

Book Review

Electronic Circuit Action Series—Amplifier Circuits

Reviewed by Charles Hansen



Electronic Circuit Action Series—Amplifier Circuits CD-ROM, Thomas M. Adams, Howard Sams, 2nd Edition 1966, 138 pdf pages. Reissued by Old Colony Sound Lab, PO Box 876, Peterborough, NH 03458, 603-924-9464, Fax 603-924-9467, E-mail: custserv@audioXpress.com ISBN, \$16.95 US.

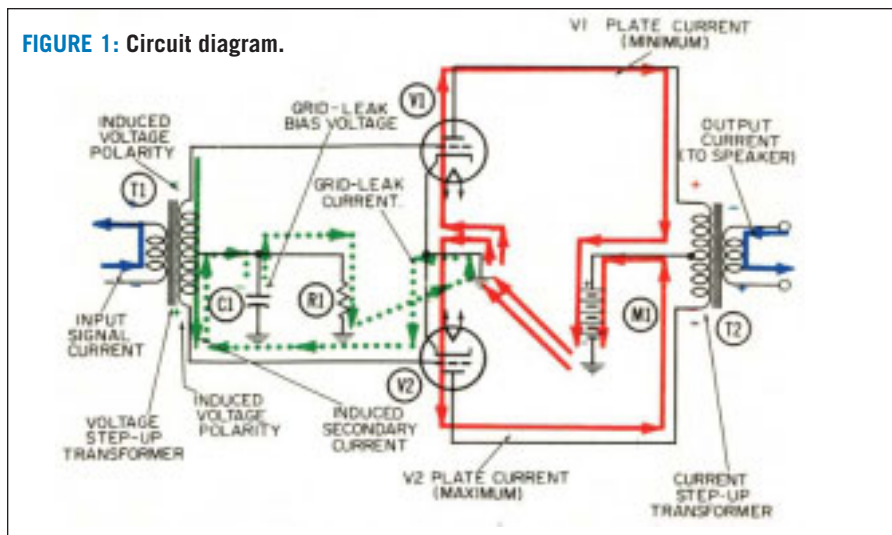
This particular title was just one in the *Electronic Circuit Action Series*. Capt. Adams (USN, retired) used a unique approach and analysis in describing vacuum tube circuit actions in his textbooks. He identified every electron at work in each circuit, then wrote a detailed discussion of the movement of the electron/current, as well as the significance of the electron flows.

The circuit diagram (*Fig. 1*) treats electrons as “moving parts,” whose multi-color visualization greatly enhances the understanding of the circuit operations. The author uses electron flow rather than conventional current, which he describes as “electrons which travel from cathode to plate become plate current.” All waveforms are drawn in time domain.

The circuits are general in nature, and applicable to public address, radio, TV, record player, and tape recorder audio amplifiers of the day. The amplifier circuits in this CD-ROM reprint are classified into three groups:

- Audio-frequency voltage amplifiers
- Audio-frequency power amplifiers
- Radio-frequency voltage amplifiers

The circuit descriptions include R-C,



impedance, transformer coupling, and positive and negative feedback. Conventions of the day were preserved. Frequency is in cps (cycles per second) rather than hertz, and micro-micro farads (mmF) are used instead of picofarads (pF). Each chapter is followed, textbook fashion, by review questions.

The textbook pages are in Adobe pdf format, and the Adobe Reader is included on the CD-ROM. Full pages are easier to read on larger monitor screens since the pages are vertical and computer monitors have a longer horizontal dimension. You can use the Adobe view, zoom and view, and fit modes to obtain the text size you desire. I found it best to print the table of contents and index pages so I could go directly to specific topics using Document, Go to Page.

CHAPTER 1—BASIC VACUUM-TUBE ACTIONS

This covers diode, triode, tetrode, and pentode tubes. The author gives plate curves for the 2X2A diode and the 6BN4 triode. This chapter covers the basic concepts of grid action, gain (μ), transconductance (g_m), and plate resistance (r_p).

CHAPTER 2—R-C COUPLED AF VOLTAGE AMPLIFIERS

Here we have circuit descriptions of R-C coupled audio amplifiers, electron

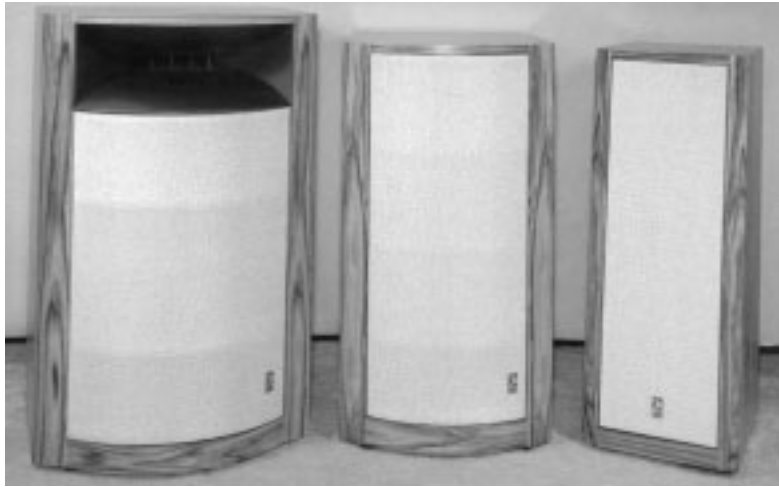
“current” flows, the cathode circuit (with filter actions and time constants, a topic common to all the cathode circuit descriptions in each chapter), waveform analysis, frequency response (with LF and HF limitations), voltage and current feedback, amplitude distortion, and phase distortion.

CHAPTER 3—TRANSFORMER-COUPLED AF VOLTAGE AMPLIFIERS

The author describes transformer action, frequency response (again with LF and HF limitations), frequency distortion, and negative voltage feedback. Cathode filter action is included in the feedback section.

CHAPTER 4—AUDIO FREQUENCY POWER AMPLIFIERS

Transformer-coupled power amplifier circuits include both input and output transformers, beginning with a description of permanent magnet speaker operation. The single-ended Class-A amplifier stage is described first, followed by push-pull Class-AB amplifiers, with their “advantages” (second harmonic cancellation, smaller output transformer, smaller power supply filter caps). The push-pull circuits’ descriptions evaluate “grid-leak bias” and cathode bias. The final section presents the Class-B push-pull circuit.



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CHAPTER 5—AUDIO PHASE-INVERSION CIRCUITS

Since the push-pull amplifier requires a phase inverter, two types of tube phase inverter circuits are presented: the single-triode cathode follower (split-load phase splitter), and the two-triode inverter (cathode-coupled phase splitter). Both use electrolytic bypass capacitors around part or all of the cathode resistance. The latter circuit has its inverting tube's grid connected to the grid circuit of the output tubes rather than being returned to ground through a capacitor.

CHAPTER 6—IMPEDANCE-COUPLED RF VOLTAGE AMPLIFIERS

These last two chapters depart from audio amplification, and present RF pentode circuits. The purpose of this textbook was, after all, to discuss vacuum tube amplifiers in all forms. The sections of this chapter are untuned impedance-coupled amplifier, tuned impedance-coupled amplifier, RF alternating currents, filtering currents (screen-plate positive feedback and oscillation are covered here), and unidirectional currents. The latter refers to the plate and screen current in a tank oscillator circuit, and "current," as always, refers to electron flow rather than conventional current.

CHAPTER 7—TRANSFORMER-COUPLED RF VOLTAGE AMPLIFIERS

The sections of this chapter are untuned-primary-tuned-secondary coupling, tuned-primary-tuned-secondary coupling, the bandpass amplifier (this circuit is a tuned circuit with damping resistors to lower the Q, and thus spread the bandwidth out), and a discussion of series versus parallel impedance in tank circuits.

The two brief pages of the index are not really comprehensive but, in conjunction with the table of contents, will get you to any topic on the CD-ROM.

CONCLUSION

I really enjoy historical electronic textbooks. I found this one to be a fascinating and technically valuable book, with some unusual vacuum tube circuits. The CD-ROM format is not as convenient as a paper book, but it was the only practical way to preserve and offer this book to you. ❖