Texas Instruments Electronics Online Challenge

By Bethany Lonsinger, Red Hawk Elementary 5th grade, VEX IQ Team 80516

Introduction

One of the many discarded pieces of technology left around my house was an old AT&T cordless phone, model number EL51209. It wasn't being used and was larger (and more complicated) than the small watch that I had originally planned to dismantle. So I set to work with a screwdriver (and safety goggles) and began dismantling.

Summary of Chips & Components

1. Circuit board containing:
    a. Microprocessor circuit
    b. Electrolytic capacitors
    c. Nonvolatile memory device
2. Magnetic speaker
3. Rubber underside of keypad
4. Removable buttons
5. Multiple layers of display screen
6. Front and back covers
7. 2.4V Ni-MH rechargeable Battery
8. Metal chip protector (covered part of circuit board)
9. Many screws
10. Misc. plastic pieces

None of these components appeared to have been manufactured by TI.

Research Findings

To research the components, I first searched their part numbers. If it came up, I'd do the research. If not, I'd research something like NXP ARM (if it was a microprocessor) and if still nothing came up, I'd research other things written on the part. After learning what each part was called, I consulted Wikipedia.

The first thing I researched was the microprocessor (labeled NXP ARM). The Wikipedia definition was: an integrated circuit that contains all the functions of a central processing unit of a computer. It is also called the logic chip. It is intended for microcontroller use. The company that made it was NXP. It pretty much is the brain of the phone.

The second thing I researched was the electrolytic capacitors (part #0v100uf). I learned that electrolytic capacitor is the generic term for Aluminum capacitors, Tantalum capacitors, and Niobium capacitors. They have a much higher capacitance-voltage than ceramic or film capacitors. Capacitors store an electrical charge. They are sometimes used to smooth a current in a circuit.

The third thing I researched was the nonvolatile memory device (part #ATMLH924). Volatile means it forgets things when turned off, nonvolatile is the opposite. That way, it doesn't forget things like the caller ID list when turned off.

Conclusion

The inside of a phone is crazy and complicated, but if you take the time to research the part numbers and look more closely, it can be really cool. From dismantling a phone I learned about microprocessors, electrolytic capacitors, and nonvolatile memory devices.

Deciding not to do a watch

Front of AT&T phone

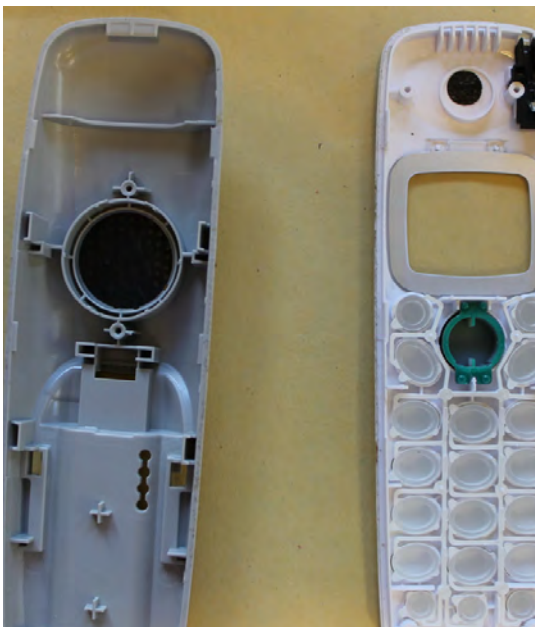
Back of AT&T phone

Back cover removed

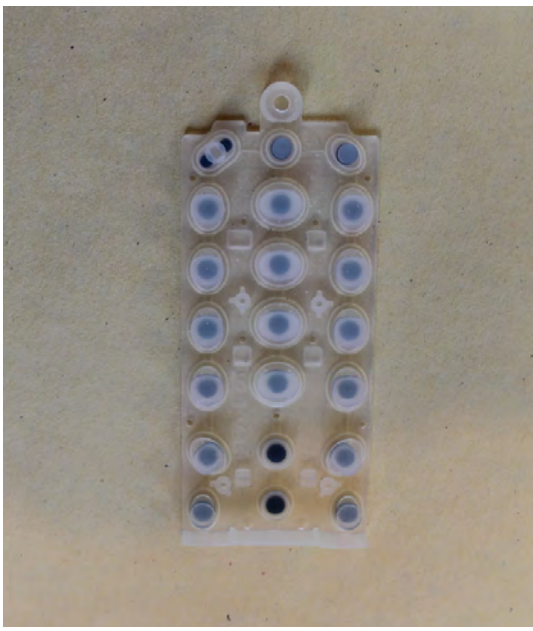
Battery

What I've dismantled so far...

Circuit board, screen, and speaker

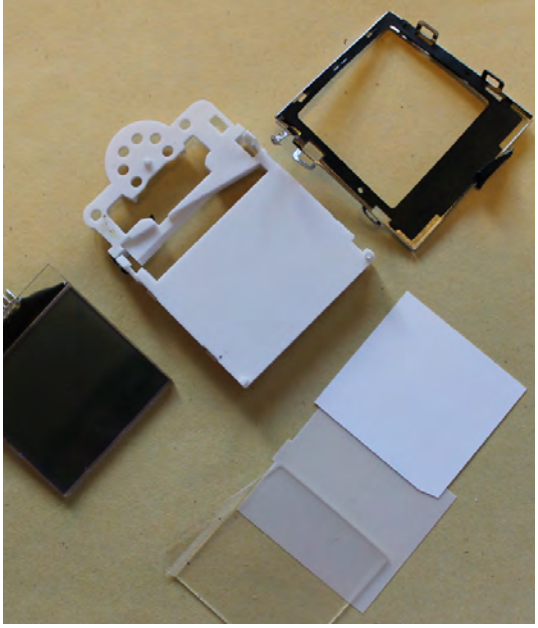


Front and back of phone (inside)

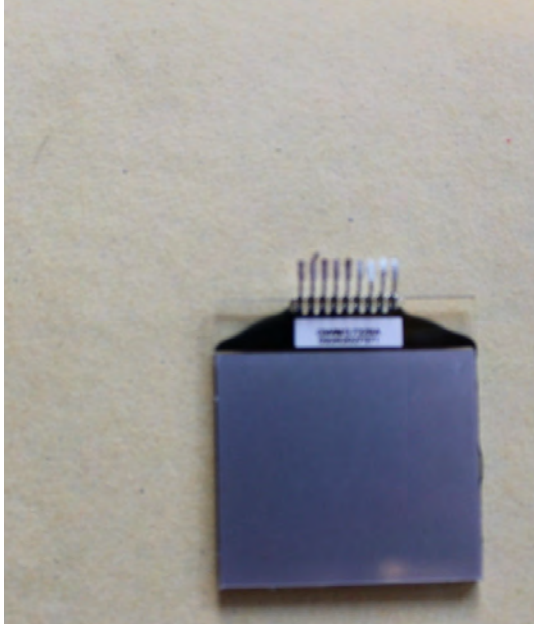


Rubber keypad

Phone screen with bracket removed

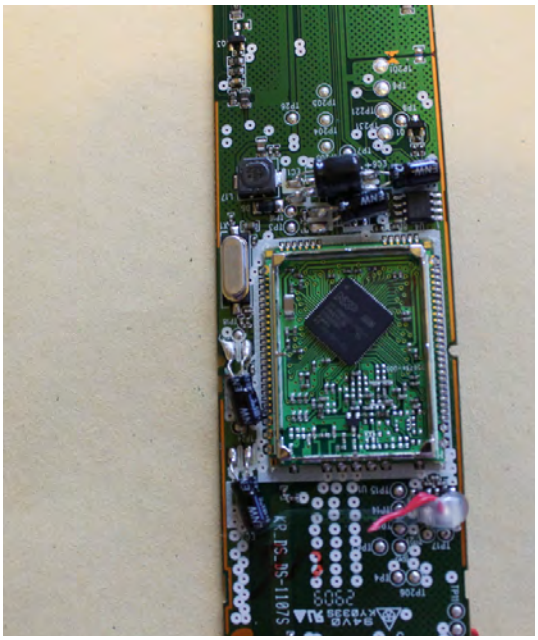


Multiple layers of screen



Main layer of screen

Metal chip protector pried off



Circuit board revealed!

Microprocessor (bottom right)

Circuit boards are COOL! :)

Nonvolatile memory device

Electrolytic capacitors