



SMITHSONIAN

Ages 8 and up

WARNING:
CHOKING HAZARD - Small parts.
Not for children under 3 years.
SHARP POINTS
Contains functional sharp points.
Adult supervision recommended!

Emergency Radio

No. 2598-08

Dear Customer,

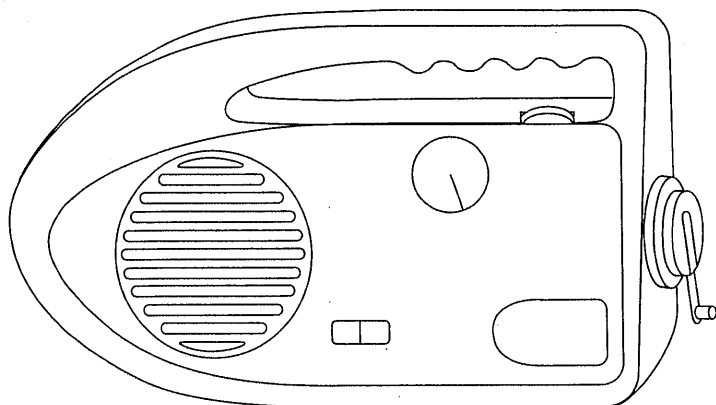
NSI is the manufacturer of this kit. We hope you enjoy our Hand-Crank Radio. If you find that we have made an error or if something is missing or damaged, let us know so that we can correct the problem for you. Please include the following:

- Name of item
- Date of purchase
- Purchase price (please include sales slip)
- Model number
- Place of purchase
- Brief description of the problem

Please do not contact Smithsonian or return the kit to the store where you purchased it. They will not have the replacement parts!

Send all correspondence to: **NSI International, Inc.**
105 Price Parkway
Farmingdale, New York 11735-1318
Attn: Quality Control Department Telephone: 888-425-9113

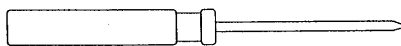
YOUR SET INCLUDES THE FOLLOWING:



Hand-Crank Radio



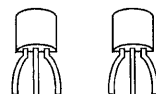
Antenna



Philips Head Screwdriver

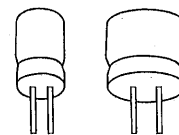
Electronic Components

Transistors



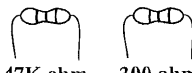
9014C 9015C

Capacitors



220 uF 470 uF

Resistors

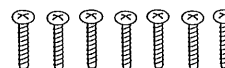


47K ohm (blue) 300 ohm (peach)



471 pF

Note: Look for the code printed on each component. Blue and peach resistors are identified by color only.



3/8" Screws

ABOUT THIS KIT

We in the museum world know that an object can have many different meanings. It depends on who is doing the looking, how the object is presented, and what other information is available.

The Hand-Crank Radio is an especially interesting example. Here are two ways it can be seen, two ways its meaning can be "interpreted." Try to think of other ways it might have meaning to you.

It can be seen as a technical device.

We could examine the Hand-Crank Radio by studying how radios work. Radio waves are a form of electromagnetic radiation produced by vibrating electrical charges. Other familiar forms of electromagnetic radiation are microwaves, light and x-rays. Electromagnetic waves can be modulated or regulated to carry voice, music, and even pictures. If the amplitude (or the range) of the radio wave is modulated, we call it AM radio. If the frequency of the radio wave is modulated, we call it FM radio. Generally, FM stations come through your radio with less static interference, and AM stations travel longer distances.

Short wave radiation has shorter waves and a much higher frequency than radio waves used for AM or FM broadcasting. These waves bounce off a layer in the atmosphere (the ionosphere) and can travel much longer distances. Short wave radios are used in international broadcasting.

The most interesting feature of the Hand-Crank Radio, however, is how it gets its electrical power. A common source of electrical power for most radios comes from the wall socket in your home. The electricity we have in our homes is produced in a large generator, usually a long distance away. Some form of energy—a waterfall, burning coal, or nuclear fission—causes part of the generator to spin and produce a continuous supply of electricity.

Radios can also get electricity from batteries. Batteries contain a limited supply of chemical energy that is converted to electricity whenever the radio is turned on. When the supply of chemical energy in the battery gets used up, the

radio stops working. Some batteries can be recharged, but most batteries used in radios are simply replaced.

The Hand-Crank Radio stores its energy in a small internal battery that you recharge by turning a crank. When the radio is turned on, energy that is stored in the battery runs the radio.

It can be seen as part of history.

The invention of the Hand-Crank Radio can be interpreted as an example of how technology has changed, and, as a result, how society has changed over time. Early radios, in the 1920's, were very heavy. The vacuum tubes inside the first radios required large amounts of electricity supplied by large batteries. In the late 1930's, smaller vacuum tubes were developed which required less electricity. Manufacturers were able to build radios that weighed only a few pounds, and people bought them to take on trips and to use in places where electrical power lines were unavailable, such as on farms.

With the invention of the transistor in 1948, radios could be made even smaller. The transistor eventually replaced vacuum tubes. Transistors used very little electrical current and could run on much smaller batteries. In 1954, the first pocket-size transistor radio appeared. These radios were small and inexpensive, and quickly gained popularity in America, Europe, and Japan, especially with young people. A new market for many radio stations with specialized programming developed. In countries with few power lines and low income levels, the transistor radio allowed people to keep up to date with news, politics and cultural programs for the first time.

The Hand-Crank Radio was designed to be even simpler to use. This radio can be used anywhere, anytime, and for no additional cost.

More information about portable radios can be found in:

Michael Shiffer, *The Portable Radio in American Life* (University of Arizona Press, 1992).

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INSIDE PARTS OF THE RADIO

Cranking Motor

This is the power plant of the machine. The cranking mechanism works with a magnet and coiled wires to generate electricity. Just the right amount of electricity is generated to make the radio work.

Rechargeable Battery Pack

Electricity generated by the hand crank gets stored in this battery pack.

Capacitor

This device has two conductive plates separated by an insulator. Electrical charges are stored in each plate.

Integrated Circuit or Microcircuit

Note: The I.C. is covered by the plastic box. The I.C. is an electronic chip in the circuit board that consists of many interconnected transistors. This tiny chip greatly reduces the size of the circuit board and allows us to build much smaller radios.

PC Board / Circuit Board

These are printed circuit boards (PCB) that connect the electronic components of the radio without wires.

Speaker Wires

The speaker is an audio device. It is like the vocal cords inside your body. A film on the speaker vibrates as an electrical signal comes in and pushes the air around it to become a sound.

Antenna Connection

The antenna collects radio waves from the air. It is the ear of the machine.

Transistor

This device is used mainly as an amplifier. It also controls and generates electrical signals.

INSTALLING THE CIRCUITS AND THE ANTENNA

Circuits and screws have functional sharp points. Adult supervision required!

1. Locate the circuit board inside the radio. Each outlet on the board is labeled with a circuit code number. See Fig 1.
2. Insert the prongs of each circuit into its corresponding outlet on the board. Some of the prongs may have to be straightened or carefully spread apart to fit properly.
3. Plug the speaker wires into its outlet. Fig 2 shows everything installed.

4. Attach the antenna to the radio by lining up the screw hole at the base of the antenna with the hole inside the radio. Place the washer on top of the hole, also situate the metal opening (hole) at the end of the black wire on top of the washer, see Fig 3. Make sure you line up the holes and then use the Philips screwdriver to secure the small 3/8" screw through the three holes.

The antenna gets placed into position in the notches inside the radio and at the top of the radio cover.

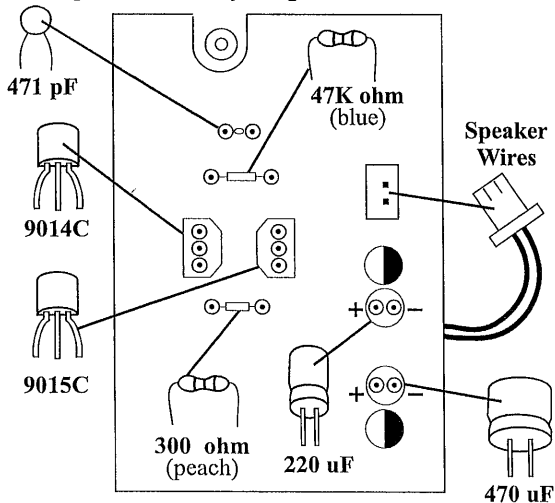


Fig 1

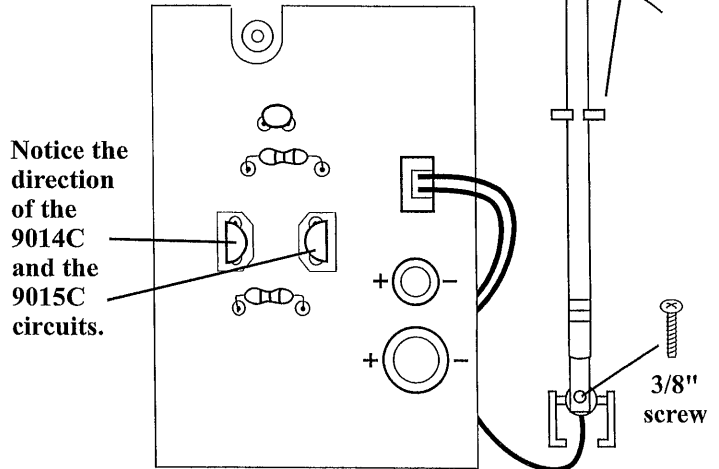
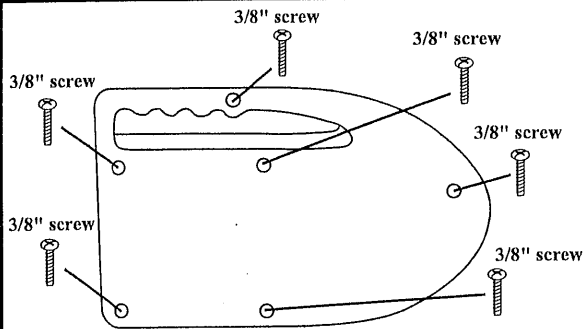


Fig 2

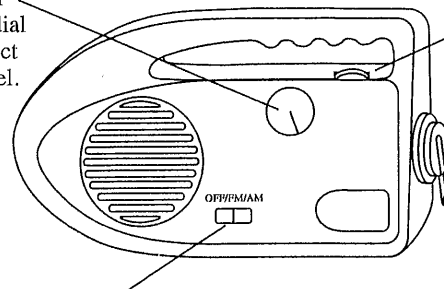
Fig 3

GETTING READY TO USE YOUR EMERGENCY RADIO!



Attach the back of the radio to the front with the six 3/8" screws.
Tighten all screws securely with the screwdriver.

Tuner
Turn dial to select channel.



Volume
Adjust dial to increase or decrease level of sound.

Crank
Turn crank clockwise to charge the battery. When you need to re-charge, simply turn the crank again!

Power Switch OFF/FM/AM

Left position will turn radio off.
Middle position will turn on FM radio
Right position will turn on AM radio.

**Turn the crank for 3 to 5 minutes for approximately 10 minutes for airtime.
Playing the radio at full blast or out of signal range will drain the battery quickly.
Turn crank 2 times/sec. Do not crank vigorously**

The Smithsonian Institution

The Smithsonian Institution is home to more than 141 million objects, ranging in size from insects and diamonds to locomotives and spacecraft. It is the world's largest museum complex, comprising 15 museums and galleries and the National Zoo in Washington D.C., and two additional museums in New York City. Millions of visitors each year visit the nation's capital to view such treasures as the Hope Diamond, the Star Spangled Banner, and the Wright Flyer. A broad range of exhibits provides a fun and educational experience for young and old alike.

One of the world's leading scientific research centers, the Institution has facilities in eight states and the Republic of Panama. Research projects in the arts, history, and science are carried out by the Smithsonian all over the world. Some of the Smithsonian's research centers include the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, the Smithsonian Marine Station at Link Port, in Florida, and the Smithsonian Tropical Research Institute, in Panama.

For membership information or pre-visit planning material, write or call the Visitor Information and Associates Reception Center, Smithsonian Institution, Washington D.C., 20560, (202) 357-2700 (voice), (202) 357-1729 (TTY). You may also visit the Smithsonian through our web site, www.si.edu

History

James Smithson (1765-1829), a British scientist, drew up his will in 1826 naming his nephew, Henry James Hungerford, as beneficiary. Smithson stipulated that, should the nephew die without heirs (as he did in 1835), the estate would go to the United States to found "at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge..."

On July 1, 1836, Congress accepted the legacy bequeathed to the nation by James Smithson, and pledged the faith of the United States to the charitable trust. In 1838, following approval of the bequest by the British courts, the United States received Smithson's estate—bags of gold sovereigns—then the equivalent of \$515,169. Eight years later, on August 10, 1846, an Act of Congress signed by President James K. Polk established the Smithsonian Institution in its present form and provided for the administration of the trust, independent of the government itself, by Board of Regents and Secretary of the Smithsonian.

Smithsonian Museums, Galleries and Zoo

Smithsonian Institution Building ("Castle")
Anacostia Museum
Arthur M. Sackler Gallery
Arts and Industries Building
Cooper-Hewitt, National Design Museum
Freer Gallery of Art
Hirshhorn Museum and Sculpture Garden
National Air and Space Museum
National Museum of African Art

National Museum of American History, Behring Center
National Museum of the American Indian
National Museum of Natural History
National Portrait Gallery
National Postal Museum
National Zoological Park
Renwick Gallery
S. Dillon Ripley Center
Smithsonian American Art Museum

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
Reorient or relocate the receiving antenna
Increase the separation between the equipment and receiver
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
Consult the dealer or an experienced radio TV Technician for help