field while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

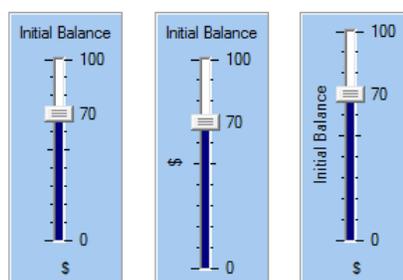
The Slider control provides a wide variety of options for controlling the appearance of the control. The most fundamental of these are the **Orientation**, and whether the Slider displays the value (**Show Value Label**) and minimum and maximum labels (**Show Min/Max Label**). By default, a Slider is horizontal and all labels are on. You can make the Slider vertical by changing the **Orientation**. (You can also make the Slider vertical when it is inserted by holding the **Ctrl** key down when you click on the Slider button in the toolbar).

The minimum, maximum and value labels always appear to the right of a vertical Slider. If the Slider is horizontal, the minimum and maximum labels are always on top, and the value label is on the bottom:

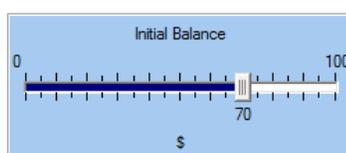


Show Ticks determines whether tick marks are shown in the Slider (and is on by default). The number of ticks displayed is determined automatically by GoldSim. Note that the tick marks displayed are always consistent with the **Smallest allowed increment**. For example, if the **Smallest allowed increment** was 10, then the tick marks would never be less than 10 units apart.

The **Header** and **Footer** fields allow you to add labels to your Slider (e.g., describing what is being entered and the units). The drop list to the right of these fields determines where the label is placed. For a vertical Slider, the Header can be at the top (left, centered or right justified) or on the left side (rotated 90°); and the Footer can be at the bottom (left, centered or right justified) or on the left side (rotated 90°). Three possible combinations of these options are shown below:



For a horizontal Slider, the options are more limited: the Header must be at the top (left, centered or right justified) and the Footer must be at the bottom (left, centered or right justified):



Note: You cannot select the font or font size for any of the labels in a Slider control. GoldSim always uses the default GUI font and font size used by the operating system.

The remaining options at the bottom of the dialog allow you to determine how the Slider control will appear on the Dashboard. The **Background** refers to the color of the body of the control. The **Text Color** controls the color of all the labels. The **Empty Color** color refers to the “unfilled” portion of the Slider channel, while the **Fill Color** refers to the “filled” portion of the Slider channel. The **Border** determines the appearance of the border of the control. You will likely want to experiment with these options to see how they change the control’s appearance.



Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User's Guide**.

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Check Box Control

The Check Box control allows you to add a binary selection (e.g., true/false, on/off, 1/0, 100/300, etc.) to a Dashboard.

The toolbar button looks like this:



Check Box Control Toolbar Button

The Check Box control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shift key, the change is 5 pixels).

Note, however, that resizing the control does not resize the box or the label itself (it simply adds empty space around the box and label). The box and font size for the label are fixed (they use the default GUI font specified by the operating system).

Double-clicking on the control displays the following properties dialog:

Within the Value portion of the dialog, the Data element to which the control is to be linked is specified. You do this by pressing **<Click to select>**. This will display a browser which shows all of the scalar Data elements in the model (both values and condition Data elements are listed).

Once you have linked the control to an element, the linked element will be listed:

Controlled Data: [Data1](#) X

You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

The **Check Box Label** allows you to specify the label that is displayed next to the check box. As discussed below, you can also control where the label is placed. By default, the check box is aligned left and the label is placed to the right of the check box.

The **Default State** can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

If the selected Data element is a value, the **Checked Value** and **Unchecked Value** fields are available. These represent the value that the linked Data element takes on when the Check Box control is checked or unchecked, respectively. You cannot specify a link or expression in these fields. In fact, *these fields only accept numbers without units*. If the Data element has dimensions, these fields assume that the value is being specified in the display

units of the Data element (which is displayed directly to the right of the two fields):

Default State: ▾

Checked Value: m

Unchecked Value: m



Note: Since a user has no way of knowing the values which will be used when the Check Box is checked or unchecked, it is good practice as an author to inform the user of these values directly (e.g., in the control’s tool tip and/or text surrounding the control). An even more effective way to do this is to add a Result Display control linked to the same Data element and place it next to the check box so that the corresponding values are automatically displayed when the Check Box is checked or unchecked.

If the selected Data element is a condition, the **Checked** and **Unchecked** fields are automatically set to True and False, respectively, and grayed out:

Default State: ▾

Checked Value:

Unchecked Value:

The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the control (check and clear the box) in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the field prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the field while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

The **Appearance** section of the properties dialog allows you to modify Background (color).

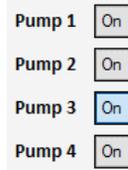


Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User’s Guide**.

It also allows you to change the following:

Alignment: Left alignment aligns the box to the left and the label appears to the right of the box. Right alignment aligns the box to the right and the label appears to the left of the box.

Push-like: If this is selected, the Check Box appears as a button with two states (depressed or cleared). In general, this is only useful if you are placing multiple check boxes next to each other on a Dashboard (otherwise the state of the control may not be obvious to the user). An example is shown below:



Check Boxes that are defined to be “push-like”.



Note: You cannot select the font or font size for a check box control label. GoldSim always uses the default GUI font and font size used by the operating system.

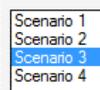
The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

List Box Control

The List Box control allows you to associate text strings with specified values for an input, and then allows the user to choose among the options in a Dashboard. An example of its use is shown below:



The toolbar button looks like this:



List Box Control Toolbar Button

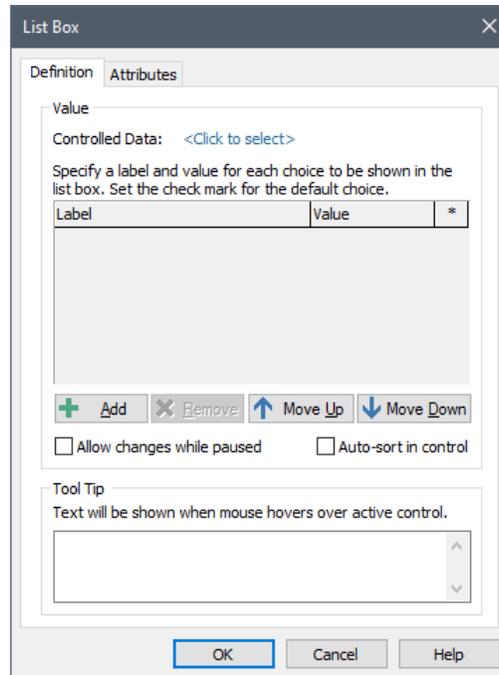
The List Box control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shift key, the change is 5 pixels).

Note, however, that resizing the control does not resize the text strings (choices) inside the control; it simply adds empty space around the text strings. The font size for the text strings is fixed (they use the default GUI font specified by the operating system).

Double-clicking on the control displays the following properties dialog:



Within the Value portion of the dialog, the Data element to which the control is to be linked is specified. You do this by pressing **<Click to select>**. This will display a browser which shows all of the scalar value Data elements in the model (condition Data elements are not listed).

Once you have linked the control to an element, the linked element will be listed:

Controlled Data: [Data1](#) ✘

You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

In addition, once you have linked the control to an element, a single row is added to the grid of choices:

Label	Value [m3]	*
Data1	0	<input checked="" type="checkbox"/>

+ Add ✘ Remove ↑ Move Up ↓ Move Down

You add and remove new rows using the **Add** and **Remove** buttons. For each row, you specify a Label (a text string), and a Value. Note that you cannot specify a link or expression in the Value field. In fact, *this field only accepts numbers without units*. If the Data element has dimensions, this field assumes that the value is being specified in the display units of the Data element (which are displayed in the header for the column).

The column labeled “*” is used to specify which of the choices is the default value. The default value can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

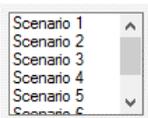
The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the field in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the field prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the field while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

The **Move Up** and **Move Down** buttons allow you to change the order in which the choices will appear in the List Box. If **Auto-sort in control** is checked, GoldSim will automatically sort the choices in alphabetical order when they appear in the control (it will not change the order in the dialog).

Within a Dashboard, if the List Box is too small to display all of the choices, scroll bars are added:



Note: You cannot select the font for the Labels describing the choices in a List Box. GoldSim always uses the default GUI font used by the operating system.

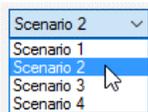
The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Combo Box Control

The Combo Box control allows you to associate text strings with specified values for an input, and then allows the user to choose among the options in a Dashboard from a combo (drop list) box. An example of its use is shown below:



The toolbar button looks like this:



Combo Box Control Toolbar Button

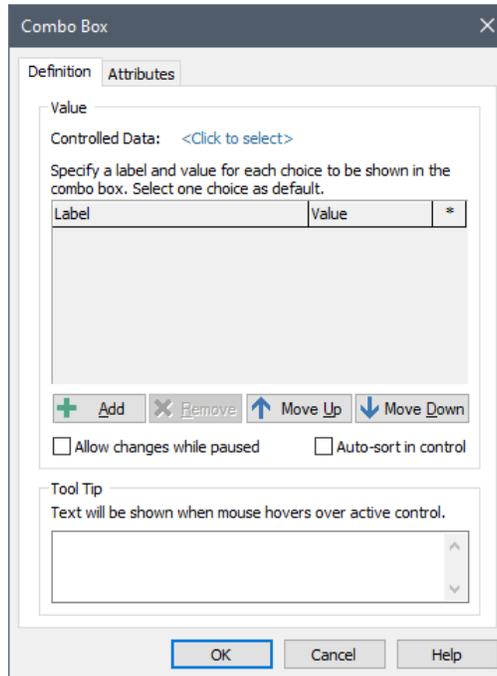
The Combo Box control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

Note, however, that resizing the control does not resize the text strings (choices) inside the control; it simply adds empty space around the control. The font size for the text strings is fixed (they use the default GUI font specified by the operating system).

Double-clicking on the control displays the following properties dialog:



Within the Value portion of the dialog, the Data element to which the control is to be linked is specified. You do this by pressing **<Click to select>**. This will display a browser which shows all of the scalar value Data elements in the model (condition Data elements are not listed).

Once you have linked the control to an element, the linked element will be listed:

Controlled Data: [Data1](#) X

You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

In addition, once you have linked the control to an element, a single row is added to the grid of choices:

Specify a label and value for each choice to be shown in the combo box. Select one choice as default.

Label	Value	*
Data1	2	<input checked="" type="checkbox"/>

You add and remove new rows using the **Add** and **Remove** buttons. For each row, you specify a Label (a text string), and a Value. Note that you cannot specify a link or expression in Value field. In fact, *this field only accepts numbers without units*. If the Data element has dimensions, this field assumes that the value is being specified in the display units of the Data element (which are displayed in the header for the column).

The column labeled “*” is used to specify which of the choices is the default value. The default value can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the field in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the field prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the field while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

The **Move Up** and **Move Down** buttons allow you to change the order in which the choices will appear in the List Box. If **Auto-sort in control** is checked, GoldSim will automatically sort the choices in alphabetical order when they appear in the control (it will not change the order in the dialog).

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Input Grid Control

The Input Grid provides an alternative to creating numerous individual controls and positioning them in a Dashboard by allowing you to create a grid of

controls. The grid cells can reference scalar, vector or matrix Data elements, and can be Edit boxes, Check boxes or Combo boxes:

Volume [m3]	10500
Flow Rate [m3/day]	150
Depth [m]	14.5
Number of Pumps	3 ▾
Recycle Pump	<input checked="" type="checkbox"/> Pump On

The toolbar button looks like this:



Input Grid Control Toolbar Button

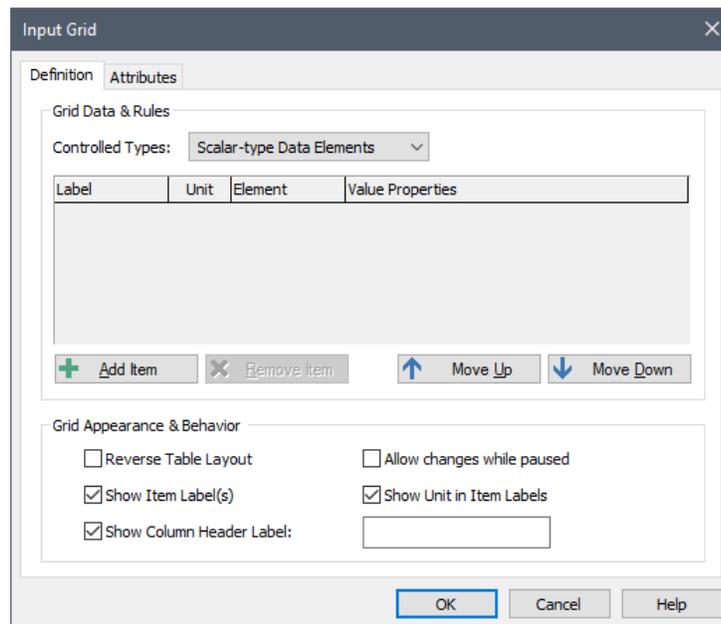
The Input Grid control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

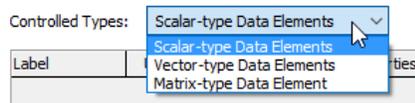
Note, however, that resizing the control does not resize the text (labels or numbers) inside the control; it simply adds empty space around the control. The font size for the text and numbers is fixed (they use the default GUI font specified by the operating system).

Double-clicking on the control displays the following properties dialog:



The first step in using the Input Grid control is to specify the type of Data elements that it will be used to control using the **Controlled Types** drop-list. An Input Grid can control either a specified number of scalar Data elements, a specified number of vector Data elements, or a single Matrix Data element:

Referencing One or More Scalars Using an Input Grid Control

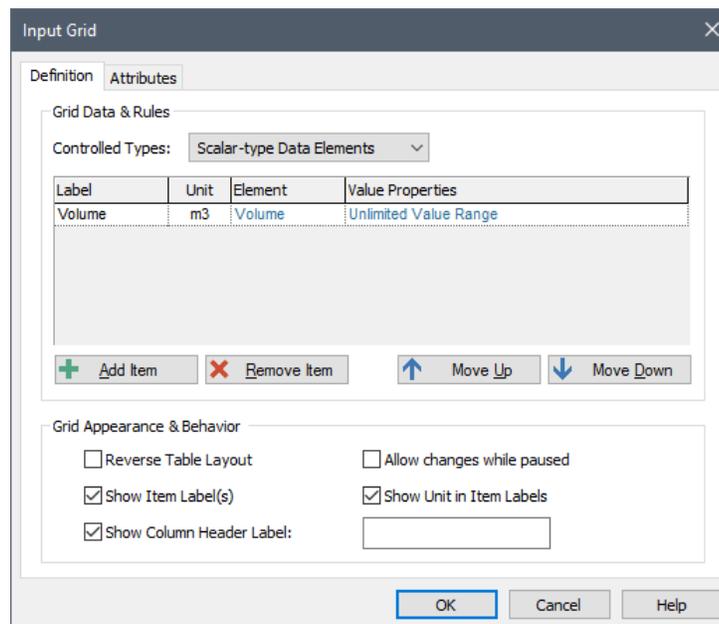


The manner in which the Input Grid control is used for each of these types is described below.

If you select “Scalar-type Data Elements” (the default) from the **Controlled Types** drop-list in the Input Grid control dialog, you can use the Input Grid to control one or more scalar Data elements.

To do so, you must first specify the scalar Data elements that you wish to add to the grid. This is done by pressing the **Add Item** button. This will display a browser which shows all of the scalar Data elements in the model.

Once you select an element, the dialog will look like this:



You can remove a selected element (by pressing **Remove Item**), or select a different element by pressing the name of the element itself. Once you have added multiple elements, the **Move Up** and **Move Down** buttons allow you to control the order that the items appear in the grid.

By default, grid cells are displayed in the Dashboard as simple edit boxes (with no minimum or maximum value and a default value of 0). You can specify minimum and maximum values, and edit other grid cell properties (i.e., controlling whether they are edit boxes, check boxes or combo boxes) by clicking the blue text corresponding to that particular cell in the “Value Properties” column.

Read more: [Defining Grid Cell Properties](#) (page 42).

The check boxes in the “Grid Appearance & Behavior” section of the dialog control how the input grid appears in the Dashboard. The **Show Item Label(s)** and **Show Unit in Item Labels** are on by default, such that the grid appears like this in the Dashboard:

Volume [m3]	10500
Flow Rate [m3/day]	150
Depth [m]	14.5

You can choose to hide the labels and units by clearing the boxes.

If you select **Show Column Header Labels** and enter a label (e.g., “Enter a Value”), it appears like this:

	Enter a Value
Volume [m3]	10500
Flow Rate [m3/day]	150
Depth [m]	14.5

If you select **Reverse Table Layout**, the rows and columns are reversed:

	Volume [m3]	Flow Rate [m3/day]	Depth [m]
Enter a Value	10500	150	14.5

Within a Dashboard, if the grid is too small to display all of the grid cells, scroll bars are added.



Note: When a Dashboard is active (such that controls can be edited) either in GoldSim or the GoldSim Player, you can paste multiple data points from the clipboard (e.g., which may have been copied from a spreadsheet) into a grid. Several points should be noted: 1) if pasting into a Check Box, only 0 and 1 are recognized; 2) if pasting into a Combo Box, only matching text (not case-sensitive) is recognized; and 3) the orientation must be consistent (e.g., if you are pasting a column of data, the grid must be a column, not a row).

The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the input grid in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the grid prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the grid while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

Referencing One or More Vectors Using an Input Grid Control

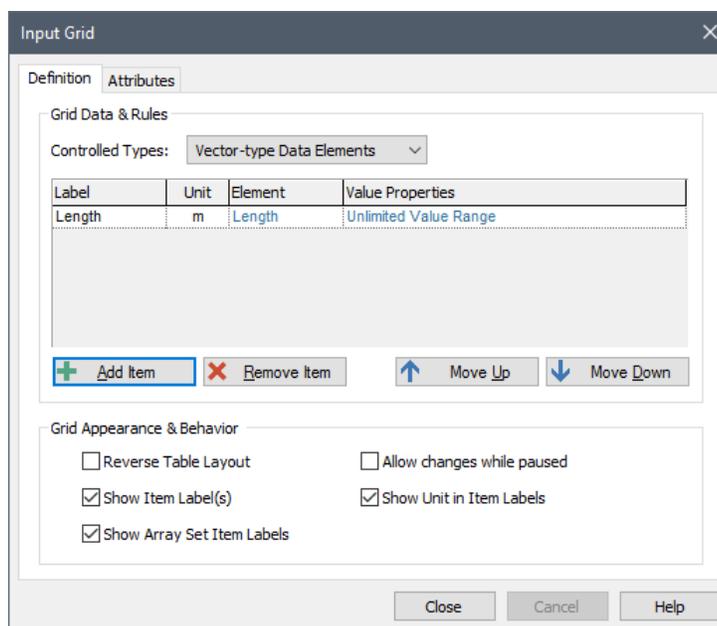
If you select “Vector-type Data Elements” (the default) from the **Controlled Types** drop-list in the Input Grid control dialog, you can use the Input Grid to control one or more vector Data elements.

To do so, you must first specify the vector Data elements that you wish to add to the grid. This is done by pressing the **Add Item** button. This will display a browser which shows all of the vector Data elements in the model.



Note: Once you select the first Data vector, it determines what other vectors can be added to the grid. All the vectors in the grid must have the same Array Label Set.

Once you select an element, the dialog will look like this:



You can remove a selected element (by pressing **Remove Item**), or select a different element by pressing the name of the element itself. Once you have added multiple elements, the **Move Up** and **Move Down** buttons allow you to control the order that the items appear in the grid.

By default, grid cells are displayed in the Dashboard as simple edit boxes (with no minimum or maximum value and a default value of 0). You can specify minimum and maximum values, and edit other grid cell properties (i.e., controlling whether they are edit boxes, check boxes or combo boxes) by clicking the blue text corresponding to that particular cell in the “Value Properties” column.

Read more: [Defining Grid Cell Properties](#) (page 42).

The check boxes in the “Grid Appearance & Behavior” section of the dialog control how the input grid appears in the Dashboard. The **Show Item Label(s)**, **Show Unit in Item Labels**, and **Show Array Set Item Labels** are on by default, such that the grid appears like this in the Dashboard:

	Length [m]	Width [m]
NE	0	0
NW	0	0
SE	0	0
SW	0	0

In this example, two vectors (Length and Width) that have four items are displayed in the grid.

You can choose to hide the item labels, array set labels and units by clearing the boxes.

If you select **Reverse Table Layout**, the rows and columns are reversed:

	NE	NW	SE	SW
Length [m]	0	0	0	0
Width [m]	0	0	0	0

Within a Dashboard, if the grid is too small to display all of the grid cells, scroll bars are added.



Note: When a Dashboard is active (such that controls can be edited) either in GoldSim or the GoldSim Player, you can paste multiple data points from the clipboard (e.g., which may have been copied from a spreadsheet) into a grid. Several points should be noted: 1) if pasting into a Check Box, only 0 and 1 are recognized; 2) if pasting into a Combo Box, only matching text (not case-sensitive) is recognized; and 3) the orientation must be consistent (e.g., if you are pasting a column of data, the grid must be a column, not a row).

The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the input grid in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the grid prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the grid while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

Referencing a Matrix Using an Input Grid Control

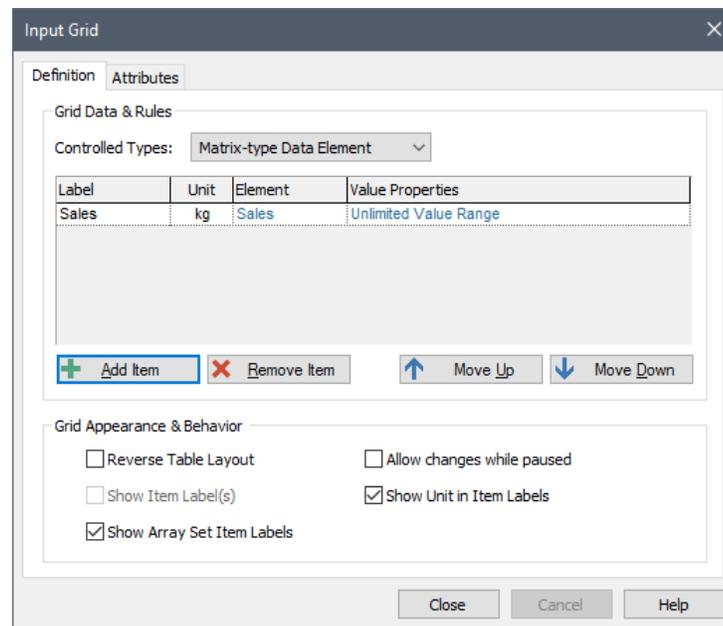
If you select “Matrix-type Data Elements” (the default) from the **Controlled Types** drop-list in the Input Grid control dialog, you can use the Input Grid to control a single Data elements.

To do so, you must first specify the matrix Data element that you wish to add to the grid. This is done by pressing the **Add Item** button. This will display a browser which shows all of the matrix Data elements in the model.



Note: You can only control a single matrix Data element in a grid.

Once you select an element, the dialog will look like this:



You can remove the selected element (by pressing **Remove Item**), or select a different element by pressing the name of the element itself.

By default, grid cells are displayed in the Dashboard as simple edit boxes (with no minimum or maximum value and a default value of 0). You can specify minimum and maximum values, and edit other grid cell properties (i.e., controlling whether they are edit boxes, check boxes or combo boxes) by clicking the blue text corresponding to that particular cell in the “Value Properties” column.

Read more: [Defining Grid Cell Properties](#) (page 42).

The check boxes in the “Grid Appearance & Behavior” section of the dialog control how the input grid appears in the Dashboard. The **Show Unit in Item Labels** and **Show Array Set Item Labels** are on by default, such that the grid appears like this in the Dashboard:

[kg]	Apples	Oranges	Peaches
NE	0	0	0
NW	0	0	0
SE	0	0	0
SW	0	0	0

In this example, the matrix has 4 rows and 3 columns.

Note the unit for the item, if shown, is indicated in the upper left hand corner of the grid.

You can choose to hide the item labels, array set labels and units by clearing the boxes.

If you select **Reverse Table Layout**, the rows and columns are reversed:

[kg]	NE	NW	SE	SW
Apples	0	0	0	0
Oranges	0	0	0	0
Peaches	0	0	0	0

Within a Dashboard, if the grid is too small to display all of the grid cells, scroll bars are added.



Note: When a Dashboard is active (such that controls can be edited) either in GoldSim or the GoldSim Player, you can paste multiple data points from the clipboard (e.g., which may have been copied from a spreadsheet) into a grid. Several points should be noted: 1) if pasting into a Check Box, only 0 and 1 are recognized; 2) if pasting into a Combo Box, only matching text (not case-sensitive) is recognized; and 3) the orientation must be consistent (e.g., if you are pasting data with 5 rows and 3 columns, the grid should consist of 5 rows and 3 columns).

The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the input grid in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the grid prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the grid while the model is paused in the middle of a simulation.

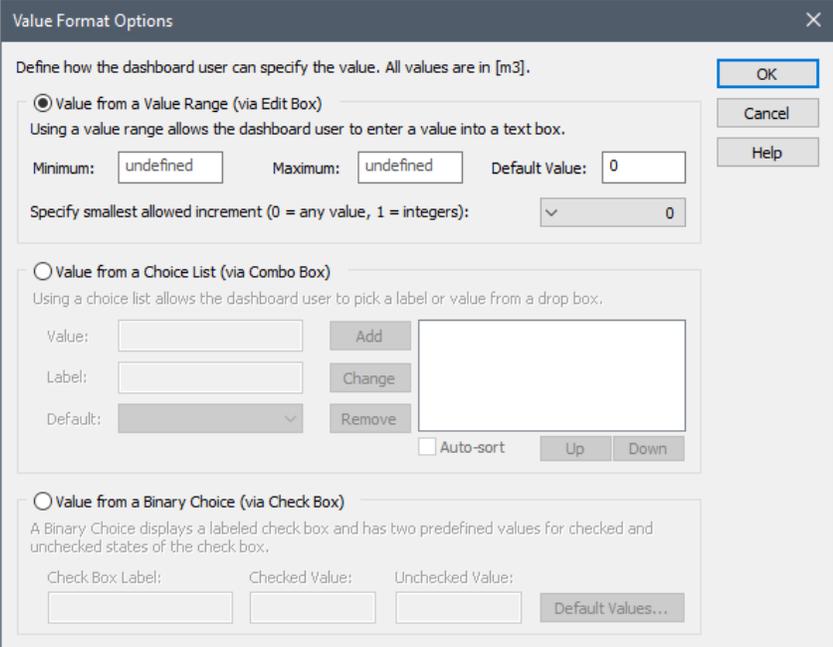


Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

Defining Grid Cell Properties

By default, grid cells are displayed in the Dashboard as simple edit boxes (with no minimum or maximum value and a default value of 0). You can specify minimum and maximum values, and edit other grid cell properties (i.e., controlling whether they are edit boxes, check boxes or combo boxes) by clicking the blue text corresponding to that particular cell in the “Value Properties” column.

When you do so, the following dialog will appear:



The dialog box, titled "Value Format Options", contains the following sections:

- Value from a Value Range (via Edit Box)**: This is the selected option. It includes fields for Minimum (undefined), Maximum (undefined), and Default Value (0). There is also a dropdown for "Specify smallest allowed increment (0 = any value, 1 = integers)" set to 0.
- Value from a Choice List (via Combo Box)**: This section includes fields for Value, Label, and Default, along with Add, Change, and Remove buttons. It also has an Auto-sort checkbox and Up/Down buttons.
- Value from a Binary Choice (via Check Box)**: This section includes fields for Check Box Label, Checked Value, and Unchecked Value, along with a Default Values... button.

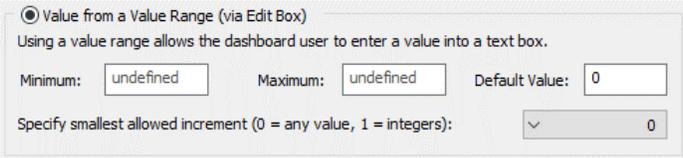
The dialog has three radio buttons that you use to select whether the grid cell (or cells if the item is a vector or a matrix) is displayed in the grid as an Edit Box, a Combo Box or a Check Box.

Each of these options is described below.

Specifying Grid Cells as Edit Boxes

By default, grid cells are displayed in the Dashboard as simple edit boxes (with no minimum or maximum value and a default value of 0). You can specify minimum and maximum values, and edit other grid cell properties (i.e., controlling whether they are edit boxes, check boxes or combo boxes) by clicking the blue text corresponding to that particular cell in the “Value Properties” column.

The first radio button (Edit Box) is the default. If this option is selected, you must specify the following information:



This image shows a close-up of the "Value from a Value Range (via Edit Box)" section of the dialog. It includes the following fields:

- Minimum: undefined
- Maximum: undefined
- Default Value: 0
- Specify smallest allowed increment (0 = any value, 1 = integers): 0

The **Minimum** and **Maximum** values define the range of values that the input field will accept. By default they are undefined, which means that the range of values is unrestricted. (You can reset a field to “undefined” by simply leaving it blank.) If the Dashboard user enters a value outside of this range, an error will be displayed, and the value will not be accepted.

The **Default** value can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).

Specify smallest allowed increment is a drop list that lets you control the precision of the values that are entered into the cell in the Dashboard. For example, if you select 0.1 in this field, the user can only enter values that are multiples of 0.1; if you enter 100 in this field, the user can only enter values that are multiples of 100. If the Dashboard user enters a value that does not meet the requirements, an error will be displayed, and the value will not be accepted. The default value of 0 puts no constraints on the value.



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.



Note: You cannot specify a link or expression in the **Default**, **Minimum** and **Maximum** fields. In fact, *these fields only accept numbers without units*. If the Data element has dimensions, these fields assume that the value is being specified in the display units of the Data element (which is displayed at the top of the dialog).



Note: If the item is a condition, the **Minimum** and **Maximum** are fixed (False and True, respectively). The **Default** needs to be entered as either 0 (treated as False) or 1 (treated as True). Within the Dashboard, users must enter either 0 or 1 (they cannot enter True or False). Hence, in general, if you have a condition input in a grid, it would be more transparent to define it as a Combo Box or a Check Box.

If the item is a vector or a matrix, a Default value is specified for each entry in the array via a **Default Values...** button, which displays the following dialog:

Day	Default Value
Sunday	0
Monday	0
Tuesday	0
Wednesday	0
Thursday	0
Friday	0
Saturday	0

You can specify the default value for each array item individually, or specify a single value and apply it to all entries.



Note: You cannot specify a link or expression in the fields in this dialog. In fact, *these fields only accept numbers without units*. If the Data element has dimensions, these fields assume that the value is being specified in the display units of the Data element (which is displayed in the title bar of the dialog).

Specifying Grid Cells as Combo Boxes

By default, grid cells are displayed in the Dashboard as simple edit boxes (with no minimum or maximum value and a default value of 0). You can specify minimum and maximum values, and edit other grid cell properties (i.e., controlling whether they are edit boxes, check boxes or combo boxes) by clicking the blue text corresponding to that particular cell in the “Value Properties” column.

The second radio button allows you to define the grid cell as a Combo Box. If this option is selected, this portion of the dialog becomes active:

You add Value/Label pairs to the Combo Box by entering a **Value** and a **Label**, and pressing the **Add** button. (If you omit a Label, the Value is used for the Label.) Once you have added one or more Value/Label pairs, you can edit them or remove them from the list using the **Change** and **Remove** buttons, and change the order they appear in the list using the **Up** and **Down** buttons. If you select **Auto-sort**, they will automatically be sorted into alphabetical order when the control appears in the Dashboard.



Note: You cannot specify a link or expression in the **Value** field. In fact, *this field only accepts numbers without units*. If the Data element has dimensions, these fields assume that the value is being specified in the display units of the Data element (which is displayed at the top of the dialog).



Note: If the item is a condition, the two choices default to True and False, and you cannot add or delete any choices. You can change the labels if required (e.g., On and Off).

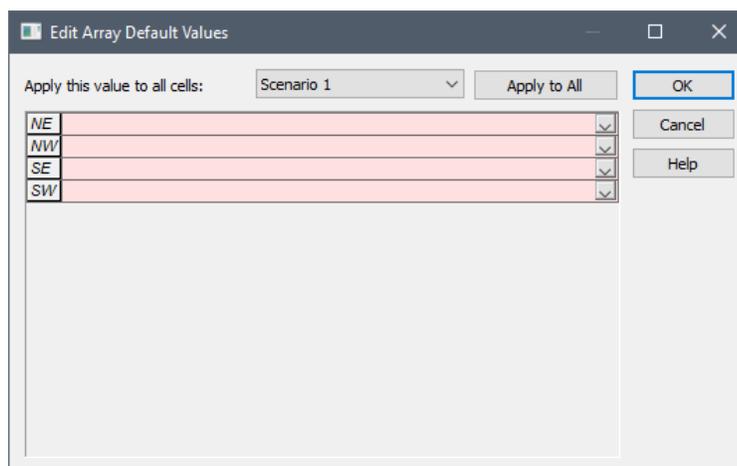
The **Default** is a drop-list with the labels for all of the choices in the list. This Default can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

If the item is a vector or a matrix, a Default choice is specified for each entry in the array via a **Default Values...** button, which displays the following dialog:

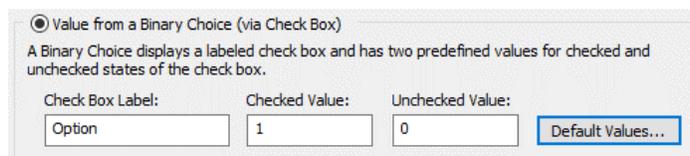


You can specify the default choice for each array item individually, or specify a single choice and apply it to all entries.

Specifying Grid Cells as Check Boxes

By default, grid cells are displayed in the Dashboard as simple edit boxes (with no minimum or maximum value and a default value of 0). You can specify minimum and maximum values, and edit other grid cell properties (i.e., controlling whether they are edit boxes, check boxes or combo boxes) by clicking the blue text corresponding to that particular cell in the “Value Properties” column.

The third radio button allows you to define the grid cell as a Check Box. If this option is selected, this portion of the dialog becomes active:



You specify a **Check Box Label**, and the value that the referenced element takes on when the box is **Checked** and **Unchecked**.



Note: You cannot specify a link or expression in the **Value** fields. In fact, *these fields only accept numbers without units*. If the Data element has dimensions, these fields assume that the value is being specified in the display units of the Data element (which is displayed at the top of the dialog).



Note: If the item is a condition, Checked Value is True (indicated as 1 in the dialog), and the Unchecked Value is False (indicated as 0 in the dialog). You cannot change these definitions.

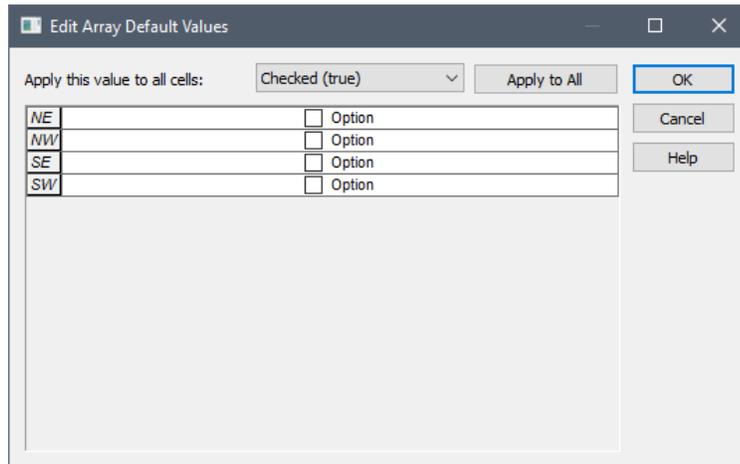
The **Default** box determines whether the box is checked or unchecked as its default state. This Default can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

If the item is a vector or a matrix, a Default choice is specified for each entry in the array via a **Default Values...** button, which displays the following dialog:



You can specify the default choice for each array item individually, or specify a single choice and apply it to all entries.

Disabling or Hiding an Input Grid Control

The **Attributes** tab of the Input Grid dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Date-Time Control

GoldSim allows you to enter dates in Data elements (and expressions in other input fields) by enclosing the date in quotation marks. The format for referencing a date is determined by the Regional and Language time/date settings specified by the operating system. For example, for a computer in the US, the following formats would all be valid ways for referencing October 1, 2009:

- “10/1/2009”
- “10-1-2009”
- “October 1, 2009”
- “1 October 2009”

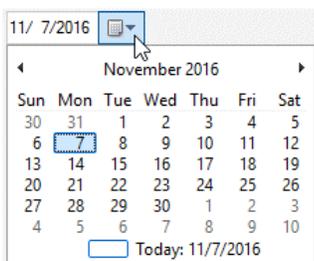
A date is internally converted to a Julian time (in particular, the time since December 30, 1899 00:00:00). Hence, a date has dimensions of time.

You would typically reference a date in conjunction with DateTime, as shown below:

```
Equation
if(DateTime > "15 April 2009", 10, 20)
```

(Referencing dates in this way is discussed in more detail in Chapter 4 of the **GoldSim User's Guide**).

As a result, in some cases, you may need to enter a date or date and a time into a Dashboard. The Date-Time control allows you to easily enter dates directly via a Dashboard. An example of its use is shown below:

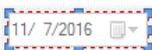


The toolbar button looks like this:



Date-Time Control Toolbar Button

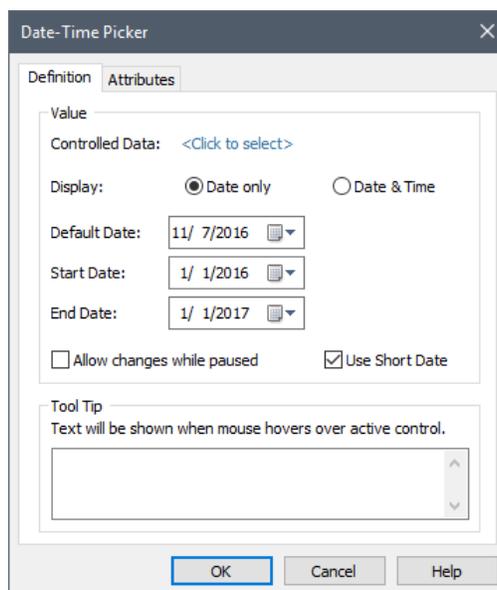
The Date-Time control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

Note, however, that resizing the control does not resize the date strings inside the control; it simply adds empty space around the control. The font size for the date strings is fixed (they use the default GUI font specified by the operating system).

Double-clicking on the control displays the following properties dialog:



Within the Value portion of the dialog, the Data element to which the control is to be linked is specified. You do this by pressing **<Click to select>**. This will

display a browser that shows all of the scalar Data elements in the model *that have units of time*.

Once you have linked the control to an element, the linked element will be listed:

Controlled Data: [Data1](#) 

You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

The two **Display** radio buttons allow you to select whether you wish to edit only dates or both dates and times in the Dashboard:



The image shows two radio buttons. The first is labeled 'Date only' and is selected. The second is labeled 'Date and Time'. Above the 'Date only' button is a date field with a dropdown arrow, showing '11/ 7/2016'. Above the 'Date and Time' button are two fields: a date field with a dropdown arrow showing '11/ 7/2016' and a time field with a dropdown arrow showing '12:00:00 AM'.

The **Start Date** and **End Date** fields define the range of dates that the control will accept. If the Dashboard user enters a date outside of this range, an error will be displayed, and the date will not be accepted.

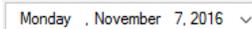
The **Default Date** can be used in conjunction with an optional Button control that the Author can provide in a Dashboard that allows the Player user to reset all input controls to default values.

Read more: [Resetting Default Values Using a Button](#) (page 87).



Note: Within GoldSim, you can reset all of the input controls in a Dashboard to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**.

By default, the **Use Short Date** box is checked. If this box is cleared, a longer date string (that includes the day of the week) will appear in the Dashboard:



The image shows a date field with a dropdown arrow, displaying the text 'Monday . November 7, 2016'.

The **Allow changes while paused** check box determines whether Dashboard users will be able to edit the field in the middle of a simulation (i.e., after the model is paused). If this check box is cleared (the default) the user can only edit the field prior to the start of the simulation. If the model is paused, the field will not be editable. If the check box is checked, the user will be permitted to edit the field while the model is paused in the middle of a simulation.



Note: Even if this box is checked, if the model contains any scenarios, no changes can be made while the model is paused.

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Connecting a Data Element to Multiple Input Controls

In some situations you may want to connect more than one input control to the same Data element. GoldSim allows you to do this.

However, there are limitations in how this can be used. In particular, *a Data element can only be linked to multiple controls if all of the controls are of the same type*. For example, a Data element can be referenced by two different Check Box controls, but it cannot be referenced by a Check Box control and an Edit Box control at the same time.



Note: The one exception to this rule is the Input Grid control. Once you have referenced a Data element in an Input Grid control, that element cannot be referenced by any other control (including another Input Grid control). That is, any element referenced by an Input Grid control can only be referenced once.

When a Data element is linked to two or more controls, when the model is viewed in a Dashboard and one of the controls is changed, any other input control linked to the same Data element responds instantaneously. For example, if two Slider controls were linked to the same Data element, whenever one Slider was moved, the other would also move.

More importantly, if you edit any of the Value properties for one of the controls (e.g., the Minimum or the Default value), these are automatically changed in all the other controls that references the same Data element.

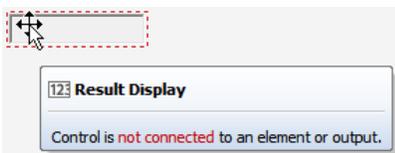
Output Controls

Output controls provide a mechanism by which a Dashboard can display the outputs of a GoldSim model. This is done by linking the control to the output of an element within the model. There are six output controls:

- Result Display;
- Digital Result Display;
- Thermometer;
- Result Status Display;
- Text Result; and
- Result Window.

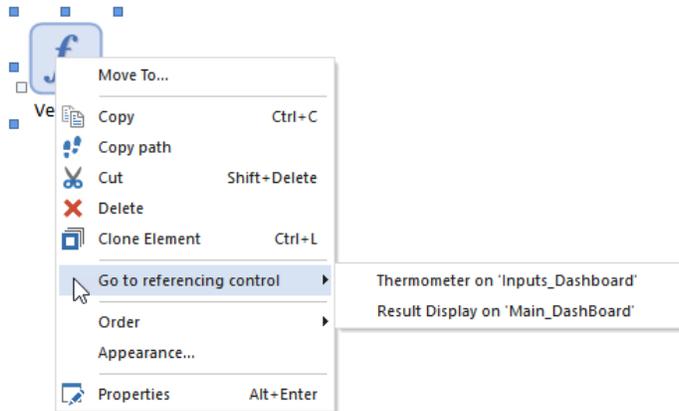
Unlike an input control, an output control can be linked to almost any kind of element. There is, however, one important restriction: *output controls are intended to display scalar outputs*. Hence, if you wish to link the control to a vector or a matrix, you must select a single item from the array.

If a control is not yet connected to an element, GoldSim indicates this by outlining the control with a dashed red line:

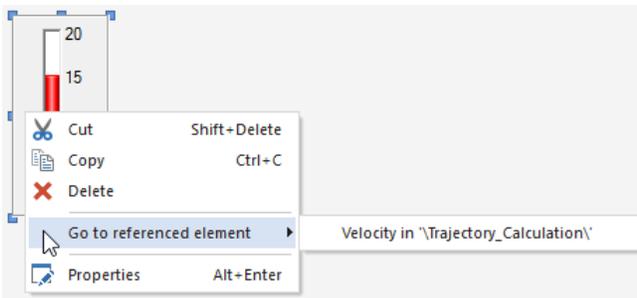


When viewed in the Player, a control that was not connected to an element would simply be grayed out.

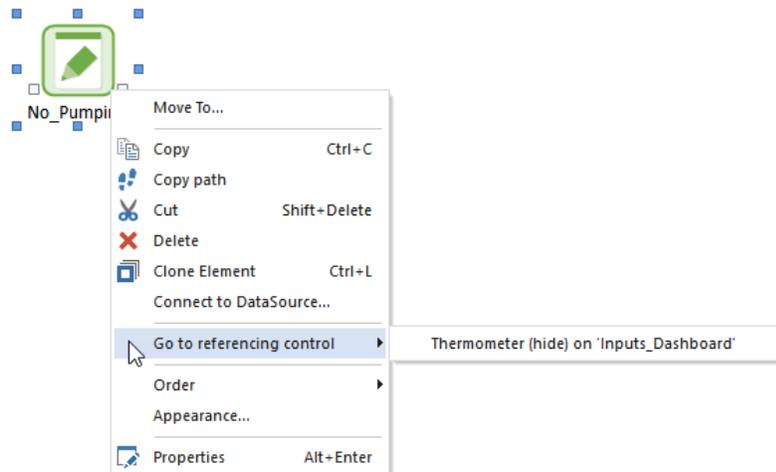
If you right-click on an element that is linked to one or more output controls, you can immediately jump to those controls:



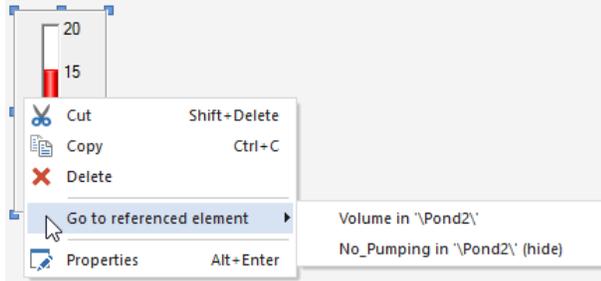
Similarly, if an output control is linked to an element, you can jump to the connected element from the control's context menu:



Note that if an element is not directly linked to an output control, but is referenced by the control in order to hide and/or disable it, this is also indicated in the context menu for the element:



Similarly, if a control has specified attributes that reference outputs for hiding and/or disabling the control, the element(s) associated with these outputs are displayed in the context menu for the control:



Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

The property dialogs for the various output controls are described in detail below.

Result Display Control

The most basic and versatile of the output controls is the Result Display control. This control provides a mechanism for viewing scalar outputs directly.

The toolbar button looks like this:



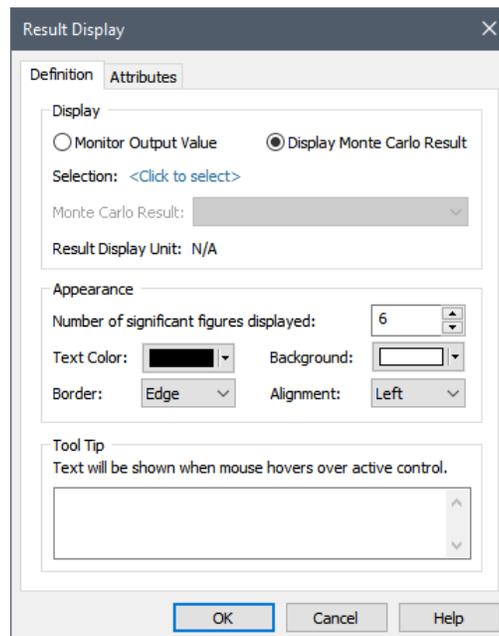
Result Display Control Button

The Result Display control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

Double-clicking on the control displays the following properties dialog:



Within the Display portion of the dialog, the output to which the control is to be linked is specified. Before doing so, however, you must specify the type of result you wish to display:

Monitor Output Value: This is the default, and will display the actual value of the selected output.

Display Monte Carlo Result: This should be selected if you wish to display a statistical result for an output from a Monte Carlo simulation (e.g., the mean value or a particular percentile).

After selecting the type of result you wish to display, you select the specific output by pressing **<Click to select>**. This will display a browser for selecting the element of interest. If you have selected “Monitor Output Value”, the browser will contain all elements in the model. In this case, any scalar output can be selected. If you have selected “Display Monte Carlo Result”, the browser will contain only the Distribution Result elements in the model (i.e., in this case, you must link to a Distribution Result element, and the first result in the element will be used).

Read more: [Displaying Statistical Results in Output Controls](#) (page 77).

Once you have linked the control to an element, the linked element will be listed:

You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

Note that if you have selected “Display Monte Carlo Result”, you must also display the type of statistical result to display:



Note: Result Display controls can be linked to both values and conditions. If the control is linked to a condition and “Monitor Output Value” is selected, the manner in which the result is displayed in the control (e.g., true/false, on/off, yes/no) is determined by the field labeled “Show condition result outputs as” within the **Results** tab of the Options dialog (accessed via **Model|Options...** in the main menu). If the control is linked to a condition and “Display Monte Carlo Result” is selected, statistics are generated by assuming True = 1 and False = 0.

If the output to which the control is linked has dimensions, the display units for the output will automatically be appended when the value is displayed in the control:

3.5 kg

The **Number of significant figures displayed** field allows you to specify the number of significant figures displayed in the control. (Note, however, that the control omits trailing zeros). Whether or not the value is displayed in scientific notation is can be controlled via options provided in the **Results** tab of the Options dialog (accessed via the main menu via **Model | Options...**).

The remainder of the **Appearance** section of the properties dialog allows you to modify the Text Color, Background (color), text Alignment, and type of Border for the display. These options are self-explanatory, and you may want to experiment with them to see how they change the control's appearance.



Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User's Guide**.

The size of the numbers displayed in the field is controlled by the size of the control (GoldSim scales up the font size to match the control size).



Note: You cannot select the font for a Result Display control. GoldSim always uses the default GUI font used by the operating system. The font is dynamically scaled based on the height of the control.

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Digital Result Display Control

The Digital Result Display control provides another mechanism for viewing scalar outputs directly. Its behavior is identical to that of the Result Display control, with three exceptions:

- The display has the appearance of a digital readout;
- The control cannot be connected to condition outputs; and
- The units for the output are not appended to the end of the display.

The toolbar button looks like this:



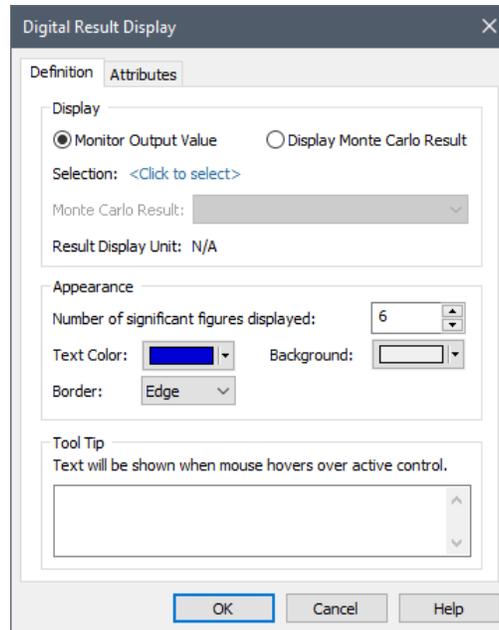
Digital Result Display Control Button

The Digital Result Display control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shift key, the change is 5 pixels).

Double-clicking on the control displays the following properties dialog:



Within the Display portion of the dialog, the output to which the control is to be linked is specified. Before doing so, however, you must specify the type of result you wish to display:

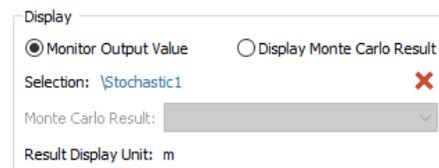
Monitor Output Value: This is the default, and will display the actual value of the selected output.

Display Monte Carlo Result: This should be selected if you wish to display a statistical result for an output from a Monte Carlo simulation (e.g., the mean value or a particular percentile).

After selecting the type of result you wish to display, you select the specific output by pressing **<Click to select>**. This will display a browser for selecting the element of interest. If you have selected “Monitor Output Value”, the browser will contain all elements in the model. In this case, any scalar value output can be selected. If you have selected “Display Monte Carlo Result”, the browser will contain only the Distribution Result elements in the model (i.e., in this case, you must link to a Distribution Result element, and the first result in the element will be used).

Read more: [Displaying Statistical Results in Output Controls](#) (page 77).

Once you have linked the control to an element, the linked element will be listed:



You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

Note that if you have selected “Display Monte Carlo Result”, you must also display the type of statistical result to display:



Note: Digital Result Display controls can only be linked to value outputs. If you wish to display a condition output, you must use a regular (non-digital) Result Display control.

A Digital Result Display control looks like this when it is linked to an output:



Note: Digital Result Display controls only show the output value. The value is displayed in terms of the display units of the output that it is linked to. However, unlike Result Display controls, the display units themselves are not shown in a Digital Result Display. If you wish to display the units in the control, you must use a regular (non-digital) Result Display control. Alternatively, you should indicate the units manually (using text) next to the control.

The **Number of significant figures displayed** field allows you to specify the number of significant figures displayed in the control. (Note, however, that the control omits trailing zeros). Note that a Digital Result Display cannot display values in scientific notation.

The remainder of the **Appearance** section of the properties dialog allows you to modify the Text Color, Background (color), and type of Border for the display. These options are self-explanatory, and you may want to experiment with them to see how they change the control's appearance.



Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User's Guide**.

The size of the numbers displayed in the field is controlled by the size of the control (GoldSim scales up the font size to match the control size).

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Thermometer Control

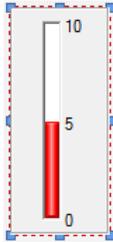
Thermometer output controls allow outputs to be viewed as thermometers. The thermometer can be oriented vertically or horizontally.

The toolbar button looks like this:



Thermometer Control Button

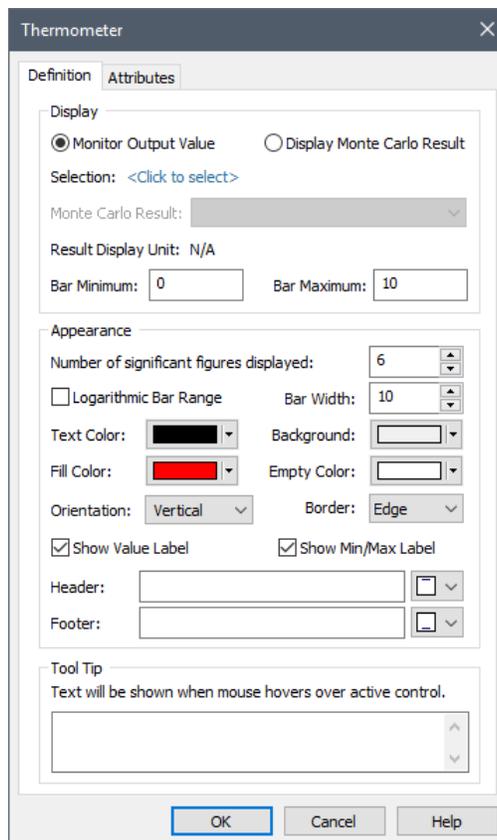
The Thermometer control looks like this when it is added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

Note, however, that as discussed below, resizing the control does not resize the labels. The label font size is fixed (it uses the default GUI font specified by the operating system).

Double-clicking on the control displays the following properties dialog:



Within the Display portion of the dialog, the output to which the control is to be linked is specified. Before doing so, however, you must specify the type of result you wish to display:

Monitor Output Value: This is the default, and will display the actual value of the selected output.

Display Monte Carlo Result: This should be selected if you wish to display a statistical result for an output from a Monte Carlo simulation (e.g., the mean value or a particular percentile).

After selecting the type of result you wish to display, you select the specific output by pressing **<Click to select>**. This will display a browser for selecting the element of interest. If you have selected “Monitor Output Value”, the browser will contain all elements in the model. In this case, any scalar value output can be selected. If you have selected “Display Monte Carlo Result”, the browser will contain only the Distribution Result elements in the model (i.e., in this case, you must link to a Distribution Result element, and the first result in the element will be used).

Read more: [Displaying Statistical Results in Output Controls](#) (page 77).

Once you have linked the control to an element, the linked element will be listed:

You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

Note that if you have selected “Display Monte Carlo Result”, you must also display the type of statistical result to display:

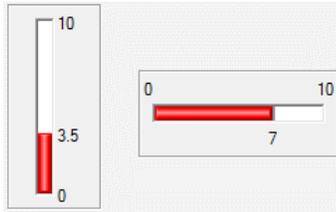


Note: Thermometer controls can only be linked to value outputs (they cannot be linked to conditions).

The **Bar Minimum** and **Bar Maximum** define the range of values represented on the Thermometer. Note that you cannot specify a link or expression in these fields. In fact, *these fields only accept numbers without units*. If the output has dimensions, these fields assume that the value is being specified in the display units of the output (which is displayed directly to the right of these two fields).

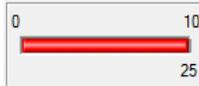
The Thermometer control provides a wide variety of options for controlling the appearance of the control. The most fundamental of these are the **Orientation**, and whether the Thermometer displays the values (**Show Value Label**) and minimum and maximum labels (**Show Min/Max Label**). By default, a Thermometer is vertical and all labels are on. You can make the Thermometer horizontal by changing the **Orientation**. (You can also make the Thermometer horizontal when it is inserted by holding the **Ctrl** key down when you click on the Thermometer button in the toolbar).

The minimum, maximum and value labels always appear to the right of a vertical Thermometer. If the Thermometer is horizontal, the minimum and maximum labels are always on top, and the value label is on the bottom:



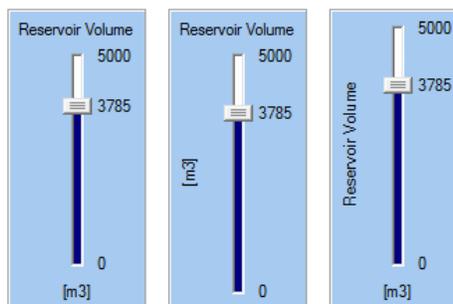
Note: In a vertical Thermometer, minimum or maximum labels are automatically hidden if the value label would otherwise overlap them.

If the value of the output displayed by the Thermometer is outside of the range of the control (i.e., less than the **Minimum** or greater than the **Maximum**), the actual value is displayed at the limit of the Thermometer:

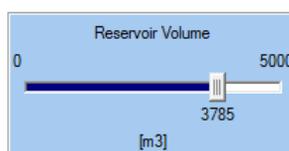


The **Logarithmic Bar Range** check box does not change the appearance directly. Rather, it simply changes the way that the current value is displayed between the minimum and maximum (by dividing the range logarithmically rather than linearly). If you do choose a logarithmic scale, it is recommended that you indicate this in the Header or Footer labels (see below).

The **Header** and **Footer** fields allow you add labels to your Thermometer (e.g., describing what is being displayed, the units, and whether it is a logarithmic scale). The drop list to the right of these fields determines where the label is placed. For a vertical Thermometer, the Header can be at the top (left, centered or right justified) or on the left side (rotated 90°); and the Footer can be at the bottom (left, centered or right justified) or on the left side (rotated 90°). Three possible combinations of these options are shown below:



For a horizontal Thermometer, the options are more limited: the Header must be at the top (left, centered or right justified) and the Footer must be at the bottom (left, centered or right justified):



The **Number of significant figures displayed** field allows you to specify the number of significant figures displayed in the control. It applies to the minimum and maximum labels, as well as the value label. Trailing zeros after a decimal are omitted. (In the examples above, this field has been set to 4).



Note: You cannot select the font or font size for any of the labels in a Thermometer control. GoldSim always uses the default GUI font and font size used by the operating system.

The remaining options at the bottom of the dialog allow you to determine how the Thermometer control will appear on the Dashboard. The **Background** refers to the color of the body of the control. The **Text Color** controls the color of all the labels. The **Empty Color** refers to the “unfilled” portion of the Thermometer, while the **Fill Color** refers to the “filled” portion of the Thermometer. The **Bar Width** controls the thickness of the thermometer bar itself. The size is specified in pixels, and can range from 4 to 100 (the default is 10). The **Border** determines the appearance of the border of the control. You will likely want to experiment with these options to see how they change the control’s appearance.



Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User’s Guide**.

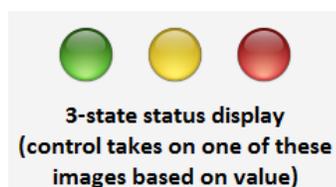
The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Result Status Display Control

The Result Status Display control allows you to display one of a series of icons based on the value of an output (e.g., if the value is less than 10, display a Green circle, if the value is between 10 and 30 display a yellow circle, and if the value is greater than 30 display a red circle):



This can be used to visually indicate the state of a variable in your Dashboard (e.g., whether a pump is on or off; whether a variable has reached a dangerous level).

The toolbar button looks like this:



Result Status Display Control Button

The Result Status Display control looks like this when it is first added to a Dashboard and selected:



The eight handles allow you to resize the control (and the associated images).

Double-clicking on the control displays the following properties dialog:

Within the Display portion of the dialog, the output to which the control is to be linked is specified. Before doing so, however, you must specify the type of result you wish to display:

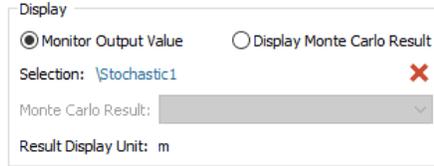
Monitor Output Value: This is the default, and will display the actual value of the selected output.

Display Monte Carlo Result: This should be selected if you wish to display a statistical result for an output from a Monte Carlo simulation (e.g., the mean value or a particular percentile).

After selecting the type of result you wish to display, you select the specific output by pressing **<Click to select>**. This will display a browser for selecting the element of interest. If you have selected “Monitor Output Value”, the browser will contain all elements in the model. In this case, any scalar output can be selected. If you have selected “Display Monte Carlo Result”, the browser will contain only the Distribution Result elements in the model (i.e., in this case, you must link to a Distribution Result element, and the first result in the element will be used).

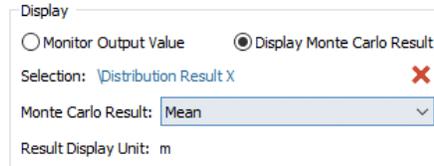
Read more: [Displaying Statistical Results in Output Controls](#) (page 77).

Once you have linked the control to an element, the linked element will be listed:



You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

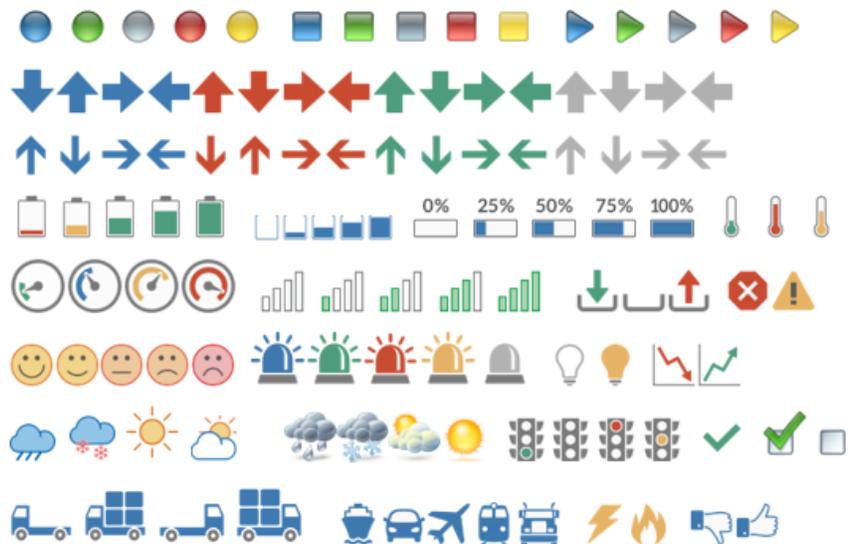
Note that if you have selected “Display Monte Carlo Result”, you must also display the type of statistical result to display:



Note: Result Status Display controls can be linked to both values and conditions. If the control is linked to a condition and “Monitor Output Value” is selected, icons must be selected for True and False. If the control is linked to a condition and “Display Monte Carlo Result” is selected, however, statistics are generated by assuming True = 1 and False = 0 (and hence icons are chosen for values ranging from 0 to 1).

Once you have selected the element that will be monitored, you must then select the set of icons that will be used to indicate various states. In the example above (the default setting), the control represents two states: if the value is less than or equal to 0, an unlit lightbulb will be displayed; if the value is greater than 0, a lit lightbulb will be displayed.

GoldSim provides a collection of preset icons that can be used. The complete set is shown below:

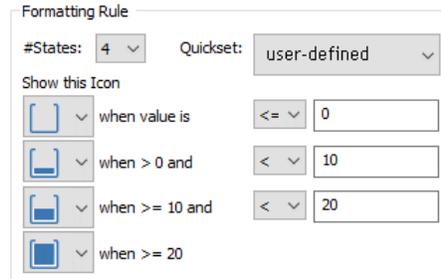


There are two ways to select icons. The easiest way to select a set of icons from the **Quickset** drop-list. This provides a number of logical sets that you can select from. Alternatively, you can select the number of states you wish to have

(#States) and then select the icon for each state from a drop list. GoldSim supports from two to five states.

In either case, you must assign the conditions pertaining to each state (i.e., the set of values that results in each icon being displayed).

For example, in this case, four different states have been selected, with four different icons:



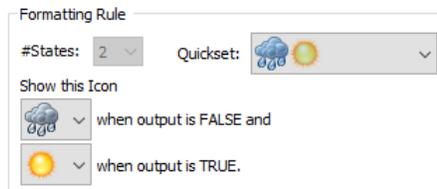
In this example,

- An empty container is displayed if the value is ≤ 0 ;
- A slightly full container is displayed if the value is > 0 and < 10 ;
- A half full container is displayed if the value is ≥ 10 and < 20 ; and
- A full container is displayed if the value is ≥ 20 .

The conditional operators ($<$, \leq , $>$, \geq) can be controlled via drop-lists. Note, however, that GoldSim ensures that they are consistent in terms of whether the choices change with increasing or decreasing values. That is, if one operator is $>$ or \geq , all the other conditions must also be $>$ or \geq .

The fields to the right of each conditional operator *only accept numbers without units*. If the element has dimensions, these fields assume that the value is being specified in the display units of the element (which is displayed at the top of the dialog).

Result Status Display controls can be linked to both values and conditions. If the control is linked to a condition (and “Monitor Output Value” is selected such that only two outcomes are possible), #States is fixed at 2, and the first icon is shown when the element is False, and the second icon is displayed when the image is True:



The **Appearance** section of the properties dialog allows you to modify the Background (color), and type of Border for the icons that are displayed. These options are self-explanatory, and you may want to experiment with them to see how they change the control’s appearance.

The size of the icons displayed in the field is controlled by the size of the control, which you can adjust by grabbing the sizing handles (you can also change these sizes by right-clicking on the control and selecting a size from **Set Size**).

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Text Result Control

The Text Result control allows you to display one of a series of user-specified text strings based on the value of an output (e.g., if the value is less than 10, display “Low”, if the value is between 10 and 30 display “Medium”, and if the value is greater than 30 display “High”).

This can be used to visually indicate the state of a variable in your Dashboard (e.g., whether a pump is on or off; whether a variable has reached a dangerous level). It behaves similarly to (and can be used in conjunction with) a Result Status Display control. A Result Status Display control displays different icons based on the value of an output; a Text Result control displays different text strings based on the value of an output.

Read more: [Result Status Display Control](#) (page 59).

The toolbar button looks like this:



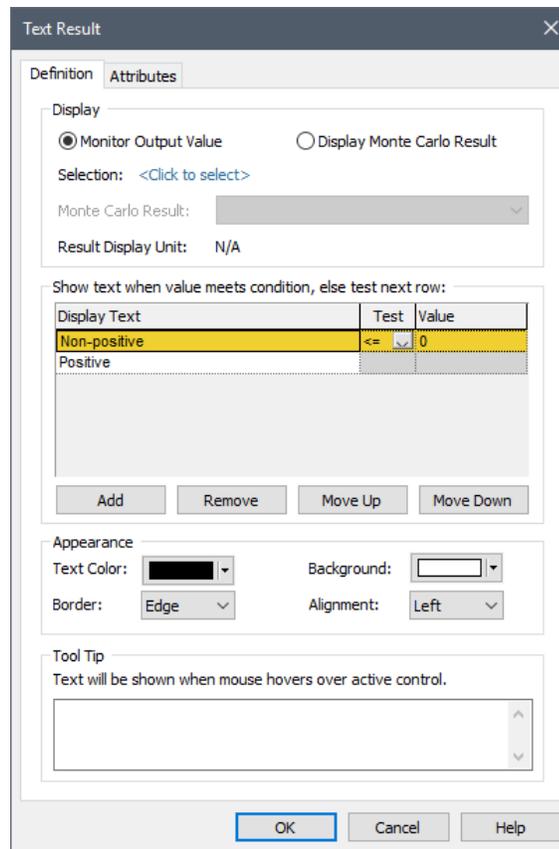
Text Result Control Button

The Text Result control looks like this when it is first added to a Dashboard and selected:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shift key, the change is 5 pixels).

Double-clicking on the control displays the following properties dialog:



Within the Display portion of the dialog, the output to which the control is to be linked is specified. Before doing so, however, you must specify the type of result you wish to display:

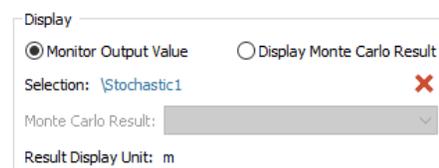
Monitor Output Value: This is the default, and will display the actual value of the selected output.

Display Monte Carlo Result: This should be selected if you wish to display a statistical result for an output from a Monte Carlo simulation (e.g., the mean value or a particular percentile).

After selecting the type of result you wish to display, you select the specific output by pressing <Click to select>. This will display a browser for selecting the element of interest. If you have selected “Monitor Output Value”, the browser will contain all elements in the model. In this case, any scalar output can be selected. If you have selected “Display Monte Carlo Result”, the browser will contain only the Distribution Result elements in the model (i.e., in this case, you must link to a Distribution Result element, and the first result in the element will be used).

Read more: [Displaying Statistical Results in Output Controls](#) (page 77).

Once you have linked the control to an element, the linked element will be listed:



You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).

Note that if you have selected “Display Monte Carlo Result”, you must also display the type of statistical result to display:



Note: Text Result controls can be linked to both values and conditions. If the control is linked to a condition and “Monitor Output Value” is selected, text strings must be selected for True and False. If the control is linked to a condition and “Display Monte Carlo Result” is selected, however, statistics are generated by assuming True = 1 and False = 0 (and hence text strings are chosen for values ranging from 0 to 1).

Once you have selected the element that will be monitored, you must then define the text strings that will be used to indicate various states. In the example above (the default setting), the control represents two states: if the value is less than or equal to 0, the text “Non-positive” will be displayed; if the value is greater than 0, the text “Positive” will be displayed.

You can add as many states as you want (using the **Add** button). States can be deleted (using the **Remove** button) or moved up and down (using **Move Up** and **Move Down**).

You must assign the conditions pertaining to each state (i.e., the set of values that results in each text being displayed). You do not assign a condition for the final string. If all the other conditions are false, the last text string is displayed.

For example, in this case, four different states have been selected, with four different text strings:

Display Text	Test	Value
Negative	<	0
Low	<=	10
Medium	<=	20
High		

In this example,

- “Negative” is displayed if the value is < 0 ;
- “Low” is displayed if the value is ≥ 0 and ≤ 10 ;
- “Medium” is displayed if the value is > 10 and ≤ 20 ; and
- “High” is displayed if the value is > 20 .

The conditional operators ($<$, \leq , $>$, \geq) can be controlled via drop-lists. Note, however, that GoldSim ensures that they are consistent in terms of whether the choices change with increasing or decreasing values. That is, if one operator is $>$ or \geq , all the other conditions must also be $>$ or \geq .

The Value fields to the right of each conditional operator *only accept numbers without units*. If the element has dimensions, these fields assume that the value is being specified in the display units of the element (which is displayed at the top of the dialog).

Text Result controls can be linked to both values and conditions. If the control is linked to a condition (and “Monitor Output Value” is selected such that only two outcomes are possible), the number of states is fixed at 2 (the **Add**, **Remove**, **Move Up** and **Move Down** buttons are grayed out), and the first text string is shown when the element is False, and the second text string is displayed when the image is True:

Show text when value meets condition, else test next row:

Display Text	Test	Value
Pump Off	==	FALSE
Pump On	==	TRUE

Add Remove Move Up Move Down

The *Test* and *Value* columns cannot be changed when the control is linked to a condition. Only the *Display Text* can be edited.

The **Appearance** section of the properties dialog allows you to modify the Text Color, Background (color), text Alignment, and type of Border for the display. These options are self-explanatory, and you may want to experiment with them to see how they change the control’s appearance.

The size of the text is controlled by the size of the control (GoldSim scales up the font size to match the control size).



Note: You cannot select the font for a Text Result control. GoldSim always uses the default GUI font used by the operating system. The font is dynamically scaled based on the height of the control.

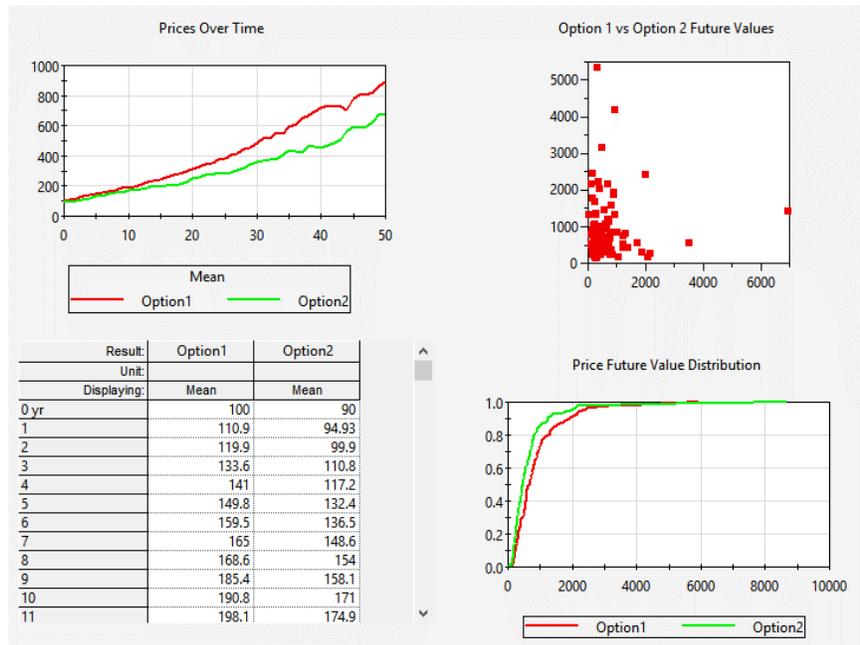
The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the Dashboard user holds the mouse cursor over the control.

The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

Result Window Control

The Result Window control allows you to embed a result window (as either a chart or a table) directly into a Dashboard:



You do this by specifying an existing Result element. Any of the five Result element types (Time History, Distribution, Final Value, Multi-Variate and Array) can be embedded and displayed.



Note: An alternative way to display a result window via a Dashboard is to link it to a Button control: pressing the button then displays the result window. The Result Window control, however, is different in that it embeds the result window directly in the Dashboard so it can be viewed without requiring the Dashboard user to press a button.

Read more: [Displaying Chart and Table Results Using a Button](#) (page 84).

The toolbar button looks like this:



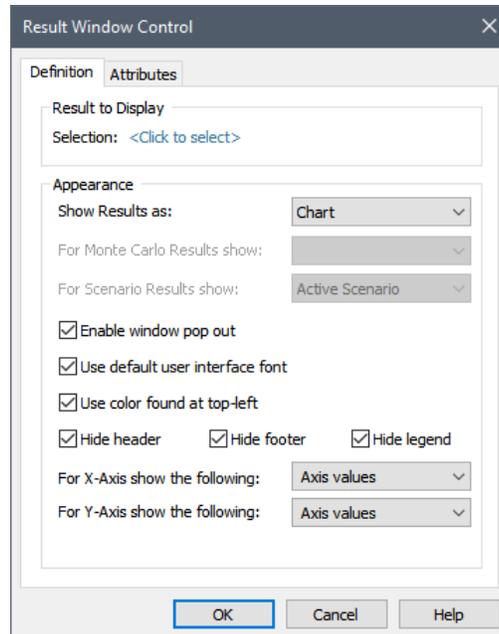
Result Window Control Button

The Result Window control looks like this when it is first added to a Dashboard and selected:



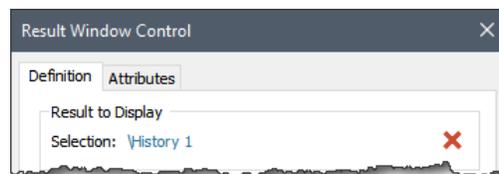
The eight handles allow you to resize the window. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

Double-clicking on the control displays the following properties dialog:



The first action you must take is to specify the Result element you wish to display by pressing **<Click to select>** at the top of the dialog. This will display a browser for selecting the Result element of interest. Note that the browser will contain only the Result elements in the model (you can only select a Result element).

Once you have linked the control to an element, the linked element will be listed:

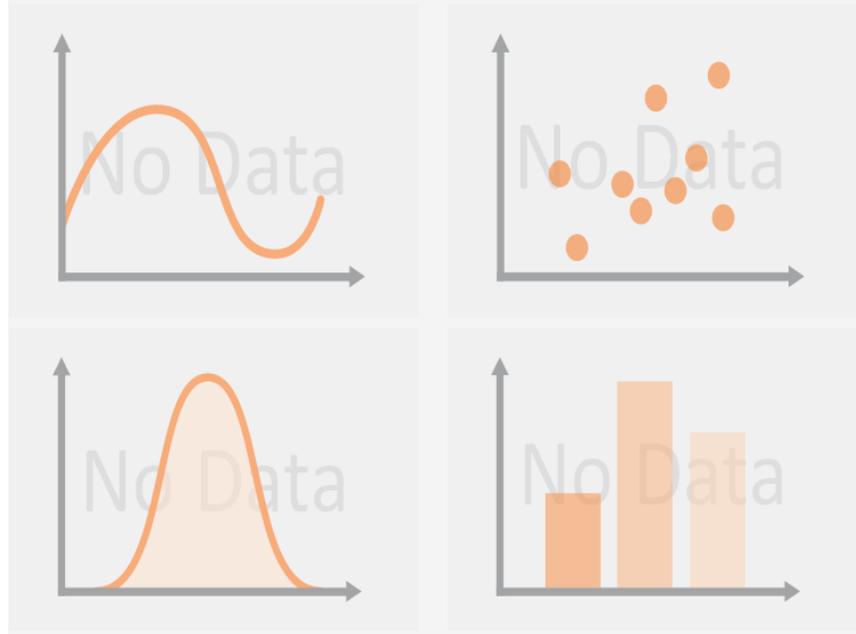


You can remove the linkage (by pressing the red X button), or reassign the linkage (by pressing the name of the element itself).



Note: You cannot link the same Result element to different Result Window controls. If you wish to have the same result displayed in two different controls (e.g., one as a chart and one as a table), you must copy the Result element so each control can link to a different element.

In the Dashboard (prior to running) the control has a different appearance based on the type of Result element selected:



The next several options will differ depending on the type of Result element you have selected. These (and the remaining Appearance options) are described below.

Displaying a Time History Result Using a Result Window Control

If the selected Result is a Time History, the display options are as follows:

Appearance	
Show Results as:	Chart
For Monte Carlo Results show:	Custom Statistics
For Scenario Results show:	Scenario Comparison

Show Results as. This determines if the results are displayed as a Chart or a Table.

For Monte Carlo Results show. This determines what is displayed (in both Charts and Tables) if you have run multiple realizations (Monte Carlo results). The options are:

Realization: The final (unscreened) realization is displayed. If you choose to allow the control to “pop out”, you will be able to toggle through different realizations while it is “popped out”.

All Realizations: Displays all (unscreened) realizations.

Probabilities: Probability Histories (e.g, selected statistics at each plot point) will be displayed for the collection of (unscreened) realizations.

Statistic: A single selected statistic will be displayed for the collection of (unscreened) realizations. The statistic that is displayed is specified within the Display window of the referenced Result element.

Custom Statistics: Allows a different custom statistic to be displayed for each result (when displaying multiple outputs) for the collection of (unscreened) realizations. The Custom Statistic that is shown for each result is specified in the Result Properties dialog of the referenced Result element.

You can learn more in “Viewing Time Histories of Multiple Realizations” in Chapter 8 of the **GoldSim User’s Guide**.



Note: If the selected Time History Result element contains multiple outputs, and you select either “All Realizations” or “Probabilities”, only the first output as listed in the Result Properties dialog for the Time History Result element will be displayed (as it is not possible to display these types of results for multiple outputs). If you choose to allow the control to “pop out”, you will be able to toggle through different outputs while it is “popped out”.

For Scenario Results show. This determines what is displayed if you are running and displaying multiple scenarios (it is ignored if you are not running scenarios). The options are:

Active Scenario: The active scenario is displayed (if it has results; otherwise, the display shows “No Data”).

Scenario Comparison: All available scenarios with results are displayed.

You can learn more in “Viewing Scenario Results in Time History Result Elements” in Chapter 8 of the **GoldSim User’s Guide**.



Note: If 1) you have run multiple realizations; 2) have selected to show either “All Realizations” or “Probabilities”, and 3) you are running and displaying multiple scenarios, only the Active Scenario will be displayed (even if you select “Scenario Comparison”). This is because it is not possible to display these types of results for multiple scenarios). If you choose to allow the control to “pop out”, you will be able to toggle through different scenarios while it is “popped out”.

Read more: [Enabling a Result Window Control to Pop Out](#) (page 74).

If the selected Result is a Distribution, the display options are as follows:

Appearance	
Show Results as:	Chart
Show this chart type:	CDF
For Scenario Results show:	Scenario Comparison

Show Results as. This determines if the results are displayed as a Chart or a Table. If Table is selected, a table showing each realization is displayed.

Show this chart type. This determines what type of chart is displayed (it does not apply to tables). The options are:

PDF: Displays a probability density function (or probability mass function for discrete distributions).

CDF: Displays a cumulative distribution function.

CCDF: Displays a complementary cumulative distribution function.

For Scenario Results show. This determines what is displayed if you are running and displaying multiple scenarios (it is ignored if you are not running scenarios). The options are:

Active Scenario: The active scenario is displayed (if it has results; otherwise, the display shows “No Data”).

Displaying a Distribution Result Using a Result Window Control

Scenario Comparison: All available scenarios with results are displayed.

You can learn more in “Viewing Scenario Results in Distribution Result Elements” in Chapter 8 of the **GoldSim User’s Guide**.



Note: Distribution Result elements actually have three different views: Chart, Table and Distribution Summary (a dialog displaying statistics and a small chart). You cannot directly view the Distribution Summary in a Result Window control. However, if you choose to allow the control to “pop out”, you will be able to toggle to this view while it is “popped out”.



Note: Distribution Result elements can show results at different Capture Times that you have defined in the Advanced Time Settings dialog. In a Result Window control, the final Capture Time (i.e., the end of the realization) will always be shown. However, if you choose to allow the control to “pop out”, you will be able to change the Capture Time while it is “popped out”.

Displaying a Final Value Result Using a Result Window Control

Read more: [Enabling a Result Window Control to Pop Out](#) (page 74).

If the selected Result is a Final Value result, the display options are as follows:

Show Results as. This determines if the results are displayed as a Chart or a Table. There are seven different options for chart (and one for table).

Arrange data based on. This determines how the results are presented (in both tables and charts). Final Value results provide a large degree of flexibility in how the results are presented. When displaying a Final Value result in a Result Window control, however, you do not have the full range of options. In particular, what you select is where (Row/Series, Columns/Points or Layers) the results (i.e., outputs) are mapped. The options are:

Results in Rows: The results (i.e., outputs) are assigned to the Rows for tables and the Series for charts.

Results in Columns: The results (i.e., outputs) are assigned to the Columns for tables and the Points for charts.

Results in Layers: The results (i.e., outputs) are treated as Layers for both tables and charts. While multiple Layers can be viewed in a table, charts can only display a single Layer (and in this case this will always be the first result).

Array Rows in Rows: If the output is a vector or matrix, the vector or matrix rows are assigned to the the Rows for tables and the Series for charts.

Array Rows in Columns: If the output is a vector or matrix, the vector or matrix rows are assigned to the the Columns for tables and the Points for charts.

You can learn more in “Viewing Final Value Results” in Chapter 8 of the **GoldSim User’s Guide**.



Note: It is possible to select an option that is not applicable for the particular Final Value Result element that is selected. For example, you could select “Array Rows in Rows” for a Result element that only had scalars. In such a case, the display will automatically default to the first item (“Results in Rows”) and ignore what you have selected.



Note: There can be up to four different “dimensions” that can be assigned when displaying a Final Value result. However, when displaying a Final Value result in a Result Window control, you do not have the full range of options to assign how these dimensions are displayed. In particular, you can only control how the results (outputs) are mapped. GoldSim then automatically selects how the other dimensions are mapped. If you wish to have more control over this you have two options. You can choose to allow the control to “pop out”, at which point you can control the display (although once you close the “pop out” display, the display returns to its defaults). A second option is to not use a Result Window control, but instead open the Final Value Result element directly using a Button control. This then provides complete control over how the results are displayed (and these options are saved when the display is closed).

Read more: [Enabling a Result Window Control to Pop Out](#) (page 74); [Displaying Chart and Table Results Using a Button](#) (page 84).

For Scenario Results show. This determines what is displayed if you are running and displaying multiple scenarios (it is ignored if you are not running scenarios). The options are:

Active Scenario: The active scenario is displayed (if it has results; otherwise, the display shows “No Data”).

Scenario Comparison: All available scenarios with results are displayed.



Note: It is possible to select options that are not compatible. For example, you could select **Arrange data based on** “Array Rows in Rows” for an array and **For Scenario Results show** “Scenario Comparison”. Such a combination is not possible to display (“Scenario Comparison” can only be displayed if you display “Results in Rows”). In such a situation, one of your choices will be ignored and GoldSim will show a default display.

Displaying a Multi-Variate Result Using a Result Window Control

You can learn more in “Displaying Scenarios in Final Value Result Elements” in Chapter 8 of the **GoldSim User’s Guide**.

If the selected Result is a Multi-Variate result, the display options are as follows:

Appearance	
Show Results as:	Chart
Show this chart type:	2d-Chart
For Scenario Results show:	Active Scenario

Show Results as. This determines if the results are displayed as a Chart or a Table. If Table is selected, a table showing all of the outputs for each realization is displayed.

Show this chart type. This determines what type of chart is displayed (it does not apply to tables). The options are:

2d-Chart: Displays a 2d scatter plot.

3d-Chart: Displays a 3d scatter plot. Note, however, that this only applies if the Result element has more than two outputs specified (otherwise a 2d scatter plot will be displayed).



Note: Multi-Variate Result elements actually have two other result views in addition to the Chart (2d and 3d scatter plots) and Table (displaying all outputs for each realization): a Sensitivity Analysis Table and a Correlation Matrix Table. You cannot directly view these in a Result Window control. However, if you choose to allow the control to “pop out”, you will be able to toggle to these two tables while it is “popped out”.



Note: Multi-Variate Result elements can show results at different Capture Times that you have defined in the Advanced Time Settings dialog. In a Result Window control, the final Capture Time (i.e., the end of the realization) will always be shown. However, if you choose to allow the control to “pop out”, you will be able to change the Capture Time while it is “popped out”.

Read more: [Enabling a Result Window Control to Pop Out](#) (page 74).

Note that scenario choices are grayed out because Multi-Variate Result elements cannot display scenario results.

If the selected Result is an Array result, the display options are as follows:

Appearance	
Show Results as:	Chart
Show this chart type:	2d-Chart
For Scenario Results show:	Active Scenario

Show Results as. This determines if the results are displayed as a Chart or a Table. If Table is selected, a table showing all of the items for the array is displayed.

Show this chart type. This determines what type of chart is displayed (it does not apply to tables). The options are:

2d-Chart: Displays a 2d bar chart.

3d-Chart: Displays a 3d bar chart. Note, however, that this only applies if the Result being plotted is a matrix (otherwise a 2d scatter plot will be displayed).



Note: If multiple realizations were run, the final realization is displayed. If you choose to allow the control to “pop out”, you will be able to toggle through different realizations while it is “popped out”.

Displaying an Array Result Using a Result Window Control



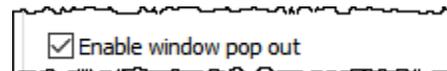
Note: Array Result elements can show results at different Capture Times that you have defined in the Advanced Time Settings dialog. In a Result Window control, the final Capture Time (i.e., the end of the realization) will always be shown. However, if you choose to allow the control to “pop out”, you will be able to change the Capture Time while it is “popped out”.

Read more: [Enabling a Result Window Control to Pop Out](#) (page 74).

Note that scenario choices are grayed out because Array Result elements cannot display scenario results.

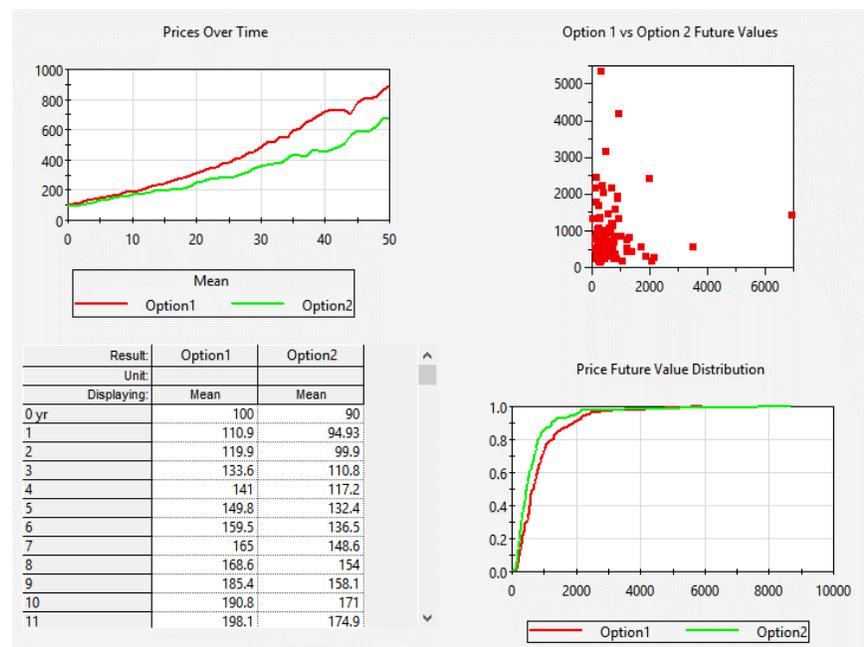
Enabling a Result Window Control to Pop Out

One of the options for a Result Window control is whether or not you want to enable the control to “pop out”:



This option defaults to being checked. If the option is checked, while viewing a Result Window control in a Dashboard, double-clicking on the control “pops out” the embedded window to full size, such that it appears as it would if you were to view the Result element directly.

For example, assume that the Result Window control in the upper left-hand corner of this Dashboard is enabled to pop out:



Double-clicking on it “pops out” a larger window:



Note that while embedded in a Dashboard, Result Window controls intentionally hide some options and features (so as to allow them to more easily fit into the Dashboard). By popping out the window, you can access additional options and features for viewing the result (e.g., buttons and drop-lists at the top of the window and context-sensitive menus). This allows you to examine the result in more detail.

Pressing the red X in the upper right-hand corner of the window collapses the window back to the original embedded window.



Note: While the window is popped out, you can make various changes to how the result is displayed. However, once you collapse the window, the changes are lost. The appearance of the embedded result is always controlled by the options selected on the Result Window control.

Controlling the Appearance of a Result Window in a Dashboard

In addition to the key display options in the Result Window control dialog (e.g., chart or table, type of chart to display), you have a number of additional options for controlling the appearance of the embedded result:

Use default user interface font
 Use color found at top-left
 Hide header Hide footer Hide legend
 For X-Axis show the following:
 For Y-Axis show the following:

Use default user interface font. If this box is checked, the default GUI font and font size used by the operating system are used for the various labels in the embedded chart. Otherwise, the font and font size specified in the Result element is used.

Use color found at top-left. If this box is checked, GoldSim uses the background Dashboard color found at the top-left corner of the embedded

window and forces the Data area to be white; otherwise it uses the colors specified within the result element. To illustrate this, consider the example below. Here is an embedded result (superimposed on a dark Dashboard background) with the box checked:



Here is the same embedded result with the box cleared:



Hide header, Hide footer, Hide legend. These boxes allow you to override the settings defined in the Result element to control whether or not the header, footer are hidden in the embedded chart (they do not apply to tables). Note, however, that these can only force something that is shown in the Result element to be hidden in the embedded chart. If the item is already hidden in the Result element, clearing this box has no impact (i.e., it will not force the item to be displayed).

For X-Axis show the following. This determines what is shown on the X-axis in the embedded chart (it does not apply to tables). The choices are:

Axis title and values: Displays the axis title and values.

Axis values: Displays only the axis values (but not title).

Show nothing: Displays neither the axis titles nor the axis values.

Note, however, that this can only force something that is shown in the Result element to be hidden in the embedded chart. For example, if the X-Axis is already hidden in the Result element, selecting to display the Axis here has no impact.

For Y-Axis show the following. This determines what is shown on the Y-axis in the embedded chart (it does not apply to tables). The choices are:

Axis title and values: Displays the axis title and values.

Axis values: Displays only the axis values (but not title).

Show nothing: Displays neither the axis titles nor the axis values.

Note, however, that this can only force something that is shown in the Result element to be hidden in the embedded chart. For example, if the Y-Axis is already hidden in the Result element, selecting to display the Axis here has no impact.

Displaying Statistical Results in Output Controls

When using an output control in a Dashboard, there are two ways to display results:

Monitor Output Value: This is the default, and will display the actual value of the selected output.

Display Monte Carlo Result: This should be selected if you wish to display a statistical result for an output from a Monte Carlo simulation (e.g., the mean value or a particular percentile).

All output controls provide these two options. The second option allows you to display statistical results for an output in your model. For example, after running a Monte Carlo simulation, you might want to display the 95th percentile of a particular result in a Dashboard:



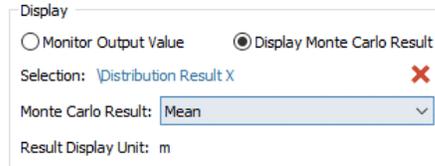
To display a statistical result in an output control, you must do the following:

1. In the GoldSim model, create a Result Distribution element. The output of interest must be the first result listed in the Result Distribution element.



Note: Distribution Result elements are discussed in detail in Chapter 8 of the **GoldSim User's Guide**.

2. With the Dashboard, open property dialog for the output control.
3. Select the "Display Monte Carlo Result" radio button at the top of the output control's property dialog.
4. When you do so, GoldSim will display a browser for selecting the element of interest. The browser will contain only the Distribution Result elements in the model. Select the Distribution Result element of interest.
5. After doing so, the upper part of the dialog will look like this:



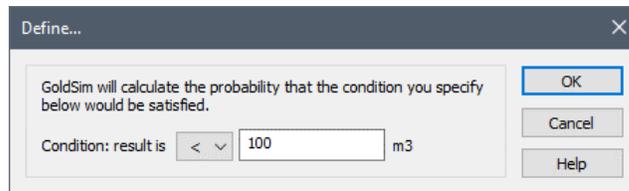
You must then select the specific Monte Carlo Result that you wish to display. The choices are as follows:

Mean: The mean value of the Monte Carlo realizations.

50%: The median (50th percentile) of the Monte Carlo realizations.

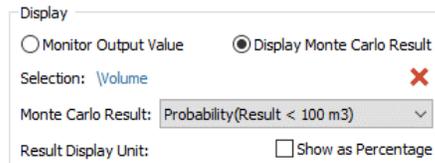
Specify Percentile: This provides access to a new dialog for defining a specific percentile (a number ranging from 0 to 100).

Specify Result Condition: This provides access to the following dialog:



The displayed result represents the probability (computed over all realizations) that the value of the output satisfies the specified condition. In the example above, the result would represent the probability that the final value of the output was less than 100 m3.

In this case, you will also be presented with the option of displaying the result as a percentage rather than a fraction (**Show as Percentage**):

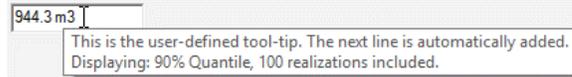


Obviously, this only applies to those output controls that would directly display the value (Result Display, Digital Result Display and Thermometer).

Note that one of the options in the list for the Monte Carlo Result to display will be labeled as the “default”. The default statistic refers to the Default Display Statistic in the Monte Carlo Options dialog. If you change the Default Display Statistic, this will be reflected in the Monte Carlo Result drop-list in the output control property dialog

Several points are worth noting regarding displaying statistical results in output controls:

- Output controls can display statistical results only after at least one realizations is available. Hence, they cannot display results in Edit or Ready Mode, or when all realizations have been screened out.
- In order to allow Dashboard users to better interpret statistical results, GoldSim always appends additional information to the user-defined tool-tip for the control:



Using the Button Control

The Button control is perhaps the most versatile of all of the Dashboard controls. It allows the Author to link one of a large number of actions to a button that is placed on the Dashboard.

The toolbar button looks like this:



Button Control Toolbar Button

The Button control looks like this when it is added to a Dashboard and selected:



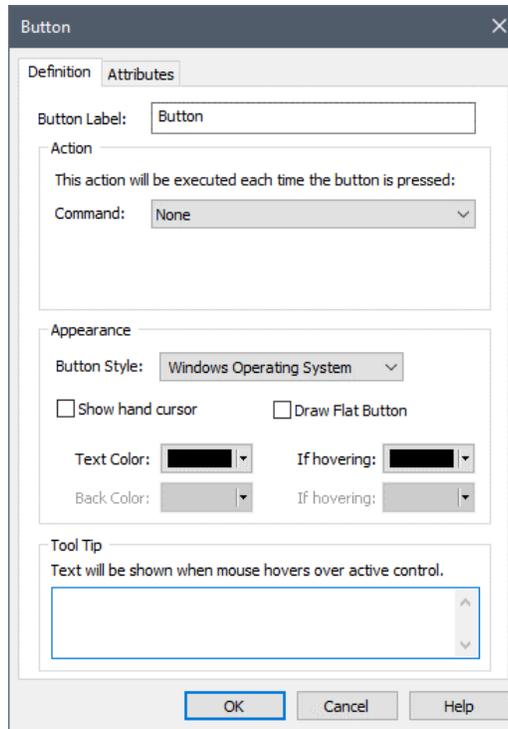
The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shift key, the change is 5 pixels).

Note, however, that resizing the control does not resize the Button label; it simply makes the Button larger. The font and font size for the Button label are fixed (they use the default GUI font specified by the operating system).



Note: If you wish the Button label to use a different font or font-size, you can do so by creating an image for the Button, placing the actual Button on top of the image, and making the **Button Style** transparent.

Double-clicking on a Button control displays the following properties dialog:



The **Button Label** defines the text that appears on face of the Button.

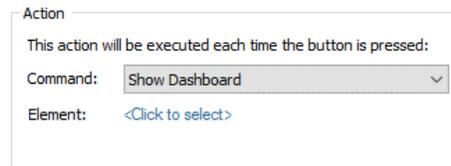


Note: You should always ensure that the Button is sized to allow for some space around (above, below, left, right) the Button Label. Otherwise, the text could potentially be cut off at certain resolutions and/or text scaling.



Note: If you want to include an ampersand (&) in your Button Label, you must enter it twice. That is, “X && Y” entered as a Button Label will appear on the Button as “X & Y”.

The command that the Button carries out when it is pressed is specified by selecting an option from the **Command** drop-list. Depending on the option selected, one or more additional fields may be required in order to specifically control how the Button behaves. For example, if you select the “Show Dashboard” command, one additional field is provided to allow you to enter the name of the Dashboard element:



A complete list of the available commands, a description of what they do, and the additional required information is summarized below.

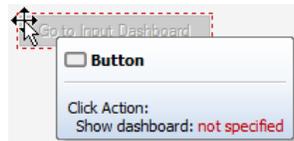
Command	Description	Required Information
Run Model	Runs the GoldSim model. Equivalent to pressing the Run button in the Run Control toolbar.	None
Reset Model	Resets the model to Run Mode (“Ready”) from Result Mode so input controls can be used. Equivalent to pressing the Reset button in the Run Control toolbar.	None
Go to Element	Jumps to the specified element in the graphics pane (but does not open the property dialog).	Element ID
Open Element	Opens the specified element’s property dialog (but does not jump to it in the graphics pane).	Element ID
Show Container	Shows the contents of the specified Container in the graphics pane.	Container ID
Execute Application	Runs the specified application.	Name and path to executable and any required command line arguments
Open File	Launches the application associated with the specified file and opens the specified file.	Name and path to file. For Microsoft Excel files, you can optionally specify the sheet and cell(s) to be selected when the file is opened
Open URL	Opens the specified URL in a browser.	URL
Show Dashboard	Displays the specified Dashboard. ¹	Dashboard ID
Show Result	Shows the specified Result element as a table or chart.	Result element ID
Close Application	Closes GoldSim (or the GoldSim Player).	None
Show Message Box	Displays a short message dialog (with an OK button to close the dialog)	Title (displayed in the dialog’s Title Bar) and the Message
Global Database Download	Performs a download to all elements linked to databases in the model.	If Extended GoldSim database is used, you are prompted for the effective date.
Edit Time Series Data	Allows you to edit the data defining a Time Series element.	Time Series Element ID
Edit Lookup Table Data	Allows you to edit the data defining a Lookup Table element.	Lookup Table Element ID
Select Spreadsheet File for Element	Allows you to change the spreadsheet file that the element is linked to.	Element ID
Show Simulation Settings	Allows you to view and edit the simulation’s time and Monte Carlo Settings.	Category (Time or Monte Carlo)

Command	Description	Required Information
Set Input Components to Default Values	Sets all of the input components in the current Dashboard or all Dashboards to their Default values.	Apply to this Dashboard or all Dashboards
Refresh all Spreadsheet outputs	Imports all outputs from Spreadsheet elements into model. Useful if you want to import and view outputs prior to running simulation.	None
Export Simulation Results	Executes a global export of available results from Time History Result elements that are specified to export to spreadsheets and/or text files. Equivalent to pressing “Export Now” button from Results tab of Options dialog in GoldSim.	None

¹When linking to a Dashboard within a SubModel, if any of the elements in the path change their name or location, the link will be lost.

Some of these commands are self-explanatory. Others (those highlighted in gray) are discussed in greater detail below.

If a button is not yet assigned a command, or if the required information for the selected command is incomplete, GoldSim indicates this by outlining the control with a dashed red line:



When viewed in the Player, a Button that was not assigned a command or had incomplete information would simply be grayed out.

Within a Dashboard, Buttons can be pressed by left-clicking on them, or by pressing the space bar when the Button has the focus.

The **Appearance** section of the properties dialog allows you to modify the appearance of the Button. GoldSim provides a wide variety of options for what the Button looks like in the Dashboard. The best way to understand the various options is to simply experiment with them to see how they change the control’s appearance.



Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User’s Guide**.



Note: You cannot select the font or font size for the Button label. GoldSim always uses the default GUI font used by the operating system. However, the Transparent **Button Style** allows you to place an image (with any font or font size) behind a Button. In this case, you would leave the **Button Label** blank.



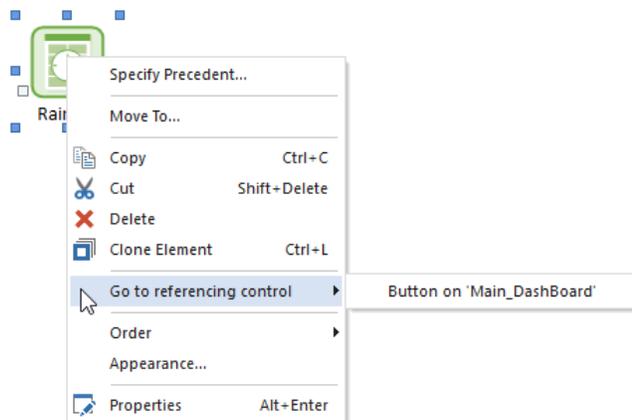
Note: When selecting the Transparent Button Style, the Button is always transparent. However, depending on whether or not you have selected **Draw Flat Button**, it behaves differently. If **Draw Flat Button** is selected, you must then select a **Hover Color** (the color the Button takes on when you hover over it), along with an **Opacity**. If **Draw Flat Button** is cleared, rather than changing when you hover, the Button only changes appearance when it is pressed. Hence, you must select a **Pressed Color** (the color the Button takes on when you press it), along with an **Opacity**.

The bottom section of the dialog allows you to enter a tool tip, which will be displayed whenever the user holds the mouse cursor over the Button.

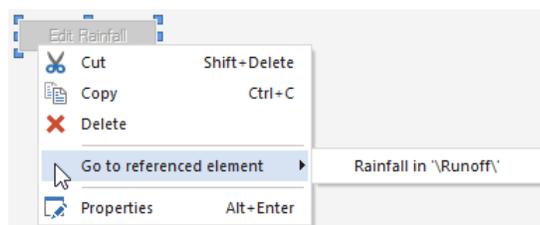
The **Attributes** tab of the dialog provides tools that allow you to hide or disable the control dynamically based on the values of various model outputs. This allows you, for example, to hide the control if it was not applicable under certain situations.

Read more: [Dynamically Disabling and Hiding Dashboard Controls](#) (page 98).

If you right-click on an element that is linked to one or more button controls, you can immediately jump to those controls:



Similarly, if a button control is linked to an element, you can jump to the connected element from the control's context menu:



If the button control has specified attributes that reference outputs for hiding and/or disabling the control, the element(s) associated with these outputs are also displayed.

Opening a Spreadsheet at a Specified Location Using a Button

The **Open File** command for a Button control opens a specified file. Doing so launches the application associated with the specified file and opens the file in the application. For example, if you specified a Microsoft Excel file (*.xls, *.xlsx or *.xlsm), GoldSim would launch Excel and open the file.

When opening a spreadsheet file, in some cases you may want to immediately jump to a specified location (sheet and cell range) when opening the file. GoldSim provides specialized syntax to support this. The syntax is as follows:

Filename#sheetname!cellrange (e.g., Book1.xlsx#Sheet1!a1:c3)

The following points should be noted:

- The entire text can be wrapped in quotes. This should be done if the filename or sheet name contain any spaces.
- For an Excel file, GoldSim will recognize extension .xls, .xlsx, or .xlsm.
- The filename can be specified as a relative or absolute path. Absolute filenames must start with the drive letter or be a UNC path (starting with "\\"). Relative paths can contain "." and ".." as well as folder names (e.g., "..\DataFolder\file.xlsx"). Relative filenames with no path are assumed to refer to the folder in which the model file is located.
- # is the delimiter between the filename and the sheet name. It is optional (you do not need to provide a sheet name). The sheet name is not case-sensitive.
- ! is the delimiter between the sheet name and the cell range. It is optional (you do not need to provide a cell range). The cell range can refer to a single cell (e.g., A2) or a range (e.g., A1:A3).

Displaying Chart and Table Results Using a Button

Output controls in Dashboards (e.g., Result Displays, Thermometers, Status Displays) can be used to display single items, and they respond dynamically as the simulation progresses. In many situations, however, you will want to display an entire result chart or table. This can be done by using a Button control that is linked to a Result element. When you click on the button, the result is displayed.



Note: An alternative way to display a result window via a Dashboard is to embed the result directly in the Dashboard using a Result Window control. This allows the result to be displayed without requiring the Dashboard user to press a button.

Read more: [Result Window Control](#) (page 66).

Within the Button control, you must select **Show Result** for the command. You then select the Result element that you want to display. Note that when you click on **<Click to select>**, the dialog to select an element will only display Result elements.

When you link a Button control to a Result element, the specified Result display opens when the button is pressed. The Result element remembers the last state of the display (i.e., table or chart), and displays that when the button is pressed.

If the Player user presses the Button prior to running the model, GoldSim indicates that there are no available data to display.

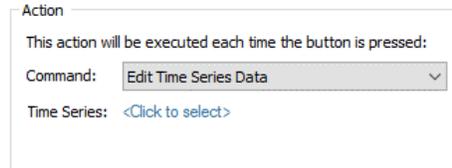
The window for the result can be moved and resized by the Player user. The Author, however, can control the initial size and position of the result window by placing the file into Active view within GoldSim, pressing the button, and moving and resizing the result chart/table appropriately.

Editing Time Series Elements Using a Button

Result Elements are discussed in detail in Chapter 7 of the **GoldSim User's Guide**.

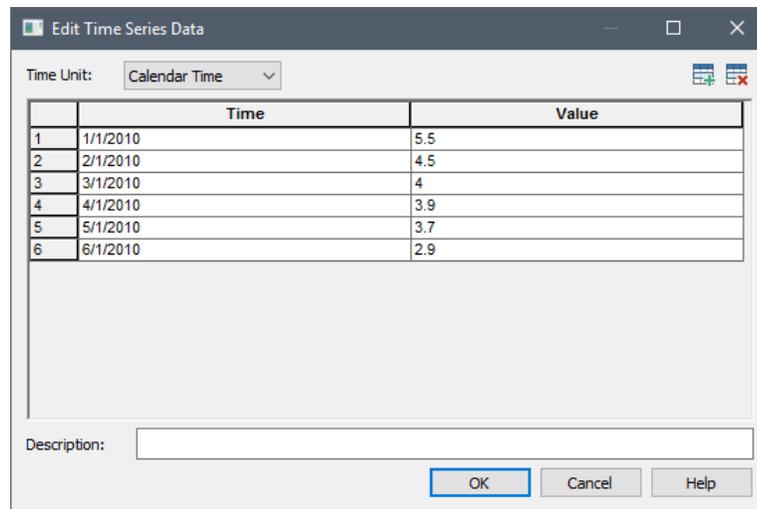
Input controls in Dashboards (e.g., Input Edit Fields and Sliders) can be used to enter single values. However, if your model uses Time Series elements to input time series data, you may want the user to be able to directly edit these data. This can be done by using a Button control that is linked to a Time Series element.

Within the Button control, you must select **Edit Time Series Data** for the command:



You then select the Time Series element that you want to edit. Note that when you click on **<Click to select>**, the dialog to select an element will only display Time Series elements.

Within a Dashboard, when the Button is pressed, the dialog for defining the Time Series data is displayed:



	Time	Value
1	1/1/2010	5.5
2	2/1/2010	4.5
3	3/1/2010	4
4	4/1/2010	3.9
5	5/1/2010	3.7
6	6/1/2010	2.9

The user can edit existing items, or add and remove new rows to the time series.



Note: Pressing a Dashboard button linked to a Time Series element is equivalent to pressing the **Edit Data** button within the Time Series element's property dialog. As a result, depending on how the element is defined, under some circumstances, the Dashboard user may only be able to view the data, but not edit it (e.g., if the element was linked to a spreadsheet).

Editing Lookup Table Elements Using a Button

Time Series Elements are discussed in detail in Chapter 4 of the **GoldSim User's Guide**.

If your model uses Lookup Table elements, you may want the user to be able to directly edit the definition of the Lookup Table. This can be done by using a Button control that is linked to a Lookup Table element.

Within the Button control, you must select **Edit Lookup Table Data** for the command:

Action

This action will be executed each time the button is pressed:

Command:

Table: [<Click to select>](#)

You then select the Lookup Table element that you want to edit. Note that when you click on **<Click to select>**, the dialog to select an element will only display Lookup Table elements.

Within a Dashboard, when the Button is pressed, the dialog for defining the Lookup Table definition is displayed:

Edit 1-D Table

The table can be referenced in the model as:
Rainfall2(row variable)

	Row Variable	Result
1	0	11.4
2	1000	12.8
3	2000	13.4
4	3000	13.8

OK
Cancel
Help
Add Row(s)
Remove Row(s)
Import Table...

The user can edit existing items, or add and remove new rows (and columns and layers if the table has more than one dimension).



Note: Pressing a Dashboard button linked to a Lookup Table element is equivalent to pressing the **Edit Data** button within the Lookup Table element's property dialog. As a result, depending on how the element is defined, under some circumstances, the Dashboard user may only be able to view the data, but not edit it (e.g., if the element was linked to a spreadsheet).

Specifying a Linked Spreadsheet File Using a Button

Lookup Table elements are discussed in detail in Chapter 4 of the **GoldSim User's Guide**.

If your model has elements that are linked to spreadsheets (e.g., Spreadsheet, Time Series, or Lookup Table elements), you may want the Dashboard user to be able to directly change the spreadsheet file to which the element is linked. This can be done by using a Button control.

Within the Button control, you must select **Select Spreadsheet File for Element** for the command:

You then select the element whose spreadsheet linkage you wish to change. Note that when you click on **<Click to select>**, the dialog to select an element will only display Spreadsheet, Time Series and Lookup Table elements *that are currently linked to spreadsheets*.

Within a Dashboard, when the Button is pressed, a standard Windows dialog for selecting a new spreadsheet is displayed.



Note: This command does not provide any mechanism for you to define how the spreadsheet is linked to the element (e.g., the location in the spreadsheet). This information must already be specified inside the element. The Button simply provides a way to select a different spreadsheet file (that, of course, will need to be formatted in a manner consistent with how it is being used by the element).

Linking Time Series and Lookup Table elements to spreadsheets is discussed in detail in Chapter 4 of the **GoldSim User's Guide**. Using Spreadsheet elements is discussed in Chapter 10 of that document.

Displaying the Simulation Settings Dialog Using a Button

The Simulation Settings can be viewed from a Dashboard by selecting **the Show Simulation Settings** within the Button control:

Using the **Category** drop-list, you can select whether the button will display the Time Settings or Monte-Carlo page.



Note: This button command allows the Player user to view the Simulation Settings, but this does not necessarily mean that they will be able to edit them. Whether or not the Simulation Settings can be edited by the Player user is determined by the Author when creating the Player file.

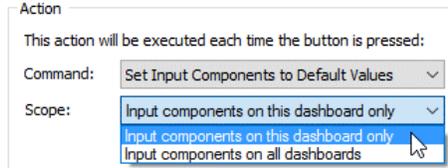
Read more: [Creating the Player File](#) (page 110).

Resetting Default Values Using a Button

Input controls in Dashboards (e.g., Edit Boxes, Check Boxes, Input Grids) all have Default values that can be defined by the Dashboard author. Within GoldSim, the Author can reset all of the input controls to their default values by right-clicking anywhere in the Dashboard, and selecting **Set to Default Values**. An Author will typically do this prior to creating a Player file in order to initialize the file.

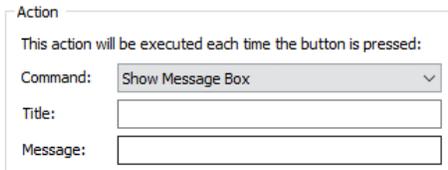
However, in some cases, you may want to provide a mechanism by which the Dashboard user can reset input controls to their Default values. This can be done from a Dashboard by selecting the **Set Input Components to Default Values** option within the Button control:

Displaying a Message Using a Button



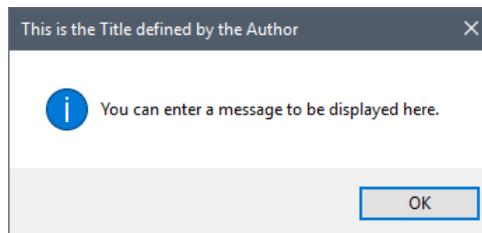
Using the **Scope** drop-list, you can select whether the default values are reset just for the current Dashboard, or for all Dashboards in the model.

Occasionally, you may want to add a Button to a Dashboard that simply displays a pre-defined message. This can be done by selecting the **Show Message Box** option within the Button control:



After doing so, you must enter a **Title** and a short **Message**.

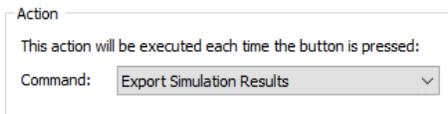
When the Button is pressed in the Dashboard, the message will appear in a dialog with an **OK** button:



Exporting Simulation Results

In some situations, you may want to export results from a Time History Result element to a spreadsheet or text file. Time History Result elements provide the capability to do so. (Exporting results from a Time History Result element is described in detail in Chapter 8 of the **GoldSim User's Guide**.)

This can be done by selecting the **Export Simulation Results** option within the Button control:



This executes a global export of available results from Time History Result elements that are specified to export to spreadsheets and/or text files. It is equivalent to pressing **Export Now** button from **Results** tab of Options dialog in GoldSim.

Using the Simulation Time Control

The Simulation Time control allows you to change the Duration (for Elapsed Time simulations) or the Start Date and End Date (for Calendar Time simulations).

The toolbar button for the Scenario control looks like this:



The appearance of the Simulation Time control differs depending on whether the model is set up to run an Elapsed Time simulation or a Calendar Time simulation. If running an Elapsed Time simulation, the control looks like this:



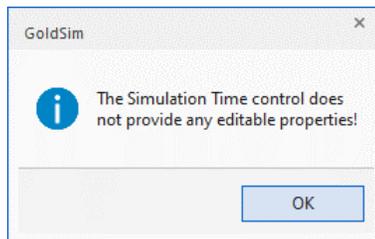
If running a Calendar Time simulation, the control looks like this:



The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shft key, the change is 5 pixels).

You cannot select the font for a Simulation Time control. GoldSim always uses the default GUI font used by the operating system for the items in the control.

There are no options or attributes to specify for a Simulation Time control. Hence, double-clicking does not display a dialog:



For an Elapsed Time simulation, in Active view within a Dashboard the Simulation Time control looks like this:



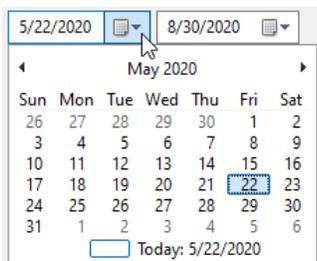
The control directly changes the Duration (in the Simulation Settings) for the model. It must be entered as a number (with a valid time unit).

For a Calendar Time simulation, in Active view within a Dashboard the Simulation Time control looks like this:



This control directly changes the Start Date and End Date (in the Simulation Settings) for the model.

You can click on the arrow in the box to view a calendar to assist you in selecting a start or end date:



You can select part of the date (month, day, year) in the input field and then enter a value or use the arrow keys to increment or decrement the value. Arrow buttons on the calendar move forward or backward one calendar month. Clicking the month on the calendar

activates a menu with the twelve months. Clicking the year on the calendar activates a control for changing the year.



Note: GoldSim supports a date range from 1 January 1700 to 31 December 9999.



Note: The format in which the dates are displayed is determined by the Windows settings for your machine. To change these settings (e.g., to display dates in European format with the day before the month), go to Control Panel and edit the Regional Options.



Note: Although the Simulation Settings also support setting the time (as well as the date) for a Calendar Time simulation, the Simulation Time Control does not allow you to change the time. GoldSim will use whatever time was set in the Simulation Setting dialog (which defaults to midnight).

Using the Scenario Control

GoldSim provides a specialized capability that allows you to create, run and compare different scenarios for your model. Scenarios are differentiated by having different sets of input data. In particular, different scenarios have different values for one or more Data elements. GoldSim's scenario modeling capability allows you to directly compare results generated by your model by different sets of input parameters. In effect, when you use this capability, your model can store (and subsequently compare) multiple sets of inputs and outputs.

This can be very useful for carrying out sensitivity analyses, testing and comparing alternative designs, and asking “what if” questions.

GoldSim allows users to create, edit and run scenarios from a Dashboard. In particular, Dashboards provide a control that can be added that allows you to: 1) select the Active Scenario, 2) run the scenario; and 3) add and delete scenarios.

Scenarios are discussed in detail in Chapter 7 of the **GoldSim User's Guide**.

Scenarios are an advanced feature in GoldSim. Moreover, they have the potential to cause confusion for a Player user who is unfamiliar with GoldSim. Therefore, prior to adding the Scenario control to a Dashboard, it is strongly recommended that you have a good understanding of how scenarios work. *The discussion below assumes you are familiar with the details of scenarios.*

How the Scenario Control Works

The Scenario control is a specialized control that allows you to: 1) select the Active Scenario, 2) run a scenario (or all scenarios); 3) add and delete scenarios; and 4) access the Scenario Data dialog.

The toolbar button for the Scenario control looks like this:



The Scenario control looks like this when it is first added to a Dashboard and selected:

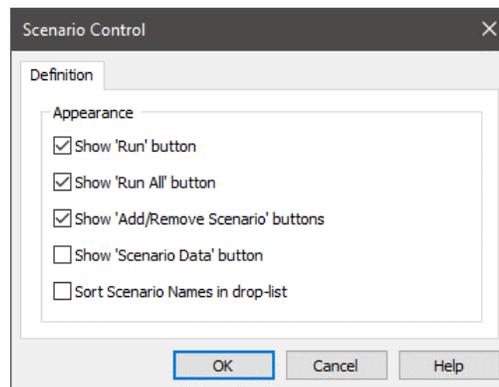


As can be seen, by default, the control consists of a drop-list, and four buttons (**Run**, **Run All**, + and -).

The eight handles allow you to resize the control. For more precise changes, you can also change the width of the control using Ctrl-Left and Ctrl-Right, and change the height using Ctrl-Up and Ctrl-Down. (The default change is 1 pixel at a time. If you press the Shift key, the change is 5 pixels).

You cannot select the font for a Scenario control. GoldSim always uses the default GUI font used by the operating system for the items in the drop list and the Run button. Resizing the control simply affects the length of the drop-list (which is valuable if your scenario names are long).

Double-clicking on the Scenario control displays the following dialog:



This dialog controls what appears in the Scenario control. By default, the first three buttons are checked. The first button (**Run**) allows you to run the scenario selected in the drop-list. The second button (**Run All**) runs all the scenarios. The third button (**Add/Remove Scenario**) allows the user to add a new scenario delete the selected scenario.

The fourth button (**Show “Scenario Data” button**) adds a button that provides access to the Scenario Data dialog (allowing Dashboard users to see and compare the various scenarios). The fifth button (**Sort Scenario names in drop-list**) sorts the scenarios in the control in alphabetical order (by default they are sorted by their order in the Scenario Manager). Clearing any of these boxes removes that particular option from the Scenario control in the Dashboard



Note: If you have multiple Scenario controls on your Dashboard(s), they are automatically linked and work in unison. That is, if you select a particular scenario in one control, it is selected in all controls.

How the Scenario Control Works in GoldSim

Because scenarios are an advanced feature in GoldSim, and have the potential to cause confusion for a Player user who is unfamiliar with GoldSim, the control is designed so it behaves slightly differently depending on whether you are viewing the control within GoldSim or the GoldSim Player.

The Scenario control is designed so it behaves slightly differently depending on whether you are viewing the control within GoldSim or within the GoldSim Player. In particular, when used from within GoldSim (i.e., when a GoldSim user edits and runs a model from a Dashboard), it provides several additional options that are not available to Player users (as these features would likely confuse Player users, who are typically unfamiliar with the details of GoldSim).

Read more: [How the Scenario Control Works in the GoldSim Player](#) (page 94).

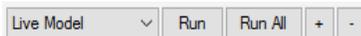
The discussion below focuses on how the Scenario control would be used by someone who is running and editing their scenarios from within GoldSim (i.e., running GoldSim and using a Dashboard in Active view).

Read more: [Understanding Dashboard Views](#) (page 16).

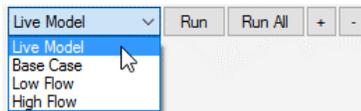
It is assumed that such a user has a good understanding of GoldSim and the use of scenarios, and understands the difference between Result Mode and Scenario Mode.

Scenarios are discussed in detail in Chapter 7 of the **GoldSim User's Guide**.

In Active view within a Dashboard, the Scenario control displays the Active Scenario (or “Live Model”). If the model does not contain any scenarios, the control will display “Live Model” as the only option:



If the model includes scenarios, these will be included in the drop-list:



Scenarios can be created from a Dashboard in two ways:

- Pressing the “+” button on the Scenario control.
- After running the Live Model, and then resetting the model (by pressing **F4**), you are presented with an option to save the results as a scenario.

When you change to a different scenario in the Scenario control, the value in any input control that is linked to a Scenario Data element (i.e., a Data element that is scenario-specific) will instantaneously change. If you then change the value in such an input control, that will become the value for the selected scenario.



Note: Not all of the input controls in a Dashboard will necessarily be linked to Scenario Data. Some may be linked to Data elements that are not Scenario Data. That is, some of the inputs will be scenario-specific, while others will apply to all scenarios. When you design your Dashboard(s), it will be critical to make it clear which input controls are scenario-specific and which are not.

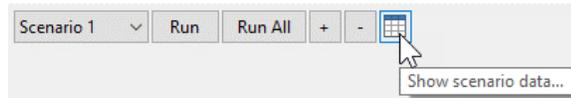


Note: If the Dashboard exposes Time Series or Lookup Table data via a button, that information *is never* scenario-specific. If these are changed, they apply to all scenarios. This is because only Data elements can vary between scenarios.



Note: When a Scenario control is present on a Dashboard, all Scenario Data elements must be editable via a Dashboard control in one of the Dashboards in the model in order to create a Player file. That is, if a Scenario Data element has been defined that is not accessible via a Dashboard, you will not be able to create a Player file.

If you have checked the **Show “Scenario Data” button** option in the properties dialog for the Scenario control, a button is added on the right-hand side of the control:



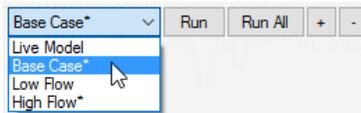
Clicking on this button opens the Scenario Data dialog directly (allowing Scenario Data to be edited). Note that this button behaves somewhat differently in GoldSim Player (Scenario Data can be viewed but not edited).

When using a Scenario control within GoldSim the model can actually be run in two different ways:

- Pressing the **Run** button in the toolbar runs the scenario and places the model in *Result Mode*. All output displays show results only for that particular scenario.
- Pressing the **Run** button on the Scenario control when a scenario is selected runs the scenario and places the model in *Scenario Mode*. Hence, although output displays (such as thermometers) show the results for the Active Scenario, buttons linked to Time History and Distribution Result elements show results for ALL scenarios that have been run (and hence have results). Note, however, that pressing the **Run** button on the scenario control when “Live Model” is selected is identical to pressing the **Run** button in the toolbar. The model is placed into *Result Mode*, and your output controls display results for the Live Model.

Pressing the **Run All** button on the Scenario control runs all of the defined scenarios and places the model in *Scenario Mode*.

Scenarios that have results are highlighted with an asterisk:



In this example the Base Case and High Flow scenarios have results.

It is important to re-emphasize that the scenario results shown in result displays are a function of the simulation mode (and hence how the model was run). In Result Mode, only the results for the Active Scenario (i.e., the scenario shown in the control) are displayed. In Scenario Mode, the results for *all* scenarios that have been run (using the Scenario control) are shown when viewing Time History and Distribution Result elements.

After you have run your model, you can reset the model (so that you can edit input controls) by pressing **F4**. If the Active Scenario has results (indicated by an asterisk), you must reset the model in order to change values of any input controls in the Dashboard. If you change the Active Scenario to one that does not have results, you can change the values of input controls that are scenario-specific without having to reset the model (even if other scenarios have results). However, if any of your scenarios have results, you can not change the values of any input controls that are not scenario-specific (i.e., that apply to all scenarios).

Pressing **F4** to reset the model will display a dialog that may provide several choices. The dialog that is displayed differs depending on 1) how you ran the model (is it in Scenario Mode or Result Mode); 2) whether the Live Model or a

How the Scenario Control Works in the GoldSim Player

scenario was run; and 3) whether or not multiple scenarios in the model have results.

The Scenario control is designed so it behaves slightly differently depending on whether you are viewing the control within GoldSim or within the GoldSim Player. In particular, when a Scenario control exists within a model in the GoldSim Player:

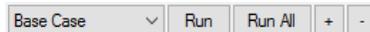
- The model can never enter Result Mode. When it is run, it always enters Scenario Mode.
- The Player user never sees the “Live Model”. The Player user can only create, edit and run scenarios.



Note: When using the Scenario control in GoldSim (as opposed to the Player), depending on how the model is run, you can enter either Result Mode or Scenario Mode. Moreover, the Live Model can be accessed and run. However, these features are removed in the Player, as they would likely confuse Player users, who are typically unfamiliar with the details of GoldSim.

Read more: [How the Scenario Control Works in GoldSim](#) (page 91).

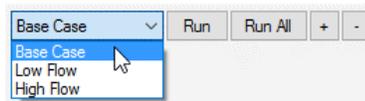
Within the GoldSim Player, the Scenario control displays the Active Scenario.



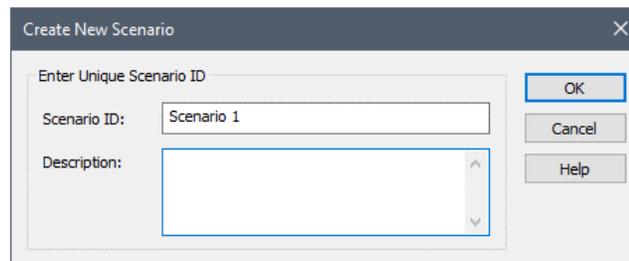
Note: You cannot create a Player file with a Scenario control if no scenarios have been defined. That is, if the model contains a Scenario control, at least one scenario must exist in the GoldSim model in order to create a Player file of that model.

Read more: [Creating the Player File](#) (page 110).

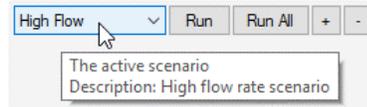
Note that the “Live Model” is never included in the list of options when viewing the Scenario control in the Player:



Scenarios can be created from a Dashboard by pressing the “+” button on the Scenario control. When the Player user does so, the following dialog will be displayed for specifying a name and Description for the scenario:



The Description for the scenario is displayed in a tool-tip when the scenario is selected:



Note: The Player user cannot edit the name or description after the scenario has been created.

When the Player user changes to a different scenario in the Scenario control, the value in any input control that is linked to a Scenario Data element (i.e., a Data element that is scenario-specific) will instantaneously change. If they then change the value in such an input control, that will become the value for the selected scenario.

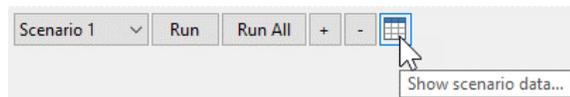


Note: Not all of the input controls in a Dashboard will necessarily be linked to Scenario Data. Some may be linked to Data elements that are not Scenario Data. That is, some of the inputs will be scenario-specific, while others will apply to all scenarios. When you design your Dashboard(s), it will be critical to make it clear to the Player user which input controls are scenario-specific and which are not.



Note: If the Dashboard exposes Time Series or Lookup Table data via a button, it is important to make it clear to the Player user that that information *is not* scenario specific. If these are changed, they apply to all scenarios. This is because only Data elements can vary between scenarios.

If the Dashboard author checked the **Show “Scenario Data” button** option in the properties dialog for the Scenario control, a button is added on the right-hand side of the control:



Clicking on this button opens a modified version of the Scenario Data dialog. In particular, it allows all of the Scenario data to be viewed (but not edited):

Element ID	Scenario 1	Scenario 2	Scenario 3
Data1	1	7	11
Data2	2	4	2

The dialog box also includes 'Close' and 'Help' buttons at the bottom right.

Pressing the **Run** button on the Scenario control or pressing the **Run** button in the toolbar runs the selected scenario (the Active Scenario) and places the model

in *Scenario Mode*. Output displays (such as thermometers) show the results for the Active Scenario. However, buttons linked to Time History and Distribution Result elements show results for ALL scenarios that have been run (and hence have results).

Pressing the **Run All** button on the Scenario control runs all of the defined scenarios and places the model in *Scenario Mode*.

It is important to reiterate that if a Player file contains a Scenario control, it can never be in Result Mode. When you run it, it is placed into Scenario Mode. (This is different than the behavior of the Scenario control used within GoldSim, in which both Result Mode and Scenario Mode are supported).

Scenarios that have results are highlighted with an asterisk:



In this example the Low Flow and High Flow scenarios have results.

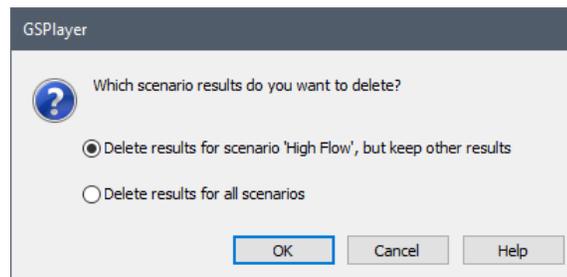
After the Player user has run the model, the Player user can reset the model (so that the input controls can be edited) by pressing **Reset** button in the toolbar:



If the Active Scenario has results (indicated by an asterisk), the model must be reset in order to change values of input controls in the Dashboard. If the Active Scenario is changed to one that does not have results, values of input controls that are scenario-specific can be changed without having to reset the model (even if other scenarios have results). However, if any of the scenarios have results, the values of any input controls that are not scenario-specific (i.e., that apply to all scenarios) can not be changed.

Resetting the model will display a dialog that may provide several choices. The dialog that is displayed differs depending on whether or not multiple scenarios in the model have results.

If no other scenarios have results, a simple dialog to confirm that the scenario results should be deleted is presented. However, if other scenarios (other than the Active Scenario) have results the following dialog is presented:



The Player user has the option to delete results only for the Active Scenario, or to delete results for all scenarios.



Note: In browsable Player files, the Scenario Manager is not exposed and available to the Player user. The only way to edit scenarios is through the Dashboard itself.

Explaining the Scenario Control to Player Users

Because scenarios are complex and have the potential to confuse Player users who may be completely unfamiliar with GoldSim, it is important that as an author, you provide sufficient explanation and instruction when adding a Scenario control to your Player models. This is discussed in the next section.

Because scenarios are complex and have the potential to confuse Player users who may be completely unfamiliar with GoldSim, it is important that as an author, you provide sufficient explanation and instruction when adding a Scenario control to your Player models. In particular, there are several aspects of the use and behavior of a Scenario control that may not be obvious to a Player user.

Within the Dashboard, therefore, it is recommended that you add text making the following points clear:

- You can add scenarios using the “+” button. Scenarios can be deleted using the “-” button.
- When the Player user changes to a different scenario in the Scenario control, the value in any input control that is linked to a Scenario Data element (i.e., a Data element that is scenario-specific) will instantaneously change. If they then change the value in such an input control, that will become the value for the selected scenario. However, not all of the input controls in a Dashboard will necessarily be linked to Scenario Data. When you design your Dashboard(s), it will be critical to make it clear to the Player user which input controls are scenario-specific and which are not.
- Similarly, if the Dashboard exposes Time Series or Lookup Table data via a button, it is important to make it clear to the Player user that that information *is not* scenario specific. If these are changed, they apply to all scenarios.
- Pressing the **Scenario Data** button allows the user to view and compare the Scenario Data values for all scenarios.
- Pressing the **Run** button on the Scenario control (or in the toolbar) runs the selected scenario.
- Pressing the **Run All** button on the Scenario runs all scenarios.
- If a scenario has results, an asterisk will appear next to it in the list. Time History and Distribution charts and tables display results for all scenarios that have results. Other controls (such as thermometers) show results for the selected scenario.
- Pressing the **Reset** button in the toolbar allows you to delete results for the selected scenario (or all scenarios):



In addition, as an author, you may want to consider the recommendation when building models with Scenario controls:

- If your model has multiple Dashboards, you might consider placing a Scenario control on every Dashboard so that it is always clear to the user which scenario is being edited/viewed. Note that if you have multiple Scenario controls on your Dashboard(s), they are automatically linked and work in unison. That is, if you select a particular scenario in one control, it is selected in all controls.

Dynamically Disabling and Hiding Dashboard Controls

In some models, some inputs (or outputs) may not be applicable based on the values of other inputs (or outputs) in the model. For these situations, GoldSim allows you to *disable* or *hide* Dashboard controls based on various model attributes.

Disabling a control grays it out on the Dashboard (so it cannot be edited). When a control is hidden, it cannot be seen at all on the Dashboard (hiding a control also disables it).

Examples of what you can do with this feature include the following:

- Show a control only if a different check box control on the Dashboard is checked.
- Enable an input control only if another input control's current value is greater than 10.
- Show an output control only if a specific model output is True.
- Enable a control only if a specific model output's current value is between 0 and 100.
- Enable a control only if a specific model output's current value is one of several specified values.

This feature is provided in the **Attributes** tab of each control:

The screenshot shows the 'Attributes' tab of a control in GoldSim. It features a 'Programmable Attributes' section with the instruction: 'Define rules to disable (input and button controls) and hide the control as a function of a model output's current value.' There are two main options, each with a checkbox and a dependency field:

- Disable control if the following condition is met:
No dependency defined
value is == []
- Hide and disable control if the following condition is met:
No dependency defined
value is == []

At the bottom, there is an additional checkbox: Apply 'Default Value' when control is hidden or disabled.

All controls have an **Attributes** tab, but it differs slightly between the various types of controls. In particular,

- You cannot disable Output controls; you can only hide them. As a result the first check box in the dialog is disabled for Output controls.
- The **Apply "Default Value"...** check box is only available for Input controls. It is not available for Output controls or Button controls.

By default, controls are visible and enabled. To disable or hide a control, click on the appropriate check box. When you do this, a dialog will be displayed explaining what to do next (select OK), followed by a browser which shows all of the outputs in the model that are scalars (values or conditions). Once you have selected an output, it will be displayed in the dialog:

Hide and disable control if the following condition is met:

Pond2\Volume

value is == m3

Apply 'Default Value' when control is hidden or disabled.



Note: You can change the selected output by clicking on it in the dialog. Doing so will open a browser for selecting a new output.

Once the output is selected, you must then select the type of condition that is to be tested from the drop-list. If the output is a value, the following options are available:

Hide and disable control if the following condition is met:

Pond2\Volume

value is == m3

Apply 'Default Value' when control is hidden or disabled.

value is >
value is >=
value is ==
value is <=
value is <
value is !=
value is in range
value is outside range

Most of these condition types require a single value entered immediately to the right. For example, the dialog below would hide (and disable) the control if the value of Volume was greater than 10m³:

Hide and disable control if the following condition is met:

Pond2\Volume

value is > m3

Apply 'Default Value' when control is hidden or disabled.

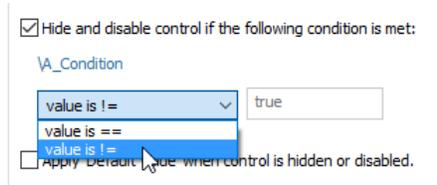
Note that this value cannot be entered as a link or expression, and no units can be specified. The units that are used are automatically displayed to the right of the field (and are the Display Units for the output).

The following condition types require or accept multiple values in the field to the right:

- “value is in range” requires two values, which must be separated by a semicolon. The evaluation is inclusive with regard the ends of the range (e.g., if the range is 5 to 10, then values of 5 or 10 are considered inside the range).
- “value is outside range” requires two values, which must be separated by a semicolon. The evaluation is inclusive with regard to the ends of the range (e.g., if the range is 5 to 10, then values of 5 or 10 are considered inside the range).
- “value is ==” (value is equal) supports (but does not require) multiple values (which must be separated by semicolons). If multiple values are provided, the test is considered to be true if any of the conditions are met (i.e., the conditions are ORed).
- “value is !=” (value is not equal) supports (but does not require) multiple values (which must be separated by semicolons). If multiple

values are provided, the test is considered to be true if all of the conditions are met (i.e., the conditions are ANDed).

If the output selected for the attribute is a condition, only two condition types are available in the drop list:



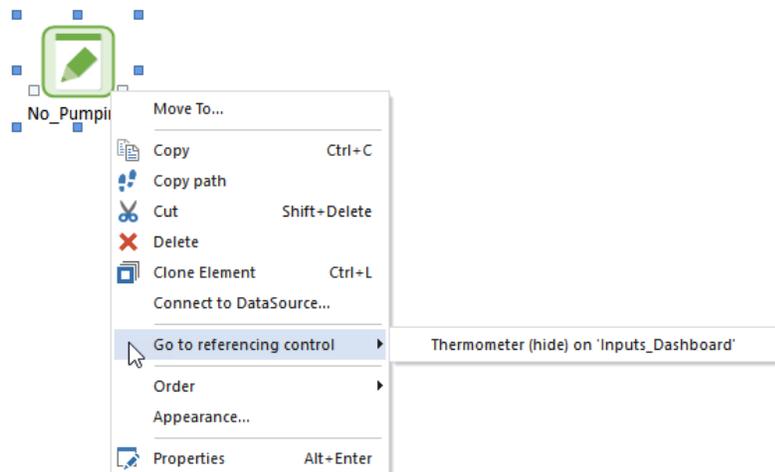
The field to the right is “hardwired” to True (i.e., it cannot be edited). These two choices, therefore, allow you to apply the attribute when the specified output is either True or False.

Input controls all have Default values that are defined by the Dashboard author. The **Attributes** tab of Input controls has a special option that can be selected to **Apply ”Default Value” when control is hidden or disabled**. If this check box is checked, when the control transitions from a visible state to a disabled or hidden state, the default value is automatically assigned to the element linked to the control.

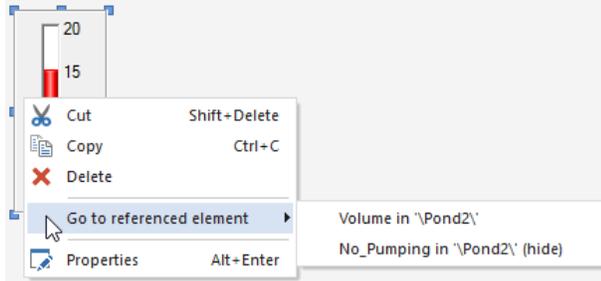


Note: If the model is Paused or running, this will only occur if the “Allow changes while paused” box is checked for the control.

Note that if an element is referenced by a control in order to hide and/or disable it, this is indicated in the context menu for the element:



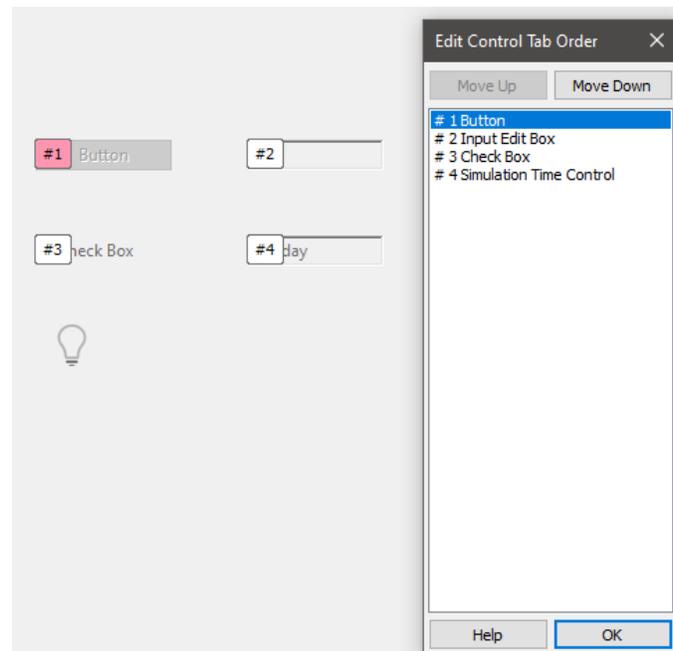
Similarly, if a Dashboard control references an output for hiding and/or disabling the control, the element associated with this output is displayed in the context menu for the control::



Controlling the Tab Order in a Dashboard

When you create a Dashboard, in order to make it easier to navigate your Dashboards, you will want to define the *tab order* for the controls. The tab order represents the order in which the focus is shifted between controls when the Dashboard user presses the **Tab** and **Shift-Tab** keys (to move forward and backward through the tab order).

You define the tab order by right-clicking in the Dashboard and selecting **Tab Order...** from the context menu (note, however, that this option is only available if the Dashboard is in Design View). When you do so, the Tab Order editing dialog will appear on top of the Dashboard:



In addition, you will notice that the Dashboard controls in the Dashboard are overlaid with a number indicating their current tab order.



Note: The tab order numbers are overlaid on the entire window; if you move the Tab Order dialog, you will see that these number float on top of the dialog. Hence, you should try to move the Tab Order dialog off to the side, away from the controls.

If you select an item in the Tab order dialog, the overlaid number for that item will be displayed in red so that you can easily identify it. Once an item is selected in the Tab Order dialog, you can move it up or down using the **Move Up** and **Move Down** buttons. In addition, the following shortcut keys can be used:

- **U** and **D** move the item up and down, respectively.
- **Alt-U**, **Ctrl-U** and **T** or pressing **Move Up** while holding the **Ctrl** key all move the item to the top (tab index 1)
- **Alt-D**, **Ctrl-D** and **B** or pressing **Move Down** while holding the **Ctrl** key all move the item to the bottom (last tab index)
- Pressing a single digit (e.g., 3) moves the item to that tab index position.

Once you are satisfied with the tab order, press the **OK** button to close the dialog.

The following points should be noted with regard to tabbing:

- All input controls are included in the tab order.
- Button controls are included in the tab order.
- Result Display output controls and Text Box fields are included in the tab order. Although you cannot edit these in a Dashboard, you can select text or numbers (e.g., to copy to the clipboard), or scroll (in the case the Text Box).

Text Boxes are discussed in detail in Chapter 9 of the **GoldSim User's Guide**.

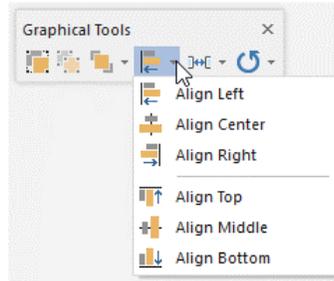
- Thermometer, Result Status Display and Digital Result Display output controls are *not* included in the tab order (as there is nothing to change or select for these controls).
- Graphics and text in the Dashboard (except for Text Boxes) are *not* included in the tab order.
- When a control has the focus in the Dashboard, a light focus rectangle appears around the control to indicate this to the user.

Aligning and Positioning Dashboard Controls

When you create a Dashboard, you will typically spend some time aligning and positioning the various controls to make the Dashboard attractive and easy to navigate. GoldSim provides several tools to facilitate this.

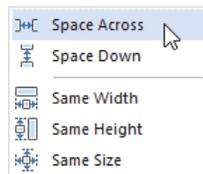
First, GoldSim provides two toolbars (and corresponding menu options for aligning and spacing selected object).

If you have selected multiple objects in the Dashboard, you can choose **Graphics|Align** from the main menu, or use the Graphical Tools toolbar to access a submenu for aligning the objects.

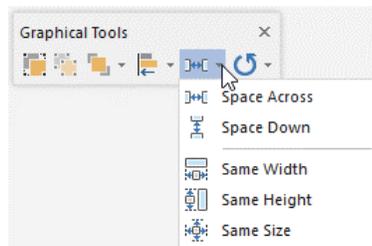


The options in this menu are self-explanatory.

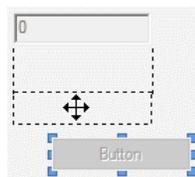
If multiple objects are selected, you can also choose to space them evenly (horizontally or vertically), or set their widths, heights or sizes to be identical. These options are provided under **Graphics|Layout** in the main menu:



They are also available via the Graphical Tools toolbar:

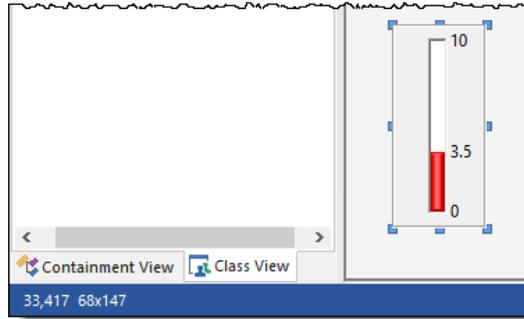


In addition to these tools, within a Dashboard, GoldSim also provides an automatic alignment tool as you move controls across the Dashboard. In the example below, you see that as the button is dragged, lines are automatically drawn in some positions (and GoldSim will snap the control to that position) to help you align it with other controls:



In this example, the Button was dragged up and to the left. When it aligned with the Edit Box, GoldSim indicated this by drawing lines. When the Button was released at that point, the two controls became perfectly aligned

To further assist you in aligning and positioning controls, when you select a control (in Design view), the X,Y coordinate of the top-left corner of the control, as well as the width and height of the control, are displayed in the left side of the Status bar:



Copying and Moving Dashboards and Controls

You can move a Dashboard within a model just like any other GoldSim element. Dashboards can be “dropped” into containers, and moved to a different container by right clicking their icon and selecting the “Move to” option. Moving a Dashboard preserves all of the links between the Dashboard controls and GoldSim elements, in addition to all of the other control settings.

You can also copy and paste a Dashboard within your model. The pasted Dashboard will preserve all the control settings and links between the Dashboard controls and GoldSim elements, with one exception: pasted Input Grid controls will retain all of their settings, but will not retain the link to the original element. This is because GoldSim does not allow the same element to be referenced by multiple Input Grid controls.

You can also copy a Dashboard from one model to another. When you do so, how it behaves in the new model is a function of how the Dashboard was pasted:

- If you paste the Dashboard separately from any elements it references (e.g., in multiple operations), the pasted Dashboard *will not* retain any links to the original elements (even if you subsequently paste them into the model).
- If you paste the Dashboard simultaneously with the elements it references, the pasted Dashboard *will* retain any links to the original elements.

In both cases, the pasted Dashboard will preserve all the other control settings,

You cannot move a Dashboard control from one Dashboard to another in a model. However, you can copy (or cut) and paste the control. When you do so, the pasted control will preserve all the control settings and the link between the control and any referenced elements. There is, however, one exception to this rule: pasted Input Grid controls will retain all of their settings, but will not retain the link to the original element. This is because GoldSim does not allow the same element to be referenced by multiple Input Grid controls.

You can copy and paste multiple controls simultaneously. To do so, select the controls you wish to copy and paste, press **Ctrl-C** (copy), and then click **Ctrl-V** (paste) in the destination Dashboard.

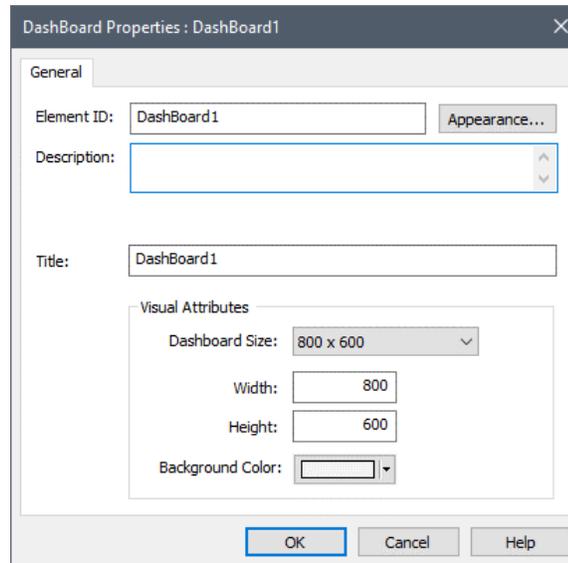
You can also copy and paste a control from one model to another. When you do so, the pasted control will preserve all the control settings, but will not retain any link to a referenced element (even if you subsequently paste the element into the model).

Adding Backgrounds, Text and Graphics to Dashboards

In addition to the various Dashboard controls, you can add backgrounds and graphics to Dashboards. The sections below describe how you can add backgrounds, graphics and text to Dashboards.

Adding Backgrounds to Dashboards

The Background color for a Dashboard can be selected from the Settings section of the Dashboard's property page:



At the bottom of the dialog, you can select the **Background Color** for the Dashboard.



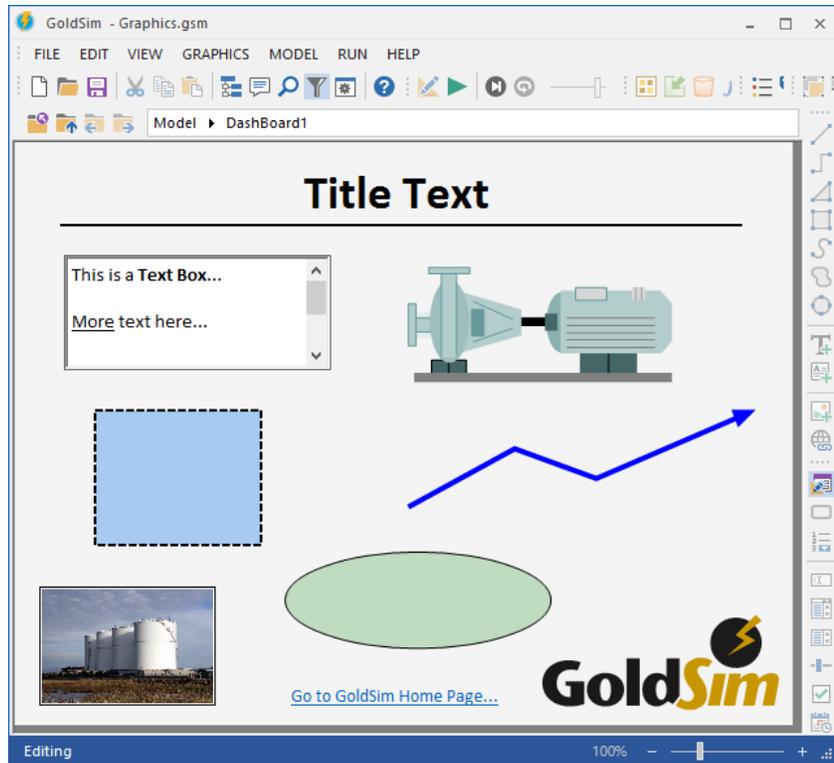
Note: Using and creating custom colors for objects is discussed in detail in Chapter 6 of the **GoldSim User's Guide**.



Note: The default color for a Dashboard is a very light gray (the default color for Windows dialogs).

Adding Graphics and Text to Dashboards

Adding graphics (an image or a simple schematic) and explanatory text is a powerful and straightforward way to augment a Dashboard:



The Drawing Tools toolbar in GoldSim provides access to a number of buttons for adding graphics and text to your Dashboard. The Drawing Tools toolbar is present by default on the right side of the GoldSim window, directly above the Dashboard toolbar (although it can be moved to another location). The same functions can also be accessed under **Graphics|Insert** in the main menu.

Adding and editing graphic objects and text is discussed in detail in Chapter 9 of the **GoldSim User's Guide**.

Adding text objects to Dashboards is particularly important, as in most cases, you will want to do so in order to properly label the various controls that are placed on the Dashboard. The Drawing Tools toolbar provides two different mechanisms for inserting text onto a Dashboard: you can insert simple text or a Text Box (both are illustrated in the example above). The following should be noted regarding the use of text in Dashboards:

- Text Boxes are included in the tab order for a Dashboard, since the user may want to select text and/or scroll in the box.
- Simple text (rather than Text Boxes) should always be used for labels. Text Boxes use significantly more memory, and, as pointed out above, are included in the tab order.



Note: In a Dashboard, graphics always appear *behind* any controls that are present. That is, the drawing order of a control is always higher than that of a graphic. The drawing order of controls is determined by when they were added to the Dashboard. Newer controls always appear on top of older controls if they overlap. You cannot modify the drawing order of controls.



Note: When adding text (e.g., for labels) to a Dashboard, you should always ensure that the text object is sized to allow for some space around (above, below, left, right) the text itself. Otherwise, the text could potentially be cut off at certain resolutions and/or text scaling.

Chapter 4: Creating and Viewing Player Files

Play the game for more than you can afford to lose...only then will you learn the game.

Winston Churchill

Chapter Overview

This chapter describes how to create a Player file in GoldSim. It also discusses what your model will look like when opened using the GoldSim Player.

In this Chapter

This chapter discusses the following topics:

- Creating the Player File
- Understanding How Your Model Will Appear in the Player

Creating the Player File

Player files (with or without Dashboards) can be viewed and run using the GoldSim Player (which can be downloaded for free from the GoldSim website). This allows your models to be viewed and run by others without requiring them to have a licensed version of GoldSim.

You can save a copy of a GoldSim model as a Player file by selecting **File|Save Player File...** from the main menu.

In order to create a Player file, one of the following must be true:

- The model is in Edit Mode; or
- The model is in Scenario Mode and contains a Scenario control.

You cannot create a Player file if the model is in Result mode, or if it is in Scenario Mode but does not contain a Scenario control.



Note: If the model file from which the Player file is created was password-protected, the Player file will also be password-protected, and the user will need to enter a password to open the file. (Password-protecting a file is discussed in Chapter 3 of the **GoldSim User's Guide**.)

Before creating a Player file that contains Dashboards, you may want to first set all of the input controls to their default values. You can do this by right-clicking in each Dashboard and selecting **Set to Default Values**. This will set all the input controls to their default values for that Dashboard (you must repeat for every Dashboard).

When you try to create a Player file, GoldSim first checks that the model is valid (e.g., there are no invalid elements in the model). It will not allow you to create a Player file unless the model is valid.



Note: When a Scenario control is present on a Dashboard, all Scenario Data elements must be editable via a Dashboard control in one of the Dashboards in the model in order to create a Player file. That is, if a Scenario Data element has been defined that is not accessible via a Dashboard, you will not be able to create a Player file.

Read more: [Using the Scenario Control](#) (page 90).

If the model is valid, GoldSim then checks to see if all of the controls on the Dashboards are valid. If it finds invalid controls (e.g., an input control that is not linked to an element), it displays a dialog identifying the invalid controls.

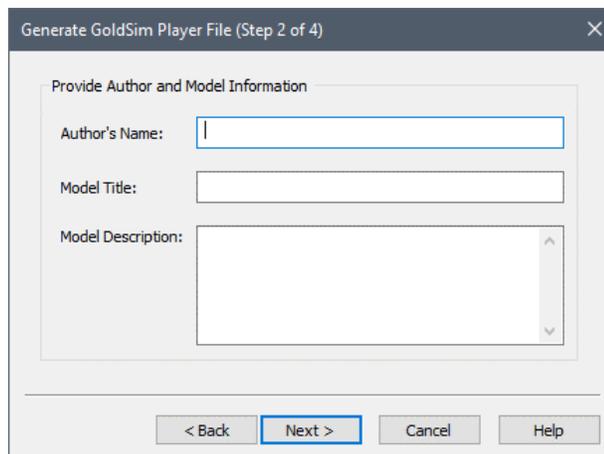
Note that you have the choice to go and correct the invalid control (invalid controls are outlined in red in GoldSim), or you can choose to create the Player file. In this case, any invalid controls will be grayed out when viewed in the Player.

If all Dashboard controls are valid (or you choose to create the Player file with invalid controls), a wizard will appear to assist you in creating the Player file.

The first page simply provides some explanatory text.



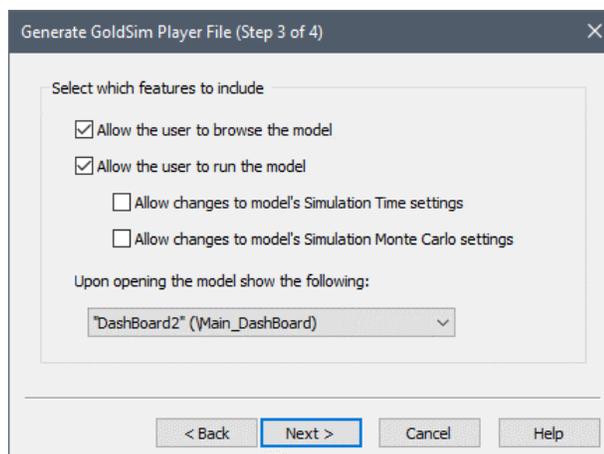
The second page of the wizard prompts you for the Author's Name, a Model Description, and a Model Title.



The Author's Name, Model Title, and Model Description can be viewed via a menu item in the Player. The Model Title also appears in the title bar of all Dashboards.

Read more: [Viewing a Player File](#) (page 114).

The third page of the wizard allows you to specify the properties of the Player file:



If the **Allow the user to browse the model** option is checked, the Player user is allowed to leave any Dashboard(s) and browse the structure of the model. If this option is cleared, the browser button will be grayed out and the Container navigation bar will be hidden. Note, however, that if the model does not have at least one Dashboard and/or the Dashboard includes a Button control that jumps to a Container or an element, the model is automatically browsable and this option will be checked on and grayed out.

Read more: [Types of Player Files](#) (page 113).

If the **Allow the user to run the model** option is checked, the buttons in the Run Control toolbar within the Player will be available to run the model. If this option is off, the buttons in the Run Control toolbar will be grayed out and the Player user will be able to view the model, but will not be able to run it. Moreover, the user will not be able to save the model (via the **File** menu).

If a Player user can run the model, two additional options will become available. Checking the **Allow changes to Time settings** option allows the Player user to edit most settings on the **Time** tab of the Simulation Settings dialog (**Advanced Time Settings** cannot be edited). Selecting the **Allow changes to Monte Carlo settings** allows a player user to edit all of the settings on the **Monte Carlo** tab of the Simulation Settings dialog.



Note: If you want the Player user to change either Time or Monte Carlo settings, you must provide a mechanism for them to access the Simulation Settings dialog. There are two ways for a Player user to access the Simulation Settings dialog: 1) via a Dashboard Button; or 2) by browsing the model. That is, even if you allow Monte Carlo or Time settings changes, if you don't provide a path to the dialog (by making the model browsable and/or creating a Dashboard Button), the Player user will not be able to edit these settings. In addition to using a button, you can also allow the user to change the Duration or Start Date/End Date using a Simulation Time control.



Note: If any of your Dashboards have a Simulation Time Control, **Allow changes to Time settings** must be checked to continue.

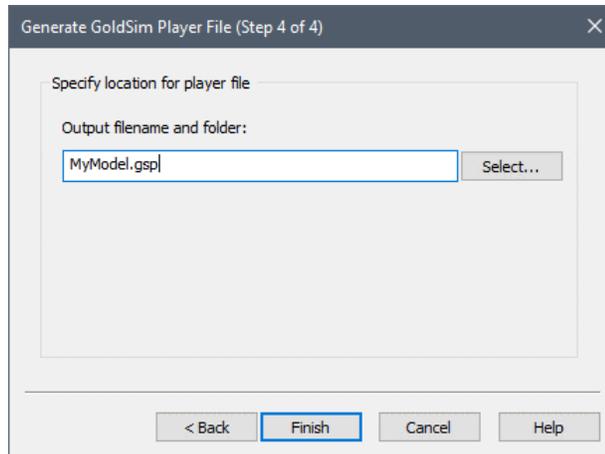
Read more: [Displaying the Simulation Settings Dialog Using a Button](#) (page 87); [Using the Simulation Time Control](#) (page 88).

The final field in the third page of the wizard determines what will be displayed when the Player user opens the file. If the Player file has no Dashboards, the only option is “Top-level Container”. However, if the file contains one or more Dashboards, you can specify the **Default Dashboard**; that is, the Dashboard that will be displayed when the file opens in the Player. The drop-list contains all Dashboards in the model. If the model is browsable, it also contains “Top-level Container”.

These options define the type of Player file that is created.

Read more: [Understanding How Your Model Will Appear in the Player](#) (page 113).

The final page of the wizard is used to specify the path and filename of the Player file.



The extension of the Player file *must* be .gsp. If this is left out, GoldSim automatically adds this extension when it creates the file.

Understanding How Your Model Will Appear in the Player

In order to design effective Dashboards, you must first understand how the GoldSim Player works, and how your model will appear when viewed in the Player.

A Player file cannot be read by GoldSim; it can only be read by the GoldSim Player.

In general, the Player allows the user to view and navigate a GoldSim model just as they would view and navigate a GoldSim model file in GoldSim. This includes the ability to open most GoldSim dialogs (e.g., in order to examine how an element has been defined). Note that not all Player files must contain Dashboards.

Types of Player Files

How a Player file appears when viewed in the Player is determined by the author when the Player file is created. The primary types of Player files (from the simplest to the most complex and powerful) and how they would generally be used is summarized below:

- **Player file with no Dashboards, cannot be run.** This is the simplest type of Player file. This is the type of file which is produced if you only wish to allow others to view and browse your model.
- **Player file with no Dashboards, can be run.** This type of Player file is useful if you wish to distribute a Player file without results (due to their size), and have the Player user generate the results once they have received the file.
- **Player file with Dashboard(s), cannot be browsed.** In this file, the Player user can only navigate within Dashboards, and can never “look under the hood” to see the detailed structure of the model. Such a file is useful if you want to allow someone to run your model and play “what if” games, without requiring them to be familiar with the GoldSim interface or the technical details of the model. Although the author can control whether or not the model can be run, this would typically be allowed for this type of file (as a Dashboarded model that can not be run would be of limited use).

- **Player file with Dashboard(s), can be browsed.** In this file, in addition to providing Dashboards to enable the user to modify some features of the model and view results, you also allow the user to “look under the hood” to see the detailed structure of the model. This is particularly useful if the audience for the model includes some modelers who may wish to better understand some of the technical details. As is the case above, typically the author would allow the model to be run for this type of file (as a Dashboarded model that can not be run would be of limited use).

Viewing a Player File

Player files have the extension .gsp. You can double-click on a Player file to open it, or open the Player executable directly (GSPlayer.exe). In the latter case, a screen will be displayed to allow you to open a particular Player file:



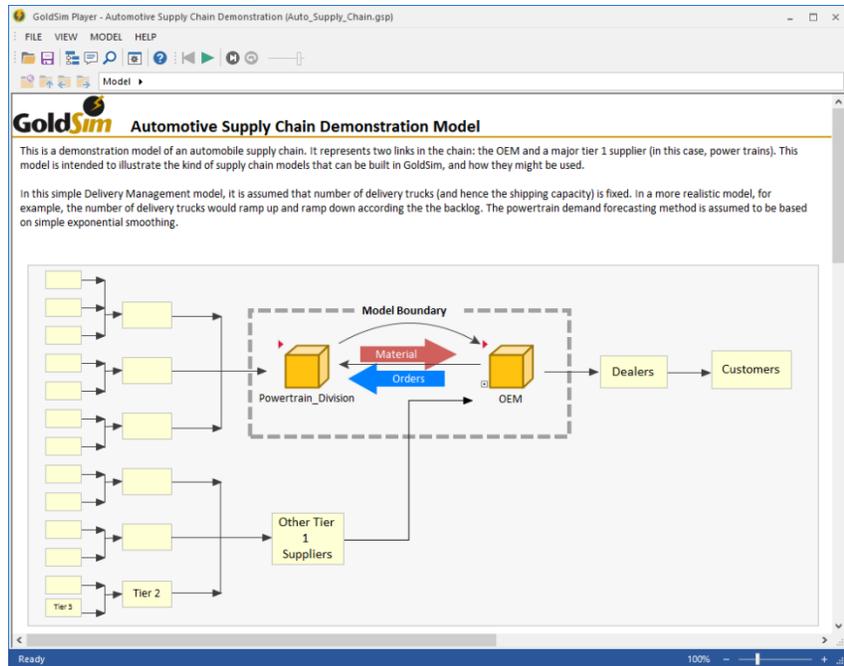
The appearance of the Player file when it first opens is a function of whether it has any Dashboards, and options selected by the author.



Note: If the model file from which the Player file was created was password-protected, the Player file will also be password-protected, and the user will need to enter a password to open the file. (Password-protecting a file is discussed in Chapter 3 of the **GoldSim User’s Guide**.)

Viewing Player Files Without Dashboards

If a Player file does not have any Dashboards, it will open within the GoldSim Player at the top-level Container (just as a .gsm file would open in GoldSim):



Note that “GoldSim Player” is displayed in the title bar (rather than “GoldSim”)

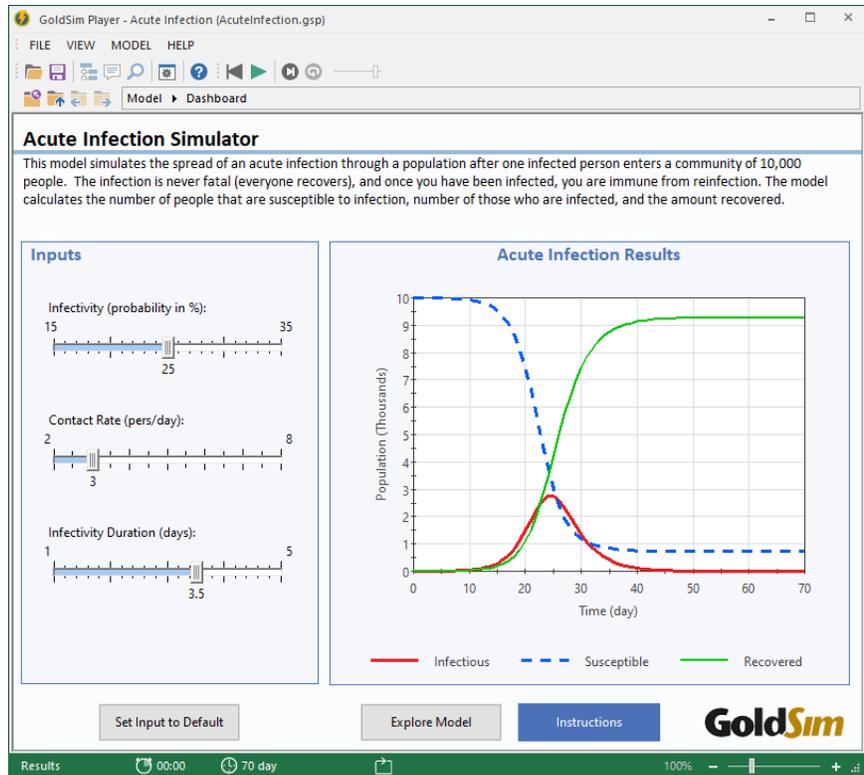
The GoldSim Player interface in this case is essentially identical to that of GoldSim, with one exception:

- Some of the menu options and toolbars available in GoldSim (e.g., the Insert menu) are not available in the GoldSim Player (since editing functions are not allowed).

Viewing Dashboard-Enabled Player Files

If the Player file has at least one Dashboard, the author can choose for the file to initially open to a specified *default Dashboard*, or to the top-level Container.

If the author chooses for the model to open to the default Dashboard (e.g., if the author does not want the model to be browsable), the specified Dashboard will be displayed:

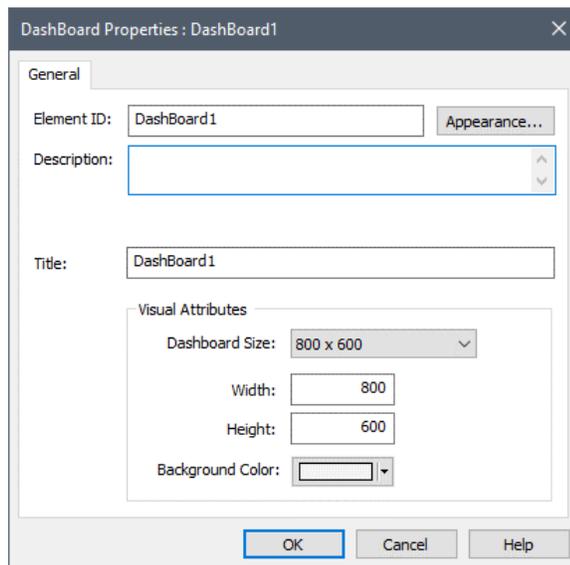


Note: If the model is not browsable, the menus and toolbars are available, but the Container navigation bar will be hidden.

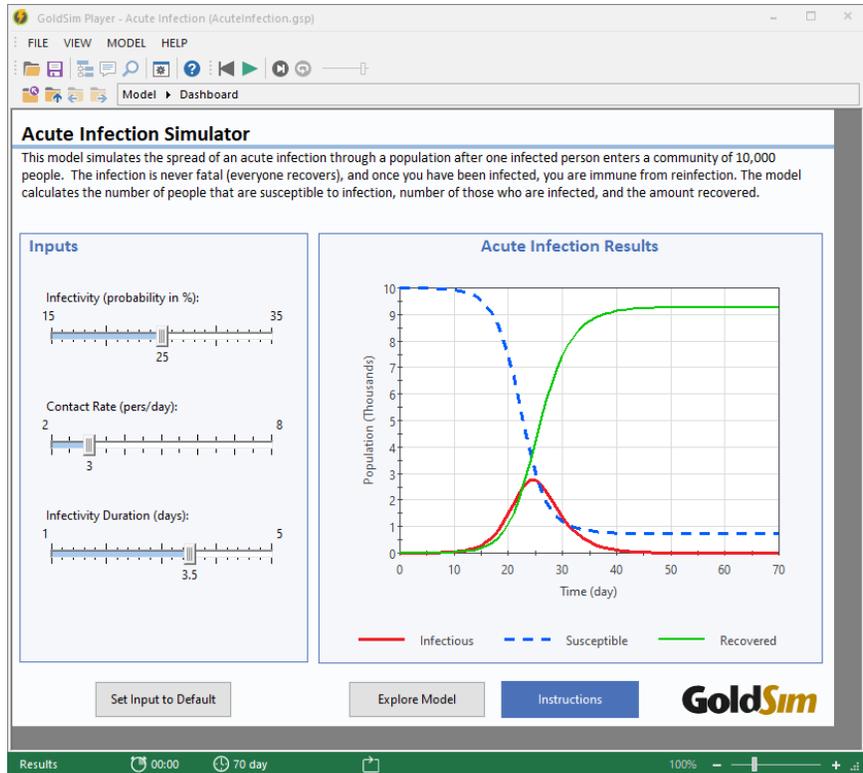
The Player user can tab through the controls (in the tab order defined by the author) using the **Tab** and **Shift-Tab** keys.

Read more: [Controlling the Tab Order in a Dashboard](#) (page 101).

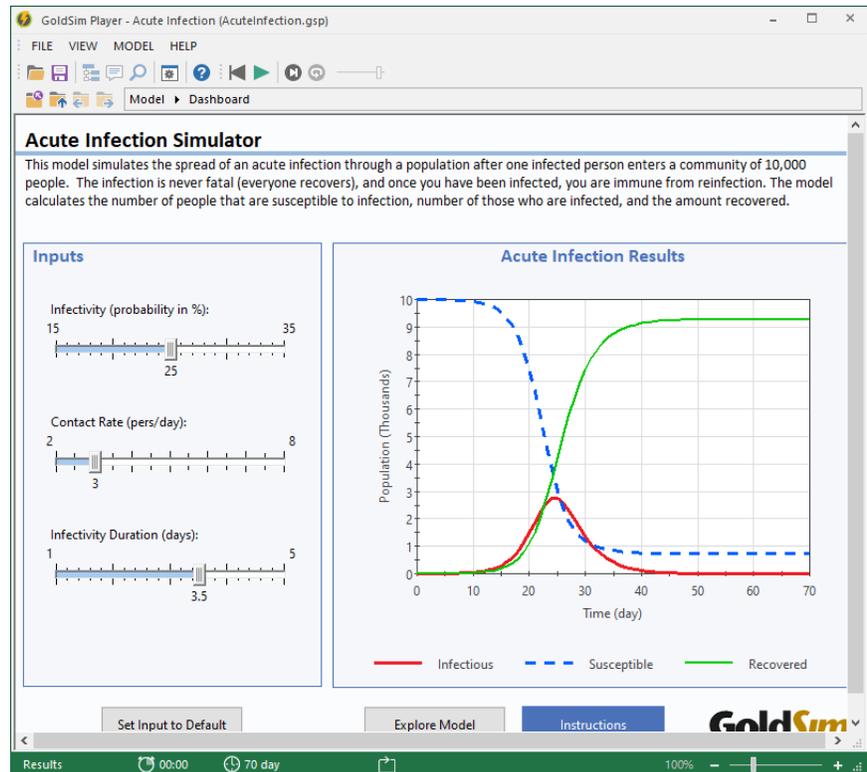
The size of the Dashboard itself is fixed (i.e., it cannot be resized by the Player user), and is defined by the author in the property dialog for the Dashboard:



The Player will open such that the Dashboard exactly fits inside the window that is displayed. Note, however, that the Player user can expand or shrink the window (by dragging the edges). If the Player user expands the window, the Player simply displays gray empty space around the Dashboard (since the Dashboard itself is of fixed size):



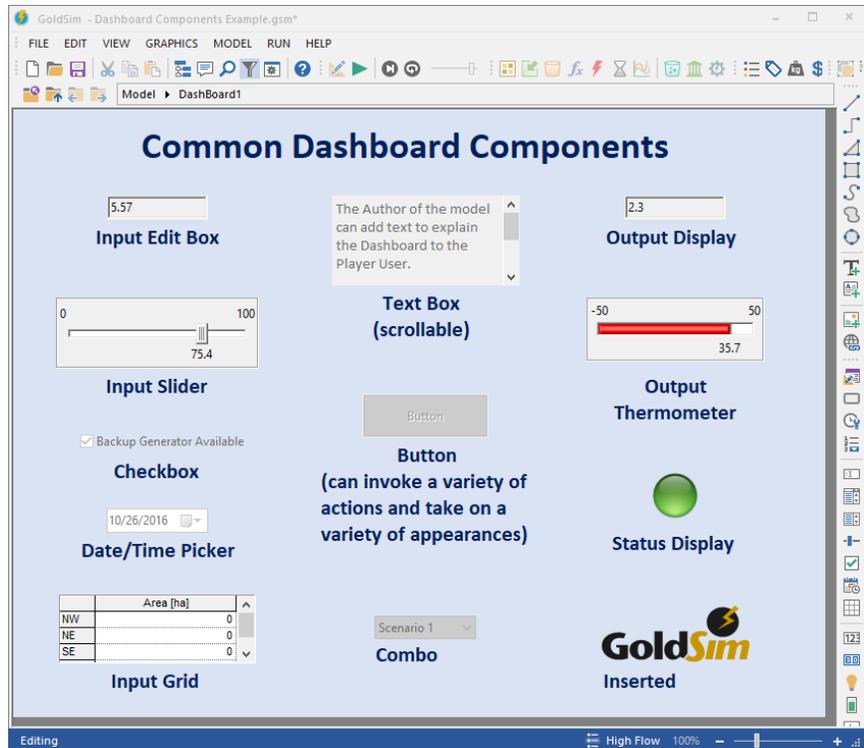
If the Player user shrinks the window, scrollbars appear:



If the Dashboard is too large to fit on the Player user's screen (e.g., the Dashboard was 1024 by 768, but the Player user's screen was only 800 by 600), the Dashboard fills the screen and scrollbars are automatically added.

When viewing a Dashboard within the Player, the interface seen by the user is completely determined by the author. Other than menu and two toolbars at the top, none of the regular GoldSim interface is visible. The Dashboard has the appearance of a custom application.

Note that when the Dashboard is viewed within GoldSim (e.g., by the author), it appears differently than it does within the Player. In particular, it is embedded within the GoldSim interface (which has additional toolbars and menu options):



The Run Control Toolbar

Within the GoldSim Player, the Run Control toolbar takes on a slightly different appearance than within GoldSim:



The Run Control toolbar behaves in the same manner within the Player as it does in GoldSim with several exceptions:

- The first button from the left in the Player Run Control toolbar (**Reset**) is active after a model has been run, and allows the user to Reset the model so various input controls can be changed and the model can be run again. The model can also be reset by pressing **F4**.
- If a Scenario control is present in the model, the Run button on the Run Control toolbar runs the Active Scenario and places the model into Scenario Mode.

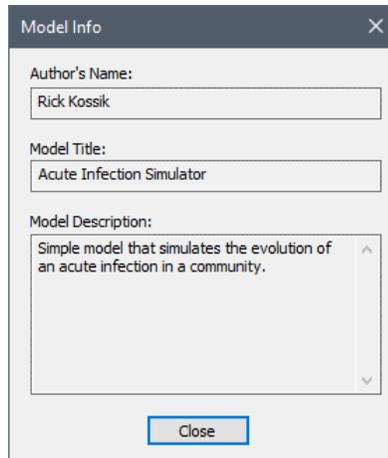
Read more: [How the Scenario Control Works](#) (page 90).

Viewing the Player File Author, Title and Description

When the author creates a Player file, the wizard prompts him/her for and Author, Title and a Description.

Read more: [Creating the Player File](#) (page 110).

This information can subsequently be viewed in the Player by selecting **Model Info...** under **File** in the main menu. A dialog showing the Author, Title and Description will be displayed:



Browsing and Running Models with the Player

Simulation Modes in the GoldSim Player

A short User's Guide is available on the GoldSim web site to explain the basic functions of the GoldSim Player to the Player user, and the Player also has a Help system. In general, however, it is good practice for an author to provide sufficient instructions (through text boxes, tool-tips for controls, and graphics and text) to enable the user to interact with the Player file that they have created.

Unlike a GoldSim file, a GoldSim Player file can never be in Edit Mode. It can only be in Run Mode, Result Mode or Scenario Mode.

In the absence of a Scenario control, the Player file can only be in Run Mode (in Run Mode, it can either be "Ready" or "Running") or Result Mode. When it is ready to run it will display "Ready" in the Status bar (which will be blue). While it is running, it will display "Running" in the Status bar (which will be pink). After the model has been run and contains results, it will display "Results" in the Status bar (which will be green).

While it is in Run Mode ("Ready"), input controls can modify Data elements (as well as Time Series and Lookup Tables) through a Dashboard. When it is in Result Mode, input controls are locked, and if the user tries to change them, the Player will warn the user that in order to change the setting in the control, the results must be discarded (by resetting the model to "Ready" by pressing the **Reset** button immediately to the left of the **Run** button in the toolbar).

If the model contains a Scenario control, the Player file can only be in Run Mode ("Ready" or "Running") or Scenario Mode. After the model has been run and contains results, it is in Scenario Mode. While it is in Run Mode (or if a scenario without results is selected as the Active Scenario when in Scenario Mode), input controls can modify Data elements (as well as Time Series and Lookup Tables) through a Dashboard. When the Active Scenario has results (and the model is therefore in Scenario Mode), input controls are locked, and if the user tries to change them, the Player will warn the user that in order to change the setting in the control, the results must be discarded.

Viewing GoldSim Windows and Dialogs in the Player

If a Player file is browsable, for the most part, all of the dialogs and property pages that can be viewed in GoldSim can also be viewed in the Player. With a few exceptions associated with viewing results, all of the input fields will be grayed out in the dialogs and cannot be modified or edited by the user.

If your Player file is browsable but contains Dashboards, it is good practice to provide an easy mechanism for navigating back to a Dashboard (even though this can be done directly from the browser, it may not be obvious to the user). The way to do this is to insert Hyperlink objects that jump to specified Dashboards.

Running and Saving Models with the Player

Hyperlink objects are discussed in detail in Chapter 8 of the **GoldSim User's Guide**.

If the author has created a Player file which can be run, the Run Control toolbar can be used to run, pause and step through the simulation in the same manner as in GoldSim.

If the Player file can be run, the file can be saved after modifying inputs (via input controls on Dashboards) or generating results by selecting **File|Save** from the main menu.

The Player user can view the Simulation Settings dialog in a browsable model, and may or may not be able to edit any of the options (depending on how the author created the Player file).

Editing Simulation Settings in the Player

In some situations, you may want to allow the Player user to edit the Simulation Settings for a model. You have the option to allow the Player user to edit some of the Time and Monte Carlo Settings in the model.

When browsing a model within the Player, selecting **Model|Simulation Settings...** from the main menu displays the Simulation Settings dialog.



Note: You can also allow users to access this dialog via a Dashboard button control.

Read more: [Displaying the Simulation Settings Dialog Using a Button](#) (page 87).

Although this dialog can be viewed in a Player file (as long as it is browsable or you have defined a simulation settings button), it cannot necessarily be edited by the user. You specify whether or not Player users can edit the Time and Monte Carlo settings when saving the Player file.

Read more: [Creating the Player File](#) (page 110).

The Simulation Settings dialog is discussed in detail in Chapter 7 of the **GoldSim User's Guide**.

Viewing Results in the Player

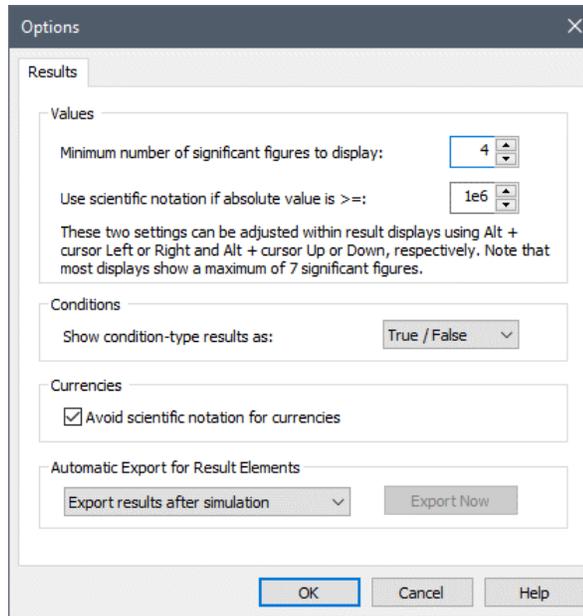
There are four ways for a Player user to view simulation results:

1. Through the standard output controls;
2. Via an embedded result display (i.e., a Result Window control);
3. By pressing a Button which is linked to a Result element; and
4. By right-clicking on an element with saved results (or double-clicking on a Result element) in a browsable model.



Note: The Properties dialog for Result elements are not available to the Player user.

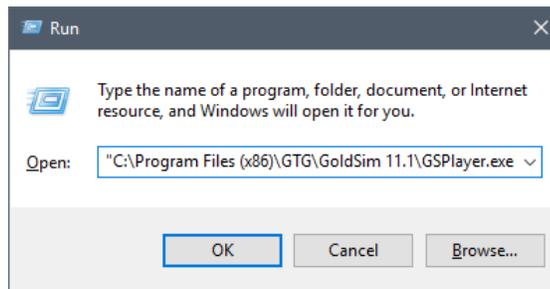
The last three options provide direct access to GoldSim's result display capabilities. For example, when viewing a chart, the Player allows the user to change the Style (via the Edit Style button on a chart). In addition, several result display options are available via **Model|Options...**:



Running Player Files from the Command Line

In some cases, it may be useful to run the GoldSim Player directly from the command line.

This, for example, could be done by selecting **Run** from the Windows **Start** menu, which displays the following dialog:



You must enter the full path to the GoldSim Player executable (which may, of course, be different than that shown above), followed by the GoldSim file that you want to open. If no filename is specified, GoldSim simply opens the Player and displays the splash screen.



Note: If no path is specified for a filename, GoldSim Player looks in the same directory as the Player executable. Hence, it is highly recommended that you provide a full path for the filename.

The primary reason for running the Player from the command line is to take advantage of a number of command line parameters that cause the Player to execute in a specific manner.

The command line parameters are summarized in the following table. Note that the parameters are entered *after* the executable and *before* the model file name.

Parameter	Description	Comments
-r -run	Opens the GoldSim Player file and immediately runs the simulation.	
-x	Closes GoldSim after all other options have been executed.	Note that unless the -sv parameter is also used, the GoldSim Player file will NOT be saved when the application is closed.
-sv [filename] -save [filename]	Saves the Player file using either the optionally provided output filename, or the input filename (if an output file is not provided).	This option can be used to run and save a Player file.

Examples of how these parameters would commonly be used are provided below. Note that these parameter strings would follow the name (and path) of the GoldSim Player executable (GSPlayer.exe).

Command line	Comments
-r test1.gsp	Opens test1.gsp, executes pre-run checks and starts the simulation. GoldSim Player remains open after the simulation.
-r -sv test1.gsp	Opens test1.gsp, executes pre-run checks and starts the simulation. At the end of the simulation, the Player file is saved. GoldSim Player remains open after the simulation.
-r -sv -x test1.gsp	Opens test1.gsp, executes pre-run checks and starts the simulation. At the end of the simulation, the Player file is saved. GoldSim Player is then closed.
-r -sv test1res.gsp test1.gsp	Opens test1.gsp, executes pre-run checks and starts the simulation. At the end of the simulation, the Player file is saved to test1res.gsp. GoldSim Player remains open after the simulation.

In most cases, it is likely that you will want to “stack” a number of GoldSim runs by creating a batch file that you run from the command line. However, if you simply stack command lines and then run a batch file, all GoldSim Player calls would be launched in parallel (e.g., if you had 10 command lines that ran GoldSim Player, 10 instances of GoldSim Player would open and run simultaneously).

To avoid this problem and force the commands to run in series, you can use the Start/Wait command provided by Windows. An example batch file that utilizes this is shown below:

```
CD c:\Program Files\GTG\GoldSim 10.5
Start /wait GSPlayer.exe -r -sv -x c:\runs\input1.gsp
Start /wait GSPlayer.exe -r -sv -x c:\runs\input2.gsp
Start /wait GSPlayer.exe -r -sv -x c:\runs\input3.gsp
Start /wait GSPlayer.exe -r -sv -x c:\runs\input4.gsp
```

The first line simply sets the directory to the location of the GoldSim executable. The next line opens a GoldSim Player file called input1.gsp. The Player runs the model, saves the results and then closes. After closing, the next GoldSim Player command is implemented (open input2.gsp, run and save the model). This continues until all four GoldSim runs are complete.

Glossary of Terms

Active View

One of the two types of views that a Dashboard can be in within GoldSim. A Dashboard is automatically placed in Active View whenever the model is in Run Mode or Result Mode. When in Active View, the Dashboard appears as it would in the Player, and the controls cannot be edited or moved.

Button Control

A special control that can be added to a Dashboard that provides a mechanism for linking a wide range of actions to a button.

Check Box Control

An input control that can be added to a Dashboard that provides a mechanism for making a binary selection (i.e., yes/no, on/off, 10/20).

Combo Box Control

An input control that can be added to a Dashboard that provides a mechanism for selecting one option from a drop-list (combo box).

Control

An object that can be added to a GoldSim model (via the Dashboard Authoring tools) in order to construct a customized user interface (a dashboard) for the model. Controls provided by GoldSim include buttons, checkboxes, sliders, input edit fields, text boxes and result displays.

Dashboard

A special GoldSim element that allows you to build custom interfaces or "control panels" for your models. By adding controls (e.g., sliders, input edit fields, buttons, result display) to a dashboard, users can directly interact with the model without having to be familiar with either the GoldSim modeling environment or the details of the specific model.

Date-Time Control

An input control that can be added to a Dashboard that provides a mechanism for entering dates.

Default Dashboard

The Dashboard that a Player file displays when the file is first opened.

Design View

One of the two types of views that a Dashboard can be in within GoldSim. When you are creating and editing your Dashboards, you will be in Design View.

Digital Result Display Control

An output control that can be added to a Dashboard that provides a mechanism for viewing scalar outputs directly in the form of a digital readout.

Edit Mode

One of the three modes that a GoldSim model can be in. In Edit Mode, you can edit the model. It does not contain any results.

GoldSim Player

A program that allows you to "play" or "read" an existing GoldSim model without having to license the GoldSim software. The GoldSim Player is available as a free download from the GoldSim website.

Input Control

A type of control which can be added to a GoldSim model (when using the Dashboard Authoring tools) in order to construct a customized user interface (a dashboard) for the model. Input controls (e.g., sliders, checkboxes and input edit fields) are linked directly to Data elements and allow a user to directly modify the values of these elements via the dashboard.

Input Edit Box Control

An input control that can be added to a Dashboard that provides a mechanism for typing values directly into an input field.

Input Grid Control

An input control that can be added to a Dashboard that provides a mechanism for entering inputs (in the form of edit boxes, check boxes or combo boxes) into a grid.

List Box Control

An input control that can be added to a Dashboard that provides a mechanism for selecting one (or more) options from a List Box.

Output Control

A type of control which can be added to a GoldSim model (when using the Dashboard Authoring Module) in order to construct a customized user interface (a dashboard) for the model. Output controls (e.g., thermometers, result displays) are linked directly to GoldSim elements and allow a user to directly view the values of these elements via the dashboard.

Player file

A special file format (with the extension .gsp) that can be created by GoldSim and can only be read by the GoldSim Player.

Result Display Control

An output control that can be added to a Dashboard that provides a mechanism for viewing scalar outputs directly.

Result Window Control

An output control that can be added to a Dashboard that allows you to embed a result window (as either a chart or a table) directly into a Dashboard.

Result Mode

One of the three modes that a GoldSim model can be in. After a simulation has completed (and the model has some results), the model is placed in Result Mode. You cannot edit the model in Result Mode. When viewing a Dashboard within GoldSim when in Result Mode, the Dashboard is placed in Active View.

Result Status Display Control

An output control that can be added to a Dashboard that provides a mechanism for displaying a series of icons that indicate the status (value) of an output.

Run Mode

One of the three modes that a GoldSim model can be in. While the model is running, the model is placed in Run Mode. You cannot edit the model in Run Mode. When viewing a Dashboard within GoldSim when in Run Mode, the Dashboard is placed in Active View.

Scenario Control

A special control that can be added to a Dashboard that provides a mechanism for selecting and running scenarios.

Slider Control

An input control that can be added to a Dashboard that provides a mechanism for selecting a value using a horizontally or vertically oriented slider.

Text Box Control

A special control that can be added to a Dashboard that provides a mechanism for adding scrollable text (e.g., for providing instructions and/or explanations to the user).

Thermometer Control

An output control that can be added to a Dashboard that provides a mechanism for viewing scalar outputs directly in the form of a vertically or horizontally oriented thermometer.

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