

# Morse code

## History

2013-June-11

## Code pre-Morse



Polybius, Greek historian from 150 BC, sent messages with torches, with numbers standing for letters.

	1	2	3	4	5
1	A	B	C	D	E
2	F	G	H	I,J	K
3	L	M	N	O	P
4	Q	R	S	T	U
5	V	W	X	Y	Z

# Invention of telegraph

In the Napoleonic wars both the French and the British set up towers



# Invention of telegraph

In the Napoleonic wars both the French and the British set up towers



that tied together to make national networks.



# The code as part of the telegraph: Morse

Samuel Morse was a well-known painter.



S F B Morse 1791-1872

In 1825 he was asked to paint the Marquis de Lafayette in Washington DC. Mid-way through he got a note that his wife was ill. He hurried home to CT, but was too late.

## The code as part of the telegraph: Morse

Samuel Morse was a well-known painter.



S F B Morse 1791-1872

In 1825 he was asked to paint the Marquis de Lafayette in Washington DC. Mid-way through he got a note that his wife was ill. He hurried home to CT, but was too late.

Heartbroken to know that for days he was unaware of his wife's failing health and her lonely death he first began to think about how to do rapid long distance communication.

In 1830, Morse traveled to Europe to improve his painting skills. In Paris, he painted miniature copies of the Louvre's most famous paintings on a single canvas, which he would exhibit for money.



*Gallery of the Louvre, 1832*

In 1830, Morse traveled to Europe to improve his painting skills. In Paris, he painted miniature copies of the Louvre's most famous paintings on a single canvas, which he would exhibit for money.



*Gallery of the Louvre, 1832*

On the boat home he met an expert in electromagnetism. Seeing the demonstrations, Morse had the idea of a single-wire telegraph.



Morse developed a device that wrote dashes and dots on a paper tape.



Morse developed a device that wrote dashes and dots on a paper tape.



One helper in his early development was Alfred Vail who had skills, insights, and money.



Alfred Vail, 1807-59

On 1838-Jan-11 Morse and Vail made their first public demonstration with the message “A patient waiter is no loser”.

The big breakthrough was the invention of relays so they could send signals further than two miles.

The big breakthrough was the invention of relays so they could send signals further than two miles.

In 1843 congress appropriated \$30,000 for a line between Washington, D.C., and Baltimore. On 1844-May-24 Morse sent "What hath God wrought?"



The paper tape with *What hath God wrought?*

Morse spent the rest of his life developing his invention,

The big breakthrough was the invention of relays so they could send signals further than two miles.

In 1843 congress appropriated \$30,000 for a line between Washington, D.C., and Baltimore. On 1844-May-24 Morse sent "What hath God wrought?"



The paper tape with *What hath God wrought?*

Morse spent the rest of his life developing his invention, suing other telegraph inventors (many of which had developed earlier and better systems than his),

The big breakthrough was the invention of relays so they could send signals further than two miles.

In 1843 congress appropriated \$30,000 for a line between Washington, D.C., and Baltimore. On 1844-May-24 Morse sent "What hath God wrought?"



The paper tape with *What hath God wrought?*

Morse spent the rest of his life developing his invention, suing other telegraph inventors (many of which had developed earlier and better systems than his), and writing letters to the editor in favor of slavery.

## The code itself: operators

Morse planned to only transmit numerals. Then operators would look up the corresponding word. Vail added letters and special characters. He got the frequency of letter use in English by counting the letters of movable type in the type cases of a local newspaper.

## The code itself: operators

Morse planned to only transmit numerals. Then operators would look up the corresponding word. Vail added letters and special characters. He got the frequency of letter use in English by counting the letters of movable type in the type cases of a local newspaper.

In the original Morse receivers the armature made a click as it moved to mark the tape. Telegraph operators soon learned that they could understand the message from the clicks alone, eliminating the paper tape.



## The code itself: operators

Morse planned to only transmit numerals. Then operators would look up the corresponding word. Vail added letters and special characters. He got the frequency of letter use in English by counting the letters of movable type in the type cases of a local newspaper.

In the original Morse receivers the armature made a click as it moved to mark the tape. Telegraph operators soon learned that they could understand the message from the clicks alone, eliminating the paper tape.



T Edison 1847-1931

# International Morse

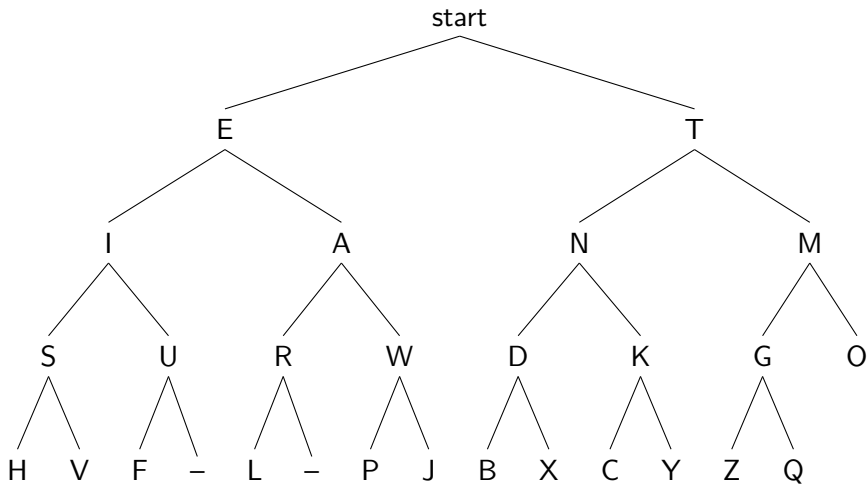
What is called Morse code today is different from what was originally developed by Vail and Morse.

## International Morse

What is called Morse code today is different from what was originally developed by Vail and Morse.

International Morse code was created in Germany by Friedrich Clemens Gerke in 1848. He changed nearly half of the alphabet and all of the numerals. After some additional minor changes, this was standardized at the International Telegraphy Congress in 1865 in Paris. Morse's original code, largely limited to use in the United States and Canada, became known as American Morse code or railroad code and is no longer used.

# Morse tree



## Words per minute: records

A dash is three dots long and spacings are in dot lengths so Morse code speed depends on the dot length, and on the word length. The standard word is PARIS, with 50 dot units. Thus for instance at 20 words per minute each dot is 60 milliseconds.

## Words per minute: records

A dash is three dots long and spacings are in dot lengths so Morse code speed depends on the dot length, and on the word length. The standard word is PARIS, with 50 dot units. Thus for instance at 20 words per minute each dot is 60 milliseconds.

The fastest speed ever sent with a straight key was 35 wpm by Harry Turner W9YZE in a demonstration at a US Army base in 1942.

In 1939 at a contest, Ted R. McElroy set a record for Morse copying, 75.2 wpm, by hand.

*From Morse Code at 140 WPM on the ARRL website:* Chuck Adams, K7QO, copies at 140 wpm, making him one of the fastest operators in the world. Chuck explains, “There are three code speeds. [The first is] plain text with a keyboard. This is the way world records are done, [copying] one minute without error out of five minutes of plain text.”

*From Morse Code at 140 WPM on the ARRL website:* Chuck Adams, K7QO, copies at 140 wpm, making him one of the fastest operators in the world. Chuck explains, “There are three code speeds. [The first is] plain text with a keyboard. This is the way world records are done, [copying] one minute without error out of five minutes of plain text.”

“Plain text without hard copy, also known as copying in your head, is much more difficult to measure. This doesn’t have to be 100% copy. There are guys who consistently carry on QSOs at 110-120 wpm but those QSOs are disappearing from the bands.”



*From Morse Code at 140 WPM on the ARRL website:* Chuck Adams, K7QO, copies at 140 wpm, making him one of the fastest operators in the world. Chuck explains, “There are three code speeds. [The first is] plain text with a keyboard. This is the way world records are done, [copying] one minute without error out of five minutes of plain text.”

“Plain text without hard copy, also known as copying in your head, is much more difficult to measure. This doesn’t have to be 100% copy. There are guys who consistently carry on QSOs at 110-120 wpm but those QSOs are disappearing from the bands.”

“The third way is a computer program where the 140.9 wpm comes from for me and the 200 wpm that two individuals did at the IARU competition. The program has a database of radio amateur calls. You hear a call and type it in. If you get it right, the program sends another call at a faster speed. If you miss then the next call is sent at a slower speed. Your score is determined by a number of factors: response time, correct calls or number of characters per call, etc. This program is the most frustrating thing you can do – [and] will drive anyone to drink in a hurry.”

# Why Morse code?

# Why Morse code?

Simple It is a natural way to communicate.

# Why Morse code?

**Simple** It is a natural way to communicate.

**Efficient** It can be heard when other signals cannot.

# Why Morse code?

**Simple** It is a natural way to communicate.

**Efficient** It can be heard when other signals cannot.

**Neat** It is fun.