GENERAL ELECTRIC RADIO

Short-wave Primer

A Short-wave RADIO PRIMER

WRITTEN ESPECIALLY FOR

GENERAL ELECTRIC

BY ONE OF THE COUNTRY'S

LEADING AUTHORITIES ON RADIO

A SHORT-WAVE RADIO PRIMER

TO a large percentage of radio set owners, that glamorous world of Radio by which we hear music, lectures, opera, football games and dramatic happenings of the day, begins at a spot on the dial marked 550 kilocycles and ends on the 1500 kilocycle line. Little do these people realize that above 1500 kilocycles lies a new realm of radio, a vast territory of ethereal space that scientists have developed for the benefit of Man. This new romantic world appeals to every man, woman and child. It is as thrilling in its possibilities as a new microscope to a research worker or an unknown country to an explorer. Thanks to the skill of engineers, most of the obstacles that formerly hindered the full use of these short waves have been overcome. During the last year or two, more and more stations designed to supply world-wide entertainment have sent out their programs over these new low waves.

These increased short-wave activities have resulted in the development of a new type of radio set which brings in not only the usual broadcast stations with increased beauty of performance but also makes it possible to hear a large number of other stations in both hemispheres. This is the short-wave receiver.

Short waves, so called because by actual measurement in meters they are only a fraction of the length of the long radio waves with which you are already familiar, are not actually different in their characteristics from the long waves. The radio sets we have hitherto known ignored these

short waves because up to now it has been impossible to design a commercial receiver capable of receiving them well. But science is always marching along and today General Electric offers sets that receive both long- and short-wave programs so efficiently that both may be heard with pleasure.

Short waves bring you a new type of entertainment. They give you close contact with strange lands, new peoples, different manners and customs. They bring the outposts of the world to your own living room. They supply a passport to the many countries that all of us hope to visit but which we somehow never seem to get to.

The field of short waves is international. Through them we are privileged to hear famous operas from Italy, tingling tangos from the Argentine, native melodies from the South Sea Isles, and reports on international affairs by speakers of world repute. These and many other features were once available only to the globe trotter but now are brought to the homes of thousands of enterprising Americans who have discovered the thrill and glamour of short waves.

Because of the characteristics of short waves, programs coming from great distances are often received with greater clarity and volume than might be expected. Thousands of short-wave enthusiasts listen to the messages sent by radio from Admiral Byrd and his men in snow-bound Little America. Others who own short-wave receivers are able to set their clocks by the strokes of Big Ben in London. Still others, permanently residing in this country, tune by choice to the programs which originate regularly in their home lands. They hear the native songs they know so well and get the news of political developments that affect the daily lives of their relatives back home.

Blood-tingling stunts that are unknown to the owners of standard broadcast receivers are high spots in the memory of short-wave set owners. At Christmas and New Year's

time, for instance, they enjoy the novelty of tuning to one country after another as midnight heralds the coming of the great day. As the difference in longitude shifts the clock ahead hour after hour, from East to West, the dial of a short-wave receiver may pick up as many as nine Merry Christmas or Happy New Year greetings.

In isolated sections of this country where standard radio reception is not so extensive as in the more thickly settled areas, short waves fill the need for continuous entertainment. Often when atmospheric conditions make it unpleasant or impossible to listen on the regular broadcast waves, a simple shift to the lower waves permits the owner of a modern receiver to reach out over hundreds and perhaps thousands of miles for the same program free from annoying disturbances.

Short waves, once a plaything of scientists and experimenters, are now a priceless supplement to the established broadcasting facilities and services . . . a new world of radio enjoyment available to all who have a modern short-wave receiver.

EVERY COUNTRY OFFERS ITS PARTICULAR TYPE OF PROGRAM

Broadcasting, being an expression of the people of any country, is naturally typical of that country. Our programs here in the United States follow a pattern that is peculiar to our times and our people. As such they are recognized wherever they are heard. The same can be said of broadcasts originating in European, South American and Asiatic centers. So typical are many of these offerings that listeners, after a few months, can identify the sources of their entertainment long before the stations announce their call letters or give their identifying signals.

ENGLAND

One of the most extensive of all radio systems is the so-called Empire System of world-wide broadcasting formed by Great Britain for the benefit of the British Isles and the

far-flung dominions of the Empire. Over the numerous waves set aside by the British for the transmission of entertainment and information to her colonies go an almost continuous stream of material, a fair share of which can be picked out of the air in America.

The British excel in talks by outstanding statesmen on topics of international interest. So important are some of these lectures and discussions that the big networks in the United States frequently arrange to rebroadcast them for the benefit of listeners who are not so fortunate as to own short-wave receivers. The man or woman who has a receiver for short as well as for long waves is not limited in the number of these broadcasts, but may enjoy them all.

One bit of "Old England" that is seldom missed by the owners of short-wave sets is the striking of midnight and every hour in London by Big Ben. As the twelve sonorous tones of the mammoth bell ring out, the clocks in New York point to 7 p. m., in Chicago to 6 p. m. and in San Francisco to 4 p. m.

GERMANY

Germany divides her short-wave broadcasting periods about equally between news of the day and the playing of those swinging waltzes that are always associated with the Rhine and the Danube. Her news reports are delivered in several of the most widely-used languages, including, of course, English, and are intended to supply a word picture of national developments in the Reich. With the new Germany playing a highly important part in world affairs these news bulletins are interesting and vital, even though it is generally recognized that they are intended as propaganda.

ITALY

Easily identified by the voices of their women announcers, the short-wave stations of Italy take pride in the artistic quality of the programs which they transmit for the world to enjoy. The operas especially, coming as they do from the cradle of many fine operas, are highly regarded by music lovers. Many of the operatic productions at the leading theatres in Rome are caught by the microphone and broadcast on short waves. Unfortunately for the majority of American listeners, most of the talks and addresses from the Italian stations are given only in the native tongue, but the universal language of Music breaks down all such barriers and is free to all radio users who have the proper equipment with which to tune in.

RUSSIA

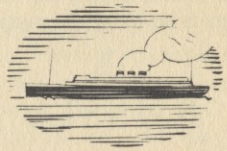
Russia has expanded her radio plans by increasing both the number and power of her stations. American listeners tune to Moscow for the latest news of the Soviet government, which is translated into several languages. Dramatic plays are also a feature of the Russian studios.

OTHER COUNTRIES

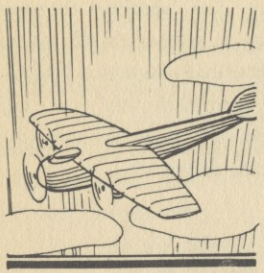
Now that statesmen appreciate the covering power of short waves there is scarcely a country of any size that is not now broadcasting special programs or arranging to do so. In far-off Morocco, on the edge of the Sahara Desert, a radio station produces programs on regular schedule and is heard frequently in this country. In Spain, Switzerland and the Netherlands . . . in Mexico, Central America and South America . . . in Hawaii, the Philippines and New Zealand

. . . from all these countries come radio features that are considered "rare catches" by the ever-growing army of short-wave listeners.

What better comparison could be drawn between a short-wave receiver and a world passport? A G-E short-wave receiver may be likened to a world cruise in an easy chair, taken at the convenience of the traveller. As a matter of plain truth, a real world cruise would never touch many of the spots that are brought to our easy chair by the ether waves. In this respect at least, the radio tuner has a decided advantage over the world voyager who must follow a definite route at a definite time, and who cannot detour from the stereotyped trail to enjoy an unexpected thrill from some remote country.



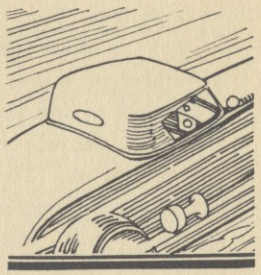
SOME OTHER SHORT-WAVE ATTRACTIONS



For strange radio fare that is never found on the regular broadcast bands it is not necessary to leave the shores of our own country. Beyond 1500 kilocycles there are countless services . . . commercial, governmental and amateur, that offer unusual features.

The aviators that fly the skies over America carry on conversations with their home airports. Occasionally when a pilot finds himself and his plane in difficulties the moments that follow are as full of thrills to the radio listener as the climax of the most exciting radio drama.

Police departments from Maine to the Pacific are equipping their patrol cars with short-wave sets and the orders that go out from headquarters are easily caught on G-E short-wave radio sets. Real enthusiasts sometimes spend an entire evening shifting from one police wave to another as warning bell or whistle announces that a patrol car is about to be dispatched to the scene of a crime.

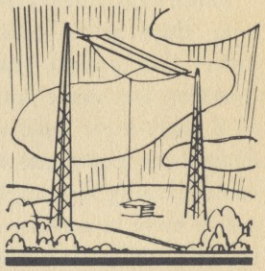


Amateur radio operators . . . there are now over 40,000 of them . . . hold forth at numerous spots on the short-wave dial, sometimes using code but at other times conversing in voice.

And sandwiched between these services are the commercial phone stations. These stations form the transoceanic

links in two-way conversations between telephone subscribers in this country and in foreign lands. Privacy is sometimes insured by "scrambling" or intentionally distorting the speech, thereby producing a gibberish of noise. While these conversations are absolutely unintelligible to us, they are "unscrambled" at the authorized point of reception and converted back into understandable speech.

SHORT WAVES WHAT THEY ARE AND HOW THEY ACT



All radio waves travel at the same speed as light . . . 186,000 miles a second. Each complete radio wave is known as a cycle. The number of waves or cycles sent out each second by a station is called its frequency. "Kilo" means a thousand. Therefore, a kilocycle means a thousand waves, or cycles, a second. Station RV59 at Moscow, for example, is authorized to radiate 6,000,000 radio waves a second, or 6,000 kilocycles.

In exploring the mysteries of short waves you will sometimes find stations listed by frequency (kilocycles) and other times by wave-lengths (meters). To convert kilocycles into meters, simply divide 300,000 by the figure you have. Thus, Station RV59, which sends out 6,000

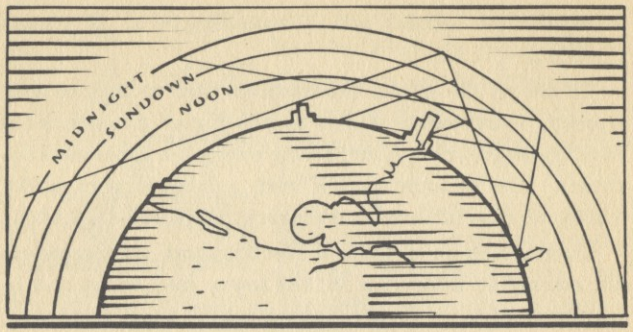
kilocycles per second, uses a wave-length of 50 meters (300,000 ÷ 6,000).

To reduce the size of the numbers used to indicate frequency, sometimes a station in the higher frequencies is listed in megacycles. A megacycle is simply a thousand kilocycles. The Moscow station with a frequency of 6,000 kilocycles may be listed as 6 megacycles (6,000 ÷ 1,000).

Tuning dials on all General Electric short-wave receivers are marked in kilocycles for the lower frequencies and in megacycles for the higher frequencies. To simplify tuning, the important short-wave channels are also indicated on the dial in meters.

There are no definite limits for the short wave but it is generally understood that short waves, as such, are those represented by the frequencies extending from the upper end of the broadcast band (1500 kilocycles) to the 30,000 kilocycle, or 10 meter wave. All frequencies higher than 30,000 kilocycles are commonly known as ultra short waves and are not reached by the average short-wave receiver for the reason that broadcasting in those frequencies is entirely experimental and of no value to the average listener.

Let us, then, study the general behavior of short waves from the time they are transmitted by the station until they reach the radio receiver. When these waves leave the station antenna they are in two parts. One part, called the ground wave, travels close to the earth and is soon absorbed by buildings, metal deposits and natural screens. The other wave sets off into the air at an angle determined by the design of the antenna and the frequency of the transmitted wave and travels in a straight line until, at a point 75 to 125 miles up in the air, it encounters a region known as the Heaviside layer, which is thought to be an area of highly charged particles which cannot be penetrated by the short waves. This layer acts like a mirror and turns the wave back toward the earth. As a result, the waves which started away from the ground finally come back to the earth's



surface many hundreds of miles from their starting point. The distance between the station and the point of return to the earth is called the "skip distance" and in this area it is not possible to hear the station with any degree of reliability. This explains why a short-wave station of relatively low power is often heard with good volume several thousands of miles away whereas its signal may be completely missing only fifty miles or so from the transmitter.

The height of the Heaviside layer varies with the time of day and the season. Because of this, the signals change in strength as the hours pass from daylight to darkness. To overcome this objection, radio engineers have worked out charts which give the best wave length to use at every hour of the day and these charts are followed closely in selecting the frequency best suited for any particular broadcasting schedule.

For instance, the waves from 15 to 25 meters give best service during daylight hours but are practically useless after sundown. When the sun sets, the stations transfer their activities to the 30-to-50 meter waves and continue there until the sun is about to rise again.

So you see how essential it is to consider the prankishness of nature when dealing with short waves. Actually, Mother Nature still holds the upper hand and her vagaries must be considered seriously, if the best results from broadcasts in the lower wave regions are to be obtained.

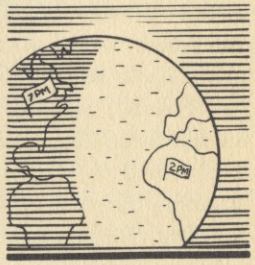
Long before the general public took any interest in short waves, the leading scientists of the world were studying their action. Just outside the city of Schenectady, Dr. E. F. W. Alexanderson of the General Electric Company erected a complete short-wave laboratory with the idea of seeing what happened to short waves after they had been shot into the air. He tried many types of antennas and watched their effect on signals sent into space. One of these antennas, called a "directional antenna," displayed remarkable ability in reaching remote points, and made possible the establishment of continuous contact with the first Byrd expedition to the Antarctic in 1929. These antennas are called "directional" because they aim the signals at the particular spot it is desired to reach instead of spreading them fan-wise in every direction. They are now in world-wide use, and by means of them, Germany and England and many other countries are able to send you fine programs with a volume and fidelity that sometimes equal those from your local stations . . . provided you have a modern short-wave receiver, like the General Electric.

These scientists also discovered that those mysterious blemishes on the sun called "sun spots" have a definite effect on radio reception and that the strength of signals can be prophesied many weeks ahead of time by the movement of these spots.

These things indicate how necessary it is to consider the workings of nature as they affect short-wave reception. Except for the static which comes from thunderstorms, standard broadcast programs are seldom ruined by upheavals of nature, but the short-wave listener has learned that he must make due allowances for such things until science finds a way for us to get around them.

THE TRUTH ABOUT SHORT-WAVE RECEPTION

Short-wave radio reception is one of the most fascinating types of home entertainment. However, there are several factors which at times make perfect reception impossible.



A fair appreciation of short-wave reception, with a knowledge of its limitations, only adds to the attractiveness of this newest branch of radio. For let it be said here, short-wave reception is far from perfect. Those who are now utilizing it as a supplement to their regular broadcasting services do so because the lower waves have a carrying power far greater than that of the broadcast waves and are therefore indispensable when reaching out to distant points.

Short-wave broadcasts lose quality as the distance from the transmitter increases. Another drawback is fading.

A fading signal is one that varies in strength from minute to minute. Sometimes fading is scarcely noticeable . . . at other times it makes intelligible reception impossible. Here again weather conditions have a great deal to do with the character of the waves as they reach your ears through the loudspeaker of your short-wave receiver. Infrequently, fading becomes so pronounced that the signals disappear for seconds and even minutes, only to reappear and build up again to their original strength. As one season passes into another the period of fading may lengthen until the station is silent as far as your locality is concerned, although listeners in other parts of the world may be tuning to

the same station and reporting unusually satisfactory reception.

The difference in time between various parts of the world serves likewise to complicate short-wave reception. For instance, when it is evening in the eastern part of the United States, it is midnight or later in Europe. This time difference means that European broadcasters desirous of reaching America must go into action at an hour when their own local listeners are asleep.

For the same reason, Australian stations are heard here in the early morning although it is late the night before in Oceania. By experience, if not by reading, the short-wave fan soon learns the most favorable listening times for the various countries and makes his plans to listen when he has the best chance to reach his objective.

Generally speaking, short-wave broadcasters are assigned to one of four main sections of the dial, known as the "19 meter," "25 meter," "31 meter" and "49 meter" bands. On both sides of these bands and filling the space between them are the commercial radiophone and radio-telegraph stations, amateurs who talk by both code and voice, and the airplanes which get their orders and weather reports from headquarters.

There are so many short-wave broadcasters and so few available places for them that the stations necessarily are close together. Exceedingly fine tuning is therefore required in order to select one particular program from the many that cluster about it. Often a movement of the dial so slight as to be scarcely noticeable tunes one station out and another one in. The cleverest users of all-wave receivers eventually develop a knack of slicing the desired station from those adjacent to it. With General Electric receivers, short-wave tuning is made easier through the use of a vernier control with a reduction of 55 to 1, thus making it possible to tune sharply with ease . . . a most important requirement in a short-wave receiver.

HOW TO TUNE

The new owner should look to the "old faithfuls" of the dial for his first introduction to short waves. The best "catches" are found in the vicinity of 19, 25, 31 and 49 meters. The location of these bands is plainly marked on the dial of G-E short-wave receivers. After these waves have been exhausted and the user has learned to handle his receiver with reasonable skill, then he can reasonably begin his explorations in the other fertile sections of the ether.

In tuning for short waves, the procedure differs but little from that followed when selecting a standard broadcast station, except that the tuning must be more exact. Haphazard twisting of the tuning control is a waste of time. The successful dialist goes after his prey like a scientist seeking a missing element and does not cease the search until he bags his game.

The first move is to make sure that the station sought is actually on the air at the time. Because foreign broadcasters find it necessary occasionally to shift their schedules and wave-lengths, every short-wave fan should subscribe to one of the publications catering to this field. The International Short Wave Club, with headquarters in Klondyke, Ohio, issues a monthly magazine to its members in which all late changes are noted and new stations announced and identified. With a membership in nearly 100 countries, the International Club is supplied with a continuous stream of accurate news of old and new stations. This club is only one of many.

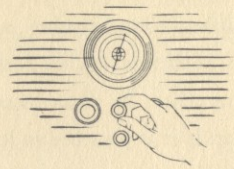
We have now made sure that the station is on the air. The next step is the location of its wave. In the 31 meter band, let us say, there may be several stations. Their separation, therefore, must be reckoned in fractions of a meter. For instance, DJA, Germany, transmits on 31.38 meters while W2XAF, Schenectady, works on 31.48 meters, a

trifling separation but ample enough to give perfect reception when using a General Electric set with its extremely accurate vernier tuning control and its precisely balanced circuit arrangement.

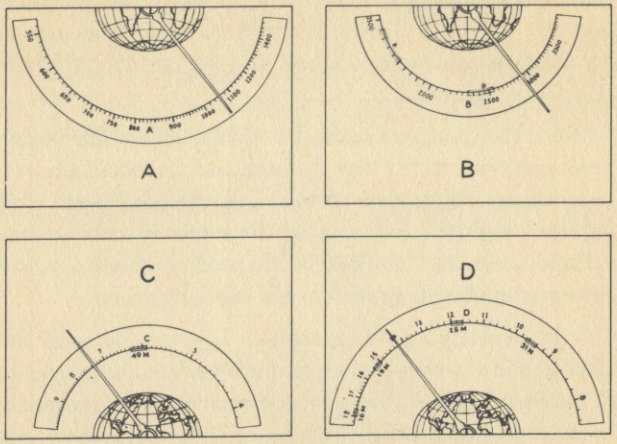
When the approximate dial location is known, the tuning knob must be rotated slightly back and forth and the volume control adjusted until the signal is recognized. Then by closer and still finer tuning the signal is built up to a volume sufficient to identify the station from the call letters or the language used in the announcements.

It is considered good practice to have several such stations in mind so that if the signal of one does not happen to be strong enough at the moment for satisfactory reception, a search may be made for another.

General Electric short-wave receivers are equipped with a device called a tone control. This accessory is invaluable when a program from a distant station is accompanied by atmospheric noises. Fortunately, most of these noises are pitched high in the musical scale so that by rotating the tone control, they may be suppressed without affecting the program. The proper adjustment of this control is found by practice and its judicious use sometimes means the difference between success and failure in the search for the best broadcasts on the shorter waves.



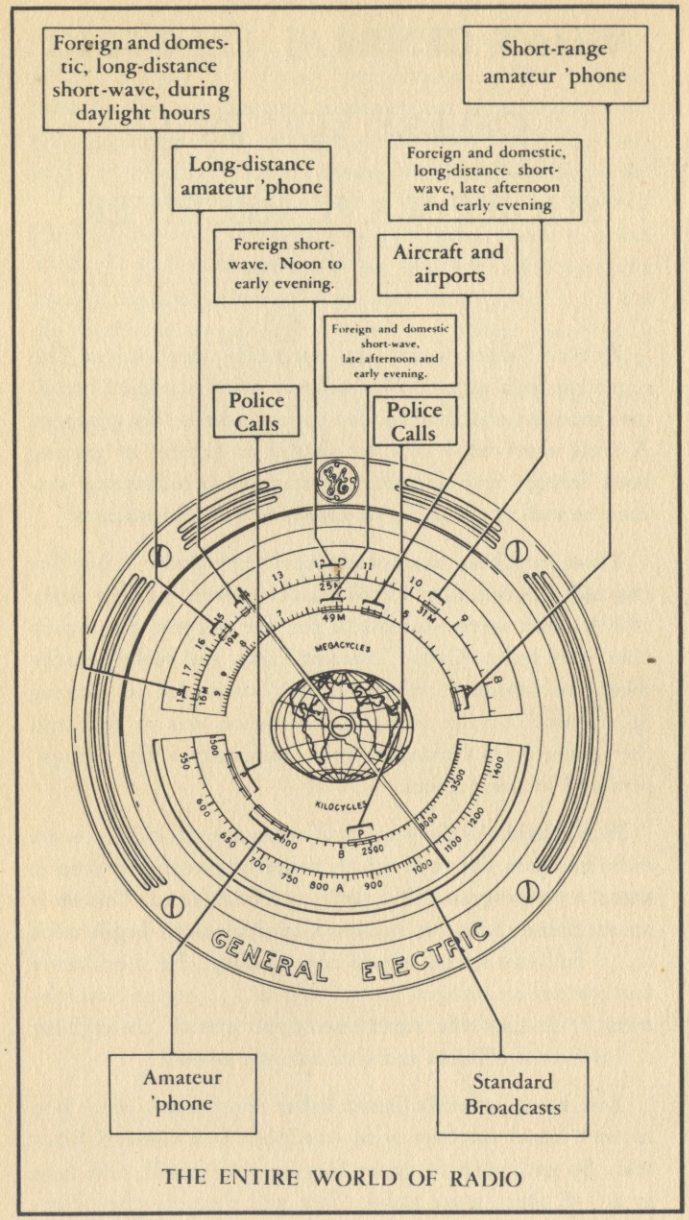
THE MAGIC DIAL



FOUR DIALS IN ONE

One of the many modern and distinctive features of General Electric all-wave receivers is the full range, airplane type, illuminated dial. Not only does this dial add to the appearance of the set but it is important in tuning . . . the G-E short-wave set is about the easiest set to tune that has yet been made. The dial is really four dials in one as the range of the set has been divided into four bands . . . "A" for standard broadcasts, "B" for police calls, amateur and aircraft stations, and "C" and "D" for short-wave broadcasts. A single, double-pointed tuning needle is used for all four bands while a band selector switch is used to switch from one band to another. By thus spreading the range of the set over four bands it is possible to locate stations with greater ease and speed.

General Electric's dual-wave set has a similar dial but in two bands instead of four . . . one for standard broadcasts . . . the other for short-wave.



THE ENTIRE WORLD OF RADIO

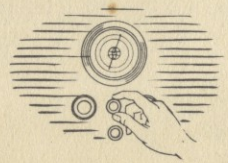
WHAT GENERAL ELECTRIC OFFERS YOU IN A SHORT-WAVE RECEIVER

Not all "short-wave" sets are really short-wave. This name has been given erroneously to many standard broadcast receivers that also receive police and aircraft messages. A truly short-wave receiver should be capable of getting both foreign and domestic short-wave broadcasting stations as well as the other six classes of radio broadcasts.

There have been short-wave receivers before . . . but like the old "two-lunger" broadcast receivers of the early 1920's, they were inadequate for the purpose for which they were built. Called "adapter" sets, and really attachments to broadcast receivers, they succeeded in picking up stations but the quality of reception was so poor and the difficulty in tuning so great that only a few "bugs" persisted in using them.

Now, thanks to the wizards of radio science, a short-wave radio has been designed which makes it possible to receive short-wave programs that really can be enjoyed. This set is an excellent radio for standard broadcasts to begin with . . . a full-size set of superb tone quality. Its short-wave features are an integral part of the set . . . not an "attachment." It uses the superheterodyne circuit throughout . . . the most efficient radio circuit yet devised.

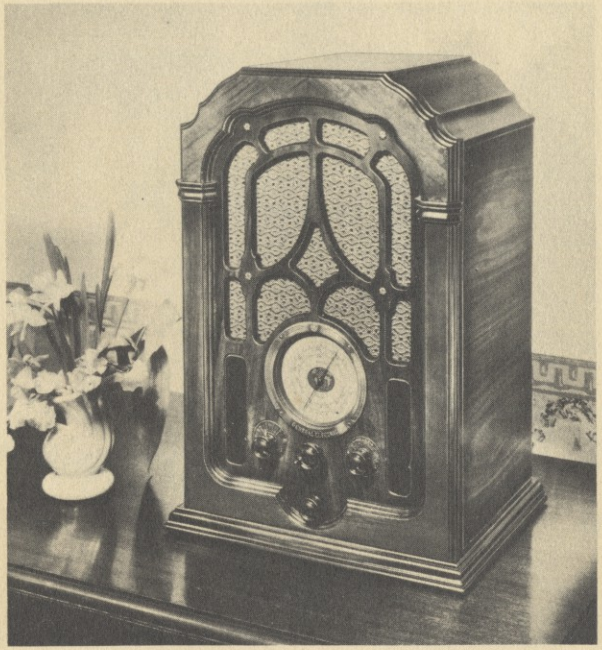
You have probably heard other short-wave sets. You haven't heard the best until you listen to a General Electric. So get ready for your biggest radio thrill, and tune in a G-E short-wave radio. You will discover the difference immediately . . . the difference in tone, reception, flexibility and all-around performance. The reason? Because General Electric, a pioneer in short-wave communications, waited to produce short-wave sets that satisfy . . . to assure clearer, better, more realistic reception . . . before introducing them to the public. A General Electric short-wave radio is not a hit-or-miss receiver. With the G-E it is possible to get amateur broadcasts or a foreign station with less noise and interference . . . for the first time to get real entertainment from short-wave broadcasts. There are several models of General Electric short-wave receivers. There is one to meet your taste and pocketbook.



GENERAL ELECTRIC ALL-WAVE RADIO

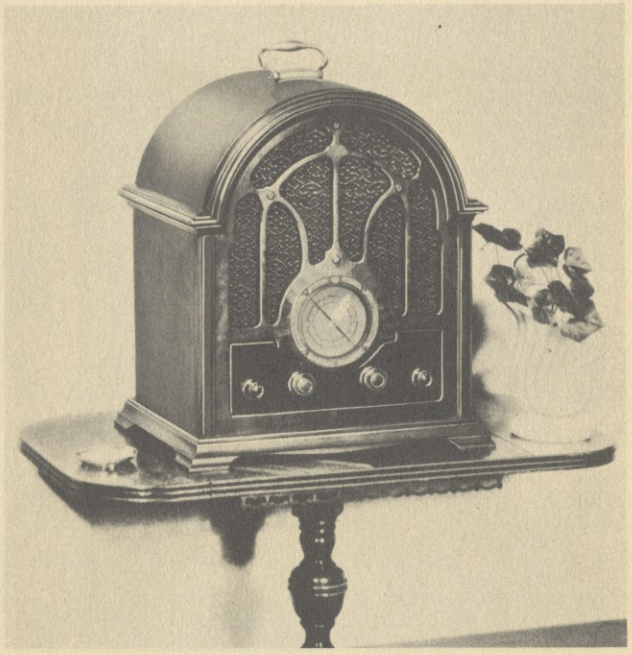
MODEL K-85. Superlative all-wave reception and distinctive cabinet beauty are combined in this versatile aristocrat of the General Electric short-wave line. It will bring you all your favorite standard radio programs as well as transoceanic and American short-wave broadcasts, police calls, and amateur and aircraft transmissions. The graceful lines of its two-tone brown walnut console cabinet make it a distinctive piece of furniture. Other features: G-E Tone Equalizers; electrodynamic speaker; twin-push amplification; automatic volume control; continuously variable tone control; airplane tuning dial; fine tuning ratio 55 to 1.

GENERAL ELECTRIC ALL-WAVE RADIO



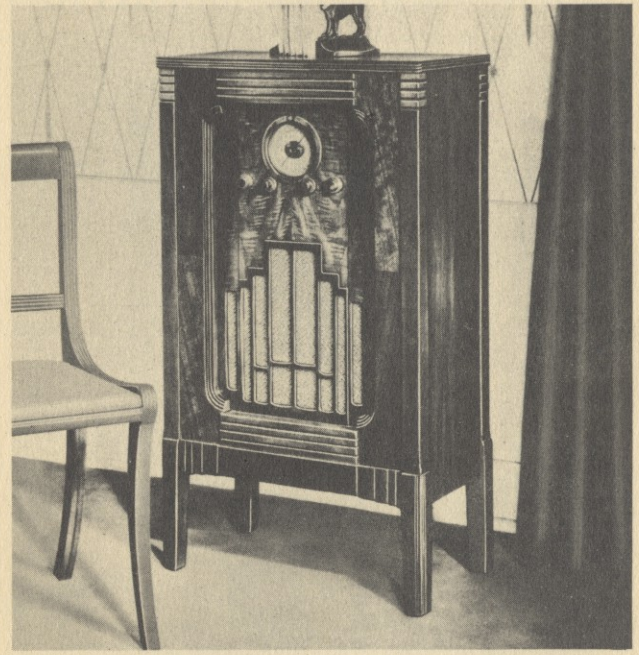
MODEL K-80. With this distinctive G-E All-wave superheterodyne table model, the whole world of radio entertainment is yours. Using one of its four wave-bands, you can bring in your favorite American broadcasts; with the other three, all foreign and domestic short-wave stations as well as police calls, amateur and aircraft transmissions. A new airplane type, four-band illuminated tuning dial, operated by a double reduction vernier tuning control, insures easy station selection. Other features: automatic volume control; twin-push amplification; continuously variable tone control; full-size electrodynamic speaker; two-tone walnut cabinet.

GENERAL ELECTRIC DUAL-WAVE RADIO



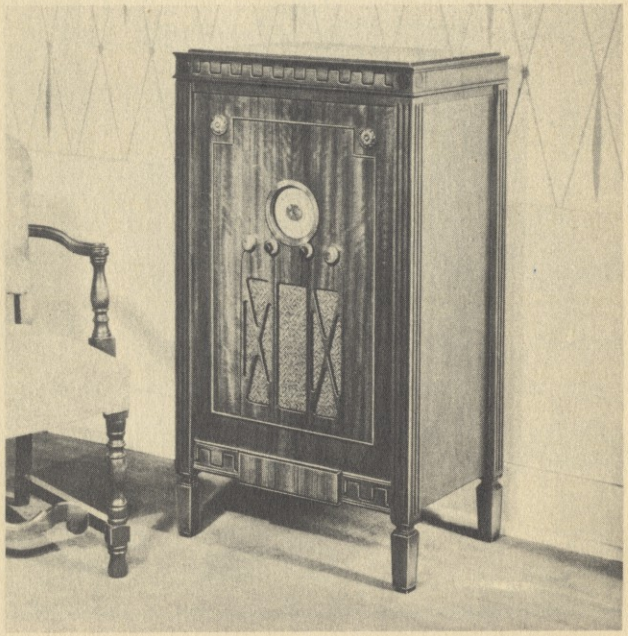
MODEL K-64. Housed in a beautiful mantel-clock cabinet of two-tone walnut, this General Electric dual-wave superheterodyne table model has two bands, one of which will bring in your favorite broadcast programs; the other, a number of foreign and domestic short-wave stations and some amateur and aircraft transmissions. Station selection is made remarkably simple by the use of a new airplane type, two-band illuminated tuning dial, operated by a double reduction vernier tuning control. Other features: automatic volume control; continuously variable tone control; electrodynamic speaker.

GENERAL ELECTRIC DUAL-WAVE RADIO

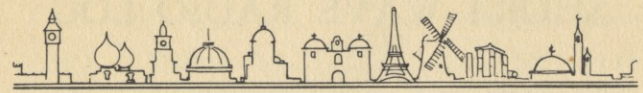


MODEL M-65. This G-E Console combines the feature of G-E short-wave reception with positive tone superiority in a cabinet of rare beauty, at an attractive low price. It receives, with remarkable sensitivity and selectivity, the most popular short-wave broadcasts from the whole world plus standard broadcast programs. Vernier control and the large, airplane-type dial facilitate tuning. Other features include automatic volume control, variable tone control, full-sized electro-dynamic speaker and handsome cabinet, Neo-Classical in design, made with heart-walnut top and sides, with deep-recessed butt-walnut instrument panel and hand-rubbed wax finish.

GENERAL ELECTRIC DUAL-WAVE RADIO-PHONOGRAPH COMBINATION



MODEL M-68. An amazing short-wave, long-wave radio-phonograph combination in a beautiful cabinet at a remarkably low price. Amazing domestic long- and short-wave reception and foreign reception on short-waves. Thrilling reproduction of all phonograph records including both 10- and 12-inch, 78 or 33 1/3 RPM. Positive tone beauty and versatile performance on standard American programs. Other features are: airplane-type dial with vernier tuning control; improved automatic volume control; full-size electro-dynamic speaker; splendid Neo-Classic style cabinet with rare heart and butt walnut overlays; handy record compartment.



HOW TO IDENTIFY SOME OF THE LEADING SHORT-WAVE STATIONS

ENGLAND'S EMPIRE STATIONS — Strokes of Big Ben on the hour.

MOSCOW (RV59) — "Hillo, hillo. Ici Moscow." Also the playing of the "Internationale."

SYDNEY, AUSTRALIA (VK2ME) — Laughing notes of the kookaburra at the opening and closing of each program.

VATICAN CITY (HVJ) — "Pronto, pronto, Radio Vaticano."

ZEESEN, GERMANY (DJA-DJC) — Opening bars of an old German song played over and over again on chimes.

LISBON, PORTUGAL (CT1AA) — "Coo-coo. Coo-coo."

MADRID, SPAIN (EAQ) — "Hillo, Ay-Ah-Coo, Transradio Madrid."

PONTOISE (PARIS, FRANCE) — Playing of "Marsellaise" at opening and closing of programs.

KOOTWIJK, HOLLAND (PCV) — "Hillo, Bandoeng."

ROME, ITALY (12RO) — Voices of women announcers. Also "Radio Roma-Napoli."

RABAT, MOROCCO (CNR) — "Hillo, hillo, Radio Rabat dans Maroc."

SHORT-WAVE RADIO LOG

100 LEADING SHORT-WAVE STATIONS

(Arranged by frequency in kilocycles)

Time schedule of these stations included with every G-E short-wave receiver

(As of March 1, 1934)

		Kilocycles	*Meters*
WKK	Lawrenceville, N. J.	21420	14.00
LSM	Buenos Aires, Argen.	21130	14.15
WKA	Lawrenceville, N. J.	21060	14.24
LSN	Buenos Aires, Argen.	21020	14.27
LSY	Buenos Aires, Argen.	20730	14.47
LSG	Buenos Aires, Argen.	19900	15.03
FTM	St. Assise, France	19355	15.55
PLE	Bandoeng, Java	18830	15.94
PMC	Bandoeng, Java	18370	16.33
FZS	Saigon, Indo-China	18345	16.38
PCV	Kootwijk, Holland	17810	16.82
W3XAL	Bound Brook, N. J.	17780	16.87
GSG	Daventry, England	17770	16.88
PHI	Huizen, Holland	17770	16.88
W9XL	Anoka, Minn.	17300	17.34
WOO	Ocean Gate, N. J.	17120	17.52
GBC	Rugby, England	17080	17.55
FZR	Saigon, Indo-China	16233	18.50
W2XAD	Schenectady, N. Y.	15330	19.56
CP4	La Paz, Bolivia	15295	19.60
W2XE	Wayne, N. J.	15270	19.65
FYA	Pontoise (Paris)	15243	19.68
W8XK	Saxonburg, Pa.	15210	19.72
DJB	Zeesen, Germany	15200	19.73
GSF	Daventry, England	15140	19.81

		Kilocycles	*Meters*
HVJ	Vatican City	15120	19.83
J1AA	Tokyo, Japan	15120	19.83
XDA	Mexico City, Mex.	14525	20.50
LSA	Buenos Aires, Argen.	14530	20.65
GBA	Rugby, England	13990	21.45
WOO	Ocean Gate, N. J.	13210	22.70
CNR	Rabat, Morocco	12820	23.38
FTN	Paris, France	12260	24.46
FYA	Pontoise (Paris)	11880	25.20
W8XK	East Pittsburgh, Pa.	11870	25.26
GSE	Daventry, England	11865	25.28
W2XE	Wayne, N. J.	11830	25.36
I2RO	Rome, Italy	11810	25.40
W1XAL	Boston, Mass.	11790	25.45
DJD	Zeesen, Germany	11760	25.50
GSD	Daventry, England	11750	25.53
PHI	Huizen, Holland	11730	25.57
VE9JR	Winnipeg, Canada	11720	25.58
FYA	Pontoise (Paris)	11705	25.60
YVQ	Maracay, Venezuela	11695	25.65
CT3AQ	Funchal, Madeira	11181	26.83
LSX	Buenos Aires, Argen.	10350	28.98
EAQ	Madrid, Spain	10000	30.00
LSN	Buenos Aires, Argen.	8890	30.30
J1AA	Tokyo, Japan	9870	30.35
T14NRH	Heredia, Costa Rica	9675	31.15
HSP2	Bangkok, Siam	9640	31.10
CT1AA	Lisbon, Portugal	9600	31.25
XETE	Mexico City	9600	31.25
VK2ME	Sydney, Australia	9590	31.28
W3XAU	Newtown Sq., Pa.	9590	31.28
GSC	Daventry, England	9585	31.32
HBL	Geneva, Switzerland	9580	31.34
W1XAZ	Springfield, Mass.	9570	31.35
DJA	Berlin, Germany	9560	31.38
W2XAF	Schenectady, N. Y.	9530	31.48

		Kilocycles	Meters
GSB	Daventry, England	9510	31.55
VK3ME	Melbourne, Australia	9510	31.55
SR1	Poznan, Poland	9490	31.60
WOO	Ocean Gate, N. J.	8560	35.09
CNR	Rabat, Morocco	8036	37.35
HBQ	Geneva, Switzerland	7444	40.30
HKF	Bogota, Colombia	7630	39.40
	Prado, Rio Bamba	7540	39.82
HBP	Geneva, Switzerland	7799	38.47
HBQ	Geneva, Switzerland	7799	38.47
HJ4ABB	Manizales, Colombia	7150	41.90
KEL	Bolinas, Cal.	6860	43.70
F8KR	Constantine, Algeria	6660	45.00
REN	Moscow, U. S. S. R.	6610	46.60
W3XL	Bound Brook, N. J.	6425	46.70
VE9BY	London, Ont., Canada	6425	46.70
HC1DR	Quito, Ecuador	6382	47.10
VE9AP	Drummondville, Canada	6335	47.35
HKC	Bogota, Colombia	6270	47.81
HKD	Barranquilla, Colombia	6243	48.05
CN8MC	Casablanca, Morocco	6250	48.00
VE9CL	Winnipeg, Canada	6147	48.87
W8XK	Saxonburg, Pa.	6140	48.86
VE9HX	Halifax, Nova Scotia	6125	48.98
ZTJ	Johannesburg, S. Africa	6122	49.10
W2XE	Wayne, N. J.	6120	49.02
YV1BC	Caracas, Venezuela	6120	49.02
VE9CG	Calgary, Alta., Canada	6110	49.10
VUC	Calcutta, India	6110	49.10
W3XAL	Bound Brook, N. J.	6425	46.70
W9XF	Downers Grove, Ill.	6100	49.15
VE9GW	Bowmanville, Ont., Canada	6090	49.22
VE9BJ	St. John, N. B., Canada	6090	49.23
CP5	La Paz, Bolivia	6085	49.25
W9XAA	Chicago, Ill.	6080	49.31
YV5BMO	Maracaibo	6075	49.39

		Kilocycles	Meters
OXY	Skamleboaek, Denmark	6075	49.40
VE9CS	Vancouver, Canada	6069	49.43
W8XAL	Cincinnati, Ohio	6060	49.50
VQ7LO	Nairobi, Kenya, Africa	6060	49.50
W3XAU	Newtown Sq., Pa.	6060	49.50
GSA	Daventry, England	6050	49.55
W1XAL	Boston, Mass.	6040	49.67
VE9CA	Calgary, Alta., Canada	6030	49.75
XEW	Mexico City	6023	49.80
DJC	Zeesen, Germany	6020	49.83
VE9DR	Drummondville, Canada	6005	49.96
VE9CU	Calgary, Canada	6005	49.96
EAJ25	Barcelona, Spain	6000	50.00
RV59	Moscow, U. S. S. R.	6000	50.00
HVJ	Vatican City, Rome, Italy	5970	50.26
HJ4ABE	Medellin, Colombia	5900	50.80
HJ1ABB	Barranquilla, Colombia	5835	51.50
HCJB	Quito, Ecuador	5714	52.50
VE9CL	Winnipeg, Canada	5710	52.50
FIQA	Tanarive, Madagascar	5690	52.69
PMY	Bandoeng, Java	5170	58.00

Stations Heard

Station	*Location*	*Date*	*Kilocycles*

13-477

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