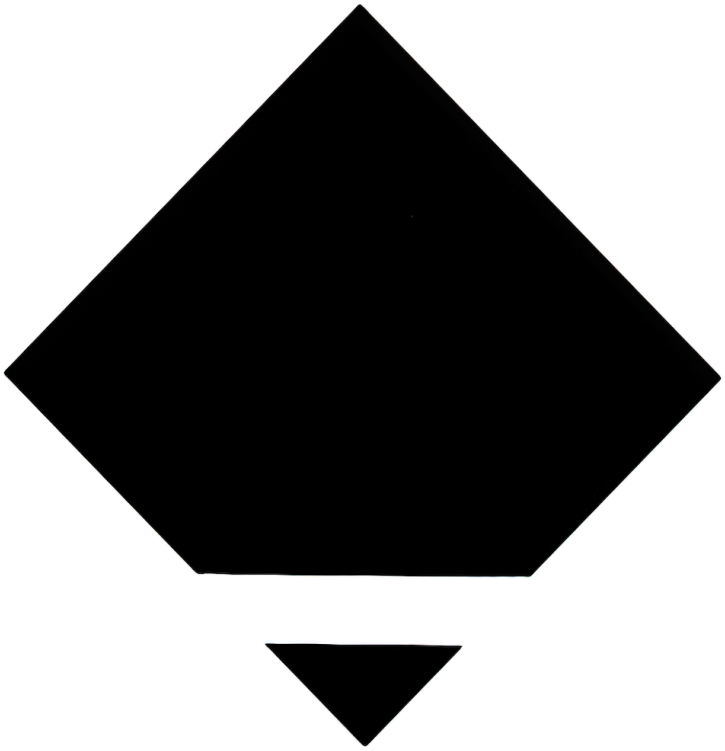
OWNERS MANUAL

MANUAL NO. 02

REV. DATE: 1/2026

The DynaGrid Jr.



Exotic Replacement for 5U4G / 274B rectifier tube.

MODEL DGJR

DECWARE

OWNERS MANUAL

OVERVIEW

The DynaGrid Jr. was designed for people who like to explore the different sonic signatures of rectifier tubes. A rabbit hole that can be quite expensive and at the same time enlightening as you hear how large the difference in overall sound quality can be from one rectifier tube to another. The DynaGrid Jr. is a plug-in replacement for a 5U4G / 274B or compatible rectifier tube. Compatible tubes are listed at the bottom of this manual.

Of course the reason for exploring different rectifier tubes in the first place is to find the one that brings the best possible sound from your amplifier/preamp. There is no rectifier tube that sounds as good as a DynaGrid Jr. It is a step beyond rectifier tubes.

SHORT DESCRIPTION

The DynaGrid Jr. is a stand-alone component that uses a large high-voltage triode vacuum tube to replace the 5U4G compatible rectifier in your component. It has a grid supply that allows it to automatically adjusts the voltage drop across the tube. There is a cable with an octal tube base on one end that plugs into your component where the rectifier tube normally goes. The DynaGrid Jr. uses it's own power supply to heat the large 845 triode, so your component no longer has to provide a heater voltage and will often run cooler as a result.

DynaGrid Jr. lets you monitor the actual B+ (unfiltered high voltage) of your amplifier and the total current draw. These two variables are largely responsible for many of the differences people hear when swapping out rectifier tubes. But they have no idea how each tube affects these variables so there is little if any science to it, just trying dozens of rectifiers until you find one you think sounds the best.

SPECIFICATION

DynaGrid Jr. has a **maximum voltage** of 500 volts DC. Most components are well below that, but if you have a fairly high power amplifier using an industrial version of a 5U4G you should research what the B+ voltage is and see that it is below 500 volts.

DynaGrid Jr. has a **maximum current** rating of 300 mA, higher than a 5U4G rectifier tube.

DynaGrid Jr. requires 120V power outlet and grounded power cord. The total power draw from the outlet is between 35 and 50 watts

DynaGrid Jr. uses an 845 triode vacuum tube. The tube is replaceable with any brand 845 triode.

HOW IT WORKS (Detailed explanation followed by a non-technical explanation)

When your tube component needs its high-voltage DC supply (often called the **B+**), the alternating current (AC) from the amplifier's power transformer must first be **converted to direct current (DC)**. Traditionally, this was done with a *tube rectifier* (such as a 5U4), which has a characteristic behavior engineers and musicians call **"sag"** — a dynamic drop in voltage during high current demand. This sag isn't a flaw; it influences the amplifier's dynamics and feel by making available voltage change with load.

In the DynaGrid Jr, this rectification and sag behavior is achieved in two stages that take advantage of modern components **without sacrificing the dynamic traits of a tube supply**:

At the front end, the DynaGrid Jr. uses **high-current silicon rectifier diodes** to convert the AC voltage from your amplifier's transformer into raw DC voltage. Unlike tube rectifiers, which have significant internal resistance and slower conduction characteristics, modern solid-state diodes:

- Switch on and off very rapidly, producing DC with minimal inherent voltage drop (typically ~1 V total for a bridge).
- Do not exhibit the "internal resistance sag" that tube rectifiers show under load.
- Provide a **stiffer, more consistent DC source** for the rest of the supply network.

This raw DC is the foundation for the high-voltage supply of your component, but on its own with just diodes it would not have the dynamic behavior that many tube components rely on.

Series Resistor – Introduces Controlled Impedance

Following the solid-state diodes in the DynaGrid Jr. the DC is passed through a **high-power silicon resistor**. This resistor is engineered to:

- **Dampen the diode output**, increasing the effective source impedance seen by the downstream circuit.
- Simulate the *voltage drop characteristics* one would see with a classic rectifier tube under load.
- Help shape the way the supply responds as current demand rises and falls.

This resistor does not *smooth* the DC like a capacitor filter — instead, it deliberately introduces a controlled, predictable drop so that the next stage can interact with the supply in a tube-like way.

The DynaGrid 845 Tube as a Pass-Thru/Control Element

After the diodes and series resistor, the supply is fed into an **845 triode** configured as a *series pass element*. Unlike a simple diode, a triode has a control grid that allows the circuit to regulate how easily current flows based on the grid bias.

In this design:

- The 845 doesn't rectify — it *passes* the already rectified DC.
- Its grid is biased so it introduces additional *dynamic impedance* under load.
- This dynamic impedance acts much like the internal resistance and voltage drop of a traditional rectifier tube, so the supply can **sag under high load in a controlled, tube-characteristic way**, even though the initial rectification was done with solid-state diodes.

This is the key to combining modern diode performance with the *musical and dynamic behavior* that tube enthusiasts expect: the diodes provide efficient rectification, while the 845 pass element reintroduces the familiar and desirable power supply behavior.

How It All Fits Together in Operation

Here's how the system behaves when your component (amplifier or preamp) is turned on and running:

- Your components **power transformer provides AC.** The DynaGrid Jr. does not generate high voltage by itself — it converts and shapes what your amplifier/preamplifier already supplies.
- **Diodes rectify AC to DC efficiently.** This DC is available more quickly and with less internal loss than a tube rectifier alone could provide.
- **Series resistor sets an intentional drop.** It raises the effective source impedance so that the downstream element (the 845) sees something that behaves more like a tube rectifier.
- **The 845 tube introduces dynamic behavior.** As load increases, its effective conduction resistance changes, allowing your B+ to sag in a similar way to how a 5U4 would. This sag contributes to the amplifier's feel and transient response, especially in audio applications.

Heater Power and Thermal Effects

Because the DynaGrid Jr. includes its own **heater supply for the 845**, your amplifier doesn't need to provide additional heater current for a rectifier tube. This means:

- Your component's power transformer thermal load is reduced.
- The component's overall heat dissipation can drop when compared to using a traditional tube rectifier.

The 845 heater in the DynaGrid Jr. is self-powered, providing just enough energy (typically around 10 V) to warm the 845 tube before it begins conducting DC. This protects the tube and improves longevity.

Turn-On Procedure and Tube Life

Vacuum tubes benefit from being warm when high voltage is applied because:

- A heated cathode emits electrons most reliably.
- Applying high B+ before the heater is at temperature can stress cathode materials and shorten life.

For that reason:

- You may prefer to **power the module first**, allowing the 845's heater to reach operating temperature before applying full high voltage from the component.
- This practice can help minimize cathode stress and support long tube life.

Estimate lifetimes (e.g., thousands of hours) reflect typical usage under moderate load, but actual life will vary based on bias, operating temperature, and the specific tube used.

Consumer-Friendly Explanation (Non-Technical)

If you're not electrical, here's what you need to know:

- The first part of the DynaGrid Jr. converts your component's high-voltage AC into DC cleanly.
- A precision resistor gently shapes that DC so the next stage feels like a classic tube rectifier.
- The 845 tube then "modulates" that DC in a way that behaves like the tube rectifiers many players and audiophiles prefer, letting the supply respond musically to load.
- The DynaGrid includes its own heater supply for the 845 tube, so your component's interior isn't heated extra, and it can improve reliability and longevity of the amp.
- Turning on the DynaGrid Jr. before your turning on your component warms things up gradually and supports 845 tube health.

Key Takeaways

- The DynaGrid Jr.'s Solid-state diodes handle the heavy lifting of AC→DC conversion with minimal loss.
- Series impedance in the DynaGrid Jr. restores the *character* of a tube supply.
- The 845 triode acts as a controllable voltage element to emulate classic tube rectifier sag and dynamics giving you the magic sound improvement that exotic rectifiers can bring.
- The system combines efficiency, reliability, and musical response in a way that respects both engineering and sonic expectations.

METERS AND AJUSTMENTS

The DynaGrid Jr. has two meters on it. One is the **voltage** of your component and the other is how much **current** the component is drawing.

The DynaGrid Jr. is **fully automatic, meaning there is nothing to adjust**. It simply adjusts itself to be similar to a normal rectifier tube based on the current draw of the component.

The Original DynaGrid, (Yes there is another model) has a fully adjustable bias supply on the grid of the 845 that allows you to adjust the voltage drop by either increasing it or decreasing it over a stock rectifier tube. Of course this makes the meters far more meaningful, especially when you take into account that the B+ voltage will increase and decrease based on slight variations in voltage at the wall outlet. When the B+ increases as a result, the total current draw will also increase. This is the case with most tube gear, but you have no way of knowing it is happening. With the meters you can see what the voltage and currant are at any given time during operation with either model.

THE HIGH VOLTAGE CABLE

The DynaGrid Jr. comes with a **high voltage interconnect** that connects the DynaGrid Jr. to the rectifier tube socket of your component. This cable is by default 1 meter in length however a 2 meter length is also available.

To install the cable, first connect it to the DynaGrid Jr. with the twist lock connector, and then to the component by inserting it exactly as you would a rectifier tube. Be sure both units are turned off before you begin.

WARNING: This cable contains **high voltages** and must not be altered or damaged in any way. If you have pets inspect the cable to be sure it hasn't been chewed on before use.

THE HIGH VOLTAGE CABLE CONT.

The DynaGrid Jr. has the **high voltage interconnect cable jack located in the rear**. The picture above shows the cable installed into the jack.

FUSE

The IEC connector shown between the power switch and the cable jack, has a 1.6 amp fuse located inside and contains a spare fuse. This is the mains fuse for the unit. If the 845 tube doesn't light up — you either have no power, or the fuse is blown suggesting an issue with the 845 tube. If replacing the fuse, unhook the unit from your component, and remove the 845 tube. Turn the DynaGrid Jr. on for a few seconds without the 845 tube and then back off. Now check the fuse to see if it blew. If it did, there is a problem with the DynaGrid Jr., if it didn't then install the 845 tube and turn the DynaGrid Jr. back on. If the tube doesn't light up, check the fuse again. If the fuse blew, the 845 tube is bad. Replace the 845 tube and you'll be back in business.

The 845 Triode tube

The DynaGrid Jr. is designed specifically for the 845 directly heated triode tube. No other substitutions will work. Attempting to use any other tube will void the warranty and could cause damage to the unit.

The 845 tube does not do the rectification, instead it is wired as a series pass thru device. Lifespan in a DynaGrid Jr. would be similar to normal operation in a single-ended triode amplifier.

A list of rectifier tubes that the DynaGrid Jr. can replace:

5U4G Compatible Rectifier Tubes (Part 1: 5U4 Variants and 5AR4/GZ34 Family)

Tube Type	Key Specs (Filament, Max Current, Voltage Drop, Max PIV)	Notes
5U4G	5V/3A, 225mA, 44V, 450V	Baseline reference tube (coke-bottle shape).
5U4GA	5V/3A, 250mA, 44V, 450V	Very similar to 5U4G; slightly higher current rating.
5U4GB	5V/3A, 275mA, 50V, 450V	Straight bottle; higher current, but may increase B+ voltage if subbed for 5U4G—check circuit.
5AR4 (GZ34)	5V/1.9A, 250mA, 17V, 450V	Indirectly heated; lower filament draw and voltage drop (higher B+ output); common upgrade/substitute.
GZ32 (5V4 equiv.)	5V/1.9A, 125-150mA, 22V, 375V	Lower current rating than 5U4G; softer start.
GZ37	5V/2.8A, 275mA, 50V, 500V	Similar to 5U4GB; higher current capability.
GZ31	5V/2A, 200mA, ~40V, 500V	Rare; intermediate ratings.

COMPATIBLE RECTIFIERS CONT.

Part 2: 5R4 and 5Y3 Families

Tube Type	Key Specs (Filament, Max Current, Voltage Drop, Max PIV)	Notes
5R4G (GY/GA/GB/GYA/GYB)	5V/2A, 250mA, 63-67V, 750-900V	Higher voltage drop (sag/compression) and PIV; lower filament draw; good for guitar amps.
5Y3 (5Y3G/5Y3GT)	5V/2A, 125mA, 60V, 350V	Lower current rating; higher drop; common in lower-power amps but may sag more.

Part 3: 5V4 and 5V3 Families

Tube Type	Key Specs (Filament, Max Current, Voltage Drop, Max PIV)	Notes
5V4G	5V/1.75A, 175mA, 25V, 375V	Lower current and filament; indirect heated; softer start.
5V3	5V/3.8A, 350mA, 47V, 425V	Higher current; higher filament draw—check transformer.

COMPATIBLE RECTIFIERS CONT.

Part 4: 274B Family and Russian/Chinese Equivalents

Tube Type	Key Specs (Filament, Max Current, Voltage Drop, Max PIV)	Notes
274B	5V/2A, 160-200mA, 75V, 450V	Often used as substitute but lower current; higher drop; not always recommended for high-demand circuits.
5C3S (5U3C/5C3M)	5V/3A, 225mA, ~44V, 450V	Direct equivalent to 5U4G; interchangeable.
5Z3P (5Z3PA/5Z3P-J)	5V/3A, 225mA, ~44V, 450V	Octal version of 5Z3; direct substitute.

COMPATIBLE RECTIFIERS CONT.

Part 5: Other Compatibles

Tube Type	Key Specs (Filament, Max Current, Voltage Drop, Max PIV)	Notes
5AS4 (5AS4A)	5V/3A, 275mA, 50V, 450V	Similar to 5U4GB; higher current.
5AU4	5V/3.75A, 325mA, 50V, 400V	Higher current and filament—may overload transformer.
5AW4	5V/3.7A, 250mA, 46V, 450V	Similar to 5AU4; high filament draw.
5DJ4	5V/3A, 300mA, 44V, 600V	Industrial/damper type; higher PIV.
5T4	5V/2A, 225mA, 45V, 450V	Metal shell; similar ratings, lower filament.
5931	5V/3A, 300mA, 47V, 600V	Rugged industrial version of 5U4GB.
596	5V/3A, ~250mA, ~50V, 450V	Similar to 5U4G/GB; military/industrial.

Part 6: British/Military Equivalents

Tube Type	Key Specs (Filament, Max Current, Voltage Drop, Max PIV)	Notes
U52	5V/3A, 225mA, 44V, 450V	British equivalent to 5U4G.
CV575	5V/3A, 225mA, 44V, 450V	Military designation for 5U4G.
VT-244	5V/3A, 225mA, 44V, 450V	US military equivalent to 5U4G.

DYNAGRID JR METERS

The DynaGrid Jr. has both a **current** and a **voltage** meter, as previously mentioned, but for those new to tube amps, this section will give you a better understanding of what you should expect in the way of readings.

First we'll talk about the current meter on the left. **mA** stands for **milliamps**. This is total current draw of your amplifier or preamplifier. It is possible for preamplifiers and phono stages to draw less than 50 mA so don't be alarmed if the need only reads 2 or 3 places off zero.

Amplifiers, will draw more current. In the picture the connected amplifier is drawing a total of **150 mA**. The largest reading you would see for big tube amps is 250 mA with rare exception. The DynaGrid Jr. can handle up to 300 mA but anything higher than 250 mA may indicate a problem with the amplifier, like perhaps a shorted output tube.

The **meter on the right**, is the high voltage meter, showing you **DC voltage**. This meter can read anywhere between around 150V all the way to 500V depending on the component. Preamplifiers often run at lower voltages when compared to amplifiers.

Specifically, this voltage meter is showing you the amplifier's rectified DC voltage **before** it is filtered with any capacitors. This is often referred to as the amplifier's B+ voltage.

DYNAGRID JR METERS CONT.

It is useful to understand that the rectified high voltage (B+) can be 100 volts **higher** than the amplifiers actual operating voltage because capacitor filters in the power supply drop the voltage by that much. So the reading you see on the DynaGrid Jr. is a lot higher than what your component's tubes actually see.

POWERING EVERYTHING UP

Your amplifier or preamplifier once connected to the DynaGrid Jr., is what supplies the high voltage as well as the current draw you see on the DynaGrid Jr. meters. This means that if you have the DynaGrid Jr. powered up first and then turn on your component, (the recommended sequence) you will see the Voltage meter rise pretty rapidly whereas the Current meter will come up much slower as the tubes in your component warm up and begin to draw current.

If you have your component turned on first, then the tubes will be warm and drawing current immediately when the DynaGrid Jr. is turned on.

It does not technically matter which you turn on first. However, turning on the DynaGrid Jr. first is recommended for the longevity of the 845 tube.