Setting Up a Raspberry Pi for DStar
By Ken (KC) Nicely KE3C
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The components you will need to order to set up your Raspberry Pi Dstar Access Point are listed below with links to where I ordered the items. You may choose to order from your favorite retailers.

- Raspberry Pi Model B Revision 2.0 (512MB) purchase from Amazon
- Edimax EW-7811un 150 Mbps Wireless 11n Nano Size USB Adaptor purchase from Amazon
- SB Raspberri Pi Case purchase from Amazon
- 2 Amp USB Charger with USB to MicroUSB Cord purchase from Amazon
- 8 GB SD Memory Card purchase from Amazon. I suggest you buy two of these right away so you can have a hot backup if one gets corrupted or you mess up on configuration.
- 2 Meter or 70 cm Digital Voice Access Point (DVAP) purchased from Ham Radio Outlet
- Optional Short Mini USB Cable purchase on Ebay. Here is a link for one on Amazon. One of these comes with the DVAP, but it is about 6 feet long.

Once you have all the components, you can download the image of the Raspberry PI operating system with VNC, SSH, and the G4KLX software installed and configured at http://www.westerndstar.co.uk/html/downloads.html

Download File	Description	Base Image	ircDDBGateway	Repeater
D-StarRepeater+ircDDB+VNC	An 'Autostart' Raspberry PI image for D-StarRepeater	Dedbian Wheezy HF 25-05-2013	26-06-2013	02-07-2013
DVAP+ircDDB+VNC	An 'Autostart' Raspberry PI image for DVAP	Dedbian Wheezy HF 09-02-2013	03-05-2013	03-05-2013
GMSK+ircDDB+VNC	An 'Autostart' Raspberry PI image for GMSK modem	Dedbian Wheezy HF 09-02-2013	03-05-2013	03-05-2013
DVRPTR+ircDDB+VNC	An 'Autostart' Raspberry PI image for DVRPTR board	Dedbian Wheezy HF 09-02-2013	05-04-2013	23-03-2013
Win32DiskImager	Disk imaging tool to write an Image to your SD card	------	------	------
FreeLog	A basic but useful and easy to use log program.			

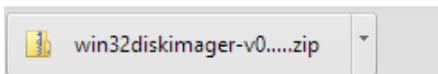Click on the link to download the file to your computer's downloads directory.

Then use this software to burn the image to the SD card.

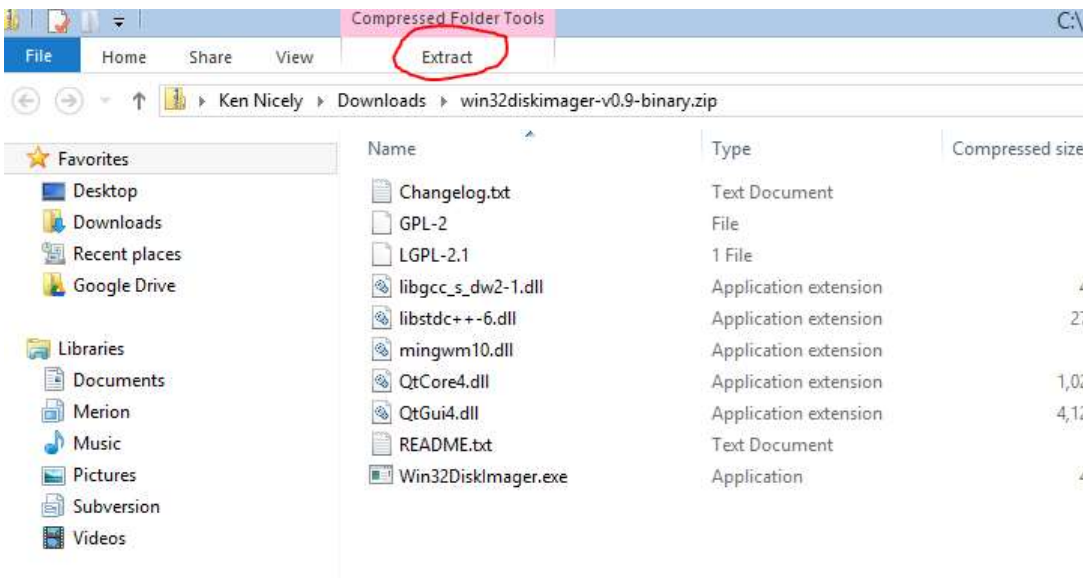http://sourceforge.net/projects/win32diskimager/
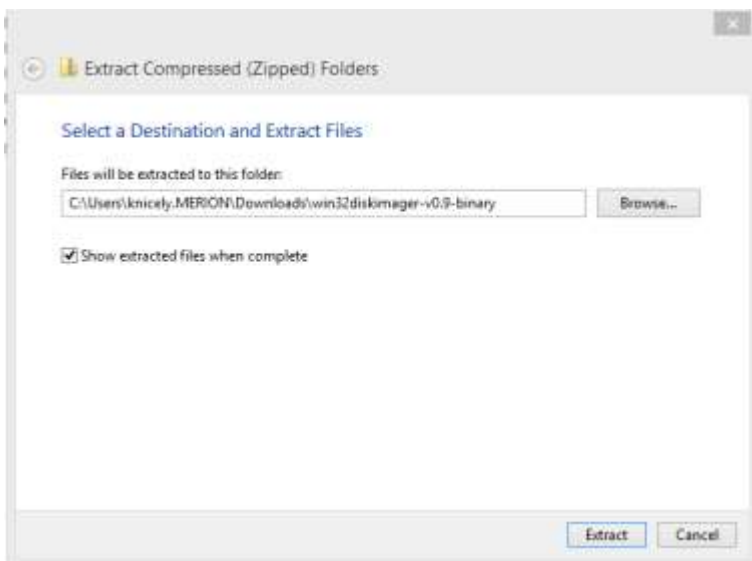
Click the download link.
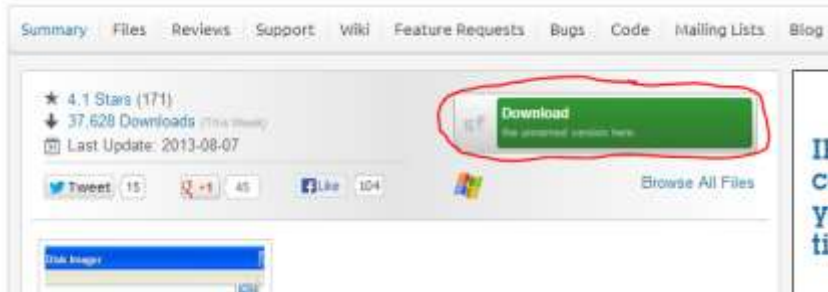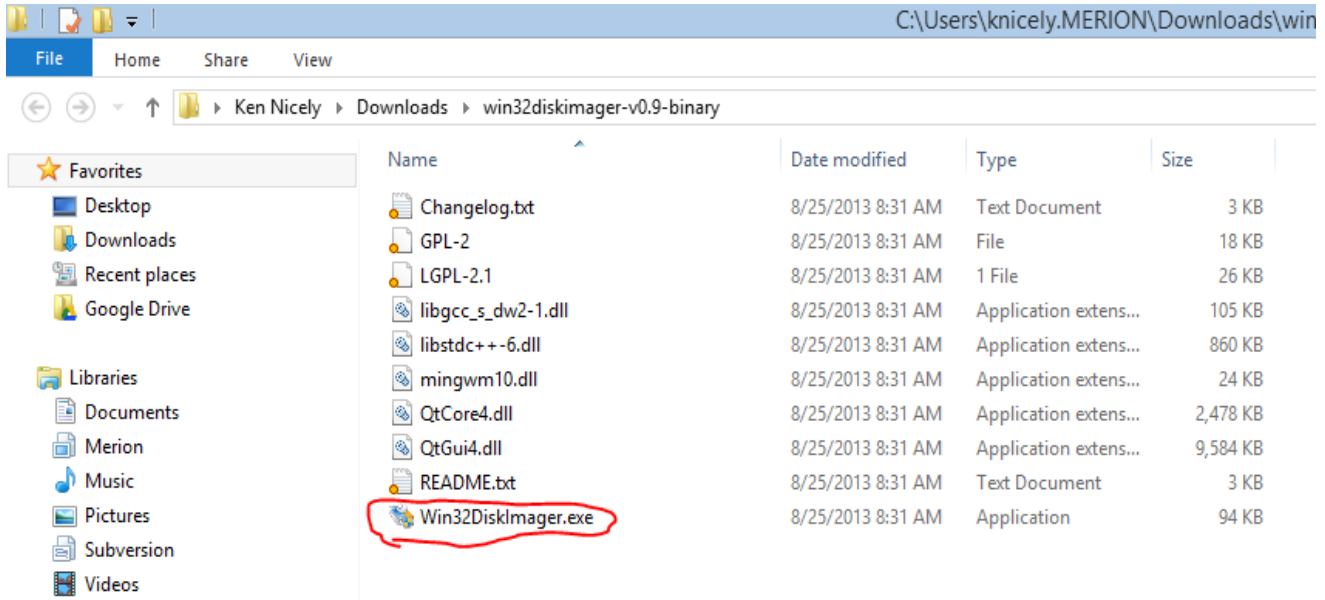

The file will download to your computer.

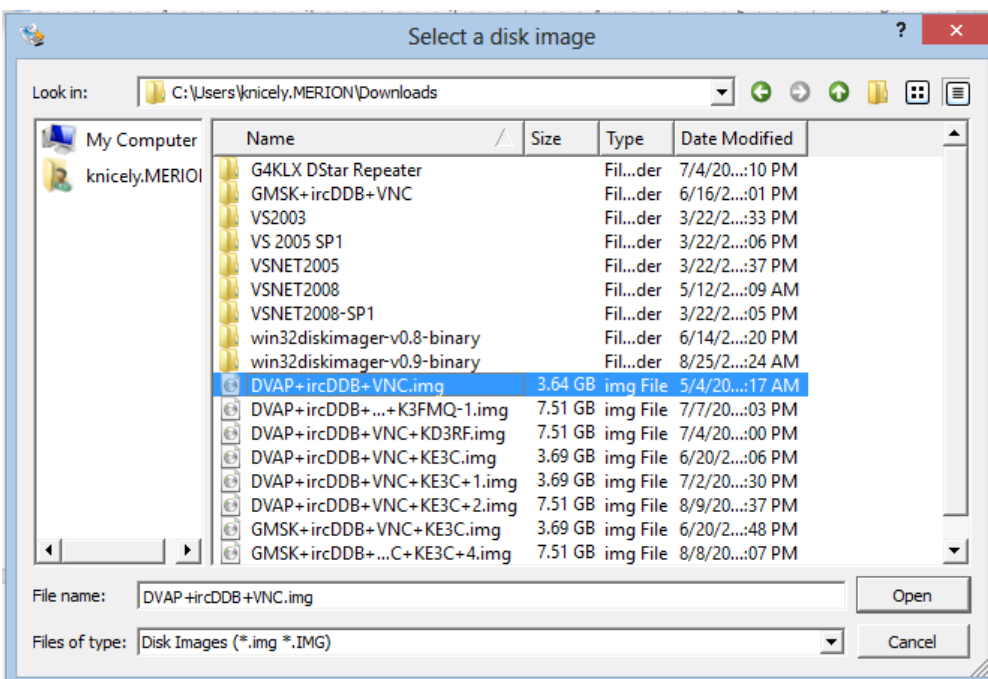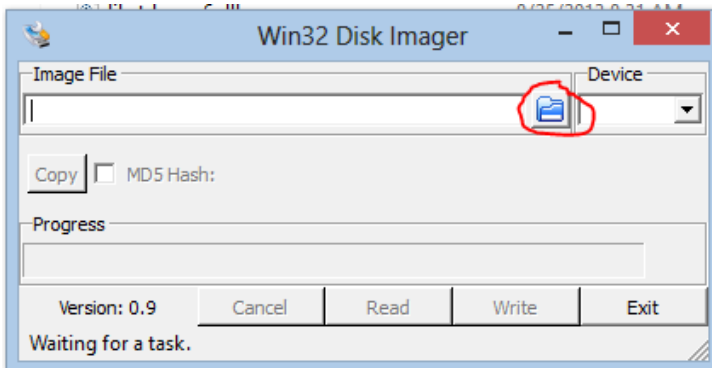Click on the file to open it and then click Extract and then Extract All

Then choose a location to extract the files to. Make sure you select show extracted files when complete.

Then double click on the Win32DiskImager.exe to start the Win32DiskImager application.

C:\Users\knicely.MERION\Downloads\win

| File | Home | Share | View |

Ken Nicely ▸ Downloads ▸ win32diskimager-v0.9-binary

Favorites
- Desktop
- Downloads
- Recent places
- Google Drive

Libraries
- Documents
- Merion
- Music
- Pictures
- Subversion
- Videos

Name	Date modified	Type	Size
Changelog.txt	8/25/2013 8:31 AM	Text Document	3 KB
GPL-2	8/25/2013 8:31 AM	File	18 KB
LGPL-2.1	8/25/2013 8:31 AM	1 File	26 KB
libgcc_s_dw2-1.dll	8/25/2013 8:31 AM	Application extens...	105 KB
libstdc++-6.dll	8/25/2013 8:31 AM	Application extens...	860 KB
mingwm10.dll	8/25/2013 8:31 AM	Application extens...	24 KB
QtCore4.dll	8/25/2013 8:31 AM	Application extens...	2,478 KB
QtGui4.dll	8/25/2013 8:31 AM	Application extens...	9,584 KB
README.txt	8/25/2013 8:31 AM	Text Document	3 KB
Win32DiskImager.exe	8/25/2013 8:31 AM	Application	94 KB

Click on the folder icon and select the WesternDStar image that you downloaded earlier from your downloads folder.

Win32 Disk Imager

Image File

Device

Copy ☐ MD5 Hash:

Progress

Version: 0.9   Cancel   Read   Write   Exit

Waiting for a task.

Select a disk image

Look in: C:\Users\knicely.MERION\Downloads

My Computer
knicely.MERIOI

Name	Size	Type	Date Modified
G4KLX DStar Repeater		Fil...der	7/4/20...:10 PM
GMSK+ircDDB+VNC		Fil...der	6/16/2...:01 PM
VS2003		Fil...der	3/22/2...:33 PM
VS 2005 SP1		Fil...der	3/22/2...:06 PM
VSNET2005		Fil...der	3/22/2...:37 PM
VSNET2008		Fil...der	5/12/2...:09 AM
VSNET2008-SP1		Fil...der	3/22/2...:05 PM
win32diskimager-v0.8-binary		Fil...der	6/14/2...:20 PM
win32diskimager-v0.9-binary		Fil...der	8/25/2...:24 AM
DVAP+ircDDB+VNC.img	3.64 GB	img File	5/4/20...:17 AM
DVAP+ircDDB+...+K3FMQ-1.img	7.51 GB	img File	7/7/20...:03 PM
DVAP+ircDDB+VNC+KD3RF.img	7.51 GB	img File	7/4/20...:00 PM
DVAP+ircDDB+VNC+KE3C.img	3.69 GB	img File	6/20/2...:06 PM
DVAP+ircDDB+VNC+KE3C+1.img	3.69 GB	img File	7/2/20...:30 PM
DVAP+ircDDB+VNC+KE3C+2.img	7.51 GB	img File	8/9/20...:37 PM
GMSK+ircDDB+VNC+KE3C.img	3.69 GB	img File	6/20/2...:48 PM
GMSK+ircDDB+...C+KE3C+4.img	7.51 GB	img File	8/8/20...:07 PM

File name: DVAP+ircDDB+VNC.img   Open

Files of type: Disk Images (*.img *.IMG)   Cancel

Insert your Raspberry Pi SD Card in your computer's SD Card slot and select the drive letter corresponding to the SD Card.
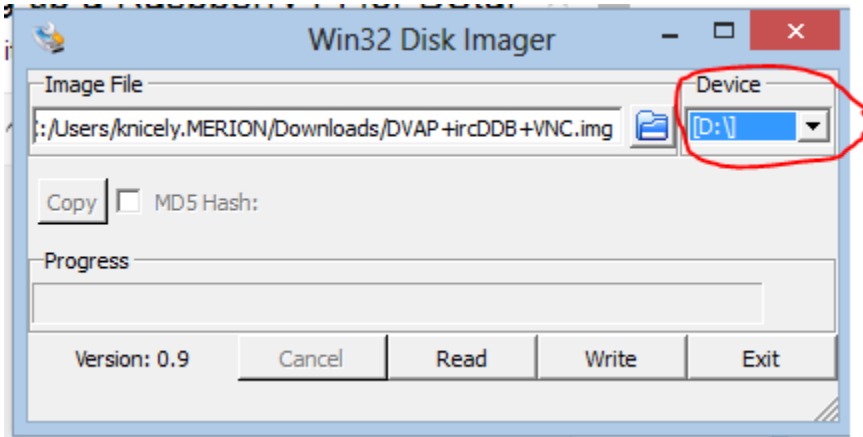
Once you have the correct drive selected click the Write button. This will write the Western DStar image to the SD Card. You will receive a warning as follows. If you are sure you have the correct drive letter for your SD Card, click Yes and the software will begin writing the image to your card.
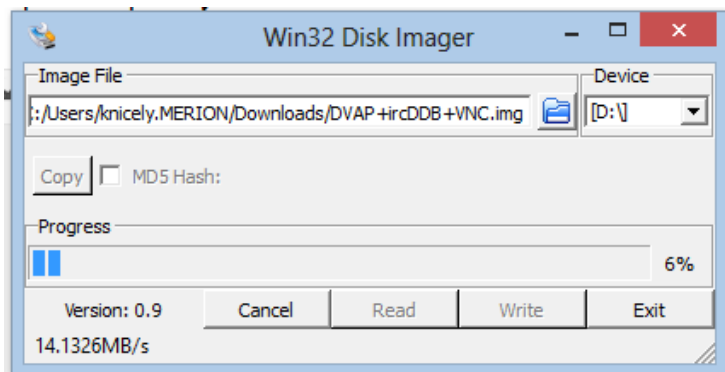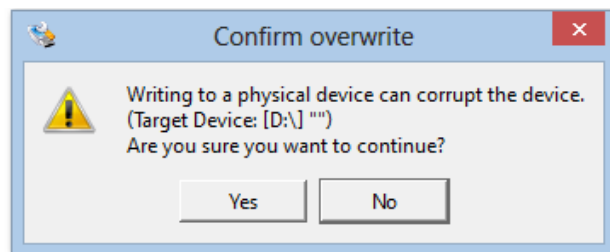
The WinDisk32Imager software will prompt you when image is successfully written and you can then remove the SD Card from your computer and insert it into the Raspberry Pi. Make sure the Raspberry Pi is powered down when inserting or removing the SD card.
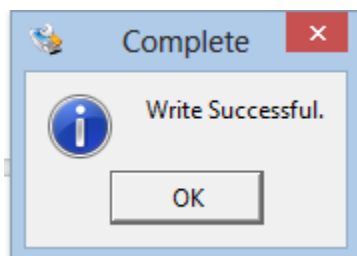
Next plug in the dvap and wireless card into the pi.

For the initial setup you will have to connect the Raspberry Pi directly to a wired network connection using a standard network cable. Plug the network cable into the Raspberry Pi and into your home network.

Plug the Micro USB cord into the USB power adapter and the Raspberry Pi and plug in the power adaptor. The Raspberry Pi red power indicator should light up and you should see yellow and green flashing lights on the Raspberry Pi indicating that you have network connectivity. The DVAP should start out with a slow flashing green and after 10 to 15 seconds should switch to a slow flashing blue.

Use your router to figure out the IP Address that has been assigned to the pi. Usually the router has a place where it lists the clients that are connected. This is different for every router, so I am not providing instructions here.

Once you know the IP Address, connect to the Pi via VNC using TightVNC on your windows computer. You can get tight VNC here... http://www.tightvnc.com/

Fire up the TightVNC Viewer, not the server, and then put in the ip address of the Pi to connect.
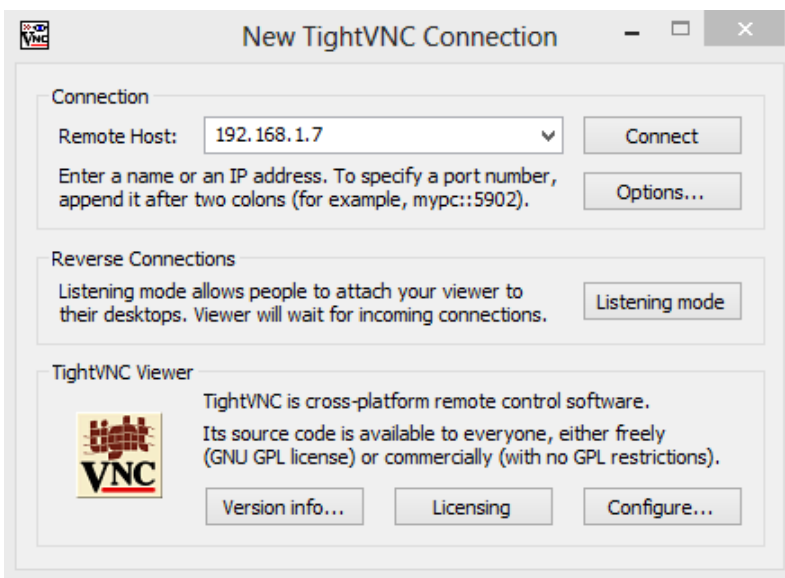
After connecting to the Raspberry Pi via VNC using the TightVNC client you will see a screen that looks like the one below with the ircDDB Gateway and the DVAP Node running.
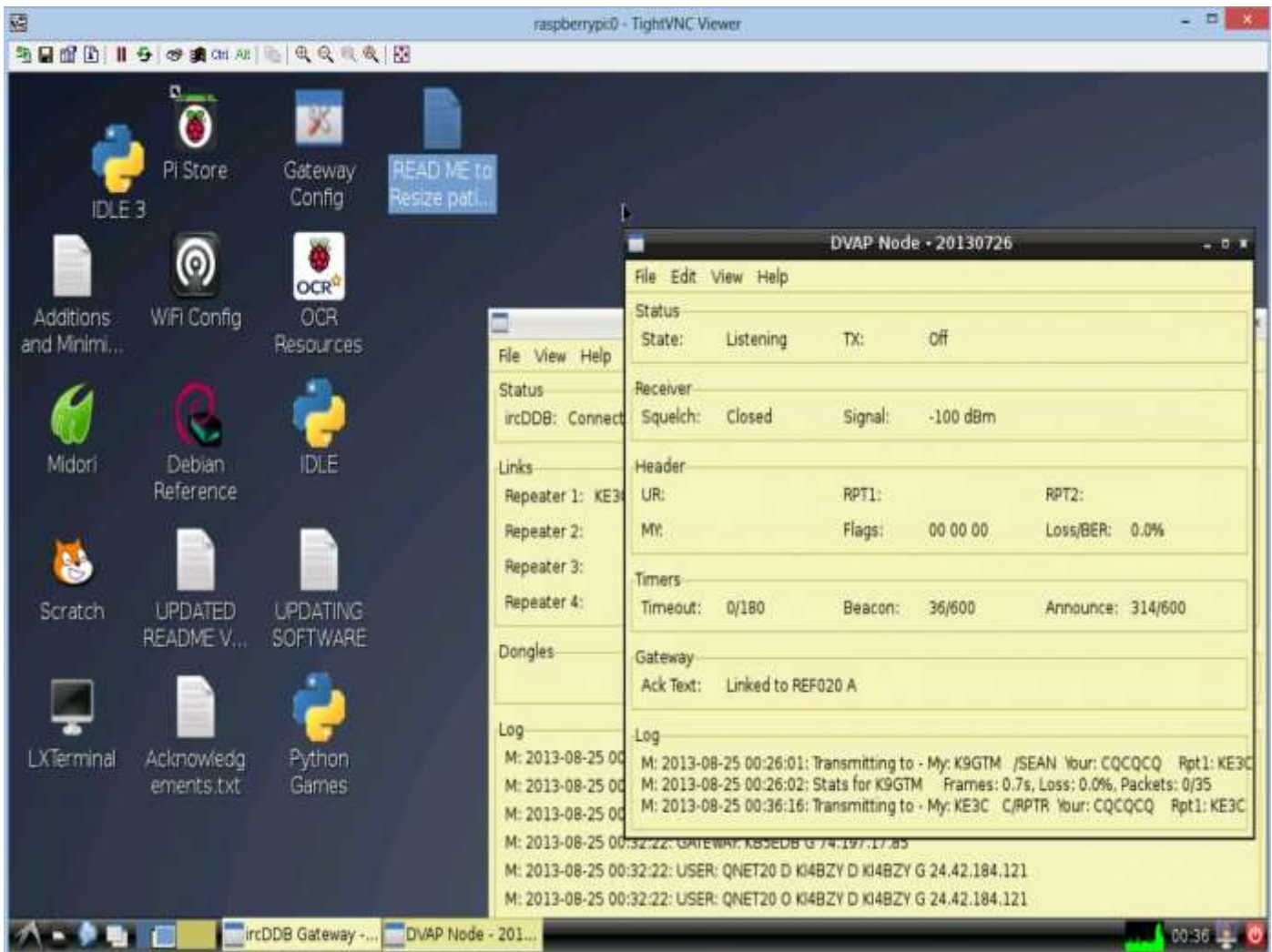
Double click on the Gateway Config.

Under the Gateway tab, enter your Callsign, QTH and URL (if you have one).
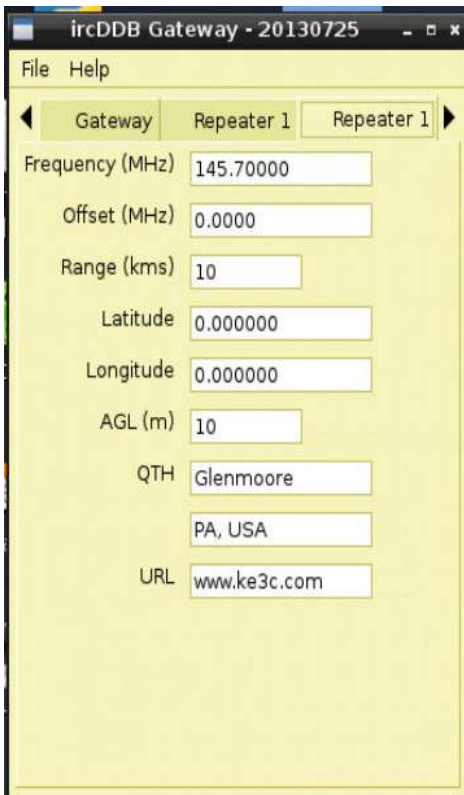
In the Repeater 1 tab select the band. Select B for if you have a 440 mhz (70 cm) DVAP and C if you have a 144 mhz (2 meter) DVAP. You can also select a reflector for the DVAP to connect to on startup. I have mine set to connect to reflector 20A.
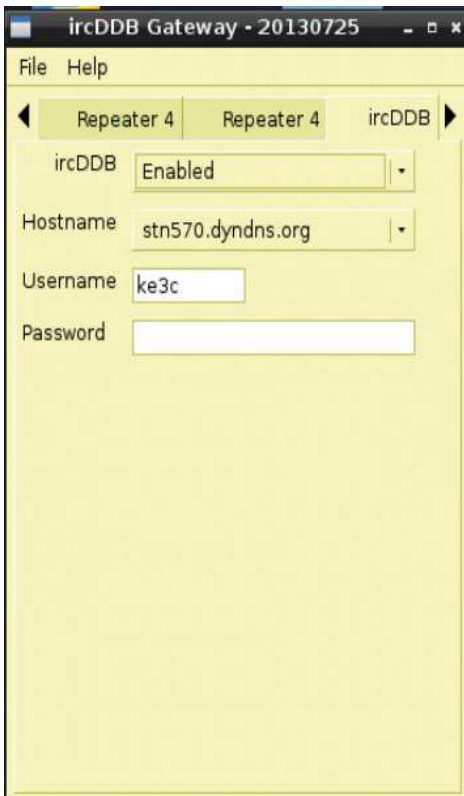
In the second Repeater 1 tab select the simplex frequency you plan to use for the DVAP. This can be any simplex frequency in the band except the simplex calling frequency. Set the offset to 0.000 and optionally set the range, latitude, longitude, QTH and URL.

Skip the Repeater 2, 3 and 4 tabs and move directly to the ircDDB tab. It is not necessary to set the ircDDB settings. I like to set my settings as follows. This allows call sign routing through the Quadnet system stn570.dyndns.org. Your username should just be your call sign. No password is required on Quadnet.

Next we will check the DPRS settings. Set the D-PRS to enabled if your HT or mobile rig has a GPS unit and you want to report your location. Let the other settings set to the defaults.
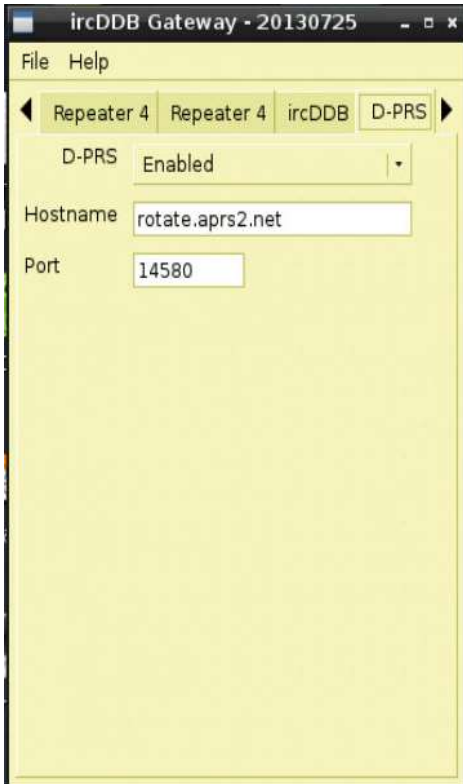

On the DExtra tab, set the DExtra to enabled. This will allow you to connect to the DExtra (XREF) reflectors.
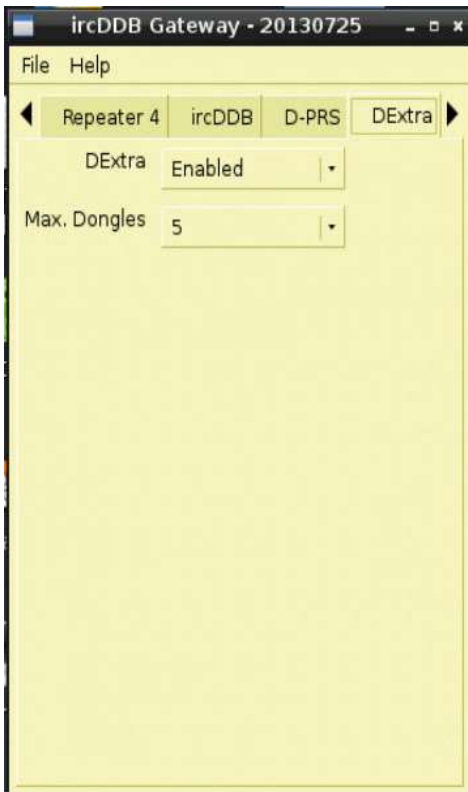
Set the DPlus to enabled and enter your callsign in the Login field in all capital letters. The DPlus system is sometimes referred to as the US Trust system. These are the reflectors that begin with REF, such as REF020A. The icom radios like the ID31 an ID51 may be preprogrammed to link to these reflectors.
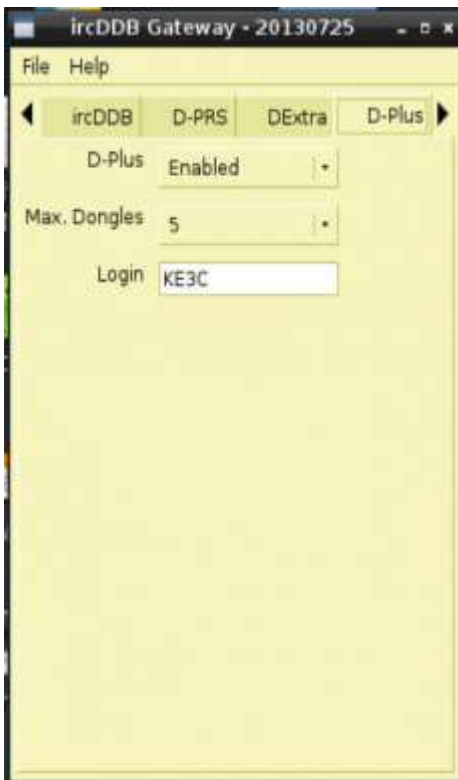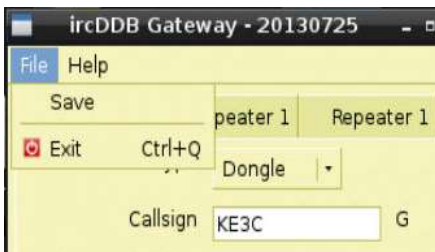

Under the DCS and CCS tab, enable both DCS and CCS and let the Server set to CCS004.
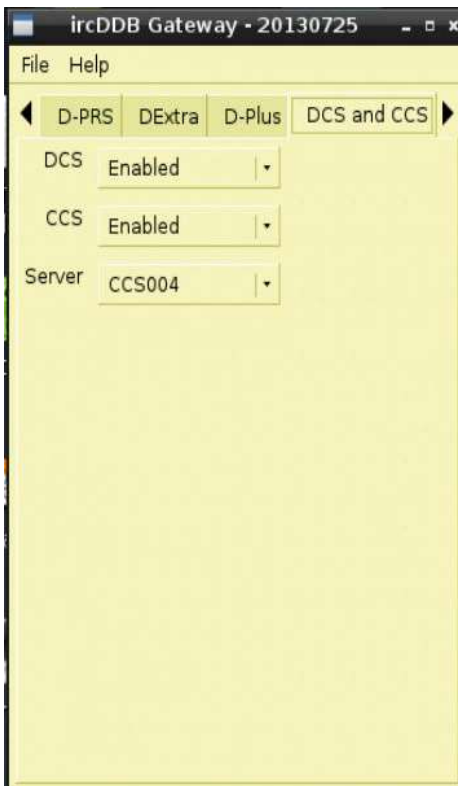
Skip the four Starnet tabs and just let them set to the defaults. In the Misc. tab set the language to English (US) and enable everything else.
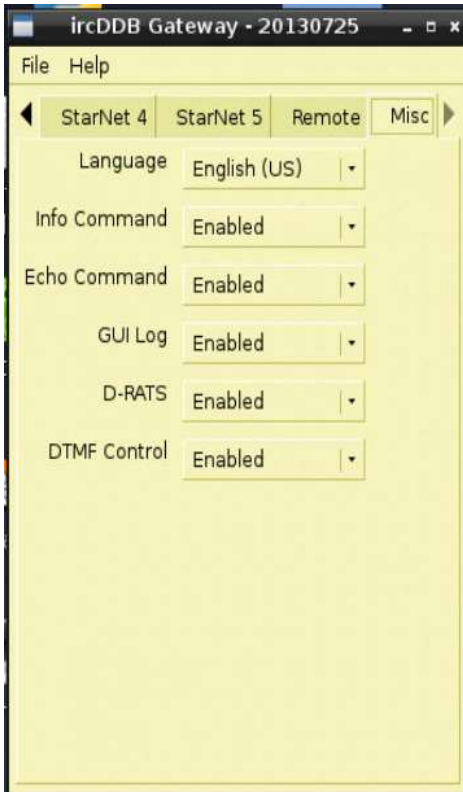

Select File and Save.

You will get a dialog that tells you that the settings will not take effect until you restart the Gateway. We will be restarting the Raspberry Pi at the end of this process so you can just select OK and ignore the message for now.
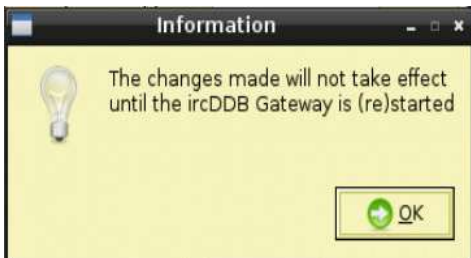
Next we will configure the DVAP Node. Click on the DVAP node screen and then select Edit and Preferences.

In the Callsign Tab, enter your callsign in the callsign field and select B if you have a 440 mhz (70 cm) DVAP and C if you have a 140 mhz (2 meter) DVAP. Enter your callsign again in the gateway field. Set the Mode to Simplex, the Ack to Status, the Restrict and RPT1 Validation to off.
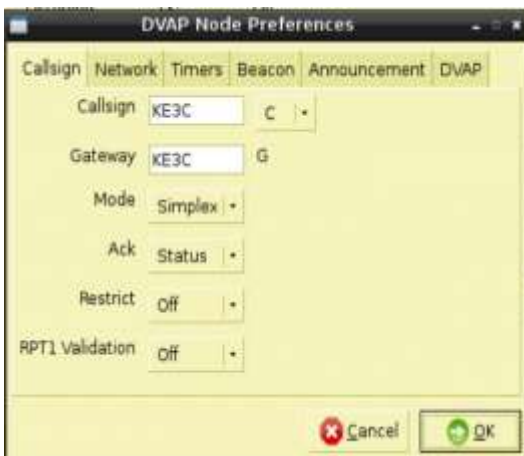

Let the Beacon and Announcements set to the default for now.

Set the Band in the DVAP tab to either 2 meters or 70 cm based on the type of DVAP you have. Set the frequency to the same simplex frequency you set when you were configuring the ircDDB Gateway. This can be any simplex frequency except the call frequency.
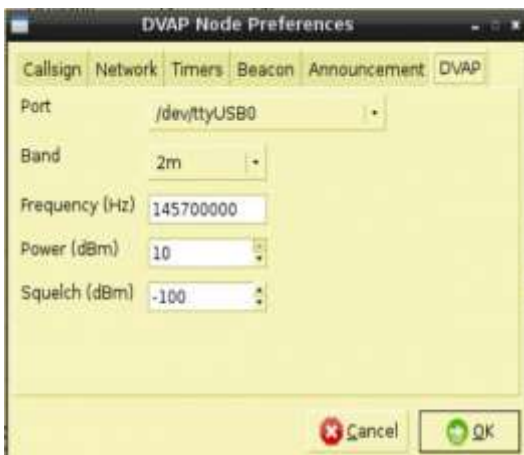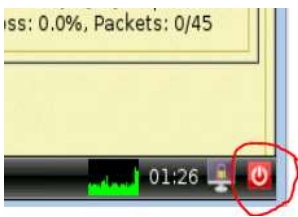
Click OK and you will get a message telling you that you need to restart the DVAP Node before the settings will take effect.
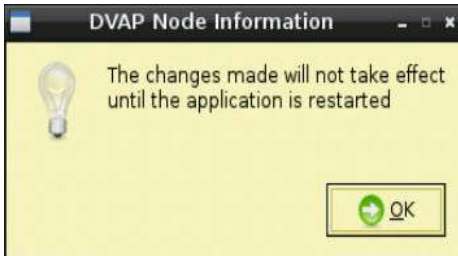
Click OK.

Go to the lower right hand corner of the screen and click on the shutdown button.

A message will be displayed as shown.

Click Reboot. This will restart the Raspberry Pi and disconnect your VNC session.

Tune your radio to the simplex frequency you configured. If all goes well your Raspberry Pi should be ready to go once it restarts.

Try keying up your radio on the simplex frequency with no offset and with the radio set in DV mode. You should hear a dink from the G4KLX DVAP Node software. If that works, try and Echo test by setting the UR field to "#######E" and transmitting a short voice message. If all goes well you should hear your voice repeated back to you. Next try to link to reflector 20A by setting the UR Field to "REF020AL". If all goes well you should see a scrolling message at the bottom of the screen telling you that you are connected to REF020A. Next set the UR to "CQCQCQ" and see if you can get someone to answer. If that works, you are good to go and you have your Raspberry Pi all set up.

There is just one last thing we need to do to complete the installation. We need to set up the wireless network connection.
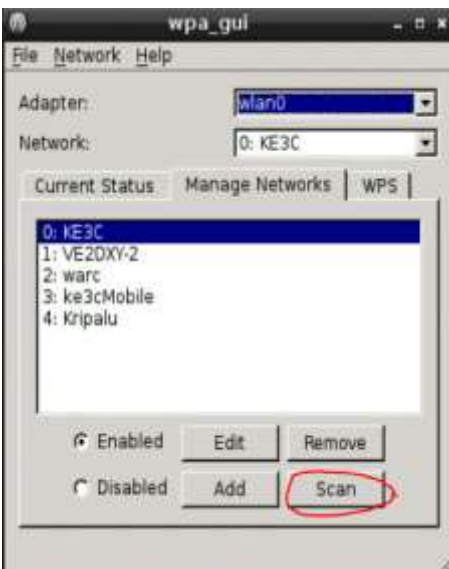
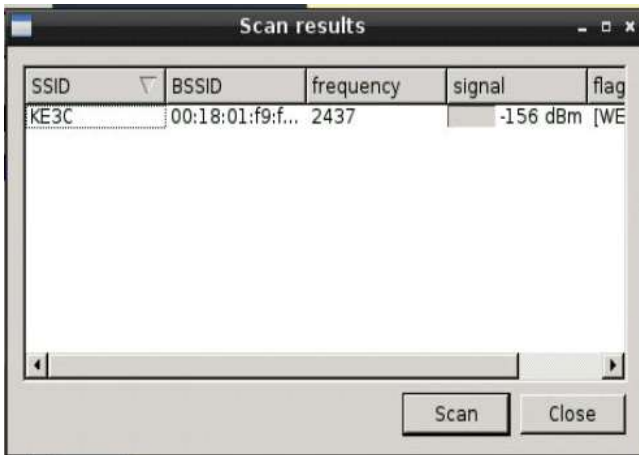Switch to the VNC window and double click on the WiFi Config Icon.

After a few seconds you will see a screen that looks like this one.
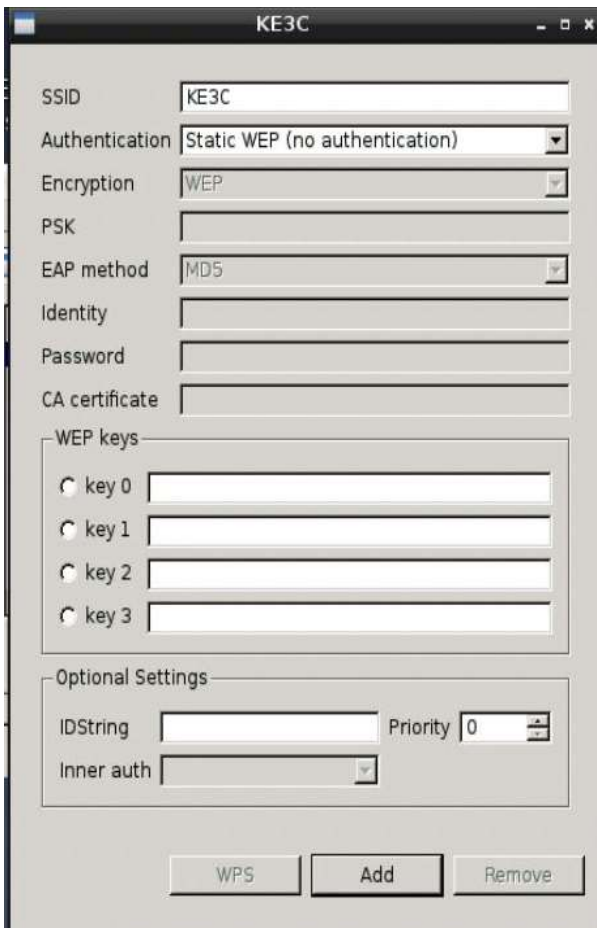

Click on the Manage Networks tab and click on the Scan button.

You should see a dialog that looks like the following. Find your wireless network and double click on it.

SSID ▽	BSSID	frequency	signal	flag
KE3C	00:18:01:f9:f...	2437	-156 dBm	[WE

Scan results

Scan   Close

Select the Authentication type and keys for your wireless network and then click the add button. You need to know the authentication and settings and keys for your network, so I am not providing them here. My network is KE3C.

KE3C

SSID	KE3C
Authentication	Static WEP (no authentication)
Encryption	WEP
PSK	
EAP method	MD5
Identity	
Password	
CA certificate	

WEP keys
- key 0
- key 1
- key 2
- key 3

Optional Settings

IDString   Priority 0
Inner auth

WPS   Add   Remove

Once you have added the correct settings, click close button on the scan results dialog and switch to the current status tab. You should see an IP address for your wireless in the current setting if you have been successful.
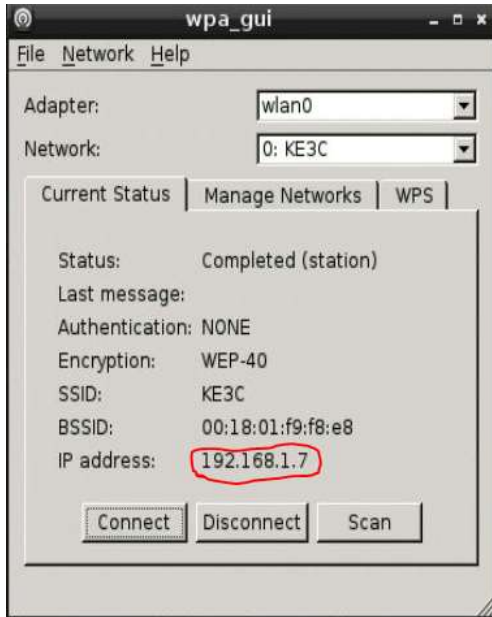
You can now restart your Raspberry Pi without the network cable and test the connectivity using your radio.

Give me a call on 20A and let me know that everything worked out well!