Using Recipes with a UniOP Panel

All versions of Designer above or equal to 4.00 offer the possibility of storing data inside the panel in data retentive memory. The available amount of data retentive memory varies depending on the UniOP model. This data retentive memory can be used to permanently store data for use by an attached controller. This data can be written to the controller. Conversely, the data can be read from the controller and then placed in the data retentive memory. This concept is termed *Recipes* and offers a powerful way to extend the capabilities of the controller. This is especially true for controllers that have a limited amount of internal memory.

All UniOP panels offer 16K of memory for usage with recipes, with the exception of the MD01 and the MD03, which are not recipe capable.

Recipes are configured by simply adding the required controller data items to the page as recipe data items. To add a recipe data item, the user can perform the same procedure used to create a numeric field almost exactly. The only change necessary is to select *Data Field Source - Recipe Data* from the *Edit* menu *instead* of selecting *Data Field Source - Controller Data* (or select the *Recipe* icon from the *Extra ToolBelt* instead of the *Controller Data* icon).

Recipe data items contain all the information associated with normal controller data items, but rather than the data being read and written directly to the controller during the course of normal operation, the data is instead read from and written to the UniOP memory that is reserved for the data item. Only when the user explicitly asks the UniOP panel to write the data to the controller is the data sent to the controller. Similarly, only when the user explicitly asks the UniOP panel to read the data from the controller is the data read from the controller.

A Quick Start Example

It is not necessary to create a complex project to try recipes. This example will show the user how to define a very simple recipe in a few steps.

1. Make sure that the panel is in *Configuration Mode*.

2. Connect the panel to the personal computer and the controller using the correct cables.

3. Start the *Designer* software.

4. Define some background text and two numeric fields with different addresses as shown in Figure 1.

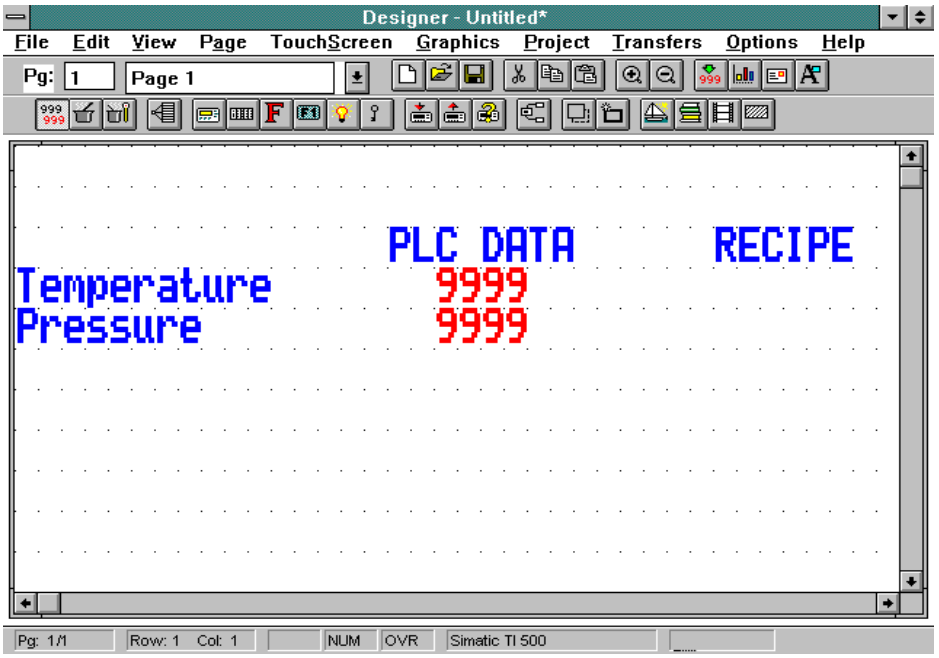

Figure 1

5. Go to the *Edit* menu and select *Recipe Data* from the *Data Field Source* option or choose the *Recipe* icon in the *Extra ToolBelt*.

6. Define two recipe data items with the same addresses as given to the numeric fields that were created in step 4. The two recipe data fields will be shown on the Designer page with the placeholder 'R' instead of the '9' used for numeric fields (see Figure 2).

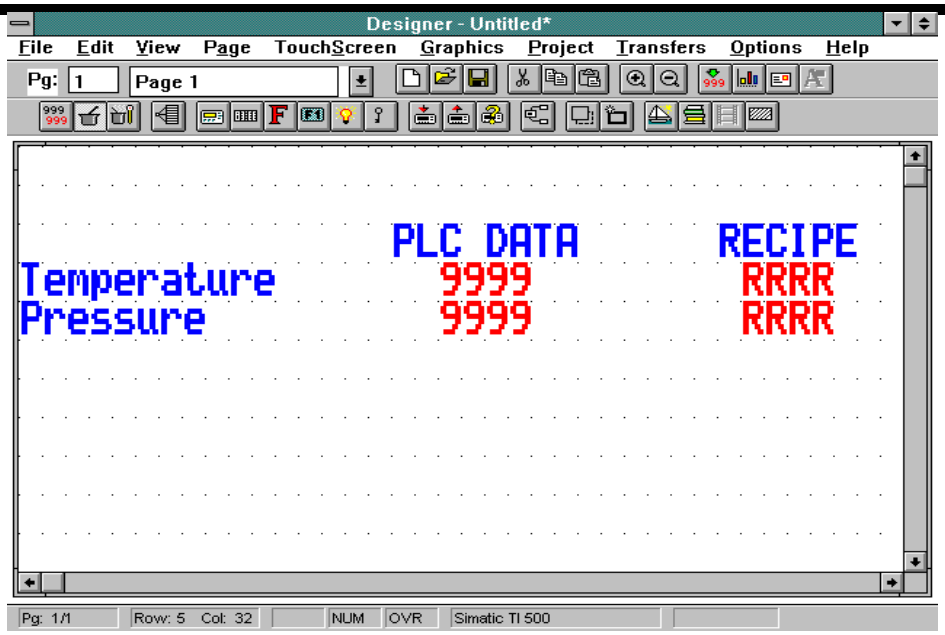

Figure 2

7. Go to the *Page* menu and select the option *Recipe Configuration*. This will bring up the dialog box that is shown in Figure 3.

8. Enter 4 for the *Number of Parameter Sets* and initialize the recipe values as shown in Figure 3. Note that the Recipe Item addresses will be the addresses of the fields that were defined earlier. Select *OK* to confirm the operation.

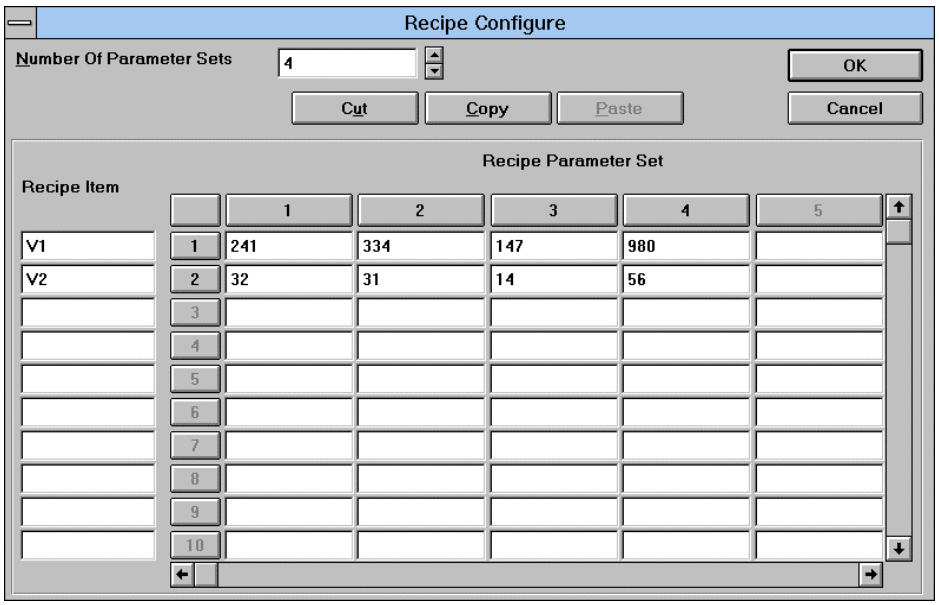

Figure 3

9. Enter the *Keyboard Macro Editor* and configure the F1 key using the command *Recipe*

Control to download the current parameter set.

10. Download the project to the panel either by pressing the *F2* key on the *computer keyboard*, by selecting the *Download* icon in the *Extra ToolBelt*, or by choosing *Download* from the *Transfers* menu.

11. When the download is finished, the panel will go into operation mode. The variables in the left column represent the content of the controller memory. The column on the right will represent the content of the first recipe parameter set once the F1 key is pressed.

12. Pressing the F1 key will cause the panel to begin downloading the current recipe parameter set (which is parameter set 1). After a few seconds, the operation will be completed and the content of the controller memory will show the same values as those that are stored in parameter set 1.

Adding Recipe Data Items with Designer

The user can add recipe data items to a page using Designer by selecting *Data Field Source - Recipe Data* from the *Edit* menu. From the *Data Field Source* menu, the user can specify that the data item is either *controller Data* (the default), *Recipe Data*, or a *Panel Control Variable*. The *Control Variable*, which will be discussed later, offers a means of controlling and monitoring recipes.

Note: *When Recipe Data has been selected in the Data Field Source menu (or with the icon), all data items that are subsequently added to the page by the user will be recipe data items.*

Specifying Initial Values for Recipe Data Items

A recipe is associated with a particular page and is composed of all the recipe data items on that page. However, there can be different parameter sets of a recipe. A recipe parameter set is created by assigning particular values to the recipe data items on a page. It is possible with Designer to create many parameter sets that are contained within a single recipe. All of these different parameter sets of the recipe can contain different values and control different processes. This allows the user to enter many different sets of parameters for the controller. One set may be used to configure the controller to control the production of 2 mm screws, another set may be used to configure the controller to control the production of 5 mm screws, and yet another to control the production of 7 mm screws. Each set of parameters would be stored in a different parameter set within the same recipe.

The user can specify the number of parameter sets contained within a recipe, as well as assign the initial values to the different parameter sets of a recipe with the *Recipe Configuration* dialog box. This dialog box is accessed by selecting *Recipe Configuration* from the *Page* menu. The initial values entered for a particular recipe data item are in the format that was specified in the define field dialog box for that data item. For example, if a numerical format of hexadecimal was entered in the define field dialog box for a recipe data item, then all the values entered in the *Recipe Configuration* dialog box for this recipe data item will also be in hexadecimal. If the user specifies a numeric data format of hexadecimal for a recipe data item, and then enters a value of 10 in the *Recipe Configuration* dialog box, the 10 will be interpreted as 10 hexadecimal (16 decimal).

Note: The user must have recipe data items defined on the current page before entering the Recipe Configuration dialog box.

The *Recipe Configuration* dialog box is in the form of a spreadsheet. *Each **row** is associated with a particular Recipe data item.* The controller address of the recipe data item is displayed at the far left hand side of the row, enabling the user to tell which row is associated with which recipe data item.

*Each **column** is associated with a particular parameter set of the recipe*. The initial values for a particular parameter set can be fully specified by entering a value for each row in the column.

Each parameter set is identified by a numeric number. The first column corresponds to parameter set 1, the second column to parameter set 2, and so on.

Selecting Parameter Sets & Controlling Transfers

As mentioned earlier, *Control Variables* offer a means of controlling and monitoring the recipes. Control Variables are special data items that are stored in the UniOP panel memory. The user can control certain operations of the panel by modifying the values held in these internal variables. Control Variables can be added to the project in exactly the same way as controller variables. The user must first select *Data Field Source - Panel Control Variable* from the *Edit* menu. With this selection in force, all newly added data items will be Control Variables.

There are 5 types of Control Variables: *Recipe File Status, Recipe Parameter Set Selection, Recipe Action, Data Entry Status*, and *Data Entry Field Number*. The first three are used with recipes, while the last two can be used whenever desired.

Recipe File Status

In the UniOP panel memory there is a single memory location that is used to store the status of the entire recipe data in the panel. This memory location is called the *Recipe File Status*. The user can add data items to the project file of type Recipe File Status, but all data items of this type refer to the same memory location in the panel.

The *Recipe File Status* cannot be modified by the user of the panel; it is controlled by the internal logic in the panel. The *Recipe File Status* can take on only 2 values, 0 or 1. A value of 0 indicates that all of the recipe data for every page in the project is valid. A value of 1 indicates that an error in some part of the recipe data was found. This means that the integrity of the recipe data is compromised. It is very rare for this to happen, but it can feasibly occur if the UniOP panel is powered off while the user is modifying the value of a recipe data item.

If the *Recipe File Status* has a value of 1 the user must physically change the value of one of the recipe data items to reset the *Recipe File Status* to 0. Until this occurs, the user will not be able to perform recipe transfers.

Recipe Parameter Set Selection

For each page that contains a recipe, the UniOP panel reserves a separate memory location for the *Recipe Parameter Set Selection* for each recipe page. The *Recipe Parameter Set Selection* memory location stores the numeric identifier of the currently selected recipe parameter set for the recipe page.

The user can add *Recipe Parameter Set Selection* data items to the project. These data items can then be used to visually display the currently selected recipe parameter sets of the various recipes in the project.

When the user adds these data items to the project, they must specify which recipe is to be monitored by the data item. This is done by specifying the page number that contains the required recipe.

For example, a project might contain 3 recipes, one on page 2, one on page 3 and the other on page 7. To monitor the currently selected recipe parameter sets of these 3 different recipes, it is necessary to add 3 Recipe Parameter Set Selection data items to the project. One of these data items will be used to monitor the recipe on page 2, one to monitor the recipe on page 3 and the other to monitor the recipe on page 7. These 3 Recipe Parameter Set Selection data items could all be placed on any page of the project. Regardless of where they are placed in the project, the address of the first data item would be Recipe Parameter Set Selection 2, the address of the second data item would be Recipe Parameter Set Selection 3 and the address of the third data item would be Recipe Parameter Set Selection 7.

The user can also change the parameter set of a recipe on a particular page by modifying the value held in the Recipe Parameter Set Selection variable. This is done in the same way as changing the value of a normal controller data item. For example, to make recipe parameter set number 3 the current parameter set, the user would enter a value of 3 in the appropriate Recipe Parameter Set Selection variable. In order to do this, the user must select the Recipe Parameter Set Selection variable as a ***Read/Write*** *variable.*

Recipe Action

For each page that contains a recipe, the UniOP panel reserves a separate memory location for the *Recipe Action* for that recipe page. The Recipe Action memory location stores the current status of operation of the recipe for the page.

The user can add Recipe Action data items to the project. These data items can then be used to visually display the current state of the various recipes in the project.

When the user adds these data items to the project, they must specify which recipe is to be monitored by the data item. This is done by specifying the page number that contains the required recipe.

A Recipe Action data item can take on only 3 values: 0, 1 or 2.

A value of 0 indicates that the recipe is in its normal state of operation. In this mode of operation, the values of the recipe data items are displayed on the screen of the panel and the user can modify the values of the recipe data items.

A value of 1 indicates that the recipe data for the currently selected parameter set is being transferred to the controller. When the transfer is complete the value is automatically reset to 0.

A value of 2 indicates that the recipe data for the currently selected parameter set is being transferred to the panel. When the transfer is complete the value is automatically reset to 0.

The user can start a recipe transfer by entering a value of 1 or 2 for the Recipe Action data item. By entering a value of 1, the user can force the UniOP panel to send the recipe data for the

currently selected parameter set to the controller. By entering a value of 2, the user can force the controller to transfer the recipe data for the currently selected parameter set to the panel.

Data Entry Status

This control variable will be set to a 1 while the UniOP panel is in data entry mode. In all other modes it will be set to 0.

Data Entry Field Number

This control variable simply contains the field number of the selected data entry field whenever the panel is in data entry mode.

Recipes and the Keyboard Macro Editor

Recipe transfers can also be performed by using the Keyboard Macro Editor. *When doing so, the user should program the keys using Page n mode (where n is the page on which the recipe of interest is located)*. By selecting the *Recipe Control* macro command from within the *Commands* toolbar of the Keyboard Macro Editor, the user can either download, upload, or select a parameter set on any given page. See TechNote 28 for more information on the Keyboard Macro Editor.

Recipes and the Interlock Mailbox

The Interlock Mailbox offers a powerful way to control the operation of recipes from the controller. There are seven mailbox commands available to function with recipes:

- start recipe download
- start recipe upload
- recipe status
- get parameter set number
- set parameter set number
- get recipe transfer priority
- set recipe transfer priority

The mailbox commands allow the choice of the recipe page and also of the parameter set. All mailbox commands related to recipes return a completion code describing the results of the operation. The mailbox interface to recipes is particularly useful if it is necessary to transfer a sequence of recipes to and/or from the panel. See TechNote 35 for more information on the Interlock Mailbox.