RASPBERRY PI 2,3,4 ALLSTARLINK + DVSWITCH SERVER INSTALLATION GUIDE.

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Thanks to Dave G0KBM
Special thanks go out to
Dave WB3JSW
And Ken M1DYP

Contents

Flashing the ASL image

For all operating systems, we recommend downloading and installing balenaEtcher. It's available for macOS, Windows, and Linux. If you're flashing for RaspberryPi, an SD card reader is required.

Download balenaEtcher

USB Thumbdrive (PC/Pi4)

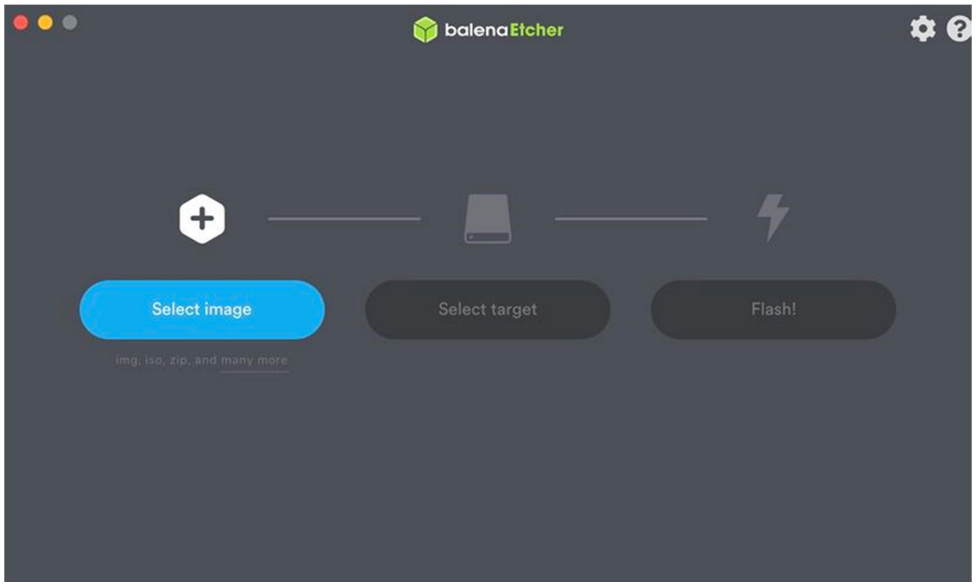
1. Follow the directions below, but use a USB thumbdrive instead.

SD Card (Pi2-Pi4)

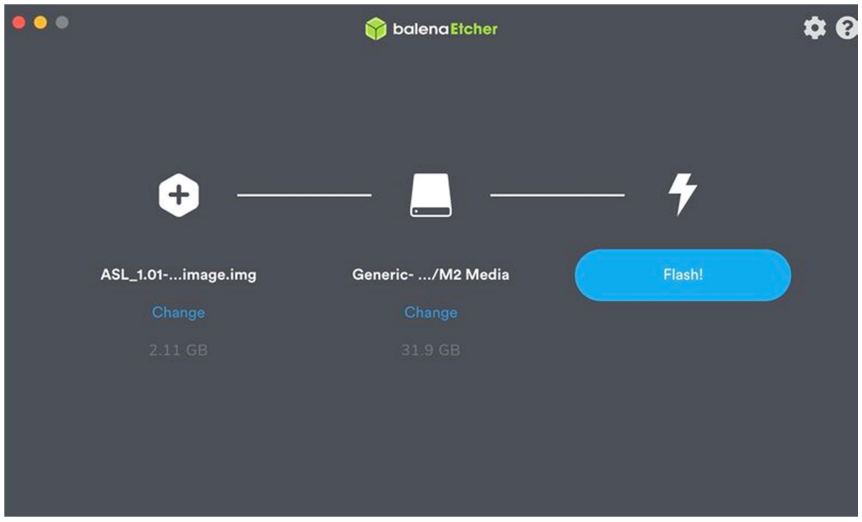
1. Open balenaEtcher

2. Insert your SD card into your SD card reader

3. Press "Select Image" and locate the downloaded image (e.g. asl-2.0.0-beta.6-kc1kcc-20210324-rpi-armhf.img)



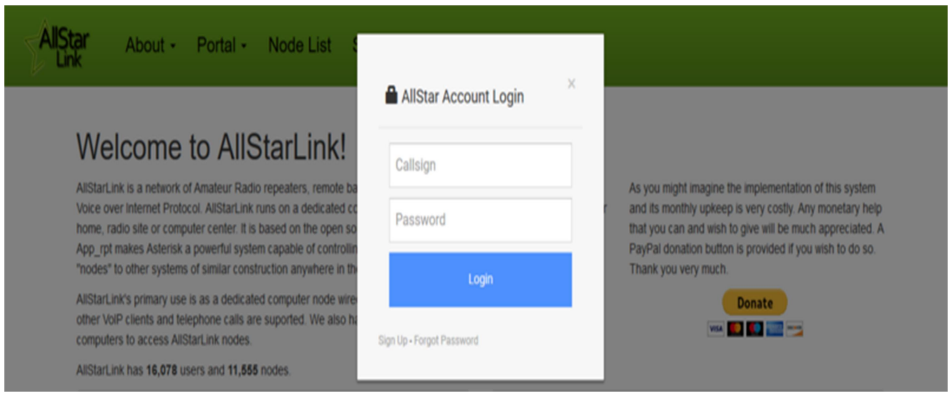
4. If your SD card is ready to flash, you can simply press the "Flash!" button:



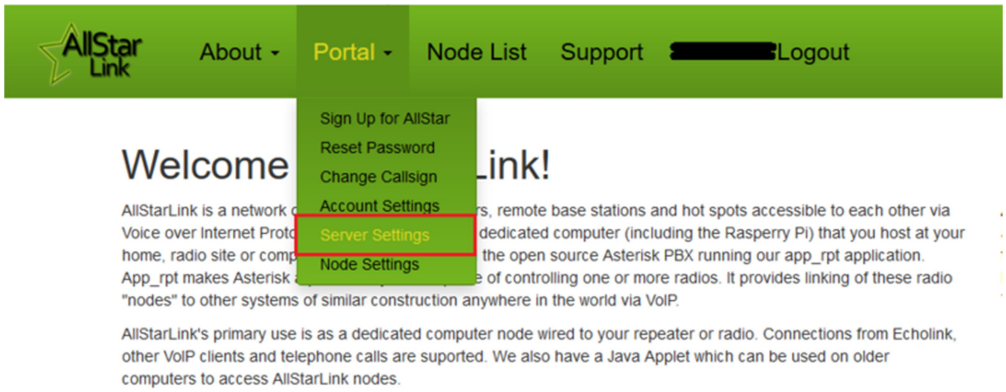
5. Insert your SD card into your Raspberry Pi and boot it up!

Login & Create a Server

Once your account is verified, login to your account at https://www.allstarlink.org/



You will need to create a "server" : Click on **<Portal>** then **<Server Settings>**.

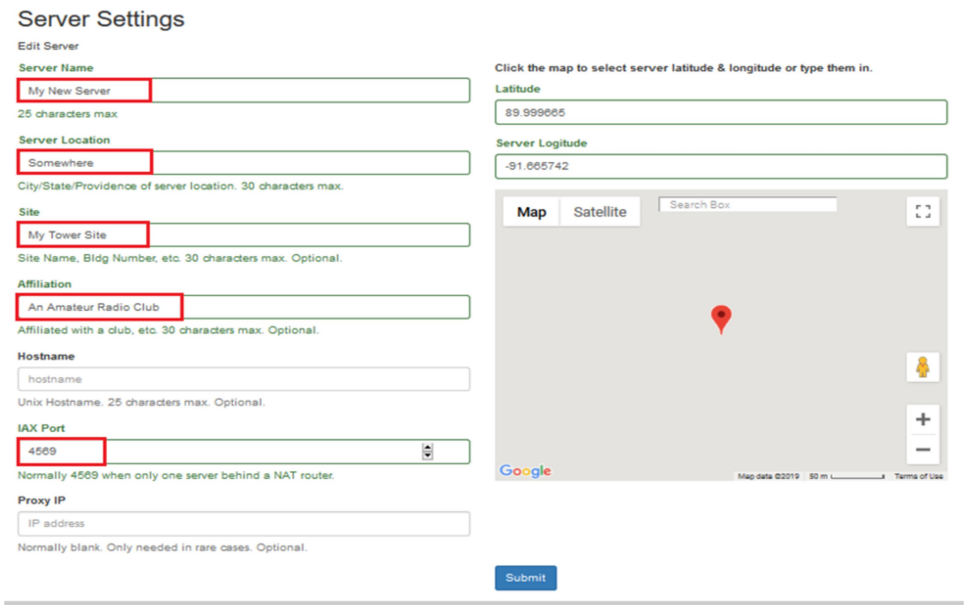


Click on **<Add a new server>**.

Please take the time to read the instructions on each page.

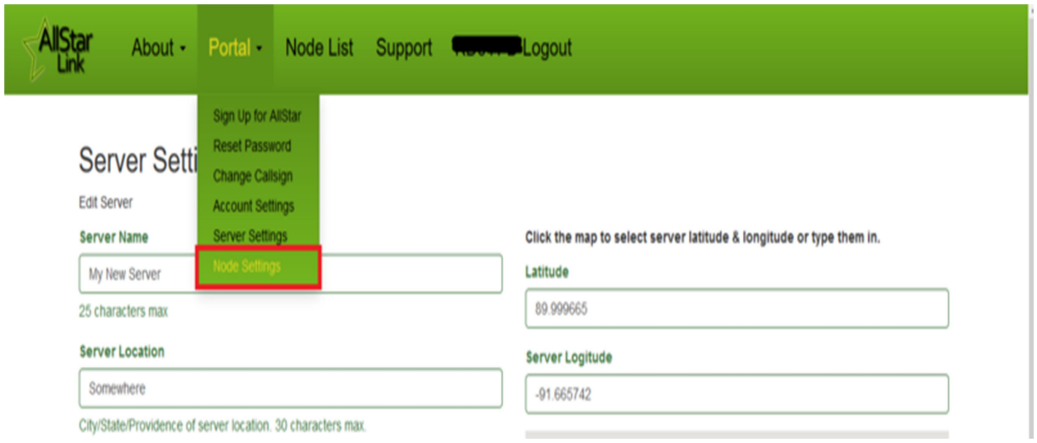
Then click **<Proceed with Server Setup>** if needed.

Fill in all of the information and click **<Submit>** at the bottom of the page.

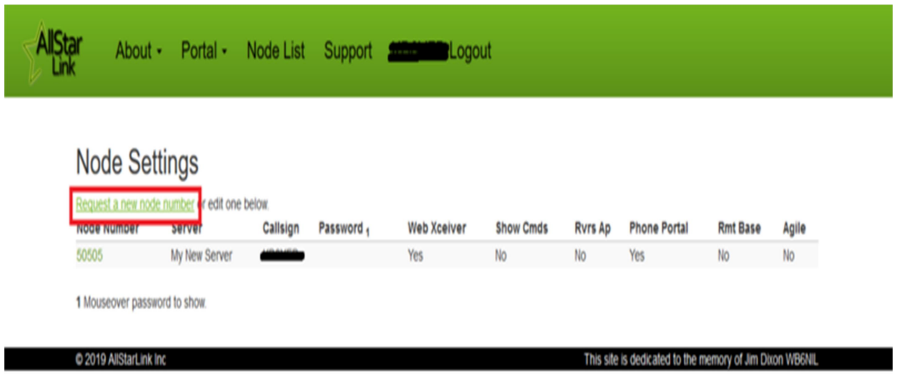


Request a Node number

At the top of the page, click **<Portal>** and then on **<Node Settings>**.



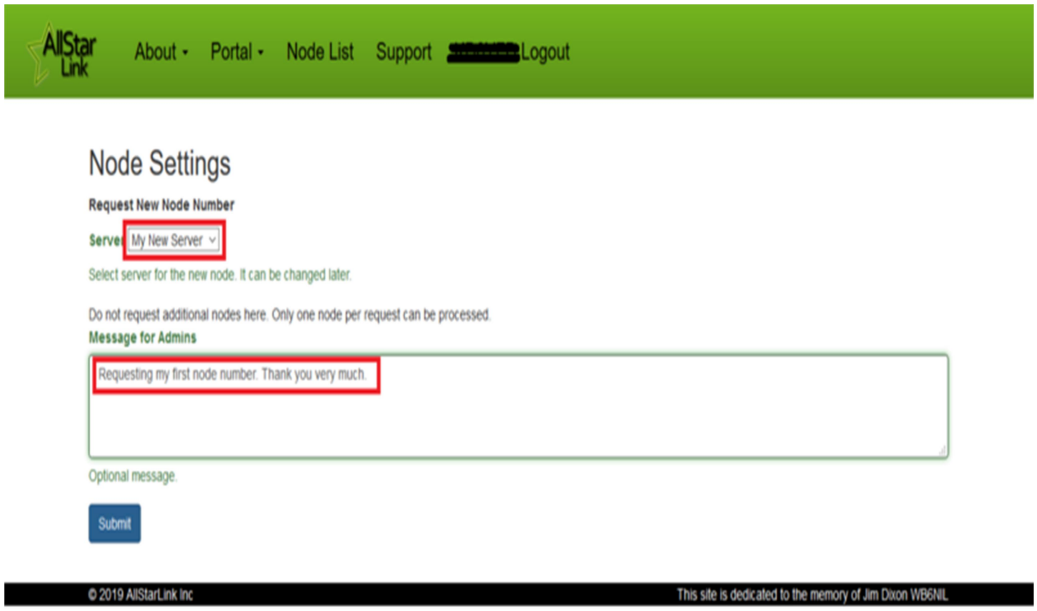
Then click **<Request a new node number>**.



Select which server you would wish to have a node number assigned to

if you need more than one node number for the same server, repeat this process

A comment of 'additional node on same server' would be appropriate



Your first node will be automatically approved. Subsequent nodes are subject to approval.

Once your node number request(s) are processed you will receive an email.

Edit Node settings

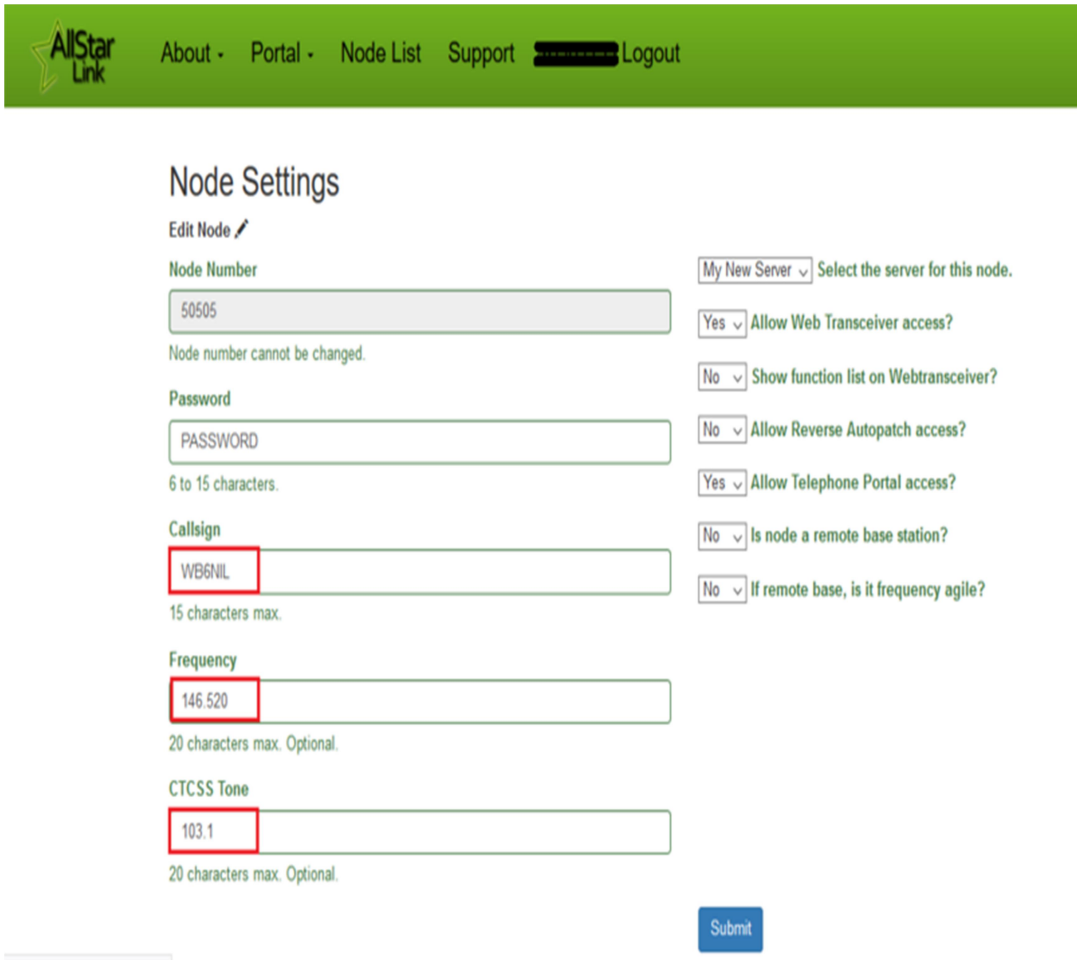
Log into your account on https://allstarlink.org/

Click **<Portal>** then **<Node settings>**.

The AllStarLink node numbers that have been assigned to you are displayed here.

Select which node you wish to view/edit.

Fill in the information for you node and click **<Submit>**.



Write down your node number, password and the call sign you assigned for the node as you will use them to configure your AllStarLink system.

Install and configure ASL to your computer

Consult your owners manual or your favorite internet search engine for how to install an image for your computer system.

Install the AllStarLink disk image to your computer. Insert the appropriate media for your system and boot the computer.

When the login prompt appears enter the user ID of

```
repeater
```

and press **<Enter>**.

Enter the default password of

`allstarlink`

Follow the on screen instructions for the initial password change.

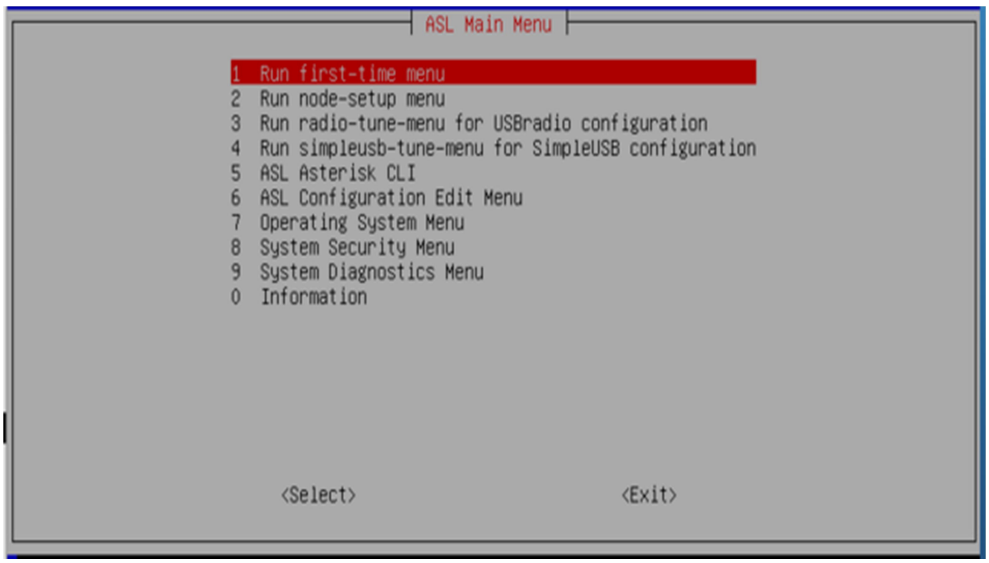
For users familiar with the linux operation system you may proceed to edit the system manually.

For users not familiar with linux and ASL, at the Linux CLI (command line interface)

Type **sudo asl-menu** as the example below shows.

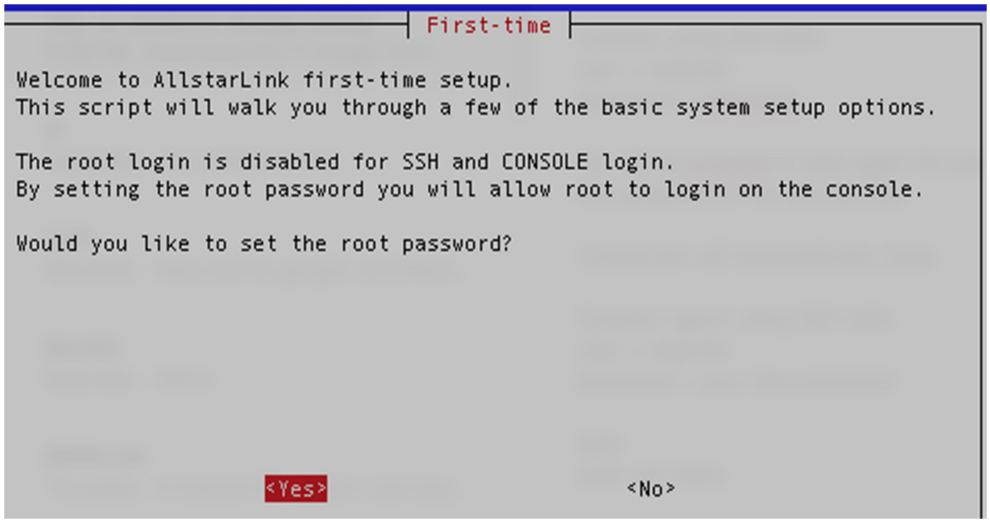
repeater@repeater:~$ sudo asl-menu

This will load the AllStarLink configuration menu.



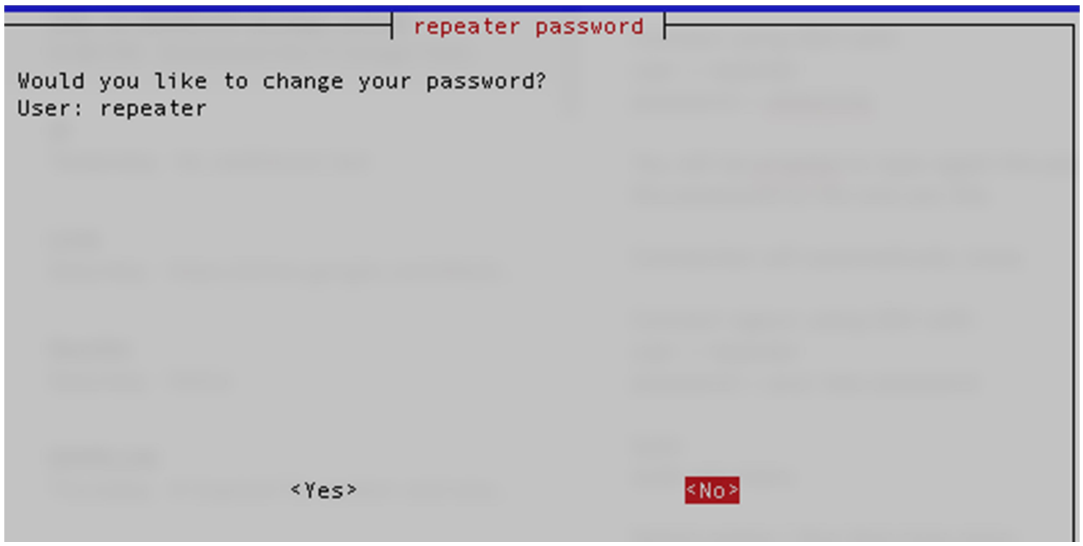
AllStarLink software setup

Choose option **<1>**.

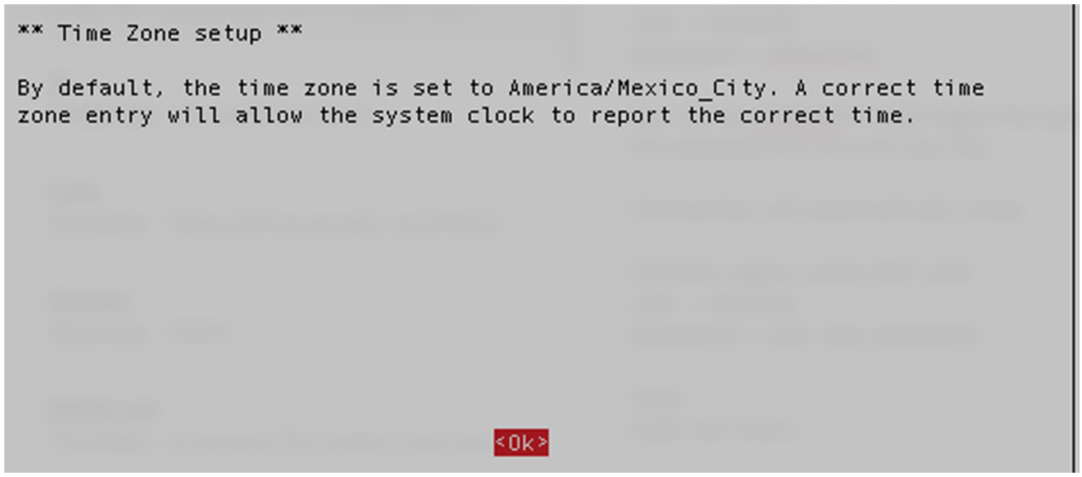


Since it is your first time setup, answer **<No>**.

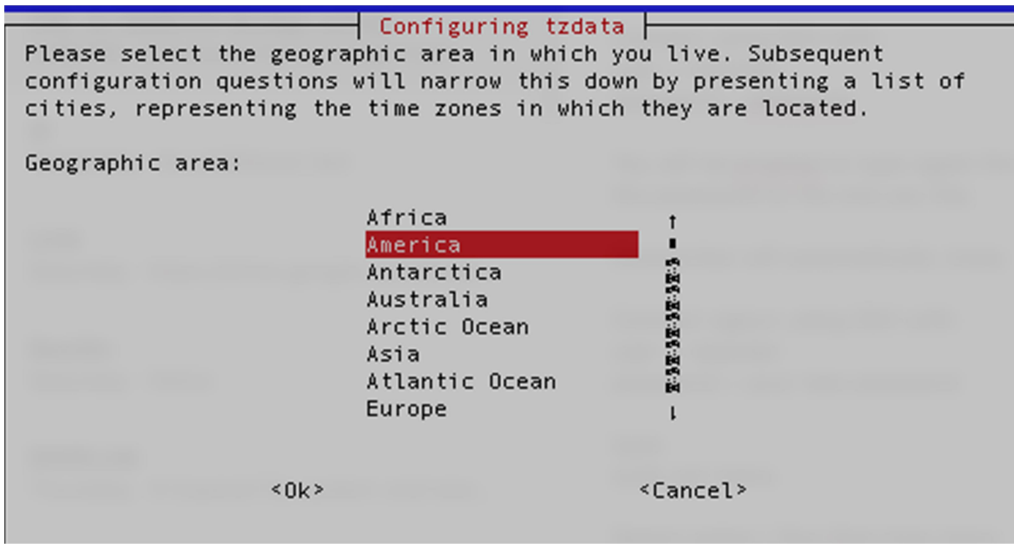
Setup now will ask if you want to change "**repeater**" account password with select answer **<No>**.



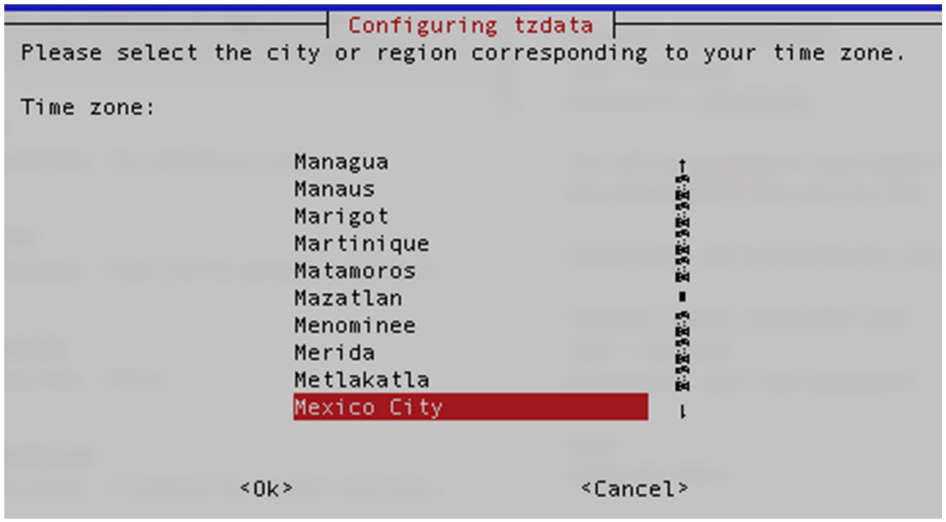
Now lets set time zone **<Ok>**.



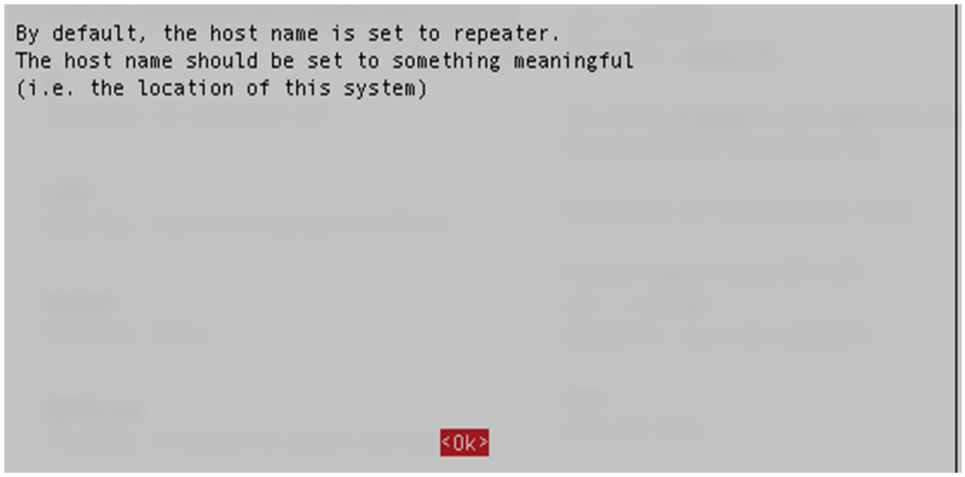
Choose the node's continent Europe.



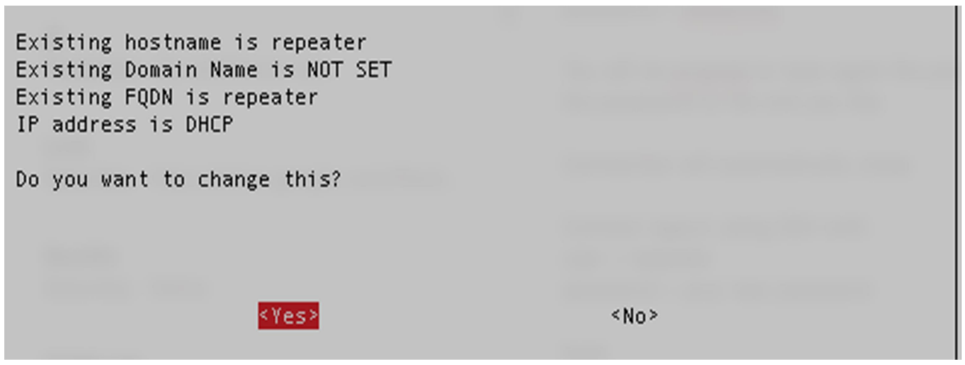
Choose the node's city London.



Next you can change the name of you host name, the default is **repeater**.



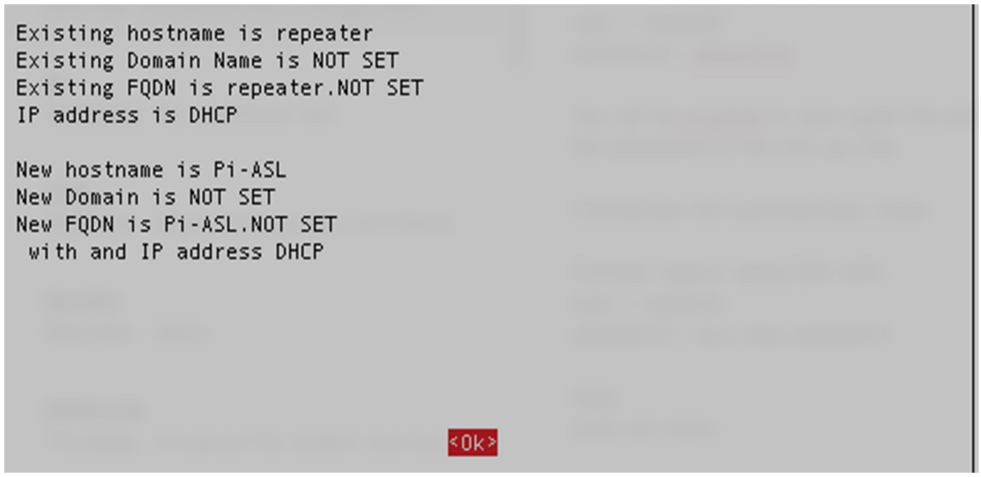
Answer **<Yes>** to be able to make changes.



Type the new host name and hit **<Enter>**.

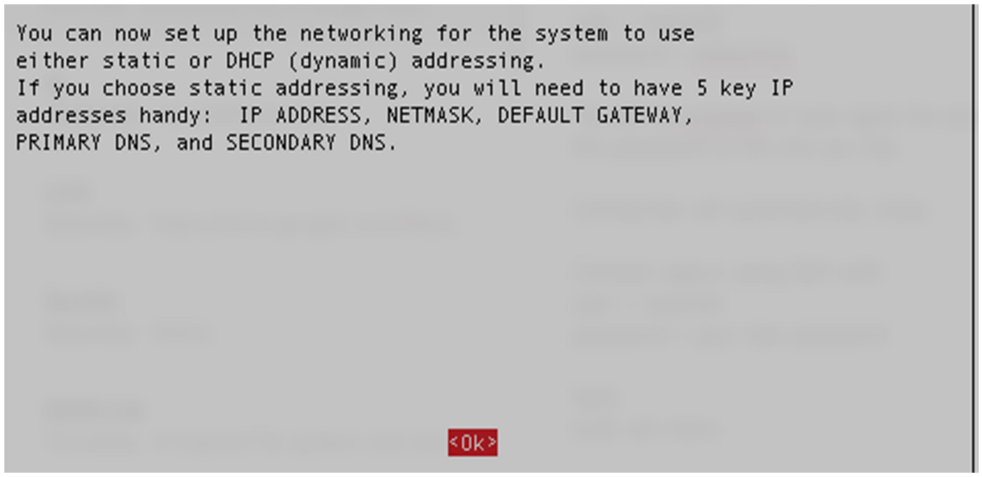
If you want to set up a domain, type it and hit **<Enter>**.

Say **<Ok>** to this message.

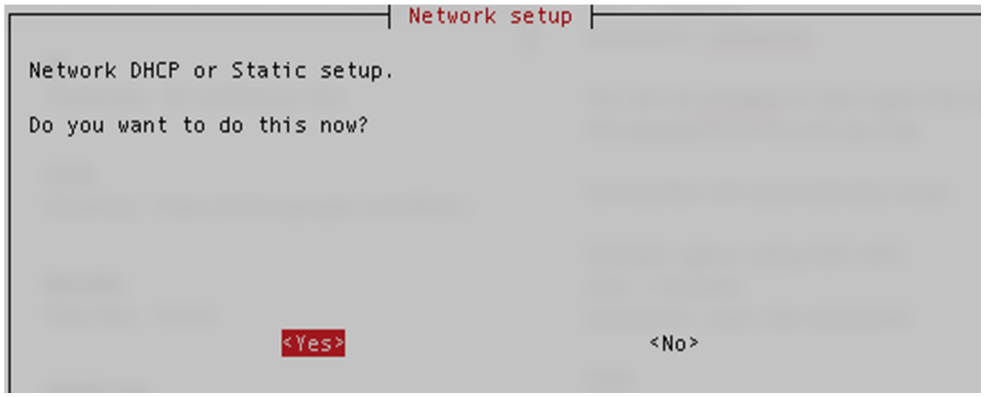


Now you can make your network settings **<Ok>**.

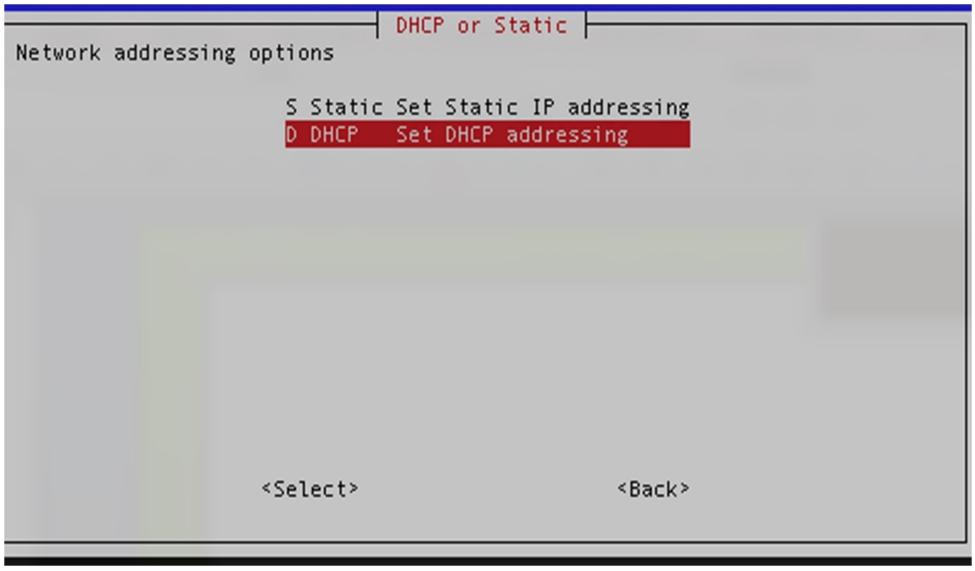
Just say **<Ok>** to this message.



To choose between DHCP or Static IP say **<Yes>**.

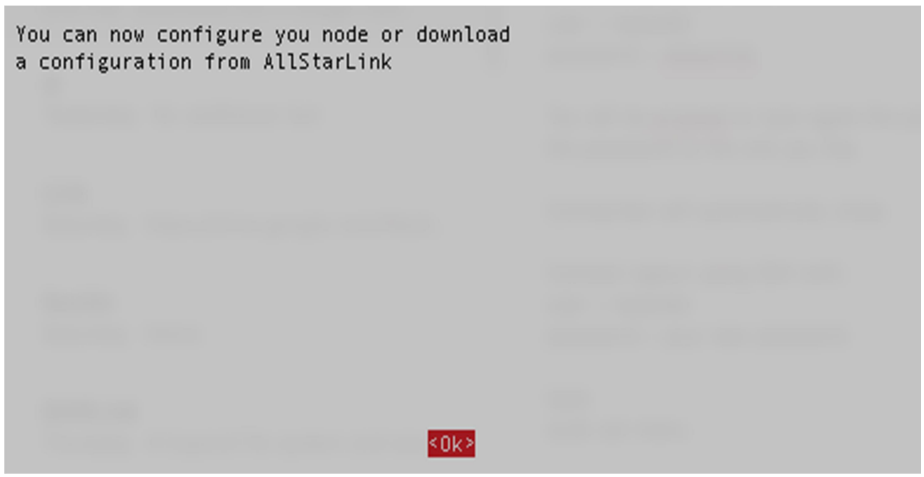


Use **<D>** for DHCP or **<S>**. for Static, if you choose Static, you will be asked to enter it next, for this example DHCP is in use.

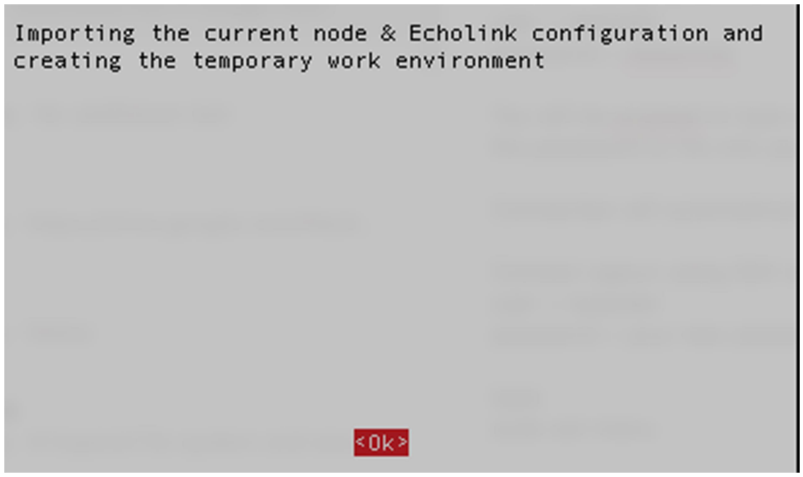


Just say **<Ok>** to this message.

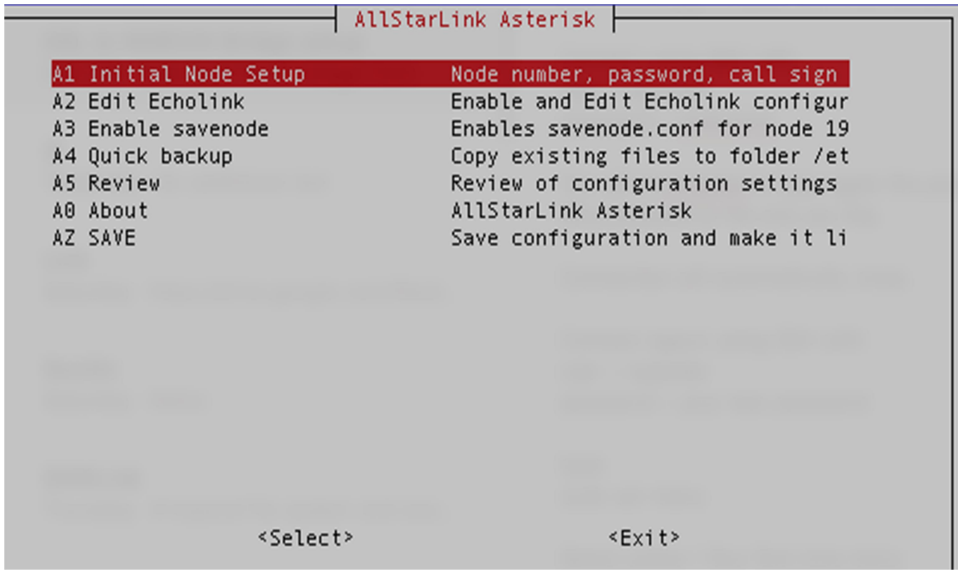
Just say **<Ok>** to this message.



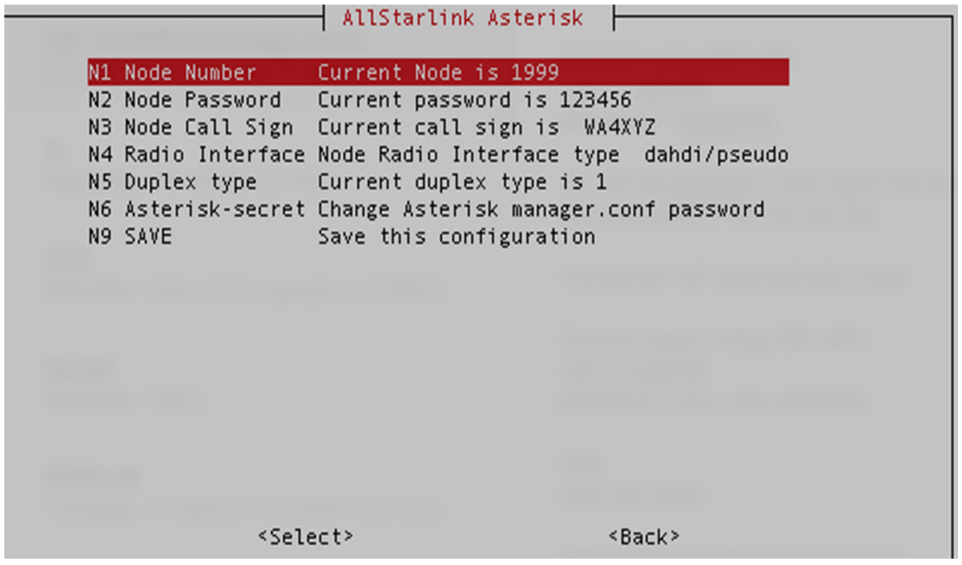
Just say **<Ok>** to this message.


Importing the current node & Echolink configuration and
creating the temporary work environment
<Ok>

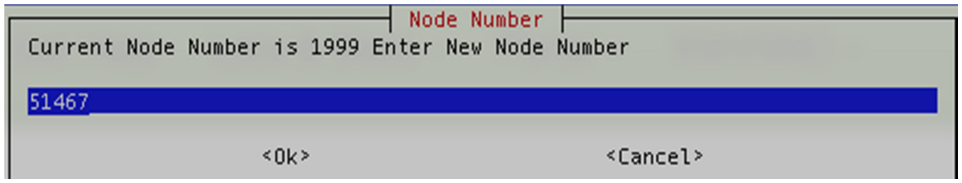
Choose option **<A1>**.



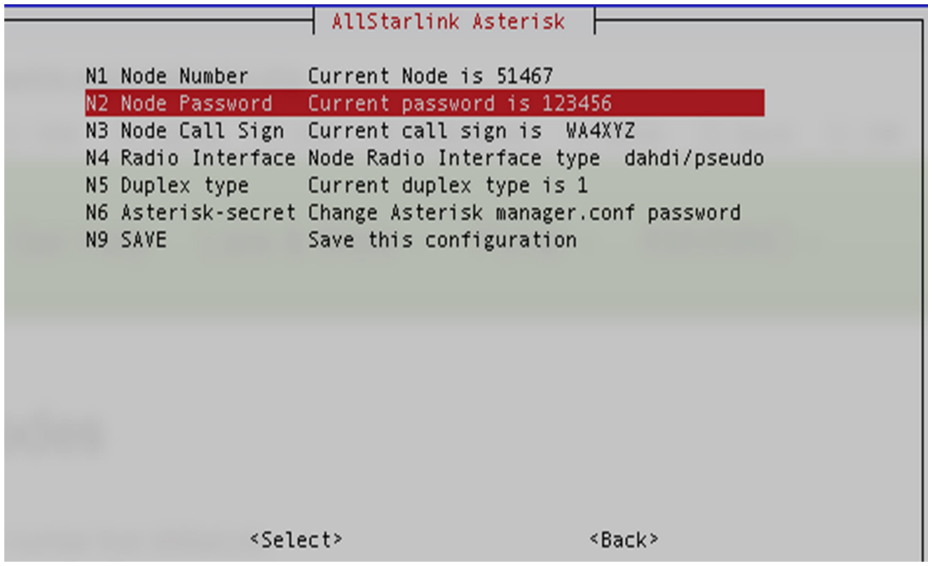
Choose option **<N1>**.



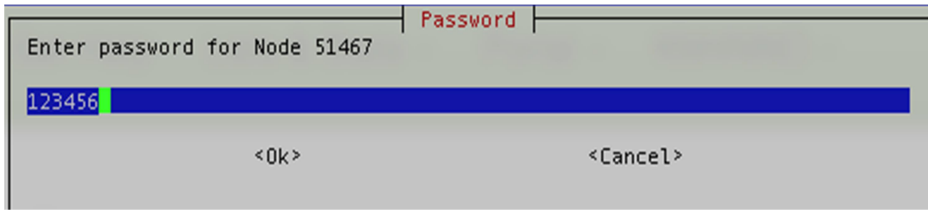
Type the node number for your node. Yes the one you previously wrote down from AllStarLink site.



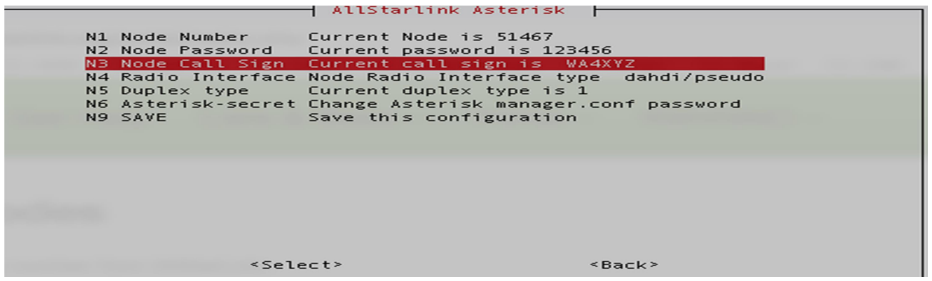
Choose option **<N2>**.



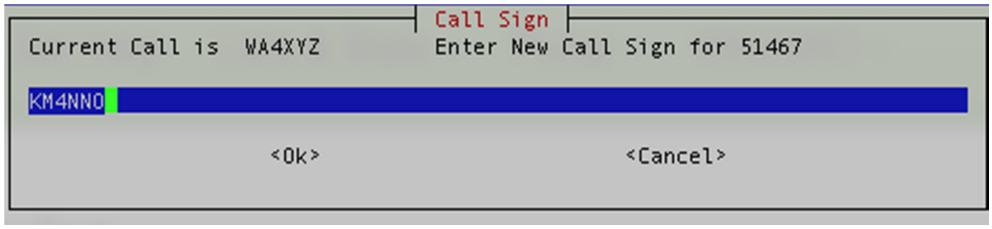
Type the node password for your node. Yes the one you previously wrote down from AllStarLink site.



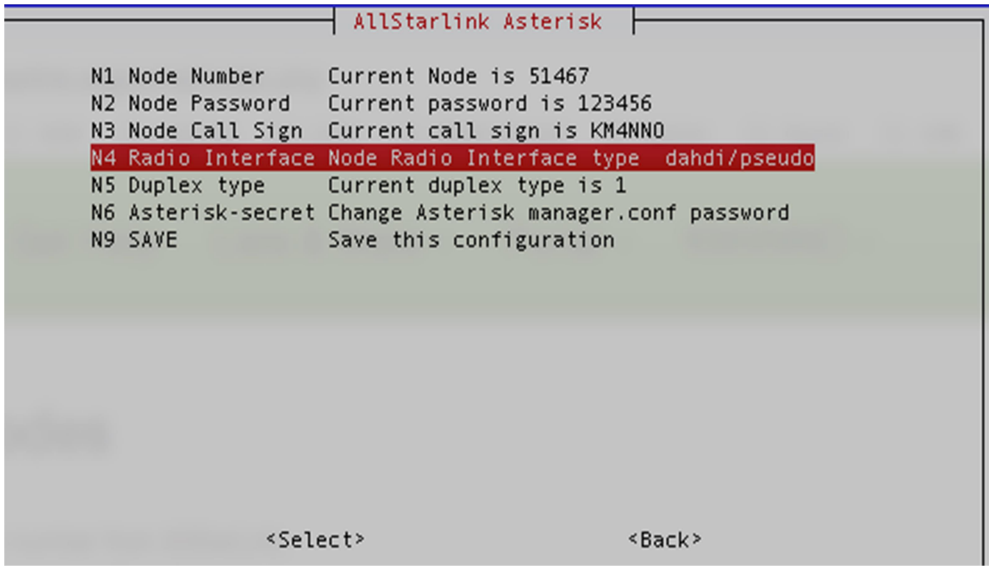
Choose option **<N3>**.



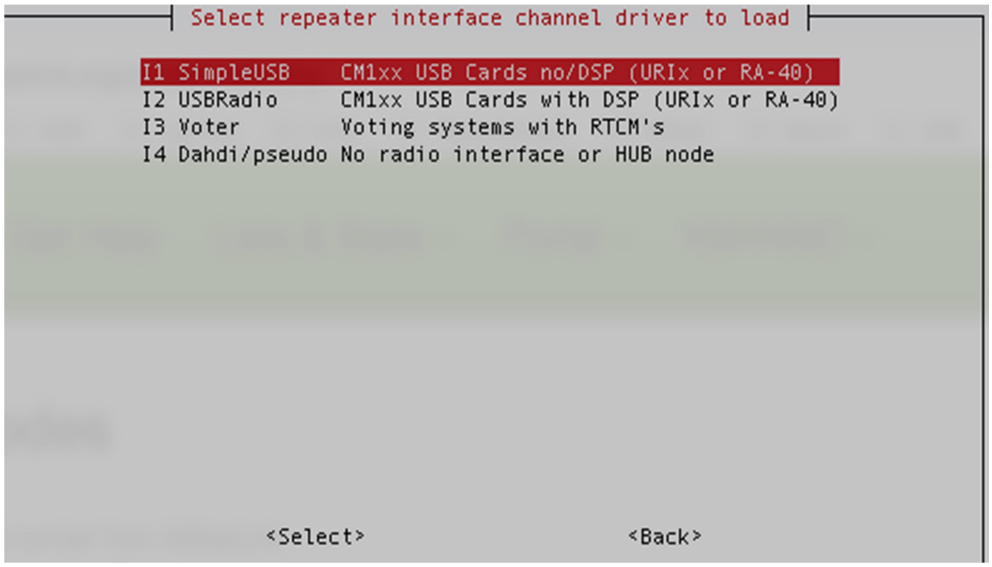
Type the call sign for your node. Yes the one you previously wrote down from AllStarLink site.



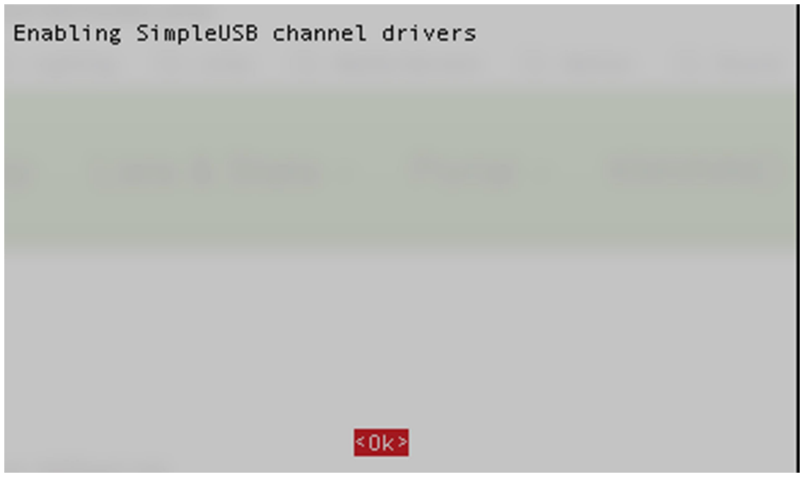
Choose option **<N4>**.



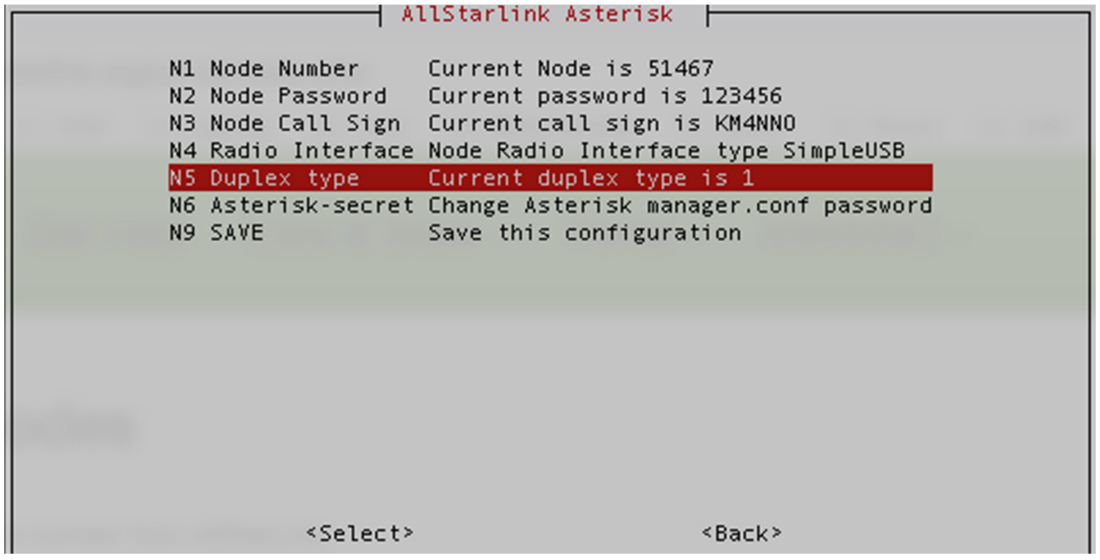
Choose option **<I4>** Dahdi/Pseudo No radio interface or HUB node.



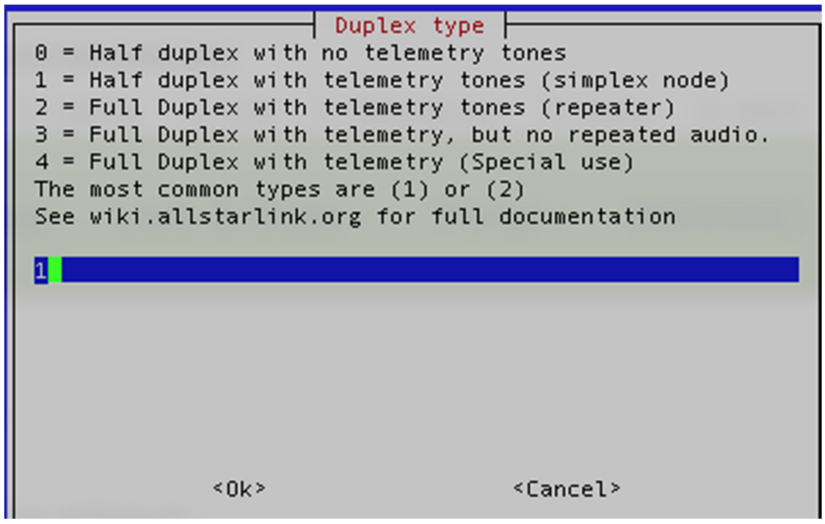
Just say **<Ok>** to this message.



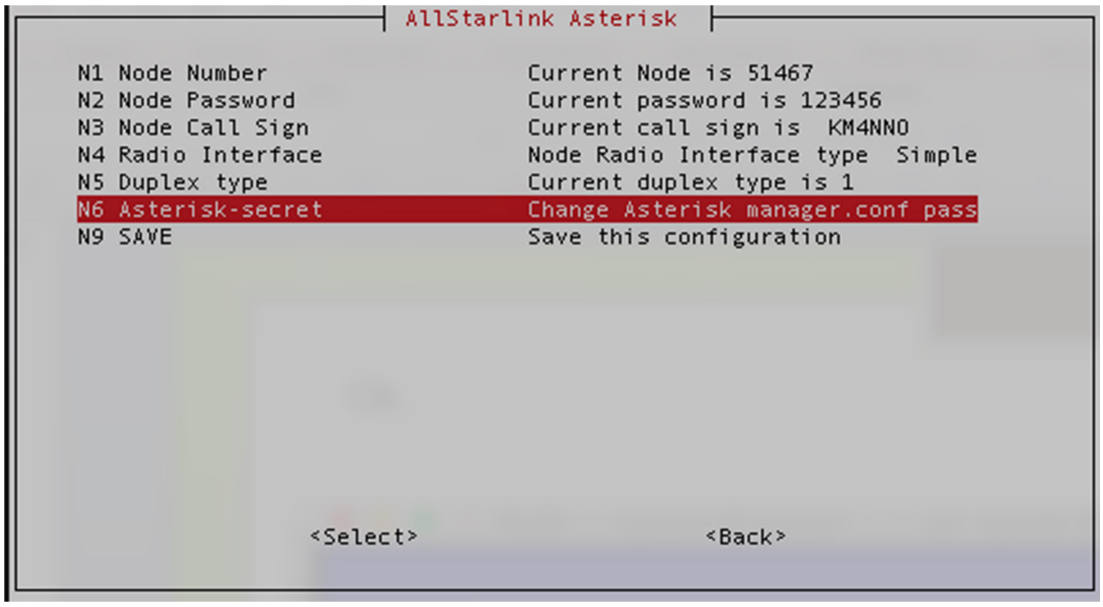
Choose option **<N5>**.



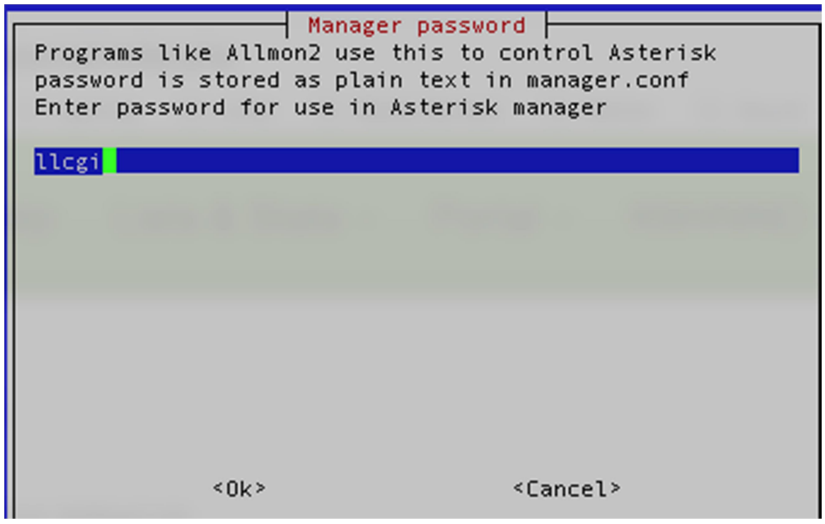
Your node will be a simplex node type **<1>**.



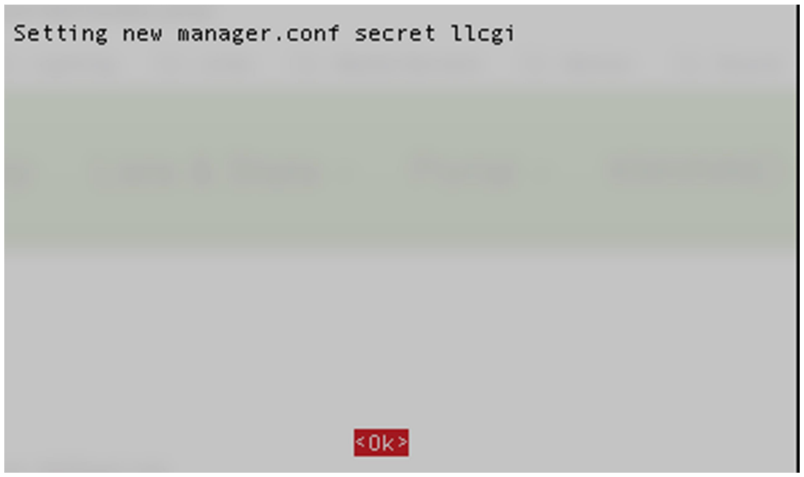
Choose option **<N6>**.



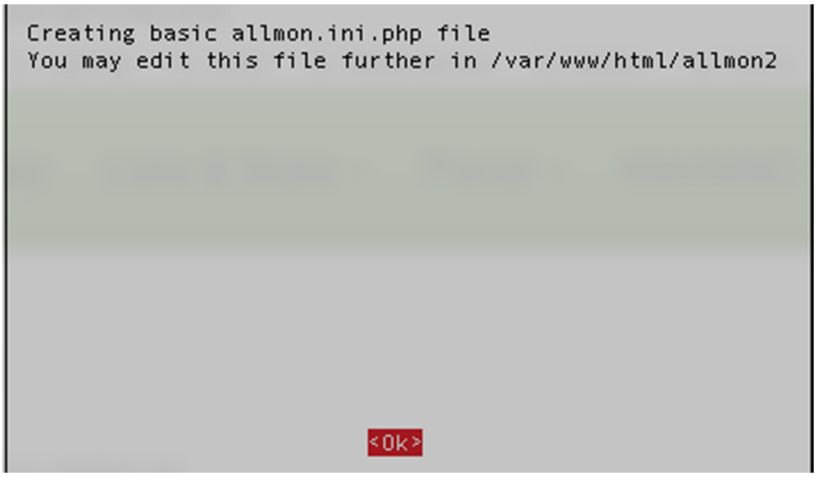
Type in your Allstarlink node Password to have access from the nodes web site Allmon2, the default password will be your AllStar node password'.



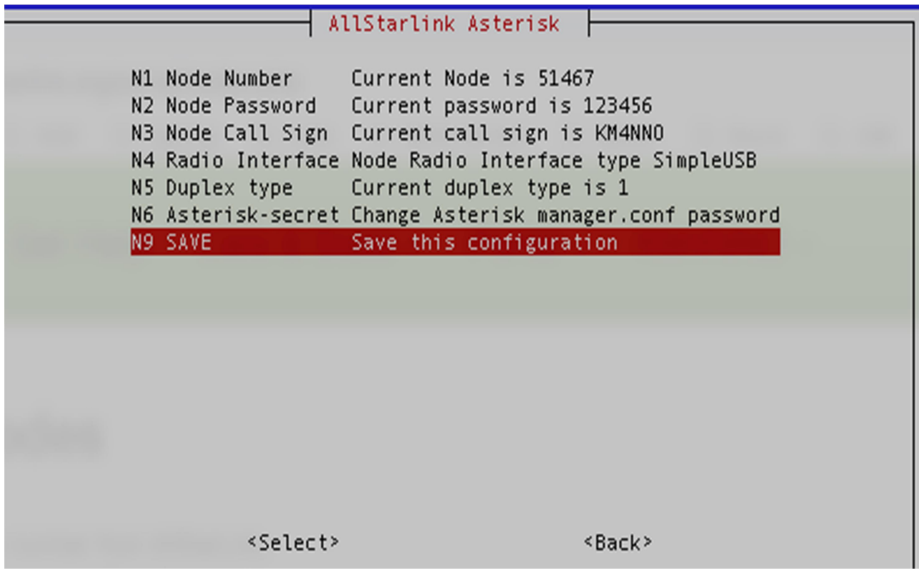
Just say **<Ok>** to this message.



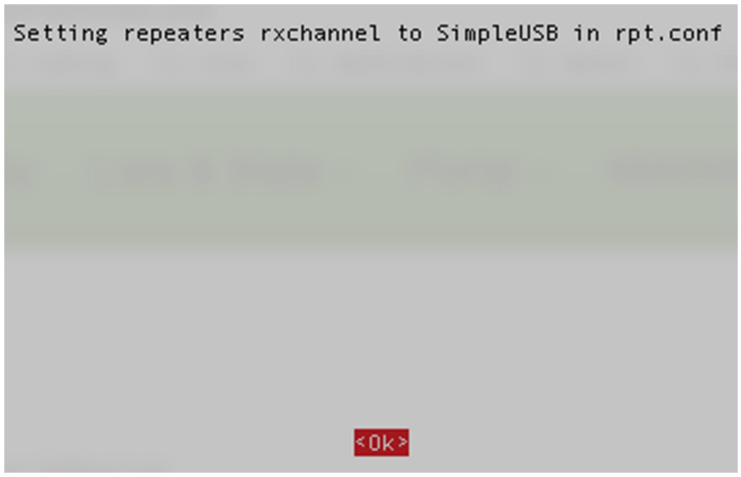
Just say **<Ok>** to this message.



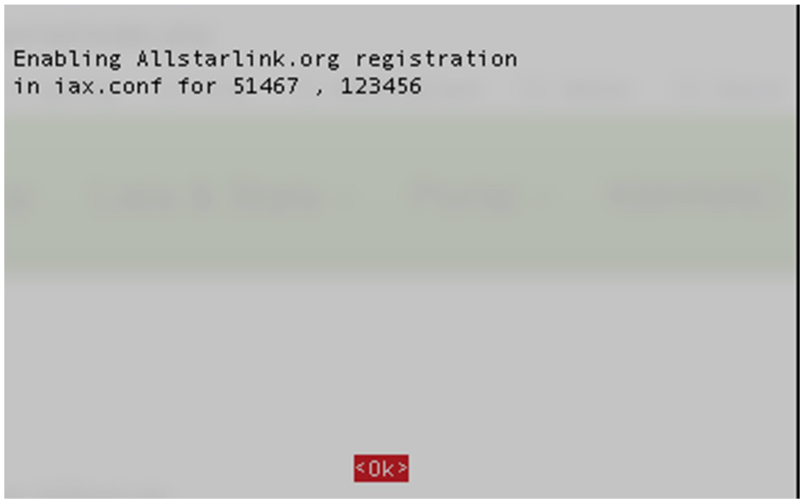
Choose option **<N9>**.



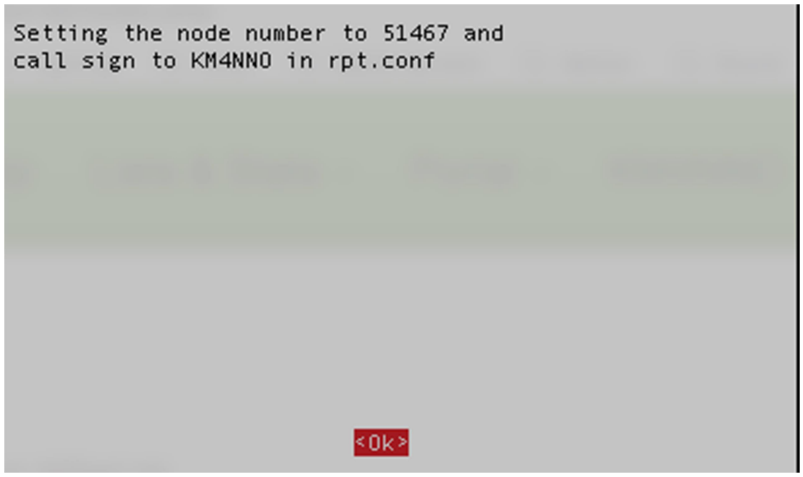
Just say **<Ok>** to this message.



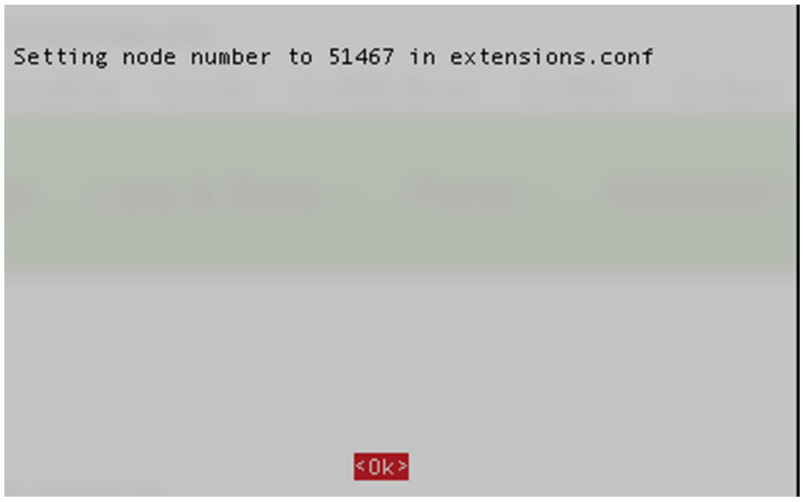
Just say **<Ok>** to this message.



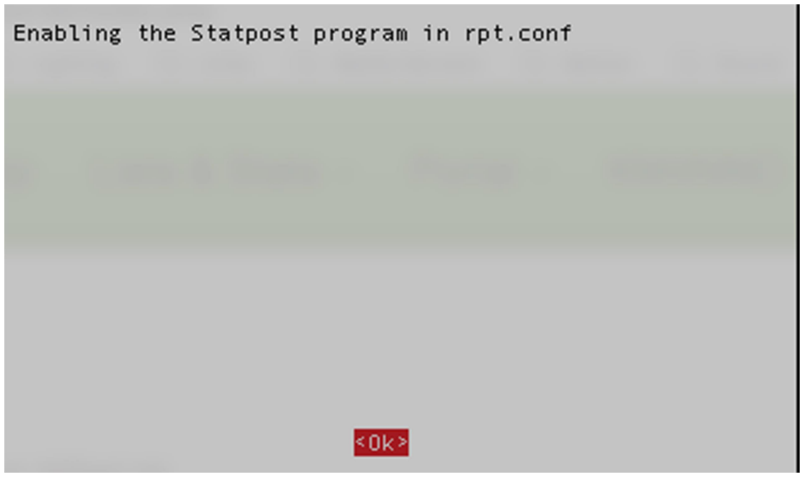
Just say **<Ok>** to this message.



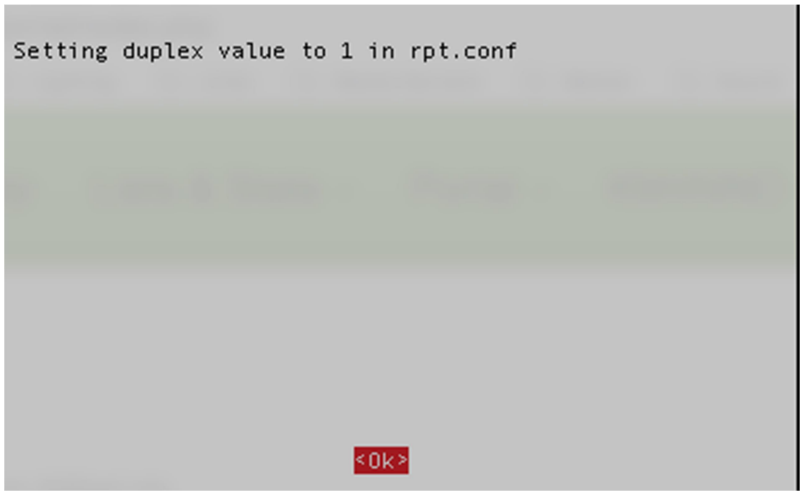
Just say **<Ok>** to this message.



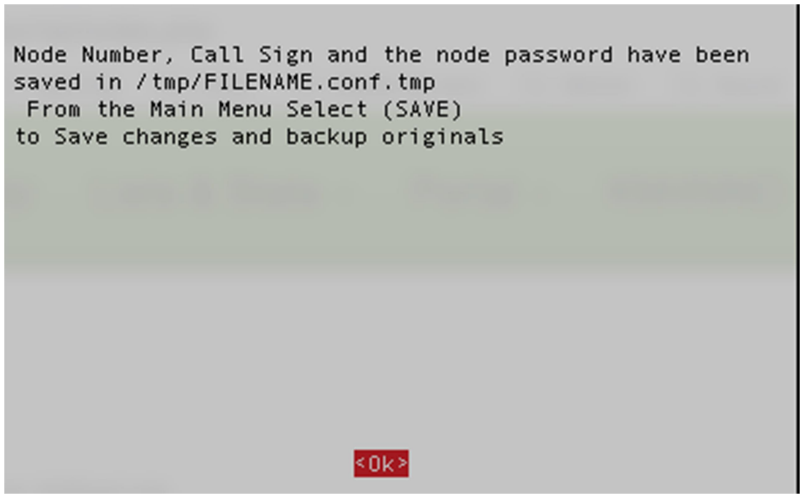
Just say **<Ok>** to this message.



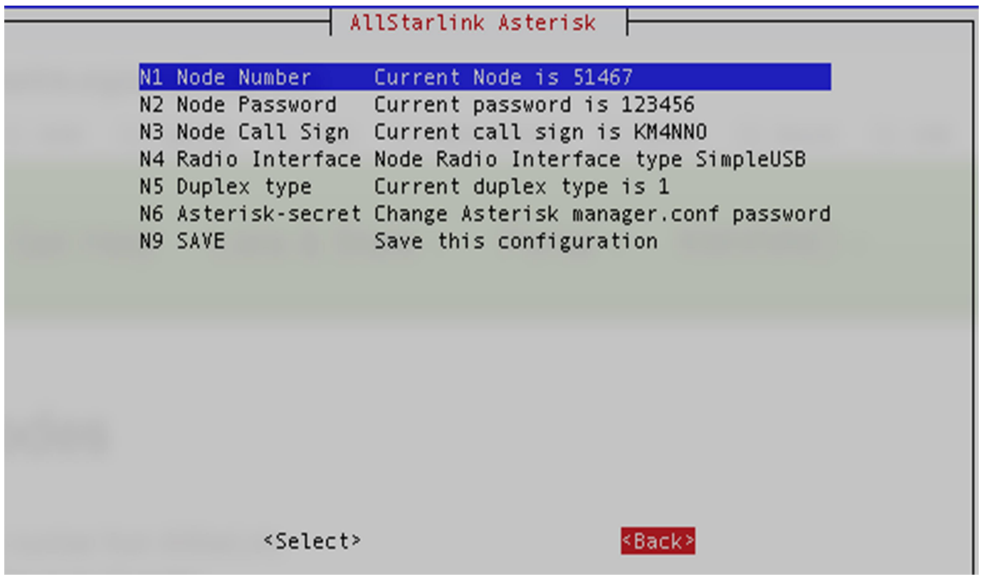
Just say **<Ok>** to this message.



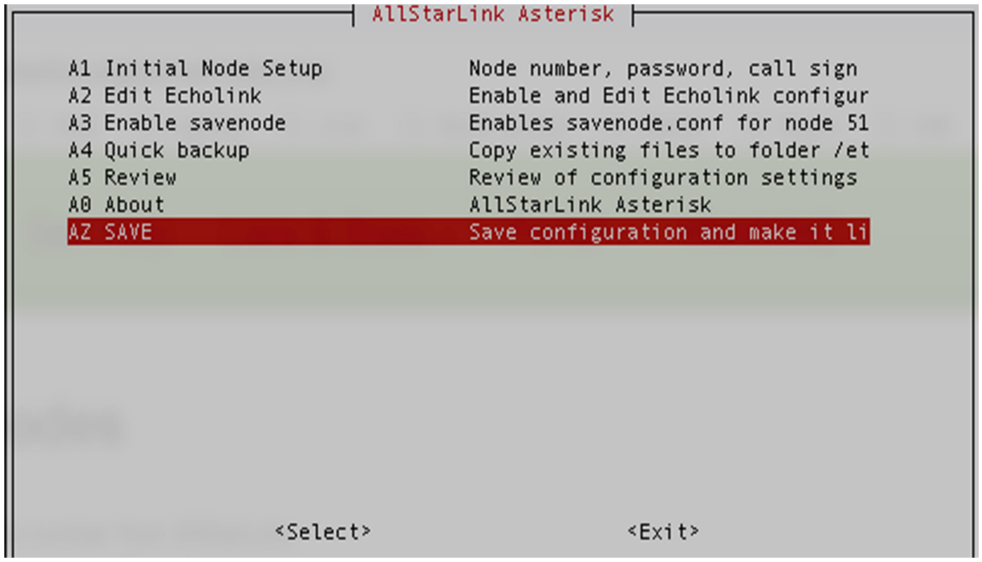
Just say **<Ok>** to this message.



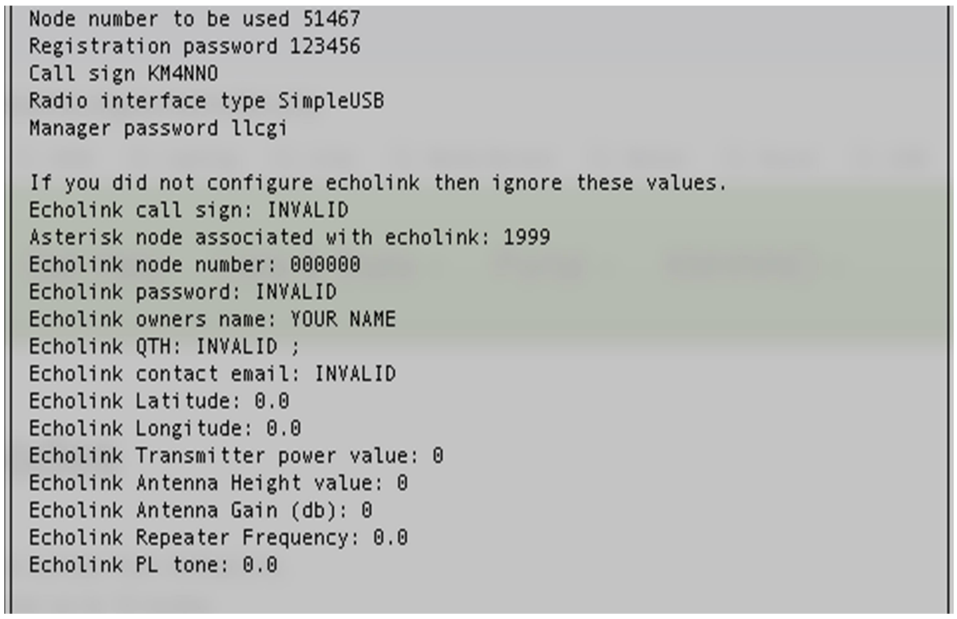
Choose option **<Back>**.



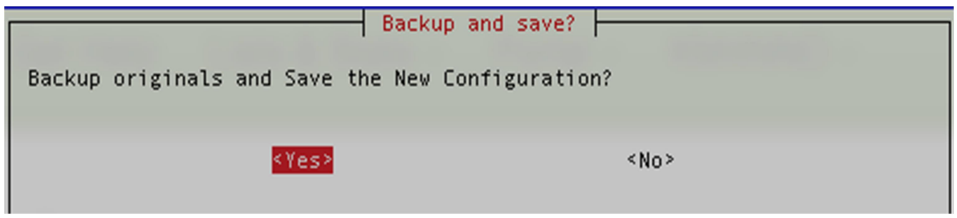
Choose option **<AZ>**.



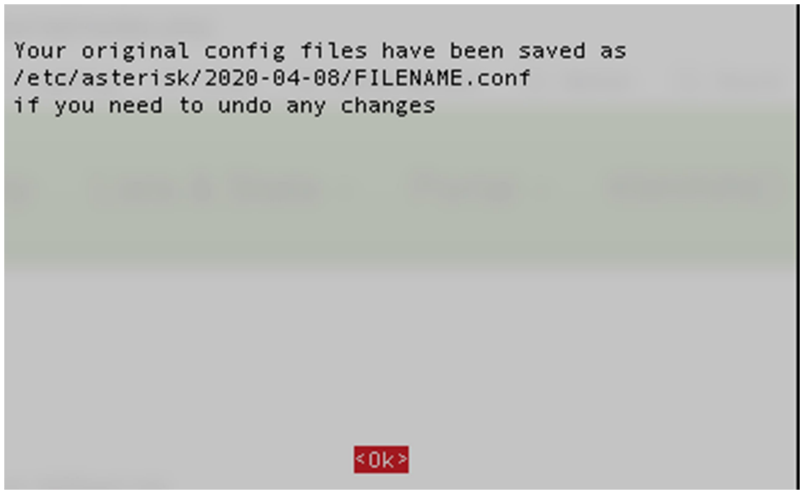
Review what you wrote down with what you have configured on your system and press **<Enter>**.



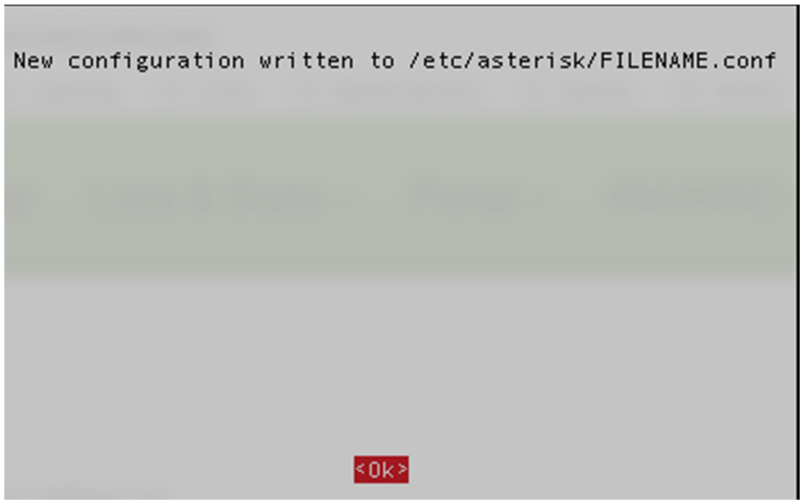
Choose **<Yes>** to backup your configuration.



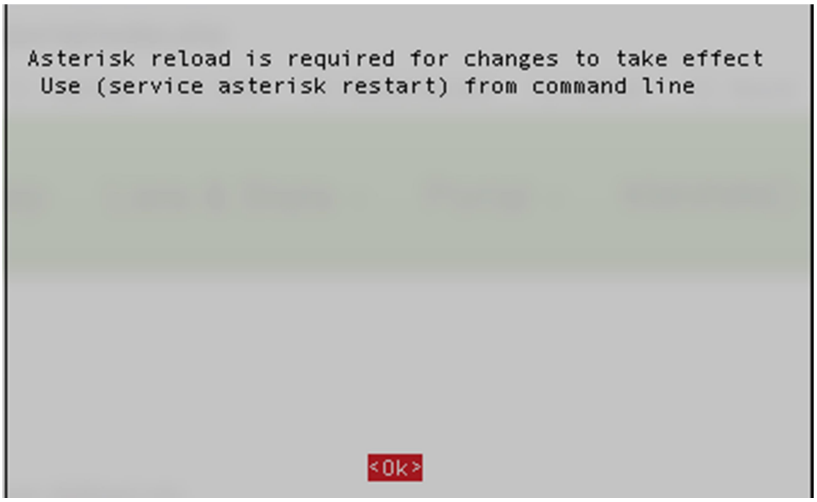
Just say **<Ok>** to this message.



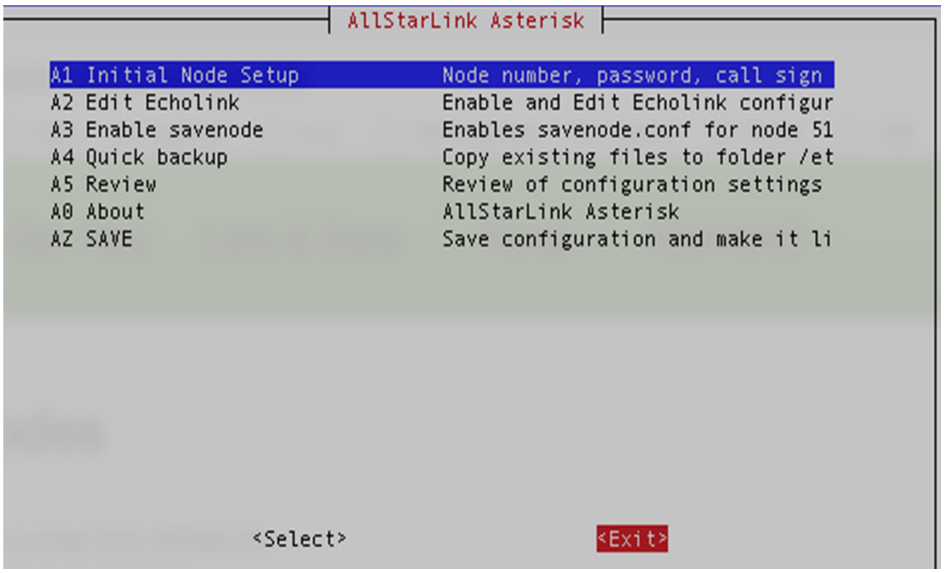
Just say **<Ok>** to this message.



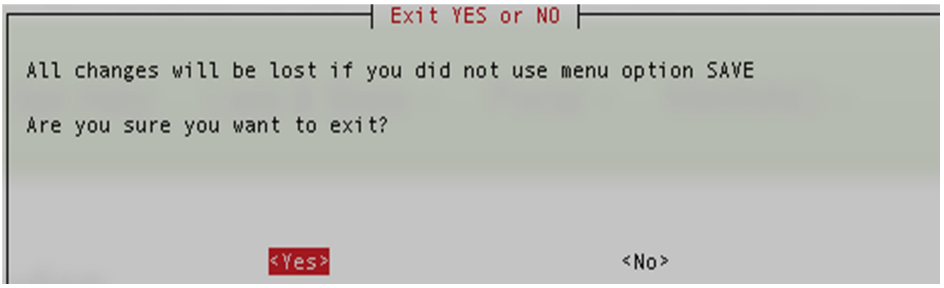
Just say **<Ok>** to this message.



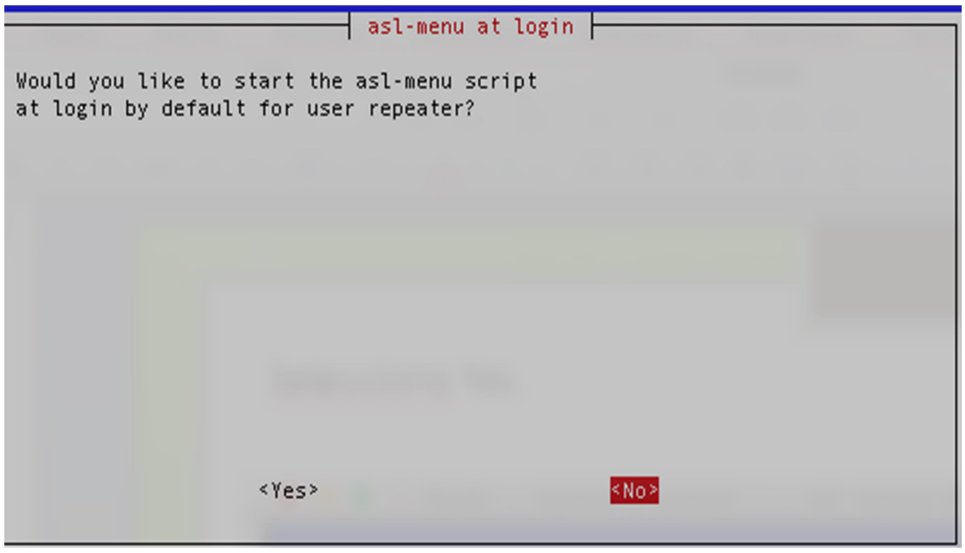
Choose option **<Exit>**.



Answer **<Yes>**, because we already saved our configuration.

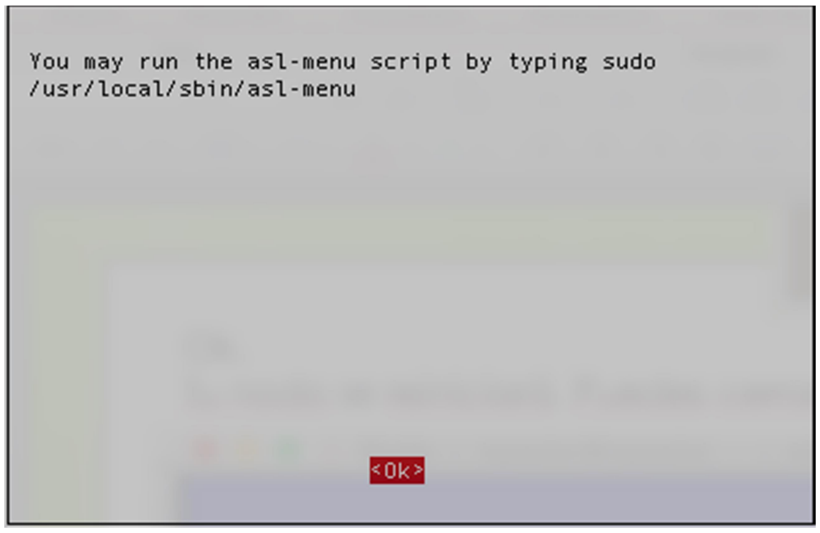


If you want to automatically start your system with this menu answer **<Yes>**, if not then **<No>**.

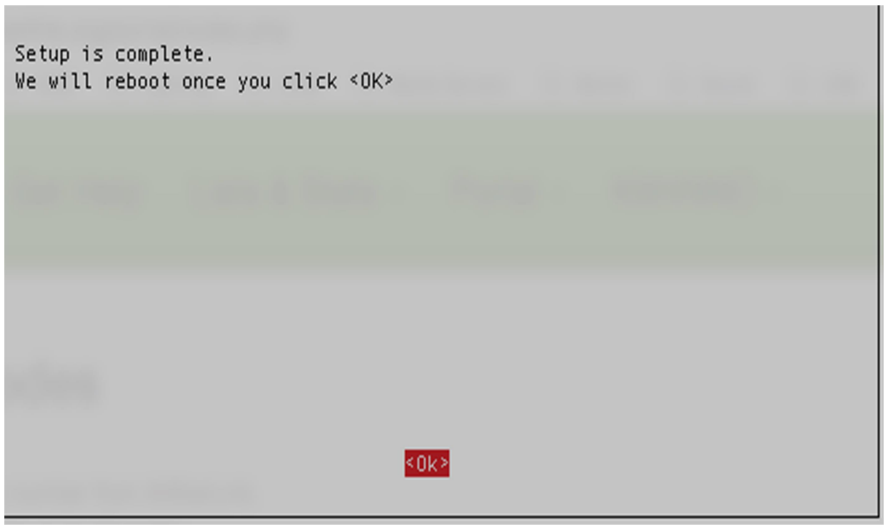


If you answer was **<No>**, remember you can come back to this menu typing **sudo asl-menu** as the following example:

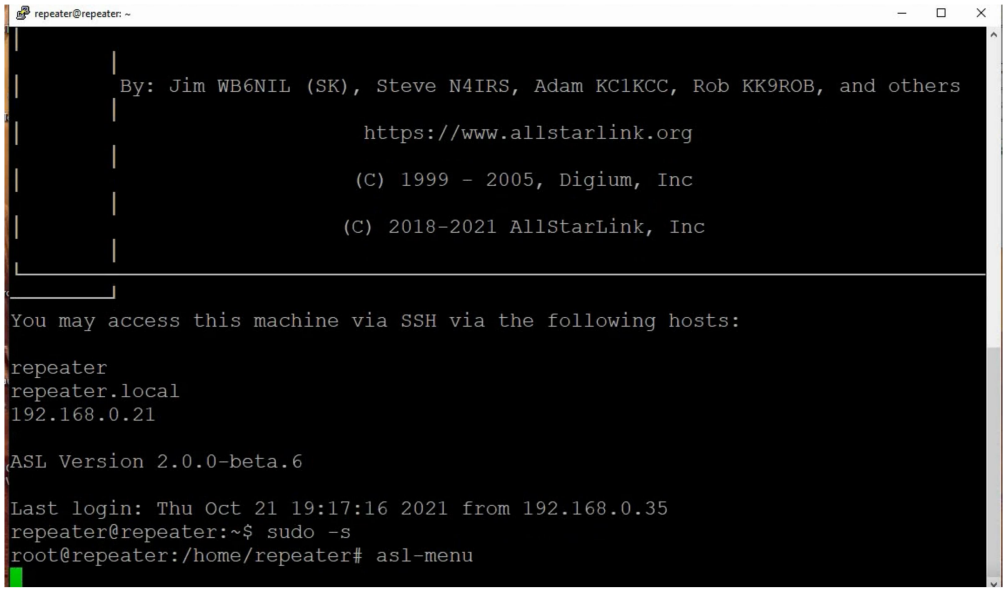
repeater@repeater:~$ sudo asl-menu



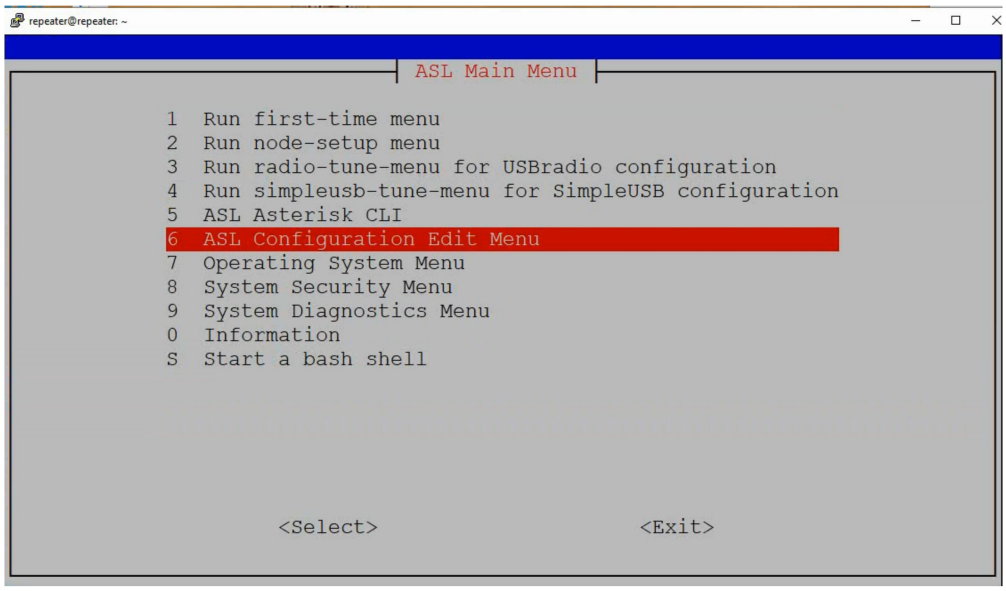
Now your node will reboot to apply all the changes we have done, so say **<Ok>**.



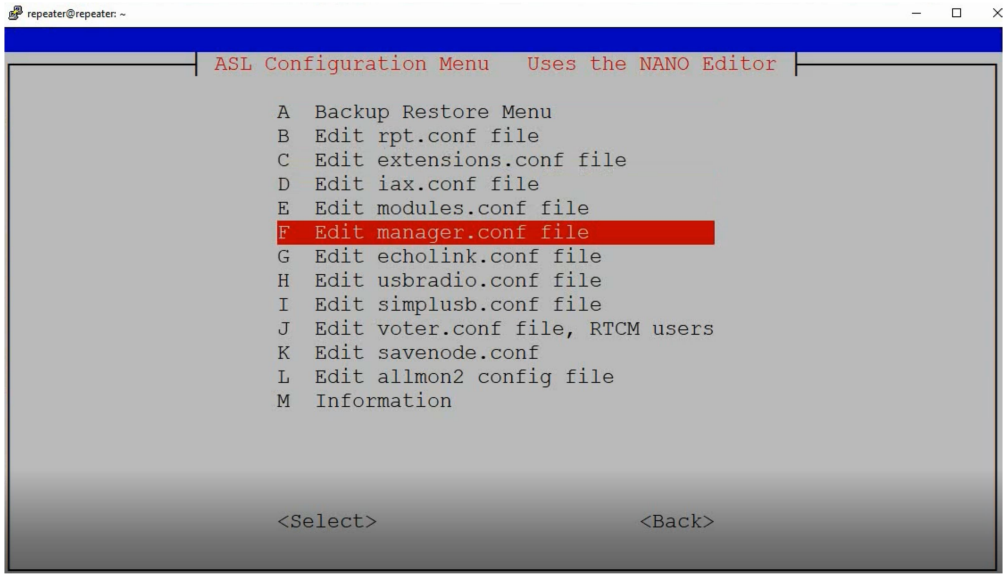
After Reboot open up a new termimal in putty and login, at the prompt type in sudo –s, then asl-menu.

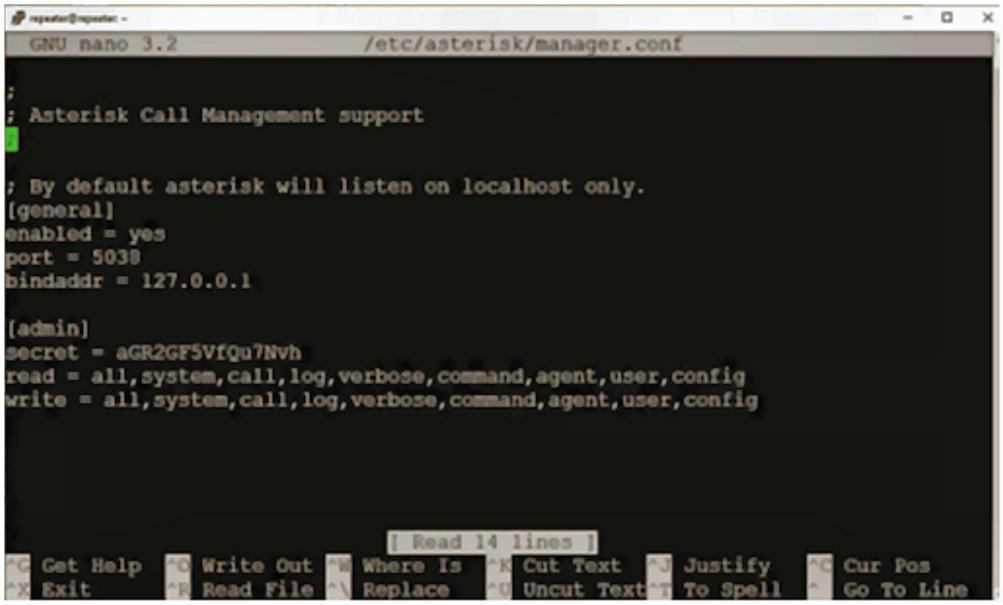


Choose option **<6>**



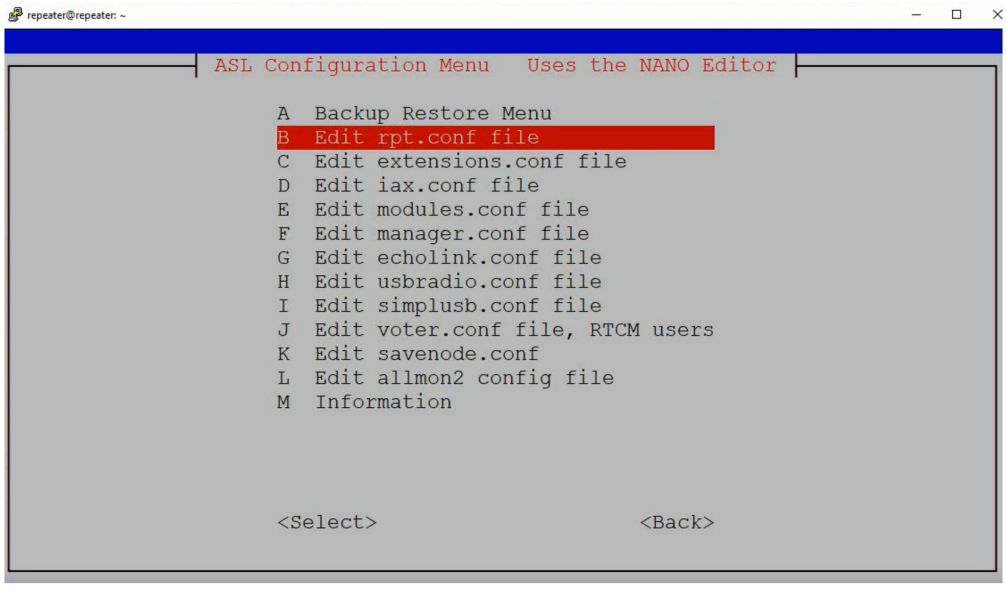
Select option **<F>**.



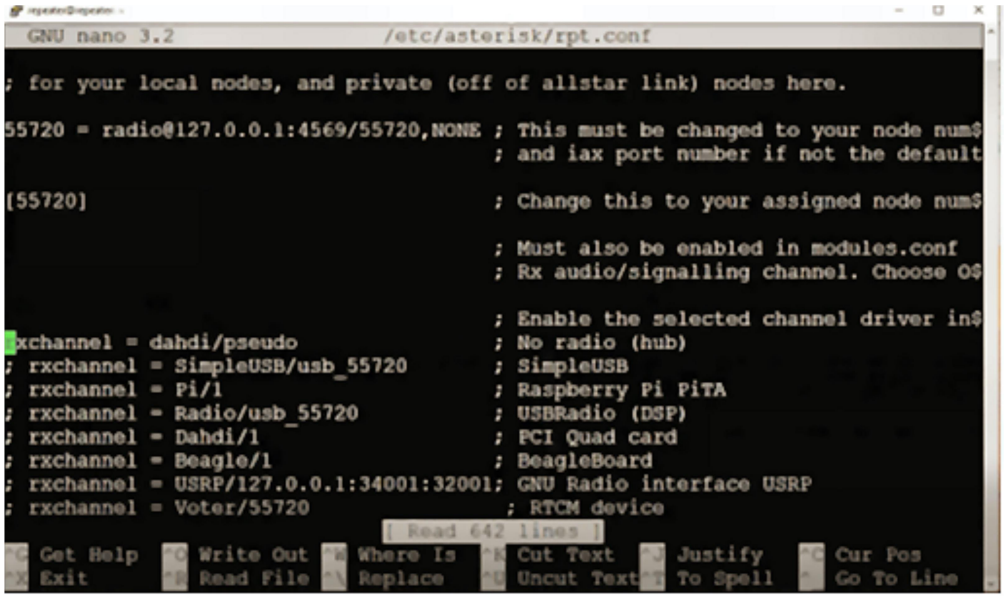


Change **secret =aGR2GF5VfQu7Nvh** to your node **password.**

Ctrl X, Yes and exit to save. Now select option **<B>**.



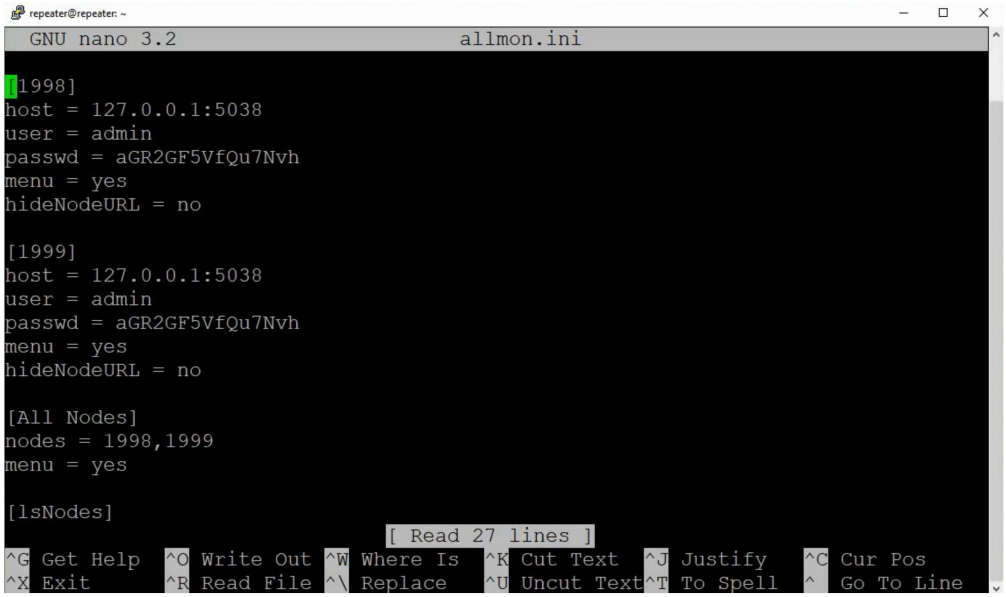
put semicolon in front of **rxchannel = dahdi/psuedo**



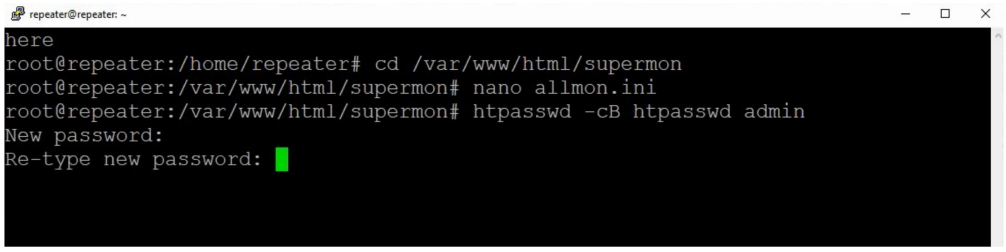
remove semicolon from **RX channel = USRP/127.0.0.1**, CTRL X, save and Exit and then Exit asl-menu.

At prompt **cd /var/www/html/supermon.**

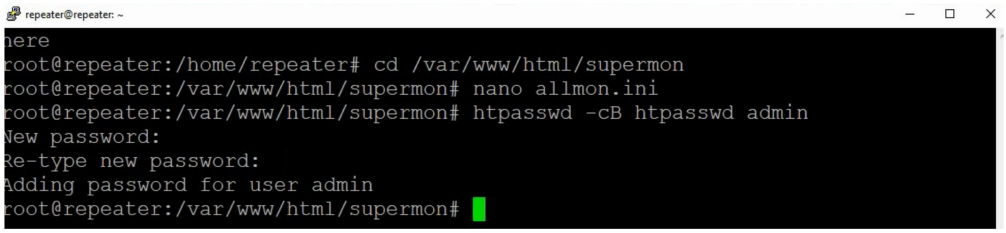
Then **nano allmon.ini**, change **[1998]** to **[your node number]** and change **passwd = aGR2GF5VfQu7Nvh** to your node **passwd.**



CTRL-X, save and exit. Type in terminal **cd ..**



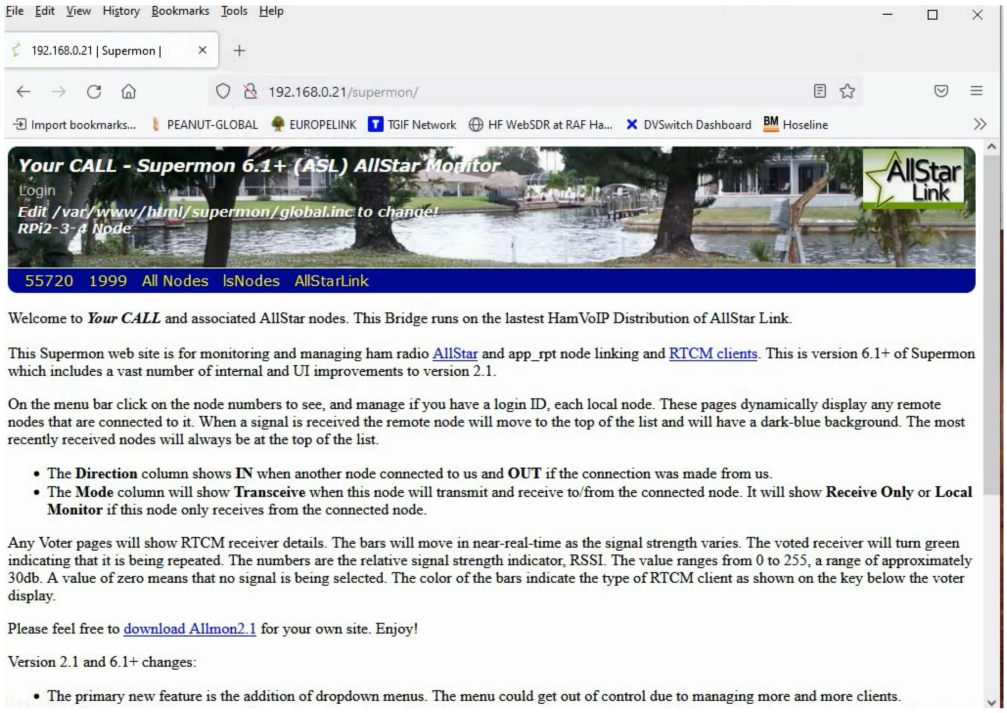
Type in **htpasswd –cB .htpasswd admin**. Then at the prompt type in your node password, and then type it again to confirm.



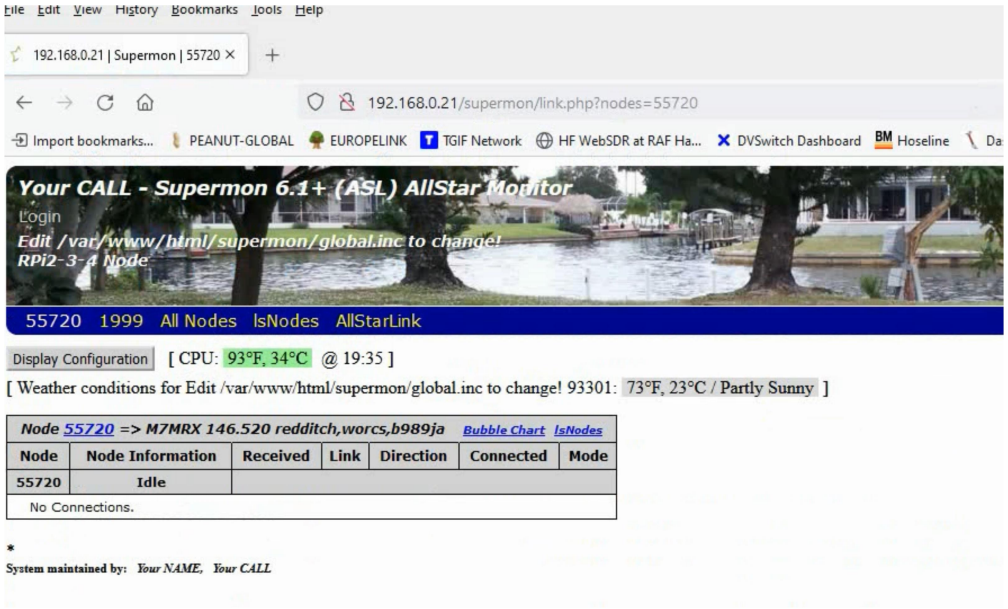
Type in terminal **cd ..** then **cd allmon2** then type in the command **./astdb.php**

```
Re-type new password:
Adding password for user admin
root@repeater:/var/www/html/supermon# cd ..
root@repeater:/var/www/html# cd allmon2
root@repeater:/var/www/html/allmon2# ./astdb.php
```

Now open up a web browser to the IP address of your raspberry pi. i.e http://192.168.0.55/supermon



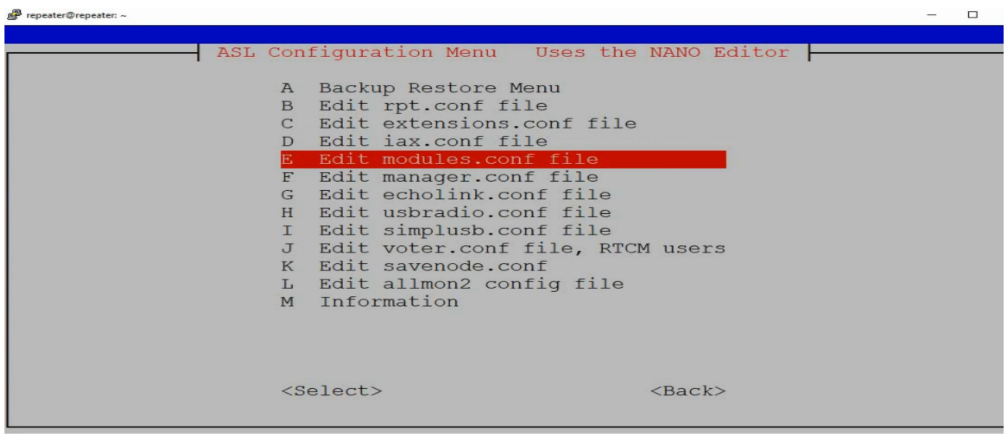
Login with admin, and your node password or just click on your node number.



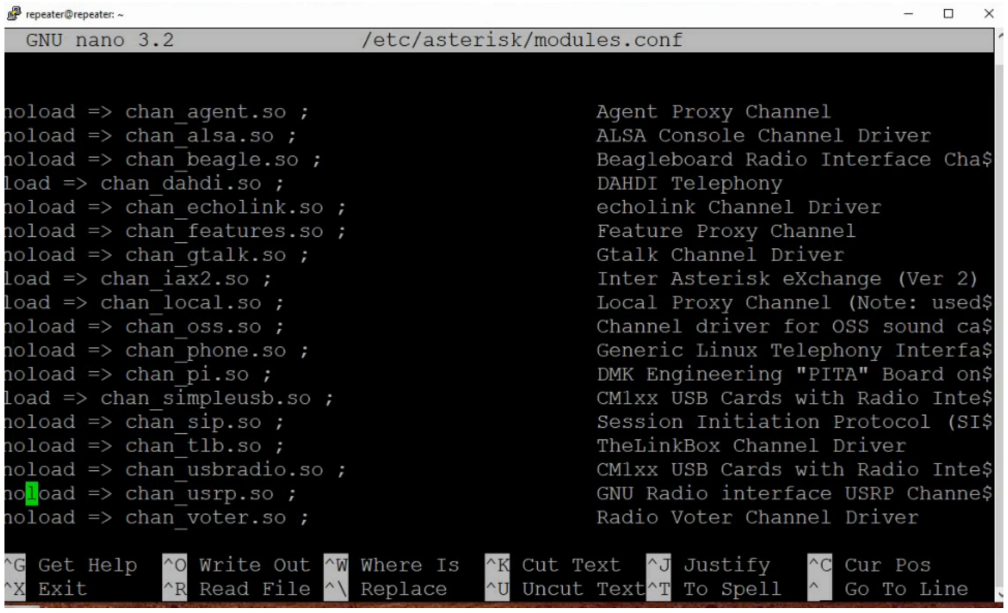
In the terminal, type **astres.sh** to restart the asterisk service.

```
root@repeater:/var/www/html/allmon2# astres.sh
Restarting Asterisk
systemctl restart asterisk.service
root@repeater:/var/www/html/allmon2# cd ..
root@repeater:/var/www/html# cd supermon
root@repeater:/var/www/html/supermon#
```

Then type asl-menu and select asl configuration menu then select option **<E>.**



Scroll down to **;Channels**



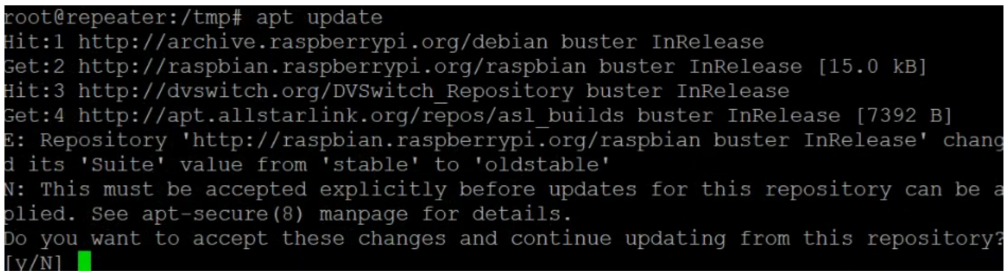
Remove the **no** from **noload => chan_usrp.so**, the CTRL-X save and exit. then exit asl-menu to get back to command line. Type in **cd /tmp.** Now we will install DVSWitch. First type in the terminal **wget** http://dvswitch.org/buster

```
root@repeater:/tmp# wget http://dvswitch.org/buster
--2021-10-21 19:46:08--  http://dvswitch.org/buster
Resolving dvswitch.org (dvswitch.org)... 44.103.34.4
Connecting to dvswitch.org (dvswitch.org)|44.103.34.4|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1831 (1.8K)
Saving to: 'buster'

buster              100%[===================>]   1.79K  --.-KB/s    in 0s

2021-10-21 19:46:08 (27.1 MB/s) - 'buster' saved [1831/1831]
```

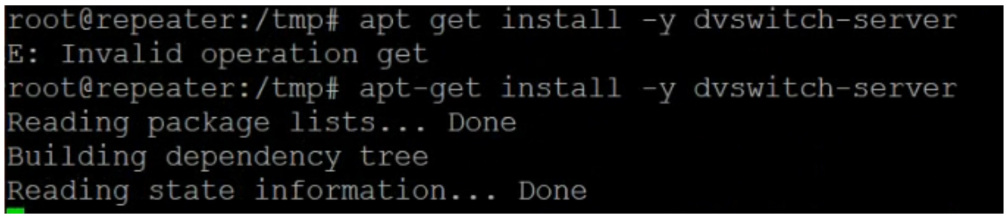
The type in **chmod +x buster** followed by **sudo ./buster.**

```
root@repeater:/tmp# chmod +x buster
root@repeater:/tmp# ./buster
--2021-10-21 19:46:21--  http://dvswitch.org/DVSwitch_Repository/dvswitch.gpg.k
y
Resolving dvswitch.org (dvswitch.org)... 44.103.34.4
Connecting to dvswitch.org (dvswitch.org)|44.103.34.4|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1678 (1.6K) [application/pgp-keys]
Saving to: 'STDOUT'

-                   100%[===================>]   1.64K  --.-KB/s    in 0s

2021-10-21 19:46:22 (22.7 MB/s) - written to stdout [1678/1678]
```

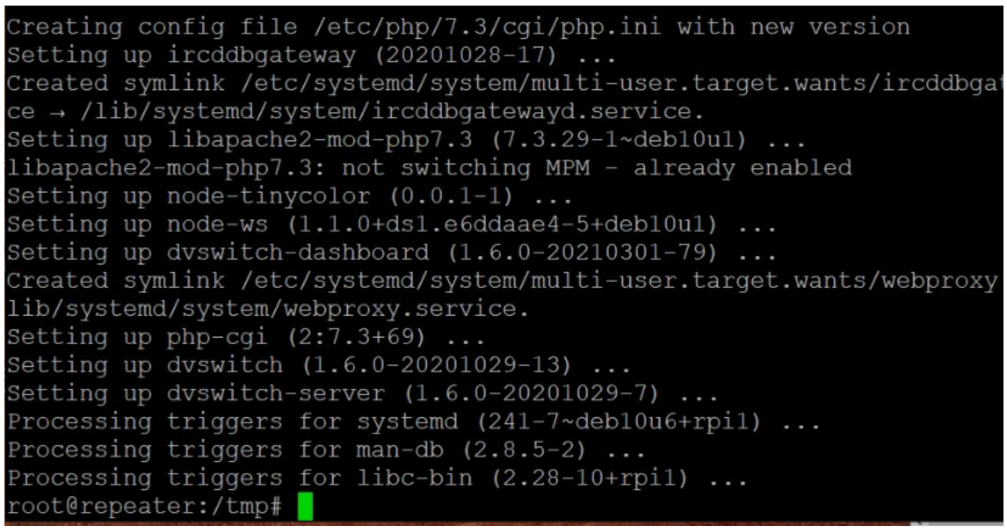
Now before we carry on and install DVSwitch, we will do an update, so type in at prompt **apt update** be warned this can take a while so get yourself a pint of beer and sit back. Oh and press y at any prompts.



At prompt type in **apt-get install -y dvswitch-server** and sit back and watch the show.

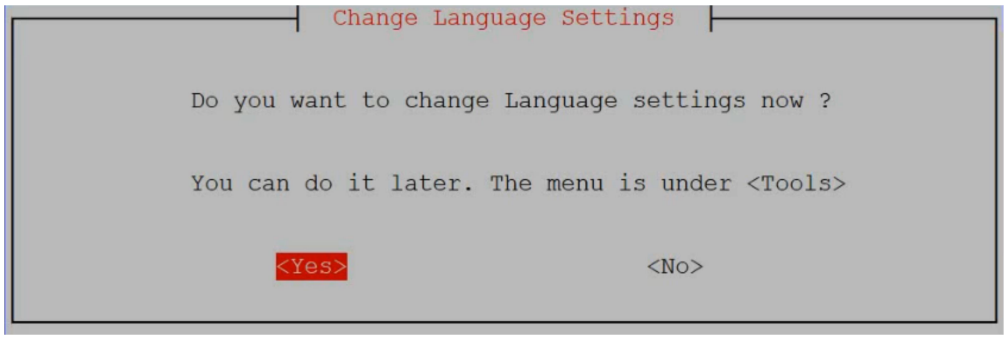


This continues for about 5 mins.



```
root@repeater:/tmp# cd /usr/local/dvs
root@repeater:/usr/local/dvs# ./dvs
```

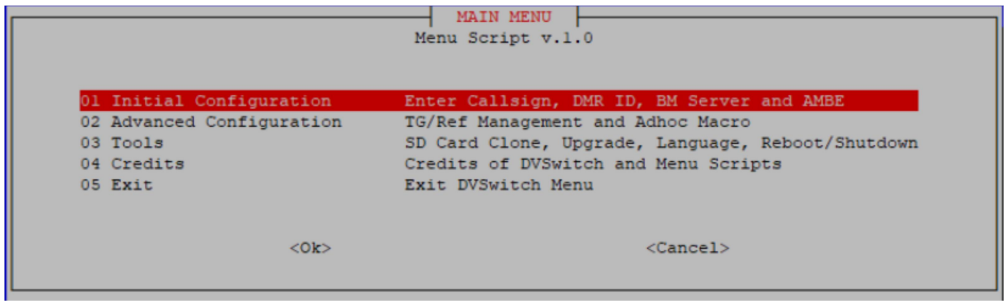
At the prompt type in **cd /usr/local/dvs** then the command **./dvs** to enter the dvswitch menu. First you will be asked if you want to change the language select **<OK>.**



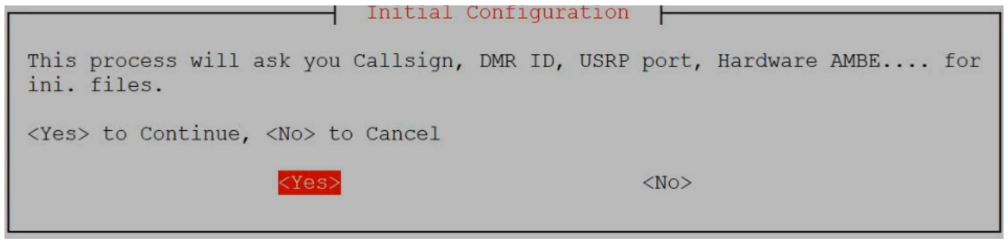
Select English and **<OK>**

Select **<OK>**

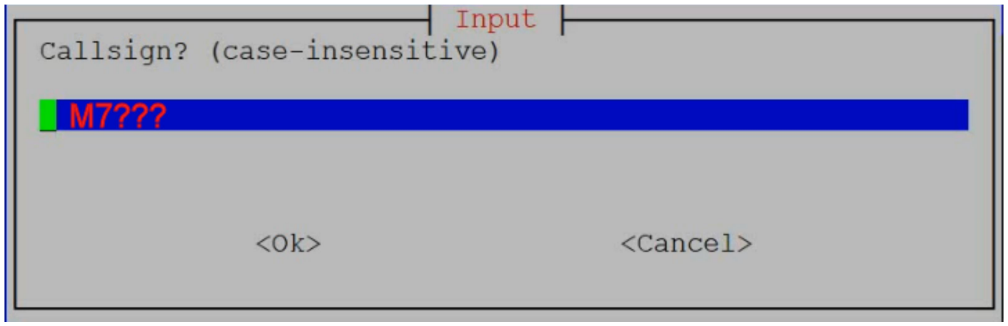
Select Option **<01>**



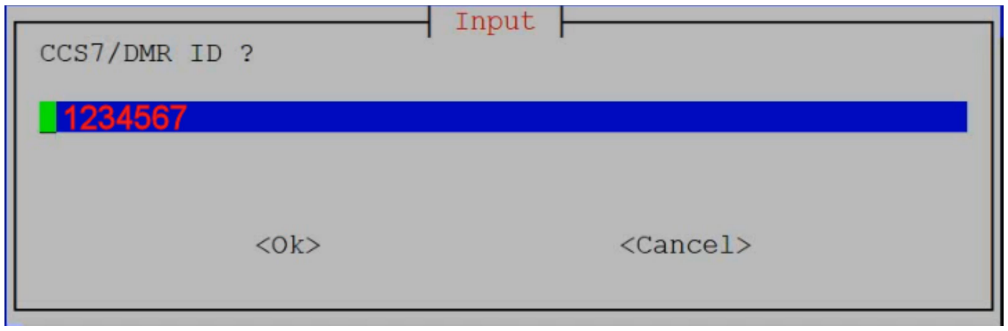
Select **<Yes>**



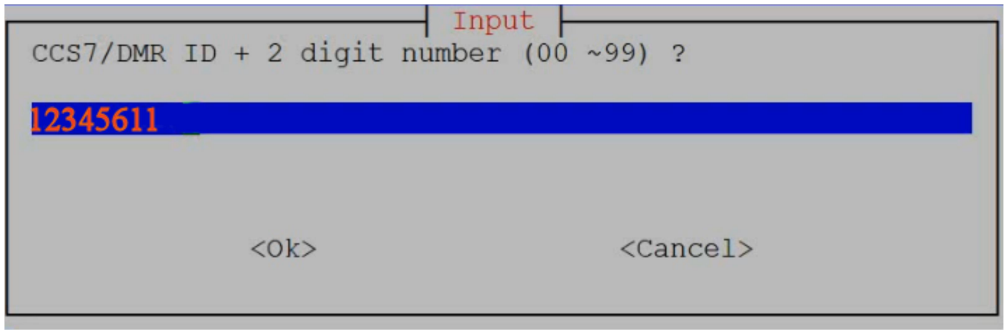
Enter Call Sign and select **<OK>**



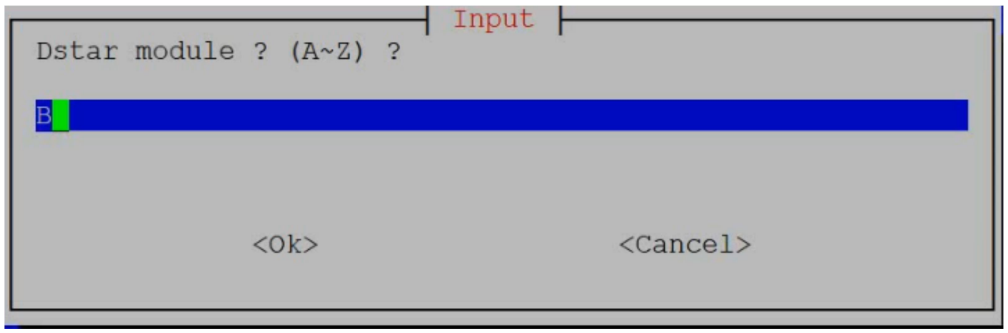
Enter your dmrID and select **<OK>**



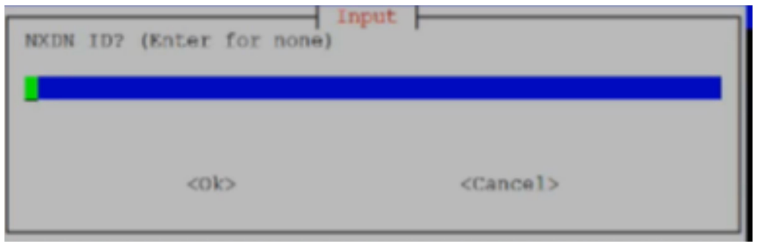
Your DMRID will appear gain with a 2 digit suffix on the end you can change this number to anything between 0 and 99, I usually leave it to default unless you are going to use 1 or more servers.



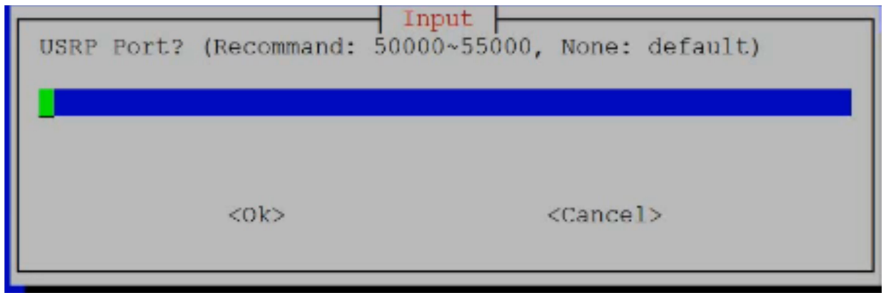
Leave Dstar module at default and Select **<OK>.**



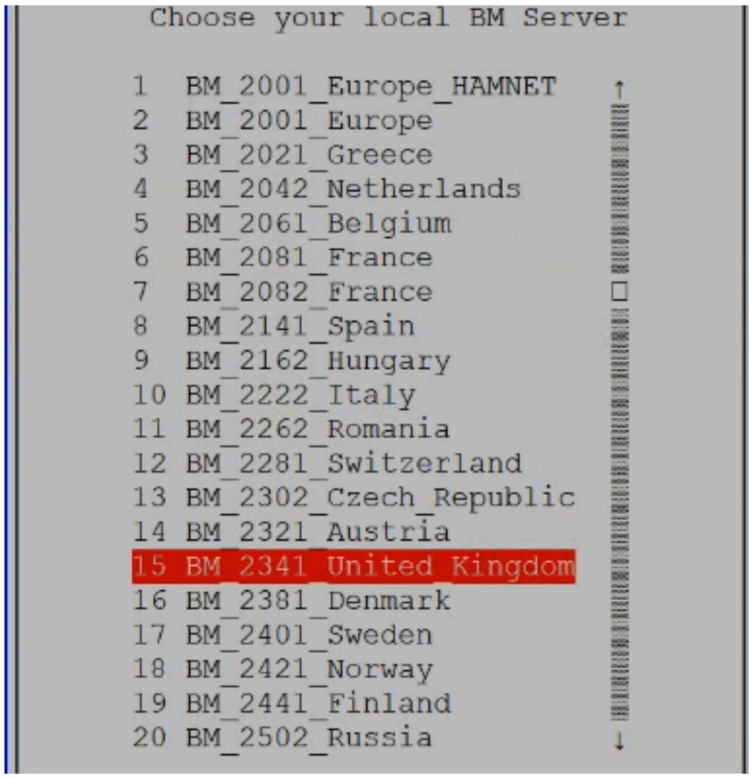
Select **<OK>**



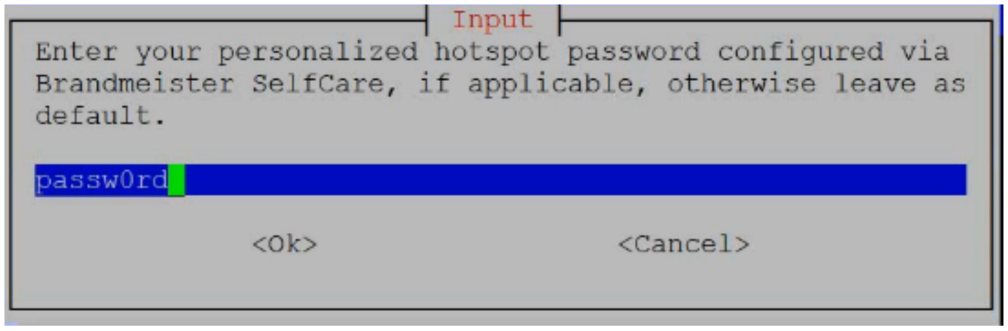
Enter 52424 and Select **<OK>**



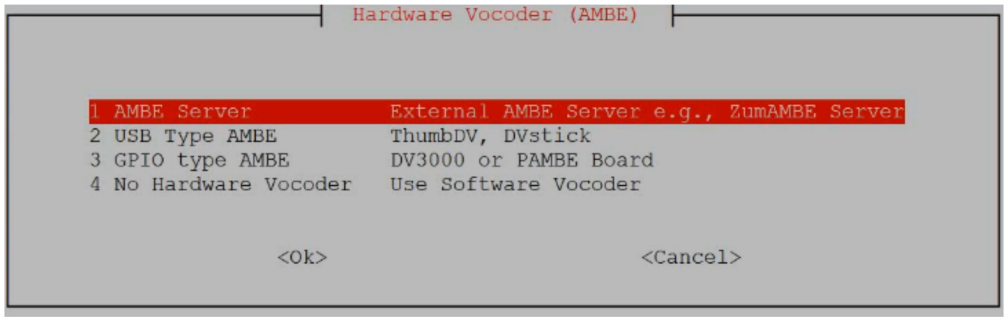
Now Choose Your local BrandMiester Server



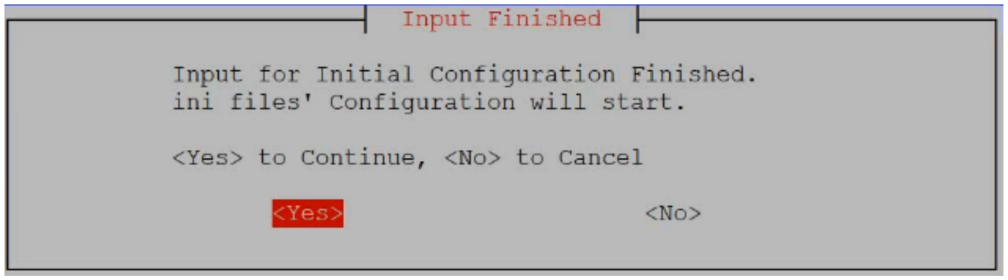
Enter ok for default unless you have setup your own password in selfcare, when complete Select **<OK>**

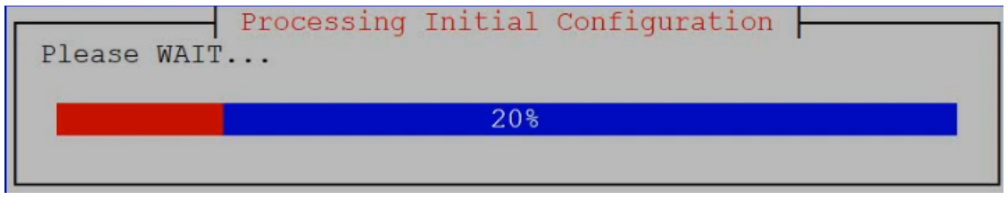


Choose Option **<4>** and Select **<OK>**

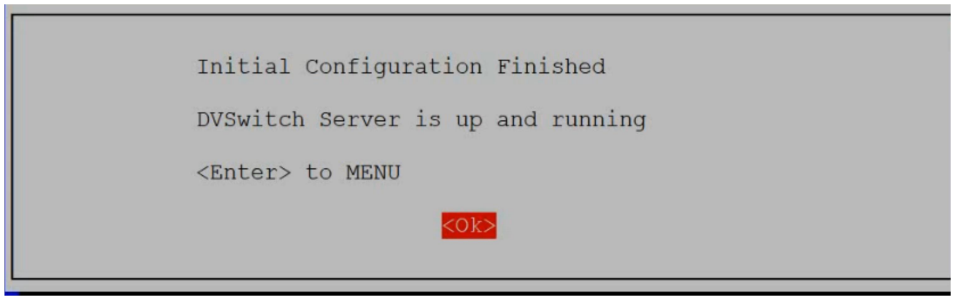


Select **<Yes>** to save your options.

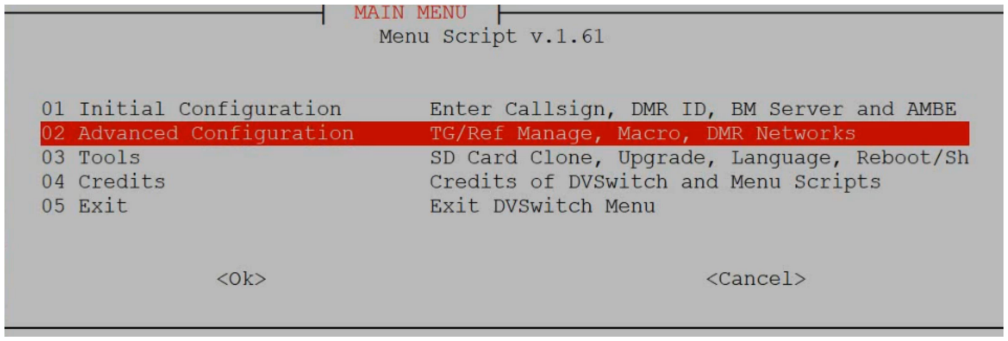




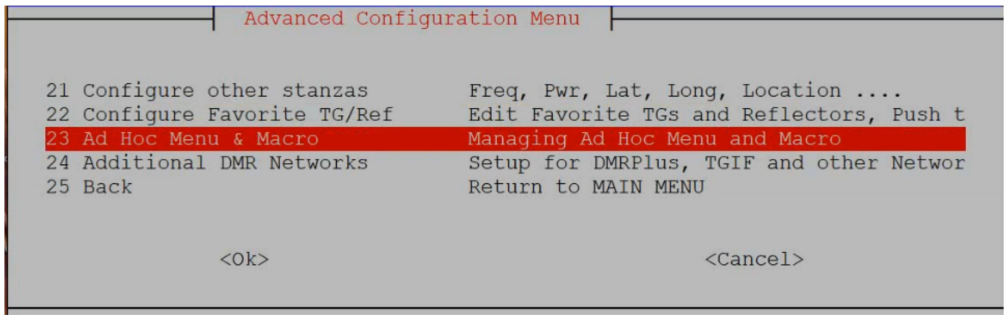
Select **<OK>** to return to Main Menu.



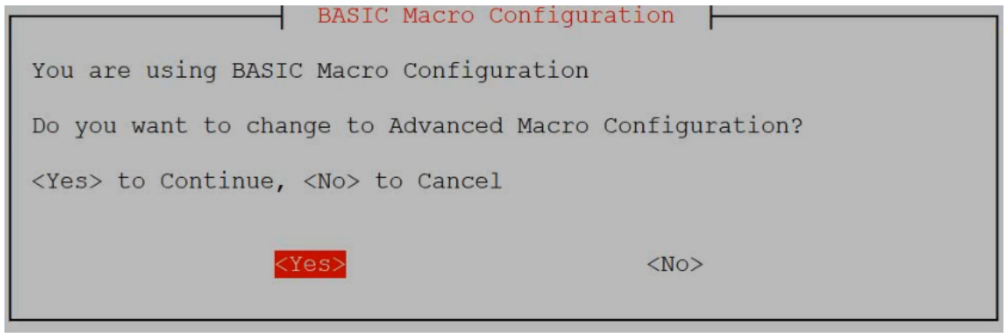
Choose Option **<2>**



Choose Option **<23>** and select **<OK>**

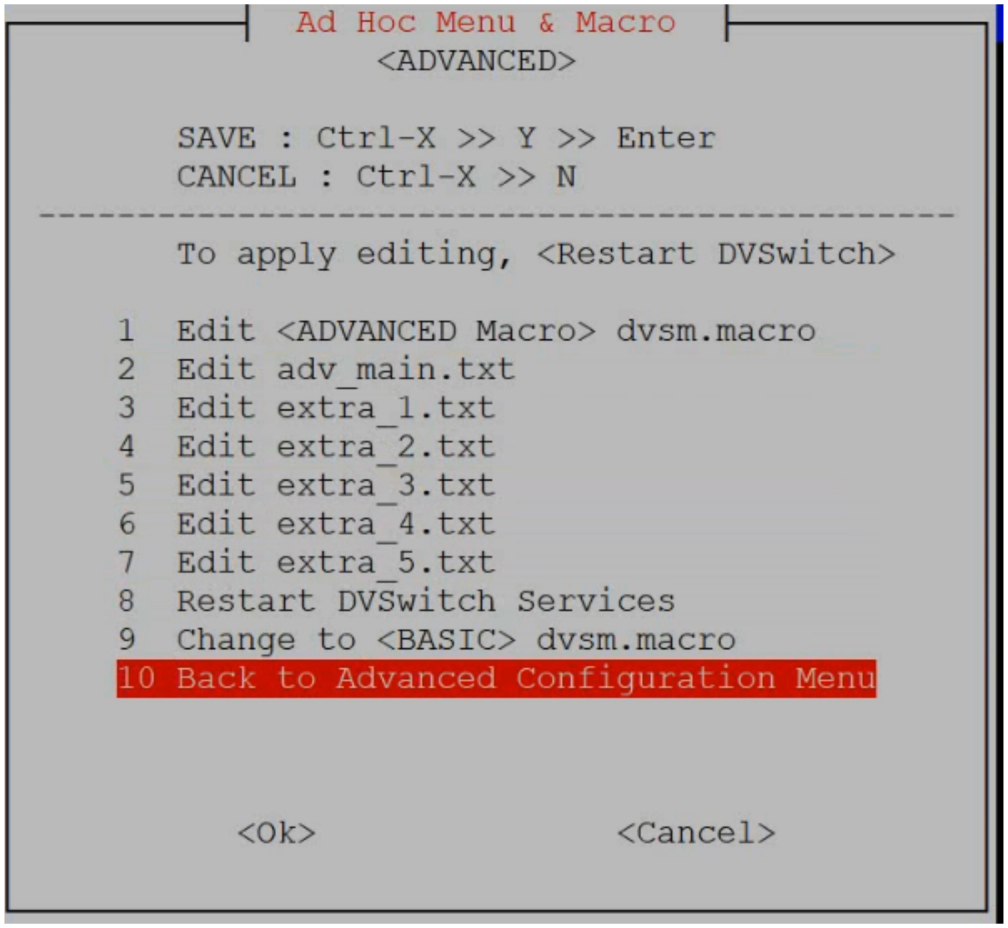


Select **<Yes>**

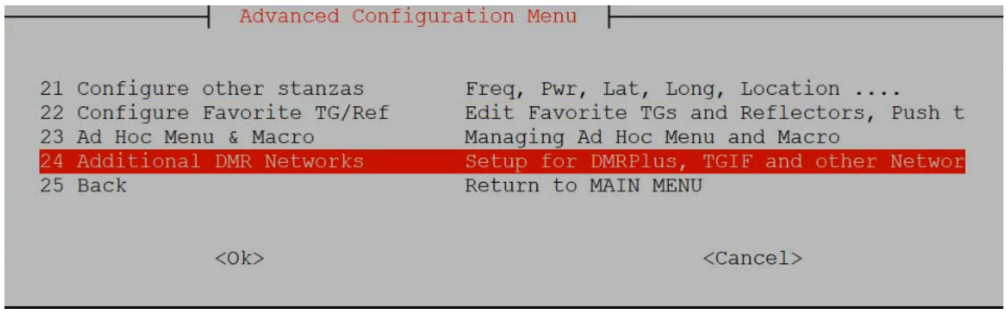


Select **<Ok>**

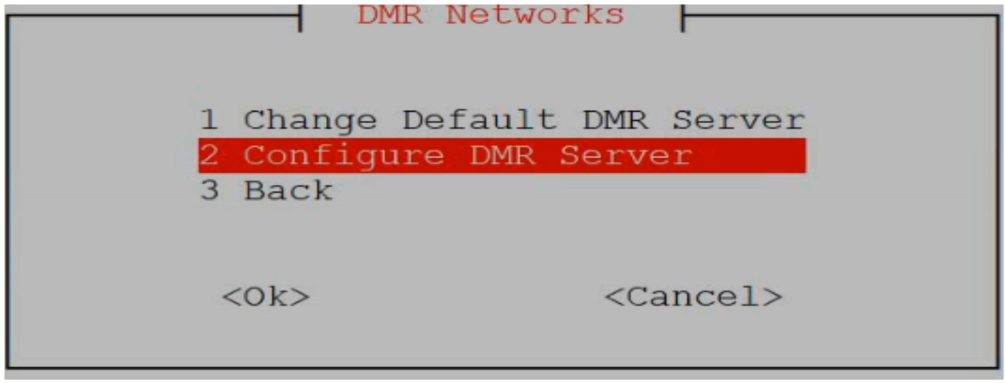
Select Option **<10>** and select **<OK>**



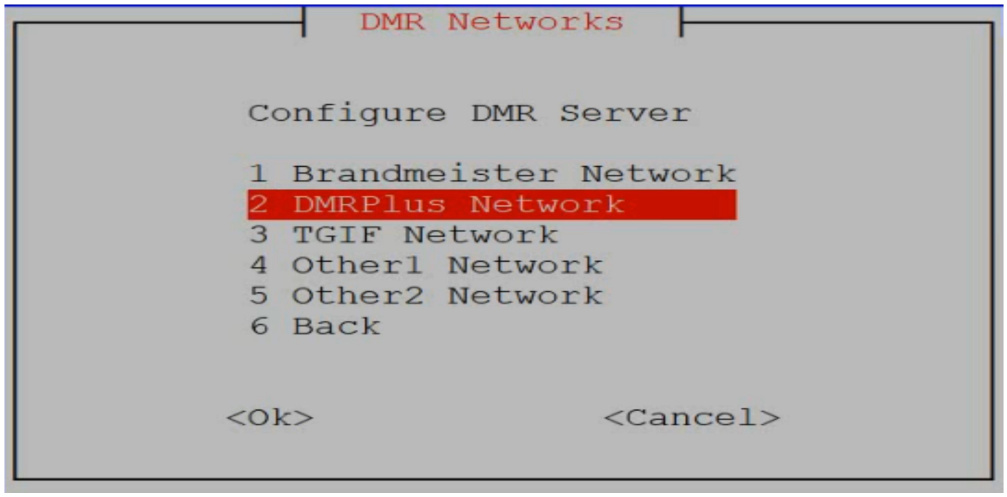
Select Option **<24>**



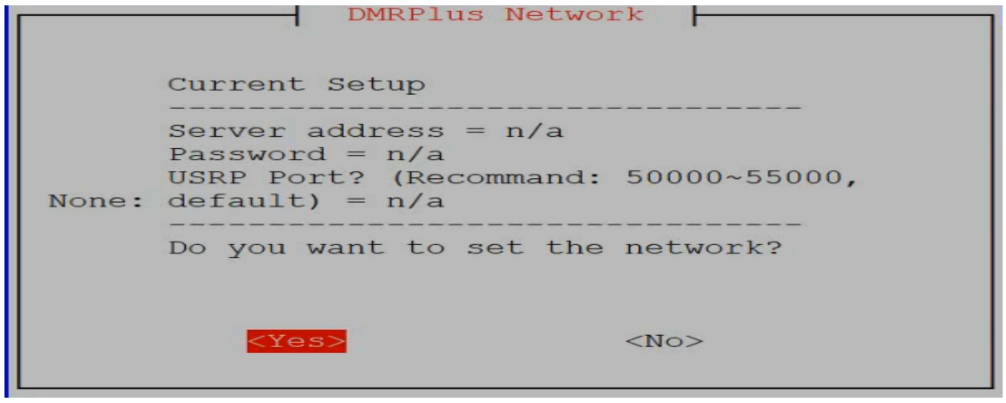
Select Option **<2>**



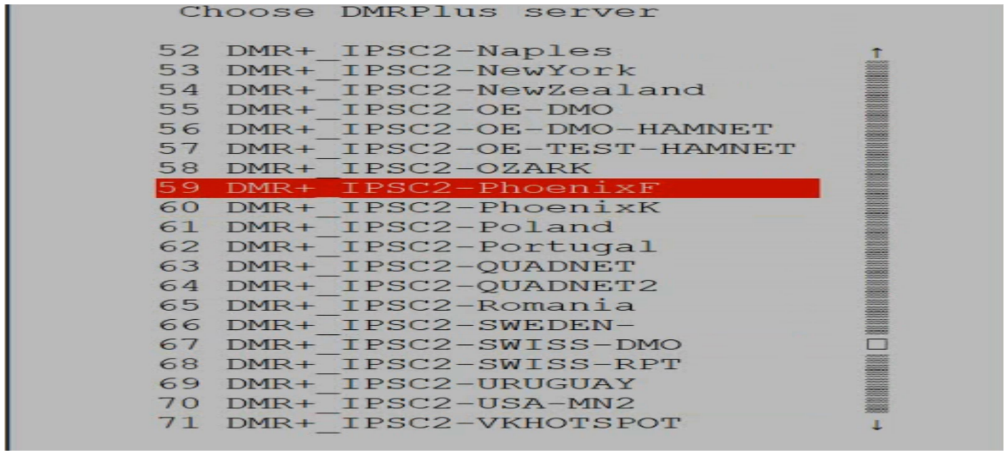
Now because we set up the BrandMeister network up in the initial configuration we don't need to touch it so select Option **<2>** and select **<OK>**



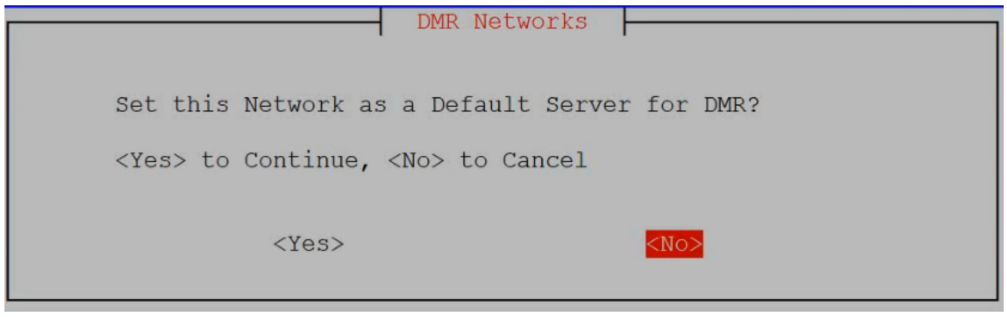
Select **<Yes>**



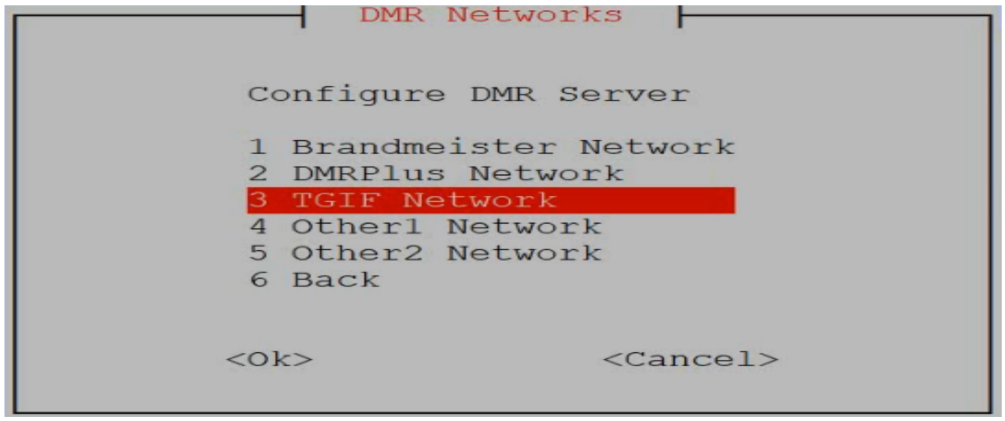
Scroll down the list and choose option **<59>** IPCS2-PheonixF unless you have a preference and press **<Enter>**



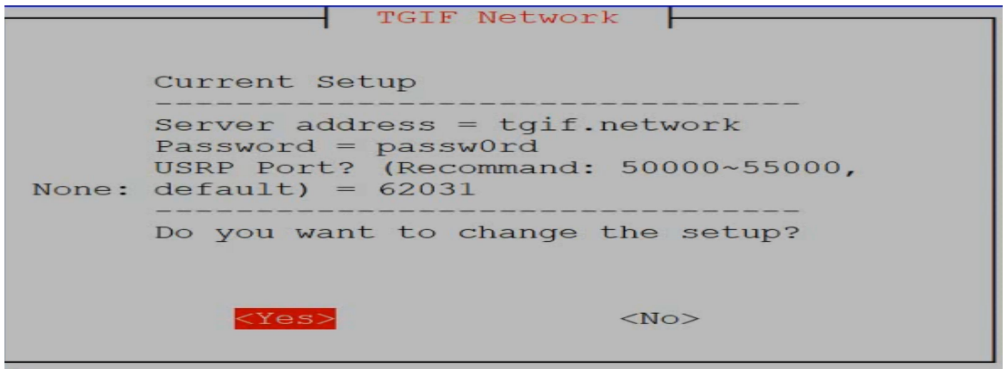
Select **<No>** and press **<Enter>**



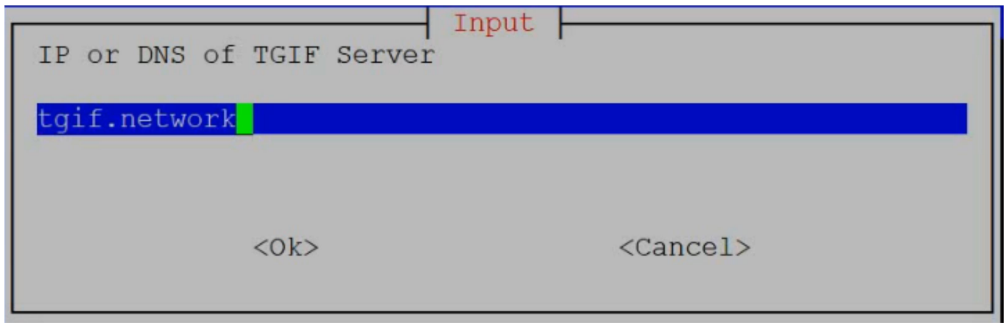
Select Option **<3>** and **<OK>**



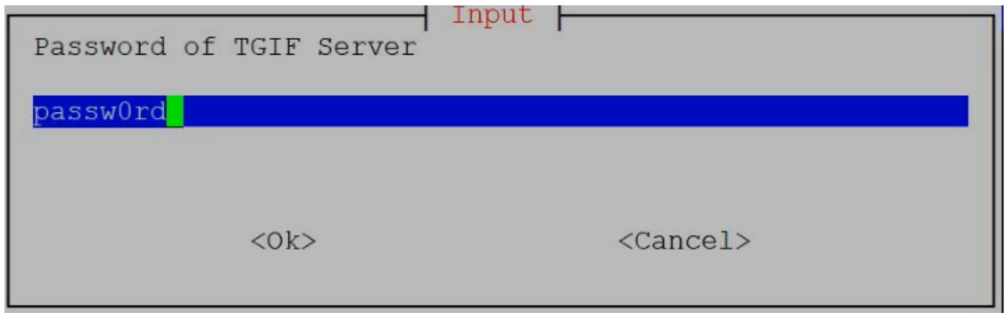
Select **<Yes>**



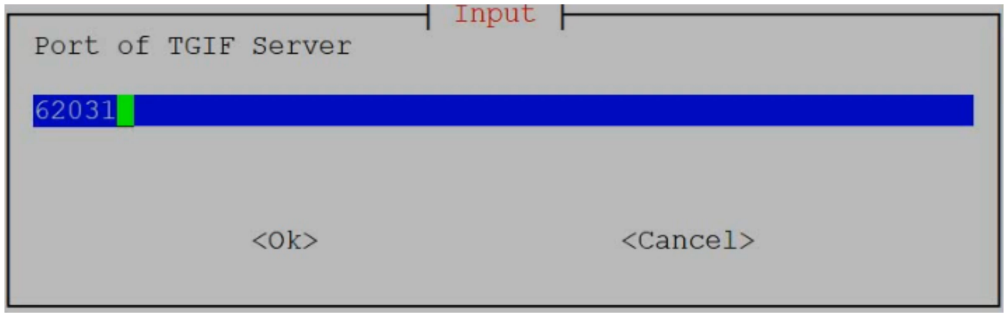
Select **<OK>**



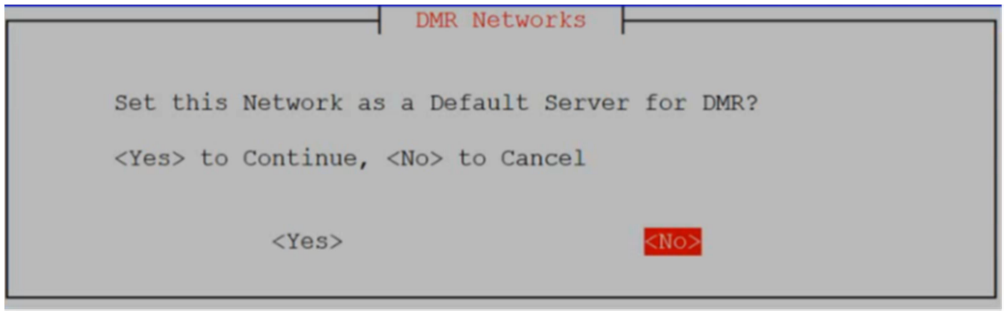
Leave as default or type in your personnel TGIF password and select **<OK>**



Select **<OK>**

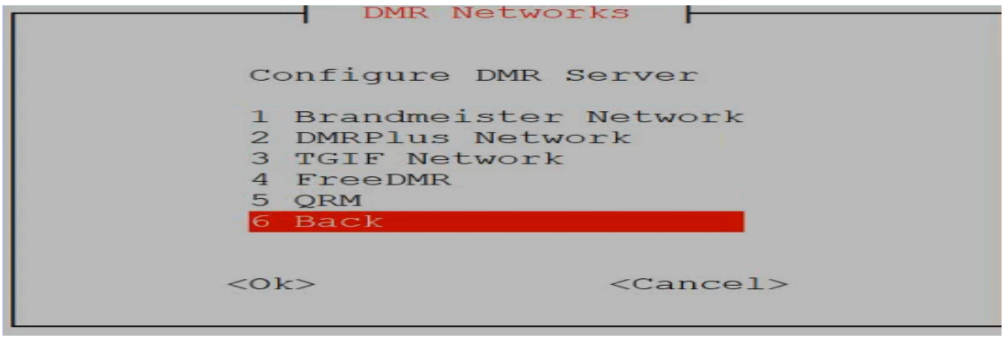


Select **<No>**

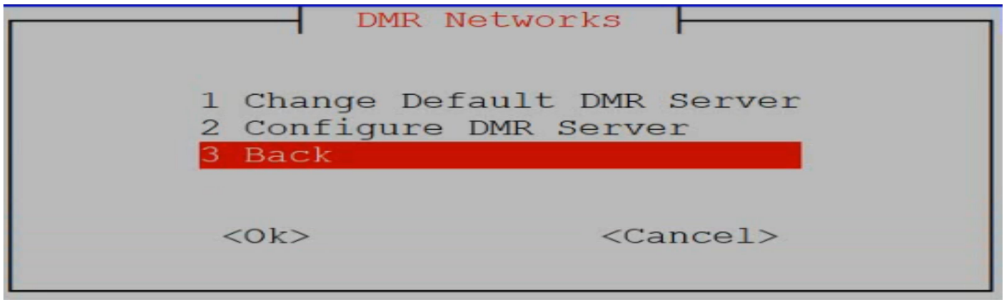


Select **<OK>**

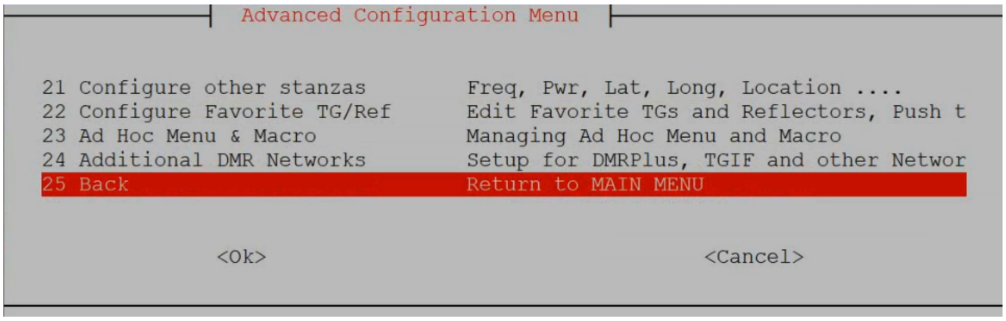
Select option **<6>,** then **<OK>**



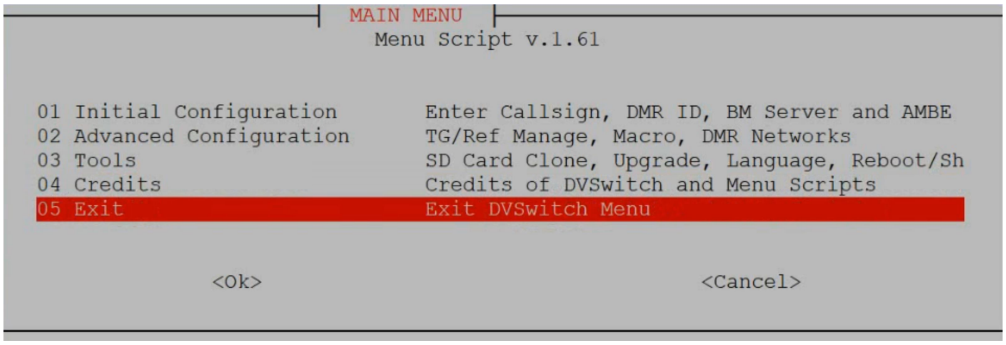
Select option **<3>** then **<OK>**



Select option **<25>** then **<OK>**



Select option **<05>** then **<OK>**



In the Terminal type **apt update**

```
root@repeater:/usr/local/dvs# apt update
Hit:1 http://archive.raspberrypi.org/debian buster InRelease
Hit:2 http://raspbian.raspberrypi.org/raspbian buster InRelease
Hit:3 http://dvswitch.org/DVSwitch_Repository buster InRelease
Get:4 http://apt.allstarlink.org/repos/asl_builds buster InRelease [7392 B]
Err:4 http://apt.allstarlink.org/repos/asl_builds buster InRelease
  The following signatures couldn't be verified because the public key is not av
ailable: NO_PUBKEY 6A72C389B517460F
Fetched 7392 B in 4s (1891 B/s)
Reading package lists... 52%
```

When completed type **apt upgrade**

```
root@repeater:/usr/local/dvs# apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... 10%
```

Press **<Y>** to continue

```
102 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 111 MB of archives.
After this operation, 8569 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Type in **apt install analog-reflector**

```
root@repeater:/usr/local/dvs# apt install analog-reflector
```

Answer **<Yes>**

```
The following NEW packages will be installed:
  analog-reflector libev4 libwebsockets8 lsof mosquitto
0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.
Need to get 11.7 MB of archives.
After this operation, 1035 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Type **cd /opt/Analog_Reflector/ssl**

```
root@repeater:/usr/local/dvs# cd /opt/Analog_Reflector
root@repeater:/opt/Analog_Reflector# cd ssl
root@repeater:/opt/Analog_Reflector/ssl#
```

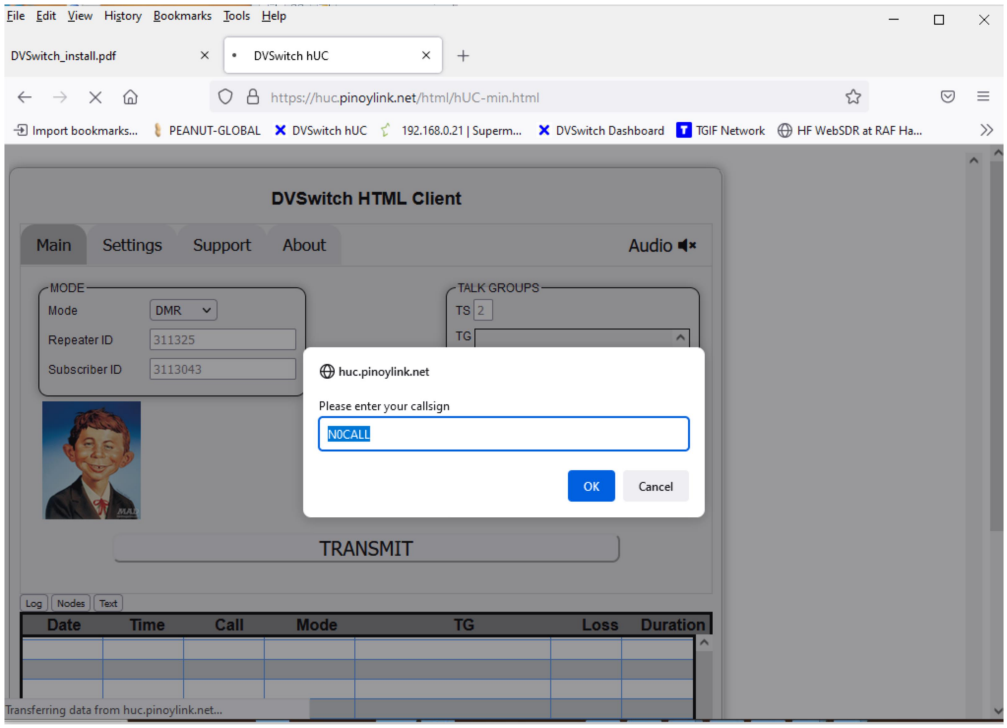
Type in **./mkcerts.sh** reboot after this as pic

```
root@repeater:/opt/Analog_Reflector/ssl# ./mkcerts.sh
Can not get country, state and locality, using placeholders.
Generating self signed certificate, please wait.....
```

Type in **cd .. ,** then **./Analog_Reflector -f Analog_Reflector.json**

```
Your certificate is now ready for use
root@repeater:/opt/Analog_Reflector/ssl# cd ..
root@repeater:/opt/Analog_Reflector# ./Analog_Reflector -f Analog_Reflector
```

Open up a web browser you're your PI's IP address https://192.168.x.x/html/hUC-min.html and check if the client page comes up. If it does login with your call sign and your node password. **NOTE:** you will not be able to transmit at this point.



Go back to the terminal type in **cd ..** , then cd **Analog_Bridge**, then **nano Analog_Bridge.ini**

```
root@repeater:/opt/Analog_Reflector# cd ..
root@repeater:/opt# cd Analog_Bridge
root@repeater:/opt/Analog_Bridge# ls
Analog_Bridge      adv_hotspot.txt    adv_rxgain.txt  dvsm.basic
Analog_Bridge.ini  adv_main.txt       adv_tgref.txt   dvsm.macro
adv_audio.txt      adv_managetg.txt   adv_tools.txt   dvsm.sh
adv_dmr.txt        adv_resetfvrt.txt  adv_txgain.txt  parrot.sh
root@repeater:/opt/Analog_Bridge# nano Analog_Bridge.ini
```

scroll down to **[USRP]** change **txPor**t and **rxPort** to **31001.** The CTRL –X save and exit.

```
  GNU nano 3.2                    Analog_Bridge.ini

txTg = 9                                ; TG to use for all frames sent from An$
txTs = 2                                ; Slot to use for frames sent from Anal$
colorCode = 1                           ; Color Code to assign DMR frames

; Information for USRP channel driver.  This interface uses PCM to transfer aud$
; There are two typical configurations, ASL and Transcode.  ASL (AllstarLink) i$
; to a digital network.  Transcode is when Analog_Bridge actually points its PC$
; causing a TLV <-- (pcm <--> pcm) --> TLV type of architecture.
;   When using ASL, this matches the rpt.conf ASL file with a setting like:
;   rxchannel = usrp/127.0.0.1:34001:32001
;   When Transcoding, make two ini files and set txPort equal to the other inst$
;   each instance with its own ini file.
[USRP]
address = 127.0.0.1                     ; IP address of USRP partner (Analog_Re$
txPort = 52424                          ; Transmit USRP frames on this port
rxPort = 52424                          ; Listen for USRP frames on this port
usrpAudio = AUDIO_USE_GAIN              ; Digital -> Analog (AUDIO_UNITY, AUDIO$
usrpGain = 4.00                         ; Gain factor when usrpAudio = AUDIO_US$
usrpAGC = -20,10,100                    ; Set the agc threshold (db), slope (db$

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text^T To Spell  ^_ Go To Line
```

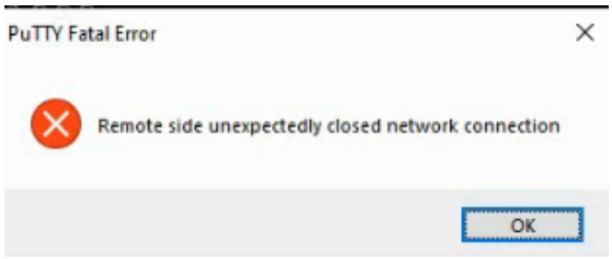
Type in **cd .. , then ./Analog_Reflector user [call sign] [dmirid] [dmrid11] [node passwd] 11.** Fill in the square brackets with your call sign, your dmrid, your dmrid with the 2 number prefix you chose in the initial setup of dvswitch, your node passwd and again the 2 number prefix.

```
root@repeater:/opt/Analog_Bridge# cd ..
root@repeater:/opt# cd Analog_Reflector
root@repeater:/opt/Analog_Reflector# ./Analog_Reflector user M7MRX 2[redacted]4 2[redacted]11 [redacted] 11
User successfully created.
root@repeater:/opt/Analog_Reflector#
```

In terminal type **reboot**

```
root@repeater:/opt/Analog_Reflector# reboot
```

Click **<OK>**



Re open a terminal in putty and login at the prompt type in **sudo –s**

```
Last login: Thu Oct 21 19:26:59 2021 from 192.168.0.35
repeater@repeater:~$ sudo -s
root@repeater:/home/repeater#
```

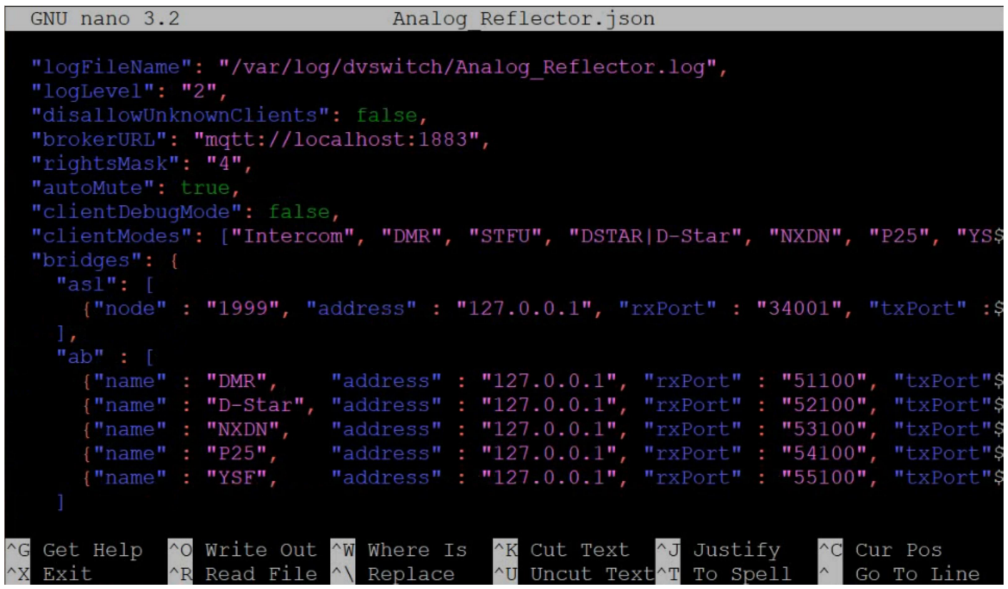
Type **cd /opt/Analog_Reflector,** then **nano Analog_Refector.json**

```
root@repeater:/home/repeater# cd /opt
root@repeater:/opt# cd Analog_Reflector
root@repeater:/opt/Analog_Reflector# nano Analog_Reflector.json
```

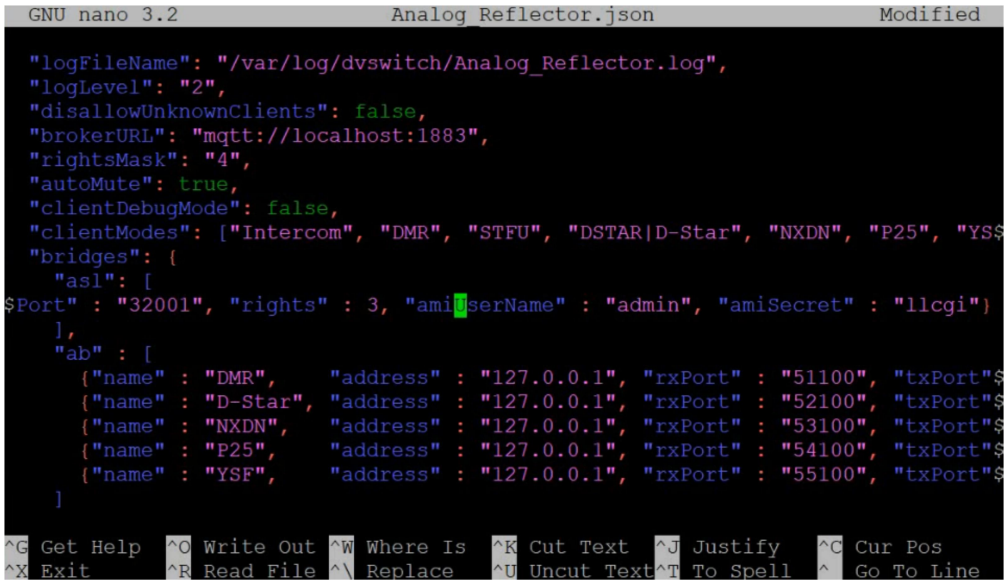
Change **"dmrID":"1234567",** to your **dmrID** number

```
  GNU nano 3.2                  Analog_Reflector.json

{
  "nodeName":"DVSwitch",
  "dmrID":"1234567",
  "abAddress": "127.0.0.1",
  "usrpTxPort": "31001",
  "usrpRxPort": "31001",
  "mobilePort": "12345",
  "wsPort": "443",
  "keyDir": "./ssl/",
  "siteroot": "./arRoot",
  "logFileName": "/var/log/dvswitch/Analog_Reflector.log",
  "logLevel": "2",
  "disallowUnknownClients": false,
  "brokerURL": "mqtt://localhost:1883",
  "rightsMask": "4",
  "autoMute": true,
  "clientDebugMode": false,
  "clientModes": ["Intercom", "DMR", "STFU", "DSTAR|D-Star", "NXDN", "P25", "YS$
  "bridges": {
                        [ Read 34 lines ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace   ^U Uncut Text^T To Spell  ^_ Go To Line
```

Scroll down to node and change **[1999]** to your Allstar node number.



Then scroll to the end of the line and **change "amiSecret" : "11cgi"** to **"amiSecret" : "your node password"**



CTRL-X save and **Exit**, type in **reboot** and that it your done