

# DO-MORE! DESIGNER GETTING STARTED

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## Forward

This getting started guide is designed to assist the first time user of Do-more! Designer with getting the PLC connected and a simple program written. While this guide is written for the Do-more! BRX series of PLC, the steps herein are basically the same for any Do-more! Series PLC, including H2-DM1(E) and T1H-DM1(E).

If at any time you find yourself with questions, our technical support team is available to help. Please see the resource guide in the Appendices for more information on the available help resources.

We hope you enjoy programming your new Do-more! PLC. The Do-more! engine is an incredibly powerful processor, we think you will find it capable of nearly any task that you can attempt with it.

Good luck on your programming journey. If after you have spent some time with the system you want to tell us about your experience, please feel free to tell us in a product review or on our forums! We love to hear customer feedback.

## Overview

The BRX Platform is a Micro PLC system that uses the Do-more! Designer Software version 2.0 or newer (ADC part number DM-PGMSW). The Do-more! Designer programming software package (downloadable for free) was developed as a powerful, flexible and easy to use controls design tool.



The programming GUI features a user-friendly fill-in-the-blank design for editing ladder logic, making complex operations such as PID and motion control easy to setup while minimizing programming time. A built-in simulator allows testing of a program design concept without requiring any external hardware. This will help to reduce programming errors during the development phase of your application.

Easy to use troubleshooting tools allow you to actually see what is going on in your logic, from single stepping through the program one scan at a time to monitoring multiple elements during verification of correct program execution.

For the DirectLOGIC users that want to use the BRX Do-more! Micro PLC Unit (MPU) for projects originally written in DirectSOFT, Do-more! Designer software has a built-in DirectLOGIC migration tool that will greatly reduce the time to migrate a DirectSOFT program into Do-more! Designer.

This guide focuses on installing the Do-more! Designer software, establishing a connection to a BRX MPU, writing a simple ladder logic program and downloading it to the MPU. This should help get you familiarized with the software and get started utilizing one of the most powerful PLC's on the market.

## Before You Begin...

### Wiring Tools and Hardware

The tools and hardware shown below may be required to make connections to the BRX MPU system.



Screwdriver  
TW-SD-MSL-3



Wire Strippers  
DN-WS



Electrical and  
Signal Wire



AC Power Cord  
(Not available from  
Automationdirect.com)

## Programming Connection Options

The BRX MPU allows several built-in programming interface options. Choose from one of the following suggested communication methods for this short step-by-step introduction to the BRX platform. You should have at least one of these programming options ready and available.

- Ethernet port: A standard Ethernet patch cable



**Ethernet Cable**  
C5E-STPxx-xx

- Serial port: Using the 3-pin serial connection on the MPU



**Serial Cable**  
ZL-DB9F-CBL-2P

- POM Slot Programming Options
  - USB POM and cable assembly



**Programming Cable Assembly**  
BX-PGM-CBL

- Ethernet POM and cable



**Ethernet POM Module with Cable**  
BX-P-ECOMLT, C5E-STPxx-xx

- RS-232 serial POM (RJ12 or 3-pin)



**RS-232 Serial POM (RJ12) Module with Cable**  
BX-P-SER2-RJ12, D2-DSCBL



**RS-232 Serial POM (3-pin) Module with Cable**  
BX-P-SER2-TERM, ZL-D89F-CBL-2P



**NOTE:** Ethernet POMs, USB and Serial Cables are sold separately. USB or Ethernet cable is also required for communications between PC and CPU.

## BRX Do-more! Designer System Requirements

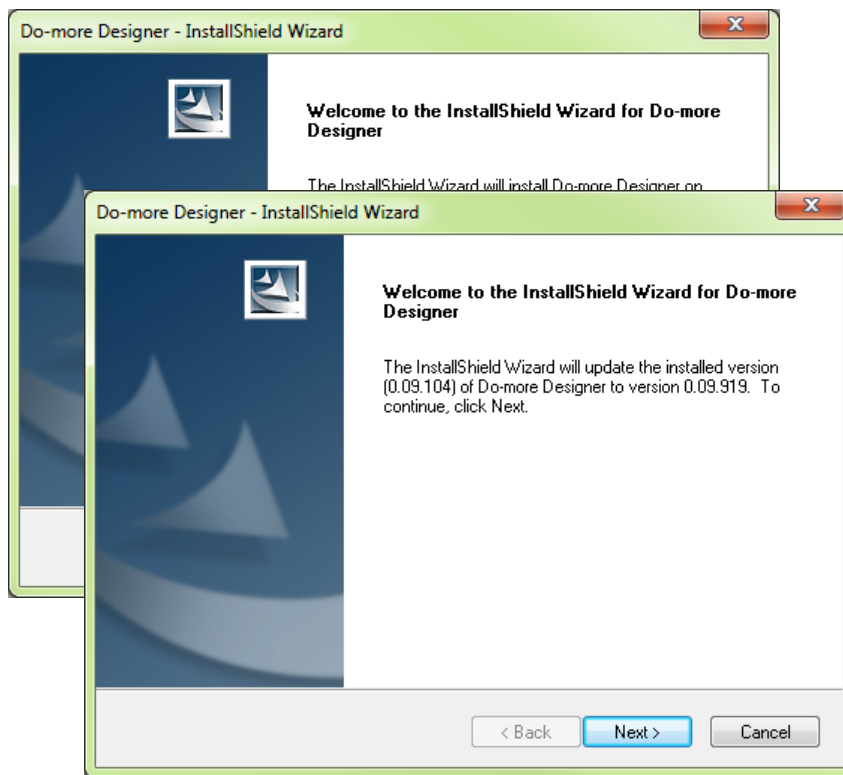
Do-more! Designer Windows-based programming software is available on CD-ROM or as a FREE download at <https://support.automationdirect.com/downloads>. Please check our website for this product's current operating systems requirements.



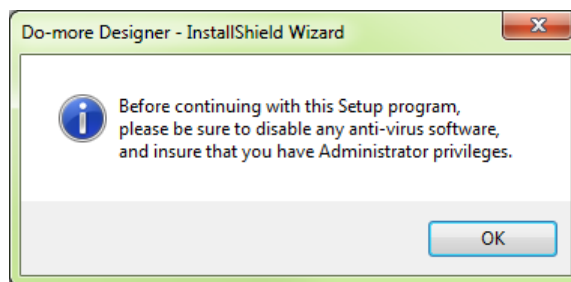
## Step 1: Install Do-more! Designer Software

Download the Do-more! Designer programming software (DM-PGMSW) from our website at <http://support.automationdirect.com/products/domore.html>, and launch the install procedure. If you already have Do-more! Designer installed, you can just update to version 2.0 or newer to get BRX MPU support.

The first window that opens displays the *Welcome* screen seen here. If there are previous versions of the software already installed, this screen will show the version number of the software being replaced as well as the one being installed. Click **Next** to continue.

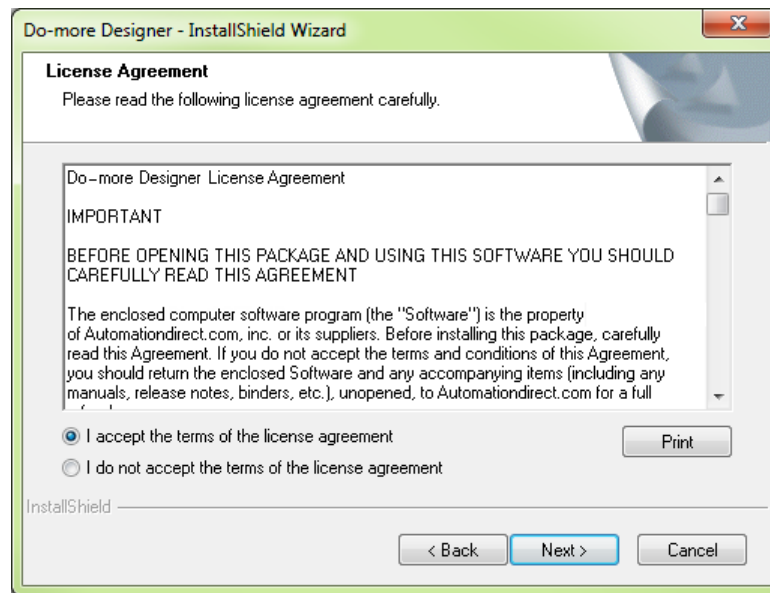


An alert window will appear requesting that all anti-virus software be disabled and also reminding the user that administrative restrictions may exist.

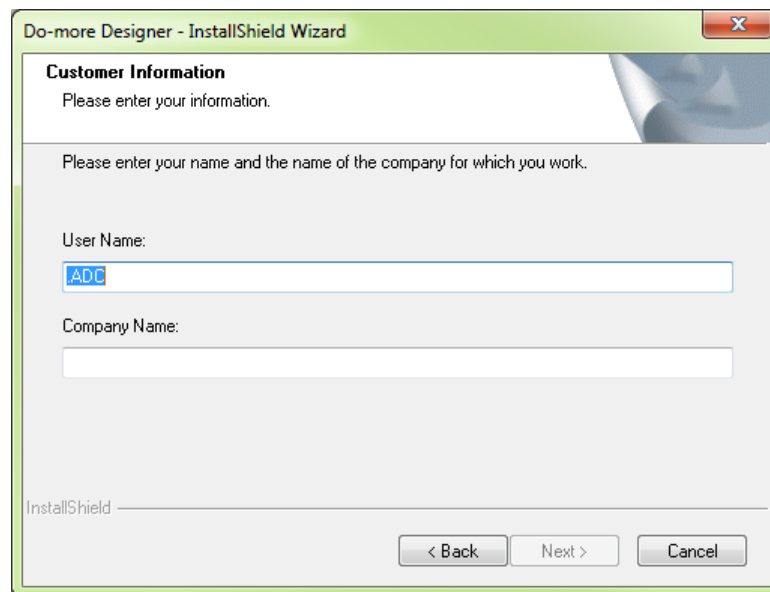


The *License Agreement* window will be displayed next. Read over the agreement, select **I accept the terms of the license agreement** and click the **Next** button to continue.

The license agreement may be printed if desired. The **Print** function will print a pdf of the *License Agreement* document to your default printer.

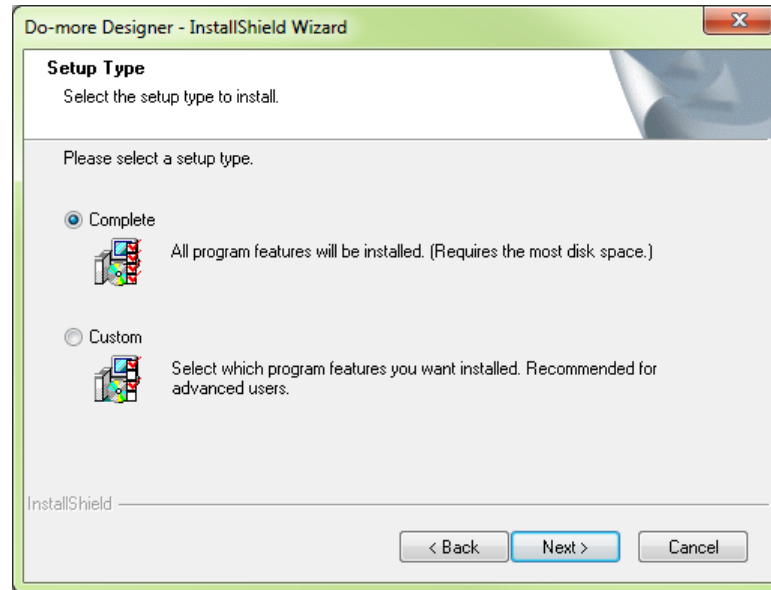


At this point the software will ask a little about you. Please fill in the user information requested on the *Customer Information* screen and click **Next** to continue.



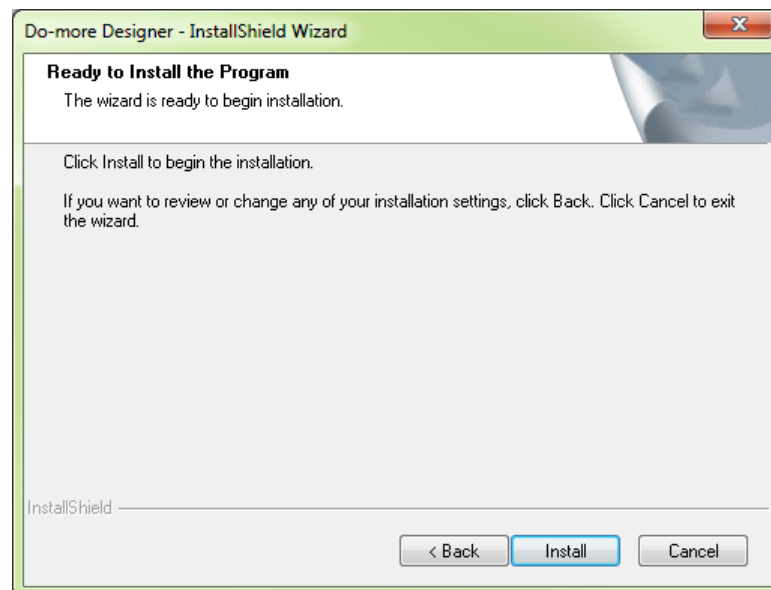
At this stage, the software will ask which type of install you would like to perform. The *Setup Type* window seen below gives two options for installation type: **Complete** and **Custom**.

**Custom** installation allows you to choose which program features to install, whereas **Complete** installation installs all of the program features available. The **Complete** installation is selected by default and is recommended for first-time users. Leave **Complete** selected (default) and click **Next** to continue.



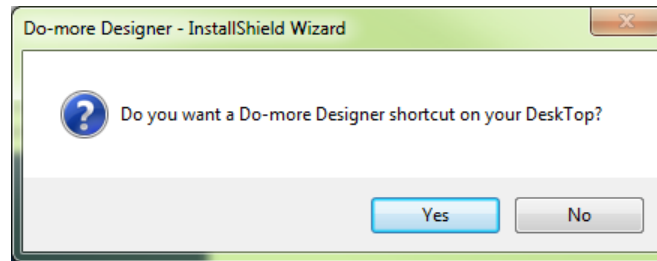
The next window to appear is the *Ready to Install the Program* window. This window is an alert window, cautioning you that the program is about to be installed. If there are any changes that need to be made to the install settings do them now before continuing.

To review or change any of the previous installation selections, click **Back** to return to the appropriate window and make the change. If no changes are necessary click **Install** to begin the installation.



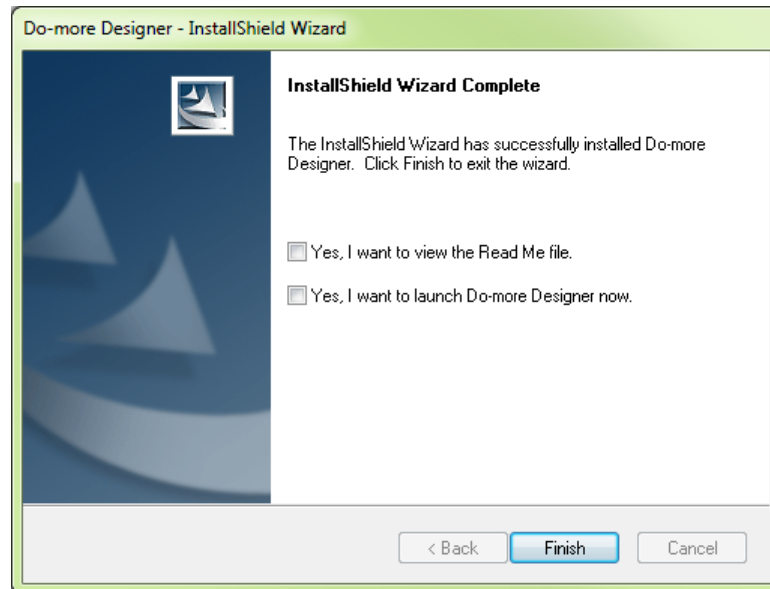


The pop-up shown here will allow you to choose to install a Do-more! Designer software desktop shortcut on your PC. Click **Yes** or **No** and continue with the installation.



The software will now install the needed folders and files while the *Setup Status* window displays the installation progress status.

Once the installation has been successfully completed, the *InstallShield Wizard Complete* window below will open.



Your software is now installed and ready to use. The installation wizard can now be closed by clicking **Finish**.



**NOTE:** By default the **Read Me File** and **Launch Do-more! Designer now** boxes are checked. Un-check either box should you choose not to view the Read Me file and not launch the software at this time.

## Step 2: Launch the Do-more! Designer Software



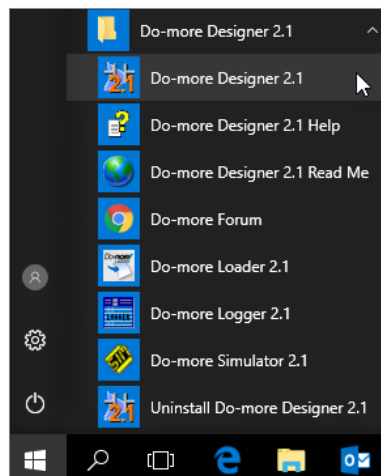
**NOTE:** For this step, ensure the BRX MPU is not powered up. Connection to your PC is in Step 3.



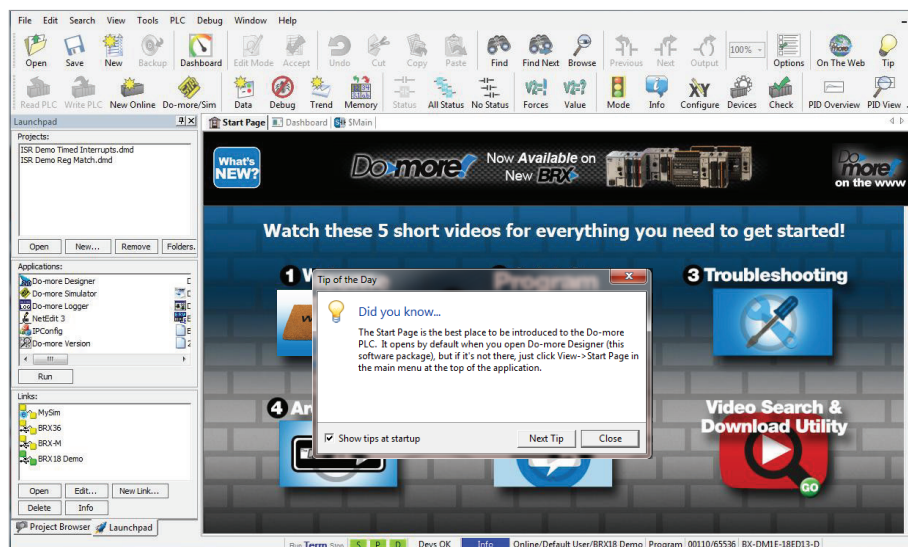
**NOTE:** There are many keyboard shortcuts available in the Do-more! Designer software. For a list of available short cuts (hot keys), view *Help* topic DMD0361 within Do-more! Designer, or Appendix B of this guide.

After installing the Do-more! Designer software, launch the software by double clicking the desktop Do-more! Designer icon.

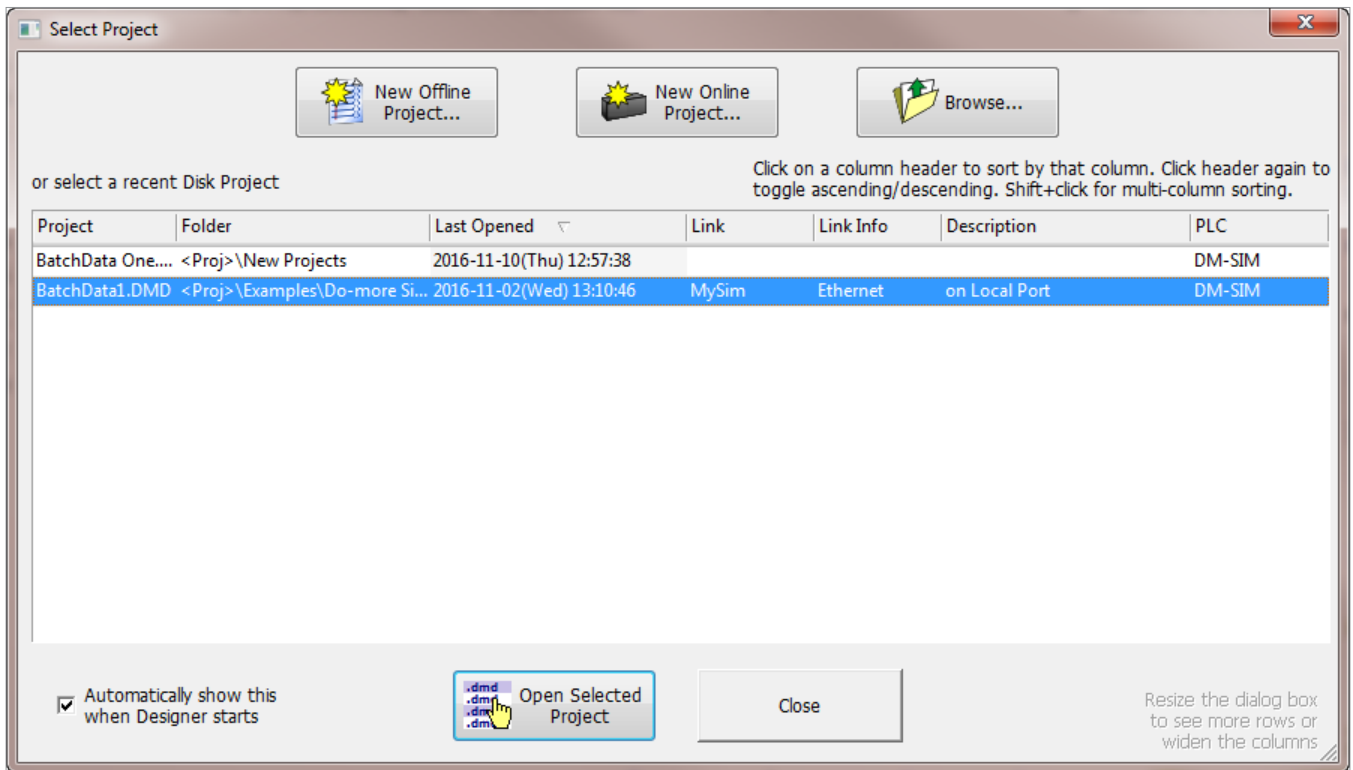
You can also launch the software from your PC *Start* menu or *All Programs* menu. If the software link is not embedded in the *Start* menu, use the path: **Start > All Programs > Do-more > Designer x.x > Do-more! Designer x.x** to launch the software.



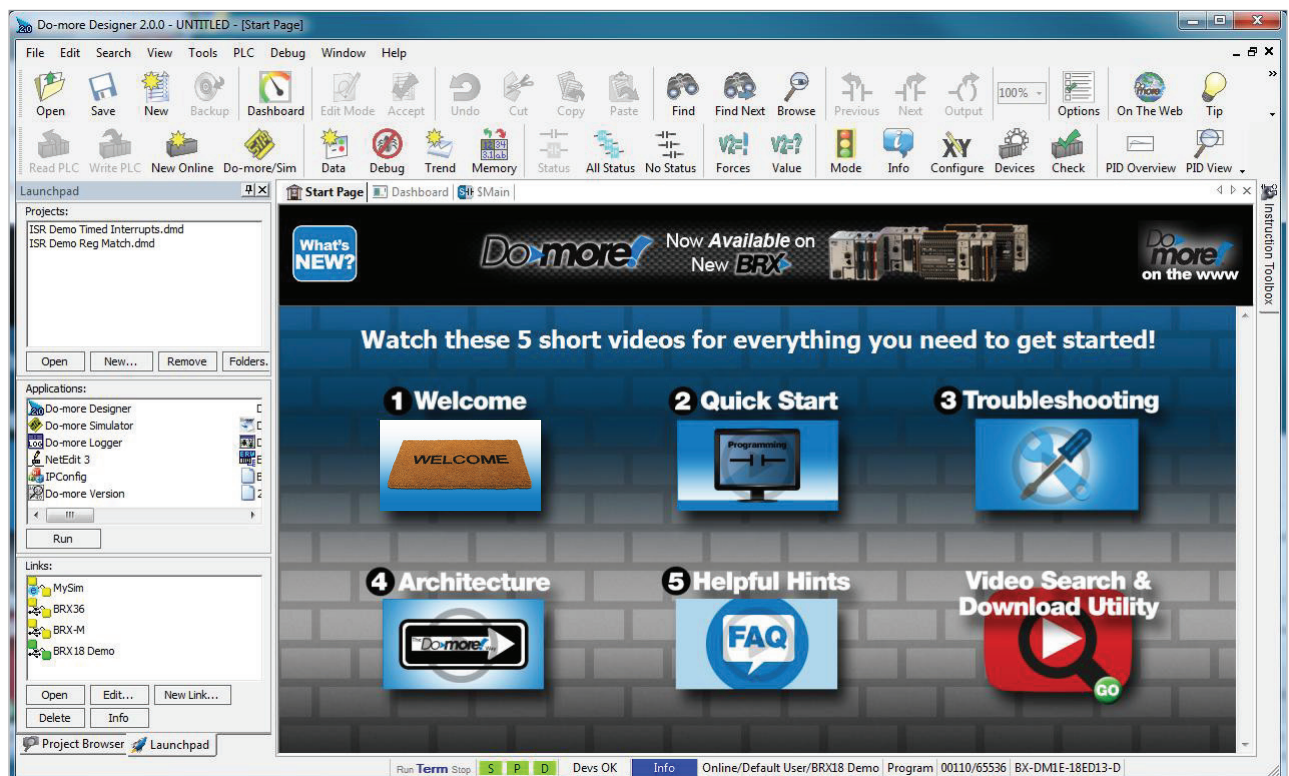
When Do-more! Designer runs for the first time it goes to the *Start Page* (area with ‘brick’ wallpaper) and the *Tip of the Day* pop-up comes up by default. This feature can be disabled by un-checking the **Show tips at startup** box in the lower left corner. Select **Close** on the *Tip of the Day* pop-up when you are finished viewing the tips.



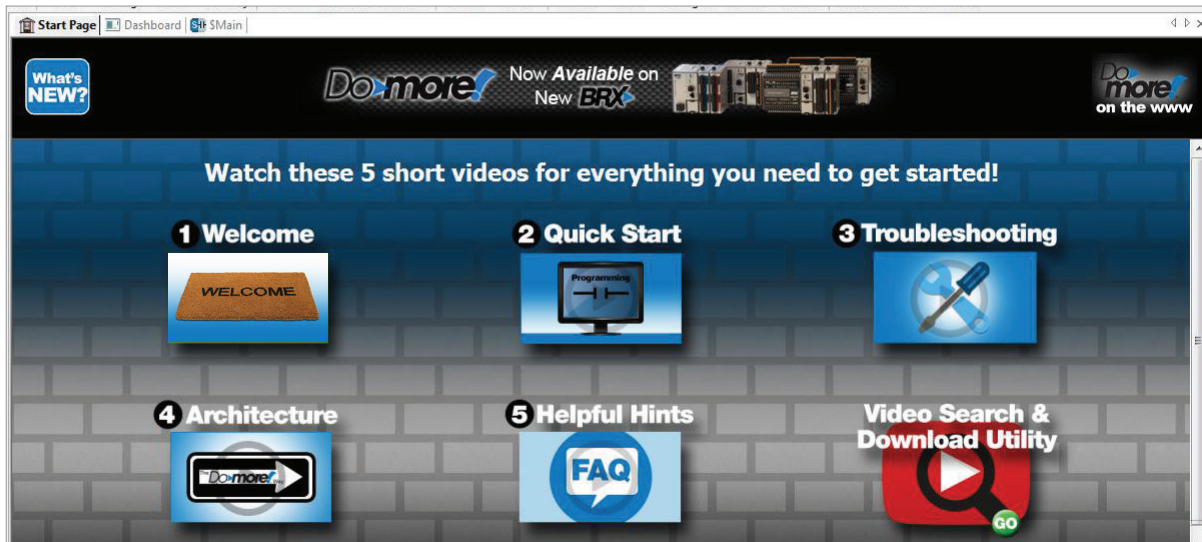
When the **Close** button on the *Tip of the Day* pop-up is pressed, the *Select Project* window comes up after a slight pause. Here you will select which project to work with - New Offline Project, New Online Project, or Browse (for a project not listed). If you have worked on current projects, they will appear below in the *Recent Project* list. As this is your initial install your window will be empty.



Press the **Close** button. The *Launchpad* area (on left side of window) is displayed with the *Startup Page* selected.



From the *Start Page*, you can select from any of 5 short videos that demonstrate how to use the software and explain how the Do-more! technology works.



**Video 1: “Welcome”**, welcomes you to the Do-more! Designer Software. This video familiarizes you with the BRX environment showing you how to connect to a BRX MPU, open a project, etc.

**Video 2: “Quick Start”**, walks you through writing and documenting a simple program and downloading it to the BRX MPU.

**Video 3: “Troubleshooting”**, introduces you to and shows you how to use the troubleshooting and debugging tools built in to the Do-more! Designer software.

**Video 4: “Architecture”**, explains how the Do-more! Technology works. Understanding the Do-more! Technology allows you to take advantage of the built-in features allowing you to create projects easier and decreasing the amount of programming time needed.

**Video 5: “Helpful Hints”**, covers some of the most common BRX MPU programming challenges and explains how easily Do-more! Designer can help with these challenges.

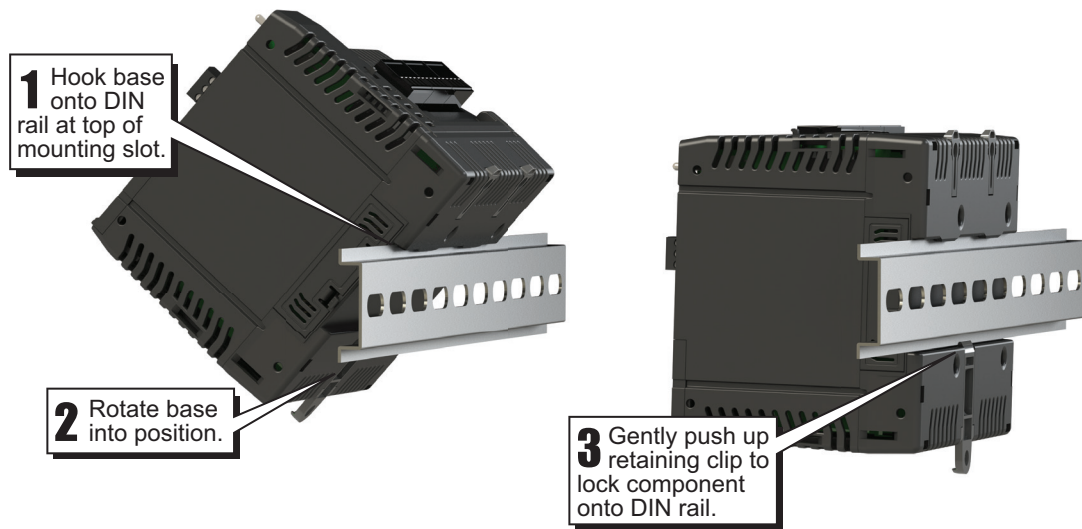
The **Video Search & Download Utility** opens a search window and download screen.

## Step 3: Prepare the Hardware

The “Installation and Wiring” chapter of the BRX User Manual (BX-USER-M) contains detailed information for your specific model.

The following summary explains the basic steps needed to get the BRX MPU ready to establish a link so you can program and run a project.

1. Installing the BRX MPU on DIN rail:
  - a. Hook rear upper tabs over flange of DIN rail.
  - b. Rotate the unit down toward the DIN rail, pressing firmly until the BRX MPU snaps securely to the DIN rail.



2. There are three ways to connect to the BRX MPU for programming:
  - a. Using the USB POM with a USB programming cable.
  - b. Using Ethernet cable with built-in Ethernet port.
  - c. Using RJ12 Serial POM module and RJ12 programming cable or via the built-in 3-pin serial port connector with user supplied cabling.

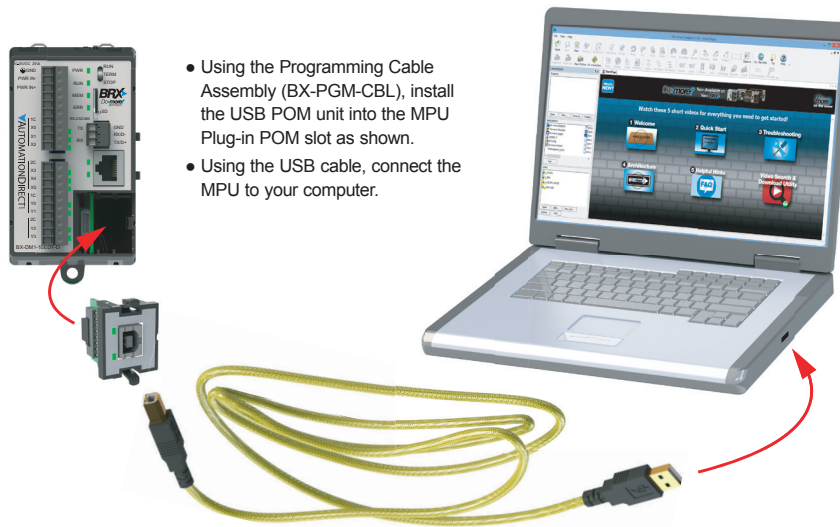
Examples of each connection type are shown on the following pages.



**NOTE:** All communication connections between the BRX MPU and PC should be completed prior to launching Do-more! Designer software.

## A. Connect BRX USB to Computer Using Programming Cable

For USB connectivity the BX-PGM-CBL assembly is required. This assembly includes one USB POM module (BX-P-USB-B) and one 6ft USB-A to USB-B cable (USB-CBL-AB6).

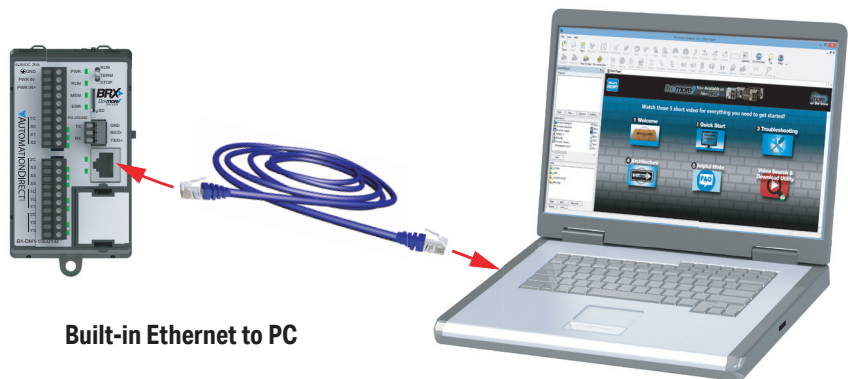


- Using the Programming Cable Assembly (BX-PGM-CBL), install the USB POM unit into the MPU Plug-in POM slot as shown.
- Using the USB cable, connect the MPU to your computer.

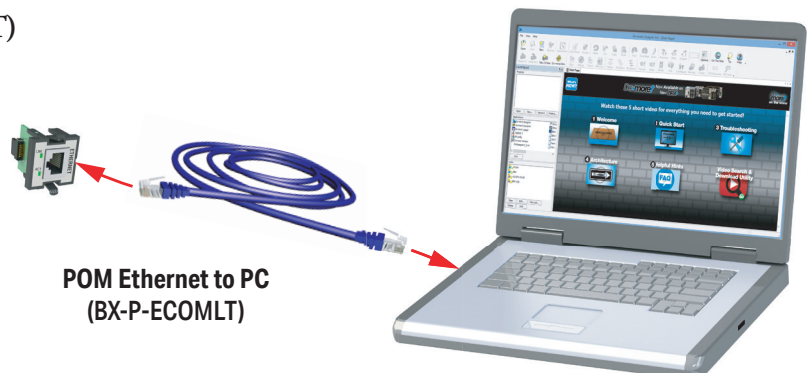
## B. Connect BRX Ethernet to Computer Ethernet

There are two options for connecting the BRX via Ethernet to a PC. One option is to use the built-in Ethernet port and connect to the PC via a Cat5 Ethernet cable. An alternate connection is available by using the optional Ethernet POM (BX-P-ECOMLT) module that plugs into the POM slot on the MPU. Both Ethernet options support 10/100Base-T via the RJ45 port. The Ethernet port supports Auto-Crossover, which allows the use of a Cat5 patch or crossover cable.

### Built-in Ethernet Port



### BRX POM Ethernet (BX-P-ECOMLT)



**NOTE:** When connecting to a BRX MPU via Ethernet for the first time, you will need to use the NetEdit 3 tool. Please see your device's user manual for NetEdit instructions.

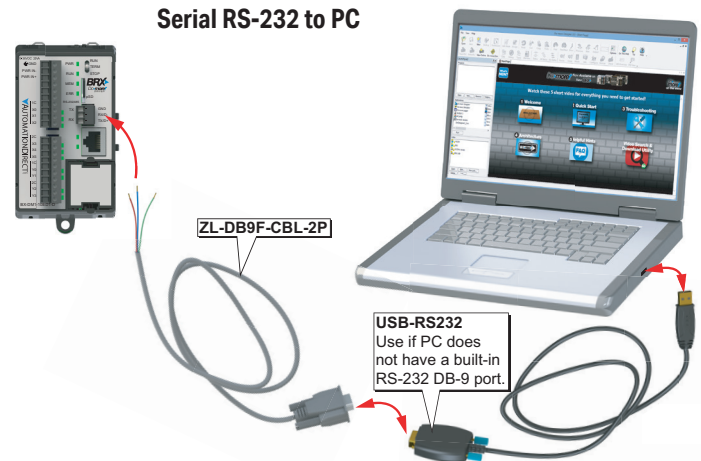
## C. Connect BRX Built-in Serial Port BRX POM serial port to Computer Serial or USB Port

It is possible to connect to the BRX using the CPU's built-in serial port or by installing the BRX POM serial port, BX-P-SER2-RJ12.

### BRX Built-in Serial Port.

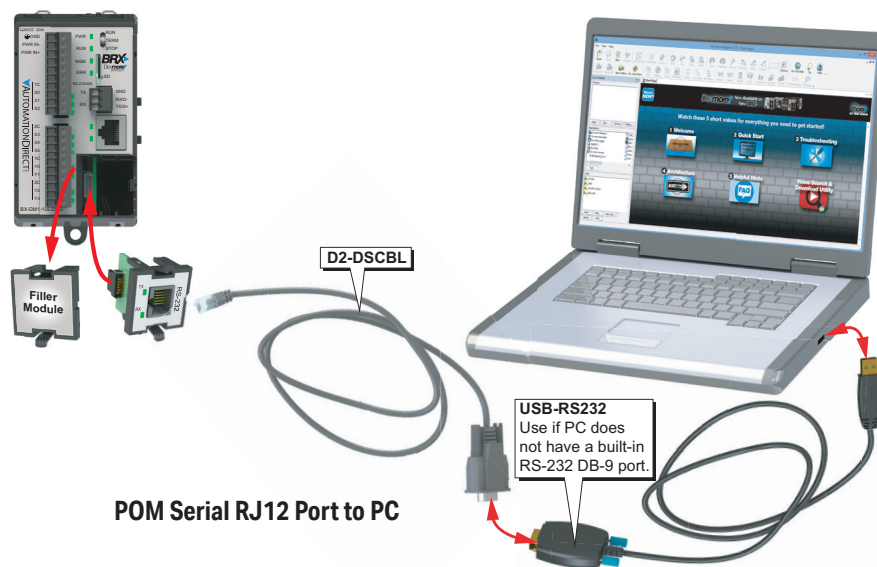
There are two options to consider for connecting the BRX built-in serial port to a PC. The first option uses a ZL-DB9F-CBL-2P to a PC USB port using a USB to Serial adapter (USB-RS232, as shown below). If the PC has a 9-pin serial port connection, you don't need to use the USB to Serial adapter. The second option (not shown) is to use a user built cable to connect the built-in 3-pin serial port to the PC serial port or USB to Serial adapter.

BRX 3-Pin Serial Port				
ZL-DB9F-CBL-2P			To	3-pin Terminal
Pin #	Term	Color		
2	RXD	Brown	.....	TXD
3	TXD	Red	.....	RXD
5	GND	Yellow	.....	GND
7	RTS	Blue	Jumper	
8	CTS	Violet		



### BRX POM Serial Port

The BRX Serial POM (BX-P-SER2-RJ12) can connect to a PC by using the D2-DSCBL programming cable. The 9-pin connection of the D2-DSCBL cable can be connected to a serial port on a PC or to a USB to Serial adapter (USB-RS232, as shown below).

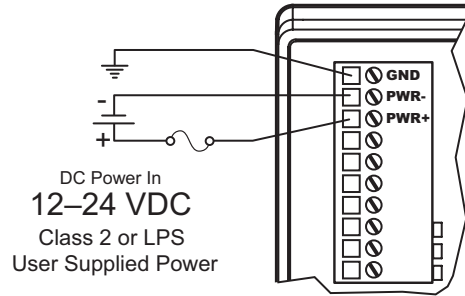


## Step 4: Apply Power to the PLC



**WARNING:** Minimize the risk of electrical shock, personal injury, or equipment damage. Always disconnect the system power before installing or removing any system component.

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Once all of the power wiring has been completed and verified, connect the appropriate voltage source to the power supply and power up the system. The BRX MPU will perform a self-evaluation once power is applied.

The following summary explains the basic steps needed to get the BRX MPU ready to establish a link for programming and running a project.



**NOTE:** Please see Chapter 1 of the BRX User Manual for the power wiring diagram corresponding to your specific BRX MPU.

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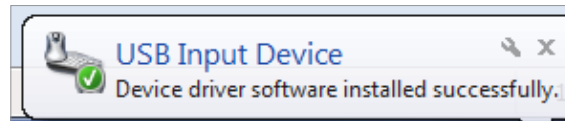
## Step 5: Establish PC to BRX MPU Communications

The BRX MPU should now be powered up and the programming cable connected.

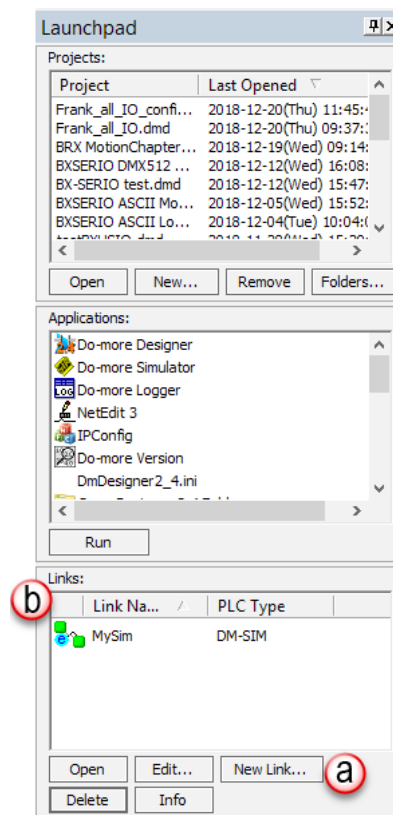


**NOTE:** The following example assumes that you are using the USB POM.

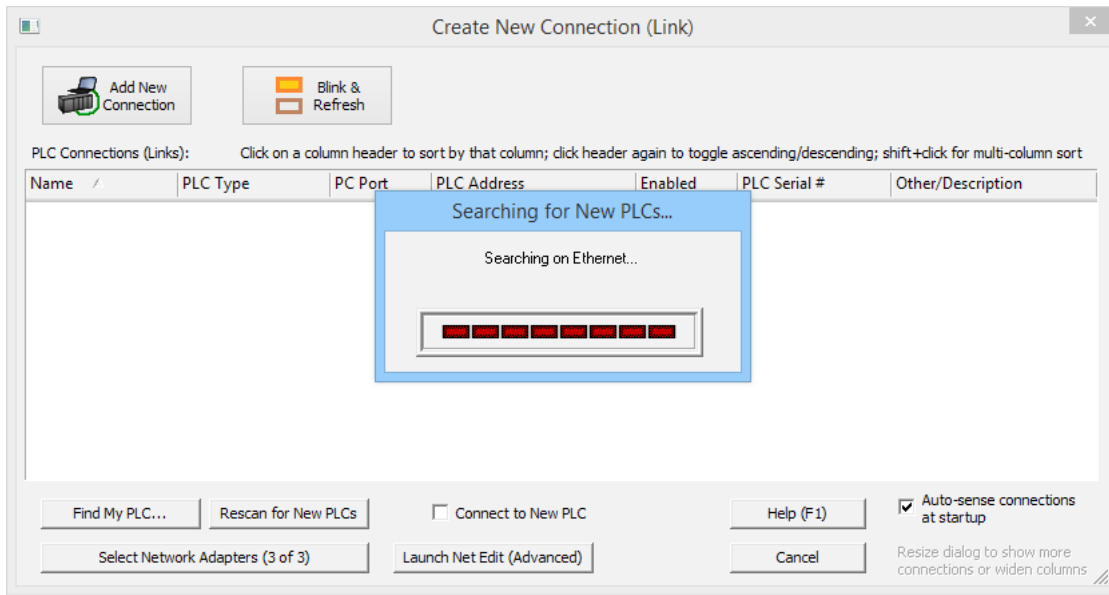
The first time the BRX USB POM is connected to your PC, you should see a message on your PC indicating that the driver for the USB device was successfully loaded:



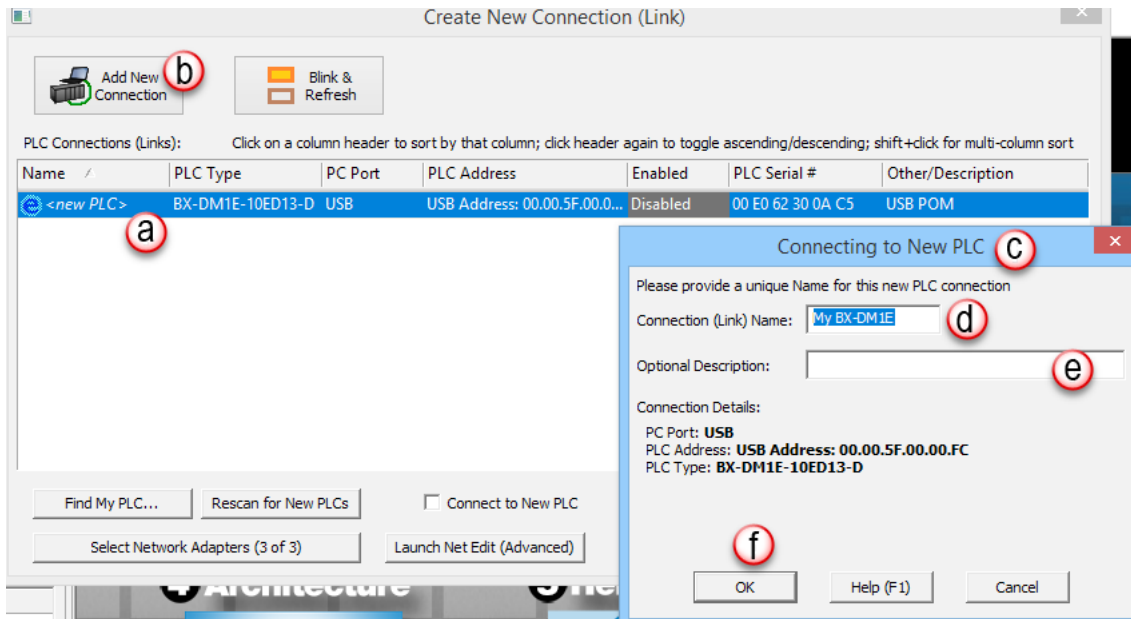
After connecting the USB cable between the MPU and the PC, click the (a) **New Link...** button in the (b) *Links* windows of the *Launchpad* area.



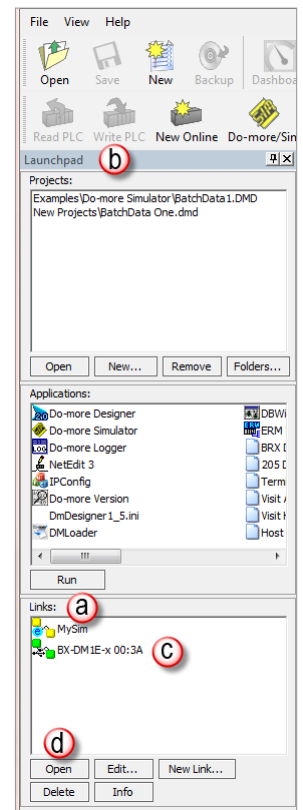
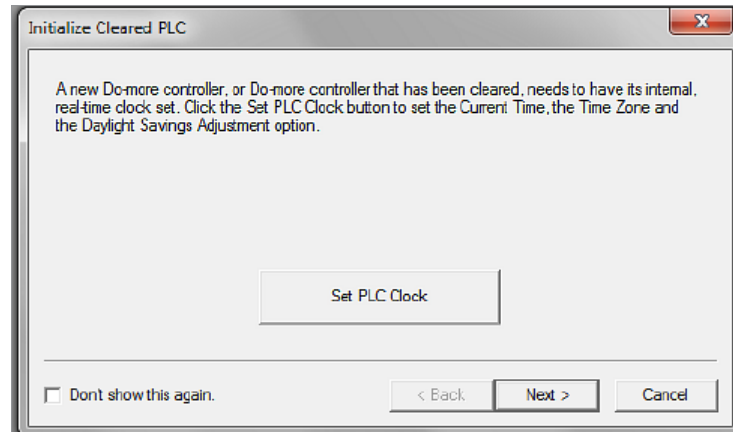
This brings up the *Create New Connection (Link)* dialog page and it begins to search for devices on the Ethernet, Serial and USB ports.



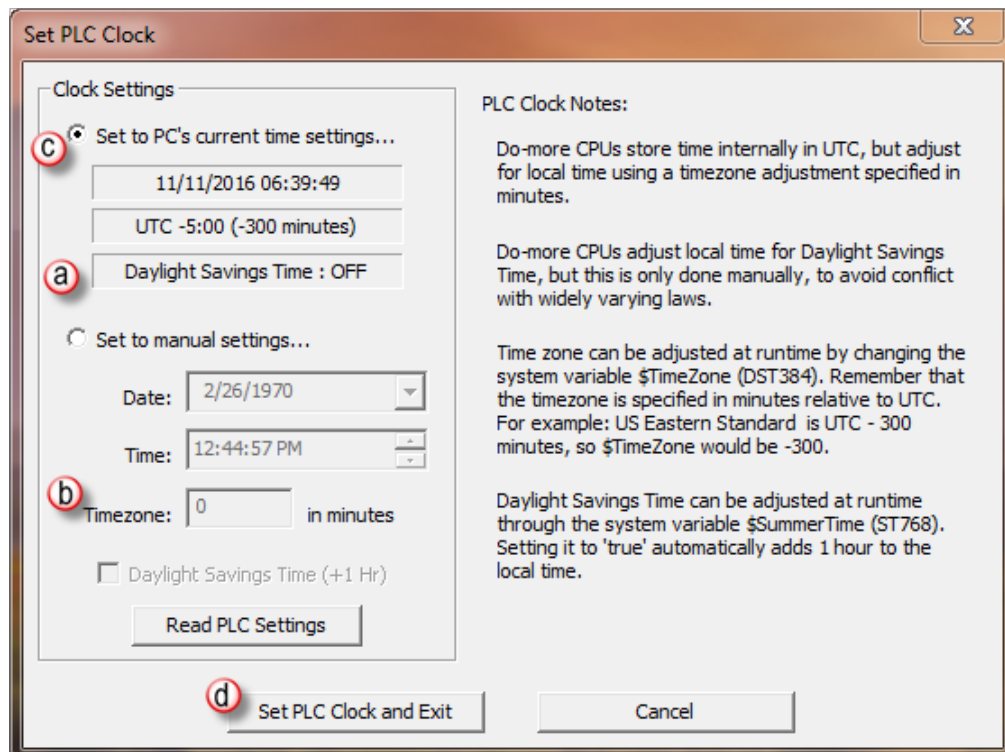
When the search is complete, the (a) MPU with the USB POM we are connected to will be displayed on the list. With this MPU highlighted on the list, click on (b) Add New Connection button. This brings up the (c) Connecting to New PLC dialog. Here you can enter a new (d) Connection (Link) Name, or use the default name, My BX-DM1E, and you can enter (e) an Optional Description. When finished press the (f) OK button.



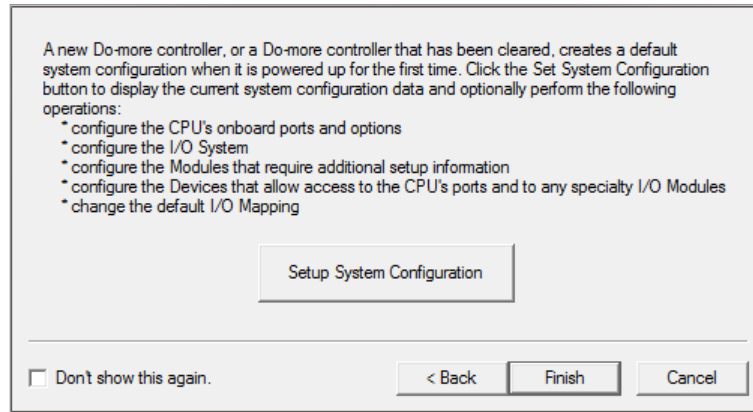
1. We are now ready to go online with the MPU. In the (a) *Links* section of the (b) *Launchpad*, select the (c) USB link; in this example it is called BX-DM1E-X 00:3A. Click on (d) **Open** button.
2. Once connected to the MPU, you may encounter the initialization screen shown below. This will appear on first initialization of a new MPU. Select **Set PLC Clock** to set the clock in the new MPU to be synchronized with your PC clock.
3. The *Set PLC Clock* option allows you to set the internal, real-time clock of the BRX MPU.



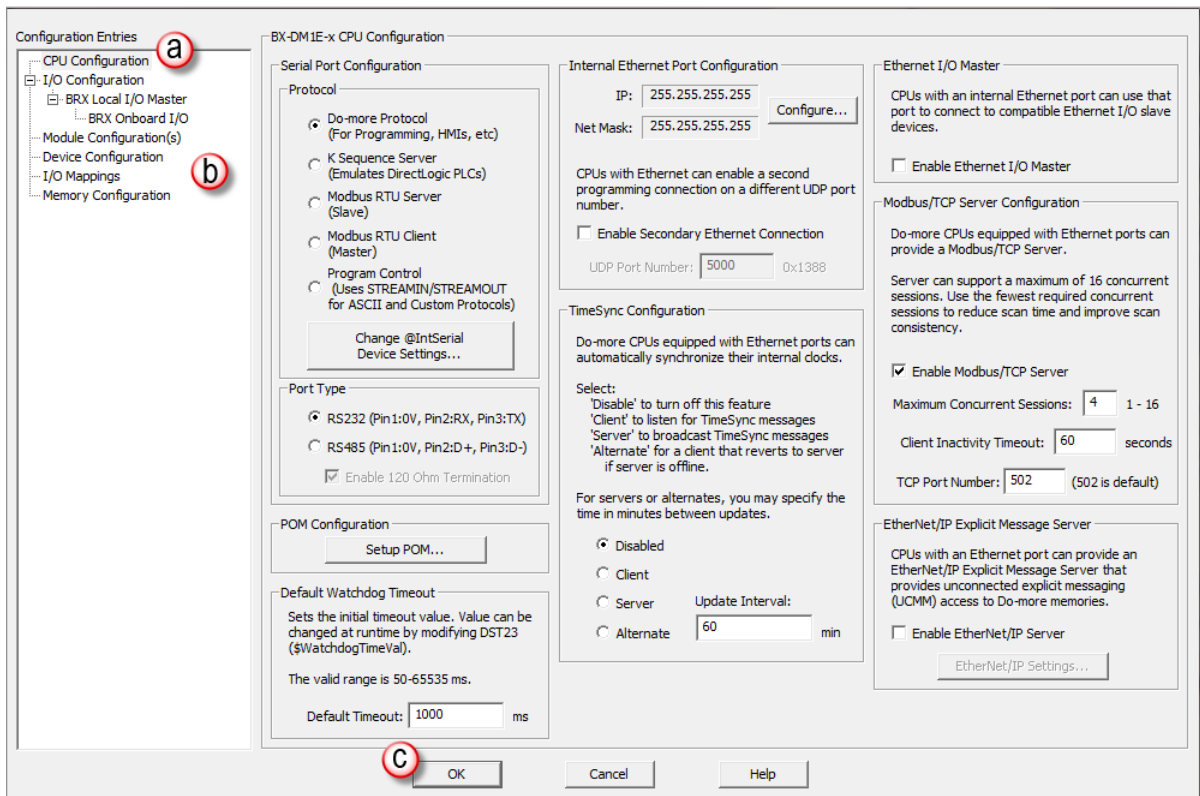
The *Set PLC Clock* window has options for (b) *Timezone* and (a) *Daylight Saving Time* adjustments. Select (c) **Set to PC's current time settings** then select (d) **Set PLC Clock and Exit**.



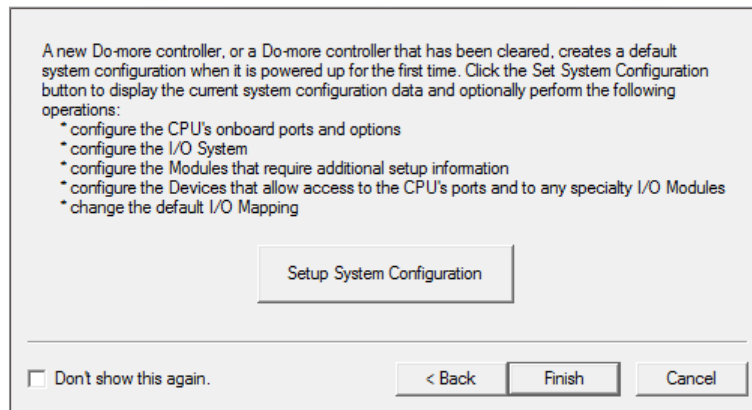
- The option for *Setup System Configuration* appears next (below). This allows you to configure parameters of the BRX MPU, such as onboard communication port configuration, I/O configuration (i.e. high-speed), and mapping. Select **Setup System Configuration**.



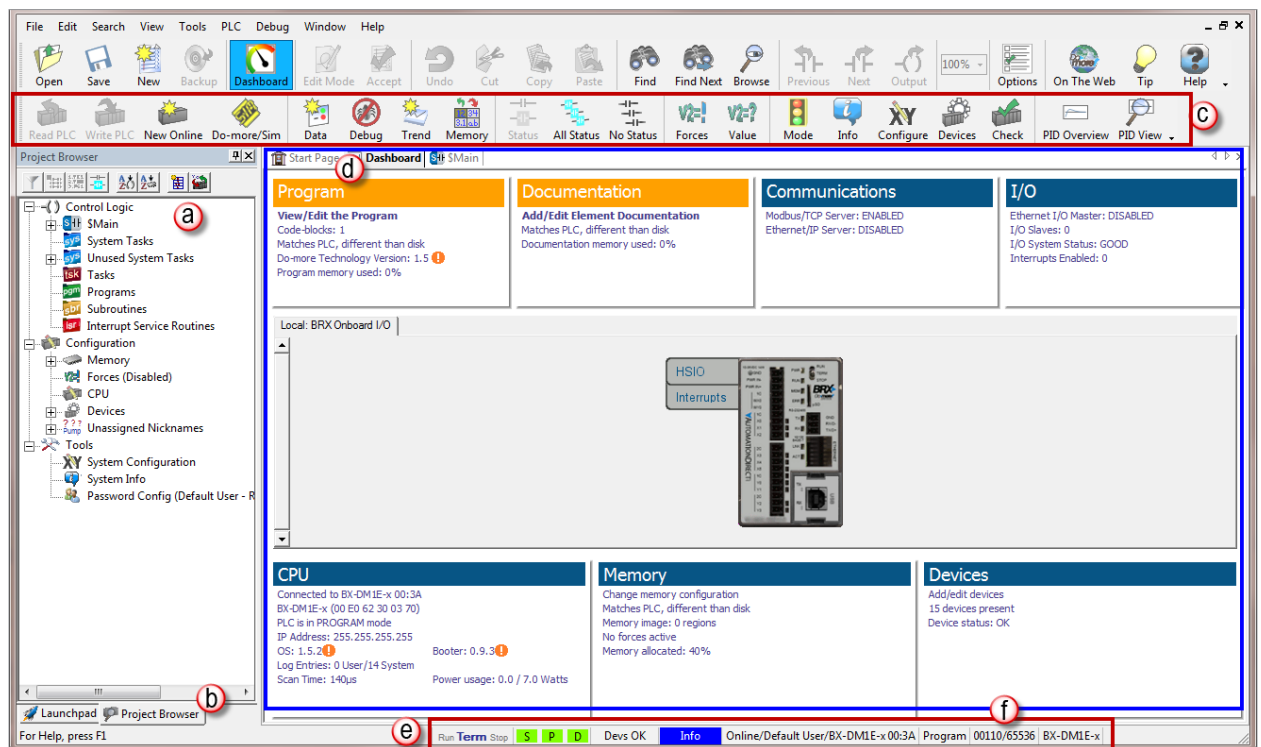
- The *System Configuration* window appears next with the (a) *CPU Configuration* selected by default. This window and those indexed in the (b) *Configuration Entries* tree on left, expose many of the system operating parameters for your MPU. For purposes of this introduction we will accept the default settings. Click (c) **OK**.



The *Setup System Configuration* box reappears. Select **Finish** button to move to next step.



6. The *Project Browser* (a, b), including the *Dashboard* (d), will open with the online toolbar (c) active. Notice the status bar indications (e, bottom of window) show the MPU type, memory usage, communication status, errors, and mode, etc. Hovering your mouse over the status bar (e) will highlight the items that are selectable.



If you select one of the items, a new window will open with real-time data and available options. For example, the *System Information* window seen in the next figure, opens after selecting the memory usage values (f) in the status bar. This information and much more can be accessed by way of the *Dashboard*.

General Information | System Status | Event Logs

Type  
PLC Type: BX-DM1E-x  
Serial Number: 00 E0 62 30 03 70

Mode  
Keyswitch: TERM  
PLC Mode: Program

Scan Times  
Min: 140 us [Reset]  
Avg: 140 us  
Max: 496 us [Reset]

System Clock  
Date: 11/11/2016 Time: 08:49:08  
Time Zone: UTC -5:00 DST: OFF  
[Set]

Node and IP Configuration  
Module ID: 0 IP Address: 255.255.255.255  
Name: H1-DM1x Subnet Mask: 255.255.255.255  
Description: Do-more PLC! Gateway: 0.0.0.0  
[Set Node and IP Configuration]

Memory Usage  
Max Program: 65536  
Program Used: 0  
Max Documentation: 1048576  
Documentation Used: 0

CPU Version Information  
Do-more: 1.5.0 [Update]  
OS: 1.5.2\* [Update]  
Booter: 0.9.3\* [Update]  
FPGA: 1.3  
Hardware: 1B  
[Use Live Update to get Firmware]

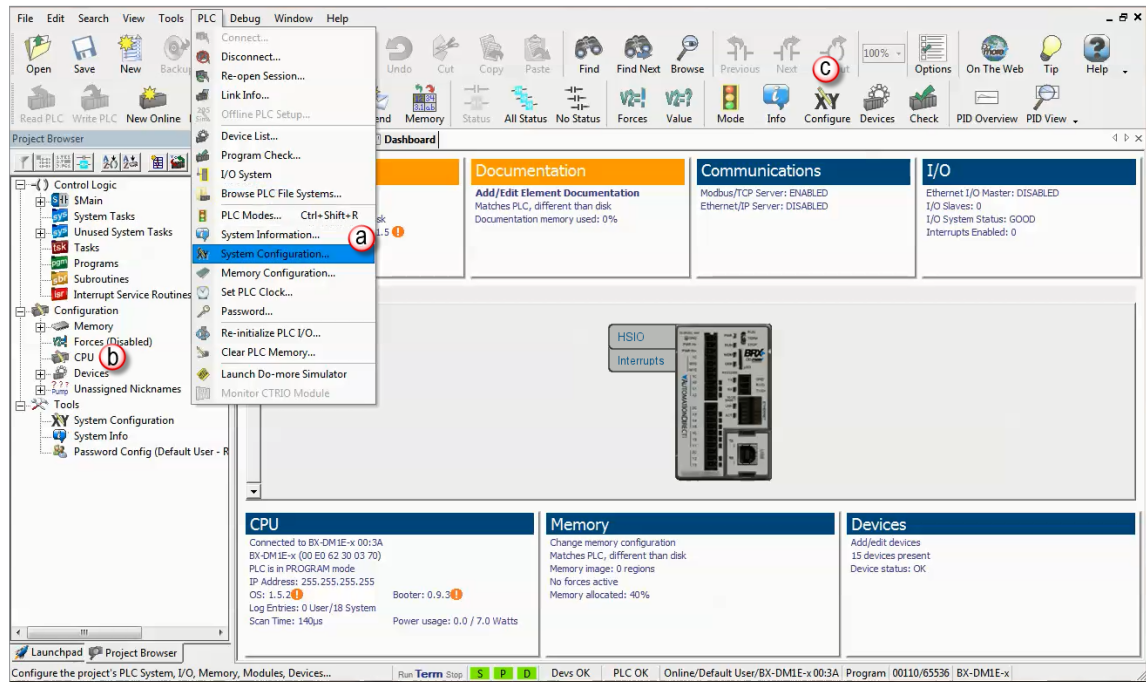
Program Version Information  
Do-more: 1.0.0  
[Show Do-more Technology Versions]

[OK] [Help]

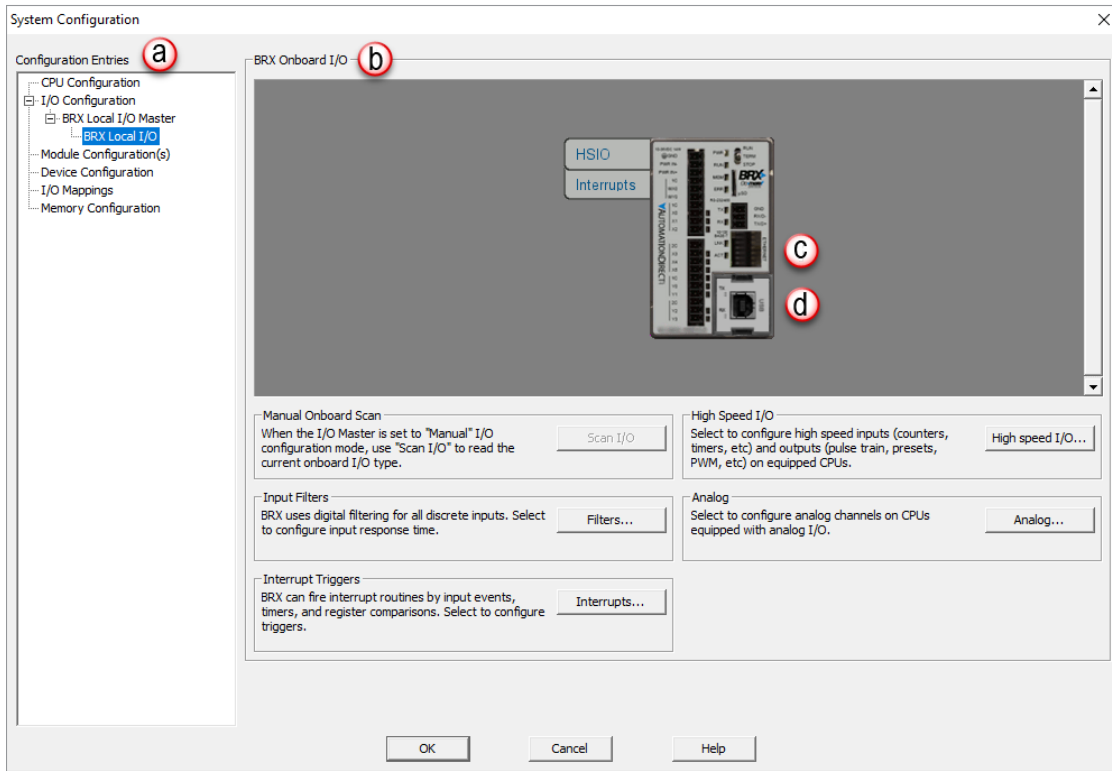
## Step 6: Verify Hardware Configuration

Next we will verify the hardware configuration. The BRX series has an auto discover feature that will automatically detect installed I/O modules. You can access the System Configuration in three ways:

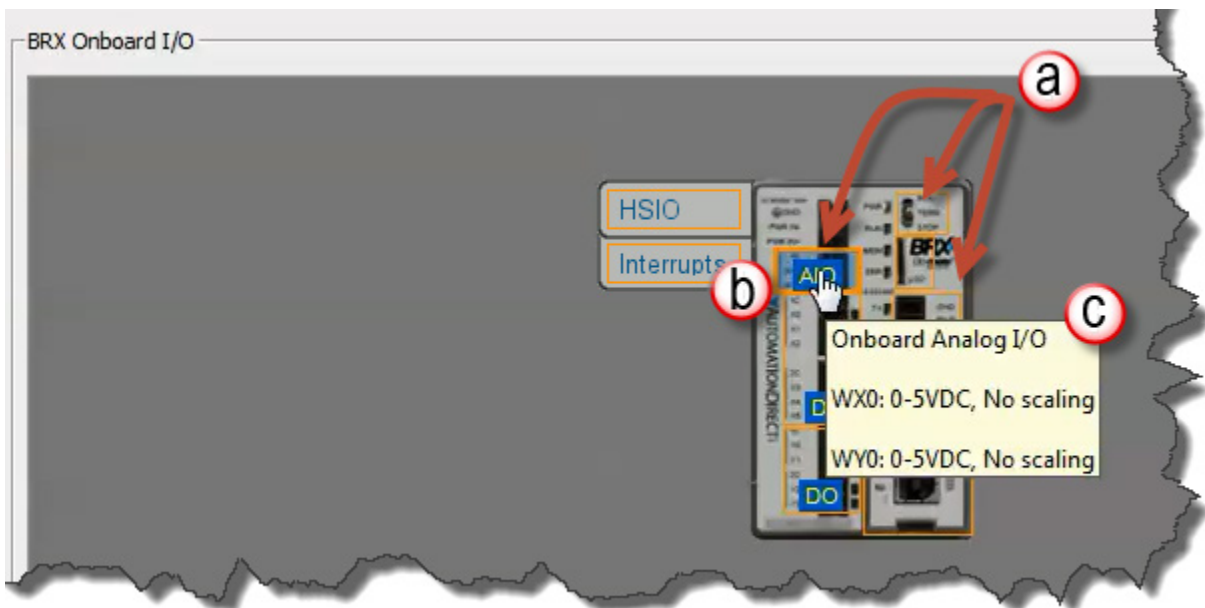
1. By selecting (a) **PLC > System Configuration**
2. By double clicking on the (b) **CPU** link under the *Configuration* tab in the *Project Browser*
3. By clicking the (c) **X/Y Configure** icon on the project toolbar.



On the left side of the System Configuration window is an index of topics titled (a) *Configuration Entries*. The (b) *BRX Local I/O* allows you to view the modules the software has detected. For this example, we are working with a BX-DM1E-10ER3 MPU and no expansion I/O. This unit has a built-in (c) Ethernet port and a (d) USB POM plugged in which show up in the overview graphic.



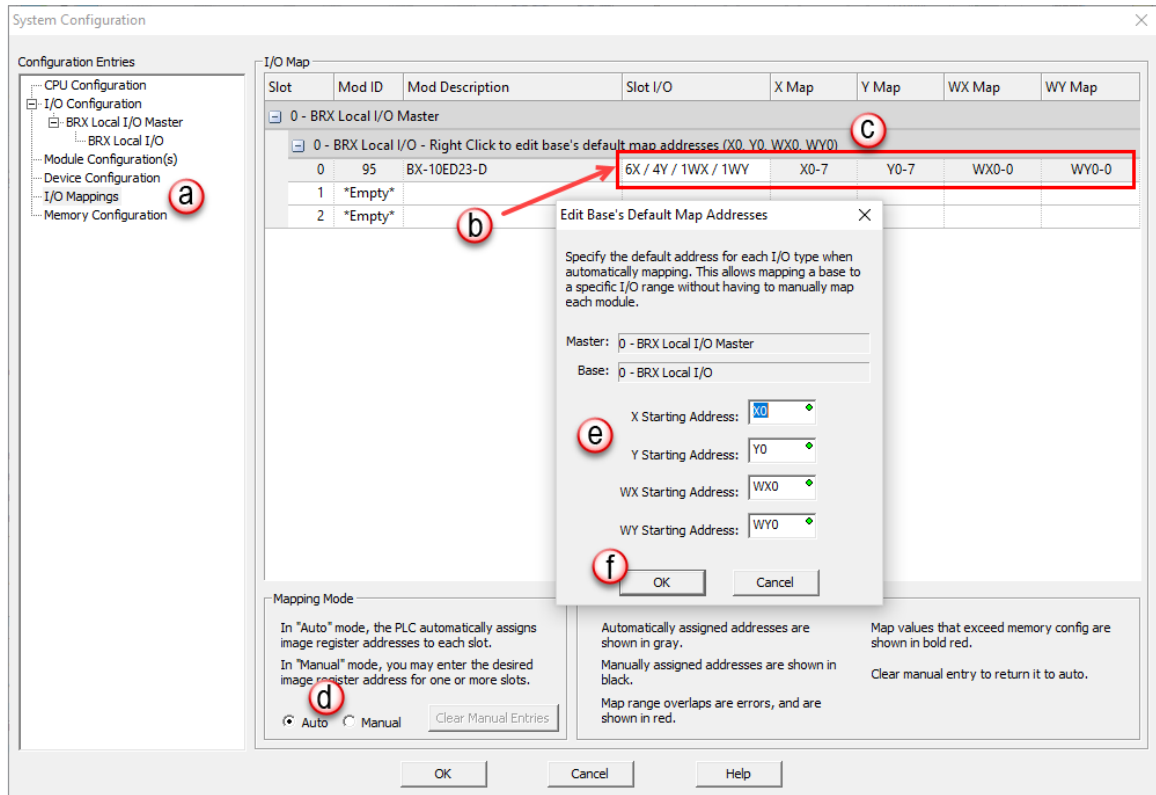
The (a) BRX Local I/O graphic area is interactive, like the system *Dashboard*, and as you hover and move across the image (b) “orange” boxes will appear and display information about the highlighted section.





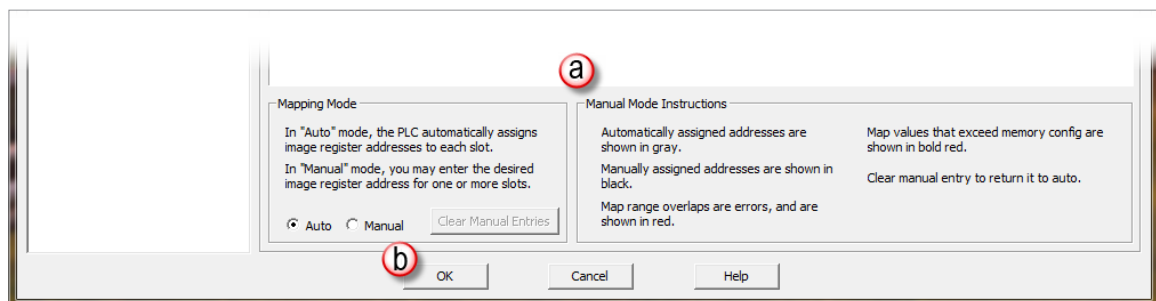
Also if the highlighted section can be configured you can click in the highlighted area and a configuration screen will pop up. For example hovering over (b) the built-in analog I/O hot spot, a pop up will display information on how the analog I/O is configured.

After the hardware configuration is verified, select (a) the *I/O Mappings* option in the *Configuration Entries* index. This option will display (b) the assigned addresses for the available I/O, as seen below.



These (c) X (discrete input), Y (discrete output), WX (analog input) and WY (analog output) addresses are automatically assigned by Do-more! Designer. You have the option to manually configure these addresses by selecting (d) **Manual** in the Mapping Mode section at the bottom of the window or by right clicking (g) **BRX Local I/O**. Change default starting address in (e) *Edit Base's Default Map Addresses* dialog box. Click (f) **OK** when completed to close *Edit Base's Default Map Addresses* dialog box.

The (a) *Manual Mode Instructions* section, also found at the bottom of the window, details the various color indications associated with this mode.



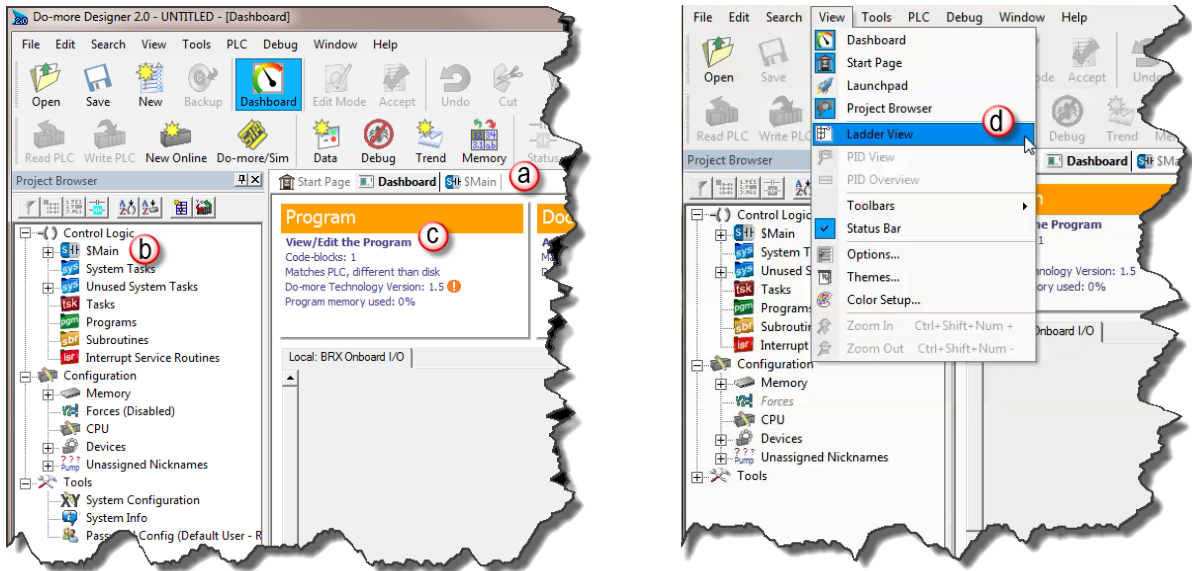
Once the hardware and mapping is configured and verified, click (b) **OK** to return to the main screen, displaying the *Dashboard* and the *Project Browser*.

## Step 7: Create a Ladder Logic Program

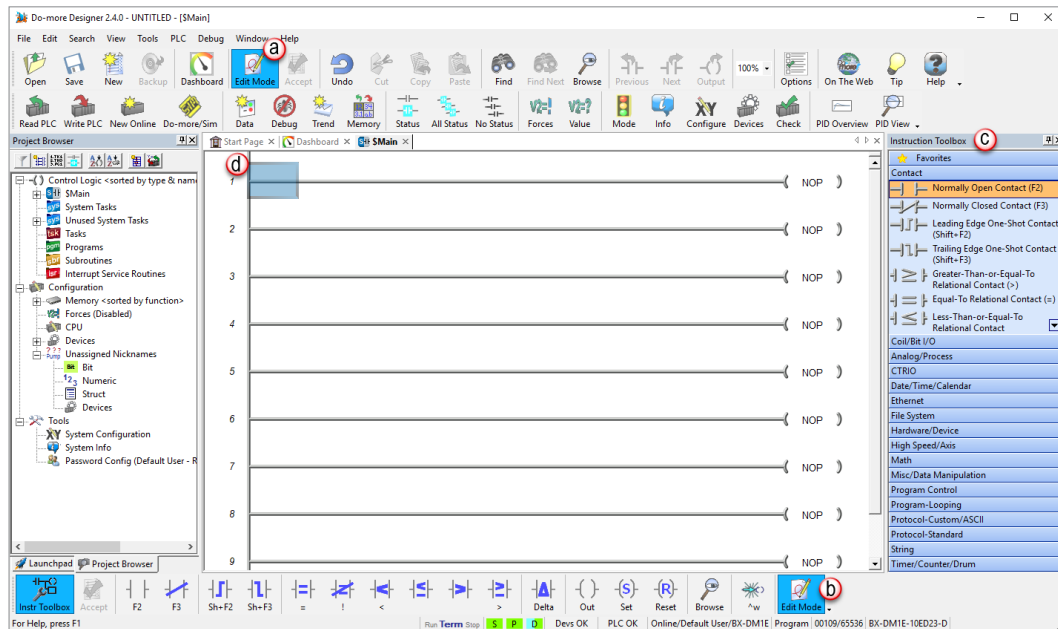
In order to create a ladder logic program, you will need to be in Edit Mode. All programs start with a default *\$Main* code block. We will be adding our ladder logic to this code block.

We can get to the *\$Main* code block four different ways:

1. By selecting the (a) *\$Main* navigation tab.
2. By double clicking on the (b) *\$Main* option under the *Control Logic* section of the *Project Browser*.
3. By selecting (c) **View/Edit the Program** under the Program section of the *Dashboard*.
4. By using the drop-down menu (d) **View > Ladder View**, as seen below.

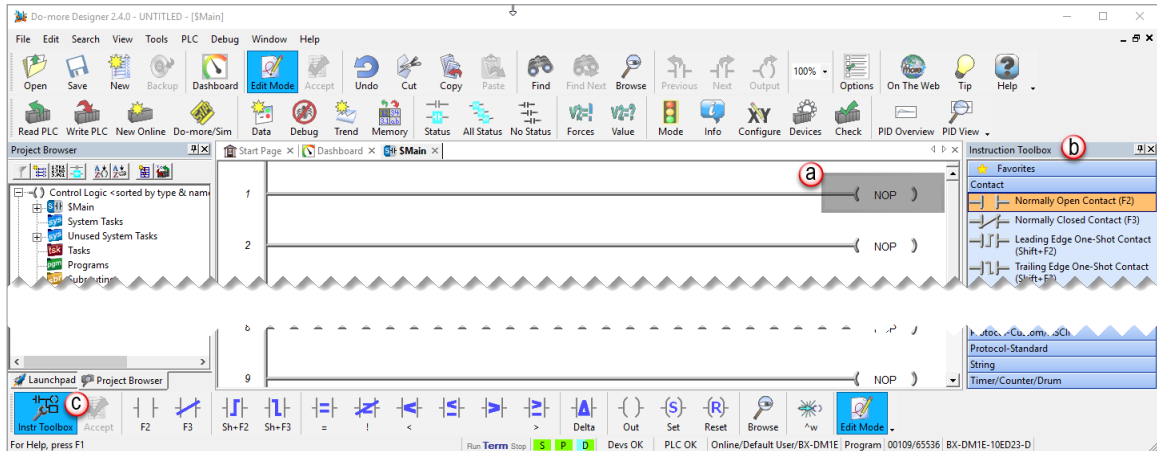


When in (a, b) *Edit Mode*, (c) *Instruction Toolbox* options will become active. The cursor will be positioned on (d) Rung #1 and highlighted.



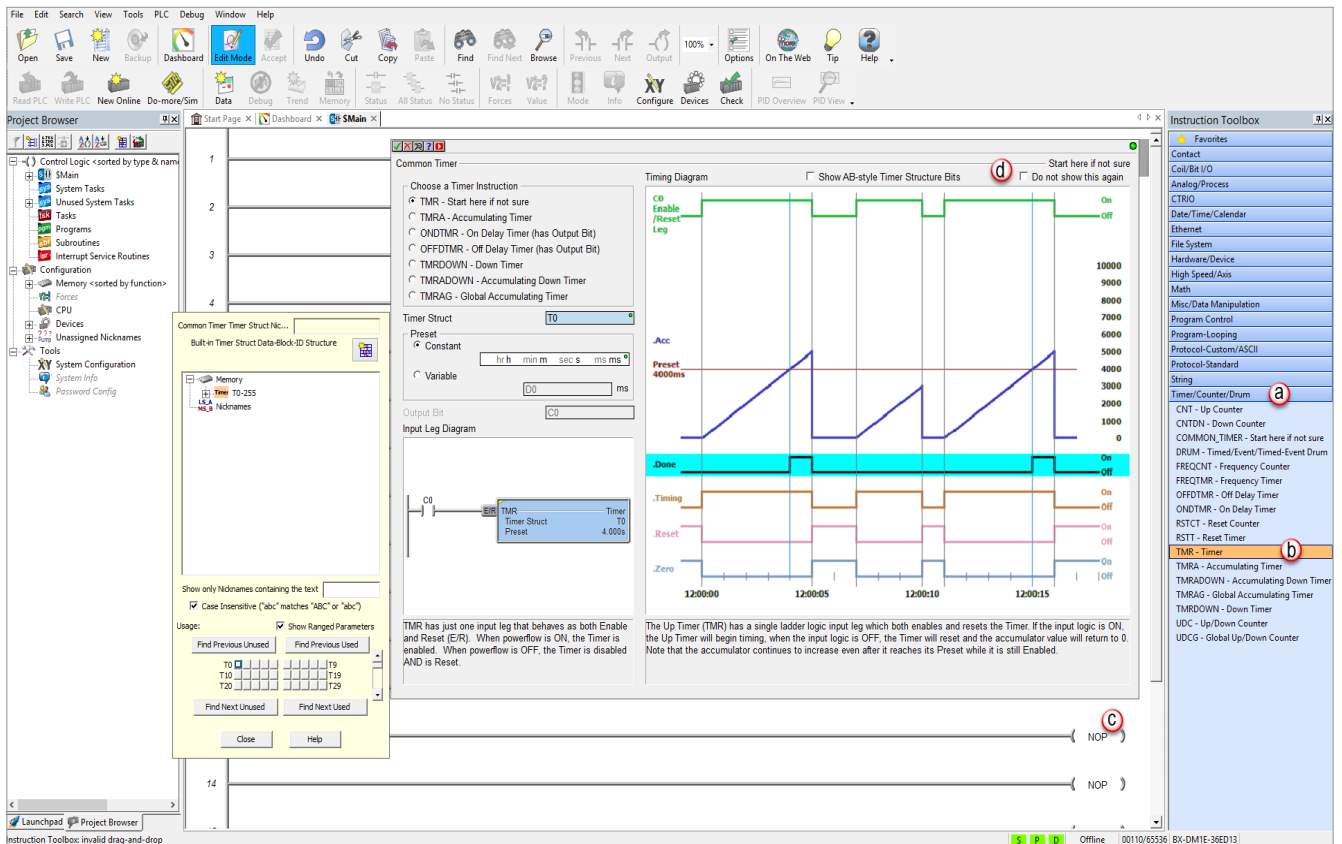
## Rung #1

Place the cursor box in the (a) NOP position on Rung #1. If the (b) *Instruction Toolbox* is not open, click **Edit** on the menu and select (c) **Instruction Toolbox** from the drop-down menu.

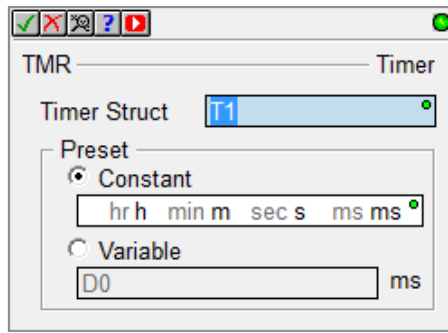


Now, you are ready to begin entering the example ladder logic.

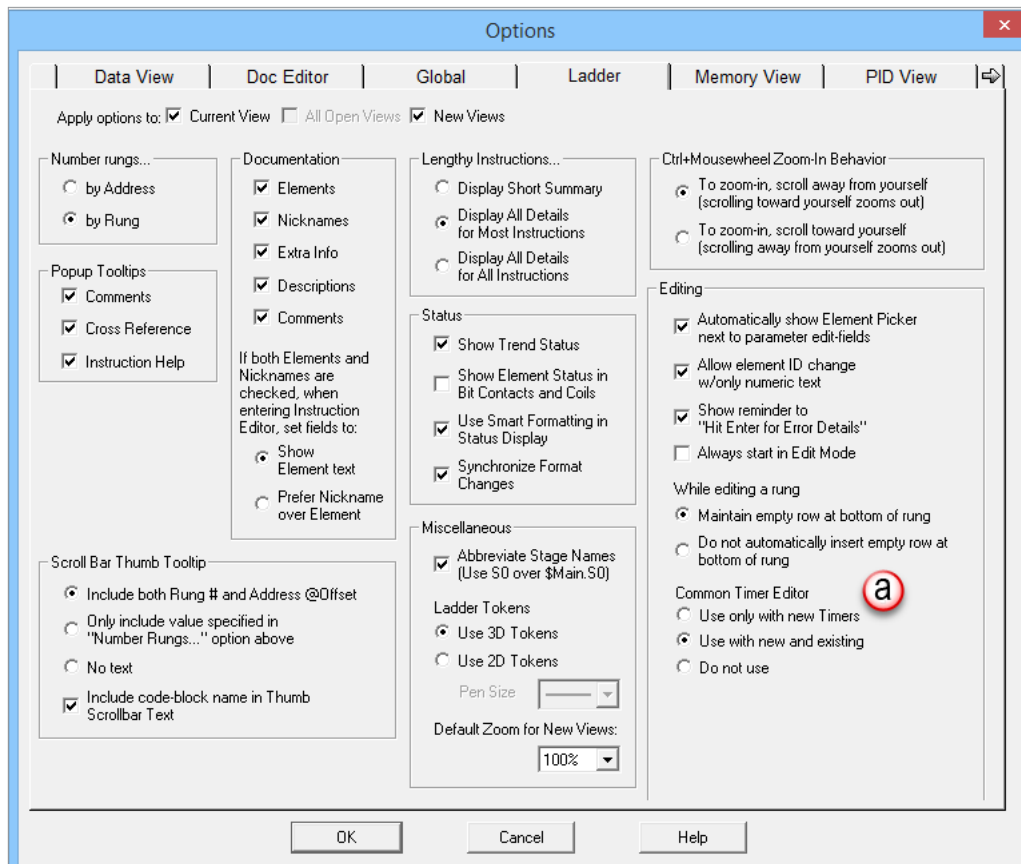
Click on the section heading (a) **Timers/Counters/Drums** and (b) double click or drag/drop the **TMR** instruction.



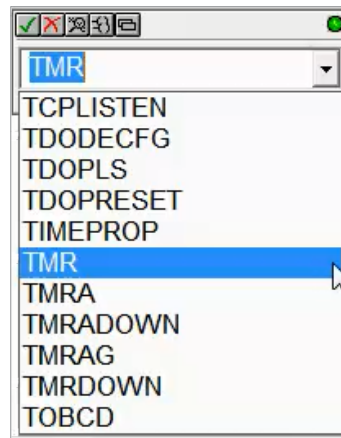
Checking (d) **Do not show this again** will cause a more concise timer dialog to open on subsequent access to the TMR dialog.



Access to the more detailed *Common Timer Editor* dialog can also be controlled from the Editing section (a) of the *Options* dialog accessible from the main Do-more! Designer toolbar.



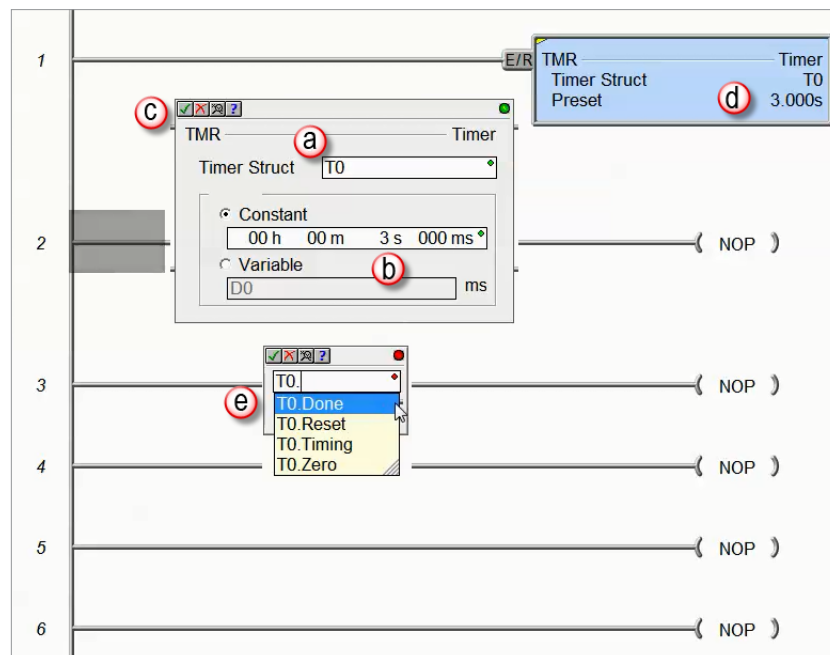
Alternatively, you can type “T” while the cursor is on the NOP position and select **TMR** from the drop down menu, then press **Enter**.



Once the TMR is selected, a Timer dialog box appears.

1. Set the (a) *Timer Struct* to T0
2. Enter 03 into the (b) Preset Constant Value for the seconds (s) preset.
3. Click on the (c) green checkmark in the upper left corner to accept.

After clicking the checkmark, Rung #1 should show the (d) T0 timer (TMR) instruction with a Preset of 3.000 seconds. A user variable can be assigned to the Preset value if needed, to allow the timer preset to be set from an external source.



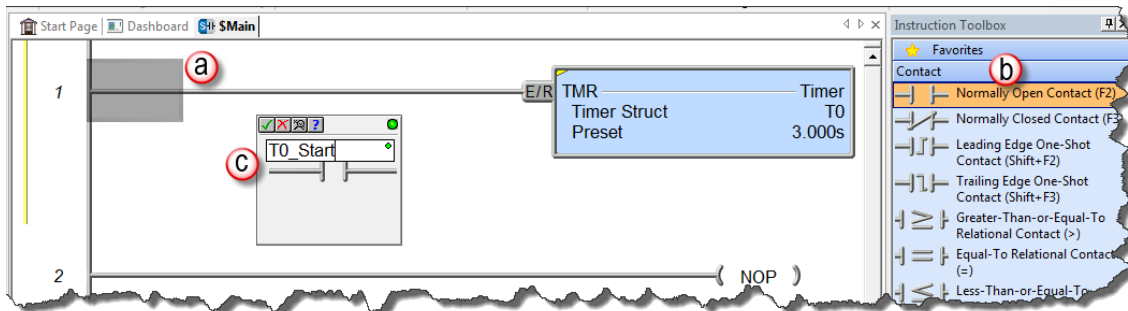
Since a Timer is a structure, it has predefined elements associated with it, such as “Tx.Acc” (accumulated time), “Tx.Done” (the completion bit) and “Tx.Timing” (the timer is enabled and timing).

Therefore, if T0. (the “period” must be used to open drop-down list) is entered into any contact name, the Auto-Complete feature of Do-more! Designer will display all applicable bit (Boolean) selections available for

that structure. Selecting (e) the T0.Done element, as seen above, will assign this element to the contact and the contact name will be T0.Done.

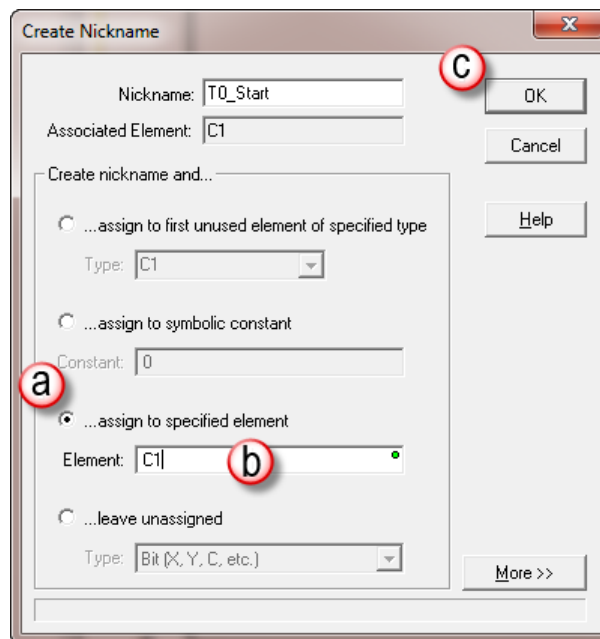
This feature works for all structures including: timers, counters, PID loops and strings, to name a few. Many system data types such as, \$Main and \$FirstScan, as well as those associated with user-created devices like ECOM, CTRIO, or SERIO modules also use the Auto-Complete feature. See the Do-more! Designer Help file topic DMD0327 for more information on structure members.

Place the cursor in the (a) leftmost column of rung #1. Type the nickname *T0\_Start* at the (a) cursor position. The (c) Normally Open contact instruction (b) will be used by default as the nickname is entered. Press Enter.

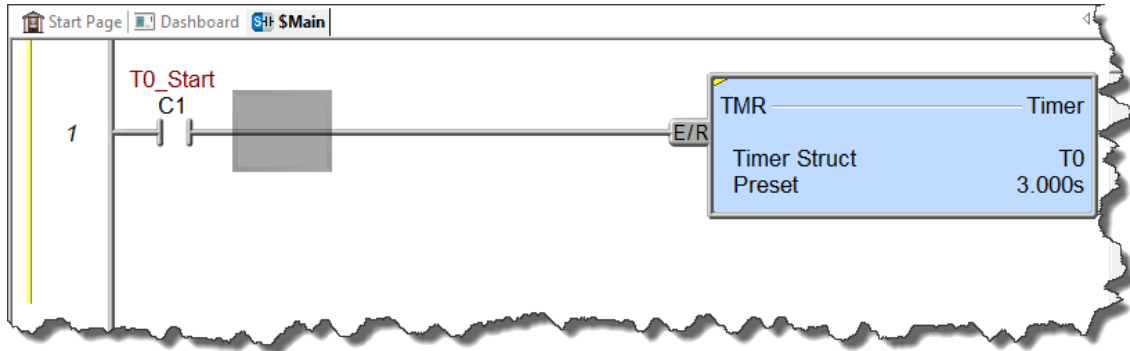


Another option is to (b) click or drag/drop from the Instruction Toolbox (F2 hot key), enter *T0\_Start* for the name, and click the (c) green checkmark in the upper left corner.

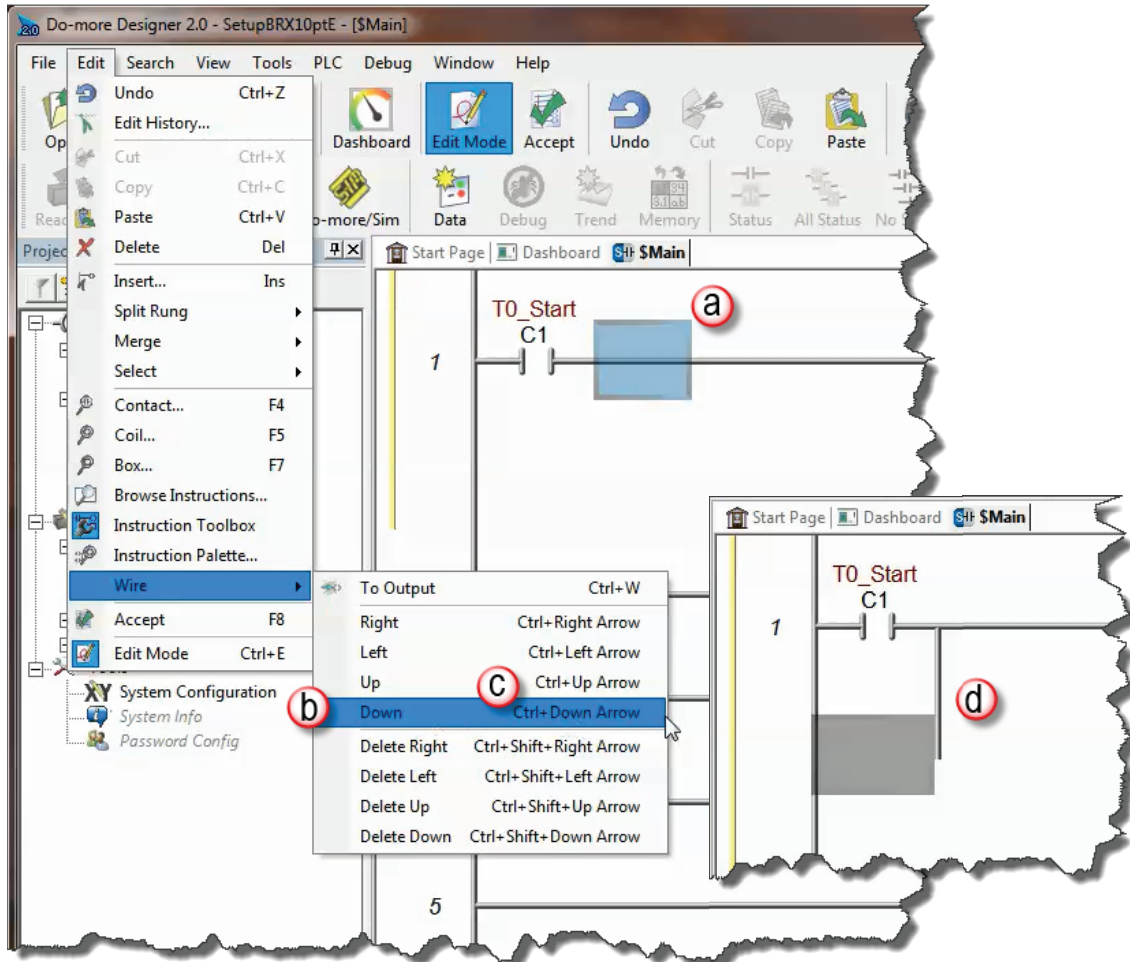
This will open the Create Nickname dialog seen here. Select (a) the option **...assign to specified element**, (b) type the desired memory bit for this contact (C1), and select (c) **OK** to accept.



Rung #1 should appear as shown below.

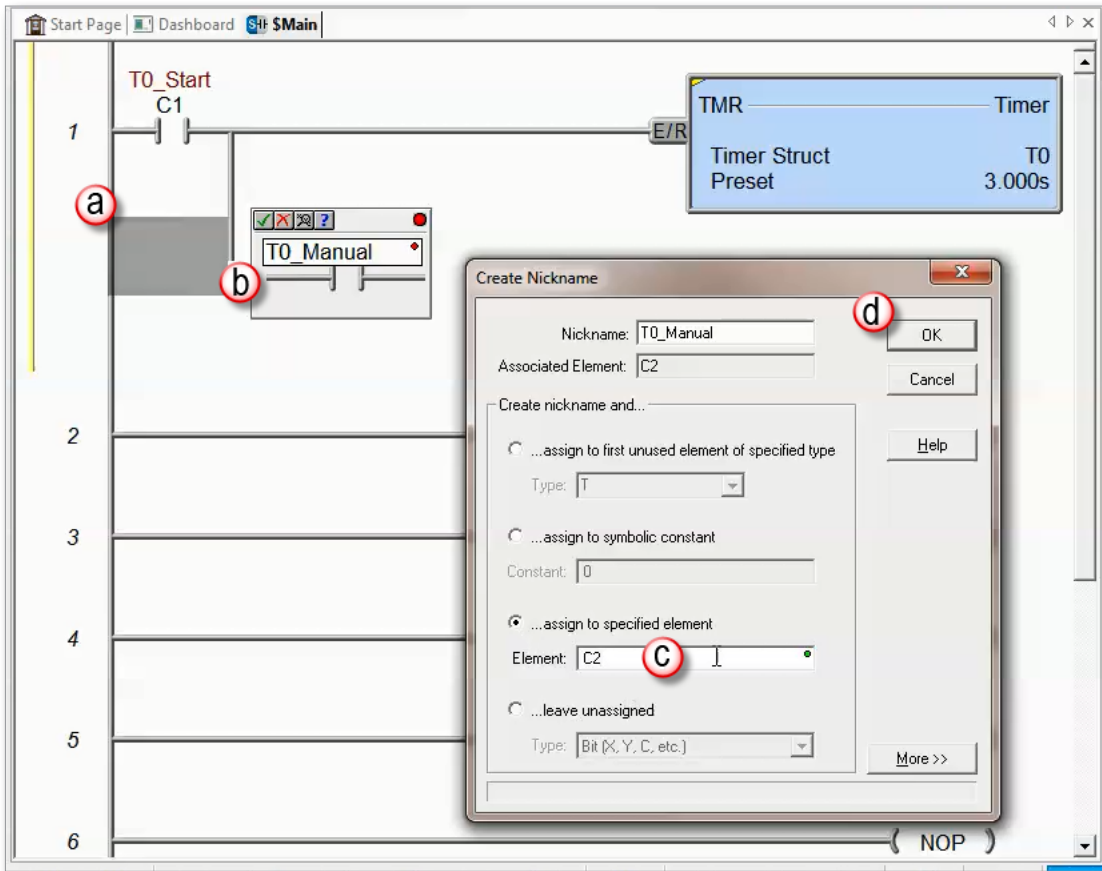


With the cursor in the position to the (a) right of contact *TO\_Start*, begin drawing a branch circuit. Under the *Edit* drop-down menu, select **Wire**, then select (b) **Down**. Notice the shortcuts that are available for wire drawing. The wire could also be drawn using the shortcut: (c) **Ctrl+Down Arrow**. The (d) wire should now appear in your ladder.

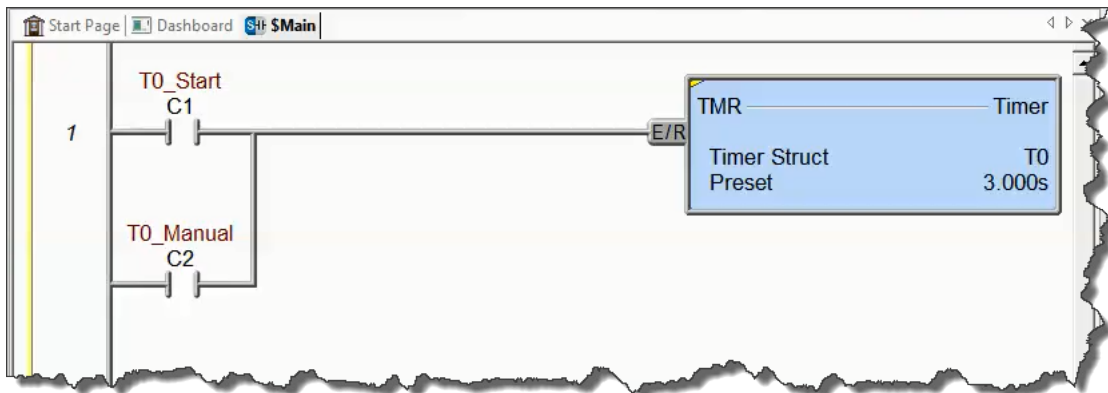


**NOTE:** There are also Delete Wire options in the Edit drop down menu that are used to erase any wires not needed.

Place the (a) cursor in the space to the left of the new line and select another normally open contact. Type in the nickname (b) *T0\_Manual* and (c) assign bit *C2*. Select (d) **OK** to accept.



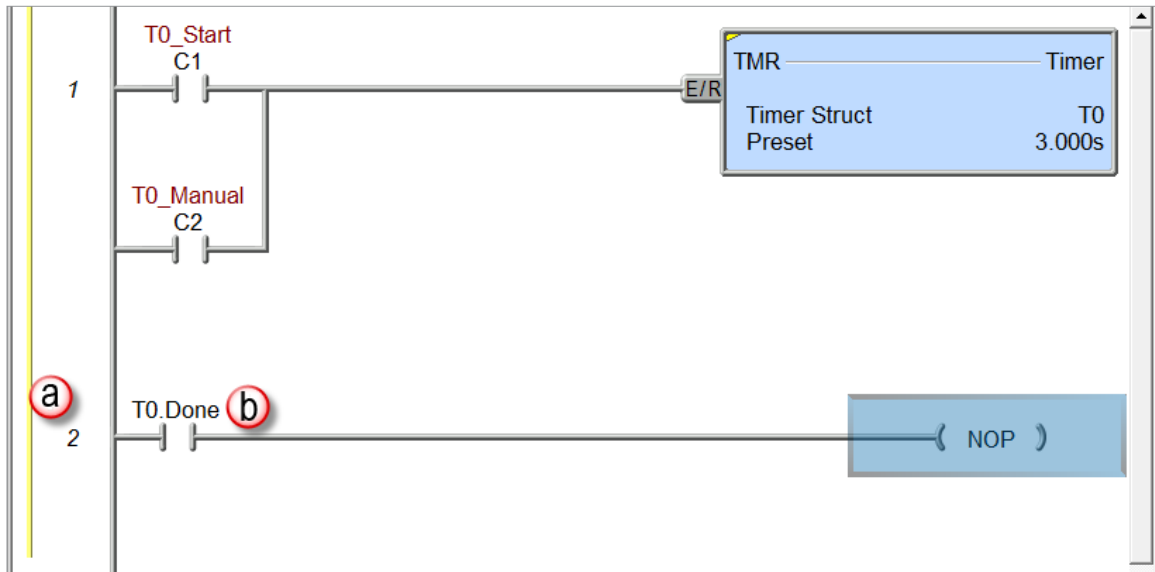
Rung #1 should look like this:





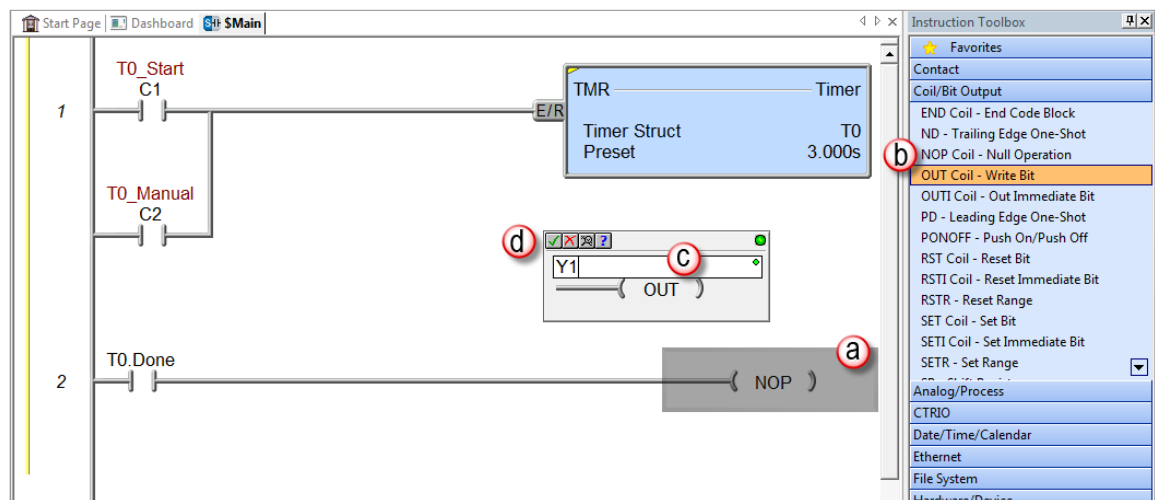
## Rung #2

Place a normally open contact in the first position of (a) Rung #2. This contact will be tied to the Done bit of timer T0. Therefore, the name for this (b) contact should be entered as “T0.Done”. There should be no Create Nickname dialog box as seen with the earlier normally open contacts.

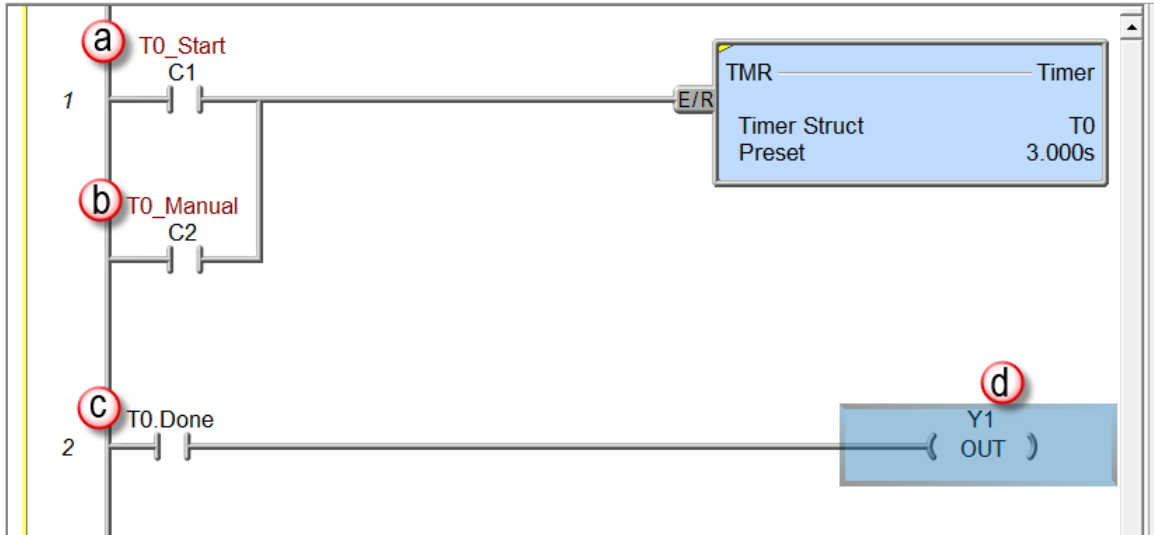


Lastly, you will need to add an Out coil to the end of Rung #2. Place the (a) cursor at the end of the rung highlighting NOP and type “OUT” and select the OUT instruction from the drop down menu. Another option is to (b) select the OUT instruction from the Instruction Toolbox under the Coil/Bit Output section.

Next, choose which bit will be tied to this coil. Tie this (c) coil to the physical output Y1 by typing “Y1” and clicking the (d) green checkmark in the upper left corner.

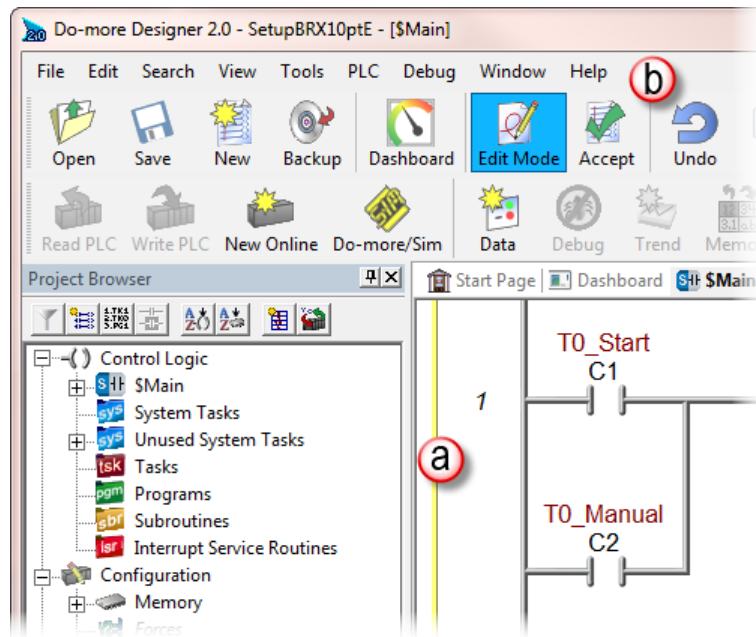


The ladder program should now look like this:

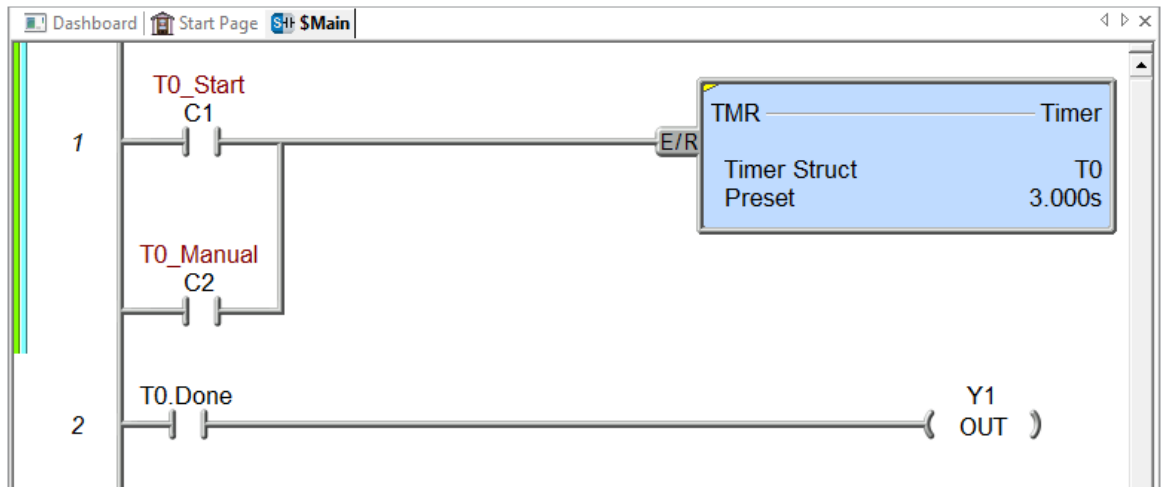


When either the (a) T0\_Start or (b) T0\_Manual contact is energized, the timer will begin timing. When it times out, contact (c) T0\_Done will energize and the (d) output coil Y1 will turn on. Note that an END instruction is not required.

The (a) yellow bar in the left margin signifies logic that has not been accepted. So once you have verified your logic, click the (b) **Accept** button in the *Project Toolbar* to accept the changes.



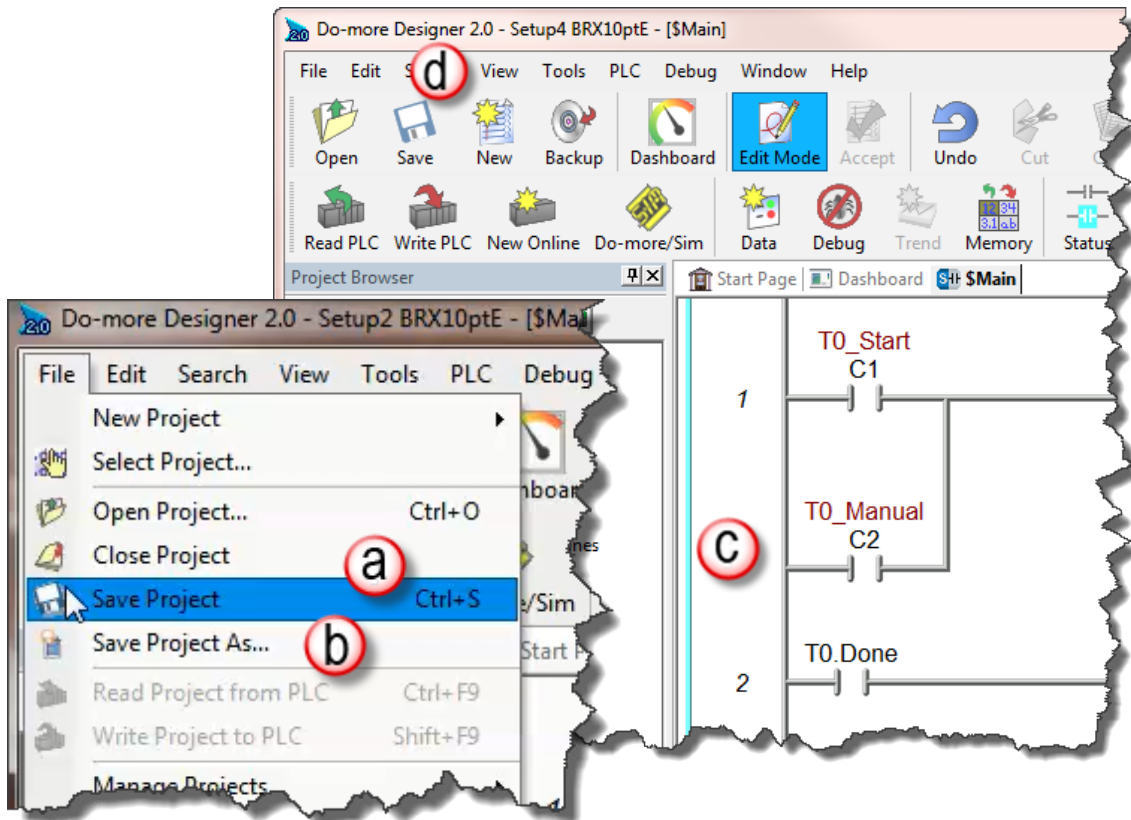
After selecting “Accept”, the yellow bar should be replaced by green and cyan bars (left margin). The green bar means the project has been accepted but not saved to disk. The cyan bar (only appears when online) means the project has been accepted, but not yet downloaded to the MPU.



## Step 8: Save Project

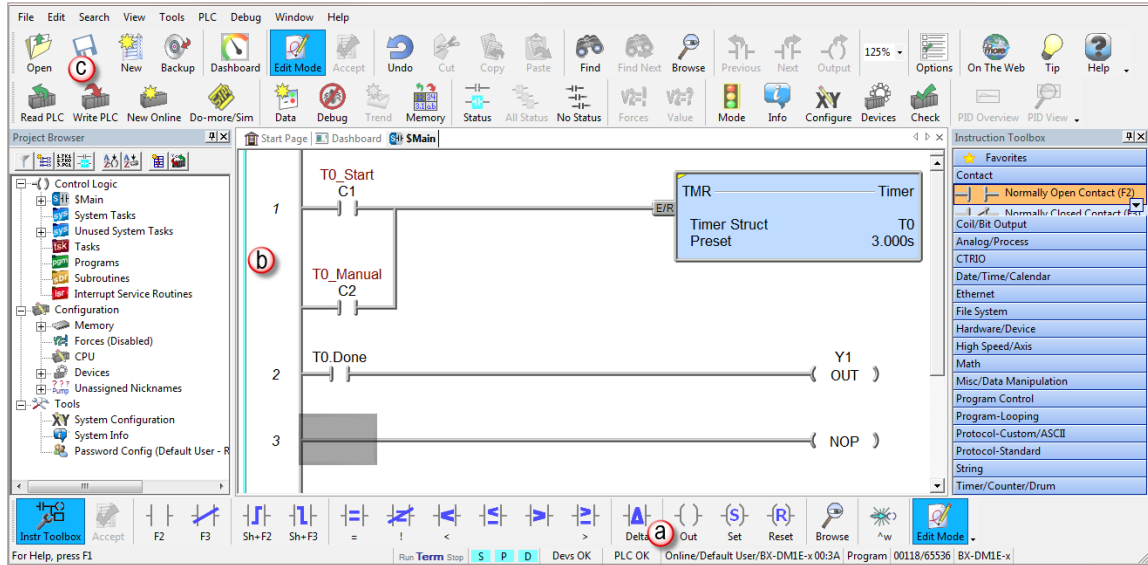
Save the project by selecting (a) **Save Project** from the *File* drop down menu (**Ctrl+S**), or save the file under a different name or in a different location by selecting the (b) **Save Project As** option. You can also save the project by selecting the (d) **SAVE** icon on the *Project Toolbar*.

Once you save the project, the green bar on the left side of the ladder will disappear and the cyan bar (c) will remain, meaning you have successfully saved the project to disk, but not yet downloaded to the MPU.

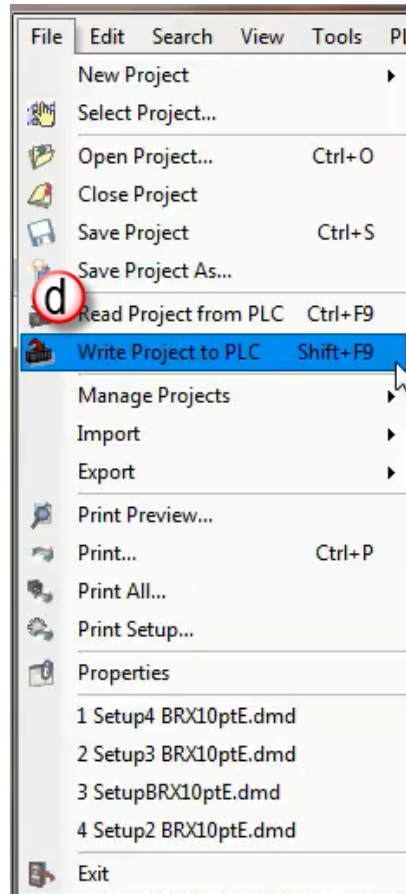


## Step 9: Write Project to the BRX MPU

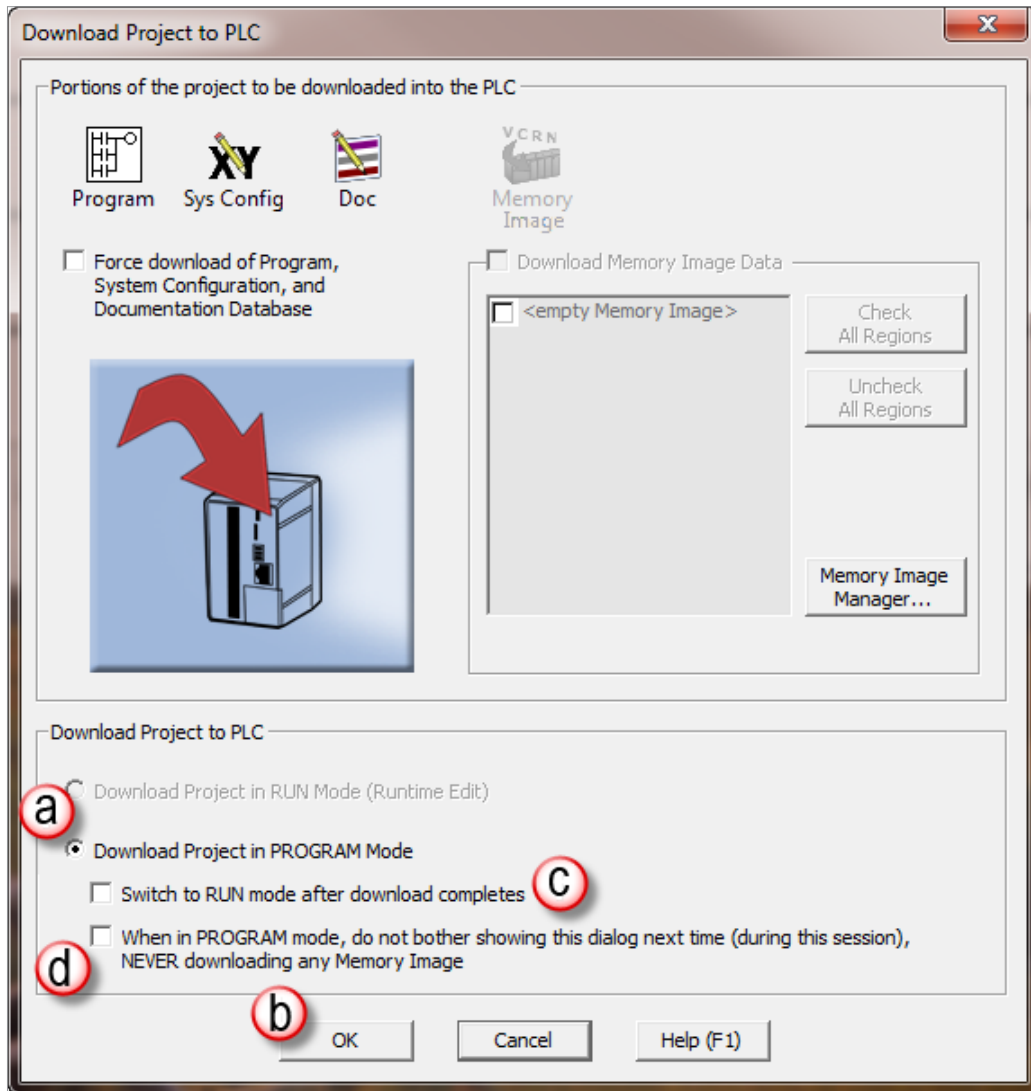
Now that you have created the example ladder logic program, you can write the program to the MPU. As a quick review, (a) check the status bar at the bottom of \$Main window to verify you are Online with the MPU. Also notice the (b) cyan bar to the left of the ladder logic program signifying that your project has been accepted, but not downloaded/written to the MPU.



There are several ways to write the project to the MPU. You can chose (c) **Write PLC** button from the Project Toolbar or select (d) **Write to PLC** from the *File* drop down menu (**Shift+F9**).



When the **Write PLC** button is selected and the MPU is in program mode, the *Download Project to PLC* pop-up window seen here appears.



When the BRX MPU is in (a) Program mode and you click on the (b) **OK** button, the project is written to the MPU. When the download is complete, the MPU remains in program mode. In this window, you can select (c) to switch the MPU to **RUN** mode after the download is complete.

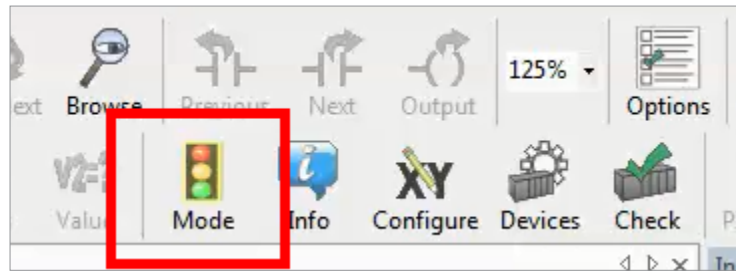
You can also select (d) not to display the *Download Project to PLC* window if the MPU is in program mode, keeping in mind that selecting this option will not download any Memory Image. Please view the Do-more! Designer HELP topics for details on the features available in the *Download Project to PLC* window.



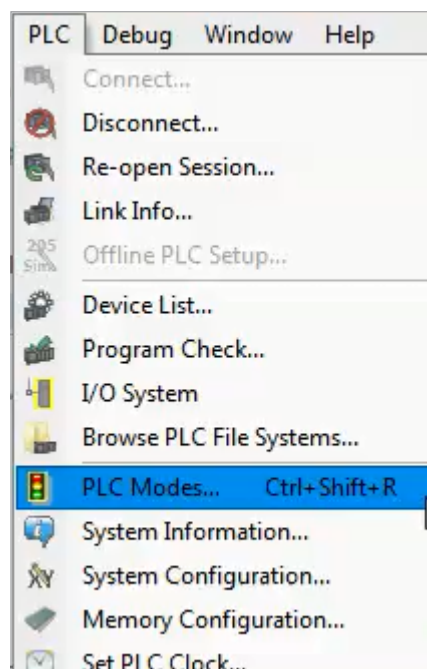
**NOTE:** It is good practice to verify that the process you are controlling can be interrupted before downloading a project to the MPU.

If you do not select the option to *Switch to RUN mode after the download completes*, you can switch to RUN mode manually several ways:

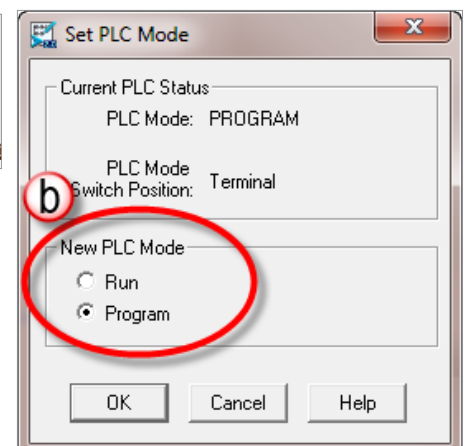
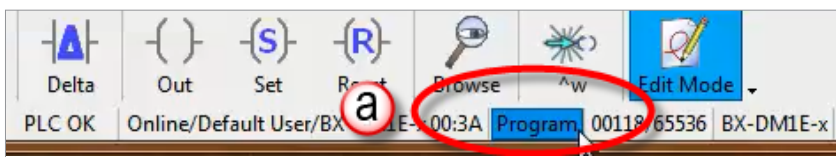
Click on the **MODE** icon on the Project Toolbar



Select PLC Modes from the PLC drop down menu or use the shortcut, **Ctrl+Shift+R**.



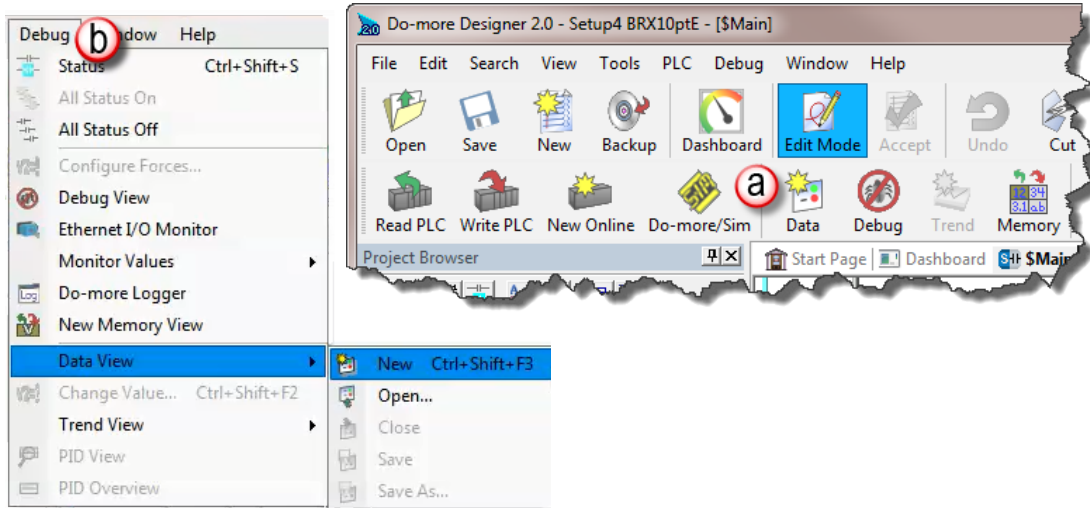
Click on (a) *Program* in the Status bar. This will bring up the *Select PLC Mode* pop-up where you can change the PLC mode by selecting the (b) **Run** radio button.



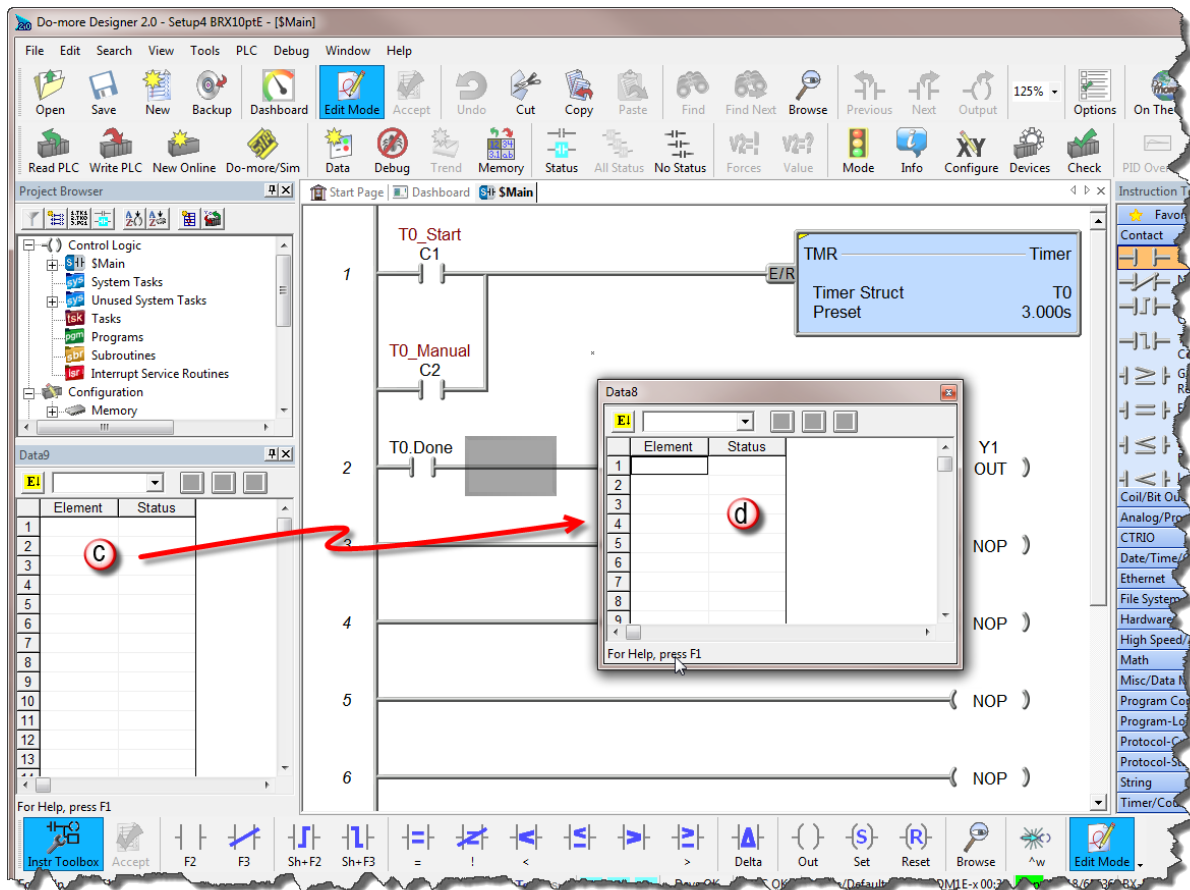
## Step 10: Testing Project Using Data View

With the project successfully downloaded to the MPU and the unit in RUN mode, you can now test the function of the ladder program using the Data View tool.

Start by opening a new *Data* window. To do this, click on the (a) **Data** icon on the Project Toolbar, or (b) select menu item **Debug > Data View > New (Ctrl+Shift+F3)**.

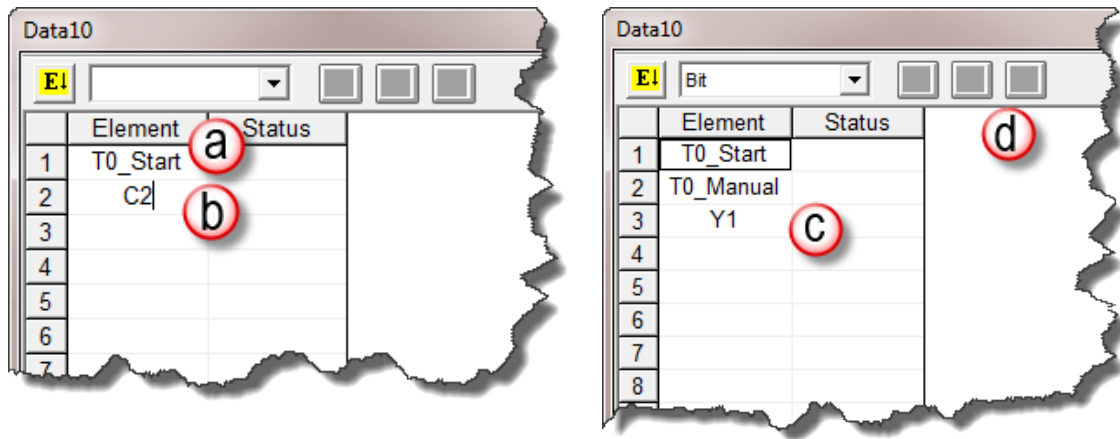


The *Data View* window shown below (c) will open. This window will open in the project browser section of the programming window but it can be (d) relocated anywhere on the screen by clicking the title bar and dragging it to a new location.

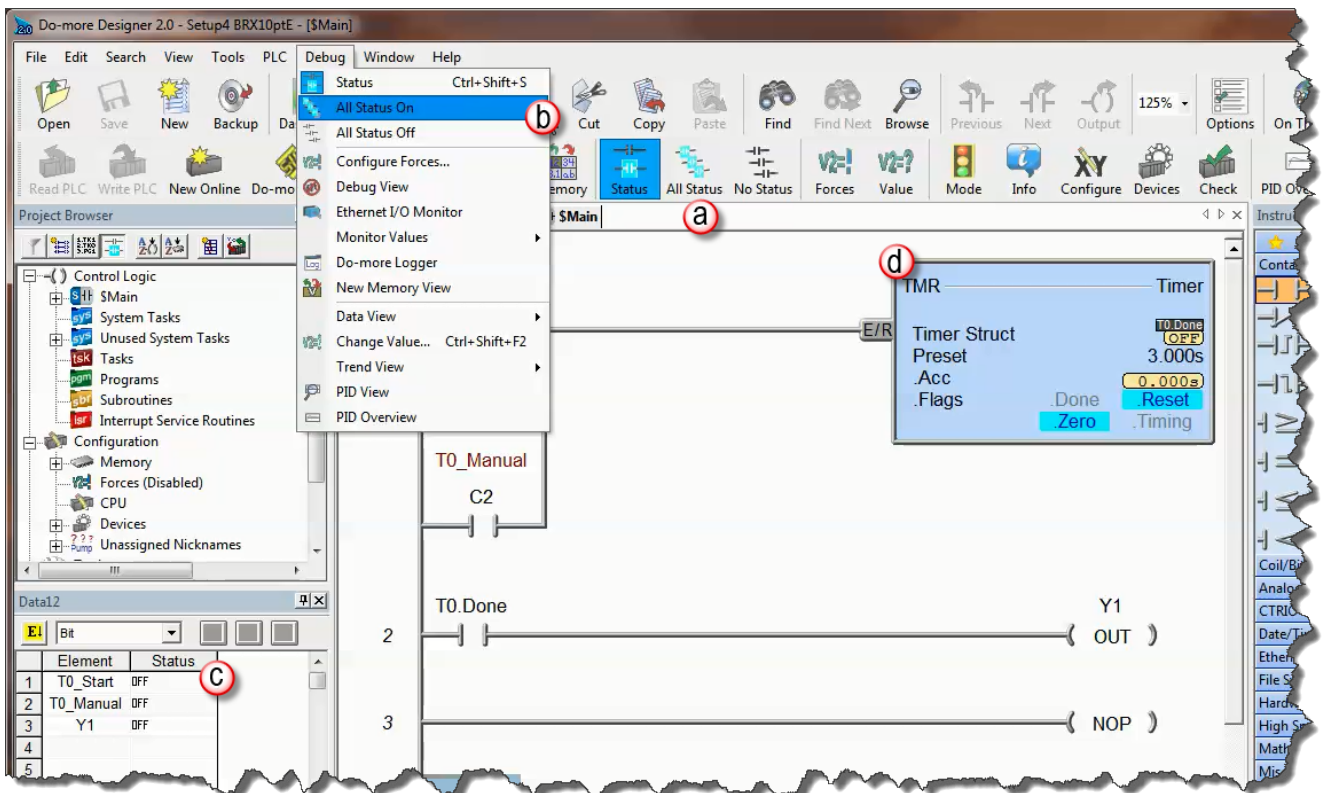




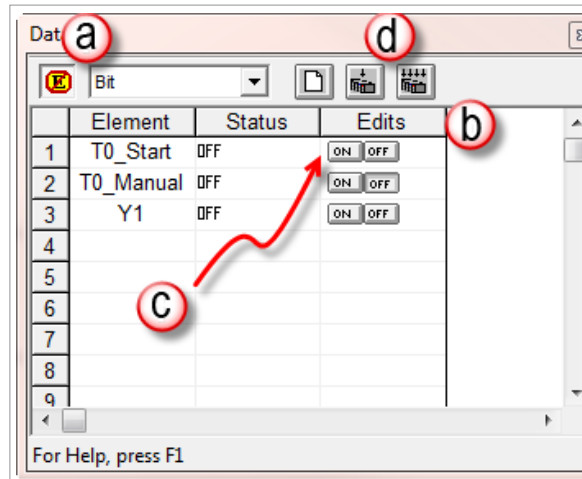
Now enter the elements that you wish to monitor. On line one type “C1” under the Element column and press Enter. You will see the C1 change to the (a) nickname associated with it, T0\_Start. On line two (b) type the element “C2” (T0\_Manual) and on line three (c) type “Y1”. Notice the three icons (d) at the top right in the data window are grayed out. This will change in the next step.



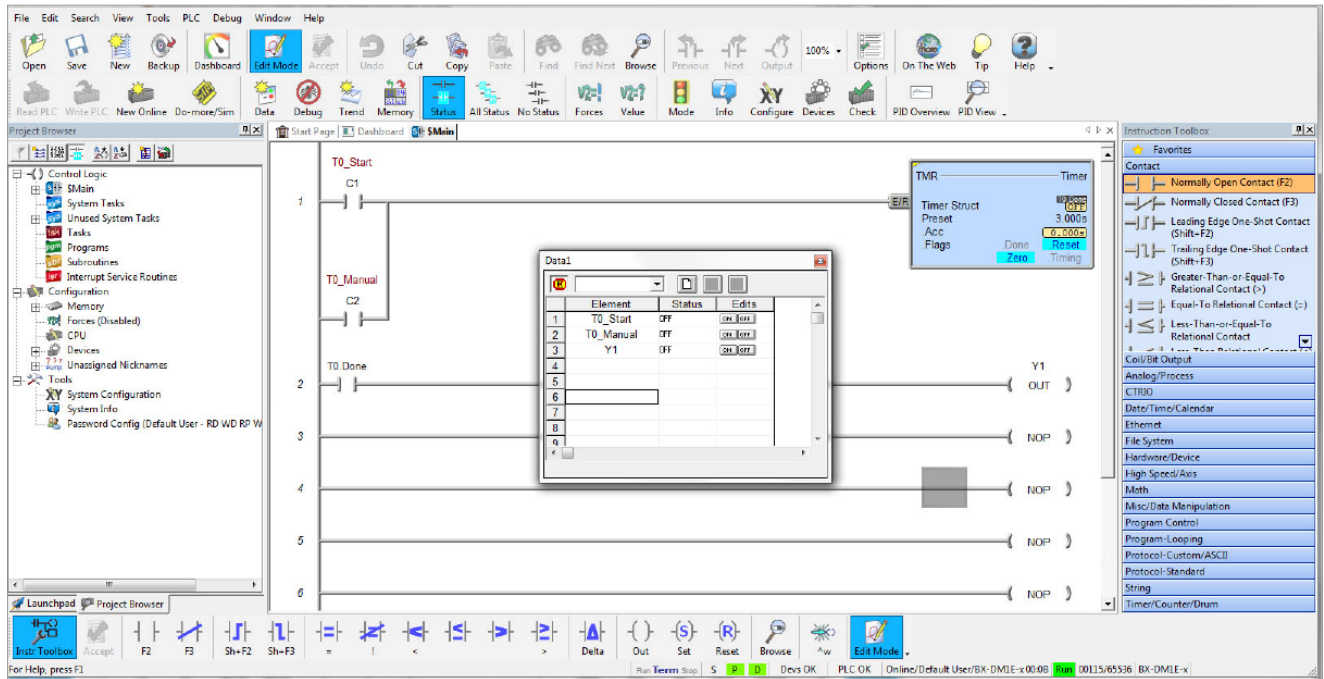
With the ladder elements entered into the Data View window, you now need to activate their status. To do so, (a) click the **All Status** icon on the Project Toolbar, or (b) select **Debug > All Status On**. The **All Status On** option will not only activate (c) the *Status* of the *Data View* window but also the status of the (d) ladder program as seen below. The timer structure now shows the status of its structure elements, including the accumulated value.



The next step is to enable edits within the Data View window. To do this, click the (a) yellow box with the E found in the top left corner of the *Data View* window. The (b) Edits column is now added to the *Data View* window.

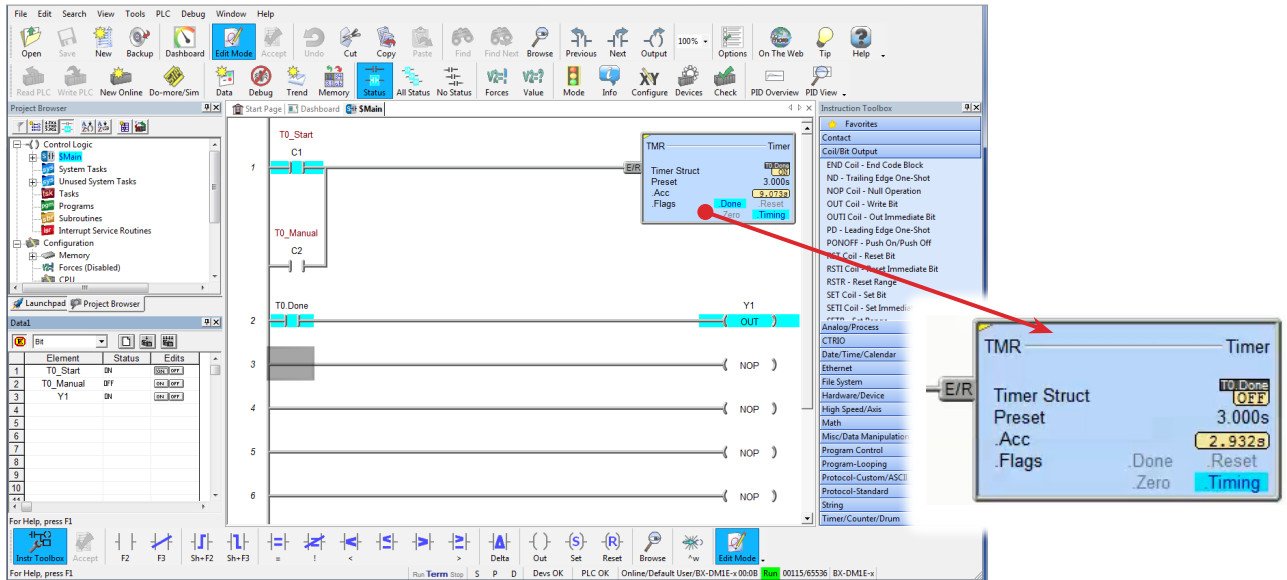


The Edits column allows you to make changes to the current values of the elements listed. T0\_Start's current value is OFF. Double-click the (c) ON button under the Edits column. The (d) **Write Current Edit** and the **Writes All Edits** buttons will appear at the top of the window. The buttons will write individual or all edits, respectively, made in the *Data View* window to the MPU.



Click the **Write Current Edit** to PLC button and confirm it. This will write the new value to T0\_Start. Once T0\_Start changes to an ON state, the timer (T0) will begin to time and quickly reach the preset. As soon as the preset has been met the done bit, T0.Done, will turn ON causing output Y1 to also turn ON, as seen on the following page. Now write an OFF to T0\_Start and watch as the timer and Y1 reset.

With *All Status* ON, you can view instruction information in the ladder view (below). For example, on the TMR instruction you can see the actual accumulated time while the timer is on, and when the timer is done, to mention a few.



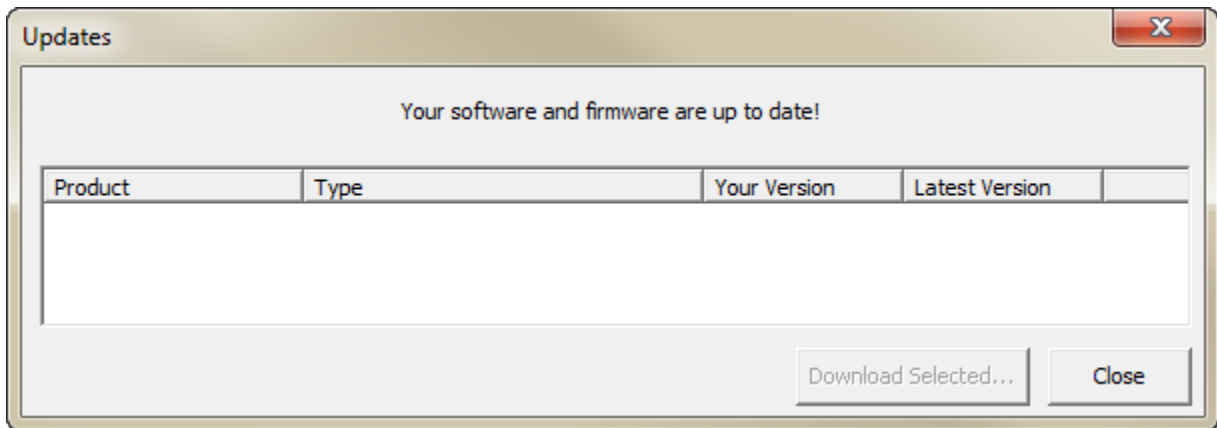
Congratulations, you have now programmed, downloaded, and tested a ladder logic program for the BRX Do-more! MPU. Feel free to experiment with a program of your own and please remember that the software Help file is an essential tool to use when programming your controller.

## Do-more! Designer Software and Firmware Updates

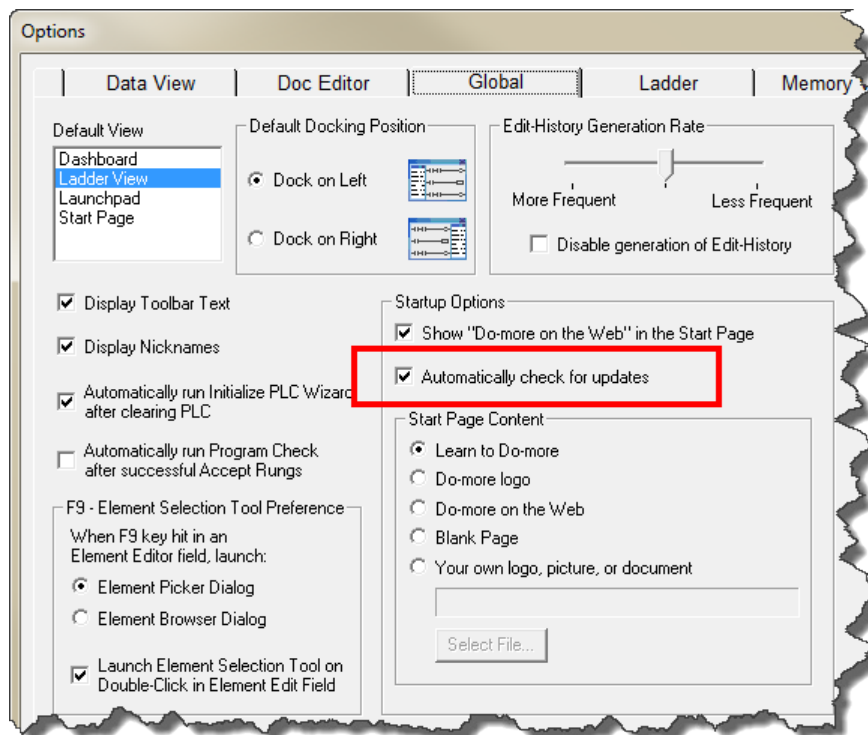
There will be times when an update is available for the BRX firmware or the Do-more! Designer programming software. The Do-more! Designer software makes it very easy to download the updated files.

By default, checking for updates is done automatically each time Do-more! Designer is started. Do-more! Designer will check for updates to the programming software, the Help file content, Start Page content, new firmware for BRX Do-more! and Do-more! controllers and new firmware for CTRIO(2) modules. An Internet connection is required to perform the check and to download the updates.

When updates are available, the user is notified through this dialog:

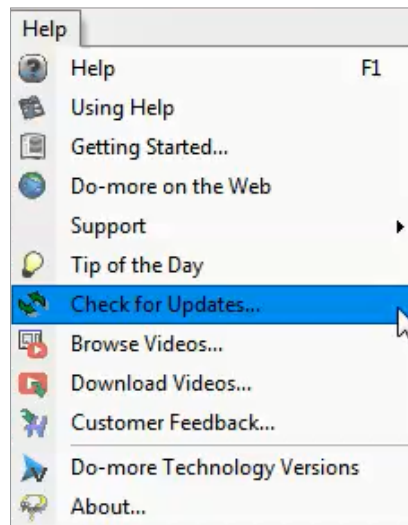


The automatic check can be disabled by opening the **View -> Options** menu, select the Global tab and uncheck the **Automatically Check for Updates on Startup** selection.



To manually check for software or firmware updates, go to **HELP -> Check for Updates**.

Do-more! Designer Help Topic DMD0310 provides detailed information on downloading the programming software updates, firmware updates, Do-more! Designer Help System updates, and HTML/Documentation updates.



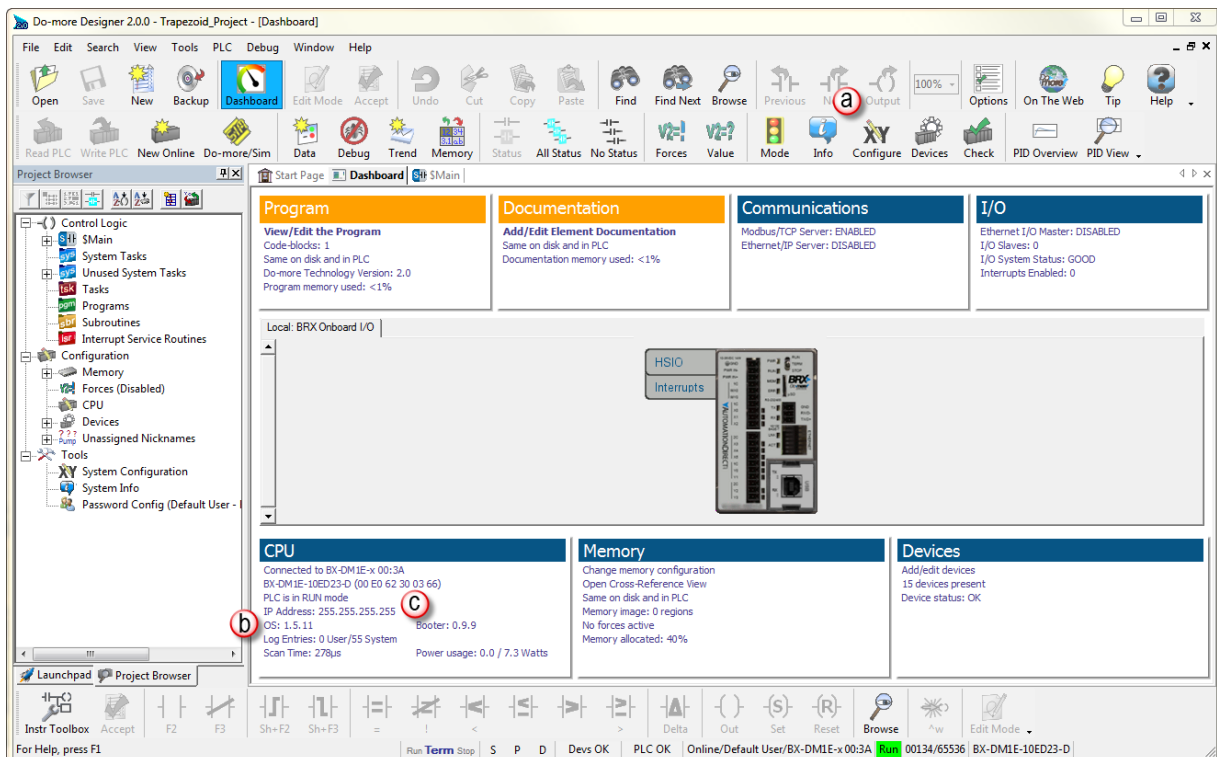
## Updating the Firmware



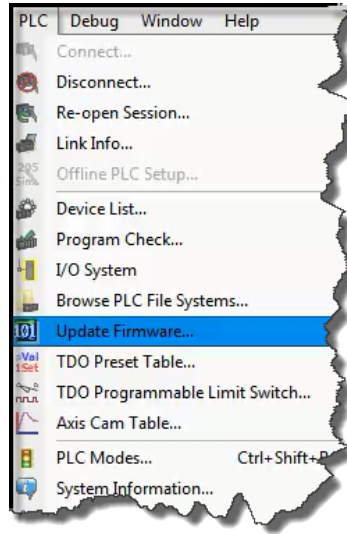
**NOTE:** Downloading the firmware files does not automatically update the firmware of the connected BRX PLC. You must use the available tools to update the Operating System and the Gate Array and Loader. The available tools will indicate when the firmware is not up to date in the controller.

There are three ways to access the dialogs needed to update the Operating System and the Booter/Loader.

The first method is by using the (a) Info icon on the online toolbar. A second method is by selecting the (b) OS or (c) Booter links under the CPU section of the Dashboard.

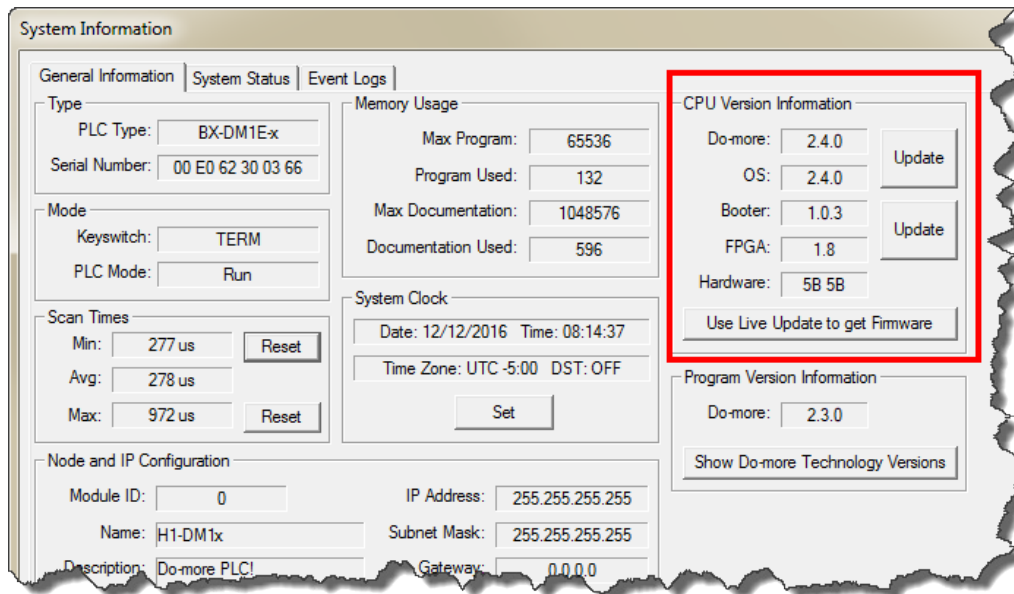


The third method is through the menu, PLC -> Update Firmware.



When you select the Info icon on the online toolbar, the System Information utility (below) comes up. To update the controller firmware, use the section under CPU Version Information.

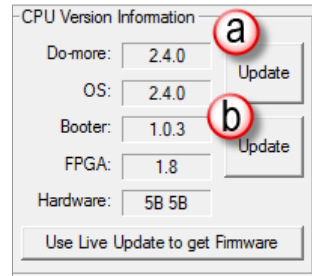
The CPU section displays the following information:



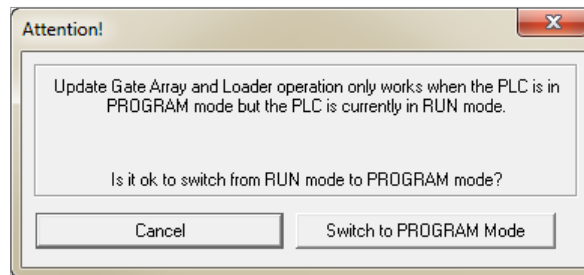
- Do-more!: The current version of the instruction set in the controller.
- OS: The current version of the operation system in the controller.
- Booter: The current version of boot loader in the controller.
- FPGA: The current version of the Gate Array code in the controller.
- Hardware: The current revision of the controller hardware.



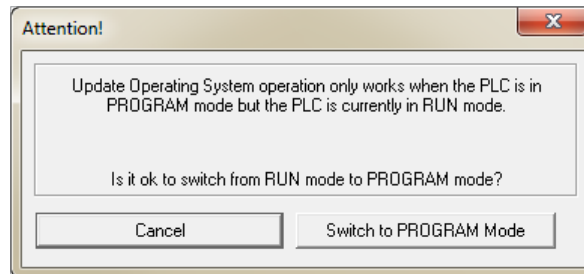
**NOTE:** An Asterisk (\*) next to any of the numbers means that there is an update available for that particular portion of the firmware.



Click the **Update** button (a) adjacent to the *Do-more & OS* display to open the *Update Operating System* dialog.



Click the **Update** button (b) adjacent to the *Booter & FPGA* display to open the *Update Gate Array and Loader* dialog.

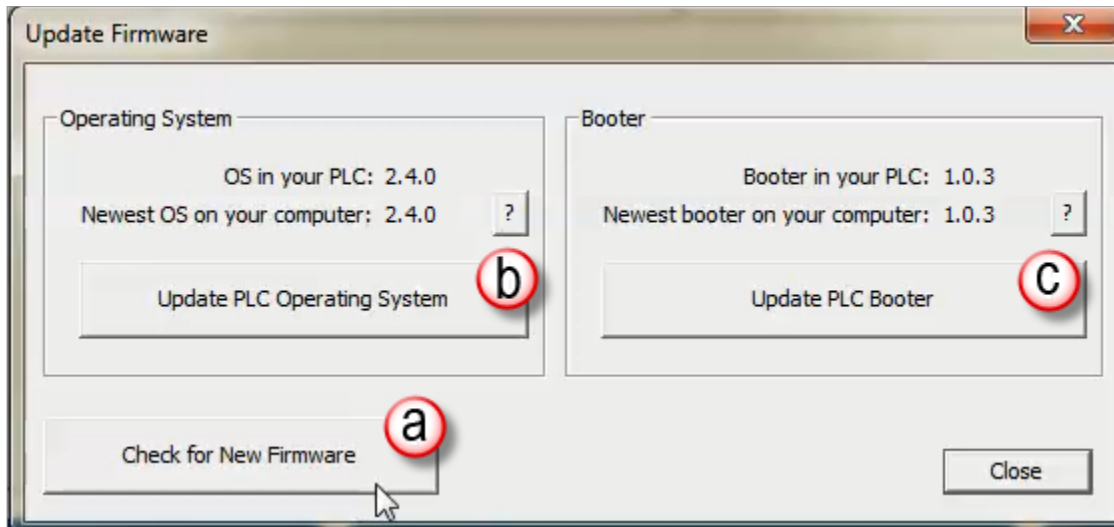


**NOTE:** If both the *Booter* and *OS* need updating, it is recommended to do both updates, starting with the *OS*.



**NOTE:** DIP switch #3 (on MPU) is used to Enable/Disable the ability to update the firmware in the controller. This DIP switch must be OFF to allow Do-more! Designer to update the operating system or the gate array. Please review Do-more! Designer Help topic DMD0266 for information on the on-board dipswitches.

The dialog shown below is displayed when you use the OS or Booter link under the CPU section of the Dashboard or you use the menu **PLC -> Update Firmware**.



The *Update Firmware* dialog has the necessary tools to download new firmware files from the Web and update the connected Do-more! CPU.

The *Operating System* and *Booter* sections show the version currently running in the attached Do-more! CPU and the latest versions of the firmware and boot loader files that have been downloaded to this PC.

Click (a) **Check for New Firmware**. The *Live Update* tool comes up, which allows you to see if there is a newer firmware available, and if so to download the updated files. The *Live Update* tool is discussed later in this chapter.

Clicking (b) **Update PLC Operating System** opens the *Update Operating System* dialog that shows detailed information about the attached CPU's operating system and Do-more! Technology versions and selects the latest Operating System firmware file based on the connected Do-more! CPU. The *Update Operating System* dialog is discussed later in this chapter.

Clicking (c) **Update PLC Booter** opens the *Update Gate Array and Loader* dialog that shows detailed information about the attached CPU's Gate Array and Boot Loader versions and selects the latest Boot Loader firmware file based on the connected Do-more! CPU. The *Update Gate Array and Loader* dialog is discussed later in this chapter.



**NOTE:** If both the Booter and OS need updating, it is recommended to do both updates, starting with the OS.

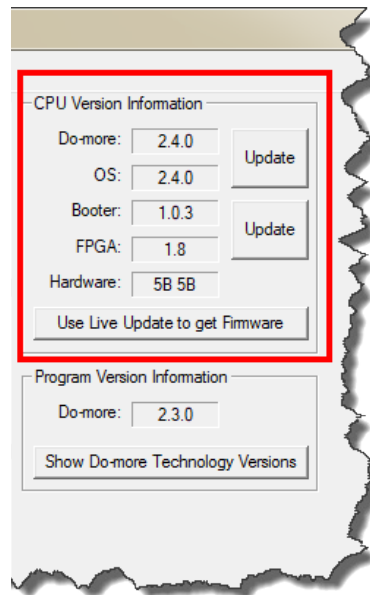


## Live Update

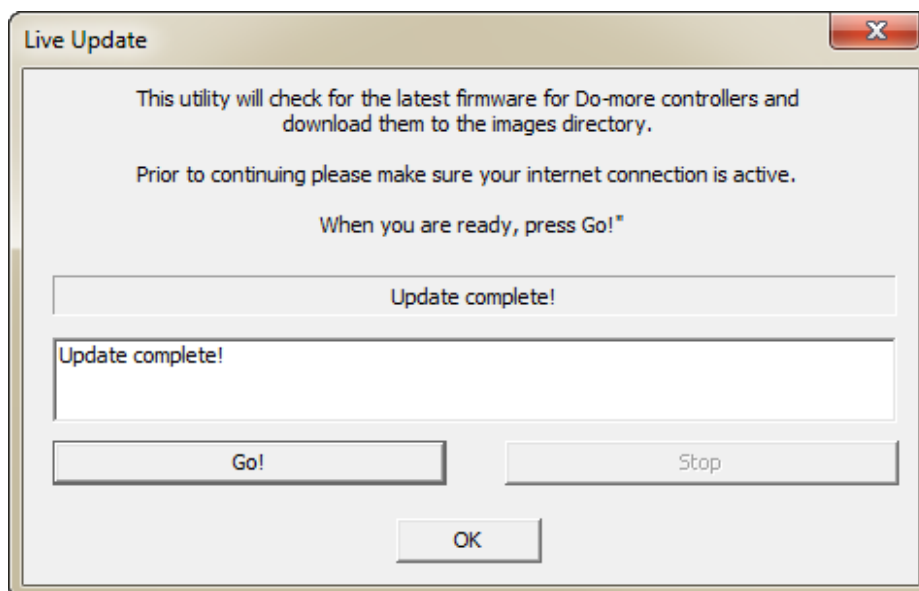


**NOTE:** DIP switch #3 (on MPU) is used to Enable/Disable the ability to update the firmware in the controller. This DIP switch must be OFF to allow Do-more! Designer to update the operating system or the gate array. Please review Do-more! Designer Help topic DMD0266 for information on the on-board dipswitches.

Click the **Use Live Update to get Firmware** button to open the *Live Update* dialog. Live Update will utilize the Internet connection to check for new firmware files for the Do-more! controllers and the CTRIO modules, then download any new files to the appropriate Bin\Images\< Device > folders.



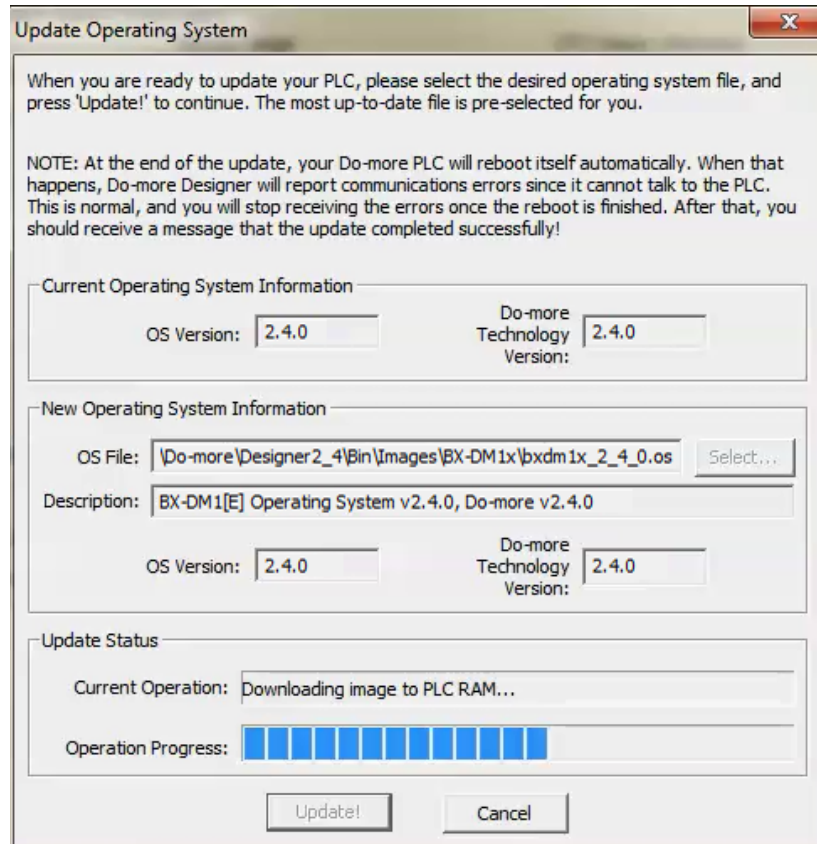
Click the **Go!** button to check for updated firmware files. Click the **OK** button to close the *Live Update* dialog.



**NOTE:** Live Update requires a functional Internet connection to work. Make sure the Internet connection is active before running Live Update.

## Update Operating System

When the dialog opens it will read the OS Version and Do-more! versions from the currently connected controller, and from the latest operating system firmware file.



### Current Operating System Information

*OS Version* - the current version of the operation system in the controller

*Do-more Technology Version* - the current version of the instruction set in the controller

### New Operating System Information

*OS File* - the most up-to-date operating system firmware file in the default firmware folder

**Select** - opens a File Open dialog to select an operating system firmware file. Operating System firmware files typically have the following form: “H2DM1x\_<major>\_<minor>\_<build>.os”

*Description* - the current version information from the selected file

*OS Version* - the current version of the operation system in the selected file

*Do-more Technology Version* - the current version of the instruction set in the selected file

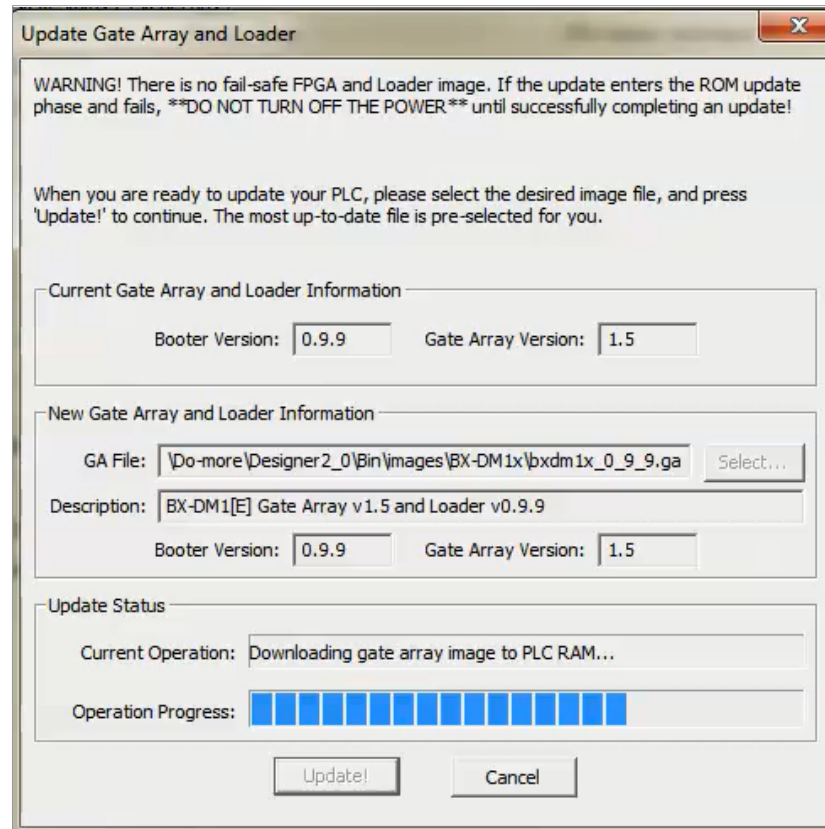
Click the **Update!** button to begin the update progress. The last phase of updating the operating system is a reboot of the Do-more! controller. While the controller is rebooting, the normal communication updates will fail, and the Link indicator on the Status bar will turn red. Once the controller has successfully rebooted, normal communication updates will automatically resume, and the Link indicator will return to normal.

Click the **Cancel** button to exit without updating the operating system.

## Update Gate Array and Loader



**WARNING:** There is no fail-safe for the Gate Array and Loader update, which means, if the update process begins and then fails, **\*\* DO NOT TURN OFF THE POWER\*\***, keep trying the update process until it is successful. If you turn off the power without a successful update the controller must be sent back to the factory for repair (use the 'H/W Repair (RMA)' link at [www.hosteng.com](http://www.hosteng.com) to request an RMA number for a Do-more! CPU that fails to update the Gate Array and Loader).



When the dialog opens it will read the Gate Array Version and Boot Loader version from the currently connected controller and from the latest Gate Array firmware file.

### Current Gate Array and Loader Information

*Booter Version* - the current version of Boot Loader in the controller

*Gate Array Version* - the current version of the Gate Array code in the controller

### New Gate Array and Loader Information

*GA File* - the most up-to-date Gate Array firmware file in the default firmware folder

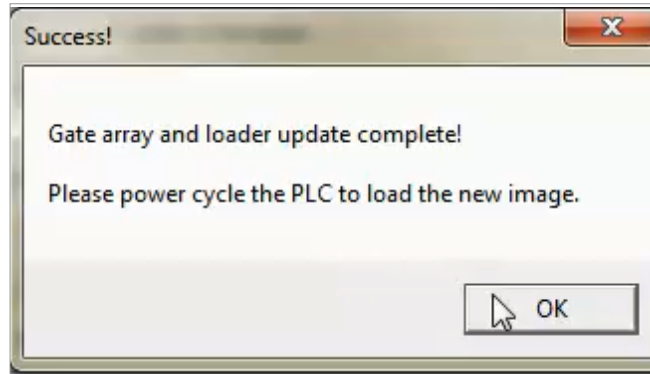
**Select** - opens a File Open dialog to select a Gate Array firmware file. Gate Array files firmware file typically have the following form: “H2DM1x\_<major>\_<minor>\_<build>.ga”

*Description* - the current version information from the selected file

*Booter Version* - the current version of Boot Loader in the selected file

*Gate Array Version* - the current version of the Gate Array code in the selected file

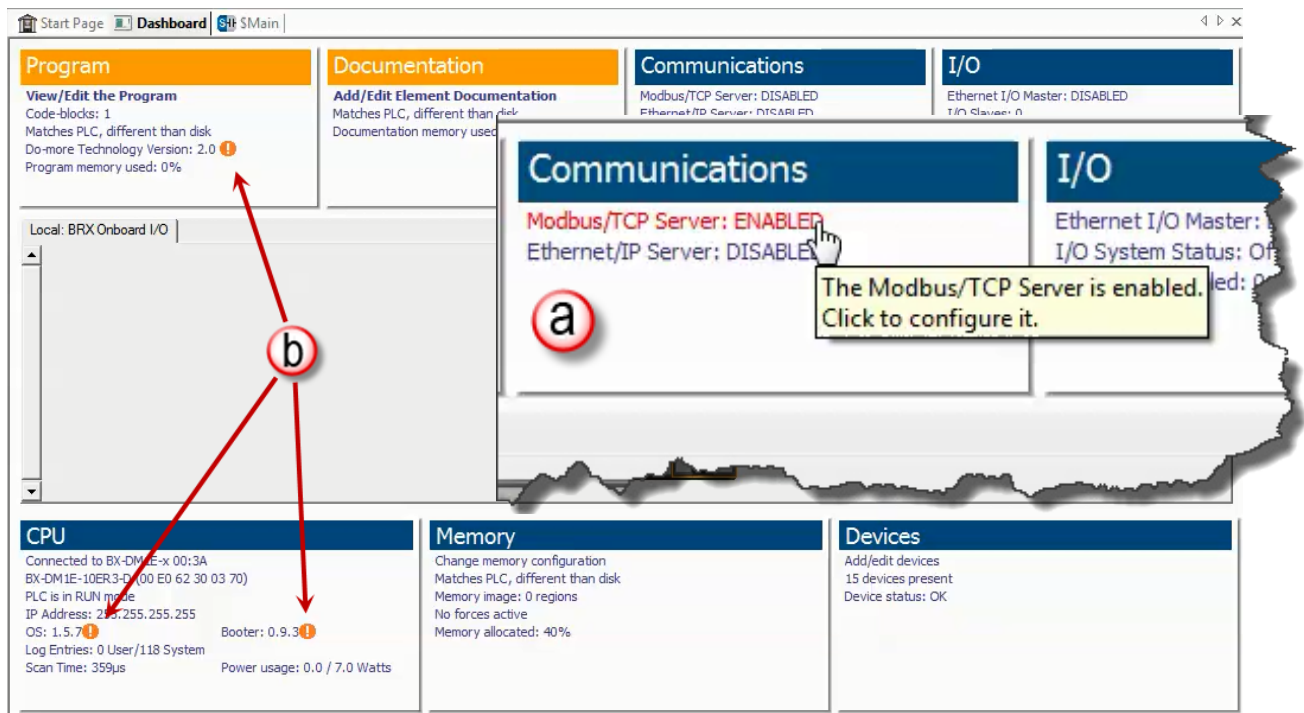
Click the **Update!** button to begin the update progress. When the Gate Array and Loader update is complete, you will see the following window with instructions to power cycle the PLC.



Click the **Cancel** (previous graphic) button to exit without updating the Gate Array and Loader.

## Dashboard

The Do-more! Designer Dashboard is a graphical representation of the PLC system. It is used to assist in the configuration of the various components of the system as well as for monitoring and troubleshooting after it is up and running. The following pages will be a quick overview on how to use the Dashboard. Please reference Do-more! Designer Help topic DMD0415 for more detailed information.



The dashboard is divided horizontally into three sections, top, center and bottom sections. The top and bottom sections consist of distinct panes each of which contain related items with current status of each. These entries (a) are also mouse-over links; as you move your mouse over an entry it will highlight in red and a pop-up text box will appear with more detailed information. Left click a link to open a dialog that addresses the configuration of that entry, or opens a monitor tool for that entry.

Entries (b) that have an orange (!) next to them indicate items that need your attention. For example, an orange (!) adjacent to the “OS: x.y.z” item in the CPU section indicates the firmware in the CPU is older than the firmware you have downloaded to this PC. Click the link to open the firmware update tool.

Some entries will have their text displayed with a yellow background to indicate the item is generating a warning message that may need your attention. For example, if you have Forces enabled and one or more items are currently being Forced to a value, the Memory section will display the “x forces active” text with a yellow background. Click this link to open the Configure Forces dialog to see what elements are being forced.

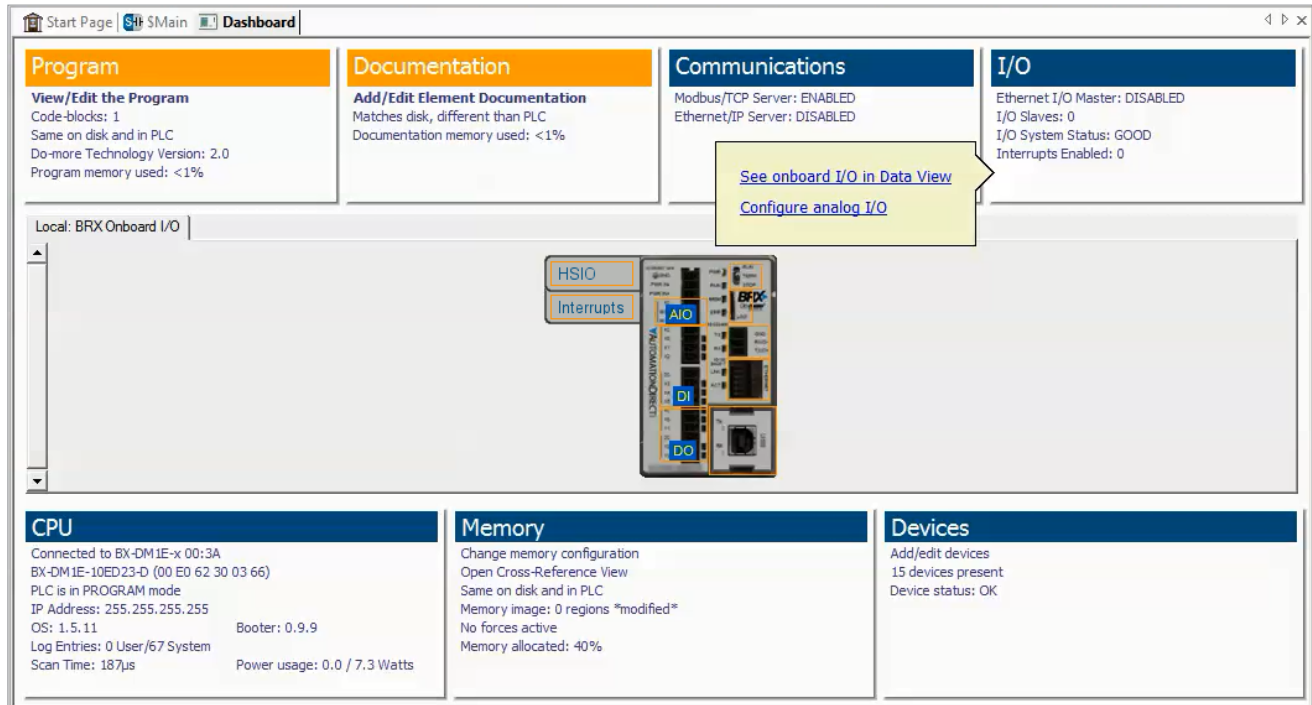
Some entries will have their text displayed with a red background to indicate the item is generating a warning message that may need your attention. For example, if an I/O module is reporting an error, the I/O section will display the “I/O System Status” text with a red background. Click this link to open the I/O System View to see an overview of the entire I/O system and locate the module that is reporting an error.

The center section contains a series of tabbed (a) graphical representations of the PLC system components. The leftmost (top) selection is the local CPU. There is an additional tab created for each Ethernet Remote I/O Slave. Any time the mouse cursor is in the center section (b) orange outlines (known as hotspots) will appear on the sections of the PLC system to indicate there is status information available for that area or configuration that can be performed.

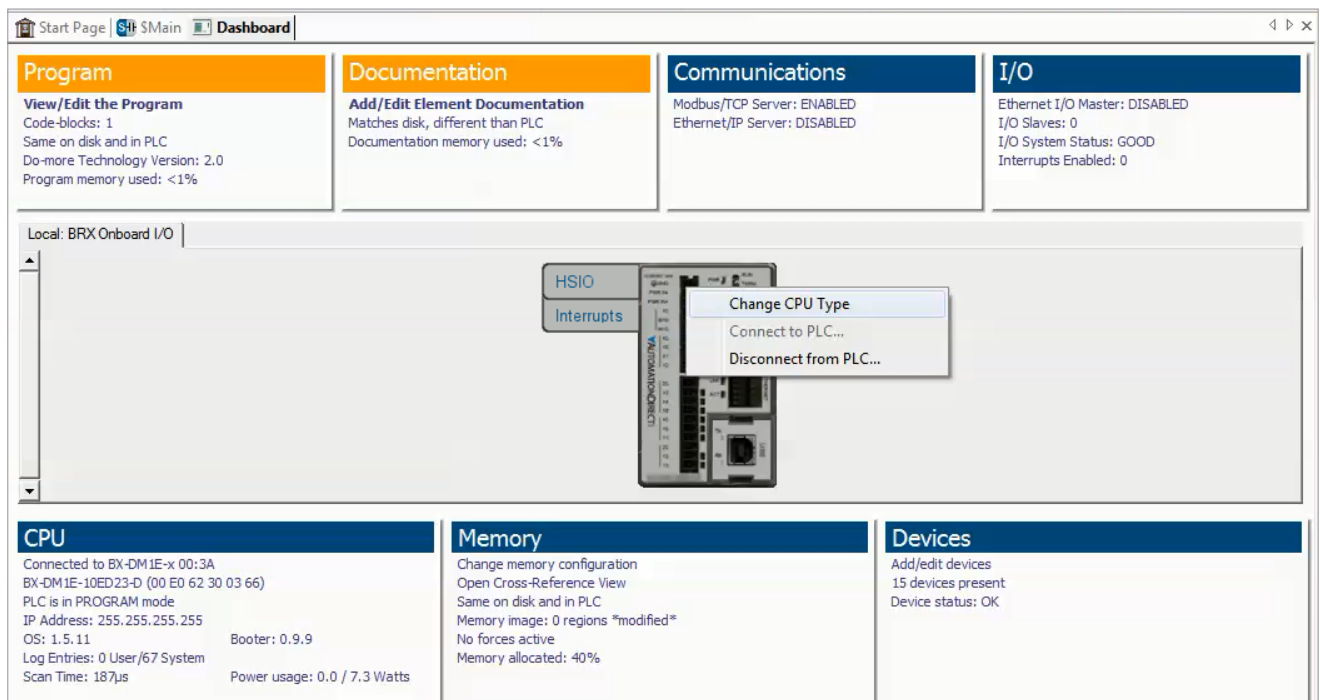
Hovering the mouse cursor over any of the hot spots will display a popup that shows the current status of the item in that hotspot. For example, hovering over the DI hotspot (c) will display information on the response times configured for the discrete inputs and, if the unit supports high speed inputs, it will display how the high speed Counter/Timer functions are configured.

The screenshot displays the Do-more! Designer software interface. At the top, there are navigation tabs for 'Start Page', 'Main', and 'Dashboard'. Below this, there are four main panels: 'Program', 'Documentation', 'Communications', and 'I/O'. The 'Program' panel shows 'View/Edit the Program' with details like 'Code-blocks: 1' and 'Program memory used: <1%'. The 'Documentation' panel shows 'Add/Edit Element Documentation' with 'Documentation memory used: <1%'. The 'Communications' panel shows 'Modbus/TCP Server: ENABLED' and 'Ethernet/IP Server: DISABLED'. The 'I/O' panel shows 'Ethernet I/O Master: DISABLED', 'I/O Slaves: 0', and 'I/O System Status: GOOD'. Below these panels is a central graphical representation of the PLC system components, including 'Local: BRX Onboard I/O', 'HSIO', 'Interrupts', and 'AIO'. A popup window is open over the 'Discrete Inputs' section, showing 'Response times' for five inputs (all disabled) and 'High-Speed Counter/Timer Functions' (all disabled). The 'CPU' panel at the bottom left shows 'Connected to BX-DM1E-x 00:3A', 'PLC is in PROGRAM mode', and 'OS: 1.5.11'. The 'Memory' panel at the bottom center shows 'Change memory configuration', 'Open Cross-Reference View', and 'Memory allocated: 40%'. The 'I/O Devices' panel at the bottom right shows 'edit devices', 'devices present', and 'device status: OK'.

Left-clicking on the hot spot will display a popup menu that contains links specific to the configuration tools and information displays for that item. For example, left clicking on the AIO (analog I/O) hotspot, displays links to view onboard analog I/O values in Data View and a link to configure the analog I/O, as shown below.



Right-clicking on the MPU or an expansion module will display a list of operations that can be performed on that module. For example, right-clicking on the MPU (below) gives the option to Change CPU Type, Connect to PLC, or Disconnect from PLC. The options will vary depending on the MPU family and module type.



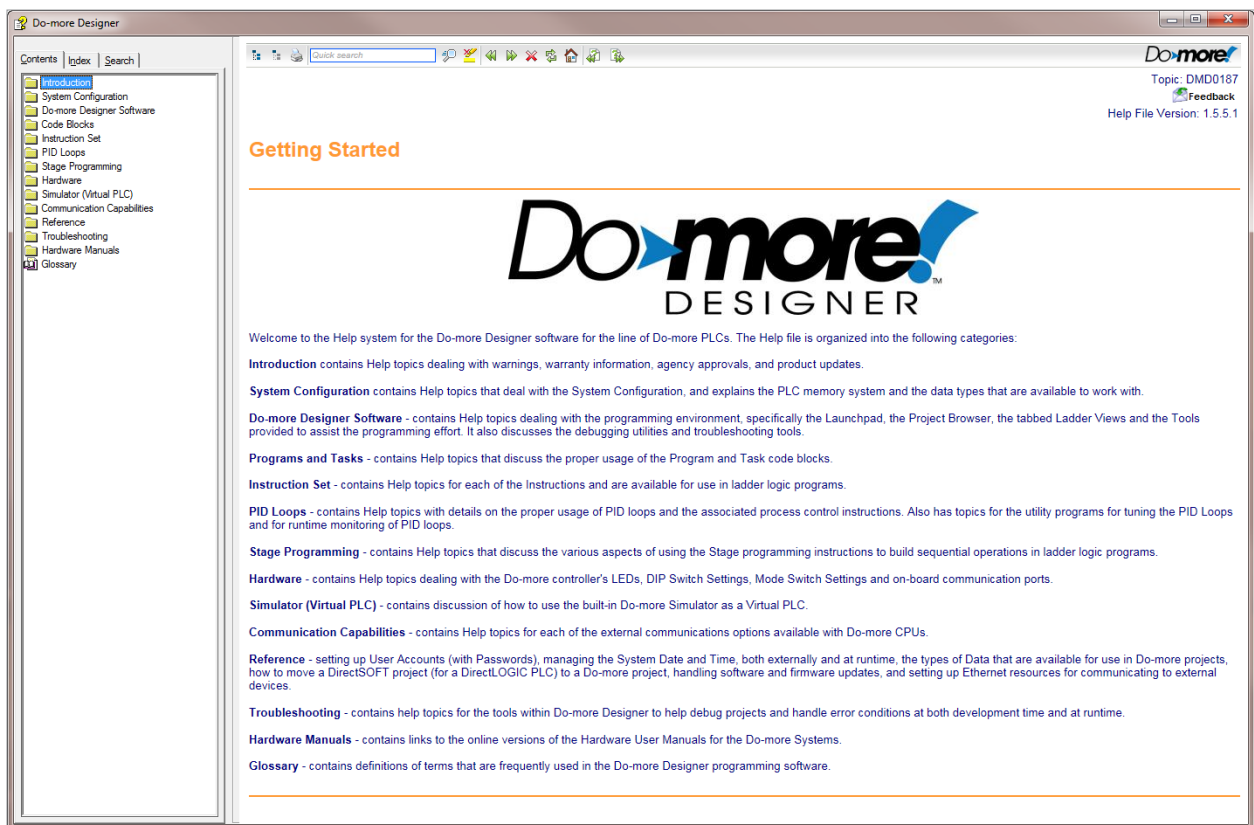
# Help File

## Accessing the Help File

The software Help file is available as a quick reference or detailed guide to the many features and capabilities of the Do-more! Designer software. This provides comprehensive support for you as a user of not only the BRX Platform but also the whole Do-more! product family.

There are three ways to access the Help File:

1. Select the Help File icon from the Project Toolbar.
2. Choose Help from the Help menu drop down.
3. Use the shortcut **F1** or press the(?) button or the Help button on the dialog that you need help with.



Notes: