

**WHILE STUDYING THE CODE PREPARE FOR  
AMATEUR AND COMMERCIAL F. C. C. LICENSES**

# PHOTOSOUND TRAINING

**REDUCES TIME AND STUDY EFFORT BY HALF**

Now, audio-visual training through Home Study is at last made possible by PHOTOSOUND! Your instructor is virtually brought to your home by means of specially prepared recordings of his voice. You learn not only by reading your text material and looking at carefully prepared illustrations and diagrams but you actually hear your instructor as he discusses the many important phases of your lessons.

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The full purpose of PHOTOSOUND training is to prepare for your F.C.C. exams as rapidly and effectively as possible by using the latest scientific training methods. Courses offered include over 150 two-side records as well as 75 lessons which are profusely illustrated with clear diagrams, charts and drawings. All of the instruction you receive bears *directly* on the knowledge you need to pass your F.C.C. exams.

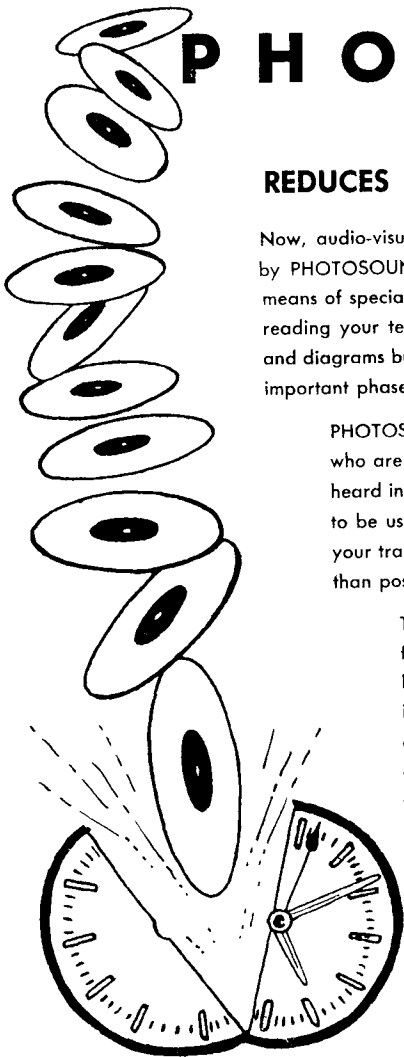
Send to Electronic Technical Institute for free catalog on home study courses in amateur and commercial radio. (Schedules, inside back cover.)

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**ELECTRONIC  
TECHNICAL  
INSTITUTE**

**REMEMBER THIS: E.T.I. WILL INSTRUCT AND  
COACH YOU UNTIL YOU PASS THE EXAM FOR  
THE F.C.C. LICENSE YOU WANT!**



PHOTOSOUND ELECTRONICS COURSE COMBINED WITH PREPARATION FOR COMMERCIAL LICENSES

BOOK 1

LESSON 1A—STATIC ELECTRICITY, CURRENT ELECTRICITY, OHM'S LAW

Theory of positive and negative charges. Series and parallel resistor networks in and in cells and electronics. Ohm's law as applied to electricity. Multiple meters necessary to the electronic technician.

LESSON 1B—BATTERIES USED IN COMMUNICATIONS

The dry cell and its component parts. Electrolyte and specific gravity. Series and parallel cells. Construction of lead-acid storage batteries. Do's and don'ts in charging and checking of batteries.

BOOK 2

LESSON 2A—POWER, CAPACITANCE AND INDUCTANCE IN D.C. CIRCUITS

Applied Ohm's law. Study of capacitors. Construction and use in direct-current circuits. Formulas for series and parallel circuits. The study of induction and magnetic fields. Commercial capacitors and coils.

LESSON 2B—INDUCTANCES IN SERIES AND PARALLEL D.C. MOTORS AND GENERATORS

Coils in series and parallel. Motor and generator fundamentals. Discussion of magnetism. Left-hand rule for current flow. Series motors. Shunt motors. Compound motors.

BOOK 3

LESSON 3A—D.C. METERS

Construction of commercial meter. D.C. meters. Safety precautions in the use of voltmeters and ammeters. Theory of operation. How to read different types of scales. Watt-hour meters.

LESSON 3B—A.C. THEORY, A.C. METERS

How alternating current is generated. How to determine instantaneous voltages and currents on sine waves. Effective peak and average voltages. Capacitive reactance. Construction of repulsion-type ammeters.

BOOK 4

LESSON 4A—INDUCTANCE AND CAPACITANCE IN A.C. CIRCUITS

Basic powers of ten. The relationship between vector representations and sine waves. How capacitors and coils function in alternating current circuits. Inductive and capacitive reactances. Leading and lagging of voltages and currents.

LESSON 4B—IMPEDANCE

Current and impedance in alternating current circuits. Vector study of resistances, capacitance and inductance.

BOOK 5

LESSON 5A—TRANSFORMERS, RELAYS AND PROTECTIVE CIRCUITS

How transformers function. Step-up and step-down transformers. Losses in transformers. Turns ratio. Relays and how they are applied to electronics. Fuses. Commercial fuses and their application.

LESSON 5B—PARALLEL A.C. CIRCUITS AND POWER FACTOR

Applying Ohm's law to parallel alternating-current circuits. Power in A.C. circuits. True power. Apparent power. Use of wattmeters.

BOOK 6

LESSON 6A—DIODE TUBES AND POWER SUPPLIES

Construction and operation of diode tubes. Diodes used as rectifiers. Filtering rectifier outputs. Percentage of regulation. Gas rectifiers. Bridge rectifiers. Voltage doublers. Vibration power supplies. Synchronous and nonsynchronous power supplies.

LESSON 6B—A.C. MOTORS, THREE-PHASE MOTORS, GENERATORS AND POWER SUPPLIES

Three-phase alternators. Commercial motors and generators. Star and delta connections. Three-phase half-wave rectifiers. A.C. motors. Polyphase, three phase, a.c. universal split phase and shaded-pole motors.

BOOK 7

LESSON 7A—TRIODE TUBES, AUDIO AMPLIFIERS AND REPRODUCERS

Construction of triode tubes. The function of the control grid. Circuits using triodes. Theory and construction of speakers. Matching impedance in the output transformer. Push-pull amplifiers. Harmonics. Microphones.

LESSON 7B—VACUUM TUBE CHARACTERISTICS

How to determine the specific function of a tube. The family of curves. Plate characteristics. How to use feedback in tube circuits. Lottin-White amplifier.

BOOK 8

LESSON 8A—RESONANT CIRCUITS AND BASIC OSCILLATORS

How to determine resonance in an a.c. circuit. Resonance. Series-resonant circuit. The operation of Armstrong oscillators.

LESSON 8B—OSCILLATORS

Theory of armature oscillators. Hartley oscillators. Colpitts oscillators. See-saw oscillator and the screen grid frequency chart. Shunt and series construction of oscillators.

BOOK 9

LESSON 9A—BASIC TRANSMITTER CIRCUITS

Different types of crystal. Crystal oscillators. Neutralizing circuits. Block diagrams of amplifiers with cooling. Faraday shield. RF indicators. Pentode and beam power tubes.

LESSON 9B—ANTENNAS, TRANSMISSION LINES AND LOGARITHMS

Discussion of logarithms. Logarithm charts. How a transmission line functions. Standing waves. Types of transmission lines. How to use an antenna. Antenna impedance and matching. Hertz and Marconi antennas.

BOOK 10

LESSON 10A—MODULATION

Investigated carrier. Amplitude modulation. Power and efficiency. Sidebands. Modulation factor. Types of modulation. Low- and high-level modulation.

LESSON 10B—FILTERS AND SPECIAL TRANSMITTER CIRCUITS

Transformer coupling. Heising modulation. Filament construction. Low- and high-pass filters. Band-pass filters.

BOOK 11

LESSON 11A—DETECTORS AND RECEIVERS

Receiving the transmitted wave. Crystal detectors. The use of earphones. Detector construction. Block diagrams of receivers. RF amplifiers. IF amplifiers. Oscillators. Pentagrid converters. Tuning indicators.

LESSON 11B—STUDIO EQUIPMENT AND DECIBELS

Decibels and their use. DB meters. Link pads. Tapads. Headsets. Pre-amplifiers. Studio monitors. Jack panels and patch cords. Carbon microphones. Velocity microphones. Dynamic and crystal microphones. Different record cuttings. Equalizers.

BOOK 12

LESSON 12A—OSCILLOSCOPES

The cathode-ray tube. Deflection. Lissajous patterns and how they are formed. Sawtooth waves. How to use the oscilloscope. Multi-vibrators and how they operate. Oscilloscope schematic. Trapezoidal patterns.

LESSON 12B—VACUUM TUBE VOLTMETERS AND FREQUENCY-MEASURING EQUIPMENT

Vacuum tube voltmeters and circuits. Using this meter. Range selecting. Absorption-type wave meters. Electron-coupled oscillator frequency meters. I.M. meters.

BOOK 13

LESSON 13A—FREQUENCY MODULATION PRINCIPLES

The principles of F.M. Use of the Armstrong system in frequency modulation. Deviation for different type transmitters. The reactance tube. Advantages of frequency modulation. Frequency modulation classification. F.M. frequencies.

LESSON 13B—COMMERCIAL FREQUENCY MODULATION

Phosston tube. Theory of operation. Discriminators and ratio detectors. Armstrong F.M. system. Frequency multipliers. Van der Bijl modulation. Phase shift. Pre-emphasis circuits.

PHOTOSOUND COURSE PREPARATION FOR AMATEUR LICENSES ALSO AVAILABLE

PRE-2ND CLASS FCC EXAM GIVEN AFTER 14

PRE-1ST CLASS FCC EXAM GIVEN AFTER 18

PRE-1ST CLASS FCC EXAM GIVEN AFTER 20

PRE-1ND CLASS FCC EXAM GIVEN AFTER 22

BOOK 14—RADIO OPERATION PROCEDURE AND PRE-FCC EXAMINATIONS

Study of basic laws of radiotelephony and radiotelegraph operating procedure. Pre-FCC examinations that are to be sent to the Electronic Technical Institute for grading.

BOOK 15—THE TELEVISION STUDIO

How the picture is formed on a cathode-ray tube. Generation and amplification of sawtooth waveforms. Push-pull deflection. The cathode-ray tube grid. The flying spot scanner. A simple closed-circuit television system. Horizontal and vertical blanking pulses. Horizontal and vertical synchronization pulses. Equalizing pulses. The composite signal. Video amplifier. D.C. restoration. Synchronization. Camera tubes. The iconoscope. The image orthicon. Camera circuits. Motion picture transmission. Monitoring equipment. Remote equipment. Microwave links.

BOOK 16—THE TELEVISION TRANSMITTER

FCC standards regarding channel frequency and bandwidth. Vestigial sideband transmission. Modulation methods. Vestigial sideband filter. Stagger tuning. The sound transmitter. The diplexer. Transmitting antennas.

BOOK 17—THE TELEVISION RECEIVER

Receiving antennas and transmission lines. RF amplifiers. Oscillators and sync separators. Differentiating and integrating circuits. Magnetic deflection. Damping. Trapezoidal waveforms. High-voltage supplies. Flywheel sync. The sound section. Intercarrier. Projecting-type television.

BOOK 18—COLOR TELEVISION SYSTEMS AND OPTICS

Lenses. Color and light. The eye. Additive and subtractive color. The CBS color system. The color disc. FCC approved standards. The color receiver. Additional color systems, compatibility and new developments.

STUDY OF RADIO LAWS FOR FIRST-CLASS

RADIOTELEPHONE OPERATION

Pre-FCC radiotelephone first class license examinations to be sent to the Electronic Technical Institute for grading.

BOOK 19—RADAR, PART I

Introduction. Derivation of the word radar. Importance of radar for National Security. Visual detector methods and limitations. Types of radar search or scan. Line scan. Non-scan. High altitude bombing. Altimeters. Special information given by radar. Types of modulation. Basic principles of radar. Pulse modulation. Principle of pulse reflection. Time base. Sweep. Bearing. Range. Altitude determination. Maximum range. Minimum range. Main parts of radar system. Transmitter. Coaxial transmission line and antenna. Receiver and indicating device.

RADAR, PART II

Basic radar set. Purpose and special features. Critical facts: unity, weight, frequency, pulse width, pulse repetition frequency, peak power, average power, range. Block diagram of set. Failure continuity of events from time to transmitter. Receiver. Indicator. Study of schematic of set. Calibration of the radar. Transmitters. Wave guides and antenna systems. Receivers. Indicators. Timers. Modulators. Power supplies.

BOOK 20—RADAR, PART III AND IV

Wave guides and antennas.

PRE-FCC EXAMINATIONS, ELEMENT 8

BOOK 21—AUTO ALARM SYSTEM

Theory of operation and use of automatic alarm systems on board ships.

DIRECTION FINDERS

Theory of operation. Use aboard ships and aircraft.

BOOK 22—LORAN, PART I

Using range and time signature principles. Use on ships. Use on planes.

LORAN, PART II

Study of commercial time equipment.

PRE-FCC EXAMINATIONS, ELEMENT 6

Pre-FCC examination for radiotelegraph second class operator's license and shipboard radiotelegraph endorsement.

PRE-3RD CLASS FCC EXAM GIVEN AFTER 48

ANSWERS TO SIDE 71

(10 WPM)

(PHRASES)

cushions on the sofa fireplace with oak panels covering on the chair interesting look  
she glows radiates with poise wrapped from the end scaln tinales bothers most  
sand dune not enough new school some

'13 WPM)

(WORDS)

glass lower level the timber large eye areas fixed some room around  
as bricks steel built face both views wide taper wells columns to  
couches living table slides pocket or banquet size glasses breakfast  
kitchen assure supervision interior row alternated light serves house  
planned most major ribbon range

(16 WPM)

(GROUPS)

VDLT7	GO9BJ	RIAIN	VDLTB	JQYHP	MUCLT
BJRZH	PXFMU	AEMU8	HPØCK	SZBJO	JEMUC
KRZGO	NVDMO	CKSAI	QYGNV	WFN1A	IQ DL
T3C9P	XFNVD	LSBJR	OWENV	DLTBJ	RZHOW
XGO2B	JRWEM	U4DØQ	YGOWE	MTAIQ	PXFOW
EMUCK	SAIPX	YHP3C	KSXFN	YSE R	ZHPXF
NUCLT	QYGPX	FNVDL	TBJQY	ZIQ4D	LYGQO
W6FKS	AIQYG	OVDKS	RZHQY	GOWEM	UKCRZ
BJRSE	MU7HP	X7GIT	BJRTH		

