Sigma Eight Inc.
Solutions for Wildlife Tracking

ARES MANUAL

For Ares firmware v3.0.11

9 September 2021
Version 1.0

Table of Contents

1 INTRODUCTION

The Ares receiver is a narrow band, VHF, wildlife telemetry receiver with 5kHz wide channels used to detect and track animals outfitted with telemetry transmitters. It is capable of receiving, decoding and logging both pulsed (beeper) and coded transmitters. Data is logged to a removable SD card and can also be sent out an RS232 compatible serial port. The receiver can be remotely controlled via the RS232 port as well.

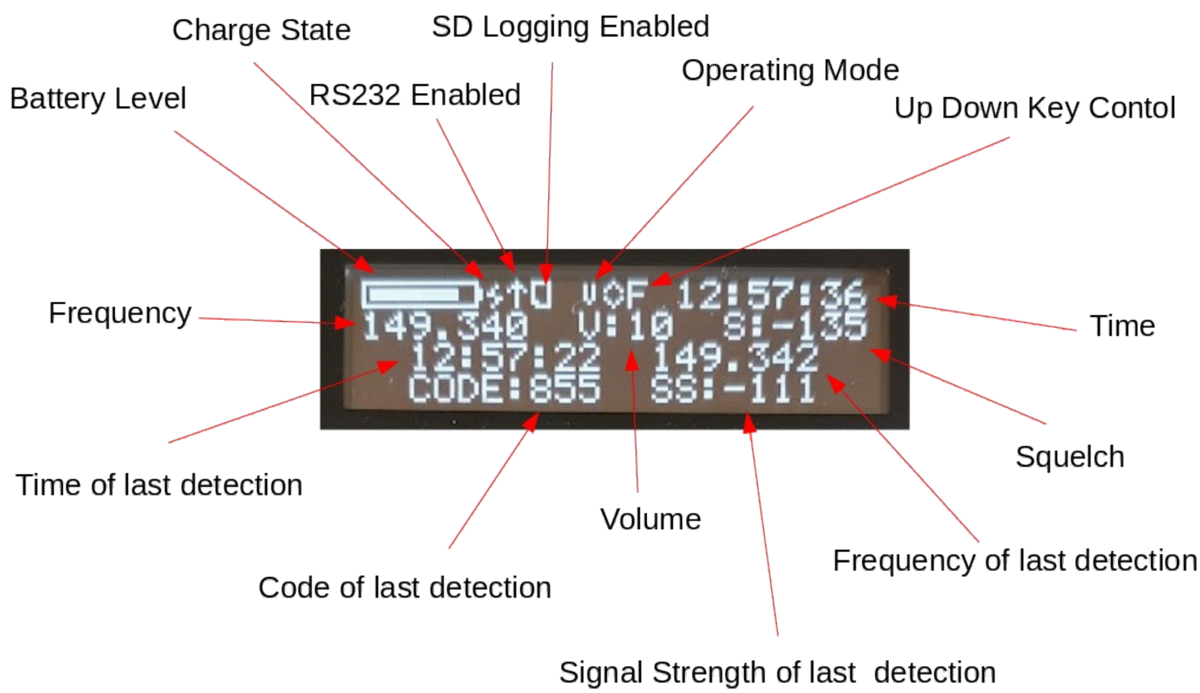
2 FRONT PANEL

The front panel of the Ares receiver consists of both a display, to show the current status and options of the reciever, and keypad, to permit direct user control.

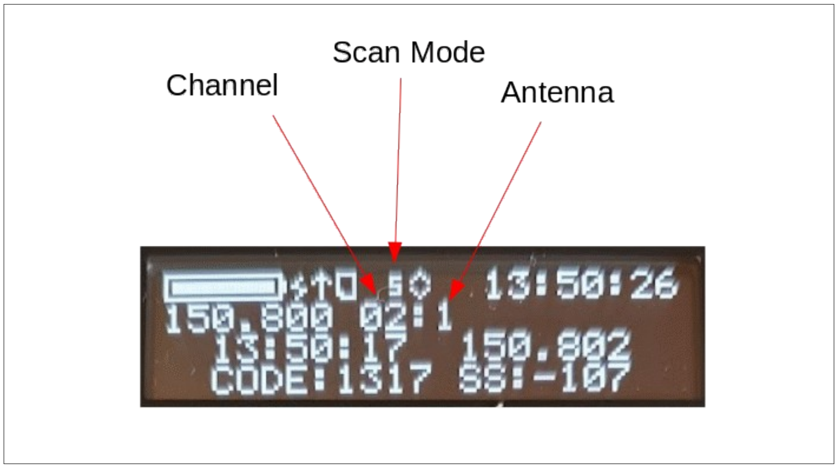
3 Receiver Display

When turned on, the receiver displays a title page along with a scrolling bar that indicates the receiver is booting up. When the bootup is completed, the receiver then goes into the last mode used (VFO or SCAN).

VFO mode provides direct control over the Variable Frequency Oscillator. In other words, it allows the user to directly tune in any frequency desired. Details of VFO mode are covered under the VFO option setting. In this mode, the following display is shown.

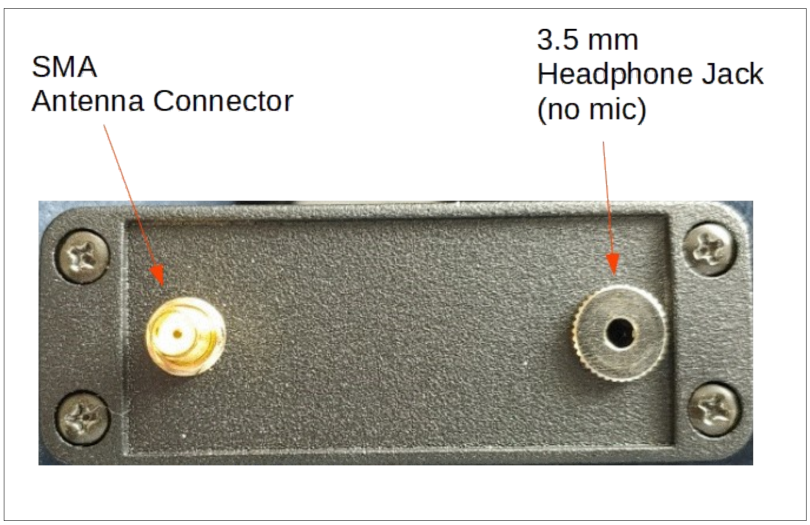


SCAN mode enables automatic control of the VFO where the receiver automatically tunes in sequence to frequencies entered into a list. Details of scan mode are covered in the SCAN mode options. The display in SCAN mode is similar to VFO mode with a few differences. The following is the display shown in SCAN mode.



1 Top Panel

The receiver top panel has two connections, an SMA antenna connector and a 3.5 mm audio jack.

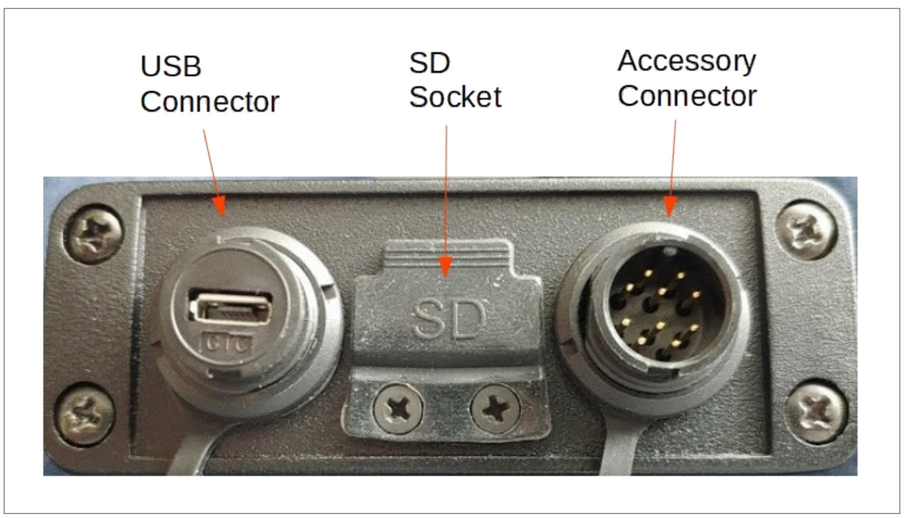


Since BNC connectors are commonly used with wildlife telemetry equipment, an SMA to BNC adaptor is also provided with the receiver so it can be connected easily to existing antenna systems.

The Audio jack is a 3.5 mm, 3 conductor socket for common stereo headphone and earphone plugs. It is not compatible with 4 conductor plugs that commonly come with stereo/mic headsets. If a microphone equipped headset is used, the audio level will be very low.

2 Bottom Panel

The bottom panel has two connectors, a USB connector and an accessory connector, and an SD card slot.



The USB connector can be used for charging the receiver. The receiver is provided with a USB cord for this purpose which can be used with any 2.5A 5V USB charge adaptor commonly used with cell phones. The receiver will charge fastest with the power turned off. Currently the USB connector is not available for data connections.

The accessory connector can be used to charge the receiver, supply external power or communicate with the receiver through an RS232 interface. An optional accessory Adaptor is available for this purpose.

The SD card slot can be used to log data collected by the receiver for future analysis. An 8GB

3 SETTINGS

The receiver has 10 setting categories that can be accessed by pressing the Fn key. These setting categories are:

1. VFO
2. SCAN
3. SA
4. SET
5. CHAN
6. CODE
7. TIME
8. SD
9. CFG
10. ADV

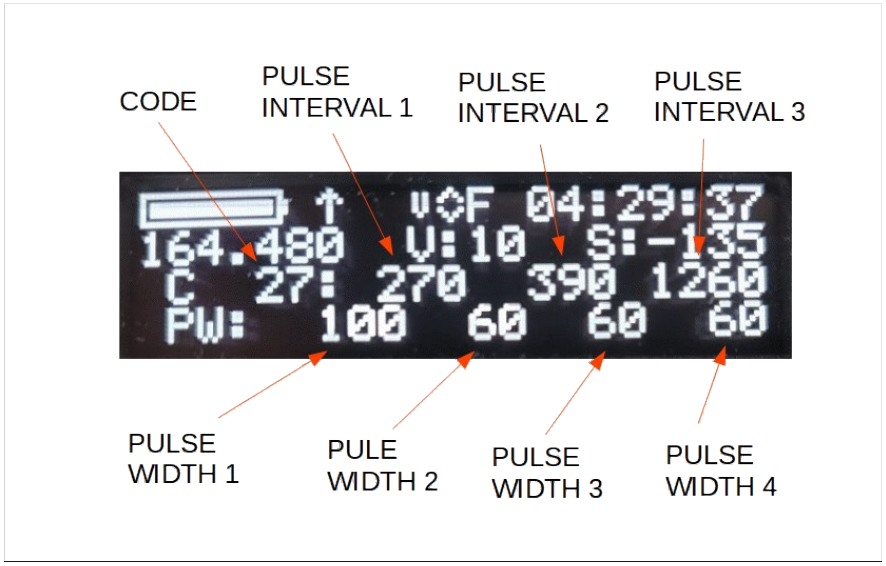
3.1 VFO – VFO MODE

Selecting VFO places the receiver into VFO mode where the user can directly enter the frequency desired. There is limited dynamic control over volume, squelch and frequency can be selected with the left and right arrow keys and the values can be incremented up and down with the up and down arrow keys. In this mode, the receiver will display detections as they are received including time, frequency, code and signal level.

While in VFO mode, there are two diagnostic displays that can be accessed by pressing either 8 or 9 while decoding data.

1.1 Interval and pulse width diagnostic screen (Viewed by pressing number 8)

Pressing 8 in VFO mode will show the following information after decoding a tag:



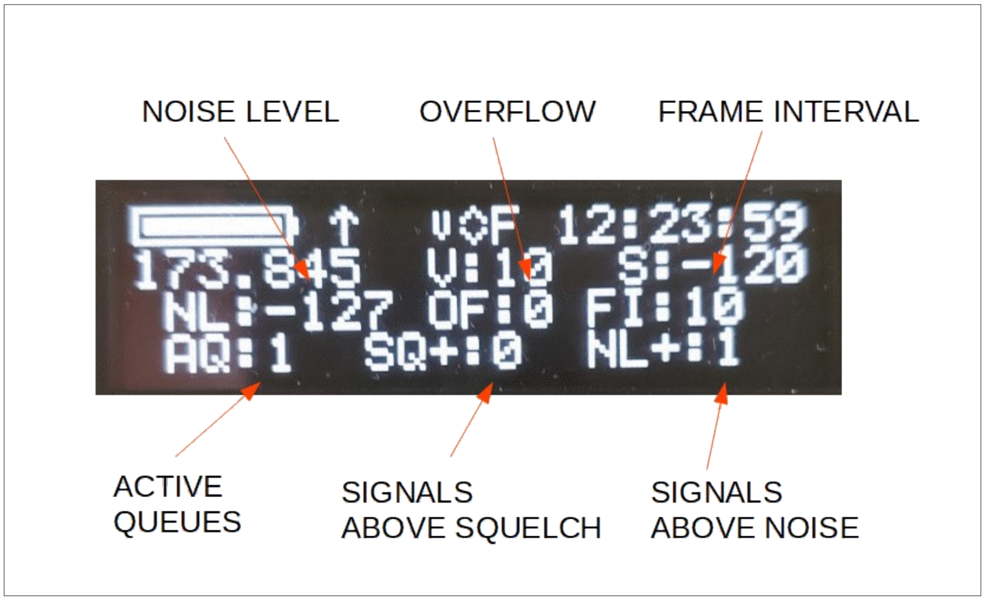
ITEM	DESCRIPTION
CODE	The code of the last detected contact
PULSE INTERVAL 1	The interval between the first and second pulse in milliseconds (will show zero if not applicable)
PULSE INTERVAL 2	The interval between the second and third pulse in milliseconds (will show zero if not applicable)
PULSE INTERVAL 3	The interval between the third and fourth pulse in milliseconds (will show zero if not applicable)
PULSE WIDTH 1	The first pulses width in *tenths of a millisecond*
PULSE WIDTH 2	The second pulses width in *tenths of a millisecond* (will show zero if not applicable)
PULSE WIDTH 3	The third pulses width in *tenths of a millisecond* (will show zero if not applicable)
PULSE WIDTH 4	The fourth pulses width in *tenths of a millisecond* (will show zero if not applicable)

Table 1: Meaning of the items on the interval and width diagnostic screen

To return to the default display showing last detection, press 7. It will update on the next detection.

1.2 Advanced diagnostic screen (Viewed by pressing number 9)

Pressing 9 will show the following information updated every second:



ITEM	DESCRIPTION
NOISE LEVEL (NL)	The average background noise level in the environment
OVERFLOW (OF)	Overflow, should almost always be 0. If the value is 1, the receiver is trying to process too much information due to high background noise
FRAME INTERVAL (FI)	Frame Interval, this value is the chunk of time the receiver is currently trying to process in tenths of a millisecond. Should almost always be 10 (1ms)
ACTIVE QUEUES (AQ)	Active Pulse Queues, this is the number of signals that are potentially a transmitter. If this value is above 10, the receiver is seeing a lot of signals that are within your filter criteria
SIGNALS ABOVE SQUELCH (SQ+)	The number of frequencies within the channel that have signals above the squelch level.
SIGNALS ABOVE NOISE (NL+)	The number of frequencies within the channel that have signals above the noise level +3dB.

Table 2: Meaning of the items on the advanced diagnostic screen

This mode is useful for analyzing the background noise level that may be preventing detections from happening. If the signals above the squelch are high and the signals above the noise are high you will likely have difficulty decoding a tag. In this case, increase the squelch level so the number of signals above the squelch is 0. If your tag is strong enough to be above the squelch level, you should be able to decode it.

To return to the default display showing last detection, press 7. It will update on the next detection.

3.2 SCAN – SCAN MODE

In scan mode, the receiver will step through the frequencies entered in the Channel Settings and the antennas entered in Num Ant in the General Settings at a rate defined by the Scan Sec in the General Settings. The antennas are scanned before the frequency is changed. The display shows the current frequency, channel and antenna being monitored.

Scan mode is used to scan through multiple frequencies. The receiver will listen to each frequency for a set time before moving onto the next one. To enter the frequencies you wish to scan through, access the scan table by pressing:

```
Fn -> 5)CHAN
```

When in this menu, you can add a new channel by entering the next unlisted channel. For example, if there are two channels (01, and 02), you can add a third channel by pressing ‘03’. Add the frequency by entering in the full value down to the kHz, then press the green checkmark to submit.

To edit a frequency, simply enter its two-digit channel number.

Note: you can enter in a channel that is not visible on the screen to jump to it.

To set the amount of time spent on each channel, go to the SET menu through the following:

```
Fn -> 4)SET
```

Scroll down one page, to see the ‘Scan sec’ and ‘Sync min’ options. Scan second, is the amount of time to listen to a frequency before moving onto the next one in seconds. Sync minute, is the minute multiple of the hour that the receiver will go back to the first scan frequency. This feature was implemented to aide in coordinating multiple receivers on the same frequency if the configurations are set at different times.

3.3 SA – SPECTRUM ANALYZER MODE

This mode is not available yet.

3.4 SET – GENERAL SETTINGS

The general settings are a variety of options that apply to overall receiver operation. These settings can be viewed by scrolling up and down with the arrow keys and selected by entering their menu number. It is not necessary to scroll to the item before selecting it. You can directly enter the item number after entering this sub menu. When selected, enter the new value and press the check mark to save or the x mark to abort. X will also leave this menu or you can press the Fn key.

3.4.1 Freq Mhz

This is the frequency used in VFO mode. Enter the frequency in Mhz. It can be any value from 148.000 to 175.000.

3.4.2 Volume

This is the audio volume level. It can be any value from 1 to 20.

3.4.3 Squelch (or Noise Floor)

This is the signal strength value below which all signals will be ignored. It helps filter out low level noise. Weak signals are below -115 dBm, moderate signals are in the -115 to -90dBm range and strong signals are above -90dBm. A good setting for the Squelch in average conditions would be -120 or -125.

Typically, a beeper transmitter is a square wave superimposed on a noisy background.

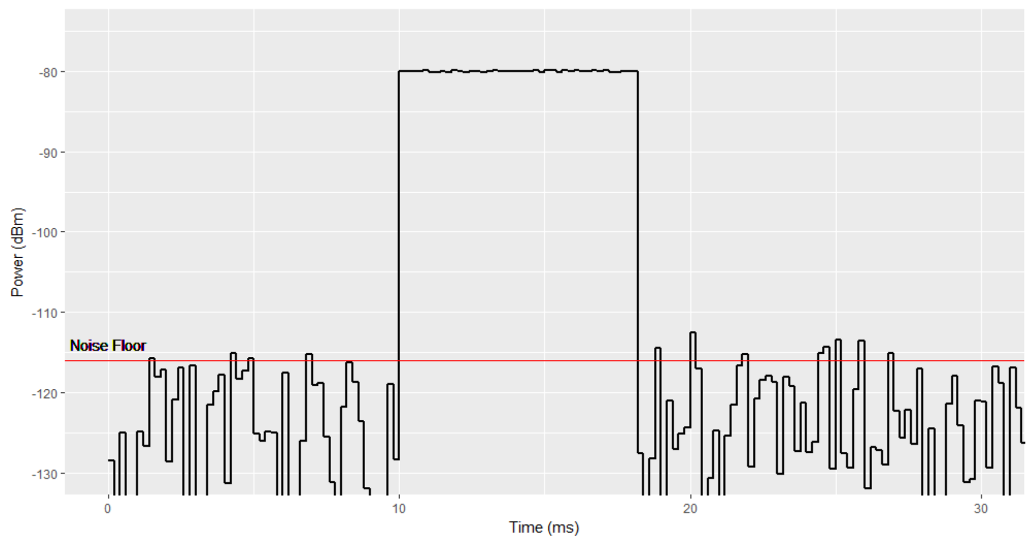


Figure 1: Beeper pulse superimposed on the background noise. A red line is drawn across at roughly 5dBm above the average noise level.

Figure 1 shows how a beeper pulse may be interpreted by a receiver. In order to decode a transmitter, a receiver must look at the general signal level coming in, and set a threshold for what strength to expect real signal to come above. This is known as the 'Noise Floor', or 'Squelch'. The receiver uses the squelch level to determine what is strong enough to be considered a signal, everything below it will be ignored and not decoded.

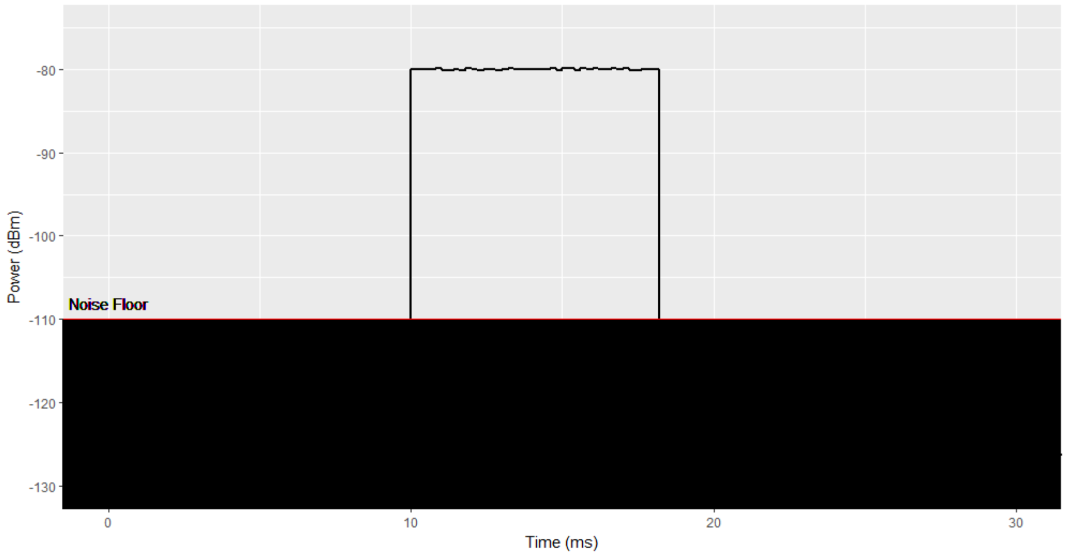


Figure 2: How a receiver sees the incoming signal after taking into account the noise floor, or squelch level

Above, Figure 2 shows how the receiver ignores everything below the squelch level. This level can either be set manually, or automatically determined.

If the manual squelch level is set close to the average background noise level, then the receiver will automatically determine the squelch. This prevents the receiver from getting overwhelmed processing all the signals buried in the noise.

The threshold that the receiver will automatically determine the squelch level is 3dB above the average noise level.

For example, using Figure 1, the average noise level is about -125dBm, and the manual squelch level has been set to -116dBm. If the squelch level was set to -122dBm (-125 + 3dBm) or lower, then the receiver automatically will cut off signals below -122dBm, no matter what.

This new auto squelch level feature is useful because the user can set the squelch to -135dBm so that the receiver always determines it. With electronic noise often having diurnal behaviour, this also aides in making the receiver vary its squelch dynamically to be as sensitive as possible all of the time.

3.4.4 RF Gain

This setting determines the front end gain of the receiver. Normally it is set to 10 to give accurate readings in dBm of signal strength. In certain circumstances like manual tracking, when you get close to the transmitter, the signal strength can saturate the receiver making it hard to distinguish the direction of the signal. By moving this down, the receiver can be brough out of saturation making it more sensitive to changing the direction of the antenna. Saturation occurs at about -72dBm. Be aware that the signal strength is no longer a calibrated value when this value is changed from 10.

3.4.5 Num Ant

This setting is the number of antennas you wish to scan when using the optional Hermes Solo Coordinator. The Hermes unit has a 4 way antenna switch which will allow the user to scan up to 4 antennas. Setting this number from 1 to 4 determines how many antennas will be used.

3.4.6 Scan Sec

This is the time spent on each channel/antenna combination before switching to the next one. In other words, it is the time spent listening on each channel. Specify the time in seconds and it should be longer than the burst interval of the transmitter. If you are using any filtering mechanism relying on multiple receptions, you need to take this into consideration.

3.4.7 Sync min

If running multiple receivers where you wish to coordinate their scanning, this setting provides an option for re-starting the scanning sequency at a specific interval which will allow all receivers to be in sync. For example, if you set the minute to 30, every 30 minutes, the receiver will start at the top of the channel/antenna sequence regardless of where it was. You don't want to restart too soon. If your sync min is less than the time it takes to go through all the channel and antenna combinations, the receiver will never reach the final frequencies and antennas. The value should be greater than the time it takes to go through all channels and antennas. For example, if the Scan Sec is 5, there are 10 channels and 2 antennas, it will take 100s to go through all combinations. You would need the sync min to be at least 2. To balance the monitoring on all channels/antennas, you might want to choose a Sync min value that is divisible by the overall time. In this case, a good choice would be 5 minutes.

3.4.8 Rx ID

This setting is simply an identifier for the receiver that goes into the data records produced on the SD card or sent via the serial port. If you make sure all receivers have different IDs, when you merge the data you will be able to tell which records came from which receivers.

3.4.9 Cal Off

This setting is the offset value in dB used to give a calibrated reading when the RF gain is 10. It is set in the factory and should not need changing.

3.5 CHAN – CHANNEL SETTINGS

The CHAN sub menu is used to enter a table of frequencies that will be used in SCAN mode. Up to 99 frequencies can be entered. Enter 2 digits to select an entry. Once selected, the value can be modified by typing in a new number. New entries can be made by entering a channel number after the last one or by pressing the right arrow when in edit mode. Channels can be deleted by pressing the left arrow while in edit mode. Multiple channels can be added or deleted in succession. Frequencies are entered in MHz.

3.6 CODE – CODE SETTINGS

The CODE sub menu is used to select the decoder type and adjust parameters related to decoding. The currently active decoder is shown beside the menu title at the top. The items in this menu are as follows.

1. Beeper
2. 2000
3. 2003
4. Powermatch
5. Show Noise

1.1 Beeper

The beeper setting selects the beeper decoder mode and has several sub settings.

1. PW min
2. PW max
3. PI min
4. PI max
5. Pulses
6. Dropouts

These settings are used to help filter out noise from valid beeper tags.

3.6.1.1 PW min

This is the minimum pulse width expected in milliseconds

****

A Note on Pulse Width

Another aspect the user needs to be aware of, is setting the windows for the allowable signal. The first two settings for a beeper transmitter are pulse width minimum and pulse width maximum.

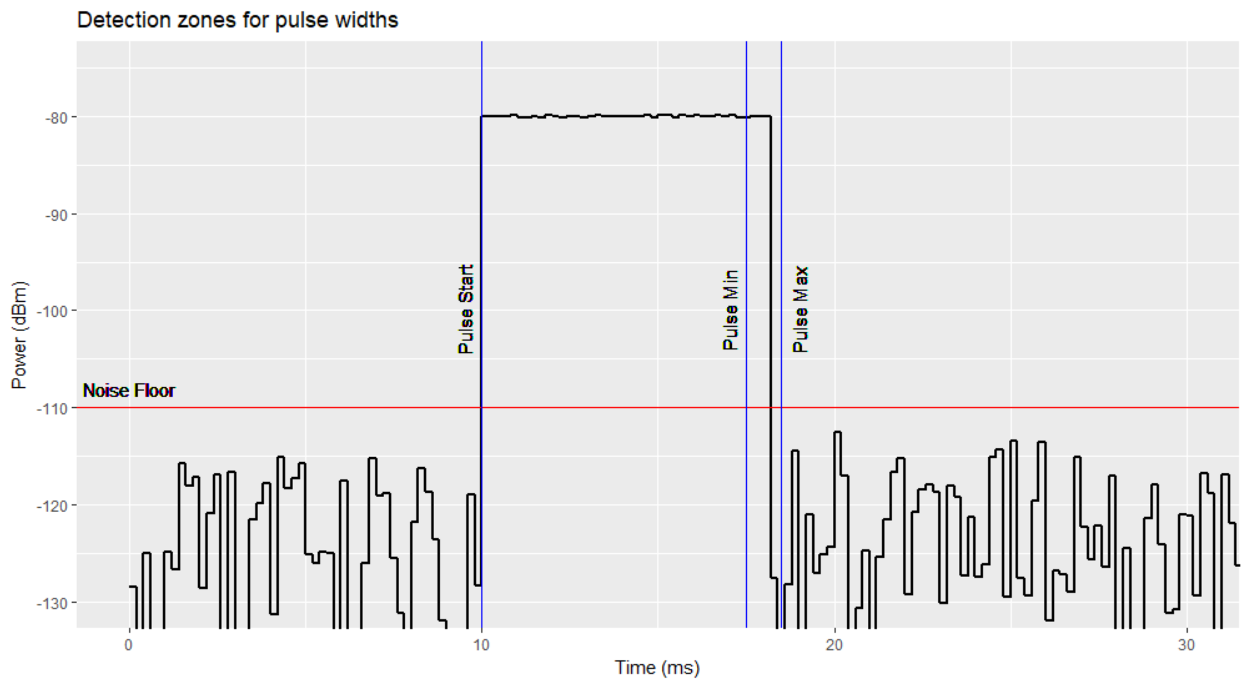


Figure 3: Detection windows for a pulse

Above, a transmitter has started emitting a strong signal at -80dBm when the time is 10ms. It goes until about 18ms, and turns off, for a total duration of 8ms. In order for the receiver to decode a transmitter, you must give it windows to determine if the signal is valid. If you were to set the pulse min as 17ms, and the pulse max at 19ms, the pulse would likely fall into a valid window if the signal was strong. However, as the signal get weaker, it gets more difficult for the receiver to determine where the signal turns on:

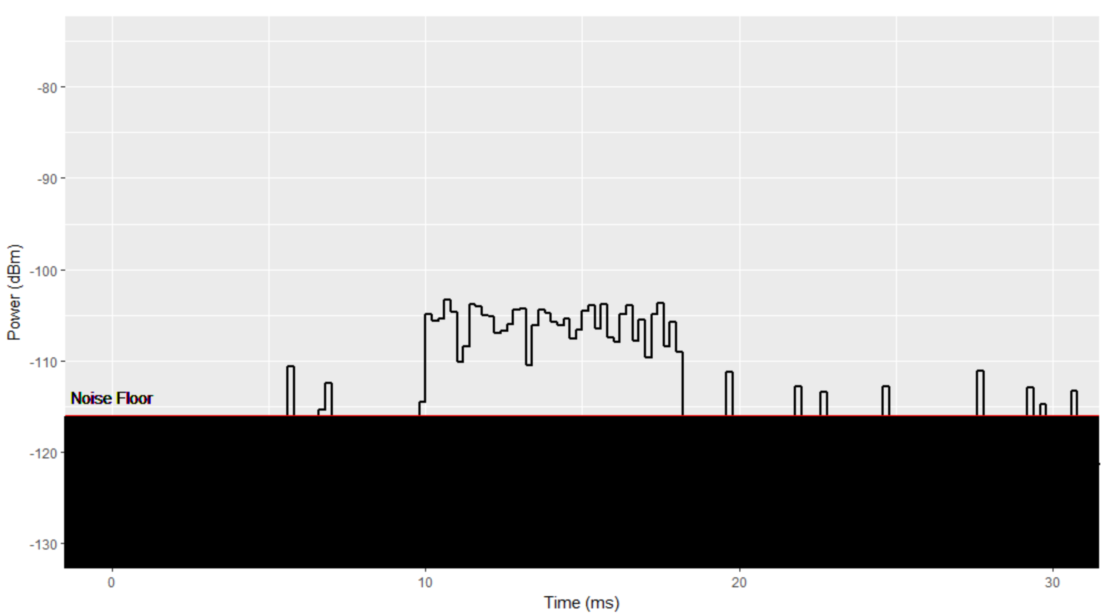


Figure 4: A low power transmitter signal

Although the tag still turned for ~8ms, it is much weaker at about -115dBm. Here it is still relatively distinct, as it looks like the signal rose above the noise floor at about 10ms. But what if we drop the signal level further:

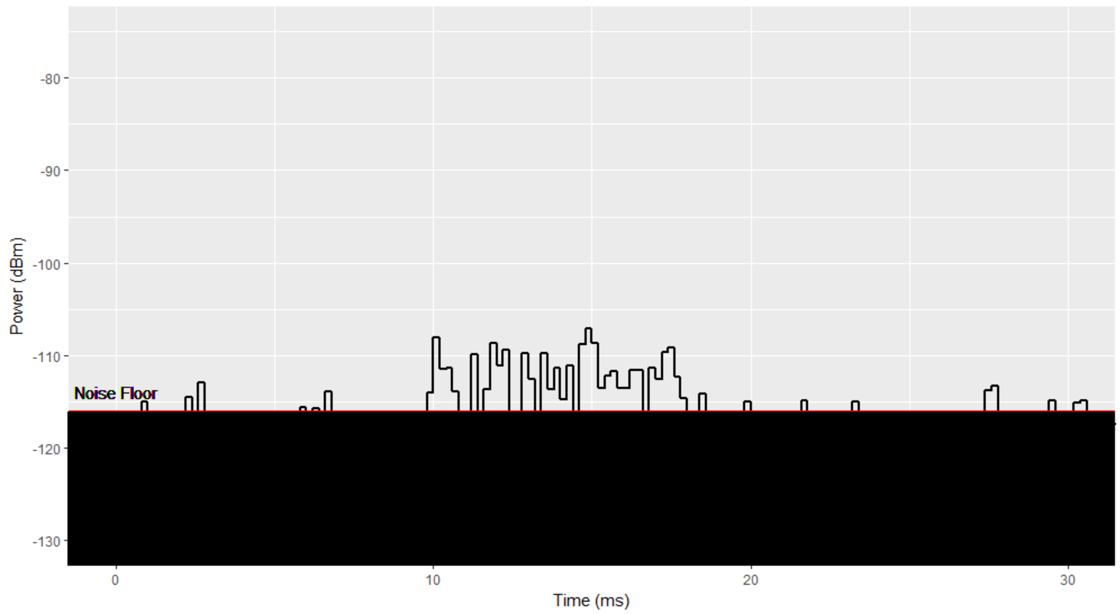


Figure 5: A very low power transmitter signal

Now, it is very difficult to see exactly where the transmitter starts and ends, so the receiver will not likely see a valid signal.

As a transmitter gets weaker, making windows wider may allow the receiver to pick up the tag. However, this will also introduce more chance that general background noise will fit the criteria, giving more false positives. Configuration of the receiver must be done to try to optimize the sensitivity for the least number of false positives.

Please note: Pulse width is only configurable for Beeper transmitters.

Internally, the operational algorithm of the receiver is to look for pulses, and create a queue of detected pulses with their widths, and timestamps known. Next, the receiver will look at its set 'Pulse Count' to filter the queue of pulses on, and generate data.

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3.6.1.2 PW max

This is the maximum pulse width expected in milliseconds. (See detailed explanation above).

3.6.1.3 PI min

This is the minimum pulse interval expected in milliseconds

****

A Note On Pulse Intervals

Pulse Interval is determined from the leading edge to leading edge of two successive valid signals.

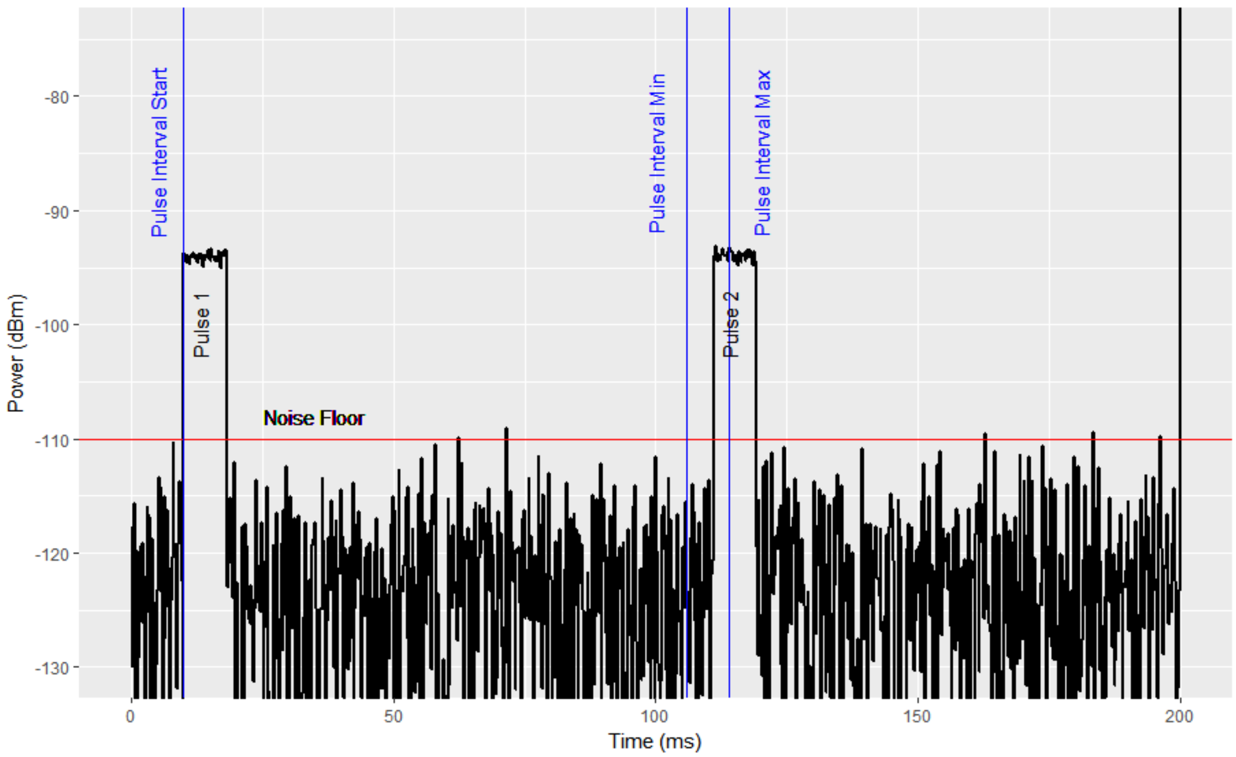

Figure 6: How pulse interval is calculated

Here, a transmitter is emitting rapidly at ~100ms between transmissions, with an 8ms width. A signal is captured at 10ms on the time scale, and also at 110ms. This difference between these two values (100ms) is the pulse interval, and will be used to determine if the signal falls within the pulse interval min, and pulse interval max settings. This precise interval that it sees (100ms in Figure 6) will be output to the screen of the receiver as CODE: 100.

Please note: Pulse interval is only configurable for beeper transmitters

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3.6.1.4 PI max

This is the maximum pulse interval expected in milliseconds

3.6.1.5 Pulses

Pulses or 'Pulse Count' is the amount of pulses that the receiver will look for before outputting a valid contact. The pulse drop count is also utilized to determine how many pulses are allowed to be missed.

Here is an example of a transmitter emitting every 100ms, with a 20ms pulse width (I widened the pulse width so it was more visible).

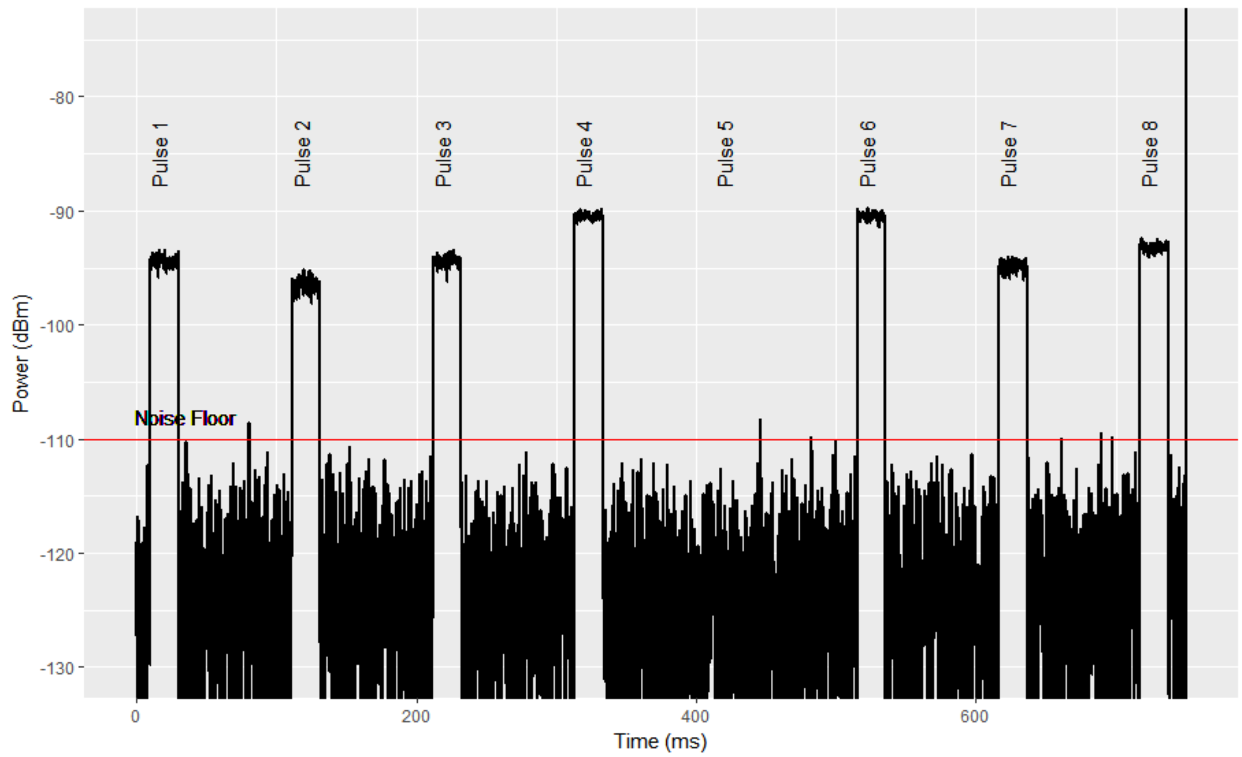


Figure 7: Beeper transmitter emitting a 20ms pulse every 100ms starting at 10ms

3.6.1.6 Dropouts

In the figure above, this could be a signal that is somewhat like real life as the transmitter tumbles, it will vary in signal strength. Once in a while a pulse may also be missed as well, as seen for Pulse 5.

In terms of valid pulses, let's say the receiver is programmed for a Pulse Count of 3, and a pulse drop of 0 (none allowed). As the receiver scans in real time, it would see a valid pulse at position 1 and add it to the Pulse Count queue, then position 2 and add it to the Pulse Count queue, then position 3 and add it to the Pulse Count queue. At this point in time right after the 3rd pulse (about 240ms), the queue has 3 valid pulses in it that all meet the width, interval and count criteria. A 'contact' will now be recorded and output to the screen. As we go along, Pulse 1 will be dropped from the queue, and Pulse 4 will be appended. This still meets all of our criteria, so another contact will be output to the screen. However, when we get to Pulse 5, the pulse is missing, and our setting was to not allow any pulses to drop, so now it will reset the queue. Continuing along, no contact would be output until Pulse 8 is reached. In total for above, we would have 3 data points (Pulse 3, 4, and 8).

Now, imagine we run the same scenario but with a pulse count of 3 and a drop count of 1. As the receiver scans, it would see a valid pulse at position 1 and add it to the Pulse Count queue, then position 2 and add it to the Pulse Count queue, then position 3 and add it to the Pulse Count queue. At this point in time right after the 3rd pulse (about 240ms again), the queue has 3 valid pulses in it that all meet the width, interval and count criteria. A 'contact' will now be recorded and output to the screen just as before. We will still get a contact for position 4, but the pulse missed at position 5 is allowed. This means that the counter does not reset, and when pulse 6 is detected, another contact will be recorded and output to the screen. Pulses 7 and 8 will also be decoded, giving 5 data points now for the same tag.

Here is a sample of what the screen would look like for pulse 3:

```
15:35:58    164.331
CODE:101     SS:-94
```

If you wish to see some diagnostic data about the transmitter on the receiver itself (like pulse width), press the 8 key. The next time the tag is decoded, it will output something similar to the following:

```
C101:101    100     0
PW:  200 200 200   0
```

The three values highlighted in teal above are the pulse intervals leading up to that contact. Since we have a pulse count of 3 in our example, we have only two intervals, 101ms, and 100ms. The bottom 4 values are the pulse widths in tenths of a millisecond. Therefore, since our tag was a 20ms pulse width, it outputs 200 for the 3rd pulse, and the 2 preceding ones.

1.2 2000

The 2000 setting selects the 2000 code set decoder.

1.3 2003

This 2003 setting selects the 2003 code set decoder.

1.4 Powermatch

This selection is used to adjust the powermatch setting. Powermatch is the expected variation in signal strength between pulses in a code and is used to match pulses to an individual transmitter. It helps separate true pulses from noise. A typical powermatch setting would be between 8 and 10 dB.

1.5 Show Noise

This setting is used to enable the display of pulses that did not match any of the decoding criteria. It can be used to help diagnose why certain tags are not decoding. In this mode, any tag that does not decode will be displayed as -1.

3.7 TIME – DATE AND TIME SETTINGS

This selection provides a means of setting the date and time in the receiver. The date and time are used in the records saved to the SD card and sent out the RS232 port and the time is displayed on the receiver screen.

3.8 SD – SD CARD SETTINGS

There are 3 sub settings in this menu

1. Init/Erase
2. Enable
3. Disable

3.8.1 Init/Erase

This selection is used to initialize and erase the card that is in the SD slot at the bottom of the radio. It must be performed on any new card that has not been used in the receiver to prepare it to receive data. **Note, the data is stored in a non-readable format. When placed in a PC, Windows will say it is not recognized and ask if you would like to format it. Don't do it. You will be using the AresTool software to extract the raw data and save it in a CSV file.**

3.8.2 Enable

This selection will enable the receiver to store data to the SD card. If the card is not recognized, the receiver will auto matically turn this option off.

3.8.3 Disable

This selection will disable logging to the SD card.

3.9 CFG - Configuration

The configuration sub menu allows selection of default settings. This can be handy if you want to return the receiver to a known configuration so you can apply your wanted settings again.

3.10 ADV – Advanced Settings

This is the advanced sub menu. It is used for updating the firmware in the receiver or viewing the model number, current firmware version, hardware version and serial number.

4 Example: Decoding a Tag

Criteria for a valid signal is input into the receiver by the operator through the keypad. The receiver will then analyze the incoming signals from the antenna to see if anything matches the parameters set by the user.

To setup the Ares, make sure you know the frequencies that you want to monitor, the type of transmitter encoding, and also the parameters regarding the encoding (interval, code number, etc.).

4.1 Beeper Tags

Once you have all these parameters, we can program them into the receiver by going:

```
Fn -> 6)CODE -> 1)BEEPER
```

You will see a menu like this:

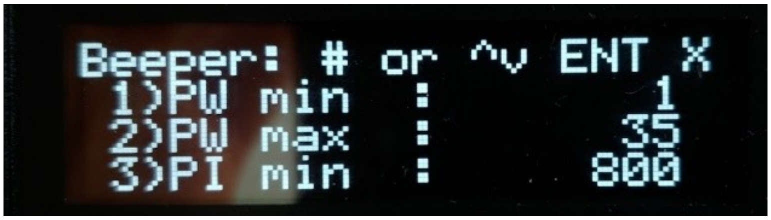


Figure 8: Ares Beeper menu options

Press the up and down arrow keys to get more options. The following is what each item means:

Menu Item	Description	Suggest Initial Value
1)PW min	Pulse width in ms (has a max of 10 currently)	Transmitter width – 5ms
2)PW max	Pulse width max in ms	Transmitter width + 5ms
3)PI min	Pulse interval min in ms	Transmitter interval – 200ms
4)PI max	Pulse interval max in ms	Transmitter interval + 200ms
5)Pulses	Number of pulses to count	2
6)Dropouts	Pulses allowed to dropout before resetting counter	1

Table 3: Ares Beeper Menu Options

You can edit each item by pressing the number corresponding to the key on the left. When arrows are seen on the left and right, the value is ready to be edited. Press ENT (the green checkmark) to submit the new value, or BACK (the red X) to cancel.

Next, enable VFO mode, and tune into your transmitter. Make sure that you get a few contacts on the screen that are expected, and that the 'L' is displayed for logging (if you desire logging). Also check that the number of contacts is increasing by going to:

```
Fn -> 8)SD -> 4)Status
```

5 Updating Firmware

Occasionally there will be updates available to the firmware. If you are having any difficulty with the receiver, it would be best to check to see if an update is available to address your issue.

To update the firmware, you will need the following items:

1. A PC with a micro SD reader or a micro SD reader adaptor
2. An installed copy of Balena Etcher (https://www.balena.io/etcher/)
3. up to 2 micro SD cards
4. A charged Ares receiver to receive the update

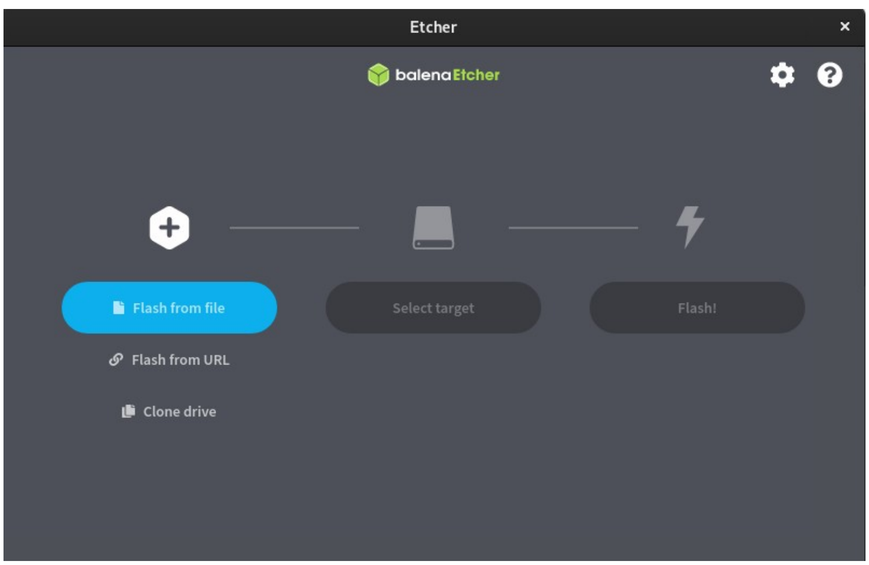
You will need to get a copy of the binary files from Sigma Eight. There are two types of files:

1. AresPPS-x.x.x.bin – this is the firmware to be loaded into the CODEC for audio processing.
2. Ares-x.x.x-hr-1.x - This is the main firmware for the receiver DSP.

The CODEC firmware will not have to be changed with minor updates but will likely be required for a major update. For example, in going from 2.x.x to 3.0.8 you will need to load both the CODEC and the DSP binary files.

STEP 1: Place the first SD card into the PC card slot.

STEP 2: Open Balena and select the AresPPS file as the image.



STEP 3: The SD card you inserted may now be automatically selected or you can manually select the proper SD card. Make sure it is the right card so you don't end up distroying files you don't want to lose.

STEP 4: Select the flash button and Balena will copy the binary to the micro SD card. It will say when it is finished so you know when it is safe to remove the card. Mark the card so you can distinguish from the next one you will make.

STEP 5: Repeat running Balena and select the Ares-x.x.x-hr-1.x.bin file to create a second micro SD. Make sure the firmware is for your hardware, hr-1.0 for hardware version 1.0 and hr-1.2 for hardware version 1.2. This can be observed when you start the receiver or by pressing in sequence Fn 0 2.

STEP 6: At this point you should have 2 micro SD cards, one for the CODEC code (AresPPS) and one for the DSP code (Ares).

STEP 7: Make sure your receiver has sufficient charge. If in question, let it charge with the power off for a couple of hours. You don't want the receiver to die in the middle of loading firmware or you may have to send it in to get it revived.

STEP 8: Put the AresPPS SD card into the slot.

STEP 9: Press in sequence Fn 0 to get to the advanced menu.

STEP 10: Press 1 to update the firmware and confirm by pressing the check or ENT symbol. The receiver will start loading the firmware and show the progress. It finally ends by instructing you to restart the receiver.

STEP 11: After you turn off and then on the receiver, you will see a screen instructing you to insert the firmware and press 1. At this point, remove the AresPPS SD, insert the Ares-x.x.x-hr-1.x SD card and press 1.

STEP 12: The receiver will again show the progress and end by saying "Done receiver init". At this point, turn off the receiver, remove the SD card, then on the receiver and it will be running the latest firmware as shown during startup.

6 FAQ

6.1 My receiver is not responding to the keypad

This is a known issue, although the receiver is still operating and decoding, you will need to reboot it to get the keypad functioning again.

6.2 My receiver is not communicating with RS232

Make sure you do not have the menu open, as the receiver will stop communicating and decoding while any menu is displayed.

6.3 I can't decode my tag

Make sure that your settings under the beeper configuration are correct, and that the SMA connector is on tight. Use an 8mm wrench to tighten it down snug, but do not overtighten. You can also plug in a headset to the audio jack to hear what signal the receiver is getting from the antenna. A headset without a microphone is desired (TRS). Headsets with a mic (TRRS) will have extremely low audio.

If you can't hear the tag, try doing an SWR sweep on your antennas. The dip in the sweep should be close to your desired tracking frequency and below 2. Include any coax jumpers between your antenna and antenna analyzer to check their functionality at the same time.

The problem may also be a high amount of impulsive noise that confuses the decoder. In VFO mode, press 9 to see the diagnostic screen and check the noise level (NL), active queues (AQ), Signals above squelch (SQ+) and signals above the noise +3dB (NL+). The goal is to have 0 Active queues and 0 signals above the squelch with no signals present. The noise level will give you an idea how high you need to raise the squelch. If you raise the squelch about 3dB above the noise level you will probably get the active queues down to 0 most of the time. When you turn on the tag, you should now be able to decode it and you will probably see the active queues raise to 1. If the squelch is too low, the receiver automatically tries to automatically use a squelch level just above the noise level but this may not be successful if the noise is pulsed.

7 Known Firmware Issues

The following are known issues with 3.0.8. Check with us for future updates.

1. Occasionally the receiver does not respond to the keypad. Reboot the receiver re-gain access.
2. Hardware version 1.0 receivers need a hardware modification to be able to respond properly to the charge state. Otherwise they will always indicate that charging is on.
3. Hardware veseion 1.2 needs a hardware modification to properly indicate the battery level.
4. Under CODE settings, the Show Noise feature may initially default to a large number and therefore be on. You can either set it to 0 or 1 or default the configuration to fix it.
5. The receiver has birdies (internal signals) at multiples of 50 kHz (i.e. 150.100, 150.150, 150.200 ...) which mask weaker signals at these frequencies. If possible, avoid using these frequencies.