

High Performance Regenerative Receiver Design

There have been several popular Regen projects in recent QST's and ARRL Handbooks. Look at the design process and progress; then build one—or both—of the receivers described.

By Charles Kitchin, N1TEV

Many hams have tried regenerative receivers with mixed results. Some people are quite attached to "regens," while others consider them only suitable for beginner experimentation.

I have spent several years researching this subject and have come away with a great respect for the technical knowledge possessed by the "old-timers" of the 1920s and '30s. Unfortunately, much of this knowledge has been forgotten. Many significant discoveries, such as the "throttle"-capacitor regeneration control are unknown to most modern homebrewers.

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This article will show that, if properly designed, a modern regen is quite capable of direct-conversion or superheterodyne-level performance, although it does require greater operator skill. Attention to a few simple details can provide an excellent receiver for ham or general-coverage shortwave use. For beginners and veterans alike, studying, building and using regenerative circuits can add new interest, excitement and fun to the radio hobby.

A Brief History

The regenerative circuit was used in both commercial and ham receivers in the 1920s until the early 1930s. It was the standard ham receiver during this period, and a great deal of experimental work was done to optimize its performance. As the great depression slowly ended, the use of the regen de-

clined, because many people could then afford to buy commercial superheterodyne receivers.

Hams continued to use regens, usually home-brewed, through the rest of the 1930s. Although better components were then available, regens of the 1940s and '50s had been reduced to introductory sets for beginners—with generally poor performance.

By the 1960s and '70s, regenerative circuits had been replaced by the now popular direct-conversion receiver.

Regeneration Basics: What's Really Happening Here?

Fig 1 shows the basic regenerative circuit, discovered by Edwin Howard Armstrong¹ in 1914.

Fig 2 shows a modern equivalent

¹Notes appear on page 36.

High Performance Regenerative Receiver Design

Sebastian Brünink



High Performance Regenerative Receiver Design:

Modern Communications Receiver Design and Technology Cornell Drentea, 2010 This comprehensive sourcebook thoroughly explores the state of the art in communications receivers providing detailed practical guidance for constructing an actual high dynamic range receiver from system design to packaging You also find clear explanations of the technical underpinnings that you need to understand for your work in the field This cutting edge reference presents the latest information on modern superheterodyne receivers dynamic range mixers oscillators complex coherent synthesizers automatic gain control DSP and software radios You find in depth discussions on system design including coverage of all pertinent data and tools Moreover the book offers you a solid understanding of packaging and mechanical considerations as well as a look at tomorrow OCOs receiver technology including new Bragg cell applications for ultra wideband electronic warfare receivers This one stop resource is packed with over 300 illustrations that support critical topics throughout

Chronological Developments of Wireless Radio Systems before World War II Vinayak Laxman Patil, 2021-02-15 This comprehensive and authoritative volume traces the history of research leading to the development of the wireless radio systems It discusses the methods adopted by a large number of inventors and the results they obtained to provide perspective on how historical methods and events can be a source of inspiration for future research This book will be of interest to researchers and students in telecommunications engineering as well as to teachers of history of science and technology

Radio Receivers for Systems of Fixed and Mobile Communications Vasiliy V. Logvinov, Sergey M. Smolskiy, 2022-05-13 The textbook acquaints the reader with the architecture of receivers of analog and digital radio systems helps to study the stages of designing a modern radio receiver and reveals the reasons and methods for its effective operation in networks for various purposes Particular attention is paid to the methods of generating and processing signals in the receivers of digital systems with multiple access which make it possible to provide data transfer rates close to the maximum possible according to Shannon As a textbook for students studying methods of optimal signal reception the book will also be useful to specialists in the field of telecommunications involved in the development of radio receivers The book shows how the development of theoretical circuitry and integrated technologies led to the active introduction of algorithmic methods for signal processing changed both the design of receivers and the methods of forming the information flow in free space MIMO beamforming The creation of a global 5G network based on heterogeneous networks puts forward new requirements for the architecture of receivers which are determined by the requirements to achieve high data rates low time delays or use in networks with coordinated multipoint transmission and reception CoMP To consolidate the knowledge gained the book includes a complete set of materials for online classes including questions and answers a guide to solving problems for each chapter and computer modeling units of receivers in the MicroCAP environment based on preliminary calculations

American Radio Relay League Handbook for Radio Communications ,2007 *Design of CMOS*

Millimeter-Wave and Terahertz Integrated Circuits with Metamaterials Hao Yu, Yang Shang, 2015-10-19 This book shows that with the use of metamaterials one can have coherent THz signal generation amplification transmission and detection for phase arrayed CMOS transistors with significantly improved performance Offering detailed coverage from device to system the book describes the design and application of metamaterials in actual CMOS integrated circuits includes real circuit examples and chip demonstrations with measurement results and also evaluates system performance after CMOS based system on chip integration The book reflects the latest research progress and provides a state of the art reference on CMOS based metamaterial devices and mm wave and THz systems

The ARRL Handbook for Radio Communications, 2003
Communications Receivers, Fourth Edition Ulrich L. Rohde, Jerry C. Whitaker, 2017-03-10 State of the art communications receiver technologies and design strategies This thoroughly updated guide offers comprehensive explanations of the science behind today's radio receivers along with practical guidance on designing constructing and maintaining real world communications systems You will explore system planning antennas and antenna coupling amplifiers and gain control filters mixers demodulation digital communication and the latest software defined radio SDR technology Written by a team of telecommunication experts Communications Receivers Principles and Design Fourth Edition features technical illustrations schematic diagrams and detailed examples Coverage includes Basic radio considerations Radio receiver characteristics Receiver system planning Receiver implementation considerations RF and baseband techniques for Software Defined Radios Transceiver SDR considerations Antennas and antenna coupling Mixers Frequency sources and control Ancillary receiver circuits Performance measurement

QST., 1915 **Ham Radio**, 1977 *Ham Radio Magazine*, 1977 *The Wireless Engineer and Experimental Wireless*, 1935 **Electronic Technology**, 1927 [The Radio Amateur's Handbook](#) George Woodward, 1982-12 **CMOS Transceiver Design for Short Range Wireless Telemetry** Jonghae Kim, 2001 **Science Abstracts**, 1930 *The ARRL Handbook for the Radio Amateur*, 2001 *Radio Broadcast*, 1926 **The Industrial Arts Index**, 1927 **Wireless World**, 1925 *Radio News*, 1923 Some issues 1943 July 1948 include separately paged and numbered section called Radio electronic engineering edition called Radionics edition in 1943

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