

How E.T. Really Called Home

If it were not for an inventive ham, E.T. might still be trying. In this exclusive article, the designer of the little guy's communicator unveils its inner workings.

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"T GIF," I thought as I returned from lunch to my office in the exhibit department of Bell Labs. Lying on top of my desk—on top of a pile of exhibit plans—was a telephone message asking me to call Kathleen Kennedy in Hollywood. Now, the public

relations department of Bell Labs gets many requests for information, but this one was considerably more unusual than most.

Ms. Kennedy, who produced *E.T.* with Steven Spielberg, had called Bell Labs earlier that day to find someone who would work at home during the weekend, designing a space communicator to be used by a stranded alien to contact his space ship. Few other details

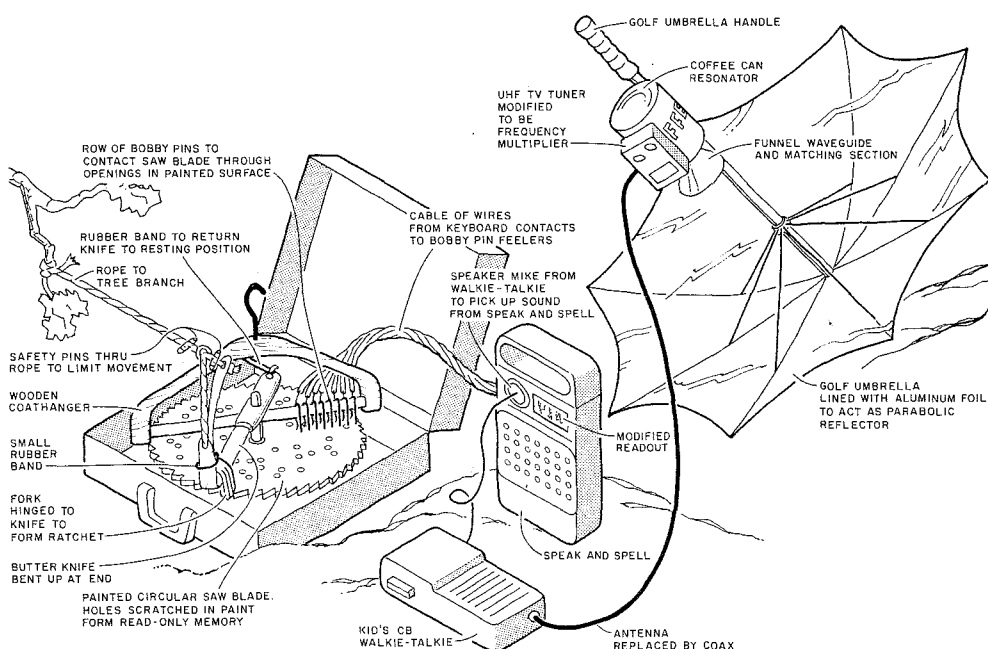
were given, as a great deal of secrecy surrounded the film. Even the name of the film was a secret. I was told that the alien was called E.T., short for extra-terrestrial, but the working title given me for the film was deceiving; it was called "A Boy's Life."

I guess the call was referred to me because of my experience in using household objects to explain science. My title at Bell Labs at

the time was Exhibits and Science Presentations Coordinator. Before coming to the Bell system, I worked with Don Herbert, TV's "Mr. Wizard," designing experiments using everyday materials to explain scientific principles. At the Labs, I continued my work popularizing science through films, demonstrations, and exhibits. Currently, my work at AT&T involves corporate exhibitions such as the Bell System's Futurecom at Epcot Center in Walt Disney World.

Kathleen Kennedy asked me to work by phone with Melissa Mathison, who was writing the *E.T.* script and who was also associate producer. I had several long phone calls with Melissa, discussing items found around the house that could be used in a communicator. As an avid ham-radio operator with a limited junk box, I first looked for household objects that could actually transmit a signal. Transmitters of various sorts were too ordinary, of course. I was looking for something more exotic, something like a microwave oven that could be converted to send a signal into space.

Plausibility was a big fac-



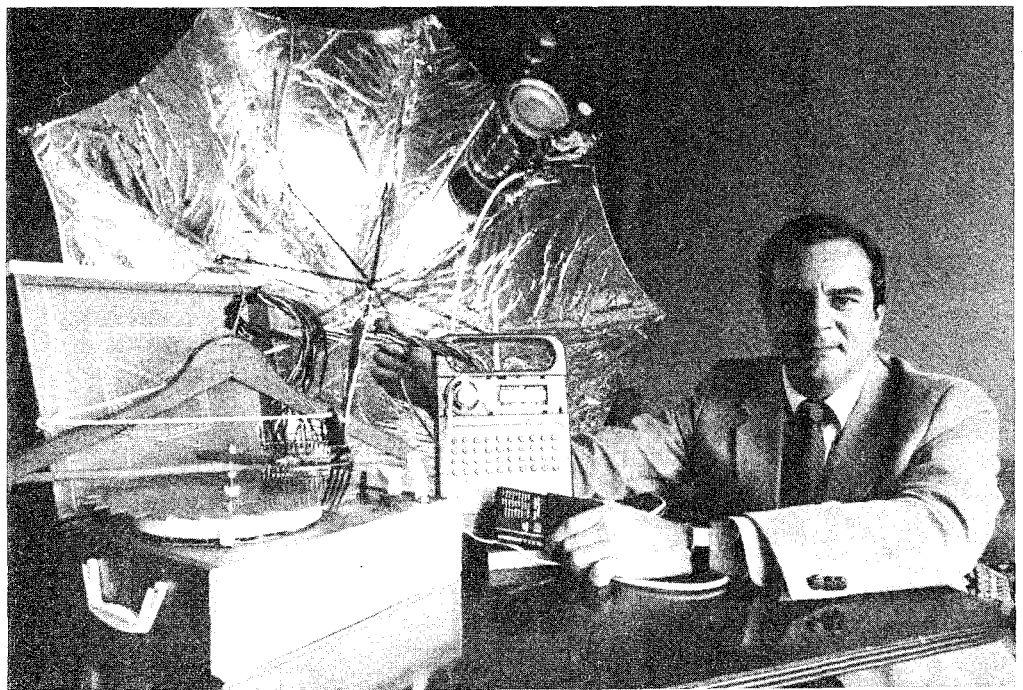
Pictorial drawing of the E.T. communicator.

tor. While the communicator didn't actually have to work, I wanted it to be plausible enough that my ham friends at Bell Labs wouldn't laugh me away from the "ham table" in the cafeteria. I also wanted to avoid a science-fiction look with a lot of blinking lights, coils, and sparks. It was important to me that people seeing the film would not be scared away from the science, and might even understand how a communicator like this might work.

Using a microwave oven as a transmitter seemed plausible enough, and I expanded on the fanciful design by placing a round hubcap in the oven to focus the microwave energy out the door and into a waveguide made of flexible aluminized air-conditioning duct. The duct could be run out the kitchen window to an antenna made by inverting a metal patio umbrella and using it as a parabolic reflector.

At this point, before I'm accused of gross ignorance for failing to recognize how the oven would be de-tuned or how inefficient the system would be, remember that the objective was plausibility, not practicality. It was the thought that counted, and I was having fun thinking of possibilities such as building a flying spot-scanner using a combination of mechanical and electronic components—like Christmas tree ornaments and loudspeakers with mirrors attached. Melissa Mathison told me that Steven Spielberg liked the microwave oven idea but wanted a portable unit to work from a forest clearing. Back to the drawing board.

During my years with Mr. Wizard, we put together one Rube Goldberg contraption after another to illustrate scientific principles. Invariably, we would use household materials in unorthodox ways. Psychologists call this type of creative brainstorming a release from



The E.T. communicator. (Photo copyright © 1982, Henry R. Feinberg)

"functional fixedness." Briefly stated, it means that you can do more with an old 813 than build a lamp with it. The trick is to analyze the desired result by function, breaking down each section to as simple a scale as possible; then it's easier to build the unit from the ground up in a new way. (Sounds a lot like writing a computer program, doesn't it?)

What Spielberg wanted was a beacon transmitter—something to say "Here I am! Come and get me!" I reasoned that three main parts were needed for a basic beacon: a means of producing a message, a programmer to repeat the message, and a way of transmitting the signal into outer space.

Working backward, I knew that a golf umbrella lined with aluminum foil would make a plausible-looking parabolic reflector. And on my last trip to the Dayton Hamvention, I saw coffee cans being used as resonators for receiving MDS TV signals. In fact, a UHF TV tuner purchased there *could* be extensively modified to act as a multiplier to select the ump-

teenth harmonic of a CB signal from a toy handie-talkie. The resulting microwave signal *could* then be directed from the coffee-can resonator toward the umbrella reflector through a waveguide/matching section made from a funnel. Ah, the license of plausibility!

To produce the message, I used a Speak and Spell™ learning aid made by Texas Instruments. The unit contains a speech synthesizer, a keyboard, a fluorescent readout, and a speaker. E.T. deserved his own alphabet, so I rewired the segments of the alphanumeric readout. It took several tries to make the resulting gibberish look like another language. No changes were made in the speech circuits since I thought the sound-effects people would add their own sound. Actually, they never did, and in the film one doesn't hear any sound at all from the communicator—not even the original "message" I devised with the help of Debbie, my wife. It was our names repeated over and over.

The remaining problem was how to program the Speak and Spell to repeat

the same message over and over. To begin with, wires were attached to each keyboard contact. A set of feelers was needed for the other end of the wires. Originally, I used a row of safety pins inserted through the dowel of a wooden coat hanger. But these were a problem to keep straight under pressure. Debbie deserves the credit for suggesting bobby pins. Their flat cross-section prevented them from moving sideways.

The coat hanger was positioned across a child's record player. On the turntable, a circular metal saw blade took the place of a record. The surface of the saw blade was coated with several layers of spray paint which served as insulation, preventing the bobby pins from contacting the metal blade. The message was programmed on the blade by carefully scratching through the paint. This created a pattern of openings similar to those on a punched card through which selected sets of bobby pins could make contact with the blade as it turned.

But how to turn the saw blade? Well, since the com-

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municator was to work by itself in the forest and saw blades have teeth, I decided to use wind power to rotate the blade via a ratchet mechanism. A knife and fork were hinged together and made to pivot on the spindle of the turntable. Each back-and-forth motion of the knife and fork pulled another tooth of the saw blade around and created another set of contacts. A rubber band returned the knife between pulls. A string tied between the knife and a nearby tree branch was all that was needed—the rest was a breeze!

How were the electronics powered? As Melissa Mathison rationalized it, E.T. came from an agrarian society that had learned to tap the forest for electrical power. On the set, the day's shooting schedule didn't leave time to wire the trees, so a battery was used. Score one for practicality over plausibility.

The close-ups of the communicator were filmed in a sound stage dressed to look like the forest. To achieve a misty quality, the trees were sprayed with water before each take. Everything was damp, including the boulder on which E.T. placed the Speak and Spell. At one point, the bare circuit board made contact with the wet surface and it stopped working. Panicked thoughts of zapped ICs flashed through my mind as all eyes turned to me for help. I was scared, but I said a silent prayer and asked for a hair dryer to be brought onto the set.

There's a scene in the film where Elliott helps E.T. set up the communicator in the forest. As the wind starts to blow, Elliott shouts, "It's working! It's working!" I remember that scene, because I was standing right next to the camera, wiping my brow and mouthing the same words. ■

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