FM-TV

RADIO COMMUNICATION

★ ★ Edited by Milton B. Sleeper ★ ★

th Year of Service to Management and Engineering

Look closely into *all* the advantages of VARIAC VOLTAGE CONTROLS

- **EXCELLENT REGULATION** — less than $\frac{3}{4}\%$ at line voltage and less than 3% of line at $\frac{1}{2}$ line voltage. There is very little change in output voltage under varying loads with the VARIAC*
- **TOROIDIAL CONSTRUCTION** — voltage change is directly proportional to dial rotation over the complete output range
- **MACHINE-WOUND COILS** — insure maximum uniformity in lay and tension of windings (and a toroidial winding machine for wire of these sizes is a neat machine to design!)
- **ADVANCED BRUSH CONSTRUCTION** — coil spring maintains uniform brush pressure under all conditions of brush wear; very low inertia of sprung weight in moving part results in less wear under vibration, and eliminates bounce; NO TOOLS needed to change brushes
- **READILY REMOVABLE SHAFT** — for reversing to table or panel mounting — requires no disassembly of radiators, collars, etc.
- **KEYED SHAFTS** — on larger models requiring greater torque, insure permanent line-up of shaft and radiator; especially important in ganging
- **NO PIGTAIL CONNECTIONS**
- **SAFE TERMINALS** — for either screw or solder connections — clearly marked in output voltages
- **PRESSURE CONTACTS** in the VARIAC do not depend upon mechanical properties of insulating materials

VARIACS are manufactured and sold in standard units or assemblies to control from 170 to 24,700 va. There is a VARIAC to fit almost any a-c voltage-control problem. Our engineering department will be glad to assist you in selecting the most suitable model.

*VARIAC *is a registered trade name*

NO tools needed to change the VARIAC brush. A twist of the cartridge-like holder and it and the brush come out immediately.

For changing to behind-the-panel or to table mounting the brush, radiator, collar, etc. are not disturbed. Just the shaft, dial and knob, as a unit, are removed.

Moulded barriers between terminals eliminate possibility of short-circuits. Both screw and solder terminals provided. Voltages across terminals clearly indicated in moulded terminal board.

Write for the new VARIAC BULLETIN

GENERAL RADIO COMPANY

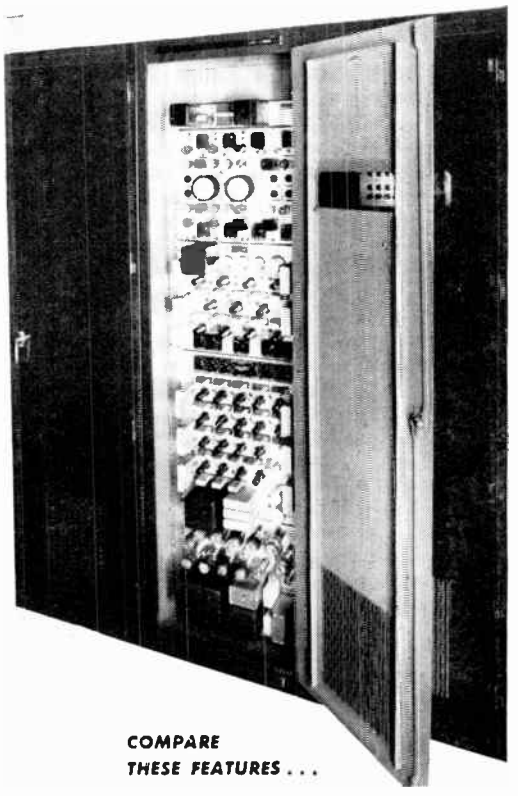
Cambridge 39, Massachusetts

90 West St., New York 6 920 S. Michigan Ave., Chicago 5 1000 N. Seward St., Los Angeles 38

For that steady pulse of dependable, day-in and day-out telecasting service . . .

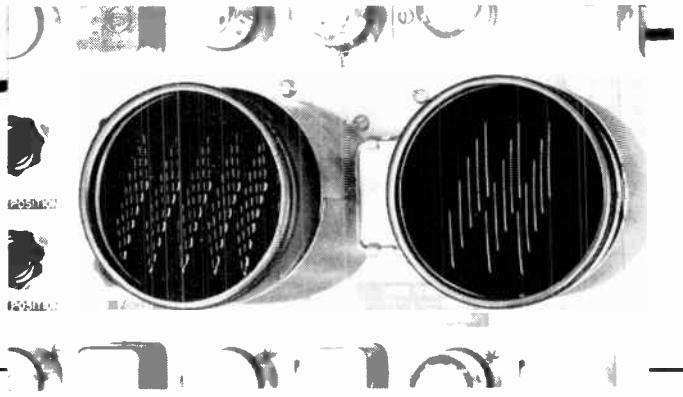
DU MONT MODEL TA-107 A/B

Synchronizing SIGNAL GENERATOR



Basically a set of tried-tested-proven units packaged in one cabinet for use in furnishing the horizontal and vertical driving pulses; the blanking signals; and the composite synchronizing signals required by studio and film cameras, camera control units, monitors and other telecasting station equipment. May also be used with a source of television picture signal in the preliminary and the final testing of television receivers in production. Likewise in the development laboratory, in schools and wherever video circuits are critically analyzed.

Further details on request



Close-up of the two 3" cathode-ray tube monitors indicating all frequencies within sync generator. Below, the composite signal provided by Model TA-107 A B.

COMPARE THESE FEATURES . . .

✔ Conforms to all RMA and FCC specs for standard output signals, horizontal and vertical driving signals, composite video blanking and synchronizing signals.

✔ Linearity test signals at 900 cycles providing 15 horizontal bars, and 157.5 kc providing 10 vertical bars mixed with blanking, by means of switch, for use in checking scanning linearity of picture monitors and television receivers.

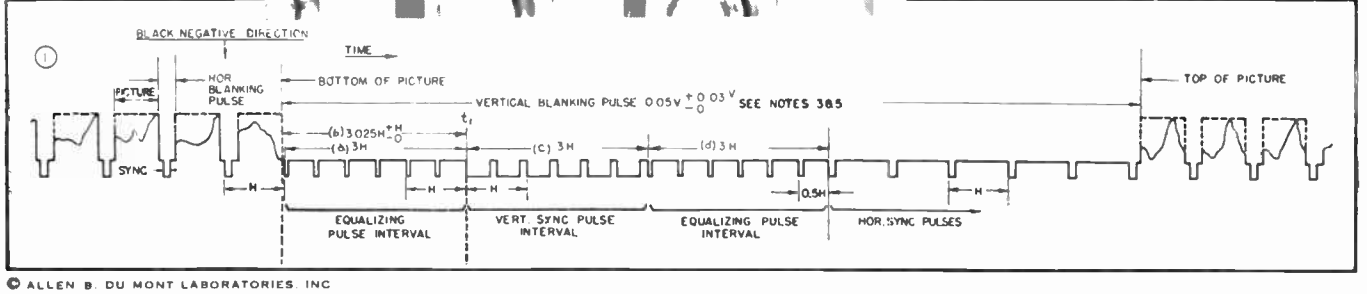
✔ Provision of two 3" c-r tubes for use in *simultaneous monitoring* (without switching) of all frequencies in the sync generator. Thus frequency counts may be checked or adjusted without use of external oscillographs.

✔ Leading edges of equalizing pulses are also leading edges of horizontal and vertical sync pulses . . . for perfect interlacing.

✔ A crystal oscillator at 157.5 kc or a highly stable self-excited oscillator at 157.5 kc may be selected by a switch for use as master oscillator. The self-excited MO is useful in synchronizing the generator, by means of provided lock-in circuit, to 60 cycle power line or to a remotely generated sync signal.

✔ Very short signal lead lengths. Operation of all tubes well within manufacturer's rating. Dimensions, mounted in cabinets: 83¼" x 22" x 18¼". 680 watts.

Plus many other outstanding features.



DUMONT *First with the Finest in Television*

ALLEN B. DU MONT LABORATORIES, INC. • TELEVISION TRANSMITTER DIVISION, CLIFTON, N. J. • DU MONT NETWORK AND WABD, 515 MADISON AVE., NEW YORK 22, N. Y. • DU MONT'S JOHN WANAMAKER TELEVISION STUDIOS, NEW YORK 3, N. Y. • WTTG, WASHINGTON, D. C. • STATION WDTV, PITTSBURGH, PA. • HOME OFFICES AND PLANTS, PASSAIC, CLIFTON, ALLWOOD, AND EAST PATERSON, N. J.

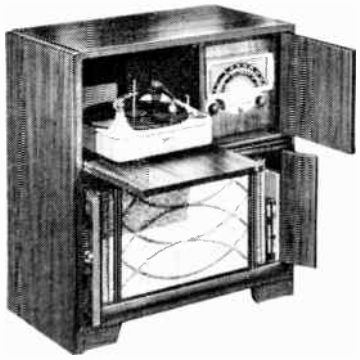
Pack More Sales Power with These All-New Zenith Radio Sensations

World's Easiest New Way to Play Records Plus New Super-Sensitive FM and Long-Distance AM

Now sensational new Zenith radio-phonograph combinations that completely revolutionize record playing! No needles or center posts to adjust. No complicated gadgets. In one new Zenith, a *single* Cobra† automatically plays 7, 10 and 12 inch records . . . 33⅓, 45 and 78 R.P.M.! In another new Zenith, a single Cobra automatically plays all 7 inch records, 33⅓ or 45 R.P.M.!

And in radio, Zenith's new Super-Sensitive FM assures clear, static-free reception even in remote "fringe" FM areas and where ordinary AM sets are almost useless! Long-Distance† AM provides amazingly more powerful and more sensitive Standard Broadcast reception.

Call your Zenith Distributor right away. Get ready now for your biggest year—with Zenith!

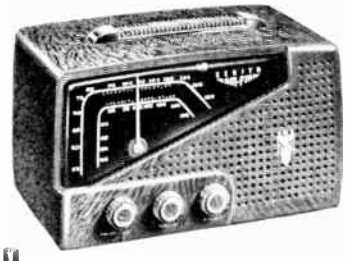


New Zenith "Bradbury"
Sensational new FM-AM Radio-Phonograph combination—offers the world's easiest way to play all type records. Revolutionary 3-Way Cobra Tone Arm and automatic record changer plays 7, 10, 12 inch records . . . 33⅓, 45, 78 R.P.M. Gives superb radio reception with Zenith's new Super-Sensitive FM and famous Zenith Long-Distance AM. Stunning period cabinet of figured walnut finished hardwoods. **$239.95***

ZENITH RADIO

New Zenith "Zephyr"†
Unquestionably the quality leader in its field. New Zenith improved Consol-Tone† gives the tone richness and volume of a large set. Famous Wavemagnet† pulls in signals sharp and clear—minimizes static and interference. Alnico 5 speaker assures amazing fidelity. Smartly styled in sparkling black or swirl walnut plastic with large sweep circle dial. AC, DC. **$34.95***

ZENITH RADIO



New Zenith "Super-Triumph"
Top FM-AM value of the year! New Super-Sensitive Zenith-Armstrong FM with patented powerline Antenna, and famous Zenith Long-Distance AM. Exclusive Wavemagnet . . . big Alnico 5 Speaker . . . tone control . . . on/off indicator . . . easier-to-tune "Cut-Away" Dial. Beautiful swirl walnut plastic cabinet with "Flexo-Grip" handle. AC, DC. **$59.95***

ZENITH RADIO CORPORATION
6001 W. Dickens Ave., Chicago 39, Illinois

New Zenith "Trans-Oceanic"
New edition of the Aristocrat of all portables—now more sensitive and more powerful than ever. Exclusive Wavemagnet . . . brings in long-distance Standard Broadcast plus Short Wave on any of five separate international bands. Plays where ordinary portables won't—in boats, trains, planes, remote areas. Works on thrifty long-life battery and on AC or DC. **$99.95***

**Suggested retail prices. West Coast prices slightly higher. Prices subject to change without notice.*

ZENITH
•LONG DISTANCE• RADIO and TELEVISION

THE ROYALTY OF RADIO AND TELEVISION

†®

®

Zenith has the great values

FM-TV

Formerly, *FM* MAGAZINE and *FM* RADIO-ELECTRONICS

VOL. 10 JANUARY, 1950 NO. 1

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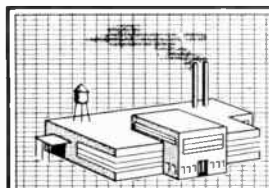
CPA AUDIT
CIRCULATION AUDITED BY HENRY R. SYKES, CERTIFIED PUBLIC ACCOUNTANT SYKES, GIDDINGS & JOHNSON SPRINGFIELD, MASSACHUSETTS



Set Production

TV SETS produced by RMA members in October were just twice the monthly average for the first half of the year, FM sets were up 19 per cent on the same basis, and AM sets were up 15 per cent.

Since TV conditions are more favorable now than at the first of the year, despite the indefinite continuation of the new-station freeze, it can be expected that this year-end gain will be held in 1950.

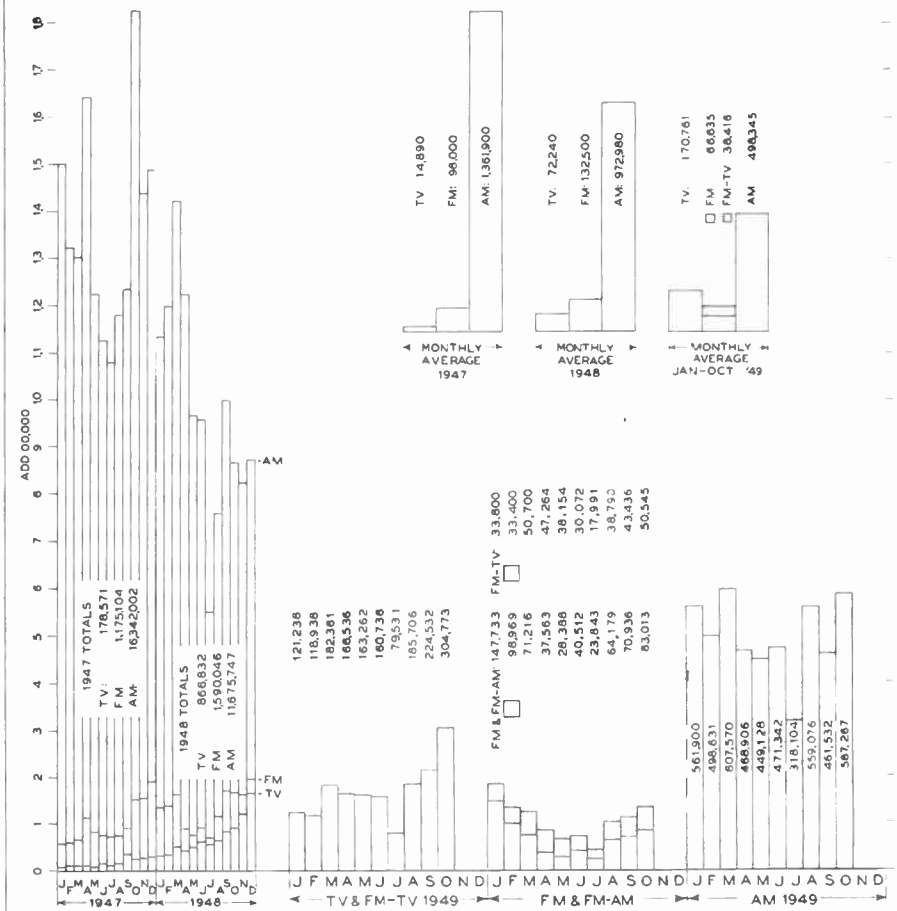
FM-minded broadcasters can take encouragement from the fact that to the 83,013 FM receivers produced in October they can add 50,545 TV sets equipped for FM reception. Thus, in ten months this year, over 1 million more families have been added to the FM audience.

AM production will total about 5.5 million sets for 1949. This represents a reduction in number of sets in use this year upwards of 1.5 million.

TV set trends are indicated by the RMA report on picture tubes. The number of tubes produced in nine months this year was 63 per cent above the entire year of '48, but the dollar volume was up 87 per cent, despite substantial price reductions. This seeming contradiction is due to greater demand for large tubes. In the third quarter this year, 65 per cent of the tubes were of the 12-in. size or larger. The most popular size, accounting for 44 per cent of the total production, was in the 12- to 13.9-in. group, while 21 per cent were 14 ins. or larger.

Third-quarter sales to equipment manufacturers amounted to 609,517 units valued at $15,926,047, bringing the three-quarters' total to 1,992,541 units, valued at $58,253,474.

Receiver tube sales in October amounted to 24,353,631, up 2.9 million over September, and 4.8 million over October '48. The October breakdown shows 18.9 million going to set manufacturers, 4.4 million for replacement, .773 million for export, and .259 million for Government agencies. Total sales for 10 months came to 151,034,194.



TV, FM, and AM set Production Barometer, prepared from RMA figures

Your telephone uses ceramics, too!

Five thousand years ago, potters were making household vessels of clay. As skill grew, grace of shape and ornament were added. The beauty of fine china has been recognized by every civilization, while the availability, ease of manufacture and durability of other ceramics have given them wide use.

Your telephone, too, uses ceramics. Behind its dial is a metal plate, glazed as carefully and in much the same manner as this fine piece of pottery. It carries the letters and numbers you dial, so it must resist both fading and abrasion. You will find other ceramics as insulators, supporting wires on pole lines; in eighty thousand miles of underground conduit, where fired clays defy decay and corrosion.

Today at Bell Telephone Laboratories scientists utilize ceramics in ways undreamed of in ancient times. Thermistors, made of a ceramic, provide automatic controls for electric current, to offset fluctuations in temperature and voltage. One kind of ceramic makes low-loss insulation at high frequencies, while another supplies controlled attenuation for microwaves traveling in waveguides.

Each use demands a special composition, scientifically controlled and processed. Basic studies in the chemistry and physics of ceramics have shown how to utilize their versatile properties in electrical communication. And research continues on ceramic materials as well as on every other material which promises better and cheaper telephone service.

BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE.

THIS MONTH'S COVER

This month's cover shows front and rear views of 15-watt, 960-mc, multiplex transmitters manufactured by Link Radio for the Carolina Light & Power Company. A 35,000-cycle modulation band provides three 2-way voice channels over the 31 miles between the company's main office at Raleigh and the Duke substation. Provisions are made for adding four 2-way channels later. Also, each voice channel can carry 18 teletype, telemetering, or control channels. Parabolic antennas at the sub-station are mounted on a 250-ft. tower.

WHAT'S NEW THIS MONTH

1. FM Communications Vs FM Broadcasting 2. About 16-mm. Projectors
3. Television in England

1. The success of FM for communications, now involving over 10,000 fixed stations and more than 200,000 installations in automobiles and commercial vehicles, shows up in interesting contrast to what has been going on in the field of home broadcast reception.

To go back a few years: when we started to publish the Registry of Radio Systems, each listing included the letter A or F to show the type of modulation employed. Since the war, however, FM has been used exclusively for new installations, and practically all the old AM systems have been replaced by FM.

Experience has demonstrated the superiority of FM to the point where AM is no longer used in services involving the protection of life and property and the maintenance of essential public services. And we have dropped the letter designations of modulation from the Registry in this issue because there are virtually no A's left!

The 1949 figures on home radio sets tells a different story. About 900,000 FM sets were produced, against some 6,500,000 AM models. We hear that television has hurt FM sales, but people haven't stopped buying audio receivers. Why, in the last year, audio set sales exceeded TV three to one.

Nor is there any lack of FM program service. There are FM stations in 138 of the 150 principal retail markets in the USA, while television broadcasting is available in only 44 of those markets.

Why, then, with ample stations to furnish programs, and a continued demand for audio receivers, has FM failed to replace AM in the broadcast field as it has done already in communications?

We know that the transmitters used in both services meet the highest standards of radio engineering. But how about the receivers? Do communications receivers have something that home sets lack? It isn't audio quality, for they are designed to attenuate sharply above speech frequencies. No, the difference lies in three other factors. These are: 1) high sensitivity, 2) effective limiting, and 3) the use of an adequate antenna, even though for mobile reception it is only a whip.

In contrast, except for Zenith and REL models and several makes of chassis for custom set-builders, FM home sets employ makeshift circuits of low sensitivity. They do not have effective limiting. And they are not supplied with antennas equivalent even to a whip.

Strangely enough, while so much has been accomplished to improve communications by implementing the replacement of AM with top-performance FM equipment the manufacturers have, with the exceptions noted above, taken an attitude of passive resistance toward doing the same kind of a job for audio broadcast listeners.

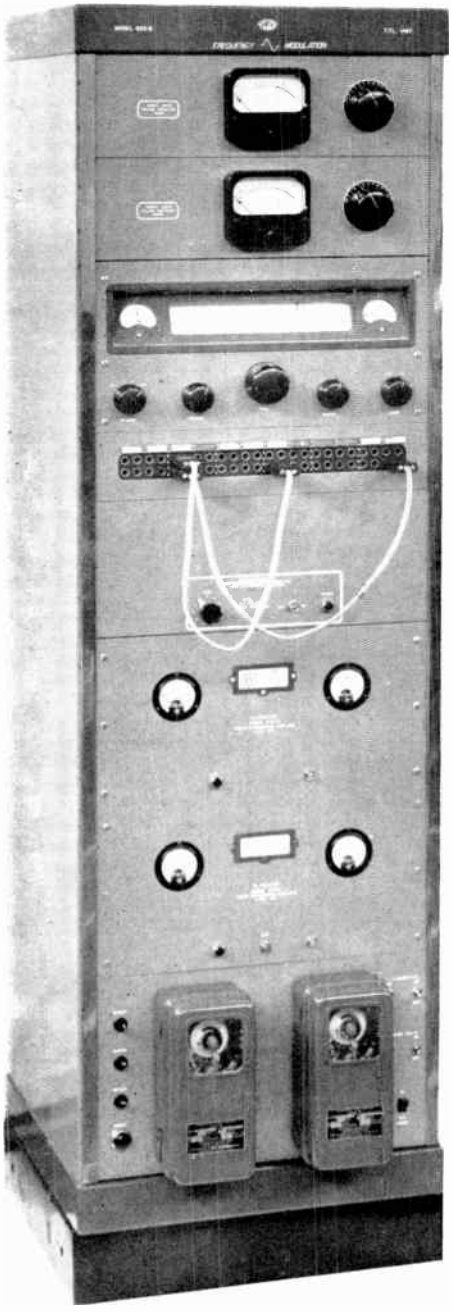
The sale of FM sets with high sensitivity and effective limiting is increasing steadily, nevertheless, and at a rate that certainly warrants the continuation of FM broadcasting on a nation-wide scale. There have been some deflections by the faint-hearted, but they will not be missed.

Ultimate conversion to FM will come to broadcasting as surely as it has to communications, and for the same, sound reasons, albeit at a slower rate.

For fifteen years, FM has been disproving dire predictions by the prophets

ACKNOWLEDGED STANDARD OF FM PERFORMANCE

A Truly Universal FM Receiver



$345 646-B ONLY, WITH 19-IN. PANEL OR IN METAL CASE

OF all radio receivers, only the REL 646-B is equally at home in research laboratories, broadcast stations, and private residences. You might say that it is a highly versatile piece of scientific apparatus. You'd be equally correct in calling it a home receiver of such precision design that it is also used in Government, college, and commercial laboratories, and sound studios.

The particular 646-B in the accompanying illustration—third panel down from the top—was installed as a repeater in an FM radio relay station. But it might have been shipped to the home of a listener who had decided to own the finest receiver that money can buy.

The most amazing things are done with these REL receivers. Sound studios and broadcast stations use them for off-the-air-disc and tape recordings of live talent shows carried on FM. In private homes, too, an increasing number of people use the 646-B with a Magnecord tape unit to record and play back radio programs, or to record speech and music from a microphone in their own homes.

Many people who have these receivers and special speaker installations are now using them in place of the audio circuits in their television sets. Others buy TV chassis, such as the Radio Craftsmen type, with require external audio amplification. The 646-B has the necessary connections and a switch at the left of the panel to change from FM reception to any source of external modulation.

Sales records show that these receivers are also going into a great variety of installations for hotels and other public buildings where both static-free FM reception and recorded music are required. The 646-B delivers 10-watts of clean audio output. If additional power is necessary a Brook, McIntosh, or other power amplifier can be added. Such a system is ideal for driving a Klipschorn, or any of the other extra-quality speakers.

Sometimes we are told: "The REL receiver costs a lot more than any other." Well, while you are making comparisons, try lifting each receiver with one hand. Be careful of the 646-B, though. It weighs 35 pounds!

If you are handling equipment of this quality, either as a dealer or a professional custom set-builder, write for information as to the trade discount and deliveries.

FM THE ARMSTRONG SYSTEM
LICENSED UNDER ARMSTRONG PATENTS

RADIO ENGINEERING LABORATORIES, Inc. 35-54 36th STREET, LONG ISLAND CITY 1, N. Y.

WHAT'S NEW THIS MONTH

(Continued from page 6)

of gloom. On Christmas Day, at the church in our little village, we heard the reading of the text: "The light is still shining in the darkness, for the darkness has never put it out." But instead of the sermon, we seemed to hear the words: "— — visionary development — — a receiving set of 57 tubes — — utterly impractical." Then we made a mental note to remember that we are expected to forget about the radio business for at least one hour each week!

2. Following the publication of our December issue, we received a letter from John A. Maurer, president of J. A. Maurer, Inc., asking us to assist him in correcting a "regrettable mistake" in his company's advertisement which appeared last month on page 8, under the caption "Another Big Step Forward."

When we re-read the advertisement, mindful of the poor-to-awful quality we have heard on so many of the 16-mm. films used for television, it seemed to us that the copy was entirely in order. However, we know John Maurer to be a stickler in matters of engineering ethics to the same degree that precision is represented in products which bear his name. Accordingly, we are pleased to publish the following, quoted from a letter which Mr. Maurer sent us on December 6, 1949:

"The advertisement in question related to a new type of multiple, variable-area 16-mm. sound track recently introduced by us. It contained the statement that when this type of sound track is reproduced on a projector which has its reproducing light beam rather badly out of adjustment, the distortion that results is much less than would be obtained with the types of variable-area track that have been in general use. Unfortunately the distortion figures given, which relate properly to percentages of *intermodulation* distortion, were stated simply as *per cent* distortion (about four times as bad, if interpreted as I believe most engineers would interpret such a statement). The copy was written in such a way that the reader might draw the conclusion that this very poor performance was characteristic of 16-mm. projectors in general. Because of one of those unusual combinations of circumstances that seem to arise when a mistake is afoot, the copy for this advertisement was not submitted to me for approval, and it was only by accident that I saw a proof of the plate on the very day that you were mailing *FM-TV* Magazine. I instructed our advertising agency to make every effort to make the proper changes, and succeeded in doing so in several other magazines that were later in going to press. We feel

(Concluded on page 9)

Professional Directory

WHAT'S NEW THIS MONTH

(Continued from page 8)

very much embarrassed that this blunder occurred, and we will be most appreciative of your bringing our apology and regrets to the attention of the manufacturers whose products may possibly be involved, and to their customers."

3. If you are interested in audio and video equipment manufactured in England, you may want to send for catalogs and literature. It's advisable to send a 25c money order to cover mailing charges. U. S. stamps, of course, can't be used in England. Some of the principal concerns are listed here:

Pye Ltd., Radio Works, Cambridge
Marconi's Wireless Telegraph Co. Ltd., Marconi House, Chelmsford, Essex
A. J. Balcombe Ltd. (Alba), 52-58 Tabernacle St., London, E. C. 2
Decca Record Co. Ltd., 1-3 Brixton Rd., London, S. W. 9
Ferguson Radio Corp. Ltd., 105 Judd St., London W. C. 1
Ferranti Ltd., Hollinwood, Lancashire
Philips Electric Co. Ltd., Century House, Shaftesbury Ave., London W. C. 2
Rengentone Products Ltd., Eastern Ave., West, Romford, Essex
Radio Gramophone Development Co. Ltd., Bridgnorth, Shropshire
Vidor Ltd., West St., Erith, Kent
Ambassador Radio, Hutchinson Lane, Brighouse, Yorkshire
Ekco Works, Southend-on-Sea, Essex
Kolster-Brandes Ltd., Footscray, Sidcup, Kent
Murphy Radio Ltd., Welwyn Garden City, Hertfordshire
Romac Radio Corp. Ltd., The Hyde, Hendon, London, N. W. 9
Scophony Baird Ltd., Lancelot Road, Wembley, Middlesex
A. C. Cossor, Ltd., Highbury Grove, London, N. 5
His Master's Voice, Hayes, Middlesex
Wolsey Television Ltd., 75 Gresham Rd., Brixton, London, S. W. 9
Antiference Ltd., 67 Bryanstone St., Marble Arch, London, W. 1
Belling & Lee Ltd., Cambridge Arterial Rd., Enfield, Middlesex
H. J. Leak & Co. Ltd., Westway Factory Estate, London, W. 3
H. A. Hartley Co. Ltd., 152 Hammersmith Rd., London, W. 6

If you want to keep up to date on the current progress of television and the various other radio activities in England, we suggest that you subscribe to the *Wireless World*, a splendidly edited monthly which has been published there since 1911. The address is Dorset House, Stamford Street, London S. E. 1, and the yearly subscription rate $4.50. You can send your remittance by ordinary U. S. Post Office money order.

Special Services Directory

Introducing THE NEW

POWERSTAT

TYPES 116 and 216

FOR LOADS UP TO 1 KVA

REDESIGNED FOR IMPROVED PERFORMANCE

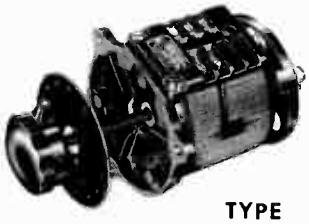
POWERSTAT variable transformers Types 116 and 216 have been redesigned. It wasn't a mere "face-lifting" operation, although a streamlined appearance has resulted. It has incorporated many of your worthwhile suggestions and the latest technical knowledge of variable transformer design and manufacture. All improvements have been made within the old standard mounting dimensions to conform to your existing panel layouts, assuring easy replacement if desired.

JUST A FEW OF THE IMPROVEMENTS

New fusing arrangement employed on cord-plug models. Twist-lock holder on side of terminal box gives easy access and simple replacement • New diecast aluminum terminal box on cord-plug models adds strength and longer service. On all models, the new, extra heavy and rugged terminal board of phenolic plastic prevents breakage. Solder-screw terminals arranged for better spacing for quicker, easier and more positive connections. Barriers between terminals reduce short-circuit hazards • Heavy-duty "ON-OFF" switch on cord-plug models is in a more convenient position to eliminate interference with input cord and output receptacle • Coil and core design provides excellent regulation, high efficiency and conservative rating for both 50 and 60 cycle duty • Polarity identification provided on cord-plug models for requirements involving ground loads.

Ratings of Types 116 and 216 remain the same. Type 116 operates from a 115V., 50/60 cycle, 1 phase source to deliver 0-135V., 7.5 amps. Type 216 has an output of 0-270V., 3.0 amps from 230V., 50/60 cycle, 1 phase. As in the past, the current rating is the current available over the entire range of output voltage. There's no need to refer to a graph to determine the allowable current at a specified value of output voltage.

Write today for complete details on these completely redesigned POWERSTAT Types 116 and 216.



TYPE 116U

For back-of-panel mounting, incorporation in existing equipment.

TYPE 116-2

A ganged assembly for open-delta, three phase or series, single phase connection.

TYPE MT116

A motor-driven unit for push-button remote-control operation.

9010 MEADOW STREET, BRISTOL, CONNECTICUT

THE SUPERIOR ELECTRIC CO.

BRISTOL, CONNECTICUT

SECO

POWERSTAT VARIABLE TRANSFORMERS • VOLTBOX A-C POWER SUPPLIES • STABILINE VOLTAGE REGULATORS

1950

A BACKWARD LOOK TO SEE WHAT CONCLUSIONS CAN BE DRAWN TO SERVE AS SIGNPOSTS FOR FM AND TV DURING THE YEAR AHEAD—*By* MILTON B. SLEEPER

MOST new-year statements of industry prospects are written in the Pollyana vein of high holiday spirit. If they check with the realities of the ensuing months, it is more by accident than intent. That may be best, after all, in an industry as consistently inconsistent as radio. However, there are a few items that must be given serious consideration at this time.

Outcome of the TV Freeze:

It is reassuring to find that the TV freeze has not had any adverse effect on receiver sales. Some ninety stations on the air have provided sufficient public service to enable manufacturers to build set sales, despite freeze conditions, far beyond the level they would have predicted a year ago.

No one can say that set business has been hurt by the freeze. Manufacturers aren't giving much thought to it. They are too busy with production problems. If the freeze continues another year or so, its principal effect will be to increase the potential receiver market in areas where there is no TV service now.

So the only pressure on the FCC is to open up TV for those who are not within range of existing stations.[1] There is nothing to indicate that the FCC is in a hurry to end the freeze. Here is the situation:

The present Commissioners are in the embarrassing position of having inherited an impractical and inoperative plan, set up in 1945 under the administration of Paul Porter. Various accusations have been made concerning the conception of that plan, ranging from maladministration and incompetence to downright dishonesty.

Chairman Coy could assume the burden of his VHF inheritance, but it has become more evident that there is no direct way out of either the administrative or engineering entanglements. Also, it has become more certain that the present chairman will not try to find temporary expedients.

Since administrative decisions must be based on engineering information, and must be patterned after the technical progress of the television art, it is only reasonable for the FCC to put pressure on the manufacturers to accelerate their UHF research and field testing and, meanwhile, withhold any action that might add to the accumulated errors.

In short, rather than acting now to patch up the VHF situation, the FCC may let it ride until such time as the industry can prove that it is ready to use the UHF band. When that time comes, UHF propagation data will be available in such detail that the possibilities and limitations of that band will be thoroughly understood by all concerned.

Meanwhile, VHF service will continue, but eventually, with UHF channels to provide virtually nation-wide service, a crossover point will be reached beyond which VHF television may be superseded by the higher band. This may be an oversimplification, but it probably follows the course of present FCC thinking.

UHF Television Standards:

There is logic in the argument that UHF transmission standards should be the same as those already established, but it is backward-looking logic. It does not stand up in the light of public demand as it is being expressed by the current purchase of receivers.

In terms of scientific progress, our VHF standards are obsolete now. It must be remembered that the first public demonstrations of reception with the cathode-ray tube were made in 1935. That was with 343-line images. The following year, an RMA committee started work on television standards, and their work was completed in 1940, except for agreement as to the number of lines. NBC's first scheduled broadcasting, initiated on April 30, 1939, employed 441 lines. However, on March 8, 1940, the National Television Standards Committee settled on 525 lines, and commercial broadcasting under the present standards was authorized by the FCC effective July 1, 1941, five months before this Country entered the war.

Those standards did not anticipate the benefits that would accrue to television through the intensive development of radar equipment, and large cathode-ray tubes. The experience of the men who set them up was limited almost entirely to 5-in. picture tubes, producing images 3 by 4 ins. Only a few 12-in. tubes had been produced on a model-shop basis. It seemed then that the 7-in tube would become the popular size.

Now, let's look at the picture-tube situation as disclosed by the RMA report for the third quarter of 1949. During 1948, only 6 per cent of the tubes sold to manufacturers were 12 ins. or more in size, but they amounted to 65 per cent in July, August, and September 1949. The largest class was 12 to 13.9 ins., constituting 44 per cent of the total production, but tubes 14 ins. and larger accounted for 21 per cent. This trend of public preference will continue, and it is probable that the 16-in. tube will be the most popular size in 1950.

While 525 lines are enough for 7-in. tubes, no one wants such small images any more. But to get any real benefit from 16-in. tubes and projection types, viewers must have a correspondingly larger number of lines.

The Commissioners may saddle UHF television with the old standards. But if they do, they will pin the art down to its prewar limitations.

FM Broadcasting:

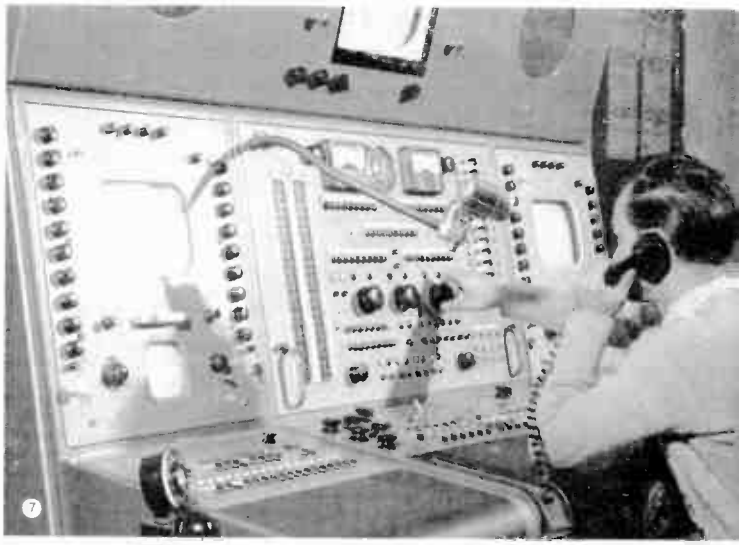
Some AM stations seem quite oblivious to the fact that they have FM affiliates. For example, WOR announces on FM: "This is station WOR, 710 on your dial!" And when WOR ran full-page newspaper announcements of its World's Series broadcasts on AM and TV, there was no mention of FM, although the Series was also carried on its FM transmitter.

There are a few orphans among the FM stations owned by newspapers, too. As a case in point, we asked publisher Robert Choate why his Boston *Herald* and *Traveler* station WHDH-FM is never mentioned in display advertising of WHDH. In reply, he said that WHDH-FM is always listed on the program page of both papers, and he sent us a clipping of the fine-type, one-line listing to prove it. However, he didn't mention the display advertising about which we had inquired. And we noticed that even his letterhead, although it carried "WHDH 850 on Your Dial," had nothing to indicate that there is an affiliated station WHDH-FM.

In its issue of December 5, our esteemed contemporary *Broadcasting* warned: "With big AM outlets starting to shed FM affiliates as bad investments, feeling grows that proposed FCC rule requiring increased FM operating hours may result in hearing that could spell life or death for entire FM industry by bringing into limelight sources of its troubles."

(Continued on page 37)

[1]The distribution map of TV stations in relation to the 150 principal retail markets was shown in the *FM-TV* Management Bulletin No. 6. A few copies of this map are still available without charge. Address: Charles Fowler, Business Manager, *FM-TV*, Great Barrington, Mass.



1949 TV PROGRESS

A PICTORIAL REPORT ON THE LATEST TYPES OF TRANSMITTERS & RECEIVERS

THE photographs on this page have been assembled to indicate the state of progress achieved by television at the end of 1949. While the public acceptance of TV was firmly established in the preceding year, it was put to the severe test of surviving the FCC's freeze order that became effective on September 29, 1948, and came out at the end of '49 with a fine record of accomplishment, its future definitely assured.

Just what that future holds, no one can presume to know now. However, industry management and engineering should have accumulated sufficient experience with all phases of television to chart the next stages patiently and wisely.

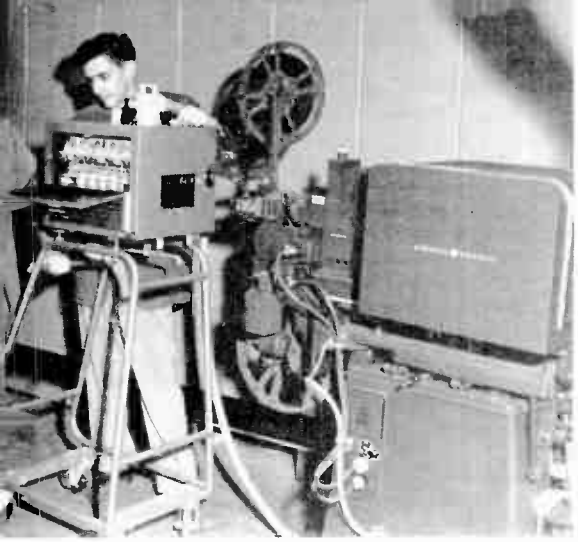
Following are brief notes on the illustrations herewith:

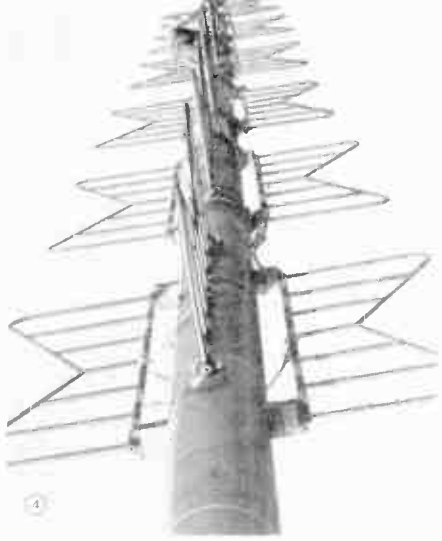
1. The use of film for TV program production and as a means of distributing programs has come into greatly increased use. Film equipment is now an essential part of TV station facilities. This view shows a film camera control being installed at WXEL, Cleveland. William C. George is WXEL's engineering supervisor.

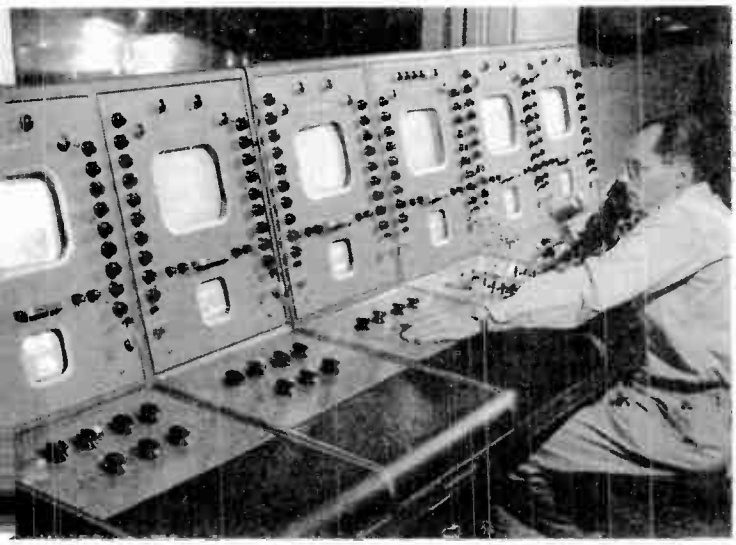
2. The film projection setup at WXEL. Duplicate cameras and projectors are used here.

3. General Electric's model 4PC2B2 television film camera used with a 16-mm. motion picture projector. This camera is equipped with a new type of preamplifier.

4. The elements of a TV antenna seem very small when viewed from the ground. Their actual dimensions can be







gauged from this unusual picture, where an engineer can be seen at the fourth bay.

5. WRGB Schenectady, one of the pioneer TV stations, went on the air November 10, 1940. Now it has completely new equipment. This picture shows the audio section of the master control room where C. M. Lewis, in telephone contact with the audio director, monitors the signal level during a broadcast.

6. Master control desk at WRGB. Robert Gutshall, left, handles the audio part of the show; technical director Paul Andrews is responsible for the visual appearance of the picture, and Ted Baughn directs the program on the studio floor.

7. TV picture quality is controlled at this master control panel, where the transmitted picture is monitored.

8. This six-section shading desk has three picture monitors connected with three studio cameras, two monitors for film and slide projection cameras, and one to show the final picture.

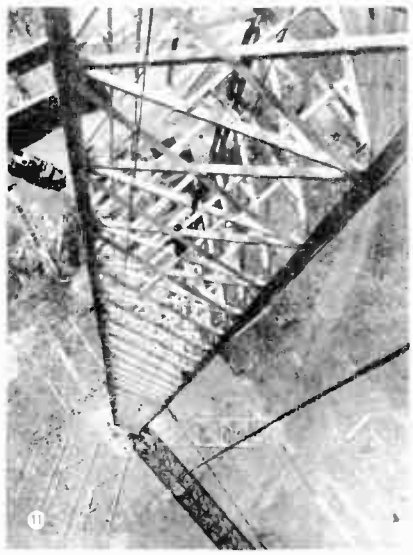
9. The studio at WRGB during a recital by Isabel Dunagan, showing the new cameras in action. About $300,000 have been spent to modernize this station.

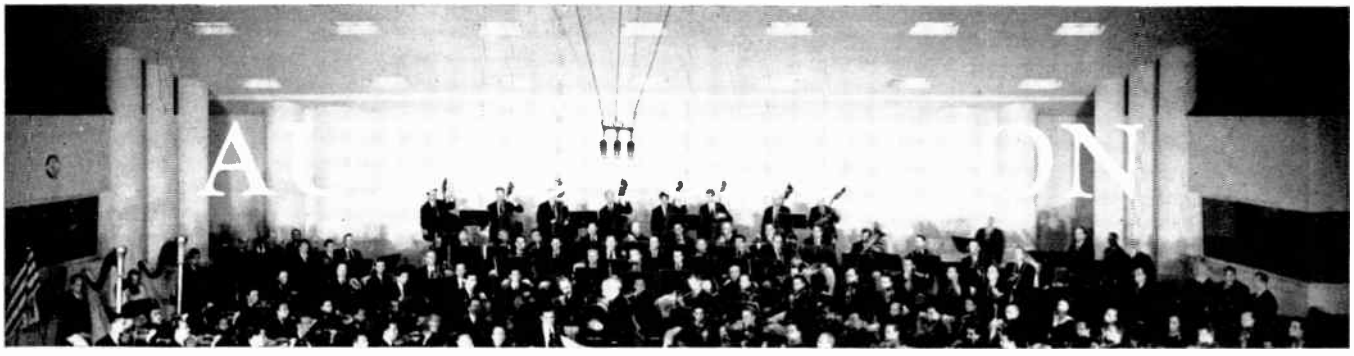
10. A television receiver installation that offers some interesting ideas for custom set-builders. This can be seen at Sylvania's Lighting Center, 500 Fifth Avenue, New York.

11. BBC is completing a 750-ft. FM-TV antenna tower at Sutton Coldfield, near Birmingham, England. As the two close-up views show, the 100-ton steel structure is pivoted on a 2-in. steel ball, so that it can sway in the wind. This station will carry programs relayed from London.

12. Patients at the Army Station Hospital at Fort Jay, on Governor's Island, New York, get their TV entertainment over a Guest Television installation using equipment produced by Industrial Television, Inc.

13. Units of the ITI system are controlled from the monitor receiver, shown at the left. At the right is one of the 10-in. portable units that can be plugged in wherever it is required.





A NEW SOUND-EFFECTS CONSOLE

IT CAN PROVIDE SOUND EFFECTS FOR VIDEO AND AUDIO PROGRAMS WHICH ARE BEYOND THE CAPABILITIES OF ORDINARY TURNTABLES—*By* EDWARD BEAL*

VIDEO broadcasting has brought with it the need for more elaborate sound-effects facilities than have been available in the past. The variety of entertainment offered by TV calls for more versatile installations, and the fidelity of TV's audio section calls for more accurate, realistic sound effects. And audio broadcasting, especially FM, today requires better sound-effects than ever before.

Gray Research has recently introduced a sound-effects console, illustrated on these pages, which is designed to meet these needs. The three turntables visible in Fig. 2 are made continuously variable in speed from 10 to 130 RPM. Four transcription pickup arms are provided, so arranged that two arms can be placed simultaneously on any one turntable. Each pickup head has a built-in light which illuminates the record surface, assisting in the accurate placement of the stylus on required section of the record to be played.

The provision for using two pickups on one turntable in advantageous in many ways. With a single engine-noise record, for instance, the illusion of two dogfighting aircraft can be created easily, since the sounds picked up by the two arms will be out of phase. For continuous background noise, such as that of a waterfall, the second arm can be placed on the record as the first is approaching the center or end. This procedure can be repeated for as long as the noise is desired.

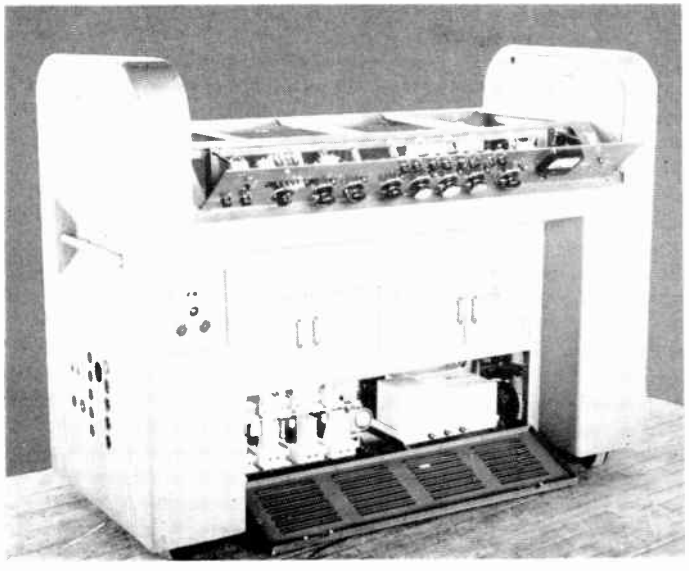
Circuit Description:

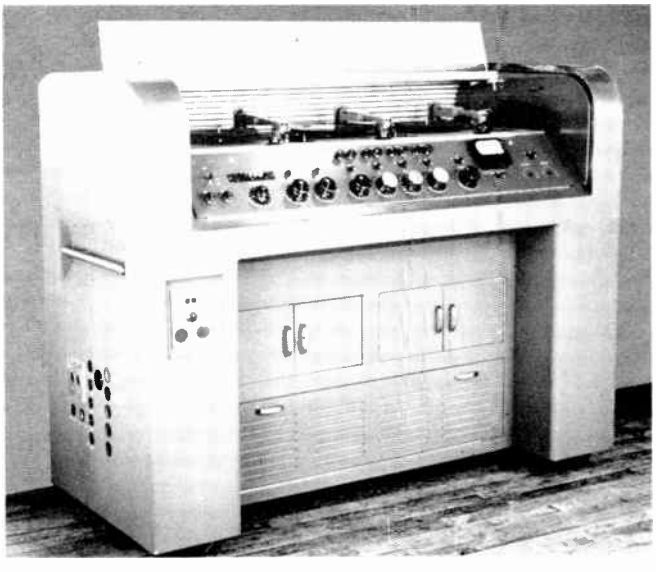
Fig. 3 is a block diagram of the console. Six input channels are available, to be used singly or in any combination. Each pickup arm has its own amplifier and volume control, and controls for adjusting the individual variable equalizers. On-off switches are also provided for each channel, so that the separate filters and gain controls can be pre-set and any channel switched in at the proper time. Two input channels can be fed from outside microphone sources. Connections for these are built in at the end of the cabinet. They are visible in Fig. 2.

The input channels are mixed and the composite signals fed through a common high-fidelity amplifier to a second set of high- and low-pass filters. These filters can be bypassed, if desired, as shown in Fig. 3. After passing through the master volume control and a final amplifier, the signals are brought to the output receptacle at the end of the cabinet. Normally, the output is taken from there and fed to the audio section of the transmitter. However, as will be explained later, this is not always done.

It will be noted that the system is lavishly provided with on-off switches. These are key switches, of the rotary make-and-break type. In the input channels, they are used to assure smooth transitions from one channel to another.

*Electronics Engineer, Gray Research and Development Co., Inc., 16 Arbor Street, Hartford 1, Conn.





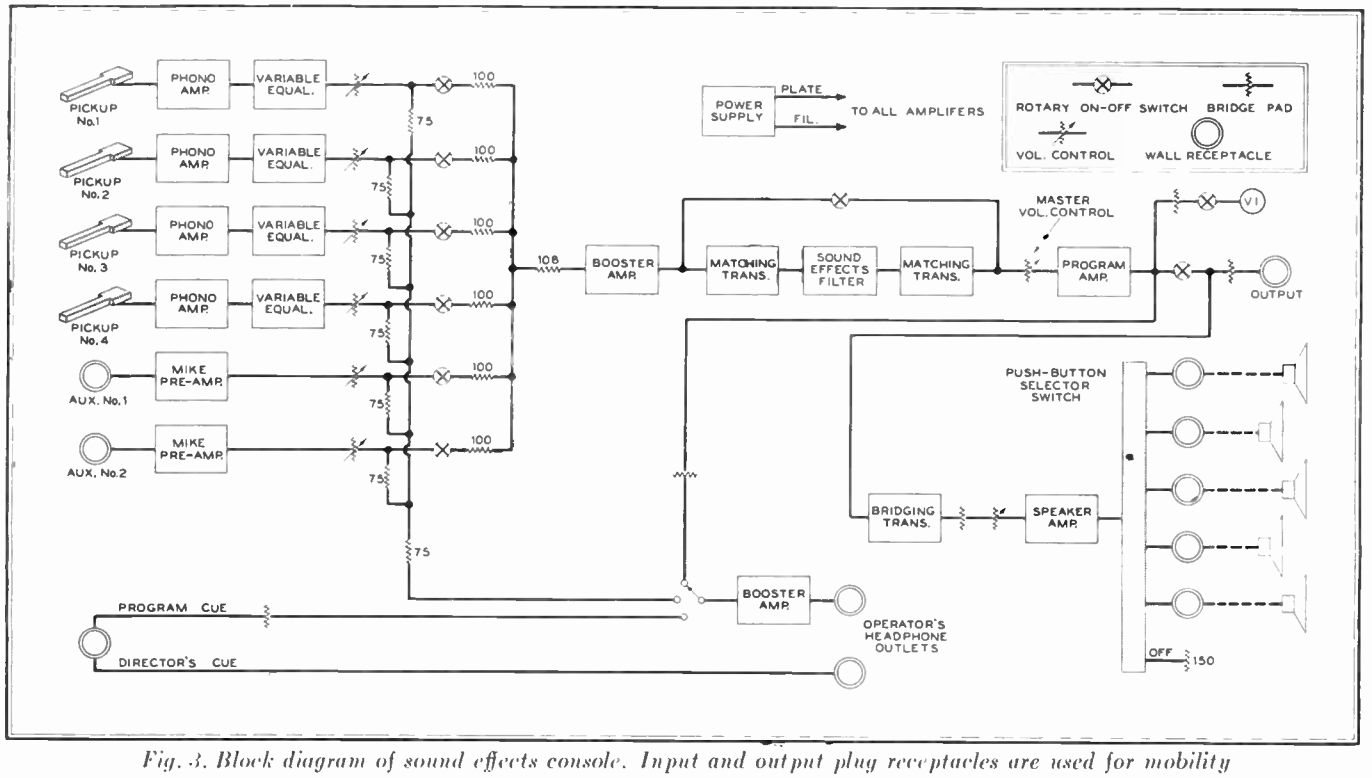


Fig. 3. Block diagram of sound effects console. Input and output plug receptacles are used for mobility

For instance, when changing pickup arms on one record used for continuous background noise, the second arm is placed at the outer edge of the record and cut in by its switch after tracking begins. Special sounds from another channel, too, can be added easily at just the right moment by turning the switch for that channel, rather than lowering and removing a pickup arm.

Occasionally, a script calls for heavy explosive sounds. They can be obtained by using the master switch, directly after the program amplifier, Fig. 3, and the master volume control. The master switch is turned off, the proper record is put on a turntable and tracking begun with the amplifiers set at high gain. At the director's cue, the master switch is turned on, suddenly throwing the sound on the air and giving the impression of a sharp, tremendous explosion. The volume control is turned down gradually to fade the sound.

Volume levels at the output of the console can be determined precisely by the VI meter. The meter is left normally in the circuit, but can be switched out if necessary.

A speaker amplifier is included so that actors can hear the sound effects for their own cues. The signals go through a separate volume control to a power amplifier capable of feeding up to five speakers simultaneously. A push-button selector switch permits connection to any combination of speakers used in the studios.

Normally, these speakers are operated at just enough volume to be heard by the actors but, if desired, the volume can be increased sufficiently to permit pickup by the studio microphones, thus eliminating the need for direct feed to the audio section of the transmitter.

Fig. 4 is a rear view of the console, with the wiring and circuit elements exposed. Terminal boards and preformed cables are used extensively for easy accessibility and repair. Amplifier units plug in, so that a complete amplifier can be removed for servicing while its duties are performed by a spare. Bridge pads, as seen in Fig. 3, are used to keep impedances constant, and to permit the volume levels of the output circuits to be varied independently.

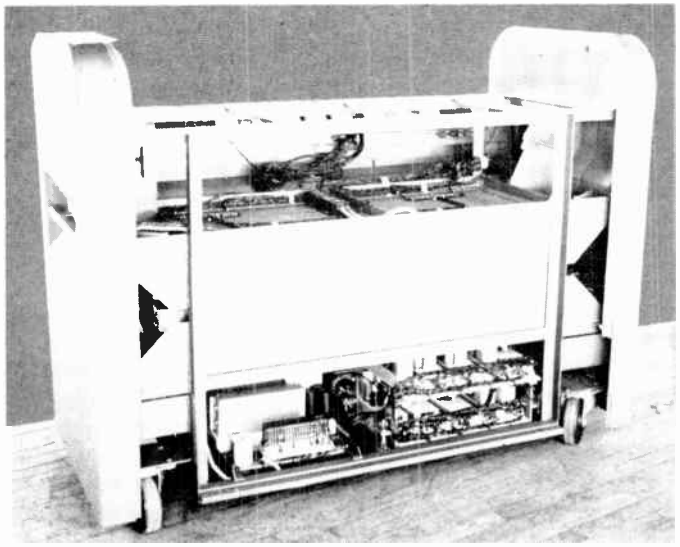


Fig. 1. The hinged control panel and access doors facilitate maintenance. Fig. 2. The console assembled, showing the turntables and 3 of the 4 pickups. Fig. 4. A rear view of the console reveals the orderly assembly of parts.

Operator's Cue:

The console operator's cues are brought to him in the same headset he uses for monitoring purposes. One earpiece is used for the incoming director's cue alone. He can switch his other earpiece to any one of three sources: the complete program as it is being sent out on the air, for program cuing; the mixed signals from the sound-effects input channels; or the output of the sound effects console.

It should be noted that the last two sources mentioned are for monitoring alone, and that both are taken from points located in the circuit just before on-off switches. This can be verified from Fig. 3. Not only can the operator monitor his sound effects as they are sent on the air, but he can hear them before he switches them in. In this way, he can

(Concluded on page 37)

SPOT NEWS NOTES

NOTES AND COMMENTS ABOUT SIGNIFICANT ACTIVITIES OF PEOPLE & COMPANIES

More TV Programs:

Effective December 5, the Du Mont network has added two hours of programming from 2:30 to 4:30 P. M. on Mondays through Fridays over the AT & T cable and by tele-transcriptions to affiliated stations. Those already airing these added program hours are WTVN Columbus, WXEL Cleveland, WJBK Detroit, WSPD Toledo, WHIO Dayton, WJAC Johnstown, and Du Mont stations WABD New York, WTTG Washington, and WDTV Pittsburgh.

New Idea for Transit Radio:

Theatres and amusement places have found commercials timed to reach late afternoon and early evening riders highly effective for increasing attendance. Transit Radio, Inc., has 24 such accounts.

Color Hearing Delayed:

Demonstration by Color Television, Inc. has been postponed from February 6 to 20; second comparative color demonstration has been put forward from February 8 to 23; and resumption of direct testimony, scheduled to start February 13, will not begin until the 27th.

Night Watch Patrol:

One of the big uses coming up for the low-power, hand-carried radio telephone units is for night watchmen, so they can report fires, thieves, or other trouble without a moment's delay.

Use of TV Sound Channels:

To clarify rules on sound transmission separate from video programming, FCC has proposed an amendment specifically prohibiting the transmission of music or any FM or AM program with a test pattern or clock for the purpose of demonstration, sale, receiver installation, or antenna orientation.

BBC Gives FM Green Light:

Following the successful broadcasting of FM programs from an antenna on the TV tower at Alexandra Palace, London, the British Broadcasting Company has decided to extend FM transmission as rapidly as possible. Sir Noel Ashbridge, BBC director of technical services, is reported to be an enthusiastic advocate of FM broadcasting.

Components Company Purchased:

Entire outstanding stock of Electrical Reactance Company has been bought by Aerovox Corporation. ER will be operated as a wholly-owned subsidiary, under the continued management of president Charles Krampf and his executive staff.

"I just have to listen to Mel Bromo when I mix my cake and my radio's just quit."

Microwave Equipment:

Relay systems operating at various frequencies from 450 to 6700 mc. are being manufactured or are in the process of development at Federal, General Electric, Link Radio, Motorola, Philco, Raytheon, RCA, and REL. This equipment is intended to handle speech and control circuits either where radio offers advantages over wires or carrier current systems by reason of greater dependability or economy, or where topographical conditions make it impractical to use wire lines.

TV at Its Best:

TV has no equal at putting across certain kinds of ideas. A perfect example of television at the level of its greatest effectiveness was the Du Mont network's dramatization of the need for conserving water during the current shortage in New York City.

More Manufacturing Space:

Insuline Corporation of America has taken an additional space of 10,000 square feet for the production of TV antennas and accessories.

WBRC-FM Hangs Out Crepe:

Although Mrs. Eloise Hanna, operator of the 546-kw. Birmingham station, said last summer that operations would soon be in the black, the transmitter has been closed down. Reason: "Consistent with the policy of the Birmingham Broadcasting Company of serving the people of Alabama, it was decided that it was in the public's interest to concentrate all efforts on WBRC and WBRC-TV." Solid-coverage radius of WBRC-FM was over 200 miles.

Coaxial Line From England:

By using a new type of insulated bead, capacity and attenuation have been substantially reduced in 7/8-in. coaxial lines manufactured by Transradio, Ltd., 138A Cromwell Road, London S. W. 7. One type is rated at 4.3 mmf. per foot, impedance 231 ohms. A 73-ohm type is rated at .65 db per 100 ft. at 100 mc. and 1.5-kw. loading, and another at .78 db with 2.3-kw. loading.

Largest FM Net Contract:

Kaiser-Fraser will spend over $50,000 for 5-day, 15-minute program series on FM stations WFDR New York, WVUN Chattanooga, KFMV Los Angeles, WDET Detroit, WCUO Cleveland, and WCFM Washington.

Microwaves for R. R. Radio:

Chicago, Rock Island & Pacific is installing Philco FM Microwave relay communications between Goodland and Norton, Kans. This 110-mile stretch was chosen for the first installation because of the high mortality of telephone lines during ice, sleet, and snow storms. Systems will provide one control, one telemetering, and five voice channels.

FCC Hearing on Phonevision:

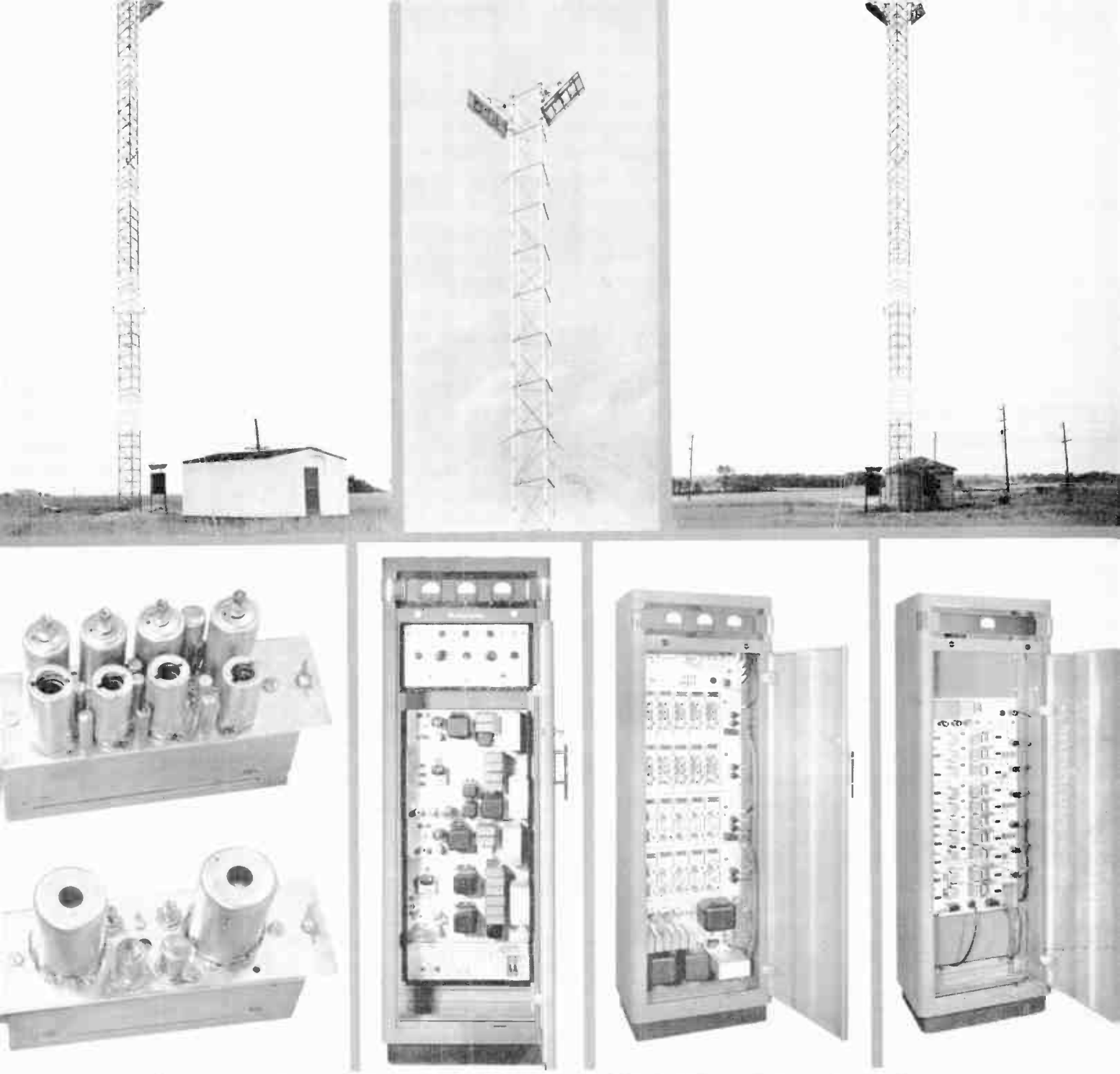
Set for January 16, to consider Zenith's request that TV rules be waived so that a three-month test can be made on a limited commercial basis. To field-test the system, Zenith will put Phonevision sets in 300 homes within 10 miles of the Illinois Bell's Lakeview exchange.

TV Net for New York:

The Albany terminal of AT & T's coaxial cable is now connected by FM radio relay stations to Schnectady, Utica, and Syracuse. From Albany there is a 21-mile hop to Rotterdam, 32 miles to Cherry Valley, 33 miles to Deerfield, and 40 miles to Sullivan. The distance from Rotterdam to Schnectady is 7 miles, from Deerfield to Utica 3 miles, and Sullivan to Syracuse 12 miles.

Better, Smaller Storage Batteries:

Perfection of smaller, lighter storage batteries which do not give off corrosive fumes is claimed by Yardney Electric Corporation, 107 Chambers Street, New York 7. Using silver and zinc as the active materials, Silvercel batteries of .5 to 40 ampere-hours are described as being 66 to 80 per cent lighter and of 50 to 66 per cent less cubic volume than lead batteries of the same capacity. This would make the new batteries ideal for hand-carried FM transmitter-receiver units.



Multiplex FM relay equipment for voice communication, telemetering, and remote control. Upper photos show test installation

NEWS PICTURES

GREAT progress is being made in the development of multiplexed FM point-to-point and relay systems. So far, most of the work has been kept under wraps. However, we can present at this time details of Motorola equipment which handles 10 voice channels, operating on 6,600 and 6,700 mc.

The upper illustrations here show a terminal station, a relay repeater, and a detail of the repeater reflectors. The outdoor cabinet, containing duplicate plug-in transmitter-receiver units, can be seen at the base of the tower in the left hand view. Above the cabinet is a conical dish carrying an upturned parabola, fed by a curved section of waveguide. Microwaves directed toward the reflector are radiated in a horizontal plane.

Of the three racks, that on the left carries the microwave terminal circuits and power supplies. The top panel provides remote control for all functions of the outdoor microwave transmitter and receiver section. Below are four power supply panels, with power switches at the bottom.

The 10-channel multiplex cabinet is shown at the center. At the top is a subcarrier test panel, including a receiver for frequency checking. Next are two rows of five subcarrier receivers, and then two rows of subcarrier transmitters. The power supply section can be seen at the bottom.

The third is the line termination cabinet. There is a voice-test panel at the top, with a 1,000-cycle test oscillator and a 20-cycle ringing-voltage generator. Succeeding panels carry voice terminal circuits.

Detailed views are given of a plug-in FM receiver unit, above, and FM transmitter below. The technique of both telephone and radio apparatus design have been used to make the equipment as nearly fool-proof and as easy to repair as possible.

PRIVACY FOR MOBILE PHONES

DESCRIBING THE MOBILE DECODER UNIT, AND THE SEQUENCE OF OPERATIONS BY WHICH THE FUNCTIONS ARE ACCOMPLISHED. PART 2—*By* J. K. KULANSKY*

DECODER units to operate with the Hammarlund selective system are designed for DC operation in vehicles, or AC operation at fixed points. They can be connected readily with any type or make of radio telephone equipment.

The decoder is a simple and rugged device, employing a mechanism that can withstand all the rigors of mobile service. Even the matter of setting up the code number to which a given unit will respond has been reduced to merely inserting a plug, the pins of which are connected together to establish a given number. This can be changed simply by inserting a different plug.

General Description of Decoder:

Fig. 7 shows the decoder with the cover removed, and the mechanism inside. The dashboard control and signaling unit are illustrated in Fig. 8. This has a buzzer mounted on the under side. On repair trucks, where the driver may be out of the cab at times, an alarm bell or flashing light may be added.

Some systems require the use of a selective-calling on-off switch on the control unit, so that the transmitter can be monitored when necessary. That is the purpose of the toggle switch shown in Fig. 8. Also, an emergency break-in switch can be provided, so that headquarters can be called even though the channel is busy.

Additional views of the decoder are presented in Figs. 9 and 10. The latter shows the top and bottom of the chassis. It is mounted permanently. Then, by means of four Dzus fasteners, the decoder base is secured to the chassis. Connections from the decoder are made to the connectors on the chassis through a 12-pin Jones plug. Fig. 10 shows the male part on the former, and the female part on the latter. Thus, a unit can be replaced without touching the wires to the other parts of the installation.

The code plug can be seen in the left view, Fig. 9, on the left hand corner of the base plate. As will be explained, there are no external connections to the code plug.

Fig. 8. This dashboard unit carries the decoder controls and the call buzzer

Installation of Decoder:

For mobile service, the decoder requires the following connections:

1. Hot side of the storage battery, 5.2 to 8 volts. This operating range exceeds the RMA specifications of 5.5 to 7.5 volts. Standby drain is .45 amperes, and 4 amperes during the selecting operation.

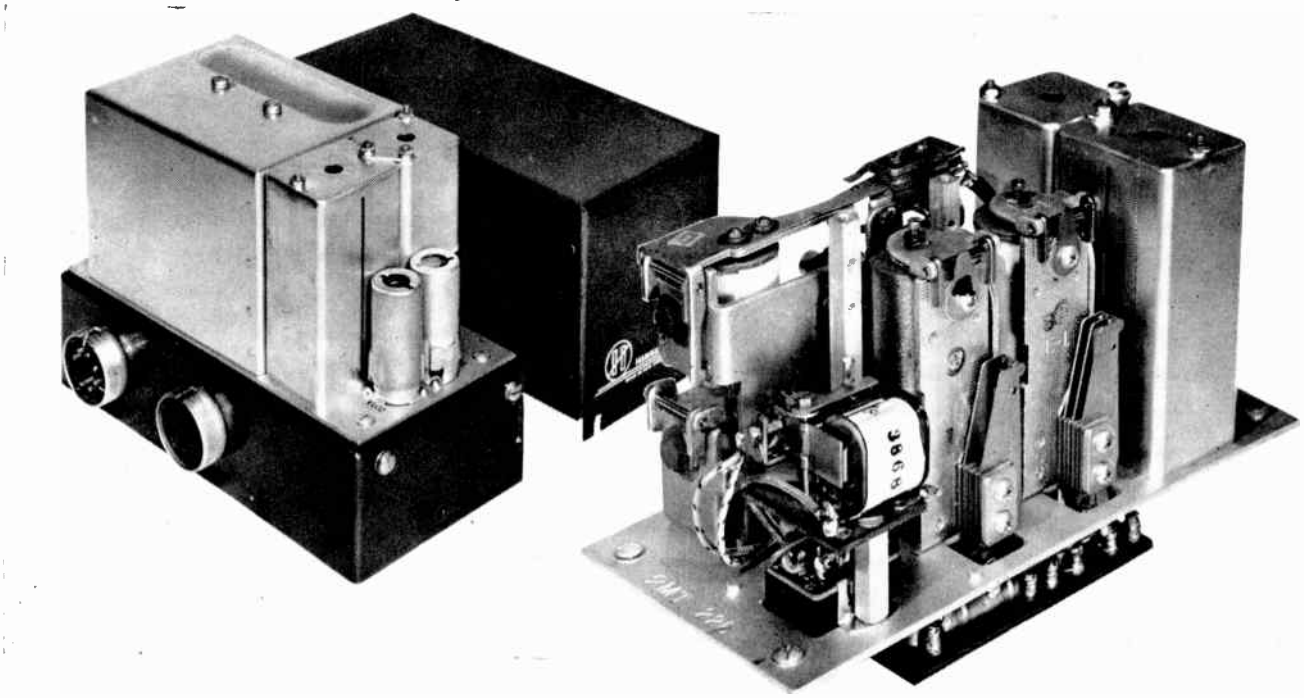
2. Ground connection.

3. B+ 150 to 210 volts. The standby drain is .0053 ampere, and peak selecting drain .01 ampere.

4. Audio connection from the discriminator output of the receiver. At that point, the decoder is not affected by manual adjustment of the volume control, and there is little attenuation of the 3,000-cycle code tone in the de-emphasis network.

5. The audio mute connection to the receiver requires the insertion of a 2-megohm resistor to furnish approximately 75 volts bias on the audio output tube to a point below cutoff under standby conditions. This results in a reduction of 1 ampere in the receiver battery drain.

Fig. 7. Left: the complete decoder with the outer cover removed. Right: decoder chassis, showing the arrangement of the relays



*Mobile Systems Engineer, Hammarlund Manufacturing Company, Inc., 460 West 34th Street, New York City.

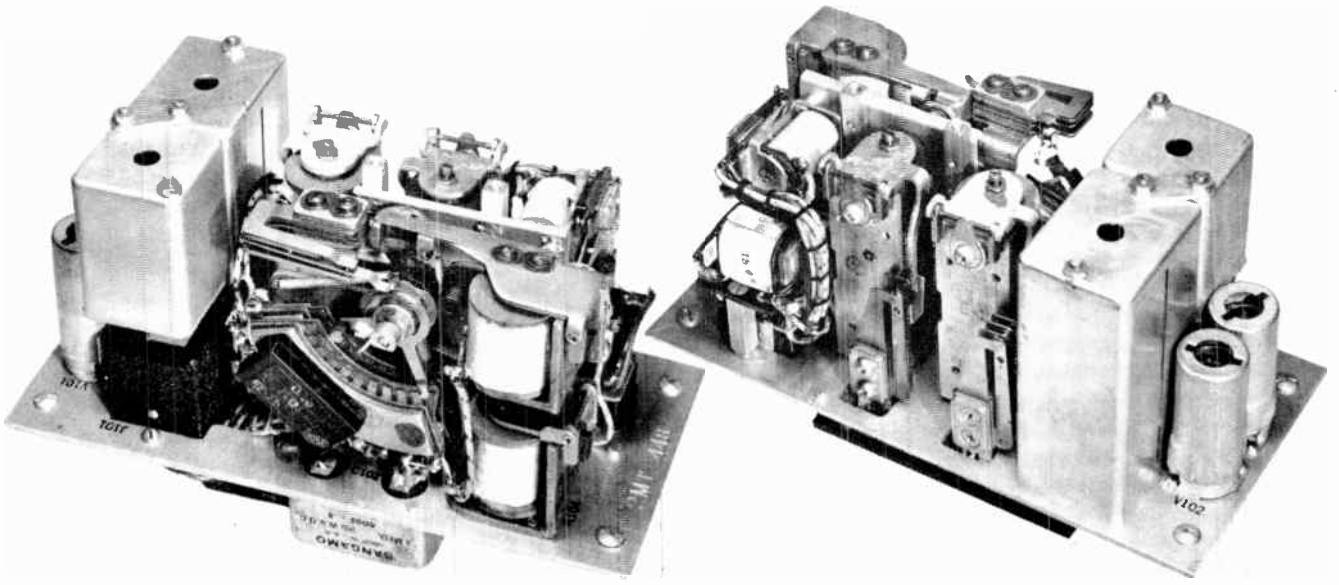


Fig. 9. Additional detailed views of the decoder chassis. The code plug can be seen in the left view, under the small filter case

and a net saving of .5 ampere in mobile installations where the decoder is used.

When the decoder is used for fixed service, the AC-operated power supply, Fig. 11, is required. It furnishes 6 volts and 240 volts DC for the two tubes in the decoder, 6 volts filtered bias, and 6 volts for signal lights and buzzer, call bell, or auxiliary indicator.

To facilitate installation, each coder is supplied with cables cut to the required lengths. Thus, the work can be done very quickly.

Operation of the Decoder:

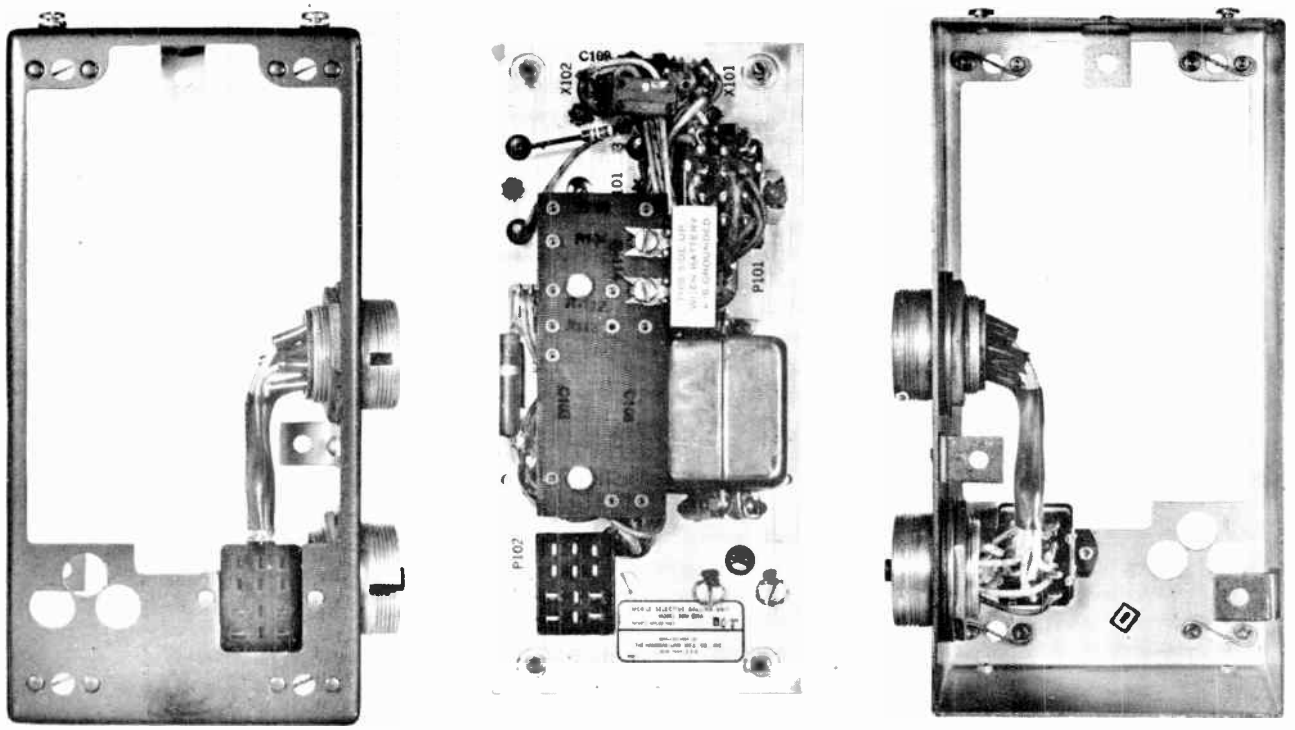
The operating sequence of the relays and stepping switch in the decoder is very interesting, and well worth the time spent in studying the circuit, Fig. 12. Input and other external connections to the decoder are made through plug P2, as indicated in the list of connections.

Signals of 1 volt or more are required from the receiver. They are fed to a high Q, 3-kc. bandpass filter in the decoder unit. If adjacent tone channels are separated by 75 cycles, the crossover attenuation will be more than 20 db in this filter. Also, the bandpass filter and succeeding limiter-amplifier are designed to exclude sub-multiples of higher frequencies. That is done to prevent stray impulses from actuating the decoder accidentally.

From the limiter-amplifier, signals are fed to a multiple bandpass filter network and on to a pulse detector and amplifier which is biased beyond plate-current cutoff. Using an R-C network, any sharp pulses at 3 kc. are suppressed. That is, if they are below 5 volts or roughly 6 db below normal tone-signal level at this point, they will not operate the pulse detector amplifier.

Electro-mechanical selection is started when pulse digit trains set up at the transmitter are finally fed from the output of the detector amplifier to pulsing

Fig. 10. Left: Top side of base, showing the connector for the chassis. Center: bottom of the chassis. Right: under side of base



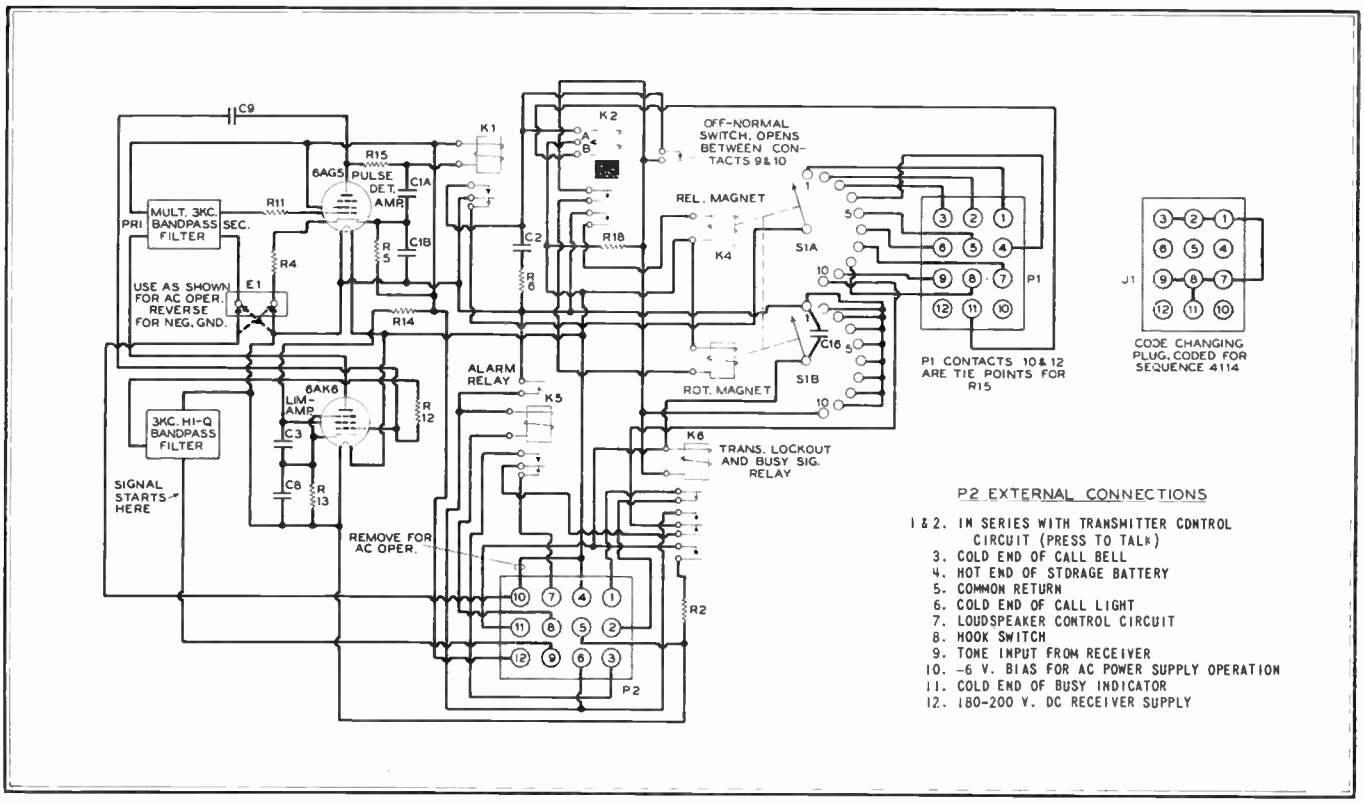


Fig. 12. Complete wiring diagram of the decoder. The code plug, at the extreme right, has pins connected for the code 4114

relay K1. Each time K1 is actuated, the Clare stepping switch is advanced one position by action of the rotary step magnet. When the stepping switch is advanced to the first position, the transmitter lockout and busy-signal relay K6 is sealed in. The busy light comes on at the dashboard control unit, and a pair of contacts on K6 opens the transmitter control circuit.

At the end of each train of digit pulses, the rotary arms of the stepping switch come to a point of rest. If this particular point is a point of rejection, as determined by the code connections in the code jack J1, the B coil of pulsing relay K2 will operate the release magnet of the stepping switch, allowing the wiper arms to return to the normal starting position, as shown at the left in Fig. 9.

A rejection point is one at which the number of pulses of a particular digit is not related to the code number of a particular decoder. As Fig. 12 shows, the rejection points are tied together by means of connections in the code jack, J1, in the circuit between the stepping switch contacts of S1A and the B coil of pulsing relay K2.

Relay K2 is slow-acting, and will not operate when S1A passes a rejection point during the transmission of a digit-pulse train, since it must be energized for at least 100 milliseconds before pulling in. However, it will operate if S1A comes to rest on a rejection point at the end of a digit-pulse train.

A holding point on S1A is one at which the number of pulses of a particular digit is related to the code number of a particular decoder. When a digit-pulse train leaves S1A at a point not interconnected to relay K2 through the code jack, *ie.*, at a holding point, the rotary arm of the stepping switch will remain at the last advanced position, in readiness for the next digit-pulse train.

Fig. 11. AC unit for fixed-station decoder

Since the digits in each code number used in this system always add up to 10, an unbroken chain of holding points at the corresponding decoder will bring that particular stepping switch to the 10th and final position.

At the 10th point, the lockout relay K6 is unsealed, the busy signal light is switched off, and the break in the transmitter control circuit is closed. In addition, alarm relay K5 is energized, and assumes a locked position through power applied from the normally-closed contact on K1, contact 10 on the S1A bank, and the momentary-make contact on K6. This cuts in the call light and buzzer or bell.

Removing the handset from the hook-switch in the car, or pushing the alarm release button on the control box opens the alarm circuit. Relay K5 drops out and cuts off the call light and buzzer or bell. Then K5 closes the circuit of the audio power amplifier on the receiver from pin 7 on plug P2, through a normally-closed contact on K6 to position 10 on bank S1A, and through the normally closed contact on K1 to ground.

At that point, all other mobile units show the busy signal light, and are locked out.

As soon as the conversation has been completed between headquarters and the car called, the headquarters operator presses the reset button on the coder. This transmits a signal of .25 second duration, which energizes coil A of the slow-operating decoder relay K2 in every mobile unit. Then release magnet K4 of the stepping switch permits the wipers of both banks to return to their normal starting position. Also, a short is applied across the coil of lockout relay K6 by the energized contact on relay K1, releasing transmitter lockout relay K6, and extinguishing the busy light. This completes the operating cycle.

Special Systems:

Variations of this system can be worked out to suit special situations. However,

(Concluded on page 37)

JEREMIAH COURTNEY'S* MOBILE RADIO NEWS and FORECASTS

IMMERSED in television and other broadcast matters, it isn't often that any member of the Federal Communications Commission finds it possible to make a detailed review of the problems of an individual industry using radio for operational communications purposes.

Commissioner E. M. Webster therefore established something of a record during the month of November by making a formal address at the annual convention of the American Taxicab Association in Chicago, and another at the annual meeting of the American Petroleum Institute.

The juxtaposition of these two speeches permits a very clear indication of Commissioner Webster's personal approach to the many requests that may be expected from various individual users and industries for exceptions to the frequency allocations framework recently established by the new mobile rules. In both his taxi and petroleum talks, Commissioner Webster addressed himself with admirable forthrightness to the problem that is of so much importance to both industries — that of sharing frequencies allocated to other radio services on a nationwide basis, but not used by those services in particular areas.

This sharing question is of particular importance to the petroleum industry because that industry makes very extensive use of radio communications, and has only 9 frequencies assigned for its use in the desirable 152- to 162-mc. band, all shared with the forest products radio service. Employed in very isolated areas, there is no question that there are many frequencies in that band which could be used by the petroleum industry without interference to any other users.

The taxi industry, with many less frequencies than needed in all congested metropolitan areas, was the original proponent of the secondary service frequency-utilization principle.

Commissioner Webster's remarks on this subject, however, gave neither industry any immediate encouragement. Speaking before the Petroleum Institute, he reiterated his earlier general remarks to the taxicab industry on the subject:

"I would like to mention for a moment the subject of the sharing of the same radio frequencies by two or more users. A number of users are urging us to be liberal in this respect. Under our Rules your service has a limited sharing privilege with several other users and you may well ask, 'Why should we—the petroleum industry—not be permitted to share further the frequencies of some of the other services not operating in our areas?' While sharing either on an equal or secondary basis is a legitimate device for making full use of frequencies, I feel that the Commission must approach the sharing problem with some caution. To allow extensive sharing, especially at this time when no one has enough operational experience to know what the result will be, is to destroy the very beginnings of stability that the present rules and the decision were designed to establish. As experience is gained by all the services, including your own, operating under the rules which we have promulgated, proceedings may be instituted, as the situation demands, to modify those rules so as to allow additional sharing where it is possible to do so without creating chaos in the basic allocation pattern."

Commissioner Webster's views in the non-broadcast field are entitled to the greatest weight and respect, and his statement of personal position is most welcome because it is important to the non-broadcast radio industry to know where he stands on this important point. It is most certainly not in any spirit of quibbling, therefore, that it is pointed out that his sharing fears are predicated on the Commission's allowance of "extensive sharing" without "enough operational experience."

Few will quarrel with Webster's basic thesis that to allow extensive sharing without sufficient operational experience may destroy the stability the new rules were designed to create. But, does that principle strike down the oil industry's use of the four 172-mc. relay press frequencies if an application is presented for their use in the isolated oil fields of Texas or Louisiana, where reporters or photographers are not likely to be cruising about now or in the future? Similarly, does that principle mean that no taxicab company will be permitted to use an unused railroad frequency anywhere in the United States, regardless of the showings of non-use which may be made on the subject?

The recent decision of the Commission on the petition of the four Madison, Wisconsin taxicab operators for temporary railroad frequency use suggests that the Commission is not disposed to examine into the present or prospective frequency-utilization of particular areas. In that case, the four taxicab operators in Madison had asked for the temporary use of two of the unused railroad frequencies so that each of the four operators might have an interference-free channel until the present equipment had been depreciated and replaced with equipment capable of operating on the four taxi channels which are separated by only 60 kc. Although there are only three railroads operating in the Madison area, and no likelihood whatsoever that all the 39 frequencies allocated primarily to the railroad radio service would ever be used there, the Commission denied the request of the Madison operators.

That decision must have been received with some misgivings by the four Madison operators. For the Commission didn't say that sharing couldn't practically be permitted in Madison. Instead, the decision was based on the fact that "the Commission is not prepared at this time to permit the general sharing of railroad frequencies by taxicab operators." Lacking any plan for general taxi sharing of railroad frequencies, the Commission held that "it does not appear feasible to permit isolated sharing plans as requested by the petitioners."

It would appear from the language of this decision that the Commission is not interested in what may be done in Madison unless the same action can be taken throughout the rest of the country.

That outlook on the part of the full Commission with respect to isolated sharing proposals poses for every industry the dilemma presented by Webster's thesis that extensive sharing may imperil the stability the new rules were designed to create. Note the squeeze play: Isolated sharing proposals will not presently be entertained; and neither will nationwide sharing proposals because they imperil the stabilizing effects of the new rules.

The obvious result of the interplay of these two philosophies is a freezing of the present frequency structure and a needless wastage of valuable frequencies in many areas. The importance of this subject requires further discussion. A more fruitful approach to the problem of putting frequency needs and assignments in better balance will be outlined on this page next month.

*1707 H Street, N. W., Washington, D. C.

REGISTRY OF RADIO SYSTEMS, Part 1

COMMON CARRIERS, LIMITED COMMON CARRIERS, PETROLEUM & PIPELINES, INDUSTRIAL, SPECIAL INDUSTRIAL, MOTION PICTURE, AND PUBLIC UTILITIES

PUBLIC SERVICES
COMMON CARRIER

Associated Tel Co Ltd 1314 7th St
Santa Monica Calif
Long Beach Calif — 152.75 — KMA609
158.01 170

Bell Tel Co of Nev 14 New Montgomery
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Reno Nev — 152.63 — W7XQG
157.89 85 W7XQH

Bell Tel Co of Penna 1835 Arch St Philadelphia 3 Pa
Landenberg — 35.66 — W3XAI
35.66 — W3XAO
43.66 100 W3XAQ

Philadelphia Pa — 152.39 152.51 152.63 152.75 — W3XEK
152.39 152.51 152.63 — W3XZF
157.65 157.77 157.89 158.01 260 W3XZG
Harrisburg Pa — 157.89 — W3XMF
157.89 100 W3XMG
Pittsburgh Pa — 152.39 152.51 152.63 152.75 — W3XZD
157.65 157.77 157.89 158.01 290 W3XZE
35.42 — W3XNQ
43.26 43.30 43.34 43.38 43.42 43.54 43.66 100 KA2996
1.9 mi N of Wyoming Pa — 152.63 — W3XIQ
157.89 100 W3X1B

Chesapeake & Potomac Tel 725 13th St NW
Washington DC — 43.66 — W3XAT
35.66 — W3XAV
43.66 50 W3XAW

Chesapeake & Potomac Tel Co of Baltimore City
Baltimore 2 Md 320 St Paul Pl — 43.66 75 KA3639
Fork Md — 35.66 — W3XBE
Baltimore Md — 152.39 152.63 — W3XYI
157.65 157.89 110 W3XYJ

The C & P Tel Co of Virginia 703 E Grace
Richmond Va — 152.39 152.63 — W4XMA
157.65 157.89 130 W4XMB
Norfolk Va — 152.63 — W4XMN
157.89 65 W4XMO

Cincinnati & Suburban Bell Tel Co 225 E 4th
Cincinnati — 152.39 152.51 152.63 — KQA461
152.39 152.51 152.63 — KQA482
157.65 157.77 157.89 175 KA3697
35.42 — W8XDQ
43.42 100 W8XDS

Commonwealth Tel Co 122 W Washington Av
Madison Wis
Marathon Cnty Wis — 35.42 — W9XDA
43.42 50 W9XDC

Diamond State Tel Co 1835 Arch St Philadelphia 3 Pa
Philadelphia Pa — 157.65 157.77 157.89 30 W10XNJ
43.66 30 W10XNK
35.42 — W8XHW
43.42 10 W8XHY

Greenwood Tel Co 212 Hodges Bldg Greenwood SC
Verdery SC — 35.34 — W4XPH
43.34 10 W4XPI

Hathaway Oil Co Inc 501 County St
New Bedford Mass — 43.66 — KA4334

The Home Tel & Tel Co 303 E Barry St
Ft Wayne Ind — 35.42 — W9XML
152.63 — W9XMM
157.89 — W9XMN
43.42 2 W9XMO
157.89 50 W10KAK

Illinois Bell Tel Co 212 W Washington St
Chicago 6 Ill
152.39 152.45 152.51 152.57 152.63 152.69 — W9XIA
157.65 157.71 157.77 157.83 157.89 157.95 500 W9XIH
35.42 — W9XKG
43.42 — W9XKK
157.65 157.71 157.77 157.83 157.89 157.95 — W9XKT
Kankakee Ill — 43.42 — KSA221
2.0 mi E of St Anne Ill — 35.42 — W9XEL
43.26 43.30 43.34 43.38 43.42 43.54 43.66 550 KA3483
2.25 mi E of Sandoval Ill — 35.42 — W9XES
Centralia Ill — 43.42 — W9XET
Marseille Ill — 35.42 — W9XKH
Sangamon St N of Hiway 36 Curran Ill — 35.42 — W9XKJ
Ottawa Ill — 43.42 — W9XKL
Peoria Ill — 43.42 — W9XKM
Peoria Heights Ill — 35.42 — W9XKI
Springfield Ill — 43.42 — W9XKN
5 mi NW of Rockford Ill — 35.42 — W9XNL
Rockford Ill — 43.42 — W9XNM
4.8 mi NW of Champaign Ill — 35.42 — W9XNN
Champaign Ill — 43.42 — W9XNO

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43.42 75 KA2869
Elkhart Ind — 35.42 — W9XEF
43.42 75 W9XEH

Indiana Bell Tel Co 240 N Meridian St
Indianapolis Ind — 35.42 — W9XNP
43.42 80 W10XMU
152.51 152.63 — W9XJE
Evansville Ind — 35.42 — W9XCF
43.42 — W9XCG
157.77 157.89 165 W9XJF

Lima Tel & Tel Co 122 S Elizabeth St Lima Ohio — 152.63 — KQA459
157.89 33 KA3467

The Lincoln Tel & Tel Co 1342 M St Lincoln Neb
Lincoln Neb — 35.54 152.63 — KAA689
48.54 157.89 70

The Lorain Tel Co 203 9th St Lorain Ohio — 152.39 152.51 — W8XFT
152.39 152.51 157.65 157.77 2 W8XFU
Meister Rd nr Lorain Ohio — 35.42 43.42 — W8XHE
35.42 43.42 2 W8XHF

The Mansfield Tel Co 35 West Park Av
Mansfield Ohio — 35.42 152.51 — W8XMA
43.42 157.77 30 W8XMZ
Michigan Assoc Tel Co 840 Terrace Muskegon Mich — 35.42 — W8XCI
43.42 75 W8XCK

Michigan Bell Tel Co 1365 Cass Av Detroit 26 Mich
Detroit Mich — 152.39 152.51 152.63 152.75 — W8XCU
157.65 157.71 157.77 157.83 300 W8XCV
157.89 157.95 158.01 — W8XCV
35.42 — W8XLO
4.4 mi E of Post Office Kalamazoo Mich — 35.42 — W8XJP
Jackson Mich — 35.42 — W8XJR
Lansing Mich — 35.42 — W8XLF
5 Mi NE Grand Rapids Mich — 35.42 — W8XLH
Flint Mich — 35.42 — W8XLQ
Bay City Mich — 35.42 — W8XLS
43.42 225 W8XLU
Port Huron Mich — 35.42 — W8XLM
Sault Ste Marie Mich — 35.42 — W8XOK

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157.77 157.89 200 WØXAF
Phoenix Ariz — 152.63 — W7XOC
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157.77 157.89 4 KA2XAR
Salt Lake City Utah — 152.63 — KOA377
157.89 100 KA3261

Mutual Tel Co 1128 Alakea St Honolulu TH — 152.63 — K6XOI
152.63 157.89 64 K6XME

New England Tel & Tel 185 Franklin St Boston Mass
Haverhill Mass — 152.45 152.57 — KCA207

INFORMATION ABOUT THIS REGISTRY

This Registry is published by authority of the Federal Communications Commission. Information for the systems listed is revised annually from FCC license records at Washington, D. C.

ADDRESSES: Each system listing shows the mail address of the operating company. Also, addresses are given for additional fixed stations.

ABBREVIATIONS: The following abbreviations are used in company names

CEA: Cooperative Elec. Assn.
CPA: Cooperat ve Power Assn.
EC: Electric Cooperative
ECA: Elec. Cooperative Assn.
EPA: Electric Power Assn.
PUD: People's Utility District
REA: Rural Electrification Assn.
REC: Rural Electric Cooperative
RECC: Rural Elec. Cooperative Corp.
REMC: Rural Elec. Membership Coop.

FREQUENCIES: The first figures following each address give the operating frequency of the land station identified by the accompanying call letters. If the station is authorized to use more than one frequency, it is so indicated. If an additional mobile frequency is assigned, it is so listed.

MOBILE UNITS: The second column shows the number of mobile units in the system. The figure is generally opposite the address of the licensee, even though there is more than one land station, since mobile units may be shifted from the area of one land station to another. Call letters for mobile units are not shown separately, for they are usually the same as the call letters of the main station.

CALL LETTERS. It will be noted that many stations have changed to the new call-letter system. In time, all will be changed.

EQUIPMENT: The last column shows the make of equipment used. In some cases, two manufacturers are indicated. Where a system uses equipment from several manufacturers, the names principally represented are given. These are:

B Belmont-Raytheon
C Communications Co.
D Doolittle
E West Coast Elect.
F Federal
G General Electric
H Harvey Radio
K Kaar
L Link
M Motorola
P Philco
R RCA
W Western Elec.
X Composite

Further information about this Registry can be obtained by addressing: Registry Editor, **FM-TV**, Great Barrington, Mass.

Chelmsford Mass — 152.45 152.57 — KCA208
157.71 75 KA2088
Providence RI — 152.51 152.63 — KCA228
35.66 — W1XAZ
43.66 60 W1XBE
157.77 157.89 150 KA2288
Boston Mass — 152.39 152.51 152.63 — W1XAW
157.65 157.77 157.89 158.01 235 W1XAX
35.66 — W1XAY
Worcester Mass — 152.63 — W1XBZ
Springfield Mass — 152.63 — W1XCA
157.89 75 W1XCC
157.89 75 W1XCF

New Jersey Bell Tel Co 540 Broad St Newark 1 NJ
Newark NJ — 152.39 152.75 — W2XFR
157.65 157.77 157.89 158.01 200 W2XFU
Trenton NJ — 35.66 — W2XLC
43.66 80 W2XLE
New Brunswick NJ — 35.66 — W2XMX

New York Tel Co 140 West St New York 7 NY
New York — 157.65 157.77 157.83 157.89 325 W2XAR
152.51 152.57 152.63 — W2XLH
Buffalo NY — 35.66 — W2XHM
152.63 — W2XEP
35.42 35.66 — W2XKS
Bedford Twp NY — 35.66 — W2XHN
43.42 43.66 481 W2XHP
Illinois Mt Lloyd Twp NY — 35.66 — W2XKI
Kingston NY — 43.66 — W2XKJ
Port Chester NY — 35.66 — W2XDV
Guilderland NY — 35.66 — W2XKK
Albany NY — 43.66 — W2XKL
Utica NY — 35.66 — W2XKN
Syracuse NY — 35.66 — W2XKO
Rochester NY — 35.66 — W2XKQ

Northwestern Bell Tel Co 118 S 19th St
Omaha Nebr — 152.63 — WØXCI
157.89 60 WØXCK
Minneapolis Minn — 152.63 — WØXAY
157.89 65 WØXAZ
35.54 — WØXPN
43.26 43.30 43.34 43.38 43.42 43.54 43.66 275 WØXPQ
Des Moines Ia — 152.63 — WØXCF
157.89 50 WØXCH
Duluth Minn — 35.42 — WØXGA
Fergus Falls Minn — 35.54 — WØXOE

Ohio Bell Tel Co 42 E Gay St Columbus 15 Ohio
Dayton Ohio — 152.45 152.57 — KQA440
157.71 157.83 130 KA3305
Ironton Ohio — 35.42 — KQA468
Cleveland Ohio — 152.51 152.63 — W8XCD
157.71 157.77 157.89 180 W8XCE
35.42 — W8XEP
43.42 80 W8XER
43.42 50 KA2695
Columbus Ohio — 152.51 152.63 — W8XDN
35.42 — W8XEN
157.71 157.77 157.89 130 W8XDO
Toledo Ohio — 152.45 152.57 — W8XDT
157.71 157.83 157.89 130 W8XDU
Youngstown Ohio — 152.63 — W8XRA
157.89 75 W8XRC
East Canton Ohio — 152.39 152.63 — W8XWH
157.65 157.89 60 W8XWM

Pacific T&T Co 140 New Montgomery St
San Francisco Calif — 152.51 152.63 — W6XKE
157.77 157.89 165 W6XKF
Los Angeles Calif — 43.38 — W6XNU
Los Angeles Liebre Mt — 35.38 — KMA203
152.45 157.71 — KMA210
Fresno Calif — 35.38 — KMA333
Newhall Calif — 152.45 157.71 — KMA211
Ephrata Wash — 35.26 — KOA226
Portland Ore — 152.39 152.51 152.63 — KOA246
43.26 43.30 43.34 43.38 43.42 43.54 43.66 200 KA2006
43.26 43.30 43.34 43.38 43.42 43.54 43.66 100 KA2118
35.26 — W7XLJ
43.26 100 W7XLL
157.65 157.77 157.89 121 KA2242
Sacramento Calif — 152.63 — W6XAD
157.89 85 W6XAE
35.38 — W6XVD
Del Mar Calif — 152.63 — W6XIZ
Burbank Calif — 152.51 152.57 152.63 — W6XLL
157.77 157.83 157.89 260 W6XLR
35.38 — W6XNT
San Diego (Mt Woodson) Calif — 35.38 — W6XNV
San Diego Calif — 152.63 — W6XQC
Oakland (Round Top Hill) Calif — 152.39 152.75 — W6XRS
157.65 158.01 85 W6XRT
35.38 — W6XVE

San Jose Calif — 152.45 152.57 — W6XSG
157.71 157.83 120 W6XSH
Salinas Calif (11.5 Mi NE) — 35.38 — W6XJM
43.26 43.30 43.34 43.38 43.42 43.54 43.66 250 W6XUQ
Modesto Calif — 35.38 — W6XVF
Coalinga (Joaquin Ridge) Calif — 35.38 — W6XVG
Grapevine Calif — 35.38 — W6XVH
Seattle Wash — 152.39 152.51 152.63 — W7XHR
157.65 157.77 157.89 225 W7XHT
152.33 152.51 152.63 — W7XPT
152.39 152.51 152.63 — W7XPV
Eugene Ore — 35.26 — W7XJF
Salem Ore (7 mi SW) — 35.26 — W7XJH

Southern Bell Tel & Tel 67 Edgewood Av SE
Atlanta Ga — 152.39 152.51 152.63 — W4XLF
157.65 157.77 157.89 100 W4XLG
Charlotte NC — 152.63 — K1A251
Louisville Ky — 152.39 152.51 152.63 — K1A648
157.89 100 KA2198
Miami Fla — 152.39 152.51 152.63 — W4XKU
Birmingham Ala — 152.63 — W4XAM
157.65 157.77 157.89 100 W4XKV
Memphis Tenn — 152.39 152.51 152.63 — W4XKW
157.65 157.77 157.89 125 W4XKX
18 mi E of Louisville Ky — 35.42 — W4XOT
43.42 100 W4XPC
Ensley Ala — 152.63 — W4XLK
157.89 125 W4XLL
Nashville Tenn — 152.63 — W4XOE
157.89 100 W4XOG
Chattanooga Tenn — 152.63 — W4XPJ
157.89 100 W4XPL
Highland Park Tenn — 152.63 — W4XPR
157.89 100 W4XPT
Jacksonville Fla — 152.63 — W4XSO
157.89 100 W4SXQ
New Orleans La — 157.65 157.77 157.89 150 W4XXC
152.39 152.51 152.63 — W5XID
157.65 157.77 157.89 200 W5XIE

Southern New England Tel Co 227 Church St
New Haven Conn — 152.63 — KCA221
157.89 50 KA2229
35.66 — W1XCN
43.66 100 W1XCO
Groton Conn — 35.66 — W1XCM
43.66 — W1XCQ
Hartford Conn — 152.45 — W1XHK
157.71 50 W1XHQ
Bridgeport Conn — 152.45 — W1XSG
157.71 50 W1XSI

Southwestern Assoc Tel Co 505 N Ervay St
Dallas 1 Texas
Hobbs New Mex — 35.30 — KKA284
43.30 75 KA2231
43.30 50 KA2216

Southwestern Bell Tel Co 1010 Pine St
St Louis 1 Mo
Poplar Bluff Mo — 35.30 — KAA337
Oklahomo City Okla — 152.63 — KKA282
35.30 — W5XTU
Dallas Tex — 152.51 152.63 — KKA782
Houston Tex — 152.51 152.63 — KKA819
157.89 75 KA2230
1.2 mi W of Hway 290 11 mi N of Houston — 35.30 — W5XLY
St Louis Mo — 35.42 — WØXBE
St Joseph Mo — 35.30 — WØXEA
Kansas City Mo — 35.36 — WØXEC
Topeka Kans — 35.30 — WØXEE
Emporia Kans — 35.30 — WØXEG
Salina Kans — 35.30 — WØXEI
Wichita Kans — 35.30 — WØXEK
Joplin Mo — 35.30 — WØXGJ
Springfield Mo — 35.30 — WØXGN
0.75 mi SW Kingdom City Mo — 35.30 — WØXRO
2 mi N Sedalia Mo — 35.30 — WØXSV
Newport Ark — 35.30 — W5XCT
Hope Ark — 35.30 — W5XCX
157.77 157.89 200 W5XIB
157.77 157.89 200 W5XIO
San Antonio Tex — 35.30 — W5XJ
Tulsa Okla — 35.42 — W5XKB
Austin Tex — 35.30 — W5XKR
16 mi N Ardmore Okla — 35.30 — W5XLQ
2.4 mi SW Grand Prairie Tex — 35.30 — W5XLS
0.7 mi SW Eureka Tex — 35.30 — W5XLU
Buffalo Tex — 35.30 — W5XLV
5.5 mi NW Huntsville Tex — 35.30 — W5XLW
Galveston Tex — 35.30 — W5XMA
2.5 mi NW Los Fresnos Tex — 35.30 — W5XMM
3.25 mi N San Manuel Tex — 35.30 — W5XMO
Corpus Christi Tex — 35.30 — W5XMQ
0.5 mi E Pettus Tex — 35.30 — W5XMS
0.7 mi E Campbell Tex — 35.30 — W5XMW
Ranger Tex — 35.30 — W5XMY
6 mi E Big Spring Tex — 35.30 — W5XNE
3 mi N Odessa Tex — 35.30 — W5XNG
3.5 mi NW Elm Mott Tex — 35.30 — W5XNI
2.7 mi NE Temple Tex — 35.30 — W5XNJ
Beaumont Tex — 35.30 — W5XNL
Little Rock Ark — 35.30 — W5XQV
Enid Okla — 35.30 — W5XUQ
Lawton Okla — 35.30 — W5XWQ
McAlester Okla — 35.30 — W5XYT
43.26 43.30 43.34 43.38 43.42 43.54 43.66 1710 W10XEA

United Tel Co 127 N Main st Bellefontaine Ohio — 152.63 157.89 20 KQA651

Upstate Tel Corp of NY 6 Church St Johnstown NY
Fonda (Mohawk Hill) NY — 35.66 — W2XNM
43.66 20 W10XMT

West Production Co Box 1677 Houston Tex
43.26 43.30 43.34 43.38 43.42 43.54 43.66
158.09 157.89 157.77 25 KA2400

The Western Union Telegraph Co 2500 Greenmount
Ave Baltimore Md — 35.22 35.46 43.22 43.66 — KGA335

Wisconson Tel Co 722 N Broadway
Milwaukee Wis — 35.42 — KSA210
152.39 152.63 — W9XIJ
157.65 157.89 260 W9XIK
Lake Geneva Wis — 35.42 — KSA220
Madison Wis — 152.63 — W9XBQ
Oshkosh Wis — 152.63 — W9XCA
Eau Claire Wis — 35.42 — W9XEO
43.42 140 W9XIJ
Glenmore Wis — 35.42 — W9XJA
43.42 90 W9XJB
Hartford Wis — 35.42 — W9XST
43.42 60 W9XSV

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601 Broad St Phoenix City Ala — 152.03 158.49 50 K1A337
Arizona Mobile Radio Serv 2509 N 7th St
Phoenix Ariz — 152.15 158.61 80 KOA276
Motorola Res Labs Inc 401 W Jackson St
Phoenix Ariz — 152.03 157.29 50 KOA265
Black & White Cab Co 814 N A St
Fort Smith Ark — 152.03 158.49 27 KKA402
Amer Tel Answering Serv & Physicians
Exch 419 E 6th Long Beach Calif — 152.03 157.29 150 KMA249

LIMITED COMMON CARRIER, Cont.

hone Xchange 10910 Kinross Av
eles Calif 152.03 KMA250
§ Professional Tel Exchg 6331
od Blvd Los Angeles Calif 152.03 157.29 100 KMA200 P
1223 Hamilton St El Centre Calif 152.03 158.49 20 KMA251 M
al Radio & Electronics Co
th St Eureka Calif 152.03 158.49 7 KMA252 DM
o 114 N Rose St Toluca Lake
Calif 152.03 157.29 300 KMA253 M
adiophone Serv Co 202 E 4th St
ach Calif 152.03 157.29 120 KMA255
Tel Answering Serv
ws Landing Rd Modesto Calif 152.03 158.49 50 KMA219 M
Radio Secretarial Serv 517 San
San Mateo Calif 152.15 158.61 10 KMA608 M
patch Eng Co 215 E 18th St
ld Calif 152.03 158.49 100 KMA257 M
Radio Dispatch 430 College St
d Calif 152.03 158.49 25 KMA259 PM
adio Dispatch Co 266 F St
nardino Calif 152.03 157.29 100 KMA260 M
Radio Dispatch 1500 College Av
alif 152.15 158.61 200 KMA261 M
dio Communication 931 C St
o Calif 152.03 157.29 150 KMA262 M
cisco Station 152.03 158.49 15 KMA263
Wilde Inc 1861 Broadway
alif 152.03 158.49 100 KMA267 M
Development Corp 1201 24th St
olo 152.03 158.49 50 KAA276 M
dio Inc 608 8th Av
Colo 152.03 158.49 10 KAA279 F
rmored Serv Inc 75 Pearl St
Conn 152.09 158.55 95 KCA514 M
Radiotelephone Serv Albee Bldg
Sts NW Washington DC 152.03 158.49 50 KGA248 M
patch Serv 325 19th St
s Ga 152.03 157.29 50 KIA332 M
-Electronics Co Inc
wood Dr NW Atlanta Ga 152.03 158.49 10 KIA953 M
Hills Communication Honolulu 152.03 158.49 2 KUA215 C
Gen Sales & Serv 115 Bensyl Av
Ill 152.03 158.49 15 KSA343 X
tier Co Sheffield Ill 152.21 158.67 15 KSA621 M
r 323 E Broadway Centralia Ill 152.15 158.61 15 KSA620 M
Co Mobile Radio Dispatching Co
ridan Rd North Chicago Ill 152.03 157.29 35 KSA256 M
patch Serv 325 19th St
Ill 152.03 157.29 176 KSA262 X
Answering Serv Inc
Nat'l Bank Bldg Peoria Ill 152.15 158.61 40 KSA265 M
Radiotelephone Serv
th St Anderson Ind 152.21 158.67 60 KSA625 L
dio Disp Inc 415 S Mulberry St
Ind 152.03 157.29 60 KSA258 L
hone Co of Indiana
Webster St Kokomo Ind 152.03 158.49 11 KSA259 X
hone Co of Indiana
Meridian Sts Anderson Ind 152.03 158.49 7 KSA295 M
Radiotelephone Inc
Center Bldg Richmond Ind 152.15 158.61 100 KSA260 L

The Sagert Radin Co 5305 Hohman Av
Hammond Ind 152.03 157.29 30 KSA264
Electronic Engineering Co 1435 Walnut St
Des Moines Ia 152.03 157.29 50 KAA277 M
L W Andrews Inc 219 Whitaker Bldg
Davenport Ia 152.03 157.29 20 KAA278 B
A R Blossman Inc 107 Lake Av
New Orleans La 152.15 158.61 20 KKB387 M
Covington La 314 Florida St 152.15 158.61 20 KKB388 M
Bogalousa La 612 Columbia St 152.15 158.61 20 KKB389 M
Ponchatoula La 152.15 158.61 20 KKB390 M
Amite La Pender Hotel Bldg 152.15 158.61 20 KKB391 M
Mumphrey's Radio Dispatch Serv
PO Box 1676 New Orleans La 152.03 158.49 150 KKA400 M
American Radiorelephone Serv
809 Cathedral St Baltimore Md 152.03 158.49 50 KGA249 M
Baltimore Radio & Tel Dispatch Serv
1259 E North Av Baltimore Md 152.15 158.61 25 KGA250 M
American Communications Co
272 Centre St Newton Mass 152.03 158.49 90 KCA240 X
Autofone Inc 1200 Main St Springfield Mass 152.03 158.49 50 KCA236 M
Berkshire Radio Dispatch Serv 23 Fasce Pl
Pittsfield Mass 152.03 158.49 10 KCA237 M
Mobile Radio Communications
10 Grosvenor St Taunton Mass 152.03 158.49 100 KCA239 M
U-Dryvit Auto Rental Co 30 Myrtle St
Worcester Mass 152.03 157.29 100 KCA244 P
Cambridge Mass 46 First St 152.03 157.29 100 KCA258 P
L J DeLamarter Jr 1151 Sheldon Av SE
Grand Rapids Mich 152.03 158.49 100 KQA336 M
Grand Rapids Merchants Serv Bureau
190 Munroe Av NW Grand Rapids Mich 152.03 157.29 100 KQA337 M
Mobile Radio Telephone Co
1749 Washington Blvd Detroit Mich 152.09 158.55 50 KQA338 M
Radio Dispatch Serv 132 N Winter St
Adrian Mich 152.03 158.49 30 KQA339 X
Waldo Wilson 1556 Hoyt St
Muskegon Heights Mich 152.21 158.67 10 KQA647 M
Twin City Radio Dispatch Inc
2146 Marshall Av St Paul Minn 152.03 157.29 100 KAA282 M
Newton Z Wolpert 225 S Fifth St
Minneapolis Minn 152.15 158.61 100 KAA285 MB
American Radiotelephone Co
1407 Central St Kansas City Mo 152.03 158.49 50 KAA275 B
St Louis Raditone Inc 5579 Pershing St
St Louis Mo 152.03 158.49 150 KAA281 B
Frontier Radio & Music Co 225 S Fifth St
Las Vegas Nev 152.03 158.49 50 KOA261 M
Mobile Radio Dispatch Serv 124 Church St
New Brunswick NJ 152.03 157.29 50 KEA256 MB
Trenton NJ 214 E Hanover St 152.03 157.29 20 KEA257 MB
Telephone Secretarial Serv 156 Clinton Av
Newark NJ 152.03 157.29 50 KEA263 B
Burk Radio Dispatch Serv 810 Floretta Dr
Albuquerque New Mex 152.03 158.49 10 KKB386 L
Woodruff Groff Evans 707 N Madison St
Rome NY 152.03 158.49 30 KEA253 M
Utica NY 110 Genesee St 152.03 158.49 7 KEA344 M
J J Freke-Hayes 595 Fifth Av New York NY 152.03 157.49 165 KEA254 X
H W Graff 121 Church St Freeport NY 152.03 157.49 76 KEA255 X
J M Mulligan 819 Clairmont Av Elmira NY 152.03 158.49 30 KEA258 M
Rural Radio Network Inc Ithaca NY
2.7 Mi E of Cherry Valley NY 152.15 158.61 40 KEA629 GM
3 Mi NE of DeRuyter NY 152.15 158.61 40 KEA630 GM
1.9 Mi SW of Wethersfield NY 152.15 158.61 40 KEA631 GM

Worden Hill So Bristol Twp NY 152.15 158.61 41 KEA632 GM
4.5 Mi NW of Turin NY 152.15 158.61 40 KEA633 GM
4 Mi NW of Newfield NY 152.15 158.61 72 KEA634 X
Solomon Schiller 66 Willoughby St
Brooklyn NY 152.03 157.29 100 KEA260 M
Syracuse Electronics Corp 204 Lynch Av
Syracuse NY 152.09 158.55 50 KEA261 G
Telephone Message Serv of Yonkers
130 Buena Vista Av Yonkers NY 152.03 157.29 10 KEA200
Westchester Mobilfone System Inc
150 Main St White Plains NY 152.03 157.29 72 KEA274 X
McPherson's Mobile Dispatch 516 S River St
Newcomerstown Ohio 152.03 158.49 10 KQA648 M
Radio Telephone Serv Co 408 N Wayne St
Piqua Ohio 152.03 157.29 15 KQA340
The Telephone Message Bureau Inc
1010 Euclid Av Cleveland Ohio 152.15 158.61 50 KQA646 G
Telephone Secretarial Serv 518 Jefferson Av
Toledo Ohio 152.03 157.29 30 KQA399 G
Universal Communications Co
2009 Monroe St Toledo Ohio 152.03 158.49 50 KQA342 X
A J Spooner Radio Co
1415 Westwood Blvd Oklahoma City Okla 152.03 158.49 100 KKA401 L
Chickasha Okla 528 Chickasha 152.03 158.49 15 KKA200 L
Ralph Hicks 204 E Fairview St Tulsa Okla 152.03 157.29 100 KKA341 M
Mobile Communications Serv
205 SW Jefferson St Portland Ore 152.03 158.49 100 KOA264 X
Salem Ore 1004 Tile Rd 152.03 158.49 50 KOA603 MK
Mobile Communications of Pa 500 Fifth Av
McKeesport Pa 152.03 157.29 7 KGA252 M
Mobile Radio Serv Inc 1063 Otis Blvd
Spartanburg SC 152.03 158.49 60 KIA220 M
Mobile Radiotelephone Serv 111 Butler Av
North Augusta SC 152.03 157.29 60 KIA331 M
Brownsville Radiotelephone System
Box 1713, Brownsville Tex 152.03 158.49 10 KKA403
Hollomon Radio Dispatch Serv
1510 Elgin St Houston Tex 152.03 157.29 50 KKA343 M
Mobile Radio Message Serv
4219 Yoakum Blvd Houston Tex 152.03 157.29 27 KKA344 LM
Radio Message Systems
513 Capital Nat'l Bank Bldg Austin Tex 152.03 157.29 10 KKA408 M
Utah Radio Dispatch 36 SW Temple
Salt Lake City Utah 152.03 158.49 10 KOA272 M
Danville Car-Phone Co Box 1239
Danville Va 152.03 158.49 10 KIA952 F
Radio Dispatch Serv Co 402 E City Hall Av
Norfolk Va 152.03 157.29 30 KIA334 G
Radio Dispatch Inc 301 S Tower St
Centralia Wash 152.03 158.49 30 KOA267 M
Seattle Wash 302 Malden Av 152.03 158.49 105 KOA268 X
Olympia Wash 1021 W 4th Av 152.03 158.49 25 KOA269 M
Tacoma Wash 3731 S Yakima St 152.03 158.49 50 KOA270 M
Yakima Wash 22½ S 2nd Av 152.03 158.49 10 KOA605 M
Everett Wash 2931 Rockefeller 152.03 158.49 10 KOA606 M
Harold A Salisbury 115 W 34th Av
Spokane Wash 152.03 157.29 25 KOA271 M
Whiteman Fuel Co Inc 611 N Wenatchee
Wenatchee Wash 152.15 158.61 24 KOA604 M
Charleston Radio Central
1600 MacCorkle Av Charleston W Va 152.03 157.29 10 KQA354 M
Robert H Butcher 2105 Roosevelt Rd
Kenosha Wis 152.03 157.29 20 KSA284 B
Telephone Message Exchange
312 Wisconsin E Av Milwaukee Wis 152.03 158.49 50 KSA266 M

NDUSTRIAL SERVICES

PETROLEUM & PIPELINE

ofining Co
lle Okla
Tex 33.38 25 KKA372 M
KKA700
Tex 33.38 KKA371 M
ry Bases 33.38 KKA373 M
Petroleum Corp
y New York 5 NY
a Calif 33.22 15 KMA712 G
alif 33.22 KMA713 G
Island Cal 33.22 KMA714 G
en La 33.18 32 KKA391 G
Calif 33.22 KMA411 G
1.602 1.628 26 KA2895 X
1.652 1.676 1.700 KA2895
Exploration 204 N
St Lafayette La 1.602 1.700 3 KNFY K
1.602 1.700 31 KNFV X
xploration Co 1451
Bldg Houston Tex 31.06 2 KA2911 L
Western Gas Co 28 E
t Fayetteville Ark 33.18 15 KKB768 M
rk 33.18 KKB767 M
illing Co 3415 West-
St Dallas Tex
33.18 17 W10XFK G
W10XFL
Oil & Refining Co
nchester Ashland Ky
y 49.06 KIA996 M
Ky 49.06 KIA997 M
Ky 49.06 KIA998 M
49.06 KIA999 M
Ky 49.06 KIB200 M
Ky 49.06 20 KIB374 M
Refining Co 260 S
Philadelphia Pa 153.35 2 KGA564 P
1.652 31.06 32 KA2914 X
y Bases
25.06 25.10 25.14 25.18 KKB426
to KKB440
eaboard Corp 1033
St Charleston W Va
W Va 33.34 18 WLYQ L
rret Inc 909 Giddens-
g Shreveport 4 La
1.602 1.700 35.06 27 KA2987
35.14 43.02 43.10 43.18 KA2987
y Bases 1.602 1.700 KKA593
KKA594 KKA595 KKA596
Petroleum Co 420
dg Minneapolis Minn
t Kans 153.05 23 KKB776 M
y Bases 153.05 KKB781 M
KKB782 KKB783
Oil Co City Nat'l
g Wichita Falls Tex
33.26 30 W5XFJ G
ipe Line Co
orth St Lima Ohio
ich 33.26 100 WVBQ M
hio 33.26 WVBR M
hio 33.26 WVBS M
33.26 WSLV M
Mich 33.26 WSLZ M
Ohio 33.26 KQA433 M
Ohio 33.26 KQA470 M
Burns 224 1st Nat
Wichita Falls Tex
48.86 16 KA3230 G
on Co Pampa Texas
ex 153.11 10 KKB797 M
x 153.11 KKB798 M
Co 1818 Canal Bldg
ans 12 La
f La 33.18 KKB750 G
Miss 33.18 KKB752 G
n Miss 33.18 KKB751 G
33.18 KKB748 G
.a 33.18 KKB749 G
olo 33.18 KAA303 G
olo 33.18 KAA325 G
33.18 KKA443 G
Nyo 33.18 KOA285 G

Harvey La 33.18 301 KKA807 X
Mobile 2.292 65 KA4384 X
Temporary Bases 33.18 KKB799 L
KKB800 KKB801 KKB802 KKB803 KKB804 ML
KKB805 KKB806 KKB807 KKB808 KKB809 G
California Pipe Line Co 1818
Canal Bldg New Orleans La
Laramie Wyo 33.26 6 KUKY G
Rock River Wyo 33.26 KULF G
Canadian River Gas Co
Rule Bldg Amarillo Tex 39.98 21 KKA658 G
39.98 KKA661 G
Dalhart Tex 39.98 KKA659 G
Century Geophysical Corp
1333 N Utica Av Tulsa 6 Okla
Mobile 1.602 1.700 12 KA4127
25.02 25.06 25.10 25.14 KA4127
Central Kentucky Nat Gas Co
1033 Garrier Charleston W Va
Means Ky 33.34 22 WEXP L
Lexington Ky 33.34 KIA349 L
Cold Spring Ky 33.34 KIA350 L
Foster Ky 33.34 KIA351 L
Cities Service Oil Co
Masonic Bldg Bartlesville Okla
Mobile 1.602 1.700 5 KA2912 K
Consolidated Oil Co Hamilton
Bldg Wichita Falls Tex 33.34 20 KKA677 GM
Continental Oil Co
Ponca City Okla 31.18 5 KGVA M
31.18 KKA654 M
Mobile 33.38 8 KA2211 M
1.602 1.700 KA3031 X
Continental Pipe Line Co 1000
S Pine St Ponca City Okla
Brownsville Tex 39.66 11 KCRB M
Mercedes Tex 39.66 KCRD M
McAllen Tex 39.66 KCRE M
Sullivan City Tex 39.66 KSCW M
Rio Grande City Tex 39.66 KKA340 M
Barreda Tex 39.66 KKA675 M
Throckmorton Tex 33.38 35 KKB785 M
Danager Oil & Refining Co 169
Lafayette St Baton Rouge La
Mobile 39.14 2 KA3562 L
Davon Pipe Line Co Box 1586
Oklahoma City Okla 33.26 20 KKA438 L
Davenport Okla 33.26 KKA434 L
Dayton Exploration 445 S Lewis
Tulsa Okla
Mobile 1.602 1.700 2 KA4124 K
Delta Drilling Co Box 2012
Tyler Tex 49.06 20 KKB228 G
Kilgore Tex 49.06 KKB229 G
Chapel Hill Tex 49.06 KKB230 G
Owenton Tex 49.06 KKB231 G
El Paso Nat Gas Co 1010
Bassett Tower El Paso Tex 37.54 91 KQNP M
Ehrenberg Ariz 37.54 KQNL M
Tucson Ariz 37.54 KQNM M
Gage NM 37.54 KQNO M
Jal NM 37.54 KQNQ M
Casa Grande Ariz 37.54 KQNR M
Phoenix Ariz 37.54 KOA337 M
Douglas Ariz 37.54 KOA338 M
Mobile 37.54 2 KJCD M
Esso Standard Oil 15 W 51st St
New York NY
Linden NJ 153.35 KEA237 M
Mobile 153.35 75 KA2271 M
Fain & McGaha Hamilton Bldg
Wichita Falls Tex
Mobile 33.34 15 KA4535 G
Temporary Bases 33.34 KKB628 G
to KKB636 G
Fairchild Aerial Surveys Inc
224 E 11th Los Angeles 15
Calif
Mobile 1.602 1.628 3 KXOW
1.652 1.676 1.700 KXOW
General Petroleum Corp 108
W 2nd St Los Angeles Calif
Davenport Calif 153.11 2 W6XZJ
Geophysical Research Corp
120 Bway NY 5 NY
Mobile 1.602 1.700 4 KA2896 X
Geophysical Serv Inc
6000 Lemmon Dallas Tex
Mobile 1.602 1.700 20 KA2120 X

30.62 31.06 35.54 153.11 KA2120 X
The Geotechnical Corp
3712 Haggar Dr Dallas 1 Tex
Mobile 1.602 1.700 152.87 24 KA3219 X
152.99 153.11 153.23 153.35 KA3219 X
Gravity Meter Exploration Co
1348 Esperson Bldg
Houston 2 Tex
Mobile 152.87 12 KCLP
25.02 25.06 3 KA3871 L
25.10 25.14 25.18 KA3871 L
Great Lakes Pipe Line Co
Box 2239 Kansas City Mo
Mobile 33.26 10 KVUY M
Gulf Refining Co
PO Drawer 2100 Houston Tex
Mobile 2.206 1 KFAW R
Gulf Res & Dev Co Box 2038
Pittsburgh Pa
Mobile 1.602 1.700 69 KA2973 X
30.62 31.06 33.54 KA2973 X
35.06 35.14 35.54 KA2973 X
Houston Industrial Gas Co 2027
Commerce Bldg Houston 2 Tex
Refugio Tex 37.54 KHKS K
Ganado Tex 37.54 KKA777 K
Yoakum Tex 37.54 KHMS K
J M Huber Corp 200 1st St
Borger Tex 49.18 KKA984 M
Mobile 49.18 50 KA3971 M
Humble Oil & Refining Co
1216 Main St Houston 1 Tex
Refugio City Tex 37.14 KCQX L
Acadia Parish La 39.14 KRCJ L
48.86 KKA354 L
48.86 KKA437 L
Collier Co Fla 48.86 KIB294 L
48.86 KIB295 L
Doss Field Tex 48.86 KKA301 M
Newton Co Tex 48.86 KKA313 R
Jefferson City Tex 48.86 KKA317 R
Denver City Tex 48.86 KKA355 L
Crockett Tex 48.86 KKA356 M
Iberville Parish La 37.14 KKA357 L
48.86 KKA553 L
Upton Tex 48.86 KKA358 M
Houston Tex 48.86 KKA388 M
48.86 KKA664 L
Grand Isle La
2.134 2.206 2.638 2.738 KKA394
KKA395 KKA396
Vermilion Parish La 48.86 KKA436 L
Port Acres Tex 48.86 KKA552 L
Ascension Parish La 48.86 KKA554 L
Pleasanton Tex 48.86 KKA578 L
New Orleans La 48.86 158.37 KKA627 L
Galveston Tex 48.86 KKA629 M
Chambers Tex 48.86 KKA630 M
48.86 KKA637 M
Galveston Bay Tex 48.86 KKA638 M
Kinsville Tex 48.86 KKA639 L
Jefferson Parish La 48.86 158.37 KKA649 L
Odessa Tex 48.86 KKA702 L
48.86 KKA579 L
48.86 KKB561 L
Fayette Miss 48.86 KKA760 L
New Iberia La 48.86 KKA756 L
Ector Tex 48.86 KKA802 L
Jim Hogg Co Tex 48.86 KKA814 L
Andrews Co Tex 48.86 KKA951 M
Brookhaven Miss 48.86 KKB267 L
Baytown Tex 158.37 KKB421 M
Polk Co Tex 48.86 KKB559 G
Brooks Co Tex 48.86 KKB560 L
Baxterville Miss 48.86 KKB562 L
Plaquemines Parish La 48.86 KKB563 L
48.86 KKB565 L
Livingston Tex 48.86 KKB564 G
Terrebonne Parish La 48.86 KKB566 L
LaFourche Parish La 48.86 KKB567 L
St Charles Parish La 48.86 KKB568 L
Cameron Parish La 48.86 KKB569 L
St Mary Parish La 48.86 KKB570 L
McCamey Tex 48.86 KKB571 L
Davis Co Miss 48.86 KKB584 L
Marion Co Miss 48.86 KKB794 L
Wayne Co Miss 48.86 KKB811 L
San Patricio Co Tex 48.86 KKB492 L
48.86 KKB434 L

La Rosa Station Tex 48.86 KKB493 L
Pampa Tex 48.86 KKB504 L
Stinnet Sta Tex 48.86 KKB506 L
Mobile 1.628 1.700 6 KHPI
48.86 158.37 258 KA2301 X
1.602 1.700 30.62 31.06 97 KA3092 X
33.54 35.14 35.54 43.10 KA3092 X
152.75 153.11 153.23 KA3092 X
158.37 30 KA4119 M
48.86 70 KA3242 X
Temporary Bases 48.86 KKA351 L
KKA352 KKA353 L
2.134 2.206 2.638 2.738 KKA470 R
to KKA473
48.86 KKB590 L
KKB637 KKB638 L
48.86 KKB612 H
KKB615 KKB616 H
KKB640 M
158.37 KKB639 L
48.86 KKB641 L
to KKB647
48.86 KKB656 L
to KKB673
48.86 KKB676 M
to KKB690
48.86 KKB706 L
to KKB712
158.37 KKB713 L
to KKB720
48.86 KKB721 L
to KKB735
158.37 KKB736 L
to KKB746
Independent Exploration Co
901 Esperson Houston Tex
Mobile 1.602 1.700 20 KA3096
Interstate Nat Gas Co
Box 1482 Monroe La
Branch La 48.58 KKA409 L
Fairbanks La 48.58 KKA411 L
Krotz Spgs La 48.58 KKA374 M
Ferriday La 48.58 KKB754 M
N Baton Rouge La 48.58 KKA450 M
N Tepetate La 48.58 KKA531 L
Pecan Island La 48.58 KKA530 L
St Landry Parish La 48.58 KKA399 L
Vixen La 48.58 KKA410 L
Mobile 48.58 25 KA2484 X
Interstate Oil Pipe Line Co
Box 967 Wilson Okla 156.99 50 KAJR M
Cranfield Miss 49.10 15 KKA963 G
Anse LaButte La 49.10 KKA966 G
Delhi La 49.10 KKA757 G
Lake St John La 49.10 KKA664 G
Sunset La 49.10 1 KDEU G
Fayette Miss 49.10 WKAK G
Okla City Okla 156.99 KXDS M
Mobile 156.99 4 KOFW M
Temporary Bases 49.10 KKA391 G
Interstate Petroleum Communications Inc, 30 Rockefeller
Plaza New York 20 NY
Monroe La 48.70 KKA533 M
El Capitan Calif 153.29 KMA685 M
Roxana Ill 153.35 KEA704 M
Farmersville La 48.70 KKA534 M
New Orleans La 48.70 KKA992 L
Hobbs NM 158.31 KKB757 M
Kermit Tex 48.58 KKB675 M
Odessa Tex 48.70 KKB778 M
Mobile 158.31 10 KA2356 M
153.29 13 KA4422 M
48.58 8 KA4566 M
30.82 KKA534 M
153.35 10 KA4644 M
2.206 1 KPGM X
2.206 2.670 2.638 2.738 1 KPGR X
1 KPGT X
2.134 2.206 2.670 2.638 2.738 KKA314 X
1.602 1.700 30.62 33.54 69 KA3118 X
35.54 152.87 153.35 KA3118 X
152.99 153.11 153.23 KA3118 X
48.70 10 KA4674 M
48.70 5 KA4694 M
Temporary Bases 48.70 KKA990 L
KKB200 L

PETROLEUM & PIPELINE, Cont.

G E Kadane & Sons
Hamilton Bldg
Wichita Falls Tex 33.26 KKB815 G
Albany Tex 33.26 KKA626 G
Mobile 33.26 22 KA4753 G

Kerr-McGee Oil Industries Co
Box 1700 Berwick La 30.82 KXXA M
Temporary Base 2.134 KKA583

Keystone Exploration Co 2813
Westheimer Rd Houston 6 Tex
Mobile 31.06 2 KA2897 L

Lion Oil Co El Dorado Ark
Magnolia Ark 153.71 15 KCLT M
Shuler Ark 153.71 KCLQ M

L M Lockhart 200 Milam Bldg
San Antonio Tex
Mobile 1.602 1.700 14 KA4096 M

Loffland Bros Co 1807
Philtower Bldg Tulsa Okla
New Iberia La 2.292 KKB424 C
Mobile 2.292 6 KA2184
2.292 KKA830 K
Temporary Bases 2.292 KKB401 K
KKB402 KKB420 KKB443 KKB444 K
KKB445 KKB609 KKB442 K

Magnolia Petroleum Co
Box 900 Dallas Tex
Hickock Kans 49.18 KAA716 M
Morgan City La 49.18 KKA292 G
Beaumont Tex 49.18 KKA532 L
Eugene Island La 49.18 KKB457 G
Temporary Bases 49.18 KKB456 G
KKB459 KKB463
KKB464 KKB465 KKB472
Mobile 49.18 32 KA2328 GL
49.18 5 KA2784 G
49.18 36 KA2831 L
49.18 10 KA4338 M
1.602 1.700 94 KA2976 X
35.06 35.14 43.02 43.10 KA2976 X
43.18 152.87 152.99 153.11 KA2976 X
152.75 153.23 153.35 153.47 KA2976 X

Manufacturers Light & Heat Co
800 Union Tr Bldg Pittsburgh 33.38 KGA215 L
Kane Pa 33.38 KGA212 L
Ellwood City Pa 33.38 KGA213 L
Hickory Pa 33.38 KGA214 L
Emlenton Pa 33.38 KGA257 L
Mobile 33.38 60 KA2091 L

Marine Exploration Co 3732
Westheimer rd Houston 6 Tex
Mobile 30 82 152 75 45 KA2198 X

McCollum Labs Inc 853
Esperson Bldg Houston 2 Tex
Mobile 1.602 1 700 28 KA3141 K

John W Mecom
3100 Gulf Bldg Houston Tex
High Island Tex 30.74 KKB535 L
Houston Tex 30.74 KKB536 L
Dickinson Tex 30.74 KKB537 L
Cove Tex 30.74 KKB780 L
Temporary Bases 30 74 KKB538 L
Mobile 30 74 4 KA4484 L

Michigan Gas Storage Co
212 W Mich Av
Jackson Mich 33.30 KQA219 M
Saginaw Mich 33 30 KQA218 M
Marion Mich 33.30 KQA220 M
Flint Mich 33.30 KQA221 M
Midland Mich 33.30 KQA222 M
Manchester 33 30 KQA224 M
Mobile 33.30 50 KA2111 M

Montana-Dakota Utilities Co
831 2nd Av So
Minneapolis 2 Minn
Saco Mont 153.71 KOA275
Shelby Mont 33.18 KOA211 G
Cut Bank Mont 33 18 KOA212 G
Teistad Mont 33.18 KOA213 G
Mobile 33.18 153.71 7 KA2392 X

Mountain States Exp Drilling Co
141 So Durbin St Casper Wyo
Temporary Bases 153 05 KOA536
KOA537 KOA538 K
Mobile 153 05 6 KA4065 K

Monray Moore Drilling Co
Abilene Tex 48 94 KKB496 G
Temporary Bases 48 94 KKB497 G
KKB498 KKB499
KKB500 KKB501 KKB502

National Geophysical Co Inc
880 Lemmon Av Dallas 9 Tex
Mobile 1 676 31 06 19 KA3093 X
1 676 152 87 29 KA2903 X

Northern Natural Gas Co
Aquila Ct Bldg Omaha Nebr
Ogden Ia 33.18 KAXG M
Paulina Ia 33 18 KAXI M
Welcome Minn 33.18 KCFR M
Beaver Okla 33.18 KTQP M
Skellytown Tex 33 18 KTQZ M
So Sioux City Nebr 33.18 KWSR M
Hooper Nebr 33.18 KXRC M
Sublette Kans 33.18 KYDH M
Mullinville Kans 33.18 KYDI M
Bushton Kans 33.18 KYDL M
Clifton Kans 33 18 KYDN M
Beatrice Nebr 33 18 KYDP M
Palmyra Nebr 33.18 KYDQ M
Oakland Ia 33.18 KYDR M
Omaha Nebr 33.18 KYGL M
Ventura Ia 33.18 KIVX M
Hugoton Kans 33 18 KAA208 M
Owatonna Minn 33.18 KAA284 M
Sunray Tex 33.18 KKA431 M
Minneapolis Minn 33.18 KYDT M
Garden City Kans 33.18 KAA574 M
Mobile 33.18 190 KXWU M

Norwood Drilling Co 730 Wagoner Bldg Wichita Falls Tex
Temporary Bases 33.34 KKB786 G
to
KKB793
Mobile 33.34 10 KA4698 G

Offshore Navigation Inc 3503
Fern St New Orleans 18 La
Mobile 1.628 1.652 26 KA2307
1.676 1.700 KA2307

Oklahoma Geophysical Co
Box 597 Shawnee Okla
Mobile 1.700 3 KA3806 K

Onyx Refining Co
302 Butternut Abilene Tex 48.62 KKB404 G
Merkel Tex 48.62 KKB403 G
Mobile 48.62 14 W5XTQ DG

Overseas Navigation Inc 3503
Fern St New Orleans 18 La
Mobile 1.628 1.700 10 KA2258

Paine Drilling Co 302 Guardian
Life Bldg Dallas Tex
Graham Tex 48.98 KKB691 G
Temporary Bases 48.98 KKB692
KKB693 KKB694 KKB695
Mobile 48.98 10 KA4569 G

Pan American Pipe Line Co
Esperson Bldg Houston 2 Tex
Kilgore Tex 31.98 KHIL L
Hawkins Tex 31.98 KKA817 L
Port Isabel Tex 33.26 KJTA L
Raymondsville Tex 33.26 WTJB L
Quitman Tex 31.98 KKA412 L
Mobile 31.98 33.26 14 KA3619 L

Pan American Refining Corp
Box 401 Texas City Tex 153.05 KKB508
Mobile 153.05 6 KA4396

Pan American Southern Corp
El Dorado Ark
Ora La 33.30 KKB769
Mt Holly Ark 33.30 KKB770
Stephens Ark 33.30 KKB771
Magnolia Ark 33.30 KKB772
Schuler Ark 33.30 KKB773
Lockhart Ark 33.30 KKB774
El Dorado Ark 33.30 KKB775
Mobile 33.30 8 KA4599

Panhandle Eastern Pipe Line
1221 Baltimore Kansas City Mo
Jackson Co Mich 75.54 KQA78
Jackson Mich 72.66 KQA79

Pelican Oil Purchases Inc
Box 1090 Lafayette La
Lake Charles La 33.30 KKA847
Tepetate La 33.30 KKB705
Jeff Davis Parish La 33.18 KRXT
Mobile 33.18 29 KA2749

Pettus Communications Inc
Box 2649 Tulsa 2 Okla
Nordheim Tex 33.18 KKA328
Pettus Tex 33.18 KKA329
Runge Tex 33.18 KKA330
Mobile 33.18 21 KA2339

Petty Geophysical Eng Co
317 6th St San Antonio Tex
Mobile 1.602 1.700 12 KPYK
43.02 43.10 KPYK
1.602 1.700 34 KA2847

Phillips Petroleum Co 1625 K
St NW Washington 6 DC
Phillips Tex 158.31 KKB810
33.38 KKB819
Sanford Tex 158.31 KKB818
Hansford Co Tex 33.38 KKB820
Dumas Tex 33.38 KKB821
Mobile 33.38 60 KA2365
1.628 - 1.700 55 KA3123
30.62 35.54 KA3123
158.31 10 KA4766

Placid Oil Co 1107 City Bank
Bldg Shreveport la
Arcadia La 49.14 KKB696
Temporary Bases 49.14 KKB697
KKB698 KKB699 KKB700 KKB701
Mobile 49.14 20 KA4570

Plains Pipe Line Co
Newcastle Wyo 49.10 KOA567
KOA570 KOA566 KOA568
Lance Creek Wyo 49 10 KOA569
Mobile 49 10 7 KA4198

Plantation Pipe Line Box 1743
Atlanta Ga
Mobile 153 71 6 WHYR
WIBE

Portable Seismograph Inc
801 Insurance Bldg
San Antonio 5 Tex
Mobile 1.602 1.700 9 KA3217

Premier Oil Refining Co of Tex
Box 1512 Longview Tex
Kilgore Tex 30 70 KKA273
Chesley Station Tex 30.70 KKA319
Wilds Station Tex 30 70 KKA320
Ranger Tex 30 70 KKA628
Baird Tex 30.70 KKB548
Novice Tex 30.70 KKB549
Mingus Tex 30.70 KKB550
Arp Tex 30 70 KKB551
Longview Tex 30 70 KKB552
Mobile 30 70 33 KA2664

Pure Oil Co Box 239
Houston Tex
Berwick La 33.34 KKA846
Cameron La 33.34 KKB451
Rocky Mt Prod Div of POC)
Billings Mont
Worland Wyo 158 31 KOA632
KOA633
Temporary Bases 158.31 KOA634
KOA635
Mobile 1 628 1 700 5 KA2898
158.31 12 KA4337
33.34 1 KA4343

Robert H Ray Co 608 Nat'l
Standard Bldg Houston Tex
Mobile 1 602 1 700 21 KA3226

Republic Exploration Co
815 S Boulder Av Tulsa Okla
Mobile 1 700 11 KA2518

Rhodes Drilling Co Box 239
Abilene Tex 49 02 KKB835
Temporary Bases 49 02 KKB836
KKB834
Mobile 49 02 15 KA4791 D

S W Richardson 2105 Ft Worth
Nat'l Bank Bldg Ft Worth Tex
New Orleans 48 90 KKA775
Mobile 48 90 15 KA3324

Richfield Oil Corp 555 S Flower
St Los Angeles 13 Calif
Bakersfield Calif 49 14 KMA687
Mobile 48 14 1 KA4433

Rock Island Oil & Refining Co
Duncan Okla 153.05 KKA492
KKA495 KKB468
Marlow Okla 153.05 KKB467
Mobile 153 05 12 KA2021

Rogers-Ray Inc 608 Nat'l
Standard Bldg Houston Tex
Mobile 1 602 1 700 4 KA3485
30.62 31 06 33 54 35 54 KA3511

Salt Lake Pipe Line Co Calif
Commercial Co 635 Shoreham
Bldg Washington DC
Salt Lake City Utah 158.25 KTOF
Rangely Colo 158.25 KTOX
Hanna Utah 158.25 KTOQ
Willard Utah 73 54 KOA58
456 85 KOA80
Hayden Peak Idaho 72.74 KOA62
Tabiona Utah 153.11 KOA63
Shafer Butte Idaho 73.54 KOA64
Salt Lake City Utah 456.05 KOA81
Boise Idaho 73.54 KOA82
Mobile 158.25 15 KTKD

Seaboard Oil Co of Del 612 S
Flower St Los Angeles 14
Calif
Mobile 33 18 2 KA3884

Seismic Eng Co 6 11 Maple Av
Dallas Tex
Mobile 1.652 2 KA2917

Seismic Exp Inc of Del
2911 Gulf Bldg Houston Tex
Mobile 1 602 - 1.700 24 KA2916

Seismograph Serv Corp
Kennedy Bldg Tulsa 1 Okla
Mobile 1.602 - 1.700 52 KA2915

Shamrock Oil & Gas Corp
Amarillo Tex
Sunray Tex 37.50 KRYV
Mobile 37.50 30 KRYX

D W Slattery Box 924
Chadron Neb
Mobile 1.628 1.700 2 KGTU

Socony-Vacuum Oil Co
26 Bway New York NY
Mobile 153.05 25 KA2489

Amazing...New

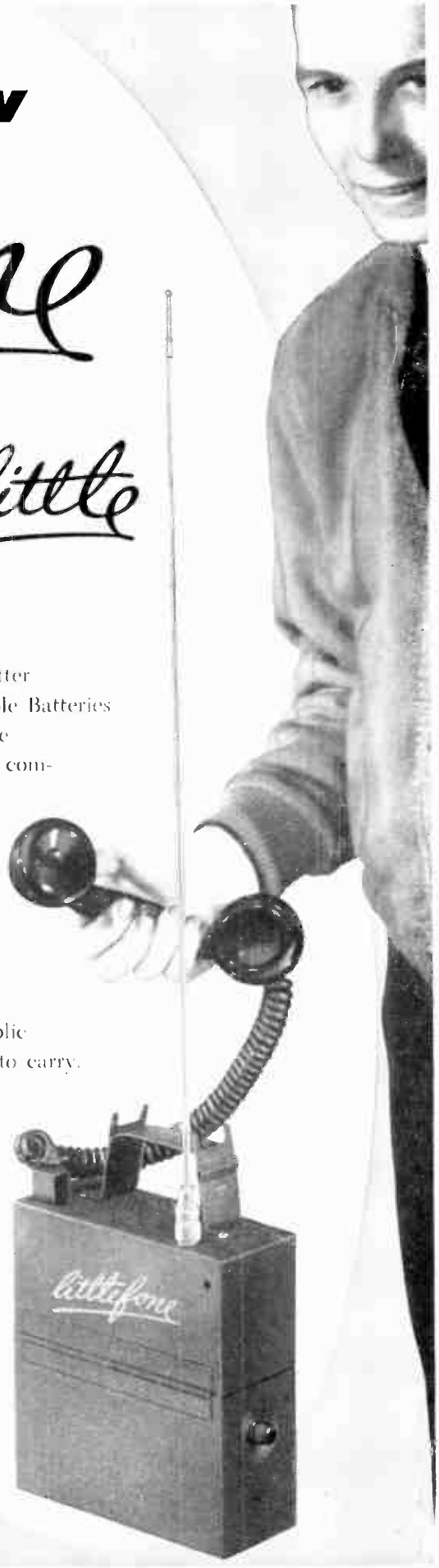
littlefone

the Portable FM Radiotelephone by Doolittle

PJZ-1A PJZ-11

25-50 MC 152-162 MC

Compact, crystal-controlled unit contains FM transmitter and ultra-sensitive receiver. Powered by Wet Rechargable Batteries Gives 8 hours continuous service between charges which can be made from car battery or 115 volts AC. The *littlefone* is complete in one 8" x 8" x 3½" case. Weighs only 9 lbs. Ready for immediate 2-way operation. Gives 2 to 5 mile coverage between units or much greater coverage when used with a fixed station or mobile equipment. Opens vast new opportunities for the effective use of 2-way radio communications. Enables constant contact between and with men in the field. Provides new efficiency and flexibility in field operations of emergency radio, public services, transportation, and industry. Easy to carry. Simple to operate. Dependable. Variety of accessories available.



Both models can be supplied with dry batteries if desired.
Both models can be supplied with "SQUELCH" if desired.

Doolittle RADIO, INC.

Builders of Precision Radio Communication Equipment

7421 S. LOOMIS BLVD • CHICAGO 36, ILLINOIS

PETROLEUM & PIPELINE, Cont.

Sohio Petroleum Co 614 Esperson Bldg Houston 2 Tex
Mobile 1.602 - 1.700 28 KA2900 X
35.06 35.18 KA2900

Sohio Pipe Line Co 407 N 8th St Louis Mo
Mt Pleasant Mich 153.71 WBAE M
Greendale Twp Mich 153.71 WMZB M
Buckeye Twp Mich 153.71 WMZD M
Coldwater Twp Mich 153.71 WMZF M
Freeman Twp Mich 153.71 WMZP M
Mobile 153.71 15 WMZU M

So Geophysical Co 308 Sinclair Bldg Fort Worth Tex
Mobile 1.628 4 KA3482 KX

So Natural Gas Watts Bldg Birmingham Ala
Pickens Miss 49.06 KKA945 M
Gwinville Miss 49.06 KKA946 M
Brandon Miss 49.06 KKA947 M
Perryville Ala 49.06 KIA716 M
Atlanta Ga 49.06 KIA719 M
Wetumpka Ala 49.06 KIA717 M
Birmingham Ala 49.06 KIA718 M
Reform Ala 49.06 KIA889 M
Gadsden Ala 49.06 KIA904 M
Logansport La 49.06 KKB308 M
Perryville La 49.06 KKB307 M
Macon Ga 39.66 WWNA M

So Union Gas Co Burt Bldg Dallas Tex
Cuba New Mex 158.31 KKB486 R
Barker Dome NM 158.31 KKB543 R
Santa Fe NM 158.31 KKB545 R
Farmington NM 158.31 KKB547 R
Star Lake NM 158.31 KKB487 R
Bloomfield NM 158.31 KKB544 R
Albuquerque NM 158.31 KKB546 R
Mobile 158.31 25 KA4486 R

SW Gas Producing Co Box 45 Monroe La 153.35 10 KKA511 M
Dubach La 153.35 KKB777 M

Standard-Fryer Drilling Co 1012 M&W Tower Dallas Tex
Temporary Bases 33.34 KKB617 G
to KKB627
Mobile 33.34 15 KA4549 G

Standard Oil Co of Calif 225 Bush St San Francisco Calif
Avenal Calif 158.37 85 KMA214 M
Suisun City Calif 39.14 12 KMA365 L
Temporary Bases 158.37 KMA480 M
KMA481 KMA482 KMA618 to KMA624

Standard Oil Co of Tex 1600 City Nat'l Bank Houston Tex
Snyder Tex 48.74 20 KKB235 G

Stanolind Oil & Gas Co Box 591 Tulsa Okla (also Box 3092 Houston Tex)
Plains Tex 30.78 8 KKB466 G
Ulysses Kans 33.18 20 KAA210 M
Galveston Tex 153.23 30 KKA385 R
Lubbock Tex 30.78 KKA540 G
Levelland Tex 30.78 KKA986 G
Slaughter Field Tex 30.78 KKA985 G
Brownfield Tex 30.78 KKA993 G
Cedar Lake Camp Tex 30.78 KKA994 G
Hackberry La 153.23 KKB763 R
Sabine Tex 153.23 KKB766 R
Kirby Wyo 153.71 13 KGRS M
KGRU
Pauls Valley Okla 2.292 KQWF
Shawnee Okla 2.292 10 KKA442
Temporary Bases 153.23 KKA524 R
KKB758 to KKB762
Mobile 153.71 1 K5XCM R
2.965 - 3.019 W10XCA X
2.134 2.206 2.638 2.738 KKA254 R
1.602 - 1.700 35.06 81 KKA964 X
35.14 43.02 43.10 43.18 KA2964
2.292 KQWE

Sun Oil Co Box 2880 Dallas Tex
Beaumont Tex 49.06 49 KKB539 L
Marcus Hook Pa 153.17 15 KGA261 R
Mobile 1.602 - 1.700 8 KA3095 X
35.06 35.14 153.11 153.47 29 KA3095

Sun Pipe Line Co San Jacinto Life Bldg Beaumont Tex 48.62 KKA895 L

Superior Oil Co 400 Oil & Gas Bldg Houston Tex
Iberville Parish La 2.292 KKA468 C
Intercoastal City La 2.292 KKA676 R
Harvey La 2.292 56 KKA855 X
Lake Arthur La 2.292 KKA496
Cameron La 2.292 KKB610 R
KKB611 C
Mobile 2.134 2.206 2.726 2 KFHJ X
1.602 - 1.700 25.20 30.62 45 KA3003 X
31.06 33.54 35.54 152.75

Susquehanne Pipe Line Co 1608 Walnut St Philadelphia 3 Pa
Mobile 158.01 5 WSXN X

Tennessee Gas Trans Co Box 2511 Houston Tex
Campbellsville Ky 33.26 194 WIAW X
Catlettsburg Ky 33.26 WKMJ M
Winchester Ky 33.26 WKMK M
Clendenin W Va 33.26 WKNF M
Morehead Ky 33.26 WVBH M
Middleton Tenn 33.26 KIA560 M
Portland Tenn 33.26 KIA570 M
Lobelville Tenn 33.26 KIA585 M
Dickson Tenn 33.26 KIA586 M
E Bernard Tex 33.26 KKA230 L
Houston Tex 33.26 KKA261 L
Jasper Tex 33.26 KKA262 L
Victoria Tex 33.26 KKA485 L
W Monroe La 33.26 KKA563 L
Greenville Miss 33.26 KKA650 L
Mansfield La 33.26 KKA692 L
Cleveland Tex 33.26 KKA693 L
Batesville Miss 33.26 KKA701 M
Natchitoches La 33.26 KKA776 L
Mobile 33.26 KKA706 L
KKA707 KKA708 KKA709 KKA710 KKA711

The Texas Co 516 Munsey Bldg Washington DC (also 135 E 42nd St New York 17 NY)
Bay de Chene La 48.94 30 KKA952 M
Delta Duck Club La 48.94 KKA953 M
Garden Island Bay La 48.94 KKA954 M
Lafitte La 48.94 KKA960 M
Elaine La 48.94 KKA955 M
Lake Palto La 48.94 KKA956 M
Caillon Island La 48.94 KKA962 M
Montegut La 48.94 KKA957 M
Dog Lake La 48.94 KKA958 M
Harvey La 48.94 KKA959 M
Houma La 48.94 KKA970 M
Southern La 48.94 KKA961 M
Golden Meadow La 48.94 KKA218 M
Leeville La 48.94 KKA293 M
Lake Barre La 48.94 KKA359 M
Cat Island Pass La 48.94 KKA360 M
De Lacroix La 48.94 KKA643 M
Mobile 1.602 - 1.700 62 KA2997 X
30.62 31.06 33.54 KA2997 X
35.54 152.75 153.47 KA2997 X

Texas Eastern Trans Corp Box 1612 Shreveport 94 La
Mobile 48.94 215 KA3337 M

Texas Gas Trans Corp 931 Sterick Bldg Memphis 3 Tenn
Lisbon La 48.90 65 KIA340 M
Guthrie La 48.90 KKA324 M
Texas Pipe Line Co Box 2332 Houston Tex 48.90 KKB514 M
Paradis La 153.71 30 KKA238 M
Lafitte La 153.71 KKA239 M
Lake Salvadore La 153.71 KKA240 M

Tide Water Assoc Oil Co 17 Battery Place New York NY
Bayonne NJ 153.17 15 KEA625 M
Seaside Calif 158.31 1 KMA726 R

Two States Drilling Co Magnolia Bldg Dallas Tex
Temporary Bases 33.26 40 KKB812 G
KKB813 KKB814

Unger Exploration Co 2210 21st Lubbock Tex
Mobile 1.602 - 1.700 2 KA2306 X

Union Sulphur Co Sulphur La
Sulphur La 48.98 KKA535 M
48.98 33 KKA743 R
Roanoke La 48.98 KKA747 M
KKA748
Eunice La 48.98 KKA749 R
Lake Charles La 48.98 KKA742 M
Church Pt La 48.98 KKA753 R
Hackberry La 48.98 KKA754 R
Woodlawn La 48.98 KKA755 M
De Quincy La 48.98 KKB817 M
Temporary Bases 48.98 KKA547 M
KKA548 M
KKA836 KKA837 KKA838 R

United Fuel Gas Co 1033 Quarrier St Charleston W Va
33.34 WQZS L
72.66 KQA38 L
Huntington W Va 33.34 127 WQZF L
Inez Ky 33.34 WQZO L
Maytown Ky 33.34 KIA428 L
Bee Mt W Va 75.50 KQA39 L
Spencer W Va 33.34 KQA321 L
Burlington Ohio 33.34 KQA445 L
Reedy W Va 33.34 KQA448 M
Ravenswood W Va 33.34 KQA474 L

United Gas Pipe Line Co 1525 Fairfield Av Shreveport La
48.78 KKA500 M
Arcadia La 72.66 134 KKA26 M
Sterlington La 31.18 48.78 KKA242 M
Iowa La 31.18 48.78 KKA435 M
Houma La 31.18 48.78 KKB648 M
Jackson Miss 31.18 48.78 KKB649 M
Gwinville Miss 31.18 48.78 KKB650 M
Bogalusa La 31.18 48.78 KKB651 M
Carthage Tex 31.18 48.78 KKB652 M
New Orleans La 31.18 48.78 KKB653 M

United Geophysical Co 595 E Colo St Pasadena 1 Calif
Mobile 1.602 1.700 103 KA3094 X
35.06 35.10 35.14 35.18 KA3094
43.02 43.06 43.10 43.14 KA3094
43.18 152.87 152.99 KA3094
153.11 153.23 153.35 KA3094

Vibration Eng Co 131 N Wyo St Hazelton Pa
Mobile 42.98 6 KA4104 M

Virginia Gas Trans Corp 1033 Quarrier St Charleston W Va
Gala Va 33.34 25 WLCH L
Standardsville Va 33.34 WOAG L
72.66 W4XXO L
Lexington Va 33.34 KIA248 L
Criglersville Va 75.50 KIA81 L

Warren Oil Corp Box 1589 Tulsa 2 Okla
Mobile 37.14 5 KA3176 G

Warren Petroleum Corp 400 Gas & Oil Bldg Houston 2 Tex
33.26 KIBV M
Conroe Tex 33.26 12 KEMY M
Texas City Tex 33.26 KIBX M

West Central Drilling Co Abilene Tex 42.98 22 KKA375 G

West Production Co Box 1679 Houston Tex
75.54 KKA84 L
75.54 KKA86 L
30.82 170 KKB321 L
Madisonville Tex 30.82 5 KKA726 L
30.82 KKB280 L
Thompsons Tex 72.06 KKA85 L
30.82 KKB316 L
30.82 KKB339 L
Westport Tex 30.82 KKB340 L
KKB345 KKB346 KKB347 L
Madisonville Tex 30.82 KKB280 L
Kemah Tex 30.82 KKB315 L
Ft Worth Tex 30.82 KKB314 L
Dallas Tex 30.82 KKB322 L
Round Mt Tex 30.82 KKB323 L
Temporary Bases 30.82 KKB325 L
KKB326 KKB327 KKB341 KKB328 KKB329
KKB330 KKB331

Western Geophysical Co 1333 S Hope St Los Angeles 15 Calif
Mobile 1.602 - 1.700 8 KA2899

Whitman Drilling Co 906 Esperson Bldg Houston 1 Tex
Cameron La 2.134 2.206 KKA392 H

Russell Wolf & Co Box 44 Harvey La 2.292 20 KKA660 R

Yegua Corp 2302 Esperson Bldg Houston Tex
Mobile 31.00 6 KA3121

SPECIAL INDUSTRIAL

Abbett Elec 472 Tehama San Francisco Cal
Mobile 30.78 8 KA2454

Alexander & Baird Co
Pierson Fla 154.49 6 KIA616 C
Deland Fla 154.49 KIA617 C

Allen-Codel Co 45 S Main Winchester Ky
Temporary Bases 49.86 6 KIA743 M

Amer Mutual Liability Ins Co 142 Berkely Boston 16 Mass
Mobile 33.14 200 WADG M

Amer Tel & Tel 32 Av of Americas NY 13 NY
Mobile 154.49 6 KA2105 M

Amis Constr Co Box 1871 Okla City Okla
Ellis Kans 30.62 KAA385 G
Potholes Dam Wash 30.62 28 KOA233 G
Cambridge Nebr 30.62 KAA559 G

Armco Steel Corp Ashland Ky
Butler Pa 152.93 10 KGA522 M

Arute Bros Co Williamstown NY
Mobile 154.49 3 KA4760 M

Ashbach-Steenberg Co 110 N G St Exeter Calif
Mobile 154.49 12 KMA432 M
154.49 KMA221 M

Assoc Pipe Line Contractors Box 2163 Houston 1 Tex
Temporary Bases 30.62 10 KKA864 M

Baldwin Locomotive Works Burnham Pa
154.49 12 KGA334 M

Bath Iron Works Corp 4 Union Bath Me
154.49 12 KCA217 B

J R Bazely Inc Box 117 Pottsville Pa
Temporary Bases 154.49 10 KGA425 M
KGA426

Becker Farms Rte 1 Croydon Pa
Bensalem Pa 152.99 5 KGA480 M

Bennett Well Serv Box 222 Graham Tex 49.94 12 KKA688 M

Birmingham Slag Co 2019 6th Av N Birmingham Ala
Ensley Ala 154.49 KIA629 R

George Bobo Co Grove City Pa 154.49 25 KGA337 M

Broadway Maintenance Corp 22-09 Bridge Pl Long Island City NY 152.99 150 KEA642 G

Brown & Root Inc 4300 Calhoun Rd Houston Tex
Temporary Bases 30.58 38 KKB292 L
KKB293 KKB294 KKB295

Brown Trucking Co Rte 2 Michigan City Ind 30.58 22 KSA371 M

John F Buckner & Sons 509 S Main Cleburne Tex
Mobile 154.49 10 KKA879 M
to KKA883

California Packing Corp 101 Calif St San Francisco 19 Calif
Yakima Wash 154.49 20 KOA406 M
Rochelle Ill 154.49 3 KSA383 M

Carnegie-Illinois Steel Corp Homestead Pa 154.49 8 KGA238 L

J W Carruth Contr Co 3170 Fla St Baton Rouge La 43.02 4 KKB366 M
Baywood La 43.02 KKB368 M

Central Iron & Steel Co S Front St Harrisburg Pa 154.49 15 KGA400 M

Collins Bros 12 Talmadge Pl Mechanicville NY 152.87 10 KEA488 M

Copano Cattle Co Victoria Tex 30.58 KKB513 K
Refugio Tex 30.58 30 KKA965 D

Deere Mfg Co Box 1595 Des Moines Iowa
Ankeny Ia 154.49 30 KAA751 M

Diamond Constr Co Box 549 Brunswick Ga 154.49 20 KIA515 M

Dickerson Inc Box 448 Monroe NC
Mobile 49.94 90 KA3795 M

Robert B Doe Rte 1 Box 123 E Norris Rd Bakersfield Calif 30.82 12 KMA222 K
KKA287 G

Dow Chemical Co Freeport Tex 30.58 KKA228 G
Collegeport Tex 30.58 KKA288 M
Velasco Tex 30.58 KKA290 M
Houston Tex 30.58 KKA289 M
Sweeney 30.58 40 KKA291 M

Dowell Inc Kennedy Bldg Tulsa Okla
Kermit Tex 43.18 50 KKA728 G
Midland Tex 43.18 KKA851 G
Hobbs NM 43.18 KKA850 G
Levelland Tex 43.18 KKA860 G

Eastman Kodak Co 343 State St Rochester NY 154.49 100 KEA449 M

E Texas Salt Water Disp Co Box 633 Kilgore Tex 43.10 6 KKB473 M

Erwin Newman Co Box 1308 Houston 1 Tex
Morgan City La 2.292 KKA801 R

Ewa Plantation Co Box 2990 Honolulu TH 152.93 30 KUA200

Fibreboard Products Inc Antioch Calif 154.49 2 KMA456 G

Ford Motor Co 3000 Shaefer Rd Dearborn Mich 154.49 KQA612 M

Frost Geophysical Corp 4410 S Peoria Tulsa Okla
Mobile 1.652 1.700 KA2706

Garwood Irrig Co Garwood Tex
Temporary Bases 35.46 9 KKA538 L
KKA539 KKA544

General Electric Co Electronics Park Syracuse NY Schenectady NY 154.49 15 KEA676 G

General Constr Co Hungry Horse Dam Mont 42.98 KOA318 M

Geneva Steel Co Box 269 Salt Lk Cty Utah
Geneva Utah 154.49 KOA453

Griffin Inc Lassen Av & Hway 198 Huron Calif 154.49 20 KMA625 M

Goetz Constr Co 199 W Washington Av Chambersburg Pa 30.62 5 KGA328 L

Granite City Steel Co 20th & Madison Granite City Ill 154.49 4 KSA279 M

J E Greiner Co 1201 St Paul Baltimore 2 Md
Mobile 35.02 4 KA2753 M

Nellie C Griffin 603 N 8th St Alpine Tex 43.14 5 KKB553 M

G G Griffin Constr Co 1225 W 3rd St Tulsa Okla
Mobile 43.02 15 KA4041 M

S J Groves & Sons 511 Wesley Temple Bldg Minneapolis Minn
Cairo Ill 152.93 5 KSA539 M
Whithee Wis 152.93 6 KSA435 M
Temporary Bases 152.93 KSA540 M

Gordon G Guiberson 3 G Ranch Davis Calif 152.87 6 KMA439 L

Gulf Veg & Fruit Co 504 E Railroad Weslaco Tex 30.58 10 KKA322 M

Gulf Welding & Machine Works Conroe Texas
Temporary Bases 30.66 5 KKA381 L

W D Haden Co 200 Haden Bldg Galveston Tex
Houston Tex 2.292 KBYA

Hammonds Ranch Inc Box 130 Firebaugh Calif 154.49 10 KMA592 L

Hanna Coal Co Adena Ohio 154.49 KQA611
Cadiz Ohio 154.49 17 KQA674 M

Harrison Constr Co Box 152 Marysville Tenn
Alcoa Tenn 30.58 12 KIA948 M

S A Healy Co 61 Westchester Av White Plains NY
Neversink NY 49.86 35 KEA413 X
Lackawack NY 49.86 KEA371 R

H-E-B Constr Co Box 633 Hobbs NM 49.86 10 KKB365 G

Hercules Powder Co Glynn Av & L St Brunswick Ga 154.49 2 KIA371 M

Chas E Hipp 1103 Bluett Graham Tex
Temporary Bases 43.02 24 KKB581 G
43.02 KKB317 G
KKB572 to KKB579

Horrigan Farms Prosser Wash 49.86 4 KOA490 G

Isbell Constr Co Santa Rita NM
Temporary Bases 154.49 KKA736 M
KKA737

Isabell-Hartner Ranches Inc Box 666 Glendale Ariz 152.99 5 KOA510 G

Kansas City Bridge Co 215 Pershing Rd Kansas City 8 Mo
Mobile 154.47 16 KA4309

Kelley-Generes Constr Co 4 Carondelet St New Orleans La 154.49 KKA657 B

Kennecott Copper Corp Kearns Bldg Salt Lake City Utah 152.87 15 KOA686 M
to KOA689

Santa Rita NM 154.49 30 KKA718 M

Peter Kiewit Sons Co Box 872 Porterville Calif 154.57 10 KMA300 B
King Farms Co Morrisville Pa 152.87 14 KGA460 M
Ladder Ranch Hot Springs NM 30.58 2 KKA884
KKA885

Latex Constr Co 2707 Ferndale Houston Tex
Temporary Bases 30.62 30 KKB409 M
KKB410 KKB411

Libby MacNeill & Libby Honolulu TH
Maunaloa TH 152.99 5 KU

Lowdermilk Bros Box 501 Los Alamos NM
Temporary Bases 154.49 25 KKE
to KKE

Lukens Steel Co Coatesville Pa 154.49 12 KG

Lynn Sand & Stone Co 30 Danvers Rd Swampscott Mass 152.18 20 WI

Manitowoc Shipbuilding Co Manitowoc Wis 154.49 15 KSA

Maydwell & Hartzell Inc 1238 NW Glisan St Portland Ore
Mobile 152.87 4 KA

McCarthy Improvement Co 602 Kahl Bldg Davenport Ia
Pickstown SD 154.49 4 KA
Mix Cnty SD 154.49 KA
KAA460 KAA461 KA

Temporary Bases 154.49 KA

J Ray McDermott & Co Box 38 Harvey La 2.292 50 KKB

Robert E McKee 1918 Texas St El Paso Tex
Temporary Bases 49.94 25 KKB
KKB225 KKB

McVean & Roberts Box 2607 Odessa Tex
Temporary Bases 30.62 25 KKB
KKB541 KKB

McWilliams Dredging Co 860 St Charles St New Orleans La
Mobile 33.46 42 KA2

Mercer-Frazer Co 2nd & Commercial Sts Eureka Calif
Samoa Calif 49.86 10 KM

Midland Elec Coal Corp Farmington Ill 154.57 2 KSA

Merritt-Chapman & Scott Corp Box 188 Wilmington 99 Del 154.49 18 KG

Clair H Milton Wheatland Wyo
Platte Cnty Wyo 154.49 5 KO

Minnesota Valley Canning Co N 5th St Dayton Wash 152.99 10 KO

Morrison Constructors Co Box 384 Odessa Tex
Temporary Bases 30.62 50 KKB
KKB703 KKB

L E Myers Co 314 E Wood St Decatur Ill
Mobile 154.49 95 KA2

National Steel Corp Weirton W Va 152.87 12 KQA

National Water Main Cleaning Co 50 Church New York 7 NY
Mobile 42.98 12 KCM

Clarence B Neidig 4197 S Ave Youngstown O
Mobile 33.14 35.02 3 KA2

NJ Bell Tel Co 540 Broad St Newark 1 NJ
Mobile 33.14 6 KA3

R W Nichols 513 Capital Nat'l Bank Bldg Austin Tex
Mobile 154.49 5 KA4

Oahu Sugar Co Fort & Queen Sts Honolulu TH
Waipahu TH 154.49 20 KUA

Odegard Farms Princeton Minn
Princeton Minn 154.49 7 KAA

Okla Contr Co 1210 Mercantile Bank Bldg Dallas 1 Tex
Temporary Basis 30.58 KKA
30.58 10 KKA
KKA

Oliver Iron Mining Co Wolvin Bldg Duluth Minn
Chisholm Minn 152.93 6 KAA

Pacific Bridge Co 333 Kearny St San Francisco Calif
Coulee Dam Wash 30.58 5 KOA

Pacific Engineering Co Box 252 S Bend Wash
Mobile 42.98 10 KA37

Parish Bros E 2nd & L Sts Benicia Calif 43.06 18 KMA

Parker Bros & Co 5303 Navigation Blvd Houston Tex 2.738 KHG

Commonwealth of Pa Education Bldg Harrisburg Pa
Mobile 152.99 30 KA2

B Perini & Sons Inc 73 Monawaite Av Framingham Mass
Middlesboro Ky 154.49 10 KIA6

S J Peterson Constr Co Box 277 Fairfax Mo 43.02 10 KAA

Peterson Engineering Co 4126 26th St San Francisco Calif
Mobile 154.49 15 KA4

Phelps Dodge Corp Morenci Ariz 154.49 54 KOA

R B Potashnick Box 205 Cape Girardeau Mo
Pine Bluff Ark 154.49 10 KKA

Potter DeWitt Corp Pavilion NY
Middlebury NY 30.62 100 KEA
Mt Norris NY 30.62 KEA
Batavia NY 30.62 KEA
Caledonia NY 30.62 KEA
Middlebury NY 75.50 KEA
Pavilion NY 72.66 KEA
Medina NY 30.62 KEA

L W Potter 403 Real Rd Bakersfield Calif
H C Price Co Box 149 Bartlesville Okla
Mobile 30.66 14 KMA
30.82 46 KA23

Producers Cotton Oil Box 518 Five Points Calif 49.94 12 KMA

Pullman-Standard Car Mfg Co 719 Wabash St Michigan City Ind 152.99 9 KAA

Putman & Greene Inc Box 205 Osceola Mills Pa 30.58 4 KGA3

Queen Creek Potato Growers Assn 350 Term Bldg Phoenix Ariz 154.49 6 KOA
Temporary Bases 154.49 KOA
KOA

Peter Rasmussen & Son Oshkosh Wis
Mobile 154.49 15 KA361

Reynolds Cattle Co 1906 Ft Worth Nat'l Bank Bldg Fort Worth Tex
Jeff Davis Cnty Tex 49.98 16 KKB51
Camp #1 49.98 KKB51
Camp #2 49.98 KKB51
Camp #3 49.98 KKB52
Camp #4 49.98 KKB52
Kent Tex 49.98 KKB51

Riverview Farms Box 258 Washington Av Oxford NY 49.98 KEA73

Rogers Canning Co 325 S Mill St Milton Ore 154.49 4 KOA46
Athena Ore 154.49 KOA46

Sanford Constr Co 509 W Texas Av Midland Tex 30.62 10 KKB41

Peter J Schweitzer Windom Minn 154.49 4 KAA54
Seabrook Farms Bridgeton NJ 154.49 30 KEA57

Edward R Siple Co 2545 San Fernando Rd Los Angeles 41
Santa Cruz Isle Calif 152.87 16 KMA60
KMA60

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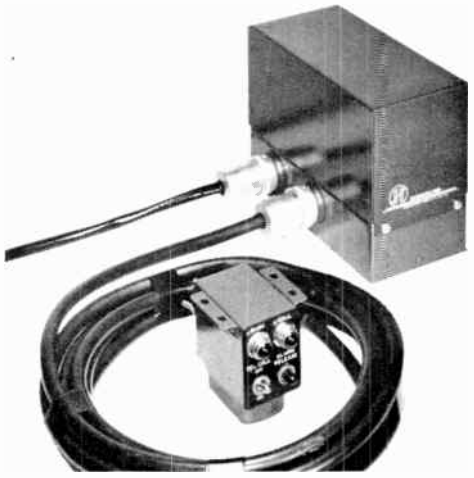

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Smith Bros Contractors
29 Algona Dr Vancouver Wash 154.49 8 KOA468 DK
Smith Coal Co Woonten Ky 153.59 2 KIA673 L
Coombs Ky 153.59 KIA674 L
Smith Constr Co 1000 44th Av N
Nashville Tenn
Mobile 154.49 61 KA4781 M
SE Utilities Serv Co Box 64
Miami 38 Fla
Mobile 30.62 24 KA4574 M
A E Staley Mfg Co
2200 E Eldorado St Decatur Ill 154.49 20 KSA419 M
R B Stovall Co 2909 Maple Av
Dallas Tex
Temporary Bases 49.94 10 KKB396 G
Sunlight Coal Co Boonville Ind 154.43 25 KSA216 G
Sunnyhill Coal Co 3090 W
Liberty Av Pittsburgh 16 Pa
New Lexington Ohio 154.49 9 KQA458 M
Sussex Poultry Co S Marshall St
Milford Del 154.49 15 KGA486 M
J A Terteling & Sons Box 1428
Boise Idaho
Wheeler Wash 30.58 10 KOA613 M

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75 E 45th St NY 17 NY
Wallisville Tex 30.62 20 KKA588 G
New Gulf Tex 30.62 KKB385 G
Timken Roller Bearing Co 1835
Dueber Av SW Canton Ohio 154.49 45 KQA683 M
H E Toney Rte 3 Eaton Ohio 154.49 6 KQA638 M
C H Trigg 1144 S 8th St
Yuma Ariz 154.49 5 KOA430 M
Andride Calif 154.49 KMA435 M
T B Tripp & Sons
1604 W 2nd St Odessa Tex 43.10 20 KKB397 M
Trojan Constr Co Box 4427
Okla City Okla
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R B Tucker Box 272 Arvin Calif 154.49 10 KMA548 M
Union Bag & Paper Corp
9 John St Hudson Falls NY 154.49 4 KEA436 X
United Aircraft Corp (Pratt & Whitney Div) 400 Main St
East Hartford Conn 35.46 11 KCA252 L
United Elec Coal Co
DuQuoin Ill 154.57 15 KSA275 M
Utilities Constr Co
4313 Marvin St Boise Idaho
Mobile 49.86 10 KA3712 L
Ventura Farms Frozen Foods
Box 752 Oxnard Calif 154.49 6 KMA512 M
Waialua Agric Co Waialua TH 154.47 35 KUA203 M
Watsonville Exchange Inc
Box 809 Watsonville Calif 49.94 15 KMA495 M

West Production Co Box 1679
Houston Texas 30.82 KKB324 L
Temporary Bases 154.57 KKA488 L
154.57 KKA497 L
154.57 KKA498 L
27.47 5 KKB311 L
Madisonville Tex 154.57 12 KKB320 L
The Western Co Box 5312
Seagraves Tex 43.02 30 KKB342 G
Odessa Tex 43.02 KKB333 G
Levelland Tex 43.02 KKB343 G
Eunice NM 43.02 KKB344 G
J O Willett Box 38 Monroe La
Mobile 30.62 15 KA4115 M
H W Winstead 104 Barnett Av
Roxboro NC 154.49 KIA933 C
Leasburg NC 154.49 KIA467 C
Y O Ranch Mountain Home
Kerr Cnty Tex
Chas Schreimer Ranch 43.02 20 KKB583 M
Zanetti Mining & Milling Co
Box 500 Wallace Idaho 154.49 4 KOA664 G
Osburn Idaho 154.49 KOA663 G

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Blvd Culver City Calif

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1.628 1.652 KM
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5451 Marathon St Los Angeles
Calif
Mobile 30.62 31.06 8 KA
33.54 35.54
Pictorial Productions Inc
1357 N Gordon St Hollywood
28 Calif
Mobile 30.62 31.06 2 KR
33.54 35.54 KR
152.75 153.53 153.47 152.81 2 KR
1.652 KR
Red Starr Sound Systems
1347 5th Av Los Angeles Calif
Mobile 30.62 31.06 33.54 32 KR
35.54 152.99 153.11 153.23 KR
1.652 6 KS
Twentieth Century-Fox Film
Corp 10201 West Pico Blvd
Beverly Hills Calif
Mobile 152.75 153.47 12 KQ
Warner Bros Pictures Inc 400
W Olive Av Burbank Calif
30.62 31.06 KM
33.54 35.54 KM
Mobile 30.62 31.06 33.54 35.54 18 KA
49.70 49.74 49.78 49.82 KA

PUBLIC UTILITY

Adams Cnty Coop Elec 606 8th St Corning Ia 153.71 10 KAKM M
Adams Cnty Coop Elec 606 8th St Corning Ia 47.98 14 KGA533 M
Shippensburg Pa 205 W King 47.98 KGA354 M
Adams EC 402 Henry Bank Bldg Camp Point Ill 37.62 15 KSA237 M
Adams Elec Lt 34 Spring Adams NY 39.66 3 WJSO M
Adams-Marquette EC Friendship Wis 158.25 8 WKQU M
Adams REC 201 E Main West Union Ohio 37.54 6 KQA355 M
Aiken EC Box 417 Aiken SC 48.18 15 KIA805 M
Alabama EC 225 Cotton Andalusia Ala 31.46 15 KIA203 M
Alabama Gas Corp 209 Montgomery St
Montgomery Ala 158.25 30 WSXJ M
Birmingham Ala 1200 6th Av N 31.46 51 WBXI M
Birmingham Ala 2501 N 29th St 31.46 WBXH M
Alabama Power Co 600 N 18th St
Birmingham 2 Ala 37.86 50 WGHA M
Anniston Ala 1201 Noble St 37.86 KIA583 M
Atmore Ala 37.86 KIA390 M
Clanton Ala 37.86 KIA226 M
Gadsden Ala 628 Broad St 37.86 KIA582 M
Mobile Ala Tenn St & Dexter Av 37.86 WFUB M
37.86 KIA642 M
Montgomery Ala 111 Dexter Av 37.86 WDPE M
Selma Ala 37.86 KIA302 M
Tuscaloosa Ala 2230 Broad St 37.86 KIA584 M
Tallassee Ala 37.86 KIA592 M
Wetumpka Ala Jordon Dam 37.86 KIA593 M
City of Alameda Oak & Santa Clara Av
Alameda Calif 153.53 10 KA3954 L
Alcorn Cnty EPA Waldron & Jackson Sts
Corinth Miss 30.86 5 KKA979 G
Alfalfa EC 315 E Main Cherokee Okla 153.71 12 KKA787 M
Allamakee-Clayton EC Postville Ia 39.66 7 KSWV M
Altamaha EMC Lyons Ga 37.62 6 WUAB G
Anoka Cnty Coop L&P Assn Anoka Minn 33.34 6 KGVV
Appalachian EC Jefferson City Tenn 153.71 8 KIA846 M
Appalachian Elec Pr 301 Virginia St
Charleston W Va 31.46 39.66 39.86 264 WMOF X
2.726 30 KA4189 M
Fieldale Va St Rte 57 31.46 39.66 39.86 KIA626 L
Lynchburg Va 523 Main 31.46 KIA627 L
Logan Co W Va Blair Mt 31.46 39.66 39.86 WAT1 M
Beckley W Va 306 S Kanawha St 31.46 39.66 39.86 WNPT L
Bluefield W Va 31.46 39.66 39.86 WCQL G
Cabin Creek Jct W Va 31.46 KQA334 L
Huntington W Va 31.46 39.66 39.86 WHTY L
Roanoke Va 328 Walnut 31.46 39.66 39.86 WRIS L
Stuart Va Main St 31.46 39.66 39.86 WMRH L
Arkansas-Missouri Pr Co Caruthersville Mo 158.25 40 KAA422 M
Blytheville Ark Railroad & Cherry 158.25 KKA444 M
Campbell Mo 158.25 KAA503 M
Mammoth Springs Ark 158.25 KKA502 M
Walnut Ridge Ark 158.25 KKA303 M
Arkansas P&L Co Pine Bluff Ark 37.18 31.46 183 KHQY LX
Arkins Ark Crow Mt 31.46 KKA432 M
72.18 KKA24 M
Batesville Ark 173 E Main 31.46 KKA622 F
Camden Ark 133 W Washington St 31.46 KKB296 L
El Dorado Ark 301 N Washington St 31.46 KKA831 L
Fordyce Ark 109 W 3rd St 31.46 KKB298 L
Glenwood Ark 31.46 KHKC F
Harrisburg Ark 31.46 KKA621 F
Hot Springs Ark 915 Central 31.46 KJQS F
Little Rock Ark 600 Garland Av 31.46 KHQL M
75.46 KKA23 M
Magnolia Ark 117 N Jefferson St 31.46 KKB297 L
Malvern Ark 31.46 KJJW F
Newport Ark 123 Walnut St 31.46 KKA620 F
Searcy Ark 107 W Arch St 31.46 KKA619 F
Stuttgart Ark 602 Main St 31.46 KSJT M
Arkansas Vlly ECA 28 E Sherman St Hutchinson Kan 37.54 10 KAA218 G
Arkansas Vlly EC 300 W College Ozark Ark 153.71 12 KPIB M
Waldron Ark 153.71 KKB291
Atchinson-Holt EC Rockport Mo 153.53 8 KAA733 M
Atlanta Gas Lt Macon Ga 220 2nd St 33.02 50 WKAE M
Atlanta Ga 1240 Caroline St 33.02 WKAG M
Rome Ga 235 W 1st St 33.02 WKAH M
Atlantic City EC 1600 Pacific Av Atlantic City NJ
Atlantic City NJ Missouri Av 31.46 39.66 39.86 70 WMWQ M
Bridgeton NJ Cohansey St 39.86 WDEH
Pitman NJ 31.46 39.66 39.86 KEA409 M
Wildwood NJ 31.46 39.66 39.86 WMWR M
City of Austin 300 West Av Austin Tex 158.25 25 KKA612 M
Earl W Baker Utilities 5934 NW 39th St
Oklahoma City Okla 153.41 15 KKB586 L
Baldwin Cnty EMC 110 Ohio St Robertsdale Ala 158.25 25 KIA602 B
Bangor Hydro EC 33 State Bangor Me 37.54 114 KA2904 G
Bar Harbor Me 16 Edgewood St 37.54 KCA345 G
Chamberlain Lake Me 37.54 KCA380 G
Eastport Me 37.54 KCA300 G
Ellsworth Me 63 Grant St 37.54 KCA346 G
Grand Lake Me 37.54 KCA344 G
Harrington Me 37.54 KCA325 G
Holden Me 37.54 KCA305 G
Howland Me 37.54 KCA323 G
Lincoln Me 37.54 KCA321 G
Machias Me Bridge St 37.54 KCA390 G
Milo Me Main & Elm Sts 37.54 KCA306 G
Medway Me 37.54 KCA353 G
Milford Me 37.54 KCA311 G
Millinocket Me 37.54 KCA322 G
Telos Lake Me 37.54 KCA381 G
Veagie Me 37.54 KCA310 G
West Enfield Me 37.54 KCA324 G
Barron Cnty EC Barron Wis 39.66 6 WUAD M
Barry EC 100 S Main Cassville Mo 158.25 10 KAA252 G
Bartholomew Cnty REMC 1136 2nd St
Columbus Ind 37.54 9 KSA209 ML
Bartlett EC Bartlett Tex 153.41 8 KKB554 M
Barton Cnty EC Lamar Mo 153.59 12 KIWY M
City of Beatrice Bd of Pub Wks Beatrice Nebr 153.47 10 KAA786 L
City of Beaumont Louisiana & Pine Sts
Beaumont Tex 31.46 35 KETX L
31.46 KBTQ G
Weiss Bluff Tex 31.46 KEEB G
Belmont EC State Rte 40 St Clairsville Ohio 37.54 4 WQZD M
Big Horn Cnty EC Lodge Grass Mont 153.71 7 KOA509 M
Big Sandy RECC Plaintsville Ky 37.62 10 WFGP G
Birmingham Elec Co 2100 1st Av N
Birmingham Ala 153.71 100 KIA389 B
B-K EC Wash & Pecan Sts Seymour Tex 37.74 7 KKA647 G

Black Hills P&L 621 State St Bell Fourche SD 37.78 KA2854 G
Custer SD 630 Custer Av 37.78 KAA410 G
Deadwood SD 67 Sherman St 37.78 KAA411 G
Rapid City SD 621 6th St 37.78 KAA354 G
Black Riv EC 13 Caldwell Sumter SC 37.70 10 KIA352 M
Black Warrior EMC Strawberry St Demopolis Ala 37.70 15 KIA607 M
Blackstone Vlly G&E Jenks Lane St Pawtucket RI 39.66 19 WQHG G
Woonsocket Rt Villa Nova St 39.66 WQHI G
Boone Cnty REMC Lebanon Ind 47.90 5 KSA384 M
Border Cnties Pr Coop Warroad Minn 153.71 4 KAA313 M
Little Ford Minn 153.71 KAA610 M
Boston Cons Gas 144 McBride St Boston Mass 39.86 16 WDDE M
Boston Edison Co 1165 Mass Ave
Boston Mass 39.66 153.59 75 WRIU L
Boston Mass 175 Alford St 39.66 WAAE L
Boston Mass 325 Cambridge St 39.66 WAZK L
Boston Mass 1205 Commonwealth Av 39.66 WAZC L
Boston Mass 776 Summer St 39.66 WAZD L
Boston Mass 669 South St 39.66 WAZE L
Boston Mass 182 Tremont St 39.66 WAZI L
Framingham Mass 19 South St 39.66 WLDT L
Weymouth Mass 87 Bridge St 39.66 WAZB L
Woburn Mass Cove St 39.66 WQWP L
Bowie-Cass EC Douglasville Tex 158.13 10 KKA235 M
Brazos Riv Transmission EC Granbury Tex 37.86 25 KCVM R
Belton Tex 37.86 KKA465 R
Waco Tex 5th & Austin Av 37.86 KKA260 R
Brockton Edison 150 Summer St Brockton Mass 31.46 30 WEKS G
Brockton Gas Lt Co 196 Grove St Brockton Mass 33.22 23 KCA448 G
Brooklyn Union Gas 8322 Ditmars Av Brooklyn NY 39.98 100 WNVG L
Brown Atchison ECA 924 Central Horton Kans 158.13 5 KAA223 M
Brown Cnty REA Sleepy Eye Minn 158.13 9 KAA477 M
Buchanan Cnty REC 201 2nd Av NE
Independence Ia 153.71 10 KAA568 R
Buckeye REC 143 3rd Gallipolis Ohio 37.54 10 KQA706 M
Buena Vista Cnty REC 725 Lake St Storm Lake Ia 37.86 10 KAA602 R
Buffalo EC Alma Wisc 39.66 8 WEXU M
City of Buffalo Filter Plt Jersey St Buffalo NY 39.66 WBQO X
Buffalo NY Intake Crib 39.66 WBQH X
Buffalo Niagara EC 535 Washington St
Buffalo 3 NY 31.46 47.82 85 KA4188 RM
Batavia NY 31 Franklin St 47.82 KEA564 M
Buffalo NY 93 Dewey Av 31.46 47.82 KEA563 R
Olean NY 14th & Henley 47.82 KEA562 M
Stockton NY 47.82 KEA282 M
Burt Cnty Ru Pub Pr Dist North 13th Tekamah Nebr 153.71 10 KAA431 G
Butler Cnty EC Allison Ia 37.86 8 KWEV M
Caddo EC Main & Caddo Sts Binger Okla 153.71 10 KVDC L
Calhoun Cnty EC 331 Court Rockwell City Ia 37.86 10 KAA684 G
California Elec Pr Control Station
Bishop Calif 31.46 37.70 27 KGYF M
37.70 KABM M
72.66 KMB44 M
75.50 KMB43 M
Blythe Calif 37.70 KGJF M
Calipatria Calif 37.70 KGJD M
Leevining Calif Sub Station 37.70 KAEI M
37.70 KMA227 M
San Bernardino Calif 1400 Oak St 37.70 KMA401 M
Tonopah Nevada 37.70 KGYB M
California Oregon Pr 209 N 6th St Grants Pass Ore 37.58 102 KCVY M
Alturas Calif Main St 37.58 KKLE M
Crescent City Calif 270 I St 37.58 KCVZ M
Dixonville Ore 37.58 KKUC M
Klamath Falls Ore Mill St 37.58 KKLB M
Lakeview Ore 37.58 KKLH M
Medford Ore 37.58 KQA390 M
Roseburg Ore 37.58 KKUF M
Callaway EC 10 E 4th Fulton Miss 153.65 4 KAWQ M
Cambridge Elec Lt 46 Blackstone St Cambridge Mass 158.25 20 WVER H
Caney Fork EC McMinnville Tenn 48.50 15 KIB272 M
Sparta Tenn 48.50 KIB271 M
Caney Vlly EC Assn Cedar Vale Kans 153.65 10 KAA739 M
Sedan Kans 153.65 KAA740 M
Canoochee EMC Reidsville Ga 153.71 6 KIA538 M
City of Canton Div of Water City Hall
Canton 2 Ohio 153.41 25 KQA347 L
Caprock EC 409 Peters Stanton Tex 37.74 5 KWEP M
Cape & Vineyard EC 396 Main St Hyannis Mass 39.66 19 WJKN L
Capital EPA Clinton Miss 33.34 12 KKB218 M
Carolina P&L 3 Manning Av Sumpter SC 37.62 200 WJSQ L
Asheville NC 37.62 WUGA L
Canton NC 155 Main St 37.62 KIA725 L
Florence SC 110 W Darlington St 37.62 WUGH L
Goldsboro NC 134 W Walnut St 37.62 WIJP L
Greeleyville SC Hway 621 37.62 WUGI L
Hartsville SC 37.62 KIA876 L
Henderson NC 133 Garrett St 37.62 WAKP L
Raleigh NC 513 W Jones St 37.62 WHNH L
Sanford NC 13 N Steel St 37.62 WIIG L
Carroll Cnty EMC 109 E Franklin St Delphi Ind 37.54 6 WCIQ M
Carroll EC South Lisbon Carrollton O 37.54 10 WGOJ M
37.54 KQA255 M
Carroll ECC Springfield & Church Berryville Ark 158.13 12 KKA606 M
Bentonville Ark 158.13 KKA607 M
Huntsville Ark 158.13 KKA608 M
Carroll EMC 32 Rome Carrollton Ga 37.54 8 KIA684 G
Carteret-Carven EMC Morehead City NC 153.47 6 KIB284 B
Cass Cnty EC Kindred ND 37.82 15 KSJC G
Cent Ariz L&P 3rd Av & Buchanan St Phoenix Ariz 153.59 60 KIOT R
Gila Bend Ariz Rock Mt 153.59 KSKE R
Maricopa City Ariz 72.66 W7XNT R
Phoenix Ariz Serv Bldg 72.66 W7XNV R
75.50 KOA68 R
153.59 KIOY R
153.59 KSKG R
Prescott Ariz Towers Mt 72.66 W7XN5 R
153.59 KSKF R
Central EC Parkers Landing Pa 37.62 10 WBUB G
Central EC 628 G St Redmond Ore 153.71 10 KMHN M
Central EMC Box 337 Sanford NC 153.71 8 WQQR M
Central EPA Carthage Miss 37.78 15 WHMN K
Central Hudson G&E 26 E O'Reilly St
Kingston NY 48.06 75.66 181 KEA641 L
75.66 KEA67 L
Catskill NY 4th Av 75.66 KEA640 L
75.66 KEA66 L
Newburg NY 256 Bway 48.06 75.66 KEA645 L
75.66 KEA69 L
Poughkeepsie NY 284 South Av 48.06 75.66 KEA643 L
75.66 KEA68 L
Central Illinois E&G Lincoln Ill 158.25 15 KSA304 M
Central Illinois Lt 146 S 3rd St DeKalb Ill 158.25 15 WNNV M

Cent Kans ECA 1906 Bway Great Bend Kans 153.71 15 KAA
Hanston Kans Logan & Main 153.71 KAA
Central Kans Pr Hays Kans 47.78 15 KAA
Atwood Kans 47.78 KAA
Wakeeney Kans 47.78 KAA
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Florence Ore Front St 37.78 KQA
Reedsport Ore City Hall 37.78 KQA
Waldport Ore Alsea Jct 37.78 KQA
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Bunkie La 39.98 KCC
Colfax La 39.98 KCC
LeCompte La Wall St 39.98 KPY
Mansura La 39.98 KCQ
Pineville La 39.98 KCC
St Landry La 39.98 KCC
Central Maine Pr 9 Green Augusta Me 47.98 30 KCA
Portland Me 125 St John St 47.98 KCA
Cent Massachusetts EC 465 N Main Palmer Mass 31.46 16 WHi
Cent Minnesota CPA Clements Minn 153.71 10 KAA
Cent Missouri EC 120 W 5th Sedalia Mo 37.86 8 KAA
Cent New York PR 725 Oswego St Syracuse NY 31.46 11 WPJ
Otisco NY 31.46 WIA
Cent Ohio L&P 120 N Main Findlay Ohio 153.71 25 KQA
Bluffton Ohio 153.71 KQA
N Baltimore Ohio 153.71 KQA
St. Marys Ohio 153.71 KQA
Wapakoneta Ohio 12 S Blackhoof St 153.71 KQA
Wooster Ohio 120 Beall Av 153.71 KQA
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39.66 KRM
San Benito Tex LaPalma Pr Plt 39.66 KCP
Pharr Tex 5th & Clark 72.34 WSJ
Cent Vlly EC 1109 W Merchant St
Artesia New Mex 39.98 3 KVG
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St Johnsbury Vt 37.54 27 WCI
Bennington Vt 37.54 WKT
Bradford Vt 37.54 WJE
Brattleboro Vt 37.54 KCA
Cavendish Vt 37.54 WJE
Claremont NH 37.54 WJF
Royalton Vt 37.54 WJE
Sherburn Vt 37.54 WJE
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Chattanooga Tenn 31.46 17 WBA
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Cherokee Cnty REC 112 S 4th St Cherokee Ia 158.13 4 KAA
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Leesburg Ala 153.59 15 KIA
72.22 KIA
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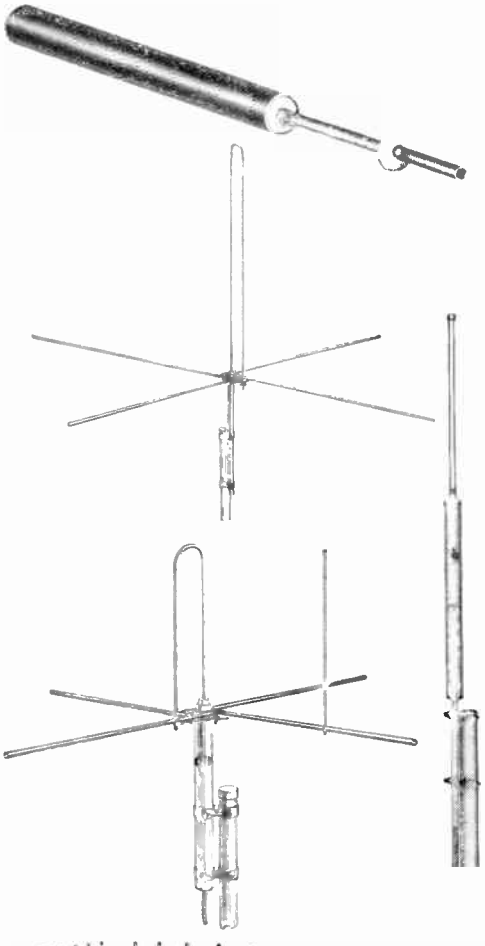
158.25 KSA
Chicago Ill 742 W Monroe Av 158.25 KSA
City of Chicopee 725 Front St Chicopee Mass 30.86 10 WJP
Choctawhatchee EC Baldwin Av
DeFuniak Springs Fla 37.78 7 KIA
Choptank EC Sudlersville Md 37.62 10 KGA
Citizens EC 260 Merchant St St Genevieve Mo 153.41 50 KAA
Altenburg Mo 153.41 KAA
Perryville Mo 329 N Jackson St 153.41 KAA
Claibone EC Ruston Hwy Homer La 48.26 8 KKB
Farmerville La 48.26 KKB
Clark Cnty REMC Sellersburg Ind 158.25 7 KSA
Clark EC 233 Main St Greenwood Wis 39.66 8 KSA
Clarke EC Inc 119 N Main Osceola Ia 153.71 12 KAA
Humeston Ia Main St 153.71 KAA
C-L RECC 152 N Drew St Star City Ark 153.71 12 KKA
Claverack EC 30 Cherry Montrose Pa 158.13 12 KGA
Lake Carey Pa 158.13 KGA
Towanda Pa 607 N Main St 158.13 KGA
Clay Cnty EC Water Tower Corning Ark 37.58 10 KAX
Clay EC Thrush St Keystone Hghts Fla 37.78 15 KIB3
Clay-Union EC Vermillion SD 37.66 6 KTH
Clearfield EC 212 N 3rd Clearfield Pa 37.62 15 WXV
Cleveland Elec Illum 75 Public Sq Cleveland Ohio 35.14 154 WTJ
Parma Ohio 35.14 WTJ
Thompson Village Thompson Twp Ohio 35.14 WTJ
W Saybrook Twp Ohio 35.14 WTJ
Clinton Pr Comm 310 Broad Clinton Tenn 37.50 15 KIA
Coahoma Elec Pr Assn 317 Delta Av Clarksdale Miss 37.78 12 WEJ
Tunica Miss 1220 S Edwards St 37.78 WEK
Coast Cntys G&E Blain St Santa Cruz Calif 39.66 14 KAE
Gilroy Calif 39.66 KFIB
Hollister Calif 39.66 KFIL
Watsonville Calif 39.66 KAF
Coffey Cnty REC Assn 215 N 3rd St Burlington Kans 153.53 10 KAA
Coles-Moultrie EC 212 N 20th Matoon Ill 37.62 10 KMA
Colorado Central Power 3470 S Broadway
Englewood Colo 33.30 60 KRYE
Ft Lupton Colo 319 Denver Av 33.30 KAA
Colorado Interstate Gas Co PO Box 1087
Colorado Springs Colo 39.98 50 KAA
39.98 KRAF
Denver Colo 700 S Colorado Blvd 39.98 KAA
Model Colo 39.98 KHG
Pueblo Colo Devine Comp Station 39.98 KHH
Lakin Kans 39.98 KPMI
Clayton New Mex Clayton Comp Station 39.98 KHIJ
Guy New Mex Cimarron Comp Station 39.98 KHH
Colorado Wyoming Gas 1755 Glenarm Pl
Denver Colo 37.62 12 KA23
City of Columbia 212 W 7th St Columbia Tenn 37.54 9 WDD
City of Columbus 589 Dublin Av Columbus O 158.25 20 KQA
Columbus & S Ohio Elec 215 N Front St
Columbus Ohio 47.78 122 KA39
Chilicothe Ohio Chestnut & Park Sts 47.78 KQA
Columbus Ohio 100 Hickory St 47.78 KQA
Harrison Ohio 47.78 KQA
Madison Ohio 47.78 KQA
Commonwealth Edison Co 2233 S Throop St
Chicago Ill 37.86 158.13 105 KSA6
Chicago Ill 6141 S Prairie Av 37.86 KSA6
Chicago Ill 72 W Adams St 37.86 KSA6
Chicago Ill 3400 N Calif Av 37.86 KSA6
Chicago Ill 1111 Cermak Rd 37.86 KSA6
Chicago Ill 3501 S Pulaski Rd 37.86 KSA6
Chicago Ill 2413 W Thomas St 37.86 KSA6
Chicago Ill 3200 E 100th St 37.86 KSA6
Kewanee Ill US Rt 34 37.86 KSA6

MORE *Andrew* FIXED STATION ANTENNA EQUIPMENT IS USED THAN ANY OTHER KIND!



HERE'S WHY: The topnatch engineering that only the world's largest antenna equipment specialists can give . . . the uniform dependability of Andrew equipment . . . its superior performance . . . the fact that only Andrew makes a complete line of fixed station antenna equipment.

But that's not all. An imposing parade of "firsts" maintain Andrew leadership. Some current Andrew "firsts" are 1) the exclusive Folded Unipole Antenna, 2) the new Hurricane Models, 3) the Corner Reflector Antenna, and 4) a Very High Gain Communications Antenna soon to be announced.

COAXIAL CABLE, Type 737. Significantly, there is more of this Andrew 7/8" diameter cable now in use than all similar makes combined! You get a bonus of extra miles added to your service radius because loss characteristics are exceptionally low.

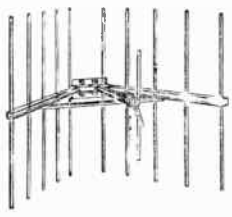
FOLDED UNIPOLE ANTENNAS. Another Andrew "first" and made only by Andrew. Thousands of these popular antennas are in use at fixed stations throughout the world. More new stations are using it than any other antenna. Users acclaim 1) its quieter reception produced by the grounded radiating element, 2) the excellent impedance match, and 3) its greater transmitting coverage.

Extra! Now available in Hurricane Models to insure uninterrupted operation when you need it the most.

COAXIAL ANTENNAS. Most economical where signal-to-noise ratio is high. Above 108 MCS only.

CARDIOID ANTENNAS. If you operate along a shore or border line and want your signal to cover only a certain 180° area, this rugged antenna is made to order for you. It concentrates your signal where you want it and doesn't waste radiation where you don't want it.

CORNER REFLECTOR ANTENNAS. For narrow angle coverage or point-to-point relaying. Concentrates your signal in the exact area where you want it, using a 60° beam. Avoids interference to and from the remaining area. For the 72-76 and 148-174 MCS bands. Only Andrew makes a commercial model of this special purpose antenna—another Andrew "first."



It will pay you, too, to use Andrew fixed station equipment. Write for further information—today!

VERY HIGH GAIN COMMUNICATIONS ANTENNA
(soon to be announced)

The highest gain antenna in mobile communications history. It actually delivers the full gain of 6.5 db as claimed—the same as increasing your power 4½ times! Think of the economy. Now, for the first time, you can cover areas you couldn't reach before! It's another pace-setting Andrew "first." Frequency range is 148-174 MCS.

Andrew CORPORATION
363 EAST 75th STREET · CHICAGO 19
World's Largest Antenna Equipment Specialists

TRANSMISSION LINES FOR AM-FM-TV • ANTENNAS • DIRECTIONAL ANTENNA EQUIPMENT • ANTENNA TUNING UNITS • TOWER LIGHTING EQUIPMENT • CONSULTING ENGINEERING SERVICES

Ogiesby Ill U S Rt 51 37.86 KSA676 M
Pekin Ill Aid Rt 10 37.86 KSA678 M
Community EC PO Box 48 Suffolk Va 153.71 6 WSXS M
Co-Mo EC Tipton Mo 158.13 8 WSFR M
Concho Valley EC 20 N Main St San Angelo Tex 37.78 10 KRGR W
Concordia EC Second St Ferriday La 47.78 9 KKA995 G
Connecticut L&P Clough Rd Waterbury Conn 39.86 12 WAVT L
Devon Conn Naugatuck Av 39.86 WAWF L
Montville Conn 39.86 WAVY L
New Milford Conn 39.86 WAWK L
Southington Conn Bellevue Av 39.86 WKMC L
Stevenson Conn Rte 34 39.86 WAWN L
Waterbury Conn 250 Freight St 39.86 WAVX L
Connecticut River Pr 1st Conn Lake Dam
Pittsburgh NH 37.86 21 KCA452 M
Barret Vt 37.86 WIWV M
Littleton NH 65 Main St 37.86 KCA453 M
Cons Edison Co of NY 4 Irving Pl New York NY 31.74 2 KA4382 W
153.41 118 KA4382 DL
153.41 KEA591 L
Cons EC 217 W Jackson St Mexico Mo 37.86 9 KSHD G
Cons Gas Elec L&P 501 E Madison St Baltimore Md 39.86 235 WAQI LM
153.71 25 WLIT M
Annapolis Md Ridout St 39.86 WCPK L
Big Gunpowder Falls Hartford Rd 39.86 KGA254 M
Rolling Rd N5 Powers Lane 39.86 KGA255 M
Bel Air 114 S Main 39.86 WNBL L
Westminster 39.86 WSTT L
Consumers Pr 212 W Mich Av Jackson Mich 37.62 37.70 1000 WRYN M
Adrian Mich 37.62 WOSI M
Alma Mich 37.62 WMSK M
Battle Creek Mich 37.62 WEQD M
Bay City Mich 37.62 WRYC M
Cadillac Mich 37.62 WMSN M
Flint Mich 37.62 WRYU M
Grand Rapids Mich 37.62 KQA317 M
Greenville Mich 37.62 KQA238 M
Hastings Mich 37.62 KQA235 M
Ionia Mich 37.62 KQA318 M
Jonesville Mich 37.62 KQA307 M
Kalamazoo Mich 37.62 WRYY M
Lansing Mich 39.86 KQA255 M
Manistee Mich 37.62 KQA306 M
Midland Mich 37.62 KQA236 M
Mt Clemens Mich 37.62 WRYW M
Muskegon Mich 37.62 KQA305 M
Owosso Mich 37.62 WFQC M
Pontiac Mich 37.62 WRYV M
Royal Oak Mich 37.62 WRYZ M
Saginaw Mich 37.62 KQA223 M
Tawas City Mich 37.62 KQA237 M
Consumers Pub Pr Dist 14th St & 25th Av
Columbus Neb 48.18 275 KA3918 M
Ainsworth Neb 48.18 KAA613 M
Albion Neb 48.18 KAA638 M
Beatrice Neb 48.18 KAA619 M
Belden Neb 48.18 KAA560 M
Clay Center Neb 48.18 KAA566 M
Fullerton Neb 48.18 KAA570 M
Geneva Neb 48.18 KAA562 M
Hartington Neb 48.18 KAA612 M
Humbolt Neb 48.18 KAA618 M
Kearney Neb 48.18 KAA617 M
Loup City Neb 48.18 KAA616 M
Nedigh Neb 48.18 KAA563 M
Norfolk Neb 48.18 KAA614 M
Oakland Neb 48.18 KAA611 M
O'Neill Neb 48.18 KAA615 M
Plattsmouth Neb 48.18 KAA567 M
Scribner Neb 48.18 KAA564 M
Seward Neb 48.18 KAA561 M
Spencer Neb 48.18 KAA565 M
Valentine Neb 48.18 KAA625 M
York Neb 48.18 KAA639 M
Cooke Cnty EC Muenster Tex 158.13 8 KKB555 M
Coop Electric Co Pleasant & 4th Sts St Ansgar Ia 39.66 8 KRKT M
Coos EC Coquille Ore 37.62 16 KOA327 F
Coosa V'ly EC 109 N East Talladega Ala 37.70 10 KIA293 M
Corn Belt EC 315 E Front Bloomington Ill 47.78 20 KSA664 M
Clinton Ill 47.78 KSA268 M
Cotton EC Bway & Okla Walters Okla 153.71 15 KQN5 L
Coweta Fayette EMC Box 261 Newnan Ga 153.41 6 WB275 M
Craighead EC 508 Main Jonesboro Ark 153.71 10 KOJC M
Crawford EC Gays Mills Wis 37.62 6 KSA632 M
Crow Wing Coop P&L 823 Maple St Brainerd Minn 48.34 20 KAA573 M
Cullman EC Second Av Cullman Ala 158.13 30 WXWK M
Cumberland Cnty Gas 209 High St Millville NJ 158.13 10 WHJE M
Cumberland EC Pub Sq Springfield Mo 37.54 20 WFGH M
Clarksville Tenn 99 Franklin St 37.54 WJPX M
Portland Tenn Main St 37.54 WMTJ M
Cumberland V'ly REC Box 865 Corbin Ky 37.62 12 KIA298 M
C&W REC Assn 815 Sab Clay Center Kan 158.13 10 KAA274 M
Dairyland Pr 407 River Bldg LaCrosse Wis 39.66 18 KSA234 M
Alma Wis 39.66 WETV M
Baldwin Wis 39.66 WKWG M
Chippewa Falls Wis 39.66 WDPD M
Genoa Wis 39.66 WKXB M
Dallas P&L 515 Park Av Dallas Tex 39.88 59 KJTB M
Davie EMC Mocksville NC 153.71 9 KIA501 M
Taylorsville NC 153.71 KIA499 M
Davies Martin Cnty REC 217 SE 3rd St
Washington Ind 37.54 10 WVKR M
Dayton P&L 25 N Main Dayton Ohio 39.86 50 WAMZ L
Dayton Oh o 409 E Monument Av 39.86 25 WOBR L
Coldwater Ohio State Rt 219 39.86 WJTX L
Barrysville Ohio 113 S Main St 39.86 WJTY L
Piqua Ohio 115 S Wayne St 39.86 WPDJ L
Russells Pt Ohio Orchard Isle Rd 39.86 WJTZ L
Sidney Oh o Campbell Rd 39.86 WJTQ L
Washington CH Ohio 101 E St 39.86 WBNJ L
W Alexandria Ohio 12 S Main St 39.86 WBNI L
W Urbana Ohio US Hway 36 39.86 WJTO L
Wilmington Ohio 503 N Columbus 39.86 WBNH L
Xenia Ohio 215 Sycamore St 39.86 WBNK L
Deaf Smith Cnty EC Hereford Tex 158.25 10 KKB234 M
Delaware P&L 600 Market Wilmington 99 Del 37.62 24 KGA523 G
Delaware REC 44 E Winter Delaware Ohio 158.13 6 KQA386 M
Delta EPA Box 935 Greenwood Miss 153.53 30 KKA987 R
E Cleveland Miss 153.53 KKA988 R
Indianola Miss 153.53 KKA983 R
Winona Miss 153.53 KKA990 R
Delta-Montrose Ru Pr Lines Delta Colo 37.54 15 KAA581 G
Detroit Edison Co 2000 2nd Av Detroit Mich
31.46 31.74 33.06 33.82 35.14 153 KA3246 L
37.18 37.82 39.34 39.66 39.86 KA3246 L
158.01 158.13 25 WEQQ M
31.46 39.66 39.86 WQJL L
WDAX M F
3,190 KQA65 F
959.70 WRQV X
Ann Arbor Mich 39.66 WGYF L
Bad Axe Mich 308 E Huron St 39.66 WCGZ L
Birmingham Mich 39.66 WFGY L
Caro Mich 196 N State St 39.66 KQA692 M
Detroit Mich 679 Ledyard St 153.53 WGYH L
Lapeer Mich 315 Cedar St 39.66 WMAV G
Marysville Mich Gratiot Rd 3,190 WEBO L
Pt Huron Mich 600 Grand River Av 39.66 WGYK L
Sandusky Mich 19 S Elk St 39.66 WSUP G
Superior Mich 401 S Main St 3,190 KQA64 F
Trenton Mich 952.30 WFVS M
Tn of Dickson 101 N Main Dickson Tenn 158.25 10 WDWL M
Dixie EMC 2900 North Baton Rouge La 37.62 21 KKA304 M
Greensburg La 37.62 KRGD G
Douglas Cnty L&P Alexandria Minn 31.46 15 KIA543 G
Douglas Cnty EMC Douglasville Ga 37.54 8 KQA614 M
Douglas EC 419 Pacific Bldg Roseburg Ore 153.71 15 KAA255 F
DS & O REA Coop Assn Solomon Kans 158.25 10 KIA312 M
Dubois Ru EC 502 Jackson Jasper Ind 37.54 6 KIA374 M
Duck Riv EMC 210 S Main Shelbyville Tenn 153.71 25 KIA598 M
Sewanee Tenn 153.71 10 WCBV M
Duke Power Co Charlotte NC 31.46 100 WETC L
Duquesne Light Co Springdale Pa 31.46 WETI L
Pittsburg Pa 435 6th Av 31.46 WETD L
Rochester Pa 31.46 WQHR M
W Mifflin Boro Pa 31.46 WQHO M
Wireton Pa 31.46 WFOL L
East Central Elec Assn Braham Minn 33.34 15 KAA334 M
E Mississippi EPA Meridian Miss 37.54 15 KKA725 K
72.06 KKA46 X
72.58 KKA47 X
DeKalb Miss 37.54 KKA694 K
Louisville Miss 37.54 KKA695 K
Quitman Miss 37.54 KKA689 K
The East Ohio Gas Co 1405 E 6th St
Cleveland 14 Ohio 158.25 50 WAXF L
Akron Ohio 158.25 KQA400 L
Jackson Twp Ohio 37.86 KQA403 L
Richfield Twp Ohio 37.86 KQA401 L
Wheeling Twp Ohio 37.86 KQA402 L
E towa L&P Washington & US Rte 61 Wapello Ia 33.34 20 KOCX M
Dewitt Ia 1505 6th Av 33.34 KOGV M
Wilton Jct Ia 5th & Sycamore Sts 33.34 KOFV M
Eastern Shore Pub Serv Co of Md 114 N Division St Salisbury Md 37.78 35 WKUN
Eau Claire EC Badger Av & U5 Hway 53
Eau Claire Wis 39.66 10 KSA572 M
Edgar EC Assn 219 N Main Paris Ill 37.62 10 WJGA M
Edgecombe-Martin Cnty EMC Tarboro NC 158.25 4 WMJF M
E Dist EC Inc Bamberg SC 47.78 10 KIA765 M
Egyptian EC Assn Hway 3 & MPRR Steelville Ill 37.62 43 WCYH GM
Carbondale Ill N Illinois Av 37.62 WCYN G
City of Elmira City Hall Elmira NY 153.71 10 KEA319 M
Empire Dist EC Church & Elliott Sts Aurora Mo 39.66 53 KCKJ G
Baxter Springs Kans 39.66 KYDA G
Belivar Mo 39.66 KDFQ G
Forsyth Mo 39.66 KAUP G
Gravette Ark 39.66 KTWN G
Greenfield Mo 522 College St 39.66 KWOV G
Joplin Mo 925 E 4th St 39.66 KFLC G
Neosho Mo 115 N Jefferson St 39.66 KSWJ G
Pierce City Mo 39.66 KWOJ G
Springfield Mo Nichols St 39.66 KVTF G
Empire Elec Assn 127 N Market Cortez Mo 33.58 4 KSGD G
Empire Gas & Fuel 80 N Main St Wellsville NY 37.54 20 WHYQ M
Erath Co EC 131 S Graham St Stephenville Tex 37.70 17 KWGT M
Escambia Riv EC Jay Fla 153.71 6 KIA245 M
City of Eugene City Hall Eugene Ore 75.62 20 KEPI L
Leaburg Ore Rte 2 75.62 KEPJ L
City of Everett 3006 Wetmore St Everett Wash 31.46 8 KFQB M
Lake Chaplain Wash 31.46 KHGN M
Panther Creek Wash 31.46 KHGP M
Excelsior EMC 30 S Broad Metter Ga 39.98 6 WKWE G
Exeter & Hampton EC South St Exeter NH 31.46 10 WAXA M
Faribault Cnty Co-op Elec Frost Minn 153.71 10 KAA489 M
Farmers EC Inc Greenfield Ia 153.71 10 KAA480 M
Farmers Ru EC 138 N Race Glasgow Ky 37.62 10 WIVO G
Federated REA 310 Sherman Jackson Minn 158.25 12 KUIV L
Welcome Minn 158.25 KVXA L
Firelands EC 33 Main New London Ohio 37.54 15 KQA436 M
First ECC Jacksonville Ark 153.71 27 KXZM M
Heber Springs Ark 153.71 KKA446 M
Perry Ark 153.71 KKA447 M
Fitchburg G&EL Co Fitchburg Mass 37.58 14 KCA483 G
Flathead EC Box 402 Kalispell Mont 47.94 8 KOA572 M
Fleming-Mason REC 225 Water St Flemingsburg Ky 37.62 24 WRXI G
Grayson Ky US Rte 60 37.62 WKJA G
Stanton Ky 37.62 WRYA G
Flint EMC Reynolds Ga 153.71 15 KIA341 M
153.71 KIA379 M
153.71 KIA380 M
153.71 KIA381 M
City of Florence Ala & Chestnut Sts Florence Ala 37.62 8 KIA430 G
Florida Pr Corp Fla Pwr Bldg St Petersburg Fla
St Petersburg Fla 16th Substation 31.46 76 WJTL M
St Petersburg Fla 1300 3rd St S 31.46 WJTR M
Florida P&L Co 25 SE 2nd Av Miami Fla 37.86 405 KIA601 X
153.71 25 KIA820 C
Bradenton Fla 37.86 KIA755 R
Cocoa Fla 37.86 KIA816 G
Cutler Fla 37.86 KIA530 M
Daytona Beach Fla Seagrave St 37.86 KIA831 G
Delray Beach Fla 37.86 KIA814 R
Ft Lauderdale Fla Broward Rd 37.86 KIA818 G
Ft Lauderdale Fla 318 NW 3rd St 37.86 KIA817 G
Ft Myers Fla 2010 Lee St 37.86 KIA825 M
Ft Pierce Fla Orange Av 37.86 KIA822 G
Hialeah Fla 9th & W 2nd Sts 37.86 KIA819 M
Lake City Fla St Clair St 37.86 KIA827 M
Lake Monroe Fla US Hway 17 37.86 KIA815 M
MacClenny Fla Hotel Annie 37.86 KIA828 M
Madison Fla 37.86 KIA721 R
Monticello Fla 37.86 KIA722 R
Naples Fla 37.86 KIA922 G
Pahoke Fla 8 Bacon Pt Rd 37.86 KIA823 G
Palatka Fla Greenleaf & Twigg Sts 37.86 KIA830 G
Perry Fla 37.86 KIA720 R
Punta Gorda Fla 37.86 KIA825 G
St Augustine Fla 118 Ribera St 37.86 KIA829 M
Sarasota Fla Orange Av & 18th St 37.86 KIA824 R
Starke Fla 37.86 KIA269 R
W Palm Beach Fla Charlotte Av 37.86 KIA821 G
Fontana Union Water Co Box 126 Fontana Calif 31.98 4 KSPM K
Forked Deer EC 111 S Front Halls Tenn 37.70 6 WUAJ G
Forsyth Cnty EMC REA Off Cumming Ga 158.25 10 WMVD M
Ft Belknap EC Olney Texas 48.26 10 KKB271 M
Ft Loudon EC Madisonville Tenn 37.86 12 WVCW M
City of Ft Wayne 308 E Berry St
Ft Wayne Ind 158.01 158.19 43 KSA310 M
Four Cnty EMC Box 57 Burgaw NC 158.25 8 KIA612 M
Elizabeth NC 158.25 KIA613 M
4-Cnty EPA Ackerman Miss 37.78 20 WJKZ M
Columbus Miss 5th St 37.78 KKA397 M
Franklin Cnty EMC Franklin Nebr 153.71 12 KAA259 F
Franklin EC Russellville Ala 153.71 12 KIA422 M
Red Bay Ala 153.71 KIA423 M
Franklin REC City Wtr Tr Hampton Ia 153.71 10 KRCQ M
Freeborn-Mower Coop L&P Assn Albert Lea Minn 39.66 10 KIAQ M
French Broad EMC Burnsville NC 158.25 10 WMTD M
Bakersville NC 158.25 KIA338 M
Fruit Belt EC Cassopolis Mich 158.25 10 KQA227 G
Vandalia Mich 153.71 KQA228 M
Fulton Cnty REMC Rochester Ind 37.54 6 WHMX M
Gate Cnty EC Childress Tex 37.54 6 KKA251 G
Georgia Pr Co Elec Bldg Atlanta Ga
Albany Ga 127 N Jackson St 37.62 WVMK G
Americus Ga 134 W Lamar St 37.62 WVMY G
Arco Ga 37.62 KIA255 L
Athens Ga 1004 Blvd 37.62 WRXR L
Atlanta Ga 1301 N Blvd NE 37.62 WRXQ L
Atlanta Ga Elec Bldg 37.62 WYMS M
Augusta Ga 15th & Green Sts 37.62 WKGA M
Baxley Ga 37.62 KIA254 L
Canton Ga 290 Main 37.62 WVMZ M
Carrollton Ga 14 Adamson Sq 37.62 WVMM M
Columbus Ga 19th & 2nd Av 37.62 WVMT G
Commerce Ga Pr Substation 37.62 WVMF M
Dalton Ga 37.62 KIA256 L
Dublin Ga 37.62 KIA257 L
Gainesville Ga 409 Oak St 37.62 WCKN L
Hartwell Ga 37.62 WVMW M
Lindale Ga Substation 37.62 WKEM G
Louisville Ga 124 Broad St 37.62 WVMX M
Macon Ga 315 Turpin St 37.62 WVMJ G
Manchester Ga 37.62 KIA258 L
Milledgeville Ga 37.62 KIA259 L
Putney Ga 37.62 KIA243 G
Smyrna Ga 37.62 WYMS M
Tallulah Falls Ga Hydro Plant 37.62 WCKJ L
Statesboro Ga 4 E Main St 37.62 WVMV M
Thomson Ga 849 Main St 37.62 WKFP M
Tifton Ga Love Av 37.62 WVMQ G
Vidalia Ga 37.62 KIA260 L
Georgia P&L Co 201 Parker Waycross Ga 158.25 45 KIB282 M
Bainbridge Ga 158.25 KIB283 M
Valdosta Ga Daniel Ashley Hotel 158.25 WBXB M
Gibson Cty EMC Broadway Obion Tenn 37.54 10 WUDY G
W Trenton Tenn 37.54 WUEC G
Godfrey L Cabot Bradley Comp Sta
Baileysville W Va 39.66 2 WDDJ M
Beckley W Va 224½ Main 39.66 WDDO M
Charleston W Va 123 Kanawha 39.66 WKJ
Lester W Va 39.66 WKG
Pineville W Va 39.66 WDE
Graham Cnty EC Pima Ariz 158.13 15 KOA
City of Grand Rapids Grand Rapids Mich 158.13 30 WIY
Allendale Mich 158.13 WIW
W Olive Mich 158.13 WIW
Grand Riv Dam Auth Langley Okla 31.46 14 KCH
Pryor Okla 31.46 KCH
Tulsa Okla 31.46 KTU
Grand V'ly Ru Pr Lines Grand Jct Colo 37.70 6 KAA
Grant EC PO Box 71 Lancaster Wis 39.66 12 WBX
Grayson-Collins EC PO Box 307 Van Alstyne Tex 153.71 10 KVV
Great Plains EC Brewster Kans 158.13 5 KAA
Greenbelt EC Wellington Tex 37.86 10 KKA
Green Riv RECC Owensboro Ky 37.62 12 WIT
Greenwood Cty Elec Pr Comm Greenwood SC 158.25 35 WIQ
Chappells SC 158.25 WIW
Grundy Cnty REC Grundy Center Ia 153.71 15 KAA
Grundy EC Trenton Mo 48.10 12 KAA
Guadalupe V'ly EC Gonzales Tex 153.71 15 KKA
Seguin Tex 153.71 KKA
Guernsey Muskigum EC 27 E Main
New Concord Ohio 31.98 4 WCS
Gulf Coast EC Wewahitchka Fla 37.78 8 KIA
Gulf Power Co 8 N Palafox St Pensacola Fla 153.59 58 WJP
Chipley Fla 153.59 WSV
Crestview Fla 290 Main St 153.59 WSV
Defuniak Fla 14 Baldwin Av 153.59 WSV
Panama City Fla Harrison Av 153.59 WJP
Gulf Pub Serv Co New Iberia La 37.54 10 KKA
Patterson La 37.54 KKA
Gulf States Utilities Neches Pr Plt Beaumont Tex 39.86 351 KGT
Baton Rouge La 1563 Govt St 39.86 WBR
Beaumont Tex 362 Liberty St 39.86 KGS
Calvert Tex Main St 39.86 KCF
Conroe Tex, 129 S Chambers St 39.86 KCF
Huntsville Tex 15th & Av I 39.86 KCF
Lafayette La 39.86 KGK
Lake Charles La 39.86 3 KCF
Navasota Tex Louise & Johnson Sts 39.86 KCF
Orange Tex Front & 1st Sts 39.86 KGT
Port Arthur Tex Houston Av 39.86 KGT
Huckensack Water Co Weehawken NJ 37.78 6 WDY
Hall Cnty EC Memphis Tex 37.54 10 KKA
Hamilton Cnty EC Assn Hamilton Tex 37.86 8 KWS
Hancock Cnty REMC Greenfield Ind 158.13 5 KSA
Hancock Co REC Assn Garner Ia 158.13 10 KAA
Hancock-Wood EC 116 S Main St N Baltimore Ohio 158.13 10 WLC
Harmon Elec Assn 114 N Main Hollis Okla 158.25 6 KCL
Harrison Cnty REC Cynthiana Ky 37.62 17 WFA
Bracken Ky 37.62 WEY
Harrison Cnty REC Woodbine Ia 158.25 5 KAA
Harrison Cnty REMC Corydon Ind 37.54 5 KSA
Harrison REA 917 W Pike St Clarksburg W Va 153.41 3 KQA
Hart Cnty EMC Depot & Carolina Sts Hartwell Ga 47.78 10 KIB2
Hartford Elec Lt Co 266 Pearl St Hartford Conn 39.66 22 KCA
Hawkeye Tri-Cty EC Cresco Ia 39.66 10 KAA
Henderson-Union RECC USH 41 & 60
Henderson Ky 33.58 12 WKV
Hickman-Fulton Cnties RECC 220 S Clinton
Hickman Ky 30.86 8 WOG
Hill Cnty EC W 2nd Havre Mont 37.78 6 KQO
Hill Cnty EC 212 Main St Itasca Tex 31.46 6 KTIB
Holmes REC Millersburg Ohio 37.54 8 KQA
West Salem Ohio 37.54 KQA
Holston EC 108 S Church Rogersville Tenn 158.13 10 WLFC
Holyoke Water Pr Co Water St Holyoke Mass 39.66 7 WBX
Home G&E Co 810 9th Greeley Colo 37.86 12 KHU
Hope Natural Gas Co Chelyan W Va 37.86 70 WDG
Clarksburg W Va 37.86 WUE
Corton W Va 37.86 WKX
Hastings W Va 37.86 WHN
Kopperston W Va 37.86 WWH
Lockney W Va 37.86 WVN
Marianna W Va 37.86 WDG
Houlton Water Co Houlton Me 37.86 4 KA24
Houston Cnty EC Water Tr Crockett Tex 37.70 10 KHA
Houston Industrial Gas Co 900 Main Houston Tex 37.54 20 KHK
Houston L&P Co 2114 Church Galveston Tex 39.66 212 KALH
Bellaire Tex 39.66 KXA
Freeport Tex 214 W Park St 39.66 KALP
Goose Creek Tex 301 Texas St 39.66 KALQ
Houston Tex 6200 Canal St 39.66 KXA
Houston Tex Elec Bldg 39.66 KXA
Houston Tex 1016 Walker St 39.66 KALU
Lamarque Tex Substation 39.66 KXA
Rosenburg Tex 39.66 KXA
Howard EC Commercial Bank Fayette Mo 158.13 10 KAA
Humboldt Cnty REC 419 Sumner St Humboldt Ia 37.86 10 KBNX
Huntington Cnty REMC 419 Poplar St
Huntington Ind 37.54 12 KSA2
City of Huntsville Dept of Elec
Huntsville Ala 106 Jefferson St 153.59 15 W4XS
Ida Cnty REC 401 Court Ida Grove Ia 153.71 6 KCFS
Idaho Power Co 621 S 17th Boise Idaho 37.46 153.59 80 KVWE
Illinois E&G Co 111 N 16th Herrin Ill 39.86 15 WBQ
Du Quoin Ill 39.86 WBQI
Marion Ill 39.86 WNW
Murphysboro Ill 39.86 WBQ2
Illinois Northern Utilities 421 1st Dixon Ill 158.19 100 KSA2
Aledo Ill 158.19 KSA3
Alpha Ill 158.19 KSA3
Belvidere Ill 158.19 KSA2
Freeport Ill 158.19 KSA2
Lena Ill 158.19 KSA2
Mendota Ill 158.19 KSA2
Oregon Ill 158.19 KSA2
Prophetstown Ill 158.19 KSA2
Sterling Ill 159.19 KSA2
Illinois REC Winchester Ill 47.78 25 WVJL
Pittsfield Ill 47.78 KSA6
Illinois V'ly EC 420 S Main Princeton Ill 37.62 10 WJJD
Univ of Ill c o J Doak Urbana Ill 158.25 30 KSA3
Indiana & Michigan EC 220 W Colfax Av
South Bend Ind
South Bend Ind 401 E Colfax 31.46 31.74 39.66 39.86 151 WAU
2,726 4 WAU
Allen Cnty RR 2 Leo Rd 31.46 39.66 39.86 WAJX
Bluffton Ind Horton & Johnson Sts 37.62 WCBR
Buchanan Mich 112 Days 31.46 39.66 39.86 WIGX
Butler Ind 238 S Bway 31.46 39.66 39.86 WRFG
Elkhart Ind 110 W Lex 31.46 39.66 39.86 WAK
Elwood Ind 31.46 39.66 39.86 WKQ
Ft Wayne Ind 1704 Webster 37.62 WDDF
Ft Wayne Ind 2101 Spy Run 37.62 WFIA
Hartford City Ind 31.46 39.66 39.86 WKQ
Marion Ind 120 Branson 31.46 39.66 39.86 WSA
Mishawaka Ind Pr Plt 31.46 KSA3
Muncie Ind 419 N Walnut 31.46 39.66 39.86 WSA
Indianapolis P&L Co 1230 W Morris St
Indianapolis Ind 31.46 31.74 33 WDBP
Inland Empire REA 325 Sprague St Spokane Wash 37.54 15 KOA3
72.70 KOA8
Steptoe Butte Wash 37.86 KOA5
75.50 KOA8
Intercounty EC Assn Licking Mo 158.19 15 KAA7
Intercounty Elec Assn Mitchell SD 48.06 6 KAA5
Inter-Cty REC 135 S High Hillsboro O 37.54 18 KQA4
Chillicothe Ohio 102 S Walnut 37.54 WULI
Intermountain REA Box 232 Littleton Colo 37.58 24 KAA5
Interstate Pr Co Serv Bldg Dubuque Ia 37.50 50 KTFU
Albert Lea Minn 37.50 KTEZ
Decorah Ia 110 Winnebago St 37.50 KAA3
Dyersville Ia 37.50 KAA4
Fulda Minn 37.50 KDMU
Iowa Elec Co Box B Guthrie Ctr Ia 158.13 10 KAA7
Iowa Elec L&P 213 2nd St NE Cedar Rapids Ia 37.62 50 KTFO
Iowa-Illinois G&E 1400 5th Av Moline Ill 39.66 60 WTYR
Iowa P&L Co 312 6th Av Des Moines Ia 39.66 115 KAA7
Adel Ia 39.66 KYBA
Avoca Ia 37.74 KGUM
Clarinda Ia 37.74 85 KGTQ
Colfax Ia 39.66 KYBC
Knoxville Ia 39.66 KYBB
Malvern Ia 37.74 KGBV

MOBILE RADIO HANDBOOK FIRST EDITION

Of all the radio books that have been published, here is the first complete handbook on mobile and point-to-point communications. Based on the new rules and allocations made effective by the FCC last July, the Mobile Radio Handbook covers this field from cost figures, system planning, and license applications, to maintenance, operation, and theory. Complete information is given for common carrier, public safety, industrial, and transportation services.

It is a big book, 8¾ by 11½ inches, of more than 200 pages, profusely illustrated with diagrams and detailed photographs of the latest types of equipment and installations.

This book has been planned to present practical, working information for company executives and public officials responsible for communication systems, as well as for radio engineers, supervisors, and operators. The chapters were written by men who are recognized authorities on the subjects treated. Milton B. Sleeper, publisher of *FM-TV* Magazine and one of the pioneers in mobile radio, is the Editor. Jeremiah Courtney, former FCC assistant general counsel and now a specialist in the mobile radio field, is Assistant Editor. Following is a list of the chapters, and a resume of the subjects covered:

1. PLANNING MOBILE SYSTEMS

General information for company executives, public officials and communications engineers on the layout of equipment and facilities for various types of systems, including data on the cost of equipment and towers.

2. FCC RULES AND ALLOCATIONS

Resumé of the rules, frequencies, and qualifications for each class of service, and a complete allocations table for the band from 30 to 30,000 mc.

3. HOW TO APPLY FOR A LICENSE

General instructions are given for selecting the proper FCC form, with step-by-step instructions for filling out a license application. There is also a list of FCC field offices, and the area served by each one.

4. FIXED AND MOBILE EQUIPMENT

Details of standard equipment for various service applications, and a complete table of specifications for all current types of fixed and mobile transmitters and receivers, including tube lists and current consumption data.

5. ADJACENT-CHANNEL OPERATION

A discussion of the engineering problems of adjacent-channel operation, and a description of equipment now available. This is a most important subject, in view of the new FCC rules applying to all transmitters which are installed after July 1, 1950.

6. SELECTIVE CALLING

Details of instantaneous and dial system, and their application to various types of mobile systems. This equipment deserves special attention, as the wide application of selective calling is expected to be the next big advance in mobile radio service.

7. TYPES OF ANTENNAS

Purposes and characteristics of various designs for specific types of communications systems.

8. ERECTION OF A GUYED TOWER

Detailed instructions for erecting a typical 105-ft. steel tower, with photographs showing progressive steps from start to finish.

9. POINT-TO-POINT SYSTEMS

Relays for remote transmitters, two-way communication for rural telephones, and multiplex systems, including cost-per-mile figures.

10. SYSTEM MAINTENANCE

Methods and records for routine maintenance of equipment, use of monitors, frequency meters and WWV calibrators, and FCC rules. Maintenance men will be particularly interested in the illustrations of typical service shops.

11. OPERATOR REQUIREMENTS

Training of operators, taking license examinations, FCC regulations concerning operators. Information presented on examinations for operators will be found particularly helpful.

12. FM THEORY

A thorough, non-mathematical explanation of frequency modulation transmission and reception, and the advantages of FM over AM for mobile systems.

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Missouri V'ly Ia Erie St			37.74		KIZG M
Oskaloosa Ia 1st Av & A St			39.66		KYBO M
Red Oak Ia			37.74		KSWH M
Shenandoah Ia			37.74		KGUV M
Iowa Southern Util Delaware Cnty Centerville Ia			158.13	30	KAA345 R
Corydon Ia			158.13		KAA344 R
Iroquois Gas Corp 249 W Genesee Buffalo NY			39.98	35	WTHN G
Buffalo NY 338 Bailey Av			39.98		WTHR G
Gowanda Village NY			39.98		WTHX G
Hamburg NY 301 Union St			39.98		WTHV G
Salamanca NY 38 Main			39.98		WTIO G
Irwin Cty EMC Box 125 Ocilla Ga			153.71	10	WAVF M
Jackson Cty REM 101 W Walnut St Brownstown Ind			39.66	8	WCGO G
Jackson Cnty RECC McKee Ky			37.62	20	KIA201 M
Jackson EC LaWard Tex			37.62	10	KTJP G
Jackson EC Inc Black Riv Falls Wis			39.65	6	WSXL M
Jackson EMC Jefferson Ga			37.54	10	WJDR M
Jackson Elec Dept 312 N Main Jackson Tenn			153.71	20	KIA308 M
City of Jacksonville 1040 Laura St Jacksonville Fla			31.46	100	WMQG M
James V'ly EC Box 175 Edgeley ND			48.18	10	KAA753 G
Jefferson Cnty EMC Louisville Ga			37.54	10	KIA622 G
Jefferson Davis EC 230 N Market Jennings La			153.71	10	KPGC M
Cameron La			153.71		KXAN M
Jefferson EC Brookville Pa			158.13	10	WILW M
Jersey Central P&L 501 Grand Av Asbury Park NJ			153.71	138	KGA325 L
Boonton NJ			153.71		WXSI L
Hightstown NJ			153.71		KEA226 L
Lakewood NJ			153.71		KEA225 L
Morristown NJ			153.71		WXSK L
Summit NJ			153.71		WXSQ L
Union Beach NJ			153.71		KEA227 L
Jo-Carroll EC Madison St Elizabeth Ill			37.62	6	WUSF M
Johnson Cty EC 114 W Chambers St Cleburne Tex			37.62	10	KSBO G
Jones Cty EPA 336 Ellisville Blvd Laurel Miss			158.25	12	KA740 M
Jones-Onslow EMC Jacksonville NC			158.25	12	KIAB34 G
Jump Riv EC Vosz Bldg Ladysmith Wis			39.66	6	WJRW M
Kandiyohi Coop Pr Assn 328 5th St W Willmar Minn			33.34	10	KJNL R
Kankakee V'ly REMC Wanatah Ind			33.58	10	WKAV M
Kansas City P&L 1330 Baltimore Av Kansas City 10 Mo	39.34	39.66	153.71	220	KQIG M
Brunswick Mo Broadway			39.66		KAWY M
Glasgow Mo			39.66		KAA323 M
Higginsville Mo Main St			39.66		KAXH M
Ottawa Kans 410 S Main			39.66		KBVX M
Sweet Springs Mo 117 S Miller			39.66		KAWX M
Kansas G&E Co 1900 Central Wichita Kans	37.70		37.82	160	KAOC R
Atlanta Kans			75.50		WØXID R
Cheney Kans			75.50		WØXIB R
Independence Kans 900 N 2nd St			37.82		KQXO R
			72.66		WØXIA R
Moline Kans			75.50		WØXIC R
Oxford Kans			75.50		KAA48 R
Pittsburg Kans			37.82		KAHK R
			72.66		WØXAB R
Strauss Kans			37.82		KAHJ R
			75.50		WØXIP R
Kans Nebr Natural Gas 300 N St Joseph Hastings Nebr			37.74	25	KCNS M
Colby Kans			37.74		KSHQ M
Cozad Nebr			37.74		KAA445 M
Deerfield Nebr			37.74		KRXO M
			37.74		KRXQ M
Holcomb Kans			37.74		KAA286 M
Holdredge Nebr			37.74		KSGH M
Otis Kans			37.74		KVPW M
Palco Kans			37.74		KRXP M
Pawnee Rock Kans			37.74		KQDY M
Phillipsburg Kans			37.74		KAA326 M
			72.66		KAA28 M
Scott City Kans			37.74		KICU M
Kansas P&L 808 Kansas Av Topeka Kans			37.62	130	KAA382 G
			37.62		KAA374 G
			37.62		KAA375 G
			37.62		KAA376 G
			37.62		KAA377 G
			37.62		KAA378 G
Abilene Kans			37.62		KAA383 G
Hutchinson Kans			37.62		KAA379 G
Manhattan Kans			37.62		KAA380 G
Salina Kans			37.62		KAA381 G
Kaufman Cnty EC Box 70 Kaufman Tex			37.70	10	KAA318 M
Kay EC 201 E Blackwell Blackwell Okla			75.42	4	KRZF L
Kentucky Utilities Limestone & Short Sts Lexington Ky			31.46	8	WCLI G
Ky & W Va Pr Co Lothair Ky			2.726	2	KIA400 M
	31.46	39.66	39.86	72	KIA400 LM
Ashland Ky			31.46		KIA754
Pikeville Ky	31.46	39.66	39.86		WSPZ M
Whitesburg Ky			31.46		KIA306 L
Kit Carson EC Taos New Mex			48.26	1	KKB529 P
City of Knoxville Wash & 6th Av Knoxville Tenn			31.46	37	WAWS X
Kootenai Elec Assn 117 Coeur D'Alene Coeur D'Alene Idaho			39.66	5	KIGN G
Koskiusko Cty REMC 102½ E Market Warsaw Ind			37.54	10	KSA409 M
Laclede EC 119 N Jefferson Lebanon Mo			153.71	15	KBPJ M
Lafayette EC 438 N Main St Darlington Wis			39.66	6	WSGH M
City of LaFollette 102 E Central Av LaFollette Tenn			37.78	10	WDRT G
City of Lamar 106 W Elm Lamar Colo			31.98	5	KRJY G
Lamar Cnty EC 1465 N Main Paris Tex			37.50	10	KXRD M
Lamb Cnty EC Littlefield Tex			37.54	10	KKA733 G
Larens EC 725 Irby Av Larens SC			37.70	10	WJMI M
Laurence G&E 173 Methuen Lawrence Mass			31.46	26	WMVU M
Licking Ru Electrification Inc 112 Main St Utica O			37.54	10	KQA395 M
Limestone Cnty EC Mart Texas			158.25	12	KKB202 M
Lincoln Cty EMC Fayetteville Tenn			153.47	10	KIA556 M
Lincoln EC 10th & Jeff Sts Davenport Wash			39.66	7	KCMA G
Lincoln-Union EC Alcester SD			158.25	6	KXXJ M
Linn Cty RECM 1138 7th Av Marion Ia			37.82	10	KAIP R
Little Ocmulgee EMC 323 Railroad Av Alamo Ga			158.13	10	WEXF M
Little Riv EC Abbeville SC			48.50	6	KIA970 M
Little Rock Wtr Wks Bway & Markham Sts Little Rock Ark			158.13	20	KQCK M
			158.13		KQCJ M
Village of Lodi Lodi Ohio	39.34		39.66	5	WJMZ L
Logan Cty Coop P&L Assn 1015 S Detroit Bellefontaine Ohio			158.13	6	KQA417 M
Long Island Lighting Co 250 Old Cnty Rd Mineola NY			37.62	75	KA4222 L
Bay Shore NY			37.62		KEA603 L
Glenwood Landing NY			37.62		KEA602 L
Northport NY Woodbine Av			37.62		KEA604 L
Port Jefferson NY			37.62		KEA320 L
Riverhead NY			37.62		KEA605 L
Roslyn NY 94 Powerhouse Rd			37.62		KEA606 L
Lorain-Medina REC 224 N Main St Wellington Ohio			158.13	15	WKYG M
City of Los Angeles Box 3669 Terminal Annex Los Angeles Calif	2.726	3.190	48.42	300	KMA442 L
	2.292	3.190	4.6375	2	KQT X
Boulder City Nevada	2.726		3.190		KIKH G
Independence Calif	2.726		3.190		KQS G
Silver Lake Calif			3.190		KIIG X
Victorville Calif			3.190		KIIE X
Louisiana P&L Co 142 Delaronde St New Orleans Ia La			39.66	169	KEFH M
Amite La Hway 51			39.66		KIAL M
			39.66		KKA323 M
Arabi La			39.66		KKA835 M
Bastrop La 225 E Jefferson			39.66		KIEJ M
Columbia La			39.66		KPDI M
Cotton Valley La			39.66		KKA668 M
Delhi La Hways 90 & 16			39.66		KKA209 M
Donaldsonville La			39.66		KICH M
Dubach La			39.66		KXEG M
Ferriday La 112 2nd St			39.66		KIDY M
Gibsland La 703 S 1st St			39.66		KIEI M
Gretna La			39.66		KKA727 M
Hammond La			39.66		KICC M
Haynesville La			39.66		KXEI M
Jonesboro La			39.66		KXDC M
Kenner La			39.66		KYJT M
Kentwood La			39.66		KXET M
La Place La			39.66		KXEU M
Lockport La Main St			39.66		KICF M
Luling La			39.66		KXEP M
Lutcher La			39.66		KXFA M
Metairie La			39.66		KICB M
Minden La			39.66		KIAM M
Montegut La			39.66		KXEV M
Napoleonville La			39.66		KKA792 M
Oak Grove La			39.66		KXEK M
Olla La 613 N Front			39.66		KICZ M
Ponchatoula La			39.66		KICE M
Rayville La			39.66		KXDY M
Sorrento La			39.66		KXEW M
Springhill La			39.66		KXDB M
St Joseph La			39.66		KKA207 M
Sterlington La			39.66		KEBW M
Tallulah La			39.66		KIDP M
W Monroe La			39.66		KIAN M
Winnesboro La			39.66		KICX M
Louisville G&E 731 Ormsby St Louisville Ky			31.46	33	WRHD L
Louisville Ky Muldraugh Comp Sta			31.46		WCZG
Lowell Elec Lt 107 Perry Lowell Mass			158.13	25	WITB M
Lowell Gas Lt 22 Shattuck Lowell Mass			153.71	25	WMFE H
Lower Colo Riv EC Giddings Tex			39.98	11	KCMD G
Brenham Tex 307 Church St			39.98		KWMZ
Buchanan Dam Tex			39.98		KWNP G
Peters Tex			39.98		KWNX G
San Marcus Tex			39.98	58	KHMD G
Lower Colo Riv Auth Box 1153 Austin Tex			39.98		KWNZ G
Kerrville Tex			39.98		KKA263 G
Marshall Ford Dam Tex			39.98		KKA326 G
New Braunfels Tex			39.98		KCLH G
Lower Yellowstone REA Sidney Mont			47.86	6	KOA595 M
City of Lubbock Lt & Wtr Dept 417 Av J Lubbock Tex			153.71	20	KKA741 M
Lumbee Riv EMC Raeford NC			153.59	8	KIA265 M
Lyon REC Rock Rapids Ia			153.71	10	KAA513 M
Lynn G&E 788 Broad Lynn Mass			158.13	25	WUAQ G
Lyntegar EC Sundown Tex			37.82	10	KBGW M
Tahoka Tex			37.82		KRLU
Macon EC Martin Bldg Macon Mo			153.59	15	KHZS M
Magic V'ly EC 638 S Tex Av Mercedes Tex		31.46	39.86	13	KMAJ G
Magnolia Elec Pr Assn 213 Canal McComb Miss			31.46	25	WMFK M
Maine Pub Serv 144 E State Presque Isle Me			37.86	21	WYSK M
			75.50		KCA62
Caribou Me			37.86		WYSF M
Castle Hill Me			37.86		WYSC M
			72.30		KCA63 M
Houlton Me			37.86		WYSR M
Madawasca Me			37.86		KCA329 M
Masardis Me			37.86		WYSV M
Millinocket Lake Me			37.86		KCA388 M
Malden EC 81 Center Malden Mass			153.71	15	WVJU G
Malden & Melrose Gas Lt 157 Pleasant Malden Mass			153.71	10	WVJW G
Marias Riv EC 413 Main Shelby Mont			37.86	12	KOA249 M
Marshall Cnty REMC 112 S Center Plymouth Ind			37.54	8	KULC M
Marshall Cnty REC 19 Center St Marshalltown Ia			37.86	5	KAA448 M
City of Marshfield 112 E Second St Marshfield Wis			39.66	4	WBZQ M
McCone Cnty EC Circle Mont			47.94	10	KOA660 M
McCook Pub Pr Dist No 79 305 Main St McCook Nebr			153.71	11	KAA331 F
McDonough Pr Coop US Rt 10 MaComb Ill			37.62	10	WRWY R
McLennan Cnty EC McGregor Tex			153.71	10	KSYX M
McLeod Coop Pr Assn 808 Franklin St Glencoe Minn			39.66	8	KRTG G
Meade Cnty RECC Brandenburg Ky			37.62	12	WHUQ G
Medina EC Hondo Tex			158.25	10	KASC M
Dilley Tex			158.25		KASV M
Uvalde Tex			158.25		KASO M
City of Memphis 179 Madison Av Memphis Tenn		39.34	39.86	116	WMJV M
Metropolitan Edison Co 141 S 7th St Reading Pa			37.18	47	WFAZ G
Easton Pa 160 Ferry St			37.18		WMZL G
Miami-Cass Cnty Ru Memb 58 E Main Peru Ind			37.54	7	WGIC M
Michigan Cons Gas Freeman Mich			37.78	12	WDIL L
Austin Mich			37.78		WDJR L
Goodwell Mich			37.78		WVSJ X
Mid-Carolina EC Lexington SC			153.71	8	KIA421 M
Mid Georgia EMC Vienna Ga			158.25	10	WSND M
Mid Tenn EMC Franklin Tenn			37.78	45	WAHH GM
Lebanon Tenn 220 E Main			37.78		WAIA G
Murfreesboro Tenn			37.78		WJSI G
Midwest Elec Spring St St Marys Ohio			158.13	10	WNMH L
Elida Ohio Greenlawn Av			158.13		WNHJ L
Mid-Yellowstone EC Hysham Mont			37.70	4	KSRK G
Millville Elec Lt Co Millville NJ			158.13	10	WUXP M
Minneapolis Gas Lt Co 700 Linden Av Minneapolis Minn			31.46	100	KIDJ G
Minnesota P&L 30 W Superior Duluth Minn			37.54	30	KSKH G
Minnesota V'ly Coop L&P Assn Montevideo Minn			48.46	12	KAA580 P
Minnkota Pr US Hway 81 Harwood ND			37.82	20	KUKC R
Grand Forks ND			37.82		KUKG R
Mississippi P&L Lampton Bldg Jackson 113 Miss			37.62	168	KKA265 K
Brookhaven Miss			37.62		KKA234 K
Byhalia Miss			37.62		WAGD K
Greenville Miss			37.62		WAWA K
Hernando Miss			37.62		WAUU K
Indianola Miss			37.62		WBOP K
Marks Miss			37.62		WAIX K
McComb Miss			37.62		WBSF K
Sardis Miss			37.62		WAUL K
Senatobia Miss			37.62		WAUP K
Tunica Miss			37.62		WASZ K
Mississippi Pr Box 1039 Gulfport Miss			158.13	100	WKMQ M
Bay St Louis Miss			158.13		WKMY M
Bay Springs Miss			158.13		WWVO M
Biloxi Miss			158.13		KKA449 M
Columbia Miss 721 Main			158.13		WKMT M
Forest Miss			158.13		WGSQ M
Hattiesburg Miss			158.13		KKA211 M
Laurel Miss			158.13		WGRP M
			158.13		KKA366 M
Meridian Miss			158.13		KKA448 M
Moss Point Miss			158.13		KKA297 M
			158.13		KKA425 M
Newton Miss			158.13		WKMS M
Pascagoula Miss			158.13		KKA210 M
Picayune Miss			158.13		KKA424 M
Poplarville Miss			158.13		KKA528 M
Quitman Miss			158.13		WGRQ M
Richton Miss			158.13		KKA212 M
Sumrall Miss			158.13		KKA365 M
Taylorsville Miss			158.13		KKB453 M
Union Miss			158.13		KKB452 M
Waynesboro Miss			158.13		KKB454 M
Wiggins Miss			158.13		WGSU M
Missouri G&E Serv 1108 Main St Lexington Mo			48.18	32	KKA364 M
Liberty Mo			48.18		KAA741 M
Platte City Mo			48.18		KAA744 M
Richmond Mo			48.18		KAA742 M
Missouri P&L 106 W High Jefferson Cty Mo			48.18		KAA743 M
Mexico Mo			158.25		KAA365 M
Missouri Pub Serv Warrensburg Mo			158.25		KAA366 M
Clinton Mo			37.54	104	KAA299 G
Lees Summit Mo			37.54		KDIE G
Nevada Mo			37.54		KDLO G
Sedalia Mo			37.54		KAA321 G
Trenton Mo			37.54		KAA446 G
Missouri Utilities 400 Bway Cape Girardeau Mo			37.54		KAA498 G
			158.13	15	KAA237 G
Mitchell Cnty EMC 109 S Scott Camilla Ga			37.54	11	WVJX M
Mobile Gas Serv 162 St Francis St Mobile Ala			153.71	20	KIA227 M
Modesto Irrig Dist Modesto Calif			2.292	23	KMA660 X
Monongahela Pr Box 1392 Fairmont W Va			37.18	55	WJBQ L
Elkins W Va 5th & RR			37.18		WJBU L
Howesville W Va Substation			37.18		WJBX L
Clarksburg W Va			37.18		KQA319 L
Webster Springs W Va			37.18		KQA449 L
Monroe Cnty EC 113 W Mill Waterloo Ill			158.25	10	WVCB G
Montana Pr 40 E Bway Butte Mont			158.13	126	KQII M
			2.726	21	KQIA G
Billings Mont			158.13		KIHE G
Bozeman Mont			158.13		KQHC M
Cut Bank Mont			158.13		KOA354 M
			158.13		KOA393 M
Great Falls Mont			158.13		KPCZ G
Hamilton Mont			158.13		KFJD M
Helena Mont Hauser Lake			158.13		KQFA M
Helena Mont 34 N Main			158.13		KH
Lewiston Mont			158.13		KD
Missoula Mont			158.13		KO
Morgan Cnty REMC 159 Main Martinsville Ind			39.66	5	WE
Morrow REC 75 S Cherry Mt Gilead O			37.54	6	KQ
Mountain EC Box 337 Mountain City Tenn		72.14	153.71	20	KIA
Newland NC			153.71		KIA
Pine Mt Tenn			153.71		KIA
			75.34		KIA
Mountain Fuel Supply 36 S State Salt Lake City 10 Utah			2.726	1	KO
			158.13	55	KO
Coalville Utah			2.726		KQ
Rock Spgs Wyo 615 Connecticut Av			2.726		KA
Narragansett EC 280 Melrose St Providence RI			39.86	55	WA
Westerly RI			39.86		WL
Nashville Gas & Heating 800 Church St Nashville Tenn			153.59	12	KIA
City of Nashville Elec Pr Bd 60S Church St Nashville Tenn			158.13	35	WL
Natchez Trace EPA Houston Miss			37.78	12	WD
Natural Gas Pipeline Co of America 20 N Wacker Dr Chicago 6 Ill			2.726	15	KIF
			33.26	52	WE
Natural Gas Serv Co of Ariz Box 127 Coolidge Ariz			37.54	20	KO
Navarro Cnty EC 214 N Main Corsicana Tex			47.78	10	KK
Nemaha-Marshall EC Assn Axtell Kans			158.13	8	KPI
Nevada Irrig Dist 144 S Auburn Grass Valley Cal		2.726	3.190	3	KN
New Bedford G&E Lt Co 5 Cannon St New Bedford Mass			39.66	18	KC
Wareham Mass			39.66		KC
Newberry EC Newberry SC			153.47	8	KI
New England Pr Box 380 Littleton NH			37.86	5	KA
Buckland Mass 45 Conway St		2.726	3.190		WA
Millbury Mass Grafton St		2.726	3.190		WA
New Era EC Box 270 Athens Tex			47.98	12	KK
New Jersey P&L 9 W Blackwell Dover NJ		75.42	75.50	200	WL
Flemington NJ 38 Main			75.50		WL
Glen Gardner NJ			75.50		KE
Hackettstown NJ 179 Main			75.50		WL
Milford NJ			75.50		KE
Newton NJ 217 Spring			75.50		WL
Phillipsburg NJ			75.50		WL
New-Mac EC Neosho Mo			153.13	10	KA
New Mexico Elec Serv Hobbs New Mex			37.86	28	KK
New Orleans Pub Serv 317 Baronne St New Orleans La			31.46	45	WL
New Orleans La 527 Magnolia St			158.19	35	WX
New Orleans La 3734 Tulane Av			31.46		WN
			153.59		WV
New Orleans La Market St		39.66	153.59	26	WC
New Orleans La Dwyer Rd			153.59		WV
New Orleans La Valence St			153.59		WV
New Orleans La Polymnia St			153.59		WV
New Orleans La PO Box 340			153.59		WV
New Orleans La Iberville St			153.59		WV
New Orleans La Elysian Flds			153.59		WV
Newport News Waterworks Comm 6100 Virginia Av Newport News Va			37.54	15	KIA
City of New York 120 Wall New York NY			37.46	10	KA
New York State E&G 62 Henry Binghamton NY			37.78	101	KE
Elmira NY			37.78		KEA
Hornell NY			37.78		KEA
Ithaca NY			37.78		KEA
Lancaster NY			37.78		KEA
New York State Nat Gas Genessee Pa			37.86	14	WB
Caledonia NY			37.86		WB
Lawrence Pa			37.86		WK
Otsco NY			37.86		WK
Waynesburg Pa Taylor Farm			37.86		WS
Wellsville NY			37.86		WB
Niagara Falls Pr Schoelkopf Gen Sta Niagara Falls NY			158.13	10	KEA
Nishabotna V'ly REC Harlan Ia			153.71	8	KA
Noble Cnty REMC Albion Ind			37.54	5	WN
Nobles Coop Elec 1121 3rd Av Worthington Minn			158.13	8	KA
Slayton Minn			158.13		KA
Nodak REC Grand Forks ND			37.82	10	KFH
Nolin RECC 101 S Main Elizabethtown Ky			158.13	5	KIA
Norris EC 103 W Jourdan Newton Ill			37.62	11	KSA
North Alabama EC Stevenson Ala			75.50		KIA
Cumberland Farms Ala			37.70	26	KIA
			72.66		KIA
North Arkansas EC Salem Ark			37.86	12	KQI
North Central EC Kibler St New Washington Ohio			158.13	8	WA
Attica Ohio 115 Rt 224			158.13		WSI
North Georgia EMC Dalton Ga			47.74	14	KIA
North Pine EC Finlayson Minn			153.71	10	KA
North Western EC 211 W Main Montpelier Ohio			158.13	10	WM
Northeast Okla EC 229 S Wilson Vinita Okla			153.71	12	KK
Northern Indiana Pub Serv 5265 Hohman Av Hammond Ind			39.86	132	
Angola Ind Sub Station			39.86		WM
Crown Point Ind			39.86		KSA
Fowler Ind 8th St			39.86		WS
Gary Ind			39.86		KSA
Goshen Ind W Washington St			39.86		WD
Hammond Ind 4621 Elm Av			39.86		WU
Hobart Ind			39.86		KSA
Kentland Ind W 108 Goss St			39.86		WSF
La Porte Ind 701 Washington St			39.86		WK
Michigan City Ind			39.86		KSA
Monticello Ind Hanswalt St			39.86		WSF
Plymouth Ind Lake Av			39.86		WM
Valparaiso Ind Washington St			39.86		WIK
Warsaw Ind 340 N Buffalo St			39.86		WM
Northern Piedmont EC 175 E Davis St Culpepper Va			153.59		WG
Northern States Pr 1600 Chestnut Av Minneapolis Minn			37.82	160	KTN
Minneapolis Minn 15 S 5th St			3.190		WLP
St Croix Falls Wis			3.190		WPL
Northfork EC Sayre Okla			153.71		KKA
Northwest Kansas ECA Bird City Kans			153.71	10	KAA
Norton-Decatur Coop EC 207 E Main Norton Kans			153.71	10	KAA
Nueces EC Robstown Tex			39.86	4	KBW
Nyman EC Center & Broad Stanton Ia			153.71	7	KOZ
O & A EC 26 State Newaygo Mich			37.86	15	WPP
Hersey Mich			37.86		WPC
Burnips Mich			37.86		WRX
Oakdale Coop Elec Assn US Hway 12-16 Oakdale Wis			39.66	7	WNL
Oconee EMC Dudley Ga			158.25	10	WDL
Ohio Edison Co Mad Riv Gen Plt Springfield Ohio			39.66	94	WLT
Akron Ohio			39.86		WO
Springfield Ohio 121 E High St			39.66		WRF
Youngstown Ohio			31.46		WQI
Ohio Fuel Gas Comp Sta So Point Ohio			33.34	75	WN
Columbus Ohio			33.34		KQA
Pavonia Ohio			33.34		KQA
Sugar Grove Ohio			33.34		WNT
Wellston Ohio			33.34		WXI
Ohio-Midland L&P 10 S High St Canal Winchester Ohio			37.54	6	WEI
Ashville Ohio			37.54		WM
Ohio Power Co 606 2nd St SE Canton Ohio		31.46	39.66	39.86	281 WCE
				2.726	4 WOI
Bellaire Ohio		31.46	39.66	39.86	WAI
Cambridge Ohio		31.46	39.66	39.86	WOI
Crooksville Ohio				39.86	WAC
Hicksville Ohio				39.86	WO
Kenton Ohio		31.46	39.66	39.86	WAI
Lancaster Ohio		31.46	39.66	39.86	KQA
Leipsic Ohio		31.46	39.66	39.86	WCI
Lima Ohio		31.46	39.66	39.86	WCL
Mt Vernon Ohio		31.46	39.66	39.86	KQA
Newark Ohio		31.46	39.66	39.86	WM
Newcomerstown Ohio		31.46	39.66	39.86	WKI
New Philadelphia Ohio		31.46	39.66	39.86	WOI
Roscoe Ohio		31.46	39.66	39.86	WOI
Tiffin Ohio		31.46	39.66	39.86	WDE
Van Wert Ohio		31.46	39.66	39.86	WCL
Vernon Jct Ohio		31.46	39.66	39.86	WAF
Zanesville Ohio				39.86	WAJ

PUBLIC UTILITY, Cont.

rs Alliance Ohio	39.34	39.66	493	KA2355	L
		39.66		WAHI	L
		39.66		WJPH	L
		39.66		WKBJ	L
		39.66		KQA428	L
		39.66		WIYQ	L
Ohio		39.66		WKPO	L
hio		39.66		WQWX	L
		39.66		WEBW	L
St Rte 203		39.66		WRQD	L
hio		39.66		WRQW	L
Ohio		39.66		WMLY	L
		39.66		WKVU	L
hio		39.66		WRRA	L
Ohio		39.66		WAWM	L
		39.66		WMLX	L
homa—Water Dept					
ity Okla 5th & Pa Sts		153.59	25	KKB256	L
ity Okla 4th & Pa Sts		153.59		KKB257	L
City Okla Lake Hafner		153.59		KKB258	L
&E 321 N Harvey St					
ity Okla		39.66	98	KRMH	L
		3.190		KEXC	X
		3.190		KEXA	X
		39.66		KUCP	L
rk		3.190		KEXD	X
		39.66		KQMO	L
		39.66		KRMI	L
Okla		3.190		KEXS	X
		39.66		KAMO	L
City Okla 420 S Bway		39.66		KRMH	
kla		39.66		KBTS	L
Pr Dist 17th & Harney Sts					
ebr		37.70	60	KAA468	M
REMC 235 S 2nd Orleans Ind		37.54	6	KSA233	M
EC Assn Butler Mo		158.19	12	KWVI	M
RECC Owenton Ky		37.62	18	WRFJ	MG
		37.62		KIA358	G
FC 5th & Poplar Sts Poplar Bluff Mo		153.47	15	KAA336	M
ox 481 Mt Vernon Mo		153.71	20	KWSX	G
Mc		153.71		KXYH	G
17 N Block St Fayetteville Ark		39.98	10	KCLM	M
kla		39.98		KFQO	M
245 Market San Francisco Calif		158.25	85	KHUL	L
		153.59	36	KMA636	L
		158.13		KMA638	L
		158.13		KMA637	L
ing Calif		158.13		KPGE	L
ilf 17th & Clay Sts		153.71		KHUK	L
Calif					
ing Corp 810 S Flower St					
s 14 Cal	2.292 31.74	33.06		KABS	
	2.292 31.74	33.06	14	KRML	M
Co 920 SW 6th Av Portland Ore		39.86	41	KKPH	M
		39.86		KCA222	M
Ore		153.59		KOA386	M
r Ore		153.59		KOA385	M
h		153.59	73	KAZB	M
Wash		153.59		KOA219	M
Wash Sub Station		153.59		KTLU	M
a Wash 6th & Rose Sts		153.59		KSXE	M
ash		153.59		KOA321	M
astern Pipeline 1221 Baltimore Av					
y Mo		39.86	206	KPHD	M
ns		39.86		KPHE	M
d		39.86		WWVU	M
Mo		39.86		KNHJ	M
Mo		39.86		KPHF	M
h 3700 Greenfield Rd		39.86		WFYF	M
		39.86		KPHK	M
Ind		39.86		WPYB	M
		39.86		KKA624	M
II		39.86		WPZY	M
g Kans		39.86		KPHG	M
Tex Hardesty Station		39.86		KPHL	M
ns		39.86		KPHP	M
ich		39.86		WDYP	M
Cans		39.86		KTSQ	M
Mo		39.86		KLAH	M
ns		39.86		KCKX	M
Kans		39.86		KLAY	M
Ohio		39.86		WQQF	M
314 W Love St		39.86		KDGO	M
a Ind		39.86		WPHW	M
		39.86		KFOH	M
s		39.86		KAA348	M
II		39.86		KSA322	M
ill III		39.86		WPIB	M
Prospect Hill		39.86		WIHK	M
ans		39.86		KUBQ	M
a		39.86		KIUG	M
		39.86		WPZZ	M
Ind		39.86		WQEB	M
6 E Callender Livingston Mont		37.54	9	KOA637	M
REMC 119 W High St, Rockville Ind		37.54	8	WDSS	M
adena 100 N Garfield St Pasadena Calif		153.71	15	KAVF	M
stnam EC 101 N Main St Paulding Ohio		158.13	12	WFIE	M
Grove Ohio		158.13		WRTR	M
y EMC Wachula Fla		153.71	8	KIA200	L
ly EPA Columbia Miss		158.25	30	KKA858	M
EC Fredericksburg Tex		39.98	32	KPED	G
a		39.98		KPEF	
sty Tex		39.98		KPEG	
		39.98		KPEE	G
AC 46 S Rutherford St Wadesboro NC		158.13	8	WSHA	M
Elec Assn W Washington St Pella Ia		153.71	7	KIGI	R
anklin EC 325 S 3rd St Hayti Mo		153.65	20	KAMY	M
Lt Co Grg Harbor Wash		158.25	10	KA2016	M
ia EC 222 Levergood St Johnstown Pa		39.86	138	WIUT	L
		952.70		KGA81	
a		39.86		WMTS	L
		39.86		WMYV	L
o Twp Pa		39.86		WMSV	L
Twp Pa		39.86		KGA399	L
vp Pa		39.86		KGA309	L
wp Pa		39.86		KGA224	L
a		959.50		KGA82	
ia P&L 9th & Hamilton Sts					
a Pa	37.82	39.86	188	WFAE	L
rg Pa		39.86		WKQY	L
a Pa 10th St		39.86		WFAF	L
a		39.86		WHTP	L
Pa 117 E Broad St		39.86		WFGR	L
Pa		39.86		WHTO	L
o Pa		39.86		WFAD	L
Pa		39.86		WJIK	L
ort Pa		39.86		WKQX	L
rre Pa		39.86		WHLX	L
ia Wtr & Pr Holtwood Village Pa		30.86	45	KGA262	M
en Village Md		30.86		KGA313	M
EC Hway 100 Russellville Ky		37.86	28	WUEE	
		37.86		WUEM	
oop Pr Assn 11 3rd St SE					
Minn		37.78	11	KHCH	G
&E Mason City Ia		48.18	30	KAA770	M
as Lt & Coke 122 S Michigan Av					
3 III		153.41	100	KSA469	M
		153.41		KSA470	M
		153.41		KSA471	M
at Gas 545 Wm Penn Pl Pittsburgh Pa		37.66	60	WCZI	L
		37.86		WJHT	L
a Comp Station		37.86		WUEA	L
Pa		158.25		KGA354	L
hela Pa		37 86		WEQC	
Twp Pa		37 86		WJHE	L
DBA Westwood Wtr Util Co					
Ariz		30.86	5	KCTU	X
ia EC 2301 Market Philadelphia Pa		37.54	150	WQLZ	M
		37.70		WQLP	M
		37.70		WQRL	M
en Pa					
ps Gas & Oil Tarentum Pa		33.58	20	WJDY	L
a		33.58		WJGY	L
a		33.58		KGA206	L
EMC Houston & 3rd Selmer Tenn		37.54	10	KIA434	G
EMC S Churton Hil'sboro NC		37.86	6	WHMV	M

Pierce-Pepin EC Ellsworth Wis		39.66	8	WJQV	G
Pioneer Coop Assn Ulysses Kans		153.71	10	KAA787	L
Pioneer EC Box 401 Greenville Ala		37.70	10	KIA537	B
Pioneer REC Piqua Ohio		158.13	15	WKTC	M
Urbana Ohio		158.13		WKMI	M
P K M EC 404 May St Warren Minn		37.82	10	KAA324	R
Plymouth Cnty EC Water & Leyden Sts					
Plymouth Mass		39.66	16	KCA429	L
Wareham Mass		39.66		WHTR	
Plymouth EC Le Mars Ia		33.34	8	KXOJ	G
Plymouth Gas Lt 727 Mass Av Cambridge 39 Mass		39.66	2	KA3924	L
Pocahontas Cnty REC Pocahontas Ia		37.86	10	KSTG	R
Pointe Coupee EMC New Roads La		33.58	5	KRPQ	G
Polk-Burnett EC 4th & Mich Sts Centuria Wis		39.66	6	WDJU	M
Pontotoc EPA 215 E Liberty St Pontotoc Miss		158.13	12	WMJC	M
Portland Gas & Coke Portland Ore		31.74	2	KGFT	M
Portland GE Co 621 S Adler St					
Portland Ore	31.74 33.82	75.50	131	KGEN	GL
		75.50		KAZJ	
		2.292		KQEB	X
Three Lynx Ore		75.50		KRKX	
Potomac Elec Pr 929 E St NW					
Washington DC	2.726	33.82	174	WSIB	GL
Potomac Edison Co, 55 E Washington St					
Hagerstown Md		158.25	4	WVQO	L
		158.25		KSA426	M
Price EC Phillips Wis		158.25	8	WUYB	M
Prince George EC Hunter St Waverly Va		37.54	23	KXPH	M
Producers Pipeline & Gas Hays Kans		37.54		KXPL	M
Otis Kans					
Provincetown L&P 104 Bradford St					
Provincetown Mass		39.66	4	WJPN	H
Pub Serv Co of Colorado 1123 W 3rd Av					
Denver Colo		37.62	50	KPSD	
Pub Serv Co of Indiana Kokomo Ind		37.82	111	WEQP	X
Marion Ind		37.82		WKKI	L
Terre Haute Ind Pr Station		37.82		WNVV	L
Terre Haute Ind 118 N 9th St		37.82		WNVW	L
Pub Serv of New Hampshire 1087 Elm					
Manchester NH		158.25	26	WEXA	M
Pub Serv Co of New Mex Box 1360					
Albuquerque New Mex		47.86	20	KKB372	G
Santa Fe New Mex		47.86		KKB373	G

Pub Serv Co of No Illinois 72 W Adams St					
Chicago 3 III		153.71		WXAR	M
Bourbonnais III		153.71	108	WGTZ	M
Homewood III		153.71		WXAN	M
Minooka III		153.71		WXAS	M
Fontiac III		153.71		KSA202	M
Sparland III		153.71		WXCF	M
Streator III					
Pub Serv Co of Oklahoma 600 S Main St					
Tulsa Okla		39.86	49	KGNS	GL
Pub Serv Elec & Gas I Newman St					
Hackensack NJ		37.18	214	WCHC	L
Camden NJ 17th St		37.18		WCIH	L
Elizabeth NJ 900 W Grand St		37.18		WCIA	L
Irvington NJ 938 Clinton St	37.18	158.13	37	WCIK	L
Jersey City NJ 107 NY Av		37.18		WNPF	L
New Brunswick NJ 268 Baldwin St		37.18		WMQV	L
North Caldwell NJ		158.25		KEA405	L
Paterson NJ 31 Van Houten St		37.18		WCID	L
Princeton NJ Substation		37.18		WFPI	L
Trenton NJ 225 N Warren St		37.18		WCIE	L
Pub Utilities Dist 1 of Clark Co 710 King St					
Vancouver Wash		158.13	40	KACH	M
Camas Wash		158.13		KOA573	R
Pub Utilities Dist 1 of Cowlitz Co LB Mill Site					
Longview Wash		37.66	20	KOA317	G
Pub Utilities Dist 2 of Grant Co 63 B St					
Ephrata Wash		158.13	18	KJHM	M
Moses Lake Wash		158.13		KOA641	M
Pub Utilities Dist 1 of Klickitat Co					
White Salmon Wash		158.25	10	KOA217	M
Centerville Wash		158.25		KOA218	M
Pub Utilities Dist 1 of Lewis Co 981 Pacific Av					
Chehalis Wash		39.66	4	KAAU	R
Morton Wash		39.66		KAAY	R
Puerto Rico Aqueduct & Sewer Auth Filtration Plt					
Guyanbo PR		153.71	10	WWA208	M
Cipra PR		153.71		WWA210	M
Santurce PR		153.71		WWA209	M
Puerto Rico Water Res Auth San Juan PR					
Rio Piedras PR	2.726	39.66 153.41	84	WWA300	XG
		153.53 158.13		WWA24	M

PUBLIC UTILITY, Cont.

Arecibo PR Dos Bocas H-E Pl			2.726	WQUL	X	
			153.41	WWA207	M	
			153.53	WWA27	M	
Bayamon PR			153.41	WWA218	M	
			153.53	WWA33	M	
Caguas PR			153.41	WWA215	M	
			153.53	WWA30	M	
Ceiba PR			153.53	WWA203	M	
			153.53	WWA35	M	
Guayama PR			2.726	WAJU	X	
			153.41	WWA204		
			153.53	WWA28		
Humacao PR			153.53	WWA34	M	
Jayuya PR		153.41	158.25	WWA22	M	
Luquillo PR		153.41	158.25	WWA23	M	
Maricao PR		153.41	158.25	WWA21	M	
Mayaguez PR		2.726	153.41	WWA206	X	
			153.41	WWA214	M	
			153.53	WWA29	M	
			153.53	WWA36	M	
Naguabo PR			153.53	WWA205	M	
Penuelas PR			153.41	WWA217	M	
			153.53	WWA32	M	
Ponce PR Hostos Av		2.726	153.41	WWA202	X	
		153.53	158.13	WWA26	M	
Villalba PR			153.41	WWA216	M	
			153.53	WWA31	M	
Yauco PR			153.41	WWA213	M	
			153.53	WWA25	M	
Puget Sound P&L 7th Av & Olive St						
Seattle Wash	2.292	2.726	75.42	55 KXIO	L	
Queens Boro G&E Brunswick Av						
Far Rockaway NY			37.62	15 KEA585	L	
			37.62	KEA586	L	
Ralls Cnty EC New London Mo			158.13	8 KAA308	M	
Randolph EMC E Salisbury St Asheboro NC			158.25	8 KIA296	G	
Red Lake EC Red Lake Falls Minn			37.82	12 KUAS	R	
Red River V'ly CPA Halstad Minn			37.82	10 KAA300	G	
Riceland EC 320 S Main Stuttgart Ark			153.71	12 KKA652	M	
Richland Coop Elec Assn Richland Center Wis			37.62	8 KSA689	M	
Rich Mtn EC Mena Ark			153.71	10 KKA636	M	
Roanoke EMC Rich Square NC			153.71	6 KIA253	M	
City of Rochester Rochester Minn			158.25	8 KAA306	G	
Rochester G&E 89 East Av Rochester NY			39.86	80 WGAE	G	
			158.19	KEA560		
Canandaigua NY			39.86	WZGC	G	
Fillmore NY			39.86	WZGG	G	
Wolcott NY			39.86	WZGE	G	
Rockland L&P Bway & Ivy Nyack NY			31.46	8 WCWP	M	
Middletown NY			31.46	WCWQ	M	
Roosevelt Cnty EC 202 SE Main Portales New Mex			37.70	10 KXDL	M	
Rosslyn Gas 2700 Shirley Mem Hway Arlington Va			33.06	15 WRKA	L	
Rural CPA Cambridge Minn			33.34	15 KQWZ	M	
Hawick Minn			33.34	KQWY	M	
Milaca Minn			33.34	KGXT	M	
Pine City Minn			33.34	KGXS	M	
Rural Elec Conv Coop Divernon Ill			37.62	8 WLBT	M	
Rush Cnty REMC 119 E 3rd St Rushville Ind			31.46	4 WDGH	L	
Rusk Cnty REA Henderson Tex			37.86	7 KBZI	K	
Rutherford Elec Memb Forest City NC			37.78	5 WSXT	G	
Sac Cnty REC State & Main Sts Sac City Ia			37.86	10 KSTX	G	
Sac-Osage EC El Dorado Springs Mo			153.41	10 KAA735	M	
Sacramento Mun Util Dist 59th & R Sts						
Sacramento Calif			153.59	11 KHRD	F	
Safe Harbor Water Pr Manor Twp Pa			30.68	5 WNJF	L	
St Croix Cnty EC Baldwin Wis			39.66	4 WEXR	M	
St Joseph L&P 502 Angelique St St Joseph Mo			39.98	15 KRMK	M	
City of St Petersburg Mirror Lake Dr						
St Petersburg Fla			39.86	3 WPOB	M	
Salkehatchie EC Barnwell SC			153.59	8 KIB291	M	
Salt Riv Proj Agricultural Improv & Pr Dist						
Wtr Users Bldg Phoenix Ariz			153.71	104 KOA244	F	
Salt Riv RECC 111 W Brashear Av Bardstown Ky			37.62	10 WJRN	G	
Sam Houston EC Livingston Tex			48.18	10 KKB449	M	
City of San Antonio Box 1771 San Antonio Tex			158.13	20 KKA703	M	
San Antonio Tex 201 Mission Rd			31.46	78 KAXX	G	
San Antonio Tex 326 Jones Av			31.46	KRMW	G	
San Bernard EC Bellville Tex			158.25	10 KCKV	M	
San Diego G&E Box 1831 San Diego Cal			153.71	63 KMA265	G	
Oceanside Calif 311 N Tremont St			153.71	KSKL	G	
San Jose Water Wks 374 W Santa Clara						
San Jose Calif			153.47	20 KMA342	P	
Los Gatos Calif			153.47	KMA341	M	
San Patricio EC Sinton Tex			39.98	8 KKA617	K	
Beeville Tex			39.98	KKA616	K	
Sand Mt EC Ala Av & 2nd St SW Ft Payne Ala			153.71	WLTG	M	
Sanlee EC Kingstree SC			37.70	12 WGKC	M	
Satilla EMC Box N Alma Ga			37.70	8 WOHF	G	
Scott-New Madrid-Miss EC Hway 60 Sikeston Mo			37.62	15 KOVF	G	
Scranton EC Elec Bldg Scranton Pa			33.26	50 WGEE	M	
Scranton-Spring Brook Wtr Serv 30 N Franklin						
Wilkes-Barre Pa			37.70	124 KGA285	LM	
City of Seattle 7th & Yessler Sts Seattle Wash			39.66	100 KFEC	M	
			39.66	KSMH	M	
Bothell Wash			39.66	KRTB	M	
Cedar Falls Wash			39.66	KFEJ	M	
Diablo Wash			39.66	KFED	M	
Hazel Wash			39.66	KRTE	M	
Newhalem Gorge Wash			39.66	KFEE	M	
Rockport Wash			39.66	KRTO	M	
Ross Dam Wash			39.66	KUKM	M	
Sedgwick Cnty ECA Cheney Kans			153.71	10 KAA548	M	
Sekan EC Assn 701 S Cherokee St Girard Kans			37.86	10 KTYQ	G	
Sequachee V'ly EC So Pittsburg Tenn			74.14	KIB36	M	
Sock Creek Mt Tenn			72.10	KIB35	M	
Sock Creek Mt Tenn			47.78	20 KIB341	M	
Sevier Cty 109 Bruce St Sevierville Tenn			158.25	10 WVGU	M	
Shelby EC Masonic Bldg Shelbyville Ind			37.62	10 WJKD	M	
Shelby REC Box 311 Shelbyville Ky			37.62	12 WSDV	G	
Campbellsburg Ky			37.62	KIA456	G	
Shenandoah V'ly EC Box 115 Dayton Va			158.13	22 KIA496	F	
Mt Jackson Va			158.13	KIA495	F	
Staunton Va			158.13	KIA497	F	
Sierra Pacific Pr 21 E 1st Reno Nev			48.02	24 KOA511	G	
			37.62	KOA313	G	
Singing Riv EPA NYA Bldg Lucedale Miss			37.78	10 WAXR	K	
Sioux V'ly Empire Elec Coleman SD			37.70	12 KXAK	G	
So Alabama EC 113 N Market Troy Ala			37.70	10 KIA238	B	
So Atlantic Gas 656 E Broughton St Savannah Ga			153.59	30 WFPW	M	
So Carolina E&G W Bridge St St Matthews SC			37.86	32 WBCB	M	
Batesburg SC RR Av			37.86	WBCN	M	
Columbia SC 328 Main St			37.86	WQGH	M	
Johnston SC			37.86	KIA276	M	
North SC			37.86	KIA278	M	
Parr Shoals SC			37.86	WBCY	M	
Saluda SC			37.86	KIA277	M	
So Carolina Pr 141 Meeting St Charleston SC			37.86	73 KIA461	M	
			37.86	KIA458	M	
			37.86	KIA459	M	
Aiken SC			37.86	KIA460	M	
So Central REC PO Box 425 Lancaster O			37.54	14 WFEO	M	
Circleville Ohio			37.54	WEVB		
SE Colorado Pr Assn 19 W 4th La Junta Colo			37.62	15 KQAY	G	
Eads Colo			37.62	KQCZ	G	
Lamar Colo			37.62	KQBB	G	
Springfield Colo			37.62	KQCW	G	
SE Iowa CEA Box 109 Mt Pleasant Ia			153.71	10 KAA475	R	
SE Illinois EC 23 S Commercial Harrisburg Ill			37.62	41 WKZL	M	
Cave-in-Rock Ill			37.62	WLXY	M	
SE Indiana Pr 306 E 3rd Rushville Ind			39.86	12 WWDP	L	
Shelbyville Ind			39.86	WWDQ	L	
Se Indiana REMC 101 N Walnut Osgood Ind			37.54	22 KSA399	G	
SE Michigan REC 1610 E Maumee Adrian Mich			158.25	5 WRTG	M	
So California Edison 601 W 5th St						
Los Angeles Calif						
Alhambra Cal 401 S Marengo		2.726	158.13	293 KAMB	M	
Alpine Calif			75.50	KMB94	M	
Anaheim Cal Substation			158.13	KQDZ	M	
Bakersfield Calif			75.50	KMA42	M	
Chino Calif			158.13	KQER	M	
Colton Calif			158.13	KNHT	M	
Corona Calif			75.50	KMB95	M	
Dalton Calif			158.13	KNHV	M	
Delano Calif Vestal Substation			158.13	KNHW	M	
Exeter Calif			75.50			KME
Huntington Lake Calif			158.13			KMA
Lancaster Calif			158.13			KNH
Long Beach Calif 515 W State St			158.25			KQE
Newhall Calif			75.50			KM.
Santa Barbara Calif			158.13			KNH
Santa Fe Springs Calif			158.13			KM.
Santa Monica Calif Marine St			158.13			KQ
			75.50			KM
Santa Paula Calif			72.98			KM
Saticoy Calif			158.13			KM
Saugus Calif			158.13			KQ
Torrance Calif			158.25			KQ
Vernon Calif			158.25			KQ
Visalia Calif Rector Substation			158.13			KNH
So California Gas 810 S Flower St						
Los Angeles Calif						
Newhall Calif			153.47	160		KM
		2 292	33.06			KFC
Lebec Calif			153.47			KM
Taft Calif			153.47			KFC
So Colorado Pr 401 N Main Pueblo Colo			37.74	75		KH
So Counties Gas Co of Calif 810 S Flower St						
Los Angeles Calif	2 292	31.74	33.06	34		KA
	33.82	35.14	37.18			KA;
	37.82	39.34	158.01			KA
	153.41	153.47	153.53			KM
			5.685			KM
Blythe Calif			153.41			KM
			73.18			KM
Brea Calif			158.01			KM
Chuckawalla Peak Calif			75.58			KM
			158.01			KM
Dana Pt Calif			153.41			KM
El Monte Calif			153.41			KM.
Indio Calif			72.18			KM
			158.01			KM.
Pomona Calif			153.41			KM
Santa Maria Calif			153.41			KM.
Santa Barbara Calif			153.41			KM
San Pedro			153.41			KM.
Santa Ana Calif			153.41			KM
Santiago Peak Calif			158.01			KM.
			6.865			KM
Venice Calif			153.47			KM
Ventura Calif			153.41			KM.
So Illinois EC 200 Charles St Dongola Ill			37.70	20		KSA
Metropolis Ill Rte 145			37.70			KSA
So Indiana REC 302 Main Tell City Ind			158.25	5		WM
So Maryland EC Hughesville Md			158.25	20		KG
Hollywood Md			158.25			KG
Prince Frederick Md			158.25			KG
So Pine EC Brewton Ala			37.70	8		WJS
Frisco City Ala			37.70			WS
So Jersey Gas 142 S Main Glassboro NJ			153.59	20		WR
So Plains EC 305 Av W Lubbock Tex			37.62	7		KNF
Southside EC Rte 460 Crewe Va			37.78	25		WB
Johnson Mt Va			37.78			WK
			72.66			W4
SW Central RECC 21 N 5th Indiana Pa			39.98	10		WW
Southwest EC 107 N Springfield St Bolivar Mo			158.13			KA
Preston Mo			158.13			KA
SW Louisianna EMC 203 N College Av						
Lafayette La			33.58	10		KK
SW Mississippi EPA Lorman Miss			37.78	15		WH
SW Federated Pr Box 437 Creston Iowa			158.25	10		KIZ
Southwestern G&E 815 E Cotton St Longview Tex			39.86	53		KA
Shreveport La			39.86			KK
SW Minnesota Coop Elec Pipestone Minn			158.19	16		KA
Southwestern Pub Serv Box 1261 Amarillo Tex			31.46	187		KK
Abernathy Tex			31.46			KK
Borger Tex			31.46			KK
Lubbock Tex			31.46			KK
Plainview Tex 114 W 7th St			31.46			KK
Southwest REC Tipton Okla			158.13	12		KK
SW Tennessee EMC 115 E Main St						
Brownsville Tenn			153.59	20		WV
Covington Tenn 20 E Pleasant St			153.59			WV
Henderson Tenn 109 Main St			153.59			WV
Jackson Tenn 217 Liberty St			153.59			WV
Springer EC Box 678 Springer N Mex			37.74	12		KK
Stamford EC 211 W McHarg St Stamford Tex			153.71	6		KK
Staten Island Edison 1188 Richmond Terrace						
Staten Island 10 NY			153.59	25		KE
Stearns CEA Melrose Minn			30.86	6		KS
Steele Waseca CE 321 N Cedar St Owatonna Minn			37.54	10		KF
Stevens Cty EC 344 N Main Colville Wash			37.86	4		KC
Suburban Nat Gas 400 E 8th St Dewey Okla			158.01	30		KS
Sullivan Cty REM 106 W Washington St						
Sullivan Ind			37.54	8		WL
Sulphur Springs V'ly EC Willcox Ariz			158.13	20		KO
Sumner-Cowley EC 122 E Lincoln St						
Wellington Kans			153.71	10		KA
Sumter EC Sumterville Fla			37.78	19		WS
Suwanee V'ly EC Live Oak Fla			37.78	5		WR
City of Tacoma 402 City Hall Tacoma Wash			158.25	105		KB
Alder Wash Power House			158.25			KH
Kanaskat Wash Green Riv Purif Plt			153.71			KR
Potlatch Wash			158.25			KH
Tacoma Wash 3110 S 1 St			153.71			KR
Tallahatchie V'ly EPA Batesville Miss			37.78	12		KK
Tallapoosa Riv EC Lafayette Ala			37.70	6		KI
Tampa EC Box 111 Tampa Fla			153.59	50		WT
Mulberry Fla			153.59			WT
Plant City Fla E Haines Av			153.59			WT
Tampa Fla 11th Av Substation			153.59			WT
Tampa Fla Power Plt			153.59			WT
Winter Haven Fla			153.59			WT
Taunton Mun Lt Plt 55 Weir St Taunton Mass			158.19	15		WX
Taylor Cty EC Medford Wis			39.66	6		WB
Taylor Cnty RECC Campbellsville Ky			158.13	8		KI
Taylor EC 304 Front Merkel Tex			37.62	20		KK
Tennessee V'ly EC Box 247			37.54			KI
Savannah Tenn			37.54	15		KI
Texas Elec Serv Box 970 Ft Worth Tex			39.66	55		KT
			39.66			KK
			39.66			KK
			39.66			KK
			39.66			KK
Big Spring Tex			39.66			KC
Monahans Tex			39.66			KK
Midland Tex			39.66			KK
Odessa Tex			39.66			KC
Wichita Falls Tex			39.66			KU
Texas P&L 1001 W Erwin Tyler Tex			33.02	212		KR
Athens Tex Substation			33.02			KR
Gainsville Tex			33.02			KR
Palestine Tex Gen Station			33.02			KR
Sherman Tex Sub Disp Off			33.02			KR
Trinidad Tex Gen Station			33.02			KR
Texoma Nat Gas Co Fritch Tex			33.26	30		KQ
			2.726	2		KQ
Three Notch EMC 112 W 2nd St						
Donalsonville Ga			158.13	8		WV
Three Rivers EC Linn Mo			158.13	10		KA
Tide Water Pr Co Wilmington NC			153.71	16		KI
Tipmont REMC Bank Bldg Linden Ind			47.90	7		KS
T I P REC Jackson & Front Brooklyn Ia			37.86	9		KA
Tishomingo Cty EPA Fulton St Iuka Miss			158.25	10		WG
Todd Wadena P&L 312 Jefferson St Wadena Minn			37.70	10		KA
Toledo Edison Co 1001 W Delaware Toledo Ohio			39.86	52		WB
Defiance Ohio Pr Dam Rd			39.86			WK
Fremont Ohio 134 S 5th St			39.86			WC
Toledo Ohio Collins Pk			31.46			WJ
Toledo Ohio Intake Crib			31.46			WB
Toledo Ohio Low Ser Pump Station			31.46			WB
Wauseon Ohio 134 N Fulton St			39.86			WK
Tombigbee EC 6 E 11th St Guin Ala			37.70	10		KI
Traverse EC Wheaton Minn			153.71	9		KA
Trempealeau EC 315 E Main Arcadia Wis			39.66	8		WB
Trico EC 3800 N Oracle Tucson Ariz			37.78	20		KO
Marana Ariz			37.78			KO
Tri Cnty Elec Assn Plankinton SD			48.26	8		KA
Tri-Cty ECA Lancaster Mo			153.71	12		KW
Tri-Cty EC Rushford Minn			39.66	12		KH
Tri-Cty EC Portland Mich			31.46			WK

SOUND EFFECTS CONSOLE

(Continued from page 15)

be sure that the sound is satisfactory before it is cut into the program.

In TV work, visual cues are important also. For this reason, the console is mounted on wheels. The entire console can be moved to any location desired, so that the operator can figuratively keep one eye on the script and the other on the action.

Special TV Applications:

There are certain sound effects required for television which are not ordinarily used for audio broadcasting. Sounds such as slamming a door, for instance, which would be produced physically on an audio program, must be simulated by a record for TV work. Television stage sets are too fragile to take vigorous slamming.

Movies of news events are usually silent except for the narrator's voice, and realism is added with recorded sound effects at proper places. TV commercials on film generally require the talents of the sound-effects man.

Silent motion pictures are often broadcast on TV. After watching a run of the film and taking notes of the sounds needed, the console operator can collect his records and make a perfectly-synchronized fill-in during the actual broadcast.

With progress in the broadcasting art, the use of good sound effects is increasing in importance. The listening public is becoming more vehement in demanding perfection, and competition calls for satisfying the customer's wishes. Therefore, it is reasonable to assume that in the near future even the smaller stations will have more elaborate sound effects.

SMALL TV RECEIVER

Motorola has introduced a 25½-lb. set with a 7-in. tube, retailing at $119.95. Tube voltage has been stepped up to improve brilliance and clarity, giving excellent picture quality.

COST OF TV COLOR SETS

Zenith vice president H. C. Bonfig, discussing the 20 revolving-disc color TV receivers his company built for CBS, and used for the widely-publicized surgical demonstration: "Bear in mind that they were not complete television receivers. They had no tuners. They reproduced only what was fed into them over a telephone wire. We contracted to build those receivers for $1,000 each, and did build and deliver them for that price. However, when we got our costs together, we found that we had suffered a net loss of $15,400 on the order."

PRIVACY MOBILE PHONES

(Continued from page 20)

a careful study of the requirements to be met usually shows that no changes are necessary beyond the choice between the very fast pushbutton coder and the conventional dial-operated coder.

There are also many applications of the Hammarlund system to telemetering and remote controls, both for radio point-to-point and relay installations for public utilities and oil and gas pipe lines. These will be discussed separately in a forthcoming paper.

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Of course, the FCC could dig into the economics of FM broadcasting, but such an investigation would represent just another example of Government participation in the affairs of private business. Under our American system, a broadcast station must operate at a profit in order to perform the public service which is a prerequisite of its license. The FCC can and has set up rules without regard to increasing the cost of broadcast operations, but there is no record of an FCC action intended to aid any station to increase its net operating revenue!

The economies of FM broadcasting do become the proper concern of the FCC.

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however, when questions of public interest, convenience, and necessity are involved. Of course, if a particular station continues on a limited program schedule in order to hold an FM license at minimum expense as a means of keeping out a potential competitor, that certainly calls for FCC action as a failure to meet the obligation of public service.

But if FM operation is draining off an unreasonable part of the profit realized by an affiliated AM station, it isn't up to the FCC to tell the management to close down the FM transmitter.

On the other hand, FM may be the salvation of some broadcasters right now when AM service is threatened with further deterioration. The proceedings of the NRBA conference at Montreal disclose that plans for Cuban AM stations threaten interference with WBBM Chicago, WNBC New York, WJR Detroit, WCCO Minneapolis, WENR Chicago WCFC Chicago, WBZ Boston, KYW Philadelphia, KRLD Dallas, WTIC Hartford, WBAL Baltimore, KTHS Hot Springs, WNEW New York, KWKH Shrevesport, WRVA Richmond, KVOO Tulsa, WWVA Wheeling, WOWO Fort Wayne, WTOP Washington, KOMA Oklahoma City, KPRC Houston, WFBC Greenville, WSUN St. Petersburg, KFI Los Angeles. The majority of these stations have FM affiliates that are not troubled by interference, and have greater solid coverage than the primary areas of the AM transmitters.

Mexico has not taken part in the NRBA sessions, so no one knows exactly what may be coming up down there that will further reduce the coverage of AM stations in the USA.

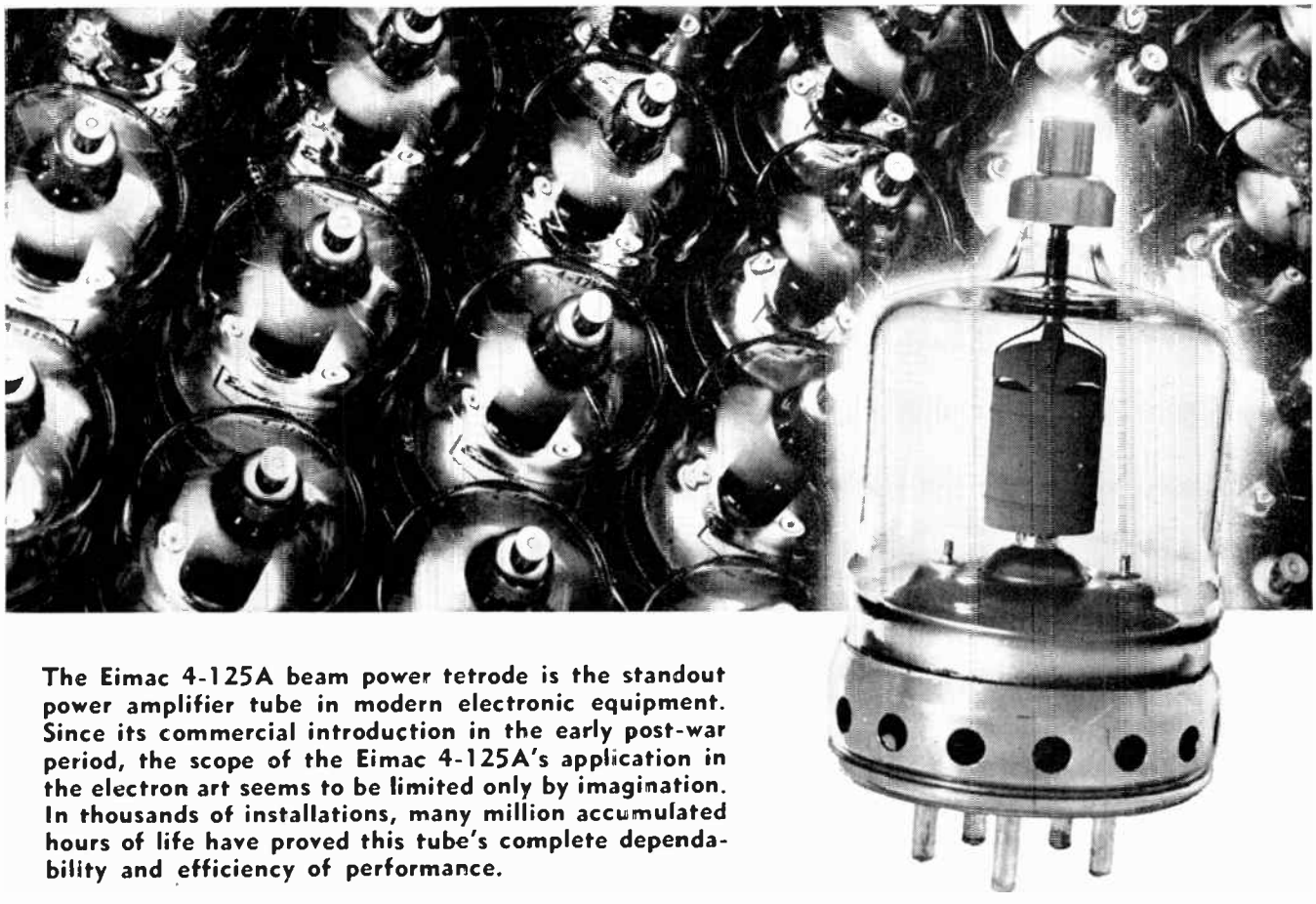
Former FCC Chairman Charles Denny, when he addressed the NAB at Chicago on October 23, 1946, told the broadcasters: "Many local channel operators will, when they get FM, be able for the first time to sit in their homes in the evening and hear their own stations." And also: "The Commission has expressly authorized me to say to you again that it is our opinion that FM is the finest aural broadcasting system obtainable in the present state of the radio art."

The ensuing years have confirmed these statements. In fact, no broadcaster has ever refuted them, nor denied that the problems of interference which plague him on AM do not exist on FM.

However, while the superiority of FM as a broadcast system has been established beyond question, it could be permitted to fail as an effective public service through lack of effort on the part of both broadcasters and set manufacturers to establish FM as an economic success.

Advertisers' Index

THE DEMAND STILL GROWS



The Eimac 4-125A beam power tetrode is the standout power amplifier tube in modern electronic equipment. Since its commercial introduction in the early post-war period, the scope of the Eimac 4-125A's application in the electron art seems to be limited only by imagination. In thousands of installations, many million accumulated hours of life have proved this tube's complete dependability and efficiency of performance.

Incorporated in the design of the 4-125A are many features contributing to its outstanding capabilities. Most notable among these are:

Its pyrovac plate which enables the tube to withstand high momentary overloads.

Its processed non-emitting grids which impart the operational stability universally associated with this tube.

Its internal input-to-output-circuit shielding which allows considerable simplification of associated circuitry.

Its well engineered mechanical structures that make the tube physically rugged and maintain precise element alignment.

Detailed data and application notes on the Eimac 4-125A tetrode are, upon request, immediately available. Assistance in unusual application problems involving the use of the 4-125A is offered as a service of the Eimac Field Engineering Department.

EIMAC 4-125A POWER TETRODE	
Electrical Characteristics	
Filament: Thoriated tungsten	
Voltage	5.0 volt
Current	6.5 amp
Grid-Screen Amplification Factor (Average)	6.2
Direct Interelectrode Capacitances (Average)	
Grid-Plate (Without shielding, base grounded)	0.05 μuf
Input	10.8 μuf
Output	3.1 μuf
Transconductance (i_b = 50 ma. E_b = 2500 v., E_{c_2} = 400 v.)	2450 μmhos
Maximum Ratings (Class-C FM or Telegraphy, key-down conditions, 1 tube)	
Plate voltage, d-c	3000 volts
Plate current, dc	225 ma.
Screen voltage, d-c	400 volts
Grid voltage, d-c	-500 volts
Plate dissipation	125 watts
Screen dissipation	20 watts
Grid dissipation	5 watts

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