



OWNERS GUIDE

MODEL S-120

FOUR-BAND

COMMUNICATIONS RECEIVER



WARRANTY

"The Hallicrafters Company warrants its products to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to our authorized radio dealer, wholesaler, from whom purchased, or, authorized service center, intact, for examination, with all transportation charges prepaid within ninety days from the date of sale to original purchaser and provided that such examination discloses in our judgment that it is thus defective.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring and use, or, improper installation, or to use in violation of instructions furnished by us, nor extended to units which have been repaired or altered outside of our factory or authorized service center, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used throughout out of our own manufacture.

Any part of a unit approved for remedy or exchange hereunder will be replaced or exchanged by the authorized radio dealer or wholesaler without charge to the owner.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio product."

the hallicrafters CO.

174-5014-23

NOTE: Fill out and return immediately the enclosed
WARRANTY CARD.

Record equipment information for future reference

RECEIVER:

Model number _____

Serial number _____

Date purchased _____

Purchased from _____

ACCESSORIES:

_____ # _____

_____ # _____

_____ # _____

For maximum enjoyment from your equipment . . . read your
Owner's Guide before you start operating your receiver.

GET SET FOR EXCITING ADVENTURES OUT OF THIN AIR... AS YOU TUNE IN THE WORLD ON YOUR *hallicrafters* COMMUNICATIONS RECEIVER

From the grim wilderness of a remote village in the central Congo, the voice of a missionary cries out, "Please hurry . . . we need help . . . there's no time . . . !



A hair's breadth away another voice--almost monotonous in its calm business-like, professional manner, booms in--"Charlie base, this is Air Force Zebra Two Nine Brave . . . target bearing Zero-Three-Zero angels fifty-two . . . Roger, I have him in sight . . ."

From a bomber over the Aleutians to the darkest reaches of Africa . . . from a satellite in outer space to America's nuclear submarines . . . voices like these, the voices of modern pioneers of adventure, are yours to command with a twist of the dial, in your own living room!

This is the amazing world of Short Wave Listening--an exciting world, a serious world, a world of infinite variety.



Only by short wave radio can you become a witness to history as it occurs.

And only through short wave can you hear, in a single day, a Wagnerian opera from Heidelberg . . . a news broadcast from behind the iron curtain . . . and an airport control tower bringing in a crippled plane !



Every moment of every day and night, Short Wave brings into your home an absorbing new interest--a fascinating way to keep up with international affairs, to be informed and stay informed.

This book was prepared to give you a quick and thorough Guided Tour of Short Wave, and to help you enjoy more fully this wonderfully informative pastime.

Good listening !

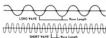
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HOW SHORT WAVE ... LONG WAVE BROADCASTING WORKS

Understanding the mechanics of short-wave radio will help you receive the most enjoyment and the greatest thrills for the hours you spend at the dials.

You may often have heard the term *Wave Length* applied to the radio signals transmitted by a broadcasting station. Radio signals travel in waves; the wave length is the distance between the crests of the waves.



The total number of complete waves (or cycles) that a station can send out per second is referred to as *frequency*. The broadcasting frequency, therefore, is determined by the wave length on which a particular station is transmitting. The shorter the wave length, the higher the frequency.

Every radio station in the world is licensed to broadcast on certain assigned frequencies or bands of frequencies.

The standard broadcasting stations such as those in your home town are assigned to lower frequencies, or longer wave lengths. The high-frequency bands are reserved for other types of transmitting stations throughout the world known as Short-Wave Stations.

Why Short Wave Is Used For Long Distance Transmission

The chief characteristic of short waves is their amazing ability to span enormous distances.

The illustration shows the manner in which all radio signals travel in waves as they leave the transmitter antenna. Some of the signal hugs the ground, while the rest travels upward and outward away from the earth.



You are able to hear short-wave radio signals over great distances because they are refracted back to earth from layers of rarified gases high in the ionosphere. Short-wave signals enter the ionosphere and are refracted (bent) by the layer's electrical particles.

The physical action is similar to skipping a stone on smooth water. If the stone is of the correct size and shape and is thrown with enough power at the right angle, it will skip over the water's surface. The short-wave signal finds the ionosphere just as particular.

Similarly, the short-wave signal must be of the right size (frequency).

It must strike or enter the ionosphere at precisely the correct angle, and it must have sufficient power.

It may take several skips (just like a stone) for the signal to travel from the distant transmitter to your receiver. With each consecutive bounce, the signal becomes weaker until it is too weak to continue its process of refracting from the ionosphere back to earth (where it is heard), back off the earth into the ionosphere, and then again back to earth.

At different periods of the year, short-wave reception improves above the normal rules between your receiving site and various areas of the world. As an example, the spring months bring the strongest signals from Australia and the South Pacific. In the fall months, signals from Europe and the Far East dominate the dials. Also as daylight changes into darkness each day between your receiving location and the transmitting station, so does the nature of the reception. Day-to-day variations are also present.

What You May Hear On The Short Wave Bands

The Short Wave Bands are your passport to a world of exciting adventures.

AMATEUR RADIO. Amateur (ham) radio stations are operated by private citizens in more than 250 countries around the globe.

Amateurs talk to other amateur operators for personal pleasure or experimentation. No business or commercial transactions are permitted over stations operating in this service. Hams are allowed to operate on any frequency within assigned bands. The most commonly used are the 80-meter band; and the 40-, 30-, 15-, and 10-meter bands. (See page 9 for an explanation of the relationship between megacycles and meters.)

SHIP-TO-SHORE, MOBILE RADIO-TELEPHONE. Essentially a telephone without wires. Operated by telephone companies and businesses who lease transmitters and receivers to individuals.

Listen at approximately 2.1 MC.

AERONAUTICAL-AIRPLANES-AIRPORTS. Weather information, flight conditions, re-routing of planes in time of bad weather. General communications between planes and stations on the ground.

You will find signals in this service at approximately 2.6, 2.9 to 3.0, at 4.1, and at approximately 7.6 MC.

MILITARY. Air Force, Army, Navy, Marine, and Coast Guard communications may be heard between ground stations and planes or vehicles 24 hours a day. These signals may be heard throughout the short-wave frequency range.

MARITIME MOBILE. In addition to military naval forces, commercial vessels, fishing fleets, and pleasure craft regularly communicate routine and emergency messages on short wave. These may be heard in the ranges from 2 to 3 MC, 4 to 4.4 MC, 6.2 to 6.5 MC, and 8.1 to 8.8 MC.

CITIZENS BAND. Low-cost, two-way radio now available to private citizens on the 11-meter band. More than 1,000,000 U.S. citizens are expected to be operating citizen-band transmitters. No operator's license is required. You will find the 11-meter band at approximately 27 MC.

INTERNATIONAL SHORT-WAVE BROADCASTING. Of all of the services you'll meet on short wave, international broadcasting offers the most varied entertainment. Many governments operate powerful short-wave transmitters (e.g., the U.S. Government's Voice of America) to keep the world informed of activities within their countries. Many countries also license commercial short-wave stations, and in fact, many regions of the world conduct much of their daily broadcasting on short wave, instead of the standard broadcast band. Major frequency assignments are indicated by the dots located in the upper portion of the bands. For specific stations and frequencies consult your Station Log.

STANDARD TIME SIGNALS - WWV. United States National Bureau of Standards broadcasts the correct time with voice as well as code identification. The identification occurs during the last two minutes of each 5 minute period (i.e., 03 to 05, 08 to 10, 13 to 15, etc). Other checks such as radio frequency, audio frequency, and forecast of conditions which will affect radio reception are broadcast. WWV will be found at 2.5, 5.0, 10.0, 15.0, 20.0, and 25.0 MC.

ADDITIONAL INFORMATION WHICH WILL ENRICH YOUR SHORT WAVE LISTENING PLEASURE

Glossary of Familiar Short Wave Terms

AF Gain Control -- same as volume control . . . AM -- Amplitude Modulation -- the transmitting frequency amplitude is varied at an audio rate . . . ANL -- Automatic Noise Limiter -- reduces impulse noises (ignition, static, crashes, etc.) . . . ANT -- Antenna . . . AVC -- Automatic Volume Control -- controls radio frequency gain automatically -- (i.e., reduces gain on strong signals) . . . BFO -- Beat Frequency Oscillator -- provides a special beating signal so that CW (code) signals can be heard . . . CQ -- a general call used by radio amateurs to establish contact. Caller will talk to anyone who answers. Can also be used specifically (CQDX, when calling only DX stations, or CQ Chicago, when calling stations only in Chicago) . . . CF -- Continuous Wave -- unmodulated signal wherein intelligence is transmitted by interrupting signal to produce dots and dashes (code) . . . DX -- distant stations . . . FM -- Frequency Modulation -- the transmitting frequency is varied at an audio rate . . . QRM -- interference from other signals . . . QRN -- interference-static . . . QRX -- Standby . . . QSL -- usually a card which verifies contact or acknowledges specific transmission . . . QSO -- a contact between two stations . . . QSY -- change operating frequency . . . RF Gain Control -- radio frequency gain control: controls the sensitivity of the radio frequency amplifier stage . . . RST -- readability, strength, tone . . . SWL -- short-wave listener.

Official Radio Ten Signals (Police, fire, citizens band, etc.)

| | | | |
|-------|-----------------------------------|-------|------------------------------------|
| 10-1 | Receiving poorly | 10-11 | Remain in service |
| 10-2 | Receiving well | 10-12 | Advise weather and road conditions |
| 10-3 | Granted | | |
| 10-4 | Received | 10-14 | Correct time |
| 10-5 | Relay | 10-15 | Anything for us? |
| 10-6 | Standby | 10-16 | Nothing for you |
| 10-7 | Out of service | 10-20 | What is your location? |
| 10-8 | In service | 10-21 | Too weak; talk louder |
| 10-9 | Repeat, conditions bad | 10-22 | Too loud |
| 10-10 | Out of service -- subject to call | 10-23 | Frequency check |
| | | 10-24 | Give a test |

International Morse Code

| Letter | Phonetic Sound | Dot-Dash Sequence | Letter | Phonetic Sound | Dot-Dash Sequence |
|--------|----------------|-------------------|---------|---------------------|-------------------|
| A | di-dah | -- | T | dah | - |
| B | dah-di-di-dit | ---- | U | di-di-dah | --- |
| C | dah-di-dah-dit | ---- | V | di-di-di-dah | ---- |
| D | dah-di-dit | --- | W | di-dah-dah | --- |
| E | dit | . | X | dah-di-di-dah | ---- |
| F | di-di-dah-dit | ---- | Y | dah-di-dah-dah | ---- |
| G | dah-dah-dit | --- | Z | dah-dah-di-dit | ---- |
| H | di-di-di-dit | ---- | | | |
| I | di-dit | -- | Numbers | | |
| J | di-dah-dah-dah | ---- | 1 | di-dah-dah-dah-dah | ----- |
| K | dah-di-dah | --- | 2 | di-di-dah-dah-dah | ----- |
| L | di-dah-di-dit | ---- | 3 | di-di-di-dah-dah | ----- |
| M | dah-dah | -- | 4 | di-di-di-di-dah | ----- |
| N | dah-dit | --- | 5 | di-di-di-di-dit | ----- |
| O | dah-dah-dah | ---- | 6 | dah-di-di-di-dit | ----- |
| P | di-dah-dah-dit | ---- | 7 | dah-dah-di-di-dit | ----- |
| Q | dah-dah-di-dah | ---- | 8 | dah-dah-dah-di-dit | ----- |
| R | di-dah-dit | --- | 9 | dah-dah-dah-dah-dit | ----- |
| S | di-di-dit | --- | 0 | dah-dah-dah-dah-dah | ----- |

How To Set Up Your Receiver

Your Hallicrafters Model S-120 is a Communications Receiver designed and manufactured to the most stringent quality standards. It has been packaged to insure safe arrival.

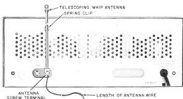
First, carefully lift the receiver out of the shipping carton and remove the specially coated wrapping paper.

Inspect the receiver for any visible damage.

Decide where you want to set up the receiver. In making your decision you should consider several things:

1. **■ YOUR COMFORT.** You will spend many fascinating hours with your receiver. Be sure you place it where you will be able to enjoy tuning and listening at any time.
2. **■ YOUR ANTENNA.** The first time you turn the receiver on and start your adventure in short-wave listening, you will most likely be using the whip antenna and antenna wire provided. As you get more experience and begin reaching out for more distant stations, you may want to set up an outside antenna. With this in mind, try to choose a location which is near a window or outside wall.
3. **■ YOUR GROUND.** Should you progress to an outside antenna, it is **GOOD PRACTICE TO GROUND YOUR SET FOR SAFETY.** This will require running a ground wire from the ground connection on the back of the receiver to a cold water pipe or to a metal pipe driven into the earth.

Now, let's set up the **SHORT WAVE** antennas which come with your receiver. A length of wire is already attached to the antenna terminal. Leave it connected and stretch it out in the room or out a window.



Next, carefully remove the telescoping whip antenna which is shipped snapped into two spring clips. Then, rotate the clip which is directly above the antenna screw terminal 90° (see drawing).

Loosen the antenna screw terminal and place the whip antenna lug (slotted) in behind the screw head. Tighten the screw, making sure that the antenna wire is still attached.

Then, snap the whip antenna into the spring clip. Extend the whip antenna to its full length (45 inches) by pulling up on the little tail at the top of the antenna.

Your AM (or BROADCAST BAND) antenna is already built into your receiver. No setup is required.

To complete your initial installation, plug your receiver into an electrical outlet which provides 105 to 125 volt, 50/60-cycle, AC or DC current. Power consumption is 30 watts. This is the type of electrical supply common throughout the United States. The set may also be operated on 210 to 250 volt, AC or DC current using a Hallicrafters' Line Cord Adapter, part number 087-201566.

Now, let's look at some of your receiver features and controls ...

hallicrafters MODEL S-120 FOUR BAND COMMUNICATIONS RECEIVER *Identification of features and controls*

COVERAGE: Your receiver has a Broadcast Band covering 550 KC to 1600 KC, plus three Short Wave Bands which provide continuous coverage from 1.6 MC (1600 KC) to 30 MC.

BAND 1 - Standard AM Broadcast station reception. The Civilian Defense frequencies are indicated by the CD emblem and a dot at 640 and 1240 kilocycles (KC).

BAND 2 - Covers the range from 1.6 to 4.4 megacycles (MC). The markings at the upper portion of the band indicate the various types of broadcast material you may expect to hear. The thick line between 3.5 and 4.0 is the 80-meter amateur band. (See page 9 which explains the relationship between megacycles and meters.)

BAND 3 - Includes 4.4 to 11.5 megacycles (MC). A number of frequencies assigned to various countries are indicated by dots in the upper portion of the band. The thick line starting at 7.0 is the 40-meter amateur band.

BAND 4 - Covers from 11.5 to 30 megacycles (MC). A few country-by-country frequency assignments are indicated by dots. The 20-, 15-, and 10-meter amateur bands are shown by a thick line.

SPEAKER: 5-inch, permanent magnet, 8-ohm voice coil.

BANDSPREAD CONTROL: Similar to a fine tuning control, only for more sensitive. Use for fine tuning after you have used Main Tuning Control to move red pointer to approximate dial location of station you wish to receive. Electrically expands a 0.1 reading 100-times. Control moves yellow pointer on Bandspread Dial.

OFF-ON/VOLUME CONTROL: Turns receiver ON (right) and OFF (left); also controls volume which increases as you turn right. After turning ON, normal warmup is approximately 30 seconds. A slight hum is normal. If operating on AC (alternating current) and you hear a loud humming sound, reverse the plug to the electrical outlet. This should minimize the hum. If operating on DC (direct current) and the receiver does not operate (no sound) after warmup, reverse the plug.

PHONES: Front panel jack for plugging in any commercial headphones ranging from 50 to 10,000 ohms. With headphones plugged in, the receiver speaker is silent. May be used to plug-in an external 8-ohm loudspeaker for remote location. The built-in speaker will be silent.

BFO CONTROL: This control is primarily used to provide the necessary beat frequency tone when receiving CW (code) signals, or single sideband. In addition to this function, however, the Model S-120 circuit is designed so that this control also acts as a sensitivity adjustment, making reception of extremely weak signals possible. Operation of the control is as follows:
To receive normal AM broadcasts: The control should be set in the OFF position (maximum counterclockwise).

To increase sensitivity for weak signal reception: Turn the control ON and advance slowly in a clockwise direction to the point where maximum weak signal sensitivity is obtained.

To receive CW (code) signals or SSB: The control should be advanced fully clockwise and slowly turned counterclockwise to the point that produces the clearest tone. The pitch of the tone may be adjusted with either the Main Tuning or Bandspread control.

It will be found during the course of using this control that a point exists between the setting required for weak signal reception, and that required for CW reception where receiver noise will increase considerably. This is a normal condition. It is undesirable to operate the receiver with the control set at or very near this point as tuning will become extremely critical.

BANDSPREAD DIAL: Professional micrometer-type scale which reads to one-thousandths of a megacycle. Yellow pointer, moved by Bandspread Control, indicates reading on the Bandspread Dial.

MAIN TUNING CONTROL: Use for regular or fast tuning. Moves red pointer to dial location. Adequate for tuning most Standard Broadcast stations and for scanning the Short Wave Bands.

SPECIFICATIONS

ANTENNAS: Built-in ferrite loop for Broadcast Band. Whip antenna and wire antenna for Short Wave Bands.
TUBES: Four: 12BE6 Converter; 12BF6 IF amplifier, BFO; 12AV6 audio amplifier, AVC detector; 50C5 audio power amplifier; plus one selenium rectifier.
PANEL LAMPS: Two each No. 47.
PHYSICAL DATA: Grey steel cabinet with silver trim. Size: 15-1/2 inches wide by 5-7/8 inches high by 8-3/4 inches deep. Approximate weight: 13-3/4 pounds.



C&A Approval

BAND SELECTOR: White dot on control knob indicates the band you are tuning. The numbers 1, 2, 3, and 4 coincide with the band numbers on the dial.

RECEIVE/STANDBY SWITCH: Normally pushed up to the Receive position. When in the Standby position, the set is ON and remains at operating temperature, but the speaker or headphone circuits are not connected; no sound is heard. The Standby feature lets you thoughtfully and silently warm-up the tubes for precise location of previously tuned stations. Or if you are already tuned-in, the Standby feature lets you silence the receiver but return it to Receive and instantly be on a frequency.



hallicrafters

How to Operate Your Receiver

Some of the basics, such as setting up your receiver and plugging it in, have already been covered. Now you are ready to start listening. Here's how.

A good way to become familiar with your receiver is to first try it out on Band 1, the Standard AM Broadcast Band. You will find that stations with which you are familiar come in loud and clear. You will also discover many other stations which you may never have heard before.

Getting Ready to Tune Your Receiver

1. Turn receiver ON by turning the OFF/VOLUME Control to the right. The dial will light up.
2. Place the red RECEIVE/STANDBY Switch up into the Receive position.
3. Turn the BFO Control to OFF by rotating to the left.
4. Turn the BAND SPREAD Control until the short yellow pointer is at 100 on the Band Spread Dial.
5. Select the band to which you wish to tune by turning the BAND SELECTOR Control to the appropriate band number.

Tuning Standard AM Broadcast Band

1. Turn BAND SELECTOR Control to Band 1 setting.
2. Using the TUNING Control, move the red pointer to the station frequency desired.
3. If several stations are close together, they may be fine tuned or separated by moving the yellow pointer on the Band Spread Dial. Movement is normally from 100 down toward 0 until you have separated the stations.
4. If a station is coming in very weak, the signal may be improved by turning the BFO Control ON and slowly to the right. Before you tune in another station, turn BFO Control back to OFF.

Tuning Short Wave Stations

The transmission of short-wave signals is a more precise operation. Reception of these signals is subject to several things which are, for the most part, beyond the control of your receiver. These are: 1) atmospheric conditions such as solar disturbances which can help make a signal come in loud and clear, reduce signal strength and clarity or even block it out completely, 2) day-to-night and month-to-month atmospheric variance, and 3) your skill as a Short-Wave Listener in tuning your receiver. These skills are quickly developed, however, and a good way to start is Dial Scanning.

Dial Scanning Method

1. Select the band you wish to scan (by tuning through the entire band) by turning the BAND SELECTOR Control to Band 2, 3, or 4.
2. Adjust the yellow pointer on the Band Spread Dial to about 90, by turning the BAND SPREAD Control.
3. Slowly move the red pointer across the dial, using the TUNING Control. You will alternately hear nothing, a few squeals, and then dots and dashes, voice, or music.
4. After you have tuned in as fine as you can with the TUNING Control, use the BAND SPREAD Control. Slowly move the yellow pointer, first from 90 toward 100, and then down toward 0 until you bring a station in clearly.
5. You will notice as you scan the dial you can hear CW code (dots and dashes). If you wish to hear the code with the clarity required to read it, turn the BFO Control ON and turn all the way to the right and then slowly turn back to the point which gives the clearest tone. You can make the tone sound higher or lower by turning the BAND SPREAD Control.

6. If you are receiving voice or music and the signal is coming in weak, the signal strength can be increased by turning the BFO Control ON and slowly to the right.
7. By waiting until the station identifies itself, you can log the station call letters, country and city of origin, transmitting frequency, and the time of reception so that you can tune in again at a later date. (See Station Log starting on Page 11.) For future location of the station, note the numbers indicated by the red and yellow pointers. For example: if the Band frequency is indicated as 8.0 and the Band Spread Scale yellow pointer shows 72, the dial location should be logged as 8.072.

TUNING A SPECIFIC STATION follows the same steps as for Dial Scanning, except that you start with a specific frequency selected from your Station Log (see page 11). For example: if you wish to tune Radio MOSCOW you will see that one of the frequencies is 7.555. Taking 7.555 to demonstrate, you would:

1. Turn the BAND SELECTOR Control to Band 3.
2. Make sure the yellow Band Spread Dial pointer is at 100.
3. Move the red pointer slightly above 7.5 on Band 3 with the TUNING Control.
4. Then, with the BAND SPREAD Control, slowly move the yellow pointer down from 100 on the Band Spread Dial to the vicinity of 55. NOTE: You may find that the station comes in a little below or above the 55 mark on the scale. Adjust if you wish.
5. Procedure for using the BFO Control for CW (code) or voice or music reception is the same as in Dial Scanning.

Questions on Service or Operation

Most service problems are relatively minor. For example: if you hear a disturbing buzz, when trying to tune in a weak station, chances are it is being caused by a fluorescent light. Look for the cause and, if you can, turn it off.

If the receiver is ON, but you hear nothing, look to see if the RECEIVE/STANDBY Switch is in the Receive position. If the switch is in Receive and you are operating on DC (direct current) reverse the plug to your electrical outlet.

When you turn the OFF/VOLUME Control to ON and nothing happens, look to see if the receiver is securely plugged into the electrical outlet.

If signals are coming in very weak, check to see if your antenna wire is securely connected.

For further information regarding operation or servicing of this equipment, contact the dealer from whom the unit was purchased. The Hallicrafters Company maintains an extensive system of Authorized Service Centers where any required service will be performed promptly and efficiently at no charge if this equipment is delivered to the service center within 90 days from date of purchase by the original buyer and the defect falls within the terms of the warranty. It is necessary to present the Bill-of-Sale in order to establish warranty status. After the expiration of the warranty, repairs will be made for a nominal charge. All Hallicrafters' Authorized Service Centers display the sign shown at right. For the location of the one nearest you, consult your dealer or your local telephone directory.

No service shipments should be made to the factory unless instructed to do so by letter, as The Hallicrafters Company will not accept the responsibility for unauthorized shipments.

The Hallicrafters Company reserves the privilege of making revisions in current production of equipment and assumes no obligation to incorporate such revisions in earlier models.



THE ANTENNA

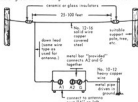
All short-wave receivers need an antenna. A better antenna will receive signals that are weak and far away. Chances are you'll do very well with the antennas provided.

More elaborate antennas generally are built either to operate on one frequency, or to perform with effective results over a wide band of frequencies.

Because most listeners want results on all short-wave frequencies covered by their receiver, a suitable antenna for general coverage is illustrated.

This antenna will produce the best reception when it is mounted high and clear away from power lines, trees, and surrounding objects.

Listeners desiring specific design information on more specialized antennas are referred to the "A.R.R.L. Antenna Book" published by the American Radio Relay League.



Megacycles to Meters

All modern communication receivers are calibrated in megacycles. None the less, it is sometimes helpful to know what meter band corresponds to 11,866 megacycles for example. This is particularly true when tuning the International Short Wave Broadcasting stations who often announce only in meters. Megacycles may be converted to meters through the use of this simple formula:

$$300/\text{Megacycles} = \text{Meters}$$

For example:

$$300/11.866 = 25.28$$

or 11.866 MC = 25.28 meters

The conversion from meters to megacycles uses the same formula:

$$300/\text{meters} = \text{megacycles}$$

For example:

$$25.28 \text{ meters}$$

$$300/25.28 = 11.866 \text{ MC}$$

Reference Material

Here are sources through whom a logbook with listing of foreign and local stations, as well as other information of interest to both radio and short-wave listeners, may be obtained.

AMERICAN RADIO RELAY LEAGUE, 38 La Salle Rd., West Hartford, Conn. Official organization of radio amateurs in the U.S. Free Literature. Special publications on how to become a radio amateur.

WORLD RADIO HANDBOOK, available through Geller Associates, Box 230, Park Ridge, New Jersey. Yearly handbook of all short-wave stations, printed in Denmark.

POPULAR ELECTRONICS, 1 Park Avenue, N.Y. 16, N.Y. Monthly magazine available on newsstands. General news and features for the electronics hobbyist; excellent regular column on short-wave listening plus occasional SWL feature stories.

TIME AND INTERNATIONAL BROADCASTING

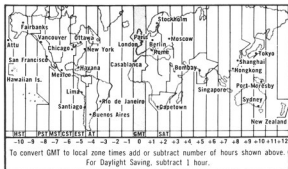
Communications time is told on a 24-hour clock. One AM is 0100; 4 AM is 0400; Noon is 1200; 3:30 PM is 1530; 8:45 PM is 2045; etc. With this method, there can be no confusion between AM and PM.

The base for telling time in International Broadcasting is Greenwich Mean Time, GMT, the time at Greenwich Observatory in England.

Converting from GMT to a local time zone is accomplished by adding or subtracting the hours shown on the INTERNATIONAL TIME MAP. For example: 1000 GMT is 0400 in CST (Central Standard Time).



Conversion from GMT to any other time zone is likewise accomplished by adding or subtracting hours. The chart for this is shown at the bottom line on the INTERNATIONAL TIME MAP.



International Station Log

Instructions for use --- International Station Log.

Short wave listeners will find the following pages of great use in spotting and identifying international short-wave broadcasting stations operating from locations around the globe. The "Log" is prepared by broadcast frequencies. A column is provided for listing "Local Time Heard." Conversion from GMT to local time is explained above.

Stations listed in the log can be heard by listeners throughout the North American Continent. Transmission periods vary throughout the day and night. All broadcasts are in the English language unless otherwise indicated.

Column five, TYPE PROGRAM, is included in the log so that you may list the type of broadcast you heard. The following abbreviations will be of assistance in filling out that column.

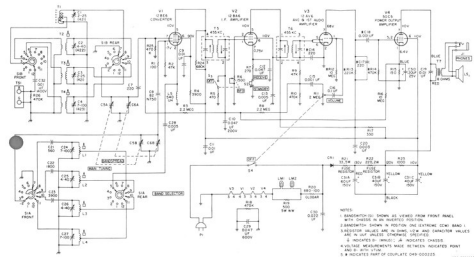
NE - News in the English language. ME - Music, English.
 ET - Commentary in English. MS - Music, Spanish.
 ST - Commentary in Spanish. MN - Music, native to the country of location.
 ND - Indicates station does not broadcast daily.

In addition to the transmissions listed in the log, you will hear many English language broadcasts from such countries as Canada, Great Britain, and the United States. Because of the great volume of such broadcasts, and as they are easily heard without consulting a prepared guide, we have listed only a few such stations.

STATION LOG

| COUNTRY OF ORIGIN | CITY OF ORIGIN | CALL LETTERS | FREQUENCY IN MEGACYCLES | TYPE PROGRAM | LOCAL TIME HEARD |
|--------------------|----------------|--------------|-------------------------|--------------|------------------|
| Liberia | Monrovia | ELBC | 3.255 | | |
| British Honduras | Belize | | 3.300 | | |
| Ghana | Accra | | 3.365 | | |
| S. Africa | Paradys | | 4.810 | | |
| Singapore | | FBS | 5.010 | | |
| Tanzania | Dar-es-salaam | | 5.050 | | |
| Ethiopia | Addis-Ababa | | 5.060 | | |
| Brazil | Sao Paulo | ZYR328 | 5.955 | | |
| Germany | Ismaning | | 5.960 | | |
| Dominican Republic | Ciudad Juarez | Radio Caribe | 5.970 | | |
| North Borneo | Cap Herten | 4YB | 5.980 | | |
| Haiti | Cap Herten | | 5.980 | | |
| Romania | Bucharest | | 5.990 | | |
| Belgium | Brussels | ORF | 6.000 | | |
| Egypt | Alex. Sidi | | 6.015 | | |
| Rhodesia | Salisbury | | 6.020 | | |
| Morocco | Tangier | | 6.025 | | |
| Iraq | Alex. Ghazali | | 6.030 | | |
| England | Dorset | GWS | 6.035 | | |
| Morocco | | 3M3 | 6.037 | | |
| China | Weking | BCA22 | 6.040 | | |
| Indonesia | Djakarta | YDF | 6.045 | | |
| Nigeria | Ibadan | | 6.050 | | |
| Poland | Warsaw | | 6.055 | | |
| Canada | Sackville N.B. | CKR2 | 6.060 | | |
| India | Delhi | | 6.065 | | |
| U.S.S.R. | Mosk | | 6.075 | | |
| Canada | Halifax | | 6.100 | | |
| England | London | BBC | 6.110 | | |
| Morocco | | | 6.115 | | |
| Japan | Tokyo | FEM | 6.160 | | |
| Mexico | Mexico City | | 6.165 | | |
| Switzerland | Berna | | 6.165 | | |
| Nigeria | Kaduna | | 6.175 | | |
| North Korea | Pyeongrang | | 6.195 | | |
| North Korea | Pyeongrang | | 6.250 | | |
| Egypt | Cairo | | 7.051 | | |
| Taiwan | Chiayi | | 7.100 | | |
| Congo | Brazzaville | | 7.105 | | |
| Okinawa | Naha | YOA | 7.160 | | |
| Hungary | Budapest | | 7.220 | | |
| Pakistan | Karachi | | 7.280 | | |
| East Germany | Berlin | | 7.300 | | |
| Czechoslovakia | Prague | | 7.340 | | |
| U.S.S.R. | Moscow | Radio Moscow | 7.555 | | |
| Belgium | Brussels | | 7.144 | | |
| Bulgaria | Sofia | | 7.255 | | |
| China | Peking | | 7.480 | | |

| COUNTRY OF ORIGIN | CITY OF ORIGIN | CALL LETTERS | FREQUENCY IN MEGACYCLES | TYPE PROGRAM | LOCAL TIME HEARD |
|----------------------|-------------------|-----------------|----------------------------|-----------------|---------------------|
| Denmark | Copenhagen | OZF | 9.520 | | |
| Cuba | Havana | | 9.531 | | |
| Nigeria | Lagos | | 9.535 | | |
| Switzerland | Berne | | 9.535 | | |
| New Zealand | Wellington | ILZ | 9.540 | | |
| Czechoslovakia | Prague | | 9.550 | | |
| Windward Islands | St. George's | WBS | 9.550 | | |
| Romania | Bucharest | | 9.570 | | |
| Italy | Rome | RAI | 9.575 | | |
| Canada | Montreal | CBC | 9.585 | | |
| Mozambique | Lourenco | | | | |
| | Marquet | CR78J | 9.616 | | |
| Sweden | Stockholm | Radio Sweden | 9.665 | | |
| Argentina | Buenos Aires | LRA | 9.690 | | |
| Dominican | | | | | |
| Republic | Ciudad | Radio Caribe | 9.735 | | |
| China | Peking | | 9.785 | | |
| U.S.S.R. | Moscow | Radio Moscow | 9.855 | | |
| Windward Islands | Barbados | JHX50 | 11.475 | | |
| U.S.S.R. | Moscow | Radio Moscow | 11.570 | | |
| Egypt | Cairo | | 11.665 | | |
| Thailand | Bangkok | H8K9 | 11.670 | | |
| Pakistan | Karachi | | 11.674 | | |
| Sweden | Stockholm | Radio Sweden | 11.705 | | |
| India | New Delhi | | 11.710 | | |
| Australia | Melbourne | VLA | 11.710 | | |
| Holland | Hilversum | | 11.730 | | |
| Windward Islands | St. George's | | 11.735 | | |
| Morocco | Rabat | | 11.735 | | |
| Vatican | Vatican City | HYJ | 11.740 | | |
| Canada | Montreal | CBC | 11.760 | | |
| Indonesia | Djakarta | | 11.795 | | |
| Australia | Melbourne | VLA | 11.810 | | |
| U.S.S.R. | Moscow | Radio Moscow | 11.815 | | |
| Belgium | Brussels | ORU | 11.850 | | |
| Katanga | Elizabethville | | 11.866 | | |
| Philippines | Manila | OZF2 | 11.920 | | |
| Congo | Brazzaville | | 11.925 | | |
| Singapore | | BBC-FES | 11.955 | | |
| China | Peking | | 12.125 | | |
| Iran | Tehran | 2PB | 12.125 | | |
| Japan | Tokyo | JOA15 | 12.135 | | |
| Finland | Helsinki | O1E4 | 12.190 | | |
| Canada | Montreal | | 12.190 | | |
| Liberia | Monrovia | ELWA | 12.190 | | |
| Taiwan | Taipei | BED3 | 12.225 | | |
| Yugoslavia | Belgrade | | 12.240 | | |
| Sweden | Stockholm | Radio Sweden | 12.240 | | |
| Israel | Tel Aviv | | 12.250 | | |
| Ceylon | Colombo | | 12.265 | | |
| Poland | Warsaw | | 12.275 | | |
| New Zealand | Wellington | ILZ | 12.280 | | |
| Australia | Melbourne | VLA | 12.315 | | |
| France | Paris | | 12.350 | | |
| United States | New York City | WRUL | 12.380 | | |
| West Germany | Cologne | DWD15 | 12.405 | | |
| South Korea | Seoul | HLE9 | 12.745 | | |
| United States | New York City | WRUL | 12.750 | | |
| Portugal | Lisbon | CS444 | 12.870 | | |



ALIGNMENT PROCEDURE

- Use an amplitude modulated generator covering 455 KC to 30 MC.
- Connect the output meter across the speaker voice coil.
- Use a non-metallic alignment tool.
- Use a standard EIA dummy antenna as shown at the right.
- Set BFO control to OFF, VOLUME control maximum clockwise, RECEIVE/STANDBY control to RECEIVE, and the BANDSPREAD control to 100.
- Refer to the top and bottom views for location of adjustments.



| Step | Signal Generator Connections | Generator Frequency | Band Selector Setting | Receiver Dial Setting | Adjust |
|------|--|---------------------|-----------------------|-----------------------|--|
| 1 | High side through a .01 mfd capacitor to outer plates of rear section of TUNING capacitor. | 455 KC (30% mod.) | 1 | 1.0 MC | A, B, C and D for maximum output. Reversing the generator output to keep the output meter below 50 milliwatts. |
| 2 | High side through EIA antenna to terminal ANT on rear of chassis. Low side to chassis. | 1400 KC (30% mod.) | 1 | 1400 KC | C1 and C24 for maximum output in step 1. |
| 3 | Same as step 2. | 600 KC (30% mod.) | 1 | 600 KC | L1 for maximum output as in step 1. |
| 4 | Same as step 2. | - | 1 | - | Repeat steps 2 and 3 until no increase in output can be obtained on either adjustment. |
| 5 | Same as step 2. | 4.3 MC (30% mod.) | 2 | 4.3 MC | C2 and C25 for maximum output as in step 1. |
| 6 | Same as step 2. | 1.9 MC (30% mod.) | 2 | 1.9 MC | T2 and L2 for maximum output as in step 1. |

| Step | Signal Generator Connections | Generator Frequency | Band Selector Setting | Receiver Dial Setting | Adjust |
|------|------------------------------|---------------------|-----------------------|-----------------------|---|
| 7 | Same as step 2. | - | 2 | - | Repeat steps 5 and 6 until no increase in output can be obtained. |
| 8 | Same as step 2. | 31 MC (30% mod.) | 3 | 11 MC | C3 and C26 for maximum output as in step 1. |
| 9 | Same as step 2. | 5 MC (30% mod.) | 3 | 5 MC | T3 and L3 for maximum output as in step 1. |
| 10 | Same as step 2. | - | 3 | - | Repeat steps 8 and 9 until no increase in output can be obtained. |
| 11 | Same as step 2. | 30 MC (30% mod.) | 4 | 30 MC | C4 and C27 for maximum output as in step 1. |
| 12 | Same as step 2. | 14 MC (30% mod.) | 4 | 14 MC | T4 and L4 for maximum output as in step 1. |
| 13 | Same as step 2. | - | 4 | - | Repeat steps 11 and 12 until no increase in output can be obtained. |

TUBE AND DIAL LAMP REPLACEMENT

For access to the tubes, remove the cabinet rear panel which is held in place by two screws. Care should be exercised so as not to damage the leads to the loop-stick antenna mounted on the inside of the rear panel. For dial lamp replacement, remove the chassis from the cabinet (see CHASSIS REMOVAL).

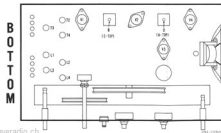
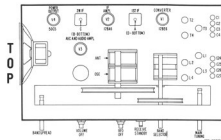
CHASSIS REMOVAL

To remove the chassis from the cabinet, remove the four screws (within the plastic feet) that secure the chassis to the cabinet. Slide the chassis out the rear of the cabinet.

CAUTION: Just before removing the chassis from the cabinet rotate the MAIN TUNING and BAND SPREAD controls fully counterclockwise to prevent damage of the tuning capacitors.

DIAL CORD RESTRINGING

Remove the chassis from the cabinet to restring either dial cord (see CHASSIS REMOVAL).



To restring the BAND SPREAD dial cord remove control knobs, phone jack retaining nut, escutcheon trim plate and clip on each end of plate (2 screws), insulation spacer, dial scale (two screws), and dial plate (four hex head screws). Care should be exercised when removing the dial plate not to damage the pointers. Referring to figure A, follow the arrows and letter sequence to string the dial cord. The dial cord spring should be expanded from 1/4 inch to 1/2 inch. Place the BAND SPREAD pointer on the bottom of the dial rail and engage the dial cord with the pointer clips. Replace the dial plate, dial scale, escutcheon trim strip (replace clips on either end of plate), and control knobs. With the BAND SPREAD control fully counterclockwise, align the pointer on "B" and apply a drop of cement to the dial cord and pointer clip. Replace chassis in cabinet.

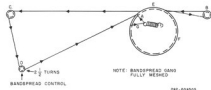


Figure A. Restringing the Bandspread Control.

To restring the MAIN TUNING dial cord with the chassis removed from the cabinet, refer to figure B and follow the arrows and letter sequence. The dial cord spring should be expanded 1/4 inch to 1/2 inch. Place the MAIN TUNING pointer on the dial rail and engage the dial cord with the pointer clips. With the MAIN TUNING control fully counterclockwise, align the pointer with "B" on the BA" TUNING scale and apply a drop of cement to the dial cord and pointer clip. Replace the chassis in the cabinet.

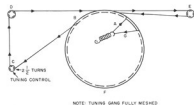


Figure B. Restringing the Tuning Dial.

SERVICE REPAIR PARTS LIST

| Schematic Symbol | Description | Hollingers Part Number | Schematic Symbol | Description | Hollingers Part Number | Schematic Symbol | Description | Hollingers Part Number |
|-------------------|--|------------------------|---|---|------------------------|---|-------------------------------------|------------------------|
| CAPACITORS | | | *RESISTORS (cont.) | | | TUBES, LAMPS AND RECTIFIERS | | |
| C1,2,3,4 | 2-25, 4-40, 2-25, 7-100 mfd., Var. Grid Trimmer, Assy; Inc. mtg. bracket | 044-000533 | R6 | 1.5K ohm, 20%, 1/4 watt, Variable, BFO control, Inc. Switch S3 | 025-002024 | CR1 | Rectifier, Selenium | 019-803373 |
| C5A,B | MAIN TUNING, Var. Cap. | 048-000479 | R7 | 270 ohm | 451-252271 | LM1,2 | Lamp, Dial type A47 | 029-100004 |
| C6A,B | BANDSPREAD, Var. Cap. | 048-000477 | R10,18,35,36 | 470K ohm | 451-252474 | V1 | 12 BE6; Converter | 090-900040 |
| C7 | 220 mfd., 500V, 20%, Cer. Disk | 483-021221 | R11 | 2 megohm, 30%, 1/8 watt, Variable, VOL/ME Control, Inc. Switch S4 | 025-002025 | V2 | 12 BA6; IF Amplifier | 090-900039 |
| C8 | 82 mfd., 500V, 10%, Cer. Disk | 491-126820-95 | R12,13,14 | Part of Audio Couplete | ----- | V3 | 12 AV6; AVC and 1st Audio Amplifier | 090-901187 |
| C9 | .01 mfd., 500V, 50V, Cer. Disc | 047-100234 | R15 | 150 ohm | 451-252151 | V4 | 50C5; Power Output Amplifier | 090-900541 |
| C10 | .047 mfd., 200V, 20%, Molded Paper | 499-014473 | R16 | 10 megohm | 451-252106 | MISCELLANEOUS | | |
| C11 | .01 mfd., 500V, .80-20%, Cer. Disc | 047-100217 | R17 | 300 ohm | 451-252231 | Antenna, Telescoping | 057-000421 | |
| C12,29 | .047 mfd., 600V, 20%, Molded Paper | 499-034473 | R19 | 500 ohm, SW, Wire wound | 034-001328-06 | Bracket, Antenna | 047-009150 | |
| C13,28 | .005 mfd., 500V, 20%, Cer. Disc | 047-100442 | R20 | 880-100 ohm, Gliber | 023-000327 | Bracket, Dial Plate | 047-008766 | |
| C14,17,18 | Part of Audio Couplete | ----- | R21 | Resistor, Fuse, 33 ohm, SW | 034-001389 | Cabinet (Inc. Trim Strip) | 150-000981 | |
| C15 | .001 mfd., 600V, 20%, Molded Paper | 499-034102 | R22 | Resistor, Fuse, 220 ohm, SW | 034-001399 | Clip, IF mtg. | 076-100285 | |
| C16 | 0.1 mfd., 25%, 100V, Molded Paper | 046-001259-05 | R23 | 1K ohm | 451-252123 | Clip, Fuse (Antenna mtg.) | 076-102274 | |
| C17 | .01 mfd., 600V, 20%, Molded Paper | 499-034103 | R24 | 680K ohm | 451-252684 | Couplete, Audio | 049-000225 | |
| C20 | .003 mfd., 600V, 20%, Molded Paper | 499-034302 | *All RESISTORS are 10%, 1/2 watt, carbon type, unless otherwise specified. | | | Dial Scale, Calibrated | 083-000982 | |
| C21 | 560 mfd., 5%, 125V, Plastic | 505-102561 | COILS AND TRANSFORMERS | | | Dial Card | 036-000049 | |
| C22 | 1800 mfd., 5%, 125V, Plastic | 505-102182 | T1 | Antenna Loop Stick Assembly | 150-001606 | Escutcheon, trim plate | 007-000793 | |
| C23 | 3900 mfd., 5%, 125V, Plastic | 505-102292 | T2 | Coil, RF (band 2) | 051-003473 | Foot, Front | 016-201072 | |
| C24,25,26,27 | 7-100, 4-40, 4-40, 7-100 mfd., Var. Grid Trimmer, Inc. mtg. bracket | 046-000534 | T3 | Coil, RF (band 3) | 051-003474 | Foot, Rear | 016-201073 | |
| C30 | .022 mfd., 600V, 20%, Molded Paper | 499-034223 | T4 | Coil, RF (band 4) | 051-003475 | Grommet, nylon plastic (foot and rear panel mtg.) | 002-103453 | |
| C31A,B,C,D | 60-40-40 mfd., 150V, 20 mfd., 25V, Electrolytic | 045-000711 | T5 | Transformer, 1st IF | 050-300531 | Grommet, nylon plastic (escutcheon mtg.) | 002-103445 | |
| C32 | .01 mfd., 1400V, Spark Gap type, Cer. Disc | 047-001309 | T6 | Transformer, 2nd IF | 050-300532 | Grommet, nylon plastic (dial scale mtg.) | 002-103446 | |
| | | | T7 | Transformer, Audio Output; Part of L51 | ----- | Grommet (speaker and tuning capacitor mtg.) | 016-100661 | |
| | | | L1 | Coil, Oscillator (band 1) | 051-003476 | Inc. Core | 003-004564 | |
| | | | L2 | Coil, Oscillator (band 2) | 051-003477 | Knob, MAIN TUNING and BANDSPREAD | 015-001680 | |
| | | | L3 | Coil, Oscillator (band 3) | 051-003478 | Knob, VOL/ME and BFO | 015-001678 | |
| | | | L4 | Coil, Oscillator (band 4) | 051-003479 | Knob, BAND SELECTOR | 015-001679 | |
| | | | L5 | 345 OH, RF Choke | 053-100197 | Lock, Line Card | 076-200397 | |
| | | | SWITCHES | | | Speaker, 8 ohm Voice Coil, Inc. T7 | 085-000210 | |
| | | | S1A,B | BAND SELECTOR | 068-002526 | Plate, Dial | 063-004908 | |
| | | | S2 | STANDBY-RECEIVE | 068-002548 | Pointer, BANDSPREAD | 082-000471 | |
| | | | S3 | BFO-OFF, Part of R6 | ----- | Pointer, MAIN TUNING | 082-000472 | |
| | | | S4 | VOLUME-OFF, Part of R11 | ----- | Rear Panel | 048-001220 | |
| | | | SOCKETS AND CONNECTORS | | | Ring, Electrolytic mtg. | 076-003384 | |
| | | | J1 | PHONES, jack | 036-000339 | Ring, Retaining | 076-100883 | |
| | | | J2 | Socket, w/air (V1-V6) | 006-101036 | Spacer, Insulation (escutcheon) | 073-003679 | |
| | | | T31 | Terminal Board, Antenna | 088-100020 | Spring, dial cord | 015-100612 | |
| | | | P1 | Line Cord | 087-100078 | Shield, Tube (V1) | 068-100232 | |
| | | | | Socket, Dial light assembly | 086-900578 | Shield, Base (V1) | 076-100402 | |
| | | | | | | Shift, BANDSPREAD | 074-002606 | |
| | | | | | | Shift, MAIN TUNING | 074-002607 | |

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