*Perera's*

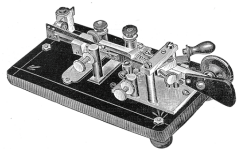
# TELEGRAPH
## COLLECTOR'S GUIDE

Camelback Keys

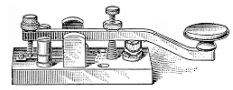
**Third Edition: 2008**

Prof. Tom Perera
W1TP

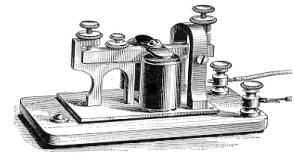
Triumph Keys



Semi-Automatic "Bugs"



Spark Keys



Sounders

Published by the Radio Society of Great Britain,
Lambda House, Cranborne Road, Potters Bar, Herts.
EN6 3JE, UK.



ISBN 9781-9050-8637-5

Production: Mark Allgar, M1MPA
Cover design: Dorotea Vizer, M3VZR
Subediting and typography: Chris Danby, G0DWV.

Printed in Great Britain by Latimer Trend & Company Ltd of Plymouth.

For the continually updated list of additions and corrections and for information on thousands of additional keys, please visit The W1TP.COM Telegraph Museum:
**www.w1tp.com**

**ACKNOWLEDGMENTS**
I am indebted to the real scholars of telegraph history for most of the information in this book. My special thanks to the late Louise Moreau - W3WRE, whose efforts provided a clear time-line of the evolutionary changes in telegraph key design.

I would also like to thank (in alphabetical order): Lynn Burlingame, John Casale, Randy Cole, John Elwood, Tom French, Bill Holly, John Kelly (Silent Key, 1998), Russ Kleinman, Jim Kreuzer, Pete Malvasi, Neal McEwen, Larry Nutting, David Pennes, Greg Raven, Roger Reinke, Gil Schlehman, Doug Seneker, Ed White, Murray Willer (SK), and John WiIliams: all fine telegraph collectors and historians.

Special thanks to those who have allowed me to include their photographs and the information that they have laboriously gathered. Bill Holly and "Mitch" Mitchell have graciously allowed me to use photographs from The Vibroplex Book. Tom French has allowed me to use illustrations and info. from his Vibroplex and McElroy books. Roger Reinke has allowed me to use his important list of Early American Telegraph Equipment Manufacturers. Neal McEwen has let me use his digitization of Roger's list, his Military Manufacturer's Code list, and his list of Bug Manufacturers. Doug Seneker has let me use his extensive Bug List. Larry Nutting has allowed me to use information from his book on Military J-Series Keys.

The many collectors who have allowed me to use photographs of their keys are identified at the end of each description. The Bibliography, Periodicals, and Internet Links sections near the end of this book give more information about how to find these & other materials, books, lists, and collections. **Updates at: http://w1tp.com**

**NOTES ON PRICES**
Although, in general, the OLDER and RARER an item is, the more it is worth, most buyers and sellers simply don't know what telegraph items are worth. Despite their historical and scientific significance, telegraph items are among the few remaining "undiscovered" collectibles. They are not even mentioned in most Antique Collector's Guides. Consequently, the prices paid for telegraph items range from the one or two dollars paid at junk sales to the tens of thousands paid by wealthy and knowledgeable collectors caught-up in bidding frenzies at auctions. I have chosen to eliminate both ends of this continuum and indicate the "Median" or "Most Commonly Paid" prices at auctions, hamfests, antique shows, and flea markets, and private and public sales. These are the prices an "**Average Collector**" would pay.

The quoted prices are for items in **"AVERAGE" CONDITION** with **ALL** of the **ORIGINAL PARTS** and **MOST** of the **ORIGINAL FINISH**. Items in mint condition are worth about 15% more. Items in poor condition or items that have been "RESTORED" by using wire brushes, steel wool, files, pliers, polish, or paint are worth about 30% less. Since parts are hard to find, if parts are missing, deduct an additional 30% - 50%. Please see my Notes on the importance of CAREFULLY Restoring Items and: **PLEASE DON'T WIRE-BRUSH or "POLISH" !!**

NOTE: Recent Internet auction prices have been influenced by the huge bidder base of collectors competing for items, but the RELATIVE values of the keys in this book remain constant. (Low value keys continue to remain PROPORTIONALLY low in value with respect to high value keys despite the higher overall price base.)
**The LATEST (Downloadable) REVISION OF THE PRICE LIST WILL ALWAYS BE POSTED IN MY INTERNET MUSEUM: http:// w1tp.com**

# HOW TO USE THIS GUIDE

**OVERVIEW:** This guide is designed to serve as a source of general and specific information about telegraph instruments and their current values. The detailed 1500 entry cross-referenced **INDEX** (Pages **91-102**) and the recently revised **EARLY AMERICAN TELEGRAPH MANUFACTURER'S LIST** (Pages **66-70**) and Bug Lists: (Pages **71-83**) are the primary reference and indexing aids.

**ORGANIZATION OF THIS GUIDE:**
The first section of the guide provides a brief history of the development of telegraph apparatus. It includes labeled pictures and general descriptions to help illustrate the major types of instruments. The main section is organized from **Oldest-to-Newest**. It contains pictures, descriptions, and comments about 300 keys. Later sections provide more information about keys, books, periodicals, & internet links which should help answer virtually any telegraph related questions. The final section is the price guide.

**IDENTIFICATION OF SPECIFIC INSTRUMENTS:**
First, determine which type of instrument you are trying to identify. Use the first section of the guide and match your item to the pictures and descriptions until you are certain that it is either a key or a sounder or a relay, etc. and what it's approximate age is. Then search the cross-referenced **INDEX** on pages **91-102** and the **EARLY TELEGRAPH MANUFACTURER'S LIST** on pages **66-70** for the name of the manufacturer if it carries a maker's name. Look at the various items made by that manufacturer and try to find yours. If you find it, read the description and look up the current value and, if you wish, look at the color photographs on the internet. If you can't find what you are looking for, see if you can find something similar in the guide, or search the entire 3000+ item internet telegraph museum at: **http://w1tp.com** and the new John Casale, W2NI manufacturers pages: www.telegraph-history.org/manufacturers/index.html

**USE THE GUIDE TO HELP YOU MAKE BUYING DECISIONS:**
To help you determine how much to pay for a telegraph instrument, find it, or a similar item in the guide as described above and look up its value. Then determine whether it is in average condition with all parts and labels. If it is better or worse than average, adjust the listed value appropriately. Finally, you must make your own decision about whether to offer more or less than the average value based on how badly you want the item. Good places to look for telegraph items include: hamfests, antique shows/shops, flea markets, auctions, the internet, and, it often pays to place advertisements in local newspapers and classified buyers' and sellers' magazines.

**USE THE GUIDE TO HELP YOU SELL:**
To help determine how much to ask for a particular item, find it or a similar item in the guide and look up its value. Then determine whether it is in average condition with all parts and labels. If it is better or worse than average, adjust the listed value appropriately. Finally, you must make your own decision about how badly you need to sell the item and adjust the price you are asking accordingly. Good ways to sell telegraph items include directly contacting telegraph collectors through their web pages on the internet, and finding collectors in published antique guides. Local and national hamfests are attended by many thousands of ham radio operators, many of whom collect telegraph keys. Internet auctions are also productive.

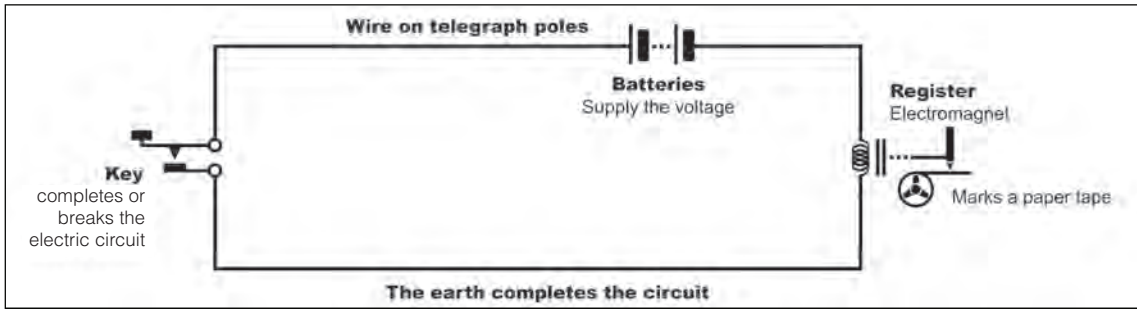
**USE THE GUIDE FOR INSURANCE AND ESTATE APPRAISALS:**
Most insurance companies require that you have a collection appraised before they will agree to insure it. Using the guide, list the items in your collection and their values to establish the overall value of your collection. I suggest that you photograph your collection as additional proof in the event that you lose items in a fire or theft.

# HISTORICAL BACKGROUND

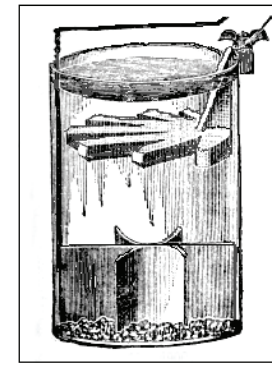
**HISTORICAL BACKGROUND**
Since the beginnings of recorded time, people have been trying to find ways to communicate over distances that were greater than the human voice could carry. Early smoke signals, signal fires, signal lamps, and signal flags eventually led to the development of semaphores. In the 1830's, France had established semaphores on every available hill throughout the country. They allowed messages to be sent across the country in mere hours rather than the weeks it had taken to hand carry them.

**Samuel F. B. Morse:**
The United States was in the process of considering the installation of a similar country-wide semaphore system when Samuel Finley Breese Morse convinced Congress to fund a demonstration of his new "Electric telegraph" between Baltimore and Washington. His successful demonstration before Congress in 1844 revolutionized communication, allowed messages to be sent over vast distances in the blink of an eye, and was one of the most important inventions of the 19th century.

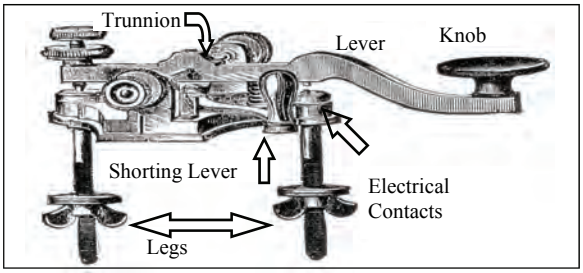
**Electrical Telegraph Circuit Components**:
Morse's "Land-line" telegraph system consisted of an electrical circuit with 2-3 **"batteries"** to supply the electricity, a **"key"** to control current flow through the circuit, and a **"register"** to make marks on a paper tape when the circuit had been activated. In practice, the key and register were connected by a long single wire supported by telegraph poles. The earth itself completed the circuit as shown in the following diagram: These circuits across the land were called "land-line" circuits.



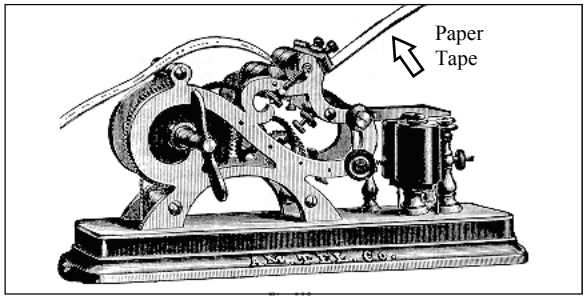

**Morse Code and the Continental / International Code:**
Morse's "code" for each letter of the alphabet consisted of a series of short electrical signals (dots), and long electrical signals (dashes). His code has been used on the American land-lines to the present day, and is called the "Morse Code" or "American Morse Code". This code was modified to eliminate spaces within characters and extra-long dashes, and used in Europe, and on the intercontinental submarine telegraph cables, and on the radio waves. This modified code is called the "Continental" or "International" Code.



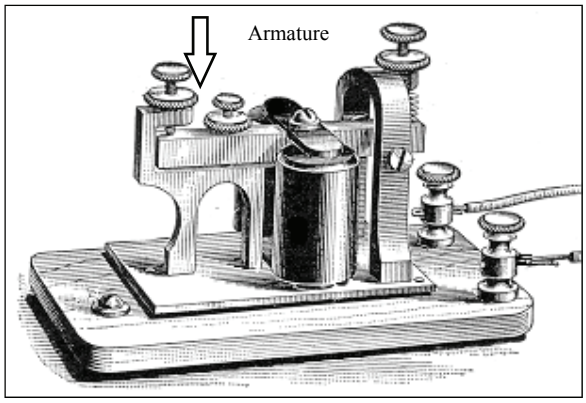
**The "Crow's Foot" or "Gravity" Battery:**
Most telegraph systems used 2-3 batteries with a crow's-foot shaped zinc electrode and a star shaped copper electrode immersed in a blue vitriol (copper sulfate) solution. Each battery produced about 1.5-2 volts. [1]



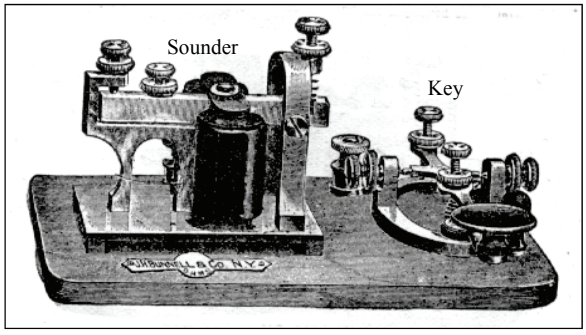

**The Key:**
The telegraph key started as a simple "strap key" consisting of a springy strip of metal, and gradually evolved into a well-balanced, pivoted, refined device as shown.




**The Register:**
Registers started as weight-driven clockwork devices which pulled a paper tape across an embossing stylus that marked the dots and dashes onto the tape (shown). They gradually evolved into spring-driven clockwork mechanisms with ink pens marking the tape.

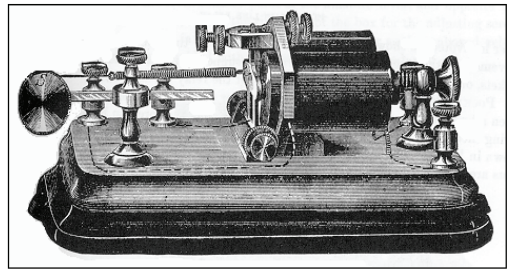



**The Sounder Replaces the Register:**
Shortly after Morse's 1844 Congressional demonstration, telegraphers discovered that the register made noises as it wrote the dots and dashes on the paper tape and they found that they could "copy" the characters by ear. Around the time of the Civil War, a new device called a "sounder" which made click sounds with its armature when its coils were activated (or deactivated) by about 3-6 volts, gradually replaced most of the early registers although some people continued to distrust "Copy-By-Ear". Telegraph operators learned to discriminate the time between the (quite different) pull-in and release sounds and used this time to identify dots or dashes.

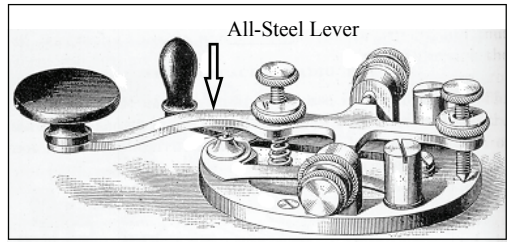



**The KOB ( Key [and Sounder] on Base ):**
Sounders were small enough to allow them to be mounted on the same wooden base as the telegraph key. Portable key-and-sounder combination sets called "KOB's" (Key [with sounder] on Base ) became popular before, during, and after the Civil War because telegraphers could carry them with them. Tiny pocket-sized key and sounder sets were also developed and used by linemen and Civil War spies. They were called "Pocket Sets" or "Pocket Relays" (See item 90). Keys and sounders on cast iron bases were often used inside private homes and called "Private Line Sets".

**The Relay:**
To help strengthen the electric current in very long telegraph lines, a very sensitive "relay" was used part way along the line. It's horizontally mounted coils could be adjusted to detect even tiny voltages in the incoming line and to operate a set of contacts that switched the voltages in the next part of the line. Relays were very important for all long distance lines.

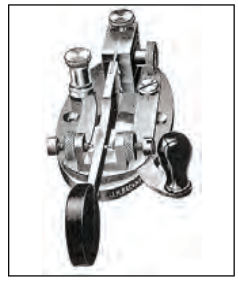


**The Bunnell "Triumph Key":**
The explosive growth of telegraph land-line communications after 1844 led to interesting "improvements" in telegraph key design which culminated in the "Triumph Key" patented in 1881 by Jesse Bunnell, a telegraph equipment manufacturer who had been a telegrapher during the Civil War. The all-steel lever of Bunnell's "Triumph Key" solved the problem which affected all of the earlier key designs in which the lever would come loose from the press-fit trunnion pin and slide back and forth, left-to-right, making the key useless.

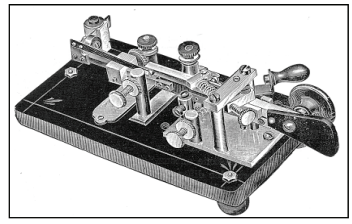


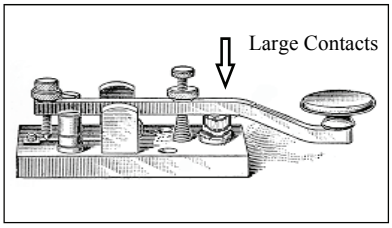

**1881: An Important Year:**
As Bunnell predicted, his "Triumph Key" was an instantaneous success that made all previous designs obsolete. Hundreds of thousands of them were made from 1881 to the present. Thus, 1881 IS A VERY IMPORTANT DATE TO REMEMBER because most keys made AFTER 1881 are so common as to have virtually no value and keys made BEFORE 1881 are generally rare and valuable.

**The "Sideswiper":**
As telegraphers began to work longer and longer hours sending fast code with up and down movements of the telegraph keys, many began experiencing severe pains in their wrists which they called "Telegrapher's Paralysis". "Telegrapher's Cramp", or "Glass Arm" (We now call it Carpal Tunnel Syndrome.) Around 1900, Jesse Bunnell introduced a key that used a side-to-side movement and named it a "Sideswiper" or "Double-Speed key". It virtually eliminated "Telegrapher's Paralysis", and became very popular. They were still being made in the 1950s.

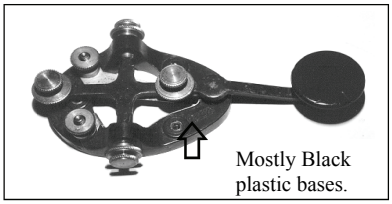


**The Semi-Automatic Key or "Bug".**
Another landmark in telegraph key design was the invention in 1904, of "automatic" (technically: "semi-automatic") keys or "bugs". which could make dots automatically and therefore produce a dramatic increase in the speed at which code could be sent.






**Spark, Wireless, and Radio Keys:**
The tiny electrical contacts used by the land-line keys were unable to handle the high currents of Marconi's 1910 spark transmitters, and later wireless transmitters and radio transmitters. Special spark keys with huge electrical contacts (usually made of silver) were designed and used. As improvements in radio design allowed, the contacts were gradually reduced in size but remained larger than the pencil-lead sized (1/16 - 1/32 inch) contacts of the land-line keys.




**Military Keys:**
As the Military began using radio to replace land-line communications, specialized military keys were manufactured in great numbers and tens of thousands appeared on the war surplus market after the end of the wars in which they had been used. Ham radio operators bought up most of these keys for their own use.

The apparatus which was used for early telegraphic communication has great historical importance and many instruments are valuable collector's items. However, some apparatus such as post 1881 land-line and WW-II military keys were made in such large quantities as to be virtually worthless to collectors. This guide is designed to assist in the identification and appraisal of all types of telegraph instruments. For further information, please visit my internet museum with over 3000 descriptions and color photographs and lots of other information: **http://w1tp.com**

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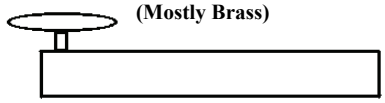
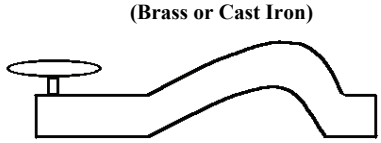
**TELEGRAPH KEY LEVER SHAPES:**
These are the shapes of the levers used on keys during different historical periods.
(There are some exceptions.)

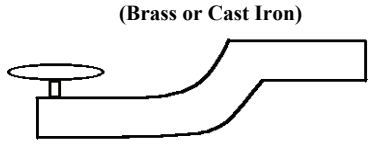
**STRAIGHT LEVER:**
American Pre-"Triumph Key"
Morse land line keys. (1844-1881)
(Also used in MOST European keys)



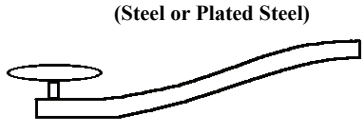

**CAMELBACK LEVER:**
American Pre-"Triumph Key"
Morse land line keys. (1848-1881)
(Also a few German keys)




**STEP LEVER:**
American Pre-"Triumph Key"
Morse land line keys. (1850's-1881)




**CURVED LEVER:** (Flat Steel)
"Triumph-Key" Style:
American Keys of All Types.
(1881 - present)



# PRE-MORSE LAND-LINE TELEGRAPH

**PRE-MORSE LAND-LINE TELEGRAPH: ( 1830 - 1844 )**
Galvani's discovery that electricity could be carried through long wires and give electric shocks to frogs legs at the end of the wires contributed to the development of the "Electric Telegraph". In 1800, a Spaniard named Salva sent signals over a long distance by stationing a slave at the end of the wire to report when he felt the electric shocks. (After reading this, I have always wondered what kind of sounds the man made when he received a “dot” or a “dash”... .OUCH! ...OOOUUUCH!).

**British “Needle Telegraph”:** (1830’s - 1960’s)
In England, Charles Wheatstone developed and patented an electromagnetic telegraph system called a **"Needle Telegraph"** in which an electrical voltage in a coil of wire pulled a needle left (dot) or right (dash). These early "Needle Telegraph" sets were installed on the English railroad lines in the 1830's and dramatically reduced the number of railroad accidents. They are very attractive and many were still being used in Great Britain well into the 1960’s. [4]

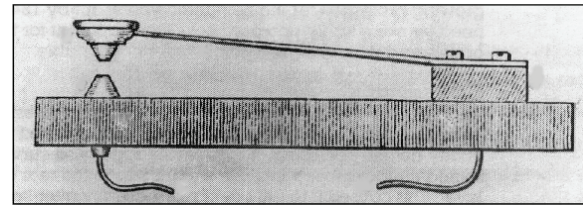
# MORSE LAND-LINE TELEGRAPH

**MORSE LAND-LINE TELEGRAPH: ( 1844 - 1881 )( Pre-Triumph Key )**
In America, Professor Joseph Henry discovered that an electromagnet consisting of a coil of wire wound around an iron core could attract a metal bar and ring a bell. As early as 1835, he had installed a telegraph system between his office and his home. Samuel Morse found out about Henry's work and began developing his own electric telegraph system which he was able to patent because Professor Henry had not taken out any patents on his early inventions.

Morse’s first key was a simple strip of springy brass mounted on a wooden base. He called it the “Correspondent” and it was similar to the simple “Strap keys” used later in telegraph and non-telegraph switching. (See number 138 for an example.)

**Keys: ( 1844 - 1881 )**

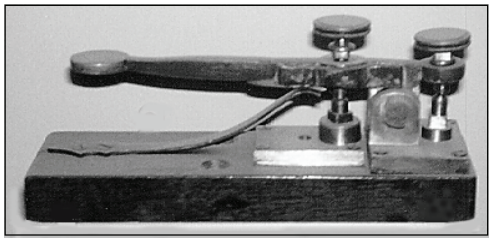
**The first key: The Correspondent**
The Correspondent had a number of serious problems with its design. Among these was the fact that the springy brass strip was hard to press down, the pressure was uneven, and there was no provision for adjusting the spring tension to suit the needs of the operator. [9]



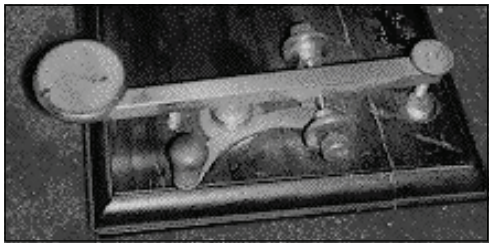
By the time Morse gave his demonstration of Baltimore-to-Washington telegraphic communication, he had started working with an assistant, Alfred Vail, who was an expert machinist and mechanic. Vail had redesigned the simple "strap key" made from a metal strip, and the wooden framed "register" that Morse had used in his early experiments and eliminated many problems with their operation. (cont. overleaf)

# MORSE LAND-LINE TELEGRAPH

The redesigned key was called the "**Lever Correspondent**" and it's basic pivoted lever design has been copied in virtually every telegraph key made since that time.

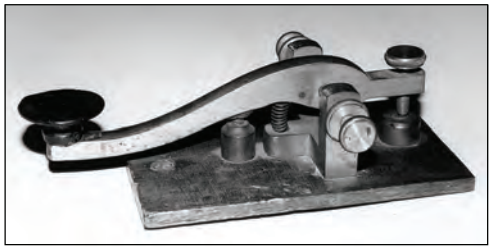


**The Lever Correspondent**
This is the original "Lever Correspondent". It is on view in the Smithsonian Institution. It has a straight brass lever with a steel pin or "trunnion" press-fit into the brass lever which pivots in the upright supports. [10]
(Smithsonian Institution)

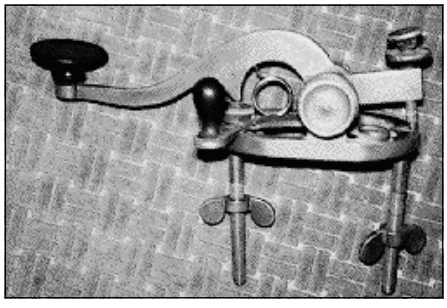


**Straight Lever Key:**
This is an example of an early American telegraph key with a straight lever based on the Lever Correspondent design. [12]

**CAMELBACK KEYS:**
Vail's straight lever design continued well-into the 1870's in America (and to the present in Europe). American keys with levers with upward humps called "Camelback" or "Humpback" keys appeared in 1848 perhaps for better appearance.

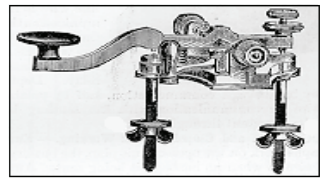


**Very Early Thomas Hall Camelback key:**
This key is typical of the very early camelback designs of the 1840's and 1850's. The lever shows a very pronounced curve, the contacts are brass-on-brass, and note that there is no spring tension adjusting screw. These early camelbacks are very scarce. [16]

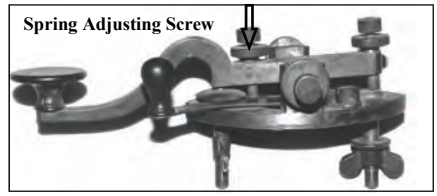


**Very Early Camelback key found in Canada:**
This is another example of the very early camelback design. The lever displays a high, curved arch, the contacts are brass-on-brass, and there is no provision for adjusting the spring tension. Notice that the adjusting screw head is severely bent. In a key that is this rare and old, it would be extremely dangerous and unwise to try to straighten it. Doing-so might break the adjusting screw and irrevocably damage the historic value of the key. [18] In 2006 I discovered that this and similar keys were made by Foster in Canada.

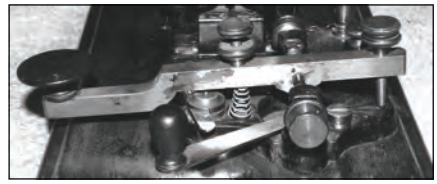
**Civil War Era Camelback keys:**
A smaller upward hump replaced the extreme curves of the earliest camelback levers. The legs attached the keys permanently to the table and made electrical connections to their contacts which were now made of silver. [20]



**Phelps Camelback Keys:**
George Phelps made "Camelback" keys which were widely used during the Civil War. He was the first inventor to put a spring tension adjustment screw on his keys and this screw has continued to be used to the present time. [30]



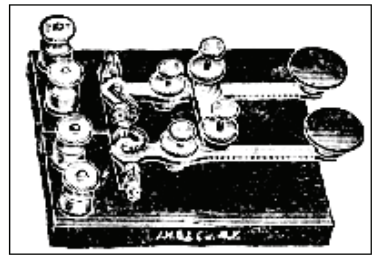

**Step Lever Keys:**
In 1869, the camelback levers were gradually being replaced with step-down levers. These keys are quite rare because relatively few were produced. [34]



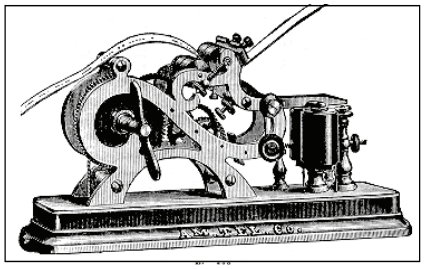
**Lewis Keys: ( 1874 - )**
The 1874 “Lewis Patent” was granted on the unique appearance of these keys with their lovely ornate and bulbous base and the sloping lever which set a trend for future levers. [40]

**Problems: A Major Flaw in Design.**
Keys made before 1881 suffered from one major flaw. As they were used, the steel trunnion pin eventually worked loose from the brass lever allowing the lever to slide left and right and making the key useless. These early keys disappeared after Bunnell invented his "Triumph" key in 1881. Their scarcity explains why they are valuable.

**Submarine Telegraph Cable Keys and Cables:**
The long intercontinental submarine telegraph cables which were laid from the 1850’s-on had very long time-constants due to their great capacitance values. Special cable keys with **two sets of contacts**, operated by **two knobs** were used. They put positive voltages on the cable for dots and negative voltages for dashes. This effectively reduced the time-constant and increased transmission rates. [50]

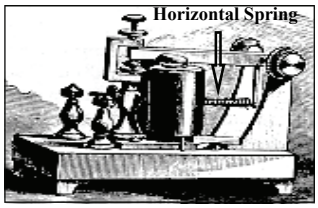


Tiffany Co. cut up thousands of unused **pieces of the 1858 Transatlantic Submarine Cable** and sold them with a certificate of authenticity. Their value is increasing. [60]
**Tom Perera - W1TP**, using scuba diving gear, recovered several pieces of early submarine telegraph cables that had been under the ocean for well over 100 years: The cable was still in useable condition after all those years in the ocean. [64] ( See museum: http://w1tp.com for stories, photographs, and descriptions of cables.)

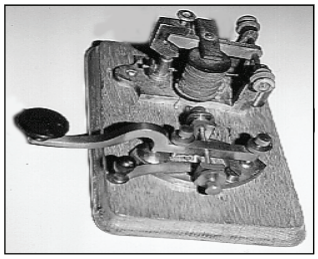


**Registers: ( 1844 - 1881 )**
The very early registers marked dots & dashes on a paper tape and used **weight driven mechanisms** to pull the tape through. They are scarce. and expensive. [70] (Right)

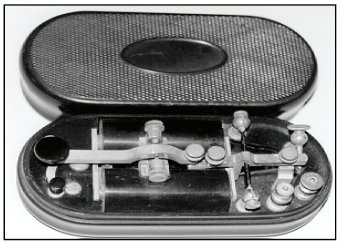
Registers that use spring-wound clockwork mechanisms were made from the 1860's to the 1960's and are much less valuable. [70a] (see number 178.) Many of these wind-up registers were used by fire departments. This further reduces their value to telegraph collectors. The Gamewell Company has been manufacturing fire alarm equipment since before the Civil War and despite its age, their apparatus sells for very low prices [70b] because it is not telegraph equipment.



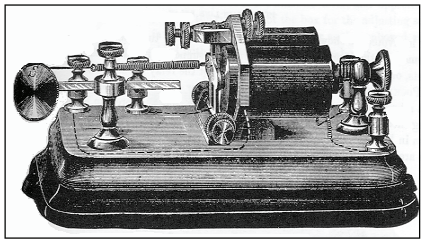

**Sounders: ( 1848 - 1881 )**
The lovely "sounders" from this period can be identified by the fact that most of them use **Horizontally-mounted springs**. They sell for much less than registers or keys because few collectors know how to tell them from the common post-1881 sounders. Phelps sounders like this [75]. Others [75a]. Sounders generally work on 3 - 6 Volts DC.



**KOB's: ( 1844 - 1881 )**
Telegraphers soon found a need for portable telegraph sets that could be carried from job to job. They began mounting the sounders on the same wooden base as the telegraph keys making a portable key-and-sounder combination called a "KOB". (Key [with sounder] on Base). [80]
NOTE: Mass produced BUNNELL "practice" versions with cast iron or brass -lever camelback keys are often found. [80a]



**Pocket Relays - also called "Pocket Sets"**
**& "Linemen's Test Sets": ( 1844 - 1881 )**
Tiny pocket-sized key-and-sounder combinations called "Pocket Sets" or "Pocket Relays" and used by linemen and Civil War spies are very rare and hard to find. They are often found in oval hard-rubber cases.(shown) [90]



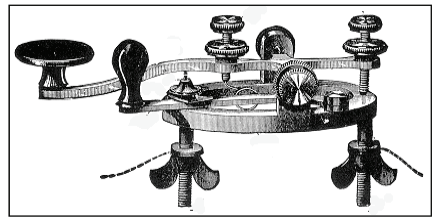
**Relays: ( 1844 - 1881 )**
Relays from this period have intricate brass parts and large horizontal coils. They sell for quite low prices because collectors are not as interested in them, and because it is hard to identify the really early ones. [95]

# POST-TRIUMPH KEY LAND-LINE TELEGRAPH

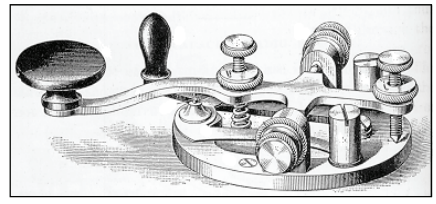
**POST "TRIUMPH KEY" LAND-LINE TELEGRAPH: ( 1881 - 1950 )**

**Keys: ( 1881 - 1950's )**
When Jesse Bunnell patented his new solid-steel lever key in 1881, he called it the "Triumph Key" because he believed (correctly) that it would "triumph" over other key designs and make them obsolete. No longer would keys stop functioning because the brass key lever had come loose from the trunnion shaft and started sliding sideways.

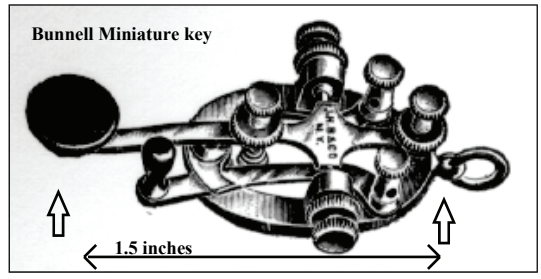
The **"Leg" Triumph Style Key** was designed to be screwed permanently through the operating table. The electrical connections were made under the table to the legs. These keys were made by the tens of thousands from 1881 through the 1950's. These "Leg" style keys are quite common. [102]



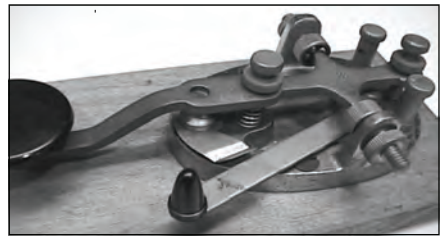
The **"Legless" Style Triumph Key** was designed to be screwed down to the top of a table. The electrical connections are made to terminal posts on top of the key. They were made by the hundreds of thousands from 1881 through the 1950's and consequently, these attractive keys are VERY VERY common. [104]



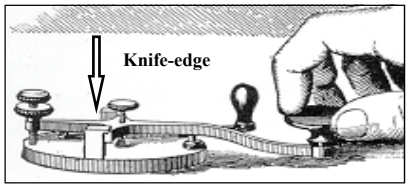
**The Miniature Bunnell Triumph Keys and Sounders:**
The tiny Bunnell **Miniature** Triumph Key is one of the most attractive and difficult keys to find. It is a fully functional key that measures only 1.5 inches long. It was made in three versions, the plain key, [108] the key with a ring (shown), [108a] and the key with a pin, [108b]. A tiny sounder was sold by itself [108c] and as a KOB on a tiny base along with the key. [108d] Most of them were given as retirement presents to telegraph operators. Some were used as jewelry. There is always the hope of finding one in a box of estate jewelry. Joe Jacobs, who now owns the Bunnell Company makes a nice new Gold-plated KOB version. [108e] (See Bibliography.)



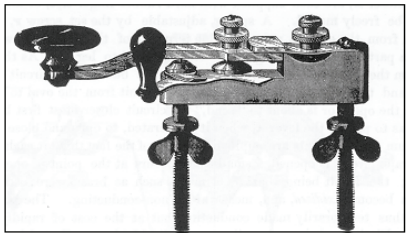

**TRIUMPH KEY LOOK-ALIKE ALERT !:**
**A VERY inexpensive Japanese key that looks like a Triumph Key but has BALL-BEARINGS and the word Japan under its hollow, cast, imitation brass base is easily mistaken for the "Real" Triumph Keys. These keys were and are sold by the tens of thousands. VERY VERY common! [110]**



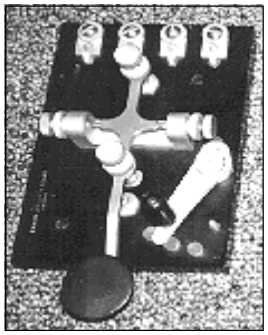
**Competition:** During the course of Bunnell's 1881 patent on the solid steel lever "Triumph Key", other manufacturers attempted to develop designs for solid-lever keys that would not impinge on Bunnell's patent.




**Victor Keys: ( 1883 - )**
The "Victor Key" used the 1883 Hamilton patent design which described an unique **knife-edge pivot**. They were made in "leg" and "legless" designs and sold by Tillotson and later Greeley and Bunnell. They are fairly scarce. [116]



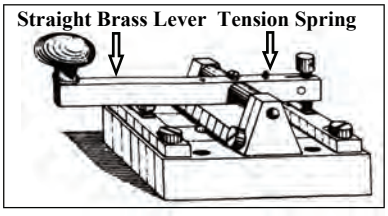
**Steiner Keys: ( 1886 - )**
The interesting "Steiner Key" design of 1886 eliminated the use of a trunnion and pivot by using a springy strip of steel as the flexing mounting for the lever. Manufactured by Western Electric, they are hard to adjust and were not popular. They are fairly scarce. [118]



**Polechanger Keys: ( 1880's - 1950's )**
The development of duplex and quadruplex circuits led to the need for keys that could switch positive or negative voltage polarities into a line. The Spies "Polechanger Key" incorporates a three position switch that selects the polarity for a particular line. The switch and the name allow it to be easily distinguished from the military keys of WW-I and WW-II. Common. [120]

**NOTE**: Many Triumph-Style keys from this period carry the designer's or maker's names. However, Many just carry the **names of the companies for which they were made,** such as Western Union, and various local telegraph companies and railroads stamped onto their levers and bases. Some of the company names were stamped onto the keys by the company after special unlabeled keys were purchased from Bunnell or other makers. [122]

**Other Manufacturers' Keys: ( 1881 - 1950's)**
After Bunnell's "Triumph Key" patent expired, many other companies copied the design and put their names on the keys. Menominee Electric Co. (which became Signal Electric Co.), MESCO (Manhattan Electric Supply Co.), Speed-X, and E. F. Johnson are all names you may find on these keys. They are VERY common. [122]

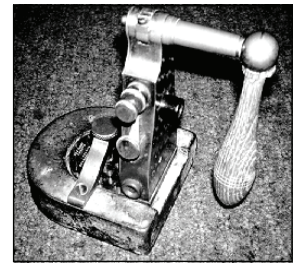



**Foreign Keys: ( 1880's - 1950's )**
Most of the land-line telegraph keys used in Europe and other countries outside the United States have heavy, straight brass levers, heavy brass supports, and pull-down or tension springs. They are quite common in Europe but they are hard to find in this country. [130]

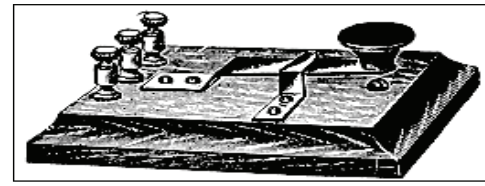
**Early German Camelback Keys: (1880's +/-)**
Many very lovely early curved camelback lever keys were made in Germany. [130a]

**The Bunnell "Sideswiper": ( 1888 - 1950's )**
As telegraphers began to work longer and longer hours sending fast code with up and down movements of their telegraph keys, many began experiencing severe pains in their wrists which they called "Telegrapher's Paralysis", or "Glass Arm". (We now call it Carpal Tunnel Syndrome.) In 1888 Jesse Bunnell invented a key that used a side-to-side movement and named it a "Sideswiper" or "Double-Speed key". It virtually eliminated "Telegrapher's Paralysis", and became quite popular. It was produced well into the 1950s. [134]

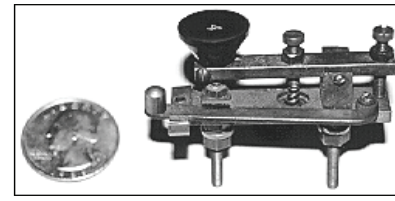
**The "Twentieth Century Key" or**
**"Pump Handle Key": ( 1900 - )**
Foote-Pierson produced another "solution" to Telegrapher's Paralysis in the form of a lovely key with flowers on its base and a pump-handle-like wooden handle which was moved to the left to make both dots and dashes. They only made about 1000 of these keys and they are very hard to find. [136]



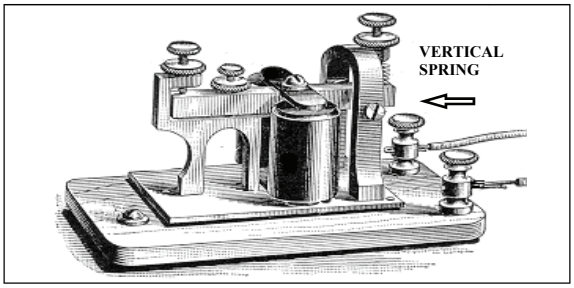
**Strap Keys:**
Simple "strap keys" from this period are very common. Because they were used for many switching functions in addition to telegraph, they generally sell for very little. [138]



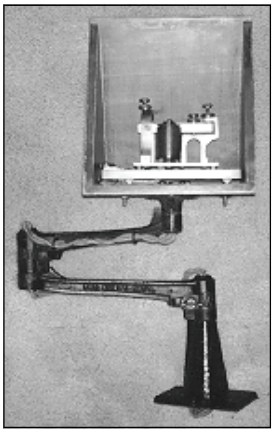
**Western Electric**
**Miniature Test Set Key:**
**(Often Mistaken for a**
**"Spy Key") (1900 - )**
These tiny keys look as though they belong on a clandestine radio transmitter designed for use behind enemy lines. They are often called "Spy Keys" by sellers hoping to get the maximum amount of money for them. In fact, they do make very nice miniature keys when mounted on a small QRP transmitter. [139]



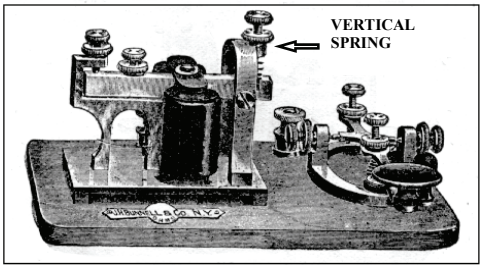
Actually these keys were mounted in sets of four on top of the Western Electric Test Set shown at right. [139a] Each key has a number from 1 - 4 to help the operator identify the correct circuit. Since the test sets are not useful to modern operators, most have had their keys removed and then found their way to the scrap yard.



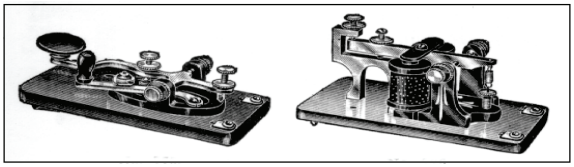

**Sounders: ( 1881 - 1950's )**
Sounders made after about 1881 can be identified by the fact that they use a **VERTICAL Spring** to position the armature. Both small sounders and the large, sensitive, "Mainline" sounders are VERY common. [140] The less attractive and more recent aluminum armature sounders bring less. Most work on 3 - 6 Volts DC.

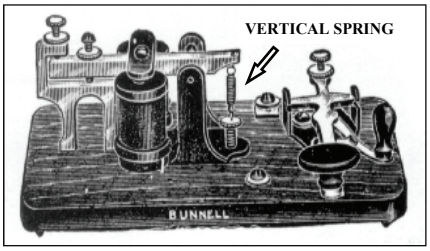
**Sounders in "Resonators"**
**and The "Prince Albert Tobacco Can".**
Busy Telegraph Offices and Railroad Stations were very noisy and a wooden "solid state" amplifier box was invented to make the clicks from sounders louder and easier to hear. This triangular or rounded wooden "amplifier" was called a "Resonator". It was mounted on a black metal pedestal [142] or an articulated swinging arm that could be brought near the operator's ear. [142a] To allow a telegrapher to be able to distinguish his/her sounder's clicks from other nearby sounders, a Prince Albert Tobacco can was tucked between the sounder and the wooden box. Opening or closing the lid of the tobacco can changed the tone of the sounder and made it's sound distinct from the other nearby sounders.




**KOB's: ( 1881 - 1950's )**
Key-and-sounder combination sets (KOB's) from this period are VERY COMMON. [150] Slightly higher prices are usually paid for sets with pretty oval BRASS-based keys and brass armature sounders. Slightly lower prices for sets with oval, black painted cast IRON or steel-based keys and/or sounders with the more recent aluminum armatures.

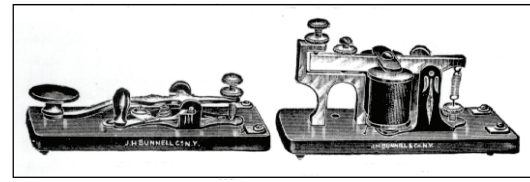


**KOB components**
**on separate bases:**
The keys and sounders were also sold separately. [152a] [152b]

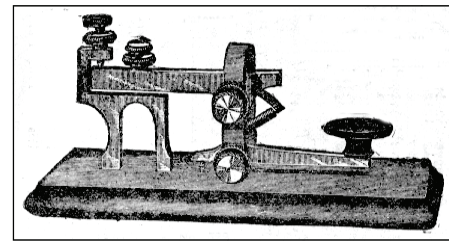



**BEEKO KOB Practice Sets:**
Bunnell made a line of inexpensive KOB practice sets consisting of keys and sounders with black-painted sheet metal key and sounder supports. They were so simply-made, that many were thrown away as junk and they are now somewhat hard to find. [154]

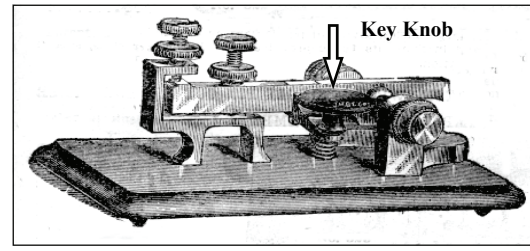
**BEEKO KOB**
**Components**
**on separate bases:**
The inexpensive BEEKO sheet-metal keys and sounders were also sold separately. [156a] [156b]



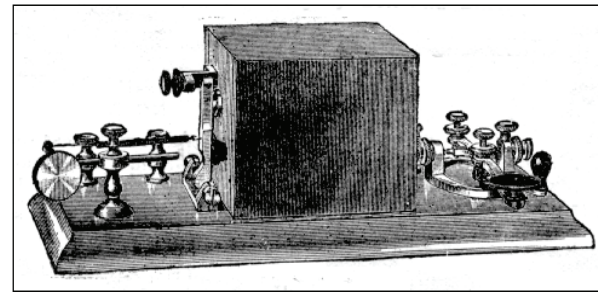
**Bunnell Non-Electric**
**Key and Sounder**
**Practice Sets:**
Several kinds of non-electric key-sounder combinations were made. They produced clicking sounds when the key was pressed and were used for teaching and learning the Morse Code. This one uses a mechanical lever connection between the key and the sounder. [160]



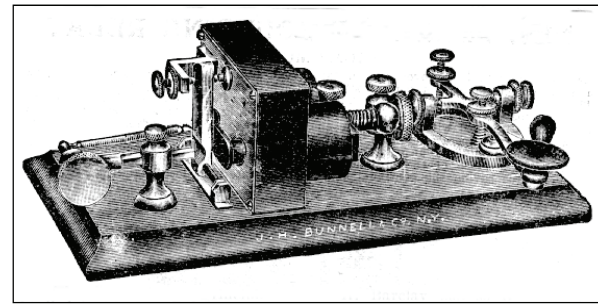
This **Bunnell Non-Electric Practice Set** has the key knob directly attached to the sounder armature. It is cast as part of the armature and extends off to the side. [162]

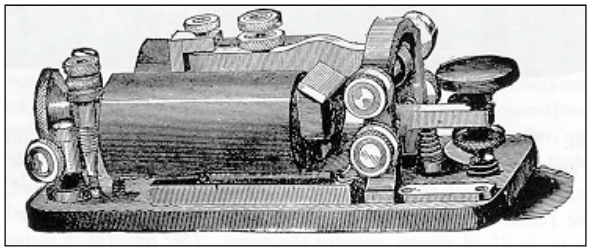



**Box Type KOB'S:**
These lovely KOB's enclosed large and sensitive coils within a wooden box. Even the weak voltages from long telegraph lines would activate the coils and pull the armature to make a clicking sound which was enhanced by striking a piece of metal attached to the wood of the box. [164]. A few early examples of this design have been seen with camelback and other early keys indicating that some were made in the 1850-1881 period. [164a]

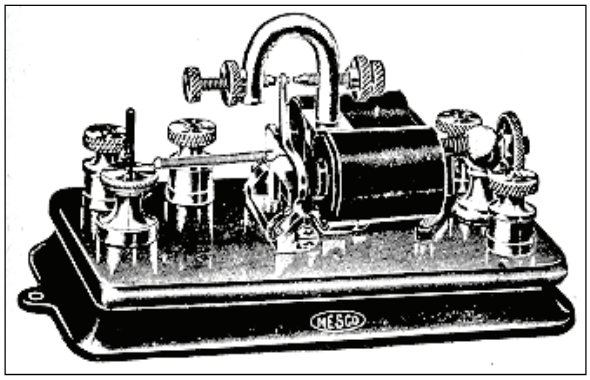


**Barclay Box**
**"Snare Drum": KOB:**
Similar to above but with exposed coils and a thin wood "Snare Drum" sounding board. Keys were usually "Triumph" style with steel levers.[166]

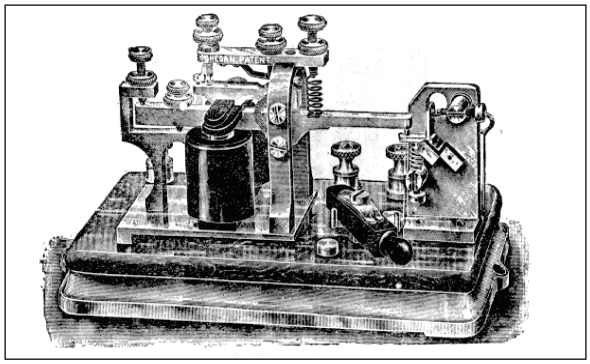




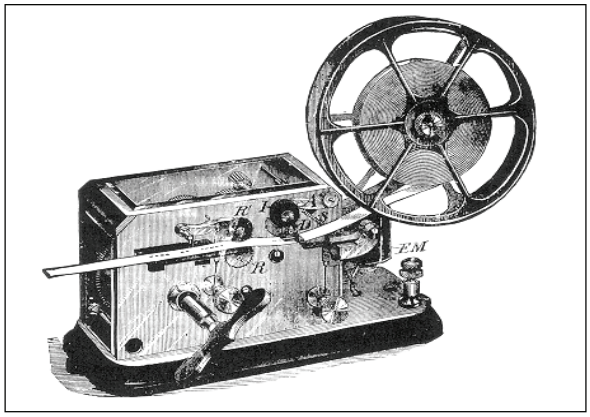
**Pocket Relays - (Also Called "Linemen's Test Sets"): ( 1881 - 1950's )**
Like the Civil War-era pocket sets, these instruments combine a key and a very sensitive sounder into a pocket-sized instrument that could be easily carried up a telegraph pole to allow a lineman to tap into and test the telegraph wires. [170]




**Relays: ( 1881 - 1950's )**
Relays from this period are called "Pony Relays". They have an unique curved upper contact support that looks a bit like the neck of a goose and therefore they are also called "Goose Neck Relays". Hundreds of thousands were made by Bunnell, MESCO, Western Electric, and many other manufacturers, so they are VERY common. [174]

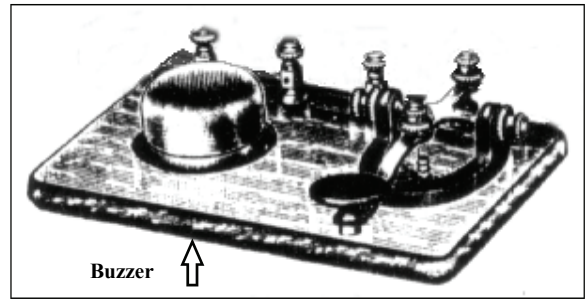


**Duplex, Quadruplex, and Repeating Relays: ( 1881 - 1950's )**
Dozens of different schemes to allow several telegraph messages to be transmitted and received simultaneously on a single circuit were developed. Each scheme required a complex relay with intricate and interacting contacts. Since very few people now understand these elegant circuits, their value remains low. [176]



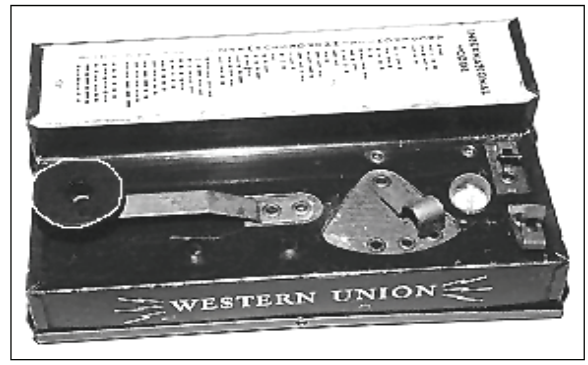
**Registers: ( 1881 - 1950's )**
Wind-up registers from this period were made by Bunnell, Tillotson, and Foote-Pierson. Many were used in fire alarm systems to record the fire alarm signals in ink on permanent paper tape. Since many were not used in telegraph systems, they sell for low prices. [178] Gamewell and Roland made registers and very telegraph-like keys and relays that were used only for fire alarm systems and have very little value to telegraph collectors. [178a]

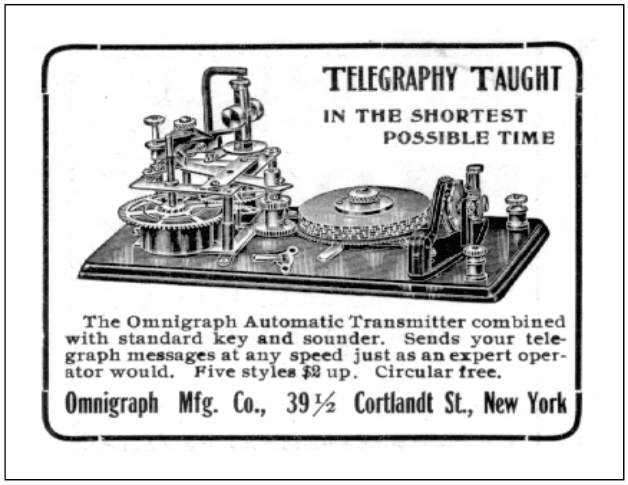
**Code Practice Sets: ( 1880's - 1950's )**
Many of the less elaborate KOB sets discussed above were also used for teaching and practicing sending and receiving the code. The most frequently used practice sets were the BEEKO models which were inexpensive to produce and purchase. As wireless and then radio telegraph communication became popular, Key and sounder practice sets were replaced with **Key and buzzer practice sets**: [190]




**Toy Code Practice Sets:**
In the first half of the Twentieth Century inexpensive telegraph sets were very popular toys. They were instrumental in starting many young people on the road to lifetime careers in telegraph.

Young people were fascinated by the ability to communicate over a set of wires. Toy companies, realizing the huge market for these sets, produced tens of thousands of very attractive toy practice sets with keys, buzzers, and lights. Names on the sets include: Western Union, (Right) and Fleron, (Below) and many others. Although they were very significant, so many thousands were made that they have never become very valuable. [192]




**Automatic Code-Sending Practice Devices:**

**The Omnigraph:**

A number of ingenious devices have been invented to help people learn and practice copying the code. One of the first of these was the Omnigraph. It used one or more aluminum disks with the code characters cut as notches in their outer rim. As the disk(s) rotated, the notches opened and closed an electrical contact which could be used to operate a sounder or buzzer. Omnigraphs were available in several models from simple 1 disk hand-cranked versions to 10 and 15 disk spring-driven models which automatically switched between disks. [194] The **Natrometer** and **Teleplex** are very similar spring driven code wheel practice devices. [194a]


**The Instructograph:**

The Instructograph was another device which was very widely used for code practice. It used a paper tape with holes punched into it which allowed electrical contacts to be closed and opened automatically. The contacts then activated a sounder used for land-line Morse Code training. Later models used a buzzer or built-in oscillator which produced a tone. These models were used to train radiotelegraph operators. Several versions were available from hand-wound spring motor versions with battery-powered oscillators to 110V models. They are VERY common and were in production as late as 1983. [198]

# SEMI-AUTOMATIC KEYS OR "BUGS"

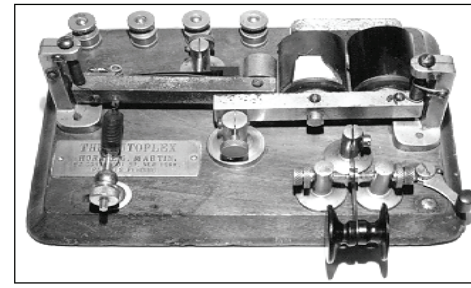
**Semi-Automatic Keys or "Bugs" ( 1902 - Present )**
By 1900, telegraph operators were handling tremendous amounts of traffic and there was a need for a way to send code more rapidly than was possible with a conventional hand key. Horace G. Martin's 1902 invention of the Semi-Automatic key dramatically increased the message sending capabilities of an operator by allowing dots to be made automatically. When his very broadly-written Vibroplex patent ran out in the 1920's many other manufacturers began making bugs.

**Identification of Bugs:**
Gil Schlehman, a Chicago collector with the world's largest bug collection containing over 300 DIFFERENT models of bugs says that there are plenty more out there. This book can't include all of them but I have included most of the bugs that you are likely to find as well as lists and references that will help identify most of the others.

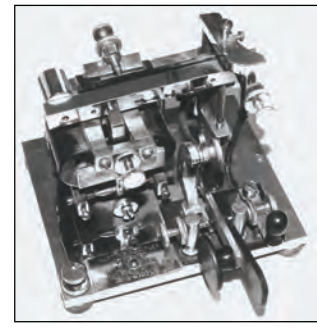
Please see the bibliography for Bill Holly-K1BH's excellent **Vibroplex Book.** Most of these Vibroplex pictures are from his book and used with his permission.
John Ellwood has spent many years cataloging the serial numbers of Vibroplex bugs. Information from his list is included in this book and helps to date the keys. The entire list is in Tom French's excellent **book on Vibroplex**. Neil McEwen's **Bug Makers List** and Doug Seneker's **List of the Known Bugs** also add a great deal of information.

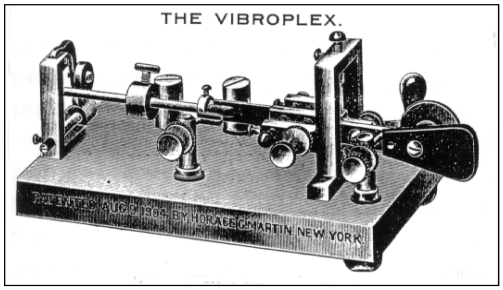
**"Bug" Collectors and "Bug" Values:**
Many collectors specialize in Bugs because of their historical importance and mechanical complexity. In general, the OLDER and RARER the bug, the more it is worth although some bugs are worth much more than this formula would suggest. I have tried to explain special bug pricing criteria along with each bug if it does not follow the "OLDER and RARER" guideline.

**The Autoplex: ( 1902 )**
In 1902, Horace G. Martin patented the first telegraph key capable of making dots automatically. The Autoplex was not very convenient because it required the use of batteries to power its mechanism, but it was the first of a long line of semi-automatic keys designed to increase an operators ability to send fast code. Very rare. [200]
(The Gil Schlehman - K9WDY collection.)



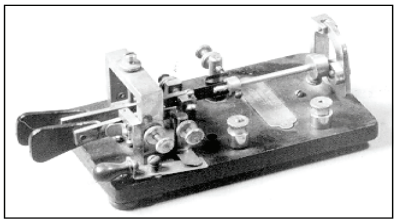
**The Metal Autoplex: (1904)**
In 1904, Horace Martin began manufacture of an all-metal Autoplex. The heavy metal bar running from right to left across the top of the key was made to vibrate and produce dots by the two coils which were energized by batteries. Not very many of these keys were made and they are very hard to find. [202]
(The Russ Kleinman WA5Y collection.)



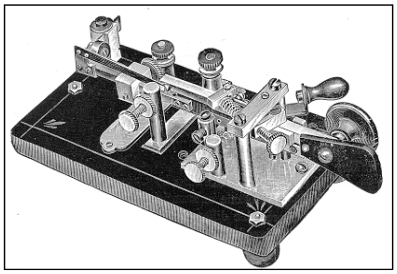



**The Vibroplex "Original":**
**( 1904 - present )**
Martin's next invention was a key that made dots automatically with a totally mechanical vibrating mechanism. Named the "Original", it has remained virtually unchanged to the present. 3-1/2 inch-wide base. Its value depends on its age as shown by its serial number. Earliest: s/n under 1000 [204]. Recent: s/n greater than 200,000 [204a] (K1BH picture)

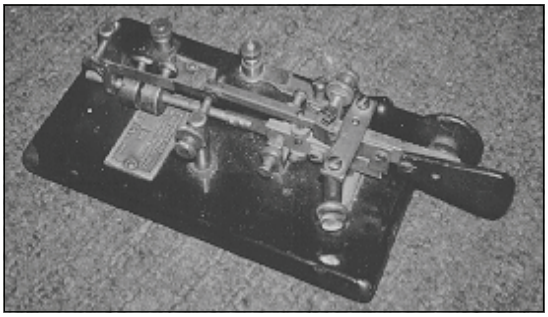
**"Deluxe" Model and Colored-Base Vibroplex Keys:**
Vibroplex keys were available in "standard" models with black Japanned finish and later (around 1933) wrinkle-finished black. They were also available with Nickel and later Chrome-plated bases and with colored bases. (During the 1950's some of the chrome finish was particularly susceptible to pitting and 1950's Vibroplex keys have often been replated.) Deluxe and Colored-Base Vibroplex keys are worth about 20% more than standard models.



**Vibroplex "Double Lever: ( 1907 - 1925 )**
This key has separate levers for the dot and dash functions. It has a very light, crisp "feel". 3-1/2 inch wide base. [208]
(Bill Holly - K1BH photo.)

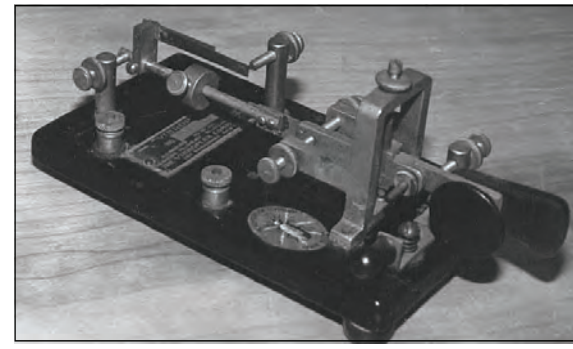


**Vibroplex Model "X"**
**Square Shaft Model:**
**"Single Lever" also called "Single Contact" and "Single Point" (1911 - 1923 )**
This key has an intricate mechanism which allows a single set of contacts to make both the automatic dots and the dashes. The first model "X" keys had square vibrating shafts. 3-1/2 inch wide base. [212]

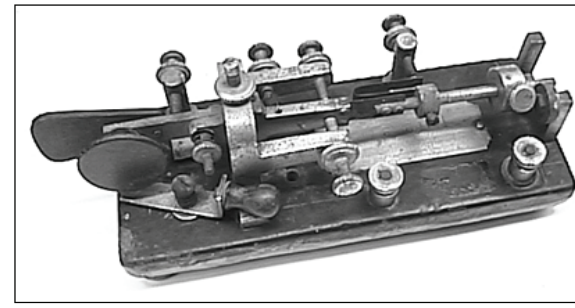


**Vibroplex Model "X"**
**Round Shaft, (also called "Improved" Model:)**
This key is similar to the square shaft version and uses a single set of contacts for both dots and dashes. The vibrating shaft, however, is round rather than square. [213]

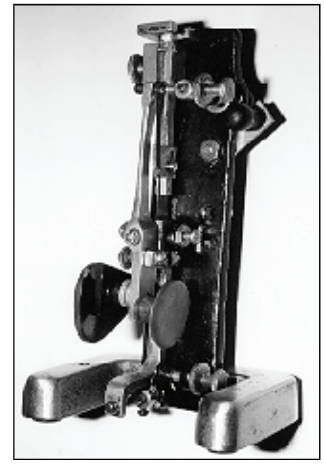
**Vibroplex “Pseudo-X”:** This key is basically a Vibroplex Original but it uses the Round-Shaft Model “X” damper, dot spring, and dot contact. 3-1/2” wide. [214].
This very rare left-handed example is owned by Ed Biter - NS3E. [215]



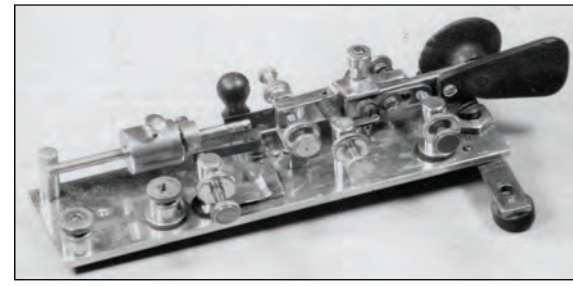
**Vibroplex No. “4” -**
**Blue Racer:**
**( 1914 - 1966 )**
This key was designed to be carried easily in a pocket. It is similar in design to the Original but the base is only 2-1/2 inches wide. Early [216] Late [216a]

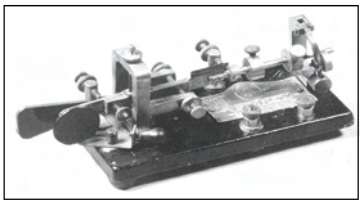


**Vibroplex “Vertical”,**
**or “Upright”,**
**or “Wire Chief’s Key”:**
**( 1917 - 1919 )**
Responding to the need for a key that took up very little of the space on top of the table of a busy wire chief, Vibroplex designed a vertically-oriented version of their Model “X”. It was nicknamed the “Wire Chief’s Key”. Since they are very hard to find, Vibroplex must not have been able to sell very many of them. [220]

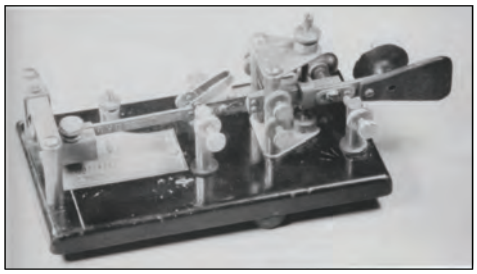


**Vibroplex Midget:**
**( 1918 - 1920 )**
There are VERY few examples of this tiny pocket-sized key. It was built on a thin, 1-1/2 inch wide base which required an articulated rear leg for stability. [224] (K1BH photo)

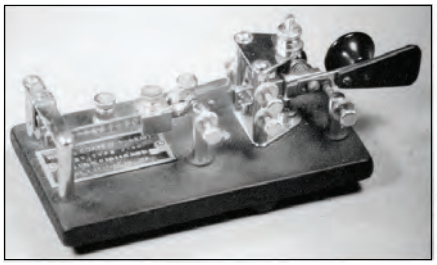




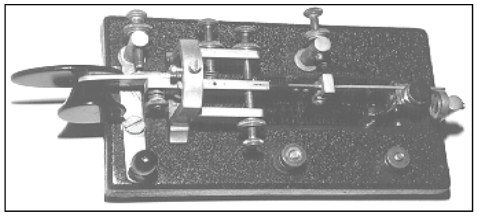
**Vibroplex Junior: ( 1920 - 1939 )**
This is an intermediate sized key which can be easily identified by it's 3-inch wide base and "Original" mechanism. It was one of the Vibroplex keys that were made with Blue, Green, Red, and Black colored bases. [226] (K1BH Photograph)



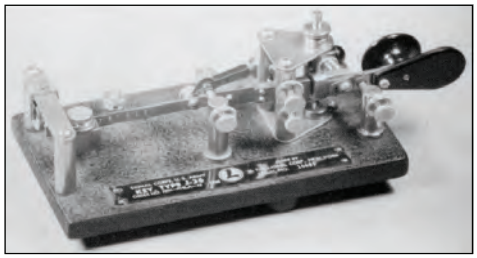
**Vibroplex No. 6 "Lightning":**
**(1927- 1980 )**
This simple key has a flat, calibrated vibrating lever and "M" shaped damper. It has a nice crisp feel and was, and is, very popular. It has a 3-1/2 inch wide base. A version of it called the J-36 was used by the military in WW-II. [228] (K1BH)



**Vibroplex J-36 ( 1941 - 1945 )**
This is the military J-36 version of the Vibroplex Lightning bug - (see above). It has a 3-1/2 inch wide base. [230]
(Bill Holly - K1BH photograph.)

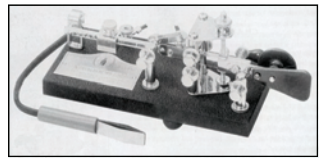


**Bunnell J-36: ( 1941 - 1945 )**
During WW-II, the J. H. Bunnell Co. manufactured their own version of the J-36 bug. [232]

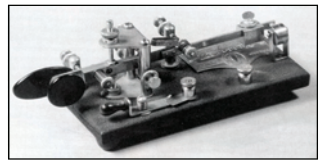


**Lionel J-36: ( 1941 - 1945 )**
During WW-II, Vibroplex could not keep up with the demand for bugs so The Lionel Electric Co., makers of Lionel Toy Electric Trains also manufactured J-36 keys using the Vibroplex Lightning design. [234] The plastic label often curls up in sun and heat. It is shown full-size below: If yours is missing seal this in plastic and glue it on your key. You may also download it from http://w1tp.com, print it, seal it, and glue it on your key.

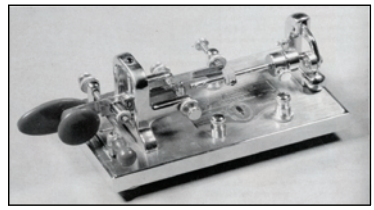
**Vibroplex Champion: ( 1939 - 1980 )**
Similar to the Lightning but has a simpler vertical damper. 3-1/2” wide[238](K1BH)



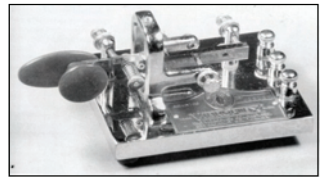
**Vibroplex Zephyr: (1939 - 1958 )**
A Champion on a narrower 3-inch wide base. [240] (Bill Holly, K1BH photo.)



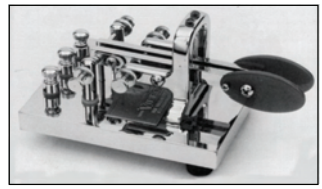
**Vibroplex Presentation:**
**( 1948 - present )**
This is an Original with a gold-plated plate on the base, all-chrome parts, and bright red trim and finger pieces. [242]
(Vibroplex Co. photo)



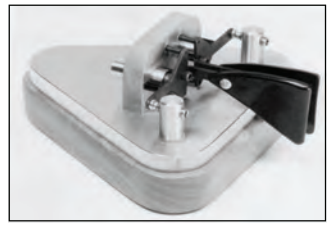
**Vibroplex Vibro-Keyer:**
**( 1960 - present )**
This is the “Classic” single lever paddle. [244] (Vibroplex Co. Photo)



**Vibroplex Iambic Keyer:**
**( 1979 - present )**
This is a revised version of #244 designed for use with iambic keyers. [246] (Vibroplex Co. photo)

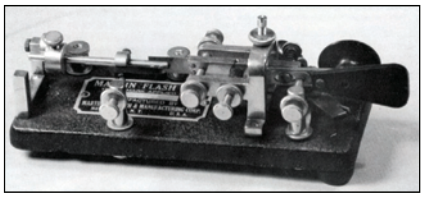


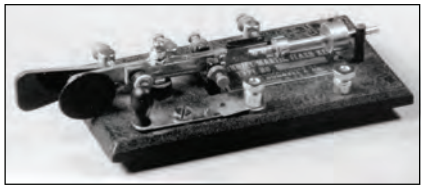
**Vibroplex Brass-Racer Iambic:**
**( 1982 - present )**
This is a brass-based Iambic keyer. The model EE-1 has a built-in electronic keyer chip. It is currently also being produced with a square base. [248] (Vibroplex Co. photo)



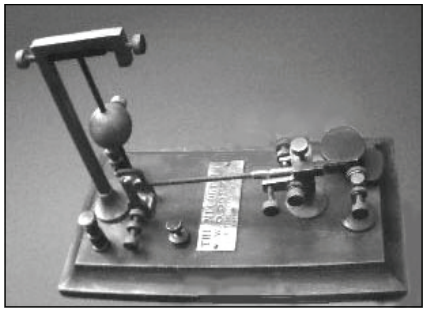
**Vibroplex Straight Key: (1996 - present )**
This is a lovely LARGE, nicely balanced straight key mounted within an original-like frame on heavy base.[250](Vibroplex.Photo)

**NOTE**: In 2000, Vibroplex announced their new BLUE RACER 2000 Which they call their ‘Millenium Bug’. It has already become a “classic”.
( For a **Current Vibroplex Catalog**,
visit: http://www.vibroplex.com )

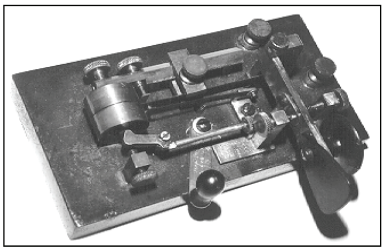


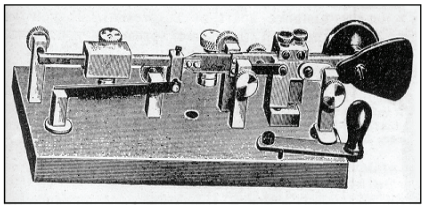


**Martin Leaves Vibroplex: The Bunnell-Martin Flash Keys: ( 1930's )**
In the 1930's Martin left The Vibroplex Co. and began manufacturing a line of narrow-based keys which were called Martin Flash keys and then Bunnell-Martin Flash Keys after Martin sold his interest in them. [252] (K1BH photos)



**Mecograph Bugs Try to Avoid Martin's Patent: ( 1906 - 1913 )**
Martin's original patent was so broadly written that it covered just about every conceivable method of automatically making dots. However a clever 1906 patent by Coffee did not infringe on Martin's patent and led to the development of the Coffee Vertical key. This only known example of the priceless key is owned by collector Russ Kleinman - WA5Y. [254]

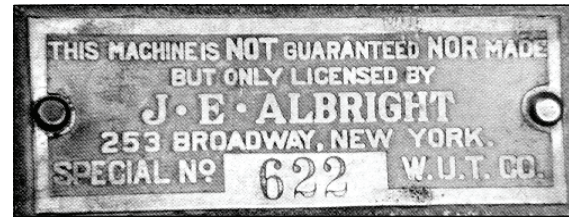




**Mecograph Right-Angle and Straight Bugs: ( 1907 - 1913 )**
Since Vibroplex dots were made by TENSIONING a spring, in order to avoid infringing on Martin's patent, Coffee, and then Benjamin Bellows invented a key that made dots by RELEASING tension on a spring. Bellows manufactured these "Mecograph" keys in a right-angle [256] design (Left photograph). He also manufactured a hard-to-find straight version [258] (Right Photograph) until Vibroplex bought his company after his death in 1913 and ended production of his keys. ([258] is a Bill Holly, K1BH picture)

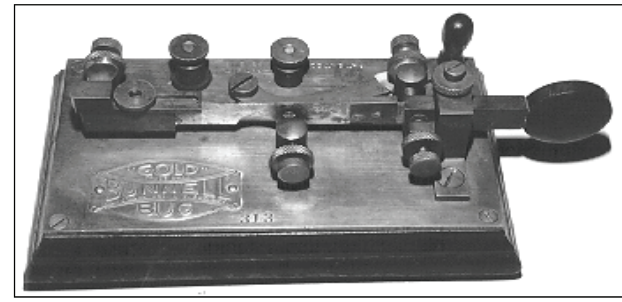
**Patent Infringement From MANY Companies: ( 1912 - 1920's )**
Semi-automatic bugs were so popular that many companies began manufacturing blatant copies of Martin's patented Vibroplex keys. Some of these companies were: Dunn (Dunnduplex), MacDonald, Mt. Auburn Specialty Co, O. M. Thomas Electric Co., A to Z Electric Novelty Co., etc. J. E. Albright, as Martin's agent took decisive legal action against all of these companies and put all of them out of business. These "illegal" keys do not have much value to most collectors. [260]

**J. E. Albright "Licensed" Bugs / "Legal" Bugs: ( 1912 - 1920's )**
Although the companies that made the Non-Vibroplex keys were forced out of business, many operators continued to use them and Albright convinced the companies that employed these operators that "Vibroplex" keys were the only "Legitimate" bugs. Rather than outlaw the use of all of these bugs, the companies insisted that each one be "inspected" for quality of operation and, if it passed, it could become a "LICENSED BUG" if the owner purchased a license tag from Albright.
The licenses cost $2 and read: THIS MACHINE IS NOT GUARANTEED NOR MADE BUT ONLY LICENSED BY J. E. ALBRIGHT. "Licensed" bugs were nicknamed "The Legal Bug", or "The Albright Bug". [262]

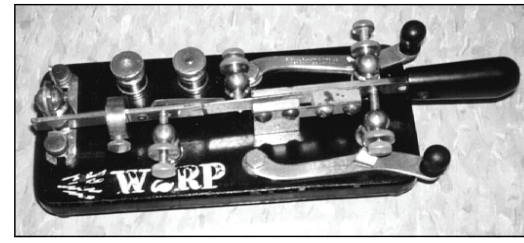



(This photograph and most of the Vibroplex bug photos are used with permission, from Bill Holly's important and scholarly book on Vibroplex which is now out of print.)

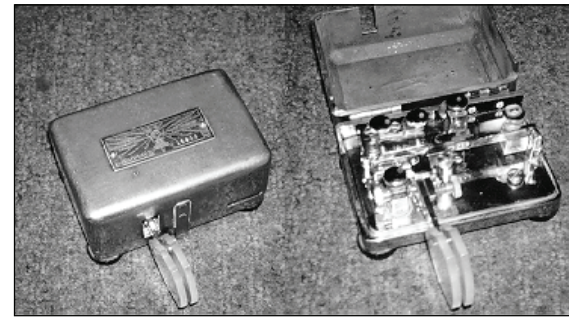
**Bunnell's "Gold Bug": (1922 - )**
As Martin's patent was running out, Bunnell began producing a very attractive bug which he hoped would attract buyers through it's appearance. It was made of brass with a gold-plated label and looked extremely impressive. The problem was that it was a TERRIBLE key with a mushy feel and it was so poorly received that only 1200 were made. Many were being given away free with any purchase over $50 by many suppliers. They are now hard to find. [264]



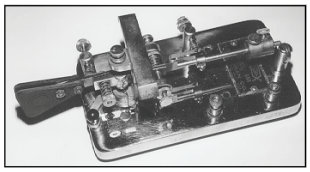

**The "Sematic" by Signal Electric Co.**
**( 1920's - )**
This interesting key combined a very good sideswiper and a bug. It had a clip to secure the vibrating lever when it was being used as a sideswiper, and a circuit-closing lever on each side. [266] (W2PM key)



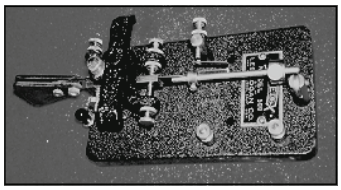

**The "Ultimate" or "73" Bug:**
**( 1925 - )**
This truly pocket-sized right-angle bug with a cover over the mechanism became quite popular during the late 1920's. Several models were made. Scarce. [268]



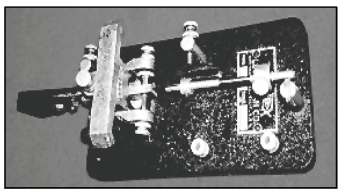
**The Logan and then Johnson "Speed-X" Bugs: ( 1920's - )**
The Les Logan Company (Later taken over by the E. F. Johnson Co.) made a popular and inexpensive line of bugs.



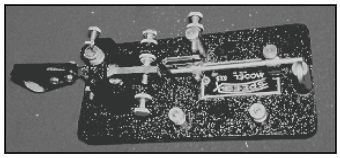
**The Speed-X Model 501**
This is the Speed-X "Professional Model" It has a chromium plated steel base and chromium plated brass mechanism with a "T"-shaped frame for easy carrying. [270]



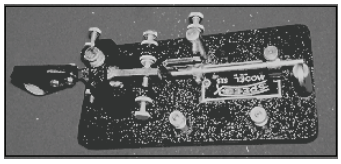
**The Speed-X Model 500**
This is the Speed-X "Standard Model" It has a black wrinkle baked enamel finish and the "T"-shaped frame.[270a]



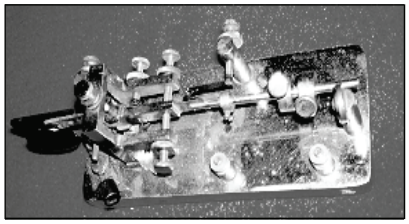
**The Speed-X Model 500 (Variant)**
This variant had a chromium plated brass "T"-shaped easy-carrying frame on the black wrinkle baked enamel base.[270b]

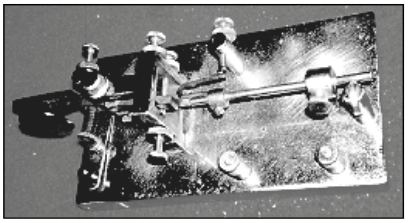


**The Speed-X Model 510 (Junior)**
A pocket-sized "T"-less version. [270c]

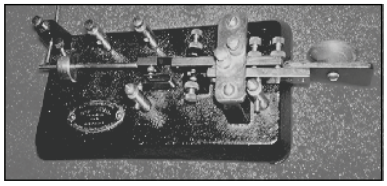


**The Speed-X Model 515 Amateur Model**
A full-size model without the "T"-frame. [270d]





**Early unlabeled** chrome-based versions of the Speed-X keys. [272, 272a]



**The "Go-Devil"**
Several models of this key were made by A. H. Emery in Poughkeepsie, New York. It is believed that only about 200 of each model were produced. [274]

**Theodore McElroy’s Keys: ( 1934 - 1942 )**
Theodore McElroy, who held the record as the world’s fastest telegrapher, had copied code at 75.2 words-per-minute during a well attended contest in 1939. He cast his claim to being the “Worlds Fastest Telegrapher” into the base of the earlier models of a line of keys that were interesting and innovative.

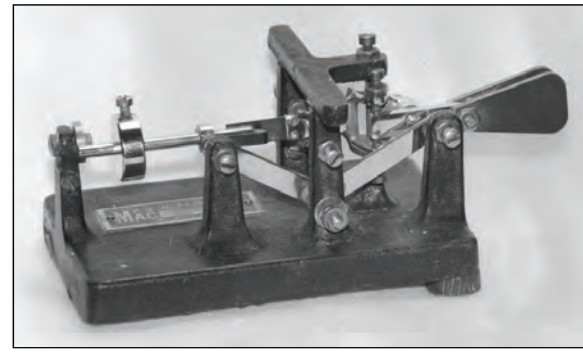

**The inscription reads:**
(In Telegrapher’s short hand)
PAT APP FOR 1934. SEMI-AUMC TGH & RDO CODE XTR. MAC-KEY. MFD AJD & GA BY T R McELROY. WLDS FASTEST RDO TGHR. BOSTON MASS

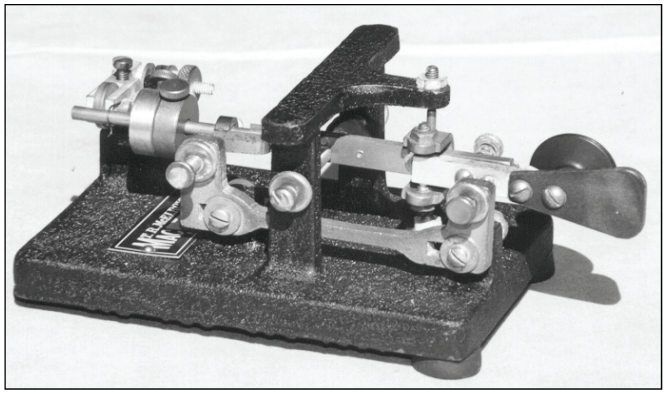
(Translation: Patent applied for 1934. Semi-automatic Telegraph and Radio Code Transmitter. Mac-key Manufactured, Adjusted, and Guaranteed by T. R. McElroy. World’s Fastest Radio Telegrapher. Boston, Mass.)

**The McElroy “Mac-Keys”: ( 1934 - 1942 )**
The early Mac Keys were characterized by a “T” shaped frame that allowed them to be laid-over on their left side and used as straight keys. A small clip prevented the lever from vibrating when they were used in this way.

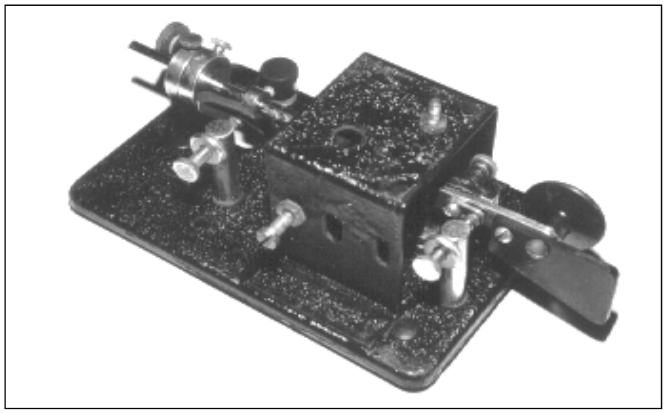
They went through many interesting changes in design as described in Tom French’s Book: “McElroy, World’s Champion Telegrapher”. Many of the model changes were not identified as separately-named models and are identified, instead, by their date of manufacture. Most of the following pictures and details about design features are used with permission from Tom French’s book. (See Bibliography.)

**The Earliest McElroy Models:**
**( 1934 and 1935 )**
McElroy’s first models have diagonal steel bars that carry the dot and dash contact voltages. In the 1934 model [278] (Not shown), the dot contact was not supported by a casting. It was just located at the end of the diagonal steel bar.
In the 1935 model (shown) [278a], the dot contact was supported by the metal casting. (Tom French - W1IMQ photograph.)

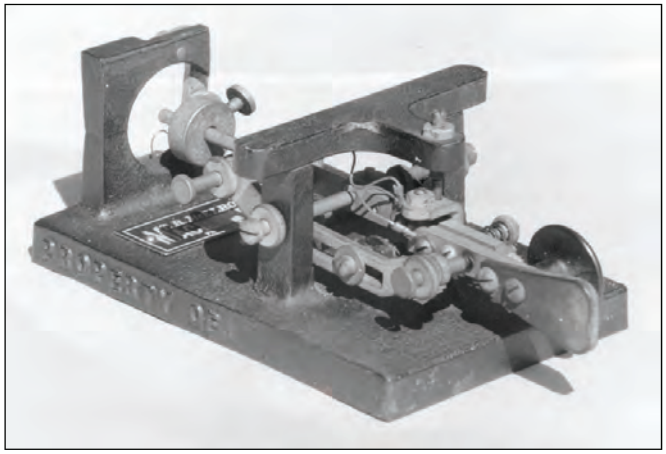




**The 1936 McElroy Mac-Keys:**
(The last models with cast lettering under the base.)
These keys are characterized by an "L"-shaped bar which connects and supports the dot and dash contacts and carries the electrical current from them. There are several minor refinements of this basic design. [278b] (Tom French - W1IMQ photograph.)

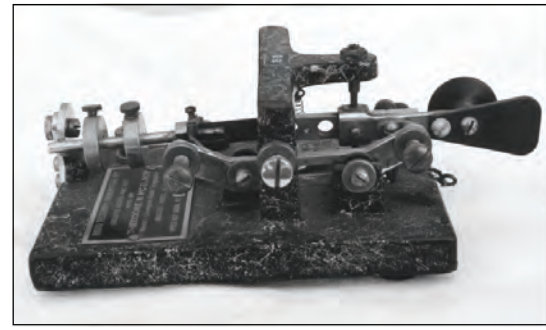


**The McElroy "Junior": ( 1936 - 1938 )**
This key was designed to be a very inexpensive model that anyone could afford to own. Several minor refinements were made in its design as described by Tom French in his book on McElroy. The "Junior" was made of sheet metal and apparently, very few were sold because they are EXTREMELY hard to find. [280]



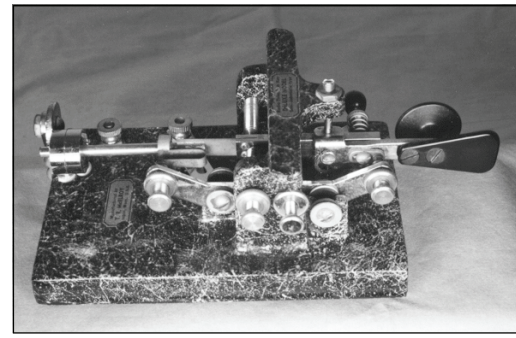
**The 1937 McElroy Mac-Keys:**
(The first models without cast letters under base.)
These keys are characterized by a "U"-shaped bar which connects and supports the dot and dash contacts and carries the electrical current from them. A U.S.Navy model, CMK-26009 [281] (Shown) is hard to find. A civilian model [281a] is more common. (Tom French - W1IMQ photograph.)

**The 1938 McElroy Mac-Keys:**
Like the 1937 models, these keys also have the “U”-shaped bar which connects and supports the dot and dash contacts and carries the electrical current from them. They also have the larger nameplate. They were available in a “Standard” black wrinkle-finish paint [281b], and in a “Deluxe Marbelite” finish (shown) with larger adjustment screws, a circuit closing switch, and a “dot stabilizing” pre-tensioner clip on the dot spring. The deluxe version with the Marbelite finish (made by spraying a random pattern of white paint to simulate marble) is considered quite attractive and commands a premium price among collectors. [281c]
(Tom French—W1IMQ photograph & information.)

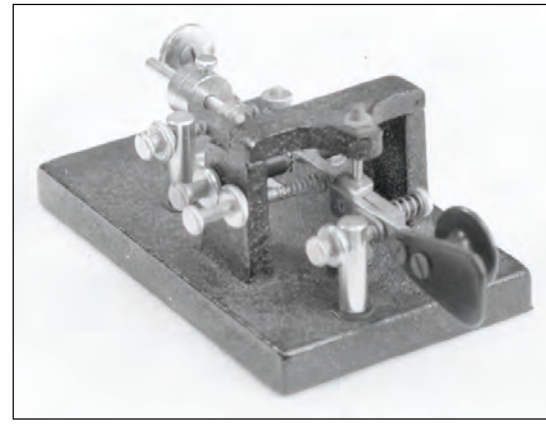


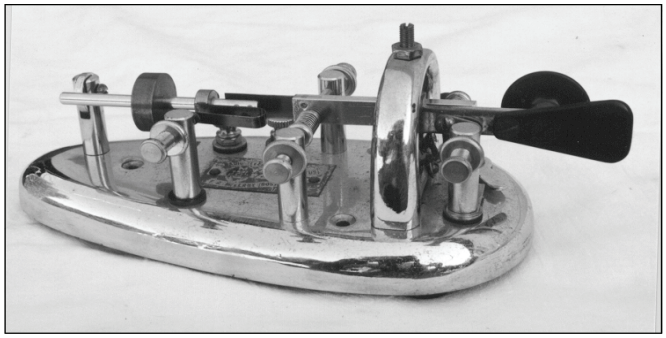
**The 1939 McElroy Mac-Keys: (Not Shown)**
These keys are very similar to the 1938 model but have a different base casting which includes a forward extension of the frame that supports a dot-lever spring adjustment screw on the left side next to the lever stop screw. This extension can be seen in the picture of the 1940 model 500 which is shown below. Standard 1939 model [281d]. “Deluxe Marbelite” 1939 model: [281e]. (Tom French information.)

**The McElroy 1940**
**Models 500 and 600:**
These keys are similar to the 1939 models but have decals instead of name plates. The model 500 has a “Standard” finish, [281f] and the model 600 has a “Deluxe Marbelite” finish. [281g] (shown) (Tom French - W1IMQ photo.)

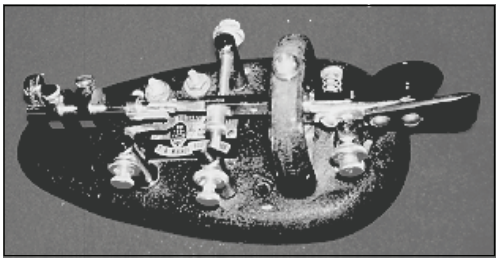


**The McElroy 1941**
**Model A-400**
**“Amateur Model”:**
In a considerable departure from his previous bugs, McElroy designed this key without the “T” frame and with the more conventional Vibroplex-like vertical support posts for the dot and dash contacts. It was only available in the “Standard” finish. [281h]. (Tom French photo.)

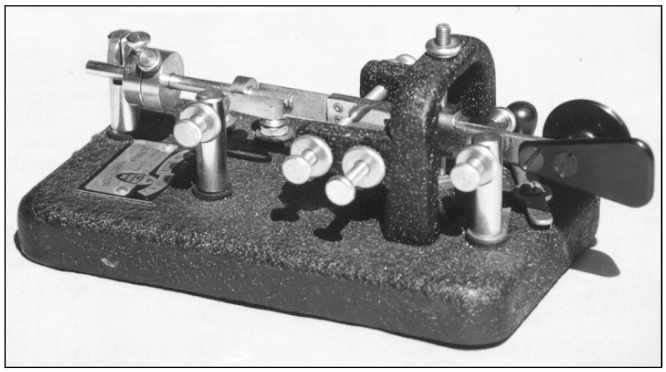




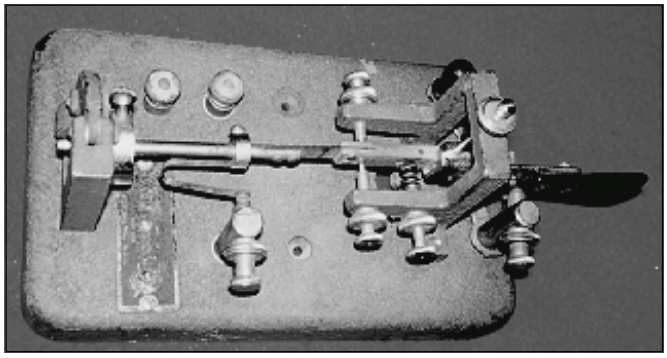
**The McElroy Oval-Based S-600 Super Stream-Speed Bug:**
**(1941 - 1942 )**
This beautiful chrome-plated, oval-based bug is a must for any serious collector and, happily, there are quite a few of them around. [282]
(Tom French photo.)



This rare **All-Black** wrinkle-finish version of the **S-600** may be the only one manufactured. Unique keys such as this are hard to find and command high prices from collectors who specialize in McElroy keys. [282a]

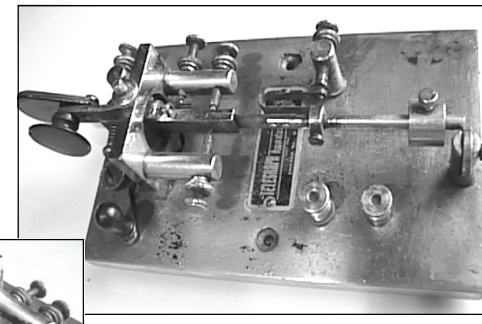


**The McElroy P-500 Bug:**
**(1941 - 1942)**
This key looks like an All-Black wrinkle finished Vibroplex original. [284a]. It was also made in Grey wrinkle finish. [284] (Tom French Photo.)

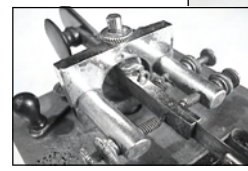


**The McElroy CP-500 Bug:**
**(1942 )**
The CP-500 looks like a Vibroplex Original because it has a rectangular rather than rounded frame. Black wrinkle finish [284b]. Grey wrinkle finish [284c].

**McElroy Telegraph Apparatus Company (TAC) CP-510 / 810 Bugs: (1936-1938)**



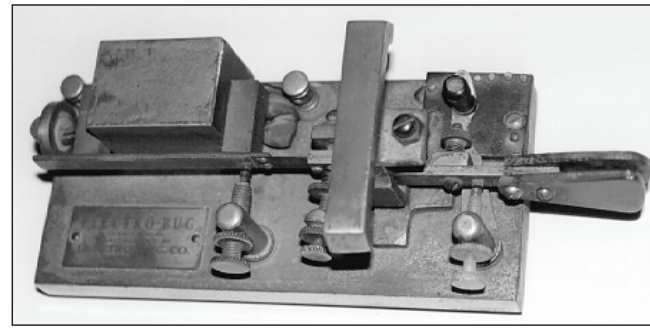
The Telegraph Apparatus Company (TAC) was one of Ted McElroy’s other companies. The labels on these keys read “Not Inc.” to show that it was not incorporated. TAC keys are characterized by a frame with a large circular hole drilled through it for the lever. They are often called “Hole-in-the-Wall” bugs because of the circular hole. They are quite common. Model CP-810 (All-chromed): [286] Model CP-510 (Black base): [286a]



**The McElroy Generic Label:**

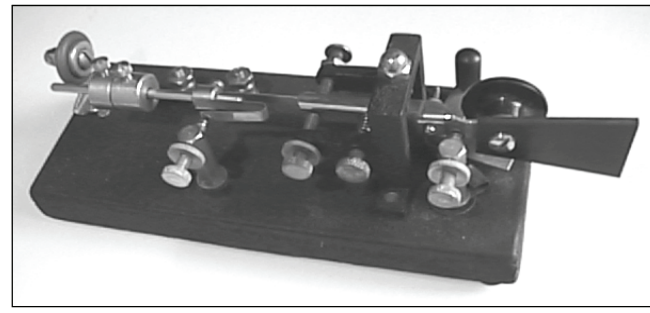

This label was used to identify many of McElroy’s later keys and code practice oscillators.

**The Electro Bug: ( 1930’s - )**

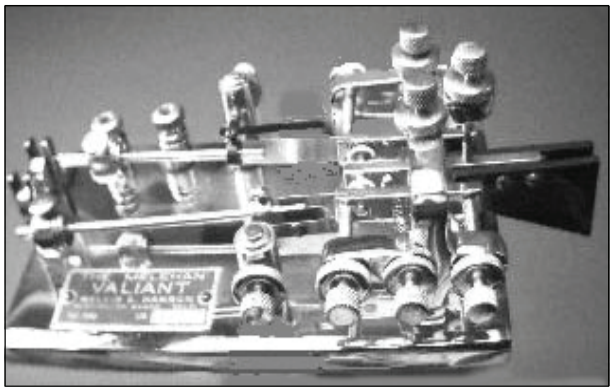


The Electro Manufacturing Company made this interesting key in two models. The Junior is a conventional bug. [288] The one shown uses electric current from the keyed circuit to activate an electromagnet which causes the lever to vibrate. A switch selects various current taps to adjust for different keyed circuits. Nickel-Plated base: [288a]. Black base: [288b].

**The Electric Specialty Co. Kit” Bug: ( 1939 - )**

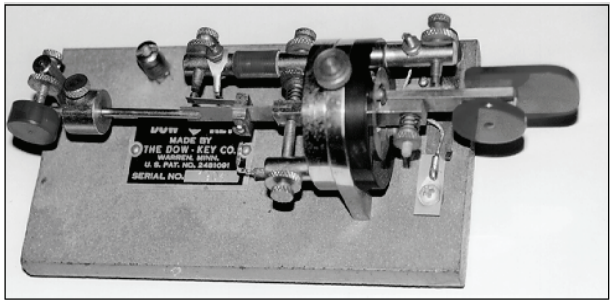


This is the only bug that was offered in kit form. Also called the “Cedar Rapids Bug”, it was advertised as the “Radio Speed Bug” and sold primarily to amateur radio operators for about $ 4.00. They are fairly common. [290]

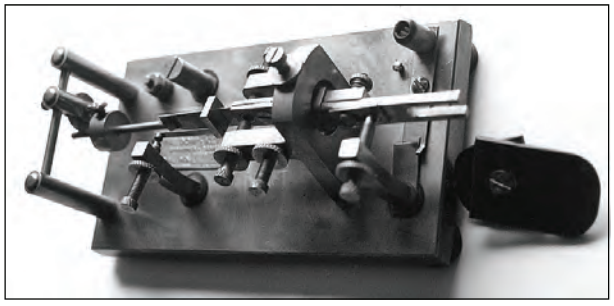



**The Melehan Valiant Full-Automatic Bug: ( 1939 - )**
Mel Hansen (W6MFY) manufactured this rare and complex bug. Actually consisting of two bugs on the same base, it was capable of making dots AND dashes automatically. They are very hard to find! This one belongs to collector Russ Keinman - WA5Y. [292]

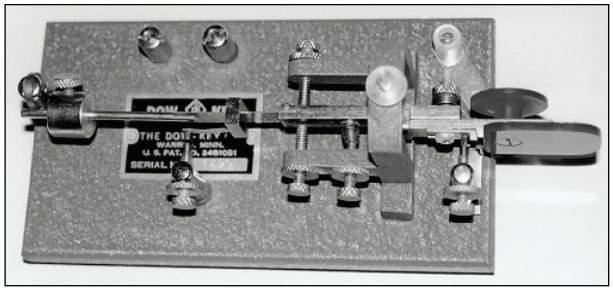
**The Canadian Dow-Key Bugs: (1949 - 1950's)**
These bugs were built by Paul Dow of Winnipeg, Manitoba, Canada.




**Rotating-Frame "Universal" Model :**
This Dow Key bug had a frame which could be rotated to allow it to be used as a straight key or even a left-handed bug. [294]

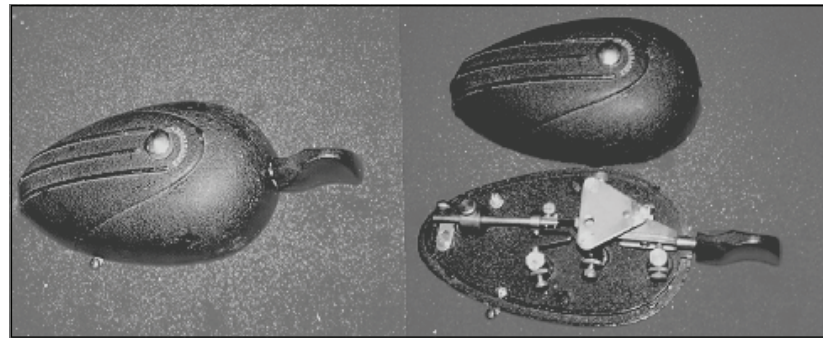


**The "Bent-Frame" Model.**
This Dow Key bug had a frame that was permanently bent about 30 degrees to the right. The contacts were also bent to the right. It had a polished brass base and mechanism. [294a]



**The Conventional Model. (Also called "Standard Model")**
This Dow Key bug was very similar in design to the classic Vibroplex Original. [294b]

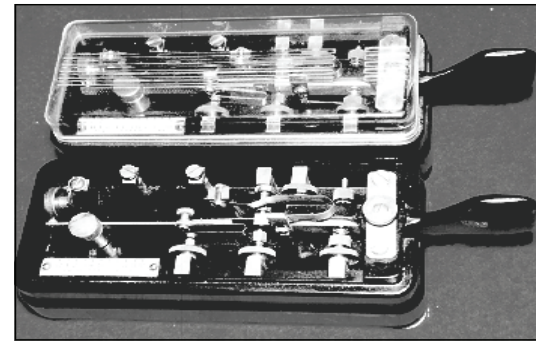
**The British Eddystone Bug: (1948)**



This unusual bug was manufactured on an oval base and has a cover which gives it a very distinctive look. The paddle is contoured and provides a very nice “feel.”

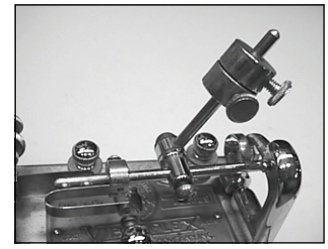
It is widely believed that only 500 of these bugs were ever made but I have seen and owned so many of them that I believe this number may be on the low side. [295]

**The Skillman Japanese Bugs:**
**(Also called “Jelectro”)( 1949 - )**



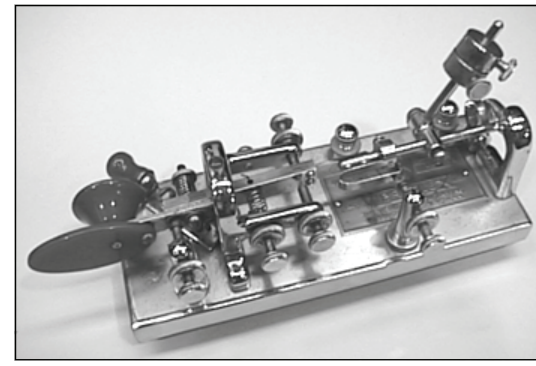
Tens of thousands of these bugs were made by Swallow, Skilman, and Hi-Mound, imported into this country, and sold by Lafayette Radio, Radio Shack, and many other retailers. They were extremely inexpensive but have a nice crisp feel when properly adjusted. Very common. [296]

**The Hills Vari-Speed attachment:**



This device was sold by A. Hills of Dayton, Ohio. It was designed to allow the speed of a bug to be changed quickly while the operator was sending by simply swinging the weights forward or back. They are quite difficult to find and it is nice to have one in any bug collection. [297]

**Left-Handed Bugs:**

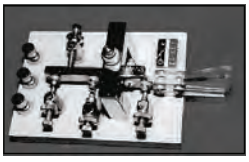


Left handed versions of most bugs turn up occasionally. Since very few were made, they generally double the value of a bug. This picture shows a left-handed Vibroplex Blue Racer Presentation Model. [298]

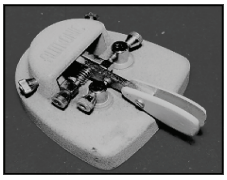
(A Hills Vari-Speed is shown mounted on the vibrating shaft.)


**Electronic Keyers and Paddles: (1940's - present)**
Many different kinds of electronic keyers were marketed during this time interval. With very few exceptions, they are too recent and common to qualify as collectibles. The solid-state ones by Heathkit, Palomar, MFJ, Ten-Tec, etc. are very common. [302]

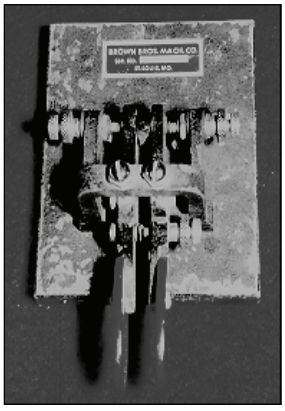
**The Mon-Key Electronic Keyer: ( 1947-1958 )**
This early vacuum tube type electronic keyer was one of the first to be made. It was made by the Electric Eye Equipment Co. It used a resistive line cord and no transformer so the raw AC voltage on the keyer contacts could be deadly even though they were partially protected by a plastic cover. [304]



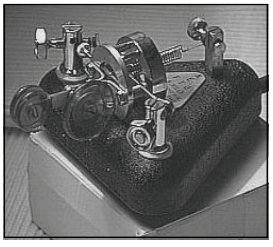
**El-Key Paddles: ( 1960's )**
These massive paddles are fairly hard to find. They were made by Robert Poucel W2AYJ on Long Island. (Black and Grey bases) [310]



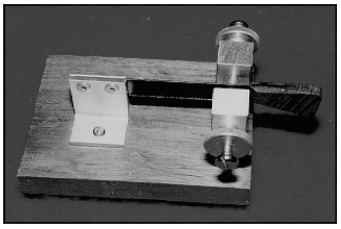
**Autronic Paddles: ( 1960's )**
Several models of these interesting and complex paddles were made by Electrophysics Corp. of Newport Beach, CA. [320]



**Brown-Brothers Paddles: (right)**
Brown Brothers made paddles & paddle/straight key combinations. This is one of the rarer ones. [330] (Right)



**FYO Paddles:**
These are hard to find and VERY popular. Single [340] (Shown) and Double lever [341] models. were made. (W2PM collection)



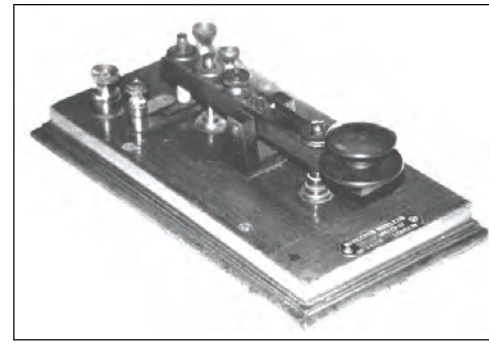
**Kungsimport Paddles:**
These extremely simple paddles were made using a hacksaw blade with the teeth still in place. [350]

**Other Paddles:**
Other modern paddles made by Bencher, Ham-Key, MFJ, Ten-Tec, etc. are Very common. [360]

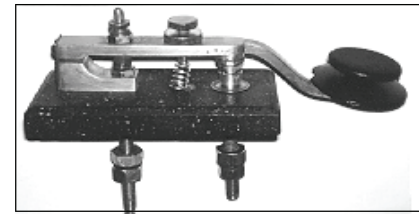
# SPARK AND WIRELESS KEYS

**SPARK AND WIRELESS KEYS ( 1900 - 1920's )**
Marconi's early spark transmitters used a transformer to step up the low battery voltages in the primary to the high voltages in the secondary which were necessary to produce a spark that could radiate signals through the air. Telegraph keys were used to "key" the primary circuit. As the transmitters became bigger and the primary currents became higher, it was soon found that the tiny 1/32 inch contacts on land line keys could not carry the very high primary currents and quickly melted away.

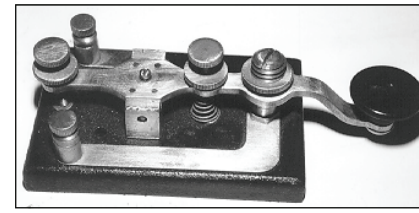
During this period, telegraph keys with larger and larger contacts were developed. These contacts were often made of silver and some could be unscrewed for easy replacement. Some of these large contacts were even equipped with cooling fins. Large spark keys are quite scarce. This is hard to explain since there were many thousands of transmitting stations.



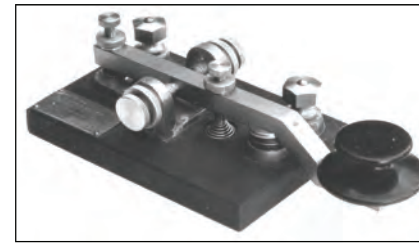
**Marconi Spark Key as Used on the Titanic: (1910 - 1920's)**
This lovely Marconi key is just like the ones used on the Titanic. It is made in the classic European style with a heavy straight lever and a tension or "pull-down" spring to keep the contacts separated until the operator pressed the key. [402] (W2PM collection)



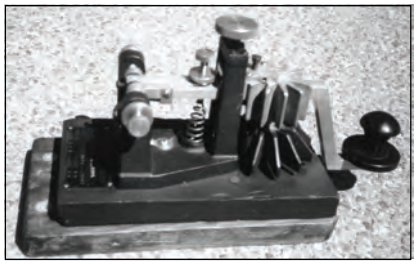
**Marconi Miniature Spark Key:**
This small key was used to operate some of the lower powered Marconi System transmitters. The long legs allowed it to be screwed to the operating table. [406]



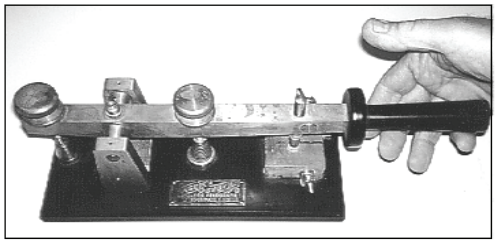
**Marconi Roadmap Spark Key:**
This small spark key was nicknamed the "roadmap key" because the parts are electrically interconnected by copper strips that look a little like like a road map. [408]



**Counterfeit / Fake Marconi Spark Key:**
This key is a near-perfect reproduction of a Marconi CM-425 Spark Key. It was made by a man who specializes in making reproduction spark keys. The major difference between this counterfeit key [410] and a genuine Marconi key [412] is that the label of this key has engraved lettering and a Marconi key has embossed lettering. The only counterfeit keys that have shown up so far have been Big, Valuable, (mostly Marconi) spark keys but this might change in the future as keys become more widely recognized and valued collectables.



**High Power Marconi Spark Key:**
This Huge key was designed to key the primary circuit of a 5 KW Navy spark transmitter. The oversize silver contacts have been surrounded with cooling fins to help dissipate the heat generated as they make and break the high current circuit. [414]
(From the Jim and Felicia Kreuzer Collection)

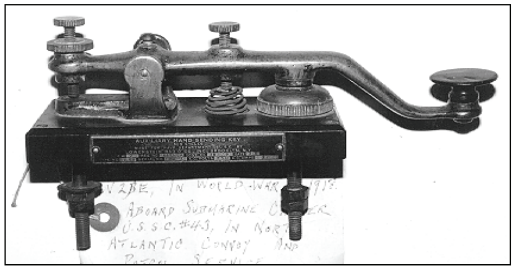


**Counterfeit Massie Spark Key:**
This massive and magnificent spark key [416] is a nearly exact copy of the real ones [418] which were used to key the powerful Massie System Spark Transmitters. It was sold as a genuine Massie key. It is one of the few counterfeit keys that have been reported. (Mostly Marconi spark keys).

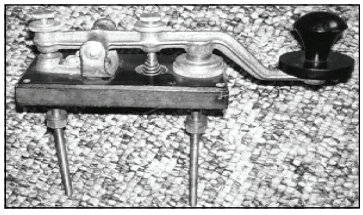

**The Counterfeit Massie Key Label:**
(The poor quality sand casting shows its a reproduction.)

**Massie Spark Key:**
A genuine Massey Spark Key
of different design [420](W2PM)

**NOTE: Please see Neal McEwen's explanation of the Navy Identification Code Schemes for a clarification of the SE and other Navy numbering systems. It is located on pages 85-86.**

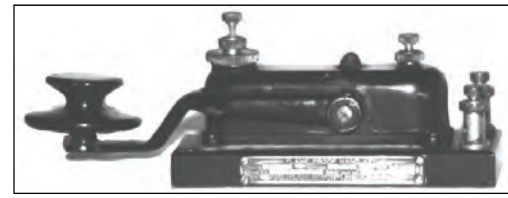


**U. S. Navy SE-68**
**Spark Key from WW-I:**
This key was used on a WW-I destroyer on anti-submarine patrol in the North Atlantic. [422]
Documentation of the history or "provenance" of a key generally adds about 30%-50% to its value.



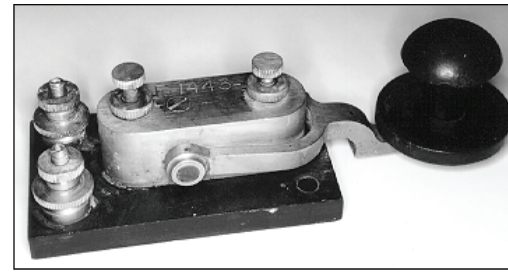
**U. S. Navy SE-68A-like Keys:**
A batch of these SE-68A-like keys were found new in the box in the Philadelphia Navy Base. [424] The ribbed cast lever is different from the classic SE-68 and SE-68A lever shown above.

**Wireless Specialties SE-653 Flameproof Spark Key:**
This unusual key is similar to the larger Marconi SE-86 Spark key.
It's contacts were enclosed within a metal cover to allow it to be used in explosive environments. [426] (W2PM Collection)

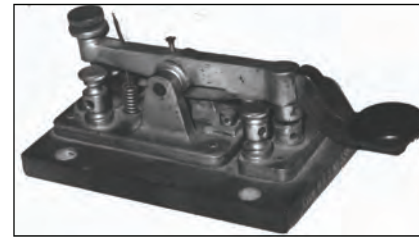


**Miniature**
**Wireless Specialties**
**Spark Key:**
This is a small key made by Wireless Specialties Co. It does not have any label but it appears in their literature. [428]

**U. S. Navy SE-1443A**
**Flameproof Spark Key:**
This is another small flameproof spark key made and used by the Navy. [430]
(W2PM collection)

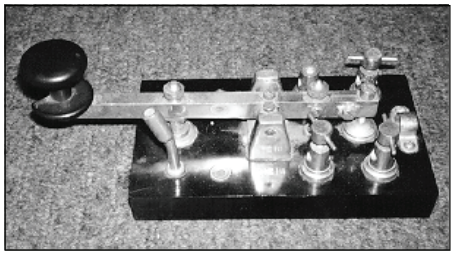


**Unusual German Spark Key:**
This massive high-current key is marked: H.T. 3 No. 3362. [432]
(W2PM collection)



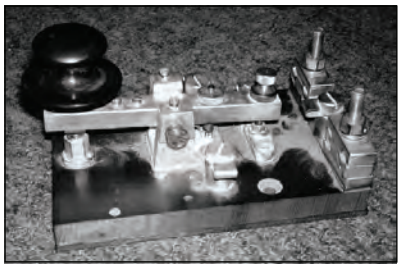
**Unusual German Spark Key:**
This small spark key measures just 4-1/2 inches long. It's lever and design is very similar to that of the key above. The purpose of the high wooden knob is not known for certain. It is possible that the key was used in German WW-I aircraft and that the high knob was easier to use by the heavily-gloved operator. [433]

**Federal Telegraph Co.**
**Navy Key:**
An unusual key made with a knob which is adjustable in height probably to allow telegraphers to use different operating styles. [434]
(W2PM collection)

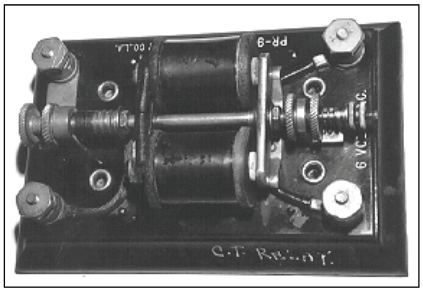


**Japanese Wireless Key:**
The straight lever design of this key has continued from the spark era, through WW-II to the present. This makes it difficult to tell when a particular example was made and used. If the key has a label, and If you can read Japanese, the key can be dated by reading the year of the emperor who was in power when it was built. [436] (w2pm collection) (The most recent models are made by Japanese Radio Corp., and carry the JRC Trademark-See #564.)

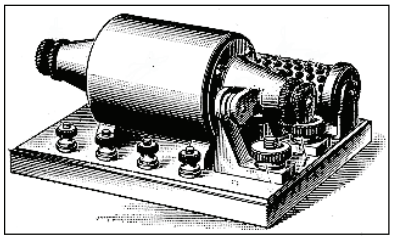
**British Air Ministry Key Type "D":**
This massive solid brass key has interesting, heavy, spring-mounted electrical contacts. As the key lever is depressed, the 1-1/2 inch silver contacts close and, at the same time, wipe diagonally against each other. This makes a more reliable contact and may reduce contact arcing. Light brown plastic cover. [438]



**British Admiralty (Navy) key:**
A massive Navy key with large contacts. [440] It was usually supplied with a pressed steel cover. (Pete Malvasi -W2PM)

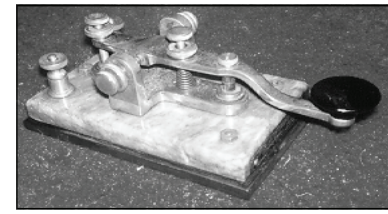


**Leach Spark Relay:**
The Leach Company made an extensive line of spark relays which were designed to key the high-current primaries of spark transmitters. These relays allowed telegraph keys with small contacts to key very high current circuits. The relays even made it possible for operators to use semi-automatic keys or bugs to key their transmitters. [442]

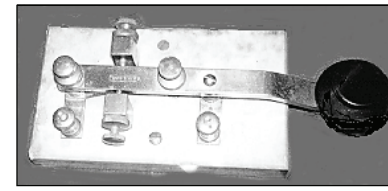


**Marconi Spark Relay:**
This is a keying relay which allowed small-contact hand keys to operate high powered spark transmitters. [444] Although relays generally have little value, a relay carrying the "Marconi" name brings much higher prices.

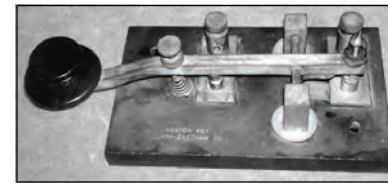
**Murdoch Spark Key:**
This marble based spark key is one of the several brands that were used to key relatively low power transmitters such as those used by Amateur Radio Operators. [446]



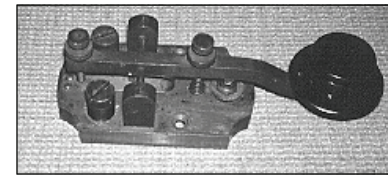
**A. W. Bowman Spark Key:**
This key was used by many amateur radio operators. It has a white marble base. It was sold as shown with the A.W.B. initials stamped on the lever. [448] It was also sold by Montgomery Ward, Sears, and other companies with no identifying marks. [448a]



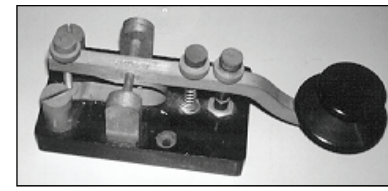
**Clapp-Eastham "Boston" Spark Key:**
This was the ultimate spark key that every Amateur Radio Operator wanted. It was sold on a black base [450] and on a lovely marble base much revered by collectors. [450a]



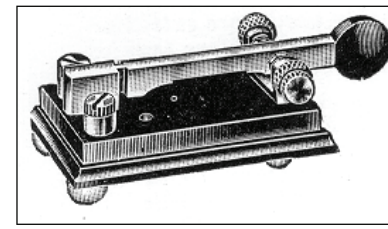
**Bunnell Spark Key:**
This Bunnell key had a nice looking brass base with Mica-insulation. Notice the copper strip which connects the lever to the base for high current applications. It was a popular key and many were sold. [452]



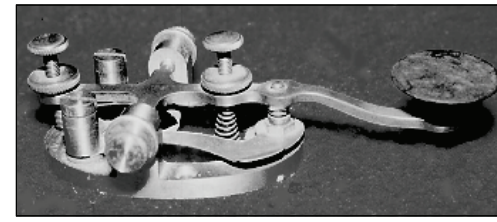
**Bunnell Spark Key:**
This key had a Black base and a copper current-carrying strip like the key above The contacts could be unscrewed for easy replacement. [454]

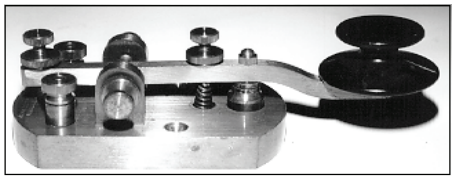


**Bunnell Wireless "Sideswiper":**
This hard to find key was similar to the land-line sideswiper designed to "cure" Telegrapher's Paralysis. It had large, heavy contacts to switch the high current primaries of the spark transmitters. The fact that it is so hard to find indicates that not very many were sold. [456]



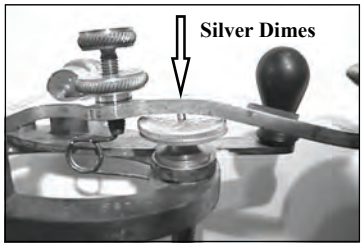
**Bunnell "Triumph Style" Wireless and Radio Key:**
Bunnell modified the land-line Triumph key for use in high current transmitter circuits. These keys have large contacts, a brass lever, and a copper strap between the base and the lever to carry the high current.Very Common. [458]

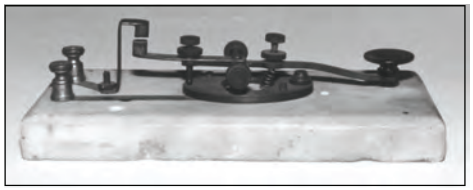




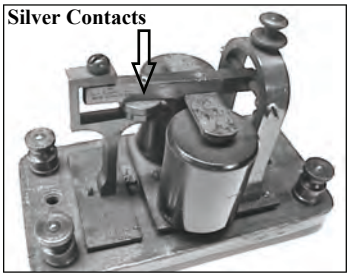
**Signal Electric Co. Spark Key:**
Also called the "Standard Wireless Key". An incredible number of keys with this design were made from the 1920's to the present. The earliest ones were designed for keying high current primaries of spark transmitters. They can be identified by their 1/4" contacts and the mica insulation under the brass base. [460]

**Homemade Spark Keys:**
**The "Dime Key":**
Amateur radio operators were usually short on funds. Although they dreamed of having a magnificent Clapp Eastham "Boston Key", after they had paid for the other parts of their spark transmitters, they simply couldn't afford one. Often they took an old land-line key and tried to use it instead. After they had burned the contacts all the way down, they would solder dimes to the remaining metal of the contacts. Since dimes were made of silver in those days, they made very good and durable contacts. The resulting keys were called "dime keys" and they are fairly common. [492]



**Another Homemade Spark Key:**
Amateur radio operators are known for their ingenuity. If they couldn't afford a fancy spark key with large silver contacts, they made one out of what was at hand. The lever of this early Western Electric land-line key was extended out and away from the operator and a set of large contacts was arranged to carry the heavy current and dissipate the heat. [496] (Gerry Maira, KA2MGE collection)




**A Bunnell Sounder that Became a Spark Relay:**
This Bunnell sounder has large silver contacts mounted on the armature and the anvil. They look as though they were factory installed but it is the only known example of such a modification and might have been done by Bunnell after it was made. [498]

# RADIOTELEGRAPH OR "CW" KEYS

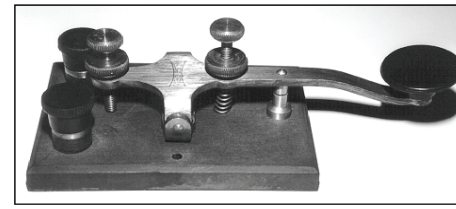
**RADIOTELEGRAPH OR "CW" KEYS: ( 1920's - present)**

**Radio Transmitters Replace Spark Transmitters:**
Spark Transmitters were outlawed in the early 1920's because their transmissions could not be confined to a single frequency. They generated a broad spectrum of signals that interfered with other stations. Radiotelegraph transmitters which generated a single frequency continuous wave (CW) signal replaced the spark transmitters.

**Radio Keys:**
Keying these radio transmitters required much less current and the keys could be smaller than those used for the spark rigs. Although keying currents were small, radio keys sometimes had a resistor/capacitor network built into their bases to reduce contact pitting and sparking and prolong contact life. Spark keys continued to be used for a while, of course, but they were gradually replaced by the smaller and cheaper radio keys.

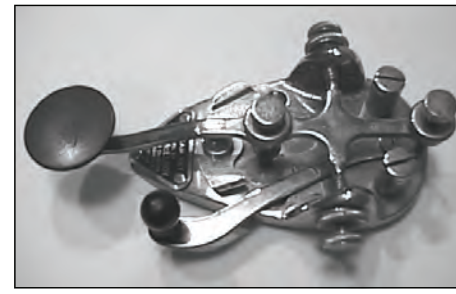
**The Marconi Radiotelegraph Key:**
Just as the Marconi Spark Key was the granddaddy of all spark keys, this magnificent Marconi Radio Key was the granddaddy of all radio keys. It's massive European-style straight lever, ball bearings, excellent balance, and a built-in r/c network made it an instant favorite. [502] (W2PM Collection) A cover in good condition adds at least 20% to it's value.

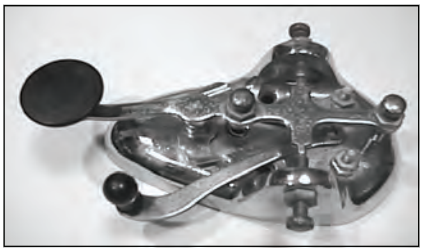
**Mignon Radio Key:**
This is a rare key [508] but it's design is typical of many radio keys produced in the 1920's - 1940's. [508a]



**McElroy Radio Keys:**
**( 1937 - 1984 )**
Ted McElroy manufactured a very popular line of radio keys which are thoroughly described in Tom French's book "McElroy" (see bibliography). Starting with a rectangular-based model, [520] he quickly shifted to an oval-based "Triumph-key" look-alike [522] and then introduced the first model of his VERY popular teardrop-shaped "Stream Key" in 1938.

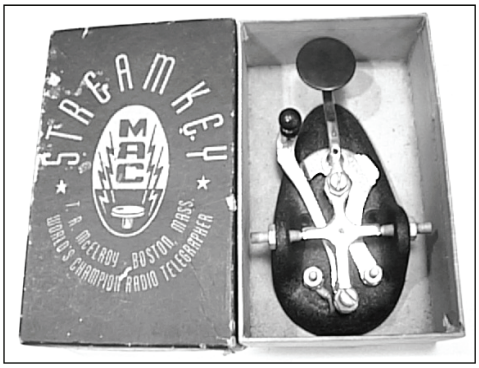
**McElroy Stream Keys: (First model)**
The first Stream Key had a chromed teardrop-shaped base with a label which reads: Stream Key. Mfg by T.R. McElroy World's Champion telegrapher, Boston,USA [524]



**McElroy Stream Keys: (2nd Models)**
All of these second models of the Stream Key had much more rounded teardrop-shaped bases with no labels.

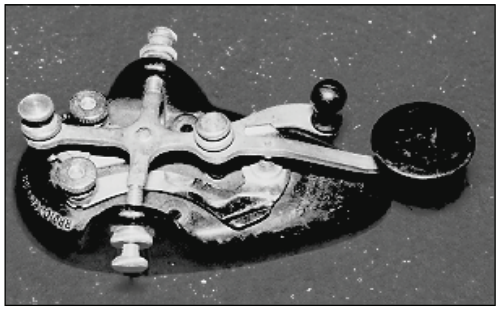
**The "Deluxe" Model 300:**
All parts were chrome plated. [526]



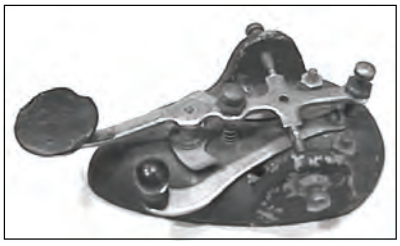

**The Professional Model 200:**
This key had a chromed lever and
black wrinkle-finished base. [528]

**The "Amateur" Model 100:**
This key had a cadmium-plated lever and black wrinkle-finished base. [530]

**The Gray-Based Variant:**
Similar to the models 200 and 100 but with gray wrinkle-finish. [532]



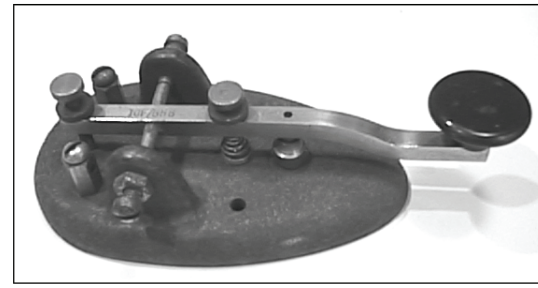
**The Later "Amateur" Model 100**
**with Plastic Base.**
This very inexpensive key has lettering cast into the plastic base which reads: "Stream Key. Manufactured by T.R. McElroy, Boston, Mass. USA." They are quite hard to find. [534]



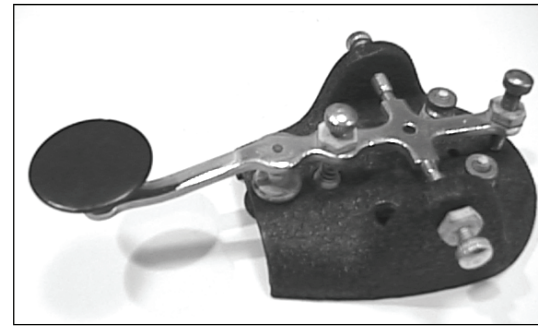
**WARNING !**
**Fake McElroy Keys !**
Someone made thousands of exact copies of the popular McElroy Stream Keys. These copies were made with a very cheap "pot metal" casting and cracks frequently develop around the upright portions of the base. (See below.) [536]

**HOW TO IDENTIFY A "FAKE"**
**McElroy Key**
The only reliable way to identify this "counterfeit" key is to see whether the base is attracted by a magnet. If it is attracted, it is a genuine McElroy Stream Key. If not, it is a fake..

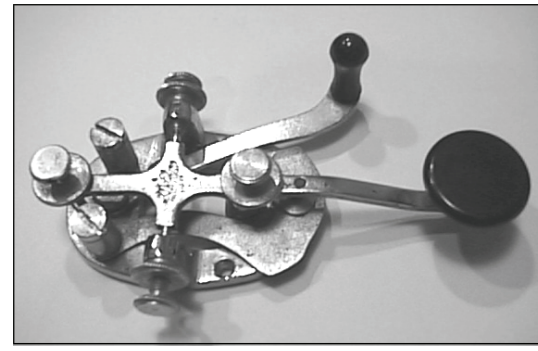
**The McElroy-Like Canadian Grimmer-Wilson Radio Key:**
This gray wrinkle-finish key looks suspiciously like the McElroy Stream Key. It was made for the Canadian Military and carries the number: 10F/556. [538]



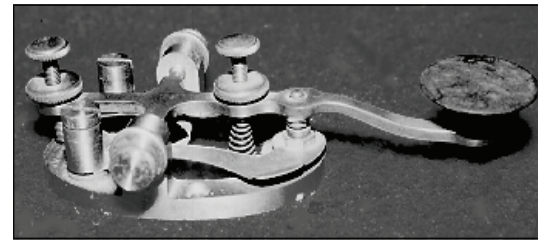
**The Telegraph Apparatus Corp Code Practice Oscillator Key:**
This key is a Model 100 metal-based stream key with its base cut off to fit inside a Telegraph Apparatus Co.
(A McElroy Company) “Oscillatone” code practice oscillator. [540]



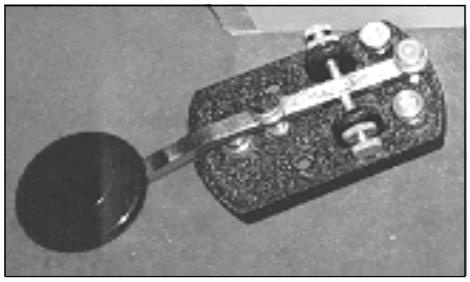
**The McElroy “Professional Model Hand Key”**
In 1965, long after Ted McElroy had died, John McElroy began production of a lovely chrome-plated all brass key. It was sold in a Silk-lined jewelry box along with a pin in the shape of a key. Only 100 were sold and production was discontinued... making this a very hard key to find. [542]



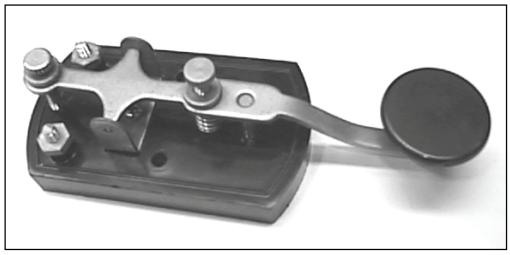
**Bunnell Radio Keys:**
Bunnell continued to manufacture their Triumph-style spark key [458] for radio use. [546] Notice how very similar it is to the McElroy above...



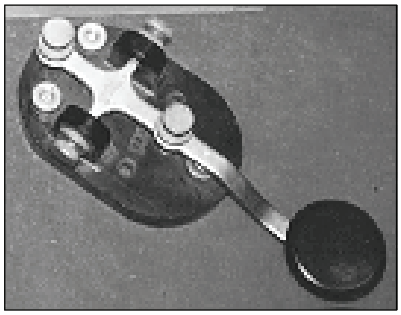
**BUNNELL LOOK-ALIKE - ALERT!:**
This Japanese key looks like a Bunnell radio key. But you can easily identify it by the ball-bearings. The contacts oxidize making for poor keying. Tens of Thousands of these keys have, and are, still being sold by Radio Supply Companies. VERY common. [548]



**Signal Electric Radio Keys:**
Signal Electric Co. continued to manufacture their spark key [460] for radio use. It had smaller contacts, no mica, and many different bases. The bases include the original brass, chrome, chrome-edged black, and black wrinkle-finish. (Shown)
Very common. [550]



**Signal Electric Co. Look Alike:**
This extremely poor quality plastic copy of the Signal Electric Co. keys has, and is being sold in great quantities. The metal contacts do not close reliably and this makes for erratic keying. They are, perhaps, the most common of all keys. [552]

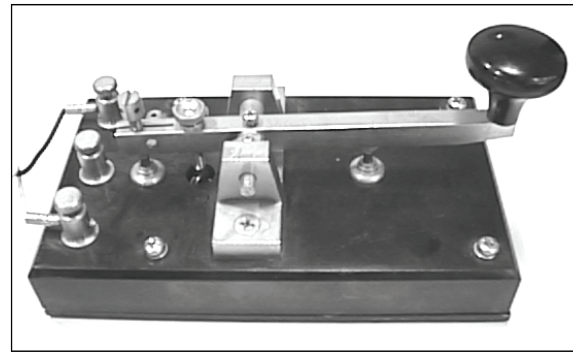


**Speed-X Radio Keys:**
Speed-X has been making a line of radio keys for many years. They range from this inexpensive plastic-based key [554] to some nicely made Bunnell Triumph-style keys with oval chromed [556] or oval black wrinkle-finished [558] bases.

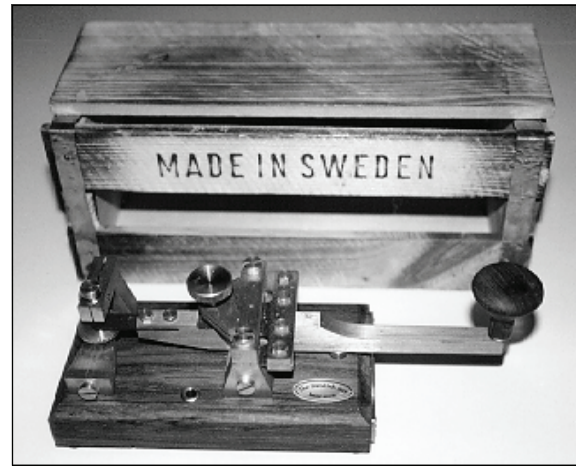
**Brown Brothers Radio Keys and Key-Keyer combinations:**
Brown Brothers made a line of straight keys and straight key - keyer combinations that have become especially popular among the group of collectors who also use their keys on the air. [560]

**"Ham Key" Radio Keys:**
Ham Keys are quite common.
They work well but they have not become popular among collectors yet. [562]

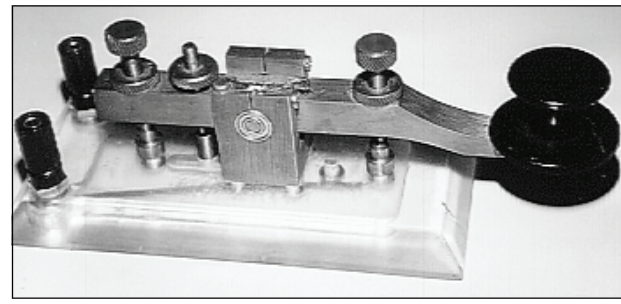
**Japanese Radio Corp. "JRC" Keys:**
JRC makes keys that are virtually identical to the earliest of the Japanese spark and wireless keys (see number 436). They have the classic European-style rectangular straight levers with tension or pull-down springs. [564]



**The "Swedish Key":**
This key is being produced in limited quantities in Sweden. It is patterned after the very early Swedish land-line keys and has a wonderful "feel". [570] Unlike most other keys, it has no trunnion shaft at all. Instead, a thin piece of spring steel acts as the support for the lever and flexes as the key is pressed. This is similar to the Steiner Key design (See No 118)




**British Kent**
**"Kit" Keys:**
Kent keys are very nicely made with a massive European-style straight, ball-bearing-mounted lever and a pull-down spring. They are sold in various ways some of which allow the builder to add a base of their own design as shown here. Kent keys have such nice "feel" that they sell for almost as much "used" as they do new. [574]



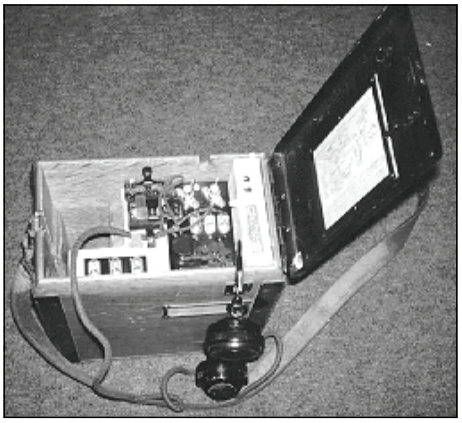
**Other "New" Keys:**
A surprising number of individuals and companies are currently making a wide variety of innovative and interesting keys. The advertisements in the back of most ham radio magazines will introduce many of them and most have internet web sites which can be found by searching the internet for "telegraph keys".

# AMERICAN MILITARY KEYS

**AMERICAN MILITARY KEYS: ( 1910 - Present )**
The earliest American military keys were the lovely Civil War camelback keys described in earlier sections. Land-line telegraph communications continued through WW-II using the field sets described in the first section below. By the time World War I began, Spark Transmitters and then radio transmitters were being used and the military added a line of keys designed for these new forms of communication.

**Land Line Field Telegraph Sets:**
**(1914 - 1945 )**
**The U.S. Army Service Buzzer**
**Model 1914:**
The military continued to use land-line telegraph sets well into modern times and manufactured them in huge quantities. One of the most interesting and frequently seen of these sets is the U.S. Army Service Buzzer Model 1914 manufactured by Stromberg Carlson and other companies. It is enclosed in a leather case with a thin leather diaphragm that allows the key to be operated with the case closed presumably to keep out the mud of the European trenches. It has an interesting and very tiny telegraph key, a compartment for batteries, and space for a pair of headphones. [606]

**Kellogg Telegraph/ Telephone Set:**
WW-I. Wood case with crank ringer magneto, battery compartment, tiny telegraph key, and telephone. [608]



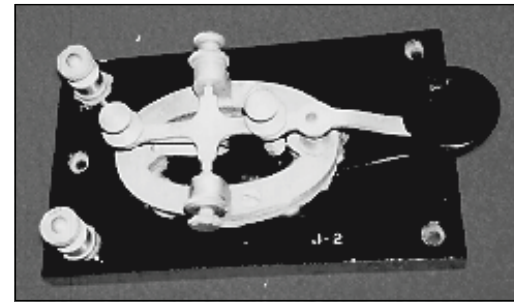
**TG5A WW-II Field Telegraph Set:**
Metal box with battery and headphone compartments, buzzer, bell, and J-41A telegraph key which has both normally-open and normally-closed contacts. A tremendous number of these sets were made but they are becoming harder to find since many people removed the keys and discarded the sets. [610]

**AMERICAN MILITARY SPARK KEYS:**
These WW-I vintage spark keys have been discussed in the "Spark Keys" section.

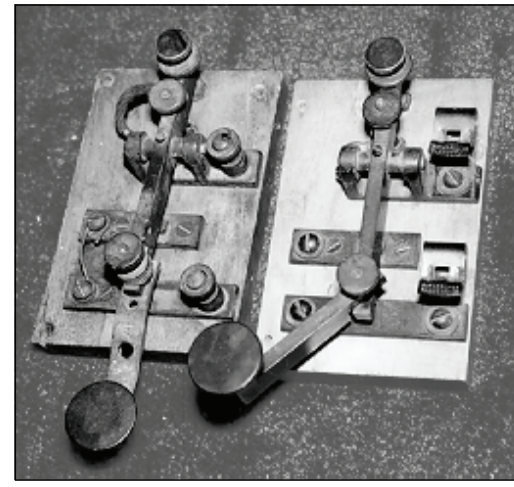
**AMERICAN MILITARY RADIO KEYS:**
**J-Series Keys:** The U.S. Army made keys with model designations from J-1 to J-51. Larry Nutting's book (see Bibliography) describes these keys in detail and an excerpt from his book is included on page 84 in this book with his permission. The following J-Series Keys include the ones that you are most likely to find.

**THE J-SERIES KEYS:**

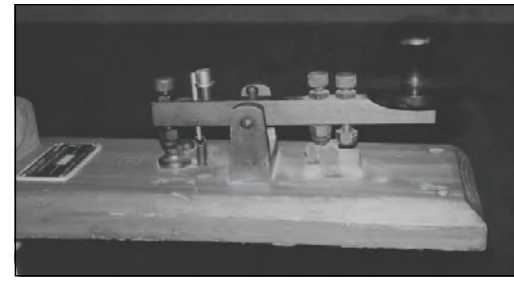
**J-2:**
The J-2 is an oval based key mounted on a black bakelite base. It was used for keying WW-I radio sets. It is very easy to mistake it for a common WW-II J-38 or J-37. Look for the J-2 model number. Hard to find. [620]

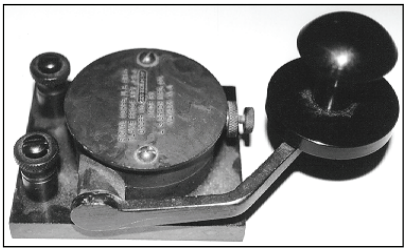



**J-3 WW-I Folding-Lever Key:**
This key had a folding European / British-style straight lever with the classic tension or pull-down spring. It was manufactured with screw terminals or Fahnstock Clip ter-mains. Another version had Fahnstock clips. It was used inside a field telegraph set and the folding lever allowed the top of the set to be closed. [622] (The key on the left has a homemade swivel portion of the lever. This, of course, reduces it's value by about 50%.)

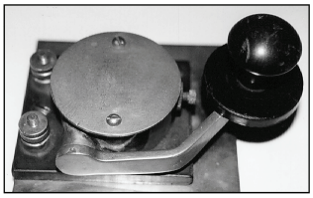


**J-4 Silenced Instrument Key:**
This s a very unusual key. The contacts and adjusting screws have rubber bumpers which reduce the clicking sounds as the key is operated. It was probably used as a practice key and the clicks were eliminated to avoid bothering nearby students in a large classroom. It has the classic European style straight lever and pull-down spring. [624] (W2PM collection)

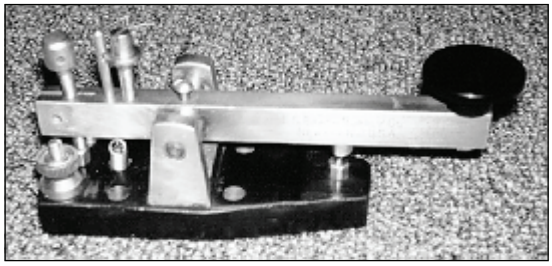




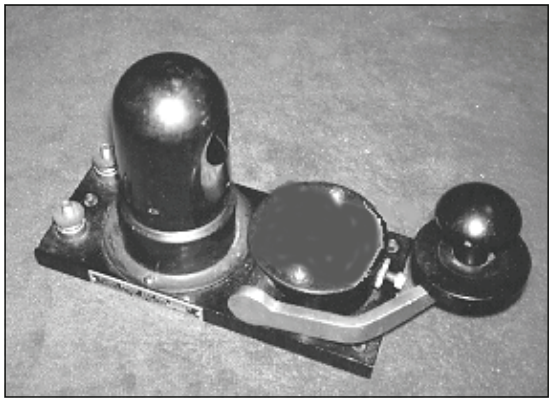
**J-5 and J-5A Flameproof**
**Aircraft Keys: ( 1918 - 1945 )**
These keys were made in large quantities from 1918 through 1945. The contacts are totally enclosed to allow them to be used in explosive environments without danger of the contact sparks igniting an explosion. [626]



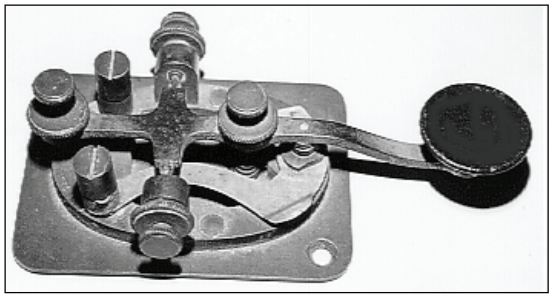
**CAG-1169 WW-I Version of the J5 Aircraft key:**
This is a flameproof key designed to be used in aircraft. It was manufactured by General Radio Corp. and carried the model number: CAG-1169. [626a]



**J-6 WW-I Aircraft Key:**
This is an unusual key with a classic European style straight lever and pull-down spring.. The base has a distinctive taper. It was manufactured by L. S. Brach in Newark, NJ. And used in WW-I aircraft[628]



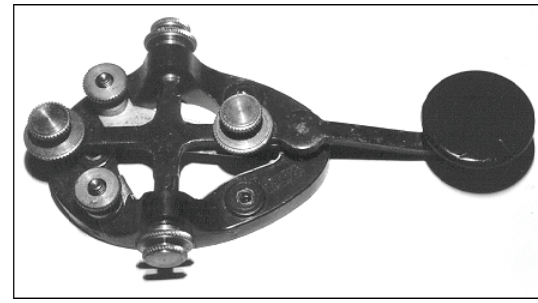
**J-7 and J-7A Aircraft Keys**
**with Winker Lamps.**
These interesting keys consisted of a J-5 or J-5A key mounted on a black base with a "Winker Light" aimed back at the operator. The purpose of the light is not clear and many explanations have been suggested. [630]



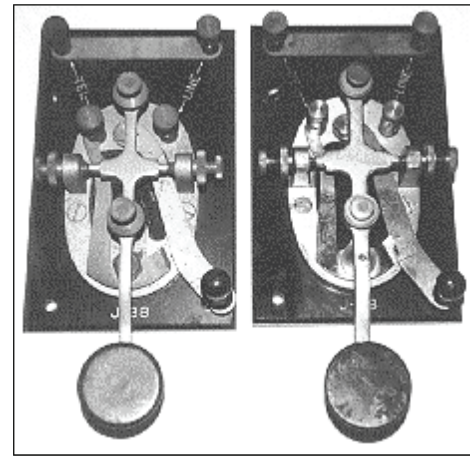
**J-12 Radiotelegraph Key:**
This key consists of an oval "Triumph Style" key mounted on a 3-1/2 x 2-1/2" metal base. It was used with numerous WW-II transmitters. [632] (See summary of Larry Nutting's book on "J" series keys on page 84.)

**J-36 Semi Automatic Keys:**
You will find pictures and descriptions of the various versions of this key in the section on semi-automatic keys or bugs. (See [230, 232, and 234]on page 24. )

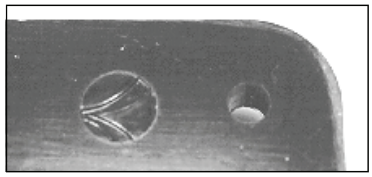
**J-37 General Purpose Key:**
This Phenolic oval based key was very widely used in many different applications. It was made by at least 5 manufacturers and mounted on several different bases. They are VERY common. [634]

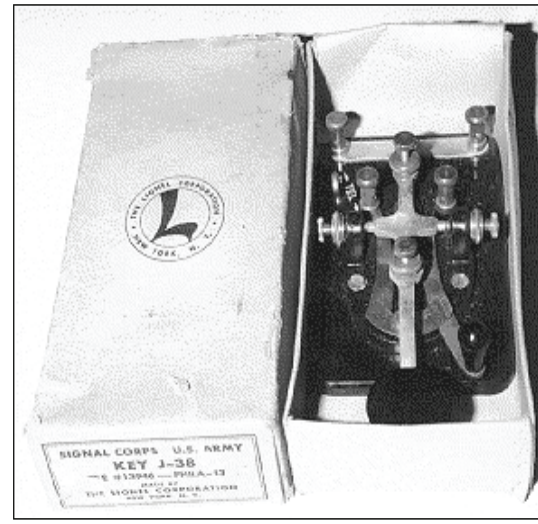


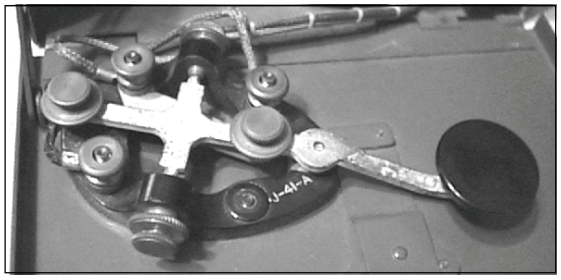
**J-38 General Purpose Key:**
The J-38 is a general purpose radio key that was made in very large quantities during WW-II. After the end of the war, I remember huge barrels filled with them for sale at 25 cents each or five for a dollar.
It is a "Triumph-style" key mounted on a black bakelite base with extra terminals for a headset. They were made by many manufacturers including Bunnell and the oval bases were either plated brass (left), or plain brass (right). [636]
**JF-38 French Version. [636a]**
**JJ-38 Japanese Ver. [636b]**
(For photo see # 896)



**The "Lionel" J-38:**
The J-38 was also made by the Lionel Electric Company, manufacturers of Lionel Toy Electric Trains. The Lionel version had the name: "Lionel Electric Co." on top of the cast metal key base and the well known "L" emblem cast into the bottom of the rounded-corner bakelite sub-base. [638]

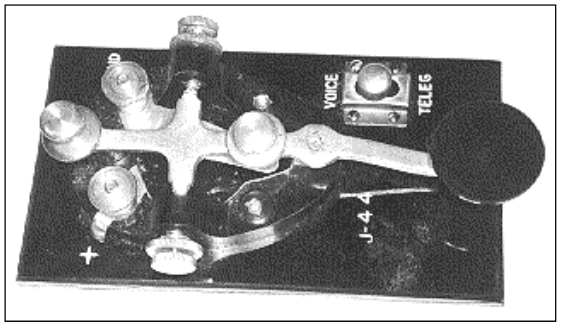






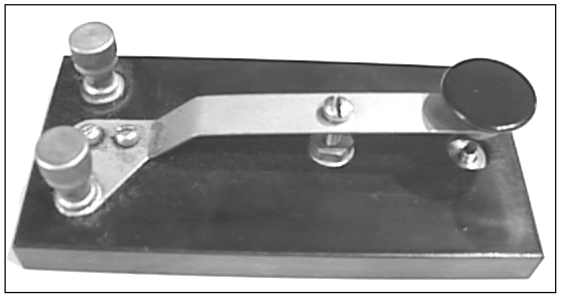

**J-41 and J-41A Open and Closed Circuit Key:**
This is a J-37 key with an extra set of normally-closed contacts. [640] It is used in the TG-5 and TG-5A field telegraph sets. (See # 610)

**J-43 Key:** (not shown)
This is a J-37 key mounted on a black base with a push button switch. [642]

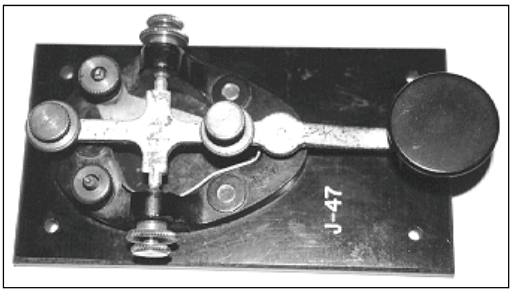



**J-44 Key:**
This is a J-37 key mounted on a black base with a switch which shorts out the contacts: [644]

**J-45 Clip-On The Leg Key:**
This key was clipped onto the operator's leg for use in aircraft and various other military vehicles. Later, Post WW-II models are stamped KY-116U. [646] A Japanese JJ-45 with a JJ-37 key has been found recently. It was probably a copy.

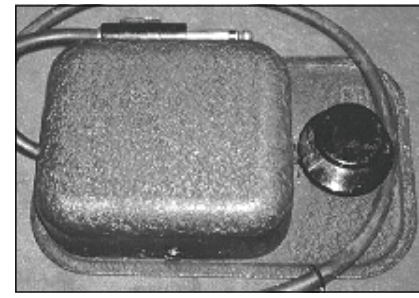


**J-46 Signal Lamp Key:**
This small strap key was used to key the EE-84 Signal Lamp Sets which were used for sending light signals. They are hard to find. [648]

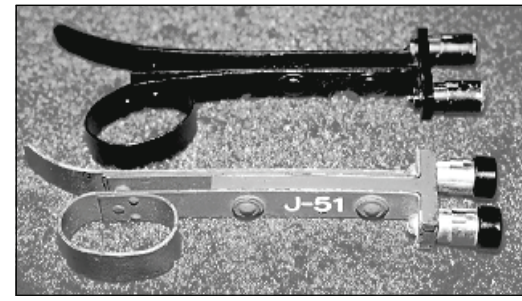



**J-47 General Purpose Key:**
This is a J-37 key mounted on the same kind of black base as a J-43 and J-44 but without the switch. These keys were used with many WW-II radio sets. [650]

**J-48 Enclosed Radio Key:**
This olive-drab-painted key was mounted on the flip-open front panel of the BC-654 portable and mobile radio set. [652]
This key is in great demand among military radio collectors because it matches this popular WW-II radio set.

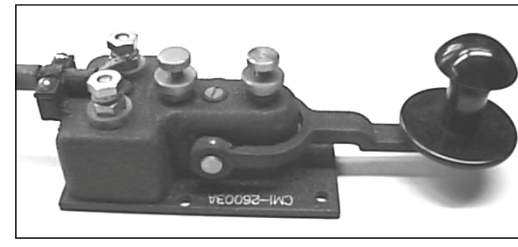


**J-51 Scissors-Style**
**Signal Lamp Key:**
This unique key was used to operate the SE-11 Signal Lamp. Since enemy soldiers would shoot at signal lamps, the key was supplied with a long cable so the operator could flash the lamp while standing safely far away from the light itself. Black and olive-drab versions were produced. [654]

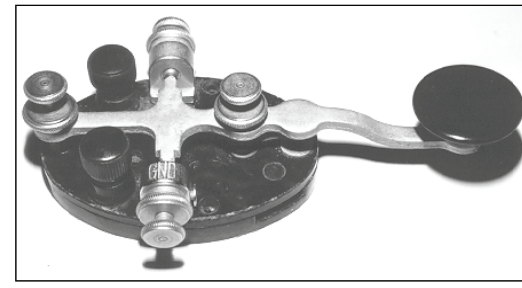



**U.S. NAVY KEYS: - MANUFACTURER'S CODES:**
Neil McEwen's list of Navy key Manufacturer's codes included in this book is helpful in identifying which manufacturer made a particular Navy key.
I am including a representative sampling of the Navy keys that you may expect to find as you search for keys for your collection.

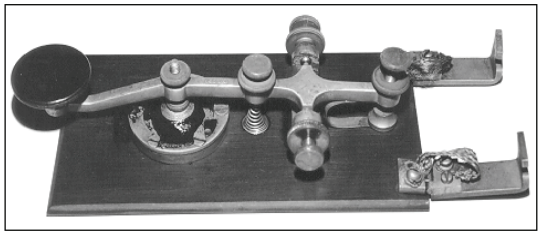
**CXX-26003A Flameproof Navy Key:**
This is the widely used flameproof Navy key used throughout WW-II. It's design was apparently copied from the German Luftwaffe Key (818) shown under "German Keys". The three letters at the beginning of the number indicate the manufacturer's code. (See Neal McEwen's List of Navy Manufacturers.) This key is a CMI-26003A model. The CMI indicates that it was made by Moulded Insulator Co. [660]



**CXX-26012A Navy Key:**
This is another widely used Navy key used throughout WW-II. It has a small hole on the left side which accepts the "wedge" connector of a J-36 bug. This is a CJB-26012A. (CJB indicates it was made by Bunnell.) [662]

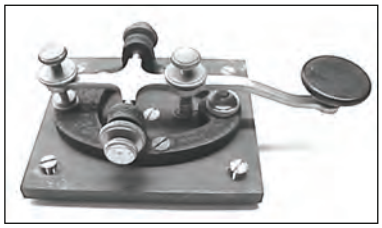


**OTHER MILITARY KEYS:**

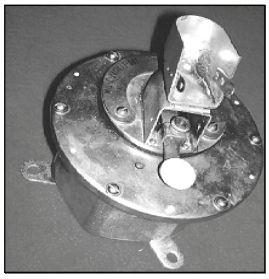


**Very Early Flameproof Radio Key:**
This key was mounted on the front panel of a WW-I radio set. The contacts were enclosed by a leather membrane so that their sparks would not ignite an explosive environment. [670]


**TBY Portable Field Radio Key:**
This tiny key was enclosed within the (rather deteriorated) black rubber boot shown on its left. It was used with the TBY radio Set. [672]



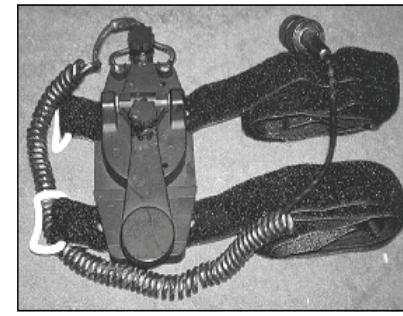
**Teletype / Telegraph Test Set Key:**
This key is mounted on a black bakelite base which is stenciled: D165581 on the bottom. It was used on a huge test set. Most of these keys were removed from the test set and used by ham radio operators. [674]



**VERY Large Navy Light Signaling Flameproof Key:**
This huge key was used on Navy ships to flash the running lights for communication in periods of radio silence. It is totally enclosed so it can be safely used in a potentially explosive atmosphere aboard ship. It is marked: MIL-C-24174/3-001 and made by STB Co. with a manufacture date of 1977. [692]


**BRELCO Flameproof Key:**
This flameproof key is mounted on a circular metal base which clips to the panel of several radio sets and to a thigh-mounted leg clip. The model number starts with CAQZ which shows that it was made by Brelco. (See Neal McEwen's Navy Manufacturer's codes on pages 85-86.) [694]

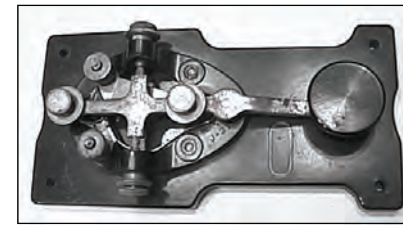
**Nylon Strap-on Key:**
This recent key is held to the operator's leg by two velcro straps. It is made almost entirely in nylon. It is marked KY-605U and it was manufactured by ElectroVoice Corp. in 1976. [696]



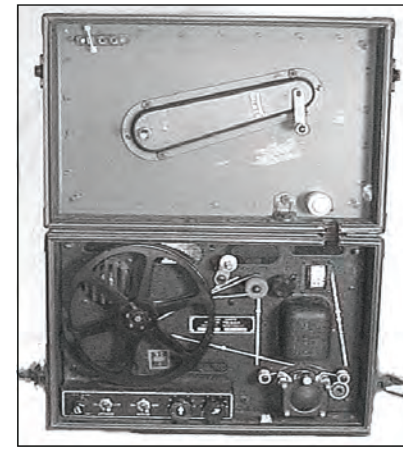
**Note**: Although they were important in WW-II, the next two sets are not very popular among collectors because they are very heavy and bulky and fairly plentiful.

**AN / GSC-T1 Training Set:**
This set was designed to provide audio code practice tones sent by an instructor and to allow up to 10 students to send code. It consists of a tube-type audio oscillator and amplifier contained in a heavy metal and wood case. The cover swings upward and stores a total of 10 J-37 Telegraph Keys mounted on special bases which are notched to allow the connecting wire to be wrapped around the key and base for storage. [697] (From the Derek Cohn WB0TUA collection.)

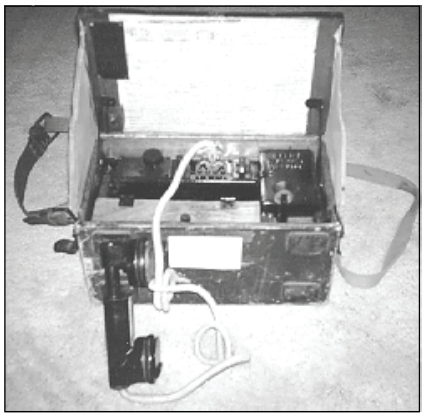
**Specially Mounted J-37 Key:**
(Used in above practice set.)
This J-37 key is mounted on a special plastic base designed to allow the connecting wire to be wrapped around the key and base so that they both can be stored in the cover of the above AN/GSC-T1 Training set. [697a]



**TG-34 Telegraph Training Machine:**
This set was designed to automatically send audio tone dot and dash signals at varying speeds for students to practice copying by hand or on a typewriter. A variable speed electric motor pulled a paper tape past a photoelectric tube. A light shined through to the photoelectric tube unless it was blocked by black ink marks on the tape. This determined when the oscillator would be keyed to make the tones. (From the Derek Cohn WB0TUA collection.)



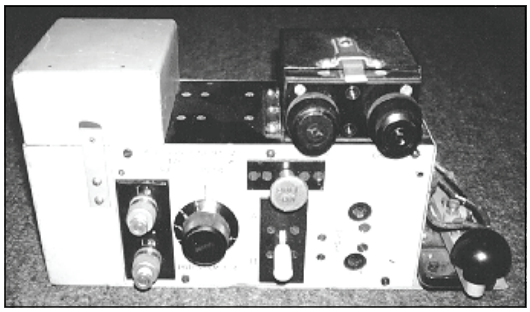
# BRITISH, AUSTRALIAN, S. AFRICAN, NATO MILITARY KEYS



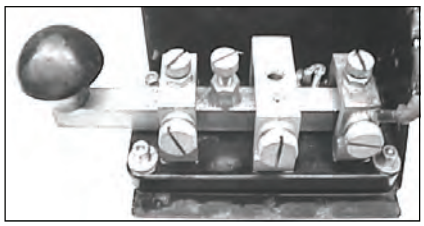
**BRITISH, AUSTRALIAN, S. AFRICAN, NATO MILITARY TELEGRAPH:**

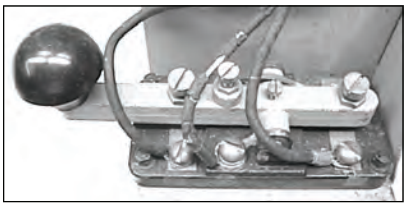
**FIELD TELEGRAPH SETS:**
The British Army used a variety of field telegraph/ telephone sets. Many of them were designed by A.C. Fuller in 1915. Named "Fullerphones", they made it impossible to intercept the telegraph signals (because they were DC) and then made them audible by using an interrupter and headphones.

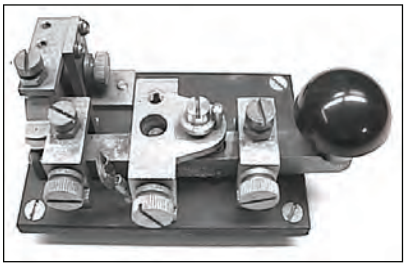
**WW-I Fullerphone:**
This early set is mounted in a canvas-covered wooden box. It contains a telegraph key with a folding lever which allows the box to be closed. [704]



**WW-II Fullerphone:**
This British field telegraph set was usually mounted in a wooden box. [708]. On the right side you can see one of the familiar WW-II WT-8A keys (Properly called Key, WT 8 Amp). (See below:)

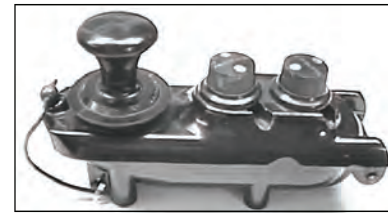


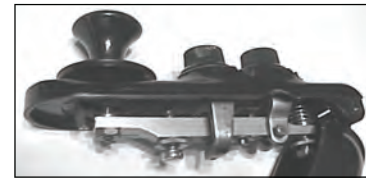




**The "KEY, WT 8 AMP":**
The WT-8A keys were made in over 100 versions in 6 countries and in huge quantities starting in the 1920's. They were used by the British armed forces with most of their communications gear throughout WW-II. [710, 712, 714, 716]

**The British Air Force R.A.F. "Bathtub" Flameproof Key:**
This interesting key was the standard key used in British bombers throughout WW-II. It is totally enclosed, making it suitable for use in explosive environments. The mechanism is attached to the top of the key and operates "upside down". The metal clip seen on the left keeps the cover closed but it can also be slipped over the skirt of the knob to hold it down and thus send out a continuous signal. This allowed a radio operator to parachute from a damaged plane while still sending out homing signals for rescue craft. These keys are common enough to allow most collectors to find one. [720]

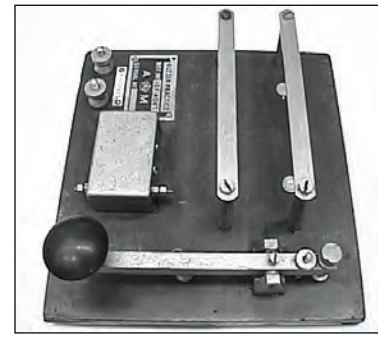




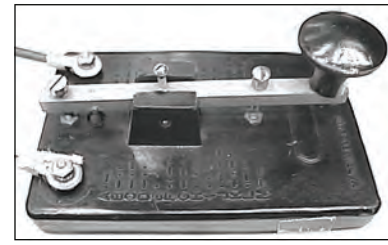
**WT-8A Strap-on-The-Leg Key:**
WT-8A Key (Properly called: Key, WT 8 Amp) in a black sheet-metal box. Canvas straps held it to the radio operator's leg. [721]

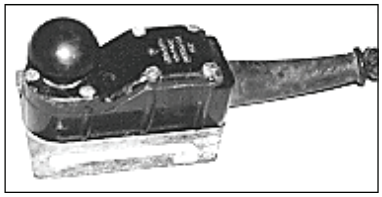
**"Dummy Signaller's" Key: (Right)**
Versions of this lovely all brass key with no electrical connections were made from 1902 to 1939 (shown). It helped British Army Trainee Signallers become familiar with the sound of a telegraph key and sounder because it made a firm "click" when the lever was pressed, and another when it was released. [724]

**British Air Ministry Training Set:**
These sets were used for training cadets to send and receive the code. They incorporated a classic European-style telegraph key with the typical straight, heavy, rectangular lever and the tension pull-down spring. The key was mounted on a wooden board along with a buzzer and a battery hold-down clamp. [726]



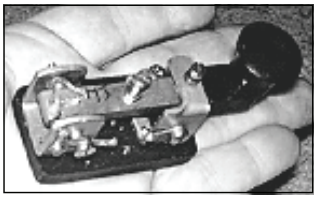
**British Training Key:**
This simple key was used by cadets in conjunction with a separate buzzer and battery for learning the code. It has a plastic base into which the letters of the code are molded. [728]



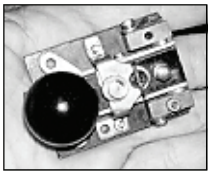


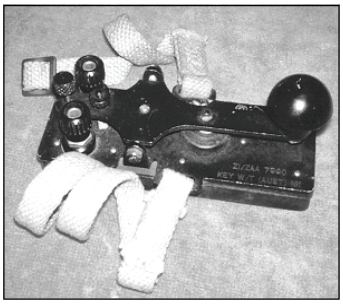
**Key, Lightweight:**
This tiny key was used on many post-WW-II British and Australian portable field radio sets. It is completely sealed and waterproof and has non adjustable contacts which require 10 oz. pressure and have .013" travel. [730]

**"SPY" Keys:**
These miniature military keys are often assumed to have come from clandestine spy radios used behind the enemy lines. [732]

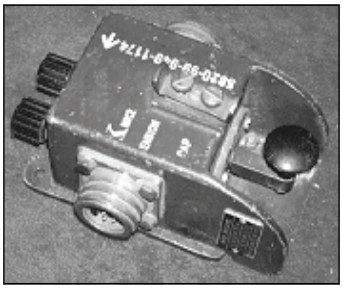


Actually, the tiny keys such as this one (right) [734] were used in military field telegraph/telephone sets such as the one shown on the left. (Which sell for less than the keys, due to their size and weight.) [735]

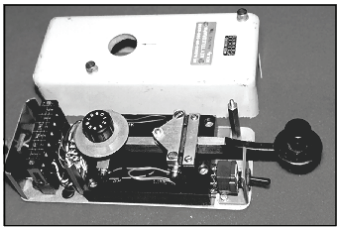




**Australian Field Radio Set Key:**
This is a typical strap-on-the-leg key designed for use with portable field radio sets. It has a very unusual wide flat lever. It is stamped: Z1/ZAA 7990 Key, W/T (AUST) No. 1. [742]



**South African and British KMK.2 Key:**
This totally-enclosed flameproof key was used with British C11, C12, and C13 portable field radio sets. A version was made by SMD in Pretoria, S Africa. [744]



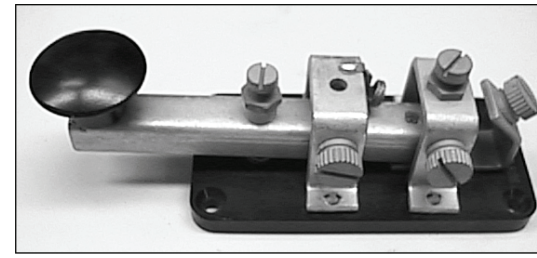
**NATO Key:**
This impressive key incorporates the classic Scandinavian long tapered lever. It was designed for use by NATO forces. [746]

**NOTE:**
(Please see the bibliography for Luis Meulstee's comprehensive AWA article on many of these and other foreign military keys and also see the back issues of the out-of-print "Morsum Magnificat" journal.)

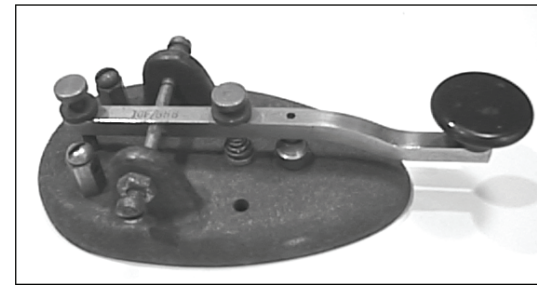
# CANADIAN MILITARY KEYS

**CANADIAN MILITARY TELEGRAPH KEYS:**

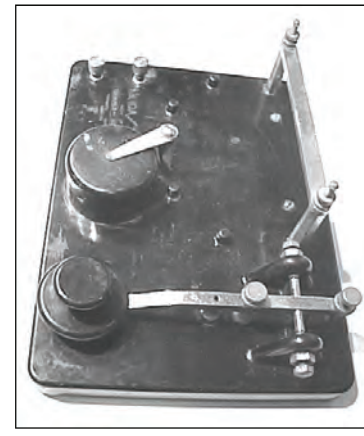
**Westclox Key:**
This key is the Canadian version of the ubiquitous British WT-8A key (Properly called: KEY, WT 8 AMP). It was used in many of the Canadian field telegraph sets and radios. [754]



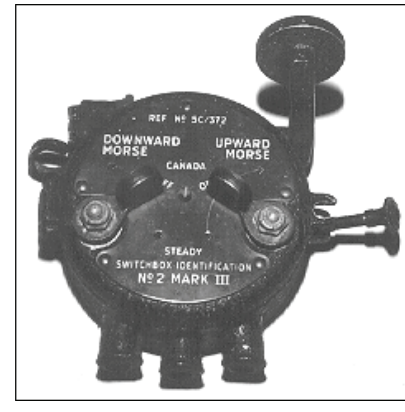
**Grimmer-Wilson Key:**
This key looks VERY much like the McElroy Stream Key: The lever is stamped 10F/556, and the name "Grimmer-Wilson" is cast into the underside of the grey wrinkle-finish base. [760]



**Grimmer-Wilson Practice Set:**
This set consists of a telegraph key with the same style of lever used in the Grimmer-Wilson key described above. The key is mounted on a black plastic base along with a buzzer and a battery holder bracket. The base is marked: No. 10A/726. Made by Grimmer-Wilson, Toronto, Ontario, Canada. [764]

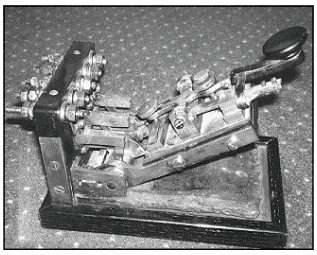


**Military Aircraft Light Blinker Key:**
This round, vertically-mounted flameproof key was made in bakelite and metal versions. It was used to blink the top and bottom lights on many of the RAF and Canadian Air Force airplanes for visual plane-to-plane and plane-to-ground communications during periods of "radio silence" to keep the enemy from listening in. [770]

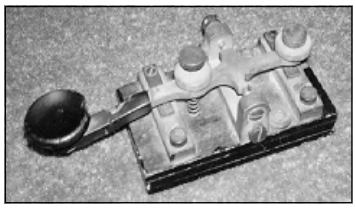


# GERMAN MILITARY KEYS

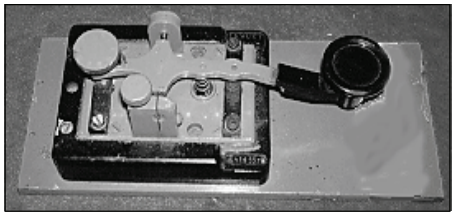
**GERMAN MILITARY KEYS:**



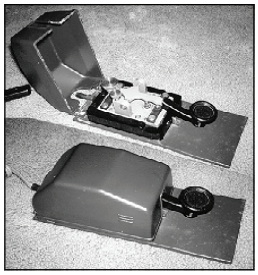
**Early German Arc Transmitter Key Recovered from a Sunken WW-I Cruiser:**
This interesting key was brought up by divers from a sunken German Cruiser in Scappa Flow. Pushing the entire key down activates the transmitter. [802] (Museum of Communication,Scotland)



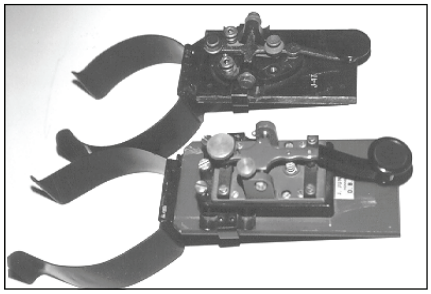
**Early WW-I German Radio Key:**
This key has the characteristic normally-open and normally-closed contacts. The lower contacts are mounted on springs to add a wiping action as the contacts close. [806] (Pete Malvasi - W2PM)



**Junker WW-II Key:**
These keys have very precise adjustments and a very crisp feel. [810] They were, and are still made by the Junker Co., of Bonn - Not to be confused with Junkers who made airplanes.



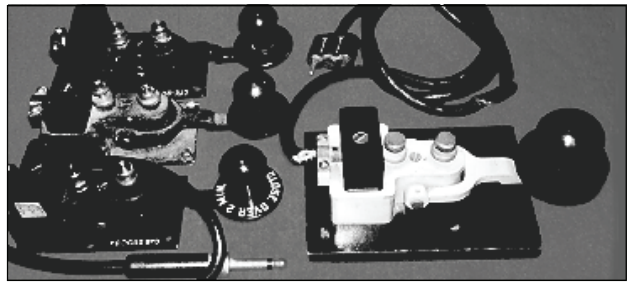
**Recent Junker Keys: (left)**
Junker continues to manufacture these keys and they are still available. This is one of the current models. Colors are olive drab or silver. [812]



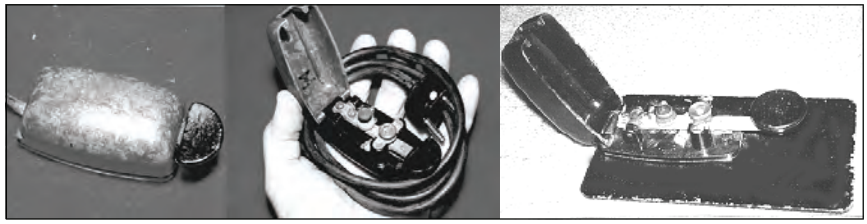
**Junker Clip-on-the-Leg key and Allied Copy of the Junker Design:**
The Germans manufactured a leg clip for their Junker keys which allowed the keys to be secured to the radio operator's leg in aircraft and ground vehicles. [814] The Allied copy with a J-37 key mounted on the clip is also shown (at the top).

**NOTE:** WW-II Keys with the nazi eagle-and-swastika stamp are generally worth about 30% more than without. Look closely, it's a very small mark stamped into the plastic. The DRP (Deutsches Reichs Patent) mark also indicates WW-II.(DBGM indicates post-war manufacture)

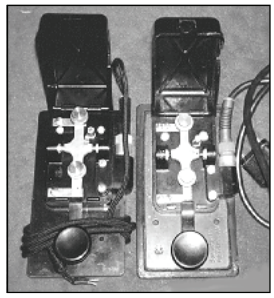
**Luftwaffe Flameproof Key which was Copied by the Allied Forces and Became the Cxx-26003A WW-II U. S. Navy key.** On the right is the original German key with the "BAL" Luftwaffe markings [818] and on the left are several examples of the classic Allied forces WW-II Navy key. [660]



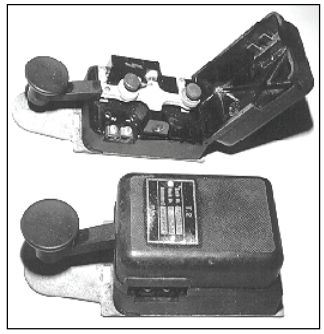
**Maus Keys:**
The tiny German Maus keys were used with many WW-II German field radios. They were made in several versions. The smaller version [820] (left) has half of the knob cut off and the larger version [821] (right) has a full-round knob.



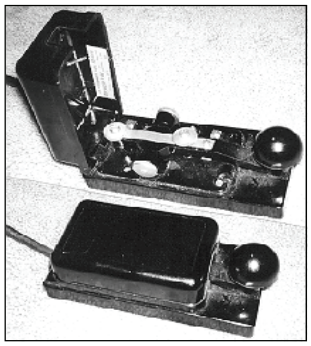
**T-1 Baumuster Key:** (right)
The Baumuster keys were very widely used with German radio sets. They were also called "T-1" , "Taste (key) P", or Taste "Paula". [824]



**T-2 Key:**
The T-2 was another widely used radio key. [826]

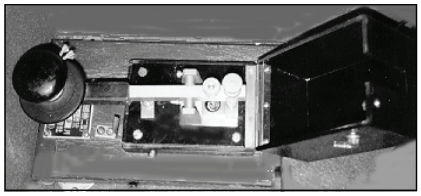


**K-34:** (right)
Another German radio key: [828]

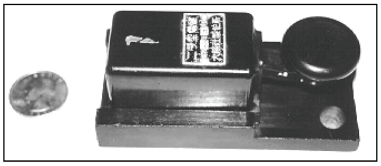


# JAPANESE MILITARY KEYS

**JAPANESE MILITARY RADIO KEYS:**

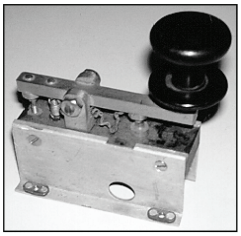


**Early Japanese Radio Key:**
This is a nicely made key mounted on a wooden base with a "classic" European- style straight lever and a cover. The label gives information about when the key was made relative to a particular emperor and thus dates the key. [860]

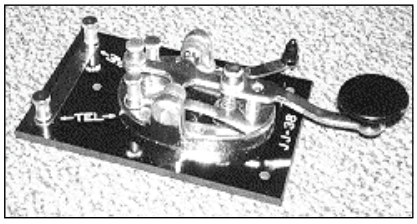


**Miniature Japanese Key:**
This tiny key was brought back from the island of Mindanao after WW-II. It had been used in the back seat of a command car. [864] It is shown next to a quarter for size comparison.

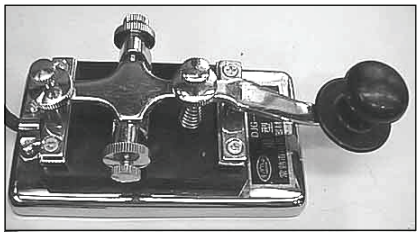
**Japanese Navy Key:**
This key and the box in which it was mounted were removed from a destroyer anchored in Tokyo Harbor on the day of the Japanese surrender. It has the spring-mounted lower contacts that are characteristic of 'German' military keys. [870] Without this history or "provenance", it would be worth less. [870a]



**Miniature WW-II Japanese "Zero" Aircraft Key:**
This small key was mounted in the cockpit of a WW-II Japanese Zero fighter aircraft. [874]



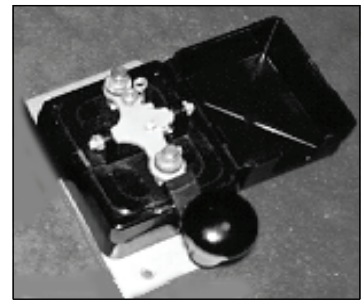

**Recent JJ-38**
**Japanese Copy of the**
**U.S. J-38 Telegraph Key:**
This key is a copy of the design of the U.S. J-38 key. It uses the extremely common Japanese ball-bearing copy of the Triumph key, mounted on a black plastic copy of a J-38 base.[ 896]
(Not really a military key)



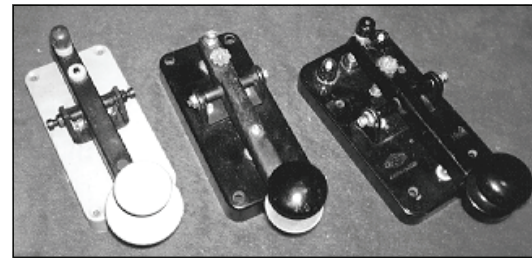
**Recent Chinese Radio Key:**
These nicely made keys are beginning to show up in small quantities in the U.S. [898]
(Not a Military Key)

# RUSSIAN & CZECH MILITARY KEYS

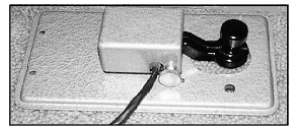
**RUSSIAN AND CZECH KEYS:**

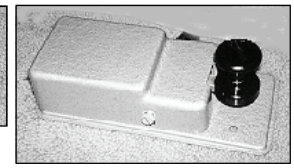


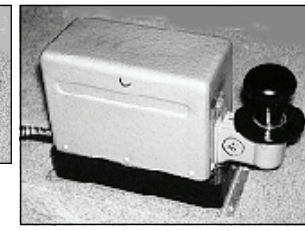
**Plastic-Enclosed Russian Military Keys:**
These keys were manufactured with and without a spark suppressing capacitor in the base. [910]



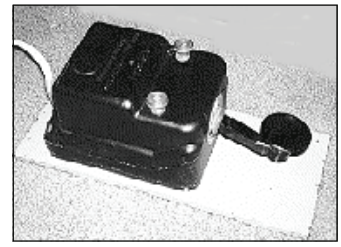
**Plastic-Based Russian Military Keys:**
These keys were made in a number of styles. They are of very simple design and show the influence of the classic European-style straight lever. [ 912]







**Metal Enclosed Russian Military Keys:**
The tiny one on the left [920] and the one in the middle [922] were used with the R104M radio sets. The one on the right was used with the high-powered R102M radio sets. [924]



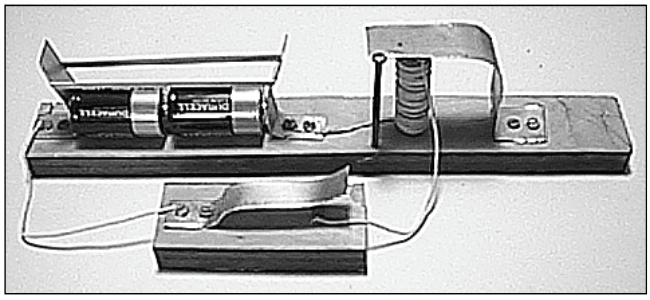
**Russian Flameproof Key:**
This key is completely sealed in a (non-waterproof) plastic housing. Its internal mechanical design is very similar to the German Junker keys but it does not have the same kind of fine micrometer-like adjustments. [926]

**Czech Army Key:**
This interesting and unusual key is enclosed in a plastic casing. When the knob and associated lever of the key is raised slightly upward (as shown), the contacts are shorted out. [946]

**NOTE:** See Luis Meulstee's excellent AWA article on these and other unusual military keys listed in the bibliography. Also see issues of Morsum Magnificat.

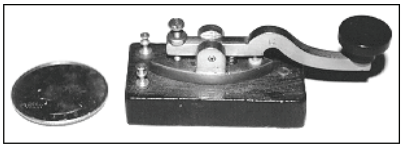
# HOMEMADE KEYS

**HOMEMADE KEYS:**
Over the years, thousands of people have tried their hands at making their own keys. They were motivated either by an attempt to save money or by a belief that they could come up with a better design. Some of the designs are interesting and innovative but, unfortunately, most collectors avoid buying and owning even the most interesting of these designs. I hope that as more people become involved in collecting telegraph keys, innovative homemade keys will become more widely appreciated.

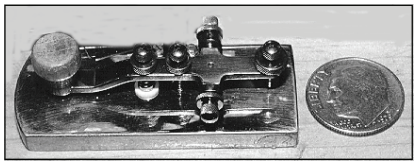


**The BASIC Homemade Telegraph Set:**
Probably the most frequently built telegraph set is the basic Key and Sounder. Kids often build them as science projects, scout projects, and just for fun. This is perhaps the simplest design. It uses just nails, strips of metal, and wire. It's construction is described in detail in my museum. http://w1tp.com [954]

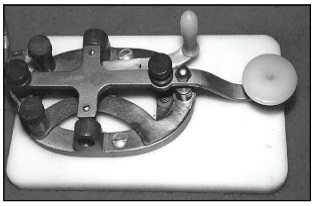
**Another Simple Key and Sounder Design:** This set was built from plans in a popular children's periodical from the 1930's [956]



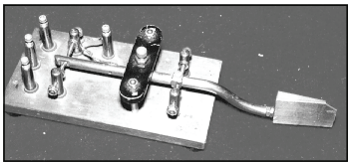
**A Beautifully-Homemade Miniature Camelback Key:** [958]



**A Tiny, Dime-Size Hand Key Made in Roumania:** [959]

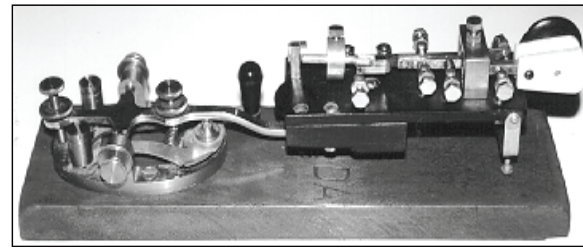


**A Very Nicely Made Full-Size Hand Key:** [960]

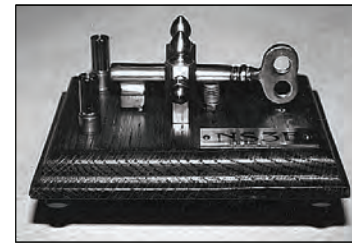


**A Paddle With Really Terrible "Feel":**[962]

**A Homemade Semi-Automatic Bug Designed to be the Knob of a Straight Key:**
This is the strangest bug I have ever seen. The designer of this tiny, and unusual bug has made it fit over the knob of a straight key. Flipping up the support allows it to be used as the knob of the straight key. [ 968]

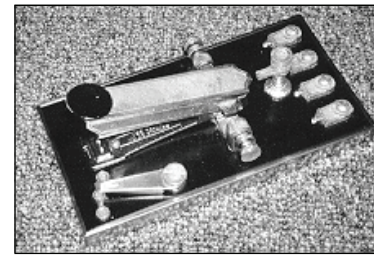


**Homemade "KEY" Key:**
This unusual and amusing key was made by collector Ed Biter - NS3E. [969] It is part of his permanent collection.



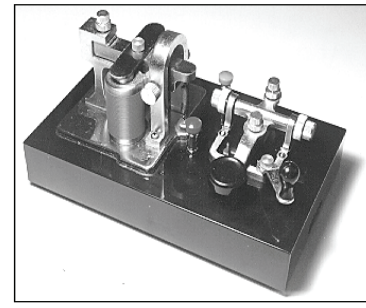
# UNUSUAL NOVELTY ITEMS:

**"Stapler" Made in the Shape of a Polechanger Key:**
This is a fully-functional stapler which closely resembles a Spies Polechanger key. (See item 120) The line-selecting switch acts as a staple remover. Many of these were sold. [970]



**Cigarette Lighter Made in the Shape of a Bunnell Triumph Key:**
This is a fully-functional cigarette lighter with a butane reservoir and batteries in the base. Pressing down on the lever releases the butane and activates a buzzer which makes a spark to light the butane, and can also be used for code practice. Quite a few of these were sold. They were made by the Hugo Rousseau Co. [971]

**Transistor Radio and Code Practice Oscillator Made in the Shape of a KOB:**
This set consists of a fully functional AM transistor radio. In addition to serving as a radio, when the key lever is depressed, it emits a tone which can be used for code practice. [972]



# AMERICAN TELEGRAPH INSTRUMENT MAKERS 1837-1900

**(Second Edition, 2004)**

**Roger W. Reinke** ( Copyright (c) 2004 )

Dates shown are only approximate and are based on trade catalogs, patent dates, advertisements and other ephemera. Corrections or additions are welcome; Please write:

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Email: rwreinke@cox.net

## ABOUT THE TELEGRAPH MAKER'S LIST

This is a revision of a list that my son and I first developed in 1983. The intent then and now was simply to provide a guide to makers of early telegraphic equipment, and especially the years they were in operation. Since then, a number of interested and thoughtful persons have contributed additions and corrections to the list. There are still many unanswered questions, however, so please regard this effort as a work in progress.

A collector of telegraphic equipment will notice that occasionally instruments from different makers share remarkably similar features. The inevitable conclusion is that some instruments were made by one maker for another. For example, J. H. Bunnell & Co. was the dominant maker from the 1880's on. Some Manhattan Electrical Supply Co. catalogs show illustrations of Manhattan instruments, but Bunnell's name is on them – and the actual instruments differ in very few, insignificant ways. The classic camelback key originally made by George M. Phelps seems to be replicated in every important respect by keys labeled Western Electric, Partrick & Carter, and Edison & Murrey [sic]. The frame of a Knox & Shain register looks exactly like the frame of Tillotson's premium register. A business connection between or among these makers seems evident, but the "proof" is yet to be discovered.

Further compounding the identification problem is manufacture by established makers for distribution by companies which did not make instruments themselves. C. E. Jones and Brother of Cincinnati sold nicely made practice sets bearing their name, but the sets are identical to those of Partrick & Carter. There are so many similar examples that it seemed helpful to divide the "real" makers from their agents, which we have tried to do in Parts I and II of the list. Also, there were many individuals, typically engineers, who produced prototype, specialized, or patent model instruments which were never intended for the market. They are *not* included in this listing. Finally and probably most frustrating to the collector, many early makers did not consistently mark their instruments. An educated guess based on arcane clues such as knurling or binding post styles is about all one can do.

Reviewing the list suggests that there was a telegraphic community of sorts in the early days. Jesse Bunnell started out with the Chester's family operation, then joined with Partrick and Tillotson before setting out on his own venture. The days of telegraphy are now over, but I hope the list will contribute in some small way to recognition of and appreciation for the accomplishments of the early makers. Oftentimes, they designed and produced instrumentation that far surpassed ordinary functional needs.

Roger W. Reinke, November 29, 2004

(Also see Telegraph Makers by John Casale, W2NI at: www.telegraph-history.org/manufacturers/index.html)

**Part I: Firms and individuals believed to have manufactured their own instruments**

**Maker; Address; Dates; Remarks**

Allen, Alx; Rochester, NY; c.1870; Apparently made registers only

American Electrical Works; 61 Stewart St., Providence, RI; c.1880;
May have made only "Steiner" type keys

Avery, Thomas C.; New York, NY; 1848; Early maker of keys
Bain, Alexander; 1849-51; Chemical printers for O'Reilly's lines
Barnes, Edmund F.; 1847; "Columbian" register with Samuel K. Zook
Bliss, George H. & Co.; 41 3rd Ave., Chicago, IL; 1873-75;
To Western Electric 4/15/1875; after, see Part II
Bradley, Dr. Leverett; 9 Exchange Pl., Jersey City, NJ; 1867-73;
After Jan. 1873, made only measuring equipment
Buell, M. A.; 26-27 Waring Block, Cleveland, OH; 1870-76; At 86 Bank St. in 1875
Buell, M. A. & Sons; 76 Frankfort St., Cleveland, OH; 1876-82; 144 Superior St. 1882-84; To W. B.Cleveland
Bunnell, J. H. & Co.; 106-108 Liberty St., New York, NY; 1878-1988; 76 Courtlandt St. from 1890 to 1900
Burrell, Samuel J.; 50 Broad St., New York, NY; c. 1870; Made printing registers
Burritt, J. & Son; Ithaca, NY; c.1865; Apparently made registers only
Calahan, Edward A. New York; 1867; Printers, Improved Law's Ticker
California Electrical Works; 134 Sutter St., San Francisco, CA; 1877-1908;
1889 35 Market St.; 1892 agents for Western Elec.
Cardwell, Dr. G. A.; New York, NY; c.1896; Little production
Caton Instrument Shop; Ottawa, IL; 1851-72; To Western Electric; superior machining
Chester, Charles T.; 104 Centre St., New York, NY; 1855-58; John N. Chester joined in1858
Chester, C. T. & J. N.; 104 Centre St., New York, NY; 1858-72; John N. d. 1872
Chester, Charles T.; 204 Centre St., New York, NY ; 1858-72; 1872-80;
Stephen Chester joined in 1867, then to Partrick
Chester, Partrick & Co.: 38 S. 4th St., Philadelphia, PA; 1868-72; To Partrick, Bunnell & Co.
Chubbuck, A. S. / S. W.; Hotel St., Utica, NY; 1852-69;
Supplied much early Western Union equipment. Also: Laws Gold Reporting Ticker.
Clark, James J.; Philadelphia, PA; 1845-61; "& Sons" appears occasionally
Clark, J. J. & Co.; 19 E. 20th St., New York,NY; 1861-66; Apparently in Harrisbg, PA in 1868
Clark, William; Philadelphia, PA; 1846-47; James' father, made "Harp" registers
Clark & Splitdorf; New York, NY; c.1865; Box relays and keys
Cleveland, W. B.; 144 Superior St. S., Cleveland, OH; c.1884; Apparently practice sets only
Cooperative Manufacturing Co.; 216 ½ Walnut St., Philadelphia, PA; 1871-75; 1875-76 at 218 Pear St.
Davis, Daniel, Jr.; Boston, MA; 1842-48; To Palmer & Hall
Davis, William E.: 319 Newark Ave., Jersey City, NJ: 1869-74: 1874 at 341 Newark Ave.
Davis & Watts; Baltimore, MD; 1878-84; To Viaduct Mfg. Co.
Day, S. F. & Co.; Ballston Spa, NY (Saratoga County); c.1865; Seldom found
DuBois, Charles H. & Son; 61 Ann St., New York; 1850-88; Fairly large business
Edison & Murray; 10 Ward St.Newark, NJ; 1869-73;"Murray"stamped on keys; & Unger1873
Edmands & Hamblet; 40 Hanover St., Boston, MA; c.1868; "Magneto" telegraph
Electric Improvement Co.; Galesburg, IL; c.1872; To Western Electric Co.
Electric Telegraph Works; 2nd. & Chestnut Sts., Philadelphia, PA; c.1871; To Flemming, Potter & Co. See part II
Electrical Construction & Maintenance Co.; San Francisco, CA; 1870-77; To Calif.Elect.Wks
Electrical Supply Co.; 109 Liberty St., New York, NY; 1875-85; Makers of the "Prosch" key
Electro Magnetic Mfg. Co.; 36 Broad St., New York, NY; c.1875; Sought telegraph inventors
Facer, W. E.; 48 S. 4th St., Philadelphia, PA; c.1868; Few examples
Farmer, Moses G.; Boston, MA; 1852-57; Developed fire alarm system with. W. F. Channing
Farmer & Woodman; Boston, MA; 1857-62; Farmer invented duplexing
Foote, Pierson & Co.; 82-84 Fulton St., New York, NY; 1896-?; Became a major supplier
Frederick, Pearce & Co.; 77-79 John St., New York, NY; c.1875; Distinctive Registers
Frey, Joseph J. B.; 213 Church St., New York, NY; 1870-?; With A. Illig; "self closing" keys
Gaynor Electric Co.; Louisville, KY; c.1875; Fire alarm equipment
Greeley, E. S. & Co.; 5&7 Dey St., New York, NY; 1885-96; To Foote, Pierson & Co.
Hall, Thomas; 13 Bromfield St., Boston, MA; 1842-66; To Palmer & Hall

Henning, Robert; Ottawa, IL; c.1864-73; Superintendent of Caton Shop
Hicks & Shawk; 144 Superior St., Cleveland, OH; 1869-84;
Hicks made repeaters 1858-62; to Telegraph Supply
Hinds & Williams; 318 Washington St., Boston, MA; 1850-56; To Charles Williams, Jr.
Hochhausen, W.; 132 William St., New York, NY; c.1870; Many nicely made instruments.
House, Royal E.; 1848-; Printers, Made by J.B. Richards.
Hughes, David E.; 1855-59; Printers; to G. M. Phelps
Huttman, William E.; 154 S. Water St., Chicago, IL; c.1867; Instruments "made to order";
also Milwaukee Address, With Erpelding, J.
d'Infreville, George; New York, NY; c.1881; Apparently made only keys
Johnson, W. H.; Louisville, KY; c.1870; Superintendent at Western Union's Louisville Shop
Keeling, J. S.; 16 Broadway, New York, NY; 1865-67; Made registers; few if any other instruments.
Knox (J. H.) & Shain (C. J.); 46 ½ Walnut St., Philadelphia, PA; 1855-76;
1876-91 at 716 Chestnut St., surveying instruments
Lannert & Decker; Cleveland, OH; 1877-81; Not often found
Lannert, J. A.; Cleveland, OH; 1876-78; To Lannert & Decker
Lewis & Fowler Mfg. Co.; 27-35 Walworth St., Brooklyn, NY; 1886-87;
"Conklin" keys, few examples
Longstreet, J. H.; 9 Barclay St., New York, NY; 1880-88; Seemed to specialize in sounders
Lundburg & Marwedel; San Francisco, CA; 1869-70; Employed Paul Seiler
Lyman, A. B.; 9 Slater Ave., Cleveland, OH; 1875-80; 91 ½ Seneca St. another address
Lyman, A. B.; 36 S. Water St., Cleveland, OH; 1880-94; To I. H. Moses; appears often
Manhattan Electrical Supply Co.; 54 Water St., New York, NY; 1880-?; 32 Courtlandt in 1888; prolific maker
Merchants' Mfg. & Construction Co.; 50 Broad St., New York, NY; 1872-76; At 40 Broad St. in 1876
Moses, I. H.; 36 S. Water St., Cleveland, OH; 1888-97; Kept Lyman's patterns
National Electric Co.; Milford, CT; c.1890-?; Also had New York office
New Haven Clock Co.; 29 Murray St., New York, NY; 1883-90; Marked "Electrical Dept.;" to National Electric
Nickolaus & Kline; c.1875; "Monitor" relay; very few examples
Norton, J. W.; 177 Broadway, New York, NY; 1852-53; Chester was shop superintendent
Norton, J. W.; 179 Broadway, New York, NY; 1853-55; To Charles T. Chester
Palmer & Hall; New York, NY; 1847-49; Boston in 1850
Partrick, Bunnell & Co.; 38 S. 4th St., Philadelphia, PA; 1872-75; NY office 22 Dey St.; to Partrick & Carter
Partrick & Carter; 38 S. 4th St., Philadelphia, PA; 1867-76; 114 S. 2nd St. 1876-91; 125 S. 2nd St. 1891-97
Pearce & Jones; 64-66 John St., New York, NY; 1872 - ?; Specialized in police and fire systems
Pearce, R. K. & Co.; 54 S. 4th St., Philadelphia, PA; 1878; 38 S. 4th St. 1879; bought Tillotson's Phila. Office
Pennsylvania Railroad Co.; Altoona Shops, Altoona, PA; c.1880;
Distinctive instruments for company use only
Peterson, C.; c.1860; Apparently made keys only; few examples
Phelps, George M.; Troy, NY; 1855-71; Pre-eminent maker; William P. in association
Pierson, E. M.; c.1860; Apparently made keys only; few examples
Pike, Benjamin, Jr.; 291 Broadway, New York, NY; c.1880;
Dial telegraphs; primarily a lab instrument maker
Pope, F. L. & Co. 194 Fulton St., New York: 1869-72; 38 Vesey St. 1873-74; 80 Broadway 1874-?
Pope, Edison & Co.; 78-80 Broadway, New York, NY; c.1869; To F. L. Pope & Co.
Post & Co.; Cincinnati, OH; c.1878; Few examples
Putt, D. W. & Co.; Wellsville, OH; 1870-74; Mechanical practice sets
Redding Electrical Co.; 30 Hanover St., Boston, MA; 1884-85; Few examples
Redding, Jerome & Co.; 30 Hanover St., Boston, MA; 1877-82; Presumably to Redding Electrical
Richards, J. B.; 621 Grand St., New York, NY; 1854; Made Registers
Sargent, William D.; 812 Race St., Philadelphia, PA; c.1871; To U.S. Telegraph & Supply Co.
Schuyler & Smith, 1843, Registers 100 pounds plus.

Seiler, Paul Electrical Works; 406-08 Market St., San Francisco, CA; 1888-1916; Few examples
Shawk & Barton; 98 St. Clair St., Cleveland, OH; 1869; Very few examples
Shawk & Foote; 55 Center St., Cleveland, OH; 1870; Very few examples
Shawk, George W.; Cleveland, OH; c.1870; Shawk was Western Union Shop Superintendent
Sherman & Lyman; Oberlin, OH; c.1875; Very few examples
Speedwell Iron Works; Morristown, NJ; 1837-38; Alfred Vail, William Baxter Principals.
Standard Electric Co.; 502 4th Ave., Louisville, KY; 1887;
410 3rd Ave. in 1888; "M.Biggs" Key Pat'd 10/20/1886
Standard Electric Works; Cleveland, OH; 1883-84; Made "Stevens" keys
Telegraph Supply Co.; 40 Public Sq., Cleveland, OH; 1878;
Related to Telegraph Supply & Mfg. Co.?
Telegraph Supply & Mfg. Co.; 130-34 Champlain St.,Cleveland, OH; 1871-84; To W.B.Cleveland
Tillotson & Co.' 262 Broadway, New York, NY; 1862-65; J. S. Keeling a partner
Tillotson, L. G. & Co.; 8 Dey St., New York, NY; 1865; E. S. Greeley a partner
Tillotson, L. G. & Co.; 26 Dey St., New York, NY; 1865-67; 11 Dey St. 1868-72; 8 Dey St. 1872-79
Tillotson, L. G. & Co.; 5 & 7 Dey St.; 1879-85; To E. S. Greeley & Co.
U. S. Telegraph & Supply Co.: 812 Race St., Philadelphia, PA; c.1872; Few examples
Union Electric Co.; New York, NY; c.1875; Apparently made keys only
Utica Fire Alarm Telegraph Co.; 106-08 Liberty St., Utica, NY; 1879-88;
Apparently made practice sets only
Viaduct Mfg. Co.; Relay Station, Baltimore, MD; 1884;
Primarily made practice sets; at 4 S. Howard in 1894
Watts & Co.; 47 Holliday St., Baltimore, MD; 1872-78; To Davis & Watts 8/18/78
Welch & Anders; 30 Hanover St., Boston, MA; 1876-78; Printers only; to Jerome Redding?
Western Electric Mfg. Co.; 220 E. Kinzie St., Chicago, IL; 1872-84; "Mfg" dropped in 1884; had other offices
Williams, Charles, Jr.; 109 Court St., Boston, MA; 1856-78; To Western Electric Mfg. Co.

**Part II: Distributors, agents, or others who probably did not make the instruments on which their names appear**

American Electrical Works; 461 Clark Ave., Cleveland, OH; 1894
Anderson Bros.; Peekskill, NY; c.1875; Practice sets
Ayers, Tillotson & Co.; 333 Chestnut St., Philadelphia, PA; 1865-67
Barber, Palmer & Jones; Utica, NY; c.1875; To Utica Fire Alarm Telegraph Co.?
Bliss, George H. & Co.; 41 3rd Ave., Chicago, IL; 1873-75; To Western Electric Mfg. Co. 4/15/1875
Bliss, George H. & Co.; 220 E. Kinzie St., Chicago, IL; 1876-79; At 76 Market St. 1879; to Electric Merchandising
Bliss, Tillotson & Co.; 126 S. Clark St., Chicago, IL; 1868-70; Also at 171 S. Clark St.
Bliss, Tillotson & Co.; 54 S. 4th St., Philadelphia, PA; 1874
Crain, George H. & Co.; 145 S. Clark St., Chicago, IL; c.1871
Day, W. E. & Co.; Pittsfield, MA; 1876; Practice sets
Delaney Patent Relay Co.; 61 Broadway, New York, NY; 1881; Partrick & Carter made Delaney's keys
Durant, Charles; 86 Nassau St., New York, NY; 1869; May have been connected with Pope
Electric Merchandising Co.; 76 Market St., Chicago, IL; 1879; George H. Bliss manager
Fleischmann's Electrical Works; 1226 Chestnut St., Philadelphia, PA; c.1875; Practice sets
Fleming, Potter & Co.; Pine & Chestnut Sts., Philadelphia, PA; 1870-71; At 2nd & Chestnut Sts. 1871-?
Gilliland & Co.; 41 Dey St., New York, NY; 1875
Gray & Barton; 162 S. Water St., Chicago, IL; 1869; 479 State St. 1870-72; to Western Electric Mfg. Co.
Grinnell, H. B. & Co.; 7 Murray St., New York, NY; 1875-76
Jenkins, M. R.; Browning, MO; 1886
Jones, C. E. & Bro.; Pike's Opera House, Cincinnati, OH; 1878-80; 51 W. 4th St. 1880-82; Carlisle Bldg. 1882-87

Jones Electrical Mfg. Co.; New York, NY; c.1890; Bunnell agent?
Keating Electrical Co.; Corry, PA; c.1880
Mack, F. G. & Co.; 55 ½ Frankfort St., Cleveland, OH; 1877-?
Maynard, George C.; 1711 G St. N.W., Washington, DC; 1874; Agent for D. W. Putt & Co.
Morgan, B. L. & Co.; P.O.Box 122, Louisville, KY; c.1886; Agent for "M. Biggs" key pat'd 10/26/86; few examples
Pennsylvania Telegraphic Agency; Waverly Heights, PA; 1874-?
Pope, R. W.; Box 5278, New York, NY; c.1876;
Rogers, H. D. & Co.; 161-65 Pearl St., Cincinnati, OH; c.1878
Rosenfeld, Eugene I.; Baltimore, MD; c.1875; Agent for Watts
Shaw Electric Co.; Philadelphia, PA; c.1880; Practice sets
Smith, F. C.; 1041 Penn Ave., Pittsburgh, PA; 1886; "Herbert" key
Springer, L. C.; 162 S. Water St., Chicago, IL; c.1865
Ware, H.; Cincinnati, OH; c.1865
Wessman, G.C. & Son; 209 Centre St., N. Y., NY; 1871; Gustav listed in 1853 at 11 Spruce St.

**Part III: Makers or, agents believed to have telegraph interests but for whom more information is needed:**

Blattner; St. Louis, MO; c.1851
Bulkley, Charles S.; c.1848
De Mier, John R.; Coulterville, IL; 1877
Dent; c.1865
Donaldson, Dr. R. B.; Washington, DC; c.1848
Empire Electrical Mfg. Co.; 27-38 Walnut St., Brooklyn, NY; c.1887
Mona Mfg. Co.; P.O. Box 178, Newark, NJ; 1874; "Snapper" sounders.
Palmer & Barber; Utica, NY; To Utica Fire Alarm Co.
Rogers, Henry J.; New York, NY; c.1850

( List Reformatted by Randy Cole and Tom Perera)

Legend: ("General line") Products include at least keys, sounders and relays.
(A) May have been an agent only, and probably not an instrument maker.
(V) Verification sought that this firm actually made instruments.
(S) Succeeded by ...

**Industry Leaders to circa 1890:**
This is only speculation based on the frequency with which instruments seem to appear in collections, extent of advertising, etc., but the dominant makers in approximate order were:

Bunnell; Western Electric & Tillotson/Greeley, tied; Partrick & Carter; Phelps; Williams; Redding; New Haven Clock Co; Clark, Chester & Chubbuck, tied; Watts, Buell, DuBois, Lyman and Pope not far behind.

In the 1890s Manhattan Electrical Supply Co. was a very large supplier, but Bunnell and Greeley (the "Ludwig" mechanical set) actually may have provided many if not all of their instruments. Some Manhattan catalogs show illustrations of instruments labeled "Bunnell."

**Other Notables in Instrument Development:**
There were many inventors/engineers who contributed substantially to instrument development, such as Milliken, Stearns, Curtiss, Toye and others. They are not listed individually because they apparently did not make instruments other than for patent purposes.

**Why Sounders Replaced Registers**
"By 1849, operating by sound was becoming prevalent... The reception by register, the constant winding, the mistakes made by copyist caused by imperfect hearing, the whirr of the wheels, the breaking of the weight cord and the howl caused by damaged toes, the delay, the labor of all this was palpable and sought deliverance... It soon became, for all

# MANUFACTURERS OF BUGS

## LISTS OF MANUFACTURERS OF AMERICAN AND FOREIGN BUGS (Revised in 2006)

Neal McEwen - K5RW - email:k5rw@telegraph-office com

(*) Denotes manufacturers which have not been previously researched. They are described in detail at: http://telegraph-office.com

(+) Denotes bugs added to this list by Tom Perera using information from the Doug Seneker Bug List, & the Gil Schlehman and Tom Perera collections.

| AMERICAN MANUFACTURER | LOCATION | DATE(s) |
|---|---|---|
| *A-to-Z Electric Novelty Co. (ATOZ) | Chicago, Ill. | pre-WWI |
| A.E.Co ("Improved Vibroplex") | Chicago, Ill. | pre-WWI |
| Abernathy | Hampton, Va | 1916-19?? |
| +Advance Relay Co. | ???? | ???? |
| +Air Hawk | ???? | ???? |
| *Bell Novelty Co. | Cedar Rapids, Iowa. | 1949-1950s |
| *Boulter,R.L. | Los Angeles, Cal | 1913-1920 |
| *Breedlove (Codetrol) | Atlanta, Ga. | 1950-1951 |
| *Brooklyn Metal Stamping Co. (Speed Bug, J-36) | Brooklyn, N.Y. | 1930-1942 |
| Brown Brothers. (CSA Combination) | St.Louis, Mo. | 1967-1975 |
| *Bunnell,J.H. (Original, Gold Bug,) | New York, N.Y. | 1926-1960 |
| (CJB-26009A, J-36, Bunnell-Martin Flash Key, etc.) | | |
| +Bureau of Engineering 26009A by: Bunnell, | New York | 1940s |
| *Cardwell, A.D. | ???? | ???? |
| +Central Typewriter Exch.(Dununit) | New York | 1922 |
| Clark,James (Rotoplex) | Louisville,KY | 1942-1945 |
| +Conkling, D.C. | Pittsfield, MA | 1912?c1 |
| +Conkling, James (George W.?) | New York | 1908 |
| +Cope | ???? | ???? |
| Cote,O.E. | Canada? | 1930s |
| *D&K Mfg. (Dinger) | Cleveland, Ohio | 1909-1920 |
| +Davis | Seattle | 1950s? |
| *Delaney Telegraphic Transmitter Co. (Auto-Dot) | New York, N.Y. | 1907-1924 |
| Dow-Key | Minnesota & Maine | 1940s-1960 |
| *Dunn,Thomas J. (Dunnduplex) | New York, N.Y. | 1909-1913 |
| Electric Specialty Co. (Cedar Rapids Bug. Speed Key) | Cedar Rapids, Iowa | 1939-1955 |
| *Electro Mfg. (Electro Bug) | San Francisco, Fresno | 1924-1934 |
| *Emory,A.H. (Go-Devil) | Poughkeepsie, N.Y. | 1934-1950 |
| +General Metalcraft Ltd. (Gem) | Boston, Mass | 1960s? |
| *Go-Devil Instrument Co. (See Emory) | Poughkeepsie, N.Y. | 1958-?? |
| Hulit (Hulit Key-Wound Bug) | Topeka, Ks | 1909-1911 |
| Hunter, David (Apex) | Tampa, Fl | 1935-1965 |
| Johnson,E.F. (SPEED-X) | Waseka, Minnesota | 1955-1970 |
| Kenmore (Kenco) | Boston, Ma. | 1934-1941 |
| +Kenwood (Split-lever bug) | ???? | 1940s |
| *King & Co. ("Orig. Am. Vibroplex") | Cincinnati | pre-WWI |
| *Leach Relay Co. (Speedoplex) | Los Angeles | 1920-1930s |
| Lionel Electric Co. | New York | 1942-1945 |
| Lippencott | ???? | pre-WWI |
| Logan,Les (SPEED-X) | San Francisco, CA | 1928-1955 |
| MacDonald,Wm. | Chicago,Ill. | pre-WWI |
| Martin,Horace G. (Vibroplex) (Autoplex, Rotoplex) | Brooklyn,N.Y. | 1903-1914 |
| *Martin Research & Mfg.(Flash Key) | N.Y. | 1933-1939 |
| +Marvel (Marvel) | Chicago, IL | |
| +Mason, Howard (Moto-Key) | Seattle, WA | 1939 |
| McClintock, O.B (Keen-Kode) | Minneapolis, Minn. | 1931-???? |
| McElroy, T.R. (Mac-Keys & others) | Boston, Mass. | 1934-1955 |
| Mecograph | Cleveland, Ohio | 1906-1913 |
| Melehan (Valiant) | Anaheim/Huntgtn Bch CA. | 1939-1947 |
| Mt. Auburn Specialty Co. | Cincinnati, Ohio | pre-WWI |
| National Transmitter Co. | New Jersey | 1920-19?? |
| +New Haven Clock Co. | New Haven, CT | ???? |
| *Pat Products | Roseland,N.J. | ???? |

| | | |
|---|---|---|
| +Peerless Mfg. Co. | Fordson, MI | 1930s? |
| +Perry, G.S. Mfg. (Tinsley Trans.) | Kansas City, MO | 1911 |
| Philadelphia Thermo. Inst.(Triplex) | Philadelphia | 1924-1926 |
| *Postal Telegraph | ???? | Before 1943 |
| +Precision Thermom. (Lytle Triplex) | Philadelphia, PA | 1920s |
| +Radio Electronics Laboratories(REL) | Long Island City,NY | 1940s? |
| +Saney Metal Products Co. Inc. | Cleveland, OH | ???? |
| *Sarno, J.J | ???? | ???? |
| Signal Electric (Sematic) | Michigan | 1928-1934 |
| +Simplex Co. (Leiser's Simplex) | Salt Lake City, UT. | 1907 |
| Specialty Shoe Mach. (Shawplex) | St. Joeseph, Mo | 1916 |
| *Speed-X Radio Manufacturing | San Franciso, Ca. | 1933 |
| *Standard Radio (Standard) | New York | 1930s ? |
| Starkins,W.R. (Equable) | Rochester, N.Y. | 1940s |
| Telegraph Apparatus Co. | Chicago, Ill. | 1943-1950 |
| +Teleplex Co. (Telespeed) | New York, NY | 1935 |
| *Thomas,O.M., Electric | ???? | pre-WWI |
| +Tinsley Transmitter: See Perry,G.S. | | |
| Ultimate Transmitter Co. ('73') | Los Angeles | 1925-1932 |
| United Electric Mfg. (Vibroplex) | Norcross, Ga | 1903-1910 |
| *Vailograph International Co | Minneapolis, Minn. | 1908-1912 |
| Vibroplex | New York, Maine | 1914-pres. |
| Western Electric | New York, N.Y. | 1916-???? |
| *Westinghouse Air Brake | Wilmerding, Pa. | ???? |
| *Wheaton Res. & Dev. (Go-Devil) | Wheaton, MD. | 1930s-1950s |
| +Zip | ???? | ???? |

| **FOREIGN MANUFACTURER** | **LOCATION** | **DATE(s)** |
|---|---|---|
| +Bech (Bech Bug) | Switzerland. | 1942-43 |
| +BMR (Codemaster) | Sydney, Australia | ???? |
| +Brown, Rolf. (Xograph) | Toronto, Canada | 1930s? |
| +Buzza Products Co. (Buzza) | Australia | 1940s? |
| +Charlottenburger Motoren und Geratbau (Novoplex) | Berlin, Germany | 1940s? |
| +China Scientific Instrument Co. | Shanghai, China | ???? |
| +Cohen, Leo G. (Simplex Auto) | Melbourne, Australia | 1923 |
| +Dentsuseiki Co. (Swallow) | Japan | 1950s? |
| +Dow-Key (Dow-Key) | Canada | 1940s |
| +Drescher, Felix (Felix Drescher bug)JEDA, | Germany | 1950s-60s |
| +Eddystone | England | 1948 |
| +Frattini, Alberto. (I1QOD BUG) | Italy | 2000s |
| +Fujiseikosha | Japan | ???? |
| +Goerge, Georg (Bug 001) | N.S.W. Australia | 2000s |
| +Hannes Bauer | Germany | 1965-1975 |
| +HB9FAE | Switzerland | 2000s |
| +Hi-Mound (BK-100) | Japan | ???? |
| +Hirschmann | Germany | 1935 |
| +Hitchcock Brothers (See Thomas). | Adelaide, Australia | 1918 |
| +Hobart Autobug | Australia ?? | ???? |
| +I1QOD | Italy | 2000s |
| +Ingram, H.C. (Ingram Master Key) | Perth, Australia | ???? |
| +Japan Radio Co. (JRC) | Japan | ???? |
| +Jablonsky (FME-33 Mini Novoplex) | Berlin, Germany | 1960s-1970s |
| +Jelectro (Same as Hi-Mound BK-100) | Japan | ???? |
| +Johnsson,Sture:(SM7XY / Harlosa bug)Vaxjo, | Sweden | 1946 |
| +Junker | Germany | ???? |
| +Levensons Radio (Like-A-Flash) | Sydney, Australia. | 1950s |
| +Llaves telegraphicas Artesanas(GMSO) | Balearic Islands | 2000s |
| +MacDonald, A. (Pendograph) | Australia | ???? |
| +McCarthy, A. & W. | Aukland, New Zealand | 1968 |
| +Merrick, John B. | Scarborough, Ont. Can. | ???? |
| +Mikasa Radio Co. | Kobe, Japan | ???? |
| +Muse | Japan | ???? |
| +Northampton Plating Bug: | England | ???? |
| +Novoplex | Germany | 1940s |
| +Parcusio, Lou A. (Parcusio) | Melbourne, Australia | ???? |
| +Radio-Lune (Vibro-mors) | Paris France | 1953-1965 |

| | | |
|---|---|---|
| +Ragar Ltda Inds Mech Electro | Bogota, Columbia | ???? |
| +Robley & Tough | Perth, Australia | 1920s |
| +Scash, J. (shurdot) | Mordailloc, Australia | ???? |
| +Schurr, Gerhard | Germany | ???? |
| +Skillman | Japan | ???? |
| +Steele, R.W. (Auto Plex) | Winnipeg, Canada | 1910 |
| +Swedish Radio Co. (Bug 140) | Sweden | 1960s+ |
| +Tahua Electric Works(Chinese Bug) | Shanghai, China | ???? |
| +Telefunken | Germany | ???? |
| +Thomas, N.P. (See Hitchcock Bros.) (Automorse Fully automatic) | Adelaide, Australian | 1918 |
| +Tricity House. (Supreme) | Christchurch,NewZealand | 1986 |
| +Ujiie, Toshihiko: JA7GHD (GHD bug) | Sendai City, Japan. | 2000s |
| +Vaille, J. | Burwood,Vict.Australia | 1950s |
| +Vibrax (Model 02 & 03) | Italy | ???? |
| +Wilcox | Canada | ???? |
| +Wilson Mfg. Co. (Wilson) | Toronto, Canada | 1940s |

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**[ <— 2.5 inches —> ] 3in —>|3.5in—>]**

**BASE WIDTHS OF VIBROPLEX BUGS:**

(Measure from left side to right side of base.)

(From Tom French: Vibroplex Pocket Reference.)

**3.5-inch: Vibroplex Original, 2-Lever, Model "X", Lightning (No. 6), & Champion.**
**3.0-inch: Vibroplex Junior and Zephyr.**
**2.5-inch: Vibroplex Blue Racer (No. 4).**

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**APPROXIMATE DATES OF MANUFACTURE OF VIBROPLEX BUGS**

**John Elwood - WW7P** has been gathering information about Vibroplex keys for many years. He has been able to reconstruct many of the dates of manufacture of the various models of Vibroplex keys which had been lost in the Vibroplex fire. His complete list of dates and data is published in The Vibroplex Collector's Guide by Tom French. The following information briefly summarizes these published findings:

To use this summary, first find the **serial number** of your Vibroplex. It will be stamped into the label on later models and into the damper or sometimes other parts on earlier ones. Then use this table to find the **approximate year it was made**.

| SERIAL No. - YEAR | SERIAL No. - YEAR | SERIAL No. - YEAR |
|---|---|---|
| **001,000 - 1905** | **150,000 - 1946** | **Portland, ME** |
| **002,000 - 1906** | **160,000 - 1948** | **390,000 - 1979** |
| **003,000 - 1907** | **170,000 - 1950** | |
| **006,000 - 1908** | **180,000 - 1953** | **Two sets of** |
| **010,000 - 1911** | **190,000 - 1955** | **Numbers:** |
| **020,000 - 1912** | **200,000 - 1957** | **001,000 to** |
| **050,000 - 1913** | **210,000 - 1959** | **008,000** |
| **060,000 - 1917** | **220,000 - 1961** | **AND** |
| **070,000 - 1919** | **230,000 - 1962** | **040,000 to** |
| **080,000 - 1920** | **240,000 - 1964** | **080,000** |
| **090,000 - 1923** | **250,000 - 1967** | **in the years:** |
| **100,000 - 1927** | **260,000 - 1969** | **1980 to 1995** |
| **110,000 - 1937** | **270,000 - 1972** | |
| **120,000 - 1942** | **370,000 - 1974** | **Mobile, AL** |
| **130,000 - 1944** | **380,000 - 1976** | **100,000 - 1995** |

# LIST OF BUGS

**THE BUG CHECKLIST:** List & Descriptions of Full & Semi-Automatic Bugs.
Doug Seneker N0WAN: Editor. First Edition. August 17, 1995
Revised and expanded (+) in 2007 by Tom Perera using information from the
Gil Schlehman and Tom Perera collections and input from many collectors.
(NM) Signifies information from the Neal McEwen Bug Manufacturer's List.

**ABERNETHY:** 1916: Very rare. Only 3 salesmen's samples believed to have been made, and these are in collections. Two paddles, tiny 2x4" metal base, made in Hampton, VA. Mfg halted due to infringement of Vibroplex patent.
+ **A. E. COMPANY:** Chicago, IL. No Further Information but might have been made by A-to-Z. (NM)
**AIR HAWK:** Has damper like a Vibroplex lightning bug. (NM)
**ALBRIGHT:** See VIBROPLEX LICENSED COPY.
**APEX HUNTER:** Early prototype mfg by David Hunter. Single, long paddle, wrinkle paint. Brass lacquered finish. Few made.
**APEX II:** 1963: Mfg by David Hunter Tampa, FL. Wooden base, brass finish. Single lever held by 2 coil springs. Very limited production.
**ATOZ, FIRST MODEL:** Copy of Vibroplex Original made by A TO Z Electric Novelty Co., Chicago. Usual U-shaped dot spring replaced by small cylindrical contact mounted on pendulum at right angles. Nameplate says "Improved Vibroplex". Some also bear "Albright License" plate. Two heights of frame encountered.
**ATOZ, MODEL:** 1912: Copy of Vibroplex Model X. Nameplate in same spot but has ATOZ designation and square corners. Screws for feet do not extend completely through base and base has more rounded corners.
**AUTO-DOT, FIRST MODEL:** 1906: Made by Delany Telegraphic Transmitter Co., NYC. Wooden base on steel sub-base. Lever, on right side of base, connects to cross-arm which causes full-length pendulum on left side of base to move. Weight is at left front, near the paddle.
**AUTO-DOT, SECOND MODEL:** 1908: Straight-line pendulum and lever, but with damper at left rear. Some have cloverleaf logo embossed in top of wooden base portion bearing letters "D T T C" on four leaflets. Both models have conventional finger knob and thumb paddle.
**AUTOMORSE:** 1920's: Hitchcock Bros. (Designed by Norman Percy Thomas) 3-lever, Mfg in Adelaide, Australia. Full or semi-automatic. 3 finger pieces. Solid frame. Second, extra-large weight produces dashes in usual way.
+ **AUTO PLEX:** Ca. 1910: Winnipeg Canada. Made by R.W. Steele. Heavy Copper plated metal base. Round vertical posts. Horizontal bar across top of tubular frame. Long shorting bar on right side. Label reads: The Auto Plex Mfg by R.W.Steele, Winnipeg, Man. One known serial number is 824.
**AUTOPLEX, FIRST MODEL:** 1902: Horace G. Martin, NY. Electric vibrator made dots. Wooden base similar to telegraph relay. Nothing located above the two coils. Two knobs back-to-back on flat spring.
**AUTOPLEX, SECOND MODEL:** Ca 1903-5: Mfg by Martin in NY and by United Electrical Mfg Co, NY & GA. Metal base. Some mechanism placed above coils.
**AUTOPLEX, THIRD MODEL:** Conventional finger and thumb pieces on single lever. Long, vertical flat spring in center.
+ **AUTOPLEX:** 1950s: Made by J. Vaille in Burwood, Victoria, Australia. Very modern looking bug with enclosed frame and damper and large AUTOPLEX Label.
+ **A.& W. McCARTHY:** 1968: Auckland, New Zealand. Looks very much like a Lightning Bug. Green or Red Base. Label reads: A & W. McCarthy, Dunedin & Invercargill.
+ **BECH BUG:** 1942-1943: Schwartzenburg, Switzerland.
+ **BELL NOVELTY Co:** Cedar Rapids, Iowa. Inexpenisve right-angle bug. (NM)
**BOULTER:** 1914: R. L. Boulter Co., L. A. Had assembled frame and flat pendulum like Lightning Bug. Patent 1110373 bought out by Vibroplex.
+ **BRADYPLEX:** Maker Unknown. Cast bronze base. Nickel plated parts. Only 1 known to exist.
**BROOKLYN METAL STAMPING CO:** U.S. Army Signal Corps J-36 similar to Vibroplex. "J-36", stamped on underside. Also a civilian model, see SPEED BUG.

**BROWN BROTHERS MODEL CSA:** Early 1960's: Combination bug & straight key on one base. Mfg by Brown Bros. Machine Co, St. Louis. Black wrinkle finish base, red knobs. Vibrating portion of bug extends far beyond end of straight key part over a special screwed-on thin sheet metal black wrinkle-finish extension. It looks as though this CSA was made using a Brown Brothers "UTL" combination straight key / paddle base that was modified with the bug extension.
**+ BUG 001:** Made by Georg Goerge, N.S.W. Australia. Looks like a Lightning bug with heavier hardware and extended pendulum. Optional solid brass base.
**BUG 140:** Swedish Radio Co. Has base similar to T-frame Mac Key. Silver-gray painted finish.
**+BUNNELL ORIGINAL BUG:** Patented in 1915 by Bunnell president John Gehegan. Unique Release-of-Tension design with lever that curls around under the main spring. It led to the design of the Gold Bug. Only one known example.
**BUNNELL GOLD BUG:** 1927-8: Gold-plated name plate. One style has single round paddle; another has swivel paddle; another with knob & rounded paddle and split lever. Single contact for both dots and dashes. Brass construction.
**BUNNELL SPEED KEY:** J. H. Bunnell & Co. WWII Navy MODEL CJB 26009A contract. Resembles Vibroplex Lightning Bug. Nickel parts on black wrinkle base. 3 feet. "Property of U. S. Navy" cast in bottom. Issued with black case bearing ID plate similar to that on key. Also Army J-36 version made.
**BUNNELL-MARTIN FLASH KEY:** See FLASH KEY.
**+ BUREAU OF ENGINEERING:** 1940s: 26009A Stamped "Property of US Navy". (Made by Bunnell).
**BUZZA BUG:** Australia, mfg by Buzza Products, no model no. on ID plate. Resembles Lightning Bug but has unique stepped base, wider in rear. Post damper on right with arm extending out to left.
**BUZZA MODEL 100:** Australia, mfg by Buzza Products. Assembled triangular frame. Has round weight on flat pendulum. Rubber damper attached to rear binding post. Main arm mounts between two posts. A double lever model with Post damper on right with arm extending out to left was also made.
**+ CARDWELL, A. D:** Dual lever bug. (NM)
**+ CHINESE BUG:** Made by Tahua Electronics in Shanghai, China. Label in English. Medium size bug with heavy and thick chrome-plated base and plated Speed-X style movement and hardware. Thick paddle with slight indent for finger and thumb knob to right.
**+ CHINESE BUG:** Made by China Scientific Instrument Co. in Shanghai. Looks just like the above Tahua Bug. Medium size bug with heavy and thick base wrinkle-finish black painted base and black Speed-X style movement and hardware.
**+ CODEMASTER:** Made by BMR Products in Sydney, Australia. Flat bridge like a Simplex Auto located over the right angle mechanism.
**CODETROL:** 1950: B. H. Breedlove, Atlanta, GA. Right-angle bug, enclosed. 175 bel'd sold overseas; perhaps only 25 in US. Black wrinkle finish, two paddles at right.
**COFFE VERTICAL:** 1906: Wm. 0. Coffe, patent assigned to Benjamin Bellows, dba MECOGRAPH Only one known specimen exists.
**CONKLING KEY:** 1908: Used mainline telegraph battery and large, cylindrical coil to form dots electromechanically. Two paddles & arms, paddles connected by long bolt. Lever on left rear selects various resistances. Mfg by George Conkling, NY. Another Conkling bug was made by D.C. Conkling of Pittsfield, MA as mentioned in the July, 1912 Railroad Telegrapher. (NM)
**+ COPE BUG:** Narrow Bug with cast uprights for contacts and adjusting screws. Unplated brass hardware. "The Cope" Cast into base.
**+ COTE BUG:** O. E. Cote. Probably made in Canada. Small bug with cast uprights for damper and all frame and adjusting points. O.E. Cote stamped into top of lever.
**CR (CEDAR RAPIDS) SPEED (KEY FIRST MODEL):** Electric Specialty Mfg. Co, Cedar Rapids, IA. Original bugs had cast base, cast damper support, straight circuit closer on right side.
**CR TELEGRAPH SPEED KEY (SECOND MODEL):** Stamped damper support, right-angle circuit closer under paddles, extension arm for pendulum. Also a similar "Radio Bug" made without a circuit closer and available in kit form or assembled.
**CEDAR RAPIDS SPECIALTY BUG:** (New Old Stock): Electric Specialty ceased production of keys & paddles in 1957. Inventory sold to Jim Hess who produced "New, Old Stock" bugs & paddles using 3/8 steel bases. Other variants by Doug Seneker, owner since 1994.
**+ DAVIS:** Made in Seattle, Washington. Elongated teardrop chromed base with very modern streamlined frame.

**DELANEY TELEGRAPHIC TRANSMITTER:** See AUTO-DOT, Two models.
**DINGER:** D & K Mfg, Cleveland OH. Right angle with fixed round weights in center. Circuit closer on right side. Coil tension spring on left adjusted by string wound on knob, as with early telegraph relays. Some mechanism located beneath-base. Two paddles. Very similar to early 1907 Mecograph, also made in Cleveland.
**DOW KEY, STRAIGHT BUG:** Canada, 1920's Paul Dow, Dow Key Co, Winnepeg. Resembles Vibroplex Original. Thumb and fingerpiece fit into slot in dash lever. Long main-spring with dot spring assembly fastened to mainspring rather than to pendulum. Frame attached to base with only one bolt, typical with DOW KEYS. Chrome base and hardware but brass frame is painted black wrinkle. Square thumbpiece and round finger-piece. Later variation has burgundy, oval thumbpiece and round fingerpiece and change in damper. Also made in Brewer Maine.
**DOW KEY, "BENT BUG":** Canada, Dow Key Co, Winnepeg. Frame, lever, pendulum, & posts all inclined to the right 15 degrees. Damper suspended on arm between two posts. Bronze base and hardware. Solid frame. Also made in Brewer Maine.
**DOW KEY, "UNIVERSAL" CANADIAN:** Canada. After 1949 also sold through same Co. in Warren, MN with US patent no. added to nameplate. Circular frame with lock-screw on top permits rotating mechanism to desired angle, 30 degrees right, left, or any point between. Chrome base 15/16" thick.
**DOW KEY, "UNIVERSAL" AMERICAN:** Dow Key Co Inc, Warren, MN (purchased from Canadian Co.) Rotatable bug similar to Canadian version but with slightly thinner base, Warren, Minn. and US patent on nametag, and lock screw on left side of frame. Base chrome, gray wrinkle or black wrinkle. Also made in Brewer Maine.
**DUNDUPLEX, DOUBLE LEVER:** 1909: Thomas J. Dunn, NY. Full Auto. Two round paddles, pendulums and weights. Had two buttons on top which could be pressed to form dots and dashes. Hex-shaped weights, thin base on wooden sub-base. Early models advertised as the "Peerless Key". (NM) Some have Albright license plate (see VIBROPLEX LICENSED COPY.)
**DUNDUPLEX, SINGLE LEVER:** Semi-automatic, round paddle with circuit-closer knob just to right. Flat spring attached at center rear of base. Assembled frame.
**DUNUNIT:** Ca 1922: Single round paddle, with vertical pendulum pivoted at bottom. Irregular-shaped base . Described as the "First semi-automatic sending machine ... that functions under the control of a single unit". Sold by Central Typewriter Exchange, NYC.
**EDDYSTONE S689:** 1948: British. Unusual curved paddle. Conventional mechanism under a cast aluminum, pear-shaped shell. Only 500 made.
**ELECTRO-BUG (ELECTRO-MECHANICAL MODEL):** 1927: Electro Mfg Co. Fresno (later S.F. CA. T-handle reverse frame. Uses current of telegraph line to operate electromagnet, producing continuous dots. 1/21, steel base with serial no. underneath. Seven-position rheostat/switch selects open/closed and provides 5 choices of resistances (approx .05 - 45 ohms).
**ELECTRO-BUG (MECHANICAL MODEL) (ELECTRO-BUG JR.):** Advertised in 1929 as Model 11 (sold for $11.00 f.o.b. San Francisco & Fresno.) had various base colors. Resembles electromagnetic model with magnet & rheostat removed. Wireless model called "The Radio Bug" also available with 3/8-inch contacts.
**EQUABLE KEY:** 1942: Full-automatic bug made by W.R. Starkins, Rochester, NY. Electric motor-driven. 2 levers w/round paddles. Dot-dash functions could be set for right or L.
+ **FELIX DRESCHER BUG:** 1950s-1960s. Made By Felix Drescher. Jena, German Democratic Republic. Lightning bug clone. Black base. Very rare. Perhaps 20 made. Label reads: Felix Drescher, Feinmechanische Werkstatt, Jena, Theo-Neubauer-Str. 8.
**FLASH KEY:** (As follows): 1938: Martin Research & Mfg Co. 1939 sold to J. H. Bunnell Co. who cont'd basically the same lines with change in nametags. Some have Signal Corps J-36 designation.
**- BUNNELL-MARTIN #5-47 BUNNELL FLASH KEY #1:** First MARTIN FLASH KEY, Appearance of Vibroplex Original but w/U-type damper. Black or chrome base.
**- BUNNELL-MARTIN #5-45 BUNNELL FLASH KEY #6:** Assembled frame, similar to Vibroplex Lightning Bug (Vibroplex model 6). Black or chrome base.
**- BUNNELL-MARTIN #5-46 BUNNELL AMATEUR FLASH KEY:** Frame like Vibroplex Midget but with a 3" x 6 " x 3/8" cast base. NOTE: Bunnell also sold a PIGGY BACK KEY, a straight key which attached to any of the bugs on the right side, but was actually a separate item, not part of a combination bug.

**- BUNNELL-MARTIN #5-48:** Closely resembles Vibroplex Original, with L-damper.
**FUJISEIKOSHA:** Japan, resembles Vibroplex Original but with unusual damper which can lock pendulum to permit use as side-swiper. Damper post has screw and locknut adjustment. 3 feet, black wrinkle base 6-3/8 x 3-1/2 x 1/2".
**+ GEM BUG:** Inexpesively made bug on sheet metal base with thin sheet metal hardware. Made by General Metalcraft Ltd. Boston, MA.
**+ GHD BUG:** 2000s: Made by Toshihiko Ujiie, JA7GHD in Sendai City, Japan. Several models: The "Classic" convertible from single to dual-lever. The Fully automatic "Ultimate" model that is made in conventional and optical sensor-(Convertible from dual to single lever) versions. Very modern looking plated keys. The full automatic versions use the same basic principles as the Melehan Valiant.
**GO DEVIL, (EMORY MODEL):** Mid- 1930's, made by Al H. Emory, Poughkeepsie, NY, also dba Go-Devil Instrument Co. Tapered, cast base, assembled frame, bent-rod damper. Extremely long base, gray wrinkle finish, over 911 long. Similar key with black.wrinkle finish was 1/3 shorter than the gray version.
**GO DEVIL, (WHEATON MODEL):** Mfg by Wheaton Research in early 50's in Wheaton, MD. Tapered base. Paddle is cylindrical piece of Lucite. Dot spring is straight rather than conventional "U" shape.
**GO DEVIL, MODEL U:** 1958: Go Devil Inst. Co. Poughkeepsie NY. Latch on damper permits use as sideswiper. Aluminum construction. White plastic paddle. Components attached to engraved metal plate which is bolted to hollow base, 2 terminals. Later, 3-terminal model permits use also as a keyer.
**+ HANNES BAUER:** 1965-1975: Made in Germany. At least 3 very different Models. Two have a heavy blue/grey base and a large colored paddle. One has a Heavy Black wrinkle-finish base and a massive frame. Different hinge techniques were used with the different models. Some include captive ball- bearings.
**+ HARLOSA BUG:** 1946: Made by Sture Jonsson in Vaxjo, Sweden. Also Called: SM7XY BUG and JW KEYER: Looks somewhat like a Speed-X bug but has a "T" shaped top on the Lightning bug style frame. Green smooth and wrinkle finish bases. About 100 made. Sold by Raiolaboratoriet in Harlosa Sweden.
**HI-MOUND MODEL BK-100:** Japan, clear plastic cover, bakelite base, one paddle. "Adhesive gum" pad over entire bottom. Still produced.
**+ HIRSCHMANN BUG:** 1935: Made by Hirschmann in Germany. Lightning bug clone. Large square weight.
**HOBART AUTOBUG: Sub-**Miniature. Springs inside base. Only 1 known . Possibly Australian?
**HULIT KEY-WOUND:** 1909: Vibroplex later bought patent. Made in Topeka, KS. Brass upper parts with steel base. Spring wound Has a key, like a clock. Appears to be 2-lever but they come together on one arm. Uses rotating discs.
**+ I1QOD BUG:** 2000s: Made by Alberto Frattini in Italy. An all brass magnetically energized bug with square brass uprights and Red paddles.
**+ INGRAM "MASTER KEY":** Made by H.C. Ingram, Perth, Australia. Flat bridge over pendulum like a Simplex Auto but located over the inline rather than right angle mechanism.
**+ JRC JAPAN RADIO CO:** Made by Japan Radio Company. Marked JRC. Strange narrow bug with bars supporting contacts and adjustments and an odd and lockable spiral damper.
**JELECTRO BK-100:** 1950's: Same as HI-MOUND with lead-weighted base & suction cup feet.
**+ JUNKER:** Made in Germany by Junker. Looks like a Vibroplex Lightning bug. No circuit closer. 1 model made for private use. One model for police with darker gray base. Different knurling. Very high binding posts.
**+ KEEN KODE:** Made by McClintock, Minneapolis, MN. Keyboard style key with 8 numbered keys.
**KENCO:** Ca 1930: Kenmore Co., Boston, MASS. Base is 1/8" bakelite, mounted on a hollow cast iron sub-base. Cast Vibroplex-type frame. Wide dot spring. Post damper
**KENWOOD:** 1940's: Lower half of split lever pivots to left to form dashes. Has unusual cast base.
**+ LIGGETT:** 1914? Tyler, TX. A relabeled A-toZ Original or "X" Model. (NM)
**LIKE A FLASH:** 1950s: Levensons Radio, Sydney, Australia. Assembled frame, wrinkle black base. Resembles Buzza Automatic Key but has conventional base and decal across width of base just before the damper. Circuit closer posts & dot & dash posts have washers at base. Levensons also made a J-36-like bug during WW-2.

+ **LIPPENCOTT:** No Further Information.
**LIONEL J-36:** Lionel Train version of U S Army bug using Vibroplex Lightning Bug design. Plastic nametag on left often missing. WARNING: Label curls up in sunlight.
+ **LLAVES model GMSO:** 2000s: Spanish Key made by Llaves Telegraphicas Artesanas in the Balearic Islands. Wooden Base, Gold-plated hardware. Concentric Sliding Pendulum.
**LOGAN/SPEED-X TRANSITIONAL:** Tentative ID. Has much resemblance to early Speed-X of Les Logan. (See TVC 6, pgs. 3 & 15). 3-1/2 x 6-1/4 black wrinkle finish on 1/2" flat steel base. Reverse frame, (arms extend to the rear to carry the pivots). Seen with both black & nickle frame.
**MAC-KEY, 1934:** Ted McElroy's first bug. T-bar reverse frame. Dot contact located on unsupported metal bar. ID cast into underside of base. Could be turned on left side and used as a straight key by latching pendulum. Two paddles on single arm.
**MAC-KEY, 1935:** T-bar frame, Dot and dash posts cast into base. Only one screw on paddle. V-shaped nickel contact connecting bars. 2 variants, shallow & deep "VI'
**MAC KEY, 1936:** T-bar frame moved forward on base. Two screws on paddle. V-shaped connecting bars now shaped like a wide "U". On late 1936 models the twin paddles are replaced by conventional finger knob and thumb paddle.
**MAC KEY JUNIOR:** 1935-38, Formed sheet metal base & frame. Early model had terminals on left side of frame "box". Later model had terminals on right rear of base.
**MAC KEY, NAVY MODEL:** 1936: Similar to 1937 but has Navy ID plate with "Model CMK-26009", also "PROPERTY OF U.S. NAVY" cast in side.
**MAC KEY, 1937:** Large C-shaped damper support. No wording cast into bottom of base. Civilian version of the Navy Model. May read "PROPERTY OF" on side.
**MAC KEY, 1938, STANDARD:** Similar to 1937 but with larger 2-1/2 x 3-1/2" nameplate & simplified small damper. Black finish. Early models had offset dash lever pivot. Later bugs had Vibroplex style bent-lug dash lever attachment.
**MAC KEY, 1938, DELUXE:** Added circuit closer & "Marbelite" finish. (black with white oversprayi, sometimes the white appears green). Also had a "dot stabilizer" clip on the dot spring.
**MAC KEY, 1939, STANDARD:** T-bar supports widened to accept two screws. Dot lever tension set by a compression spring. Last use of serial numbered name plate.
**MAC KEY, 1939, DELUXE:** "Dot stabilizer" gone. "Marbelite" finish.
**MAC KEY NO. 500:** 1940: Has appearance of model 1939 but has decals rather than a name-plate. Black. No serial numbers. Last of the T-bar Mac Keys.
**MAC KEY NO. 600:** Deluxe model of No.500 with "Marbelite" overspray finish.
**MAC KEY NO. A-400:** 1941: New nameplate but without a serial number. Square, cast frame. Chrome dot & dash posts similar to Vibroplex.
**MAC KEY NO. P-500:** 1941: Frame is separate piece and rounded, arms extending forward in the Vibroplex manner. Chrome dot and dash posts with circuit closer
**MAC KEY NO. S-600 SUPER STREAM-SPEED:** 1941: All chrome, tear-drop shaped base. S-600-PC had platinum contacts S-600-SC had silver.
**MAC KEY NO. CP-500:** 1942: P-500 with chrome frame on gray or black base.
**MAC KEY NO. 500-742:** CP-500 with chrome base.
+ **MacDONALD, WILLIAM:** 1912: Chicago, IL. A dual-lever design. (NM).
+ **MARTIN FLASH KEY:** Martin Research And Mfg. Co. New York. pre-WW-II. No Further Information.
+ **MARVEL:** Chicago. IL. Tiger striped base. (NM)
**MacDONALD PENDOGRAPH:** First and second models: (RIGHT ANGLE, VERTICAL): Pat: 1908: Albert Mac-Donald. Adelaide, Australia. Right angle bug with tubular frame on left supporting vertical pendulum. Blue colored base cut out to allow weight to swing.
**MacDONALD PENDOGRAPH:** Third model: (STRAIGHT, VERTICAL): Arched frame similar to right-angle bug but straight, with dual paddles and thicker base. Both models also called "PMG BUG" as they were used by the Australian Postmaster General's Office. Most were destroyed.
+ **McCARTHY BUG:** See A. & W. McCarthy.
**MECOGRAPH VERTICAL 1904:** properly known as "COFFE" bug. Patent granted in 1906 to William O. Coffe. Benjamin Bellows acquired the rights which were later sold to Vibroplex. One known specimen exists.

**MECOGRAPH COMBINATION BUG/KEY:** 1905: The Mecograph Co, Cleveland, OH Riqht angle, enclosed mechanism. Box has straight key on left, unique H-shaped paddle on right. Wheel on top set dot speed. Ad appeared in Jan, 1905 Comm. Telegraphers' Journal for $10.00, "patent pending."
**MECOGRAPH RIGHT-ANGLE, 1906:** Cleveland OH. Round pendulum with rectangular weight which has moving pointer to indicate dot speed on a numbered bar. Assembled frame which angles across dot and dash levers. Circuit closer at right rear of base Works by release of spring tension. Black japanned pinstriped base.
**MECOGRAPH RIGHT-ANGLE:** 1907 (EARLY MODEL): Fixed, round weights. Coil spring and string extend to left, string is wound by a knob, similar to early telegraph relays and to the Dinger bug (also made in Cleveland, OH). Uses tension-release system to form dots. Frame and circuit-closer similar to model 1909.
**MECOGRAPH RIGHT-ANGLE, 1907 (LATE MODEL):** Also known as No. 3. Rectangular weights on flat spring pendulum. Wedge-shaped pointer indicates dot speed, also slides back and forth to clamp pendulum & set dot speed. Two base types.
**MECOGRAPH RIGHT-ANGLE, 1908:** Assembled frame similar to 1906 but has vibrating pendulum as with the Vibroplex, rather than using the tension-release operation. Circuit closer on left front. Scarce.
**MECOGRAPH RIGHT-ANGLE, 1909:** Fixed round weights, steel base finished in unusual striped pattern similar to gun bluing. 3 patent dates on circuit closer stop; Feb. 13 '06, May 28 '07 and May 5 '08. Speed adjusted by moving clamp on flat spring pendulum. Tension release.
**MECOGRAPH PREMIER (STRAIGHT BUG):** 1911: straight dot spring extends from post on left rear. Assembled frame. Circuit closer at left front. Nickel plated version also. Some have name stamped in top of base. Square pendulum.
**MELEHAN VALIANT:** 1939: Melvin E. Hanson. Fully automatic bug with pendulums for both dots and dashes. Early model had brass, unpainted base but most were painted or in deluxe chrome. Made with Anaheim and Huntington Beach, CA nameplates. The Patent is dated 1943 but he may have been making them before that date. Distinctive, classic.
+ **MERRICK, John B.:** Scarborough, Ontario Canada. All brass. Made as vertical, right angle, and straight Bugs.
+ **MIKASA RADIO CO.:** Kobe, Japan. Looks very much like a Vibroplex Lightning bug but carries the MIKASA label. Very slight differences from Vibroplex include shaped shorting bar knob.
**MOTO-KEY:** 1939: Mfg by Howard Mason, Seattle, WA. Aluminum frame, 110 VAC motor, made automatic dots & dashes using 2 friction discs with cams. Only 3 were made.
**MT. AUBURN:** Mfg by James M. Dickson, dba Mt. Auburn Specialty Co. Sued by Albright for making bugs in conflict with Vibroplex patent. Very similar to Vibroplex Original, with black japanned base. Has Mt. Auburn Decal where Vibroplex plate would be.
**MUSE:** Japan. Heavy round frame, white paddle, damper support is large, inverted "U" 3" base.
**NATIONAL TRANSMITTER CO.:** Ca 1920: Small bug with 2 paddles and short vertical pendulum that swings from the bottom. Mfg in NJ. Resembles DUNUNIT bug (which see). Three models.
**NEW HAVEN:** Nameplate reads "Electrical Dept. N. H. C. Co" (New Haven Clock Co, New Haven, Conn). Hardware mounted on small brass plate. This is atop a wooden base 3-1/4 x 6-9/16 x 7/16 which is on a steel sub-base of the of same dimensions. Brass hardware
+ **NORTHAMPTON PLATING CO.:** England. Heavy black base with stepped levels. Frame is cast with base and extends forward and back with metal cross piece. Terminal posts are black plastic.
**NOVOPLEX:** WWII German bug: believed to have been made by Charlottenburger, Motoren und Geratebau, Berlin. Base is brown bakelite with nickel-plated brass parts. Single, curved paddle. Very low, assembled frame. Thick, flat pendulum, single post damper with nylon stop.
**NOVOPLEX MINIATURE MODEL FME-33:** 1960s-1970s: Made by Jabolonsky in Berlin, Germany. Base is brown bakelite with nickel-plated brass parts. Very low, assembled frame.
+ **ORIGINAL AMERICAN VIBROPLEX:** King & Co., Cincinatti, OH. (NM)
+ **PARCUSIO:** Made by Lou A. Parcusio in Melbourne, Australia. Looks like a vibroplex original with black plastic binding posts.
+ **PAT PRODUCTS:** Roseland, NJ. Bug labeled "Pat Products."

**PEERLESS KEY:** Peerless Mfg Co, Fordson, Mich, per ID plate. Circuit closer on left has no stop. Uses small perm. magnet to attract flat pendulum "at rest".
**+ PENDOGRAPH:** 3 models: See MacDonald.
**+ PIERGRAPH:** 1920s: Robley and Tough, Perth, Australia. Large two lever key with reversed pendulum that swings over the two levers. .
**POSTAL TELEGRAPH:** 1 inch thick cast iron base. Has words stamped in top, "Property of Postal Telegraph Cable Co." Single post damper, square-shaped paddle. Small, solid frame. Much Postal Tel. equipment was destroyed after their merger with Western Union in 1943, making their keys more scarce.
**PMG (POSTMASTER GENERAL) ROTOPLEX:** 1941, designed by Horace Martin. Usual frame replaced by large, round, cover containing 3 sets of ball bearings. Both civilian and Army Signal Corps versions. May bear name of sub-contractor James Clark Jr. Electric Co., Louisville, KY.
**+ RAGAR:** Made by Ragar LTDA Indus Mech. Electro. in Botota, Columbia. Green striped base. Tubular inverted "U" frame. Widely adjustable damper.
**+ REL Bug:** Radio Electronics Laboratories, Long Island, New York. Medium size bug with black binding posts and oval REL label.
**+ ROTOPLEX:** made by Horace G. Martin in New York. Unique round central ball-bearing pivot for lever. Some also made by James Clark of Louisville, KY. One model with Nickel base.
**+ SANEY:** Saney Metal Products: Cleveland, OH. Looks like a Vibroplex Lightning Bug. (NM)
**+ SARNO, J.J:** No Further Information.
**+ SCHURR:** Made by Gerhard Schurr in Germany. Heavy brass base and hardware. Red knobs. Each one is personally made by Mr. Schurr.
**SEMATIC:** Signal Electric Mfg. Co, Menominee, MI. Could be used as a bug or as a sideswiper. Extra contacts by paddle. Extra switch on left resembles the circuit closer. Pendulum latch on damper. Black base. Another model was nickel plated, about 1/3 larger and had a sculpted base.
**SHAWPLEX:** 1916: Designer Wm. E Shaw. Mfg by Specialty Shoe Machinery Co. St. Joe, MO. Square pendulum. Damper weight swings from horizontal arm. Rounded dot springs come from both lever and post.
**+ SHURDOT BUG:** Made by J. Scash in Mordialloc, Victorai, Australia. Like a low Vibroplex Lightning with large flat sheet metal plate over frame. Few Made.
**SIMPLEX (AMERICAN):** Right angle, thick base, two "square" paddles, round coil (resembling small relay or sounder coil) on left rear. Simplex Co, Salt Lake City, UT, circa 1907. Also called LEISER'S SIMPLEX.
**SIMPLEX AUTO (AUSTRALIAN):** 1923: Leo G. Cohen, Melbourne. 8 Models. Most are right angle bugs with nickle-plated flat "bridge" (wide, flat strap which protects the exposed mechanism.) Nameplate on top. Adjustable finger & thumbpieces. "New Improved Model" has pivot screw adjustment extending through top of bridge. Others had pivot screw under the bridge/cover. Fully Automatic inline model.
**SKILLMAN:** Japan. Name on clear plastic cover. Earlier version of Hi Mound but with four rubber feet. Also marketed by Lafayette Radio, Radio Shack, and as the JELECTRO bug. Also see related, earlier SWALLOW bug.
**+ SM7XY BUG:** see Harlosa Bug: Also called SM7XY BUG and JW KEYER.
**SPEED BUG:** Mfg by Brooklyn Metal Stamping Corp, NY. Resembles Vibroplex Original but has vertical dot spring & unusual ball damper. Military version also, see BROOKLYN METAL STAMPING BUG.
**SPEEDOPLEX MODEL 1:** Leach Relay Co, San Francisco. Brass base 5-1/8 x 2-1/2 x 15/32". Post damper with washer. Trapezoidal, solid frame (sloping sides, flat top) with nickel hardware. No serial no.
**SPEEDOPLEX, MODEL 2:** Leach Relay Co. Copy of Vibroplex Original. Has "Pig-tail,, wiring added to dot lever "to assure good circuit continuity." Flat spring tapers down in front to diameter of pendulum. Circa 1930.
**SPEED-X HIGH SPEED KEY:** Ca 1933: Mfg by Stewart Johnson dba Speed-X Radio Manufacturing Co, San Francisco, CA. Rounded nickel frame with reverse arm back to top pivot. Single post damper. Pin-Striped Base. The company was sold to Les Logan in 1937. Speed-X later sold to William M. Nye but they made only some straight keys, no bugs.

**SPEED-X MODEL 500, EARLY (E. F. JOHNSON # 114-500):** T-bar chrome frame like Electro-Bug. 2 paddles, large base 3-1/2 x 6-1/4" Mfg by Les Logan from 1937 to 1946, E. F. Johnson Co. 1947 to 1967. 500-L is left-handed bug.
**SPEED-X MODEL 500, LATE STYLE (E. F. JOHNSON # 113-500):** Late Johnson version. Assembled, Lightning Bug-style frame. Black wrinkle base. 1/8" contacts.
**SPEED-X MODEL 501, EARLY (E. F. JOHNSON # 114-501):** Same T-bar frame as with early 500 but all chrome. 1/4" contacts. Circuit closer. The Logan models, from WWII on, had gray frame & base.
**SPEED-X MODEL 501, LATE (E. F. JOHNSON # 114-501):** E. F. Johnson Co. only. Assembled frame like Lightning Bug but with only one screw on left frame post and a round pendulum. Single post damper. Chrome base, 1/4" contacts.
**SPEED-X MODEL 510, EARLY:** aka SPEED-X JUNIOR: Mfg by Speed-X Radio Mfg Co."square" Vibroplex Original-type frame. Feet cast into base. No nameplate. Post damper with wheel, like Electro-Bug.
**SPEED-X MODEL 510, LATE (E. F. JOHNSON # 114-510):** Ca 1937: Les Logan Mfg. Frame like Vibroplex Original. Rubber feet. Black base and frame with chrome hardware. Circuit closer. Later E. F. Johnson Co version had their nameplate but otherwise the same.
**SPEED-X MODEL 513 (E. F. JOHNSON # 114-513) AMATEUR MODEL:** Made by E. F. Johnson only, similar to Vibroplex Original but with two wedge-shaped fiber paddles. Single post damper and no circuit closer. Black wrinkle base and frame, chrome hardware. Four rubber feet. Dot stop function and dot spring on same screw
**SPEED-X MODEL 515 (E. F. JOHNSON # 114-515) AMATEUR MODEL:** Made by Logan and later, by Johnson. Vibroplex Original style frame. 3" x 6-1/4" base. Black. Two paddles, no circuit closer. Dot spring & stop are on separate screws, Vibroplex-style. (Both functions are on one screw with most Speed-Xs). Wheel and post Electro-Bug style damper. Model number may be on bottom.
**SPEED-X MODEL 520 (E. F. JOHNSON # 114-520):** 1954: Made by Johnson. Like model 515 with circuit closer added and new E. F. Johnson nameplate.
**STANDARD:** Standard Radio Co, NYC. Heavy U-damper. Dot and dash posts slotted at top and mounted on round bases. Husky, solid, square frame similar to earlier Vibroplex Originals. Came in green, red, black and nickel bases. With and without labels.
+ **SUPREME:** 1986: Made by Tricity House, Christchurch, New Zealand. Looks very similar to Vibroplex Original.
**SWALLOW KEY, BK50:** Dentsuseiki Co, Japan. Earlier version of Hi-Mound and Skillman bugs. Plastic frame, damper, base. Has 4 feet, rather than the full-length rubber pad on Hi-Mound bugs.
+ **TAHUA:** Tahua Electric Works. Shanghai, China. Looks like a Speed-X. Chromed base and mechanism.
**TELEGRAPH APPARATUS CO. - CP500:** Chicago, IL. Partnership of Ted McElroy and two others. Base of a Mac Key P-500 but with frame and damper of Vibroplex original, painted black or gray.
**TELEGRAPH APPARATUS CO. - CP800:** Same as CP500 but deluxe, chromed.
**TELEGRAPH APPARATUS CO. - CP510:** Large 4x6.5" base w/hole in wall" frame (vertical chrome piece w/round hole in center).Single post damper. Gray or black base.
**TELEGRAPH APPARATUS CO. - CP810:** Large 4 x 6.5" base with "hole in the wall" frame. Same as CP510 but deluxe, chromed.
+ **TELEFUNKEN 401 BUG:** Made by Telefunken in Germany. Grey Base. Slotted but headless adjusting screws. Frame and hardware like the narrow- base Speed-X 510.
**TELESPEED (TELEPLEX):** Ca. 1935: Right angle bug using wide, flat lever bent 90 degrees. Part of Improved Teleplex code training machine made in NY. The machine embossed copper "tapes". Has single flat damper, screw top terminals, 4 large brass nuts on top of base securing foot screws.
+ **THOMAS:** Ca 1918: Australian fully automatic bug, dual lever.
+ **TINSLEY TRANSMITTER:** G.S. Perry, Kansas City, MO. 1911. Low mechanism with unusual pivot at far end of lever.
**TRIPLEX, LYTLE:** Mid-20's, Precision Thermometer and Instrument Co., Phila. PA. Mechanism rotates to permit its use as a right or left-handed bug, or, in center position as a straight key. Brass. Round paddles on lever with two sharp bends. Square pendulum arm.

**ULTIMATE 73:** Mid-20's: Ultimate Transmitter Co. Los Angeles. Small right-angle bug with lockable metal cover. (later version only snapped closed) Top is hinged in rear resulting in nickname "flip-top bug". Early model was cast bronze. Later, common model was pot metal which tended to crumble. Variants had square or rounded edges, were chrome plated or painted black. Pot metal version also painted blue.
**ULTIMATE (STRAIGHT BUG):** Small straight version w/o cover. Assembled, low frame. Dot & dash posts are square rather than round. Single post damper w/wheel.
**UNITED ELECTRICAL MFG CO.:** See early Vibroplex.
**VAILOGRAPH:** Ca 1908. Adaptor which converts a straight key into a "vertical bug." Dots are formed by raising up on the key, dashes by pressing down. Rare.
+ **VIBRAX:** Made in Italy. Model 03 has oval base, aluminum hardware and blue paddle. Model 2 has rectangular base, brass hardware, and blue paddle. It also has thick round uprights for all adjustment screws and the main frame.
**VIBRO-MORS:** 1953-1965: Made by Radio-Lune, Paris. Assembled frame similar to Lightning Bug but lower and only 1 screw on left frame post. No circuit closer. Single post damper with small fiber washer to contact the flat pendulum. Very short mainspring. Black wrinkle base seen in conventional style or with beveled top edges.
**VIBROPLEX BLUE RACER, NO. 4:** Advertised in 1914 as the "No. 4". Dark blue, black or nickel (later chrome). 1 piece frame, U-shaped support. Narrow base, but full-size Japanned or nickel base could be specified. Reintroduced in late 1960s with L-type damper resembling the Martin Jr.
**VIBROPLEX BLUE RACER, DELUXE:** 1940: Chrome base, red knobs, pivot bearings jeweled. All Vibroplex Deluxe models got gray bases during WWII.
**VIBROPLEX CHAMPION:** 1939: Similar to Lightning Bug's assembled, triangular frame but with "I" damper and no circuit closer. Discontinued in 1979. Standard 3.5" black base, later beige or gray.
**VIBROPLEX LIGHTNING BUG, NO. 6:** 1923: Flat vibrator pendulum and assembled frame, 2 triangular pieces with posts between. "M" type damper, base colors blue, red, green, black, nickel, later chrome and gray.
**VIBROPLEX J-36:** US Army version of Lightning Bug. Federal stock # 3Z3436 called for 3/16" contacts. 1/8" contacts were used on stock # 3Z3436.1.
**VIBROPLEX LIGHTNING BUG, DELUXE:** Chrome base, red knobs, jeweled pivot bearings. Later bugs have red plastic insert in top of frame.
**VIBROPLEX MARTIN JUNIOR:** 1934: 'Original', style one piece frame but with "L" type damper and smaller 3" base.
**VIBROPLEX MARTIN MIDGET:** 1918: Thin base with legs extending out from sides. Small post damper. Circuit closer across center of base. Small frame. Very rare.
**VIBROPLEX MODEL X (SINGLE LEVER, DIRECT POINT):** 1912: Single contact used to make both dots and dashes. Appearance of having an extra pendulum arm. Assembled frame, black or nickel base. Early version has rectangular pendulum, later version is round.
**VIBROPLEX ORIGINAL, 1ST MODEL:** 1904: Set screw in side of frame rather than a lock nut to secure the top pivot screw. Slotted binding post nuts., Adjustable shaft in bottom of damper. Black or nickel base but also seen w/ "striped" Mecograph-style finish. Dot spring was initially straight, rather than the current "U" shape.
**VIBROPLEX, EXTENSION ARM:** 1907: Thin base with leg which swings out to left. Similar to Original.
**VIBROPLEX LICENSED COPY:** Special nameplate shows bug licensed by Martin's agent, J. E. Albright but not made by Vibroplex. Various mfg.
**VIBROPLEX ORIGINAL, DELUXE:** 1940: Chrome base, red finger and thumb pieces, solid frame.
**VIBROPLEX ORIGINAL, IMPROVED:** U-shaped dot spring, Dash lever is second piece attached to main arm. L-type damper. Blue, red, green,, black, nickel and beige bases, gray after 1960. New, 1995 Alabama-made models again have black base. Later models have rounded, solid frame, earlier frames more square. This is the classic design most seen and copied.
**VIBROPLEX, IMPROVED:** See ATOZ Illegal copy of Vibroplex.
**VIBROPLEX ORIGINAL, PRESENTATION:** 1948: Jeweled pivot bearings, red knobs, top of base is gold plated. Early or special-order models have an adjustable mainspring fastened by screws rather than rivets.

**VIBROPLEX DOUBLE LEVER, NORCROSS MODEL:** 1907: Thin base, with extension leg. Circuit closer on rt. side. Assembled frame. Independent dash lever.
**VIBROPLEX DOUBLE LEVER, HEAVY BASE:** Ca 1911-14: Square frame. Later (1914-17) with rounded frame. Independent dash lever. Black or nickel base.
**VIBROPLEX UPRIGHT:** 1916: Also called the "Wirechief's Special". Vertical mechanism. Used a single contact, as with the Model X. Black or nickel.
**VIBROPLEX ZEPHYR:** 1940: Like Champion but with narrow 3.0-inch wide base and a circuit closer added. Assembled frame.
**+ WESTERN ELECTRIC:** No Further Information.
**+ WESTINGHOUSE AIR BRAKE:** Wilmerding, PA. No Further Information.
**WILCOX:** Fred Wilcox, Canada. Bugs resemble Vibroplex. Many had slight variation such as bases of brass, steel or lead laminated, all quite heavy. Usually had wing nuts on terminals. No name-plate but name F. A. Wilcox usually stamped at some location. Serial no. usually stamped on damper. Variations w/threaded pendulum & weight, another w/square dot & dash posts rather than usual round posts. Etc. Rectangular, triangular and oval based models are known to exist.
**WILSON:** Wilson Mfg Co, Toronto, Canada. Made for RCAF in WWII. Name Plate carries the number: 10F/7380. Base dark blue. T-frame. Damper disc held in U-shaped high damper post. Large diameter round weights. Wire dot-spring damper. Can be turned on side to use as straight key or upside down to use left handed.
**XOGRAPH:** Canada, mfg by Rolf Brown, Toronto. Similar to Vibroplex Original. Dot & dash posts square. Black enameled steel base, 2-3/4 x 6-1/4" with rounded corners. Thumb and finger-pieces are black, plastic paddles. Also seen with chrome base and red paddles. Two sizes. Later variant had a larger base and black wrinkle finish.
**+ ZIP Bug:** Narrow Olive-colored wrinkle-finish base, No shorting lever. All hardware Cadmium plated. Contacts supported by round uprights. Locking screws extend down into tops of all uprights that support adjustments or contacts.

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# J-SERIES U.S. ARMY TELEGRAPH KEYS

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The following brief summary is used with the author's permission.

**J-1:** 1915. For use in SCR-49 (BC-24).
**J-2:** 5.5x3.25x1.75" black base key used in above set.
**J-3:** 5-5/32 x 3-3/8" Wood base. Folding British-style key.
**J-4:** A silenced key.
**J-5, J-5A:** Round, Flameproof Aircraft key.
**J-6:** 4-1/16 x 1-3/4" Black base. British-style. Aircraft key
**J-7:** J-5A on a base with a blinker light. Aircraft Key.
**J-7A:** As above.
**J-8:** Unknown.
**J-9:** Unknown.
**J-10:** Transmitting key.
**J-11:** Flameproof, silenced key with rubber buffers.
**J-12:** 3.5x2.5" Brass sub-base. For field radios.
**J-13:** Unknown.
**J-14:** Folding adjustable key used with BC-47.
**J-15:** Brass-Based, Bunnell key used in EE-15 Buzzer Set.
**J-16:** Strap key used in EE-10 Signal Lamp Set.
**J-17:** Unmounted contacts for attachment to panel.
**J-18:** MESCO Oval legless key for EE-21 Field Set.
**J-19:** Sliding switch: connects telephone lines together.
**J-20:** Telephone line switch. Double pole-single throw.
**J-21:** Strap key used in target range signalling.
**J-22:** Small strap key with upper, lower, and center contacts.
**J-23:** 6-5/8x3-1/2x1/2" black base Wireless telegraph key Heavy brass 7-3/4x5/16 lever.
**J-24:** 15-1/2 x 6 x 1-1/2" base oil break wireless key.
**J-25:** 8.5x4.5x.75" slate base wireless key for SCR-41. 1KW set.
**J-26:** Small wireless key mounted on 12-7/8 x 9 x 3-3/8" wooden box.
**J-27:** Small wireless key mounted on 12-1/4 x 4-3/8 x 3-1/4" wood box.
**J-28:** 5-1/4 x 2-7/8 x 3-1/4" open circuit leg key.
**J-29:** 5-1/4 x 2-7/8 x 3" closed circuit leg key.
**J-30:** 5-1/4 x 2-3/4 x 1-1/2" closed circuit legless key.
**J-31:** 6-1/4 x 3-5/8 x 4" open and closed circuit leg key.
**J-32:** J-30 on a 5 x 3" wooden base.
**J-33:** 5-1/8 x 2-5/8 x 2-3/4" open circuit legless key.
**J-34:** 3-7/8 x 1-7/8 x 9/16" wood base. For signal lamp EE-6.
**J-35:** 5-3/4 x 2-7/16 x 9/16" wood base. For signal lamp EE-6A.
**J-36:** 8x.5x.5" High speed vibrating bug: Vibroplex, Lionel, & Bunnell.
**J-37:** 5-3/16 x 2-5/8 x 1" Ovoid Moulded bakelite base
**J-38:** 5-1/4 x 3 x 1-1/2" bakelite base. (J-30 open circuit key)
**J-39:** Unknown.
**J-40:** For field set SCR-163A
**J-41:** 5-1/4 x 2-5/8 x 7/8" Like J-37 but with back contact. For TG-5.
**J-42:** Unknown.
**J-43:** 5-1/4 x 2-3/4 x 1-1/2" J-37 on base with push switch.
**J-44:** 5 x 2-3/4 1-1/2" J-37 on base with shorting switch.
**J-45:** 5-3/16 x 2-5/8 x 1" metal base. J-37 on a metal leg clip. (Later models marked KY-116/U)
**J-46:** 4-3/8 x 2" phenolic base. Strap key for EE-84 signal lamp.
**J-47:** 5 x 2-3/4 x 1-1/4" bakelite base. Like J-43/44 but without switch.
**J-48:** 4 x 5-5/8 x 1-1/2 metal base. in olive drab box. For BC-654.
**J-49:** Automatic code keyer. Keys oscillator for identification.
**J-50:** Unkown.
**J-51:** Hand-held and hand-operated scissors-like key for signal lamp M-227.

# NUMBERING SYSTEM FOR U.S. NAVY KEYS

**U. S. Navy Telegraph Keys: Understanding and Interpreting the Numbering System**
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Even the smallest of telegraph key collections has at least one and probably several keys with a long string of letters and numbers. If the string starts with a 'C' or 'SE' is is most likely a Navy key. A typical number on a Navy key would be CTE-26003A, CT-1756 or SE-68A. The former is a flameproof key from the WWII era made by Telephonics. The next is a key from an arc transmitter from the post WWI era made by Federal Telegraph and the later a spark key of the early WWI era made by the Boston Navy yard. How does one learn this type of information from the numbers?

The Navy "Type Number" system of equipment nomenclature was introduced by the Navy's Bureau of Steam Engineering in approximately 1915 or 1916. The scheme is basically a sequence number with other numbers and letters before and sometimes after it.

The first code that was used had two or three letters followed by the sequence number. The letters always started with a 'C' if the key was designed and made by a contractor. This was followed by one or two letters denoting the manufacturer of the key. The letters 'CL' denoted Fritz Lowenstein and 'CAM' denoted Manhattan Electrical Supply Co. for example. Both of these names are familiar to key and wireless collectors. See the table below for a full list of codes and makers. Most keys labeled with this scheme have few if any other marks.

If the key was designed by the Navy, then the letters started with 'SE.' The SE represents the Bureau of Steam Engineering, the arm of the Navy responsible for communications equipment. The Navy designed 'SE' keys were made both by the Navy and by contractors. A typical number for these keys would be 'SE-68A.' The trailing letter denotes an alteration to the contract. Most 'SE' keys are marked with the maker's name and ratings of the key. The SE-923, for example, has a label that reads:

**AUXILIARY HAND SENDING KEY: 500 CYCLES: MADE FOR NAVY DEPARTMENT (BU. S.E.) LOWENSTEIN RADIO CO. INC. BROOKLYN N.Y.: REQ. NO. NAS681: CONTRACT NO. 43945: TYPE NO. SE-923: DATE 1919: KW 1/4 & 1/2: SER. NO. 297: AC VOLTS 250: AC AMPS 5**

Because the type numbers were sequential, it is possible to estimate the date of a particular design. The type numbers had passed 1,400 by 1918. In the above example, 1919 is likely the actual date of manufacture as opposed to the date of design; the type number reflects the date of design. Keys could have been manufactured years later and often were. Note that the numbering system applied to all Navy communications equipment, not just keys, so the numbers grew large.

Between WWI and WWII (most likely in the early 30s), the numbering scheme was not able to keep up with the exploding inventory of communications equipment, so the scheme was modified. The prefixing letters were retained to identify the contractor. However, the rapidly growing serial numbers gave way to a 'classification' of the equipment. There were dozens of classifications. For example, the numbers '19' denoted batteries, the number '61' insulators and the number '26' denoted 'keys - telegraph: manually operated.' Three numbers following the classification denoted the specific model. A letter following the number denoted a modification to the original contract.

Let's take apart the CTE-26003A used in the introductory example. The 'C' is the common Navy prefix. The 'TE' denotes Telephonics as the maker. The '26' denotes this is a telegraph key. The '003' is the third model in this numbering scheme. The 'A' denotes a modification to the original design.

At the start of WWII, the Navy and the Army adopted adopted a joint type numbering system. These numbers all start with AN, representing Army-Navy. These numbers first appeared on communications gear in December of 1942. It is not known when keys began being marked with this system. Keys numbered under the old system continued to be made many years after the advent of the new system.
The two tables below show the **Navy Manufacturer's Codes** and the actual manufacturers. These codes are for makers of communications gear. Those that made keys are a sub-set.

# NUMBERING SYSTEM FOR U.S. NAVY KEYS

**Early U.S. Navy Type Number System**
(1915 to c. early 1930s)
**CA** - American Radio Research Corp.
**CAB** - Baldwin Telephone Co.
**CAC** - Central Telephone Co.
**CAD** - Domestic Mfg. Engineering Co.
**CAE** - Cutler Hammer Manufacturing Co.
**CAF** - John Firth
**CAG** - General Radio
**CAH** - Cutter Manufacturing Co.
**CAJ** - Holtzer Manufacturing Co.
**CAK** - William J. Murdock
**CAL** - Locke Insulator Co.
**CAM** - Manhattan Electrical Supply Co.
**CAN** - Sagame Electric Co.
**CAO** - Ward Leonard Co.
**CAP** - Frank B. Perry
**CAQ** - Robbins and Meyers
**CAR** - Roller Smith
**CAS** - Chloride of Silver Co.
**CAT** - American Transformer Co.
**CAU** - Triumph Electric Co.
**CAW** - C. & C. Electric Co.
**CAX** - Metropolitan Electric Co.
**CAV** - Industrial Controller Co.
**CAY** - West Electric Controller Co.
**CB** - Crocker Wheeler Co.
**CD** - E. J. Simon
**CF** - DeForest Radio Tel & Tel Co.
**CG** - General Electric Co.
**CH** - Electrose Insulator Co.
**CK** - Kilbourne and Clark
**CL** - Fritz Lowenstein
**CM** - Marconi Wireless Telegraph Co. of America
**CN** - National Electric Supply Co.
**CO** - Copely Manufacturing Co.
**CP** - Cutting and Washington
**CQ** - International Radio Telegraph Co.
**CR** - Wireless Specialty Apparatus Co.
**CS** - Sperry Manufacturing Co.
**CT** - Federal Telegraph Co.
**CU** - Miller Reese Hutchinson
**CV** - Weston Instrument Co.
**CW** - Western Electric Co.
**CY** - Wireless Improvement Co.
**SE** - Bureau of Steam Engineering, U.S. Navy

**Later U.S. Navy Type Number System**
(c. early 1930s to post WWII)
**CAY** - Westinghouse Electric & Mfg. Co.
**CABH** - Signal Electronic & Mfg. Co.
**CABJ** - Lionel Corp.
**CAPH** - Telegraph Apparatus. Co. (Ted McElroy)
**CAPZ** - Telegraph Apparatus. Co. (Ted McElroy)
**CAQZ** - Brelco
**CAZ** - Brooklyn Metal Stamping Co.
**CAZT** - Electro Specialty Co.
**CBBX** - Western Union Telegraph Co.
**CDM** - D. P. Mossman Co.
**CEA** - Bendix
**CEJ** - E. F. Johnson
**CJB** - J.H. Bunnell
**CJF** - J. F. Frietz
**CJY** - Leach Brothers
**CKI** - Chicago Apparatus Co.
**CLR** - Leach Relay
**CLS** - L.S. Brach
**CLT** - Lundquist Tool & Mfg. Co.
**CMH** - American Radio Hardware
**CMI** - Molded Insulator
**CMK** - McElroy Electronics (T. McElroy)
**CN** - National Elect. Machine Shops Inc.
**COL** - Collins Radio Co., Inc
**CRR** - Bendix
**CRV** - RCA Victor, Div of RCA
**CSE** - Signal Electric
**CTC** - Chicago Telephone Supply
**CTE** - Telephonics Corp.
**CUZ** - United States Elev. Mfg. Co.

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# HOW TO ADJUST TELEGRAPH KEYS & POWER UP SOUNDERS

**STRAIGHT KEYS:**
Before starting to adjust the key, tighten the frame & terminal mounting screws.
Clean the contacts and burnish them with very fine emory cloth if they need it.

**Pivot Adjustment:**
The two side pivot screws should be adjusted while ensuring that the lever is completely free to move up and down.
To free the lever: Loosen the spring tension & contact spacing screws.
Now use the pivot adjusting screws to move the lever-mounted contact left and right until it is Centered DIRECTLY OVER the lower contact.
Tighten the left and right pivot screws to eliminate all side play in the lever but be certain that it is completely free to move.
Tighten the securing nuts.

**Contact Spacing Adjustment:**
Tighten the contact spacing screw to produce desired contact spacing. About 1/32" or 1mm. is a good starting point.
Refine this adjustment to suit your style of sending.
Then tighten the contact spacing screw's securing nut.

**Spring Tension Adjustment:**
Tighten the spring tension adjusting screw to produce the desired tension.
Then tighten it's securing nut.

**SEMI-AUTOMATIC KEYS or BUGS:**
Before starting, securely tighten all screws that connect the frame, damper, contacts, and terminals to the base.
Clean & burnish fixed and moving contacts with fine emory cloth if necessary.

**Pivot Adjustment:**
Adjust upper & lower pivot screws so lever is free to move side-to-side.
Back out all other adjusting screws until the lever is very free.
Loosen the lock screw(s) or nut(s) on the lower and upper pivot screws.
Adjust the lower and upper (if present) pivot screws to center the lever-mounted contacts directly across from the base-mounted contacts.
Tighten the pivot screws slowly until all up-and-down movement of the lever is eliminated but lever is VERY free to move from side-to-side.
Secure the lock screw(s)/lock-nut(s) on the top and bottom pivot screws.

**Damper Adjustment:**
Screw-in the spring tension adjusting screw that pushes the lever against the damper until the lever is firmly pressing against the damper.
Now screw-in the damper spacing screw which pushes the lever away from the damper.
Adjust this screw so that the lever just barely touches the damper.
Secure it with the lock-nut.

**Dot Contact Adjustment:**
Screw in the base-mounted dot contact so that there is approximately a 1/8-inch gap between the fixed and the moveable contact.
Press the lever to the right - causing the dot contacts to close.
Adjust the dot contact spacing screw until contacts just barely touch. (For longer dots, adjust to cause the contacts to close quite firmly.)
(For shorter dots, adjust to cause the contacts to not-quite close.)
Secure this screw with the lock-nut.

**Dash-Contact Adjustment:**
Screw-in the base-mounted dash contact until it is approximately 1/8-inch from the lever-mounted contact. Then secure it with the locknut.
Adjust dash contact spring tension screw for comfortable tension.

Refine the contact spacing and spring tension adjustments to suit your touch.

**POWERING UP AN OLD TELEGRAPH SOUNDER:**
Start with 3 volts and increase the voltage by adding 1.5 volt batteries until you get reliable pull-in. STOP there to avoid the possibility of overheating the coils and perhaps damaging the old insulation. Most operate well on 3-6 volts.

# NOTES ON RESTORING OLD TELEGRAPH KEYS

There is a difference of opinion among collectors about the desirability of "restoring" old telegraph apparatus to its original condition. Most collectors prefer the marks and discoloration of age in a hundred-year-old key in preference to a shiny like-new appearance. The restoration of old telegraph apparatus then, may involve simply light cleaning and stabilization of the deterioration process or, it may involve the complete cleaning and relaquering of the instrument. Restoration of any kind is a time-consuming activity which can not be rushed. Quick, short-cut methods usually damage the instrument permanently and irrevocably, and are to be avoided at all costs!

**MINIMAL CLEANING AND STABILIZATION:**

If the unit is to be kept in its present condition, (a strategy that I personally recommend) you may want to simply remove superficial dirt and stop further rusting of ferrous parts. The safest cleaning tools are soft toothbrushes and cotton-tipped applicators. Detergents of any kind are generally ok on metal parts but very dangerous to painted parts because they may dissolve or remove original paint and historically important painted-on or ink-stamped-on identification marks and decals. Also, historically important hand-written information often inscribed on the bottom of instruments in pencil may be erased by energetic cleaning. Rust can be stopped by Naval Jelly which replaces it with a black oxide. Pete Malvasi, W2PM recommends a light protective coating of Armor-All to inhibit oxidation. It works well but produces a shiny appearance which may be inappropriate for some items.

**THOROUGH CLEANING AND RESTORATION:**

Before beginning a complete restoration, make sure that you have adequate time so you will not feel rushed into taking disastrous shortcuts. PLEASE give up any ideas of using motorized or hand held metal brushes or steel wools to remove finishes or corrosion because even soft brass brushes will leave tell-tale scratch marks on the metal and obscure the historically important machining marks. It is also worthwhile to examine every part of a key with a magnifying lens to locate any identification marks that may have been stamped or written on the underside or on individual parts. Once located, these marks should be carefully preserved.

You may decide to try to restore the instrument without disassembling it but if you do disassemble it be certain that you can put every part back where it came from. Missing and broken parts can often be reproduced by machinists and many gunsmiths can also make fine brass reproductions. Springs can be replaced by those available in hardware stores. Tapered springs can be made by carefully "necking down" one end of a straight spring using pliers and going around and around the end until the desired diameter is achieved.

Most old telegraph apparatus was painted with a protective lacquer after manufacture and this lacquer must be removed before the metal can be cleaned, and then relaquered. The least damage will be done by using a powerful paint remover such as Zip-Strip and / or acetone to remove the laquer. Apply the chemical using protective gloves and eye protection and wait for it to loosen and soften the paint. Remove the paint residue with a toothbrush or cotton-tipped applicator. Then wash thoroughly to remove absolutely all traces of the chemical.

The next step is to restore the original shine to the metal. Try several NON-ABRASIVE copper, brass, and silver polishes until you find one which you can simply apply and wait. The more you have to rub a polish into the metal, the more you remove the trade marks and machining marks and the more you tend to round sharp edges. This dramatically reduces its value.

After the unit is clean and shiny and any broken parts have been repaired, it is time to apply a new finish. A clear spray varnish would preserve the shined up appearance of the unit but it wouldn't look authentic. Since most telegraph units were purposely painted with a duller finish to avoid distracting the operators, you will want to use an amber colored laquer. This will bring the unit back close to its original appearance.

# BIBLIOGRAPHY

**A BRIEF BIBLIOGRAPHY FOR KEY COLLECTORS:**
This is a short summary of some of the more important reference books and periodicals for telegraph collectors and historians. Many other references may be found in the telegraph web pages listed as "INTERNET LINKS" in the next section


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**PERIODICALS: ( See updates at: http://w1tp.com )**


***The KEYLETTER:*** A compendium of information for telegraph collectors/historians. Lynn Burlingame, N7CFO, 15621 SE 26th. St. Bellevie, WA 98008. email: n7cfo@n7cfo.com. Donation requested for subscription. Back issue library: $ 25 for CD and $ 45 for hard copy. website: http://www.n7cfo.com

***DOTS AND DASHES:*** The Morse Telegraph Club. John M. Barrows, Editor: 415 South Rife. Dillon, MT 59725 ($10/yr in 1999) Homepages: http://www.morsetelegraphclub.org

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***The VAIL CORRESPONDENT:*** (Ceased publication-Back Issues available) at: www.artifaxbooks.com

# INTERNET LINKS

**INTERNET LINKS TO TELEGRAPH-RELATED SITES:**
These are just a few of the telegraph-related pages on the web.
(Hundreds of additional links are to be found in these pages.)
**NOTE: SINCE THESE INTERNET LINKS CHANGE FREQUENTLY, PLEASE SEE THE OFTEN - UPDATED BIBLIOGRAPHY & LINKS at: http://w1tp.com**

The "TOM PERERA-W1TP" Telegraph Museums:
http://w1tp.com
The "TOM PERERA-W1TP" Enigma Museums:
http://w1tp.com/enigma
The “ARTIFAX BOOKS” - “TOM FRENCH-W1IMQ” pages:
http://www.artifaxbooks.com
The “JOHN CASALE-W2NI” Telegraph History Pages:
http://telegraph-history.org
NEW: John Casale Telegraph Manufacturers Web pages:
http://telegraph-history.org/manufacturers/index.html
The "NEAL McEWEN-K5RW" Telegraph Pages:
http://www,telegraph-office.com
The "GREG RAVEN-KF5N" Telegraph Pages:
http://www.faradic.net/~gsraven/index.shtml
The "PETE MALVASI-W2PM" Telegraph Pages:
http://members.aol.com/pmalvasi/keypix/pete.html
The "RUSS KLEINMAN-WA5Y" Telegraph Collection:
http://www.zianet.com/sparks/index.html
The "RANDY COLE-KN6W" Vibroplex Collector’s pages:
http://www.la.ca.us/frandy/
The “LYNN BURLINGAME-N7CFO” “KEYLETTER” Newsletter pages:
http://www.n7cfo.com
The BILL BURNS Atlantic Telegraph Cable Pages:
http://www.atlantic-cable.com
The “ELISEO CHIARUCCI—IK6BAK” Telegraph Key Pages:
http://www.morsekey.net
The "ANTIQUE WIRELESS ASSOCIATION" pages:
http://www.antiquewireless.org
The "MORSE TELEGRAPH CLUB" pages:
http://morsetelegraphclub.org
The WESTERN UNION ARCHIVES - Smithsonian Institution:
http://www.si.edu/lemelson/dig/westernunion.html
The “ALFRED VAIL-SPEEDWELL MUSEUM”:
http://www.speedwell.org
The “VIBROPLEX CORPORATION” pages:
http://www.vibroplex.com
The MORSE EXPRESS Telegraph Key Sales Site:
http://mtechnologies.com
The TANNENBAUM CATALOG of Old RADIO MANUALS, RADIOS & PARTS:
http://www.agtannenbaum.com
The PORTHCURNO TELEGRAPH CABLE AND WIRELESS MUSEUM pages:
http://www.porthcurno.org.uk/cwpk/index.html
The “INSULATOR COLLECTORS PAGES”:
http://www.insulators.com

# INDEX:

# PRICE GUIDE

**PRICE GUIDE: Prices the Average Collector Would Pay.** (Updates:http://w1tp.com)
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**PRE-MORSE TELEGRAPH**

| | | |
|---|---|---|
| 001 | $100 | 0000 |
| 004 | $500+ | 0010 |

**MORSE TELEGRAPH**

| | | |
|---|---|---|
| 009 | $---- | ---- |
| 010 | $---- | ---- |
| 012 | $750+ | 0280 |
| 016 | $750+ | 0067 |
| 018 | $750+ | 0060 |
| 020 | $350+ | ---- |
| 030 | $350+ | 0081 |
| 034 | $300+ | 0225 |
| 040 | $300+ | 0235 |
| 050 | $500+ | 0190 |
| 060 | $100 | 9925 |
| 064 | $20 | 9950 |
| 070 | $3500+ | 0055 |
| 070a | $200 | 2520 |
| 070b | $100 | ---- |
| 075 | $350+ | 0085 |
| 075a | $100+ | 0690 |
| 080 | $350+ | 0080 |
| 080a | $175+ | 0260 |
| 090 | $800+ | 0203 |
| 095 | $50+ | 0800 |

**POST-TRIUMPH KEY TELEGRAPH**

| | | |
|---|---|---|
| 102 | $40 | 1350 |
| 104 | $20 | 1460 |
| 108 | $500+ | 1550 |
| 108a | $500+ | 1550 |
| 108b | $500+ | 1550 |
| 108c | $500+ | 1540 |
| 108d | $750+ | 1550 |
| 108e | $500 | 1555 |
| 110 | $5 | 5460 |
| 116 | $200+ | 1325 |
| 118 | $200+ | 1055 |
| 120 | $45 | 1457 |
| 122 | $20 | 1464 |
| 130 | $200+ | 1225 |
| 130a | $350+ | 0171 |
| 134 | $250+ | 1441 |
| 136 | $800+ | 1080 |
| 138 | $10 | 1282 |
| 139 | $35 | 4582 |
| 139A | $35 | 4582A |
| 140 | $15 | 2060 |
| 142 | $125 | 2030 |
| 142a | $200+ | 2035 |
| 150 | $35 | 1832 |
| 152a | $20 | 1850 |
| 152b | $20 | 1850 |
| 154 | $35 | 1862 |
| 156a | $20 | ---- |
| 156b | $20 | ---- |
| 160 | $300+ | 0325 |
| 162 | $200+ | 0315 |
| 164 | $200+ | 2815 |
| 164a | $800+ | 0285 |
| 166 | $175+ | 2820 |
| 170 | $500+ | 0206 |
| 174 | $20 | 2599 |
| 176 | $35+ | 2570 |
| 178 | $200 | 2520 |
| 178a | $100 | ---- |
| 190 | $25 | 1872 |
| 192 | $15 | 3332 |
| 194 | $100 | 3060 |
| 194a | $100 | 3066 |
| 198 | $15 | 3070 |

**SEMI-AUTOMATIC BUGS**

| | | |
|---|---|---|
| 200 | $5000+ | 6005 |
| 202 | $4000+ | 6010 |
| 204 | $600+ | 6020 |
| 204a | $45 | 6580 |
| 208 | $700+ | 6260 |
| 212 | $400+ | 6123 |
| 213 | $500+ | 6340 |
| 214 | $300+ | ---- |
| 215 | $600+ | 6401 |
| 216 | $400+ | 6331 |
| 216a | $250 | 6860 |
| 220 | $1500+ | 6265 |
| 224 | $5000+ | ---- |
| 226 | $175 | 6460 |
| 228 | $45 | ---- |
| 230 | $150 | 7900 |
| 232 | $150 | 7910 |
| 234 | $125 | 7920 |
| 238 | $45 | ---- |
| 240 | $200 | ---- |
| 242 | $New | ---- |
| 244 | $New | ---- |
| 246 | $New | ---- |
| 248 | $New | ---- |
| 250 | $New | ---- |
| 252 | $150 | 7160 |
| 254 | $+++++ | ---- |
| 256 | $450+ | 7141 |
| 258 | $550+ | 7140 |
| 260 | $125 | ---- |
| 262 | $125 | ---- |
| 264 | $300+ | 7192 |
| 266 | $400+ | ---- |
| 268 | $600+ | 7120 |
| 270 | $75 | 7337 |
| 270a | $55 | 7330 |
| 270b | $65 | 7335 |
| 270c | $125 | 7340 |
| 270d | $55 | 7350 |
| 272 | $45 | 7310 |
| 272a | $45 | 7314 |
| 274 | $200+ | 7220 |
| 278 | $600+ | ---- |
| 278a | $500 | ---- |
| 278b | $350 | 7620 |
| 280 | $3500+ | 7600 |
| 281 | $450 | ---- |
| 281a | $350 | ---- |
| 281b | $300 | ---- |

**SEMI-AUTOMATIC BUGS (Continued)**

| | | |
|---|---|---|
| 281c | $400 | ---- |
| 281d | $300 | 7630 |
| 281e | $400 | ---- |
| 281f | $250 | ---- |
| 281g | $350 | ---- |
| 281h | $450 | ---- |
| 282 | $400 | 7680 |
| 282a | $700 | 7682 |
| 284 | $250 | 7720 |
| 284a | $250 | 7722 |
| 284b | $250 | ---- |
| 284c | $250 | 7740 |
| 286 | $75 | 7750 |
| 286a | $55 | 7760 |
| 288 | $250 | ---- |
| 288a | $350 | 7245 |
| 288b | $300 | 7240 |
| 290 | $85 | 7480 |
| 292 | $3000+ | 7940 |
| 294 | $300 | 7960 |
| 294a | $250 | 7962 |
| 294b | $200 | 7965 |
| 295 | $300 | 7820 |
| 296 | $40 | 7980 |
| 297 | $100 | 7998 |
| 298 | $600+ | 6700 |

**KEYERS & PADDLES**

| | | |
|---|---|---|
| 302 | $25 | ---- |
| 304 | $75 | 5510 |
| 310 | $125 | 5550 |
| 320 | $150 | 5566 |
| 330 | $200 | 5580 |
| 340 | $300+ | ---- |
| 341 | $300+ | ---- |
| 350 | $15 | 5570 |
| 360 | $20 | ---- |

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**SPARK KEYS**

| | | |
|---|---|---|
| 402 | $2500+ | 4015 |
| 406 | $800+ | 4025 |
| 408 | $600+ | 4030 |
| 410 | $400 | ---- |
| 412 | $2000+ | ---- |
| 414 | $3000+ | ---- |
| 416 | $500 | 4035 |
| 418 | $2500+ | ---- |
| 420 | $800+ | 4037 |
| 422 | $600+ | 4058 |
| 424 | $450+ | 4070 |
| 426 | $1200 | 4078 |
| 428 | $500+ | 4080 |
| 430 | $700+ | 4100 |
| 432 | $800+ | 4102 |
| 433 | $800+ | 4103 |
| 434 | $850+ | 4104 |
| 436 | $800 | 4220 |
| 438 | $450 | 4230 |
| 440 | $450 | 4232 |
| 442 | $25 | 4490 |
| 444 | $600 | ---- |
| 446 | $700 | 4040 |
| 448 | $400 | 4050 |
| 448a | $300 | ---- |
| 450 | $300 | 4114 |
| 450a | $400 | ---- |
| 452 | $100 | 4140 |
| 454 | $150 | 4142 |
| 456 | $450 | ---- |
| 458 | $35 | 4144 |
| 460 | $35 | 4170 |
| 492 | $30 | 4148 |
| 496 | $35 | ---- |
| 498 | $65 | 4480 |

**RADIO KEYS:**

| | | |
|---|---|---|
| 502 | $850+ | ---- |
| 508 | $150 | 4130 |
| 508a | $50 | ---- |
| 520 | $175 | ---- |
| 522 | $75 | ---- |
| 524 | $200 | 4558 |
| 526 | $65 | 4568 |
| 528 | $45 | 4559 |
| 530 | $45 | 4559a |
| 532 | $65 | 4562 |
| 534 | $100+ | 4560 |
| 536 | $15 | 4567 |
| 538 | $55 | 9220 |
| 540 | $65 | 4565 |
| 542 | $400+ | 4570 |
| 546 | $35 | 4144 |
| 548 | $5 | 5460 |
| 550 | $15 | 4552 |
| 552 | $1 | 5480 |
| 554 | $15 | 4554 |
| 556 | $15 | ---- |
| 558 | $15 | ---- |
| 560 | $125 | 5585 |
| 562 | $25 | 5200 |
| 564 | $75 | 5020 |
| 570 | $100 | 1125 |
| 574 | $85 | 5010 |

**AMERICAN MILITARY KEYS**

| | | |
|---|---|---|
| 606 | $85 | 8020 |
| 608 | $100 | 8040 |
| 610 | $45 | 8120 |
| 620 | $150+ | 8210 |
| 622 | $150+ | 8230 |
| 624 | $250+ | 8235 |
| 626 | $65 | 8260 |
| 626a | $150 | 8250 |
| 628 | $250+ | 8220 |
| 630 | $250+ | 8240 |
| 632 | $75+ | 8270 |
| 634 | $10 | 8360 |
| 636 | $25 | 8340 |
| 636a | $35 | ---- |
| 636b | $25 | 9850 |
| 638 | $40 | 8320 |
| 640 | $15 | 8120 |

**AMERICAN MILITARY KEYS (Continued)**

| | | |
|---|---|---|
| 642 | $35 | ---- |
| 644 | $15 | 8370 |
| 646 | $25 | 8520 |
| 648 | $75+ | 8380 |
| 650 | $15 | 8390 |
| 652 | $100+ | 8420 |
| 654 | $100 | 8540 |
| 660 | $40 | 8280 |
| 662 | $40 | 8700 |
| 670 | $350+ | 8201 |
| 672 | $55 | 8620 |
| 674 | $35 | 8680 |
| 692 | $125 | 8810 |
| 694 | $45 | 8870 |
| 696 | $75 | 8880 |
| 697 | $35 | 8900 |
| 697a | $10 | 8905 |
| 698 | $25 | 8920 |

**BRITISH KEYS**

| | | |
|---|---|---|
| 704 | $350 | 9020 |
| 708 | $55 | 9080 |
| 710 | $30 | 9140 |
| 712 | $30 | 9141 |
| 714 | $30 | 9142 |
| 716 | $30 | 9143 |
| 720 | $75 | 9120 |
| 721 | $35 | 9155 |
| 724 | $200+ | 9110 |
| 726 | $55 | 9112 |
| 728 | $15 | 9116 |
| 730 | $75 | 9130 |
| 732 | $40 | 4585 |
| 734 | $40 | 4586 |
| 735 | $35 | 4586a |
| 742 | $125 | 9195 |
| 744 | $100+ | 9160 |
| 746 | $250+ | 9185 |

**CANADIAN MILITARY KEYS:**

| | | |
|---|---|---|
| 754 | $30 | 9240 |
| 760 | $55 | 9220 |
| 764 | $35 | 9230 |
| 770 | $100+ | 9300 |

**GERMAN MILITARY KEYS:**

| | | |
|---|---|---|
| 802 | $++++ | ---- |
| 806 | $300+ | 9420 |
| 810 | $200+ | 9460 |
| 812 | $100 | 9468 |
| 814 | $250+ | 9470 |
| 818 | $250+ | 9500 |
| 820 | $150 | 9520 |
| 821 | $150 | 9525 |
| 824 | $75 | 9480 |
| 826 | $65 | 9491 |
| 828 | $55 | 9542 |

**JAPANESE & CHINESE MILITARY KEYS**

| | | |
|---|---|---|
| 860 | $500+ | 9640 |
| 864 | $250+ | 9651a |
| 870 | $450+ | 9660 |
| 870a | $300+ | 9660 |
| 874 | $200+ | 9670 |
| 896 | $25 | 9850 |
| 898 | $35 | 9690 |

**RUSSIAN/CZECH MILITARY KEYS**

| | | |
|---|---|---|
| 910 | $45 | 9710 |
| 912 | $35 | 9720 |
| 920 | $75 | 9714 |
| 922 | $75 | 9716 |
| 924 | $75 | 9717 |
| 926 | $100 | 9469 |
| 946 | $100 | 9740 |

**HOMEMADE & NOVELTY ITEMS**

| | | |
|---|---|---|
| 954 | $---- | 9805 |
| 956 | $25 | 9810 |
| 958 | $200 | 9825 |
| 959 | $150 | 9818 |
| 960 | $20 | 9820 |
| 962 | $5 | 9830 |
| 968 | $125 | 9835 |
| 969 | $---- | 9898 |
| 970 | $45 | 9860 |
| 971 | $55 | 9870 |
| 972 | $100 | 9880 |