S/3 Model 15 Project Denmark 2022

In 2011 and in 2014 Jurgen and I made a start with the restauration of an IBM S/3 model 15D at the Dansk Datahistorisk Forening.

This is the blog of my third visit.

IBM 5415 CPU restart

Unfortunately DDHF had to reduce floor space and the system was moved.
Reconnected the main (via an 3ph variac) to the CPU and slowly recharged all power supply capacitors.


This time also with a high tech trick: pushing the main relay switch closed with a stick.

After a power up the system gave a power check (PWR CHK).
Checked (and corrected) all power sequence wiring between the CPU and the 5421.
The THERMAL and PWR CHK problem was resolved.

The memory of the CPU was non-functional. The +3.4V supply for the MOSFET memory was out of spec.
After adjusting the output level to exact +3.4 Volt, still no working memory.
Followed the IBM MAP charts which pointed to a card in location U4.

Pulled out, checked and reseated the card and the memory was partially working again.
Decided to check and reseat all CPU and memory cards. A memory test scan went now without any problems.

IBM 3741 Diskette station restart

Next, the IBM 3741 Data Entry Station.

After a controlled power up of the 3741, it remained completely silent. Normally it starts up with a lot of rattling
noise when the diskette drive head is recalibrated to track 0.
After inspecting all power supply levels: two fuses where blown. A short circuit in the -12V was the culprit.
Disconnected the diskette drive, keyboard & monitor and the newly inserted fuse remained intact.
After reconnecting the monitor the fuse blown again. The 3741 was now starting but without a monitor.

Removed the monitor and checked is only PCB. There was a definite short circuit in the -12V connection.
From experience I know that, over time, especially the 'high' voltage (> 10V) IBM capacitors fail.
The search for the faulty capacitor had begun. This is not that easy when you don't have a schematic of the board.
Finally found and replaced it. The 3741 with monitor was working again.

Cleaned the glass of monitor with Covid 19 disinfectant (b.t.w. very good stuff for doing this)
Mounted the monitor back underneath the desk and turned the machine again on. Nothing happend !
Now it becomes frustrating. This time the +5V was absent, but all fuses where ok !
The search started again. To my big surprise I finally found a (illegal ?) circuit breaker (CB) behind the monitor which I
flipped unknowingly while mounting the monitor back. I checked all IBM documentation and even my own IBM 3741,
but no +5V CB found.
Anyway, the unit was working again.

We where now able to run the CPU diagnostics from diskette (via the 3741) with success.
Jurgen was happy again :-)

IBM 3340 Disk drive restart

Back to the point where I left off on my 2014 visit: getting the IBM 3340 drives running again.
Connected power and pressed POWER-ON, nothing happened (surprise !).
In the new mains power box the three phase power lines where connected in the wrong rotation.
This was easily corrected and the unit powered up.

At the end of my DDHF visit in 2014 we discovered that a terminator card (originally in the drive at the end of the string) was missing.

Just before the Covid pandemic started I was lucky in obtaining a original one from a System/3 model 12 in München Germany.

Re-installed this card. [Note: I still need to check some jumpers. See INST_4]

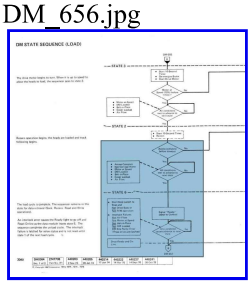
When setting the "Start/Stop" switch to ON, the IBM 3348 Data Module (DM) was loaded and the drive motor started spinning.
The manual says that the READY light should turn on within 30 sec after starting the drive.
Still no luck. (we already checked and replaced the READY and all other lights). Starting the other drive gave the same result.

After the CPU experience I also checked and reseated all the cards in the logic gate of the 3340. Still no luck.

Looking in the IBM manuals [these are online available at: ftp://129.69.211.2/pub/cm/ibm/ibm4331/3340/] the DM load sequence goes through the following states:

- State 0 - Wait. (drive motor stopped, DM unloaded, door unlocked, start switch in OFF position.)
- State 1 - Load the DM, lock the cover door and unlock the carriage. (start switch in ON position)
- State 3 - Get the drive motor up to speed.
- State 2 - Move the carriage from the Home position to track 0.
- State 6 - Access data (Read and Write) READY light on.

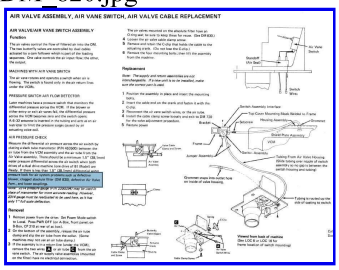
See DM_656.jpg



Conditions to go to from state 2 to 6 are:

1. Access Complete in state 2 (not yet verified)
2. Not Carriage HOME (not yet verified)
3. Motor at speed (Most likely yes)
4. DM Loaded (Yes)
5. Belt in-Place (Yes)
6. Cover locked (Yes)
7. Air flow (No !)

See DM_820.jpg



Possible reasons for missing air flow may be:

- Defective blower (It sound ok, it is running)
- Clogged absolute filter (Likely the reason, but to be verified)
- Defective air valves (Unlikely, but to be verified)
- Loose couplings (Not seen)
- Check the seal between DM and Voice coil. When not properly sealed (after loading the DM) air may leaking out of the clean air system and no air diff pressure is built up.

A fourth vistit is planned for 2023. Hopefully then we can IPL the CPU with the SCP (System Control Program) and may be even start CCP (Communication Control Program).
Will be continued.