

Altair #220081K, a Remarkable Early Altair 8800 Computer

This is an unusual early Altair 8800 that is remarkable in several ways. The first things that a collector will notice are the tell-tale external signs of a very early Altair: the straight line on the front panel's Sense Switch indicator, the open fan grille and the sharp corners of the connector cutouts on the back, and of course its low serial number.

When the cover is removed, two things are immediately apparent. First, this is a completely unmodified, unexpanded Altair, with just the components that came with the original kit. Second, whoever assembled this one did an exceptionally careful job down to the finest details.

Looking closer, you start to see indications that this might have been one of the earliest Altair kits: the card guides are off-white, the color of natural nylon, rather than the normal blue color. The case is not quite the same as other Altairs – the cabinet feet are screwed into PEM nuts on the case bottom – PEM nuts that were pressed in before the cabinet was painted. The top cover is especially peculiar, the inside looks like it's corrugated, with grooves apparently machined across its top inner surface, again before it had been painted.

Looking closely at the boards, you can see the careful assembly of all of the PC boards. You'll also see that the date codes on the ICs are all from 1974 or earlier, and all components of the same type have matching date codes, indicating that they are all from the original Altair kit.

And then there's the 8080 CPU chip. Only the earliest Altairs shipped with Intel 8080's – MITS quickly switched to the 8080A's once they were available. This 8080 is a very early one, made sometime in November of 1974.

I've seen quit a few Altairs, and I've never seen one quite like this one.

This Altair is remarkable in several ways:

1. It is in amazingly good condition

- Nearly no paint chips, rust, or other cosmetic damage
- It is clean and with very little corrosion inside and out
- The serial number sticker is flat and without creases
- All of the switches are straight (not bent)
- The delicate (naked) IC sockets are all in perfect alignment

2. This is a very early Altair

- The CPU chip is an Intel C8080, not a C8080A as found on most Altairs.
- The 8080's sequence number is K9896, which indicates manufacture around week 44 of 1974, very early in the 8080's production sequence
- The date codes printed on components are all from 1973 or 1974
- All PC boards are Rev 0
- The edge connectors on both the CPU and the SRAM board do not have gold plating
- The crystal is installed in a cardboard cover. (Later, electrical tape was used as a substitute.)
- The 7805 voltage regulators are in the older Motorola packaging, not the later (industry-standard) TO-220 packaging

- The front panel has a straight-line on the Sense-Switch indication. (This was changed to a bent line for later Altairs.)
- The fan location is a round hole, covered by a screwed-on screen, not the slots found on later Altairs. (No fan was ever installed.)
- The 4-slot backplane PC board is only 0.062" thick. (Later backplanes were made with thicker fiberglass to make them stiffer.)
- No official MITS "errata" have been implemented on the CPU board, the front panel, or the power supply
- The complex ground-strap errata from MITS have not been implemented
- There are no P-clamps securing the wiring harnesses. Instead, the wiring harnesses are laced.
- The inner (structural) front panel does not have the usual yellow "alodine" plating
- The front panel circuit board is attached to the structural panel with screws, nuts, and stand-offs on all 4 corners, as well as a nut and lock-washer on every switch
- All 14- and 16-pin IC sockets are naked stamped pins without any plastic body. (These were very low-cost in the 1970's, but were very difficult to work with!)

3. Several peculiarities suggest an earlier date than its low serial number indicates

- The feet on the bottom are screwed into pressed-in PEM nuts on the bottom enclosure. (Every other Altair that I've seen has adhesive feet, if the feet exist at all.)
- The inside of the top cover is strangely grooved, or corrugated. (I have never seen this before, and I do not understand why it was made this way.)
- The card guides are natural off-white in color, not blue
- The row of capacitors on the power supply board are black and branded "Nippon Chemi Con", not the usual (and terribly unreliable) silver "Arcolytic" ones that are usually found in these Altairs. (There are no signs that these have been replaced either.)

4. It is completely unmodified, unrepaired, and un-expanded

- The 4-slot backplane has only two S-100 connectors installed
- It contains only the CPU and the 1K SRAM boards
- The 1K SRAM card has only 256 bytes installed, though sockets were installed for the rest of the 1K bytes
- The component date codes on all of the boards are matched, implying that they were built together, all part of the original kit
- It has no fan
- The date codes printed on components are all from 1973 or 1974. Chips of the same type have the same date codes.
- There are no signs of any rework anywhere in the Altair
- Screw-heads are not stripped, and most nuts do not have marks from star-washers on their exposed faces
- All standoffs are the original brown fiber type

5. It was well-assembled when it was first built as a kit, closely following the directions

- Soldering is excellent, with a minimal of flux left on the boards
- Wiring is exactly as specified in the assembly instructions (prior to any errata).
- Resistors are all oriented in consistent directions
- Disk capacitors are all installed with their labels all facing the same direction
- All electrolytic capacitors are all installed with their value markings facing upward (to be visible)
- The wiring harnesses are neatly laced with lacing tape

6. It works perfectly

- Power supply voltages are correct
- All front-panel operations (including memory-protect) work correctly

Martin Eberhard, January 2024