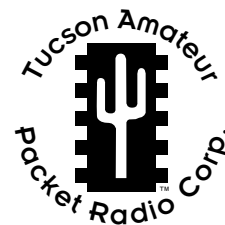


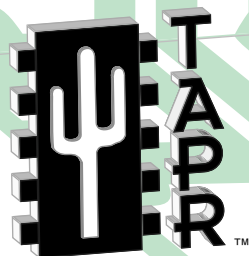
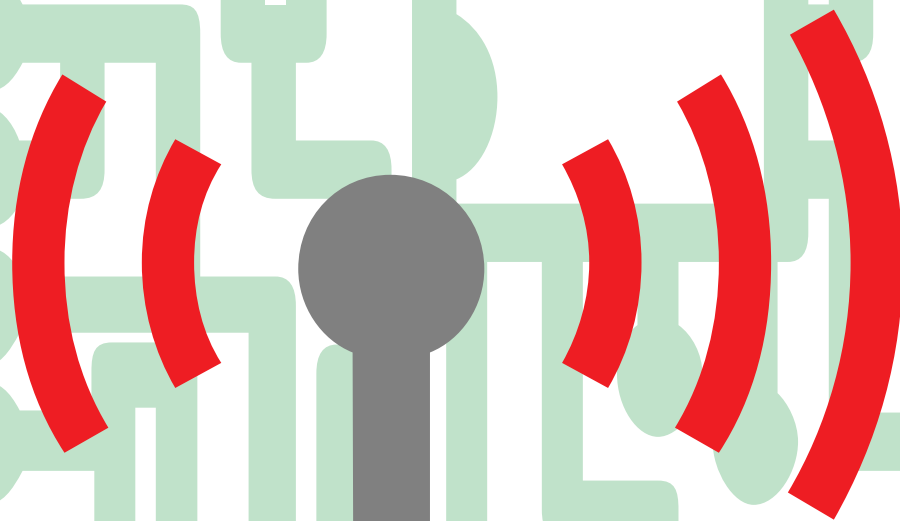
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## Wireless Digital Communications: Design and Theory

Tom McDermott, N5EG



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# Preface

Amateur radio communication has progressed in many ways since its beginning in the early 1900's. General communications progressing from spark to CW and voice from AM to FM and SSB. Similarly, data communications as a mode of amateur communications has progressed from using on-off keying (OOK) to FSK, and from RTTY to more modern modes of communications (synchronous and error-correcting). There has been a lack of good technical background material in amateur radio literature on the principles and design of synchronous digital modems.

The wealth and quality of literature in the professional world in the subject area is astounding, but much of it may not be readily accessible to the radio amateur, whether for reasons of advanced mathematics, or simple lack of availability.

In writing this book, the aim has been to bring a concise group of topics covering a broad spectrum of amateur synchronous digital communications subjects to print in one place, and to make it readily accessible to the radio amateur. This text aims to present the information in a clear and straight-forward manner, with the maximum use of graphical and computer-assisted aids, and with a minimum of rigorous mathematical theory. However, digital communications deals with the application and solution of statistical phenomenon, and a minimum background is necessary. Where practical, the appendices provide short summaries of some of the important mathematical concepts that will be needed in understanding certain areas.

Overall, the field of digital communications could be generally broken into two categories: bandwidth-limited communications and power-limited communications. Much of the professional literature focuses on the former, while in practice the amateur is many times concerned with the latter. This text focuses more on the subject of power-limited communications and emphasizes, through examples, the circuits and problems of the latter category of applications.

With time and the increasingly more crowded HF bands, however, the radio amateur will adopt more sophisticated data modems, offering higher throughput and narrower bandwidth operation under the demanding propagation conditions of the HF medium. This trend has already started and should accelerate as the cost of technology, particularly Digital Signal Processing, continues to decrease. So, this text includes information on the subject areas of DSP-based modem filters, and on forward-error-correcting codes, whose use by the radio amateur will become dominant within a few short years. While the data rate of VHF and UHF communications will increase, it is expected that, for the radio amateur, these will remain power-limited applications for some time.

In the preparation of this text, I have relied on the study of a number of exceptionally well written textbooks, and to the IEEE literature in the area, and these should be consulted whenever more depth or broader interest is desired. I would like to thank the reviewers of the text for many helpful comments, related both to the readability of the material, ... **(more in the book!)**

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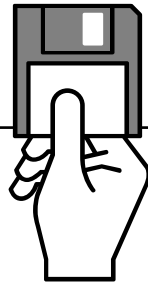
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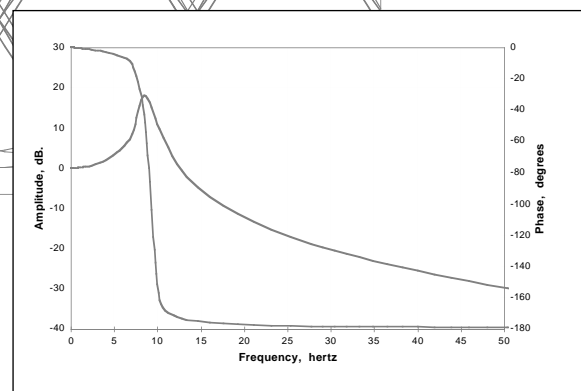
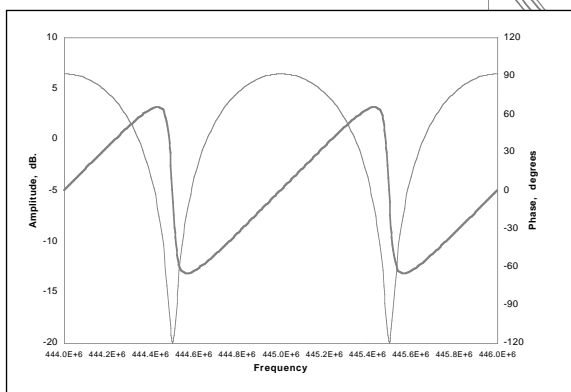
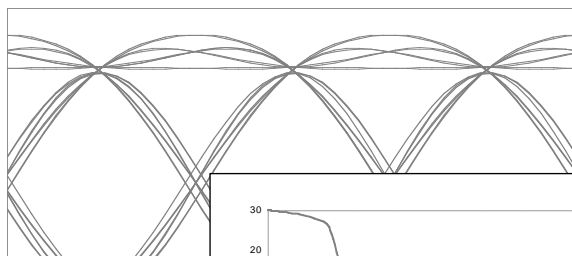
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