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To our families

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Preface

Digital Signal Processing (DSP) is concerned with the theoretical and practical aspects of representing information bearing signals in digital form and with using computers or special purpose digital hardware either to extract that information or to transform the signals in useful ways. Areas where digital signal processing has made a significant impact include telecommunications, man-machine communications, computer engineering, multimedia applications, medical technology, radar and sonar, seismic data analysis, and remote sensing, to name just a few.

During the first fifteen years of its existence, the field of DSP saw advancements in the basic theory of discrete-time signals and processing tools. This work included such topics as fast algorithms, A/D and D/A conversion, and digital filter design. The past fifteen years has seen an ever quickening growth of DSP in application areas such as speech and acoustics, video, radar, and telecommunications. Much of this interest in using DSP has been spurred on by developments in computer hardware and microprocessors. *Digital Signal Processing Handbook CRCnetBASE* is an attempt to capture the entire range of DSP: from theory to applications — from algorithms to hardware.

Given the widespread use of DSP, a need developed for an authoritative reference, written by some of the top experts in the world. This need was to provide information on both theoretical and practical issues suitable for a broad audience — ranging from professionals in electrical engineering, computer science, and related engineering fields, to managers involved in design and marketing, and to graduate students and scholars in the field. Given the large number of excellent introductory texts in DSP, it was also important to focus on topics useful to the engineer or scholar without overemphasizing those aspects that are already widely accessible. In short, we wished to create a resource that was relevant to the needs of the engineering community and that will keep them up-to-date in the DSP field.

A task of this magnitude was only possible through the cooperation of many of the foremost DSP researchers and practitioners. This collaboration, over the past three years, has resulted in a CD-ROM containing a comprehensive range of DSP topics presented with a clarity of vision and a depth of coverage that is expected to inform, educate, and fascinate the reader. Indeed, many of the articles, written by leaders in their fields, embody unique visions and perceptions that enable a quick, yet thorough, exposure to knowledge garnered over years of development.

As with other CRC Press handbooks, we have attempted to provide a balance between essential information, background material, technical details, and introduction to relevant standards and software. The Handbook pays equal attention to theory, practice, and application areas. *Digital Signal Processing Handbook CRCnetBASE* can be used in a number of ways. Most users will look up a topic of interest by using the powerful search engine and then viewing the applicable chapters. As such, each chapter has been written to stand alone and give an overview of its subject matter while providing key references for those interested in learning more. *Digital Signal Processing Handbook CRCnetBASE* can also be used as a reference book for graduate classes, or as supporting material for continuing education courses in the DSP area. Industrial organizations may wish to provide the CD-ROM with their products to enhance their value by providing a standard and up-to-date reference source.

We have been very impressed with the quality of this work, which is due entirely to the contributions of all the authors, and we would like to thank them all. The Advisory Board was instrumental in helping to choose subjects and leaders for all the sections. Being experts in their fields, the section leaders provided the vision and fleshed out the contents for their sections.

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Finally, the authors produced the necessary content for this work. To them fell the challenging task of writing for such a broad audience, and they excelled at their jobs.

In addition to these technical contributors, we wish to thank a number of outstanding individuals whose administrative skills made this project possible. Without the outstanding organizational skills of Elaine M. Gibson, this handbook may never have been finished. Not only did Elaine manage the paperwork, but she had the unenviable task of reminding authors about deadlines and pushing them to finish. We also thank a number of individuals associated with the CRC Press Handbook Series over a period of time, especially Joel Claypool, Dick Dorf, Kristen Maus, Jerry Papke, Ron Powers, Suzanne Lassandro, and Carol Whitehead.

We welcome you to this handbook, and hope you find it worth your interest.

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Editors

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