



The LabVIEW Style Book

By Peter A. Blume

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Drawing on the experiences of a world-class LabVIEW development organization, *The LabVIEW Style Book* is the definitive guide to best practices in LabVIEW development.

Leading LabVIEW development manager Peter A. Blume presents practical guidelines or “rules” for optimizing every facet of your applications: ease of use, efficiency, readability, simplicity, performance, maintainability, and robustness. Blume explains each style rule thoroughly, presenting realistic examples and illustrations. He even presents “nonconforming” examples that show what *not* to do—and *why not*. While the illustrations in the print book are in black and white, you can download full-color versions from the publisher web site for free.

Coverage includes

- Significance of style: How good style improves quality and actually saves time over the full project life cycle
- Before you code: Configuring your LabVIEW environment, and organizing your files on disk and in the LabVIEW project
- LabVIEW project specifications: A specialized standard for specifying LabVIEW application requirements
- Efficient VI layout and development: front panel, block diagram, icons, and connectors
- Data structures: Choosing data types, efficient use of arrays and clusters, and special considerations with nested data structures
- Error handling strategies: Trapping and reporting errors for robust and reliable applications
- Design patterns: Standard VI architectures and application frameworks that promote good style
- Documentation: Essential rules for source code documentation and streamlining the process
- Code reviews: Enforcing a style convention using a checklist, the LabVIEW VI Analyzer Toolkit, and peer reviews
- Appendixes: Convenient glossary and style rules summary

This book will be indispensable to anyone who wants to develop or maintain quality LabVIEW applications: developers, managers, and end users alike.

Additionally, it will also be valuable to those preparing for NI's Certified LabVIEW Developer or Certified LabVIEW Architect exams, which contain significant content on development style.

Foreword by Darren Nattinger

Preface

Acknowledgments

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The LabVIEW Style Book is a comprehensive reference on recommended LabVIEW development practices. It contains guidelines designed to optimize the ease-of-use, efficiency, readability, maintainability, robustness, simplicity, and performance of LabVIEW applications. The book provides thorough explanations of each guideline, including examples and illustrations. The material leverages the work of the early pioneers of the LabVIEW community¹, has evolved from many years of use by Bloomy Controls², and has been reviewed by esteemed representatives of the LabVIEW community³. I invite you to learn from the experiences of myself and the staff at Bloomy Controls, Inc., by reading *The LabVIEW Style Book*. I hope you enjoy reading it as much as I enjoyed writing it!

Intended Reader

Intended readers include developers, managers, and organizations that develop or use LabVIEW applications. Developers that have learned and successfully applied the fundamentals of LabVIEW can use this material to learn LabVIEW best practices. Experienced beginners can use this book to form good programming habits early in their LabVIEW careers. You must have a working knowledge of fundamental LabVIEW principles and terminology, as instructed in a LabVIEW Basics I and II hands-on course⁴, and experience developing and deploying applications. Intermediate developers, who have mastered the fundamentals and are ready to take their skills to the next level, will learn the most from this material. No doubt you have experienced the power and flexibility of LabVIEW and are ready to concentrate on style. Advanced developers will strongly identify with the contents, reinforce their knowledge and experience, and have a useful reference to share with colleagues. You might use *The LabVIEW Style Book* to help reduce the training and support burden you might have within your organization, to focus on your primary responsibilities. **Managers** and **Organizations** that employ multiple developers and users can gain maximum benefit by standardizing on these guidelines across the organization. Specifically, an organization might adopt the recommended guidelines and reference as its standard and require that all applications, whether received from internal or remote developers, consultants, or third-party systems integrators, conform to these guidelines. This approach ensures quality and consistency throughout an organization and helps satisfy industry quality standards.

Organization

The chapters of *The LabVIEW Style Book* present guidelines and examples organized by topic. Chapter 1, "Introduction," discusses the significance of style, including its relationship to ease of use, efficiency, readability, maintainability, robustness, simplicity, and the performance of the completed application. Chapter 2, "Prepare for Good Style," presents considerations that influence style before you begin programming, including specifications, configuration of the LabVIEW environment, and project and file organization. Additionally, it presents a specialized standard for LabVIEW project specifications. Chapter 3, "Front Panel Style," Chapter 4, "Block Diagram," and Chapter 5, "Icon and Connector," present the basics for VI layout and development. Chapter 3 provides guidelines for layout, text, color, and navigation. It distinguishes separate guidelines for the front panels of GUI VIs and subVIs, where appropriate. Chapter 4 presents guidelines for layout, wiring, and data flow, along with techniques for optimizing data flow. Chapter 5 discusses good icon development practices and editing shortcuts, and covers standard connector terminal patterns, assignments, and conventions.

Chapter 6, "Data Structures," provides guidelines on data type selection and array and cluster development. A methodology is integrated with several useful reference tables for simplifying data type selection and configuration. Guidelines and examples for optimizing VIs involving complex data structures also are presented in this chapter. Chapter 7, "Error Handling," Chapter 8, "Design Patterns," and Chapter 9, "Documentation," expand upon the basics. Chapter 7 presents comprehensive guidelines for thorough error

handling, along with special considerations for error handling within subVIs. Chapter 8 discusses common VI architectures that promote good style, beginning with simple subVI design patterns and progressing to single and multiple loop design patterns. It also describes several variations of the LabVIEW state machine. Additionally, Chapter 8 presents three complex application frameworks, including a dynamic framework that uses plug-ins, a multiple-loop framework, and a modular multiple-loop framework that uses loop-subVIs. Chapter 9 provides a summary of guidelines to facilitate source code documentation. Chapter 10, "Code Reviews," presents manual and automated methods of reviewing source code and enforcing style rules. The LabVIEW VI Analyzer Toolkit, an add-on tool that integrates with the LabVIEW environment for analyzing VIs, is discussed. An analysis task is configured and an application is evaluated using the VI Analyzer.

Appendixes include a glossary, a style rules summary, and a bibliography. Appendix A, "Glossary," provides a list of terms and definitions; many LabVIEW and software industry terms are evolutionary and context sensitive. Any term that seems specialized or ambiguous is defined where it first appears within the book and used consistently in successive chapters. The definitions are repeated in the glossary for ease of reference. Appendix B, "Style Rules Summary," lists the style guidelines presented in each chapter. Finally, additional references are noted throughout the book where they apply to the material, and each is described in Appendix C, "Bibliography." These include online documents and downloadable materials, books, and resources.

- See the "Acknowledgments" section for a list of reviewers, contributors, and people who have helped advance the science of LabVIEW Style.
- Bloomy Controls is a National Instruments Select Integration Partner with offices in Windsor, Connecticut; Milford, Massachusetts; and Fort Lee, New Jersey. Information is available at <http://www.bloomy.com>.
- LabVIEW Basics I and II is a one-week hands-on course offered by NI Certified Training Centers. More information is available from <http://sine.ni.com/nips/cds/view/p/lang/en/nid/2236>.

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