

THE EXCITING WORLD OF SHORT WAVE  
*Radio*

SHORT WAVE RADIO LISTENER'S GUIDE



# The exciting world of Shortwave radio

... is now within your reach with your new General Electric multi-band portable radio. With it, you can ...

- Share in the adventure, education and entertainment of international shortwave broadcasting from Moscow, Paris, Berlin, and other cities of the world,
- Listen in on ships at sea, ship-to-shore conversations, aircraft communications,
- Hear comprehensive weather and storm reporting and the world's most accurate time signals,
- Get fine-quality reception of favorite programs on the *standard* broadcasting band.

Shortwave radio provides a new appreciation for international politics and current events as you get first-hand reports on foreign cultures and news direct from the

capitals of the world. And, to many families, it has become a rewarding and educational hobby, as well as a useful communications tool.

An understanding of the basic principles involved in shortwave broadcasting is quite desirable, as this will enable you to take fuller advantage of the many pleasures shortwave listening has to offer. It will also help you realize the limitations of shortwave reception — what it can *not* do as well as what it *can* do.

Therefore, we suggest you read this booklet carefully. In it, you'll find an interesting discussion of the natural phenomenon that makes shortwave broadcasting possible, information on the kinds of broadcasts you can listen to and where to find them on the radio dial, as well as complete operating information.



**P965**  
The Globestar



**P968**  
The Mariner



**P1830**  
Shortwave

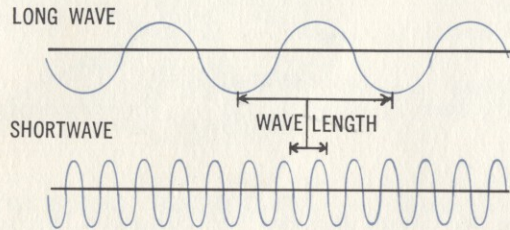
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# How Shortwave broadcasting works

All radio broadcasting is based on a principle of radio "waves" which travel at the speed of light. These waves may be likened to waves on the water, or a flag blowing in the breeze. The distance between wave peaks is known as the "wave length." If the peaks are far apart, it is a "long wave." If they are close together, it is a "short wave."

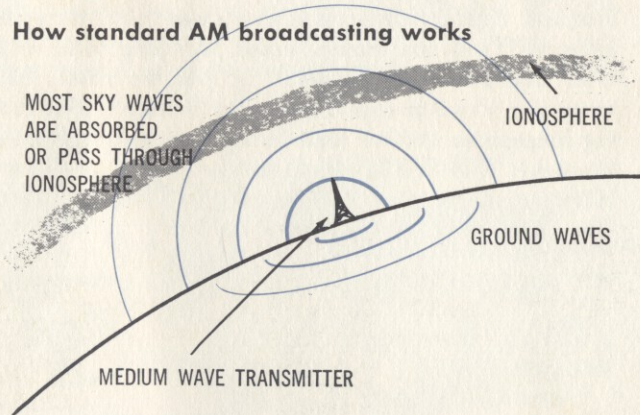


The speed at which these waves pass a given point in one second is called the "frequency." The long waves pass slowly, and therefore are low-frequency waves; while the short waves pass more rapidly and are therefore high-frequency waves. In radio terminology, wave lengths are expressed in meters, and frequencies are expressed in cycles (kilocycles, megacycles). Note that one megacycle equals one million cycles, or 1,000 kilocycles. One kilocycle equals 1,000 cycles. Thus, a station broadcasting at a frequency of 2 million cycles may also be said to be broadcasting at 2,000 kilocycles or 2 megacycles. All are

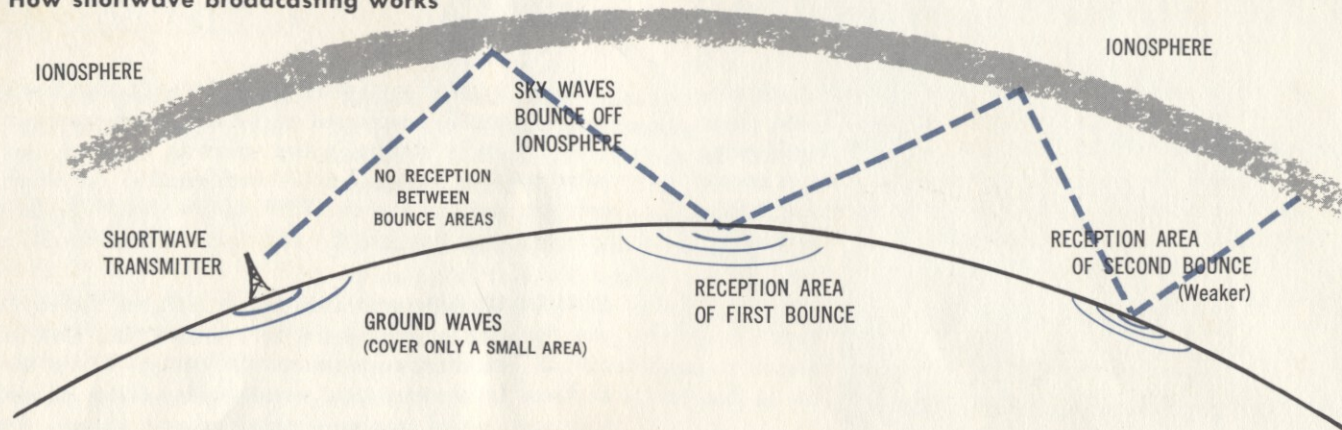
different ways of saying the same thing. Station frequencies are usually expressed in kilocycles or megacycles.

Every radio station in the world is assigned one or more specific frequencies (or wavelengths) on which it may transmit its signals. The radio *receiver* selects the frequency (or wavelength) and reproduces the broadcast.

**STANDARD AM** radio stations are assigned the medium wave lengths — frequencies between 540 and 1600 kilocycles. The illustration shows the pattern which waves in these frequencies take when leaving the transmitter. Certain types of waves — called ground waves — stay close to the ground, while some go into the sky and pass through the ionosphere to outer space. Ground waves can be picked up by receivers in the immediate area.



## How shortwave broadcasting works



**SHORTWAVE STATIONS** throughout the world are assigned the frequencies above 1600 KC (shorter wave lengths). Again, both ground waves and "sky" waves are generated, with the ground waves providing local reception. The difference, however, is that the short, high-frequency waves have a tendency to "bounce" back from the ionosphere (rather than being absorbed, or passing through). It is this "bounce" that provides long-distance reception of shortwave broadcasting, as illustrated above. The shortwave broadcast may be heard in each area

where the signal bounces back to earth. By selecting their angle of transmission, stations may beam their signals to the part of the world they desire.

The electronic character of the ionosphere is constantly changing, however, and thus we can never be quite certain of what shortwave receiving conditions will be. The ability of the ionosphere to reflect radio signals changes with the time of day, the time of year, and even such remote occurrences as the frequency of "sunspots" or magnetic storms on the surface of the sun.

# What kinds of Shortwave broadcasts can be received?



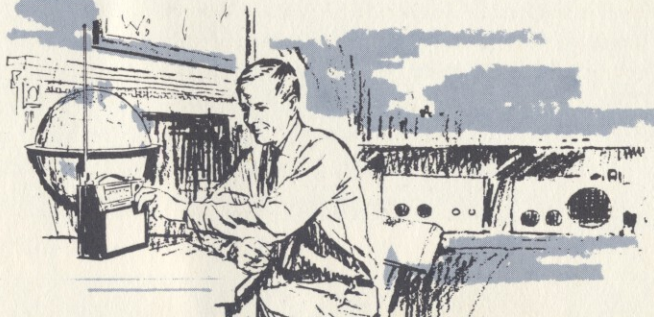
**INTERNATIONAL BROADCASTS** — Radio stations throughout the world broadcast on specific assigned frequencies. Programming runs the gamut from news and music, through dramatic programs. Most foreign countries have English language broadcasts which are beamed especially at the United States.

**AMATEUR COMMUNICATION** — Amateur radio operators (Hams) are licensed by the federal government to operate transmitters. These broadcasts and conversations between Hams can be heard on your shortwave receiver.



**MARINE COMMUNICATION** — Shortwave radio is an indispensable adjunct to marine operations throughout the world. Stations broadcast detailed weather information and storm warnings. Marine frequencies are also used for ship-to-ship, ship-to-shore, and distress communications.

**STANDARD FREQUENCIES AND TIME SIGNALS** — Station WWV, located near Washington, D. C., broadcasts continuously, day and night, giving precise time signals, and audio standard frequencies. These frequency transmissions are used for precise calibration of shortwave receivers, electronic computers, and many, many other types of intricate electronic devices. WWV transmits at frequencies of 2.5, 5, 10, and 15 mc.



# How to operate your new multi-band radio: Models P965 and P968...

## BATTERIES . . .

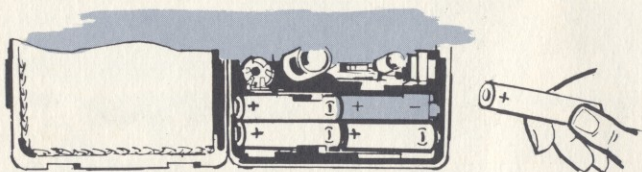
This radio uses four penlight flashlight batteries, which are installed in the battery compartment inside the radio. To install the batteries, first unfasten the snap strap on the back of the set and swing open the back flap.

Insert *carbon* batteries as shown in the diagram inside the battery compartment. Be sure to install the batteries with the + or cap end pointing to the left, as shown in the diagram. The cap end of a *mercury* penlight battery is — (minus), and therefore mercury batteries should be installed in the opposite direction from that used for carbon batteries.

## VERY IMPORTANT:

When any battery-operated transistor radio begins to play badly, become weak, or exhibit almost any other trouble, the **VERY FIRST** thing to suspect is run-down batteries. If a new set of batteries does not restore the radio to normal operating condition, only then should you seek service.

Since very few batteries are actually "leakproof", always remove the batteries, even if new, when storing the radio unused for long periods. Always remove any worn-out batteries as they have a tendency to leak chemicals which will damage the electronic components and cabinet.



## HOW TO USE . . .

Turn the radio on by turning the knob marked **VOLUME** downward. Continue to rotate in the same direction to increase volume. Select either the standard broadcast band (AM) or the shortwave band (SW) with the push-button **BAND SELECT** switch. The band selected will be shown in the **SW-AM** indicator window on the dial face.

Set the **FINE TUNE** control to mid-position. (This is particularly important when listening to shortwave, as the accuracy of the dial setting depends on the control being at midposition). Then tune to a station with the main **TUNING** control. On the AM band, this will usually be sufficient to satisfactorily tune a station.

On the shortwave band, however, the stations are frequently crowded more closely together on the dial and are usually more difficult to tune. In this case, tune first with the main **TUNING** control until you have located a station. Then make a finer adjustment with the **FINE TUNE** control.

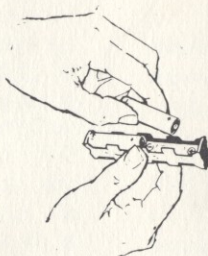
Be sure to extend the telescoping antenna for shortwave listening (a built-in antenna works when listening to AM programs).

You will notice several heavy lines along the shortwave scale. The ones marked **MARINE** indicate the range or band of frequencies used for marine or maritime service. The heavy lines marked **60M**, **49M**, **41M**, etc. indicate the wavelength (in meters) of the particular international broadcast band located at that point on the dial. For more information on tuning to these bands and the stations located within them, see page 9.

# How to operate your new multi-band radio: Model P1830...

## BATTERIES . . .

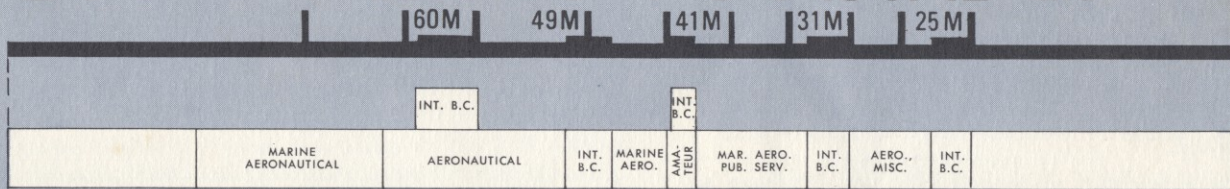
This radio uses four "AA" size penlight batteries, which are installed in the battery tube inside the radio. Remove the cabinet back by inserting a coin in the slot on the bottom of the cabinet, and then giving the coin a slight twist. Lift the battery tube out of its compartment, and insert the batteries into the tube as shown, with the cap or + plus end of each battery positioned as shown in the diagrams inside the tube.



## HOW TO USE . . .

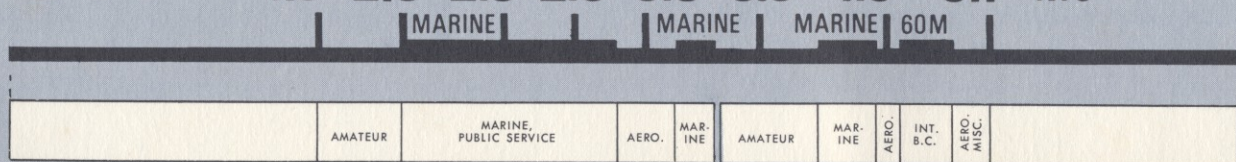
Turn the radio on by turning the knob marked VOLUME downward. Continue to rotate in the same direction to increase volume. Select either the standard AM band or the SW shortwave band with the slide switch on the front of the set. Extend the telescoping antenna for shortwave listening (a built-in antenna works when listening to AM programs.)

**SW**      4   4.5   5      6   7   8   9   10   11   12      **MC**



**MARINE**

**SW**      1.8   2.0   2.3   2.6   3.0   3.6   4.5   5.1      **MC**



MODEL P1830

**SHORT WAVE**

MODEL P965

THE

**GLOBESTAR**

MODEL P968

THE

**MARINER**

### PRIVATE LISTENING . . .

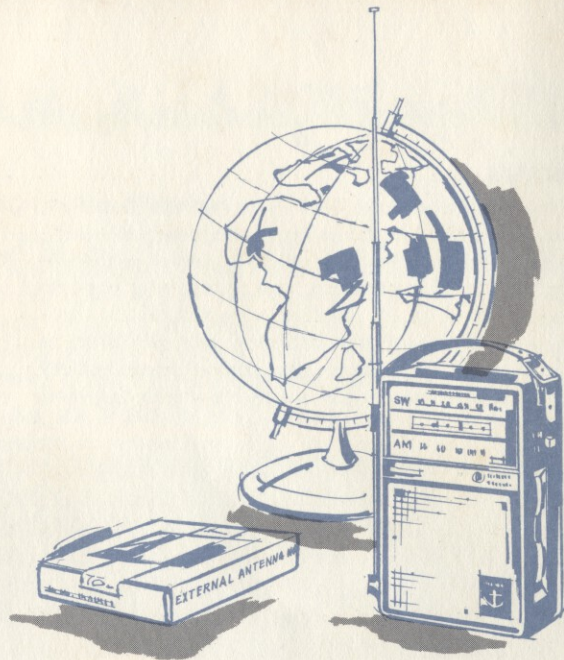
An optional accessory earphone which will enable you to enjoy complete listening privacy is available for use with your radio. When plugged into the earphone jack, it automatically silences the radio's speaker.

You may order this accessory earphone for \$1.00 each from the General Electric Company, Replacement Parts Section, 1001 Broad St., Utica, New York. Use the accessory order form enclosed in the carton to order the proper accessories for your model.

### IMPROVING RECEPTION WITH ANTENNAS . . . MODELS P965 AND P968

General Electric portable shortwave receivers are equipped with long, telescoping whip antennas, which should be extended to their full length when shortwave bands are used.

Shortwave reception on models P965 and P968 can be improved greatly with the addition of an external wire antenna. This wire antenna (as long as possible) should be connected to the screw terminal marked "A" which is located next to the whip antenna. Further improvement in reception is usually possible when a wire connected to an earth ground (a water pipe or a metal stake driven into the earth) is attached to the screw terminal marked "G".



A special External Antenna Kit (Catalog No. RS-9683) including wire, ground clamp, instructions, and other materials required for a complete antenna installation may also be ordered on the accessory order form. The kit is available at a price of \$3.50 each.

NOTE: If a permanent outside antenna installation is to be used, suitable protection from lightning in the form of a lightning arrester should be used.



# How and when to listen to Shortwave broadcasts

**INTERNATIONAL** — Certain bands on the shortwave dial are set aside for international shortwave broadcasting. Each band spans less than .5 mc, and is identified by its wavelength (25-meter, 31-meter, etc.) The more-frequently used shortwave bands are identified on the G-E tuning dials by heavy bars. To locate an international station on the G-E portable, set the FINE TUNE knob to midposition, and turn the main tuning knob till the pointer is within the desired band. Now you may use the main tuning knob to rough-tune to a station. Then turn the FINE TUNE knob slowly, to zero-in on the station.

Many international stations are assigned more than one frequency in different bands. They may broadcast on all frequencies at once, or they may switch from one frequency to another during the day to take advantage of the best shortwave broadcasting conditions.

Inherently, *evening and nighttime hours* are best for reception of shortwave. Most major European stations are beaming English-language broadcasts to the U.S. during those hours. The most-active bands are 25 and 31 meter, but broadcasts may also be heard on the 41 and 49 meter bands during those hours. Some international broadcasting may also be heard on the 60, 75, 90, and 120 meter bands, but these are used principally for short-range or local shortwave broadcasting.

What daytime broadcasting there is will most often be heard on the 25 meter band. Some South American stations (generally not English language) may be heard in the afternoon on these bands.

While it is often possible to find a specific station on the dial, most shortwave listeners find greatest satisfaction from “working” the bands, and picking out the strongest stations. Many listeners make a hobby of cataloging the foreign stations received. (Most stations will supply, on request, a “QSL” card to confirm a long-distance, shortwave reception).

**AMATEUR** — Amateur operators are not assigned specific transmitting frequencies as are international stations. Amateurs are permitted to transmit voice on any frequency they desire, within allocated bands at 1.8-2.0 mc, 3.8-4.0 mc, and 7.2-7.3 mc (160, 75 and 40 meter bands in that order).

The 160 and 75 meter bands are generally used for shorter range, or local broadcasts, while the higher-frequency amateur bands are generally used for international amateur communication. Again, reception will usually be best in the evening and nighttime hours.

**MARINE** — Marine stations and stations on board ships at sea are found within the 2.0-3.0 mc, 3.1-3.4 mc, and 4.0-4.4 mc bands. Weather and storm warning broadcasts may also be heard on these bands. Broadcasts may be heard on these bands throughout the day and night. The most used band is 2-3 mc. Reception will generally be best in coastal and Great Lakes areas.

# Some Shortwave stations you can receive

The list below shows some of the many foreign broadcast stations you may hear on your multi-band radio, and the hours of best reception (based on 24-hour Eastern Standard Time).

It should be noted that some of these stations change their frequency during the day to take advantage of the changing shortwave conditions. Some also broadcast on several frequencies at once. Most stations will supply free information on programming, schedules, and frequencies on request.

COUNTRY	STATION, CALL	MC	TIME	ADDRESS	COUNTRY	STATION, CALL	MC	TIME	ADDRESS
Algeria	R. Alger	11.8	Afternoon	Algiers	Monaco	Transworld R.	9.7	0230 EST	Monte Carlo
Andorra	Andorradio	6.3	Late aft.	Andorra	Morocco	V. America	11.7	P.M.	Tangiers
Angola	Emissora Oficial, CR6RZ	17.7	Afternoon	Luanda	Mozambique	R. Clube de Mozambique	11.7	0330 EST	Lourenco Marques
Argentina	RAE	11.7	Evening	Buenos Aires	Netherlands	R. Nederland	9.5	Evening	Hilversum
Australia	R. Australia	11.7	0715 EST	Melbourne	New Caledonia	R. Noumea	6.0	Early A.M.	Noumea
		11.8	0715 PST		New Zealand	New Zealand B.S., ZL2	9.5	Early A.M.	Wellington
Austria	Osterreichischer R., OE121	6.1	Late aft.	Vienna	Nigeria	Western Nigeria B.S.	6.1	2400 EST	Ibadan
Azores	Santa Maria Aeradio, CSY	13.2	Day	Santa Maria Aeropuerto	Norfolk I.	Norfolk Aeradio	8.8	Early A.M.	Norfolk I.
Bahrein	Bahrein Aeradio, 2AE	8.8	Afternoon	Bahrein	North Korea	R. Pyongyang	6.1	Early A.M.	Pyeongyang
Belgium	Radiodiffusion Natl. Belge	9.7	Early eve.	Brussels	North Vietnam	V. Vietnam	9.8	0530 EST	Hanoi
Canada	CBC, CKRA	11.7	Evening	Montreal	Norway	R. Norway, LLK	11.8	Evening	Oslo
Ceylon	V. America	11.8	Morning	Colombo	Okinawa	V. America	11.9	Morning	Okinawa
Chile	Sociedad Nacional de Mineira, CE1196	11.9	Evening	Santiago (Casilla 2626)	Pakistan	R. Pakistan	9.5	Late aft.	Karachi
		12.0	Early eve.	Peking	Paraguay	R. Nacional, ZPA1	11.9	Evening	Asuncion
China	R. Peking	12.0	Evening	Bogota	Peru	R. Nacional, OAX4R	9.5	Evening	Lima
Colombia	Nueva Granada, HJKJ	6.1	Evening	Brazzaville (BP 108)	Philippines	V. America	15.1	1800 EST	Manila
Congo Rep.	R. Brazzaville	11.7	P.M.	San Jose (Apt. 2710)	Poland	R. Warsaw	11.8	Evening	Warsaw
Costa Rica	Faro del Caribe, TIFC	9.6	Evening	Havana (Apt. 7026)	Portugal	Emisora Nacional, CSA45	17.8	1215 EST	Lisbon
Cuba	R. Havana	11.7	Evening	Nicosia	Puerto Rico	San Juan Aeradio, WWA	8.8	Day	San Juan Airport
Cyprus	BBC	9.6	Evening	Prague	Rep. Congo	R. Leopoldville	11.7	P.M.	Leopoldville (BP 3471)
Czechoslovakia	R. Prague, OLR3A	9.5	Evening	East Berlin	Rhodesia	Salisbury Aeradio	13.3	Afternoon	Salisbury Airport
East Germany	R. Berlin International	9.7	P.M.	Quito (Casilla 691)	Rumania	R. Bucharest	11.8	Late eve.	Bucharest
Ecuador	V. Andes, HCJB	11.9	Night	London	Senegal	National Station	11.8	Afternoon	Dakar
England	BBC, GRV	12.0	Evening	Addis Ababa	Siberia	R. Khabarovsk	12.0	Night	Khabarovsk
Ethiopia	R. Addis Ababa	11.9	Early aft.	Paris	Singapore	BBC	11.9	Early A.M.	Singapore
France	Radiodiffusion Francais	17.8	Mid aft.	Guam (c/o FAA)	South Africa	Springbok R.	7.1	0515 EST	Johannesburg
Guam	Guam Aeradio	8.8	Early A.M.	Accra	South Korea	Korean B.S., HLK6	11.9	2400 EST	Seoul
Ghana	R. Ghana	11.8	1400 EST	Quezaltenango	Spain	R. Nacional	9.3	Late eve.	Madrid
Guatemala	R. Nacional, TGQB	11.7	Any	Point a Pitre	Sudan	Khartoum Aeradio, STK	13.3	Afternoon	Khartoum Airport
Guadeloupe	Guadeloupe Aeradio, HYG	8.8	Afternoon	Cap-Haitien	Sweden	R. Sweden	9.7	Evening	Stockholm
Haiti	4VEC	6.1	Evening	San Pedro Sula	Swan I.	R. Swan	6.0	Evening	Swan I. (c/o Gibraltar Steamship Corp., 29 Broadway, NYC 22)
Honduras	La Voz de Suyapa, HRDS	9.7	Evening	Budapest	Surinam	R. Surinam, PZC	15.4	Early eve.	Paramaribo
Hungary	R. Budapest	11.9	Evening	Keflavik (USAF)	Switzerland	Swiss Broadcasting, HER3	11.8	Evening	Berne
Iceland	Keflavik Aeradio, AJM2	11.2	Afternoon	Delhi	Taiwan	V. Free China, BED29	6.0	Evening	Taipei
India	All India R., VUD	11.7	Evening	Djakarta	Thailand	Overseas Bc. Station HSK7	11.9	0500 EST	Bangkok
Indonesia	R. Republic Indonesia, YDF6	9.5	Morning	Baghdad	Tunisia	Radiodiffusion Tunisienne	11.9	Afternoon	Tunis
		7.1	Late eve.	Jerusalem	U. Arab Rep.	R. Cairo	11.9	Afternoon	Cairo
Iraq	Baghdad	7.1	Afternoon	Rome	Uruguay	R. Electrica, CXA10	11.9	Evening	Montevideo
Israel	Kol Israel, 4XB31	9.0	Early Eve.	Tokyo (NHK)	United States	V. America	9.6	0400 EST	Honolulu
Italy	RAI	11.9	Evening	Amman	U.S.S.R.	R. Moscow	11.8	Evening	Moscow
Japan	R. Japan	11.8	Afternoon	Beirut	Vatican	Vatican R.	11.7	Evening	Vatican City
Jordan	Hashmite B.S.	11.8	Evening	Monrovia	West Germany	Deutsche Welle, DMQ11	11.9	Evening	Cologne
Lebanon	Lebanese B.S.	8.0	Evening	Luxembourg	Windward Is.	Windward Is. B.S.	11.9	Early eve.	Grenada
Liberia	ELWA	15.1	1515 EST	Malta (RAF)	Yugoslavia	R. Belgrade	9.5	Evening	Belgrade
Luxembourg	R. Luxembourg	6.0	Late aft.	Mexico, D.F.					
Malta	Malta Aeradio, ZBJ	13.3	Afternoon						
Mexico	V. Latin America, XEWW	9.5	Any						

# Interference and Limitations of Shortwave reception

Even on the finest shortwave receivers, there is likely to be considerable interference and unwanted noise. Experienced shortwave listeners, however, accept this condition and do their best to tune around it. An understanding of the types of interference, and the limitations of shortwave broadcasting will assist greatly in obtaining better reception and knowing what to expect from the shortwave receiver.

**TIME OF DAY** — Reception will be very limited during the daytime hours. In late afternoon, reception should begin to improve and some stations may be received on higher frequency bands. Evening hours are usually best for reception.

**SEASON** — Fall and Winter are generally the best seasons for shortwave reception, particularly from European and Far Eastern stations. Australian and South Pacific stations are somewhat stronger in the Spring.

**SHORT-TERM CHANGES IN THE IONOSPHERE** — These are possibly the most frustrating conditions that affect shortwave reception. Conditions in the ionosphere can change rapidly, increasing or decreasing interference, and possibly causing stations to fade completely away.

**TYPE OF BUILDING** — Reception in buildings of steel construction may be difficult. Better reception may be obtained by taking the receiver outside or at least to a window. An external antenna will usually help.



**FLUORESCENT LIGHTS** — Considerable interference may be caused by lighted fluorescent lamps, particularly in the higher frequencies. Keep the receiver at least 12 feet away.

**TELEVISION RECEIVERS** — Operating television sets may interfere greatly with reception. For best reception, all sets should be turned off in the immediate area . . . at least within 25 feet of the receiver.

# IMPORTANT CUSTOMER NOTICE

## SPECIAL CUSTOMER SERVICE OPTION . . .

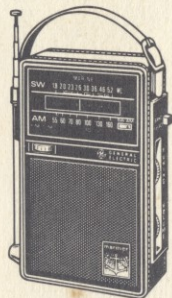
This radio contains one of the latest innovations in the manufacture of electronic devices. It uses special, high reliability modules in its construction. This should minimize the need for service, but when adjustments are required, they should be performed only by those trained in the specialized servicing techniques required. For this reason, this radio must be serviced by the factory or by an AUTHORIZED GENERAL ELECTRIC RADIO SERVICE STATION.

Refer to the accompanying sheet for the address of the G-E authorized service facility nearest you. Or, for factory repair, you may ship your radio prepaid and insured directly to: General Electric Company, Radio Receiver Department, 1001 Broad Street, Utica, New York, Atten: Consumer Service Lab.

If you return your radio to the factory for service under the terms of the warranty, your radio will be repaired and returned to you immediately, no charge. If the 90-day warranty period has expired, enclose a check or money order for \$7.00 made payable to the General Electric Company.\* Your radio will be repaired and returned to you at once. (Do not send cash or stamps). To assist us in the repair please mention the difficulties you have experienced with your radio. Be sure to enclose your name and address and pack the radio carefully, using the original carton or equivalent.

\*Damaged or abused radios excluded from flat-rate charge. Flat rate subject to change without notice.

Inquiries about General Electric radio service may be addressed to: Manager-Product Service, General Electric Company, 1001 Broad Street, Utica, New York.



P1830  
P965  
P968  
154A5641-2

## WARRANTY

General Electric Company warrants to the purchaser of this new General Electric portable radio that if any part thereof proves to be defective in material or workmanship within 90 days from the date of original purchase for use, such defective part will be repaired or replaced free of charge. The cabinet alone is warranted against breakage or replaced free of date of original purchase of radio. If breakage occurs within this period, a new cabinet will be furnished, but free labor for its installation is provided for only 90 days from date of original purchase. The Company has no other obligation or liability in connection with said radio.

To obtain repairs or replacements, within the terms of this warranty, said radio should be brought to the attention of a General Electric Servicer or factory-authorized service station.

This warranty is void if said radio has been subject to misuse or abuse.

This warranty applies only to products purchased for use within and retained within, the continental limits of the United States, Alaska, and Hawaii. The Company makes no warranty expressed or implied, to purchasers located elsewhere.

Our warranty does not include batteries, since batteries are not installed at the factory. Also, damage to the radio caused by leaking batteries is not covered by warranty.

## CARE

A few moments spent in the care of your radio will do much to protect and preserve its appearance. Use saddle-soap to clean Texon cabinets, or a soft moist cloth for plastic cabinets and the grille. Do not use any other polish or cleaning agent on the grille or cabinet as damage to the surface may result.



Specifications subject to change without notice

*Progress Is Our Most Important Product*

**GENERAL ELECTRIC**

RADIO RECEIVER DEPARTMENT • UTICA, N. Y.

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