The Broadcaster's Guide To

PROGRAM SOURCES

By

Ernest G Wilson

THE BROADCASTER'S GUIDE TO PROGRAM SOURCES

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CONTENTS

INTRODUCTION

Radio stations have a tremendous appetite for program materials. Every moment of broadcast must be filled with a program designed to attract, please, and hold your audience.

Commercial station formats are generally musical, requiring a library containing hundreds if not thousands of records. This record library needs constant attention through the addition of new and currently popular music. The station may also broadcast news, sports, public service announcements and special features to add character to its overall programming.

Non-commercial stations may also rely a great deal on music as the largest portion of the day's programming. However, the majority of non-commercial stations also provide their audiences with educational, instructional, public service announcements, news, documentaries, etc. Not only does the non-commercial station require a well maintained record library, it also needs libraries of tapes and scripts.

This publication was especially prepared for new radio stations that wish to start a music, educational, instructional, inspirational, and/or public service library as quickly and inexpensively as possible.

The source addresses listed herein were current at the time of publication. Distributors change addresses, the materials they offer become outdated, outdated materials are replaced with up-to-date offerings, and new distributors become available. Because of this volatile nature, it is very important that, once you have established contact and are receiving materials, you keep communications open and current. When your source of supply asks that you complete a questionaire and return it, or that you use and return their material immediately, do it. Work with your sources of supply and they will work with you. They can, and will, provide you with mountains of programs, public service messages, music records, catalogs, scripts, and miles of recording tape.

Taped programs and public service announcements are usually recorded at the speeds of 3 3/4 or 7 1/2 inches per second. The tapes may be recorded either in stereo (2 track) or in monaural (1/2 track or full track). Sometimes you have the option of selecting the type of recording best suited for your particular station. Three inch or five inch reels are most common for public service tapes while programs are usually shipped to you on five, seven or even 10 inch reels. Short tapes, the ones with public service announcements, may be kept by you. Longer tapes, those containing several short programs or one long program, may or may not have to be returned to the supplier. Tapes that must be returned must not be damaged as they will be sent directly to other stations for their use. These tapes will be sent to you in a fairly sturdy package. Keep the package in tact so you may use it to return the tape after its play date.

Educational programs and public service messages furnished to you on disc (transcriptions) (records) usually need not be returned. These recordings may be either stereo or monaural, and, as with the tapes, you may be able to specify which you prefer when you place your order. The playback speed of these transcriptions are 33 1/3 rpm for 12" discs and 45 rpm for 7" discs.

Musical transcriptions are in a class by themselves. Several distributors offer yearly subscriptions for particular types of music such as country, rock, middle-of-the-road, popular, etc. Subscription prices may be as low as $45.00 per year with a guaranteed minimum delivery of 60 records at about 5 records per month. The records received from a subscription are most likely hits or are hit bound. Records may also be purchased individually by title, number, and artist, allowing a station to start a music library or to fill gaps in an existing library. Records are offered to radio stations at a price lower than normal wholesale. In other words, lower than that paid by music stores and record shops. Single record albums start at about $1.25 and go up to about $4.00 for a four record set. Single 45 rpm records cost only about 30¢.

Record distributors also provide FREE promotional copies of their latest releases. Hundreds of new records are produced and released each month. Some of these become popular and find their way to the music charts across the nation. Others fail to receive recognition and appear to be destined for the trash can, but, now and then one of these "flops" does become popular. Therefore, it is wise not to throw away any records, but store them for awhile in a separate section of the music library. In addition, "flop" records quite often have music suitable for background of a station produced program.

There are probably several record distributors in your own city or in a large city near you. Check your telephone directory, and the telephone directory of the largest city nearest you, under the headings of "Records" and "Music". To begin a steady flow of records coming to you each week, write to the record distributors nearest to you and/or to the national offices of record distributors listed in this publication. Remember, record distributors only give records to radio stations. Be sure your letter has your station call letters, best of all would be to use pre-printed letterhead stationary.

Non-commercial stations are sometimes successful in establishing a good working relationship with local record shops and commercial radio stations. Commercial stations may received several duplicates of new record releases. Some of these will be filed in their library, some will be used on the air, and some may still be left to give away. Record shops may allow tape recording of their records, they may allow use of their records by a non-commercial station, or they may furnish a few records free each month.

Educational programming is really a rather broad title as it encompasses any program that conveys information, news, instruction, commentary, drama, children's stories, etc. Many programs are produced by agencies of the Federal Government, by foreign governments, by companies, associations, and socieities, etc. These programs may be in script, taped or transcription form.

Programs of great interest can be produced by stations utilizing materials not normally thought of as being used in broadcasting. For example, the U.S. Government Printing Office publishes several hundred informative pamphlets. These pamphlets cover all sorts of topics including earthquakes, tornados, oceanography, plant life, animal husbandry, geology, map reading, economics, how to can and otherwise preserve foods, and on and on. U.S. published materials are not copyrighted. This means no permission is required to read from these publications directly on-the-air or to record that information for future broadcast. The program might be presented in narrative form or as a dramatization.

Public utility companies such as gas, electric , water, etc., sometimes publish a newsletter which is sent to their customers along with the monthly statement. These newsletters may also contain a story or article of local or regional history. A letter sent to the company requesting permission to use the material usually receives a favorable reply.

Several magazines can be approached regarding permission to broadcast the material they publish each month. At least one school station has permission to broadcast materials from the Time-Life series of science books, the Reader"s Digest, the local newspapers, Highlights magazine (children's stories), City magazine (San Francisco), and Rolling Stones magazine. In other words, your resources are limited only by your imagination to use them.

Probably the best source of free tapes, tapes which cover a wide range of subjects and culture, are those produced overseas. Where you will deal directly with a foreign source you may need to complete a customs clearance form. This form merely requires a description of the materials you will receive from outside of the United States, the name of your organization, and the name and address of the foreign source. These forms are available from any U.S. Customs office. Consult your telephone directory for the office nearest you. They will usually send you the forms by mail. In some cases the foreign source will prepare the Customs form for you. Where the foreign source has an office or Embassy in the United States then the Customs clearance has already been completed by them.

Religious programs tend to be non-denominational. Their religious content is usually not presented as a "Hell Fire and Damnation" sermon but rather as a guideline for living in every day life. Programs cover topics which include current issues, drug abuse, special schools, missionary work, and inspirational poetry and music.

Some commercial and non-commercial stations are broadcasting programs over 30 years old! Radio formats began to change somewhere in the 1950's from dramatic and comedy presentations to an almost all music format. The period of time between about 1930 and 1950 has been termed the Golden Age of Radio, a classical period which has much nostalgic meaning for broadcasters and persons over about 30 years of age. And, oddly enough, persons under 30 years of age show an intense interest in learning and listening about radio programs produced before they were born.....and before television.

Collectors have managed to locate and restore original 16" transcriptions. They have found original scripts, many with penciled margin notes made by the actors and actresses. Colleges have set aside space for a library of original scripts and transcriptions. Collectors trade taped and re-taped recordings made from the original 16" transcriptions, or from an old wire recorder, or taped directly off the air. Radio stations have scheduled 3-hour time periods just for the rebroadcast of these historical broadcasts. In fact, the syndication, the collection, and the resale of these old radio programs has become a big business.

Broadcasting organizations can be quite beneficial to new radio stations. They can help the new station find program sources, establish station guidelines and objectives, and acquaint them with the broadcast industry. A list of helpful organizations is also included in this publication for your convenience.

HOW TO REQUEST MATERIAL

In requesting materials, it is important that you clearly state your desires and the purpose for which the material will be used. Your letter should include the fact that you wish to broadcast the material. If you are requesting the material for a school, church, or other non-profit organization primarily for the use of a non-commercial station, then so state. Here are a few guidelines:

The Letter

1. Use standard 8 1/2 x 11 inch paper
2. Use letterhead
3. Type the letter
4. Correct all spelling errors
5. Clearly indicate what you desire

The Envelope

1. Use business size (#10)
2. Use complete return address
3. Use complete mailing address
4. Use correct postage

* *

Sample Letter (music record distributors)

ALLIGATOR RECORDS
Box 11741 Dearborn Station
Chicago, IL 60611

December 15, 1975

Gentlemen:

We would appreciate being placed on your mailing list so we may receive radio station promotional copies of your latest releases. We are particularly interested in the latest "Rock" albums and singles. In addition,will you please send us information about your subscription plan plus your price sheet for albums and singles.

Thank you.

J. P. Souza
General Manager

* *

Sample Text (public service announcements)

We wish to include your Public Service Announcements as a regular part of our daily broadcasts. Please place us on your mailing list.

* *

Sample Text (educational programs)

Please send us a copy of your current catalog. We wish to include some of your material in the educational segment of our daily radio broadcasts.

* *

Some companies may not respond for several weeks simply because they are backlogged. Be sure to give them ample time for a reply before sending a second order or inquiry. Remember also, where materials must be returned to the originator, be sure to return them in accordance with their instructions. Prompt return will assure continued service. Record distributors are particularly anxious about which of their promotional records are being aired. To keep a continued flow of free promotional records coming from them, send them a "Play List" weekly if possible, if not weekly, certainly not less than every two weeks.

Record Distributors

ABC/DUNHILL
1330 Avenue of the Americas
New York, NY 10019

ABC/DUNHILL
8255 Beverly Blvd.
Los Angeles, CA 90043

ADELPHI
Box 288
Silver Springs, MD 20907

ALITHIA
9034 Tonnele Avenue
North Bergen, NJ 07047

ALLIGATOR
Box 11741 Dearborn Station
Chicago, IL 60611

A & M
1855 Broadway
New York, NY 10023

A & M
1416 North LaBrea
Hollywood, CA 90028

ARHOOLIE
Box 9195
Berkeley, CA 94709

ATLANTIC
75 Rockefeller Plaza
New York, NY 10019

AUDIO-FIDELITY
221 West 57th St.
New York, NY 10019

AVCO EMBASSY
1301 Avenue of the Americas
New York, NY 10019

BEARSVILLE
75 East 55th St.
New York, NY 10022

MIKE BORCHETTA
6290 Sunset Blvd.
Hollywood, CA 90028

BELL
1776 Broadway
New York, NY 10019

BLUE THUMB
427 North Canon Drive
Beverly Hills, CA 90210

BRUNSWICK
888 Seventh Avenue
New York, NY 10019

BUDDAH
810 Seventh Avenue
New York, NY 10019

CAPRICORN
535 Cotton Avenue
Macon, GA 31208

CAPITOL
1370 Avenue of the Americas
New York, NY 10019

CAPITOL
1750 North Vine St.
Hollywood, CA 90028

CHESS/JANUS
900 Sunset Blvd. Suite 402
Hollywood, CA 90069

CHESS/JANUS
1301 Avenue of the Americas
New York, NY 10019

COLUMBIA
51 West 52nd Street
New York, NY 10019

COLUMBIA
6430 Sunset Blvd.
Hollywood, CA 90028

MONITOR
156 Fifth Avenue
New York, NY 10010

LONDON RECORDS OF CALIF.
680 Beach Street, Suite 314
San Francisco, CA 94109

MONUMENT
530 West Main St.
Hendersonville, TN 38127

MOTOWN
6464 Sunset Rlvd.
Hollywood, CA 90028

MOTOWN
2 Gardner Place
Winchester, MA 01890

MUSICOR
240 West 55th Street
New York, NY 10019

NASHBORO
1011 Woodland Street
Nashville, TN 37206

OVATION
1249 Waukegan Road
Glenview, IL 60025

PAUL BROWN PROMOTIONS
507 Fifth Avenue
New York, NY 10017

PERCEPTION
165 West 46th Street
New York, NY 10036

POLYDOR
1700 Broadway
New York, NY 10019

POPPY
551 Fifth Avenue
New York, NY 10010

RCA
1133 Avenue of the Americas
New York, NY 10036

RSO
135 Central Park West
New York, NY 10023

RANWOOD
9034 Sunset Blvd.
Los Angeles, CA 90069

ROULETTE
17 West 60th Street
New York, NY 10023

SSS INTERNATIONAL
2106 Belmont Blvd.
Nashville, TN 37212

SIRE
165 West 74th Street
New York, NY 10023

STAR-DAY KING
3557 Dickerson Road
Nashville, TN 37207

STAX
Union Avenue
Memphis, TN 38104

STEREO DIMENSION
888 Seventh Avenue
New York, NY 10019

SCEPTER
254 West 54th Street
New York, NY 10019

TAKOMA
Box 5403
Santa Monica, CA 90405

TIME
101 West 57th Street
New York, NY 10019

20TH CENTURY
8255 Sunset Blvd.
Hollywood, CA 90028

TUMBLEWEED
1368 Gilpin Street
Denver, CO 80218

UNITED ARTISTS
6920 Sunset Blvd.
Los Angeles, CA 90028

UNITED ARTISTS
729 Seventh Avenue
New York, NY 10019

VANGUARD
71 West 23rd Street
New York, NY 10010

WARNER BROTHERS
44 East 50th Street
New York, NY 10022

WARNER BROTHERS
3701 Warner Blvd.
Burbank, CA 91503

WARNER/ELEKTRA/ATLANTIC
680 Beach Street
San Francisco, CA 94109

WINDFALL
161 West 54th Street
New York, NY 10019

THOMAS J. VALENTINO, INC
151 West 46th Street
New York, NY 10036
(Sound effect records)

Classical Music Programs

Distributor	Content	Comment
PARKWAY PRODUCTIONS, INC. 7979 Old Georgetown Road Washington, DC 20014	Symphonic Discussion of Artists.	Write for catalog.
THE KOUSSEVITZKY RECORDINGS ASSOCIATION 3 Hutton Road Dover, MA 02030	Symphonic Interviews with Boston Symphony musicians.	Over 50 one-hour programs. Free of charge.
THE TELEMANN SOCIETY Independence Court Concord, MA 01742	17th and 18th century compositions. Some commentary.	Over 25 one-hour programs. Write for catalog.
RADIO STATION WIAA Interlochen, MI 49643	Concerts by students and faculty groups.	Write for information.
WCLV-SEAWAY PRODUCTION Penthouse East The Terminal Tower Cleveland, OH 44113	Cleveland Orchestra	Write for information.
BOSTON SYMPHONY TRANSCRIPTION TRUST PO Box 288 Boston, MA 02154	Boston Symphony Orch. Boston Pops Orch.	Over 100 one-hour programs. Price depends on market. Write for details.
LIBRARY OF CONGRESS Music Division Washington, DC 20540	Concert 90 minute length	One concert per week Write for details.
KEYBOARD IMMORTALS 455 Fox Street San Fernando, CA 91340	Piano/Classical	Free of charge

EDUCATIONAL PROGRAM SOURCES

Distributor	Content	Comment
GEROGETOWN UNIVERSITY Washington, DC 20007	"Georgetown University Forum" Varied topics.	Free on tape return basis Write for catalog.
YALE REPORTS 1773 Yale Station New Haven, CT 06520	General discussions. Medicine, ecomics, law, literature.	Write for catalog and cost
EARPLAY Vilas Communication Hall 821 University Avenue Madison, WI 53706	Radio drama, sound essays, music.	Write for catalog and cost
UNIVERSITY OF ILLINOIS Public Information Chicago Circle Box 4348 Chicago, IL 60680	Discussions about our environment. Old age, pollution.	Free on tape return basis Write for catalog
RADIO STATION WUOM University of Michigan 5501 LSA Building Ann Arbor, MI 48104	Commentary, lectures, discussions. Conservation, health.	Free on tape return basis Write for catalog
MEDICAL COLLEGE OF GEORGIA Div. of Institutional Rel. Augusta, GA 30902	"Exploring health"	Weekly series. Free of charge.
CORNELL UNIVERSITY Radio-TV Public Information 110 Day Hall Ithica, NY 14850	Science, Art, Ecology, Education, Politics, Nutrition, Astronomy, Athletics, Psychology	Write for catalog and cost Some tapes free of charge
UNIVERSITY OF CHICAGO Office of Radio-TV 1307 East Sixtieth St. Chicago, IL 60637	Discussions of widely varied topics.	Write for catalog. Free on tape return basis
MICHIGAN STATE UNIVERSITY National Voice Library East Lansing, MI 48823	Historical recordings going back almost 100 years.	Write for catalog and cost
UNIVERSITY OF TENNESSEE Dept. of Radio Services 232 Communications Bldg. Knoxville, TN 37916	History and culture of the American Indian. Analysis of the U.S. Constitution.	Free on tape return basis
LEAGUE OF WOMEN VOTERS 1730 M Street N.W. Washington, DC 20036	Interviews and discussions of current issues.	Write for list of latest tapes. Costs minimal. Phone service: 202-296-0218

Distributor	Content	Comment
CENTER FOR THE STUDY OF DEMOCRATIC INSTITUTIONS Box 4068 Santa Barbara, CA 93103	Dialogues between leaders in science, law, politics, business, education, philosophy.	Write for catalog and cost
HOLIDAY WORLD OF TRAVEL 69-10 108th Street Forest Hills, NY 11375	Tour of locations and cultures throughout the world with stories.	Write for catalog. Free of charge.
YOUR STORY HOUR RECORDINGS Dept. SU-972 P.O. Box 511 Medina, OH 44256	For and about children throughout the world.	Write for catalog. Free of charge.
SOUND SEMINARS McGraw-Hill Book Co. 1221 Avenue of the Americas New York, NY 10020	Tapes by well known persons on student revolt and urban problems.	Write for catalog. Samples available.
AGENCY FOR INTERNATIONAL DEVELOPMENT Radio-TV Dept. Room 4893 Washington, DC 20523	Leaders of developing nations of the world are interviewed by newsmen.	Write for catalog. Also ½ hour series "Overseas Mission". No cost to non-commercial stations
AMERICAN CHEMICAL SOCIETY 1155 Sixteenth St. N. W. Washington, DC 20036	Discussion of current advancements in the chemical industry	Series of tapes. Free of charge.
STANDARD OIL COMPANY 225 Bush St. San Francisco, CA	"Standard School Broadcast" Various topics.	Series produced on disk. Free of charge.
ORGANIZATION OF AMERICAN STATES 17th and Constitution Ave. Washington, DC 20006	Spanish lessons, spanish language programs of music, drama, interviews, features.	Write for catalog and cost
THE MUSEUM OF THE CONFEDERACY 1201 East Clay Street Rich mond, VA 23219	Programs deal with personalities and events of the American Civil War.	Write for more information
ZBS MEDIA Trade Relations R.D. 1 Fort Edward, NY 12828	Radio plays, documentaries, serials.	Write for catalog. Free to non-commercial stations.
FRED ROSEN ASSOCIATES, INC 110 East 59th Street New York, NY 10022	Discussions of how to protect yourself against crime hazards	A series of 30 and 60 second spot announcements. Write for more information.

Distributor	Content	Comment
EUROPEAN COMMUNITY INFORMATION SERVICE Suite 707 2100 M Street N.W. Washington, DC 20037	Short commentaries of social, political, and economic developments in the Common Market	Available weekly. Free of charge.
UNITED NATIONS RADIO Station Relations Room 862 New York, NY 10017	Discussion about major issues and the work accomplished by various UN agencies.	Free on tape return basis
RADIO STATION WDET(FM) 5035 Woodward Avenue Detroit, MI 48202	Features the American Indian as artist, poet, musician and activist.	Write for further information
RADIO STATION WOSU Program Supervisor 2400 Olentangy River Rd. Columbus, OH 43210	Book reviews, Jazz, and discussions of current issues.	Write for catalog and cost
RADIO STATION WIPR-AM-FM P.O. Box 909 Hato Rey, PR 00919	Spanish language radio drama, prose, short stories.	Write for catalog and cost Available for rental or purchase.
BIG SUR RECORDINGS 117 Mitchel Blvd. San Rafael, CA 94903	Lectures on growth of human potentialities. Derived from Esalen Institute, Jung Institute, Acadamy for Parapsychology and Medicine.	Write for catalog and cost Available for non-commercial use at no cost.
BROADCASTING FOUNDATION OF AMERICA 52 Vanderbilt Avenue New York, NY 10017	Varied topics include music, education, Literature, arts, travel.	Write for catalog and cost Non-commercial membership required ($125/yr). Talk shows on tape return basis
BROADCAST NEWS-WASHINGTON 3132 M Street N.W. Washington, DC 20007	Debates on Current Issues include senators, newsmen, economists.	Write for specifications
CAEDMAN RECORDS 505 Eighth Avenue New York, NY 10018	Poetry, drama. Shakepeare. Children's literary classics read by Karloff, Channing, Bloom.	Write for catalog. Special price to radio stations.
COMMUNETICS MULTIMEDIA 485 Madison Avenue New York, NY 10022	News about health and medicine.	Write for catalog. Produced on disk. Free of charge.

Distributor	Content	Comment
RESOURCE CENTER ON MEDIA, PHYSICAL EDUCATION DIV. Matthaei Building Wayne State University Detroit, MI 48202	History of Physical Education. Black atheletes.	Program dubbed on your blank tape. Write for catalog of other topics.
RADIO STATION WGGL Michigan Tech. University Houghton, MI 49931	Our dependency on electricity and its affect on business, economy, etc.	Free on return tape basis.
U.S. DEPT. OF HEALTH, EDUCATION AND WELFARE 5600 Fishers Lane, RM 14-102 Rockville, MD 20852	Mental health, drug abuse, alcoholism.	Free and may be kept by radio stations.
NRTA-AARP RADIO DEPT. Box 292 Long Beach, CA	How to get along with people, creative writing, American heritage.	Free to radio stations. Listener study guides are also available.
PACIFICA TAPE LIBRARY 2217 Shattuck Avenue Berkely, CA 94704	Talks & discussions of current issues, many on controversial topics.	Write for catalog and cost
RADIO FREE PEOPLE 133 Mercer Street New York, NY 10012	Peoples' Revolution Tapes. Complete programs.	For sale only - no rental. Write for more information
MOTHER EARTH NEWS P.O. Box 38 Madison, OH 44057	Ecology, alternate life styles, working with nature.	Free. Write for details.
BERKSHIRE FARM INSTITUTE FOR TRAINING AND RESEARCH Canaan, NY 12029	"Listen to Their Voices" Deals with drugs and juvenile delinquincy.	Free on tape return basis.
AUDIO VENTURE, INC. Canaan, NY 12029	Criminal justice, drugs, delinquincy.	Write for catalog and cost
RAI CORPORATION 1350 Avenue of the Americas New York, NY 10019	Newsletters, film reviews, art, music, profiles.	Write for catalog and cost
FEMINIST RADIO NETWORK P.O. Box 5537 Washington, DC 20016	Interviews, women and film, women in prison, music, plays, authors.	Write for catalog and cost
FIRING LINE P.O. Box 5966 Columbia, SC 29250	Interviews, debates with William F. Buckley.	Write for details.

Distributor	Content	Comment
AFL-CIO Public Relations Dept. 815 Sixteenth Street, N.W. Washington, DC 20006	John F. Kennedy's last words to labor.	Free. Tapes may be kept.
AMERICAN DENTAL ASSOCIATION Bureau of Audiovisual Serv. 211 East Chicago Avenue Chicago, IL 60611	Dialogue about Fluoridation and other dental health topics.	Free. Transcriptions may be kept.
AMERICAN PHYSICAL FITNESS RESEARCH INSTITUTE 824 Moraga Drive Box 90024 Bel Air, CA 90049	Discussion of hyperactivity, acupuncture, adverse reactions to food chemicals.	Free on tape return basis. Transcriptions may be kept.
NATIONAL PUBLIC RADIO Room 310 1001 Connecticut Ave. N.W. Washington, DC 20036	Censoring of textbooks, compulsory education, illiteracy in the U.S., and other topics.	Write for catalog. Free, materials may be kept.
NATIONAL SCIENCE FOUNDATION Room 531 1800 G Street, N.W. Washington, DC 20550	Encounters with science, interviews with men and women working on nation's scientific projects.	Write for catalog. Ask to be placed on mailing list. Free.
AMERICAN FOREST INSTITUTE Education Division 1619 Massachusetts Ave.N.W. Washington, DC 20036	Growth and conservation of our forests. Several topics in series.	Write for catalog. Free scripts and tapes.
AMERICAN FOUNDATION FOR THE BLIND Public Education Director 15 West 16th Street New York, NY 10011	How sightless persons can & do work in the sighted world. Informal interviews.	Write for catalog. Free.
AMERICAN MEDICAL ASSOCIATION 2323 New Hyde Park Road New Hyde Park, NY 11040	Good nutrition, importance of vitamins, minerals.	Short programs and public service announcement. Some materials may be kept.
AMERICAN LIBRARY ASSOC. 50 East Juron Street Chicago, IL 60611	An individual's right to dissent and other topics.	Write for catalog. Pay postage both ways.
NATIONAL TAPE REPOSITORY Stadium Bldg. 313 University of Colorado Boulder, CO 80302	Programs by U.S. Dept. of State. Business, oil and energy, Radio Free Europe, and much more.	Write for catalog and possible costs of rental, purchase or dubbing.

Distributor	Content	Comment
NATIONAL COMMITTEE ON U.S.-CHINA RELATIONS, INC 777 United States Plaza, 9B New York, NY 10017	Interviews with China specialist.	Write for more information
OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION State of Illinois Springfield, IL 62706	Weekly program of education news.	Recorded on plastic sound sheets.
UNICEF - UNITED NATIONS Audio Visual Services Rm A6106 - 866 UN Plaza New York, NY 10017	Feature stories about developing countries with emphasis on the children around the world.	Monthly feature. Free on a tape return basis.
EDUCATIONAL BROADCASTING ASSOCIATES P.O. Box 552 Waltham, MA 02154	Various topics and series.	Write for more information
APPLIED CONCEPTS 866 Third Avenue New York, NY 10022	Various Topics and discussions.	Write for more information
GEORGE GREEN ASSOCIATES 141 East 33rd Street New York, NY 10016	Various topics in discussion and series form.	Write for catalog and cost
CASPER CITRON PROGRAM 350 Park Central West New York, NY 10025	Various topics and discussions.	Write for catalog and cost
SILHOUETTES IN COURAGE 22 East 40th Street New York, NY 10016	Commentary on heroic events.	Write for catalog and cost
EDUCATIONAL COMMUNICATION 704 National Press Bldg. Washington, DC 20004	Documentaries of widely varied topics.	Write for catalog and cost
ALMANAC PRODUCTIONS Box 10356 Denver, CO	Various topics.	Write for more information
WESTPORT COMMUNICATIONS 155 E. State Street Westport, CT	Various topics.	Write for more information

Distributor	Content	Comment
THE GREAT OUTDOORS Outdoors Building Columbia, MO 65201	Wildlife, hunting, care of the environment, fishing, dog care.	Write for catalog. Free.
THE NATIONAL EXCHANGE CLUB 3050 Central Avenue Toledo, OH 43606	Crime prevention and other various topics.	Write for catalog. Free.
TIME-LIFE PRODUCTIONS 120 College St. SE Grand Rapids, MI 49502	Life sciences.	Write for further details.
CONSUMER'S UNION 256 Washington Street Mount Vernon, NY 10550	Consumer protection.	Write for details of series. Free.
SOCIETY OF SEPARATIONISTS P.O. Box 2117 Austin, TX 78767	Series of programs representing the Atheistic points of view.	Write for catalog. Free. Over 200 tapes available.
CLERGY AND LAYMEN CONCERNED Suite 507 1330 Massachusetts Ave.N.W. Washington, DC 20005	Well known, moderate-liberal Americans serving as news commentators.	Write for further details.
CONGRESS CALLING 300 Independance Ave. Washington, DC	News of Congressional activities.	Write for further details.

Program materials may also be available locally. Some of the offices listed below may already have prepared tapes and/or printed material. In some cases script writing will be required. Check your telephone directory for the proper address.

Check under state, county and city listings:

Board of Education
Dept. of Recreation
Chamber of Commerce
Adult Education
Law Enforcement
Dept. of Parks
Power Utility Co.
Water Districts
Automobile Clubs
Minority Groups
Dept. of Employment
Churches
Board of Supervisors
City or County Council
Consumer Affairs
Drama Groups
Assemblymen
Congressmen
Senator
Conservation
Newspapers
Dept. of Health

GOVERNMENTAL SOURCES

Distributor	Content	Comment
U.S. DEPT. OF AGRICULTURE 14th & Independence Ave.N.W. Washington, DC 20001	Various topics about American agriculture.	Write: Chief, radio & TV services. Public Service Announcements, programs.
U.S. DEPT. OF COMMERCE 14th & Constitution Ave.N.W. Washington, DC 20230	Travel, tourism, economic developments.	Write: Broadcast Media Director. Public Service Announcements. Programs.
DEPT. OF HEALTH, EDUCATION AND WELFARE 330 Independence Avenue S.W. Washington, DC 20201	Social Security, Food & Drug, Health, education, Civil Rights.	Write: Public Affairs. Public Service Announcements. Short programs.
U.S. DEPT. OF STATE 2201 C Street, N.W. Washington, DC 20520	National policy.	Write: Media Services. Public Service Announcements. Short programs.
U.S. INFORMATION AGENCY 1776 Pennsylvania Ave. N.W. Washington, DC 20547	Various topics of National concern.	Write: Public Information. Public Service Announcements. Short programs.
U.S. DEPT OF THE TREASURY 15th St. & Pennsylvania Ave. Washington, DC 20220	Internal Revenue Service news, U.S. Savings Bonds, Customs.	Write: Public Affairs. Public Service Announcements.
FEDERAL TRADE COMMISSION 6th St. & Pennsylvania Ave. Washington, DC 20580	Consumer protection.	Write: Public Information. Public Service Announcements. Newsletters.
NATIONAL AERONAUTICAL & SPACE ADMINISTRATION 400 Maryland Ave. S.W. Washington, DC 20546	Developments in the space program. Information about projects.	Write: Chief, Radio-TV. Short programs (5 min)
GENERAL SERVICES ADMIN. General Services Bldg. 18th & F Streets N.W. Washington, DC 20405	Various topics. Regular program "Consumer Focus".	Write: Public Information. Public Service Announcements and Newsletters.
NATIONAL LABOR RELATIONS BOARD 1717 Pennsylvania Ave. N.W. Washington, DC 20570	Labor problems.	Write: Public Information. Public Service Announcements and newsletters.
U.S. DEPT OF TRANSPORTATION 400 7th Street, S.W. Washington, DC 20590	Aviation, highway, and seaway safety and concerns.	Write: Public AffairsDir. Public Service Announcements and Newsletter.

NOTE: All materials received from the above sources are free.

PROGRAMS FROM FOREIGN SOURCES

Distributor	Content	Comment
BELGIAN RADIO AND TV International Service Eugeen Flageyplein 18 1050 Brussels Belgium	Music festivals, Belgian, French, and Dutch.	Write for catalog. All services are free.
AUSTRIAN INSTITUE Educational Tape Service 11 East 52nd Street New York, NY 10022	Literature, poetry, music, Viennese classics.	Free on tape return basis. Write for catalog and cost of purchase.
ASSOCIATION OF GERMAN BROADCASTERS 1 East 57th Street New York, NY 10022	"Germany Today" and "Music from Germany" are regular series programs.	Write for more detail. Tapes are free.
DEUTCHE WELLE Transkriptionsdienst 5 - Koln 1 P. O. Box 100 444 Federal Republic of Germany	Music programs include festivals, concerts. Talk shows also available.	All programs are free. Write for catalog.
SWEDISH BROADCASTING CORP. 1345 Avenue of the Americas New York, NY 10019	Short interviews on wide range of subjects and the arts.	All programs are free. Write for catalog.
RADIO AUSTRALIA Overseas Service Box 428G G. P. O. Melbourne, Australia 3001	Music, drama and special features.	Write for catalog. U.S. representative in New York. Australian Broadcast Comm. 1270 Ave. of the Americas New York, NY 10020
THE NETHERLANDS INFORMATION SERVICE 711 Third Avenue New York, NY 10017	Music and drama.	Free. Write for details.
NIPPON HOSO KYOKAI Program Exhange Division Uchisaiwai-cho Chiyoda-ku Tokyo 100, Japan	Talk programs in English, cover industry, economy, culture, sports, tourism, travel. Also Japanese lessons.	All material free except for copyright clearance. Write for details.
CBC INTERNATIONAL SERVICE English Language Section Room 971, Radio Canada Bldg. P.O. Box 6000 Montreal 101, Quebec Canada	Drama, documentary, history, children's stories, readings, lectures, and much more.	All materials free. Write for current catalog.

Distributor	Content	Comment
OVERSEAS PROGRAMMING COS.LTD. 230 Park Avenue New York, NY 10017	Historic radio drama as performed by Orson Welles, John Mills, Rex Harrison and others.	Write for further details. Prices negotiable, perhaps free to non-commercial stations.
OY. YLEISRADIO AB Kesakatu 2 00260 Helsinki 26 Finland	Finnish literature, music festivals, interviews.	Write for further details. All programs are free.
CONSULATE GENERAL OF PAKISTAN Information Center 12 East 65th Street New York, NY 10021	Instrumental music includes classical, flute, orchestral and folk.	Free on tape return basis.
NEW ZEALAND EMBASSY Information Officer 19 Observatory Circle N.W. Washington, DC 20008	Maori songs and dances. Famous Maori legends.	Free on tape return basis.
SOUTH AFRICAN BROADCASTING P.O. Box 4559 Johannesburg, Sout Africa	Music, culture, advancements in technology and science. Plays & talks.	Write for catalog. All materials are free.
CHINESE INFORMATION SERVICE 110 West 42nd Street New York, NY 10011	Music, culture, talks.	Write for further details.
KOREAN INFORMATION OFFICE Embassy of Korea 1828 Jefferson Place, N.W. Washington, DC 20036	Music, culture, talks.	Write for further details.
B.B.C. Hartwest Productions Inc. 635 Madison Avenue New York, NY 10022	Plays, readings, poetry, comedy. Several series available.	Write for catalog and cost.
ISTITUTO ITALIANO DI CULTURA 686 Park Avenue New York, NY 10021	History of the Romans, music, culture, lessons in Italian.	Free on tape return basis. Write for catalog.

RELIGIOUS PROGRAM SOURCES

Distributor	Content	Comment
GUIDELINES, INC 3011 South Madison Denver, CO 80210	General discussions Public Service	Write for tape catalog Free
GUIDELINES, INC Box 202 Redondo Beach, CA 90277	General discussions Public Service	Write for tape catalog Free
GUIDEPOSTS 747 Third Avenue New York, NY 10017	General discussions Public Service	Write for tape catalog Free
GOLDEN AVATAR PRODUCTIONS 3764 Watseka Avenue Los Angeles, CA 90034	Lectures and authentic chanting/music	Tapes, free of charge.
MARYKNOLL FATHERS Media Relations Walsh Building Maryknoll, NY 10545	General discussions Public Service	Write for tape catalog Free
MESSIAH BROADCAST STUDIOS Messiah College Granthem, PA 17027	General discussions Public Service	Write for tape catalog Free
NATIONAL COUNCIL OF CHURCHES 475 Riverside Drive New York, NY 10027	General discussions Daily and weekly series.	Write for specifications. Free. Tapes and albums.
RLDS CHURCH Saints Auditorium Independence, MO 64051	Organ music. Modern with commentary.	Free. One station per city.
SOUTHERN CHRISTIAN LEADERSHIP CONFERENCE 334 Auburn Avenue Atlanta, GA 30303	Analysis of issues affecting black communities. Sermons, Choir.	Free. Write for specifications.
THE LUTHERAN HOUR 2185 Hampton Avenue St. Louis, MO 63139	General discussions Choir	Write for specifications. Free
THE SOUND OF LISTEN Box 4390 Washington, DC 20012	General discussions of contemporary issues.	Audio version of LISTEN magazine. Free. Write for more information.
UNION THEOLOGICAL SEMINARY Audio-Visual Center Richmond, VA 23227	Music, poetry, drama, lectures, sermons, church conferences.	Write for tape catalog. Free.

Distributor	Content	Comment
AMERICAN BAPTIST CONV. Radio-TV Department Valley Forge, PA 19481	Lectures, sermons, choir.	Write for specifications Free
AMERICAN LUTHERN CHURCH Radio-TV Department 1568 Eustis Avenue St. Paul, MN 55108	General discussions, lectures, sermons.	Write for specifications Free
SOUTHERN BAPTIST CHURCH P.O. Box 12157 Fort Worth, TX 76116	Lectures, sermons, choir.	Write for specifications Free
THE UNITED PRESBYTERIAN CHURCH Division of Mass Media 475 Riverside Drive New York, NY 10027	General discussions, lectures, sermons.	Write for specifications Free
UPPER ROOM RADIO-TV 1908 Grand Avenue Nashville, TN 37203	General discussions.	Write for tape catalog Free
SACRED HEART PROGRAM INC. 3900 Westminister Place St. Louis, MO 63108	General discussion	Write for tape catalog Free
THE RADIO BIBLE CLASS 2303 Kalamazoo S. E. Grand Rapids, MI 49501	Bible study, lecture, discussions.	Write for specifications Free
THE EPISCOPAL CHURCH 815 Second Avenue New York, NY 10017	General discussion, choir, music.	Write for tape catalog Free
FAITH FOR TODAY 200 Stonehinge Lane Carle Place New York, NY 11514	Inspirational thoughts, some discussion.	Write for tape catalog Free
WORLD GOODWILL 866 United Nations Plaza Suite 566-7 New York, NY 10017	Discussion of issues.	Write for tape catalog Free
UNITED COMMUNICATIONS MISSION West Silver Star Rd. Route 3, Box 399 Orlando, FL	Lectures, sermons, music, choir.	Write for spefications Free

HISTORICAL RADIO PROGRAMS

Distributor	Content	Comment
Tom Wesley 3228 E. 13th St. Vancouver, WA 98661	"The Whistler"	Syndicated Write for more information
Jay Hickerson 6 Koczak Court North Haven, CT 06473	"Suspense", "Abbot & Costello","Fibber McGee and Molly", "Count of Monte Cristo", "Ellery Queen", "Henry Aldrich"	Write for catalog and cost
Chuck Schaden 8939 North Marion Avenue Morton Grove, IL 60053	"Fibber McGee & Molly"	Write for catalog and cost
Pat McCoy 1228 Lincoln Drive Pasco, WA 99301	Several listed.	Write for catalog and cost
Joel Siegel 2322 Sunset Heights Drive Los Angeles, CA 90046	"Hallmark Playhouse" "Acadamy Award Theatre"	Write for catalog and cost
Charles Michelson, Inc. 45 West 45th Street New York, NY 10036	"The Shadow" "Sherlock Holmes" "Gangbusters" "The Lone Ranger" "The Green Hornet"	Syndicated Write for catalog and cost Offers non-commercial rates
Charlie Garant Route 3 Greenville, TN 37743	Classical radio shows containing original commercials	Write for catalog and cost

The following publications list additional sources of historical radio programs as well as background information about the performers:

ECHOES OF THE PAST
c/o Don Pellow
705 E. Chandler Ave.
Evansville, IN 47713

HELLO AGAIN
c/o Jay Hickerson
6 Koczak Court
North Haven, CT 06473

RADIO DIAL
c/o Charles Ingersoll
Box 190
Cloquet, MN 55720

STAY TUNED
c/o Bob Joseph
1250 La Baron Circle
Webster, NY 14580

EPILOG
c/o George Jennings
7605 Sandra Drive
Little Rock, AR 72209

NORTH AMERICAN RADIO ARCHIVES
c/o Roger Hill
1231 Grove (Apt. 11)
San Francisco, CA 94117

SOURCES OF PUBLIC SERVICE ANNOUNCEMENTS

All materials received from the following sources are free and are non-returnable. Materials may be in script, tape or transcription form.

JOHNEY HORIZON
Washington, DC 20240

IN THE PUBLIC INTEREST
122 Maryland Ave. N.E.
Washington, DC 20002

U.S. AIR FORCE
Information Center
Bolling Air Force Base
Washington, DC 20332

DEPT. OF THE NAVY
Recruiting Aids Dept.
Washington, DC

THE SALVATION ARMY
130 West 14th Street
New York, NY 10011

AMERICAN FOUNDATION FOR
THE BLIND
15 West 16th Street
New York, NY 10011

ENVIRONMENTAL PROTECTION
AGENCY
Washington, DC

AMERICAN CANCER SOCIETY
1155 Sixteenth St. N.W.
Washington, DC 20036

U.S. ARMY
Publicity & Public Relations
620 Central Ave. Bldg. 3
Alameda, CA 94502

AMERICAN MEDICAL ASSOCIATION
535 North Dearborn
Chicago, IL 60610

AGENCY FOR INTERNATIONAL
DEVELOPMENT
Washington, DC 20523

UNITY
Unity Village, MO 64065

WAYOUT
Box 2829
Hollywood, CA 90028

AMERICAN OPTOMETRIC ASSOC.
7000 Chippewa Street
St. Louis, MO 63119

THE NATIONAL EXCHANGE CLUB
3050 Central Avenue
Toledo, OH 43606

AMERICAN FOUNDATION FOR
OVERSEAS BLIND
22 West 17th Street
New York, NY 10011

DRUG ABUSE CONTROL
1828 L Street, N.W.
Washington, DC 20036

AMERICAN CHIROPRACTIC ASSN.
2200 Grand Avenue
Des Moines, IA 50312

VETERANS ADMINISTRATION
11000 Wilshire Blvd.
Los Angeles, CA 90024

CONSUMER INFORMATION CENTER
Room 2660
7th & D Streets, S.W.
Washington, DC 20407

ST. JUDE CHILDREN'S HOSPITAL
Director of Communications
611 Massachttes Ave.
Indianapolis, IN 46204

Some of the above sources have local offices located in major cities. In addition, most states and some counties have public information services. State and county sources include: Department of Parks, Transportation, Highway Patrol, Sheriff, Consumer's Affairs, Medical and Health Agencies, etc. Check the listings in your telephone directory under U.S. Government, State, County offices, and Charitable Organizations.

NEWS SERVICES

Distributor	Content	Comment
ASSOCIATED PRESS (AP) 50 Rockefeller Plaza New York, NY	International, National, Regional news coverage. Also feature material.	Teletype newswire. Write for details and fees.
ASSOCIATED PRESS RADIO 1825 K Street N.W. Washington, DC 20006	Live newscasts, sports-casts, agriculture news, business news.	Audio service. Write for rates and services.
UNITED PRESS INTERNATIONAL 220 East 42nd Street New York, NY 10017	International, National, Regional news coverage. Also feature material.	Teletype newswire. Write for details and rates.
UPI AUDIO NETWORK 220 E. 42nd Street New York, NY 10017	Live newscasts, sports-casts, agriculture news, business news.	Audio service. Write for rates and services.
BLACK AUDIO NETWORK 166 Madison Avenue New York, NY 10016	Black oriented public affairs, actualities, special news programs.	Audio service. Write for rates and services.
EARTH NEWS 24 California Street San Francisco, CA 94111	Alternative news. Inter-views, Government boon-doggles, counter culture.	Write for further details and rates. Possibly free to non-commercial stations.
CAPITOL HILL NEWS 502 National Press Bldg. Washington, DC 20037	News accent on Capitol decisions. Actualities.	Write for further details and rates.
COMMODITY NEWS SERVICE 4800 Main Street Kansas City, MO 64112	Farm news, grain price, stock and other commodi-ties.	Write for further details and rates.
AMERICAN BROADCASTING CO. 1330 Ave. of the Americas New York, NY 10019	ABC News- ABC Informa-tion Network.	Write for rates, services, and availability in your area.
COLUMBIA BROADCASTING SYSTEM 51 West 52nd St. New York, NY 10019	CBS News.	Write for rates, services, and availability in your area.
NATIONAL BROADCASTING CO. 30 Rockefeller Plaza New York, NY 10020	NBC News.	Write for rates, services, and availability in your area.
MUTUAL BROADCASTING SYS. 918 16th Street, N.W. Washington, DC 20006	Mutual News.	Write for rates, services, and availability in your area.

ADDITIONAL SOURCES OF PROGRAM MATERIALS

Record distributors come and go but an excellent way to keep up-to-date about who is new in the business is to subscribe to one or both of the following trade publications. In addition to listing record sources, these magazines also include national music charts for rock, country, middle-of-the-road, etc.

BILLBOARD MAGAZINE
1 Astor Plaza
New York, NY 10036

RECORD WORLD MAGAZINE
200 West 57th Street
New York, NY 10019

An INTERNATIONAL BUYER'S GUIDE is also available from Billboard Publications, 9000 Sunset Blvd. Los Angeles, CA 90069.

A listing of FREE program sources available to schools is published by:

EDUCATORS PROGRESS SERVICE, INC
Randolph, WI 53956

Title: Educators Guide to FREE Tapes, Scripts, Transcriptions.

Information about advertising agencies, networks, program services, jingle producers, music licensing groups, and other broadcast services are presented in BROADCASTING YEARBOOK.

BROADCASTING PUBLICATIONS INC.
1735 DeSales Street, N.W.
Washington, DC 20036

Two complete one-hour radio shows hosted by WOLFMAN JACK and ROGER CARROL are available free from the U.S. Air Force Recruiting Office. For more detail write to:

U.S. AIR FORCE RECRUITING SERVICE
ATC/RSA
Randolph AFB, TX 78148

BROADCASTING ORGANIZATIONS

NATIONAL ASSOCIATION OF
EDUCATIONAL BROADCASTERS
1346 Connecticut Ave. N.W.
Washington, DC 20036

AMERICAN COUNCIL FOR BETTER
BROADCASTS
111 King Street
Madison, WI 53703

ASSOCIATION FOR PROFFESSIONAL
BROADCASTING EDUCATION
1771 N. Street, N.W.
Washington, DC 20036

SPEECH ASSOCIATION OF AMERICA
Radio-TV Interest Group
Statler Hilton Hotel
New York, NY 10001

NATIONAL ASSOCIATION OF
BROADCASTERS
1771 N Street, N.W.
Washington, DC 20036

NATIONAL PUBLIC RADIO
2025 M Street, N.W.
Washington, DC 20036

INTERCOLLEGIATE BROADCASTING
SYSTEM
Box 592
Vails Gate, NY 12584

NATIONAL ASSOCIATION FOR
BETTER BROADCASTS
P.O. Box 43640
Los Angeles, CA 90043

NATIONAL BLACK MEDIA COALITION
1816 T Street, N.W.
Washington, DC 20009

NATIONAL ASSOCIATION OF FM
BROADCASTERS
420 Madison Ave. Suite 803
New York, NY 10017

NATIONAL ASSOCIATION OF STATE
RADIO NETWORKS
Box 1000
Oklahoma City, OK 73101

FM ROCK BROADCASTERS ASSN.
Box 6071
New Orleans, LA 70114

COUNTRY MUSIC ASSOCIATION
1511 Sigler Street, Suite 111
Nashville, TN 37203

INTERNATIONAL CHRISTIAN
BROADCASTERS
Box 6516
Clearwater, FL 33518

UNDA-USA
Catholic Broadcasters Assn.
305 Michigan Avenue
Detroit, MI 48226

AMERICAN WOMEN IN RADIO
1321 Connecticut Ave. N.W.
Washington, DC 20036

NATIONAL COMMITTEE FOR THE
SUPPORT OF FREE BROADCASTING
1771 N Street, N.W.
Washington, DC 20036

In addition to the above, your own state may have a broadcasting association. Check your telephone directory under "State Offices" and "Associations". If none are listed in your directory, check with the telephone information operator at your state capitol.

How To Get Into

BROADCASTING

By

Ernest G Wilson

HOW TO GET INTO BROADCASTING

Illustrations by Rick McCannon

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CONTENTS

INTRODUCTION

One of the most dramatic developments of 20th Century technology has been the use of radio waves - electromagnetic radiations traveling at the speed of light - for communication. Radio communication was born of many minds and developments. In the 1860s, the Scottish physicist, James Clerk Maxwell, predicted the existance of radio waves. Heinrich Rudolf Hertz, the German physicist, later demonstrated that rapid variations of electric current can be projected into space in the form of waves similar to those of light and heat. In 1895, the Italian engineer, Guglielmo Marconi, transmitted radio signals for a short distance, and at the turn of the Century he conducted successful transatlantic tests.

The first practical application of radio was for ship-to-ship and ship-to-shore telegraphic communication. Marine disasters quickly demonstrated the speed and effectiveness of radiotelegraphy for saving life and property at sea.

Many people began to see the exciting possibilities of this new wonder. Hundreds of experimenters, radio amateurs, built receivers and transmitters in their basements and living rooms. They began experiments with voice communication and broadcasting was on its way to being born.

The origin of the first voice broadcast is a subject for debate. There is one claim that it took place in Murray, Kentucky in 1892 between two neighbors. Another claim states that it was an impromptu program from Brant Rock, Massachusetts in 1906 which was received by passing ships. Other early experiments included those of Lee DeForest transmitting the voice of singer Enrico Caruso in 1910 and the Transatlantic voice tests by the Bell Telephone Company in 1915, but it was not until after World War I that regular broadcasting began.

The identity of the "first" broadcasting station is also a matter of conflicting claims. This is due largely to the fact that some pioneer AM broadcast stations developed from experimental operations. Although KDKA, Pittsburgh, did not receive a regular broadcasting license until November 7, 1921, it furnished programs under a different authorization before that date. Records of the Department of Commerce, which then supervised radio, indicate that the first station issued a regular broadcasting license was WBZ, Springfield on September 15, 1921. WBZ later moved to Boston.

Early experiments in network operation produced a broadcast of the World Series by WJZ (now WABC) in New York City and WGY in Schenectady, New York, in 1922. In 1923 WEAF (now WNBC), New York City and WNAC in Boston, broadcast a football game from Chicago. Later that same year several stations broadcast President Coolidge's message to Congress. By 1927 twenty-four stations stretched from coast-to-coast broadcast the same football game. The National Broadcasting Co., a subsidiary of Radio Corporation of America, was formed in 1926. In 1927 the Columbia Broadcasting System, first called the Columbia Phonograph Broadcasting System, was organized.

The 1930s saw an increase in radio stations to over 700 with their signals reaching almost all Americans. Whole families gathered together in the evenings to listen to their favorite programs. Radio had become America's largest entertainment medium with millions of people listening to Amos and Andy, Fred Allen, Kate Smith, Jack Benny and many others. News of World War II was brought into homes directly from the battlefields, from cities during bombing attacks, and from the decks of warships. News reporting came of age in the voices of newsmen Edward R. Murrow, H. V. Kaltenborn and John Daly.

For some years NBC operated two networks, the Red and the Blue, but when the FCC adopted chain broadcasting rules in the early Forties, one organization was prohibited from operating two networks serving the same area at the same time. RCA, owner of NBC, sold the Blue Network to Edward J. Noble in 1943. It ultimately became the American Broadcasting Company. In 1968 ABC was given a limited exception to the dual-network rule in order to operate four radio networks each providing a specific service.

FM and TV broadcasting emerged from their experimental stage just before the United States entered World War II. Wartime restrictions retarded expansion of radio facilities, although the emergency produced new techniques and apparatus that are in use today. In the decades following the war, broadcasting expanded domestically, and the development of communication satelites has opened new possibilities for international relay and world broadcasts.

Although radio continued as a leader in entertainment and information of world news, the industry began to change after World War II. Stations began programming for specialized audiences. Programs and radio plays were replaced with all-music programs aimed at teen-agers, classical music enthusiasts, and country music fans. The number of radio stations has grown to such an extent that almost every city and town in the United States is within the service area of its own station. Further expansion has been the development of transistor radios that fit in your pocket and stereo radio reception in automobiles. Radio is truly everywhere.

Radio and television have had a tremendous impact in every phase of our lives. This presents the broadcaster with an overwhelming responsibility. Dean George Gerbner of the Annenberg School said it this way:

"In only two decades of massive national existence, radio and television have transformed the political life of the nation, have changed the daily habits of our people, have moulded the style of the great generation, made overnight global phenomena out of local happenings, and redirected the flow of information and values from traditional channels into centralized networks reaching into every home. In other words, they have profoundly affected the process by which members of our species become human."

WHAT ARE THE JOB OPPORTUNITIES?

Nearly half of all employees in broadcasting hold professional and technical jobs such as staff announcer, newsman, continuity writer, or broadcast technician. About one-fourth hold managerial jobs such as producer, manager, or director. Clerical workers account for about one-seventh of all those employed, and sales workers for about one of every 20.

There are over 7000 commercial AM and FM stations, and over 700 VHF and UHF television stations in the United States. In addition to commercial stations, there are about 800 non-commercial broadcast stations and 250 non-commercial TV stations. In 1975 these stations employed about 150,000 full-time employees and 33,000 part-time workers.

Most commercial broadcast stations are small, independent businesses. The average radio station has about 12 full-time employees and 4 part-time workers. Television stations are generally larger, and on an average, they employ about 60 full-time and 8 part-time employees.

Broadcasting stations offer a variety of interesting jobs in all parts of the country. Opportunities for entry jobs are best at stations in small communities. Generally,the most specialized and best paying jobs are in large cities, especially those with national network stations. Nevertheless, the talented individual will have many opportunities to advance to good paying jobs in stations located in smaller communities. Employment in a small station helps gain experience before moving on to a major market station.

Employees of broadcasting stations generally specialize in one of the following areas:

Operations

The General Manager is in charge of the business management and administrative responsibilities that are part of operating a radio station. The job requires a combined business sense and creativity. Often the owner or part-owner of the station, the general manager must handle the day-to-day problems, establish policy, and supervise all of the station's employees. This position usually is filled by a person that has had several years of experience in one or more areas of broadcasting including sales and programming responsibilities.

Office Staff In small stations the general manager and his secretary may handle all the functions of typists, file clerk, receptionist and accountant. Where the size of the station warrents the employment of full-time specialists, the staff may include accountants, publicity specialists, personnel workers, secretaries, purchasing agents, etc.

The Sales Manager supervises a staff of several salespersons, develops sales plans and packages which appeal to prospective sponsors, and hires and trains new salespeople. Most sales managers have had a successful career in broadcasting and have risen from the ranks but will continue to sell and service some of the station's larger accounts. Some large stations may also employ statistical clerks and research personnel to assist the sales staff by analyzing and reporting market data and trends under the supervision of the sales manager.

Time Salesmen sell time on the air to sponsors, advertising agencies, and other buyers. They must have a thorough knowledge of the station's operations and the characteristics of the area it serves that are of most interest to advertisers. Characteristics of concern would include population, number of radio and television sets in use, income levels, and consumer patterns. Time salesmen in large stations often maintain close relationships with particular sponsors and advertising agencies by selling time and acting as general consultants in matters pertaining to advertising through the station. In very small stations, the time salesman also may handle other functions such as writing their client's commercial announcement and perhaps voicing and producing it as well.

Programming

The Program Manager or Program Director arranges for a combination of programs that will be most effective in meeting the needs of both the station's advertising clients and the station's audience. Other responsibilities include the supervision of program staff employees. This position is usually filled by someone with several years of broadcast experience.

The Traffic Manager prepares the daily schedules and keeps accurate records of which programs were broadcast, at what time they were broadcast, the number of times sponsor's commercial messages were broadcast, and the amount of commercial time still available for sale.

The Music Director selects, arranges, and directs suitable music for programs on general instructions from the program director. The music director usually watches closely the trend in musical selections made by other stations, record sales in the area, and other indicators of audience desires in order to remain competitive in air time sales.

The Music Librarian receives new records, catalogs them, adds them to the station's music library, orders new records, and answers requests for any particular selection or type of music. A music librarian is seldom required at a small station where the music director and music librarian jobs are combined in one person.

The Continuity Director is responsible for the writing and editing of all scripts or the supervision thereof. The continuity director may assist a continuity writer in the preparation of public service announcements and commercials for inclusion in the announcer's script book, often refered to as the "Copy Book".

The Program Staff produces the daily and weekly shows, assign personnel to cover special events, and provide general program services. The size of the programming staff depends on the extent to which its broadcasts are live, recorded, or received from a network. In small stations the program functions are handled by a few people who make commercial announcements, read news, give sports summaries, select and play recordings, and introduce network programs.

The News Director plans and supervises the overall news and special events coverage of the station. In addition to daily coverage of the news, sports, weather, and, in rural areas, farm reports, the news department also presents special programs covering such events as conventions and disasters. News gathering and reporting is an increasingly important aspect of today's programming and requires an experienced person to fill this position.

The Newswriter selects and writes news copy to be read on the air. The news may be gathered directly from the scene or may be edited from any one of several news sources and wire services.

A Newscaster is an announcer whose primary function is to broadcast the daily news programs and report on special events on the scene. In small stations the newswriter and newscaster may be the same person.

Announcers are the largest and best known group in the programming department. In radio and television stations of all sizes, the announcer introduces programs, guests, musical selections, and delivers most of the live commercial messages.

The Disc Jockey is a type of an announcer only found in radio. Disc jockies are, basically, entertainers and salespersons while on the air, and sometimes off the air as well. They sell not only a particular brand of music (hard rock, middle-of-the-road, country, rhythm and blues, etc.) but also their sponsor's products, their station, and themselves. Interspersed with the music, the disc jockey may present news and sports items,time, weather and public service announcements, along with commercial messages. In presenting a program, particularly on AM stations, the disc jockey strives to develop an individual style and personal following.

On most smaller AM radio stations the disc jockies have a rigorous job. They may be on the air as much as four or five hours at a time and be their own board engineer as well. They usually work in a small control room, and while on the air, are continually in motion, sometimes doing several things at once to ensure that the broadcast has continuity. Programs are planned in advance, and the station log or schedule, the disc jockey's guide to the order of program selections and announcements, is close by for easy referral.

The disc jockey at a large metropolitan "split operation" station (one in which announcer and board engineer are separate jobs) has more technical help. In either case, a great deal of skill is necessary to bring off a program that may seem rather simple. Much of the disc jockey's repertoire is ad-libbed. It must be interesting, it must fit well in the available time, and it must be in keeping with the desired image of the station and show.

Off-air duties of disc jockies vary. Most are required to do some form of commercial "production" work consisting of recording commercial and public service announcements. Before the show, the disc jockey must also rehearse any commercial copy or other material which is to be read live. In small, non-union stations, the disc jockey may be required to write commercial messages or sell air time.

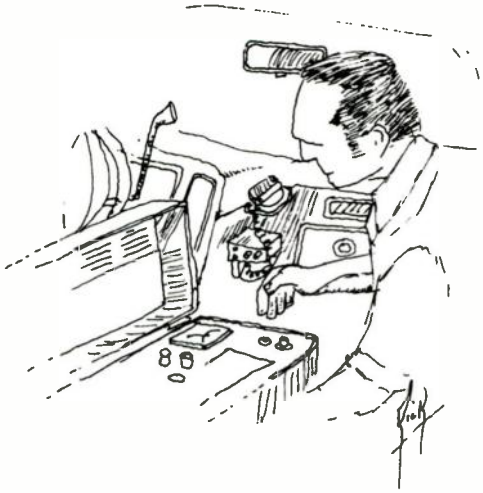
Engineering

The engineering department has the responsibility of maintaining all station equipment to provide reliable and quality broadcasts. The program, sales, and other departments of the station rely on the engineering department as the final link between the station and its listeners.

The Chief Engineer supervises the engineering department. A large station may have several broadcast technicians assigned to various tasks with the department. A small station may have an engineering department consisting of only the chief engineer who may also have additional duties such as working as a control board operator part of the time. The chief engineer usually has several years of experience as a broadcast technician working in one or more stations. The holder of this position must be fully qualified in all areas of broadcast engineering and have an FCC Radiotlephone First-Class Operators License. Other duties include the repair of sophisticated equipment, design of special equipment, and purchases of new equipment

The Broadcast Technician is usually responsible for proper operation of the transmitter including all adjustments to assure that transmissions are within FCC limits. The technician also operates, tests, and repairs studio equipment such as microphones, turntables, tape recorders, and audio control boards. Remote broadcasts, (broadcasts from outside of the studio) such as coverage of football games, are usually handled by broadcast technicians. Qualified technicians may advance to the position of chief engineer.

The Control Board Operator (engineer) mixes together several audio signals originating from turntables, tape play-back units, microphones, network feeds, and telephone conversations. The operator controls the level of sound the listener hears and sequences each source of program material to provide audio continuity.



THE WORKING CONDITIONS

Broadcasters in large stations generally work a 40-hour week with overtime pay for work beyond the 40 hours. They are usually members of a broadcast union and enjoy fringe benefits including paid vacations, sick leave, and medical insurance. The work is challenging, often fast paced, and interesting.

Employees of small broadcast stations have a greater probability of working shorter or longer hours than the standard 40 per week. Many small stations are not unionized and do not provide employees with paid vacations, sick leave or other benefits. Some employees may be responsible for several jobs within the station. For example, announcers may also be their own board engineer (called "combo" operation), while a newsperson may also perform general office tasks or double as a salesperson.

Evening, night, and weekend work is frequently necessary since many stations are on the air 24 hours a day, 7 days a week. Although the general office staff, salespeople, music director, etc., leave at the end of the regular work day, announcers and technicians are scheduled for night work. Technicians in particular are required to work evenings and nights, when station operation is at a minimum, for maintenance of the transmitter and other equipment. Announcers are usually scheduled for a 4-hour on-the-air shift with the remainder of their time devoted to recording spot announcements, publicity and public relations.

HOW MUCH CAN YOU EARN?

The amount you can earn as a beginner varies between small and large stations, union and non-union stations, different areas of the country, and between AM, FM and TV stations.

Small market stations are usually non-union with part-time and week-end shift work ranging from $2.00 to $3.20 per hour. Full-time salaries can range from $350.00 per month for a beginner to $750.00 per month for an experienced person. Part-time and week-end shift employees generally do not receive employee benefits.

Medium market stations, feeders for larger stations, may or may not be unionized. Non-union starting salaries begin around $450.00 to $550.00 per month. Experienced announcers and key personnel may earn up to $1000.00 per month. Sales positions may be salaried but also receive a commission on each sale.

Large market stations generally are unionized. Starting salaries range from $145.00 to $245.00 per week ($620.00 to $1050.00 per month). Experienced applicants and employees may receive between $190.00 and $365.00 per week($815.00 to $1550.00 per month). Announcers (disc jockey personalities) in major markets earn up to $50,000.00 a year.

Cable television systems that originate some their own programming require a modest programming staff, camera operators, and technicians. Salaries start at about $400.00 per month with a top salary between $700.00 and $900.00 per month. Programming staff and camera operators may be hired on a part-time basis.

HOW TO QUALIFY FOR A JOB IN BROADCASTING

Of course a formal education at a broadcasting school will go a long way toward getting a job in radio or television, but initiative will go a long way too. If you have that initiative you can certainly get yourself into a good job in broadcasting.

Your method of obtaining a job in broadcasting without attending a broadcasting school will largely depend on your career interests. You will want to read as many books and trade magazines, dealing with those interests, as you can put your hands on. Your County Library is an excellent source for the books you will need. Trade magazines may be borrowed from local radio stations or purchased through subscription. Suggested books and magazines are listed at the end of this book.

You will also want to research the job that interests you the most. This can be done by having a local station help teach you what you will need to know. Go to a station and tell the General Manager you are very interested in broadcasting. Ask if you might have permission to watch the station staff at work. Mention that you would greatly appreciate this opportunity, that you will not be in anyone's way, but you would like to ask a few questions now and then. Ask also, if it would be alright for you to visit the station for a few days under these same conditions.

After a while, when you get to know some of the station staff, ask if there is anything you can do to help with their job. Explain that in helping them you will gain a greater understanding of their job. You must do this carefully. Do not appear to be pushy, just interested. If you have not been a bother to them they probably will be helpful. You may also have a chance to sit-in with the DJ, help the board engineer, and be present during recording of public service messages and commercials.

To succeed as an announcer or disc jockey, you must have a pleasant and well controlled voice, a good sense of timing, and excellent pronunciation. A thorough knowledge of correct English usage and a knowledge of dramatics, sports, music and current events improve chances for success. When on the air, you may have to react quickly and imaginatively in unusual situations. You must also be a convincing salesperson when presenting commercials. Most successful announcers have a combination of personality and showmanship that makes them attractive to their audience.

Listen to stations in your area and draw a "clock" of their hourly presentations. A clock is simply the face of a clock drawn on a piece of paper showing the times different things are broadcast. At the "top of the hour" the announcer will give a station identification (ID), this may be followed by a "jingle" and then a top-10 record, another record, a back announcement, then a commercial at about 6 minutes after the hour, etc. Listen for a full hour and draw a complete clock. Do this for several stations and compare how they present their music, news, commercials, etc. Later, when you have some idea what each station is trying to do, go to a station's Program Director and ask if you can be given an explanation of why certain portions of the program are presented at specified times.

Listen to several disc jockies and how they present music, public service announcements and commercials. Pick up a newspaper or magazine, find an advertisement, and read it out loud in a style like that of the disc jockies. Imitation of a disc jockey's style is a good start but you will want to sound like yourself. You should develop your own style. Have one of your friends listen to your announcements and make suggestions to you. When you feel you can read a commercial advertisement fairly well, and perhaps a bit of news style as well, approach one of the radio stations in your area and ask them how you sound. Explain you are very serious about broadcasting and are anxious to hear their comments and suggestions. If you are good, and have established a good relationship with the station from previous visits, ask if you can record a public service announcement for them.

To qualify in other areas of programming you should have some background in writing and journalism. Typing skills and an understanding of clerical procedures are also helpful in this area. A thorough knowledge of several types of music and an up-to-date knowledge of artists and record companies is essential for working in the music department.

If your desire is to become a broadcast technician then you should plan to get an FCC Radiotelephone First-Class License. Federal law requires that anyone who operates or adjusts broadcast transmitters must be so licensed. Some stations require all their technicians to have this license even though they may not be in actual charge of transmitter operation. Building and operating an amateur radio station provides excellent training in preparation for the license examination. Technical school electronics courses also give a firm foundation for the knowledge required. Study guides and samples of examination questions are available from various sources, some of which are listed at the end of this book.

It is not necessary for a disc jockey, announcer or newscaster to have a license of any kind. However, if the announcer is required to also operate the transmitter as part of the regular duties then a license is required. Most AM stations and all TV stations require that a Radiotelephone First-Class Licensee be in charge of the transmitter. Almost all FM stations,however, require only a Radiotelephone Third-Class Operators Permitee be in charge of the transmitter. The Third-Class Permit must also have the words "Broadcast Endorsement" typed or printed on it by the issuing FCC office. Your chances of employment will be greatly improved if you have one of these, the license or the permit, before you apply for a job at any station. Don't put it off. Make this one of your first study projects. Third-Class study guides and samples of examination questions are listed at the end of this book. The examination must be taken at an FCC field office. Check your telephone book under United States Government listings to determine the location of your nearest Regional FCC office. Call or write them for further information about examination days and times.

Qualifications for entry into broadcast sales includes knowledge of advertising and the ability to sell. This ability is usually a combination of oral facility, competitive drive, a pleasant personality, and a willingness to work hard. Station managers prefer salespeople that have had prior experience in selling intangibles such as life insurance and newspaper and magazine advertising space.

You should be familiar with some of the history of broadcasting and the nature of the broadcasting industry today. It is important also that you have an understanding of how AM and FM stations work, some of their characteristics, and how and by whom they are governed. All of this information is covered in the following chapters.

STARTING YOUR OWN STATION

The United States Federal government has said "Any qualified citizen, firm or group may apply to the Federal Communications Commission for authority to construct a standard (AM), frequency modulation (FM), or television station." This means that you have the opportunity to start your own radio station. You may do so as an individual or as a group effort. The station may be operated as a business, a community service, or as a school or college project. In any case, you can put your best ideas to work - perhaps as your own boss.

Most radio stations have no need to worry about programming materials. Bonafide stations receive promotional copies of records from manufacturers almost on a daily basis. Quite often duplicate copies of new releases are sent to stations for the disc jockies to give away to their listeners. Charitable and non-profit organizations, and governmental agencies supply free taped public service announcements. Educational programs are available on both record and tape from all over the world, many of which are free for the asking. In most cases tapes do not have to be returned to the originator which allows the station to use outdated tapes for its own use.

The easiest type of station to construct uses the Carrier-Current method of transmission. This is a "wired" wireless system which uses power lines or intercom lines to carry a radio signal to various parts of a building. Carrier-Current stations have unlimited broadcast hours, may sell air time, and are not required to have the station, or its operators, licensed. Although the power and coverage is limited by FCC Rules, it is adequate for dormitories, classrooms, and over most of the grounds of a small campus. Operation of a Carrier-Current station can help develop skills, procedures, and techniques prior to the establishment of a larger station or in preparation for job entry into commercial radio.

A cable FM station makes avaliable a larger coverage area consisting of a whole community and sometimes several communities. This larger coverage area can provide a potential audience in the tens of thousands in medium to heavily populated areas. Air time sales can provide a continued income for the operator both as a salary and for further expansion of the station's facilities. Some cable FM stations have reported incomes up to $17,000 per year. The station's hours are unlimited, construction is relativily easy, stereo operation is practical, and neither the station or its operators require an FCC license. Although the transmitter is usually located at the cable TV company, furnishing each of its subscribers with the station's signal, the studio may be located anywhere. The studio may be part of a classroom, it may be in a spare room at the cable TV company, or it may be in an individual's home. All of these factors make the Cable FM station a particular favorite of schools and colleges. The Cable FM station also affords an excellent opportunity for a person to earn an income while providing his or her community with cultural, religious or entertainment services.

FM broadcast stations operate with output powers ranging from 10 watts to 100,000 watts. Coverage area is greatly expanded over Carrier-Current and Cable FM stations, extending to about 10 miles for small stations and over a hundred miles for larger stations. All of the FCC Rules governing broadcast stations apply. These rules include the requirements of obtaining a construction permit, a station license, and that each operator of the station has an FCC license or permit. A person having an FCC Radiotelephone First-Class License is required for adjustment, maintenance, and repair of the transmitter. Normal operation of the transmitter may be performed by operators having a Radiotelephone Third-Class Permit endorsed for broadcast operation.

FM broadcast stations are licensed as either commercial or non-commercial operations. The main differences are that commercial stations sell air time, are operated as a business, and they are required to pay certain FCC fees. Commercial stations may receive gross incomes of several hundreds of thousands of dollars each year. Non-commercial stations are not allowed to sell air time but they may solicit and receive donations of money, services, or materials. The names of the contributors may be announced on the air but not as a commercial announcement. Non-commercial stations are often owned and operated by schools, colleges, churches, and community interest organizations. As a non-commercial operation, the station is not required to pay any FCC fees.

The FCC is lifting a long freeze on the allocation of new AM stations. A new station classification in the 2,500 watt range has been proposed with several new stations being allowed. Generally more expensive to build than an FM station, the potential commercial income is also larger. The audience for AM stations is huge. Almost everyone has an AM radio at home, in their car, at work, or may carry a transistor radio along with them. As a general rule, AM stations employ operators who have a First-Class license although some small non-directional stations may also employ a few operators with a Third-Class permit.

A handbook entitled "The Broadcaster's Guide to Radio Station Development" is a step-by-step guide to the planning, licensing and operating of your own radio station. It describes in detail the various types of stations, how to select a facility, how to get along with the FCC, how to prepare application papers, and much more. For further information refer to the "Broadcasting Books" section.

WHAT YOU SHOULD KNOW ABOUT THE FCC

The Wireless Ship Act of 1910 applied to use of radio by ships, but the Radio Act of 1912 was the first domestic law for general control of radio. It made the Secretary of Commerce and Labor responsible for licensing radio stations and operators.

Early broadcasting was experimental and therefore noncommercial. In 1919, radiotelephone experiments were enabled to operate as "limited commercial stations". In 1922, the wavelength of 360 meters (approximately 830 kilocycles per second) as assigned for the transmission of "important news items, entertainment, lectures, sermons, and similar matter".

Recommendations of the first National Radio Conference in 1922 resulted in further regulations by the Secretary of Commerce. A new type of AM broadcast station came into being, with minimum power of 500 watts and a maximum of 1000 watts (1 kilowatt). Two frequencies (750 and 833 kilocycles per second) were assigned for program transmission.

So rapid was the development of AM broadcasting that upon recommendation by subsequent National Radio Conferences in 1923 and 1924, the Department of Commerce allocated 550 to 1500 kilocycles per second for standard broadcast and authorized operating power up to 5000 watts (5 kilowatts).

Increasing numbers of AM stations caused so much interference that, in 1925, a fourth National Radio Conference asked for a limitation on broadcast time and power. The Secretary of Commerce was unable to deal with the situation because court decisions held that the Radio Act of 1912 did not give him the authority. As a result, many broadcasters changed frequencies and increased power and operating time at will, regardless of the effect on other stations producing bedlam on the air.

In 1926, President Coolidge urged Congress to remedy matters. The result was the Dill-White Radio Act of 1927.

The Radio Act of 1927 created a five-member Federal Radio Commission to issue station licenses, allocate frequency bands to various services, assign specific frequencies to individual stations, and control station power. The same Act delegated to the Secretary of Commerce authority to inspect radio stations, to examine and license radio operators, and to assign radio call signs.

Much of the early effort of the Federal Radio Commission was required to straighten out the confusion in the broadcast band. It was impossible to accommodate the 732 broadcast stations then operating. New regulations caused about 150 of them to surrender their licenses.

At the request of President Roosevelt, the Secretary of Commerce in 1933 appointed an interdepartmental committee to study electrical communications. The committee recommended that Congress establish a single agency to regulate all interstate and foreign communication by wire and radio, including telegraph, telephone, and broadcast. The Communications Act of 1934 created the Federal Communications Commission for this unified regulation. This is the statute under which the FCC operates and which it enforces. Several of its provisions were taken from the earlier Radio Act.

The FCC began operating July 11, 1934, as an independent Federal agency headed by seven Commissioners, who are appointed by the President with the advice and consent of the Senate.

One of the FCC's major activities is the regulation of broadcasting. This has three phases:

The first is the allocation of space in the radio frequency spectrum to the broadcast services and to many nonbroadcast services which also must be accommodated. In view of the tremendously increased use of radio technology in recent decades, the competing demands for frequencies are among the Commission's most pressing problems. Fortunately, as technology has advanced, frequencies higher and higher in the spectrum have become usable. Apart from the frequencies used for broadcasting, frequencies in other portions of the spectrum are allocated for "broadcast auxiliary" use by remote pickup and other transmitters auxiliary to main broadcast stations.

The second phase of regulation is the assignment of stations in each service within the allocated frequency bands, with specific location, frequency, and power. The chief consideration, though by no means the only one, is to avoid interference with other stations on the same channel (frequency) or channels adjacent in the spectrum. If a person's application is granted, the applicant for a new station or for changed facilities receives a construction permit. Later, when the station is built and it is capable of operating as proposed, a license to operate is issued.

The third phase is regulation of existing stations: inspection to see that stations are operating in accordance with FCC Rules and technical provisions of their authorizations, modifying the authorizations when necessary, assigning station call letters, licensing transmitter operators, processing requests to assign the station license to another party or transfer control of the licensee corporation, and processing applications for renewal of license. At renewal time, the Commission reviews the station's record to see if it is operating in the public interest.

A summary of the most pertinent FCC Rules and Regulations is included in the publication BROADCASTING YEARBOOK. The "Yearbook" is recommended reading for the serious broadcaster. See the "Trade Magazines" section of this handbook for further details.

Although educational and other noncommercial stations share the airwaves, the American broadcasting system for the most part is a commercial system. In this respect it is supported by revenues from those who advertise goods or services to the audience. Advertising messages are presented as commercial "spot announcements" before, during, and after programs, or as part of "sponsored" programs.

Broadcast stations are licensed to serve the public interest, convenience, and necessity. Because radio channels are limited and are part of the public domain, it is important to entrust them to licensees with a sense of public responsibility. By law, each license must contain a statement that the licensee does not have any right to operate the station or use the frequency beyond the term of the license. The maximum term of license is three years.

Under requirements of the Communications Act, applicants must be legally, technically, and financially qualified, and they must show that their proposed operation would be in the public interest. They must be citizens of the United States. Corporations with alien officers or directors or with more than one-fifth of the capital stock controlled by foreign interests may not be licensed.

Penalties for broadcast station violations, depending upon the degree of seriousness, range from reprimands, fines up to $10,000, and short-term probationary licenses to denial of license renewal, or even license revocation. Cease and desist orders may also be issued by the Federal Communications Commission.

In 1965, the Commission provided for public inspection of certain records of broadcast stations in the communities they serve. These are mainly duplicate copies of records in the public files of the Commission in Washington, and include licenses, records of ownership, applications to the FCC and related material, network affiliation contracts, and employment reports.

Under the Communications Act, it is the responsibility of each broadcast licensee to program in the public interest. The Commission does not prescribe the time to be devoted to news, educations, religion, music, public issues, or other subjects. Programing can vary with community needs at the discretion of the station licensee.

Licensees are expected to ascertain and meet the needs of their communities in programing. Applicants must show how community needs and interests have been determined and how they will be met. The Commission periodically reviews station performance, usually in connection with the license renewal application, to determine whether the licensee has lived up to its obligations and the promise it made in obtaining permission to use the public airwaves.

The Commission is forbidden by law from censoring programs. The Communications Act, Section 326, states: "Nothing in this Act shall be understood or construed to give the Commission the power of censorship over the radio communications or signals transmitted by any radio station, and no regulation or condition shall be promulgated or fixed by the Commission which shall interfere with the right of free speech by means of radio communication."

The industry tends to be self regulating. Radio and TV "codes" are administered by the National Association of Broadcasters for the guidance and voluntary compliance of stations subscribing to the codes. The codes govern programing and advertising practices.

WHAT IS AM AND FM?

Although "AM" and "FM" are often used to refer to the standard broadcast and FM broadcast services, these terms more properly apply to methods--"amplitude modulation" and "frequency modulation"-- used to impress aural or visual intelligence on the carrier wave. The "AM" principle is used not only in the standard broadcast service but also in the picture portion of television and in the international "shortwave" service. The "FM" principle is used both in the FM broadcast service and in the sound portion of television.

Without being too technical, this is how an aural broadcast station works:

A person talks into a microphone as if it were a telephone. The sound sets up vibrations of varying intensity and frequency within the microphone. These vibrations are converted into electrical impulses which are then greatly amplified at the transmitter before being put on the "carrier" wave. A carrier wave, before intelligence is impressed on it, has a constant intensity and frequency. When the amplified impulses from the microphone are applied to the carrier wave it said to be "modulated".

In AM broadcast, the audio waves are impressed on the carrier wave in a manner to cause its amplitude (or power) to vary with the audio waves. The frequency of the carrier remains constant. This is known as amplitude modulation. In frequency modulation (FM), the amplitude remains constant but the frequency is varied in a manner corresponding to the voice or music to be transmitted.

These modulated waves radiate from the antenna tower at approximately 186,000 miles per second (the speed of light). Some of them follow the contour of the ground and are called "groundwaves". Others dart upward and are called "skywaves". At night, the skywave portions of transmissions in the standard broadcast (AM) frequencies are reflected back to earth by electrical paricles in the "ionosphere" portion of the atmosphere. This gives the listener a choice of more distant AM stations at night, but also increases interference. Daytime reception is dependent on groundwaves. FM broadcast frequencies (waves) tend to follow a "line of sight" path.

Radio waves may pass through buildings and other objects but are subject to absorbtion or interference. As in the case of ripples on water, radio waves will weaken with distance. Seasonal disturbances and sunspot periods can throw them off course and cause "freak" reception.

The modulated radio wave from the radio station is picked up by the home receiving antenna. The wave produces a current having the same frequency and modulation characteristics as the one transmitted. The receiver separates the audio and carrier waves with a device called a detector or demodulator. The carrier wave, no longer needed, is discarded while the audio wave is amplified and sent to the loud speaker. The loud speaker transforms the electrical impulses back into the sound that is heard by the listener.

FM and AM broadcast do not interfere with each other since they are on widely separated bands. Because of the difference in their carrier frequency and the modulation system used, FM cannot be heard on AM receivers without special adapters. Likewise, AM cannot be heard on sets made to receive only FM. However, combination sets receive both systems.

THE STANDARD BROADCAST (AM) STATION

Amplitude modulation is the oldest system of program transmission. The pioneer AM broadcast service started operation on the low frequencies it still uses now-- 535 to 1605 kHz.

AM broadcast stations use power of 250 watts to 50 kw (50,000 watts)--the maximum power permitted in the United States. AM stations fall into one of four classes dependent on coverage area and output power. These classes are:

A CLASS I station operates on a "clear" channel and usually with an output power of 50 kw (but not less than 10 kw) and serves remote rural areas as well as large centers of population. The United States has Class I priority on 45 clear channels. Other North American countries have their own Class I priorities, some of which are shared by the United States. There are only one or two Class I stations on each clear channel.

A CLASS II station is a secondary station on a clear channel, operating with an output power of 250 to 50,000 watts. It serves a population center and an adjacent rural area and is so operated as not to interfere with the extensive services rendered by major clear channel stations (both U.S. and foreign). There are 29 channels on which Class II stations may operate.

A CLASS III station shares a "regional" channel with numerous similar stations, using an output power of 500 to 5,000 watts to serve a center of population and an adjacent rural area. There are 41 regional channels and more than 2000 Class III stations.

A CLASS IV station operates on a "local" channel (shared by many similar stations elsewhere), employing a maximum output power of 1 kw during the day, and if authorized, 250 watts at night. There are six local channels, each occupied by 150 or more stations.

In the AM service, antenna height above ground is not usually a matter of much importance. The entire antenna structure (tower) acts as the antenna and usually varies in height with the frequency of the transmission. Few AM towers exceed 1,000 feet in height and most are considerably less.

"Directional antennas" consist of more than one radiating element (tower), with phasing of the radiation from a series of towers so arranged that radiations cancel each other in some directions and reinforce each other in other directions. Sometimes they are used to increase radiation and service in a particular direction. More commonly the purpose is to restrict radiation in one or more directions, usually to avoid interference to other stations.

AM broadcast stations use "medium waves". That is to say, they transmit 540,000 to 1,600,000 waves a second, or 540 to 1600 "kilocycles" or "kilohertz" (kHz), which is the expression of frequency. Wavelength is determined by dividing the frequency by the speed of light (186,000 miles per second). The wavelength of a frequency of 540 kHz is approximately 1,800 feet.

AM stations are assigned at 10 kHz intervals beginning at 540 kHz. Within the standard broadcast band of 535 to 1605 kHz, this provides for 107 channels.

THE FREQUENCY MODULATED (FM) BROADCAST STATION

Frequency-modulation broadcast has several advantages over the amplitude modulation system. FM has higher fidelity characteristics and is freer of static, fading, and background overlapping of other stations' programs.

FMs greater tonal range is due primarily to the fact that it uses a wider channel than that employed for AM broadcast. Then, too, it occupies a higher portion of the radio frequency spectrum where there is less static and other noises. FM receivers have the particular ability to supress weaker stations and other interference.

Since the frequencies on which FM stations operate do not ordinarily reflect back to earth skywaves from the ionosphere, many scattered FM stations may use the same frequency without interference.

The FCC has divided the country into three FM station zones. Zone I includes part or all of 18 Northeastern states, plus the District of Columbia; Zone I-A is limited to Southern California, and Zone II includes the rest of the country.

Three classes of commercial FM stations are assigned to these zones. Class A stations are assigned to all zones and are limited to a maximum effective radiated power of 3 kilowatts. Class B stations are assigned to Zones I and I-A and are limited to a maximum effective radiated power of 50 kilowatts. Class C stations are assigned to Zone II and are limited to a maximum effective radiated power of 100 kilowatts.

FM reception varies with location of the receiver in relation to the transmitting antenna. With maximum power and antenna height, good service extends to about 15 miles for Class A stations, 33 miles for Class B, and 64 miles for Class C stations. There are also FCC rules concerning minimum milage separation between stations on the same channel or adjacent channels to avoid interference. Stations are further limited as to their antenna height above the average terrain. Class A stations are permitted an antenna height of 300 feet above the average terrain, Class B stations are permitted 500 feet,and Class C stations up to 3000 feet. Higher antenna heights are permitted but only with a reduction of power.

To aid FM broadcasters, the FCC has enabled them to apply for subsidiary communications authorizations (SCA) for suplemental service such as background music. This specialized service is offered to stores, factories, and other business subscribers producing additional income for the station.

FM stations may also transmit stereophonic programs by means of a multiplex sub-carrier. A "stereo generator" or "multiplex generator" is used to process the audio signals before they are used to modulate the carrier. This transmission is compatible with monophonic receivers and uses a system developed by the General Electric Co. and the Zenith Corp. Because of the wide channel space afforded FM stations, both SCA and stereo signals may be transmitted simultaneously.

The FM band of frequencies is from 88 to 108 MHz (millions of cycles per second). The band is separated into 100 channels of 200 kHz each, the lowest 20 of them reserved for educational use. Both the center frequency and the designated channel number are used, although channel numbers are not in popular usage since they are not listed on receivers. Channel 201 is a frequency of 88.1 MHz while channel 300 is a frequency of 107.9 MHz.

The Traditional Approach

The traditional approach of finding a job envolves sending a personal data sheet called a RESUME (pronounced rez-u-may) to each station in your area. In every case it should be addressed by NAME to the person that does the hiring. If you are in doubt about what name to use then send it to the general manager of the station. The resume should be attached to a cover letter which explains why you wish to work at that station and which job you are seeking. This method reaches a lot of stations in a short time, without extensive travel, and without talking to a lot of people. Although this method seems expedient it does not always bring favorable results. It is much better to visit each station personally.

Several copies of your resume should be prepared enabling you to leave one at each station you visit. It is wise to leave your resume at a station before a scheduled interview. This way the interviewer has a chance to become familiar with your background before you both actually meet face-to-face. Your resume should be neat and brief (so the interviewer will read it all).

With all the information you should include in your resume, while limiting space to one or two pages, it may seem like a hopeless task. By careful planning you will be able to prepare an informative yet concise resume for yourself. Here are the sections your resume should have:

HEADING:	Name, address, telephone number, position sought.
PERSONAL DATA:	Age, place of birth, height and weight, health, marital status, and military service.
EDUCATION:	List all schools and colleges, degrees earned, average grade, scholarships, honors, and special education. It is not necessary to list high schools if you have a college degree.
SCHOOL ACTIVITIES:	List items only if significant such as; class president, athelete, club organizer, or being a member of a specific club or activity that might relate to the job for which you are applying.
WORK EXPERIENCE:	List your jobs in reverse chronological order. Show dates, name of company, the company's address, nature of the business, name and title of your supervisor, the position you held, your job duties, and any supervisory responsibilities.
OTHER:	List special skills, hobbies, outside interests, languages, organizational memberships, and licenses such as a drivers license and broadcast operators license.
REFERENCES:	Give name, job title, address of business and telephone number. List at least three references.

Use the following sample resume as a guideline for yours.

RESUME (sample)

John B. Jones
1140 West Elm St.
Springfield, IL 62703
Telephone: 224-6569

Announcer

PERSONAL INFORMATION

Age:	24	Marital status:	Married, 1 child
Place of birth:	Logan, Utah	Military:	Navy, Honorable.
Height and Weight:	6' 1", 175 pounds		
Health:	Excellent		

EDUCATION

College:	Logan Community College, Utah
Degree:	AA degree
Major:	Journalism
Grade Average:	B+

SCHOOL ACTIVITIES:

Editor of campus newspaper for one year. Supervised a staff of seven.

WORK EXPERIENCE:

Reporter. June 1974 to present. SPRINGFIELD MINI-GAZETTE newspaper. 1492 Maple St. Springfield. Collected information and wrote news articles of local events. J. P. Dunn, supervisor.

Salesman. January 1974 to May 1974. B & K INSURANCE UNDERWRITERS. 175 Gary St. Springfield. Sold homeowners and life insurance by direct selling. Harold Johnston, supervisor.

OTHER INFORMATION:

Radiotelephone Third-Class Permit with broadcast endorsement.
Amateur radio operator, call letters WA6JOK
Associate member, Springfield Junior Chamber of Commerce

REFERENCES:

Mr. J. P. Dunn, supervisor, Springfield Mini-gazette. 1492 Maple St. Springfield. Telephone number: (555) 224-7400

Mr. Paul B. Smith, insurance salesman, B & K Insurance Underwriters. 175 Gary St. Springfield. Telephone number: (555) 245-6789

Dr. James Peabody, journalism instructor, Logan Community College. 220 Mt. Zion Blvd. Logan, Utah. Telephone number: (800) 222-2222

The Audition Tape

Some announcers prefer to let a recorded tape represent them. They record a tape with their name, their assets, a bit of copy to show off their voice and style, and mail it to a station. If a cover letter isn't sent with the tape, the tape will probably be discarded as soon as it arrives. Few managers will attempt to copy the applicant's name, address and phone number while listening to the tape.

The audition tape, like the resume, is an important part of your job finding tactics. It must be GOOD or it will be a liability rather than an asset. Use a quality microphone and tape recorder. Use clean tape, you don't want any previously recorded noises in the background. Record your tape at 7½ inches per second using a half-track or full-track recorder if possible. Do your recording in a noise free place, and don't record pops and clicks from operating the recorder.

Here is a suggested content for your audition tape:

INTRODUCTION:	Begin by saying: This is an audition tape prepared for radio station (KVHS) by (John Jones), (1414 Astra Way, Anytown). My phone number is (444-5678).
OPENING:	Use a news opening such as: "NOW, FROM THE WIRES OF THE ASSOCIATED PRESS AND THE (KVHS) NEWSROOM, HERE IS A FIVE-MINUTE SUMMARY OF THE LATE NEWS" (If you have listened to the station try to use the same news opening they do.)
NEWS:	Read about two minutes of news from the newspaper. You may wish to rewrite the news articles from the paper to change them to radio style copy.
COMMERCIAL:	Write or ad-lib a commercial announcement using a magazine or newspaper ad as a guide. When read this announcement should not be more than one minute in length.
NEWS:	Read about two more minutes of news from the newspaper.
CLOSE:	Use a news close such as: "THIS HAS BEEN A FIVE-MINUTE SUMMARY OF LATE NEWS FROM THE WIRES OF THE ASSOCIATED PRESS AND THE(KVHS)NEWSROOM,(JOHN JONES)REPORTING" If you used the same opening as the station to which you are sending the tape, then use their closing here.

The Creative Research and Interview Method

The best way to apply for a job is to go directly to the station and ask for an appointment to see the manager. You are there to "sell yourself" and that takes personal contact. Letters, resumes, audition tapes, and phone calls won't do the job as well as the personal interview. It leaves a lasting impression. Here is what you must do:

1. Decide exactly what type of broadcasting job or jobs you want. Be realistic, choose a job where your skills and talents will be used to best advantage. Determine if this job will be challenging and enjoyable for you.

2. Do some additional research about the job or jobs you are seeking. What skills and talents are needed? Does the job require typing, writing, reading, personal contacts with people, drivers license, a good speaking voice, a knowledge of electronics, etc.?

3. Determine who has the power to do the actual hiring for the kind of work you have chosen. Remember the person's name, not just the title. When you go in for your interview use that person's name in your warm greeting at the beginning.

4. Learn what you can about the station. How long has it been on the air, who owns it, what are the names and jobs of some of the staff, what kind of format do they have, etc.?

5. Call or visit the station and make an appointment for a personal interview with the person responsible for hiring.

6. Be on time for your interview. Five minutes early is about right. This will give you a chance to settle down and organize your thoughts.

7. Your personal appearance will be very important. Your clothing should be neat and clean and appropriate for the job. You shouldn't have strong odors on your breath such as spicy foods or tobacco. If you smoke, try not to during the interview. Your not smoking will not offend the interviewer but smoking may offend the interviewer who is a non-smoker. If you are a man you should be clean shaven. If you are growing a beard, fine, but it should look like a beard and not just stubble. The interviewer might get the impression that you are just lazy and didn't take time to shave. Smile, be pleasant, look the interviewer straight in the eye and show confidence in yourself, even if you are a little nervous.

8. Be prepared. Bring your social security card, drivers license, broadcast license or permit, your resume, your audition tape, and bring a pen for filling out application forms.

9. If you are applying for an announcing job your interviewer may ask for an audition tape. If you already have one, now is the time to present it. If you don't have one with you, you may be given some copy to read and be led off to a recording booth. You probably will be a little nervous and it may show in your voice, but don't worry about it. The manager has interviewed people before and expects you to be a little nervous. Just relax and do your best. If the manager doesn't give you any copy, or seems hesitant, suggest that you read a public service announcement. The station should have several in its "copy book". Begin the recording by giving your name, address, and telephone number. Pause after your introduction for a couple of seconds then read the copy given to you.

10. Your evaluation starts when you park your car. Where and how you park, the door you use, how you conduct yourself with the office staff, what you do while waiting and how you acknowledge introductions, all furnish the interviewer with clues to your behavior and personality.

11. Remember the names of the people to whom you are introduced. If you are not sure you caught their name the first time, ask them to repeat it. Most people are impressed when you make an effort to remember their name correctly.

12. Be prepared to answer questions such as:

Why do you want to work in broadcasting?
Are you looking for a permanent or temporary job?
What are your future career plans?
What salary do you expect?
Do you prefer working by yourself or with others?
Why do you think you can handle this job?
What are your special abilities?
What is your major weakness?
What kind of books do your read?
What are your hobbies?
How well did you get along in school?

Many other questions may be asked also, each designed to give the interviewer a better picture of you. Answer all questions honestly, don't try to cover up or apologize for anything. Prospective employers are impressed with applicants who have taken an inventory of themselves and know their strong and weak points. They respect the person that has set a definite goal and is willing to work toward it. In this day and age, when all too many employees give the appearance of not caring at all about the company they work for, your knowledge of your prospective employer could make you an employee.

Here are some reasons employers give for NOT hiring a person:

Poor personal appearance
Poor scholastic record
Unwilling to start at the bottom
Overemphasis on money and benefits
Lack of maturity
Lack of courtesy;ill mannered
Condemnation of past employers
Lack of vitality
Makes excuses;evasiveness
Lack of tact
Lack of planning a career
Sloppy application blank
Merely shopping around
Wants temporary job only
Little sense of humor
Lack of knowledge of the job sought
Low moral standards
Inability to take criticism
Late to interview without reason
Indefinite response to questions
Failing to get to the point
"know-it-all"
Poor voice, diction, grammar
Lack of confidence and poise
Indecision
Radical ideas
Asks no questions about the job
Marital problems
Emphasis on whom he knows
Intolerant, strong prejudices
Laziness
Shifty;doesn't look at interviewer
Cynical
No interest in the community
Limp handshake
Little interest in the industry
Lack of appreciation for experience
Failure to thank interviewer
Narrow interests
Unwillingness to work odd hours
Poor handling of personal finances
Little interest in the job

The Back Door Approach

This method can work rather well in small community stations that need extra help but don't necessarily have the money to spend to get it. You may be able to get a job at such a station for no pay or at best receive a part-time position. At least you can get your foot in the door this way and gain valuable experience. After you have gained experience, perhaps in several areas, you can speak to the manager about a full-time, paid, position. This could also place you in line for the next job opening at the station. Beginning in this way may mean sweeping floors, getting coffee for others, and running various errands.

Small stations almost always need additional salespeople but will probably pay a commission on sales rather than a salary. Get some pointers from the sales staff or manager and ask if you can try selling air time for the station. It is not an easy job but you can earn a little income while learning the business and waiting for a job opening elsewhere at the station. If you are good at it you may just decide to stay with sales.

Another area that may be open is that of a "spotter". A spotter is a person who helps a sportscaster with detail work during live coverage of sports events. The sportscaster can't see all of the action and is aided by the spotter who gives him names of players, who did what and when, the current score, etc. If you know something about sports this may be just the opportunity to get into sportscasting. Check the stations in your area that cover local games.

Still another way in is through summer replacements. Although radio station personnel will have their vacations staggered during the summer, certain jobs just can't be filled by those remaining. Someone from outside must be hired for a short period of time. This is a chance for you to show the station manager what you can do, even if the pay is a minimum wage or you have to volunteer your help. Your good work will be remembered and you will be asked back again for other replacement work and, better still, to fill a job opening when someone leaves.

Local chapters of charitable organization usually send numerous public service announcement material to their local stations. Some of these announcements are in script form while others are on tape. Locate some of these organizations in your area, tell them of your broadcast interests, and ask if you can record their announcements for them. This will give you some additional practice, perhaps make you a little money, and it will get your voice on the air. What is more important is that station program directors will become familiar with your voice. You won't be a stranger to them when you see them about a job.

Its much easier to get odd-hour jobs, such as late evenings, early morning, all-night, and especially weekends, as stations often have trouble finding someone they can depend on to work these shifts.

If a station signs-off at, say, midnight, you might be able to start a new program, extending their hours of operation (some stations have their hours of operation limited by the FCC, so check first). This may require that you hold a First Class Radiotelephone license (or know someone who does and work with you). To convince the station, you may even have to "sell" the program to one or more sponsors, before the station manager will go for the idea. But it has worked - and there are an amazing number of stations who do not operate all the hours they are licensed to operate.

THE COVER LETTER

Always enclose a covering letter when you mail your resume or audition tape to a station. Address your letter to a specific person by name when possible. Your letter should not be too long but it should include the title of the job you are seeking, the fact that your resume and audition tape are enclosed, and that you would like to make an appointment for an interview. Here is a sample letter you may use as a guide:

Mr. Charles Bloomfield
General Manager
KBOY-FM
2463 Sky St.
Whitney, PA

July 14, 1975

Dear Mr. Bloomfield:

I am very much interested in a position as announcer or board engineer with your station.

The enclosed personal data sheet gives details of personal qualifications and education. An audition tape is also enclosed.

May I telephone your secretary next week to arrange for an appointment? Thank you.

Very truly yours,

John Jones
1111 Oakdale St.
Whitney, PA
Phone: 555-1234

(enclose self-addressed, stamped envelope)

THE FOLLOW-UP LETTER

The follow-up letter is sent immediately after your personal interview. It thanks the interviewer for the time spent with you. It says that you are still interested in the job. In addition, it gives the interviewer a gentle nudge toward making a decision. Use the following sample as your guide.

Mr. Charles Bloomfield
General Manager
KBOY-FM
2463 Sky St.
Whitney, PA

July 20, 1975

Dear Mr. Bloomfield:

Thank you for your interest and time spent in interviewing me yesterday. I am most interested in the announcing position we discussed.

If you wish to discuss further my qualifications or background, I would be pleased to meet with you at your convenience. Thank you.

Sincerely,

John Jones
1111 Oakdale St.
Whitney, PA
Phone: 555-1234

WHAT TO DO AFTER YOU GET THE JOB

Broadcasters are well informed in several areas and especially in current international, national and local events. They know their business and they know their audience. A complete broadcaster is a well informed broadcaster.

Keep up on what's happening around you. Read the newspaper daily. When you find words you don't understand or are hard to pronounce look them up in a dictionary, build your vocabulary and avoid making mistakes on the air. Listen to other radio stations, see what they are doing and how they sound. Talk with anyone and everyone. Almost everyone has something interesting to say.

You will find that in many ways broadcasting is an exacting business. This is especially true where time is involved. Programs are broadcast on a definite time schedule, often fitting in with network programs that are timed to the second. With some jobs a few minutes one way or the other may not make any difference. In broadcasting being late can mean loss of your job.

Always be prepared. Before an announcing or board shift read over the program log. Get your materials ready, pre-read your announcements, pre-read your news, select your records and prepare whatever else that is required for your shift. Plan to spend at least one half hour in preparation before your show.

Keep your work area clean. Have respect for other people's work areas. If you had records out for your show, put them back when you are through. If someone else left something out, put it away for them as a courtesy. Don't bring coffee, Cokes, milkshakes and sandwhiches into the announce booth or control room. If there is anything that makes managers and chief engineers cry, it is milkshake in the control board and peanut butter on the turntables.

Don't be afraid to put in a little of your own time, time you won't receive money for but which pays off in the long run. Be early to work and late to go home. Fill in for someone else that needs the help. Sometime you may need help from them and they will be glad to return the favor.

If at all possible continue your education. You may be able to arrange your shift to take advantage of day or evening classes. Do it if you can. Continue to improve your skills and your knowledge of broadcasting to help further your career.

CONCLUSION

No attempt has been made here to teach you the fundamental skills of speech, reading or writing. These are jobs for a professional broadcasting school. What the author has done is provide you with the instruction and references needed to get a job in broadcasting through your own initiative and determination. If you follow these instructions and are persistent in your efforts you can get a good paying, challenging, and rewarding job in broadcasting.

The important thing to remember is to act quickly. If you know of a job opening now, don't take time to prepare a resume or an audition tape, go to the station immediately. Don't let someone else get the job while you are still getting ready. There will be plenty of time to prepare a resume or tape (if they are still needed) <u>after</u> your personal interview.

BROADCASTING BOOKS

Many of the following books are used by colleges and broadcasting schools. You should be able to find them at your local library. It is suggested that you at least read those books dealing specifically with your job interests.

Title and Author	Some of the Book's Highlights
THE BUSINESS OF RADIO BROADCASTING By Edd Routt	How to operate a station as a profitable business.
GUIDELINES FOR NEWS REPORTERS By Sol Robinson	Covers most aspects of broadcast journalism, its problems and solutions. It also lists commonly mispronounced words.
HOW TO SELL ADVERTISING By Si Williams	How to present your offer, how to counter objections and how to close the sale.
HOW TO WRITE NEWS FOR BROADCAST & PRINT MEDIA By David Dary	A handbook on journalism for the student or practicing newsman. Included are self-help exercises to aid in reporting skills.
GUIDE TO PROFESSIONAL RADIO & TV NEWSCASTING By Robert C. Siller	A self study guide for those just getting started in broadcast journalism.
AUDIO CONTROL HANDBOOK By Robert S. Oringel	Covers most aspects of audio control in broadcast stations.
RADIO BROADCASTING By Irving E. Fang	An introduction to the sound medium. It includes radio news and electronic journalism.
BROADCASTING IN AMERICA By Sydney W. Head	Examines american broadcasting, its origin and growth, economics, regulation, and its influence on our lives.
THE DEEJAYS By Arnold Passman	The author relates his personal experiences while covering the history of music in radio.
YOU'RE ON THE AIR By Sam Ewing	Written by a radio station manager as an aid to young people entering the broadcast industry with little or no training.
FIRST-CLASS RADIOTELEPHONE LICENSE HANDBOOK By Edward M. Noll	General course in radio and broadcast equipment. Includes sample FCC type examination questions with answers.
TELEVISION AND RADIO ANNOUNCING By Stuart W. Hyde	A general handbook covering broadcast announcing including practice assignments.
THE BROADCASTER'S GUIDE TO RADIO STATION DEVELOPMENT By Ernest G. Wilson P.O. Box 5516 Walnut Creek, CA 94596	A step-by-step guide to planning, licensing, building and operating a broadcast radio station.

TRADE MAGAZINES

Many of the following magazines can be borrowed from local radio and television stations or your nearest library. Each of these magazines contain articles and data which will give you a further understanding of the broadcast industry.

Title and Address	Suggested Reading
BROADCASTING YEARBOOK 1735 DeSales St. N.W. Washington,DC 20036 (annual)	Listings of broadcasting schools, stations in your state, college stations, station formats, advertising markets, and broadcasting books. You should also read the summary of FCC rules and the NAB Radio and Television Codes.
BROADCASTING 1735 DeSales St. N.W. Washington, DC 20036 (weekly)	Listings of new station applications, construction permits, and licenses; FCC Rule changes, broadcast business and economics. Classified ads (help wanted).
BROADCAST ENGINEERING 1014 Wyandotte St. Kansas City, MO 64105 (monthly)	New equipment and engineering articles. Classified ads (help wanted).
BM/E (Broadcast Management/Engineering 820 Second St. New York, NY 10017 (monthly)	Articles about management, sales, engineering, and economics. Classified ads (help wanted).
BILLBOARD 165 W. 46th St. New York, NY 10036 (weekly)	News and stories about recording artists. Music by rating and by category. New record releases.
CASH BOX 1780 Broadway New York, NY 10019 (weekly)	News and stories about recording artists. Music by rating and category. New record releases.
RECORD WORLD 200 W. 57th St. New York, NY 10022 (weekly)	News and stories about recording artists. Music by rating and category. New record releases.
HIGH FIDELITY Great Barrington, Mass. 01230 (monthly)	New consumer equipment. Articles about audio systems. Articles about classical, jazz, and other high fidelity recordings.

The Broadcaster's Guide To

EQUIPMENT SOURCES

By

Ernest G Wilson

THE BROADCASTER'S GUIDE TO EQUIPMENT SOURCES

Printed in the United States of America

Revised 1977

TABLE OF CONTENTS

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by
PANAXIS PRODUCTIONS
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Walnut Creek, CA 94596

INTRODUCTION

The names and addresses listed in this book are representative of dealers and manufacturers serving the broadcast industry. These addresses are not all inclusive, but have been selected for diversity in content. The companies listed herein have not paid for space in this publication, nor does this book intend to endorse or solicit customers for those companies. All addresses listed herein were current at the time of publication.

This book was prepared to be of benefit to all broadcasters, unlicensed, educational, and commercial stations alike. It must be understood that many of the examples listed in this book work best for non-profit unlicensed and educational stations. Low power (Class D FM), Carrier-Current, and Cable FM (CAFM) stations can almost always locate inexpensive or donatable equipment.

Commercial stations operate as a business and must expect to purchase most or all of their equipment. It should be noted however, a commercial station is not required to buy new equipment. Used, rebuilt, and home-made equipment can be quite satisfactory for establishing a new station inexpensively. Careful planning and shrewd shopping can equip a Class A (3000 watt) FM station for under $5000.00.

A great deal of capital is not necessarily needed to establish a new station because you have several options. For example, you may select to rent or lease your equipment instead of purchasing it outright. Several manufacturers offer some kind of lease arrangement or a lease-with-option-to-buy plan. Manufacturers that do not offer a plan themselves usually can put you in contact with a regular leasing company, one that specializes in leasing equipment. Your local bank can also help arrange a leasing plan for you. Although a straight lease of equipment costs more over a period of time than does a one-time purchase, it may offer some tax advantage as well.

Inexpensive equipment, and equipment that can be donated to non-profit stations, is available. The broadcast industry is ever-changing, upgrading, with good used equipment becoming available continuously. You need only be tenacious enough to go after it.

In addition to the equipment manufacturers and dealers listed in this book, a list of wholesale component parts distributors is included. Individuals that wish to construct their own equipment will find they can do so with a minimum of cost. Some of these distributors offer resistors as low as 1.6 cents each, capacitors as low as 3 cents and IC operational amplifiers at 22 cents! A complete stereo preamplifier can be built for under $5.00.

Surplus military electronic equipment dealers are also listed. Some military radios can be easily converted to broadcast band operation for use as a carrier-current transmitter. Other military transmitters may be converted to the FM broadcast band and be usable as Cable FM modulators. These same dealers offer test equipment as well - a much-needed part of any radio station.

AVAILABILITY OF EQUIPMENT

Several changes in the broadcast industry over the past 20 years have made certain kinds of equipment fairly easy to obtain. About 1960, the FCC permitted FM stations to begin broadcasting in stereo. As a result, a part of the transmitter (the exciter) had to be replaced if it could not accept the new stereo signal. These monaural exciters were traded to manufacturers as part of the purchase of new stereo exciters. Others were simply left to gather dust in a storeroom somewhere. Most of those monaural exciters are still listed on the approved equipment list of the FCC. This means, with the simple addition of some meters, or perhaps no changes at all, these units can be licensed as 10-watt FM transmitters. These exciters can also be used as Cable FM (CAFM) modulators or be used to "drive" a 250-watt FM power amplifier.

Further changes permitted FM Class A stations, previously limited to 250 watts of effective radiated power, to increase their power to 3000 watts. Broadcasters unloaded their 250-watt transmitters in favor of new and larger units and the increased coverage they would provide. Their old transmitters were either traded-off to manufacturers and used equipment dealers, or were stored for some future use. Most of those 250-watt transmitters are still licensable by the FCC.

Advances in the industry produced circularly polarized antenna systems. This new method of radiation promised increased coverage for broadcasters. Old antenna systems were removed and sold or traded. Others were stored and forgotten. Some of these can be found in warehouses, garages, alongside of buildings, etc. Still other antenna systems were left in place, either as a standby unit or because it was inconvenient at the time to remove them. All a person needs is a steel brush, a little steel wool, some paint and a little time...WOW, a new antenna!

Solid-state equipment is rapidly invading all corners of broadcast stations. Tube-type equipment is being replaced. It is not being replaced because it doesn't work well, but rather because the newer equipment is prettier and a novelty. This means tube-type equipment can be purchased very reasonably, and there is a continual flow of it into the used market.

Major manufacturers and dealers accumulate a lot of equipment by accepting it in trade toward the purchase of other equipment. About once a year they offer a "clearance" sale and send flyers to interested persons. Extremely good bargains can be found at these "sales". It is wise for you to get on as many manufacturer's and dealer's mailing lists as you can.

Some beginning broadcasters start with consumer products such as turntables, reel-to-reel tape recorders, microphones, preamplifiers, speakers, headphones, and audio power amplifiers. There is nothing wrong with this as long as the equipment selected will provide decent fidelity. New broadcast type turntable preamplifiers can cost over $150.00 apiece. A hobby electronics store special sells for about $10.95! If you are building your own console, you can make allowances for the impedance characteristics of the inexpensive preamplifier. Some stations prefer high-quality "audio file" turntables over broadcast types. Generally, consumer equipment is not made for the long hours of use for which broadcast equipment is designed, but it can be used to start a station.

HOW TO TRADE EQUIPMENT

One very important rule to remember - always accept any equipment that is donated, no matter how old, working or not. What you receive can later be used in trade for something more useful to you at that time.

Now and then you will find a piece of equipment that can be a worthwhile investment. This is especially true if you or someone you know has a technical background. A little clean up, perhaps a part or two, maybe some paint, and a piece of "junk" can return to a useful and functioning unit.

A good example of how to turn a donation, a small investment, and a little labor into worthwhile station equipment was shown by a high school radio-electronics class. They received 2 turntables as a donation. They replaced two broken castings, cleaned and oiled the units, replaced the felts and sold them for $50.00 each. The materials cost less than $10.00 - a profit of $90.00!

But they didn't stop there. They used the $90.00 to purchase new heads and a rebuilt motor for a cartridge tape recorder salvages from a commercial station's junk box. With the new heads aligned, a new motor, some oiling and cleaning, they had a cartridge recorder worth about $400.00 on the used equipment market.

On another occasion, that same school received a donation of a 25-year old FM exciter. It appeared to be worthless because it needed a tube that was no longer being manufactured. It was also missing a crystal - the part of the exciter that keeps its frequency stable. A visit to a few of the stations in the area revealed that one of them had several of these special tubes, and best of all, the tubes were donated. A new crystal was purchased, the exciter was tuned and the school went on the air with its first 10-watt transmitter. A few years later the exciter was sold to another school. The proceeds from the sale were used to purchase additional station equipment.

Other equipment the school had accumulated was traded to other schools and to some commercial stations as the need arose. That school's station has grown from its initial 10-watts output to a 5000-watt stereo station primarily by donations, repair and trade, and careful purchasing. If they can do it, you can do it too!

HOW TO GET FREE TECHNICAL ASSISTANCE

Broadcast equipment manufacturers are anxious to sell their products. Very often they will give help in the initial planning of studio and transmitter facilities. They can not offer assistance to any great degree in preparing an application for submission to the FCC. Station applications for a construction permit or license usually requires someone with a good technical background.

Non-profit stations can usually enlist the help of an engineer from one of the nearby radio or TV stations. Another good source are electronics students and teachers. Get them involved from the start; they will enjoy doing the technical work for you. Also try cable TV companies, two-way radio repair and radio-TV repair technicians. They may also have some equipment they can donate.

WHERE TO FIND FREE EQUIPMENT

Radio and TV Stations

Visit each of the radio and TV stations within about 50 miles of your proposed station location. Telephone first and ask for an appointment to talk with the station's chief engineer. Don't talk with the station owner or manager; you will find chief engineers more sympathetic to the equipment needs of a beginning broadcaster.

Most stations have some old equipment they have stored for some possible future use. Engineers usually tend to hold on to things and not throw them away or sell them. They can be convinced, however, to donate to a worthy cause.

When you present your needs to the engineer, specify your exact problem. Don't be vague hoping to get whatever you can from him. If you present your needs well, seem to know what you are doing, and don't appear too greedy, you should leave with as much equipment as can be spared by the station. Be sure to send a thank-you letter itemizing everything you received.

One school station in a metropolitan area received in one afternoon of visitation:
- 1 - Hewlett-Packard 335B frequency & modulation monitor ($400)
- 100 feet of 7/8" coaxial cable with connectors ($300)
- 2 - Turntable preamplifiers ($150)
- 1 - 50-watt audio monitor amplifier ($100)
- 2 - Portable 5-channel audio mixers ($400)

Their only cost was for transportation; they received donations worth over $1300.00!

Broadcast Equipment Manufacturers

Major manufacturers often accept old equipment in trade toward the purchase of new equipment. They do not fully expect to be able to resell the old equipment and may simply junk it. Some of the better equipment is held for resale during yearly "clearances".

Contact manufacturers by telephone or by letter and explain your situation. Again, don't try to get everything you can. Specify your needs and be willing to accept anything. If the manufacturer does not have equipment that can be donated at that time, ask if you can be placed on a waiting list. In any case, ask that you be placed on their mailing list for "clearance" items.

If you or someone else connected with your broadcast venture has some technical background, then consider accepting equipment that can be repaired. Some manufacturers have equipment that was rejected from their assembly line, or perhaps an original prototype unit. Scratched, bent or slightly broken units that might not be profitably repaired by the manufacturer might do very well for you.

The school station mentioned earlier was very pleased and thankful for the cooperation they received from manufacturers. Over a period of time they received: a 100-foot all-aluminum tower, a complete 8-bay antenna system, an FM stereo exciter, a 250-watt transmitter, a 3000-watt dummy load, a complete microwave studio-transmitter link, and stereo cartridge record/play unit. This amounts to over $14,000.00 worth of donations.

Broadcast Consultants

Broadcast consultants are engineers that work for several stations and perhaps within a geographic area that might include several States. They are in close contact with these stations and know what kinds of equipment might be spared by them.

Contact a broadcast consultant by phone or by letter and explain your needs. Ask if he or she will keep a "look-out" for you. The consultant might be able to arrange a donation or an inexpensive purchase for you; however, you should plan to contact the station yourself.

Your telephone directory can be a good source for finding a consultant in your area. Several consultants are listed in broadcast trade magazines.

Classified Advertising

To expand your search for equipment beyond the limit of your transportation, use the classified ads which appear in the various trade magazines. These ads quite often offer excellent bargains in used broadcast equipment. But, not only can you look for what you need...you can advertise for what you need! Here is an example of an ad placed by a school planning to start its own station:

> NEEDED - 10-watt FM exciter or transmitter, 4-bay antenna, tower, coaxial cable, and studio equipment for college station. Donation tax deductible. Contact J. Jones, Johnston College, Box 1976, Pellum, NY 11803 (516) 923-1120.

Approximate cost of this ad: $5.00

Trade Magazines:

BROADCASTING MAGAZINE

Broadcasting Publications, Inc.
1735 DeSales Street N.W.
Washington, DC 20036

BROADCAST ENGINEERING

Intertec Publishing Corp.
1014 Wyandotte Street
Kansas City, MO 64105

BROADCAST MANAGEMENT/ENGINEERING

Broadband Information Services
274 Madison Avenue
New York, NY 10016

TELEVISION/RADIO AGE

666 Fifth Avenue
New York, NY 10019

REQUIRED STUDIO EQUIPMENT

AUDIO EQUIPMENT

1 - 5 to 8 Channel Console

2 - 12" Turntables (two-speed)

2 - RIAA Equalized Preamplifiers

2 - 12" Tone Arms

2 - Phono Cartridges

1 - Monitor Amplifier

1 - Monitor Speaker & Cabinet

1 - Microphone (Cardioid Pattern)

1 - Microphone Desk Stand (or boom)

1 - Set of Headphones

1 - Tape Recorder (Reel-to-Reel)

1 - Tape Recorder (Cartridge)

1 - Bulk Tape Eraser

This list of equipment should be considered the minimum requirement for satisfactory studio operation.

This list is not the only possibility, but a guide which may have any number of substitutions. It should be trimmed or added to, to fit your specific needs.

Consider also the question of beginning with stereo operation or converting to stereo operation at a later date. If you decide to broadcast in stereo at a later date, then it will be worthwhile to invest in stereo studio equipment at the start. The stereo transmitter equipment can be installed at some later time.

It costs you nothing to obtain a cost estimate for all the equipment you will need. Contact any of the new or used equipment dealers and ask for a quote. Ask for a complete list (package) of what you should have, and what they can supply. Also inquire about the availability of a rental or lease agreement plan.

OPTIONAL EQUIPMENT

1 - Studio Clock

1 - Additional Tape Recorder (Reel-to-Reel)

1 - Additional Tape Recorder (Cartridge)

1 - Additional Microphone (Omni-directional)

The quote you receive, along with the lists of equipment and specification sheets, will give you an excellent means for comparison between the different manufacturers and suppliers.

Exactly what is needed in the way of transmitter support equipment will depend on which type of station you will be starting. For example, frequency and modulation monitors and RF amplifiers are not required for CAFM, Carrier-Current, or Class D (10W) FM stations.

TRANSMITTER SUPPORT EQUIPMENT

1 - Audio Compressor/Limiter

1 - Frequency/Modulation Monitor

1 - Remote Control Unit

1 - RF Amplifier (for Monitor)

1 - EBS Monitor, Decoder-Encoder

A remote control unit will only be required if the transmitter is to be operated at a distant location - out of view of the operator.

An EBS monitor with encoder is only required for AM stations and FM stations exceeding 10 watts power output.

TRANSMITTER SITE EQUIPMENT

CARRIER-CURRENT STATION

1 - Carrier-Current Transmitter

* - Predictable Radiation Cable

1 - RF to Power Line Matching Unit

Carrier-Current stations must be considered "closed-circuit" installations because of the limited radiation restrictions imposed by the FCC. Some radiation is permissible with a special coaxial cable.

CABLE FM (CAFM) STATION

1 - Cable System FM Modulator

1 - Stereo Generator

Some military surplus transmitters may be converted to operate as carrier-current transmitters with outputs up to 50 watts. Other surplus transmitters may be converted to CAFM modulators; however, they probably will not accept a stereo composite signal.

FM STATION (ALL CLASSES)

1 - FM Transmitter

1 - Stereo Generator

1 - 4-Bay Horizontal Polarized Antenna

- 100' 7/8" 50-ohm Coaxial Cable

1 - 100' Utility Antenna Tower

- Misc. Cable Connectors

Class D stations require a 10-watt transmitter. Class A stations are limited to 3000 watts. Class B stations are limited to 50,000 watts. Class C stations are limited to 100,000 watts.

Antenna systems may include vertical polarization. Circular polarization tends to fill in shadow areas. Coaxial cable smaller than 7/8" is not recommended for transmission line lengths greater than 50 feet. Special low-power educational FM station antennas are available at half the cost of regular antennas.

STANDARD BROADCAST (AM) STATION

1 - AM Transmitter

1 - (or more) 300' Tower(s)

1 - Antenna Coupling (Phasing) Unit

- Antenna Beacon Lights

- 100' to 2000' 7/8" 50-ohm Coax.

- Misc. Cable Connectors

Due to the longer wavelength of the energy transmitted by AM stations, the antennas must be quite tall. The greatest expense in starting an AM station, especially if it is to be a directional station, is the cost of the antenna system. As many as 5 towers may be required along with an antenna phasing unit and long lengths of coaxial cable.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
ACE HIGH TOWER COMPANY P. O. Box 55 Greenville, NC 27834 (919) 752-7323	Suppliers and installers of large commercial station towers. Send for catalog of specifications and costs.
APPLIED TOWER P. O. Box 331 South Houston, TX 77587 (713) 946-9546	Manufacturer of all sizes of towers. Send for catalog of specifications and costs.
AMPEX CORPORATION 401 Broadway Redwood City, CA 94063 (415) 367-2011	Broadcast quality audio and video tape recording equipment. Write for catalog.
AMPRO CORPORATION 850 Pennsylvania Boulevard Willow Grove, PA 19090 (215) 322-5100	Manufacturer of broadcast quality tape recording equipment, audio consoles, and pre-amplifiers. Send for catalog.
ANDREW CORPORATION 10500 W. 153rd Street Orland Park, IL 60642 (312) 349-3300	Manufacturers of antennas for AM, FM, and two-way communications. They also manufacture flexible and rigid coaxial transmission line. Send for catalog.
AUDIO DEVICES INC. 100 Research Drive Glennbrook, CT 06906 (203) 327-6500	New and used broadcast equipment including mixers, pre-amps, monitor amplifiers, tape recorders, limiters, etc. Send for catalog.
AUDIO DISTRIBUTORS INC. 2342 South Division Avenue Grand Rapids, MI 49507	New and used broadcast and sound studio equipment. Mixers, turntables, pre-amps, etc. Send for catalog.
APPLIED BROADCAST EQUIPMENT 124 South 6th Street Richmond, IN 47374 (317) 962-8596	Specializes in used equipment. They also have new equipment. They handle almost everything. Send for catalog.
BELAR ELECTRONICS LABORATORY Lancaster & Dorset, Box 826 Devon, PA 19333 (215) 682-5550	Manufacturers of frequency and modulation monitors for AM, FM, Stereo, SCA. Send for more information of complete line.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
BIRD ELECTRONIC CORP. 30303 Aurora Road Cleveland, OH 44139 (216) 248-1200	Manufacturers of RF power measuring devices, dummy loads, and reflectometers. Write for catalog.
BROADCAST EQUIPMENT & SUPPLY CO. P. O. Box 3141 Bristol, TN 37620 (615) 764-8032	New and used equipment dealer. Wide variety including antennas, towers, mixers, turntables, tape decks, cart decks, etc. Ask to be placed on their mailing list.
BROADCAST SUPPLY WEST 2711 Locust Avenue Tacoma, WA 98466 (206) 565-2301	New and used equipment supplier. Wide variety of broadcast and sound studio equipment. Ask to be placed on their mailing list.
BOYNTON STUDIO INC. Melody Pines Farm Morris, NY 13808 (607) 263-5695	New and used equipment. Wide variety of broadcast and sound studio equipment. Ask to be placed on their mailing list.
BROADCAST COMMUNICATIONS DEVICES 5526 E. La Palma Avenue Anaheim, CA 92807 (714) 528-9505	New and used equipment dealer. All types and makes. Send for catalog. Ask to be placed on their mailing list.
CBS LABORATORIES 227 High Ridge Road Stamford, CT 06905 (203) 327-2000	Manufacturers of audio processing equipment such as limiters, compressors, etc. Send for catalog and price list.
CCA ELECTRONICS CORP. Broadcast Plaza, Box 5500 Cherry Hill, NJ 08034 (800) 257-8171 (U.S. only) (800) 261-4088 (Canada)	Manufacturers of FM transmitters and antennas in power ranges of 10 watts to 10,000 watts. They also have low-cost line for educational broadcasters. Send for catalog.
CABLEWAVE SYSTEMS INC. 60 Dodge Avenue North Haven, CT 06473 (203) 239-3311	Manufacturers of coaxial cable. Write for catalog and prices.
COLLINS RADIO GROUP 1200 N. Alma Road Richardson, TX 75080 (214) 690-5574	Manufacturers of AM, FM, stereo, SCA equipment, transmitters, antennas, cart decks, etc. Write for catalog.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
LPB INC. 520 Lincoln Highway Frazer, PA 19355 (215) 644-1123	Low-power broadcast equipment including carrier-current transmitters. Consoles, amplifiers, tape recording equipment. Write for catalog.
MARTI ELECTRONICS 1501 North Main, Box 661 Cleburne, TX 76031 (817) 645-9163	Aural studio-transmitter links, remote pickup broadcast transmitters and receivers, low-power FM antennas. Write for complete catalog and price list.
MAZE CORPORATION P. O. Box 6636 Birmingham, AL 35210 (205) 591-4800	New and used broadcast and sound studio equipment. All types. Write for current catalog. Ask to be placed on mailing list.
McMARTIN INDUSTRIES 4500 South 76th Street Omaha, NE 68127 (402) 331-2000	Audio consoles, mixers, frequency and modulation monitors, all types studio equipment. Write for catalog.
MICRO-TRAK CORPORATION 620 Race Street Holyoke, MA 01040 (413) 536-3551	Turntable pickup arms and cartridges. Write for complete catalog.
MOSELEY ASSOCIATES INC. 111 Castilian Drive Goleta, CA 93017 (805) 968-9621	Aural studio-transmitter links, remote pickup broadcast transmitters and receivers, remote controls, FM stereo exciters. Write for catalog.
NATIONAL AUDIO COMPANY 1911 South Stewart, Box 3857 Springfield, MO 65804 (417) 883-5377	All types of audio supplies. Cartridges, tape, cleaners, reels, etc. Some equipment. Write for further details.
PRODELIN INC. P. O. Box 131 Hightstown, NJ 08520 (609) 448-2800	Manufacturers of flexible and rigid coaxial cable, reducers, connectors. Send for catalog.
RCA COMMUNICATIONS DIVISION Bldg 2-2, Front & Cooper Streets Camden, NJ 08102 (609) 963-8000	AM and FM transmitters, all types studio equipment, antennas, etc. Write for detailed catalog.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
RAPID-Q 680 Bizzell Drive Lexington, KY 40504 (606) 259-0434	Cartridge tape equipment. Complete line. Write for catalog and price list.
REVOX CORPORATION 155 Michael Drive Syosset, NY 11791 (516) 364-1900	Reel-to-reel tape recorders, decks, and radio receivers and monitor amplifiers. Write for catalog.
ROH CORPORATION 107 Technology Park Norcross, GA 30071 (404) 449-0873	Modular assemblies. Microphone-line amplifiers, monitor amplifiers, power supplies, enclosures. Write for catalog.
ROHN MANUFACTURING P. O. Box 2000 Peoria, IL 60601 (309) 697-4400	Manufacturers of antenna towers from "crank-up" to guyed and self supporting. Write for catalog.
RUSCO ELECTRONICS MANUFACTURING 1070 Brookhaven Drive Clovis, CA 93612 (209) 299-2167	Turntables, preamplifiers, pickup arms, cartridges, etc. Write for catalog.
SCALA RADIO CORPORATION 1970 Republic Avenue San Leandro, CA 94577 (415) 351-3792	Custom-made antenna systems including directional designs. Indicate your specific needs when writing.
SOUND DYNAMICS P. O. Box 32055 San Jose, CA 95152 (408) 925-3588	New and used equipment for the studio including frequency monitors and audio processing equipment. Write for catalog.
SOUND GENESIS 445 Bryant Street San Francisco, CA 94107 (415) 391-8776	Specializes in used sound studio equipment. Speakers, amplifiers, tape decks, etc. Ask to be placed on mailing list.
SPARTA ELECTRONIC CORPORATION 5851 Florin-Perkins Road Sacramento, CA 95828 (916) 383-5353	Audio consoles, cartridge recorders, studio furniture, AM and FM transmitters, turntables, preamplifiers, etc. Write for complete catalog.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
DELTA ELECTRONICS INC. 5534 Port Royal Road Springfield, VA 22151 (703) 321-9845	Manufacturers of digital remote control systems. Write for catalog.
EIMAC 301 Industrial Way San Carlos, CA 94070 (415) 592-1221	Manufacturers of radio frequency amplifier tubes in power ratings from 150 watts to megawatts. Send for catalog.
E-Z WAY PRODUCTS INC. P. O. Box 22845 Tampa, FL 33622 (813) 677-7144	Manufacturers of antenna towers in all sizes. Write for catalog and prices.
GARRON ELECTRONICS 1216 Kifer Road Sunnyvale, CA 94086 (408) 736-8737	Audio processing equipment. Specialty item: stereo phase enhancer. Write for more information.
HARRIS CORP. GATES DIVISION 123 Hampshire Street Quincy, IL 62301 (217) 222-8200	AM and FM transmitters. Antenna systems, studio equipment, monitors. Write for catalog.
RICHARD R. HASKEY 1489 Callens Road Ventura, CA 93003 (805) 642-2300	Specializes in used equipment. Tape recorders, turntables, transmitters, etc. Ask to be placed on his mailing list.
INOVONICS INC. 1630 Dell Avenue Campbell, CA 95008 (408) 374-8300	Audio processing equipment. Limiters, compressors, equalizers, etc. Write for catalog.
JAMPRO ANTENNA COMPANY 6939 Power Inn Road Sacramento, CA 95828 (916) 383-1177	Manufacturers of all types of antenna systems. Specialty: circularly-polarized FM antennas. Also low-cost educational FM antennas. Write for more details.
JERROLD ELECTRONICS CORPORATION P. O. Box 346 Horsham, PA 19044 (215) 674-4800	Manufacturers of Cable TV equipment and field intensity measuring devices. Write for catalog.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
STANTON MAGNETICS Terminal Drive 175 Plainview, NY 11803 (212) 445-0063	Specialize in high performance turntable pickup arms, cartridges and styli. Write for catalog of complete line.
TABER MANUFACTURING 2081 Edison Avenue San Leandro, CA 94577 (415) 635-3831	New and used equipment and carries own line. Write for current listings.
TAPECASTER TCM INC. 12326 Wilkins Avenue, Box 662 Rockville, MD 20851 (301) 881-8888	Specializes in cartridge recording and playback units. Write for catalog.
TFT INC. 3000 Olcott Street Santa Clara, CA 95051 (408) 246-6365	Remote control equipment. EBS monitors. Frequency measurement equipment. Write for catalog.
WILKINSON ELECTRONICS P. O. Box 738 Trainer, PA 19013 (215) 497-5100	AM and FM transmitters. Audio consoles and other related studio and transmitting equipment. Write for catalog.
INTERNATIONAL TAPETRONICS 2425 South Main Street, Box 241 Bloomington, IL 61701 (309) 828-1381	Cartridge and reel-to-reel tape recording and playback equipment. Write for catalog.
BROADCAST ELECTRONICS 8810 Brookville Road Silver Spring, MD 20910 (301) 588-4983	New and used broadcast and sound studio equipment. Handles just about everything. Ask to be placed on mailing list.
MARTIN 320 West 46th Street New York, NY 10036 (212) 541-5900	Audio consoles, turntables, tape recorders, earphones, speakers, amplifiers. All studio audio equipment - no transmitters. Write for catalog.
ECONCO BROADCAST SERVICE 1302 Commerce Avenue Woodland, CA 95695 (916) 662-4495	Rebuilders of high power radio frequency amplifier tubes. Write for their specifications sheet and price list.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
LANGEVIN COMPANY 1050 Howard Street San Francisco, CA 94103 (415) 621-7421	Audio consoles, mixers, preamplifiers, monitors, etc. They also supply components for making your own equipment. Write for catalog and specify needs.
ELECTRO-VOICE INC. 600 Cecil Street Buchanan, MI 49107 (616) 695-6831	Microphones, mike stands, speakers. Write for catalog.
TELETRONIX 11922 Valerio Street North Hollywood, CA 91605 (213) 764-1500	Audio consoles, preamplifiers, audio processing equipment, etc. Write for catalog.
SHURE BROTHERS INC. 222 Hartrey Avenue Evanston, IL 60202	Microphones, preamplifiers, portable mixers, audio processing equipment such as limiters and compressors. Send for catalog.
PHELPS DODGE 3043 Rosslyn Street Los Angeles, CA 90065 (213) 245-1143	Manufacturers of rigid coaxial transmission line, connectors, reducers, low-pass filters, antennas. Send for catalog.
EIDSON ELECTRONIC CO. Box 96 Temple, TX 76501 (817) 773-3901	Broadcast crystals for AM, FM or TV transmitters and frequency monitors. Write for prices and specify your needs.
SIERRA WESTERN CABLE P. O. Box 23872 Oakland, CA 94623 (415) 832-3527	Wholesale coaxial cable distributors, cable connectors and hardware. Ask to be placed on their mailing list.
AUTODYNE Box 1004 Rockville, MD 20850 (301) 762-7626	Specializes in rebuilding cartridge and reel-to-reel tape requipment. Write for current listing of used equipment. Ask to be placed on mailing list.
BROADCAST EQUIPMENT DIST. P. O. Box 54 Allentown, PA 18105 (215) 437-0607	New and used broadcast equipment including transmitters, antennas, monitors, and studio equipment. Write for current list and ask to be placed on their mailing list.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
F. T. C. BREWER P. O. Box 8057 Pensacola, FL 32505	All types of audio equipment and supplies. Write for catalog.
McINTOSH LABORATORY INC. 2 Chambers Street Binghampton, NY 13903	Amplifiers, preamps, receivers. Write for price list and catalog.
OPAMP LABS 1033 North Sycamore Avenue Los Angeles, CA 90038 (213) 934-3566	Audio processing devices, equalizers, preamps, amplifiers, etc. Write for catalog.
FISHER RADIO CORPORATION 11-40 45th Road Long Island City, NY 11101	Audio mixers, tuners, amplifiers, reverberation units. Write for catalog.
COMMUNICATIONS SYSTEMS, INC. Drawer C Cape Girardeau, MO 63701 (314) 334-6097	AM and FM used transmitters. Power range of 10 watt to 10,000 watt. Write for catalog.
TELEX COMMUNICATIONS 9600 Aldrich Avenue South Minneapolis, MN 55402 (612) 884-4061	General recording equipment, reel-to-reel recorders and decks, amplifiers, earphones, etc. Write for catalog.
CROWN 1718 W. Mishawaka Road, Box 1000 Elkhart, IN 46514 (219) 294-5571	Reel-to-reel tape recorders and decks, preamps, amplifiers, etc. Write for catalog.
ROBINS/FAIRCHILD 75 Austin Boulevard Commack, NY 11725 (516) 543-5200	Audio mixers and consoles, audio processing equipment. Send for catalog.
AEL (AMERICAN ELECTRONIC LABS) P. O. Box 552 Lansdale, PA 19446 (215) 822-2929	AM and FM transmitters from 2.5 kW to 50 kW. Write for catalog.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
NORLAB P. O. Box 217 Blue Bell, PA 19422 (215) 279-4165	Distributors of carrier-current and FM broadcast transmitters with output power ranges of 1 to 100 watts. Write for specifications.
COOKE ENGINEERING COMPANY 900 Slaters Lane Alexandria, VA 22314 (703) 548-3889	Audio and video distribution amplifiers, preamplifiers and monitor amplifiers. Write for catalog.
COMMUNICATIONS MEDIAS P. O. Box 54 Allentown, PA 18105 (215) 437-0607	New and used cartridge and reel-to-reel tape equipment and repair service. Write for catalog and rates.
SHALLCO, INC. Highway 301 S, P. O. Box 1089 Smithfield, NC 27577 (919) 934-3135	Manufacturers of broadcast quality step attenuators. Write for catalog and specification sheet.
FIDELIPAC 109 Gaither Drive Mt. Laurel, NJ 08057 (609) 235-3511	Cartridge tapes, cartridge racks, on-the-air signs. Write for catalog.
UREI 11922 Valerio Street North Hollywood, CA 91605 (213) 764-1500	Specialize in audio mixers and consoles. Write for free catalog.
PACIFIC RECORDERS AND ENG. CO. 11760 Sorrento Valley Road San Diego, CA 92121 (714) 453-3255	Specialize in AM and FM limiters. Write for specifications and prices.
CONTEL P. O. Box 206 Hialeah, FL 33012 (305) 822-1421	Cartridge tape recorders and playback units. Economy priced. Write for catalog.
RAMKO RESEARCH 3516-C La Grande Boulevard Sacramento, CA 95823 (916) 392-2100	Preamplifiers, monitor amplifiers, audio distribution amplifiers. Write for catalog.

WHOLESALE COMPONENTS DEALERS

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
A. B. INDUSTRIES 4735 North Damen Chicago, IL 60625	All types of component parts such as resistors, capacitors, semiconductors, etc. Write for free catalog.
BURNSTEIN-APPLEBE 3199 Mercier Kansas City, MO 64111	Supplier of component parts, all types. Free catalog includes "bargain" pages. Write for catalog.
WESTERN COMPONENTS P. O. Box 2581 El Cajon, CA 90221	All types of parts, many imported and inexpensive. Write for free catalog.
WESTERN OVERRUN & SURPLUS P. O. Box 2637 El Cajon, CA 90221	All types of parts, some imported and some American-made surplus. Inexpensive. Write for free catalog.
KELVIN ELECTRONICS 460 Smith Street Farmingdale, L.I. NY 11735	All types of parts. Specialize in quantity discounts. Write for free catalog.
CALIFORNIA ELECTRONICS P. O. Box 35 Chatsworth, CA 91311	All types of parts and PC materials. Inexpensive. Write for free catalog.
BRIGAR ELECTRONICS 10 Alice Street Binghampton, NY 13904	General parts supplier. Quantity discounts. Inexpensive. Write for free catalog.
MOUSER ELECTRONICS 11511 Woodside Avenue Lakeside, CA 92040	All types of parts. Inexpensive. Write for free catalog.
CHANEY'S ELECTRONICS P. O. Box 15431 Lakewood, CO 80215	All types of parts. Specializes in ultrasonic transducers. Write for free catalog.
CORNELL 4219 E. University Avenue San Diego, CA 92105	All types of tubes for less than 50¢ each. Free catalog.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
LAFAYETTE 111 Jericho Turnpike Syosset, NY 11791	Supplier of parts and equipment. Speakers, receivers, tools, recording tape, small component parts. Write for free catalog.
OLSON ELECTRONICS CORPORATION 260 South Forge Street Akron, OH 44327	Supplier of parts and equipment. Closed circuit TV, tools, speakers, radios, few component parts. Write for catalog.
ALLIED ELECTRONICS P. O. Box 1544 Fort Worth, TX 76101	Supplier of all types of component parts produced by American manufacturers. Prices are a bit high. Write for free catalog.
INTERNATIONAL ELECTRONICS P. O. Box 1708 Monterey, CA 93940	Mostly digital and linear integrated circuits. Write for free catalog.
ANCRONA CORPORATION P. O. Box 2208 Culver City, CA 90230	Supplier of digital and linear IC's, LED's, hybrid power amplifiers, sockets. Write for free catalog.
FAIR RADIO SALES P. O. Box 1105 Lima, OH 45802	Specialize in surplus electronic equipment including military radio transmitters. Write for free catalog.
FORDHAM RADIO SUPPLY COMPANY 558 Morris Avenue Bronx, NY 10451	Specializes in surplus electronic equipment including military radio transmitters. Write for free catalog.
LECTRONIC RESEARCH LABS Atlantic & Ferry Avenue Camden, NY 08104	Specializes in electronic test equipment but also supply meters, high wattage resistors, transformers, inductors, switches, etc. Write for free catalog.
INDUSTRIAL INSTRUMENTS INC. 89 Commerce Road Cedar Grove, NJ	Used and surplus test equipment and large components such as transformers, relays, switches, etc. Write for free catalog.
STAR-TRONICS P. O. Box 17127 Portland, OR 97217	All types of parts including digital and linear IC's. Write for free catalog.

SOURCE ADDRESS	DESCRIPTION OF PRODUCTS
POLY PAKS P. O. Box 942 Lynnfield, MA 01940	Pre-packaged assortments of parts such as "75 linear IC op amps, $1.98". Write for free catalog.
S. D. SALES COMPANY P. O. Box 28810 Dallas, TX 75228	Knobs, digital read-outs, rectifiers, IC op amps, and high-frequency transistors. Write for free catalog.
ALTAJ ELECTRONICS P. O. Box 38533 Dallas, TX 75238	Linear IC's, transformers, relays, digital read-outs, etc. Inexpensive. Write for free catalog.
JAMES P. O. Box 822 Belmont, CA 94002	Miniature components such as potentiometers, transformers, and switches. Linear and digital IC's, etc. Write for free catalog.
DIGI-KEY CORPORATION P. O. Box 677 Thief River Falls, MN 56701	Integrated circuit hardware, capacitors, reed relays, resistors, etc. Write for free catalog.
ELECTRONIC DISTRIBUTORS, INC. 4900 Elston Chicago, IL 60630	Power supply components, coaxial relays, some semiconductors. Write for catalog.
SOLID STATE SALES P. O. Box 74A Somerville, MA 02143	Digital and linear IC's, transformers, rectifiers, hybrid audio power amplifiers. Inexpensive. Write for free catalog.
NEW-TONE ELECTRONICS P. O. Box 1738A Bloomfield, NJ 07003	Specializes in imported semiconductors and R.F. power output transistors. Write for catalog.
BABYLON ELECTRONICS P. O. Box 41778 Sacramento, CA 95841	Mostly digital IC's. Some relays and miniature components. Send for flyer.
ADVA ELECTRONICS P. O. Box 4181 Woodside, CA 94062	Popular linear IC's and transistors. Data sheets supplied with each order. Write for free catalog.

AUTOMATION EQUIPMENT

SOURCE ADDRESS

CONTROL TECHNOLOGY INC.
2513 Tortugus Lane
Ft. Lauderdale, FL 33312
(305) 587-2716

COMPU/NET INC.
8616 La Tijera Boulevard
Los Angeles, CA 90045

CONTROL DESIGN CORPORATION
205 South Whiting Street
Alexandria, VA 22304
(703) 751-5650

CETEC BROADCAST GROUP
75 Castilian Drive
Goleta, CA 93017
(805) 968-1561

BROADCAST INDUSTRY AUTOMATION (SYSTEMS)
3000 Directors Row
Memphis, TN 38131
(901) 332-3544

SOURCE ADDRESS

BROADCAST SUPPLY WEST
2711 Locust Avenue
Tacoma, WA 98466
(206) 565-2301

AUDIO/VIDEL PRODUCTS
4421 Riverside Drive
Burbank, CA 91505
(213) 841-3020

AUTOMATED PROCESSES INC.
789 Park Avenue
Huntington, NY 11743
(516) 427-6024

AUTOGRAM CORPORATION
P. O. Box 456
Plano, TX 75075
(214) 424-8585

VIF INTERNATIONAL
P. O. Box 1555
Mountain View, CA 94042
(408) 739-9740

Each of the firms listed above can supply automation equipment. Send for further information.

The Broadcaster's Guide To

RADIO STATION DEVELOPMENT

By

Ernest G Wilson

THE BROADCASTER'S GUIDE

TO

RADIO STATION DEVELOPMENT

A step-by-step guide to planning,
licensing, building and operating
a broadcast radio station

Illustrations by Rick McCannon

Printed in the United States of America

Revised 1977

DEDICATION

To my wife Joan who has stood by faithfully

while radio has engulfed my life

CONTENTS

CONTENTS

Appendices

INTRODUCTION

"Any qualified citizen, firm or group may apply to the Federal Communications Commission for authority to construct a standard (AM), frequency modulation (FM), or television broadcast station" is a direct quote from an FCC Bulletin. Sounds simple doesn't it? It is, IF you go about it in the right way. There will be certain rules and procedures you must follow in order to succeed. These rules and procedures are not difficult to follow but they do require some work on your part . . . . . You CAN do it.

How do you start your own broadcast station? This depends pretty much on which type of station you have in mind. Some stations require licensing by the FCC, while others need only follow certain FCC rules. Some radio stations may sell advertising time, while others may not. Some radio stations can cost thousands of dollars to build, while others can be built for under a hundred dollars.

To start your radio station you must decide which of several type stations and formats are best for you. You must then find a frequency on which to operate, find a suitable location, and obtain financing. If the proposed station will be owned by an institution or corporation you will need approval from its officers. If your plans are for a licensed radio station there will be forms and exhibits to prepare for the FCC. How to go about all this is described in the following pages along with step-by-step instructions, hints, references, and where to get additional help if needed. Since much of the information is inter-related, I suggest that you read this entire book through first to prevent needless waste of your time and money. Make a list of the things you must do, in an order most convenient for you, then use this book as a reference for completing those tasks.

Costs of the various materials and services mentioned throughout this book are representative of the costs at the time of its writing. Current price levels may or may not stabilize resulting in substantially different price levels two or three years from now.

Occasionally your attention will be called to a reference appearing in the appendices or in the FCC rules and regulations. References appearing in the appendices will be shown as a letter designator and item number such as (A-3) indicating appendix A, item number 3. References to a specific FCC rule or regulation will be shown as (FCC R, R, Part 1.573). A list of abbreviations used in this book follows.

Good luck with your project.

Ernest G. Wilson

ABBREVIATIONS USED IN THIS BOOK

ac	Alternating current
AHAAT	Antenna height above average terrain
AM	Amplitude modulation
CATV	Cable television
CAFM	Cable FM
C-C	Carrier current
CP	Construction permit
dc	Direct current
ERP	Effective radiated power
FCC	Federal Communications Commission
FM	Frequency Modulation
H	Horizontal
kHz	Kilohertz (1000 cycles per second)
kW	Kilowatt (1000 watts)
MATV	Master antenna system
MHz	Megahertz (1,000,000 cycles per second)
MSL	Mean sea level
mV/M	Millivolt per meter (unit of field strength)
PTA	Parent-teacher association
R, R	Rules, regulations (FCC)
SCA	Subsidiary communications authorization
TPO	Transmitter power output
TV	Television
V	Vertical
uV/M	Microvolts per meter (unit of field strength)

WHICH TYPE OF STATION IS BEST FOR YOU?

There are many things to consider before jumping into broadcasting. Let us begin by asking a few questions the answers to which will help direct your efforts.

Q: Who will be your audience?

Q: How large is the audience you wish to serve?

Q: How much money do you have to spend for equipment?

Q: Do you have a location for your station?

Q: Do you, or does someone you know, have a working knowledge of electronics?

Q: Will the station be operated for profit?

Q: Do you have an attorney that can help you?

Q: How can your station help the community?

Q: What legal entity will own the station (individual, partnership, association, corporation, institution)?

With the answers to the above questions at least partially thought out we may proceed by discussing the different types of broadcast facilities and some of their characteristics. The information contained in this and following chapters should assist you in your search for these answers. At your first opportunity, if the station is to be owned by someone other than yourself, ask the proposed owner to help in resolving these questions. Your final answers will largely determine your station's programming, which type will be constructed, construction costs, and many other facets that should become apparent as you read on.

TYPES OF STATIONS

There are seve , types of stations from which to choose. Some will require licensing w ie others will not. It is possible to operate one or several different types of stations simultaneously to serve varied audiences.

The Carrier Current Station

A carrier current (C-C) station is one which operates with a minimum of power, either as a closed-circuit system or by direct radiation. Carrier current stations cover a limited range.

With the closed-circuit system, radio frequency energy is coupled into power lines, intercom lines, or other such conductors and travels along these conductors. Radios in close proximity to the lines receive the signal through induction.

The direct radiation system uses an antenna with a maximum length of ten feet and a maximum transmitter power output (TPO) of 100 milliwatts (.1 watt). A combination of the closed-circuit and direct radiation systems utilizes a special coaxial cable with controlled radiation characteristics (A-26).

Range of a carrier current station seldom exceeds one mile but can provide coverage of a school campus, dormitories, cluster housing, apartment houses, and small communities. Carrier current stations operate on frequencies between 535 and 1605 kilohertz (kHz), which is called the standard broadcast band, and are received by standard (AM) radios.

This type of station is not licensed by the FCC, but it must abide by certain FCC rules. Restrictions concerned with maximum power, field strength, and avoidance of harmful interference to public safety and broadcast stations are covered by FCC Rules and Regulations, Part 15 (see appendices A-3, A-4).

Several factors make the carrier current station ideal for the beginning braodcaster. These include the selling of advertising time, unlimited operation time, and no license requirements for announcers, disk jockeys, transmitter, or transmitter operators. Further, carrier current transmitters may be built by you instead of purchasing them from commercial sources (A-26. This can save you a substantial amount of money. All of your studio equipment may be built by you. Some hi-fi equipment may work out very well for studio use.

Many radio stations began with carrier current systems before moving on to a larger operation. This allows the staff of the station time to develop skills, procedures, and techniques for a "quality sound" on the air.

The Cable FM Station

A cable FM (CAFM) station is one which transmits its signal over an existing cable TV (CATV) distribution system. Although transmission takes place over a closed system the audience can far exceed that of a carrier current station. Commercial cable TV companies may have 5000 to 100,000 subscribers in your area. This gives you a potentially good listening audience. A CAFM station may also transmit over master antenna (MATV) systems which are used in schools, colleges, apartment houses and small communities.

An FM modulator is installed at the "head end" of the CATV or MATV system and receives audio signals from your studio by way of broadcast-grade telephone lines. Your FM modulator (basically a low power transmitter) is tuned to an FM channel that will not interfere with other FM or TV stations already provided by the cable system. Your signal is received by anyone who has an FM receiver connected to the cable system and who is tuned to your channel (frequency).

Operating hours of CAFM stations are unlimited, may be operated in stereo and do not require FCC licensing of the modulator (transmitter) or the operators of the station. Although not requiring an FCC license the CAFM station still must abide by certain FCC Rules governing profanity, obscenity, equal time, etc.

CAFM stations may sell advertising time (spot announcements) and, with the audiences available through CATV systems, the income can be pretty good. The Intercollegiate Broadcasting System (IBS), through a survey of campus operated radio stations, received reports of income up to $17,000 a year. The average income appeared to be about $2,000 a year. With a small initial cost the CAFM station owner can develop an audience, train his staff and improve his equipment in preparation for future expansion into non-commercial or commercial broadcasting.

The Class D FM Station (Non-commercial)

A class D FM station operates with a maximum transmitter output (TPO) of ten watts with the signal radiated directly from an antenna system. A properly located and designed antenna system can make the class D FM station receivable to a distance of ten miles or more. This means the possibility of over 300 square miles of coverage. Multiple antenna elements (bays) provide a still greater coverage area and should be considered in the initial planning of the station.

Class D FM stations normally operate on a channel in the lower portion of the FM band (between 88 and 92 MHz) and are receivable on regular FM radios including FM auto radios and portables. The lower twenty channels of the FM band are reserved by the FCC for use by non-commercial stations.

Class D FM stations and operators must be licensed by the FCC. Applications for authority to construct a non-commercial station are covered later in this book and in the FCC Rules and Regulations, Volume I, and Part 73 of Volume 3 (see appendices A-13, A-15). Operators of a class D station are required to have a minimum of a third class radiotelephone permit with broadcast endorsement (A-29). A person having a second class, or higher grade, radiotelephone license must be under contract for maintenance of the transmitter even if only on a part time basis. Certain documents must also be maintained by the station which include program, maintenance, and operating logs.

Class D stations are considered to be non-commercial by the FCC and advertising time therefore may not be sold. FCC Rules and Regulations, Part 73.503 does allow however for the announcement once each hour, of the name of contributors that have donated materials, services, or monies to the station. Instead of selling advertising time, the non-commercial station owner may solicit contributions as a means of providing the station with income.

Construction time and costs are greater for a class D station compared to C-C or CAFM stations but then so is the potential audience. Several other factors different from C-C or CAFM stations include finding an FM channel on which to

operate which will be approved by the FCC, finding a good transmitting site, and the possible formation of a non-profit group as legal entity - owner of the station.

You must apply for an FCC Construction Permit (CP) which, when approved, authorizes the construction of the station. Granting of a CP by the FCC takes about 90 days after preparing and filing the proper application and exhibits. This 90 days, your actual construction and testing time, and another 10 days to receive "program test authority" from the FCC is the minimum length of time before you are "on the air". The FCC issues your final FM broadcast license about 60 days after that. All this may seem like a long time but the resulting license is good for three years and is renewable.

Stereo operation is not recommended for class D stations due to inadequate margin for noise degradation which would be quite noticable due to multipath and weak signal reception. Stereo operation would also require the addition of costly frequency and modulation monitoring equipment normally not required by class D stations.

The FM Broadcast Station (Non-commercial, class A, B or C)

Non-commercial FM stations operate with a greater output power than class D stations. Non-commercial stations are classified as type A, B or C dependant on their power output and zoning. Class A stations broadcast with an effective radiated power (ERP) of up to 3000 watts (3kW) and an antenna height of 300 feet above the average terrain (AHAAT). Class B stations are allowed up to 50kW ERP with an AHAAT of 500 feet. Class C stations may operate up to 100 kW ERP with an AHAAT of 2000 feet. The operating frequency (channel) is the same for class D stations.

Greater power output requires more planning, larger equipment and antenna, extra monitoring equipment and, of course, greater cost. Some additional FCC rules apply: While a second class radiotelephone licensee may inspect and maintain lower-power transmitters (less than one kW) a first class licensee is required if your transmitter power output is one kW or more. Additional work must be completed in determining the coverage area and in the preparation of exhibits which must accompany the application for a construction permit.

Some knowledge of electronics is required for proper completion of the application for construction permit. Step-by-step instructions are presented in later chapters of this book but you may still need some outside help. The engineer at your local commercial station may be able to help you and should be contacted as soon as possible. If you have $300 to $600 to invest you may wish to employ a broadcast consulting-engineer to prepare your application and exhibits for the construction permit.

The FM Broadcast Station (Commercial, Class A,B,C)

The commercial FM station is classed the same as the non-commercial FM station in regards to maximum authorized power outputs and antenna heights. Minimum power for a commercial FM station (class A) is 100 watts. The commercial FM station operates on an assigned channel (frequency) between 92 and 108 MHz and is receivable by regular FM radios.

The commercial FM Station derives its operating capital through the sales of spot announcements with additional revenue possible through the lease or rental of special receivers. Some commercial stations apply for the Subsidiary Communications Authorization (SCA) available from the FCC. This allows the station to broadcast background music which is receivable only by special radio receivers. These special receivers are rented to store owners which use them to "tune in" on the commercial free background music from the commercial station. FM stations, because of their transmission characteristics are able to simultaneously broadcast the SCA signal and a monophonic or stereo signal.

Commercial FM station applicants will have additional expenses not required by non-commercial stations. Commercial class A applications require a $200 filing fee, another $1350 grant fee when the CP is approved, and an annual fee based on the station's spot announcement rate but not less than $52. The necessary equipment would not be covered under an educational grant nor would equipment be available through donations as is the case with non-commercial stations. Construction costs, fees and a margin for first year operating expenses could amount to more than $30,000 for a class A commercial station.

Applications may be filed to construct an FM station only on the channel listed for that community in the FCC's Table of Assignments (FCC R, R, 73.020). The FCC allows applications for class A stations within ten miles of the assigned community and within fifteen miles for class B/C stations. The FCC also allows the filing of petitions to amend the Table of Assignments which could make an FM channel available in a community not currently listed. Commercial FM stations are licensed for a specific city, called the city of license, and its surrounding communities.

Protection from interference accorded to FM stations is limited to the protection that results from the FCC Rules regarding minimum mileage separation (FCC R, R 73.207 and 73.209).

Your application for a construction permit must also include the results of a "community needs" survey. This survey should be conducted and documented by you to ascertain the interest and needs of your community. The FCC will require a showing on your application of how you intend to serve those interests and needs. It may be advisable to have your attorney check your survey and application forms. It would be wise also to have a broadcast engineer or consultant check over your engineering data.

Other FCC Rules and Regulations pertinent to the application, construction, programming, control and operation of your commercial FM station can be found in BROADCASTING YEARBOOK (A-11) and FCC R, R Part 73, Subpart B(A-15).

The Standard (AM) Broadcast Station (Commercial)

An applicant for a standard broadcast station must be prepared to hire a broadcast consultant or have the ability to research, design and prepare technical portions of his application. The application for a standard broadcast station involves an assessment of community needs, a frequency search, facilities location and interference considerations.

Standard broadcast stations may operate on local, regional or clear channels. Stations with up to one kW output during the day (up to 250 watts at night) may

serve an area of approximately 2500 square miles. Stations with output powers of 500 to 5,000 watts cover larger centers of population and their surrounding communities, with a coverage area of up to 10,000 square miles. Stations with output powers of ten kW to fifty kW are considered regional stations and may cover an area of several states (particularly at night).

Construction of an AM station can be rather costly. A good used 500 watt transmitter begins at about $4,000. Because of interference problems, most new AM stations are required to be directional; this means the installation of several towers costing up to $4,000 each. Directional antenna systems also require engineering studies, antenna phasing equipment and good ground conductivity, all of which adds to the expense. Filing, grant and annual fees must also be considered in addition to first year operating expenses. Plan to spend at least $40,000 for a 1000 watt day time station.

Standard broadcast station channels are scarce with those that might be available requiring interference studies with resultant costly station construction. The FCC has, in the near past, put a freeze on the acceptance of AM station construction permits. It might be less bothersome and expensive to purchase an existing AM station.

PROGRAMMING

You will undoubtedly want your station to be known throughout your community for its special character and rapport. Part of that character and rapport involves your programming, the material you present to your audience. Your programming can of course take many shapes depending on the community needs and interests and your own particular interests. No one station can be all things for all people, of course. Let us examine some of the possibilities, remembering that your particular programming may be a mixture of the following.

Entertainment

Entertainment programming includes programs of general or specific interest including public service messages, sports, news and recorded music. The recorded music offered may be Rock, Country, Middle-of-the-Road, "Easy listening", Jazz, Contemporary, Underground, Classical, Background, etc. Usually entertainment programming includes a "personality" as an announcer of disc jockey. See appendices A-27 and A-29 for sources of program materials, records, etc.

Educational

Educational programming includes general and specific interest programs, including instructional programs prepared for use by both schools and the general public. News, special events, school-related activities, sports, drama and musical entertainment are also included. Educational programming is often employed by schools and colleges and may be used in conjunction with their broadcast training facilities. Program material sources, records, tapes, etc., are included in the books listed in appendices A-27 and A-29.

Community/Alternative

The community or "alternative" radio station tends to operate at the grass roots level, its prime concern being communication with the people of the community. Controversial issues affecting the community are openly discussed, community meetings are broadcast live, and attempts are made to arouse community awareness and community action. Musical entertainment may also be presented, usually classical and esoteric music. See appendix A-23.

Religious

"Religious" stations generally offer educational programs of a religious nature, inspirational entertainment (including music and drama), theological discussions, and broadcasts of religious services. See appendix A-27.

Conversational

Some stations devote a substantial portion of their broadcast time to conversational programming. These include interviews, talk shows (where listeners call in) and/or simply supply conversation without audience response. Program hosts must be articulate, knowledgeable, and understanding of how to talk to and with the audience.

All News

"All news" stations are generally limited to large market areas where potential advertising revenue can sustain the operation. The necessity to continually gather news throughout the day requires a large expense for a news staff, news wire services, affiliations with news gathering agencies, and mobile radio equipment and cars.

For more information on radio programming see "Modern Radio Station Practices" (A-35).

GETTING STARTED

There are several forms, information bulletins, and reference materials that are both helpful and necessary toward getting your radio station started. Some of these require several weeks for delivery. Others may be found as near as your local public library, FCC field office and radio station(s). In any case, you should attempt to get them in your hands as soon as possible.

Appendix A lists the various forms and reference materials you will need along with addresses and approximate costs if any. Depending upon which type of station you wish to start, certain materials will be more important to you than others. Of course for a broad understanding of the broadcasting field you may wish to obtain all the reference materials you can.

Below is a list of appendix items needed by you according to the type of station that interests you most. Send for them immediately.

Type of Station	Appendix A Item Number
Carrier Current	1,3,4,11,12,16,17,18,19,26,27,28,29
Cable FM (CAFM)	11,12,22,24,26,27,28,29
FM (Non-Commercial)	1,2,5,6,9,10,11,12,13,14,15,16,17,18 19,20,21,22,23,25,26,27,28,29
AM or FM (Commercial)	1,2,7,8,9,10,11,12,13,14,15,16,17,18, 19,20,21,22,26,27,28,29

HOW TO GET ALONG WITH THE FCC

Contrary to popular opinion the Federal Communications Commission is not comprised of ugly monsters waiting with fangs bared ready to gobble up wrong doers. All my dealing with the FCC has shown me that the people that make up that group are just as human as you and I. They even make mistakes like you and I and therefore expect you and I to make mistakes.

The principal task of the FCC is to ensure coherent and dependable radio communications. They want to be certain that your station does not interfere with existing stations, that your station is needed, and once you get your station on the air no one interferes with it. In the face of what occassionally seems to be outrageous bureaucracy and outmoded or unnecessary laws the FCC does a reasonably good job. Anything you can do to make their job easier will result in less paper work for you and them, less wasted time, and a better working relationship between the both of you.

In all of your dealing with the FCC strive to be specific, concise, complete, neat, follow directions and above all be HONEST. The FCC does not wish to scold or fine broadcasters and do so only when pushed into it. If you try your hardest to follow the FCC rules, regulations and procedures, admit to your mistakes and take steps to correct those mistakes, you are pretty safe. It is the willful and knowing disregard for FCC Rules, Regulations and procedures that upsets the FCC the most.

Remember also that FCC field offices (H) can offer little help other than to provide forms and make available certain reference materials. They cannot give advice other than is already part of the Rules and Regulations. It won't hurt to make an effort to know the people at your local FCC field office. They may, on occasion, be able to give you advance information about FCC changes and policies.

COMMUNITY NEEDS ASSESSMENT

The FCC has a growing interest in the effectiveness of broadcast stations in meeting the needs of the community. Broadcast stations are licensed to meet the public interest, convenience and necessity. Proof that your station can and will strive to meet this requirement rests with you. A part of the application for a construction permit requires an exhibit showing the results of a community needs assessment survey.

A survey form should be prepared by you considering fully the area your station is to serve, including the nature of the community such as residential, business, rural, and the ethnic and educational background of your proposed audience.

Visit your community, and through your survey form and personal conversations make a list of the apparent needs and interests of the persons polled. Talk with minority groups and leaders, church groups, civic officials, school administrators, newspaper editors, and the general public on a door-to-door basis if need be.

Consider ways your station can be beneficial to the community such as presentation of local news, public service messages, open debates, free speech messages, editorials, minority discussions, live and prerecorded broadcasts of city and county meetings, etc. Compile all your information. If you later file an application for a licensed broadcast station you will have a neat exhibit to send along.

BUSINESS RELATIONS

As a beginning broadcaster you will need help and support from various persons and groups. The amount of help and the approach you take in asking for help and continued support will depend somewhat on the type of station you propose. If you are planning an educational non-commercial station to be owned and operated by a school or college you should be concerned with how you will present your ideas to the Board of Trustees. On the other hand, if you are planning a commercial station you should be concerned with the competition offered by other commercial broadcasters. The following information is presented as suggestions and hints in a general overview.

Relations with your School Board

If you propose a station which will be under the jurisdiction of a school board, you must consider things from the point of view of that school board. They will be concerned with how much your proposed radio station will cost and what the continuing costs are likely to be. They will be concerned about your proposed programming and who will be responsible for its preparation. They will worry about libelous statements, editorials, obscenity and profanity on the air. They will want to know how your station will help in the education or training of students. Who will supervise students, what hours will the station be on the air, and what area will it cover, why, why, why?

Getting the Board on your side is not an overwhelming task, but it will take a little work on your part. First check with school administrators and board members, one at a time, and note their reactions and concerns. Keep notes. Next, prepare a proposal for presentation to the school board which includes answers and solutions to the board's anticipated concerns. Send a copy of the proposal to each board member and other interested persons prior to the board meeting you will be attending.

Your proposal should be short but specific to ensure that it's read by all concerned. Point out that the application for construction permit (if you are planning for a licensed station) costs little to nothing and does not obligate the school board or you to actually construct the station.

While waiting for approval of your construction permit you will have time to search out possible funding through federal or private grants and examine the possibility of donations of equipment. On-going costs of the station would include electrical power, space, and some new equipment from time to time. Audio visual equipment may be used in the beginning. Upgrade your station over a period of time from school capital outlay budgets and through the construction of equipment using instructional supply budgets.

Programming could include topics of community interest, local and school news, interviews with civic leaders and school administrators, public service announcements, music, etc. A teacher or faculty advisor may be responsible for the preparation, supervision and presentation of programming materials. Point out that future programming could include live coverage of football, basketball and baseball games.

Probably the toughest thing to do is convince the board that libelous statements, obscenity, profanity, etc., will not be broadcast. Reliable students,

operators and faculty are the answer. The FCC Rules and Regulations are specific in these areas. Apparently there are insurance companies that carry libel suit policies (A-30, A-31) although little is known about them other than their addresses.

As to the educational and training aspects of your proposal, consider educational and instructional programs that can be broadcast directly to your school and other schools for use in the classroom. Include the fact that students operating the station gain experience in announcing (speech), station operation (technical), management (business, legal), typing, creative writing (secretarial, English), editing, news reporting (journalism), etc. The proposed station may be made part of a school department such as speech, drama, electronics, etc.

Supervision will be a worry to most school officials. Consider building the station so it will be within view of a supervisor or teacher. The station might be supervised by special personnel, parents, or closed circuit TV. Night operation, when teachers may not be available, could have the parents of the students involved act as supervisors on a rotational basis.

Gain community support, before your presentation to the school board, by talking with the PTA, teachers, local businessmen, the mayor, and local service organizations. With a few members of the community on your side and present at the school board meeting, present your proposal and watch the board members fight over which one should make the motion to approve it. . . . . .

Relations with other broadcasters

Your entering into broadcasting will present the other local radio station owners and managers with somewhat of a dilema. On the one hand, a non-commercial station may not take advertising dollars away from the commercial broadcaster although it can spirit away some of the audience. A loss of listeners can result in a loss of sales and this will make the commercial station owner unhappy.

Non-commercial stations, carrier current and CAFM stations may operate with unlimited hours, which may also be displeasing to the commercial station owner. One case in particular that is annoying to "day time" AM commercial stations is the fact that they must record local night time sports events then broadcast them the following day. Twenty-four hour stations could broadcast the live action because they can broadcast at night. Local commercial stations might also feel some competition presented by your station; this could force them to upgrade their programming and talent creating an additional expense.

This brings us around to the other side of the coin. The FCC thinks favorably of the broadcaster that is concerned about the community his station serves. The FCC tends to encourage beginning broadcasters especially since non-commercial broadcasters generally try to be community oriented. Further, school and college stations, training grounds for broadcasters, can supply local commercial broadcasters with skilled full and part time help. This offers an advantage to both student and broadcaster. It behooves the commercial broadcaster then to help the non-commercial station get started by offering advice and possible donations of old equipment (also good for a tax deduction).

In view of the commercial broadcasters plight, non-commercial broadcasters should approach them with the understanding they may be helpful one time and resentful the next.

If you are planning the construction of a commercial station other local broadcasters will certainly view you in a dim light. You will be a definite threat to them and their share of the community's advertising dollars.

You should be prepared to accept the possibility of several "Petitions to Deny" your application being sent to the FCC by those same threatened broadcasters. Your application may be denied or accepted through the process of an FCC hearing. FCC hearings can be lengthy and attorney costs high.

It has been my experience that the technical personnel of stations, the chief engineers, not the program and operations people, get along well with other station technical persons. Engineering people are mostly concerned with proper transmitter performance, equipment specifications and have a lot in common. The program directors, sales staff, and owners at different stations have a lot in common also, they are busy trying to get the other station's audience and as much advertising as possible. This means competition which, at times, can be unfriendly.

Of course you may not have any problems. Your best approach might be to locate your station in an area that is relatively untouched by broadcasting sales and enjoy those dollars yourself.

Relations with the Cable Company

The cable system operator can gain a great deal by carrying FM and CAFM stations. There is considerable profit in selling second cable taps for FM receivers and even more profit selling the original hook up. Cable companies must be franchised in the city or county where they provide service and usually try to stay on the good side of civic offices. Because of these positive features cable operators are almost always cooperative, its just good business.

The sales operator is under no obligation to carry FM or CAFM station signals, but most likely will. If you are proposing a CAFM station be sure to check with the cable company before making elaborate plans. You might consider asking the cable company to loan or give you the equipment needed by their "head end" to transmit your signal. They will probably want to maintain the equipment anyway as if it were their own. You might also persuade them to pay the rental charges for the audio lines from your studio to their head end. This would be so if the proposed station will be owned by an educational institution.

If you are planning an FM station, especially a high powered one, be careful to locate your transmitter site for minimum interference to the cable company antennas and receivers. Overloading their system with strong signals will bring quick complaints from both the cable company and their subscribers.

Relations with the public

All broadcasters should be sharply aware of the needs of the community they serve. Always be ready to help in providing public service and offering advice as a leader in your community. Strong AM and FM stations often cause interference to home hi-fi equipment, TV and CATV systems. Complaints will arise concerning this interference and you should be ready to assist in correction of the problem even though the major problem is in the complaintant's equipment.

Make air time available for qualified spokespersons in your community. Join local business and service organizations to bring you close to the problems of the community. These business and service organizations will, in turn, help support your station and your efforts.

WHERE DO WE GO FROM HERE

Now that you have a good idea of what is involved in starting a radio station your next step is to complete the planning of your own. You will need a frequency on which to operate, a suitable site for your studio and a proper location for your transmitter and antenna. If your plans are for a licensed station you will need to complete various forms and exhibits and submit them to the FCC.

The following pages will help you achieve your goal by the easiest and shortest way possible, but that will still require much time. The following chapters include frequency search procedures, facilities planning, step-by-step preparation of your applications, examples of exhibits, local notice of filing, call letter requests, etc.

SCHEDULE OF EVENTS

There will be a great deal of interplay between you and the FCC when applying for a broadcast station construction permit and license. The procedures go like this:

You do the following:	The FCC responds with:
1. Select your frequency Select your location Research community needs	
2. Complete FCC application Requested facilities Legal qualifications Financial qualifications Purpose and objectives Program intentions Technical information/maps Antenna site information	
Mail to FCC in Washington	Sends receipt by post card
Publish public notice	Publishes public notice
	Grants construction permit (Approximately 90 days)
	Requests call letters
3. Begin construction Suggest call letters	Issues call letters
4. Complete construction Test equipment Notify FCC field engineer	Field office inspects station
5. Complete application for license Informal request for program tests Mail to FCC in Washington	Authorizes program tests (Approximately 90 days)
6. Start normal operation (Program tests)	Grants license (4 to 6 weeks)

How soon you will be on the air depends largely on how well you have prepared your paper work and how technically correct your station construction has been. If all is well you should be on the air in between 90 and 120 days plus your construction time from the date you first submitted your application.

SELECTING YOUR FREQUENCY

One of the deciding factors on whether you build a carrier current, Cable FM, FM or AM station will be the availability of a frequency on which to operate. Your search for an available frequency must be performed differently for each type of station as described below:

Carrier current frequencies:

Selection of a frequency for carrier current stations simply involves listening to the broadcast band (AM) in your area with a sensitive receiver. Standard broadcast stations can be heard at much greater distances at night. It is therefore important to check for clear spots on the band during both daytime and night time hours to avoid the selection of a frequency that might be subject to interference.

Standard broadcast frequencies are assigned in 10 kHz steps to broadcast stations. It is acceptable practice for carrier current stations to use one of the standard frequency assignments not receivable in its area. The standard broadcast frequencies begin at 540 kHz and continue in 10 kHz steps, thus 550, 560, 570 . . . . 1580, 1590 and 1600 kHz. The lower frequencies are generally preferred by carrier current broadcasters because FCC Rules permit a slightly greater range due to the longer wavelengths. The FCC Rules, Part 15 and FCC Bulletin OCE-12 (see appendix A-4) gives all the information on restrictions of field strength and coverage area.

Cable FM frequencies

Selection of a frequency for use by a cable FM station will depend on the availability of channel space provided by the cable company's "head end" equipment. Some cable companies use broadband receivers and amplifiers to supply their cable with all FM stations received by their antenna system. Other cable companies select the most popular FM stations and process their signals individually so as to "Channelize" them. In "channelizing " stations the cable company may convert the station's original frequency to a different frequency. By doing this the cable company can space each station equally across the band. In some cases the cable company will insist that no more stations can be added as their channels are all taken. In most cases however an extra FM station or CAFM station can be squeezed in between existing channels if the cable company is willing.

In any case your first step should be the making of an appointment with the cable company manager or owner. Discuss your desires with him and together determine your best choice of frequency.

Non-Commercial FM frequencies

The lower 20 channels of the FM band are reserved for use by non-commercial stations except as otherwise listed in the FCC Rules, Part 73. The FM band begins with channel 201 at a frequency of 88.1 MHz. Channel numbering continues with frequency steps of 200 kHz (0.2 MHz) thus, 202 (88.3 MHZ), 203 (88.5 MHz), to channel 220 at 91.9 MHz. In Alaska, the frequency band of 88 to 100 MHz is allocated to other radio services. However, channels 261 through 300 are available for broadcast use. Channel 206 (89.1 MHz) is reserved for the United Nations in New

York City.

If your proposed station will be in the vicinity of a Channel 6 TV station you should contact the FCC about their current restrictions. The FCC may reject your application for a frequency below 90 MHz or insist on colocation of your FM station with that of the Channel 6 TV station. If your proposed station will be within 60 miles of Monterey, West Virginia or North Eastern Colorado you must abide by the instructions included in Part 73.515 of the FCC rules.

Non-commercial class A, B and C stations (more than 10 watts output) proposed for operation on channels 218, 219 or 220 must maintain a minimum distance away from stations operating on channels 221, 222 and 223. Tables listing the minimum allowable milage between stations operating on these channels are included in the FCC Rules, Parts 73.207 and 73.504. Stations proposed for location within 199 miles of the Mexican Border must comply with FCC Rules, Part 73.507.

For channels 218, 219, and 220 the maximum power output is limited to 3 kW with an AHAAT of 300 feet for class A stations, 50 kW with an AHAAT of 500 feet for class B stations and as otherwise outlined in Part 73.211 of the FCC Rules. If your proposed station frequency will be 10.6 or 10.8 MHz above or below another nearby station you must comply with the minimum spacing between stations as outlined in the FCC Rules, Part 73.504.

Selection of a frequency for non-commercial FM stations is best performed with the aid of a work sheet/chart you can make, some reference materials, and topographic maps covering 50 miles in all directions from your proposed station location. Maps suitable for this purpose include the 15 minute series quadrangle or sectional aeronautical charts, see appendix A-21. A suitable work sheet is shown as appendix D. Detailed frequency search procedures are included in the following pages.

Commercial FM frequencies

The FCC has established which frequencies (channels) may be used commercially, by class of station, for communities throughout the United States. FM broadcast stations may be assigned only on the channels listed in the FCC's "Table of Assignments", FCC Rules, Part 73.202.

A channel assigned to a community listed in the Table of Assignments may be applied for within ten miles of that community if it is a class A channel. Application may be made for class B and C channels within fifteen miles of the listed community. The above is true providing no other channel in the listed community has been similarly assigned to another community and providing the unlisted community has not already removed a channel from any other listed community.

In Alaska the frequency band 88-100 MHz is used for other than broadcast service, however, 100.1 through 107.9 MHz may be used. In Hawaii, the frequency band 98-108 MHz is allocated for non-broadcast use with 88.1 through 97.9 MHz being available.

A petition to amend the Table of Assignments may be filed with the FCC but will not be considered if the change will affect the minimum milage separation between cochannel and adjacent channel stations in accordance with FCC Rules, Part 73.207.

Protection from interference is limited solely to the protection that results from the minimum assignment and separation requirements as outlined in the FCC Rules, Part 73.209.

Commercial AM frequencies

The FCC has established the operating frequencies for Standard Broadcast stations in respect to a Class number. Although the FCC has made exceptions in the assignment of frequency and power, they will do so only upon evidence that a proposed station will not cause interference and it will serve in the public interest.

Class I	10 kW to 50 kW	Dominant clear channel stations permitted to operate on one of the following frequencies: 640,650,660,670,700,720,750,760,780,820,830,840, 870,880,890,1020,1030,1040,1100,1120,1160,1180, 1200,1210,kHz
Class II	10 kW to 50 kW	Secondary clear channel stations limited by, but subject to, interference from Class I stations. Directional antenna systems required to protect coverage area of class I stations. Permitted to operate on one of the following frequencies: 670,720,780,880,890,1020,1030,1100,1120,1180, 1210, kHz
Class III	1 kW to 5 kW	Considered Regional stations and may operate on one of the following frequencies: 550,560,570,580,590,600,610,620,630,790,910,920, 930,950,960,970,980,1150,1250,1260,1270,1280, 1290,1300,1310,1320,1330,1340,1350,1360,1370, 1380,1390,1410,1420,1430,1440,1460,1470,1480, 1590,1600,kHz
Class IV	.25 kW to 1 kW	Considered Local stations and may operate on one of the following frequencies: 1230,1240,1400,1450,1490

The FCC Rules and Regulations, Part 73, Subpart A, should be reviewed concerning limitations of frequency assignments, permitted hours of operation, and signal strengths near Canadian and Mexican borders.

Commercial and Non-Commercial FM stations

The best place for an FM station antenna is on top of a hill or building. FM radio waves travel a line-of-site path. Objects, buildings, hills, etc., between your antenna and your audience's receivers will reduce the quality of their reception. High antenna locations permit better signal coverage by filling in "shadowed" areas and by reduction of ground reflections.

There are several possibilities to explore in finding a suitable antenna site. If your station is to be located on school or church grounds there will undoubtedly be a roof on one of the buildings you can use. A tower of at least 40 feet in height should be used on buildings less than 4 stories for better coverage. To minimize reflection losses from the roof top a minimum tower height of 20 feet should be used. Be sure to check with city and county offices regarding ordinances concerned with maximum heights above existing structures and roof loading.

Stations that are to be located amidst office buildings, especially concrete buildings, may have an irregular radiation pattern. The radio waves may travel between buildings instead of through them giving you a coverage area that follows the lay of the streets.

If at all possible the transmitter and antenna should be located on a hill or mountain a short distance away from the community you wish to serve. If you plan a mountain top installation then you must also consider your transmitter's requirements. It will need electrical power, large transmitters may need 230-volt service and perhaps 3-phase service. It must also be fully controllable from your studio and must be provided with your audio signal input. You will need a minimum of one telephone line for transmitter control and another for your audio signal (two if stereo).

Your audio lines must be "equalized" for an audio response of 50 to 15,000 cycles per second which may not be possible with some mountain top telephone lines. Check with your local electrical power and telephone companies about the availability and costs of lines to your proposed site before making any other plans. Don't forget that your transmitting site must also be accessable during all times of the year including the winter mess of rain, snow and mud.

Depending on the height of your tower it may be free standing or require guy wires. A simple tower, requiring only enough room to stand it up, would be a wooden telephone or power pole about 100 feet long with 10 to 20 feet stuck in the ground. A word of caution about wooden poles however, DO NOT pour concrete in the mounting hole. The absence of adequate drainage around the pole will allow accumulated water to rot the base. A guyed tower should have guy wires every 30 feet in elevation. The other end of the guy wire should be anchored in concrete at a distance from the tower that produces an angle of about 45 degrees for best stability. A 100-foot guyed tower should have guy wires at the 30, 60 and 90 foot points. This means the guy wires from the 90 foot point will be anchored 90 feet from the base of the tower (angle of 45 degrees). Be sure to check if you will have enough room to guy your tower.

A good location might be found by talking with communications persons in your area. Your city or county communications director (or some similar title) should know of most hill/mountain top 2-way or repeater radio installations. With luck you may be able to use someone's existing tower and building for free or a nominal rental fee. In areas that have UHF television stations, usually mountain top installations, the owners probably would be interested in leasing part of their building and some tower space. Non-commercial radio installations have a good chance for a donation of building and tower space.

The FCC requires your antenna to be horizontally polarized first of all; having met that requirement, you may add vertical polarization to the system. Vertical polarization is helpful in filling in shadowed areas behind hills and buildings and aids reception by portable, table and auto radios. Your vertical power output may not exceed your horizontal power output however according to FCC Rules. Circularly polarized antennas, a combination horizontal and vertical antenna in one unit, is still more effective than separate horizontal and vertical units, but may cost more initially.

The signal strength of radio waves is based on the voltage induced in a receiving antenna wire by those waves. Signal levels are usually quite small ranging from microvolts (uV), millionths of volts to millvolts (mV), meaning thousandths of volts. The length of the receiving wire also helps determine the amount of voltage induced by the radio wave. A standard unit used in field strength measurements is the Meter. A wire, 1 meter long, which has 1 millivolt of signal induced in it by a radio wave is said to be in a field intensity of 1 millivolt per meter (1mV/M). Signal levels are thusly expressed as so many millivolts per meter (mV/m) or microvolts per meter (uV/M).

The number of antenna bays has a direct affect on the coverage area as does the antenna height. Consider an antenna height of 100 feet above the average terrain (AHAAT) with a single bay antenna and a power output of 10 watts. According to the figures in appendix B, the distance to the 1 millivolt per meter (1mV/M) contour would be 2 miles. If the antenna height is doubled to 200 feet AHAAT the distance to the 1 mV/M contour increases to 2.9 miles. To reach the same distance of 2.9 miles with an AHAAT of 100 feet would require almost 4 times the output power. An effective radiated power (ERP) of 4 times can be obtained by a four bay antenna.

Antenna bays may cost up to $800 each with a good four bay system costing about $3,000. Light duty towers may cost $2 to $4 a foot, with heavier duty towers costing twice that much. Although antenna height is preferred, you may need to compromise between the cost of additional bays, erection of tall towers and costs associated with hill/mountain top installations.

Another consideration is the amount of tower space needed for the number of antenna bays you intend to use. Spacing between bays should be one wave-length, which works out to be about 10 feet. This means a four-bay antenna system will require 30 feet of tower space. The bottom bay should be at least one wave-length above the roof or ground to avoid reflections. This adds another 10 feet, for a total of 40 feet required for a four-bay antenna system.

Antenna gain is largely determined by the number of bays used. A two-bay antenna gives about twice the effective radiated power (ERP) of a single bay. A three-bay antenna gives about three times the ERP, a four-bay about 4 times, etc. Where high antenna heights are not practical or available you might think more antenna bays would be better, but this is not necessarily so. Multiple bays

produce an almost "beamed" signal which may pass over a nearby area. The "beamed" signal can be purposely distorted, "tilting" it so it will fill in dead areas, but this only complicates the system and adds additional expense. A four-bay antenna system seems to be the best compromise.

Your antenna system is fed power from your transmitter by a coaxial transmission line. The transverse size, length and type of insulation all affect the efficiency of the line. The larger the transverse size the greater the amount of power will be delivered to the antenna. The longer the transmission line the less will be the power delivered to the antenna. A short and fat transmission line seems to be your best bet for maximum efficiency. Appendix I shows approximate costs and efficiencies of popular transmission lines.

Your effective radiated power (ERP) is a function of your transmitter power output (TPO), transmission line efficiency and antenna gain. As an example, a 10 watt transmitter is connected through a transmission line that has an efficiency of 80% at the length used, to a four-bay antenna (gain of 4):

10 watts x .80 x 4 = 32 watts ERP

This example also applies to higher power outputs: the resultant numbers would be larger.

By the way, the engineering data section of the application for a class D station (10 watts) does not require a showing of ERP. This means if your AHAAT is rather low (about 100 feet), the FCC considers your coverage area to be that produced by only 10 watts although you may actually have 32 watts ERP.

Antenna systems that combine both horizontal (H) and vertical (V) polarization split the available transmitter power between the two planes. In a system where equal numbers of H and V bays are used, half of the power is fed to the H bays and half the power is fed to the V bays. A four-bay H and four-bay V antenna system would give one half the effective radiated power output of a four-bay H antenna in the horizontal plane.

EXAMPLE: Transmitter power output (TPO) = 10 watts

Transmission line efficiency = 80%

Composite four-bay H and four-bay V antenna with power splitter

10 watts x .80 x .50 x 4 = 16 watts ERP Horizontal

10 watts x .80 x .50 x 4 = 16 watts ERP Vertical

Of course, other combinations may also be used with different amounts of power being delivered to each plane. A four-bay H and two-bay V antenna would have two-thirds of the available power delivered to the H bays and one-third of the power delivered to the V bays. Assuming a 10 watt TPO and line efficiency of 80% the system would provide 21 watts ERP horizontal and 5 watts ERP vertical. Best practice is considered having equal amounts of power in both planes.

Circularly polarized antennas typically have a gain of .50 per bay. This means a two-bay antenna would be required for a total gain of 1 in all planes.

Choosing your transmitter is also an important step. If you have lots of money it will be easy to buy the best. The price of a new 10 watt transmitter ranges from $1,500 to $3,000. A 1 kW transmitter equipped for stereo and SCA operation can cost over $8,000. There are several used transmitter dealers, however, and the possibility of donations if you are considering building a non-commercial station. See appendix A-26.

Because of the small signal produced by a 10 watt transmitter, multipath and weak signal reception make it almost useless for stereo operation. Class D stations (10 watt) are not required to have a frequency or modulation monitor, however all stereo stations must have them. A stereo frequency and modulation monitor can cost more than a 10 watt transmitter. Unless you have an overwhelming desire to broadcast stereo with a class D station, avoid doing so.

Whether you decide to buy a new or used transmitter, be sure to get at least three copies of the instruction manual. This will make it easier to sell later if you wish to change transmitters. The manual may also be your only aid in repairing your transmitter if the manufacturer goes out of business. Keep one manual with the transmitter, one at the station and have one at home.

Carrier current stations

Carrier current stations have many advantages, one of which is the possibility of building your own transmitter. Surplus army and navy transmitters can sometimes be converted to operate on the standard broadcast band enlisting the talent of a radio amateur to do the job. Commercially built carrier current transmitters are also available with prices up to $400. See appendix A-26.

The output from your carrier current transmitter will be coupled into some form of transmission lines. Where the power lines are to be used as the transmission means, the transmitter should be located near a power distribution point. Audio signals from your studio are delivered to your transmitter by a telephone line or an audio line you yourself have installed. The audio response of the line should be good from 50 Hz to at least 10,000 Hz.

If you plan to use an antenna and directly radiate your signal, remember to abide by the FCC Rules, Part 15 (A-3, A-4) which limits the length of your antenna to 10 feet and your transmitter power to 100 milliwatts. Several small transmitters each with its own 10 foot antenna may be installed at key locations and all be fed from one common audio signal line. In this way you can still have a large coverage area with small amounts of power in addition to concentrating your signal to areas where your audiences will be.

Your radio signals may also be distributed by coaxial cables with controlled radiation characteristics. The coaxial cables are placed along hallways, corridors, outside walk ways and roof edges. Larger distances can be covered by stringing the cable on existing telephone or power poles. Be sure to check with the telephone and power companies before doing so.

The FCC does not go around looking for carrier current stations that violate radiation restrictions. If your surrounding community is happy and does not have interference caused by your station, you will probably not be bothered.

CAFM Stations

Your cable FM station facility will depend mostly on the conditions that exist with the CATV company. Your CAFM transmitter should be installed at the CATV company's "head end" with your audio signal being delivered to it by telephone lines. Your telephone lines should be equalized to 15,000 Hz for best audio quality. If you plan a stereo operation then you will require two identical phone lines.

Some CATV company head ends do not have provisions for telephone lines. Although the telephone company could install them for you, the costs may be prohibitive. If the cable TV company is so equipped, you may be able to send your audio signals from your studio to their head end by a sub-channel over the company's cable. Your signal is de-modulated and then fed to your transmitter and comes back down the cable to your audience.

The cost of a CAFM transmitter including stereo capability is between $400 and $600. Your telephone lines, depending somewhat on the distance between your studio and the CATV head end, will lease for about $15 to $30 per month. See appendix A-26, A-11, A-24.

Standard Broadcast (AM) stations

Standard Broadcast stations usually require more ground area then FM stations due to the complexity of the Standard Broadcast station's antenna system. Antenna towers may reach heights of 300 feet or more requiring a guy wire radius up to 300 feet. Directional antenna systems may have up to six towers with spacing between towers of up to 1500 feet. All this requires land on which to build the antenna system which can amount to several acres.

Because of the space requirements AM stations transmitter and antenna sites are quite often located outside of the space limitations of cities. The unused part of the antenna site may be used for other such things as cattle grazing, car parking, storage, etc. Care must be taken to protect the antenna system, however, which may require fencing around one or all of the antenna towers and guy wire anchors.

Ground conductivity is another important consideration. The better the conductivity the better the antenna efficiency. Some areas therefore make good to excellent antenna sites, while others may be worthless. For information about good ground conductivity consult the FCC R, R's, Part 73, Subpart A.

The AM transmitter must be located near the antenna system with a small cinder block, concrete, or metal building housing it. A fence around the building with solid doors and locks on the building will help reduce vandalism.

Several telephone lines will be needed between your studio and transmitter site. You will need a program line equalized at least to 10 kHz, a transmitter control line, and a standard telephone for communication with the studio.

Studio Equipment and Production Facilities

Below is a suggested list of studio equipment. This should be considered the minimum requirement for a satisfactory studio operation. The Modulation Monitor will not necessarily be required for carrier current, cable FM stations and Class D FM stations. The listed items shown with an asterisk (*) must have stereo capability if you intend to broadcast in stereo. With the exception of the modulation monitor, this list may be used to equip a separate production room.

Quantity	Description	Quantity	Description
1	*5-8 Channel Console	1	*Studio Monitor Speaker
2	12" Turntables	1	*Monitor Speaker Cabinet
2	*Equalized Phone Preamps	1	Microphone (Cardioid)
2	12" Tone Arms	1	Microphone Stand
2	*Phono Cartridges	1	*Set of Headphones
1	Studio Clock	1	Modulation Monitor
1	*Tape Recorder (Reel)	1	Tape Recorder (Cartridge)

The studio and production rooms should be as far from noise producing areas as possible. However, you may wish your studio to be a "showplace" with large windows permitting spectators to watch your broadcasting operation. Although this may raise the noice level of your studio, you may wish to compromise for the sake of public relations. Sound deadening drapes may be used near and around windows and walls which help with the decor of the room as well. Accoustic deadening materials should also be used on all flat surfaces such as doors, walls, and ceiling to avoid sound reflections. Floors should be carpeted. Set glass windows at an angle so reflections are toward the ceiling or floor. Equipment mounting cabinets must be solid and perhaps shock mounted to eliminate vibrations. Doors should be mineral filled, weather stripped and lockable. Refer to Appendix A-26 for further information on studio equipment and construction.

FREQUENCY SEARCH PROCEDURES

Non-Commercial FM stations

Begin your frequency search by determining the call letters and addresses of all non-commercial stations within 50 miles of your proposed transmitter site. List each of these stations according to their frequency on the work sheet shown in appendix D. Much of the information needed to complete your work sheet can be found in the BROADCASTING YEARBOOK and FM STATION ATLAS (See appendix A for where to get them). Allocation conditions change from the time of their printing however, so these books cannot be considered to be the final authority. Also consult BROADCASTING MAGAZINE (see appendix A) for the current public notices of new station applications, call letters issued, construction permit grants, and license grants.

Call, write or visit each of the stations you have listed on your work sheet. Ask them to confirm the information you already have and to provide you with information you don't have yet. Ask for their exact geographic location. It should be given to you in degrees, minutes and seconds for both lattitude and longitude. As a last resort if you cannot obtain the exact geographic location use the address of their transmitter site. You should also ask for the distance to their 1 mV/M contour. Their ERP and AHAAT would be nice to know also but may not be needed if you know the distance to their 1 mV/M contour. The 1 mV/M contour is the perimeter of the primary coverage area of a station.

The FCC will not grant an application for a construction permit if your proposed station will cause interference within the 1 mV/M contour of any other station or if any other station will cause interference within your proposed station's 1 mV/M contour according to the conditions shown in appendix J. The distance to the 1 mV/M contour is determined through the use of the FCC's F(50,50) curves which appear in this book as appendix B.

If the persons at these stations are nice guys they will give you all the information you will need on the phone and perhaps send you photocopies of their coverage maps. On the other hand, some station management may be reluctant to release this information or may try to give you erroneous information. It may then be necessary for you to personally visit that station.

Each station is required by the FCC to maintain a PUBLIC ACCESS FILE of which copies of all of their applications are a part (FCC R, R, 1.526). This file must be made available for inspection by anyone requesting it while visiting the station during normal working hours. The only identification you will need will be giving your name and address. Failure on their part to be cooperative can be corrected by writing a letter to the Complaints and Compliance Division of the FCC in Washington. It may be helpful to inspect their entire applications file to see how they prepared their forms. This will give you a better idea of how to prepare yours.

When you have completed your frequency search work sheet and have included all existing and proposed stations, look it over carefully. If there is a channel that is unassigned and the 3 channels either side of it are also unassigned or are assigned to Class D stations, the chances are good you have found a channel to use. You need not continue the rest of the frequency search procedure unless you wish to double check your find.

Appendix E is a photographically reduced portion of a larger map which was prepared as an exhibit for radio station KVHS. This map will serve as an example for the next step in your frequency search. Any map showing an area to a 50 mile radius can be used for this purpose however.

You may wish to use your map several times so it will be wise to use a plastic sheet as an overlay. All your marking can be done on this overlay and saved for future reference. You will need a minimum of two overlays. Plastic sheets can be purchased at most stationary stores. You will also need a felt pen with a fine point that will mark on plastic and a compass for drawing circles.

Place your plastic overlay on your map. From your worksheet information mark the location of each station listed including your own proposed transmitter site. Label each location with the station's call letters and channel number (frequency).

Using your compass and felt pen, draw a circle around each station that represents the distance to their 1 mV/M contour.

Most class D (10 watt) stations are considered to have an AHAAT of 100 feet. At that height they would have a 1mV/M contour at a distance of 2 miles. Appendix E shows stations KZSU (211), KALX (214) and KDHS (213) as being class D stations with their 1mV/M contour at 2 miles. Radio station KANG (210) which appears on the same map has a 1mV/M contour at 35 miles because of an ERP of 20 kW and an AHAAT of 900 feet. If you are planning a class A, B or C station or a highly elevated antenna you must know your AHAAT. See pages 34 and 35 for AHAAT determination.

Where you do not have a station's 1 mV/M data you must know their ERP and AHAAT. With their ERP and AHAAT you can easily find the distance to their 1 mV/M contour with the FCC's F (50,50) curves or the tables prepared for you as part of Appendix B. See page 65 for an explanation of how to use the curves and tables.

Around your own station location draw four circles to scale which represent the distance to your 100 mV/M, 10 mV/M, .5 mV/M and .1 mV/M contours as determined by the F (50,10) curves or tables in appendix C. If you propose a class D station you may use the F (50,50) curves or tables instead.

Now take another sheet of plastic for a second overlay and plot the reverse conditions. This second overlay is prepared to show possible interference to your 1 mV/M contour which could be caused by other stations.

Draw a circle to scale around your station's location that represents your proposed 1 mV/M contour as determined by the F (50,50) curves or tables.

Use the F (50,10) curves or tables (appendix C) to determine the following coutours. Draw circles to scale around all other stations that represents the distance to their individual .1 mV/M, .5 mV/M, 10 mV/M, and 100 mV/M contours.

Now check each of your overlay sheets carefully. You are looking for a channel that meets the requirements of the FCC Rules, Part 1.573 which has been summarized for you in appendix J. Select a channel you feel may meet these requirements and submit it to a test using appendix J. If it meets the requirements of Part 1.573 you have found your channel.

If your selected channel fails the test, try another channel and still another until you have exhausted all possibilities. If you are proposing a station with more than 10 watts ERP you should now consider reducing your power and/or antenna height. This will reduce the distance to interference contours perhaps making a channel available. The FCC Rules, Part 1.573 also allows the use of directional antennas with up to 15 db discrimination, roughly 30 times more power in one direction than another. A directional antenna may allow you to squeeze your station into an otherwise congested area.

Keep your map and overlays as they will be helpful in preparing your FCC application for construction permit and accompanying exhibits.

Commercial FM Stations

The FCC Rules, Part 73.202, Table of Assignments, lists communities under State headings for which the FCC has assigned specific channels and classes of stations. You should become familiar with Parts 73.202 through 73.209 before attempting a frequency search for a commercial FM station (A-15).

The FCC will only accept applications for new stations if the proposed channel is listed for the community where the station is to be built or within 10 miles of that community. For this reason, applicants for new commercial FM stations may have to search for an available channel several miles from where they would like to build their station. In some cases the nearest available channel may be in another part of the state or in a different state all together.

Begin your frequency search by marking the location, channel number and call letters of all known commercial FM stations on a plastic overlay positioned on a map of your state. Plastic sheets and marking pen that will write on plastic can be found at most stationary stores.

Broadcasting Yearbook (A-11) has listings of radio stations by State and city (community) including addresses, ERP, owners and other information. Since the Broadcasting Yearbook is published only once each year you will want to supplement its information with up-to-date listings. Broadcasting Magazine (A-12) which is published weekly, lists current public notices of new station applicants, call letter issueances, construction permit and license grants.

Compare your completed map with the FCC's Table of Assignments (FCC R, R, 73.202). Look for a city (community) whose channel allocation has not been granted to a station or is currently under application by someone else. When found, move quickly, and file your application for construction permit.

Commercial AM Stations

An available AM frequency will be quite difficult to find. Many consulting engineers now believe that no more are available. The FCC has, in the recent past, not accepted applications for new AM stations. This does not stop the persistant and potential broadcaster however. Channels can be found although the construction will probably require an elaborate and directional antenna system in addition to much communication with the FCC.

References you will need for your frequency search include BROADCASTING YEARBOOK (A-11) BROADCASTING MAGAZINE (A-12), NARBA Official Notification List (from Cooper-Trent, Inc., Washington, D.C.), and a map of the U.S. which also shows 200 miles inside the Canadian and Mexican borders.

Prepare a work sheet consisting of each AM frequency (540 kHz) to 1600 kHz), a column showing the class of station assigned to that frequency, and a column for comments. With the information contained in the above references and with the aid of the FCC Rules and Regulations, Part 73, Subpart A (Volume III) determine the distance to the following contours for each station in your area: 25uV/M, .5 mV/M, 2 mV/M, 25 mV/M.

Around each of your work sheet stations draw a circle whose diameter indicates

the relative day and night coverage for the above field strength contours. Look for an "opening" between coverage contours. This opening will be an area where contours do not overlap in accordance with the following interference criteria: Co-channel stations must maintain a 20:1 signal ratio where either station's 25 uV/M contour may not overlap the other station's .5 mV/M contour. First adjacent channel stations and your channel may not overlap each other's .5 mV/M contour. Second adjacent channel stations and your channel's 2 mV/M contours may not overlap each others 25 mV/M contour.

It is advisable to have a consulting engineer check your findings and prepare your application exhibits for you.

HOW TO PREPARE YOUR APPLICATION

General Information

A few general hints should be considered first. Use one copy of your application form as a work sheet. Mark on it only with a pencil so you can make changes when required. Remove sections of the application form that will not apply to you such as the AM and TV sections if you are applying for an FM station.

Look over the entire application thoroughly. Read all the instructions. Some of the sections will require additional information typed or drawn on a separate sheet, called an "exhibit", which will be attached to your application. Some sections may not apply to your proposed station at all, when this is the case simply answer the question with "not applicable" or "does not apply".

Exhibits must be clearly identified with the exhibit number, the applicant's name and the date of the application. Appendix G is a good example of how to mark your exhibits. A good system for identifying exhibits shows the number of the exhibit and to which section of the application it belongs, for example:

SECTION II	(Legal Qualifications)	Exhibits L-1, L-2 or II-1, II-2, etc.
SECTION III	(Financial Qualifications)	Exhibits F-1, F-2, or III-1, III-2, etc.
SECTION IV	(Program Service)	Exhibits P-1, P-2 or IV-1, IV-2, etc.
SECTION V	(Engineering Data)	Exhibits E-1, E-2 or V-1, V-2, etc.

All sections of the application may be filled out by you. If you do not have technical or legal background, it will be wise to have your work checked by a broadcast engineer and by an attorney. Non-commercial stations may be able to obtain these services as a donation or favor. Try it.

Check your application twice, have someone else go through it with you, as incomplete applications will be rejected by the FCC.

FCC forms change from time to time although the basic information remains essentially the same. For this reason the following procedures and instructions do not attempt to cover application questions by item number but rather as a

general discussion.

The completion of FCC forms 340 (non-commercial applications) and 301 (commercial applications) are similar with a few extra requirements needed for form 301. The completion of form 340 will be discussed first. You should complete as much of your form 301 (if applying for a commercial station) as you can from the form 340 instructions. Additional instructions for completion of your form 301 will follow the form 340 instructions.

FCC Form 340, Non-commercial FM stations

SECTION I

Read the instructions carefully and comply with them fully. Fill in the necessary information on the first page if you wish, the second page must be completed later when all exhibits and other pages have been completed.

SECTION II

The applicant for any station must be a legal entity. This means that schools, both public and private, school districts, church groups, educational foundations, etc., qualify. Others wishing to apply must form a non-profit corporation or association for the purpose of operating a non-commercial broadcast station. City, county and state offices should be contacted regarding the proper procedures for forming a non-profit legal entity in your area. Your organization will need a charter or articles of association or incorporation which must specify your organization is empowered to construct the proposed station. Answer each question honestly and precisely.

When the applicant for the station is to be a non-profit organization it will need a governing board. A governing board may be selected according to the guidelines or laws pertaining to the formation of the organization. Members of the governing board must be listed in this section including their residence, office held, citizenship, occupation and how they became a member of the board. Where the applicant is to be a school or school district, officers include the Principal, District superintendent and members of the school board.

SECTION III

This section is best completed after section IV and V when you have a better idea of how much your costs will be. The FCC is trying to determine in this section if you will be able to construct, operate and maintain your station if they grant you a construction permit. You must list in this section all the costs you anticipate and where the money will come from. These costs are only estimates and do not have to be exact. Keep it simple.

If buildings, towers, studio equipment, etc., already belong to the applicant then they should not be shown as "new" costs. Simply write "see exhibit F-1" in the appropriate box on the form. Then prepare a listing of all buildings, equipment, etc., that are already owned, on a separate piece of paper and label the top of the sheet as exhibit F-1.

SECTION IV

The FCC will be looking closely at the exhibits prepared for this section. Prepare them with a great deal of thought. Your station should serve the public interest, convenience and necessity. The FCC will be looking for how you intend to meet that obligation. Exhibit P-1 of this section should show the purpose and objectives of your proposed station. This is where your community needs assessment comes in handy. Your survey compilation combined with a statement of your intended program policies should make a quite adequate exhibit.

A second exhibit, exhibit P-2, should show your proposed weekly programming. Although the bulk of your programming may be entertainment you should include topics such as news, community meetings, discussion groups, public service announcements, bi-lingual presentations and other topics included in your community needs survey. Non-commercial stations are not required at the present time to present specific percentages of educational or instructional programs, however the FCC will consider this in their determination of how well you will serve the needs of your community.

Another exhibit required by this section includes your sources of program material and how you will produce your own programs. This exhibit can simply state "programs other than recorded musical entertainment will be produced in the proposed studios and/or by remote broadcast". Include in this exhibit the names and addresses of proposed program sources such as public service announcements from national or local charitable organizations, news services, network affiliations and educational institutions (A-27).

SECTION V-B

This section requires the showing of your proposed transmitter location by street address or some other form of identification. If your transmitter will be located out-of-view of your operator such as another room, top of a building, top of a hill, etc., then it will be operated by "remote control". Most stations using remote control have their control unit in their studio so the announcer (disc jockey), often doubling as the transmitter operator, controls the transmitter. The remote control point therefore is usually the same as the studio address.

It is not necessary to finalize your decision of which make of transmitter, type of antenna or transmission line you will buy or ultimately use. You may enter any type approved transmitter on your application that meets your power requirements, and change it later. You may also enter the make and model number of any transmission line and change it later. You may also list any make and model of antenna including a homemade one as long as you know its gain characteristics. THE IMPORTANT THING IS TO GET YOUR APPLICATION MAILED to assure you a good chance of getting your selected frequency before someone else does.

If you wish to change any of the above equipment entries at a later date you may need to submit an application for modification of your construction permit but this should not prove difficult. This may not be necessary.

You may use any type approved transmitter in place of the one listed on your application as long as it has the same rated power output and you list it on your application for license. If you wish to use a homemade transmitter an extra exhibit must accompany your application showing complete engineering data

for it. If you propose to use other than a type approved transmitter in place of the one listed on your application you will have to prepare an application for modification of your CP. You may change to another make and model of transmission line as long as the efficiency remains the same. An antenna similar to the one on your application may be substituted later providing the antenna gain and height do not change. See appendix A-26.

A vertical plan sketch of your proposed antenna structure is also required by this section. An example of a vertical plan sketch appears as appendix K. Obstruction lighting will not be needed if there are nearby structures such as trees, buildings, power poles, utility poles and hills which are higher than your proposed antenna. Antenna structures under 120 feet in height generally do not require obstruction marking or lighting unless close to an airfield. More information on obstruction marking and lighting can be found in the FCC Rules, Part 17. Although the FCC and FAA may accept your proposed antenna structure local authorities may not. Be sure to check with city, county and state authorities and ordinances concerning antenna towers.

The radiation center of your antenna system is the center most point of all the bays used, as if they were all one large antenna. Your elevation above mean sea level may be found easily by phoning or visiting city or county offices concerned with planning, public works, etc. Your exact geographic coordinates to the nearest second can also be furnished by the same offices.

The antenna data part of this section may seem a little tricky but the following information should help:

(a) A single bay horizontal antenna has a power gain of 1.

(b) A single bay vertical antenna has a power gain of 1.

(c) An antenna bay with a power gain of 1 produces a free space field intensity at one mile for one kilowatt in-put of 137.6 mV/M if it is not directional.

(d) Antenna field gain is the square root of the antenna power gain.

(e) "Effective free space field intensity at one mile in mV/M for one kilowatt antenna input power" will be field gain times 137.6 mV/M.

EXAMPLE: A 4 bay horizontal, non-directional antenna has a power gain of 4.

The antenna field gain is 2 (square root of 4)

Its free space field intensity is 137.6 mV/M x 2 = 275.2 mV/M

If you propose the use of a directional antenna, the gain characteristics in all directions must be obtained from the manufacturer.

Attach an exhibit showing the exact location of your proposed transmitter and studio sites. U.S. Geological quadrangles of the 7.5 or 15 minutes series may be used for this exhibit and must show the area within 15 miles of your proposed site (A-21).

Another exhibit required by this section must show the FCC the nature of the surrounding terrain in the vicinity of your proposed station. Read the preparation

instructions on the form carefully before preparing the exhibit. Snapshot photos may be used, but a minimum size of 8 x 10 inches is recommended.

Check with your local airport for someone with a plane that can fly you over your proposed site. Take pictures in several directions but be sure you know the compass heading for each by asking the pilot. A very good camera equipped with a haze filter should produce excellent results. A camera with a focal plane shutter will work best as it is least disturbed by the vibrations of the plane. Be sure to date and properly identify each photo exhibit.

If your proposed site is on a hill top, building, etc., you may take your pictures from that point, looking in eight different directions, preferably for each 45 degrees with 00 degrees at true North.

An example of how a map may be marked showing direction from which photographs were taken appears as appendix G.

If your application is for a class D (10 watt) station this section is finished except for a signature.

You may sign this section if you prepared it but be sure to check the proper title box. Remember, it is against the law in most states for anyone to use the title of Registered Professional Engineer or Consulting Engineer unless they legally hold that title. Checking the chief operator's box implies you are a second or first class radiotelephone licensee; if you do not have a license, do not check this box. You cannot go wrong by checking the Technical Director box.

Class A, B and C station applications will need some additional work in this section. Sharpen your pencil, here we go . . . . . .

In the appropriate box, indicate your proposed transmitter output power (TPO) in kilowatts. Your antenna input power in kilowatts is simply your TPO times Transmission line efficiency factor (obtain from appendix I). The power dissipation within transmission line in kilowatts is the difference between transmitter output power and antenna input power. Your effective radiated power in kilowatts is your antenna input power in kilowatts x antenna gain.

Class A, B and C stations are required to have certain monitors. In the appropriate box indicate the make and type number of the frequency and modulation monitors you intend to use. Stereo stations will also require a stereo modulation monitor. Any type approved monitors may be shown here and be replaced by another type approved monitor after you have been granted your CP. Just show the change on your application for license (A-26).

On the topographic map required by an earlier exhibit you drew the location of your proposed transmitter and studio sites. You must now add to that map the location of all known radio stations including commercial and government receiving stations within two miles. Draw a circle around the locations of the other transmitting and receiving sites. Your city or county communications director should be able to help you with locations. The FCC is trying to determine with this exhibit if your proposed station will cause interference to, or will receive interference from, other radio facilities.

On this same topographic map draw lines within the two mile radius separating the area as to its nature such as rural, residential, business, industrial, etc. Clearly identify each area.

You will need two more circles drawn on your topographic map. One circle should be drawn around your transmitter site that represents a two mile radius, the second circle should represent the ten mile radius. Draw eight radial lines from the two mile radius to the ten mile radius beginning with the first at 00 degrees (true North). The other radials are drawn at 45 degree intervals in a clockwise direction. A good example of how the radials are drawn is shown in appendix G.

You must now find the average elevation of each of these eight radials between the two mile and ten mile circles. You will need an adding machine or calculator. On a separate sheet of paper, properly identified with the radial headings, in degrees, write down the elevations, in feet, above mean sea level (MSL) taken from the map's contour lines. The elevations listed should be at regular intervals of not less than 50 points between the two mile and ten mile circles along the radial. Add all the elevations for that radial together and divide by the number of r adials (8). This gives you the average terrain elevation around your transmitter site. Keep your worksheets, you will need them later. Instructions on how to read topographic contour lines can be obtained from the same source as the map (A-21).

Once an antenna and its support are selected you can determine the antenna height (center of radiation*) above the ground. To this figure add the elevation of the ground directly under the antenna to determine the antenna height above mean sea level.

To calculate signal coverage (distance to various signal contours) you must use the antenna height above the average terrain (AHAAT). This figure is obtained by subtracting the average terrain elevation (feet above MSL) from the antenna height above mean sea level. The result may be a negative height. Negative antenna heights are not uncommon in hilly or mountainous areas.

Stop for a moment and study appendix F. Note the 270 degree radial: the antenna radiation center is at 333 feet above mean sea level (MSL), while the average terrain elevation is 336 feet above MSL. This means that for this radial the antenna height above the average terrain elevation is minus three (3) feet. Although a negative antenna height limits the distance an FM signal will travel, the FCC tends to ignore this and prefers predicted distances to signal contours based on a minimum height of 100 feet. One hundred feet is the lowest elevation shown on the FCC's F(50,50) and F(50,10) curves.

The 315 degree radial profile graph in appendix F shows an average terrain elevation of 46 feet above MSL. With the antenna radiation center at 333 feet the antenna height above the average terrain for this radial is 287 feet. This is the figure that would be used in predicting the distance to various signal strength contours for this radial.

Using the examples above, determine the antenna height above the average terrain (AHAAT) for each of your eight radials. Enter your figures on the application form.

* The antenna manufacturer can provide you with this information.

Included with this section of the application are graphs prepared by you showing the profile of the terrain for each of the eight radials. Each profile graph must be properly identified and show elevations in feet and land distances in miles. Be sure to also show the height of your antenna radiation center and the source of the topographic information. Use appendix F as your guideline.

The following formula should be used to determine your free space field intensity in millivolts per meter at one mile:

$$\sqrt{ERP/1000} \times 137.6 \text{ mV/M}$$

The ERP is the effective radiated power radiated in the direction of that radial. When using an omni-directional antenna your answer for each radial will be the same. If you propose to use a directional antenna you must obtain the gain characteristics for all directions from the antenna manufacturer.

EXAMPLE: Using an omni-directional antenna and ERP of 250 watts

(1) $\sqrt{250/1000} = \sqrt{.25}$

(2) $\sqrt{.25} = \sqrt{.5}$

(3) .5 x 137.6 mV/M = 68.8 mV/M (free space field intensity)

Predicted distance in miles to the 1 mV/M and 50 uV/M contours may be found with the help of the FCC's F(50,50) curves or the tables in appendix B. If your ERP or AHAAT does not appear on the distance tables you may interpolate between the next higher and lower powers and elevations or use the F (50,50) curves. See "How To Use the FCC Field Strength Curves" section in the following pages of this book.

If the FCC feels that your proposed station may cause interference to other stations or that other stations will cause interference to your station they will ask for an engineering study. They will hold your application until your study is received by them: ultimately they will reject your application if they do not receive the study. You have all the necessary information already. It is part of your frequency search worksheets and overlays. You might just as well send it along now as an exhibit, it will avoid trouble later. You will need two exhibits. One shows interference contours against your 1 mV/M contour. The other shows your interference contours against other station's 1 mV/M contours. Examples of both of these exhibits appear as appendix E.

Section V-B should now be complete. If it has not been signed yet, do it now.

SECTION V-G

This section is self explanatory. You will need an exhibit prepared from an Instrument Approach Chart or Sectional Aeronautical Chart (A-20). An example of the exhibit appears as appendix G. Another exhibit, a vertical plan sketch, was prepared earlier; just send extra copies. Sign this section.

FCC Form 301, Commercial AM and FM Stations

SECTION I

Refer to Section I of the form 340 instructions.

SECTION II

The FCC asks specific questions in the section about the applicant's background, corporate holdings, stocks, business interests, and some personal information. The legal entity for a commercial station may be an individual or group; however, the FCC is interested not only in ownership but who will be in actual control of the station.

SECTION III

This section asks specific questions about how the station will be financed including a personal financial statement covering the last 2 years.

SECTION IV-A

Part I of this section requires three exhibits: (1) the method you used to determine the needs and interests of the community you wish to serve, (2) the needs and interests you believe your station can provide, (3) a listing that is typical and illustrative of the programs you will broadcast to meet the community needs. These programs might include live coverage of city, county and school board meetings, interviews with civic leaders and minority groups, cultural programs such as concerts, operas, religious programs, etc.

Part II of this section is not applicable to new station applications.

Part III will be your programming commitment to the FCC which they will expect you to carry out. Your programming may be modified later by submitting an informal application (letter) to the FCC outlining your proposed changes. Failure on your part to uphold your commitment may be reason for the FCC to reject your application for renewal later on.

Part IV of this section is not applicable to new station applications.

Part V asks how much of your broadcast time will be allocated for commercial announcements. The NAB (National Association of Broadcasters) Radio Code, included in BROADCASTING YEARBOOK (A-11) may be used as a guide. The radio code suggests no more than 18 minutes of commercial time per hour.

Part VI of this section simply asks about your proposed station policies and procedures.

Part VII is the certification of this section and is completed by the signature of the applicant, if an individual, or by one of the officers, if the applicant is a corporation or an association.

SECTION V-A
(AM Applications)

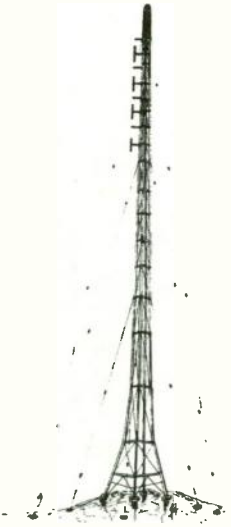
You may refer to section V-B of the form 340 instructions for partial completion of this section. The FM data in section V-B does not apply to AM however. The engineering data and exhibits for this section should be prepared by a consulting broadcast engineer.

SECTION V-B
(FM Applications)

Refer to Section V-B of the form 340 instructions on how to calculate Antenna input power, ERP and how to predict the distance in miles to your 3.16 mV/M and 1 mV/M contours.

SECTION V-G

Refer to Section V-G of the form 340 instructions.



LOCAL NOTICE OF FILING

Immediately after sending your application for CP to the FCC in Washington you must have a legal notice published in your local newspaper. This notice must be published twice a week for two consecutive weeks in a daily newspaper serving the community in which your station will operate. This two week notice must be published within the three week period immediately following the mailing of your application for CP. If your local paper is published weekly instead of daily then your notice must appear once a week for three consecutive weeks within the four week period following the mailing of your application. (FCC R, R, 1.580)

The notice must contain the following information:

(a) The purpose of the application

(b) Date of submission

(c) Type, class and power of station

(d) Location of transmitter and studio

(e) Antenna height above average terrain

(f) Where copies of the application may be seen

EXAMPLE: The John Jones Foundation for Oral Community Communications, on January 16, 1975, did submit to the Federal Communications Commission an application for authority to construct a non-commercial FM station in the city of Anytown, California. The proposed class A station is to operate on channel 201, 88.1 Mhz, with an effective radiated power of 250 watts at an antenna height of 400 feet above average terrain. The station transmitter is to be located at number 12, Knob Hill Circle, Anytown, California. Individuals who wish to advise the Commissions of facts related to this application should file comments with the FCC, Washington, DC, 20554. A copy of this application is available for public inspection at the John Jones Foundation for Oral Community Communications studio and offices, 4444 Orange St., Anytown, California, during normal business hours.

SELECTION OF CALL LETTERS

Unlicensed stations such as Carrier Current and Cable FM may use any call letters they desire. Care should be exercised however, to choose call letters that will not be confused with call letters of existing stations.

The FCC will not consider requests for call letters nor will they reserve call letters prior to the granting of your construction permit. Immediately following your construction permit grant however you must request your desired call letters. If you do not choose your own call letters the FCC will choose them for you. See FCC Rules, Part 1.550.

Call letters must consist of 4 letters beginning with K west of the Mississippi River and beginning with W east of the Mississippi River. Your selected call letters should be in good taste (although they can also be clever). KRAP and KRUD may be clever but perhaps are not in good taste. Most often call letters are chosen to indicate the location or some particular facet of a station. KFOG is located

in San Francisco where it is foggy. KIOI indicates their operating frequency 101.3. Schools often incorporate the school's initials such as KVHS, Clayton Valley High School. Call letters that closely resemble other call letters in the area should be avoided. KIZE AND KIZZ for example should not be so closely located as to confuse the listeners.

Check the AM, FM and TV call letter section of BROADCASTING YEARBOOK (A-11) to determine which call letters are in use already. Sometimes, call letters are in use but will not appear in the YEARBOOK (e.g. certain documented vessels), and will not be available. If you happen to unknowingly choose one of these the FCC will provide you an opportunity for another selection.

Your request for call letters may be made informally, that is, by a standard letter. The letter must contain a statement that a copy of the request has been sent to all licensed radio and TV stations and stations under construction within a 35 mile radius of your community. The letter is sent to the FCC in Washington, DC. A copy of the letter is sent to each of the stations within the 35 mile radius to notify them of your intended call letters in any case they have any objections.

Your request should also indicate up to 5 choices of call letters in descending order of preference.

EXAMPLE: Pursuant to Federal Communications Commission Rules, Part 1.550, the John Jones Foundation for Oral Community Communications herewith requests the following call letters in order of descending preference:

KJJF

KSPK

KCOM

KJOC

KJFO

A copy of this request has been mailed to all radio and TV stations in accordance with the above cited rules.

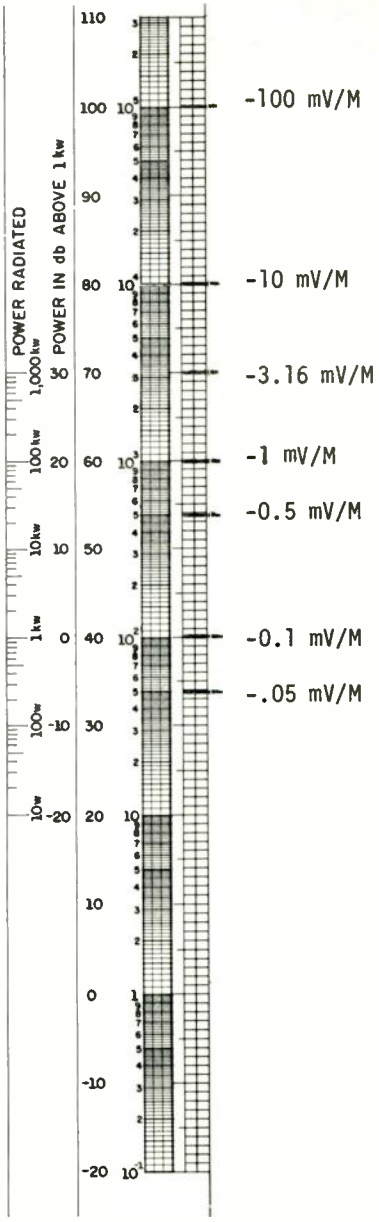
(Signature)

_____

John Jones
President

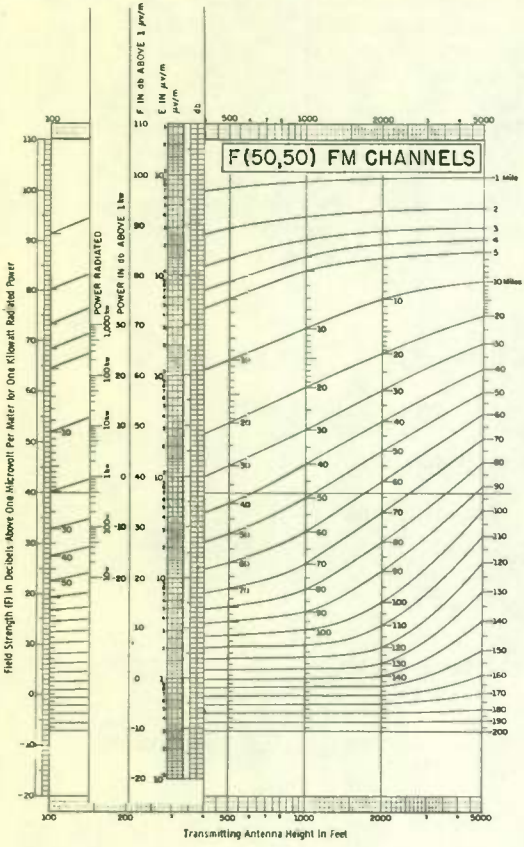
The FCC's field strength charts appear as appendices B and C. For all their numbers and lines they are really quite simple to use. The scale along the right side of the curves shows the predicted field strength in uV/M for 1 kW of radiated power. The scale is logarithmic with major divisions at multiples of 10 and minor divisions for numbers in between. There are only seven points on the scale that are needed for your frequency search and construction permit application. These seven points are marked for you on the sliding scale to the right.

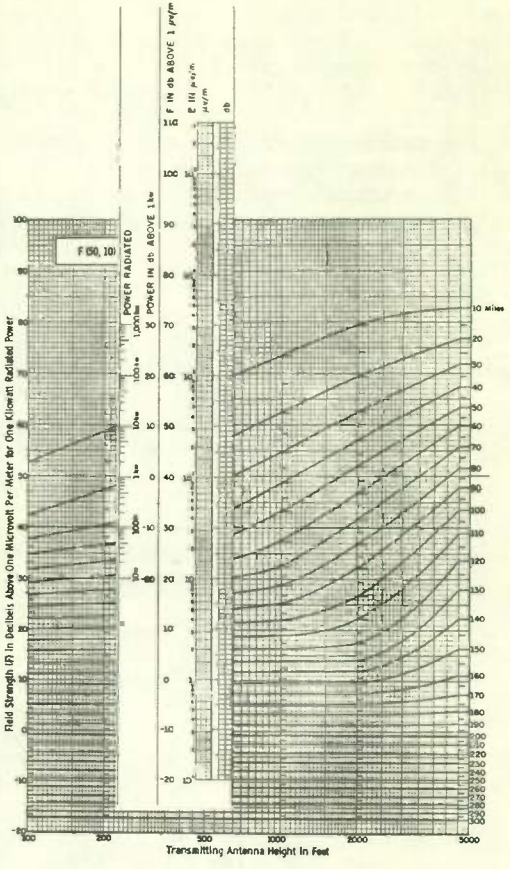
Although the chart is direct reading for 1 kW of radiated power you will require the use of the sliding scale for other powers. You may make a photocopy of the sliding scale or cut it from this page or appendix B when you are ready to use it. The sliding scale should be trimmed and used as the ordinate vertical scale. Place it on the chart with the appropriate gradation for power in line with the horizontal reference line on the chart. The right edge of the scale is placed in line with the appropriate antenna height gradations. The chart is then direct reading in uV/M for that power and antenna height above average terrain.



EXAMPLE: For 500 watts ERP, antenna height of 400 feet, find the distance to your 1 mV/M contour on the F (50,50) curves

EXAMPLE: For 100 watts ERP, antenna height of 800 feet find the distance to your 100 uV/M contour with F (50,10) curves





For your convenience tables have been prepared from the F (50,50) and F (50,10) curves for the field strength voltages needed for your interference studies and for your application for CP. The F (50,50) tables are used to determine distances to your 3.16 mV/M, 1 mV/M and 50 uV/M contours. The F(50,10) tables are used to determine the distances to your 100, 10, .5, and .1 mV/M contours.

To use the tables simply locate your ERP along the top of the table and your AHAAT along the left side. The distance to the listed field strength contour is shown where the ERP and AHAAT columns intersect.

WHERE TO GET FUNDING

The lack of sufficient money is probably one of the most discouraging problems facing all of us. The commercial station owner may borrow from any number of lending institutions if he can show a reasonable need and will have the potential to repay it. The non-commercial station owner, however, cannot rely on his station to make money. The potential may be there for contributions from the public, but this may not be substantial. If the station is part of an educational system, funding can come from various capital or instructional budgets.

Other sources of funding open to non-commercial stations are through government and private grants. Some monetary grants are given which require the grantee to produce a matching amount of money; in other words, the grant covers 50% of the money needed. Other grants are available that cover the total amount required for construction of a non-commercial station. In some cases grants are made for the continued operation and maintenance of non-commercial stations. Some possible sources of monetary grants are listed below:

Governmental Grants: Health, Education & Welfare, Title III

Non-Commercial educational broadcasting facilities
Volume 40, No. 47, Part II, Title 45, Chap. 1, Part 153
of the Federal Register, March 10, 1975

Corporation for Public Broadcasting
888 16th Street, N. W.
Washington, DC 20006

Vocational Education

State Department of Telecommunications

One organization that claims to have information on over 50,000 government, private, corporation and association grant programs is:

Funding Sources Clearing House
149 Ninth Street
San Francisco, CA 94103

or

116 South Michigan Avenue
Chicago, Illinois 60603

The following companies provide an equipment leasing plan. They either have the equipment you require or can make arrangement to purchase it and provide a lease plan for you.

International Financing Inc.
PO Box 88947
Seattle, WA 98188

Leasametric
822 Airport Blvd.
Burlingame, CA 94010

APPENDIX A

Forms and Reference Materials

Description and Title	Available From:
1. FCC Bulletin 1-A; Printed Publications	Federal Communication Commission Washington DC 20554
2. FCC Bulletin 1-B; How to apply for a broadcast station	-Or-
3. FCC Bulletin OCE-11; Does my transmitter need a license?	FCC Field Offices (free) (see appendix H)
4. FCC Bulletin OCE-12; Operation in the 535-1605 kHz band without a license.	
5. FCC Form 340; Application for a non-commercial broadcast station construction permit	
6. FCC Form 341; Application for a non-commercial broadcast station license	
7. FCC Form 301; Application for a commercial broadcast station construction permit.	
8. FCC From 302; Application for a commercial broadcast station license.	
9. Procedural Manual; The Public and broadcasting.	
. . . . .	
10. Radio Equipment List; Equipment acceptable for licensing	FCC Field Offices (H) (for inspection by public)
	-Or-
	Information Planning Associates 310 Maple Drive Rockville, Maryland 20850 ($25.00)

11.	Broadcasting Yearbook Annual Edition ($30.00) Broadcasting Cable Source book Annual Edition ($20.00)	Broadcasting Publications 1735 DeSales Street N.W. Washington, DC 20036 -or-
12.	Broadcasting Magazine Weekly Edition ($30.00/year)	Borrow from your local radio or TV station, or Cable TV system.
13.	FCC Rules & Regulations ($8.50) Vol. 1 (Parts 0,1,13,17,19)	U.S.Government Printing Office Washington DC 20402 (allow 6 months for delivery)
14.	FCC Rules & Regulations ($7.00) Vol. II (Parts 2,5,15,18)	-Or-
15.	FCC Rules & Regulations ($18.50) Vol. III (Parts 73,74,76,78)	Read necessary section at your local radio or TV station, FCC field office or law library. Broadcasting Yearbook also includes copies of most pertinent regulations and procedures.
16.	Journal of College Radio Bi-monthly Magazine ($5.00/year)	Journal of College Radio Central State University Dept. of Oral Communications Edmond, Oklahoma 73034
17.	Journal of College Radio Annual Edition $4.00)	
18.	Broadcast Engineering Monthly Magazine ($6.00/year) (Free to broadcast stations)	Intertec Publishing Corp. 1014 Wyandotte Street Kansas City, Missouri 64105
19.	Broadcast Management/Engineering Monthly Magazine ($15.00/year) (Free to broadcast stations)	Broadband Information Services 274 Madison Avenue New York, NY 10016

20. FAA Sectional Aeronautical Charts or Instrument Landing Chart for local airport. (5 copies) ($1.00/each)

Jeppeson & Co.
8025 E. 40th Avenue
Denver, Colorado 80207

-Or-

National Oceanographic Survey
at local Federal Offices

-Or-

Flight suppliers at your local airport.

. . . . . .

21. Topographic Quandrangle Maps (4 copies) (Must cover area within 15 mile radius of your proposed station)

Map reading instructions

U.S. Geological Survey
1200 Eads Street
Arlington, Virginia 22202

-Or-

Federal Center Building #41
Denver, Colorado

-Or-

Local Geological Survey Offices

. . . . . .

22. FM Station Atlas ($2.50)

FM Atlas Publishing Co.
Box 24
Adolph, Minnesota 55701

. . . . . .

23. Sex and Broadcasting ($2.15) (A handbook for community radio stations)

The Book People
7th Street
Berkeley, CA

. . . . . .

24. Cable FM Broadcasting - an enriching experience (How to start a CAFM station)

25. Carrier-Current Techniques: Wired-Wireless Broadcasting

Panaxis Productions
PO Box 5516
Walnut Creek, CA 94596

26. The Broadcaster's Guide to Equipment Sources.

Panaxis Productions
Box 5516
Walnut Creek, CA 94596

27. The Broadcaster's Guide to Program Sources

28. Questions and Answers for FCC Examinations

29. How to Get Into Broadcasting

30. Questions and Answers for Broadcast Permit Exams

. . . . . .

31. Libel Insurance for broadcasters

Broadcasters Libel Insurance
Employers Reinsurance Corp.
21 West 10th Street
Kansas City, MO 64105

Wm. K. O'Connor
Association Insurance Consultants
175 West Jackson Blvd.
Chicago, IL 60604

. . . . . .

32. Broadcast station operating guide by Sol Robinson ($12.95)

Broadcast Book Division
1735 DeSales St., N.W.
Washington, DC 20036

33. The business of radio broadcasting by Ed Routt ($12.95)

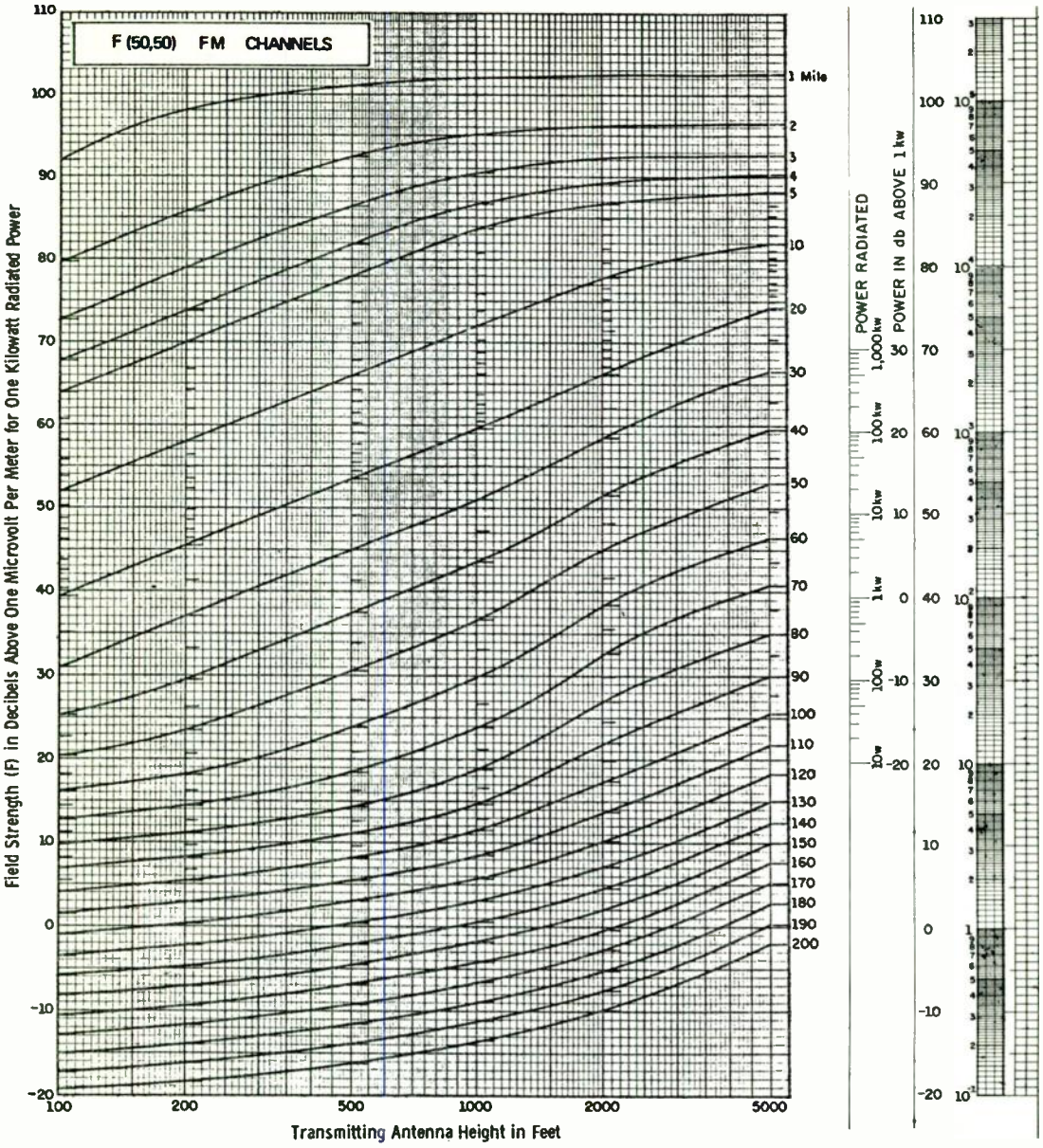
34. AM-FM Broadcast planning guide by Harry A. Etkin (12.95)

. . . . . .

35. Modern Radio Station Practices by Johnson & Jones

Wadsworth Publishing Co.
Belmont, CA

(send for details)



FM CHANNELS

ESTIMATED FIELD STRENGTH EXCEEDED AT 50 PERCENT
OF THE POTENTIAL RECEIVER LOCATIONS FOR AT LEAST 50 PERCENT
OF THE TIME AT A RECEIVING ANTENNA HEIGHT OF 30 FEET

Predicted Distance in Miles to your 3.16mV/M Contour (F50,50)

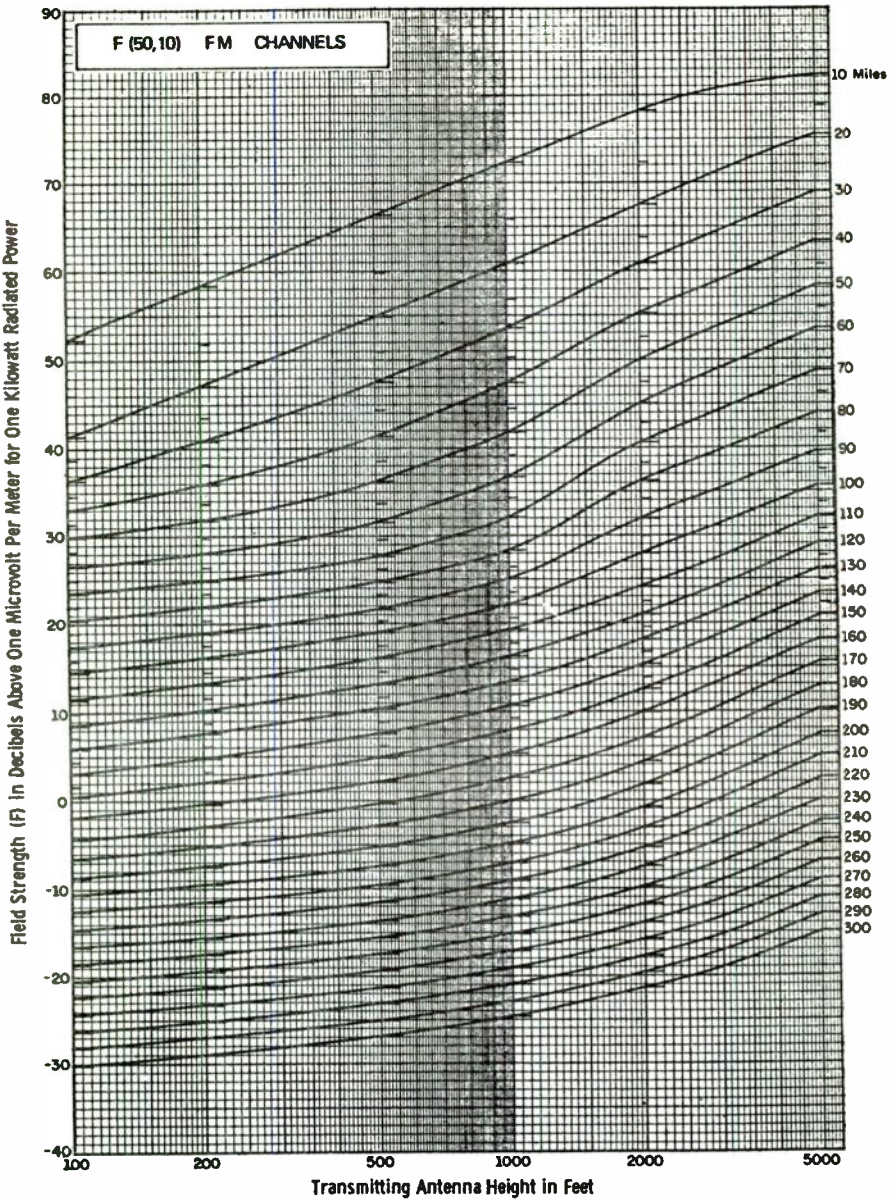
AHAAT in feet	Effective Radiated Power in Watts								
	10	25	50	100	250	500	1000	2500	5000
3000	4.0	6.0	8.1	10.2	14.1	17.1	20.4	25.6	29.0
2800	3.9	6.0	8.0	10.0	13.8	16.7	19.0	24.6	28.0
2600	3.9	5.8	7.8	9.7	13.3	16.1	18.0	23.8	28.0
2400	3.9	5.6	7.6	9.4	12.7	15.5	17.0	22.6	27.0
2200	3.7	5.6	7.4	9.1	12.2	14.9	16.5	21.5	26.0
2000	3.7	5.4	6.9	8.8	11.6	14.1	16.3	20.0	24.0
1800	3.7	5.3	6.8	8.4	10.8	13.4	15.5	19.2	22.6
1600	3.6	5.0	6.5	8.0	10.0	12.5	14.5	18.3	21.3
1400	3.3	4.8	6.2	7.6	9.4	11.5	13.5	17.3	20.0
1200	3.2	4.6	5.6	7.1	8.9	10.4	12.5	16.1	18.8
1000	3.1	4.2	5.2	6.5	8.3	9.6	11.0	14.8	17.5
900	3.0	4.0	5.0	6.3	7.9	9.3	10.8	14.0	16.6
800	2.9	3.8	4.7	5.8	7.5	8.8	10.0	13.2	15.6
700	2.8	3.6	4.4	5.3	7.0	8.3	9.5	12.4	14.6
600	2.6	3.3	4.1	4.9	6.5	7.8	8.5	11.2	13.3
500	2.4	3.0	3.8	4.5	5.8	7.1	8.0	10.0	12.0
400	2.2	2.8	3.4	4.0	5.0	6.3	7.2	9.2	11.0
300	1.9	2.5	2.9	3.5	4.4	5.2	6.2	8.1	9.0
250	1.7	2.2	2.7	3.2	4.0	4.8	5.6	7.5	8.0
200	1.6	2.0	2.4	2.9	3.4	4.2	5.0	6.7	7.5
150	1.5	1.8	2.0	2.5	3.1	3.7	4.6	5.6	6.2
100	1.2	1.5	1.8	2.0	2.5	3.0	3.5	4.5	5.2

Predicted Distance in Miles to your 1.0mV/M Contour (F50,50)

AHAAT in feet	Effective Radiated Power in Watts								
	10	25	50	100	250	500	1000	2500	5000
3000	10.1	14.0	17.1	20.0	25.6	29.7	34.0	39.3	44.0
2800	10.0	13.8	16.7	19.4	24.6	28.9	32.7	38.6	43.0
2600	9.7	13.4	16.1	18.8	23.8	27.6	31.7	37.6	42.0
2400	9.4	12.7	15.5	18.2	22.6	26.6	30.6	36.3	40.0
2200	9.1	12.2	14.9	17.5	21.5	25.4	29.3	35.0	39.0
2000	8.8	11.7	14.1	16.6	20.0	24.0	27.9	33.4	38.0
1800	8.4	10.8	13.3	15.9	19.2	22.5	26.4	31.3	36.0
1600	8.0	10.0	12.5	15.0	18.3	21.3	25.0	30.0	34.3
1400	7.6	9.5	11.5	14.0	17.3	19.8	23.4	28.3	31.4
1200	7.5	9.0	10.4	12.9	16.1	18.6	21.5	26.2	30.0
1000	6.5	8.3	9.6	11.6	14.8	17.3	19.6	24.1	27.5
900	6.3	7.9	9.3	10.8	14.0	16.5	18.8	22.9	26.0
800	5.8	7.5	8.8	10.0	13.2	15.7	18.0	21.7	25.0
700	5.4	7.1	8.3	9.5	12.4	14.8	17.2	20.5	23.8
600	4.9	6.4	7.8	8.9	11.2	13.6	16.0	19.2	22.5
500	4.5	5.8	7.1	8.0	10.0	12.4	14.8	18.0	20.0
400	4.0	5.0	6.3	7.5	9.2	10.8	13.2	16.4	18.0
300	3.5	4.4	5.2	6.5	8.1	9.4	11.2	14.4	16.0
250	3.2	4.0	4.8	5.8	7.5	8.8	10.0	13.2	14.5
200	2.9	3.6	4.2	5.0	6.7	7.9	9.2	11.6	13.5
150	2.5	3.1	3.7	4.3	5.6	6.8	8.0	9.4	11.5
100	2.0	2.6	3.0	3.6	4.5	5.4	6.6	8.3	9.5

Predicted Distance in Miles to your 50uV/M Contour (F50,50)

AHAAT in feet	Effective Radiated Power in Watts								
	10	25	50	100	250	500	1000	2500	5000
3000	42.3	48.3	52.9	57.7	64.6	70.0	75.0	81.9	87.0
2800	41.5	47.4	51.9	56.7	63.5	69.3	73.8	80.4	85.0
2600	40.2	46.2	51.0	55.6	62.2	67.8	72.5	79.3	84.5
2400	39.1	45.2	49.1	54.4	60.6	66.1	71.4	78.1	83.0
2200	37.8	43.9	48.5	53.0	59.0	64.6	69.5	76.7	81.0
2000	36.4	42.3	46.9	51.5	57.4	62.2	67.4	74.4	79.0
1800	34.3	40.1	45.0	49.8	55.6	60.0	65.0	71.9	77.0
1600	32.9	38.6	42.6	47.6	53.3	57.6	62.2	68.8	73.0
1400	30.5	36.0	40.0	44.7	50.9	55.0	58.8	65.8	70.0
1200	28.9	34.0	38.0	42.0	48.2	52.2	56.6	62.8	66.6
1000	26.9	31.3	35.4	39.6	45.0	49.1	53.7	59.9	63.0
900	25.3	30.0	34.0	38.1	43.6	47.9	52.3	58.3	62.7
800	24.1	28.8	32.7	36.7	42.1	46.4	50.6	56.8	60.0
700	23.0	27.5	31.1	35.2	40.4	44.9	49.0	54.0	58.6
600	21.3	25.9	29.6	33.3	38.6	42.9	47.1	52.9	57.0
500	19.5	24.1	27.7	31.3	35.3	40.0	45.0	50.8	55.0
400	16.0	21.8	25.4	28.9	34.0	37.7	42.1	46.7	52.5
300	15.0	19.2	22.4	26.0	30.8	34.5	38.7	44.6	38.5
250	14.0	18.0	20.6	24.1	28.8	32.6	36.6	42.2	46.6
200	12.5	16.4	18.8	21.8	26.4	30.0	34.0	39.3	43.3
150	10.5	14.4	16.8	19.2	23.6	27.1	30.7	36.3	40.0
100	9.0	11.7	13.9	16.2	19.5	23.0	26.0	31.7	36.6



FM CHANNELS

ESTIMATED FIELD STRENGTH EXCEEDED AT 50 PERCENT
OF THE POTENTIAL RECEIVER LOCATIONS FOR AT LEAST 10 PERCENT
OF THE TIME AT A RECEIVING ANTENNA HEIGHT OF 30 FEET

Predicted Distance in Miles to your 100mV/M Contour (F50,10)

AHAAT in feet	Effective Radiated Power in Watts								
	10	25	50	100	250	500	1000	2500	5000
3000	*	*	*	*	*	*	1.4	2.3	3.1
2800	*	*	*	*	*	*	1.4	2.3	3.1
2600	*	*	*	*	*	*	1.4	2.3	3.0
2400	*	*	*	*	*	*	1.4	2.3	3.0
2200	*	*	*	*	*	*	1.4	2.2	3.0
2000	*	*	*	*	*	*	1.4	2.2	2.9
1800	*	*	*	*	*	*	1.4	2.2	2.9
1600	*	*	*	*	*	*	1.4	2.1	2.8
1400	*	*	*	*	*	*	1.3	2.1	2.8
1200	*	*	*	*	*	*	1.3	2.1	2.7
1000	*	*	*	*	*	*	1.3	2.0	2.6
900	*	*	*	*	*	*	1.2	2.0	2.5
800	*	*	*	*	*	*	1.2	1.9	2.4
700	*	*	*	*	*	*	1.2	1.9	2.3
600	*	*	*	*	*	*	1.2	1.8	2.2
500	*	*	*	*	*	*	1.1	1.7	2.1
400	*	*	*	*	*	*	1.0	1.6	1.9
300	*	*	*	*	*	*	*	1.4	1.7
250	*	*	*	*	*	*	*	1.3	1.5
200	*	*	*	*	*	*	*	1.2	1.4
150	*	*	*	*	*	*	*	1.0	1.3
100	*	*	*	*	*	*	*	*	1.0

* Less than 1 mile

Predicted Distance in Miles to your 10mV/M Contour (F50,10)

AHAAT in feet	Effective Radiated Power in Watts								
	10	25	50	100	250	500	1000	2500	5000
3000	1.4	2.2	3.0	4.0	6.7	8.3	11.1	15.1	18.4
2800	1.4	2.2	3.0	3.9	6.5	8.2	10.5	14.5	17.6
2600	1.4	2.2	3.0	3.9	6.4	8.1	10.2	14.0	17.0
2400	1.4	2.2	2.9	3.8	6.3	7.9	10.0	13.5	16.4
2200	1.4	2.2	2.9	3.8	6.2	7.7	9.7	12.9	15.7
2000	1.4	2.2	2.9	3.7	6.0	7.4	9.3	12.0	15.1
1800	1.4	2.1	2.8	3.6	5.8	6.9	8.7	11.4	14.0
1600	1.4	2.1	2.8	3.4	5.5	6.6	8.1	10.4	13.1
1400	1.3	2.1	2.8	3.3	5.3	6.2	7.4	10.1	12.0
1200	1.3	2.1	2.6	3.2	5.0	6.0	6.9	9.2	10.8
1000	1.2	2.1	2.3	3.1	4.6	5.6	6.4	8.8	10.0
900	1.2	2.0	2.2	3.0	4.4	5.2	6.1	8.1	9.3
800	1.2	1.8	2.2	2.9	4.0	5.0	5.8	7.8	8.9
700	1.2	1.8	2.1	2.8	3.9	4.6	5.3	7.2	8.2
600	1.2	1.7	2.1	2.5	3.6	4.2	5.0	6.7	7.8
500	1.1	1.7	2.0	2.4	3.2	4.0	4.6	6.2	7.2
400	*	1.5	1.8	2.2	3.0	3.4	4.0	5.5	6.5
300	*	1.4	1.6	1.9	2.6	3.0	3.4	4.8	5.5
250	*	1.3	1.5	1.8	2.3	2.9	3.2	4.2	4.9
200	*	1.2	1.4	1.6	2.2	2.7	2.9	3.9	4.4
150	*	*	1.3	1.4	1.9	2.1	2.5	3.2	3.9
100	*	*	*	1.1	1.6	1.8	2.0	2.8	3.1

*Less than 1 mile

Predicted Distance in Miles to your 0.5mV/M Contour (F50,10)

AHAAT in feet	Effective Radiated Power in Watts								
	10	25	50	100	250	500	1000	2500	5000
3000	17.2	21.8	26.3	30.9	38.2	44.0	49.6	57.9	64.0
2800	16.6	21.1	25.3	30.0	37.3	42.6	48.6	56.5	63.0
2600	16.0	20.0	24.4	28.8	36.0	41.6	47.6	55.2	62.0
2400	15.4	19.1	23.3	27.7	34.6	40.0	46.0	54.0	60.0
2200	14.7	18.5	22.2	26.7	33.3	38.3	44.0	52.0	58.0
2000	14.0	17.7	20.8	25.4	31.7	26.6	42.0	50.0	56.0
1800	13.1	16.8	19.3	23.9	30.0	35.0	40.0	48.0	54.0
1600	17.1	15.8	18.1	22.1	27.9	32.7	38.2	45.5	50.8
1400	10.9	14.6	17.1	20.0	25.8	30.0	35.2	42.0	48.0
1200	10.0	13.5	16.1	18.7	23.6	27.9	32.5	39.2	44.6
1000	9.5	12.0	14.7	17.3	21.4	25.3	29.3	35.8	40.9
900	9.0	11.3	13.9	16.4	20.0	24.1	28.1	34.2	39.5
800	8.5	10.4	13.0	15.6	19.0	22.6	26.6	32.5	37.5
700	8.0	9.3	11.9	14.6	18.0	21.3	25.3	30.8	35.7
600	7.5	8.6	10.9	13.5	17.0	19.6	23.2	28.7	33.3
500	7.0	7.7	10.0	12.1	15.6	18.0	21.3	26.4	30.8
400	6.5	6.9	9.0	10.4	13.8	16.4	19.0	24.2	28.3
300	6.0	6.1	8.1	9.0	11.7	14.4	17.0	20.7	25.0
250	5.0	5.4	7.2	8.2	10.3	12.9	15.5	19.0	22.9
200	4.0	4.7	6.3	7.5	9.0	11.2	13.8	17.3	20.0
150	3.5	4.2	5.4	6.7	8.0	9.6	11.7	15.2	18.2
100	3.0	4.0	4.5	6.0	7.0	8.0	9.0	11.7	14.8

Predicted Distance in Miles to your 0.1mV/M Contour (F50,10)

AHAAT in feet	Effective Radiated Power in Watts								
	10	25	50	100	250	500	1000	2500	5000
3000	38.2	45.7	51.2	57.9	66.3	73.1	78.7	89.1	96.0
2800	37.3	44.6	50.0	56.5	65.0	71.1	77.5	87.5	95.0
2600	36.0	43.0	49.0	55.2	63.8	70.0	76.7	85.8	92.5
2400	34.6	41.9	47.6	54.0	62.1	68.5	75.1	84.6	91.3
2200	33.3	40.0	46.0	52.0	60.0	66.7	73.6	82.5	90.0
2000	31.7	38.3	44.0	50.0	58.0	64.4	71.5	80.9	87.5
1800	30.0	36.7	42.0	48.0	56.0	62.2	69.1	79.0	85.0
1600	27.9	34.4	40.0	45.5	52.6	58.6	65.8	75.0	82.5
1400	25.8	31.7	36.7	42.0	50.0	56.0	62.0	70.0	77.5
1200	23.6	29.3	34.2	39.2	46.4	52.0	58.0	66.0	72.5
1000	21.4	26.7	30.8	35.8	42.7	48.2	54.0	62.0	68.2
900	20.0	25.3	29.3	34.2	41.0	46.4	52.0	60.0	66.3
800	19.0	24.0	28.0	32.5	39.2	44.6	50.0	58.0	64.4
700	18.0	22.7	26.7	30.8	37.3	42.0	48.0	56.0	62.3
600	17.0	20.7	24.7	28.7	35.0	40.0	45.8	53.6	60.0
500	15.6	19.1	22.6	26.7	32.8	37.5	42.6	50.0	56.8
400	13.8	17.9	20.0	24.2	29.8	34.5	40.0	48.0	54.4
300	11.7	15.2	17.8	20.7	26.4	31.2	36.4	44.4	51.0
250	10.3	13.9	16.6	19.0	24.5	29.0	34.0	42.3	49.1
200	9.5	12.2	14.9	17.3	21.7	26.7	32.0	40.0	47.5
150	8.0	10.0	12.7	15.2	18.9	23.3	28.3	36.7	44.3
100	6.8	8.0	10.0	11.7	15.2	17.8	22.2	30.0	40.0

APPENDIX D

Frequency Search Work Sheet

Channel & Frequency	Call Letters	Geographic Location	Distance in Miles	ERP & AHAAT	Distance to 1 mV/M
201					
202					
203					
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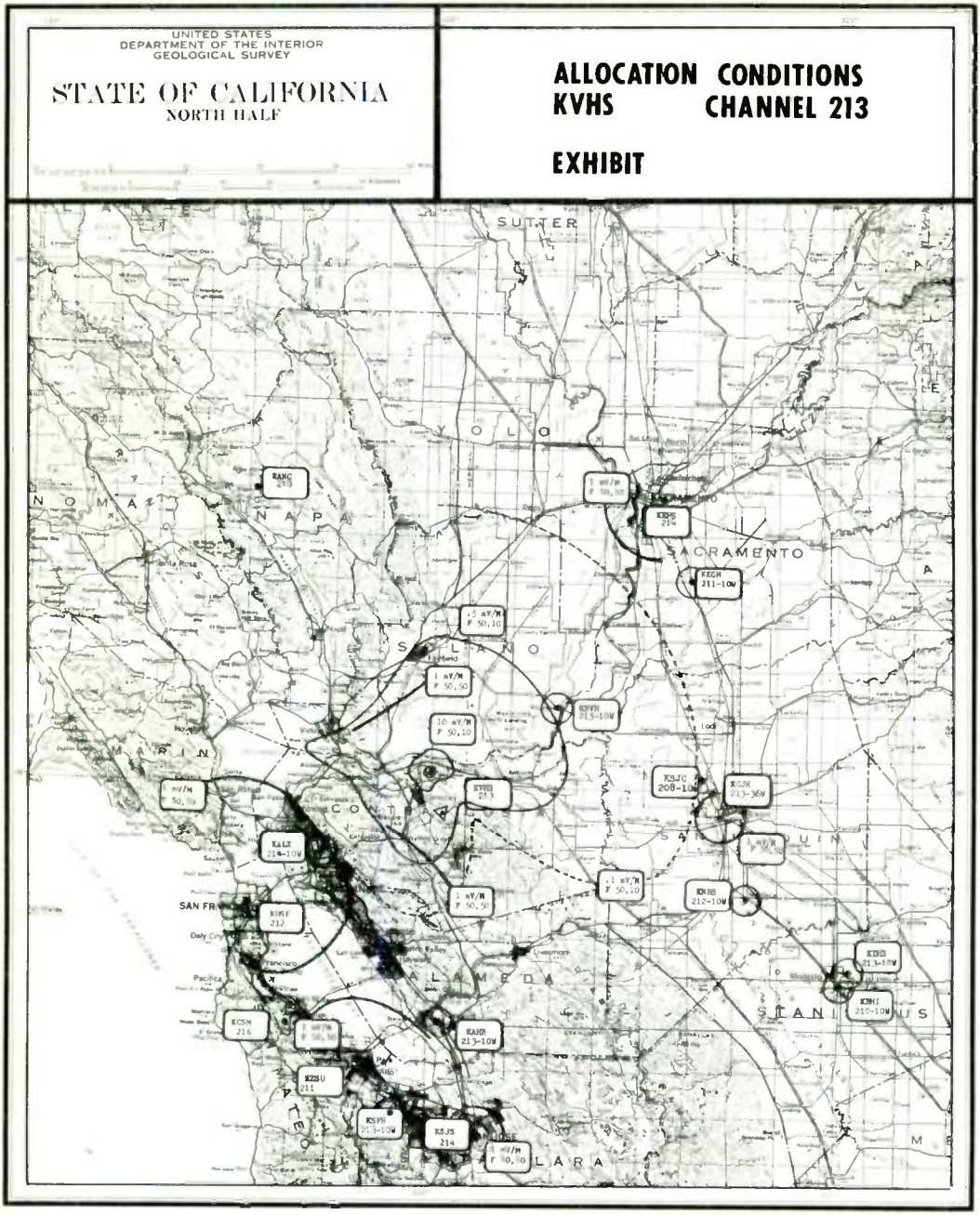
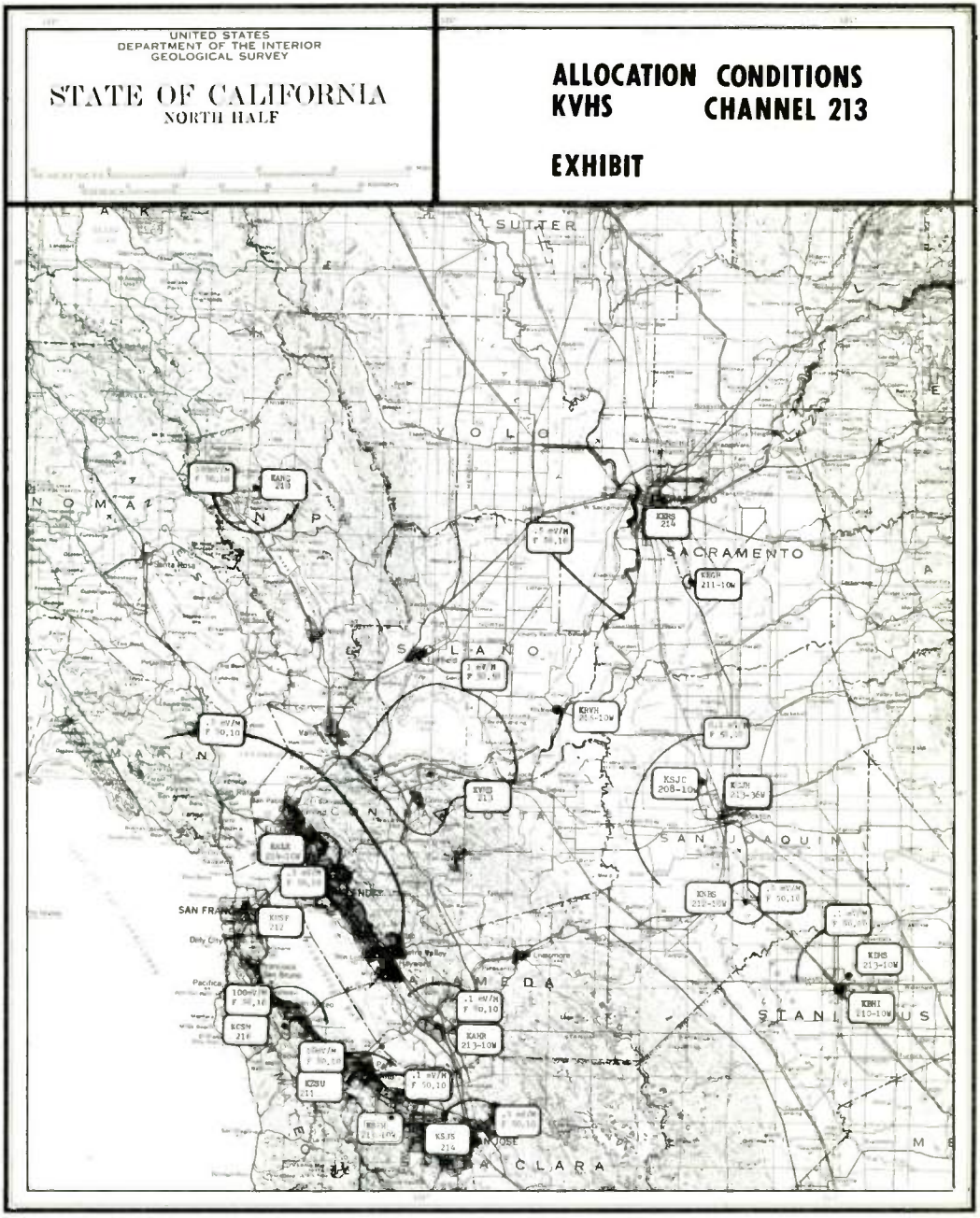
APPENDIX E

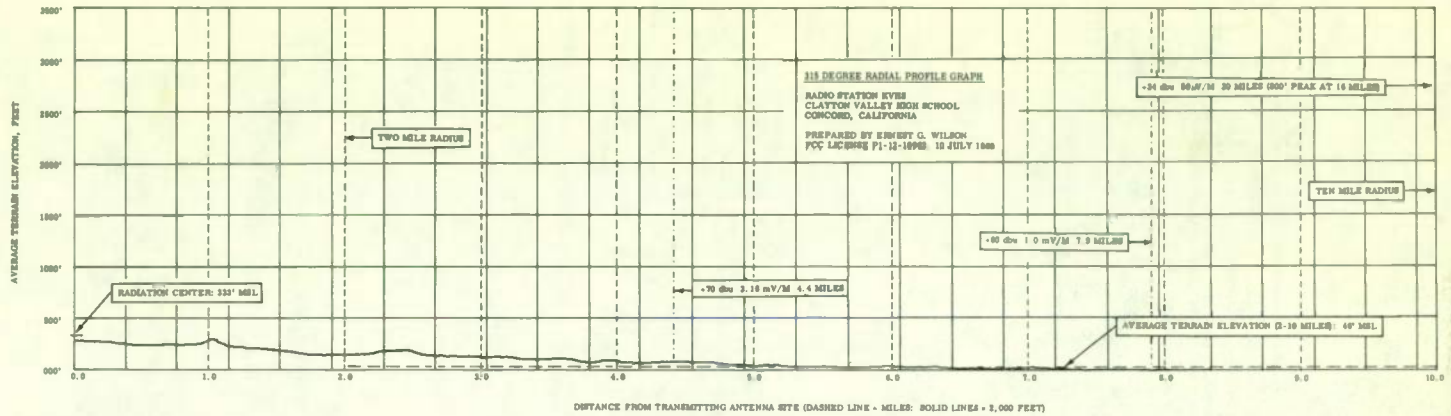
MAP OF INTERFERENCE TO OTHER STATIONS

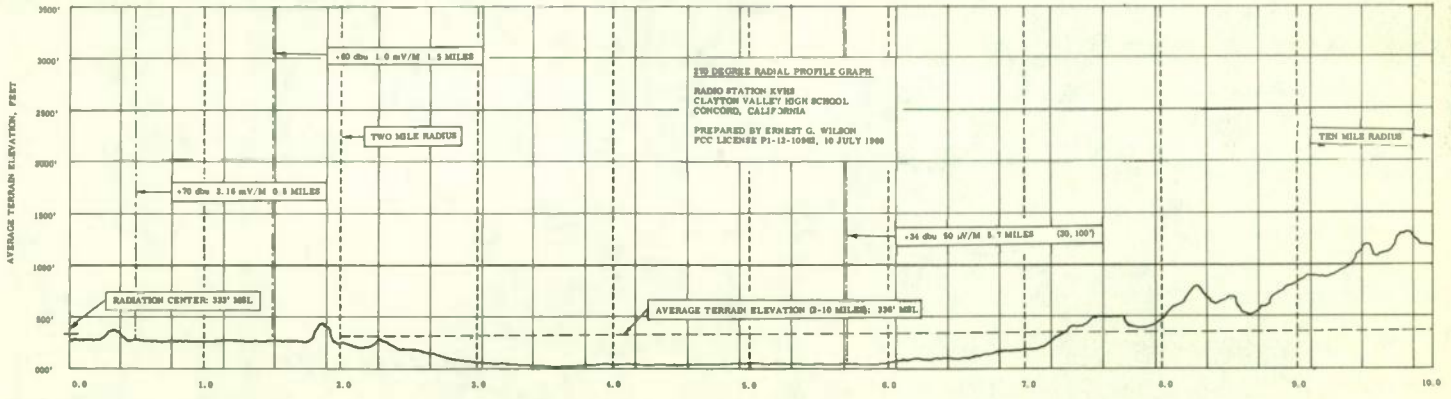


APPENDIX E

MAP OF INTERFERENCE FROM OTHER STATIONS



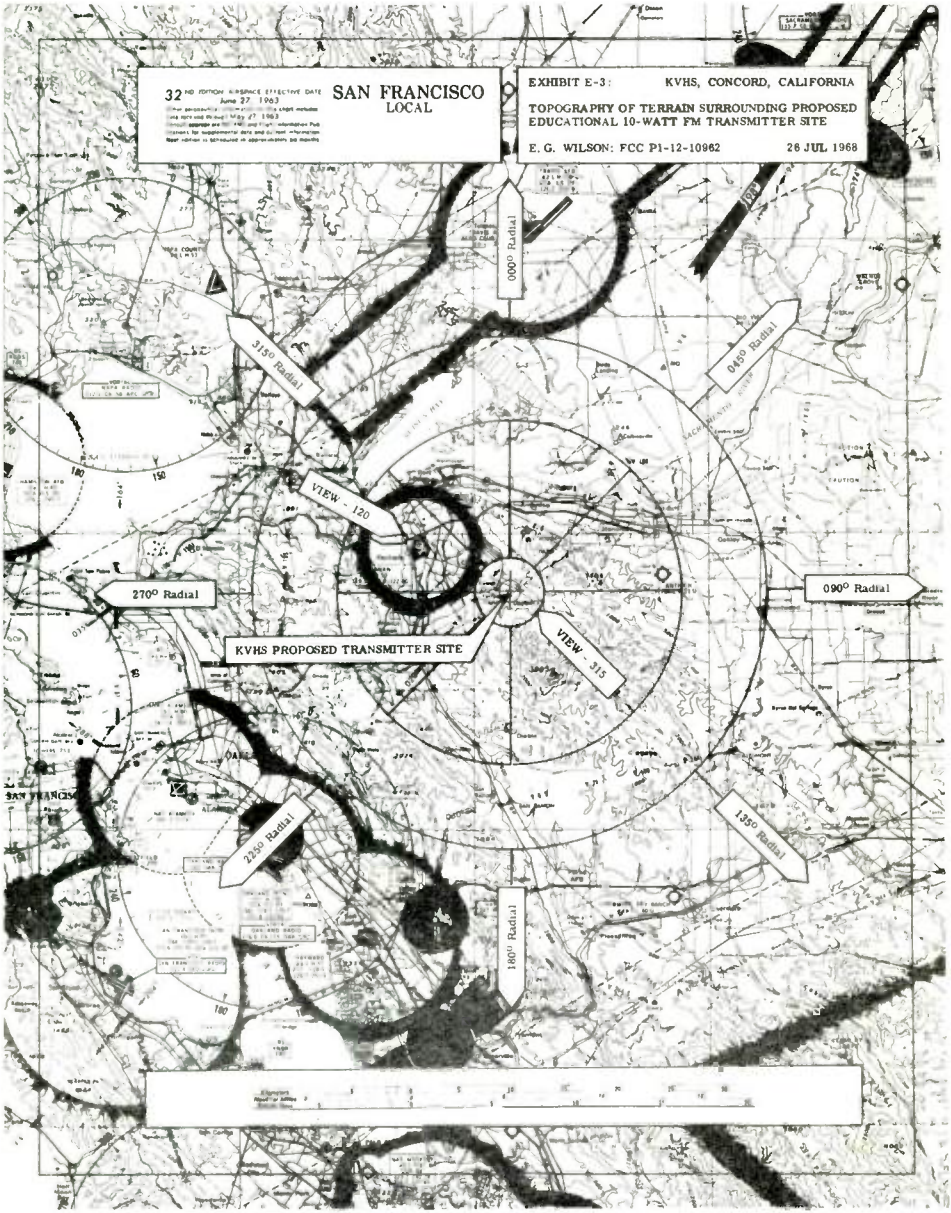




APPENDIX F

APPENDIX G

Aeronautical Map



APPENDIX H

Federal Communications Commission Offices

Headquarters
(202) 655-4000

1919 M St. N.W.
Washington, DC 20036

Broadcast Bureau
(202) 632-6460

Broadcast Facilities
(202) 632-6485

License Division
(202) 632-6334

District	Address and Phone
1	1600 Custom House Boston, Mass 02109 (617) 223-6608
2	Rm 748 Federal Bldg 641 Washington St. New York, NY 10014 (212) 620-5745
3	1005 U.S.Custom House Philadelphia, PA 19106 (215) 597-4410
4	George M. Fallon Federal Bldg Room 819, 31 Hopkins Plaza Baltimore, MD 21201 (301) 962-2727
5	Military Circle 870 North Military Highway Norfolk, VA 23502 (703) 520-4100
6	1602 Gas Light Tower Atlanta, GA 30303 (404) 526-6381
7	919 Federal Bldg. Miami, FLA 33130 (305) 350-5541
8	829 Federal Bldg. South New Orleans, Louisiana 70130 (504) 527-2094
9	5636 Federal Bldg. 515 Rusk Avenue Houston, Texas 77002 (713) 226-4306
10	1100 Commerce St., Federal Bldg, Room 13 E7 Dallas, Texas 75202 (214) 749-3243
11	US Courthouse, Rm 1754 312 N. Spring St. Los Angeles, CA 90012 (213) 688-3276
12	323A Customhouse 555 Battery San Francisco, CA 94111 (415) 556-7700
13	314 Multnomah Bldg 319 S.W. Pine St. Portland, Oregon 97204 (503) 221-3097
14	8012 Federal Office Bldg 909 First Avenue Seattle, WA 98014 (206) 442-7653
15	504 New Customhouse Denver, Colo 80202 (303) 837-4054
16	691 Federal Bldg. St. Paul, Minn. 55101 (612) 725-7819
17	1703 Federal Bldg. Kansas City, MO 64106 (816) 374-5526
18	1872 U S Courthouse Chicago, ILL 60604 (312) 353-5386

19 1054 Federal Bldg.
Detroit, Michigan 48226
(313) 226-6077

20 905 Federal Bldg.
111 W. Huron St.
Buffalo, NY 14202
(716) 842-3217

21 502 Federal Bldg, Box 1021
Honolulu, Hawaii 96808
(808) 546-5640

22 U.S.Post Office & Courthouse
747 Federal Building
Hato Rey, Puerto Rico 00903
(809) 753-4008

23 US Post Office Bldg Rm G63
4th & G St, PO Box 644
Anchorage, Alaska 99510
(907) 272-1822

24 Room 216
1919 M Street NW
Washington, DC 20554
(202) 632-7000

APPENDIX I

Coaxial Cable Characteristics per 100 feet

Cable Type	Maximum Power Rating	(90 MHz) db loss	(90 MHz) Efficiency	(100 MHz) db loss	(100 MHz) Efficiency	Cost per foot
RG-8 (RG-213)	700 watts	1.9	64%	2.0	63%	$ .25
RG-17 (RG-218)	2 kW	.7	85%	.8	83%	1.20
1/2 inch (Heliax)*	2 kW	.79	83%	.8	83%	1.80
7/8 inch (Heliax)*	6 kW	.34	92%	.35	92%	3.50
1 5/8 inch (Heliax)*	11 kW	.19	95%	.20	95%	6.00

To find the efficiency for other lengths of cable complete the following:

1. Divide your cable length (in feet) by 100 and multiple by the db loss shown above. This gives you the total db loss for your cable length.

2. Multiply the total db loss by 0.1. Use this number as the exponent (e) in the following calculation. This is easily done with a good calculator.

3. Now divide 100 by $10^{(e)}$. This equals the % of efficiency for your cable.

EXAMPLE:

250 feet of 7/8 inch Heliax cable at 90 MHz

(1) $\frac{250}{100} \times .34 = .85$ (total db loss)

(2) $.85 \times .1 = .085$ (used for exponent)

(3) $10^{(.085)} = 1.216$ and $\frac{100}{1.216} = 82.22\%$

* Trademark of Andrews Corporation

APPENDIX J

Interference conditions as derived from FCC Rules, Part 1.573

CO CHANNEL STATIONS

Your 1 mV/M contour does not overlap their .1 mV/M contour.

Your .1 mV/M contour does not overlap their 1 mV/M contour.

FIRST ADJACENT CHANNEL

Your 1 mV/M contour does not overlap their .5 mV/M contour.

Your .5 mV/M contour does not overlap their 1 mV/M contour.

SECOND ADJACENT CHANNEL

Your 1 mV/M contour does not overlap their 10 mV/M contour.

Your 10 mV/M contour does not overlap their 1 mV/M contour.

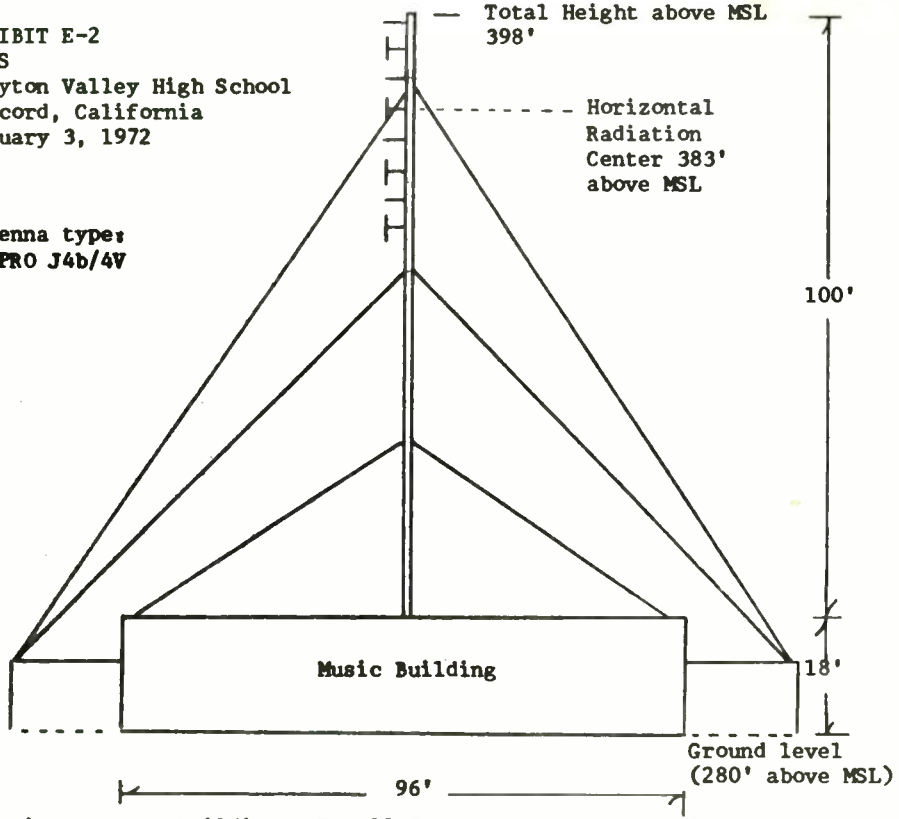
THIRD ADJACENT CHANNEL

Your 1 mV/M contour does not overlap their 100 mV/M contour.

Your 100 mV/M contour does not overlap their 1 mV/M contour.

EXHIBIT E-2
KVHS
Clayton Valley High School
Concord, California
January 3, 1972

Antenna type:
JAMPRO J4b/4V



Existing support building. Top 20 feet of top guys are fiberglass attached with steel pre-forms to steel guy wires. All other guys are steel. Guy wires are anchored to 2 inch iron pipe in concrete (part of covered walk-way support).

Prepared by:
Ernest G. Wilson
Technical Director