Learning RSLogix 5000 Programming

This book provides a detailed overview of the Logix platform including ControlLogix, CompactLogix, and SoftLogix and explains the significant changes introduced in Studio 5000. A clear understanding of the recent Logix platform changes is critical for anyone developing a Rockwell Automation solution. This book provides an easy-to-follow, step-by-step approach to learn about the essential Logix hardware and software components and provides beginners with a solid foundation in the Logix platform features and terminology. By the end of this book, you will have a clear understanding of the capabilities of the Logix platform and the ability to navigate the Rockwell Automation Literature Library Resources.

Who this book is written for

This book is for PLC programmers, electricians, instrumentation technicians, and automation professionals with basic PLC programming knowledge, but no knowledge of RSLogix 5000. If you are a student who is familiar with automation and would like to learn about RSLogix 5000 with a minimal investment of time, this is the book for you.

What you will learn from this book

- Briefly explore the history of Rockwell Automation and the evolution of the Logix platform
- Discover the complete range of ControlLogix and CompactLogix controllers and form factors available today, and the key things you should consider when you are engineering a Rockwell Automation solution
- Explore the key platform changes introduced with Studio 5000 and Logix Designer version 26 and the latest firmware versions
- Get to grips with the modules available in the ControlLogix, SoftLogix, and CompactLogix platforms
- Understand writing Ladder Logic (LL) routines, Sequential Function Chart (SFC) routines, and Structured Text (ST) routines
- Design Function Block Diagrams (FBD) and their easy integration with HMIs

Learning RSLogix 5000 Programming

Become proficient in building PLC solutions in Integrated Architecture from the ground up using RSLogix 5000
In this package, you will find:

- The author biography
- A preview chapter from the book, Chapter 1 'ControlLogix and CompactLogix Overview and Firmware'
- A synopsis of the book’s content
- More information on Learning RSLogix 5000 Programming
Austin Scott founded Synergist SCADA in 2006, a successful company that provides vendor-neutral SCADA architecture and development. Synergist has also developed a suite of engineering tools, including Citect Power Tools and Active Network Security. In July 2013, Synergist was acquired by Cimation as the catalyst for its growing Canadian operations and ongoing product development.

With more than a decade of industrial automation and software development experience, Austin has worked on large-scale, high-profile projects across North America and around the globe, incorporating most major SCADA platforms. His professional focus includes developing and refining custom software solutions to enhance the productivity of SCADA developers and improve the integration between the SCADA data and corporate applications. He is also skilled in cyber security, especially the detection of unauthorized access to SCADA networks and the forensic analysis of SCADA breaches. In 2013, he wrote *Instant PLC Programming with RSLogix 5000* by Packt Publishing.
In 1997, Rockwell Automation launched their current generation control platform, Logix. It represented decades of automation technical advancement for robust, large-scale solutions. When it launched, it included the ControlLogix 5550 controllers (Bulletin 1756), ControlLogix I/O modules, and RSLogix 5000 programming software platform. In 2001, CompactLogix Controller (Bulletin 1769) was added to the Logix family to support intermediate-sized automation solutions under the same development platform. The RSLogix 5000 programming software (in version 21 and higher, is now referred to as Logix Designer within the Studio 5000 software package) provided a unified IEC61131-3 control platform, featuring user-friendly interfaces and workflows. Ultimately, the Logix platform reduced programming complexity, eased troubleshooting, and increased plant reliability.

RSLogix 5000 provides intuitive access to real-time information, easy to follow run-time logic animations, and a comprehensive suite of online change capabilities. Rockwell is the automation market leader in North America. Moreover, due to Rockwell Automation’s continued success and the glacial speed at which most plants switch platforms, it will be the market leader for the foreseeable future. Outside North America, it is widely considered to be the fourth largest automation manufacturer (after Siemens, ABB, and Schneider). Its total global installation base is well over 2 million programmable controllers. Needless to say, as an automation professional, learning the Logix platform suite is an excellent investment of your time.

Rockwell Automation has provided a wealth of knowledge in their web-based Literature Library resources, which is the ultimate source of all the Logix platform knowledge. Rockwell has created a web of over 10,000 documents that is often difficult to navigate for beginners. Learning RSLogix 5000 Programming is in no way a replacement for this resource (this book would need to be 100,000 pages longer), but provides newcomers with a solid foundation in the Logix platform features and Rockwell Automation terminology. By the end of this book, the reader will have a clear understanding of the capabilities of the Logix platform and how to quickly navigate through the Rockwell Automation Literature Library resources.
Learning RSLogix 5000 Programming provides a gentle introduction to RSLogix 5000 and the Logix platform. If you understand the basics of PLC programming or have experience with programming other PLC platforms, this book will provide you with the knowledge to become proficient at implementing Logix solutions from the ground up.

What this book covers

Chapter 1, ControlLogix and CompactLogix Overview and Firmware, introduces the ControlLogix and CompactLogix platforms by exploring the evolution of the Allen Bradley controllers. It provides details of the Rockwell Automation Integrated Architecture and then discusses the important role that firmware plays in the Logix5000 platform.

Chapter 2, Industrial Network Communications, details the various communication technologies available for the Logix platform. The focus of this book is on the current state of Rockwell Automation's ControlLogix and CompactLogix controllers, however, this chapter discusses some legacy communications protocols, which you may still find running in the field today.

Chapter 3, Configuring Logix Modules, looks at the available modules for the Logix platform, how to configure them, and their usage in a Logix project. It also includes methods for identifying module features by their Logix Module Catalog numbers and the address tree that a typical I/O module creates.

Chapter 4, SoftLogix, introduces the Rockwell Automation SoftLogix 5800 Controller and Virtual Chassis. It guides you through the setup of the SoftLogix chassis monitor and configuration of your SoftLogix controller within Logix. Finally, this chapter investigates the techniques for simulating I/O using the 1784 SIM module.

Chapter 5, Writing Ladder Logic, looks at the history of ladder logic and the development of the IEC standard programming languages. Then, it lets you jump into ladder logic programming by creating a simple pump control program. It demonstrates how to buffer inputs and outputs in our ladder logic code and discusses the importance of this process. Finally, it explores the buffering capabilities of the new Program Parameter features in Studio 5000 Logix Designer.

Chapter 6, Writing Function Block, explores the merits of function block programming by building a small sample application. It also provides instructions for modifying the function block properties and performing online edits.

Chapter 7, Writing Structured Text, explores the strengths and weaknesses of structured text programming by exploring the typical uses of this language and demonstrates several sample applications.
Chapter 8, Building Sequential Function Charts, implements a sequential function chart routine and breaks down the steps, actions, transitions and branches that are used to construct it. Finally, it lets you work with the online editing capabilities of sequential function chart routines.

Chapter 9, Using Tasks and Programs for Project Organization, looks at the ways to structure a Logix project using the basic organization units—tasks, programs, and routines. It also looks at the ways in which task scheduling and prioritization can be used to balance the processing time of a controller.

Chapter 10, Faults and Troubleshooting in Logix, teaches you how to identify and troubleshoot faults in a Logix controller. It details a list of fault codes that provide insights into the problems encountered by the platform. It introduces the process of fault recovery, which allows a program to resume its execution after encountering a specific fault type. Finally, it brings you the convenient troubleshooting applications available for your iPhone and iPad.


Safety warning – loss of control/view
The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. The examples of critical control functions are emergency and over-travel stop that may include the following capabilities:

- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Each implementation of a control system must be individually and thoroughly tested for proper operation before being placed into service.
- Failure to follow these instructions can result in death, serious injury, or equipment damage.

This book is not comprehensive for any systems using the given architecture. It does not absolve users of their duty to uphold the safety requirements for the equipment used in their systems or compliance with both national or international safety laws and regulations.
In this chapter, we will introduce the ControlLogix and CompactLogix platforms by exploring the evolution of the Allen-Bradley controllers. We will provide details of the Rockwell Automation Integrated Architecture and then finally, we will discuss the important role that firmware plays in the Logix5000 platform. Due to 15 to 20 years of industrial controller life span, it is common to encounter older versions of hardware and firmware, and critical to be familiar with legacy systems.

A brief history of Rockwell Automation
This book begins with some background history on the Rockwell Automation ecosystem. It is important to understand the legacy systems provided by Rockwell Automation because some of them can still be found operating in the field today. Also, it is important to understand the overall Rockwell Automation offering and terminology, and how the platforms we focus on in the book fit into the real world.
Allen-Bradley was founded in 1904 by brothers, Harry (19 years old) and Lynde Bradley (26 years old), with seed money from Dr. Stanton Allen. As a teenager, Lynde Bradley developed the prototype for what would later become Allen-Bradley's first commercial product. The primary focus of Allen-Bradley was motor controllers for several decades until they received an unusual challenge from General Motors (GM) in 1968. Each time GM wanted to introduce a new car, they needed to spend two or three months rewiring all their relays to support the production process changes. The request was to build a system to replace their hard-wired relay logic with something more dynamic—Standard Machine Controller. Modicon ultimately won the GM contract with their highly robust Modicon 084 Controller. As a result, Allen-Bradley acquired a company called Information Instruments Inc and produced their first functional controller—Programmable Matrix Controller (PMC) in 1971. Shortly after the release of PMC, Allen-Bradley released a more feature-rich product known as Programmable Logic Controller 1 (PLC-1). Since the introduction of the first Allen-Bradley (later, Rockwell Automation) PLC-1, we have seen several platforms released, including PLC-2 (1978), PLC-3 (1981), PLC-5 (1986), SLC 500 (1991), MicroLogix (1994), ControlLogix (1997), and finally, CompactLogix (2006). In 1985, Allen-Bradley was acquired by Rockwell International and was later spun off as a part of Rockwell Automation. In the field today, the Allen-Bradley name and logo can still be seen on many of the Rockwell Automation's products. The focus of this book will be on the modern ControlLogix and CompactLogix controllers and Studio 5000 Automation Engineering and Design Environment, which I will refer to as the Logix family.

Integrated Architecture

Like many other vendors, Rockwell Automation has recently rebranded and reorganized their offering. The ControlLogix family is a part of Rockwell Automation's larger solution offering called Integrated Architecture. It is a relatively new term in the world of Rockwell Automation, but the concept has been in place for quite some time. It represents a convergence of the control and information systems within an industrial operations environment. This convergence is in line with the industry trend we have witnessed over the past decade and has increased the ties between Operational Technology (OT) and traditional Information Technology (IT). We have seen a continuous increase in demand for operational information to be provided to the corporate information system in real time in order to fulfill the maintenance needs, environmental reporting, accounting, and other corporate requirements. At the same time, we have seen OT move from proprietary protocols and data access technology to traditional IT technologies such as TCP/IP and Ethernet. The promise of Integrated Architecture is the ability to easily implement plant-wide optimization, reduce technical project risk, increase machine performance, and improve long-term reliability.
The five core technologies of Integrated Architecture Programmable Automation Controller (PAC) product line include the following platforms:

- ControlLogix
- CompactLogix
- GuardLogix
- DriveLogix
- SoftLogix

The preceding diagram outlines the Integrated Architecture structure and shows where ControlLogix fits into the mix. The FlexLogix (bulletin 1794) controllers were also part of the Logix PAC family and was used to communicate with PLC-5 and SLC 500 Flex I/O blocks. However, FlexLogix has now been retired from the lineup, so it will not be covered in this book.

The product, formally known as RSLogix 5000 (used for programming the ControlLogix and CompactLogix controllers), is now included within the automation engineering and design software suite called Studio 5000 and is now referred to as Logix Designer. For the remainder of this book, we will be using the terms—Logix Designer, RSLogix, and Logix—interchangeably to refer to the Logix controller family programming environment.
ControlLogix controllers

ControlLogix controller was first launched in 1997 as a replacement for Allen-Bradley’s previous large-scale control platform, PLC-5. The ControlLogix platform includes a bulletin 1756 ControlLogix 5550 controller, bulletin 1756 ControlLogix I/O modules, and the RSLogix 5000 programming software platform (now referred to as Studio 5000 Logix Designer). ControlLogix represented a significant technological step forward that included a 32-bit ARM-6 RISC-core microprocessor and an ABrisc Boolean processor combined with a bus interface on the same silicon chip. At launch, the series 5 ControlLogix (also referred to as L5 and ControlLogix 5550) controllers were able to execute the code three times faster than PLC-5. The following diagram is an illustration of the original Logix L5 controller:
The L5 controller is considered to be a PAC rather than a traditional PLC due to its modern design, power, and capabilities beyond a traditional PLC (such as motion control, advanced networking, batching, and sequential control). The ControlLogix platform is built on the ControlBus backplane, which performs like a mini-network and allows devices to be Removed or Inserted Under Power (RIUP).

Warning: Removing modules while under power can create an arc and have disastrous consequences in explosive environments.

L5 has since been retired from the lineup, so we will focus on the newer L6 and L7 controllers in this book. Throughout this book, we will be referring to the ControlLogix controllers as PACs, which are the modern day equivalent of PLCs.

**Logix operating cycle**

The entire Logix family of controllers (ControlLogix and CompactLogix) has diverged from traditional synchronous PLC scan architecture in favor of a more efficient asynchronous operation. Like most modern computer systems, asynchronous operation allows the Logix controller to handle multiple tasks at the same time by slicing the processing time between each task. The continuous updating of information in an asynchronous processor creates some programming challenges, which we will address throughout the book. The following diagram illustrates the difference between the synchronous and asynchronous operation:
ControlLogix series 6 controllers
In 2002, the bulletin 1756 ControlLogix L6 (Logix556x) processor was released with a more powerful processor and more memory, and the CompactFlash nonvolatile memory card was added to the entire lineup.

Even though the ControlLogix platform is approaching its 20th birthday, it is still in the early stages of its product life cycle. For example, Allen-Bradley’s 1747 series SLC500 family, which was introduced in 1989, is still available for sale today. Although no longer actively being developed, SLC500 represents a product life in excess of 25 years.

ControlLogix represents a common control engine with a common development environment and tight integration between the programming software, controller, and I/O modules. This close integration greatly reduces automation engineering development time and cost.

ControlLogix series 7 controllers
In 2010, Rockwell Automation launched the series 7 (also referred to as L7 and ControlLogix 5570) controllers, which featured the following enhancements over the series 6 (L6) controllers:

- The performance capability doubled due to a more powerful dual core CPU.
- The adoption of modern SDRAM memory.
- The replacement of the 9-pin serial port with a USB 2.0 port (programs transfer 200 times faster over USB 2.0 than serial).
- The replacement of the CompactFlash memory card with a Secure Digital (SD) memory card.
- The replacement of the lithium battery with the capacitor-based Energy Storage Module (ESM). The ESM provides power to the controller during a power loss event to allow it to copy the contents of its memory from volatile memory to the onboard nonvolatile memory. The ESM eliminates the issue with L6 series controllers that would lose the program after a few weeks without power once the battery was completely drained.
- The ability to store program comments and tag descriptions on the controller (firmware v21 and higher).
• The addition of the onboard four character display.

ControlLogix L73 controller
Selecting a ControlLogix controller

When selecting a ControlLogix controller, it is important to consider the following points:

- Supported Logix Designer software versions
- Processing the requirements of your current application and future expansion
- Memory requirements of your current application and future expansion

The ControlLogix series 6 and series 7 controllers and their software version compatibilities are shown in the following table:

<table>
<thead>
<tr>
<th>ControlLogix controllers</th>
<th>Logix Designer software (RSLogix 5000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Controller</td>
</tr>
<tr>
<td><strong>Series 6 (L6)</strong></td>
<td></td>
</tr>
<tr>
<td>1756-L61</td>
<td></td>
</tr>
<tr>
<td>1756-L62</td>
<td></td>
</tr>
<tr>
<td>1756-L63</td>
<td></td>
</tr>
<tr>
<td>1756-L64</td>
<td></td>
</tr>
<tr>
<td>1756-L65</td>
<td></td>
</tr>
<tr>
<td><strong>Series 7 (L7)</strong></td>
<td></td>
</tr>
<tr>
<td>1756-L71</td>
<td></td>
</tr>
<tr>
<td>1756-L72</td>
<td></td>
</tr>
<tr>
<td>1756-L73</td>
<td></td>
</tr>
<tr>
<td>1756-L74</td>
<td></td>
</tr>
<tr>
<td>1756-L75</td>
<td></td>
</tr>
</tbody>
</table>

It is important to note that the L6 controllers are not supported in Version 21 and higher of Studio 5000 Logix Designer.
GuardLogix safety controllers
With the launch of the (bulletin 1756) GuardLogix controller in 2005, the ControlLogix platform supported both standard and safety system control in the same chassis. The GuardLogix controller system is designed for use in safety applications, including SIL 3 (IEC 61508) and the ISO standard for Safety of Machinery (ISO 13849-1 General Principles for Design and PLe/Cat.4). GuardLogix safety controllers represent an essential piece of a fail-safe (de-energize to trip) solution. Fail-safe refers to a solution that when a fault is detected, all of its outputs are set to zero. And, in the event of a faulty input or input module, it automatically sets any input values associated with them to zero. Both the L6 and L7 controllers are available in the GuardLogix form factor. Physically, the GuardLogix controllers feature a red faceplate and are usually installed in pairs—primary and safety partner controller. The GuardLogix controllers are only supported in Version 18 and higher of RSLogix 5000 and Studio 5000 Logix Designer.

Extreme environment controllers
The Rockwell Automation's extreme environment controllers (bulletin 1756 ControlLogix-XT) share the same features and programming interfaces as the standard ControlLogix controllers, but are certified to operate in extreme conditions. The ControlLogix-XT modules are darker gray in color than the ControlLogix modules and are spaced in every other slot to provide an improved ventilation/isolation. In addition, the ControlLogix-XT modules are treated with a conformal coating that improves the product’s resistance to corrosive environments. The ControlLogix-XT controllers and modules are rated for temperatures ranging from -20°C to 70°C (-4°F to 158°F) and have the following environmental certifications—cULus, Class 1, Div 2, C-Tick, CE, ATEX Zone 2, SIL 2, IEC 61131-2, ANSI-ISA-S71.04-1985, Class G1, G2, and G3. The L6 and L7 standard controllers and GuardLogix controllers are all available in Extreme Environment (XT) form factors.
CompactLogix controllers

In 2006, Rockwell Automation first shipped the (bulletin 1768) L43 CompactLogix controllers targeted at cost effective, small- to medium-size automation solutions. At the time of launch, CompactLogix controller was planned as the long-term replacement for the SLC 500 controller family. The CompactLogix control platform is designed with an emphasis on the controller software. As the CompactLogix hardware evolves with an improved performance and additional features, the logic will easily migrate to new hardware and firmware versions. Unlike the SLC 500 platform, the CompactLogix controllers can be programmed using the same RSLogix 5000 (Logix Designer) software suite that is used with ControlLogix. In 2006, CompactLogix L43 with integrated motion support was added to the family. It features a CompactFlash memory card, Ethernet port, Serial RS-232 port, 1769 / 1768 modules, and a power supply module. The following is an illustration of the L43 CompactLogix controller:

![CompactLogix controller-bulletin 1768 — L43 and L45](image)

Modules on L43 can only be placed to the right of the power supply.
In 2008, Rockwell Automation released the low-cost CompactLogix L23 controllers (bulletin 1769) with embedded I/O. The L23 controller features a serial RS-232 port, Ethernet port (only on the E models), embedded I/O, and an embedded power supply. The following is an illustration of an L23 controller:
Also in 2008, Rockwell Automation released the (bulletin 1769) CompactLogix L3x modular controllers. The 1769 CompactLogix modules do not have a chassis like the ControlLogix modules. The 1769 CompactLogix modules can be connected together using a DIN rail or can be screwed in directly to a panel. CompactLogix L3x features a CompactFlash memory card, serial RS-232, ControlNet or Ethernet port, and a power supply module. The following diagram is an illustration of the CompactLogix L3x controller:
The L3x modules can be placed to the left or the right of the power supply.

In 2009, Compact GuardLogix, an SIL3 certified controller, with the L43S and L45S CPU supporting integrated safety, was added to the Logix family.

**CompactLogix 5370 controllers**

In 2012, Rockwell Automation released the (bulletin 1769) CompactLogix 5370 L1, L2, and L3 controllers, which provided a low-cost Ethernet/IP-enabled, high-performance controller in a 40 percent smaller form factor than ControlLogix. The CompactLogix 5370 series controller provides many of the same enhancements that the ControlLogix series 7 provided over the ControlLogix series 6 controllers, including the following properties:

- Twice the performance capability due to a more powerful dual core CPU
- Adoption of modern SDRAM memory
- Replacement of the 9-pin serial port with a USB 2.0 port (programs transfer 200 times faster over USB 2.0 than serial)
- Replacement of the CompactFlash memory card with an SD memory card
- Added the ESM and removed the need for a lithium battery
- Made use of the existing CompactLogix 1769 I/O modules
- Integrated motion control over Ethernet
- Ability to store program comments and tag descriptions on the controller (firmware v21 and higher)
The following table provides illustrations of the CompactLogix 5370 controllers and their distinguishing features:

<table>
<thead>
<tr>
<th>CompactLogix Controller — bulletin 1769 5370 – L1</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD memory card</td>
<td></td>
</tr>
<tr>
<td>2 X Ethernet ports</td>
<td></td>
</tr>
<tr>
<td>USB 2.0 port</td>
<td></td>
</tr>
<tr>
<td>Embedded point I/O modules</td>
<td></td>
</tr>
<tr>
<td>Expandable with 6 or 8 point I/O modules</td>
<td></td>
</tr>
<tr>
<td>Embedded power supply</td>
<td></td>
</tr>
<tr>
<td>Integrated motion control</td>
<td></td>
</tr>
</tbody>
</table>

![CompactLogix 5370 L1 Controller](image1.png)

<table>
<thead>
<tr>
<th>CompactLogix Controller – bulletin 1769 5370 – L2</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD memory card</td>
<td></td>
</tr>
<tr>
<td>2 X Ethernet ports</td>
<td></td>
</tr>
<tr>
<td>USB 2.0 port</td>
<td></td>
</tr>
<tr>
<td>Embedded 1769 I/O modules</td>
<td></td>
</tr>
<tr>
<td>Expandable with 4 x 1769 I/O modules</td>
<td></td>
</tr>
<tr>
<td>Embedded power supply</td>
<td></td>
</tr>
<tr>
<td>Integrated motion control</td>
<td></td>
</tr>
</tbody>
</table>

![CompactLogix 5370 L2 Controller](image2.png)
Selecting a CompactLogix controller

There are many factors to consider when selecting a CompactLogix controller due to their module nature and wide range of form factors which are available:

- Supported Logix Designer software versions
- Cabinet size restrictions
- CompactLogix form factors or I/O module scalability
- Processing the requirements of your current application and future expansion
- Memory requirements of your current application and future expansion

The CompactLogix controllers and their software version compatibilities are shown in the following table:

<table>
<thead>
<tr>
<th>CompactLogix controllers</th>
<th>Logix Designer software (RSLogix 5000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>Memory</td>
</tr>
<tr>
<td>Bulletin 1768</td>
<td></td>
</tr>
<tr>
<td>1768-L43</td>
<td>2 MB</td>
</tr>
<tr>
<td>1768-L45</td>
<td>3 MB</td>
</tr>
<tr>
<td>Bulletin 1769 L23x</td>
<td></td>
</tr>
<tr>
<td>1769-L23</td>
<td>512 KB</td>
</tr>
<tr>
<td>Bulletin 1769-L3x</td>
<td></td>
</tr>
<tr>
<td>1769-L3x</td>
<td>1.5 MB</td>
</tr>
</tbody>
</table>
ControlLogix and CompactLogix Overview and Firmware

<table>
<thead>
<tr>
<th>CompactLogix controllers</th>
<th>Logix Designer software (RSLogix 5000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>Memory</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>5370 1769-L16</td>
<td>384 KB</td>
</tr>
<tr>
<td>5370 1769-L18</td>
<td>512 KB</td>
</tr>
<tr>
<td>5370 1769-L24</td>
<td>750 KB</td>
</tr>
<tr>
<td>5370 1769-L27</td>
<td>1 MB</td>
</tr>
<tr>
<td>5370 1769-L30</td>
<td>1 MB</td>
</tr>
<tr>
<td>5370 1769-L33</td>
<td>2 MB</td>
</tr>
<tr>
<td>5370 1769-L36</td>
<td>3 MB</td>
</tr>
</tbody>
</table>

It is also important to consider that some of the CompactLogix 5730 controllers are slated as direct replacements for some of the older CompactLogix controllers (although the older controllers are still available for purchase):

- 5370 1769-L24 replaces 1769-L23
- 5370 1769-L3x replaces 1769-L3x

ControlLogix software and firmware

Due to the long life span of most industrial PACs, it is common to encounter controllers still running legacy firmware. Controller firmware versions and RSLogix 5000 and Logix Designer versions go hand in hand. If you are working on the ControlLogix or CompactLogix controller that is running firmware version 13.03, you should be using RSLogix 5000 Version 13.03 to program it. As updating firmware can introduce process downtime, it is important to understand and work with the capabilities of older firmware and software versions:

<table>
<thead>
<tr>
<th>Version</th>
<th>Year</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1997</td>
<td>Cross reference support, RSLinx Version 2.0 support, L5x</td>
</tr>
<tr>
<td>2</td>
<td>1998</td>
<td>Trending, position and time camming, 1794 FLEX I/O, RSWho</td>
</tr>
<tr>
<td>3,4</td>
<td>1998</td>
<td>Internal builds, not released to the public</td>
</tr>
<tr>
<td>5</td>
<td>1998</td>
<td>SERCOS, quick view pane, function block diagrams, FLEX EX</td>
</tr>
<tr>
<td>6</td>
<td>1999</td>
<td>FlexLogix and SoftLogix support</td>
</tr>
<tr>
<td>7</td>
<td>2000</td>
<td>Windows 2000 support, CompactLogix support, Ethernet/IP support</td>
</tr>
<tr>
<td>8</td>
<td>2001</td>
<td>ControlLogix redundancy, DH485, nonvolatile memory L55</td>
</tr>
<tr>
<td>9</td>
<td>2001</td>
<td>SERCOS Drive support with 1756-M08SE module</td>
</tr>
<tr>
<td>10</td>
<td>2002</td>
<td>ControlLogix 5563 controller support</td>
</tr>
</tbody>
</table>
### Version Year Notes

<table>
<thead>
<tr>
<th>Version</th>
<th>Year</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>2002</td>
<td>SFC, ST, FBD online edits SoftLogix 5800, point I/O support</td>
</tr>
<tr>
<td>12</td>
<td>2003</td>
<td>RSLogix Emulate 5000, event task, CompactLogix support, compare</td>
</tr>
<tr>
<td>13</td>
<td>2004</td>
<td>SFC online editing, ST online editing, LD import/export</td>
</tr>
<tr>
<td>14</td>
<td>2004</td>
<td>GM only build</td>
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<tr>
<td>15</td>
<td>2005</td>
<td>S88, add 1756 I/O modules during runtime, <strong>user-defined data type (UDT)</strong></td>
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<tr>
<td>16</td>
<td>2007</td>
<td>User-defined <strong>add-on instructions (AOI)</strong>, ControlLogix 1756-L64</td>
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<tr>
<td>17</td>
<td>2008</td>
<td>Windows Vista, free to download demo, advanced process control</td>
</tr>
<tr>
<td>18</td>
<td>2010</td>
<td>1756-L73, 1756-L75 controller, CIP motion, CIP SYNC, CompactLogix safety</td>
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<tr>
<td>19</td>
<td>2010</td>
<td>Windows 7 support, 1756-L72, 1756-L74, integrated motion Ethernet/IP</td>
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<tr>
<td>20</td>
<td>2012</td>
<td>1756-L71, support 200 to 10,000 I/O points, GuardLogix</td>
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### Studio 5000 – Logix Designer

<table>
<thead>
<tr>
<th>Version</th>
<th>Year</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>2013</td>
<td>Logix Designer, alarm log, comments and descriptions stored in PAC</td>
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<tr>
<td>22</td>
<td>2014</td>
<td>Internal build, not released to the public</td>
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<tr>
<td>23</td>
<td>2014</td>
<td>Controller firmware updates and fixes</td>
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<td>24</td>
<td>2014</td>
<td>Windows 8 support, logical organizer view, program parameter, merge improved</td>
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<td>25</td>
<td>2015</td>
<td>Internal build, not released to the public</td>
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<td>26</td>
<td>2015</td>
<td>Windows 8.1 support, license-based source protection</td>
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</tbody>
</table>

### Product Selection Toolbox

Rockwell Automation provides a software suite called **Product Selection Toolbox**, which is designed to help you select and design Integrated Architecture solutions. This software suite provides helpful tools for evaluating the size of your application, generating drawings, and even estimating the cost of your application. This product is available for free to approved partners and customers.
Rockwell Automation Product Catalog for iPad

Rockwell Automation has created an iPad-based product selection tool. Rockwell Automation Product Catalog is a portable version of Product Selection Toolbox that allows you to select and configure thousands of products from Rockwell Automation and their industry partners. Product Catalog will even help you find the nearest distributor to your location. It is available for free in the App Store.

Summary

In this chapter, we learned about the controllers available within Rockwell Automation's Integrated Architecture. We also explored the history of Rockwell Automation and evolution of the industry-leading Logix platform. We now have an idea of the controller solutions available within Integrated Architecture, and are capable of making basic solution architecture decisions. In the appendix of this book, you can find links to Rockwell Automation Literature Library where you can dive deeper into the topics covered in this chapter.

In the next chapter, we will introduce the various networking and communication options available for the Rockwell Automation Logix controllers.
Where to buy this book

You can buy Learning RSLogix 5000 Programming from the Packt Publishing website.

Alternatively, you can buy the book from Amazon, BN.com, Computer Manuals and most internet book retailers.

Click here for ordering and shipping details.