

## **Supplemental Files – ARRL Antenna Book, 23rd Edition**

Supplemental files are included on the CD-ROM. They include additional discussion, related articles, additional projects, construction details and other useful information. All of these packages are available on this CD-ROM in the **Supplemental Files** directory and then organized by chapter. (Note: Chapters 2 and 28 have no supplemental files.)

### **Chapter 1**

#### **Supplemental Articles**

- “Radio Mathematics” — supplemental information about math used in radio and a list of online resources and tutorials about common mathematics

### **Chapter 3**

#### **Supplemental Articles**

- “Determination of Soil Electrical Characteristics Using a Low Dipole” by Rudy Severns, N6LF
- “Maximum-Gain Radial Ground Systems for Vertical Antennas” by Al Christman, K3LC
- “Some Thoughts on Vertical Ground Systems over Seawater” by Rudy Severns, N6LF

### **Chapter 4**

#### **Supplemental Articles**

- Antenna Book Table 4.3 expanded for other locations
- “Using Propagation Predictions for HF DXing” by Dean Straw N6BV

## Chapter 5

### Supplemental Articles

- “A Closer Look at Horizontal Loop Antennas” by Doug Demaw, W1FB
- “A Horizontal Loop for 80-Meter DX” by John Belrose, VE2CV
- “An Antenna Idea for Antenna-Restricted Communities” by Cristian Paun, WV6N
- “Nested Loop Antennas” by Scott Davis, N3FJP
- “The Horizontal Loop — An Effective Multipurpose Antenna” by Scott Harwood, K4VWK

## Chapter 6

### Supplemental Articles

- Appendix B — Manual Calculations for Arrays
- “A Wire Eight-Circle Array (for 7 MHz)” by Tony Preedy, G3LNP
- “A Study of Tall Verticals” by Al Christman, K3LC
- “Tall Vertical Arrays” by Al Christman, K3LC
- “The Simplest Phased Array Feed System — That Works” by Roy Lewellan, W7EL

## Chapter 7

### Supplemental Articles

- 5-Band LPDA Construction Project and Telerana Construction Project
- “An Updated 2 Meter LPDA” by Andrzej Przedpelsi, KØABP
- Log Periodic-Yagi Arrays
- “Six Band, 20 through 6 Meter LPDA” by Ralph Crumrine, NØKC
- “Using LPDA TV Antennas for the VHF Ham Bands” by John Stanley, K4ERO
- “Vee Shaped Elements vs Straight Elements” by John Stanley, K4ERO

## Chapter 8

### Supplemental Articles

- “How to Start Modeling Antennas Using *EZNEC*” by Greg Ordly, W8WWW

## Chapter 9

### Supplemental Articles

- “Designing a Shortened Antenna” by Luiz Duarte Lopes, CT1EOJ
- “A 6-Foot-High 7-MHz Vertical” by Jerry Sevick, W2FMI
- “A Horizontal Loop for 80-Meter DX” by John Belrose, VE2CV
- “A Gain Antenna for 28 MHz” by Brian Beezley, K6STI
- “A Low-Budget, Rotatable 17 Meter Loop” by Howard Hawkins, WB8IGU
- “A Wideband Dipole for 75 and 80 Meters” by Ted Armstrong, WA6RNC
- “A Wideband 80 Meter Dipole” by Rudy Severns, N6LF
- “Broad-Band 80-Meter Antenna” by Allen Harbach, WA4DRU
- “Inductively Loaded Dipoles”
- “Off-Center Loaded Antennas” by Jerry Hall, K1PLP
- “The 160-Meter Sloper System at K3LR” by Al Christman, KB8I, Tim Duffy, K3LR and Jim Breakall, WA3FET
- “The ‘C-Pole’ — A Ground Independent Vertical Antenna” by Brian Cake, KF2YN
- “The Compact Vertical Dipole”
- “The Half-Delta Loop — A Critical Analysis and Practical Deployment” by John Belrose, VE2CV and Doug DeMaw, W1FB
- “The K1WA 7-MHz Sloper System”

## Chapter 10

### Supplemental Articles

- “An Effective Multi-Band Aerial of Simple Construction” by Louis Varney, G5RV  
(Original G5RV article)
- “An Experimental All-Band Non-directional Transmitting Antenna,” by G.L.  
Countryman, W3HH
- “An Improved Multiband Trap Dipole Antenna” by Al Buxton, W8NX
- “Broadband Transmitting Wire Antennas for 160 through 10 Meters” by Floyd  
Koontz, WA2WVL
- “End-Fed Antennas” by Ward Silver, NØAX
- “HF Discone Antenna Projects” by W8NWF
- “Practical High Performance HF Log Periodic Antennas” by Bill Jones, K8CU
- “Revisiting the Double-L” by Don Toman, K2KQ
- “Six Band Loaded Dipole Antenna” by Al Buxton, W8NX
- “The HF Discone Antenna” by John Belrose, VE2CV
- “The Log-Periodic Dipole Array” by Peter Rhodes, K4EWG
- “The Multimatch Antenna System” by Chester Buchanan, W3DZZ
- “The Open Sleeve Antenna” by Roger Cox, WBØDGF
- “Two New Multiband Trap Dipoles” by Al Buxton, W8NX
- “Wideband 80 Meter Dipole” by Rudy Severns, N6LF

## Chapter 11

### Supplemental Articles

- “A 10 Meter Moxon Beam” by Allen Baker, KG4JJH
- “A 20 Meter Moxon Antenna” by Larry Banks, W1DYJ
- “Construction of W6NL Moxon on Cushcraft XM240” by Dave Leeson, W6NL
- “Having a Field Day with the Moxon Rectangle” by L.B. Cebik, W4RNL
- “Multimatch Antenna System” by Chester Buchanan, W3DZZ (see the Chapter 10  
folder)

## Chapter 12

### Supplemental Articles

- “A Dipole Curtain for 15 and 10 Meters” by Mike Loukides, W1JQ
- “Bob Zepp: A Low Band, Low Cost, High Performance Antenna - Parts 1 and 2” by Robert Zavrel, W7SX
- “Curtains for You” by Jim Cain, K1TN (and Feedback)
- “Hands-On Radio Experiment #133 – Extended Double Zepp Antenna” by Ward Silver, NØAX
- “The Extended Double Zepp Revisited” by Jerry Haigwood, W5JH
- “The Extended Lazy H Antenna” by Walter Salmon VK2SA
- “The Multiband Extended Double Zepp and Derivative Designs” by Robert Zavrel, W7SX
- “The N4GG Array” by Hal Kennedy, N4GG
- “The W8JK Antenna: Recap and Update” by John Kraus, W8JK

## Chapter 13

### Supplemental Articles

- “A Four Wire Steerable V Beam for 10 through 40 Meters” by Sam Moore, NX5Z

## Chapter 14

### Supplemental Articles

- “Station Design for DX, Part I” by Paul Rockwell, W3AFM
- “Station Design for DX, Part II” by Paul Rockwell, W3AFM
- “Station Design for DX, Part III” by Paul Rockwell, W3AFM
- “Station Design for DX, Part IV” by Paul Rockwell, W3AFM
- N6BV and K1VR Stack Feeding and Switching Systems

## Chapter 15

### Supplemental Articles

- “2 x 3 = 6” by L.B. Cebik, W4RNL
- “A 902-MHz Loop Yagi Antenna” by Don Hilliard, WØPW
- “A Short Boom, Wideband 3 Element Yagi for 6 Meters” by L.B. Cebik, W4RNL
- “A VHF/UHF Discone Antenna” by Bob Patterson, K5DZE
- “An Optimum Design for 432 MHz Yagis – Parts 1 and 2” by Steve Powlishen, K1FO (SK)
- “Building a Medium-Gain, Wide-Band, 2 Meter Yagi” by L.B. Cebik, W4RNL
- “Development and Real World Replication of Modern Yagi Antennas (III) - Manual Optimisation of Multiple Yagi Arrays” by Justin Johnson, GØKSC
- “High-Performance ‘Self-Matched’ Yagi Antennas” by Justin Johnson, GØKSC
- “High-Performance Yagis for 144, 222 and 432 MHz” by Steve Powlishen, K1FO
- “Loop Yagi for 2304 MHz” by Bob Atkins, KA1GT
- “LPDA for 2 Meters Plus” by L.B. Cebik, W4RNL
- “Making the LFA Loop” by Justin Johnson, GØKSC
- “Microwavelengths - Microwave Transmission Lines” by Paul Wade, W1GHZ
- “RF - A Small 70-cm Yagi” by Zack Lau, W1VT
- “Three-Band Log-Periodic Antenna” by Robert Heslin, K7RTY/2
- “Using LPDA TV Antennas for the VHF Ham Bands” by John Stanley, K4ERO (see the Chapter 7 folder)
- “V-Shaped Elements vs Straight Elements” by John Stanley, K4ERO (see the Chapter 7 folder)

### Support Files

- Model files and sample radiation patterns for Yagi designs by Justin Johnson, GØKSC (require *EZNEC PRO/4* to reproduce the gain and other performance specifications listed) These files are located in the ARRL Antenna Modeling Files folder on the CD.

## Chapter 16

### Supplemental Articles

- 5/8-Wavelength Whips for 2 Meters and 222 MHz
- “A 6 Meter Halo” by Paul Danzer, N1II
- “A New Spin on the Big Wheel” by L.B. Cebik, W4RNL and Bob Cerreto, WA1FXT
- “A Simple 2 Meter Bicycle-Motorcycle Mobile Antenna” by John Allen, AA1EP
- “A Two-Band Halo for V.H.F. Mobile” by Ed Tilton, W1HDQ
- “A VHF-UHF 3-Band Mobile Antenna” by J.L. Harris, WD4KGD
- “Bicycle-Mobile Antennas” by Steve Cerwin, WA5FRF and Eric Juhre, KØKJ
- “Six Meters from Your Easy Chair” by Dick Stroud, W9SR
- “The DBJ-2: A Portable VHF-UHF Roll-up J-pole Antenna for Public Service” by Edison Fong, WB6IQN

## Chapter 17

### Supplemental Articles

- “A 12-Foot Stressed Parabolic Dish” by Richard Knadle, K2RIW
- “A Parasitic Lindenblad Antenna for 70 cm” by Anthony Monteiro, AA2TX
- “A Portable Helix for 435 MHz” by Jim McKim, WØCY
- “A Simple Fixed Antenna for VHF/UHF Satellite Work” by L.B. Cebik, W4RNL
- “An EZ-Lindenblad Antenna for 2 Meters” by Anthony Monteiro, AA2TX
- Converted C-Band TVRO Dishes PDF
- “Double-Cross Antenna – A NOAA Satellite Downlink Antenna” by Gerald Martes, KD6JDJ
- “EME with Adaptive Polarization at 432 MHz” by Joe Taylor, K1JT, and Justin Johnson, GØKSC
- “Inexpensive Broadband Preamp for Satellite Work” by Mark Spencer, WA8SME
- “L Band Helix Antenna Array” by Clare Fowler, VE3NPC
- “Quadrifilar Helix As a 2 Meter Base Station Antenna” by John Portune, W6NBC
- Space Communications Antenna Examples PDF
- “The W3KH Quadrifilar Helix” by Eugene Ruperto, W3KH (plus two Feedback items)

- “Two-Meter Eggbeater” by Les Kramer, WA2PTS and Dave Thornburg, WA2KZV
- “Work OSCAR 40 With Cardboard-Box Antennas” by Anthony Monteiro, AA2TX
- “WRAPS: A Portable Satellite Antenna Positioning System” by Mark Spencer, WA8SME
- “WRAPS Rotator Enhancements Add a Second Beam and Circular Polarization” by Mark Spencer, WA8SME

## Chapter 18

### Supplemental Articles

- 144 MHz Duplexer Cavities

## Chapter 19

### Supplemental Articles

- “6 Meter 4 Element Portable Yagi” by Zack Lau, W1VT (plus separate element design drawing)
- “A One Person, Safe, Portable and Easy to Erect Antenna Mast” by Bob Dixon, W8ERD
- “A Portable 2-Element Triband Yagi” by Markus Hansen, VE7CA
- “A Portable Inverted V Antenna” by Joseph Littlepage, WE5Y
- “A Simple and Portable HF Vertical Travel Antenna” by Phil Salas, AD5X
- “A Small, Portable Dipole for Field Use” by Ron Herring, W7HD
- “A Super Duper Five Band Portable Antenna” by Clarke Cooper, K8BP
- “An Off Center End Fed Dipole for Portable Operation on 40 to 6 Meters” by Kai Siwiak, KE4PT
- “Compact 40 Meter HF Loop for Your Recreational Vehicle” by John Portune, W6NBC
- “Fishing for DX with a Five Band Portable Antenna” by Barry Strickland, AB4QL
- Ladder Mast and PVRC Mount
- “The Black Widow — A Portable 15 Meter Beam” by Allen Baker, KG4JJH

- “The Ultimate Portable HF Vertical Antenna” by Phil Salas, AD5X
- “Three-Element Portable 6 Meter Yagi” by Markus Hansen, VE7CA
- “Zip Cord Antennas and Feed Lines for Portable Applications” by William Parmley, KR8L

## Chapter 20

### Supplemental Articles

- “A Compact Loop Antenna for 30 through 12 Meters” by Robert Capon, WA3ULH
- “A Disguised Flagpole Antenna” by Albert Parker, N4AQ
- “An All-Band Attic Antenna” by Kai Siwiak, KE4PT
- “Apartment Dweller Slinky Jr Antenna” by Arthur Peterson, W7CZB
- “Better Results with Indoor Antennas” by Fred Brown, W6HPH
- “Short Antennas for the Lower Frequencies – Parts 1 and 2” by Yardley Beers, WØJI
- “Small High-Efficiency Loop Antennas” by Ted Hart, W5QJR
- Tuning Capacitors for Transmitting Loops

## Chapter 21

### Supplemental Articles

- “How To Build A Capacity Hat” by Ken Muggli, KØHL
- “Screwdriver Mobile Antenna” by Max Bloodworth, KO4TV
- “Table of Mobile Antenna Manufacturers” by Alan Applegate, KØBG

## Chapter 22

### Supplemental Articles

- “A Four-Way DFER” by Malcolm Mallette, WA9BVS
- “A Fox-Hunting DF Twin Tenna” by R.F Gillette, W9PE
- “A Receiving Antenna that Rejects Local Noise” by Brian Beezley, K6STI
- “Active Antennas” by Ulrich Rohde, N1UL

- “Design, Construction and Evaluation of the Eight Circle Vertical Array for Low Band Receiving” by Joel Harrison, W5ZN and Bob McGwier, N4HY
- “Flag, Pennants and Other Ground-Independent Low-Band Receiving Antennas” by Earl Cunningham, K6SE
- “Introducing the Shared Apex Loop Array” by Mark Bauman, KB7GF
- “Is This EWE for You?” by Floyd Koontz, WA2WVL
- “K6STI Low-Noise Receiving Antenna for 80 and 160 Meters” by Brian Beezley, K6STI
- “Modeling the K9AY Loop” by Gary Breed, K9AY
- “More EWEs for You” by Floyd Koontz, WA2WVL
- “Simple Direction-Finding Receiver for 80 Meters” by Dale Hunt, WB6BYU
- “The AMRAD Active LF Antenna” by Frank Gentges, KØBRA
- “The Snoop-Loop” by Claude Maer, WØIC
- “Transmitter Hunting with the DF Loop” by Loren Norberg, W9PYG

## Chapter 23

### Supplemental Articles

- “Coaxial RF Connectors for Microwaves” by Tom Williams, WA1MBA
- “Hands-On Radio: Open Wire Transmission Lines” by Ward Silver, NØAX
- “Hands-On Radio: SWR and Transmission Line Loss” by Ward Silver, NØAX
- “Multiband Operation with Open-wire Line” by George Cutsogorge, W2VJN
- “My Feedline Tunes My Antenna” by Byron Goodman W1DX
- RF Connectors and Transmission Line Information - ARRL Handbook
- Smith Chart supplement
- “Using RG58 coaxial crimp connectors with RG6 cable” by Garth Jenkinson, VK3BBK

## Chapter 24

- “Baluns in Matching Units” by Robert Neece, KØKR
- “Broadband Antenna Matching”
- “Coiled-Coax Balun Measurements” by Ed Gilbert, K2SQ
- “Compact 100-W Z-Match Antenna Tuner” by Phil Salas, AD5X
- “Don’t Blow Up Your Balun” by Dean Straw, N6BV
- “Factors to be Considered in Matching Unit Design” by Robert Neece, KØKR
- “Hairpin Tuners for Matching Balanced Antenna Systems” by John Stanley, K4ERO
- “Matching with Inductive Coupling”
- “Matching-Unit Circuit Comparison Table” by Robert Neece, KØKR
- “Optimizing the Performance of Harmonic Attenuation Stubs” by George Cutsogeorge, W2VJN
- “The AAT - Analyze Antenna Tuner - Program” by Dean Straw, N6BV
- “Toroid Core Data” from ARRL Handbook

## Chapter 25

### Supplemental Articles

- “K5GO Half-Element Designs” by Stan Stockton, K5GO

## Chapter 26

### Supplemental Articles

- “A One Person, Safe, Portable and Easy to Erect Antenna Mast” by Bob Dixon, W8ERD
- “Antenna Feed Line Control Box” by Phil Salas, AD5X
- “Homeowners Insurance and Your Antenna System” by Ray Fallen, ND8L
- “Installing Yagis in Trees” by Steve Morris, K7LXC
- “Is Your Tower Still Safe?” by Tony Brock-Fisher, K1KP
- Ladder Mast and PVRC Mount

- “Lightning Protection for the Amateur Station, Parts 1, 2 and 3” by Ron Block, KB2UYT
- “Removing and Refurbishing Towers” by Steve Morris, K7LXC
- Rotator Specifications
- “The Care and Feeding of an Amateur’s Favorite Antenna Support — The Tree” by Doug Brede, W3AS
- “The Tower Shield” by Baker Springfield, W4HYY and Richard Ely, WA4VHM

## Chapter 27

### Supplemental Articles

- “A Reflectometer for Twin-Lead” by Fred Brown, W6HPH
- “An Inexpensive VHF Directional Coupler” and “A Calorimeter for VHF and UHF Power Measurements”
- “Build a Super-Simple SWR Indicator” by Tony Brock-Fisher, K1KP
- “Improving and Using R-X Noise Bridges” by John Grebenkemper, KI6WX
- “Microwavelengths — Directional Couplers” by Paul Wade, W1GHZ
- “On Tuning, Matching and Measuring Antenna Systems Using a Hand Held SWR Analyzer” by John Belrose, VE2CV
- RF Power Meter (Kaune) support files
- “QRP Person’s VSWR Indicator” by Doug DeMaw, W1FB
- “Smith Chart Calculations”
- “SWR Analyzer Tips, Tricks, and Techniques” by George Badger, W6TC, et al
- “Technical Correspondence — A High-Power RF Sampler” by Tom Thompson WØIVJ (plus “More on a High-Power RF Sampler” by Thompson, two files)
- “The Gadget — An SWR Analyzer Add-On” by Fred Hauff, W3NZ
- “The No Fibbin RF Field Strength Meter” by John Noakes, VE7NI
- “The SWR Analyzer and Transmission Lines” by Peter Schuch, WB2UAQ
- “The Tandem Match — An Accurate Directional Wattmeter” by John Grebenkemper, KA3BLO (plus corrections and updates, four files)