

## Setup a MMDVMHost Raspberry Pi DVMEga Hotspot

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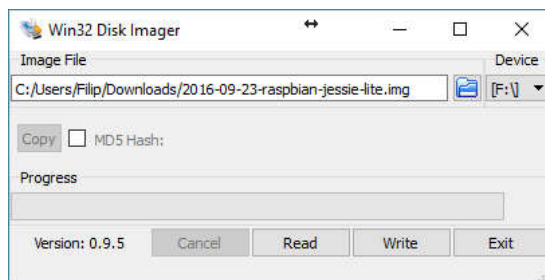
**Labels:** DMR, Dstar, Fusion, HAM, Linux

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1. Download Raspbian Jessie Lite <https://www.raspberrypi.org/downloads/raspbian/>



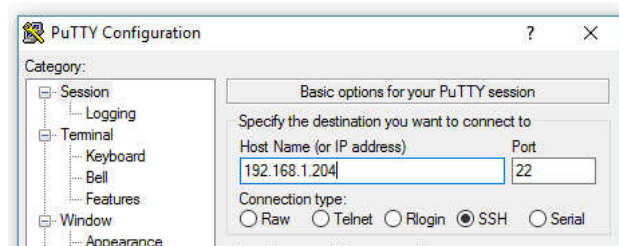
2. Use Win32 Disk Imager to save the Raspbian Jessie Lite on a 16 GB MicroSDHC card <https://sourceforge.net/projects/win32diskimager/>



3. Boot the Raspberry Pi 3 with a network connection and check the IP address in your router

```
192.168.1.204 | B8:27:EB:21:5B:A8 | raspberrypi | 2d 23:59:18 bound
```

4. Use Putty to make a SSH connection to your Raspberry Pi 3 <http://www.putty.org/>



Accept the Putty Security Alert

5. Login into your Raspberry Pi 3

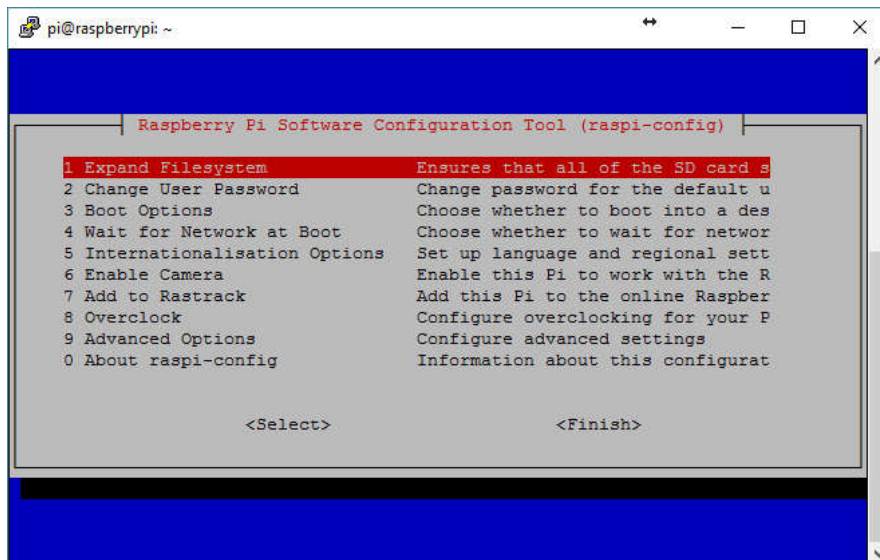
```
login as: pi  
raspberrypi@192.168.1.204's password: raspberry
```

```
192.168.1.204 - PuTTY
login as: pi
pi@192.168.1.204's password: █
```

```
pi@raspberrypi:~
login as: pi
pi@192.168.1.204's password:
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
pi@raspberrypi:~ $ █
```

6. Expand your MicroSDHC filesystem to 16GB

```
# sudo raspi-config
```



and reboot



7. Update your Raspberry Pi 3 to the latest Raspbian Jessie Lite version

```
# sudo apt-get update && sudo apt-get upgrade
```

8. Setup Wireless networking

Check the available ESSID's

```
# sudo iwlist wlan0 scan
```

Edit wpa\_supplicant.conf --> add your wireless network

```
# sudo nano /etc/wpa_supplicant/wpa_supplicant.conf
```

```
country=BE
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1

network={
    ssid="Fill in your SSID"
    psk="Fill in your password"
}
```

9. Improve color scheme / readability of the 'ls' command in Putty

```

# ls /home/
# dircolors --print-database > ~/.dircolors
# grep DIR .dircolors

Edit the .dircolors file
# nano .dircolors

Change DIR 01;34 # directory into DIR 01;33 # directory

# grep DIR .dircolors
# eval `dircolors ~/.dircolors`

```

## 10. Improve color scheme / readability of the command prompt

```

Edit the bashrc file
# nano .bashrc

Change following rows
if [ "$color_prompt" = yes ]; then
    PS1='${debian_chroot:+($debian_chroot)}\[\033[01;32m\]\u@\h\[\033[00m\]:\[\033[01;34m\]\w
\$\[\033[00m\] '
else
    PS1='${debian_chroot:+($debian_chroot)}\u@\h:\w\$ '
fi

into these rows
if [ "$color_prompt" = yes ]; then
#     PS1='${debian_chroot:+($debian_chroot)}\[\033[01;32m\]\u@\h\[\033[00m\]:\[\033[01;34m\]\w
\$\[\033[00m\] '
    PS1='${debian_chroot:+($debian_chroot)}!\ [\033[01;32m\]\u@\h] \[\033[01;36m\]\w \$ \
[\033[00m\]'
else
    PS1='${debian_chroot:+($debian_chroot)}\u@\h:\w\$ '
fi

Reload the bashrc file
# source ~/.bashrc

```

## 11. Install MMDVMHost

```

Install git software
# sudo apt-get install git screen

Download MMDVMHost & MMDVMCal
# cd /opt
# sudo git clone https://github.com/g4klx/MMDVMHost.git
# sudo git clone https://github.com/g4klx/MMDVMCal.git

Compile MMDVMHost & MMDVMCal
# cd /opt/MMDVMHost
# sudo make
# cd /opt/MMDVMCal
# sudo make

Create log directory for the MMDVMHost log files
# sudo mkdir /var/log/MMDVM

```

## 12. Configure MMDVMHost

```

# cd /opt/MMDVMHost
# sudo nano MMDVM.ini

[General]
CallSign=fill in your callsign
Timeout=180
Duplex=0
# ModeHang=10
# RfModeHang=10
RfModeHang=30 # (minimum 30sec required for Fusion)
NetModeHang=3
Display=Nextion # (in case Nextion display is used)
#Display=None
Daemon=0

[Info]
RXFrequency=433650000

```

```
TXFrequency=433650000  
Power=1  
Latitude=50.858935  
Longitude=3.431811  
Height=15  
Location=Describe your location  
Description=Multi-Mode Repeater  
URL=fill in your website (f.i. https://www.qrz.com/db/callsign
```

```
[Log]  
# Logging levels, 0=No logging  
DisplayLevel=2  
FileLevel=2  
FilePath=/var/log/MMDVM  
FileRoot=MMDVM
```

```
[CW Id]  
Enable=1  
Time=10
```

```
[DMR Id Lookup]  
File=DMRIds.dat  
Time=24
```

```
[Modem]  
Port=/dev/ttyAMA0  
# Port=/dev/ttyACM0  
# Port=\\.COM3  
TXInvert=1  
RXInvert=0  
PTTInvert=0  
TXDelay=100  
DMRDelay=0  
RXLevel=50  
TXLevel=50  
# CWIdTXLevel=50  
# D-StarTXLevel=50  
# DMRTXLevel=50  
# YSF TXLevel=50  
# P25TXLevel=50  
OscOffset=0  
RSSIMultiplier=1  
RSSIOffset=10  
Debug=0
```

```
[UMP]  
Enable=0  
# Port=\\.COM4  
Port=/dev/ttyACM1
```

```
[D-Star]  
Enable=1  
Module=B  
SelfOnly=0
```

```
[DMR]  
Enable=1  
Beacons=1  
Id=fill in your EMR ID XXXXXX  
ColorCode=1  
SelfOnly=0  
# Prefixes=234,235  
CallHang=3  
TXHang=4  
#Blacklist=  
#DstIdBlackListSlot1RF=  
#DstIdBlackListSlot2RF=  
#DstIdWhiteListSlot1RF=  
#DstIdWhiteListSlot2RF=  
#DstIdBlackListSlot1NET=  
#DstIdBlackListSlot2NET=  
#DstIdWhiteListSlot1NET=  
#DstIdWhiteListSlot2NET=  
TGRewriteSlot1=0  
TGRewriteSlot2=0  
BMAutoRewrite=0  
BMRewriteReflectorVoicePrompts=0  
DirectDial=0  
TargetTG=9  
#RewriteMapSlot1=  
#RewriteMapSlot2=
```

```
[System Fusion]
Enable=1
RemoteGateway=0

[F25]
Enable=0
NAC=293

[D-Star Network]
Enable=1
GatewayAddress=127.0.0.1
GatewayPort=20010
LocalPort=20011
Debug=0

[DMR Network]
Enable=1
Address=81.95.127.156 # (DMR Master Belgium)
Port=62031
Jitter=300
# Local=3350
Password=password
# Cptions=
RSSI=0
Slot1=0
Slot2=1
Debug=0

[System Fusion Network]
Enable=1
LocalAddress=127.0.0.1
LocalPort=3200
GwyAddress=127.0.0.1
GwyPort=4200
Debug=0

[P25 Network]
Enable=0
GatewayAddress=127.0.0.1
GatewayPort=42020
LocalPort=32010
Debug=0

[TFT Serial]
# Port=modem
Port=/dev/ttyAMA0
Brightness=50

[HD44780]
Rows=2
Columns=16

# For basic HD44780 displays (4-bit connection)
# rs, strb, d0, d1, d2, d3
Pins=11,10,0,1,2,3

# Device address for I2C
I2CAddress=0x20

# PWM backlight
PWM=0
PWMPin=21
PWMBright=100
PWMDim=16

DisplayClock=1
UTC=0

[Nextion]
# Port=modem
# Port=/dev/ttyAMA0
Port=/dev/ttyUSB0
Brightness=50
DisplayClock=1
UTC=0
IdleBrightness=5

[OLED]
Type=3
Brightness=0
Invert=0

[LCDproc]
Address=localhost
Port=13666
```

```
#LocalPort=13667
DimOnIdle=0
DisplayClock=1
UTC=0
```

### 13. Configure serial communication with DVMega

```
# sudo nano /boot/cmdline.txt

Delete «ttyAMA0 » if present
Delete «console=serial0,115200»
You will get something like
«dwc_otg.lpm_enable=0 console=tty1 root=/dev/mmcblk0p2 rootfstype=ext4 elevator=deadline
fsck.repair=yesrootwait»

# sudo nano /boot/config.txt

Disable Bluetooth --> add at the end of the file

# Additionaloverlays and parametersare documented/boot/overlays/README
# Enableaudio (loadsnd_bcm2835)
dtparam=audio=on
# Modification Bluetooth
dtoverlay=pi3-disable-bt
```

### 14. Creating the needed services

Create service mmdvmhost.service  
# sudo nano /lib/systemd/system/mmdvmhost.service

Add below in the new file

```
[Unit]
Description=MMDVM Host Service
After=syslog.targetnetwork.target
[Service]
User=root
WorkingDirectory=/opt/MMDVMHost
ExecStart=/usr/bin/screen -S MMDVMHost -D -m /opt/MMDVMHost/MMDVMHost /opt/MMDVMHost/MMDVM.ini
ExecStop=/usr/bin/screen -S MMDVMHost -X quit
[Install]
WantedBy=multi-user.target
```

CTRL+X and Y

Make your file executable

```
# sudo chmod 755 /lib/systemd/system/mmdvmhost.service
# sudo ln -s /lib/systemd/system/mmdvmhost.service /etc/systemd/system/mmdvmhost.service
```

Create a 60 sec timer mmdvmhost.timer

```
# sudo nano /lib/systemd/system/mmdvmhost.timer
```

Add following in the new file

```
[Timer]
OnStartupSec=60
[Install]
WantedBy=multi-user.target
```

CTRL+X and Y

Make your file executable

```
# sudo chmod 755 /lib/systemd/system/mmdvmhost.timer
# sudo ln -s /lib/systemd/system/mmdvmhost.timer /etc/systemd/system/mmdvmhost.timer

# sudo systemctl daemon-reload
# sudo systemctl enable mmdvmhost.timer
```

### 15. Reboot the Raspberry Pi 3 and wait 60 seconds till MMDVMHost starts

### 16. Install ircDBGateway

```
# sudo curl http://repo1.ham-digital.net/raspbian/pendv.list -o /etc/apt/sources.list.d/pendv.list
# cd /tmp
# wget http://repo1.ham-digital.net/debian/dl5di.pk
```

```
# sudo apt-key add dl5di.pk
# sudo apt-get update
# sudo apt-get install ircddbgateway
```

After the installation your /home/opencv/ircddbgateway/ircddbgateway file should like similar to below file

```
language=10
gatewayCallsign=fill in your callsign
latitude=50.858935
longitude=3.431811
description1=Describe your location
url=fill in your website (f.i. http://status.ircddb.net/qam.php?call=your callsign)
hbAddress=127.0.0.1
hbPort=20010
repeaterCall1=fill in your callsign
repeaterBand1=B
repeaterType1=0
repeaterAddress1=127.0.0.1
repeaterPort1=20011
frequency1=433.650000
offset1=0.0000
rangeKms1=1
ag11=15
reflector1=DCS011 B
atStartup1=1
reconnect1=0
latitude1=50.858935
longitude1=3.431811
ircddbEnabled=1
ircddbHostname=group1-irc.ircddb.net
ircddbUsername=fill in your callsign
ircddbPassword=fill in your callsign
aprsEnabled=1
aprsHostname=euro.aprs2.net
aprsPort=14580
ccsEnabled=1
ccsHost=CCS711
dextraEnabled=1
dextraMaxDongles=3
dplusEnabled=1
dplusMaxDongles=3
dplusLogin=fill in your callsign
dcsEnabled=1
remoteEnabled=0
infoEnabled=1
echoEnabled=1
logEnabled=1
dratsEnabled=0
dtmfEnabled=1
```

Reboot the Raspberry Pi 3 and wait 60 seconds till MMDVMHost starts

## 17. Install YSFGateway

Download YSF Gateway

```
# cd /cpt
# sudo git clone https://github.com/g4klx/YSFclients.git
```

Compile YSF Gateway

```
# cd /cpt/YSFclients/YSFGateway
# sudo make
# sudo cp YSFGateway /usr/local/bin
```

Configure YSF Gateway

```
# sudo mkdir /etc/YSFGateway
# sudo nano /etc/YSFGateway/YSFGateway.ini
```

```
[General]
Callsign=fill in your callsign
Suffix=RPT
# Suffix=ND
RptAddress=127.0.0.1
RptPort=3200
LocalAddress=127.0.0.1
LocalPort=4200
Daemon=1

[Info]
RXFrequency=433650000
TXFrequency=433650000
Power=1
Latitude=50.858935
```



```

Longitude=3.431811
Height=15
Name=Describe your location
Description=Multi-Mode Repeater

[Log]
# Logging levels, 0=No logging
DisplayLevel=2
FileLevel=2
FilePath=/var/log/YSFGateway
FileRoot=YSFGateway

[aprs.fi]
Enable=1
# Server=noam.aprs2.net
Server=euro.aprs2.net
Port=14580
Password=xxxx #(password can be checked with via http://apps.magicbug.co.uk/passcode/index.php)

[Network]
Enable=1
Port=42000
Hosts=/etc/YSFGateway/YSFHosts.txt
ReloadTime=60
ParrotAddress=127.0.0.1
ParrotPort=42000
# Startup=
Debug=0

```

Create log directory for the YSF Gateway log files

```
# sudo mkdir /var/log/YSFGateway
```

Move the Fusion Host file to the correct location

```
# sudo cp YSFHosts.txt /etc/YSFGateway
```

Download the most recent host file from the web

```
# sudo wget -O /etc/YSFGateway/YSFHosts.txt http://register.yzfreflector.de/export_csv.php
```

Define the correct file access rights

```
# sudo groupadd mmdvm
# sudo useradd mmdvm -g mmdvm -s /sbin/nologin
# sudo chgrp mmdvm /var/log/YSFGateway
# sudo chmod g+w /var/log/YSFGateway
```

Create a starting script for automatic start during boot

```
# sudo nano /etc/init.d/YSFGateway.sh
```

```

#!/bin/bash
### BEGIN INIT INFO
#
# Provides:          YSFGateway
# Required-Start:    $all
# Required-Stop:
# Default-Start:     2 3 4 5
# Default-Stop:      0 1 6
# Short-Description: Example startscript YSFGateway

#
### END INIT INFO
## Fill in name of program here.
PROG="YSFGateway"
PROG_PATH="/usr/local/bin/"
PROG_ARGS="/etc/YSFGateway/YSFGateway.ini"
PIDFILE="/var/run/YSFGateway.pid"
USER="root"

start() {
    if [ -e $PIDFILE ]; then
        ## Program is running, exit with error.
        echo "Error! $PROG is currently running!" 1>&2
        exit 1
    else
        ## Change from /dev/null to something like /var/log/$PROG if you want to save output.
        sleep 20
        cd $PROG_PATH
        ./$PROG $PROG_ARGS
        echo "$PROG started"
        touch $PIDFILE
    fi
}

stop() {
    if [ -e $PIDFILE ]; then

```

```

        ## Program is running, so stop it
        echo "$PROG is running"
        rm -f $PIDFILE
        killall $PROG
        echo "$PROG stopped"
    else
        ## Program is not running, exit with error.
        echo "Error! $PROG not started!" 1>&2
        exit 1
    fi
}

## Check to see if we are running as root first.
## Found at http://www.cyberciti.biz/tips/shell-root-user-check-script.html
if [ "$(id -u)" != "0" ]; then
    echo "This script must be run as root" 1>&2
    exit 1
fi

case "$1" in
    start)
        start
        exit 0
    ;;
    stop)
        stop
        exit 0
    ;;
    reload|restart|force-reload)
        stop
        sleep 5
        start
        exit 0
    ;;
    **)
        echo "Usage: $0 {start|stop|reload}" 1>&2
        exit 1
    ;;
esac
exit 0
### END

```

Make the starting script executable

```
# sudo chmod +x /etc/init.d/YSFGateway.sh
```

Activate script to run during boot

```
# sudo apt-get install chkconfig
# sudo chkconfig YSFGateway.sh on
```

Start the Fusion Gateway

```
# sudo /etc/init.d/YSFGateway.sh start
```

Update the Fusion Host file each 10 minutes

```
# sudo crontab -e
```

```
*/10 * * * * wget -O /etc/YSFGateway/YSFHosts.txt
http://register.ysfreflector.de/export_csv.php
```

Reboot the Raspberry Pi 3 and wait 60 seconds till MMDVMHost starts

## 18. Install MMDVMHost Dashboard

Install a lightweight webserver

```
# sudo apt-get install lighttpd
```

Create the correct group and user access rights

```
# sudo groupadd www-data
# sudo usermod -G www-data -a pi
# sudo chown -R www-data:www-data /var/www/html
# sudo chmod -R 775 /var/www/html
```

Install PHP5

```
# sudo apt-get install php5-common php5-cgi php5
# sudo lighty-enable-mod fastcgi
# sudo lighty-enable-mod fastcgi-php
# sudo service lighttpd force-reload
```

Install the MMDVMHost Dashboard

```
# cd /opt
# sudo git clone https://github.com/dg9vh/MMDVMHost-Dashboard.git
# sudo cp -a /opt/MMDVMHost-Dashboard /var/www/html/
# sudo rm index.lighttpd.html
```

Allow reboot, restart and halt commands within PHP

```
# sudo nano /etc/sudoers
```

```
%www-data ALL=NOPASSWD: /sbin/halt, /sbin/reboot, /bin/systemctl
```

your dashboard can now be accessed via <http://ip-of-your-mmdvm/>

move `/var/www/html/config/config.php` outside your web file system !!!

#### 19. Install and connect your Nextion 2.4" LCD display using a USB to TTL UART converter type CP2102



Connect the Nextion display to the CP2102 converter

```
Black --> GND  
Yellow --> RXD  
Blue --> TXD  
Red --> 5V
```

Plug in the USB-TTL converter into the USB port

Install Python & Python-Serial

```
# sudo apt-get install python-serial python
```

Stop the MMDVMHost if running

```
# sudo systemctl stop mmdvmhost.service
```

Download the Nextion Firmware into the display using the Raspberry Pi 3

```
# cd /opt/MMDVMHost/Nextion
```

```
# python nextion.py NX3224T024.tft /dev/ttyUSB0 # (use the .tft file conform the productcode mentioned on the back
```

The MMDVM logo should appear after a successful download

Make sure the use of your Nextion display is activated in your MMDVM.ini file and the communication port and brightness are correctly set

```
[General]  
Display=Nextion  
#Display=None  
  
[Nextion]  
# Port=modem  
# Port=/dev/ttyAMA0  
Port=/dev/ttyUSB0  
Brightness=50  
DisplayClock=1  
UTC=0  
IdleBrightness=5 # (level at your own preference)
```

Restart the MMDVMHost service

```
# sudo systemctl start mmdvmhost.service
```

#### 20. Enjoy your MMDVM Host in DMR, Dstar and Fusion mode !

