TransMuter

REAL DISTORTION

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Product Brief Introduction

What is the TransMuter?

The **TransMuter** is a new class of peripheral device for electric guitar **valve amplifiers**. Its primary function allows users to produce live **'concert-like' distortion** at a wide range of volumes that are acceptable for home and practice use. It has been conceived to solve classic failures and limitations of both pedals and power attenuators. We have added modular secondary features in addition to the 'TransMuter Core' as shown in the image above. These can be added or removed during manufacture as required.

Desirability

The Problem

Under normal conditions, the tone effect known as valve distortion is only available when an amplifier is close to its **maximum volume**. This sound level is **completely impractical** for most users, being comparable to that of using a pneumatic drill without ear defenders.

Shortfalls Of Current Products

This is far from a new problem and products have been created which attempt to offer players the effect of valve distortion at practical volumes. Most prominent among these are the extremely popular **distortion pedal**. Other devices, known as **power attenuators**, attempt to achieve a more accurate distortion than that synthesized by pedals but are also generally more expensive. The problem with pedals has always been that the distortion they produce is synthetic. These **synthetic** sounds are noticeably different from the sound a users amplifier will naturally produce when turned to full volume. This has led to a flood of distortion pedals in recent times as producers make slight alterations in attempts to produce more accurate sounds. Power attenuators resolve this problem to some extent by allowing amplifiers to generate large amounts of power and then turning most of that energy into **heat rather than sound**. With respect to the sound quality of the distortion effect this is superior to a pedal. However, it has many of its own pitfalls which the community has long complained about. Due to the power they dissipate, **attenuators create disruptive magnetic fields** which interfere with the signal they pass to the amplifier. This results in a 'fuzzy' sound being produced which is not desirable and has earned them the name 'fuzzboxes'. Their mechanism of operation also produces large amounts of waste heat, so much so that one of the most popular attenuators is branded as the 'HotPlate' and carries a heat warning label. Attenuators are extremely **power inefficient** as most of the electricity is wasted, **dangerous,** given that the devices are potential fire hazards, **expensive** in that they require large enclosures and cooling mechanisms such as fans and heatsinks to continue functioning and are **incompatible** across different amplifier power and impedance levels.

The Solution

The TransMuter solves all the above shortcomings through its use of newly created technology. The fundamental attribute of this technology is the ability **to reduce the headroom** threshold of the amplifier. This means that is enables valve distortion at lower volumes while not interfering with its natural mechanism of production. It **does not** do this through use of synthetic digital electronics, or through power dissipation, but through a newly derived and novel method. This allows the TransMuter to preserve the **true distortion** of a users amplifier, something even the best pedal in the world is incapable of.

It also proves superior to attenuators. The TransMuter does not need to dissipate any of the amplifiers energy and so does not generate the interfering magnetic fields which in attenuators adds the unwanted 'fuzz' sound to the distortion. The benefits of not dissipating power are manifold. The TransMuter is up to **120 times more power efficient** than an attenuator, which is better for users and the environment. The lack of heat makes it **safer to operate**, **more reliable**, **longer lasting**, and **significantly cheaper to build**. Further, unlike any power attenuator, the TransMuter is **compatible** with a wide range of amplifier powers and all common speaker configurations.

The core technology of the TransMuter has been engineered to be inexpensive to produce. However, the modular design of the TransMuters secondary features allow for it to be sold at a **wide range of price points**. This allows it to target different customer price ranges in both the pedal and attenuator marketplaces.

Feasibility

Technical Feasibility

The R&D stage has been completed and fully functional and finalized prototypes have been realized.

The engineering workflow for this product has necessitated starting with theoretical abstracts and building out from there. As such we have extensive documentation and underlying understanding of how and why the product can produce the effects it does which will prove

invaluable in building future versions and other products based on this technology. A purely experimental workflow would not have yielded this additional value.

Legal Feasibility

An extensive worldwide patent search has been conducted to ensure that our technology does not infringe on any other intellectual property. After much consideration and legal advice, the decision was taken not to patent the novel technology in the TransMuter. Much of what underlies the core technology of the TransMuter is proprietary mathematics. In patenting this product that understanding would be freely exposed publicly and impossible to protect in certain jurisdictions. Instead we maintain a trade secret with the addition of several anti-tamper safeguards to protect against reverse engineering efforts.

Operational Feasibility

Reliability

Given the goals of the TransMuter to allow great distortion at low volumes, and therefore low powers, the components experience very little thermal stress. All components have been rated with minimum margins 2x greater than the required theoretical needs. Further, to avoid the necessity for outside power sources and potential software malfunctions, the TransMuter contains no digital components at all.

Usability

With consultation from focus groups we have improved the user interface to be attractive, simple to understand, and easy to use. The device takes only seconds to connect to an amplifier and we have protected against all forms of physical misconfiguration a user could create.

Sustainability

The TransMuter attempts to tackle sustainability in two forms. Firstly, through the significant reduction in waste of electrical power when compared to power attenuators. This can be an

improvement of up to 120 times less wasted energy. Secondly, its flexibility eliminates the need for guitarists to own multiple pedals or attenuators by producing an accurate sound and being compatible with almost any amplifier and speaker combination.

Reproduction Feasibility

In order to maximize your potential investment, we have taken several steps to protect against reverse engineering efforts. Unusually the first is not having patented the core technology. In doing so we would have been forced to disclose how the underlying physics of the device operates and create publicly available steps to reproduce it. Additionally, a patent would not protect this product in certain key jurisdictions. Instead we have been able to protect the physical electronics themselves. The enclosure of the device is protected with one-way screws with breakaway heads. This necessitates drilling or cutting into the product. The internal electronics are protected through a process of submersion in a specific thermoplastic compound with a melting point of ~3000 degrees Celsius. Upon reaching temperatures >3000 degrees, the plastic will combust making recovery of the electronics impossible. Additional protection steps have been taken but these remain company secrets at this time.

Based strictly on our own efforts, Time to Reproduce this product would be in the order of 7000 hours, however this assumes the basic mechanisms of the core technology are already understood.

Viability

Cost and Manufacture

We have a completed manufacturing process and full bill of materials with suppliers should you need them. We will also be happy to assist with any knowledge you might require during the manufacturing process.

(Prices below are with consideration to producing the TransMuter with all features)

To produce a single unit of the TransMuter at present costs $75(US).
Producing 100 units almost halves this cost to $38.
With the economies of scale of a large enterprise behind it we confidently estimate that each unit can be produced for <$30(US) including labor.

Competition

The core technology of the TransMuter has been designed from the ground up to provide exceptional buyer utility at prices comparable to distortion pedals and attenuators. The modular nature of the TransMuter allows for easy addition or removal of features for manufacture of a whole product range which can be fit outcompete the current pedal/attenuator at that price point.

The approximate price range of pedals is $50 - $300.
The approximate price range of attenuators is $150 - $1300.

From the outset the objective of the TransMuter was to not have to compete with these technologies, it was to surpass them. To do so we have developed an objectively superior product when compared with both other technology options available to consumers, all the while still maintaining the manufacturing costs of a pedal.

About Us

Lyons Technology

Lyons Technology is a UK based engineering R&D company with more than 45 years combined experience in Science and Engineering. We pride ourselves on bringing systematic scientific processes to bear to create truly innovative products. Together and apart we have worked on everything from iPhones and machine learning to lasers and rockets. As passionate guitar players ourselves this project has been near to our own hearts and ears.

Contact

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