



The Axon Guide

Electrophysiology and Biophysics Laboratory Techniques
Fourth Edition

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Preface

Molecular Devices is pleased to present you with the latest edition of the Axon™ Guide, laboratory techniques for electrophysiology and biophysics. The purpose of this guide is to serve as an information and data resource for electrophysiologists. It covers a broad scope of topics ranging from the biological basis of bioelectricity and a description of the basic experimental setup to a discussion of mechanisms of noise and data analysis.

This guide is a tool benefiting both the novice and the expert electrophysiologist. Newcomers to electrophysiology will gain an appreciation of the intricacies of electrophysiological measurements and the requirements for setting up a complete recording and analysis system. For experienced electrophysiologists, we include in-depth discussions of selected topics, such as advanced methods in electrophysiology and noise.

The original edition was published in 1993. While the fundamentals of electrophysiology have not changed in that time, changes in instrumentation and computer technology made a number of the original chapters interesting historical documents rather than helpful guides. This edition is up-to-date with current developments in technology and instrumentation.

This guide was the product of a collaborative effort of many researchers in the field of electrophysiology and the staff of Molecular Devices. We are deeply grateful to these individuals for sharing their knowledge and devoting significant time and effort to this endeavor, and we hope you find this Axon Guide helpful in your own research!

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Introduction

Axon Instruments, Inc. was founded in 1983 to design and manufacture instrumentation and software for electrophysiology and biophysics. Its products were distinguished by the company's innovative design capability, high-quality products, and expert technical support. Today, the Axon Instruments products are part of the Molecular Devices portfolio of life science and drug discovery products. The Axon brand of microelectrode amplifiers, digitizers, and data acquisition and analysis software provides researchers with ready-to-use, technologically advanced products which allows them more time to pursue their primary research goals. As of February 2020, our Axon instruments range has been cited over 40,000 times worldwide. We are proud that our solutions support the work of so many researchers across a diverse array of fields.

Furthermore, to ensure continued success with our products, we have staffed our Technical Support group with experienced Ph.D. electrophysiologists.

In addition to the Axon product suite, Molecular Devices has developed High-Content Imaging Systems and the FLIPR® High-Throughput Cellular Screening System, allowing us to support research across the entire drug discovery process.

In recognition of the continuing excitement in ion channel research, as evidenced by the influx of molecular biologists, biochemists, and pharmacologists into this field, Molecular Devices is proud to support the pursuit of electrophysiological and biophysical research with this laboratory techniques workbook.

Acknowledgment of Molecular Devices Consultants and Customers

Molecular Devices employs a talented team of engineers and scientists dedicated to designing instruments and software incorporating the most advanced technology and the highest quality. Nevertheless, it would not be possible for us to enhance our products without close collaborations with members of the scientific community. These collaborations take many forms.

Some scientists assist Molecular Devices on a regular basis, sharing their insights on current needs and future directions of scientific research. Others assist us by virtue of a direct collaboration in the design of certain products. Many scientists help us by reviewing our instrument designs and the development versions of various software products. We are grateful to these scientists for their assistance. We also receive a significant number of excellent suggestions from the customers we meet at scientific conferences. To all of you who have visited us at our booths and shared your thoughts, we extend our sincere thanks. Another source of feedback for us is the information that we receive from the conveners of the many excellent summer courses and workshops that we support with equipment loans. Our gratitude is extended to them for the written assessments they often send us outlining the strengths and weaknesses of Axon Conventional Electrophysiology products from Molecular Devices.

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