

WMLK

***Shortwave Radio
Listener's
Handbook***

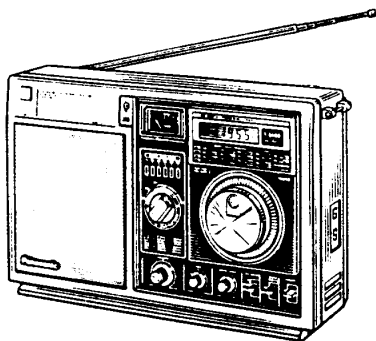
Contents:

Selecting a Shortwave Receiver.....	2
Connecting an External Antenna.....	2
Constructing an Inexpensive Antenna.....	3-6
A Simple Lightning Arrester.....	7
Grounding Your Receiver.....	8
Listening Information.....	9
Current Program Schedules.....	11
Times Zones.....	12

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Selecting a Shortwave Receiver

When purchasing a shortwave receiver, one must bear several important things in mind. First, he must be sure that his receiver has adequate frequency range. The shortwave bands fall within the high-frequency (3 to 30 MHz) portion of the radio spectrum; therefore, one



must be sure that his receiver can tune over this entire range. Many AM/FM/SW receivers possess only one or two shortwave bands, which simply do not offer complete shortwave coverage. Be sure to watch for this when buying a receiver.

A number of other desirable features of shortwave receivers also exist. Among them are automatic noise limiting (ANL) and bandspread. Automatic noise limiting helps the receiver to reject annoying electrical noise from such sources as lighting, auto and aircraft ignition, etc., which tend to degrade reception. Line filters for the AC plug can also be added. These can be purchased at many electronic supply centers.

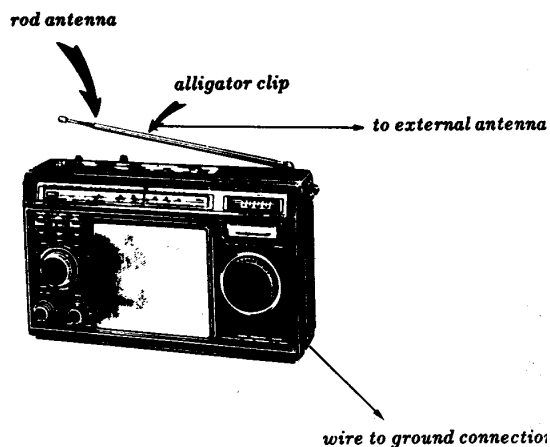
Bandspread is actually a fine tuning control which enables a listener to center his receiver right on frequency.

Yet another desirable feature for a shortwave receiver is that of a built-in preamplifier having a variable R.F. gain control. This is especially useful for pulling in weaker signals.

Connecting an External Antenna

Many portable, multiband radios come equipped with built-in antennas, but do not feature inputs for external antennas. This can be a disadvantage if one wishes to receive weak or distant signals. In most cases, however, this problem is easily overcome.

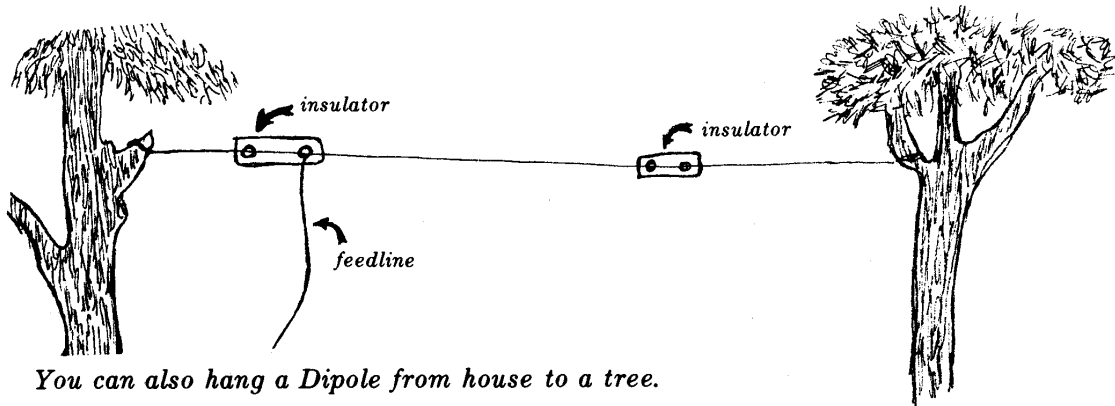
Most portable radios having shortwave bands utilize a telescoping rod antenna for reception. A lead from an external, long-wire antenna may easily be clipped directly to the telescoping rod, which will dramatically improve receiver sensitivity. Further improvement can be realized if the metal chassis of the radio is connected to a suitable ground, such as a water pipe or ground rod.



Antennas

Where to Put Your Antenna

With the use of insulators you can hang antennas from trees as long as the end of the antenna is at least $1/8$ wavelength from any branches or limbs by using rope.



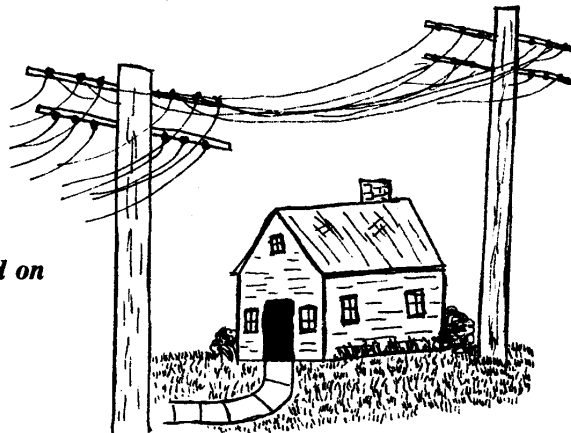
You can also hang a Dipole from house to a tree.

Always place antenna at a safe height above the ground so as not to obstruct passage and at least $1/4$ wavelength (see page 9 for meter equivalents) at lowest frequency of your intended receiving frequency above the ground.

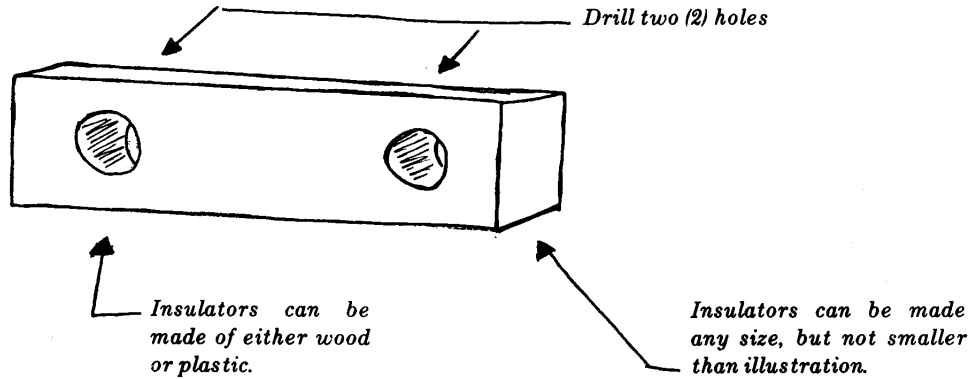
Remember, when putting up an antenna—never take chances, because both you and your equipment are too precious to get hurt. Keep it from power lines and where the antenna could break and fall across a power line. Always ground your equipment to prevent damage to your receiver and for personal safety.

Warning

Never put antennas near power lines and on power poles.



Insulators



Types of Feed Lines:

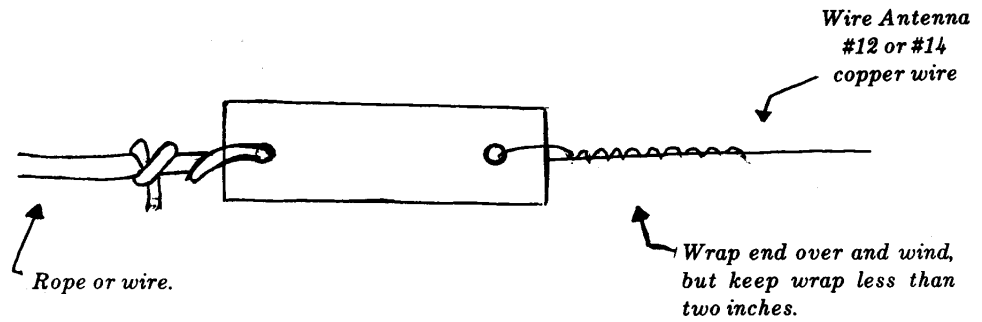
TV Twin Lead
Open Wire Lead

300 OHMS
600 OHMS

UHF-VHF type
#12 or #14

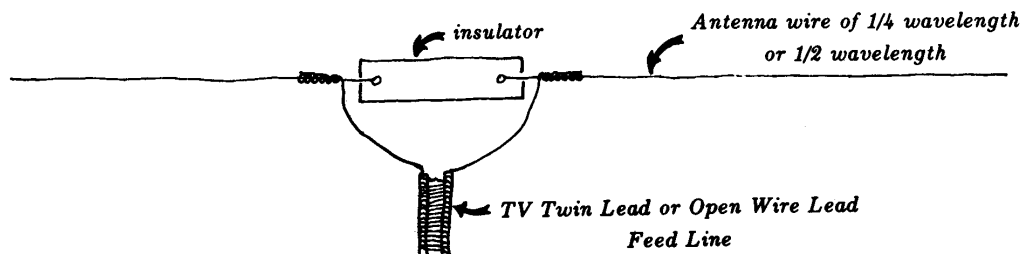
(Must be held apart by insulators, and cannot touch any metal.)

Antenna Wire — Should be bare #12 or #14 copper.



Different Types of Antennas

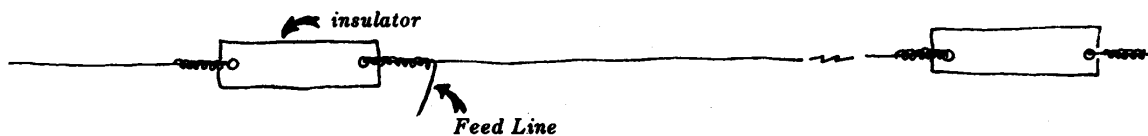
Dipole Antenna



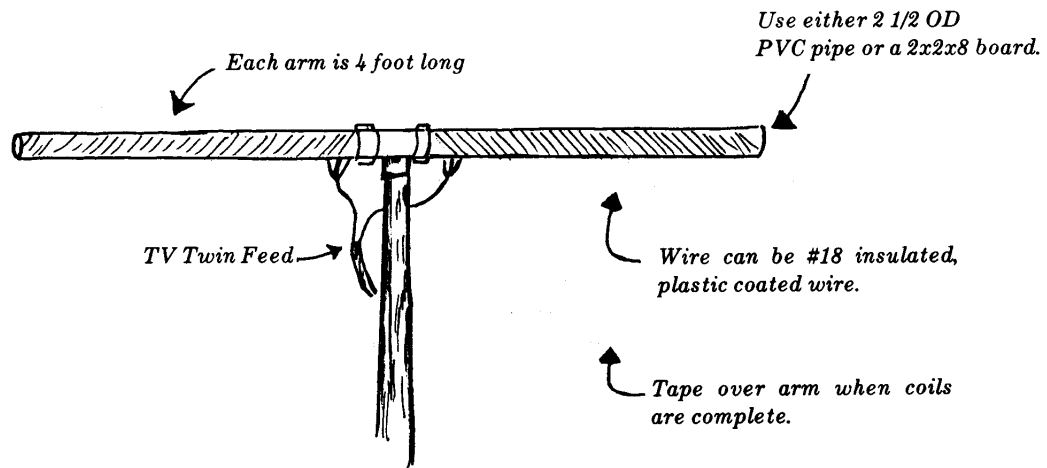
Notes: Both ends of antenna must be suspended from insulators.

Antenna should be at least $1/2$ wavelength from trees and power lines.

Long Wire Antenna



Simple Rotatable Horizontal Dipole



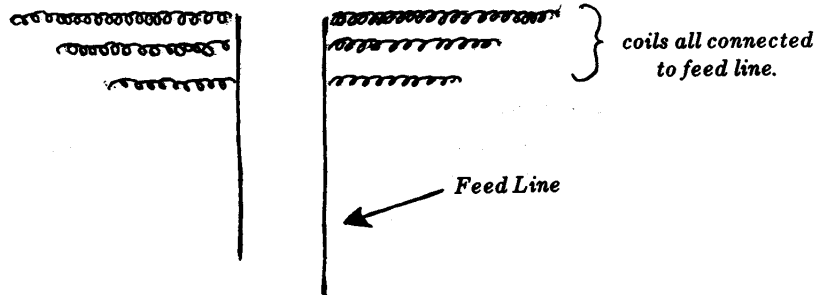
Wrap each arm with three layers of wire forming three coils wrapped in layers.

Bottom Layer: 100 ft. on each arm.

Middle Layer: 75 ft. on each arm.

Top Layer: 50 ft. on each arm.

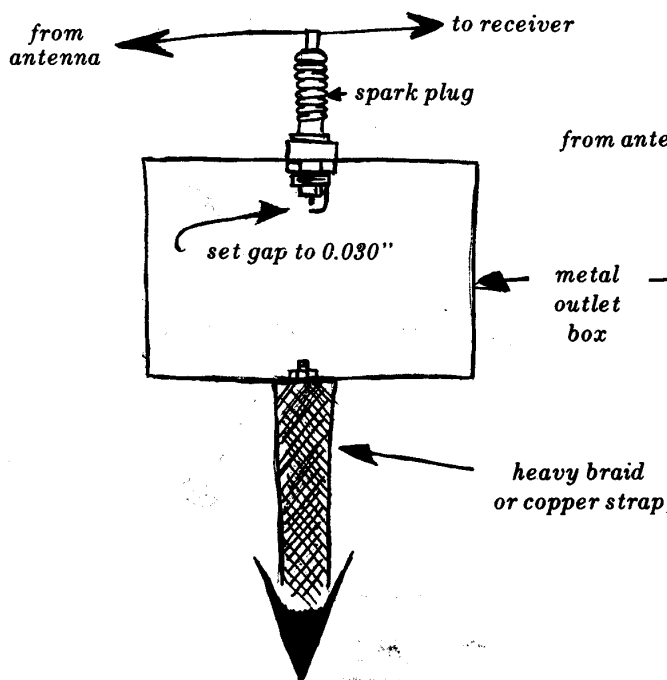
Connect the coils as shown:



Note: For more, advanced antenna designs, see the **ARRL Antenna Book**, Newington, CT, 1980.

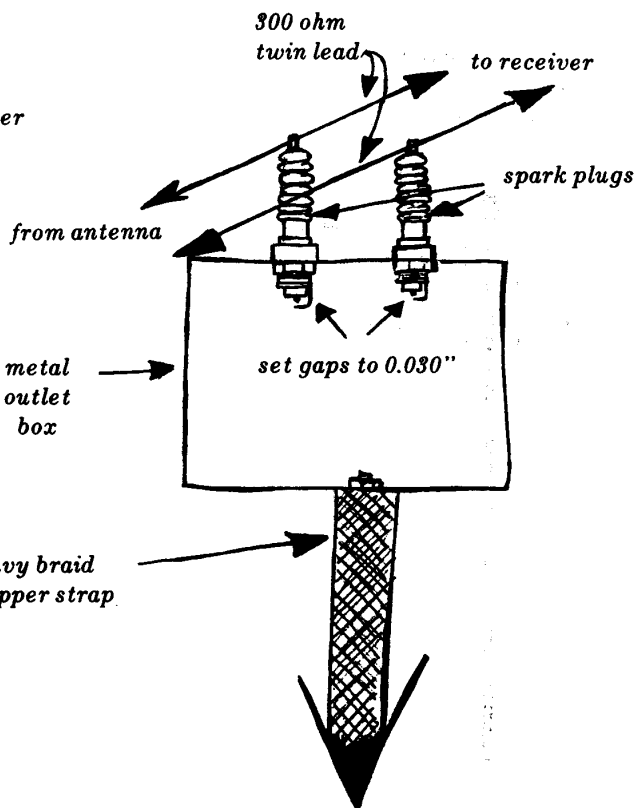
Antenna Lightning Arrester

Unbalanced, single-wire antenna



to nearest ground outside the house; make this lead as short as possible.

Balanced, two-wire antenna



to nearest ground outside the house; make this lead as short as possible.

Additional Sources of Information

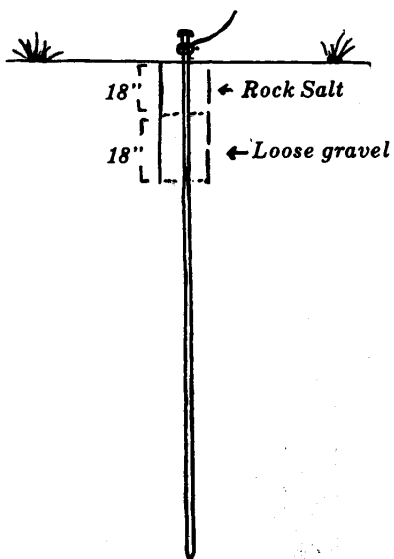
The American Radio Relay League publisher has numerous books and pamphlets relating to shortwave and amateur radio listening. Their address is:

The American Radio Relay League
Newington, CT 06111

Grounding Your System

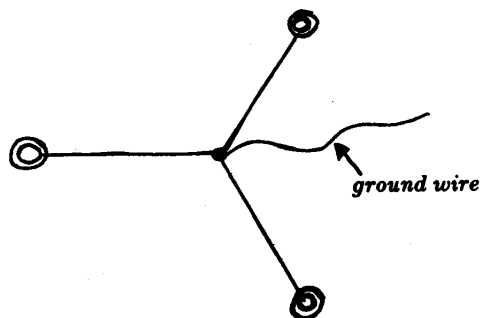
No receiver outperforms its antenna ground. It is the most important part of your receiving system.

Single ground rod: Use an 8' electrical ground rod pounded into ground



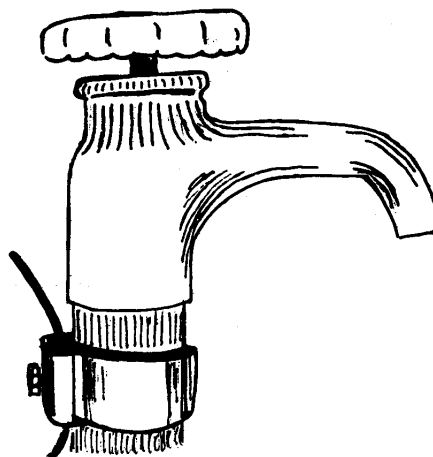
Multiple ground rods: Three 8' electrical ground rods pounded at least 18" apart.

Top view:



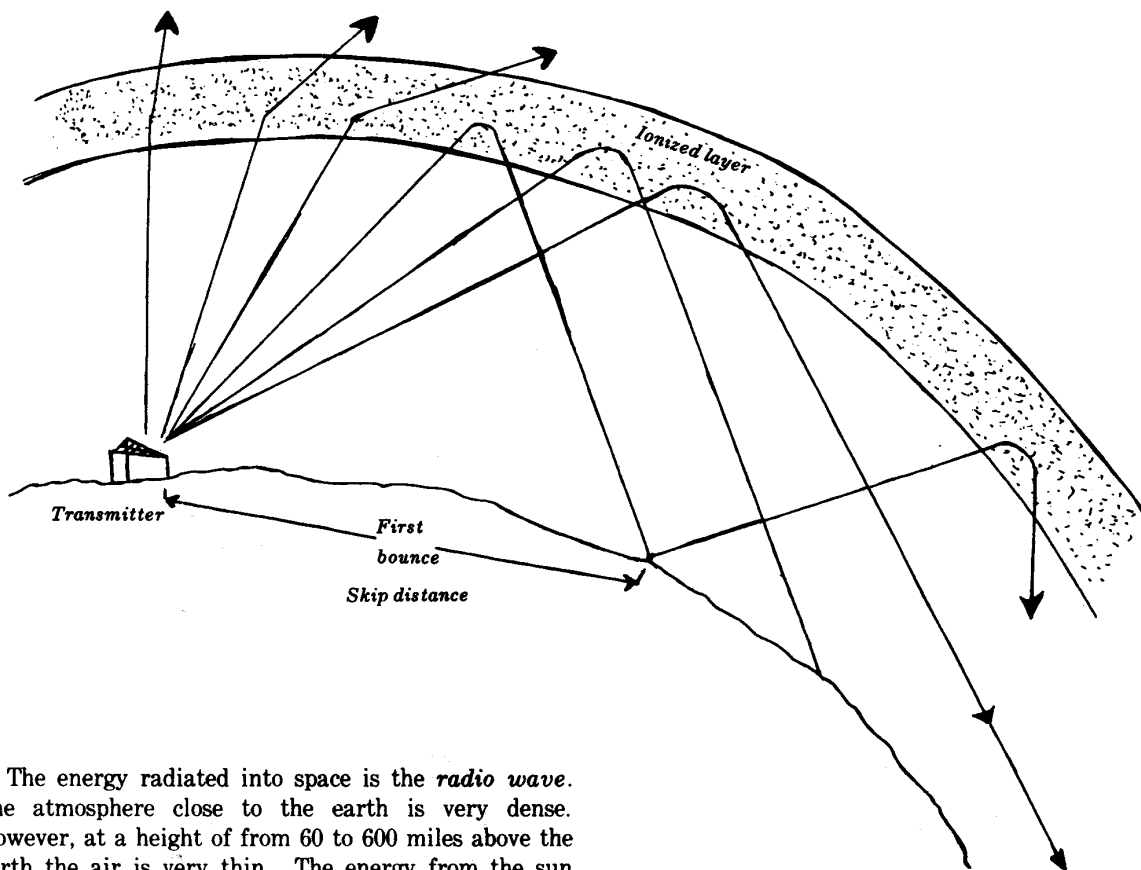
Cold water pipe ground:

Use only when a direct earth ground rod is not possible. Only fasten ground to an iron or copper cold water pipe. These make a better direct ground.



Listening Information

Atmospheric Influences



The energy radiated into space is the *radio wave*. The atmosphere close to the earth is very dense. However, at a height of from 60 to 600 miles above the earth the air is very thin. The energy from the sun ionizes the air molecules in this region, and affect the radio wave. As the radio wave enters the ionosphere, the top of the wave moves faster and refracts the wave back toward the earth.

At night, the ionosphere is thinner and the waves turn more slowly, causing the skip distance to increase dramatically, and the signal is heard over a wider area. If the skywave returns to earth and hits a good reflective surface (like salt water) the radio wave will take a double hop. This will carry the signal for a distance.

Heat inversions over water may cause a *duct* to carry the signal hundreds of miles farther than normal. Sunspots and aurora borealis may cause the ionosphere to absorb the radio signal completely.

International Broadcast Bands

Meters	Frequency Range (MHz)
60	4.65 - 5.175 MHz
49	5.75 - 6.375 MHz
41	6.905 - 7.635 MHz
31	9.35 - 9.95 MHz
25	11.6 - 12.2 MHz
19	14.9 - 15.6 MHz
16	17.54 - 18.2 MHz
13	21.2 - 21.9 MHz
11	25.4 - 26.4 MHz

Strange Sounds and Garbled Voices

Those who are new to shortwave listening are bound to encounter sounds and voices they do not expect to hear. The initial reaction to these phenomena may be to suspect faults in the receiving equipment, though such is usually not the case.

When tuning across the shortwave bands, one will often hear sounds like loud rushing, rapid electronic impulses, or even sounds that resemble machinery or engines. These sounds are often the result of jamming signals, deliberately aimed at preventing other signals from being understood by their listeners. Yes, a number of countries do take great liberties on the international

broadcasting scene, especially countries whose governments wish to control the waves.

Garbled voices are also often received at various points across the shortwave bands. These voices sometimes resemble those of fictional creatures from outer space and cannot be tuned in, even though you are right on frequency. Again, the problem is not with your receiver. These voices are most likely single-sideband (SSB) signals, which cannot be adequately received by a conventional AM receiver without single-sideband capabilities. This phenomenon can be observed, but there is little one can do about it, unless he wishes to purchase the proper type of receiver!

Some Terms Used

Antenna—	the device used to catch signals
AF Gain—	audio gain of volume control
AGC—	automatic gain control
AFC—	automatic frequency control
AVC—	automatic volume control
BFO—	beat frequency oscillator
Band Switch—	frequency range switch
ANL and NL—	automatic noise limiter
Band Spread—	fine tuning control
AM—	amplitude modulation (voice)
CW—	continuous wave (code)
SSB—	single sideband (voice)
QSL—	a reception verification card
Tuner <i>or</i>	
Frequency—	main frequency tuning control
Preselector—	a tunable RF preamplifier
RF—	radio frequency received signal
RFG—	RF gain control

A— Alfa	J— Juliette	S— Sierra
B— Bravo	K— Kilo	T— Tango
C— Charlie	L— Lima	U— Uniform
D— Delta	M— Mike	V— Victor
E— Echo	N— November	W— Whiskey
F— Foxtrot	O— Oscar	X— X-Ray
G— Golf	P— Papa	Y— Yankee
H— Hotel	Q— Quebec	Z— Zulu
I— India	R— Romeo	

TELEGRAPH CODES

MORSE <small>Used on Land Lines in United States and Canada</small>	INTERNATIONAL OR CONTINENTAL <small>Used on Submarine Cables, Wireless and in Foreign Countries</small>
A	A
B	B
C	C
D	D
E	E
F	F
G	G
H	H
I	I
J	J
K	K
L	L
M	M
N	N
O	O
P	P
Q	Q
R	R
S	S
T	T
U	U
V	V
W	W
X	X
Y	Y
Z	Z
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0
Period	Period
Comma	Comma
Interrogation	Interrogation
Colon	Colon
Semi-colon	Semi-colon
Quotation Marks	Quotation Marks

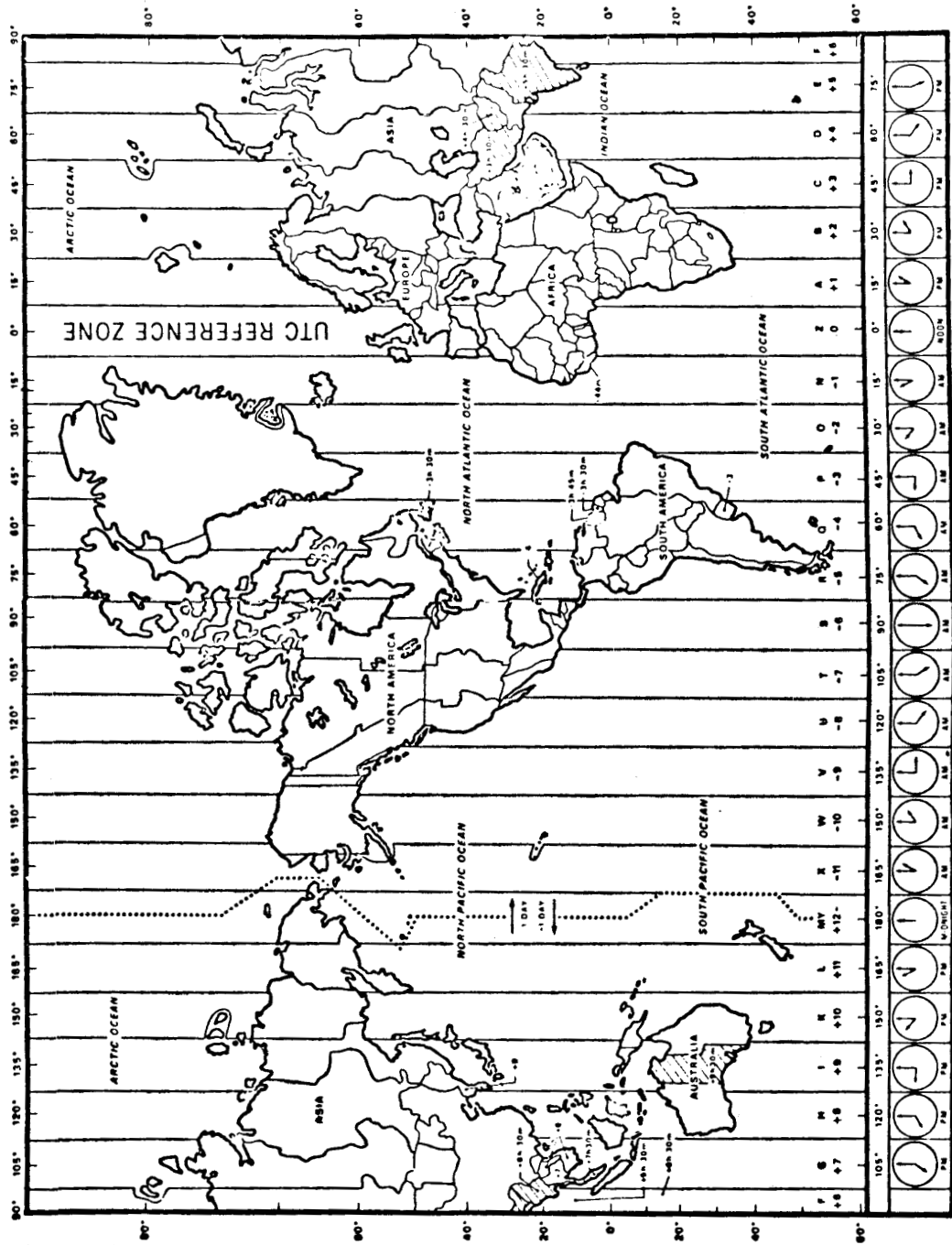
Current Program Schedules for WMLK

The table below can be used to keep abreast of radio programming and frequency changes.

<i>Time—UHT</i>	<i>Conversion to Home Time Zone</i>	<i>Frequency</i>
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NOTE: See the current issue of The Sacred Name Broadcaster for the latest schedule of WMLK.

Standard Time Zones of the World & Their Relationship to UTC or GMT



This material is taken from "NBS Special Publication 432, Dissemination Services", entitled NBS TIME AND FREQUENCY, courtesy of the US Department Of Commerce, National Bureau Of Standards, Time and Frequency Division Institute for Basic Standards, National Bureau Of Standards, Boulder, Colorado.