Do-more Updates Rel 2.7, March 25, 2020



This file documents the list of new features, enhancements, and "adjusted anomalies", starting with the most recent Rel 2.7 version, followed by the 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. 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):

Setup BX-04UT Module			
Module Configuration	Name: BX_04UT_001	Info: Module Type: BX-04UT Assigned to: BRX Local I/O Master : BRX Local I/O : Slot 1	
Analog Inputs 0-3	Global Settings		
Analog Input 0 Thermocouple Type J Filter Time: 0.00 Time is in seconds. Enter 0 to disable.	WX1 Range: -346 - 2192 Units/Ct: 1DegF Out of Range: X16 Burn Out: X17 RX1 Range: -346.00 - 2192.00		
Analog Input 1 RTD (3/4 wire) Pt10 Filter Time: 0.00 Time is in seconds. Enter 0 to disable.	WX2 Range: -328 - 1562 Units/Ct: 1DegF Out of Range: X18 Burn Out: X19 RX2 Range: -328.00 - 1562.00		
Analog Input 2 Thermistor 2252 Filter Time: 0.00 Time is in seconds. Enter 0 to disable.	WX3 Range: -40 - 302 Units/Ct: 1DegF Out of Range: X20 Burn Out: X21 RX3 Range: -40.00 - 302.00		
Analog Input 3 Voltage ± 31.25mVDC	WX4 Range: -32768 - 32767 Units/Ct: 0.95uV Out of Range: X22 Channel Fault: X23	Enable Scaling from WX4 to RX4	OK Cancel Help

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):

etup BX-04AD-3 Module		>
Module Configuration Name: BX_04AD_3_002	Info: Module Type: BX-04AD-3 Assigned to: BRX Local I/O Master : BRX Local I/O : Slot 2	
Analog Inputs 0-3		
Analog Input 0 Analog Input 0 Range: 6553 - 32767 Resolution: ~15 bits Units (2: 0.5 luA Broken Transmitter: X24 Time is neconds. Enter 0 to disable.	Enable Scaling from WXS to RXS	
Analog Input 1 WX6 0 - SVDC Range: 0 - 32/67 Resolution: 15 bits Unts/Ct: 305/V Filter Time: 0.00 Out of Range: X25 Time is in seconds. Filter (3 highlight)	Enable Scaling from WXG to RXG	
Analog Input 2 WX7 ± SVDC ▼ Filter Time: 0.00 Out of Range: X26 X2768 - 32767 Resolution: 16 bits Units/Ct: 305,W Out of Range: X26 Time is in seconds.	Enable Scaling from WX7 to RX7	
Analog Input 3 WX8 ▲ nalog Input 3 Range: -32768 - 32767 ▲ 10VDC WX8 Units/Ct: 305.0V Units/Ct: 305.0V Outs of Range: X27 X28	Enable Scaling from WXB to RXB	ĸ
Time is in seconds. Enter 0 to disable.	Can	
	He	dp

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):

Module Configuration Na	me: BX_04DA_3_003	Info: Module Type: BX-04DA-3 Assigned to: BRX Local I/O Master : BRX Local I/O : Slot 3	
Analog Outputs 0-3	1		
Analog Output 0	WY1 Range: 6553 - 32767 Resolution: ~15 bits Units/Ct: 0.61uA	Enable Scaling from RY1 to WY1	
Analog Output 1	WY2 Range: 0 - 32767 Resolution: 15 bits Units/Ct: 153uV	Enable Scaling from RY2 to WY2	
Analog Output 2	WY3 Range: -32768 - 32767 Resolution: 16 bits Units/Ct: 153uV	Enable Scaling from RY3 to WY3	
Analog Output 3	WY4 Range: -32768 - 32767 Resolution: 16 bits Units/Ct: 305uV	Enable Scaling from RY4 to WY4	ОК
			Cance

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 Pluggable Option Modules (POM)

BX-P-SER2-TERMFCRS232 Serial Port w/Flow Control using 5-pin terminal block conn.BX-P-SER422-TERMRS422 Serial Port using a 5-pin terminal block connection

f. 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.

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

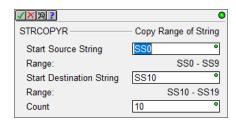
Copy a *range* of Source String elements to a *range* of Destination String elements.

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).

✓X № ?			•
STRCOPY			- Copy String
Source	••••		•
Destination		SS0	•
Range:			SS0
Count		1	•



✓X¤?	•
RANGECHECK	
Input Value	D0 •
High Limit	100 °
Low Limit	0 •
Turn Bit ON whe	n
Out of Range	
C In Range	
Out of Range Bit	C0 •

3. New Nickname Workflow – Create Nicknames as Needed

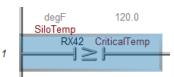
When writing Ladder Logic, you can create your Nicknames as you need them. For example, when entering a >= relational contact to see when a temperature value exceeds 120.0 degrees, you do not have to predefine the Nickname for the RX analog input temperature or for the Symbolic Constant. Just type in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

✓X % ? D		0
SiloTemp	CriticalTemp	•
	—J≥⊢—	

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).

Create Nicknames for Contact - Greater-Than-or-Equal-To Relational Contact							
The following 2 Nicknames need to be defined for Contact - Greater-Than-or-Equal-To Relational Contact: Click on a cell in the "To Element or Constant" column to enter the desired element for that Nickname, or click on "Special Action" for special processing. Click on the "Extra Info" or "Description" cell to enter that element's additional documentation.							
Parameter Description	Assign New Nickname	To Element or Constant	Usage	Special Action		Extra Info	Description
left	SiloTemp	RX42 🔷	Unused	Choose action	\sim	degF	
right	CriticalTemp	120.0 •	n/a	Choose action	~		
		- -					
		ОК	Cancel	Help (F1)			Resize the dialog to widen columns or see more rows

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).

Special Action
Choose action 🗸
Choose action
Find next unused Ctrl+N
Browse F9
Make unassigned
Do not create this Nickname

4. Formatted Rung Comments

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

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

Justification: Left, Centered, Right

Edit Comments >	🖞 Do-more Designer 2.7.0 - UNTITLED - [\$Main] — 🗆 🗙
Arial 🔹 Medum 🔹 B I U 🕲 🖹 🚊 🗮 🗙	<u>File Edit Search View Tools PLC D</u> ebug <u>W</u> indow <u>H</u> elp
Comment for rung \$Main#1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
This paragraph is centered with large red text. This word is bold . This sentence is Courier New font, useful for tables: Column 1 Column 2 Column 3 Beto.	Open Save New Backup Dashboard Edit Mode Accept Undo Cut Copy Accept Accept Edit Mode Accept <
	í 👔 Start Page X 🖸 Dashboard X 🐏 SMain X
1,1 1,2 1,3 <u>Move</u>	This paragraph is centered with large red text.
<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	This word is bold . This sentence is Courier New font, useful for tables:
This line is italicized. Heb The editor matches your Color Settings for Background color and Rung Comment color. Heb	This word is bold. This sentence is Courier New font, useful for tables: +++ Column 1 Column 2 Column 3 +++ 1,1 1,2 1,3 +++ 2,1 2,2 2,3
	This line is italicized. This line is right justified.
	The editor matches your Color Settings for Background color and Rung Comment color. C0 C1 C42 1 OUT)
	For Help, press F1 S P D Offline 00113/65536 BX-DM1E-18ED13

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

Instruction Toolbox		7 ×			
All Core 🔻 Comm 🔻 Process 🔻 🔳					
🔶 Favorites					
Contact					
-) - Normally C	per	n Contact (F2)			
Normally	loc	od Contact (E2)			
Leading E		Add to Favorites			
(Shift+F2)		Organize Favorites	>		
-J Trailing Ec		Assign Instruction Hot Keys			
(Shift+F3)		Hide/show classifications			
-) Greater-TI Relational		a			
	~	Show Descriptions			
-] = - Equal-To F	~	Show Hotkeys			
Coil/Bit I/O	~	Show "Help" Tooltip			
Analog/Process		Show when in Edit Mode			
CTRIO					
Date/Time/Calendar		Show Always			
Ethernet		Manually Show			
File System		Instruction Help (F1)			
Hardware/Device		Toolbox Help			
High Speed/Axis	_		_		

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!

Assign inst	ruction Hot Keys		~
Utilize	the number keys across the top of your keyboard (Ctrl+1 through Ctrl+0) Hot Keys tied to your 10 favorite instructions.	as	
Just pic	k your favorite from the list for each Hot Key, or hit the Reset to Default to the pre-defined list, or hit Reset to Unassigned to clear them all.	get	
	Sort Instruction Lists By		
	Instruction Class C Mnemonic		
Ctrl+1	Delta Contact: On When Value is Different from Previous Scan	•	
Ctrl+2	Invert Power Flow	•	
Ctrl+3	TMR - Timer	•	
Ctrl+4	SG - Stage	•	
Ctrl+5	<unassigned></unassigned>	•	
Ctrl+6	CNT - Up Counter	•	
Ctrl+7	STRCOPY - Copy String STRCOPYR - Copy Range of String STRDELETE - Delete Substring STREIND - Find within Strina	^	
Ctrl+8	STRGETB - Get Bytes Out of a String STRINSERT - Insert Substring		
Ctrl+9	STRPRINT - Print to String STRPUTB - Put Bytes Into a String STRSUB - Get Sub-String		
Ctrl+0	STRTRIM - Trim Whitespace STRTRUNC - Set String Length Timer/Counter/Drum		
	CNT - Up Counter		
	CNTDN - Down Counter COMMON_TIMER - Start here if not sure		
	DRUM - Timed/Event/Timed-Event Drum		
	FREQCNT - Frequency Counter		
	FREQTMR - Frequency Timer OFFDTMR - Off Delay Timer		
	ONDTMR - On Delay Timer		
	RSTCT - Reset Counter		
	RSTT - Reset Timer TMR - Timer		
	TMRA - Accumulating Timer		
	TMRADOWN - Accumulating Down Timer		
	TMRAG - Global Accumulating Timer		
	TMRDOWN - Down Timer		
	UDC - Up/Down Counter UDCG - Global Up/Down Counter	~	

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.

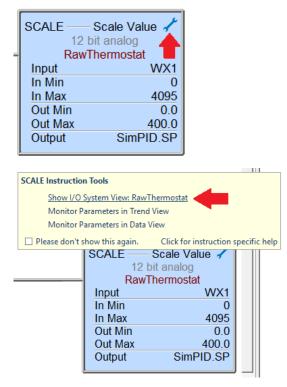
Image: Structure Image: Structure <td< th=""><th>JSON Pretty Print</th><th></th><th></th><th></th><th></th><th></th><th>×</th></td<>	JSON Pretty Print						×
Raw JSON String Pretty-printed JSON ["FV":134.799, "SP":124.542, "Gain":0.99, "Res (et":8.627, "Rate":0, "Bias":37.9654, "Output": (27.7149, "ErrorDB":0, "DGainLmt":0, "SampleTim (e":259, "Mode":true, "AutoTuningI: false, "Auto "SP": 124.542, TuneComp":false, "AutoTuningEr":false, "RanT "Reset": 0.627, hisScan":false, "Tune":false, "TuningAlg":fal "Bias": 37.9654, se, "TunedParms":false, "LastError":-10.3541} "Bias": 259, "Mode": true, "AutoTuningTr": false, "MutoTuningTr": false, "AutoTuningTr": false, "TunedParms": false, "Tune": false, "Mode": true, "AutoTuningTr": false, "Tune": false, "Tune": false, "TunedParms": false, "Tune": false, "LastError": -10.3541 >	C String Structure	• Numeri	c Data B	lock Containing Text		1	
	<pre>{"PV":134.799,"SP":124.542,"Ga et":8.627,"Rate":0,"Bias":37.5 27.7149,"ErrorDB":0,"DGainLmt" e":259,"Mode":true,"AutoTuning TuneComp":false,"AutoTuningErr hisScan":false,"Tune":false,"T</pre>	654,"Output": :0,"SampleTim ":false,"Auto ":false,"RanT uningAlg":fal		<pre>{ "PV": 134.7 "Sp": 124.5 "Gain": 0.5 "Rase": 8. "Rate": 0, "Dias": 37. "Output": 2 "ErrorDB": "DGainImt": "SompleTime "Mode": tru "AutoTuniqg "AutoTuniqAlq" "TuniqAlq" "TunedParms "LastError" </pre>	99, 42, 5, 627, 9654, 7.7149, 0, 0, ": 259, ": false, mp": false, pr": false, pr": false, :: false, :: false,	N	~
Close help (1) Resize dialog to see more of		Close	1	Help (F1)		d	re of

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.).



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:

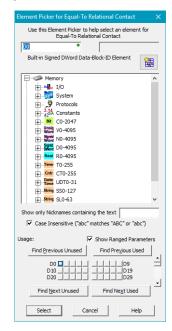
AXCAM Table Editor, Browse PLC File System, Device Status View, Configure Device, Ethernet I/O Monitor, Enable Stage, JSON Pretty Print, Monitor Parameters Trend/Data View, PID View, PLC Message Dump, Run DmLogger, I/O System View, Memory View, Stage Status, Show Structure Members, Show Structure Memory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

✓X [∞] ?	_	0
D0	<u>D</u> 0	•



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).

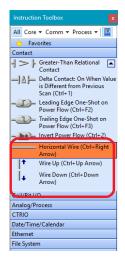
X % ? D	•
MRX	Modbus Network Read
Device	@IntModTCPClient
Modbus/TCP addressing	Edit Modbus TCP Client Settings X
C Variable IP Address	Device Name: @IntModTCPClient
TCP Port Number	Modbus Protocol Settings
Unit ID Function Code	Timeout: 1000 ms
Modbus	60
From Modbus Offset Address Number of Modbus Coils	Inactivity Timeout: 00 sec
To Do-more Memory Address	OK Cancel

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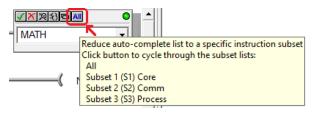
d. Ladder View – In PROGRAM code-blocks with Stages, show the Stage number of each rung above its Rung#/Address in the left margin (6332):

🏰 Do-more Designer 2.7.0 - UNTITLED - [ABCTelNetServer]	– 🗆 X
Eile Edit Search View Tools PLC Debug Window Help	_ 8 ×
Image: Open Save Image: Open Image: Open <tht< th=""><th></th></tht<>	
Read PLC Write PLC New Online Do-more/Sim Data Debug Trend Memory Status All Status	→⊢ →⊢ s No Status Forces Value
Main × 🔐 ABCTelNetServer ×	4 Þ 🖛 🗙
Output a new command prompt on client terminal	-
Project Brown	
	Stream Out Data to Device 🖌
Device String Stream	@ABCTelNetServer SS100
On Success, JMP t On Error, JMP to st	
Wait for a command line from the client. This Stage is where this code-block should be	.90 011
sitting most of the time, because command processing is very quick.	
SG Stage Stage	
S11 \$ABCTelNetServer.InQueue 0	Stream in Data from Device 🖌
Device	@ABCTelNetServer
0x0D 0x0A, trimmin	vived exact delimiter sequence g delimiter from output
Automatically remo BACKSPACE chara	e previous character when cter is received
String Structure On Success, JMP t	SS1 S12
On Error, JMP to st	age S12
If while we are waiting for the "next" command, the client disconnects, then start	
shutting down this code-block. SABCTelNetServer.Connected	
	JMP Jump To Stage Transition To S98
For Help, press F1 S P D Offline 00737/65536	H2-DM1E

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).

Find X
Search For: - C Element - C Instruction - C Contact -
Look for: - Normally Open Contact
Match Normally Open Contact
Normally Closed Contact
Element s - Leading Edge One-Shot Contact
Refine - Trailing Edge One-Shot Contact
Inplant Invert Power Flow
Cout - Equal-To Relational Contact
In a - Greater-Than-or-Equal-To Relational
Not-Equal-To Relational Contact
- Less-Than Relational Contact
Where to S
All Cont - S - Less-Than-or-Equal-To Relational Co
C All Oper - Leading Edge One-Shot on Power Flo
C Current - Trailing Edge One-Shot on Power Flc
C Entire Delta Contact: On When Value is Diff
C Specific Rungs
1 to 1
Find Prev Find Next Find All Close

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):

Address	Description
	Searching for X0 in entire project (double-click to refresh)
\$Main#1:01:01	STR X0
\$Main#2:01:01	STR X0
\$Main#3:01:01	STR X0
MonitorAlarms#2:01:01	STR X0

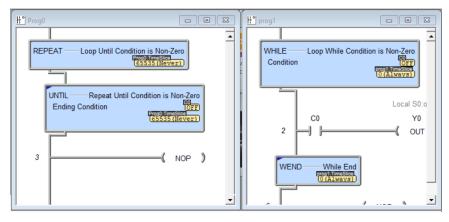
i. Ladder View - added More>> and Less<< button to the Find dialog (5062):

Find	×			
Search For: - • Element - O Instruction - O Contact				
Look for:				
Match exactly Match in	Range << Less			
Element search options				
Refine Search				
© Input parameter C	Inside of a contact			
C Output parameter C	Inside of a coil			
C In a specific instruction C	Inside of a box			
_				
-Where to Search	Show 'Find All' Results In			
All Control Logic	'Find Results 1'			
C All Open Code Blocks	C 'Find Results 2'			
C Current Code Block				
Entire Code Block				
C Specific Rungs				
1 to 1 A				
Find Prev Find Next F	Find All Close			

Find	×
_ Search For: −● Element −C Instruction −C Contact	
Look for:	
☐ Match exactly More >>	
Find Prev Find Next Find All Close	

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):



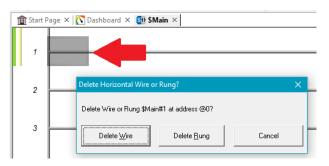
k. Ladder View - PID instruction editor lets you initialize the Error Deadband member (.ErrorDB) if you enable that option. It gets initialized when the input leg transitions from OFF to ON (Manual to Auto). Requires DmT 2.7 or later. (6394).

X 2 ? D		0
PID		Closed Loop Controller
enter the create it wher	MyPID • <pid> heap-item, just e new name to n you enter the PID truction.</pid>	Useful PID Structure Members MyPID.Mode MyPID.SP MyPID.PV MyPID.Bias MyPID.Output MyPID.Gain MyPID.Reset MyPID.Rate MyPID.SampleTime
-Loop Algorithm		Other Options
C Velocity		Enable Error Deadband Initialize MyPID.ErrorDB
Control Loop Forward Act C Reverse Act		1.0
Initialization Mode Set SP equances Bumpless	e	Clamp Bias at 100%
Scale to .PV		Scale from .Output %
From Raw PV	WX0	Scaled Min (0%) 0
Raw Min	0	Scaled Max (100%) 4095
Raw Max	4095	To Scaled Output WY0
Eng. Min	0.0	
Eng. Max	100.0	
Eng. Units		
	ОК	Cancel Help (F1)

- 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).
- 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.
- 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):



- 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):

Comm Link tied to disk project is not responding X				
Retry connecting to the associated PLC	Retry			
Edit the communications link	<u>E</u> dit Link			
Remove the link from this project	Remove <u>L</u> ink			
Open the disk project disconnected	Continue Offline			

- 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.

5	System Configuration		×
	Configuration Entries	□ Fnable Ethernet I/O Master	
	CPU Configuration I/O Configuration BRX Local I/O Master BRX Local I/O	CPUs with internal Ethernet ports can use any mix of up to 16 EBC100s, GSEDRV100s and DMIOs as native PLC I/O. The \$EthIOMaster structus status information that is accessible to the PLC program. Ethernet I/O Monitor displays system status. Ethernet Master Address Configuration	re contains
	Ethernet I/O Master Module Configuration(s)	Module ID: 0 IP Address: 0.0.0.0	
	Device Configuration	Name: Subnet Mask: 0.0.0.0	
	I/O Mappings Memory Configuration	Description: Gateway: 0.0.0.0	

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):

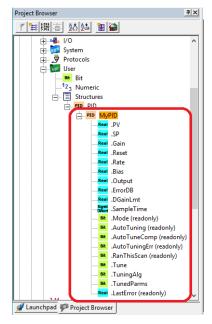
Edit MQTT Client Settings	×	
Device Name: MyMQTTServer		
MQTT Server Address	Enable Account Authentication	
(* Use Server Name	Username:	
acme.com	Password:	
C Use IP Address	Enable Will	
255 . 255 . 255 . 255 DNS Lookup	Topic:	
Other Settings	Payload:	
Protocol: MQTTS 🗨		
Server Port: 8883	🗌 Retain Topic	
Session Keep Alive: 30 seconds	F Enable User Specified Client ID	
Quality of Service: QoS 0	Client ID: Machine#42 00E0623003AD	
Session Type: Clean		
OK Cancel		

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

Device:	@POM		Device: @POM
Heap Item:	\$POMServer		Heap Item: \$POMServer
rotocol	,	K Sequence Server Settings	Use POM's IP Configuration
Do-more P (For Progr	Protocol amming, HMIs, etc)	Station Address: 1 1 - 90	Override IP Configuration
C K Sequence (Emulates	e Server DirectLogic PLCs)	-Modbus RTU Server Settings	IP Address: 255 . 255 . 255 . 255
C Modbus R (Slave)	TU Server	Unit ID; 1 0 - 255	Subnet Mask: 255 . 255 . 255 . 255
C Modbus R (Master)	TU Client	Modbus RTU Client Settings Timeout; 1000	Gateway: 0.0.0.0
	Control REAMIN/STREAMOUT and Custom Protocols)	Retries: 2	NOTE: Overriding the ECOMLT's IP config dc not alter the module's internal config, it only overrides while plugged into this PLC. To
ort Settings —		Inter-packet Delay; 3500	us change the module's config, use the SETUPI instruction or NetEdit.
Baud Rate:	115200 -		BX-P-USB-B (USB)
Data Bits:	8 💌		Device: @POM
Stop Bits: Parity:			Heap Item: \$POMServer
	Unconditional		
RTS Control:	Follows Transmitter		

- cc. Select Project Dialog added Remove button (6422).
- dd. Select Project Dialog pops up immediately, then populates the list (5772).

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).

🔰 Do-more Designer 2.7.0 - UNTIT	LED - [\$Main]					-		\times
Eile Edit Search View Tools	<u>PLC Debug Window Help</u>							
Open Save New Back		ept Undo Cut Copy	Paste Find Find	Next Browse Previous No		00% •	ptions	
Read PLC Write PLC New Online	Do-more/Sim	Trend Memory Status Al	I Status No Status Force		Configure De	vices Che	n eck	
Project Browser	🖭 🏦 Start Page 🗙 🚺	Dashboard × 🔠 SMain ×					4.1	Þ 🕶 3
『無關書 始ぬ 🏙 🗑								1
	pe & name 1	ST4				-(OUT)	
 Do-more Simulator File Sim 				_	• ×	-(NOP)	
BX-DM1E 16 D	16 DO	8 Analog Inputs		8 Analog Outputs				
Simv262	X8 Y0 Y8 WX0 X9 Y1 Y9 WX1		0 순 WY0			-(NOP)	
PWR SerRX X2)	(10 Y2 Y10 WX2 (11 Y3 Y11 WX3		0 + WY2 0 + WY3			- NOP)	
	(12 Y4 Y12 WX4		0 🗧 WY4		0			
RUN - I	Y5 Y13 WX5 (14 Y6 Y14 WX6		0 ↔ WY5 0 ↔ WY6		0	-(NOP)	
	(15 Y7 Y15 WX7		0 ± WY7		0	- NOP)	
C Memory C0 C1 C	2 C3 C4 C5 C6 C7	C8 C9 C10 C11 C12 C	13 C14 C15 C16 C1	7 C18 C19 C20 C21 C	22 C23			
Counters		R Memory		Strings		-(NOP)	
CT0 Acc 0 Done CT1 Acc 0 Done	V0 0 D0 V1 0 D1	0 R0 0.000 0 R1 0.000	MSG ERR			- NOP)	
CT2 Acc 0 Done	V2 0 D2 V3 0 D3	0 R2 0.000 0 R3 0.000	SS0 THIS IS SOME LO	JNG TEXT				
Timers	V4 0 D4	0 R4 0.000		or all good men to come to the	aid of thei	-(NOP)	
TO Acc 0 Done	V5 0 D5	0 R5 0.000	SS3					
T1 Acc 0 Done T2 Acc 0 Done	V6 0 D6 V7 0 D7	0 R6 0.000 0 R7 0.000	SLO		Exit	-(NOP)	
			-)	
🚀 Launchpad 🤎 Project Browser					-			_

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

hh. New System Status Nicknames

	ST9	\$ForcesActive		
	ST19	\$IsSimulator		
	DST60	\$Keyswitch	0 1 2	RUN TERM STOP
	DST61	\$SysMsgLevel	0 1 2	ERR and MSG String Reporting Level Disabled ERR Only (default) ERR and MSG
ii.	-	m View – added n nalog configuration		details about on-board I/O and I/O modules (5609):

Analog scaling BX-HSIO I/O functions *-SERIO protocols *-CTRIO I/O point functions/scaling

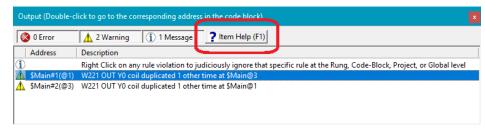
jj. **Program Check Rules** – Each rule now has information in Help topic DMD0469 (Program Check Errors, Warnings, and Message Codes) that **describes the specific rule**, what the concerns may be, valid reasons it could be ignored, along with ways to re-write the code to make the logic do what you want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

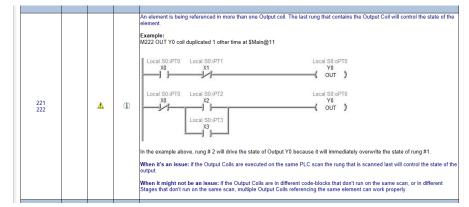
Just click on the specific rule, then hit the new Item Help button or hit the F1 key to jump to details on that specific rule (e.g. W221 Duplicate Coil).

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

Each entry explains:

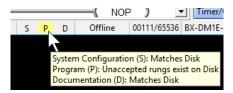
- 1. What the rule is
- 2. Shows an example
- 3. Describes when it's an issue





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- 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 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).
- b. Ladder View DEVREAD/DEVWRITE instructions fully support BX-POM modules, like reading the Baud Rate of an RS-232 Serial Port POM.
- c. Ladder View corrected Instruction Structure Status: CNT*, TMR*, CT*, FREQ*, FIFO*/LIFO*, INTCONFIG, RAMPSOAK, MEMCOPY, MEMCLEAR (6306).
- d. Ladder View LERP import from CSV file properly handles situation when CSV file is currently opened by another application.
- e. Ladder View STRCLEAR validates the range of strings (6373).
- f. Ladder View removed "Use Existing TCP Connection" option from HTTPCMD (6370).
- g. 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).
- h. 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).
- i. Ladder View optimize structure parameter status area (6341).
- j. Ladder View warn when a BRX High Speed Counter/Timer Accumulator is used as a highspeed accumulator in an instruction, but the resource is configured as a Pulse Catch (6249).
- k. Ladder View properly display input leg text with 55% or lower zoom level (5980).
- I. Ladder View GSREGRD/GSREGWR P21.00 parameter, added "use .StatusMonitor1" to parameter description (6418).
- m. Ladder View prohibit GSREGWR from adding P9 parameters as valid writes (6419).
- n. Ladder View allow full range of Module ID values in PING instruction (6372).
- o. Ladder View Replace properly works for Success/Error bits in RX instruction (6375).
- p. Ladder View Editing an existing RX/WX Remote Memory Block ID no longer always resets the Block ID to 0 (6376).
- q. Ladder View properly recalculate layout when switching wire display between 2D and 3D.
- r. 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).
- s. Ladder View allow MRX Modbus Read Multiple function codes to support structure members when the count is a constant 1 (6381, thanks to BK).
- t. Ladder View refined parameter error messages.
- u. Ladder View SWAPB and other ranged instructions properly check memory overlap when using arrays (6348, thanks to GD)
- v. Ladder View properly calculate rung indentation after NEXT/WEND/UNTIL is automatically added when entering FOR/WHILE/REPEAT start-of-loop instruction (6004).

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- w. Ladder View FILEREAD properly reports range errors.
- x. I/O Configuration correctly disallow remapping of BRX Onboard I/O (6397).
- y. I/O Configuration Setup BX-HSIO module Input Events shows all event details (6208).
- z. 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).
- aa. Documentation Editor properly sorts elements by natural number value (5440).
- bb. Documentation Editor Find Text within Nickname, Extra Info, and Description fields working for all sort options (6346).
- cc. 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).
- dd. Project Browser sort Control Logic by Execution Order sorts Subroutines and ISRs by name since these have no "execution order" (6266).
- ee. Project Browser Control Logic tree better handles pasting of a bunch of rungs with rung comments (6340, thanks to JW).
- ff. Cross Reference View report implicit fixed range of FIFO/LIFO buffers (6277).
- gg. Memory View -handle displaying current Element when clicking outside a valid cell (6380).
- hh. Memory View better handling of long strings by supporting wrapping (6389).
- ii. Memory View better error reporting when trying to write a string literal value longer than the string's Maximum Length.
- jj. Update Firmware dialog ensure that firmware file matches the target hardware (6334).
- kk. Various PID dialog boxes added support for the Video Play button in the title bar.
- II. Tooltips instructions on how to disable Instruction Help tooltip are consistent with the source view of the tooltip.
- mm. Program Check Warning 521 *High Speed Discrete Output set within non-Immediate instruction in ISR* working correctly (6368).
- nn. Dashboard Right Click on a GS-EDRV100 lets you set the Drive Type (GS1 vs. GS2 vs. GS3 vs. GS4, 6365).
- oo. Dashboard updated High Speed I/O hot spot text.
- pp. Dashboard *Refresh I/O* properly handles swapping out two similar modules with consistent module configurations, like swapping a BX-SERIO with a BX-SERIO2.
- qq. Dashboard BRX Onboard I/O addressing corrected in tooltip (6396, thanks to BF).
- rr. Global Options Default Dock Position radio buttons behave correctly (6358)
- ss. Communication Server properly perform bulk writes of a structure over 1000 bytes (6403).
- tt. 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)

	PDV engles input module 16 channel surrent input surrent signal range(s) of					
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					
DA-TOAD-2D	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,					
DA-4ADZDA-1	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,					
DA-ZADZDA-1	Output: 2-channel, current, 0-20 mA and 4-20 mA					
	BRX analog combo module, Input: 4-channel, voltage, 0-5 VDC, 0-10 VDC, +/-					
BX-4AD2DA-2B	5 VDC and +/- 10 VDC, Output: 2-channel, voltage, 0-5 VDC, 0-10 VDC, +/- 5					
	VDC and +/- 10 VDC					
	BRX analog combo module, Input: 2-channel, voltage, 0-5 VDC, 0-10 VDC, +/-					
BX-2AD2DA-2B	5 VDC and +/- 10 VDC, Output: 2-channel, voltage, 0-5 VDC, 0-10 VDC, +/- 5					
	VDC and +/- 10 VDC					
	BRX temperature combo module, Input: 4-channel, RTD, input RTD type(s):					
BX-4RTD4DA-1	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					
	BRX temperature combo module, Input: 4-channel, thermocouple, input					
BX-4THM4DA-1	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, C100 FIFOI OAD 2 ╡┝ Queue Structure Structure, or UDT value (InPackage) at the Head index of a User Block LOAD/ Head-1 matching data block (.TimeStamp(08-JUN-2019 SAT 11:57:08) Stamp(08-JUN-2019 SAT 11:57:01) JUN-2019 SAT 11:56:56) (InWork), and the Head .TimeStamp(08-JUN-2019 SAT 11:56:26) is adjusted accordingly. .TimeStamp(08 UNLOAD/.Tail 11:56:10)Note how the value in Value to Load into User Block InPackage is now at

Load First-In-First-Out

InWorkPackage0 - InWorkPackage9

Barcode (18874385))

.Barcode (18874402)

Barcode (18874414)

Barcode (18874477)

ode (18874498)

de (18874486)

FIFO_0

FIFO 0 He

InPackage

FIFO 0.Tai

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.

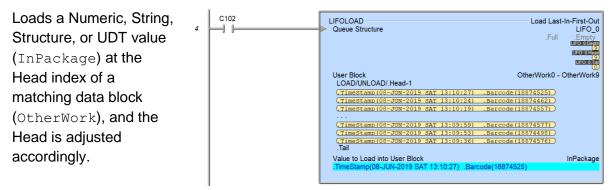
ii. FIFOUNLOAD – Unload First-In-First-Out

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.

Г	3	C101	FIFOUNLOAD Unload First-In-First-Out Queue Structure FIFO_0 .Full Empty Generation Content of C
k			User Block InWorkPackage0 - InWorkPackage9 LOAD/.Head-1 (.Timestamp(08-JUN-2019_SAT_11:57:08) .Barcode(18874485)) (.Timestamp(08-JUN-2019_SAT_11:57:01) .Barcode(18874485)) (.Timestamp(08-JUN-2019_SAT_11:56:56) .Barcode(18874402)) (.Timestamp(08-JUN-2019_SAT_11:56:26) .Barcode(18874448)) (.Timestamp(08-JUN-2019_SAT_11:56:19) .Barcode(18874448)) (.Timestamp(08-JUN-2019_SAT_11:56:19) .Barcode(18874486)) UNLOAD/.Tail
			Destination OutPackage ,TimeStamp(08-JUN-2019 SAT 11:56:10) .Barcode(18874477)

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



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.

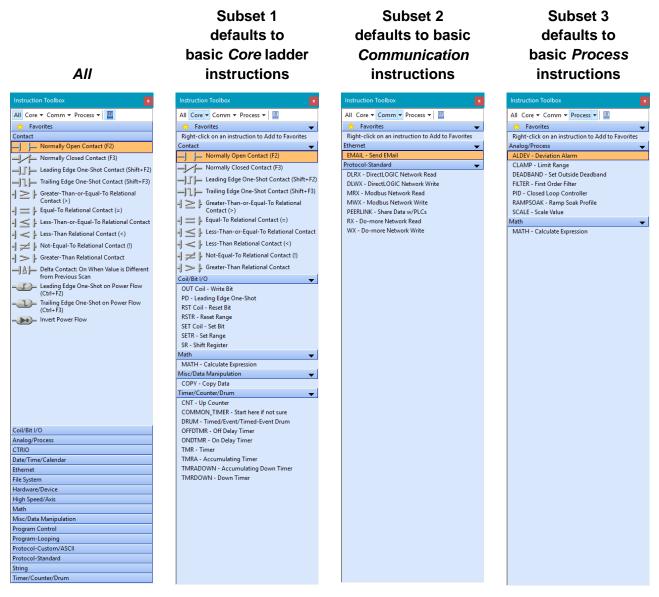
iv. LIFOUNLOAD - Unload Last-In-First-Out

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.

5	C103	LIFOUNLOAD Unload La: Queue Structure .Full	st-In-First-Out LIFO_0 .Empty LIFO 00esti B LIFO 01est B LIFO 01est
		User Block OtherWork0 LOAD/UNLOAD/.Head-1 (TimeStamp(08-JUN-2019 SAT 13:10:24) Barcode(18874462)) (TimeStamp(08-JUN-2019 SAT 13:10:19) Barcode(1887457)) (TimeStamp(08-JUN-2019 SAT 13:10:12) Barcode(1887447)) (TimeStamp(08-JUN-2019 SAT 13:09:59) Barcode(18874576)) (TimeStamp(08-JUN-2019 SAT 13:09:36) Barcode(18874576)) (TimeStamp(08-JUN-2019 SAT 13:09:36) Barcode(18874576)) (TimeStamp(08-JUN-2019 SAT 13:09:36) Barcode(18874576))	- OtherWork9
		Destination	OutPackage
		.TimeStamp(08-JUN-2019 SAT 13:10:27) .Barcode(18874525)	

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,

					\Documents\Do-more\Designer2_6\Bin\PID.CSV with contents:
R17C4	Ŧ	\times	~	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	0.2495	PID1	Default User	
4												

- 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).
- 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).

Do-more Updates Rel 2.6.2, August 12, 2019

- 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).
- 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).

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- 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).

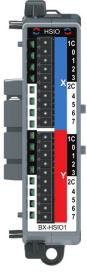
6. Adjusted Anomalies

- 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).
- I. 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).
- 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).

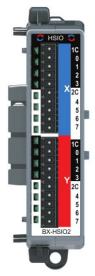
1. New BX-HSIO and BX-SERIO modules for the BRX I/O Platform

(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



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!

BX-HSIO2 Sourcing Y's

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:

Select PLC Connect	ion					×
Connect	Blink		10.0.1.3 Name	<u>D</u> elete	Link Ir	ıfo
PLC Connections (Links):	Click on a column	header to s	ort by that column; click header ag	ain to toggl	e ascending/descend	ling; shift+click for multi-column sort
Name 🛆	PLC Type	PC Port	PLC Address	Enabled	PLC Serial #	Other/Description
e <new plc=""></new>	BX-DM1E-10ED23-D	Ethernet	IP Address: 255.255.255.255	Disabled	00 E0 62 30 04 6B	PLC's IP Address is uninitialized
e My BX 36	BX-DM1E-x	Ethernet	IP Address: 10. 0. 1.35	Disabled	<unknown></unknown>	
e My BX-10 on E	BX-DM1E-x	Ethernet	IP Address: 10. 0. 1.49	Disabled	<unknown></unknown>	
e My BX-DM1E	BX-DM1E-x	Ethernet	IP Address: 10. 0. 1.51	Disabled	<unknown></unknown>	
MySim	DM-SIM	Ethernet	IP Address: 127. 0. 0. 1	Disabled	<unknown></unknown>	
Eind My PLC	Rescan for New PLC	s 🔽 S	how <u>N</u> ew PLCs		Help (F1)	Auto-sense connections at startup
Select Network	Adapters (1 of 1)	Lau	inch Net Edit (Advanced)		Cancel	Resize dialog to show more connections or widen columns

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

	Power flow enabled		Parameter 1	Pa	arameter 2
1	Ramp to Velocity, Wait until @Vel	٠	Target Vel (pps): D16	•	Scurve Jerk (pps ^s) 7500
2	Set Bit	٠	Bit: C1000	٠	
3	Wait for Discrete Input Limit	٠	X3 (On-Board Input 3)	٠	Rising Edge
4	Raw Velocity	٠	Velocity (pps): D17	٠	
5	Reset Bit	٠	Bit: C1000	٠	
6	Wait for Discrete Input Limit	٠	X2 (On-Board Input 2)	٠	Rising OR Falling Edge
7	Ramp to Velocity, Wait until @Vel	٠	Target Vel (pps): 0	٠	Trapezoid
8	Go to Idle Mode (immediate stop)	٠			
9					
	Add Insert	Edit	t <u>R</u> emove Move <u>Up</u> M	love <u>D</u>	

Example AXSCRIPT Command Editor

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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**.

PCMD				quest / Response with Se
P Client Device	@MyTCPClient	* -	HTTP Response	
50D 0			Response Status Code	D2
CP Connection			Response Full Status Line Text	SS0
Using existing TCP connect			Response Header	SS1
Establish TCP connection to	HITP Server		Response Body	
Vse SSL / TLS			C String Structure	SS2
by Name	"www.ncdc.noaa.gov"		• Numeric Data Buffer	Create Byte Buffer
C by IP Address	www.ncuc.noaa.gov		Deserves Dedu Otest Address	HTTPCMDBuff0
 by IP Address Variable 	100		Response Body Start Address	4096
	DO		Buffer Size in Bytes	
C Fixed	127 . 0	. 0 . 1	v	DBuff0 - HTTPCMDBuff40
TCP Port Number	44	3 •	Number of Bytes Received	D3
Additional User Request H		•		
Request Body String		·		
**		Ŷ	On Success: C Set bit (• JMP to Stac	le S1
C Numeric Data Buffer		reate Byte Buffer	On Success: O Set bit O JMP to Stag	
Request Body Start Add):UB0	Automatically create the SG box for	
	D		Below this rung	any meny stage number
Number of Bytes				
Number of Bytes	E	1	At end of code-block	

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.

Fi	eld Name	Туре	Source		Count
1	"TempDegF"	Numeric	 RX3 	٠	n/a
2	"RunCount" •	Numeric	 D42 	٠	n/a
3	"InAlarm" 🔹	Doblean (true, laise)	• C101	٠	n/a
4	"AlarmTimeStamp"	String/Object/Array	• SS3	•	n/a
5					2
	Add Insert Inser	t <u>S</u> tructure Fields <u>E</u> di	t <u>Remove</u> Move <u>Up</u>	Move [<u>2</u> own
ISON		t Structure Fields Edi	t <u>Remove</u> <u>Move Up</u>	Move [Down
ISON	Output Record	SL1		Move [Down
ISON ŠStri	I Output Record	SL1	• Byte Buffer	Move [<u>D</u> own

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

<u> X 2 ?</u>	0
JSONPARSE	Parse JSON Text
JSON Input	
String	SS0 °
C Numeric Data Block Containing Text	Create Byte Buffer
JSON Input Text Start Address	D0:UB0
Number of Bytes	D1
Lookup Value by	
Field Name String	"Name"
O o-based Array/Field Index	D2
Found Field Name @Index	SS1
Found Value	
Text Values that are Strings, Objects, Array	vs, Numbers, Booleans)
 String (Up to 1024 characters) 	Create Max Size String
	SL0 °
Max Length:	256 Characters
O Numeric Data Block containing text or text larger than 1024 characters	Create Byte Buffer
Found Value Text Start Address	D3:UB0
Buffer Size in Bytes	4096
Buffer Range:	
Number of Bytes Parsed	D1027
$\ensuremath{\mathbb{C}}$ Numeric Values that are Numbers or Bits	D1028
Return Results	D1029 •

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.

✓X¤?	0
PWMOUT	Pulth Width Modulated Output
PWM Device	@PWMOut2
PWM Structure	\$PWMOut2
Discrete Output	Y0
	Configure PWM Outputs
Frequency (Hz)	60 •
Duty Cycle (Percent)	R0 •

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	\$lsrOverload1	see Help Topic DMD0208
DST59	\$DNSAddress	System Nickname Locations

5. Enhancements

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

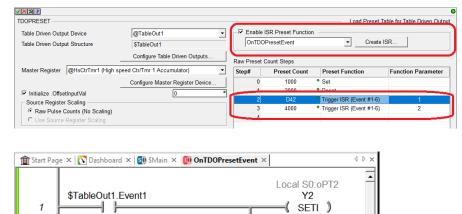
The previous version only supported unsecured MQTT, using QoS Level 0 (At Most Once), with Clean session type. BRX Do-more Technology Version 2.5 adds support for:

- 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.



Local S0:oPT3

Y3 (SETI)

Local S0:oPT3

Y3

(RSTI)

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.

\$TableOut1.Event2

4 6

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

2

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).

Launchpad Project Browser VO System System	# X	On Success, Set bit CU On Error, Set bit C1 C100 (RST)
Employee Sectors 282 (sector 00 Marter (1 base has assuming) Employee Sectors 282 (sector 00 Marter (1 base has assuming) Employee Sectors 282 (sector 00 Marter (1 base has assuming) Employee Sectors 282 (sectors 00 Marter (1 base has assuming) Employee Sectors 282 (sectors 00 Marter (1 base has assuming) Employee Sectors 282 (sectors 00 Marter (1 base has assuming) Employee Sectors 283 (sectors 00 Marter (1 base has assuming) Employee Sectors 283 (sectors 00 Marter (1 base has assuming) Employee Sectors 283 (sectors 00 Marter (1 base has assuming)	Master 0: BRX Local I/O Master Base 0: BRX Local I/O Sigit 2: BX4AFTM [X16- SyrVX:ra] Missing external 24VDC Specification for: • <u>BX-04THM</u>	Adjust (Bouble-click to open the VO System tool) Rix Adjust (Bouble-click to open the VO System tool) Rix System Status System Status System Status System Status Double-click to adjust to
For Help, press F1	Run Term Stop S	P D Devs OK Warning Online/Default User/MyBX-10 Program 00162/65536 BX-DM1E-10ED23-D

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

Cross Reference View							
	BNS	D I O	Ex Sort by Data-Block	Number/ID	•		
Element	Extended Info	Access Type	Code Block	Rung	ddress	Instruction	Parameter Info
C0 JogSimRS leading edge		Input	\$Main	#2	@18	IE STR	
C1 PauseSimRS		Input	\$Main	#2	@19	HE STR	
C2 LogDone on Success or on Error		Input	GenAlarmText	#7	@84	EE ANDN	
		Output	GenAlarmText	#7	@97	STREAMOUT	Parm 8 : On Success
		Output	GenAlarmText	#7	@97	STREAMOUT	Parm 9 : On Error
		Input	GenAlarmText	#8	@105	IE STR	
		Output	GenAlarmText	#8	@106	E 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	\$tTopOfScan	#3	@14	FILTER	Parm 3 : Out
		Output	\$tTopOfScan	#3	@19	MOVE	Parm 2 : Destination
		Input	\$Main	#1	@1	E 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.

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- **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 12 (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.

	0
MATH Calculate	Expression
Result [D[(V10 * 7) + V11] Result can be an Array with full MATH expression for Array Index	•
Expression	
3.141593 * (R[(V10 * 7) + V11] ** 2.0)	• ^
Use Ctrl+Enter to embed carriage-return (only during edit)	

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

✓X % ?		0
EMAIL		Send EMail
SMTP Devic	@MySMTPClient	
🔽 То ["JohnS@acme.com"	۰
Cc [119	
Bcc	10	
Subject	"Shift Report"	۰
	ically insert space after each term	
Message Pr		
Widget Tot	al:" D3 "\$N" 'idget Rate:" R7 "minutes"	• ^
Average vv	loget Rate. R7 minutes	
		\sim
	Use Ctrl+Enter to embed carriage-return (only during edit)	
- Attach	File	
File Syster	m @RamFS 💌	
File Name	"MyLog.txt"	
🗖 Delete P	File after EMail sent	
On Sussaan	s: Set bit G JMP to Stage C0 •	
	r: • Set bit C JMP to Stage C1 •	
	atically create the SG box for any NEW stage number	
C Below		
	of code-block	
- / 10 0110		

	C
STRPRINT	Print to String
Print to SS0 •	
C Append to String	
Automatically insert space after each term	
Print Script	
TimeStamp() Lookup(D42, "No Alarm", "Unacknowledged Alarm", "Acknowledged Alarm"	") ° ^
	\checkmark
Use Ctrl+Enter to embed carriage-return (only during edit)	
C Edge triggered	
Power flow enabled	

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

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- k. I/O System Tool provides detailed error information on BRX modules. See PLC->I/O System menu (6163).
- I. 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.
- 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 automagically 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.
- I. 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).
- II. 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-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		BX-DM1E MPUs				
BX-DMIO-M-D	12-24 VDC	Do-more! Ethernet Remote I/O	H2-DM1E CPUs T1H-DM1E CPUs				
BX-EBC100-M	120-240 VAC	Do-more Ethernet Remote I/O	BX-DM1E MPUs H2-DM1E CPUs				
BX-EBC100-M-D	12-24 VDC	Host Ethernet Remote I/O Modbus TCP	T1H-DM1E CPUs H2-ERM100s H4-ERM100s	8			
BX-MBIO-M	120–240 VAC	Modbus RTU	Modbus RTU Master				
BX-MBIO-M-D	12-24 VDC	Modbus TCP					

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

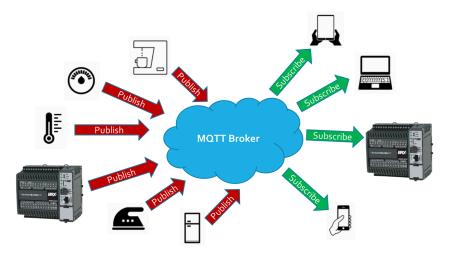
(requires DmT 2.3)

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

Publish IoT Topic data to an MQTT Broker via the MQTTPUB instruction

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

2 Yes "OVEN_GHl/currentTempDegF" SS43 No Alway 3	QTTP					
Enable Conce on Leading Edge Continuous on Power Flow at Interval Constant <u>00 h 00 m 01s 000 ms</u> Cvariable <u>D0</u> ms Cvariable <u>Cv</u> Edit <u>Insert</u> <u>Remove</u> <u>Move Up</u> <u>Move Down</u> Con Error: C Set bit C JMP to Stage Cc1 D99 Cr At end of code-block Cvariable <u>Cvariable</u> <u>Cvariable</u> Cvariable <u>Cvariable</u> Cvariable <u>Cvariable</u> Cvariable <u>Cvariable</u> Cvariable <u>Cvariable</u> Cvariable <u>D0</u>		PUB			loT Publ	ish MQTT To
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C Variable DD ms If Optional Topic Prefix This may be useful if some or all of your topics start with the same root text "ACME/MACHINE_ABC/" Payload Retain Publish 1 Yes "OVEN_XYZ/currentTempDegF" SS42 No Alway 2 Yes "OVEN_CHI/currentTempDegF" SS43 No Alway 3 OVEN_GHI/currentTempDegF" SS43 No Alway 3 ON Co Alway 3 ON Co Co Co Co Co Co On Error: © Set bit C JMP to Stage Co Co On Error: © Set bit C JMP to Stage Digg Digg ✓ Extended Error Information Digg Digg Digg — Automatically create the SG box for any NEW stage number Co Digg © Below this rung C Aut end of code-block Automatically create the SG box for any NEW stage number Co	۰c					
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On Error: © Set bit © JMP to Stage C1 ✓ Extended Error Information D99 □ Automatically create the SG box for any NEW stage number						
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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.).

OTTO	?		Int Outparity	MOTT Takin
AQTTS		F	loT Subscribe	матт торіс
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	Optional Topic	: Prefix	at taxt	
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		Edit Insert Remove Move Up	Move Down	
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On E				

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 whever you save MyProject.dmd to disk: MyProject_EXPORT_DMD.txt and MyProject_EXPORT_CMORE.txt (5978).
- 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

- Do-more Designer and its HAPTools now install to the standard Window'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.
- 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.

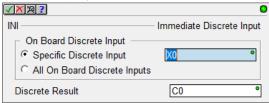
You can also verify your SMTP Client settings against the actual SMTP Server from your PC.

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

Edit SMTP Client Settings	X
Device Name:	
SMTP Server Address Use Server Name smb_gmail.com Use IP Address 255 , 255 , 255 DNS Lookup Security (only available on BRX platform)	Account Authentication C Disabled C AUTH LOGIN C AUTH FLAIN C POP before SMTP POP3 Port: 110 Account Information Username: Joe@gmail.com
Enable SSL/TLS TLS (usually port S87) SSL (usually port 465) Disable Certificate Validation	Password: Test settings and venfy server credentials
Other Settings Server Part: 587 Timeout: 30 seconds 'From' Email Address: Joe@gmail.com	
OK	Cancel

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 automagically 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.

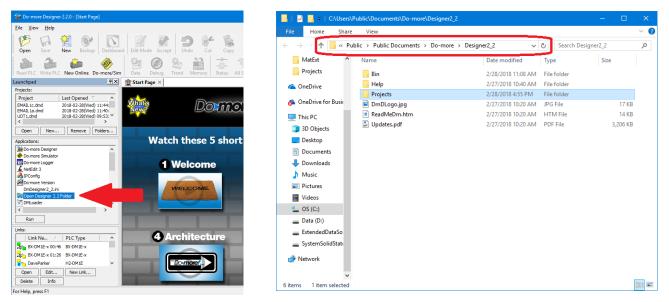
5. New System Status Elements:

DST52	\$ActiveSessions	S
DST58	\$ProgramChecksum	S

see Help Topic DMD0208 System Nickname Locations

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:



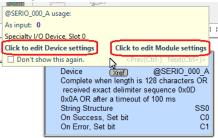
There is a similar link to **Open HAPTools Folder** further down the *Applications* list. If you have an older version of Windows, these will be located below the *All Users Documents* folder.

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



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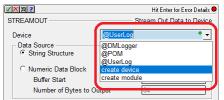
- c. View Options Dialog: **Smarter** about when to automatically check the **Apply to New Views** checkbox (5853).
- d. Ladder View: Added option to Always start in Edit Mode (5620).
- e. Ladder View: Show specific **Leg Label or Edge Trigger tooltip** when floating mouse cursor over an instruction's 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).
- 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.

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- 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:

Setup Node and	IP Address								×
Module ID:		IP Address:	10	•	0	•	1	•	30
Name:	BX-DM1x	Subnet Mask:	255	•	255	•	252	•	0
Description:	Mark's -36	Gateway:	10		0		0		1
		DNS:	10	•	0		0	÷	3
		l	Get P	C's	DNS	Se	rver	Ad	dress
	without an Ethernet port, the bles in status memory and car			figi	urati	on,	but	are	still
	ОК	Cancel							

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.

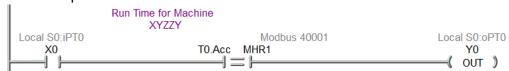
- t. Browse PLC File System Dialog: Now shows files' date-time-stamps using the PC locale's short **month text** (thanks to MK@PD).
- u. Output Window: **Automagically hides** after successful operations that utilize the Output Window, like after a successful Accept or a successful Program Check. It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

Change Va	alue		
SS0	•	• 🙊	
_ <u>V</u> alue Current: <empty< th=""><th>v-string></th><th></th><th></th></empty<>	v-string>		
New:	psum dolor sit arr	net	<u>*</u>
- Format-			
	C Decimal	C Exp.	ASCII
	C Hex	C <u>R</u> eal	C Quoted
	C Binary	C IP Address	C Hexadecimal
	C Octal	C Timer	\square
	C BCD		
	Esit	Help	

- 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).
- 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 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).

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)

Part Number	Туре	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	±5VDC or ±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	±5VDC or ±10VDC or 0-5VDC or 0-10VDC	8	16 bit

1. Added support for NEW BRX Analog Expansion Modules.

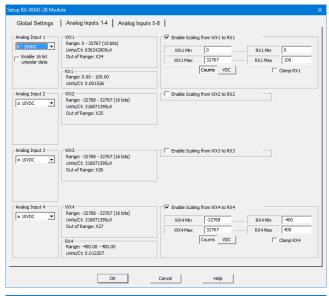
Auto-Scaling Analog

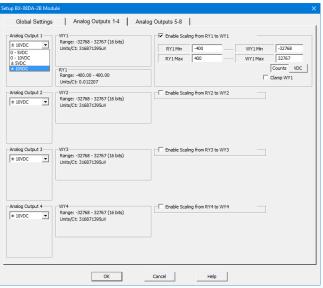
The BRX analog modules along with any onboard MPU's analog channels support autoscaling on a **per-channel** basis. Auto-scale also supports **clamping**, if desired.

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 automagically, 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 (±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, ±5VDC, or ±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.

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:

Edit User Data Type Definition					×
Structure Name: RecipeStruct	 Number of D	WORDs: 3	View Mem	nory Layout	
Ejeld List					
Field# 🔺 Field Name	Data Type	Layout	Read/Write	Display Format	Data View Detail
#1 .CornWeight	Real Real	dw 2	Read-Write	Native	Short and Long
#2 .WaterVolume	Unsig Unsigned Word	dw 1:W1	Read-Write	Native	Short and Long
#3 .CookTemp	Unsig Unsigned Word	dw 1:W0	Read-Write	Native	Short and Long
#4 .CookTime	Signed DWord	dw 0	Read-Write	Native	Short and Long
Add Insert Duplica	te Dele <u>t</u> e		<u>E</u> dit	Move Up Move	e Do <u>w</u> n <u>R</u> enumber
	ОК	C	ancel He	elp (F1)	Resize the dialog to widen the columns or show more rows

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.

Add Block	×
Block Settings	Usage Notes:
Name: Recipes	Names must be 1 to 16 characters, must be unique, and may contain only letters.
Data Type: RecipeStruct	Memory blocks are allocated on dword
String Length: 4 chars	boundaries. A dword equals 32 bits, 4 bytes, or 2 words.
Block Size: 100	Memory marked as retentive holds its state when powered down. Memory not marked as
Radix: Decimal	retentive is deared at power up.
Retentive Range	Rententive ranges must also be specified on dword boundaries.
O Nothing Retentive	
Entire Block Retentive	Block Range: Recipes0-99
C This Range Retentive	
From block ID	Retentive Range: Recipes0-99
To block ID 99	OK Cancel

	Add Heap Item	×
You can also create a new heap-item of a single <i>RecipeStruct</i> as the current recipe and call it CurrentRecipe.	Name: CurrentRecipe Data Type: RecipeStruct String Length: 4 chars Is Retentive Is OK Cancel	
Then you can move one of the <i>RecipeStructs</i> 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.	Start of Source Recip Start of Destination Currer Range C End of Source C Number of Source Elements C Number of Bytes C Number of Destination Elements 1	Memory Range es[V100] • htRecipe • kecipe • Recipe
Then in your Ladder Logic, use CurrentRecipe.CookTime as the Preset to your TMR instruction .	TMR Timer Struct T0 Preset Constant hrh min m sec s msms Variable CurrentRecipe.CookTime m	

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 automagically 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.

Create BRX PLC Image File This utility will create a .BIN binary image file from the contents of your BRX PLC. This image file can later be transferred to a micro-SD card and restored back to a BRX CPU without using can later be transfe Designer software. To restore this image to a BRX PLC via the micro-SD card, the file name must be "Image.bin" and be located in the root folder on the micro-SD card. Then install the micro-SD card in the BRX CPU, put the PLC's Mode switch in the STOP position, and power up the PLC. This will OVERWRITE the project in the PLC with the contents of the Image.bin file. The result of the restoration will be written to the PLC's System Log. Image File Contents The image .BIN file contains all the critical areas in your PLC, and can optionally contain other important areas: 🗹 Program, System Configuration, Documentation ✓ Retentive Memory (Memory Block and Heap-Item values) Only include Regions defined by the project's Memory Image Manager Select the source of the Memory Image Region Data C Read Region content from the PLC (requires multiple PLC scans) Read Reagion content from the DISK User Password Configuration ☐ IP Configuration (IP Address, Subnet Mask, Gateway Address) Restoration Security (must already exist in PLC BEFORE power-up in order to load Image.bin) Require this password to restore this image to the PLC $\hfill Require this Product ID to match DST387 ($ProductID) in PLC in order to restore this image to the PLC$ 0 \Rightarrow OK Cancel Help (F1)

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)

1	<mark>×</mark>]%	?				
С	OPY					Copy Data
	#	Source		Destination		Number of Elements
	1	V0	٠	DLV2000	۰	8 •
	2	SS0	٠	SL5	۰	1 *
	3	3.14	٠	R10	۰	1 •
	4					
	5					
	0	K Cancel	1	nsert <u>R</u> emove	N	Nove Up Move Down
	Ċ	it Leg Edge triggered				
		Power flow enabled				

• **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.

	G
BACKUP	Backup System
File System	@SDCardFS ▼
Base File Name "MyImage"	•
Example	MyImage_y2017m07d05.bin
 ✓ Append Date to Filename Additional Content ✓ Include Retentive Memory Values ✓ Include Passwords Configuration ✓ Include IP Configuration 	
Security Use this Password to Restore © Text © Variable Ensure Product ID (DST387) matches	SS0
On Success: Set bit SJMP to Stage On Error: Set bit JMP to Stage Automatically create the SG box for any N Below this rung At end of code-block	C0 • C1 • EW stage number

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.

✓X ≈ ?		O
DEBOUNCE -		Reduce Discrete Input Chatter
SET Delay		10 • ms
Input Leg Powerflow	ON OFF	_
Debounced Bit Output	ON OFF	_
● RESET De ● Use RES ● Do not R	ET Delay	10 • ms
Input Leg Powerflow	ON OFF CESET Delay Time	_
Debounced Bit Output	ON	Use RESET Delay
	OFF	Do not RESET
Debounced B	it	C0 •

• 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.

✓X [∞] ?	0
FLASHER	Cycle Output ON/OFF
On Time	500 • ms
Off Time	500 • ms
Output	C0 •

• **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.

	0
TIMEDOUT	Timed Output
Minimum On Time Output	1000 ms C0 •
T Maintain Output	
Input Leg Powerflow Minimum On Time Instruction Output	Maintain Output Maintain Output

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).

Download Project to PLC		
Portions of the project to be downloaded into	the PLC	
Frogram Sys Config Doc	V C R N Memory Image	
Eorce download of Program, System Configuration, and Documentation Database	Download Memory Image Data Check All Regions	
	Lincheck All Regions Memory Image	
- Prepend to Project Notes	Manager	
Testing the new DEBOUNCE instruction	Project Notes Editor	
Download Project to PLC		
C Download Project in <u>R</u> UN Mode (Runtime	Edit)	
Download Project in PROGRAM Mode		
Switch to RUN mode after download o	ompletes	
When in PROGRAM mode, do not both NEVER downloading any Memory Imag	ner showing this dialog next time (during this session), ge	
Ōĸ	Cancel Help (F 1)	

Project Notes	
08/08/17 11:13:41 (Default User): Testing the new DEBOUNCE instruction	

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.

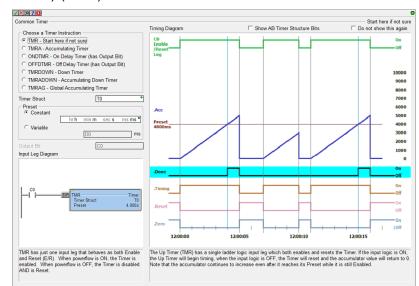
6. New System Words (DSTs)

S
C
/ Г
F
(

see Help Topic DMD0208 System Nickname Locations and DMD0425 Backup and Restore Using Micro-SD Card for details

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:

Launchpad		
Projects:		
Project	Last Modified 🗸	
PID 1.DMD PID_H2_R2.dmd PID_SimRemoteIO	2017-05-18(Thu) 18:29:10 2017-05-18(Thu) 10:42:47 2017-05-18(Thu) 10:34:21	
Open New	Remove Folders	
Applications:		
Do-more Designer		^
DmDesigner2_1.ini		
<		>
Run		
Links:		
Link Name 🛆	PLC Type	
- MySim	DM-SIM	
Open Edit	New Link	
Delete Info		

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).

	, C
JMP	Jump To Stage
Transition To	\$Main.S1 °
Automatically create the SG box for any	NEW stage number —
• Below this rung	
C At end of code-block	

- 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).

	Up Counter	Enable Scaling Fosition Converts counts to engineering units. Specify raw input
Input 0 (X0) 💽 🚽	Count Input	range in counts and output range in engineering units. Min Raw: Min Scaled:
	Initial Reset Value	Max Raw: 1 Max Scaled: 1
	Reset Condition	C Rate Converts counts to units per time period. Specify ratio of counts to units (e.g., counts/revolution) then specify time period for normalization (e.g. revolutions/minute).
	Capture Condition	Unit Definition Raw Counts / Unit: Unit: Unit: I Unit: Time Base: Units per second
	Enable Inhibit Input	Scale Offset: 0
	C Enable Rotary Mode	Calc Options Calc Interval: 100 - ms
	Enable Retentive Accumulator	Data Filter: 0 seconds (Enter 0 to disable)

 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:

	ion Entries Configuration	Memory Blocks		User Data Type				Configuration Entries	Memory Bloc		Use	Data Type		
	puration ocal 1/O Master	Memory Configuration: M		106,716 bytes	Max Size: 262,14	4 bytes Space Av	adable: 155,428 bytes	⊖ 1/0 Configuration ⊖ BRX Local 1/0 Master	Memory Configu		106,716	bytes	Max Size: 262, 144 bytes Space	Available: 155,428 bytes
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	pings						<u> </u>	-1/O Mappings		Data Type String Struct			Extended Info	L
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			Eit	0 - 2047	Dec	Built-In	-		SysDesc	String Struct	Yes	Built-In		
			Signed Word	0 - 255	Dec	Built-In	Edit Memory Block		IntSerialServer	Server Struct	Yes	Built-In	Internal serial server port : @IntSerial	Edit Heap Item
		9 C	Signed Word Bit	0 - 2047	Dec 0 - 2047	Built-In			IntSerial	Server Struct Stream Struct	Yes	Buit-In Buit-In		
		10 V	Unsigned Word	0 - 4095	Dec 0-4095	Built-In	Delete Memory Block		Local/OMaster	10Master Struct	Yes	Built-In	Do-more Local I/O Master : @LocalIOMaster	Delete Heap Item
		12 D	Signed DWord	0 - 4095	Dec 0 - 4095	Built-In			Parthum	String Struct	Yes	Built-In		
		13 R 14 T	Timer Struct	0 - 255	Dec 0 - 255	Built-In				FileSys Struct	Yes	System	General purpose RAM-based file system :	
		15 CT 16 SS	Counter Struct String Struct		Dec 0 - 255 Dec 0 - 127					FileSys Struct Server Struct	Yes	System	SD Card-based file system : @SDCardFS	
		17 54	String Struct	0-63	Dec 0-63	Built-In			#POMServer	Server Struct	Yes	System	Plug-able Option Module : @POM	
is boot of integendent		19 PL	Unsigned Word	0 - 255	Dec 0 - 255	Built-In	Biocks		\$Axis0	Axis Struct	Yes	System	Motion Centrol Axis : @Axis0	Items: 34
is boot of integendent		20 DUX 21 DUY		0 - 777	Oct	Built-In			SAxis1 SAxis2	Axis Struct Axis Struct	Yes		Motion Control Axis : @Axis2	
is boot of integendent		22 D.C		0 - 777	Oct 0 - 777	Built-In			SAxis3	Axes Struct	Yes		Motion Control Axis : @Axis3	
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I. **MATH Editor** now warns if the Expression is performing INTEGER arithmetic but the Result parameter is REAL (5860).

Help

OK Cancel

Integer Expression with Real Result
The Expression result is an INTEGER value but the Result parameter is a REAL element. For most expressions this is DK. But for some, like Integer Division that truncates, you may not get the desired result. Say D42 equals 5, then Integer Division "D42 / 2" will equal 2 not 2.5, so the REAL Result parameter will then be set to 2.0, NOT 2.5.
If you need to change INTEGER calculations to perform REAL calculations, introduce a REAL early in the expression. For example, to use REAL division, try "D42 / 2.0" or "TOREAL[D42] / 2"
🗖 Do not ask again
Accept Go back

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

	in to accept, carrocc	L to jump back and edit.
	Parameter	Description
7	P4 Master Register	High speed Ctr/Tmr 1 Acc is NOT configured

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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).

✓X № ?	Hit Enter for Error Details 🔍
MOVE	Move Value
Source	• xyzzy
Destination	D1 •

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.

AXPOSTRAP	
Axis Device	@Axis0 -
Axis Structure	\$Axis0
	Configure Axis
Move Type	
C Single move	
C Edge triggered	
Power flow enabled	
Multi-move	
Update Target Position	C0 •
Initial move begins when input logic Axis' AtPosition bit comes ON when Subsequent moves: 1. Write new value to Position Valu 2. Turn Update Target Position bit (Update Target Position bit will be cle toward new Position Value. This all Value w/o stopping current move.	n Position Value is reached. le parameter DN ared to indicate Movement

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).

	· · · · · ·	
Read From Remote Into Local	I	×
Read From Remote Memory B Guilt-In Element User (see remote system Block # of Memory Type Address	t D0 's Memory Configration Memory Blocks table) 32	
Number of Elements	10 🚽 Signed DWord	
Current: 40 bytes Others:	: Obytes New Size: 40 bytes Bytes Remaining: 96	0 bytes
	D9 (Signed DWord) D9 (Signed DWord)	
	OK Cancel	

- 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.
- I. Ladder View Relational Contact instruction properly displays different sized left-side and rightside 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).

- 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).
- II. 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.

- 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).
- III. 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). Page 66 of 96

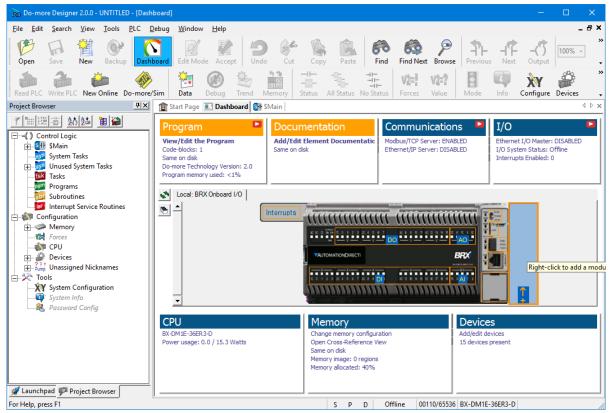
- sss. Added pop-up Help content for new 2.1 instructions (2.1.2).
- ttt. Download Project dialog's *Prepend Project Notes* field word-wraps (5877) (2.1.2).
- uuu. FILELOG correctly performs *Replace* operation (5878) (2.1.2).
- vvv. Reworded Output Window Warning message when Designer's Memory Configuration 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.

Do-more Updates Rel 2.0, February, 2017



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 "screwhead" 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 Page 68 of 96

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*.

🔊 Do-more Designer 2.0.0 - UNTITLED - [Start Page]			
<u>File Edit Search View Tools PLC Debug Windo</u>	w <u>H</u> elp		- 8 ×
Open Save New Backup Dashboard Edit M	ode Accept D Undo Cut Copy Pas	te Find Next Provide Previous	Image: Next Output Image: Next Image: Next <t< th=""></t<>
Read PLC Write PLC New Online Do-more/Sim Data		H⊢ H⊢ IS No Status Forces Value Mode	Info Configure Devices Check PID Overview
	e 🖅 Dashboard 🕵 SMain		d ⊳ x
「無語」が認識 What's ● ● ● ● ● ● ● ● ● ● ● ● ●	Doxmore/	Now Available on New BR	on the www
	Vatch these 5 short vide	eos for everything you	I need to get started!
Onfiguration Generation Generation	1 Welcome	2 Quick Start	3 Troubleshooting
System Configuration System Configuration System Configuration System Config	WELCOME TO 2.0		
	4 Architecture	S Helpful Hints	Video Search & Download Utility
Vaunchpad Project Browser		S P D Offline	00110/65536 BX-DM1E-36ER3-D

New Start Page Videos

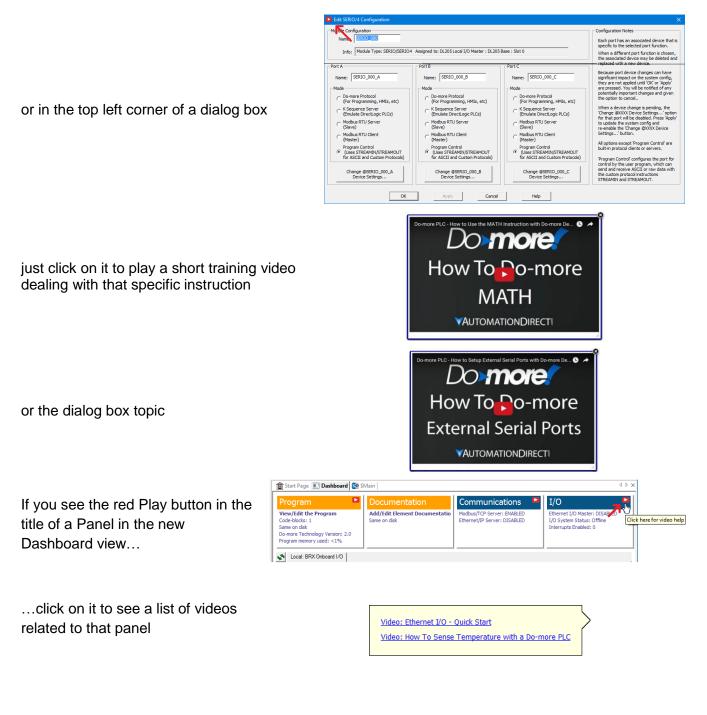
The Start Page has been changed to provide hot link buttons to play 5 new videos that will help you get up and running with Designer 2.0.

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

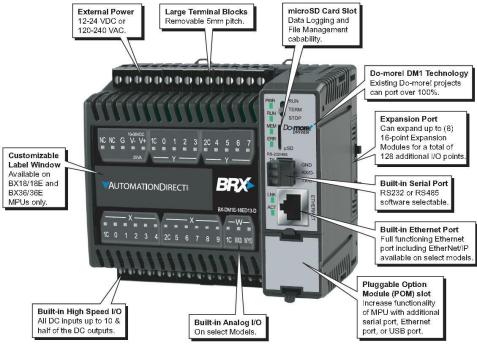
The 6th button lets you navigate, play and optionally download any/all the hundreds of short videos (details below).

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

✓X [∞] ?					0
MATH	- K				Calculate Expression
Result	D0				•
Express					
V0 + V1					• ^
					~
	ι	Jse Ctrl+Enter to e	embed carriage-	eturn (only during edit)



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:

Do-more BRX/Series BX-DM1Exx BX-DM1E-102R3.D Do-more Simulator BX-DM1 * BX-DM1E-10E13.D Do-more T1H Series BX-DM1 * BX-DM1E-10E13.D BX-DM1 * BX-DM1E-10E13.D BX-DM1E-10E13.D BX-DM1 * BX-DM1E-10E13.D BX-DM1E-10E13.D BX-DM1E-10E13.D BX-DM1E-10E13.D BX-DM1E-10E13.D BX-DM1E-30E13.D BX-DM1E-30E13.D BX-DM1E-30E13.D BX-DM1E-30E13.D	Do-more Hardware <u>C</u> lass:	<u>Type:</u>	Sub-Type:		
High Speed Discrete Output: 4 at 250 kHz Built-in Discrete Output: Sinking Built-in Analog In-Count/Out-Count/Type: 1/1/Current or Voltage	Do-more BRX Series Do-more H2 Series Do-more Simulator	BX-DM1E-x	BX-DMTE-104R3-D BX-DMTE-10ED13-D BX-DMTE-10ED13-D BX-DMTE-10ED23-D BX-DMTE-10ER3-D BX-DMTE-10ER3-D BX-DMTE-18ED13-D BX-DMTE-18ED13-D BX-DMTE-18ED13-D BX-DMTE-18ED23-D BX-DMTE-18EB23-D BX-DMTE-18ER3-D BX-DMTE-36ED13-D BX-DMTE-36ED13-D BX-DMTE-36ED13-D BX-DMTE-36ED23-D BX-DMTE-36ED23-D BX-DMTE-36ED3-D	Erhanced features are highlighted in green Stackable up to 8 modules Bult-n Ethernet Power Suppl: AC # Bult-n Discrete Inpl. Count/Type: 10/12-24 VDC/VAC High Speed Discrete Inpl. Stat 250 kHz Bult-n Discrete Outpl. Val 250 kHz Bult-n Discrete Outpl. Val 250 kHz Bult-n Discrete Outpl. Val 4 250 kHz	

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:











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

Analog Inputs Analog Outputs		
Analog Input 1 WX0 Range: 0 - 16383	Enable Scaling from WX0 to RX0	
C 0 - 5VDC Resolution: 14 bits	WX0 Min 0	RX0 Min 0
C ± 5VDC C ± 5VDC C ± 10VDC	WX0 Max 16383	RX0 Max 100
C 4 - 20mA C ± 20mA C ± 20mA Range: 0.00 - 100.00 Units/Ct: 0.001526	Counts VDC	Range Limit RX0
Analog Input 2	Finable Scaling from WX1 to RX1	
C 0 - 5VDC Resolution: 16 bits	WX1 Min -32768	RX1 Min 0
C ± 5VDC • ± 5VDC • ± 10VDC	WX1 Max 32767	RX1 Max 100
C ± 20mA C ± 20	Counts VDC	🗌 Range Limit RX1
Analog Input 3 WX2	Finable Scaling from WX2 to RX2	
C 0 - 5VDC Range: 6553 - 32768 Resolution: ~15 bits	VX2 Min 6553	RX2 Min 0
C 0 - 5VDC Range: 6553 - 32768 C 0 - 10VDC Resolution: ~15 bits Units/Ct: 610uA C ± 5VDC Breiter Transmitter Y23		RX2 Min 0 RX2 Max 100
C 0 - 5VDC Range: 6553 - 32768 C 0 - 5VDC Resolution: ~15 bits C 0 - 10VDC Units/Ct: 610uA	WX2 Min 6553	RX2 Max 100
C 0 - SVCC Range: 6533 - 32768 Resolution · 15 bits execution · 15 bits units(C: 510.4 Forker Transmitter: X22 Forker Transmitter: X22 Range: 0.00 - 100.00 units(C:: 0.00.2526 Analog Input 4 W33	WX2 Min 6553 WX2 Max 32767	RX2 Max 100
0 - SVDC Range: 6533 - 32768 Resolution: 1-5b tis Resolution: 1-5b tis Lints/Ct: 510uA Broken Transmitter: X22 C ± 500C C ± 20mA Analog Input 4 WX3 C ± 500C Resolution: 1-6133 Resolution: 1-6133 C ± 500C	WX2 Min 6553 WX2 Max 32267 Counts VDC	RX2 Max 100
C 0-50Cc Range: 653 - 32768 Resolution: -151bits Linits(Ct: 510.4 Direct Strice Transmitter: X22 Range: 000 - 100.00 Linits(Ct: 0.01526 Analog Input 4 WX3 Range: 0.00-1630.00 Linits(Ct: 0.01526 Units(Ct: 0.01526 Linits(Ct: 0.0504/	WX2 Min 6553 WX2 Max 32767 Counts VDC	RX2 Max 100
C 0 - SVCC Range: 6533 - 32768 Resolution: +15 bits Resolution: +15 bits C ± SVDC Fixed Transmitter: X22 F ± SVDC Fixed Transmitter: X22 Fixed Transmitter: X22 F ± 20mA Fixed Transmitter: X22 Fixed Transmitter: X22 Analog Input 4 Fixed Transmitter: X22 Fixed Transmitter: X22 Analog Input 4 Fixed Transmitter: X22 Fixed Transmitter: X22 C ± 20mA Fixed Transmitter: X22 Fixed Transmitter: X22 Analog Input 4 Fixed Transmitter: X2 Fixed Transmitter: X2 Fixed Transmitter: X2 C 0 - 500C Range: 0 - 15333 Fixed Transmitter: X2 Fixed Transmitter: X2	WX2 Min 6553 WX2 Max 32267 Counts VOC	RX2 Max 100 RX2 Max 100 Range Limit RX2

	WY0 Range: 0 - 16383	F Enable Scaling from RY0 to WY0
• 0 - 5VDC	Range: 0 - 16383 Resolution: 14 bits	RY0 Min 0 WY0 Min 0
C 0 - 10VDC C ± 5VDC	Units/Ct: 305uV	RY0 Max 100 WY0 Max 16383
C ± 10VDC	RYO	Counts VDC
C 4 - 20mA	Range: 0.00 - 100.00	Range Limit WY
C ± 20mA	Units/Ct: 0.001526	1 Range Linit Wi
Analog Output 2	WY1	Finable Scaling from RY1 to WY1
O - 5VDC	Range: 6553 - 32768 Resolution: ~15 bits	RY1Min 0 WY1Min 6553
C 0 - 10VDC C ± 5VDC	Units/Ct: 610uA	RY1 Max 100 WY1 Max 32767
C ± 10VDC	RY1	Counts VDC
4 - 20mA ± 20mA	RY1 Range: 0.00 - 100.00	Range Limit WY
() ± 20mA	Units/Ct: 0.001526	1 Kange Linie Wi

BRX Interrupt Support

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

Setup Input Event X		
An input event consists of 0 to n prequalifying levels and 1 to n edge triggers. Once all of the level preconditions are true, any one of the edges will run the associated interrupt service routine. The INTCONFIG instruction can also be used to configure events from PLC code. For Enable Event Input 0: OR Rising Edge Input 10: Don't care I		
Input 1: Don't care Input 11: Don't care Input 11: Don't care		
Input 2: AND High Level Input 12: Don't care		Setup Match Register X
Input 3: Don't care 💌 Input 13: Don't care 💌	Setup Timer X	BRX can use a hardware-based register comparison to invoke an interrupt service
Input 4: Don't care Input 14: Don't care		routine. The INTCONFIG instruction can also be used to configure match registers from PLC
Input 5: Don't care Input 15: Don't care	BRX can use a hardware timer to invoke an interrupt service routine. The timer can be configured to fire recurrently, or as a single event.	code.
Input 6: Don't care Input 16: Don't care	The INTCONFIG instruction can also be used to configure timers from PLC code.	Set the match condition, then select the interrupt service routine to run when the condition fires.
Input 7: Don't care Input 17: Don't care	Set the timer behavior and duration, then select the interrupt service routine to run when the timer fires.	☐ Frable Match Register
Input 8: Don't care Input 18: Don't care Input 18: Don't	□ Finable Timer	Run interrupt service routine FireOutput Create ISR
Input 9: Don't care Input 19: Don't care	Timer Mode: Recurrent	when High speed Ctr/Tmr 1 Accumulator
	Timer Duration: 1250 us	is Greater Than (>)
Interrupt Service Routine: FireOutput Create ISR Create ISR	Interrupt Service Routine: FireOutput	this value: 42
OK Cancel	OK Cancel	OK Cancel

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 codeblocks. 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	×
Input Event Image: Configure Interrupt Timer BRX can use a hardware timer to invoke an interrupt service routine. The timer can be configured to fire recurrently, or as a single event.	ISR Code-Block FireOtherOutput FireOutput
Set the timer behavior and duration, then select the interrupt channel and the interrupt service routine to run when the timer fires. Timer# 1 • Load from System Config Behavior C Turn On Recurrent at interval µSec	
 Turn On Once in 0100 μSec Turn Off 	
	Create Code-Block
OK Cancel	<u>H</u> elp

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.

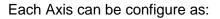
High Speed I/O

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).



- 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.

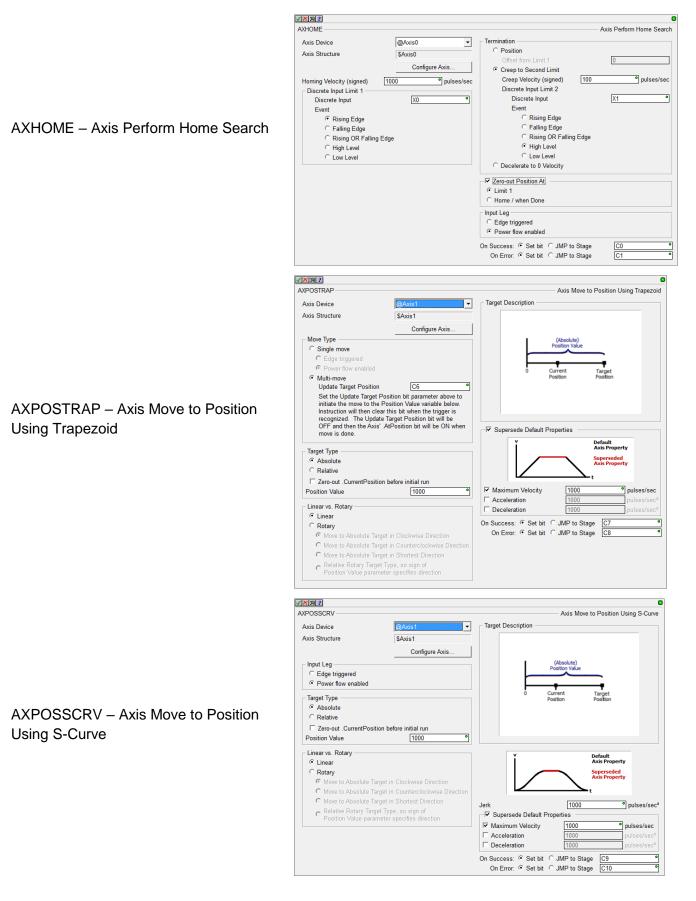
At runtime, the detailed configuration of an AXIS must be configured using the AXCONFIG – Configure Axis instruction.

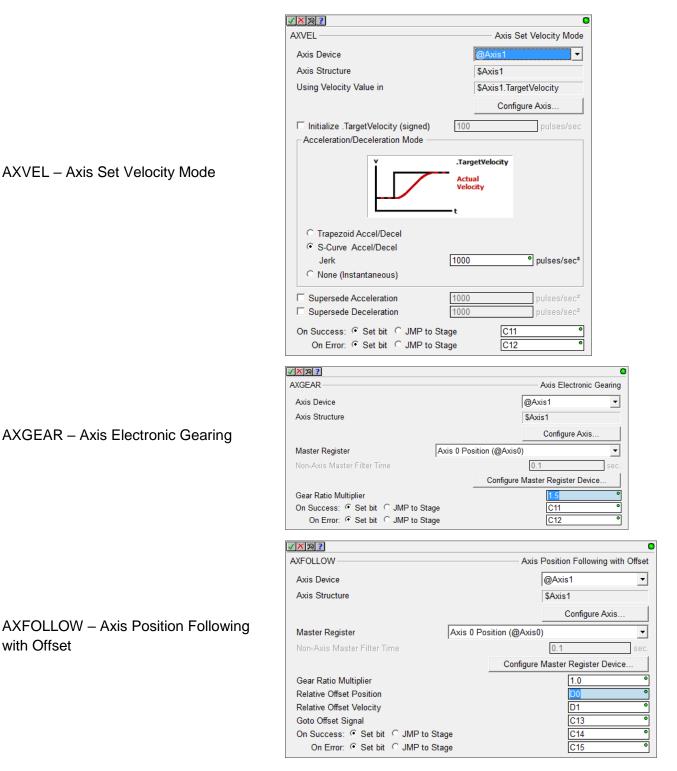
AXJOG – Axis Jog Mode

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

- 1. Enable/Reset
- 2. Forward
- 3. Reverse

xis/Pulse Output Configuration		×	
Axis Device Name: @Axis1			
Axis Heap Item: \$Axis1			
Select Axis type and assign physical I/O. AXCONFIG instruction. Axis profiles and b AXnnn instructions.		are configured at runtime through the e executed at runtime through the remaining	
C Virtual			
Axis can execute profiles for master/sla Outputs or Match Register interrupts, b		is with other axes, or can trigger Table Driven drive physical I/O.	
Pulse Output			
Axis drives a physical pulse output. Sele	ect pulse out	put mode and assign to physical outputs.	
-Pulse Output Mode		Function Output 1 (Step)	
Step/Direction		Output 0 (Y0) - *Selected* Output 1 (Y1) - +++++	
Pulses on "Step" output to move, set "Direction" on and off to select direct		Output 2 (Y2) Output 3 (Y3) Output 4 (Y4)	
C cw/ccw		Output 5 (Y5) Output 6 (Y6) Output 7 (Y7)	
Pulses on "CW" output to move in po direction, pulses on "CCW" to move i negative direction.		Function Output 2 (Direction)	
negauve un ecdon.		Output 0 (Y0) - +++++ Output 1 (Y1) - *Selected*	
C Quadrature		Output 2 (Y2) Output 3 (Y3)	
Asserts "A" and "B" outputs in 4X qua sequence. "A" leads "B" for positive r		Output 4 (Y4) Output 5 (Y5)	
"B" leads "A" for negative move.		Output 6 (Y6) Output 7 (Y7)	
ОК		Cancel	
Axis Device @Axis1 Axis Structure \$Axis1 Configur	• Axis	Image: First Construction Fault-Limit Limit Input X0 Stop/fault when Limit is C Off	
Linear vs. Rotary		© On	
C Rotary		Enable negative/counter-clockwise motion Fault-Lir Limit Input X1	mit
Rotary Range Length 360 Rotary Range:]	Stop/fault when Limit is	
Initial Output Position 0 Minimum Velocity 100	• pulses/sec	• On	
Maximum Velocity 1000	• pulses/sec	Monitor Axis structure's .Fault read-only bit member Execute AXRSTFAULT or AXCONFIG instruction to cle	ear the F
Acceleration 1000 Deceleration 1000	Pulses/sec pulses/sec	2 On Success: © Set bit O JMP to Stage CO	
Fault Deceleration 0 Fault Deceleration value of 0 means "Stop immed	• pulses/sec diately"	2 On Error: C Set bit C JMP to Stage C1	
Encoder Feedback High Speed Input Function 1 High Speed Input Function 2			
C High Speed Input Function 3 Disabled Conf	igure High		
Spe	ed Input		
Position Based on			
C Pulse Output			
Pulse Output/Encoder Scele Faster 11.0	•		
Pulse Output/Encoder Scale Factor 1.0 Encoder Deadband (counts) 1			
		0	
Encoder Deadband (counts)		Axis Jog Mode	
Encoder Deadband (counts)	@Axis1		
Encoder Deadband (counts)	@Axis1 \$Axis1		
Encoder Deadband (counts)	\$Axis1		
Encoder Deadband (counts)	\$Axis1	•	





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.



AXRSTFAULT - Reset Axis Limit Fault

VX 2				•
AXCAM			Curve Fitting Point	Axis Electronic Camming
Slave Axis Device Slave Axis Structure	SAxis1	Pt# Raw Master Value	Cove Fitting Point	Slave Value
	Configure Axis	1 2	0 83	0
Master Register Axis 0 Position (@Axis		3	167	87
Non-Axis Master Filter Time	0.1 sec.	4	250	100
Configure	Master Register Device	5	333 417	87 50
Clinear vs. Rotary		Insert Append	d <u>Remove</u> Move <u>Up</u>	Move Down Imgort
	0 • 1000 11 D0 CAM Curve Fitting Editor	-0.3000 -0.3000		
Fixed Curve Fitting Points Length from Starting Master Position Number of Curve Fitting Points Enable Relative Mode	Apply to table	+0.0000 -0.3500		
On Success: Set bit JMP to Stage On Error: Set bit JMP to Stage	C16 • C17 •	-110	\sim	\sim
OK Cancel		-0.70000 0	250 500	750 1,000
			0	
AXSETPROP		Set Avis	Properties	
	-		Topentes	
Axis Device	1	@Axis1	•	
Axis Structure		\$Axis1		
		Configure Axi		
Position		0	•	
Minimum Velocity	100	• p	ulses/sec	
Maximum Velocity	1000	• p	ulses/sec	
Acceleration	1000	• p	ulses/sec ²	
Deceleration	1000	• 0	ulses/sec ²	
Fault Deceleration	0		ulses/sec ²	
Fault Deceleration value	-		1000/000	
Pulse Output/Encoder		1.0	•	
Encoder Deadband (co		1		
		-	•	
On Success: Set bit		C18		
On Error: 🖲 Set bit	 JMP to Stage 	C19		
			0	
AXRSTFAULT		Reset Axis Lim	it Fault	
Axis Device	@A	xis1	•	
Axis Structure	\$Ax	tis1		
		Configure Axis		
On Success: . Set bit	C JMP to Stage	C20	•	
On Error: Set bit	-		•	

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)

PWM Output Configuration X
Device Name: PWMOut1
Heap Item: \$PWMOut1
Use heap item's .Enable, .PeriodScale, .Period, and .DutyCycle fields to control the PWM from user program.
Function Output Select output to be driven by the PWM. An output can only be assigned to a single high speed output function.
Output 0 (Y0) - *Selected* Output 1 (Y1) Output 2 (Y2) Output 3 (Y3) Output 4 (Y4) Output 5 (Y5) Output 6 (Y6) Output 7 (Y7)
OK Cancel

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.

Table Driven Output Configuration
Table Driven Output Configuration X Image: Enable Table Driven Output Device Name: TableOut1 Device Name: TableOut1 Heap Item: \$TableOut1 Table Driven Outputs trigger high speed outputs in response to high speed Counters, Timers, and Pulse Outputs. Use PLC instructions TDOPRESET, TDOPLS, and TDODECONFIG to setup and manage tables. Function Output Select output to be driven by the table. An output can only be assigned to a single high speed output 1 (Y1) Output 0 (Y0) - *Selected* Output 1 (Y1) Output 4 (Y4) Output 5 (Y5) Output 6 (Y6) Output 7 (Y7)
Select output to be driven by the table. An output can only be assigned to a single high speed output function. Output 0 (Y0) - *Selected* Output 1 (Y1) Output 2 (Y2) Output 3 (Y3) Output 4 (Y4) Output 5 (Y5) Output 6 (Y6)
OK Cancel

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.

<u> </u>					0
TDOPRESET				Load Preset Ta	ble for Table Driven Output
Table Driven Output Device	@TableOut1	Raw Prese	t Count Steps		
Table Driven Output Structure	\$TableOut1	Step#	Preset Count	Preset Function	Function Parameter
	Configure Table Driven Outputs	0	1000	• Set	
	configure fusic birten outputs	1	2000	 Reset 	
Master Register High speed	Ctr/Tmr 1 Accumulator	2	3000	 Toggle 	
	Configure Master Register Device	3	4000	 Pulse ON (µSec) 	987
Laitializa Offectional/al	lo	4	5000	 Pulse OFF (µSec) 	654
□ Initialize .OffsetInputVal	0	5			
Source Register Scaling Raw Pulse Counts (No Second Seco		6			
C Use Source Register Sca					
Load Raw Preset Table from					
Table Start Address	D0	J L			
Number of Preset Steps	10	J	Insert	Remove Import	
Table Data Block Range:		1			
_	PLC TDO Preset Table Editor]			
On Success: Set bit O Ji	MP to Stage C0 •				
On Error: 🔍 Set bit 🗠 JM	VIP to Stage C1 •	1			
	OK	Cancel	1		
		Cancer	1		

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

✓X≈?									
TDOPLS					Lo	ad Programmable L	imit Switch 1	Table for Table Driver	n Output
Table Driven Outp	ut Device		@TableOut1	•	_ Defaul	t Output State			
Table Driven Outp	ut Structure		STableOut1		• OF				
		Configuro	Table Driven	Outouto	0 0	4			
		Conligure	Table Driven	Outputs	Raw PL	S Count Steps Outp	out ON when	1	
Master Register	High speed	Ctr/Tmr 1 Ac	cumulator	-		ON when			
		Configure I	Master Regis	ter Device	Step#	Greater Than or	Equal to	and Less Than	i
Initialize .Input	ValOffset		0) 100	۰	200	۰
- Source Registe	r Scaling —				1	300	٠	500	•
Raw Pulse (Counts (No S	Scaling)			2	2 600	۰	900	•
C Use Source	Register Sc:	aling			3	3			
Load Raw PLS	S Table from (Data Block			4	1			
Table Start Add	lress		D0]				
Number of PLS	Steps		10		j				
Table Data Blo	ck Range:								
		PLC TD	O PLS Table	Editor					
On Success: @	Set bit O J	MP to Stage	C2	•	1	Insert	Remove	Import	
On Error: @	Set bit O J	MP to Stage	C3	•	j				
		_				_			
			-	ŀ		J			
0		250		50	0	7!	50	1,0	00
Click on the graph	hic to jump to	o that point in t	the table	OK	Cancel				
✓X № ?						0			
TDODECFG -			- Deco	nfigure Table	e Driven	Output			
Table Driven	Output E	Device	0	TableOut1		•			
Table Driven	Output S	Structure	\$	FableOut1					
		Co	onfigure Ta	able Driven (Dutputs.				
On Success		hit. C. IN		ge C4					
On Erro	r: 🤨 Set	bit O JN	IP to Stag	ge C5					

Setup Discrete Input Response	Times			×
		of filter time is 13.33ns (the 75Mh and enter the desired filter value		dock), but you can specify the filter
A filter value of 0 results in the valid filter value is 8388607 do		ch is appropriate for the maximum	design inp	out rate of 250Khz. The maximum
Certain input types (like AC) ma	ay have specific maximums over	rridden by the hardware.		
Choose Preferred Filter Scale				
Frequency C Time in	Nanoseconds C Raw Clock	s		
Input 0: 0 Hert	tz (default)	Input 10: 0	Hertz	(default)
Input 1: 0 Hert	tz (default)	Input 11: 0	Hertz	(default)
Input 2: 0 Hert	tz (default)	Input 12: 0	Hertz	(default)
Input 3: 0 Hert	tz (default)	Input 13: 0	Hertz	(default)
Input 4: 0 Hert	tz (default)	Input 14: 0	Hertz	(default)
Input 5: 0 Hert	tz (default)	Input 15: 0	Hertz	(default)
Input 6: 0 Hert	tz (default)	Input 16: 0	Hertz	(default)
Input 7: 0 Hert	tz (default)	Input 17: 0	Hertz	(default)
Input 8: 0 Hert	tz (default)	Input 18: 0	Hertz	(default)
Input 9: 0 Hert	tz (default)	Input 19: 0	Hertz	(default)
	ОК	Cancel Help	1	

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

		y Offline nject	New Online Project	P	Browse	
or select a recent Dis	<pre>c Project</pre>				er to sort by that colu ending. Shift+click for	ımn. Click header agai multi-column sorting.
Project	Folder	Last Opened 🗸	Link	Link Info	Description	PLC
Axis1.dmd	<proj></proj>	2016-12-07(Wed) 14:45:53				BX-DM1E-x
PID1.DMD	<proj>\Examples\Do.</proj>	2016-12-02(Fri) 14:38:28	MySim	Ethernet		DM-SIM
AXPOSSCRV2.dmd	<proj></proj>	2016-12-02(Fri) 11:51:28	MyBRX on USB	USB; enabled		BX-DM1E-x
Math1.dmd	<proj></proj>	2016-12-01(Thu) 12:11:29	MyBRX on USB	USB; enabled		BX-DM1E-x
maf1.dmd	<proj></proj>	2016-12-01(Thu) 11:46:01				BX-DM1-x
Math2.dmd	<proj></proj>	2016-12-01(Thu) 10:38:17	MyBRX on USB	USB; enabled		BX-DM1E-x
AXPOSSCRV1.dmd	<proj></proj>	2016-11-30(Wed) 16:55:15	MyBRX on USB	USB; enabled		BX-DM1E-x
TDOPLS1.dmd	<proj></proj>	2016-11-17(Thu) 10:43:45	MyBRX on USB	USB; enabled		BX-DM1E-x
Count1.dmd	<proj></proj>	2016-11-16(Wed) 11:54:43	MyBRX on USB	USB; enabled		BX-DM1E-x
Automatically si when Designer		dmd dmf, Open Selected	c	lose		Resize the dialog b

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.

X 泡 ?				0
FILELOG			Log	to File
File System			@RamFS	-
Base .csv File I	Name MyFILELOC	9" <mark>-</mark>		•
Example		N	lyFILELOG_y2016m12d	07.csv
Input Leg C Edge triggered (Log on Event) Power flow enable Log Interval Once Every Second Once Every Minute Once Every Hour Once Every Day Once Every Month		Append T to the Ho to the Da to the Da to the Mo to the Ye Generated luded in each lo	y onth ar File Name SS0	
Entry# Elem	ient	Coun	t	
1	V100	•	2	•
2	R100	•	1	•
3	CT0.Acc	•	1	•
	Insert Remove Set bit JMP to S Set bit JMP to S OK	-	Move Down C0 C1	•

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

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.).

		0
	FILEOPEN	Open File
	File System	RamFS 🔹
	File Name "MyLog.txt"	•
	Mode	
FILEOPEN – Open File	• Read	
	O Write (Create/Append if exists)	
	O Write (Create/Overwrite if exists)	
	File Handle Struct	FILE_0
	To create a new <file_handle> heap-item, just en</file_handle>	
	create it when you enter the FILEOPEN ins	
	On Success: Set bit JMP to Stage	<u>C0</u>
	On Error: Set bit JMP to Stage 	C1 •
		0
	FILEREAD	Read from File
	File Handle Struct	FILE 0
	To create a new <file_handle> heap-item, just ent</file_handle>	ter the new name to
	create it when you enter the FILEREAD in	
	Complete when	
	✓ Length is 128 • bytes OR	
	Delimiter(s) received OR	
	2 V 0x0D • Exact sequence	
FILEREAD – Read from File	0x0A • C Any one delimiter(s)	
	0x00	g
	Data Destination	
	String Structure	SS0 •
	O Numeric Data Block	Create Byte Buffer
	Start Address	D0
	Buffer Size in Bytes	64
	Number of Bytes Read	D1
	On Sussess & Set hit C. IMD to Store	
	On Success: Set bit C JMP to Stage	C0 *
	On Error: C Set bit C JMP to Stage	C1 •
		0
	FILEWRITE	Write to File
	File Handle Struct	FILE_0 °
	To create a new <file_handle> heap-item, just en</file_handle>	
	create it when you enter the FILEWRITE in	struction.
FILEWRITE – Write to File	String Structure	SS0 °
	C Numeric Data Block	Create Byte Buffer
	Buffer Start	D0
	Number of Bytes to Output	64
	On Surgery & Catable C. IMD to Street	0.0
	On Success: Set bit C JMP to Stage	C0 •
	On Error: C Set bit C JMP to Stage	C1 •
		0
FILECLOSE – Close File		Close File
	File Handle Struct FILE_0	•
	On Success: Set bit C JMP to Stage C2	•
	On Error: Set bit JMP to Stage C3	•

FILEDEL – Delete File

FILECOPY - Copy File

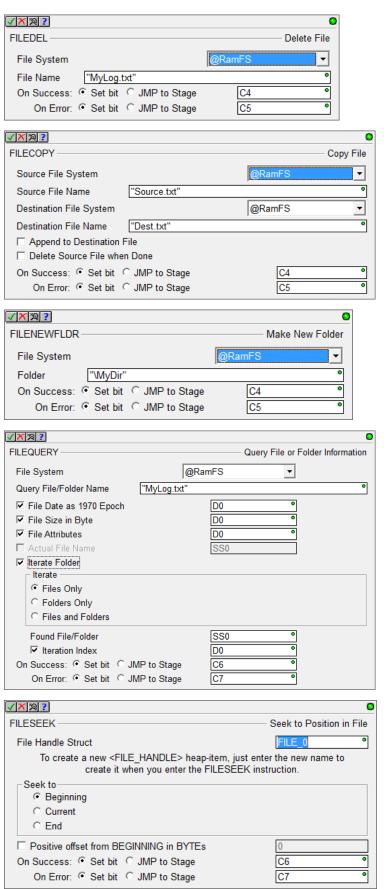
```
FILENEWFLDR – Make New Folder
(note that there is no Remove Folder
instruction)
```

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.

FILESEEK - Seek to Position in File

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



FILETRUNC – Truncate File

FILESYSCMD – Perform File System Command

- Format (RAM Drive Only)
- Dismount
- Mount

✓X∞?	0
FILETRUNC	Truncate File
File Handle Struct	FILE_0
To create a new <file_handle> heap create it when you enter the F</file_handle>	
On Success: Set bit JMP to Stage 	C6 •
On Error: Set bit JMP to Stage 	C7 •
	-
FILESYSCMD Perform	File System Command
File System @Ra	mFS
Command	Format 💌
On Success:	Format 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)

Browse PLC File Systems [@SDCardFS:\MyFILE	LOG_y2016m09d15_h16.csv]				
Do-more File System: @SDCardFS - SD Card File System Browse to Root	Ellor Click on a	Total Dis Free S	talled and mounte sk Space: 77619 Space: 7707276 I Space: 54644 by that column. a. Shift+click for	20 KB KB KB	ain to
Name /	Date	Туре	Size	Attributes	
a a	2016-08-16 (Tue) 22:23:00	Folder		D	-
b	2016-08-16 (Tue) 22:23:02	Folder		D	
	2016-08-16 (Tue) 22:23:10	Folder		D	_
New Folder	2016-08-16 (Tue) 19:54:44	Folder		D	
MyFILELOG y2016m09d15 h16.csv	2016-09-15 (Thu) 17:59:58	.CSV	85,914	A	
MyFILELOG_y2016m09d15_h17.csv	2016-09-15 (Thu) 18:59:58	.CSV	356,574	A	
MyFILELOG_y2016m09d15_h18.csv	2016-09-15 (Thu) 19:59:58	.csv	356,574	A	
MyFILELOG_y2016m09d15_h19.csv	2016-09-15 (Thu) 20:59:58	.CSV	351,956	A	
MyFILELOG_y2016m09d15_h20.csv	2016-09-15 (Thu) 21:59:58	.CSV	355,706	A	
MyFILELOG_y2016m09d15_h21.csv	2016-09-15 (Thu) 22:59:58	.CSV	356,574	A	
MyFILELOG_y2016m09d15_h22.csv	2016-09-15 (Thu) 23:59:58	.CSV	356,885	Α	
MyFILELOG_y2016m09d15_h23.csv	2016-09-16 (Fri) 00:59:58	.CSV	356,669	A	
MyFILELOG_y2016m09d16_h00.csv	2016-09-16 (Fri) 01:59:58	.CSV	352,976	A	
MyFILELOG_y2016m09d16_h01.csv	2016-09-16 (Fri) 02:59:58	.CSV	352,974	A	
MuEll ELOG v2016m00d16 b02 cov	2016 00 16 (E+0) 02-50-50		252.074	n	~
Current Folder: @SDCardFS:\ Number of Files: 88	Number of Folders:	4			_
	py Selected File Do-more PLC to PC	Delete Selected Files in Do-more PLC		te New Folder Do-more PLC	
	Close			alog box to see or widen the co	

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.

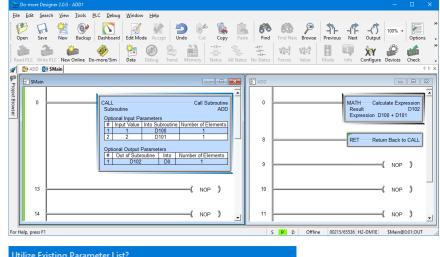
Password Configuratio	n	×
Users		
User Name	Privileges	Add
Default User	RD WD RP WP SS PM PW FW FS	Edit
		Delete
Accept	Read PLC	Cancel
Configuration Notes: Click 'Add' to add up to	16 users.	
The minimum privileges	for a Do-more Designer session are RD a	nd RP.
	only user, it must have all privileges and c ust be Administrator, and must minimally h imally RD RP PW).	
Passwords are case se	nsitive.	
Privilege Key:		
RD - Read Data	SS - System Settings	FS - Access File System
WD - Write Data	PM - Change PLC Mode	
RP - Read Project WP - Write Project	PW - Change Password FW - Update Firmware	
we - write Project	r w - opuate Firmware	

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



o the existing romineter eistr				
Utilize an existing CALL subroutine Input/Output parameter list?				
Don't ask again during this session				
Yes	No			

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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 reused, 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)

							~	
	xisting CALL I						×	
If you wi	f you wish to re-use an existing CALL Subroutine parameter list, you can select one below.							
	nes typically ut ne" Output par		set of "Into S	ubroutine" Inpu	ıt par	ameters and	"Out of	
and Inpu		meter tables.	You will only r	s new CALL to t need to provide				
	(2 Input param						^	
SUBI	RACT (2 Input	parameters,	1 Output para	meters)				
							~	
		0	<	Cancel				
√ ⊠⊠	2							
CALL -	-						Call Su	broutine
Subro	outine					ADD		•
To	create a new	v <subro< td=""><td>UTINE> hea</td><td>p-item and c</td><td>ode-</td><td></td><td>enter th</td><td>e new</td></subro<>	UTINE> hea	p-item and c	ode-		enter th	e new
				ou enter the C	CALL	_ instruction	۱.	
		ut Paramet	1	broutine		Number o	fElom	onte
#	Input Valu		1	broutine	0	Number o		ents
#	Input Valu		Into Su	D100	•	Number o	of Eleme 1 1	
	Input Valu		Into Sul			Number o	1	•
# 1 2	Input Valu		Into Sul	D100		Number o	1	•
# 1 2	Input Valu		Into Sul	D100	•	Number of	1	•
# 2 3	Input Valu	Insert	Into Sul	D100 D101	•		1	•
	Input Valu	Insert put Param	Into Sul	D100 D101	•		1	
	Optional Out	Insert put Param	Remove	D100 D101	•	ove Down	1	
# 2 3	Optional Out Out of Sub	Insert put Param proutine	Remove	D100 D101	• Mo	ove Down	1 1	• • ents
# 2 3 	Optional Out Out of Sub	Insert put Param proutine	Remove	D100 D101	• Mo	ove Down	1 1	• • ents
# 2 3 	Optional Out Out of Sub	Insert put Param proutine	Remove	D100 D101	• Ma	ove Down	1 1	• • ents
#	Optional Out Out of Sub	Insert Insert Insert Insert	Remove eters	D100 D101 Move Up	• Ma	ove Down	1 1	• • ents
# 1 2 3 3 () () () () ()	Optional Out Out of Sut Out of Sut	Insert iput Param proutine 102 Insert ered enabled	Remove eters	D100 D101 Move Up	• Ma	ove Down	1 1	• • ents

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):

20 Do-more Designer 2.0.0 - ADD1					-		×
<u>File Edit Search View Tools PLC Debug Window</u>	v <u>H</u> elp						
Open Save New Backup Dashboard Edit Mo		aste Find	Find Next Browse	Previous Next Output	100% -	Options	*
Read PLC Write PLC New Online Do-more/Sim Data	Debug Trend Memory	tus No Status	V2=1 V2=? Forces Value I	Mode Info Configure	Devices	Check	»
Main Strain						4	Þ×
🖞 📳 SMain	- • •	🗊 ADD				• 8	3
Protection of the second secon	Into Subroutine Number of Elements ADD_Addend1 1 ADD_Addend2 1 Parameters outine Into Number of Elements	8 -	R	ADD_Resu Result Expression ADD_Addend1		D102 dend2	
CALL Subroutine Optional Input Pa # Input Vale 2 5 Optional Output # Out of Subr 1 ADD Re	Into Subroutine Number of Elements ADD Addend1 1 ADD Addend2 1 Parameters outine Into Number of Elements suit D1 1	10 - 11 - 12 -			K NOP NOP)))	
<u> </u>							-
For Help, press F1		S	i P D Offline	00206/65536 H2-DM1E			1

Enhanced New Offline Project Dialog

New Offline Project			
Domore Hardware Class: Domore BFX Series Domore Simulator Domore Simulator Domore TIH Series	lype: H2DM1 H2DM1E	Sub-Type: unresected (up to \$ slot) 3 slot 4 slots 6 slots 9 slots	Enhanced features are highlighted in green Modular base with up to 9 dots Built in Ethernet
New Project Name	Browse	ОК	Cancel <u>H</u> elp

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

<u>***</u>	0
EMAIL	- Send EMail
SMTP Device @MySMTPServer	
✓ To "joe@acme.com"	•
□ Cc	
□ Bcc	
Subject "Look at the attached data"	•
Automatically insert space after each term	
Message	
"This is the log data from " TimeStamp() ". Please analyze"	• ^ •
	~ · · ·
Use Ctrl+Enter to embed carriage-return (only during edit)	
Attach File	
File System @RamFS	
File Name <mark>"MyLog.csv"</mark> ● ✓ Delete File after EMail sent	
On Success: Set bit JMP to Stage C0	
On Error: • Set bit C JMP to Stage C1 •	

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

✓X¤?	0
ENDC — Conditional End of Code-Bloc	:k

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.

			Show C	lassificatio	ns
Inst 		on Toolbox 1 × worites - Delta Contact: On When Value is Different from Previous Scan - Invert Power Flow	Sho V V	Check All ow Class in I Favorites Contact Coil/Bit Ou Analog/Pri	
Co	× ×	Add to Favorites Organize Favorites Hide/Show Classifications Show Descriptions Show Hotkeys	N	CTRIO Date/Time Ethernet File System Hardware/ High Spee	n /Device
Co An CT Dat Eth File	•	Show when in Edit Mode Show Always Manually Show Instruction Help (F1) Toolbox Help	বিব	Program C Program-Lu Protocol-C Protocol-S	ooping iustom/ASCII
			•	Timer/Cou OK	inter/Drum Cancel

Uncheck All

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 System Nickname Locations 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.

www Local Name Check All Uncheck All https://www.youtub Start_Welcome_1.mp4 205 Analog EtherNet/I https://www.youtub DmEIPClientBarCode Check All Uncheck All EtherNet/I https://www.youtub DmEIPClientSercer_1 Communication CTRIO/2 EtherNet/I https://www.youtub DmEIPClientSrotStart Data DirectLOGIC EtherNet/I https://www.youtub DmEIPClientVFD_1 Ethernet
EtherNet/I https://www.youtub DmEIPClientBarCode 205 EtherNet/I https://www.youtub DmEIPClientServer_1 Communication EtherNet/I https://www.youtub DmEIPClientEncoder Data EtherNet/I https://www.youtub DmEIPClientSoftStart Data
EthenNet/ https://www.youtub DmEIPClientBarCode Analog EthenNet/ https://www.youtub DmEIPClientServer_1 Communication EthenNet/ https://www.youtub DmEIPClientSortStart DirectIOG/C
EtherNet/I https://www.youtub DmEIPClientEncoder Data EtherNet/I https://www.youtub DmEIPClientSoftStart DirectLOGIC
EtherNet/I https://www.youtub DmciPClientEncoder
EtherNet/I https://www.youtub DmEIPClientSoftStart
EtherNet/I https://www.youtub DmEIPClientVFD_1
EtherNet/I https://www.youtub DmEIPPrimer_1.mp4
ge https://www.youtub DmStageIntro_1.mp4
tion Simul https://www.youtub DmBenefits_1.mp4
Drive https://www.youtub DmEIOGSAdvanced
Drive Intro https://www.youtub DmEIOGSIntro_1.mp4
Introduction https://www.youtub DmEIOQuickStart_1
Troublesh https://www.youtub DmEIOTroubleshoot
https://www.youtub DmStarterKit_1.mp4
n https://www.youtub DmHints_1.mp4 🔲 Simulator
ram https://www.youtub DmCTRIO2Dynamic
ram https://www.youtub DmCTRIO2ConfigJo v Troubleshooting
-

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).

arch:	Search every	rthing C Search checked categories
leos hedk All Uncheck All		ategories Check All Uncheck All
	Online/Local	205
How To Do-more CTRIO2 Motion Config and JOG	Online	Analog
How To Do-more CTRIO2 Motion Using Encoders	Unine I-	Communication
How To Do-more CTRIO2 Motion Using Limits	Unine	CTRIO/2
How To Do-more CTRIO2 Trapezoid Moves	Online I'	✓Data
How to Use the MATH Instruction with Do-more Designer	Online	DirectLOGIC
An Intro to Using Stage Programming with Do-more Designer	Online	☑Ethernet ☑EtherNet/IP
Benefits and Features of Do-more Programmable Logic Controller	Online	Ethernet I/O
How to Use the Simulator to Test Your Ladder Code with Do-more Designer		GS Drive
How to Setup External Serial Ports with Do-more Designer		HMI/Monitoring
How To Sense Temperature with a Do-more PLC		ZI/O
Helpful Hints to Get the Most Out of Your PLC with Do-more Designer		✓ Instruction
How to Setup and Use a Bar Code Scanner	Online	✓ Introduction
How to Use Data View to Monitor and Control Data with Do-more Designer	Online	✓ Math
How to Use Trend View to Log Data in Real Time with Do-more Designer	Online	Motion
Terminator I/O T1H Stackable PLC Field I/O Kickstart	Online	Program
How To Control On/Off AC Motors with a Do-more PLC, Part I Hardware	Of Mile	Serial_Comm
How To Control On/Off AC Motors with a Do-More PLC, Part II Software	Of mile 14	✓ Simulator
How to Get Started with the Do-more Designer Software	Onine	✓ Stage
How to Connect to a Do-more PLC Via Ethernet	Online 15	Terminator
How to Connect to a Remote Do-more PLC Behind a VPN	Online	✓ Troubleshooting
How to Connect to a Remote Do-more PLC via Port Forwarding	Online	200P
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 Llea a C-more HMT Dienlay	Online V	

Video Download Utility

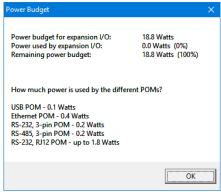
The new Video Download utility can be especially helpful for installations where Internet access is erratic or does not exist. By downloading relevant videos to your hard drive ahead of time, you can still play these videos regardless of your Internet connection at those critical moments! (see Help->Download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

- 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
- 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