

Understanding Amplifier 'Clean Headroom'

This is a topic which guitarists tend to worry about a lot and seem to have inaccurate understanding of. But it's not really that complicated if you can learn a few basic rules.

Lack of 'clean headroom', or early distortion, can be caused in two ways...

High Output Pickups

First off, high output pickups are probably the most common and least appreciated cause.

As the name suggests, they inject a much bigger signal into the amplifier's input socket from the guitar. In truth, they are a bit of a 'throw back' from the early nineteen seventies to drive amps much harder and create power amp distortion. This was before amplifiers with DRIVE and MASTER VOLUME controls were invented.

Using those modern amplifiers, able to create distortion by use of a DRIVE or GAIN control, it is important to employ guitars fitted with pickups able to produce a more reasonable (lower) output level. Using high output pickups will make it almost impossible to keep the DRIVE control turned down enough to allow the required 'clean' headroom the player wants.

There is another unhelpful tendency too! Players often try and set their clean sounds whilst playing the amp set very quietly. By doing this it becomes very hard to set a truly clean tone because we all strike the strings much harder when we play with the amp set to a low MASTER VOLUME setting. Therefore, the guitar's output signal is often far too big and the amplifier cannot provide a clean tone even when the DRIVE control is set to a low level.

I cannot stress enough! It is very important to turn up the MASTER VOLUME to the volume level where you will be actually performing at and use this to set your clean tones!

It may well sound too loud, but when it does, players pluck the string with much less force, thereby restricting the signal strength to a comfortable level where distortion is far less likely to be caused.

The object is to help your amplifier produce the tones you need by modifying your playing

technique appropriately.

Amplifier Power Rating

The power rating of any amplifier is a statement of how much power it can produce into its speaker before it runs out of power and starts to sound distorted.

Many musicians understand that amplifiers made in the nineteen-sixties, like those made by Fender without DRIVE or MASTER VOLUME controls, are able to be played rather loudly before distortion sets in. But when they do, it's at the point where their rated power has been exceeded. This is called 'Power Amp Distortion' in the guitar world.

When those types of amp designs were latterly updated to include DRIVE and MASTER VOLUME controls, there was a lot of misunderstanding of them from guitarists. Many just never really got to grips with setting them up correctly... especially the 'old timers' used to turning up everything to full bore to get their beloved distortion sounds!

However, it is not possible to get clean headroom that the amp's rated output cannot achieve! If it's not clean enough for you, then you will just have to buy a higher power rated amp! Simple, but here's some tips...

To achieve good clean headroom from your amp, on a stage in a band situation, **with no pedals connected**, you need to remember a few things:

- Use a guitar with 'standard' output pickups. Like a 60's spec Strat or Les Paul for example. But do not raise the pickups too close to the strings!
- Using high output pickups is like turning up the gain on your amp... it will go into distortion quicker!
- Use an amp with a respectable power output of at least forty Watts or more, and fitted with efficient speakers with a 'Sound Pressure Level' (SPL) of 100dB or more.

If you cannot find a good amount of clean headroom with those, then you are probably playing beyond the power rating of the amp or 'overdriving' the input stage of the preamp with 'loud' pickups! A very common cause!

To be fair, it is unreasonable to blame your amp for low clean headroom if your guitar is equipped with high output pickups or the amp's power is very low.

Essential Pointers For The CLEANEST Tones

- Most good amps will produce undistorted sound right up to its rated output power.
- It's worth mentioning that certain rock music orientated amps are almost incapable of creating an entirely clean sound! Yes, they do have a 'so called' clean channel, but it's designer has not really given enough consideration for the fact that many rock players do actually want a really clean sound on occasions at high volumes. Sadly, there's not much anyone can do about it in this case!
- The reason a Fender 'Twin Reverb' has so much clean headroom is because it can produce 100 Watts of sound into two very efficient 12" speakers before distortion really sets in big time.
- Two 12" speakers will produce more acoustic output than the same power into one 12" speaker! Two speakers will NOT add as much 'cone compression' like a single 12" speaker being pushed to the limits of its mechanical travel! Four 12" speakers even better, but not much more improvement after four.
- 12" speakers are, generally, 3dB louder than many 10" or 15" speakers. So, for the most clean headroom, use 12" speakers of 100dB SPL or more.
- Plug in your guitar directly into the amp input and turn the guitar's volume to maximum... ALL the way up!
- When we play at a low volume, we strike the strings much harder than we would if the volume was very loud. This will cause early distortion to occur! So, try to set the amp's volume to a level that you will be using live, FROM THE OUTSET.
- In order to get the loudest and cleanest tone possible, it is essential that you set the **MASTER VOLUME** control to **MAXIMUM... NOT 6 to 9!**
- Now use the **GAIN** control to set the amplifier's volume to the level you require.

- A 1960s valve 'Blackface' style amp with no MASTER volume, is preset internally as if the MASTER volume was set to FULLY UP - MAXIMUM!
- By using a 'Standard' Strat, Telecaster or Les Paul Standard, with normal output pickups, it is perfectly possible to get a clean sound using this method.
- If this does not help either, then you may have pickups that are far too hot or adjusted much too closely to the strings. You may need to visit a guitar tech to have your instrument set up properly.
- **ANY amplifier** will sound much quieter when it is being played totally clean! You may even think the amp is not producing its rated power... when it is! To get **REALLY** loud clean tones, you could well need 100W of clean power!
- If you can't manage to achieve a very clean tone after all this, then you're doing something wrong or your pickups are just too loud! But it's **NOT** your amp!

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