Retrocomputing

Where can I find a schematic of the AT&T KBD 301?

Asked 1 year, 2 months ago Modified 4 days ago Viewed 297 times

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Where can I find a schematic of the AT&T KBD 301?

I have an old AT&T 6300 (AT&T's rebrand of the Olivetti M24) but the keyboard (AT&T KBD 301) is not working.

Many of the keys do work when I press them. But some of the keys either don't produce a character, or they produce the wrong character. I know the keyboard worked back in 2007 before it got put it in storage.

I opened the keyboard and tried cleaning the electrical contacts beneath the keys with some alcohol, but the problem is still there.

I want to try and diagnose what the problem is specifically. It would be really useful to find a schematic rather than having to reverse engineer one myself.

Once I know how it works I can either try and repair it or make a replacement keyboard.

I could see a cheap microcontroller running some custom code acting as a translator for a USB keyboard as being a reasonable solution.

hardware debugging hardware-testing

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asked Nov 28, 2023 at 0:41

user4574
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1 Answer

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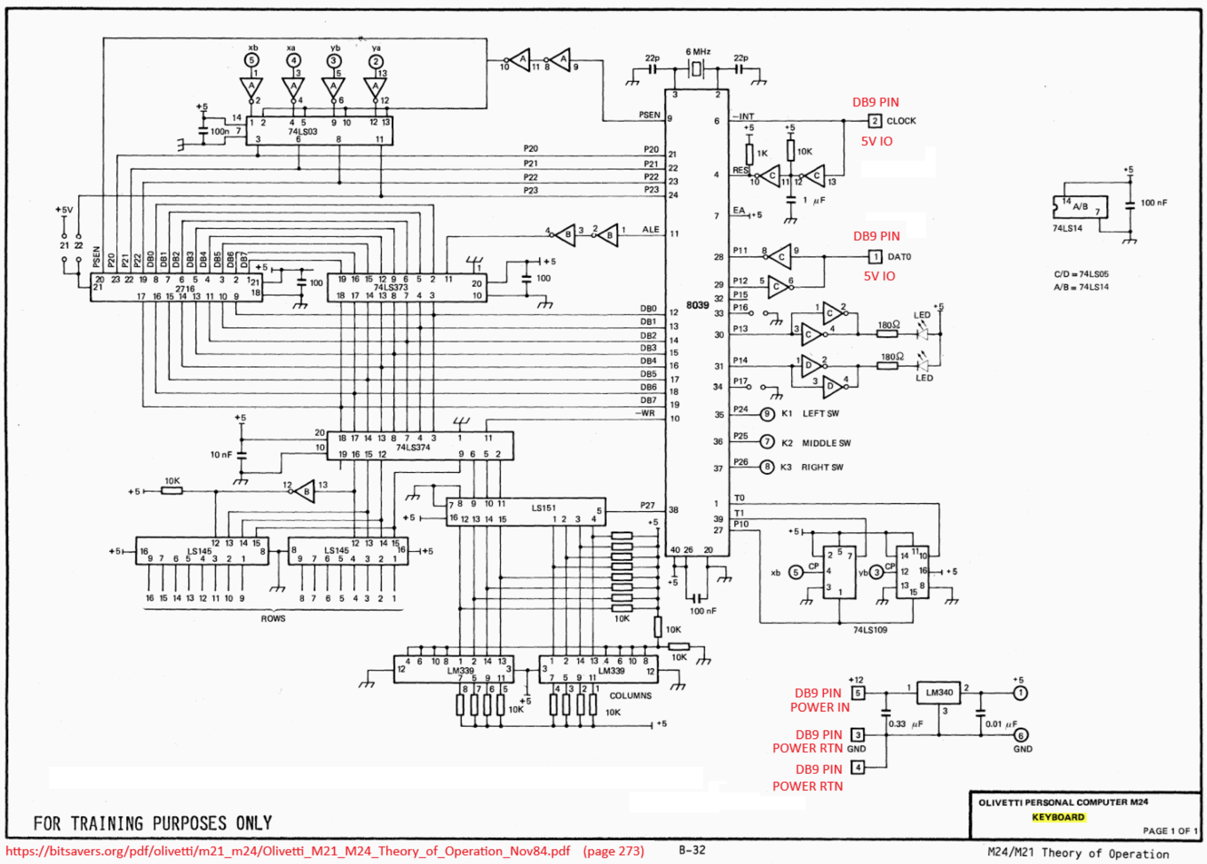
After some searching, I was able to find information on the KBD 301 in the

OLIVETTI PERSONAL COMPUTER M24 M21 Theory of Operation document. The document can be found on bitsavers.org.

The schematic can be found on page 273.

KBD 301 SCHEMATIC

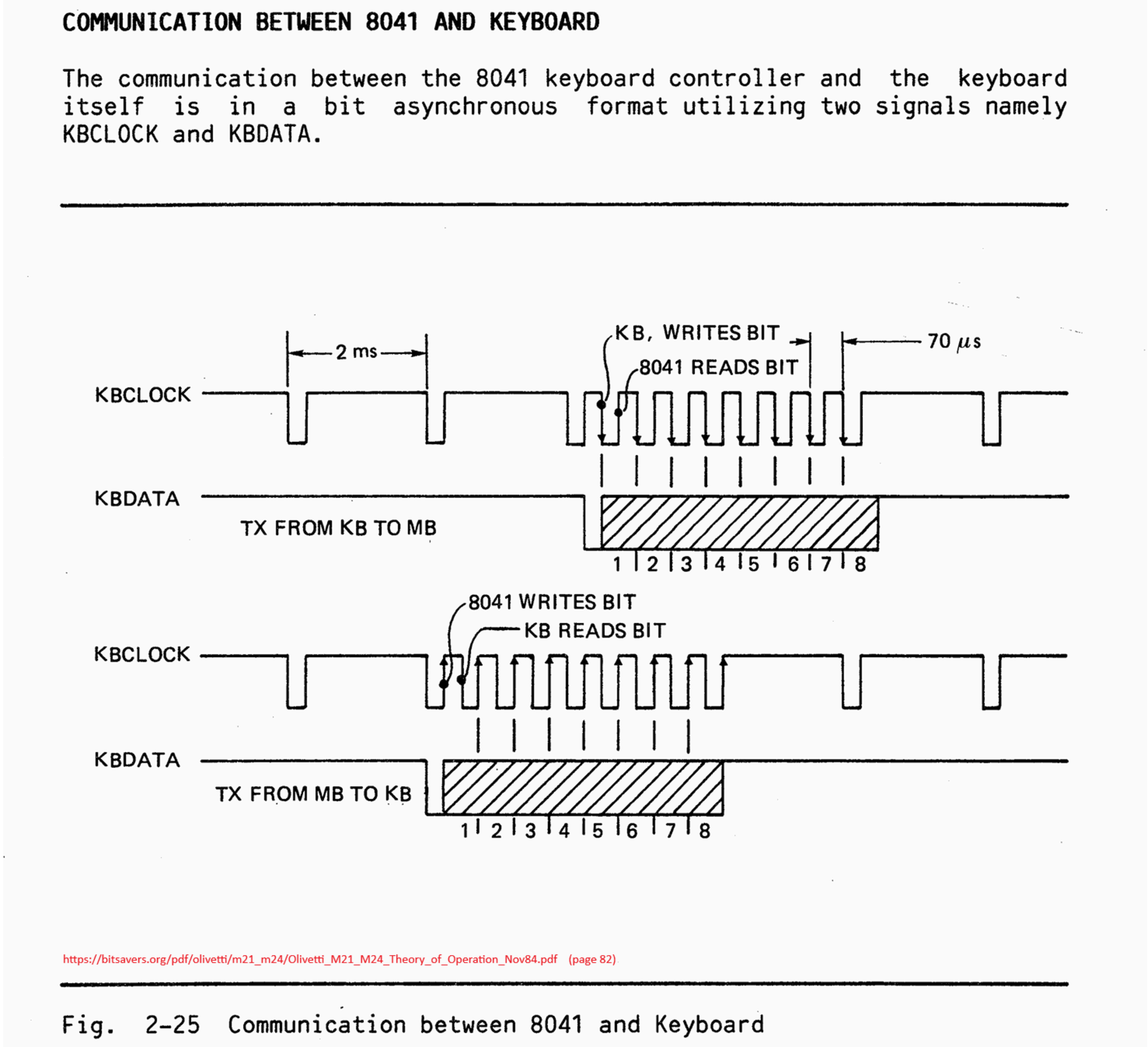


https://bitsavers.org/pdf/olivetti/m21_m24/Olivetti_M21_M24_Theory_of_Operation_Nov84.pdf (page 273)

The keyboard controller on the main board side is an 8041A microcontroller with a program that translates serial data between the keyboard and the 8086 processor bus.

On the keyboard side the keys are arranged in a 16 by 8 grid. There is an 8039 microcontroller that scans through the keys and sends the data serially to the 8041A on the main board.

The waveforms for sending the keyboard scan codes and a description of the protocol are on page 82.



COMMUNICATION BETWEEN 8041 AND KEYBOARD

The communication between the 8041 keyboard controller and the keyboard itself is in a bit asynchronous format utilizing two signals namely KBCLOCK and KBDATA.

https://bitsavers.org/pdf/olivetti/m21_m24/Olivetti_M21_M24_Theory_of_Operation_Nov84.pdf (page 82)

Fig. 2-25 Communication between 8041 and Keyboard

The clock (KBCLOCK) is always generated by the 8041. The data line (KBDATA) may be driven by either the 8041 or the keyboard depending on which way the data is being sent.

The 8041 always reads KBDATA on the rising edge of KBCLOCK. The keyboard always reads data on the falling edge of KBCLOCK.

When idle the 8041 keeps KBDCLOCK high and sets it low for 70us every 2ms. The KBDATA clock period is nominally 70us when transferring bits. Per page 176, a low pulse of 50ms or more on KBDCLOCK will reset the keyboard.

For transmissionf from the mainboard to the KB.

- The 8041 will leave KBDATA low on the first clock falling edge.
- The KB will read KBDATA as low on the first falling edge and know that the 8041 wants to send data.
- The KB will make sure its not driving KBDATA before the first rising edge.

- The 8041 will then generate 8 more lock cycles.
- The 8041 will output the data bits on the rising edges and the KB will sample them on the falling edges.

For transmissionf from the KB to the mainboard...

- The 8041 will leave KBDATA high on the first clock falling edge.
- The KB will read KBDATA=high on the first falling edge and know that the 8041 is not intending to send data.
- The KB will then pull KBDATA low before the first rising edge.
- The 8041 will sample KBDATA on the rising edge and see that the KB intends to send data.
- The 8041 will then generate 8 more lock cycles.
- The KB will output the data bits on the falling edge and the 8041 will sample them on the rising edges.

A map of showing which keys correspond to which keyboard scan codes can be found on page 182.

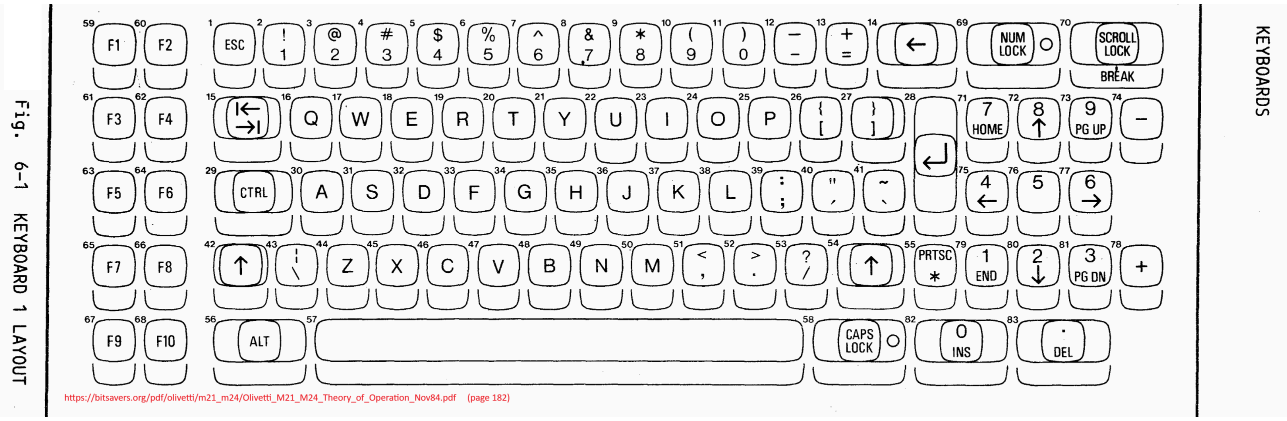


Fig. 6-1 KEYBOARD 1 LAYOUT

https://bitsavers.org/pdf/olivetti/m21_m24/Olivetti_M21_M24_Theory_of_Operation_Nov84.pdf (page 182)

Per page 176. The keyboard sends out the scan codes for all currently pressed keys. When a key is released it sends out a different scan code to indicate the release of the key. The release scan code is the original scan code + 0x80. The order that the key codes are sent is the scan order not the order in which they were pressed.

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answered Jan 25 at 1:32

user4574

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