



Dear customer,

Thank you for your purchase of the NC-V8 Acoustic Lathe.

The NC-V8 is a near perfect consumer phonograph recording solution based on modern affordable components and tuned to an acceptable high fidelity. With this device you will be able to create records that sound close to that of a pressed record. While in theory it is quite a simple device to operate, there will be improvements in time as you learn how to cut better yourself. The basic process however is quite simplified and you'll be able to create great records in no time.

We made a Facebook group for support, the group is called NC-V8. Please apply to join the group as Ned and myself are there to help with your setup questions.

NEW we have added a new appendix at the end of the manual that has some tips we have gathered from the community since the first release. Some valuable information is there for new users!

Read on to get the best out of your new device.

Paul



What's in the box?

NC-V8 Gantry controller
NC-V8 cutting head
Brass vacuum pipe
Spindle puck
2x Speaker wire with mono Neutrik connectors
Universal 12v/2A power supply (EU/UK/US/AUS)
Spare fuses and shank grub screw.
Turntable placement guides.

What's NOT in the box?

You will need these additional items to make a cutting system. We have based this list on our testing system. All our prototypes and beta testers have used MyShank stylus and blanks, therefore we refer to them as the only consumables we recommend to use with the NC-V8.

For stereo recording the cutting head of the NC-V8 uses a **MyShank 462 CVD** Diamond stylus 462 Synthetic.

Cutting media we use **MyShank BPCB102M** 12' Black x 100 1.5mm or **MyShank BPCB102M** 12' Black x 100 2mm. Other MyShank thickness/size/colour type blanks should also work fine.

High torque turntable with 4.5kgf -cm starting torque, we used a **Reloop 7000mk2** with torque set to turbo (4.5kgf -cm).

A **DAW** (we use logic), **Simulathe CUT** plugin set to processor mode into **waves Q10** for Inverse RIAA equalisation (see **audio setup details** later in the manual). Simulathe CUT demo version allows access to the cutting processors but does not allow saving of presets. Download the demo here <https://www.tokyodawn.net/tdr-simulathe-cut/> We are currently consulting with TDR who produce this plugin to make either a preset/version tuned especially for the NC-V8 in the near future, this will lead to improvements in cutting quality.

Soundcard with manual adjustable output control, we used an **SSL 2+**.

Power Amp (with relays to prevent spikes at power on) we used the Thomann brand **T-AMP E400**.

Equalizer for frequency response tuning of the system. We used the **DBX-215S**

Vacuum system. For this you can use a household vacuum as long as it has adjustable airflow and a pressure slide (most house vacuums have this valve near the handle). We want to run the vacuum strong enough but without too much load on the motor. Additionally you need transparent food grade Silicone tube , 8mm inner diameter, 12mm outer diameter. Get a good length of this so that you can have the vacuum away from the system. Lastly you'll need an adaptor for your vacuum. We have made some 3d models available in the facebook group, just measure the diameter of your coupling and download the appropriate model.

Digital Dynamometer 100g capable. We used a generic “**digital dynamometer emb-02**”

Heat lamp for helping to soften the blanks before and during recording. We used a small reptile lamp from the pet store.

Thermometer gun. We used one from a bbq store. Any that can point and read temperature will work.

Spray wax we use for anti static properties, our favorite so far is **TurtleWax “wax & dry”** spray wax.

Microfiber cloths for applying or cleaning wax.

We recommend a heavy duty board to mount the gantry and turntable on, perhaps some cut some mdf then drill and mount the gantry (m8 bolts), with rubber feet on the mdf and the turntable in place it would be quite sturdy.

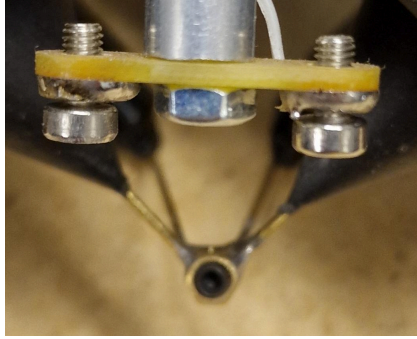
***CAVEAT** by the nature of the design, the cutting head is microphonic, so getting a solid vibration free surface is recommended.

Setting up

Ideally the gantry is bolted down, the turntable must be placed under the gantry so that the stylus will cut in a straight line across the disc. It should also be positioned so that when the head is at the inner “end stop” (the furthest the head can travel to the center of the disc) It should be around 120mm from the center spindle so that the cutter does not enter “out of bounds”. In other words the head cannot enter the label area of the disc. When set-up correctly the motor will stop at the end stop position and you can lift the head after at least one full rotation to create the outer lock groove.



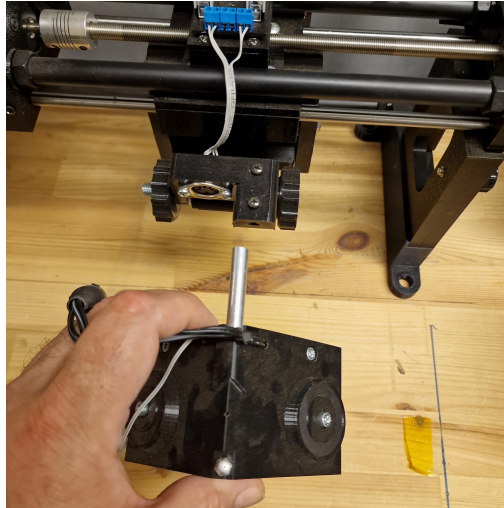
Fit the brass tube, the bend part at the front. The pipes are hand made and not bent exactly the same length, so some adjustment may be needed.



Fit the diamond stylus to the cutter head. The stylus shank has a flat side, this should face the grub screw. The shank should be placed so that 1mm of the flat surface on the down side of the mount remains visible. Carefully connect the heating coil wires from the shank to the bolts on the head. Make sure they are not shorting each other.

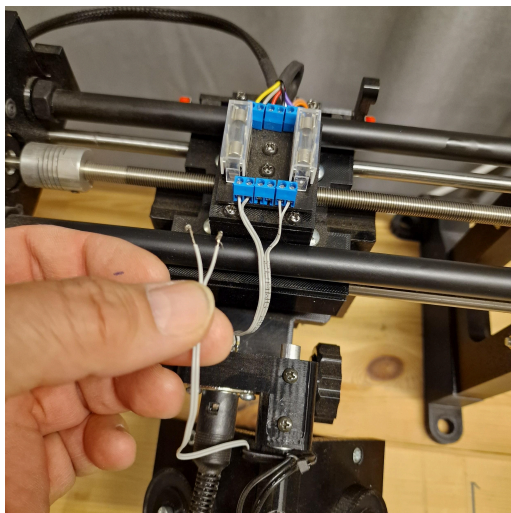
***CAVEAT** it is so very easy to damage the diamond, use absolute care as the tip is very delicate and you do not want to damage it. Can't stress this enough. Treat this like a watchmaker would treat his watch internals.

Adjust the gantry height to the upper position using the side screws, we set it high first and then we can adjust in the next step after the head is fitted. A small spirit level (or smartphone app) will be useful to set the horizontal level correctly once the desired height is set.

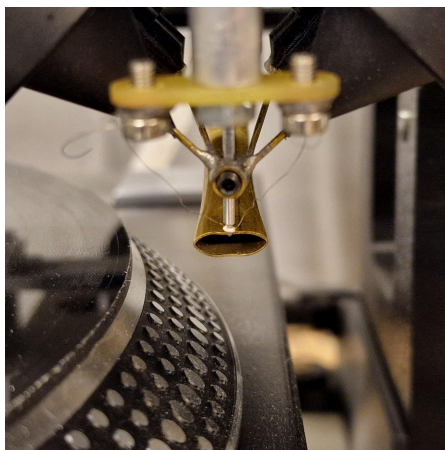


Fit the head to the gantry, push it all the way in gently. Look at the head from the front and make sure the stylus is vertical, if so gently tighten the retaining screws so the head is fixed in place. (don't worry about the dust on ours, it came from SuperBooth25 hehe)

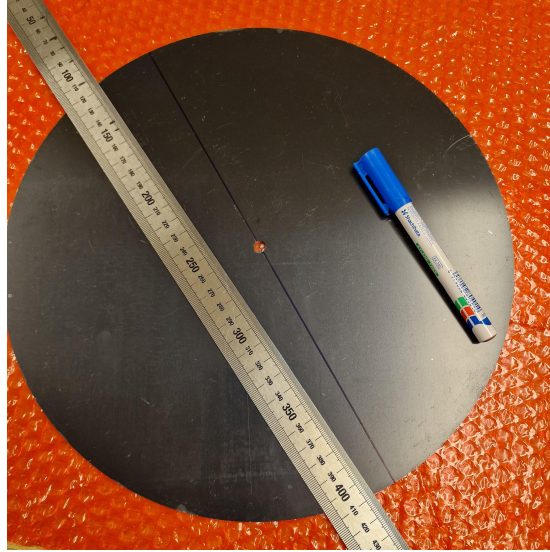
Remember to take great care with the stylus exposed, take your time with all further setup.



Connect the heater wires from the head to the center terminal.



Make sure the cutting head in the lifted position is high enough not to hit anything and carefully slide the turntable under the gantry by eye. Be wary of bumping the stylus. Placement should be so that the stylus in the parked position does not sit over the blank on the turntable platter and the stylus is somewhat centered to the spindle.



Take a blank, a pen and a ruler. Draw a line on the blank in the center of the disc, don't worry it's only on the protective cover.



Place the blank onto the turntable, check that the stylus is higher than the blank, if not carefully set the gantry until it resembles the above picture and then use the transport controls to move it to the approximate lead in position as shown here (please read the **control operation** later in this manual before using it with a stylus fitted, **you have been warned**). Now we need to adjust the height of the gantry, we want it so that the stylus in the lifted position is about 5-8 mm away from the blank, consider the upper limit if cutting 2mm blanks. Rake angle 90° to max 8° tilted.



This is the so-called rake angle and the black knobs either side of the head pivot allow adjustment, be careful not to drop the stylus when loosening these!!!

SEE THE APPENDIX FOR MORE DETAIL ABOUT RAKE ANGLE ADJUSTMENT

Now before you set the cutting line adjustment, let's set the end stop position. With the head in the lifted position and not touching the blank disc (double check) Move the head with the **FWD** transport control until it reaches the inner end stop and won't move any further. Now carefully move the turntable so that the stylus position is approximately 120mm from the center spindle. This will cause the motor to stop if we reach the out of bounds area when cutting.



Now we must set the cutting line. Make sure that the line you drew on the blank disc is centered horizontally, perhaps fix a piece of tape to stop the rotation, Move the head into the lead-in area of the blank and use the rear cantilever to carefully lower the head onto the disc. Does it land on the line? If not, lift the head, double tap the **RWD** transport control to move the head back to park position safely away from the disc and make the needed position adjustment to the turntable.

Repeat until happy then move the head manually to the inner end stop position and gently lower the head again, does it sit on the line? If not, again move the head to safety, and move the turntable again. Then repeat the procedure again to set outer and inner until both match the line. Just take your time here and be mindful of the stylus.

A few more adjustments and we are ready.

We must set the downward force of the stylus. Position the cutting head in the middle of the blank and take your dynamometer and place it under the stylus (you may need to move the vacuum pipe up a little (not too far) to get the scale in place. Rest the stylus on the meter and check the weight, we want 15g of downforce. Lift the head, adjust the rear counterweight and measure again until you have 15g.

All that remains is to set the drag offset, this will cost a blank as we need to cut to find this out, before this cut we should set up the vacuum for **automatic swarf removal** and make a test cut to confirm that this also works.

Swarf or “chip” is the material that is removed from the blank when cutting, if we don’t manage this it will cause problems. The best way is the automatic removal method, for this we need a vacuum. In testing we used an ordinary household Electrolux, with the **pressure value open**. We need to do this as the suction pipe is reduced as otherwise the motor of the vacuum works too hard and gets hot. Connect your silicone hose to the brass pipe at the rear of the cutting head and the other end to your hose adaptor (see the facebook group to get a 3d model of one that will fit your vacuum).

You will need to find the optimal level of power to noise, but for now set the vacuum to 50% power with the pressure valve open and the silicone hose connected to the cutting head and start the vacuum running. Confirm that it's working and if so we are ready for the first test cut. Check the cutting section later for details about preparing your blank with wax. We won't be cutting with audio yet. Prepare a blank for cutting, place it on the turntable and start the disc moving. If you have a heat lamp, place it into position (remember never stop the rotation with the heat lamp in place as it will quickly warp and crater your blank if left sitting.) With the disc spinning, check the disc temperature in the middle of the cutting area with your thermometer, it should be at least 24 degrees, 28-30 or more is better but we aren't cutting audio right now so we aren't so concerned with track noise yet.

Position the head into the lead-in area

Start the vacuum

Press the **REC** button so the head starts to move inwards (the **REC** button is also **STOP** as labeled under the button)

Gently lower the head so that it begins cutting, you should see the fine swarf come from the cutting head into the vacuum pipe and a groove starting to cut into the disc as it rotates. If all goes well, cut for a few more seconds, lift the head and press **STOP** to stop the motor (it pauses for a moment with **REC** light still lit) If all went well, then we only have one more adjustment to make. If not, what happened? Was the vacuum working? Check the pipe, did the swarf not collect into the brass pipe? Is the hose connected or blocked? Did it clump on the stylus? Check motor power and or the silicone pipe. Try to cut again after adjustment. If you can't get past this then jump into the facebook group and we will help you solve it. Meanwhile if needed you can still do the test cut with manual swarf removal, explained in the **cutting theory** section.

Once you have a successful silent cut regardless of the swarf removal then we need only to adjust the drag coefficient caused by the head weight before cutting audio. Make sure the turntable quartz lock is off, set up for a cut as before and place the head in the center of the cutting area (between the lead in and out) Now as before make a new silent cut and look at the strobe light. Look at the large dot (reloop/technics) and adjust the pitch until it stops moving. On the reloop 7000mk2 this is about +2%. Now you have calibrated the best average for the pitch drag coefficient and we are ready to set up audio.

***CAVEAT** the pitch offset is unavoidable with a consumer turntable, the better the starting torque the less the offset will be. Of course it is possible to completely replace the turntable with a professional cutting platter but this is beyond the scope of intended use of this model.

Audio setup details

Setup a channel in your DAW to playback audio to your adjustable sound card output, make sure the sound card volume is at zero. On the daw channel, in the first plugin slot load the Simulathe CUT plugin, press the processor button so that it just shows the cutting limiters and choose the preset "HOT 12" 33rpm maxi <14min" Next in the chain load waves q10 (or equivalent) and disable all eq bands except, Band 1, set to high shelf, gain 14db at freq 4585hz. Set Band 2 to lowshelf, cut 14db at freq 164hz. This will create the needed Inverse RIAA.

We have been talking with TDR and we will likely have direct output of the Simulathe IRIAA in the future, when this happens we will no longer need to add this EQ stage and will update the documents accordingly.

The output of your sound card then goes to the stereo equaliser which should initially be set 100% flat with gains at 0db, it is used currently for frequency response calibration but we again hope to do away with this stage eventually with TDR. Usage is explained in the cutting theory section.

The output of the equaliser is then connected to the power amp,



the output levels of ours are like this, but yours will inevitably vary a little, it even does here a little between the channels after we measured the outputs.

The output of the amplifier is connected to the gantry using the supplied cables, left and right respectively.



We even marked our sound card output levels after several cuts to find the sweet spots, S1 is safe 1 and would cut anything and HOT will likely blow fuses with slammed masters. The key here is the source material, if it's already very hot then you will have to cut at lower volumes. This is talked about more in the cutting theory section.

You could perhaps copy these settings if you had exactly the same setup but likely you will need to find your own levels with some experimentation. Start with conservative levels on the amp output, then adjust the sound card output and watch the equaliser 0db light.

You can also use the VU on the control surface, these are new old stock devices, approximately 30+ years old so we don't rely on them for more than cosmetic use, however you can trim them with a screwdriver in the small panel holes if you want to dial them into your settings.

***CAVEAT** since the VU meters are new old stock, some of them have small markings or scratches in the plastic, this "patina" is unfortunate but unavoidable.

WARNING, NEVER FEED AUDIO THAT HAS NOT HAD INVERSE RIAA EQUALISATION TO THE CUTTING HEAD!

Check the appendix for Ned's offline cutting method that doesn't require a daw but instead relies on preprocessing your audio.

Control operation



The NC-V8 controls are relatively easy to operate.

When the device is idle

FWD will move the cutter head towards the inside.

RWD will move the cutter head to the outside.

Double pressing **RWD** will automatically park the cutter head in the outermost position.

REC will advance the head towards the inside at the speed set with the data knob, pressing

STOP (same button as **REC**) will stop the cutter head advancing, the **REC** led stays lit momentarily (double tap will not work until the led is unlit)

When the device is in REC mode

FWD will advance the head, useful for track space markers, lead in and lead out.

STOP will stop the head advancing.

***CAVEAT** when using **FWD** in **REC** mode the stepper motor makes a small noise which will be audible in the background of recording. If using it to mark tracks you will hear a small whine in the background of your recording during the **FWD** advance, it can be a good idea to leave a couple of seconds between tracks and just blip the button to create the track marker to minimise unwanted noise.

Stylus Heater this is off when the toggle is in the upper position. When it is on, the heater led will be lit and the stylus will be heated. **NEVER** use the heater without the vacuum running as it may cake the stylus if the swarf is not removed.

Data knob when the device is idle you can use this to set the pitch (the speed of the head in rec mode) Simply turn the knob and push to save the setting. You can find a table in cutting theory for some approximate settings.

Cutting Theory

The idea will always be quality and loudness vs track noise and distortion. Track noise can come from poor weight setting, poor stylus alignment, too cold, bumping or generally knocking the table/area etc. Vacuum noise is also an issue, you can get near silent cuts when set correctly but finding the right angle/distance and strength for your vacuum is also a skill as vacuum noise can be added to the signal. This is a problem on high end lathes also I'm reliably told.

There is some skill to getting a good cut with a good balance between these factors. Check the basic cutting video in the NC-V8 group, it'll likely help.

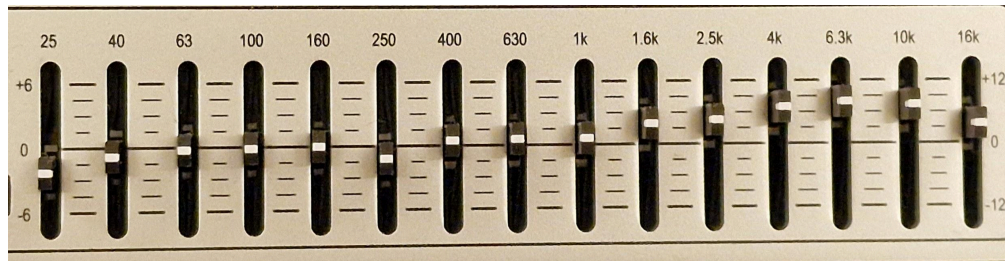
Be prepared to make plenty of mistakes and ruin plenty of blanks in leveling up your cutting ability. Like mixing music, it's somewhat of an art form. You'll learn what cuts well and how far you can push your system, eventually you'll start to be able to anticipate problems in source material before you cut. With time and patience your mixes and cuts will improve. You'll probably pop a few fuses along the way but the fact is you are cutting great records. Just think about that for a moment, for us this is a life dream and we are sure it's the same for some of you. Now before we all start the new dubplate revolution here are some extra tips.

Don't forget to join the facebook group NC-V8 where Ned and I will support you when you have questions.

Thanks for being part of our journey.

Paul

Frequency response calibration



Having the equaliser in-line and set to flat means that we can now calibrate for boosts or cuts in the frequency response of the system. Instead of cutting music, generate a wav in your daw with 30 seconds of white noise. Cut this wav and record it back into your daw from the recording, normalise it and save it as a new file. You can then plot the differences between the source file and your recording of the cut to work out the frequency response. If you have a match eq plugin it could even plot a curve for you which you can then manually enter into your in-line eq. Ours looked like the above picture.

Preparing blanks for cutting

You should remove the protective film only from the side you are cutting, after peeling there may be some static, wait a moment then spray some turtle wax on the disc, use a microfiber cloth to spread evenly. I like to spray a lot but I notice Ned sprays less, so like everything you'll find your level.

Manual swarf removal

If you don't have a vacuum setup you can still cut using manual swarf removal. This frankly is a little awkward but can be done usually quite easily once learnt, but it's definitely not something you want to do instead of the auto removal a vacuum does. Anyway it's important to have a low humidity static free room. You need a brush, like a long thin soft paint brush and a sharp pair of scissors. So as you cut, you'll see the swarf being pulled forward on the disc (and technically under the stylus making more crackle noise in the cut) and if the static level is not high it'll make a ring that resembles cotton candy. As the cut progresses the ring will shrink with rotation towards the center but also gain some height. Eventually it might be that it's too tall and will cause a problem, this is what the brush and scissors are for. You can with practise remove it on the fly and quickly cut the swarf away from the table. To be honest, it works, but it's haphazard and even if you do your best sometimes it just tangles and will bind up on the stylus or center spindle and ruin your cut. My advice, don't do it, get the vacuum going instead.

Estimated cut time in pitch (12" in bounds cut) +/- 10sec (turntable speed is not applicable with fixed pitch)

Time	Pitch
16.30	1000
15.40	950
14.50	900
14.00	850
13.10	800
12.20	750
11.30	700
10.40	650
09.50	600
09.00	550
08.10	500
07.20	450
06.30	400
05.40	350
04.50	300
03.00	200

APPENDIX

Here's some practical answers to common cut issues.

Excessive crackle in audio, this is often static or rake angle related.

Fixed pitch tone heard, this is likely microphonic feedback from your vacuum system.

Lack of volume on one side, provided this is not related to source audio or cabling, this can be that one side of the gantry is too high/low.

Thumps in audio, this can be caused by walking past or bumping your table.

Vacuum unable to collect swarf. If the pipe is set correctly then this is likely too much weight, too loud cutting and or too fast (try at 33 instead of 45). The deeper the cut, the louder the sound and the faster the speed will affect how much material is ejected from the blank.

Since writing the manual there are some things now to consider.

First off, rake angle and weights are now related to the type of myshank blank you use, please check <https://myshank.com/en/content/6-faq> and check to see what angle/weight you should use for the type of blank you have.

Some other things to consider are when learning to cut you should probably start with the original (non pressed) 12" blanks, these are the most forgiving. Don't jump direct to pressed or 7"/10" until you have dialed in cuts. (your diamond and wallet will thank you)

We recommend the Reloop rp7000mk2 as its easily available and is quite forgiving. You may in time want to update this if you can find a second hand Stanton st150 (mk1), this is a great update however unfortunately no longer available. Other used decks to consider are Technics sp15 or sp10mk2, these are vintage broadcast decks and still hold quite some value.

Remember to do your first cuts with lower volume until you have dialed in your settings. There are a few micro adjustments you will have to do. Start with conservative rake angles.

Here is a list of tips that may help..

noisy track noise (static)

1: too low temperature on blank

2: bad rake angle

noisy track noise (fixed tone)

1: vacuum pipe too close

2: vacuum too loud

Rotational whooshing sounds

1: check vertical alignment (from front)

Rotational whistle in lead in

1: try lowering the right side of the gantry slightly

Feedback/hum/tone in lead in or lead out

1: check that the linear rails (the ones the head rides on) are parallel. (use a spirit level from below not on the carbon tubes)

Shallow cuts that skip

1: check that the overall gantry height is correct.

2: check you have the correct weight.

3: check rake angle

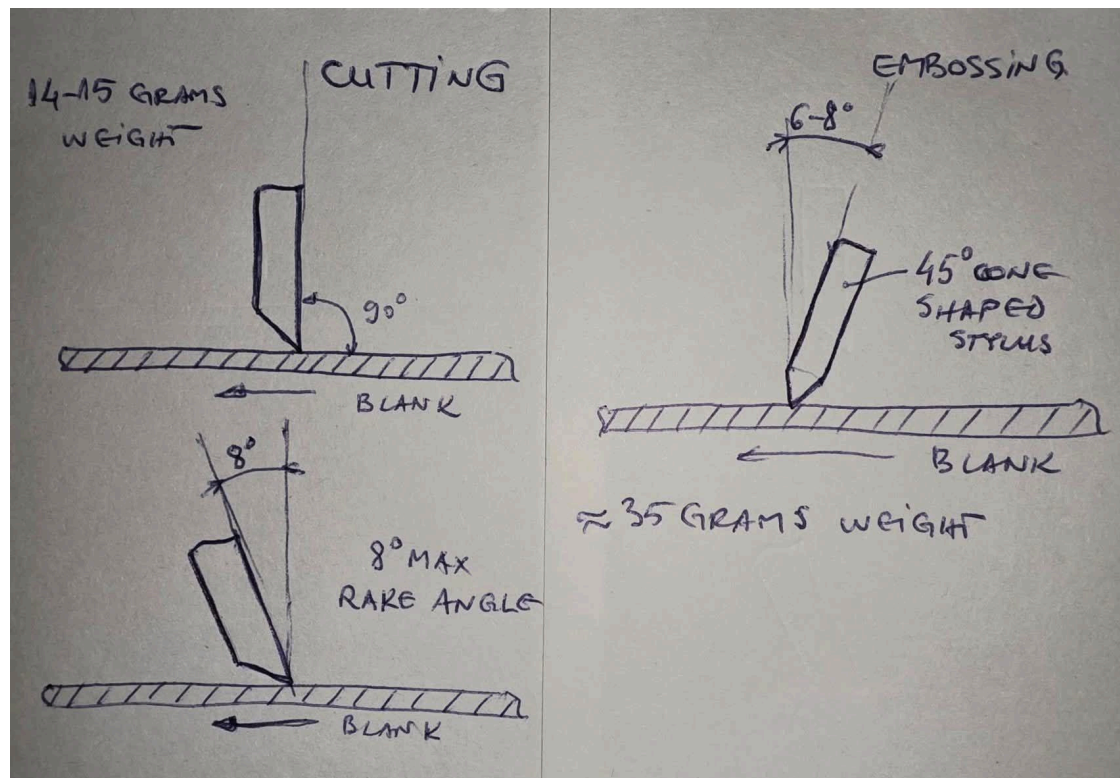
There will be some track noise either way just like real records but we can minimize it.

From the facebook NC-V8 group feedback

We have collected various tips from the facebook group, some things that will likely be useful to have here in the manual.

First off please **review all the pinned posts in the NC-V8 group**, we have a basic cutting tutorial video, manual dropping the head video (recommended !!) some details on voltage levels from Paul's setup and a tip to deburr the blanks for a nice edge.

RAKE ANGLES



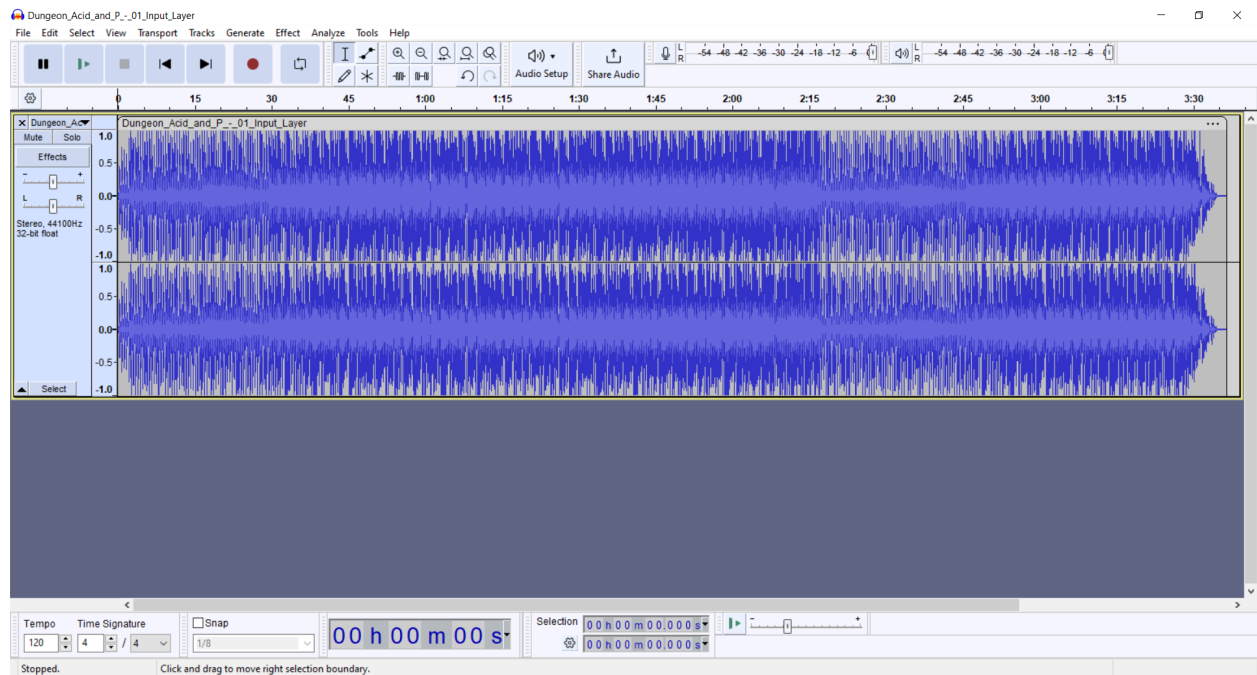
This is Ned's illustration of how to set the rake angle of your stylus. Those on the left are maximum and minimums for cutting with a diamond. On the right is for embossing with a metal stylus. Embossing doesn't create swarf as it's pressing the groove into the blank. This means it's a lot quieter, ideal for fun or novel one off recordings.

Neds cutting method

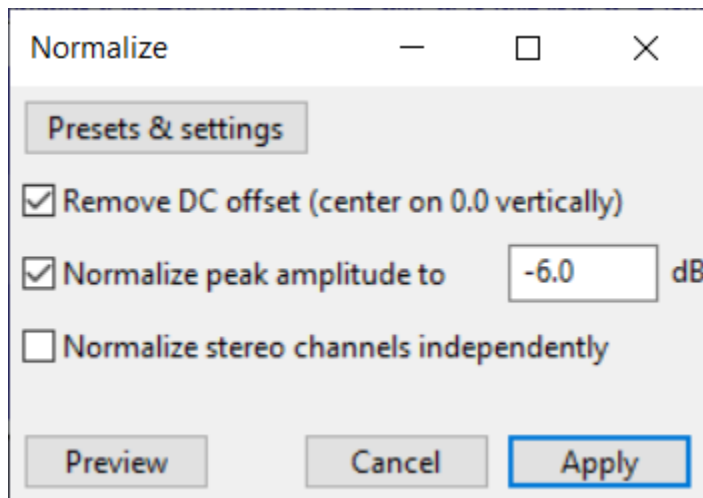
Ned's cutting method differs from the described method in the manual (Paul's method) and we should therefore talk about this for clarity. His focus is less about cutting hot (dubplates) and more focused on consistency. It's not a realtime method but instead requires the user to pre-process the audio.

Ned uses the free software Audacity since it has all the tools needed and is quite easy to use.

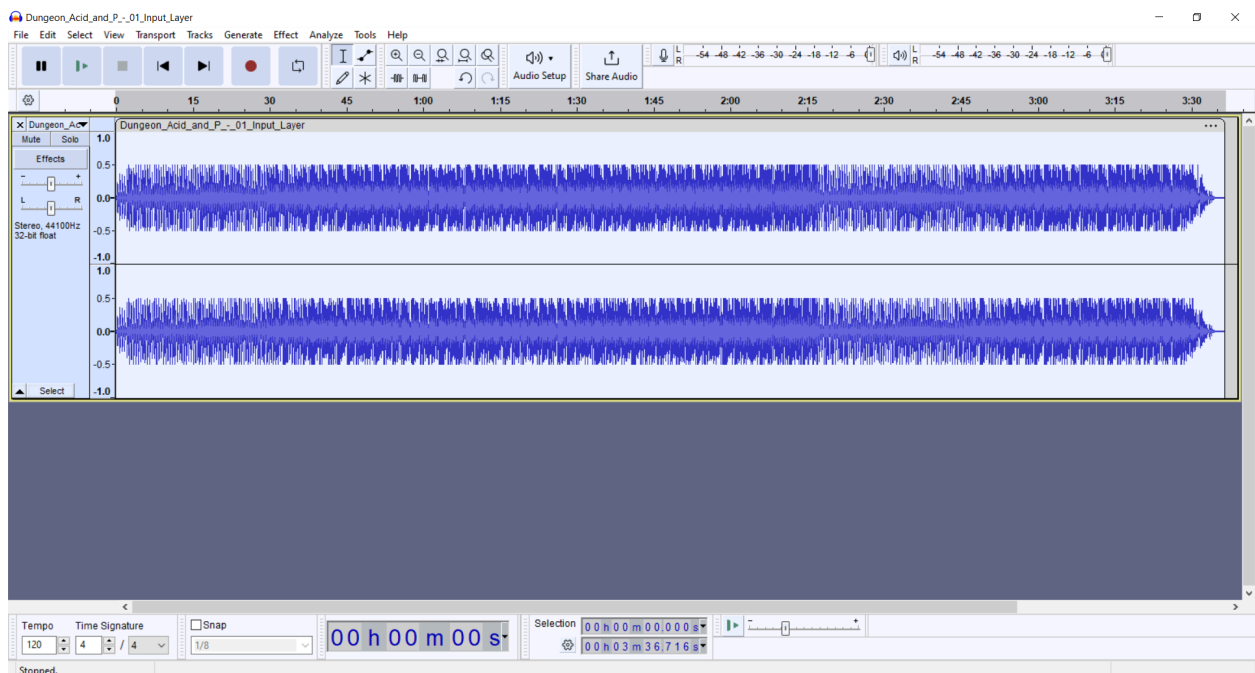
First you load the audio you want to cut

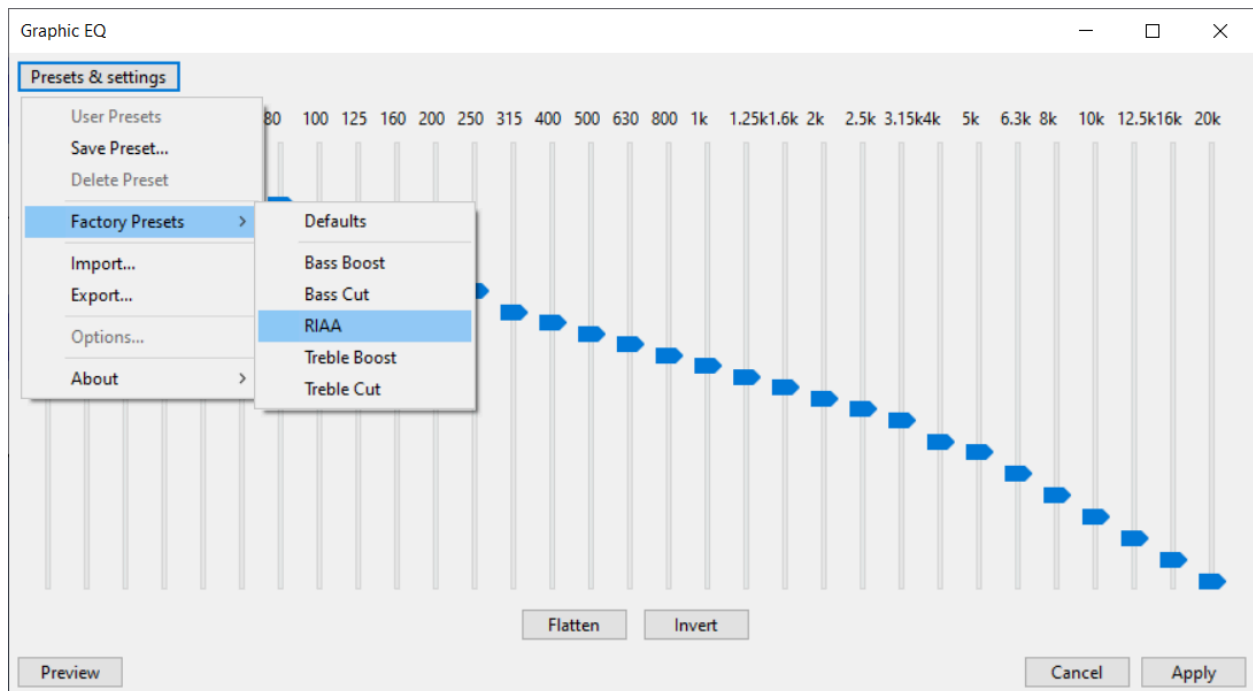


Select the track and from the dropdown menus choose normalise and apply this to the audio.

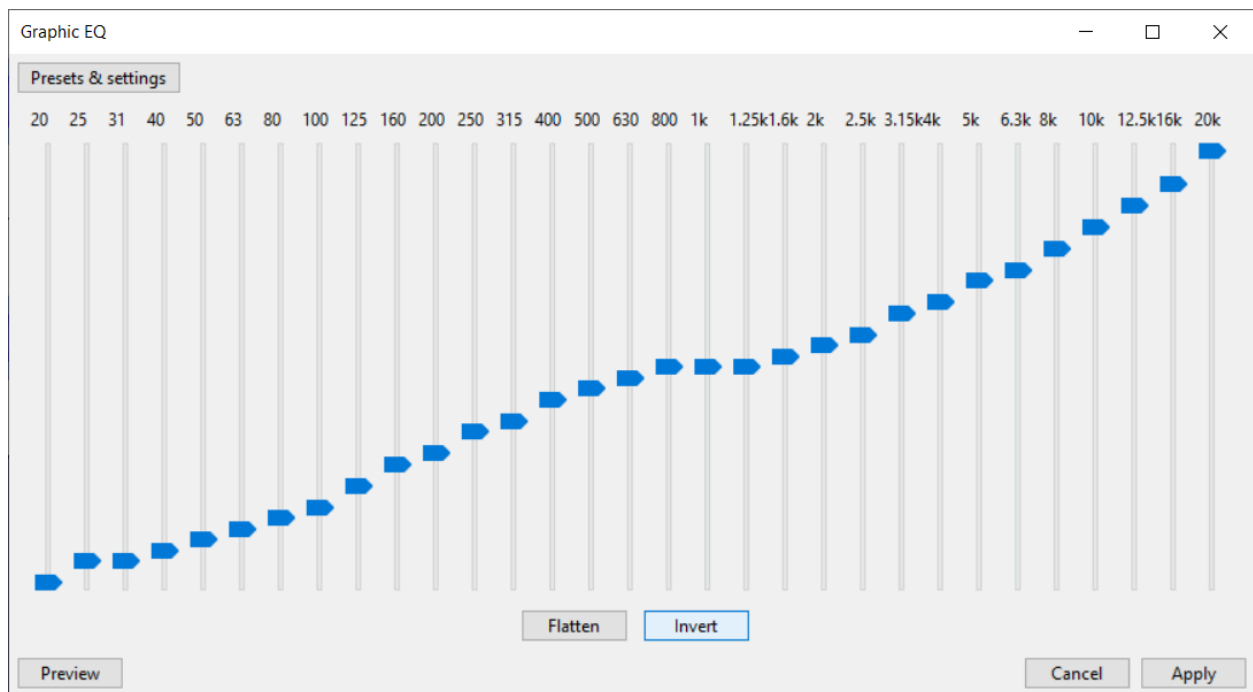


Your audio will now look something like this

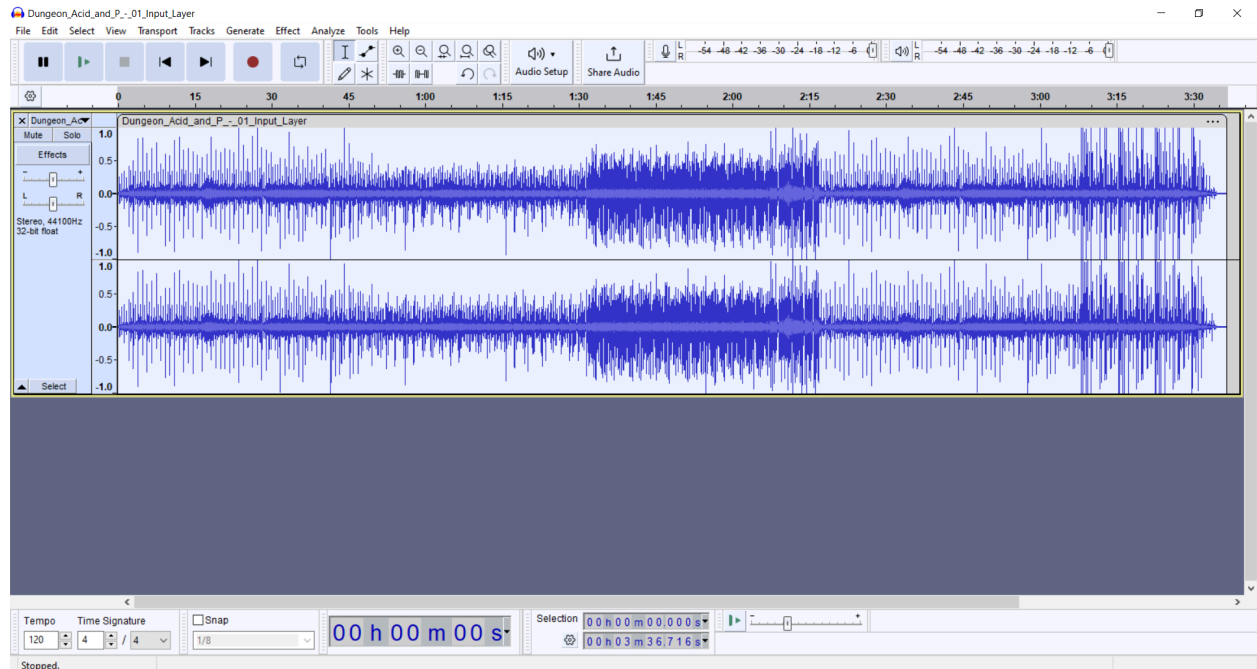




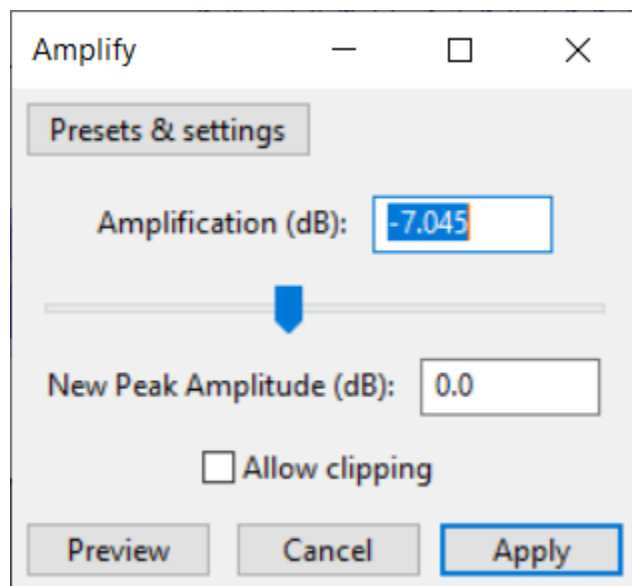
Now select the eq preset for RIAA but do not yet apply it.



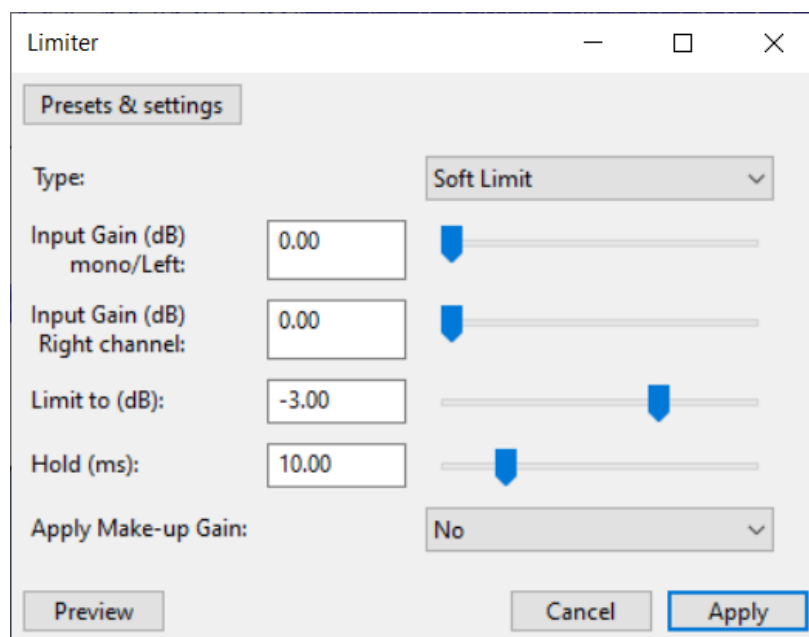
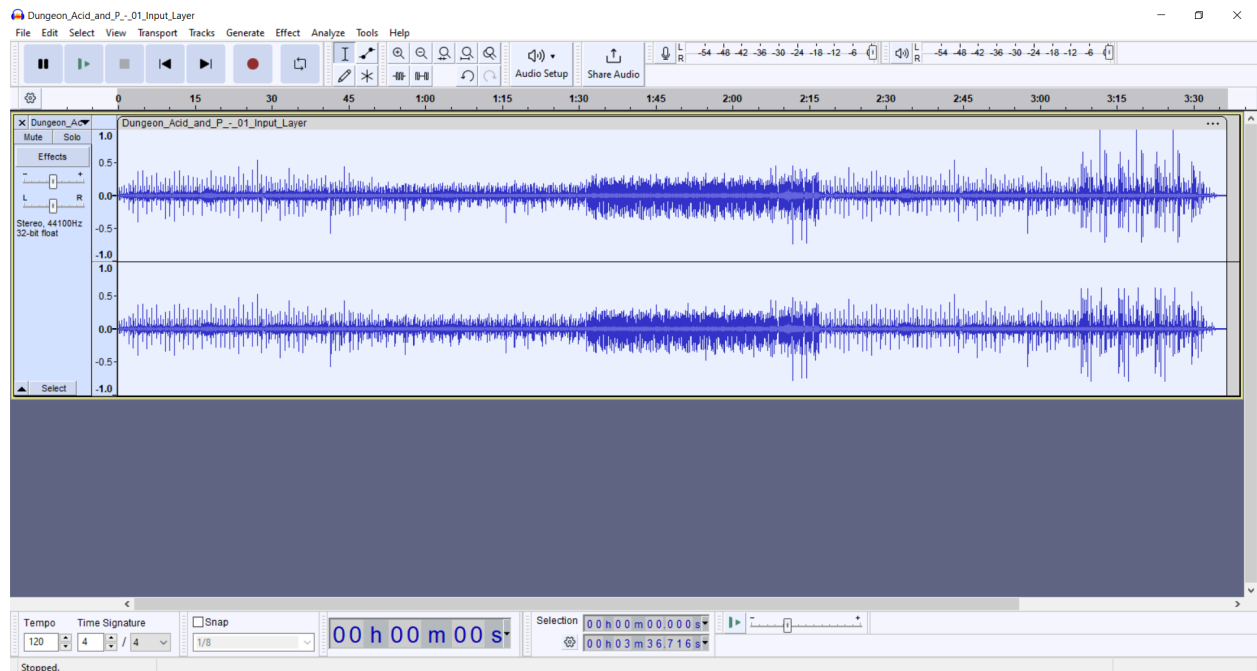
Click the invert button, now we have a reverse RIAA and you can now apply this.



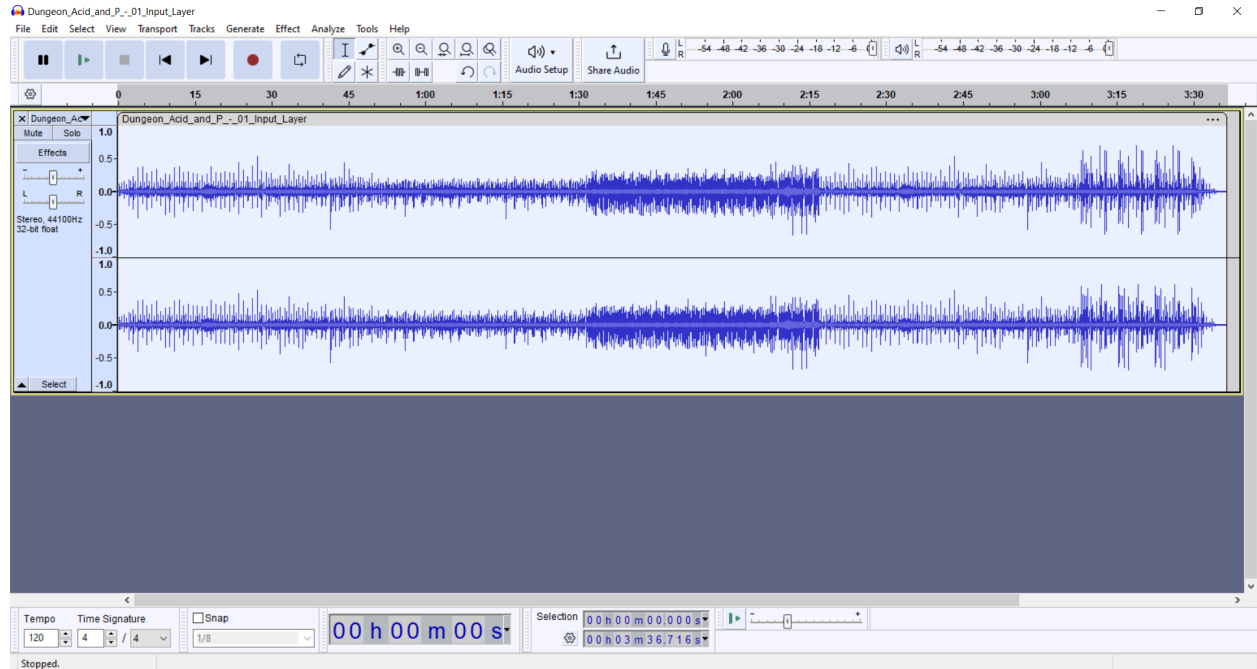
Now the audio looks a little like this.



Now open Amplify and just use the values it shows (not these ones) and press apply.



Finally apply a limiter to remove any left over peaks, use the default settings.



Save your file, this can now be cut directly without further plugins and only manual adjustment at the soundcard for volume. For example, WAV PLAYBACK -> EQ -> AMP -> NCV8

Document revisions

2025-05-31 v1.0

First draft, some corrections and additions will likely be needed. Missing photo of brass tube installed.

2025-11-25 v1.1

Updated catalog numbers for MyShank consumables, added pics for vacuum tube fitting and some formatting.

2026-04-22

Added some minor changes and appendix for batch #3 release.

2026-10-05

Added some info about blanks and rake/weight adjustments ([myshank faq link](#)) and some more tips when cutting.