

- Preface p. ix
- Acknowledgments p. xi
- Chapter 1 Introduction p. 1
 - 1.1 Definitions p. 1
 - 1.2 What the Reader Should Already Know p. 3
 - 1.3 Style of Approach p. 5
 - 1.4 Goals in System Design p. 7
 - 1.5 The Spirit of System Design p. 7
 - 1.6 Reliability and Availability p. 9
 - 1.7 Effects of User Profile p. 10
 - 1.8 Project Working p. 11
 - References p. 12
- Chapter 2 Available Parameters p. 15
 - 2.1 Standardization and Regulations p. 15
 - 2.2 Frequency p. 16
 - 2.3 Power p. 22
 - 2.4 NF p. 24
 - 2.5 RF Transmission Lines p. 25
 - 2.6 Geographical Topology p. 28
 - 2.7 Modulation p. 29
 - 2.8 Effects of the Baseband Signal p. 31
 - 2.9 Signal Processing p. 32
 - 2.10 Nonelectrical Factors p. 33
 - References p. 36
- Chapter 3 Systems Problems Involving Wave-Propagation Mechanisms p. 37
 - 3.1 Propagation Models in Brief with Reference to System Design p. 38
 - 3.2 Means to Counter Adverse Conditions (Stationary and Nonstationary) p. 42
 - 3.2.1 Attenuation p. 42
 - 3.2.2 Scattering p. 46
 - 3.2.3 Multipath Problems p. 48
 - 3.2.4 Interference Issues p. 51
 - 3.3 Examples p. 51
 - 3.3.1 Unexpected Ionospheric Disturbances at HF's p. 51
 - 3.3.2 Interference Problems in Microwave Links p. 54
 - 3.3.3 Reception of Weak Geostationary Satellite Signals p. 59
 - References p. 60
- Chapter 4 Circuits and Components for System Evaluations and Design p. 63
 - 4.1 Standard or Custom Design? p. 63
 - 4.2 Passive Modules p. 64
 - 4.2.1 Terminations p. 64
 - 4.2.2 Attenuators p. 65
 - 4.2.3 Power Dividers and Combiners p. 66
 - 4.2.4 Filters p. 66
 - 4.2.5 Directional Couplers p. 70

- 4.2.6 Isolators p. 71
- 4.3 Active Modules p. 71
- 4.3.1 Detectors p. 72
- 4.3.2 Switches p. 74
- 4.3.3 Mixers p. 76
- 4.3.4 Amplifiers p. 79
- 4.3.5 Oscillators p. 83
- 4.3.6 Modulators and Demodulators p. 87
- 4.3.7 Upconverters/Downconverters p. 90
- 4.3.8 Power Supplies p. 90
- 4.4 Mechanics p. 91
- 4.5 Purchasing Modules for Equipment Development p. 93
- References p. 94
- Chapter 5 Antennas and Associated Hardware p. 97
- 5.1 Antenna Selection Criteria p. 98
- 5.2 Some Antenna Types p. 103
- 5.2.1 Individual Antenna Elements p. 104
- 5.2.2 Antenna Arrays p. 113
- 5.2.3 Vehicle-Mounted Arrays p. 128
- 5.3 Antennas as Mechanical Elements p. 134
- 5.3.1 Antenna Mounting on Test Vehicles p. 134
- 5.3.2 A Tracking System for a 3-m Reflector Antenna p. 137
- 5.5 Connectors p. 147
- 5.4 RF Transmission Lines p. 140
- 5.4.1 Coaxial Cables p. 141
- 5.4.2 Waveguides p. 146
- 5.5.1 General Performance Requirements p. 148
- 5.5.2 Fundamental Construction p. 148
- 5.5.3 Common RF Connector Types for Mechanical Modules p. 149
- 5.5.4 Connectors as Components in Milled or Sheet Assemblies p. 152
- 5.6 Rotary Joints and Flexible Waveguides p. 153
- 5.6.1 Rotary Joints p. 154
- 5.6.2 Flexible Waveguides p. 155
- References p. 157
- Chapter 6 TXs, RXs, and Transceivers p. 159
- 6.1 Requirements for TX p. 160
- 6.2 Block Diagram p. 166
- 6.3 Choosing the Building Blocks p. 168
- 6.4 Requirements for RXs p. 170
- 6.5 Block Diagram p. 174
- 6.6 Choosing the Building Blocks p. 176
- 6.7 Selecting an RX for the System p. 179
- 6.8 Transceiver Specialties p. 180
- 6.9 Examples p. 183

- 6.9.1 Satellite System Ground Beacon p. 183
- 6.9.2 Material Analysis with Millimeter Waves p. 188
- 6.9.3 Mobile Millimeter-Wave Radar p. 193
- 6.9.4 Microwave Telemetry System p. 198
- 6.9.5 UHF Time and Frequency Reference p. 203
- References p. 212
- Chapter 7 RF Measuring Instrumentation p. 215
- 7.1 Defining a Test Setup p. 215
- 7.2 Typical Test Instruments for Systems p. 217
- 7.3 Ready-Made or Tailored p. 218
- 7.4 About Computer Control p. 219
- 7.5 Examples p. 220
- 7.5.1 Estimating VHF Ground Conductivity p. 221
- 7.5.2 High-Power HF VNA p. 225
- 7.5.3 Pattern and Impedance Measurements of Compact Antennas p. 226
- 7.5.4 Test Instrumentation for Air Navigation Facilities p. 229
- References p. 241
- List of Acronyms p. 243
- List of Symbols p. 249
- About the Author p. 253
- Index p. 255