

CONTENTS

130-in-1

Model MX-906

Before We Begin	5
Installing Batteries	5
Making Wiring Connections	6
Components	7
Building Your First Project	11
Troubleshooting	12
Helpful Suggestions	12
1) Entertainment Circuits	13
1. Electronic Woodpecker.....	14
2. The Chirping Bird.....	15
3. Electronic Cat.....	16
4. Sonic Fish Caller.....	17
5. Machine Gun Pulse Oscillator.....	18
6. Electronic Motorcycle.....	19
7. Two-Tone Patrol Car Siren.....	20
8. Electronic Siren.....	21
9. Electronic Metronome.....	22
10. Electronic Grandfather Clock.....	23
11. Light-Controlled Electronic Harp.....	24
12. Horror Movie Sound Effects.....	25
13. Strobe Light.....	26
14. Rapid LED Display Switching (Persistence of Vision Test).....	27
2) Basic Semiconductor and Components Circuits	28
A Big Change.....	29
15. Capacitor Discharge / High Voltage Generator.....	30
16. Capacitors in Series and Parallel.....	31
17. Resistors in Series and Parallel.....	32
18. Light Dimmer.....	33
19. Transistor Switcher.....	34
20. Transistor Circuit Action.....	35
21. Sound Amplifier.....	36
22. Flip-Flop Multivibrator with LED Display.....	37
3) LED Digital Display Circuits	38
23. Seven-Segment LED Digital Display Circuit.....	39
24. Basic LED Display.....	40
25. Transistor Control Switching of the LED Display.....	41
26. Transistor, CDS Cell and LED Display Circuit.....	42
4) A Tour Through Digital Circuits	43
27. Diode-Transistor Logic AND with LED Display.....	44
28. DTL OR Circuit with LED Display.....	45
29. DTL NAND Circuit with LED Display.....	46
30. DTL Exclusive OR Circuit.....	47
31. Transistor NOR Circuit with LED Display.....	48
32. Transistor Flip-Flop Circuit.....	49
33. Transistor Toggle Flip-Flop.....	50
5) More Adventures with Digital Circuits	51
34. Transistor-Transistor Logic Buffer Gate.....	52
35. TTL Inverter Gate.....	53
36. TTL AND Gate.....	54
37. TTL OR Gate.....	55
38. TTL Exclusive OR Gate.....	56
39. TTL NOR Gate.....	57
40. TTL Three-Input AND Gate.....	58
41. TTL AND Enable Circuit.....	59
42. TTL OR Enable Circuit.....	60
43. TTL NAND Enable Circuit.....	61
44. TTL R-S Flip-Flop.....	62
45. Toggle Flip-Flop Circuit Made from NAND Gate.....	63
46. TTL Line Selector.....	64
47. TTL Data Selector.....	65
6) The World of Transistor-Transistor Logic	66
48. TTL Astable Multivibrator.....	67
49. TTL Tone Generator.....	68
50. Winking LEDs.....	69
51. A One-Shot TTL.....	70
52. Transistor Timer with TTL.....	71
53. Buzzin' LED.....	72
54. Son of Buzzin' LED.....	73
55. Set/Reset Buzzer 1.....	74
56. Set/Reset Buzzer 2.....	75
57. Sound Machine.....	76
58. Big Mouth.....	77
59. Shot in the Dark.....	78

7) Application Circuits Based on the Oscillator	79	9) More Adventures with Operational Amplifiers	118
60. Variable R-C Oscillator.....	80	97. Alternating Current Sound.....	119
61. Oscillator with Turn-Off Delay.....	81	98. Light Control Sound Circuit.....	120
62. Temperature-Sensitive Audio Oscillator.....	82	99. Sound Alarm Circuit.....	121
63. Two-Transistor, Directly Connected Oscillator.....	83	100. Study Timer.....	122
64. Push/Pull Square Wave Oscillator.....	84	101. Kitchen Timer.....	123
65. Pencil Lead Organ.....	85	102. Three-Input AND Gate Using Operational Amplifier.....	124
66. LED Strobe Light.....	86	103. Voice Level Meter.....	125
67. Electronic Organ.....	87	104. Power-On Reset Circuit.....	126
68. Daylight Early Bird.....	88	105. Delayed Timer.....	127
69. Intermittent Alarm Generator.....	89	106. Pulse Frequency Doubler.....	128
8) Basic Operational Amplifier Circuits	90	107. White Noise Generator.....	129
70. Comparator.....	91	108. DC-DC Converter with Operational Amplifier.....	130
71. Basic Increase in DC Voltage.....	92	10) Communication Circuits	131
72. Constant-Current Source.....	93	109. Code Practice Oscillator with Tone Control.....	132
73. Integrating Circuit.....	94	110. Crystal Set Radio (Simple-Diode Radio).....	133
74. Schmitt Trigger Circuit.....	95	111. Two-Transistor Radio.....	134
75. Noninverting Two-Power Supply Amplifier.....	96	112. Wireless Code Transmitter.....	135
76. Inverting Two-Power Supply Amplifier.....	97	113. AM Radio Station.....	136
77. Noninverting Single-Power Supply Amplifier.....	98	114. Operational Amplifier Radio.....	137
78. Two-Power Supply Differential Amplifier.....	99	11) Testing and Measuring Circuits	138
79. Tone Mixing Amplifier.....	100	115. Aural Continuity Tester.....	139
80. Power Amplifier Using Operational Amplifier.....	101	116. Conductivity Tester.....	140
81. Voltage Controlled Oscillator Circuit.....	102	117. Transistor Checker.....	141
82. Operational Amplifier Buzzer.....	103	118. Sinewave Audio Oscillator.....	142
83. Burglar Alarm.....	104	119. Low Distortion Sinewave Oscillator.....	143
84. Hand-Operated Sweep Oscillator.....	105	120. Twin-T Audio Oscillator.....	144
85. Falling Bomb Sound.....	106	121. Pulse Oscillator Tone Generator.....	145
86. Emergency Siren.....	107	122. Audio Signal Tracer.....	146
87. First Aid Siren.....	108	123. Radio Frequency Signal Tracer.....	147
88. Musical Tempo Generator.....	109	124. Square Wave Audio Oscillator.....	148
89. Operational Amplifier Winking LED.....	110	125. Sawtooth Wave Oscillator.....	149
90. LED Flashing Light.....	111	126. Rain Detector.....	150
91. Two-LED Winker.....	112	127. Water Level Buzzer with Operational Amplifier.....	151
92. One Shot Light.....	113	128. Metal Detector.....	152
93. LED Initials.....	114	129. Water Level Alarm.....	153
94. Wake Up Siren.....	115	130. Three-Step Water Level Indicator.....	154
95. Voice-Activated LED.....	116	Index	155
96. Logic Tester.....	117	Parts List	157