

AmRRON Linux Install Scripts

Basic User's Guide

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Version History

The most up to date document will always be located at https://gitlab.com/amrron/setup-scripts.git By running git pull on your local clone of the repository, you will have the current version of this guide.

v1.0	Initial Release	23 JAN 2025

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1. Introduction

1.1: Purpose

The AmRRON Setup Scripts began as a project to assist local AmRRON operators with compiling and installing Amateur Radio software on the Raspberry Pi. Over time, the basic install script has expanded in scope and has become widely distributed.

The intent of this repository is to provide tools for the AmRRON operator to quickly and easily set up a Linux computer with the tools necessary for digital modes. Many other additional programs are included covering security, encryption, etc.

This guide will be an evolving document. As new features and modes are adopted into the script and AmRRON operations, I will add them to the guide. Check for updated and added sections in the future covering additional tools such as Bitmessage and Kleopatra GPG key usage.

1.2: Requirements

Basic requirements are a Ham Radio (preferably one with full control via USB), a computer of moderate specs able to run Linux Mint 22.1. At a minimum you'll need about 8 GB of Ram and 32 GB of storage.

I'd strongly recommend having a dedicated computer for your radio work. Ideally, choose a laptop or mini-PC that can be powered by 12v DC to allow for easy backup power.

You will need a USB flash drive of at least 8GB which can be formatted. You WILL lose all data on this drive during the process so ensure you backup anything you need to keep.

If you are installing on a Evolve III laptop, you MAY need a USB wifi or ethernet adapter or another removable flash drive for initial setup. The Evolve III wifi card may require you to build the drivers before it will work. Some testers have noted the drivers worked natively. This is covered in Appendix A.

These scripts pull, compile, and install many programs from the internet. Conflicts and corruption are not unheard of but generally, all items included have been stable for some time now.

I try to push updates to the scripts as issues arise. Should you find errors, please either submit them via gitlab or email me at tangobravo14@protonmail.com.

If you intend to use the Linux based PAT Winlink program for radio email, you will need to have a winlink password established.

1.3: Limitations

This guide is designed around the IC-7300. It is a very common and capable HF radio for digital work. Most modern radios with one cable USB control and audio should work the same. If you are using a signalink or similar VOX style keying, you will need to modify some of the setup instructions.

This guide does not account for every variability of install. If you are doing a dual-boot, or have different needs you will need to research your specifics.

Many of the scripts actions are dependent upon the structure of the software developer's websites. These do change and will cause breaks to the script. Please reach out via the AmRRON Corps forum, email, or by creating and issue on the gitlab site.

1.4: Terminology

- **OS** – Operating System; The software installed on your computer that your programs run with in. e.g. Windows, MacOS, Linux
- **Distro**- Distribution; In Linux, there are many different variations of the Linux Operating System. These are called Linux Distributions or Distros. e.g. Mint, Ubuntu, Arch, Debian, PopOS!
- **Desktop Environment (DE)** – This is the environment which you interact with your Linux distro, various desktop environments operate differently. Some behave similarly to Windows, others like MacOS, and others in their own unique way. Cinnamon is a Windows-like Desktop environment which Linux Mint uses.
- **BIOS**- Basic Input/Output System; this is the program that runs on your computer that starts the operating system and configures the hardware.
- **Live USB**- A term for a USB drive containing an OS that can be booted into for evaluation or running the installation program
- **Terminal**- This is a text based interface for telling the computer what you want it to do. Also referred to as Command Prompt, or Command Line Interface (CLI)
- **Packages**- Programs distributed for your Linux OS. Many of these operate in the background and provide the support your programs need to run. Some are the actual programs you interact with.
- **Repository**- Also shortened to 'Repo', this is a server location that holds a list of programs that are compatible with your Distro.
- **SUDO**- Super User Do; this is a command you will use in the terminal. Basically this command prefaces another command and forces the computer to execute that as the administrator or 'super user'. Unlike with other operating systems, Linux WILL do what you tell it to do especially when using sudo. If you tell it to do something it will rarely ask you for confirmation even if that action may destroy the system. Make sure you understand what you entering in the terminal.
- **sudo rm -rf /** --- DO NOT TYPE THIS. Every now and then, trolls on the internet will tell someone new to Linux to enter this command to fix a problem. This command WILL delete your entire system. Everything. Its a bad joke that pops up occasionally. You have been warned.
- **APT**- Advanced Package Tool; this is a package manager used in Debian based distros (like Mint) for handling installation and updates of system packages. Three main commands are used with this; *update, upgrade,* and *install.* Think of update like getting a list of items available at the grocery store, this is the current inventory of packages available and their versions. Once we have that list we can use upgrade to apply those system upgrades or use install to get new packages.
- **GUI**- Graphical User Interface; the graphical program a user interacts with as opposed to text based interaction in a terminal environment.

2. Preparations

2.1: Optional – Backup current configuration files.

If you are upgrading from a previous Linux installation, you may wish to backup your current configuration files. By copying these over, you can avoid much of the setup requirements for most programs. This guide is mostly intended to walk a new user through the initial installation and setup.

If you refer to Appendix A, I discuss making a full image backup of your current system as well as how to use the included backup script.

Generally, in your home directory you have 'hidden' folders that are named .config, .ssh, etc. Many people refer to these as your 'dot' files. Most of your configuration files are stored within these locations.

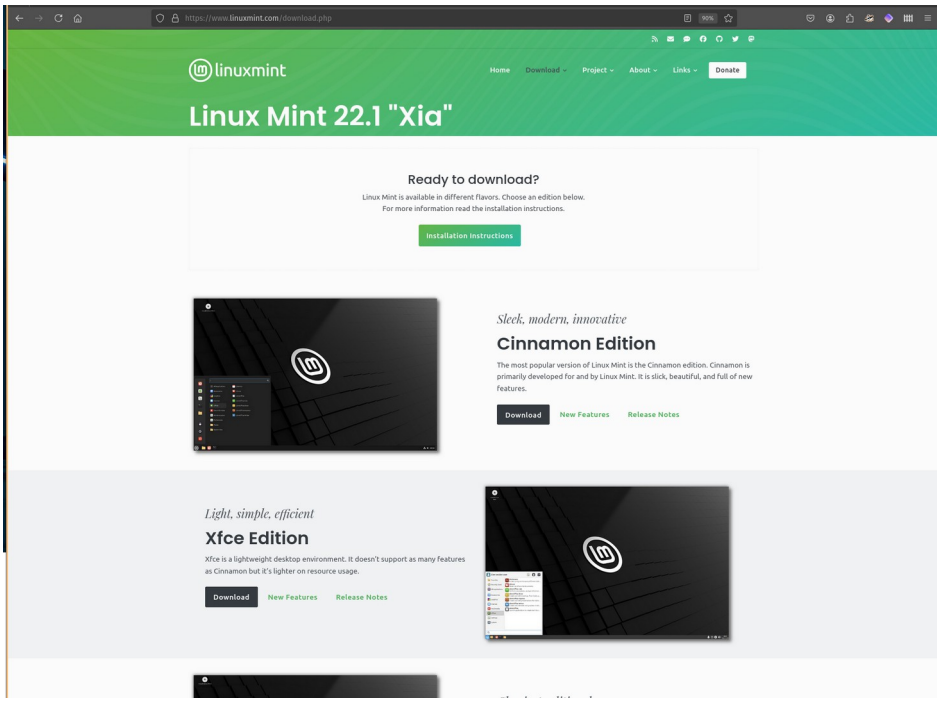
Some exceptions; varim and garim store their configs in their folders as varim.ini and garim.ini respectively.

Reference the current list the backup script archives for ideas of what you may wish to backup.

2.2: Download Linux Mint 22.1 with Cinnamon Desktop

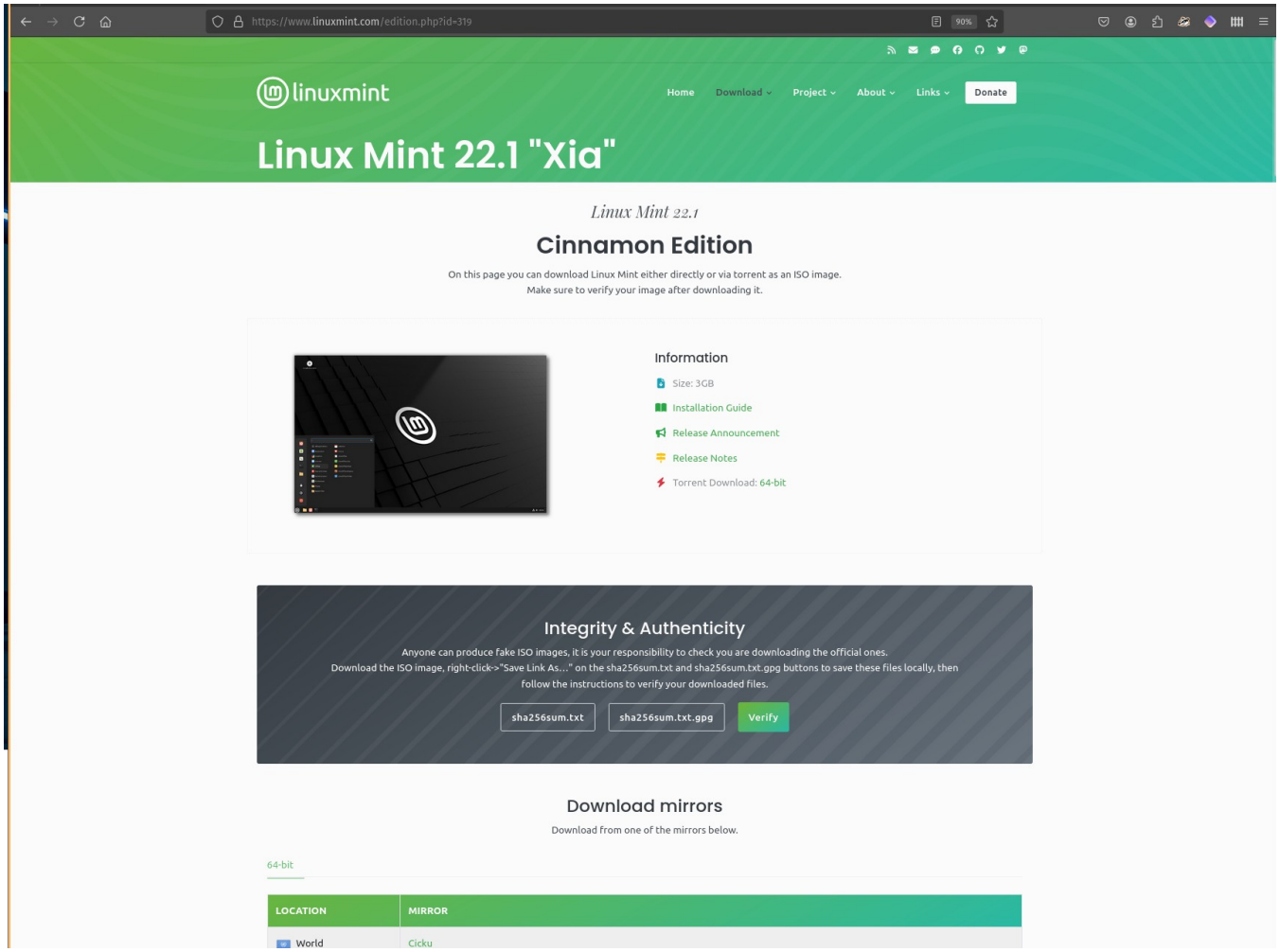
First we need to download the current release of Linux Mint.

Navigate to https://www.linuxmint.com/download.php



You'll see a link for Installation Instructions up at the top. This will provide you with amplified instructions to follow if you need them in addition to the instructions here

From this this screen, click on the Download link under *Cinnamon Edition.*

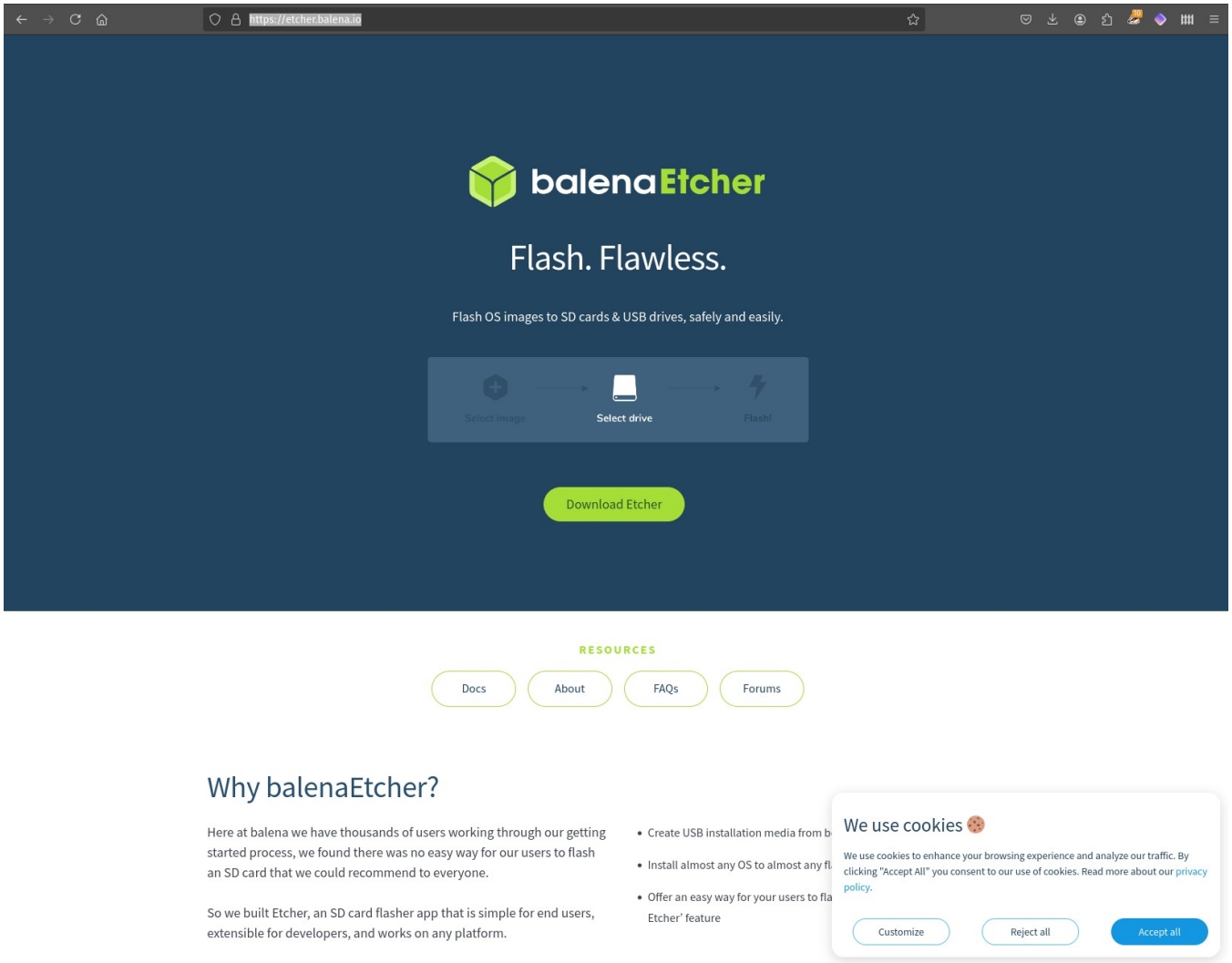


This link will present you with options to download as a torrent or ISO image. If you do not know which you want, stick with the ISO. Down below, you'll see a list of "Download mirrors." These are servers that have the file you want in various parts of the world, click one that is geographically close to you for the best download speeds. When you click the Mirror your download will begin and save the ISO file to your default Downloads folder. This file is about 2.7GB and may take a bit of time if you have slow internet. Continue on once the download is complete.

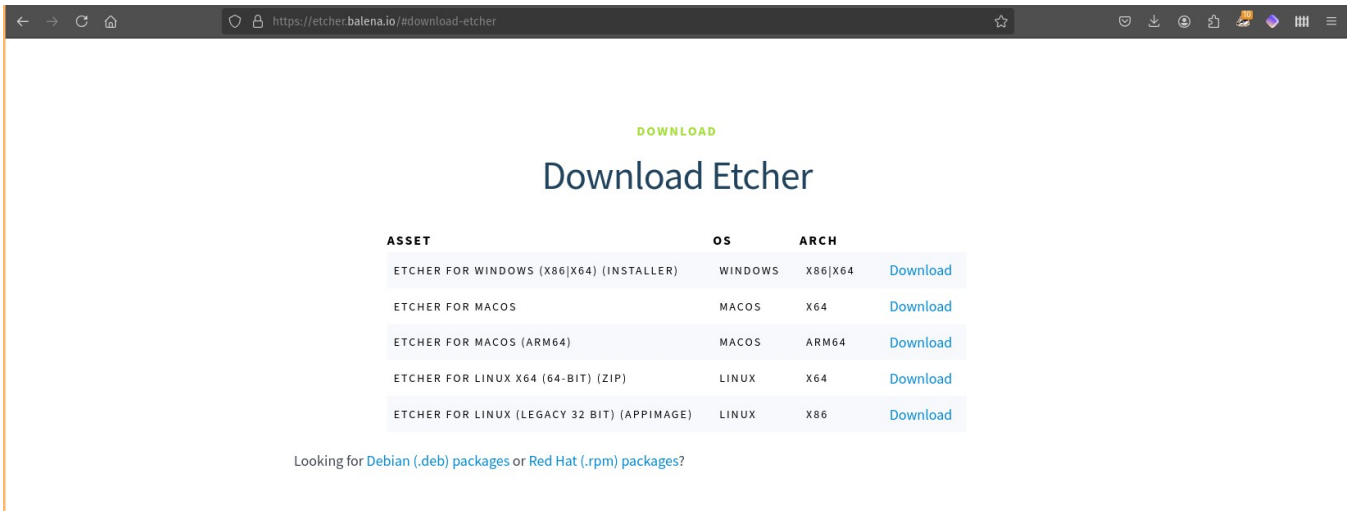
2.3: Download Etcher

Next, we will download a program called Etcher with will help us take the Linux Mint ISO we downloaded and write it to our flash drive in a format that can be booted.

Navigate to https://etcher.balena.io/.



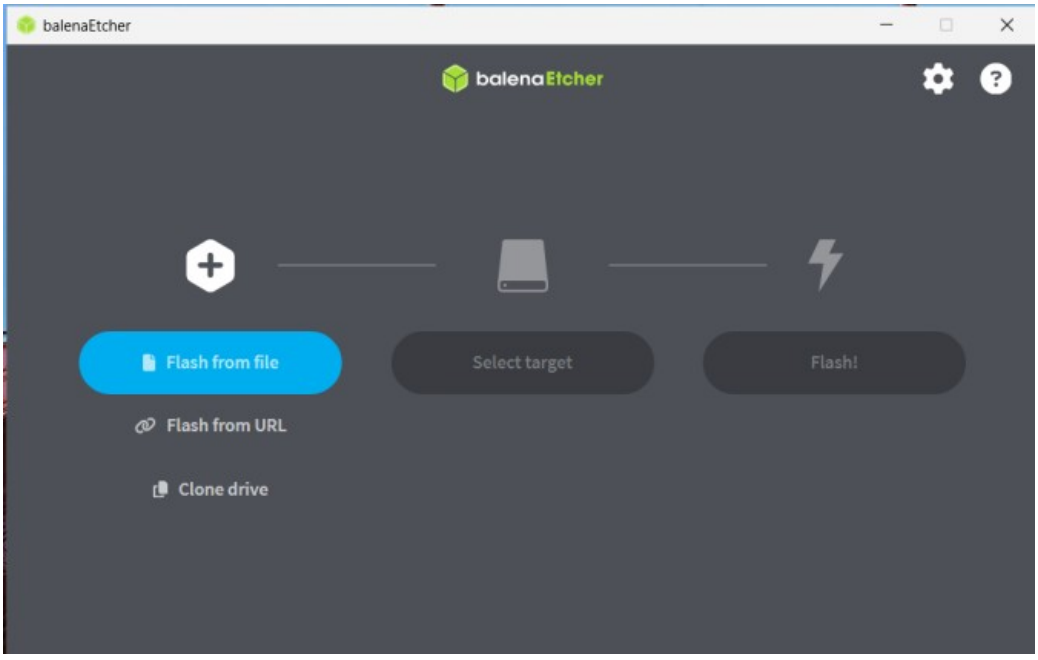
Click on *Download Etcher*



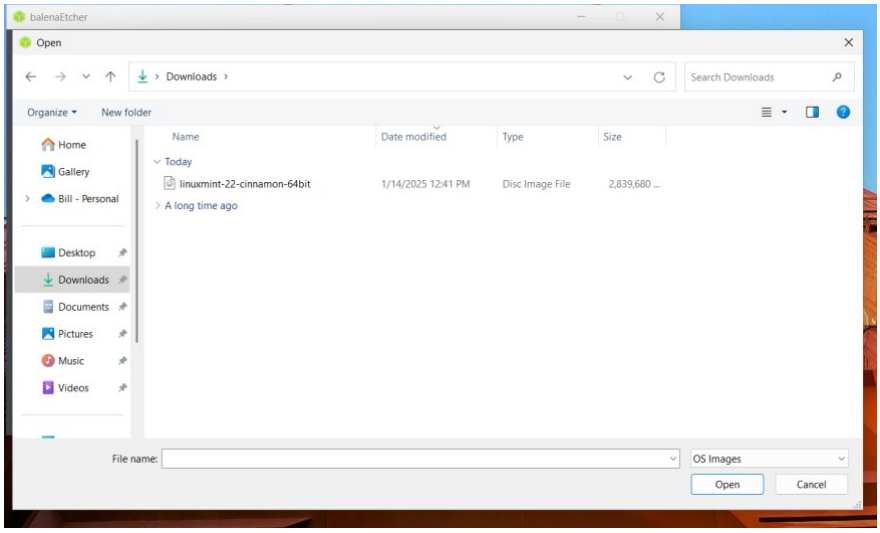
The page will scroll you down to a list of downloads available depending your operating system. Choose the Download link appropriate for the operating system you are on. When the file is complete, install and launch Etcher.

2.4: Flash Linux Mint to USB Drive

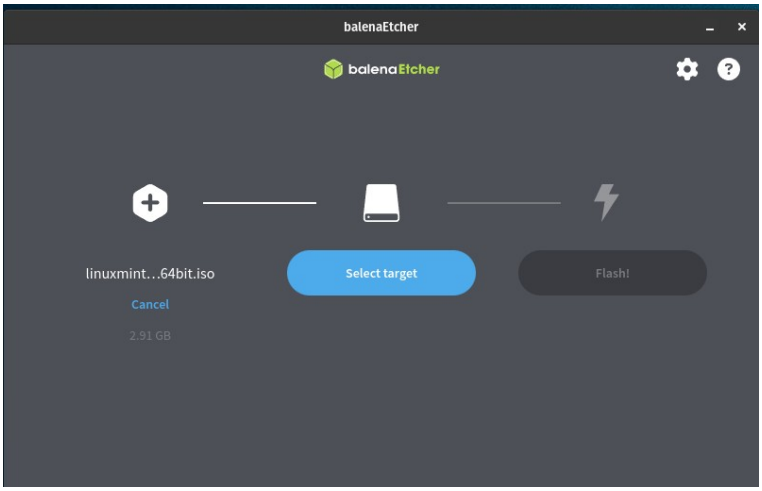
Now that Etcher is launched we should see the following screen:



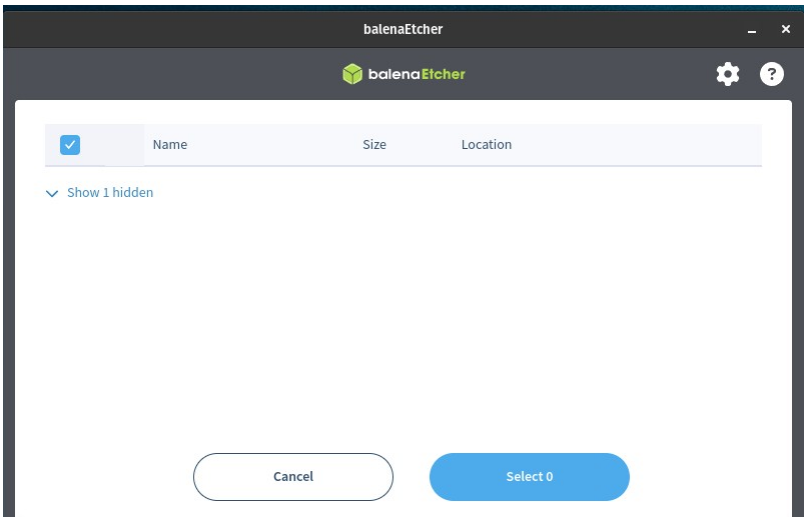
Select *Flash from file* - A window will pop up for you to select the ISO you downloaded earlier. Choose the Linux Mint ISO.

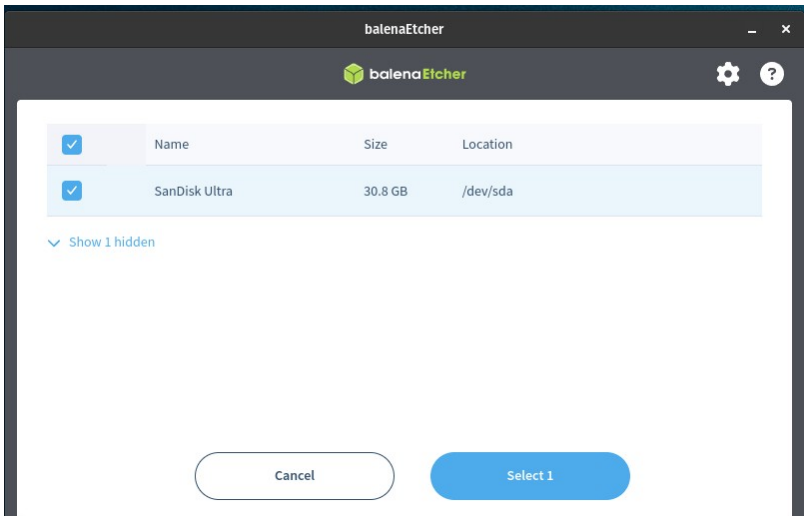


Next, *Select Target* will be highlighted. Click this:



You'll see the following screen. Plug in your USB flash drive and it will populate in the list.

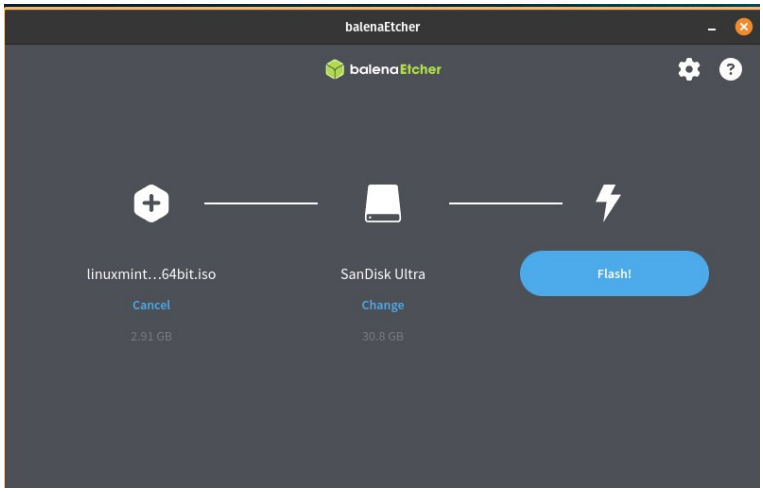




Select the flash drive and click the blue Select 1 button.

***** MAKE SURE YOU SELECT THE CORRECT DRIVE. *****

***** ALL DATA ON THE SELECTED DRIVE WILL BE ERASED *****



Now click *Flash*. When the operation is complete, you can remove the USB drive.

3. Install Linux Mint

3.1: Determine key to select boot menu

When your computer boots it will normally say on the screen which key to enter the boot menu. This is a menu built in to the BIOS which can be used to select which drive the computer should attempt to load the OS from. Most commonly this key is F2, F9, F12, or DEL. Below is a link to a chart with some common brands and what may work. Try rebooting the computer you will be installing Linux on and watching the screen before Windows loads. Alternatively, you can try the various keys from just after pressing the power on to see if one works.

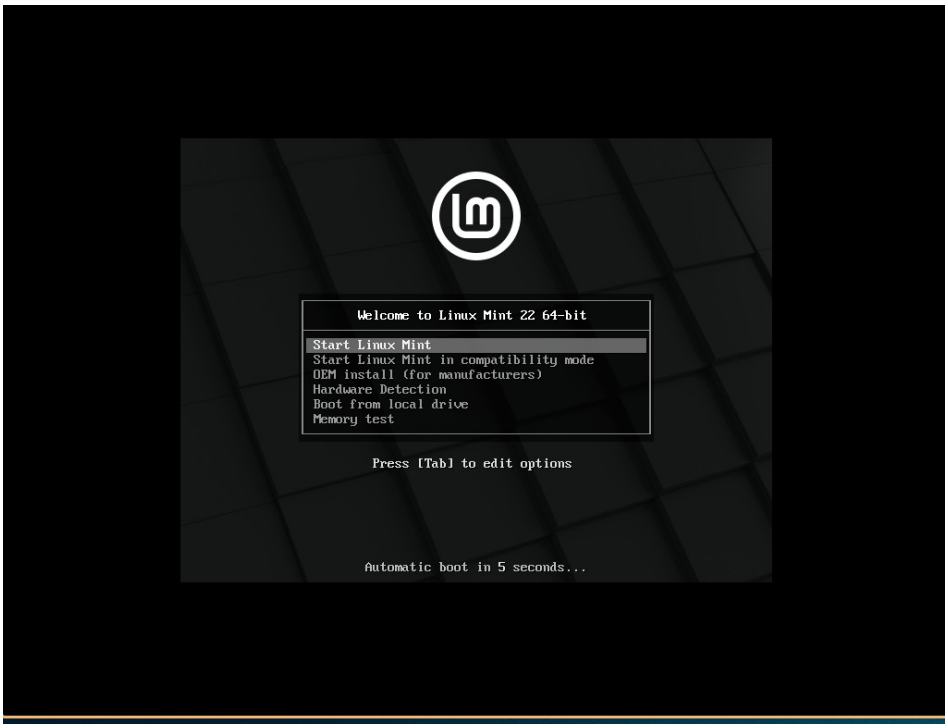
https://support.fixmestick.com/hc/en-us/articles/360001753213-List-of-Boot-Menu-Hot-Keys

3.2: Boot from the Live USB

With the computer powered off, insert your USB Flash Drive into a USB port. Press the power button and begin pressing the appropriate key to enter the boot menu.

If you do this correctly you should see a menu selection with an option to boot from your USB drive. If you pressed the BIOS setup key, you may be in a BIOS menu. Usually, on the exit menu of the BIOS there is an option to Restart and boot from the USB drive.

If you are presented with a menu with a few options of how to boot the live USB, select to Start Linux Mint.

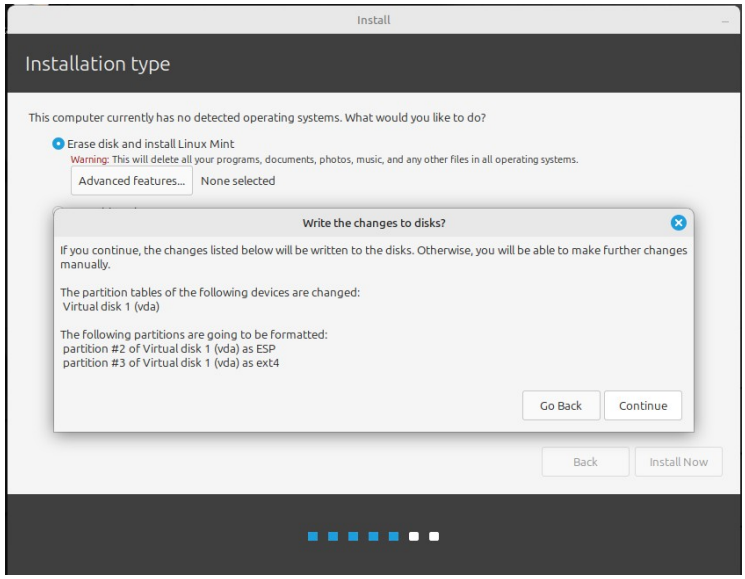


Once the Live USB has booted, you'll be looking at the Mint desktop. From here, you can play around and test the OS without making any changes to your computer. In a later section, we'll cover how this Live USB is useful for making a complete backup of your computer. If you need to do that before installing Linux, view Appendix A of this guide.

3.3: Install Mint 22.1

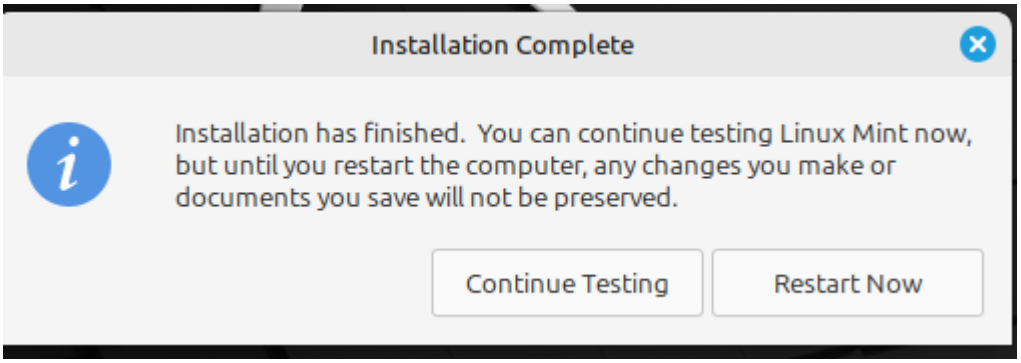
To install Linux Mint, we just need to double click on the installer icon on the desktop and follow the prompts.

- Select you language.
- Select your Keyboard layout.
- Check *Install Multimedia Codecs*
- Select Installation Type:
    - If you are dedicating this machine to Linux, select Erase Disk and Install Linux Mint. This guide assumes this is what you are selecting.
    - If you are wanting to dual boot, this guide is not going to cover all the variations. There are many resources available online. The short version is from Windows, before booting into this installer, you may need to shrink your drive partition in order to free space or have a secondary hard drive in the computer to install Linux.
- Select *Install Now*
    - You'll be prompted to confirm *Write the changes to disks?* This is the final step before you actually make changes to your computer. If you click Continue, all data on your drive will be lost and replaced with Linux Mint.



- Next, confirm your Time Zone
- Enter the name you want, the name for the computer, a username and password.
- You can select to allow the computer to log in automatically or require the password to log in.
- Encrypting the home folder can sometimes cause issues, generally for my radio computer I do not select this option.

From this point, the installer will write the required files to your hard drive and complete the installation of Linux Mint. This will take a few minutes depending on the speed of your computer and Flash Drive. Upon completion, you'll be prompted to reboot. Select Restart Now.



As the machine restarts, you'll be directed to remove the installation medium (your USB Flash Drive) and press enter. The machine will now reboot and bring you to your fresh install of Linux Mint 22.

Congratulations. The hard part is over.

4. First Boot

4.1: Welcome

At the first boot, you'll be presented with a Welcome screen. Feel free to uncheck the *Show this dialog at startup* box in the lower right. You can go through the information here to see a few tips if you are new to Linux.

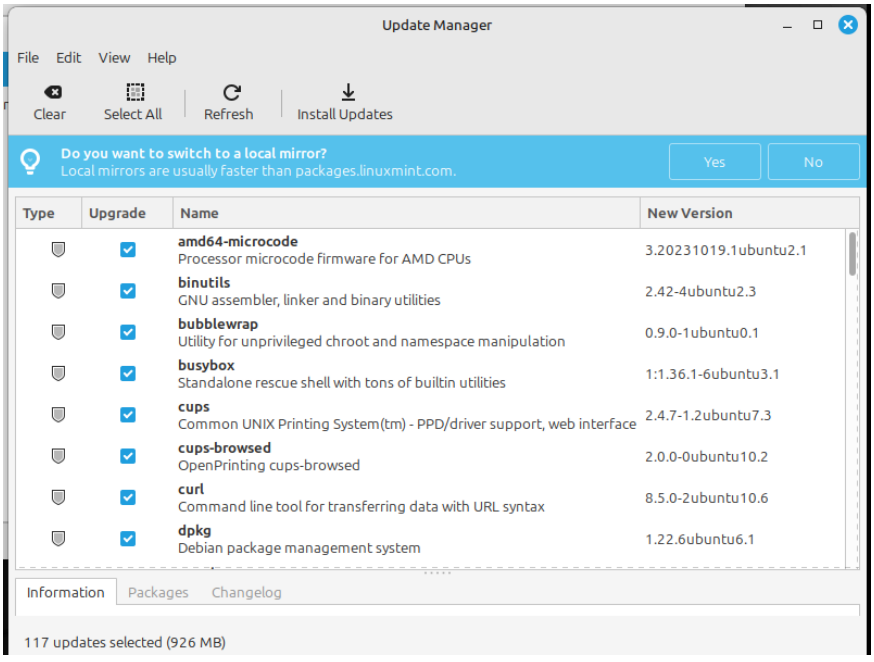
4.1.1: Evolve III – No WiFI

If you are running the Evolve III mini laptop and find that the WiFi is not working, you may need to build and install the specific drivers for the WiFi card. See Appendix A for instructions before continuing. Mint 22.1 may have fixed this issue.

4.2: Set Local Mirrors

Updates and packages are pulled from various 'Mirrors', or servers holding the same files. By telling your system which mirror to use, you can improve the speed at which updates and installs download.

Select *Let's Go* on the Welcome screen and then launch the Update Manager, clicking OK on it's first screen. You'll be taken to the main screen of the list of updates. The top bar will ask *Do you want to switch to a local mirror?* Select Yes. You will be prompted for your user password you created during the install process.



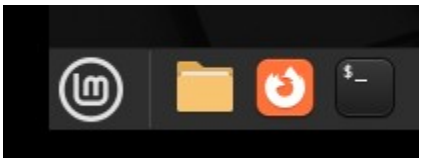
The Software Sources menu will now appear with two entries for Mirrors; Main and Base.

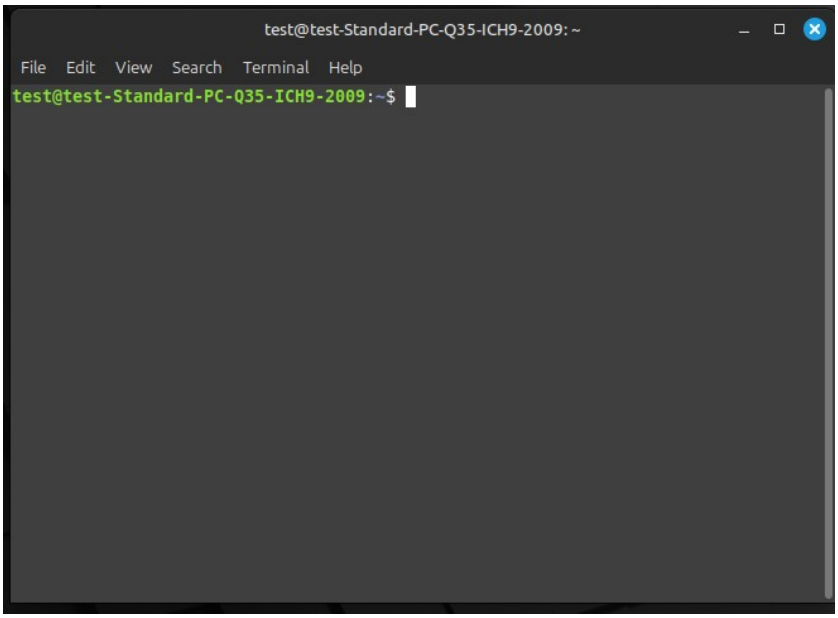
Click on the listing for each, a *Select Mirror* dialog will come up and wait for the speed tests to each mirror to populate. Once those are complete, select the top entry with the fastest speeds and select *Apply.*

Now go ahead and click the green box *Click here to update the APT* cache. With that complete we can close the windows on the screen with the blue X in the upper right of each window.

4.3: Applying first updates via Terminal

In our taskbar at the bottom of the screen, you'll see a black Icon for the Terminal program. Click this to open the Terminal window.





This is your Terminal. You'll see the top bar and the green prompt both say the same thing.

In this example:

test is my username from the install.

test-Standard-PC-Q35-ICH9-2009 is the computer name from the install.

~ is short for your home directory. As you move through the file system, this will change to show your current directory.

To update our cache (just like that green button from earlier) we will type:

```
sudo apt update
```

Press Enter and you'll be prompted for your password since we are using the sudo command. You'll see output showing that it has updated the cache and how many packages can be upgraded. Nothing has been changed yet.

To apply the upgrades we will use the following command.

```
sudo apt upgrade
```

This will output a list of which packages are to be upgraded, newly installed, and its change on your disk space. Press Y for yes and press enter. This may take a few minutes for the initial upgrade.

Once this is complete (you'll be returned to the green command prompt), go ahead and reboot your computer before we begin with installing the radio tools. You can click on the Linux Mint menu icon in the taskbar, select the red Power/Quit icon, and select Restart from the resulting menu.

5. Using the AmRRON scripts

5.1: Cloning the Script Repository

In order to get the AmRRON scripts, we need to clone the repository. This is the location that the scripts are stored on the internet and will allow you to receive updates as the scripts are modified. To do this our system needs a program called Git. We will install this from the terminal by entering the following:

```
sudo apt install -y git
```

Notice this time we used a -y flag to tell the system to not prompt us for confirmation and go ahead and install the program. Once this is complete (returned to the green prompt) enter the following to clone the repo.

```
git clone https://gitlab.com/amrron/setup-scripts.git
```

This will clone the repository into a folder named setup-scripts.

5.2: Running the scripts

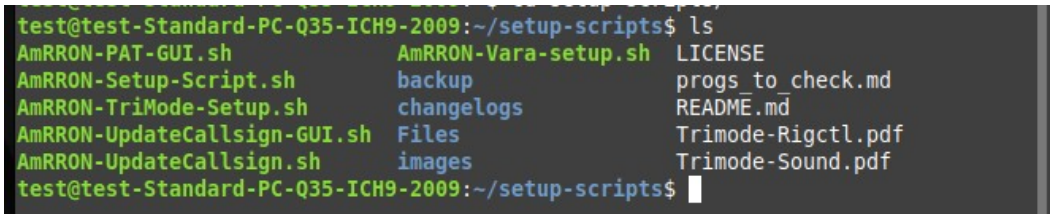
Now we will change directories to enter the new folder we added by using the **cd** command.

```
cd setup-scripts
```

We can see the terminal prompt has changed to show we are in ~/setup-scripts directory which is short for /home/test/setup-scripts. (test will be replaced with your username on your computer).

Now list the files in this directory with the **ls** command:

```
ls
```



These are the files that are included at the time of this guide. They may change occasionally as updates and new requirements are found. The green files are executable scripts. These will help you get everything installed and setup. The blue are folders, they contain things like files needed for the other scripts, guides, lists of changes as they come out, and tools for creating backups of your configurations.

From the terminal, we will run the scripts by typing **./<script-name>** while in the proper directory. The first script to run is the AmRRON-Setup-Script.sh This will take quite a bit of time as it does most of the heavy lifting for compiling and installing most everything you need. You will be prompted for your password as the script will be installing programs for you.

```
./AmRRON-Setup-Script.sh
```

5.3: AmRRON-Setup-Script.sh Menus

5.3.1: Keeping the scripts up to date – git pull

As we launch this script we'll see some output in the terminal and then we'll be presented with a GUI for making our selections.

The first window reminds you to run the command **git pull** in the setup scripts directory before launching this script in the future. Since we just cloned the repo, we know we have the most current version of the script, if some time has passed since we cloned running the git pull command will update all files in the folder with the most current. This is critical to ensure fixed and new features are implemented in your copy of the script.

Click ***Continue***

5.3.2: Welcome Information

The script will then query the internet for the most current versions of the various programs we use and then present a Welcome menu with basic information of what the script does.

Click ***OK***

5.3.3: System Update

As the script with be downloading new packages we need to ensure we have the most current update cache and upgrades applied. You should select Update from this menu.

Click ***Update***

5.3.4: Select Categories

This Menu is where we can select which categories of programs we want to choose from.

An **Easy Button** is included which bypasses many menus and installs almost everything available. This is the recommended method for most users. If you have specific desires, Tick the category box and choose Install Selected.

Click ***Easy Button***

5.3.5: Confirm Update Selection

The next menu is a final confirmation before system modifications begin. It will list all the items which the script with attempt to install when you start. Once you click Begin, the GUI menu will go away and the terminal will start scrolling output showing what it is doing as it downloads, installs and compiles the software.

This process will take quite a long time depending on your internet speed and hardware. Fast speeds can maybe complete in an hour, slower machines and internet may take multiple hours. Be patient and DO NOT CLOSE THE TERMINAL WINDOW. Just step aside and come back to check on it every now and then.

Click ***Begin***

5.3.6: ARDOP Versions

This is an informational message.

Click ***OK***

5.3.7: ARDOP Configuration

Another informational message. If you have unique soundcard usage this may apply. For most users with a modern transceiver connected via one USB cable for all functions you can disregard.

Click ***OK***

5.3.8: KM4ACK Find Ardop

KM4ACK's getardoplist script has been installed for updating ARDOP stations for PAT winlink use. This menu tells you how to add this script to be ran daily in the background so you always have up to date station lists. We can do this now by right clicking on the terminal icon in the taskbar and selecting **New Window**. Follow the instructions from this menu to add the text to the crontab file. To save and exit press **ctrl-x,** press **Y** to save, and **ENTER.** You'll be returned to the terminal prompt and can close this new terminal window. DO NOT CLOSE THE TERMINAL WINDOW THE INSTALLER IS RUNNING IN.

5.3.9: ComstatONE Downloaded

Again, this should be informational. The current version of the script should have fully installed CommstatOne on Mint 22.1 for you with a Desktop launcher so you can avoid having to load from the terminal.

Click ***OK***

5.3.10: UBLOX GPS Time

This is an informational message.

Click ***OK***

5.3.11: Conky Autostart Setup

Conky will display some helpful system information on your Desktop. The script will attempt to set it to Autostart when your system boots.

Click ***Enable Autostart***

5.3.12: Complete

You should now see Desktop Icons populate and be presented with a Completion menu saying *All selected updates have been completed.*

Consider visiting the link to donate to help support AmRRON directly.

5.3.13: Restart

Finally, with all the installation complete. Restart the computer before continuing. You may be prompted for your user password again.

Click ***Restart***

5.4: AmRRON-TriMode-Setup.sh Menus

With the initial setup script complete and system restarted, we can now work through the additional scripts to finalize some functionality.

5.4.1: Run the TriMode script

Open the terminal and change back into the setup-scripts directory.

```
cd setup-scripts
```

PRO TIP

In the terminal, you can auto complete entries by using the TAB key. Start typing cd setup and press the tab to auto complete the directory. If there are multiple matches, it will auto complete until the differences and further tab presses will show the matches. Type a few more unique characters and hit tab again to finish the auto completion.

Run the AmRRON-TriMode-Setup.sh script.

```
./AmRRON-TriMode-Setup.sh
```

5.4.2: Keeping the scripts up to date – git pull

As we launch this script we'll see some output in the terminal and then we'll be presented with a GUI for making our selections.

The first window reminds you to run the command **git pull** in the setup scripts directory before launching this script in the future. Since we just cloned the repo, we know we have the most current version of the script, if some time has passed since we cloned running the git pull command will update all files in the folder with the most current. This is critical to ensure fixed and new features are implemented in your copy of the script.

Click ***Continue***

5.4.3: TriMode

This is an informational screen.

Click ***OK***

5.4.4: Easy Button

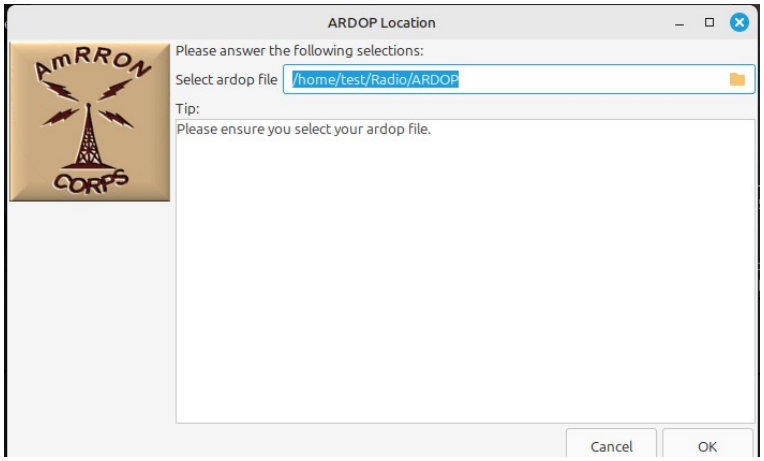
For most users of modern radios (IC-7300), this configuration should work. You may be asked for your password.

Click ***Yes***

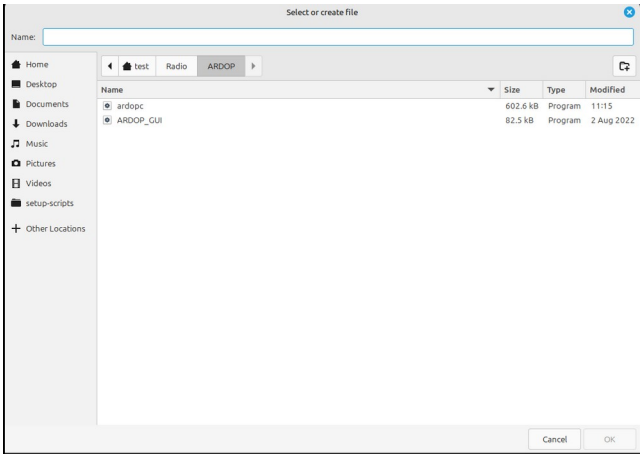
5.4.5: ARDOP Location

Here, you will need to navigate to your ardopc file that was installed by the setup scripts.

Click the yellow folder icon in the top right.



Click on the ardopc file and select **OK**



Now with the file location set, click **OK** again.

5.4.6: TriMode – asound.conf

This is an informational screen.

Click ***OK***

5.4.7: TriMode – TNC Status Launcher

This is an informational screen.

Click ***OK***

5.4.8: Complete

This is the completion message. Of note, this lists the procedure for starting up your applications to allow for simultaneous usage. That is as follows:

1. Launch FLRIG, configure transceiver for your setup.

2. Launch the ardop-status app.

3. Enable RIGTLD and PAVUCONTROL, select Toggle. They should now have PID's listed.

4. You can now enable ARDOPC and ARDOP_GUI.

Click ***OK***

TriMode script is complete and you'll be returned to the terminal prompt.

5.5: AmRRON-Vara-setup.sh Menus

5.5.1: Run the Vara Setup script

Open the terminal and change back into the setup-scripts directory if you are not there already.

```
cd setup-scripts
```

PRO TIP

In the terminal, you can auto complete entries by using the TAB key. Start typing cd setup and press the tab to auto complete the directory. If there are multiple matches, it will auto complete until the differences and further tab presses will show the matches. Type a few more unique characters and hit tab again to finish the auto completion.

Run the AmRRON-Vara-setup.sh script. You may be prompted for your password.

```
./AmRRON-Vara-setup.sh
```

5.5.2: Keeping the scripts up to date – git pull

As we launch this script we'll see some output in the terminal and then we'll be presented with a GUI for making our selections.

The first window reminds you to run the command **git pull** in the setup scripts directory before launching this script in the future. Since we just cloned the repo, we know we have the most current version of the script, if some time has passed since we cloned running the git pull command will update all files in the folder with the most current. This is critical to ensure fixed and new features are implemented in your copy of the script.

Click ***Continue***

5.5.3: Welcome

This is an informational screen.

Click ***OK***

5.5.4: Select Programs

If you have specific requirements, select those programs now, otherwise just select *Install All.*

****NOTE*** WINE must be selected as this configures wine and its dependencies for the associated programs.*

Click ***Install All***

5.5.5: Confirm Update Selection

The next menu is a final confirmation before system modifications begin. It will list all the items which the script with attempt to install when you start. Once you click Begin, the GUI menu will go away and the terminal will start scrolling output showing what it is doing as it downloads, installs and compiles the software.

This process will take quite a long time depending on your internet speed and hardware. Fast speeds can maybe complete in an hour, slower machines and internet may take multiple hours. Be patient and DO NOT CLOSE THE TERMINAL WINDOW. Just step aside and come back to check on it every now and then.

Click ***Begin***

5.5.6: WINECFG - Select Audio

A pop-up appears asking you to select the audio device for your system. Select ***OK.***

On the next Wine Configuration window, select the audio tab, and select ***Pulse Audio input*** *or* ***Output*** for the appropriate four drop downs Select ***Apply*** and then ***OK.***

5.5.7: Setup – VARA

This window will pop up for the Vara modem installer.

- Select ***Next***
- Accept the license agreement and select ***Next***
- Leave the default directory as C:\VARA. Select ***Next***
- Check the box to Create a desktop icon. Select ***Next***
- Select ***Install***
- Select ***OK*** from the VARA *installed successfully* message.
- ***UNCHECK*** Launch My Program. Select ***Finish***

5.5.8: Setup – VARA FM

This window will pop up for the Vara FM modem installer.

- Select ***Next***
- Accept the license agreement and select ***Next***
- Leave the default directory as C:\VARA FM. Select ***Next***
- Check the box to Create a desktop icon. Select ***Next***
- Select ***Install***
- Select ***OK*** from the *VARA installed successfully* message
- ***UNCHECK*** Launch My Program. Select ***Finish***

5.5.8: Setup – VarAC

This window will pop up for the VarAC installer.

- Select ***Next***
- Accept the license agreement by selecting ***I Agree***
- ***UNCHECK*** *Download VARA modem.* Select ***Next***

- Leave the default directory as C:\VarAC. Select ***Install***
- ***UNCHECK*** *Run VarAC*. Select ***Finish***

5.5.8: Setup – Winlink Express

This window will pop up for the Winlink RMS Express installer.

- Leave the default directory as C:\RMS Express. Select ***Next***
- Leave the default Start Menu Folder as RMS Express. Select ***Next***
- Check the box to Create a desktop icon. Select ***Next***
- Select ***Install***
- ***UNCHECK*** Launch Winlink Express. Select ***Finish***

5.5.8: Complete

You should now see Desktop Icons populate and be presented with a Completion menu saying *All selected updates have been completed.*

Consider visiting the link to donate to help support AmRRON directly.

Select ***OK***

Select ***Restart***

5.6: AmRRON-PAT-GUI.sh

This script will help us configure PAT with our information for making winlink connections.

5.6.1: Create config file.

Before we run the PAT-GUI script, we need PAT to create the configuration file. To do this open a terminal and run the following command:

```
pat configure
```

The config.json file will open in nano editor. We don't need to make any changes, just **ctrl-x** to close.

5.6.2: Run the PAT GUI script

Open the terminal and change back into the setup-scripts directory if you are not there already.

```
cd setup-scripts
```

PRO TIP

In the terminal, you can auto complete entries by using the TAB key. Start typing cd setup and press the tab to auto complete the directory. If there are multiple matches, it will auto complete until the differences and further tab presses will show the matches. Type a few more unique characters and hit tab again to finish the auto completion.

Run the AmRRON-PAT-GUI.sh script. You may be prompted for your password.

```
./AmRRON-PAT-GUI.sh
```

5.6.3: Keeping the scripts up to date – git pull

As we launch this script we'll see some output in the terminal and then we'll be presented with a GUI for making our selections.

The first window reminds you to run the command **git pull** in the setup scripts directory before launching this script in the future. Since we just cloned the repo, we know we have the most current version of the script, if some time has passed since we cloned running the git pull command will update all files in the folder with the most current. This is critical to ensure fixed and new features are implemented in your copy of the script.

Click ***Continue***

5.6.4: PAT Setup and Alias Manager – Initial settings

This is where you'll input your information. Fill out your callsign, winlink password, grid square.

Use the drop down to select the localhost:8080 entry.

Type your radio model. i.e. IC-7300

Check the box next to add/Change Rig Definition to PAT Config.

Click ***OK***

5.6.5: PAT Setup and Alias Manager – Managing Aliases

Once initial setup is complete, the system will update a list of stations and bring you to the alias manager. From this screen we can select stations to add to our 'Favorites' for use in PAT. For modern fully controlled radios using rigctl (Like our 7300) use Rigctl Tuning Format so that Pat will automatically tune the radio when the alias is selected.

Click ***Find Stations***

You'll see a list of stations that met the criteria set (Default was CN grid square and 20M band.)

You can check mark the ones you want to add an select ***Add Aliases*** or select ***Change Band*** to return and change the parameters. When done, select exit.

6. Initial Setup and Configuration

6.1: Multiple Workspaces.

Mint has the ability to have multiple workspaces. When you are running multiple modes, a few extra workspaces allows you more room to organize the running applications.

Right click on an empty spot of the taskbar, and select Applets.

From the Manage Tab of the Applets window that comes up, scroll down to Workspace Switcher.

Select Workspace Switcher and click the + button at the bottom. You should see it become checked and four workspace icons show on the taskbar.

6.2: FLRIG

This setup uses FLRIG to control the radio. Your various programs will then communicate with FLRIG in order to share control.

Open Flrig from the Desktop Icon.

Select **Config → Setup → Transceiver**

Select you appropriate settings:

i.e. ICOM-7300

Rig: IC-7300

Port /dev/serial/by-id/usb-Silicon_Labs_CP2102_USB_to_UART_Bridge…

Baud: **115200**

Check the box for **1 Stop Bit**

Select **Init**

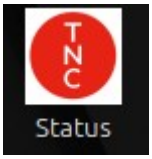
You should hear the radio click, the config dialog will show a Green diamond and say connected, and the Flrig application will show the same frequency as the radio. Test by clicking the PTT button on FLRIG to toggle PTT on and off.

You can now close the Configuration Dialog.

I recommend after getting a successful connection, close FLRIG and then relaunch it to ensure that it immediately connects.

6.3: Status Launcher

Launch the Status Launcher icon from the Desktop



Click the boxes for **PAVUCONTROL** and **RIGCTLD**

Click ***Toggle***

The window will disappear and come back, now with the boxes checked and a value listed under PID. This is the process ID saying it is running. Additionally, an audio control window will pop up. DO NOT CLOSE THIS DOWN.

Now, if you wish to use the ARDOP Modem for gARIM or PAT Winlink connections Select ***ARDOPC*** ***ARDOPGUI*** and ***PAT*** as desired.

Click ***Toggle***

6.3.1: ARDOP GUI Settings

ARDOPGUI will pop up a simple settings page the first time it is launched.

Host: localhost

Port: 8515

With these five loaded, we can move on to the next programs.

6.4: JS8Call

Next, we'll load and configure JS8Call.

Select JS8Call from the desktop icon. This may take a few seconds to launch.

JS8Call will open to the Settings Menu on first launch. Fill in your Callsign, Grid Locator, and put @AMRRON in the callsign Groups

Select the Behavior Tab and adjust behavior and Aging settings as you see fit.

Select the Networking & Autoreply tab.

Check Allow heartbeat transmissions outside of heartbeat subchannel.

Click the Radio Tab.

Under Rig drop down, select FLRig. Change the poll interval to 2s

Click the Rig Options Tab

Select CAT as the PTT Method, Data/Pkt for Mode

Now click Test CAT, it should turn green. The Test PTT should be illuminated, click it on and off and ensure your radio keys and unkeys.

Select the Audio Tab

Select the input and output selections for your radio soundcard. For the IC-7300 these will be the **alsa_input.usb.Burr-Brown_from_TI_USB_Audio_CODEC-00.analog-stereo** and **alsa_output.usb.Burr-Brown_from_TI_USB_Audio_CODEC-00.analog-stereo**

Select the Reporting Tab.

Uncheck Enable spotting to reporting networks

Select the Frequencies Tab

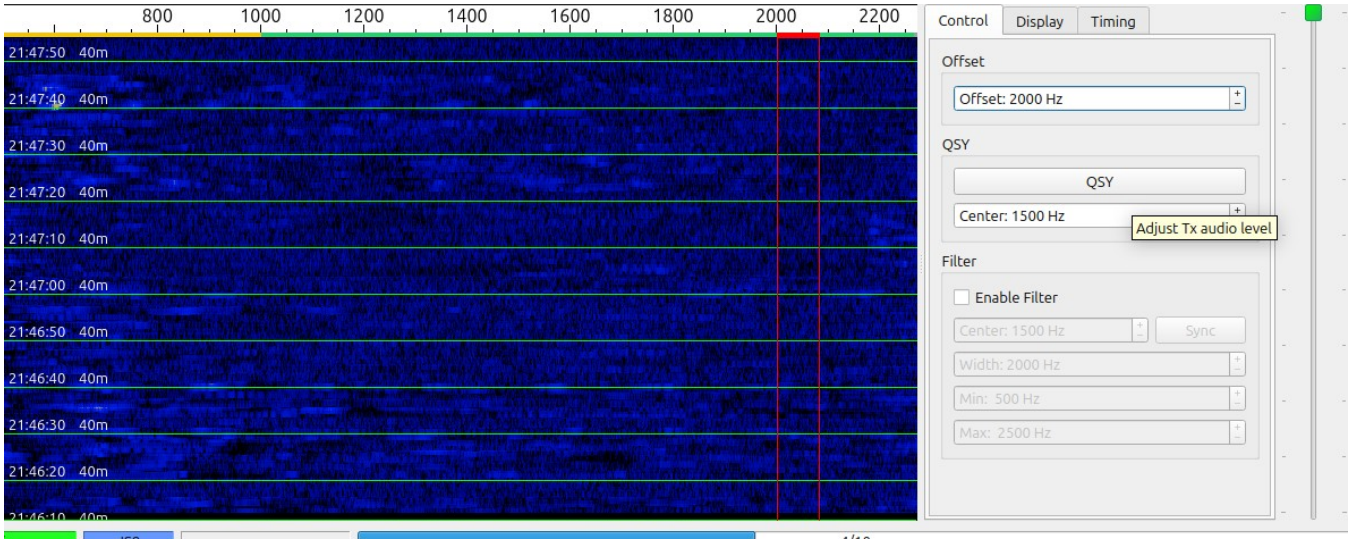
Right Click on the frequency table, select Add and add 14.110, 7.110 and 3.588.

You can also add UTC times for the radio to automatically switch bands. Generally, 40M during daylight and 80M during darkness.

Click **OK**.

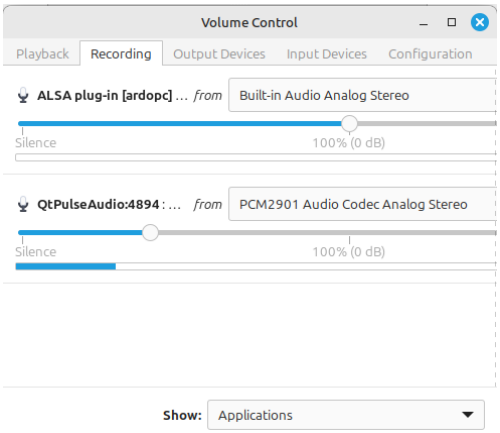
Lastly, we need to set the levels for JS8Call. The waterfall is set by default to lie to you.

Drag and reszise the windows as needed to see the three sub-tabs on the bottom right third of JS8Call



From the Control tab, change the offset value to be around 2000 hz. Per AmRRON SOI, we operate JS8 on the upper end to avoid conflict with other simultaneous modes.

From the Display tab, adjust the size parameters to see the upper end of the band as well. Now, find the check box that says “Flatten” and uncheck it. You will likely see the waterfall become yellow as its usually over driven. Open the Volume Control Window that opened from the Status app earlier and bring down the levels under the Recording that apply to JS8Call (QTPulseAudio:22926 on my machine). You’re looking to bring the receive bar on the left of the JS8 waterfall around the mid point. I find about 40% works well.



6.5: CommstatOne

Commsat will provide us with an easy visual interface of the JS8Call traffic. It also makes sending statreps effortless.

With JS8Call configured and operating, go to Log → Open Log Directory.

This will open a file browser of your JS8Call logs. Take note of the file path.

It should be /home/<username>/.local/share/JS8Call

You’ll need to input this into Commstat settings.

Now, launch CommstatOne from the desktop icon.

The Settings menu will launch for you to add your information including the path to the JS8Call DIRECTED.txt file as discussed above. CommstatOne may close completely when the settings are submitted and can be relaunched into the main program and map by using the desktop icon again.

6.6: vARIM

6.6.1: VARA Modem Configuration

For vARIM we will use the VARA Modem we installed earlier. Launch the VARA desktop icon. When it comes up, click ***Settings→ Vara Setup***. Enter your callsign and Registration key as well as select the check box for ***Accept 500 Hz connection***.

Click ***Close***

Click ***Settings→ SoundCard.*** Both input and output should be PulseAudio

Click ***Close***. You should see the waterfall start populating.

6.6.2: vARIM

VARIM does not currently have a desktop launcher (I'll address that in a future update. This is an opportunity to see how to create one.

Click the start menu and type varim in the search box. You will see vARIM show in your list of programs.

Right click on the icon and select Add to Desktop.

Now, launch vARIM, making sure your vara modem is running. VARIM creates the default config file on first start. You will need to close vARIM and then relaunch it.

When vARIM relaunches, select File→View or Edit Config File.

The first section is your Port 1 configuration. Set the following:

mycall = <Your FCC callsign>

gridsq = <Your gridsquare>

ptt-mode = RIGCTLD

Continue down the file to the [arim] section and set your callsign there as well.

Click ***Save.*** The program will tell you changes will apply when it restarts, close and relaunch vARIM one last time.

Now select ***Port→ Attach → Port 1***

Now that vARIM is connected to the vara modem we can test by selecting ***CQ→Send Beacon***

6.7: FLDIGI

Open FLDIGI, the configuration wizard will open.

Select ***Next,*** enter your station information

Under Soundcard/Devices: Check the box for PortAudio. Change the drop downs to **pulse.** Select ***Next***

Under Rig Control/flrig: Check the box for Enable flrig xcvr control with fldigi as client. Select ***Next***

Rig Control/CAT: Leave blank. Select ***Next***

Rig Control/Hamlib: Leave blank. Select ***Next***

Click ***Finish***

With the wizard complete, select ***Configure→Config Dialog***

Expand the Misc tab; select NBEMS interface, select Locate flmsg, scroll down and select the flmsg program.

Select the Misc→ Sweet Spot menu. Change the value of PSK et al. to 900

Ensure the box is unchecked for Always start new modems at these frequencies.

Click **Save** and **Close**

Lastly, change Op Mode to Contestia 4/250.

6.8: FLMSG

Launch FLMSG from the desktop icon. The configuration screen will appear. Select Communicator / Expert

Under the Personal tab, enter your Callsign followed by a – and two letter state abbreviation. e.g. W1XYZ-TX

Select the Date/Time tab. Select the YYYYMMDD and hhmmZ formats.

Select the Files Tab. Ensure under Naming the Callsign and serial # boxes are checked and change the drop down to UTC time, Z

Select ARQ tab. Uncheck all boxes except Sync modem to fldigi

Close the settings dialog.

Confirm AmRRON Custom Forms are in place by selecting ***FORM→ Custom*** and seeing the AmRRON forms listed.

6.9: FLAMP

Open FLAMP. You'll be presented with the configure page.

Enter Callsign and info.

Check the following boxes. Uncheck all others.

- ✔ Auto sync flamp to fldigi mode selector
- ✔ Change fldigi mode just prior to transmit
- ✔ Warn User when removing files from Queue
- ✔ Clear missing blocks on Non-Canceled Transmits
- ✔ Inhibit header modem on block fills
- ✔ Auto save RX Data on 100% reception

6.10: VarAC / RMS Express

6.10.1: Limitations

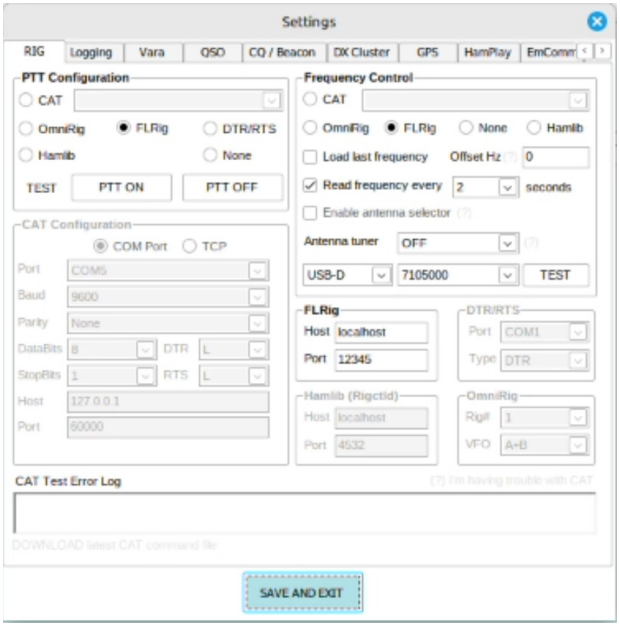
At this time, RMS Express is not possible to be used concurrently with the other programs. To use RMS Express, please close any other programs that are using your radio before launching.

6.10.2: VarAC

Setup VarAC to use FLRig for control. Launch VarAC and select Settings→Rig Control and VARA Configurations.

Select FLRig under the PTT Configuration and Frequency Control sections. Additionally, uncheck Load last frequency and check Read frequency every 2 seconds.

This will allow your frequency changes from any other program to not conflict with VarAC.



Under the Logging tab, uncheck Upload and Self Report under PSKReporter.

Under the Settings → Misc tab, ensure the box is checked for “Linux Compatible Mode”

When done with the changes, click the blue ‘Save and Exit’ button to close the settings menu.

Next, we will add the AmRRON frequencies to the drop down menu. Click Settings→Edit Frequencies Drop-Down List.

This will open a text document with the VarAC default frequencies. Insert the following above the first entry:

14.110.000|AmRRON

7.110.000|AmRRON

3.588.000|AmRRON

Select File→ Save. You will need to close and restart VarAC for these changes to take effect.

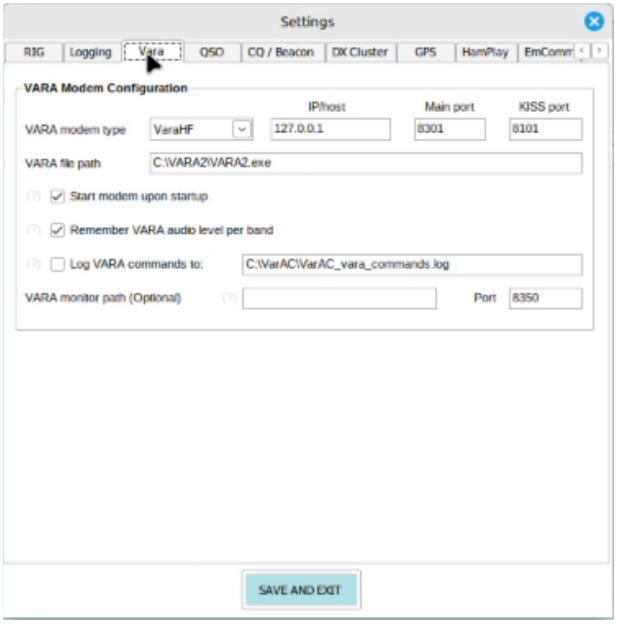
Lastly, you'll see a drop down in the upper right of VarAC. This will have the options for Simple, Advanced, and EmComm. These will change some of the options available to you. If you are on EmComm mode, your beacons will show as Red to other stations.

6.10.2.1: Running multiple VARA modems.

*** THIS IS NOT RECOMMENDED AT THIS TIME. REPORTS ARE SHOWING CONFLICTS BETWEEN vARIM AND VarAC SENDING DISCONNECTS TO EACH OTHER. ***

If you have a powerful enough machine and want to run VARA for multiple programs, it is possible to run multiple instances of the VARA modem. To do this, make a copy of the VARA directory in ~/.wine/drive_c/ and name it something different, I use VARA2. Now change the name of the VARA.exe inside the new folder so it is identifiable, again I use VARA2.exe. Lastly, edit the VARA.ini file in the new folder. You will want to change the TCP Command Port and KISS port values. These default as 8300 and 8100 respectively. I iterate them up to 8301 and 8101.

Finally, in the VarAC Settings→Rig Control and VARA Configurations → VARA tab change the values to point to your new copy of the VARA modem.



6.10.3: RMS Express / Winlink

RMS Express under wine appears to work properly but again, must be ran by itself at this time to have access to the radio if using cat control.

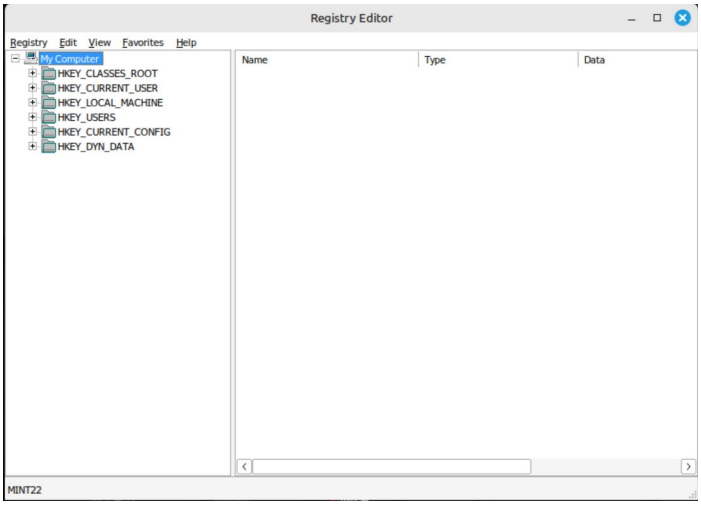
As this is a Windows program, it is expecting Windows com ports for identifying your radio. If your radio has been assigned to */dev/ttyUSB0,* default mapping should assign that to **com33.**

If you need to create mapping, you will need to do the following:

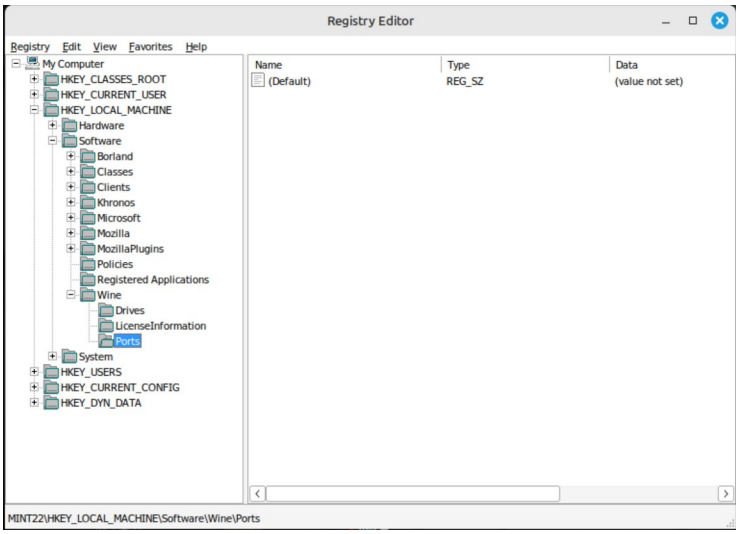
From the terminal run:

```
wine regedit
```

This will open the windows registry editor.



From here, expand HKEY_LOCAL_MACHINE → Software → Wine and select Ports

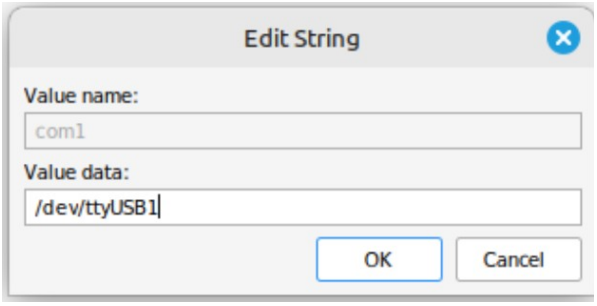


Right click on the white space of the right window and select:

New → String Value

Enter the name as the desired com port. e.g. **com1**

Now double click on the new entry to open its edit dialog.



Fill the Value Data as your device to assign to the com port. e.g. **/dev/ttyUSB1**

Click **OK**

Close the Registry Editor window.

You may require a system reboot to make the changes take effect.

7: Optional Software and Sound Issues.

7.1: Additional Software

While the Easy Button of the AmRRON-Setup-Script.sh installs almost everything, there are other items that are available if desired. Feel free to run the script to check for updates to previously installed items or select additional tools.

7.2: Sound Issues

Linux Mint changed the audio system in Mint 22 to a system called Pipewire. Many users have discovered this system is introducing ‘lag’ or a delay into their programs over time. You may recognize this with the ardop modem or js8call where the software will show it is transmitting but there will be a few second delay before the radio actually keys.

Removing this system and replacing it with the legacy PulseAudio system appears to fix the issue. This is action is available to you through the AmRRON-Setup-Script under the Radio menu and selecting the item ‘Pipewire’.

8. Starting / Shutting Down Order.

Starting programs after power on:

1. Ensure Radio is plugged in and powered on.
2. Load FLRig.
3. Load TNC Status launcher from Desktop
4. Select PAVUCONTROL and RIGCTLD. Click Toggle.
5. Select ARDOPC and PAT. Click Toggle
6. Load VARA modem from Desktop.*
7. Load vARIM. Attach to Port 1.*

   Optional: I load these on workspace 1, then move to workspace 2
8. Load JS8Call.
9. Adjust JS8Call audio levels from the Volume Control app.
10. Load CommstatOne

    Optional: I load these on workspace 2, then move to workspace 3
11. Load FLDIGI.
12. Load FLMSG.
13. Load FLAMP.
14. Optional: Load a second instance of FLDIGI and set mode to FSQ 4.5

    * If using VarAC instead of vARIM, load it in place of these steps.

Shutting down:

1. Disconnect vARIM from Port 1.
2. Close all programs except FLRIG.
3. Uncheck all items from Status Launcher. Click Toggle.
4. Close FLRIG.
5. Turn off computer.

9. Conclusion

This guide should have you with a full operational digital HF system established. While I intended to be as complete as possible, this guide is not definitive for every setup or situation. Additionally, this guide is not a replacement to the SOI. Any changes in op modes and procedures that are promulgated through AmRRON channels take precedence over those listed in this guide.

Future updates to this guide will be pushed via the AmRRON-Setup-Scripts gitlab repository and can be received by running **git pull** from your setup-scripts directory.

If you have encountered any issues with the guide or the various scripts referenced in the guide, please reach out with as many details as possible. My email is tangobravo14@protonmail.com

Appendix A

Making a full image backup.

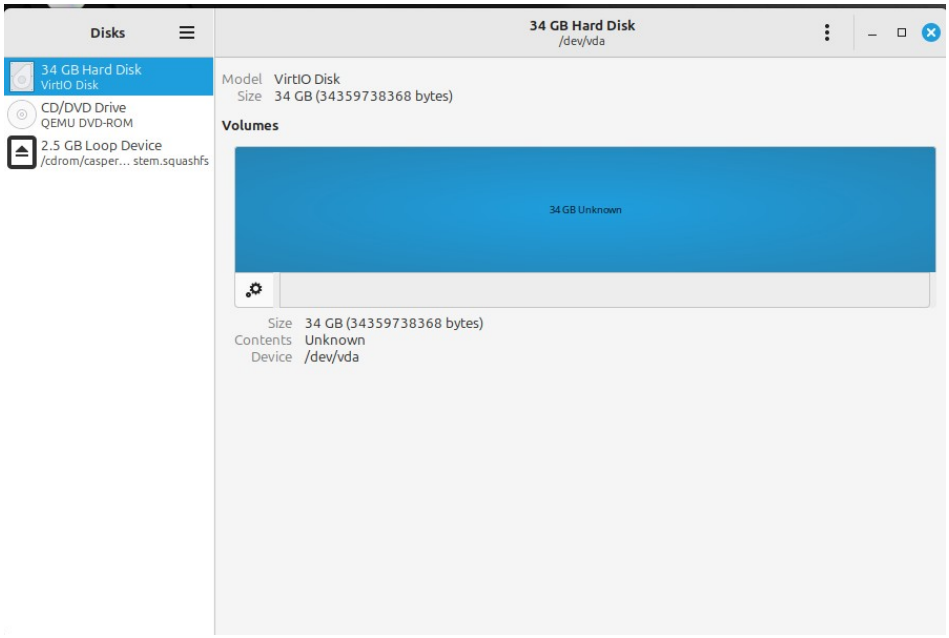
Once you get a fully configured and stable system. I recommend making a complete image backup of your drive. This will be an exact 1:1 copy of the drive in its current state. Should anything get corrupted that you are unable to recover from, you can re-image your drive with the backup image.

This process is time consuming and requires the following:

- Live USB flash drive (We made this to install Mint 22)
- Another USB external drive with a free capacity larger than the disk size of our computer.
- The storage drive the backup will be stored up should be formatted for use on Linux with EXT4

Boot into your Live USB like you did for the initial install. You should be sitting at the Mint Desktop with an Install Linux Mint icon on the desktop.

From here, open the Application Menu and select the Application called ***Disks.*** You should see a screen similar to the one below.

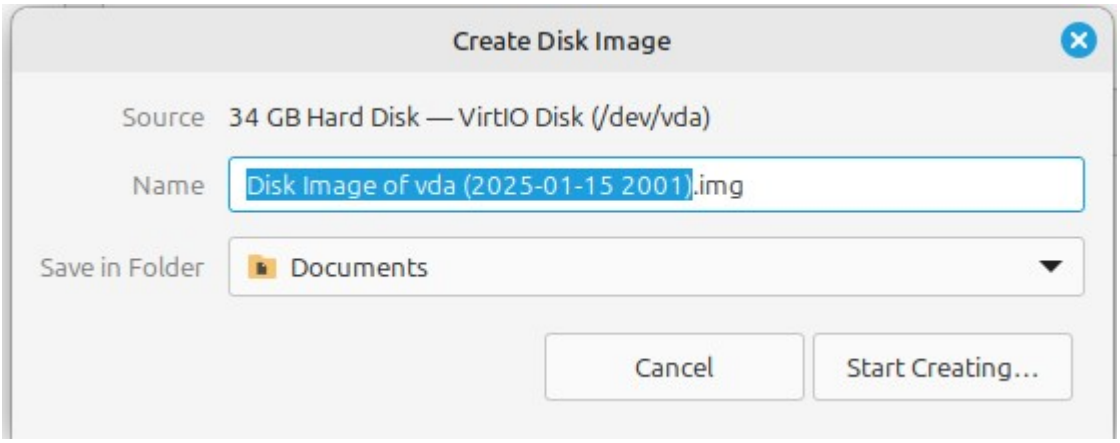


On the left menu, you should see your system drive. Since we are booted off the Live USB, you should also see that listed.

Now, plug in your hard drive you will be saving the backup file to. It will populate in the left menu as well.

Select your system drive and click the three vertical dots in the top right.

Select ***Create Disk Image*** from the menu. You'll be taken to this screen. (Your Source name will be different but should be the name of your systems drive that Mint is currently installed on.)



Click on the Save in Folder drop down.

Select your drive location that you will be storing the backup image on and click Open.

Now change the name of the file to something that makes sense for your backups making sure it ends in the .img file name.

Click ***Start Creating…***

Depending on the size of the disk you are imaging, this will take hours. Come back later.

When the process is complete, you will have an exact image of your drive stored on your external. Close out of the Disks program, reboot your system, and remove the Live USB drive. Your system has not been modified and you are back to normal but now have a complete backup set aside.

If you need to restore, the process is the same instead you will select your system drive, click the three dots, and select ***Restore Disk Image.***

Plug in your backup drive, navigate to that image file and select ***Start Restoring.*** This will overwrite your drive with an exact 1:1 copy of your backup.

Using the included Backup and Restore scripts.

Included in the setup-scripts directory is a folder named ***backup***. This folder holds tools for assisting in backing up your configurations for porting to a fresh install.

These are simple scripts that use a built in function called tar to created a compressed archive of the files you determine. The list of files it will backup are defined in the contents of the list-backup.txt file.

The README.txt will offer an explanation as well but it is critical that you open and edit the list-backup.txt document before running the backup.sh script.

At a minimum, every entry in that file that starts with HOMEDIR will need to be changed to reflect your actual home directory. For example if your username is ab01 your home directory will be **/home/ab01/**

In this case, we should modify the first line that reads **HOMEDIR/.ssh/authorized_keys** to read **/ab01/.ssh/authorized_keys**

Continue with the same modification throughout the list. Save your changes and close the document.

As of this writing, the following files/directories are included for backup in the archive:

/etc/ssh/sshd_config

/etc/wpa_supplicant/wpa_supplicant.conf

/etc/hosts

/etc/hostname

/etc/chrony/

/etc/dhcpcd.conf

/etc/ntp.conf

/etc/udev/rules.d/

HOMEDIR/.ssh/authorized_keys

HOMEDIR/.ssh/config

HOMEDIR/.config/

HOMEDIR/garim/

HOMEDIR/varim/

HOMEDIR/.nbems/

HOMEDIR/.fldigi/

HOMEDIR/.wl2k/

HOMEDIR/.conkyrc

HOMEDIR/.flrig/

HOMEDIR/.gnupg/

HOMEDIR/.gtktermrc

HOMEDIR/direwolf.conf

HOMEDIR/.wine/drive_c/VARA/VARA.ini

When we run the backup.sh script, it will read this document and add the listed locations and files to a single compressed and dated archive that will be placed in your home directory. You can export this to safe storage and use it to return your config files after a fresh installation.

At the end of the day, these scripts are a simple copy and paste automation. The file structure must be the same when you restore the files. That means if you do a fresh install and intend to use the restore script, you must use the same username as that determines the restore point home directory. Also, ensure you have ran the full installation procedures (minus configuring the individual programs) before running the restore script.

When used in this manner, you should then be able to open your FLRig, JS8Call, etc and have all your settings preserved from the last install.

Evolve III Specific tasks.

The Evolve III is a popular 12v laptop that can sometimes be found for $60-100. While not very powerful, it is generally capable of most radio work. Unfortunately, it has a few limitations.

******SOME TESTING SHOWS MINT 22.1 MAY HAVE BUILT IN SUPPORT FOR THE EVOLVE WIFI CARD NOW. TEST WITH THE LIVE USB IF WIFI IS OPERATIONAL ON YOUR DEVICE. IF NOT, FOLLOW BELOW.******

WiFi Driver Install: Using USB WiFI / Ethernet

The built in WiFi card requires drivers to be built once Linux is installed. If you have a USB WiFi adapter or Ethernet adapter to provide internet while you fix the built in drivers do the following commands in your terminal:

```
sudo apt install -y make gcc linux-headers-$(uname -r) build-essential git
```

```
git clone https://github.com/lwfinger/rtw88 && cd rtw88
```

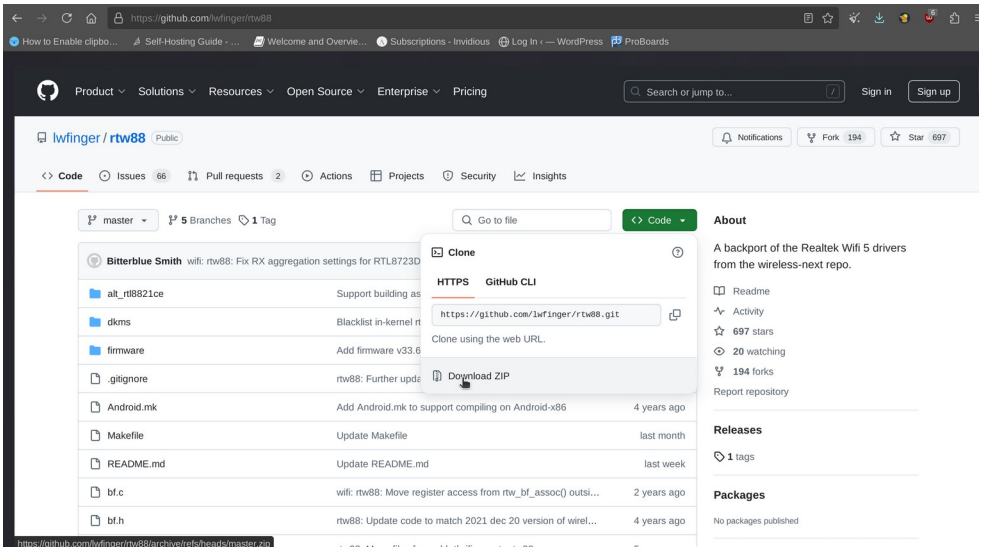
```
make
```

```
sudo make install
```

WiFi Driver Install: Offline

Alternatively, you can copy the contents of the repository to a usb drive from another computer and perform the install offline. To do so visit the repository on a separate computer. https://github.com/lwfinger/rtw88

Click the green icon labeled ‘Code’ at the top right and select the ‘Download ZIP’ option.



Once you’ve downloaded this file, unzip it and place the extracted rtw88-master folder on a portable drive for transferring to your Evolve. Once Linux has been installed, copy this folder to your Evolve III home directory. Then run the following commands in the terminal:

Enter the folder you copied over:

```
cd rtw88-master
```

Now make and install the driver:

```
make
```

```
sudo make install
```

You should now have WiFi operational and be able to continue with the installation of the AmRRON Scripts.