BRX Do-more! Designer Getting Started

In This Chapter...

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 your program design without requiring any additional external hardware. This will help to reduce programming errors prior to critical live application startups.

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! 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 chapter 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.

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Before You Begin...

Wiring Tools and Hardware

The tools and hardware shown below may be required to connect your power supply to your BRX MPU

**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 (built-in), just connect a cable
- Serial port: Using the 3-pin serial connection on the MPU

Ethernet Cable

Serial Cable
ZL-DB9F-CBL-2P

POM Slot Programming Options
- USB POM and cable assembly(below)
- Ethernet POM and cable (right)
- RS-232 serial POM (RJ12 or 3-pin) (lower right)

Ethernet POM Module with Cable

BX-PGM-CBL Programming Cable Assembly

RS-232 Serial POM (RJ12) Module with Cable

RS-232 Serial POM (3-pin) Module with Cable

BRX Do-more! Designer System Requirements

Do-more! Designer Windows-based programming software (CD-ROM or web download) works with a variety of Windows® operating systems listed below.

Do-more! Designer software can connect to the BRX system using one of the following specifications. More detailed specifications and options are listed later in this chapter.

BRX Do-more is compatible with any of these PC operating systems:

- Windows® 10
- Windows® 8.1 - 64 bit
- Windows® 8.1 - 32 bit
- Windows® 8 - 64 bit
- Windows® 8 - 32 bit
- Windows® 7 - 64 bit
- Windows® 7 - 32 bit
- Windows® Vista - 64 bit
- Windows® Vista - 32 bit

Hardware Requirements:

- HD Space: 140Mb
- Video: 1024x768 256 color (1280x720 true color recommended)
- 1GHz , single core CPU (2GHz, multi-core recommended)
- 1GB RAM (3GB recommended)
- Other: Windows® 8 RT Edition is not supported.

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

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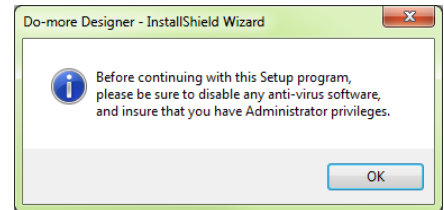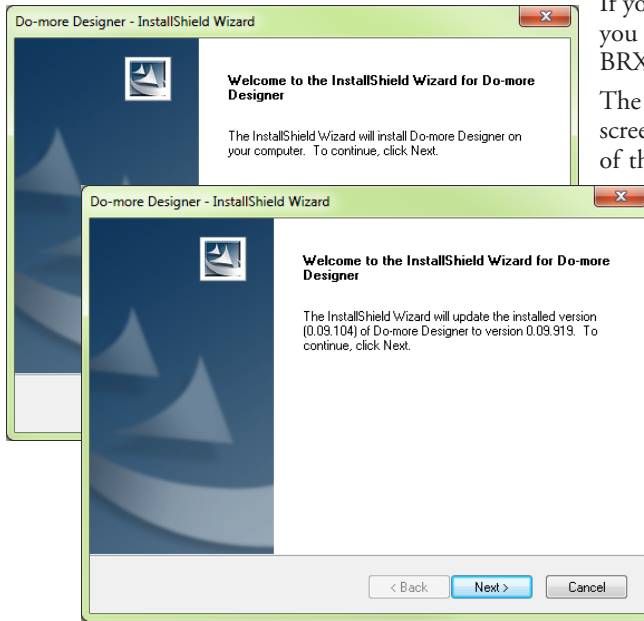
The *License Agreement* window will be displayed next. Read over the agreement, select **I accept the terms of the license agreement** and click the **Next** button to continue.

The license agreement may be printed if desired. The **Print** function will print a pdf of the **License Agreement** document to your default printer.
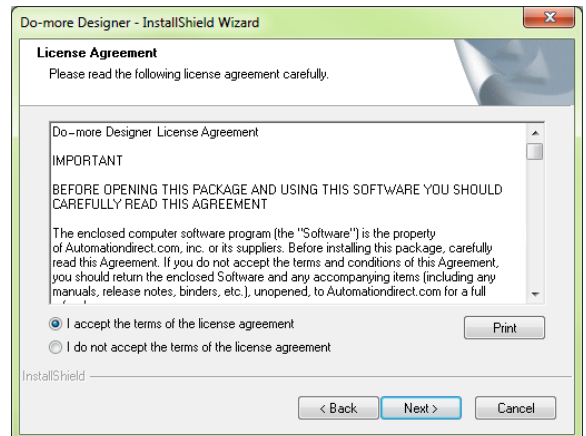
At this point the software will ask a little about you. Please fill in the user information requested on the *Customer Information* screen and click **Next** to continue.

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**.
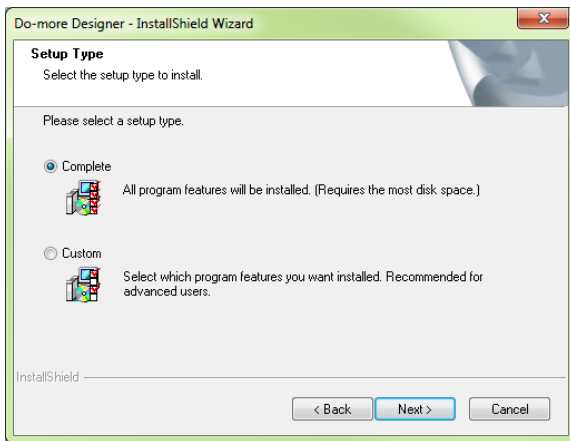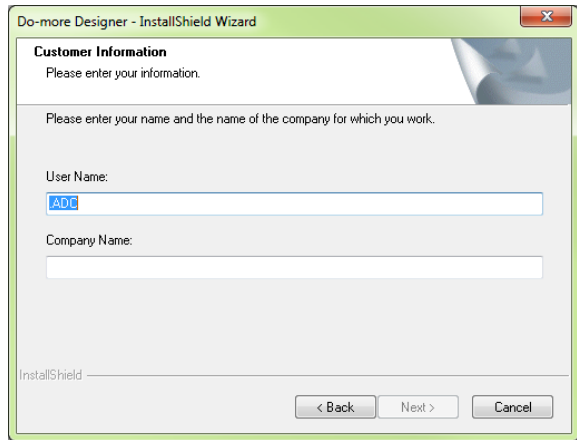
Custom installation allows you to choose which program features to install, whereas **Complete** installation installs all of the program features available. The **Complete** installation is selected by default and is recommended for first-time users and for purposes of this primer. Click **Next** to 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.

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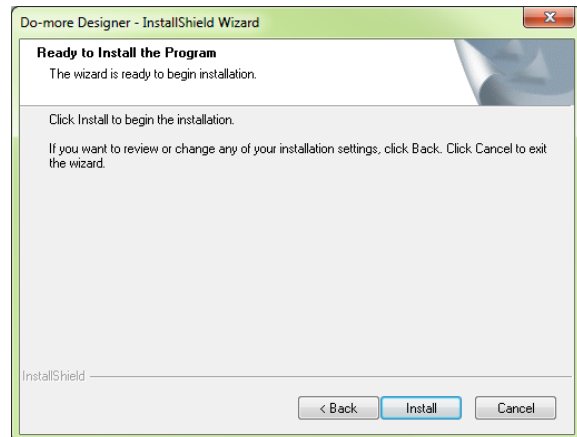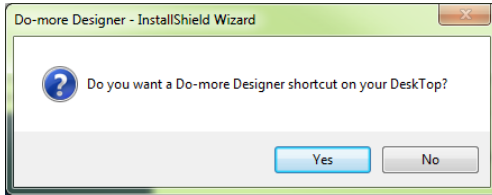
The pop-up shown here will allow you to choose to install a Do-more! Designer software desktop shortcut on your PC. Click **Yes** or **No** and continue with the installation.
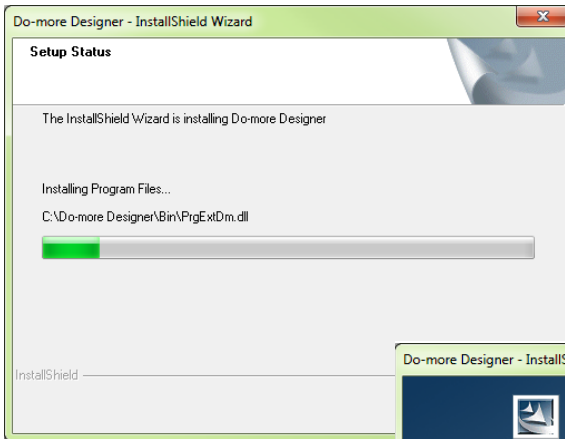
The software will now install the needed folders and files while the *Setup Status* window displays the installation progress status.

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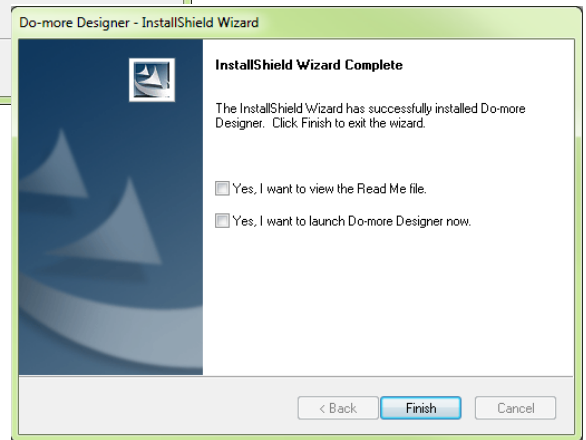
NOTE: *By default the* **Read Me File** *and* **Launch Do-more! Designer now** *boxes are checked. Un-check either box should you choose not to view the Read Me file and not launch the software at this time.*

Step 2: Launch the Do-more! Designer Software

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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.*

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.

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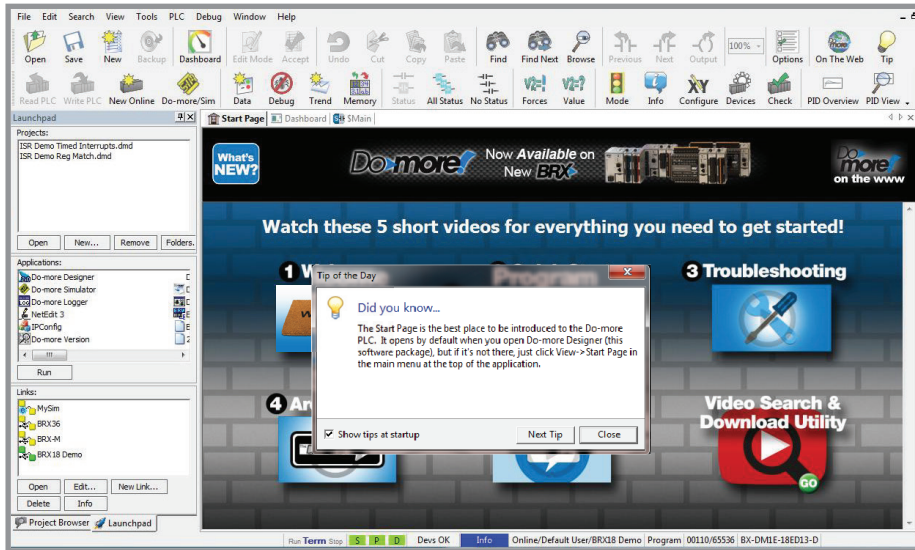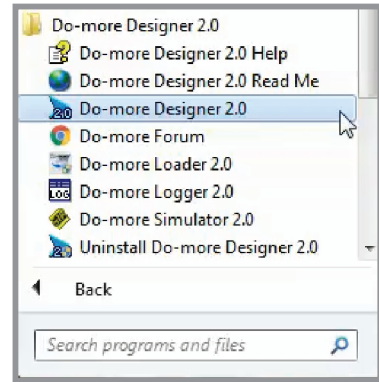
When the **Close** button on the *Tip of the Day* pop-up is pressed, the *Select Project* window comes up. Here you will select which project to work with - New Offline Project, New Online Project, or Browse (for a project not listed). If you have worked on current projects, they will appear below in the *Recent Project* list. As this is your initial install your window will be empty.
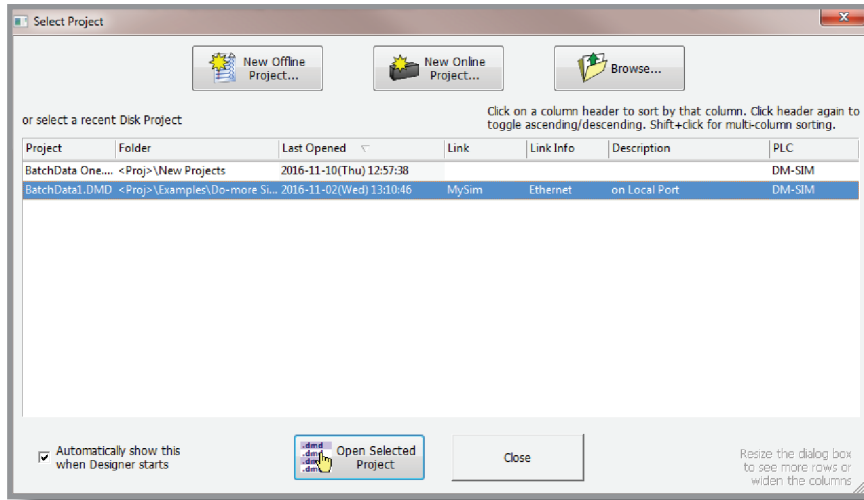
Press the **Close** button. The *Launchpad* area (on left side of window) is displayed with the *Startup Page* selected.
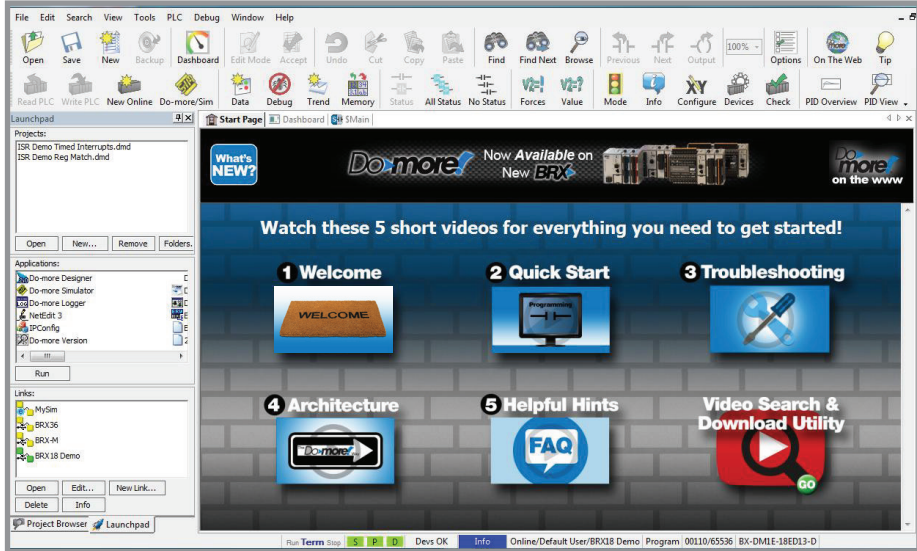
From the Start Page, you can select from any of 5 short videos that demonstrate how to use the software and explain how the Do-more! technology works.
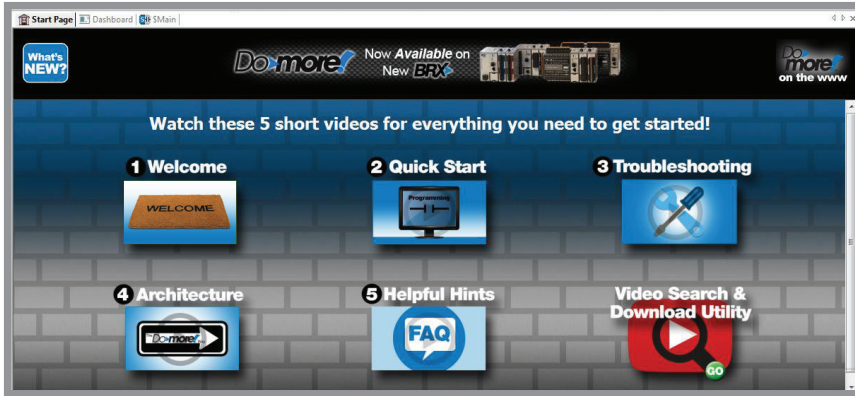
- Video 1: "Welcome", welcomes you to the Do-more! Designer Software. This video familiarizes you with the BRX environment showing you how to connect to a BRX MPU, open a project, etc.
- Video 2: "Quick Start", walks you through writing and documenting a simple program and downloading it to the BRX MPU.
- 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 for the BRX MPU 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.
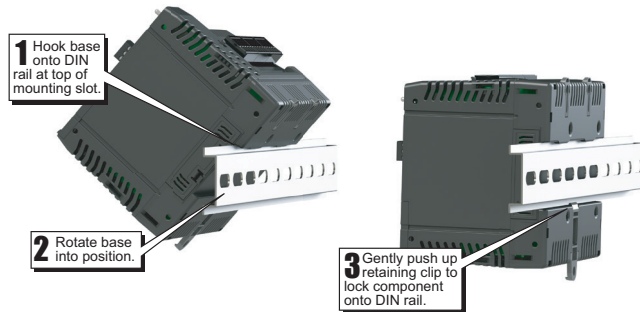
2. There are three ways to connect to the BRX MPU for programming:

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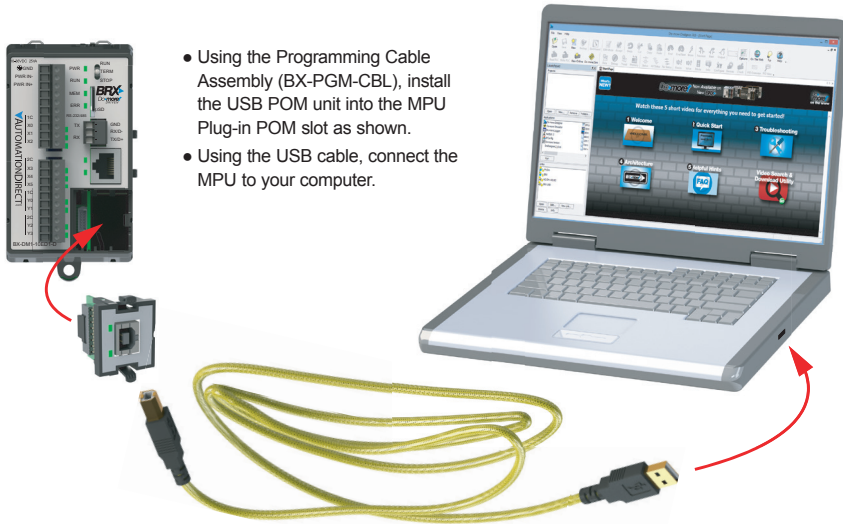
- Using the Programming Cable Assembly (BX-PGM-CBL), install the USB POM unit into the MPU Plug-in POM slot as shown.
- Using the USB cable, connect the MPU to your computer.

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 to PC

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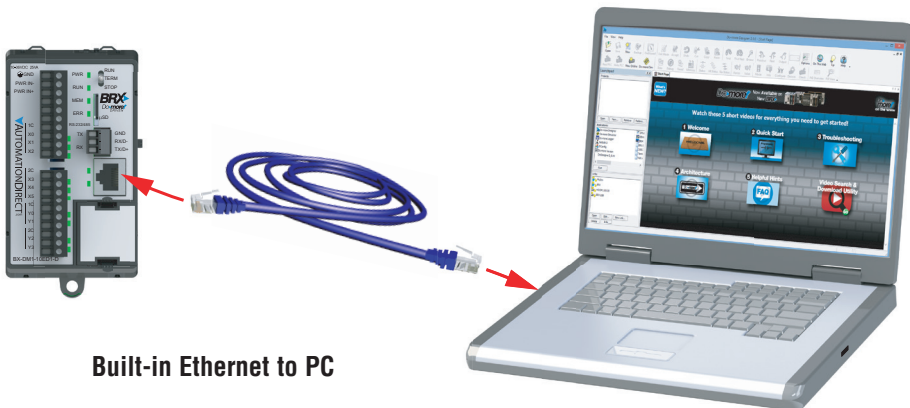
BRX POM Ethernet (BX-P-ECOMLT)
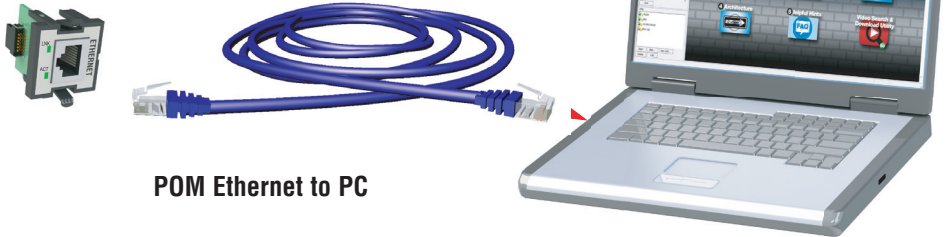
POM Ethernet to PC

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 CPUs 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.

Serial RS-232 to PC

ZL-DB9F-CBL-2P

USB-RS232
Use if PC does not have a built-in RS-232 DB-9 port.
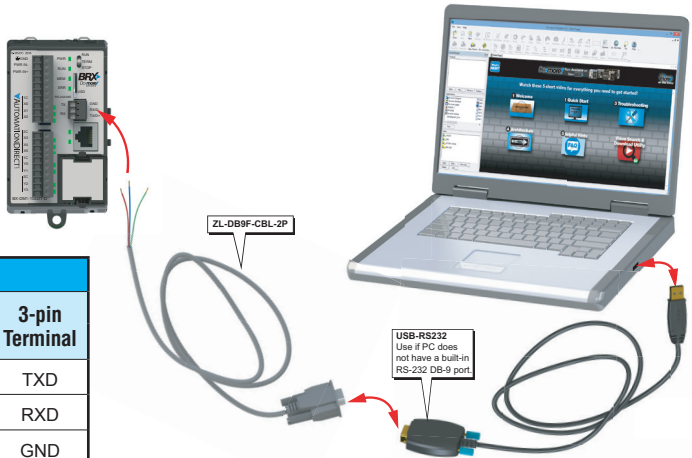
BRX 3-Pin Serial Port

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		

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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).

D2-DSCBL

USB-RS232
Use if PC does
not have a built-in
RS-232 DB-9 port.

POM Serial RJ12 Port to PC
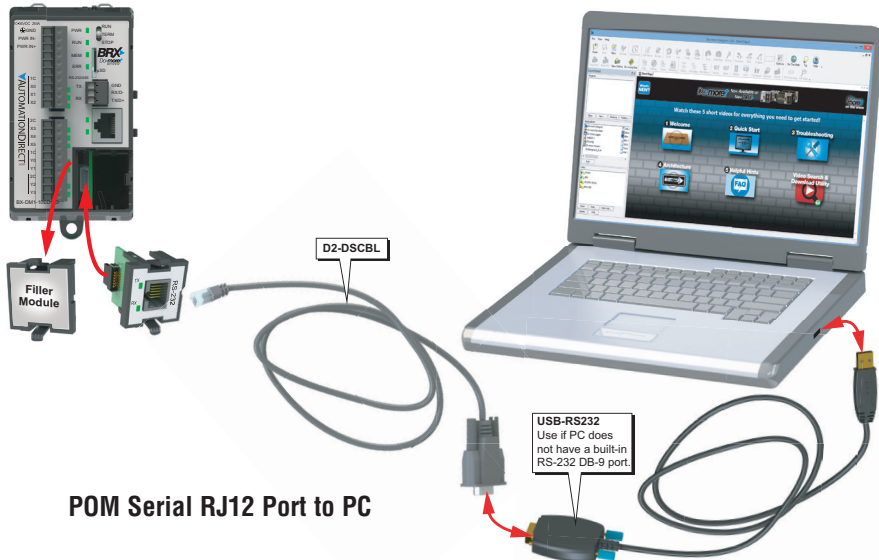
Step 4: Apply Power to the PLC

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

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.

DC Power In
12–24 VDC

DC Power

G
IN-
IN+

The following summary explains the basic steps needed to get the BRX MPU ready to establish a link for programming and running a project.
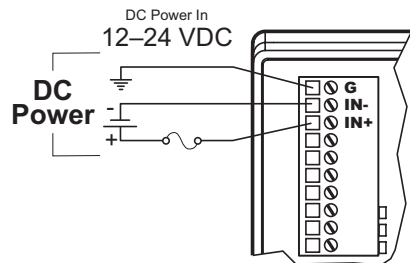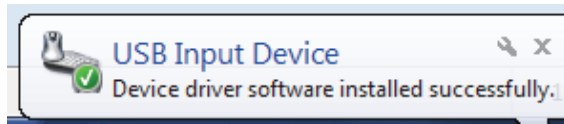
NOTE: Please see Chapter 1 for the power wiring diagram corresponding to your specific BRX MPU.

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:

When the USB connection is made, Do-more! Designer detects the USB POM and (**a**) creates a new link, shown in the (**b**) *Links* window of *Launchpad* area.

From the *Links* window (b) you can open, edit, or create a new link manually. You can also delete a link or get link information. For this exercise, we will work with the link that was generated automatically when the USB POM was inserted.

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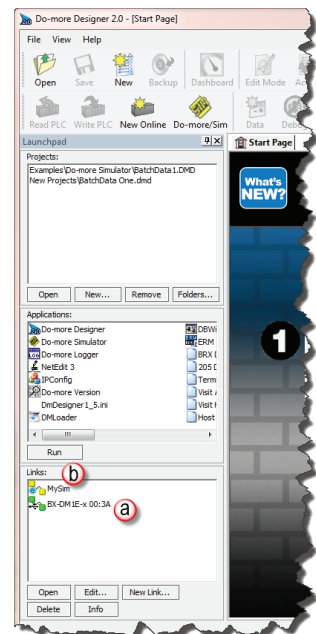
1. We are now ready to go online with the MPU. In the (**a**) *Links* section of the (**b**) *Launchpad*, select the (**c**) USB link; in this example it is called BX-DM1E-X 00:3A. Click on (**d**) **Open** button.

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.
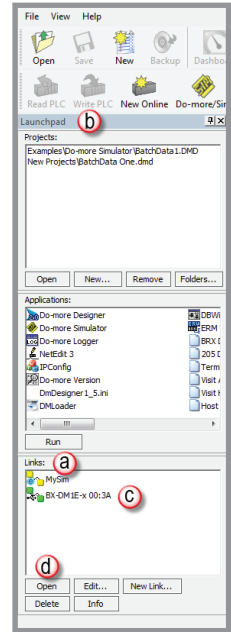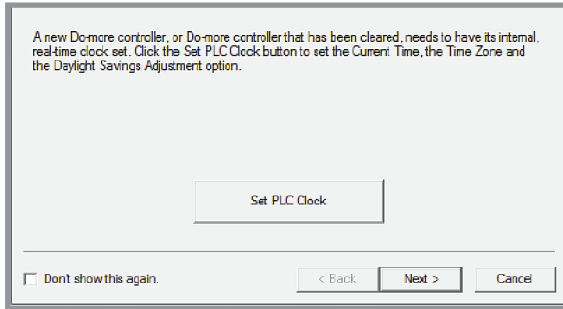
3. The *Set PLC Clock* option allows you to set the internal, real-time clock of the BRX MPU. The *Set PLC Clock* window has options for (**b**) *Timezone* and (**a**) *Daylight Saving Time* adjustments. Select (**c**) **Set to PC's current time settings…** then select (**d**) **Set PLC Clock and Exit**.

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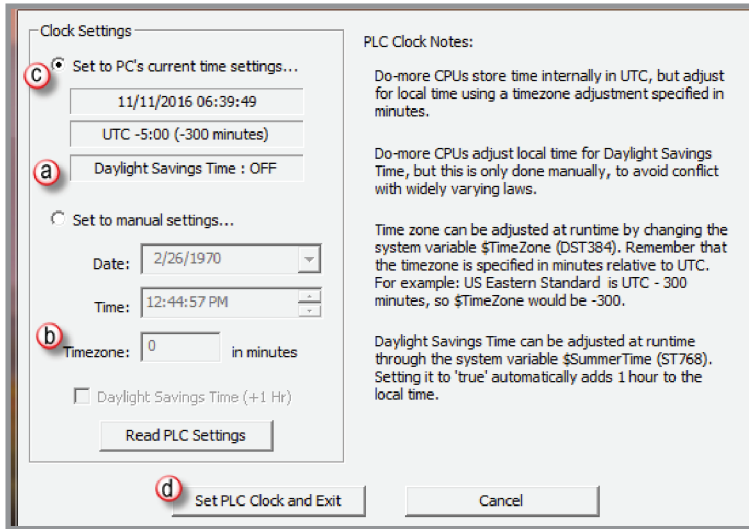
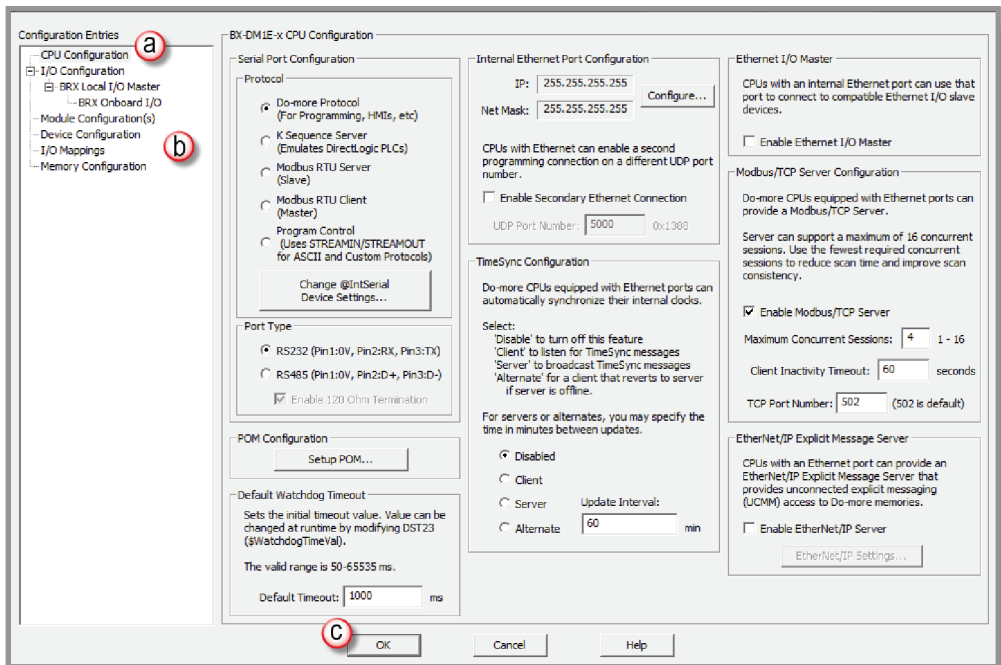4. The option for **Setup System Configuration** appears next (below). This allows you to configure parameters of the BRX MPU, such as onboard communication port configuration, I/O configuration (i.e. high-speed), and mapping. Select **Setup System Configuration**.
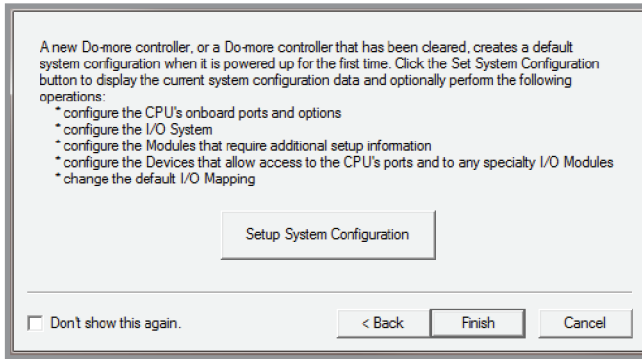
A new Do-more controller, or a Do-more controller that has been cleared, creates a default system configuration when it is powered up for the first time. Click the Set System Configuration button to display the current system configuration data and optionally perform the following operations:
* configure the CPU's onboard ports and options
* configure the I/O System
* configure the Modules that require additional setup information
* configure the Devices that allow access to the CPU's ports and to any specialty I/O Modules
* change the default I/O Mapping

Setup System Configuration

☐ Don't show this again.   < Back   Finish   Cancel

5. 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**.

Configuration Entries
 (a)
─CPU Configuration
─I/O Configuration
  ─BRX Local I/O Master
    ─BRX Onboard I/O
─Module Configuration(s)
─Device Configuration
─I/O Mappings
─Memory Configuration (b)

BX-DM1E-x CPU Configuration

Serial Port Configuration
Protocol
● Do-more Protocol (For Programming, HMIs, etc)
○ K Sequence Server (Emulates DirectLogic PLCs)
○ Modbus RTU Server (Slave)
○ Modbus RTU Client (Master)
○ Program Control (Uses STREAMIN/STREAMOUT for ASCII and Custom Protocols)
Change @IntSerial Device Settings...

Port Type
● RS232 (Pin1:0V, Pin2:RX, Pin3:TX)
○ RS485 (Pin1:0V, Pin2:D+, Pin3:D-)
☑ Enable 120 Ohm Termination

POM Configuration
Setup POM...

Default Watchdog Timeout
Sets the initial timeout value. Value can be changed at runtime by modifying DST23 ($WatchdogTimeVal).
The valid range is 50-65535 ms.
Default Timeout: 1000 ms

Internal Ethernet Port Configuration
IP: 255.255.255.255
Net Mask: 255.255.255.255   Configure...
CPUs with Ethernet can enable a second programming connection on a different UDP port number.
☐ Enable Secondary Ethernet Connection
UDP Port Number: 5000   0x1388

TimeSync Configuration
Do-more CPUs equipped with Ethernet ports can automatically synchronize their internal clocks.
Select:
'Disable' to turn off this feature
'Client' to listen for TimeSync messages
'Server' to broadcast TimeSync messages
'Alternate' for a client that reverts to server if server is offline.
For servers or alternates, you may specify the time in minutes between updates.
● Disabled
○ Client
○ Server   Update Interval:
○ Alternate   60   min

Ethernet I/O Master
CPUs with an internal Ethernet port can use that port to connect to compatible Ethernet I/O slave devices.
☐ Enable Ethernet I/O Master

Modbus/TCP Server Configuration
Do-more CPUs equipped with Ethernet ports can provide a Modbus/TCP Server.
Server can support a maximum of 16 concurrent sessions. Use the fewest required concurrent sessions to reduce scan time and improve scan consistency.
☑ Enable Modbus/TCP Server
Maximum Concurrent Sessions: 4   1 - 16
Client Inactivity Timeout: 60   seconds
TCP Port Number: 502   (502 is default)

EtherNet/IP Explicit Message Server
CPUs with an Ethernet port can provide an EtherNet/IP Explicit Message Server that provides unconnected explicit messaging (UCMM) access to Do-more memories.
☐ Enable EtherNet/IP Server
EtherNet/IP Settings...

(c) OK   Cancel   Help

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

A new Do-more controller, or a Do-more controller that has been cleared, creates a default system configuration when it is powered up for the first time. Click the Set System Configuration button to display the current system configuration data and optionally perform the following operations:
* configure the CPU's onboard ports and options
* configure the I/O System
* configure the Modules that require additional setup information
* configure the Devices that allow access to the CPU's ports and to any specialty I/O Modules
* change the default I/O Mapping

[Setup System Configuration]

☐ Don't show this again.   < Back   Finish   Cancel

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.

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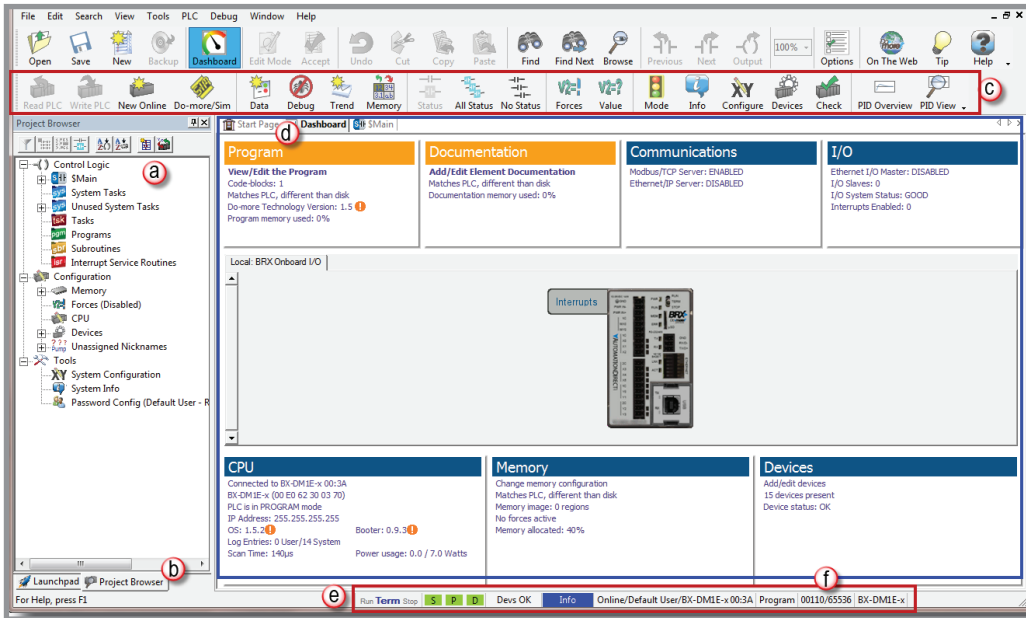
For example, the System Information window seen below, opens after selecting the memory usage values (**f**) in the status bar. This information and much more can be accessed by way of the Dashboard, a new addition to the Do-more! Designer software.

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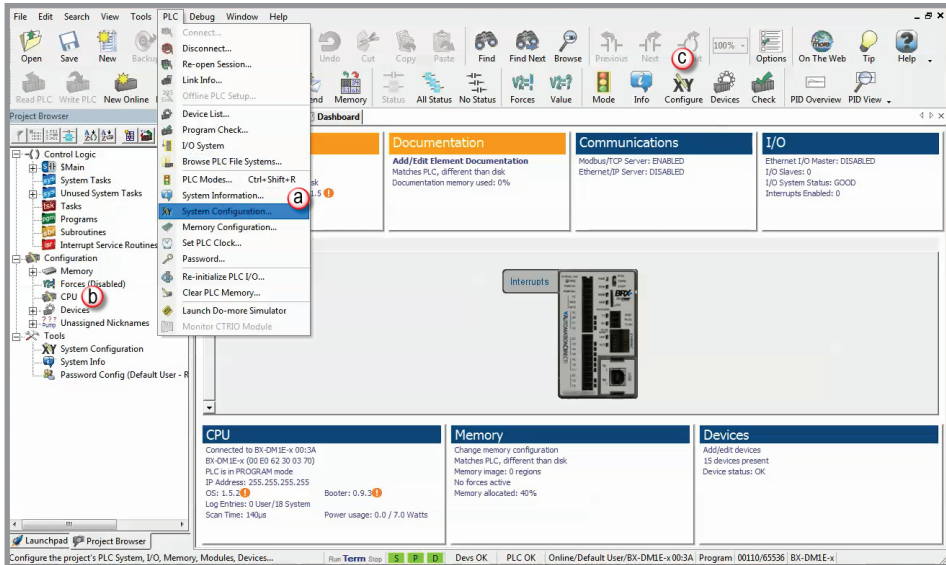
On the left side of the System Configuration window is an index of topics titled (**a**) *Configuration Entries*. The (**b**) *BRX Onboard I/O* allows you to view the modules the software has detected. For this example, we are working with a BX-DM1E-10ER3 MPU and no expansion I/O. This unit has a built-in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

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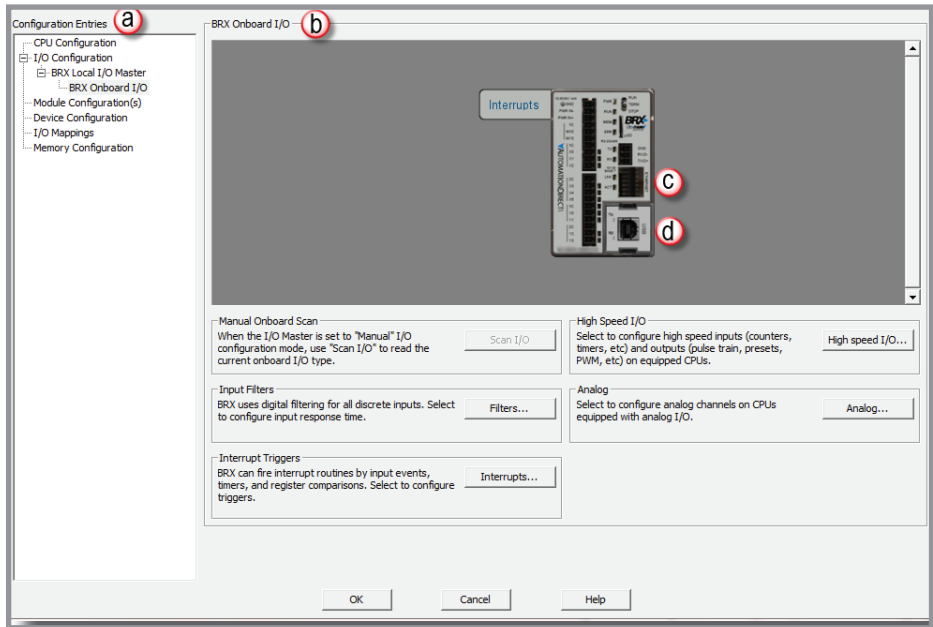
The (**a**) BRX Onboard I/O graphic area is interactive, like the system *Dashboard*, and as you hover and move across the image (**b**) "orange" boxes will appear and display information about the highlighted section.

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.

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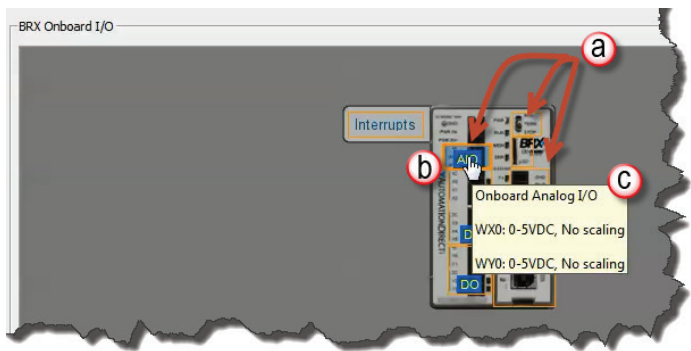
After the hardware configuration is verified, select (**a**) the *I/O Mappings* option in the *Configuration Entries* index. This option will display (**b**) the assigned addresses for the available I/O, as seen below.
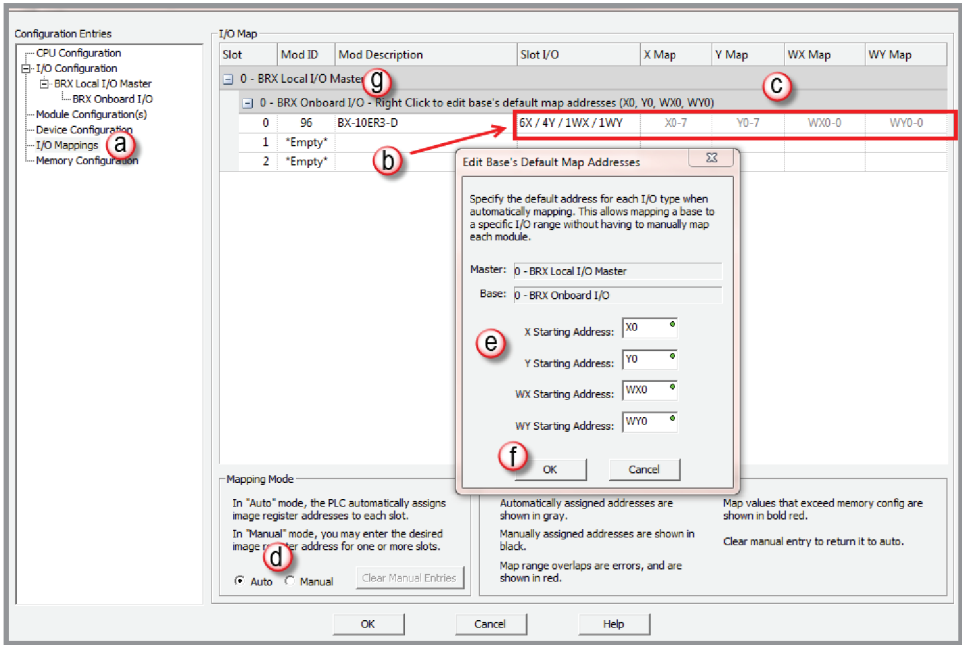
These (**c**) X (discrete input), Y (discrete output), WX (analog input) and WY (analog output) addresses are automatically assigned by Do-more! Designer. You have the option to manually configure these addresses by selecting (**d**) *Manual* in the Mapping Mode section at the bottom of the window or by right clicking (**g**) *BRX Onboard 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.
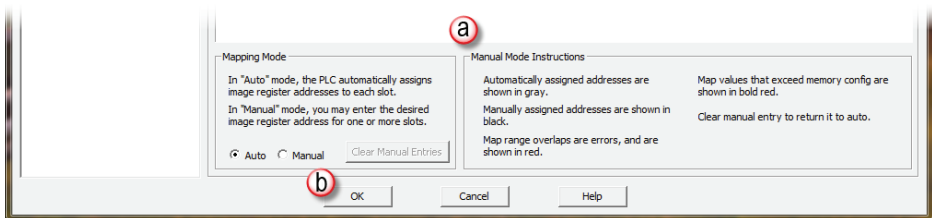
Once the hardware and mapping is configured and verified, click (**b**) **OK** to return to the main screen, displaying the *Dashboard* and the *Project Browser*.

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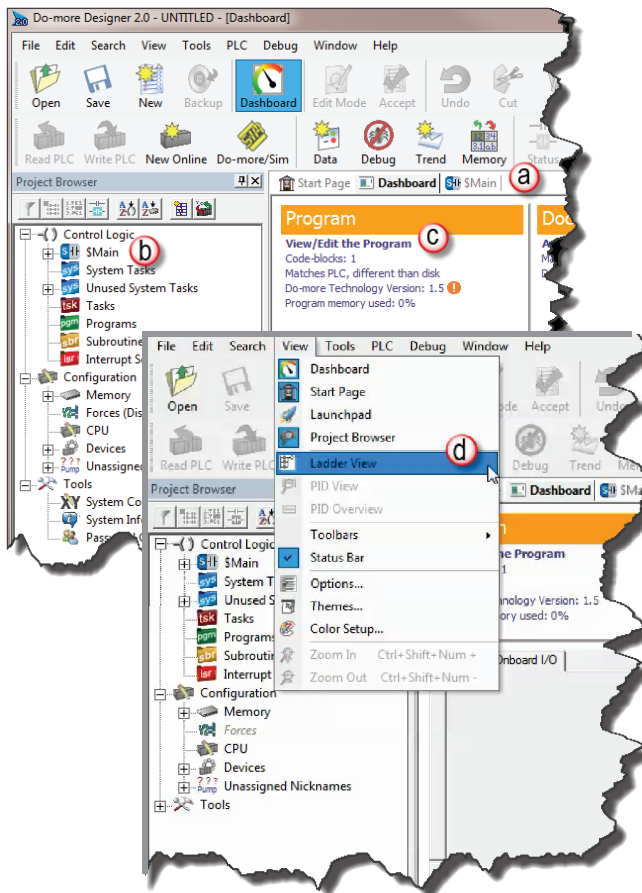
When in (**a, b**) *Edit Mode*, the ladder palette toolbar (**c**) **and** all of the ladder (**d**) *Instruction Toolbox* options will become active. The cursor will be positioned on (**e**) Rung #1 and highlighted.
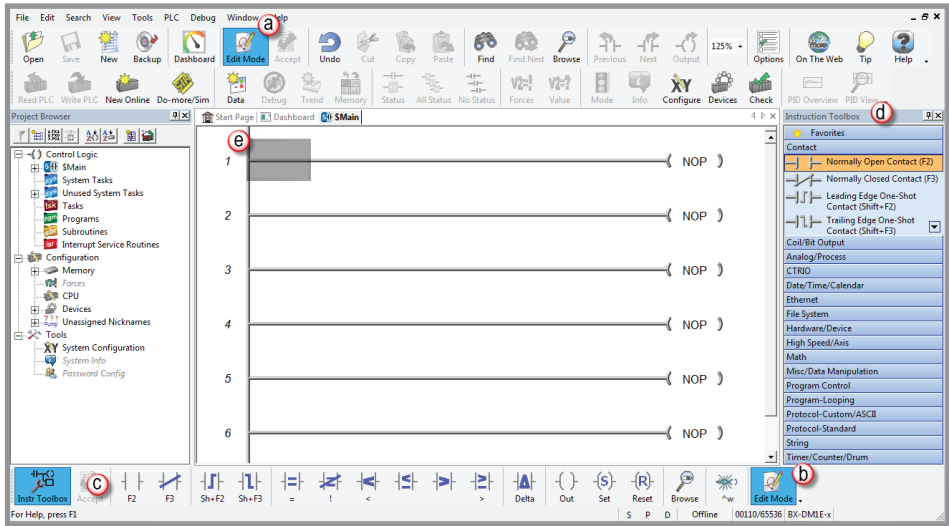
Rung #1

Place the cursor box in the (**a**) NOP position on Rung #1. If the (**b**) *Instruction Toolbox* is not open, click on the (**c**) *Instruction Toolbox* button from the ladder palette toolbar.
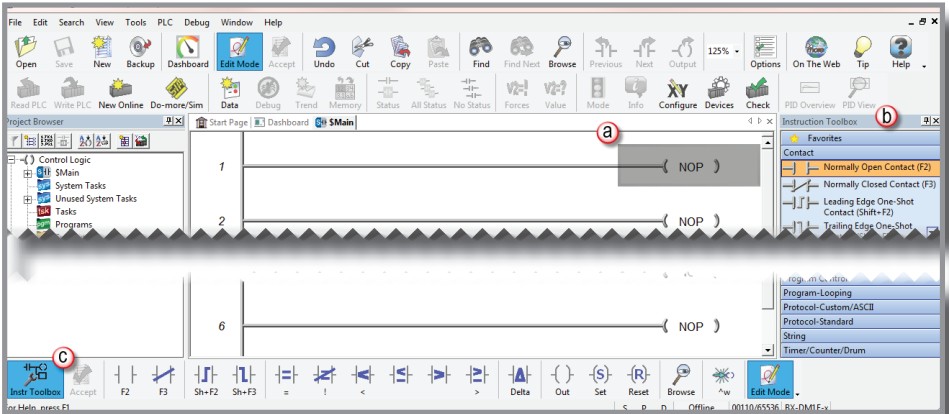
Rung #1, Continued

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.
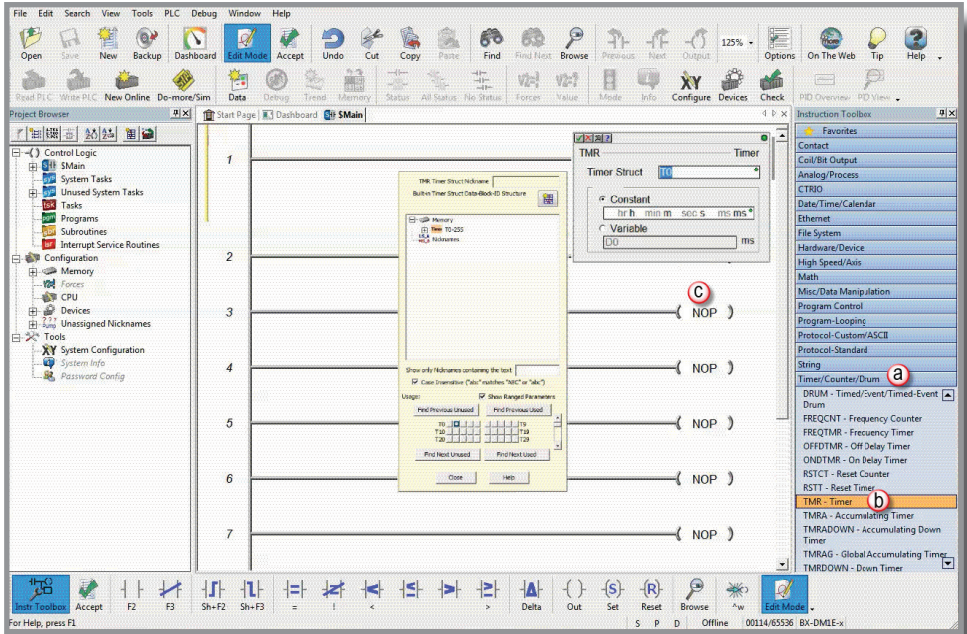
Or you can type "T" while the cursor is on the (**c**) NOP position and select TMR from the drop down menu, then press **Enter**.
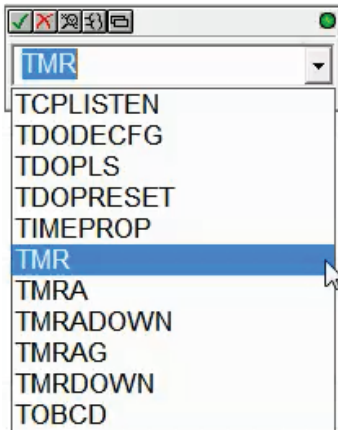
Rung #1, Continued

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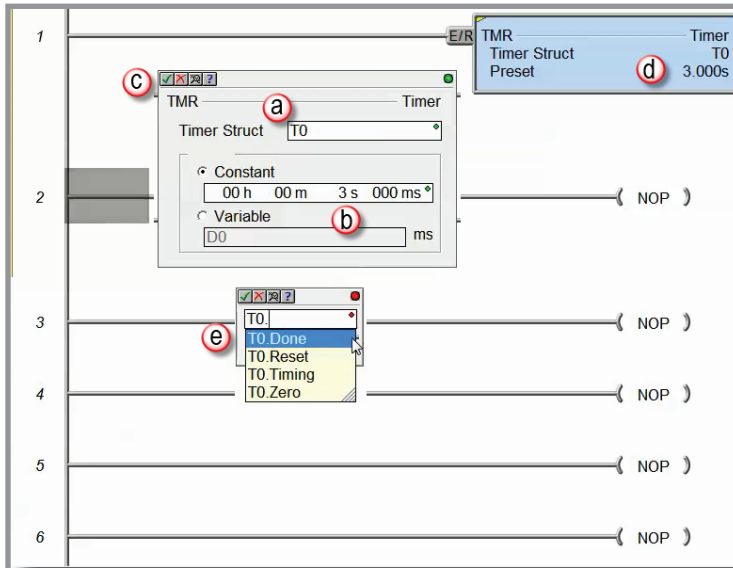
Since a Timer is a structure, it has predefined elements associated with it, such as "Tx.Acc" (accumulated time), "Tx.Done" (the completion bit) and "Tx.Timing" (the timer is enabled and timing).

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. Many system data types such as, $Main and $FirstScan, as well as 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.

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Rung #1, Continued

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.
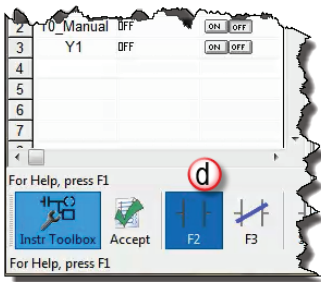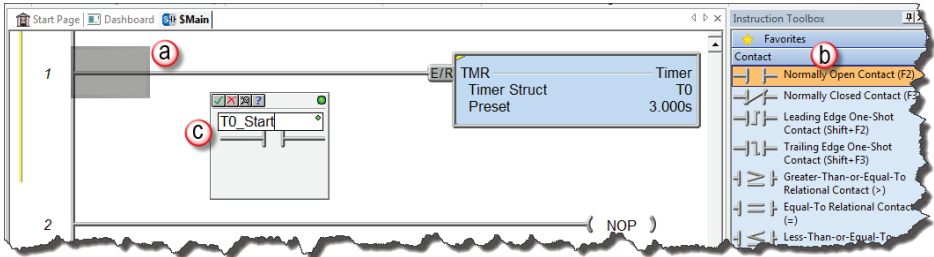

Another option is to select the (**d**) Normally Open Contact instruction from the Ladder Palette Bar (F2 Hot Key) or (**b**) double-clicking or drag/drop from the Instruction Toolbox, enter *T0_Start* for the name, and click the (**c**) green checkmark in the upper left corner.
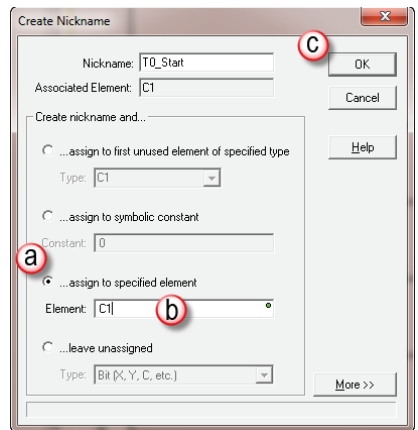
Either method will open the Create Nickname dialog seen here (Right). Select (**a**) the option *...assign to specified element*, (**b**) type the desired memory bit for this contact (C1), and select (**c**) **OK** to accept.

Rung #1 should appear as shown below.
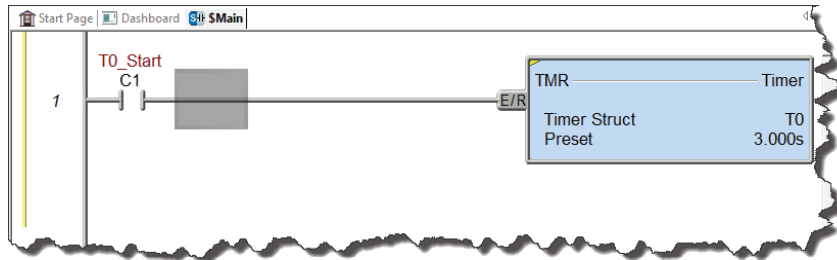
Rung #1, Continued

With the cursor in the position to the (**a**) right of contact **T0_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.
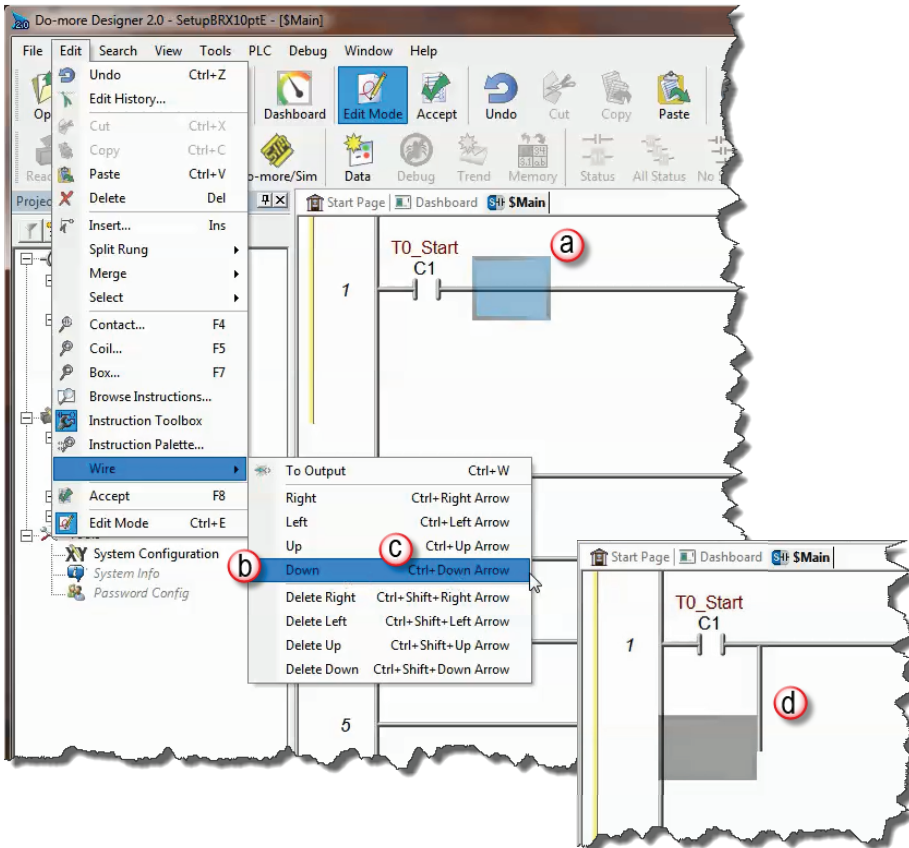
NOTE: There are also Delete Wire options in the Edit drop down menu that are used to erase any wires not needed.

Rung #1, Continued

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.
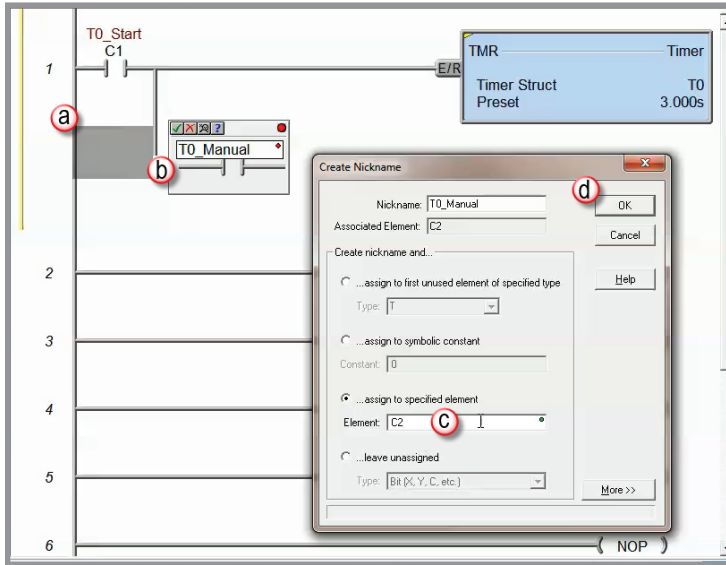
Rung #1 should look like this:
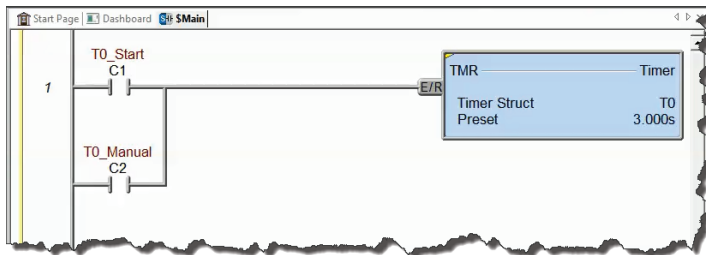
Rung #2

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.
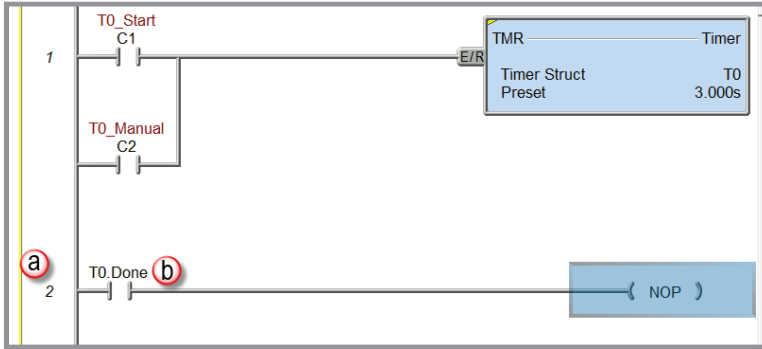
Lastly, you will need to add an **Out** coil to the end of Rung #2. Place the (**a**) cursor at the end of the rung highlighting NOP and either select **Out** from the Ladder Palette Bar, or type "OUT" and select the OUT instruction from the drop down menu. Another option is to (**b**) select the OUT 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**) checkmark.
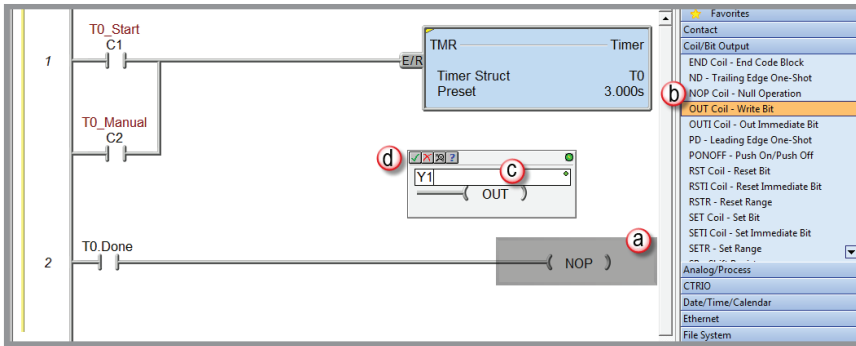
The ladder program should now look like this:
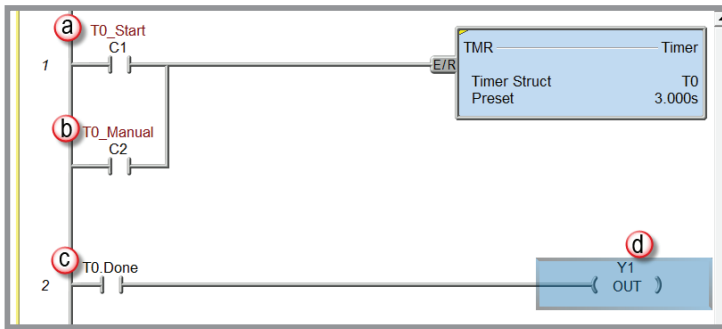
When either the (**a**) **T0_Start** or (**b**) **T0_Manual** contact is energized, the timer will begin timing. When it times out, contact (**c**) **T0_Done** will energize and the (**d**) output coil **Y1** will turn on. Note that an END instruction is not required.

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* or the (**c**) *Ladder Palette Bar* to accept the changes.

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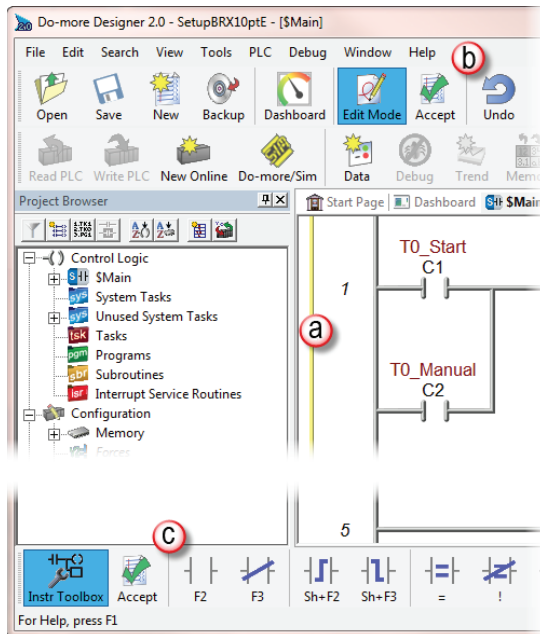
After selecting "Accept", the yellow bar should be replaced by green and blue bars (left margin). The green bar means the project has been accepted but not saved. The blue bar (only appears when online) means the project has not been downloaded to the MPU.
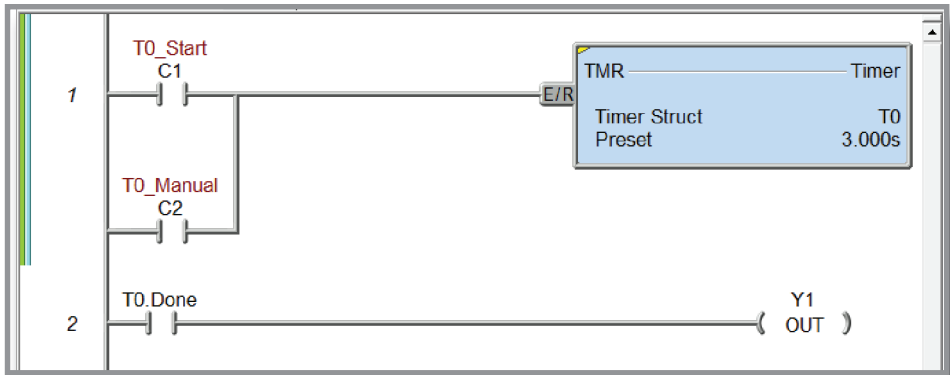
Step 8: Save Project

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 blue bar **(c)** will remain, meaning you have successfully saved the project to disk, but not yet downloaded to the MPU.
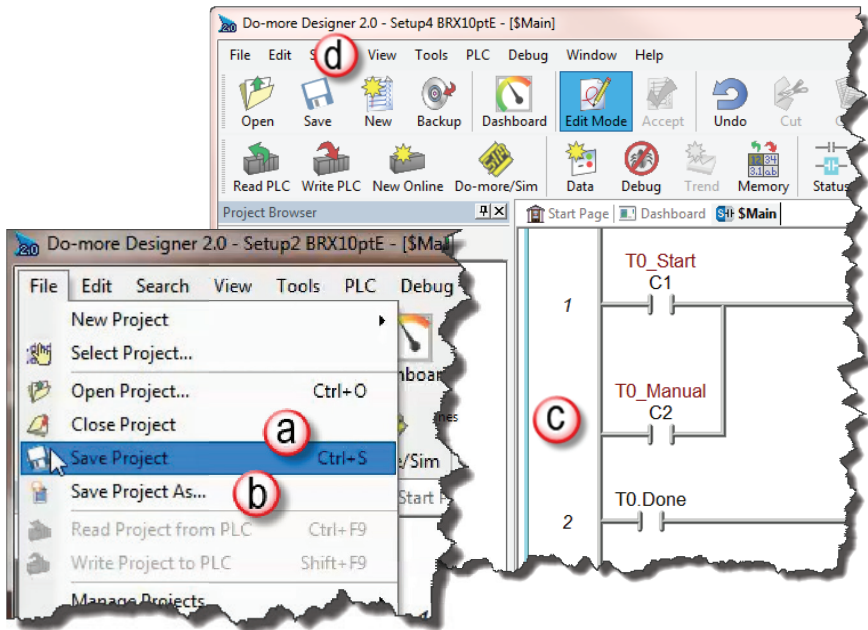
Step 9: Write Project to the BRX MPU

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**) blue bar to the left of the ladder logic program signifying that your project has been **Accepted** and **Saved** and you are online with the MPU.
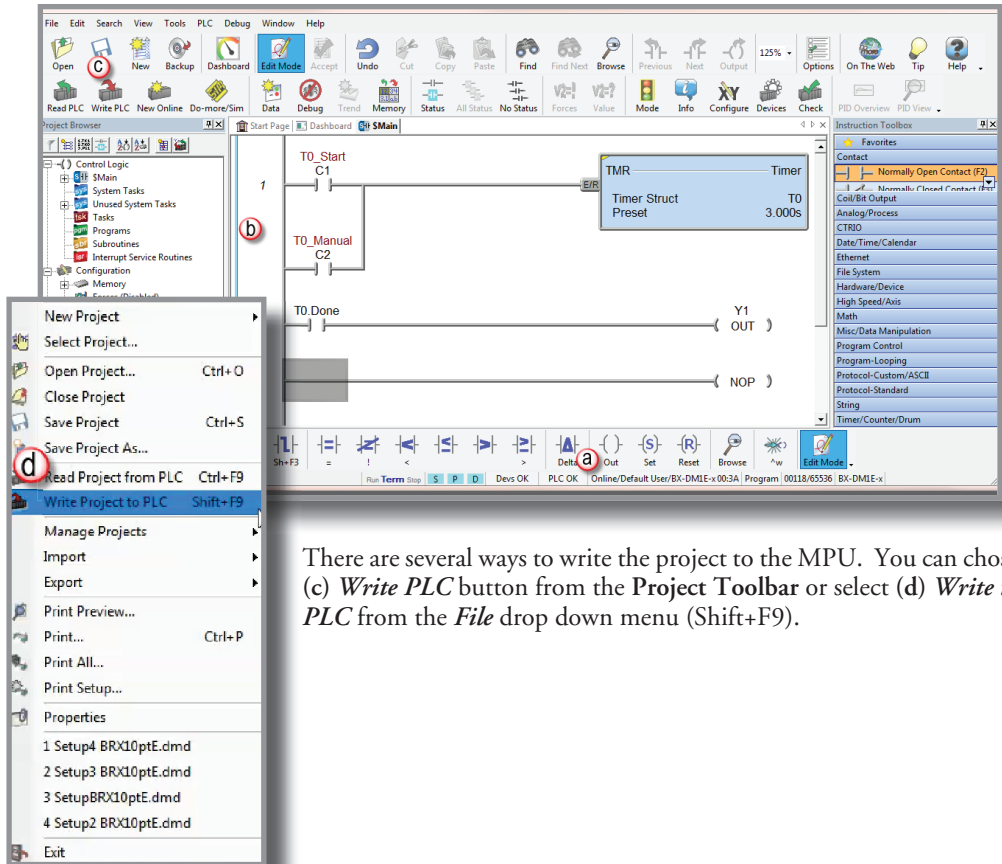
There are several ways to write the project to the MPU. You can chose (**c**) *Write PLC* button from the **Project Toolbar** or select (**d**) *Write to PLC* from the *File* drop down menu (Shift+F9).

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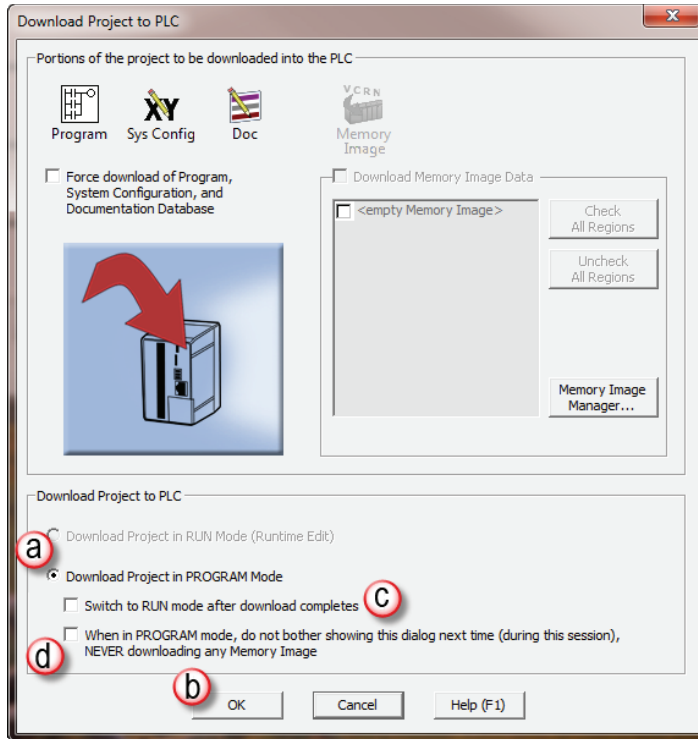
When the BRX MPU is in (**a**) Program mode and you click on the (**b**) **OK** button, the project is written to the MPU. When the download is complete, the MPU remains in program mode. In this window, you can select (**c**) to switch the MPU to **RUN** mode after the download is complete.

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.*

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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.
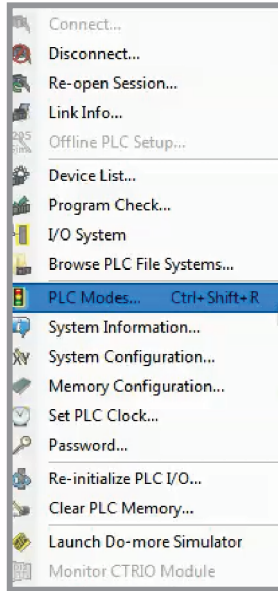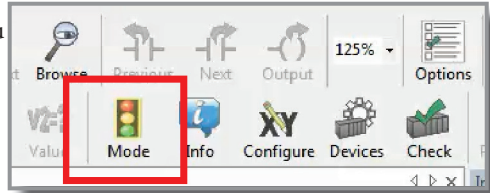
- Click on (a) *Program* in the Status bar. This will bring up the *Select PLC Mode* pop-up where you can change the PLC mode by selecting the (b) **Run** radio button.
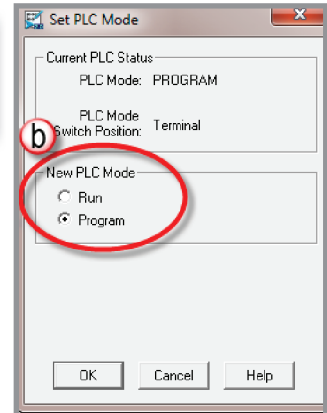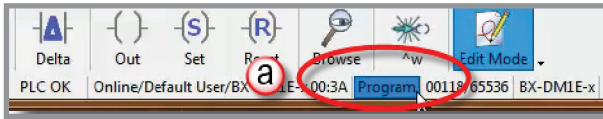
Step 10: Testing Project Using Data View

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.

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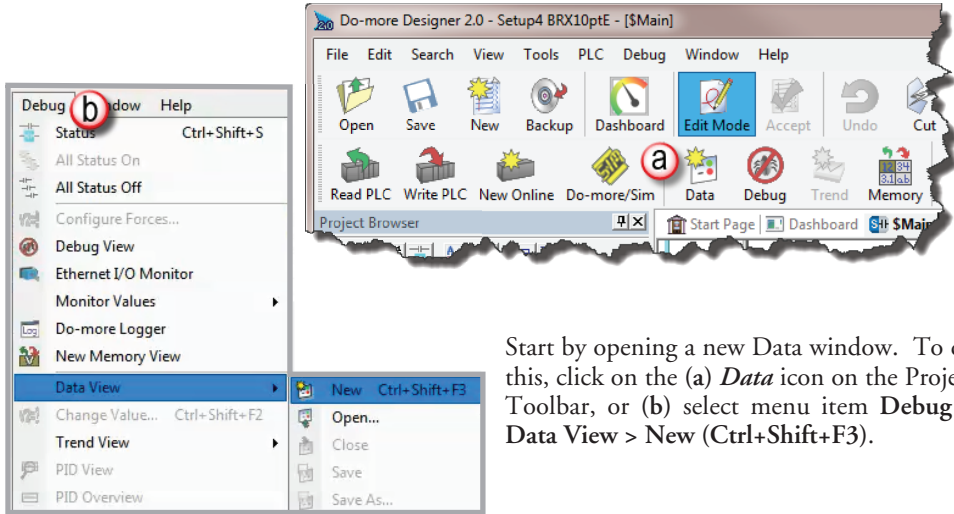
Start by opening a new Data window. To do this, click on the (**a**) *Data* icon on the Project Toolbar, or (**b**) select menu item **Debug > Data View > New (Ctrl+Shift+F3)**.

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.
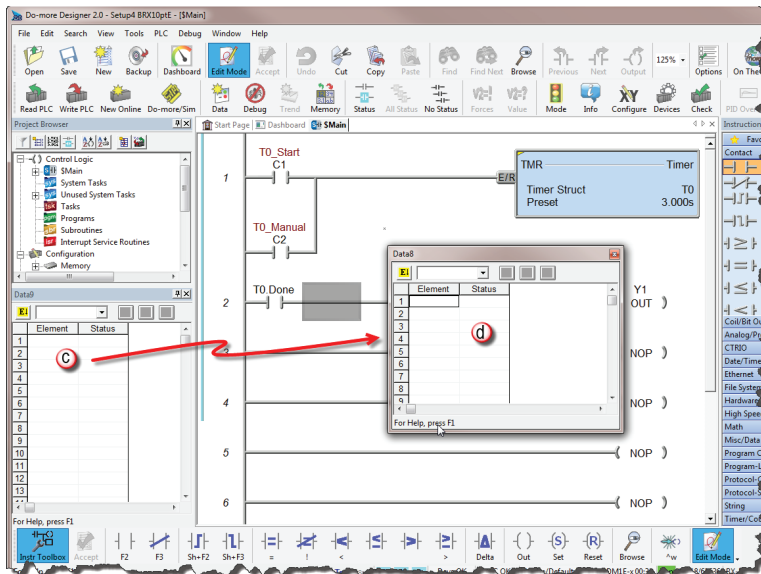
Now enter the elements that you wish to monitor. On line one type "C1" under the **Element** column and press Enter. You will see the C1 change to the (**a**) nickname associated with it, **T0_Start**. On line two (**b**) type the element "C2" (**T0_Manual**) and on line three (**c**) type "Y1". Notice the three icons (**d**) at the top right in the data window are grayed out. This will change in the next step.
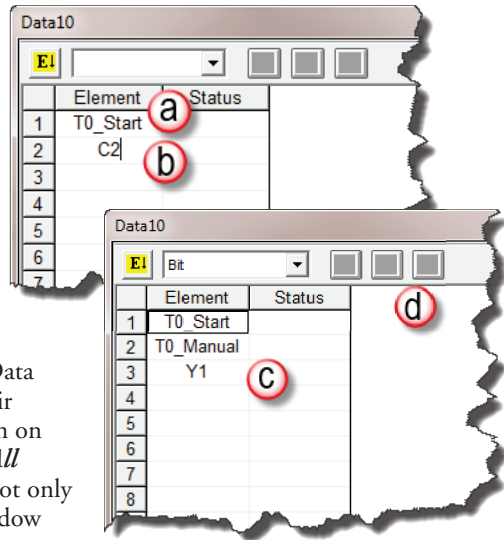
With the ladder elements entered into the Data View window, you now need to activate their status. To do so, (**a**) click the *All Status* icon on the **Project Toolbar**, or (**b**) select *Debug > All Status On*. The *All Status On* option will not only activate (**c**) the *Status* of the **Data 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.
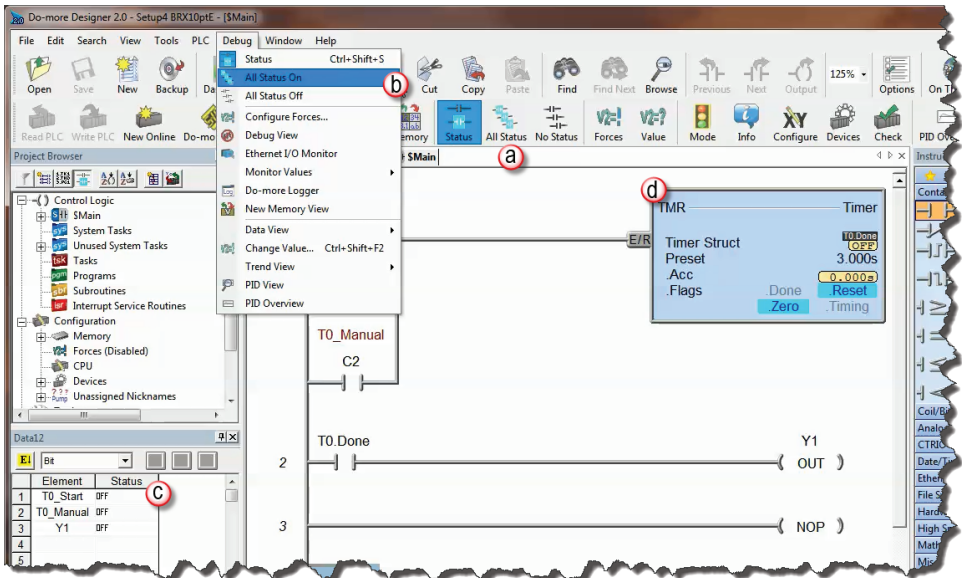
The next step is to enable edits within the Data View window. To do this, click the (**a**) yellow box with the *E* found in the top left corner of the Data View window. The (**b**) Edits column is now added to the **Data View** window.

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.
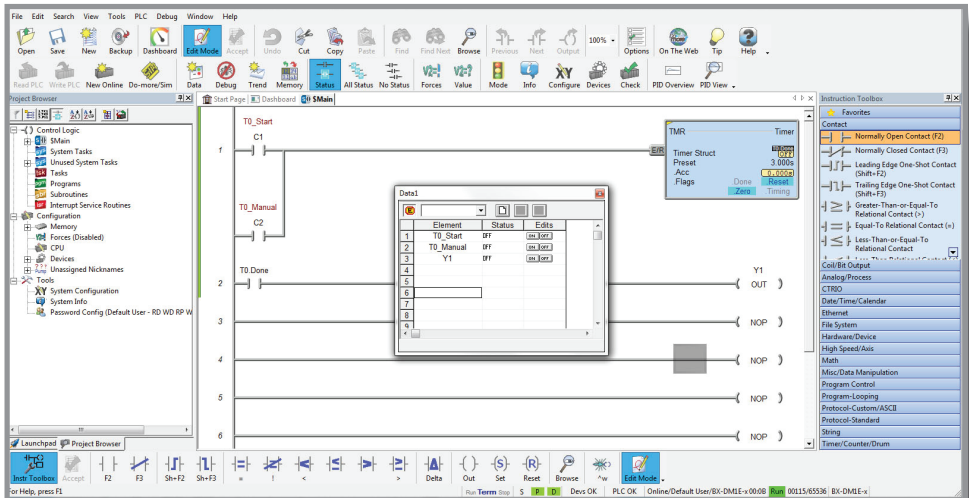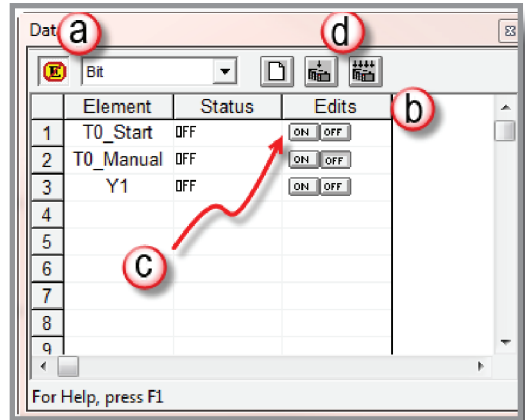
Click the *Write Current Edit* to PLC button and confirm it. This will write the new value to T0_Start. Once T0_Start changes to an ON state, the timer (T0) will begin to time and quickly reach the preset. As soon as the preset has been met the done bit, T0.Done, will turn ON causing output Y1 to also 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.
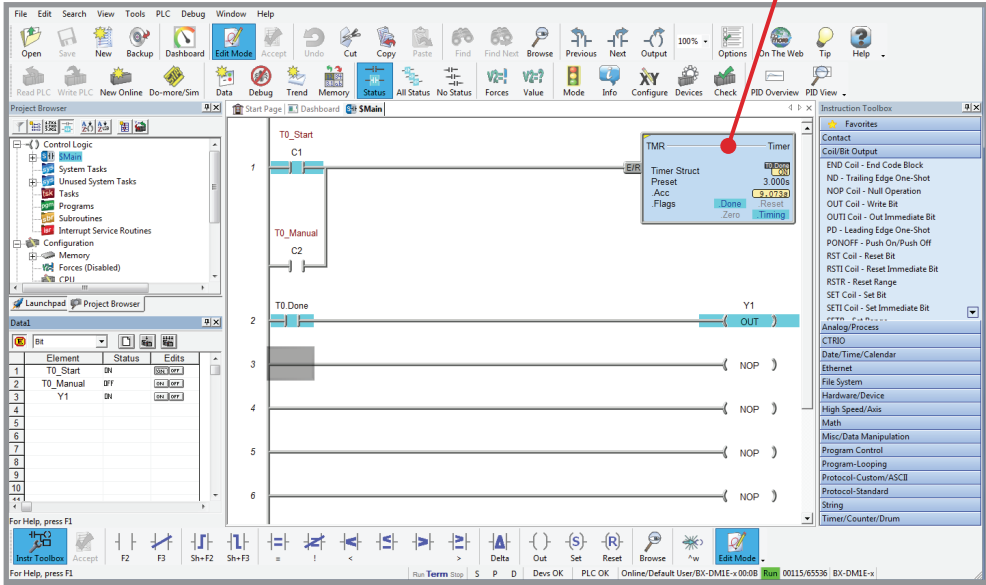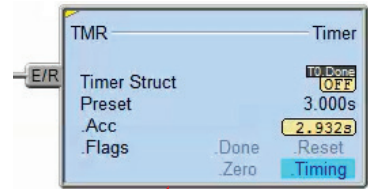

Congratulations, you have now programmed, downloaded, and tested a ladder logic program for the BRX Do-more MPU. Feel free to experiment with a program of your own and please remember that the software Help file is an essential tool to use when programming your controller.
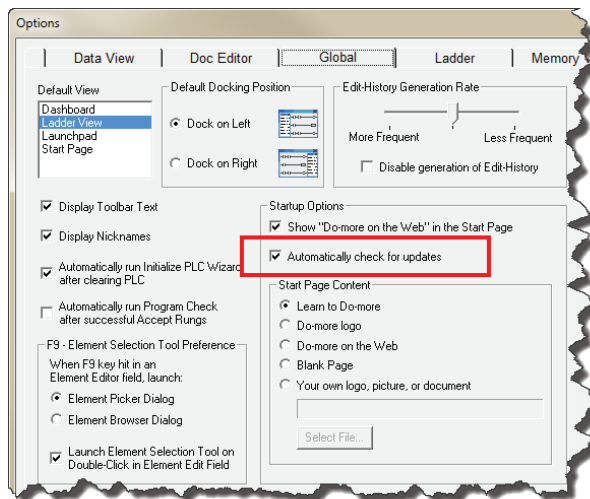
Do-more Designer Software and Firmware Updates

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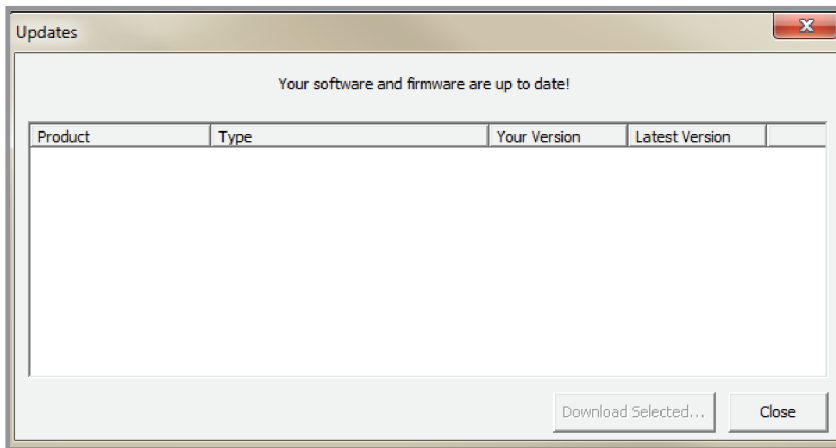
The automatic check can be disabled by opening the View -> Options menu, select the Global tab and uncheck the "Automatically Check for Updates on Startup" selection.

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## Do-more Designer Software and Firmware Updates, continued

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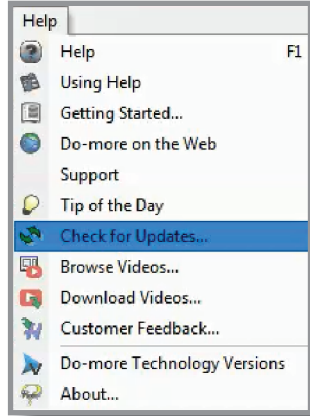
There are three ways to access the dialogs needed to update the Operating System and the Booter/Loader.

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.

Chapter 10: BRX Do-more! Designer Getting Started

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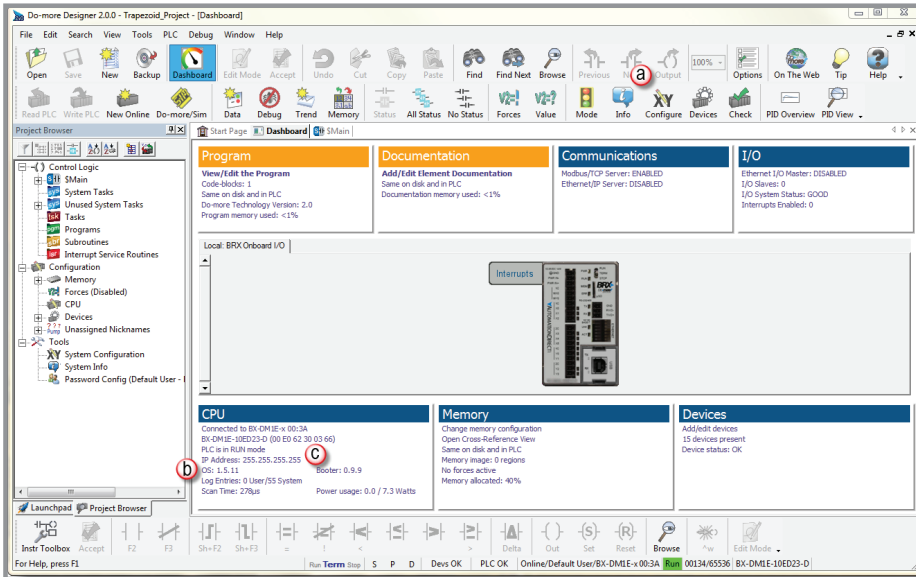
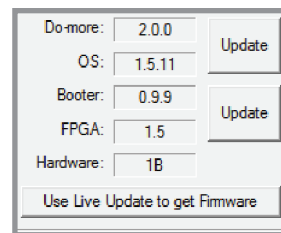## Do-more Designer Software and Firmware Updates, continued

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*.
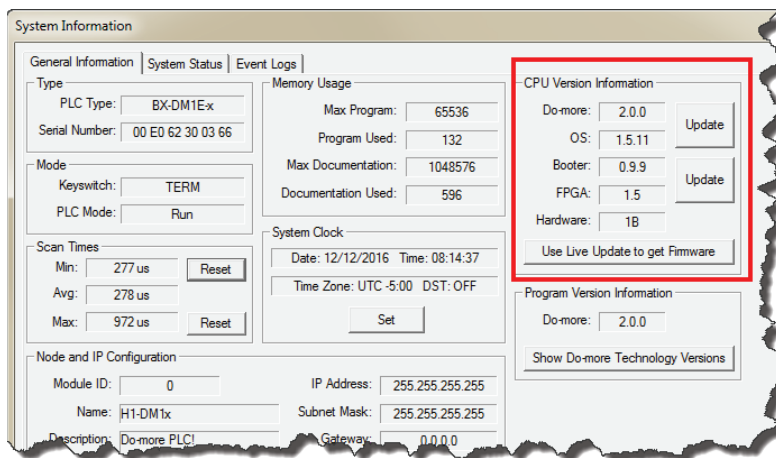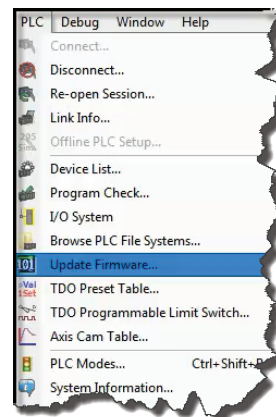
The CPU section displays the following information:

- **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.
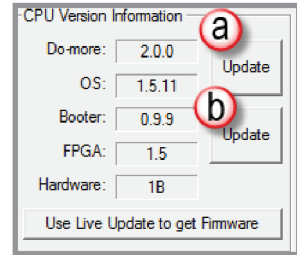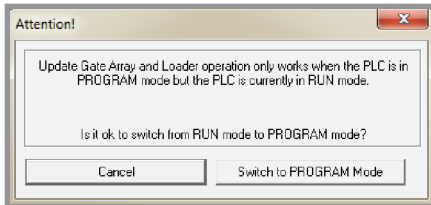- **Hardware:** The current revision of the controller hardware.

NOTE: An Asterisk (*) next to any of the numbers means that there is an update available for that particular portion of the firmware.
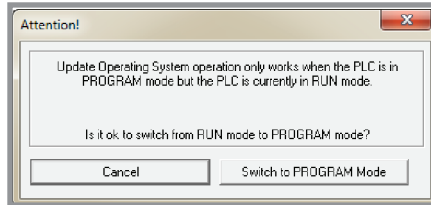
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Do-more Designer Software and Firmware Updates, continued

- 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.

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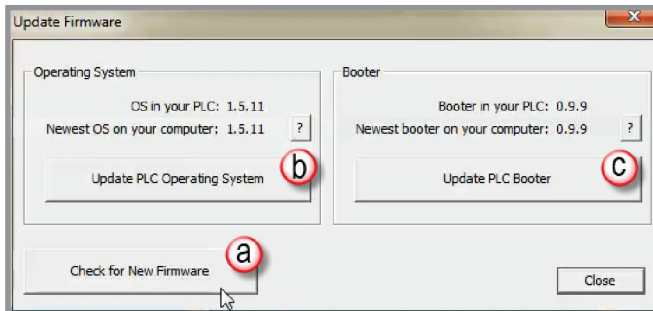
The *Operating System* and *Booter* sections show the version currently running in the attached Do-more CPU and the latest versions of the firmware and boot loader files that have been downloaded to this PC.

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Do-more Designer Software and Firmware Updates, continued

Click (**a**) **Check for New Firmware** (previous graphic). 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** (previous graphic) 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** (previous graphic) 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.*

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.
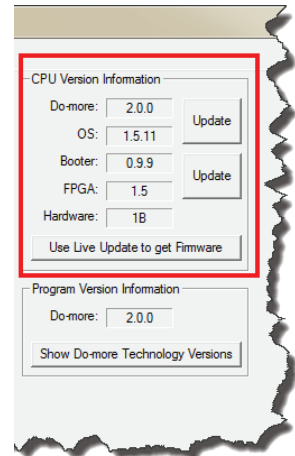
Do-more Designer Software and Firmware Updates, continued

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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.*
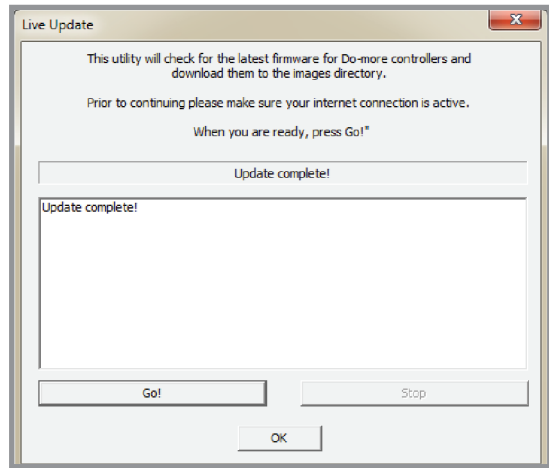
Update Operating System

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.

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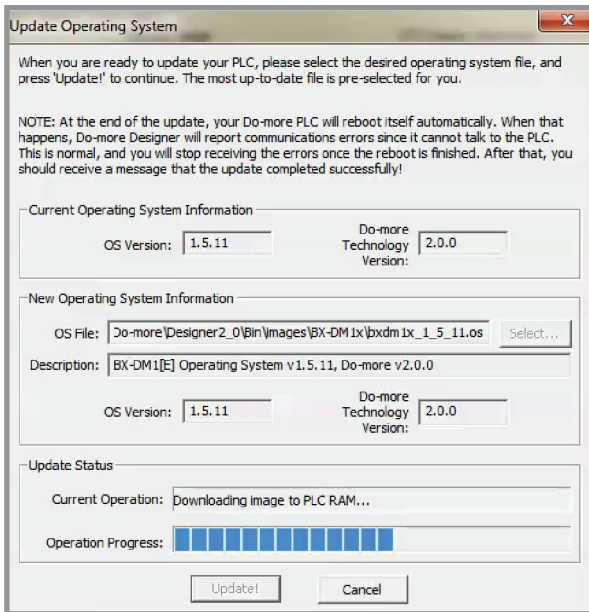
Do-more Designer Software and Firmware Updates, continued

Current Operating System Information

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

Do-more 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 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 to request an RMA number for a Do-more CPU that fails to update the Gate Array and Loader).
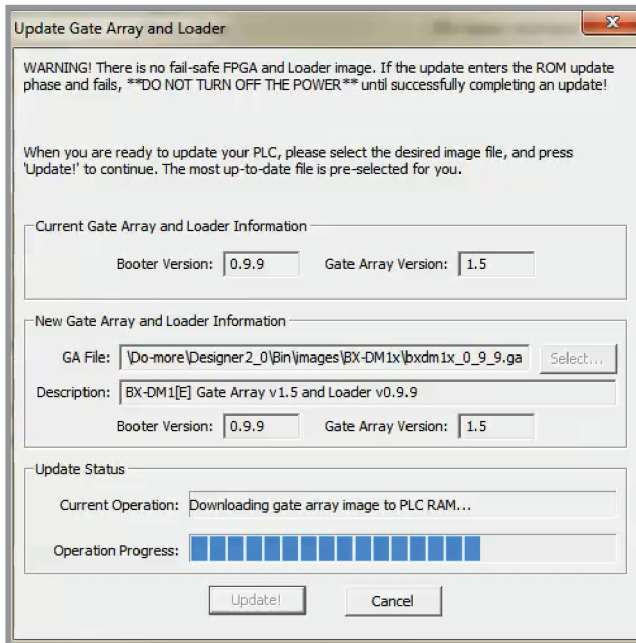
When the dialog opens it will read the Gate Array Version and Boot Loader version from the currently connected controller and from the latest Gate Array firmware file.

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.
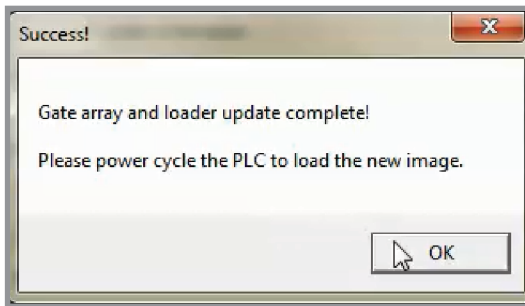

Click the **Cancel** (previous graphic) button to exit without updating the Gate Array and Loader.

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.
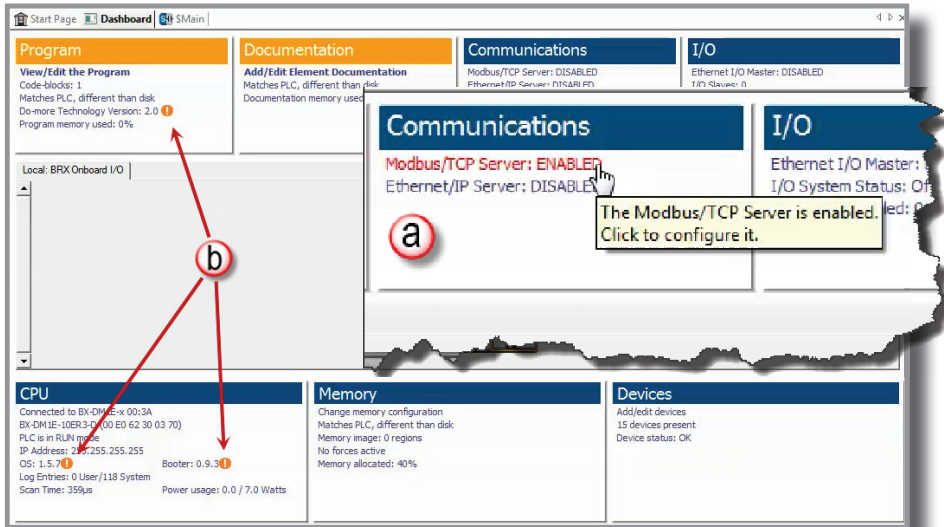
The dashboard is divided horizontally into three sections, top, center and bottom sections. The top and bottom sections consist of distinct panes each of which contain related items with current status of each. These entries (**a**) are also mouse-over links; as you move your mouse over an entry it will 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.

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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.
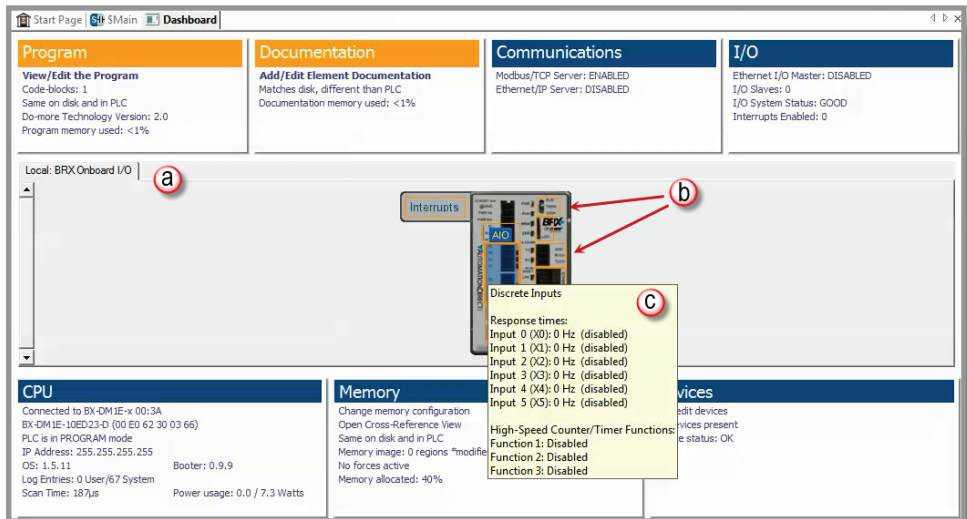
Left-clicking on the hot spot will display a popup menu that contains links specific to the configuration tools and information displays for that item. For example, left clicking on the **AIO** (analog I/O) hotspot, displays links to view onboard analog I/O values in Data View and a link to configure the analog I/O, as shown below.
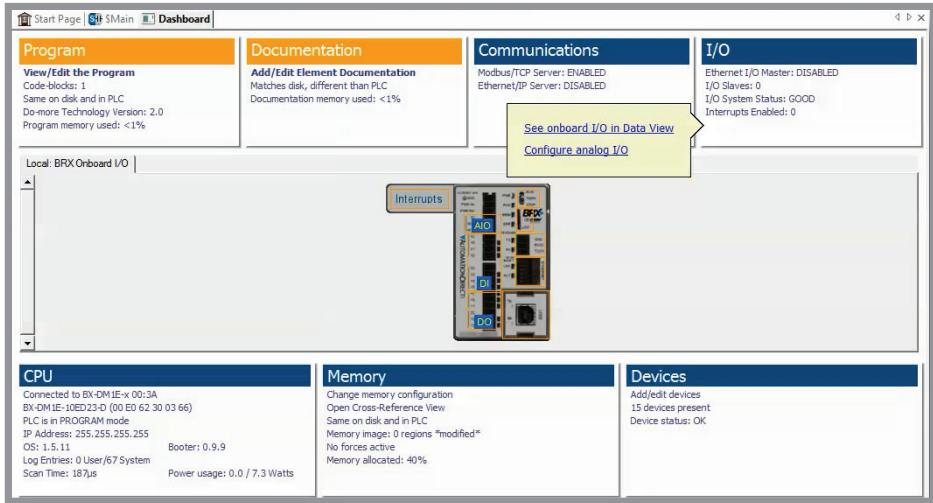
Right-clicking on the MPU or an expansion module will display a list of operations that can be performed on that module. For example, right-clicking on the MPU (below) gives the option to Change CPU Type, Connect to PLC, or Disconnect from PLC. The options will vary depending on the MPU family and module type.
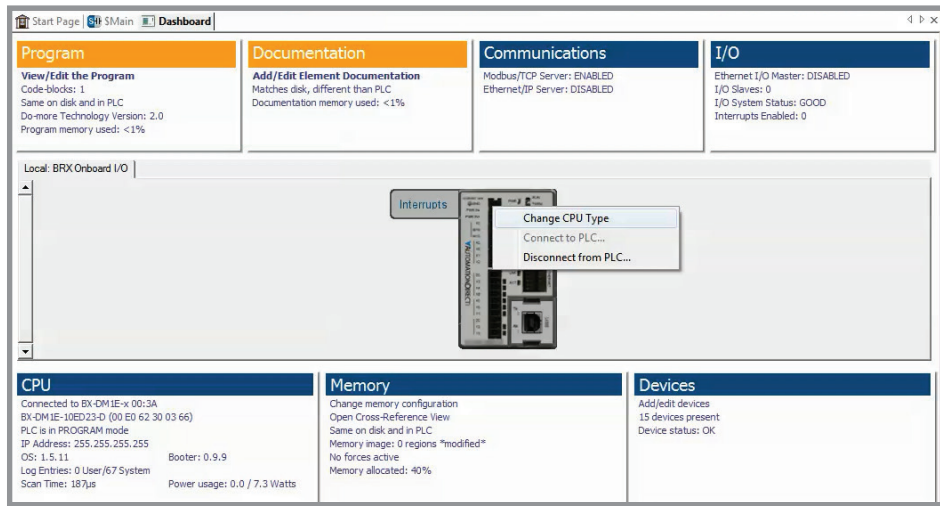
Help File

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.

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Notes: