#### Do-more Updates Rel 2.2 March 15, 2018



This file documents the list of new features, enhancements, and "adjusted anomalies", starting with the most recent Rel 2.2 version, then the 2.1.x versions, and finishing with Rel 2.0 version (there is a link at the end of this document for all the Rel 1.x update details). Each page's header shows the version for the current page.

- 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.

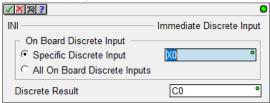
You can also verify your SMTP Client settings against the actual SMTP Server from your PC.

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

	- Account Authentication
MTP Server Address  Sutp.gmail.com  Lise IP Address	C Disabled C AUTH LOGIN C AUTH PLAIN
255 . 255 . 255 DNS Lookup	POP before SMTP POP3 Port: 110     Account Information     Lisemane: Joe@gmail.com
ecurity (only available on BRX platform)	
F Enable SSL/TLS	Password:
TLS (usually port 587)	
C SSL (usually port 465)	
Disable Ceruicate Validation	
ther Settings	Test settings and verify server credentials
Server Port: 587	
Timeout: 30 seconds	
Timeout: 30 seconds	

## 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.

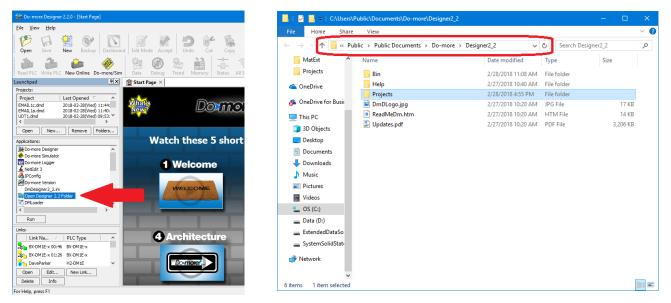
#### 5. New System Status Elements:

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:



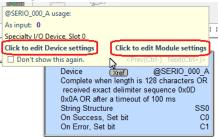
There is a similar link to **Open HAPTools Folder** further down the *Applications* list. If you have an older version of Windows, these will be located below the *All Users Documents* folder.

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



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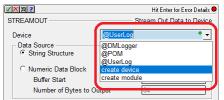
- c. View Options Dialog: **Smarter** about when to automatically check the **Apply to New Views** checkbox (5853).
- d. Ladder View: Added option to Always start in Edit Mode (5620).
- e. Ladder View: Show specific **Leg Label or Edge Trigger tooltip** when floating mouse cursor over an instruction's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

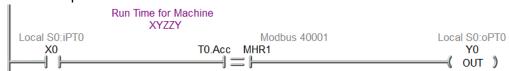
- t. Browse PLC File System Dialog: Now shows files' date-time-stamps using the PC locale's short **month text** (thanks to MK@PD).
- u. Output Window: **Automagically hides** after successful operations that utilize the Output Window, like after a successful Accept or a successful Program Check. It 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	lue		
Element	•	• 🙊	
_ <u>V</u> alue Current: <empty< th=""><th>-string&gt;</th><th></th><th></th></empty<>	-string>		
New:	-		<b>N</b>
	osum dolor sit an		
Eormat	C Decimal	C Evo	· ASCII
- DG	C Hex		C Quoted
			C Hexadecimal
	C Octal	C _imer	$\square$
	C BCD		
	E <u>x</u> it	Help	

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

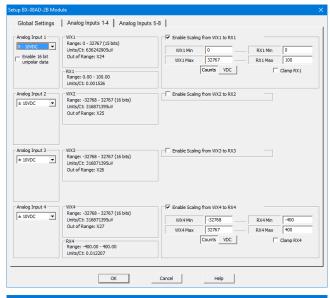
# Auto-Scaling Analog

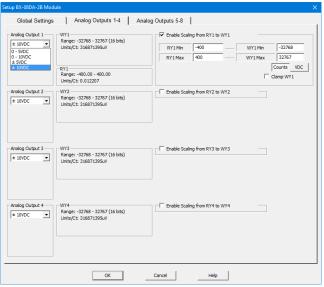
The BRX analog modules along with any onboard MPU's analog channels support autoscaling on a **per-channel** basis. Auto-scale also supports **clamping**, if desired.

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	X
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 boundaries. A dword equals 32 bits, 4 bytes,
String Length: 4 chars	or 2 words.
Block Size: 100 Radix: Decimal	Memory marked as retentive holds its state when powered down. Memory not marked as retentive is cleared 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	Retentive Range: Recipes0-99
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     Image: 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.	MEMCOPY       Copy Me         Start of Source       Recipes[]         Start of Destination       CurrentRe         C End of Source       C         C Number of Source Elements       C         Number of Bytes       C         Number of Destination Elements       1         C End of Destination       CurrentRe	ecipe •
Then in your Ladder Logic, use <b>CurrentRecipe.CookTime as the Preset to your TMR instruction</b> .	TMR Timer Timer Struct T0 • Preset C Constant hr h min m sec s ms ms © Variable CurrentRecipe.CookTime • ms	

**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)

/ X :	ହ	?				
COP	Y					Copy Data
#		Source		Destination		Number of Elements
	1	V0	٠	DLV2000	٠	8 •
	2	SS0	٠	SL5	٠	1 •
	3	3.14	٠	R10	۰	1 •
	4					
	5					
	O	< Cancel	l	nsert <u>R</u> emove	Ν	Nove Up Move Down
		it Leg Edge triggered				
	e	Power flow enable	d			

• **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.

<u> </u>	C
BACKUP	Backup System
File System	@SDCardFS ▼
Base File Name ["MyImage"	0
Example	MyImage_y2017m07d05.bin
<ul> <li>✓ Append Date to Filename</li> <li>Additional Content</li> <li>✓ Include Retentive Memory Values</li> <li>✓ Include Passwords Configuration</li> <li>✓ Include IP Configuration</li> </ul>	
Security Use this Password to Restore Text Variable Ensure Product ID (DST387) matches	SS0
On Success: © Set bit C JMP to Stage On Error: © Set bit C JMP to Stage C Automatically create the SG box for any N © Below this rung C 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 № ?		C
DEBOUNCE -		Reduce Discrete Input Chatter
SET Delay		10 • ms
Input Leg Powerflow	ON OFF ← SET Delay Time →	
Debounced Bit Output	ON OFF	_
<ul> <li>RESET De</li> <li>O Use RES</li> <li>O Do not RI</li> </ul>	ET Delay	[10 •] ms
Input Leg Powerflow	ON OFF ← RESET 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 <sup>∞</sup> ?	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	
Program Sys Config Doc	V C R N Memory Image	
Eorce download of Program, System Configuration, and Documentation Database	Download Memory Image Data      Check <u>All Regions</u>	
	Uncheck All Regions	
	Memory Image Manager	
Prepend to Project Notes Testing the new DEBOUNCE instruction	Project Notes Editor	
Download Project to PLC		
${f C}$ Download Project in <u>R</u> UN Mode (Runtime	Edit)	
Download Project in PROGRAM Mode		
Switch to RUN mode after download o	completes	
When in PROGRAM mode, do not both NEVER downloading any Memory Imag	her showing this dialog next time (during this session), ge	
QK	Cancel Help (F1)	

8/08/17 :	11:13:41 (Default Use	r): Testing the new DB	EBOUNCE instruction		1

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.

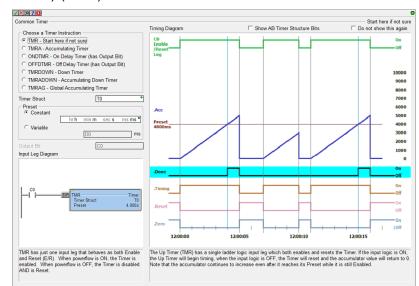
## 6. New System Words (DSTs)

\$FatalTermCode	se
\$ImageBackup	D
\$ImageRestore	N D
\$ImagePassword1	R
\$ImagePassword2	C
	\$ImageBackup \$ImageRestore \$ImagePassword1

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 🗸	
PID1.DMD	2017-05-18(Thu) 18:29:10	
PID_H2_R2.dmd	2017-05-18(Thu) 10:42:47 2017-05-18(Thu) 10:34:21	
Open New	Remove Folders	
Applications:		
Do-more Designer		<u>^</u>
A NetEdit 3		
A IPConfig		
Do-more Version		
DmDesigner2_1.ini		~
<		>
Run		
Links:		
Link Name 🛆	PLC Type	
NySim	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).

✓×泡 ?	C
JMP	Jump To Stage
Transition To	\$Main.S1 °
Automatically create the SG box for any I	NEW stage number —
<ul> <li>Below this rung</li> </ul>	
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     Position 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: Max Raw: Max Scaled:
	Initial Reset Value 0 Enable Reset Input 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).
		Raw Counts / Unit: 1 Unit: Time Base: Units per second  Scale Offset: 0
	Enable Rotary Mode	Calc Options Calc Interval: 100 ms Data Filter: 0 seconds (Enter 0 to disable)
	Enable Retentive Accumulator	

 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:

Entries Memory Blocks		User Data Types				CPU Configuration	Memory Block		User	Data Type		
puration Memory Configuration ocal 1/0 Master	Memory Configuration: Memory Blocks Current Stee: 106,716 bytes Max Stee: 262,144 bytes Space Available: 155,428 bytes				I/O Configuration     BRX Local 1/O Mester	Memory Configuration: Heap Items Current Size: 106,716 bytes Max Size: 262,144 bytes Space Available: 155,428 bytes						
RX Local 1/O	nory blocks are indexable arra	ys of elements, each c	entaining a common bit, r	numeric, or structured d	iata	- BRX Local I/O - Module Configuration(s)	Heap Items are single instance, non-indexable, structured data types. Heap items are referenced by the items name with no index.					
onnguration	e. Memory block elements are Data Type		Radix Ret Range		~	- Device Configuration	Name	en's name with no index. Data Type	Inchasto	1 minut	Extended Info	
1 ST	Bit	0 - 1023	Dec 768 - 1023	Built-In	<u></u>	-1/O Meppings	MSG	String Struct	Yes	Built-In	Extended pro	
2 DST 4 SDT	Signed DWord Date/Time Struct		Dec 384-511 Dec 0-7	Built-In Built-In	Add Memory Block		ERR SysName	String Struct String Struct	Yes	Buit-In Buit-In		Add Heap Item
5 X	Bit	0 - 2047	Dec	Built-In			SysDesc	String Struct	Yes	Built-In		
6 7 7 WX	Bit Signed Word		Dec	Built-In Built-In	Edit Memory Block		ModbusTCPServe	r Server Struct Server Struct	Yes	Built-In Built-In	Internal serial server port : @IntSerial	Edit Heap Item
8 WY	Signed Word	0 - 255	Dec	Built-In			IntUS8Server	Server Struct	Yes	Buit-In		
20 V	Unsigned Word	0 - 4095	Dec 0 - 2047 Dec 0 - 4095	Built-In Built-In	Delete Memory Block		IntSerial Local/OMaster	Stream Struct IOMester Struct	Yes	Built-In Built-In	Do-more Local 1/O Master : @LocalIOMaster	Delete Heap Item
11 N 12 D	Signed Word Signed DWord	0 - 4095	Dec 0 - 4095 Dec 0 - 4095	Built-In Built-In			SerialNum PartNum	String Struct String Struct	Yes	Built-In Built-In		
13 R	Real	0 - 4095	Dec 0 - 4095	Built-In			P.	Peerlink Struct	Yes	Built-In		
14 T 15 CT	Timer Struct Counter Struct		Dec 0-255 Dec 0-255	Built-In Built-In			stantPS SECARTES	FileSys Struct FileSys Struct	Yes Yes	System	General purpose RAM-based file system : SD Card-based file system : @SDCardFS	
16 55	String Struct	0 - 127	Dec 0 - 127	Built-In			\$IntEIPServer	Server Struct	Yes	System		
17 St 18 UDT	String Struct Date/Time Struct	0-63	Dec 0-63 Dec 0-31	Built-In Built-In	Total 44 Biocka		sPOMServer sPOMStream	Server Struct Stream Struct	Yes Yes	System System	Plug-able Option Module : @POM	Total 34 Items:
29 PL	Unsigned Word	0 - 255	Dec 0 - 255	Built-In			\$Axis0	Axis Struct	Yes	System	Motion Control Axis : @Axis0	
20 DLX 21 DLY	Bit	0 - 777	Oct Oct	Built-In Built-In	Max 256 Blocks		\$Axis1 \$Axis2	Axis Struct Axis Struct	Yes Yes	System System	Motion Centrol Axis : @Axis1 Motion Centrol Axis : @Axis2	Max 1024
22 D.C 23 D.V	Bit Unsigned Word	0 - 777	Oct 0 - 777 Oct 0 - 3777	Built-In Built-In			SAxis3	Axis Struct Program Struct	Yes	System	Motion Control Axis : @Axis3	and the second s
23 DUY 24 MS	Ext	0 - 1023	Dec 0 - 1023	Built-In	T Hole Built-In Blocks		stFirstScan	Task Struct	Yes	System		T Hole Built-in Items
20 D.X 21 D.Y 22 D.C 23 D.V 24 Hi 25 MC 26 MR 27 HHR	Bit Signed Word		Dec 0 - 1023 Dec 0 - 2047	Built-In Built-In			St1Second st100ms	Task Struct Task Struct	Yes	System		F Hde System Items
27 HHR	Signed Word	0 - 2047	Dec 0 - 2047	Built-In			\$250ms	Task Struct	Yes	System		
28 LastMSG 29 LastERR	String Struct String Struct	0-7	Dec 0-7 Dec 0-7	Built-In Built-In			\$tTopOfScan \$tBottomOfScan	Task Struct Task Struct	Yes	System System		
30 RX 31 RY	Real	0 - 255	Dec Dec	Built-In Built-In			StLastScan CurrentRecipe	Virtual Recipe	Yes	System		
1 31 KT	KEB .	0-255		built-an	v		Carrenotecpe	Kecpe	res	User		
							fine or 17 house 11	iser created structure				
(Size = 1200 bytes : L	Jser defined memory block						has - realized to	Nel Greates seucare				
50e + 1200 bytes : 1	User defined memory block	Cancel	ntries juration	Memory Block		User Data Types			Cano	<u> </u>		
201 + 1.202 bytes   1		System Config Configuration B CPU Config B 1/0 Config D 0.205 D 0.205	uration puration Local I/O Master 205 Base ti //O Master ti/O Master ti/O Master ti/O Master ti/O Master	Memory Configura	ation: User Data Types Current Size: 10 Structures where you define the fiel Attribute Key - U: User Data Type e / #DW/#Bytes #	6,516 bytes Max Size: 262,144 byte d names and data types, then create them as Me Bi: Built-in Struct. BR:Built-in Reconfigurable Mb Fields Attributes Current Bloc	es Space Avail mary Biodo & Heao Is : Add as Memory block	OK	×	•	_146	

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 va REAL element. For most expressions this Division that truncates, you may not get I then Integer Division "D42.7 2" will equal parameter will then be set to 2.0, NOT 2.1	is OK. But for some, like Integer he desired result. Say D42 equals 5, 2 not 2.5, so the REAL Result
If you need to change INTEGER calcula introduce a REAL early in the expression. try "D42 / 2.0" or "TOREAL(D42) / 2"	
🔲 Do not ask again	
<u>_</u> ccept	<u>G</u> o back

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

ound 1 warning editin	a AYCAM	
ouble click on an entr	y to jump back to that parameter.	
it OK to accept. CAN	CEL to jump back and edit.	
in on to accept, one	ale to jump black and cont	
Parameter	Description	
	er High speed Ctr/Tmr 1 Acc is NOT configured	
P4 Master Regist	er High speed Ctr/Tmr 1 Acc is NOT configured	
		To see more of the last column

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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.

✓X <sup>∞</sup> ?	
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 whe Subsequent moves: 1. Write new value to Position Val 2. Turn Update Target Position bit Update Target Position bit will be c toward new Position Value. This al Value w/o stopping current move.	en Position Value is reached. lue parameter ON leared 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			×
Read From Remote Me	mory Block	•		
	ustem's Memory Cor	nfigration Memory Blocks ta	able)	
Block # of Memor	· · · ·			
A	ddress: 0	<b>.</b>		
Number of Elements	10	<b>_</b>		
Into Local	DO	<ul> <li>Signed DWord</li> </ul>		
Current: 40 bytes 0	)thers: 0 bytes	New Size: 40 bytes	Bytes Remaining: 960 bytes	
	D0 - D9 (Signed D\ D0 - D9 (Signed D\			
	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 22 of 52

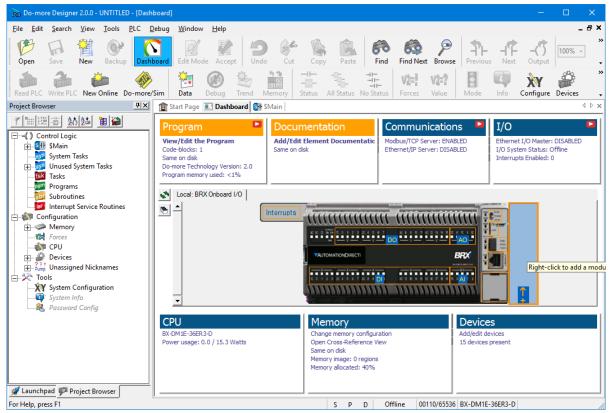
- sss. Added pop-up Help content for new 2.1 instructions (2.1.2).
- ttt. Download Project dialog's *Prepend Project Notes* field word-wraps (5877) (2.1.2).
- uuu. FILELOG correctly performs Replace operation (5878) (2.1.2).
- vvv. Reworded Output Window Warning message when Designer's Memory Configuration 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 24 of 52

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]			- 🗆 ×
Eile Edit Search View Tools PLC Debug Window	/ <u>H</u> elp		_ # ×
Open Save New Backup Dashboard Edit Mo	de Accept Dundo Cut Copy Past	Find Next Browse	
Read PLC Write PLC New Online Do-more/Sim Data		Image: Ware with the second	Info Configure Devices Check PID Overview
	Dashboard 📲 SMain		d ⊳ x
T == 100 At 23 H     H       □ = (1) Control Logic     H       □ = 00 Minim     New?       □ = 00 Minim     New?       □ = 00 Minim     New?	Dometer	Now Available on New ERX	on the www
	atch these 5 short vide	os for everything you	I need to get started!
Configuration     Memory     Forces	1 Welcome	2 Quick Start	3 Troubleshooting
CPU     CPU     Devices     Devices     Devices     Devices     Tools     XY System Configuration     System Info	WELCOME TO 2.0	Populari	
- & Password Config	4 Architecture	5 Helpful Hints	Video Search & Download Utility
Launchpad Project Browser		S P D Offline	00110/65536 BX-DM1E-36ER3-D

**New Start Page Videos** 

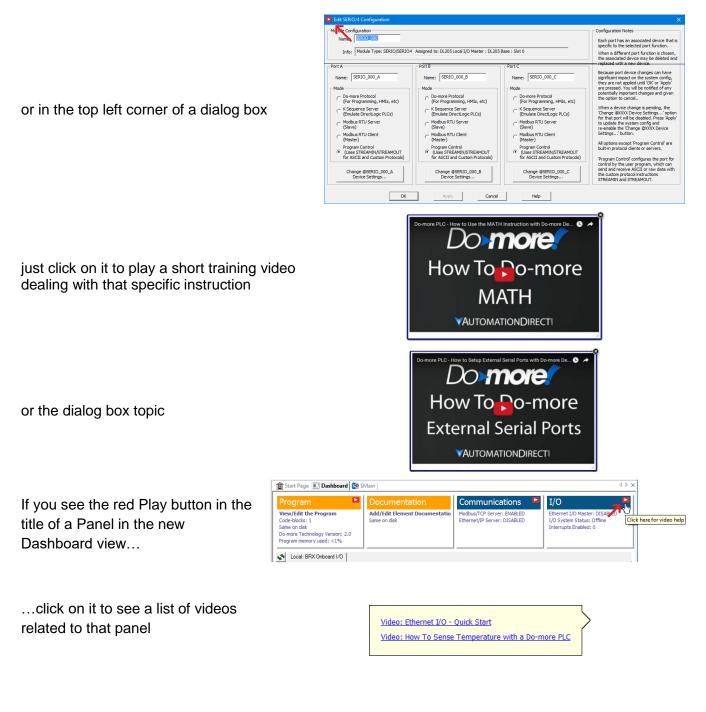
The Start Page has been changed to provide hot link buttons to play 5 new videos that will help you get up and running with Designer 2.0.

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

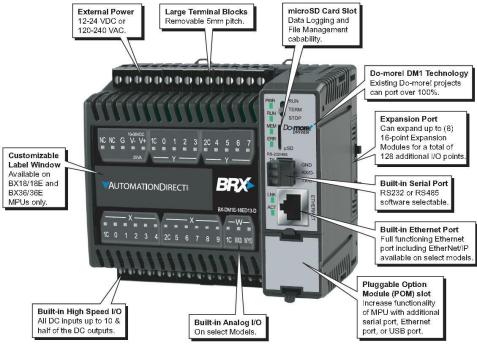
The 6<sup>th</sup> button lets you navigate, play and optionally download any/all the hundreds of short videos (details below).

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

	0
MATHC	Calculate Expression
Result D0	•
Expression	
V0 + V1	• ^
Use Ctrl+Enter to embed carriage-return (only during edit)	~
ose our Enter to embed canage-letum (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 PRX Series       Do-more Simulator         Do-more Simulator       BX-DM1 *         Do-more T1H Series       BX-DM1 *         BX-DM1 *       BX-DM1 *: 10EP13-D         BX-DM1 *: 10EP13-D       BX-DM1 *: 10EP13-D         BX-DM1 *: 30EP13-D       BX-DM1 *: 30EP13-D         BX-DM1 *: 30EP13-D       BX-DM1 *: 30	Do-more Hardware <u>C</u> lass:	<u>Type:</u>	Sub-Type:	
High Speed Discrete Output Count/Type: 87/2-24 VDC High Speed Discrete Output value 4 at 250 kHz Built-in Discrete Output Polarity: Sinking Built-in Analog In-Count/Type: 1/1/Current or Voltage	Do-more BRX Series Do-more H2 Series Do-more Simulator	BX-DM1E-x	BX:OM1E-10&R3-D           BX:OM1E-10ED13-D           BX:OM1E-10ED23-D           BX:OM1E-10ED23-D           BX:OM1E-10ER3-D           BX:OM1E-36ED3-D           BX:OM1E-36ED3-D           BX:OM1E-36ER3-D           BX:OM1E-M-D           BX:OM1E-M-D	res are highlighted in green to 8 modules et c At I/O: 18 in put Count/Type: 10/12-24 VDC/VAC screte inputs: 10 at 250 kHz 0 otput Count/Type: 8/12-24 VDC screte 0 utputs: 4 at 250 kHz 0 utput V at I/S inking

# **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

# **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

#### Do-more Updates Rel 2.0, February, 2017

Analog Inputs Analog Outputs		
Analog Input 1 WX0 Range: 0 - 16383	Enable Scaling from WX0 to RX0	
C 0 - SVDC 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: 1-15 bits         Resolution: 1-15 bits           Lints/Ct: 510uA         Broken Transmitter: X22           C         ± 500C           C         ± 20mA           Analog Input 4         WX3           C         = 0.10CC           Resolution: 1-1633           Resolution: 1-16183	WX2 Min         6553           WX2 Max         32267           Counts         VDC	RX2 Max 100
C         0-50Cc         Range: 6533-32768           Resolution: 15 bits         Linits(Ct: 510.4           Direct C:         15 bits	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         WC3         Range: 0 - 16333           C         0 - SVDC         Range: 0 - 16333           C         0 - SVDC         Range: 0 - 16333	WX2 Min         6553           WX2 Max         32267           Counts         VOC	RX2 Max 100 RX2 Max 100 Range Limit RX2

	WYO	F Enable Scaling from RY0 to WY0	
0 - 5VDC	Range: 0 - 16383 Resolution: 14 bits	RY0 Min 0 WY0 Min 0	1
C 0 - 10VDC C ± 5VDC	Units/Ct: 305uV		6383
C ± 10VDC	RYO	[co	unts VDC
○ 4 - 20mA ○ ± 20mA	Range: 0.00 - 100.00 Units/Ct: 0.001526	1	ange Limit WYO
Analog Output 2	WY1	Finable Scaling from RY1 to WY1	
C 0 - 5VDC C 0 - 10VDC	Range: 6553 - 32768 Resolution: ~15 bits	RY1Min 0 WY1Min 6	553
C ± 5VDC	Units/Ct: 610uA	RY1 Max 100 WY1 Max 3	2767
± 10VDC     • 4 - 20mA	-RY1-	Co	unts VDC
C ± 20mA	Range: 0.00 - 100.00 Units/Ct: 0.001526	E Ra	inge Limit WY 1

## **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 Input 11: 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	BRX can use a hardware timer to invoke an interrupt service routine. The timer	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 Input 16: Don't care Input	The INTCONFIG instruction can also be used to configure timers from PLC code. Set the timer behavior and duration, then select the interrupt service routine to	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 Input 17: Don't care Input	run when the timer fires.	☐ Finable Match Register
Input 8: Don't care  Input 18: Don't care	Timer Mode: Recurrent	Run interrupt service routine FireOutput  Create ISR
Input 9: Don't care   Input 19: Don't care Input 19: Don't care Input 1	Timer Duration: 1250 us	when High speed Ctr/Tmr 1 Accumulator
Interrupt Service Routine: FireOutput	Interrupt Service Routine: FireOutput	is Greater Than (>)
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.

### Do-more Updates Rel 2.0, February, 2017

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         O         Turn On Recurrent at interval         µSec	
<ul> <li>Turn On Once</li> <li>in 0100</li> <li>μSec</li> <li>Turn Off</li> </ul>	
	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.

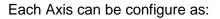
# High Speed I/O

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

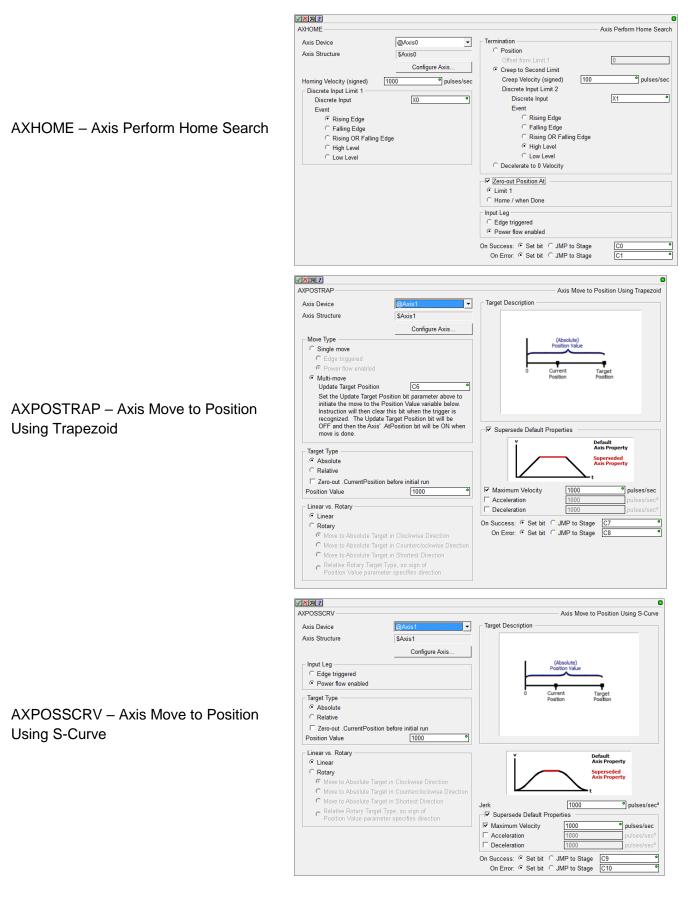
It is a 3-input leg instruction to perform a simple "jog". The input legs are

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

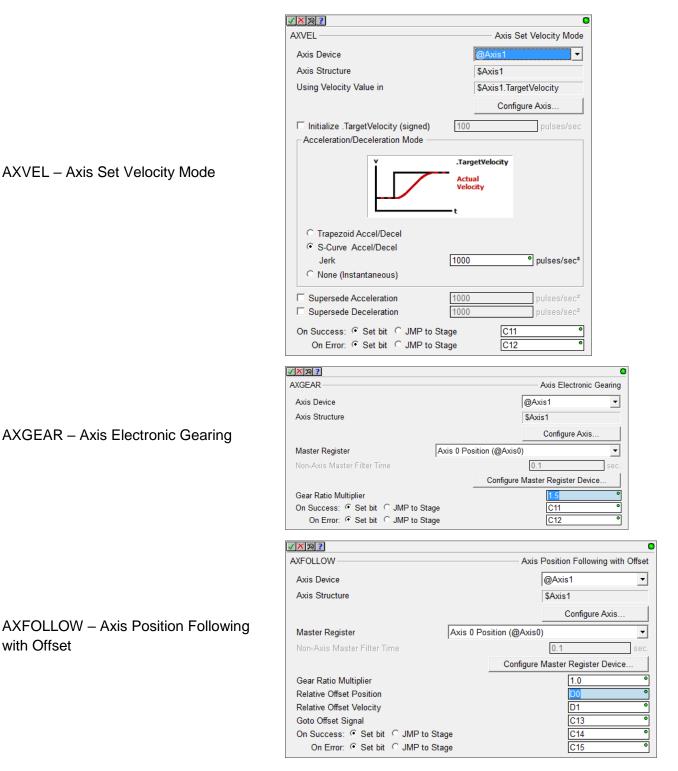
is/Pulse Output Configuration			×
Axis Device Name: @Axis1			
Axis Heap Item: \$Axis1			
		are configured at runtime through the e executed at runtime through the remaining	3
C Virtual			
		ns with other axes, or can trigger Table Driv drive physical I/O.	en
Pulse Output			
	out. Select pulse out	tput 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 m "Direction" on and off to sele	ove, sets ct direction.	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 mo direction, pulses on "CCW" to negative direction.		Function Output 2 (Direction) Output 0 (Y0) - ++++++	
C Quadrature		Output 1 (Y1) - *Selected* Output 2 (Y2) Output 3 (Y3)	
Asserts "A" and "B" outputs in sequence. "A" leads "B" for p "B" leads "A" for negative mo	ositive move,	Output 3 (Y3) Output 4 (Y4) Output 5 (Y5) Output 6 (Y6)	
_		Output 7 (Y7)	
	ОК	Cancel	
× 2 ?			
KCONFIG			— Axis Configura
Axis Device @Ax Axis Structure \$Axi		<ul> <li>Enable positive/clockwise motion Fault-Li</li> <li>Limit Input</li> </ul>	mit X0
	Configure Axis	Stop/fault when Limit is	
Clinear vs. Rotary Clinear		On	
C Rotary	000	Enable negative/counter-clockwise motion Limit Input	Trault-Limit
Rotary Range Length Rotary Range:	360	Stop/fault when Limit is	
Initial Output Position	0	C Off C On	
Minimum Velocity 100	• pulses/sec	Monitor Avia attricture's Fault road only hit -	nember
Maximum Velocity 1000 Acceleration 1000	<ul> <li>pulses/sec</li> <li>pulses/sec</li> </ul>	Execute AXRSTFAULT or AXCONFIG instruct	
Deceleration 1000	• pulses/sec	2 On Success:  Set bit  JMP to Stage	C0
Fault Deceleration 0 Fault Deceleration value of 0 means "Sto	pulses/sec op immediatelv"	. <sup>2</sup> On Error: ● Set bit ○ JMP to Stage	C1
Encoder Feedback	,,	1	
High Speed Input Function 1     High Speed Input Function 2     High Speed Input Function 3			
Disabled	Configure High Speed Input		
<ul> <li>Position Based on</li> <li></li></ul>			
Pulse Output/Encoder Scale Factor Encoder Deadband (counts)	1.0 • 1 •		
		0	
AXJOG		Axis Jog Mode	
Axis Device	@Axis1	<b>▼</b>	
Axis Structure	\$Axis1	onfigure Axis	
Zero Count at Completion		onfigure Axis	
Target Velocity	1000	pulses/sec	
On Success:  Set bit		<u>C2</u>	
On Error: 🖲 Set bit 🦳	nur to Stage [	C3 •	

0

## Do-more Updates Rel 2.0, February, 2017



#### Do-more Updates Rel 2.0, February, 2017



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

AXCAM				A.ui	s Electronic Camr	•
			Curve Fitting		Electronic Camr	ning
Slave Axis Device Slave Axis Structure	SAxis1	Pt# Raw Master Value	Cuive Fitting	Points	Slave Value	^
Slave AXIS Structure	Configure Axis	1	0		0	
		2	83 167		50	
Master Register Axis 0 Position (@Axis0		4	250		100	
Non-Axis Master Filter Time	0.1 sec. Master Register Device	5	333		87	
Linear vs. Rotary	master register Device	6	417	1	50	~
• Linear		Insert App	end Remove Move	Up Move Down	Import	
C Rotary		110				
Master Position Offset C Load Slave Curve Fitting Points from Data Blo		+0.70000	$\frown$		$\int$	
Length from Starting Master Position Number of Curve Fitting Points	1000	+0.3000			/	
Slave Curve Fitting Table Starting Address	D0	+0.35000	$\backslash$	/	/	
PLC AXC	AM Curve Fitting Editor	1/	$\langle \rangle$			
Fixed Curve Fitting Points				/	,	
Length from Starting Master Position	1000			$\land$ /		
Number of Curve Fitting Points	Apply to table	1		$\setminus$ /		
Enable Relative Mode	Apply to table	-0.35000	$\backslash$	$\mathbf{N}$	1	
On Success:  Set bit  JMP to Stage	C16 •		$\sim$	X		
On Error:      Set bit      JMP to Stage	C17 •	-110	$\sim$		•	
OK Cancel		-0.70000 0	250 500	750	1,000	
✓X¤?			0			
AXSETPROP		Set Axis	Properties			
Axis Device		@Axis1	<b>_</b>			
	1	•				
Axis Structure		\$Axis1				
		Configure A	xis			
Position	-	0				
	100					
Minimum Velocity			pulses/sec			
Maximum Velocity	1000		pulses/sec			
Acceleration	1000	•	pulses/sec <sup>2</sup>			
Deceleration	1000	•	pulses/sec <sup>2</sup>			
Fault Deceleration	0	•	pulses/sec <sup>2</sup>			
Fault Deceleration value	of 0 means "Sto	p immediately"				
Pulse Output/Encoder S	Scale Factor	1.0	•			
Encoder Deadband (cou		1				
On Success: 🖲 Set bit 🤇	JMP to Stage	C18	•			
On Error:  Set bit	IMP to Stage	C19	•			
			0			
AXRSTFAULT		<ul> <li>Reset Axis Lir</li> </ul>	mit Fault			
Axis Device	@A	xis1	•			
Axis Structure	\$Ax	dis1				
	<b>0</b> , 0,					
		Configure Axis				
On Success: 🖲 Set bit	C .IMP to Stage	C20	•			
	-					
On Error: 🖲 Set bit	U JMP to Stage	C21				

#### **Pulse Width Modulation**

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

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

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.
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 X
Enable Table Driven Output     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 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

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.

✓X № ?					
TDOPRESET				Load Preset Ta	ble for Table Driven Output
Table Driven Output Device	@TableOut1	Raw Preset	Count Steps		
Table Driven Output Structure	\$TableOut1	Step#	Preset Count	Preset Function	Function Parameter
	Configure Table Driven Outputs	0	1000	<ul> <li>Set</li> </ul>	
	Service and Servic	1	2000	<ul> <li>Reset</li> </ul>	
Master Register High speed	Ctr/Tmr 1 Accumulator	2	3000	<ul> <li>Toggle</li> </ul>	
	Configure Master Register Device	3	4000	<ul> <li>Pulse ON (µSec)</li> </ul>	987
Initialize .OffsetInputVal	0	4	5000	<ul> <li>Pulse OFF (µSec)</li> </ul>	654
	0	5			
Source Register Scaling     Raw Pulse Counts (No Si	!:)	6			
C Use Source Register Sca	u,				
Load Raw Preset Table from					
Table Start Address	D0				
Number of Preset Steps	10	]	Insert	Remove Import	
Table Data Block Range:		(			4
_	PLC TDO Preset Table Editor				
On Success: @ Set bit O JM	MP to Stage C0	1			
On Error: 🔍 Set bit 🔍 JM	MP to Stage C1	1			
	ок	Cancel	1		
	OK	Cancel	]		

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 第 ?						
TDOPLS		Lo	ad Programmable Limi	it Switch Ta	able for Table Driven	Output
Table Driven Output Device	@TableOut1	- Defaul	t Output State			
Table Driven Output Structure	STableOut1	• OF				
	Configure Table Driven Outp	10 0	4			
			S Count Steps Output	ON when		
Master Register High speed	d Ctr/Tmr 1 Accumulator	-	ON when	1		
	Configure Master Register D	evice Step#	Greater Than or Eq	ual to	and Less Than	
Initialize .InputValOffset	0		) 100	٠	200	۰
Source Register Scaling -		1	300	۰	500	۰
Raw Pulse Counts (No State Counts)	Scaling)	2	2 600	۰	900	•
C Use Source Register Sc	aling	3	3			
Load Raw PLS Table from	Data Block	4	4			
Table Start Address	D0					
Number of PLS Steps	10					
Table Data Block Range:						
	PLC TDO PLS Table Edito	or				
On Success:   Set bit	IMP to Stage C2	•	Insert R	emove	Import	
On Error: <ul> <li>Set bit</li> <li>J</li> </ul>		•				
			J			
0	250	500	750		1,00	0
Click on the graphic to jump t	o that point in the table	OK Cancel				
	-					
✓X <sup>∞</sup> ?			0			
TDODECFG	Deconfigu	ure Table Driven	Output			
Table Driven Output [	Device	leOut1	<b>_</b>			
	J					
Table Driven Output \$	Structure \$Table	eOut1				
	Configure Table	Driven Outputs.				
On Success:    Set	bit OJMP to Stage	C4	•			
	bit OJMP to Stage	C5	•			
	on Stage	00				

Setup Discrete Input Response	Times			×
BRX's onboard discrete inputs value as time, frequency, or d	use digital filters. The basic uni ocks. Select the preferred scal	it of filter time is 13.33ns (the 75M le and enter the desired filter value	z system (	clock), but you can specify the filter
A filter value of 0 results in the valid filter value is 8388607 do Certain input types (like AC) m	cks, or about 100ms.	nich is appropriate for the maximum erridden by the hardware.	design inp	ut rate of 250Khz. The maximum
Choose Preferred Filter Scale				
• Frequency C Time in	Nanoseconds C Raw Clo	cks		
			_	
Input 0: 0 Her	tz (default)	Input 10: 0	Hertz	(default)
Input 1: 0 Her	tz (default)	Input 11: 0	Hertz	(default)
Input 2: 0 Her	tz (default)	Input 12: 0	Hertz	(default)
Input 3: 0 Her	tz (default)	Input 13: 0	Hertz	(default)
Input 4: 0 Her	tz (default)	Input 14: 0	Hertz	(default)
Input 5: 0 Her	tz (default)	Input 15: 0	Hertz	(default)
Input 6: 0 Her	tz (default)	Input 16: 0	Hertz	(default)
Input 7: 0 Her	tz (default)	Input 17: 0	Hertz	(default)
Input 8: 0 Her	tz (default)	Input 18: 0	Hertz	(default)
Input 9: 0 Her	tz (default)	Input 19: 0	Hertz	(default)
	ОК	Cancel Help		

## 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

		w Offline roject	New Online Project	P	Browse	
or select a recent Dis	k Project				ader to sort by that colu scending. Shift+click for	
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\D</proj>	o 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 s	how this	dmd Open Selected		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 深?				0
FILELOG			Log	to File
File System			@RamFS	-
Base .csv File	Name MyFILELOC	3"		•
Example			MyFILELOG_y2016m12	d07.csv
Power for Log Interv Once E Once E Once E Once E Once E Once E Once E	Every Second Every Minute Every Hour	C to the C to the C to the C to the C to the C to the	a Day a Month a Year ated File Name SS0	9
Entry# Eler	ment	Co	ount	
1	V100	٠	2	•
2	R100	•	1	•
3	CT0.Acc	•	1	•
	Insert Remove © Set bit © JMP to S © Set bit © JMP to S OK	-	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.).

		O
	FILEOPEN	Open File
	File System	@RamFS ▼
	File System	
	File Name "MyLog.txt"	
	Mode © Read	
FILEOPEN – Open File	<ul> <li>Read</li> <li>Write (Create/Append if exists)</li> </ul>	
	C Write (Create/Append if exists)	
	File Handle Struct	FILE_0 °
		heap-item, just enter the new name to r the FILEOPEN instruction.
	On Success:      Set bit      JMP to Sta	
	On Error:   Set bit   JMP to Sta	-
	Off Effort. Set bit Solvip to Sta	
	<u>√X¤?</u>	0
	FILEREAD	Read from File
	File Handle Struct	FILE_0
		heap-item, just enter the new name to
	Create it when you enter	r the FILEREAD instruction.
		tes OR
	Delimiter(s) received OR	
	2 - 0x0D • Exact sequence	e
FILEREAD – Read from File	0x0A  C Any one delimit	er(s)
		) from Output String
		,
	<ul> <li>Data Destination</li> <li>String Structure</li> </ul>	SS0 •
	String Structure	
	C Numeric Data Block	Create Byte Buffer
	Start Address	D0
	Buffer Size in Bytes	64
	Number of Bytes Read	D1
	On Success:  On Success:  On Success:  On Set bit  On Success:  On Suc	age C0 •
	On Error:  On Set bit  On JMP to Sta	
		0
	FILEWRITE	Write to File
	File Handle Struct	FILE 0
		heap-item, just enter the new name to
		the FILEWRITE instruction.
FILEWRITE – Write to File	Data Source	
	<ul> <li>String Structure</li> </ul>	SS0 •
	O Numeric Data Block	Create Byte Buffer
	Buffer Start	D0
	Number of Bytes to Output	64
	On Success: Set bit JMP to Sta	-
	On Error:  Set bit  JMP to Sta	age C1 •
		0
	FILECLOSE	Close File
FILECLOSE – Close File		
	File Handle Struct	FILE_0
	On Success:  Set bit  JMP to St	-
	On Error: 💿 Set bit 🗢 JMP to St	tage C3

## FILEDEL – Delete File

## FILECOPY - Copy File

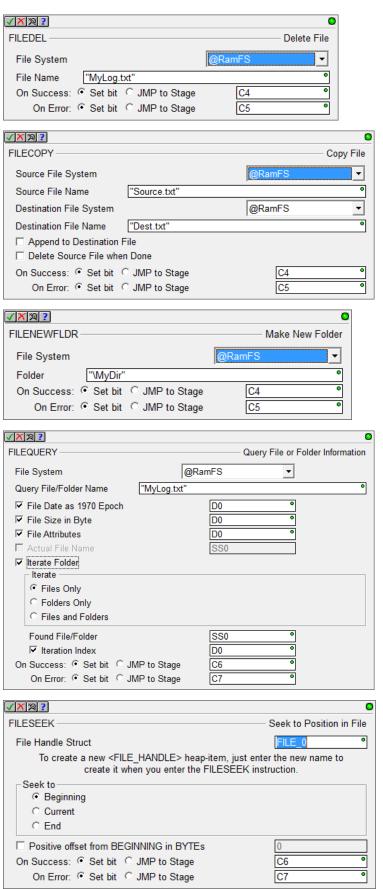
```
FILENEWFLDR – Make New Folder
(note that there is no Remove Folder
instruction)
```

# 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

	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: <ul> <li>Set bit</li> <li>JMP to Stage</li> </ul>	C6 •
On Error: <ul> <li>Set bit</li> <li>JMP to Stage</li> </ul>	C7 •
	•
FILESYSCMD Perform	File System Command
File System @Ra	mFS 💌
Command	Format 💌
On Success: • Set bit C JMP to Stage On Error: • Set bit C JMP to Stage	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	.OG_y2016m09d15_h16.csv ]				
Do-more File System:     @SDCardFS - SD Card File System       Browse to Root	,	Total Di Free		220 KB 5 KB KB Click header ag	
Name /	Date	Туре	Size	Attributes	
a a	2016-08-16 (Tue) 22:23:00	Folder	0.20	D	-
₩ °	2016-08-16 (Tue) 22:23:00	Folder		D	
C C	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		
MyFILELOG v2016m09d15 h18.csv	2016-09-15 (Thu) 19:59:58	.CSV	356,574		
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	.05V	356,574	A	
MyFILELOG v2016m09d15 h22.csv	2016-09-15 (Thu) 23:59:58	.CSV	356,885	A	
MyFILELOG y2016m09d15 h23.csv	2016-09-16 (Fri) 00:59:58	.CSV	356,669	Α	
MyFILELOG y2016m09d16 h00.csv	2016-09-16 (Fri) 01:59:58	.CSV	352.976	A	
MyFILELOG v2016m09d16 h01.csv	2016-09-16 (Fri) 02:59:58	.CSV	352,974	A	
MUELIELOG v2016m00d16 b02 cov	2016 00 16 (E-0 02-50-50		252.074	7	~
Current Folder: @SDCardFS:\ Number of Files: 88	Number of Folders: 4				
	by Selected File Do-more PLC to PC	lete Selected Files in Do-more PLC		ate New Folder Do-more PLC	
	Close			lialog 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.

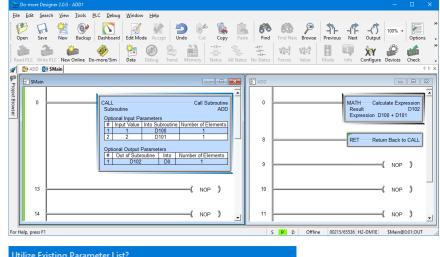
Password Configuratio	n	×
Users		
User Name	Privileges	Add
Default User	RD WD RP WP SS PM PW FW FS	Edit
		Delete
Accept	Read PLC	Cancel
Configuration Notes:		
Click 'Add' to add up to	for a Do-more Designer session are RD an	d pp
	only user, it must have all privileges and ca	
	ust be Administrator, and must minimally h	
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	PW - Change Password	
WP - Write Project	FW - Update 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/0	Dutput 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)

Re-use E	xisting CALL P	arameter Li	ist				$\times$	
	_			parameter list, v	/011 0	an select one be		
Subroutin		ize the same				ameters and "O		
and Inpu		eter tables.	You will only r			elected Subrouti "Input Value" Inj		
	2 Input parame RACT (2 Input p						~	
		0		Cancel			~	
/স্প্র	2							_
CALL -	<u>r</u>						all Subrouti	no
Subro	utino					ADD	an oubrout	•
		<subro< td=""><td>UTINE&gt; hea</td><td>p-item and c</td><td>ode</td><td>block, just er</td><td>nter the new</td><td>,</td></subro<>	UTINE> hea	p-item and c	ode	block, just er	nter the new	,
				ou enter the C			no no no.	
	Optional Inpu	t Daramat						
	optional inpu	i aramen	ers					
#	Input Value			broutine		Number of	Elements	7
				broutine D100	•	Number of		
# 1 2	Input Value		Into Su		• •			
# 1	Input Value		Into Su	D100		1		
# 1 2	Input Value		Into Su	D100	•	1		
# 2 3	Input Value	e Insert	Into Sul	D100 D101	•	1		
# 2 3	Dptional Outp	Insert Dut Parame	Into Sul	D100 D101	• M	1 1 ove Down		
# 2 3	Input Value	Insert Dut Parame routine	Into Sul	D100 D101	• M	ove Down	Elements	
# 2 3	Dptional Outp	Insert Dut Parame	Into Sul	D100 D101	• M	1 1 ove Down	Elements	
# 2 3	Dptional Outp	Insert Dut Parame routine	Into Sul	D100 D101	• Mi	ove Down	Elements	
# 1 2 3	Dptional Outp	Insert out Parame routine 102	Into Sul	D100 D101 Move Up	• Mi	ove Down	Elements	
#	Dptional Outp	Insert Dut Parame routine 102 Insert	Into Sul	D100 D101 Move Up	• Mi	ove Down	Elements	
#	Input Value Dptional Outp Out of Sub D1 Leg Edge trigge	Insert Dut Parame routine 102 Insert	Into Sul	D100 D101 Move Up	• Mi	ove Down	Elements	

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):

bo-more Designer 2.0.0 - ADD1					-	
<u>File Edit Search View Tools PLO</u>	C <u>D</u> ebug <u>W</u> indow <u>H</u> elp					
Open Save New Backup	Dashboard Edit Mode Accept Description		Find Next Browse		100% -	Options -
Read PLC Write PLC New Online Do-n	Nore/Sim Data Debug Trend Memory Status All Statu	US No Status	V2-1 V2-7	Info Configure	Devices	<b>6</b>
🚀 🌉 ADD 🔮 SMain						₫ Þ ×
SMain	- • •	🗊 ADD			-	• *
Project Browsee	CALL         Call Suboutine         ADD           Subroutine         ADD         Address         Address           Optional Input Parameters         i         Input Value         Into Suboutine         Humber of Elements           I         1         ADD         Address1         1           I         2         2         ADD         Address1	0	MATH Result Express	Calco ADD_Result ion ADD_Addend1 +		D102
	Optional Output Parameters # Out of Subroutine Into Number of Elements 1 ADD_Result D0 1	8		RET Retur	n Back to	)
	CALL Call Subroutine ADD Optional Input Parameters # Input Value Into Subroutine Number of Elements 1 4 ADD Addend1 1	10		(	NOP	)
	2 5 ADD_Addend2 1	11			NOP	) _
	Optional Output Parameters # Out of Subroutine Into Number of Elements 1 ADD Result D1 1	12		(	NOP	)
						. 🖃
For Help, press F1			S P D Offline 0020	06/65536 H2-DM1E		

# Enhanced New Offline Project Dialog

New Offline Project			
Do-more Hardware <u>Class:</u> Do-more BRX Series Do-more Simulator Do-more Simulator Do-more T1H Series	Lype: H2DM1 H2DM1E	Sub-Type: unspecified (up to 3 slots) 3 slots 4 slots 6 slots 9 slots	Enhanced features are highlighted in green Modular base with up to 9 slots But in Ethernet
New Project Name	Browse	OK	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

	0
EMAIL	- Send EMail
SMTP Device @MySMTPServer •	
✓ To "joe@acme.com"	۰
□ Cc	
□ Bcc	
Subject "Look at the attached data"	•
Automatically insert space after each term	
Message	
"This is the log data from " TimeStamp() ". Please analyze"	• ^
	$\sim$
Use Ctrl+Enter to embed carriage-return (only during edit)	
Attach File	
File System @RamFS ▼	
File Name "MyLog.csv"	
✓ Delete File after EMail sent	
On Success: Set bit SIMP to Stage CO	
On Error: <sup>©</sup> Set bit <sup>©</sup> 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

	)
ENDC — Conditional End of Code-Block	

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

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

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

# **Instruction Toolbox**

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

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

			Show C	lassification	ns
Inst 		on Toolbox 1 × worites - Delta Contact: On When Value is Different from Previous Scan - Invert Power Flow	Sho V V	Check All w Class in I Favorites Contact Coil/Bit Ou Analog/Pro	
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			•	Timer/Cou OK	nter/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
DST55	\$POMIpAddress	for details
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           ict EtherNet/         https://www.youtub         DmEIPClientBarCode         Analog           iet EtherNet/         https://www.youtub         DmEIPClientBarCode         Communication           iet EtherNet/         https://www.youtub         DmEIPClientEcoder         Communication           iet EtherNet/         https://www.youtub         DmEIPClientSoftStart         Data           iet EtherNet/         https://www.youtub         DmEIPClientVFD_1         EtherNet/OGIC           iet EtherNet/         https://www.youtub         DmEIPClientVFD_1         EtherNet/P           iet EtherNet/         https://www.youtub         DmEIPClientVFD_1         EtherNet/P
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UDP

**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).

earch:	<ul> <li>Search even</li> </ul>	rything 🔘 Search checked categorie
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ītle	Online/Local	205
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How To Do-more CTRIO2 Motion Using Encoders	Online	Communication
How To Do-more CTRIO2 Motion Using Limits	Online	CTRIO/2
How To Do-more CTRIO2 Trapezoid Moves	Online	Data     InterctLOGIC
How to Use the MATH Instruction with Do-more Designer	Online	✓DirectLOGIC
An Intro to Using Stage Programming with Do-more Designer	Online	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	Online	GS Drive
How to Setup External Serial Ports with Do-more Designer	Online	HMI/Monitoring
How To Sense Temperature with a Do-more PLC	Online	▼I/O
Helpful Hints to Get the Most Out of Your PLC with Do-more Designer	Online	✓ 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	Online	Serial_Comm
How To Control On/Off AC Motors with a Do-More PLC, Part II Software	Online	Simulator
How to Get Started with the Do-more Designer Software	Online	Stage
How to Connect to a Do-more PLC Via Ethernet	Online	Terminator Troubleshooting
How to Connect to a Remote Do-more PLC Behind a VPN	Online	
How to Connect to a Remote Do-more PLC via Port Forwarding	Online	
How To Detect Objects with a Do-more PLC	Online	
How to Sense Distance with an AutomationDirect Do-more PLC	Online	
Welcome to Do-more 2.0	Online	
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# Video Download Utility

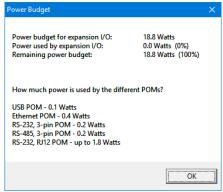
The new Video Download utility can be especially helpful for installations where Internet access is erratic or does not exist. By downloading relevant videos to your hard drive ahead of time, you can still play these videos regardless of your Internet connection at those critical moments! (see Help->Download 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
- 9. Ladder View properly displays long Unassigned Nicknames and Symbolic Constants in contacts and coils (5658)
- 10. Element Editor Auto Complete now shows Structure level nicknames which have valid structure fields for that parameter (5659)
- 11. Browse PLC File System bumped application timeout to 10 seconds (5655)
- 12. Select Project dialog's PLC Subtype Specification list shows voltage range next to power-supply type
- 13. Do-more Technology version takes you to the new Download Firmware/Gate Array dialog instead of the System Information dialog when looking to update your PLC
- 14. Project Browser shows the *Sort By* settings for the *Control Logic* and the *Configuration/Memory* nodes of the browser tree (5281)
- 15. Fixed some modality issues with various dialog boxes
- 16. Browse Videos dialog can sort based on Location column (Disk vs. Internet)
- 17. Video Download Utility reports error messages in addition to the error codes

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

For details about updates for version 1.4 and earlier, see this online document: http://forum.hosteng.com/wndm/Updates\_1\_4.pdf