

Contents

Preface	VII
Who should read this book	VII
How the book is organised	VII
How to use this book	VIII
Acknowledgments	IX
About the Authors	XI
1 Introduction	1
1.1 Motivation for Device Descriptions	1
1.2 History of Field Devices	2
1.3 Integration of Field Devices into the Automation System	5
1.4 History of the EDDL	6
2 Tool Overview	9
2.1 About this Chapter	9
2.2 Tools for Development	9
2.2.1 General Approach	9
2.2.2 The isEDD Workbench	11
2.2.3 The HCF Development Tools	22
2.2.4 The Fieldbus Foundation Development Tools	24
2.3 Compliance Tests	24
2.4 End User Tools	24
2.4.1 Approaches of EDD based End User Tools	24
2.4.2 SIMATIC PDM	25
2.4.3 isEDDView DTM	26
3 The EDD Language Concept	29
3.1 About this Chapter	29
3.2 Identification of an EDD	30
3.3 Language Conventions	32
3.3.1 Translation Phases	32
3.3.2 Preprocessor	33
3.3.3 Terminals	39
3.3.4 Dictionaries	43
3.3.5 Expressions	44
3.3.6 Conditionals	47
3.3.7 Referencing Items and their Attributes	49
3.4 Common Attributes	51

3.4.1	Label	51
3.4.2	Handling	51
3.4.3	Help	51
3.4.4	Validity	51
3.4.5	Members	52
3.4.6	Line Types and Colours	52
3.4.7	Height and Width	53
3.4.8	Response Codes	53
3.5	Data Modelling	54
3.5.1	Parameters	54
3.5.2	Arrays	73
3.5.3	Lists (Dynamic Arrays)	76
3.5.4	Collections	80
3.5.5	Records	81
3.5.6	Reference Arrays	82
3.5.7	Files	83
3.5.8	Relations	84
3.5.9	Blocks	89
3.5.10	Variable Lists	96
3.6	Communication	96
3.6.1	General	96
3.6.2	PROFIBUS / PROFINET	97
3.6.3	HART	101
3.6.4	FOUNDATION Fieldbus	103
3.7	Methods	103
3.7.1	Purpose and Syntax	103
3.7.2	TYPE	104
3.7.3	ACCESS	105
3.7.4	VALIDITY	105
3.7.5	CLASS	105
3.7.6	DEFINITION	106
3.7.7	Aborting	108
3.7.8	Signal Handler	109
3.8	Graphical User Interface	110
3.8.1	Introduction	110
3.8.2	The Idea behind	111
3.8.3	The MENU in Detail	111
3.8.4	Menus	119
3.8.5	Dialogues and Windows	120
3.8.6	Layout Rules	122
3.8.7	Images	129
3.8.8	Grids	131
3.8.9	Charts	133
3.8.10	Graphs	141
3.9	Reuse of Code	149
3.9.1	Objective	149
3.9.2	Importing external EDDs	149

3.9.3	Like	153
3.9.4	Template	154
4	Practical Usage	155
4.1	About this chapter	155
4.2	Only Prime Quality	155
4.2.1	Principles	155
4.2.2	Naming and Code Conventions	156
4.2.3	How to Comment the Source	157
4.2.4	Good Software Designs	158
4.2.5	Defense Programming	159
4.2.6	Source Control by means of Revision Control	161
4.3	How to find Failures in an EDD	162
4.3.1	General Idea to find the Defect	163
4.3.2	Order of Parameter Transfer	163
4.3.3	Wrong Parameter Values after Transfers	163
4.3.4	METHOD abort	164
4.4	Parameters of a Device and their Representation	165
4.4.1	Let us begin the Project	165
4.4.2	Using a Dictionary and Completion of the Parameters	167
4.4.3	A Simple User Interface	170
4.4.4	PROFIBUS	172
4.4.5	HART	178
4.4.6	FOUNDATION Fieldbus	190
4.4.7	Up- and Download	190
4.4.8	Validity	191
4.4.9	UNIT-Relation	192
4.5	Using the EDDL PROFIBUS PA IMPORT Library	193
4.6	Entry Points and User Roles	199
4.7	Advanced EDD Usage	200
4.7.1	How to write a Wizard?	200
4.7.2	Persistent Data Storage	203
5	Recent Works and Perspectives	205
5.1	About this Chapter	205
5.2	Modular Devices	205
5.2.1	Background	205
5.2.2	Components	207
5.2.3	Component Folders	213
5.2.4	Component References	213
5.2.5	Component Relations	214
5.2.6	Interfaces	217
5.3	EDDL and FDI	218
5.3.1	Overview	218
5.3.2	Basic Architecture	220
5.3.3	System Architecture	221
5.3.4	Advanced Harmonisation	223

5.4	Usage of EDD Technology in Wide Contexts	223
5.4.1	General	223
5.4.2	EDDL and SOA	224
	Bibliography	231
	Figures	233
	Tables	237
	Listings	239
	Abbreviations	243
	A Predefined return codes of Builtins	245
	B EDDL keywords	247
	C EDDL builtins	253