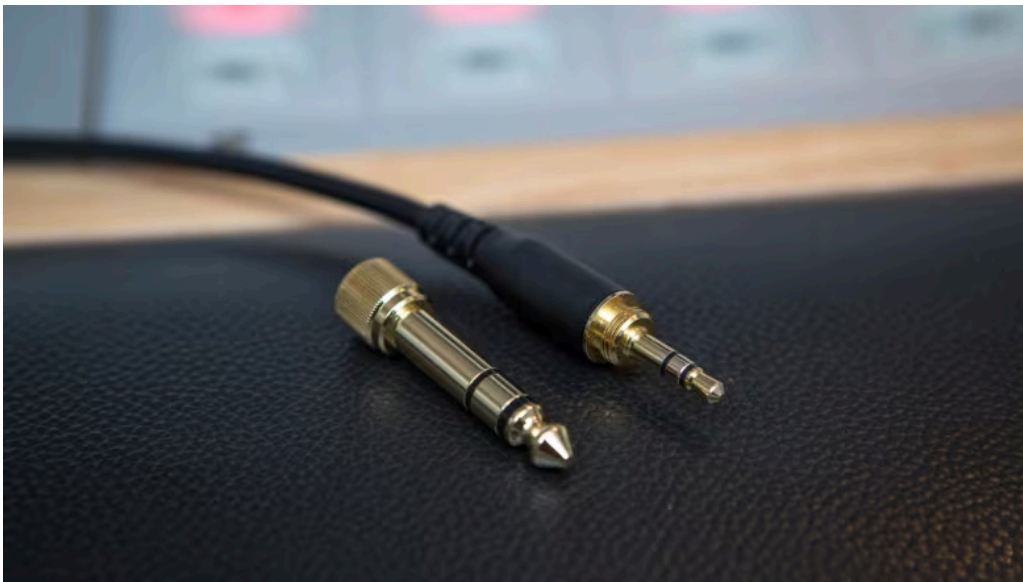


Science

Apple be damned: the humble headphone jack has survived for more than a century

Early version of ubiquitous adapter, also called the tip-ring-and-sleeve, was first used in 1880s

[Jonathan Ore](#) · CBC News · Posted: Sep 10, 2016 5:00 AM EDT | Last Updated: September 10, 2016



Traditional headphone jacks in 3.5 mm (right) and 6.35 mm sizes are still the standard connectors in nearly every consumer electronic product that outputs audio. (Evan Mitsui/CBC)

At its latest product introduction, Apple announced what for some seemed unthinkable (and for others inevitable): the next iteration of the iPhone would abandon the traditional 3.5-mm headphone jack.

Apple's marketing chief Philip Schiller characterized it as a move requiring "courage," and reaction was unsurprisingly mixed.

But what made the 3.5-mm jack such a ubiquitous, universal standard?

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To Francis Delage, store manager at Moog Audio in Toronto, it's a classic case of if it ain't broke, don't fix it.

"You don't need to improve on it. It just works," he told CBC News.

"We had one standard. You don't need to make sure, when you buy something, that it's the right connection, or you need to get something specialized to make it work. You just know it's going to work."



Operators work the switchboard of the American Telephone and Telegraph Company's long-distance exchange, circa 1930. (Getty Images)

Tip, ring and sleeve

The technology behind the headphone jack goes all the way back to the late 1800s, when the slightly larger 6.35-mm (or quarter-inch) jack was used by telephone operators who had to direct calls by plugging wires into switchboards.

The plugs' robust construction meant they could be removed and inserted into different ports on the board quickly, with little worry of damaging the equipment. It's commonly referred to as a "tip, ring and sleeve" connector, named after its recognizable components.



The Sony Walkman cassette player popularized the portable music player and headphone combo, anchored, of course, by the 3.5-mm headphone jack. (Carl Court/Getty Images)

With the introduction of the transistor radio in the 1950s, the quarter-inch jack shrank to 3.5 mm to allow people to plug earphones into these portable devices. The concept would evolve over the decades, punctuated by popular products like Sony's Walkman for cassette tapes, CD players and eventually digital music players like the iPod and smartphones.

Throughout all these changes, the 3.5-mm jack remained more or less unchanged. Slight modifications upgraded its audio capabilities from mono to stereo, and later a microphone function was added — all coursing through the same metallic plug.

Its socket has been standardized to the point where it's just about guaranteed that if a device outputs audio, your headphones will fit, whether it's a smartphone, personal computer, car radio or your seat on a commercial airplane.

Easy to use, reliable, and cheap

A quick glance at a headphone jack today makes it easy to understand why it was useful for the high-pressure switchboard business of the early 20th century. The tapered tip latches inside the port to form a secure bond, keeping it from easily slipping out.

Plugging in results in a tactile click, and its round shape means you'll never have to worry about inserting it upside down (we're looking at you, USB).



The headphone jack's metallic tip, ring and sleeve components are separated by thin insulators, coloured black in the top example and white in the lower one. Note the additional ring on the iPhone connector, which added microphone functionality to mobile headset/earphone combos. (Evan Mitsui/CBC)

Composer, producer and former CBC Radio host David Jaeger praised the audio jack design for "its simplicity, its reliability, its elegance and its durability."

"It earned that stranding and that reputation just by providing the best solution to a very common need. And it did it so effectively and convincingly that [its widespread use] really, I think, became unquestioned."

Unquestioned, at least, until now.

Is it time to drop the jack?

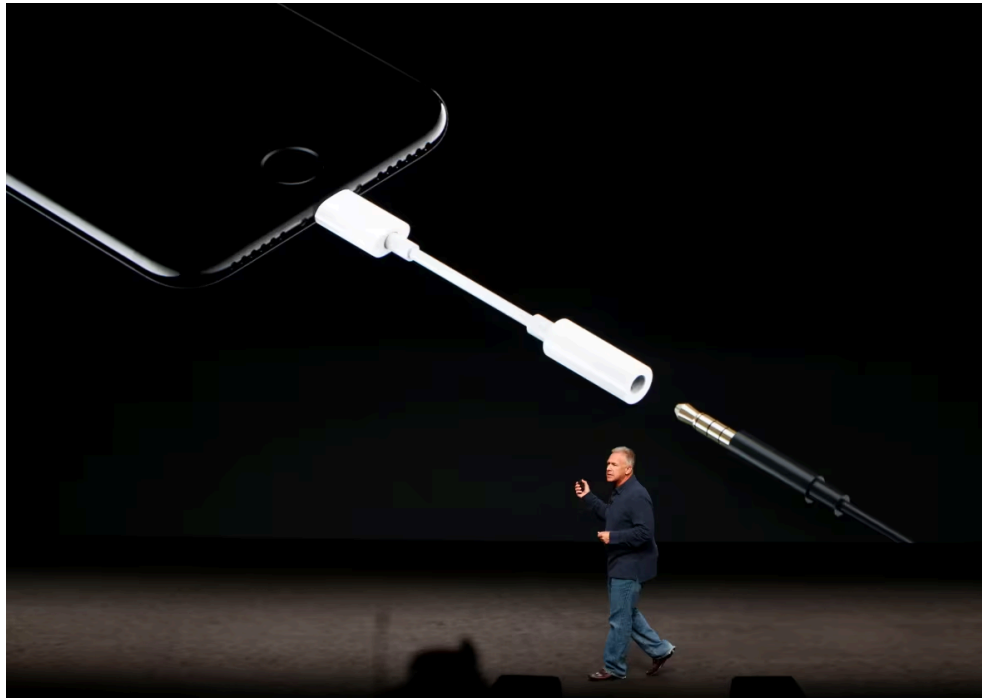
[According to Quartz](#), hardcore audiophiles and engineers see the iPhone 7 as the first move toward a future where the headphone jack's dominance will no longer be assumed, and where new alternatives provide a tangible improvement to the old standard.

Audio coming through your smartphone starts off in a digital format, but has to be converted to analog sound for your ears to hear it. This has to be done in your phone or other device before it can be sent through the 3.5-mm jack (since it's an analog, pre-digital tech).

A Lightning port can transfer more data at a faster rate than anything pushed through a phone jack, theoretically allowing for more pleasing, higher-fidelity sound being pumped into your ears.

This shift means the digital-to-analog converter (or DAC) doesn't need to be housed in the smartphone.

However, that also means manufacturers making Lightning-compatible headphones will need to build a DAC into their products, potentially increasing development costs.



Philip Schiller, senior vice-president of Worldwide Marketing at Apple, reveals a wired dongle that allows traditional 3.5-mm headphone jacks to connect to the iPhone 7's Lightning port. (Beck Diefenbach/Reuters)

For now, though, Jaeger sees the Lightning port as an interesting alternative, rather than an outright replacement for the reliable headphone jack.

"I don't think it's going to go away," he says of the tip, ring, and sleeve. "I think [Lightning] will just be another technology added to the mix.

"And let's be honest, if you've invested \$1,000 into a really fancy pair of headphones that has the 3.5-mm plug, you're just going to use an adapter."

Apple's inclusion of a 3.5-mm-to-Lightning adapter with all iPhone 7 models suggests that despite some forward-thinking toward finally retiring the headphone jack, reports of its death have thus far been greatly exaggerated.

Corrections

- An earlier version of this story had an overly simplified explanation of how digital sound is converted to analog in your smartphone headphone jack. This has been corrected to say the Air Pods do this conversion for the iPhone 7, yielding higher fidelity sound.
Sep 10, 2016 2:41 PM ET

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