

CONTENTS

	Page
1 ELECTRICITY: WHAT YOU NEED TO KNOW	1
What is Electricity?	2
Conductors and Insulators	3
Voltage	4
Current	4
Resistance	5
Power	7
The Electrical Circuit	9
Mr. Ohm's Wonderful Law	11
Electromagnetism	14
There are Two Kinds of Current	18
A Closer Look at Alternating Current	19
2 SAFETY: ELECTRICAL CODES—GROUNDS—GROUND FAULT PROTECTION	25
Electric Shock	25
National Electrical Code	27
Grounds and System Grounding	30
Short Circuits	36
Overload Protection—Fuses and Circuit Breakers	37
Ground-Fault Protection	39
3 SYSTEM DESIGN: SERVICE ENTRANCE—BRANCH CIRCUITS—CALCULATIONS	44
How Your House is Wired	44
Planning Your Systems	51
Circuit Layout	57
Old Work	59
4 HARDWARE: WIRE, CABLE, CONDUIT—BOXES—TOOLS	62
Conductors and Cable	63
Conduit	69
Surface Raceway	70
Service Entrance	71
Boxes—They're a Knockout	75
Receptacles	77
Switches	78
Lighting Fixtures	80
Tools	81
5 METHODS: WIRE TERMINATIONS—WIRING ROUTES—CONNECTION BOXES	85
Wire Connections	85
Terminal Connections	90
Running Cable and Wiring	91
Installing Conduit	99
Installing Boxes and Fixtures	96
Box Connections	99
Clean Up and Patch Up	99
6 SERVICE ENTRANCE	101
Grounding the System	102

Service Entrance Panel	104
Branch Circuit Connection to Service Entrance	109
7 BRANCH CIRCUITS: ADDING OUTLETS—ADDING CIRCUITS—GROUNDING	113
Adding a New Outlet	117
Using Three-Wire Cable for Two Two-Wire Branches	124
Split-receptacle Wiring	125
Wiring One Outlet on One Circuit, the Next on Another Circuit	127
Three-Wire Circuits for Heavy Loads	128
Wiring Both 115-Volt and 230-Volt Receptacles in a Duplex Outlet	128
Wiring a 230-Volt Receptacle for a Single Large Appliance	129
Installing a Ground Fault Circuit Interrupter Feed-Thru Receptacle	130
8 SWITCH CONTROLS: CIRCUIT INTERRUPTION—SWITCH LOOP-SPLIT CIRCUITS—THREE-WAY SWITCHES	132
Switch Controls with Two-Wire Cable	132
Switch Controls with Three-Wire Cable	135
Special-Purpose Switches	143
9 LIGHTING EFFECTS: INCANDESCENT AND FLUORESCENT LAMP INSTALLATION	146
Lighting Effects—Plain and Fancy	146
Lighting Controls	147
Incandescent Versus Fluorescent Lights	148
Incandescent Light Ceiling Fixtures	148
Fluorescent Lighting	149
10 SPECIAL CIRCUITS: BELLS—FURNACE—SECURITY—INTERCOM—EMERGENCY GENERATOR	155
Low Voltage Bells and Chimes	155
Other Low-Voltage Gadgets	159
Your Oil Burner System	160
Emergency and Portable Power	163
11 OUTDOOR WIRING: PORCH, YARD AND POOL LIGHTING LOW VOLTAGE SYSTEMS	169
Planning Your Lighting Scheme	170
Placing the Lamps	171
Wiring Your System	171
Underground Wiring	173
Low-Voltage Outdoor Lighting	175
12 TEST AND TROUBLESHOOTING—FLUORESCENT LAMPS, MOTORS, AND APPLIANCE REPAIR	179
Troubleshooting and Repair	187
Electrical Motors	188
Plug, Cord, and Lamp Repair	191
Appliance Repair	193
Bimetal Switches and Thermostats	194
GLOSSARY	198
INDEX	205