# VNA Quick Start Guide

July 22, 2011

## LOADING THE SOFTWARE:

The VNA2180 software does not require a formal installation procedure. It does not interfere with any other programs or the registry on your computer.

1) Create a folder or a subfolder on any convenient hard drive.
For example, "*C:\VNA*". (the name can be anything)

2) Download the latest program from the website:
http://www.w5big.com/vna2180.htm

The latest program is shown at the top of the page.

3) Save the zip file in the folder you just created for the VNA software and documentation. Unzip it in this folder or another folder if you wish.

4) The file labeled **"VNA_xxx.exe"** is the executable file. It is ready to run without going through an installation process. When later versions of the program are released, the number "_xxx" will be different. More than one version of the VNA program can reside in the same folder at the same time. The older programs with the lower numbers will not interfere with the newest version, so they do not have to be deleted.

Be sure your computer displays the **extensions of files** so you can distinguish the *.exe files from the other files. See Appendix 5 for more information.

5) It is important to turn on the VNA hardware before starting the program.

If you want to make a shortcut icon for your desktop, right click on the VNA_xxx.exe file (or the latest version) and select "create shortcut" from the dropdown menu. Drag the shortcut to your desktop or task bar.

## HARDWARE CONNECTIONS:

Plug in the DC power supply (12V at 500 ma recommended) and insert the connector into the jack on the rear panel of the VNA.

Press the power switch. The Red LED's will blink a few times to indicate the version of software. The Red LED's are on continuously when a measurement is in progress.

To turn off the power, press the power switch again. The Red LED's will blink again. If the VNA does not receive a command from the PC for 10 minutes, it will power down

automatically if it is in the AutoPwrOff mode. The AutoPwrOff mode can be turned on/off with a menu selection under the **Setup** tab at the top of the screen.

The VNA2180 can be operated on battery power for remote operation with a laptop computer. The current required is about 350-400ma while a measurement is in progress. When operating with battery power, you may want to select the low power mode under the Setup->Power Control menu.

Batteries are not included with the VNA2180 but you can make a battery pack using any type of batteries you like. There is room *inside the case* for a battery and disconnect diodes are included so the battery and the AC power supply will not interfere with each other. There is also a space for an optional resistor to use for trickle charging a battery, if desired. The main power on/off switch controls the battery power too, so the leakage current is less than one microamp when the VNA is turned off. Refer to Appendix 6 of the manual and the Application-Help file for more details.

When using the VNA to test a mobile antenna on a motor vehicle, it is better to use a separate battery and **not** the 12V battery in the vehicle. This avoids the problem of sneak paths through the ground between the DC power input and the antenna ground connection. It will also help reduce measurement noise if it's necessary to run the engine while taking data (such as to operate the air conditioner). **If it's essential to get power for the VNA from the vehicle, be sure to put 500 ma fuses in BOTH the +12V lead and the power ground lead.** A small voltage drop across the fuses will not affect the VNA since the battery voltage is much more than the required minimum operating voltage. The laptop computer being used should remain **floating** for the best measurement accuracy.

When using the VNA with a new antenna system, check the AC and DC voltage between the antenna ground and the ground used for the VNA and the PC. This voltage should be less than 1V. A balanced antenna should have a DC connection to ground through a balun or RF choke on one side (or both sides). Of course there should always be a large resistor (or balun) connecting both leads of the antenna to a ground path in order to drain off static electricity.

NOTE: Before connecting a transmission line to the input of the VNA, be sure to momentarily short its pins together to drain off any static charge that may be present. Also, be sure there is no DC voltage on the antenna. If there is DC, use a blocking capacitor between the VNA and the antenna input.

**Antennas and transmission lines can have enough static charge to damage sensitive electronic equipment. This can happen even when there is no rainstorm in the area. A strong wind can generate static charge. So can just flexing a coaxial cable by rolling it up or unrolling it, even if there is no antenna connected to it.**

**An antenna or a component to be measured should not be connected or**

**disconnected from the analyzer while a test is in progress. A test is in progress when the RED LED is on.**

***Be sure the maximum input voltage at the DC power connector does not exceed 15 volts. The minimum input voltage required is 11.0 volts.***

**NOTE:** Low cost power supplies that plug in the wall are usually not regulated and their maximum output when no load is connected may be several volts higher than their rated output. **Check the output voltage with no load to make sure it does not exceed 15 volts**.

Power supplies that operate on a wide input voltage range such as 120V to 220V use a switching regulator. Evaluate the measurement results to see if noise from the power supply may be a problem.

## PC INTERFACE CABLE:

Connect one end of the **USB cable** to the VNA and the other end to a USB port on your PC. Start the VNA program and click on the **Setup** menu at the top of the screen. Enter the comm port. (Use the **Device Manager** to find the comm port value if necessary.) This number will be saved in the setup file called *VNA_xxx.ini*.

For additional information on the usb port, refer to this document:
w5big.com/PC_USB_INTERFACE.pdf

Click on the Files menu in the upper left corner of the VNA window. Click **Load Config File** and select the file called: **_VNA_default.cfg.**

**Then close the VNA program and restart it. You do not have to reboot your computer. Now you are ready to calibrate.**

When the VNA is present, it must be turned on **before** the PC program is started.

If the PC program starts when the VNA is not connected and powered up, the program will automatically enter the DEMO mode. In the demo mode, you can look at previously saved scan files.

For a quick test after calibrating, leave the calibration resistor connected to the RF connector and click the **SCAN** button in the lower left corner of the screen.

The Red LED will come on while the scan is in progress. A blue bar will move across the top of the graph as the scan progresses.

## Appendix 4 – USB Operation

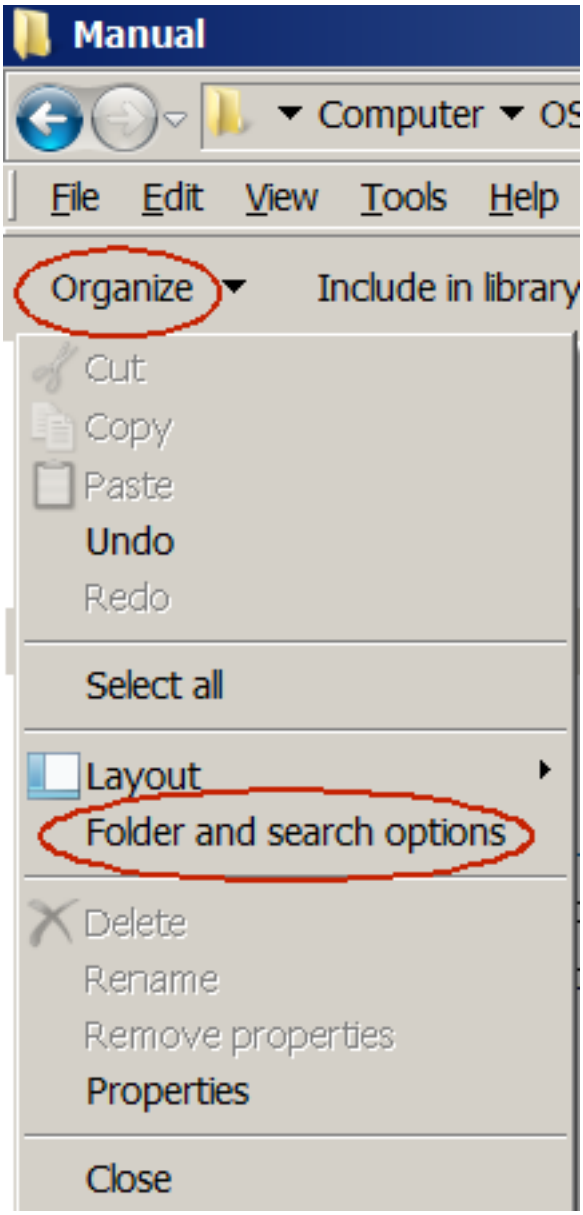
The comm port assigned to the USB adapter can also be found using the Windows Device Manager: Click Start → Settings →Control panel → System → Hardware → Device Manager. This USB adapter is called MM232R by the Device Manager.

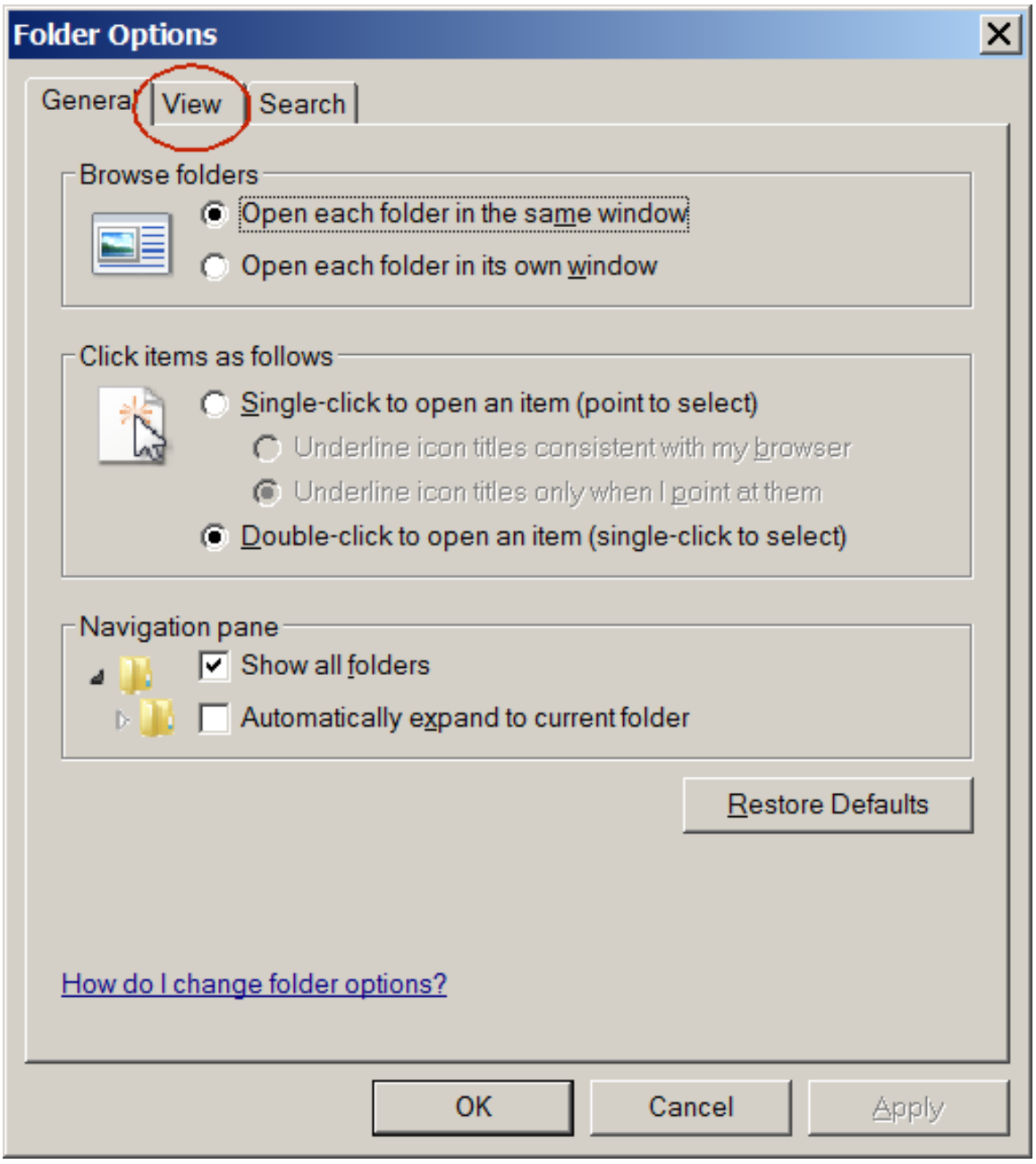
# Appendix 5 – File Extensions

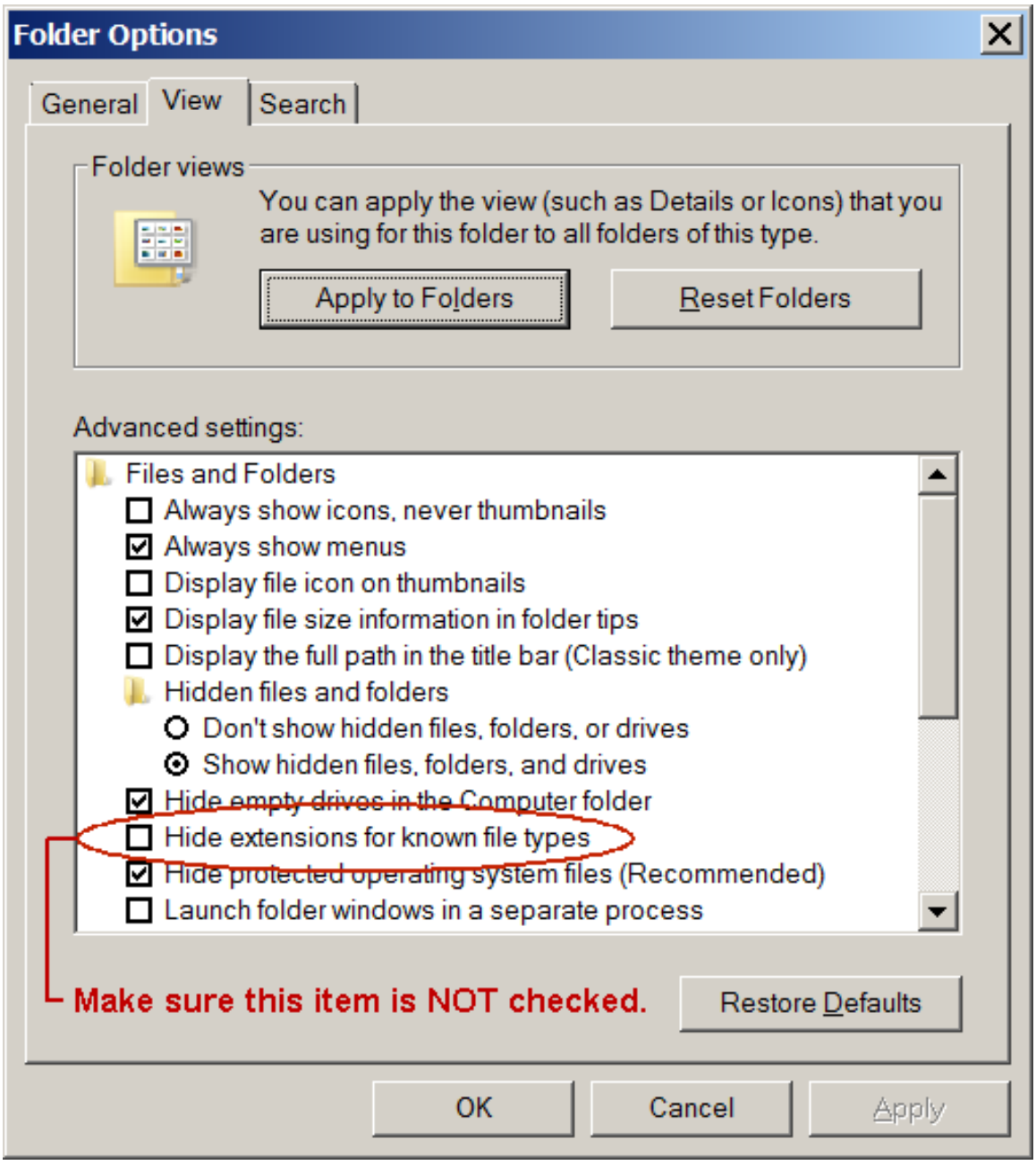
Windows has an option to not display the extensions of some files. This makes it hard to distinguish files with the same names but different extensions. **Be sure that the file extension display is enabled.**

The following images show the dialogs related to setting this option that appear in Win 7. The phrase **"Hide extensions for known file types"** is used in other versions of windows too. Make sure this option is not checked.

The following pictures will help you locate the file extension option.


Manual
Computer
File Edit View Tools Help
Organize
Include in library
Cut
Copy
Paste
Undo
Redo
Select all
Layout
Folder and search options
Delete
Rename
Remove properties
Properties
Close


Folder Options
General
View
Search
Browse folders
Open each folder in the same window
Open each folder in its own window
Click items as follows
Single-click to open an item (point to select)
Underline icon titles consistent with my browser
Underline icon titles only when I point at them
Double-click to open an item (single-click to select)
Navigation pane
Show all folders
Automatically expand to current folder
Restore Defaults
How do I change folder options?
OK
Cancel
Apply


Folder Options
General
View
Search
Folder views
You can apply the view (such as Details or Icons) that you are using for this folder to all folders of this type.
Apply to Folders
Reset Folders
Advanced settings:
Files and Folders
Always show icons, never thumbnails
Always show menus
Display file icon on thumbnails
Display file size information in folder tips
Display the full path in the title bar (Classic theme only)
Hidden files and folders
Don't show hidden files, folders, or drives
Show hidden files, folders, and drives
Hide empty drives in the Computer folder
Hide extensions for known file types
Hide protected operating system files (Recommended)
Launch folder windows in a separate process
Make sure this item is NOT checked.
Restore Defaults
OK
Cancel
Apply