This edition is the first supplement to the New List of Commercial and Government Radio Stations, edition June 30, 1922.

RADIO SERVICE BULLETIN

ISSUED MONTHLY BY BUREAU OF NAVIGATION, DEPARTMENT OF COMMERCE

Washington, August 1, 1922—No. 64

CONTENTS.

ABBREVIATIONS.

The necessary corrections to the List of Radio Stations of the United States and to the International List of Radiotelegraph 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: O=west longitude, N=north latitude, S=south latitude.
Call =Call letters assigned.
System =Radio system used and sparks per second.
Range =Normal range in nautical miles.
W. l. =Wave lengths assigned: Normal wave lengths in italics.
Service =Nature of service maintained:
PG—General public.
PR—Limited public.
RC=Radio compass station.
P—Private.
G—Government business exclusively.
Hours =Hours of operation.
N—Continuous service.
X=No regular hours.
m=a. m. (12 m=midday).
s=p. m. (12s=midnight).
Rates =Ship or coast charges in cents: c=cents. (The rates in the international list are given in francs and centimes.)
I. W. T. Co. =Independent Wireless Telegraph Co.
R. C. A. =Radio Corporation of America.
S. O. R. S. =Ship Owners' Radio Service.
C. w. =Continuous wave.
I. c. w. =Interrupted continuous wave.
V. t. =Vacuum tube.
FX. =Fixed station.

CERTIFICATE: By direction of the Secretary of Commerce this publication is issued as an administrative report and is required for the proper transaction of the public business.

1798—22——1

NEW STATIONS.

Commercial land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Chicago, Ill.[1]	WQX	140	PR(FX)	X	Walter A. Kuehl.
Kanatak, Alaska[2]	KGC	300, 522, 600, 1625	PR(FX)	X	Associated Oil Co.
Pittsburgh, Pa.[3]	KQV	300, 425	PR(FX)	X	Doubleday-Hill Electric Co.
Port Townsend, Wash.[4]	KRP	300, 600	PG		Port Townsend Radio Co.

[1] Loc. (approximately) 0.87° 37' 00", N. 41° 53' 00"; range, 50; rates, none.
[2] Loc. (approximately) 0.157° 39' 30", N. 57° 42' 00"; range, 300; system, Kilbourne & Clark, 1000; rates, none.
[3] Loc. (approximately) 0.80° 20' 00", N. 40° 20' 00"; range, 200; system, composite, v. t., telephone, and telegraph; rates, none.
[4] Loc. 0.122° 46' 02", N. 48° 07' 01"; range, 300; system, composite, 250; hours, 12 noon to 11 p. m.; rates, ship service, 6 c. per word.

Commercial land and ship stations, alphabetically by call signals.

[h=ship station; c=land station.]

Call signal.	Name.	Call signal.	Name.
KGC	Kanatak, Alaska.....c	KRP	Port Townsend, Wash.....c
KQV	Pittsburgh, Pa.....c	WQX	Chicago, Ill.....c

Broadcasting stations, alphabetically by names of cities.

[Additions to the List of Radio Stations of the United States, edition June 30, 1922.]

City.	Call signal.	City.	Call signal.
Allentown, Pa.	WIAN	Neenah, Wis.	WIAJ
Atlantic City, N. J.	WHAR	Norfolk, Nebr.	WIAG
Binghamton, N. Y.	WIAV	New Orleans, La.	WIAF
Birmingham, Ala.	WIAG	Newton, Iowa.	WIAH
Bluefield, W. Va.	WHAJ	Norwood, Ohio.	WIAL
Boise, Idaho	KFAU	Ocean City, N. J.	WIAD
Burlington, Iowa.	WIAS	Omaha, Nebr.	WIAK
Butte, Mont.	KFAP	Paducah, Ky.	WIAR
Butte, Mont.	KFBF	Portland, Me.	WIAL
Cedar Rapids, Iowa.	WJAM	Reno, Nev.	KFAS
Cedar Rapids, Iowa.	WKAA	Rockford, Ill.	WIAB
Cincinnati, Ohio.	WHAG	Rockford, Ill.	WJAH
Clarksburg, W. Va.	WHAK	Rochester, N. Y.	WHAM
Cleveland, Ohio.	KDPM	Saginaw, Mich.	WIAW
Corinth, Miss.	WHAU	San Antonio, Tex.	WJAE
Davenport, Iowa.	WHAI	San Diego, Calif.	KFBC
Dayton, Ohio.	WJAI	San Jose, Calif.	KFAQ
Decatur, Ill.	WHAP	San Luis Obispo, Calif.	KFBE
Eugene, Oreg.	KFAT	Santa Ana, Calif.	KFAW
Galveston, Tex.	WIAC	Savannah, Ga.	WHAO
Hanford, Calif.	KFBU	Seattle, Wash.	KDZT
Havre, Mont.	KFBB	Springfield, Mass.	WIAP
Hollywood, Calif.	KFAH	Springfield, Mo.	WIAI
Holyoke, Mass.	WHAX	Steubenville, Ohio.	WJAK
Huntington, Ind.	WHAV	Tacoma, Wash.	KFBG
Joplin, Mo.	WHAH	Tampa, Fla.	WHAW
Joplin, Mo.	WJAC	Tarkio, Mo.	WIAT
Lansing, Mich.	WHAL	Troy, N. Y.	WHAZ
Le Mars, Iowa.	WIAU	Ventura, Calif.	KFAV
Lewiston, Idaho.	KFBA	Vinton, Iowa.	WIAE
Lincoln, Nebr.	WIAX	Waco, Tex.	WJAD
Lincoln, Nebr.	WJAB	Washington, D. C.	WHAQ
Lincoln, Nebr.	WKAC	Washington, D. C.	WIAY
Louisville, Ky.	WHAS	Waupaca, Wis.	WIAA
Marion, Ind.	WIAQ	Wichita, Kans.	WIAN
Milwaukee, Wis.	WIAQ	Wichita Falls, Tex.	WKAF
Moscow, Idaho.	KFAN	Wilmington, Del.	WHAV
Muncie, Ind.	WJAF	Yale, Okla.	WHAT

List of stations broadcasting market or weather reports (485 meters) and music, concerts, lectures, etc. (360 meters), alphabetically by call letters.

[Additions to the List of Radio Stations of the United States, edition June 30, 1922.]

Call signal.	Station operated and controlled by—	Location of station.	Wave lengths.
KDPM	Westinghouse Electric & Mfg. Co.	Cleveland, Ohio	360
KDZT	Seattle Radio Association	Seattle, Wash.	360
KFAN	The Electric Shop	Moscow, Idaho	360
KFAP	Standard Publishing Co.	Butte, Mont.	360
KFAQ	City of San Jose	San Jose, Calif.	360
KFAR	Studio Lighting Service Co. (O. K. Olesen)	Hollywood, Calif., 1645 Hudson Avenue	360
KFAS	Reno Motor Supply Co.	Reno, Nev.	360
KFAT	S. T. Donohue	Eugene, Oreg., 681 Willamette Street	360
KFAU	Boise High School, independent school district of Boise City.	Boise, Idaho	360, 485
KFAV	Cooke & Chapman	Venice, Calif.	360
KFAW	The Radio Den	Santa Ana, Calif.	360
KFBA	Ramsey & Bryant Radio Co.	Lewiston, Idaho	360
KFBB	F. A. Buttrey & Co.	Havre, Mont.	360
KFBC	W. K. Azhill	San Diego, Calif., 5933 Cliff Place	360
KFBD	Clarence V. Welch	Hanford, Calif., 315 North Douty Street	360
KFBE	Reuben H. Horn	San Luis Obispo, Calif.	360
KFBF	Butte School of Telegraph (F. H. Smith)	Butte, Mont.	360
KFBG	First Presbyterian Church	Tacoma, Wash.	360
WHAG	University of Cincinnati	Cincinnati, Ohio	360
WHAH	John T. Griffin	Joplin, Mo., 112 West Sixth Street	360
WHAI	Radio Equipment & Mfg. Co.	Davenport, Iowa	360
WHAJ	Bluefield Daily Telegraph and E. K. Kitts	Bluefield, W. Va.	360
WHAK	Roberts Hardware Co.	Clarksburg, W. Va.	360
WHAL	Phillips Jaffery & Derby	Lansing, Mich.	360
WHAM	University of Rochester	Rochester, N. Y.	360
WHAN	Southwestern Radio Co.	Wichita, Kans.	360
WHAO	Frederic A. Hill	Savannah, Ga.	360
WHAP	Dewey L. Otis	Decatur, Ill., 650 West Eldorado Street	360
WHAQ	Semmes Motor Co.	Washington, D. C.	360
WHAR	Paramount Radio & Electric Co.	Atlantic City, N. J.	360
WHAS	Courier-Journal and Louisville Times	Louisville, Ky.	360, 485
WHAT	Yale Democrat-Yale Telephone Co.	Yale, Okla.	360
WHAU	Corinth Radio Supply Co.	Corinth, Miss.	360
WHAV	Wilmington Electrical Specialty Co.	Wilmington, Del.	360
WHAW	Pierce Electrical Co.	Tampa, Fla.	360
WHAX	Holyoke Street Ry. Co.	Holyoke, Mass.	360
WHAY	Huntington Press	Huntington, Ind.	360, 485
WHAZ	Rensselaer Polytechnic Institute	Troy, N. Y.	360
WIAA	Waupaca Civic and Commerce Association	Waupaca, Wis.	360
WIAB	Jeslyn Automobile Co.	Rockford, Ill.	360
WIAC	Galveston Tribune	Galveston, Tex.	360
WIAD	Ocean City Yacht Club	Ocean City, N. J.	360
WIAE	Mrs. Robert E. Zimmerman	Vinton, Iowa	360
WIAF	Gustav A. De Cortin	New Orleans, La., 139 North Alexander Street.	360
WIAG	Matthews Electrical Supply Co.	Birmingham, Ala.	360
WIAH	Continental Radio & Mfg. Co.	Newton, Iowa	360
WIAI	Hoer Stores Co.	Springfield, Mo.	360
WIAJ	Fox River Valley Radio Supply Co.	Neenah, Wis.	360
WIAK	Journal-Stockman Co.	Omaha, Nebr.	360, 485
WIAL	Standard Service Co.	Norwood, Ohio	360
WIAN	Chronicle & News Publishing Co.	Allentown, Pa.	360
WIAO	School of Engineering of Milwaukee and Wisconsin News.	Milwaukee, Wis.	360
WIAP	Radio Development Corp.	Springfield, Mass.	360
WIAQ	Chronicle Publishing Co.	Marion, Ind.	360
WIAR	J. A. Rudy & Sons	Paducah, Ky.	360
WIAS	Burlington Hawkeye & Home Electric Co.	Burlington, Iowa	360
WIAT	Leon T. Noel	Tarkio, Mo.	360
WIAU	American Trust and Savings Bank	Le Mars, Iowa	360
WIAV	New York Radio Laboratories	Binghampton, N. Y.	360
WIAW	Saginaw Radio & Electric Co.	Saginaw, Mich.	360
WIAX	Capitol Radio Co. (Paul C. Rahwar)	Lincoln, Nebr.	360
WIAY	Woodward & Luthrup	Washington, D. C.	360
WJAB	American Radio Co.	Lincoln, Nebr.	360
WJAC	Redell Co.	Joplin, Mo.	360
WJAD	Jackson's Radio Engineering Laboratories	Waco, Tex.	360
WJAE	Texas Radio Syndicate	San Antonio, Tex.	360
WJAF	Munsey Press	Muncy, Ind.	360
WJAG	Norfolk Daily News (Huse Publishing Co.)	Norfolk, Nebr.	360
WJAH	Central Park Amusement Co.	Rockford, Ill.	360
WJAJ	Y. M. C. A.	Dayton, Ohio	360
WJAK	White Radio Laboratory	Stockdale, Ohio	360
WJAL	Victor Radio Corp.	Portland, Me.	360
WJAM	D. M. Perham	Cedar Rapids, Iowa	360
WKAA	Republican Times and H. F. Paar	....do....	360
WKAC	Star Publishing Co.	Lincoln, Nebr.	360
WKAF	W. S. Radio Supply Co.	Wichita Falls, Tex.	360

Government land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Bethel, Alaska	WVI				U. S. Army.
Jupiter, Fla. (RC) [1]	NAQ	800	RC	X	U. S. Navy.
Selfridge Field, Mich. (Mount Clemens).	WYAO				U. S. Army.

[1] Loc. 0.80° 04' 57", N. 26° 30' 59"; range, 150; system, U. S. Navy.

Government ship stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Station controlled by
Grant	WXH	U. S. Army.

Government land and ship stations, alphabetically by call signals.

[b=ship station; c=land station.]

Call signal.	Name of station.	Call signal.	Name of station.
NAQ	Jupiter, Fla.....c	WXH	Grant.....b
WVI	Bethel, Alaska.....c	WYAO	Selfridge Field, Mich. (Mount Clemens).c

Special land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

Station.	Call signal.	Wave lengths.	Station controlled by—
Birmingham, Ala.	5XAG	200, 375	Matthews Electrical Supply Co.
Butte, Mont.	7YF	200, 375	Butte College of Telegraphy (F. H. Smith).
Corvallis, Oreg.	7YJ	200, 375	Oregon Agricultural College, department of physics.
Fort Worth, Tex.	6ZAH	200, 375	Fort Worth Record.
Do.	5ZY	200, 375	Fort Worth Star Telegram.
Galesburg, Ill.	9XW	200, 250, 375	Lombard College.
Pittsburgh, Pa.	8XY	Variable	West Penn Power Co.
Portland, Oreg.	7XL	250–3650	Northwestern Electric Co.
Raleigh, N. C.	4YC	200, 375	North Carolina State College (electrical engineering department).
Reading, Pa.	3XAH	200	Donald B. Heilman, 51 South Sixth Street.
Tacoma, Wash.	7YO	200, 375	Tacoma City College.
Troy, N. Y.	2XAP	Variable	Rensselaer Polytechnic Institute.

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
2XAP	Second district: Troy, N. Y.		
3XAH	Third district: Reading, Pa.		
4YC	Fourth district: Raleigh, N. C.		
	Fifth district:		Seventh district:
5XAG	Birmingham, Ala.	7XL	Portland, Oreg.
6ZAH	Fort Worth, Tex.	7YJ	Corvallis, Oreg.
5ZY	Do.	7YO	Tacoma, Wash.
		7YF	Butte, Mont.
		8XY	Eighth district: Pittsburgh, Pa.
		9XW	Ninth district: Galesburg, Ill.

ALTERATIONS AND CORRECTIONS.

COMMERCIAL LAND STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

CLEARWATER, CALIF.—Range, 500; system, Federal arc and composite spark, 480; w. l., 300, 600, 1900, 3375, 4200, 5500; service PG and PR; hours, N; rates, ship service 10 c. per word; PR service is with other stations of the F. T. Co.

DETROIT, MICH. (WQX).—Strike out all particulars.

EAST MORICHES, N. Y.—Service PG and PR; rates, 10 c. per word; PR service is with St. Martins (PJD), Curaçao (PJC), Caracas (AYA), Maracai (AYB), and Puerto Cabello (AYC).

EVERETT, WASH. (KFT).—Rates, 6 c. per word.

HOG ISLAND, PA.—Strike out all particulars.

JOHNSWOOD, MICH.—Range, 200.

KWIGUK SLOUGH, ALASKA (KOV).—Read Carlisle, Alaska; range, 300; loc. (approximately) 0.156° 45′ 60″, N. 59° 02′ 00″.

NEW LONDON, CONN. (WLC).—Hours, N.

NEW ORLEANS, LA.—Rates, ship service 12 c. per word.

NEW YORK, N. Y. (WCG).—System, Marconi, 1000; w. l., 300, 500, 600; rates, all services 10 c. per word.

PIKE, KY.—Read Shoek, Ky.

PORT BEAUCLAIRE, ALASKA.—Range, 300.

RADIOVILLE, ALASKA.—Range, 200; service PG and PR; PR service is point to point service with other land stations in Alaska.

SAN FRANCISCO, CALIF. (Beach station, KFS).—Range, 500; system, Federal arc and spark, 1000.

SAN FRANCISCO, CALIF. (KDRO).—Strike out all particulars.

TOLEDO, OHIO (WAC).—Strike out all particulars.

COMMERCIAL SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

NOTE.—(U. S. L.) after operating company denotes that the change applies to the List of Radio Stations of the United States only; does not apply to the Berne list. Hereafter, where the rate is given without the service specifically stated—that is North and South American and trans-oceanic cable services—it should be understood that the rate is for both classes of service. When the rate is for one class of service only, the class of service will be stated.

ABANGAREZ.—United Fruit S. S. Corp. owner of vessel.

ALBERTA (KFAK).—Strike out all particulars.

ARGENTA.—Strike out all particulars.

ARIZONAN.—Range, 300; w. l., 300, 450, 600; rates, 8 c. per word.

BAYONNE.—Range, 150; system, RCA, 1000; w. l., 300, 450, 600.

CALAMARES.—W. l., 300, 450, 600.

CATHERINE.—Bull-Insular S. S. Co. owner of vessel.

CITY OF COLUMBUS.—System, RCA, 1000.

CITY OF FLINT.—System, Wireless Specialty Apparatus Co., 1000.

CITY OF HONOLULU.—Station operated and controlled by RCA (U. S. L.).

CITY OF LOS ANGELES.—Station operated and controlled by S. O. R. S. (U. S. L.).

CITY OF SEATTLE.—Miami S. S. Co. owner of vessel.

COFFENAME.—United Fruit S. S. Corp. owner of vessel.

CORCORAN.—Baltimore & Carolina S. S. Co. owner of vessel.

COUPARLE.—Name changed to Elocadro; Erle M. Leaf owner of vessel.

COVENA.—Hammond Lumber Co. owner of vessel.

COWAN.—Name changed to Flabeto; Erle M. Leaf owner of vessel.

COWANSHANNOCK.—Bethlehem Shipbuilding Corp. owner of vessel.

COWBOY.—Fred J. Gauntlett owner of vessel.
DANVILLE.—Station operated and controlled by RCA (U. S. L.).
DEERFIELD.—Station operated and controlled by S. O. R. S.
DELPHINE (KDRR).—Range, 300; system, RCA, 1000; w. l., 300, 450, *600*; service, PG; hours, N; station operated and controlled by RCA.
DEVOLENTE.—Station operated and controlled by I. W. T. Co. (U. S. L.).
DOLLY C.—Range, 150; system, Kilbourne & Clark, 1000; w. l., 300, 450, *600*; rates, 4 c. per word.
DUNAYRE.—Range, 200; system, Gray & Danielson, 240; w. l., 300, *600*.
EDGAR F. LUCKENBACH.—Luckenbach S. S. Co. owner of vessel.
ELIZABETH.—Station operated and controlled by I. W. T. Co.
EASTERN CLOUD.—Name changed to James B. Duke; station operated and controlled by RCA.
EASTERN EXPORTER.—Name changed to William Campion; Garland S. S. Corp. owner of vessel; station operated and controlled by RCA (U. S. L.).
EASTERN IMPORTER.—Name changed to Albert Jeffrey; station operated and controlled by RCA (U. S. L.).
EASTERN MERCHANT.—W. l., 300, *600*; hours, X; Luckenbach S. S. Co. owner of vessel; station operated and controlled by S. O. R. S.
EASTERN OCEAN.—Name changed to George Allen; Garland S. S. Corp. owner of vessel; station operated and controlled by RCA (U. S. L.).
ETHAN ALLEN.—Station operated and controlled by S. O. R. S. (U. S. L.).
FEDERAL (KDWY).—Station operated and controlled by S. O. R. S.
HAMER.—Station operated and controlled by S. O. R. S. (U. S. L.).
HAMILTON.—Range, 300; system, RCA, 1000; w. l., 300, *600*; rates, 8 c. per word; station operated and controlled by RCA.
HEREDIA.—United Fruit S. S. Corp. owner of vessel.
HUMBUCK.—Station operated and controlled by RCA (U. S. L.).
GRIFFCO.—Strike out all particulars.
IRENE.—W. l., 300, 450, *600*; station operated and controlled by I. W. T. Co.
ITOMPA.—Strike out all particulars.
LAKE FLOURNOY.—System, Navy-International Radio Telegraph Co., 1000; Lone Star S. S. Co. owner of vessel.
LAKE GLEBE.—Range, 300; w. l., 300, *600*.
LAKE GUNNL.—Range, 200; system, Navy-Marconi, 1000; w. l., 300, 450, *600*; station operated and controlled by RCA (U. S. L.).
LAKE STERLING.—Name changed to Virginia Express.
LENA LUCKENBACH.—Station operated and controlled by S. O. R. S.
LIBERTY.—Station operated and controlled by S. O. R. S. (U. S. L.).
MASON CITY.—Name changed to Ellenor; A. H. Bull S. S. Co. owner of vessel.
MEMNON.—Station operated and controlled by S. O. R. S.
METAPAN.—United Fruit S. S. Corp. owner of vessel.
MONTICELLO.—System, Navy, 1000.
MOUNT HOPE.—Range, 150; system, composite, 400; service, PG.
ORIENTAL.—Name changed to Melville Dollar; Dollar S. S. Line owner of vessel.
PANAMA.—Rates, 8 c. per word.
PHILADELPHIA (KSM).—New York-Naples S. S. Co. owner of vessel.
PINE TREE STATE.—Name changed to President Grant.
PORTO RICO.—New York & Porto Rico S. S. Co. owner of vessel.
POZNAM.—Station operated and controlled by S. O. R. S.
PRESIDENT.—Name changed to Dorothy Alexander.
PRESIDENT ARTHUR.—System, Navy-Lowenstein, 1000.
PRESIDENT POLK.—Station operated and controlled by S. O. R. S.
PRESIDENT ROOSEVELT.—Name changed to President Taft.
PRESIDENT TAFT.—Name changed to President Harding.

ROSE MAHONEY.—Strike out all particulars.
SALAAM.—Range, 300; system, Navy, 1000; w. l., 300, 450, *600*.
SAN JACINTO.—Range 300.
SAN MATEO.—United Fruit S. S. Corp. owner of vessel.
S. O. CO. NO. 91.—Strike out all particulars.
STANDTOW NO. 2.—Strike out all particulars.
STEEL VOYAGER.—Station operated and controlled by RCA.
STONEWALL.—Strike out all particulars.
SURINAM.—Rates, 8 c. per word.
SURINAME.—United Fruit S. S. Corp. owner of vessel.
TAMPICO.—Strike out all particulars.
THEODORE ROOSEVELT.—Strike out all particulars.
UNDAUNTED (KDSJ).—Range, 200; system, Gray & Danielson, 240; w. l., 300, *600*; rates, 8 c. per word; station operated and controlled by owner of vessel.
WEST JESSUP.—Station operated and controlled by I. W. T. Co.
WEST ZEDA.—W. l., 300, 450, *600*.
WILLIAM A. MCKENNEY.—Range, 200; system, Wireless Specialty Apparatus Co., 1000; w. l., 300, *600*; station operated and controlled by owner of vessel.
YUMA.—Di Giorgio Fruit Corp. owner of vessel.
ZACAPA.—United Fruit S. S. Corp. owner of vessel.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDAZ, *read* William Campion; KDBY, *read* Albert Jeffrose; KDJE, *read* Virginia Express; KDUT, *read* President Grant; KDWK, *read* President Harding; KDWS, *read* President Taft; KDX1, *read* Melville Dollar; KENN, *read* Elabeto; KOV, *read* Carlisle, Alaska; KUGX, *read* Ellenor; KUNF, *read* George Allen; KUSQ, *read* James B. Duke; WAAI, *read* Shock, Ky.; WGP, *read* Dorothy Alexander; WVOE, *read* Elcedro; strike out all particulars following the call signals, KDAB, KDFN, KDOV, KDRO, KENR, KFAK, KIKS, KOXR, KPK, KSAE, WCT, WQC, WQX, and WTU.

BROADCASTING STATIONS, BY CALL SIGNALS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922.]

KDN (San Francisco, Calif.).—Address Fairmont Hotel.
KFC (Gridley, Calif.).—Strike out all particulars.
KQP (Hood River, Oreg.).—W. l., 360 only.
KSC (San Jose, Calif.).—Strike out all particulars.
WAAW (Omaha, Nebr.).—W. l., 360, 485.
WBAJ (Toledo, Ohio).—W. l., 360, 485.
WBAV (Columbus, Ohio).—W. l., 360, 485.
WCAD (Canton, N. Y.).—Erroneously given in June Bulletin as Canton, Ohio.
WGV (New Orleans, La.).—W. l., 360, 485.
WSY (Birmingham, Ala.).—Hours, 2.30 p. m. except Sunday and 8 p. m. every day.

GOVERNMENT LAND 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, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

ANNAPOLIS, MD. (Naval Academy, NAK).—Service, O; hours, X; rates, none.
PARRIS ISLAND, S. C.—Rates, ship service 6 c. per word.

GOVERNMENT SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

BUFORD.—Strike out all particulars.
CROOK.—Strike out all particulars.
GENERAL A. M. RANDAL.—Correct orthography General A. M. Randall.

LOGAN.—Strike out all particulars.
SHERIDAN.—Strike out all particulars.
SHERMAN.—Strike out all particulars.
WARREN.—Strike our all particulars.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

Strike out all particulars following the call signals, WXA, WXB, WXF, WXJ, WXK, and WXN; WYJ, *read* General A. M. Randall.

SPECIAL LAND STATIONS, BY NAMES OF STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922.

ALAMEDA, CALIF. (6XA).—Strike out all particulars.
ASHLAND, OHIO (8ZN).—Address 208 Claremont Avenue.
BILOXI, MISS. (5ZAH).—Strike out all particulars.
BOULDER, COLO. (9XAQ). Station operated and controlled by University of Colorado (department of electrical engineering).
CAMBRIDGE, MASS. (1XO).—Address 11 Windsor Street.
CHICAGO, ILL. (9XAM).—Strike out all particulars.
CHICAGO, ILL. (9XG).—W. L., 200, 375; address, 4601 North Central Park Avenue.
DENVER, COLO. (9ZAG).—Address 1124 South University Street.
EVANSVILLE, IND. (9XAH).—Strike out all particulars.
HAMILTON, OHIO (8XAG). W. L., 200, 275, 375; address 325 North B Street.
INDEPENDENCE, MO. (9ZAD).—Strike out all particulars.
KANSAS CITY, MO. (9XAB).—W. L., 200, 500; station operated and controlled by Western Radio Co., 6 West Fourteenth Street.
KANSAS CITY, MO. (9XK). Address 3525 Walnut Street.
LA CROSSE, WIS. (9ZY).—Address 241 South Seventeenth Street.
LANSING, MICH. (8XM). Call signal erroneously given as 8ZF in June Bulletin.
LITTLE ROCK, ARK. (5ZL).—Address 1301 Welch Street.
LOS ANGELES, CALIF. (6XAQ).—Address 140 South Oxford Street.
LOS ANGELES, CALIF. (6XB).—Strike out all particulars.
MADISON, WIS. (9XM). W. L., 375, variable; station operated and controlled by University of Wisconsin (department of physics).
MINNEAPOLIS, MINN. (9XI).—W. L., 200, 375, 1100, 2000.
NAPA, CALIF. (6ZAD). *Read* Sunnyvale, Calif., P. O. Box 391.
NEW ORLEANS, LA. (5XH). Address of owner 131 State Street, Boston, Mass.
OAKLAND, CALIF. (6XAJ).—Address Hotel Oakland.
OTTUMWA, IOWA (9XAD).—Strike out all particulars.
PARKERSBURG, PA. (3XW). W. L., 375, 2500, variable.
PHILADELPHIA, PA. (3XC).—W. L., 400, 425; address, 2040 Arch Street.
PHILADELPHIA, PA. (3XV).—W. L., 200, 250, variable; address, 5847 Ellsworth Street.
PORT ARTHUR, TEX. (5XV).—W. L., 200, 225, 250, variable; station operated and controlled by Louis W. Hatry, 2048 Fifth Street.
PORTLAND, OREG. (7ZB).—Address 535 East Forty-fourth Street North.
PORTLAND, OREG. (7ZT). Address 967 Vernon Avenue.
SAN FRANCISCO, CALIF. (6XJ). Strike out all particulars.
SAN FRANCISCO, CALIF. (6XX).—Address 433 California Street.
SOUTH PASADENA, CALIF. (6XAS).—W. L., 200, 260, variable.
SPRINGFIELD, ILL. (9ZS).—Strike out all particulars.
URBANA, ILL. (9XJ).—W. L., 375, variable.
WASHINGTON, D. C. (3XZ).—W. L., 175, 200, 260, 330; address, 542 Irving Street.

DEPARTMENT OF COMMERCE AND COMMUNICATIONS, BUREAU OF POSTS, P. I.

Coastal radio telegraph stations owned and operated by the Philippine Insular Government, Manila.

[This data is supplemental to the List of Radio Stations of the United States, edition June 30, 1922.]

Station.	Location (longitude latitude).	Call letters.	Primary power (kilowatts).	Type of transmitter.	Type of receiver (auditory).	Wave lengths (meters).	Nature of service.	Regular office hours.	Sunday and holiday hours.	Ship schedule.
Cayo	121° 00′ 00″ E. 10° 50′ 00″ N.	KIX	2	Telefunken	Telefunken	600 [illegible]	Public	8 a. m. to 12 m., 2 to 5.30 p. m.	8 to 10 a. m., 4 to 5.30 p. m.	0.15 to 0.25 of every hour.
Davao	125° 30′ 00″ E. 7° 00′ 00″ N.	KIF	3	do	do	600–1200	do	do	do	First 10 minutes of every hour.
Isabela de Basilan	121° 50′ 30″ E. 6° 40′ 00″ N.	KPN	(1)	Electro Import Co.	Electro Import Co.	600	do	do	do	0.15 to 0.25.
Jolo	121° 00′ 00″ E. 6° 00′ 00″ N.	KIL	2	Marconi	Marconi	600–1200–1800	do	do	do	0.30 to 0.40.
Malabang	124° 05′ 00″ E. 7° 00′ 00″ N.	KIZ	3	Composite	W. E. Co.	600–1200	do	do	do	0.15 to 0.25.
Puerto Princesa	118° 40′ 00″ E. 9° 47′ 00″ N.	KIV	2	Telefunken	Telefunken	600–1800	do	do	do	0.30 to 0.40.
San Jose, Mindoro	121° 02′ 00″ E. 12° 20′ 00″ N.	KIY	2	Marconi	Marconi	600–1200	do	do	do	Do.
Zamboanga	122° 03′ 00″ E. 6° 50′ 00″ N.	KIW	5	Composite	W. E. Co.	1220	do	7 a. m. to 8 p. m.	7 a. m. to 7 p. m.	First 10 minutes of every hour.
Batanes	121° 00′ 00″ E. 20° 47′ 00″ N.	KPC	20	Marconi	Marconi	2700	do	do	do	Do.
Iloilo	122° 33′ 00″ E. 10° 42′ 00″ N.	KPM	5	do	do	600–1800	do	do	do	Do.
Cebu	123° 50′ 00″ E. 10° 18′ 00″ N.	KPI	5	do	do	600–1800	do	do	do	0.45 to 0.55.
Malangas	123° 35′ 00″ E. 7° 42′ 00″ N.	KPV	2	do	Marconi (old type).	600–900	do	8 a. m. to 12 m., 2 to 5.30 p. m.	8 to 10 a. m., 4 to 5.30 p. m.	0.30 to 0.40 of every hour.
Orion	120° 02′ 00″ E. 14° 50′ 00″ N.	KPJ	1	do	W. S. Co.	600–1800	do	do	do	0.45 to 0.55 of every hour.
San Ysidro (Camotes).	124° 22′ 00″ E. 10° 38′ 00″ N.	KPY	½	do	do	300–600	do	do	do	0.25 to 0.35 of every hour.
Malita	125° 30′ 00″ E. 6° 22′ 00″ N.	KPW	1	do	do	600–1800	do	do	do	0.45 to 0.55 of every hour.
Aparri	122° 40′ 00″ E. 18° 15′ 00″ N.	KPB	2	do	do	600–1800	do	do	do	0.15 to 0.25 of every hour.
Mati	126° 17′ 00″ E. 6° 57′ 00″ N.	KPZ	1	do	do	600–952	do	do	do	Do.

(1) 40-watt battery.

Coastal radio telegraph stations owned and operated by the Philippine Insular Government, Manila—Continued.

Station.	Location (longitude latitude).	Call letters.	Primary power (kilowatts).	Type of transmitter.	Type of receiver (auditory).	Wave lengths (meters).	Nature of service.	Regular office hours.	Sunday and holiday hours.	Ship schedule.
Lebak	124° 01′ 00″ E. 6° 35′ 00″ N.	KPX	2	Marconi	W. S. Co.	600-952-1200	Public	8 a. m. to 12 m., 2 to 5.30 p. m.	8 to 10 a. m., 4 to 5.30 p. m.	0.30 to 0.40 of every hour.
Siasi	120° 49′ 15″ E. 5° 32′ 45″ N.	KEO	1	do	do	600	do	do	do	Do.
Bongao	119° 46′ 00″ E. 5° 2′ 00″ N.	KEO	1	do	do	600-952	do	do	do	0.15 to 0.25 of every hour.

The first 2 minutes of each of the 10-minute periods shown above shall be devoted by the respective coastal stations to "listen in" for ship signals at 600 meters wave length and the rest to the exchange of radiograms should there be any. Should there be no message to be transmitted to or received from any ship, the coastal station shall go ahead with its regular schedule with other coastal stations. Should the exchange of radiograms be not finished within the prescribed 10-minute period, the coastal station operator may extend the period until all radiograms shall have been transmitted, provided that such procedure shall, in his judgment, not delay other business too long, otherwise the ship station shall be advised that the exchange of radiograms may be resumed on the next hour.—*Extract from Administrative Order No. 55, dated December 14, 1921, regarding ship schedule.*

MISCELLANEOUS.

RADIO FOG-SIGNAL STATIONS OPERATED BY LIGHTHOUSE SERVICE.

Stations for transmitting fog signals now in commission are Ambrose Channel Light Vessel, Fire Island Light Vessel, Sea Girt (N. J.) Light Stations, and San Francisco (Calif.) Light Vessel. The three stations first named were selected so as to enable vessels approaching or leaving New York to locate themselves conveniently by cross bearings and to furnish convenient leading marks to approach the harbor. The stations are identified by the characteristics of the signals. Thus, Ambrose Channel sends one dash, Fire Island a group of two dashes, Sea Girt a group of three dashes, and San Francisco a group of two dashes, with brief intervals between the groups. The particular station on which a radio bearing is being taken in a fog is by this means just as definitely known as is the light on which a sight bearing is taken by the navigator of a ship identified by its color of flashes or color. The signals are operated continuously during thick or foggy weather, and also at the present time they are sent each day from 9 to 9 30 a. m. and from 3 to 3 30 p. m., so as to permit any vessel equipped with radio compass to try out the method and apparatus in clear weather. To avoid continuous interference between the signals themselves, they are sent on different time schedules, as follows: Ambrose sends for 20 seconds, silent 20 seconds; Fire Island sends for 25 seconds, silent 25 seconds, Sea Girt sends for 30 seconds, silent 6 minutes; and San Francisco sends for 30 seconds, silent 30 seconds. The signals are repeated rapidly, Sea Girt, for example, sending over 40 groups of dashes a minute.

The transmitting apparatus now in use is a commercial panel type transmitting set of simple and rugged construction of about 1-kilowatt power. In addition to this set a special automatic motor-driven timing switch for producing the desired signal at regular intervals is provided. The antennas at the transmitting stations are the same as used for ordinary communication. The wave length used at present is 1,000 meters, the present international standard for such signals, and the range of usefulness varies from 30 to 100 miles, depending upon the sensitiveness of the receiving apparatus.

About the middle of this month a new light vessel will be placed in commission on Diamond Shoals, which will be provided with fog-signal apparatus, transmitting signals of two dashes grouped, 30 seconds on 30 seconds silent.

The following-named stations are expected to be placed in operation about the first of next year: Nantucket (Mass.) Light Vessel, Boston (Mass.) Light Vessel, Cape Charles (Va.) Light Vessel, Cape Henry (Va.) Light Station at entrance of Chesapeake Bay, Swiftsure Bank Light Vessel at entrance to Straits of Juan de Fuca, Wash., and Columbia River (Oreg.) Light Vessel at entrance of Columbia River. Further particulars regarding these stations may be had by communicating with the Commissioner of Lighthouses, Department of Commerce, Washington, D. C.

NEW LIST OF RADIO STATIONS OF THE UNITED STATES.

Copies of the new list of Commercial and Government Radio Stations of the United States, edition June 30, 1922, will be ready for distribution about the 15th of October and may be procured from the Superintendent of Documents, Government Printing Office, this city, at 15 cents per copy. The new list of Amateur Radio Stations of the United States will be ready for distribution about the same time or a few weeks later. The price of this publication is 15 cents per copy. A list of the broadcasting stations in operation on June 30 last will be included in the first-named publication. The list of experimental stations, technical and training school stations, and special amateur stations (special land stations) will be in both publications.

CHANGE IN RATES FOR CANADIAN STATIONS.

Beginning July 1 last the through wireless rate via the radio stations at Montreal, Grosse Isle, and Father Point will be 10 cents per word (6 cents coast tax and 4 cents ship tax). In addition to the above-mentioned stations the rate of the following-

named stations will be 30 cents per word, effective on the same date: Gonzales Hill, Cape Laxo, Point Grey, Pachena, Estevan British Columbia, Bull Harbour, Dead Tree Point, Digby Island, and Alert Bay.

LEGAL TIME IN POLAND.

Effective June 1 last the legal time in Poland will be the same as that of Central Europe.

BEARINGS OBTAINABLE FROM FRENCH STATIONS.

French radio compass stations in Algeria, France, and Morocco give bearings on 450, 600, or 800 meters, as the ship station may desire. For each bearing a charge of 6 francs is made. American ship stations should obtain these bearings on the 800-meter wave.

WIRELESS STATION AT MOSCOW, RUSSIA.

The new wireless station at Shabolevka, in Moscow, was able to receive messages from the recent Conference at Genoa. Messages are sent by the commissariat for foreign affairs through this station. The receiving department is equipped with three apparatus, all of Russian construction. The station has two masts each 500 feet high.

INFORMATION FROM THE BERNE INTERNATIONAL BUREAU.

Corsica.—The wireless coast station at Bonifacio will communicate with any ship desiring information of meteorological order relative to barometrical pressure, wind (direction and velocity), condition of the sky, barometrical tendency, and the visibility and condition of the sea. The land line telegraph rate is 3 cents per word and the coast station rate is 8 cents per word.

France.—The same information (given by Bonifacio) is obtainable from the station at Marseille. The rate is the same.

Poland.—Effective June 1 last, the legal time of this country will be the same as that of Central Europe.

WIRELESS TELEPHONY IN JAPAN.

Considerable interest is now being manifested in wireless telephony. The first wireless telephone to be established will communicate between Fukuoka in Kyushu and Fusan, Morea. It is planned to connect this line with land lines. Considerable delay has been experienced in its installation, but the station, from latest reports, should be in operation at this writing. The next installations planned by the Department of Communications of Japan are from Kyushu to Formosa and from Kyushu to Tsushima in the south and from Hokkaido to Saghalien in the north. A company is now being formed to establish a wireless telephone system between Kagoya and Osaka, a distance of about 120 miles.

AMPLIFIER USING ALTERNATING-CURRENT SUPPLY.

There has been developed at the Bureau of Standards an amplifier which uses 60-cycle alternating current to supply power for both the filaments and plates. The necessity for storage batteries and dry batteries is thus eliminated. The final form of amplifier uses five tubes and a crystal detector, there being three radio-frequency stages and two audio-frequency stages. A description of this amplifier is contained in a paper by P. D. Lowell, "Note on the development of an electron tube amplifier which uses 60-cycle alternating current to supply power for the filaments and plates," which appeared in the July, 1922, issue of the Journal of the American Institute of Electrical Engineers, volume 41, pages 485–490. It is expected that this paper will also be available as a publication of the Bureau of Standards in a few months. A more extended notice will appear in the Radio Service Bulletin when the Bureau of Standards publication is available.

SOURCES OF RADIO INFORMATION.

Many inquiries for radio information are received at the radio laboratory of the Bureau of Standards. A considerable part of these inquiries call for the same kinds of elementary information regarding radio publications, radio laws and regulations, station and operator licenses, and call books. In order to facilitate the handling of these inquiries, there has been prepared Bureau of Standards Circular No. 122, Sources of Elementary Radio Information. This circular gives the more important periodicals of radio interest, lists the more important Government radio publications and the radio books issued by various publishers which are of most general interest, and gives a brief summary statement regarding the radio laws and regulations and call letters. A copy of Bureau of Standards Circular No. 122 may be purchased for 5 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

REFERENCES TO CURRENT RADIO PERIODICAL LITERATURE.

The following list of references is prepared by the radio laboratory of the Bureau of Standards and is intended to cover the more important papers of interest to the professional radio engineer which have recently appeared in technical periodicals. Abstracts and articles which are essentially of amateur or novice interest are not noted. For about two years these lists have been prepared in mimeographed form, and a very limited number of copies have been available for distribution. Recently there has arisen a very considerably increased demand, and it has seemed desirable to publish the list in the Radio Service Bulletin. The publication of these references will be continued if the readers of the Radio Service Bulletin find them useful. The Bureau of Navigation will be pleased to receive suggestions from readers as to the desirability of continuing their publication. A complete file of the previous mimeographed lists can be consulted at the Bureau of Standards in Washington. Files of these lists can also be consulted at the Library of Congress in Washington, the Engineering Societies Library in New York, and the John Crerar Library in Chicago.

These references are classified according to a decimal system outlined in a report prepared at the radio laboratory of the Bureau of Standards, an extension of the Dewey decimal classification applied to radio. It is expected that this classification will be published later. In this list the subjects corresponding to the 10 principal classes of the radio classification are given, and preceding each reference is a given number which corresponds to the classification of the reference. The subjects corresponding to the various decimal divisions of the 10 principal classes are not given in these lists, but can be found in the classification. In case a reference could properly be assigned to two or more of the numbers of the classification, it appears only once in this list, with the number corresponding to the subject in connection with which the reference is of greatest importance. In this list, under the first eight principal classes, the numbers assigned to the references are preceded by the letter "R," which is an abbreviation for the number 621.384 which is assigned to radio communication in the regular Dewey decimal classification. Under the class "R 800—Non-radio subjects," the numbers shown in this list are not preceded by an "R," but are the numbers assigned to the subject of the reference in the regular complete Dewey classification.

R000. *Radio communication.*

R007. 1 Terrell, W. D., A few ideas on radio. Radio Broadcast, **1**, pp. 330-331, August, 1922.

R007. 1 The new radio bill: Introduced in Senate by Senator Kellogg (S3694) and in House by Representative White (HR11964). QST, **5**, p. 32, July, 1922.

R007.5 Revision of British post-office regulations covering amateur transmission. Wireless Age, **9**, p. 79, July, 1922.

R020 Kendall and Koehler. Radio Simplified (book). J. C. Winston Co., Philadelphia, Pa., 1922. Price, $1. Noted in Radio Broadcast, **1**, July, 1922.

R020 Wood, A. H., Standard Radio Encyclopedia (book). Perry & Elliot Co., publishers, Boston, Mass., 1922. Price, $1.50. Noted in Radio Broadcast, August, 1922.

R020 Sleeper, M. B., The Radio Experimenter's Handbook (book). Norman W. Henley Publishing Co., N. Y. 1922. Price, $1.

R020 Smith, J. O., Modern radio operation (tube transmission and reception). Ready August, 1922. Published by Wireless Press, N. Y. Price, $1.75. Noted in Wireless Age, **9**, p. 10, July, 1922.

R052 Hirsch, R., Nomographische methoden zur bestimmung von wellenlängen und antennengrössen. Telefunken Zeitung, **15**, pp. 101–104, January, 1922.

R090 Morecroft, J. H., What everyone should know about radio history. Radio Broadcast, **1**, pp. 199–205, July, 1922.

R090 De Forest, Lee, A review of radio, Radio Broadcast, **1**, pp. 332–340, August, 1922.

R091 Nairz, O., Die einfänge der drahtlosen telegraphie im Deutschland. Telefunken Zeitung, **5**, pp. 11–19, January, 1922.

R097 Wilhelm, D., An evening with Dr. A. G. Bell, Radio Broadcast, **1**, pp. 205–211, July, 1922.

R097 Schloemilch, Lose blätter aus meinem drahtlosen erinerungsbuche. Telefunken Zeitung, **15**, pp. 77–81, January, 1922.

R097 Joyce, L., Radio personalities: Reginald Aubrey Fessenden. Radio Broadcast, **1**, pp. 227–231, July, 1922.

R100.—*Radio principles.*

R112.6 Bradbury, B., Practical information on reception of radio signals, Radio News, **4**, p. 202, August, 1922.

R113 Radio circles globe (NSS heard at antipodes), Radio News, **4**, p. 237, August, 1922.

R113 Eberhard, H., Beobachtungen über auftretende empfangsminima von gross stationen, Telefunken Zeitung, **15**, pp. 113–118, January, 1922.

R114 Wolf, F., Atmosphärische störungen nach beobachtungen am drahtlosen empfänger auf dem königstuhl bei Heidelberg, Jahrb. d. drahtlosen Telegraphie, **19**, pp. 293–299, April, 1922.

R120 Über den erdwiderstand von sendeantennen, Elektrotechnische Zeitschrift, **43**, p. 825, June 15, 1922.

R120 Dallin, E. B., Some suggestions regarding the Beverage antenna, QST, **5**, pp. 12–13, July, 1922.

R120 Press, Abraham, A critical résumé of radio science (antennas). Electrician, **89**, pp. 34–35, July 14, 1922.

R125.1 Conference on radio direction finder, Electrical World, **80**, p. 88, July 8, 1922.

R127 Eckersley, T. L., An investigation of transmitting aerial resistances, Jour. Inst. Elec. Eng. (London), **60**, pp. 581–604, May, 1922.

R127 Kruse, S., Antenna resistance can't be calculated, QST, **5**, pp. 65–66, July, 1922.

R133 Golz, J., Zur theorie der gekoppelten schwingungen zweier ungedämpft miteinander schwingender selbsterregter kreise mit untersuchungen am schwingaudion, Jarhb. d. drahtlosen Telegraphie, **19**, pp. 281–289, April, 1922.

R134.5 Harris, P. W., Practical notes on building a long wave heterodyne, Wireless World and Radio Review, **10**, pp. 449–450, July 8, 1922.

R134.7 Ringle, A., Armstrong superregenerative receiver, Wireless Age, **9**, 58–61, July, 1922.

R134.7 The new Armstrong superregenerative receiver (pamphlet). Published by Radio Guild (Inc.), N. Y. Price, 50 cents. 1922.

R134.7 The "ins" and "outs" of Armstrong circuit (superregenerative), New York Evening Mail (radio supplement), p. 3, July 1, 1922.

R134.7 Armstrong, Edwin H., Signaling system (superregenerative receiving circuit for electron tubes). U. S. Patent No. 1,424,065, issued July 25, 1922.

R134.7 Roos, O. C., Superregenerative receiver circuit, Boston (Mass.) Traveler, June 22, 23, 24, 26, 1922.

R134.7 Hull, B. D., A vacuum tube radio receiving set (regenerative receiving circuit, tickler type), Telephony, **83**, pp. 21–22, July 15, 1922.

R134.7 The Armstrong superregenerative circuit, Radio News, **4**, p. 239, August, 1922.

R134.7 Warner, K. B., Superregeneration (an invention of tremendous importance to the amateur), QST, **5**, pp. 7–11, July, 1922.

R138 Compton, K. T., Physics of the three-electrode bulb (Edison effect), J. Franklin Institute, **194**, pp. 29–48, July, 1922.

R140 van der Pol, B., Chains of magnetically-coupled circuits, Electrician, **89**, p. 33, July 14, 1922.

R140 Hogan, J. V. L., Sharpness of tuning in a radio receiver. Radio Broadcast, **1**, pp. 348–352, August, 1922.

R140 Hogan, J. V. L., Increasing the selection power of a radio circuit, Radio Broadcast, **1**, pp. 211–214, July, 1922.

R140 Owen, S. P., Oscillations in three coupled electric circuits, Wireless World and Radio Review, **10**, pp. 451–452, July 8, 1922.

R140 Richmond, L. H., How to begin to enjoy radio. Part II (tuning), Radio Broadcast, **1**, pp. 236–241, July, 1922.

R145.3 Nicholson, J. W., Zonal harmonics of the second type, capacity of parallel disks, Phil. Mag., **43**, pp. 1–19, January, 1922; Sci. Abs. A, No. 1055, May, 1922.

R148 Horle, L. C. F., Modulation in radio telephony, QST, **5**, pp. 14–18, July, 1922.

R200—Radio measurements and standardization.

R201.7 Joos, G., and Mauz, E., Zur analyse von wechselströmen mittels der Braunschenröhre, Jahrb. d. drahtl. Telegraphie, **19**, pp. 268–276, April, 1922.

R225 Kruithof, J., Die eigenfrequenzen einlagiger Spulen, Archiv für Elektrot., **11**, pp. 77–84, June 10, 1922.

R270 Wente, E. C., The sensitivity and precision of the electrostatic transmitter for measuring sound intensities, Radio News, **4**, p. 238, August, 1922.

R281 Directions for the study of hard composite dielectrics (insulating materials), Jour. Inst. Elec. Engs. (London), **60**, pp. 565–574, May, 1922.

R281.31 Schwaiger, A., Die überschlagfestigkeit des Porzellans, Elektrotechnische Zeitschrift, **43**, pp. 875–880, June 29, 1922.

R300—Radio apparatus and equipment.

R300 New radio apparatus, Radio News, **4**, pp. 228–229, August, 1922.

R300.5 Allen, G. Y., Protection of the receiving antenna, Radio Broadcast, **1**, pp. 214–218, July, 1922.

R320.8 Fine, D. S., Antenna tower erection for New York Radio Central Eng. News-Record, **88**, pp. 230–234, Feb. 9, 1922; Sci. Abs. B, No. 667, May, 1922.

R323 Wood, L., Will antenna be buried in the back yard? Radio Broadcast, **1**, pp. 303–307, August, 1922.

R325 Erreurs radiogoniométriques, La T. S. F. Moderne, **3**, pp. 246–247, May, 1922.

R325.6 Marconi describes how he transmits in any direction, American Radio Journal (N. Y.), **1**, p. 1, July 1, 1922.

R325.6 Marconi presented with Radio Institute medal of honor. Demonstrates new device for unidirectional transmission. Radio News, **4**, 231, August, 1922.

R330 Sur l'entretien simultané de plusieurs circuits oscillants par une même lampe à grille, Annales des Postes Telegr. et Telephones, **11**, pp. 676–684, May–June, 1922.

R330 Some British tube equipment, QST, **5**, pp. 25–27, July, 1922.

R330 Meissner, A., Die entwicklung der Telefunken-röhrentechnik, Telefunken Zeitung, **15**, pp. 82–100, January, 1922.

R330 Rukop, H., and Hausser-Gunswindt, I., Die Schwingungserzeugung durch Rückkopplung vermittels der Anoden-gitterkapazität bei der hochvakuum-eingitterröhre, Telefunken Zeitung, **15**, pp. 34–56, January, 1922.

R331 Brown, H. A., and Knipp, C. T., Pressure and gas content in vacuum-tube detectors, Wireless Age, **9**, pp. 78–79, July, 1922.

R331 Steichen, A., Versuche über das Nachleuchten von Röhren mit verdünnten Gasen, Physikalische Zeitschrift, **23**, pp. 229–232, June 1, 1922.

R333 Trautwein, F., The 3-electrode tube in electrical measurements, Telegr. und Fernsprech-Technik, **10**, pp. 69–74, June, 1921; Sci. Abs. B, No. 628, May, 1922.

R342 Brillouin, L., Les amplificateurs à résistance; effet des capacités de liaison-fonctionnement en détecteur—Domaine d'application des amplificateurs à résistance, La T. S. F. Moderne, **3**, pp. 209–215, May, 1922.

R342 van der pol, B., Magnetisation discontinuities revealed by the valve amplifier, K. Akad. Amsterdam, **4**, pp. 637–643 and 980–988, 1921; Sci. Abs. A, No. 1190, May, 1922.

R342 DeBellescize, H., Phénomènes de rétroaction dans les amplificateurs à résonance, Radioélectricité, **3**, pp. 238–242, June, 1922.

R342.6 Bouck, Zeh, Radio frequency amplification (its problems and possibilities), Radio Broadcast, **1**, pp. 312–16, August, 1922.

R342.7 Improvements in audio-frequency amplifiers, Wireless World and Radio Review, **10**, pp. 457–458, July 8, 1922.

R342.7 Hoke, G. E., Notes on the design of small continuous wave transformers, QST, **5**, p. 29, July, 1922.

R343 McNamee, B. F., Construction of a simple receiving set and two-stage amplifier, Radio (San Francisco), **4**, pp. 18–19, July, 1922.

R343 Harris, P. W., A four-valve station particularly suitable for short wavelengths, Wireless World and Radio Review, **10**, pp. 471–475, July 15, 1922.

R343 Mauz, E., und Zenneck, J., über niederfrequenze beeinflussung eines elektronen-relaisgenerators, Jahrb. d. drahtlosen Telegraphie, **19**, pp. 256–268, April, 1922.

R343 Blake, G. G., The addition of one stage of high-frequency amplification to the Reinartz tuner, Wireless World and Radio Review, **10**, pp. 445–446, July 8, 1922.

R343.7 Lowell, P. D., Note on the development of an electron tube amplifier which uses 60-cycle alternating current to supply power for the filaments and plates, Jour. Amer. Inst. Elec. Engrs., **41**, pp. 488–490, July, 1922.

R344.3 Bouck, Zeh, A simply constructed and operated short-range continuous-wave transmitter, Radio Broadcast, **1**, pp. 240–243, July, 1922.

R344.3 Daw, J. B., The design and construction of a 250-watt power amplifier and continuous-wave transmitter, Radio (San Francisco), **4**, pp. 12–13, July, 1922.

R344.3 Berne radio station: A description of the transmitting apparatus of the new Swiss installation, Wireless World and Radio Review, **10**, pp. 439–443, July 8, 1922.

R344.3 Seitz, W., Eine neue glühkathoden-senderöhre bei der die anode gleichzeitig die gefässwand bildet, Jahrb. d. drahtl. Telegraphie, **19**, pp. 310–312, April, 1922.

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