

GETTING STARTED

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Introduction

Purpose of this Manual

Thank you for purchasing from our Do-more PLC family of products. This manual shows you how to install, set up, program, troubleshoot and maintain your Do-more T1H Series PLC. For installation personnel, this manual contains information on power and signal wiring, mounting details and configuration procedures.

This manual can be very helpful as a quick reference guide for those who are experienced in PLCs. For those who may be new to PLCs or our products, reading this manual will give you an understanding of the variety of features available with the Do-more PLC.

Purpose of this Chapter

This chapter will guide you through the basic set up of a Do-more T1H Series PLC. It contains step by step instructions on installing the programming software, installing and configuring your hardware, applying power to the PLC, establishing a communications link, and creating, saving and writing a project to the CPU. Once these steps are completed, your Do-more T1H Series PLC will be running a ladder logic project that you have programmed.

Online Help Files and Other Documentation

Do-more Designer, the Do-more PLC programming software, is available for free download from our website at:

http://www.automationdirect.com

The software includes searchable online help topics covering all aspects of the software, instruction set, module set up and communication.

Technical Support

We strive to make our manuals the best in the industry. We rely on your feedback to let us know if we are reaching our goal. If you cannot find the solution to your particular application, or, if for any reason you need technical assistance, please call us at:

770-844-4200

Our technical support group will work with you to answer your questions. They are available Monday through Friday from 9:00 A.M. to 6:00 P.M. Eastern Time. We also encourage you to visit our web site where you can find technical and non-technical information about our products and our company.

http://www.automationdirect.com

Conventions Used



When you see the "note pad" icon in the left-hand margin, the paragraph to its immediate right will be a special note. Notes represent information that may make your work quicker or more efficient. The word **NOTE:** in boldface will mark the beginning of the text.



When you see the "exclamation point" icon in the left-hand margin, the paragraph to its immediate right will be a warning. This information could prevent injury, loss of property, or even death in extreme cases. Any warning in this manual should be regarded as critical information that should be read in its entirety. The word WARNING in boldface will mark the beginning of the text.

Key Topics for Each Chapter

The beginning of each chapter will list the key topics that can be found in that chapter.

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In This Chapter	
Introduction	
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Before You Begin

It is recommended that the following items be available to make this short step-by-step introduction to the Do-more T1H Series PLC go smoothly.





Not available from Automationdirect.com.

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Do-more T1H Series PLC System Components

The Do-more T1H Series CPU modules were designed for use with the Terminator I/O product line. For those not familiar with Terminator I/O, it is a modular system which combines the functions of terminal blocks and I/O modules for distributed I/O. Each Terminator I/O system contains: a Power Supply, a Base Controller, and one or more I/O Module(s). Now with the addition of the T1H CPU, standing in place of the Base Controller, the Terminator distributed I/O system becomes a complete, highly functional, stand-alone PLC system.

CPU

T1H-DM1/T1H-DM1E

Power Supplies

120/240 VAC and 12/24 VDC power supplies are available. The AC version has a built-in 24 VDC supply. A power supply must be the leftmost component in a slave system followed by the CPU. Additional power supplies should be added between I/O modules to meet power budget requirements.

I/O Modules

A Terminator I/O module assembly consists of an I/O module and a separate base, as shown below. A complete range of discrete modules which support 12/24 VDC, 110/220 VAC and up to 7A relay outputs is offered. The analog I/O modules provide 12 and 14 bit resolution and several selections of I/O signal ranges (including bipolar). The temperature input modules provide 16 bit resolution with several temperature input range selections.



Do-more Software System Requirements

The Do-more Designer Windows-based programming software works with Windows[®] XP (Home or Professional, 32-bit), Vista (Home, Basic, Premium, 32 or 64-bit), Windows 7 (Home, Professional, Ultimate, 32 or 64-bit) or Windows 8 (Home, Professional, Enterprise 32 or 64-bit; Windows 8 RT edition is NOT supported).

Please check the following requirements when choosing your PC configuration:

- Minimum PC to PLC Connectivity, at least one of the following:
 - USB Port: connects to the CPU with USB-A connector (USB-A to USB-B cable)
 - RS-232 Serial Port: connects to the CPU with RJ-12 connector (RJ-12 to DB9 or RJ-12 to USB-B serial converter cable)
 - Ethernet Port: connects to the CPU (T1H-DM1E) with RJ-45 10Base-T or 100Base-T (Cat5 Patch Cable)
- Hard Disk: 100MB free disk space
- Video Display: 1024x768, 256 colors resolution (1280x720, true color recommended)
- Windows XP, 32-bit:
 - 800MHz, single core CPU (2GHz, multi-core or hyperthreaded recommended)
 - 512MB RAM (2GB recommended)
- Vista, Windows 7 or Windows 8, 32 or 64-bit:
 - 1GHz, single core CPU (2GHz, multi-core recommended)
 - 1GB RAM (3GB recommended)



NOTE: The PC/Laptop/Ethernet Switch connector at the "opposite end" of the PLC connector will dictate what kind of cable you will need.

Step 1: Install Do-more Designer Software

Download the Do-more Designer programming software (DM-PGMSW) from our website at http://automationdirect.com and launch the install procedure. If you already have Do-more Designer installed, you can just update to version 1.2 or newer to get T1H CPU support.

Do-more Designer - InstallShield	d Wizard	The first screen that opens is the Welcome
	Welcome to the InstallShield Wizard for Do-more Designer The InstallShield Wizard will install Do-more Designer on your computer. To continue, click Next.	screen seen here. If there are previous versions of this software already installed, this screen will detail the version number of the software being replaced and the one being installed, click Next to continue.
Do-more Designer	- InstallShield Wizard Welcome to the InstallShield Wizard for D Designer The InstallShield Wizard will update the installed v (0.09 104) of Do-more Designer to version 0.09.91 continue, click Next.	Do-more version 313. To An alert window will appear requesting that all anti-virus software be disabled and also reminding the user that Administrative restrictions may exist. Do-more Designer - InstallShield Wizard Before continuing with this Setup program, please be sure to disable any anti-virus software, and insure that you have Administrator privileges. OK
	< Back Next >	Cancel

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

There is also the option to print the license agreement if desired. The print function will print the license agreement to a .pdf file and save it in the location you choose.



Now the software will ask a little about you. Please fill in the information requested on the Customer Information screen and click Next to continue.

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

Customer Information				
Please enter your information	1.			Contraction of the local division of the loc
Please enter your name and	the name of the	company for which	you work.	
User Name:				
1200				
Company Name:				
stallShield				

Do-more Designe	er - InstallShield Wizard
Setup Type Select the set	up type to install.
Please select	a setup type.
Complete	All program features will be installed. (Requires the most disk space.)
Custom	Select which program features you want installed. Recommended for advanced users.
InstallShield	< Back Next > Cancel

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

Select the installation type desired and click the Next button to continue.

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

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



ſ	Do-more Designer - InstallShield Wizard
	Do you want a Do-more Designer shortcut on your DeskTop?
	Yes No

The popup shown here will allow you to choose whether or not to install a shortcut for the software on your PC's desktop. Click Yes or No to continue with the installation.

Do-more Designer - InstallShield Wizard	×	The software will now install th	e
Setup Status The InstallShield W/zard is installing Do-more Designer	R.	needed files and folders with the Status window detailing the stat the installation.	e Setup tus of
Installing Program Files C:\Do-more Designer\Bin\PrgExtDm.dll		Once the installation has been successfully completed, the wim- below will open. Your software now installed and ready to use. installation wizard can now be o by clicking the Finish button at bottom of the window.	dow is The closed the
InstallShield	Do-more Designer - InstallShield W	izard	
	Example 1 and 1 an	stallShield Wizard Complete e InstallShield Wizard has successfully installed Do-more signer. Click Finish to exit the wizard. Yes, I want to view the Read Me file. Yes, I want to launch Do-more Designer now.	

< Back

Finish

Cancel

Step 2: Launch Do-more Designer Software



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

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



NOTE: Software version 1.2 or greater is required.

The Do-more Designer Software will start up and display the Start Page shown below. This page consists of a Launchpad with quick links to existing projects, software applications and communications links. There is also a section containing shortcuts to important help file topics and the Do-more Designer simulator application.





To begin a new project offline select New from the toolbar on the Start Page. The New Project window seen here will open.

Name the new project and select the type of controller it is intended for. Use the Browse button to choose a different location to store the project or accept the default location. Click OK after your selections have been made to continue. The Main programming window and Instruction Palette shown below will open.

The Instruction Palette lists all of the instructions available for use in your program. A brief explanation of each instruction is provided once the instruction is highlighted and a more detailed explanation is available in the help file.

The Main programming window is divided into menus and toolbars for quick access to configurations, instructions and other needed items used during project development.



Instruction Palette								
Instruction Class	Instructions							
Contact-Delta								
Contact-Differential	-17-							
Contact-Power Flow		- 	-000-					
Contact-Relational	+,=,+	⊣.≥.⊢	·+ > +	$+ \leq +$	+ < +	ーメト		
Contact-Standard		14						
Coil-Standard	(END)	(NOP)	(OUT)	(RST)	(SET)			
Assignment	INIT	MAPIO	MEMCLEAR	MEMCOPY	MOVE	MOVEBIT	MOVER	PUBLISH
	REFWRITE	RSIR	SETNUMR	SETR	SUBSCRIB			
BCD	BCDTO	TOBCD	DONOFF	CURADITIC				1000 (100000-1005)
Commission	CHECKCIM	DUDY	PONUPP	SUMBLIS	Chanti	CORCOR	CODECIMID	MOV
Communication	MWY	OPENTCR	PACKETIN	PACKETOLIT	DEEDITMK	DING	CETLIDID	SETLIDNOD
	SETLIDSED	STREAMIN	STREAMOUT	TOPLISTEN	PEEKLINK	PING	SETUPIP	SETUPINOD
Compare	ISCIEAD	STREAMEN	JINDAHOOI	TOPLISTER				
Conversion	EREOCNT	FREOTMR	GRAY	SCALE	SEG	STR 2INT	STR 2REAL	SWAPB
Counter	ONT	ONTON	RSTCT	UDC				
CTRIO	CTAXCEG	CTAXDYNP	CTAXDYNV	CTAXJOG	CTAXLIMT	CTAXTRAP	CTDYNPOS	CTDYNVEL
	CTPLSADD	CTPLSEDT	CTREGRD	CTREGWR	CTRUNPOS	CTRUNVEL	CTTBLADD	CTTBLCLR
	CTTBLEDT	CTTBLLD	CTUPDLVL					
Date/Time/Calendar	DT2EPOCH	DTCMP	DTDIFF	DTOFFSET	EPOCH2DT	NETTIME	SETTIME	
Device	CLOSE	DEVCLEAR	DEVREAD	DEVWRITE	OPENDEV			
Differential/Edge/Clk	ND	PD						
Drum	DRUM							
Intelligent Module	RD	WT						
Looping	BREAK	CONTINUE	FOR	NEXT	REPEAT	UNTIL	WEND	WHILE
Math	DEC	INC	LERP	MAIH	RANDSEED	FT TED		
Process	ALDEV	ALHILO	ALKATE	CLAMP	DEADBAND	FILTER	INTEGRAT	PID
Drogram Control	ENTACK	EVIT	COTO	HALT	I AREI	DEPOOT	DECTADT	DUN
Program Control	STOP	CUEDEND	WATCHDOG	VIELD	LADEL	REDUUT	RESTART	RON
Query Information	DATAINED	HW/INFO	MATCHEOG	TILLO				
Shift	ROTL	ROTR	SR					1000



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Step 3: Install Hardware

The "Installation and Wiring" chapter of this manual contains detailed information for the installation of components in your Do-more T1H Series PLC system. The following summary explains the basic steps for installing modules in a base.

- 1. First, insert module into base:
 - Pull base arm back to allow space for module to enter base.
 - Align module slides with base track.
 - · Press module firmly into base.
- 2. Next, mount the components on the DIN Rail:



NOTE: Do not force the modules on the DIN rail. Due to slight size variations in different manufacturers' DIN rail, it may be necessary to first unlatch the locking tab, rotate the module into place, then latch the locking tab.

- Make sure the locking tab is in the latched position (pushed in).
- Hook upper tab over upper flange of DIN rail.
- Tilt the unit toward DIN rail until it snaps securely to DIN rail.





- 3. Finally, slide the module assembly into position on the DIN Rail:
 - Slide the module assembly on the DIN rail until the clip arm attaches securely to the adjacent module.





NOTE: One power supply is required in the leftmost component position followed by the CPU. Additional power supplies should be added between I/O modules as necessary to meet power budget requirements. Each power supply powers the modules to its right, but is interrupted by the next power supply.



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

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Once all of the modules have been installed, connect the USB cable. Use a standard USB cable with Type A and Type B connectors. (Ethernet and Serial connections are also available, but are not shown for this example.)



Step 4: Apply Power to the PLC

Power is supplied to the Do-more T1H Series PLC through the backplane of the base from the power supply. The following diagram and table show the terminal connections located on Terminator power supplies and their specifications.





NOTE: You can connect either a 115VAC or 220VAC supply to the AC terminals.

Once all of the power wiring has been completed and verified, connect the appropriate voltage source to the power supply and power up the system. The Do-more T1H Series PLC will perform a self evaluation once power is applied. Refer to the "Installation and Wiring" chapter of this manual for more power supply and input wiring information.

Step 5: Establish Communication

Now that the Do-more T1H Series PLC is powered up, you need to establish a communications link between the PC and the PLC. The Do-more Designer software provides a Link Wizard to assist you with configuring this new communications link. To open the Link Wizard, select the New Link... button in the Links section of the Main Page's Launchpad as shown below.





programming and select Next. The Do-more Designer software will create a link to that controller.

The Link Wizard will now display the saved settings for this link as seen on following page.

Wizard will first ask you to choose which communications port you will be using. In this example, we will be using a USB connection. Select USB, click Next and the wizard will automatically search for available CPU's on that port.

Choose the CPU that you are

	Link Wizard
Car	Select an attached device from the list below. Press "Refresh List" to update the list with new devices.
e a	Currently Attached CPUs Refresh List
2	IMPORTANT NOTE: USB devices that are already in use in another link will not show up in this list. If you need to reference a single device in more than one link, make sure that device is not currently in use when running this wizard.
	Link Editor <back next=""> Cancel</back>

Link settings complete!
Please select a unique name for the new link.
Link Name: DM_1
Link Description:
Settings PLC: T1H-DM1E Port: USB
Protocol: Do-more (DM PLCs) Baud:
Address: 1 Parity:

Once you have completed configuring your communications link, either manually with the Link Editor or automatically with the Link Wizard, it will be available to select in the Links section of the Launchpad. There you can edit, enable/disable, delete or view statistics for that link.

A unique name is required for each link that is created. Name the new link and, if desired, give it a description then select Finish.

You can also manually configure each link by selecting the Link Editor... button from the lower left corner of the Link Wizard. The Configure Link dialog will open, as seen below, allowing you to select PLC types, port parameters, and protocols.

Configure Link	x
Name: DM_1 Description:	
PLC Port Protocol	
PLC Type Domore H2 Series Domore TH Series Unspecified	
Accept Cancel Help Auto Blir	ık

Do-more Designer - My_DM - (\$Main)		And and a state of the second state of the sec		
File Edit Search View Tools PLC Debug Window	Help			
Open Save New Backup	Undo Cut C	Copy Paste Find Find Next Browse Previous Next Out	tput 100% - Dptions On The Web Tip .	
Read PLC Write PLC New Online Do-more/Sim Data	ebug Trend S	tatus All Status No Status	Y Provide Participation pnfigure Devices Check PID Overview PID View	
Launchpad 📳 🗶	🟦 Start Page 🚺	SMain	Ix 4 ₽	-X-
Projects:		Link Into		
	1	Link Information	Link Performance	
		Name: DM 1	Transaction Bate/sec: 0	Exit
		Description		Help
		Description	Completed Transactions: U	
Open New Remove Folders		Status: Active	Hetry Lount: 0	Edit Link
Andrations	3		Error Count: 0	
Do-more Designer		Session Information	Item Transfer Bate/sec: 0	
Visit AutomationDirect		User Name:		
Visit Host Engineering		Privileges: "NONE"	Reset Link Statistics and Error Lo	a
CTRIO WB 2 - Do-more PLC				
4 Þ	5	Error Log		
Run		Time	Frror Exte	nded Error
Links:				
MySim				
₹ <u></u> DM_1				Ψ.
NewLink	7			· ·
		🔽 Link Enabled		
			1 100	/
			NOP J	
Open court. New DR	9		(NOP)	
de la filo : 10				
Zaunchpad Project Browser				
I \$\$\$ ₩ 11 ¥ 11 11		- < < <- <- <- <- <- <- <- <- <- <	(R)- 🎾 🔆 📝	
Instructions Accept F2 F3 Sh+F2 Sh+F3	- 1	< > Delta Out Set R	leset Browse ^w Edit Mode	
For Help, press F1		S P D Offline	e 00083/65536 T1H-DM1E	

I–15

Now select the New Online button and the Online dialog box, seen below, will open. From this dialog, you are given available communications links to choose from with options to add, edit disable/enable, or delete links.

Online		×
New Project	Browse	OK Cancel
MySim : on Local Port	Add Edit Delete	Help
↓ Link Enabled		

You are allowed to continue if you wish or place the mode selector switch on the CPU module in the Term position to avoid any unintended communication errors. Choose the appropriate link, select OK and the software will connect to the Do-more T1H Series PLC. If the mode selector switch on the CPU module is not in the Term position when connecting, the warning shown below will appear.

Warning! PLC is not in terminal mod operations require termina continue, but may receive	le! Some comm I mode. You may comm errors.
	ОК

If you were connecting to the CPU module with a project created offline, you may encounter the message window shown here.

Resolve Online/Offline Diffe	erences		x			
ATTENTION! The	ere are differe	rences between the offline project and the PLC you are connecting to!				
Details						
System Configuration:	DIFFERENT					
	- System Conf Mappings, and	nfiguration includes the configuration for Memory, CPU, I/O, Modules, I/O nd Devices.				
Program:	MATCHES	Compare Programs				
	- Program incl	dudes all Control Logic, Code-Block Configurations, and Execution Order.				
Documentation:	DIFFERENT					
	- Documentati	tion includes Element Documentation, Rung Comments, and Project Informatio	on.			
Please select one of the follo	owing:	_				
Go Online and view the D	ISK project	The currently loaded disk project will remain in memory. If the PLC is a diffe type than the current project, the project will be modified if needed to mat the PLC, and any required changes will be directed to the output window.	arent ich			
Go Online and view the PLC project The PLC's project will loaded into memory, and any offline project data curre unsaved will be discarded.						
Cancel, and return to Offline Return to the offline project without connecting to the PLC.						
<u></u>			-			

Only with the New Online option does the Do-more T1H Series PLC assume that you are creating a new project from scratch. With any other method, such as PLC > Connect, the software will compare the project in the controller with the offline version you have open. If there are any differences, this warning window will appear detailing the options available for continuing:

- 1. Go Online and view the DISK project This option will go online with the PLC but display the project from disk. Status displays may show incorrect information. If the memory configuration in the disk-based project contains elements that are incompatible with the memory configuration currently in the Do-more PLC the message box seen here will be displayed.
- •2. Go Online and view the PLC project The project from the PLC will be opened by Do-more Designer.
- •3. Cancel, and return to Offline This option will cancel the connection attempt and return to the offline project.

Online/Offline Incompatibility	×						
PLEASE NOTE!							
You have chosen to go online, but selected the offline program that contains an incompatible memory configuration.							
This is valid, but please be aware that prior to downloading the offline program to the PLC, status displays may display incorrect information. It is recommended that you immediately download the offline program to the PLC.							
Continue Online Return To Offline							

•4. Compare Programs... - If you are unsure as to why the two projects are different, then this option will do a comparison of the projects and detail the differences found. An example comparison is seen below.

In this example, the PLC project titled My_DM was compared with a project stored on the PC. The report window shown above illustrates the differences found between the two.

Compare Programs [My	y_DM to Projec	t in PLC]				×
Show code-blocks only	in My_DM		Show Code-Blo	cks in differen	t execution o	order
Show code-blocks only	in Project in PLC		Show Code-Blo	cks in consiste	nt execution	order
Exec# My_DM Code-Blo	ock	Exec#	PLC Code-E	llock		Compare
1 \$Main		1	\$Main			
2 MyNewProgram						Close
Instruction Differences	Key: Differen	t Only in Current	Project Only in	Other Project	Identical	nonic
@0		<top code-<="" of="" td=""><td>block></td><td>1</td><td><top c<="" of="" td=""><td>ode-block></td></top></td></top>	block>	1	<top c<="" of="" td=""><td>ode-block></td></top>	ode-block>
	\$Main@0	STRN C0		\$Main@0	STR C0	
	\$Main@1	OUT Y0		\$Main@1	OUT Y0	
Previous Next	C Show D	ifferences Only	Show D	ifferences w/C	ontext	C Show All Logic

According to the report, the PLC project was different in two areas. First, a new code-block was found only in the PLC project. This new code-block is titled MyNewProgram and is highlighted in green. The green color represents items that exist only in the Current Project (project in PLC) and not in the Other (project in PC). Also, the comparison noted that a normally open contact (STR) was changed to a normally closed contact (STRN) at \$Main@0. This item is highlighted in blue which represents items that are different between the PLC Project and the project in the PC.

Other colors used in the comparison are red, which denotes items that exist only in the project on the PC and not in the PLC and black which highlights items that are identical in both projects. There are also numerous checkbox and radio button options available to help you analyze the differences between projects.

Once you have connected to the CPU either by using the New Online option or using PLC

. .

cu.

	> Conne	ect for offline projects, you may
Initialize Cleared PLC	encount	er the initialization windows
A new Do-more controller, or Do-more controller that has been cleared, nee real-time clock set. Click the Set PLC Clock button to set the Current Time, the Daylight Savings Adjustment option.	ds to have its internal, the Time Zone and Set PLC Clock	ere.
	Clock Settings	PLC Clock Notes:
	04/09/2012 15:24:56	Do-more CPUs store time internally in UTC, but adjust for local time using a timezone adjustment specified in minutes.
Set PLC Clock	Daylight Savings Time : ON	Do-more CPUs adjust local time for Daylight Savings Time, but this is only done manually, to avoid conflict with widely varying laws.
Don't show this again.	C Set to manual settings Date: 4/ 9/2012	Time zone can be adjusted at runtime by changing the system variable \$TimeZone (D\$T384), Remember that the timezone is specified in minutes relative to UTC.
The Set DI C Cleak ention (above)	Time: 1:37:23 PM	For example: US Eastern Standard Is UTC - 300 minutes, so \$TimeZone would be -300.
allows you to set the internal, real-	Timezone: 0 in minutes	Daylight Savings Time can be adjusted at runtime through the system variable \$SummerTime (ST768). Setting it to 'true' automatically adds 1 hour to the
time clock of the PLC.	Read PLC Settings	iocai ume.
The Set PLC Clock window (right) has options for Timezones and	Set PLC Clock and Exit	Cancel
Daylight Savings Adjustments.		



The Setup System Configuration option (left) allows you to configure the parameters of the Do-more T1H Series PLC. I/O module configuration, CPU ports, and I/O mapping profiles are a few of the parameters available in the System Configuration window. Refer to the following section for Hardware Configuration options.

Do-more Designer - My_DM - [\$Main] File Edit Search View Tools PLC Debug Window Help (2) 02 d 9 3h B P A 60 63 ₽⊦ -IF -() Output 100% -Undo Find New Backup Edit Mode Tip Save Open -Ø 豪 쁥 3 -λY P * P v2=! v2=? New Online Do-more/Sim Debug Trend Value PID Overview PID View Data Status All Status No Status Forces Mode Info Configure Devices Check 후× Strain ▼推開書 ぬぬ --(NOP) Online Toolba 2 -(NOP) Programs i Configuration 3 4 NOP) Hemory Forces (Disabled) 🚵 CPU Devices NOP) 4 Tools XY System Configuration System Info 5 NOP) 1 Reserved Config (Default User - RD WD RP WP SS PM NOP) 6 Status Bar NOP) -(30 D -UF--11-P 1 -(s)d zł -<u>|≤</u>-**: Browse Edit Mode Online/Default User/DM 1 Program 00083/65536 T1H-DM1E or Help, press F1 Devs OK

Once all parameters have been configured, the following programming window will open with the online toolbar active.

Notice that the status bar indications show PLC type, memory usage, communication status, PLC errors, PLC mode, etc. Hovering your mouse over the status bar will highlight the items that are selectable. If you select one of these items, a new window will open with real-time data and options that are available for that selection.

As an example, the System Information window seen here appears after selecting the Memory Usage indication from the status bar.

Туре		- Memory Usage		Version		
PLC Type: Serial Number: Mode Keyswitch:	T1H-DM1E 00 00 19 00 00 4D TERM	Max Program: Program Used: Max Documentation: Documentation Used:	65536 114 1048576	Do-more: OS: Booter: FPGA:	0.11.0 0.12.0* 2.0.6	Update Update
PLC Mode:	Run	System Clock	540	Hardware:	2.0	
Min: Avg: Max: Node and IP C	I17 us Reset I18 us	Time Zone: UTC +0:0	D DST: OFF			
Module ID: Name:	0 DM_1	IP Address: 1 Subnet Mask: 25	92.168.34.3 5.255.255.255			
Description:	Do-more	Gateway: Set Node and IP C	0.0.0.0			

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Step 6: Verify Hardware Configuration

Next, you will need to verify the hardware configuration for accuracy. The Do-more T1H Series PLC has an auto discover feature that will automatically detect the I/O modules installed. You can see the results of this search by selecting PLC > System Configuration, double clicking the CPU link under the Configuration tab in the Project Browser, or by clicking the XY Configure icon in the Project Toolbar.



On the left side of the System Configuration window is an index of topics titled Configuration Entries. Click the I/O Configuration tab and you should see an overview of the modules that the software located, similar to the following.

System Configuration		×
Configuration Entries CPU Configuration G: Torofiguration C: Terminator Local I/O Master - Terminator Base - Module Configuration(s) - Device Configuration - I/O Mappings - Memory Configuration	I/O Configuration Overview	
	OK Cancel Help	

From here you can verify that the software has detected all of the I/O modules that are installed.

The Do-more T1H Series PLC allows the I/O to be manually configured as well. In order to do so, you must first set the I/O Configuration Mode to manual. Select the Terminator Local I/O Master tab found under the I/O Configuration tab in the Configuration Entries index.

System Configuration	×
Configuration Entries 	Terminator Local I/O Master Configuration I/O Configuration Mode In "Auto", the PLC automatically creates the proper configuration for the installed I/O upon transition to RUN mode. In "Manual", you must provide the I/O configuration, which the PLC will compare to the installed I/O. The manual configuration and installed I/O. The manual configuration and installed I/O. The Manual C Auto C Manual
	OK

The Terminator Local I/O Master Configuration window shown here will appear. From here select Manual to configure the I/O modules that are installed in the system yourself. It is important to remember that the PLC will compare what you configure with what is installed and they must match for the PLC to work properly.

NOTE: If the manually configured I/O modules do not match the installed I/O modules, the PLC will not go into Run Mode.

After you have set the configuration mode to Manual, select the Terminator Base tab in the Configuration Entries index. This will take you to the following set up window.

System Configuration Configuration Entries CPU Configuration E:1/0 Configuration E: Terminator Local I/0 Master Terminator Base Module Configuration(6) Device Configuration I/0 Mannines	Terminator I/O Base
Memory Configuration	Add Module Discrete Input
	Discrete Output TIK-08TD1
	Analog Input Analog Output Analog Combo TIK-08TD2-1 TIK-08TD2-1 TIK-08TA TIK-08TR
	Speciality TIK-08TRS TIH-08TDS
	T1K-16TD1 T1K-16TD2-1
	Manual Base Scan When the I/O Master is set to "Manual" I/O configuration mode, use "Scan Base" to read the current base contents into the manual configuration. Scan Base
	OK Cancel Help

Notice that from this window, you can perform a Manual Scan. When initiated, this scan will poll the available modules connected to the PC and display the I/O found. The results can then be altered as you choose.

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To manually enter your I/O modules into the configuration, right click on the slot the module will reside in, select Add Module and then choose the module from the drop down list. Once you have selected the module, it will appear in the slot that was chosen.

In order to Insert a module manually between two existing modules in the System Configuration Window, you would follow the same steps as mentioned above but instead of selecting 'Add Module' the selection will be 'Insert Module' as seen below.

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After the hardware configuration has been verified select the I/O Mappings tab in the Configuration Entries index. This option will display the assigned addresses for the configured modules as seen below.

U Configuration	Slot	Mod ID	Mod Description	Slot I/O	X Map	Y Map	WX Map	WY Map	
Configuration	🖃 0 - T	erminator Lo	cal I/O Master						
Terminator Local 1/O Master		- Terminato	or Base - Right Click to edit h	ase's default man addresse	< (X0 V0 WX0 W	V0)			
dule Configuration(s)		1102	T1K-08ND3	8X	X0-7	,			
vice Configuration		1102	T1K-08ND3	8X	X8-15				
mory Configuration		2532	T1F-08ADx	8X / 8WX	X16-23		WX0-7		
		1242	T1K-08TR	8Y		Y0-7			
		Empty							
	1	*Empty*							
		i *Empty*							
		Empty							
	4	Empty*							
	9	*Empty*							
	1	0 *Empty*							
	1	1 *Empty*							
	1	2 *Empty*							
	1	3 *Empty*							
	1	4 *Empty*							
	1	5 *Empty*							
	1	6 *Empty*							
	1	7 *Empty*							
	Mapping	Mode		-Manual Mode Instructions					
	In "Aut image i	o" mode, the egister addre	PLC automatically assigns isses to each slot.	Automatically assigned shown in gray.	addresses are	Map val shown i	ues that exceed n bold red.	memory config are	
	In "Manual" mode, you may enter the desired Manually assigned addresses are shown in image register address for one or more slots. black.					Clear m	Clear manual entry to return it to auto.		
		o C Manu	al Clear Manual Entries	Map range overlaps are shown in red.	e errors, and are				

These X (discrete input), Y (discrete output), WX (analog input) and WY (analog output) addresses are automatically assigned by Do-more Designer. You have the option to manually configure these addresses by selecting Manual in the Mapping Mode section at the bottom of the window.

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

Step 7: Create a Ladder Logic Program

To create a ladder logic program, you must first place the software in Edit Mode. Click the Edit Mode button found in the Project Toolbar or Ladder Palette Bar or use the shortcut Ctrl+E.

When in Edit Mode, all of the Ladder Palette Bar's options will become active and the cursor in Ladder View will fill in blue. Now, you are ready to begin entering the example ladder logic below.

Rung #1

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Place the box cursor in the NOP position on Rung #1. If the Instruction Palette is not open, then click Instructions from the Ladder Palette Bar and select the TMR (Timer) or type a

"T" and select TMR from the drop down menu, then press Enter. Once TMR is selected, a Timer dialog

- box appears.
- •1. Set the Timer Struct to T1.
- •2. Enter 03 into the Preset Constant Value for the seconds (s) preset.
- •3. Click the checkmark in the upper left corner to accept.

After clicking the checkmark, Rung #1 should show the T1 timer (TMR) instruction with a preset of 3.000 seconds.

A user variable can be assigned to the preset value if needed.

Since a Timer is a structure it has predefined elements associated with it. Elements such as .Acc (accumulated time), .Done (the completion bit) and .Timing (the timer is enabled and timing). Therefore, if "T1." is entered into any contact name the Auto-Complete feature of Do-more Designer will display all applicable bit (boolean) selections available for that structure. Selecting the .Done option, as seen below, will assign this element to the contact and the contact name will be T1.Done.

This feature works for all structures including: timers, counters, PID loops and strings. Many system data types such as, \$Main and \$FirstScan, as well as user-created devices like ECOM, CTRIO, or SERIO modules can also use this feature. See the Do-more Designer Help file for more information on structures.

Now place the box cursor in the leftmost column of Rung #1. Type in a meaningful nickname, such as "T1_Start", and press Enter or select the Normally Open Contact (F2) from the Ladder Palette Bar, enter "T1_Start" for the name and click the checkmark in the upper left corner. Either method will open the Create Nickname dialog seen here. Select the third option to assign the nickname to a specified element, type the desired memory bit for this contact (C1) and select OK.

Create Nickname	×
Nickname: T1_Start Associated Element: C1 Create nickname and	OK Cancel
Cassign to first unused element of specified type Type: T	Help
Cassign to symbolic constant Constant: 0 Cassign to specified element	
Element: C1 • Cleave unassigned Tune: Bit K Y C.etc.)	
l ype: Bit (X, Y, C, etc.)	

Rung #1 should now appear as follows:

File Edit Search View Tools PLC Debug Window Help Undo Ctrl+Z Edit History Cut Ctrl+Z Edit Mode Accept Undo Cut Copy Ctrl+Z Cut Ctrl+X Copy Ctrl+C Comore/Sim Data Debug Trend Status All Status Paste Ctrl+V Do-more/Sim Data Debug Trend Status All Status Paste Ctrl+V Do-more/Sim Data Debug Trend Status All Status Paste Ctrl+V Do-more/Sim Data Debug Tools Tools Contact F4 P Contact F4 P Corticle P P Contact F4 P Toolutput Ctrl+W P Ctrl+Right Arrow Vire Accept F8 Edit Mode Ctrl+Eight Arrow Left Ctrl+Down Arrow Vire System Info Password Config (Default F2 F3 Sh+F2 Sh+F3 = <t< th=""><th>Do</th><th>-more</th><th>e Designer -</th><th>My_D</th><th>M - [\$M</th><th>ain]</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>	Do	-more	e Designer -	My_D	M - [\$M	ain]								
Undo Ctrl+Z Edit History Cut Cut Ctrl+X Copy Ctrl+C Paste Ctrl+V Paste Ctrl+V Delete Del Bisert Ins Merge Paste Contact F4 Coll F5 Box F7 Instruction Palette To Output Wire F8 Edit Mode Ctrl+E Vire F8 Edit Mode Ctrl+Right Arrow Up Ctrl+Right Arrow Up Ctrl+Down Arrow Vire F8 Edit Mode Ctrl+Shift+Right Arrow Up Ctrl+Shift+Right Arrow Up Ctrl+Down Arrow Delete Up Ctrl-Shift+Right Arrow Delete Left Ctrl-Shift+Right Arrow Delete Left Ctrl-Shift+Right Arrow Delete Left Ctrl-Shift+Right Arrow Delete Up Ctrl-Shift+Down Arrow Delete Up Ctrl-Shift+Down Arrow Delete Up	File	Edit	Search	View	Tools	PLC	Debug	Wind	ow	Help				
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Insert Ins Merge Select Select Contact F4 Contact F4 Contact F5 Box F6 F7 Instructions F7 Instruction Palette To Output Ctrl+Right Arrow Left Ctrl+Bight Ctrl+Right Arrow Left Ctrl+Left Arrow Up Ctrl+Down Arrow Delete Right Ctrl+Shift+Left Arrow Delete Light Ctrl+Shift+Left Arrow Delete Light Ctrl+Shift+Left Arrow Delete Light Ctrl+Shift+Down Arrow Delete Up Ctrl+Shift+Down Arrow Delete Up Ctrl+Shift+Down Arrow Delete Up Ctrl+Shift+Down Arrow Delete Up Ctrl+Shift+Down Arrow Delete Down Ctrl+Shift+Down Arrow	Projec	×	Delete		Del			-	Ψ×	SH	\$Mair	1		
Merge Select Image: Contact F4 © Contact F4 F5 F7 © Coil F5 Box F7 Instructions Instruction Palette 2 Wire Image: Ctrl+Right Arrow 2 Wire Image: Ctrl+Right Arrow Left Ctrl+Davn Arrow Down Ctrl+Davn Arrow Image: System Info Down Ctrl+Shift+Left Arrow Delete Right Ctrl+Shift+Left Arrow Delete Up Image: Ctrl-Shift+Up Arrow Delete Up Ctrl+Shift+Left Arrow Delete Up Ctrl+Shift+Left Arrow Delete Up Instructions Accept F2 F3 Sh+F2 Sh+F3 = !	7	×°	Insert		Ins									
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Box F7 Instructions Instruction Palette Instruction Palette To Output Ctrl+Right Arrow Edit Mode Ctrl+R Edit Mode Ctrl+R V System Configuration System Info Delete Right Ctrl+Down Arrow Delete Right Ctrl+Shift+Right Arrow Delete Left Ctrl+Shift+Right Arrow Delete Left Ctrl+Shift+Night Arrow Delete Left Ctrl+Shift+Left Arrow Delete Left Ctrl+Shift+Left Arrow Delete Left Ctrl+Shift+Down Arrow Delete Down Ctrl+Shift+Down Arrow F3 Sh+F2 Sh+F3	6	2	Coil		F5							I		
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Wire To Output Ctrl+W Accept F8 Edit Mode Ctrl+E To Output Ctrl+Right Arrow Left Ctrl+Left Arrow Up Ctrl+Down Arrow Delete Right Ctrl+Shift+Right Arrow Delete Left Ctrl+Shift+Right Arrow Delete Left Ctrl+Shift+Left Arrow Delete Left Ctrl+Shift+Down Arrow Delete Left Ctrl+Shift+Down Arrow Delete Left Ctrl+Shift+Down Arrow Delete Down Ctrl+Shift+Down Arrow Delete Down Ctrl+Shift+Down Arrow F3 Sh+F2 Sh+F3	E	P	Instruction	Palett	e						-		_	
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Image: System Configuration Up Ctrl+Up Arrow Image: System Info Down Ctrl+Down Arrow Image: System Info Delete Right Ctrl+Shift+Right Arrow Image: System Info Delete Right Ctrl+Shift+Right Arrow Image: System Info Delete Left Ctrl+Shift+Light Arrow Delete Up Ctrl+Shift+Down Arrow Delete Up Image: System Info Delete Up Ctrl+Shift+Down Arrow Delete Up Ctrl+Shift+Down Arrow Delete Up Instructions Accept F2 F3 Sh+F2 Sh+F3 =	E	Ø	Edit Mode	C	trl+E		Left			Ctrl+	Left A	rrow		
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Image: Password Config (Default Delete Right Ctrl+Shift+Right Arrow Image: Password Config (Default Delete Right Ctrl+Shift+Left Arrow Image: Password Config (Default Delete Up Ctrl+Shift+Up Arrow Instructions Accept F2 F3 Sh+F2 Sh+F3 =			System In	fo	ation		Down		C	trl+Do	own A	rrow		
Image: Constructions Delete Left Ctrl+Shift+Left Arrow Instructions Accept F2 F3 Sh+F2 Sh+F3 =		_ 22	Password	Config) (Defaul	t l	Delete R	ight C	trl+Sł	nift+R	ight A	rrow		
Instructions Accept F2 F3 Sh+F2 Sh+F3 = !	۰ 📄			11	1		Delete Le	eft	Ctrl+	Shift+	Left A	rrow		
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Instructions Accept F2 F3 Sh+F2 Sh+F3 = ! <	- 11	1		1			Delete D	own Ct	rl+Sh	ift+Do	own A	rrow		r 1 2 h
	Instr	uctioi	ns Accept	1	-2	F3	Sh+F	2 Sh+	13	=			<	-

With the cursor in the position to the right of contact T1_Start, you are going to begin drawing a branch circuit. Under the Edit drop down menu, select Wire, then select Down. Notice the shortcuts that are available for wire drawing. The wire that should now appear in your ladder could have also been drawn using the shortcut Ctrl+Down Arrow.

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

Now place the cursor in the space to the left of the new line and select another normally open contact.

SMain		$\triangleleft \triangleright \times$
T1_Start C1	Create Nickname	Timer
	Nickname: T1_Manual Associated Element: C2 Create nickname and C C assign to first unused element of specified type	OK
Type in the nickname "T1_Manual" and assign bit C2. Select OK to accept and Rung #1 should now resemble the rung seen on the following page.	Type: T	
	Cleave unassigned Type: Bit (X, Y, C, etc.)	

Place a normally open contact in the first position of Rung #2. This contact will be tied to the Done bit of timer T1. Therefore, the name for this contact should be entered as "T1. Done". There should be no Create Nickname dialog as seen with the earlier normally open contacts.

Lastly, you will need to add an Out coil to the end of Rung #2. Place the cursor at the end of the rung and either select Out from the Ladder Palette Bar or just type "OUT" and select the Out instruction from the drop down menu. Next, choose which bit will be tied to this coil. Tie this coil to the physical output Y1 by typing "Y1" and click the check mark.

The ladder program should now look like the following. When either the T1_Start or T1_Manual contact is energized, the timer will begin timing. When it times out, contact T1_Done will energize and the output coil Y1 will turn on. Note that an END instruction is not required.

The yellow bar in the margin signifies logic that has not been accepted. So once you have verified your logic, click the Accept button in the Project Toolbar or the Ladder Palette Bar to accept the changes.

Now exit the Edit mode by clicking the Edit Mode button once again or by pressing ESC on the keyboard.

Step 8: Save a Project

Save the project by selecting (a) Save Project (Ctrl+S) from the File drop down menu. Or save the file under a different name or in a different location by selecting the (b) Save Project As... option.

Step 9: Write Project to the Do-more T1H Series PLC

Now that you have created the example ladder logic program, you can write the program to the PLC. To do so, click the Write PLC button in the Project Toolbar.

If the Write PLC button is not active, then you must first connect to the PLC to activate the online portion of the Project Toolbar (see the "Establish Communication" section of this chapter). If you have altered the System Configuration, which includes the hardware configuration, in any way, then the PLC must be taken out of Run mode in order to process the download.

The message seen here will appear asking you to verify if this is a good time to do so. Since this is the setup phase of this system, select Switch to Program Mode and continue with the download.

If this system was previously commissioned and in use, then you would need to verify that the

process it is controlling can be interrupted at this time before continuing.

Download the project and once the download is finished, assuming there are no errors, the Do-more T1H Series PLC

should return to Run mode. If at any time you need to change the PLC mode, select the Mode icon in the Project Toolbar, click the Mode Status indication in the Status Bar or select PLC > PLC Modes....

The PLC Modes window shown here will open displaying the current mode the PLC is in with options to change it to either Run or Program mode. Click OK to accept the change or Cancel to exit.

Attention!

😴 Set PLC Mode
Current PLC Status
PLC Mode: PROGRAM
PLC Mode Switch Position: Run
New PLC Mode
C <u>B</u> un
• Program
In order to change modes from Do-more Designer, the PLC Mode Switch must be in the Terminal position.
OK Cancel Help

Step 10: Testing Project Using Data View

With the project successfully downloaded into the Do-more T1H Series PLC, you can now test the function of the ladder program using the Data View tool. To start, you need to open a new Data window in the software. To do so, click the Data icon in the Project Toolbar, select Debug > Data View > New or press Ctrl+Shift+F3.

8

Mode

Data	

Data1			8
El	-		
	Element	Status	^
1			
2			
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4			
5			
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7			
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10			-
			1 · · ·
Fact Lister and			

The Data View window seen here will open. This window will open in the project browser section of the programming window but it can be relocated anywhere on the screen by clicking the title bar and dragging it to a new location.

Now enter the elements that you wish to monitor. On line one type "C1" under the Element column and press Enter. You will see the C1 change to the variable name associated with it or T1_Start. On line two type the element "C2" and on line three type "Y1".

With the ladder elements entered into the Data View window, you now need to activate their status. To do so, click the All Status icon on the Project Toolbar or select Debug > All Status On. The All Status On option will not only activate the status of the Data View window but also the status of the ladder program as seen on the following page.

The next step is to enable edits within the Data View window. To do so, click the yellow box with the "E" found in the top left corner of the Data View window, as seen above. The Edits column is now added to the Data View window.

The Edits column allows you to make changes to the current values of the elements listed. T1_Start's current value is OFF. Click the ON button under the Edits column and the Write Current Edit and the Writes All Edits buttons will appear at the top of the window. These buttons will write individual or all edits made in the Data View window to the PLC.

Do-more Designer - My_I	DM - [\$Main]				
File Edit Search View	v Tools PLC Debug Window	Help			
Open Save New	Backup Edit Mode	Dundo Cut Copy	Paste Find Next	Previous Next (- Ot 100% - Dutput Options On The Web .
Read PLC Write PLC New	v Online Do-more/Sim	🔊 🍇 🕂	All Status No Status Forces	V2:? 3 Contraction V2:? V2:? V2:? V2:? V2:? V2:? V2:? V2:?	Configure Devices Check PID Overview
Project Browser	<u> </u>	Ste SMain			∢ ⊳ ×
□ □ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	Write Current Edit Current Edit Element Tr_Start T1_Manual Y1 5 6	Write All Edits t			TUR Timer Struct
System Info	7 8 9 • • • • • • • • • • • • • • • • • •	•	-		(OUT)
•	m +	3			(NOP) -
Instructions Accept	F2 F3 Sh+F2 Sh+F3		· · · · · · · · · · · · · · · · · · ·	- A - () (S)- Delta Out Set	-(R)- P * Edit Mode -
For Heip, press F1		Run lerm Stop S P	D Devs OK PLC OK Or	niine/Detault User/DM_1 Run	00083/00030 TIH-DMIE

Click the Write Current Edit to PLC button and confirm it. This will write the new value to T1_Start. Once T1_Start changes to an ON state, the timer (T1) will begin to time and quickly reach the preset. As soon as the preset is reached, the done bit, T1.Done, will turn ON causing output Y1 to also turn ON as seen on the following page. Now write an OFF to T1_Start and watch as the timer and Y1 reset.

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Congratulations, you have now programmed, downloaded and tested a ladder logic program for the Do-more PLC. Feel free to experiment with a program of your own and don't forget that the software Help file is an essential tool to use when programming your controller.

Accessing the Help File

The software Help file, seen below, is available as a quick reference or detailed guide to the many features and capabilities of the Do-more PLC. To access the Help File select the Help File icon from the Project Toolbar, choose Help from the Help menu drop down or use the shortcut F1.

😵 Do-more Designer						
Hide Back Print Options						
Contents Igdex Search		Topic: DM0001				
Getting Started Initial System Setup The Launchpad	Getting Started with Do-more Controller Programming					
Communication Links System Configuration System Security	Connecting to the Do-more controller	I/O Modules and I/O Mapping				
System Information	The Launchpad	Discrete I/O Modules				
VO Module Mapping Programs and Tasks	Overview of Communication Links	Analog I/O Modules				
Stage Programming Concepts Data Types	Program Compare	Communication Modules				
The Instruction Set PID Loops	Do-more Controller Setup	CTRIO / CTRIO2 Modules				
MX Programming Tools Ladder Views	Initial System Setup	Debugging Do-more Projects				
Using the Ladder Editor Managing Project Documentation The Torond Mana	Understanding and Using the System Configuration Utility	Instruction Status				
The Data View Change Value Dialog	Setting Up the System Security	The Status Bar				
Forcing I/O and Memory Clock and Calendar Functions	Using the System Information Dialog to Monitor	Using the Trend View to Monitor the MX Controller				
 Project Backup and Restore Printing System Maintenance 	Creating and Editing Process	Using the Data View to Monitor MX Controller Memory				
	Using the Project Browser	Using the Debug View Options to Troubleshoot Logic Problems				
	Overview of Programs and Tasks	Forcing I/O and Memory Items				
	Using Programs Effectively	Suspending Programs and Tasks				
	Using Tasks Effectively	Network Message Viewer (MX Logger)				
	Instruction Browser	Using the Change Value Dialog				

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