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PORTAL Language Description

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PREFACE

The aim of this book is to give a systematic and detailed description of the programming language PORTAL, a high level language for the programming of reliable real-time systems, developed by LGZ Landis & Gyr Zug Corp. in Zug, Switzerland. In contrast to the introductory text "Programming in PORTAL" this language definition is more in the style of a manual. As a rule, the reader is expected to be familiar with a high level programming language such as Pascal, or to have acquired some PORTAL knowledge either in a course or through self-study. If these conditions are fulfilled, the language description may be used as a text-book or as a reference manual.

In the first chapter R. Schild explains the goals of PORTAL. In addition this introductory chapter contains a description of the Backus-Naur form -- the meta-language used to describe the PORTAL syntax in the remaining chapters.

The second chapter describes the lexical symbols of the language. Here the reader will find answers to questions such as "what characters may be used in a name?" or "how is a comment delimited?"

Chapters three to seven describe constants, data types, variables, expressions, and statements. Most of these language elements appear in the same or similar form in Pascal. But there are some constructions that are specific to PORTAL: the index type (4.1.7), the case type (4.4), the string type (4.6), the loop-statement (7.4.3), the with-statement (7.5), and the using-statement (7.6).

Chapters eight through ten treat routines, processes, and modules. These program blocks differ from the corresponding Pascal constructions (functions and procedures) or are not even available (resources, processes and modules). The concepts described in these chapters are of primary importance; they are therefore explained in detail.

Chapter eleven shows the overall structure of a PORTAL program. The reader will learn how to construct a complete program, and also what the influence of the block structure is on the scope of the identifiers.

Appendix A contains information on the different implementations of PORTAL. This consists of technical data (e.g. the range of the type INTEGER, or the implementation of sets) as well as certain deviations from the language definition (restrictions and additions).

Appendix B describes the machine-dependent elements of PORTAL. These include constructs such as AT, which serves to position variables at programmer-defined machine addresses.

Appendix C describes a number of compiler control commands.

Appendix D contains a summary of all the standard routines available in PORTAL.

The bibliography at the end of the book refers the reader to other publications on PORTAL.

Finally, I want to thank all those who have helped and supported me in this work and whose critical remarks and suggestions have improved this

book. In particular I would like to mention P. Bucherer, J. Hunt, W. Joerg, P. Kopp, H. Lienhard, M. Meier, M. Meyer, E. Neuenschwander, H. Oswald, B. Steinle, O. Thaler, and J. Zingg.

Special thanks go to R. Schild and R. Schoenberger. Without their continued readiness to answer all sorts of questions this language definition would never have come into existence.

Zug, July 1983 A. Businger

Preface to the 1st English Edition

The original German version has been translated into English without any major changes. Some minor errors have been corrected, and two new features in the language -- constants computed at compile time, and the possibility to add assembler code -- have been included. To give the reader a feeling for the language in actual use, a new Appendix E presents a complete PORTAL program, consisting of a module to control an elevator, together with a simulation environment.

I would like to thank my wife Carol for doing such an excellent job of translating; many thanks also go to numerous colleagues for their help with the additions and corrections.

Zug, May 1985 R. Schild

Preface to the 2nd edition

To our delight PORTAL continues to be successful. In order to improve the usefulness of this book as a reference, we have added Appendices F and G with a collection of the BNF definitions of PORTAL. In addition a minor correction was made on page 34.

Zug, January 1988 R. Schild

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