

TIME CAPSULE



Welcome to the Time Capsule of Computer History!

Inside this box, you will find real computer artifacts from The Computer Museum. This guide tells you a little bit about each artifact, and provides activities to explore each one.

Now you are ready to uncover the past...a time when computers were *hundreds* of times larger and more expensive than today's desktop computers—but ten times less powerful!

The Computer Museum, 300 Congress Street, Boston, MA 02210

Punched Card

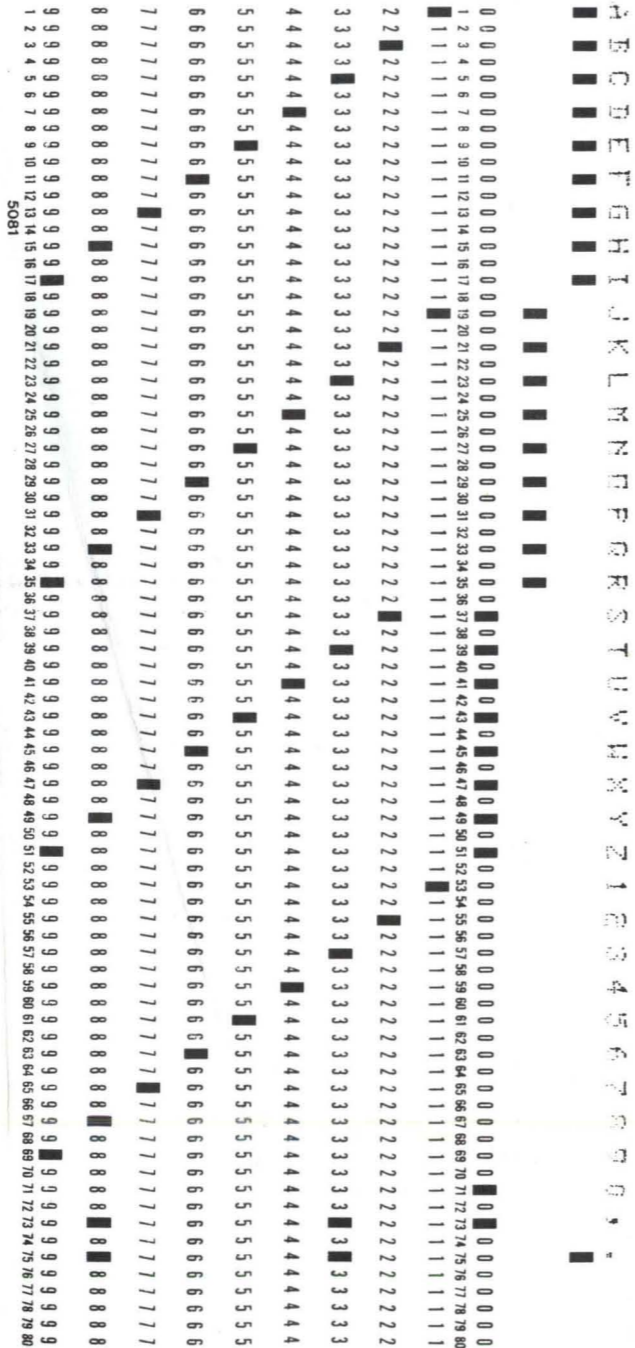
The punched card is a relic that dates back to before computers were invented. One of the first uses of a punched card was to store patterns for weaving a piece of cloth.

In the 1930s, the United States government used punched cards to record people's names and social security numbers.

The first computer for sale, UNIVAC I, read information from punched cards. That was in 1952. Can you believe a Porky Pig cartoon around that time showed him trying to use a UNIVAC I computer!

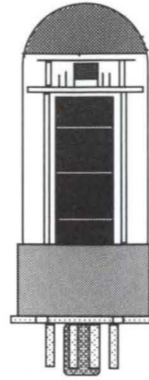
The card to the right shows the code used on standard punched cards. The black spots are holes.

ACTIVITY: Use this code to try to read the message on the real punched card in your Time Capsule.



Vacuum Tube

Vacuum tubes are glass tubes, somewhat like light bulbs. They can act like switches—they can be turned on or off by electric pulses. The first generation of computers, like the Whirlwind computer, did their calculations using vacuum tubes!



The Whirlwind computer, completed in 1951, contained 5,000 vacuum tubes. It filled an entire room.

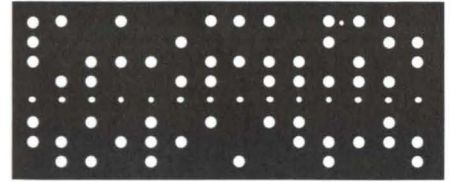
Inside your time capsule, you will find a postcard with a picture of the Whirlwind computer's vacuum tubes.

As you might guess, vacuum tubes cannot clean rugs. They are called *vacuum* tubes because there is less pressure inside the tubes than outside of them. (Scientists call a space with low pressure inside a *vacuum*.)

ACTIVITY: Do you know anyone who was living during the 1940s or 1950s, when the first generation of computers were built? Try talking or writing to them to ask if they know other ways that vacuum tubes were used.

Paper Tape

Paper tape could store programs and other computer information. The punched holes on the tape were a code that the computer could read.



Paper tape and punched cards both used holes to store information. However, paper tape and punched cards used different codes.

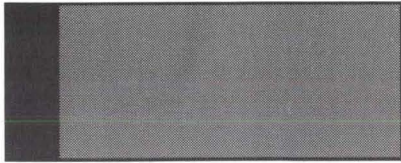
Another difference between punched cards and punched tape was that the order of punched cards could easily be changed by shuffling the cards around, but paper tape could not be changed. If you accidentally dropped a program written on a big stack of punched cards, you would have to get them all back into the right order again. If you dropped a program on a piece of paper tape, you could just bend down and pick it up.

Like punched cards, paper tape was actually invented before computers. Paper tape was used on some of the first computers in the 1940s, and continued to be used through the 1970s.

ACTIVITY: You may want to try making up your own code using punched holes. If you have a hole puncher and index cards, you could use them. Otherwise, a pencil and a paper will work! You may want to get ideas from looking at the punched card.

Magnetic Tape

Magnetic tape stored programs and other information in many early computers, such as UNIVAC I. In your Time Capsule is a piece of magnetic tape from a 1950s computer.



ACTIVITY: You can use iron filings (little pieces of iron) to see the magnetic pattern on your magnetic tape, by following the directions below:

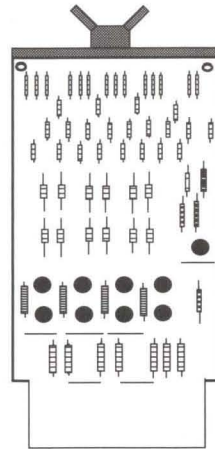
- 1) Find the small bag of iron filings and the piece of shiny tape in your Capsule.
- 2) Put a piece of newspaper down to cover the area where you are working. (Be careful to keep the iron filings away from computer disks and electronic devices!)
- 3) Carefully spread a small amount of the iron filings on the darker side of the tape.
- 4) Gently shake the loose pieces off onto the newspaper. Can you see the pattern on the tape?
- 5) Make sure to throw away all the loose filings on the newspaper.

The iron filings stick to the places on the tape that have a positive (+) magnetic charge. They fall off the places on the tape that have a negative (-) magnetic charge. The information on the tape is coded as positive and negative charges. For example, the letter "B" was coded as - + - - - + - .

Minicomputer Module

In your Capsule is an actual piece of a 1960s minicomputer. Computers in the 1960s, such as the PDP-8, did not have vacuum tubes in them. Instead, they used smaller electronic parts called *transistors*.

The invention of the transistor meant computers could be built much smaller. It meant they were light enough to be built into rockets and sent into space. Transistors were more reliable than vacuum tubes—they didn't burn out as easily. Also, they didn't get as hot.



ACTIVITY: See if you can identify these three basic electronic parts on your minicomputer module. These parts are still used today in electronic devices.

Transistor
(Acts like a switch.)



Resistor
(Reduces the amount of electricity flowing through the wire.)

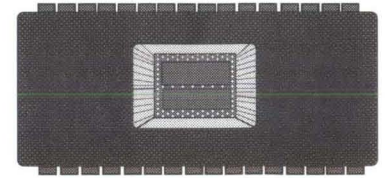


Capacitor
(Stores a small electric charge.)



ROM

The most modern piece of computer history you have in your Capsule is a ROM chip. ROM (pronounced *rawm*) is a kind of computer memory chip. Almost all computers today come with a ROM chip inside.



In the window of this ROM chip, you can see the small rectangular piece of silicon. That is the actual computer chip. The rest of the ROM is just wires and a case. Tiny, tiny transistors are etched into the ROM chip.

The ROM chip holds the most basic instructions the computer needs, such as what to do as soon as it is turned on.

ROM stands for *Read-Only Memory*. *Read-Only* means you can't change what is on it. The information stays on the chip, even when the computer is turned off.

This ROM chip holds as much information as...
12,480 punched cards
8,640 feet of punched tape
417 feet of magnetic tape
or a book 400 pages long.

As you can see, in less than 60 years, computers have become much faster, cheaper, and more powerful!

ACTIVITY: Try making your own time capsule for future generations to learn about you and your life. What do you want to put inside?