Getting Started
Connected Components Accelerator Toolkit
Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation® sales office or online at http://www.rockwellautomation.com/literature/) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

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**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

**IMPORTANT** Identifies information that is critical for successful application and understanding of the product.

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Where to Start

Connected Components Accelerator Toolkit (CCAT) Outline

Follow the path below to complete your building block project.

Chapter 1
Setting Up a Project

Chapter 2
Completing Product Selection

Chapter 3
System Layout and Wiring

Chapter 4
Initial Controller and HMI Integration Procedure
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About This Publication

This quick start is designed to provide a way to implement common control tasks by aiding in the selection of products and providing access to panel and wiring information. Each section is designed with a different task as a standalone machine, or implemented in a larger system.

To assist in the design and installation of your system, application files and other information are provided on the Connected Components Accelerator Toolkit (CCAT). The CCAT provides bills of materials (BOM), CAD drawings for panel layout and wiring, control programs, Human Machine Interface (HMI) screens, and more. With these tools and the built-in best-practices design, the system designer is free to focus on the design of their machine control and not on design overhead tasks.

The CCAT is available on the Connected Components Accelerator Toolkit DVD, publication CC-QR002, or through the Rockwell Automation Software Download and Registration System (SDRS) at http://www.rockwellautomation.com/rockwellautomation/products-technologies/connected-components/tools/accelerator-toolkit.page.

The beginning of each chapter contains the following information. Read these sections carefully before beginning work in each chapter:

- **Before You Begin** - This section lists the steps that must be completed and decisions that must be made before starting that chapter. The chapters in this quick start do not have to be completed in the order in which they appear, but this section defines the minimum amount of preparation required before completing the current chapter.

- **What You Need** - This section lists the tools that are required to complete the steps in the current chapter. This includes, but is not limited to, hardware and software.

- **Follow These Steps** - This section illustrates the steps in the current chapter and identifies which steps are required to complete the examples.

Use this publication together with other Connected Components Accelerator Toolkit quick starts to aid in building your Micro800™ based application. Refer to Available Connected Components Accelerator Toolkits on page 9 for a listing of quick starts.
# Terminology

<table>
<thead>
<tr>
<th>Term (abbreviation)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application module (AM)</td>
<td>A Micro800™ program that integrates with one or more device modules to perform a specific function within a Micro800 controller.</td>
</tr>
<tr>
<td>Auto/manual operation</td>
<td>When the PanelView™ Component terminal is in Auto mode, the controller logic controls the machine and monitors machine status. When the PanelView Component terminal switches to Manual mode, the terminal takes over control. Command buttons and numeric entry fields are available only when the machine is in Manual mode. See Appendix A for more details.</td>
</tr>
<tr>
<td>Bill of Materials (BOM)</td>
<td>A list of components needed for your system.</td>
</tr>
<tr>
<td>Building block</td>
<td>Tools for accelerating and simplifying the development of a Micro800 controller-based application. A typical building block includes a starting Bill of Material (BOM), Computer-Aided Design (CAD) drawings, Micro800 controller programs, PanelView Component terminal applications, and a Quick Start document.</td>
</tr>
<tr>
<td>Computer-aided design (CAD)</td>
<td>A computer-based system developed to facilitate design of mechanical parts.</td>
</tr>
<tr>
<td>Connected Components Accelerator Toolkit (CCAT)</td>
<td>Software with application files and other information to speed the design and start-up of component-based machines.</td>
</tr>
<tr>
<td>Connected Components Workbench™ (CCW)</td>
<td>Software environment for configuring or programming Micro800 controllers, PanelView Component terminals, PowerFlex™ drives, and other component level products.</td>
</tr>
<tr>
<td>Connected Components Workbench project</td>
<td>A project consists of one or more of the following:</td>
</tr>
<tr>
<td></td>
<td>• Micro800 controller configuration</td>
</tr>
<tr>
<td></td>
<td>• Up to 256 Micro800 programs, each with program local variables</td>
</tr>
<tr>
<td></td>
<td>• Micro800 global variables</td>
</tr>
<tr>
<td></td>
<td>• PanelView Component terminal application</td>
</tr>
<tr>
<td></td>
<td>• PowerFlex drive parameter lists</td>
</tr>
<tr>
<td>Device module (DM)</td>
<td>A Micro800 program that concentrates on integrating a single component device with the Micro800 controller, typically through the application of device-specific User-defined Function Blocks.</td>
</tr>
<tr>
<td>Global variables</td>
<td>Project variables that can be accessed by any program including all I/O and system variables.</td>
</tr>
<tr>
<td>Machine control code</td>
<td>User written programs that integrate one or more application modules into an overall machine control project within the Micro800 controller. You can also choose to integrate the state machine building block for this purpose.</td>
</tr>
<tr>
<td>Machine Project Folder (MPF)</td>
<td>A master project folder used to collect and organize your BB project components, such as drawing files and bills of material.</td>
</tr>
<tr>
<td>Modbus mapping</td>
<td>When a Micro800 controller is configured as a Modbus Slave, only the variables that have been mapped to Modbus addresses can be accessed.</td>
</tr>
<tr>
<td>Tags</td>
<td>A PanelView Component term for variables.</td>
</tr>
<tr>
<td>User-defined Function Blocks (UDFBs)</td>
<td>Function block instructions that can be used like standard function block instructions within any Connected Components Workbench programming language. These can be written by anyone using Connected Components Workbench software. Many UDFBs are posted on the Rockwell Automation sample code website: <a href="http://samplecode.rockwellautomation.com/idc/groups/public/documents/webassets/sc_home_page.hcst">http://samplecode.rockwellautomation.com/idc/groups/public/documents/webassets/sc_home_page.hcst</a></td>
</tr>
<tr>
<td>User-defined Object (UDO)</td>
<td>A collection of PanelView Component terminal screen objects that can be pasted into a new screen.</td>
</tr>
</tbody>
</table>
Additional Resources

For more information on the products described in this publication, use these resources.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro810™ Programmable Controllers User Manual, publication 2080-UM001</td>
<td>Provides information on installing the Micro810 Programmable Controller including wiring and troubleshooting.</td>
</tr>
<tr>
<td>Micro830™ and Micro850™ Programmable Controllers User Manual, publication 2080-UM002</td>
<td>Provides information on installing the Micro830 and Micro850 Programmable Controller including wiring and troubleshooting.</td>
</tr>
<tr>
<td>PanelView Component Installation Instructions, publication 2711C-IN001</td>
<td>Provides information on installing the PanelView Component HMI terminals including wiring, grounding, and troubleshooting.</td>
</tr>
</tbody>
</table>

You can view or download publications at http://www.rockwellautomation.com/literature. To order paper copies of technical documentation, contact your local Allen-Bradley® distributor or Rockwell Automation sales representative.

Available Connected Components Accelerator Toolkits

For the most up-to-date listing of available Connected Components Accelerator Toolkits and related quick starts, refer to these resources:

- Connected Components Accelerator Toolkit Building Block Project Descriptions Quick Reference, publication CC-QR003.
Notes:
Chapter 1

Setting Up a Project

This chapter guides you in selecting your starting Building Block project and setting up your Machine Project folder (MPF).

What You Need

A Windows-based personal computer with the Connected Components Accelerator Toolkit (CCAT) and Adobe Acrobat Reader software installed.

Follow These Steps

Follow these steps to design and install your starting Building Block.

1. Open the Connected Components Accelerator Toolkit (CCAT), page 12
2. Copy and Rename the Machine Project Folder (MPF) Template, page 13
3. Select a Starting Building Block (BB) Project, page 13
4. Copy Starting Building Block Project Files into Your Machine Project Folder (MPF), page 14
5. Choosing CAD Files for Your Project, page 15
Open the Connected Components Accelerator Toolkit (CCAT)

1. From your Windows desktop, choose Start > All Programs > Rockwell Automation > CCAT > Connected Components Accelerator Toolkit.

2. Click Connected Components Accelerator Toolkit to launch the software.

   You will see the following screen.

3. Click 1-System Design Flowchart to review the steps required to use the Connected Component Accelerator Toolkit projects to develop your customized system.
Copy and Rename the Machine Project Folder (MPF) Template

1. From the Project Start Tools menu, choose Machine Project Folder Template.
2. Right-click Machine Project Folder - Template.
3. Select Copy.
4. Browse to the My Documents (or other preferred) directory on your personal computer hard-disk drive.
5. Right-click again and select Paste.
6. Rename the “Machine Project Folder - Template” folder to your own project-specific name. You may leave the subfolder names as-is.

Select a Starting Building Block (BB) Project

1. From the Project Start Tools menu, choose 4-Building Block Project Descriptions.
2. Read through the available Building Blocks listed in this document.

3. Choose one to use as your starting building block project, typically based on one of the device types used in your machine.

**Copy Starting Building Block Project Files into Your Machine Project Folder (MPF)**

1. Under the Starting Building Block Projects, navigate to your building block.

   ![Building Block Project Folders](image)

   Click the building block name to get to the directory of folders for that building block.

   ![Folder Structure](image)

   **IMPORTANT** Instructions for transferring files from the CCW folder are detailed in Chapter 4.

2. Open the Quick Start (QS) folder to locate the QS publication file.

3. Select, copy, and paste that QS publication file into your 2 - MPF - QS folder on your personal computer hard-disk drive.
4. Open the bill of material (BOM) folder to choose your starting BOM file based on incoming voltage (100/120, 200/240, or 400/480V AC), IEC or UL style, and fused disconnect or circuit breaker disconnect panel options.

5. Select, copy, and paste that BOM file into your 3-MPF-BOM folder.

Choosing CAD Files for Your Project

**IMPORTANT** The figures in this section are for illustrative purposes only. They are meant to represent similar files you will find in the CAD folder of the building block you choose.

1. Open the CAD folder to access CAD files.

2. Open the folder for your needed standards orientation (IEC or NFPA).
3. Open the folder for your preferred drawing program (AutoCAD or EPLAN) and file format.

4. Each drawing file format folder has two folders. Select the System Files folder.

5. Copy and paste that Systems file folder into your 4- MPF - CAD folder.

6. Return to your chosen drawing file format folder.

7. Open the Input Power Selection folder.
8. Select the appropriate power file based on the BOM file that you copied into your MPF.


10. Return to your MPF and open it.

11. Open the Systems file folder that you copied into your 4- MPF - CAD folder.

12. Paste the copied power file into the Systems file folder in your MPF.
Completing Product Selection

This chapter helps you complete the hardware bill of materials (BOM) for your system.

Before You Begin

Populate a Machine Project Folder (MPF) with starting files as described in Chapter 1.

What You Need

You need a Windows-based personal computer with the CCAT and ProposalWorks™ software installed. The link to download free ProposalWorks software is listed in “Software and other Internet links” under the Support Tools section of the Connected Components Accelerator Toolkit (CCAT) menu.

Follow These Steps

Follow these steps to complete your product selection.
Chapter 2  Completing Product Selection

Use ProposalWorks to Open and Modify the BOM

In this section, you use ProposalWorks software to do the following:

- Open your starting BOM file.
- Verify or modify the catalog numbers for the Micro800 controller, PanelView Component terminal, and starting BB device.

1. In your 3 - MPF - BOM folder, double-click the starting ProposalWorks BOM file (*.prp) to open it.

2. Review the Micro800 controller catalog number starting with 2080-L* and verify that it is the controller model you need.

![Micro 800 Group Selection](image-url)
Completing Product Selection

Chapter 2

3. If you need to modify the controller or add controller plug-ins or accessories to your system BOM, follow these steps.

   a. Double-click the controller catalog number, which opens the 2080 Micro800 System Accessory Selection Assistant.
   b. Use the tabs in the 2080 Micro800 System Accessory Selection Assistant to modify controller information and add controller plug-ins or accessories.
   c. To complete your modifications or additions, click Accept.

4. Verify that your controller has enough plug-in slots to accommodate your plug-in modules.

   If necessary, choose a controller with more I/O points.

   10- and 16-point controllers have 2 plug-in slots, 24 point controllers have 3 plug-in slots, and 48-point controllers have 5 plug-in slots.

   **TIP** Each catalog number specifies how many I/O points a controller has. For example, 2080-LC30-16QWB has 16 points.

5. Review the PanelView Component terminal catalog number starting with 2711C-* and verify that this is the terminal model you need.

6. Modify any information as detailed in step 3.

7. Review the remaining catalog numbers and quantities listed.

8. Modify any catalog numbers or quantities as detailed in step 3 to meet the requirements of your machine.
Complete Your BOM by Adding Devices

Follow these steps to import the ProposalWorks BOM file in the BOM File Module Library folder for each additional device to be included in the system (such as drives, servos, and temperature controllers).

1. From the Design Tools menu of the CCAT, choose Bill Of Material > BOM File Module Library.

2. Select and copy the appropriate BOM files out of the BOM File Module Library, and paste them into your 3-MPF-BOM folder.

3. Open the starting BOM file in ProposalWorks software.
   a. Click Import/Export Generate.
      b. Click ProposalWorks as the import option.
      c. Choose each component BOM file copied into your 3-MPF-BOM folder to incorporate it into a single BOM file.
      d. Review and modify quantities of the added catalog numbers as necessary.

4. Save the completed BOM file.
System Layout and Wiring

This chapter helps you complete your set of CAD layout, connection, and wiring diagram drawings. You chose a starting drawing set in Chapter 1 and now you will choose additional drawings in EPLAN or AutoCAD formats to build your system drawing set.

Before You Begin

Complete the system bill of material (BOM) as described in Chapter 2.

What You Need

You need a Windows-based personal computer with the CCAT, and AutoCAD or EPLAN CAD software installed.

Follow These Steps

Follow these steps to choose additional drawings in EPLAN or AutoCAD formats to build your system drawing set.

![Flowchart]

Start

Assemble Drawings, page 24

Edit Your Project Drawing Set, page 25
Assemble Drawings

Follow these steps to access the drawing libraries to assemble all of the wiring and layout drawings for your specific system and to minimize editing of your drawing set.

1. From the Design Tools for Add-on Products menu of the CCAT, choose CAD: NFPA Orientation or CAD: IEC Orientation.

2. Navigate to the desired AutoCAD or EPLAN library directory, which is broken down further into product category subdirectories.

3. Decide which drawings you’d like to include in your drawing set.

4. Select, copy, and paste your chosen drawings into your 4 - MPF - CAD folder on your personal computer hard-disk drive.
Edit Your Project Drawing Set

Follow these steps to use the drawing library in AutoCAD or EPLAN to create a complete system layout and wiring drawing set.

1. Open your drawing software.

2. Create and name your new project.

3. Add and choose the library drawings you copied in the previous section.

4. Edit the drawings to delete any components not used in your project or to edit connections and devices as necessary.

To edit drawings in AutoCAD Electrical, follow the steps below. For EPLAN Electrical P8 software, follow the steps on page 26.

For AutoCAD Electrical

a. From the Panel Layout menu, choose Insert Footprint (Icon Menu).

![Insert Footprint](image)

**ATTENTION:** If you are using an AutoCAD application other than AutoCAD Electrical, choose Insert Block from the Panel Layout menu to browse to the same directory in step 4b.

b. Browse to the Panel Components (Footprint) directory in the following location:
   
   C:\Program Files\RA_Simplification\CCAT\B-Files\4-CAD Dev\NFPA\AutoCAD DWG\Z- Panel Components

  c. Select the drawing by part number.

  **TIP** All CCAT Panel component drawings start with the "FP_" prefix.
For EPLAN Electrical P8 software

a. From the Insert menu, choose Window macro.

b. Browse to the Panel Components directory in the following location:
   C:\Program Files\RA_Simplification\CCAT\B-Files\4-CAD Dev\NFPA\EPLAN\Z- Panel Components

   c. Open the Component Layout Macros (EMA) folder and select the drawing (macro) by part number.
Initial Controller and HMI Integration Procedure

This chapter provides a general procedure for getting your starting BB project files loaded and working.

Before You Begin

Complete the system bill of material (BOM) as described in Chapter 2.

What You Need

You need a Windows-based personal computer with the CCAT and Connected Components Workbench (release 2 or higher) software installed.

Follow These Steps

Follow these steps to get your starting BB project files loaded and working.

Start

1. Copy the Starting Building Block Project File to Your Machine Project Folder (MPF), page 28
2. Copy Additional Building Block Device Code, page 29
3. Refer to Individual Building Block Quick Starts for Integration Instructions, page 29
Copy the Starting Building Block Project File to Your Machine Project Folder (MPF)

Each building block includes completed Connected Components Workbench projects for each controller catalog number applicable to that building block. The Connected Components Workbench project includes Micro800 files and a completed PanelView Component application that can be used together as your base project upon which to build the rest of your system.

1. From the Project Start Tools menu, choose 5-Starting Building Block Projects.

2. Use the various submenus to locate the appropriate Starting_*.zip file based on the Micro800 controller catalog number you selected to include in your BOM in Chapter 2.

3. Open and extract the contents of the appropriate ZIP file to your ‘Starting Project Name’ folder in the MPF - Logic folder in the MPF on your personal computer hard-disk drive.
Copy Additional Building Block Device Code

1. From the Design Tools for Add-on Projects menu of the Connected Components Accelerator Toolkit (CCAT), choose Connected Components Workbench Quick Starts, Logic and HMI > Application and Device Modules.

2. Navigate to the desired module, where the Quick Start, Logic, and HMI folders are located for the first set of additional code.

3. Select and copy the files from these folders, and paste them into the MPF - Quick Start, MPF - Logic and MPF - HMI folders in the Machine Project Folder on your personal computer hard-disk drive.

4. Repeat steps 2 and 3 for as many additional device codes as needed.

Refer to Individual Building Block Quick Starts for Integration Instructions

The individual Quick Starts that you have copied to your Machine Project Folder (MPF) provide you with step-by-step instructions to load and validate your starting project and integrate the additional building-block files into your overall machine project.
Notes:
Auto/Manual Mode

Every Building Block incorporates an Auto/Manual mode program. **Auto mode** means the machine is being controlled by the controller logic and the HMI is in Monitor-only mode and any HMI command buttons are not available. **Manual mode** means the machine is no longer being controlled by the controller logic, but is instead being controlled by you from the HMI. When the controller is put into RUN mode, it will start in Auto mode.

Either the controller logic or the HMI can request a mode change. Permissive tags can be used for Auto-to-Manual and Manual-to-Auto mode changes. The default Auto/Manual mode program allows a mode change at any time. However, this may not be desirable for many machine applications. For example, you may want to add logic so that a mode change is permitted only when the machine is stopped. This additional logic would go into rung 3.
Notes:
Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support/, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnectSM support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/support/.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

<table>
<thead>
<tr>
<th>United States or Canada</th>
<th>1.440.646.3434</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside United States or Canada</td>
<td>Use the Worldwide Locator at <a href="http://www.rockwellautomation.com/support/americas/phone_en.html">http://www.rockwellautomation.com/support/americas/phone_en.html</a>, or contact your local Rockwell Automation representative.</td>
</tr>
</tbody>
</table>

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

<table>
<thead>
<tr>
<th>United States</th>
<th>Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside United States</td>
<td>Please contact your local Rockwell Automation representative for the return procedure.</td>
</tr>
</tbody>
</table>

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.

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