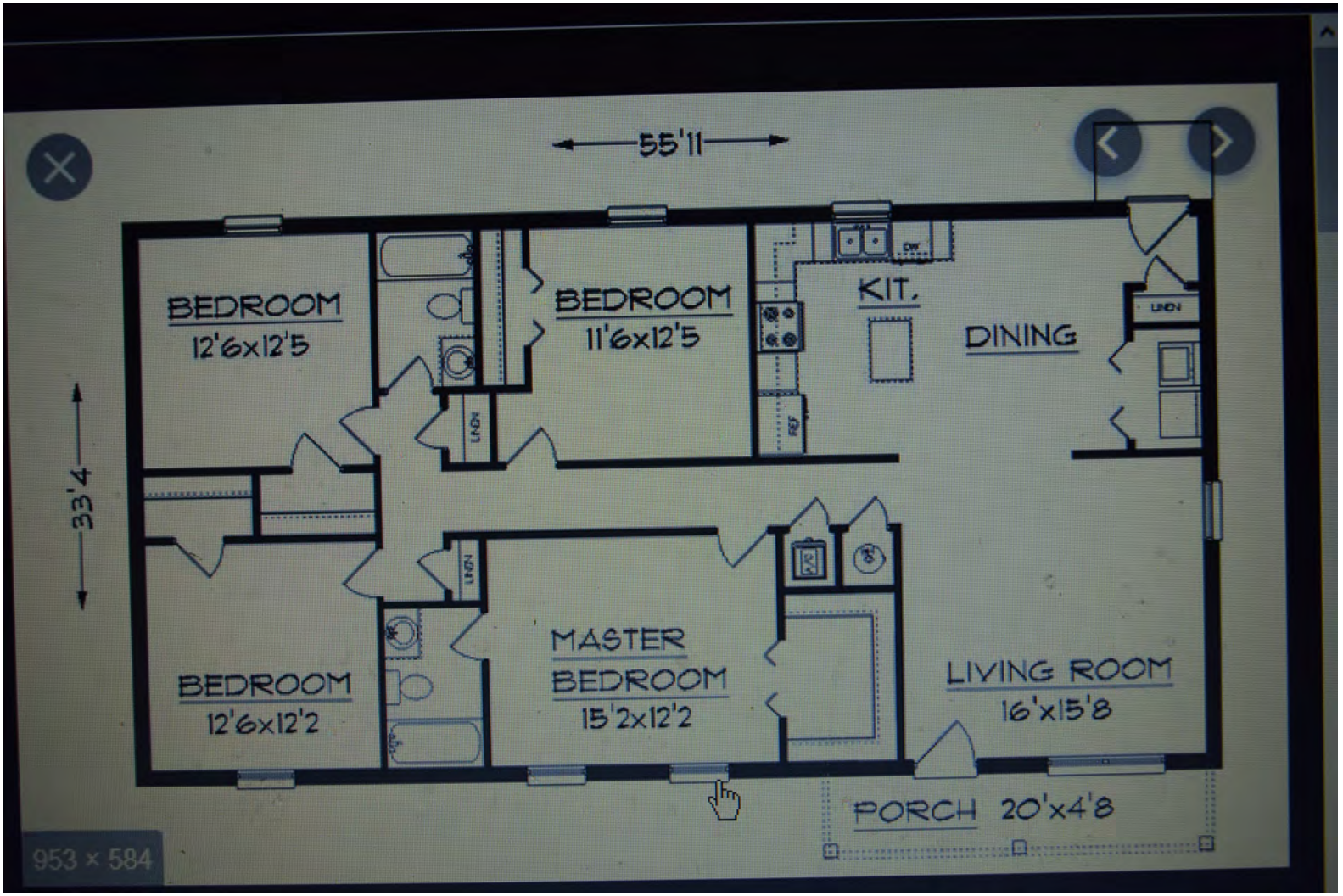
Modeling

What is modeling.
General Use
Use in Electronics

If this is what you are expecting you are in the wrong place

- A model is a physical, pictorial, graphical, or mathematical representation of object. Examples are model aircraft, boats, or cars.
- Architects commonly build models of building.
- A drawing such as a house plan is also a model.

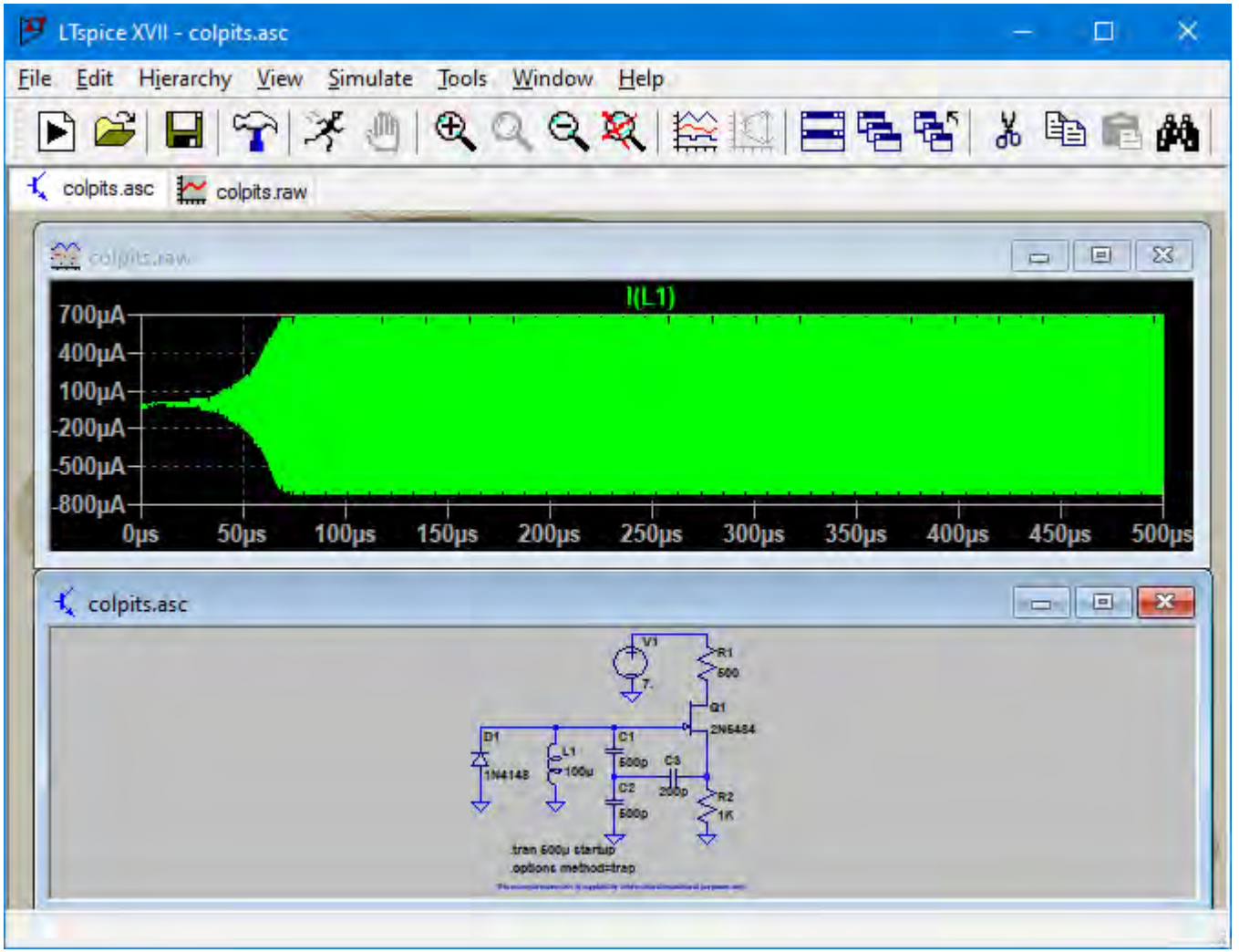
House Plan (Model)



- The detail and accuracy of the plan (model) determines how much information you can get from the model.
- With a good enough plan you can generate a materials list, cut list, and materials and labor cost to build the house.

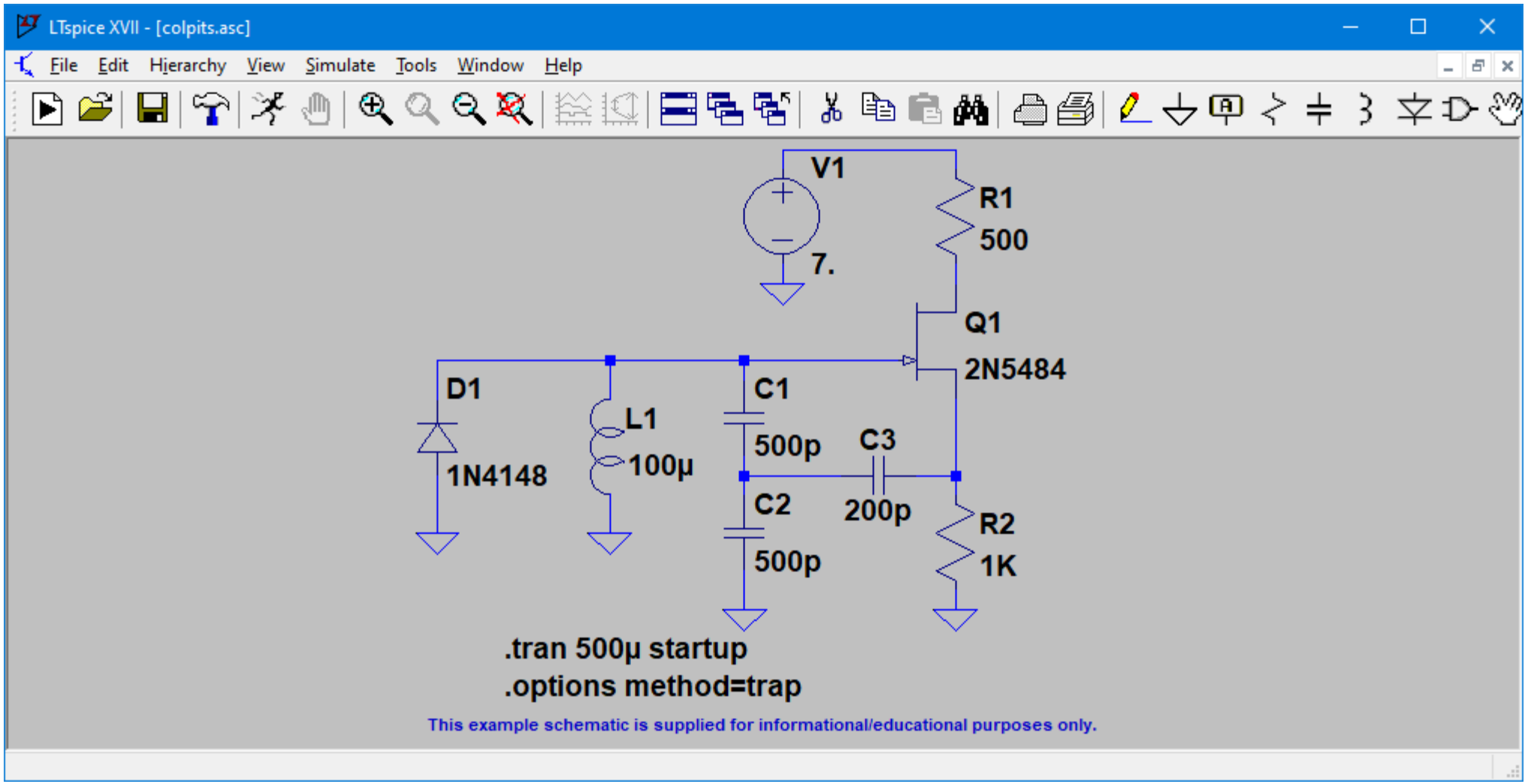
Spice

- This same principal of modeling can be used in all types of endeavors, including Ham Radio.
- Some examples of modeling are:
- Spice for circuit performance modeling. You can download a free version of this on the internet. The most common one is LT spice. There is a user forum that has much help and additional models not included with the basic download however you can do most thing with the basic download.



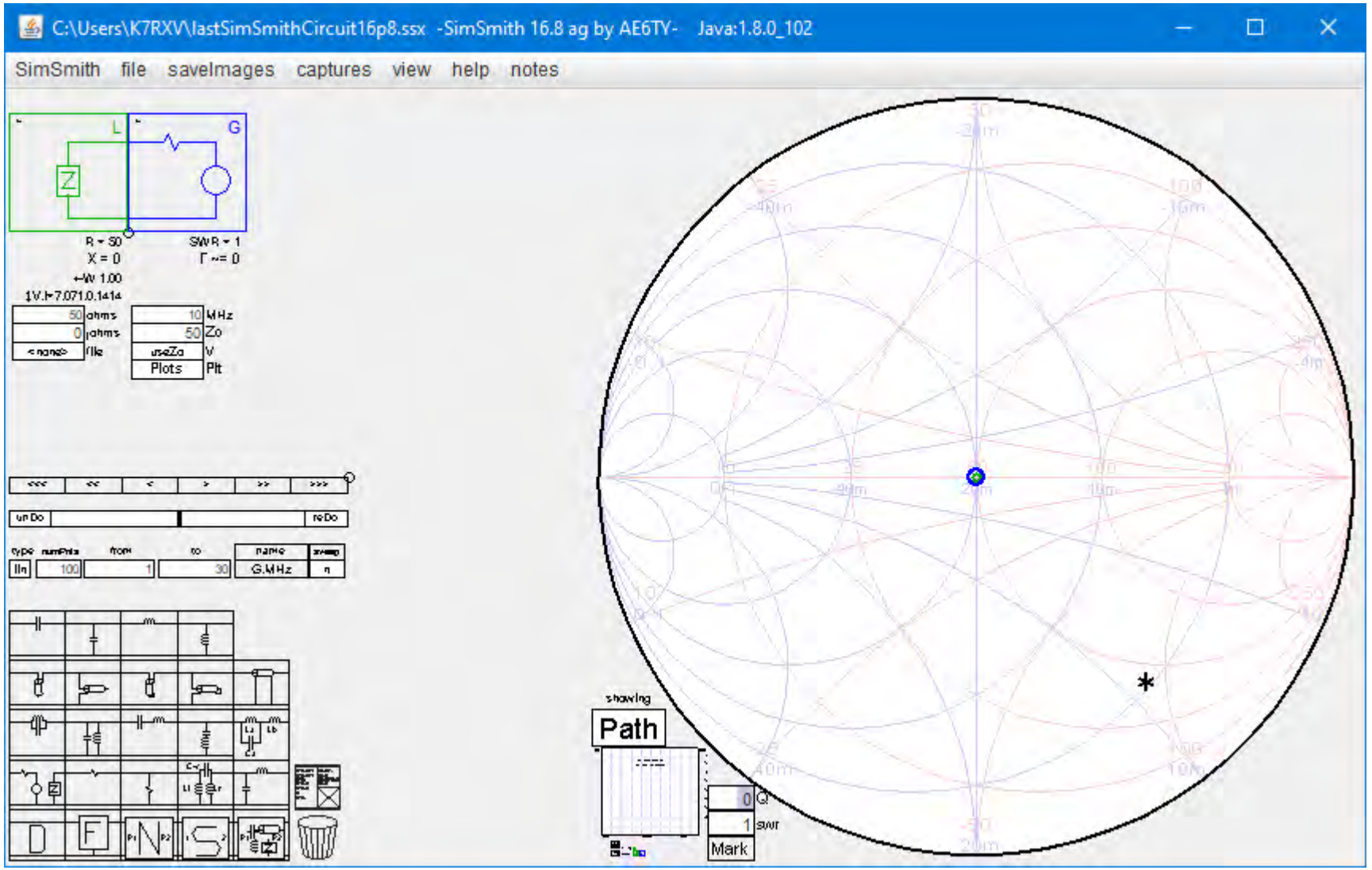
SVARC Roger Steyaert K7RXV

Colpits Osc


LTspice XVII - [colpits.asc]
File Edit Hierarchy View Simulate Tools Window Help
V1
7.
R1
500
Q1
2N5484
D1
1N4148
L1
100µ
C1
500p
C3
200p
C2
500p
R2
1K
.tran 500µ startup
.options method=trap
This example schematic is supplied for informational/educational purposes only.

- Another common modeling program is SimSmith it is also free download. You can get tutorials on how to use this program from the W0QE web site.

SimSmith


C:\Users\K7RXV\lastSimSmithCircuit16p8.ssx -SimSmith 16.8 ag by AE6TY- Java:1.8.0_102
SimSmith file saveImages captures view help notes
L
G
Z
R = 50
X = 0
SWR = 1
Γ = 0
1V,I=7.071,0.1414
50 ohms
0 ohms
<none> file
10 MHz
50 Zo
useZo V
Plots Plt
<<< << < > >> >>>
unDo reDo
type numPnts from to name sweep
lin 100 1 30 G,MHz n
showing
Path
0 Q
1 swr
Mark

- The best program for modeling antennas is EZNEC. A free demo version of this program is available one the eznec web site. The demo version is the complete program. It is just limited to modeling simple antennas IE an antenna with 2 wavelengths of conductors or less. With this you can model a dipole, vertical, quad loop etc.

EZNEC

- Antenna modeling program using NEC method of moments.
- Was developed at Berkley by the department of the navy. NEC 2 is in public domain. The most current version is NEC 4. You must buy a license to use NEC 4. The added features are not required for most ham radio applications.
- There are 3 versions for non professional use.
- The demo version is free and is only limited in the size of antenna you can model.

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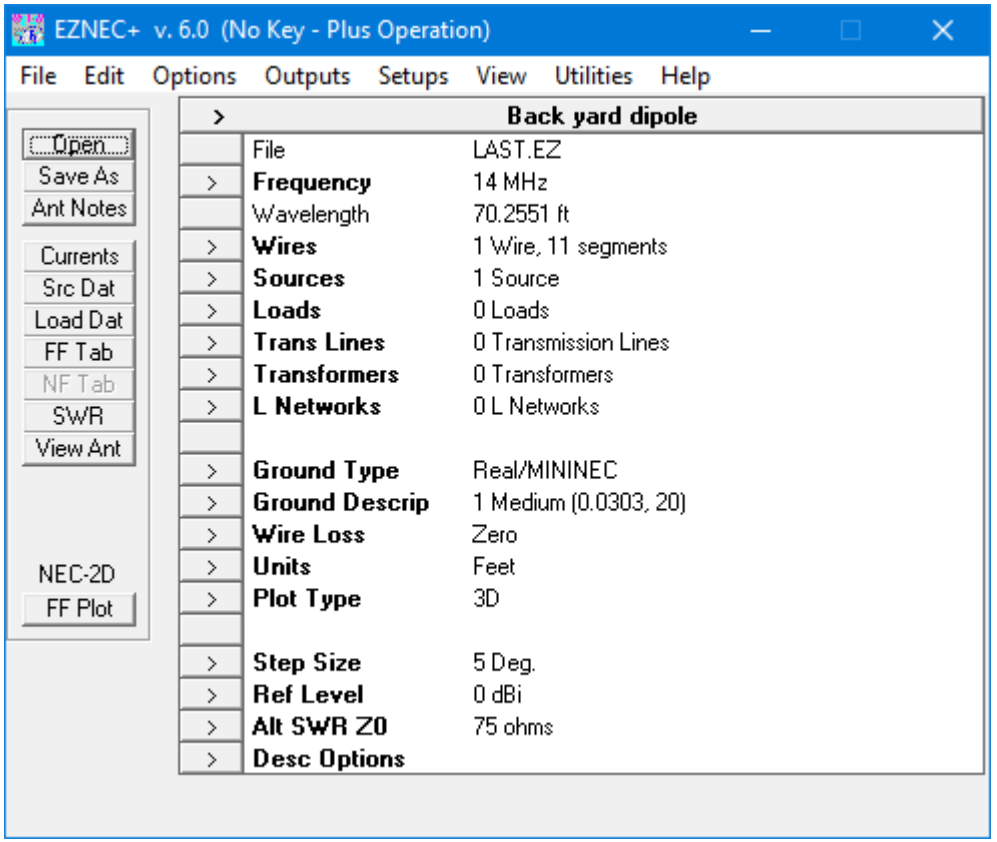
- Standard EZNEC is what most hams need .
- There is also a EZNEC + version that can handle larger models such as stacks of beams on a large tower. It also has some additional features such as circular polarization .
- The demo version will do simple antenna such as dipoles. It is limited to about 2 wavelengths of wire. (A wire is any straight conductor)

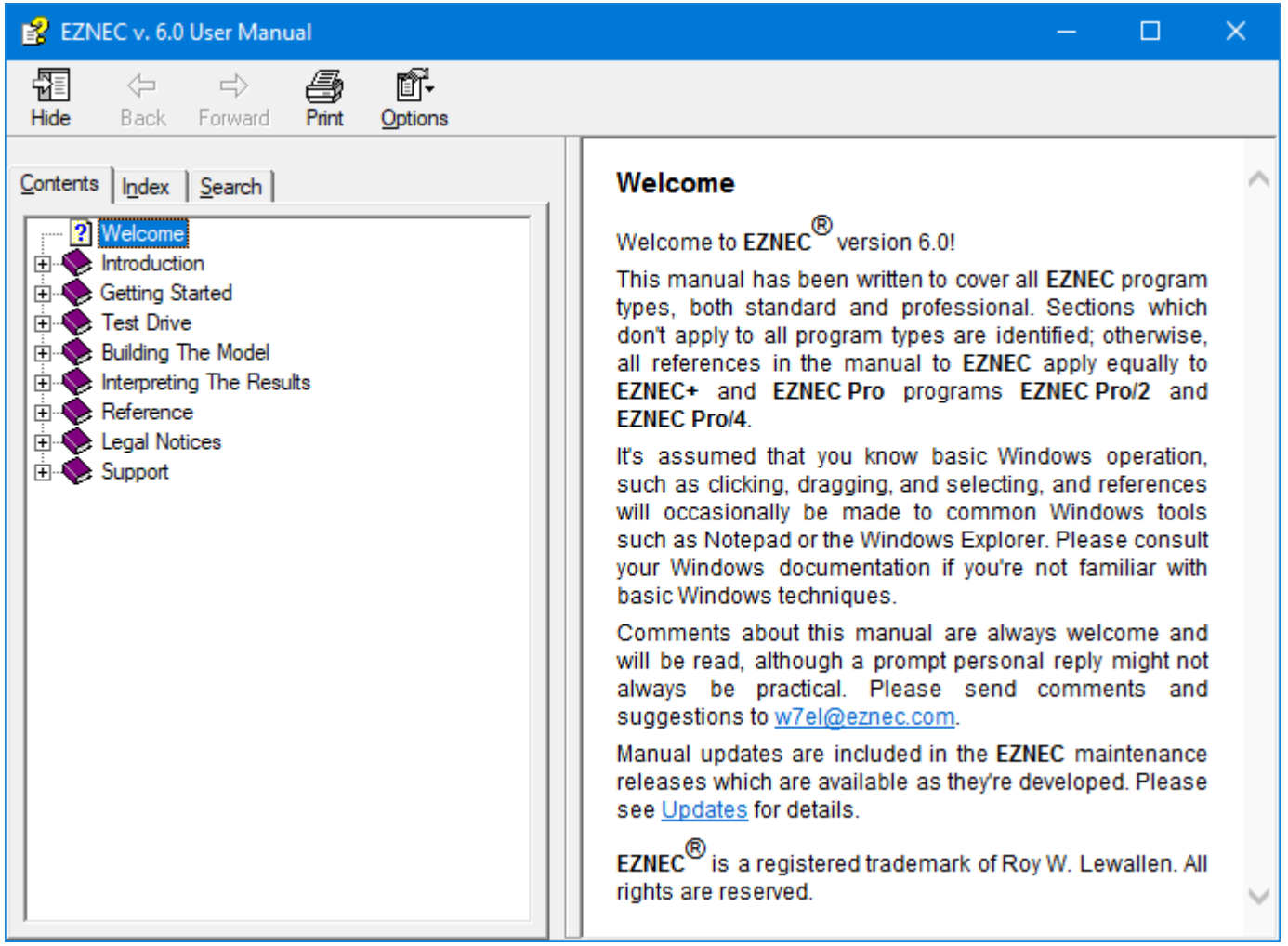
EZNEC Main Window

- This is the control window that opens when you first start EZNEC
- The best way to start using this program is to open the help pull down menu.
- Click on contents. This is the complete manual for the program.
- Read through the introduction and getting started.

EZNEC Main Window



EZNEC Help



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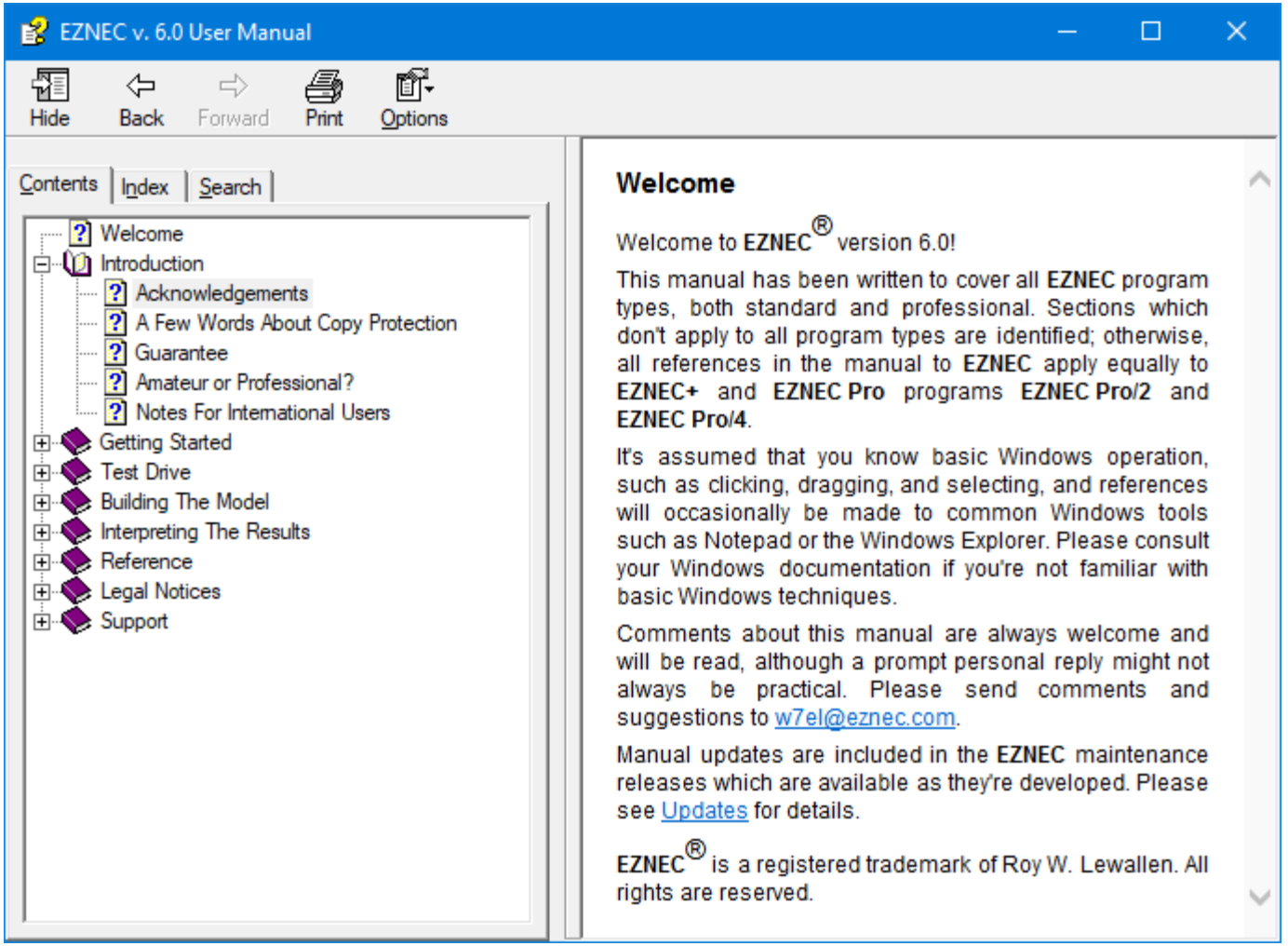
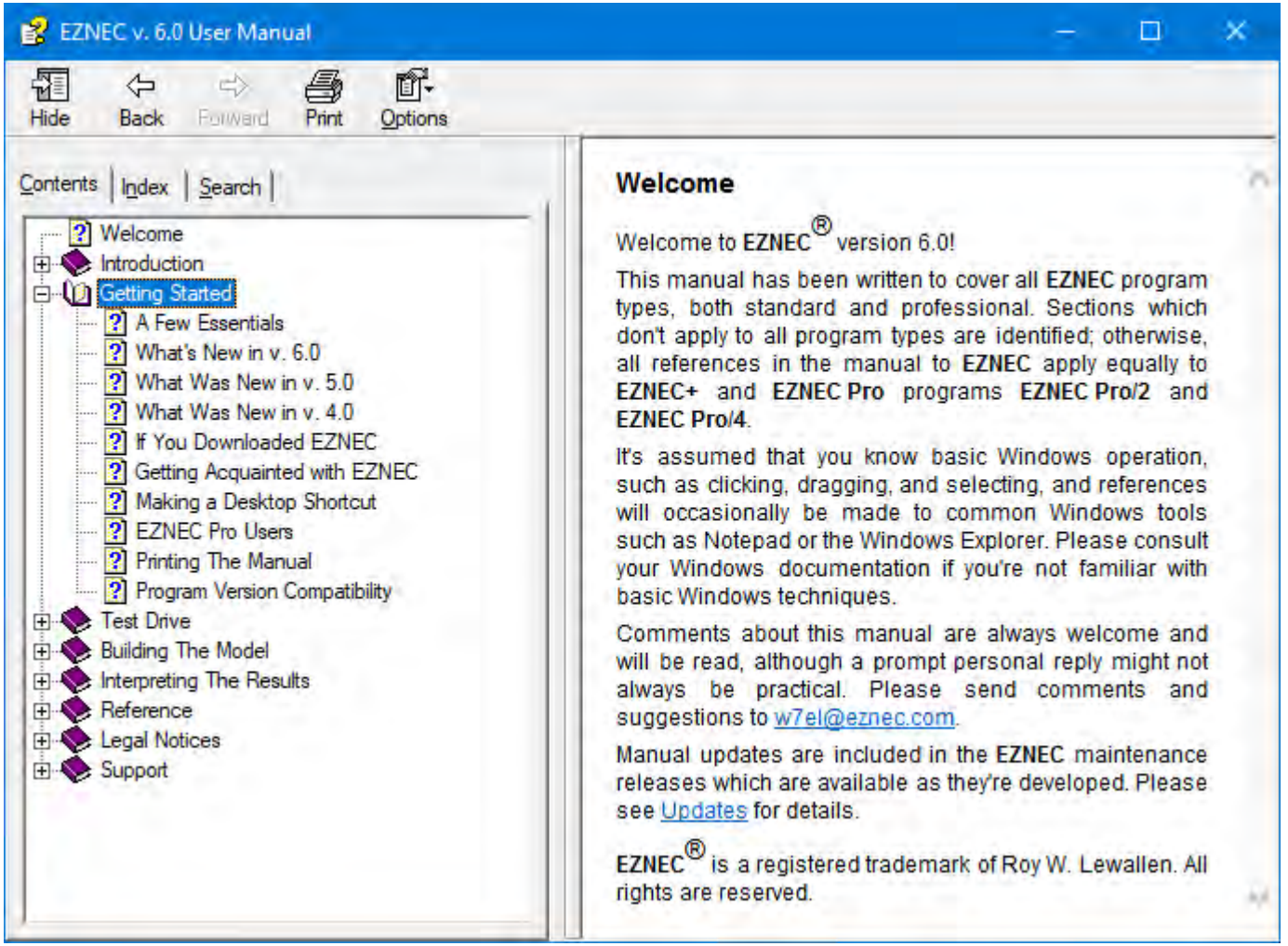
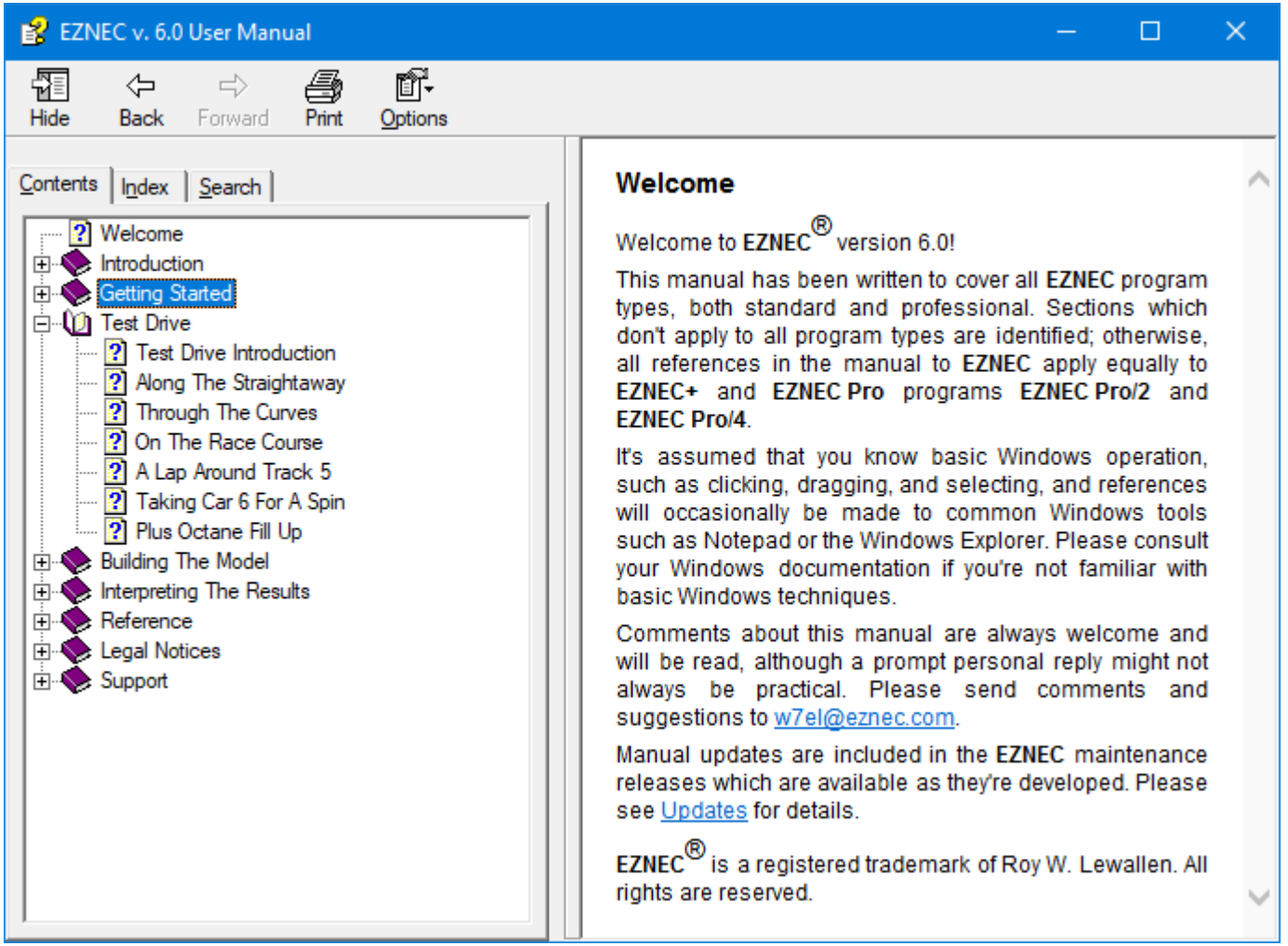
EZNEC Introduction



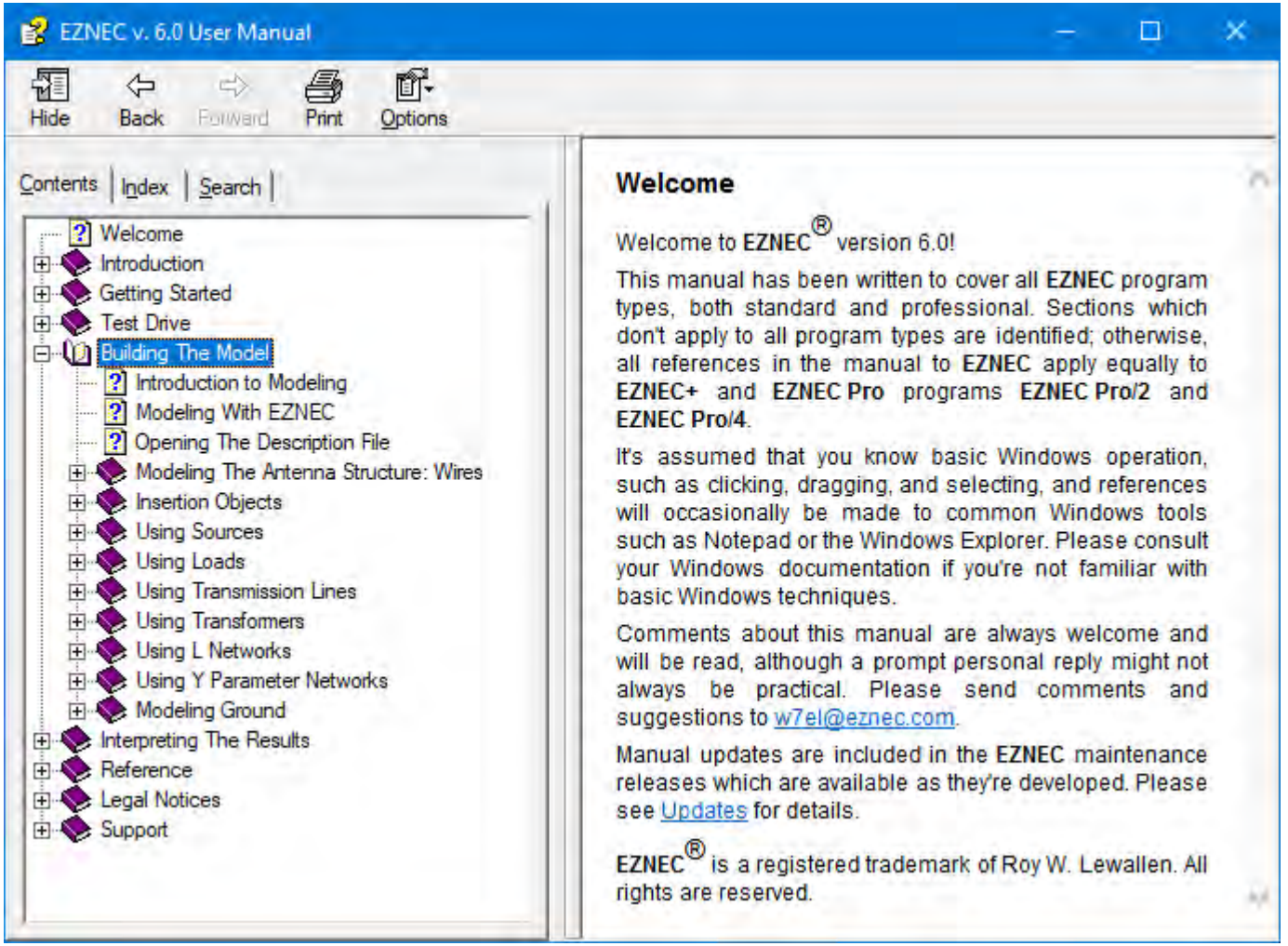
Getting Started



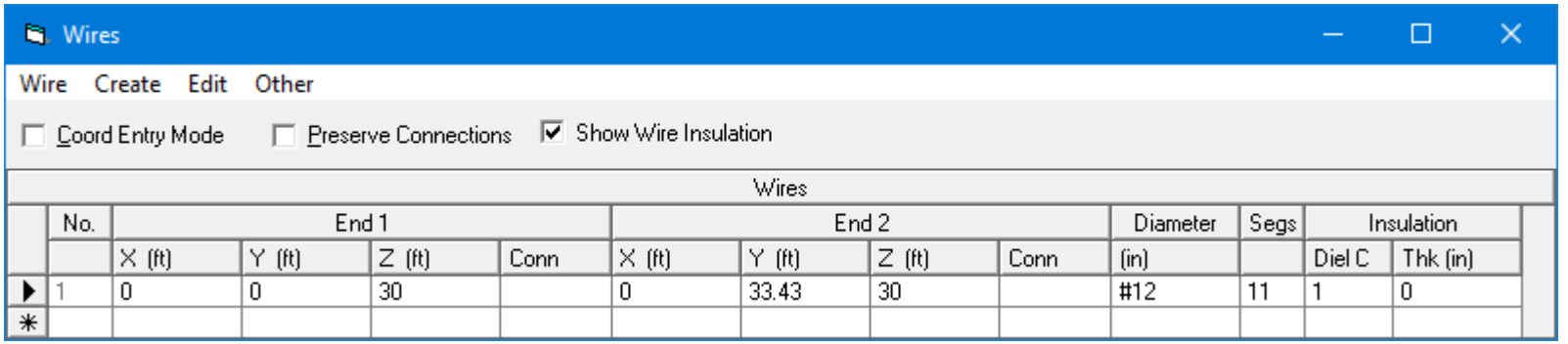
Test Drive


EZNEC v. 6.0 User Manual
Hide
Back
Forward
Print
Options
Contents
Index
Search
Welcome
Introduction
Getting Started
Test Drive
Test Drive Introduction
Along The Straightaway
Through The Curves
On The Race Course
A Lap Around Track 5
Taking Car 6 For A Spin
Plus Octane Fill Up
Building The Model
Interpreting The Results
Reference
Legal Notices
Support
Welcome
Welcome to EZNEC® version 6.0!
This manual has been written to cover all EZNEC program types, both standard and professional. Sections which don't apply to all program types are identified; otherwise, all references in the manual to EZNEC apply equally to EZNEC+ and EZNEC Pro programs EZNEC Pro/2 and EZNEC Pro/4.
It's assumed that you know basic Windows operation, such as clicking, dragging, and selecting, and references will occasionally be made to common Windows tools such as Notepad or the Windows Explorer. Please consult your Windows documentation if you're not familiar with basic Windows techniques.
Comments about this manual are always welcome and will be read, although a prompt personal reply might not always be practical. Please send comments and suggestions to w7el@eznec.com.
Manual updates are included in the EZNEC maintenance releases which are available as they're developed. Please see Updates for details.
EZNEC® is a registered trademark of Roy W. Lewallen. All rights are reserved.

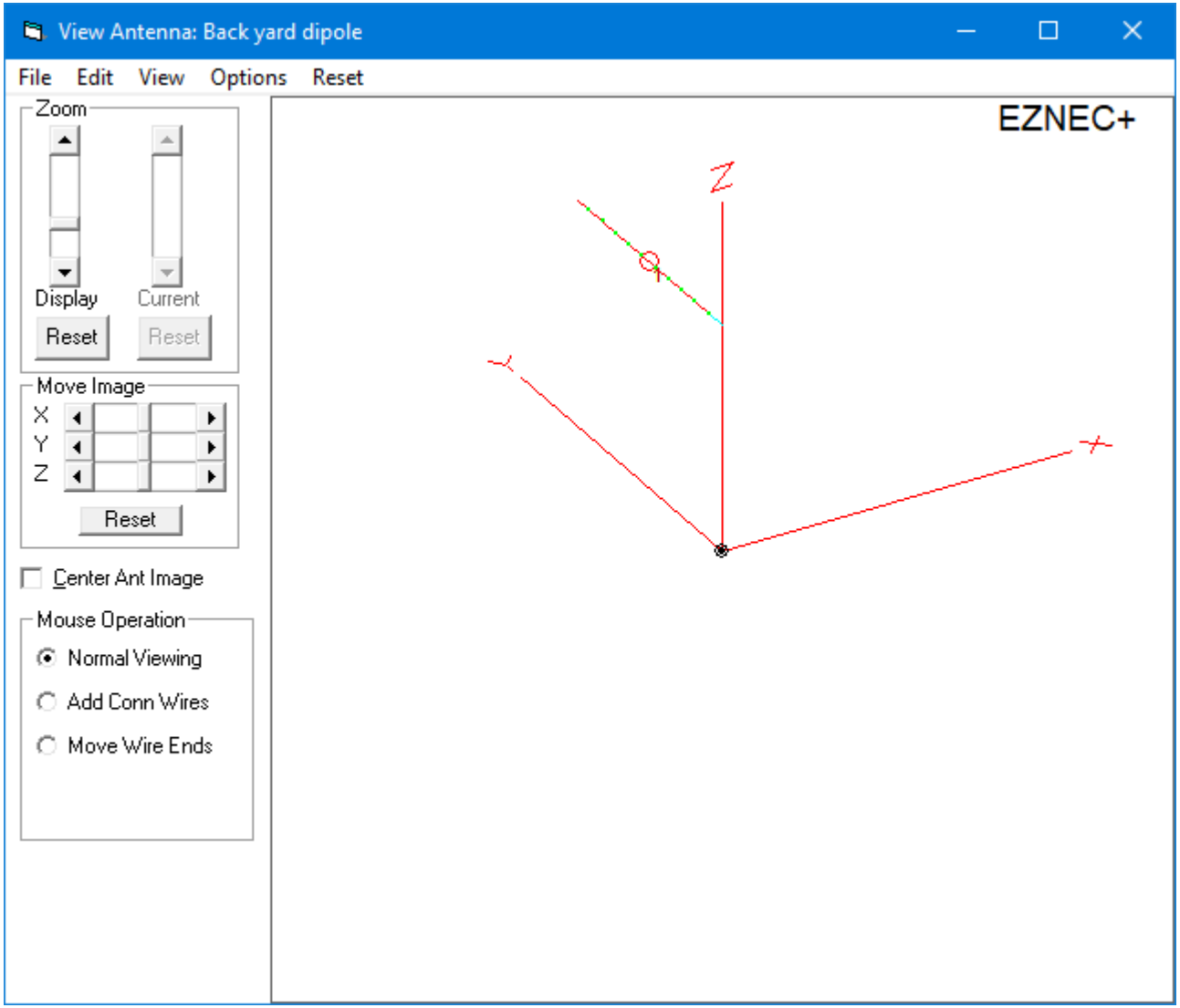
Building the Model



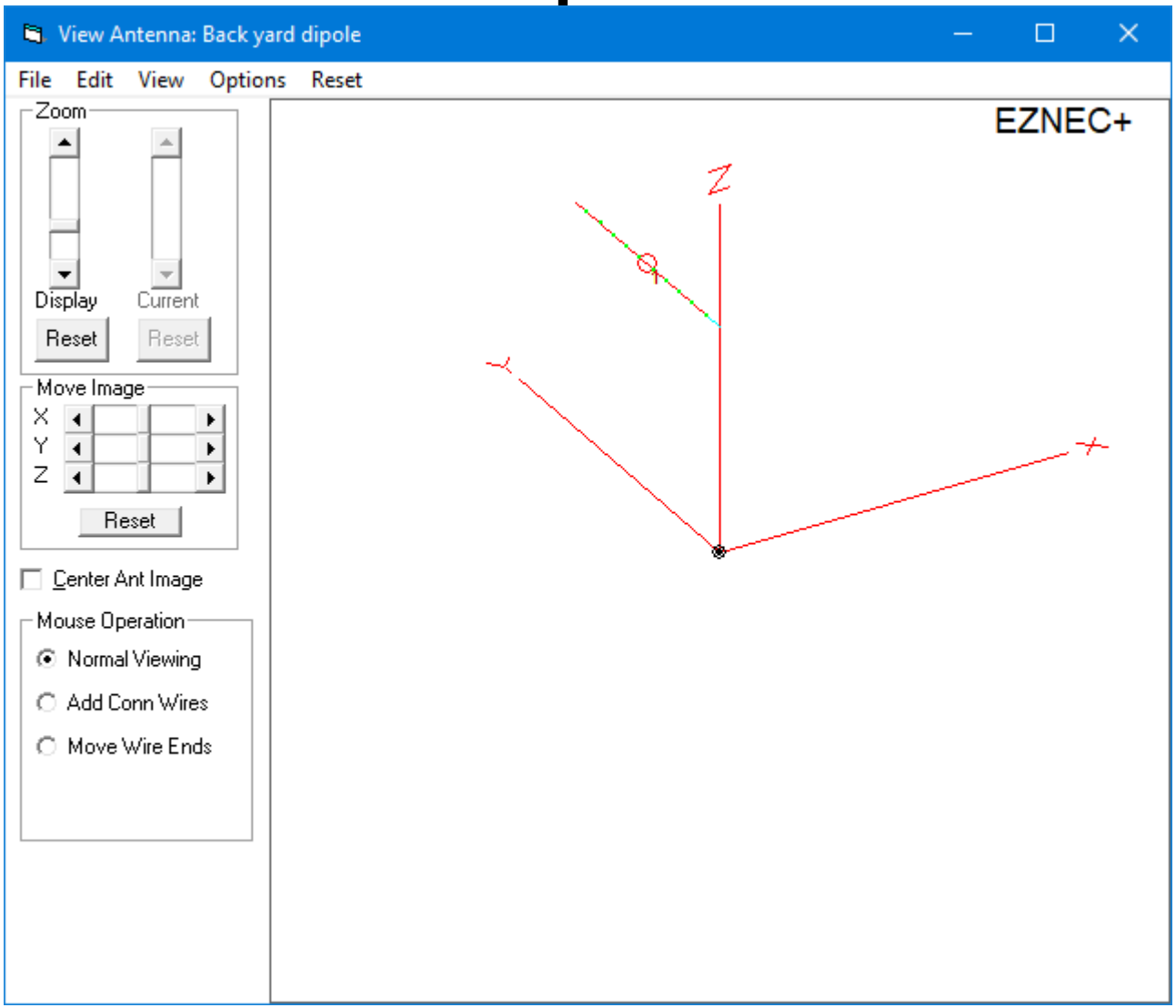
Wires Menu


Wires
Wire Create Edit Other
Coord Entry Mode
Preserve Connections
Show Wire Insulation
Wires
No. End 1 End 2 Diameter Segs Insulation
X (ft) Y (ft) Z (ft) Conn X (ft) Y (ft) Z (ft) Conn (in) Diel C Thk (in)
1 0 0 30 0 33.43 30 #12 11 1 0

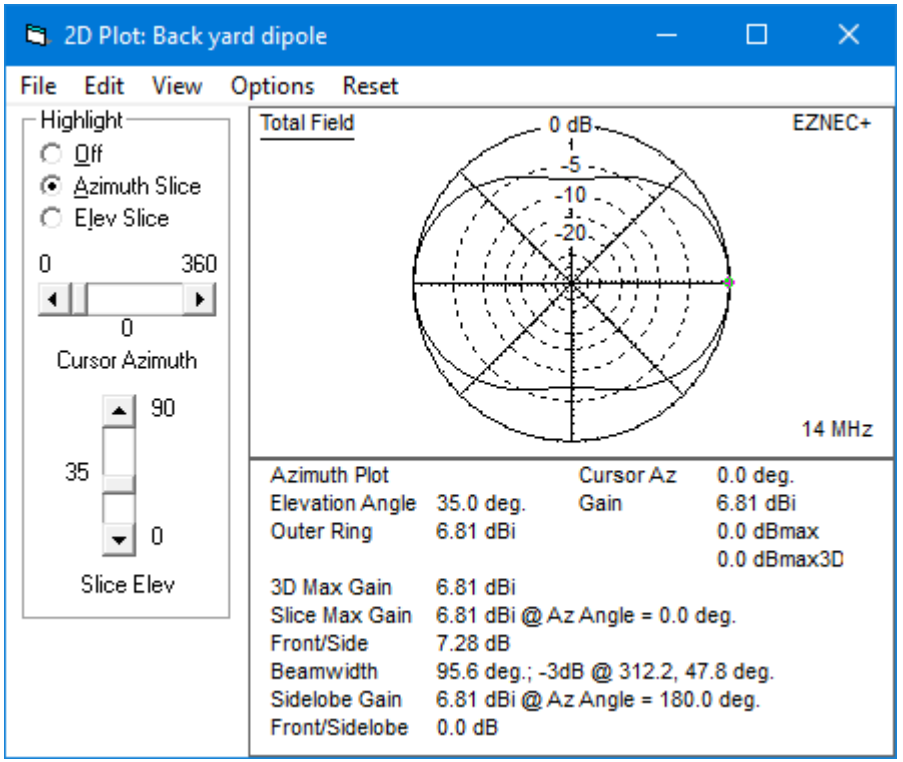
View Antenna



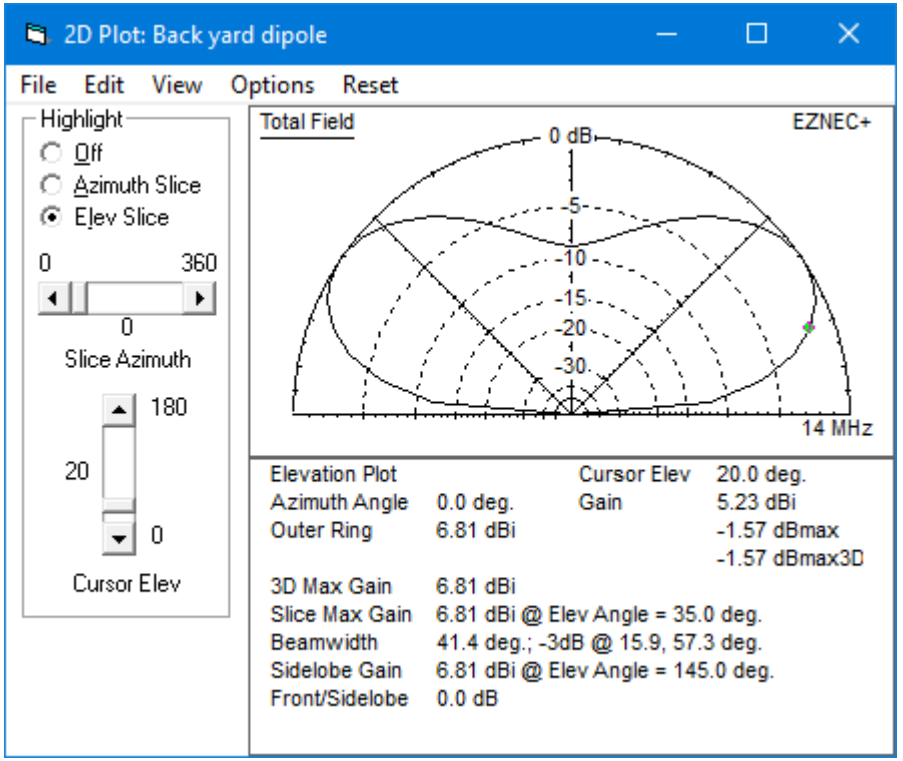
3D plot


View Antenna: Back yard dipole
File
Edit
View
Options
Reset
Zoom
Display
Current
Reset
Reset
Move Image
X
Y
Z
Reset
Center Ant Image
Mouse Operation
Normal Viewing
Add Conn Wires
Move Wire Ends
EZNEC+
Z
Y
X

Azimuth Plot



Elevation Plot



Possible Future Presentations.

- Detailed use of EZNEC
- How to use SimSmith
- Vertical Antenna Myths
- SPICE Basics
- Receiver Specifications and what they mean