MI Amplification

Owner's Manual

1. Welcome

Hi there! I'd like to take this opportunity to thank you for purchasing the MI Amplification Revelation vacuum tube guitar amplifier. I'm very proud of my baby, and I hope you like her too! Well over 4 years of development have now gone into the Revelation. In releasing a vacuum tube amplifier, I didn't want to just add another amp onto the market, simply because I could. Rather, I wanted to make a serious contribution to the continued evolution of this *art form*.

It seems to me that valve amp design is currently polarised into two distinct camps. The first of these are the elite boutique amps, offering amazing tone, wonderful workmanship, but with a limited set of features at typically 'challenging' prices. The second of these are the mass produced, assembly line amps. These offer great 'value', with (typically) many more features, but with very ordinary workmanship (since most consumer electronics are only engineered to have a life expectancy of 5 years), 'budget' components, and most importantly, generic tone. Looming in the background of this tussle is the ascent of digital modelling. This digital revolution has shown guitarists that they need no longer settle for one or two sounds. Now they can have as many as they want.

So out of this seeming disparity arose my own personal design challenge. Can a hand built boutique amp offer the same kind of features as a production line amp? Can a flexible amp be built with the best components, utilising an uncompromising build technique? And finally, can a pure vacuum tube amplifier be created with features and flexibility that pushes the limits of these traditional paradigms, even challenging the flexibility of digital modelling amps, but with pure valve integrity?

My response to these questions is the Revelation.

It's been a long time coming, but I hope you enjoy your new instrument as much as I have enjoyed creating it for you.

Michael Ibrahim
MI Amplification

2. Precautions

In order to get the most out of the Revelation, please make sure that you follow the points:

- **Make sure that the power outlet is the correct rating as stated on the amplifier**
- **Make sure that if a fuse blows, you replace it with the same type and rating only. Do not substitute. Do not change any fuse while the amp is still plugged in. If your amp continues to blow fuses, get it checked out by a qualified technician.**
- **Make sure that the amplifier is properly ventilated, both from front and rear.**
- **Do not get the amp wet. Do not expose the amp to rain, moisture, or any water or liquid.**
- **Keep the amp away from any flammable objects, as the amplifier can generate quite a bit of heat.**
- **Do not expose the amplifier to direct sunlight or extreme heat.**
- **Make sure that you leave the amplifier standby in "Warm" for at least one minute after turning the power on in order to allow the power tubes to warm up properly before turning on the high voltage.**
- **Do not touch the tubes! They are VERY hot.**
- **Always make sure that the amplifier is connected to the correct load before operating.**
- **Always make sure that the amplifier is properly grounded by using a three-pin mains plug. Do not use a modified two-pin plug.**
- **Unplug the amplifier when it is not in use.**
- **Do not remove the back grill.**
- **Do not open the amplifier, as there are no user serviceable parts inside.**
- **Do not adjust the bias of the amplifier. This is for qualified technicians only.**
- **Always replace the power tubes with a good quality matched pair.**
- **Use hearing protection at all times if exposed to high sound pressure levels.**

3. Amp Overview

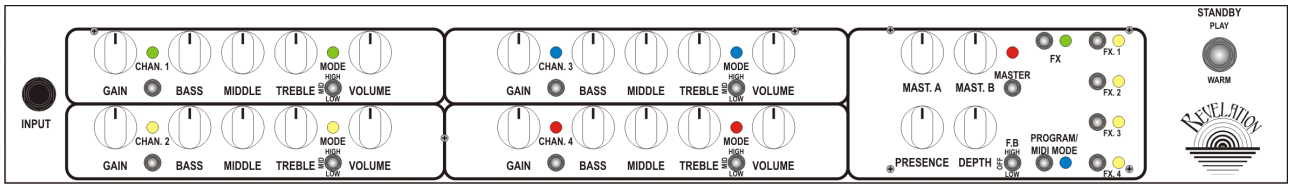

Figure 3-1 Front Panel

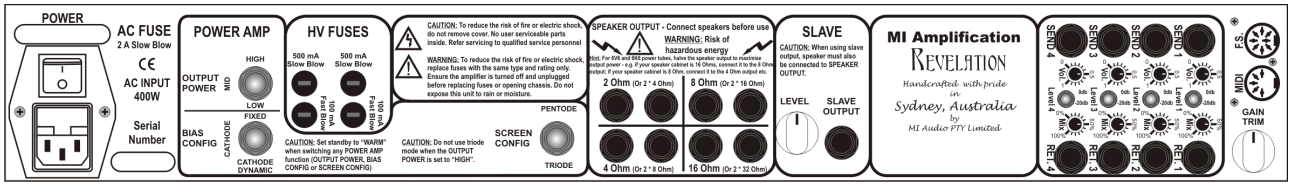

Figure 3-2 Rear Panel

3.1. Preamp

- The Revelation features 4 completely independent channels, featuring **GAIN**, **BASS**, **MIDDLE**, **TREBLE** and **VOLUME**. Each channel is independently voiced with unique design architecture, in order to capture the sonic DNA of iconic guitar tones. What this means is that when you change channels, it feels like you're changing amps, not simply adding more or less gain to the same basic sound.
- Not only is each channel independently voiced, but they also feature 3 gain modes, namely low, mid and high gain. This revolutionary approach means that for the first time, the idea of a 'clean' or an 'OD' channel is done away with. Any channel can be assigned to operate as a clean, crunch, or high gain channel. You can, for the first time, set up 4 distinct clean tones. Alternatively, all 4 channels can be variations of dirty. It's completely up to you.
- **GAIN TRIM**, for a further 'hot-rod' of the high gain modes on all 4 channels. This rear panel control allows you to further increase the gain in the high gain mode for all 4 channels.

MI: *Personally, I leave this control all the way down, as I feel that the amplifier has more than enough gain (especially in Channels 3 and 4). But if you want more gain, it's in there!*

3.2. Power Amp

- The Revelation features a push-pull power amp design, designed to take virtually any octal base power tube, including KT100, KT90, KT88, KT77, KT66, 6550, EL34, 6CA7, 6L6, 6L6G, 6L6GA, 6L6GB, 6L6GC, 5881, 6V6 and 6K6 power tubes.
- The Revelation's power amp is configurable to match any of the tube types listed above. This ensures optimal performance for each tube type.
- Dual master volumes **MAST. A** and **MAST. B**, give you the option of setting up two stage levels.
- **PRESENCE** and **DEPTH** controls, allow you to control the frequency response and feel of the power amplifier. This is particularly useful for matching the sound of the Revelation to different guitar cabs or rooms.
- Selectable power amp feedback level (low/off/high) for controlling the feel and response of the power amp. This includes completely disabling the **PRESENCE** and **DEPTH** controls (off position) for unfettered power amp response.
- The power amplifier features 3 selectable power levels, "High" "Mid" and "Low" Variations in output power are achieved in the most natural way possible, namely by varying the internal

high voltage of the amplifier. This leaves all other supplies operating at their correct voltages, so that the operation of the amplifier is not compromised.

- Triode/Pentode configuration for further variation of the power amp's feel and headroom. This is more than just power variation, but also affects the way that the power amplifier responds, with a much smoother transition between clean and clipping.
- **OPTIONAL:** The Bias configuration option adds a further 2 operating modes on top of the standard fixed bias, namely *Cathode Biased* and *Cathode Dynamic* modes. These not only change the maximum output power of the power amp, but also have a dramatic impact on the tone and feel of the Revelation, making it much spongier and more 'vintage' sounding.
- Slave output with Level control.

3.3. FX Loops

- 4 independent assignable FX loops. Each loop is assignable to any channel or program. For the first time ever, an integrated programmable FX switcher has been included in a guitar amplifier, allowing you to automatically switch your effects with each channel or each patch.
- **OPTIONAL:** Any or all of the loops can be upgraded to ***Pro Loops***. Each pro loop features low noise buffered circuitry for the ultimate in performance. Each Pro Loop can operate as either series or parallel (instead of the standard series loop). They also features level selection (line or guitar), send level and mix control.

3.4. Operating Modes

- Standard: This is similar to a conventional guitar amplifier. Using the optional 6 button foot controller, you can switch to any channel, and toggle between master volumes. Finally, Intelligent FX loop switching means that you can assign any number of FX loops to a channel, which are then turned on or off by simply pressing the one FX footswitch.
- MIDI: In this more advanced mode, you can store up to 128 user programs. For each program, you can set the channel, gain mode, master volume, FX1 to FX4 on/off, and global FX on/off.

4. Getting Started

- Unpack the amplifier head and make sure that you remove ALL packing material.
- Connect an appropriate speaker to the correct speaker output.
- Connect the power plug into the amplifier.
- To start off with, set the power tube configuration to Pentode, and High output power mode.
- Plug your guitar into the amplifier.
- Turn the amp on and leave the amp's standby in "Warm" for at least two minutes after turning the power on in order to allow the power tubes to warm up properly before turning on the high voltage.
- Turn the master volume down.
- Select Channel 1, Low gain mode, with all channel controls to 12 O'clock.
- Switch the standby switch to "play", and slowly turn up the master volume. You should start to hear a clean tone.
- Have fun!

5. The Channels

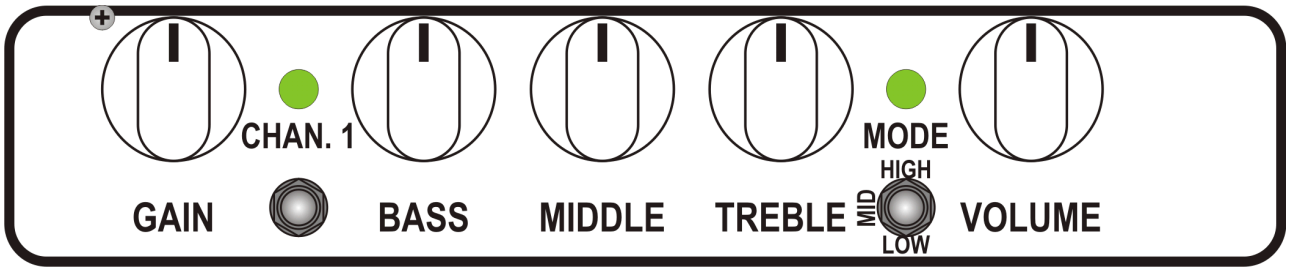

Figure 5-1 Channel Controls

5.1. Introduction

As mentioned above, each channel of the Revelation is uniquely voiced. The old paradigms about 'clean' and 'OD' channels are also completely done away with. Instead each channel implements a particular design philosophy and architecture. After a long time studying preamp designs and sounds, four unique approaches have been isolated, covering the full spectrum of guitar sounds over the past 50 years. As opposed to copying these circuit designs, the individual channels of the Revelation strive to capture the *spirit* of these sounds, and implement the underlying philosophy of each. The next logical step was to apply these various approaches to varying gain levels, creating 3 sounds per channel, all of which are the logical extension of each other.

In order to maximise the performance of the amplifier, a different approach has been taken to the tone stack design. This is something which is important to note. Unlike the traditional EQ, the tone stacks used in all four channels of the Revelation are designed with an extremely powerful midrange control. The reason for doing this is that the mids are the most important frequencies for electric guitar. It always struck me as rather curious that the most crucial frequencies of the guitar are the least tweakable. So a tone stack was designed with a midrange control which has approximately twice the range of a traditional midrange control.

Due to the increased range of the mid control, the order of dominance of the **MIDDLE** and **TREBLE** controls is reversed. As the midrange is increased, the treble becomes less powerful. This is normal behaviour. So just keep this in mind when adjusting the tone controls. In order to 'free up' the **TREBLE** control, try running the **MIDDLE** below 12 O'clock.

To select any channel, toggle the heavy duty momentary switch located between the **GAIN** and **BASS** controls of that channel. Each channel's **MODE SWITCH** is located between the **TREBLE** and **VOLUME** controls for that channel.

5.2. Channel 1

Overview

Channel 1 of the Revelation captures the sound of vintage US amps. Its architecture is different to that of the other three channels, because the EQ tone stack comes near the beginning of the preamp, immediately after the first valve stage. This tone stack is designed to have a very wide range of sweep, with all three controls having a very big effect on their respective frequency band. The position of the tone stack is an important feature, especially as this channel is driven into overdrive.

The overall gain of this channel (in all three modes) is lower than the other channels in order to accentuate the more vintage nature of this channel. So even in high gain mode, the amount of overdrive is more of a 'crunch' rather than a saturated lead.

Channel 1: Low Gain

The first mode of Channel 1 is pristine clean. This mode is by far the most balanced and detailed clean mode in the amplifier. Depending on how hot your pickups are, you may find that this channel stays clean throughout the whole range of the gain control. By keeping the low mode completely clean, this allows this channel to take pedals beautifully.

With the **GAIN** control in the lower half of the gain range, the low mode of Channel 1 exhibits beautiful, glassy high end response. With very bright single coils, this mode will deliver stunning, 3D, shimmering clean sounds. As the **GAIN** is increased past half way, the sound begins to fill out and become punchier and more muscular. By balancing the **GAIN** and **VOLUME** controls, you will find that a whole palate of clean sounds will be available.

Channel 1: Mid Gain

This mode adds an extra valve stage for a much more powerful clean sound. Most guitars will also produce a slight overdrive in this mode with the **GAIN** set at 12 O'clock or higher. In this mode, the mids are much more prominent, producing a wonderful blues tone. It's also extremely touch-sensitive.

As this channel is overdriven, the unique position of the tone control comes into play. The tone control not only affects the timbre of the channel, but also varies the response and feel of the overdrive. By running the **BASS** control in the higher region, a spongy fat overdrive is created. By running the **BASS** control below 12 O'clock, and the **MIDDLE** and **TREBLE** controls higher, the response of this channel will tighten up. Feel free to experiment with EQ settings here, as these will have a remarkable effect on the character of the overdrive.

Channel 1: High Gain

This mode of Channel 1 is the home of vintage lead - fat, dynamic and articulate. It also responds wonderfully to variations in your guitar's volume control, as well as variations in picking attack. Just remember to keep the **BASS** control in the bottom half of its range for a tighter sound. Of course, you're also welcome to experiment with different EQ settings, as there's no right or wrong way of using EQ in this mode.

As mentioned above, this channel's gain is geared more towards the vintage end of the spectrum, so the amount of saturation available with this channel is less than the other 3, (in particular Channels 3 and 4). If you do want to see how far this channel can be pushed though, bump up the **HIGH MODE GAIN TRIM** on the rear of the amp. Just keep in mind that this will affect the higher gain sound of all 4 channels.

5.3. Channel 2

Overview

Channel 2 is the second 'vintage' voiced channel in the Revelation. This channel has an architecture that pays homage to the great British amps. These British amps tended to invert the order of the tone stack, by placing the EQ at the end of the preamp. This would become the basis for the vast majority of high gain modern amp designs.

However, in this realisation, the voicing of this channel is anything but 'modern/high gain'. This channel is all about creamy fat sounds. The modern/high gain duties are relegated to the 3rd modes of Channels 3 and 4.

Channel 2: Low Gain

This clean mode is higher gain than the equivalent mode of Channel 1. You will notice that the mids are also more pronounced in this channel, making this clean tone punchier and more rounded

than the clean tone in Channel 1. This has the advantage of making single note lines more forward, particularly with the bridge pickup.

A different gain control design makes the **GAIN** control brighter in the lower region. This is particularly useful for cutting through the mix. Notes seem to leap forward without needing radical EQ settings. This mode also loves pedals, and provides a nice counterpart to channel 1 driven with pedals. Once again, experimenting with different settings of the **GAIN** and **VOLUME** controls will produce a wide range of tones.

Channel 2: Mid Gain

The first impression of this gain mode can be a bit strange, but the more you work with it, the more it will reward you. This mode purrs. Lovely, glowing amber tones… touch sensitive and sonically wide. What started out as a slightly 'honky' channel in the Low gain mode is now a much broader sound. The low end response of this mode is spongier than you'd first expect, but this is precisely the point of this mode. It's vintage attitude all the way. If you want to create super smooth, elastic tones, try cranking the **GAIN** all the way in this mode. It smooths out the top end quite a bit and increases the compression effect for low notes.

***MI**: This sound is one of my favourite sounds in the amplifier. I absolutely LOVE this mode when the power amp is set to Medium output power mode, triode configuration, with no negative feedback, for distorted power tube bliss. This IS old-school. Channel 2's mid gain mode seems to fuse seamlessly with the power amplifier, transforming the somewhat 'imprecise' low end response of this channel into a tight, punchy vintage powerhouse. Don't forget to also play around with the EQ when you've got the power tubes cooking, as you'll discover a whole range of great tones.*

Channel 2: High Gain

This mode of Channel 2 takes the same characteristics of the Mid gain mode and pushes it further into vintage lead territory. With the **GAIN** set to 12 O'clock, it has about as much saturation as the Mid gain mode with the **GAIN** set to maximum. However, the feel is quite different (although the sounds are still obviously related), with a much more precise attack and less low end compression. Don't forget to check this mode out with the **GAIN** also set high as well for some stunning fat lead sounds.

5.4. Channel 3

Overview

Guitarists from the 80's and 90's, unsatisfied with the performance of their stock amps, began experimenting with various ways to goose up their performance. A new trend of hot-rodding amps emerged. These mods were almost always done to British amps, producing a tight and focused sound. The best of these mods were also carried out in a way which left the top end response of the amps smooth, and in no way harsh. The emphasis was definitely on the mids, and these new beasts cut through the mix like nothing else. These were some of the most amazing sounds ever produced, and a quick look at any digital modelling unit will undoubtedly testify to the cult status that these amps achieved.

These amazing amps are the inspiration for Channel 3. The low end response is restrained, and high end is very smooth. The mids, on the other hand, are extremely forward. This channel, in all three modes, cuts through in just the right set of frequencies to make your guitar heard in real-life applications. This single-mindedness can be quite sonically confronting, but once you get it, you **get** it.

Channel 3: Low Gain

This clean sound is undoubtedly the 'thinnest' of the four clean sounds in the Revelation. This may tempt the uninitiated to overlook this channel's low gain mode. However, in band and recording situations, especially in more sonically complex settings, the controlled low end, and smooth high end of this channel can really help put your clean guitar sound in just the right place for it to be

heard without too much effort. This channel is my favourite for funk. It 'stops' faster than any other channel, and helps more complex chord voicings to remain clear and articulate. Of course, feel free to use the powerful tone controls to adjust the balance of this channel to your liking.

The **GAIN** control on this channel has the most radical effect on the tone, compared to any other channel in the Revelation. It can be used to skew the frequency response of this channel in favour of the mids and highs when set in the lower range of its sweep. So for the clean mode, I'd suggest that you run the **GAIN** control above 10 O'clock to keep the sound a bit more balanced. You will notice already that this mode is higher gain than the corresponding modes on the first two channels. With the **GAIN** cranked, your signal will start to clip.

The Low gain mode of Channel 3 is also a wonderful mode to use when the power amplifier is driven into distortion. The tone remains super-tight, due to the careful treatment of the bass frequencies. Try running the power amp in Low power mode (pentode configuration) for a fast, tight crunch sound. This is seriously brown!

Channel 3: Mid Gain

Shifting into Mid gain takes things up a notch. It's also here that the controlled low end of this channel's architecture starts to pay serious dividends. The response of this channel when overdriven is perhaps the 'fastest' found in the Revelation. Also, the note definition is amazing. Complex chords ring true, with wonderful note separation and clarity. In this mode, the **GAIN** control can also be used to fatten up the sound, when set above 12 O'clock. It adds girth, as well as saturation.

Channel 3: High Gain

Welcome to high gain lead bliss. The tone is deep, complex, woody, and blooming. Its top end response is smooth, and stays wonderfully musical regardless of how much gain is used. At the same time, this mode can be very deceptive. It remains so detailed and articulate that it can fool some guitarists into thinking that this channel has less gain than it actually has. In fact, this is the highest gain sound in the amplifier, although when compared to Channel 4, its superior note clarity can fool you into thinking that this is not the case.

MI: *This mode, in my opinion, is THE lead mode. For me personally, I cannot go past this for the ultimate high gain lead sound. . Amazing saturation, sustain and definition…all delivered with precision.*

5.5. Channel 4

Overview

Channel 4, it's safe to say, is the alter-ego to Channel 3. In some ways, they share a similar heritage. This Channel was inspired by a class of amp which sprung up in the late 80's and continues till this day. The heritage of these amps is decidedly British, but there's also an American twist on things. Unlike their British counterparts, whose focus was sonically narrower, these amps incorporated the 'girth' of traditional American amplification. This, combined with a serious amount of gain created an aggressive tone, never before heard.

At every stage of the preamplifier circuit, the signal is handled in the opposite way to Channel 3. This creates a sound, which in every mode, is the counterpart of Channel 3. Instead of 'thin' and detailed, the Low gain mode is dark and moody. Instead of focused and fast, the Mid gain mode is fat and momentous. Instead of cutting a controlled sonic path, the High gain mode forces its way through with sheer brute power, pushing aside anything in its way.

Channel 4: Low Gain

This mode is by far the darkest of the clean modes in the Revelation. It's markedly different to the other clean sounds, and (rather surprisingly) is wonderful for jazz. This makes Channel 4 perhaps

the most diverse channel in the Revelation. The very healthy low end response, coupled with the restrained top end adds a lot of weight to thinner single coil sounds. For humbuckers, try running the **BASS** control lower, in order not to over-saturate the lower frequencies.

Channel 4: Mid Gain

It's here that the true potential of Channel 4 begins to surface. The dark character of the low gain mode gives way to a sharper, more abrasive sound. Remarkably, the huge low end of Channel 4 remains in tact, producing a powerful rhythm guitar sound, with a very wide sonic footprint. Due to the architecture of this channel, and the broad frequency content of the sound, this mode does not lend itself well to subtle and complex chord voicings. But then again, this channel is anything but subtle! Channel 3 is a better option for these sounds.

Channel 4: High Gain

Ladies and Gentlemen, strap yourselves in. This mode is one serious ride. There is nothing tame, polite or civilised here. This is pure aggression. The tone produced takes up a lot of space, and stamps its authority in any setting, especially when the amp's negative feedback is set to 'off'. This is a sound with a lot going on… a lot of lows, a lot of mids, and a lot of highs. The EQ in this mode is also extremely powerful. For a more sociable sound, try running the **MIDDLE** EQ higher and the **BASS** lower. Then again, you know what this mode's begging for: Run the **BASS** at about 2 O'clock, the **MIDDLE** at 10, and the **TREBLE** at 1 O'clock… and stand back.
Just be careful >:-|

6. Other Preamp/FX Features

6.1. Gain Trim

Phew! That wasn't too bad now was it?

OK, now that we've covered the preamp voicings, we now turn our attention to the high mode **GAIN TRIM** located on the rear panel. This trimmer adjusts the gain for the High mode for all 4 channels. The isolated sounds initially designed for the Revelation were done so with the gain trimmer all the way down. This design provides more than enough *useable* gain, especially in Channels 3 and 4. However, the high mode **GAIN TRIM** was included for a few reasons.

Firstly, Channels 1 and 2 are definitely tamer than Channels 3 and 4. Because of the fact that Channels 3 and 4 can be used for something other than High gain the option has been given to allow the gain for Channels 1 and 2 to be cranked to create a serious high gain lead sound. For example, you could use Channel 4's Low gain mode for a dark jazzy clean, Channel 3's Mid Gain mode for a rock crunch, Channel 2's Mid gain mode for a vintage spongy rhythm sound, and Channel 1's High gain mode (with the **GAIN TRIM** turned up) for a vintage lead sound.

Secondly, we know that there are always going to be people who want more. A word of caution would be to watch out for microphonics and feedback. If you're using the high gain mode of Channels 3 or 4, and you've got the **GAIN TRIM** maxed, the output volume very high (driving the power amp into distortion), and the presence and treble set high, you may experience microphonics and feedback. This is not a problem with the amp as such, and can be tamed by backing off the settings a little bit.

6.2. Dual Master Volumes

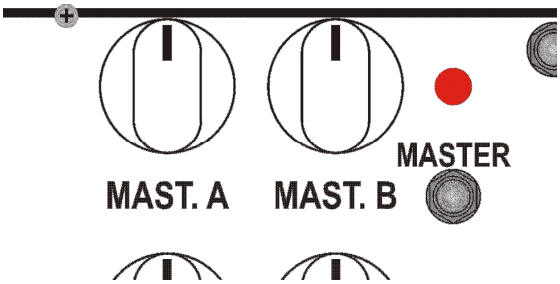

Figure 6-1 Master Volumes

The Revelation features dual Master volumes, **MAST. A** and **MAST. B**. These two controls allow you to set up two stage volumes. There are a few ways that you can use these.

Firstly, you can use this feature for a lead volume boost.

Secondly, you can use the alternate Master volume as level compensation if you switch from Low gain mode to Mid gain or High gain modes, particularly in channels 1 and 2. Remember that this mode switching can be done if you're using the amp in MIDI mode. Switching between these modes can increase the output volume quite a bit, so having an alternate Master volume control can be quite handy in this situation.

To toggle between the two Master volumes, simply press the heavy duty toggle switch located to the right of **MAST. B.** You can also toggle using the optional foot controller. When **MAST. B** is active, the red LED next to it will be active. If the red LED is off, then **MAST. A** is active.

6.3. FX Loops

The Revelation is probably the first amplifier in the world to include an integrated FX switcher. This revolutionary feature puts the Revelation in a league of its own, making it an even more formidable package for live applications.

Two different types of FX loops are offered with the Revelation, namely *standard* and *pro* loops.

Standard Loops

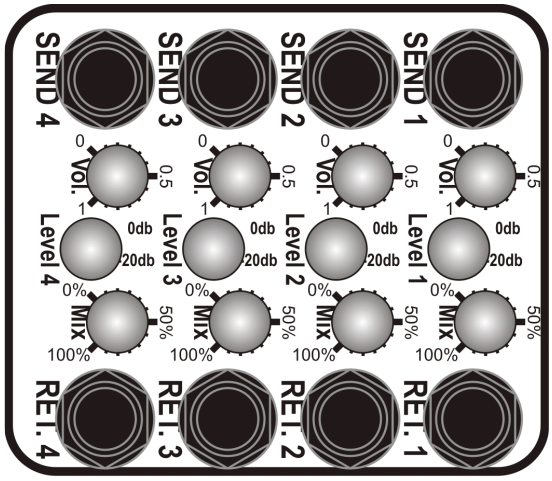

Figure 6-2 Standard FX Loops

The standard loops are series loops. You can identify your loop by seeing if the volume ('Vol.'), global level ('Level') and Mix controls are installed. If these are not installed, then the FX loop is a standard loop. Just for the record, it is possible to mix different loop types, so not all loops need to be pro or standard.

For standard loops, the send level is effectively the volume control of each channel. By keeping the volume of each channel low (below 10 O'clock), you can use guitar level effects. If you're using line level effects, such as rack gear, then the channel volume controls should be set to 12'Oclock or higher. Obviously, your channel's volume control will affect the signal level going to all 4 loops.

It should be noted that although the FX loop section of the Revelation is tube driven and also has a tube recovery circuit, each of the standard loops is not individually buffered. You can think of the standard loops as a tube driven true bypass strip. So just as with a true bypass strip, the order of effects is important, and effects can interact and load each other. This is especially the case when one FX unit has high output impedance, and the FX unit in the subsequent loop has low input impedance.

Pro Loops (Optional)

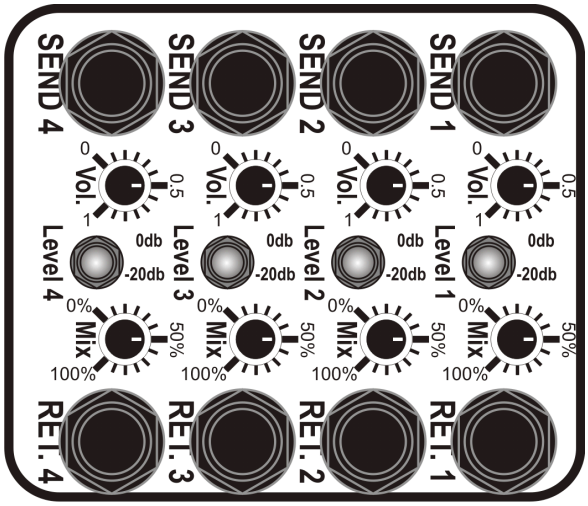

Figure 6-3 Pro Loops

The pro loops are ultra transparent, high quality, individually buffered loops. This alleviates any issues with FX loading as mentioned above. On top of this, each loop can be set to operate at line level (for pro rack gear) or guitar level (for standard guitar equipment). This allows you to mix and match the effects and effect orders to your liking. There is a further send level ('Vol.') control for adjusting the volume of each loop. The addition of this level control means that the loop can be set to have a volume cut or boost when it's engaged. This allows you to:

1. Adjust the level of the loop to compensate for loud or quiet FX units
2. Have an automatic volume boost for some effects (e.g. if you only use a delay pedal for loud lead sounds, why not set the level of the loop with the delay pedal to a higher volume, so that as soon as you turn on the delay loop, you also have a volume boost)
3. Use the loop as a standalone volume cut or boost. When no FX are plugged into the loop, the send and return jacks are bridged, allowing you to use the loop's Volume control.

There is also a Mix control for adjusting the blend of the dry signal with the FX (wet) signal, so that the loops can operate as either a series or parallel loop.

The Revelation comes with standard loops, unless your amplifier is custom ordered with one or more pro loops. For many guitarists, having 4 assignable series loops is enough. But if you want the ultimate in flexibility and audio quality, the Pro loops are the way to go.

If at any time you want to upgrade, please contact us. Changing loops is a fairly simple procedure and can be done by any competent amp tech. Alternatively, we'd be more than happy to do the upgrade for you.

To set up a Pro FX Loop

- Connect the input of the FX unit to the FX send. Connect the output of the FX unit to the FX return.
- Select the correct operating level for your effect, namely line level (0db) for professional FX or guitar level (-20db) for guitar stomp boxes.
- Set the send level of each loop to the desired level. If you leave the level at 0.5, this is the neutral setting. More than this, and you'll have a volume boost, and below this you'll have a volume cut.
- Finally set the Mix control. To use the loop as a series loop, set the mix to 100%. Below this, the loop operates as a parallel loop.

To assign and activate an FX Loop (Standard or Pro)

- Toggle the individual front panel FX loop button so that the corresponding yellow LED is activated. This means that your FX is assigned for use with this channel or MIDI patch. However this does not mean that your effect is currently *active*. Each channel or patch can use any number of FX loops.
- To activate your assigned FX loops, you must toggle the "**FX**" button on the front panel, or press the "**FX**" button on the optional 6 button foot controller, which will activate the green FX LED. When this LED is on, it indicates that your pre-assigned FX loops are active. To De-activate the pre-assigned FX loops, toggle the **"FX"** button again.

An important to note is that each loop is configured so that if nothing is connected to send and return, and the loop is switched on, the signal will be internally routed from the send to the return when the FX loop is switched on. This is a precaution so that just in case you forget to plug your FX unit into the loop, switching the loop on won't result in audio dropout.

To connect an external preamp into the power amp of the Revelation

- Assign FX loop 4, by turning on its yellow LED.
- Connect the preamp output to the FX loop 4 return.
- Set the operating level of FX loop 4 to match the output level of your preamp.
- Activate FX loop 4, but turning on the green FX LED

7. Power Amp

7.1. Introduction

Given the flexibility and huge sonic palette of the Revelation's preamp and FX loops, it was only fitting that a power amplifier be created with unparalleled flexibility.

For starters, you can use configure the power amplifier to use most of the popular octal based power tubes, including KT100, KT90, KT88, KT77, KT66, 6550, EL34, 6CA7, 6L6, 6L6G, 6L6GA, 6L6GB, 6L6GC, 5881, 6V6 and 6K6 power tubes. To accommodate for this, the Revelation is equipped with external bias pots and test points to facilitated fast and simple tube swapping, as well as a **TUBE SELECT** switch to optimise the power supply for various groups of tubes.

Next, the amp's high voltage supply can be set to 3 different levels with the **OUTPUT POWER** switch, like a built in variac (which only affects the high voltage supply). This allows you to adjust the output power of the amplifier to achieve a different feel. Even if you're playing at low volumes, changing the **OUTPUT POWER** setting will affect your tone, since the high voltage supply also powers the preamplifier.

On top of this, the screens of the power tubes can be wired up to create a pentode or a triode configuration, which not only affects the output power of the amplifier, but also the feel.

Finally, the amount of power amp negative feedback can be changed from high to low to off, giving you different levels of output power response.

In total, there are 15 power amp configurations available for any given set of power tubes.

If that wasn't enough, a bias configuration option is also offered which allows you to choose between fixed bias, cathode bias, and cathode dynamic modes. This increases the permutations of power amp circuits to 39 different configurations. The most significant advantage of this option is not the variation in output power, but rather the different feel which it imparts to the amplifier, making it much more lively and 'vintage' sounding (especially the dynamic mode).

7.2. Presence, Depth and Feedback Level (F.B)

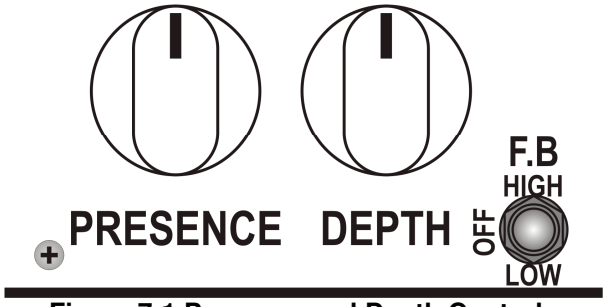

Figure 7-1 Presence and Depth Controls

The **PRESENCE** and **DEPTH** controls on the Revelation are very important controls. They are controls which regulate the high and low frequency feedback of the power amplifier. It is best to think of these controls are the final tuning stage for your overall sound. I have designed these controls to have a substantial range of operation, but I still feel that it is important to use these judiciously.

An important thing to note is that the **PRESENCE** and **DEPTH** controls are active controls. They in fact do not 'cut' at their respective frequencies, but rather *boost*. This means that in reality, the 'neutral' position for these controls is all the way down, and this is a good place to start when setting up your own sound. This will provide you with a (theoretically!) flat frequency response from your power amplifier.

***MI**: In my own personal approach to these controls, I think of them as controls which 'compensate' for the character of your speakers or acoustic environment. So for example, if you find yourself using a cabinet with poor low frequency response, then increase the **DEPTH** to compensate for this. Same for the high frequencies, but this time with the **PRESENCE** control. Using this approach, I have never found that I've needed to run either control above 12 O'clock, but as I mentioned, this is just my personal approach.*

Another distinguishing feature of the Revelation is the ability to select different feedback levels. When the Feedback Level (**F.B**) is set to high, a large signal is fed back into the phase inverter. This has three effects. Firstly, it makes the response of the power amp very tight and controlled. Secondly, it makes **PRESENCE** and **DEPTH** controls *extremely* active, so that their range is greatly increased. This is great if you intend on using the **PRESENCE** and **DEPTH** controls for more radical EQing. Thirdly, it reduces the overall gain of the power amplifier, so you will hear a drop in volume. It then follows that when the **F.B.** is set to low, the response of the power amp will get a little bit looser, the **PRESENCE** and **DEPTH** controls will have a reduced effect, and the output volume of the amplifier will increase slightly. This setting is the best setting for the vast majority of situations, and should be your first port of call.

Finally, with the Revelation, you have the ability to completely disable power amp feedback. This is done with the **F.B.** switch in the middle (off) position. In this setting, the power amplifier has no negative feedback, and so the **PRESENCE** and **DEPTH** controls have no effects. In this mode, the inherent character of different types (and brands) of power tubes becomes very prominent, as well as the open-loop response of the output transformer. The sound is loud, bold and raw. It's a great compliment to Channel 4's Mid and High gain modes.

7.3. Output Power

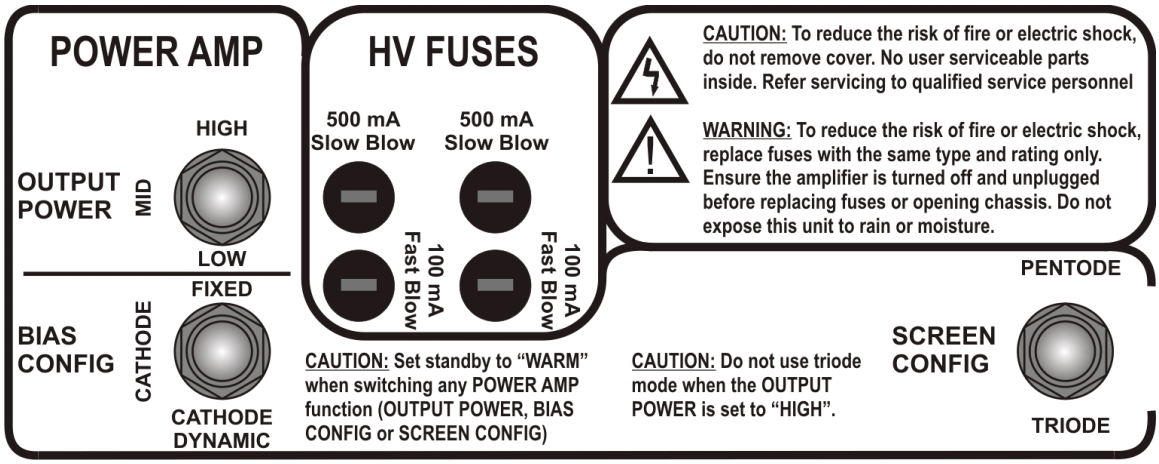

Figure 7-2 Rear panel Power amp controls a) Output Power b) Bias Config c) Screen Config

The next feature of the Revelation's power amplifier is the ability to vary the **OUTPUT POWER**. This is achieved by varying the internal high voltage supply. This has the effect of applying a 'variac' only to the power amp's high voltage supplies, whilst leaving all the other supplies operating at their correct voltages. This means that by using the lower power options, you are not damaging your tubes by operating them with an insufficient heater voltage (for example).

It's important to note that you should put the amp standby in the "Warm" position when switching **OUTPUT POWER**, as this will reduce the stress on your power supply.

I'd suggest that the **OUTPUT POWER** be set to high if you intend on using the power amp 'clean', and you're generating your tone in the preamp. This will maximise your headroom and dynamic range.

The Mid setting for the **OUTPUT POWER** is a great compromise in terms of performance. It means that you can get a little bit of power amp clipping at gigging volume without stressing out the power tubes.

In the Low setting, the high voltage is reduced for the preamp, as well as the power amp. This means that there is a slight difference in preamp tone as well, with the sound clipping quicker and feeling more compressed.

An important note about Power Tube Distortion and OUTPUT POWER Setting

The Revelation's power amplifier was designed so that when the **OUTPUT POWER** is set to "High", assuming also that your tubes are biased correctly, should not exceed any of their ratings for clean playing. This is generally the guidelines which all of the classic amps followed. The assumption on the part of the designer is that the amp will only ever be used clean. Believe it or not, amp designers in the 50's and 60's (and even into the early 70's) assumed that guitarists were going to play their amps clean. That's why (for example), many amps had high and low inputs... because the amp designers assumed that if a guitarist plugged into the high input and got distortion, they would automatically swap over to the low input to avoid this rather 'unmusical' phenomenon. What they didn't realise was that guitarists were going to turn their amps up, plug into the high input, and let it rip, far exceeding the rated specs of the power tubes.

So what's a responsible amp company to do? Nothing actually! They just let musicians blow tubes on a regular basis.

However, a light at the end of the tunnel eventually came with master volume amp, which allowed guitarists to get distortion in the preamp, without having to overdrive the power amp. Eventually, more gain was added to preamp designs to match and to even exceed the distortion levels attainable by cranked vintage 'clean' amps.

Now, the Revelation is an interesting class of amp. It has a huge amount of preamp distortion available, so you can get all the distortion you need from the preamp. I would suggest that this is the best way to use the amp to maximise tonal diversity, since the power amp stays 'neutral' and each of the radically different preamp voicings comes through without too much colouration. But I also wanted the amp to bridge the gap between vintage and modern. In other words, power tube distortion is not something we try to discourage. Go for it!

Where we're making a decision to be different is by telling you what every amp company should be telling you anyway: If your tubes are already at their technical limits for clean playing, then by overdriving the power tubes, you will push your tubes over their maximum ratings.

If playing by the rules is important to you, and power tube distortion is more your thing, my recommendation would be to run the **OUTPUT POWER** in "Medium" or "Low"

7.4. Screen Config.

The third aspect of the Revelation's power amp design is the **SCREEN CONFIG** switch. This switch changes the manner in which the power tubes are wired up, allowing the user to select "Pentode" or "Triode" configuration.

"Pentode" configuration has the boldest response. The power tubes operate more efficiently, delivering their full power capacity. "Triode" mode is less efficient, typically halving the output power compared to Pentode configuration. It also has a softer sound, and a slightly narrower dynamic range, which makes it a great choice for 'vintage' tones.

Now the observant among you will note that not all tube types which can be accepted by the Revelation are true pentodes. Quite a few are in fact beam power tetrodes or kinkless tetrodes. So strictly speaking, Pentode mode is not really Pentode mode for some tubes. However, the sonic results are the same.

An important note about using the Triode mode: **Do not use the Triode mode if the OUTPUT POWER is set to HIGH and the tube type is classified as LARGE**. If you do, then there is a good chance that at the very least, you will blow some fuses. More likely, you will blow your tubes. In the worst case scenario you can damage the amplifier. Remembering the classification of the tubes may not be easy, so if you're more comfortable, just don't use Triode mode with high power for any tubes.

7.5. Bias Config. (optional)

The optional **BIAS CONFIG** nearly triples the number of power amp configurations. However, the main impetus for adding this option was not to simply give you another way of varying output power, but rather to give you a different type of power amp.

The standard Revelation power amp is **fixed biased**. All things being equal, this configuration is the most efficient, producing the most output power. The tone is punchy and edgy, with more top end than the other configurations.

The **Cathode Biased** option is similar to the configuration found in many of the lower powered 'vintage' amps. The amplifier's tone is smoother, with a more controlled low end compared to **fixed bias**.

***MI**: I feel the most effect with this mode on the clean sounds. The clean sounds gain more complexity and detail. The **PRESENCE** and **DEPTH** controls are still very active in this mode.*

The **Cathode Dynamic** mode is the lowest power mode of the three, and configured slightly differently to typical cathode biased configurations. The resulting tone is extremely smooth and has a very subtle transition from clean to overdrive. This makes this mode extremely touch sensitive, with a wonderful harmonic swirl. Once again, this is best appreciated with clean sounds, especially when the master volume it turned up to the point where the power amp is about to clip. This creates an almost 'compressor' like feel.

Since both cathode biased configurations run the tubes much hotter than the fixed bias configuration (this is what is commonly referred to as 'Class A'), the Revelation automatically disables the High Power mode so as not to overload your tubes. Even if you have the **OUTPUT POWER** set to "High", internally the amplifier will switch the **OUTPUT POWER** down to medium.

7.6. Power Tubes

Given the fact that there are a huge number of valves which will work with the Revelation, it's probably a good idea to give you a designer's insight into the various tube types.

Firstly, output power. The tables below is a summary of typical output power of the Revelation with various types of current production tubes, grouped into large, medium and small tubes. You can refer to these tables to find out roughly how much output power you can expect from various tubes and configurations. We measure output power at the onset of clipping, which is well below the industry standard of 5% THD. In other words, these output powers are rather conservative.

Table 7-1 Typical output power for large tubes

Output Power	High	High	Mid	Mid	Mid	Mid	Mid	Mid	Low	Low	Low	Low	Low	Low
Screen Config.	Pent.	Tri.	Pent.	Pent.	Pent.	Tri.	Tri.	Tri.	Pent.	Pent.	Pent.	Tri.	Tri.	Tri.
Cathode Config.	Fixed	Fixed	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.
KT100	100	N/A	40	20	35	20	15	15	20	11	19	10	6	7
KT90	100	N/A	45	20	40	20	15	15	25	9	22	10	7	8
KT88	100	N/A	40	20	35	20	15	15	20	11	19	10	6	7
6550A	90	N/A	35	25	30	20	10	15	20	11	15	10	6	7

Table 7-2 Typical Output Power for Medium Tubes

Output Power	High	High	Mid	Mid	Mid	Mid	Mid	Mid	Low	Low	Low	Low	Low	Low
Screen Config.	Pent.	Tri.	Pent.	Pent.	Pent.	Tri.	Tri.	Tri.	Pent.	Pent.	Pent.	Tri.	Tri.	Tri.
Cathode Config.	Fixed	Fixed	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.
EL34	70	30	45	15	35	20	10	15	25	6	17	9	6	7
6L6GC	65	25	40	15	30	10	10	10	15	5	12	5	3	4
KT66	55	25	35	15	30	15	10	10	15	7	15	6	4	4
KT77	60	25	35	20	30	15	10	15	20	7	15	7	5	6
6CA7	65	25	40	10	30	20	15	15	20	7	18	9	6	7
5881WXT	55	20	35	15	30	15	10	10	15	7	14	6	4	4
6550	70	35	45	15	35	20	10	15	25	7	19	9	5	7

Table 7-3 Typical Output power for small tubes

Output Power	High	High	Mid	Mid	Mid	Mid	Mid	Mid	Low	Low	Low	Low	Low	Low
Screen Config.	Pent.	Tri.	Pent.	Pent.	Pent.	Tri.	Tri.	Tri.	Pent.	Pent.	Pent.	Tri.	Tri.	Tri.
Cathode Config.	Fixed	Fixed	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.	Fixed	Cath. Dyn.	Cath.
6L6/G/ GA/GB	40	15	20	10	15	6	4	4	6	3.2	5.1	2	1.5	1.6
5881	40	15	20	10	15	6	3	4	6	2.7	3.9	1.6	1	1.3
KT66														
6V6	22	8	12	10	10	4	2.5	3.1	3.8	2.8	3.4	1.2	0.8	0.9
6K6	17	6	9	N/A	N/A	3	N/A	N/A	2.7	2	2.2	1	0.5	0.7

The figures above are indicative, and real life variations will occur. The reasons for these variations are:

- Mains voltage: It's normal for the AC voltage coming out of the wall to vary for a number of reasons. For example, here in Australia, mains regulation is notoriously bad. We have measured voltages as low as 215V, and as high as 265V coming from domestic outlets. We have also heard stories of voltages as high as 275V. This variation alone can result in power variation of 50%!
- Tube brand: Different tubes by different manufacturers will produce different output powers. Some of the tube types are more consistent than others, but others (such as current production KT66s) can have a huge variation in performance from one brand to the next.
- Tube Life: as tubes age, their performance will change, and result in a drop in output power.

You will also notice that some tubes seem to be repeated in different tables. This is due to:

- Slight differences in tube models (e.g. a 6L6GC is a medium sized tube, and has different performance characteristics and ratings compared to other 6L6 models).
- Inconsistent performance from different manufacturers. The KT66's are a good example of this. Some are very rugged, and can run (as they should) as medium tubes, while others

seem to be a lot more sensitive, and burn out very quickly. So it's best to consider these more sensitive tubes as 'small' tubes.

7.7. Discussion about Large Size Tubes

KT88

- Classification: Large
- Maximum output power: 100W
- Consistency: This tube's performance is fairly consistent from one manufacturer to the next, although each manufacturer's tube has its own tone.
- Use: The KT88 is a mammoth sounding tube. It's a great tube to use clean, and great for higher gain sounds. It has a tremendous amount of low end, and with the negative feedback off, sounds very aggressive

KT90

- Classification: Large
- Maximum output power: 100W
- Consistency: I am only aware of two manufacturers who currently make this tube.
- Use: The KT90 is very similar in tone to the KT88. However, the improved power handing of both plate and screen make this tube even sturdier. To my ears, it's not quite as big sounding as the KT88, but close.

KT100

- Classification: Large
- Maximum output power: 100W
- Consistency: I am only aware of one manufacturer who currently makes this tube.
- Use: The current KT100 seems to be a dressed up KT88, and I don't see the need to go out of your way to try it. But hey, don't let me stop you.

6550-A

- Classification: Large
- Maximum output power: 90W
- Consistency: These tubes are of average consistency from one manufacturer to the next.
- Use: Firstly, we should distinguish this tube, which has a 42W plate dissipation rating from the standard 6550, which has a 35W plate power handling (and is classified as Medium size tube). A proper 6550A should actually be different from the KT88, although people think of them as basically the same thing. To my ears, the 6550-A is really a 6L6GC on steroids, and performs as such. This is a great tube if you like the 6L6 tone, but just want more power handling. The low end on these is not quite as big as the KT88.

7.8. Discussion about Medium Size Tubes

6550

- Classification: Medium
- Maximum output power: 70W
- Consistency: These tubes are of average consistency from one manufacturer to the next.
- Use: Strictly speaking, a 6550 has a 35W plate dissipation rating, and is thus a 'medium' size tube. However, some manufacturers make them to 6550-A specs, but neglect to label

them as such. Here we are referring to the 'proper' 6550. Once again, this is like a super sturdy 6L6GC. It's very hi-fi sounding.

EL34

- Classification: Medium
- Maximum output power: 70W
- Consistency: These tubes are of average consistency from one manufacturer to the next.
- Use: This is the classic British Rock tone. It's one of my favourites. If you find that you leave on Channels 2 and 3 most of the time, and don't mind prominent mids for Channels 1 and 4, then this is the tube to go for. This is also a great tube to overdrive. The only issue is that they tend to have fragile screens. There also seems to be a relationship between brands with high output power and fragile screens. So rather interestingly, it's the lower output power tubes which seem to have better survival rates.

6L6GC

- Classification: Medium
- Maximum output power: 65W
- Consistency: These tubes are of average consistency from one manufacturer to the next.
- Use: This is probably my favourite tube for the Revelation. A good 6L6GC will sound very hi-fi, which to my ears, is a good backbone tone to build the preamp tones on. These tend to be more sturdy than the EL34, and the plates can handle a touch more power. Overdriven, they are a bit woollier sounding than EL34s, and a bit less precise in the low end. But I think they sound great!

6CA7

- Classification: Medium
- Maximum output power: 65W
- Consistency: I've only tried one brand of these.
- Use: These tubes are meant to be close to an EL34, and perhaps it's purely psychological, but because they look a bit more like 6L6s, I think I can hear some of that in the tone!

KT77

- Classification: Medium
- Maximum output power: 60W
- Consistency: These tubes are of average consistency from one manufacturer to the next.
- Use: The datasheets, and the physical look of these kinkless tetrodes clearly highlight the fact that these tubes are meant to be EL34 drop replacements. There is some similarity in the tone, but they also have their own thing going on. Their output power is not quite as high as EL34s (in the Revelation at least), but they do have an intriguing, slightly more complex tone.

KT66

- Classification: Medium
- Maximum output power: 55W
- Consistency: These tubes are inconsistent from one manufacturer to the next.
- Use: This is a really weird one. These tubes are becoming more popular these days, but I have some mixed feelings about them. Some have performed very well, producing up to 65W output power, and have been fairly reliable. Others barely manage to put out 45W of power, and behave rather strangely. Others sit right in the middle, have a great tone, but

seem to be rather unreliable. Upon closer inspection, it seems that the ones that produce the most output power have a physical structure more like 6L6s. Are these 6L6's in a different shape bottle? They certainly sound like it! The ones that sound distinct are the mid power ones. Their internal structure looks fairly authentic. However, and this could be just a current production issue, they are fairly unreliable. In fact, it's probably safer to use these as 'small' tubes in order to avoid blowing them. But they sound wonderful! They're like a smoother, fatter 6L6, and overdrive beautifully.

5881WXT

- Classification: Medium
- Maximum output power: 55W
- Consistency: These tubes are fairly consistent from one manufacturer to the next.
- Use: These tubes sound similar to 6L6s, but have slightly less output power. Most modern manufactures state that they are interchangeable for 6L6 (GC) tubes, but in my experience, they have a slightly different performance. These should not be confused by lower rated 5881 tubes, which are classified as small tubes.

7.9. Discussion about Small Size Tubes

KT66

- Classification: Small
- Maximum output power: 35W
- Consistency: See above
- Use: Just to be on the safe side, I would suggest that KT66s be used in the Revelation as small size tubes. See my notes above about tone.

5881

- Classification: Small
- Maximum output power: 40W
- Consistency: Fairly consistent.
- Use: Most 5881s produced today are in fact the higher rated 5881WXT type, but at least one manufacturer has started making the older type. These sound a fairly bubbly with a woolly low end.

6L6/G/GA/GB

- Classification: Small
- Maximum output power: 40W
- Consistency: That's tricky! See below
- Use: Most current 6L6 tubes are in fact 6L6GC spec. Some manufacturers even categorically state that these tubes are 'upgraded' to GC spec. But strictly speaking the 4 types listed above are a lower rating. Unless you're sure that the 6L6 is a GC, or at least GC spec (500V plate supply, with a 30W plate dissipation rating), then use these tubes as 'small' tubes. They sound great. They are a little bit more compressed when run at these lower powers.

6V6

- Classification: Small
- Maximum output power: 20W
- Consistency: I have only tried two brands, and they were both good.

- Use: This is my favourite small tube. It's a very warm sounding clean, and has a very fat low end when overdriven. Let's face it. If you're choosing the 6V6 for the Revelation, it's not for clean headroom. You are probably wanting to overdrive the power amp. I'd suggest leaving all 4 channels in low gain, and adjusting the power amplifier to get the clipping happening at a reasonable volume for your situation. From there use channel settings and your guitar's volume control to adjust the amount of dirt. This is also a great tube to try with the bias configuration option, as 'class A' seems to really suit it.

6K6

- Classification: Small
- Maximum output power: 17W
- Consistency: only available as NOS, and rather inconsistent.
- Use: This is the smaller brother of the 6V6, and still available, although it's been out of production for a while now. The tone is similar, but it's a lot more fragile than a 6V6. You can't use cathode biased or cathode dynamic modes with this tube in mid power mode, as you'll overload them and burn them out.

Important Note for 6V6 and 6K6 Tubes:

Because these tubes have much lower plate power handling than other tubes in the 'small' category, the speaker load needs to be connected in a particular way. In order not to overload these tubes, their speaker load should be doubled. In other words:

- If the total speaker load is 16 Ohm, connect your speaker(s) to the 8 Ohm speaker output of the Revelation.
- If the total speaker load is 8 Ohm, connect your speaker(s) to the 4 Ohm speaker output of the Revelation.
- If the total speaker load is 4 Ohm, connect your speaker(s) to the 2 Ohm speaker output of the Revelation.

8. Speaker outputs, Slave Output

The Revelation features a full suite of speaker outputs. The revelation can drive 16Ohm, 8Ohm, 4Ohm or even 2Ohm loads. For best performance, it is recommended that you use the correct load connected to the speaker outputs.

Very important!!! **YOU MUST ALWAYS HAVE A SPEAKER LOAD CONNECTED TO THE AMPLIFIER.** Failure to do so will almost certainly result in damage to the amplifier.

The available configurations can be summaries are follows[*]:

- To connect two 32 Ohm cab, connect them to two 16 Ohm speaker outputs.
- To connect one 16 Ohm cab, connect it to the 16 Ohm speaker output.
- To connect two 16 Ohm cabs, connect them to two 8 Ohm speaker outputs.
- To connect one 8 Ohm cab, connect it to the 8 Ohm speaker output.
- To connect two 8 Ohm cabs, connect them to two 4 Ohm speaker outputs.
- To connect one 4 Ohm cab, connect it to the 4 Ohm speaker output.
- To connect two 4 Ohm cab, connect them to the two 2 Ohm speaker outputs.

The Revelation also includes a **SLAVE OUTPUT** with a level control. This takes the output after the power amplifier, which you can then send to another power amplifier for further amplification. The advantage of this is that unlike a preamp output, you also get the sound of the power amplifier, so that the characteristics of the power amplifier (such as **PRESENCE** and **DEPTH** settings) are also captured. When using the **SLAVE OUTPUT** you still need to make sure that you have a proper load connected to the speaker output.

[*] Refer to Important Note for 6V6 and 6K6 Tubes

9. Configuring and Programming the Revelation

In order to ensure that the Revelation can be integrated in to any system, both MIDI and non-MIDI control systems are supported. The non-MIDI operating mode is referred to as the **STANDARD MODE.** Both **STANDARD MODE** and **MIDI MODE** are accessed by the **PROGRAM** momentary toggle switch on the Revelation's front panel.

9.1. Standard Mode

Firstly, **STANDARD MODE** is indicated by the program/MIDI Mode LED being off. This means that MIDI control is inactive. You can toggle between **STANDARD MODE** and **MIDI MODE** by toggling the **PROGRAM/MIDI MODE** button. The blue LED next to the **PROGRAM/MIDI MODE** button will indicate the Revelation's operating mode.

In **STANDARD MODE**, the Revelation behaves very much like a normal multi-channel guitar amplifier. All options can be accessed via the front panel toggle switches. Alternatively, you can control the amplifier with the optional 6 button controller.

To set up the amplifier in **STANDARD** MODE, follow these steps:

1) For each channel, set up it's 3 position mode switch to the desired gain mode. Adjust the controls to your liking, keeping in mind how you'd like the relative volumes of each channel to be set.
2) If you'd like to, set up the alternate Master volume **MAST. B** with the desired volume boost or cut. To hear the difference in volume between the **MAST. A** and **MAST. B** settings, toggle the front panel **MASTER** switch. The red LED next to **MAST. B** indicates that **MAST. B** is active.
3) Finally with each channel selected, assign the FX loops you'd like to use with this channel by toggling their respective front panel switches so that their yellow LED is turned on. Each channel will remember which FX Loops you have assigned. These will not become *active* until the green FX LED is on.

There you go! Wasn't too bad now was it? Now your amp is ready for use in **STANDARD MODE**.

If you're using the optional 6 button foot controller, first make sure that you connect the 8 pin rear panel socket. Once this is done you can control the Revelation as follows:

1) To activate any channel, press its respective footswitch. That channel's footswitch and front panel LEDs will light up to indicate that this channel is now active.
2) To toggle between master volumes, press the Master Select footswitch. When the front panel and footswitch LED is on, this indicates that **MAST. B** is active. When you change channels, the status of the Master Select will not change.
3) To activate the pre-assigned FX loops, simply press the FX select footswitch. This will light up the Green FX LED on the front panel as well as the footswitch controller. If the FX are on and you change channels, the pre-assigned loops for the new channel will become active, and the pre-assigned loops for the old channel will become inactive.

9.2. MIDI Mode

This operating mode allows you to have more flexibility when using the Revelation. In this mode, you can store 128 different programs. For each program you can store:

- Channel
- Gain mode for that channel
- Master Select
- Assigned FX loops
- FX activated

To access MIDI mode, toggle the **PROGRAM/MIDI MODE** button on the front panel, so that the Blue Program LED is on. Obviously, you also need to make sure that your MIDI controller is connected to the 5 pin MIDI socket on the rear panel of the amplifier.

Setting the MIDI Receive Channel

To set the MIDI receive channel:

- First, you should be in MIDI Mode (blue program LED should be on)
- Press the **PROGRAM/MIDI MODE** button, and keep holding it.
- Whilst the **PROGRAM/MIDI MODE** button is depressed, send a MIDI program change message from your MIDI controller. The Revelation will ignore the message, but will pick up which channel the message was sent on, and will set its MIDI channel to this value.

Now your MIDI receive channel is set.

Editing and Storing a Program

Follow these steps to edit and store a program.

- User your MIDI controller to send a program change message. The Revelation will then load these program settings from its memory.
- Choose your channel, mode, Master, Assigned FX loops and global FX on or off. If your settings are different from the original loaded program, **the blue program LED will flash**.
- If you want to store the program, press the **PROGRAM/MIDI MODE** button for a few seconds until the blue program LED stops flashing. This indicates that your program is now stored in the internal memory.
- If you decide that you do not want to store your new settings, then use your MIDI controller to send a program change message. This will then discard your settings, and load the program from internal memory instead.

10. For Your Amp Tech - Changing and Biasing Power Tubes

10.1. Preparing the Amplifier

- Unplug the power cord from the amplifier.
- Make sure that the power switch is off.
- Make sure that the standby switch is in the 'Warm' position.
- Give the amplifier a few minutes for the power capacitors to discharge and for the tubes to cool down.
- Unscrew the rear grill and remove the old power tubes by rocking the tubes from their base. Do not do this from the tube glass.

10.2. Selecting Tubes and Setting the "Tube Size" Switch

- It's preferable to start with a matched set of tubes. Ideally, they should be matched for DC (bias voltage) and AC (transconductance) performance.
- Set the power tube size switch to the appropriate size. **THIS IS VERY IMPORTANT**.
- Do not 'downsize' your tube size selection (e.g., use a mid-size tube option for large tubes). You will damage your tubes.
- The table below gives you a guide for the tube size selection for the most common type of octal tubes.

Tube Size	Plate Power Rating	Tube
"Large"	Greater than 35W	6550A, KT88, KT90, KT100
"Mid"	Between 25W and 35W plate power dissipation	El34, 6L6GC, 5881WXT, 6CA7, KT66, KT77, 6550
"Small"	Less than 25W	6V6, 6K6, 6L6, 6L6G, 6L6GA, 6L6GB, 5881

What other Tubes can be used?

The list above is not an exhaustive one, but covers the majority of currently available power tubes which are suitable for the Revelation. However, if you'd like to experiment with different tubes, ensure that you have the datasheet for the tubes, and that the tube meets these criteria:

- Be a standard octal tube.
- Have the following pin-out:
  1. No connection, Cathode or suppressor grid/beam forming grid/ "grid 3"
  2. Heater
  3. Plate
  4. Screen Grid (often referred to as "grid 2")
  5. Control Grid (often referred to as "grid 1")
  6. No connection
  7. Heater
  8. No connection, Cathode or suppressor grid/beam forming grid/ "grid 3"
- The cathode and grid 3 must be connected to either pins 1 or 8. Many tubes have the cathode and grid 3 internally connected, and joined to only one of the pins. This is fine.
- The plate dissipation rating of the tube is known.
- The tube is designed to run off 6.3VAC heater, with each tube heater drawing no more than 2A at 6.3VAC.
- The tube can handle roughly the same plate and screen voltages as the tubes in the groups above.

Once you have established that the tube meets all these criteria, select the tube size based on the following:

- If the plate dissipation rating is greater than 35W, and the plate can handle voltages of at least 600V, choose “Large”
- If the plate dissipation rating is between 25W and 35W, and the plate can handle voltages of at least 500V, choose “Mid”
- If the plate dissipation rating is less than 25W, choose “Small”

A note on NOS tubes

Whilst in no way undermining the proverbial mojo of NOS (New Old Stock) tubes, it’s important to make sure that you know exactly the tube you’re using. Many tube types went through years of evolution.

For example, the 6L6, first released in 1936, started out with a 19W plate dissipation rating, and a maximum plate voltage of 360V. Various versions and improvements were released, 6L6G, 6L6GA, 6L6GB, and finally the 6L6GC, with a plate dissipation rating of 30W, and a maximum plate voltage of 500V. The 6L6GC is the tube on which the vast majority modern recreations are based. Many guitarists simply refer to these modern tubes as ‘6L6’ tubes, and hence assume that any tube labelled ‘6L6--’ will work just like a modern tube.

The moral of the story is, make sure you have correct information about your tube (new or NOS) before putting them into the Revelation, and potentially frying them!

A note on Modern tubes

Just as with NOS tubes, it’s important to know the exact details of the tube you’re about to put into the Revelation. Some manufacturers today use model number which are a bit ambiguous. If you are unsure about the exact ratings of the tube, contact the manufacturer, supplier or retailer to get a clear answer from them.

Having said that, most modern manufacturers base their current tube designs on the last version of tube produced. For example, most modern 6L6 tubes are in fact based on the 6L6GC. It would also seem that the internal structure of different modern ‘models’ are virtually identical, with perhaps a different glass shape or base colour. So for example, buying a whole bunch of different 6L6 ‘models’ from the same manufacturer is not necessary, and they will yield very similar tone and performance.

MI: *This brings up an interesting question. Which manufacturer is the best? That’s a very tricky question, and really not something I can answer. The reality of the situation is that tubes are an art-form. This, coupled with the fact that the tube manufacturing industry is not as competitive or ‘regulated’ as in the good-ole-days means that the variation in tone and performance from batch to batch is greater. Whilst I may have a preference right now as to tubes which I feel give the ‘best’ tone or performance (whatever that means), there’s no guarantee that in a year’s time, the tubes produced by the same company won’t be bad,… or that the company will be out of business!*

10.3. Biasing the Tubes

- Put tubes into the tube sockets.
- Plug the power socket in and connect the amplifier to a speaker or appropriate dummy load.
- On the front of the amp, make sure the amp is set as follows:
    - Standby is set to ‘warm’.
    - Nothing is connected to the input.
    - Mast A and Mast B are all the way down
    - Feedback switch is set to high
    - Presence and Depth controls are all the way down (anti-clockwise)

- On the rear of the amp, make sure the amp is set as follows:
    - Power is off.
    - Output power is set to “low”,
    - Tube Size is set to the appropriate tube size, as detailed above
    - If the cathode config option is installed, the switch is set to ‘fixed’, not ‘cathode’ or ‘cathode dynamic’
    - Screen config is set to ‘Pentode’
    - All bias controls are set to maximum (clockwise)
- Turn the amplifier on, and let the tubes warm up for a minute or so.
- Set your multimeter to DC millivolts (DC mV).
- Repeat the following steps for low, mid and high power:
    1. With the amp’s standby set to ‘Warm’ Put the red (positive) multimeter probe into the left red test point, and the black (negative) multimeter probe into the middle black test point. These test points are located between the power tubes.
    2. Set the amp standby to play. Monitor the voltage. It should read 0mV, or very close. If your reading exceeds 25mV, either:
        a. The bias pots were not turned up to their maximum position. Do this immediately
        b. The output power was set to ‘high’ and the screen config was left in triode. Set the screen config to pentode immediately.
        c. The tube size switch was not set correctly. Set the amp standby to ‘warm’, and check the tube size setting.
        d. The tubes are way out of standard spec, and are not appropriate for use with the Revelation.
        e. Failing all this, contact us.
    3. Turn the left bias pot for the appropriate output power down until the mV read on the multimeter reaches the desired setting. Please refer to the section below for appropriate bias settings for various tubes.
    4. Put the red (positive) multimeter probe into the right red test point. Repeat steps 1 and 2, but this time turning the right bias point for the appropriate output power down until the mV read on the multimeter reaches the desired setting.
    5. Double check and adjust the biases again, as there is a little interaction between the bias pots. Also, bias reading will drift for a minute or so after being set, so will need to be fine tuned after a minute or so.
    6. Once you’ve biased this power level, set the amp’s standby to warm before switching power level to the next setting.

Bias Setting Range for different tubes

There are many different opinions about the best method for biasing power tubes for class A/B amps. Each approach has its good points and bad points. The method outlined above is the simplest method. The Revelation was designed to be as easy to bias as possible, while giving you optimal performance for different power settings and tubes.

***MI**: Having said that, there are many schools of thought about what an appropriate bias current should be. I have no interest in getting involved in any of these arguments. Instead, I will outline the appropriate ranges based on experimental, as well as theoretical calculations and modelling. I have taken as many parameters into account as possible, including load impedance, operating voltages, transformer sag, screen and plate ripple voltages, mains regulations and output transformer losses. My main criteria are to:*

- *Minimise crossover distortion*
- *Remain within the maximum ratings for the tube across the full dynamic range.*

It’s important to note that these two are competing criteria, and in some scenarios (especially for the high power setting), there may need to be some compromise.

Overloading Tubes

The data in the tables below indicate the bias voltage readings for various tubes and configurations. These figures are derived from theoretical calculations, as well as experimental tests. The upper limit for each of range should give you maximum plate dissipation. However, running lower bias readings than this will result in less stress on the tubes, and longer tube life.

Having said this, a significant number of valve amps run their tubes significantly beyond the rated specs. A perfect example of this is the ubiquitous Marshall 'plexi' in its various forms. An EL34 in this amp typically ran with a maximum plate dissipation 30% above the maximum rating. No-one complained, nothing disastrous happened (tube life was presumably shortened and there would have been a higher fail rate) and the same power amp design has been in production for pretty much the last 35 years. Was this overloading part of the magic? Well, it's probably safest to say 'no comment'!

However, the ranges provided in the tables below will give you the maximum safe operating range. For example, you find that you have to run your EL34 at 26W maximum plate dissipation to get the best sound, the chances are it will run fine. You'll probably shorten the tube life slightly, but for most tubes, this is about the worst that will happen. Having said that, I've noticed that some tubes are a little more sensitive than other, and die spectacular deaths in situations where most of the compatriots have faired well. Playing with tubes is perhaps similar to Russian Roulette,…

Target bias readings for Large Tubes, High power

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio 'factory' settings
36	10mV		
37	10mV to 12mV		
38	10mV to 14mV		
39	10mV to 16mV		
40	10mV to 19mV		
41	10mV to 22mV		
42	10mV to 25mV	6550A, KT88, KT100	25mV
43	10mV to 28mV		
44	10mV to 31mV		
45	10mV to 35mV		
46	10mV to 38mV		
47	10mV to 41mV		
48	10mV to 44mV		
49	10mV to 47mV		
50	10mV to 50mV	KT90	35mV [25mV is better for extended tube life]

Target bias readings for Large Tubes, Mid power

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio 'factory' settings
36	15mV to 90mV		
37	15mV to 92.5mV		
38	15mV to 95mV		
39	15mV to 97.5mV		
40	15mV to 100mV		
41	15mV to 102.5mV		
42	15mV to 105mV	6550A, KT88, KT100	35mV
43	15mV to 107.5mV		
44	15mV to 110mV		
45	15mV to 112.5mV		
46	15mV to 115mV		
47	15mV to 117.5mV		
48	15mV to 120mV		
49	15mV to 122.5mV		
50	15mV to 125mV	KT90	50mV [35mV is better for extended tube life]

Target bias readings for Large Tubes, Low power

For large tubes in low power, you can set the bias current to pretty much anything within the range (above 15mV). We like to set our tubes between 25mV and 50mV for the best tone. For the factory settings, we like to set KT88s, KT100s and 6550A tubes to 35mV, and KT90's to 50mV. For extended tube life, we set KT90's to 35mV.

Target bias readings for Medium size Tubes, High power

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio 'Factory' setting
25	15mV to 25mV	EL34, KT66, KT77, 6CA7, 5881WXT	25mV
26	15mV to 28mV		
27	15mV to 32mV		
28	15mV to 36mV		
29	15mV to 40mV		
30	15mV to 44mV	6L6GC	30mV
31	15mV to 48mV		
32	15mV to 52mV		
33	15mV to 56mV		
34	15mV to 60mV		
35	15mV to 64mV	Older 6550's	30mV

Target bias readings for Medium size Tubes, Mid power

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio 'Factory' setting
25	20mV to 60mV	EL34, KT66, KT77, 6CA7, 5881WXT	30mV
26	20mV to 63mV		
27	20mV to 66mV		
28	20mV to 69mV		
29	20mV to 72mV		
30	20mV to 75mV	6L6GC	35mV
31	20mV to 78mV		
32	20mV to 81mV		
33	20mV to 84mV		
34	20mV to 87mV		
35	20mV to 90mV	Older 6550's	35mV

Target bias readings for Medium size Tubes, Low power

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio 'Factory' setting
25	20mV to 80mV	EL34, KT66, KT77, 6CA7 , 5881WXT	30mV
26	20mV to 84mV		
27	20mV to 88mV		
28	20mV to 92mV		
29	20mV to 96mV		
30	20mV to 100mV	6L6GC	35mV
31	20mV to 104mV		
32	20mV to 108mV		
33	20mV to 112mV		
34	20mV to 116mV		
35	20mV to 118mV	Older 6550's	35mV

Target bias readings for Small size Tubes, High power

For ‘small’ tubes, best performance is achieved if the load impedance is doubled for tubes with a plate power dissipation rating of 16W or lower. i.e., if your load is 16Oms, connect it to the 8Ohm speaker output, if it’s 8Ohm, connect it to the 4Ohm output etc. These rows are highlighted in the table below.

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio ‘Factory’ settings
8	10mV to 15mV	6K6	10mV
9	10mV to 18mV		
10	10mV to 21mV		
11	10mV to 24mV		
12	10mV to 27mV		
13	10mV to 30mV		
14	10mV to 33mV	6V6	15mV
15	10mV to 36mV		
16	10mV to 40mV		
17	10mV to 15mV		
18	10mV to 20mV		
19	10mV to 25mV	6L6, 6L6GA, 6L6GB	25mV
20	10mV to 30mV		
21	10mV to 35mV		
22	10mV to 40mV		
23	10mV to 45mV	5881	30mV
24	10mV to 50mV		

Target bias readings for Small size Tubes, Mid power

For ‘small’ tubes, best performance is achieved if the load impedance is doubled for tubes with a plate power dissipation rating of 16W or lower, i.e., if your load is 16Ohms, connect it to the 8Ohm speaker output, if it’s 8Ohm, connect it to the 4Ohm output etc. These rows are highlighted in the table below.

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio ‘Factory’ setting
8	10mV to 25mV	6K6	15mV
9	10mV to 29mV		
10	10mV to 33mV		
11	10mV to 37mV		
12	10mV to 41mV		
13	10mV to 45mV		
14	10mV to 49mV	6V6	20mV
15	10mV to 51mV		
16	10mV to 55mV		
17	10mV to 57mV		
18	10mV to 61mV		
19	10mV to 65mV	6L6, 6L6GA, 6L6GB	35mV
20	10mV to 69mV		
21	10mV to 73mV		
22	10mV to 77mV		
23	10mV to 81mV	5881	35mV
24	10mV to 85mV		

An important note about 6K6 tubes If you have the cathode configurations installed in the amp, do not use 6K6 in mid power with either of the cathode biased configurations (Cathode and Cathode Dynamic)

Target bias readings for Small size Tubes, Low power

For ‘small’ tubes, best performance is achieved if the load impedance is doubled for tubes with a plate power dissipation rating of 16W or lower. i.e., if your load is 16Oms, connect it to the 8Ohm speaker output, if it’s 8Ohm, connect it to the 4Ohm output etc. These rows are highlighted in the table below.

Plate Dissipation rating (W)	Bias Reading Range (mV)	Tube	MI Audio ‘Factory setting
8	10mV to 45mV	6K6	15mV
9	10mV to 50mV		
10	10mV to 55mV		
11	10mV to 60mV		
12	10mV to 65mV		
13	10mV to 70mV		
14	10mV to 75mV	6V6	20mV
15	10mV to 80mV		
16	10mV to 85mV		
17	10mV to 95mV		
18	10mV to 100mV		
19	10mV to 105mV	6L6, 6L6GA, 6L6GB	35mV
20	10mV to 110mV		
21	10mV to 115mV		
22	10mV to 120mV		
23	10mV to 125mV	5881	35mV
24	10mV to 130mV		

How we bias in the Workshop

Staying within plate power dissipation is just one side of the story. The aim of proper biasing for class A/B amps, is after all getting rid of crossover distortion,… in other words, it's about tone. So in order for us to make sure everything is as it should be, we search for the proof in the proverbial pudding, by looking at the output waveform on an oscilloscope and making fine adjustments.

If you do not have access to an oscilloscope, don't worry. For 99% of cases, using a standard set of matched tubes, and following the procedure outlined above should get your tubes biased just right. But if you happen to have access to an oscilloscope, you can be 100% sure everything's spot on.

After the amp has been biased as per the instructions above, we monitor the output waveform as follows:

- Turn the master volumes all the way down, with the standby set to 'warm'
- Set the negative feedback to high and the presence and depth controls all the way down (counter clockwise).
- Connect an appropriate dummy load to the Revelation's speaker output. Make sure that the speaker output matches the impedance of the dummy load, unless the tube is a small tube with a plate dissipation rating of 16W or less, in which case you connect the dummy load to *half* the impedance.
- Connect a function generator to FX loop 4's return. If the 'pro loop' is installed in the amp, then:
    - Set the level to 'line 0db'
    - Set the mix to 100%
- Set the function generator, to 1KHz, 1Vrms, sine wave.
- Connect your oscilloscope probe to the dummy load.
- Set the standby to 'play' and slowly turn up the master volume until you reach clipping, then turn the signal down slightly, so that you have maximum output before clipping.

If the tubes are behaving correctly and you've biased them well, you should not see any crossover distortion.

For the high power mode for all tubes, we like to set the bias up just hot enough as not to have any crossover distortion, but no more. For the mid power mode, we like a little more bias than this, and for the lower power mode, we can add quite a bit more. But this is personal taste. You'll reach this if you follow the recommended bias reading in the tables in the last column on the right.

So if we find that for high power mode, after setting the bias, we have no crossover distortion, we reduce the bias voltage setting a little, until we reach crossover distortion. From there, we increase the bias slightly until we've eliminated crossover distortion.

For further information on products or servicing of products please do not hesitate to contact us via the contact details provided below:

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