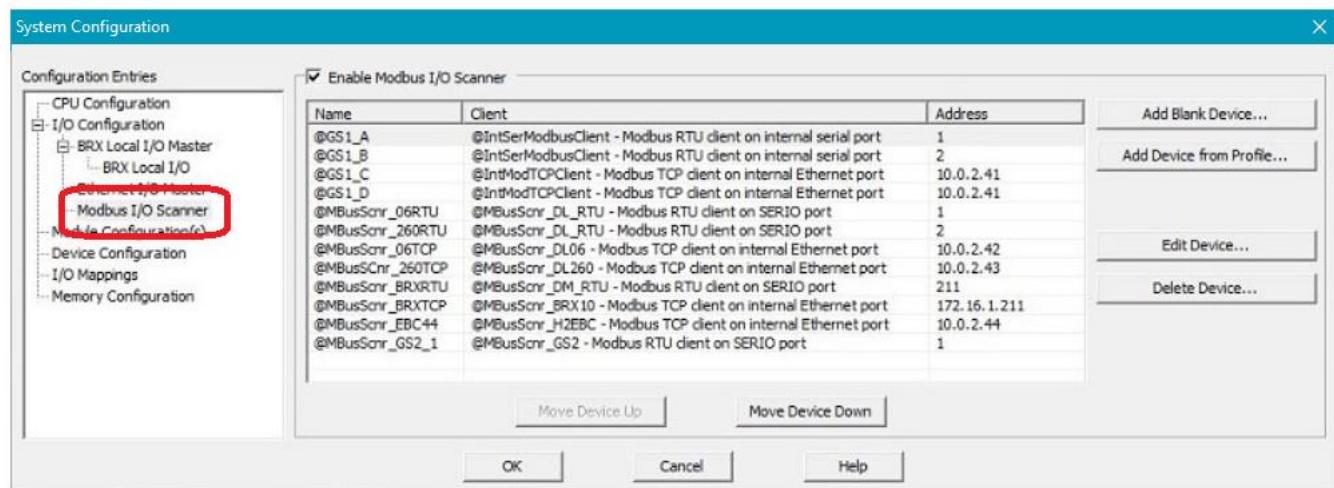




This file documents the list of new features, enhancements, and “adjusted anomalies”, starting with the most recent Rel 2.9.4/Rel 2.9.3/2.9.2/Rel 2.9.1 version (2.9.4/2.9.3/2.9.2 specific entries are noted), followed by the 2.8.x, 2.7.x, 2.6.x, 2.5.x, 2.3, 2.2, 2.1.x, and finishing with Rel 2.0 version. Each page’s header shows the version for that current page.

1. Modbus I/O Scanner (BRX/Simulator only, requires Do-more Technology version DmT 2.9)

Do-more BRX and Simulator PLCs can use the Modbus I/O Scanner to process Modbus Read and Modbus Write requests similar to the way it handles local I/O and Ethernet Remote I/O. It does this by creating a *Scanner Device* for any combination of up to 32 Modbus/TCP and/or Modbus/RTU servers/slaves. The Scanner Device can additionally perform any required format conversion on the data, **eliminating the need to add ladder logic** to process the data before it is sent or after it is received.



A customized set of I/O for each individual server/slave is defined such that the Do-more PLC sends Modbus Read and Write Function Codes as part of its I/O cycle by specifying the set of Modbus Data Types and Addresses (Coils 0xxxx, Discrete Inputs 1xxxx, Input Registers 3xxxx, Holding Registers 4xxxx). No programming is necessary for these configured background I/O updates.

In addition to the background I/O, individual slave parameters can also be specified for **event-based requests** using the new **MSREGRD** and **MSREGWR** instructions (see below) for configuration or other non-polling data.

Some **predefined Modbus Device Profile files** for common Modbus products are included, like GS Drives (no need for GS-EDRV100), Sure Servo Drives, STRIDE Analog and Temperature modules, even “generic” profiles for other Automation Direct PLC lines like Click and DirectLOGIC, making it much easier to monitor and control these devices from your Do-more PLC.

a. Modbus I/O Scanner Monitor (Debug menu)

After the Modbus I/O Scanner is configured and running, the Modbus Scanner Monitor can be used to display the "health" of the currently configured network of Modbus Scanner Devices.

Scanner Device	Modbus Device	Device Structure	.WriteComplete		.ReadComplete		.EnableWrites		.EnableReads		.XferCount		.ErrorCount	
			.WriteComplete	.ReadComplete	.EnableWrites	.XferCount	.ErrorCount	.LastError						
@GS1_A	@IntSerModbusClient	\$GS1_A	On	Off	On	On	250	0	114	0	0	0	Ex4: Slave Service Failure	
@GS1_C	@IntModTCPClient	\$GS1_C	On	Off	On	On	250	0	851	6963	0	0		
@GS1_D	@IntModTCPClient	\$GS1_D	On	Off	On	On	250	0	105	0	0	0		
@MBusScnr_GS2_1	@MBusScnr_GS2	\$MBusScnr_GS2_1	On	On	On	On	100	250	31174	0	0	0		
@MBusScnr_SL_RTU	@MBusScnr_SOLO1	\$MBusScnr_SL_RTU	On	On	On	On	500	1000	44310	14	0	0	Operation timed out.	
@MBusScnr_06RTU	@MBusScnr_DL_RTU	\$MBusScnr_06RTU	On	Off	On	Off	166	0	40372	0	0	0		
@MBusScnr_06TCP	@MBusScnr_DL06	\$MBusScnr_06TCP	Off	On	Off	On	0	333	32924	0	0	0		
@MBusScnr_BRXRTU	@MBusScnr_DM_RTU	\$MBusScnr_BRXRTU	On	On	On	On	133	266	47868	0	0	0		

2. New Instructions (DmT 2.9)

a. MSREGRD – Modbus Scanner I/O Register Read MSREGWR – Modbus Scanner I/O Register Write (Ethernet BRX/Simulator only)

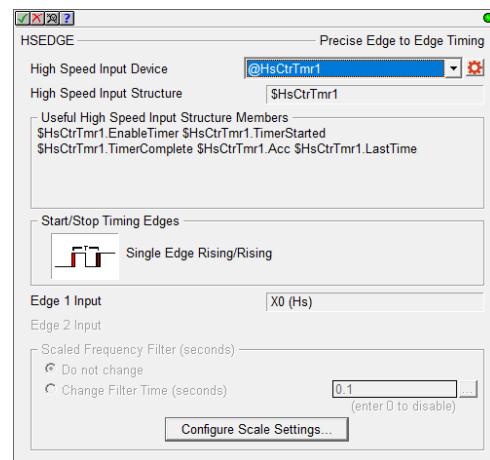
Used in combination with Modbus I/O Scanner devices for non-polling Modbus Server/Slave device parameters, like writing configuration parameters or reading static information like Model Number, or any other event-based data access.

The screenshot shows two overlapping dialog boxes. The top box is titled 'MSREGRD' and is labeled 'Modbus Scanner I/O Register Read'. It contains fields for 'Device' (@GS20Dev), 'Structure' (\$GS20Dev), and 'Profile' (DuraPulse GS20.mdp). Below these are tables for 'MSREGRD' and 'MSREGWR' instructions. The bottom box is titled 'New Row #2 Modbus Scanner I/O Register Read' and is also labeled 'Modbus Scanner I/O Register Read'. It has a search bar and a table with columns: #, Function Code, Address, Name/Description, Conversion, Count, and Destination. A specific row is selected with values: # 1, Function Code 3 - Read Holding Registers, Address 41544, Name/P0.07 / Over-Torque Detec..., Conversion 16 bit Signed Integer, Count 1, Destination N10. The right side of the bottom box contains various configuration options for the Modbus Address, Data Format, and Scale Factor.

Filling in the Function Code and Modbus Address values for these instructions is much more useful when used with pre-defined Profiles that have their many parameters also defined such that you can use the Browser mechanism on the left side that then fills out the information on the right side. Regardless, any valid Modbus Function Code and Address can be manually entered on the right side of the form.

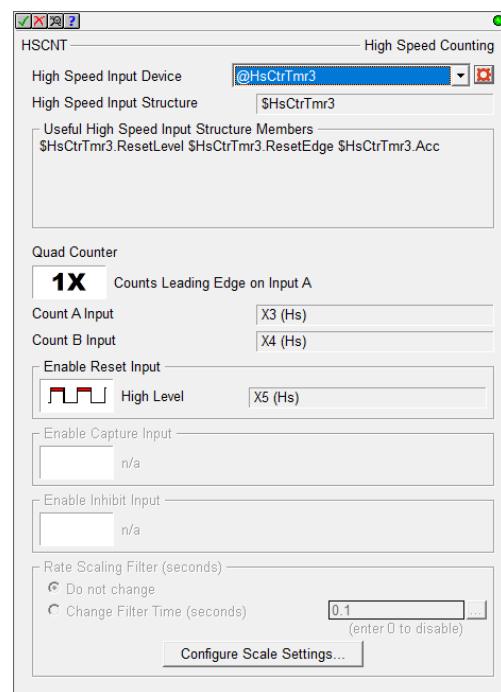
b. HSEdge – Precise Edge to Edge Timing

Provides a Ladder Logic reference to your BRX High Speed Timer function (5551).



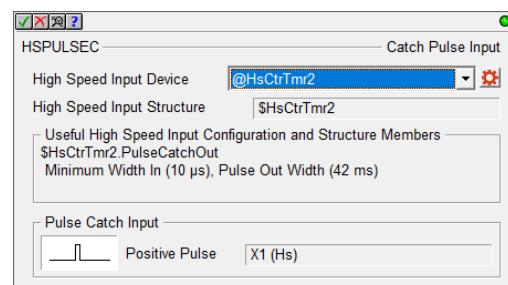
c. HSCNT – High Speed Counting

Provides a Ladder Logic reference to your BRX High Speed Counter function (5551).



d. HSPULSEC – Catch Pulse Input

Provides a Ladder Logic reference to your BRX High Speed Pulse Catch function (5551).



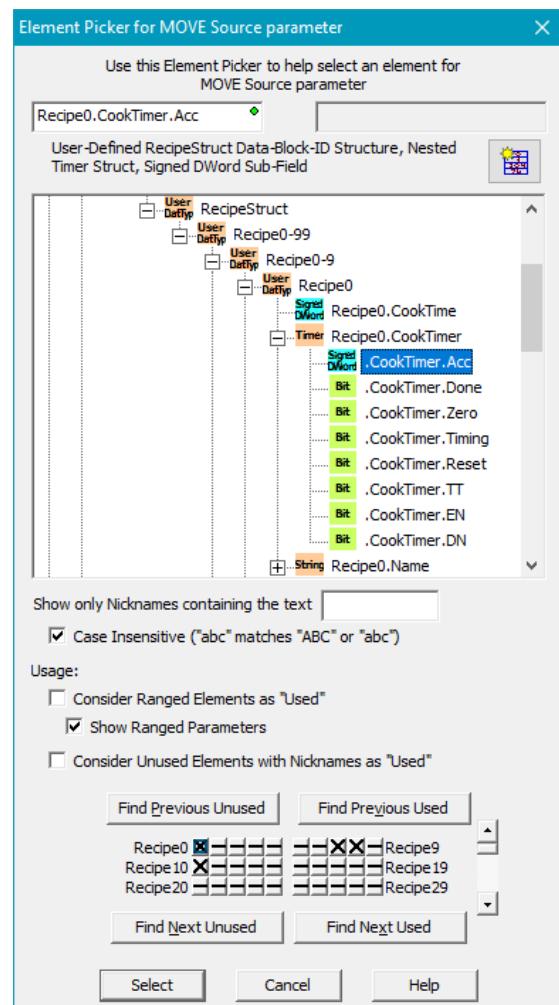
3. Nested Structures within User Data Types

Add other structures to your User Data Types like Strings, Timers, Counters, PID, Date/Time, et. al., in addition to your other User Data Types. Multiple structure members of most built-in and UDT structure types can be added to a UDT.

So a RecipeStruct UDT can have a nested .Name String field and a .CookTimer Timer field, then have a block of 50 Recipes and reference

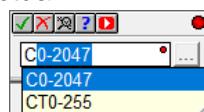
Recipe42.CookTimer in a TMR instruction, or CurrentRecipe.Name heap-item in a report, or use Recipe[V7].CookTimer.Acc in a MOVE box.

Note: *Nesting is limited to one additional structure level*, so you cannot embed a UDT that contains other structures inside yet another UDT. Structures with just bit and numeric fields can be embedded within UDTs, like a Timer structure embedded inside a Recipe UDT, Recipe42.CookTimer.Acc. However, Recipe42.Control.CookTimer.Acc (note Control structure level) is not supported because Control structure contains a (Timer) structure. Also, some complex built-in structures are not nestable like Programs and Axis.



4. Enhancements

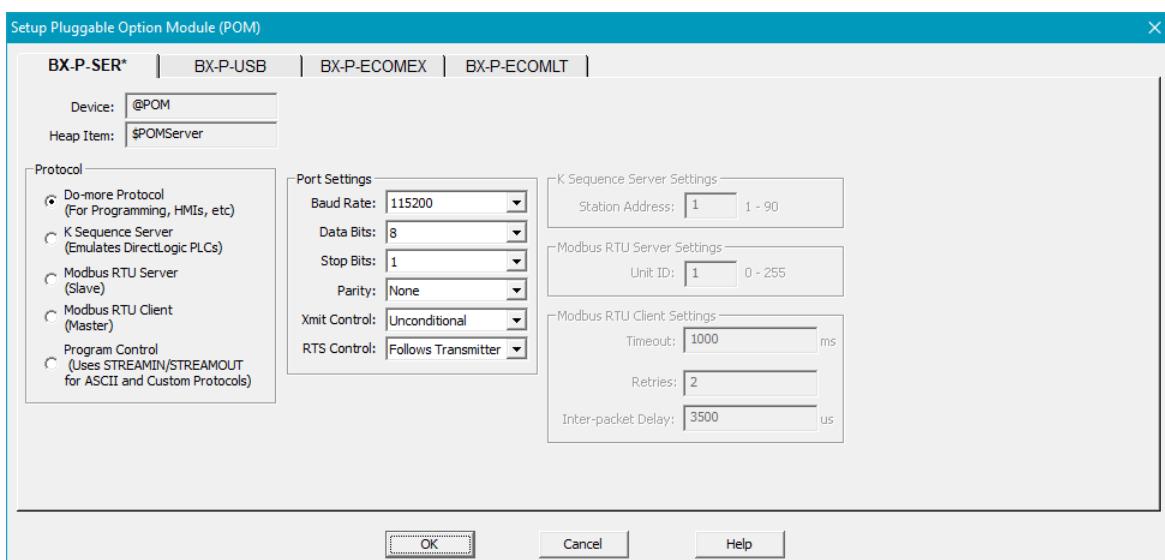
- Element Field Auto-Complete ID Edit** – when you arrow down or select an Element Range from the Auto-Complete list, the edit control automatically selects the text characters of the ID range to make it easy to enter the actual ID:



In the above example, after selecting the C0-2047 item from the Auto-Complete list, the next keystroke will replace the selected text in the edit field 0-2047 with the entered number keystroke. You used to have to manually edit the text of the ID range, which required a combination of various keystroke sequences of Arrow keys, Shift key, Delete key, and/or mouse actions (5943, thanks to CA).

- Ladder View** – warn when using a **Standard Input or Output in High Speed instructions** that specify speed parameters faster than 2ms or 500Hz (6609). For example: warn when setting the Maximum Velocity parameter to 1000Hz in the AXCONFIG for an Axis device that is bound to a Standard Discrete Output (1000Hz would only work with a High Speed Discrete Output).

- c. **Ladder View – COPY** instruction now supports copying a range of strings between blocks that contain strings of different Maximum Lengths (6594). STRCOPY warns when the Source string literal is too long to fit in the destination string element. Improved COPY instruction's warning and error reporting.
- d. **Ladder View – FILE*** instructions do not support arrays for the File Handle Struct parameter.
- e. **Ladder View – Find dialog** added a checkbox to *Close dialog on Find* (5607).
- f. **Ladder View – Comment Editor** dialog supports setting the default Font size for when you create a new Rung Comment. Factory default is Medium, so it can be changed to Small, Large, or Huge (6643).
- g. **System Configuration – BRX POM Configuration** has been moved from being part of the CPU Configuration to being its own tabbed dialog (accessed from the CPU Configuration Entry page of the System Configuration dialog):



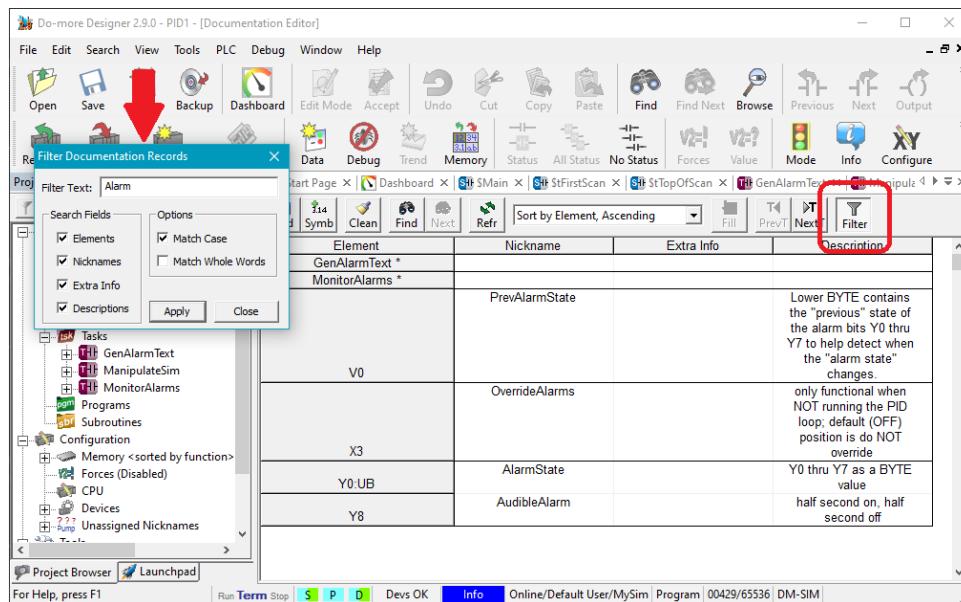
As new BRX POM modules are developed, their configurations will be added to this dialog.

- h. **System Configuration – Memory Configuration Entry/Structs (Built-In/UDT)** page, Attributes column designates which Structures are Nestable (N) and which ones are Deep (D) (see *Nested Structures within User Data Types* above).
- i. **System Configuration** – made the **Server Whitelist Settings** dialog easier to use.
- j. **Global Options** – added options whether to **auto-generate** Project Export files and C-more Export files (6093).
- k. **Element Picker** – added checkboxes for classifying certain **Unused Elements** as Used (6602):
 - * Unused Elements within Ranges
 - * Unused Elements with Nicknames
- l. **Change Value** dialog – when entering a structure field that has a custom format by default (say a timer accumulator), automatically choose that custom format display/editor (6704).
- m. **Memory View** – added support to edit fields of structure blocks (6629). For REAL fields, added support for Exponential format like 6.02E+23.

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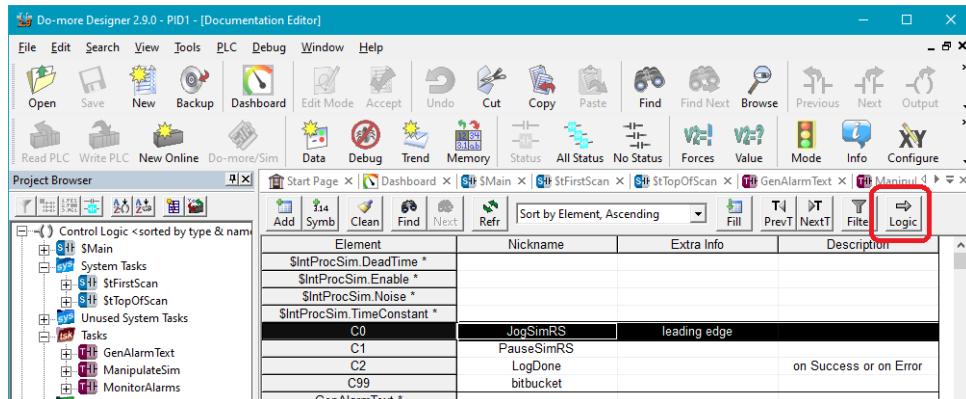
- n. **Documentation Editor** – Added a **Text Filter** mechanism to reduce the viewable set of records.

The Filter dialog is mode-less in that you can continue to do other work in Designer while maintaining that Filter in the Documentation Editor. It auto-hides as you are doing other work away from the Documentation Editor - just click on the Document Editor to bring it back.



- o. **Documentation Editor** – Added **Go To Logic** button that brings up the first occurrence of the selected Doc Editor Element in Ladder Logic:

In this example, clicking the Logic button with C0 record selected will open \$Main code block to address 18, the first occurrence of C0 in Ladder logic.



- p. **Documentation Editor** – Add **Documentation Record** dialog Nickname field automatically replaces spaces with underscores as you type (6640).
- q. **Trend View, PID View** – added a **Reset** button that clears only the graph on the screen and starts trending on the left edge (3979). The collected set of timed data point values is still maintained, which can be viewed by changing the time scale or going into Historical mode.

- r. **Dockable/Floatable Views** – added Help Topic **DMD0500 Docking and Floating Views** that provide details about how to manipulate your Designer work environment. Whether you have a multi-monitor system where you float multiple groups of multiple Data Views outside the Designer main window, or your development system is on the opposite extreme where you have a small laptop screen, so you need to maximize Ladder View real estate, but you need your Project Browser and Cross Reference views to be easily accessible using the auto-hide mechanism where just floating your mouse cursor over the tab reveals it, but then it auto-hides when you move the mouse cursor away (4031, thanks to MN).
- s. **Constants** – added Help Topic **DMD0499 Using Constant Values** that describes the best use of constants, constant formats, status data formats, and Symbolic Constants (4279).
- t. **New System Status Nicknames**

ST156 \$QueueFull	Turns ON after a Queue Load instruction (FIFOLOAD, LIFOLOAD) attempts to add a new entry to a full queue (2.9.3, requires firmware 2.9.4)
DST412 \$AssertCode	Should be 0; non-zero value indicates a firmware diagnostic code
DST413 \$ForceMinScan	Minimum Scan Time in microseconds; ensure PLC scan time will be at least this long (actual scan time can be longer)
- u. **Contact Mnemonics** – enhanced Help Topic **DMD0186 Instruction Set for Do-more CPUs** that list out all the contact mnemonics for each contact type (6100, thanks to DB).

5. Adjusted Anomalies

- a. Documentation Editor – properly show Element Documentation Records after sorting or filtering (2.9.4, 6754, thanks to RB); properly handles Paste operation with a large Element Documentation Database that utilizes an Operation Status dialog (2.9.3).
- b. Simulator – FILE* instructions properly report file status to FileHandle struct; when changing PLC modes, properly manage files that are open (2.9.4, thanks to KK).
- c. Replace Dialog – better handling of List of items; after hitting Add to List button, move keyboard focus back to Replace edit field (2.9.4, 6753, thanks to GD).
- d. FIFO/LIFO Queue Full Diagnostic – new error when attempting to add a record to a full queue; see new ST Bit System Nickname \$QueueFull ST156 (2.9.3, requires firmware 2.9.4).
- e. PLC Mode Change Dialogs - support asynchronous mode change behavior along with better error reporting (2.9.3).
- f. System Configuration – Edit Modbus I/O Scanner supports ordering the Modbus Comm and Modbus Field nodes in the configuration tree using Move Up/Down buttons (2.9.4, thanks to GD); Edit Modbus I/O Scanner Local Element entry field properly allows Read Only structure fields, and properly disallows array elements (2.9.3); Updated SMTP Client Settings Test Settings (2.9.3); Edit Modbus I/O Scanner Device dialog lets you add a Modbus/TCP Client device using the new Add button next to the Modbus Client dropdown box (2.9.2); Modbus I/O Scanner Profiles support Coil Read/Write and Input Read (2.9.2); automatically bind Modbus I/O Scanner Profiles to current Modbus I/O Scanner Devices (2.9.2); enabled Help(F1) button in various dialog boxes (2.9.2); Serial Port Physical Layer configuration (RS-232/RS-485) propagated properly when PLC CPU types change (2.9.2).
- g. Ladder View – STRPRINT Script Editor properly allows exclusion of Thousands (Comma) Separator in FmtReal command (2.9.4); JMP instruction description changed to *Transition From This Stage* to better illustrate that JMP is NOT an assembly language type Jump/Goto, but a higher level SFC-like transition (logic below enabled JMP within containing Stage still executes on that transitioning scan, 2.9.4); properly handle Replace of a structure with a nested structure (2.9.3, 6743, thanks to RB); after Replace, adjust contact/coil/box size (2.9.3); MSREGRD/MSREGWR added Range details to Name/Description column (2.9.3, 6741); MSREGRD/MWREGWR support for Copy of whole structures and range structure fields (2.9.3); MSREGRD/MSREGWR Monitor Values handles table parameters (2.9.3, DM-609); MSREGRD/MSREGWR editor properly updates Profile Parameter Table after changes are made (DM-610); proper handling of placement of New Toolbox dialog box (2.9.3, 6552/6553 thanks to BC); FIFO/LIFO Queue Status proper handling of unwritten changes to queue block size (2.9.3); proper handling when editing elements in a table-based instruction with IDs that are out of range after a block size change (2.9.3); STRSUB – warn when inconsistency exists between Input and Output Strings' Maximum Lengths, Offset, and Length parameters that could cause unexpected truncation of desired Output String (2.9.3, 6728/6745); MATH – added Element Picker button for Expression field that lets you easily browse for element names since it is a free-form editor and not auto-complete (or just hit F9 key) (2.9.3, thanks to RB); Report Control editors properly handle launching Element Browser using F9 key when Element Picker is already opened (2.9.3); proper handling MRX/MWX status display when range of 2 16-bit Registers are transferred to/from a complete 32-bit integer or real (2.9.2).

- h. Connect to PLC – converting PLC Opcodes to Element properly handles array of a BYTE or WORD struct field (2.9.2).
- i. Edit User Data Type - when connected to a PLC, and Designer's Memory Configuration becomes incompatible with what is currently in the PLC, disable Online Status (2.9.2).
- j. Element Text Entry – properly handles PL array reference like PL[V42] (2.9.2).
- k. Program Export/Clipboard/Copy/Paste – export nested UDT definitions before the deep UDT that references them (2.9.2); properly handle nested UDT structures when pasting (2.9.2); properly set Disk and PLC Modified flags when pasting a clip that changes System/Memory Configuration (2.9.2); optimizations on Paste (2.9.2).
- l. Project Browser – Adjust Force subtree entries when Designer and PLC Memory Configurations become incompatible (2.9.2).
- m. Ladder View – MEMCOPY instruction, wrong error message if source or Destination parameter is unassigned struct (6578).
- n. Efficiently print multiple row rungs across multiple pages (6619).
- o. Ladder View – PWMOUT instruction's High Speed Discrete Output parameter that is not entered explicitly (it is implicitly based on the entered PWM Device parameter) shows up in Cross Reference (6630).
- p. Ladder View – MRX/MWX instruction's valid range for Number of Modbus Elements properly based on the Modbus Function Code. For example, Read Coils range is 2008 Bits, but Read Holding Registers range is 125 Registers (6625); MRX/MWX editor properly handles IP Address field when changing device from a Modbus/TCP Ethernet port to a Modbus/RTU serial port (6651). MRX/MWX Do-more Range parameter's Element Picker and Auto Complete list reflect the valid ranges based on the current Function Code (6677). Properly show sub-range in Ladder Display using casts (e.g. D0:W0) when Modbus Register Count is odd. MWX Do-more Range properly handles constant Do-more parameter.
- q. Ladder View – RX/WX Remote Memory Block, Built-In field editor no longer setting Remote Built-In elements to the local project's nicknames (6701)
- r. Ladder View – DATAINFO – Query Information about Data Memory instruction, corrected wording of Heap Item Information Type entry *Number of DWORDs* to *Number of BYTES in Heap Item*. The instruction in the PLC always has returned Number of BYTES for that entry, even though the wording in Designer was not correct.
- s. Ladder View – Common Timer editor properly limits Timer types within a Subroutine (6667).
- t. Ladder View – added support for bit memory cast as numeric in the FIFO* and LIFO* Queue instructions (6639).
- u. Ladder View – STREAMIN warns when Data Destination Numeric Data Block *Buffer Size in Bytes* value is smaller than *Complete when Length is* value (6669).
- v. Ladder View – MEMCLEAR validates the parameter range (6671). MEMCLEAR box width displays correctly. MEMCLEAR status display optimized (6690).
- w. Ladder View – do not allow array references for File Handle parameter in FILE* instructions (6685).

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- x. Ladder View – Print/Print Preview no longer trims off wide boxes. When returning back to the Ladder View, the width of those boxes are displayed properly (6627).
- y. Ladder View – as editing various parameters, properly set inter-dependent dynamic parameter ranges (6677, 6650).
- z. Ladder View – constrain set of Timer types in Common Timer when inside a Subroutine (6667).
- aa. Ladder View – proper display of instructions after a Print Preview (6627).
- bb. Ladder View – added confirmation dialog to Replace operation (6649, thanks to GD).
- cc. Project Browser - properly shows dynamic system structure schema changes like when adding scaling to a High Speed Counter/Timer resource (6628).
- dd. Project Browser – Properly show dynamic updates to the Memory Configuration.
- ee. System Configuration – Edit User Data Type dialog properly handles DEL key when editing the Structure Name field (6645).
- ff. System Configuration – SMTP Client (EMAIL) dialog properly initializes Port field after re-opening dialog.
- gg. System Configuration – ensures device name's heap item name does not conflict with an existing heap item (6683).
- hh. Project Files – warn when an entered Project file/folder name or a Designer Folder Setting name is too long for Window's file system (6634).
- ii. Data View – properly handle Offline Data View when Connecting to a PLC (6706).
- jj. Trend View – properly restores the Minor Tick Mark count (6654).
- kk. Memory View – need to unconditionally close UDT based Memory View when the UDT definition itself is modified via the System Configuration dialog.
- ll. Memory View –upon opening a Disk Project whose Memory Configuration is incompatible with its associated PLC Project, do not open any incompatible Memory Views.
- mm. Clear PLC Dialog – keep the dialog open if any issues are reported.
- nn. BRX Axis status – changed unconfigured status text from <disabled> to <unconfigured>.
- oo. JSON Pretty Print – properly report Windows DOM object failure (6665, thanks to BG).
- pp. Status Updates – adjusted Designer's Communication Update mechanism to better handle status update bursts (6670).
- qq. Write to PLC – properly verifies PLC mode when required to switch to Program mode.
- rr. Close Project – all view types are properly queried about any pending changes before closing.
- ss. Export Element Documentation – properly handling used vs. unused options and C-more export options (DM-590).
- tt. View Status – try to govern status update overload when the application GUI starts becoming unresponsive.

1. New Hardware (these require Do-more Technology Version 2.8)

BX-P-ECOMEX	<p>BRX POM: Secondary Ethernet port</p> <ul style="list-style-type: none"> Client capabilities: Ethernet I/O Master, EMAIL(SMTP), MRX/MWX, RX/WX, DLRX/DLWX, HTTPCMD, MQTT(PUB/SUB), DNS, PING, EtherNet/IP™ Explicit, FTP(GET/PUT see below), SNTP, STREAMOUT, PACKETOUT, PEERLINK, GSREG(RD/WR) Server Support: Modbus Server, EtherNet/IP™ Explicit Server, HTTP Web Server (see below), TCPLISTEN, PEERLINK, STREAMIN, PACKETIN, Do-more TimeSync, ... Supports DHCP (added DHCP to Primary Internal Ethernet Port also)
BX-HSIO4	<p>Similar to BX-HSIO1/2 High Speed Discrete I/O module except:</p> <ul style="list-style-type: none"> Input Frequencies up to 2,000,000 Hz (8 times faster) Output Frequencies up to 2,000,000 Hz (8 times faster) Input and Output Type: Differential TTL Nominal Voltage Rating: 5 VDC
BX-16NF3	BRX 16 point TTL Input, Sinking/Sourcing, 2.5 VDC
BX-16TF2	BRX 16 point TTL Output, Sourcing, 20 mA @ 2-5 VDC
BX-16CF3F2	BRX 16 point TTL Combo, 8 pt. Input Sinking/Sourcing, 8 pt. Output Sourcing
BX-08TRZ	BRX 8 point Relay Output, Dry Contacts
BX-16TRZ	BRX 16 point Relay Output, Dry Contacts
BX-05TRS-1	BRX 5 point High Current Relay Output, Form C, 8A @ 12-48 VDC, 24-240 VAC, or 0.5A @ 100-125 VDC

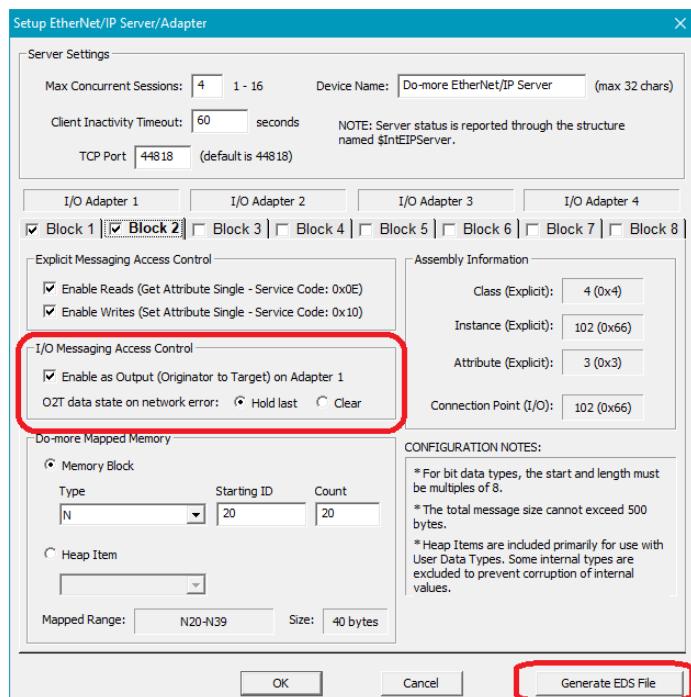
2. EtherNet/IP™ Adapter w/Implicit Messaging (Ethernet BRX/Simulator only, DmT 2.8)

Configure up to 8 blocks of **4 Adapter Pairs** as an EtherNet/IP Adapter, utilizing Implicit Messaging for **real-time** control by your Scanner device.

For each Adapter Pair, the odd numbered Block can be configured as **T2O**, and the even block can be configured as **O2T**. Blocks can also be configured for Explicit.

In addition to numeric/bit data blocks like N or C, blocks can be also tied to data blocks of Structures, and to **User Data Type** and Heap-Item structures, providing for a true **object instance** interface.

Generate the BRX's **Electronic Data Sheet** file with the push of a button to easily interface your configuration with **your EtherNet/IP Scanner**.



3. HTTP Web Server (*Ethernet BRX/Simulator only, DmT 2.8*)

Ethernet-equipped BRX CPUs have an on-board web server that can be accessed by any web browser using the IP address of the BRX CPU as the URL.

The CPU's web service has a REST API allows access to the memory elements in the BRX CPU from any web browser or other web client programming package. The on-board web server uses the REST API to automatically build several web pages that can be displayed in a web browser.

Once the web server has been enabled in the System Configuration, the main web page in a BRX CPU can be opened with any web browser, simply enter the TCP/IP address of the CPU as the URL.

The screenshot shows a web-based interface for a BRX CPU. At the top, there is a navigation bar with tabs: BRX, Info (which is selected), Status, I/O, DataView, SysLog, UserLog, and UserPages. The main content area is divided into several sections:

- Type**: Displays basic PLC information: Name: BX-DM1x, Description: MLS Do-more PLCI, PLC Type: H1-DM1E-6, Serial Number: 00 E0 62 30 04 74, and IP Address: 10.0.0.109.
- Mode**: Shows Keyswitch: TERM and PLC Mode: Run.
- Scan Times**: Provides statistics for scan times: Min: 666 us, Avg: 882 us, Max: 13430 us.
- Memory Usage**: Shows Program Used: 6% and Documentation Used: 1%.
- Versions**: Lists software versions: Do-more: 2.8.0, OS: 2.8.0, Booter: 1.0.7, FPGA: 1.12, Hardware: 5A5D, and Program DmT: 2.8.0.
- System Clock**: Displays Date: 6/16/2020 and Time: 10:28:43 AM.

Info: basic information about the PLC and its current state

Status: any current Info, Warning, and Error messages

I/O: current status of local discrete and analog I/O, updated once per second

Data View: a configurable table of selected element status locations, updated once per second

SysLog/UserLog: the current System Log and User Log tables

For details about the Web Server, see the Help Topic DmD0481 The Web Server.

REST API

The REST API can return the contents of any PLC memory location in JSON formatted records. The REST API is accessed using a URL with the appropriate parameters.

The format of the URL is <PLC-IP-Address>/data/json?<client-name>=<do-more-element>, for example:

192.168.10.42/data/json?MyScanCounter=DST0

and will respond with a JSON object containing the client-name and the element's data value:

```
{
  "MyScanCounter":14437656
}
```

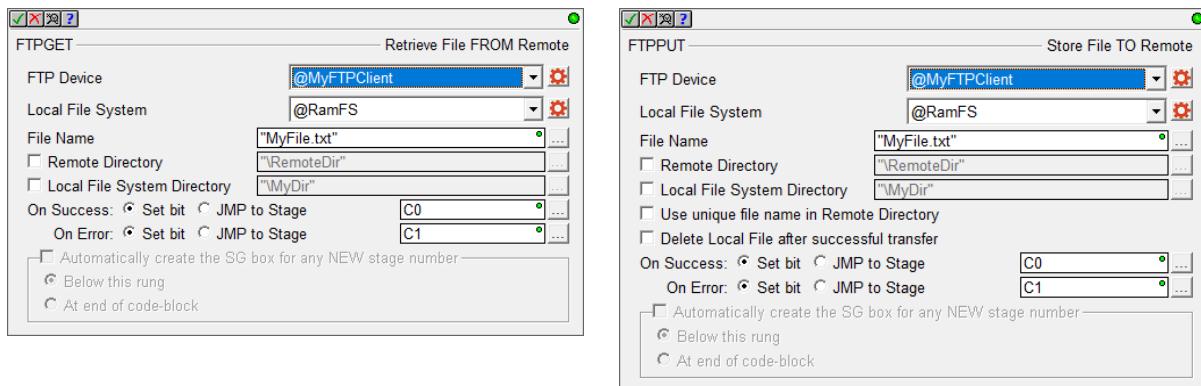
The REST API URL supports lists of elements, a range of elements, even structures as embedded JSON objects with Do-more structure field names as the nested object's field names.

For all the details about the REST API, see Help Topic DmD0482 REST API.

4. New Instructions (*DmT 2.8*)

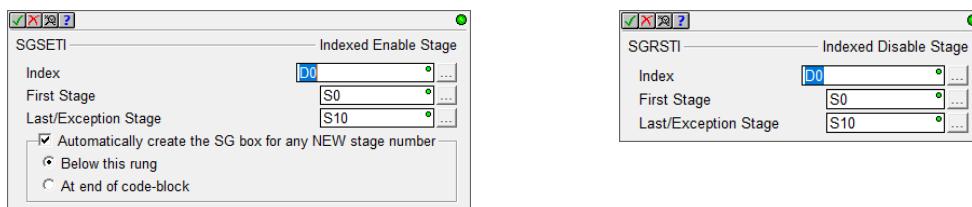
- a. FTPGET – Retrieve File FROM Remote
FTPPUT – Store File TO Remote**
(Ethernet BRX/Simulator only)

The FTP functionality is FTP Client only (not Server). The BRX PLC can GET(read from) and PUT(write to) files between a remote FTP Server and the PLC's File System.



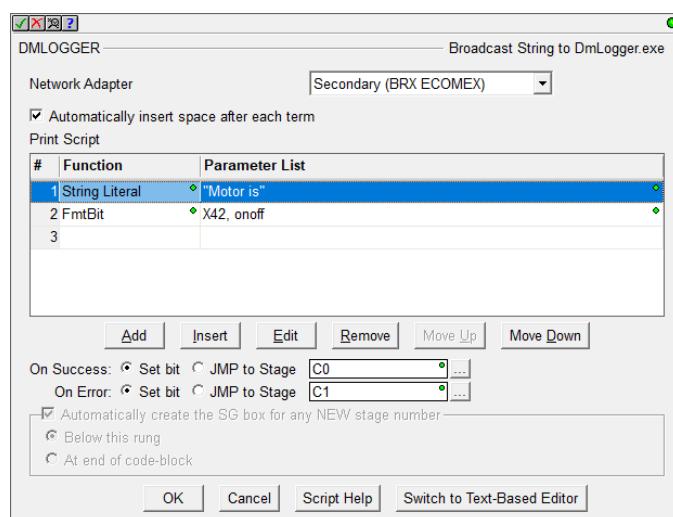
- b. SGSETI - Indexed Enable Stage
SGRSTI – Indexed Disable Stage**

Similar to the capabilities that JMPI (Stage Indexed JMP) provides, this pair of instructions lets you Enable or Disable another Stage indirectly via a variable index of a range of Stages. In the examples below, if D0 equaled 3, then S3 would be Enabled (or Disabled). While JMPI also transitions OUT OF the CURRENT Stage, the SGSETI/SGRSTI will NOT transition out of the current stage, but just enable/disable the other stage.



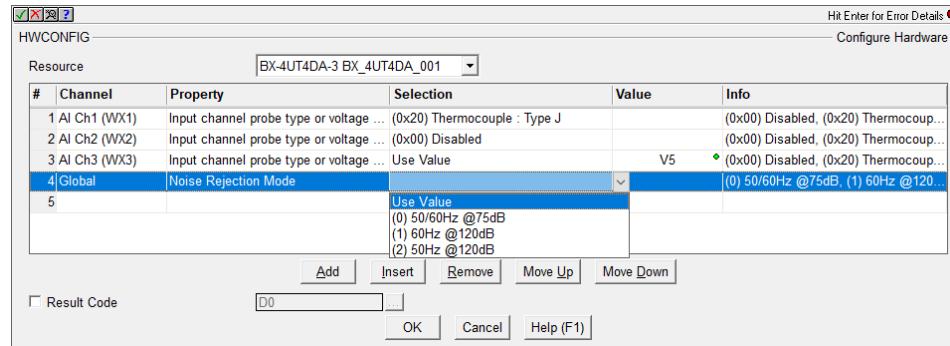
- c. DMLOGGER – Broadcast String to DmLogger.exe**

Combines the need for
selecting a Network Adapter for BRX Secondary Ethernet Port to broadcast the string to any PC with DmLogger.exe listening, and the need for **Print Script** capabilities.



d. HWCONFIG – Configure Hardware (BRX Local Only)

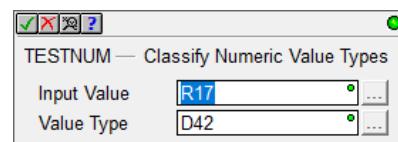
You can now manipulate certain I/O Configuration settings at runtime. For example, the on-board Analog I/O voltage/current setting(s) is normally configured statically in the System Configuration, but the HWCONFIG instruction can change those settings dynamically at runtime. So you can change an Analog Input from unipolar 0-5V to bipolar +/- 10V.



Manipulate High Speed Input Filter times, set Thermocouple Probe Types, et. al. Not all BRX modules are configurable at runtime. Some of the supported modules are MPU Onboard, BX -3 Analog Input/Output/Combo, and BX-HSIO. See help topic DmD0488 for details.

e. TESTNUM – Classify Numeric Value Types

Sets the Value Type to one of five possible “types” based on the Input Value (thanks to PK).



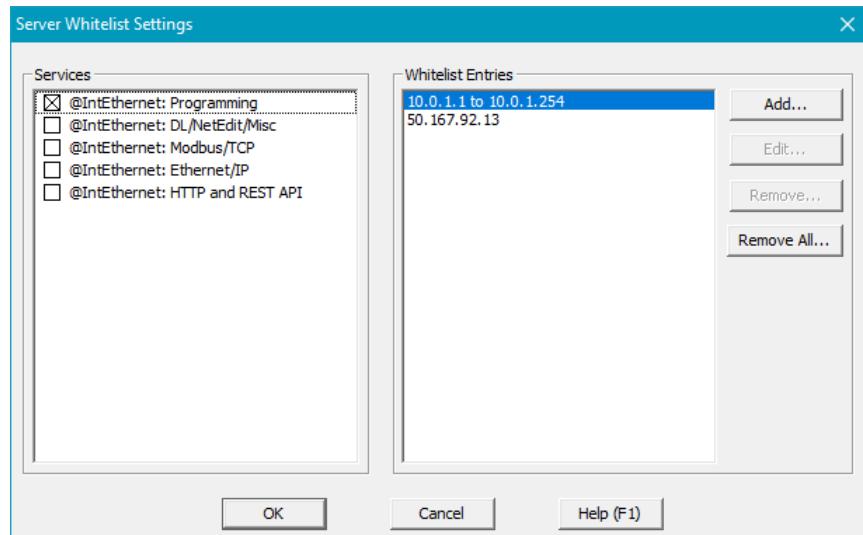
Tests REAL Input Value for IEEE 754 Floating Point classifications of Not A Number(0), Plus/Minus Infinity(1), Plus/Minus Zero(2), Subnormal(3), and Normal(4) Value Types.

Tests INTEGER Input Value for Min/Max Integer(1), Zero(2), and Normal(4) Value Types.

5. Server Whitelist support (Ethernet BRX/Simulator only, DmT 2.8)

per Server function, lets you specify a Whitelist of IP Addresses and/or IP Address Ranges allowed for that specific function.

PLC->System Configuration... CPU Panel, Whitelist Settings button.

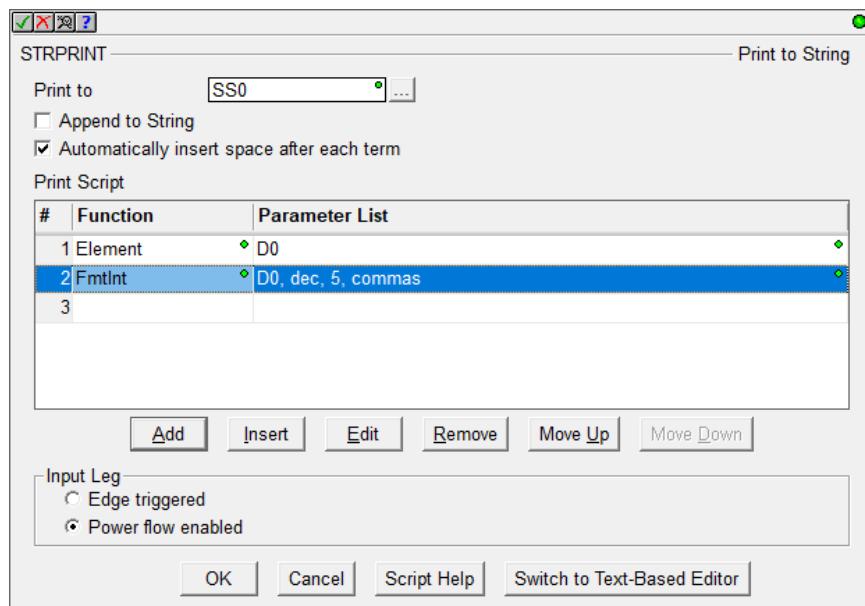


6. Table Based Script Editor for STRPRINT, EMAIL, and DMLOGGER (6431)

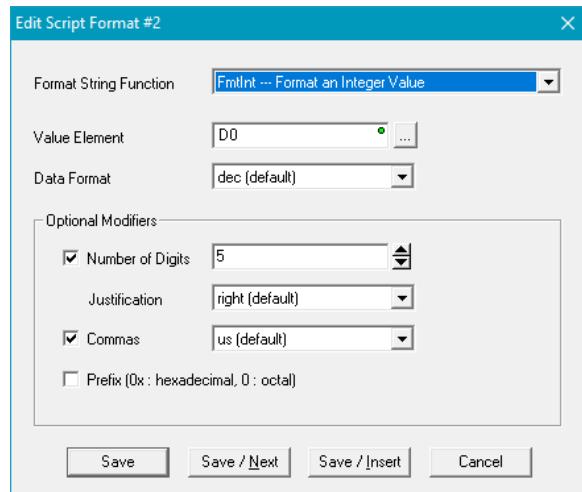
The original editors' multi-line text editor required knowing the function names, parameters, and keywords.

The new editor is table-based with intelligent form command entry, making it easy to see all the options for all the different Print Script commands.

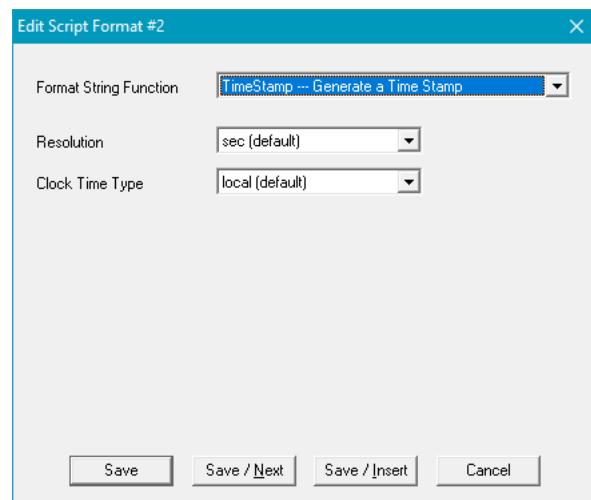
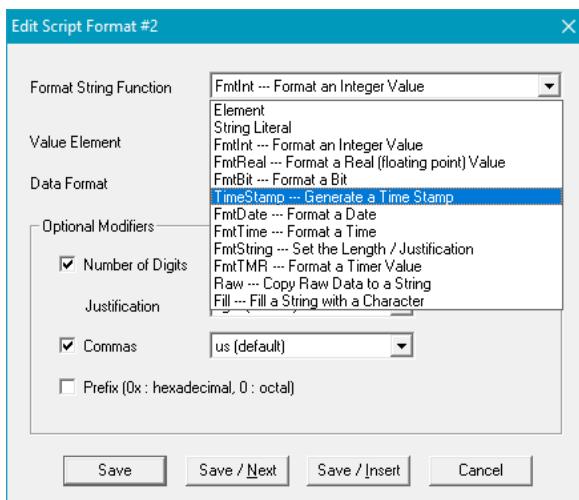
(To switch back to the Text-Based editor, just hit the button at the bottom).



In the Table Editor, when you add/edit a new function, you get a smart form that lets you fill out that specific function's parameters, like Justification of Left/Right/Zero Pad for the FmtInt - Format an Integer command.



Select a new function from the Format String Function list, the form will adjust to THAT function:

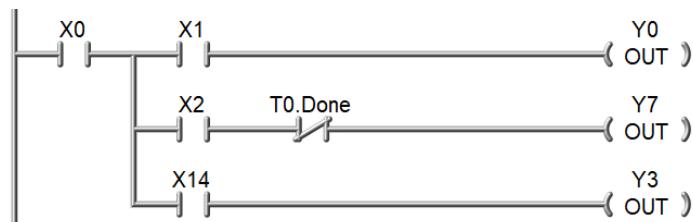


7. Enhancements

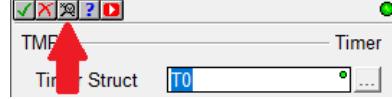
- Install** – migrate **Recent Projects List** from any **previous** installation (6312, thanks to JT).
- Ladder View** – Ladder Editor now allows **Master Relay type rungs**.

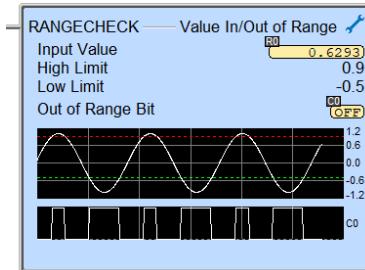
In this example, X0 enables or disables 3 other sub-rungs, which drive 3 different coils based on the state of other switches and a timer.

The Master Relay pattern can be nested within the same rung.



This *eliminates the AND-ABOVE-JOIN* Ladder Editor compiler error (6444, thanks to every customer since 1994).

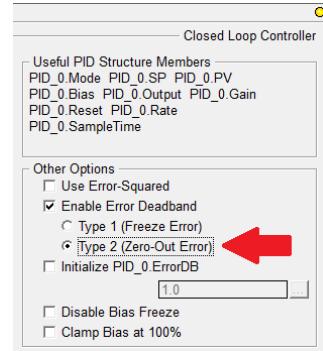
- Ladder View** – added F1 Help functionality to the Ladder Editor's compiler errors that are listed in the Output Window.
 - Ladder View** – Instruction Editor (general)
- when hitting the *Browse Element* button on any Instruction Editor toolbar, always launch the original Element Browser dialog box for the current edit field (6550).
- 
- Ladder View** – added support for **string literals** in **COPY** and **CALL** instructions (6253, thanks to TGM, et. al.).
 - Ladder View** – **Network Adapter selection** in specific Ethernet TCP Client Instructions is typically **implied** by the entered Server's IP Address and then is routed based on the configured Subnets of the Primary and the Secondary Ethernet ports. However, when TCP **broadcasts** must be utilized, or for internal **configuration**, a Network Adapter must be **selected**. The following instructions added Network Adapter selection: PEERLINK, PACKETOUT, PING, SETUPIP.
 - Ladder View** – added **Mini-Trend** to **RANGECHECK** instruction (6454)



- Ladder View – Instruction Specific Tools** 
- RUN, ENTASK, CALL and TCPLISTEN: open the referenced code-block's Ladder View.
- MATH: show Function help topic, STRPRINT/EMAIL: show Print Script help topic (6453).
- JSONPARSE: JSON Pretty Print for the non-numeric Found Value parameter (6599).
- Ladder View – JSONBUILD, STRCOPY** – support **string heap-items** when the Count is 1 (requires DmT 2.8, 6559).

j. **Ladder View – PID instruction Deadband**

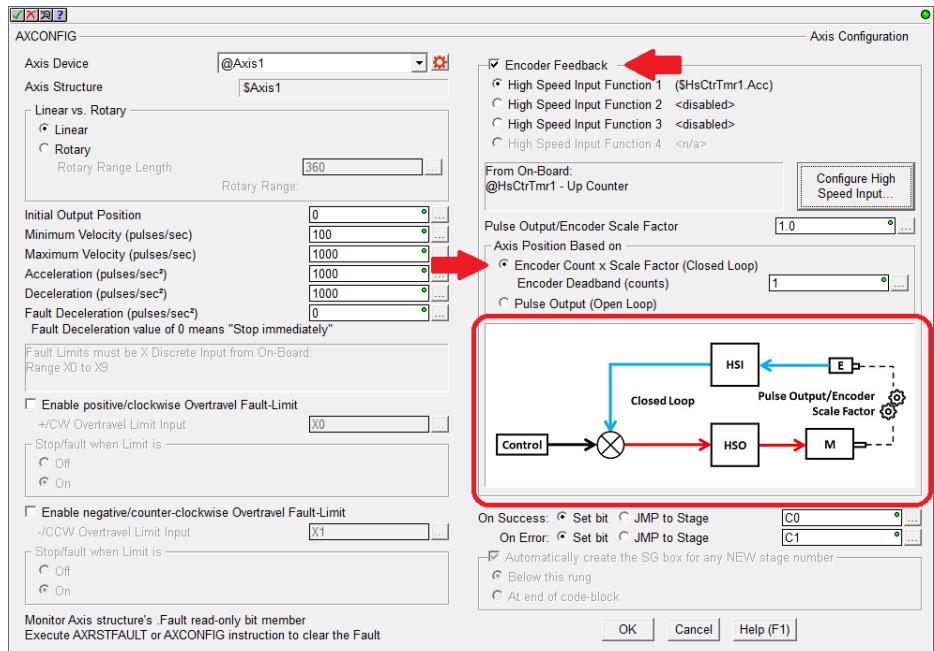
PID supports a second type of Deadband behavior. The original behavior (Type 1) freezes the Error term while it is within the Deadband value. The new behavior (Type 2) Zeros-Out the Error term while the calculated PV-SP Error term is within the Deadband value (6481, thanks to MM).



k. **Ladder View – AXCONFIG instruction editor**

Has dynamic **graphic** to help explain the specific behaviors of the Axis's reported position based on the three possible Encoder Feedback settings:

- No Encoder Feedback
- Position based on Encoder Count (Closed Loop)
- Position based on Pulse Output (Open Loop)



l. **Ladder View** – added OK/Cancel/Help buttons to all the large instruction editors that did not have them (HTTPCMD, AXPOSSCRV, AXPOSTRAP, AXHOME, AXCONFIG, EIPMSG; 6026).

m. **Ladder View** – DEVREAD/DEVWRITE supports the various FTP device parameters.

n. **Ladder View** – warn when editing Interval Time Based configured device instructions that utilize Stage Transition On Success/Error (MRX/MWX, RX/WX DLRX/DLWX, EIPMSG, MQTT PUB). These instructions report “Success” or “Error” at every time interval (since they technically never complete), so JMPing out of a stage of a recurrent time based instruction would cause that instruction to “terminate” the very first time, and hence never get a chance to run the interval time to do it a second/third/fourth recurrent time (6320, thanks to GD).

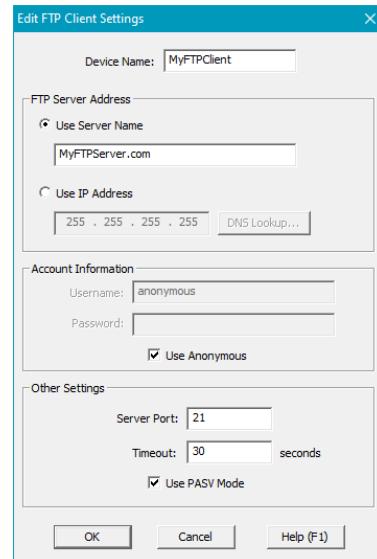
o. **Ladder View** – AXSCRIPT and Print Script command entry dialogs – added Help (F1) button.

p. **Ladder View** – adjusted JSONBUILD instruction editor Output Record group box border.

- q. **System Configuration** – modified the **CPU Configuration panel layout**. Streamlined TimeSync mode, added Initial TLS TimeSlice setting, moved configuration of the Modbus/TCP Server to its own dialog box, changed EtherNet/IP section to include EtherNet/IP Adapter, added Web Server and TCP Server Whitelist Configuration buttons.
- r. **System Configuration** – Setup (BRX High Speed) Match Register dialog has note next to “this value” field, to utilize the INTCONFIG instruction if the Match Register value needs to be a variable (the static configuration only accepts constants, 6588).
- s. **System Configuration – MQTT Broker** Configuration supports **empty passwords**.
- t. **System Configuration – Configure FTP Client Device** (*Ethernet BRX/Simulator, DmT 2.8*)

PLC->System Configuration...

Device Configuration Panel

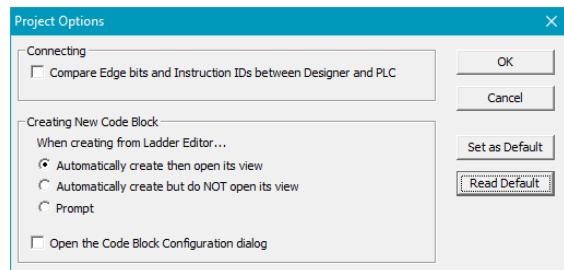


- u. **Memory View** - added support for **Structure** data blocks, READONLY (6209):

Memory View [T0-T100 - TIMER]								
T	Acc	Done	Zero	Timing	Reset	TT	EN	DN
T0	35.302s	0	0	1	0	1	1	0
T1	17.718s	0	0	1	0	1	1	0
T2	0.000s	0	1	0	0	0	0	0
T3	17.718s	0	0	1	0	1	1	0
T4	0.000s	0	1	0	0	0	0	0
T5	17.718s	0	0	1	0	1	1	0
T6	0.000s	0	1	0	0	0	0	0
T7	17.718s	0	0	1	0	1	1	0
T8	17.718s	0	0	1	0	1	1	0
T9	17.718s	0	0	1	0	1	1	0
T10	17.718s	0	0	1	0	1	1	0

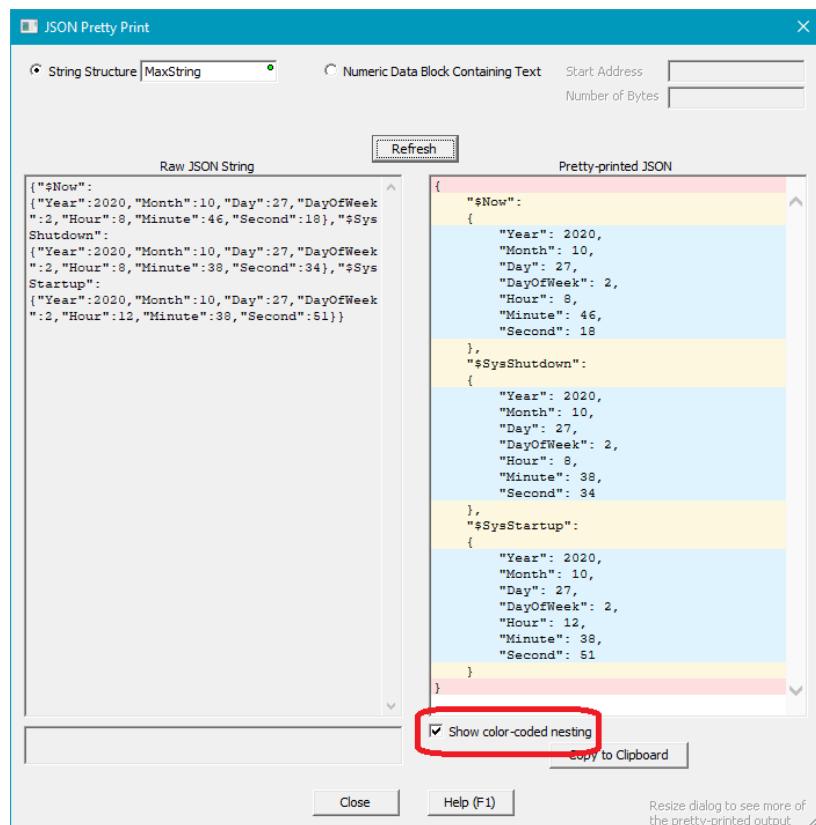
- v. **File->Project Options**

File->Project Options... lets you tweak project specific Designer behaviors, like filling out the Code Block Configuration dialog when you create a new Program. These options are configurable PER project, but you can define your own “default” options for new or for existing projects that don’t yet have any Project Options (6442).



w. JSON Pretty Print

Supports **nesting-level** based background colors (6513).



- x. **Dump File** – Dump File message box prompts to open **Windows Explorer** to the .dmp file location (e.g. c:\users\Public\Documents\Designer2_8\Bin) and selects that specific .dmp file inside Explorer (6482).
- y. **DmT 2.8 Firmware Enhancements:**
 - i. **DST68 (\$TLSTimeSlice)** – the amount of time per PLC scan in MICROseconds for running the **TLS/SSL security state machine** in the PLC. Some remote servers limit the amount of time a client has to perform the TLS handshaking. By allocating more time per PLC scan, more work can be done per scan, reducing the total amount of time to establish the secure connection.
- z. **Program Check** – New Rules:
 - i. W425 *Recommend not using within a Stage*, specifically an array indexed OUT coil (6070, thanks to MW).
 - aa. **New Online Project** – when **Offline Project is opened** and user hits New Online Project, offer option to **Connect to PLC** with the currently opened Offline Project (6515).
 - bb. **Select PLC Connection** – when showing **New PLCs**, the ones found via Ethernet provide the PLC's Ethernet (MAC) Address in the Other column when it is different than the PLC's Serial Number. This occurs when connecting via an ECOM module instead of a built-in Ethernet port.
 - cc. **Select PLC Connection** – supports PC Ethernet Network Adapters that are configured with multiple IP Addresses/Subnets (thanks to JB).

dd. Select PLC Connection – when connecting to a New PLC that does not have an IP Configuration (out-of-box IP Address is 255.255.255.255), the **Configure New IP Settings** dialog provides an option to have the PLC use **DHCP** to obtain an IP Address (vs. assigning a static IP Address).

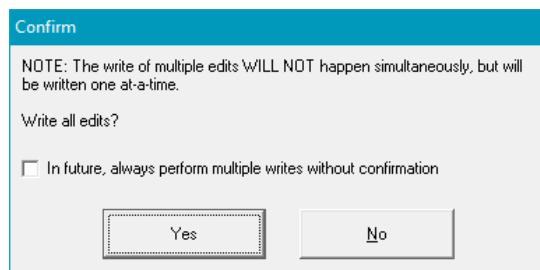
ee. New System Status Nicknames

		In BRX with BX-ECOMEX POM, when ST36 is ON (\$EnableMsgDump), use this bit to select which Ethernet Port to broadcast the messages out of:
ST38	\$DumpToSecAdaptr	0 Primary Port (IntEthernet) 1 Secondary Port (ECOMEX POM)
DST61	\$SysMsgLevel	ERR/MSG strings Report Level value: 0 – do not update ERR nor MSG 1 – update ERR only (default) 2 – update ERR and MSG
DST62	\$Eth2IpAddress	IP Config status registers for ECOMEX
DST63	\$Eth2Netmask	
DST64	\$Eth2Gateway	
DST65	\$Eth2DroppedPkts	Diagnostic registers for ECOMEX
DST66	\$Eth2PktsReceivd	
DST67	\$Eth2PktsSent	
DST68	\$TLSTimeSlice	Time in MICROseconds allotted to a PLC scan for servicing TLS secure handshaking
DST69	\$EIPAdaptrStatus	When a bit is ON, the corresponding EtherNet/IP Adapter Connection Block is being “scanned” by a remote Scanner; Bits 0-7 correspond to EtherNet/IP Server/Adapter Block #1 thru #8
DST70	\$Eth2MACAddress	Last 4 bytes of ECOMEX MAC address

ff. Launch Pad – added **Open Dump File Folder** to the Applications group (6488).

gg. Output Window – no longer closes automatically if it is floating, it will only automatically close if it is docked (6231).

- hh. **Data View – Write All Edits** message box informing user of it NOT being able to write all simultaneously has a “don’t ask again” checkbox (6492):



- ii. **Browse Videos** – added support for **Playlists** (see Keyword list).

- jj. **Browse PLC File System** – added **Help** button (5639).

kk. **Debug->Launch DmLogger**

The **Confirm Message Logging** dialog supports the 2 new System BIT/DWORDs

ST38 (\$DumpToSecAdaptr) - let you choose **which BRX Ethernet Port** to **dump** the system generated debug/error messages (Primary-OFF vs. Secondary-ON, 6585)

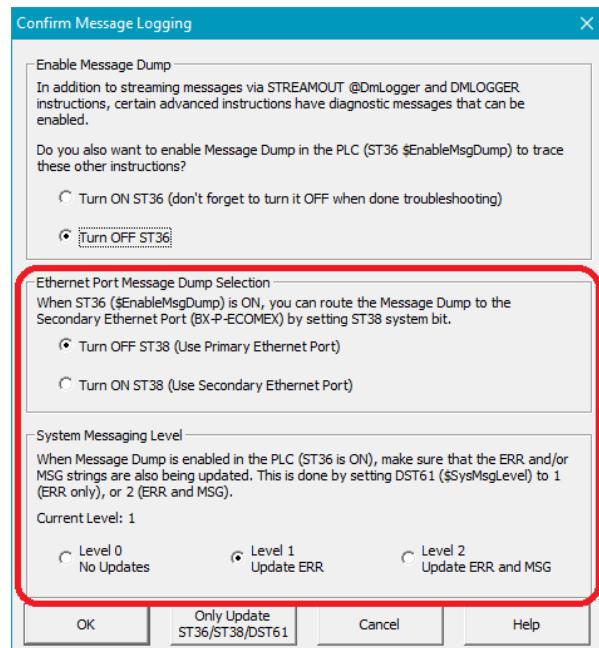
DST61 (\$SysMsgLevel) ERR/MSG strings

Report Level value (6461):

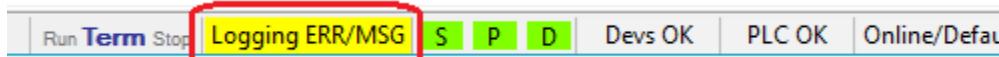
0 – do not update ERR nor MSG

1 – update ERR only (default)

2 – update ERR and MSG (useful for MQTT transaction analysis, however it also causes HEAVY CPU LOAD, so caveat emptor and remember to change it back to 1 or 0.



- ll. **Status Bar** – added a **new panel** when connected online to a PLC, that shows status of **DST61 (\$SysMsgLevel)** and **ST36 (\$EnableMsgDump)** when either is NOT their default (defaults are ERR only, Message Dump OFF) (6508).



- mm. **DMLoader** – lets you select the specific Network Interface Card (NIC) when connecting to your PLC

- nn. **Cross Reference** – added support for Print Ranges (6581)

8. Adjusted Anomalies

- a. Ladder View – High Speed I/O instructions editors’ Configure HSIO Resource buttons go to the proper module specific resource configuration dialog (5889, 5965, 5999, 6439).
- b. Ladder View – SR Shift Register Editor’s Shift Register range description text field changed from 1 line to 2 lines (6458).
- c. Ladder View – RAMP\$OAK instruction’s Monitor Values in Data View contains the Ramp Soak structure once (6441).
- d. Ladder View – after Search/Replace, refresh Stage numbers in the Address margin (6518).
- e. Ladder View – STREAMOUT’s Flush INPUT Buffer checkbox enabled properly (6534).
- f. Ladder View – MRX – Modbus Network Read instruction display no longer clips the Function Code parameter (6473).
- g. Ladder View – New Instruction Toolbox one-time notification dialog no longer shows up off-screen, which was causing Designer appear to be locked up (6552, thanks to BC).
- h. Ladder View – properly handle new heap-item name (instead of a new nickname) in RUN instruction vs. a new nickname.
- i. Ladder View – display coils properly when part of rung with W-I-D-E boxes (6562; thanks JW).
- j. Ladder View – EIPMSG – Send EtherNet/IP Message editor’s On Success label no longer grays out inappropriately.
- k. Ladder View – RX/WX – Do-more Network Read/Write properly shows the Element Picker button for On Success and On Error JMP to Stage option.
- l. Ladder View – Replace dialog maintains proper Documentation behavior radio button as you add multiple replace items to the replace list (6353, thanks to JW).
- m. Ladder View – Properly handles print pagination of tall box instructions like TDOPLS with 50+ steps (6256).
- n. Ladder View – Replace properly handles “temporary string” parameter of SS0 utilized in newer instructions (6570).
- o. Ladder View – JSONBUILD properly handles switching to Array Record Type after “Insert Structure Fields” was performed. Also disables the “Insert Structure Fields” button when Record Type is Array (6580).
- p. Ladder View – Table-based instructions properly display columns when “Lengthy Instructions” Ladder Option is set to “Display Short Summary” (6590).
- q. Ladder View – FILELOG handles ranged casts (6595).
- r. Ladder View – When performing Past of Rungs or Code Block, show a Status dialog (6450, thanks to JW).
- s. Ladder View – Drum instruction editor properly handles changing focus from the Mask or Step Preset field to the Output, Time, or Event fields (6451, thanks to CA).
- t. Ladder View – User Data Type parameter limits its status width (2.8.3, 6623, thanks to GD).

- u. Ladder View – COPY, CALL support copying Heap item to Heap item (2.8.3, 6622, thanks to M@F)
- v. Ladder View – PWMOUT: Edit Device instruction tool works properly (2.8.3, 6613); parameters properly change when PWM configuration is modified or deleted (2.8.3, 6614).
- w. Ladder View – String Script Editor properly handles unsupported Element types (2.8.3, 6618, thanks to RBP).
- x. Ladder View – Print properly handles rungs with many rows (2.8.3, 6617, thanks to CW).
- y. System Configuration – BX-HSIO module configuration dialog properly saves entered module configuration name (2.8.3).
- z. System Configuration – Properly hide/disable EtherNet/IP Implicit Adapter fields and MQTT/FTP device creation for CPUs that do not support those features (2.8.3, 6610).
 - aa. System Configuration – maintain devices associated with modules that are being disconnected when you change the CPU type.
 - bb. System Configuration – BRX Analog Output dialog properly handles scaled values in Electrical mode (thanks to DS).
 - cc. System Configuration – properly disables the Enable Ethernet I/O Master checkbox when PLC is a non-Ethernet CPU.
 - dd. System Configuration – properly disables EtherNet/IP Server Block when unchecked.
 - ee. Update Operating System dialog –Version Details button properly goes to Help topic about Do-more Technology Version 2.8 (2.8.3, 6611).
 - ff. Memory View – Support Bit data blocks in addition to Numeric and Structure data blocks (2.8.3, 6612)
- gg. Data View – Bit Display Settings for the individual graphics of a bit's ON/OFF states warns if BOTH are set to the "blank" graphic (6485).
- hh. Trend View – changed ambiguous menu "Options" terminology to differentiate between the general View Options and the view's specific Configuration.
- ii. Trend View – F1 Help button works in the Trend View Configuration dialog (6600).
- jj. Trend View – changes to default History Size option propagates properly (6567, thanks to GD).
- kk. Create Nickname – sets initial elements to be unused and w/o Nicknames (6549).
- ll. Download Project to PLC dialog – word wrap in Project Notes edit field behaves properly (6605).
- mm. Program Compare – no longer displays the Edge and Instruction IDs as part of the mnemonic when that option is turned off (6583, thanks to SM).
- nn. I/O System View – properly displays Analog Output Scale details (6542).
- oo. I/O System View – properly show warning state of analog modules
- pp. I/O System View – properly link to online documentation and spec sheets based on part number (6603).

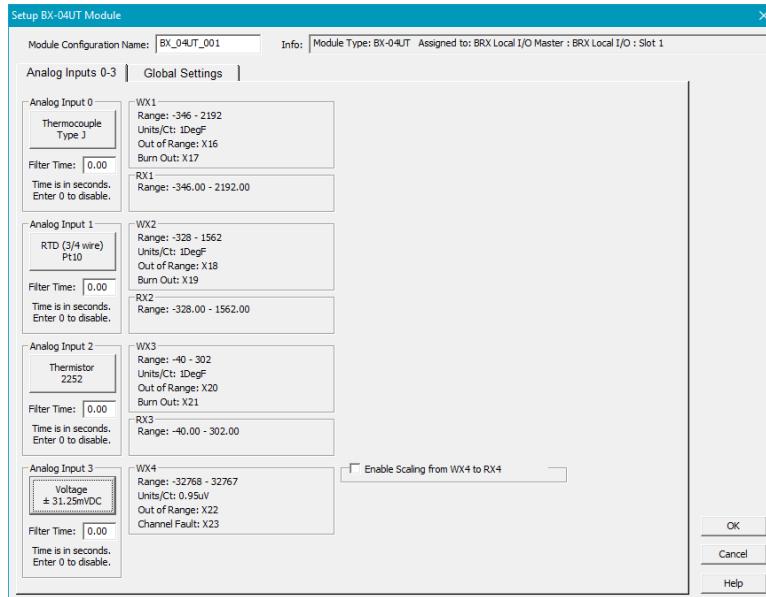
Do-more Updates Rel 2.8.3, February 1, 2021

- qq. I/O System View – properly handles changes to the I/O Configuration when online (6607).
- rr. New Offline Project dialog's New Project Name/Browse buttons work properly (6555, thanks to FD).
- ss. New Project – When creating a new Online or Offline project, use Window's %temp% folder when the specified *Projects* folder does not exist (6556).
- tt. Open Project Files – properly report when attempting to open a “newer” versioned .dmd project file with an older version of Designer (6530).
- uu. PLC Communication – enhanced Windows responsiveness during PLC read/write project operations (5772).

1. New Hardware (these require Do-more Technology Version 2.7)

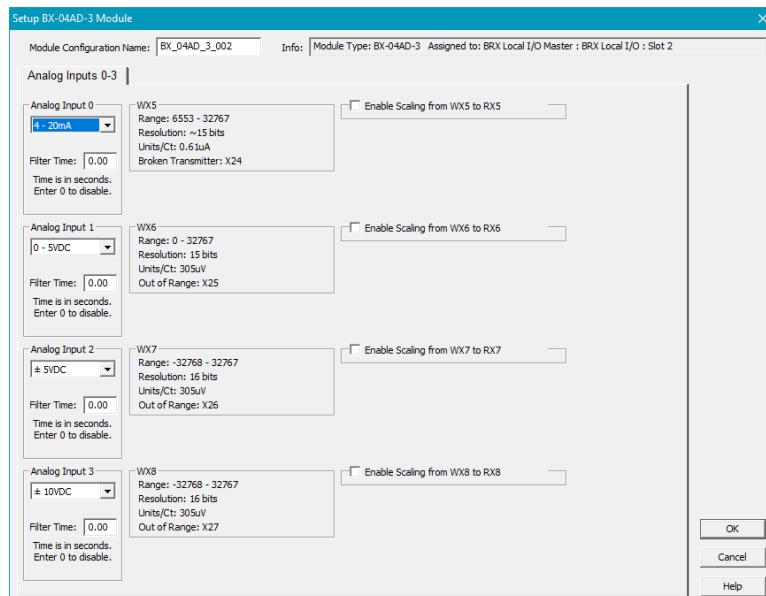
**a. BRX Universal Temperature Modules (Thermocouple, RTD, Thermistor)
BX-04UT and BX-08UT**

Configure each channel's signal independently (RX resolution is 0.001 of a degree):



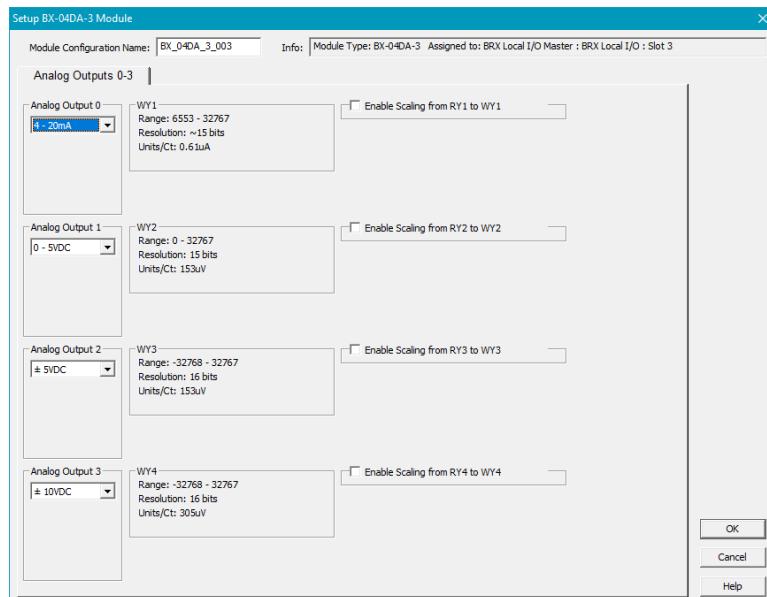
**b. BRX Universal Analog Input Modules (Current, Voltage, Unipolar/Bipolar)
BX-04AD-3 and BX-08AD-3**

Configure each channel's signal independently (similar to onboard analog inputs):



**c. BRX Universal Analog Output Modules (Current, Voltage, Unipolar/Bipolar)
BX-04DA-3 and BX-08DA-3**

Configure each channel's signal independently (similar to on-board analog outputs):



d. BRX *Universal* Analog Input/Output Combo Modules (Temperature, Current, Voltage, Unipolar/Bipolar, Discrete)

Analog Channels are configured similar to Universal Analog modules above.

BX-2AD2DA-3	2 Universal Analog Input, 2 Universal Analog Output
BX-4AD4DA-3	4 Universal Analog Input, 4 Universal Analog Output
BX-4UT4DA-3	4 Universal Temperature, 4 Universal Analog Output
BX-4UT4TD1	4 Universal Temperature, 4 Sinking 24VDC Discrete Output
BX-4UT4TD2	4 Universal Temperature, 4 Sourcing 24VDC Discrete Output
BX-4UT4TR	4 Universal Temperature, 4 Relay Discrete Output

e. BRX Serial Communication Modules

BX-P-SER2-TERMFC	4 RS-232 Serial Ports w/Flow Control using 5-pin terminal block conn.
BX-P-SER422-TERM	4 RS-422 Serial Ports using 5-pin terminal block connections

f. BRX Pluggable Option Modules (POM)

BX-P-SER2-TERMFC	RS-232 Serial Port w/Flow Control using 5-pin terminal block conn.
BX-P-SER422-TERM	RS-422 Serial Port using a 5-pin terminal block connection

g. Miscellaneous

BX-APAD	Active Pad Module emulates other BRX modules in the I/O configuration of a BRX system. It is configured in software to emulate the address space of a specific BRX module. As a padding module, it can be used to reserve address space so that addressing in subsequent modules does not change if a module is removed. It also allows intelligent module configurations and data structures to be emulated.
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2. New Instructions

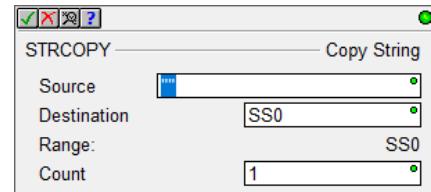
(these require Do-more Technology Version 2.7)

a. Copy Strings

STRCOPY – Copy String

Copy a *single* String element or String literal to *1 or more* string element destinations.

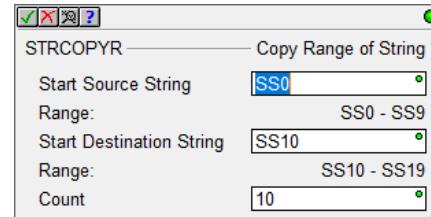
The String elements can be of different Maximum Lengths.



STRCOPYR – Copy Range of Strings

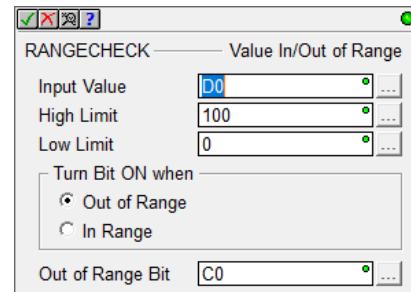
Copy a *range* of Source String elements to a *range* of Destination String elements.

The String elements can be of different Maximum Lengths.
The range of String elements *can* overlap in memory, so you can easily shift a block of Strings.



b. RANGECHECK – Value In/Out of Range

Turn a bit ON or OFF when a numeric element is either In Range or when it is Out Of Range of a High/Low Limit (constant or variable range).

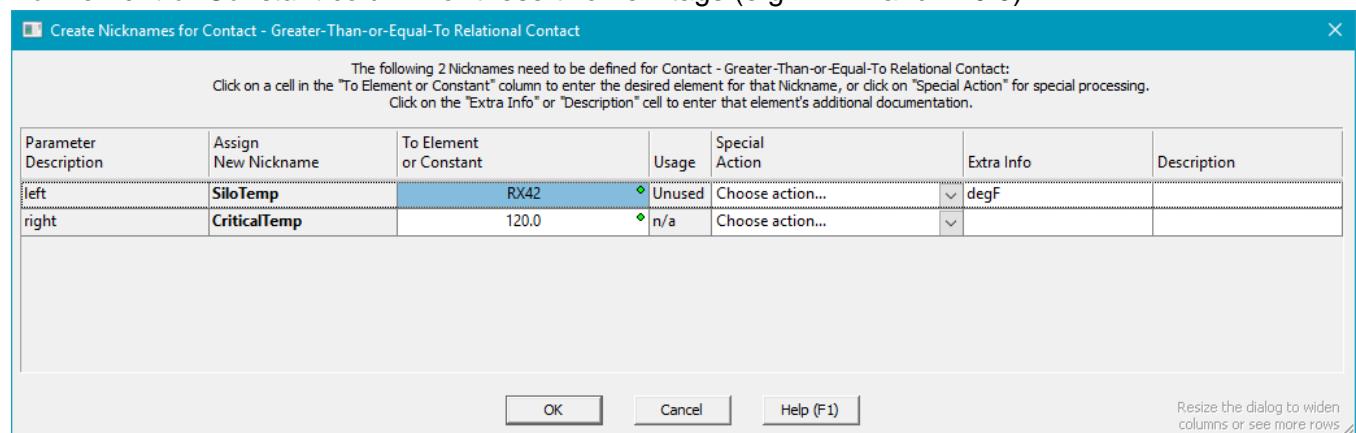


3. New Nickname Workflow – Create Nicknames as Needed

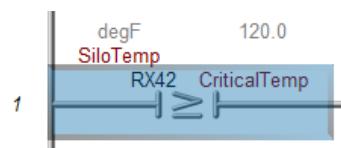
When writing Ladder Logic, you can create your Nicknames as you need them. For example, when entering a \geq relational contact to see when a temperature value exceeds 120.0 degrees, you do not have to predefine the Nickname for the RX analog input temperature or for the Symbolic Constant. Just type in the desired names in the contact editor's parameter fields (e.g. SiloTemp and CriticalTemp):



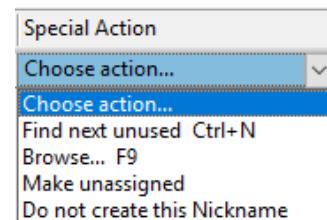
Note the Yellow bulb in the top right corner of the two fields and the instruction title bar - this means that these Nicknames are not yet defined. Just hit the ENTER key to accept the instruction with these new Nicknames, and you will be prompted to define these two new tags, just fill in the *To Element or Constant* column for these two new tags (e.g. RX42 and 120.0).



That's it! Just hit OK and you have the new contact with the two new Nicknames:



You also have **Special Actions** to simplify the Element selection, like getting the **next unused** element in the block, or **browsing** for the element using the **Element Picker**, or making the nickname **unassigned**, so that it can be assigned later (great for I/O elements early on in a project when I/O module definitions are unknown).

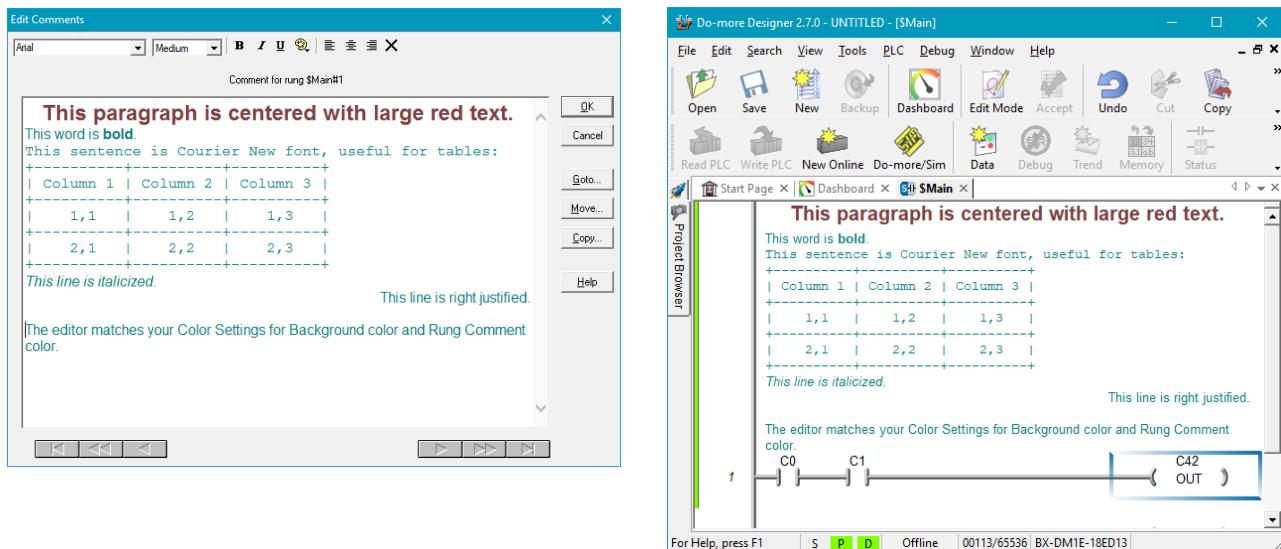


4. Formatted Rung Comments

Rung Comment Edit/Display supports rudimentary text formatting (4030):

Font: typeface, size, color, bold, italics, underline

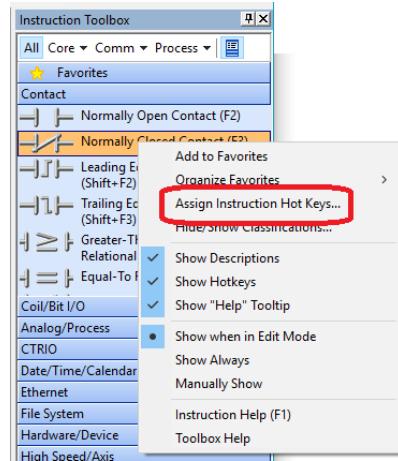
Justification: Left, Centered, Right



5. User Assignable Instruction Hotkeys

Keyboard users are used to utilizing hotkeys to program quickly, for example F2 for a Normally Opened Contact, > for a Greater Than or Equal To Contact. Now you can assign up to 10 of your favorite instructions to the number keys at the top of your keyboard, Ctrl+1 thru Ctrl+0 (6227):

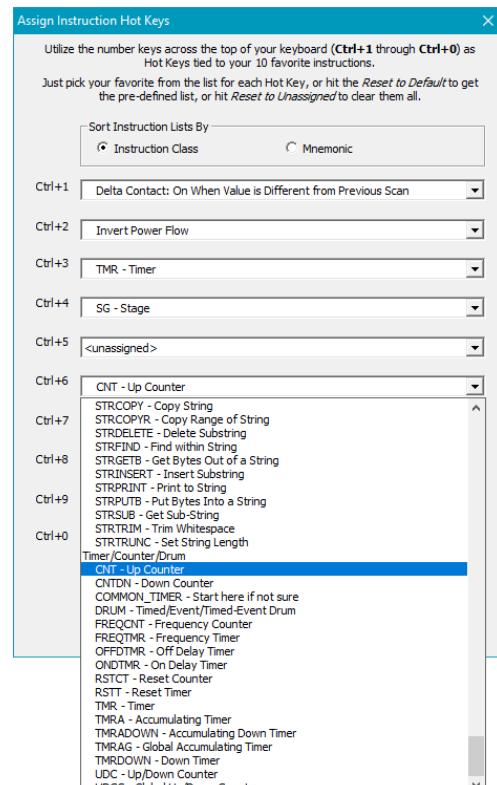
Just right click on the Instruction Toolbox



and select Assign Instruction Hotkeys...

Just scroll down a specific Hotkey's List Box and pick the desired instruction (e.g. Ctrl+6 to CNT box), and hit OK.

Now, just hit Ctrl+6 in the Ladder Editor and a CNT box will show up in the output column!



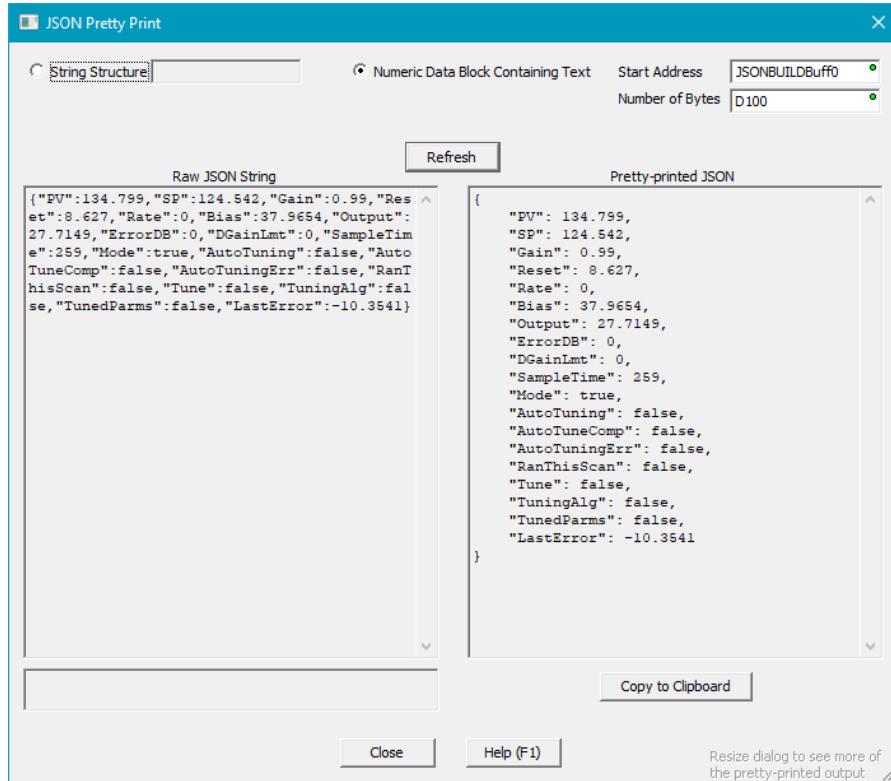
6. JSON Pretty Print Tool (6154)

When JSON support was added, along with MQTT (IoT) and HTTPCMD REST API support, it became obvious that analyzing incoming or outgoing JSON records became critical.

Whether it was the length of the data or the nested & hierarchical format of the JSON text, the normal Data View and Memory View tools were not useful. JSON Pretty Print tool was created specifically for this.

Just enter the source of the JSON text, either a String or the Data Block Start Address and the Number of Bytes (can be a variable), then hit the Refresh button to read up the Raw JSON text and also render the formatted Pretty Print equivalent.

Access via Debug-> JSON Pretty Print menu, or via the new Instruction Specific Tools tooltip.



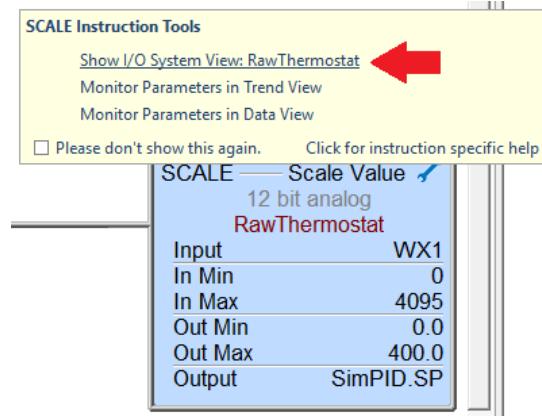
7. Launch Instruction Specific Tools from Ladder View with 1 Mouse Click

Almost every box instruction now displays a wrench in the top right corner to access tools that are useful to THAT instruction's function or specific parameters.

Just float the mouse cursor over the wrench and a Tool Tip popup will list out that instruction's context specific set of tools. Just click on one of the items to launch that specific tool.

For example, this SCALE instruction has an Analog Input register WX1 (RawThermostat) for its Input parameter, so with 1 mouse click you can launch the I/O System View to the specific Analog Input module tied to WX1 to get detailed status of THAT I/O module (scaling info, broken transmitter status, etc.).

SCALE	Scale Value	
	12 bit analog	
	RawThermostat	
Input	WX1	
In Min	0	
In Max	4095	
Out Min	0.0	
Out Max	400.0	
Output	SimPID.SP	



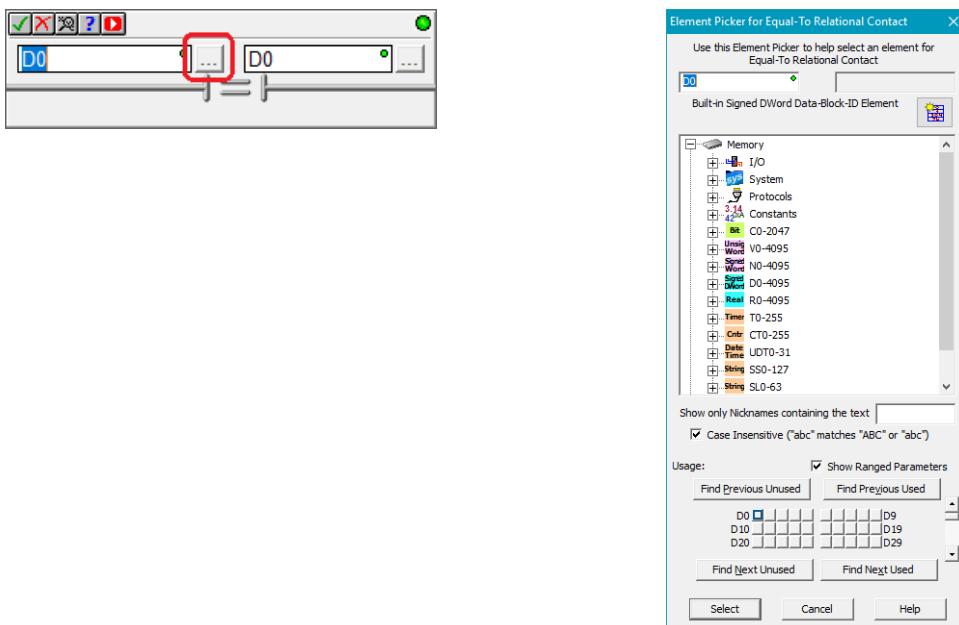
The full cross section of tool set to instructions and parameters are too large to enumerate, but the possible list of tools now accessible with 1 mouse click includes:

AXCAM Table Editor, Browse PLC File System, Device Status View, Configure Device, Ethernet I/O Monitor, Enable Stage, JSON Pretty Print, Monitor Parameters Trend/Data View, PID View, PLC Message Dump, Run DmLogger, I/O System View, Memory View, Stage Status, Show Structure Members, Show Structure Memory Layout, TDOPLS Table Editor, TDOPRESET Table Editor.

Note: many of these are ONLINE Tools, so they will not show up in the Tool list when OFFLINE.

8. Enhancements

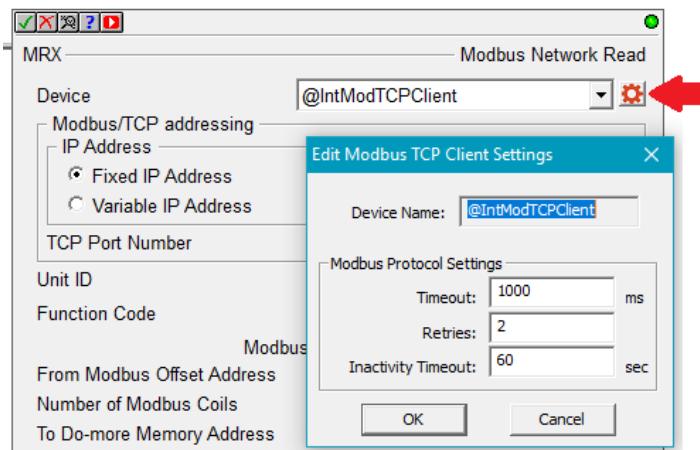
- a. **Install (Setup.exe)** copies **toolbar settings** across from previous installation.
- b. **Ladder View - Easily launch Element Picker** in the instruction editors via the  button adjacent to each field. Also added to various dialog boxes with element fields.



You can configure how the Element Picker is launched in the Ladder Options dialog:

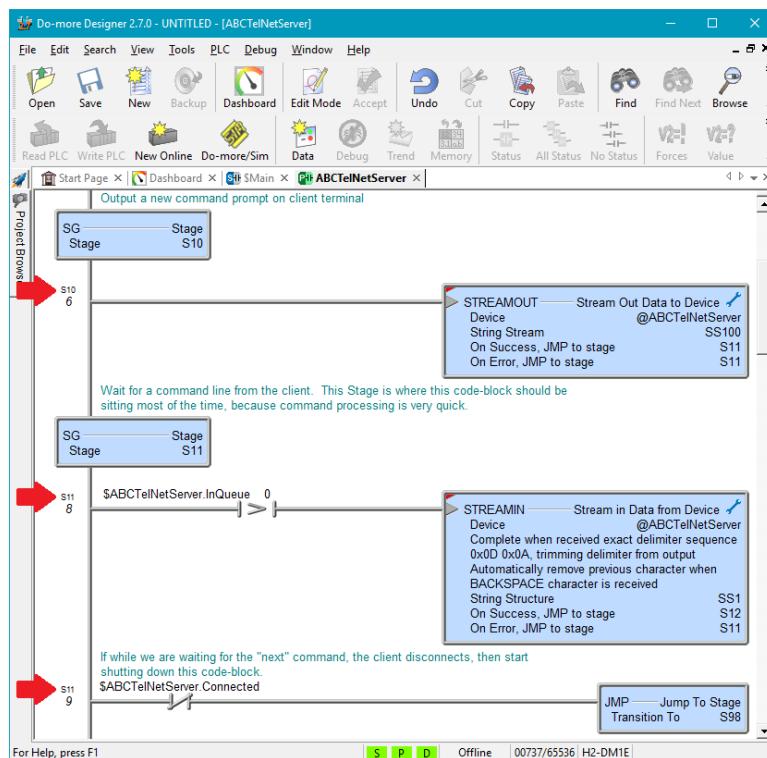
1. Using this new button. 2. Automatically (hides new button). 3. F9 key only. (F9 key always works).

- c. **Ladder View – Edit or view the Device Configuration** from any **instruction editor** that has a device parameter. A red Device gear box button  will show up to the right of the Device parameter list box. Just click on it to edit/view that device's configuration (6186).

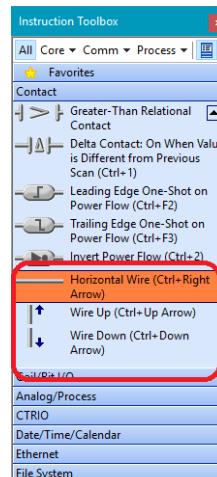


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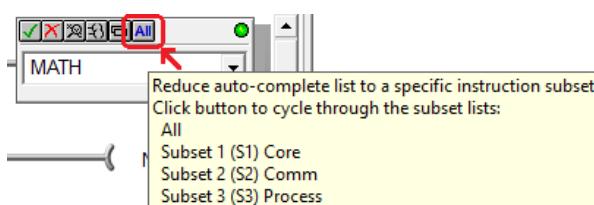
- d. **Ladder View** – In PROGRAM code-blocks with Stages, **show the Stage number** of each rung above its Rung#/Address in the left margin (6332):



- e. **Ladder View** – added **wire drawing commands** to the **Instruction Toolbox** inside the Contact group, so you can **drag and drop horizontal and vertical wires** to construct a rung (6297):

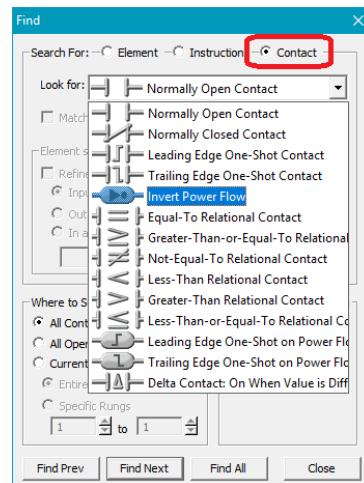


- f. **Ladder View** - the Output column's **Token Selector** dialog can filter the mnemonics list based on one of the Instruction Toolboxes Subsets (All, S1-Core, S2-Comm, S3-Process):

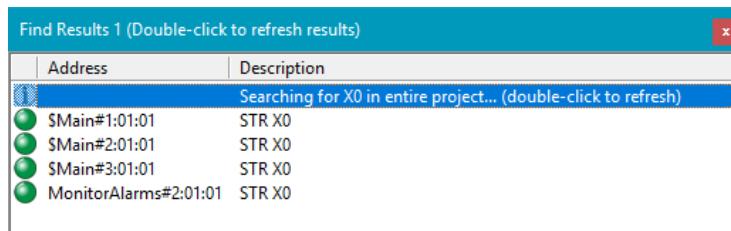


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- g. **Ladder View – Find dialog** lets you search for a Contact instruction based on its type (vs. Instruction Mnemonic, 5847).



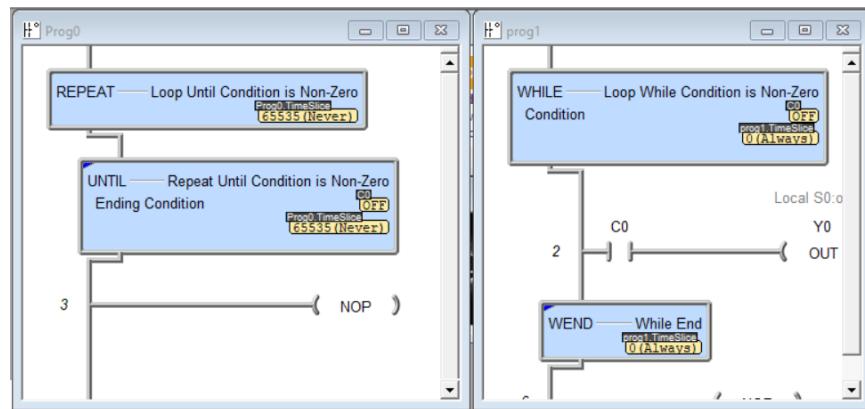
- h. **Ladder View - after doing Find All to a Find Results window, made it easy to redo the search** by double clicking on the top entry in the Find Results window (6325):



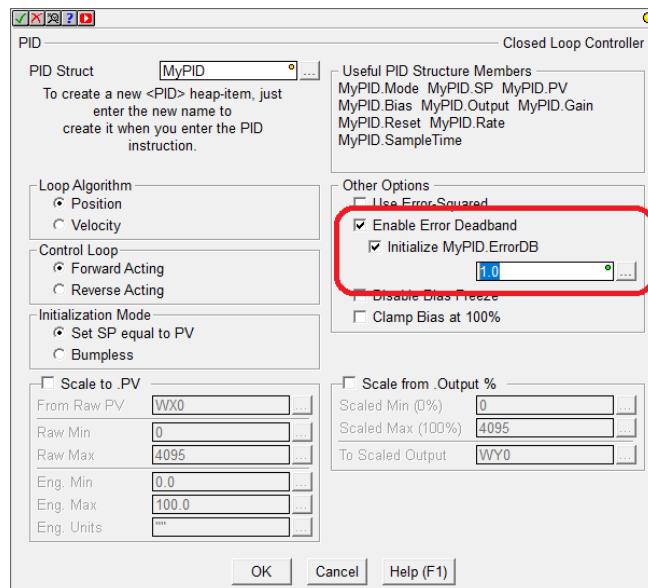
- i. **Ladder View - added More>> and Less<< button to the Find dialog** (5062):

When Less, there is no “Refined Search” capabilities – it’s *always* All Control Logic with Find All Results in Find Results 1

- j. **Ladder View** - when showing .TimeSlice status in “yielding” instructions, **show 0 as “Always”** and **65535 as “Never”** (6265):



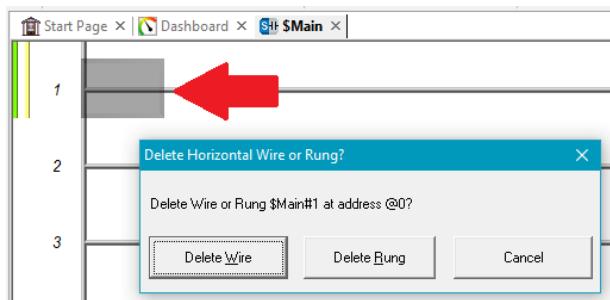
- k. **Ladder View - PID** instruction editor lets you **initialize the Error Deadband member (.ErrorDB)** if you enable that option. It gets initialized when the input leg transitions from OFF to ON (Manual to Auto). Requires DmT 2.7 or later. (6394).



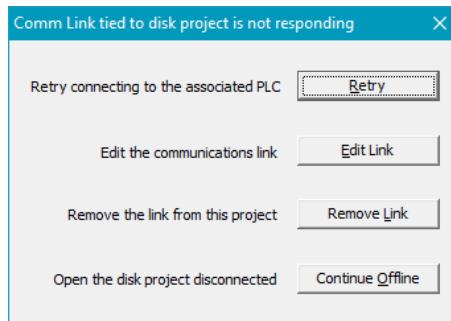
- l. **Ladder View** – default display format for a **parameter status** in an instruction may default to a more appropriate format in certain instructions, sometimes D memory should be displayed in Hexadecimal or ASCII over Native decimal (e.g. D memory text buffer in JSONBUILD).
- m. **Ladder View** – Added **DNS** support to **SETUPIP** instruction (requires DmT 2.7 or later).
- n. **Ladder View** – INTCONFIG Configure Interrupt, Time event, removed the Timer Off option, which is now obsolete (6202). Use the INTDECONFIG – Deconfigure Interrupt instruction instead.
- o. **Ladder View** – optimized AXPOSSCRV editor layout.
- p. **Ladder View** – moved various instruction “units” fields (e.g. *milliseconds* or *ms*) to be part of the parameter description.
- q. **Ladder View** – FIFO/LIFO Queue instruction status are **minimal** when the Ladder Options’ Lengthy Instructions setting is set to Display Short Summary (6345).

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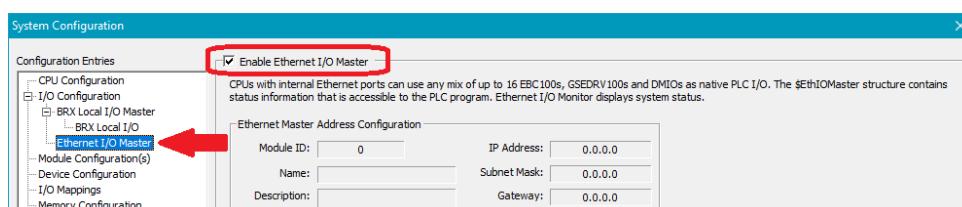
- r. **Ladder View** – when you hit the **Delete key** with the block cursor positioned in the first column of the first row of a rung that has a horizontal wire, **prompt** the user whether they want to delete the wire or delete the rung (6388):



- s. **Ladder View** – added **special Help button** in the **MATH** instruction editor to launch Help for the list of Mathematical Operators and Functions. Added special Help button in **STRPRINT** and **EMAIL** instruction editors to launch Help to the list of String Scripting functions (6369).
- t. **Ladder View** – **device** parameter combo-boxes that support Create Module, **filter the list of possible modules** to those that support that instruction's function (6414).
- u. **Ladder View** – the **Instruction Toolbox** remembers its docked **Hidden** state (6436, thanks to AS and JR).
- v. **Ladder View** – when prompted to create a new code-block via the RUN, ENTASK, or CALL instruction editor, added a checkbox to also go ahead and open this new code block (or not).
- w. **Connect** - when opening a disk project from another PC that references Communications Link that does not yet exist on the current PC, offer better options to resolve the failed Link (6062):



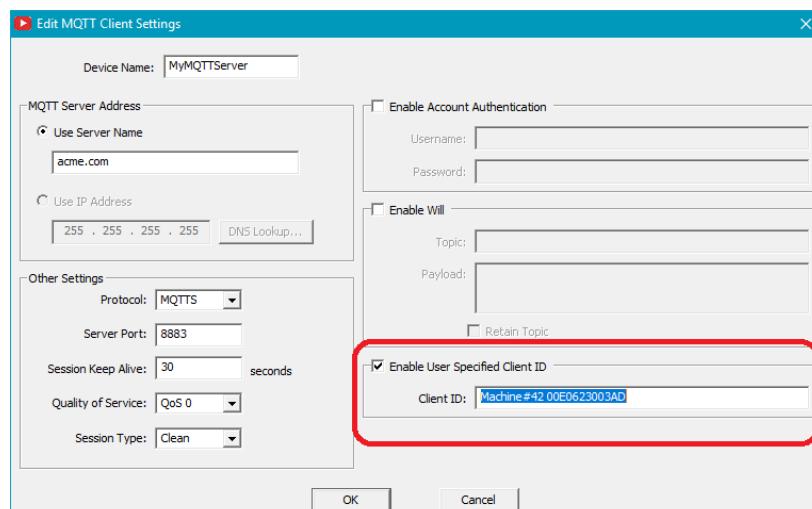
- x. **Documentation Editor and Element Browser** – when typing a <SPACE> when entering a Nickname, automagically **replace the space with an underscore**, since spaces are not allowed inside a Nickname (4276).
- y. **System Configuration** – moved **Enable Ethernet I/O Master checkbox** from CPU entry page to **Ethernet I/O Master entry page** below **I/O Configuration** entry.



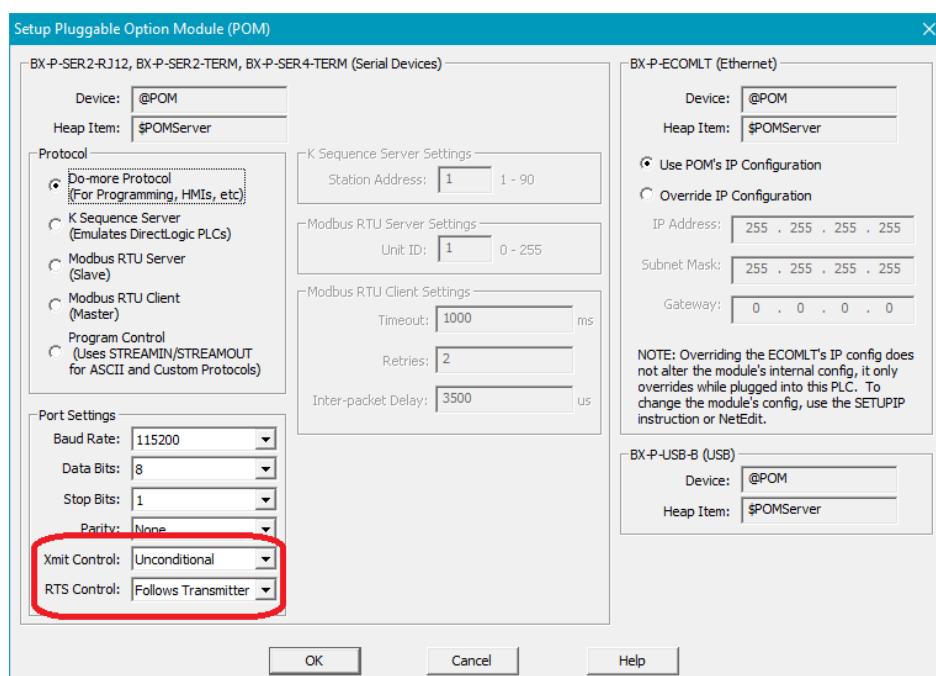
- z. System Configuration - when resolving new I/O Modules** after connecting to a PLC from a Disk Project, see if there already is a Disconnected Module Configuration that had been in that slot, and **reconnect** that Module Configuration to that “new” module.

aa. System Configuration - MQTT Client Settings (require DmT 2.7 or later):

- i. Extended maximum User Name length to 128
- ii. Extended maximum Password length to 256
- iii. Extended maximum Session Keep Alive period to 65535 seconds
- iv. Added support for user specified Client ID (default is MAC Address):



bb. System Configuration – added flow control options for Serial Port POMs that support it:

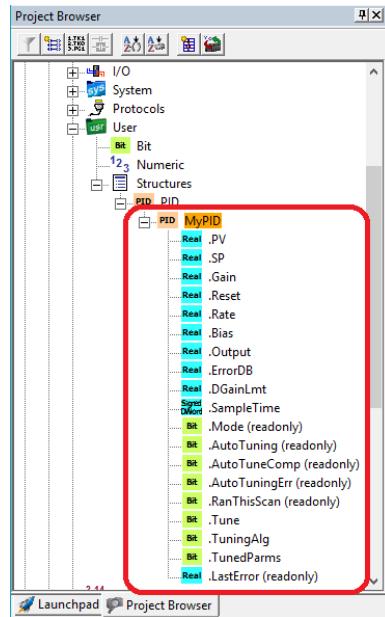


cc. Select Project Dialog – added Remove button (6422).

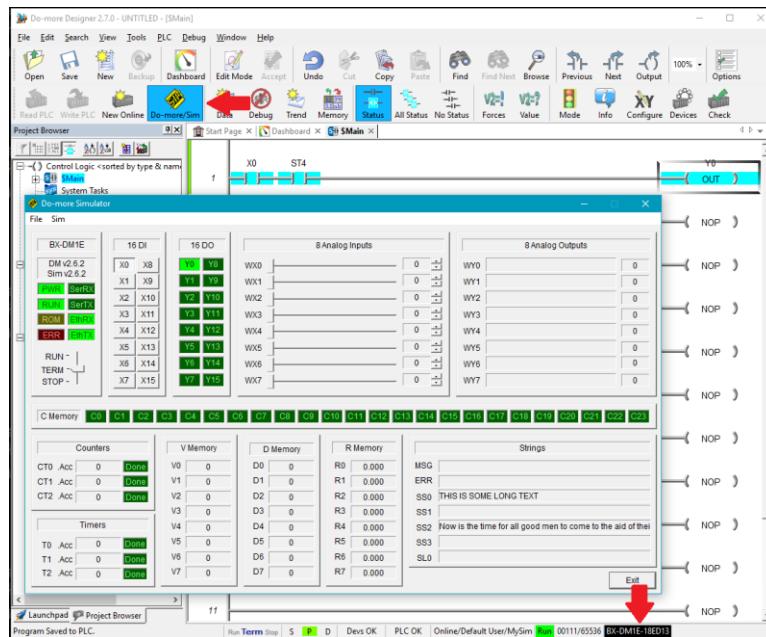
dd. Select Project Dialog – pops up immediately, then populates the list (5772).

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ee. Project Browser - when a **new memory** Data Block or Heap Item structure gets created, such as when the user adds a PID instruction and created a new PID heap item called MyPID, the Memory sub tree of the Project Browser will expand and **highlight** to that new item. This is very helpful for structures since it blows out all the fields that are available for them to use (5384). This can be turned off from the Project Browser Options dialog.



ff. Simulator – when simulating a disk project, show the **disk project's PLC type** designation in **reverse video** in the status bar, since you are technically not connected to that model of PLC, but to the DM-SIM “PLC” (6393).



gg. Simulator - related to new feature added in 2.6.2 of simulating **any hardware project** in the Windows based Simulator, added **\$IsSimulator** (bit ST19) system nickname.

hh. New System Status Nicknames

ST9 \$ForcesActive

ST19 \$IsSimulator

DST60	\$Keyswitch	0	RUN
		1	TERM
		2	STOP

ERR and MSG String Reporting Level

DST61	\$SysMsgLevel	0	Disabled
		1	ERR Only (default)
		2	ERR and MSG

ii. **I/O System View** – added **more details** about on-board I/O and I/O modules (5609):

Analog configuration

Analog scaling

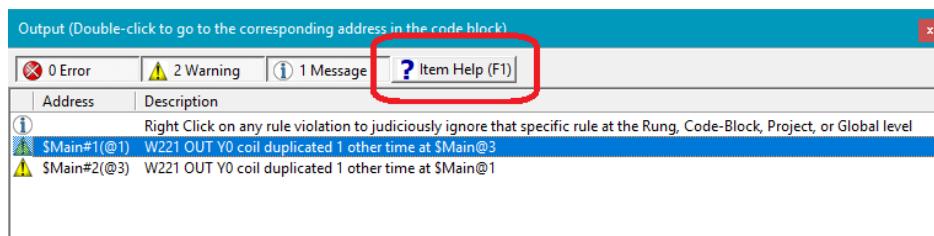
BX-HSIO I/O functions

*-SERIO protocols

*-CTRIO I/O point functions/scaling

jj. **Program Check Rules** – Each rule now has information in Help topic DMD0469 (Program Check Errors, Warnings, and Message Codes) that **describes the specific rule**, what the concerns may be, valid reasons it could be ignored, along with ways to re-write the code to make the logic do what you want (6363).

Just click on the specific rule, then hit the new Item Help button or hit the F1 key to jump to details on that specific rule (e.g. W221 Duplicate Coil).



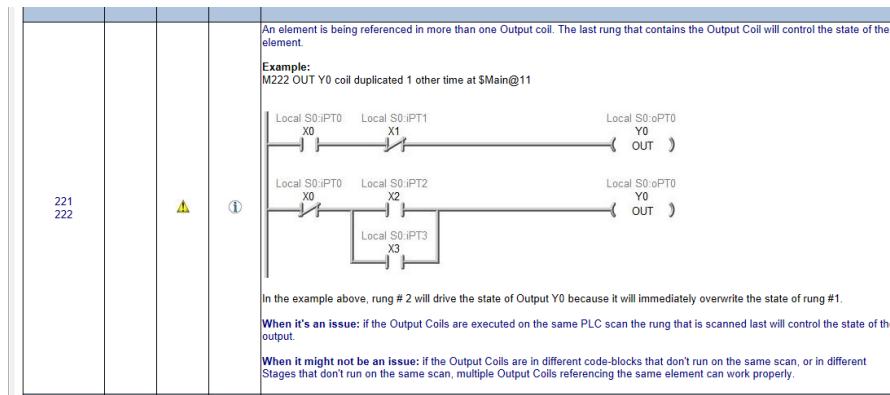
Once the Help topic is brought up, it will automatically jump to the entry in the table for W221.

Each entry explains:

1. **What** the rule is

2. Shows an **example**

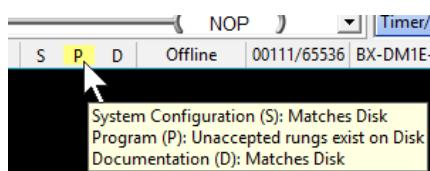
3. Describes **when** it's an issue



4. Describes when it **might not be** an issue. If you know this specific instance is not an issue, you can go back to the Output Window, right click on that specific rule instance, and Ignore that rule. This will help minimize the total number of Warnings and Messages so that you can more easily analyze them as new ones show up as you write more code.

kk. Program Check – New Rules:

- i. W405 *Code exists after unconditional END/RETURN instruction; code will never execute* (6438, thanks to RBP).
- II. **Program Check Rules** – changed some rules from Warnings to Messages and some from Messages to Warnings.
- mm. **Program Check** – adjusted rules W221 and M222 **Duplicate Coil** Check to also include **FLASHER** and **TIMEDOUT** boxes as part of the existing OUT coil check (6402).
- nn. **General Element Fields** – provide **better error details**; for example, fields that limit the element to be an integer only – tell the user they have entered a real element, but the field requires an element that is a type of integer (vs. just saying “invalid format”, 6383).
- oo. **Select PLC Connection Dialog** – added checkbox to **Include (or ignore) Serial Ports** when Scanning for New PLCs (6382).
- pp. **Element Documentation** – changed **file extension** for **C-more Export** from .txt to .csv to match the C-more software Import function.
- qq. **Dashboard - Show I/O Module Status in Data View** now supports Scaled Analog **RX/RY** (6354).
- rr. **Trend View** – added “Do Not Ask Me Again” to the Delete Trend Point operation (6304).
- ss. **Memory View** – when creating New Memory View, it remembers the settings from the last time you created a new one (5589).
- tt. **Trend View, PID View, and Dashboard** tabs now have their own **icons** (5569).
- uu. **Status Bar** – S/P/D Disk/PLC Difference pane now shows Unaccepted Rung state in Yellow for the Program (P) status (4770):



9. Adjusted Anomalies

- a. Ladder View – Rung Comment properly handles non-ASCII characters (2.7.4; 6514, thanks to TL).
- b. Ladder View – eliminated resource issue in Rung Comment editor (2.7.2; 6479, thanks to BF).
- c. Ladder View – Create Nicknames dialog Find Next Unused also skips elements that already have a Nickname (2.7.2; 6477, thanks to MR).
- d. Ladder View – Create Nicknames dialog merges any existing Extra Info or Description with new Nickname (2.7.2; 6478).
- e. Ladder View – properly handle pasting COPY sub-instructions w/faulty parameters (2.7.3; 6506, thanks to MG).
- f. Ladder View – when synchronizing parameter formats in Ladder Status, format constants to match the other parameter status. This is helpful in relational contacts with Timer Accumulators compared with constant values (6378, thanks to RP).
- g. Ladder View - DEVREAD/DEVWRITE instructions fully support BX-POM modules, like reading the Baud Rate of an RS-232 Serial Port POM.
- h. Ladder View - corrected Instruction Structure Status: CNT*, TMR*, CT*, FREQ*, FIFO*/LIFO*, INTCONFIG, RAMPSOAK, MEMCOPY, MEMCLEAR (6306).
- i. Ladder View - LERP import from CSV file properly handles situation when CSV file is currently opened by another application.
- j. Ladder View - STRCLEAR validates the range of strings (6373).
- k. Ladder View – removed “Use Existing TCP Connection” option from HTTPCMD (6370).
- l. Ladder View – disable status on a rung where an instruction has been modified by a Replace operation until the modified instruction is written to the PLC (6399).
- m. Ladder View – when creating a new code-block, always open it, but intelligently decide whether to make the new code-block the active view or maintain the current active view (6324).
- n. Ladder View – optimize structure parameter status area (6341).
- o. Ladder View – warn when a BRX High Speed Counter/Timer Accumulator is used as a high-speed accumulator in an instruction, but the resource is configured as a Pulse Catch (6249).
- p. Ladder View – properly display input leg text with 55% or lower zoom level (5980).
- q. Ladder View – GSREGRD/GSREGWR P21.00 parameter, added “use .StatusMonitor1” to parameter description (6418).
- r. Ladder View – prohibit GSREGWR from adding P9 parameters as valid writes (6419).
- s. Ladder View – allow full range of Module ID values in PING instruction (6372).
- t. Ladder View – Replace properly works for Success/Error bits in RX instruction (6375).
- u. Ladder View – Editing an existing RX/WX Remote Memory Block ID no longer always resets the Block ID to 0 (6376).
- v. Ladder View – properly recalculate layout when switching wire display between 2D and 3D.

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- w. Ladder View – when editing a cell in a report control, select the entire cell content to make it easier to just start typing or pasting to replace the contents (6352, thanks to JW).
- x. Ladder View – allow MRX Modbus Read Multiple function codes to support structure members when the count is a constant 1 (6381, thanks to BK).
- y. Ladder View - refined parameter error messages.
- z. Ladder View - SWAPB and other ranged instructions properly check memory overlap when using arrays (6348, thanks to GD)
- aa. Ladder View – properly calculate rung indentation after NEXT/WEND/UNTIL is automatically added when entering FOR WHILE/REPEAT start-of-loop instruction (6004).
- bb. Ladder View - FILEREAD properly reports range errors.
- cc. System Configuration – properly handle longer MQTT Client Device user name (2.7.2).
- dd. I/O Configuration – Setup BRX Universal Temperature modules dialog user interface now shows WX range/units in tenths of a degree (PLC firmware was always doing tenths of a degree; 2.7.2, thanks to JR).
- ee. I/O Configuration – correctly disallow remapping of BRX Onboard I/O (6397).
- ff. I/O Configuration – Setup BX-HSIO module Input Events shows all event details (6208).
- gg. I/O System View – properly handles details of 32 point discrete I/O modules and combo discrete I/O modules (6500; 2.7.3, thanks to SM).
- hh. I/O System View – provides channel level error details on BX-4RTD4DA-1, BX-16AD-1, BX-16AD-2B (6504, 6507; 2.7.3).
- ii. Documentation Editor – properly handle paste of Extra Info or Description field to a record with an implied Nickname (e.g. record of a cast of something with a Nickname; 6366, thanks to JW).
- jj. Documentation Editor - properly sorts elements by natural number value (5440).
- kk. Documentation Editor – Find Text within Nickname, Extra Info, and Description fields working for all sort options (6346).
- ll. Element Documentation – Export C-more Element Documentation properly exports relevant structure field names. It also automatically exports relevant ST/DST/SDT system elements like \$BatteryLow bit (ST149), \$IPAddress DWORD (DST18), and \$Now date/time members (SDT0.Year, SDT0.Month, ... SDT0.Hour, SDT0.Minute, ...) (6283).
- mm. Project Browser – sort Control Logic by Execution Order sorts Subroutines and ISRs by name since these have no “execution order” (6266).
- nn. Project Browser – Control Logic tree better handles pasting of a bunch of rungs with rung comments (6340, thanks to JW).
- oo. Cross Reference View – report implicit fixed range of FIFO/LIFO buffers (6277).
- pp. Memory View – handle displaying current Element when clicking outside a valid cell (6380).
- qq. Memory View – better handling of long strings by supporting wrapping (6389).
- rr. Memory View – better error reporting when trying to write a string literal value longer than the string’s Maximum Length.

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- ss. Connect – better handling of retrying a bad communications link of an Ethernet via USB on your PC (2.7.2).
- tt. Update Firmware dialog - ensure that firmware file matches the target hardware (6334).
- uu. Various PID dialog boxes – added support for the Video Play button in the title bar.
- vv. Tooltips – instructions on how to disable Instruction Help tooltip are consistent with the source view of the tooltip.
- ww. Program Check – Warning 521 *High Speed Discrete Output set within non-Immediate instruction in ISR* working correctly (6368).
- xx. Dashboard – Right Click on a GS-EDRV100 lets you set the Drive Type (GS1 vs. GS2 vs. GS3 vs. GS4, 6365).
- yy. Dashboard – updated High Speed I/O hot spot text.
- zz. Dashboard – *Refresh I/O* properly handles swapping out two similar modules with consistent module configurations, like swapping a BX-SERIO with a BX-SERIO2.
- aaa. Dashboard – BRX Onboard I/O addressing corrected in tooltip (6396, thanks to BF).
- bbb. Global Options – Default Dock Position radio buttons behave correctly (6358)
- ccc. Communication Server – properly perform bulk writes of a structure over 1000 bytes (6403).
- ddd. New PLC error message for when it "could not open TCP connection with specified device".

1. New 16 Channel Analog Input and Combo Analog modules for the BRX I/O Platform
(these modules require Do-more Technology Version 2.6)

BX-16AD-1	BRX analog input module, 16-channel , current, input current signal range(s) of 0-20 mA, 4-20 mA, external 24 VDC required
BX-16AD-2B	BRX analog input module, 16-channel , voltage, input voltage signal range(s) of 0-5 VDC, 0-10 VDC, +/- 5 VDC, +/- 10 VDC, external 24 VDC required
BX-4AD2DA-1	BRX analog combo module, Input: 4-channel, current, 0-20 mA and 4-20 mA, Output: 2-channel, current, 0-20 mA and 4-20 mA
BX-2AD2DA-1	BRX analog combo module, Input: 2-channel, current, 0-20 mA and 4-20 mA, Output: 2-channel, current, 0-20 mA and 4-20 mA
BX-4AD2DA-2B	BRX analog combo module, Input: 4-channel, voltage, 0-5 VDC, 0-10 VDC, +/- 5 VDC and +/- 10 VDC, Output: 2-channel, voltage, 0-5 VDC, 0-10 VDC, +/- 5 VDC and +/- 10 VDC
BX-2AD2DA-2B	BRX analog combo module, Input: 2-channel, voltage, 0-5 VDC, 0-10 VDC, +/- 5 VDC and +/- 10 VDC, Output: 2-channel, voltage, 0-5 VDC, 0-10 VDC, +/- 5 VDC and +/- 10 VDC
BX-4RTD4DA-1	BRX temperature combo module, Input: 4-channel, RTD, input RTD type(s): Pt100, Pt1000, JPt100, Cu10, Cu25 and Ni120, Output: 4-channel, current, 0-20 mA and 4-20 mA. (1) BX-RTB10 screw terminal block kit included
BX-4THM4DA-1	BRX temperature combo module, Input: 4-channel, thermocouple, input thermocouple type(s): J, E, K, R, S, T, B, N, C, Output: 4-channel, current, 0-20 mA and 4-20 mA. (1) BX-RTB10 screw terminal block kit included

2. The PC based Simulator now simulates **any PLC Offline Project (BRX, 205, Terminator)**

When you do not have hardware available, the Do-more Simulator now accepts any Do-more project file, whether it's BRX, 205, or Terminator. After opening/creating a disk project, just click the Simulator button in the Online toolbar and the Simulator will launch with the current project loaded in the Sim.

3. New Instructions

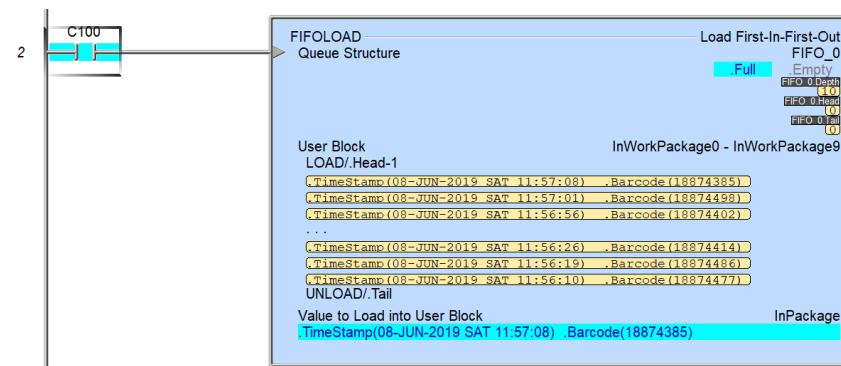
(these require Do-more Technology Version 2.6)

a. FIFO/LIFO Queuing (Misc./Data Manipulation group) available on all Do-more platforms: FIFOLOAD, FIFOUNLOAD, FIFORESET, and LIFOLOAD, LIFOUNLOAD, LIFORESET

i. FIFOLOAD – Load First-In-First-Out

Loads a Numeric, String, Structure, or UDT value (*InPackage*) at the Head index of a matching data block (*InWork*), and the Head is adjusted accordingly.

Note how the value in *InPackage* is now at



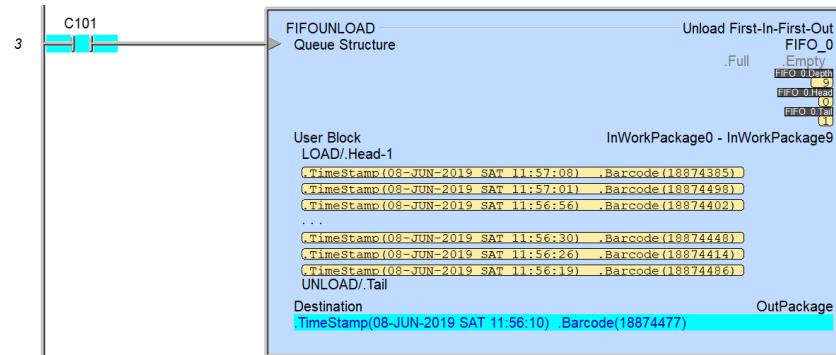
the previous Head of the InWork block.

When the corresponding FIFOUNLOAD occurs, it removes the FIRST value that was loaded using FIFOLOAD, which is located at the Tail index of the data block.

In this example, InPackage is a heap element and InWork is a data block of size 10 of a User Data Type (UDT) PackageStruct that contains 2 fields, .TimeStamp (based on DST22 \$LocalTime, 1970 Epoch DWORD value) and .Barcode.

ii. FIFOUNLOAD – Unload First-In-First-Out

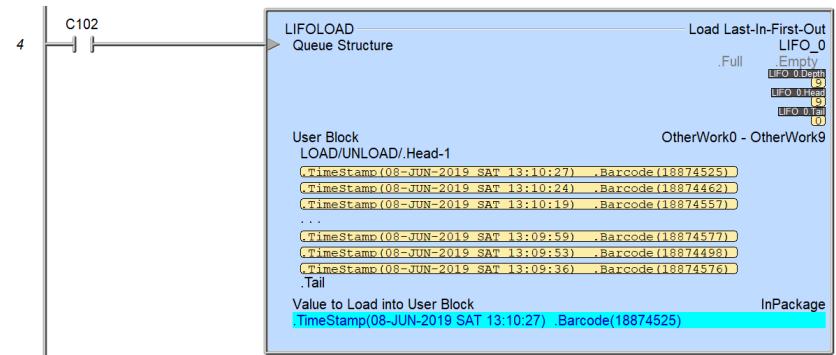
Unloads the Numeric, String, Structure, or UDT value at the Tail of the FIFO data block InWork and copies it into to the Destination parameter OutPackage. The Tail is adjusted accordingly.



Note how the value at the Tail in FIFOLOAD above is now in the Destination OutPackage in FIFOUNLOAD here. The Tail now references the element before the old Tail above in the InWork data block.

iii. LIFOLOAD – Load Last-In-First-Out

Loads a Numeric, String, Structure, or UDT value (InPackage) at the Head index of a matching data block (OtherWork), and the Head is adjusted accordingly.

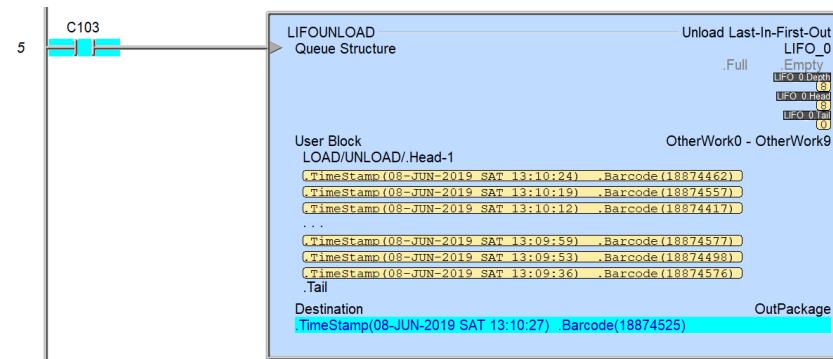


Note how the value in InPackage is now at the previous Head of the OtherWork block.

When the corresponding LIFOUNLOAD occurs, it removes the LAST value that was loaded using LIFOLOAD, which is located at the previous Head index of the data block.

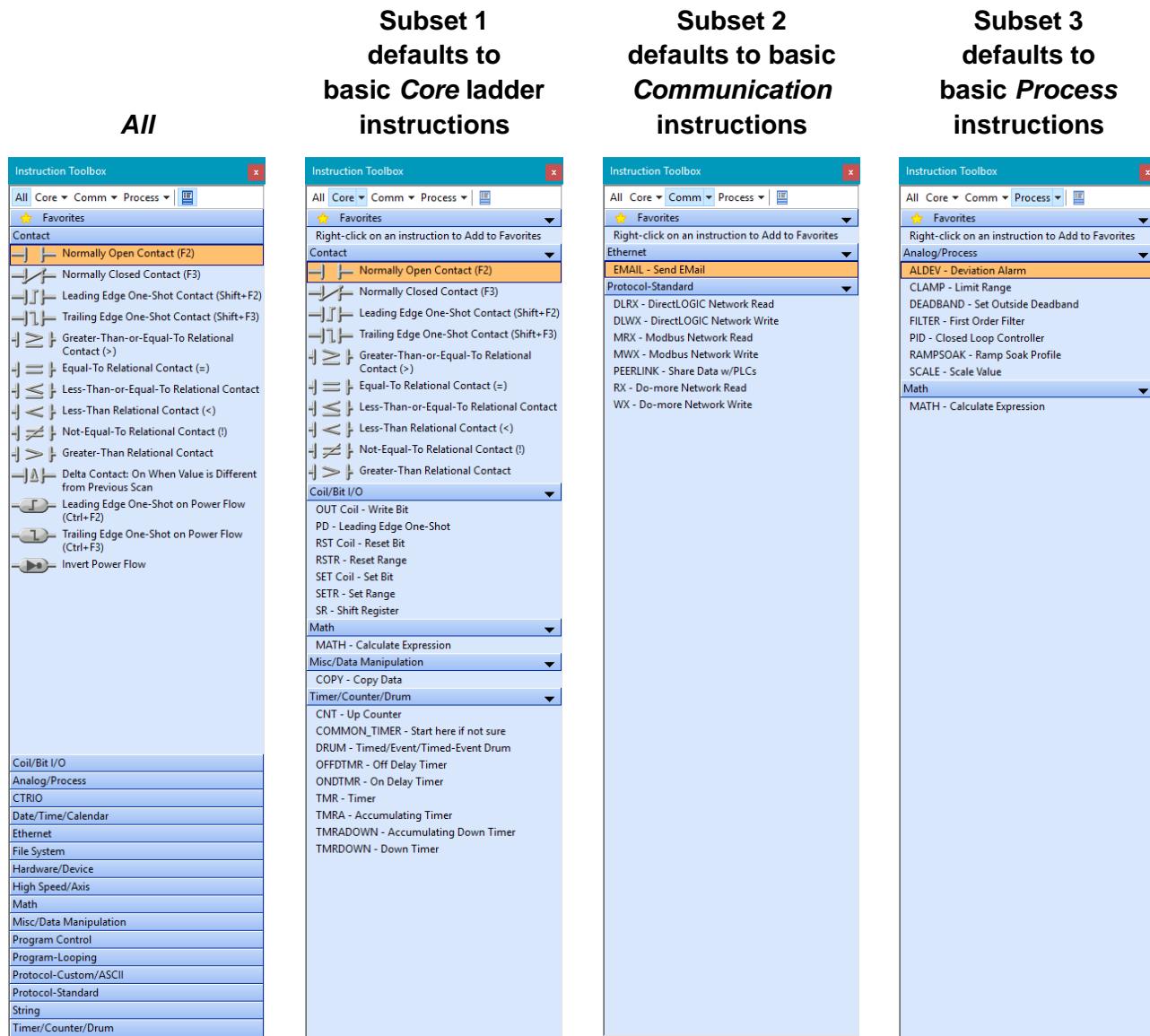
iv. LIFOUNLOAD – Unload Last-In-First-Out

Unloads the Numeric, String, Structure, or UDT value at the previous Head of the LIFO data block OtherWork and copies it into to the Destination parameter OutPackage. The Head is adjusted accordingly.



Note how the value at the previous Head in LIFOLOAD above is now in the Destination OutPackage in LIFOUNLOAD here. The previous Head now references the element before the old previous Head above in the OtherWork data block. Note that the Tail is not adjusted by LIFOUNLOAD.

4. Instruction Toolbox supports 3 additional Instruction Subsets



Subsets are all **user definable**, so mix and match instructions for 3 different custom toolboxes! Just click on one of the Subset button dropdown arrows to customize. These settings are saved and migrated to new installations of Designer. **Just click on a toolbox subset, then Drag-n-Drop!**

Also, the Instruction Toolbox groups can auto-collapse (original behavior) or **independently expand/collapse** by toggling the Auto-Collapse sticky button at the end of the toolbar at the top of the Instruction Toolbox. In the example in the first column above, the Auto-Collapse sticky button is pressed IN, so it is in Auto-Collapse mode. In the other 3 examples, the Auto-Collapse sticky button is pressed OUT, so Auto-Collapse is DISABLED, allowing you to EXPAND every group.

5. Enhancements

- a. For **BRX Local I/O Configuration Mode**, added a 2nd Manual mode to support a more forgiving I/O Configuration mis-match, where you can specify that **EVERY local expansion module is “optional”** (but if module DOES exist, it MUST match the Manual configuration).
- b. Added support for setting **DNS** in **SETUPIP** instruction (2.6.2; 6312; requires DmT 2.6.2; thanks to SM).
- c. Added support for **MQTT Client-ID** string to **DEVREAD** and **DEVWRITE** instructions (2.6.2; requires DmT 2.6.2).
- d. **MQTTPUB** and **MQTTSUB** support sending/receiving **numeric/bit element data as TEXT**. Ladder program no longer needs to use STRPRINT, STR2INT, and/or STR2REAL to generate/parse the text (6245). Edge-triggered **MQTTPUB** works properly in firmware 2.5.x or 2.6.1 (2.6.2).
- e. **AXJOG – Axis Jog Mode** lets you **supersede** the default Acceleration and Deceleration properties.
- f. **PID – Closed Loop Controller** instruction editor spells out the **important PID structure fields** (6111); added OK/Cancel Help(F1) buttons (6026); also added option to **Clamp Bias at 100%** (requires DmT 2.6).
- g. The **history of ALL PID Loop Tuning across ALL projects**, whether by Auto Tune or using the PID View to write the loop's Gain/Reset/Rate/Sample Time tuning parameters, is now logged to a Comma Separated Variable file (.csv) in the Public Document Do-more Designer's bin folder in the file PID.CSV (5325). For example,

C:\Users\Public\Documents\Do-more\Designer2_6\Bin\PID.CSV with contents:

R17C4		:	X	✓	f _x						
1	2	3	4	5	6	7	8	9	10	11	12
1	Loop Name	Date	Time	Source	Gain (P)	Reset (I)	Rate (D)	Sample Time (msec)	Sample Time (HH:MM:SS.mmm)	Project Name	User Name
2	SimPID	05/16/19	15:14:09	Initial Values	0.99	8.627	0	259	0.259s	PID1	Default User
3	SimPID	05/16/19	15:15:12	Auto-Tune Closed/DB 0.1%	0.985	8.313	0	249	0.249s	PID1	Default User
4											
5											

- h. The **PID Recent Tuning History** dialog has a button to open the folder of the PID.CSV **tuning history** file discussed in the previous item (5325).
- i. Changed Resource # field in the **INTCFG – Configure Interrupt** instruction editor from a numeric editor to a drop down list box (6199).
- j. **Smarter mouse wheel scrolling in Ladder View** such that tall instructions don't scroll by (6234).
- k. **Instruction Toolbox** can now **independently expand/collapse Instruction Groups, or Auto-Collapse Groups as you click on them** (6269, thanks to MN). **Just toggle the Auto-Collapse sticky button** on the Instruction Toolbox toolbar. Expanding all Groups is very helpful when utilizing the new Instruction Toolbox Subsets (see #4 above).
- l. **DEL** key in **Ladder View** now leaves a horizontal wire instead of empty cell (2.6.2). When **Deleting a Rung**, message box now has a “**Don't Ask Again**” **checkbox** (2.6.2; 6318, thanks to AS). When Deleting a Rung via **Context Menu Delete Rung** menu item, **maintain the block cursor position** (2.6.2, 6317, thanks to AS).

- m. **Program Check** now posts the reminder about *how to ignore program check rules* at the TOP of the Output Window, not the BOTTOM.
- n. Added **Find All hot key (Ctrl+Shift+Y)** and **Search->Find All** menu item to perform a Find All operation on the current view's current element. This works great from Documentation Editor or Data View, along with Ladder View. Whatever Element field has focus, simply hitting Ctrl+Shift+Y will find all of the references of that element in your Ladder Logic and list them out to the Find Results 1 window. Simply double-click on the entries in the Find Results window to navigate to that specific instruction parameter where the element is used (5515, thanks to MN).
- o. Added **Session Count** to **Dashboard** view's Communications Panel, i.e. how many users or other PLCs are connected to THAT PLC utilizing Do-more session-based protocol (5886). Possible clients that could bump the Session Count value include: HMI's, other Do-more PLCs using RX/WX instructions, other Do-more Designer programming sessions, etc.
- p. Pre-fill the **Documentation Editor** with all **physical I/O points** in the system to make it easy to fill out the element documentation for all the I/O (5916).
- q. Easily open the **Documentation Editor** to a specific I/O Module's set of I/O from the Dashboard by left clicking on the specific module and selecting the Edit I/O Documentation menu item (5916).
- r. **Setup Offline** dialog provides all the **hardware specification details** similar to the New Offline Project dialog (5631).
- s. **Force dialog** now sets the initial focus on the VALUE field rather than the ELEMENT field when the ELEMENT is initially provided like after right clicking on an element in the Ladder View and selecting Force menu item to force THAT element (5888).
- t. **Check for Updates** now prompts you to "Open the Download Folder?" after a successful download of the Designer installation program so that you could then right-click on the Setup EXE in Windows Explorer and "Run as Administrator" (5917).
- u. Added buttons to the **Do-more Technology Version** and the **Upgrade Firmware** dialog boxes that take you to the **help topic** that points out the **major feature set** for THAT specific Do-more Technology Version (5350).
- v. **Trend View** snapshot dialog points out that it is **resizable** (6108). Resizing the dialog is necessary when the element names are long because the value column could get clipped.
- w. When creating a new **Memory View**, it pre-selects the fields with the last block/range that was used (5589).
- x. **Edit User Data Type Definition** dialog supports the **DEL key** to delete the current field (6035, thanks to JW).
- y. Added a **drop-down list** at the end of the main window list that makes it easy to select which code-block or main window you want to view.
- z. When there is a **failure to connect** to the PLC, **provides options** to modify the connection parameters, or an option disassociate a project file with a specific connection (6062).
- aa. Added **Windows Command Prompt** to Launch Pad's Applications panel (5506).

Do-more Updates Rel 2.6.2, August 12, 2019

- bb. When a **dump file** is created, message box now recommends that the customer email the .dmp file to Host Engineering.
- cc. Bumped Designer Installation Live Update TCP timeout to be more tolerant (2.6.2).

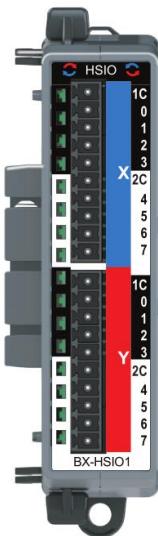
6. Adjusted Anomalies

- a. Ladder View - after adding a new code-block from within an instruction editor (such as a Task from ENTASK, Subroutine from CALL, or ISR from AXSCRIPT), the current Ladder View stays on the original instruction editor's code-block, not the newly created code block (6192).
- b. Ladder View - added support for Element Browser (F9) in a few instruction fields where it was missing.
- c. Ladder View – Device instruction editor - hitting F9 on the Stage Bit On Success/On Error field properly brings up the Element Browser/Picker (6236, thanks to JW).
- d. Ladder View – The pop-up instruction help properly informs how to disable the pop-up based on its context (Ladder View, Instruction Toolbox, Instruction Palette) (6217, thanks to AA, KR).
- e. Ladder View – Reworded AXRSTFAULT description to Reset Axis Fault, also updated its Help text.
- f. Ladder View - Print handles printing tall instructions that do not fit on a single page (6205).
- g. Ladder View - Enlarged the Replace and multiple Replace List boxes in the Replace dialog box to accommodate long element names (6210).
- h. System Configuration – ensure device configurations are properly aligned.
- i. Trend View - when a Trend View's layout is saved as part of a project file's workspace, every individual elements' Trend Buffer Size in Megabytes is saved and then restored later when the project file is re-opened (6076, thanks to GD).
- j. Trend View - Symbolic Constants properly show up (6248).
- k. Memory View - when initiating a numeric edit from the Memory View, automatically select the entire field so that you can easily replace the current value with another value by simply typing the new number (6216).
- l. Element Browser - behaves properly when entering a long nickname for a new element but where that nickname is also assigned to an unassigned nickname or symbolic constant (6284, thanks to AS).
- m. Import Documentation – EXPLICIT nicknames for bit/numeric casts or structure members can be imported when there is an IMPLICIT nickname for any bit/numeric casts or structure members based on a nickname for the root element of the cast/structure (6293, thanks to GD).
- n. Properly handle a File Association is defined for .dmd file extension (6092, thanks to SB).
- o. System Configuration – I/O Configuration Analog Scaling, adjusted scaling display (2.6.2); BRX Thermocouple Modules - corrected the default scaling ranges for JPt100 vs. Pt100 (2.6.2); properly named Ni120 type.
- p. BRX-M module MPU firmware properly handles Time based interrupts (2.6.2).
- q. Update Firmware OS/GA dialogs ensure source file is for the target hardware (2.6.2).
- r. Ladder View – LERP instruction editor's import table reports “open file” issues (2.6.2).
- s. Dashboard – Displays correct BX power-budget based on MPU model (2.6.2).

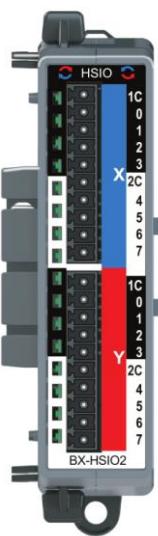
1. New BX-HSIO and BX-SERIO modules for the BRX I/O Platform

(these modules require Do-more Technology Version 2.5, and BRX Gate Array version 1.10)

a. BX-HSIO1 and BX-HSIO2 have all the High-Speed features of the on-board I/O



BX-HSIO1
Sinking Y's



BX-HSIO2
Sourcing Y's

Input Functions

- **High Speed Counting** - Step/Direction, Clock-wise/Counter-clock-wise, Quadrature with position scaling, frequency measurement
- **High Speed Timing** – measure time across various single edge or dual edge input events
- **Interrupts** – trigger Interrupt Service Routine based on Discrete Event, Microsecond Timer, Match Register on any Axis/High Speed Counter/Timer accumulator
- **Pulse Catch** – capture a narrow positive or negative pulse on an input so “normal” logic can see it

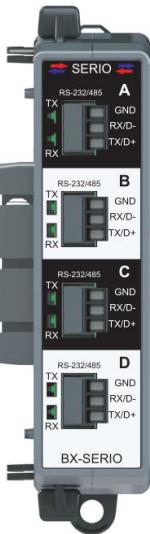
Output Functions

- **Axis Motion** (Drive as Step/Direction, Clock-wise/Counter-clock-wise, Quadrature emulation) using AX* instructions (AXJOG, AXHOME, AXPOSTRAP, AXPOSSCRV, AXVEL, AXGEAR, AXFOLLOW, AXCAM, AXSCRIPT, et.al.); **up to 4 Axis** (1 virtual, 3 tied to actual output pairs)
- **Pulse Width Modulation** configured via the PWM structure members .Period and .DutyCycle or the PWMOUT instruction
- **Table Driven Output** using TDO* instructions (Programmable Limit Switch; Preset Table script of various Set, Reset, Toggle, Pulse On, Pulse Off after micro-second duration, trigger Interrupt Service Routine)

General

- 8 High Speed Discrete Inputs
- 8 High Speed Discrete Outputs
- 4 High Speed Timer Interrupt Triggers
- 4 Discrete Input Event Interrupt Triggers
- 4 Match Register Interrupt Triggers
- **Up to 8 BX-HSIO modules per BRX PLC**, so multiply the numbers above by 8 for PLC capability!

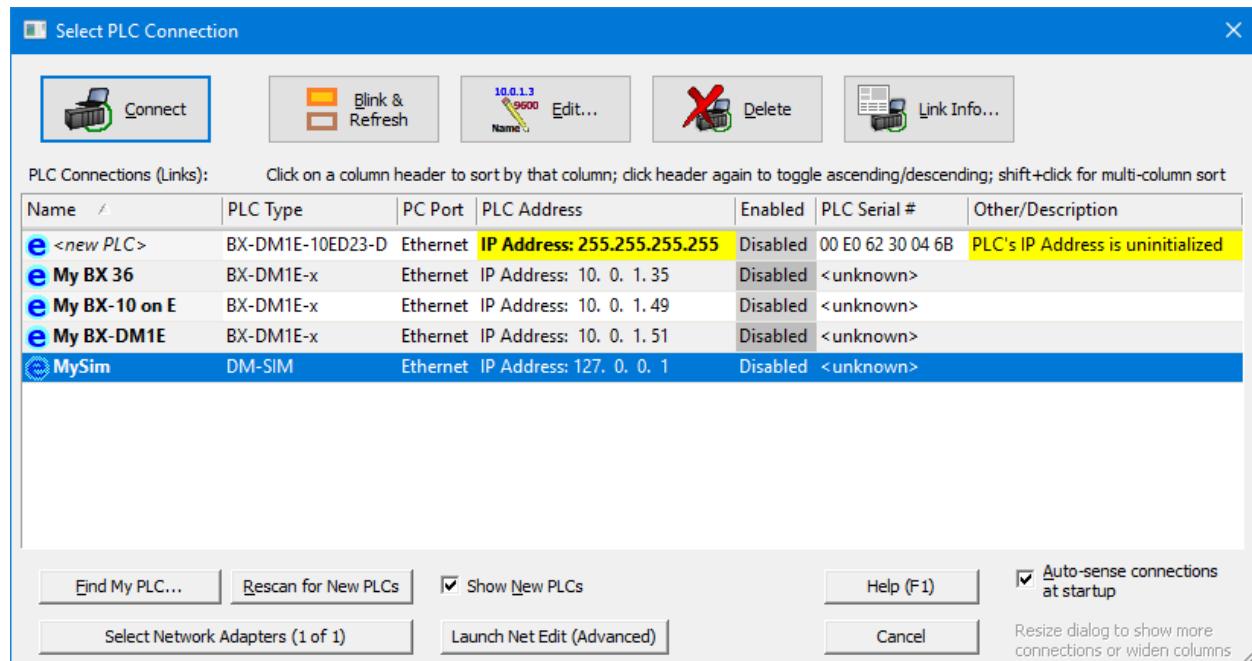
b. BX-SERIO has 4 Serial Ports with all the protocols, plus DM512!



- Four RS-232/RS-485 Serial Ports
- Isolated serial port that can communicate via RS-232 or RS-485 (software selectable). Includes ESD protection and built-in surge protection.
- Protocols: Do-more!™ Protocol (Slave)(Default), Modbus RTU (Master/Slave), **DMX512** (Master/Slave), K-Sequence (Slave), ASCII/Custom (In/Out)
- Baud Rates: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200

2. Easily Connect to your PLC

The new *Connect to PLC* dialog simplifies the steps to establish a connection to a new or an existing PLC. By default, the dialog box shows new PLCs at the top of the list:



Just double-click on any existing or new PLC Connection. Hitting the *Blink/Refresh* button at the top can help identify the selected PLC by flashing the CPU's LED. The PLC's Serial # and Model # are also updated to help identify your specific PLC, which are labeled on the CPU/MPU.

If a new PLC is found over Ethernet, Designer will also help you set up a valid IP Address configuration without having to use the NetEdit utility.

3. New Instructions

(these require Do-more Technology Version 2.5)

a. AXSCRIPT – Run a Sequence of Axis Commands (BRX only)

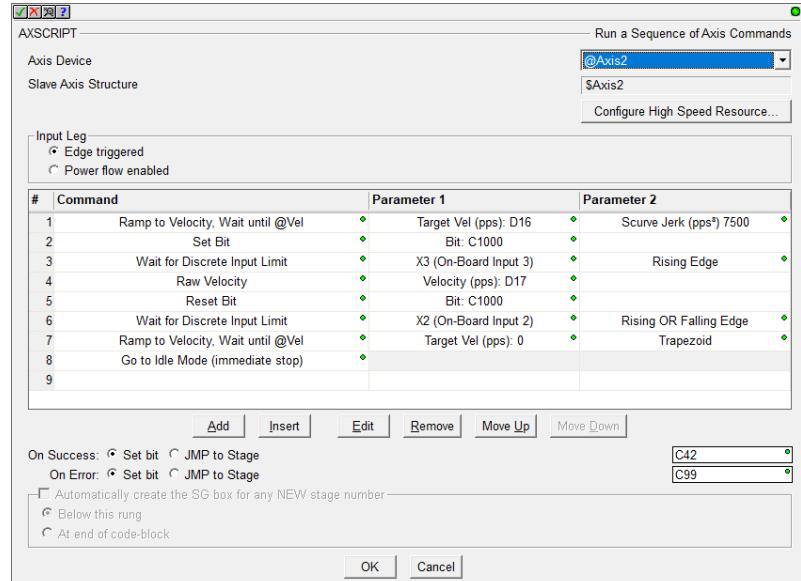
Create simple to complex **motion profiles** using an easy to use scripting editor with intelligent boiler plate editing for all of the various script commands.

The commands are categorized into functional groups:

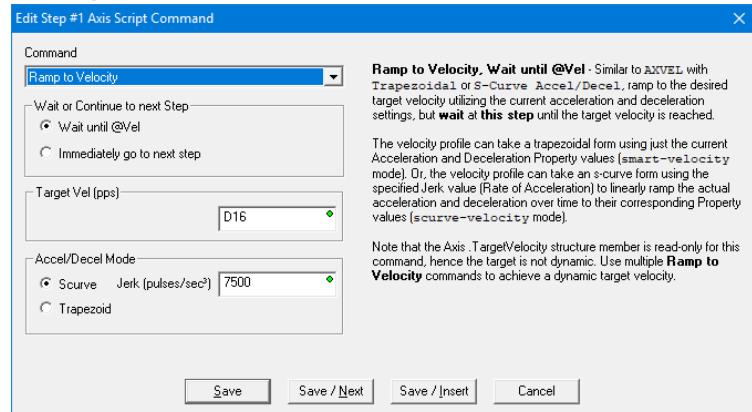
- Velocity
- Position
- Rotary
- Follower
- Wait for Event
- Ladder Operation
- Looping
- and more.

For example, choosing the *Ramp to Velocity* script command under the Velocity group gives you the options and parameters for that specific command:

- Waiting until @Velocity vs. Continuing on to the next step
- Target Velocity value (constant or variable)
- Choosing an S-curve vs. Trapezoidal velocity profile



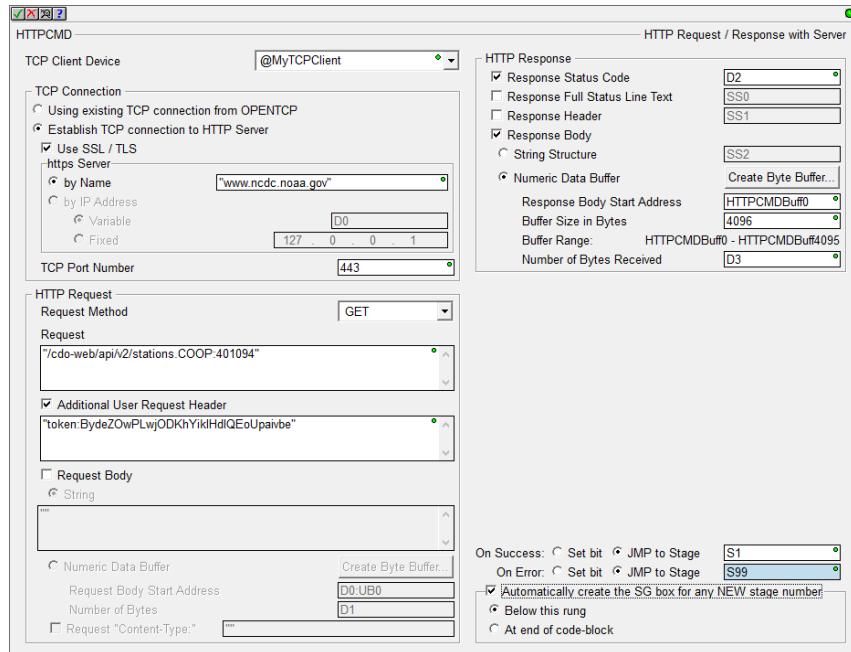
Example AXSCRIPT Command Editor



b. HTTPCMD – HTTP Request / Response with Server (BRX only)

Using the BRX PLC as an http/https client, send a **GET, POST, PUT, HEAD, or DELETE** request to a server, and receive the response.

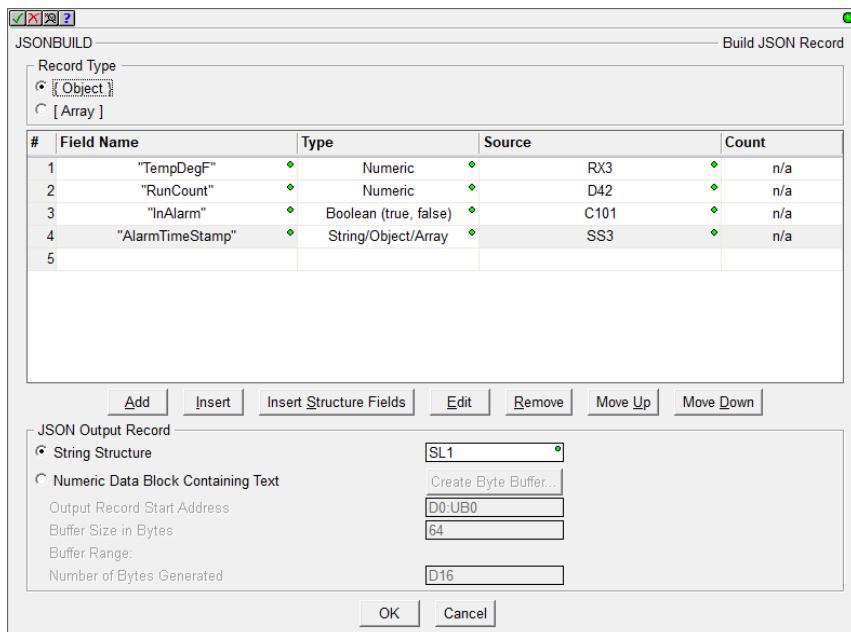
Along with the new JSONPARSE and JSONBUILD instructions (see below), HTTPCMD can provide a useful interface between your PLC and data-rich services utilizing REST APIs.



c. JSONBUILD – Build JSON Record (BRX only)

Generate a JSON record consisting of multiple fields or multiple array entries.

Use multiple JSONBUILD instructions to create nested complex JSON record structures. For example, the "AlarmTimeStamp" field value is itself a JSON object record in SS3, which contains the output of a previous JSONBUILD generated from \$Now Date/Time structure's field/value pairs.



Easily create JSON record reports of your **User Data Type** structures' fields by clicking the **Insert Structure Fields** button from the editor. Works w/built-in structures like Date/Time also.

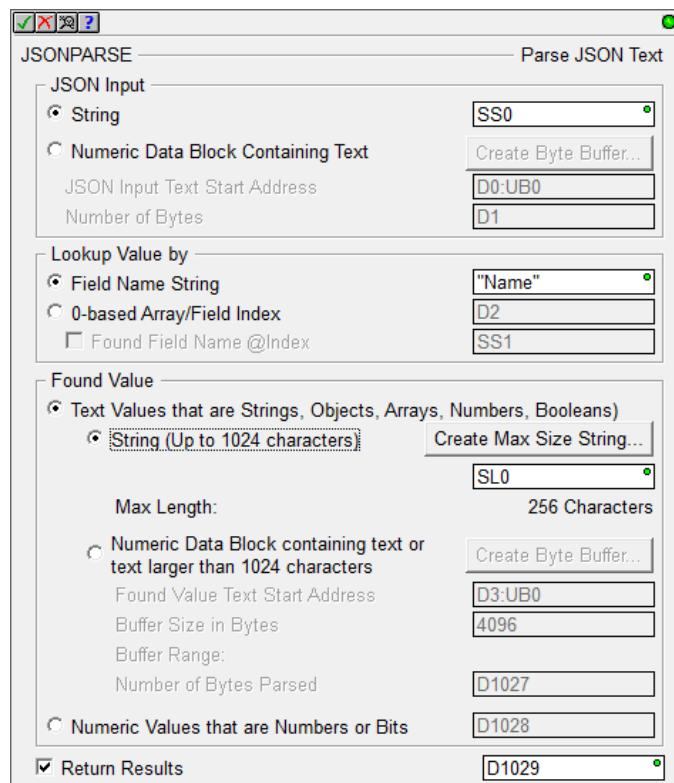
d. JSONPARSE – Parse JSON Text (BRX only)

Sometimes data received via **MQTT** or **HTTP REST APIs** can come in JSON format. The Parse JSON Text instruction looks up a value based on a **Field Name** or a **0-based array index** within a JSON Input record.

The Found Value can be returned as text or as Numeric or Bit values, depending upon the JSON record format.

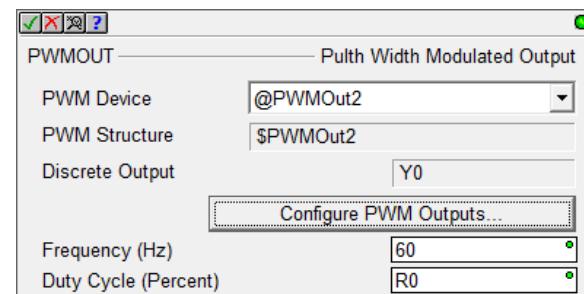
The Return Results DWORD contains details about the result of the parse:

- any JSON parsing errors
- if no parsing error, information on the JSON Input, whether it was an object, array, or value
- if no parsing error, information on the Found Value type, whether it was a nested object, an array, a number, a quoted string, or one of the predefined null, false, true values



e. PWMOUT – Pulse Width Modulated Output (BRX only)

Control one of the Pulse Width Modulated **high speed** discrete outputs on a BRX PLC with simple *Frequency* value in Hz, and *Duty Cycle* as a percentage. In this example, the R0 Duty Cycle input parameter value is expected to be 0.0 to 100.0. It does this by manipulating the values in the PWM's associated structure \$PWMOut2.



The BRX PWM Output functionality is implemented at the **hardware level**, so it can generate precise pulses **completely asynchronous** to the PLC scan's timing.

4. New System Status Elements:

ST155	\$IsrOverload1	see Help Topic DMD0208
DST59	\$DNSAddress	<i>System Nickname Locations</i>

5. Enhancements

a. BRX MQTT Client expanded to include MQTTS, QoS 1, and Persistent Session Type

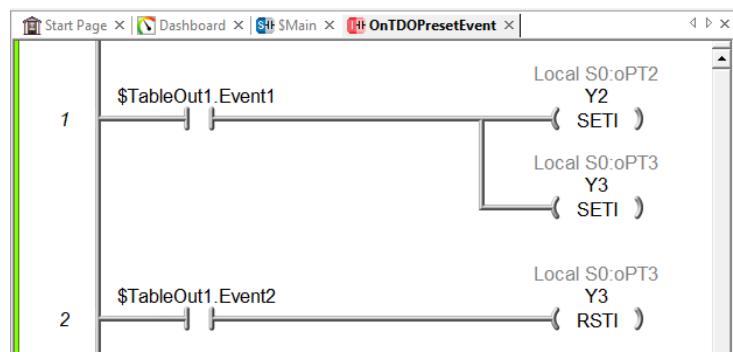
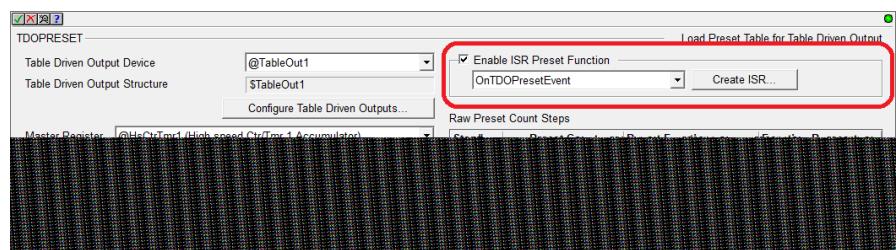
The previous version only supported unsecured MQTT, using QoS Level 0 (At Most Once), with Clean session type. BRX Do-more Technology Version 2.5 adds support for:

- MQTTS using secured TLS / SSL encryption, port 8883
- QoS Level 1 (At Least Once)
- Persistent Session (Subscriptions and their QoS state are maintained)

b. BRX TDOPRESET supports Triggering Interrupt Service Routines

As of Do-more Technology Version 2.5, TDOPRESET now supports triggering an Interrupt Service Routine (ISR) on a Preset Count event.

Select one of 6 possible events as the Preset Function Parameter, then utilize the TDO structure's event bit inside the ISR to Set Immediate or Reset an Immediate Output or whatever you want.



In the TDOPRESET example above, when the \$HsCtrTmr1 High Speed Counter accumulator reaches the value in D42 in Step #2, we want to immediately set multiple high speed outputs (Y2 and Y3). We can do this by triggering the selected ISR (OnTDOPresetEvent) along with setting Event 1 bit in the \$TableOut1 structure.

Then in the OnTDOPresetEvent ISR code-block, have ladder logic that does a SETI on Y2 and Y3 when \$TableOut1.Event1 is ON. We also have logic in the ISR to turn Y3 OFF when Event #2 is on (this is the desired behavior for Step #3 in the TDOPRESET table at count 4000).

If you are familiar with the DirectLOGIC 06 PLC High Speed I/O features, the BRX High Speed I/O' Table Driven Output and High Speed Counter/Timer functionality are similar to the **DL 06's Mode 10 High-Speed Counter** behavior.

c. AXSCRIPT editor supports Import/Export scripts as text files

To see some sample scripts for some common motion profiles, hit the **Import** button in the AXSCRIPT editor and look below the Projects\Examples\AXSCRIPT folder.

Use **Export** to share common AXSCRIPTs across projects, or even create your own in Notepad (it's just text).

d. BRX Axis structure has 3 new AXSCRIPT related fields

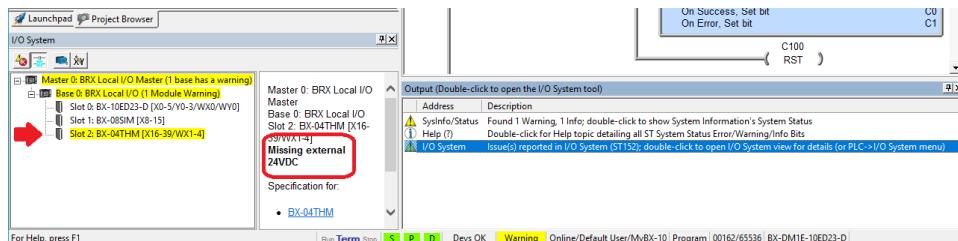
- **.ScriptStep** (Signed BYTE) – read-only current AXSCRIPT step number (-1 when complete)
- **.Timer** (Signed DWORD) – when using the Start Timer command, this is the timer current value (in milliseconds); Timers time down, so this value will be 0 when the timer finishes; it is writable, so Ladder Logic can tweak this value
- **.Counter** (Signed DWORD) – when using a For/Next loop in AXSCRIPT, this is the current count value; For/Next loops count down, so this will equal 0 when the For/Next loop finishes; it is writable, so Ladder Logic can tweak this value

e. Upon connecting to a PLC, point out any issues

After connecting to a PLC, if **any Errors/Warnings/Information System Status ST bits are ON**, those get reported to the **Output Window** (see example below). **Double-clicking** on that entry in the Output Window will launch the **System Information dialog** on the System Status tab, detailing all the Errors/Warnings/Info ST bits. There's also an item in the Output Window to launch the Help topic that describes all of the ST System Status bits.

For example, after connecting to your PLC, when there is a \$DriverError (ST143, when a device driver reports an issue), those two items get reported to your Output Window. When you double click on the Error/Warning/Information item, it will bring up the System Status tab of the System Information dialog, detailing the last 8 issues (which specific device instruction, etc.).

Also, when the **\$IOError** System Status bit is ON (ST152), that gets reported separately to the Output Window. **Double-clicking** on that entry will bring up the **I/O System** tool, detailing the first Master/Base/Slot that is reporting an issue. Just click on any other module in the I/O System tree to see that module's issue(s) in the I/O System view's Detail panel (6148).



f. Cross Reference View – added Rung Number column (2798)

Cross Reference View							
Element	Extended Info	Access Type	Code Block	Rung	Address	Instruction	Parameter Info
C0 JogSimRS leading edge		Input	\$Main	#2	@18	STR	
C1 PauseSimRS		Input	\$Main	#2	@19	STR	
C2 LogDone on Success or on Error		Input	GenAlarmText	#7	@84	ANDN	
		Output	GenAlarmText	#7	@97	STREAMOUT	Parm 8 : On Success
		Output	GenAlarmText	#7	@97	STREAMOUT	Parm 9 : On Error
		Input	GenAlarmText	#8	@105	STR	
		Output	GenAlarmText	#8	@106	RST	
R10 AdjustedRawPV We may want to filter WX0, maybe not (see X2). Regardless of that setting, R10 contains the "desired" raw analog value		In/Out	StTopOfScan	#3	@14	FILTER	Parm 3 : Out
		Output	StTopOfScan	#3	@19	MOVE	Parm 2 : Destination
		Input	\$Main	#1	@1	PID	Parm 3 : From Raw PV

g. BRX High Speed I/O – added Pulse Catch functionality; added .Done bit to Table Output structure to know when TDOPRESET has acted on all the steps in the table.

- h. BX-HSIO module** - added support for the BX-HSIO module to the AX* (Axis), TDO* (Table Driven Output), and INT* (Interrupt) instructions.
- i. I/O Screw Head Identification** - to help **identify analog channels** on BRX I/O modules, the module's screw head labels are added to the I/O System View module information, and the implicit Extra Info fields for the WX/WY/RX/RY elements. For example, when reporting a Broken Transmitter on channel 3 of BRX Analog Module BX-04AD-1, the I/O System View identifies the screw head for that channel as terminal **I2** (Current terminal 2) (6098).
- j. Differentiate MATH and Print Script field editors' background colors**

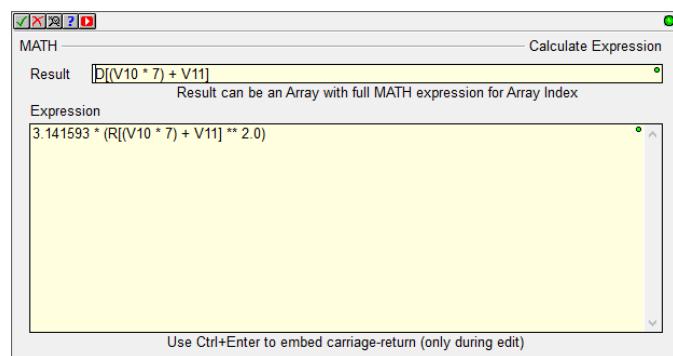
Both the Math Expression and Result edit fields can accept **complex mathematical expressions**. The Result field can accept an expression as a complex array index calculation (so can the Expression field's elements' array indexes).

MATH expression fields are differentiated from other fields with **light-yellow** background color:

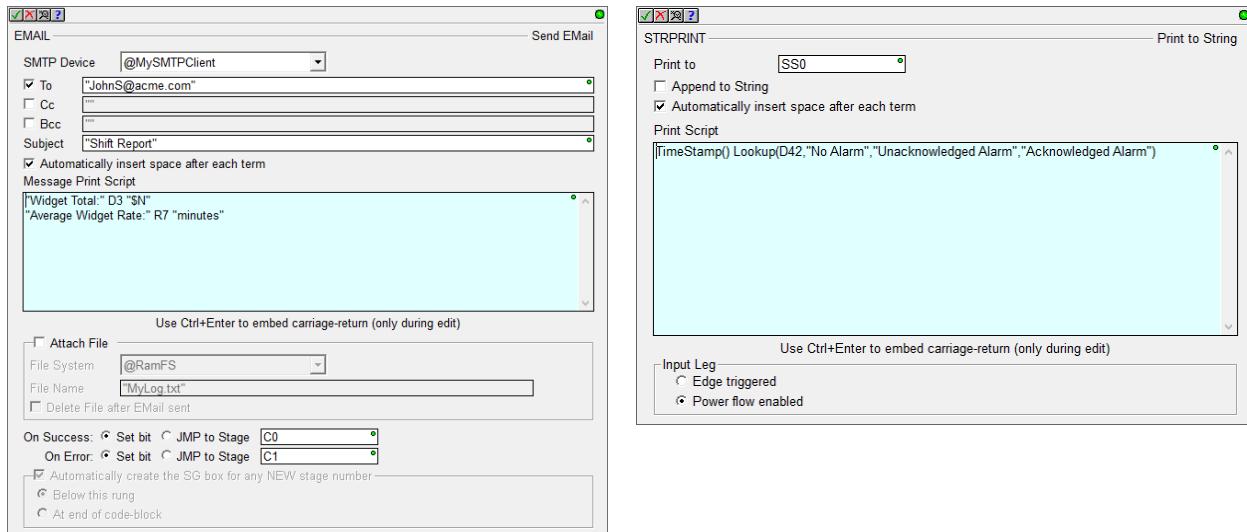
This example shows how to implement a two-dimensional array with 7 columns and a variable number of rows. V10 is the row# and V11 is the column # (0-based row / column indexes).

So V10 Row # goes from 0..N_{rows}-1. V11 Column # goes from 0..6 (N_{cols}-1).

This technique of implementing a multi-dimensional array is common in programming languages like C.



Print Script fields in the EMAIL and STRPRINT instruction editors are differentiated from other fields with a **light-cyan** background color:



See Help Topic **DMD0168 String Scripting Language Reference** for details about all the cool things you can do in a light-cyan field.

- k. **I/O System Tool** – provides detailed error information on BRX modules. See **PLC->I/O System** menu (6163).
- l. **Memory View** – numeric data blocks now support **ASCII** and **Swapped ASCII display formats**, great when using large BYTE buffers in the new HTTPCMD, JSONPARSE, and JSONBUILD instructions (6109).
- m. **Select Project Dialog** – added column for Last Saved date/time stamp of the .dmd project file (5893).
- n. **Login Count Failure Dialog** – where an Administrator login would inform you of the number of failed login attempts, and let you clear it, has been moved to just a log entry to the Output Window. This entry tells you to double-click to clear the Login Failure Count (DST386). This will only show up if you logged in with Administrator privileges (PW Change Password), and the Login Failure Count was non-zero (6125, thanks to MHW).
- o. **Program Check** – W241 warn when a BRX Slave Axis is not configured to be as fast as the Master Axis (slave has to be faster than the Master in order to “catch up” in AXFOLLOW, AXGEAR, AXCAM, and possibly in AXSCRIPT).

6. Adjusted Anomalies

- a. Ladder View – AXCONFIG editor no longer flickers Encoder Deadband field.
- b. Ladder View – AXCAM, AXGEAR properly enables/disables non-Axis Master Filter Time.
- c. Ladder View – MQTTSUB properly validates Topic fields.
- d. Ladder View – AXHOME status adjusted.
- e. Ladder View – TDOPLS and TDOPRESET default for *Initialize .InputValOffset* with value of 0 is now checked for new instructions (6123).
- f. Ladder View – GSREGWR lets you write to parameter P9.31 (JOG) (6170).
- g. Ladder View – Instruction Editor's Secondary Edit dialogs properly show Element Picker.
- h. Ladder View – Ranged BYTE fields properly display simple case of when range equals 1 BYTE.
- i. Ladder View – MRX, MWX, DLRX, and DLWX instruction editors' Device combo box, when using up/down arrow keys to select a Serial or Ethernet Device, the Serial vs. Ethernet addressing groups are properly enabled/disabled (6173).
- j. Ladder View – Instruction's String Literal parameter editors, if string literal is valid except it is missing double-quotes, warn the user that double quotes will be automatically added to make it valid, instead of reporting it as an error (do what I mean, not what I say) in EMAIL, PID, DNSLOOKUP, SETUPNOD, ... If converting the text to a string literal is NOT what is wanted (e.g. fat-fingered a string element), simply do not accept the warning and return back to the instruction editor and adjust accordingly.
- k. Ladder View – String Literal parameter errors report proper field label.
- l. Ladder View – STRINSERT properly shows nickname for first parameter (6127).
- m. Ladder View – AXCONFIG no longer shows Pop-up Cross Reference for unused parameters (6110).
- n. Ladder View – AXFOLLOW properly handles the Non-Axis Master Filter Timer option (DM-470).
- o. Ladder View – AXHOME properly reports validity of Limit 2 (DM-462).
- p. Ladder View – properly report error when accepting a rung with a multiple input box that has another output instruction above it (6119).
- q. Ladder View – properly displays Delta Contact status with Stage Bit (5977).
- r. Ladder View – properly displays instructions with Edge Input legs on 2nd or 3rd input leg (5982).
- s. Ladder View – STGDIVERG/SGCONVRG status display properly shows stage list with wide nicknames or non-abbreviated stage elements with wide program names (6016).
- t. Ladder View – consistently displays abbreviated Stage Bits vs. Nicknames for Stage parameters.
- u. Ladder View – STREAMIN and FILEREAD properly display buffer Length parameter's nickname.
- v. Ladder View – Delete Rung operation properly enables the Save Project buttons (6149).

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- w. Ladder View – Element Editor – extended edit fields' maximum widths to support longer element names (6161, thanks to JW).
- x. Ladder View – Print handles large boxes that do not fit on a page (DM-515, 2.5.2).
- y. Ladder View – Contact/Coil Editor edit field no longer clips graphic (6235, 2.5.2).
- z. Ladder View – TDOPRESET instruction editor's Master Register combo box updates after configuring a Master Register (6191, 2.5.2).
 - aa. Ladder View – MOVER and MEMCOPY instruction editor's Count parameter properly support structure fields (6246, 2.5.2, thanks to JW).
 - bb. Ladder View – on large instruction editors, properly lays out OK button and dialog size (6251, 2.5.2).
 - cc. Ladder View – MATH Fraction function (FRAC) properly reports its return value as a REAL (thanks to ATU).
 - dd. Status – User Data Type fields with *IP Address* or *Binary* Display Formats now display properly (6159, thanks to JW).
 - ee. Dashboard – center 205 base displays (5787).
 - ff. Dashboard – shows Unknown Module graphic when a new module shows up that an older version of Designer does not know about.
 - gg. Dashboard – right clicking on a 205 or Terminator CPU when offline lets you change the PLC Type of your project (6044, 2.5.2, thanks to GLE).
 - hh. System Configuration - I/O Configuration's manual I/O mapping corrected.
- ii. System Configuration – BRX Pulse Width Modulation (PWM) configuration dialog points out the new PWMOUT instruction (see 2.e. New Instructions above); corrected the .Enable structure member reference to .EnableOutput; MQTT Client Last Will's *Retain Topic* flag was not being stored in the System Configuration.
- jj. System Configuration, Memory Configuration dialog – changed *UDT* (User Data Type) tab to *Structs (Built-In/UDT)* since built-in structure layout information is also available, (although those are not editable, but UDTs are) (6053, 2.5.2).
- kk. System Configuration dialog – properly handles manually adding I/O modules with module configurations (DM-531, 2.5.2).
- ll. System Configuration – properly marked as *modified* after an inter-project paste or Insert Instructions from File operation (6250, 2.5.2).
- mm. I/O System View – application no longer “hangs” when I/O System View is initially launched behind other docked views (6243, 2.5.2).
- nn. I/O System View – now opens up showing the first Module/Base that has a fault, and collapses all other I/O Base tree nodes that do not have any faults to better diagnose I/O warnings and errors (6118).

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- oo. I/O System View – properly shows detailed warning/error information for BRX MPUs, DMIO, and EBC100 bases (6163); shows base part number for BX-DMIO-M and BX-EBC100-M slot 0 instead of “empty”; provides proper web links for the manual and specification sheets based on the part number. Properly shows detailed warning/error information for BRX MPUs (6189, 2.5.2)
- pp. Project Browser – code-block status properly works when scrolling the tree using the mouse wheel (6141, thanks to OHE).
- qq. Launch Pad Projects Panel and Select Projects dialog no longer check for existence of projects files on network UNC folders.
- rr. Cross Reference View – *Follow Ladder Cursor* mode works properly when you have multiple Ladder Views opened and navigating using the Cross Reference entries (6233, 2.5.2, thanks to JW).
- ss. PLC Menu – properly expands out (6114).
- tt. Select Project Dialog – when opening, utilizes a Wait Cursor while loading.
- uu. DirectLOGIC Migration Utility – properly launches DirectSOFT when it is installed in the Program Files folder (6178).
- vv. Element Edit Field – enhanced error reporting primarily helps instruction editor error reporting, but it also helps other dialog boxes that have element fields; show proper green/yellow/red indicator bulb (6179)
- ww. Heap Edit Fields – properly shows green/yellow/red bulb when user hits DELETE key while editing (thanks to AA).
- xx. Export Element Documentation/Element Classification – properly handles Static and Configurable Dynamic System Schemas.
- yy. Create Nickname properly handles selecting elements from the Auto-Complete list (6180).
- zz. Program Check – rule for reporting unknown module reports the module ID in hexadecimal.
- aaa. Error/Warning/Message dialog properly sets default button to Close.
- bbb. Instruction Popup Help – fixed lockup issue (6089, 6090).
- ccc. CTRIO Module Configuration properly handles Reset Counter option.
- ddd. Write to PLC dialog – no longer shows Memory Image details if the project does not contain any Memory Image Regions (6155).
- eee. System Information dialog – Event Log reporting the result of the operation to restore a project from SD card.
- fff. Browse PLC File System dialog – when reading a file from the PLC to the PC, properly reports error when destination file is already opened by another application. When this situation occurs, it points you to the temporary PC file to retrieve the contents (6244, 2.5.2, thanks to JW).
- ggg. Connect to PLC, New IP Settings dialog – no longer writes 0.0.0.0 as the IP Address after accepting a possible conflicting IP Address (6239, 2.5.2).

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hhh. Import AXSCRIPT dialog – when import line's AXSCRIPT command has the improper number of parameters, report the command's parameter signature (6214, 2.5.2).

1. New BRX Remote Base Controllers: BX-DMIO, BX-EBC100, and BX-MBIO

Each can support **up to 8 BX I/O modules**, so with the new 32 point BX I/O modules (see #2 below), each remote base can support **up to 256 I/O points**. One PLC can master up 16 of these remote bases, so **one PLC can add an another 4096 BRX I/O points** to its local I/O.



BX-DMIO-M



BX-EBC100-M



BX-MBIO-M

BX Remote I/O Controllers

Part Number	External Power	Supported Protocols	Can Be Used With	Expansion Modules
BX-DMIO-M	120–240 VAC	Do-more! Ethernet Remote I/O	BX-DM1E MPUs H2-DM1E CPUs T1H-DM1E CPUs	8
BX-DMIO-M-D	12–24 VDC			
BX-EBC100-M	120–240 VAC	Do-more! Ethernet Remote I/O Host Ethernet Remote I/O Modbus TCP	BX-DM1E MPUs H2-DM1E CPUs T1H-DM1E CPUs H2-ERM100s H4-ERM100s	8
BX-EBC100-M-D	12–24 VDC			
BX-MBIO-M	120–240 VAC	Modbus RTU Modbus TCP	Modbus RTU Master Modbus TCP Client	8
BX-MBIO-M-D	12–24 VDC			

Requires Do-more Technology Version 2.3 (DmT 2.3); see PLC->Update Firmware.

2. New BRX I/O Expansion Modules:

Model Number	I/O Count	Description
BX-32ND3	32	Discrete Input 12-24 VDC Sink/Source
BX-32TD1	32	Discrete Output 12-24 VDC Sinking
BX-32TD2	32	Discrete Output 12-24 VDC Sourcing
BX-08SIM	8	Discrete Input Simulator
BX-04ADM-1	4	Analog Input, Current Sink, 4-20mA, 0-20mA, 14 bit resolution
BX-04AD-1	4	Analog Input, Current Sink, 4-20mA, 0-20mA, 16 bit resolution
BX-04AD-2B	4	Analog Input, Voltage, +/-10VDC, +/-5VDC, 0-5VDC, 0-10VDC, 16 bit
BX-06RTD	6	Analog Input, Temperature, Resistance Temperature Detector
BX-08NTC	8	Analog Input, Temperature, Thermistor
BX-08THM	8	Analog Input, Temperature, Thermocouple
BX-04DA-1	4	Analog Output, Current Source, 4-20mA, 0-20mA, 16 bit resolution
BX-04DA-2B	4	Analog Output, Voltage, +/-10VDC, +/-5VDC, 0-5VDC, 0-10VDC, 16 bit

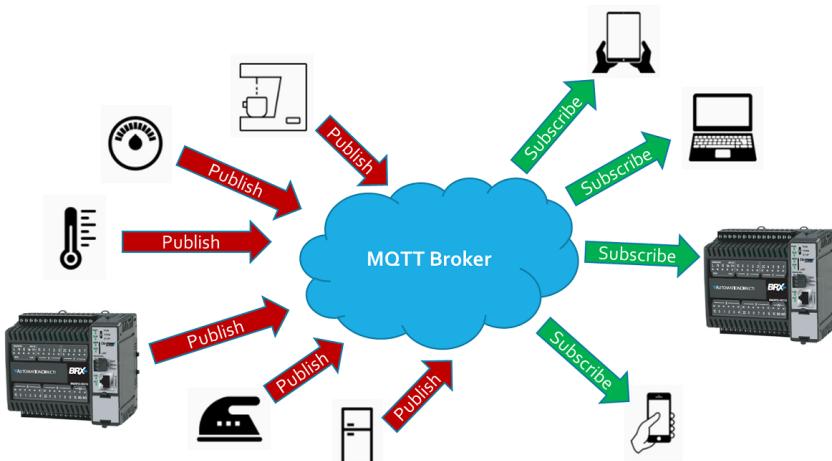
(requires DmT 2.3)

3. IoT (Internet Of Things) MQTT Client Protocol (BRX PLC and Simulator only)

Publish IoT Topic data to an MQTT Broker via the **MQTT PUB** instruction

Subscribe to an IoT Topic and receive updates from an MQTT Broker via the **MQTT SUB** instruction.

See New Instructions below for more details. Requires DmT 2.3.



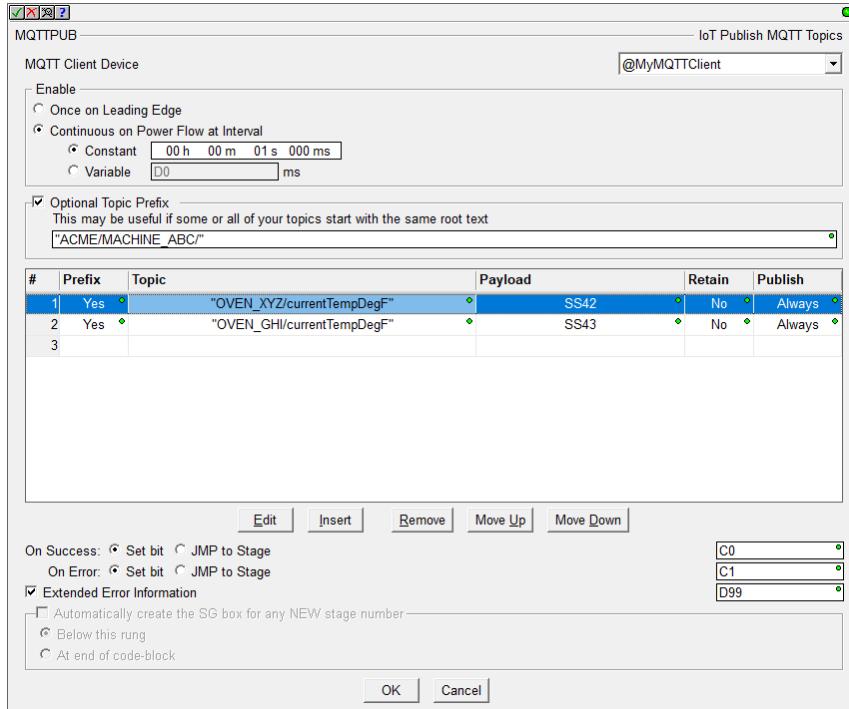
4. New Instructions

a. MQTTPUB - IoT Publish MQTT Topics (Protocol – Standard)

The MQTTPUB instruction can publish payloads of multiple topics at a desired time interval, or on an event-based edge trigger, to the MQTT Broker defined in your MQTT Client Device.

Each Topic's published Payload (data) can be set in a STRING buffer as text or as raw bytes (see STRPRINT).

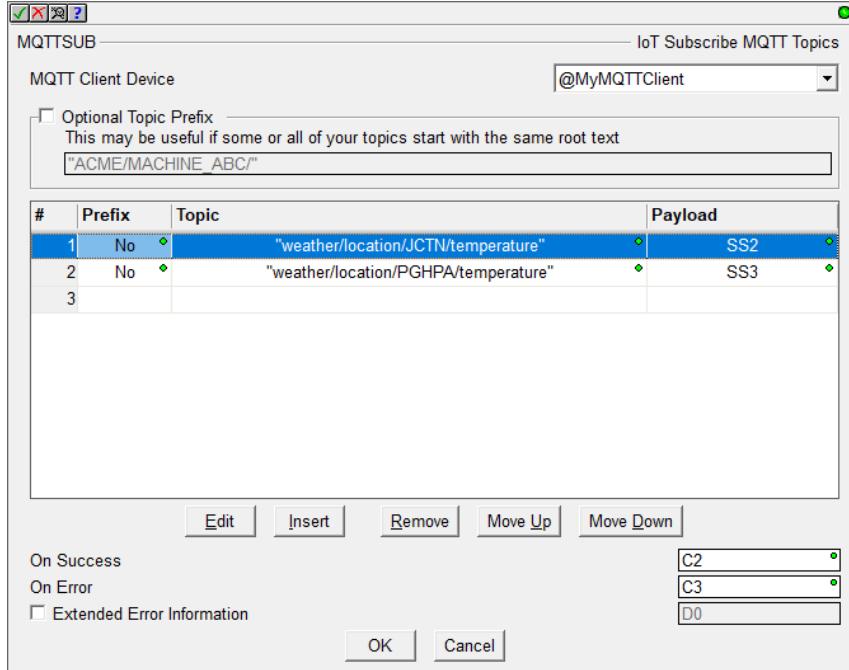
The Last Will & Testament (LWT) is set up in the MQTT Client Device. The LWT Topic or Payload can be changed via the DEVWRITE instruction.



b. MQTTSUB – IoT Subscribe MQTT Topics (Protocol – Standard)

The MQTTSUB instruction can subscribe to multiple Topics sourced by the MQTT Broker defined in your MQTT Client Device.

As long as instruction has power-flow, each Topic will receive fresh data Payload as the MQTT Broker publishes it. The Payload is written as a STRING data buffer. The contents of the STRING can then be processed in various ways based on the format of that specific Topic's Payload (see STR2INT, STR2REAL, STRGETB, etc.).



The two new MQTT Publish/Subscribe instructions support **detailed transaction logging** using DmLogger when you turn on ST36 \$EnableMsgDump status bit.

5. Enhancements

- c. Ladder View: MEMCOPY **warns when copying raw bytes** from/to structures to/from numeric data blocks, especially STRINGS (5979).
- d. Ladder View: INI – Immediate Input instruction editor smarter based on the BRX model's local discrete input count.
- e. Ladder View: DEVREAD and DEVWRITE instructions support the **new MQTT Client device configuration parameters**: Authentication Account User Name and Password, LW&T Topic and Payload, Server IP Address Name Port and Timeout.
- f. Memory View: **Status** can be turned OFF (5316).
- g. System Configuration Dialog: Added **right-click context menu** to Memory Configuration's **Edit User Data Type Definition dialog** to Add/Insert/Edit/Delete/... Fields in the UDT, and to the Memory Configuration's **User Data Type (UDT) tab** to Add/Edit/Delete/... UDTs (6029, thanks to JW).
- h. Motion: Improved Axis Instructions' **handling of Axis Devices** and other related Axis parameters (5983).
- i. Security: After the Administrator logs in, **report the number of Failed Logins** if any have occurred (this is maintained in DST386/\$FailedLoginCnt). Also, give the Administrator the option to reset it (5101).
- j. Project: If writing a Project to the PLC requires a mode change from Program to Run, and the new Project creates an issue where the PLC could not return to Run mode, **give the user options to make changes to their Project's System Configuration**, a probable place to correct any issues (4776).
- k. Project Files: Generates **Project and C-more export files automatically** whenever you Save a Project to Disk. These export files are also maintained as part of the Auto-Save and Backup facilities. The names of these export files are based on the project file name, and are created in the same folder as the project file. For example, if your project file was called MyProject.dmd, then the following 2 files will be generated whenever you save MyProject.dmd to disk:
MyProject_EXPORT_DMD.txt and **MyProject_EXPORT_CMORE.txt** (5978).
- l. Modbus/TCP: Latest firmware for all EBC100 models (H2, T1H, and BX), GSEDRV100, BX-MBIO, and all ECOM100 models (H2 and H0) **lets you close Modbus/TCP Port 502**, but lets you configure other TCP ports for Modbus/TCP. Requires NetEdit version 3.16, which ships with Designer 2.3.
- m. Live Update: **At end of Live Update** of firmware, which downloads the latest and greatest firmware files from our web server, prompt the user to update the firmware in any of their hardware (5272).

6. Adjusted Anomalies

- n. Dashboard: When reporting the SMTP Server's address, report the Name instead of the IP Address if that is how it is configured.
- o. System Configuration: Properly handling multi-packet server credential verification for SMTP Client configuration.
- p. Ladder View: Status for DRUM instruction's Mask Element Name text displays correctly.
Note: The STATUS display was always correct. What was corrected was the text for the Element Name (since the applied Mask element is indexed based on the step number, e.g. D100 when on step 1, D101 when on step 2, etc.) (6040).
- q. Ladder View: Properly displays word-wrapped script instructions as their width changes due to the width of other instructions in the output column (6055).
- r. Ladder View: When opening up a project file, properly handle when there are differences between the default zoom level vs. the workspace's zoom level of a specific view.
- s. Ladder View: Paste of AXCAM properly displays when the device parameter is an unassigned nickname (6057).
- t. Trend View/PID View Snapshot window properly displaying values to the configured number of decimal places (6054).
- u. Output Window: Paste Instruction properly maintains messages logged to the Output Window (5929).



Changes in Do-more 2.2

1. Do-more Designer and its HAPTools now **install to the standard Windows's Program Files folder**, instead of off the system root folder. The **Projects** folder is now located within the **Designer 2.2 folder below your PC's Public\Documents folder** (or **All User\Documents** in older Windows versions). Look for the **Do-more\Designer2_2\...** subfolder hierarchy below those two different system folder locations. See *Open Designer 2.2 Folder from Launchpad view in Enhancements section below.*
2. Added support for the new **DURApulse GS4** Drives (minimally requires Do-more Technology Version 2.2 (DmT 2.2), see PLC->Update Firmware). Along with a GS-EDRV100 interface module, GS4 Series drives can be part of your Do-more PLC's Ethernet I/O network, just like how the GS1, GS2, and GS3 drives work as Ethernet I/O slaves. GSREGRD and GSREGWR instructions support the new GS4's parameter set. *Note: the GS-EDRV100 firmware must be at least 6.0 to support the GS4 (use NetEdit to upgrade your GS-EDRV100 module).*
3. **EMAIL** enhancements
 - a. **DNS support** lets you specify the URL name of your SMTP server (e.g. *smtp.gmail.com*). The Do-more PLC will resolve that name automagically whenever it sends out an email (requires DmT 2.2). See *how to configure your DNS Server Address in Enhancements section below.*
 - b. **Secure EMAIL** on BRX

As security becomes more important, the BRX PLCs added support for Transport Layer Security (TLS) when sending email.

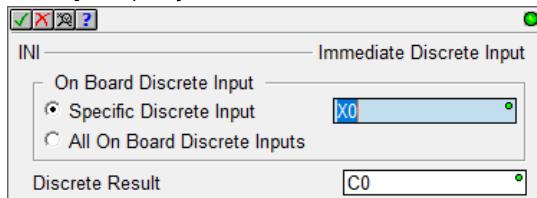
In addition, BRX PLCs support Certificate Validation to ensure the identity of the remote server.

You can also verify your SMTP Client settings against the actual SMTP Server from your PC.

Secure EMAIL is optional, but requires DmT 2.2 on your BRX PLC if configured. Also requires BRX Gate Array version 1.8.

4. New Instructions

a.INI – Immediate Discrete Input (only available on BRX MPUs with onboard discrete inputs)



Along with OUTI/SETI/RSETI that can generate clock pulse trains, use INI to read back data from devices that return data based on the generated clock pulse train.

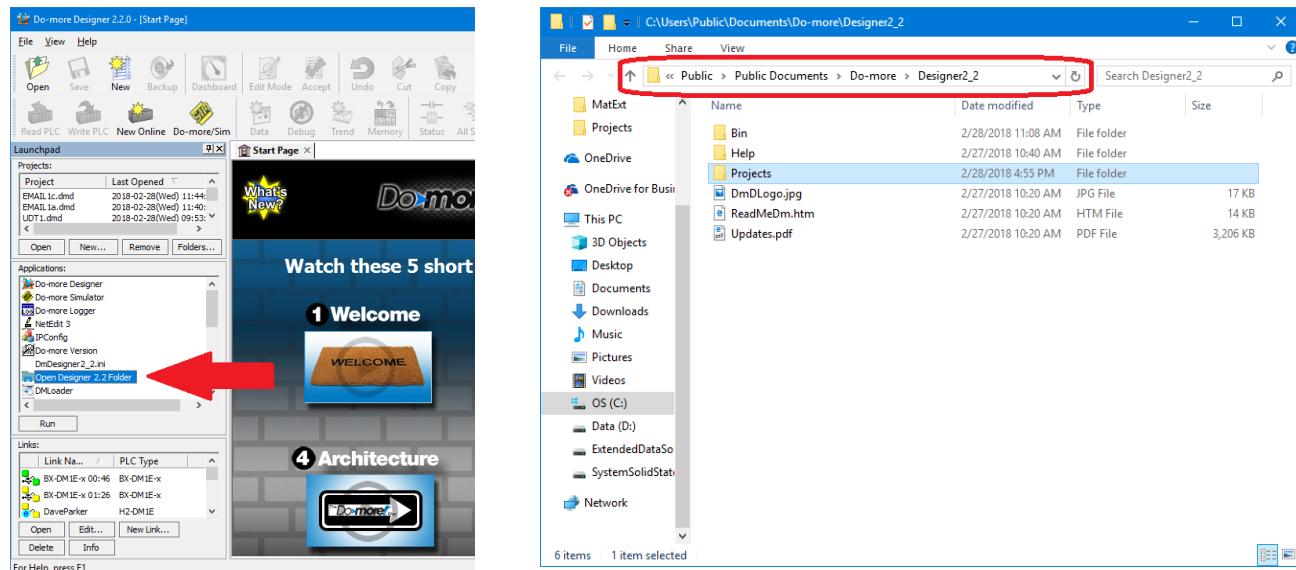
Note: INI instruction is **NOT needed by ISR** Interrupt Service Routines since ISRs automatically reads ALL the High Speed I/O input states upon entry to the ISR. Also, this instruction does **NOT** update the image register value of the Specific Discrete Input parameter (e.g. X0). It just gets the ON/OFF state of the physical input of the Specific Discrete Input parameter and writes that state to the Discrete Result parameter. This way the Specific Discrete Input image register value remains invariant throughout that specific PLC logic scan.

5. New System Status Elements:

DST52	\$ActiveSessions	see Help Topic DMD0208
DST58	\$ProgramChecksum	<i>System Nickname Locations</i>

6. Enhancements

- a. There is a link to **Open Designer 2.2 Folder** in the *Applications* panel of the *Launchpad* view to open Windows Explorer to the Designer 2.2 folder below your PC's *Public Documents* system folder:

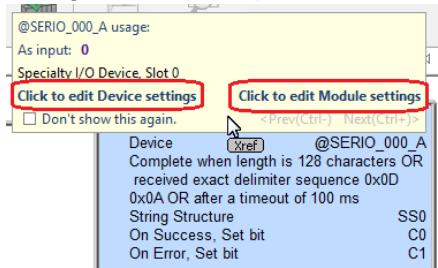


There is a similar link to **Open HAPTools Folder** further down the *Applications* list. If you have an older version of Windows, these will be located below the *All Users Documents* folder.

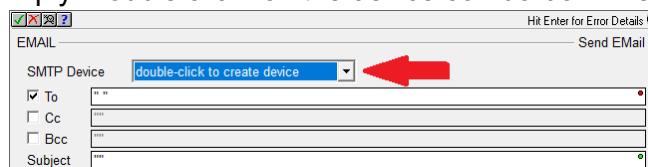
- b. Added **Close button [x]** to every MDI View tab (5972).



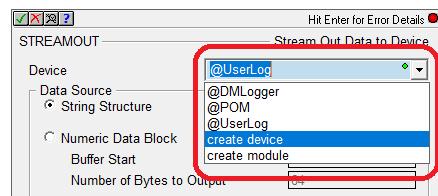
- c. View Options Dialog: Smarter about when to automatically check the **Apply to New Views** checkbox (5853).
- d. Ladder View: Added option to **Always start in Edit Mode** (5620).
- e. Ladder View: Show specific **Leg Label or Edge Trigger tooltip** when floating mouse cursor over an instruction's Leg Label or Edge trigger. Tooltip includes a link to the instruction's Help topic to get more details about the input leg (5206).
- f. Ladder View: Added two **hot links to the Cross Reference tooltip** whenever you hover over an "@" Device parameter. The hot links take you to edit either the Device configuration and/or any corresponding Module configuration (5981).



- g. Ladder View: Online **status** of **STRING** elements let you **right click** and change between ASCII and Quoted display **formats** (5501). Default format is ASCII, as before.
- h. Ladder View: **Create Nickname dialog** title bar now contains the **instruction parameter's description** to help provide better context while editing. This is especially helpful if you had 2 or more new nicknames you needed assigned during that instruction's edit session (5298).
- i. Ladder View: Added a checkbox to the **FOR and WHILE loop instruction editors** to **automagically add the corresponding NEXT or WEND instruction** as the next rung or at the bottom of the code-block (5514).
- j. Ladder View: When editing device-centric instructions, **made it easier to create devices** or modules when there currently are **NO** corresponding devices for that instruction type. Now all you have to do is simply "double click" on the device combo-box when you bring up the editor:



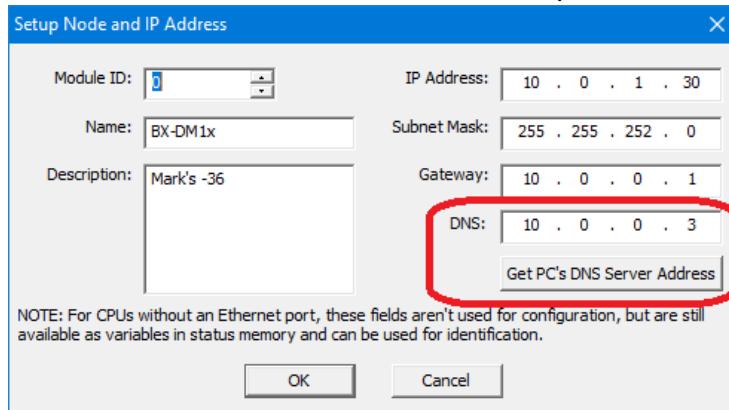
When devices *do* exist for that instruction, but you need to create another device, you can still drop-down the combo box list and select *create device* or *create module* items in the list that show up below the existing devices:



These will launch the *Create New Device* or *Create New Module* dialog box within the System Configuration (5970).

- k. Ladder View: Tweaked HSIO instruction editors' high speed register selection.

- I. Ladder View: Simplified the **RX/WX instruction editors' Read From / Write To** dialog behavior regarding built-in native data block vs. user added data block selection for the REMOTE system. The dialogs now utilize a radio button group where the Built-In radio button just has a simple element field editor, but the User radio button lets you enter the remote system's data block # (5778).
- m. Ladder View: High Speed instructions' resource descriptions changed from *general(@device)* to *@device(general)* (5675). For example, *High speed Ctr/Tmr 1 Acc (@MyEncoder)* now displayed as *@MyEncoder (High speed Ctr/Tmr 1 Acc)*
- n. Ladder View: INTCONFIG – Configure Interrupt instruction editor's Match Register panel has a “Configure Master Register Device” button (5899).
- o. Ladder View: NETTIME – SNTP Client instruction editor has button to launch the IP Address Lookup dialog (5870).
- p. Trend View/PID View: After **saving the log/exported** trend data to a file, user asked whether they would like to **open Window's Explorer** to that folder, where the user could, say, open the .CSV file with Excel, etc. (3192).
- q. PID View: Added option to let user specify **number of decimal places** for real number display in the Form View (5517, thanks to MN).
- r. I/O Base Display: Added the concept of an **unknown module**. As new modules are developed in the future, “old” versions of Designer can minimally identify them as being “unknown”.
- s. Configure your **PLC's DNS Server address** from the Setup IP Address dialog:

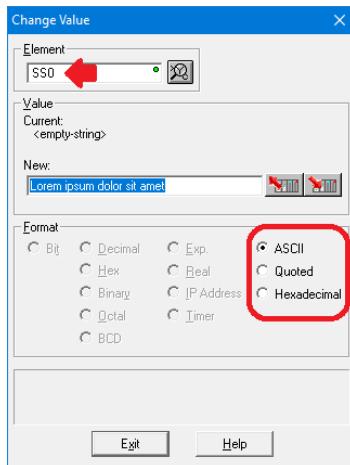


DNS (Domain Name System) resolves named URLs to their corresponding IP Addresses.

DNS/URL support was added to the EMAIL SMTP Client Configuration so you can configure the corresponding SMTP Server's address simply as *smtp.gmail.com* (for example), then let the Do-more PLC use DNS to resolve that name whenever you use an EMAIL instruction (see item 3.a. above). You no longer have to use the DNSLOOKUP instruction. Requires DmT 2.2. You can also configure the DNS Server address from NetEdit 3.15.

- t. Browse PLC File System Dialog: Now shows files' date-time-stamps using the PC locale's short **month text** (thanks to MK@PD).
- u. Output Window: **Automagically hides** after successful operations that utilize the Output Window, like after a successful Accept or a successful Program Check. It will remain visible if anything was reported in the Output Window by the operation (5929).

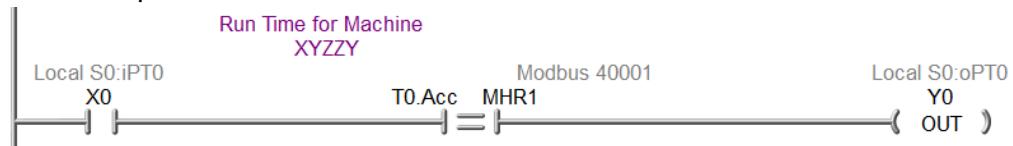
- v. Change Value dialog supports **STRINGS**, with support for ASCII, Quoted, and Hexadecimal display/edit formats (5813):



- w. Implicit Element Documentation Field Display added (3451, 5606, 5688):

- i. Inherited Extra Info/Description from **parent structure's** element documentation or from root cast element documentation. For example, if T0 element has a Description of "Run Time for Machine XYZZY", then when T0.Acc or T0.Done are shown in Ladder View or Data View, they will display the base structure's T0's Description field of "Run Time for Machine XYZZY", but ONLY if those field elements do NOT have their own Description. Or D0 has Extra Info of "IP Address", then the cast of D0:UB0 in Ladder or Data View will display the cast's root element's Extra Info field of "IP Address" if that cast does not have its own Extra Info field value.
- ii. If an I/O Element's Extra Info field does not exist, then Ladder and Data Views will display that **I/O points Master/Base/Slot Point or Channel** values. For example, if X0 does NOT have its own Extra Info field, then Ladder View will display "Local S0:iPT0" for the Extra Info field (Local base, Slot 0, Input point 0).
- iii. If a Modbus Guest Protocol element Extra Info field does not exist, then Ladder and Data Views will display its **Modbus protocol address**. For example, if MHR1 does NOT have its own Extra Info field, then Ladder View will display "Modbus 40001" for MHR1's Extra Info field.

Here's an example:



This does NOT affect the Element Documentation database contents. It only affects the DISPLAY of the element documentation fields in the various views like Ladder and Data views. Individual views' Element Documentation Field filters will still have precedence like normal. Each of the individual Implicit Element Doc options can be enabled or disabled independently from the Global Options dialog (View->Options... Global Options tab). See Help Topic *Using the Launch Pad* (DMD0294) Global Options section for more details.

- x. New Program Check Rules:
 - i. E96 Report Unknown Expansion Modules. If you ever get this, just upgrade the firmware to add support for the unknown module.
 - ii. E97 Invalid System Configuration. For example, when Memory Configuration exceeds capacity.
- y. After writing a project to the PLC where the memory configuration had been “incompatible” between Designer and the PLC (where all status had been disabled), go ahead and prompt the user to turn All Status ON since the configurations are now “compatible” (5335).
- z. Export: After exporting the Project or Element Documentation to a file, prompt to **open Windows Explorer** to the exported file folder, where you can open it or perform other file operations on it (5617).
 - aa. Global Options: Changed the initial **Default View type** to Ladder View.
 - bb. If at launch time, if Do-more Designer’s **Communication Server’s Communication Link Autosense function** reports that you have a bunch of comm links that are all disabled, then Designer will prompt you to see if you want to disable the Autosensing of your communication links at start-up. If disabled, this can speed up the launching of Designer if you have a lot of comm links to PLCs that are typically not connected to your PC. If you decide to keep the comm link autosense functional, Designer won’t ask again until you get five additional disabled comm links. If you ever need to turn it back on, open up the DmDesigner2_2.ini file and change the “AutoSense” value from 0 to 1 below the [Comm Server] group (5896, thanks to kw).

7. Adjusted Anomalies

- a. Project’s Designer Layout remembers the MDI tab order (4399).
- b. Download Project dialog’s Prepend Project Note’s field word-wraps (5877).
- c. The Project’s Do-more Technology Version is now always downloaded when you download a project.
- d. Projects that contain Shift Register instructions will now match between Disk and PLC (5927).
- e. Browse PLC File System now properly handles PCs with positive time zones (no longer displays Microsoft’s “Invalid Parameter” error; thanks to MK@PD).
- f. Remote Bases report errors if you attempt to add an unsupported module type for that base, like trying to add an H2-ECOM100 intelligent module to a H2-EBC100 205 Remote Base (5949).
- g. GSREGRD/GSREGWR were misreporting their opcode lengths, potentially causing some confusion in the Ladder Display (5953, thanks to GD).
- h. Browse PLC File System dialog now working properly with Simulator’s pseudo “SD Card” file system (5915).
- i. Project File’s Documentation Database client properly handles unknown client types, so no longer get Microsoft’s “Encountered improper argument” error (5909).
- j. Unused Dynamic Schemas properly getting cleaned up.
- k. Added status for CALL instruction’s “Called Counter” parameter.

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- I. CALL instruction display optimized when there are no parameters (5884).
 - m. Trending a COPY instruction works better (5894).
 - n. FILELOG instruction handles Replace and Assign Unassigned Nicknames (5878).
 - o. DEBOUNCE – Reduce Discrete Input Chatter instruction editor now allows the SET Delay or RESET Delay to be 0 (5950, thanks to GD).
 - p. AXHOME – Axis Perform Home Search better handles invalid Limit parameters.
 - q. EMAIL instruction's email address lists are now comma delimited.
 - r. MRX/MWX instruction editor properly handles situation when no Modbus clients exist (5975, thanks to MP@LWG)
 - s. DRUM instruction editor now intelligently warns when there are trailing or intermediate steps that do not have either an event or a time (5633).
 - t. GSREGRD/GSREGWR Parameter Editor tree missing the tree node for the last parameter.
 - u. Instruction Editors that contain tables now report the table name as part of the parameter description in its warning/error dialogs and the Create Nickname dialog (5298).
 - v. Trend/PID Views Snapshot dialog's number of floating point decimal places adjusted.
 - w. When creating a new Memory View, if the user enters a non-byte aligned range of bits, they will be alerted to the issue and offered a new range that IS byte-aligned that includes the range they originally entered (5629).
 - x. Status Bar properly halts display of flashing ROM chip when closing a project (5645).
 - y. Dashboard's O/S and Booter hot links' tooltips adjusted (no longer need to go to System Information dialog to download firmware) (5908).
 - z. Widened Block Cursor's parameter cursor so its border no longer clips any parameter text (5930).
- aa. Do-more Technology Version dialog correctly reports all the various versions (5910).
 - bb. Improved PID Auto-Tune when communication failures are occurring (5858).
 - cc. Setup BX Analog Module better handles 16 bit unipolar option.
 - dd. Memory Configuration dialogs properly report when you run out of memory (DM-416).
 - ee. Element Picker (especially Stage Bits) optimized (5973). This became slow due to Microsoft's Windows 10 Fall Creator Update's GDI memory fragmentation, which Microsoft is addressing.
 - ff. Memory Image Manager properly handles reading/writing large structures.
 - gg. Create Nickname dialog better handles duplicate nicknames (5985).
 - hh. Specific project-centric toolbar buttons properly disable when no project is opened (5988).
 - ii. Improved USB connection recovery (6010, thanks to PLCG).
 - jj. **DmT 2.2 firmware:** PD and ND box "termination" logic behaves like OUT coil and turns off the Pulse bit output (5987, thanks to AA@SV).

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Changes in Do-more 2.1

(all 2.1.4, 2.1.3 and 2.1.2 entries are noted; all other entries are from 2.1.1)

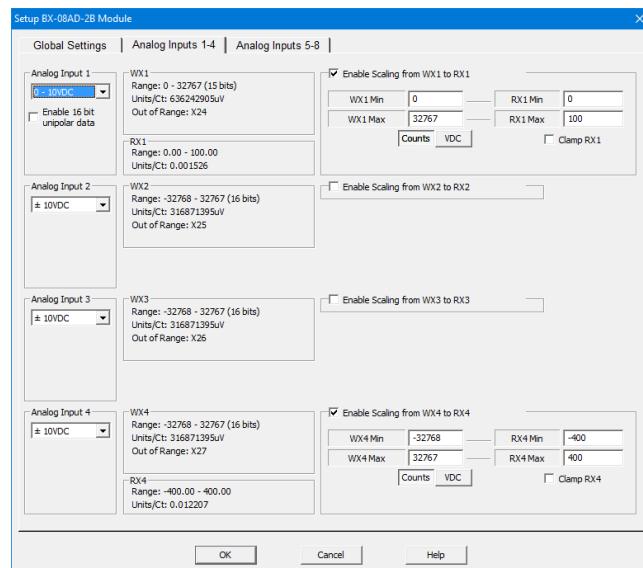
1. Added support for NEW BRX Analog Expansion Modules.

Part Number	Type	Signal	Signal Range	# Channels	Resolution
BX-08AD-1	Analog Input	Current	0-20mA or 4-20mA	8	16 bit
BX-08AD-2B	Analog Input	Voltage Bipolar or Unipolar	\pm 5VDC or \pm 10VDC or 0-5VDC or 0-10VDC	8	16 bit
BX-04THM	Analog Input	Thermocouple		4	
BX-08DA-1	Analog Output	Current	0-20mA or 4-20mA	8	16 bit
BX-08DA-2B	Analog Output	Voltage Bipolar or Unipolar	\pm 5VDC or \pm 10VDC or 0-5VDC or 0-10VDC	8	16 bit

Auto-Scaling Analog

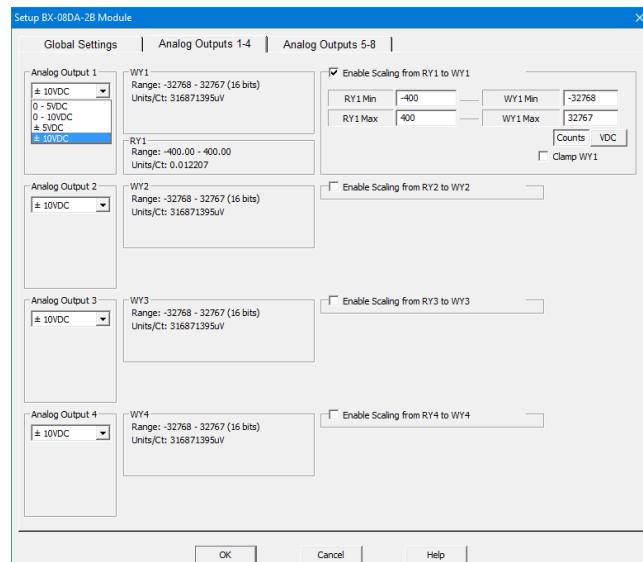
The BRX analog modules along with any onboard MPU's analog channels support auto-scaling on a **per-channel** basis. Auto-scale also supports **clamping**, if desired.

For Analog Input modules, the raw WX value can be scaled to its corresponding RX REAL value. For example, WX1 raw value range of 0-32767 can auto-scale to RX9 REAL value of 0.0-100.0. The PLC I/O scan will generate the RX1 value automatically, without the need for any SCALE or MATH instructions in your ladder code. So a WX1 signal value of 16384 (5.0VDC of 0-10VDC) will result in an RX9 value of 50.0.



For Analog Output modules, the scaled RY value can auto-scale back to its corresponding WY raw value. For example, RY1 REAL scaled value of -400.0 to +400.0 can scale back to its raw range of -32768 to +32767 (\pm 10VDC). So RY1 value of +200.0 will result in a WY1 raw value of +16384 that generates an output signal of +5.0VDC.

Per-Channel Signal Configuration lets you choose the signal ranges for voltage and current modules, and bi-polar vs. unipolar for the voltage modules. For example, for voltage output module BX-08DA-2B, you can select from 0-5VDC, 0-10VDC, \pm 5VDC, or \pm 10VDC. *No need to purchase different modules for different signal levels.*

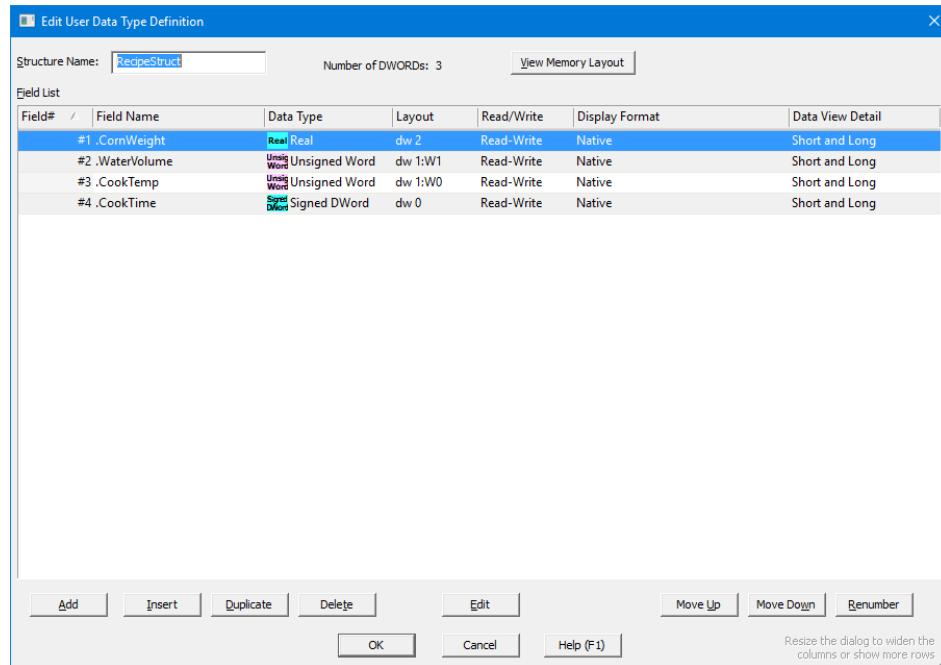


2. User Data Types Structure Definitions

Users can now define their own **complex User Data Type structure** type. Possible usage includes **recipes**, **log data**, **alarm/event details**, **complex structures from other PLC vendors**, etc. Once you have defined your own User Data Type, you can **create any number of Data Blocks or Heap Items of that User Data Type structure definition**.

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For example, if you have a recipe for cooking corn, you have recipe values such as how much corn (CornWeight), how much water (WaterVolume), cook temperature (CookTemp), and cook time (CookTime). Just go to the *Memory Configuration* entry in the *System Configuration* dialog, and click on the *User Data Type* tab. From there you can create a new User Data Type structure definition called *RecipeStruct* with those structure field members:

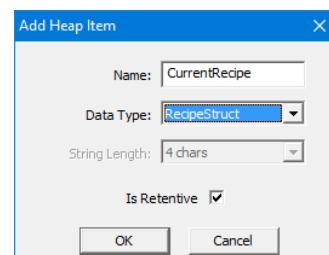
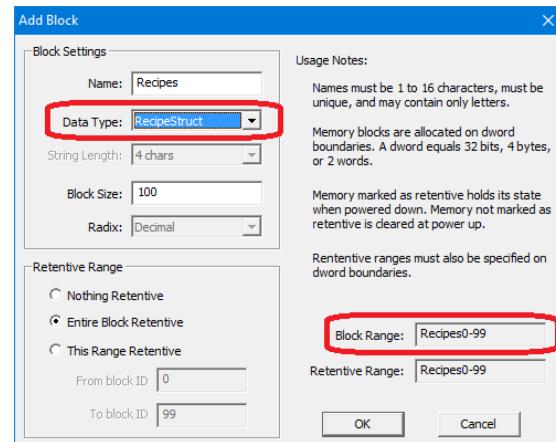


Now you can create a data-block of 100 *RecipeStruct* structures, and call that data-block *Recipes*, which you can access just like the block of T Timer structures:

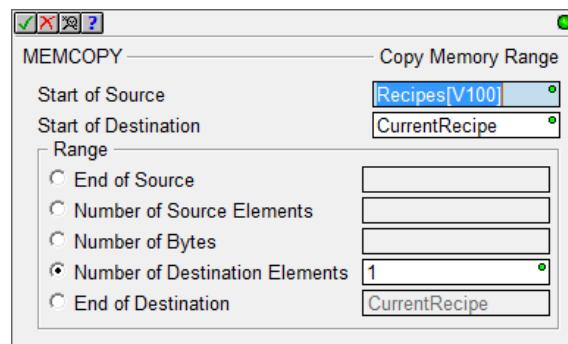
Recipes0.CookTime, *Recipes42.CornWeight*, etc.

This block could be the complete set of 100 different *RecipeStructs* that you can pick from, *Recipes0* to *Recipes99*.

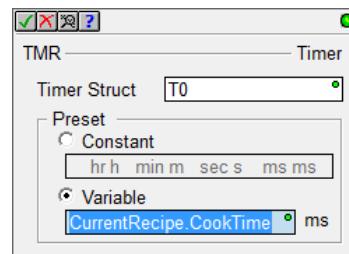
You can also create a new heap-item of a single *RecipeStruct* as the current recipe and call it *CurrentRecipe*.



Then you can move one of the *RecipeStructs* in the Recipes block to the CurrentRecipe heap-item using array indexing based on a user selection by setting V100 equal to a recipe index number from 0 to 99.



Then in your Ladder Logic, use **CurrentRecipe.CookTime** as the Preset to your TMR instruction.



Import/Export User Data Type Definitions Between Projects - Any User Data Type definition can easily be re-used in other Do-more projects by simply using the Import or Export buttons from the Memory Configuration's User Data Types dialog. You can then easily share User Data Type data between Do-more PLCs via RX/WX Network Read/Write instructions, like updating recipes across multiple PLCs. **Copy/Paste of Ladder Logic** that reference elements of a User Data Type will also automatically paste the User Data Type definition and the corresponding data-block or heap-item to the destination project.

3. Load Project Image from SD Card in BRX PLC

If an SD Card contains a PLC image file with the name `image.bin` in the root folder, then when the PLC is rebooted *with the Mode Switch in the STOP position*, the BRX PLC will load and save that project image as its new project.

This image file contains the 3 critical areas of your project: System Configuration, Program, and Documentation. It also can optionally contain the Image Register's Retentive Memory values, User Password Configuration, and IP Network Configuration.

This is a great feature for OEMs that need to replicate a PLC's contents over and over again, without the need for using Do more Designer. Just create an image on an SD Card, stick it in a new BRX PLC that is powered down, put the Mode switch to the STOP position, then TURN IT ON.

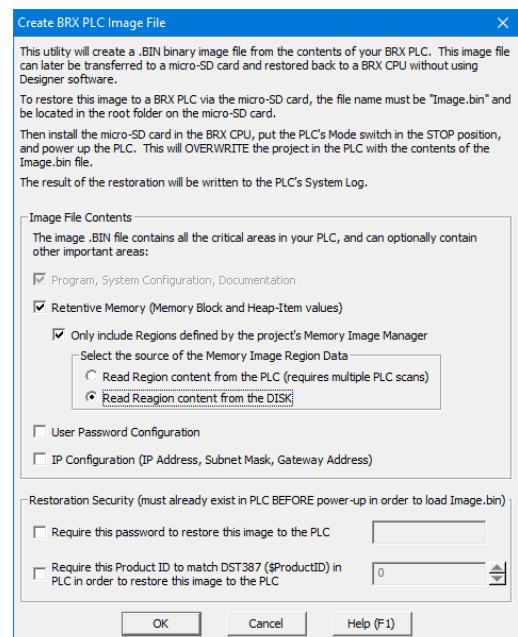
There are also some optional security features similar to what are in the DmLoader utility, like requiring a valid password to be defined in the PLC, or requiring a matching Product ID. If these optional security features are defined but fail, the PLC contents remain as-is and are NOT updated with the contents of the `image.bin` file. The result of the restoration is logged to the PLC's System Log.

There are two ways to generate a BRX PLC image file:

- from Designer via PLC->Create PLC Image File menu (see dialog box to the right)
- using the new BACKUP – Create PLC Image File instruction

The BACKUP – Create PLC Image File instruction lets you create image files on-the fly at runtime. Great for automatically making PLC image backups on a weekly or monthly basis. This is a GREAT feature for places that need to make a backup of the PLC system **including the Image Register's Retentive Memory contents**.

See Help topic **DMD0425 – Backup and Restore Using Micro-SD Card** for all of the details.

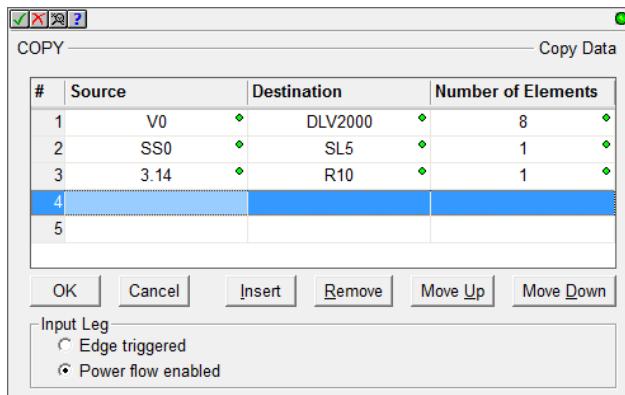


4. Instructions

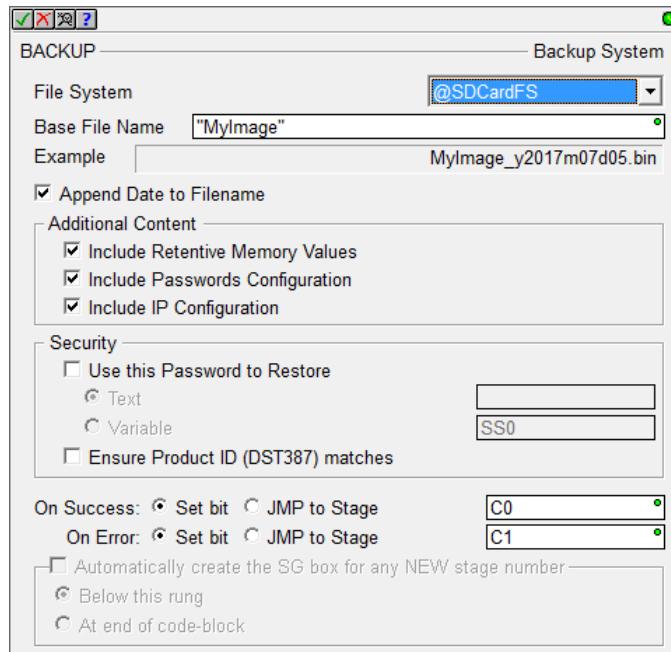
To utilize any of the new PLC features, new instructions and instruction changes, the CPU firmware requires at least **Do-more Technology Version 2.1** (see Help->Do-more Technology Versions when online). To upgrade your Do-more CPU firmware, select PLC->Update Firmware menu. The firmware files that shipped with this version support Do-more Technology Version 2.1: bxdm1x_2_1_0.os for BRX, h2dm1x_2_1_0.os for 205 Do-more CPUs, and t1hdm1x_2_1_0.os for the Terminator Do-more CPUs. Note that newer firmware files may already be available.

a. New Instructions

- **COPY – Copy Data** lets you perform most of the data assignment operations in one compact instruction. It merges the functionality of MOVE, MOVER, and SETNUMR for numeric data; SET/RST, SETR/RSTR for bit data; copying entire structures and ranges of structures; and moving Strings of different maximum lengths between each other, for example moving SS0 to SL5. (5687)

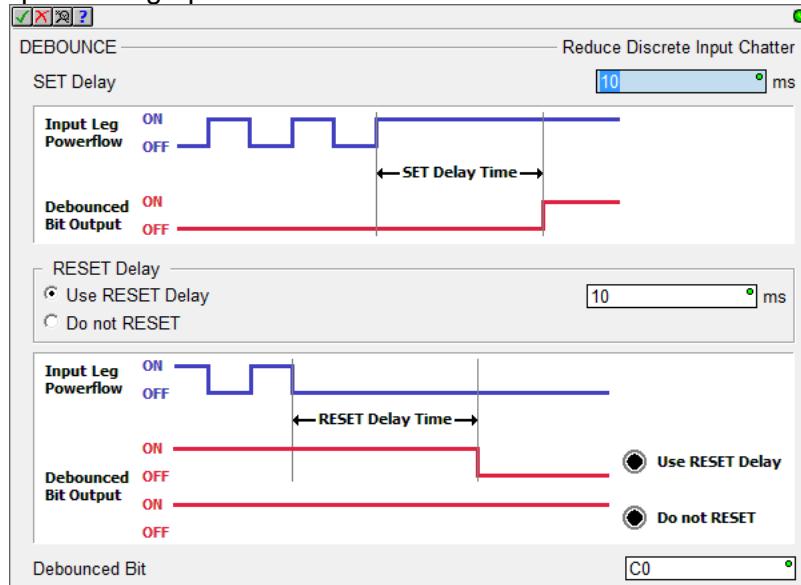


- **BACKUP – Backup System** lets you create an image of your PLC to a .bin file which can later be used to load that project into a BRX PLC without the use of Do-more Designer.

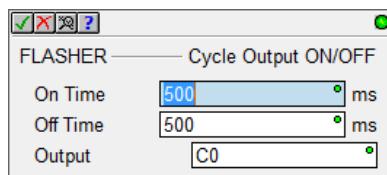


See the *Load Project Image from SD Card in BRX PLC* section above for more information.

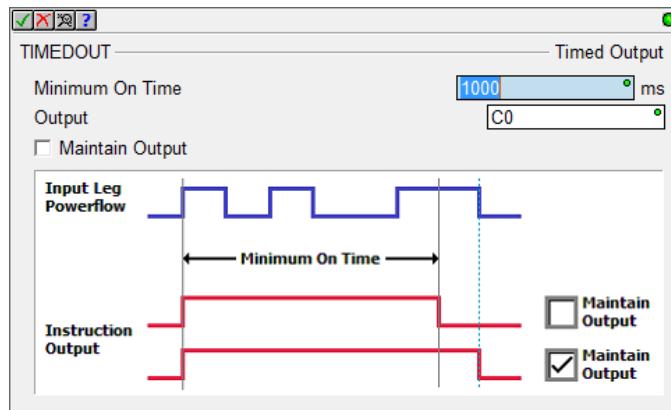
- **DEBOUNCE – Reduce Discrete Input Chatter** – software based "signal qualifier" on the powerflow input. The graph in the instruction editor below details its behavior.



- **FLASHER – Cycle Output ON/OFF** lets you define the flashing cycle of a bit output. It even supports lopsided ON/OFF times, and variable time.



- **TIMEDOUT – Timed Output** sets the Output for a predetermined amount of time based on the powerflow into the box. The Output can be ON longer if the "Maintain Output" option is checked and the input powerflow is ON when the Minimum On Time expired.

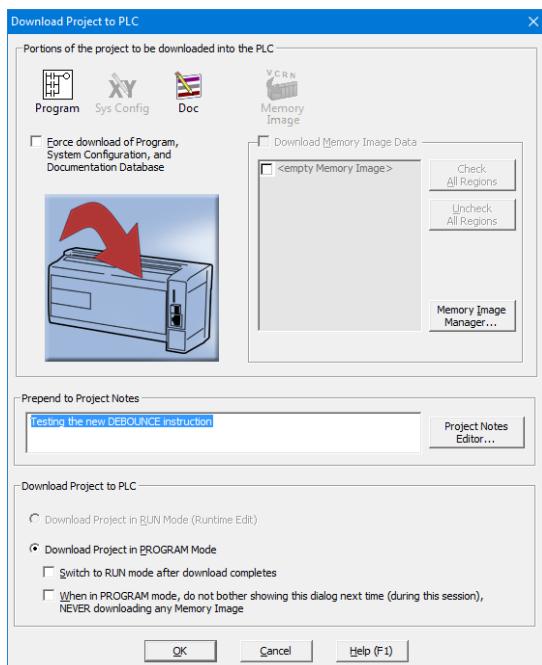
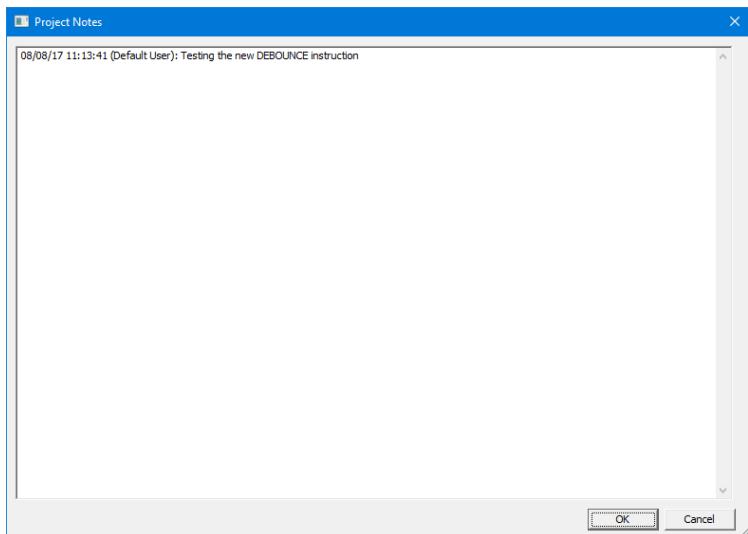


5. Project Notes Document

The new Project Notes document is a place where you can make general notes about your project. It is saved as part of your Do-more project on Disk and in the PLC, and can be printed out as part of your project's hardcopy.

The editor/viewer is accessed within the Dashboard's Documentation panel, or via the Tools->Edit Project Notes menu. It is a simple editor that contains simple text, but gives you a place to jot notes about work done, work needed to be done, design details, etc.

The document supports up to 60,000 characters (or 60 pages).



In the **Download Project to PLC** dialog, there is an option to prepend some text to the Project Notes document every time you download something to the PLC.

If anything is entered there, that entry is prepended to the top of the Project Notes document with the current date/time stamp and the current User Name that performed the download.

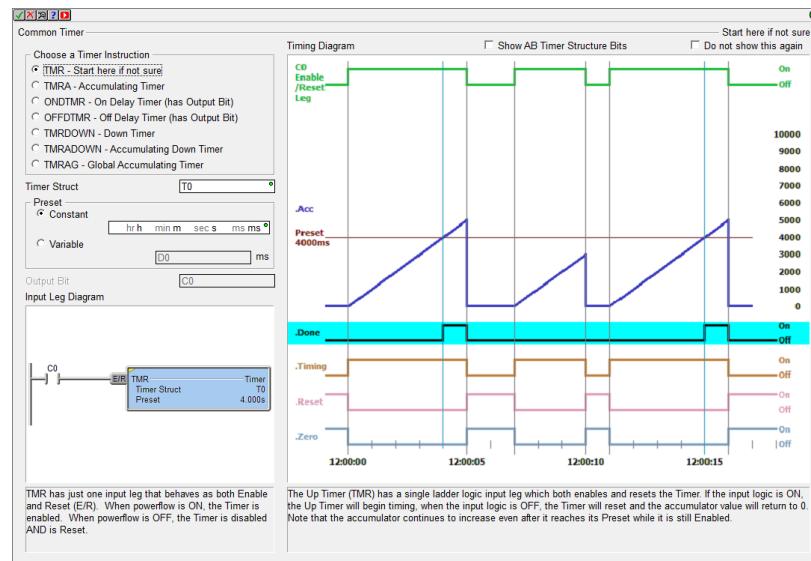
It is probably good practice to always enter something there, especially after commissioning your PLC. This way you can have a “paper trail” of any changes made to your PLC.

6. New System Words (DSTs)

DST51	\$FatalTermCode	see Help Topic DMD0208 System
DST389	\$ImageBackup	<i>Nickname Locations</i> and
DST390	\$ImageRestore	DMD0425 <i>Backup and Restore Using Micro-SD Card</i> for details
DST391	\$ImagePassword1	
DST392	\$ImagePassword2	

7. Enhancements

- a. **Timer structures** – Added **AB/Rockwell Timer bit fields**, specifically .TT (Timer Timing), .DN (Done), .EN (Enabled). These bits behave just like the AB Timers do. The behavior of the existing Do-more Timer bits has not changed. Use whichever bits you like.
- b. **Common Timer Instruction Editor** – provides details about the behavior of each different Timer instruction in the Do-more control engine. The editor comes up by default when you create any **new** Timer instruction (TMR, TMRA, ONDTMR, OFFDTMR, TMRDOWN, TMRADOWN, TMRAG) (5736).



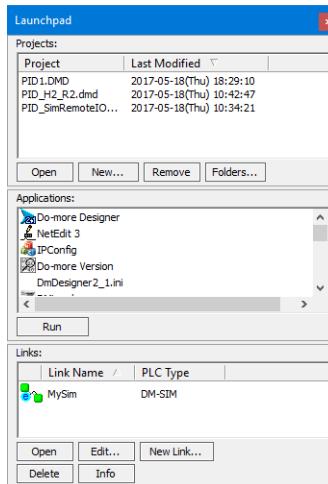
As you cycle through the different Timer instruction radio buttons in the top/left, the Input Leg and Timing diagram descriptions change, providing details about that specific Timer instruction. This makes it easy to see the differences between the various Timer instructions, giving you the information you need to choose the best Timer for the task at hand.

Whenever you edit an existing Timer instruction, the instruction specific editor is used, not this Common Timer editor (you can change that behavior via the Ladder View Options dialog if you want it to always show up, or to never show up). You can also disable the launching of this new Common Timer editor by checking the *Do not use this again* checkbox at the top/right of the editor. If disabled, Designer will always bring up the default instruction specific editor, not this Common Timer editor, regardless of whether it's a new or existing Timer instruction.

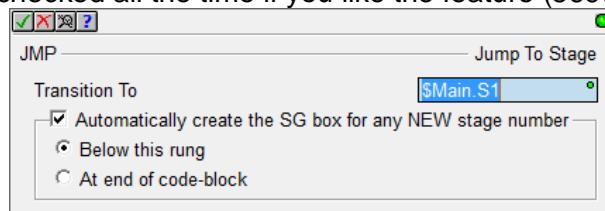
If you are familiar with AB's Timer behaviors, there is also a checkbox at the top to diagram the new AB Timer Structure bit behaviors for each Timer instruction (see previous item for details).

- c. General security enhancements (2.1.2).
- d. **Dashboard** – When the **Reload button** is hit when Online to a PLC, the **current I/O Configuration in Designer is compared with the actual I/O Configuration in the PLC** at that time. If any differences are found, user is given an option to reload actual the I/O Configuration from the PLC into the Dashboard View.
- e. **Dashboard** – Clicking on a CTRIO module in the Dashboard's base display will now give you the option to open the **Monitor CTRIO Module** dialog when you are online with a PLC (5694).
- f. **Dashboard** – A new item exists under the **I/O panel**: **Local I/O Configuration Mode** as being either Auto or Manual. Clicking on that item takes you to the I/O Configuration page in the System Configuration dialog to change the mode.

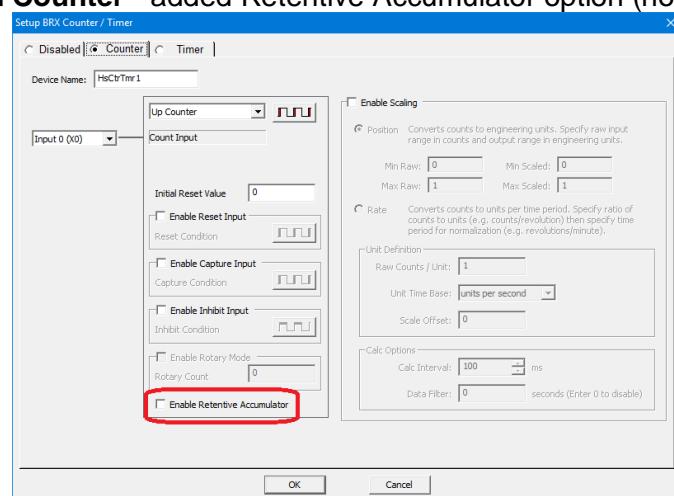
- g. **Launch Pad** – The Projects list, Applications list, and Links list are simple lists with **simple scrolling and sorting behavior**. The Projects list has **columns** for the Project name and **Last Modified date-time stamp**. The Links list has columns for the Link Name and PLC Type:



- h. **Stage Jump Instructions** - All of the instructions that support the Stage JMP operation now offer the option to **automagically create THAT Stage bit's SG instruction** if the stage bit is new for the current code-block. If the option is enabled, there are 2 options on *where* to place the new SG instruction, either below the current rung OR at the end of the code-block. It is smart enough to know to NOT create the SG instruction if it already exists for that Stage Bit, so you can just keep it checked all the time if you like the feature (5690).

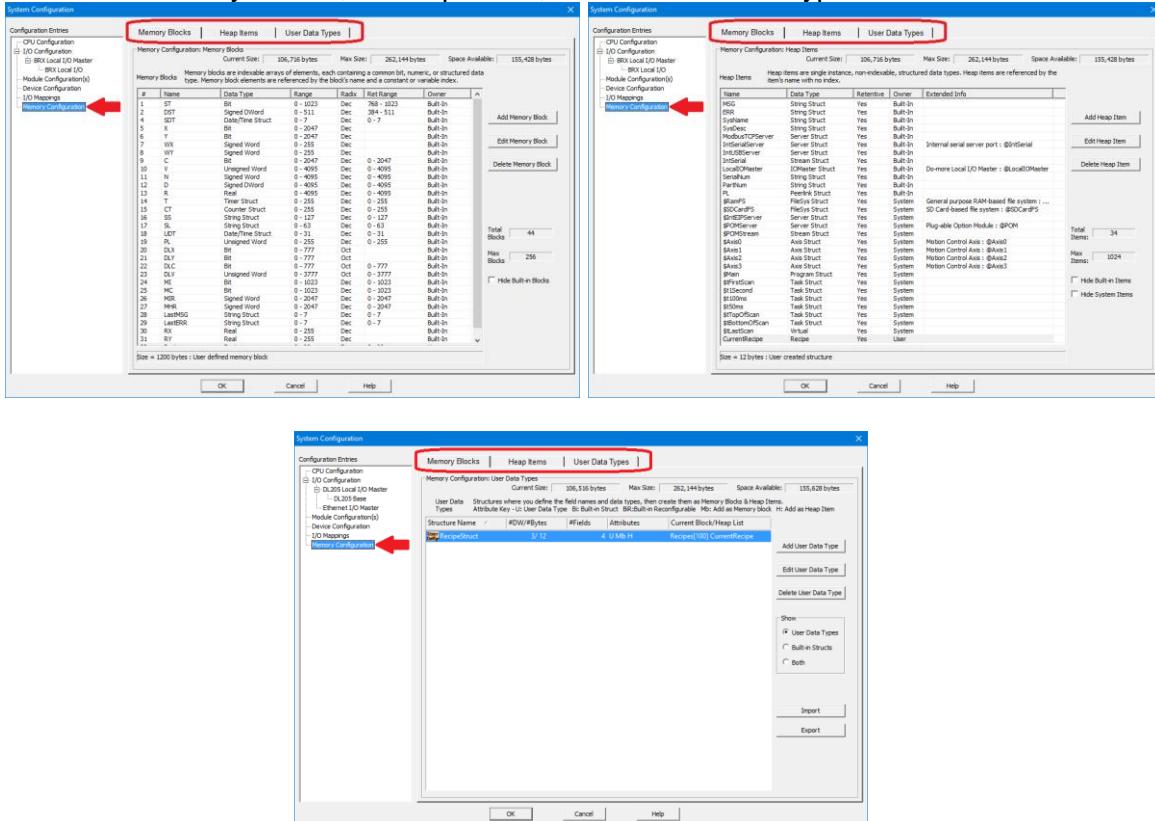


- i. **Options Dialog** now prompts you if you did not check the Apply Options To: New Views checkbox (5853).
- j. **BRX High Speed Counter** - added Retentive Accumulator option (non-retentive by default).

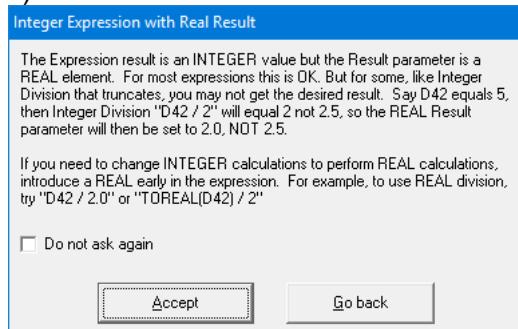


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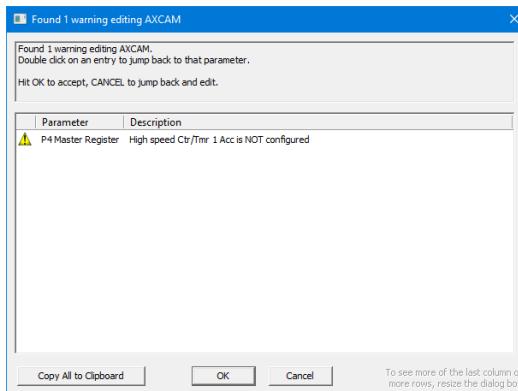
- k. **System Configuration – The Memory Configuration Entry in the dialog has been divided into 3 tabs:** 1. Memory Blocks, 2. Heap Items, and 3. User Data Types:



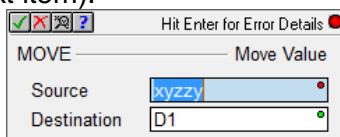
- l. **MATH Editor** now warns if the Expression is performing INTEGER arithmetic but the Result parameter is REAL (5860).



- m. **Instruction Editor - The validation mechanism now supports reporting Errors, Warnings, and Messages (3853):**

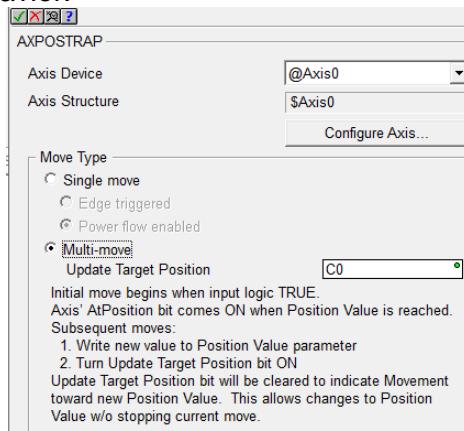


- n. **Instruction Editor** - Currently, whenever an instruction's editor knows something is invalid, it shows a red bulb in the edit dialog box's title bar. Next to the red bulb, it will remind you to *Hit Enter for Error Details* (see next item).



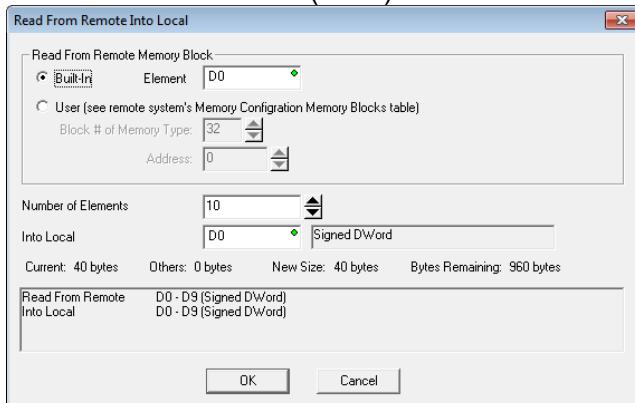
So whenever you see the red bulb, just hit *Enter* key for all of the details (5742).

- o. **Dashboard and System Configuration I/O Configuration** - Modules in the base display have "Configure Module" added to their left-click popup tip if they are configurable.
- p. **Ladder View** – Changed default ladder Background Selection color to match Windows 10 selection color. Previous default color was too dark and made element text difficult to read.
- q. **Ladder View** – Adjusted Online Status Data Format Context Menu entries.
- r. **Ladder View** – Added third Option for showing lengthy instruction details for *most* instructions (do not bother showing long AXCAM table, but show CALL subroutine parameters); this is the default, but the default for Print Ladder is to show *All Details* (5696).
- s. **Data View** - Made grid lines more visible. You can turn grid lines OFF in Data View's Options dialog. (5771).
- t. **Trend View** – Save Log File's Browse button's Save-As dialog now defaults to the directory and the file name specified in the File Name field (5243).
- u. **Trend View** – can add a range of Stage Bits (5647).
- v. **Dashboard and I/O System View** – show when too many modules are installed (5851).
- w. **Video Library** - Automatically refreshed when you launch the **Browse Videos** dialog.
- x. **Error, Warning, Message Report dialogs** - now have a Copy to Clipboard button.
- y. **Instruction Toolbox** - Has option to show **Instruction Help** in a tooltip as you hover over an instruction's mnemonic in the Toolbox. To turn that option OFF, right click on the Toolbox and UNcheck the *Show "Help" Tooltip* menu option (5672).
- z. **FILELOG Instruction** - automagically prefers nicknames over element names for the **header line** of the CSV file.
- aa. **AXPOSTRAP – Axis Move to Position Using Trapezoid** – Instruction editor better clarifies the Multi-Move steps and behavior.



- bb. **AXCAM, AXGEAR, and AXFOLLOW Editors** – Warn when the selected Master Register is an unconfigured High Speed Ctr/Tmr (5697).

- cc. **RX/WX – Network Read/Write** – The Table Entry Editor dialog makes it clearer when entering the Remote Memory Block when it is a **Built-In vs. a User data-block**. It now uses radio buttons for Built-in vs. User, uses simple element entry when it is Built-In, and relabeled the Remote block type's "ID" field to "Address" (5778).



dd. **HWINFO – Get Hardware Information** - Instruction editor's I/O Master combo box is no longer sorted alphabetically, but in Master order: @LocalIOMaster, then @EthIOMaster, then ... (5763).

ee. **DirectLOGIC Migration Utility** supports the **DL-454** CPU.

ff. **Import Project** - Instruction parameter errors are reported with more detail.

gg. **Project Information Dialog** (File->Properties) – Has an *Update Default Values* button to save off the current Company, Department, and Programmer fields, which will be used as default values on any new projects.

hh. **System Information Dialog** (PLC->System Information) **System Status** tab shows the \$FatalTermCode DST51 value for CPUs running Do-more Technology version 2.1 or later (see section 6. New System Words (*DSTs*) above) (5850).

ii. **Program Check** - Now utilizes a modal *Operation Status Dialog* in lieu of just a *Wait Cursor* because some projects can be quite complex. The Operation Status Dialog's Percentage Complete feedback is much more helpful than just a spinning wait cursor.

jj. **New Program Check** rules:

- *W131 Instruction parameter is referencing a 16 bit unipolar WX/WY analog element without Unsigned cast ":U" (need to change WX42 to WX42:U)*

Whenever you configure an analog channel to be 16 bit unipolar, the cast is needed since unipolar 16 bit values have an unsigned range of 0 to 65535, but native WX/WY are signed range of -32768 to +32767. So a maxed-out WX42 signal WITHOUT the :U cast would evaluate to -1, but it should evaluate to 65535. WX42:U will evaluate properly to 65535. So the warning just tells you to replace your WX42 with WX42:U.

- *E094 High Speed I/O cannot be mapped to a different address*

On BRX PLC systems, the accelerated hardware I/O interface requires the I/O mapping remain as-is, starting at X0 and Y0 (5818).

8. Adjusted Anomalies

- a. RX/WX Instruction's *Read From* and *Write To* table entry editors' *Remote ID* and *Number of Element* edit fields now correctly load the instruction's values, instead of always loading the default values of 0 and 1.
- b. CALL instruction being read from the PLC now correctly decodes setting range of bits to 1. Was incorrectly decoding a range of bits set to 1 as a range of bits being set to 0, not to 1 (5804).
- c. Memory Editor's and Memory Image Manager's *Import Memory* function correctly handles importing long strings (5557).
- d. The list of blocks in the "New Memory View" dialog is now sorted alphabetically (5756).
- e. Dashboard's serial port/serial POM tooltips and click behaviors properly adjust when any changes are made to their configuration.
- f. Dashboard correctly showing manually mapped I/O points.
- g. Dashboard's *Add a Module* hotspot no longer overlaps the scrollbar (5721).
- h. Dashboard better handles drawing and resizing.
- i. Dashboard Base Display no longer tries to refresh itself while the System Configuration is being redefined, specifically during Read from PLC and Clear PLC operations.
- j. Dashboard BRX SD Card hot spot always will launch the Browse PLC File System dialog regardless of whether any media exists or is mounted (5650).
- k. Launch Pad's Links list better handles unknown links.
- l. Ladder View – Relational Contact instruction properly displays different sized left-side and right-side parameters/status.
- m. Ladder View – Relational Contact has correct rung row height when using Symbolic Constant or Unassigned Nickname with Elements turned OFF but Nicknames turned ON (5872).
- n. Ladder View – Box instructions properly calculates their widths in display mode and in status mode.
- o. Ladder View – instruction editors with tables properly handle ordering of the Create Unassigned Nickname dialog and Error dialog (5873).
- p. Ladder View – corrected MOVE instruction width calculation (5821)
- q. Ladder View – optimized Relational Contact column's screen real estate (5685).
- r. Ladder View – instruction editor widths corrected when zoom level was less than 100%.
- s. Ladder View – properly filling out INTCONFIG – Configure Interrupt instruction's Match Register *Fire ISR When* combo box.
- t. Ladder View – NETTIME – SNTP Client editor for a new NETTIME instruction no longer tries to determine the current DNS IP address resolution for ntp2.hosteng.com. This was causing LONG delays if your PC was not connected to the Internet. Recommend using DNSLOOKUP's Variable IP Address and the DNSLOOKUP – Name to IP Address instruction, and resolving your SNTP server IP Address at runtime (5504).
- u. PACKETOUT – Output Data to Packet Device instruction editor supports broadcast address in the Fixed Address field (5549).
- v. Trend View properly handles ranges of casted elements (5647).
- w. Import Trend Archive utilizing Operation Status Dialog to keep the user interface responsive (5431).

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- x. When multiple PID Views are opened, closing one PID View no longer stops the communication for the remaining PID Views. Opening a non-maximized PID View properly shows the Form section of the PID View. Opening a project file/workspace that had been closed with multiple PID Views opened, now correctly re-opens all of those PID Views (5371, 5375).
- y. Data View – When you Monitor Data to a Data View, the new Data View now automatically turns Status ON.
- z. I/O System View no longer causing menus to collapse (5737).
- aa. Changed velocity range minimum value from 0 to 10 in AXCONFIG (Min & Max velocity) AXJOG (Target Velocity) AXSETPROP (Min & Max velocity) AXPOSSCRV (Max velocity) AXPOSTRAP (Max velocity) (5714).
- bb. Added a warning to AXPOSTRAP when *Multi-move* is picked but the Position Value is a constant (should be a variable when using *Multi-move*) (5809).
- cc. Corrected LERP instruction's display when in "short summary" mode.
- dd. STREAMOUT instruction editor now correctly reports valid state related to the *Flush INPUT device first* checkbox.
- ee. RX/WX Network Read/Write instruction editor's Remote Password no longer reports certain error conditions as being "valid".
- ff. Adjusted the set of instructions which are allowed in a SUBROUTINE (5730).
- gg. Creating Interrupt Service Routine (ISR) works correctly for all BRX MPU projects (5687).
- hh. Adjusted/Corrected Trend Instruction (5695, 5537):
 - AXCAM, AXFOLLOW, AXGEAR missing Master Velocity
 - AXGEAR missing Slave Position
 - FREQTMR, FREQCNT show rate and the accumulator in 2 separate panes
 - DTCMP shows the comparison bits in 1 pane, and the individual Date/Time fields in individual separate panes
 - File instructions (FILE****) show File System and/or File Handle details
 - String instructions (STR****) no longer show useless flag constants
 - CALL shows input/output parameters
- ii. Can now delete a module in an Ethernet I/O base (5718).
- jj. System Structures are updated where needed.
- kk. Right clicking in the "empty" area of the MDI tab bar no longer brings up an empty context menu (5595).
- ll. When resizing the Folder Settings dialog, the new Video Folder controls resize/move correctly (5681).
- mm. Better maintaining Parent/Child window relationship with Dashboard and System Configuration dialog boxes.
- nn. Import/Export Project supports all of the various BRX MPU models (5616).
- oo. Reduced communication errors during Clear PLC operation, which writes to Flash ROM.
- pp. Added Validation to System Configuration.
- qq. Differences between PLC and Disk Ethernet Remote I/O configurations correctly identified.
- rr. Program Check rule for detecting Unassigned Nicknames at download time now detects them within "complex" instructions like MATH (5715).
- ss. Communication Server better handles <NAK> responses from PLC.

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- tt. Communication Server does not include Modem devices by default. Change the INI File setting [devasync.dll] **ModemEnable=1** to bring it back.
- uu. System Information/System Log dialog properly handles invalid log entries.
- vv. Print Script parser correctly reports string literals that exceed the maximum length, and reports scripts that are too long. This was happening in the new FILELOG instruction if you entered too many entries.
- ww. Better handling of large Trend Archive files (5431).
- xx. Browse Videos dialog remembers the column settings from one session to the next.
- yy. Cross Reference handles casts with array references. e.g. D[V0]:B3.
- zz. Create Nickname dialog handles structure fields with nicknames at the structure level (5827).
- aaa. Create Nickname dialog handles a constant parameter (5525).
- bbb. Documentation Editor's Add Record handles *Increment Nickname After Add* when the Nickname exceeds the maximum length (5830; thanks to MW@WSS).
- ccc. Documentation Editor's Add Record auto-increment feature handles casts (5702)
- ddd. Documentation Editor more stable (5279).
- eee. Migrate DirectSOFT Project no longer fails when the DirectLOGIC project contains an ECEMAIL instruction with an empty To: field, which is common when a long To: list is configured in the ECOM100 module itself (5828 – thanks to JS in Ohio).
- fff. Migrate DirectSOFT Project calculates DirectLOGIC's ONDTMR and OFFDTMR Preset as hundredths of a second (5251; thanks to SL@MWP).
- ggg. Resolve Online/Offline Differences dialog's description of Documentation content now lists *Project Notes* and *Ignored Program Check Rules*. These were always part of the Documentation, they just weren't mentioned here.
- hhh. View Manual and View Specs context menu items for GSE Drive modules in I/O Configuration dialog and I/O System View are working correctly (5322).
- iii. Manually changing GSE Drive type works correctly.
- jjj. Updated various Message Boxes that accessing the firmware download dialog can be done using the PLC->Update Firmware menu.
- kkk. Parent/Child Window ordering adjusted (5784, 5797).
- lll. Provide more information when a desired PLC operation fails due to the current User's Security Privileges being insufficient, for example "Cannot write data to PLC! Current user doesn't have Write Data (WD) security privilege" (4134).
- mmm. Export Element Documentation in the new C-more format WITH Struct Fields properly exports when you have checked *Also export USED elements which do not have a nickname* option (5793).
- nnn. Corrected the lookup of an instruction's absolute address (5473).
- ooo. Corrected ordering of the Element Picker dialog and the Create Data Block dialog (5879).
- ppp. Dynamic system and User Data Type schema size changes propagated to corresponding heap-items and memory data blocks (**2.1.4**) (5914).
- qqq. Corrected Program Check rule for Do-more Technology Version 2.1 validation of BRX Analog Module support (**2.1.3**).
- rrr. Ladder View – added status to Called Counter parameter in CALL instruction (**2.1.2**).

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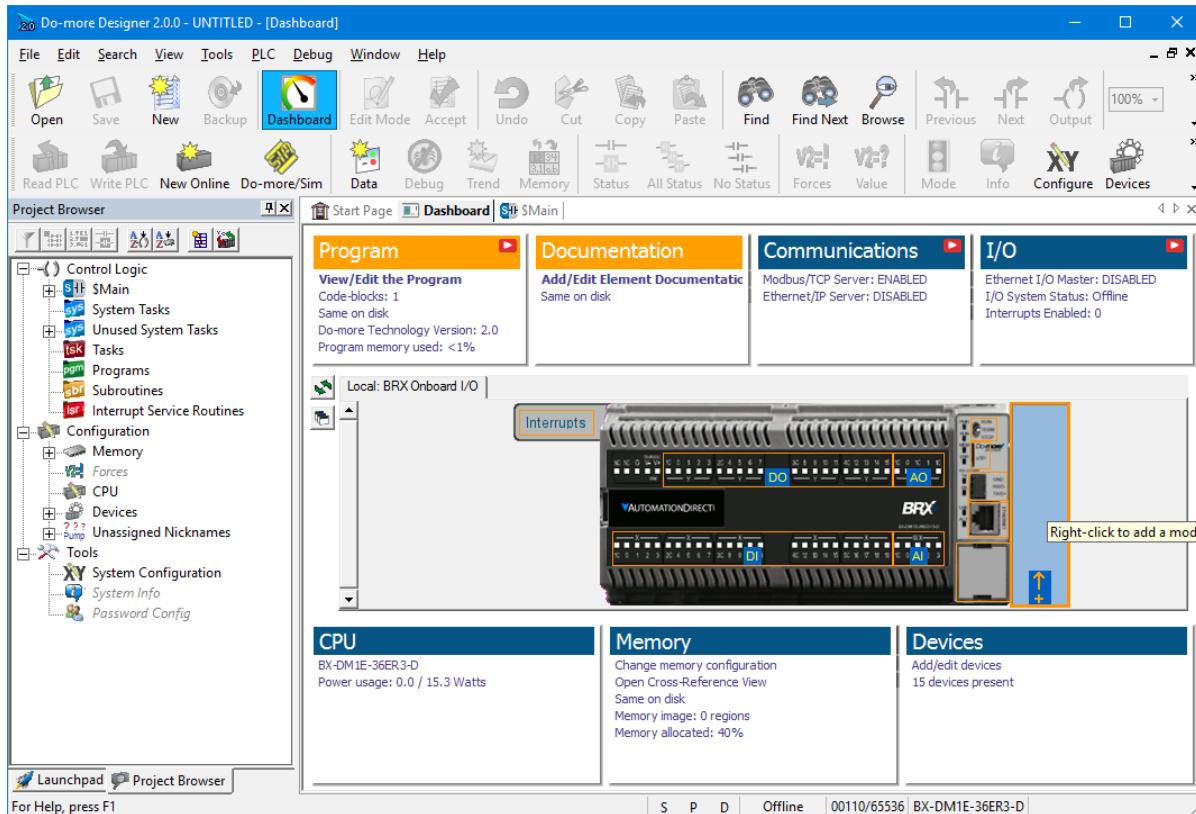
- sss. Added pop-up Help content for new 2.1 instructions (**2.1.2**).
- ttt. Download Project dialog's *Prepend Project Notes* field word-wraps (5877) (**2.1.2**).
- uuu. FILELOG correctly performs *Replace* operation (5878) (**2.1.2**).
- vvv. Reworked Output Window Warning message when Designer's Memory Configuration is incompatible with the PLC's; it now tells you what to do to resolve this, specifically either Write Designer's project to PLC or Read the PLC's project into Designer, but also offer to open up Program Compare to help resolve differences just by double-clicking on the Warning in the Output Window.

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The significant new feature in Do-more 2.0 is the introduction of the new BRX line of Micro PLCs. However, there are many cool features in 2.0 that enhance the entire product line. The first part of this document will highlight the new BRX platform and features; the last part of this document will highlight the common features across all Do-more platforms (205, Terminator, Simulator, and BRX).

Before diving into the new BRX line of PLCs, there are some key user interface enhancements which will help you with your work flow.



Dashboard View

The new Dashboard view is a *one-stop-shop* for getting status of your PLC, configuring the “screw-head” centric pieces of your project along with configuring many other areas, and as a general software navigation tool. All the existing Menus, Toolbars, and Hot Keys are also still around and still work, so continue to use those if you like (however, even some “experts” have admitted to liking this new user interface!) It’s even more powerful if you have multi-monitors or a wide monitor and “tear it off” and access it outside the Designer window frame (see Float/Dock button on view's left-toolbar).

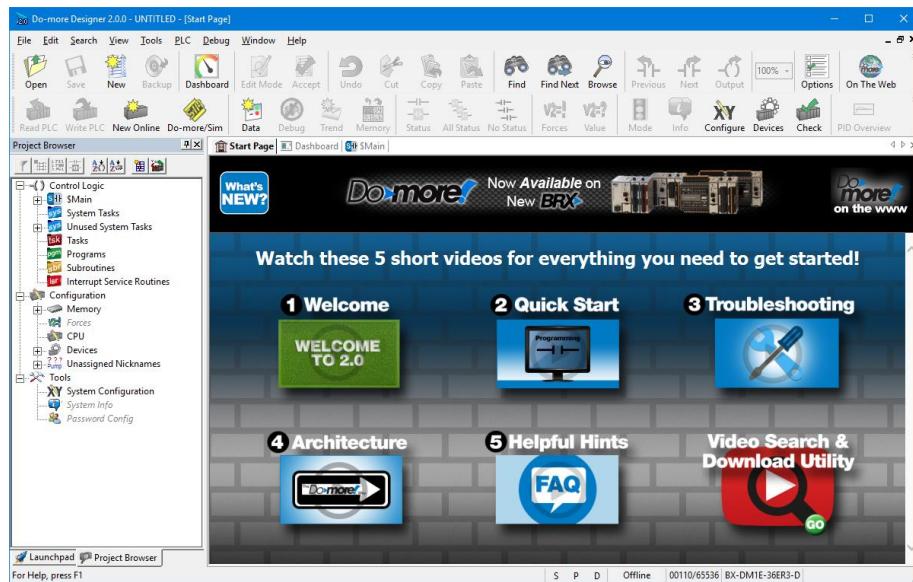
Float your mouse cursor over the picture of your PLC model and suddenly all the hot-spots are highlighted. Float over a hot spot to get general information about that specific area of the hardware. Right click on a hot spot to get a context specific menu. Left click on a hot spot and get a Pop-up Tip that will contain information and hot links to other areas of Designer related to that hot spot.

Each of the Panels that surround your PLC graphic relates to a specific area of your current project (Program, Documentation, Communications, I/O, CPU, Memory, Devices). Within each panel are

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project status information items, most of which are also hot links. Again, float your cursor over each one to get more detailed status information about that item. Click on the hot linked items and it will either show a Pop-Up Tip with more navigation options, or will take you directly to the configuration/status dialog related to that item.

Built-in Video Training has been integrated into Do-more Designer, whether it's learning how to configure an analog module, or learning the basics of Designer 2.0, video help is *just 1 or 2 mouse clicks away*.



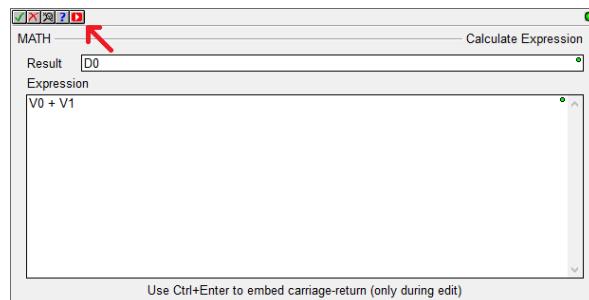
New Start Page Videos

The Start Page has been changed to provide hot link buttons to play 5 new videos that will help you get up and running with Designer 2.0.

1. Welcome to Designer 2.0
2. How to Create a Simple Program
3. Troubleshooting Tips
4. Do-more PLC Architecture
5. Helpful Hints

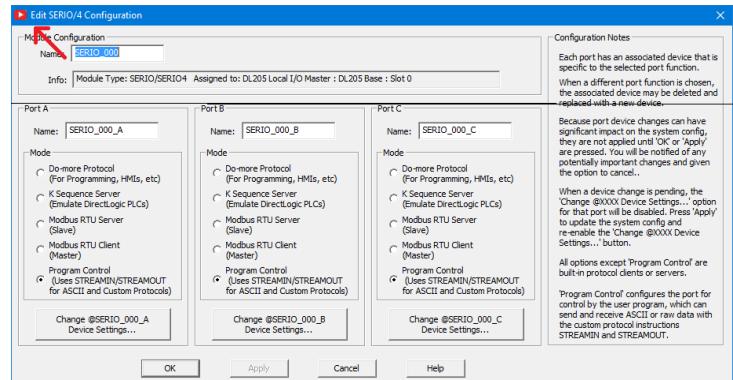
The 6th button lets you navigate, play and optionally download any/all the hundreds of short videos (details below).

If you ever see the red Play button in the top toolbar of an instruction editor

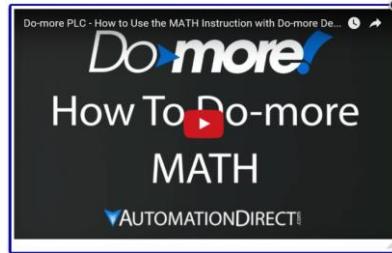


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or in the top left corner of a dialog box



just click on it to play a short training video dealing with that specific instruction



or the dialog box topic



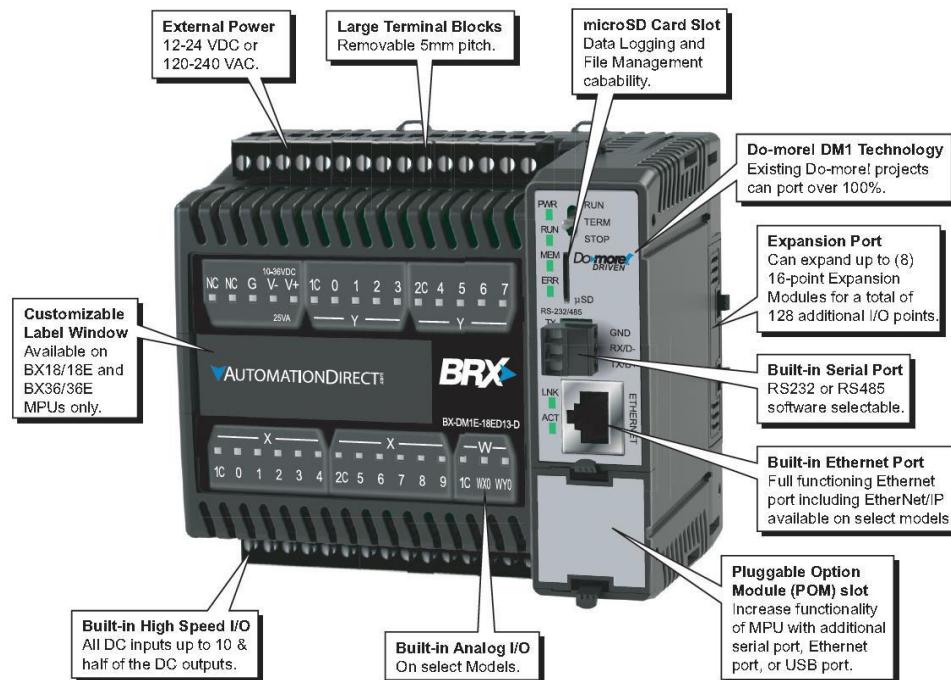
If you see the red Play button in the title of a Panel in the new Dashboard view...



...click on it to see a list of videos related to that panel

[Video: Ethernet I/O - Quick Start](#)
[Video: How To Sense Temperature with a Do-more PLC](#)

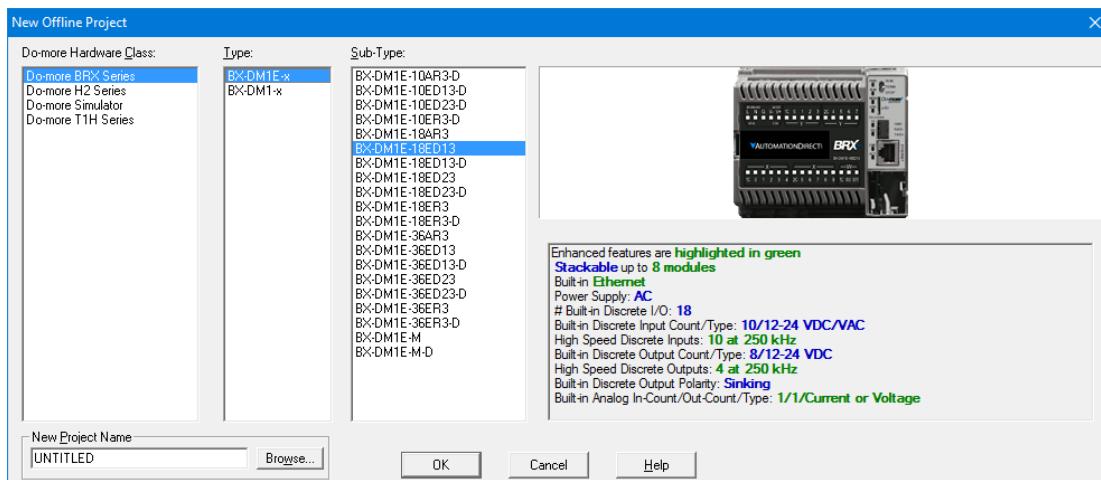
New BRX Micro line of PLCs



General BRX Micro PLC Features

All of the various **BRX Micro PLC Units** (MPUs) are stackable, with built-in Power Supply/CPU, varying in size from no onboard I/O, up thru 36 points of onboard I/O. Most MPUs support **up to 8 stackable modules, able to handle over 160 I/O locally** (Ethernet units can support **thousands** of I/O via Ethernet I/O). Many MPUs have *at least two analog I/O channels onboard*.

The mix of Power-Supply/Input Types/Output Types/Ethernet in the BRX line result in 38 different MPU models (sub-types). The new File->New->Offline Project dialog highlights the key differences between MPU sub-types, helping to make the selection easier. After selecting the BRX Hardware Class, then Ethernet vs. non-Ethernet Type, you get a list of all the possible MPU sub-types, with key specification features listed below a picture of the selected sub-type MPU model:



BRX MPU Model Differentiation

The first differentiator in the BRX hardware class is onboard **Ethernet** vs. not (similar to the H2-DM1 and T1H-DM1 CPUs). All Ethernet models (BX-DM1E-x) are fully expandable up to 8 expansion modules, and most of them have at least 1 or 2 analog output channels and 1 to 4 analog input channels. The non-Ethernet models (BX-DM1-x) are value-priced, without the extra cost of the analog channels onboard and support for only 2 or 4 expansion modules.

The second differentiator is the **number of onboard Discrete I/O**.



None, 10, 18, and 36

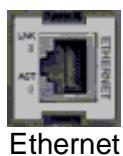
The remaining differentiators are **Power-Supply** type (A/C vs. D/C) and **Onboard Discrete Input and Output** types (A/C, D/C, Voltage Level, Relay, Sinking vs. Sourcing).

BRX Micro-SD Slot

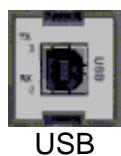
Every BRX MPU model has a micro-SD card slot for storing or accessing data files in standard disk format readable by PCs. New FILE**** instructions allow you to simply log data, or perform complete read/write file access. BRX also supports a second file system that is a RAM-drive (note: *all existing* H2 and T1H Do-more PLCs can also support a RAM-drive file system after a simple firmware upgrade to Do-more Technology Version 2.0 or later). The **EMAIL** instruction has been enhanced to allow you to add a **file attachment** from the BRX micro-SD card or a file from your existing H2-DM1E, T1H-DM1E, or new BRX RAM-drive file system.

BRX Pluggable Option Module (POM) Slot

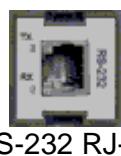
Every BRX MPU model contains a Pluggable Option Module (POM) slot. This slot is hot-swappable with various POM modules, allowing you to have dynamic functionality when needed (like during commissioning or maintenance), or as a permanent option:



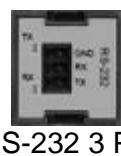
Ethernet



USB



RS-232 RJ-12



RS-232 3 Pin



RS-485

BRX Expansion Modules

Initially, the BRX line of PLCs supports 27 different I/O modules (more modules planned):

- 10 different Discrete Input modules
- 12 different Discrete Output modules
- 5 different Discrete Input/Output Combination modules

Coming soon:

- 8 different Analog Input modules
- 4 different Analog Output modules

Other expansion modules are in-work and are planned to be released soon.

BRX Onboard High Speed I/O

Most of the BRX models support some combination of High Speed Inputs and/or High Speed Outputs onboard (no extra cost). Both Input and Output frequencies support up to 250K Hz.

Specific Onboard **High Speed Input** features include

- High Speed **Counting** (Up, Down, Quad, Bi-directional, Up-Down)
- High Speed **Timing** (Single Edge, Dual Edge)
- **Interrupts** (Discrete Input Event of Rising/Falling/Either with optional Hi/Lo Level “permissives” of any/all other onboard inputs)

Specific Onboard **High Speed Output** features include

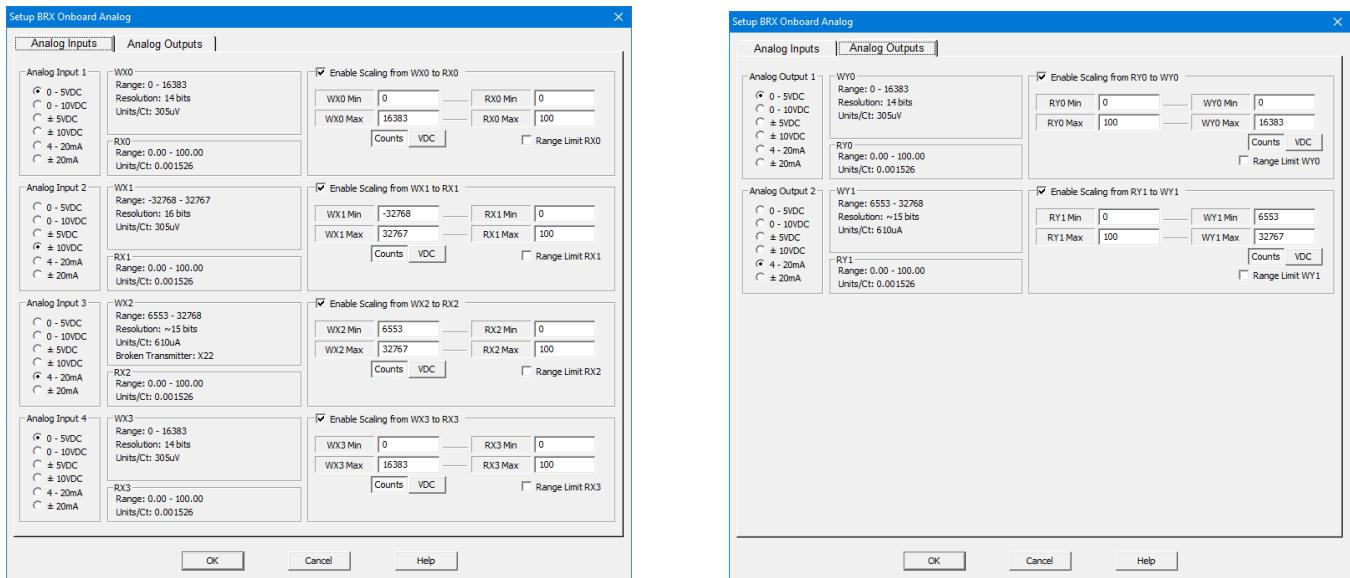
- **Axis Motion** (Step/Direction, Clock-wise/Counter-clock-wise, Quadrature emulation) using various AX* instructions (AXJOG, AXHOME, AXPOSTRAP, AXPOSSCRV, AXVEL, AXGEAR, AXFOLLOW, AXCAM, et.al.); up to 4 Axis (1 virtual Axis, up to 3 tied to actual outputs)
- **Pulse Width Modulation** configured via the PWM structure members .Period and .DutyCycle
- **Table Driven Output** using TDO* instructions (Programmable Limit Switch; Preset Table script of various Set, Reset, Toggle, Pulse On, Pulse Off after micro-second duration)

BRX Onboard Analog Configuration

The BRX MPU units that come with onboard Analog Inputs and Analog Outputs let you **fully and independently configure each analog channel's electrical characteristics**, so there is no need to qualify these when purchasing, or buy multiple module types for different signal types!

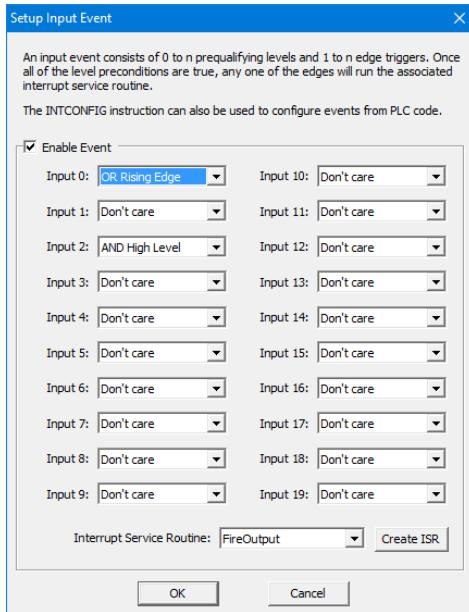
- current vs. voltage
- unipolar vs. bipolar
- voltage range
- resolution (14, 15, 16 bits)
- optionally scale WX analog input to new RX (Real Analog Input) data-block or from new RY (Real Analog Output) data-block to WY analog output, with or without clamping

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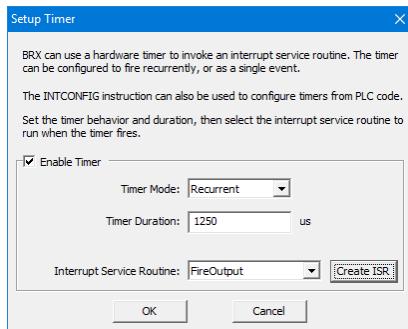


BRX Interrupt Support

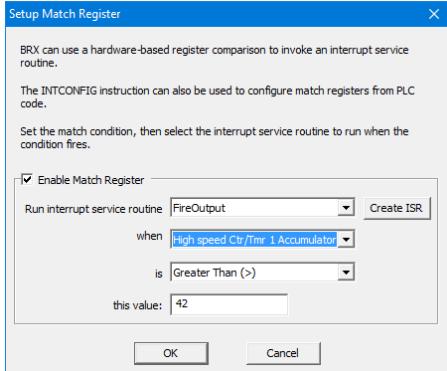
There are three different types of Interrupt Triggers: Discrete Input Events, Time, Match Register:



4 Input Event Triggers



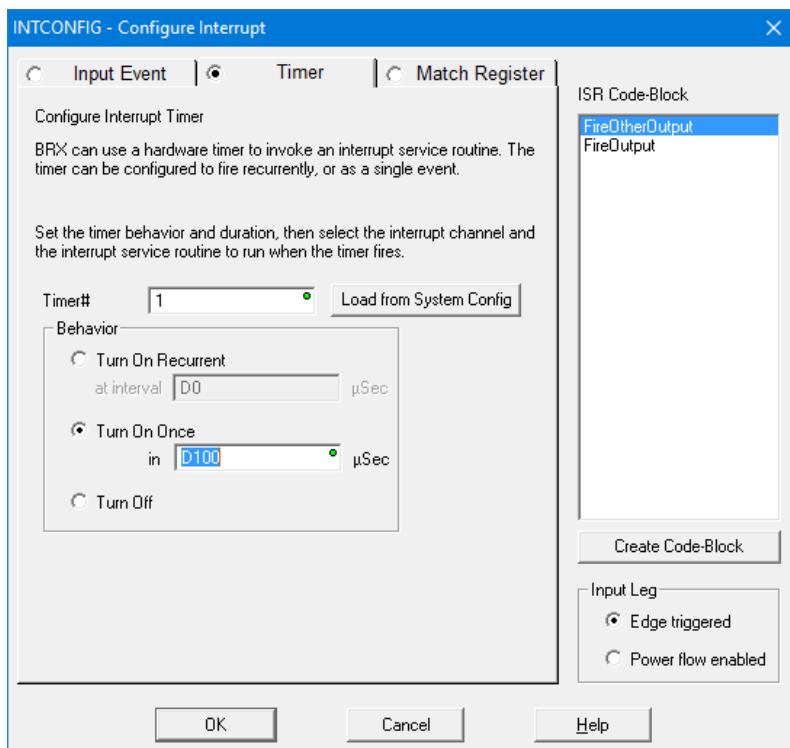
4 Timed Triggers



4 Match Register Triggers

Interrupt Service Routines (ISRs) are a new kind of code-block that get associated to a specific Trigger. Up to 20 ISR code-blocks are supported.

Immediate Output Instructions include **OUTI**, **SETI**, and **RSTI**, which are powerful within ISR code-blocks. There is no need for an Immediate Input Contact because every ISR execution gets a copy of the immediate onboard Discrete Input X state values upon being fired. So just use the “immediate” X’s like you would any other X inside an ISR code-block.



INTCONFIG – Configure Interrupt Instruction

The configuration of any Interrupt Trigger can be changed dynamically at runtime using the INTCONFIG - Configure Interrupt instruction, including remapping the associated ISR code-block. The INTCONFIG instruction can be used within an ISR code-block for some pretty powerful program control. For example:

- Dynamically control a high resolution discrete output using calculated timing values to reconfigure the Timed Event Trigger within the current ISR.
- Follow-up a Discrete Input Event with a calculated Timed Event Trigger within the Input Event ISR.
- Tweak the Match Register condition to the “next” Match Register condition within the ISR.
- Any combination of Trigger settings and/or ISR code-block binding

Other Interrupt instructions include INTSUSPEND – Suspend Interrupts, INTRESUME – Resume Interrupts, and INTDECONFIG – Deconfigure Interrupt Trigger Resource.

High Speed I/O

CTRIO functionality for BRX platform has been replaced with the following onboard resources that come with nearly every BRX MPU model:

- Counter/Timer Functions
- Axis/Pulse Outputs
- Pulse Width Modulation
- Table Driven Output

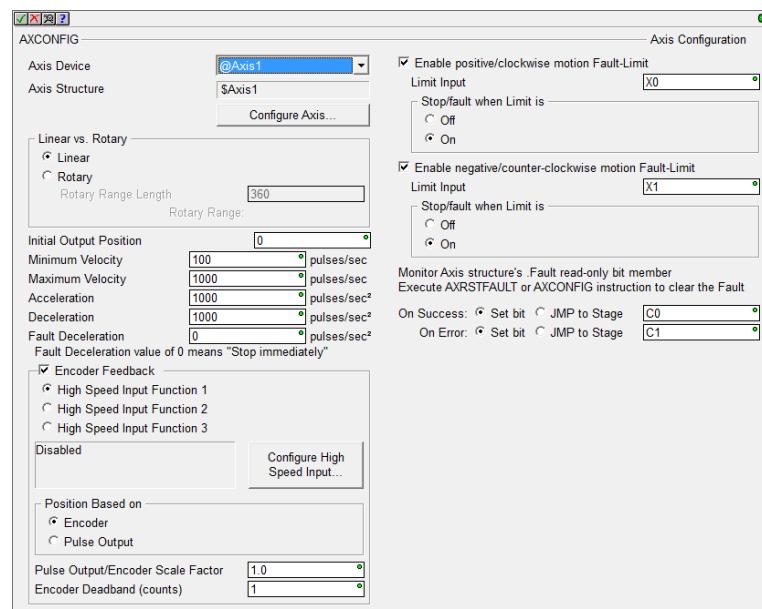
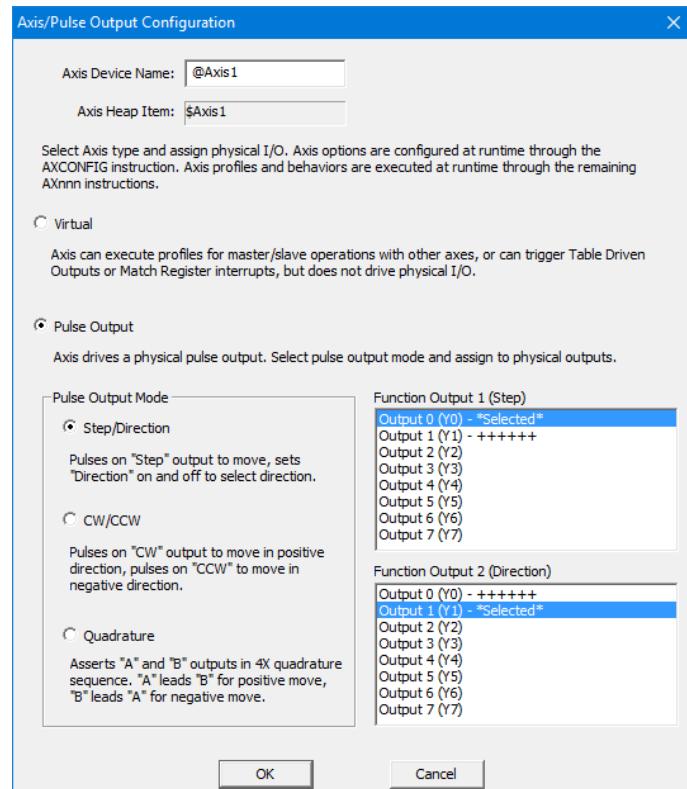
New Motion Control: Axis

Every BRX MPU model supports up to 3 Axis Pulse Output resources (a fourth Axis is permanently “Virtual”, meaning it cannot be tied to any physical pulse outputs, but can still be used to generate logical pulse counts using any of the AXIS* instructions, just like the other “hard-wired” axis).

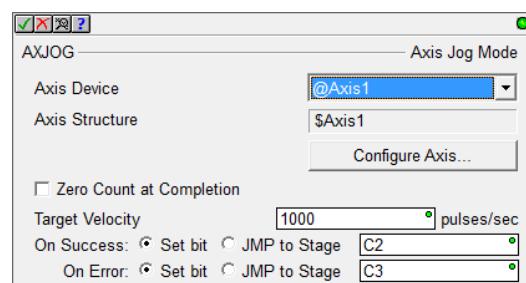
Each Axis can be configured as:

- Virtual (does not drive any physical I/O)
- Pulse Output **Step and Direction**
- Pulse Output **Clockwise/Counter Clockwise Selection**
- Pulse Output **Quadrature** (emulates a 4x quadrature sequence)

Except for Virtual, the other modes physically bind to two different onboard Discrete Y outputs.



At runtime, the detailed configuration of an AXIS must be configured using the AXCONFIG – Configure Axis instruction.



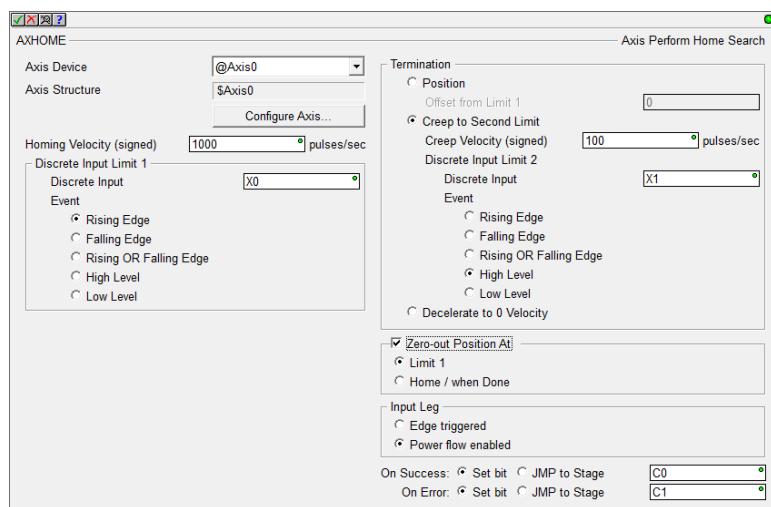
AXJOG – Axis Jog Mode

It is a 3-input leg instruction to perform a simple “jog”. The input legs are

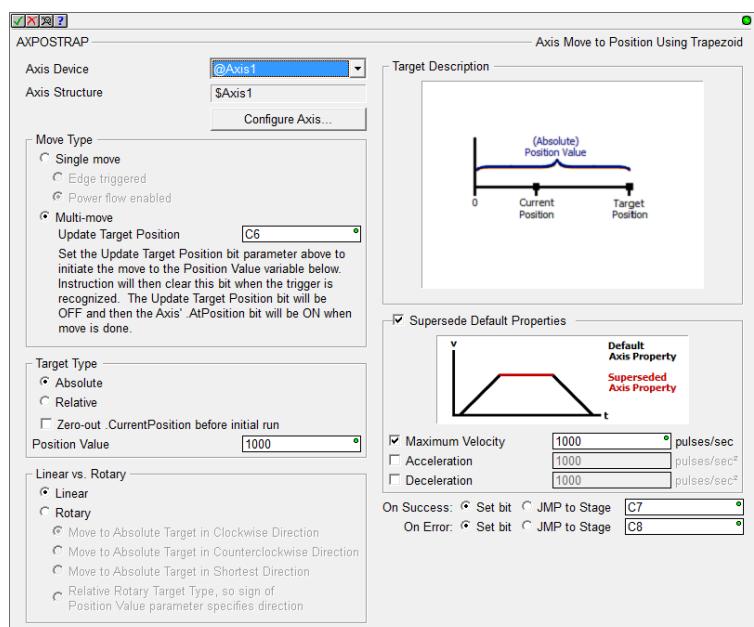
1. Enable/Reset
2. Forward
3. Reverse

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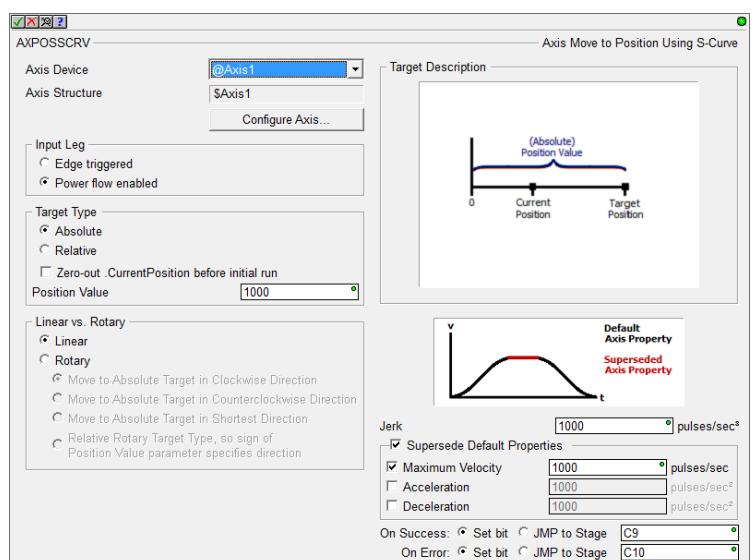
AXHOME – Axis Perform Home Search



AXPOSTRAP – Axis Move to Position Using Trapezoid

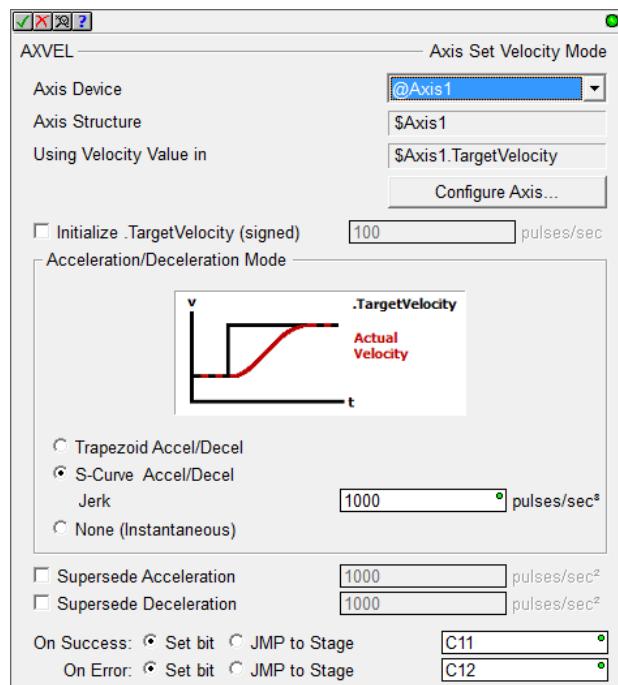


AXPOSSCRV – Axis Move to Position Using S-Curve

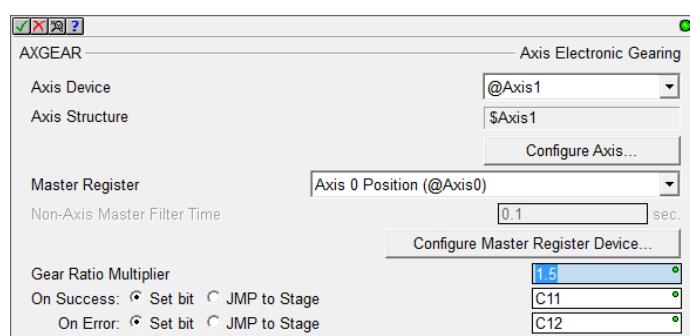


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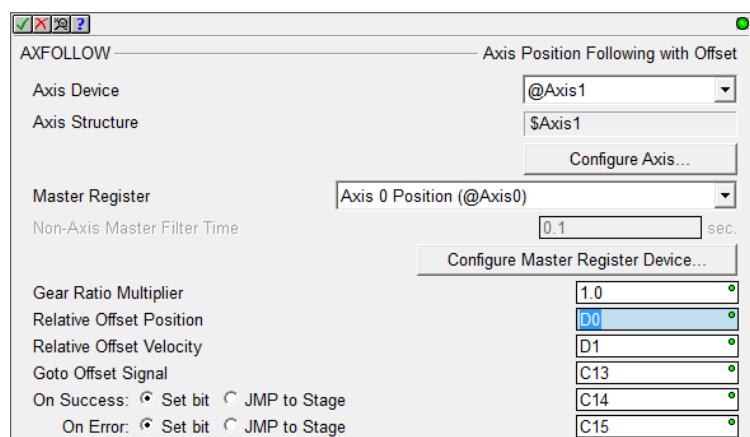
AXVEL – Axis Set Velocity Mode



AXGEAR – Axis Electronic Gearing



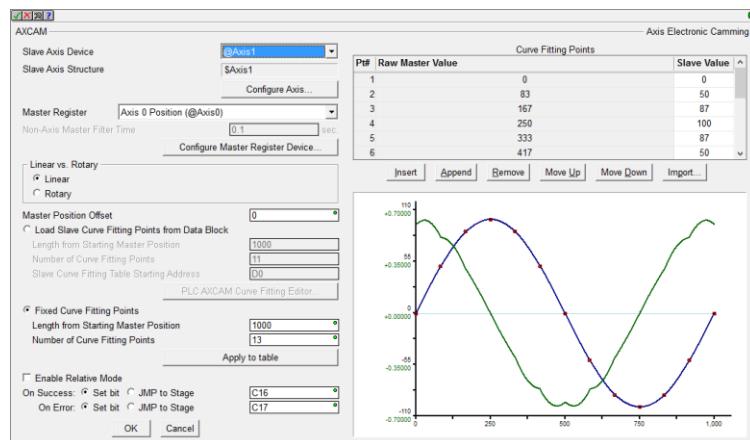
AXFOLLOW – Axis Position Following with Offset



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AXCAM – Axis Electronic Camming

The AXCAM instruction also has an online tool for easily editing/graphing PLC Memory based Curve Fitting Points. Access it via the PLC->Axis Cam Table menu.



AXSETPROP – Set Axis Properties

This screenshot shows the 'Set Axis Properties' dialog. It sets the Axis Device to @Axis1 and Axis Structure to \$Axis1. Under 'Position' settings, Maximum Velocity is set to 100 pulses/sec, Acceleration to 1000 pulses/sec², Deceleration to 1000 pulses/sec², and Fault Deceleration to 0 pulses/sec². Other options include Pulse Output/Encoder Scale Factor (1.0), Encoder Deadband (counts) (1), and On Success/On Error logic (Set bit C18/C19 or JMP to Stage C18/C19).

AXRSTFAULT – Reset Axis Limit Fault

This screenshot shows the 'Reset Axis Limit Fault' dialog. It sets the Axis Device to @Axis1 and Axis Structure to \$Axis1. The 'On Success' and 'On Error' logic is configured to Set bit C20/C21 or JMP to Stage C20/C21.

Pulse Width Modulation

Each BRX MPU supports up to 3 onboard Hardware Accelerated High Speed Output PWMs to precise microsecond or millisecond resolution. Once the PWM Output is configured, use the PWM's heap item's structure fields to control the PWM from your logic:

- .Enable
- .PeriodScale (bit 0: microsecond, 1: millisecond)
- .Period (time value 0 to 65535)
- .DutyCycle (real percentage 0.0 to 100.0)

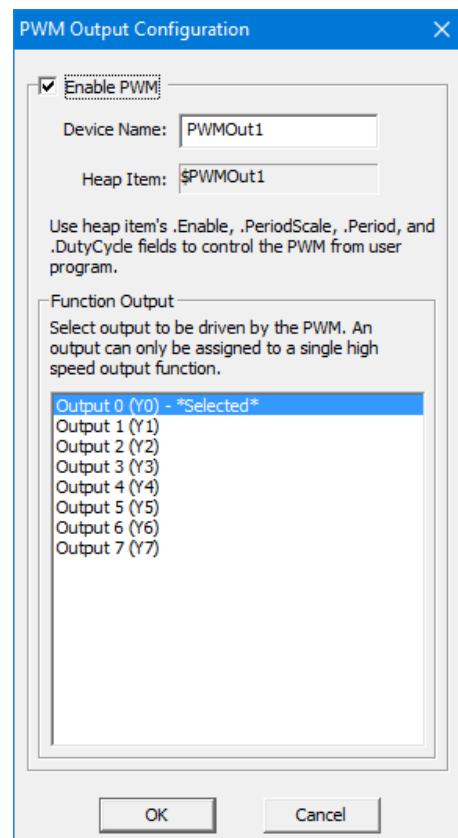
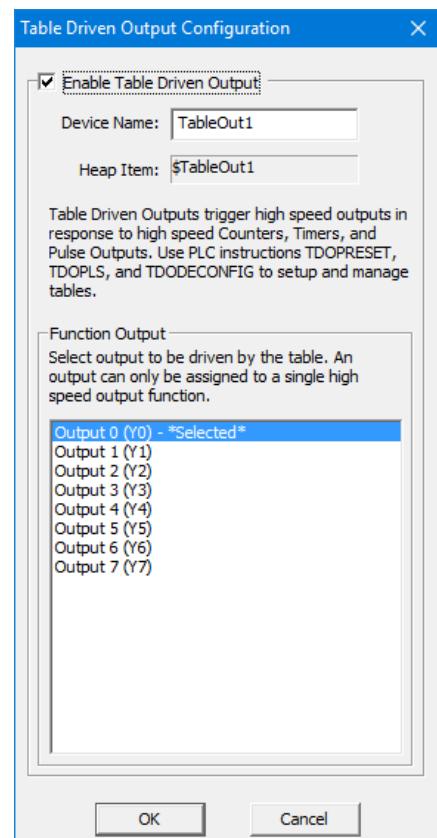


Table Driven Output (TDO)

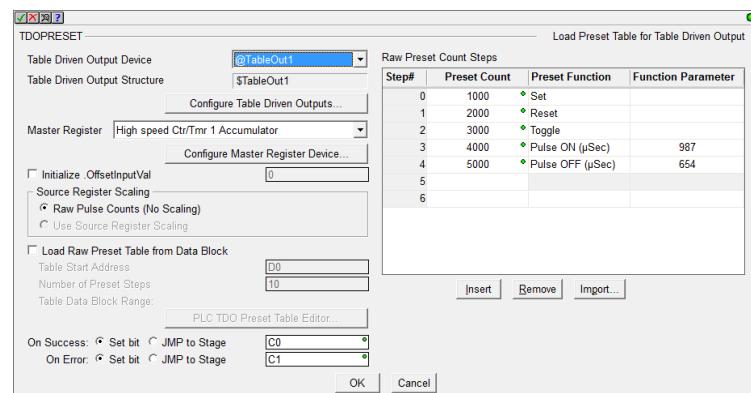
BRX supports up to 4 onboard Hardware Accelerated Table Driven High Speed Outputs in response to high speed Counters, Timers, and Pulse Outputs.



Use the TDOPRESET – Load Preset Table for Table Driven Output or the TDOPLS – Load Programmable Limit Switch Table for Table Driven Output instructions to drive the high speed discrete outputs.

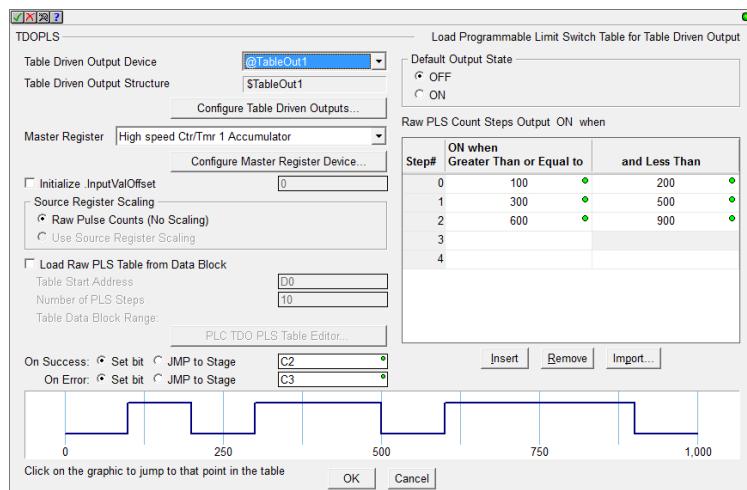
TDOPRESET – Table Driven Output Preset Table

The TDOPRESET instruction also has an online tool for easily editing PLC Memory based TDO Preset Table. Access it via PLC->TDO Preset Table menu.

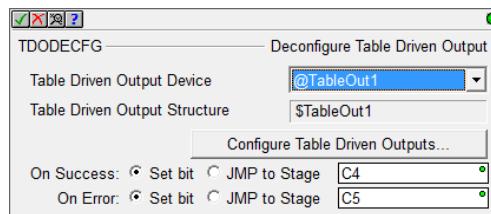


TDOPLS – Load Programmable Limit Switch Table for Table Driven Output

The TDOPLS instruction also has an online tool for easily editing and graphing PLC Memory based TDO PLS Table. Access it via PLC->TDO PLS Table menu.



TDODECFG – Deconfigure Table Driven Output

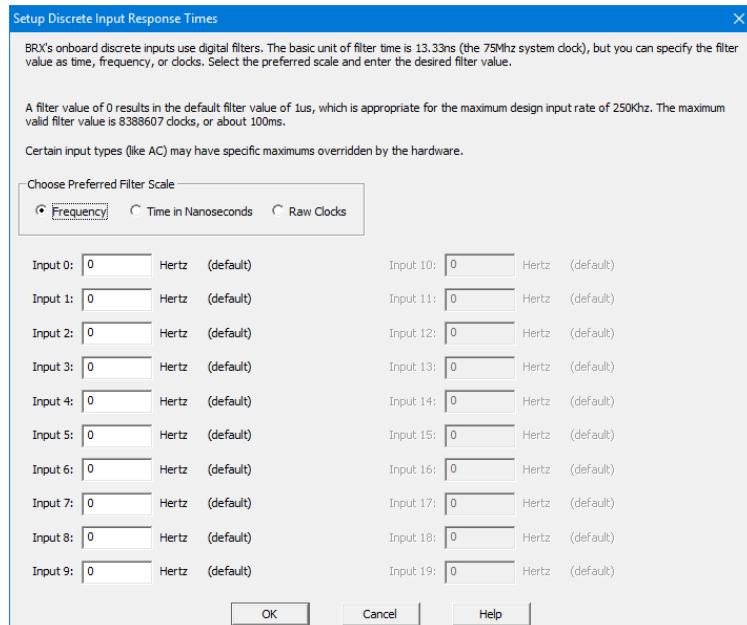


Configurable Discrete Input Filters

The onboard Discrete Inputs response times are configurable on every BRX MPU. Many of the MPU models' Discrete Inputs support very high frequency at the hardware level (up to 250K Hz). These response times can be configured through the System Configuration's **Setup Discrete Input Response Times** dialog.

You can enter the filter in any of 3 different scales:

- Frequency
- Time in nanoseconds
- Raw Clocks

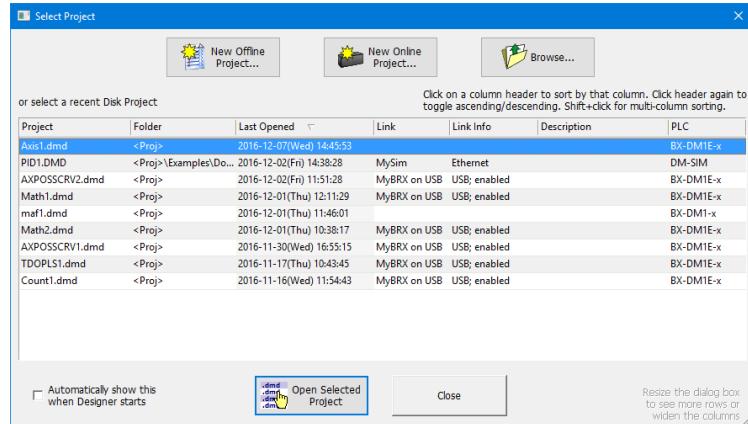


New Features in Designer 2.0 for All PLC Lines, including Do-more Technology Version 2.0

The new **Select Project** dialog is the *Launch Pad on steroids*. It lists all your recent projects sorted by the Last Opened date by default, so your most recent projects are near the top.

You can sort by any of the columns, not just Last Opened:

- Project name
- Folder
- Last Opened date/time stamp
- Link name
- Link Information
- Link Description
- PLC type



You can also create a New Offline Project, a New Online Project, or Browse to open up an unlisted project file.

The dialog box is resizeable, so if you have the screen real estate, feel free to enlarge the dialog and widen those columns. It remembers its location and sizes so that once you set it up, it will remember from launch to launch. It automatically shows up at start-up, but you can disable that functionality by UNchecking the checkbox in the lower left corner.

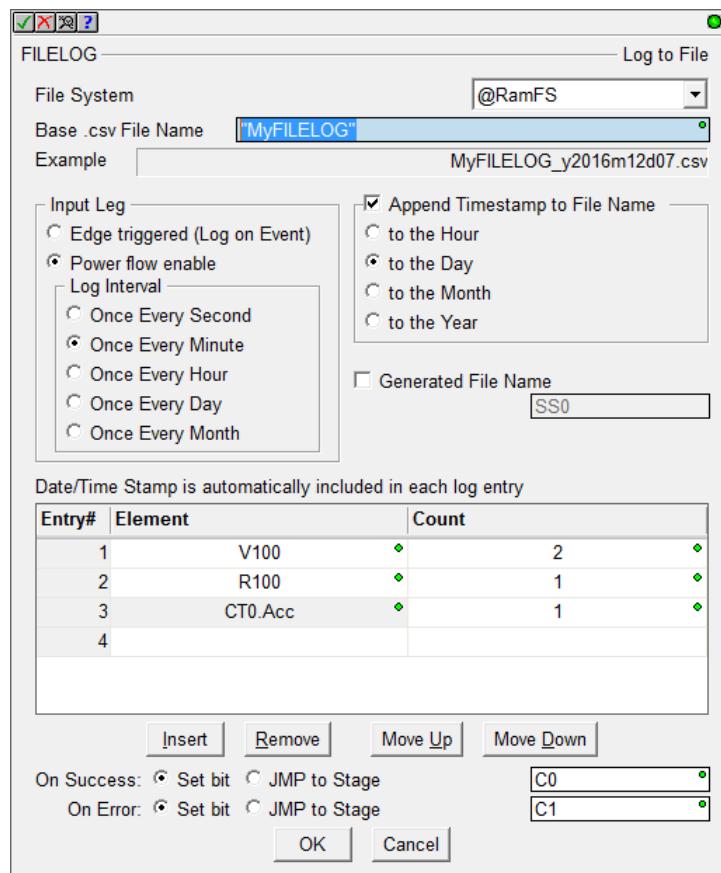
RAM Drive File System (DmT 2.0)

Do-more Technology Version 2.0 added a RAM Drive File System, so existing H2-DM1x, T1H-DM1x CPUs can support the new FILE* instructions with a simple firmware upgrade (BRX supports it out of the shoot; includes FILELOG, FILEOPEN, FILEREAD, FILEWRITE, FILECLOSE, FILEDEL, FILECOPY, FILENEWFLDR, FILEQUERY, FILESYSCMD, FILESEEK, FILETRUNC).

The **most useful FILE** instruction is the new **FILELOG – Log to File** instruction. It makes data logging very simple, but very configurable.

The most common requirement is that you need a specific set of data points to be logged at a specific interval (once a day, once an hour, once a minute, etc.). Each FILELOG instruction lets you specify the desired interval and set of data points.

You can mangle the name of the .csv file starting with a “Base” .csv (Comma Separated Variable text file) name, appending the Date/Time stamp to the nearest hour, day, month, or year (e.g. “MyFILELOG” to the nearest day: MyFILELOG_y2016m12d07.csv). This is optional.



After uploading the file using the Browse PLC File System dialog to your PC, the resulting file contains a header line showing the PLC variable names, but always starts with the current Date/Time stamp. Then it will have all the log entries for each day/hour/minute/whatever. The example to the right may look like:

```
"TimeStamp(sec,local)","V100","V101","R100","CT0.Acc"
2016/12/7 18:09:00,42,256,3.14,199
2016/12/7 18:10:00,43,301,3.14,211
2016/12/7 18:11:00,57,301,2.82,0
```

The .CSV text file can be easily opened by Excel or Notepad or imported by most database programs.

You can also just log data on an event, not a periodic time interval. Just change the Input Leg setting to Edge Triggered from Power Flow. Also, the Base .csv File Name can be a generating STRING element (e.g. SS42) in case you want to come up with your own naming convention. Just use STRPRINT to write to SS42.

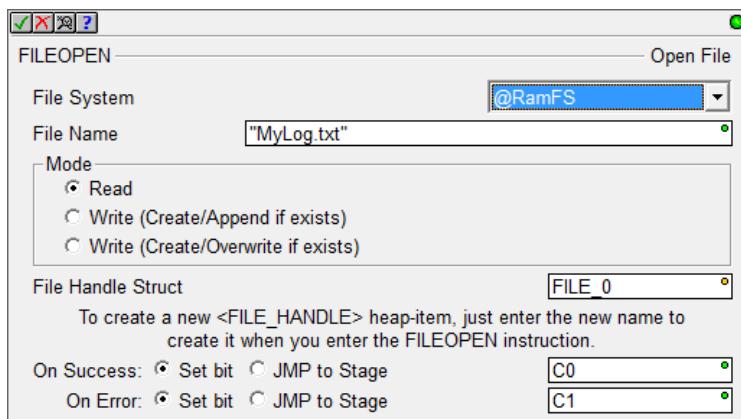
Finally, if you want to attach these .CSV log files to an EMAIL, the Generate File Name checkbox will come in handy to plug the Attachment file name in the EMAIL instruction (e.g. SS5 for the Generate File Name parameter would contain MyFILELOG_y2016m12d07.csv from the first example above, then use SS5 in your EMAIL instruction’s “Attach File Name” parameter).

If you want to do your own FILE I/O calls, the breadth and depth is typical. Note that not every file system command is supported – this is a PLC not a PC, and some of those commands could take a LONG time, like removing a folder. Hence, Remove Folder is not supported by Do-more. But if it's

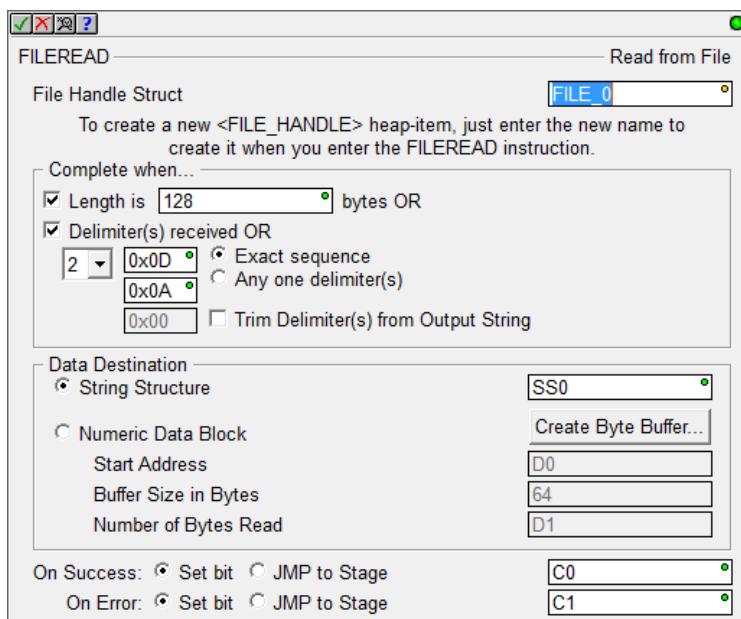
Do-more Updates Rel 2.0, February, 2017

removable media, you can remove it from your PLC and put it on a PC and still do everything you want to do from your PC (remove folders, format the media, run diagnostics, etc.).

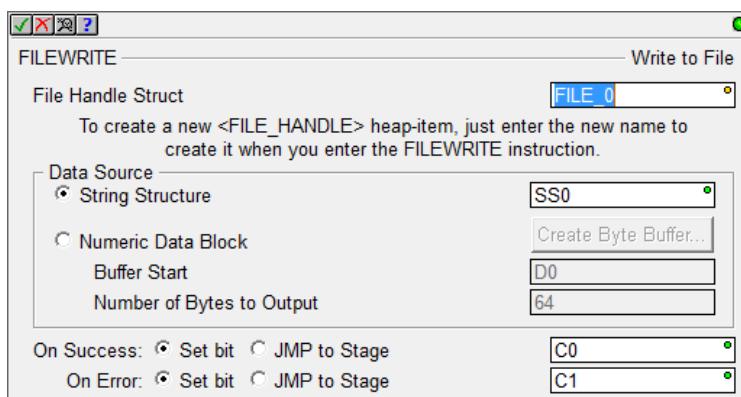
FILEOPEN – Open File



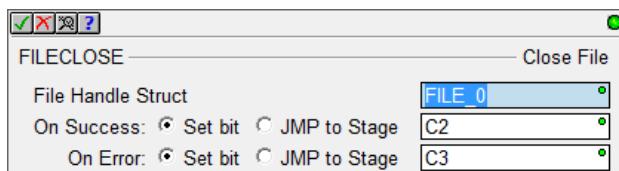
FILEREAD – Read from File



FILEWRITE – Write to File



FILECLOSE – Close File



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FILEDEL – Delete File

This screenshot shows the configuration window for the FILEDEL instruction. It has a title bar with icons for checkmark, X, and question mark. The main area is labeled "FILEDEL" and "Delete File". It includes fields for "File System" (@RamFS), "File Name" ("MyLog.txt"), and "On Success" and "On Error" options. The "On Success" section contains radio buttons for "Set bit" and "JMP to Stage", with "JMP to Stage" selected and stage numbers C4 and C5 listed. The "On Error" section also has similar radio buttons and stage numbers.

FILECOPY – Copy File

This screenshot shows the configuration window for the FILECOPY instruction. It has a title bar with icons for checkmark, X, and question mark. The main area is labeled "FILECOPY" and "Copy File". It includes fields for "Source File System" (@RamFS), "Source File Name" ("Source.txt"), "Destination File System" (@RamFS), and "Destination File Name" ("Dest.txt"). There are checkboxes for "Append to Destination File" and "Delete Source File when Done", both of which are unchecked. The "On Success" and "On Error" sections have radio buttons for "Set bit" and "JMP to Stage", with "JMP to Stage" selected for both, and stage numbers C4 and C5 listed.

FILENEWFLDR – Make New Folder (note that there is no Remove Folder instruction)

This screenshot shows the configuration window for the FILENEWFLDR instruction. It has a title bar with icons for checkmark, X, and question mark. The main area is labeled "FILENEWFLDR" and "Make New Folder". It includes fields for "File System" (@RamFS), "Folder" ("MyDir"), and "On Success" and "On Error" options. The "On Success" section contains radio buttons for "Set bit" and "JMP to Stage", with "JMP to Stage" selected and stage number C4 listed. The "On Error" section also has similar radio buttons and stage number C5.

FILEQUERY – Query File or Folder Information

This instruction lets you get detailed information on any File or Folder. You can also use it to perform a “directory” operation to iterate all the files in a folder. The FILEQUERY Help Topic DMD0388 shows an example on how to iterate a folder.

This screenshot shows the configuration window for the FILEQUERY instruction. It has a title bar with icons for checkmark, X, and question mark. The main area is labeled "FILEQUERY" and "Query File or Folder Information". It includes fields for "File System" (@RamFS), "Query File/Folder Name" ("MyLog.txt"), and several checkboxes for file properties like "File Date as 1970 Epoch", "File Size in Byte", "File Attributes", and "Actual File Name". There is also a checked checkbox for "Iterate Folder". The "Iterate" section contains radio buttons for "Files Only", "Folders Only", and "Files and Folders", with "Files Only" selected. The "Found File/Folder" field is set to "SS0". The "On Success" and "On Error" sections have radio buttons for "Set bit" and "JMP to Stage", with "JMP to Stage" selected for both, and stage numbers C6 and C7 listed.

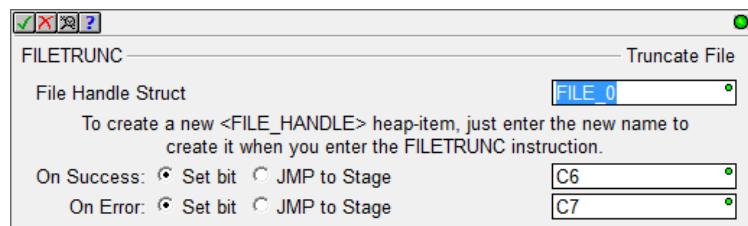
FILESEEK – Seek to Position in File

You can seek to specific positions (Beginning, Current, or End) or an offset from those positions.

This screenshot shows the configuration window for the FILESEEK instruction. It has a title bar with icons for checkmark, X, and question mark. The main area is labeled "FILESEEK" and "Seek to Position in File". It includes a "File Handle Struct" field set to "FILE_0". A note below says "To create a new <FILE_HANDLE> heap-item, just enter the new name to create it when you enter the FILESEEK instruction." The "Seek to" section has radio buttons for "Beginning", "Current", and "End", with "Beginning" selected. There is also a checkbox for "Positive offset from BEGINNING in BYTES" which is unchecked. The "On Success" and "On Error" sections have radio buttons for "Set bit" and "JMP to Stage", with "JMP to Stage" selected for both, and stage numbers C6 and C7 listed.

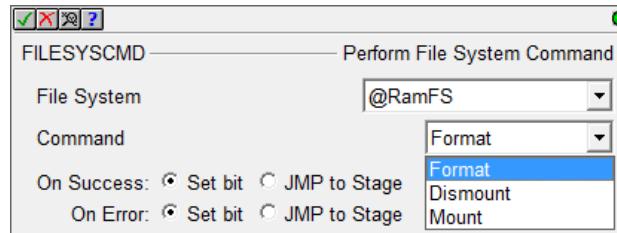
Do-more Updates Rel 2.0, February, 2017

FILETRUNC – Truncate File



FILESYSCMD – Perform File System Command

- Format (RAM Drive Only)
- Dismount
- Mount

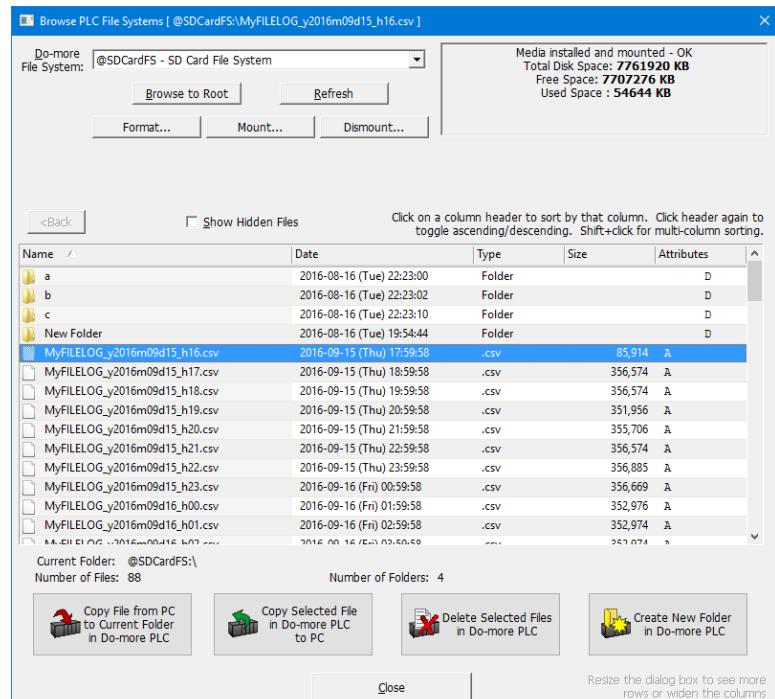


It is very useful to programmatically Dismount the SD Card before an operator tries to remove the media. The PLC's MEM LED will be RED when it is fully dismounted and safe to remove the media.

Browse PLC File Systems Dialog (DmT 2.0)

This dialog lets you explore the SD Card and RAM Drive file systems in your Do-more PLC. You can copy files between your PC and PLC in both directions.

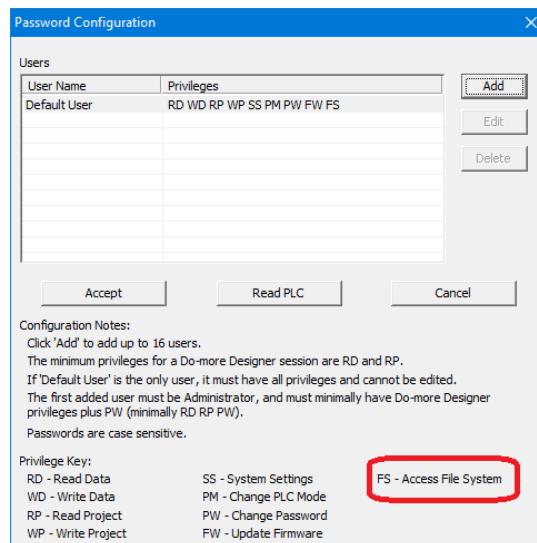
(see PLC->Browse PLC File Systems)



New Designer Security Credential: Access to File System (FS)

The Browse PLC File Systems dialog cannot be used by a Designer user whose credentials does not include File System (FS).

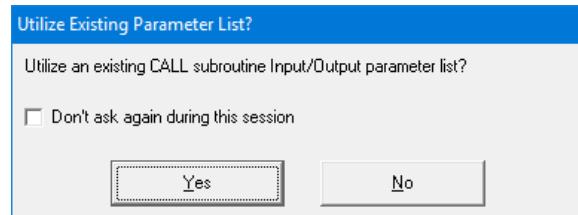
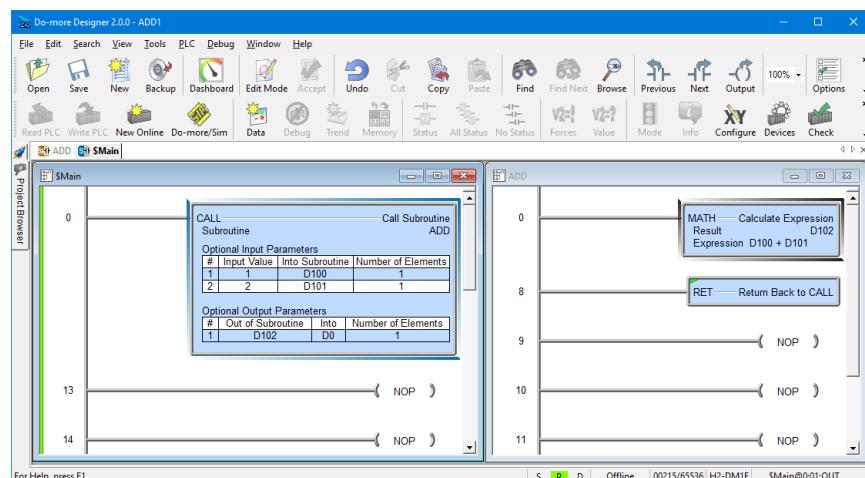
If any of your existing projects utilize Designer's Session Password facility that includes more than just the one Default User, you will have to manually add this privilege to any existing users that you wish to grant access to the File System.



Subroutine Code-Blocks (DmT 2.0)

All Do-more PLCs can support callable Subroutine code-blocks once their firmware has been updated to at least Do-more Technology Version 2.0. The CALL instruction supports passing input parameters and returning output parameters "by value" through the global image register memory. There is no actual "stack" for the parameter passing, just the CALL client side values are copied into the Subroutine's Input parameters before calling the subroutine. Then after returning from the called subroutine, the Subroutine's Output parameters are copied into the client side CALL elements. The stack DOES handle pushing the current CALL instruction address on the stack, and the Subroutine's Return/Conditional Return instructions does the clean-up, so nesting CALLs IS supported (up to 82 levels of nested CALLs), but the parameters are NOT placed on the stack.

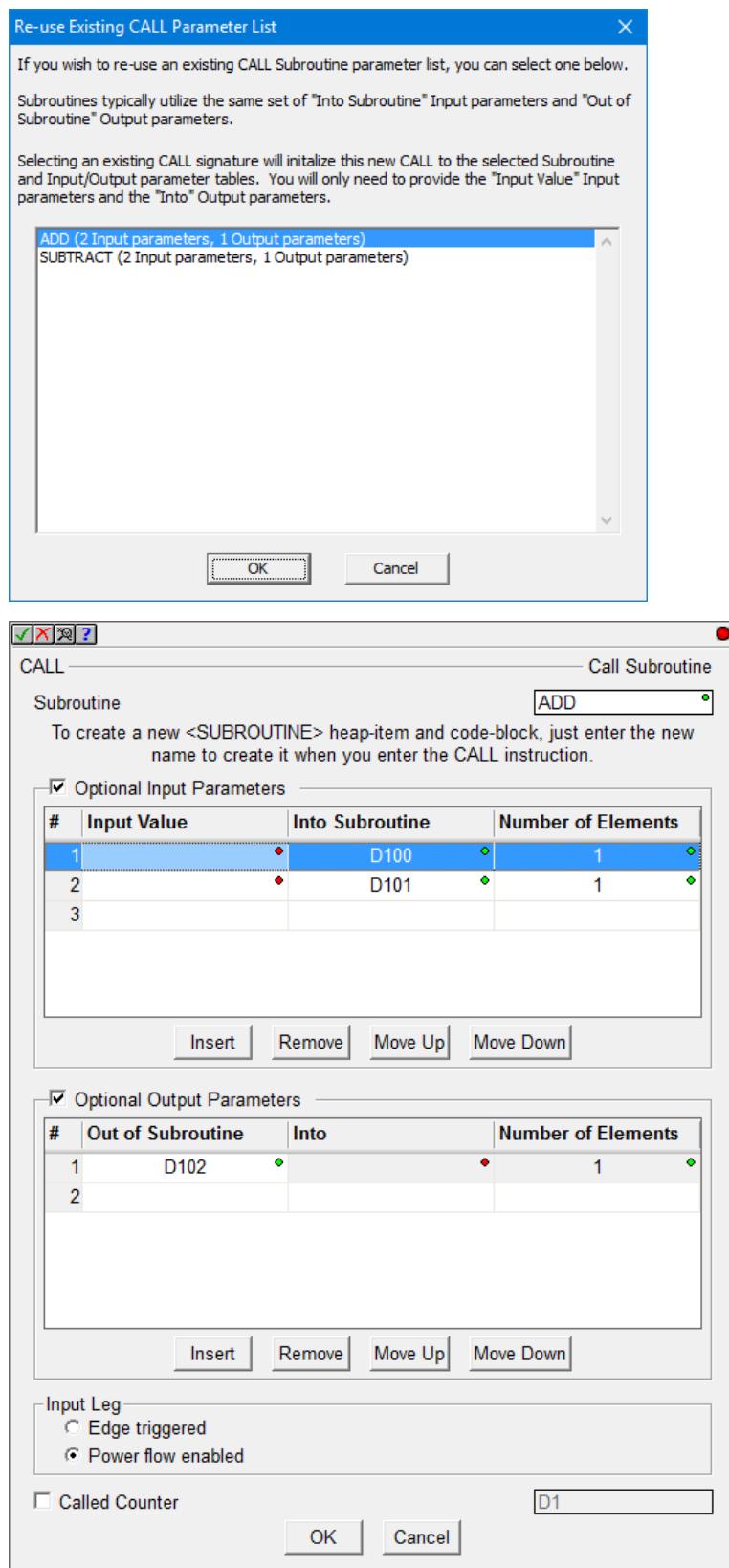
For example, you can create an ADD subroutine that takes 2 input parameters and 1 output parameter. The Subroutine reserves and uses the D100 and D101 registers for the two Addends, and D102 for the Add Result. You can then CALL the ADD subroutine with 1, 2 and D0 to get the result of 3 in D0.



Now say you want to add 4 and 5 together and store that in D1, you probably want to re-use your nifty new "ADD box" that you just created,. Normally, you would need to remember that ADD uses

D100 and D101 for the two input parameters, and D102 for the one output parameter.

So after you pick a new CALL instruction, Designer knows that Subroutines are meant to be re-used, so it asks you if you want to re-use an existing CALL signature for the Subroutine-side parameters for this new CALL box, and let you fill out the CALL-side parameters:



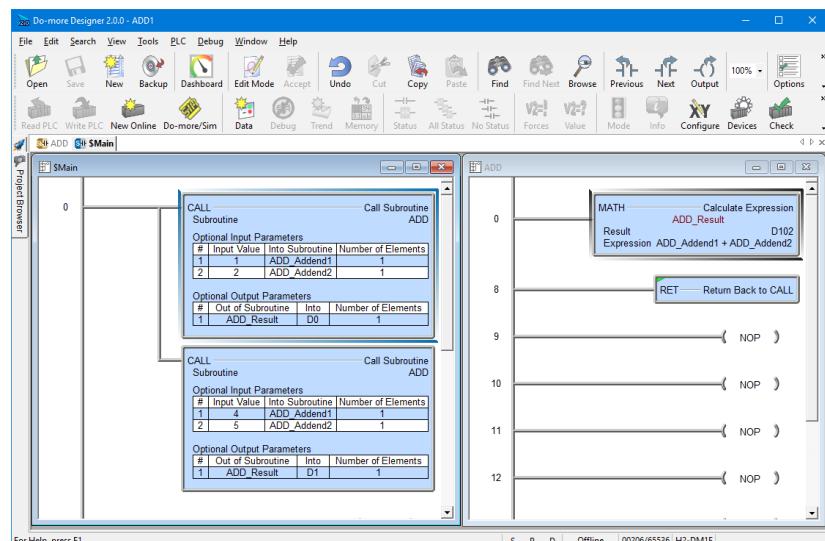
After hitting OK, you are given a more-than-half-filled-out CALL instruction.

The Subroutine name, the Subroutine's side Input and Output parameters are all filled out.

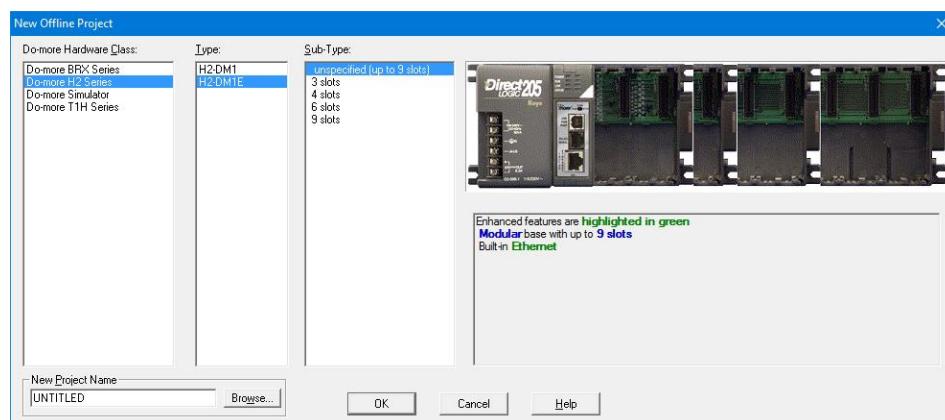
All that's left to do is fill out the three "red dot" empty parameters that are the "caller side" parameters (in this case, they will be 4, 5, and D1)

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It's also good design to assign Nicknames to the global Subroutine input/output parameters, then your CALL instruction signature and Subroutine logic looks even better (e.g. ADD_Addend1, ADD_Addend2, ADD_Result for D100, D101, and D102, respectively):



Enhanced New Offline Project Dialog



There is now a third selection level, PLC Sub-Type, which became necessary when the BRX was added due to the model/feature breadth of that new line. By adding PLC Sub-Type, this also allows for 205 Base Type selection, including an option of "unspecified".

The dialog also reports on general features of the specific sub-type selected, highlighting key features in green (like built-in Ethernet, or onboard analog I/O or ...; see other example in the BRX section above).

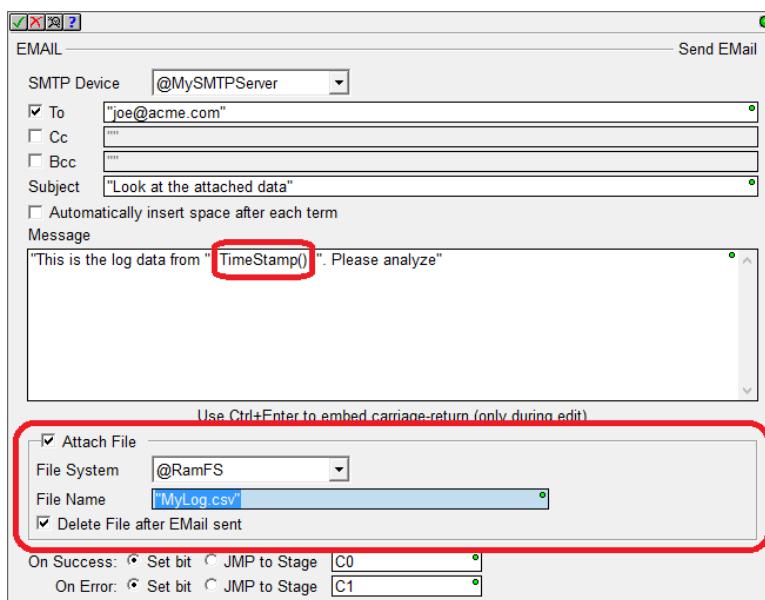
New Instructions and Instruction Enhancements

With the addition of a RAM Drive File System to all existing Do-more PLCs with just a simple firmware upgrade, the existing **EMAIL** instruction was enhanced to add some optional parameters for **sending attachments**.

A new **STRPRINT/EMAIL** Print Script command was created called **TimeStamp()** that optionally takes two parameters.

Resolution: min or sec (default) or tenths or hundredths or thousandths.

Clock-Time-Type: local (default) or utc



The format of the date portion is always YYYY/MM/DD. The format of the time portion is 24-hour, down to the specified resolution. So the default is local time to seconds resolution, for example:

2016/12/31 23:59:59

If you need more detailed formatting capabilities, use the existing **FmtDate()** and **FmtTime()** script commands.

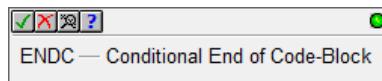
There is another **STRPRINT/EMAIL** Print Script command called **Fill()** that repeats the same character multiple times. It takes 2 parameters:

Fill-character/byte as hexadecimal constant 0x00..0xFF

Fill-length (integer element or constant)

So, **Fill(0x20, 80)** would generate 80 spaces (0x20 is the ASCII hexadecimal constant for a space).

ENDC – Conditional End of Code-Block



ENDC can be utilized in any PROGRAM, TASK or ISR code-block type. Although END coils are not required by Do-more PLCs, the Conditional End within an Interrupt Service Routine is commonly needed to help keep the ISR running as fast as possible.

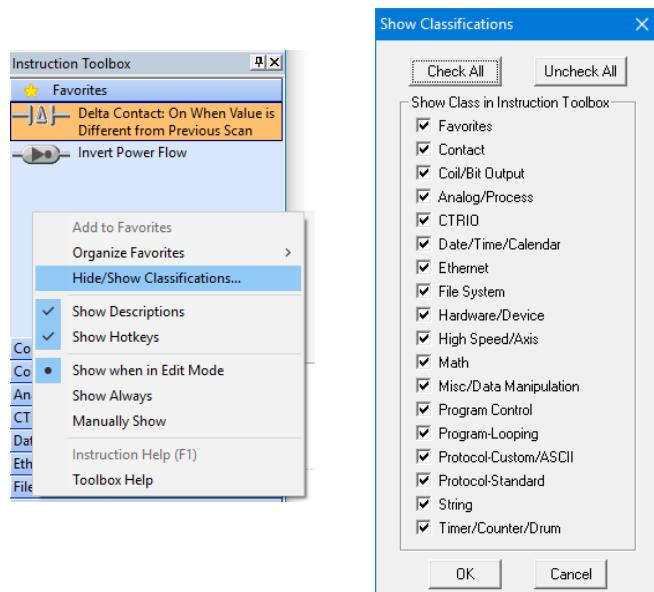
Also, it is sometimes helpful to use END/ENDC for debug purposes to block out code execution in a PROGRAM or a TASK. The ENDC box lets you do perform the End conditionally based on the input contact power flow state of the rung.

Note that ENDC is different than the EXIT instruction in that ENDC can only end the current logic scan of that code-block, it does NOT end the execution of that code-block for subsequent scans, like EXIT does.

Instruction Toolbox

You can now hide any set of instruction classifications that you don't ever use, freeing up more screen space in the Toolbox for the instructions that you do use.

Just right click on the Instruction Toolbox and select Hide/Show Classifications, then UNcheck the classes you don't ever use in the Show Classifications dialog box.



Moved CTRIO set of instructions to its own Instruction Class.

Added a higher level **Download Firmware dialog** accessed via the PLC menu, PLC toolbar, and Dashboard view. You can still download firmware from the System Information dialog.

New System Words (DSTs)

DST50	\$InstalledPOM	
DST53	\$PLCSubType	
DST54	\$POMIpSetupSrc	see Help Topic DMD0208 <i>System Nickname Locations</i> for details
DST55	\$POMIpAddress	
DST56	\$POMIpNetmask	
DST57	\$POMIpGateway	

Ladder View – added Ctrl+/ (control-slash) hot key to toggle documentation on/off quickly. Great when online and needing more logic status real estate, Ctrl+/ turns off documentation temporarily to give you more contacts/coils/boxes on your screen. Hit Ctrl+/ to bring it back to “normal”, Ctrl+/ to turn it back off. Very handy when you just need to temporarily turn off documentation in your Ladder View.

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The 'Browse Videos' dialog box displays a list of video entries. Each entry includes a thumbnail, title, key words, URL, and local name. A search bar at the top left allows users to filter the results. On the right side, a 'Key Words' section provides a list of categories with checkboxes for selecting multiple items. Buttons for 'Play', 'Run Video Download Utility', and 'Close' are located at the bottom.

#	Title	Key Words	www	Local Name
1	Welcome to Do-more 2.0	Introduction	https://www.youtub...	Start_Welcome_1.mp4
1	EtherNet/IP Explicit Client with a Datalogic Matrix 210 Bar Code Imager	Communication Ethernet EtherNet/...	https://www.youtub...	DmEIPClientBarcode...
1	EtherNet/IP Explicit Client with a Do-more Explicit Server	Communication Ethernet EtherNet/...	https://www.youtub...	DmEIPClientServer_...
1	EtherNet/IP Explicit Client with an AMCI Absolute Encoder	Communication Ethernet EtherNet/...	https://www.youtub...	DmEIPClientEncoder...
1	EtherNet/IP Explicit Client with an SR55 Soft Starter	Communication Ethernet EtherNet/...	https://www.youtub...	DmEIPClientSoftStart...
1	EtherNet/IP Explicit Client with PowerFlex40 VFD	Communication Ethernet EtherNet/...	https://www.youtub...	DmEIPClientVFD_1...
1	EtherNet/IP Explicit Unconnected Messaging Primer	Communication Ethernet EtherNet/...	https://www.youtub...	DmEIPPrimer_1.mp4
1	An Intro to Using Stage Programming with Do-more Designer	Introduction Program Stage	https://www.youtub...	DmStageIntro_1.mp4
1	Benefits and Features of Do-more Programmable Logic Controller	205 DirectLOGIC Introduction Simul...	https://www.youtub...	DmBenefits_1.mp4
1	Ethernet I/O - GS Drives Advanced	Ethernet Ethernet_I/O GS_Drive	https://www.youtub...	DmEOGSAvanced_...
1	Ethernet I/O - GS Drives Intro	Ethernet Ethernet_I/O GS_Drive Intro...	https://www.youtub...	DmEOGSIntro_1.mp4
1	Ethernet I/O - Quick Start	Ethernet Ethernet_I/O I/O Introduction	https://www.youtub...	DmEOQuickStart_1...
1	Ethernet I/O - Troubleshooting	Ethernet Ethernet_I/O I/O Troublesh...	https://www.youtub...	DmETroubleshoot_...
1	Get Up and Running Quickly with the Do-more Starter Kit	Introduction	https://www.youtub...	DmStarterKit_1.mp4
1	Helpful Hints to Get the Most Out of Your PLC with Do-more Designer	Data Introduction Program	https://www.youtub...	DmHints_1.mp4
1	How To Do-more CTRIO2 Dynamic Motion	205 CTRIO2 Motion Program	https://www.youtub...	DmCTRIO2Dynamic...
1	How To Do-more CTRIO2 Motion Config and JOG	205 CTRIO2 Motion Program	https://www.youtub...	DmCTRIO2ConfigJo...

Browse Videos Dialog

The new Browse Videos dialog box lets you navigate all the videos, and it supports keyword filtering and title text search to watch any/all videos (see Help->Browse Videos).

The 'Do-more Video Download Utility' dialog box lists videos with checkboxes for selecting them. A 'Categories' sidebar on the right lists various automation topics with checkboxes. Buttons for 'Play selected video', 'Download checked videos', and 'Delete local copy' are located at the bottom.

Title	Online/Local
How To Do-more CTRIO2 Motion Config and JOG	Online
How To Do-more CTRIO2 Motion Using Encoders	Online
How To Do-more CTRIO2 Motion Using Limits	Online
How To Do-more CTRIO2 Trapezoid Moves	Online
How To Use the MATH Instruction with Do-more Designer	Online
An Intro to Using Stage Programming with Do-more Designer	Online
Benefits and Features of Do-more Programmable Logic Controller	Online
How to Use the Simulator to Test Your Ladder Code with Do-more Designer	Online
How to Setup External Serial Ports with Do-more Designer	Online
How To Sense Temperature with a Do-more PLC	Online
Helpful Hints to Get the Most Out of Your PLC with Do-more Designer	Online
How to Setup and Use a Bar Code Scanner	Online
How to Use Data View to Monitor and Control Data with Do-more Designer	Online
How to Use Trend View to Log Data in Real Time with Do-more Designer	Online
Terminator I/O T1H Stackable PLC Field I/O Kickstart	Online
How to Control On/Off AC Motors with a Do-more PLC, Part I Hardware	Online
How to Control On/Off AC Motors with a Do-more PLC, Part II Software	Online
How to Get Started with the Do-more Designer Software	Online
How to Connect to a Do-more PLC Via Ethernet	Online
How to Connect to a Remote Do-more PLC Behind a VPN	Online
How to Connect to a Remote Do-more PLC via Port Forwarding	Online
How to Detect Objects with a Do-more PLC	Online
How to Sense Distance with an AutomationDirect Do-more PLC	Online
Welcome to Do-more 2.0	Online
How to Use a Color HMI Display	Online

Video Download Utility

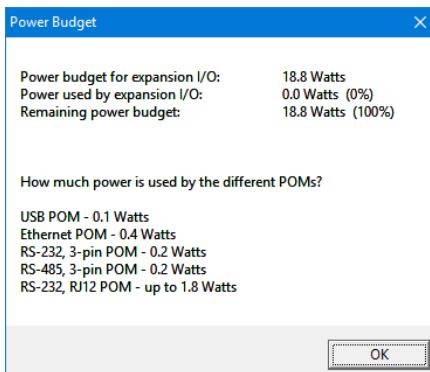
The new Video Download utility can be especially helpful for installations where Internet access is erratic or does not exist. By downloading relevant videos to your hard drive ahead of time, you can still play these videos regardless of your Internet connection at those critical moments! (see Help->Download Videos).

2.0.3 Modifications

1. Fixed major issue when writing a 1.4 (or earlier) disk project using Designer 2.0.2 or 2.0.1 down to a 205 or Terminator CPU. The PLC project may not be read back from the PLC correctly. Ladder memory will be interpreted as one large monolithic block of code (no \$Main). Workaround with 2.0.2 or 2.0.1: make a change to the Memory Configuration before writing to the PLC. **Fix: 2.0.3 fixes this issue.**

2.0.2 Modifications

1. Dashboard
 - a. Currently installed BRX POM included in Power Budget calculation when online; offline and online Power Budget dialog lists power usage for the various POMs since they are hot-swappable making the Power Budget dynamic:



- b. reload button properly refreshes at the current scrolled position
 - c. CPU panel shows Mode Switch position next to actual PLC mode
 - d. clicking on Ethernet port lets you Edit IP Configuration
 - e. adjusted behavior of Ethernet panel items on non-Ethernet PLCs
 - f. smarter display of SD Card and Mode Switch when offline
 - g. made aware of adding/removing data-blocks
 - h. added High Speed I/O tab (HSIO)
 - i. added confirmation message box when disabling Ethernet I/O Master or disabling EtherNet/IP Server
 - j. added Monitor Ethernet I/O to Ethernet I/O Master panel item's pop-up menu
2. System Configuration dialogs
 - a. BRX Discrete Input Filter – changed default filter time to 10ms; so then the BRX High Speed Input dialogs will notify user if a high speed input is configured to use that slow default filter time
 - b. BRX Discrete Input Filter – changed “response times” to “filter values”
 - c. BRX Analog Input Configuration – correctly displays analog current units 0.61 uA
 - d. BRX Analog Output Configuration properly displaying electrical units
 - e. BRX Analog Output Configuration shows max 16 bit signed raw value as 32767
 - f. BRX Analog Input and Output Configuration – replaced “Range Limit” phrase with “Clamp”
 - g. BRX Setup Interrupt Timer clamps on max value entry and also displays microsecond entry values in their seconds/millisecond equivalent
 - h. BRX Setup Interrupt Event Configuration dialog has a “Clear” button
 - i. BRX Table Driven Output dialog has correct TDODECFG mnemonic
 - j. Memory Configuration dialog no longer initially has Hide Built-in Blocks checkbox CHECKED
 - k. SMTP Configuration dialog and Ethernet I/O Monitor dialog misspellings fixed
 - l. Reduced multiple “nag” dialogs when making System Configuration changes when online
 - m. Help button now works on Setup BRX POM dialog, BRX Setup Discrete Input Filter dialog, BRX Setup Analog dialog, Edit User Password dialog
3. GSREGRD/GSREGWR correctly labeled as Fully Asynchronous (5649)

Do-more Updates Rel 2.0, February, 2017

4. RX/WX instruction From/To Local/Remote editors no longer initially clearing Local field (this may have been an issue in other element editor fields in 2.0.1)
5. AXHOME editor is 2 columns
6. Changed wording of AXCONFIG's "motion fault limit" parameters to "overtravel fault limit"
7. AXCAM editor reminds users to hit the "Apply to table" button when making changes to the table configuration parameters
8. Made Do-more serial protocol more robust
9. Ladder View properly displays long Unassigned Nicknames and Symbolic Constants in contacts and coils (5658)
10. Element Editor Auto Complete now shows Structure level nicknames which have valid structure fields for that parameter (5659)
11. Browse PLC File System – bumped application timeout to 10 seconds (5655)
12. Select Project dialog's PLC Subtype Specification list shows voltage range next to power-supply type
13. Do-more Technology version takes you to the new Download Firmware/Gate Array dialog instead of the System Information dialog when looking to update your PLC
14. Project Browser shows the *Sort By* settings for the *Control Logic* and the *Configuration/Memory* nodes of the browser tree (5281)
15. Fixed some modality issues with various dialog boxes
16. Browse Videos dialog can sort based on Location column (Disk vs. Internet)
17. Video Download Utility reports error messages in addition to the error codes

Do-more Updates Rel 1.4 September, 2015, and earlier

For details about updates for version 1.4 and earlier, see this online document:

http://forum.hosteng.com/wndm/Updates_1_4.pdf