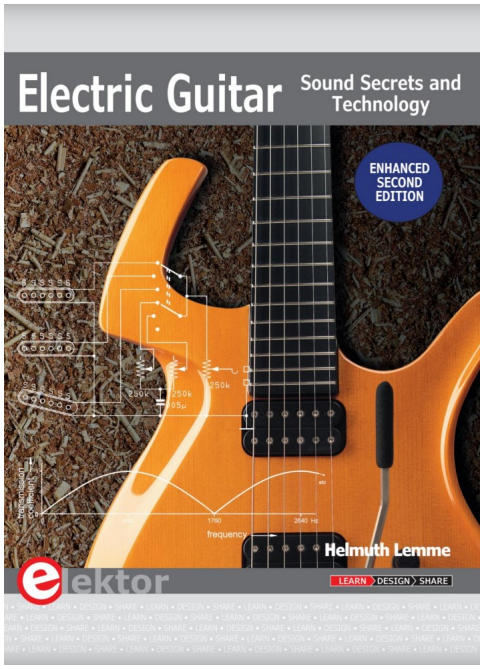
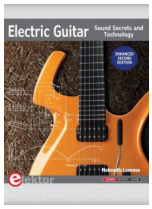
# Electric Guitar - Sound Secrets and Technology (2nd Edition)



A Book as a Bridge between Two Worlds 287 pages

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Preface

**A Book as a Bridge between Two Worlds**

Where or what would modern popular music be today without electric guitars and basses? Over the past decades these instruments have set the tone, and experienced an explosively expanding distribution. The top players are treated like heroes presenting stimulating shows on stage with their freedom of movement and performance, in comparison to rather static keyboard players and drummers.

A cult following has arisen surrounding these instruments, also strongly influenced by clever marketing strategies of manufacturers and dealers. Brand names dominate the market and the guitar's symbolic value is no longer in relation to its practical value. The idolization of electric guitars has to some extent taken on absurd forms. In this line of business however – as is always the case in a free economy – a ruthless competitive battle rages in the background, with a potential for self-destruction. The romanticism is only a façade.

This book aims to disillusion the fictitious world and bring it back down to earth. A clarification of false opinions is urgently necessary. It is aimed at musicians and should be seen as a beneficial asset. Many musicians are short of money, but are nevertheless often tricked into buying overpriced guitars or spare parts – this should not happen.

Every musician wants to have the best possible sound. The electrical equipment – pickups and internal wiring of an instrument – play a decisive role here. It is possible to improve this on many a commercial instrument. Once the art of modification has been understood, good sound can be achieved for little money. It depends less on the price of the parts used than on the right know-how.

This book's first aim is not to increase manufacturer's and dealer's sales. It addresses the average consumer who is technically interested; to help them invest their money as efficiently as possible.

The communication between musicians and technicians is often difficult. Musicians are usually emotionally-led artists who express their work through sound and lyrics, whilst technicians have to wind wires around magnets and measure physical magnitudes. These are two entirely different worlds – the 'translation' between the two can sometimes be difficult. This book attempts to build a bridge between them.

Guitar electronics is a narrow, specialized branch of electroacoustics which until now has not been taken very seriously in technical literature. However the interest is there; many a musician would like to know more about the operation of his/her instrument. This book aims to close this gap; not being content to stay on a superficial level, it delves astutely into the innards of electric guitars and basses. The main emphasis is on the pickups and their electrical environment – an area that's usually not too familiar even to instrument builders. The manufacturers prefer not to disclose their secrets and instead choose to spread misleading information solely to their commercial advantage.

It has become apparent that a new integral, systematic view on guitar electronics is desperately necessary. The sound is shaped by many different parts that interact with each other to become the complete system. It is not sufficient to describe parts separately from each other. This can be compared to chemistry: even if all the properties of hydrogen and oxygen are known, the properties of water can still not be predicted. A common question is 'What does this or that pickup sound like?' This is a question wrongly phrased; the question should be: 'How does the combination of this or that pickup with that cable and other components transfer the sound material produced by strings and body?'

So as not to exceed the scope of this book, it is assumed that reader is factually familiar with certain fundamentals of electronics. Those who have partial knowledge of alternating current engineering and the design of electronic circuits can use the knowledge found here to modify and improve their electric guitar or bass with great success.

Personally I have been fascinated by these instruments since about 1966. I have acquired an extensive collection since then, and have experimented a lot. Many instruments belonging to friends and customers have also been at my disposal; they allowed me to try out my ideas. For nearly every model I experimented how the sonic possibilities could be improved. I am not interested in keeping my knowledge secret and so I decided to share it via this book.

It was important for me to find a balance between technical and theoretical precision on the one hand and practical clarity for the musician on the other. This was not always an easy task.

Those who are not interested in theoretical discourses – for example the mechanical resonances – can skip this section and still profit from other chapters. However a full understanding is only possible with a good knowledge of the theory. Some musicians can be extremely sensitive in regards to their sound. Consequently the technical background should be examined meticulously, too, resulting in the search for the ultimate sound becoming visible and tangible. This knowledge becomes a tool with which you can begin to shape your sound. This helps to avoid the result being subject to chance but instead becoming something which can be formed to one's own ideals. This book attempts to address as many people as possible as tastes do vary immensely. Even if not all the knowledge here is used in practice, it is always useful to know what is possible and what not.

Nowadays there are thousands of models and hundreds of manufacturers of electric guitars and basses. I have tried my best to remain as neutral as possible. However there are many companies who have copied from others and therefore my focus lies on the original innovators in this field.

In order to write this book, I have spoken and corresponded with many musicians and manufacturers and have experienced very different opinions. With some I was not in accordance whilst others helped to support me strongly in my work.

I am very grateful to a number of people who helped support me in writing this book. I would like thank especially Prof. Dr. Manfred Zollner (Technological University of Regensburg), Prof. Dr. Helmut Fleischer (Bundeswehr University, Munich), Robert K. Watson and Gary Swift for the translation from German to English.

I wish you all a good sound!

Munich, Autumn 2012

Helmuth Lemme

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