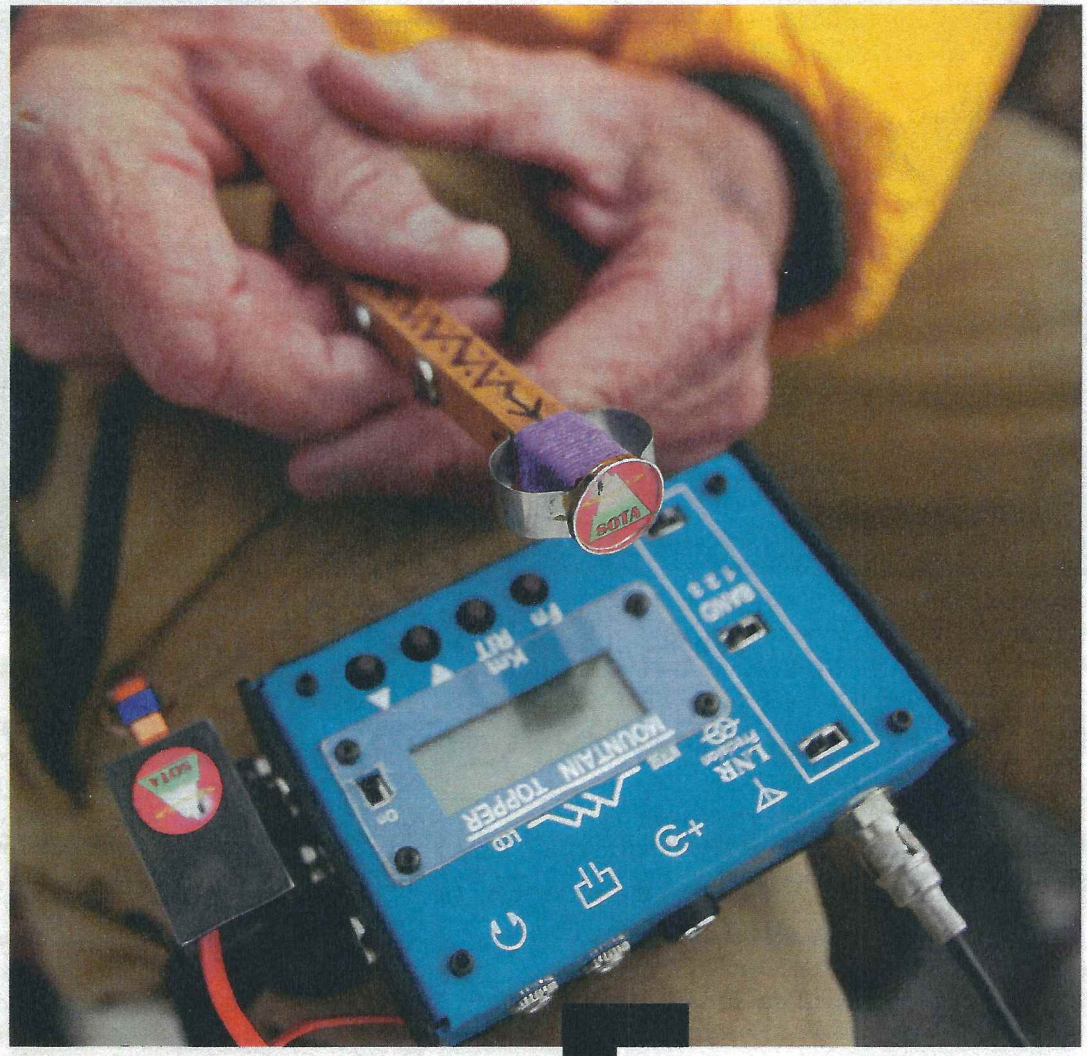
COMMUNICATION

By
Larry Kahaner



Steve Galchutt shows off the custom-made low-wattage transmitter he uses on his treks.

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Reviving a 200-year-old system, Morse code enthusiasts are putting the digit back into digital communication

FOR ALMOST 20 YEARS, Steve Galchutt, a retired graphic designer, has trekked up Colorado mountains accompanied by his pack of goats to contact strangers around the world using a language that is almost two centuries old, and that many people have given up for dead. On his climbs, Galchutt and his herd have scared away a bear grazing on raspberries, escaped from fast-moving forest fires, camped in subfreezing temperatures and teetered across a rickety cable bridge over a swift-moving river where one of his goats, Peanut, fell into the drink and then swam ashore and shook himself dry like a dog. "I know it sounds crazy, risking my life and my goats' lives, but it gets in your blood," he tells me by phone from his home in the town of Monument, Colorado. Send-

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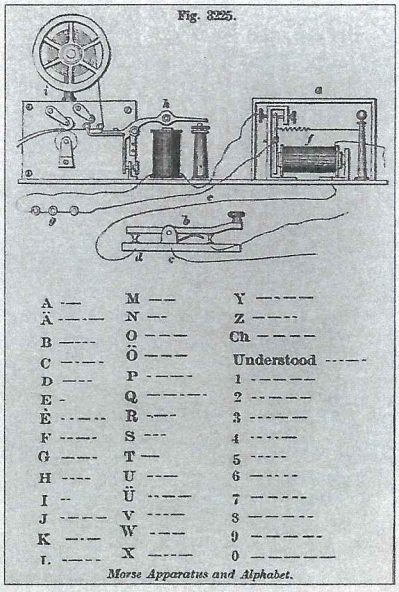


An 1877 print from *Knight's American Mechanical Dictionary* offers a simple guide for sending letters and numbers in Morse code.

ing Morse code from a mountaintop—altitude offers ham radios greater range—"is like being a clandestine spy and having your own secret language."

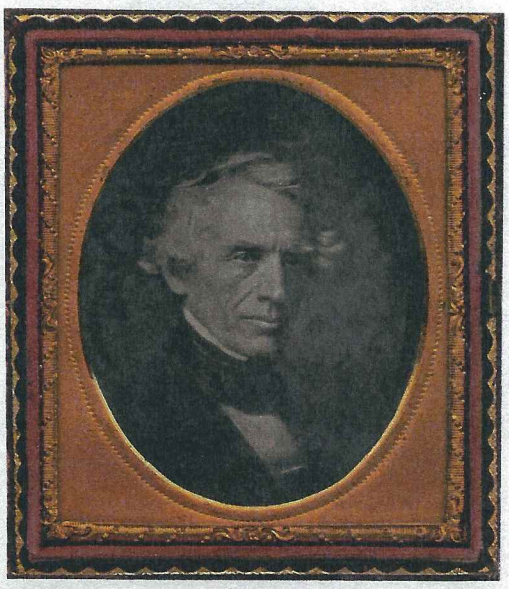
Worldwide, Galchutt is one of fewer than three million amateur radio operators, called "hams," who have government-issued licenses allowing them to transmit radio signals on specifically allocated frequencies. While most hams have moved on to more advanced communications modes, like digital messages, a hard-core group is sticking with Morse code, a telecommunications language that dates back to the early 1800s—and that offers a distinct pleasure and even relief to modern devotees.

Strangely enough, while the number of ham operators is declining globally, it's growing in the United States, as is Morse code, by all accounts. ARRL (formerly the American Radio Relay League), based in Newington, Connecticut, the largest membership association of amateur radio enthusiasts in the world, reports that a recent worldwide ham radio contest—wherein hams garner points based on how many conversations they complete over the airwaves within a tight time frame—showed Morse code participants up 10 percent in 2021 over the year before. This jump is remarkable, given that in the early 1990s, the Federal Communications Commission, which licenses all U.S. hams, dropped its requirement that beginner operators be proficient in Morse code; it's also no longer regularly employed by military and maritime users, who had relied on Morse code as their main communications method since the very beginning of radio. Equipment sellers have noticed this trend, too. "The majority of our sales are [equipment for] Morse code," says Scott Robbins, owner of ham radio equipment maker Vibroplex, founded in 1905, which touts itself as the oldest continuously operating business in amateur radio. "In 2021, we had the best year we've ever had . . . and I can't see how the interest in Morse code tails off."

Practitioners say they're attracted by the simplicity of Morse code—it's just dots and dashes, and it recalls a low-tech era when conversations moved more slowly. For hams like Thomas Witherspoon of North Carolina, using Morse code transmissions—sometimes abbreviated as CW, for "continuous wave"—offers a rare opportunity to accomplish tasks without high-tech help, like learning a foreign language instead of using a smartphone translator. "A lot of people now look only to tools. They want to purchase their way out of a situation." Morse code, on the other hand, requires you to use "the filter between your ears," Witherspoon says. "I think a lot of people these days value that." Indeed, some hams say that sending and receiving Morse code builds up neural connections that may not have existed before, much in the way that math or music exercises do. A 2017 study led by researchers from Ruhr University in Bochum, Germany, and from University Medical

Capt. Roy F. Morse (no relation to Samuel), center, teaches Morse code to Black Air Corps cadets in Tuskegee, Alabama, in 1942.

READ HOW *the telegraph inspired early computer code at* ***Smithsonian mag.com/morse***



In 1844, Samuel F.B. Morse inaugurated the first U.S. telegraph line with a verse from Numbers, recommended by a friend's young daughter: "What hath God wrought?"

Center Utrecht in the Netherlands supports the notion that studying Morse code and languages alike boosts neuroplasticity in similar ways.

Morse code emerged during a time of tinkering, at the start of the electrical age. In the 1830s, Samuel F.B. Morse, who had made a national name for himself as a painter with portraits of such luminaries as John Adams and the Marquis de Lafayette, began working with colleagues, including the inventor Alfred Vail, to experiment with how an electrical impulse initiated in one place and transmitted over a distance through wires could activate an electromagnet somewhere else. Operators would push down on a button attached to a small slab of brass that made an electrical connection between two wires. The connection sent electricity through these wires to a remote electromagnet, which then attracted a metal strip that made a clicking sound. Though British inventors William Cooke and Charles Wheatstone had used an electromagnet to create the first telegraph receiver, patented in 1837, Morse's chief innovation was the simplicity of his code: A short press made a short click, or a dot, and a longer press, three times the length of a dot, made a dash; various combinations form the 26 letters of the alphabet. Within a few years, the utility of Morse's new language became clear to governments and businesses around the globe. Morse formalized this language as American Morse code in 1838, and in 1851 countries standardized it into international Morse code, which has remained largely unchanged since.

> **"WHEN YOU CAN'T GET THROUGH WITH YOUR OWN VOICE, MORSE CODE GETS YOU THROUGH."**

After Guglielmo Marconi sent the first intercontinental Morse message by radio in 1901—a simple "S," from England to Newfoundland—Morse code became the de facto method for critical telecommunications and maintained that standing for nearly a century, despite the emergence of voice communication, because it offered clearer and more reliable communication for the military and maritime users.

That dominance broke in the mid-20th century, when digital data sent over satellites and fiber-optic cables took hold. Most historians agree that the death knell for Morse came in 1999 when the Global Maritime Distress and Safety System, which generates an automated digital emergency signal for ships in danger, replaced Morse code's SOS—the familiar dot-dot-dot / dash-dash-dash / dot-dot-dot. Military use disappeared except in extremely rare instances, other ship use became almost nonexistent and the last holdout users were hams who were still required to learn code for their licenses. That changed in the early to mid-2000s, when most countries no longer required hams to be proficient in Morse.

Although Morse remains the purview of hams, its presence still seeps into wider culture. The new Apple Watch can silently buzz out the time in Morse when you put two fingers on the face. Since its opening in 1956, the Capitol Records building in Los Angeles, shaped like a stack of vinyl records, has sported a light on the roof blinking the word "Hollywood" in Morse code.

One of the main shortcomings of Morse code identified nowadays is its slow pace in an age of instant messaging. The average English speaker talks at about 150 words per minute, while most experienced hams send and receive at only 12 to 25 words per minute (although some high-speed operators can hit 35

Amos E. Dolbear patented this telegraph sounder and speaking telephone in 1879. While versatile, it did not become a household fixture.

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or 55 words), says Howard Bernstein, who teaches Morse code at the Long Island CW Club. Another drawback is the difficulty in learning the code—tantamount to learning a foreign language. It can take months or years of hard work to become proficient in a skill that offers diminishing returns for anyone but an avid hobbyist.

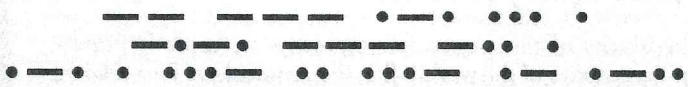
Part of Morse code's enduring appeal for hams isn't going away soon: Its simplicity and easy detection on airwaves make it more reliable than voice communication—and allow a ham to break through atmospheric noise and other weather conditions, even at extremely low transmitting power. "When you can't get through with your own voice, Morse code gets you through," says Bob Inderbitzen, director of marketing and innovation at ARRL.

Radios that send and receive Morse code are lightweight and technically simple, and they need only small batteries. These advantages have spurred several sub-hobbies within the ham community. Thousands of hams worldwide participate in programs such as Parks on the Air and Summits on the Air, in which operators take their rigs into parks or mountaintops to see how many contacts they can make and how far they can reach.

Adam Kimmerly of Ramona, California, is a regular at these events. "This is an ideal combination of my favorite hobbies: rock climbing, mountaineering, hiking and amateur radio." And while some might imagine Morse code to be less intimate than actually hearing someone's voice, veteran hams can often recognize one another based on their "fist," or the rhythm and pacing of a strip of code. "You may think of dots and dashes as not having the same personality or character as voice communication, but they actually do," Kimmerly says. "One of the really cool things I never expected is that people have their own inflections." One Morse code enthusiast, Anne Fanelli, even saved a fellow ham's life when she noticed his "fist" was off; after he stopped responding entirely, she called 911, and he was taken to the hospital, where he spent three days recuperating from an adverse drug reaction.

Doug Tombaugh, a history re-enactor from Kansas City, Missouri (he plays a mid-19th-century woodcutter), is president of the Straight Key Century Club, whose thousands of members use simple up-and-down keys like those used by the first Morse code operators, instead of modern keys that form dots and dashes electromechanically, or those that employ computer software.

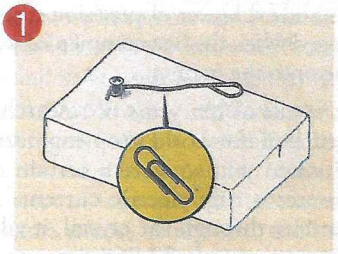
"I just like the mechanicalness of using a brass key," Tombaugh says. "It's real. It's authentic. It's tactile." ◆



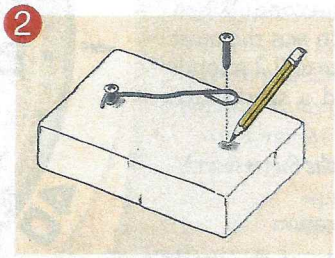
HOW TO BUILD YOUR OWN MORSE CODE PRACTICE GENERATOR

By **Larry Kahaner**

WHAT YOU'LL NEED:
1. A piece of wood
2. Two screws
3. Stiff metal wire
4. Nine-volt battery and clip
5. Buzzer

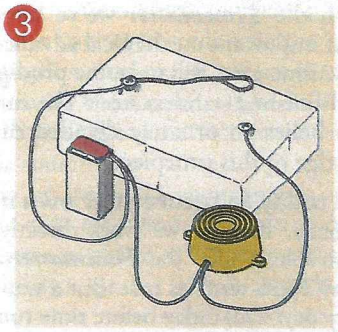


STEP 1: Take a thick wire with some spring or bounce to it, such as an opened paper clip or section of coat hanger (scrape off any coating). Loop one end around a screw head and fasten to a piece of wood. Don't tighten all the way. This is your "key."

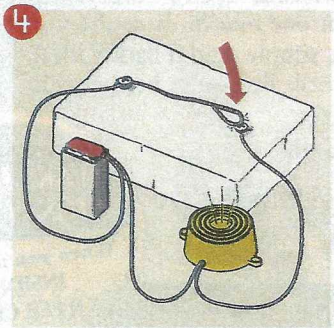


STEP 2: Press down on the key and mark where the free end touches the board. Put a screw in that mark. Don't tighten.

PRO TIP: Dashes should be three times the length of dots. The space between dots and dashes in a letter is the length of one dot. The space between letters is three dots. The space between words is equal to seven dots.



STEP 3: Connect a wire from the nine-volt battery clip to the first screw and tighten. Take the other battery wire and connect to the buzzer. Connect the other buzzer wire to the second screw and tighten.



STEP 4: When you press the key, the buzzer will sound. If no sound ensues, reverse the buzzer wires.

NOW you can send Morse signals through your smartphone by placing its microphone near the buzzer. (Be sure to snag a ham license from the FCC before connecting your gadget to a radio transmitter.)

Illustrations by **Toby Leigh**