

Instructions for Installing Content and Software/Data on the Accompanying CD-ROM for the 23rd Edition of *The ARRL Antenna Book*

The companion CD-ROM for the 23rd Edition of *The ARRL Antenna Book* includes the complete content of the book as well as software and data associated with several areas of the book. To find the titles and more information on the software, look in the Index under “Software from ARRL”.

INSTALLING THE PROGRAMS/DATA

Please use the *Setup.exe* program on this disk to install the files and programs to your hard disk. Normally, *Setup.exe* will start automatically when you place the CD-ROM in your computer, but you can also start it manually. From the Windows desktop (assuming your CDROM drive is D:), at the Windows Taskbar on the bottom left of the screen, click **Start**, select **Run**, type in (or **Browse** to find) **d:setup.exe**, click on **OK** and then follow the on-screen instructions.

The install program offers both a *Typical Setup* and a *Custom Setup* -- in the *Custom Setup* a user can select which of the three sets of material (Content, Supplemental Files, Propagation Prediction Files), and which software to install.

PLACING ICONS ON YOUR DESKTOP

Shortcuts for installed content and software are automatically placed in the Start menu and on the Desktop. In the Start menu these are located in the ARRL Software group and the ARRL Antenna Book 23rd Edition group.

SUBDIRECTORIES

Although you may override it, the default subdirectory created by *Setup.exe* on your hard drive is **C:\Program Files\ARRL Antenna Book 23rd Edition**. Additional folders are also created for installed content and software.

- \ **Antenna Book 23rd Edition Content**
- \ **Antenna Book 23rd Edition Supplemental Files**
- \ **Propagation Prediction Files**
- \ **HFTA_HF Terrain Assessment for Windows**
- \ **TLW_Transmission Line for Windows**
- \ **YW_Yagi for Windows**

The **Content** subdirectory contains PDF files for the entire edition, including an introduction.

The **Supplemental Files** subdirectory contains PDF files and other documents that support the printed material. This material includes project construction information, original articles, tables, and additional graphics. The files are organized in folders that are numbered identically to the chapters of the printed edition. The PDF file **Antenna Book 23rd Edition – Supplemental Files** contains an inventory of the files. Additional files are available for downloading from www.arrl.org/arrl-antenna-book-reference.

When selected within the setup, all software is directly installed.

Listed below are short descriptions of the content in each subdirectory. Note that additional programs provided with previous editions are available for downloading from www.arrl.org/arrl-antenna-book-reference.

Note: Software data files by default are located in the default install folder for each individual application. It may be necessary to manually navigate to this folder when the software is initially launched or when opening data files from within the application. The top level installation folder by default is C:\Program Files\ARRL Antenna Book 23rd Edition.

The software programs HFTA, TLW, and YW are known to have difficulty running on 64-bit versions of Windows operating systems. The programs were developed for and run on 32-bit versions of Windows operating systems. The utility programs available on the ARRL Antenna Book web page run in DOS windows and have not been tested with 64-bit versions of Windows.

\HFTA_HF Terrain Assessment for Windows

This subdirectory contains the *HFTA* (HF Terrain Assessment) program by Dean Straw, N6BV, and sample terrain data for evaluating the effect of uneven local terrain on the launch of HF signals throughout the world. See **HFTA.PDF** documentation file on disk or use the Help button in *HFTA* itself. The program *HFTA* is described in detail in the **HF Antenna System Design** chapter.

During the *Custom Setup* process (only) you may specify the region where you live so that appropriate statistical elevation-angle files can be installed along with *HFTA*. The *Typical Setup* default files installed cover a number of locations throughout the USA. The statistical elevation

angles are computed for the full 11-year solar cycle from transmitting sites indicated by the filename.

MAKEVOA.EXE is also included in this subdirectory. This program takes the *OUT.PRN* file generated by *HFTA* and creates an antenna file compatible with *VOACAP*. See the **HFTA.pdf** documentation file for details.

\TLW_Transmission Line for Windows

This subdirectory contains files for *TLW* (Transmission Line for Windows) program by Dean Straw, N6BV. This is described in the chapter **Transmission Line System Techniques**. *TLW* computes many parameters for transmission lines and antenna-tuners—including detailed losses and stresses. *TLW* runs under Windows 98, XP, XP Professional, NT, 2000, Vista and 32-bit versions of Windows 7, 8, and 10. The documentation file **TLW.pdf** is also located in this subdirectory, or you can open it from inside *TLW* by clicking on the **Help** button.

\YW_Yagi for Windows

This archive contains the *YW* (Yagi for Windows) program by Dean Straw, N6BV, plus 80 optimized Yagi antenna designs. See **YW.pdf** for documentation or click on the Help button in *YW*. *YW* is described in the chapter **HF Yagi and Quad Antennas**.

PROPAGATION-PREDICTION FILES

Propagation-Prediction Files are organized by country and continent as follows:

USA

W1B Boston, MA
W2A Albany, NY
W2N NYC, NY
W3D Washington, DC
W4A Montgomery, AL
W4F Miami, FL
W4G Atlanta, GA
W4K Louisville, KY
W4N Raleigh, NC
W4T Memphis, TN
W5A Little Rock, AR
W5H Houston, TX
W5L New Orleans, LA
W5M Jackson, MS
W5N Albuquerque, NM
W5O Oklahoma City, OK
W5T Dallas, TX
W6L Los Angeles, CA
W6S San Francisco, CA
W7A Phoenix, AZ
W7I Boise, ID
W7M Helena, MT
W7N Las Vegas, NV
W7O Portland, OR
W7U Salt Lake City, UT
W7W Seattle, WA
W7Y Cheyenne, WY
W8M Detroit, MI
W8O Cincinnati, OH
W8W Charleston, WV
W9C Chicago, IL
W9I Indianapolis, IN
W9W Milwaukee, WI

WØC Denver, CO
WØD Bismarck, ND
WØI Kansas City, MO
WØK Middle of US, KS
WØM St. Louis, MO
WØN Omaha, NE
WØS Pierre, SD

Other, North America

6Y Kingston, Jamaica
8P Bridgetown, Barbados
HP Panama City, Panama
KL7 Anchorage, Alaska
KP2 Virgin Islands
TI San Jose, Costa Rica
V3 Belmopan, Belize
VE1 Halifax, Nova Scotia
VE2 Montreal, Quebec
VE3 Toronto, Ontario
VE4 Winnipeg, Manitoba
VE5 Regina, Saskatchewan
VE6 Edmonton, Alberta
VE7 Vancouver, BC
VE8 Yellowknife, NWT
VO1 St. John's, NFL
VP2 Anguilla
VP5 Turks & Caicos
XE1 Mexico City, Mexico

Europe

CT Lisbon, Portugal
DL Bonn, Germany
EA Madrid, Spain
EI Dublin, Ireland
ER Kishinev, Moldava
F Paris, France
G London, England
I Rome, Italy
JW Svalbard
OH Helsinki, Finland
OK Prague, Czech Republic
ON Brussels, Belgium
OZ Copenhagen, Denmark
SV Athens, Greece
TF Reykjavik, Iceland
UA3 Moscow, Russia
UA6 Rostov, Russia
UR Kiev, Ukraine
YO Bucharest, Romania
YU Belgrade, Yugoslavia

South America

CE Santiago, Chile
CP La Paz, Bolivia
FY Cayenne, French Guiana
HC Quito, Ecuador
HC8 Galapagos Islands
HK Bogota, Columbia
LU Buenos Aires, Argentina
OA Lima, Peru
P4 Aruba
PY1 Rio de Janeiro, Brazil
PY0 Fernando de Noronha
YV Caracas, Venezuela
YV0 Aves Island
ZP Asuncion, Paraguay

Asia

1S Spratly Islands
3W Ho Chi Minh City, Vietnam

4J Baku, Azerbaijan
4S Columbo, Sri Lanka
4X Jerusalem, Israel
9N Katmandu, Nepal
A6 Dubai, UAE
AP Karachi, Pakistan
BY1 Beijing, China
BY4 Shanghai, China
BY0 Lhasa, China
HS Bangkok, Thailand
HZ Riyadh, Saudi Arabia
JA1 Tokyo, Japan
JA3 Osaka, Japan
JA8 Sapporo, Japan
JT Ulan Bator, Mongolia
TA Ankara, Turkey
UA9 Perm, Russia
UA0 Khabarovsk, Russia
UN Alma-Ata, Kazakh
VR2 Hong Kong
VU New Delhi, India
VU7 Andaman Islands
XZ Rangoon, Myanmar

Oceania

3D2 Fiji Islands
DU Manila, Philippines
FO Tahiti
H4 Honiara, Solomon Islands
JD1 Ogasawara Island
KH0 Saipan, Mariana Islands
KH5K Kingman Reef
KH6 Honolulu, Hawaii
KH8 American Samoa
V7 Kwajalein, Marshall Islands
VK2 Sydney, Australia
VK6 Perth, Australia
VK8 Darwin, Australia
YB Jakarta, Indonesia
ZL1 Auckland, New Zealand ZL3
Christchurch, New Zealand

Africa

3B9 Rodrigues
3C Bata, Equatorial Guinea
3V Tunis, Tunisia
5N Lagos, Nigeria
5R Antananarivo, Madagascar
5U Niamey, Niger Republic
5Z Nairobi, Kenya
6W Dakar, Senegal
7Q Lolongwe, Malawi
7X Algiers, Algeria
9J Lusaka, Zambia
9L Freetown, Sierra Leone
9X Kigali, Rwanda
C9 Maputo, Mozambique
CN Casablanca, Morocco
CT3 Madeira Islands
D2 Luanda, Angola
EA8 Canary Islands
IG9 Lampedusa, Italy
J2 Djibouti
ST Khartoum, Sudan
SU Cairo, Egypt
VQ9 Chagos, Diego Garcia
XT Burkina Faso
ZS1 Capetown, So. Africa
ZS6 Johannesburg, So. Africa

These PDF files contain propagation prediction tables valid from the transmitting site indicated in the filename to seven generalized receiving locations throughout the world in the Summary Tables and for the 40 CQ Zones in the Detailed Tables.

The user selects a single transmitting site closest to his/her location. You can access this data by opening *Adobe Acrobat Reader* and selecting **Prop Index.pdf**. Or you can operate from the main table of contents in the left pane of the opening window.

Each transmitting location is organized by five levels of solar activity across an entire 11-year solar cycle:

- VL (Very Low: SSN between 0 to 20)
- LO (Low: SSN between 20 to 40)
- ME (Medium: SSN between 40 to 60)
- HI (High: SSN between 60 to 100)
- VH (Very High: SSN between 100 to 150)
- UH (Ultra High: SSN greater than 150)

The seven generalized locations throughout the world for the Summary Tables are:

- EU = Europe (all of Europe)
- FE = Far East (centered on Tokyo, Japan)
- SA = South America (centered on Asuncion, Paraguay)
- AF = Africa (centered on Lusaka, Zambia)
- AS = southern Asia (centered on New Delhi, India)
- OC = Oceania (centered on Sydney, Australia)
- NA = North America (all of USA).

Both types of propagation files show the highest predicted signal strength (in S-units) throughout the generalized receiving area, for a 1500-W transmitter and rather good antennas on both sides of the circuit. The standard antennas are 100-foot high inverted-V dipoles for 80 and 40 meters, a 3-element Yagi at 100 feet for 20 meters, and a 4-element Yagi at 60 feet for 15 and 10 meters.

Discount the S-Meter readings in the tables to represent a smaller station:

- Subtract 2 S units for a dipole instead of a Yagi
- Subtract 3 S units for a dipole at 50 feet instead of a Yagi at 100 feet
- Subtract 1 S unit for a dipole at 50 feet rather than a dipole at 100 feet
- Subtract 3 S units for 100 W rather than 1500 W.
- Subtract 6 S units for 5 W rather than 1500 W.

Shown below is an image of a Summary Table printout from Boston to the rest of the world, for Very High solar activity in January. This table could be used, for example, to help plan which bands to operate when on a DXpedition to some exotic location.

The Detailed Table printout from Boston to the rest of the world on 20 meters for January from Boston during a Very High level of the solar cycle is shown on the following page. It shows the

predicted signal strength in each of the 40 CQ Zones around the world. Note that long path openings are predicted by an asterisk appended to the end of the predicted signal strength.

Also located on the CD-ROM in the \Propagation subdirectory is the **Table4-3.pdf** file described in the **Radio Wave Propagation** chapter of the printed book. This set of tables shows the hours open to each of 10 regions throughout the USA for Very-Low/Medium/Very-High levels of SSN.

Sample - Summary Propagation-Prediction Table, January from Boston to the World.

Jan., MA (Boston), for SSN = Very High, Sigs in S-Units. By N6BV, ARRL.

UTC	80 Meters								40 Meters								20 Meters								15 Meters								10 Meters								UTC
	EU	FE	SA	AF	AS	OC	NA		EU	FE	SA	AF	AS	OC	NA		EU	FE	SA	AF	AS	OC	NA		EU	FE	SA	AF	AS	OC	NA		EU	FE	SA	AF	AS	OC	NA		
0	9+	-	9+	9+	8	-	9+	9+	5	9+	9+	9	-	9+	1	9+	9+	9+	9+	9	9+	-	9	9+	2	2	9+	9+	-	1	8	-	-	8	9+	0					
1	9+	-	9+	9+	8	-	9+	9+	4	9+	9+	9	2	9+	1	9	9+	8	9+	9+	9+	-	3	9	-	7	9+	9	-	-	-	-	4	2	1						
2	9+	-	9+	9+	7	-	9+	9+	4	9+	9+	9	7	9+	1	9	9+	8	9	9+	9+	-	-	3	-	-	7	9	-	-	-	-	-	2	2						
3	9+	-	9+	9+	1	2	9+	9+	4	9+	9+	9	9	9+	-	7	9+	7	8	9+	9	-	-	-	-	-	-	-	-	-	-	-	-	2	3						
4	9+	-	9+	9+	-	7	9+	9+	5	9+	9+	8	9	9+	-	5	9+	9	9	9	9+	-	-	1	-	-	-	-	-	-	-	-	-	2	4						
5	9+	-	9+	9+	-	8	9+	9+	6	9+	9+	7	9	9+	-	5	9+	9	9	5	9+	-	-	-	-	-	-	-	-	-	-	-	-	2	5						
6	9+	-	9+	9+	-	8	9+	9+	7	9+	9+	7	9	9+	-	8	9+	8	9	5	9+	-	-	-	-	-	-	-	-	-	-	-	-	2	6						
7	9+	-	9+	9+	-	8	9+	9	8	9+	9+	7	9+	9+	-	9	9+	-	7	9	9+	-	-	1	-	-	-	-	-	-	-	-	-	2	7						
8	9	7	9+	9	-	8	9+	9	8	9+	9+	8	9+	9+	-	9	9+	-	4	9+	9+	-	-	1	-	-	-	2	-	-	-	-	-	2	8						
9	8	7	9+	7	-	8	9+	9	9	9+	9	8	9+	9+	-	6	9+	-	1	9+	9+	-	-	-	-	-	-	1	-	-	-	-	-	2	9						
10	5	8	9+	2	3	8	9+	9	9	9+	8	8	9	9+	4	-	9+	9+	1	5	9	-	-	-	-	-	-	-	-	-	-	-	2	10							
11	1	8	9+	-	4	9	9+	8	9	9+	5	8	9	9+	9+	4*	9+	9+	7	-	8	-	-	9	9	-	-	-	-	-	-	-	2	11							
12	-	7	8	-	1	9	9+	6	9	9+	1	8	9	9+	9+	9	9+	9	9	1*	9+	9	8*	9+	9+	9	5*	-	-	2*	9	9	1	1*	2	12					
13	-	-	-	-	-	2	9+	4	8	8	-	7	9	9+	9+	9	9+	9	9+	9+	9+	9+	9+	7	9+	9+	9+	3*	9	9	5*	9+	9+	9	6*	2	13				
14	-	-	-	-	-	-	9+	2	7	4	-	5	8	9+	9+	9	9+	8	9	9	9+	9+	9	9+	9+	9+	9+	9	9+	9	6*	9+	9+	9	1*	1	14				
15	-	-	-	-	-	-	9	1	5	-	-	4	5	9+	9+	9	9+	9	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	5	9+	9+	6	6	2	15					
16	-	-	-	-	-	-	8	3	4	-	-	3	1	9+	9+	8	9	9	9	9	9+	9+	9+	9+	9	9+	9+	9+	9	8	9+	9+	-	8	2	16					
17	-	-	-	-	-	-	8	5	3	-	2	4	-	9+	9+	8	9+	9+	9	9	9+	9+	9	9+	9+	9+	1*	9+	9+	-	8	9+	9+	-	8	3	17				
18	-	-	-	-	-	-	9	7	4	2	5	5	-	9+	9+	9	9+	9	9	9+	9+	9+	9+	9	9+	9+	9+	1	9+	9+	-	7	9+	9+	-	9+	9+	18			
19	1	-	-	1	-	-	9+	8	5	6	8	7	-	9+	9+	9	9+	9	9	9	9+	-	9+	9+	9+	2	9	9+	-	6	9+	9+	-	9+	9+	19					
20	4	-	2	5	-	-	9+	9	6	9	9	8	-	9+	9	9	9+	9	9	9	9+	-	8	9+	9+	3	9	9+	-	1	9+	9	-	9	9+	20					
21	7	-	8	7	1	-	9+	9+	7	9+	9+	8	1	9+	8	9	9+	9	9	9	9+	-	6	9+	9+	3	9	9+	-	-	9+	5*	-	9+	9+	21					
22	9	2	9+	9	8	-	9+	9+	7	9+	9+	9	4	9+	2	9+	9+	9+	9	9	9+	-	9+	9+	9	1	9+	9+	-	5	9+	4*	-	9	6	22					
23	9	-	9+	9	8	-	9+	9+	7	9+	9+	9	-	9+	1	9+	9+	9+	9	9	9+	-	9+	9+	6	-	9	9+	-	7	9+	2*	-	9	2	23					

Sample - Detailed Propagation Table for 20 Meters, January, Boston to World for Very High SSN.

20 Meters: Jan., MA (Boston), for SSN = Very High, Sigs in S-Units. By N6BV, ARRL.

Zone	UTC -->																							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
KL7 = 01	9+	9+	9+	7	-	-	-	-	-	-	-	-	-	-	-	3	9+	9+	9+	9+	9+	9+	9+	9+
VO2 = 02	9+	9	9	9	9	9	8	7	5	3	2	1	5	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	9+
W6 = 03	9+	9+	9+	7	7	1	1	5	8	8	3	-	-	1	9	9+	9+	9+	9+	9	9	9+	9+	9+
W9 = 04	9+	9+	8	9	9	9	9	8	5	2	1	1	9	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
W3 = 05	4	2	2	2	2	2	2	3	3	3	3	2	1	1	8	9+	9+	9+	9+	9+	9+	9+	9+	9
XE1 = 06	9+	9+	7	9	9+	9+	9+	9+	9	8	9+	9+	9+	9+	9	9	9	9	9	9	9	9	9+	9+
TI = 07	9+	9+	8	9	9	9	9	9	9	9	9	9	9+	9+	9+	9+	9	8	9	9	9	9	9	9+
VP2 = 08	9+	9+	9	9+	9+	9+	9+	9+	9	8	9	9+	9+	9+	9+	9	9	9	9	9	9	9	9	9+
P4 = 09	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9	9	9	9	9	9	9	9	9	9+
HC = 10	9+	8	9+	9	9	9	9	9	7	3	1	7	9+	9+	9	5	5	5	7	8	9	9	9	9+
PY1 = 11	9+	9+	9+	9	9	9+	9+	9	8	6	9	9+	8	2	1	-	-	1	4	8	9	9	9	9+
CE = 12	9+	9+	9+	9+	9+	9+	9+	9+	9	8	8	9	9	8	2	1	1	-	1	3	7	9	9	9+
LU = 13	9+	9+	9+	9+	9+	9+	9+	9	8	8	8	9	8	4	2	1	-	-	1	4	8	9	9	9+
G = 14	-	-	-	-	-	-	-	-	-	-	-	-	9+	9+	9+	9+	9+	9+	9+	9+	9+	8	2	-
I = 15	-	-	-	-	-	-	-	-	-	-	-	4	9	9	9	9	9	9	9	9	8	2	-	-
UA3 = 16	1	1	1	-	-	-	-	-	-	-	-	-	8	9	9+	9+	9+	9	8	5	-	-	-	1
UN = 17	1	-	-	8	7	7	7	1	-	-	-	2	9	9	9	6	-	-	2	4	8	9	5	4
UA9 = 18	6	7	6	6	9	9	9	7	4	1	-	-	8	8	6	6	5	6	7	8	9	9	8	7
UA0 = 19	9+	9	9	6	5	5	8	8	8	4	-	-	2	6	8	8	8	7	4	4	7	9	9+	9+
4X = 20	8	6	3	1	-	3	4	-	-	-	1	8	8	8	8	8	9	9	9+	9	8	7	7	7
HZ = 21	9+	9	4	3	8	8	2	-	-	-	1	7	8	8	8	8	9	9	9	9	9	9	9	9
VU = 22	7	5	8	7	6	7	5	-	-	-	6	9	9	9	9	3	2	2	2	8	8	8	9	8
JT = 23	9	9+	9	5	7	8	8	6	3	-	-	2*	8	8	5	6	8	8	8	8	9	7	5	6
VS6 = 24	9	9	9	5	4	5	7	8	6	1	-	1*	5	7	1	1	1	1	4	2	-	-	-	9
JA1 = 25	9	9	8	7	5	5	8	9	9	6	-	1	1	2	7	7	6	2	-	-	7	9	9	9
HS = 26	9	9	6	4	2	-	-	2	1	-	-	2*	9	9	9	9	8	7	5	4	5	-	1*	1
DU = 27	9	8	7	-	-	-	5	7	7	1	-	-	1*	9	9	7	6	4	5	3	1*	1*	8	9
YB = 28	9	8	1	-	-	-	-	-	-	-	-	4*	8	9	9	9	8	8	9	9	9	9	9+	9+
VK6 = 29	3*	4*	-	-	-	-	-	5	3	-	-	-	5	9	9	9	8	9	9	9	9	9	9	8
VK3 = 30	1*	-	-	-	-	-	1	3	9	9	4	-	-	9+	9	8	2	1	-	-	1	2*	5*	4*
KH6 = 31	9	9+	9+	9+	8	2	2	6	4	-	-	-	-	-	-	-	9	9	8	7	6	4	6	7
KH8 = 32	-	2	9	9	9	5	5	9	9+	9+	5	-	-	9+	9	9	8	5	3	1	-	-	-	-
CN = 33	-	-	-	-	-	-	-	-	-	-	-	9	9+	9	9	8	9	9	9+	9+	9+	9+	9+	7
SU = 34	9	8	3	3	-	1	4	-	-	-	2	7	8	8	8	8	9	9	9+	9+	9+	9+	8	8
6W = 35	9+	8	-	-	2	7	5	-	-	-	9+	9+	8	5	4	3	7	9	9+	9+	9+	9+	9+	9+
D2 = 36	9+	9+	5	3	9	9	8	-	-	-	3	-	-	-	4	4	7	8	9	9+	9+	9+	9+	9+
5Z = 37	9+	9	2	4	8	8	1	-	-	-	2	-	-	3	5	5	7	8	9	9	9+	9+	9+	9+
ZS6 = 38	9+	9+	8	7	8	9	6	-	-	-	-	-	-	-	1*	1	2	6	8	9	9	9+	9+	9+
FR = 39	9+	8	2	1	4	1	-	-	-	-	-	-	2*	3*	1*	1	3	8	9	9	9+	9+	9+	9+
FJL = 40	9+	9+	7	4	7	8	7	1	-	-	-	1*	8	9	9	9	9	9	9	9	9	9	9	9+
Zone	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23

* = Longpath
 Expected signal levels using 1500 W and 3-element Yagis at 100 feet at each station.

Enjoy the software. We would appreciate receiving any feedback or bug reports you might have.

73,
 H. Ward Silver, NØAX
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