User's Guide to Setting Up and Using Othernet Dreamcatcher v3.05 With Skylark 5.8 (Dec 21, 2020) by

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This guide is designed for users who purchased components from Othernet to set up their equipment using a ***WiFi capable*** Windows, Linux or Apple computer. **Section I - Purchase, Unpack, and Assemble** and **Section II - Energize Dreamcatcher Setup** can be done inside. **Section III - Acquiring the Satellite** is performed outside looking at the satellite. **Section IV - Connecting the Dreamcatcher to Your Local Router by WiFi as a Client** which includes information about viewing the Worldwide Status Display, using a WiFi repeater and USB to Ethernet Network Adapter; and Port Forwarding can be done inside. **Section V - Additional Storage,** and **Section VI - Printing and Othernet Satellite Radio** should be performed when connected to a satellite. **For the latest additional information not included in this User's Guide, go to the Othernet Wiki Pages at** https://forums.othernet.is/t/wiki-directory-of-wiki-pages/5314 There are **four ANNEXs** included covering: Over the Annex A: Air (OTA) Skylark OS updating, Annex B: Power Cubes and Cables, Annex C: Trouble Shooting; and Annex D: LNB Enhancements. If you are using a Dreamcatcher v3.03, check here for its User's Guide - - https://davs.org/DreamcatcherV3.03.pdf

An **internet connection is not required** for this set up except for 3 steps: **1)** Downloading the Skylark OS (Section 1 Step 4), **2)** Connecting to a Local Router as a WiFI Client (Section IV Step 3), and **3)** Viewing the Worldwide Status Display (Section IV Step 4)

Section I - Purchase, Unpack, and Assemble

Step 1. Purchase the necessary equipment from Othernet at https://othernet.is/products/dreamcatcher-v3-05

a. **The Dreamcatcher v3.05 Board** comes with an EDUP USB WiFi dongle (Fig. 1), a F-type female to F-type female Adapter Connector, and a LNB (Fig 2).

Dreamcatcher v3.05 Board with Shipped Components

Fig. 1 EDUP USB WiFi Dongle

Fig. 2 Universal Single LNB - Dual LO: 9750/106000 MHz

You **don't need** anything else. The Dreamcatcher Board has a permanent 9 inch cable with a male F-type connector at the end to connect to the LNB. You can use the F-type female to F-type female Adapter Connector to connect to a longer cable going to the LNB if you plan remote your LNB.

Step 2. Purchase the following from an electronics store:

a. **5.1 vdc 2 Amp (or more)** Regulated USB Power cube (the voltage and current rating **is extremely important**) with a micro USB plug at one end. See Annex B for more options.
b. Short length (less than 4 feet) high quality USB to micro USB charging/sync cable. See Annex B.
c. High quality fast micro SDHC or SDXC card sized between 4 and 128 GB for the Skylark program - - a micro SD larger than 16 GB is unnecessary and not required, but can be used. See Step 5 below for more information on recommended micro SD cards.
d. If you plan to remotely connect your Dreamcatcher away from you LNB, purchase the required length of low-loss RG6 cable with male F-connectors at both ends. *(Othernet performed a functional test of all Dreamcatcher Boards with Skylark, WiFi, and reception from a live signal coming through a bare LNB over ten feet of RG-6 and three feet of RG-58. Some users have successfully sited their antennas up to 400 feet away from the Dreamcatcher.)*

Male F-type connector at both ends of RG6 Cable

Male F-type connector

Female F-type connector

Step 3. Assemble the equipment.

a. Connect the F-type male LNB connector attached to the Dreamcatcher Board to the female F-type connector on the LNB. You don't need to be outside pointing to a satellite at this point.
b. Mount the LNB on some sort of stand or tripod so it points toward the satellite when you take it outside - - see **Section III - Acquiring the Satellite** for information on how to find the satellite.
c. Plug the WiFi Dongle into the female USB receptacle on the left side of the Dreamcatcher Board.
d. Connect the micro USB charging/sync cable to the USB Power Plug on the lower left side of the Dreamcatcher Board. Wait until **Section II** to energize the Dreamcatcher.

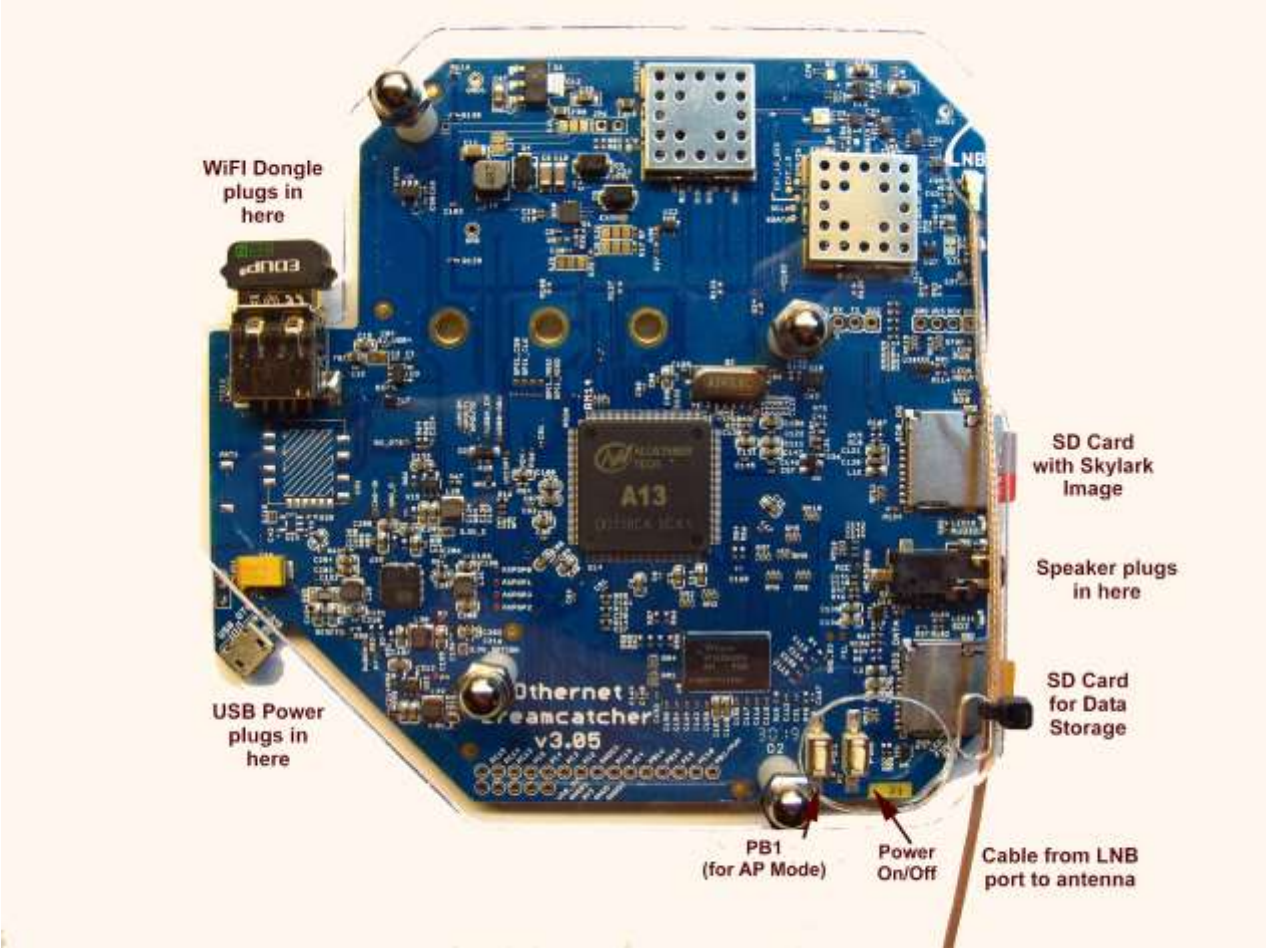


Fig. 4 Dreamcatcher v3.05 with Connections Identified

Step 4. Download the latest version of Skylark 5.8 for Dreamcatcher which is located at: https://archive.othernet.is/Dreamcatcher3%20Skylark/ It is called *skylark-dc-2003041129.img.gz*

Unzip the *.gz* file to an image file with any standard ZIP File program such as 7-Zip available at: https://www.7-zip.org/

Step 5: Make sure you use a high quality fast micro SD card sized between 4 and 128GB for the Skylark OS. Recommended size is 16GB since the Skylark OS automatically cleans old files, so never fills up. Don't skimp on quality here, as some users have discovered inexpensive micro SD cards don't last. **Some recommended micro SD cards** are: Strontium Nitro 32GB Micro SDHC Memory Card, SanDisk Ultra or Extreme, and Kingston.

When you write the Skylark image on a new micro SD card, the act of writing the image takes care of the partitioning and formatting the card correctly for Skylark. There is no need, ever, to try to partition or format the micro SD card manually, before or after writing an image. In the specific case where the micro SD card already had an older version of Skylark on it, refer to Step 8 below.

Step 6. Write the Skylark image file to a micro SD card with an image writing program such as Etcher (Fig.5) available at: https://www.balena.io/etcher/ which is cross platform compatible or Win32DiskImager (Fig. 6) available at: http://win32_disk_imager.en.lo4d.com/download

Fig. 5 Etcher

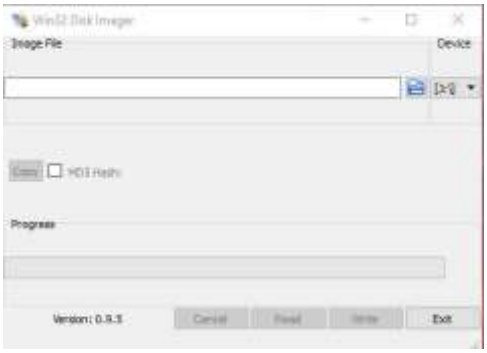


Fig. 6 Win32 Disk Imager

Step 7. **Insert the micro SD card** with the Dreamcatcher Skylark image into the Dreamcatcher Board's SD0_OS which is the micro SD card holder half way up on the right side of the board. If you use a computer to look at the micro SD card with its newly written image before you insert it, it will appear to have 1 formatted sector and 2 unformatted sectors.

Step 8. **Updating Previous Versions of Skylark** - Upgrading to Skylark 5.8 just requires a re-write of the micro SD card if the micro SD card already had an older version of Skylark on it. Writing the new image preserves the old Tuner and Network configurations; and downloaded files. The micro SD card will have 5 partitions on it from the previous install and initialization, however, only 1 will appear formatted. When you insert the micro SD card into some computers, you may get error messages for the 4 unique Skylark partitions which you should ignore, and proceed to re writing the micro SD cards as in Step 6 above.

Optional Step 9. **Over the Air (OTA) Update** Skylark has a feature to allow older Skylark versions to be updated by a preliminary test for OTA. The procedure is attached to this document as Annex A. It is *not being used for Skylark 5.8* but will be in the future. Eventually, it should happen as an automatic satellite download.

Section II - Energize Dreamcatcher Setup

Step 1. **Energize the Dreamcatcher for its first time startup** by plugging a 2 Amp (or more) USB power cube into an AC outlet. Don't forget, if you are using too small a power cube, the board's lights will blink and look correct, but there won't be enough power to run the Dreamcatcher WiFi or its satellite receiver correctly. Use a short length USB to micro USB charging/sync cable. Many Forum Members have good performance from IHome, DeWalt and FuseBox cables. See Annex B for more details on Power Cubes and USB Cables.

Step 2. **Access the Skylark Program** by using your computer operating through its WiFi to connect to the Dreamcatcher's Othernet WiFi Hotspot also called an Access Point. At this point you can alternatively use a tablet or SMART Phone to continue the setup, but the procedure is illustrated with a Windows computer. **Wait no more than 5 minutes** for the Skylark program to install itself for the first time so that the WiFi components can become operational.

Step 3. To be able to access the Dreamcatcher's Othernet WiFi Hotspot, you should be **within 10 feet** of the Dreamcatcher.

Step 4. **Find the Othernet WiFi Hotspot** by going to your computer's WiFi tab; selecting and connecting to **Othernet** (Fig. 7). For the rest of the Sections II & III of this procedure, you will be accessing the Dreamcatcher thru this Othernet WiFi Hotspot.

Fig. 7 Finding Othernet WiFi Hotspot on a Windows Computer

Step 5. **Wait another 5 minutes before you open your Web Browser** for the Skylark Program to finish initialization housekeeping functions. Then type (in the URL tab) 10.0.0.1 and you will see the Skylark Guest Logon Screen (Fig. 8).

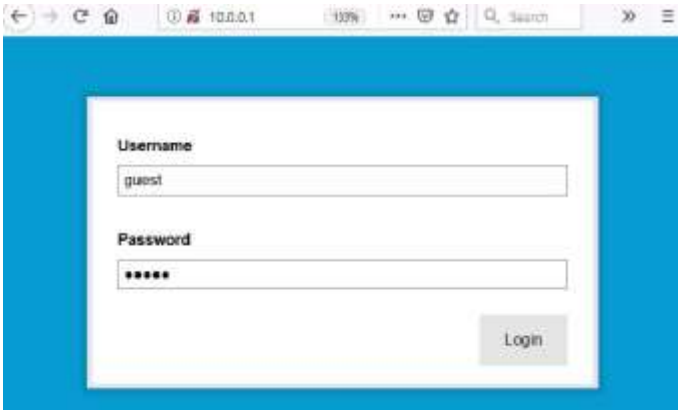


Fig. 8 Skylark Guest Logon Screen

If you don't see the Guest Logon screen (Fig. 8) on your computer, or you don't see an Othernet Hotspot, something is wrong. First thing to check is if the green LED light on the EDUP WiFi dongle is blinking green. In any case, the next step is to power the Dreamcatcher **OFF** then **ON** (referred to as a Power Cycle) with 1 minute of rest in between for 4 times. You must be able to connect to the Othernet Hotspot to proceed. **If a problem still persists, do a Factory Reset as described on page 19 using the PB1 Button to perform a Function 3 operation. If this fails to fix the problem, re write the Skylark image to the micro SD card as in Section I Steps 5 - 8. If this still fails to fix the problem, use a new micro SD card** and start over again. If you still have no response you may have insufficient power to the Dreamcatcher or a bad Dreamcatcher board.

The Dreamcatcher v3.05 Board has a power button located on the bottom right which you press for 10 seconds to activate a complete shutdown. Do not simply unplug power as that may corrupt the micro SD card.

Unique Problems Encountered After Updating Previous Versions of Skylark

Upgrading to Skylark 5.8 just required a re-write of the micro SD card if the micro SD card already had an older **working** version of Skylark on it as mentioned in Section I Step 8. Because old session cookies may be retained in your Web Browser, the new version of Skylark may not come up properly the first time you boot the Dreamcatcher. This is caused by old session cookies cached by your Web Browser clashing with the new version of Skylark which doesn't recognize them. Wait for 2 minutes following the first power on of the Dreamcatcher with the new image while you are looking at your browser, then clear cookies. In most browsers, a **Ctrl**+**F5** will clear site data and cookies. This is the easiest/fastest fix, but a reliable alternative is to Power Cycle the Dreamcatcher by turning it off, then back on. ***If you use the Ctrl+F5 right after powering it up, Power Cycle (turn on and off) the Dreamcatcher. If it still doesn't come up, do 4 more Power Cycles.***

Sometimes carrying-over old configuration files cause problems. Do a **Factory Reset** as described on page 19 using the PB1 Button to perform a Function 3 operation. If this fails to fix the problem, re write the Skylark image to the micro SD card as in Section I Steps 5 - 8. **If this still fails to fix the problem, use a new micro SD card** and start over again.

Step 6. To access all the full administrative features of Skylark, you will need to logon with Username **othernet** and Password **othernet** (Fig. 9) - - it is case sensitive. The Guest Logon will not allow you full access to the **Network or Tuner Apps.**

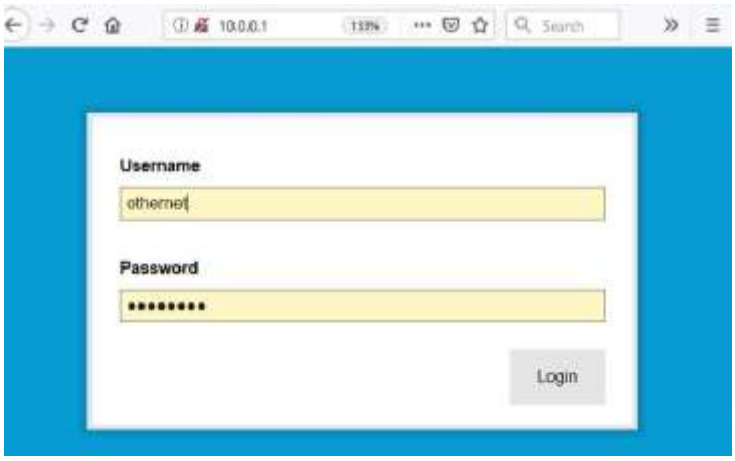


Fig. 9 Skylark Logon Screen for full feature Administrative Control

Step 7. You will now see the Skylark Welcome Screen (Fig. 10)**.** When it pops up, you may also hear a bell.

Fig. 10 Skylark Welcome Screen

Step 8. Open the Applications Icon (Fig. 11) on the top left to reveal Skylark Apps (Fig. 12).

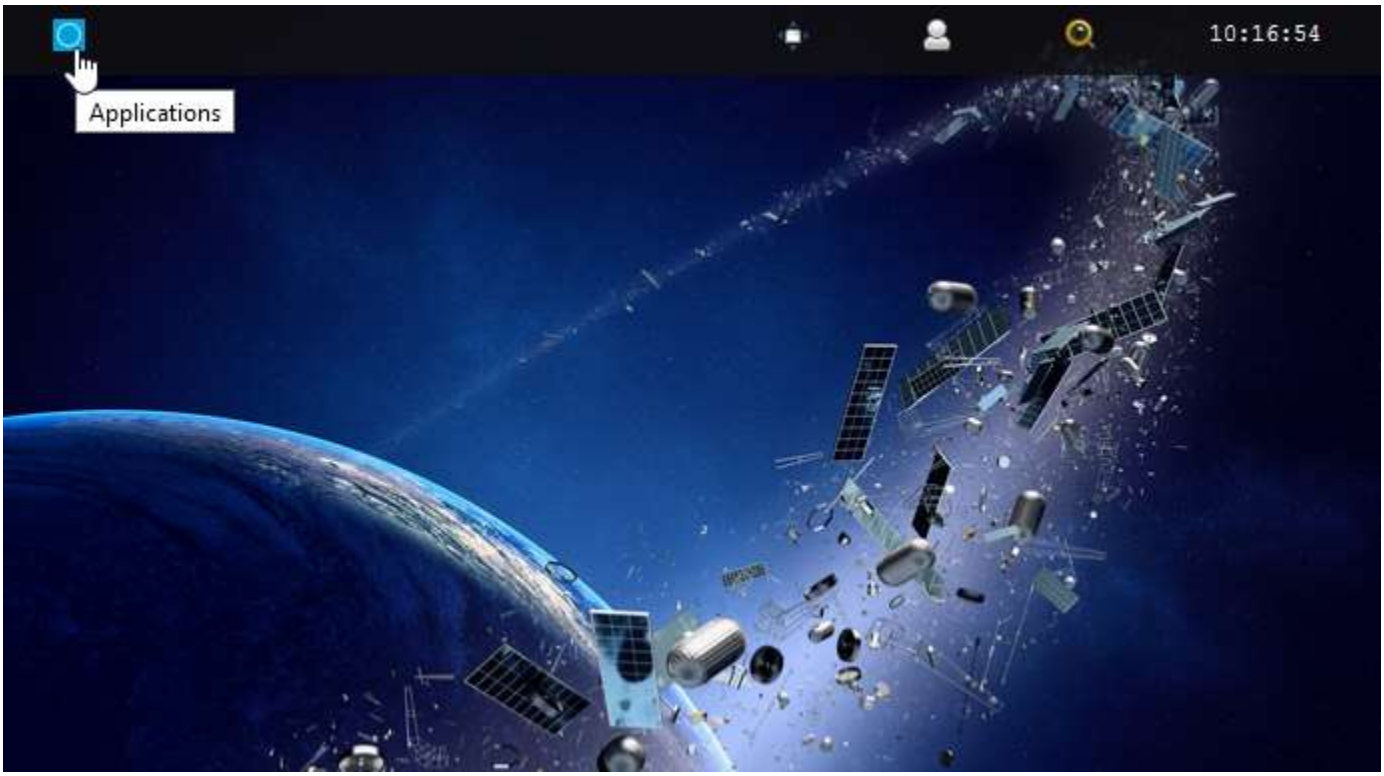


Fig. 11 Click on the blue icon to bring up the Applications Icons

Open the **Tuner Icon** (Fig. 12) to run the **Tuner App** to begin the satellite setup process.

Fig. 12 Skylark Applications Icons showing ***Tuner App*** highlighted

The default tuner screen (Fig. 13) shows *Americas with a Frequency of 12.1032 and Beam Type of 164 (Coverage of SES-2 87W is shown in Fig. 18)*.

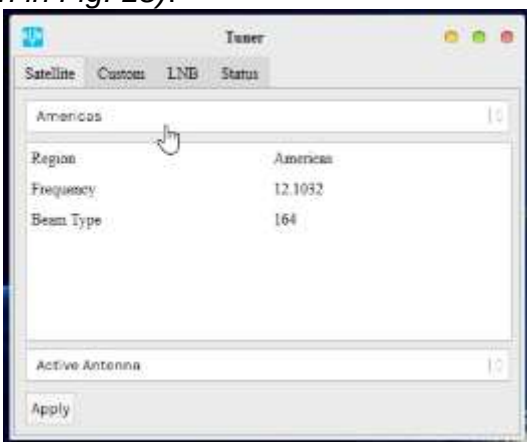


Fig. 13 Tuner Screen

Make sure to select the correct LNB you are using. The Default LNB (Fig. 13b) is the *Dual LO: 9750/106000 MHz*. The Dreamcatcher v3.05 is being shipped with the ***Othernet Dual Band LNB which is the best solution in the EU under Astra 3B*****,** however, the older LNB (Maverick 1 shipped with the Dreamcatcher v3.03) work equally well in North America under SES-2. In this version of Skylark, the Maverick LNB is selected by *Single LO: 10750 MHz*

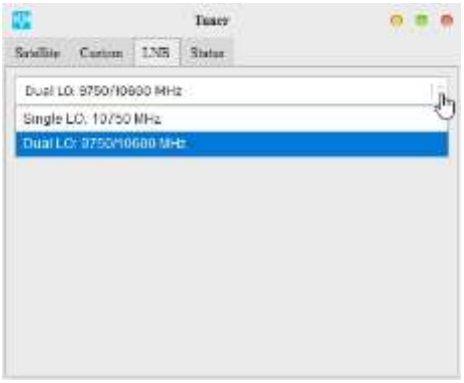


Fig. 13b Tuner LNB Selections

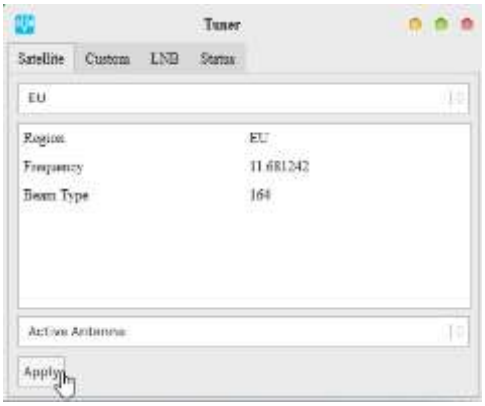


Fig. 14 EU Tuner Screen

With the recent addition of European coverage on Astra 3B (23.5E) (coverage shown in Fig 19), you must select EU as in Figure 14 on the **Satellite Tab**. As with any change, **you MUST click the Apply Button** at the **left bottom** in Fig. 14 for any satellite, frequency, Beam Type or LNB changes. A blank

Status Tab (Fig. 15) will appear when you go to the **Status Tab** because the LNB has not been pointed toward the satellite to receive a signal.

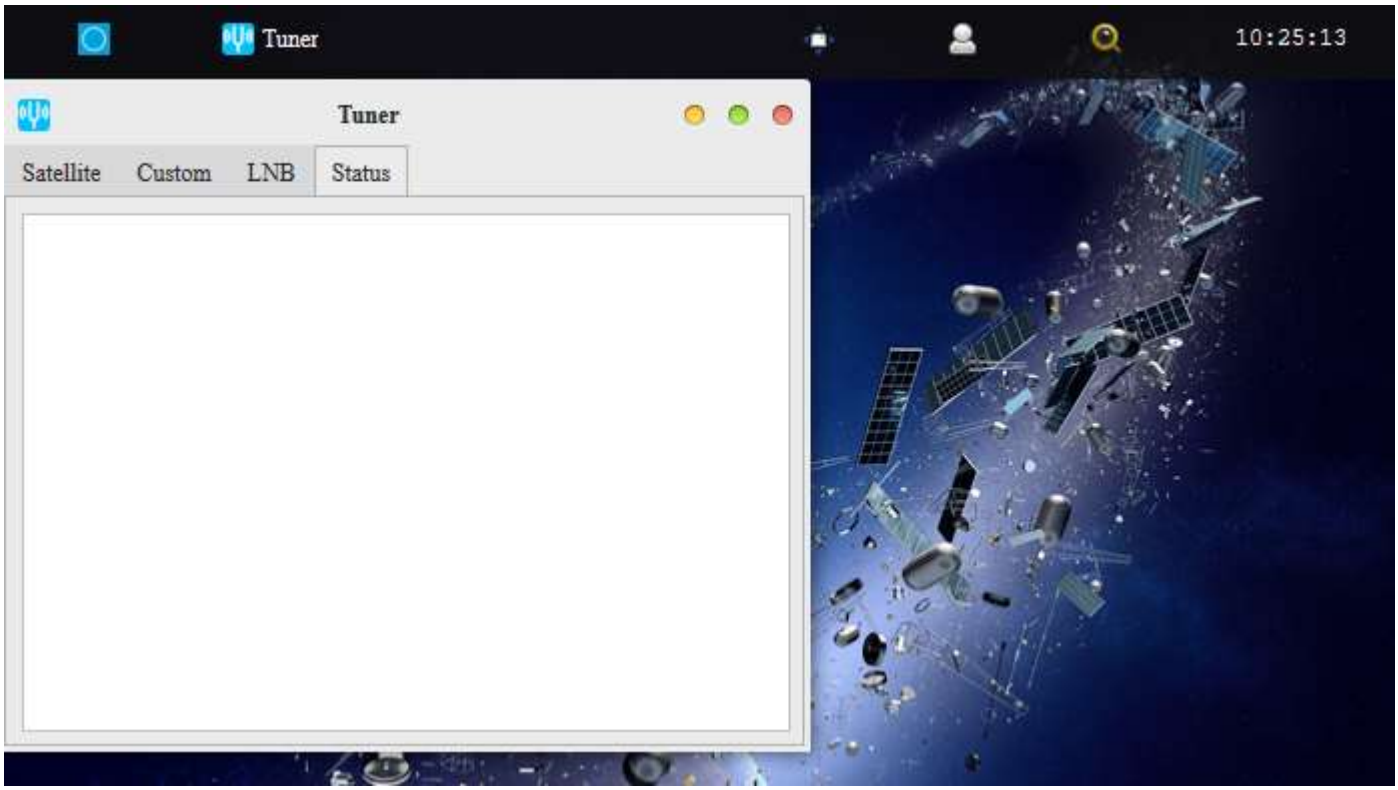


Fig. 15 Tuner Status Tab – Blank with no Signal

In the **Log Viewer App** (Fig. 16) there is a tab called Diagnostics which will confirm in (Fig. 17) at the very bottom of the screen the presence of your Bias-T voltage which powers the LNB.

Fig. 16 Applications Screen showing ***Log Viewer App-Left (and the Diagnostics tab-Right)***

If you see any Bias-T error messages at the bottom of the TAB in Fig. 17, you have a power problem to address before going any further. Your most likely problem is too small a USB power cube or too thin a USB to micro USB charging cable. Also make sure your wire connection between the Dreamcatcher Board and the LNB hasn't broken under the black wire wrap (do a continuity check on the connectors).

If everything looks good, shut down the Dreamcatcher. You are now ready to take your device outside and point it toward the satellite.

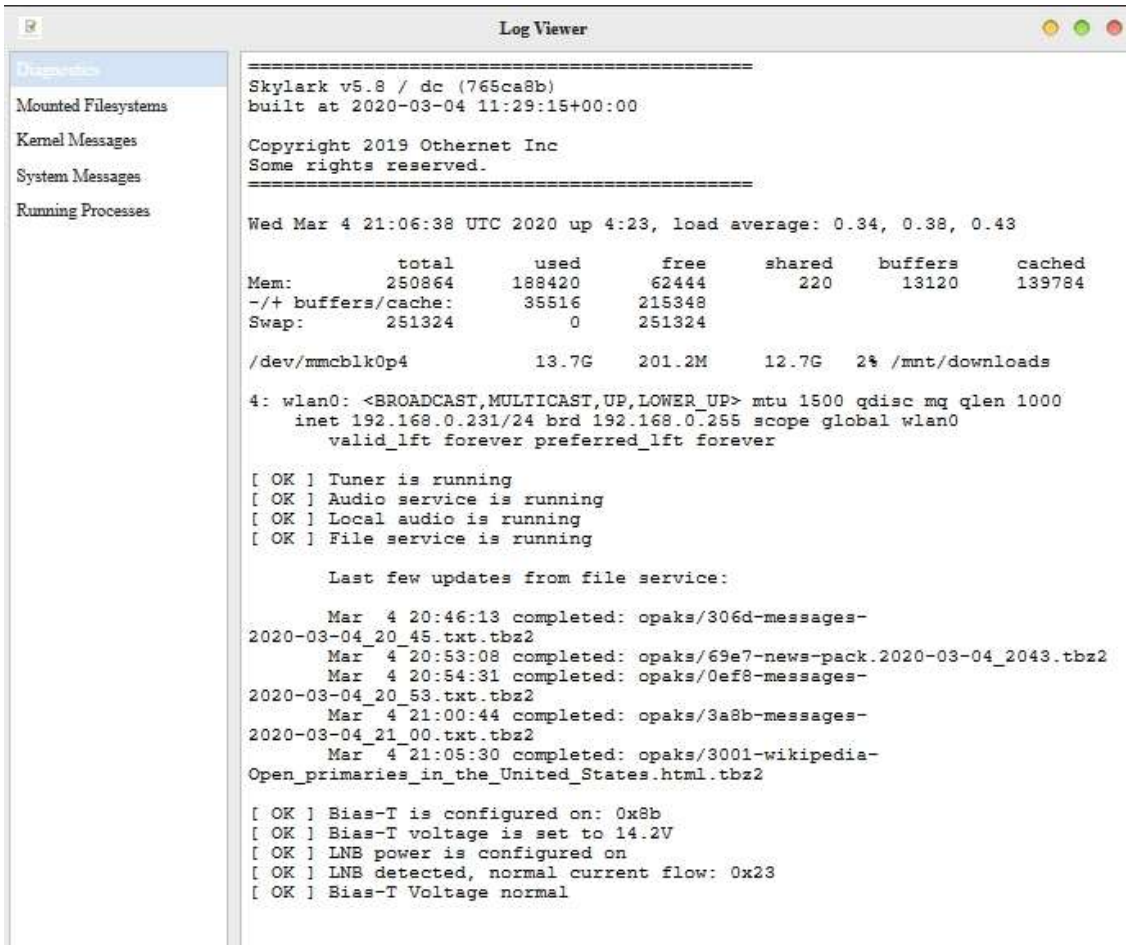


Fig. 17 Diagnostics Showing Normal Bias-T Operation

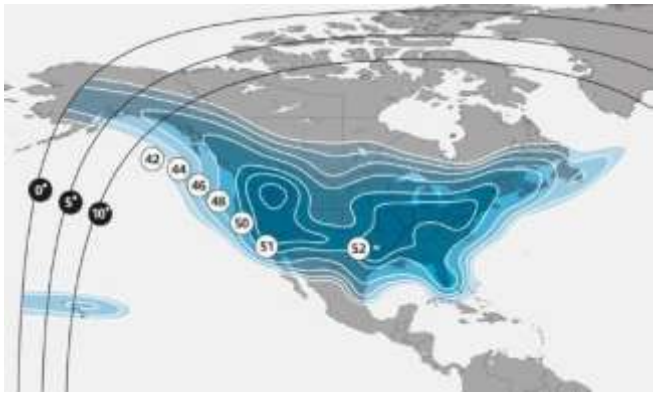


Fig. 18 Americas SES-2 (87W) Ku-band Coverage

Fig. 19 EU Astra 3B (23.5E) Ku-band Coverage

Section III - Acquiring the Satellite

Step 1. Power up the Dreamcatcher/LNB outside, and point to the satellite. Othernet is on SES-2 on Ku-band North America Beam (87W), and Astra 3B on Ku-band Central and Europe Beam (23.5E).

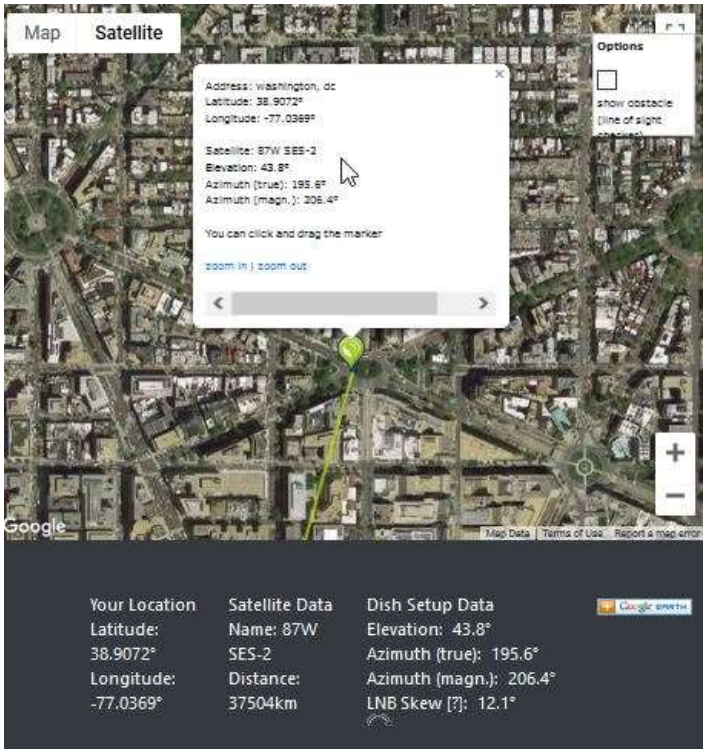


Fig. 20 Locating SES-2 in Washington, DC

Step 2. Based on where you are, find your **elevation angle, skew, and magnetic azimuth** from a site such as http://www.dishpointer.com (Fig. 20). For your first satellite acquisition effort, select a location with a **clear unobstructed view of the equatorial sky**. *(Later, once you confirm your system is working, you can try to find a better more permanent location. Many people are able to operate thru windows or off balconies with partially obstructed views.*)

Example: For Washington, DC, mount the LNB on a camera tripod with the appropriate skew angle set to 12.1 degrees clockwise (more on skew below). Using a magnetic compass chose the *Azimuth (magnetic.)* to get a sight line on close in objects which you can use to point your LNB towards the satellite at 206.4 degrees magnetic. If you use a cellular phone, you may have to use *Azimuth (true)* to get a sight line.

Using an Adjustable Sliding Bevel and a carpenter's level to get a precise elevation angle (EA) of 43.8 degrees for Washington, DC, set on the LNB, I do the following: **In the picture below, the obtuse angle inside the Adjustable Sliding Bevel is *180 degrees - EA degrees or 180 - 43.8 = 136.2 degrees* with the vertical side of the Adjustable Sliding Bevel perfectly perpendicular to the ground.** If you were in Churchill, Manitoba, Canada, with an EA of 23 degrees, the obtuse angle would be 180 - 23 = 157 degrees.

Skew allows you to match your LNB's horizontal/vertical orientation with the satellite's horizontal/vertical orientation to maximize signal strength. When you set the skew, make sure you rotate the LNB so that skew angle is pointed directly overhead. Skew is given in degrees either clockwise (CW) or counterclockwise (CCW). If the reported LNB Skew direction for your location is shown clockwise, you stand behind the LNB looking at the satellite and rotate the LNB clockwise until you arrive at that number. For Washington, DC, you set the skew to 12.1 degrees by turning the LNB in a clockwise direction. Viewing the same satellite on the same longitude, but from South of the equator, result in an opposite rotation skew angle.

Skews less than 10 degrees CW or CCW don't make much difference, but if you live on the far edge of a satellite beam, skews may approach 30 degrees which is significant. If your satellite has a built-in offset as in EU's Astra 3B, use the Skew that http://www.dishpointer.com provides which is correct.

Step 3. One of our Forum Members @Tysonpower has developed a new Satellite Calculator for Othernet Beams Fig. 22 that is now available on Othernet in the ***downloads:////Apps Folder*** Fig. 21. It is written as an HTML file and will run in Skylark as a native html program (whether you are connected to a satellite or not) and any other Java equipped computer. After you select the satellite you want to find, you insert your Latitude in **digital degrees** and your Longitude in **digital degrees** (making sure if you are in a West Longitude you enter a minus sign). It will report back your **magnetic heading**, elevation, and skew.

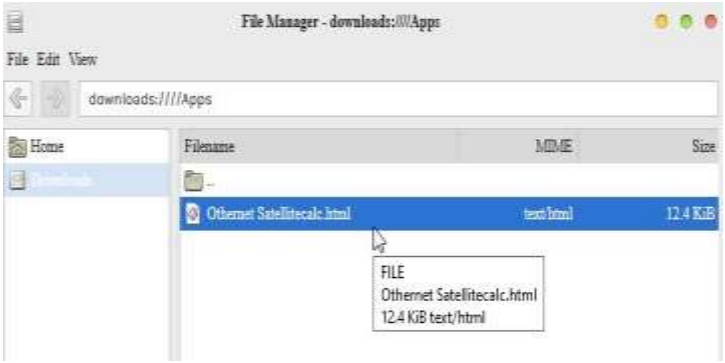


Fig. 21 File Manager Location to find Satellite Calculator for Othernet Beams App

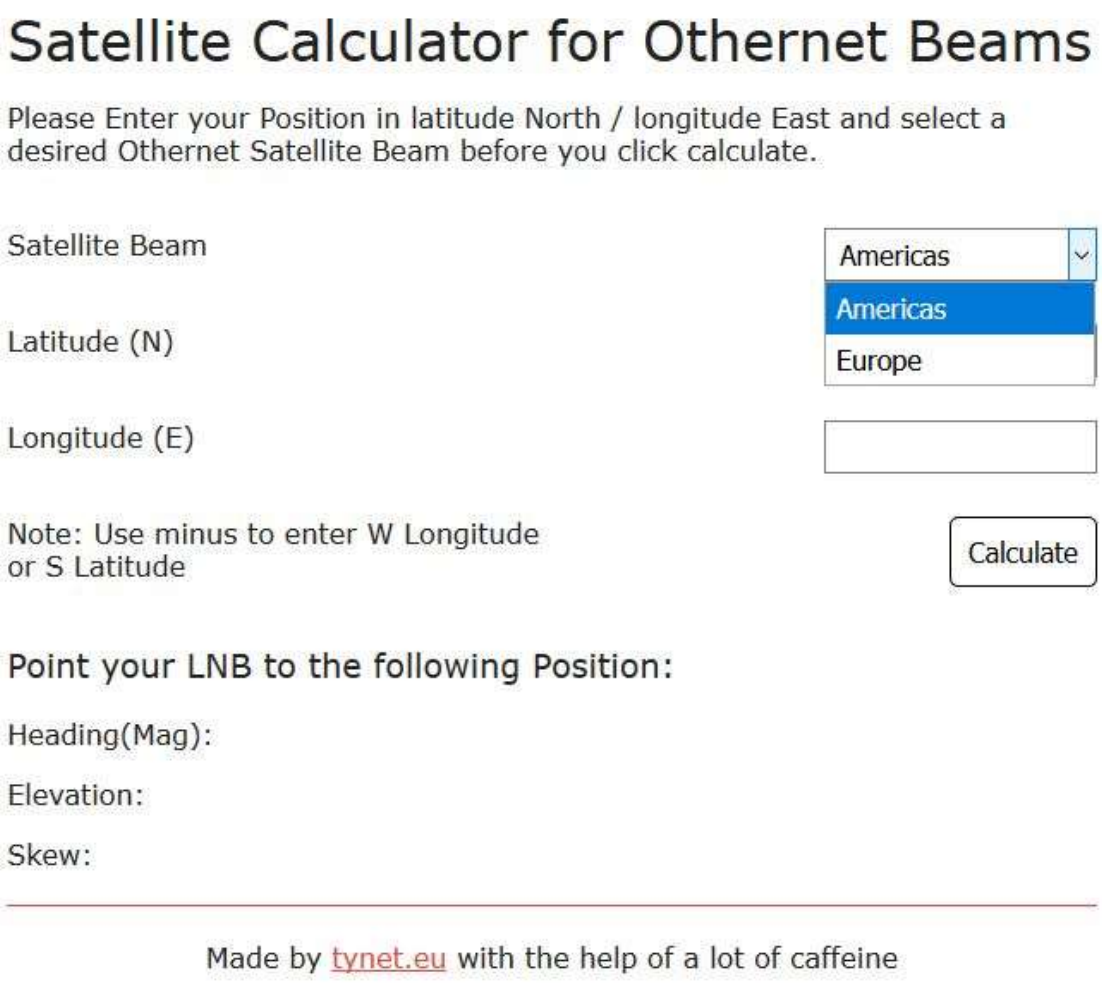


Fig. 22 \Satellite Calculator for Othernet Beams

Step 4. **Go back into your *Tuner App*** from your computer's WiFi which will be connected through the Dreamcatcher's Othernet WiFi Hotspot, and select the **Status Tab**. You should see information in the Status Tab as in Fig. 23 if you are correctly pointed at the satellite and everything is working. If you are not receiving packets or your Bias-T voltage is not present, the Status Tab will be empty as in Fig. 15. **Slowly adjust your LNB to maximize the SNR (dB) making it as large (less negative) as possible.**

The Tuner Status screen in Fig. 23 will show the *SNR (dB)* line fluctuating at a value **above -14 dB** (sometimes as high as + 10 dB), the Lock line saying **yes**, and the *Rssi (dBm)* line fluctuating at a value between **-60 and -100 dBm.** On the top of the Tuner Status Screen, you will see what type file is being downloaded at that moment - - either *audio* or *files*. At the very bottom of the screen you will see what file is being downloaded or just finished downloading at any time. This picture represents a successful connection at latitude 39 deg N longitude 76 deg W in mid morning with an accurately pointed LNB. Additionally from page 19, LED 6 will be fast blinking dim green ***if data packets are detected.***

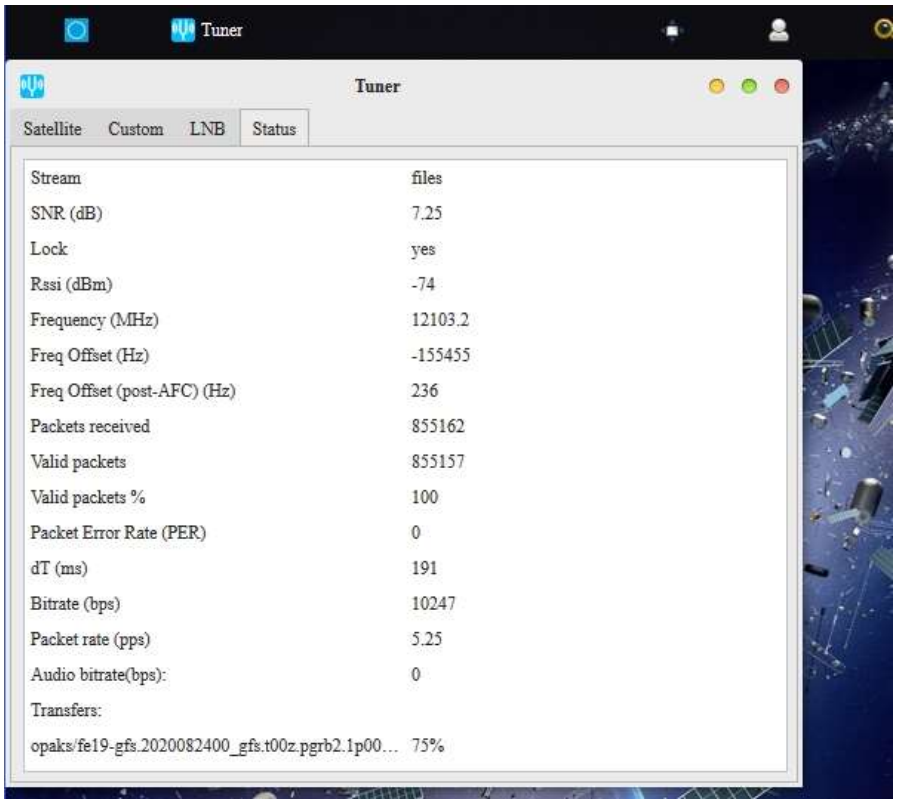


Fig. 23 Tuner Running Correctly on SES-2 at Latitude 39 degrees N

Occasionally **you may not receive a satellite signal** due to uplink or downlink weather related problems; or system problems at the head end. Othernet provides a **Worldwide Status Display** (fully described on page 17) that will immediately show you reception in your area so you can determine if a system problem exists. The status screen can be viewed at https://status.othernet.is and is shown in Fig. 28. If there are Red Balloons shown in your area, the downlink will have no signal. **Wait until you see Green Balloons in your area, then proceed.**

Red Balloons in UK and France = No Frame Lock

Step 5. **Dreamcatcher Placement**

Valid packets	75684
Valid packets %	92
Packet Error Rate (PER)	0.079
dT (ms)	192
Bitrate (bps)	9148
Packet rate (pps)	4.69

In your final setup, it is recommended to place your Dreamcatcher a few feet away from any RF generating sources (good example being a WiFi Access Point). Degraded download performance and system lock-ups have been reported when the Dreamcatcher was located too close to a WiFi Access Point. In some situations, AC power pick-up on the charging cable has caused problems. AC pick up problems can be reduced by using a ferrous choke around your power cord. One method of determining interference problems after you have acquired satellite access, is to look at the % valid packets and packet rate shown in Fig. 23. It should show close to 100% *Valid packets*, with a *Bitrate (bps)* approximately 10,000 in North America on SES-2, and in Europe on Astra 3B.

Optional Step 5. ***Cones and Horns to Improve SNR***
Several users living on the fringe of SES-2's ERIP area have discovered using a cone or horn around the LNB improves SNR by as much as 6 dB in some cases being the only way to close the link. The cones and horns being used are 8 inches tall with an upper diameter of 4 inches (either in diameter, or 4 inches by 4 inches square), and a lower diameter of 2 inches (either in diameter, or 2 inches by 2 inches square). Both martini shakers, collapsible stainless steel drinking cups, and solid aluminum or garden mesh wires are being effectively used. *Pringles potato chips tubes (which are aluminum lined) also work well and allow you a snack while sighting your LNB.* Check Annex D by @wbrown for more detailed design information.

Optional Step 6. Connect your Dreamcatcher to an outside **free-to-air (FTA) Ku-Band LNB/dish antenna** using the Othernet Stock Maverick LNB or the Othernet Dual Band LNB. The Dreamcatcher Board is powerful enough to operate at least to 400 feet of RG6 cable - maybe more! The only caveat is you **cannot use** a DiSEqC switch in series with your outside LNB/dish. Depending on the length of your cable, you may not be able to use a standard FTA antenna motor such as a STAB-HH90 or Sadoun DG-280. Some Forum Members have successfully used the STAB-HH90 at 125 feet.

I am using a ***Pico Digital LA-2150D Series Satellite IF Inline Amplifier*** which adds 20 dB of additional Rssi signal and a significant improvement in SNR. If you are running longer stretches of 75 ohm cable, this may be a way of accommodating loss.

If you chose to use the Maverick LNB as your FTA LNB, it must be tuned to 9750 - 10750 in your FTA receiver. If you chose to use the Othernet Dual Band LNB as your FTA LNB, it must be tuned to 9750 - 10600 in your FTA receiver. Most stock FTA LNBs will work with Skylark using the Tuner Setting for the Maverick LNB.

There is a comprehensive discussion in Will Brown's paper (Annex D) discussing the use of old Dish and Direct TV LNBs/parabolic dishes, and Circularly Polarized LNBs.

Section IV - Connecting the Dreamcatcher to Your Local Router by WiFi as a Client

Step 1. On the Applications Screen (Fig. 24), open the Network Icon to run the **Network App.**

Fig. 24 Applications Icons showing ***Network App***

Step 2. The default Network Screen (Fig. 25) is set to **Create a Hotspot** called **othernet** with no password.

Fig. 25 Default Network Screen

Step 3. Open the **WiFi Client** tab (Fig. 26), and fill in your Access Point Name and Password. You cannot connect to a WiFi Client network that does **not broadcast a SSID,** but you can connect to a WiFi Client network with complex (8 or more element passwords such as *Uwp!820@).* **Your network must be connected to the internet** to perform this this step. **A word of caution** here because once your Dreamcatcher is connected to the internet, it reports back to Othernet's Chicago, Illinois, USA, headquarters its location. **If stealth is required** in your country, do not perform this step.

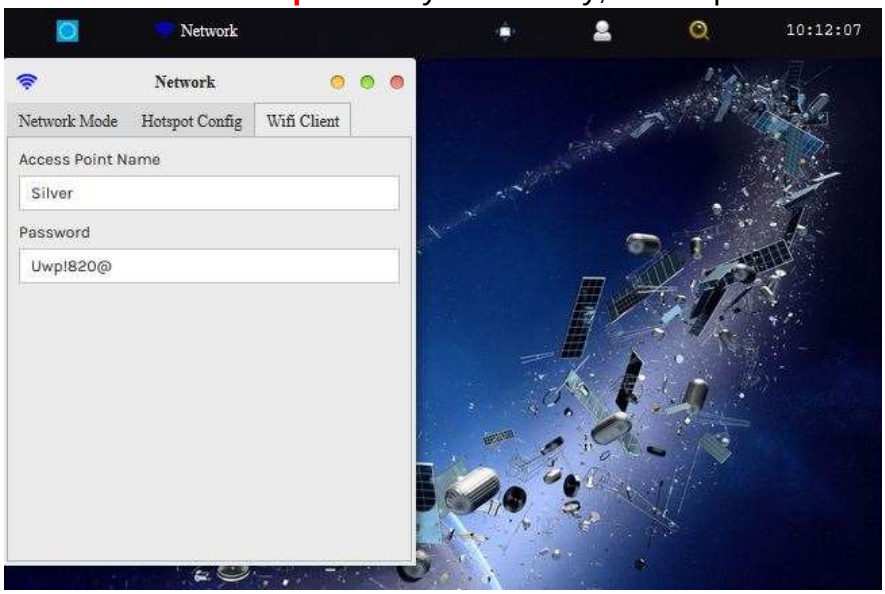


Fig. 26 WiFi Client Screen

After entering your Access Point Name and Password, go back to the Network Mode Tab (Fig. 27) and select **Connect to a WiFi router.** Then **Click Apply and Reboot.** At this time you will lose the WiFi connection between your computer and Othernet's WiFi Hotspot as the Dreamcatcher connects to your local WiFi as a client, and gets assigned an IP address by your router. Sometimes it could take up to 2 or 3 minutes for the changes to load, so be patient. If you **mistype** your Access Point Name or Password, the Dreamcatcher will connect, but you won't see it when you try to access it as in Step 4 below. To regain access to the Dreamcatcher, proceed as in Step 6 below to go back to the Hotspot mode, then redo this step.

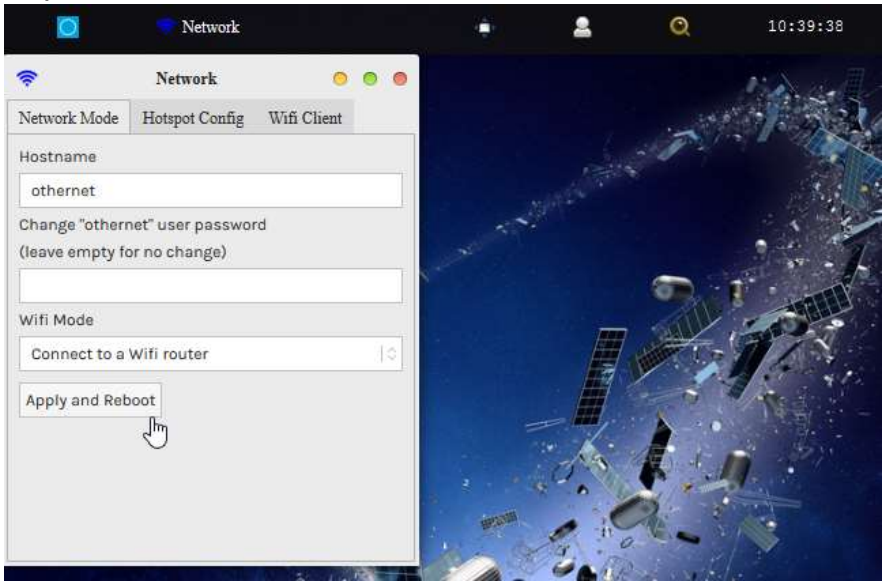
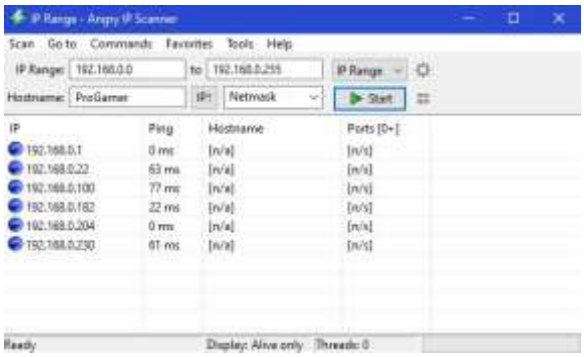


Fig. 27 Network Mode Tab ready to Connect to a WiFi router instead of Create a hotspot
Click Apply and Reboot

Keep in mind that when connected to a WiFi router, reconnecting to it after **a power failure** presents a unique problem - - the reason is most Routers take longer to boot up than the Dreamcatcher. As a result, the Dreamcatcher is trying to reconnect to the Router before the Router is ready to accept a connection and assign a Client IP address. The Dreamcatcher **must be the last device** to power up after a power failure.

Step 4. You will be connected to Dreamcatcher's Skylark Program through your local WiFi from your router. You can go to any computer on your router's network, and use any Web Browser to access Skylark through its newly assigned IP address, or by typing my.othernet.is (which requires an internet connection to work). **If you cannot find the Dreamcatcher's IP address using your router** or my.othernet.is**,** suggest you use a shareware program such as Angry IP Scanner (https://angryip.org) (Fig. 27a) for Windows, MAC, and Linux; or Advanced IP Scanner (advanced-ip-scanner.com).

If for some reason, your Dreamcatcher did not get assigned an IP address on your Client Network, the application of the Connect to a WiFi router command **may have failed**. Power Cycle the Dreamcatcher 3 or 4 times. If you still don't get an IP address assigned, return to the AP Hotspot mode as in Step 6 below, and start over with Section IV Step 1.



Another update implemented in Skylark 5.5 was that of receiver IP lookup. For those on Linux, Android, MacOS or iOS, you should also be able to access the receiver on you LAN by going to http://othernet.local For Windows users, this may work if you already have Bonjour Services installed; if not, Bonjour Services can be installed using this installer from Apple at: https://support.apple.com/kb/DL999?viewlocale=en_US&locale=en_US

Fig. 27a Angry IP Scanner Results
Showing the New IP Address for Dreamcatcher as 192.168.0.230

Worldwide Status Display - - Once your Dreamcatcher is running and connected to your local area network, Skylark has a sub-routine that reports the program's "heartbeat" via the internet (if you have an internet connection) to Othernet's Chicago, Illinois, USA, headquarters on a world map with colored balloons. Both SNR (-16dB or less = red, -13dB or less = yellow, higher = green) and Frame Lock (95% lock = green, 89% or more = yellow, less = red) are reported every 5 minutes. The status screen can be viewed at https://status.othernet.is and is shown in Fig. 28. This reporting amounts to about 1.6 MB/day of data. It cannot be disabled in Skylark, but if you want to block it with your router or a Pi Hole, look for telemetry.othernet.is, and block it.

Fig. 28 On-line Network Status Display at https://status.othernet.is

Step 5. **Changing the administrator user password and the othernet WiFi HotSpot password** is sometimes required if you are sharing your Client connection, and don't want anyone to gain administrative access to your Skylark program or connect to your Dreamcatcher.

Administrator Password Change Go back to the Network Mode Tab and enter a new password as shown in Fig. 29. Once the password is changed, everywhere where you had entered “othernet” as a password, you will use the newly established password. Once changed and ***Applied and Rebooted***, the new password will not show up in that block but it has been changed. If you want to change it again, redo this step.

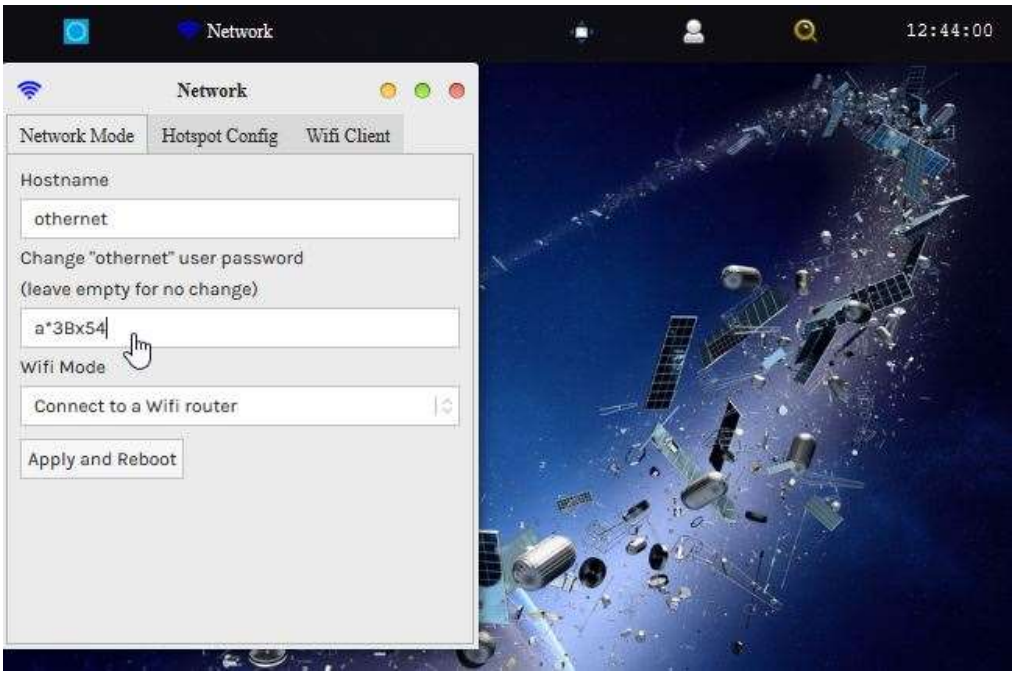


Fig. 29 Network Mode Tab Showing Method for Changing Othernet Admin Logon Password
Click Apply and Reboot when Finished

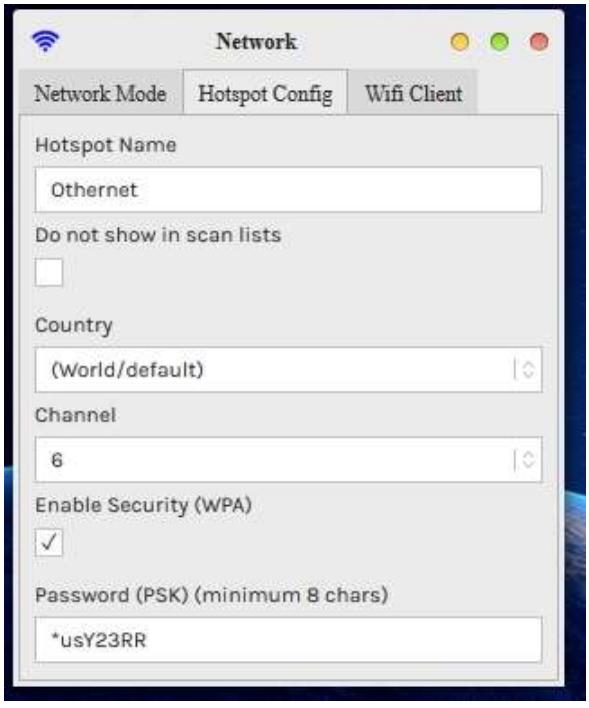


Fig. 29a Network Mode Tab Showing Method for Changing Othernet Hotspot Password
Click Apply and Reboot when Finished

Othernet WiFi HotSpot Password Change If you want to protect your WiFi HotSpot of the Dreamcatcher, add a password to protect it by going to the *Hotspot Config tab (Fig. 29a).* Don't forget to go back to the Network Mode tab to click APPLY.

Step 6. The Dreamcatcher v3.05 has an **important new process using the PB1 Button** to return to the Hotspot mode after you leave a network. Looking at the Dreamcatcher board pictured on the next page - - to enable a return to the AP Mode, press PB1 once. LED 1 will light solid green. After about 7 seconds, all the LEDs will glow solid and the **Dreamcatcher will reboot into the AP Mode**. **This function is important** if you leave a network and have to reenter a new network name and password, or if you incorrectly entered your own network information. After you initiate this option, you must completely restart **Section IV** from the **Othernet WiFi Hotspot**, and reconnect to your local router by WiFi as a Client. Make sure your satellite and LNB selections did not change - - they should remain the same.

What Else Does The PB1 Button Do? You **do not push** the Power On/Off Button **at all** when using the PB1 Button. The PB1 Button cycles thru three Functions (which used to be selectable on the Touch Screen on the Dreamcatcher v3.02Q and V3.03) selecting the one of your choice **rebooting the Dreamcatcher into the AP mode each time.**

Function 1: Switches the Dreamcatcher to the AP mode and Reboots into the AP mode.

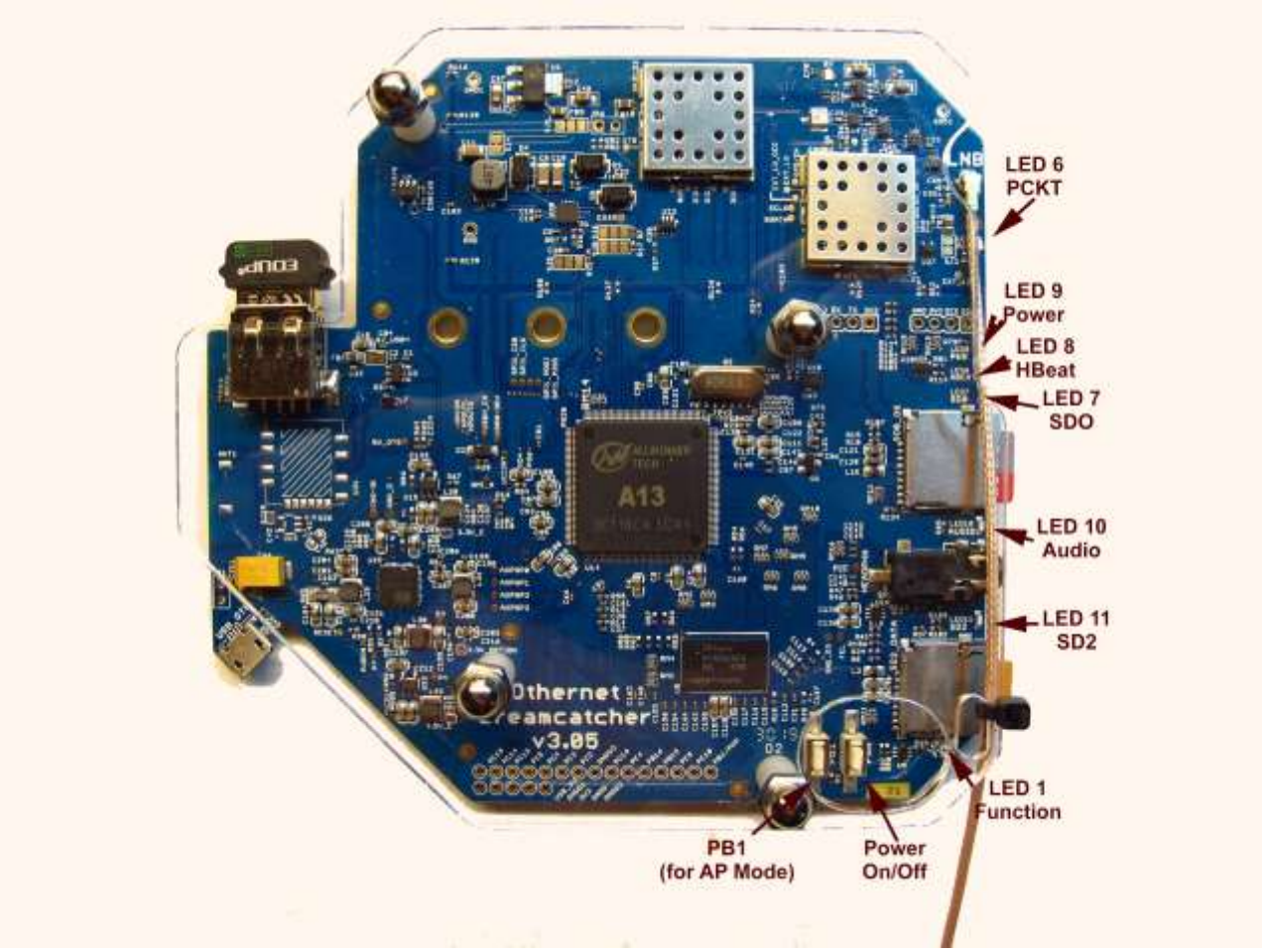
Function 2: Resets the configuration - - any WiFi configurations, AP/STA mode settings, hostname changes, password changes, beam selection, custom beam settings, LNB selection - all of that. **BUT** it does **not** clear downloaded files from storage. Then it Reboots into the AP mode.

Function 3: Does everything Function 2 does, *plus* it clears all downloaded files as well. It is a **factory reset.** Then it Reboots into the AP mode.

- If you press PB1 exactly once, LED1 turns on and flashes a "1" pattern: Long green, long green, then repeating. This action selects *Function 1* rebooting the Dreamcatcher into the AP mode.
- If you press PB1 again (for a second time within about 7 seconds of the first press), LED1 now flashes a "2" pattern: Long green, short green, long green then repeating. This action selects *Function 2* resetting and rebooting the Dreamcatcher into the AP mode.

- If you press PB1 again (for a third time within about 7 seconds of the second press), LED1 now flashes a "3" pattern: Long green, short green, short green, long green, then repeating. This action selects *Function 3* resetting and clearing all the downloaded files; and rebooting the AP mode. It is a **factory reset.**
- If you press PB1 again (for a fourth within about 7 seconds of the third press), the LED1 turns off and **selects NO FUNCTIONS**. This gives you a way to cancel out of selecting one of the functions.
- When LED1 is flashing functions 1, 2 or 3, and you do not press PB1 within 7 seconds, that specific function takes effect. **Only 4 quick pushes in the 7 second window** cancels out a Function Selection.

Properly connected and operating, the Dreamcatcher v3.05 with an external micro SD card installed, will display the following LEDs:



Design	Color	Name	Function	Normal Operation Receiving Packets
LED 1	Green	Function	See Above	Off
LED 6	Green	PCKT	Receiving packets	On fast blinking dim green
LED 7	Green	SDO	Shows read/write activity on either SD Card	On blinking green
LED 8	Green	HBeat	Reports status to Chicago	On blinking green
LED 9	Blue	Power	OFF/ON indicator	On solid blue
LED 10	Green	Audio	Blinks if audio is present	On blinking green
LED 11	Green	SD2	Blinks if SD card is active	On blinking green
EDUP	Green	WiFi	Green if WiFI is on	On blinking green

LED Table

Step 7. In some installations, a **WiFi repeater** is desirable. Most Dreamcatcher installations can reliably connect with your existing WiFi device to your router, however, low WiFi signal levels do cause unexpected disconnects requiring you to manually reboot the Dreamcatcher. Many users install their Othernet gear outside their residence in open area such as gazebos, decks, sheds, garages, etc. In these situation a WiFi repeater assures reliability of Othernet reception. Install the repeater as **far as possible from your WiFi**, and **as close as possible to your Dreamcatcher**.

Step 8. Alternate Connectivity Approach is to use a **USB to Ethernet Network Adapter** instead of going through the Othernet WiFi Hotspot or Network Client approach. Be careful, **NOT ALL** USB to Ethernet Network Adapters work both natively under Skylark and Armbian. Specifically a TP-Link TL-UE300 works properly.

This Ethernet Dongle is natively supported, so works out of the box. Just replace the EDUP WiFi Dongle (Fig. 1) with the Ethernet Dongle. **Make sure you set Skylark to run in the default WiFi Hotspot mode**. The downside of this approach is you need to determine the actual IP address as in Section IV Step 4 using your router or another program.

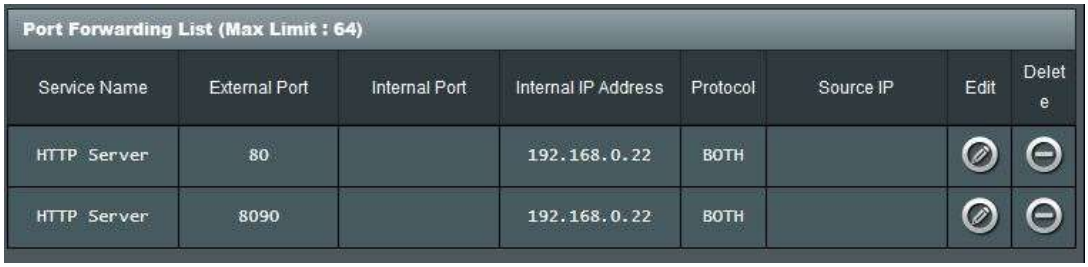
Step 9. **Calls** The apps, when they make a "call" to the Skylark server over WiFi, show a rotating "progress bar" indicator of sorts. They vanish when the call successfully complete. Tuner app, for example, makes this call about once every second. The Wikipedia app makes it only once, when you open the app. The Log Viewer app makes it every time you click on a label in the left column.

Sometimes while this call is being made, we may experience a temporary connection loss over WiFi. That causes the call to fail, and the "rotating plus" associated with that call just hangs around. Meanwhile, an app like the Tuner app might give up on the failed call, and initiate another one. Every time this failure happens you accumulate another "rotating plus".

These are really just showing failed calls. If too many of them are accumulating, you should check you WiFi signal. If you only see them accumulate every once in a while, the easiest way to clean them up is logout and log back in. They serve as a kind of record of WiFi connectivity loss.

Optional Step 10. Forum Members also use **Port Forwarding** options on their network routers to be able to see the Dreamcatcher remotely. *To be able to grant full access to all of Skylark's functions, you will need to Port Forward two different ports illustrated by an Asus RT-AC68U router. Port 80 gives access to the Skylark screen, and port 8090 gives access to Skylark's Radio.* This is how I am able to view my Dreamcatcher from remote computers away from home. Not all internet providers allow Port Forwarding, Virtual Private Networks (VPN) don't always Port Forward, and older routers do not always have a Port Forwarding option. I use an Asus RT-AC68U connected to my internet provider and port forward my Othernet terminal. I feed a second Asus RT-AC68U (daisy chained) to provide VPN protection for the rest of my network.

You may also be able to install the Tomato Router (from https://advancedtomato.com/) on an older router to enable Port Forwarding.



Section V - Additional Storage

Step 1. A micro SD data card **of any size** can act as additional storage. Make sure to use a fast high quality micro SD card formatted **FAT32.** Plug it into the Dreamcatcher Board's SD2_DATA which is the SD card holder on the bottom right of the Dreamcatcher Board. You should **not plug and unplug** the micro SD card while the Dreamcatcher is writing to the micro SD card as it may cause a writing error. LED 11 blinks fast green when the micro SD card is being written to. In Skylark, you cannot upload files

from your computer to the additional storage device - - you must remove the micro SD card and copy the file with your computer. If you use a micro SD card larger than 32 GB, make sure it is **FAT32** formatted - - 64 and 128 GB micro SD cards come exFAT formatted which **will not work**. Micro SD cards up to 64 GB have been tested and work fine.

Step 2. It has been randomly observed that - - no boot occurs if a micro SD card is installed in the data slot. Some boards work and others don't. If this occurs in your setup, (with the power on) temporarily remove the second micro SD card in the data slot while Skylark boots, then push it back in.

Step 3. Additional storage can also be provided by installing a FAT32 formatted USB Flash Drive or hard drive plugged into a passive hub (Fig. 30) along with the EDUP WiFi Dongle (Fig. 1). Both a micro SD card and an external storage device can be used simultaneously under Skylark. Again, make sure the USB Flash Drive and hard drive are FAT32 formatted. I suggest you use Rufus 2.17 to FAT32 format large *micro SD cards and USB Flash Drives* available at https://rufus.ie/downloads/ For FAT32 formatting of hard drives, I suggest you use AOMEI Partition Assistant available at https://www.disk-partition.com/download-home.html

Fig. 30 I-tec Passive Hub

By adding additional storage, the Dreamcatcher's Skylark program will be able to periodically copy downloaded files to one of the storage devices *each time you **remove/reinsert** the external storage device or **reboot** your Dreamcatcher.* This function preserves files so you won't lose them when you re format the SD_OS card, or update Skylark to a newer version. Keep in mind you will be storing approximately 2 GB of data per month, so a large micro SD card or flash drive is desirable. *(The micro SD card used with the Skylark operating system automatically gets cleaned of old files hourly, so it never fills up. The files cleaned are erased and not saved. That is why I recommend only a 16 GB micro SD card for the Skylark program.)*

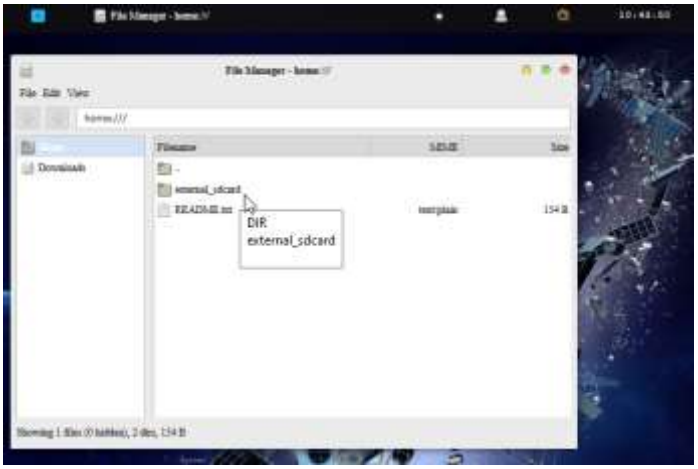


Fig. 31 Accessing Files on Additional Storage

Step 4. Access to files on additional storage devices is done by going to the **File Manager App** (Fig. 31) on the Applications Screen.

Access the **External_sdcard** folder (Fig. 32) and go to the file you want to run in Skylark. Several Forum Members run the Rachel Data Base, videos, music, and pictures. When you select a file to access, choose Skylark's Reader program (Fig. 33) to view it as Rachel is shown in Fig. 34. You can alternately select the file, and *Download it to your computer* (Fig. 35) to view it.

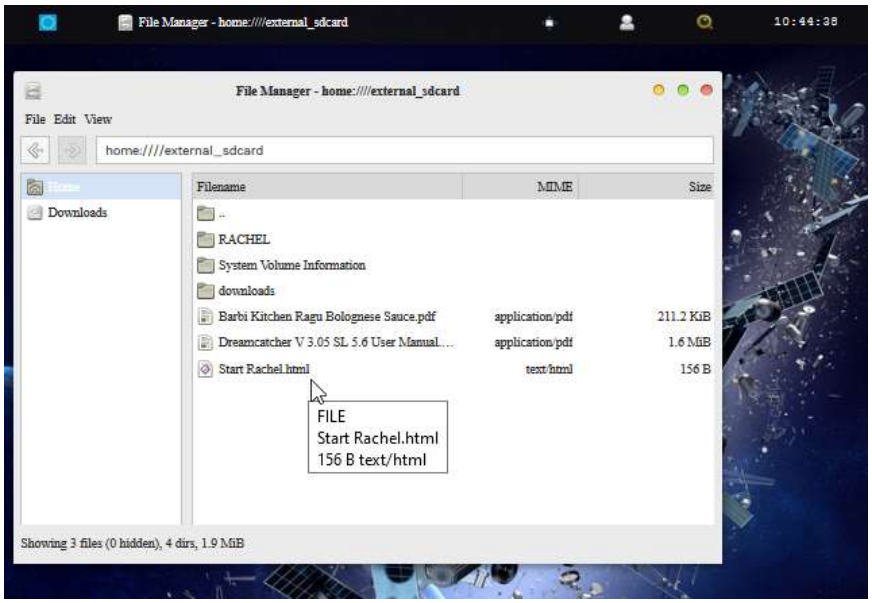


Fig. 32 Select the file you want to run e.g. *Start Rachel.html*

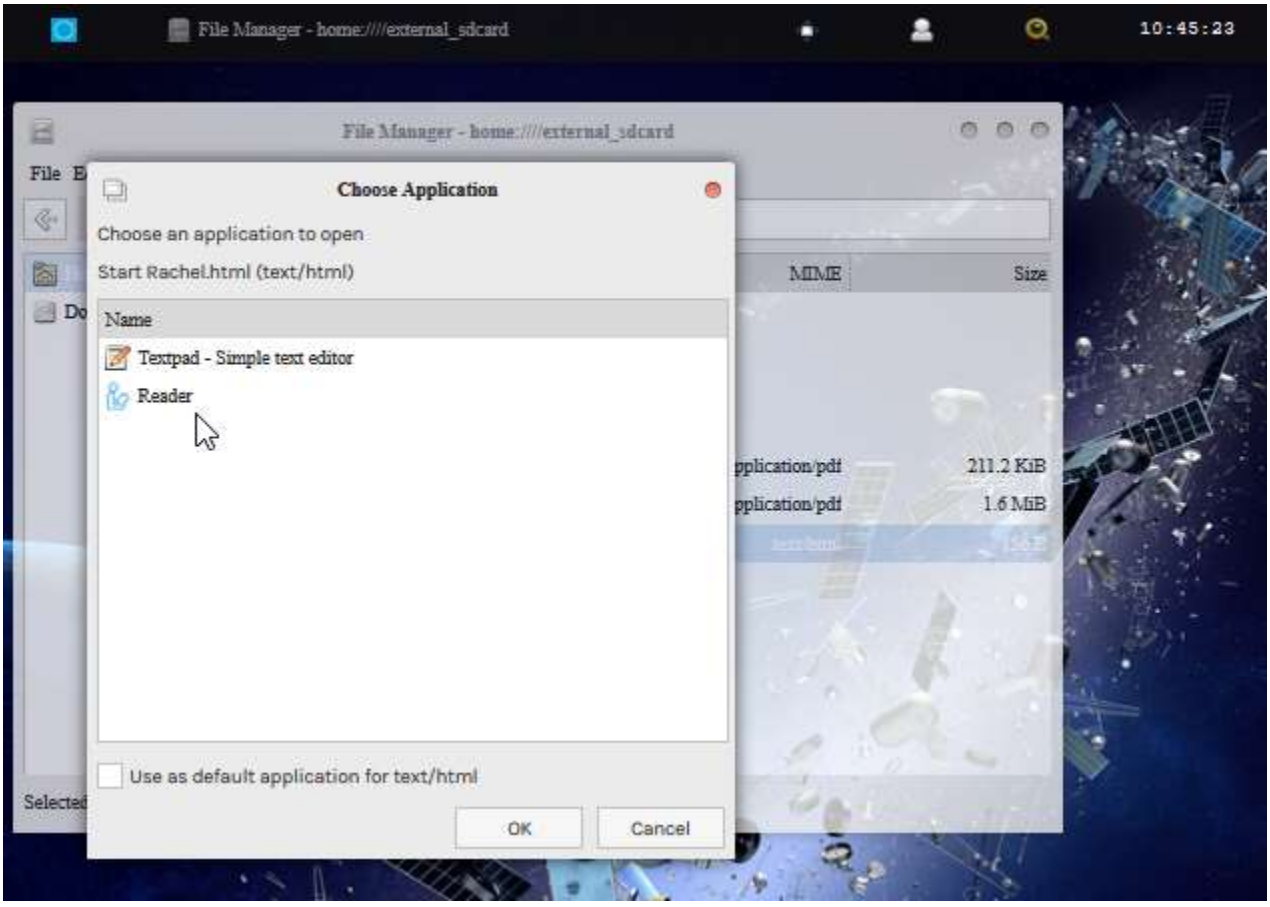


Fig. 33 Choose Skylark's Reader Program

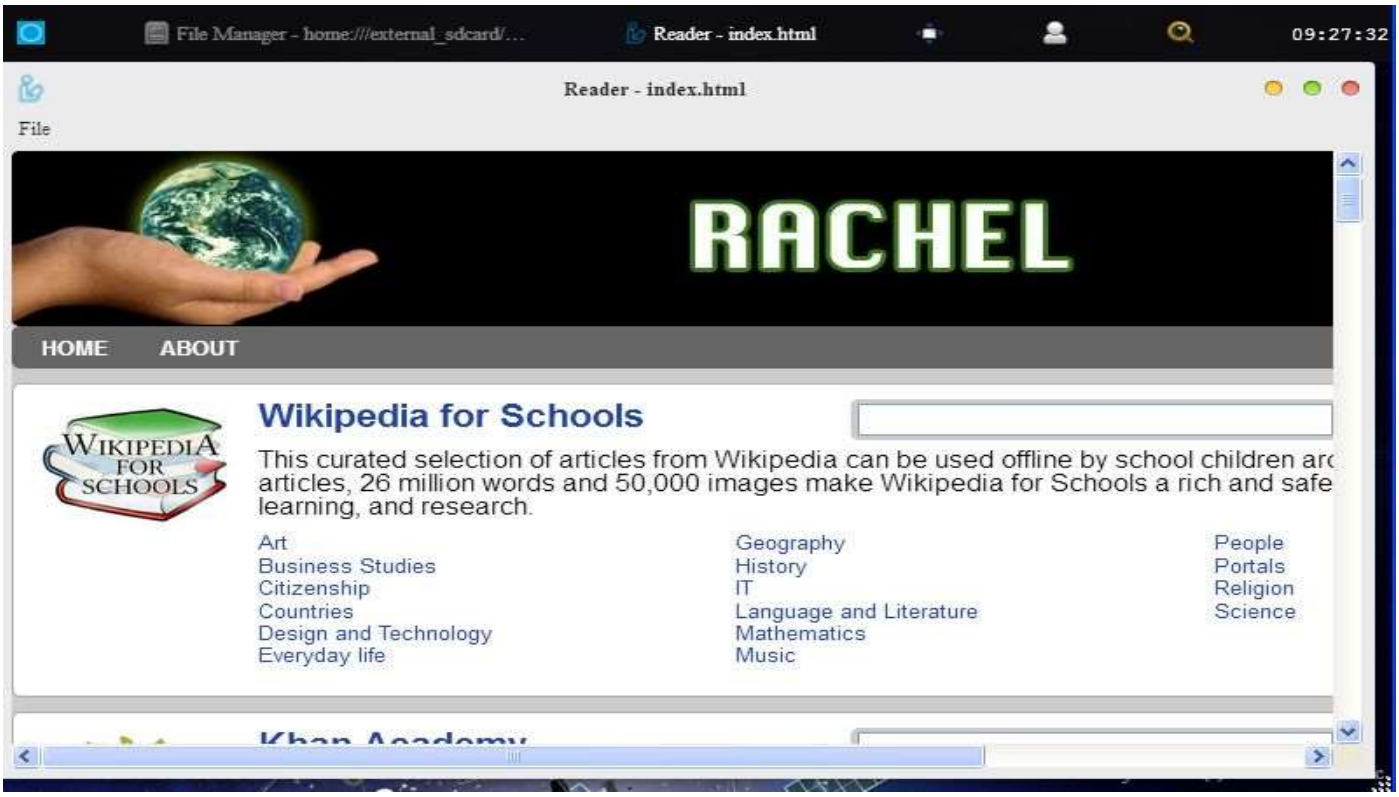


Fig. 34 Rachel's *Start Rachel.html* file viewed in Skylark's Reader Program

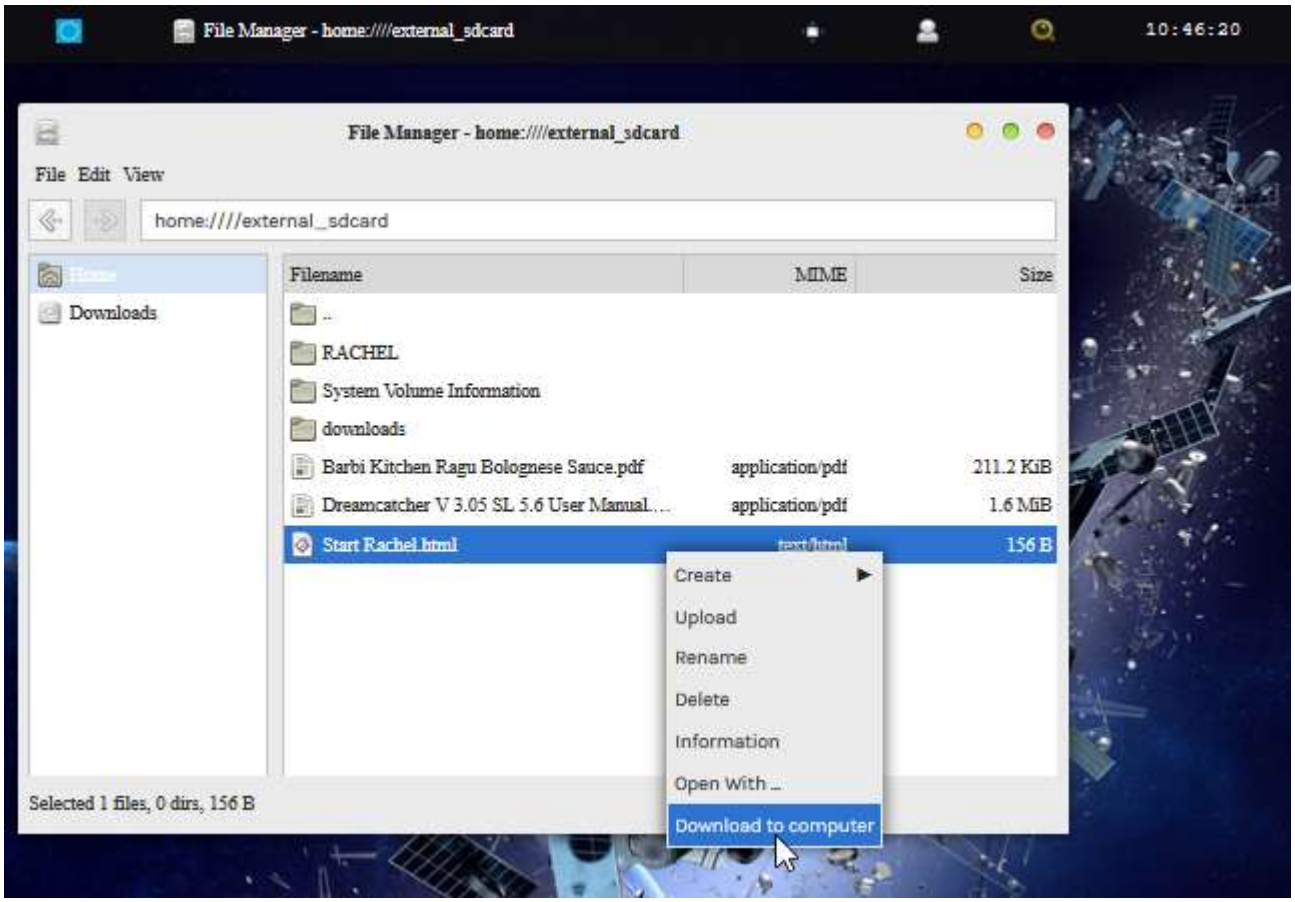


Fig. 35 Download to Computer

Section VI – Printing and Othernet Satellite Radio

Step 1. ***Printing*** frames from the Skylark data is possible if you use a **Firefox Browser**. *MS Explorer, Opera, and Chrome don't work properly in the Windows world.* The technique is very simple. Right click on the frame you want to print, as in Fig. 36, select *This Frame* to pop up the *Print Frame* drop down, and then select *Print Frame*. It will print fully in as many pages that are necessary.

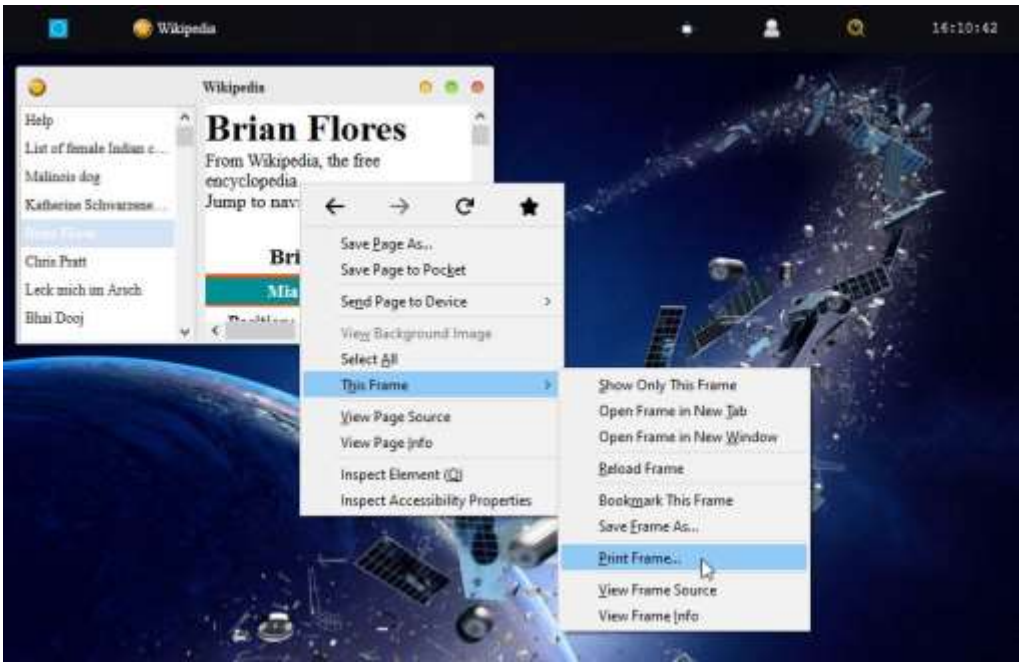


Fig. 36 Printing Frames Using Firefox Browser

Step 2. ***Othernet Satellite Radio*** is available by either use of the native Skylark App, or plugging a standard 3.5 mm stereo speaker into the speaker output plug on the Dreamcatcher Board. Audio is not stored in Skylark - - it is a live event. ***Othernet Satellite Radio*** is broadcasting continuous Voice of America (VOA) News at this time. If new content is added, it is reported on the Forum at https://forums.othernet.is

Method 1 - - **Native audio/sound** is found in the Radio App shown in Fig. 37.

Fig. 37 Radio Application Icon

Fig. 38 *Radio Icon* Screen with MP3 Player selected for listening to ***Othernet Satellite Radio***

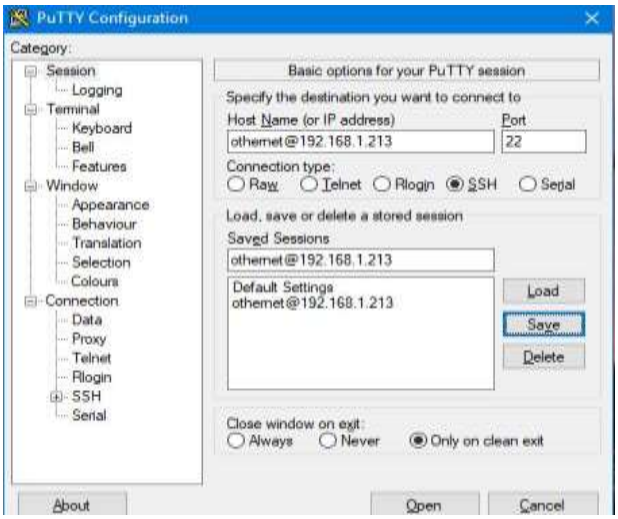
Play ***Othernet Satellite Radio*** directly here by clicking on the "play bar" shown in Fig. 38, or select **Othernet Satellite Radio** and open it in a new browser window. You can also run it with VLC (https://www.videolan.org/vlc/) RealPlayer or Windows Media Player if you copy your network URL to the player.

Method 2 - - **Use of a speaker** plugged into the standard 3.5 mm stereo output plug. Some users connect the speaker output to an *FM Player Transmitter* so they can tune to ***Othernet Satellite Radio*** on a standard FM radio. If you use a device that requires external power from a USB cord, make sure to power it from a separate power source. The Dreamcatcher power budget **cannot** support it.

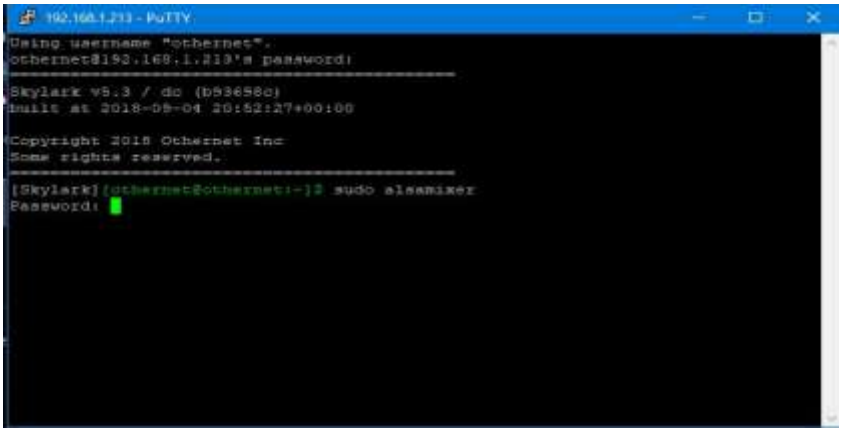
FM Player Transmitter

Step 3. ***Increasing the Volume of the Othernet Satellite Radio*** can be accomplished “on the fly” with a software modification to Skylark that *only remains in effect as long as you do not* ***reboot*** *the Dreamcatcher.* This change will have **no effect** on the Native audio/sound mentioned in Method 1.

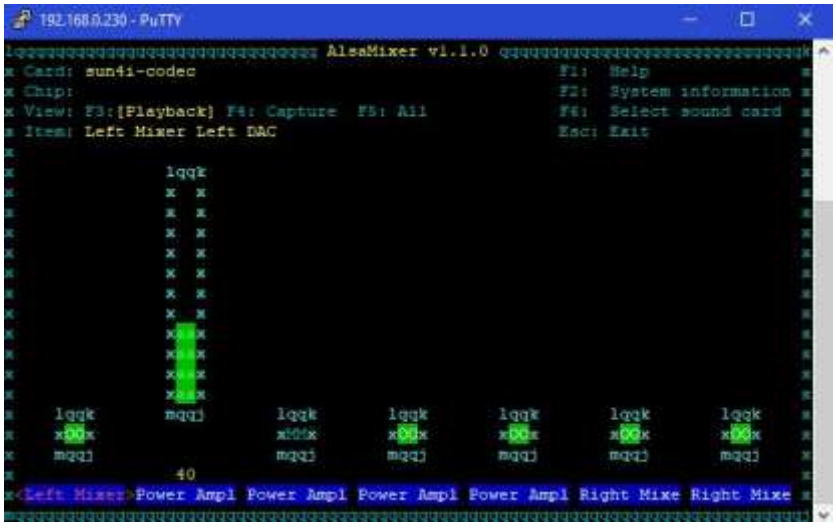
To make this adjustment use a program like PuTTY (available from https://putty.org) to gain access to Skylark through its Secure Socket Shell (SSH) by entering your IP Client address into PuTTY. You can do this from an Othernet WiFi Hotpot or as a Client (as I am doing) - -



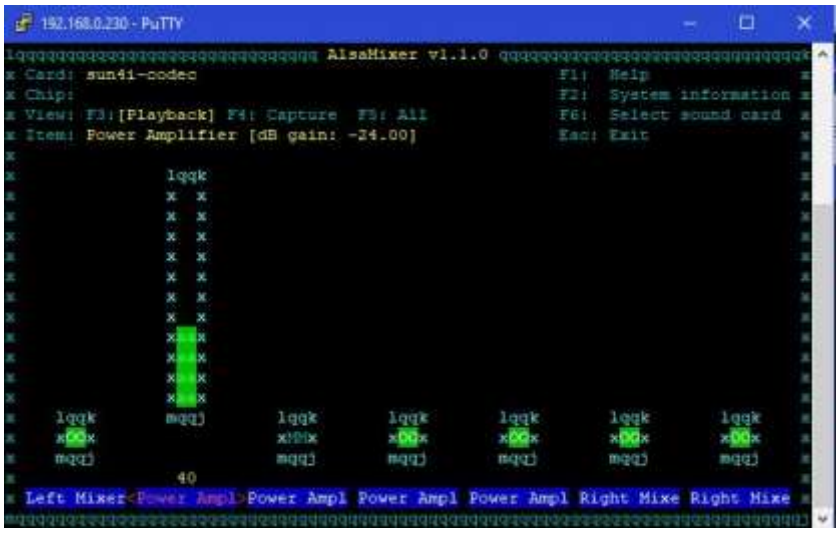
Login with Password: *othernet*
Then type *sudo alsamixer*
Then enter Password: *othernet*



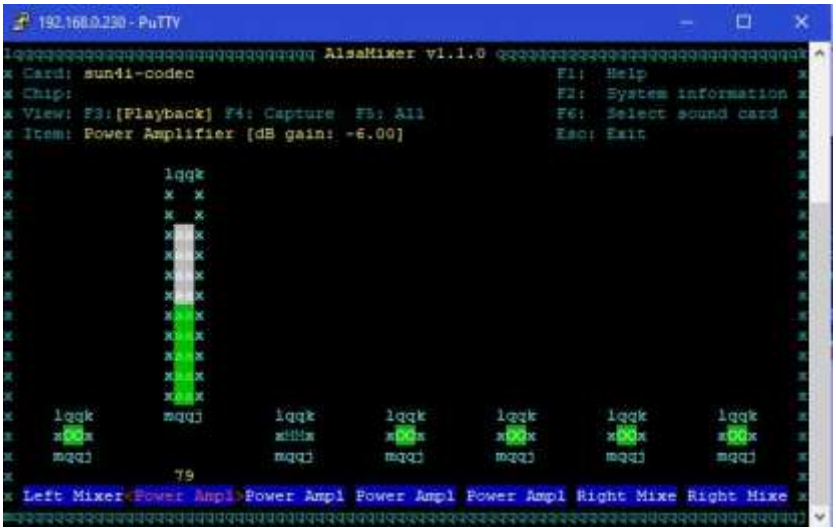
The following control screen appears - - with <Left Mixer> in red as the default.



Using your computer keyboard's right arrow key, cursor to the right until the bottom label on second vertical bar turns red and <Power Amp> appears - -



Using the UP arrow, move the green bar up to increase the volume from -24 dB (default) - - up to -6 dB or what you like.



ANNEX A
Preliminary Test for OTA

You can use an Over the Air (OTA) file to update your via the Web User Interface (webUI) – here is no need to remove the micro SD card from the Dreamcatcher. At this time, there are NO OTA files for Skylark 5.8.

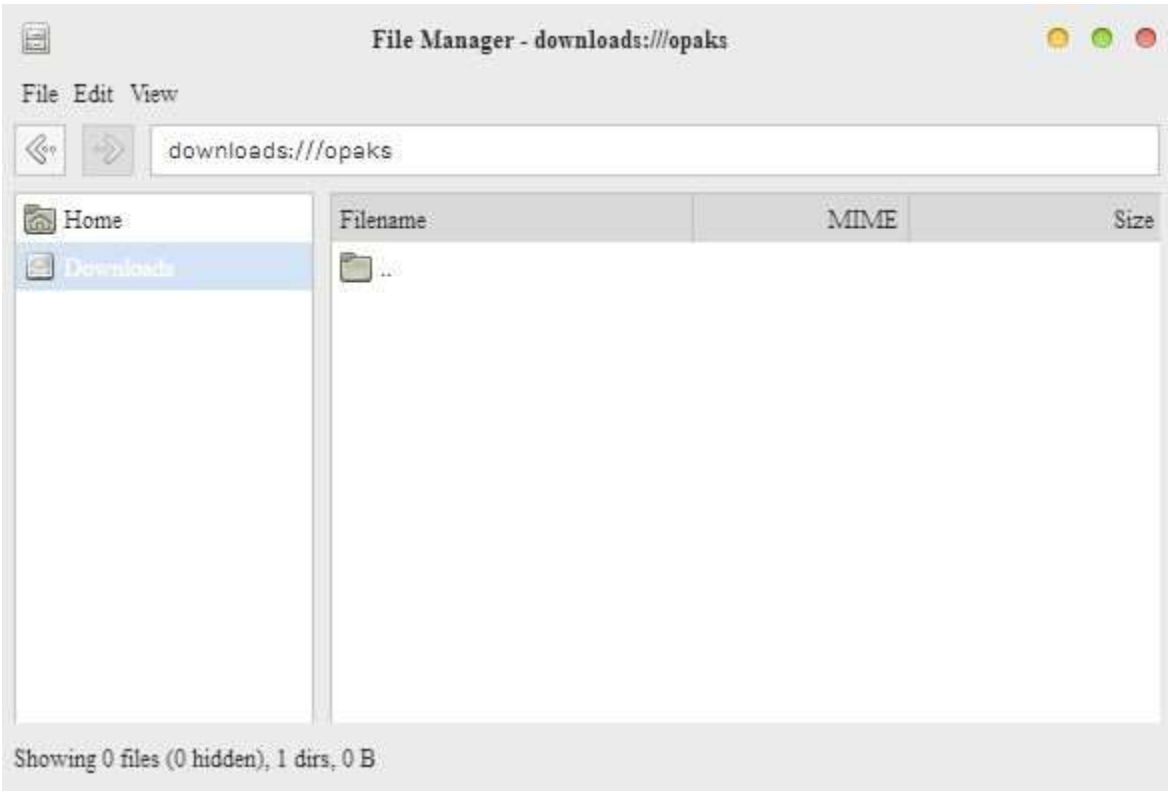
To use this method:

a. Download the update file that looked like this for the Skylark 5.3 to 5.4 upgrade skylark-dc-.1809042052.to.1810251245.psop.tbz2 from Othernet's Achieves to your computer. DO NOT extract it or process it in any way.

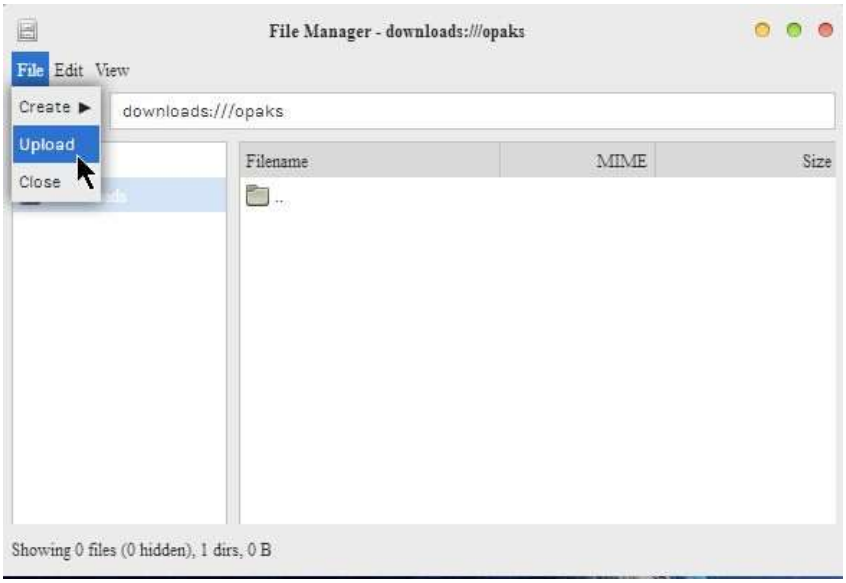
b. Login to Skylark as the "othernet" user (logging-in as "guest" WILL NOT WORK).

c. Open File Manager App.

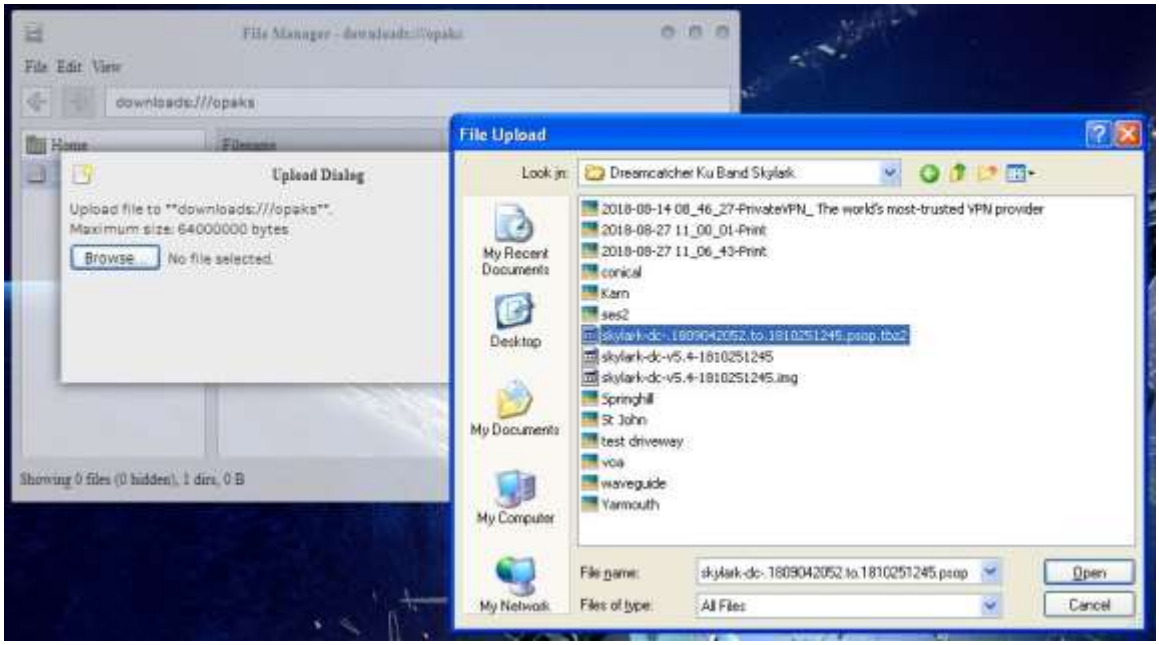
d. In File Manager, in the left-most pane, select "Downloads" and then in the right-side pane, double-click the "opaks" folder to enter it.



e. In the File Manager app menu bar, select “File” -> “Upload”. This will open up the file upload dialog, and your normal OS file selection dialog; select the update file you downloaded to your computer in step “a”. Click Ok/Open etc (as per your OS) to begin the upload.



Then select the .tbz2 file to upload, and just click ***Open*** - - nothing else needs to be clicked.



f. The update file will be uploaded to the “opaks” folder, and from there, Skylark OS will automatically start processing the update.

g. **Be patient**. The update process will take 15 - 20 minutes to complete! **Do NOT reboot** your Dreamcatcher during this process **or change any other settings.** During this process, it will appear as though nothing is happening, but don’t despair - - **it is working.**

h. After the update process is complete, the Dreamcatcher will automatically reboot into the new version of Skylark. You will need to refresh your WEB browser to see the new Skylark version.

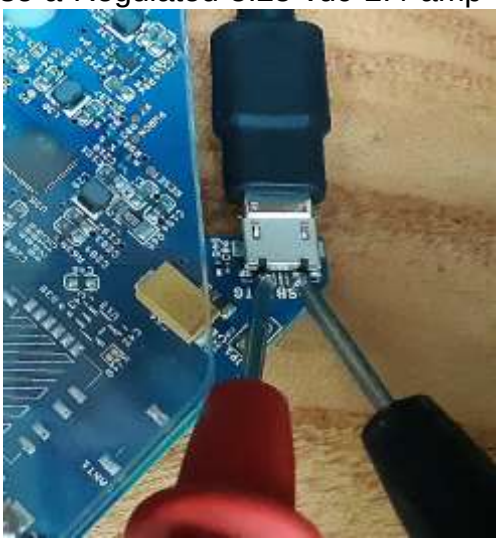
i. If the process fails, just use the normal micro SD card burning process **Section I Step 4** as before to fix things.

ANNEX B
More on Power Cubes and Cables

POWER CUBES

Forum members' experience varies with some USB power cubes. Once the power required by the Dreamcatcher exceeds1 amp dc, the voltage delivered to the Dreamcatcher Board by ***some*** USB power cubes rated at 2.4 amp dc decreases below 5 vdc to a level not sufficient to provide the 13 - 14 vdc Bias-T the LNB requires, or run the Dreamcatcher. Most home USB power cubes won't work correctly.

A reliable power option is to use a **Regulated** Raspberry Pi power supply which has a larger tolerance for low voltage from the usb cable (it just throttles itself) which means a constant output voltage not dependent on load. They come in various sizes, however I prefer to use a Regulated 5.25 vdc 2.4 amp Raspberry Pi charger. Dreamcatcher browns out when there's low voltage - and the main cause of DC not working normally is bad power. Make sure the power cube has a micro USB plug at one end. Newer power cubes come with C-type connectors which are not compatible with the Dreamcatcher.

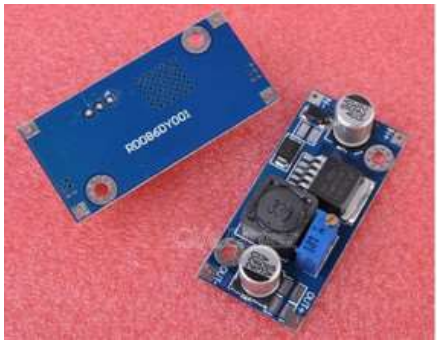


The Dreamcatcher is an energy hungry device drawing 1.1 amps at 5 vdc, so don't be surprised if your gear doesn't work.

To make sure you are supplying sufficient voltage, measure the input at the micro USB connection to the board with a VTVM. The plus and minus are at the ends of the plug:

BUCK CONVERT

Another viable solution to powering the Dreamcatcher is to use *a buck converter.* Simply put, a buck converter is a DC-to-DC power converter which steps down voltage (while stepping up current) from its input (supply) to its output (load). Specifically, the one I am using steps voltages from 6 to 26 vdc on the input (supply) side **down to** 5.25 vdc at a maximum of 3 amps on the output (load) side. This current is plenty to run the Dreamcatcher, and the 5.25 vdc is also within the Dreamcatcher's operational range that goes up to 5.5 vdc.



What makes it most useful is you can use any dc voltage power cube to run the Dreamcatcher - - you don't have to use a USB power cube which may be hard to find with the required voltage and current capability.

My Dreamcatcher runs off a 12 vdc power cube drawing 0.3 amps on the input (supply) side. The output (load) going into the Dreamcatcher is 5.35 vdc (a bit higher than it's spec) drawing 1.1 amps.

An example from http://Newegg.com costs $3 complete with a standard USB plug to connect to the Dreamcatcher.

CABLES

When selecting a USB to micro USB cable, select one less than 4 feet long that is relatively thick. These cables usually use larger gauge wire - - AGW 22 or 24. Price is also a method of choosing the best cable. Generally the more costly the cable - - the better it will be. Often cables marked as "quick charging" do a fine job running the Dreamcatcher. Many Forum Members have good performance from IHome, DeWalt and FuseBox cables.

ANNEX C
Trouble Shooting

This Annex is written to help find the cause of problems occurring after **you previously successfully set up** your Dreamcatcher.

*Most times when the Dreamcatcher v3.05 fails, **a simple reboot** by shutting down the Dreamcatcher by powering it off then on (referred to as a **Power Cycle**) will work, but if it **does not restore** Skylark 5.8, follow these guidelines:*

Problems Operating in the AP Mode

No display of 10.0.0.1 in browser

- Make sure Othernet AP Hotspot is **still broadcasting** - - if not, go to **LAST RESORT** and select **Function 1 with the PB1 Button to return the Dreamcatcher to the AP Mode**, then, redo Section II Step 4 making sure your computer is **still connected** to the Othernet HotSpot - - if not, reconnect it and continue with Section II Step 5.
- If problem persists, go to **LAST RESORT** and select **Function 3 with the PB1 Button to do a Factory Reset and start over again**.

Display available in browser, but no signal is being downloaded (Tuner App Status Screen Blank)

- Check presence of Bias T voltage as in Fig. 17. If Bias T voltage is deficient, check LNB selection to make sure it is still set up as in Section II Step 8 to the **correct satellite**, and to **the correct LNB** either the Maverick or Outernet Dual Band. Correct as necessary. Also make sure your wire connection between the Dreamcatcher Board and the LNB hasn't broken under the black wire wrap (do a continuity check).
- If problem persists, go to **LAST RESORT** and select **Function 3 with the PB1 Button to do a Factory Reset and start over again**.

Problems Operating as a Network Client

No display of Skylark on assigned local IP address in browser

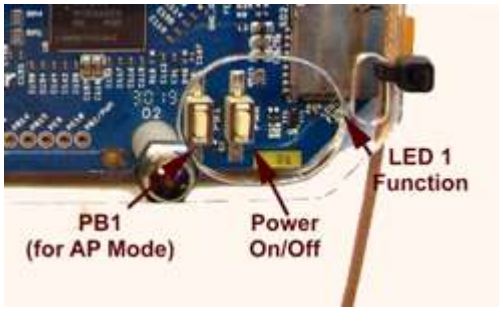
- Make sure Dreamcatcher **did not revert** to the AP mode by seeing if AP Hotspot Othernet came back on line. If it reverted, redo Section IV to connect the Dreamcatcher to your network.
- If your computer is **still connected to the same Network** you set Skylark to operate on as in Section IV Step 3, and your Network WiFi **password did not get changed** to that of your router, go to **LAST RESORT** and select **Function 3 with the PB1 Button to do a Factory Reset and start over again.**

Display of Skylark in browser, but no signal is being downloaded (Tuner Status Screen Blank)

- Check presence of Bias T voltage as in Fig. 17. If Bias T voltage is deficient, check LNB selection to make sure it is still set up as in Section II Step 8 to the **correct satellite**, and to **the correct LNB** either the Maverick or Outernet Dual Band. Correct as necessary. Also make sure your wire connection between the Dreamcatcher Board and the LNB hasn't broken under the black wire wrap (do a continuity check).
- If problem persists, go to **LAST RESORT** and select **Function 3 with the PB1 Button to do a Factory Reset and start over again**.

My.othernet.is does not find your Dreamcatcher's IP address

- It is possible you **are not connected to the Internet** or you are on a different Client Network. Verify you have an Internet connection on your router, and that you connected to the correct Client Network.



Last Resort

This process uses the **PB1 Button** on the Dreamcatcher v3.05 to reset files, and is described on pages 18 and 19.

Problems Reconnecting to a Client Network After a Power Failure

An AC power failure to the Router and Dreamcatcher create a unique problem for the Dreamcatcher to reconnect to the Router. The reason is most Routers take longer to boot up than the Dreamcatcher. As a result, the Dreamcatcher is trying to reconnect to the Router before the Router is ready to accept a connection and assign a Client IP address. The Dreamcatcher **must be the last device** to power up after a power failure.

Annex D
LNB Enhancements
by Will Brown @wbrown

Scope

The document provides a consolidated reference of techniques to enhance signal reception performance of your Dreamcatcher (as of this writing, v3.03, running on Ku band satellite SES-2 for North America). This document does not include information about where Othernet service is available, how to setup or otherwise use your equipment.

Background

The Dreamcatcher operates using a bare LNB (Low Noise Block Downconverter) to receive signals transmitted from a satellite (SES-2 for North America as of this writing). The signal being transmitted is notionally strong enough across the United States (contiguous 48 states) to be received using only a bare LNB (eg no dish antenna) and correct aiming/alignment. Due to weather patterns (heavy clouds, rain), geographical influences and nearby RF pollution sources, the Dreamcatchers signal reception performance may be increased using a "horn" or "cone" over the LNB. Alternately, an appropriately chosen dish antenna ("satellite dish") may be employed.

How Much is Good Enough?

If you're reading this with the intent of improving your reception, or generally "make it better", be aware that "making it better" beyond what's "good enough" doesn't provide any benefit. A SNR of -about -13dB is required for lock and signal reception and decoding. The SNR value tends to fade during bad weather (rain fade). If, during times of bad weather, your Dreamcatcher has a good SNR (> -13dB), and retains lock, then there is nothing to do -your setup already has enough margin.

> *There is a minimum SNR required for demodulation. After accounting for margin due to weather, there is no additional benefit to having better SNR.* – Syed, May 2018

Sources and Attributions

Information taken from the following threads:

- https://forums.othernet.is/t/increasing-gain-with-15-degree-cone/5258/
- https://forums.othernet.is/t/free-supplies-for-cone-extension-experiment/5373/
- https://forums.othernet.is/t/dreamcatcher-v3-02-feedback-thread/4997/

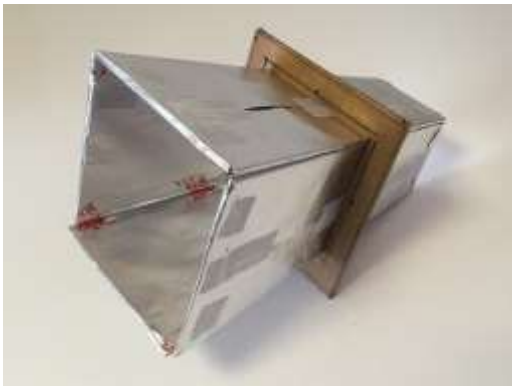
Each design is denoted with the creators Othernet Forum Username in the "Construction" column. All information provided per-row is created and owned by the username listed.

LNB Cones / Horns

This section collects the various designs created and tested by Othernet Forum Members. In most if not all cases, the received signal strength (RSSI) is not changed with the addition of the horn or cone. It is only the Signal to Noise Ratio (SNR) that is improved. Therefore, RSSI performance is not listed, rather only SNR improvements. SNR Improvements listed are the values reported by the forum members during their own tests. The following table serves as a rough guide to assist in the creation of such a device. The exact performance depends on several factors (construction technique, alignment with LNB, precision of aiming at the desired satellite) and therefore the values listed below serve only as a reference.

Construction	Finished Product	SNR Improvement
Collapsed metal rings, approx 2” diameter kenbarbi		+2dB
7.7cm diameter x 11 cm tall tin-can. We had to cut approximately 0.2 cm from the bottom to remove the floor of the can. We slotted the sides 1.8 cm wide by 8 cm deep to accommodate the LNB mounting hardware maxboysdad		+2dB
1-gallon paint can  maxboysdad		+2dB - +3dB

Construction	Finished Product	SNR Improvement
16 oz Styrofoam cup covered in aluminum duct-tape  thomslik		+2.5dB
Pringles potato chip can kenbarbi		+3dB
2.5" at the narrow end and 3.5” at the wide end, pattern expanded from the 12-oz soft-drink cup. The shield is cut from 0.019" aluminum sheet  maxboysdad		+3dB to +3.5dB
 Konrad_Roeder		+3.5dB

Construction	Finished Product	SNR Improvement
7” funnel from an auto-parts store, lined inside-and-out with aluminum duct tape maxboysdad		+4dB
4” x 2” x 8” Aluminum Flashing (held together with duct-tape)  kenbarbi		+4.5dB
1/4” grid “hardware cloth”. The opening at the LNB is 2.5”, the opening toward the sky is 5” in diameter and the cone is 8” from LNB to the outer opening.  maxboysdad		+5dB
4” x 2” x 8” Used heavy corrugated cardboard, covered each section with heavy duty aluminum foil and used thin metallic duct tape to join the 4 sections. Towards the smaller end, I left a couple of inches unattached all around allowing enough flexibility to slip over the LNB. dschre		+5dB

Construction	Finished Product	SNR Improvement
5” x 2.25” x 9” cardboard covered with aluminum foil AL0I		+5.25dB
5” x 2.25” x 9” Wire mesh thomslik		+7dB

Dish Antennas

Though the intent of using the Dreamcatcher is to simply aim a bare LNB at the transmitting satellite, some forum members have successfully implemented dish antennas:

This YouTube video shows you how to adapt a linear LNB (like the one for Outernet) onto a dish previously used for DishNetwork or DirecTV. These use circular-polarized LNBs. The LNB needs to be swapped out. This video shows you how: How to convert and install a old trashed DTV satellite dish to a FTA Dish

- Konrad_Roeder May 2018

Construction	Finished Product	SNR Improvement
An example from forum member Barefoot_Mike (March 2016) looks like this. Barefoot_Mike		(not listed)
18" DirecTV dish with Maverick Mk1 LNB. A new LNB bracket was purchased, which had the same angle as the LNB that came with the DirecTV dish. The dish was mounted indoors.  wbrown		Indoor dish setup as compared to a bare Maverick Mk1 LNB mounted outdoors: **Dish w/Maverick Mk1** SNR improved 10-13dB RSSI improved 6-7dBm **Dish w/LNB 18 (circular)** SNR improved 7-10dB RSSI improved -2dBm (RSSI is worse) *Outdoor dish performance is roughly +6dB better than mounted indoors.*

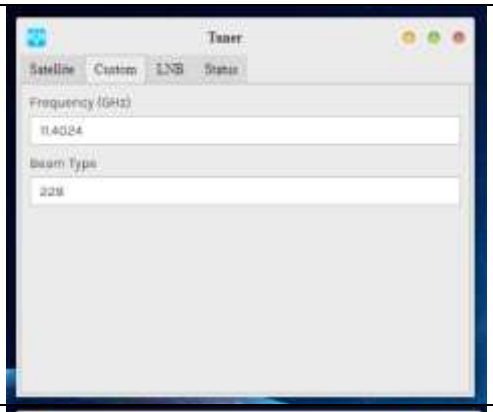
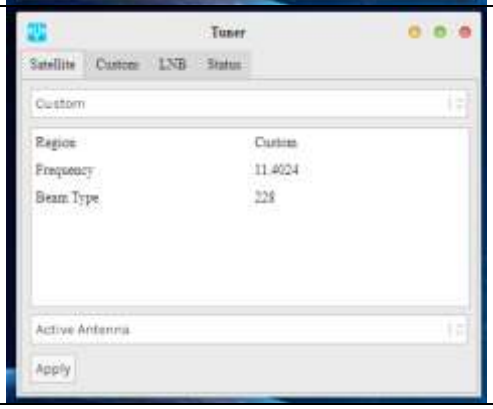
A more detailed writeup of the indoor dish shown above is here.

Circular Polarized LNBs

Circular polarized LNBs may be used with some reduced sensitivity. The LO (local oscillator) frequency of the LNB must be noted, and an appropriate adjustment made in the Dreamcatcher for it to work.
Here is a table showing a DirectTV LNB 18 vs the Maverick Mk1 supplied (as of 2019) with the DC 3.03:

LNB Type	LO	DreamCatcher "Freq"	DreamCatcher "Beam"
Maverick Mk1	10.750	11.9024	228
LNB 18	11.250	11.4024	228

To make this change, log into the Dreamcatcher as user "othernet" (default password "othernet"). Open the Tuner app.

Go to the "Custom" tab and enter the Frequency and Beam Type.	
No go to the "Satellite" tab. The first line is a drop-down selection (it says "Custom" in the image to the right). The entries available are "Americas" and "Custom". Select "Custom". Then click the "Apply" button.	

After making the above changes, reboot the Dreamcatcher either with a power-cycle or by using the "Reboot" selection on the utility menu on the touch-screen.