PRINCIPLES OF COMPACT DISC

THORN EMI
Home Electronics Development Centre

ISBN 978-0-333-44904-2 ISBN 978-1-349-09765-4 (eBook)

DOI 10.1007/978-1-349-09765-4

Copyright © 1986 THORN EMI
Home Electronics Ltd

All rights reserved. No reproduction,
copy or transmission of this publication
may be made without permission.

No paragraph of this publication may
be reproduced, copied or transmitted
save with written permission or in
accordance with the provision of the
Copyright Act 1956 (as amended).

Any person who does any
unauthorised act in relation to this
publication may be liable to criminal
prosecution and civil claims for
damages.

Published by:
THORN EMI Home Electronics Ltd
Development Centre
Sigma, Windmill Hill,
Swindon, Wilts SN5 9YY

Please quote reference PT1165 with
any enquiry regarding this book.

Contents

- 2. **Disc structure**
- 3. **PCM (Pulse Code Modulation)** Sampling, Quantization, Coding
- 9. **Aliasing**
- 13. **Bit modulation methods** NRZ (Non Return to Zero), NRZ - I, PE (Phase Encode)
- 14. **EFM (Eight to Fourteen Modulation)**
- 17. **Frame format** Frame sync, Sub-coding, CIRC parity
- 19. **CIRC principles**
- 26. **Sub coding** Sub code sync pattern, user word, control, address, data, CRC

Introduction

Compact Audio Disc is the latest development in high performance audio reproduction systems. It offers, at a reasonable cost, a technical specification unattainable with conventional tape or turntable equipment. It has a dynamic range and signal to noise ratio of -98dB . and no measurable wow or flutter.

To achieve this high performance the audio signals are converted from analogue to digital using PCM (Pulse Code Modulation) techniques. Once converted, additional digital information is added to allow the compact disc player to automatically correct for a wide range of errors. This means that the final audio reproduction is less susceptible to deterioration when the compact disc receives scratches and other damage during use.

The use of lasers for both the mastering of compact discs, and reading the stored information into the compact disc player means the digital information can be compacted to provide one hour of stereo reproduction on a single sided 4.5" disc. A facility called sub-coding, enables the compact disc player to display play time and track numbers allowing features such as auto repeat and track sequencing to be used. Spare capacity in sub-coding is provided for future expansion of the CD system.

Figure 1

A simple block diagram of a compact disc encoder is shown in figure 1. In this book each block has been dealt with on a discrete basis to enable an easy understanding of the principles involved. However in practice the latter half of the encoder would be one or several microcomputers.

To help relate the information given in the block diagram, dotted boxes indicate the parts of the encoder covered by a specific section of the book.