Contents

1 A Bit of Theory to Start **1**

1.1 Loop Antennas in General 1

1.1.1 Electrically Large Antennas 3

1.1.2 Electrically Small Antennas 5

1.1.3 Ferrite Loop Antennas 5

1.2 Electrically Small Loop Antennas 5

1.3 Principal Parts of a MLA 13

1.3.1 Main Loop 14

1.3.2 Capacitor 15

1.3.3 MLA Coupling Circuits 18

1.4 Antenna Calculation 24

1.4.1 Antenna Parameter Description 24

1.4.2 Example of MLA calculation 29

2 Magnetic Loop Antennas in Practice **35**

2.1 f-MLA versus r-MLA 48

2.2 Genesis of MLA-160 50

2.3 Genesis of MLA-M 52

2.4 Genesis of MLA-T 58

2.5 Genesis of MLA-C 67

2.6 Genesis of MLA-B 76

2.7 Genesis of MLA-4B, MLA-6B and Other Models 77

2.8 Genesis of MLA-CB 81

2.9 Genesis of MLA-ER 82

2.10 MLA-ER II 92

2.11 MLA-ER III 95

3 Reports and Experience with MLA **99**

4 Data Sheets and Manuals MLA **131**

5 Utility Models and Industrial Designs **159**

6 APPENDIX TO THE EXPANDED ISSUE **177**

6.1 Introduction to Appendix 178
6.2 MLA in Practice 179
6.2.1 MLA-ER II and MLA-ER III 180
6.2.2 MLA-UNI 187
6.3 MLA-ER Operating Instructions 193
6.3.1 Introduction 193
6.3.2 MLA-ER Design 194
6.3.3 Operation 194
6.3.4 Conclusion 194
6.3.5 Safety Warning! 195
6.4 Online MLA Calculator 196
6.5 Cardiac Pacemakers and Their EMC 197