



# **The LabVIEW Style Book**



**Peter A. Blume**

**President, Bloomy Controls, Inc.**



**PRENTICE  
HALL**

Upper Saddle River, NJ • Boston • Indianapolis • San Francisco  
New York • Toronto • Montreal • London • Munich • Paris • Madrid  
Capetown • Sydney • Tokyo • Singapore • Mexico City

# Contents

<b>Foreword</b>	<b>xv</b>
<b>Preface</b>	<b>xvii</b>
<b>Acknowledgments</b>	<b>xx</b>
<b>About the Author</b>	<b>xxii</b>



<b>The Significance of Style</b>	<b>1</b>
1.1 Style Significance .....	2
1.1.1 Ease of Use .....	6
1.1.2 Efficiency .....	7
1.1.3 Readability .....	9
1.1.4 Maintainability .....	11
1.1.5 Robustness .....	12
1.1.6 Simplicity .....	15

1.1.7	Performance	17
1.1.8	Style Tools	18
1.2	Style Versus Time Tradeoff	18

## ▼2

	<b>Prepare for Good Style</b>	<b>21</b>
2.1	Specifications	22
2.1.1	Best Practices for Specifications Development	24
2.1.2	LabVIEW Project Requirements Specification	25
2.2	Design	29
2.2.1	Search for Useful Resources	30
2.2.2	Develop a Proof of Concept	30
2.2.3	Revise the Specification	31
2.3	Configure the LabVIEW Environment	32
2.3.1	LabVIEW Options Dialog Box	32
2.3.2	Code Reuse	34
2.4	Project Organization, File Naming, and Control	39
2.4.1	Disk Organization	40
2.4.2	The LabVIEW Project	42
2.4.3	File-Naming Conventions	44
2.4.4	Source Control	45
	Endnotes	46

## ▽3

	<b>Front Panel Style</b>	<b>47</b>
3.1	Layout	48
3.1.1	General Rules	48
3.1.2	GUI VI Panel Layout	51
3.1.3	SubVI Panel Layout	59
3.2	Text	61
3.2.1	General Rules	61

3.2.2	Control Labels . . . . .	66
3.2.3	SubVI Panel Text . . . . .	68
3.2.4	Industrial GUI VI Text . . . . .	69
3.3	Color . . . . .	69
3.4	GUI Navigation . . . . .	71
3.4.1	Control Scope . . . . .	71
3.4.2	Consistency . . . . .	74
3.5	Examples . . . . .	75
3.5.1	SubVI from Selection . . . . .	75
3.5.2	Dialog Utility VI . . . . .	77
3.5.3	Capacitor Test & Sort . . . . .	79
3.5.4	Centrifuge DAQ . . . . .	81
3.5.5	Spectralyzer . . . . .	82
3.5.6	Parafoil Guidance Interface . . . . .	83
	Endnotes . . . . .	85

## ▼ 4

	<b>Block Diagram</b>	<b>87</b>
4.1	Layout . . . . .	88
4.1.1	Layout Basics . . . . .	88
4.1.2	SubVI Modularization . . . . .	90
4.2	Wiring . . . . .	93
4.2.1	Clear Wiring Techniques . . . . .	94
4.2.2	Cluster Modularization . . . . .	97
4.3	Data Flow . . . . .	101
4.3.1	Data Flow Basics . . . . .	101
4.3.2	Practical Variables and Sequence Structures . . . . .	104
4.3.3	Impractical Variables and Sequence Structures . . . . .	108
4.3.4	Optimizing Data Flow . . . . .	111
4.4	Examples . . . . .	115
4.4.1	SubVI from Selection . . . . .	115
4.4.2	Excessively Nested VI . . . . .	117
4.4.3	Haphazard VI . . . . .	119

4.4.4	Right to Left VI .....	120
4.4.5	Left to Right VI .....	121
4.4.6	Centrifuge DAQ VI .....	122
4.4.7	Screw Inspection VI .....	124
4.4.8	Optical Filter Test VI .....	127
	Endnotes .....	128

## ▼ 5

	<b>Icon and Connector</b> .....	<b>129</b>
5.1	Icon .....	132
5.1.1	Icon Basics .....	132
5.1.2	Icon Shortcuts .....	135
5.1.3	International Icons .....	139
5.2	Connector Pane .....	140
5.3	Examples .....	145
5.3.1	Obnoxious Examples .....	145
5.3.2	Instrument Drivers .....	148
5.3.3	Miscellaneous Examples .....	151
5.3.4	Clever Examples .....	153
	Endnotes .....	155

## ▼ 6

	<b>Data Structures</b> .....	<b>157</b>
6.1	Data Structure Design Methodology .....	158
6.1.1	Choose the Controls and Data Types .....	158
6.1.2	Configure the Properties .....	169
6.1.3	Create the Data Constructs .....	170
6.2	Simple Data Types .....	172
6.2.1	Boolean .....	173
6.2.2	Numeric .....	175
6.2.3	Special Numeric .....	177
6.2.4	String, Path, and Picture .....	179

6.3	Data Constructs .....	180
6.3.1	Simple Arrays and Clusters .....	181
6.3.2	Special Data Constructs .....	186
6.3.3	Nested Data Structures .....	187
6.4	Examples .....	193
6.4.1	Thermometer VI .....	193
6.4.2	OpenG Variant .....	194
6.4.3	Haphazard Data .....	197
6.4.4	Centrifuge DAQ VI .....	199
	Endnotes .....	201

 **7**

<b>Error Handling</b>	<b>203</b>	
7.1	Error Handling Basics .....	204
7.1.1	Trapping Errors .....	205
7.1.2	Reporting Errors .....	210
7.1.3	Error Codes .....	214
7.2	SubVI Error Handling .....	217
7.3	Prioritizing Errors .....	222
7.4	Error Handling Tips .....	226
7.4.1	Structure Wiring .....	226
7.4.2	Merging Errors .....	226
7.4.3	Clearing Errors .....	228
7.4.4	Automatic Error Handling .....	230
7.5	Examples .....	230
7.5.1	Continuous Acquire To File .....	230
7.5.2	Suss Interface Toolkit .....	231
7.5.3	Merge Parallel Errors .....	232
7.5.4	Screw Inspection VI .....	234
7.5.5	Test Executive VI .....	235
	Endnotes .....	238

## ▼ 8

<b>Design Patterns</b>	<b>239</b>
8.1 Simple Design Patterns	241
8.1.1 Immediate SubVI	241
8.1.2 Functional Global	244
8.1.3 Continuous Loop	246
8.1.4 Event-Handling Loop	250
8.2 State Machines	254
8.2.1 Classic State Machine	257
8.2.2 Queued State Machine	260
8.2.3 Event-Driven State Machine	262
8.2.4 Event Machine	265
8.3 Compound Design Patterns	267
8.3.1 Parallel Loops	269
8.4 Complex Application Frameworks	272
8.4.1 Dynamic Framework	272
8.4.2 Multiple-Loop Application Framework	278
8.4.3 Modular Multiple-Loop Application Framework	283
8.5 Examples	287
8.5.1 Elapsed Time VI	287
8.5.2 Poll Instrument Response VI	288
8.5.3 Unconventional State Machine	289
8.5.4 Centrifuge DAQ VI	292
8.5.5 Transducer Control Utility	293
8.5.6 Distributed Control System	296
Endnotes	297

## ▼ 9

<b>Documentation</b>	<b>299</b>
9.1 Front Panel Documentation	301
9.2 Block Diagram	304

9.3 Icon and VI Description ..... 311

9.4 Online Documentation ..... 311

9.5 Examples ..... 315

    9.5.1 SubVI from Selection VI ..... 315

    9.5.2 Filter Test VI ..... 316

    9.5.3 Meticulous Control Descriptions ..... 317

    9.5.4 Temperature Profile Illustration ..... 318

Endnotes ..... 318

## ▽ 10

**Code Reviews** ..... **319**

10.1 Self-Reviews ..... 320

    10.1.1 VI Analyzer Toolkit ..... 320

    10.1.2 Manual Checklist ..... 330

10.2 Peer Reviews ..... 334

Endnotes ..... 338

## Appendix A

**Glossary** ..... **339**

## Appendix B

**Style Rules Summary** ..... **349**

**Index** ..... **357**