

Instructions for Software/Data on Accompanying CD-ROM for 21st Edition of *The ARRL Antenna Book*

September 6, 2007

The companion CD-ROM for the 21st Edition of *The ARRL Antenna Book* includes software associated with several areas of the book (to find the programs in the book itself, look in the index under “Programs:”).

Installing The Programs/Data

Please use the *Setup.exe* program on the CD-ROM 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 CD-ROM drive is D:), at the Windows Taskbar on the bottom left of the screen, click **Start**, select **Run**, type in (or **Browse** to find) *Setup.exe*, click on **OK** and then follow the on-screen instructions.

Pay attention to your geographical area when you are clicking on statistical elevation-angle data for *HFTA*. The default files are for the entire USA (East, Mid and West).

Note that some operating systems may not respond to the selection of “Restart” at the end of the installation routine for *EZNEC ARRL* or *MicroDEM*. (In fact, some operating systems won’t even show the form where you can specify rebooting.) It is best not to select restart, but to reboot your system manually at the end of the whole installation.

Installing Over Existing 20th Edition Software

When the *Setup.exe* installation procedure detects a previous version of the software before the 21st Edition, it requires the operator to uninstall that earlier version before installation can proceed for the 21st Edition. Note that *data* saved using an older version of the software will not be erased, but will remain in the subdirectory previously used. For a default installation, that would be in the **c:\Program Files\ARRL\AntBk20** subdirectory for the 20th Edition versions of the software.

Click on ‘Remove all installed components’ and then ‘Next’ to uninstall a previous installation. Then bring up *Setup.exe* once again to install the 21st Edition software.

Microsoft Vista

Some readers have reported difficulties installing and using software from the 20th and 21st Editions of *The ARRL Antenna Book* on computers using the new *Microsoft Vista* operating system. Here are some tips on how to get things installed and running properly.

DOS Programs in Vista

Vista really doesn't like DOS programs. Here is a list of DOS programs included on the CD-ROM disk for both the 20th and the 21st Editions of *The ARRL Antenna Book*. Most especially *Vista* doesn't support "fullscreen mode," where the DOS program tries to use the entire screen. The error message (labeled "16 bit MS-DOS Subsystem") says: "This system does not support fullscreen mode. Choose 'Close' to terminate the application."

There is a workaround, however, for most of the programs. Instead of clicking 'Close,' click instead the 'Ignore' button for the DOS programs listed below. The program will open in a small window. The exceptions are *LPCAD28.EXE* and *LPCAD30.EXE*. *Vista* absolutely refuses to work with these two programs, although they work fine on older Windows systems. You'll simply have to find an older *Windows* or DOS computer to run either of them.

- *AAT.EXE* — analyzes antenna tuner configurations
- *BVYAGI.EXE* — analyzes Yagi antennas (use *YW* instead) **
- *GAMMA.EXE* — analyzes gamma matches
- *LPCAD28.EXE*—for LPDA arrays (20th Edition) — **won't work in Vista**
- *LPCAD30.EXE*—for LPDA arrays (21st Edition) — **won't work in Vista**
- *MAKEVOA.EXE* — makes antennas file for *VOACAP/VOAAREA* *
- *MOBILE.EXE* — analyzes mobile whip antennas
- *SCALE.EXE* — scales Yagi designs to other frequencies/tapers **
- *TLA.EXE* — analyzes transmission lines/tuners (use *TLW* instead) *

* Will run without problems by clicking on the icon in *Windows Explorer*.

** Starting list of available modeling files is badly formatted on-screen. Type in the name you want and this DOS program will work properly.

YW (Yagi for Windows) Program in Vista

Vista has a new security system called UAC (User Account Control). UAC is constantly lurking, looking for possible threats to your computer system — like a virus, a worm or similar kinds of malware. Its vigilance can be so overwhelming that it refuses to let legitimate programs work properly. Such is the case with the *YW* program, which *Vista* appears to at first allow, but which will finally abort, giving an error message similar to this: "The file '212-06M.YW' has an error. Examine it with a word processor." (This is an error message inherent to *YW*, but *Vista* forces it into this false "error" condition.)

The workaround is somewhat clumsy, but it will work consistently. Simply right-click on the *YW* icon, and select 'Properties.' Select the 'Compatibility' tab and check: 'Run this program as an administrator.' Click on 'Apply' and then 'OK.'

Now, when you click on *YW* to start it, the UAC will require you to "Allow" *YW* to run. Note: In the 21st Edition *YW* software, the first time you actually boot up *YW*, it will tell you: "Writing new YW.DEF. Please start YW again." This only happens once, and it clears any possibly bad settings for on-screen windows.

Most other Windows programs from either the 20th or 21st Editions (*TLW*, *HFTA*, *ArrayFeed1*, *MicroDEM*, *EZNEC-ARRL* and *Range-Bearing*) work hassle free with the UAC,

except for *GAW-ARRL* (GeoAlert Wizard) program, which also requires you to ‘Allow’ it to start under *Vista*.

The advanced *Vista* user may want to look into the freeware program *TweakUAC*, which can be found at <http://www.tweak-uac.com/>.

Installation of *MicroDEM* in *Vista*

For some reason *Vista* sometimes leaves the *Windows Explorer* open with the icons generated by *MicroDEM* during its installation procedure. You may close *Windows Explorer* anytime after the installation is finished.

Adobe Reader Version 7.0.9

The CD-ROM bundled with the first printing of the 21st Edition of *The ARRL Antenna Book* was missing the file: *AdbeRdr709_en_US.exe*. You need *Adobe Reader* Version 7 to use full indexing on the electronic version of *The ARRL Antenna Book*.

Unfortunately, the latest version of *Adobe Reader* Version 8 doesn’t work properly with book indexing, so you do really need Version 7. Go to the Adobe site:

http://www.adobe.com/products/acrobat/readstep2_allversions.html and select *Adobe Reader 7.0.9*, after making sure you specify the operating system as *Windows XP SP2*. (If you are running *Vista*, Adobe normally wants you to use Version 8, but you need to run Version 7.)

Macintosh *Adobe Reader*

Adobe Reader for the Macintosh does read the pdf files that are on the *Antenna Book*. The full-search index doesn’t work, however, so searching for individual words will take longer than on a PC.

Chapter 6 CVD Modeling Files

The modeling files for *EZNEC-ARRL* were accidentally left off the first printing of the CD-ROM. They may be downloaded in zipped format from:

http://www.arrl.org/notes/9876/Ch6_Files.zip. Extract these files to the location you specified for Modeling, Chapter 6. (The default location would be: **c:\Program Files\ARRL\AntBk21\Modeling\Chap 6.**)

Placing Icons on Your Desktop

At the last step of the installation you will probably click on the option to install icons for most of the ARRL programs on your desktop. This places icons on the desktop for *HFTA*, *TLW*, *YW*, *Range-Bearing*, *EZNEC ARRL* and *MicroDEM*, if you have chosen to install those programs.

If you have changed the default directory for *MicroDEM*, you will need to find the **microdem.exe** executable file and right-click on it in order to put an icon on your Desktop. Then click **Send To the Desktop (create shortcut)**.

Subdirectories

Although you may override it, the default subdirectory *AB21Install.exe* creates on your hard drive is **C:\Program Files\ARRL\AntBk21**, with 7 subdirectories beneath it:

- \Antenna Tuners**
- \EME & Satellite**
- \General**
- \Modeling**
- \Terrain**
- \XmsnLines**
- \Yagis**

Listed below are short descriptions of the files in each subdirectory.

IN THE C:\Program Files\ARRL\AntBk21\Antenna Tuners SUBDIRECTORY:

The *AAT* program automatically evaluates antenna tuner networks over a very wide range of load impedances. You can use a word processing program to read the three sample output ASCII files created by *AAT*. See Chapter 25 for more information on *AAT* and see **AAT.pdf** for detailed instructions.

IN THE C:\Program Files\ARRL\AntBk21\EME & Satellite SUBDIRECTORY:

K5OE1_MMDS.pdf — “A Helix Feed for Surplus MMDS Antennas” by Gerald R. Brown, K5OE.

K5OE_2_foot_mods.pdf — “2 Foot MMDS Dish Modification” by Gerald R. Brown, K5OE

K5OE_DualBandPatch.pdf — “Build This No-Tune Dual-Band Feed for Mode L/S” by Gerald R. Brown, K5OE.

SatFreqGuide0303.pdf — “Amateur Satellite Frequency Guide” by AMSAT.

W0LMD Dish Feed Systems.pdf — “Dish Feed Systems” by Robert Suding, W0LMD.

IN THE C:\Program Files\ARRL\AntBk21\General SUBDIRECTORY:

ANTPLNR.pdf — “Antenna Height and Communications Effectiveness” by Dean Straw, N6BV, and Gerald L. Hall, K1TD. This article may help you during Planning Commission or Zoning Board of Appeals meetings to convince town/city officials about your antenna needs.

EFFLEN.FOR is described in Chapter 2. This is an ASCII Fortran file that illustrates the principle behind the Schelkunoff tapering algorithm. This converts a tapered element into a single “monotaper” that can be modeled with a method-of-moments program like *NEC-2* or its derivatives.

GAMMA.BAS is described in Chapter 25. It is an ASCII text file that can be run in QBASIC or GWBASIC to compute the parameters for a gamma match. **GAMMA.EXE** is a compiled, executable file you can run from the DOS prompt or in a DOS Window.

MOBILE.EXE is described in Chapter 6. This is a terrific DOS program by Leon Braskamp, AA6GL, for evaluating and designing mobile whip antennas and the coils used for loading these short antennas.

LPCAD30.EXE is described in Chapter 10. Roger Cox, WBØDGF, wrote this DOS program for computing LPDA designs.

Range-Bearing computes the range/bearing from one latitude/longitude point to another. It also computes the latitude/longitude of a second point, given the range/bearing from the first point. *Range-Bearing* can be used in conjunction with a mapping program such as *Google Earth* to create terrain plots that the *HFTA* program can use.

Arrayfeed1 by W7EL computes parameters necessary for feeding 2-element and 4-element phased-arrays. *Arrayfeed1* is described in Chapter 8.

IN THE C:\Program Files\ARRL\AntBk21\Modeling SUBDIRECTORY:

This subdirectory contains *EZNEC* data files for antenna designs utilized in a number of chapters in the printed book. These modeling data files will work with *EZNEC ARRL* (also included with the CD-ROM), provided that the number of segments is less than 500. They will also work with the standard version of *EZNEC 4.0*. See the file **Readme_EZNEC ARRL.pdf** for further details.

Very complex models (such as some of the stacked VHF/UHF models in Chapter 18, for example) are also provided for completeness, but they must be run using the professional version of *EZNEC*, *EZNEC Pro*, which is not included with *The ARRL Antenna Book*. *EZNEC Pro* can be purchased from Roy Lewallen, W7EL.

IN THE C:\Program Files\ARRL\AntBk21\Terrain SUBDIRECTORY:

This subdirectory contains the *HFTA* (HF Terrain Assessment) program by Editor 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 Chapter 3.

During the installation process you will be asked to specify the region where you live so that appropriate statistical elevation-angle files can be installed along with *HFTA*. (The default files installed cover a number of locations throughout the USA. You can add files from other locations throughout the world.) 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.

IN THE C:\Program Files\ARRL\AntBk21\XmsnLine SUBDIRECTORY:

This subdirectory contains files for *TLW* (Transmission Line for Windows) program by Editor Dean Straw, N6BV. This is described in Chapter 24. *TLW* computes many parameters for transmission lines and antenna-tuners—including detailed losses and stresses. *TLW* runs under

Windows 98, XP, XP Professional, NT or 2000. 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.

IN THE C:\Program Files\ARRL\AntBk21\Yagis SUBDIRECTORY:

This archive contains the *YW* (Yagi for Windows) program by Editor 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 Chapter 11.

SCALE.EXE is a DOS program from scaling Yagi files to other frequencies or other element-taper schedules. See **SCALE.pdf** for details.

PROPAGATION-PREDICTION FILES

Located on the CD-ROM itself are a huge number of propagation-prediction files.

Choices, Summary and Detailed Propagation Tables

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 Colombo, 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 Aukland, 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 over the whole 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 **Fig6Tab.pdf** file described in Chapter 3 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																														
	EU	FE	SA	AF	EU	FE	SA	AF	EU	FE	SA	AF	EU	FE	SA	AF	EU	FE	SA	AF																											
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+	-	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	8																				
9	8	7	9+7	-	8	9+	9	9	9+9	8	9+9+	-	6	9+	-	1	9+9+	-	-	-	-	-	-	-	-	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+7	9+9+9+3*	9	9	5*	9+9+9	6*	2	13	13																				
14	-	-	-	-	-	9+	2	7	4	-	5	8	9+	9+9	9+8	9	9	9+	9+9	9+9+9+9	9+	9	6*	9+9+9	1*	1	14	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	8	15	15																				
16	-	-	-	-	-	8	3	4	-	-	3	1	9+	9+8	9	9	9	9+	9+9+9+9+9	9+9+	9	8	9+9+	-	8	9	16	16																			
17	-	-	-	-	-	8	5	3	-	2	4	-	9+	9+8	9+9+9	9	9+	9+9	9+9+1*	9+9+	-	8	9+9+	-	8	9+	17	17																			
18	-	-	-	-	-	9	7	4	2	5	5	-	9+	9+9	9+9+9	9	9+	9+9	9+9+1	9+9+	-	7	9+9+	-	9+9+	18	18	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	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	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*	-	5	9+4*	-	9	6	22	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*	-	7	9+2*	-	9	2	23	23																
													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

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	-	-	-	7	5	3	2	1	5	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
W02 = 02	9+	9	9	9	9	8	7	8	7	5	3	2	1	5	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
W6 =	03	9+	9+	9+	7	7	1	1	5	8	8	3	-	-	1	9	9+	9+	9+	9+	9	9	9+	9+
W0 =	04	9+	9+	9+	8	5	5	5	3	2	1	-	-	-	9+	9+	9+	9+	9+	9+	9+	9+	9+	9+
W3 =	05	4	2	2	2	2	2	2	3	3	3	2	1	-	1	8	9+	9+	9+	9+	9+	9+	9+	9
XE1 = 06	9+	9+	7	9	9+	9+	9+	9+	9+	9+	9	8	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	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+
HC =	10	9+	8	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	1	4	8	9	9+	9+	9+
CE =	12	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+	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	9	9	9
I =	15	-	-	-	-	-	-	-	-	-	4	9	9	9	9	9	9	9	9	9	9	9	9	9
UR3 = 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
UR9 = 18	6	7	6	6	9	9	9	7	4	1	-	-	8	8	6	6	5	6	7	8	9	9	8	7
UR0 = 19	9+	9	9	6	5	5	8	8	8	4	-	-	2	6	8	8	7	4	4	7	9	9	9	9
4X =	20	8	6	3	1	-	3	4	-	-	1	8	8	8	8	8	8	9	9	9	9	8	7	7
HZ =	21	9+	9	4	3	8	8	2	-	-	1	7	8	9	8	8	9	9	9	9	9	9	9	9
VU =	22	7	5	8	7	6	7	5	-	-	6	9	9	9	9	9	3	2	2	2	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	9	5	4	5	7	8	6	1	-	1*	5	7	1	1	1	4	2	-	-	9	
JR1 = 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*	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
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	8	5	3	1	-	-	-	-
CN =	33	-	-	-	-	-	-	-	-	-	9	9+	9	9	8	9	9	9	9	9	9	9	9	9
SU =	34	9	8	3	3	-	1	4	-	-	2	7	8	8	8	8	9	9	9	9	9	9	9	9
6W =	35	9+	9	8	-	2	7	5	-	-	9+	9	8	8	5	4	3	7	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
5Z =	37	9+	9	2	4	8	8	1	-	-	2	-	-	3	5	5	5	7	8	9	9	9	9	9
ZS6 = 38	9+	9	9	8	7	8	9	6	-	-	-	-	-	1*	1	2	6	8	9	9	9	9	9	9
ER =	39	9	8	2	1	4	1	-	-	-	-	-	-	2*	3*	1*	1	3	8	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	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

UTC -->

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

Product Notes

Be sure to check ARRLWeb for the latest updates at <http://www.arrl.org/notes>, or go through the ARRLWeb menu system by clicking on Support, Product Notes and Updates from <http://www.arrl.org/>.

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

73,

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