

**RADIO-CRAFT LIBRARY N°20**

# **THE CATHODE-RAY OSCILLOSCOPE**

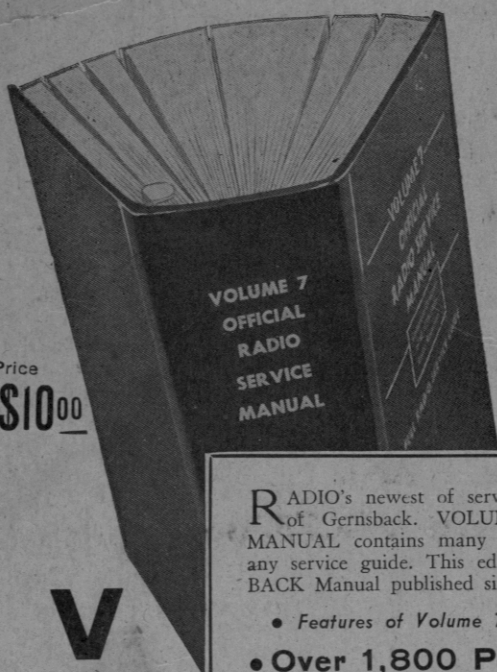
**THEORY AND  
PRACTICAL  
APPLICATIONS**

**By Charles Sicuranza**



**PUBLISHED BY  
RADCRAFT PUBLICATIONS, INC.  
99 HUDSON ST.-NEW YORK**

0000



Price

**\$10<sup>00</sup>**

# VOLUME 7

**1,800  
PAGES**

## *Servicing Radios is Made Easier with the NEW Gernsback Manual*

RADIO's newest of service manuals—published by the House of Gernsback. VOLUME 7 OFFICIAL RADIO SERVICE MANUAL contains many features never previously published in any service guide. This edition is the most outstanding GERNSBACK Manual published since 1931.

• *Features of Volume 7 Official Radio Service Manual* •

- **Over 1,800 Pages**
- **Over 3,000 Illustrations**
- **Over 1,600 Sets Represented**
- Complete Service Data
- Includes 1938 Models Not Found in Other Manuals
- All New Material—No Reprint or Rehash
- Operating Voltages for Over 85% of the Sets
- Intermediate Frequencies of All Superheterodynes
- Full Alignment Procedure for Over 75% of the Superheterodyne Receivers Listed
- Full Cathode-Ray Oscilloscope I. F. Alignment Procedure for Many of the Complicated Superheterodyne Receivers
- Simple Mechanism Permits Pages to Be Easily Removed and Re-inserted
- Stiff, looseleaf covers—size, 9 x 12 Inches
- A Master Index of 74 Pages Includes Sets Listed in All the Gernsback Manuals Since the Publication of Volume 1 in 1931.

Send remittance of \$10.00 by check or money order for your copy of VOLUME 7 GERNSBACK OFFICIAL RADIO SERVICE MANUAL. If you send cash, or unused U. S. Postage stamps, register your letter. YOUR MANUAL IS SENT TO YOU POSTPAID.

**RADCRAFT PUBLICATIONS, INC.**  
99-CR HUDSON ST. NEW YORK, N. Y.

# THE CATHODE-RAY OSCILLOSCOPE

THEORY AND  
PRACTICAL APPLICATIONS

BY  
CHARLES SICURANZA



**RADCRAFT PUBLICATIONS, INC.**

PUBLISHERS

99 HUDSON STREET



NEW YORK, N. Y.

## Table of Contents

<b>Chapter I—Theory and Function of Cathode-Ray Tubes</b>	<b>Page 4</b>
(1) How the electronic beam is formed.	
(2) How the beam is controlled.	
(3) How the beam is made visible on the screen.	
(4) How the screen is made, and its purpose.	
<b>Chapter II—Power Supplies and Associated Circuits</b>	<b>Page 10</b>
(1) Hi-voltage power supplies.	
(2) Low voltage power supplies.	
(3) Filter systems, several types.	
(4) Voltage-divider systems.	
(5) Beam-control systems, shift, focus, centering and intensity controls defined.	
<b>Chapter III—Sweep Circuits</b>	<b>Page 16</b>
(1) The saw-tooth oscillator, a brief but complete explanation of its functions.	
(2) The 60-cycle sweep and its applications.	
(3) External sweeps, and how to apply them.	
(4) Mechanical sweep circuits, their use and purpose.	
<b>Chapter IV—Operation of a Typical Unit</b>	<b>Page 22</b>
(1) Focusing (2) Centering the spot (3) Synchronizing	
(4) Spot intensity (5) Vertical and Horizontal amplifiers, their purpose and uses.	
Constructional details, Thordarson Oscilloscope Kit.	
<b>Chapter V—Methods of Measurement</b>	<b>Page 33</b>
(1) How to use the oscilloscope as a voltmeter, ammeter or ohmmeter.	
(2) How to connect the oscilloscope and its internal amplifiers to apparatus under test.	
(3) How to interpret the viewed image, in terms of cycles, volts or phrase degrees.	
<b>Chapter VI—Practical Applications of Cathode-Ray Oscillographs</b>	<b>Page 39</b>
(1) Servicing receivers.	
(2) Checking transmitters.	
(3) Checking Sound systems.	
(4) Checking operation of new-design models.	
(5) Other practical uses.	
(6) Constructional details of a 3" home-made Oscillograph.	
<b>Chapter VII—Solving Unusual Problems With the Oscillograph</b>	<b>Page 58</b>
(1) Adjustment of AFC.	
(2) Tracing inductive hum-pickup.	
(3) Adjusting 10-kc. filter in Hi-Fi Receivers.	
(4) Determining low and high frequency limits of amplifiers.	
(5) Determining low and high frequency limits of wave filters.	
(6) Determining low and high frequency attenuation of filters.	

# Introduction

THE Cathode-Ray Oscilloscope is used to-day in practically every branch of electrical engineering, and is being used more and more in other branches of industry because of its unique abilities. Its greatest value lies in its ability to define visually and trace alternating voltages of almost any frequency and complexity. Its versatility of application in the solution of measurement problems is almost endless. Aside from its uses in the laboratory, it has become an invaluable boon to the experienced Radio Service Engineer.

This book has, as its aim, an effort to help the Radio Service Man to acquire a broader knowledge of the why and wherefore of the Cathode-Ray Oscilloscope.

The following pages are dedicated to a simple and non-mathematical exposition of the theory and practical applications of the Cathode-Ray Oscilloscope, particularly stressing its uses in the field of Radio Service.

We are not, however, forgetting our fellow workers, the "ham" and the experimenter. For their benefit, we will describe the construction and operation of oscilloscopes ranging in size from one inch to nine inches, including kits, commercial units, and a home-made instrument.

We believe that the ultimate form of television receivers will embody a Cathode-Ray tube of a form similar to those in use in present-day Cathode-Ray Oscilloscopes.

A basic knowledge of the functions of Cathode-Ray tubes in general is a prime requisite toward the understanding of how Cathode-Ray tubes are used in Television.

*THE AUTHOR.*