

Innovation & Technology Forum

Connected Components Workbench™ Software Lab: CL06 Peter Madarasz Commercial Engineer

One Software Package for Device Configuration, Controller Programming and Integration with Human Machine Interface (HMI)



PowerFlex[®] Compact-class AC Drives deliver a <u>simple</u> and <u>cost-effective</u> solution for machine level, standalone control applications or simple system integration.

- Designed for ease of use, this general-purpose class of drives provides a compact package to optimize panel space and application versatility.
- Available in 0.2-22 kW or 0.25-30 Hp ratings





Micro800[®] Controller Family





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Automation

PanelView[™] 800 Graphic Terminal Family



Rockwell Automation

"Connected Components Machine"



7-inch PanelView™ 800 Graphic Terminal (also known as HMI)



Software Comparison of Standard Versus Developer Editions

 Developer Edition is for machine developers to reduce their time to Design, Develop and Deliver

 Standard Edition is meant to be installed on many Personal Computers (PCs) to help ensure availability for simple debugging and configuring devices

* – Requires Developer Edition to create data types, which can be used in Standard Edition.

**- Requires Developer Edition to create passwords, which can be used in Standard Edition.

	Standard Edition	Developer Edition	
Price	Free for download	Contact local distributor or Rockwell Automation [®] Sales	
Common environment to configure all your common devices	Yes	Yes	
Project import/export	Yes	Yes	
Archive manager	No	Yes	
Micro800 [®] Controller Programming			
IEC 61131-3 Ladder Diagram (LD), Function Block Diagram (FBD), and Structured Text (ST)	Yes	Yes	
User-defined function block	Yes	Yes	
Run mode change	No	Yes	
User-defined data types	No*	Yes	
Spy List Used	Existing lists	New lists can be created	
Intellectual Property Protection	No**	Yes	



- 1. Create a new project, add a controller to the project and configure controller plug-in modules.
- 2. Add a drive to the project using Discover mode and configure the drive using a Startup Wizard.
- 3. Add a Ladder Diagram (LD) program, rename the program and create one rung of Ladder Logic to start/stop the motor.
- 4. Build, download and test the program.
- 5. Using Run Mode Change (RMC), add a Structured Text (ST) program to control motor speed, then test and accept the change.
- 6. Copy and paste a rung of Ladder Logic from Studio 5000 Logix Designer[®] software to Connected Components Workbench[™] software.

Lab Exercises – PanelView[™] 800 Graphic Terminals

- 7. Import completed controller project, add a graphic terminal and define tags using direct referencing.
- 8. Create a new graphic terminal screen with push buttons and numeric entry, then download and test the graphic terminal application.
- 9. Use a Virtual Network Computing (VNC) client to operate the graphic terminal screens remotely from your PC.
- 10. Enable File Transfer Protocol (FTP) and see how to upload alarm history, data log and recipe files.
- 11. Explore printing configuration.
- 12. Configure and send an email with a screen print of the current screen when a button is pushed.

- Create a new project, add a controller to the project and configure controller plug-in modules.
- Pages 5-10, Steps 1-8
- 4 minutes



Pages 5-10, Steps 1-8





Start Page

Start Page provides

- Easy Project Navigation
 - Create *New* project from catalog list or network browse
 - Open Existing project
 - Discover create new project uploaded from an existing device
- <u>Helpful</u> Getting Started with clickable links to online resources
- <u>Convenient</u> access to **Recent** projects that have been opened

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Name:			Properties
Create new project from File Menu, Application Toolbar or Start Page			5 Toolbox
Application Toolbar or Start Page	Project	Getting Started	
	Design, configure, program, visualize and maintain your machine	Access online resources	
	New	Training Videos	
	Open Existing	Connected Components Accelerator Toolkit	
	Discover		
	Recent		
	No recent projects		
	☑ Show page on startup		
Error List Output			
Ready			.4



Project Organizer

- Project Organizer displays the devices in your project,
 - Controller,
 - Graphic terminal,
 - Drive(s),
 - Soft starter(s),
 - Safety relay, and/or
 - Light curtain(s),

in an organized tree view.

 Double-click the device icon to display it in the workspace to the right.



- Add a drive to the project using Discover mode and configure the drive using a Startup Wizard.
- Pages 11-19, Steps 9-23.
- 4 minutes



Pages 11-19, Steps 9-23





Drive Support

- Drive support is included for all PowerFlex[®] drive families and for the Kinetix[®] 3 servo drive.
- Wizards provide easy stepby-step drive configuration.
- View/edit parameters and view/clear faults.
- DeviceLogix[™] editor is included for drives that support this embedded control capability.

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Project Organizer 	PowerFlex 525_1 + × Start Page PowerFlex 525_1 Overview	▼ Properties Toolbox Connect マ @
PowerFlex 40P_1 PowerFlex 400_1 PowerFlex 523_1 PowerFlex 525_1 PowerFlex 70_1 PowerFlex 700_1 PowerFlex 700_1 PowerFlex 753_1	Parameters Faults / Alarms Device Info Wizards Address	Compare V Data Logger Type: PowerFlex 525 Peripherals Name: PowerFlex 525_1 No peripherals found. Drive Rating: 1P 110V .50HP Edit peripherals Revision: 5.001 Device Definition
PowerFlex 755_1 PowerFlex 755_1 PowerFlex DC_1 Kinetix 3_1	Control Bar	PowerFig; ∰
Error List Output Ready		



- Add a ladder diagram program, rename the program and create one rung of Ladder Logic to start/stop the motor.
- Pages 20-31, Steps 24-47.
- 9 minutes



Pages 20-31, Steps 24-47





Ladder Logic Programming Using the New Instruction Library

 The Instruction Library groups over 150 instructions into 31 tabbed categories like Timer/Counter.

 This is very similar to the tabbed Instruction Bar in RSLogix 500[®] programming software and the Language Element Toolbar in Studio 5000 Logix Designer[®] software.



Toolbox

- An alternative to the Instruction Library for Ladder Logic is the Toolbox.
- There are editor-specific toolbox contents for
 - Ladder Diagram (LD)
 - Structured Text (ST)
 - Function Block Diagram (FBD)
 - Graphic Terminal Screens

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- Build, download and test the program.
- Pages 32-37, Steps 48-58.
- 4 minutes

Pages 32-37, Steps 48-58



Connected Components Workbench™ Software

Ladder Logic Programming

- Turn and hold the Start Motor switch for 1 second.
- The TON 'Q' output turns on when the timer is done – that is, the Preset/ Programmed Time ('PT') input equals the Elapsed Time ('ET') output.
- The motor output turns on and the branch seals the start circuit so that the Start Motor switch can be released.
- The Stop Motor switch interrupts the circuit and turns off the motor output.



- Using Run Mode Change (RMC), add a Structured Text (ST) program to control motor speed, then test and accept the change.
- Pages 38-45, Steps 59-75.
- 8 minutes

Pages 38-45, Steps 59-75





Run Mode Change (RMC) and Structured Text (ST)

- RMC allows changes to be made to a running controller without interruption.
- ST is similar to high-level computer programming languages and includes common constructs such as
 - IF THEN ELSE
 - FOR
 - REPEAT UNTIL
 - WHILE
 - CASE
- ST is the most memory efficient programming language for Micro800[®] controllers and simplifies complicated computations.

😰 Run Mode Change 🛛 🐻 🖆 🎦

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1	IF _IO_EM_DO_09 THEN	I ST		
2	_IO_P3_AO_01 := _IO_P2_AI_00;		Pointer	
3	END_IF;			
4			CASE	
5	IF (*boolean expression*) THEN (*place your code here*)	Ģ	FOR	
7	("place your code here") ELSIF (*boolean expression*) THEN	Ŀ	IF THEN ELSE	
8	(*place your code here*)	G	REPEAT	
	ELSE	Ğ	WHILE	
10	(*place your code here*)	<u> </u>		
11	END IF;	🔺 Gen	eral	
12				
13	FOR (*index*) := (*mini*) TO (*maxi*) BY (*step*) DO		e are no usable controls in tem onto this text to add i	
14	(*place your code here*)	"	tem onto this text to add i	t to the toobox.
15	END FOR:	I		
16	-	I		
17	REPEAT	I		
18	(*place your code here*)			
19	UNTIL (*boolean expression*)			
20	END_REPEAT;			
21				
22	WHILE (*boolean expression*) DO			
23	(*place your code here*)			
24	END_WHILE;			
25				
	CASE (*integer expression*) OF			
27	1: (*place your code here*)			
	ELSE			
29	(*place your code here*)			
30	END_CASE;			

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Program Execution

- The programs in Project Organizer can be a mixture of Ladder Diagram (LD), Structured Text (ST) and Function Block Diagram (FBD).
- The programs are executed in the order they appear from top to bottom.
- You can click and drag a program to another position to change the order of execution.



- Copy and paste a rung of Ladder Logic from Studio 5000 Logix Designer[®] software to Connected Components Workbench[™] software.
- Pages 46-51, Steps 76-87.
- 5 minutes

Pages 46-51, Steps 76-87





Copy and Paste Rungs from Studio 5000 Logix Designer®

- Common ASCII nomenclature facilitates copying single or multiple rungs of Ladder Logic between different programming software packages.
- I/O naming convention varies between controller families, so I/O address assignments require updating after pasting.
- Variables used that don't exist must be created within the receiving software.
- Some ladder instructions are unique to a controller family.



- Import completed controller project, add a graphic terminal and define tags using direct referencing.
- Pages 52-62, Steps 88-119.
- 7 minutes

Pages 52-62, Steps 88-119





Tag Browsing

Tag browsing of variable addresses that exist in the Micro800[®] project makes it easy to configure new HMI tags.

Tag Edito	or 🕫 🗙 Settings	Screens: 1 -	Screen_1 S	start Page	Micro850		
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	Stop_Motor B	loolean	Stop_Motor	PLC-1			
•	Speed_Command R	leal	Speed_Comm	PLC-1			
6	Variable Selector					_	o x
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Us	er Global Variables - Mic	ro850 Local Varia	bles - N/A System	Variables - Micro850	0 I/O - Micro850	Defined Words	
	Name		Alias	Data Type	Dimension In	itial Value	Cor
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	Start_Motor			BOOL -			
	Stop_Motor			BOOL -			
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						ОК	Cancel

- Create a new graphic terminal screen with push buttons and numeric entry, then download and test the graphic terminal application.
- Pages 63-79, Steps 120-186.
- 18 minutes

Pages 63-79, Steps 120-186



Screen Creation

 Toolbox and Properties windows are all you need to create your application screens easily



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	Corner Radius	12
	Font Bold	True
	Font Italic	False
	Font Name	Arial
	Font Size	28
	Font Underline	False
	Shape	Rectangle
	Text Color	#F8F8F8
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	Description	
	Height	110
	Left	450
	Name	DataEntry_2
	Тор	120
	Width	230
Ξ	Connections	
- Use a Virtual Network Computing (VNC) client to operate the graphic terminal screens remotely from your PC.
- Pages 80-85, Steps 187-206.
- 5 minutes

Pages 80-85, Steps 187-206



Connected Components Workbench[™] Software Virtual Network Computing (VNC)

- Configure VNC server on PanelView[™] 800 graphic terminal for view-only or control access.
- Use widely available VNC client software to connect from PC, tablet or mobile phone (one at a time).
- If a password is forgotten, then re-flashing the graphic terminal firmware will clear the passwords.



Connected Components Workbench[™] Software

Virtual Network Computing (VNC)

Guidelines for using VNC

- It is recommended that you only enable the view-only access to the graphic terminal. Enabling control access increases the security risk if the password is compromised.
- Only one active VNC connection is supported.
- Terminate the VNC connection before performing a firmware update as it may interfere with the process.
- The mouse action "press and hold" is not supported over VNC.

Recommended VNC Clients

- Tight VNC: for PC/Laptop
- Real VNC: for mobile and tablet (iOS and Android), PC/Laptop
- Mocha VNC: for mobile and tablet (iOS, Android, Windows)
- Ultra VNC: for PC/Laptop

See the PanelView[™] 800 <u>User Manual</u> (2711R-UM001) for more detailed guidelines and recommended VNC Client configuration.

- Use File Transfer Protocol (FTP) to connect to your graphic terminal via web browser or PC file explorer.
- Pages 86-89, Steps 207-212.
- 5 minutes

Pages 86-89, Steps 207-212





Connected Components Workbench[™] Software File Transfer Protocol (FTP)

- Configure FTP on PanelView[™] 800 graphic terminal for read-only access.
- Allows access to Alarm History, Data log, and Recipe folders on the graphic terminal.
- Supports one connection at a time.



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. ₫ <u>1</u> Download Upload		Generate Report	Secure Y
- Graphic Terminal - Gen Validity: False Version: 5.011	eral		
Communication User Accounts Languages Advanced FTP Email		story:	ons are not visible in FTP by default.

- Configure Print: To print either the current screen or alarm history from your graphic terminal.
- Pages 90-93, Steps 213-225.
- 5 minutes

Pages 90-93, Steps 213-225



Connected Components Workbench[™] Software Printing

- Configure Print on PanelView[™] 800 graphic terminal to print either current screen or alarm history.
- Works via Ethernet over print server or direct USB print.
- Only printers using PCL 5 protocol are supported.





- Configure and send an email from the graphic terminal.
- Pages 94-97, Steps 226-236.
- 9 minutes

Pages 94-97, Steps 226-236



Connected Components Workbench[™] Software

Sending an Email

- Configure email on PanelView[™] 800 graphic terminal to send attachments such as screenshot of current screen or data log file.
- Can be configured to send an email when an alarm is triggered or manually using the 'email' button.



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L L Download Upload	☑ 👄 Validate Generate Report S	ecure ×
Graphic Terminal - Ger	neral	© menus:
Validity: False		
Version: 2.010		
Communication	Email	
User Accounts	Email Account Configuration	
Languages	Configure the Email Server and	account setting to send Email on PV800.
Advanced FTP	Email Server	
Email		
	Server Address:	
	SMTP Port:	465
	TLS 1.2 Enabled:	V
	STARTTLS:	Use STARTTLS to encrypt the connection if mail server supports.)
	Email Sender Account	
	Email Sender Account	
	Email Account:	
	Email Account: Password:	
	Email Account: Password: Email Address:	ed for Alarm.
	Email Account: Password: Email Address: Recipients Settings	ed for Alarm.
	Email Account: Password: Email Address: Recipients Settings These settings will be use	ed for Alarm.





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Thank you

in Contact me via LinkedIn! – Peter Madarasz