

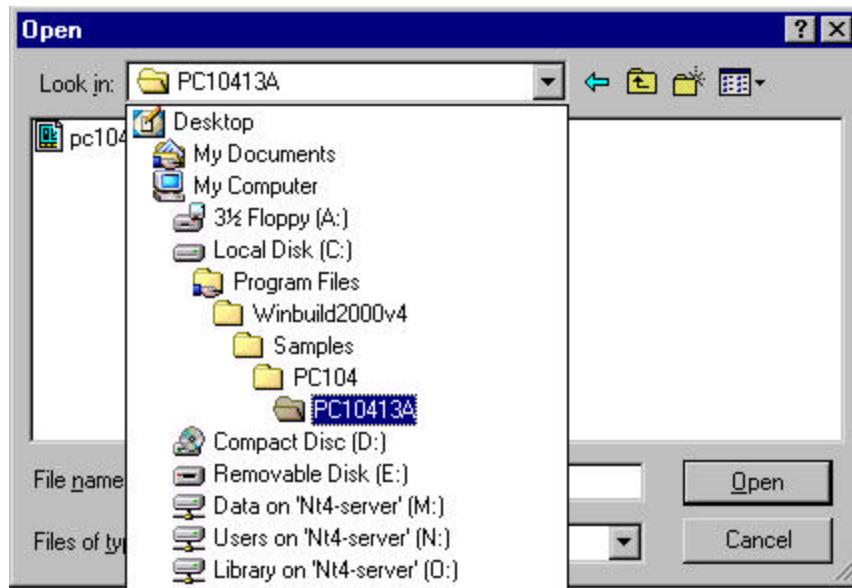


# PC10413A INTERFACING

This tutorial will guide you through the modification of an existing WinBuild program that uses the Eason PC104-13A motion controller.

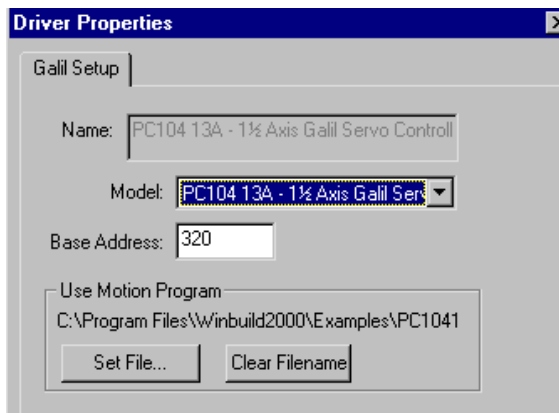
<b>STEP</b> <b>1</b>	
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Open the demo program: PC10413a



<b>STEP</b> <b>2</b>	
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Let's take a look at this program and examine how it works.



Click on the "SETUP | PROJECT" menu and select the "DRIVERS" tab. Note that two drivers have been added to this program, the "Internal Volatile" and the "PC10413A". Click on the PC10413A driver to select it and click the PROPERTIES button. Note that the Model has been selected and that the default base address has been chosen as 320. Click on the "Set File" button. This is the file that will be downloaded automatically

when the Eason powers up. The file “cutoff.dmc” is a motion control program that we will use on a screen to emulate a flying shear application. Close the driver properties dialog and close the Setup dialog box.

<b>STEP 3</b>	
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Next, select the “STARTUP” screen and view the “ON-OPEN” code for the screen. Notice the pseudocodes that run when the screen is opened. These codes initialize variables in the motion controller that are used to preset the tuning and the velocities and accelerations.

Close the Editor window.

<b>STEP 4</b>	
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Open the Tag window (SETUP | TAGS menu selection). Here are some of the highlights:

	Tag Name	Source	Address	Type	Default
1	TDX	PC104 13A - 1 ½ Axis Galil	TD.DW	Double Word	0
2	TPX	PC104 13A - 1 ½ Axis Galil	TPX.DW	Double Word	0
3	Position	PC104 13A - 1 ½ Axis Galil	TP.DW	Double Word	0
4	Batch	PC104 13A - 1 ½ Axis Galil	BATCH.DW	Double Word	0
5	Parts	PC104 13A - 1 ½ Axis Galil	PARTS.DW	Double Word	0
6	ClrCnt	Internal Volatile	WV	Word	0
7	ClrBat	Internal Volatile	WV	Word	0
8	Output	PC104 13A - 1 ½ Axis Galil	OUTPUT.DW	Double Word	0

Galil Command variables like TD (tell dual encoder) get placed into the Eason variable TDX because the data source is the 13A and the address is TD.DW.

Galil user variables like BATCH get automatically placed into the Eason variable “Batch” because the data source is the 13A and the address is “BATCH.DW”.

Properties    New Tag    Delete Tag    Ok    Cancel    Double click on column headings to sort

Click OK to close the PLC Contact and Tag Setup Window.

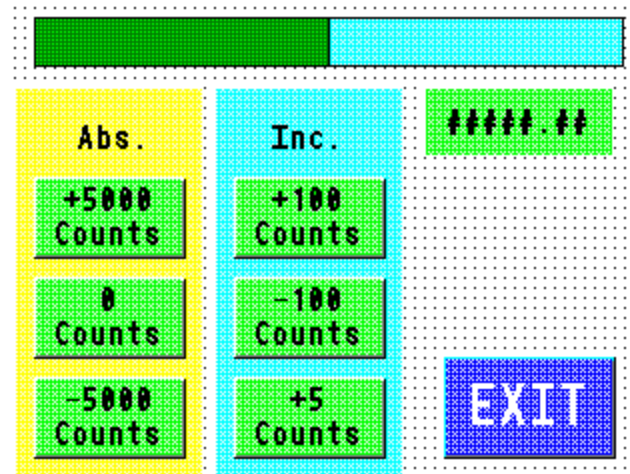
<b>STEP 5</b>	
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Next, select the “TERMINAL” screen and view the “On Release” properties of the “START” button. The pseudocode, GALIL: TERMINAL MODE ON "PC104 13A - 1½ Axis Galil Servo Controller [320]" enables a special terminal mode that allows the 13A to be programmed via a serial connection to COM1 on the Eason. The normal use for this connection is to use Galil’s DMC Terminal programming software to write and debug programs in the motion controller. Once the program has been created, it can be selected in the Driver Setup as the program to load on startup.

Close the BASIC and Pseudocode editor.

<b>STEP 6</b>	
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Click on the “INDEX” screen. This screen is used to issue simple motion commands to the 13A from the operator interface. The six buttons on the left of the screen command motion while the data display and the bargraph give a visual feedback that motion is occurring. Double click on the bargraph. If you will see that the tag “Position” is associated with the bargraph.



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Close the button properties, and open the SETUP | TAG Window. Note that the tag “Position” is associated with the command in the Galil TP.DW. This means that whenever an object (like a bargraph or button), or BASIC or Pseudocodes access the tag, it will issue a TP command to the Galil (request position), and read the result, placing it in a double word ( this is what the “.DW” stands for).

Click OK to close the Tag Setup Window.

<b>STEP 7</b>	
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Double click on the button labeled "+5000 Counts". Click on the "On Press" property, you will find the following pseudocodes:

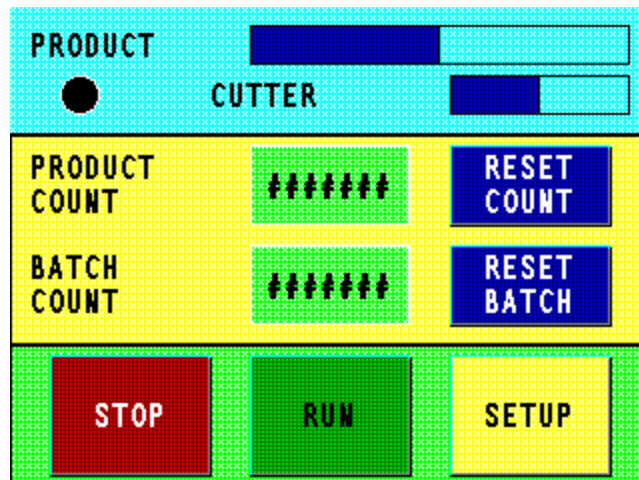
```
GALIL: PUT "PC104 13A - 1½ Axis Galil Servo Controller [320]" VALUE "PA 5000"  
GALIL: PUT "PC104 13A - 1½ Axis Galil Servo Controller [320]" VALUE "BG"
```

The first pseudocode will issue the command "PA 5000" which informs the Galil to get ready to make a 5000 count absolute move. The second pseudocode issues a "BG" or begin command, which starts motion.

Close the BASIC and Pseudocode editor.

<b>STEP</b> <b>8</b>	
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Click on the "RUNSCR" screen. This screen runs a program that has been loaded into the 13A on power-on. It will display active functions like position, encoder position, part counters, and output I/O status. This example shows how a real application would work: the 13A runs a program internally, while the Eason interacts with the program's variables to change motion characteristics.



Double click on the "RUN" button. You will find the following pseudocode:

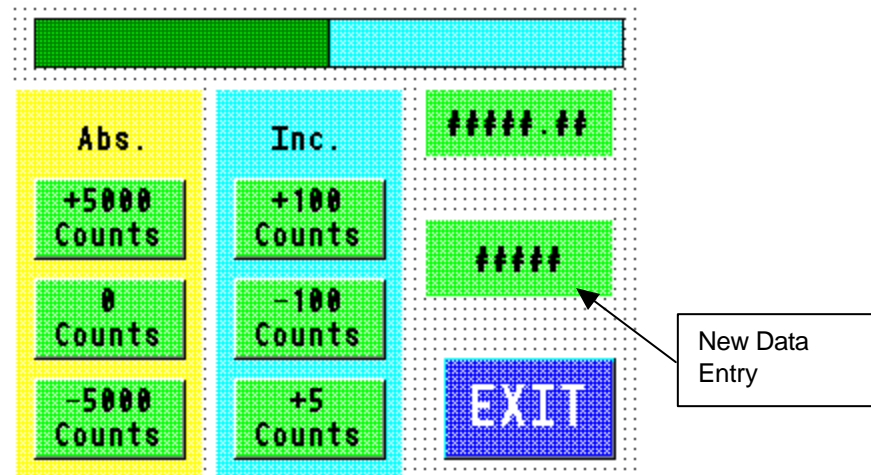
```
GALIL: PUT "PC104 13A - 1½ Axis Galil Servo Controller [320]" VALUE "XQ #PROG01"
```

This button will execute the program named: "PROG01". This program was downloaded on start-up and was part of the "CUTOFF.DMC" file that was specified in the driver.

Close the BASIC and Pseudocode editor.

<b>STEP 9</b>	
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Now that we have the feel for things, lets add some code the program to make it do something. First, open the "INDEX" screen. Add a tag that will capture the user's data entry. Make this tag an Internal Volatile Double Word. Let us then add a data entry box that will allow you to enter new data into this tag. On the "ON ENTER" property of the data entry, add a pseudocode that will send the data entered to the 13A.



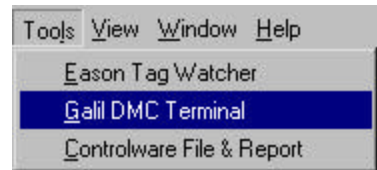
Assuming the tag name is "NEWPOS", the pseudocode to add to the "ON ENTER" property should look like:

```
GALIL: PUT "PC104 13A - 1½ Axis Galil Servo Controller [320]" VALUE "PA " VALUE NEWPOS
GALIL: PUT "PC104 13A - 1½ Axis Galil Servo Controller [320]" VALUE "BG"
```

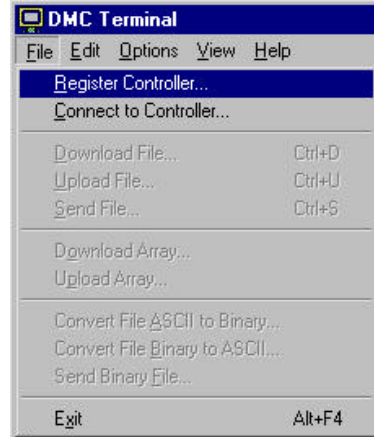
Go ahead and Compile-Download-Reboot the program and see if your data entry works.

<b>STEP 10</b>	
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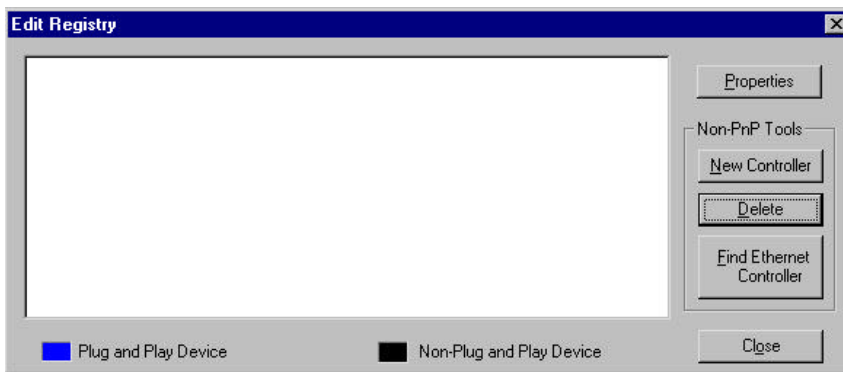
This is great, but how do we debug a program that we have developed in the 13A - With Galil's DMC Terminal programming software. Let's try it out. On the Eason, switch to the TERMINAL screen and press START. Disconnect the com port from the programming port and connect it to the Eason's COM1. On the Winbuild menu bar select TOOLS | GALIL DMC TERMINAL.



This will launch Galil's DMC Terminal program. Select "FILE | REGISTER CONTROLLER" and click "ADD".



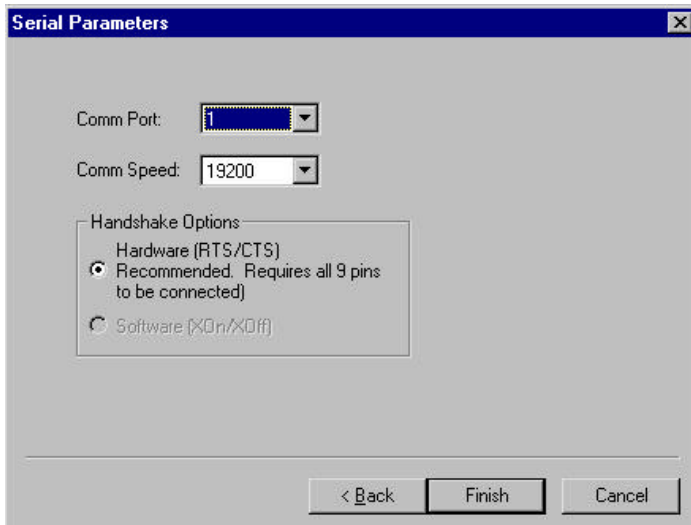
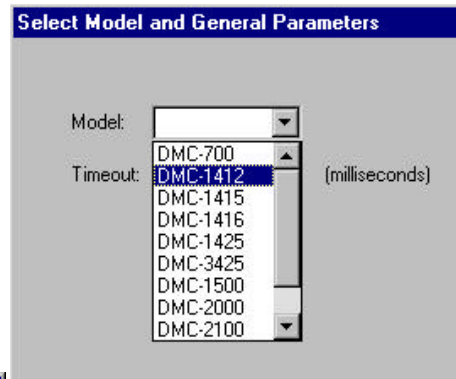
This will open the registry.



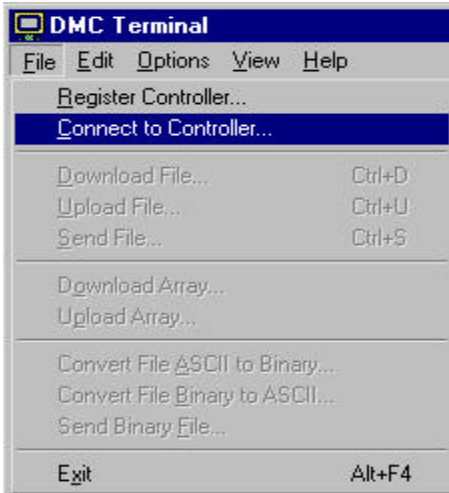
Select New Controller.

Select the "Model" DMC 1412. This will emulate the PC104-13A just fine. Leave the timeout value alone and click "NEXT".

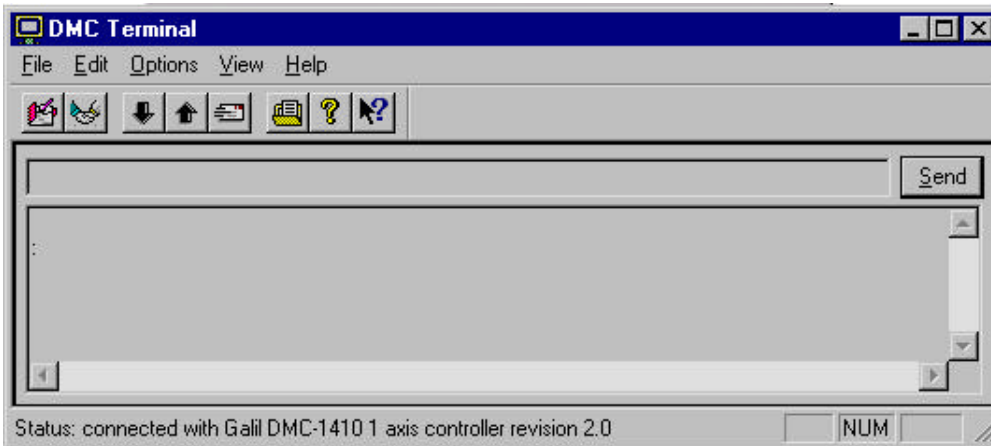
Next, select the serial parameters associated with you PC. If you are using a laptop, you will most likely use Com Port 1. Select 19200 as the baud rate.



Click "FINISH" will add the controller to the registry. Close the dialog by clicking OK, then put the controller on-line by selecting the "FILE | CONNECT TO CONTROLLER" menu item.



When your controller is properly connected, you will have a message on the bottom of the screen that looks like this:



<b>STEP</b> <b>11</b>	
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The Terminal menu will allow you to interact with the 13A like it was a stand-alone motion controller. You can download and test programs, run them, and modify variables just like your Eason program will.

Try typing in a TP command. Do you get the current position? How about if you turn the encoder a few turns and type a TD command? Did it change?

Try running the flying shear program that we looked at in the RUNSCR screen. You can do this by typing XQ #PROG01. Spin the encoder a few cycles. Type PARTS, did the variable PARTS change? Try a TR1 and a TR0 what happens?