DREAMDISK PCB TESTING NOTES Version 1.5 (Updated 12th May 2025).

Changelog for Version 1.1 PCB:

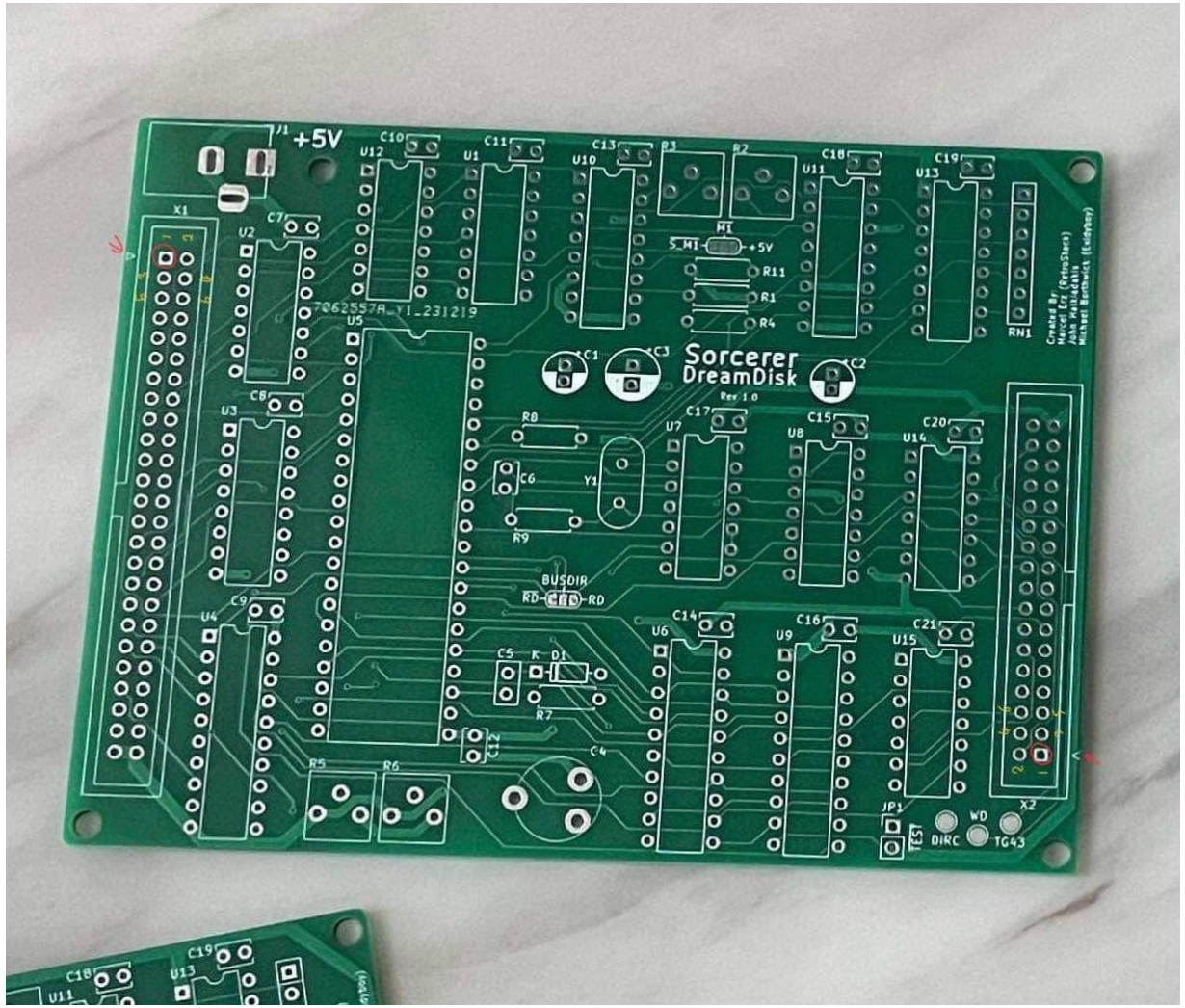
- The 470 PF Ceramic Capacitor 2Mhz Clock Fix is now located in C22 on the v1.1 PCB.
- JP2 - *RD and BUSDIR test jumper has been removed.
- X3 Connector for Microbee Z80 Bus added.
- R5 PCB footprint updated for 25 Turn trim pot.
- **Added option** for LED power (requires D2 LED and R10 330 ohm 1/4 watt resistor (observe LED polarity on PCB).
- **Added option** for J3 (extra +5V power connector) and J2 (GND test point) which is useful when doing the alignment. (Connectors are Dupont pin header style with 2.54mm pitch).
- 8" Floppy Drives can be connected using readily available commercial 8" 50 Way to 5.25" 34 way floppy adapter PCB. Example: 34 to 50-Pin 8-Inch Floppy Adapter - TexElec

- Inspect PCB solder pads (underside of PCB) with magnifier / light.
- Go over all solder pads a second time (lightly) with soldering iron.
- Inspect top side of PCB (components) with magnifier / light.
- Make sure there are no solder bridges between solder pads/pins etc.

- Power Supply requirements +5V DC @ 300 ma.
- Voltage needs to be regulated very close to +5V (~10%).
  For testing use a USB 2A charger along with a USB type A to 2.1mm barrel connector cable (Centre Pin is + Positive).
  i.e. USB Type A Male To 2.1mm DC Plug 1m.

- Check for Fault on Mainboard of Sorcerer MK2 per the Dreamdisk V2 user guide PDF page 10 (Section 2).
- i.e. Examine edge pin connector PIN 6 (NMI on bus) that it has a small trace to adjacent plated thru hole otherwise solder a small jumper trace. This step is required for just about all MK2 Sorcerers.
- You will need to install the SCUAMON (v3.4) Qty 2 x 2716 EPROMS in your Sorcerer. SCUAMON (v3.4) monitor roms have the boot code (bootstrap) to boot the DreamDisk CP/M disk image.
- Good write up here in this Exidy Sorcerer Exatron Stringy Floppy manual on how to install EPROMS to replace the Factory Monitor PROMS.
  https://exidysorcerer.net/?r=/download&path=L0Fiem1hbidzIGFyY2hpdmUvTWFudWFscy9zb3JjZXJlcl9zdHJpbmd5X2Zsb3BweV9tYW51YWwucGRm

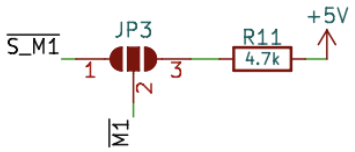
- PIN 1 (RED STRIPE) of Ribbon Cable(s) for 50 way (Sorcerer) and 34 way (Floppy).
- Note the Small Triangle Arrows for X1 and X2 on the PCB. This is PIN 1 for the ribbon cables (RED STRIPE).



JP3 test jumpers for prototype PCB.

- There is no connection for M1 signal from FDC (M1) to Sorcerer Bus (S_M1) per Dreamdisk V2 user guide (PDF page 22). Per the Dreamdisk V2 manual – We just leave this pin floating – **so none of the 3 pads are jumpered (soldered).**

- We could also pull FDC M1 high to +5V instead of leaving floating (i.e. Pins 2 and 3 jumpered) or we can connect the FDC (M1) to Sorcerer Bus (S_M1) (i.e. Pins 1 and 2 jumpered).



JP2 test jumpers for prototype PCB.

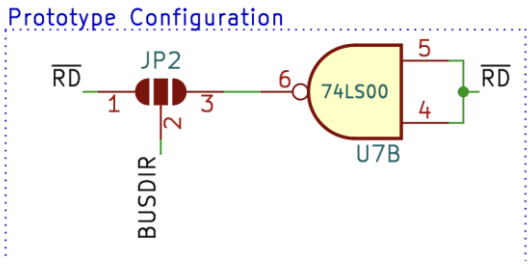
- **Only Jumper pads 1 and 2 (the red line) should be jumpered (soldered).**

- We are connecting JP2 pads 1 & 2 (red line) which connects PIN 17 to PIN 8 on expansion interface – this is per the pinouts on PDF page 22 of the Dreamdisk V2 manual. *RD is inverted (* meaning inverted).

- Connecting JP2 pads 2 & 3 (Yellow Line) will run it via the inverter (U7B), so you will get uninverted RD (so no *).

- The JP2 test PAD makes use of both for testing. ONE OR THE OTHER (NOT BOTH). i.e. Red Line or Yellow Line.

- Leaving JP2 pads un-jumpered will not connect PIN 17 to PIN 8 on expansion interface.



- R3 and R2 trimpots located at top of PCB.
  R3 is for Motor on timing. Set to between 1 – 10 seconds.
  R2 is for Fake Ready Timing (some older floppy drives do not generate a RDY signal, so this circuit counts approx. 2 Index Pules from floppy interface and generates a RDY signal for the WD2793).
  Set to 500 ms.

- R5 and R6 trimpots located at bottom of PCB (near C4 VCO Adjustment).
  R5 is for Phase comparator Adjustment (RPW Pin).
  R6 is for Delay Write Precomp (WPW PIN) and is only for 8” Floppy drives **thus no adjustment required.**

- C4 is for VCO Frequency Adjustment (Use a very thin plastic tool to slowly turn the trimmer – using a metal tool may shift the frequency while adjusting). The trimmer capacitor is fragile – adjust with care.

- PCB test pads
  WD – This is for 8” Drive delay write pre-compensation (not required).
  TG43 – This is for pulse duration nano seconds (ns) for phase comparator adjustment – (R5).
  DIRC – This is for the VCO Frequency Adjustment data (C4).

- **Errata Fix **IMPORTANT ** - This fix (stablises) the 2Mhz clock output to the WD2793.**

- You need to add a 470PF (ceramic disc capacitor) between PIN 14 (CLK A INPUT) and PIN 1 (GND) ON **IC U8 (74LS93)** on the bottom of the PCB or you can add it to the legs of the 74LS93 IC (from the top of the PCB).

- Photo below shows a 0603 package (Surface Mount Capacitor) but a normal disk ceramic capacitor is fine.

- Adjustments (page 40 of the 2793 datasheet).
- Remove test jumper first (logic high) on PCB.
- Master Reset Pin (Pin 19) is strobed by turning on Sorcerer i.e. RESET signal from Sorcerer BUS.
- Apply test jumper (logic low) on PCB.
- Continue with Adjustments.

- There are some tests that are listed in the Dreamdisk V3 manual that can be sent to the relevant FDC I/O ports using the Sorcerer Monitor ROM for testing. The V3 Dreamdisk controller appears to be the same as the V2 Dreamdisk with the addition of a Real Time Clock and a Hard Disk Interface circuit.

- Refer to PDF Page 47 – Appendix A of the Dreamdisk V3 manual for FDC port mapping.
- Refer to PDF Page 61 – Chapter 4 – Testing of the Dreamdisk V3 manual.
- Refer to PDF Page 63 – Chapter 6 – Calibration of the FDC of the Dreamdisk V3 manual.
- Also, good article on adjustment for WD2793 (Adjusting the Data Separator setting of the WD2793) http://www.s100computers.com/My%20System%20Pages/ZFDC%20Board/ZFDC.htm

From the WD2793 datasheet PDF:

DATA SEPARATOR

1) Set TEST# (pin 22) to a logic high.
2) Strobe MR# (pin 19). Ensure that 5#/8, and DDEN# are set properly.
3) Set TEST# (pin 22) to a logic low.
4) Observe pulse duration on TG43 (pin 29).
5) Adjust RPW (pin 18) for 1/8 of the read clock (250 ns for 8 " DD, 500 ns for 5'1/4" DD, etc.).
6) Observe frequency on DIRC (pin 161.
7) Adjust variable capacitor on VCO pin for data rate (500 kHz for 8" DD, 250 kHz for 5 1/4" DD, etc.).
8) Set TEST# (pin 22) to a logic high.

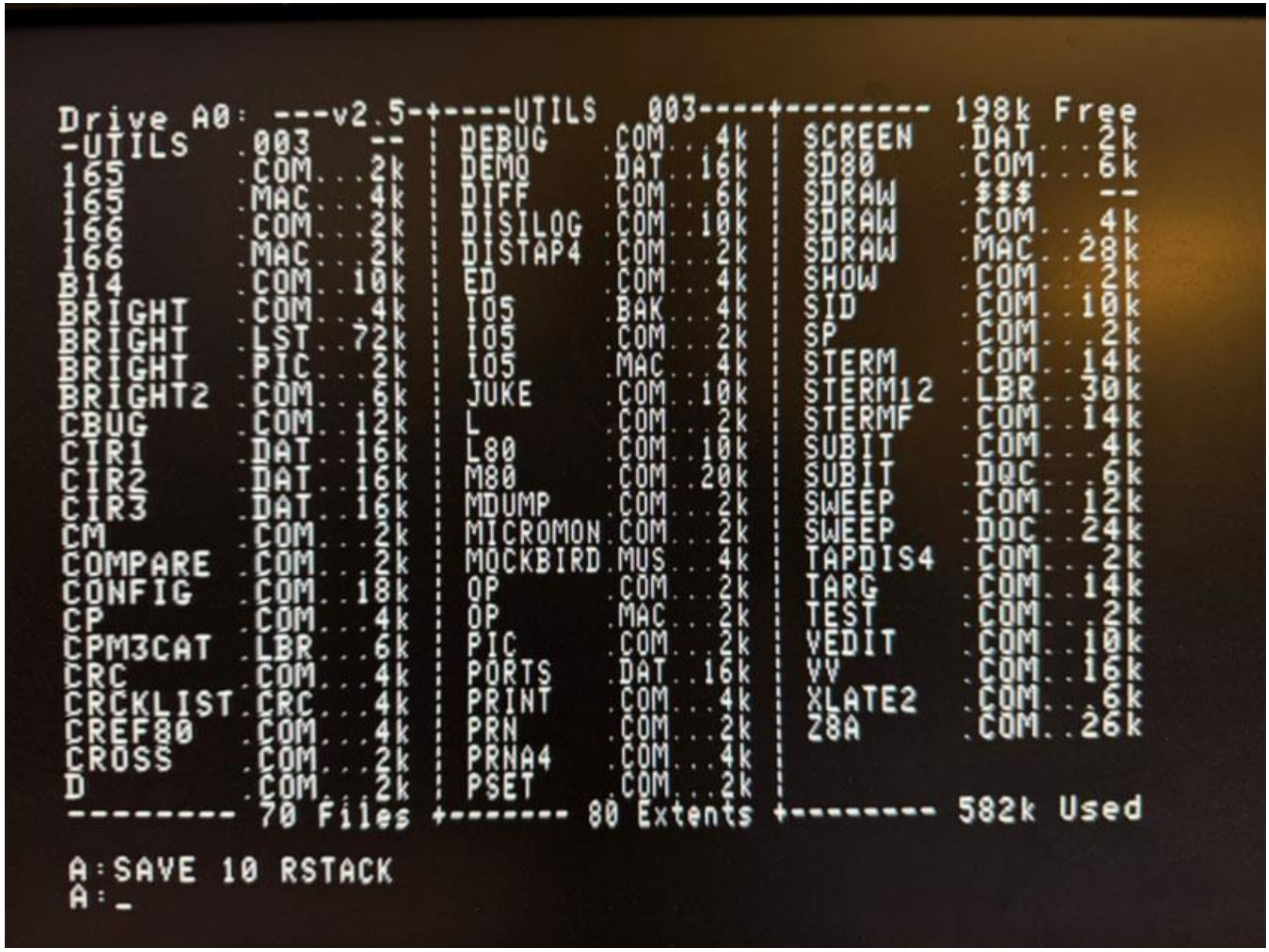
Dreamdisk Alignment Procedure Notes from a Dreamdisk builder and Exidy Sorcerer owner “Jltursan”.

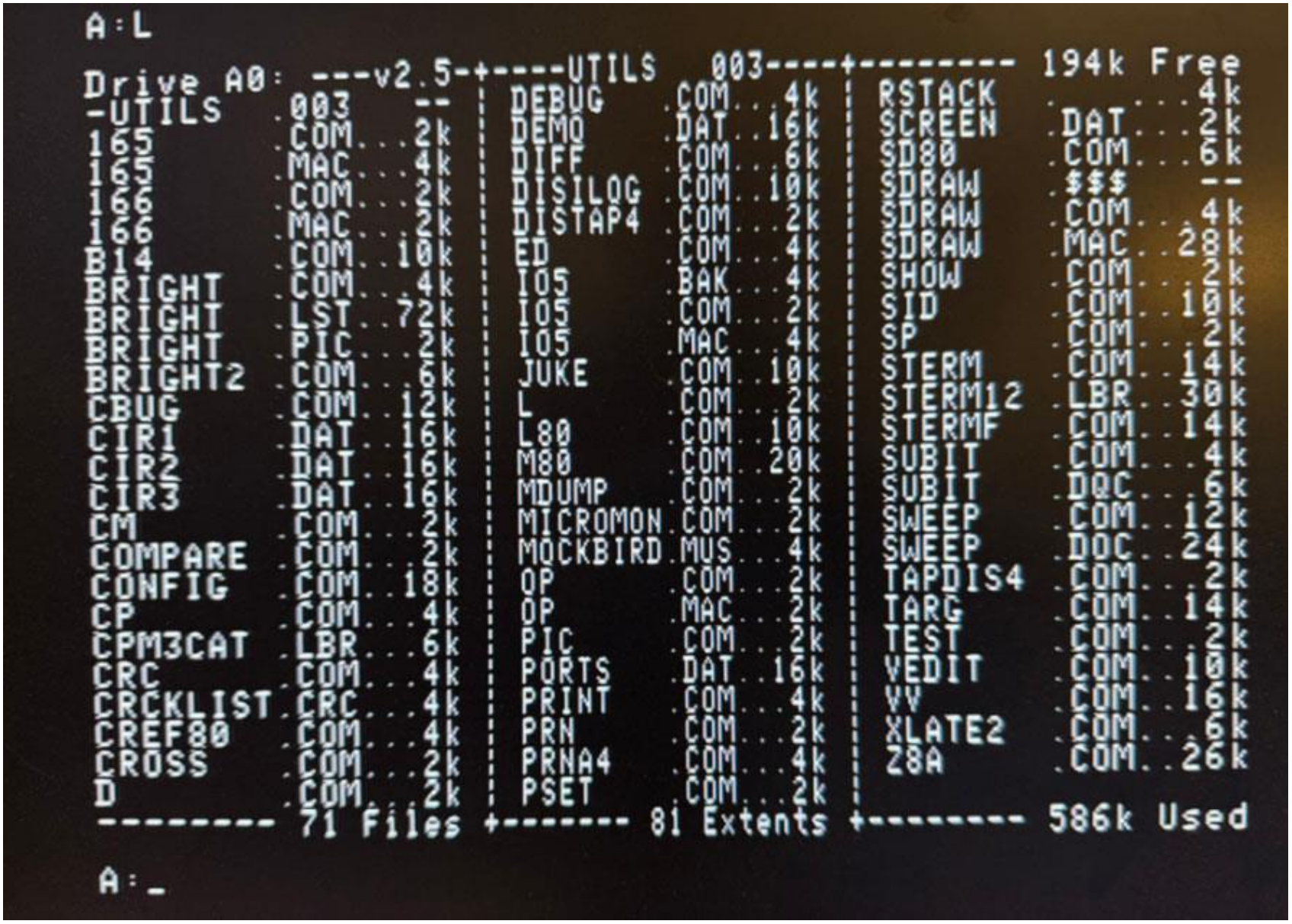
1) Connect all, cables and power to FDC and floppy
2) Check test jumper JP1 is open
3) Turn on FDC and floppy
4) Turn on Sorcerer
5) Close test jumper
6) Using an oscilloscope and turning R5, try to get a pulse of 500ns measured over TG43. Ground can be easily found in the right leg of D1 (closest to U6)
7) Now, measuring over DIRC and turning C4, try to get a frequency of 250Khz.
8) Remove test jumper (open) and reboot and test.

- “sorcerer_dreamdisk_master.dsk” is a .DSK bootable disk image (80 track DS/DD 720K) with all the master CPM files per the Dreamdisk V2 manual for Sorcerer. This has been tested on MAME with Dreamdisk FDC and boots fine.
- This CP/M disk boot image is only for a 48K RAM Sorcerer.

- You can use this .DSK image with flashfloppy firmware installed on a GoTek floppy disk emulator. https://github.com/keirf/flashfloppy

- Screen Shots of this Dremdisk CP/M 2.2 Disk Image booting under Dreamdisk FDC (reading) from disk and also saving (writing) file “RSTACK” to disk.


Drive A0: ---v2.5-+----UTILS 003----+-------- 198k Free
-UTILS .003 -- | DEBUG .COM 4k | SCREEN .DAT 2k
165 .COM 2k | DEMO .DAT 16k | SD80 .COM 6k
165 .MAC 4k | DIFF .COM 6k | SDRAW .$$$ --
166 .COM 2k | DISILOG .COM 10k | SDRAW .COM 4k
166 .MAC 2k | DISTAP4 .COM 2k | SDRAW .MAC 28k
B14 .COM 10k | ED .COM 4k | SHOW .COM 2k
BRIGHT .COM 4k | IO5 .BAK 4k | SID .COM 10k
BRIGHT .LST 72k | IO5 .COM 2k | SP .COM 2k
BRIGHT .PIC 2k | IO5 .MAC 4k | STERM .COM 14k
BRIGHT2 .COM 6k | JUKE .COM 10k | STERM12 .LBR 30k
CBUG .COM 12k | L .COM 2k | STERMF .COM 14k
CIR1 .DAT 16k | L80 .COM 10k | SUBIT .COM 4k
CIR2 .DAT 16k | M80 .COM 20k | SUBIT .DOC 6k
CIR3 .DAT 16k | MDUMP .COM 2k | SWEEP .COM 12k
CM .COM 2k | MICROMON .COM 2k | SWEEP .DOC 24k
COMPARE .COM 2k | MOCKBIRD .MUS 4k | TAPDIS4 .COM 2k
CONFIG .COM 18k | OP .COM 2k | TARG .COM 14k
CP .COM 4k | OP .MAC 2k | TEST .COM 2k
CPM3CAT .LBR 6k | PIC .COM 2k | VEDIT .COM 10k
CRC .COM 4k | PORTS .DAT 16k | VV .COM 16k
CRCKLIST .CRC 4k | PRINT .COM 4k | XLATE2 .COM 6k
CREF80 .COM 4k | PRN .COM 2k | Z8A .COM 26k
CROSS .COM 2k | PRNA4 .COM 4k
D .COM 2k | PSET .COM 2k
-------- 70 Files +------- 80 Extents +-------- 582k Used
A:SAVE 10 RSTACK
A:_


A:L
Drive A0: ---v2.5-+----UTILS 003----+-------- 194k Free
-UTILS .003 -- | DEBUG .COM 4k | RSTACK .COM 4k
165 .COM 2k | DEMO .DAT 16k | SCREEN .DAT 2k
165 .MAC 4k | DIFF .COM 6k | SD80 .COM 6k
166 .COM 2k | DISILOG .COM 10k | SDRAW .$$$ --
166 .MAC 2k | DISTAP4 .COM 2k | SDRAW .COM 4k
B14 .COM 10k | ED .COM 4k | SDRAW .MAC 28k
BRIGHT .COM 4k | IO5 .BAK 4k | SHOW .COM 2k
BRIGHT .LST 72k | IO5 .COM 2k | SID .COM 10k
BRIGHT .PIC 2k | IO5 .MAC 4k | SP .COM 2k
BRIGHT2 .COM 6k | JUKE .COM 10k | STERM .COM 14k
CBUG .COM 12k | L .COM 2k | STERM12 .LBR 30k
CIR1 .DAT 16k | L80 .COM 10k | STERMF .COM 14k
CIR2 .DAT 16k | M80 .COM 20k | SUBIT .COM 4k
CIR3 .DAT 16k | MDUMP .COM 2k | SUBIT .DOC 6k
CM .COM 2k | MICROMON .COM 2k | SWEEP .COM 12k
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CREF80 .COM 4k | PRN .COM 2k | XLATE2 .COM 6k
CROSS .COM 2k | PRNA4 .COM 4k | Z8A .COM 26k
D .COM 2k | PSET .COM 2k |
-------- 71 Files +------- 81 Extents +-------- 586k Used
A:_

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