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## Broadcast and Sound Engineering Technicians and Radio Operators

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(O\*NET 27-4011.00, 27-4012.00, 27-4013.00, 27-4014.00)

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### Significant Points

- Job applicants will face keen competition for jobs in major metropolitan areas, where pay generally is higher; prospects are expected to be better in small cities and towns.
- Technical school, community college, or college training in broadcast technology, electronics, or computer networking provides the best preparation.
- About 30 percent of these workers are in broadcasting, mainly in radio and television stations, and 17 percent work in the motion picture, video, and sound recording industries.
- Evening, weekend, and holiday work is common.

### Nature of the Work

Broadcast and sound engineering technicians and radio operators set up, operate, and maintain a wide variety of electrical and electronic equipment used in almost any radio or television broadcast, concert, play, musical recording, television show, or movie. With such a range of work, there are many specialized occupations within the field.

*Audio and video equipment technicians* set up and operate audio and video equipment, including microphones, sound speakers, video screens, projectors, video monitors, and recording equipment. They also connect wires and cables and set up and operate sound and mixing boards and related electronic equipment for concerts, sports events, meetings and conventions, presentations, and news conferences. They may set up and operate associated spotlights and other custom lighting systems.

*Broadcast technicians* set up, operate, and maintain equipment that regulates the signal strength, clarity, and the range of sounds and colors of radio or television broadcasts. These technicians also operate control panels to select the source of the material. Technicians may switch from one camera or studio to another, from film to live programming, or from network to local programming.

*Sound engineering technicians* operate machines and equipment to record, synchronize, mix, or reproduce music, voices, or sound effects in recording studios, sporting arenas, theater productions, or movie and video productions.

*Radio operators* mainly receive and transmit communications using a variety of tools. These workers also repair equipment, using such devices as electronic testing equipment, handtools, and power tools. One of their major duties is to help to maintain communication systems in good condition.

The transition to digital recording, editing, and broadcasting has greatly changed the work of broadcast and sound engineering technicians and radio operators. Software on desktop computers has replaced specialized electronic equipment in many recording and editing functions. Most radio and television stations have replaced videotapes and audiotapes with computer hard drives and other computer data storage systems. Comput-

er networks linked to specialized equipment dominate modern broadcasting. This transition has forced technicians to learn computer networking and software skills. (See the statement on computer support specialists and systems administrators elsewhere in the *Handbook*.)

Broadcast and sound engineering technicians and radio operators perform a variety of duties in small stations. In large stations and at the networks, technicians are more specialized, although job assignments may change from day to day. The terms “operator,” “engineer,” and “technician” often are used interchangeably to describe these jobs. Workers in these positions may monitor and log outgoing signals and operate transmitters; set up, adjust, service, and repair electronic broadcasting equipment; and regulate fidelity, brightness, contrast, volume, and sound quality of television broadcasts.

Technicians also work in program production. *Recording engineers* operate and maintain video and sound recording equipment. They may operate equipment designed to produce special effects, such as the illusions of a bolt of lightning or a police siren. *Sound mixers* or *re-recording mixers* produce soundtracks for movies or television programs. After filming or recording is complete, these workers may use a process called “dubbing” to insert sounds. *Field technicians* set up and operate portable transmission equipment outside the studio. Because television news coverage requires so much electronic equipment and the technology is changing so rapidly, many stations assign technicians exclusively to news.

*Chief engineers, transmission engineers, and broadcast field supervisors* oversee other technicians and maintain broadcasting equipment.

**Work environment.** Broadcast and sound engineering technicians and radio operators generally work indoors in pleasant surroundings. However, those who broadcast news and other programs from locations outside the studio may work outdoors in all types of weather or in other dangerous conditions. Technicians doing maintenance may climb poles or antenna towers, while those setting up equipment do heavy lifting.



*Evening, weekend, and holiday work is common for some broadcast and sound engineering technicians and radio operators.*

Technicians at large stations and the networks usually work a 40-hour week under great pressure to meet broadcast deadlines, and may occasionally work overtime. Technicians at small stations routinely work more than 40 hours a week. Evening, weekend, and holiday work is usual because most stations are on the air 18 to 24 hours a day, 7 days a week. Even though a technician may not be on duty when the station is broadcasting, some technicians may be on call during nonwork hours; these workers must handle any problems that occur when they are on call.

Technicians who work on motion pictures may be on a tight schedule and may work long hours to meet contractual deadlines.

**Training, Other Qualifications, and Advancement**

Both broadcast and sound engineering technicians usually receive some kind of formal training prior to beginning work. Audio and video technicians usually learn the skills they need through a year or more of on-the-job training, but some have formal education after high school. Radio operators usually train for several months on the job

**Education and training.** The best way to prepare for a broadcast and sound engineering technician job is to obtain technical school, community college, or college training in broadcast technology, electronics, or computer networking. For broadcast technicians, an associate degree is recommended. Sound engineering technicians usually complete vocational programs, which usually takes about a year, although there are shorter programs. Prospective technicians should take high school courses in math, physics, and electronics.

When starting out, broadcast and sound engineering technicians learn skills on the job from experienced technicians and supervisors. These beginners often start their careers in small stations and, once experienced, transfer to larger ones. Large stations usually hire only technicians with experience. Many employers pay tuition and expenses for courses or seminars to help technicians keep abreast of developments in the field.

Audio and video equipment technicians generally need a high school diploma. Many recent entrants have a community college degree or other forms of postsecondary degrees, although they are not always required. These technicians may substitute on-the-job training for formal education requirements. Many audio and video technicians learn through long-term on-the-job training, lasting from 1 to several years, depending on the specifics of their job. Working in a studio as an assistant is a good way of gaining experience and knowledge.

Radio operators usually are not required to complete any formal training. This is an entry-level position that generally requires on-the-job training.

In the motion picture industry, people are hired as apprentice editorial assistants and work their way up to more skilled jobs. Employers in the motion picture industry usually hire experienced freelance technicians on a picture-by-picture basis. Reputation and determination are important in getting jobs.

Continuing education to become familiar with emerging technologies is recommended for all broadcast and sound engineering technicians and radio operators.

**Other qualifications.** Building electronic equipment from hobby kits and operating a “ham,” or amateur, radio are good ways to prepare for these careers, as is working in college radio and television stations. Information technology skills also are valuable because digital recording, editing, and broadcasting are now the norm. Broadcast and sound engineering technicians and radio operators must have manual dexterity and an aptitude for working with electrical, electronic, and mechanical systems and equipment.

**Certification and advancement.** Licensing is not required for broadcast technicians. However, certification by the Society of Broadcast Engineers is a mark of competence and experience. The certificate is issued to experienced technicians who pass an examination.

Experienced technicians can become supervisory technicians or chief engineers. A college degree in engineering is needed to become chief engineer at a large television station.

**Employment**

Broadcast and sound engineering technicians and radio operators held about 105,000 jobs in 2006. Their employment was distributed among the following detailed occupations:

Audio and video equipment technicians.....	50,000
Broadcast technicians.....	38,000
Sound engineering technicians .....	16,000
Radio operators .....	1,500

About 30 percent worked in broadcasting (except Internet) and 17 percent worked in the motion picture, video, and sound recording industries. About 13 percent were self-employed. Television stations employ, on average, many more technicians than radio stations. Some technicians are employed in other industries, producing employee communications, sales, and training programs. Technician jobs in television and radio are located in virtually all cities; jobs in radio also are found in

**Projections data from the National Employment Matrix**

Occupational Title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-2016	
				Number	Percent
Broadcast and sound engineering technicians and radio operators ..	27-4010	105,000	123,000	18,000	17
Audio and video equipment technicians.....	27-4011	50,000	62,000	12,000	24
Broadcast technicians.....	27-4012	38,000	42,000	4,600	12
Radio operators .....	27-4013	1,500	1,300	-300	-16
Sound engineering technicians .....	27-4014	16,000	18,000	1,500	9

NOTE: Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook*.

many small towns. The highest paying and most specialized jobs are concentrated in New York City, Los Angeles, Chicago, and Washington, DC—the originating centers for most network or news programs. Motion picture production jobs are concentrated in Los Angeles and New York City.

### Job Outlook

Employment is expected to grow faster than average through 2016. But people seeking entry-level jobs as technicians in broadcasting are expected to face keen competition in major metropolitan areas. Prospects are expected to be better in small cities and towns.

**Employment change.** Overall employment of broadcast and sound engineering technicians and radio operators is expected to grow 17 percent over the 2006-16 decade, which is faster than the average for all occupations. Job growth in radio and television broadcasting will be limited by consolidation of ownership of radio and television stations and by labor-saving technical advances, such as computer-controlled programming and remotely controlled transmitters. Stations often are consolidated and operated from a single location, reducing employment because one or a few technicians can provide support to multiple stations. Offsetting these trends, however, is a move toward digital broadcasting that will increase employment opportunities. As of February 2009, television stations will only be allowed to broadcast digital signals and, by law, will be forced to turn off their analog signals. Technicians who can install and operate digital transmitters will be in demand as stations attempt to meet this deadline. Radio stations are beginning to broadcast digital signals as well, but there is no law that will require them to do so.

Projected job growth varies among detailed occupations in this field. Employment of audio and video equipment technicians is expected to grow 24 percent through 2016, which is much faster than the average for all occupations. Not only will these workers have to set up audio and video equipment, but they will have to maintain and repair it as well. Employment of broadcast technicians and sound engineering technicians is expected to grow 12 percent and 9 percent respectively, through 2016, about as fast as the average for all occupations. Advancements in technology will enhance the capabilities of technicians to produce higher quality radio and television programming. Employment of radio operators, on the other hand, is projected to decline rapidly by 16 percent through 2016 as more stations control programming and operate transmitters remotely.

Employment of broadcast and sound engineering technicians in the cable and pay television portion of the broadcasting industry is expected to grow as the range of products and services expands, including cable Internet access and video-on-demand. Employment of these workers in the motion picture industry is expected to grow rapidly. However, this job market is expected to remain competitive because of the large number of people who are attracted by the glamour of working in motion pictures.

**Job prospects.** People seeking entry-level jobs as technicians in broadcasting are expected to face keen competition in major metropolitan areas, where pay generally is higher and the number of qualified jobseekers typically exceeds the number of

openings. Prospects for entry-level positions are expected to be better in small cities and towns for beginners with appropriate training.

In addition to employment growth, job openings will result from the need to replace experienced technicians who leave this field. Some of these workers leave for other jobs that require knowledge of electronics, such as computer repairer or industrial machinery repairer.

### Earnings

Television stations usually pay higher salaries than radio stations; commercial broadcasting usually pays more than public broadcasting; and stations in large markets pay more than those in small markets.

Median annual earnings of audio and video equipment technicians in May 2006 were \$34,840. The middle 50 percent earned between \$26,090 and \$46,320. The lowest 10 percent earned less than \$19,980, and the highest 10 percent earned more than \$62,550. Median annual earnings in motion picture and video industries, which employed the largest number of audio and video equipment technicians, were \$34,530.

Median annual earnings of broadcast technicians in May 2006 were \$30,690. The middle 50 percent earned between \$20,880 and \$45,310. The lowest 10 percent earned less than \$15,680, and the highest 10 percent earned more than \$64,860. Median annual earnings in radio and television broadcasting, which employed the largest number of broadcast technicians, were \$27,380.

Median annual earnings of sound engineering technicians in May 2006 were \$43,010. The middle 50 percent earned between \$29,270 and \$65,590. The lowest 10 percent earned less than \$21,050, and the highest 10 percent earned more than \$90,770.

Median annual earnings of radio operators in May 2006 were \$37,890. The middle 50 percent earned between \$28,860 and \$48,280. The lowest 10 percent earned less than \$20,790, and the highest 10 percent earned more than \$57,920.

### Related Occupations

Broadcast and sound engineering technicians and radio operators need the electronics training necessary to operate technical equipment, and they generally complete specialized postsecondary programs. Occupations with similar characteristics include engineering technicians, science technicians, and electrical and electronics installers and repairers. Broadcast and sound engineering technicians also may operate computer networks, as do computer support specialists and systems administrators. Broadcast technicians on some live radio and television programs screen incoming calls; these workers have responsibilities similar to those of communications equipment operators.

### Sources of Additional Information

For career information and links to employment resources, contact:

► National Association of Broadcasters, 1771 N St.NW., Washington, DC 20036. Internet: <http://www.nab.org>

For information on certification, contact:

► Society of Broadcast Engineers, 9182 North Meridian St., Suite 150, Indianapolis, IN 46260. Internet: <http://www.sbe.org>

For information on audio and video equipment technicians,  
contact:

➤ InfoComm International, 11242 Waples Mill Rd., Suite 200,  
Fairfax, VA 22030. Internet: <http://www.infocomm.org>