Last year, we inaugurated IEEE Spectrum’s online Chip Hall of Fame, highlighting 27 integrated circuits that helped shape the modern world. This year we add five new inductees, including the Nvidia NV20, a GPU that serendipitously paved the way for the machine-learning revolution, and the Photobit PB-100, the image sensor that put webcams on the map. For the full list and their citations, visit the hall, but as an example of how a tiny device can have a big impact, here’s the tale of one inductee, the Philips TDA7000 FM receiver.

FM radio is now a standard feature in a staggering number of gadgets, including alarm clocks, wristwatches, and music players. But before the early 1980s, conventional radio functions were costly and time consuming to build. Manufacturers typically had to make 10 to 14 circuit adjustments, known as alignments, to ensure that reception was good and that the frequency shown on the radio’s tuning scale was correct. What changed was the advent of the Philips TDA7000, a chip that made cheap, easy, and ultrasmall FM radio possible.

Working in Philips’s Netherlands R&D lab in the mid-1970s, engineers Dieter Kasperkovitz and Harm van Rumpt had managed to fit an entire mono FM receiver, from antenna input to audio signal output, on a 3.5-millimeter-square chip. The only external pieces were an adjustable resonant circuit for tuning the radio to the desired frequency and as few as 14 ceramic capacitors, plus the power supply and speaker. Only one alignment was needed.

Ebullient, the duo patented their creation in 1977 and presented it to the Philips corporate team shortly afterward. The meeting didn’t go as hoped, with opposition from the radio-manufacturing group.

“It was rejected, period,” van Rumpt explains. “The Philips audio people said it was not possible to do this—they hadn’t invented it, so it must be impossible, right?—and so [the TDA7000] was more or less put in a drawer.”

That might have been the end for the chip, were it not for a third man: Peter Langendam, an atomic and molecular physicist who was then managing a factory at the Philips components subsidiary Valvo, based in Hamburg.

Langendam believed in the technology so strongly that he went rogue, secretly bringing some sample chips from the Netherlands back to Germany to produce a few demo radios. He sent those radios to Japanese clients who went wild for the technology, signing orders for a million chips.

The risk was enormous, but it worked. With the Japanese market proven, Philips was onboard—as was everyone else. Suddenly it was possible to cram FM radios into, well, just about everything: alarms, music players, and even wackadoo novelties like sunglasses. Hey, why not? The TDA7000 and its variants made radio capabilities tiny and inexpensive.

The chip changed the DIY radio world, too, making it vastly easier for hobbyists to build an FM radio from scratch and without the endless futzing with a half-dozen components to get the dang thing to work. To date, over 5 billion TDA7000s and variants have been sold.

The TDA7000 was a hit, but its success had demanded that the members of the team put their jobs at risk. Over time, van Rumpt and Kasperkovitz tired of the corporate hoopjumping at Philips. In 1998 they teamed up with Langendam and another Philips buddy, Harry Schoonheijm, to create their own “inventor company” for transceiver systems.

The naming decision was easy: They would become ItoM, shorthand for “semiconductor ideas to the market.”

Langendam retired from ItoM in 2015, but the other three continue to lead the company in creating new chips. And despite the naysayers of the ‘70s, the ItoM team looks back on the TDA7000’s early days with wistful amusement.

“It was a nice environment in that we had a lot of freedom,” van Rumpt says. “We could do crazy things without the need to get budgets and a million teams to sign off on it.”

Kasperkovitz concurs: “It was, you could say, a good old time.” —JULIANNE PEPITONE

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The Radio Stars: Dieter Kasperkovitz (left) and Harm van Rumpt squeezed a radio receiver into a microchip, spawning countless gadgets.

FM Radio Free Everywhere: This Inductee into the Chip Hall of Fame Made FM Receivers Ubiquitous.