

Mint^{MT} Multi-Tasking **Application Note****AN00137-001: Using Recipes on a Baldor HMI****Overview**

In this Application Note we will look at how blocks of application related data can be entered and stored in a Baldor Human-Machine Interface (HMI), these blocks of data or "Parameter Sets" are often referred to as Recipes.

Baldor HMI panels are available as serial (RS232/485) devices as standard, refer to Application Note AN00112 for further details about the operation of the serial HMI, or with a CANopen interface by fitting option card KPD-OPTC, Application Note AN00111 looks at the essential operating elements of the CANopen HMI and how this interfaces with a Mint controller.

Introduction to Recipes

Within a Baldor HMI recipes are used to store data associated with a quantity of different elements, thus creating an array table of information that can be edited and stored on the HMI and downloaded to a Mint Controller as required.

This is most commonly used in machines that may run a number of different products, each product having a quantity of different parameters, such as product length, machine speed etc.

Recipe data is stored as a table, (a 2 dimensional array) in non-volatile memory on the HMI, this means that the data is retained if the power to the HMI is removed. Recipe Data can also be uploaded and saved to a computer hard disk so that it can be restored at a later date or copied to another HMI.

Supported Controllers

NextMovePCI	<input checked="" type="checkbox"/>
NextMoveBX^{II}	<input checked="" type="checkbox"/>
NextMoveST	<input checked="" type="checkbox"/>
NextMoveES	<input checked="" type="checkbox"/>
NextMoveESB	<input checked="" type="checkbox"/>
NextMoveE100	<input checked="" type="checkbox"/>
MintDrive^{II}	<input checked="" type="checkbox"/>
Flex+Drive^{II}	<input checked="" type="checkbox"/>

Note – Flex+Drive^{II} is a Slave only.
There must be another master node in the Network e.g. MintDrive^{II}

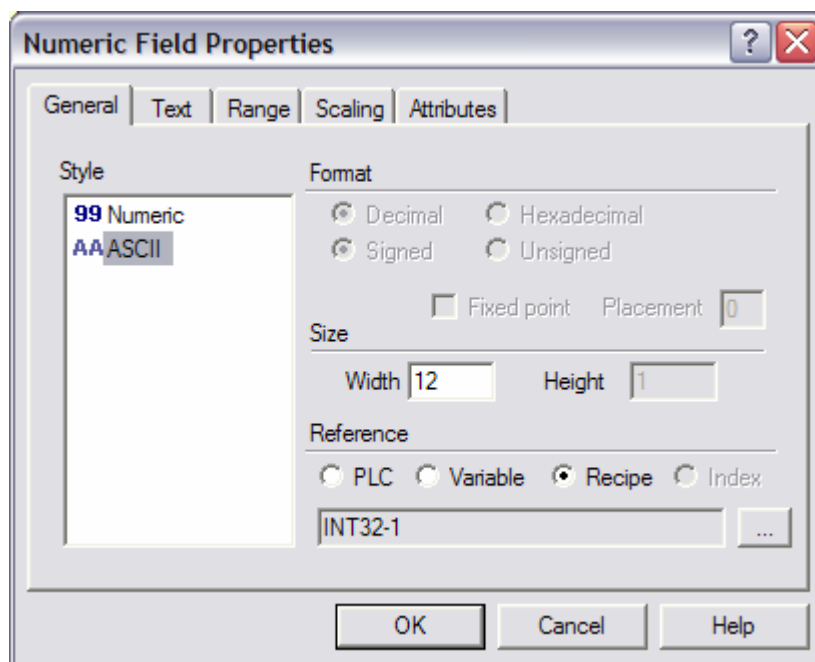
Relevant Keywords**COMMS****CONNECT****BUSEVENT****BUSEVENTINFO**

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Creating a Recipe on a page

Each recipe is set up on an HMI page. The page must include a number of data fields which will be of a type used by the Mint controller, the data entered into these fields is read from and written to HMI memory rather than directly to the controller. An additional operation is required to transfer the data to the controller.

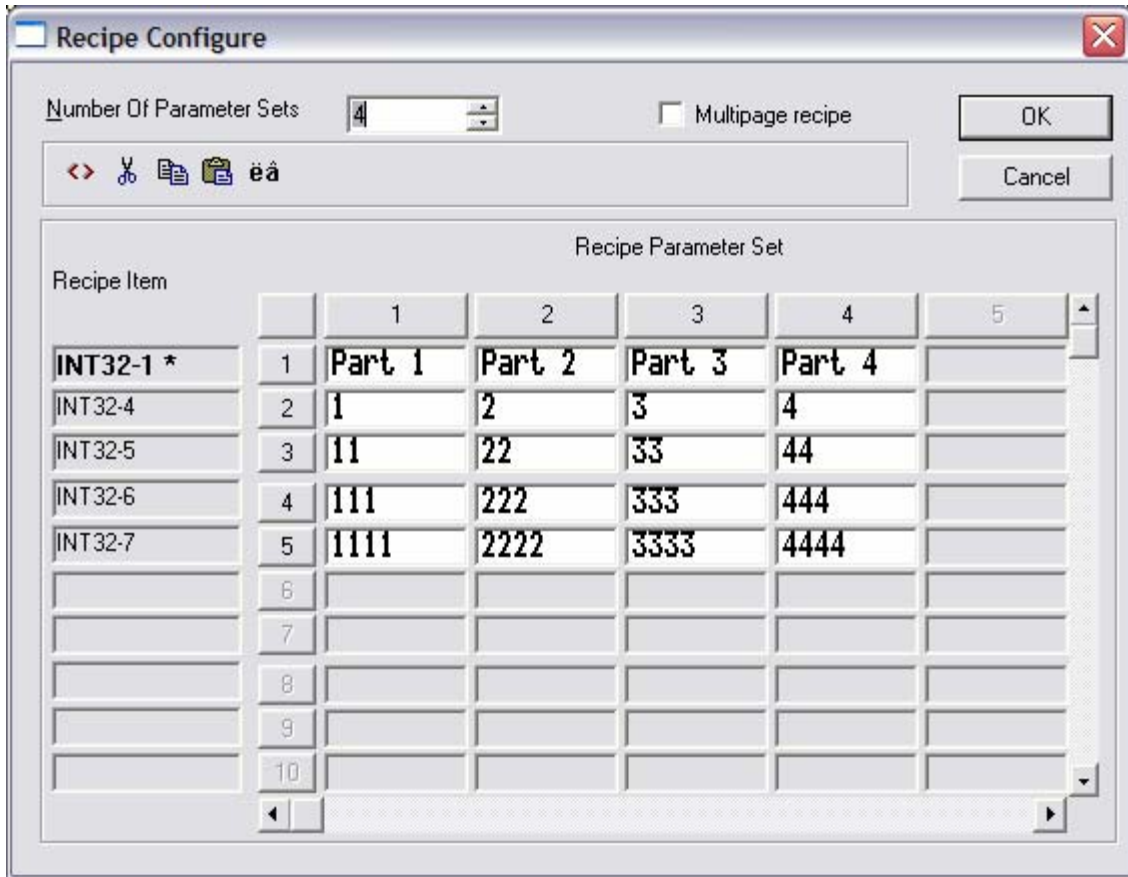
Each field is added to the page, just like any other data field, with a reference made to a Mint controller register, but the reference type must be set to "Recipe".



One of the data fields will be used to identify the parameter set that is displayed and edited in the other fields on the recipe page. This is the recipe name and must be configured as an ASCII data style.

When at least one recipe field has been added to a page then the Recipe Configuration tool becomes available, this can be activated from the "Page" pull down menu of Designer 6 and by selecting "Recipe Configuration...", this tool provides a convenient method of setting up the recipe data.

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From the Recipe Configuration screen the required number of Parameter sets (Products) can be entered, also initial values can be entered into the data fields for each of the Parameter Sets.

The Parameter Set name must be identified, as mentioned before this must be an ASCII field. Select the parameter set name field by pressing the recipe item number, in this case the number 1 next to the field named INT32-1, then press the "<>" icon on the tool bar above, a * character is then added to the recipe item that is marked as the recipe name field.

If the number of fields in each parameter set requires more space than is available on a single page then a multipage recipe can be added into the project, only one multipage recipe can exist in a project and each page included in the multipage recipe must have the "multipage recipe" check box ticked to be included.

When a recipe has been created some additional controls need to be added, the exact requirement will depend on the application but the processes required are to change the selected parameter set and to download the selected recipe data to the controller. This can be done simply with separate command buttons but it may be more appropriate to combine some of the steps in a single control or to use alternative control types to suit the application.

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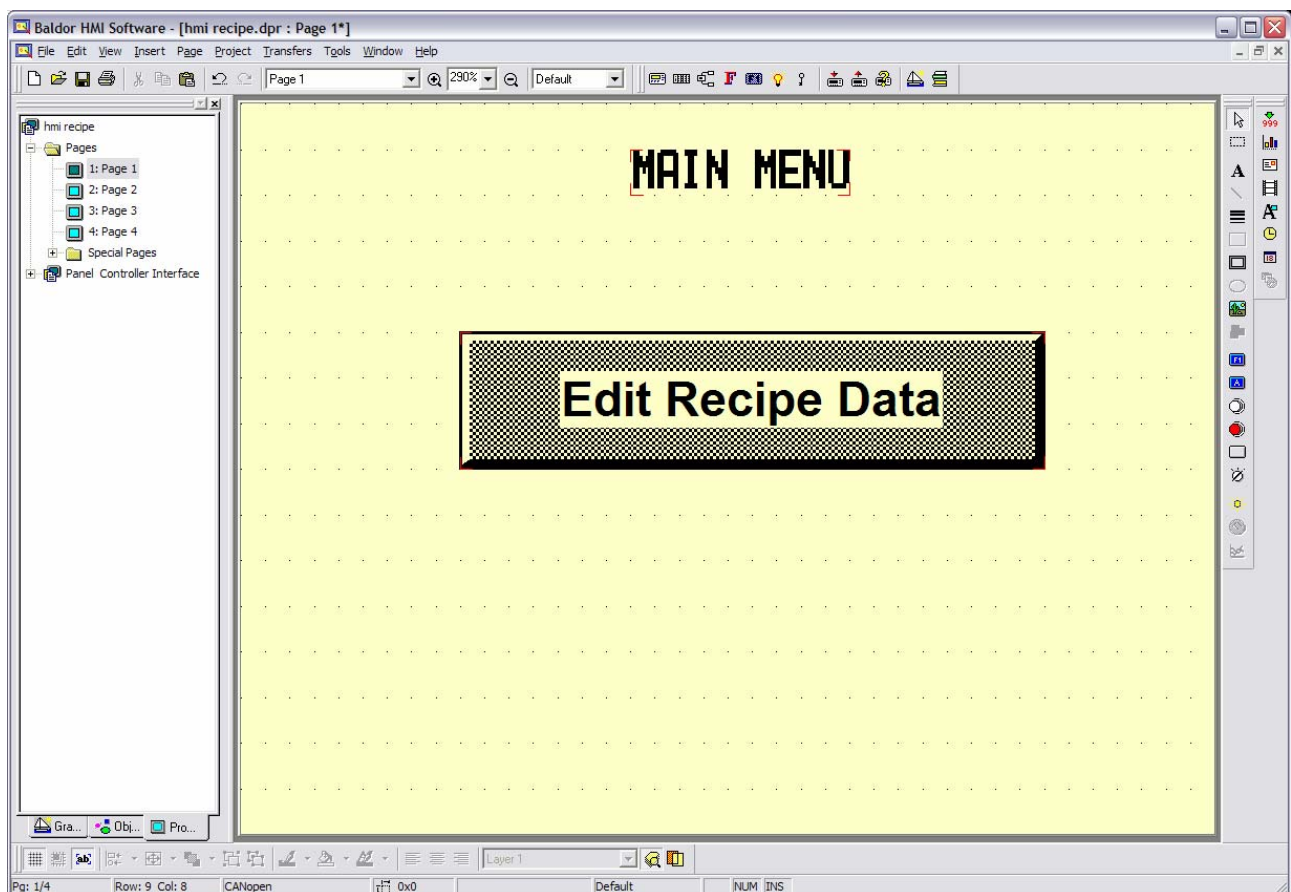
Creating Your First Recipe Project

The example project is based on a 3" monochrome touch screen with a CANOpen interface, but it will work on any other touch screen or with a serial connection. The recipe principles are the same for non-touch screen panels.

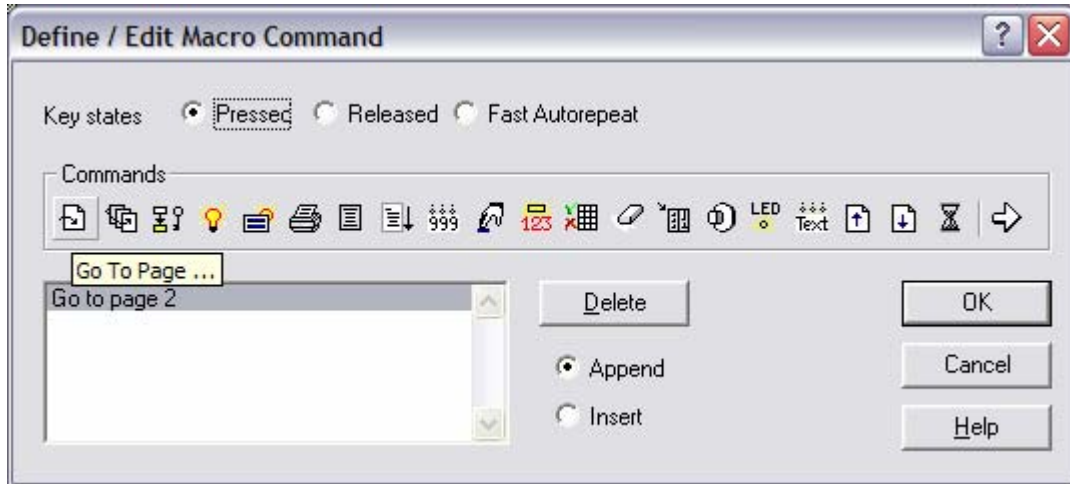
We will start by creating a simple 2 page project, the first page will be the main menu from which other pages will be called, the second will contain a single page recipe.

Run Designer 6 and select "New" from the file menu, call your new project "HMI Recipe" or something similar. If you are connected to an HMI you can upload resources from the panel, or you can select the panel type and the driver you intend to use from the Project menu. Refer to Application Notes AN00111 and AN00112 for details of how to do this if you are not already familiar.

On the first page add a "Generic button", then on the layout tab of the button's properties screen type in a label "Edit Recipe Data", on the General tab select "Macro Cmd", then press the "Macro..." button, here choose the "Goto Page..." icon and select page 2.



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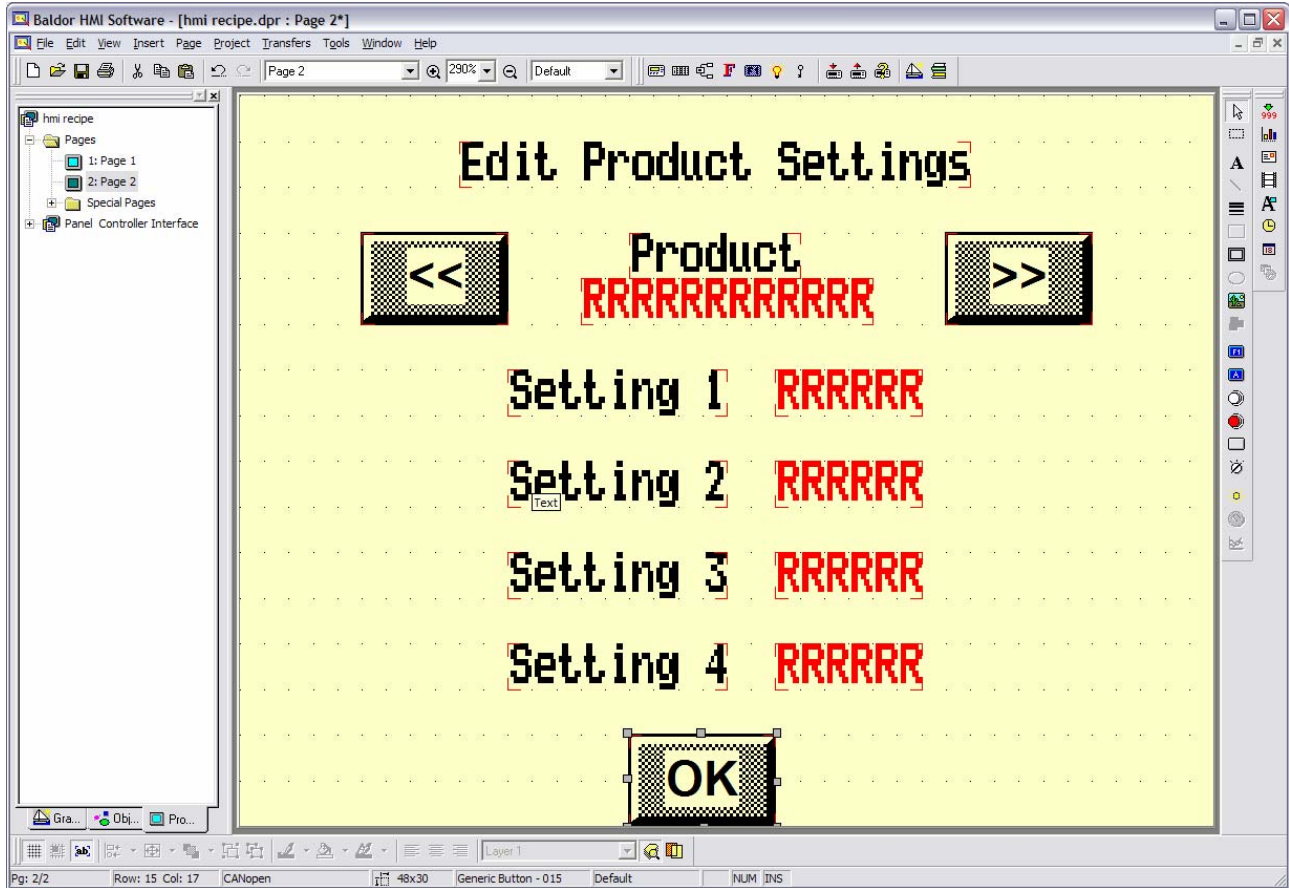


Now create a second page, select "Page" > "Add Page" from the pull down menu. On Page 2 add 5 data fields. The first should be selected as ASCII, the rest should be numeric. The reference for each one should be set to Recipe and assigned to a different COMMS register, the first field will be the Parameter set name and will require a register for each 4 characters in the name, for example if you set the text width to be 12 characters this will require 3 COMMS registers, you only need to specify the first one, COMMS 1, but you should not use the following 2 registers (COMMS2 and COMMS3) for anything else otherwise the displayed text will become corrupted. Assign the numerical fields a single COMMS register each, in this case COMMS 4 to COMMS 7. (For the CANOpen interface the COMMS registers are listed as INT32-n where n represents the COMMS register number)

For the numerical data fields it is normal to set the "Read/Write" option on the Range tab. It is possible for the Parameter Set Name field to be edited on the HMI as well but most screens do not provide a very convenient way to edit text data, it involves scrolling up through the entire character set for each letter in the name, however larger touch screen panels can make use of a complete QWERTY keyboard using the keypad designer facility.

You should also add some text around the controls to explain their function and to make the screen appear more usable to the operator.

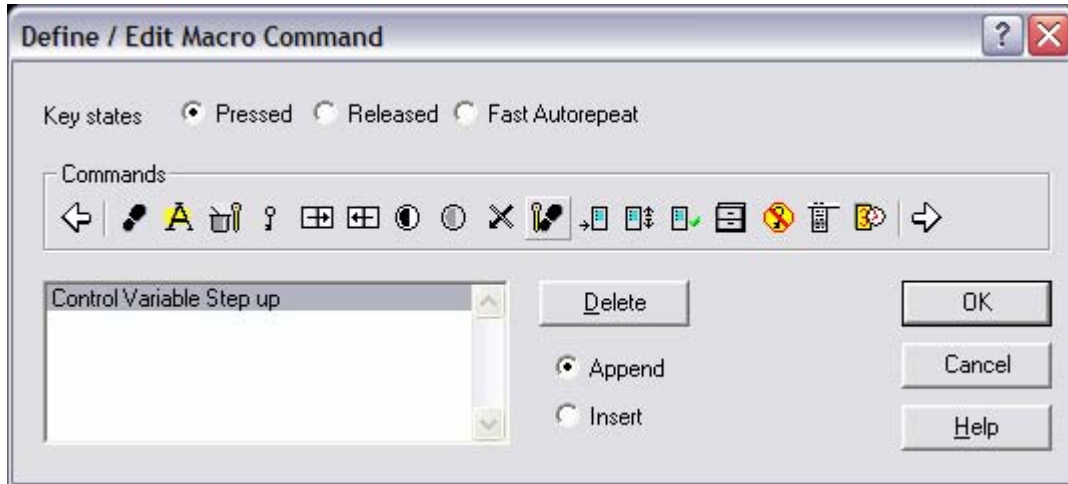
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Now the recipe fields have been added the "Recipe Configuration..." tool can be selected from the Page menu. First set the number of parameter sets, for this example use the value of 4. Now the parameter name field can be selected by pressing on the number next to the comms register that has been set up as the ASCII field (press the number "1" next to COMMS1 for example), then press the "<>" icon. A star will now appear next to COMMS1 identifying it as the Parameter Set Name field. Initial data for each of the fields can now be entered into the table in the Recipe Configuration screen.

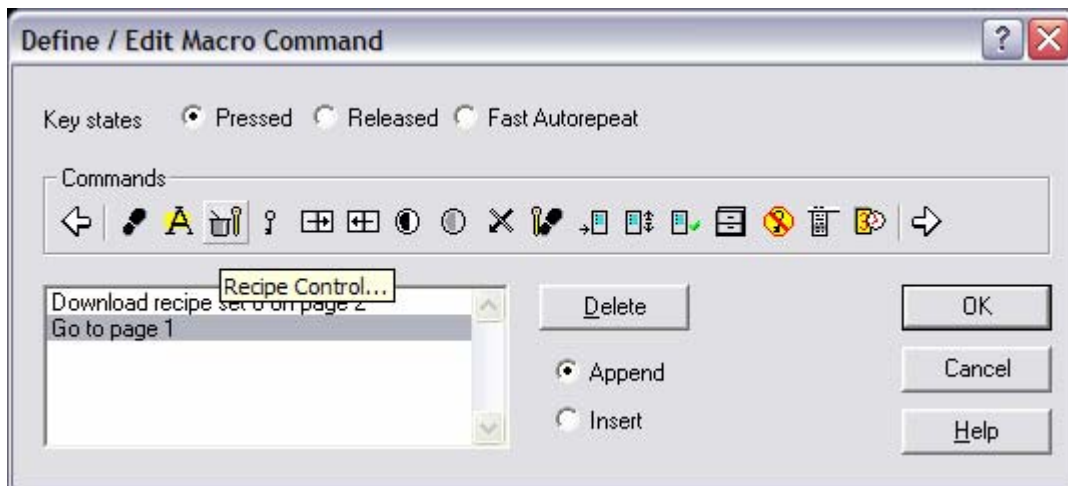
You will now need a method to change between the selected parameter sets. Add two Generic Buttons, for the first one set the label to "<<" and add a Control Variable Step macro, select the Parameter Set Select register on Page 2 and choose to Step down with a step size of 1 and a minimum limit of 1. For the next button set the label to be ">>" and choose the same macro but configure it to be Step Up, with a step size of 1 and a maximum value of however many Parameter Sets are being used, in this case 4.

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You should also add a third Generic Button to download the selected data to the Mint controller and to take you back to the Main Menu. Set the label of this button to “OK” and add two macros, the first is a “Recipe Control”, set this to Download Set 0 on Page 2, the second macro should be a “Goto Page” set to page 1.

Note - Care should be taken when downloading recipe data when using the CANOpen interface and utilizing BUS Events within a Mint program, please refer to Application note AN00134 which explains some precautions that should be taken in this situation.



The project can be run at this time, to do this put the panel into CONFIG mode and select “Download” from the transfer menu. You should also save the project to the hard disk of your computer.

Testing the HMI Project

The project will run on the HMI without being connected to a Mint controller and you will be able to move between the pages and edit the data in the parameter sets but to test it fully you will need to connect a Mint Controller. For a serial connection you only need to plug the Mint controller in and then monitor the value of the COMMS locations COMMS4 to COMMS7 as you

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select different parameter sets using the spy window in Workbench. For a CANOpen interface you will need to first establish the connection and then read back the COMMS locations on the HMI using the command line. PRINT COMMS(2,4) for example.

Details of how to do this are available in AN00111 and AN00112

Using Multipage Recipes

If the number of fields required exceeds the space available on a single page then a multipage recipe can be created by adding another page, including the additional recipe fields and then making sure that the Multipage recipe box is checked for each page. Note - there can only be one multipage recipe in a project.

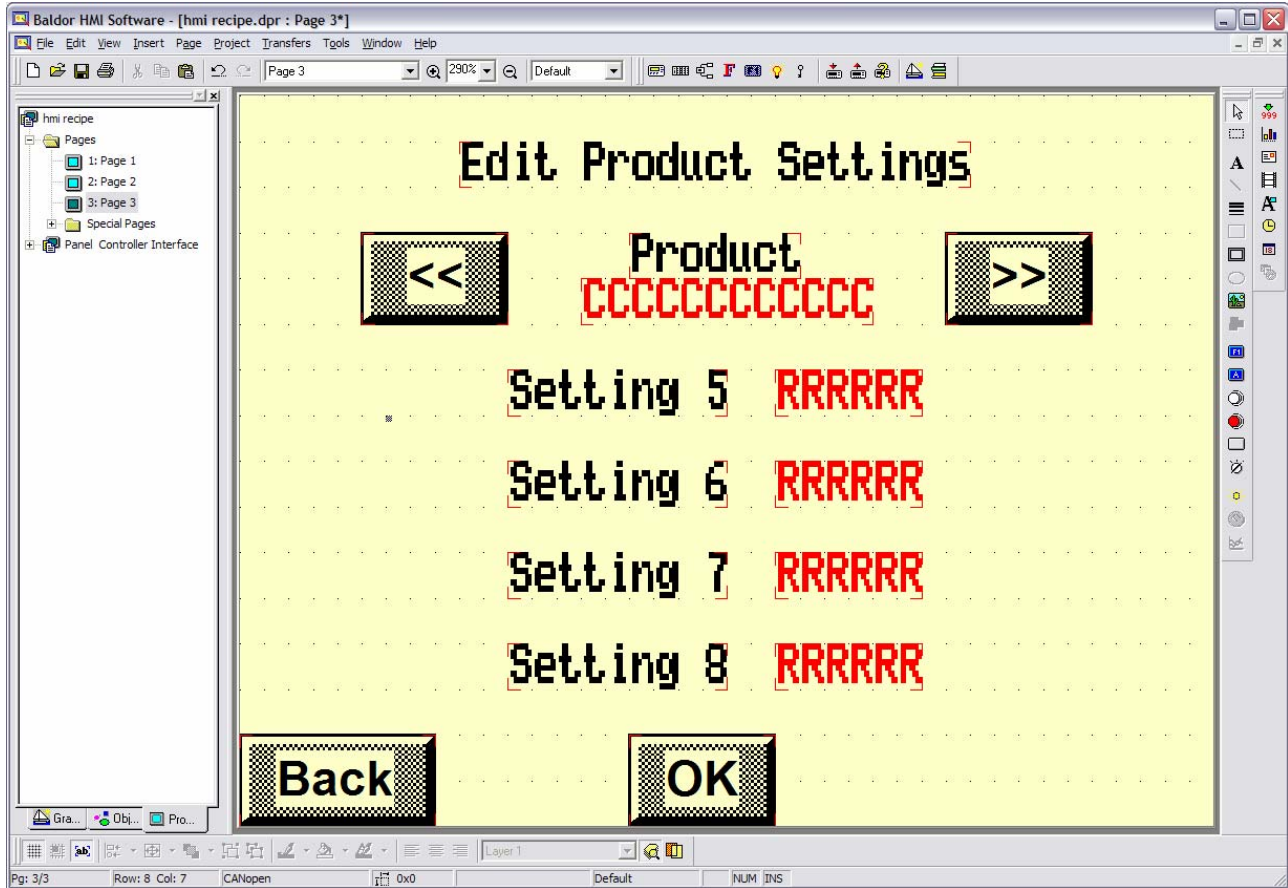
Create a new page, copy the entire contents of Page 2 onto Page 3, modify the labels for the settings fields, change the controller references for the fields to INT32-8 to INT32-B for a CAN interface COMMS 8 to COMMS 11 for serial. For a single recipe there can only be one Parameter Set name field, however you can display this field on another page by displaying a Control Variable called "Recipe Key". For the recipe name change the Reference type to "Variable" and select "Recipe Key" for Page 2 by pressing the "..." button.

Open the Recipe Configuration screen for Page 3, make sure the number of parameter sets is set to the same number as for Page 2, in this case 4, and that the Multipage box is checked, this must also be done for page 2.

To switch between the pages add a button on each page, on page 2 add a "Next" button with a macro "Go To Page" 3, on Page 3 add a button with a label "Back" and a macro "Go To Page" 2.

Your new page should look something like this

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Now save the project to disk and download it to the HMI, then try out the new functionality.

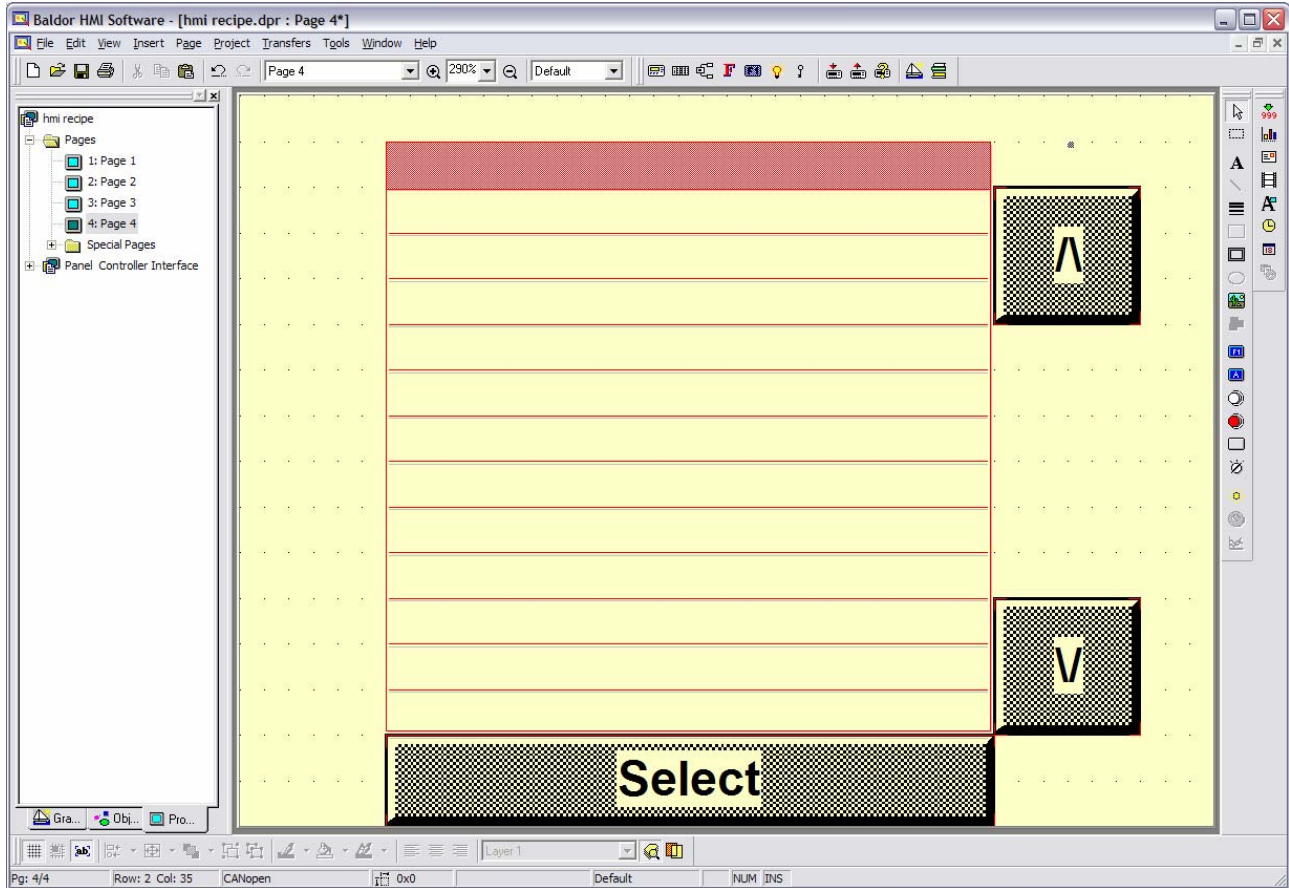
Using Recipe Menus

Many HMI designs for use by an operator will not want to allow access to viewing or editing the individual field data, but just need to be able to select the appropriate product and to run. A Recipe menu provides this functionality.

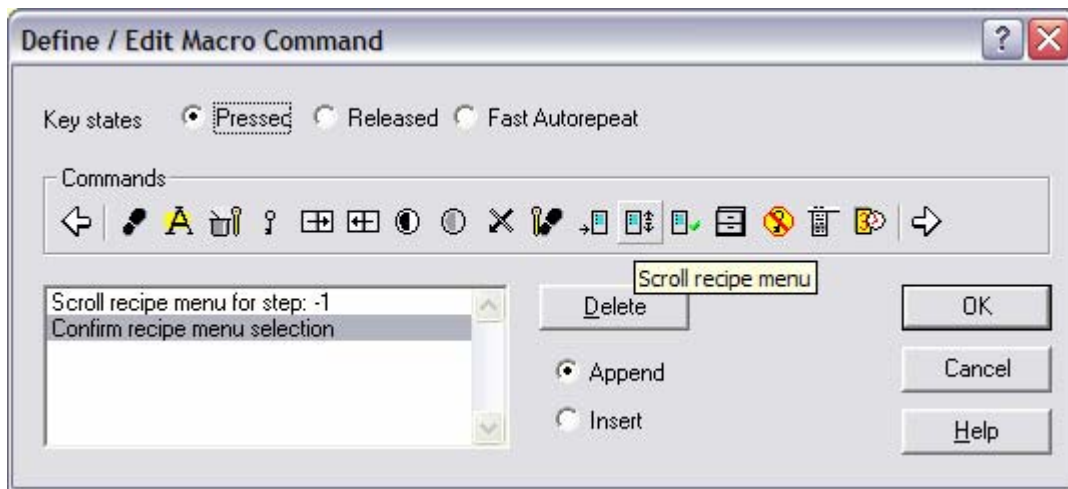
Add a new page into the project, use the "Insert" menu to select "Add Recipe" Menu, then draw a box to fill most of the screen.

To this page add three Generic buttons with the labels as shown below

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On the “/” button (forward slash / + back slash \) add a macro to Scroll Recipe Menu with a value -1 and also a Confirm Recipe Menu macro

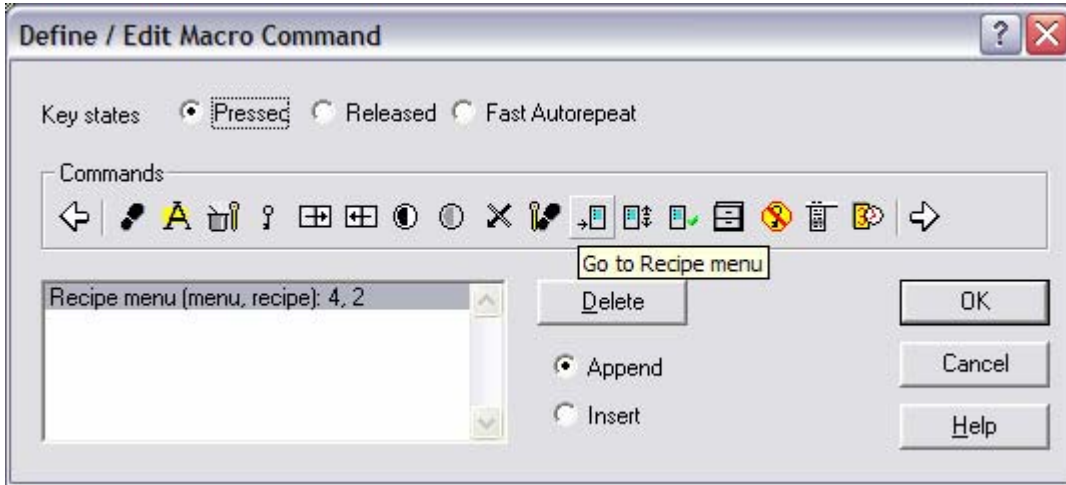


On the “\” button add a macro to Scroll Recipe Menu with a value 1 and also a Confirm Recipe Menu macro

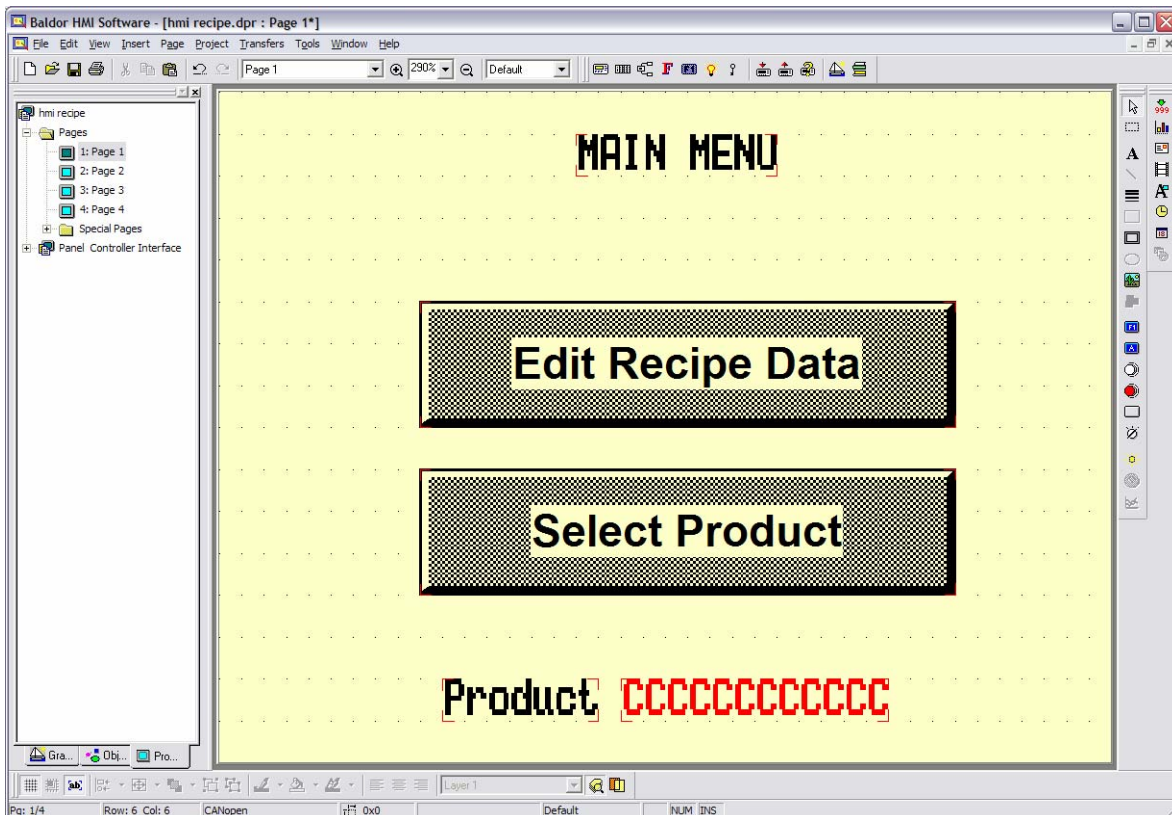
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On the "Select" button add macros for "Download Recipe set 0 on Page 2" and "Go To Page 1".

To call the Recipe Menu screen we need to modify page 1, add a button with the label "Select Product", to this add the macro "Go To Recipe menu" and specify page 4 for the menu and page 2 for the recipe.



You can also display the currently selected product on Page 1, add a data field, set it to be ASCII style and with a reference type of Variable, then set the reference to "Recipe Key" for Page 2 as we did on Page 3. Page 1 should now look like the image below.



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Now is a good time to save and download the project and test out the new functionality.

Recipe Data Upload and Download

When a recipe has been configured and valid data entered, either using the Recipe Configuration screen or by entering it directly on the HMI, then a backup of the recipe table can be uploaded from the HMI. This file can be used as a backup incase the data becomes lost or corrupted or as a method to transfer the settings to another HMI running the same project as a replacement or for another identical machine.

To do this use the DataExchanger utility that is installed with the Baldor HMI software. From the program screen "Command" pull down list select "Upload Recipe Data". Then put the HMI into config mode, press the Start button in DataExchanger to initiate the process. You must select a folder and enter a filename. The data will be uploaded and saved as a "CSV" file, this can be opened, viewed and edited in a text editor like Windows Notepad or in a spreadsheet like Microsoft Excel.

To restore a previously saved recipe data file back to the HMI, select "Download Recipe Data" from the DataExchanger command pull down list, put the HMI into Config mode and press the Start button. You must then select the folder and filename of the saved file.