

CONTENTS

Preface	v
×1. Introduction, Charles B. Pear, Jr.	1
Advantages of Magnetic Recording	2
Disadvantages of Magnetic Recording	4
Historical	5
Market Growth	7
Future Prospects	9
Organization	10
×2. Recording principles, Albert W. Friend and Charles B. Pear, Jr.	13
2.1. Elements of Ferromagnetism	13
2.2. The Recording Process	30
2.3. The Playback or Reproducing Process	42
2.4. Noise	51
2.5. Cross Talk	51
2.6. Erasing	52
2.7. Print-through	54
×3. Magnetic recording media, Eric D. Daniel and Donald F. Eldridge	58
3.0. Introduction	58
3.1. Requirements	58
3.2. Composition	62
3.3. Manufacture	75
3.4. Testing	84
3.5. Operation	99
×4. Analog recording methods, Charles B. Pear, Jr.	109
4.0. General	109
4.1. Direct Recording	116
4.2. FM Recording Methods	122

4.3.	PDM Modulation	133
4.4.	Carrier Erase Recording	134
4.5.	Boundary Displacement Recording	135
4.6.	Compound Modulation	136
4.7.	Re-recording or Dubbing	136
* 5.	Digital recording methods, <i>William J. Popowsky</i>	138
5.0.	Introduction	138
5.1.	Nature of Digital Information	139
5.2.	Forms of Modulation and Demodulation	149
5.3.	Storage Capability	164
5.4.	Tape Transport Configurations	173
6.	Analog tape recording systems, <i>Charles B. Pear, Jr.</i>	179
6.0.	Introduction	179
6.1.	Tape Transports	179
6.2.	Heads	203
6.3.	Associated Electronic Circuitry	218
7.	Digital tape recording systems, <i>George E. Comstock</i>	226
7.0.	General	226
7.1.	Digital Recording System Organization	227
7.2.	Tape Transport Operation	227
7.3.	Storing the Tape	230
7.4.	Tape Drive Principles	232
7.5.	Tape Drive Mechanisms	239
7.6.	Incremental or Stepper Tape Drive	243
7.7.	Tape Guidance	244
7.8.	Reel Drives	246
7.9.	Programming Limitations	250
7.10.	Record/Playback Heads	251
7.11.	Record/Playback Amplifiers	254
7.12.	Clocking Systems	259
7.13.	Amplifier Adjustments	260
7.14.	Reliability	262
7.15.	Auxiliary Control and Indication	263
8.	Drum and disk magnetic recording systems, <i>W. E. Bushor and Engineering Staff</i>	270
8.0.	Introductory	270
8.1.	Magnetic Drums	273

8.2. Magnetic Disks	285
8.3. Heads for Drum and Disk Files	299
8.4. Drum and Disk Recording Media	308
8.5. Analog Drum Systems	309
9. Digital data recording applications, William J. Popowsky	312
9.0. Introduction	312
9.1. Digital Versus Analog Recording	312
9.2. Sampled Data Systems	313
9.3. Details of Digital Magnetic Tape Acquisition Systems	318
9.4. Digital Data Acquisition Systems for Fixed Locations	326
9.5. Mobile Systems	338
9.6. Computer Applications	353
9.7. Communications Applications	359
10. Analog recording applications, Charles B. Pear, Jr.	363
10.0. Analog Recording	363
10.1. Standards for Analog Recording	364
10.2. Telemetry Recording	366
10.3. Laboratory Applications	378
10.4. Mobile Recording at the Source	393
11. Control applications, J. P. Tipton	403
11.1. Introduction	403
11.2. Fabrication	403
11.3. Conveyor Addressing	411
11.4. Material Handling	414
11.5. Testing	416
11.6. Simulators and Human Programming	417
12. Accessories and auxiliary equipment, Charles B. Pear, Jr.	420
12.0. Introduction	420
12.1. Time Code Generators, Translators and Search Control Units	420
12.2. Erasers	420
12.3. Head Degaussers	421
12.4. Magnetization Developers	422
12.5. Splicers	422
12.6. Tape Cleaners	422

	Contents
12.7. Reelers	422
12.8. Tape Testers	422
12.9. Tape Protection Devices	423
<hr/>	
Appendix One. Excerpt from interim Federal specification reel, precision, aluminum and magnesium, 3-inch center hole	425
Appendix Two. IRIG Document 106-66: telemetry standards	429
Index	443