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## Abbreviations and Symbols

The necessary corrections to the List of Commercial and Government Radio Stations of the United States and to the International Lists of Radio Stations appearing in this bulletin under the heading "Alterations and Corrections," are published after the stations affected in the following order:

- **Name** = Name of station.
- **Loc.** = Geographical location: W = west longitude, N = north latitude, S = south latitude, E = east longitude.
- **Call** = Call signal (letters) assigned.
- **Type** = Type of wave classified as follows: A1 = continuous wave (tube), A2 = interrupted continuous wave, A3 = phone, B = spark.
- **Fy.** = Frequency in kilocycles; normal frequency in italics; wave length in meters in parentheses.
- **Power** = Height (meters) of antenna and intensity of current (meter-amperes) at its base (sample of manner in which published—100/100) or the normal radiated power expressed in meter-amperes (sample of manner in which published—100 m. amp.).
- **Service** = Nature of service maintained: PG = general public (ship to shore), PR = limited public (limited to public, correspondence between fixed stations), P = private (limited commercial and special), G = Government business exclusively.
- **Class** = FX = fixed station (point-to-point service), RG = radio-compass station, FA = aeronautical station, AB = aviation beacon, RF = circular radio beacon, B = ship station, FC = coast station.
- **Hours** = Hours of operation: N = continuous service, X = no regular hour, Y = sunrise to sunset.
- **Accts.** = Message accounts settled by.
- **M. R. T. Co.** = Mackay Radio & Telegraph Co.
- **R. C. A.** = Radio Corporation of America.
- **R. M. C. A.** = Radiomarine Corporation of America.
- **T. R. T. Co.** = Tropical Radio Telegraph Co.
- **C. w.** = Continuous wave.
- **I. c. w.** = Interrupted continuous wave.
- **A. c.** = Alternating current.
- **V. t.** = Vacuum tube.
- **M. a.** = Meter-amperes.
- **U' S. L.** = Applies only to the list of Commercial and Government Radio Stations of the United States.
- **F. R.** = Equipped with a radio compass (direction finder).
### NEW STATIONS

**Commercial land stations, alphabetically, by names of stations**

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Fixed and Land Stations, published by the Berner bureau]

<table>
<thead>
<tr>
<th>Station</th>
<th>Class</th>
<th>Call signal</th>
<th>Frequency in kilocycles, meters in parentheses</th>
<th>Service</th>
<th>Hours</th>
<th>Licenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta, Ga. (Candler Field)</td>
<td>FA</td>
<td>WSDY</td>
<td>278 (1,080)</td>
<td>P</td>
<td>X</td>
<td>Aeronautical Radio (Inc.)</td>
</tr>
<tr>
<td>Boston, Mass. (municipal airport)</td>
<td>FA</td>
<td>WSDU</td>
<td>do</td>
<td>P</td>
<td>N</td>
<td>Do</td>
</tr>
<tr>
<td>Cleveland, Ohio (municipal airport)</td>
<td>FA</td>
<td>WSDX</td>
<td>do</td>
<td>P</td>
<td>N</td>
<td>Do</td>
</tr>
<tr>
<td>Columbus, Ohio (municipal airport)</td>
<td>FA</td>
<td>WSDV</td>
<td>do</td>
<td>P</td>
<td>N</td>
<td>Do</td>
</tr>
<tr>
<td>Dallas, Tex. (Love Field)</td>
<td>FA</td>
<td>KGUX</td>
<td>do</td>
<td>P</td>
<td>X</td>
<td>Do</td>
</tr>
<tr>
<td>Denver, Colo.</td>
<td>FY</td>
<td>KGUX</td>
<td>2,440 (123)</td>
<td>P</td>
<td>N</td>
<td>City and County of Denver, Colo. (police station)</td>
</tr>
<tr>
<td>Kansas City, Mo. (municipal airport)</td>
<td>FA</td>
<td>KGUW</td>
<td>278 (1,080)</td>
<td>P</td>
<td>N</td>
<td>Aeronautical Radio (Inc.)</td>
</tr>
<tr>
<td>Newark, N. J. (Newark airport)</td>
<td>FA</td>
<td>WSDW</td>
<td>do</td>
<td>P</td>
<td>N</td>
<td>Do</td>
</tr>
<tr>
<td>Oakland, Calif. (Oakland airport)</td>
<td>FA</td>
<td>KGUY</td>
<td>do</td>
<td>P</td>
<td>X</td>
<td>Do</td>
</tr>
<tr>
<td>Ponce City, Okla. (municipal airport)</td>
<td>FA</td>
<td>KGUZ</td>
<td>3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.48), 3,182.5 (94.29), 5,570 (53.86), 5,760 (63)</td>
<td>P</td>
<td>N</td>
<td>Do</td>
</tr>
<tr>
<td>St. Louis, Mo. (Lambert Field)</td>
<td>FA</td>
<td>KGUW</td>
<td>278 (1,080)</td>
<td>P</td>
<td>N</td>
<td>Do</td>
</tr>
<tr>
<td>Salt Lake City, Utah (airport)</td>
<td>FA</td>
<td>KGTI</td>
<td>do</td>
<td>P</td>
<td>N</td>
<td>San Francisco Municipal Airport</td>
</tr>
<tr>
<td>San Bruno, Calif. (municipal airport)</td>
<td>FA</td>
<td>KGYO</td>
<td>do</td>
<td>P</td>
<td>N</td>
<td>Do</td>
</tr>
<tr>
<td>Wichita, Kan.</td>
<td>FA</td>
<td>KGTE</td>
<td>3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.48), 3,182.5 (94.29), 5,570 (53.86), 5,760 (63)</td>
<td>P</td>
<td>X</td>
<td>Aeronautical Radio (Inc.)</td>
</tr>
</tbody>
</table>

---

### Commercial ship stations, alphabetically, by names of vessels

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Ship Stations, published by the Berner bureau]

<table>
<thead>
<tr>
<th>Name of vessel</th>
<th>Call signal</th>
<th>Rates, all services (cents)</th>
<th>Service</th>
<th>Hours</th>
<th>Owner</th>
<th>Message account settled by</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Traveler</td>
<td>KDIN</td>
<td>8 FG X</td>
<td>United States Lines (Inc.)</td>
<td>Do</td>
<td>R. M. C. A.</td>
<td></td>
</tr>
<tr>
<td>Cimarron</td>
<td>WGEI</td>
<td>8 FG N</td>
<td>Charles E. F. McCann</td>
<td>Do</td>
<td>Do</td>
<td>Oceango S. S. Co.</td>
</tr>
</tbody>
</table>

---

1. Type, A1, A2; fy., 375 (800), 400 (750), 410 (730), 425 (705), 454 (660), 468 (640), 500 (900), 5,515 (54.39), 5,530 (54.33), 5,535 (54.3), 5,530 (54.26), 6,170 (48.23), 6,150 (48.54), 6,190 (48.47), 6,200 (48.39), 6,210 (48.31), 6,220 (48.33), 6,230 (48.15), 8,340 (38.41), 8,370 (38.36), 8,380 (38.23), 9,290 (38.19), 9,360 (38.01), 11,020 (28.98), 11,040 (27.17), 12,050 (27.12), 12,170 (27.09), 12,300 (24.27), 12,370 (24.24), 12,400 (24.15), 12,430, 12,480 (18.204), 14,500 (18.182), 14,550 (18.116), 16,590 (18.994), 16,600 (18.007).
Commercial aircraft stations, alphabetically, by names of craft

[Additions to the List of Radio Stations of the United States, edition of June 30, 1931, and to the International List of Aircraft Stations published by the Berne bureau]

<table>
<thead>
<tr>
<th>Station</th>
<th>Call signal</th>
<th>Frequency, in kilocycles, meters in parentheses</th>
<th>Service</th>
<th>Hours</th>
<th>Licensee</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC-328N</td>
<td>KHVJQ</td>
<td></td>
<td>P</td>
<td>X</td>
<td>National Park Airways</td>
</tr>
<tr>
<td>NC-330N</td>
<td>KHVKP</td>
<td></td>
<td>P</td>
<td>X</td>
<td>Do.</td>
</tr>
<tr>
<td>NC-412H</td>
<td>KHXDW</td>
<td></td>
<td>P</td>
<td>X</td>
<td>American Airways (Inc.)</td>
</tr>
<tr>
<td>NC-415H</td>
<td>KHXOX</td>
<td></td>
<td>P</td>
<td>X</td>
<td>Do.</td>
</tr>
<tr>
<td>NC-4769</td>
<td>KHYLO</td>
<td></td>
<td>P</td>
<td></td>
<td>National Park Airways (Inc.)</td>
</tr>
<tr>
<td>NC-6880</td>
<td>KHVNM</td>
<td></td>
<td>P</td>
<td>X</td>
<td>Do.</td>
</tr>
<tr>
<td>NC-7048</td>
<td>KHVNM</td>
<td></td>
<td>P</td>
<td>X</td>
<td>Do.</td>
</tr>
<tr>
<td>NC-10356</td>
<td>KHVIR</td>
<td></td>
<td>P</td>
<td>X</td>
<td>John B. Brennan, jr.</td>
</tr>
<tr>
<td>NR-914 (Aloha)</td>
<td>KHNBY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Government ship stations, alphabetically, by names of stations

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Fixed and Land Stations published by the Berne bureau]

<table>
<thead>
<tr>
<th>Station</th>
<th>Call signal</th>
<th>Frequency, in kilocycles, meters in parentheses</th>
<th>Service</th>
<th>Hours</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Republic Port Lifeboat</td>
<td>WUAP</td>
<td></td>
<td></td>
<td></td>
<td>U. S. Army.</td>
</tr>
<tr>
<td>Republic Starboard Lifeboat</td>
<td>WUAS</td>
<td></td>
<td></td>
<td></td>
<td>Do.</td>
</tr>
</tbody>
</table>

Marine radiobeacon stations

[Addition to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Stations Performing Special Services, published by the Berne bureau]

Block Island Southeast Light Station, R. I.—Loc., 71° 33’ 08’’ W., 41° 09’ 10’’ N.; transmits every 180 seconds groups of 2 dots, 1 dash, and 1 dot, for 60 seconds; silent 120 seconds, thus:

...... etc.

60 seconds

120 seconds

Fy., 307 (977); hours, transmits daily in clear weather the second 15 minutes of each hour and continuously during thick or foggy weather (75th meridian time).

Commercial and Government land, ship, aircraft, radiobeacon, and direction-finding stations, alphabetically by call signals

<table>
<thead>
<tr>
<th>Call signal</th>
<th>Name of station</th>
<th>Call signal</th>
<th>Name of station</th>
</tr>
</thead>
<tbody>
<tr>
<td>KDIN</td>
<td>American Traveler</td>
<td>KHVLO</td>
<td></td>
</tr>
<tr>
<td>KGDP</td>
<td>Denver, Colo.</td>
<td>KHVNM</td>
<td></td>
</tr>
<tr>
<td>KGTE</td>
<td>Wichita, Kans.</td>
<td>KHVNM</td>
<td></td>
</tr>
<tr>
<td>KOTI</td>
<td>Salt Lake City, Utah (airport)</td>
<td>KHXOX</td>
<td></td>
</tr>
<tr>
<td>KOUV</td>
<td>St. Louis, Mo. (Lambert Field)</td>
<td>KHXOX</td>
<td></td>
</tr>
<tr>
<td>KOVV</td>
<td>Kansas City, Mo. (municipal airport)</td>
<td>KHDW</td>
<td></td>
</tr>
<tr>
<td>KOUX</td>
<td>Dallas, Tex. (Love Field)</td>
<td>WGEJ</td>
<td></td>
</tr>
<tr>
<td>KGUY</td>
<td>Oakland, Calif. (Oakland airport)</td>
<td>WSDU</td>
<td></td>
</tr>
<tr>
<td>KGUN</td>
<td>Ponce City, Okla. (municipal airport)</td>
<td>WSDV</td>
<td></td>
</tr>
<tr>
<td>KGYO</td>
<td>San Bruno, Calif.</td>
<td>WSDW</td>
<td></td>
</tr>
<tr>
<td>KHNBY</td>
<td>NR-914 (Aloha)</td>
<td>WSDX</td>
<td></td>
</tr>
<tr>
<td>KHYL</td>
<td>NC-10356</td>
<td>WSDY</td>
<td></td>
</tr>
<tr>
<td>KHVIR</td>
<td>NC-4769</td>
<td>WUAP</td>
<td></td>
</tr>
<tr>
<td>KHVQ</td>
<td>NC-6880</td>
<td>WUAS</td>
<td></td>
</tr>
<tr>
<td>KHVKP</td>
<td>NC-412H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KHVLO</td>
<td>NC-6769</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Experimental stations, alphabetically, by names of stations

[Additions to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931]

<table>
<thead>
<tr>
<th>Station</th>
<th>Call signal</th>
<th>Frequency in kilocycles, meters in parentheses</th>
<th>Power (watts)</th>
<th>License and post-office address</th>
</tr>
</thead>
<tbody>
<tr>
<td>California: San Francisco</td>
<td>WXXB</td>
<td>11,640 (28.77), 19,340 (15.912)</td>
<td>1,500</td>
<td>Press Wireless (Inc.)</td>
</tr>
<tr>
<td>New Jersey: Ocean Gate</td>
<td>WXXX</td>
<td>10,550 (28.44), 16,270 (18.439), 21,420 (14.000)</td>
<td>20,000</td>
<td>American Telephone &amp; Telegraph Co.</td>
</tr>
<tr>
<td>Portable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wisconsin: Milwaukee</td>
<td>W9XC</td>
<td>43,500 (6.9)</td>
<td>75</td>
<td>The Journal Co. (Milwaukee Journal)</td>
</tr>
</tbody>
</table>

Experimental, relay broadcasting, and visual broadcasting stations grouped by districts, alphabetically, by call signals

<table>
<thead>
<tr>
<th>Call signal</th>
<th>District and station</th>
<th>Call signal</th>
<th>District and station</th>
</tr>
</thead>
<tbody>
<tr>
<td>W9XX</td>
<td>Second district: Ocean Gate, N. J.</td>
<td>W9XC</td>
<td>Ninth district: Milwaukee, Wis. (portable)</td>
</tr>
<tr>
<td>W9XB</td>
<td>Sixth district: San Francisco, Calif.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ALTERATIONS AND CORRECTIONS

COMMERCIAL LAND STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Fixed and Land Stations, published by the Berne bureau]

ATLANTA, GA. WEEA.—Fy., add 2,964 (101.21), 5,840 (51.37).
ATLANTIC CITY, N. J.—Type, add A2; fy., add 2,964 (101.21), 5,840 (51.37).
BALTIMORE, Md. (LOGAN FIELD).—Fy., add 2,964 (101.21), 5,840 (51.37).
BECHAROF, ALASKA RADIO.—Rates, 5 cents (25 centimes) per word; minimum 10 words.
BELLEFONTE, PA.—Fy., add 3,182.5 (94.26).
CHARLESTON, S. C.—Fy., add 2,964 (101.21), 5,840 (51.37); power, 18/3.
CHICAGO, ILL. (MUNICIPAL AIRPORT) WUCG.—Fy., add 3,182.5 (94.26); power, 18/3.
CLARKS POINT, ALASKA RADIO.—Rates, 5 cents (25 centimes) per word; minimum 10 words.
CLEARWATER, CALIF. (LOS ANGELES) RADIO KOK.—Fy., strike out 8,670 (34.6) 16,900 (17.751), add 8,370 (35.84), 16,800 (17.85).
CLEVELAND, OHIO WNAK.—Fy., add 3,182.5 (94.26); power, 18/3.
GREENSBORO, N. C.—Fy., add 2,964 (101.21), 5,840 (51.37).
HILLSBORO, OREG., RADIO KEK.—Fy., strike out 6,560 (45.73), 11,320 (26.5), add 6,260 (47.92), 11,130 (26.95).
JACKSONVILLE, Fla.—Fy., add 2,964 (101.21), 5,840 (51.37).
KVICHAK, ALASKA RADIO.—Rates, 8 cents (40 centimes) per word.
LINDEN, N. J. (NEAR).—Type, add A2; fy., add 2,964 (101.21), 5,840 (51.37).
MCRAE, GA. (AIRPORT).—Type, add A2; fy., add 2,964 (101.21), 5,840 (51.37).
MILLS FIELD, CALIF. (NEAR).—Loc. (approximate) 122° 30' '00'' W., 36° 30' 00'' N.
MOLINE, ILL. (AIRPORT).—Fy., add 3,182.5 (94.26); power, 18/3.
NEWARK, N. J. WNAO.—Fy., add 3,182.5 (94.26).
NUSHAGAK, ALASKA RADIO.—Rates, 8 cents per word.
OKLAHOMA CITY, OKLA. (MUNICIPAL AIRPORT) KNAV.—Fy., add 3,182.5 (94.26); power, 18/3.
ORLANDO TOWNSHIP, ILL.—Fy., add 3,182.5 (94.26).
PALO ALTO, CALIF. (NEAR) RADIO KFS.—Fy., strike out 8,690 (34.52), 13,060 (22.97), add 8,380 (35.8), 12,555 (23.9), 16,800 (17.85).
RICHMOND, VA.—Fy., add 2,964 (101.21), 5,840 (51.37).
SAN ANTONIO, TEX. (WINBURN FIELD).—Class, add FA; power, 18/3.
SAN FRANCISCO, CALIF., RADIOPHONE.—Loc., changed to San Rafael, Calif. (near) 122° 27' 17'' W., 37° 58' 53'' N.; fy., strike out 2,542 (118.01), add 2,550 (117.6).
SAYVILLE, N. Y., RADIO.—Fy., strike out 13,060 (22.97), 16,900 (17.75), add 8,390 (35.76), 12,558 (23.84), 16,780 (17.87).
SYRACUSE, N. Y., WPEA.—Fy., strike out 1,712 (175.23), add 2,458 (122.05).
TOLEDO, OHIO WNAJ.—Fy., add 3,182.5 (94.26).
TYEE, ALASKA RADIO.—Rates, 6 cents (30 cents) per word.
WEST PALM BEACH, FLA., RADIO WMR.—Fy., strike out 8,690 (34.52), 11,320 (26.5), add 8,380 (35.8), 11,130 (26.95).
WILMINGTON, CALIF., RADIO TELEPHONE.—Loc., changed to San Pedro, Calif. (near) 118° 20′ 11″ W, 33° 43′ 33″ N.

Strike out all particulars of the following-named stations: Dearborn, Mich. WQDW; Fort Worth, Tex. (Meacham Field) KGUC; Lansing, Ill. WCQ; Orlando Township, Ill.

COMMERCIAL SHIP STATIONS, ALPHABETICALLY, BY NAMES OF VESSELS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Ship Stations, published by the Berne bureau]


ALGONQUIN KDKH.—Owner, Standard Vacuum Transportation Co. (Inc.).

AMBRIDGE.—Accts., M. R. T. Co.; owner, American Diamond Lines (Inc.).

ANNISTON CITY.—Fy., strike out 159 (1,885).


ARCHER.—Name changed to City of Newport News; type, strike out B, add A, A2; fy., add 400 (750), 408 (640), 5,525 (54.3), 5,555 (54), 6,590 (45.52), 6,605 (45.42), 8,290 (38.19), 8,450 (35.6), 11,050 (27.15), 11,110 (27), 13,240 (22.66), 16,560 (18.094), 16,660 (18.007), 22,100 (13.575), 22,220 (13.501); accts., M. R. T. C.

BARNENFORK.—Accts., Marine Contracting & Towing Co.

CITY OF ALTUS.—Accts., M. R. T. Co.; owner, American Diamond Lines (Inc.).

CITY OF FORT WORTH.—Power, 27/5.5.

CITY OF SAGINAW 31.—Power, 30/4.5.

DILWORTH.—Fy., add 400 (750).

EGLANTINE.—Accts., R. M. C. A.

ENCHANTRESS.—Type, strike out B, add A2; fy., strike out 410 (730), 454 (660), add 468 (640); power, 18/2.25; service, strike out P, add PG; rates, 8 cents per word.

ENDICOTT.—Accts., R. M. C. A.

ESPARTA.—Hours, strike out N, add X.

FORTITUDE.—Fy., add 3,105 (96.61), 3,115 (96.3), 8,280 (36.23), 8,290 (36.19), 8,450 (35.6), 11,050 (27.15), 11,110 (27), 12,230 (26.71), 13,240 (22.66), 16,580 (18.094), 16,660 (18.007), 16,860 (17.794); accts., R. M. C. A.

FRANCES WEEBS.—Power, 22/7.

HANOVER.—Accts., R. M. C. A.

HASTINGS.—Owner, Waterman S. S. Corporation.

INNOKU.—Accts., M. R. T. Co.; owner, American Diamond Lines (Inc.).

JAVA ARROW.—Owner, Standard Vacuum Transportation Co. (Inc.).

JOHN D. ARCHBOLD.—Fy., strike out 143 (2,100), 151 (1,985), 153 (1960), 157 (1,910), 159 (1,885), 160 (1,875).

JOHN PURROY MITCHELL.—Correct orthography, John Purroy Mitchel.

KENOWTS.—Type, A arc; fy., 143 (2,100), 151 (1,985), 153 (1960), 157 (1,910), 160 (1,875), 375 (800), 425 (705), 500 (600); power, 20/5; rates, 8 cents per word.

LEVANT ARROW.—Owner, Standard Vacuum Transportation Co. (Inc.).

LIEBRE.—Owner, Standard Vacuum Transportation Co. (Inc.).


MALANG.—Fy., add 425 (705).

NEW BRITAIN.—Accts., M. R. T. Co.

PENNSYLVANIA KUSG.—Accts., States S. S. Co.

POINT SUM.—Owner, Gulf Pacific Mail Line, (Ltd.) (Inc.).

RAWLEIGH WARNER.—Owner, Sabine Transportation Co. (Inc.).

ROBERT JOHNSON.—Name changed to Hubert Schafer; owner, Schafer Brothers Lumber & Shingle Co. (Inc.).

SACANDAGA.—Accts., M. R. T. Co.; owner, American Diamond Lines (Inc.).

SAC CITY.—Accts., M. R. T. Co.; owner, American Diamond Lines (Inc.).

SACO.—Accts., M. R. T. Co.; owner, American Diamond Lines (Inc.).
COMMERCIAL AIRCRAFT STATIONS, ALPHABETICALLY, BY NAMES OF CRAFT

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1931, and to the International List of Aircraft Stations, published by the Bernn bureau]

C-178E, C-179E, C-183E, C-185E, C-187E, C-188E, C-189E, C-190E, C-224M, C-268, C-269, C-270, C-272, C-273, C-274, C-276, C-277, C-279, C-281.—
  Fy., strike out 3,142 (95.48), add 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

C-283.—
  Fy., strike out 2,506 (119.71), 3,142 (95.48), 4,188 (71.62), 5,585 (53.71),
  add 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

C-284, C-285, C-286, C-287, C-288, C-290, C-291.—
  Fy., strike out 3,142 (95.48), add 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

C-292.—
  Fy., strike out 2,506 (119.71), 3,142 (95.48), 4,188 (71.62), 5,585 (53.71),
  add 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

C-413E, C-415E, C-741K, C-743K, C-5389, C-5390, C-7135, C-7137.—
  Fy., strike out 3,142 (95.48), add 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

C-7471.—
  Fy., add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

NC-153H, NC-154H, NC-174H.—Licensee, American Airways (Inc.).

NC-226M, NC-227M, NC-228M, NC-229M, NC-230M.—
  Fy., add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

NC-231.—
  Fy., add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

NC-232M.—
  Fy., add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56).

NC-234M.—
  Fy., add 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.56), 5,660 (53).

NC-328N (No. 401 W. A. E.), NC-331N (No. 402 W. A. E.).—
  Fy., strike out 3,460 (86.7), 6,350 (47.24), add 3,076 (97.5), 3,082 (97.33), 3,088 (97.15), 5,510 (54.45), 5,540 (54.15).

NC-333N (Fokker 2), NC-334N (Fokker 3).—
  Fy., strike out 6,350 (47.24),
  add 3,076 (97.5), 3,082 (97.33), 3,088 (97.15), 5,510 (54.45), 5,540 (54.15).

NC-392E (F-109), NC-421E (No. 52 W. A. E.), NC-422E (No. 53 W. A. E.), NC-455E (F-110), NC-456E (F-111).—
  Fy., strike out 3,460 (86.7), 6,350 (47.24), add 3,076 (97.5), 3,082 (97.33), 3,088 (97.15), 5,510 (54.45), 5,540 (54.15).

NC-539V.—Licensee, American Airways (Inc.).
NC-582K (F-114), NC-583K (F-115).—Fy., strike out 3,460 (86.7), 6,350 (47.24), add 3,076 (97.5), 3,082 (97.33), 3,088 (97.15), 5,510 (54.45), 5,540 (54.15).
NC-602V, NC-620V, NC-621V, NC-622V, NC-628V, NC-629V.—Fy., strike out 3,070 (97.71), 3,076 (97.5), 5,690 (52.72), add 2,964 (101.21), 5,840 (51.36).
NC-725W.—Fy., add 3,182.5 (94.26).
NC-742K (No. 54).—Fy., strike out 3,460 (86.7), 6,350 (47.24), add 3,076 (97.5), 3,082 (97.33), 3,088 (97.15), 5,510 (54.45), 5,540 (54.15).
NC-793K.—Fy., strike out 3,142 (95.48), add 3,160 (94.9), 3,166 (94.75), 3,172 (94.57), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.86).
NC-842M.—Fy., add 3,160 (94.9), 3,166 (94.75), 3,178 (94.39), 3,182.5 (94.26), 5,570 (53.86).
NC-843M (No. 55), NC-5170 (F-102), NC-8047 (F-105), NC-8048 (F-104).—Fy., strike out 3,460 (86.7), 6,350 (47.24), add 3,076 (97.5), 3,082 (97.33), 3,088 (97.15), 5,510 (54.45), 5,540 (54.15).
NC-8485.—Type, add A1, A2; fy., 3,106 (96.59), 3,238 (92.64), 3,244 (92.47), 3,452 (86.9), 3,460 (86.7), 3,468 (86.5), 3,484 (86.1), 4,915 (61.03), 5,600 (53.57), 5,630 (53.29).
NC-9153, NC-9193.—Licensee, American Airways (Inc.).
NC-9866.—Type, A3; fy., 3,070 (97.71), 3,076 (97.5), 3,082 (97.33), 3,088 (97.15), 3,106 (96.59), 5,510 (54.45), 5,540 (54.15).
NC-10351, NC-10352, NC-10355.—Fy., add 3,182.5 (94.26).
Strike out all particulars of the following-named stations: NC-74-K (Three Johns), NC-422E (Juneau), NC-75K, NC-200E, NC-422H, NC-427H, No. 502 W. A. E., No. 503 W. A. E., No. 504 W. A. E., NC-982Y, NR-496M, 111N, X-657M.

GOVERNMENT LAND STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Fixed and Land Stations, published by the Berne bureau]

CAMP JOHN HAY, P. I. (BAGUIO MOUNTAIN, LUZON).—Fy., 232 (1,281) read 232 (1,295).
FORT DE RUSSY, P. I.—Strike out all particulars.
FORT McPHERSON, GA. (ATLANTA).—Loc. (approximate) 84° 23' 00” W., 33° 45' 00” N.
KANAKANAK, ALASKA RADIO.—Fy., 555 (54.54) read 555 (540.5).
QUARRY HEIGHTS (BALBOA), CANAL ZONE.—Fy., 17,020 (17.66) read 17,020 (17.626).

GOVERNMENT SHIP STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Ship Stations, published by the Berne bureau]

WILLETTS POINT.—Name changed to Taylor.

AIRWAY RADIOBEACON STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Stations Performing Special Services, published by the Berne bureau]

Strike out all particulars of the following-named stations: Dearborn, Mich.; Lansing, Ill.

MARINE RADIOBEACON STATIONS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and to the International List of Stations Performing Special Services, published by the Berne bureau]

CAPE ST. ELIAS LIGHT STATION, ALASKA.—Hours, operates continuously during clear weather from 10 to 20 and 40 to 50 minutes after each hour.
COMMERCIAL AND GOVERNMENT LAND, SHIP, AIRCRAFT, RADIOBEACON, AND RADIO-COMPASS STATIONS, ALPHABETICALLY BY CALL SIGNALS

KLH, read San Rafael, Calif. (near) radiotelephone; KLUE, read Hubert Schafer; KOU, read San Pedro, Calif. (near) radiotelephone; WLCQ, read City of Newport News; WRBE, read John Purroy Mitchel; WYCX, read Taylor; strike out all particulars following the call signals KFIH, KFVT, KGDC, KGOE, KGUC, KHCYB, KHCZA, KHELO, KHFKP, KHIFU, KHILO, KHIPK, KHIUF, KHKIR, KHOAZ, KHSIR, KHSNM, KHVBY, KOBK, KSONA, KSNB, KUBD, KUBF, WBEX, WBEY, WCDT, WCQ, WDEA, WDEN, WFAT, WFO, WGDX, WHDY, WHDZ, WIDB, WIDD, WIDP, WJDH, WJDT, WKCU, WMBP, WMDD, WNAT, WQBM, WQDW, WTBD.

BROADCASTING STATIONS, BY CALL SIGNALS

[Alterations and corrections to be made to the List of Commercial and Government Radio Stations of the United States, edition of June 30, 1931, and the International List of Broadcasting Stations, published by the Berne bureau.]

KCRJ (Jerome, Ariz.).—Hours, daytime only.
KJFY (Fort Dodge—Riverdale, Iowa).—Licensee, Cedar Rapids Broadcast Co.
KFOR (Lincoln, Nebr.).—Loc., 96° 40' 19'' W., 40° 48' 41'' N.
KFXY (Flagstaff, Ariz.).—Post-office address changed to 117 North Beaver St.
KGFF (Shawnee, Okla.).—Loc., 96° 51' 48'' W., 35° 25' 30'' N.
KGJF (Little Rock, Ark.).—Call changed to KARK.
KIDO (Boise, Idaho).—Ey., 1,350 (222.2)
KMLB (Monroe, La.).—Studio changed to Hotel Virginia.
KTAB (Oakland, Calif.).—Post-office address, 214 South Vermont Avenue, Los Angeles, Calif.
KUT (Austin, Tex.).—Licensee, KUT Broadcasting Co.
KWK (Kirkwood, Mo.).—Licensee, Thomas Patrick (Inc.).
WALR (Zanesville, Ohio).—Transmitter location changed to East Pike, Zanesville, Ohio.
WBEO (Marquette, Mich.).—Loc., 87° 23' 40'' W., 46° 32' 38'' N.
WBOS (Needham, Mass.).—Licensee, Broadcasting Service Organization (Inc.).
WCAX (Burlington, Vt.).—Transmitter, studio, and post-office address changed to loc. (approximate), 73° 12' 00'' W., 44° 29' 00'' N., 197 College St.
WELK (Philadelphia, Pa.).—Call changed to WDAS.
WFDF (Flint, Mich.).—Loc. (approximate) 83° 41' 30'' W., 43° 01' 00'' N.
WHBU (Anderson, Ind.).—Licensee, Anderson Broadcasting Corporation.
WJAK (Marion, Ind.).—Transmitter, studio, and post-office address changed to Elkhart, Ind., loc., 85° 57' 16'' W., 41° 40' 30'' N., Elkhart Hotel.
WJBK (Highland Park, Mich.).—Post-office address changed to 6559 Hamilton Avenue, Detroit, Mich.
WMBO (Auburn, N. Y.).—Licensee, WMBO (Inc.).
WROL (Knoxville, Tenn.).—Loc., 83° 56' 14'' W., 35° 57' 21'' N.
WSAI (Mason, Ohio).—Power, 500 night, 1,000 day.
WSYB (Rutland, Vt.).—Post-office address changed to 80 West St.
WTJS (Jackson, Tenn.).—Loc. (approximate) 88° 55' 00'' W., 35° 37' 00'' N.
WTSL (Shreveport, La.).—Transmitter, studio, and post-office address changed to Laurel, Miss., loc. (approximate), 89° 08' 00'' W., 31° 44' 00'' N., 429 Magnolia St.

Strike out all particulars of the following names stations: WIBR (Steubenville, Ohio); WJAZ (Mt. Prospect, Ill.).

EXPERIMENTAL STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1931]

Louisiana: Shreveport W9XX.—Call changed to W5XA.

Portable

United States—throughout W10XAC.—Loc., changed to New York, N. Y.; class changed to relay broadcasting (portable).
RELAY BROADCASTING STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS
[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1931]

New Jersey: Coytesville W2XAL.—Loc., changed to Boston, Mass.; call changed to W1XAL.

MISCELLANEOUS

CHANGES IN THE LIST OF VESSELS EQUIPPED WITH A RADIO COMPASS

The following-named vessels are additions to the lists published in Commercial and Government Radio Stations of the United States, edition June 30, 1931, and the International List of Ships Stations published by the Berne bureau.
These changes have been made in the 1931 edition of the list first named.

<table>
<thead>
<tr>
<th>Name</th>
<th>Call signal</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Newport N.</td>
<td>WLCQ</td>
<td>Baltimore Mail S. S. Co. (Inc.)</td>
</tr>
<tr>
<td>Golden Coast</td>
<td>KUQF</td>
<td>Oceanic &amp; Oriental Navigation Co.</td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>KIPP</td>
<td>Do.</td>
</tr>
<tr>
<td>Golden Harvest</td>
<td>KUMM</td>
<td>Do.</td>
</tr>
<tr>
<td>Seaforth</td>
<td>KFZQ</td>
<td>H. W. Falk.</td>
</tr>
<tr>
<td>Sonoma</td>
<td>WBDT</td>
<td>Oceanic S. S. Co.</td>
</tr>
</tbody>
</table>

The radio compass has been removed from the SS Admiral Schley (WGCI).

LISTS OF RADIO STATIONS AVAILABLE FOR DISTRIBUTION

The Superintendent of Documents, Government Printing Office, Washington D. C., now has available for distribution the annual lists of Commercial and Government Radio Stations of the United States and Amateur Radio Stations of the United States, both as of June 30, 1931. The price of the first-named list has been increased from 15 to 20 cents a copy and the amateur list has been increased from 25 to 35 cents a copy. The increase in the price of these publications is due to the increased size of both. The Commercial and Government list contains all commercial and Government land, ship, direction-finding, radio-beacon, broadcasting, relay broadcasting, visual broadcasting (television), experimental and, in addition, stations transmitting time signals, weather reports, hydrographic reports, etc. The amateur list contains the call signal, name of the licensee, and location of the 22,739 amateur stations.
All remittances should be made to the Superintendent of Documents, preferably by postal money order and forwarded to the Government Printing Office. Do not send remittances to the Department of Commerce.

ANNUAL REPORT OF RADIO DIVISION AVAILABLE FOR DISTRIBUTION

The Annual Report of the Director of Radio for the fiscal year 1931, may be obtained from the Superintendent of Documents, Government Printing Office, this city, at 5 cents a copy. This report contains statistical tables showing the number of the different classes of radio stations, radio operators examined and licensed, ship inspections, etc., as well as a resume of the work of the radio division during the past fiscal year.
All remittances should be made to the Superintendent of Documents, Government Printing Office, Washington, D. C. Do not send remittances to the Department of Commerce.

INTERNATIONAL LISTS OF RADIO STATIONS AVAILABLE FOR DISTRIBUTION

The International Bureau of the Telegraph Union, Radiotelegraph Service, Berne, Switzerland, now has available for distribution, the third editions of the lists of Fixed and Land Stations and Ship Stations. These lists contain data of stations of all countries which are members of the International Convention. The price of the first-named list is 10 francs, 70 centimes, Swiss gold ($2.07) and
the ship station list is 12 francs, Swiss gold ($2.32). All remittances should be
made to the Berne Bureau, preferably by international money order. Do not
send remittances to the Department of Commerce as it does not have anything to do
with the distribution.

RATIFICATIONS OF THE INTERNATIONAL RADIO CONVENTION

Brazil and Iraq ratified the International Radio Convention, Washington,
1927, on October 27 and October 10, 1931, respectively.

RUSSIAN STANDARD TIME CHANGED

Summer or daylight saving time in Russia (Soviet Union), viz., one hour in
advance of the time of the standard meridian, will be kept all the year round,
irrespective of summer or winter until further notice.

BROADCASTING STATION FREQUENCY MEASUREMENTS DURING OCTOBER

The frequency monitoring stations of the Radio Division measured more broad-
casting stations during October than any other previous month; 381 stations were
measured in comparison with 328 during September and 367 during February,
the next highest month. One hundred and thirty-six, or 35.7 per cent of the
number measured, deviated less than 50 cycles; 97, or 25.4 per cent, deviated more
than 50 cycles but less than 100 cycles; 72, or 18.9 per cent, deviated more than
100 cycles but less than 200 cycles; and the remaining 76, or 20 per cent, deviated
more than 200 cycles. In the compilation of these figures, a station to be included
in the class deviating under 50 cycles must have at no time exceeded that mark.
If it went over 50 cycles but under 100, it is included in the list deviating under
100 cycles. The same procedure is followed for those shown in the classes under
200 and over 200 cycles. The figures, consequently, do not indicate the average
deviations.

In comparison with August, the best month so far, when 117, or 38.5 per cent
deviated under 50 cycles (the maximum deviation allowance beginning June, 1932),
the October figures show 136, or 35.7 per cent.

At the present time stations are allowed a permissible tolerance of 500 cycles.
The table hereunder gives the figures for all the months during which this data
has been published. As only 381 out of the 609 (or about two-thirds of all) broad-
casting stations were measured during October, it must be borne in mind that
many of those not included in the lists given hereunder are maintaining their
frequency assignment although they are not mentioned due to their not being
measured on account of their low power. Of course, these stations are measured
from time to time by radio test cars traveling through remote areas.

The following table gives the figures for the months December, 1930, to
October, 1931, inclusive:

<table>
<thead>
<tr>
<th>Month</th>
<th>Number measured</th>
<th>Under 50</th>
<th>Under 100</th>
<th>Under 200</th>
<th>Over 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>330</td>
<td>55 (16.5%)</td>
<td>66 (16.9%)</td>
<td>238 (70%)</td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>365</td>
<td>54 (15%)</td>
<td>102 (27%)</td>
<td>207 (58%)</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>367</td>
<td>99 (27%)</td>
<td>55 (15%)</td>
<td>213 (58%)</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>337</td>
<td>63 (18.3%)</td>
<td>77 (22.8%)</td>
<td>132 (39.1%)</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>314</td>
<td>54 (17.2%)</td>
<td>92 (28.3%)</td>
<td>96 (30.6%)</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>326</td>
<td>89 (27.3%)</td>
<td>68 (20.8%)</td>
<td>91 (27.9%)</td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>330</td>
<td>71 (21.5%)</td>
<td>69 (20.9%)</td>
<td>68 (20.9%)</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>364</td>
<td>70 (23.8%)</td>
<td>70 (22.9%)</td>
<td>73 (22.9%)</td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>304</td>
<td>64 (21.2%)</td>
<td>66 (21%)</td>
<td>73 (22%)</td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>328</td>
<td>72 (22%)</td>
<td>68 (21%)</td>
<td>76 (22%)</td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>381</td>
<td>97 (25.4%)</td>
<td>72 (18.9%)</td>
<td>76 (20%)</td>
<td></td>
</tr>
</tbody>
</table>
# RADIO SERVICE BULLETIN

## LESS THAN 50 CYCLES

<table>
<thead>
<tr>
<th>Call signal</th>
<th>Transmitter location, studio location in parentheses</th>
<th>Call signal</th>
<th>Transmitter location, studio location in parentheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>KELW</td>
<td>Burbank, Calif.</td>
<td>WCAP</td>
<td>Asbury Park, N. J.</td>
</tr>
<tr>
<td>KFAC</td>
<td>Los Angeles, Calif.</td>
<td>WCBM</td>
<td>Baltimore, Md.</td>
</tr>
<tr>
<td>KFDM</td>
<td>Beaumont, Tex.</td>
<td>WCFI</td>
<td>Chicago, Ill.</td>
</tr>
<tr>
<td>KGEO</td>
<td>St. Joseph, Mo.</td>
<td>WCLF</td>
<td>Crescent Springs, Ky. (Covington).</td>
</tr>
<tr>
<td>KFJF</td>
<td>Oklahoma City, Okla.</td>
<td>WCRW</td>
<td>Chicago, Ill.</td>
</tr>
<tr>
<td>KFKX</td>
<td>Bloomington, Ill. (Chicago).</td>
<td>WCRH</td>
<td>Scarborough, Me. (Portland).</td>
</tr>
<tr>
<td>KFJY</td>
<td>Rockford, Ill.</td>
<td>WDHO</td>
<td>Orlando, Fla.</td>
</tr>
<tr>
<td>KFJI</td>
<td>Lincoln, Nebr.</td>
<td>WDOY</td>
<td>Minneapolis, Minn.</td>
</tr>
<tr>
<td>KFJS</td>
<td>Spokane, Wash.</td>
<td>WEAF</td>
<td>Bellmore, N. Y. (New York City).</td>
</tr>
<tr>
<td>KFJU</td>
<td>San Diego, Calif.</td>
<td>WEAN</td>
<td>Providence, R. I.</td>
</tr>
<tr>
<td>KFJX</td>
<td>Los Angeles, Calif.</td>
<td>WERI</td>
<td>Weymouth, Mass. (Boston).</td>
</tr>
<tr>
<td>KFJF</td>
<td>Clayton, Mo.</td>
<td>WFGN</td>
<td>Forest Hills, N. Y. (New York City).</td>
</tr>
<tr>
<td>KFJV</td>
<td>Culver City, Calif.</td>
<td>WFAA</td>
<td>Grapevine, Tex. (Dallas).</td>
</tr>
<tr>
<td>KFJY</td>
<td>Hollywood, Calif.</td>
<td>WFPAN</td>
<td>South Bend, Ind.</td>
</tr>
<tr>
<td>KFKB</td>
<td>St. Joseph, Mo.</td>
<td>WFPBL</td>
<td>Collamer, N. Y. (Syracuse).</td>
</tr>
<tr>
<td>KFKF</td>
<td>Los Angeles, Calif.</td>
<td>WFOX</td>
<td>Brooklyn, N. Y.</td>
</tr>
<tr>
<td>KFKG</td>
<td>Do.</td>
<td>WGCQ</td>
<td>Mississippi City, Miss. (Gulfport).</td>
</tr>
<tr>
<td>KFKN</td>
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<td>Chicago, Ill.</td>
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<td>KFKS</td>
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<td>WGR</td>
<td>Amherst, N. Y. (Buffalo).</td>
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<td>WGY</td>
<td>Schenectady, N. Y.</td>
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<td>Louisville, Ky.</td>
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<td>WHEA</td>
<td>Troy, N. Y.</td>
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<td>Rock Island, Ill.</td>
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<td>Lewes, Del.</td>
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<td>ton.</td>
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<td>WJAZ</td>
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<td>Yankton, S. Dak.</td>
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<td>WSG</td>
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<td>WTAM</td>
<td>Brecksville Village, Ohio (Cleveland).</td>
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<td>Brookfield, Wis. (Milwaukee).</td>
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<td>Alma-Holy City, Calif.</td>
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<td>KFVS</td>
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<td>KFGF</td>
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## LESS THAN 100 CYCLES—Continued

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<td>KGER</td>
<td>Long Beach, Calif.</td>
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<td>KGIZ</td>
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<tr>
<td>KGO</td>
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<tr>
<td>KICK</td>
<td>Red Oak, Iowa.</td>
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<tr>
<td>KJ</td>
<td>Fresno, Calif.</td>
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<tr>
<td>KMLB</td>
<td>Monroe, La.</td>
</tr>
<tr>
<td>KMJM</td>
<td>Clay Center, Nebr.</td>
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<td>KON</td>
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<tr>
<td>KPV</td>
<td>Harlingen, Tex.</td>
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<td>KROW</td>
<td>Richmond, Calif. (Oakland).</td>
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<tr>
<td>KSO</td>
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<td>KTAT</td>
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<td>KTCP</td>
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<td>KTB</td>
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<td>KTM</td>
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<td>KU</td>
<td>Walla Walla, Wash.</td>
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<td>KV0O</td>
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<td>KWJH</td>
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<td>WBAL</td>
<td>Glen Morris, Md. (Baltimore).</td>
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<td>WBAF</td>
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<td>WCBC</td>
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<td>WCCO</td>
<td>Anoka, Minn. (Minneapolis).</td>
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<td>WDEI</td>
<td>Clifford, N. J. (New York City).</td>
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<td>WCHI</td>
<td>Deerfield, Ill. (Chicago).</td>
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<td>WCLB</td>
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<td>WDAE</td>
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<td>WDAQ</td>
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<td>WDAY</td>
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<td>WDSU</td>
<td>Gretna, La. (New Orleans).</td>
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<tr>
<td>WDRC</td>
<td>Chattanooga, Ill.</td>
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<td>WEIR</td>
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## LESS THAN 200 CYCLES

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<th>Call signal</th>
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<td>WFO</td>
<td>Brainier, Tenn. (Chattanooga).</td>
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<td>WDRC</td>
<td>Bloomfield, Conn. (Hartford).</td>
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<tr>
<td>WEAO</td>
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<td>WEX</td>
<td>Royal Oak, Mich.</td>
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<td>WGB</td>
<td>Cayahoga Heights, Ohio (Cleveland).</td>
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<tr>
<td>WIFC</td>
<td>Cicero, Ill.</td>
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<td>WIAS</td>
<td>Ottumwa, Iowa.</td>
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<td>WIBO</td>
<td>Desplains, Ill. (Chicago).</td>
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<td>WIL</td>
<td>St. Louis, Mo.</td>
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<td>WJAG</td>
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<td>WJAS</td>
<td>Pittsburgh, Pa.</td>
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<td>WJK</td>
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<td>WLAP</td>
<td>Off City, Pa.</td>
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<td>WLBW</td>
<td>Peoria Heights, Ill.</td>
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<td>WMMD</td>
<td>Joplin, Mo.</td>
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<td>WMC</td>
<td>Barton, Tenn. (Memphis).</td>
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<td>WNAC</td>
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<td>WNAD</td>
<td>Norman, Okla.</td>
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<td>WOMP</td>
<td>Mandeville, La. (Newark).</td>
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<tr>
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<td>Kearny, N. J. (Newark).</td>
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<td>WPAP</td>
<td>Cliffside, N. J. (New York City).</td>
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<td>WQAO</td>
<td>Providence, R.I.</td>
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<td>WPCH</td>
<td>Hoboken, N. J. (New York City).</td>
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<td>WRA</td>
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<td>WRVA</td>
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<td>WSP</td>
<td>Toledo, Ohio.</td>
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<td>WTTF</td>
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<td>WWJ</td>
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<td>WWRL</td>
<td>Woodside, N. Y.</td>
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### LIST OF CUBAN BROADCASTING STATIONS

<table>
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<tr>
<th>Frequency in kilocycles (metric in parentheses)</th>
<th>Power (watts)</th>
<th>Call signal</th>
<th>Owner</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>588 (310)</td>
<td>1,400</td>
<td>CMW</td>
<td>Columbus Com. and Radio Co.</td>
<td>Paseo de Martí número 163, Habana.</td>
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<tr>
<td>620 (483.6)</td>
<td>250</td>
<td>CMCH</td>
<td>Rafael Rodríguez</td>
<td>Estévez número 4, Habana.</td>
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<tr>
<td>690 (464.8)</td>
<td>250</td>
<td>CMCJ</td>
<td>John J. Stover</td>
<td>Àvila esq. a 8, Marianao.</td>
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<tr>
<td>730 (410.8)</td>
<td>3,150</td>
<td>CMK</td>
<td>Juan Fernández de Castro</td>
<td>Hotel Plaza, Habana.</td>
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<tr>
<td>750 (379)</td>
<td>100</td>
<td>CMHC</td>
<td>Enrique Artajona</td>
<td>Cenart, Tunel, Havana.</td>
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<tr>
<td>800 (338.8)</td>
<td>500</td>
<td>CMDC</td>
<td>Emilio Perera</td>
<td>Calzada y H. Vedado, Habana.</td>
</tr>
<tr>
<td>884 (360)</td>
<td>100</td>
<td>CMGA</td>
<td>Celedonio V. Figueroa</td>
<td>Consulado y Vírtudes, Habana.</td>
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<tr>
<td>910 (356.9)</td>
<td>500</td>
<td>CMG</td>
<td>Cubana Telephone Co.</td>
<td>Martí número 19, Colón.</td>
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<tr>
<td>925 (324.2)</td>
<td>100</td>
<td>CMGD</td>
<td>Leopoldo V. Figueroa</td>
<td>Aguila y Dragones, Habana.</td>
</tr>
<tr>
<td>950 (315.6)</td>
<td>250</td>
<td>CMHD</td>
<td>Angel Betemayty</td>
<td>Lázaro número 96, Habana.</td>
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<tr>
<td>985 (310.7)</td>
<td>150</td>
<td>CMBD</td>
<td>Manuel Alvarez</td>
<td>Rayo número 67, Habana.</td>
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<tr>
<td>1,010 (296.8)</td>
<td>150</td>
<td>CMBC</td>
<td>Luis Pérez García</td>
<td>Reina y Av. B. Retiro, Marianao.</td>
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<tr>
<td>1,050 (280.7)</td>
<td>150</td>
<td>CMBD</td>
<td>Domingo Fernandez</td>
<td>Av. de los Presidentes esq. a 25, Marianao.</td>
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<tr>
<td>1,070 (280.2)</td>
<td>150</td>
<td>CMBW</td>
<td>Manuel y G. Salas</td>
<td>María Escobar número 17, Calabrién.</td>
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<tr>
<td>1,080 (278.3)</td>
<td>150</td>
<td>CMBC</td>
<td>Modesto Alvarez</td>
<td>Enamorados y Flores, S. Suárez, Marianao.</td>
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<tr>
<td>1,100 (276.7)</td>
<td>150</td>
<td>CMBC</td>
<td>M. P. Martinez</td>
<td>Máximo Gómez número 139, Habana.</td>
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<tr>
<td>1,150 (270.7)</td>
<td>150</td>
<td>CMCK</td>
<td>Francisco Garrido</td>
<td>San Rafael número 14, Habana.</td>
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<td>1,170 (264.7)</td>
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<td>CMCH</td>
<td>Antonio Capablanca</td>
<td>San Rafael esq. y 8, La Sierra, Marianao.</td>
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<td>1,225 (244.7)</td>
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<td>CMG</td>
<td>Andrés Martí de la Vega</td>
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<td>1,250 (240.0)</td>
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<td>José Fernández</td>
<td>25 número 445, Vedado, Habana.</td>
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<td>1,285 (233.4)</td>
<td>150</td>
<td>CMCU</td>
<td>Callejas-Cosculluela</td>
<td>Príncipe número 33, Habana.</td>
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<tr>
<td>1,345 (222.0)</td>
<td>150</td>
<td>CMCA</td>
<td>Jorge García Serra</td>
<td>Avenida de Italia número 102, Habana.</td>
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<tr>
<td>1,370 (218.7)</td>
<td>150</td>
<td>CMCA</td>
<td>José Lorenzo</td>
<td>San Francisco 13, Vihora, Habana.</td>
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<tr>
<td>1,382 (217)</td>
<td>150</td>
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<td>Aurelio Hernández</td>
<td>Ayestaran número 13, Habana.</td>
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<td>1,400 (215)</td>
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<td>Alberto Alvarez</td>
<td>Milagros número 35, Vihora, Habana.</td>
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<tr>
<td>1,400 (215)</td>
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<td>CMCH</td>
<td>Feliciano Isac</td>
<td>Manzana número 33, Manzanita.</td>
</tr>
<tr>
<td>1,400 (215)</td>
<td>150</td>
<td>CMCH</td>
<td>Feliciano Isac</td>
<td>República número 145, Camagüey.</td>
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### LIST OF MEXICAN BROADCASTING STATIONS ALPHABETICALLY BY CALL SIGNALS

<table>
<thead>
<tr>
<th>Call signal</th>
<th>Owner</th>
<th>Location</th>
<th>Power (watts)</th>
<th>Frequency in kilocycles (metric in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>XEA</td>
<td>Alberto Palos Sauza</td>
<td>Guadalajara, Jal.</td>
<td>100</td>
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<td>XEB</td>
<td>El Buen Tono, S. A.</td>
<td>Mexico, D. F.</td>
<td>1,000</td>
<td>1,000 (300)</td>
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<tr>
<td>XEC</td>
<td>Jesus R. Benavides</td>
<td>Toluca, Mex.</td>
<td>50</td>
<td>1,000 (300)</td>
</tr>
<tr>
<td>XED</td>
<td>Ciba Insl. Dif. Reynosa, S. A.</td>
<td>Reynosa, Tama.</td>
<td>10,000</td>
<td>968 (310.8)</td>
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<tr>
<td>XEE</td>
<td>Alfonso Zorrilla R.</td>
<td>Oaxaca, Oax.</td>
<td>100</td>
<td>1,000 (300)</td>
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<tr>
<td>XEG</td>
<td>Miguel Yarza</td>
<td>Mexico, D. F.</td>
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<td>1,000 (300)</td>
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<tr>
<td>XEH</td>
<td>Constantino, Tarnava</td>
<td>Monterrey, N. L.</td>
<td>1,000</td>
<td>1,000 (300)</td>
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<tr>
<td>XEI</td>
<td>Carlos Gutierrez</td>
<td>Morelia, Mich.</td>
<td>100</td>
<td>1,000 (300)</td>
</tr>
<tr>
<td>XEJ</td>
<td>Juan G. Butter</td>
<td>Chihuahua, Chih.</td>
<td>100</td>
<td>1,000 (300)</td>
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<tr>
<td>XEK</td>
<td>Arturo Martinez</td>
<td>Mexico, D. F.</td>
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<td>1,000 (300)</td>
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<tr>
<td>XEL</td>
<td>Antonio Garza Castro</td>
<td>Saltillo, Coah.</td>
<td>10</td>
<td>1,000 (300)</td>
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<tr>
<td>XEM</td>
<td>María T. de Gutiérrez</td>
<td>Mexico, D. F.</td>
<td>125</td>
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<tr>
<td>XEN</td>
<td>Cervecería Modelo, S. A.</td>
<td>do.</td>
<td>1,000</td>
<td>1,000 (300)</td>
</tr>
<tr>
<td>XEO</td>
<td>Partido Nacional Rev.</td>
<td>do.</td>
<td>1,000</td>
<td>1,000 (300)</td>
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<tr>
<td>XEP</td>
<td>Asociación Radiodifusora Latino-Americana, S. A.</td>
<td>do.</td>
<td>1,000</td>
<td>1,000 (300)</td>
</tr>
<tr>
<td>XEQ</td>
<td>Feliciano Lopez Islas</td>
<td>C. Juarez, Chih.</td>
<td>5,000</td>
<td>750 (400)</td>
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<tr>
<td>XER</td>
<td>Ciba Radiodif. de Acapulco, S. A.</td>
<td>Villa Acapulco, Chih.</td>
<td>75,000</td>
<td>750 (400)</td>
</tr>
<tr>
<td>XES</td>
<td>Emilio Balli</td>
<td>Tampico, Tama.</td>
<td>500</td>
<td>800 (337)</td>
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<tr>
<td>XET</td>
<td>Mexico, Music, Co., S. A.</td>
<td>Monterrey, N. L.</td>
<td>500</td>
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<tr>
<td>XEF</td>
<td>Fernando Pasos</td>
<td>Veracruz, Ver.</td>
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<tr>
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<td>Ocho Ellias</td>
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<tr>
<td>XEH</td>
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<td>XEX</td>
<td>EXCELSOR</td>
<td>do.</td>
<td>500</td>
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<tr>
<td>XEZ</td>
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<td>Merida, Yuc.</td>
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<tr>
<td>XEC</td>
<td>José Joaquin Capilla</td>
<td>Mérida, Yuc.</td>
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</tr>
<tr>
<td>XET</td>
<td>Manuel Espinosa Tagle</td>
<td>do.</td>
<td>500</td>
<td>1,400 (265.8)</td>
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<tr>
<td>XTF</td>
<td>Manuel Angel Fernandez</td>
<td>Veracruz, Ver.</td>
<td>500</td>
<td>630 (475.9)</td>
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<tr>
<td>XEF</td>
<td>Manuel F. MurGUIA</td>
<td>Mexico, D. F.</td>
<td>250</td>
<td>1,250 (240)</td>
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<tr>
<td>XEO</td>
<td>Rafael T. Carranza</td>
<td>N. Laredo, Tama.</td>
<td>100</td>
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</table>
LIST OF MEXICAN BROADCASTING STATIONS ALPHABETICALLY BY CALL SIGNALS—continued

<table>
<thead>
<tr>
<th>Call signal</th>
<th>Owner</th>
<th>Location</th>
<th>Power (watts)</th>
<th>Frequency in kilocycles (in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>XETQ</td>
<td>Carlos G. Caballero</td>
<td>Mexico, D. F.</td>
<td>100</td>
<td>1,200 (243.9)</td>
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<tr>
<td>XEFC</td>
<td>Hugo Molina Font.</td>
<td>Merida, Yuc.</td>
<td>10</td>
<td>1,000 (283.7)</td>
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<td>XETC</td>
<td>Juventino Sanchez</td>
<td>Jalapa, Ver.</td>
<td>100</td>
<td>1,000 (300)</td>
</tr>
<tr>
<td>XETO</td>
<td>Feliciana Lopez Islas</td>
<td>Torreon, Coah.</td>
<td>100</td>
<td>1,000 (300)</td>
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<tr>
<td>XETB</td>
<td>Jose A. Berumen</td>
<td>do</td>
<td>125</td>
<td>1,300 (217)</td>
</tr>
<tr>
<td>XEFB</td>
<td>Quintanilla y Stevenson</td>
<td>Monterrey, N. L,</td>
<td>50</td>
<td>1,270 (226.1)</td>
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<tr>
<td>XEPS</td>
<td>Salvador Sanchez</td>
<td>Queretaro, Qu.</td>
<td>40</td>
<td>1,000 (300)</td>
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<tr>
<td>XEFI</td>
<td>Feliciana Lopez Islas</td>
<td>Chihuahua, Chih.</td>
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<td>1,000 (300)</td>
</tr>
<tr>
<td>XEFD</td>
<td>Carlos de la Sierra</td>
<td>Tijuana, B. C.</td>
<td>300</td>
<td>1,020 (285.9)</td>
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<tr>
<td>XETZ</td>
<td>Manuel Zetina</td>
<td>Coyoacan, D. F.</td>
<td>100</td>
<td>1,300 (199.9)</td>
</tr>
</tbody>
</table>

GOVERNMENT

<table>
<thead>
<tr>
<th>Call letter</th>
<th>Station</th>
<th>Location</th>
<th>Power (watts)</th>
<th>Frequency (kHz)</th>
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<tbody>
<tr>
<td>XFC</td>
<td>Gobno, Edo. Aguascalientes</td>
<td>Aguascalientes, Ags</td>
<td>350</td>
<td>905 (372.6)</td>
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<td>XFG</td>
<td>Sria de Guerra y Marina</td>
<td>Mexico, D. F.</td>
<td>2,000</td>
<td>688.3 (479)</td>
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<tr>
<td>XFH</td>
<td>Sria de Guerra y Marina</td>
<td>do</td>
<td>200</td>
<td>818.1 (366.7)</td>
</tr>
<tr>
<td>XFI</td>
<td>Sria Ind. Com. y Trabajo</td>
<td>do</td>
<td>1,000</td>
<td>818.1 (366.7)</td>
</tr>
<tr>
<td>XFX</td>
<td>Sria de Educacion Publica</td>
<td>do</td>
<td>500</td>
<td>800 (348.8)</td>
</tr>
</tbody>
</table>

RADIO TRANSMISSIONS OF STANDARD FREQUENCY; JANUARY, FEBRUARY, AND MARCH, 1932

The Bureau of Standards announces a new schedule of radio transmissions of standard frequency. All transmissions are on 5,000 kilocycles. This service may be used by transmitting stations in adjusting their transmitters to exact frequency, and by the public in calibrating frequency standards and transmitting and receiving apparatus. The signals are transmitted from the bureau's station WWV, in a suburb east of Washington, D. C., every Tuesday afternoon and evening. They can be heard and utilized by stations equipped for continuous-wave reception throughout the United States, although not with certainty in some places. The accuracy of the frequency is at all times better than a part in a million.

The transmissions are by continuous-wave telegraphy at 5,000 kilocycles. They are given continuously from 2 to 4 p. m., and from 8 to 10 p. m., Eastern Standard Time, every Tuesday. The dates are January 5, 12, 19, 26; February 2, 9, 16, 23; and March 1, 8, 15, 22, 29.

The transmissions consist mainly of continuous, unkeyed carrier frequency, giving a continuous whistle in the phones when received with an oscillatory receiving set. The first five minutes of the transmission consist of the general call (CQ de WWV) and announcement of the frequency. The frequency and the call letters of the station (WWV) are given every 10 minutes thereafter.

Information on how to receive and utilize the signals may be obtained by addressing a request to the Bureau of Standards, Washington, D. C. From the 5,000 kilocycles any apparatus may be given as complete a frequency calibration as desired by the method of harmonics.

The bureau is desirous of receiving reports on these transmissions, especially because radio transmission phenomena change with the season of the year. The data desired are approximate field intensity, fading, and the suitability of the transmissions for frequency measurements. It is suggested that in reporting upon field intensities for these transmissions, the following designations be used where field intensity measurement apparatus is not at hand: (1) Hardly perceptible, unreadable; (2) weak, readable now and then; (3) fairly good, readable with difficulty; (4) good, readable; (5) very good, perfectly readable. Statements as to whether fading is present or not is desired, and if so, its characteristics, such as whether slow or rapid and time between peaks of signal intensity. Statements as to type of receiving set used in reporting on the transmissions and the type of antenna used are likewise desired. The bureau would also appreciate reports on the use of the transmissions for purposes of frequency measurement or control.

All reports and letters regarding the transmissions should be addressed Bureau of Standards, Washington, D. C.
The development of various phases of radio receiving equipment for use on airplanes has been advanced by recent work of the Bureau of Standards. Detailed specifications have been prepared for receiving equipment to be used on airplanes to receive beacon signals of the visual type. These are timely in view of the installation of the visual type of radio range beacons on the midcontinent airway, from Amarillo to Los Angeles. The specifications include means for applying an automatic volume control unit to the airplane receiving sets at present in use, together with performance curves of the unit. Installations of receiving equipment as described in the specifications were made on several airplanes of the department, serving as model installations and as means of flight testing the visual radio range beacons.

Progress has been made in the design of a receiving set for use with the simultaneous radio phone and range beacon. The equipment hitherto available was not wholly suitable for this service, primarily because of inadequate audio-frequency characteristics and low power output. Experimental work has shown that an undistorted power output of 400 milliwatts is desirable to insure satisfactory service during conditions of severe atmospheric disturbances. Likewise it is essential that the receiving set has a uniform response for frequencies from 50 to 3,000 cycles. These receiving sets will be equipped with automatic volume control and will operate on the transmission from the simultaneous radio phone and visual range beacon, the visual range beacon, the airways radiophone service, and the aural range beacons.

A study has been made of the use which is often made of the airplane fuselage as a "ground" return lead between various portions of the radio circuits, in the installation of radio equipment on airplanes. Bolted connections to the fuselage have been known to loosen so that, during vibration, the electrical connection was of variable resistance. This resulted in noise in the receiving set output having the regularity and other characteristics of ignition interference. In other cases, the fuselage, although a completely welded type, offered a resistance to the flow of current equivalent to that of a direct wire connection of No. 14 American wire gage. The drop in battery voltage would depend upon the number of radio units in operation. Turning one set off or on would therefore affect the operation of whatever other radio unit was being used. The cure for difficulties of the type described is to provide a direct copper connection for ground return leads, particularly where such leads carry considerable current.

An improved method for calibrating the reed indicators used with the visual radiobeacon system has been developed. Hitherto the procedure has consisted of tuning each reed as closely as possible to the frequency desired and of adjusting the resonance curve of each reed so that its sharpness of resonance was equal to a predetermined value. The improvement now introduced in the calibration procedure consists of the addition of an over-all test whereby equal voltages of both reed frequencies are applied to the reed indicator (so that an "on-course" indication is obtained) and the two frequencies are simultaneously varied from minus to plus one-half per cent of their proper values. Any change from the on-course indication will then show that the resonance curves of the two reeds do not have the proper relation. The addition of this over-all test increases the accuracy of adjustment of the reed indicator under calibration, and reduces the amount of care needed in tuning the reeds.

Some simplifications have been made in the design of the aircraft direction finder previously reported. It was found possible to so arrange the input switching unit that only one loop antenna is required in place of the crossed loop antenna system previously employed. Besides the reduction in the number of loop antennas employed, there is additional simplification in the condenser arrangement used in the input unit. The direction of deviation from the indicated course is given the pilot by means of a zero-center pointer type course indicator. The use of the direction finder for taking cross bearings is at the same time made considerably easier through the elimination of the right-angle courses which were present with the crossed-loop antenna system.