

AccessionIndex: TCD-SCSS-T.20160323.002

Accession Date: 23-Mar-2016

Accession By: Prof.Richard Timoney

Object name: Cipher F880 Tape Drive

Vintage: c.198x

Synopsis: 1600bpi front-loading half-inch 9-track reel-to-reel tape drive. S/N: G87281.

Description:

Cipher Data Products Inc, San Diego, California, USA, made the world's best-selling minicomputer 9-track tape drive, the Cipher F880 Microstreamer, widely used, with about 300,000 units installed. It was highly regarded, very good for reading tapes with errors, and exceptionally rugged (thanks to a heavy aluminum casting) and reliable (MTBF 10,000 hours). The drive was front loading, so it could be stacked with other equipment on a table or in a rack.

The main features were high read/write rate, dual-gap heads for read-after-write, high-speed rewind, built-in diagnostics, automatic loading/threading and unloading under program control (although if necessary the hinged top cover could be lifted to allow manual loading or unloading). It could be used with 7" to 10.5" half-inch tape reels, which gave 92MB maximum storage capacity. It was ANSI and IBM compatible. The tape speed was selectable for streaming at up to 25"/sec or 100"/sec at 1600bpi.

Cipher made a PC interface, with software to translate tape data into 7-bit PC ASCII from EBCDIC, packed decimal, zoned decimal, packed HEX, or packed BCD, adding CR/LF at the end of every record and converting 8-bit ASCII to 7-bit ASCII for PCs. Specific data fields could be selected, specifying conditional imports, and changing the order of fields. The software could also import and append tape data directly into dBase compatible .DBF files. Fill characters could be removed, upper or lower case enforced, etc. Equally, data could be exported from the PC. The software came on four 5.25" disks or one 3.5" disk. It included FX (File Exchange), SR (Save and Restore), CUBS (analyse data of unknown format), KEYS (determine block size and coding), DITTO (analyse field structure of files), D2T (create mainframe-friendly tape files), and SUBS (hardware checkout and verification).

However, the F880 in this collection is a Cipher Model F880640-90-1025U fitted with the Option E Pertec interface. These TTL-compatible interfaces were widely-used but nonetheless proprietary. They had two 50-pin P1 and P2 ribbon-cable connector pairs for daisy-chaining. The right pair (from rear) was the upstream connection to the controller. Pin numbers were big-endian (bit 0 = most significant), and all odd pins were grounded except P2 pins 1 & 3. The cable ends were terminated on all receive pins (220Ω to 5V, 330Ω to GND).

The Pertec interface was connected via the two 50-pin ribbon cables to an Emulex TU02-10401 Pertec-interface Qbus Tape Drive Controller. It is said these provide DEC TS-11 emulation (the controller uses two Am2901 bitslices, one labelled TC0210201-FSJ, implying this is so), and also that early revisions were incompatible with VMS. It is also implied these were sold as M7196 by DEC for use with their TSV05 drive, and that these were rebranded Cipher tape drives. As a mathematics postgraduate, before he co-founded Corvil, Ian Dowse designed and prototyped a

Qbus-to-PC interface that interposes between the Qbus Backplane and the PC parallel port, which he then used with the F880 and TU02 to read old tapes. See Figures 15 to 33 below.

The F880 consumed 220W at 240V, 50/60Hz, 1.5A. For a reel-to-reel tape drive, it was quite compact, with a low profile, even though it measured 48cm (19") wide x 23cm (9") high x 61cm (24") deep, and weighed 36kg (80lb).

Many thanks to Prof. Richard Timoney, School of Mathematics, Trinity College Dublin, who donated these items.

Accession Index	Object with Identification
TCD-SCSS-T.20160323.002.001	Cipher F880 Tape Drive. Markings: Mfg.Date: 86119 Model: F880640-90-1025U P/N: 960671-001 Option: E Density: 1600 BPI Speed: 100/25 IPS S/N: G87281
TCD-SCSS-T.20160323.002.002	Emulex TU02 Qbus Tape Drive Controller. Markings: Emulex, Santa Ana, CA Assembly: TU02-10401 Rev.C Made in U.S.A. CTC-ML 8615 PWB: TU02-10701 Rev.A S/N:
TCD-SCSS-T.20160323.002.003	Qbus Backplane S/N:
TCD-SCSS-T.20160323.002.004	Ian Dowse's Qbus-to-PC interface.

Also see related documents in associated folder in this catalog.

References:

1. Bitsavers, *Cipher*, see:
<http://bitsavers.informatik.uni-stuttgart.de/pdf/cipher/>
Last viewed 7-Apr-2016.
2. John Wilson, *Pertec 9-Track Tape Interface*, see:
<http://www.sydex.com/pertec.html>
Last viewed 7-Apr-2016.
3. Manx, *TSV05 User Manual*, see:
http://manx.classiccmp.org/collections/hcps/TSV05_User.pdf
Last viewed 7-Apr-2016.
4. Manx, *TSV05 Pocket Service Guide*, see:
http://manx.classiccmp.org/collections/hcps/TSV05_Maint.pdf
Last viewed 7-Apr-2016.



Figure 1: CIPHER F880 three-quarter view



Figure 2: CIPHER F880 front view



Figure 3: Cipher F880 front closeup with cover open



Figure 4: Cipher F880 tape loading instructions

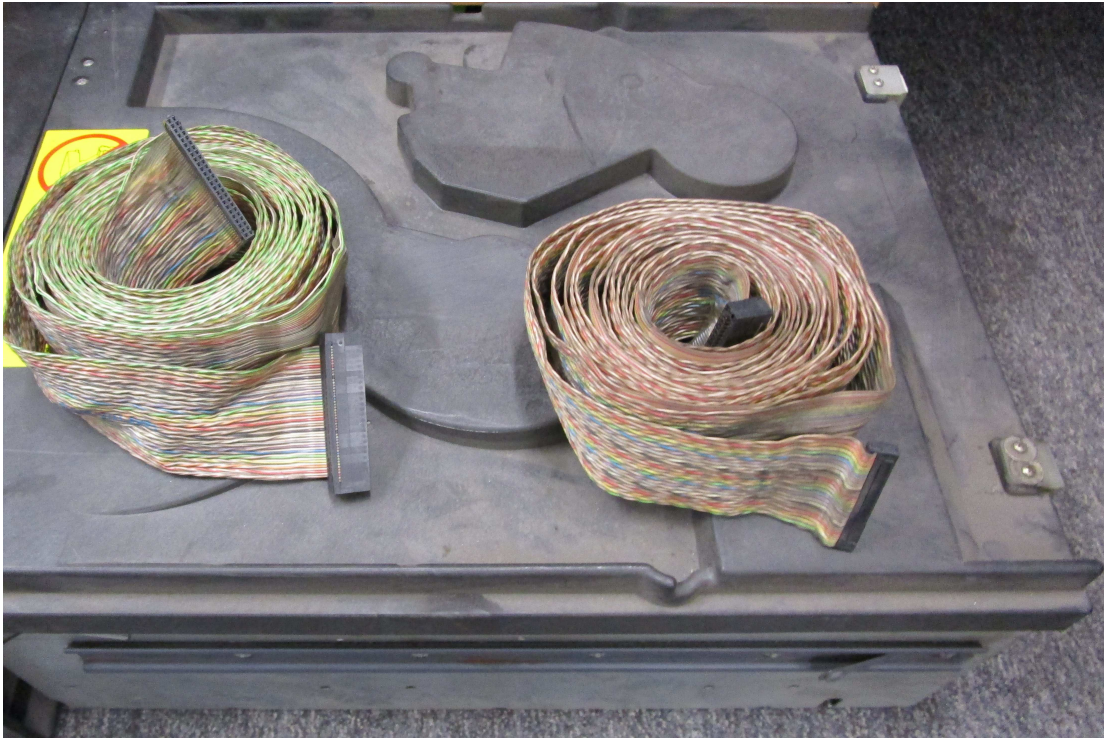


Figure 5: CIPHER F880 with top cover closed, and SCSI cables



Figure 6: CIPHER F880 three-quarter view with top cover removed



Figure 7: Cipher F880 tape path source reel closeup

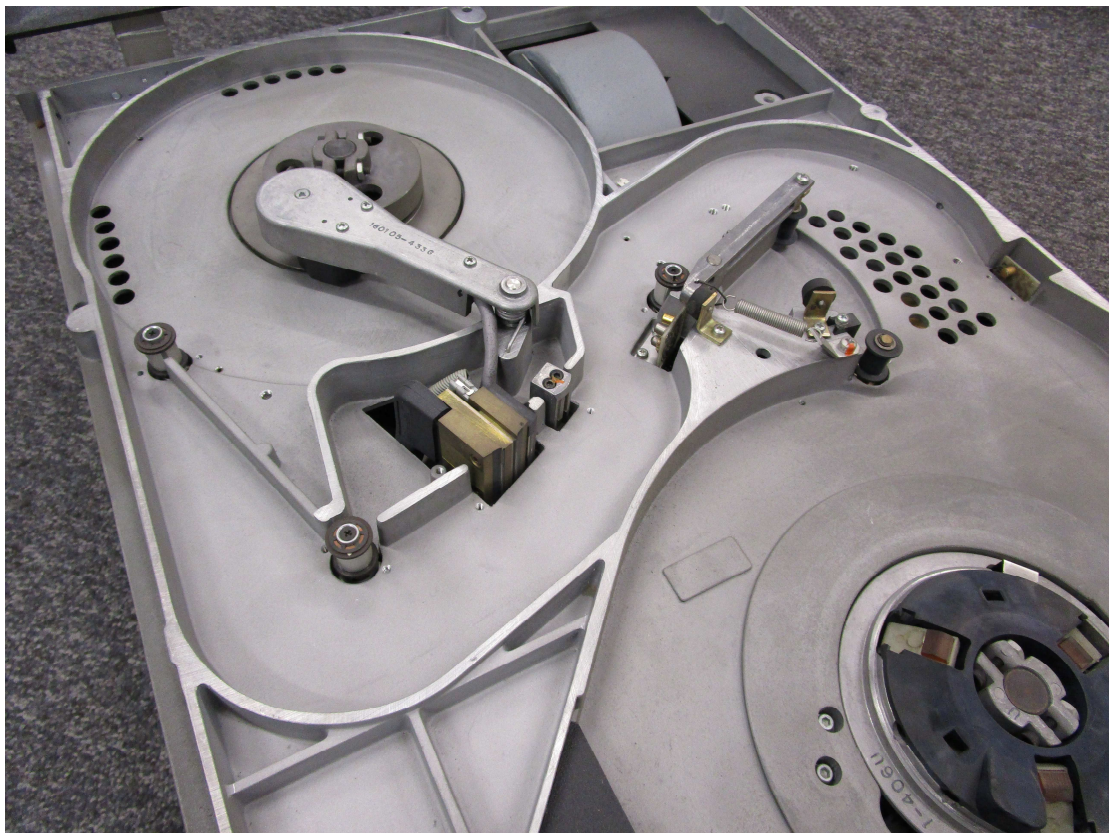


Figure 8: Cipher F880 tape path destination reel closeup

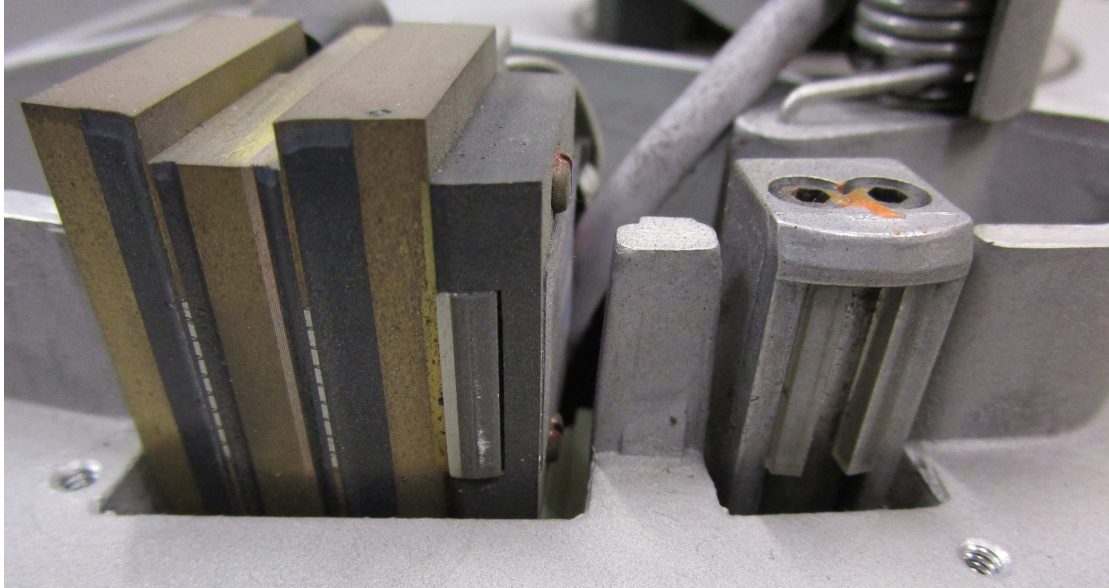


Figure 9: Cipher F880 tape heads

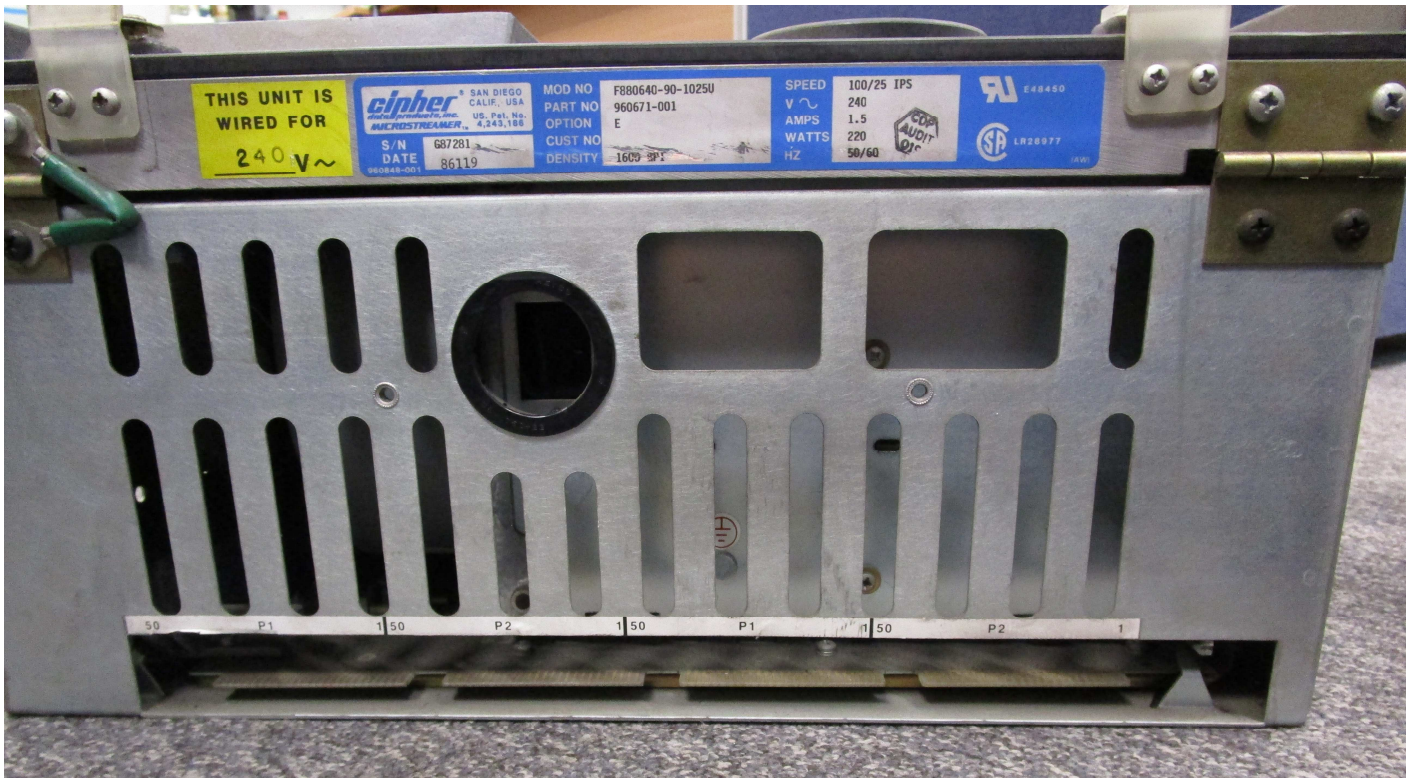
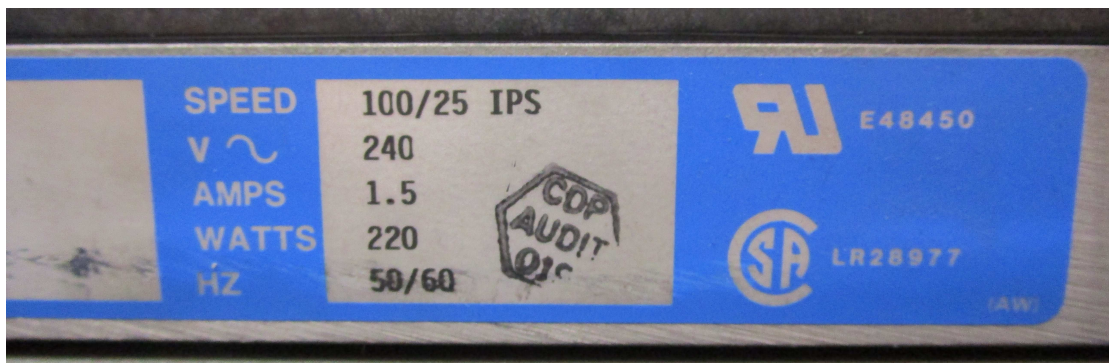
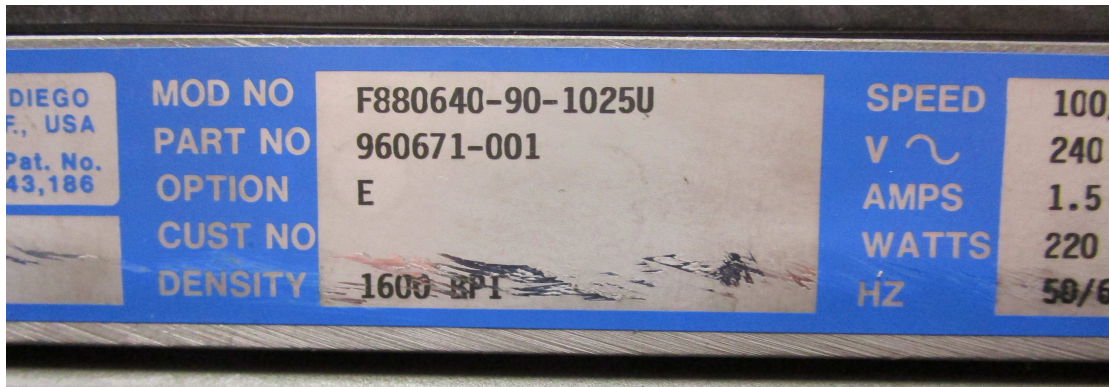


Figure 10: Cipher F880 rear view

Note at lower left and right are two sets of SCSI connector pairs P1 and P2



Figures 11(a), 11(b), 11(c): CIPHER F880 manufacturing label

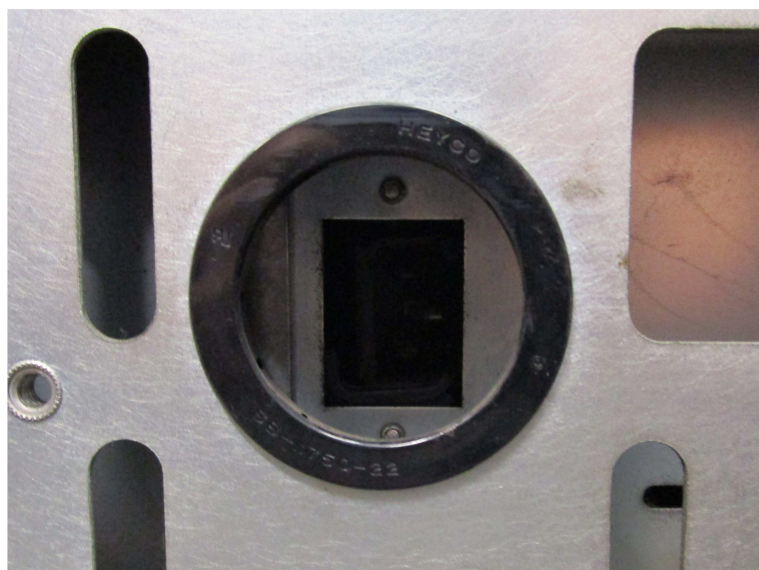


Figure 12: CIPHER F880 AC input socket

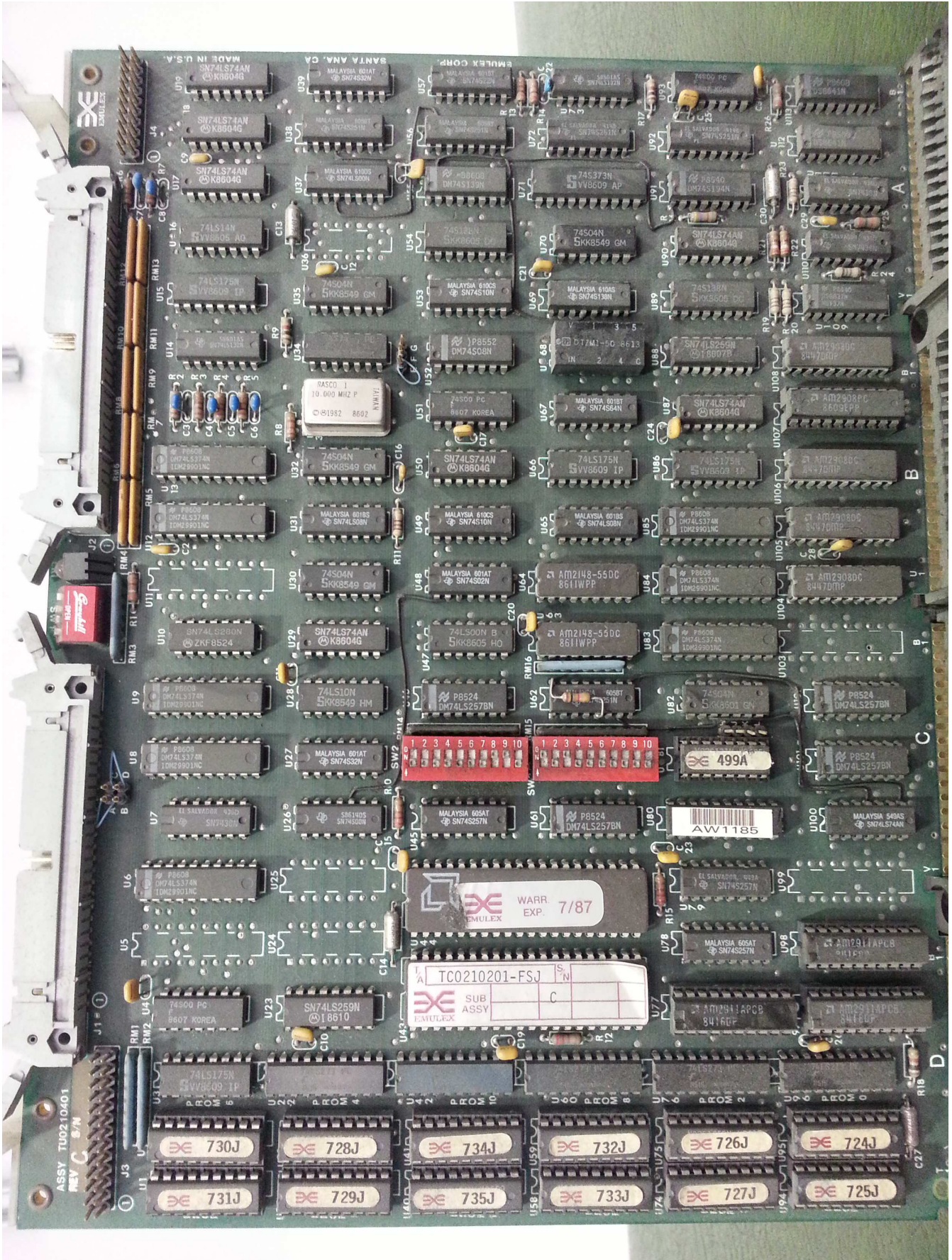


Figure 13: Emulex TU02 Qbus Tape Drive Controller top view

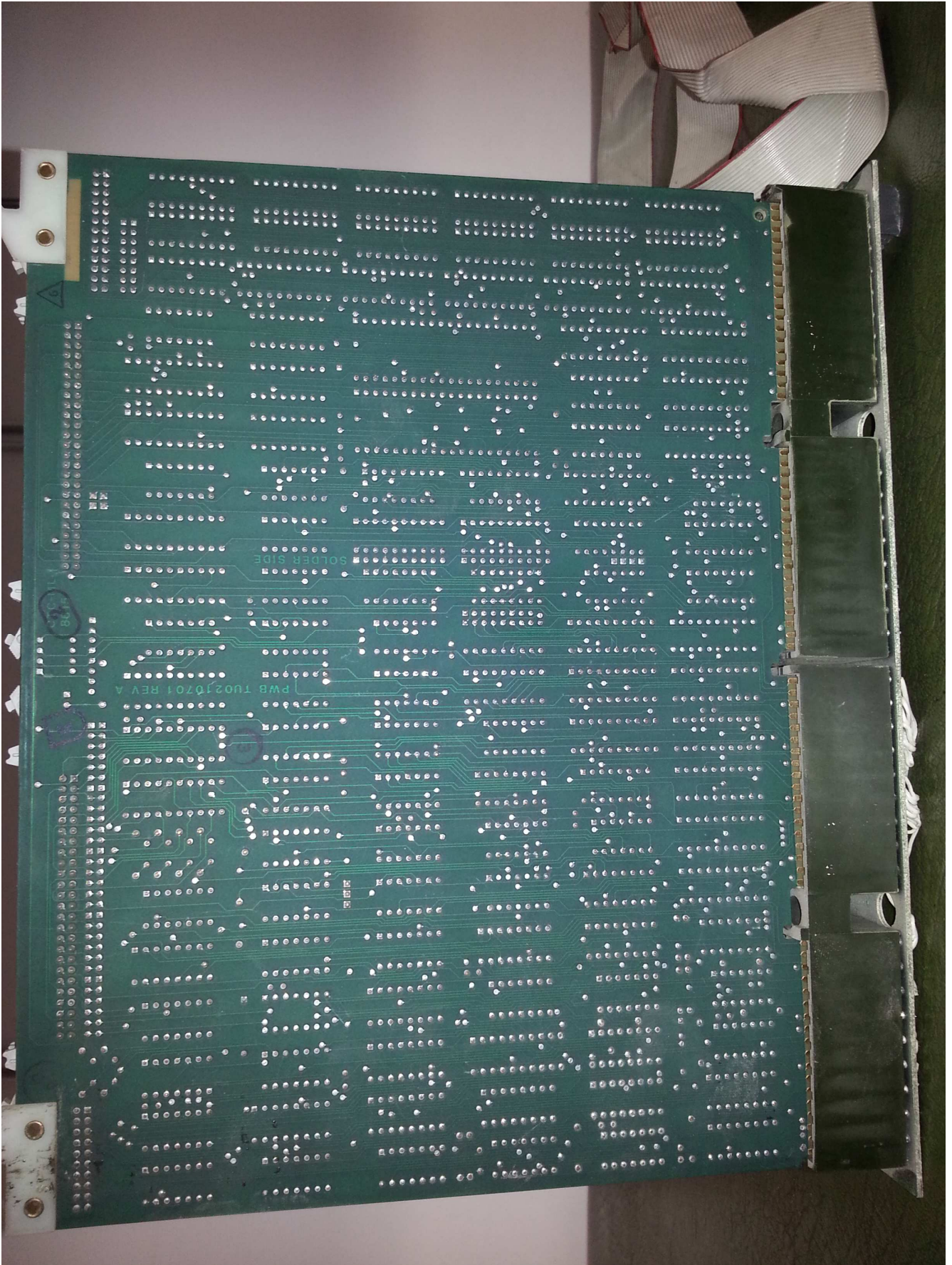


Figure 14: Emulex TU02 Qbus Tape Drive Controller bottom view

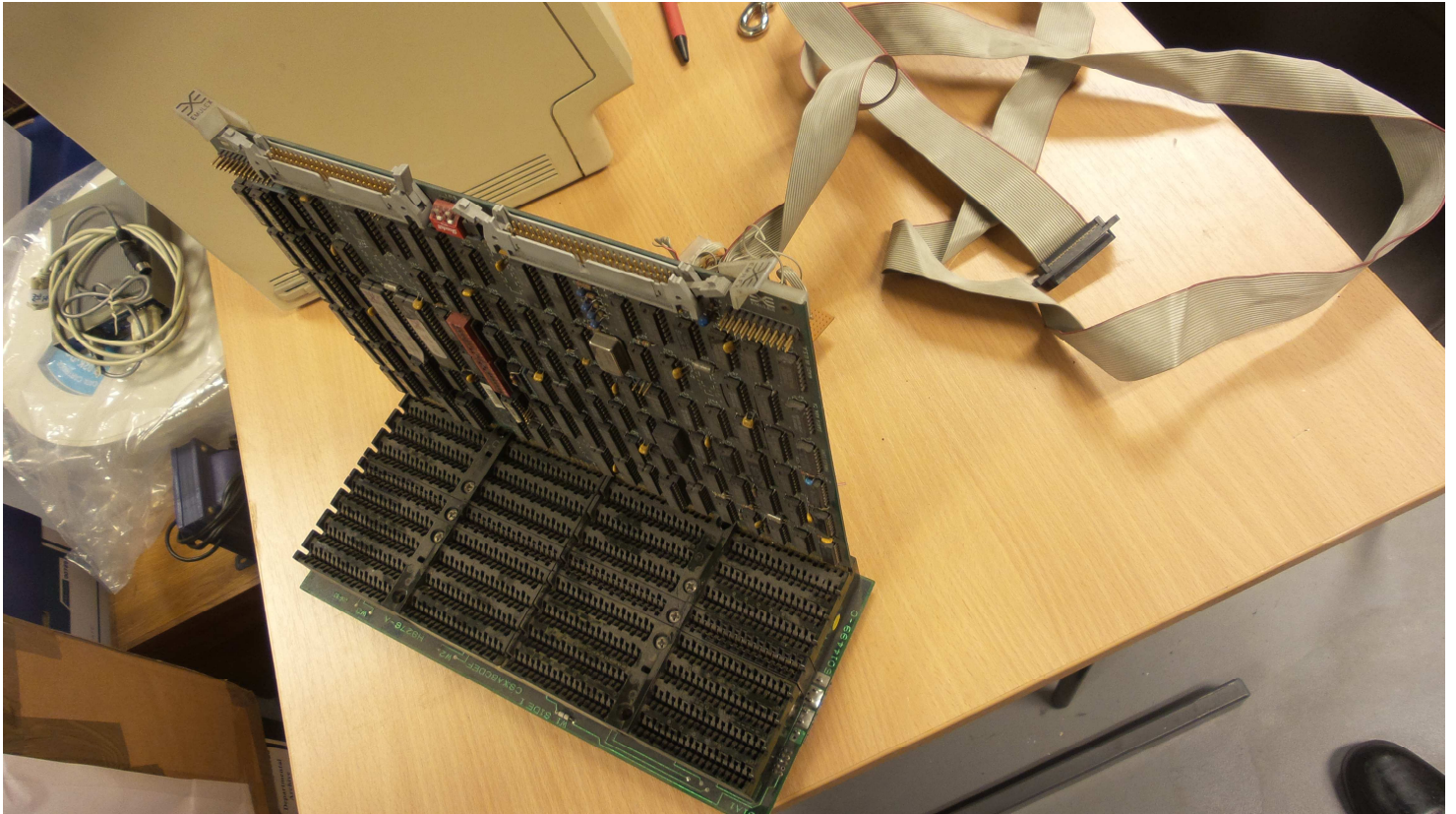


Figure 15: Emulex TU02 Qbus Tape Drive Controller connected to Ian Dowse's Qbus-to-PC interface

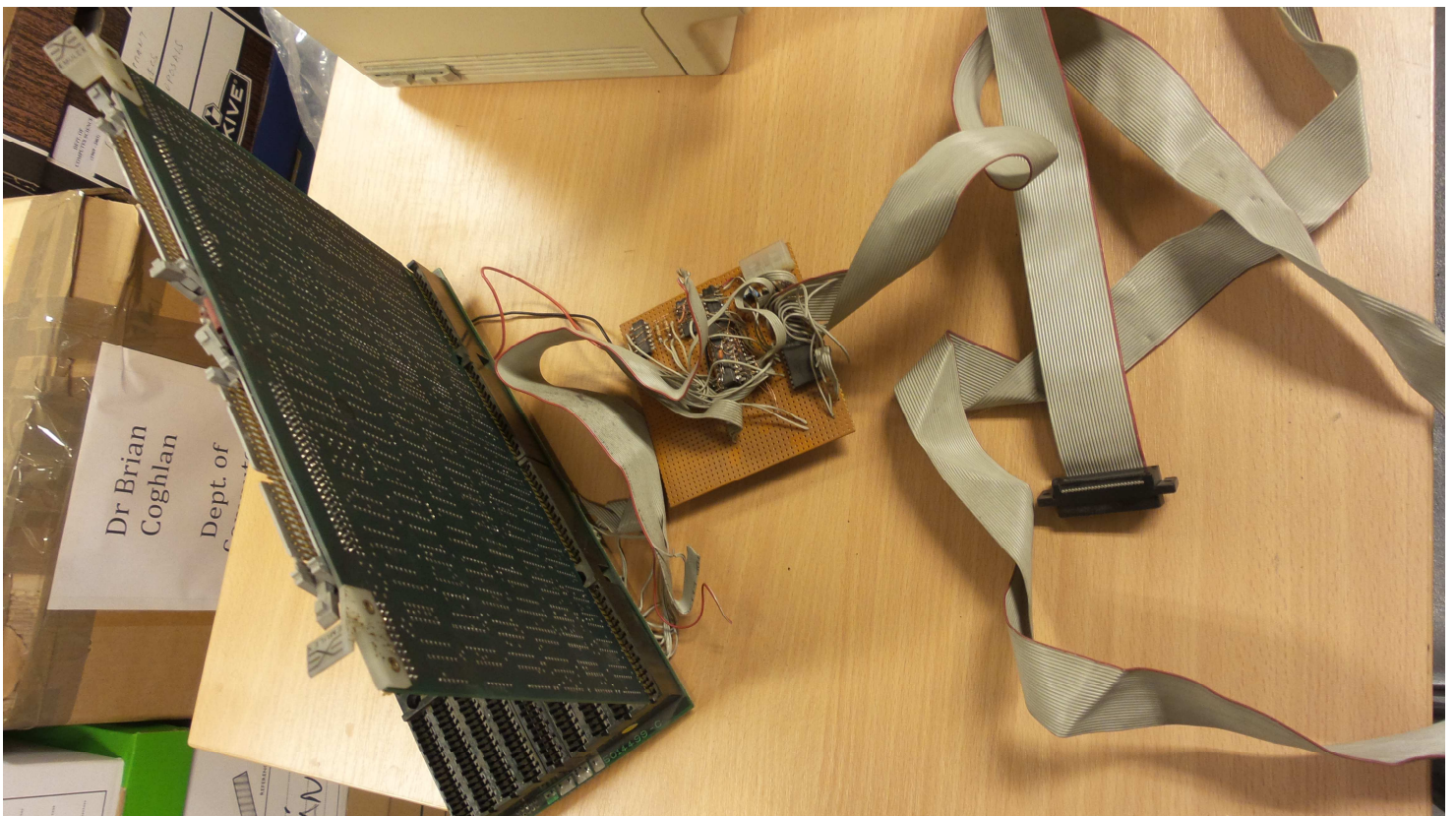


Figure 16: Emulex TU02 Qbus Tape Drive Controller connected to Ian Dowse's Qbus-to-PC interface

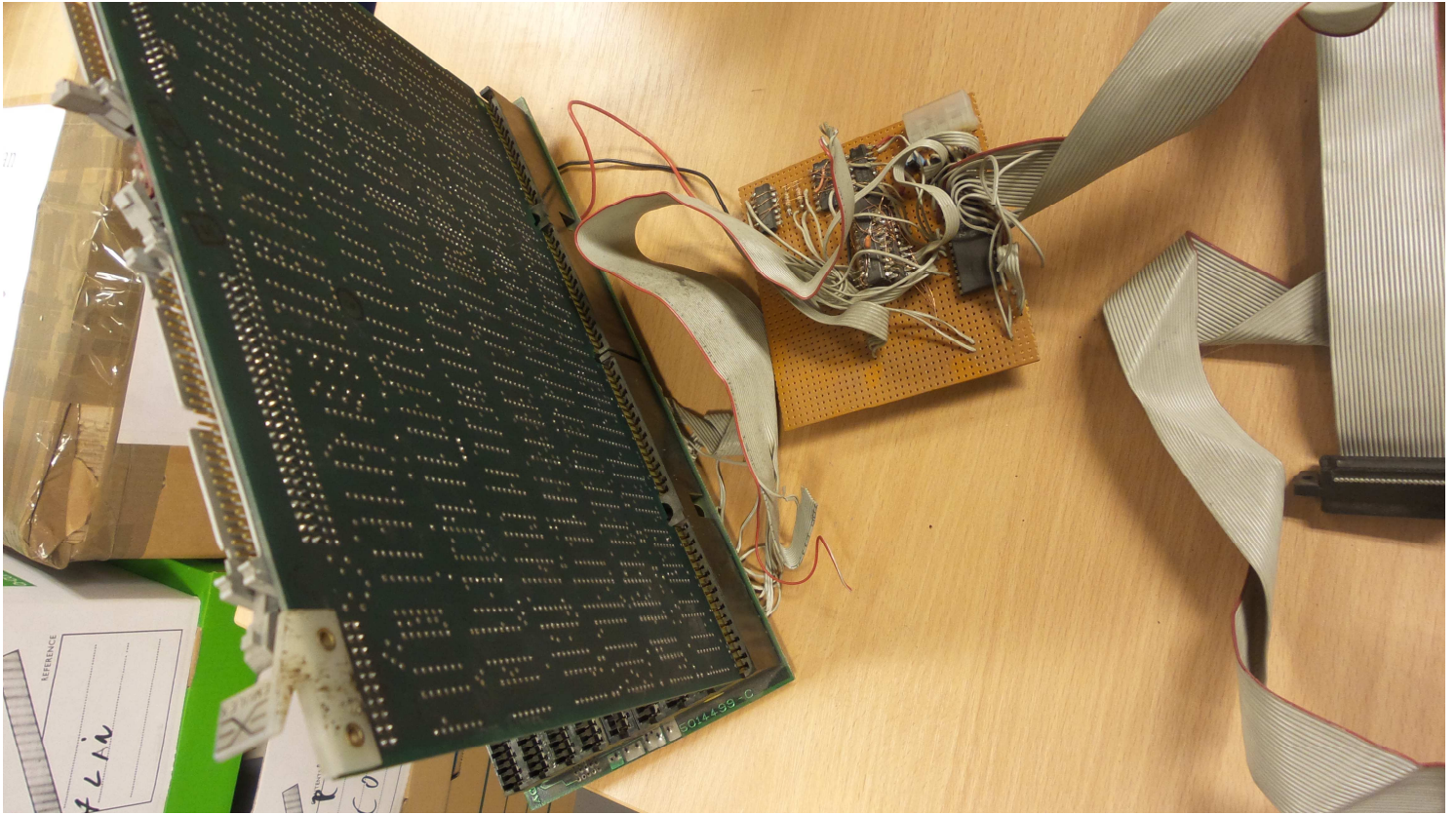


Figure 17: Emulex TU02 Qbus Tape Drive Controller connected to Ian Dowse's Qbus-to-PC interface

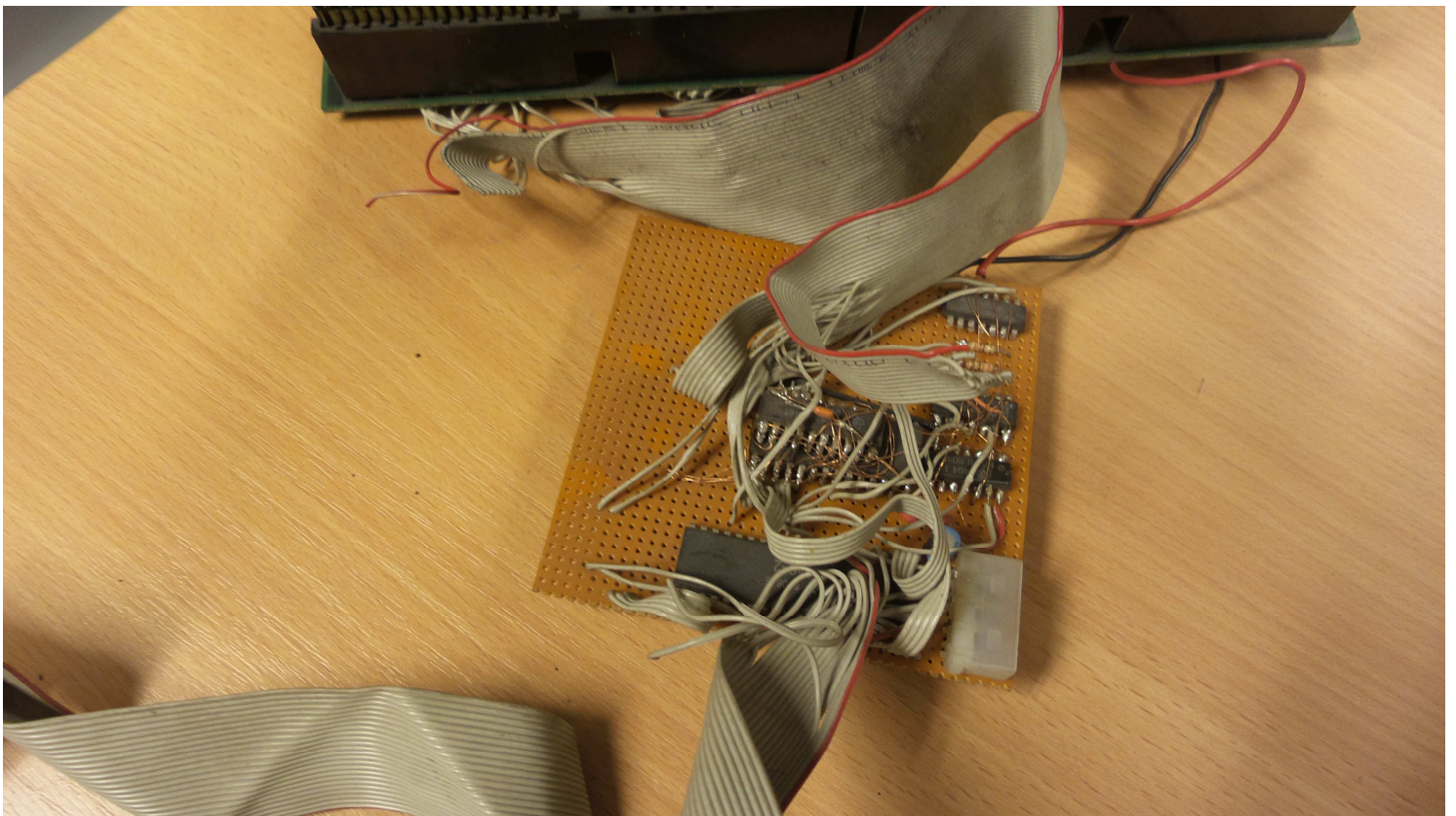


Figure 18: Emulex TU02 Qbus Tape Drive Controller connected to Ian Dowse's Qbus-to-PC interface

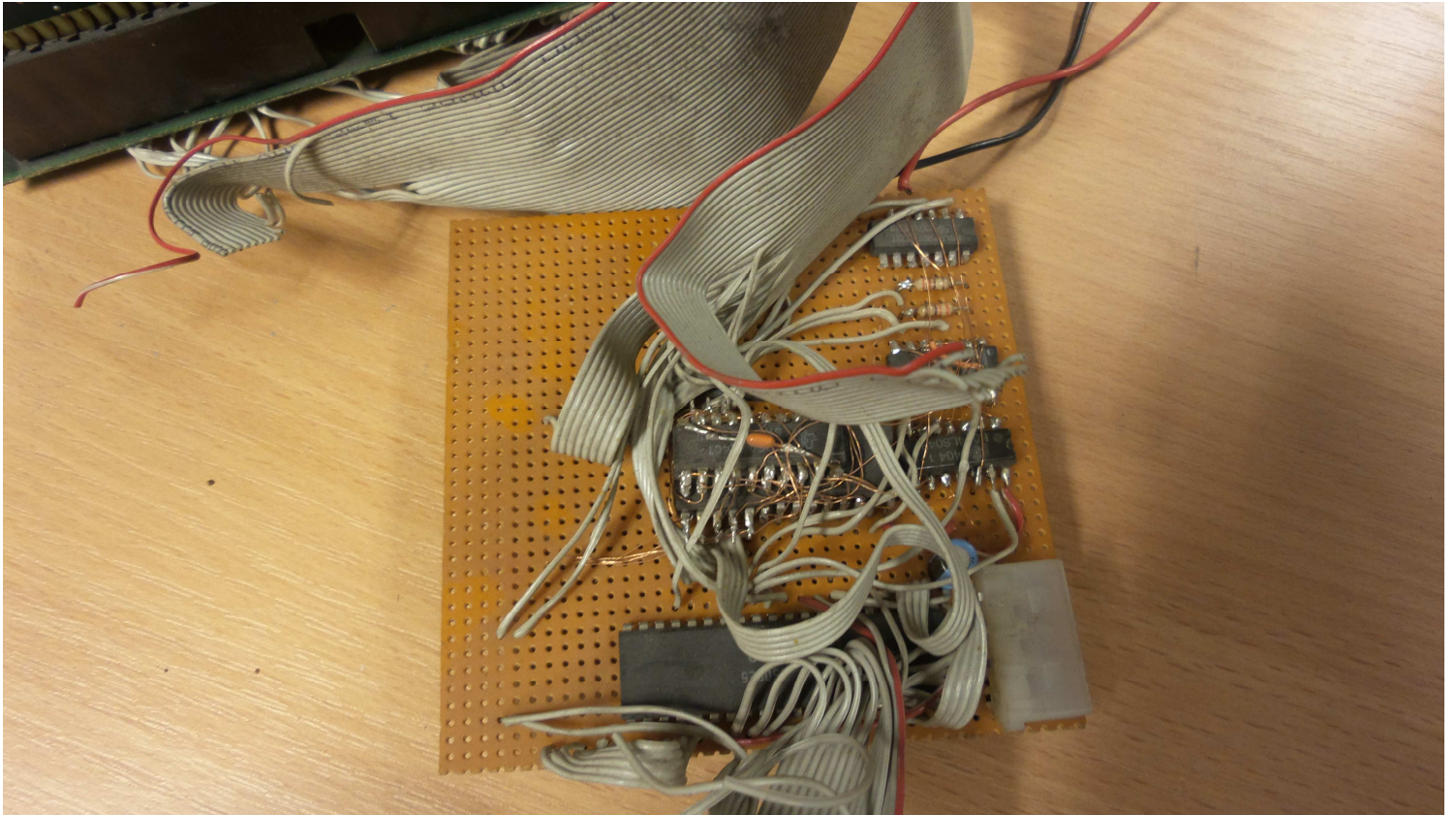


Figure 19: Ian Dowse's Qbus-to-PC interface

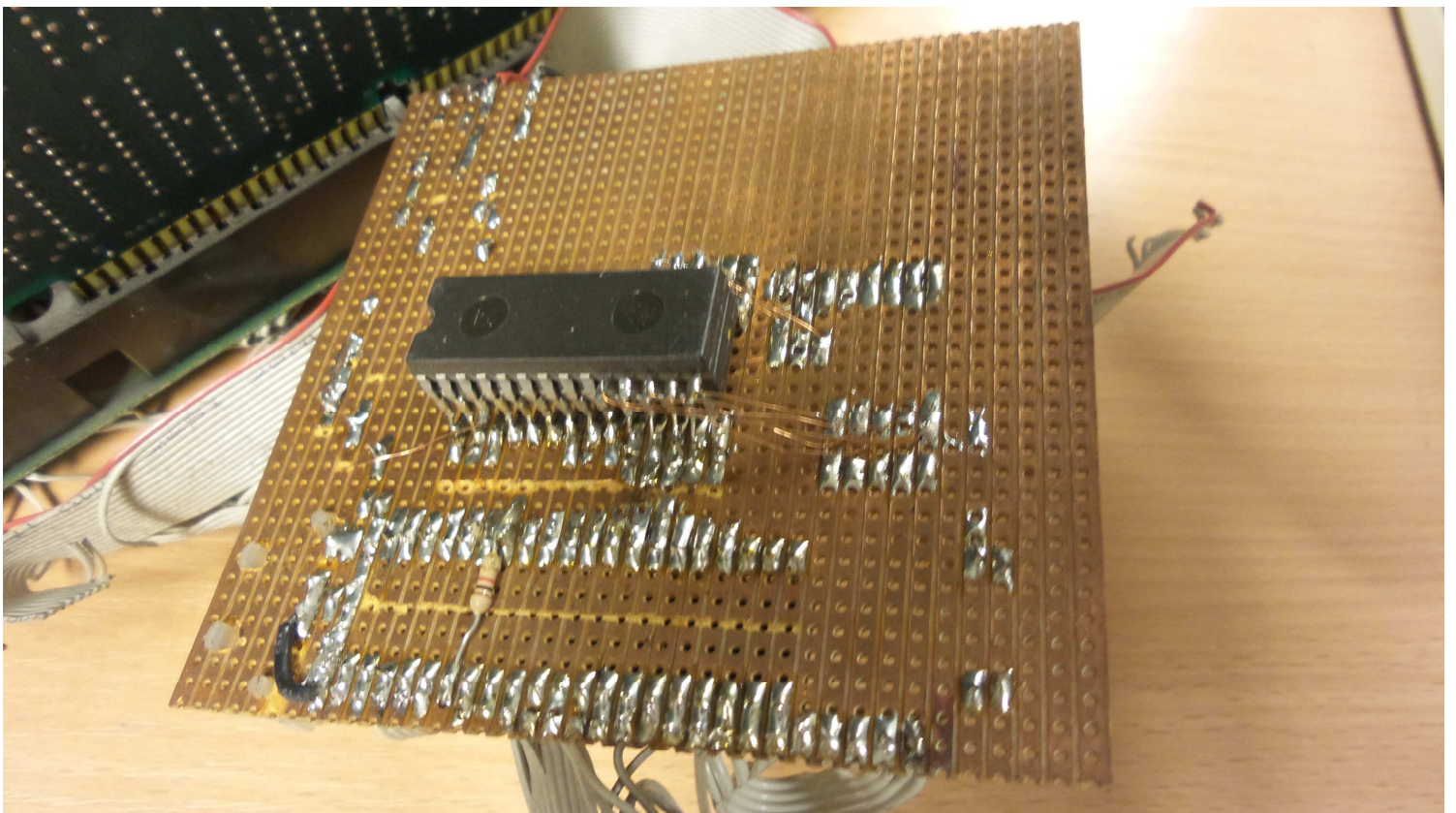


Figure 20: Ian Dowse's Qbus-to-PC interface

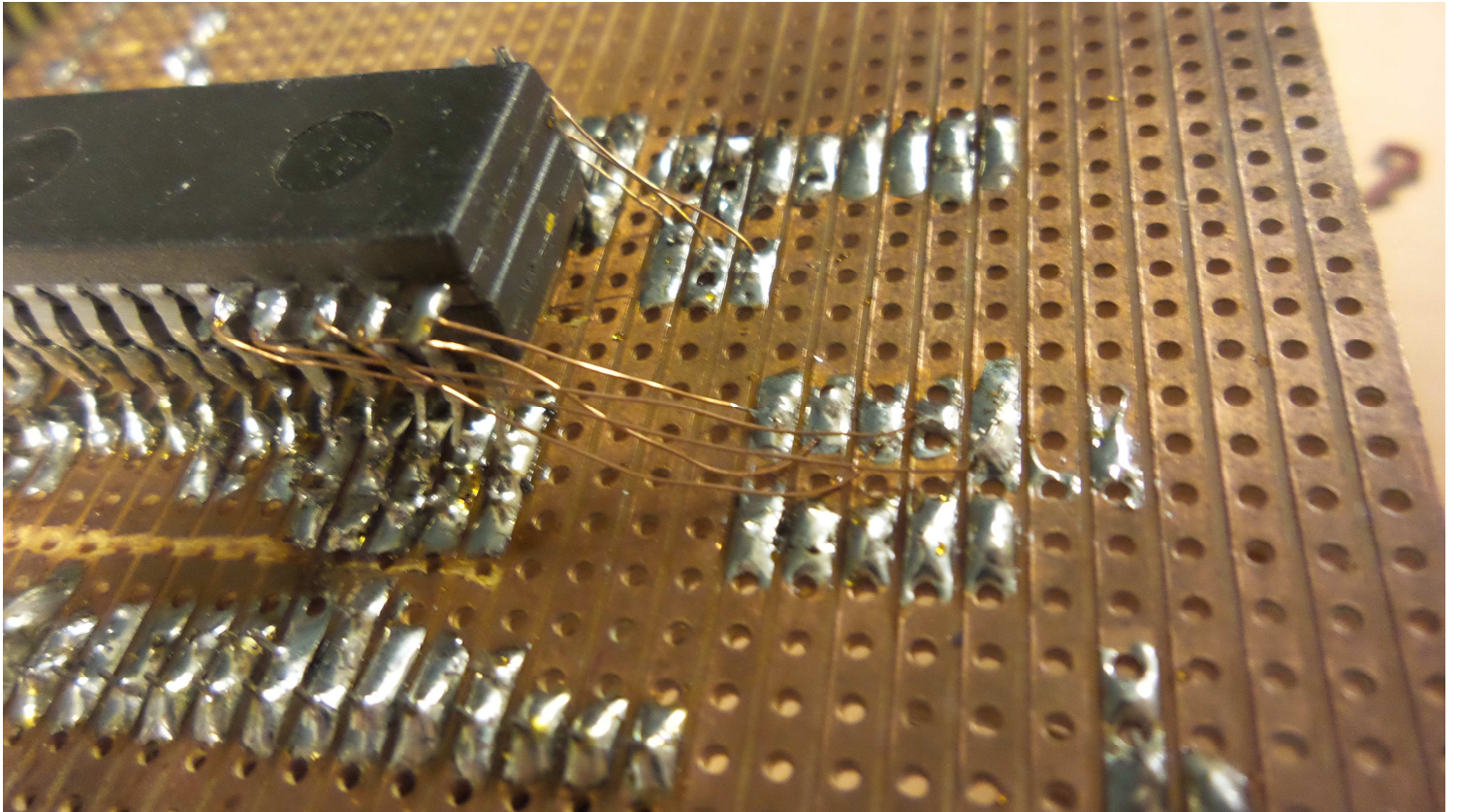


Figure 21: Ian Dowse's Qbus-to-PC interface

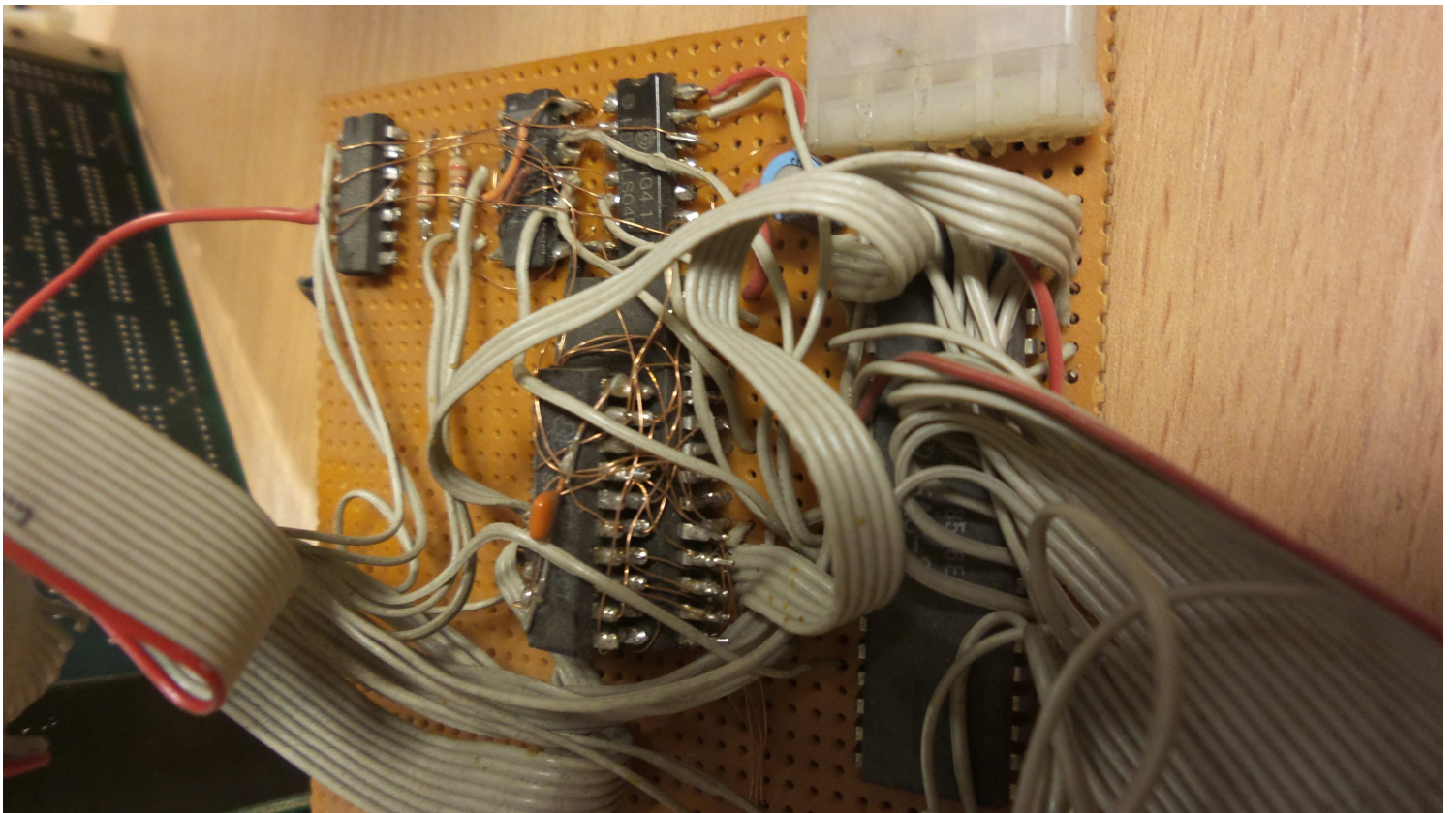


Figure 22: Ian Dowse's Qbus-to-PC interface

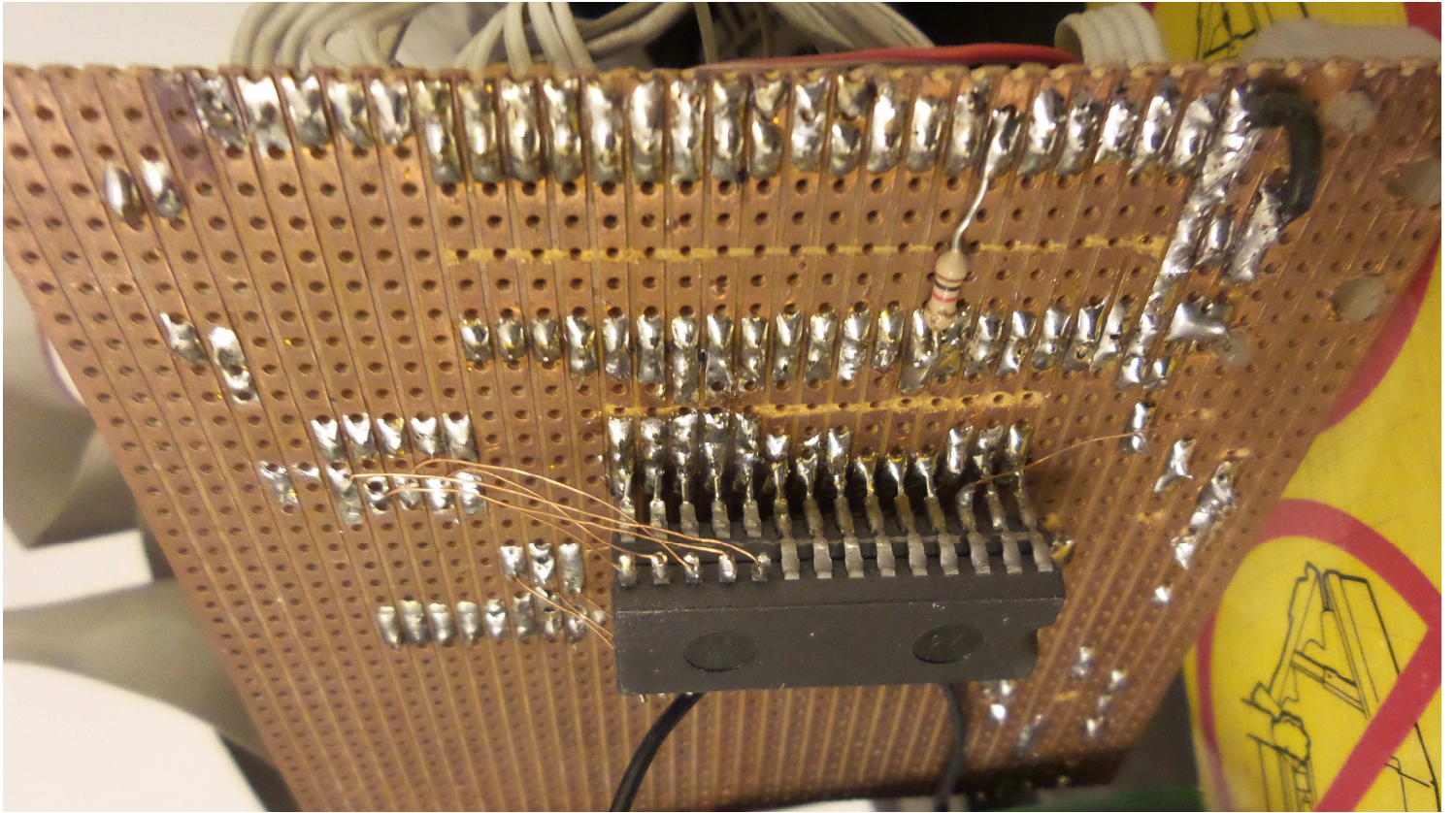


Figure 23: Ian Dowse's Qbus-to-PC interface

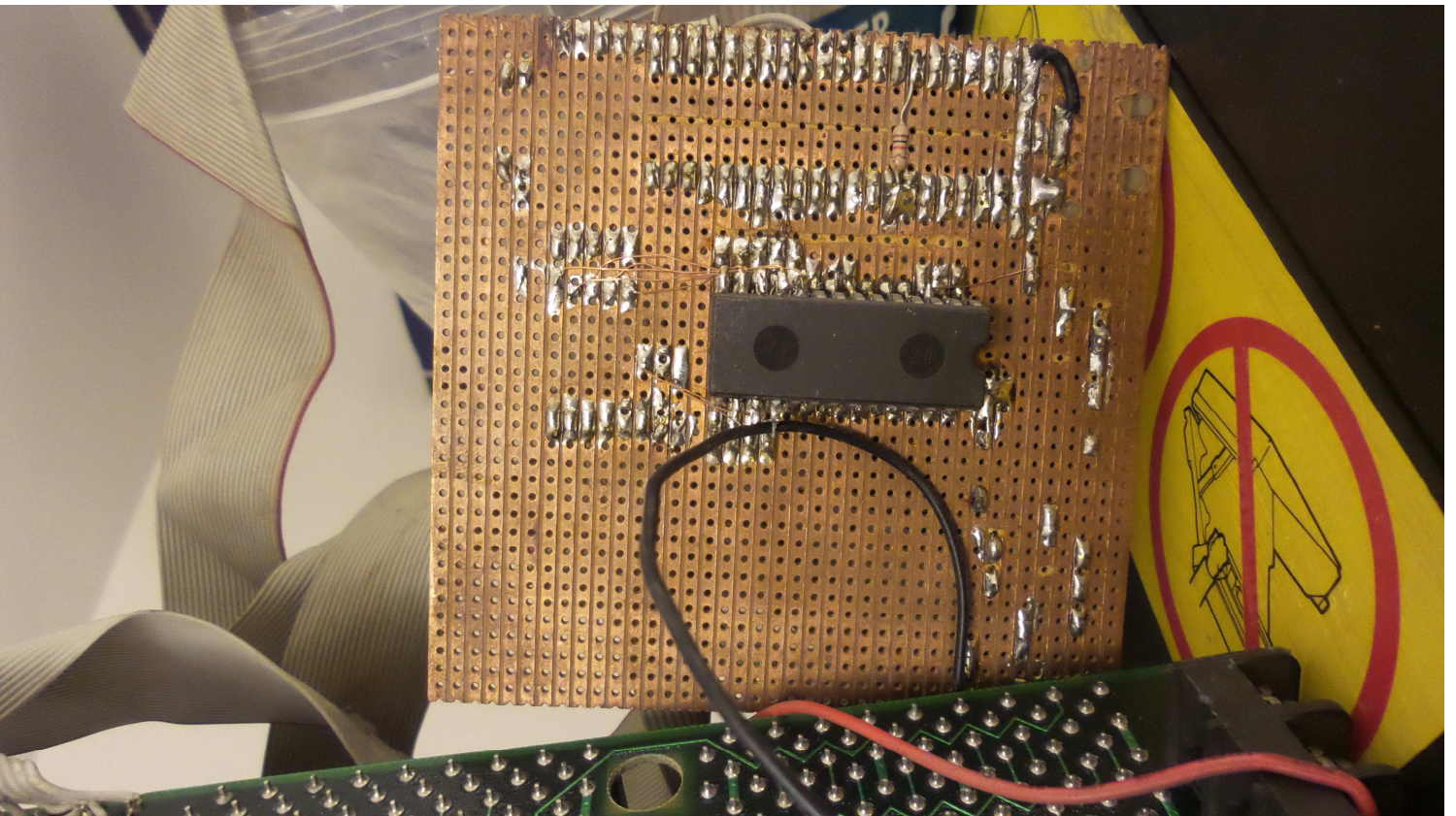


Figure 24: Ian Dowse's Qbus-to-PC interface

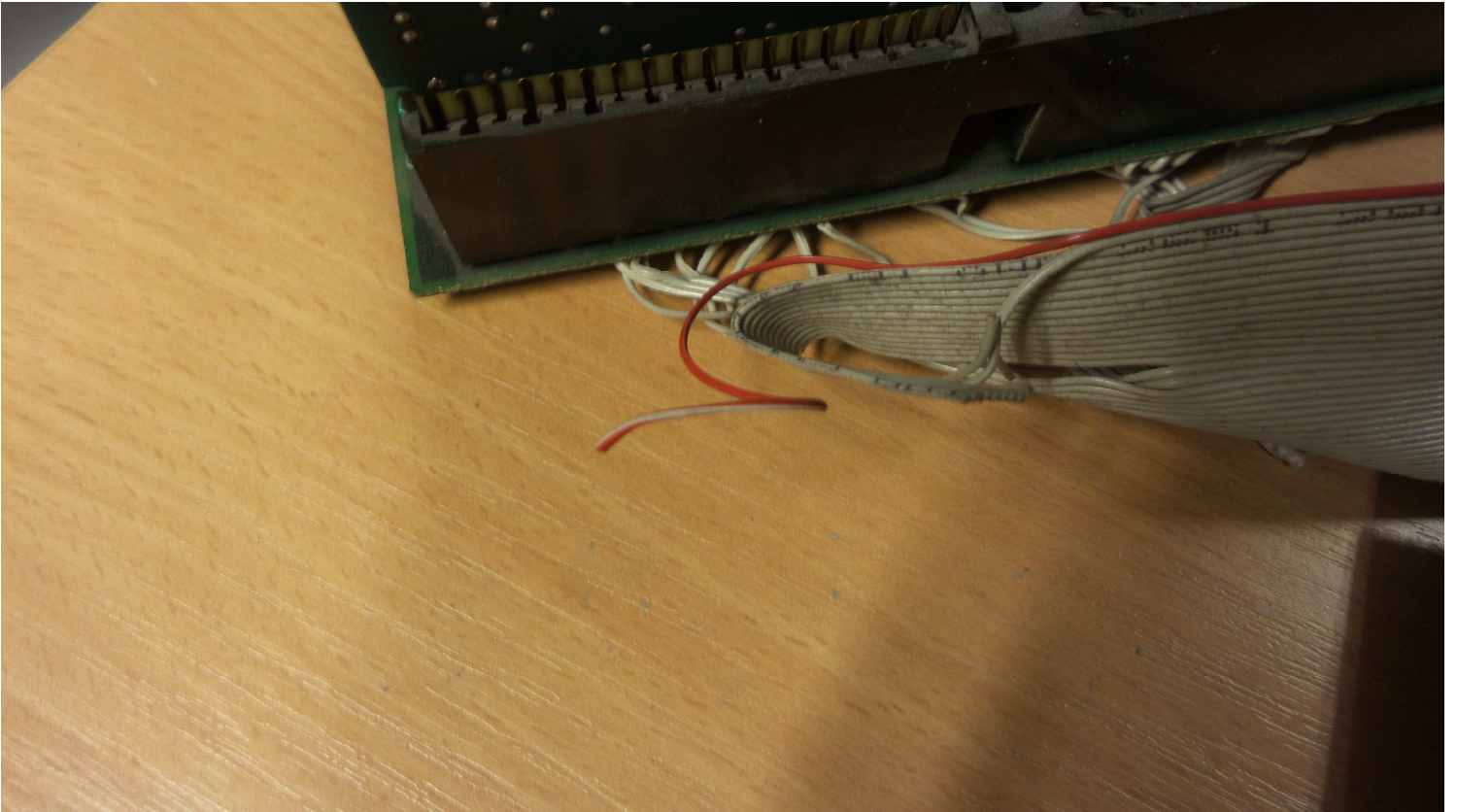


Figure 25: Qbus Backplane connections

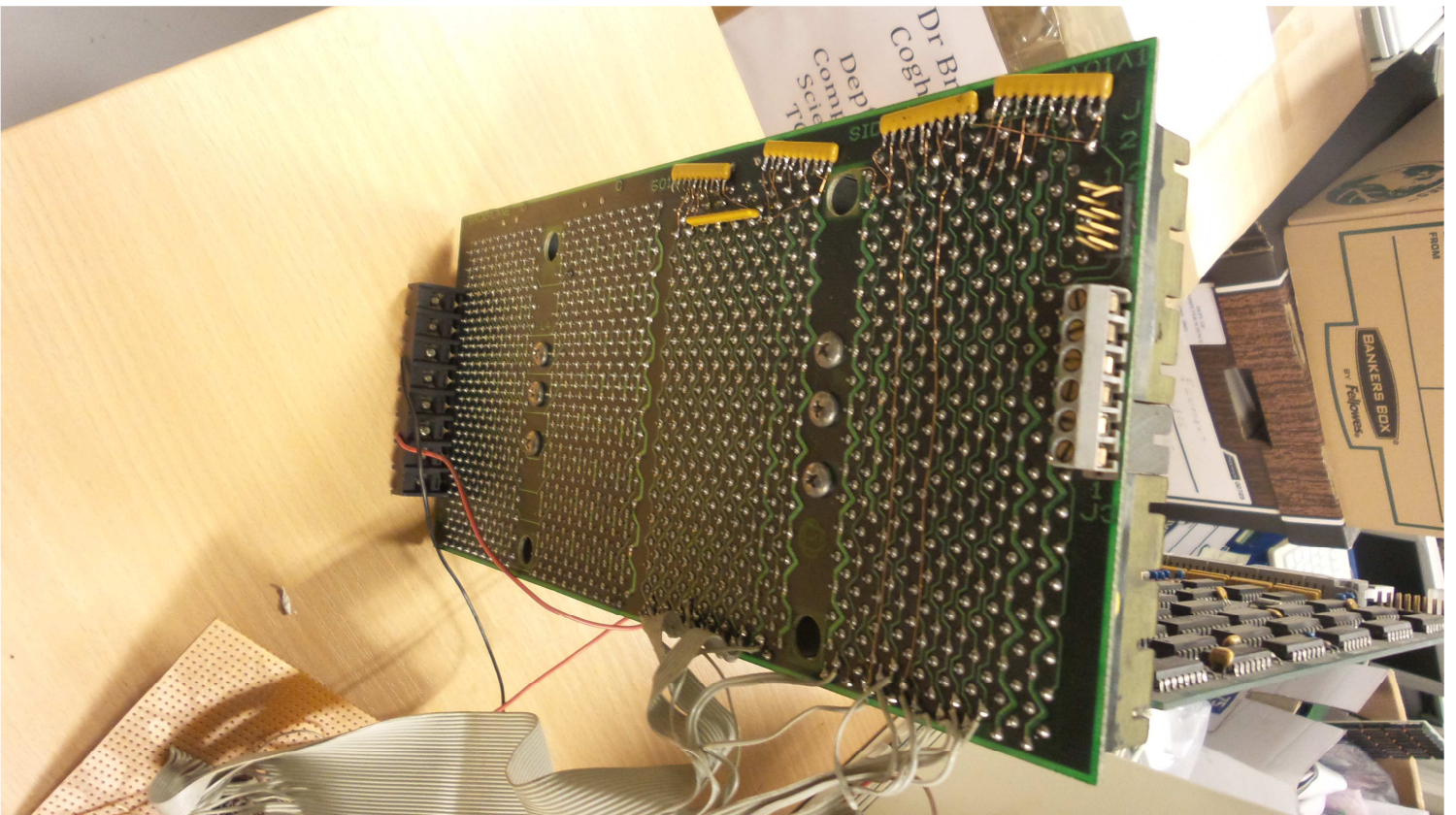


Figure 26: Qbus Backplane connections

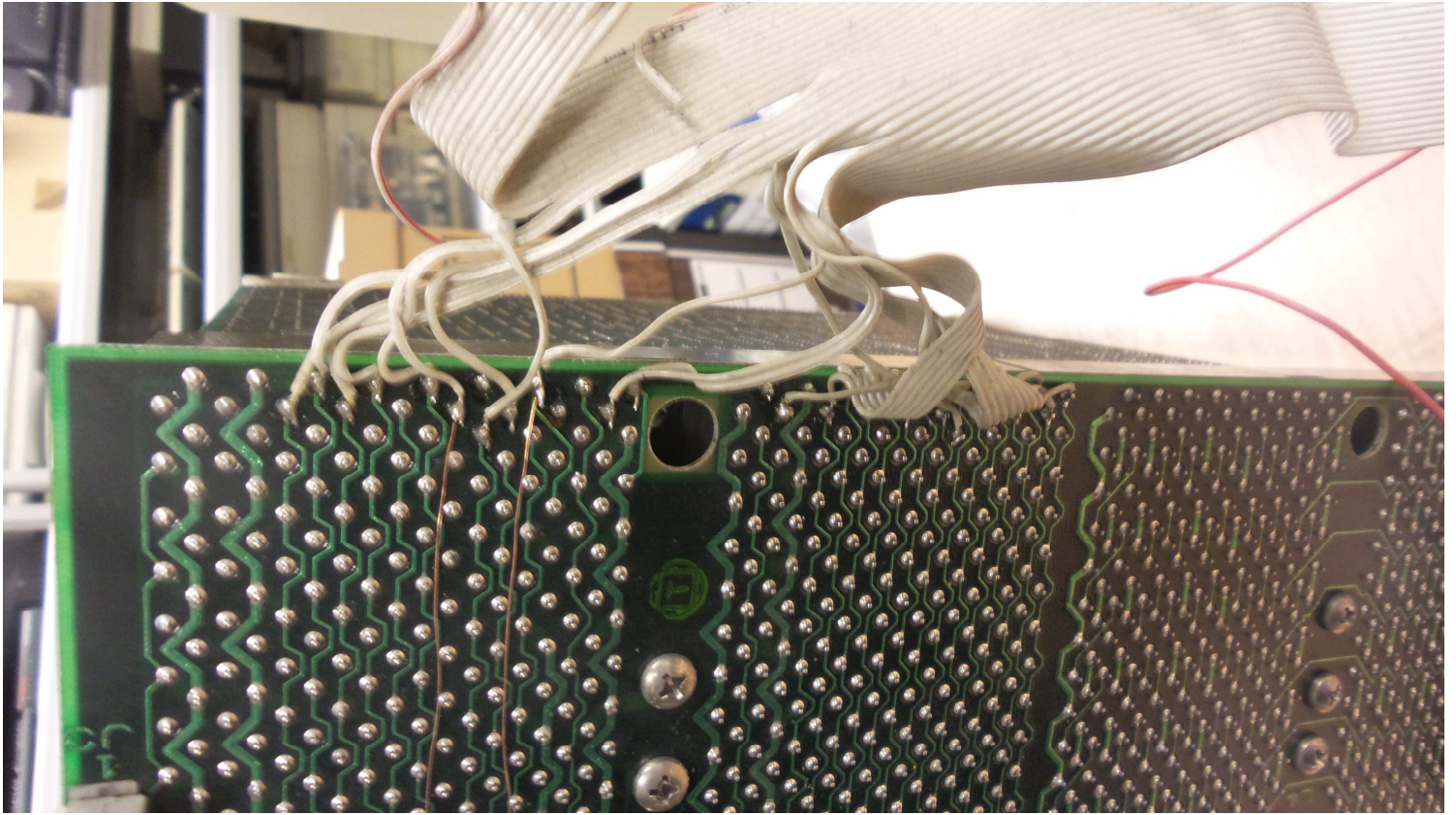


Figure 27: Qbus Backplane connections

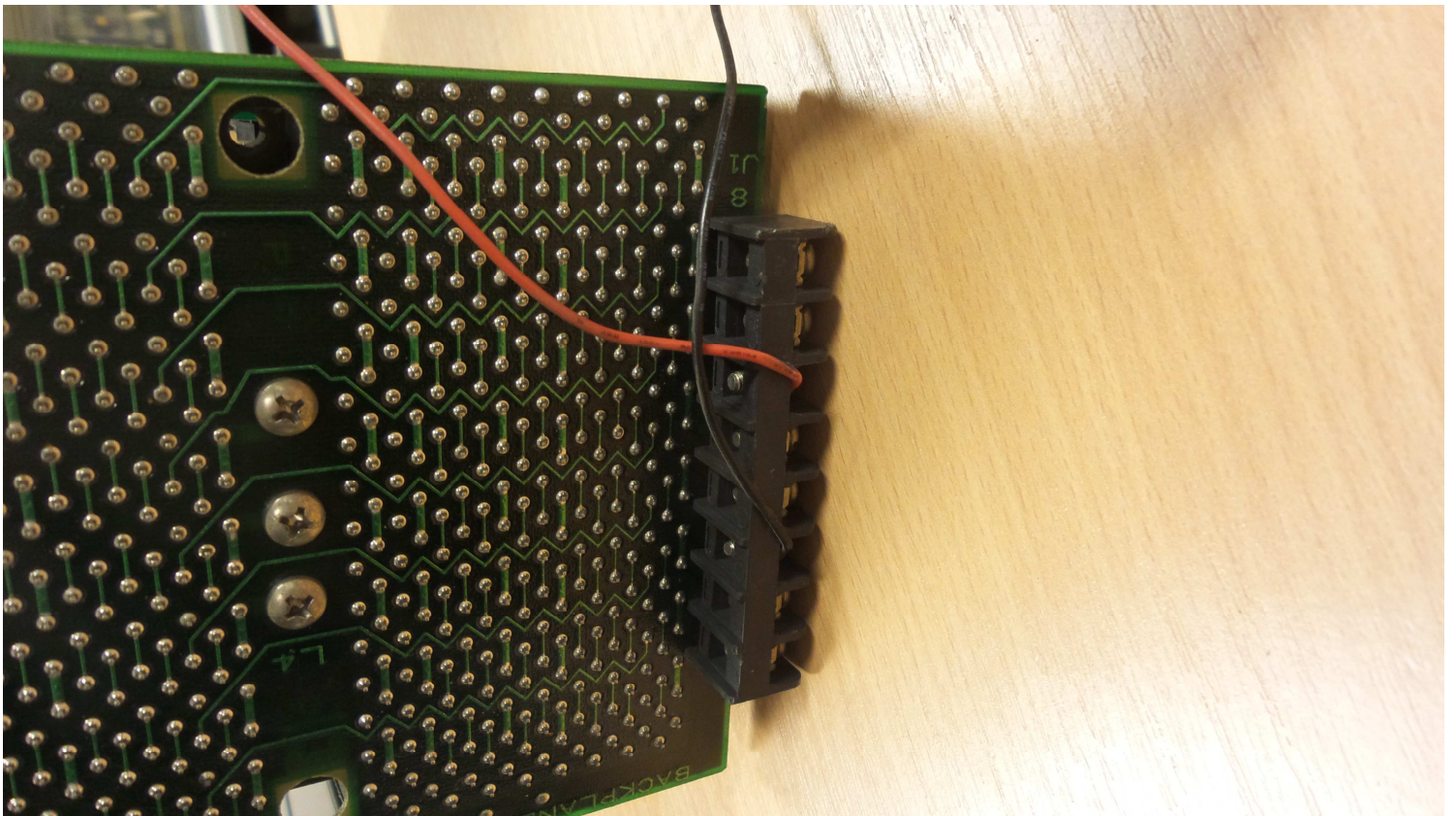


Figure 28: Qbus Backplane connections

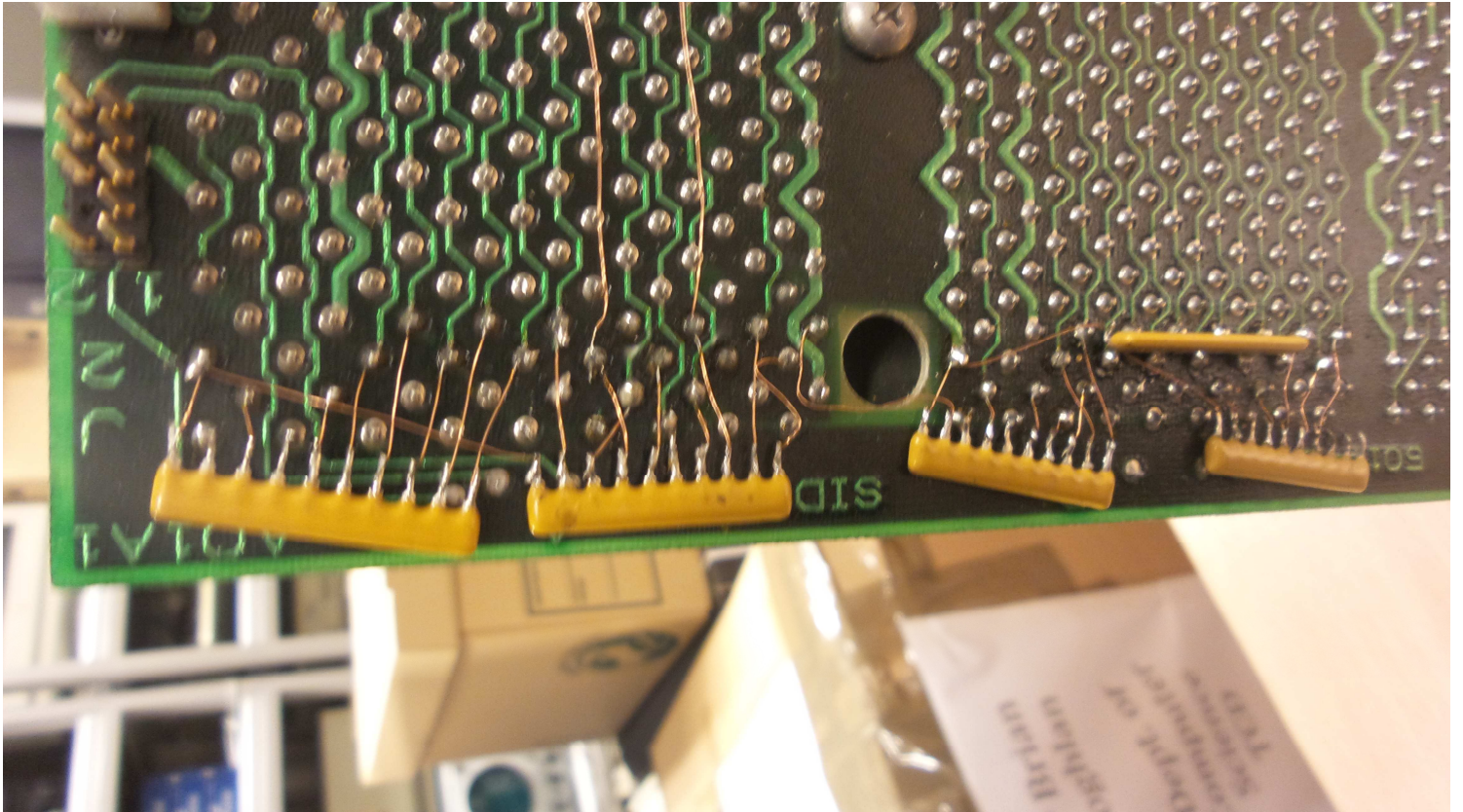


Figure 29: Qbus Backplane terminations

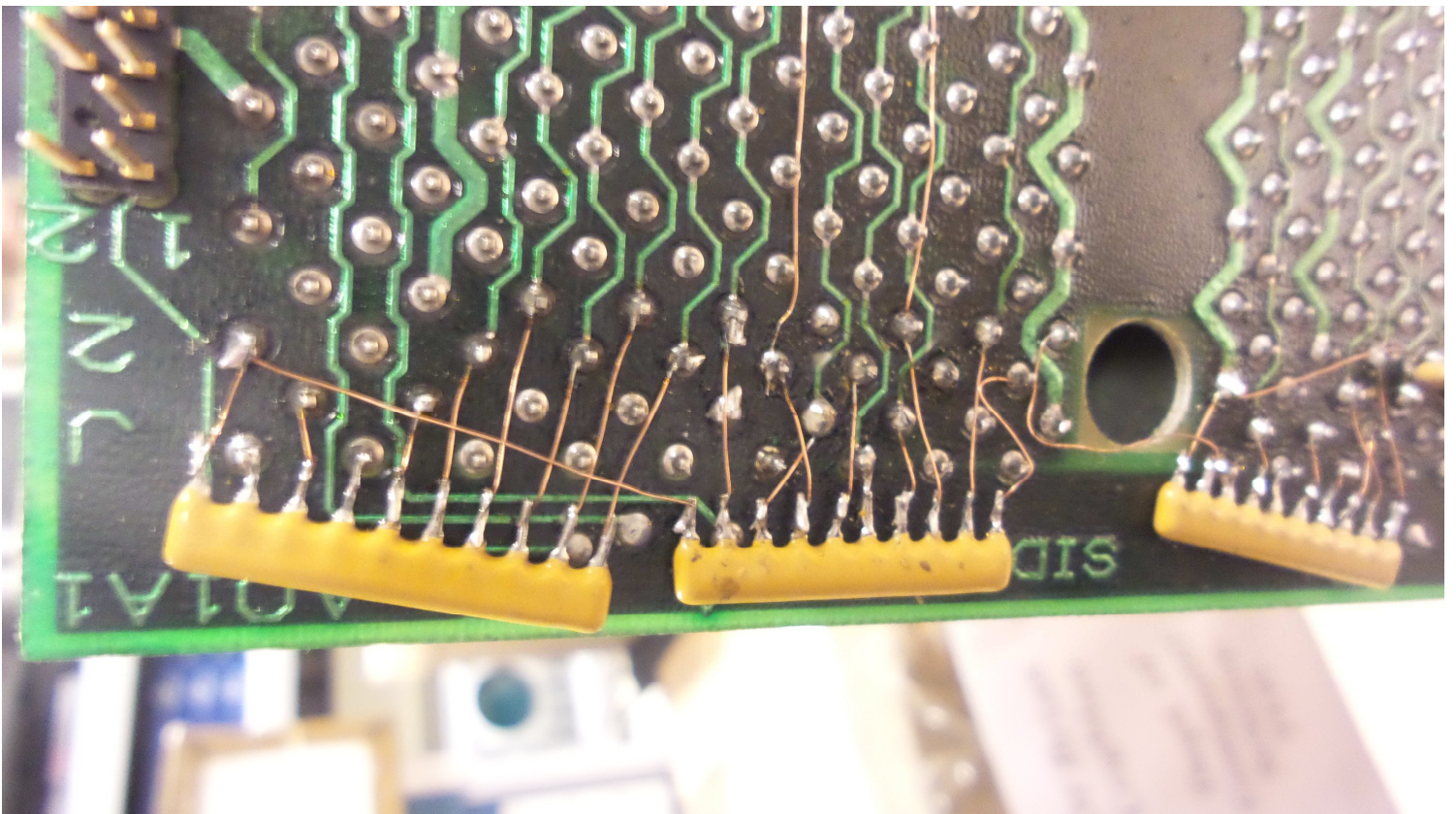


Figure 30: Qbus Backplane terminations left closeup

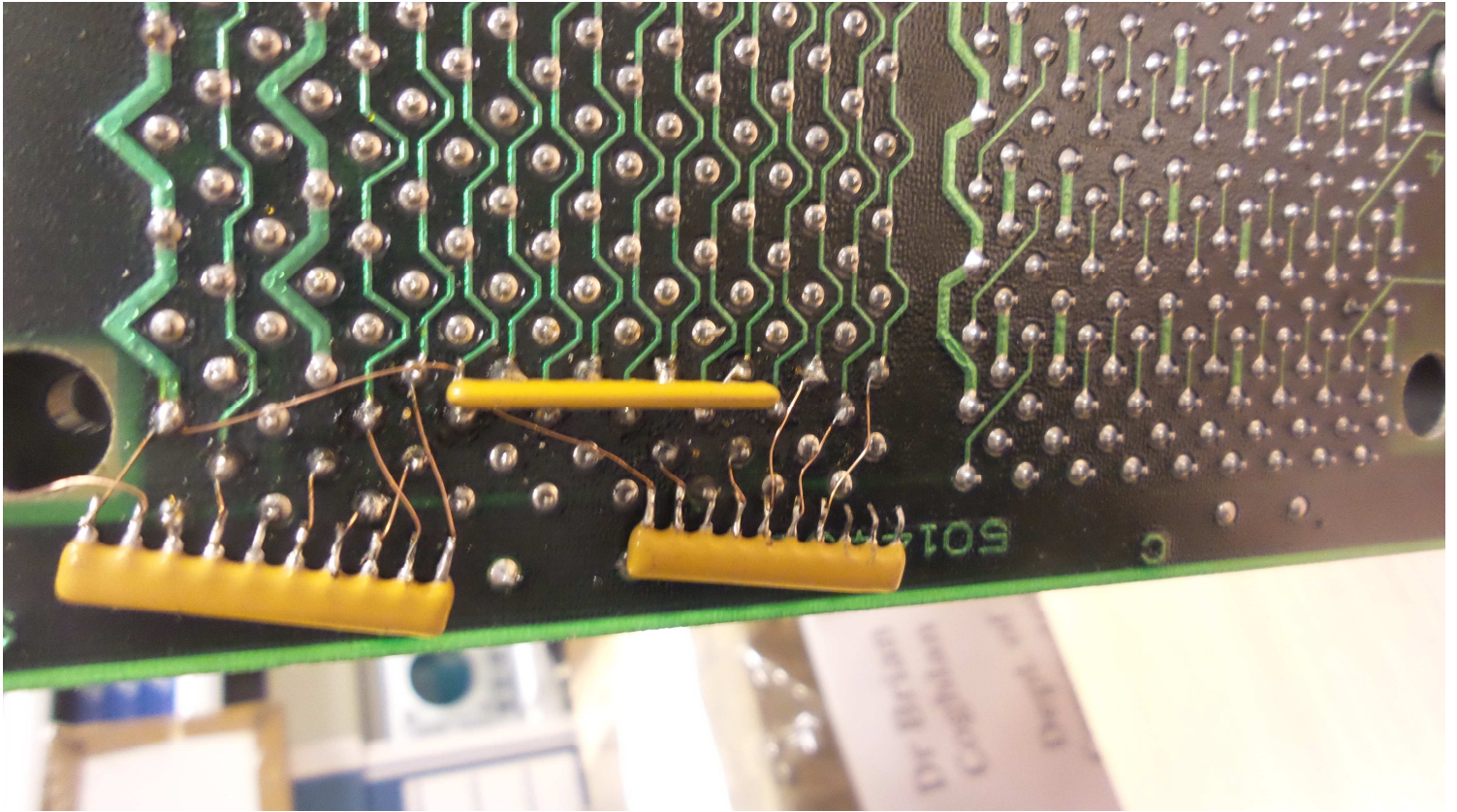


Figure 31: Qbus Backplane terminations right closeup

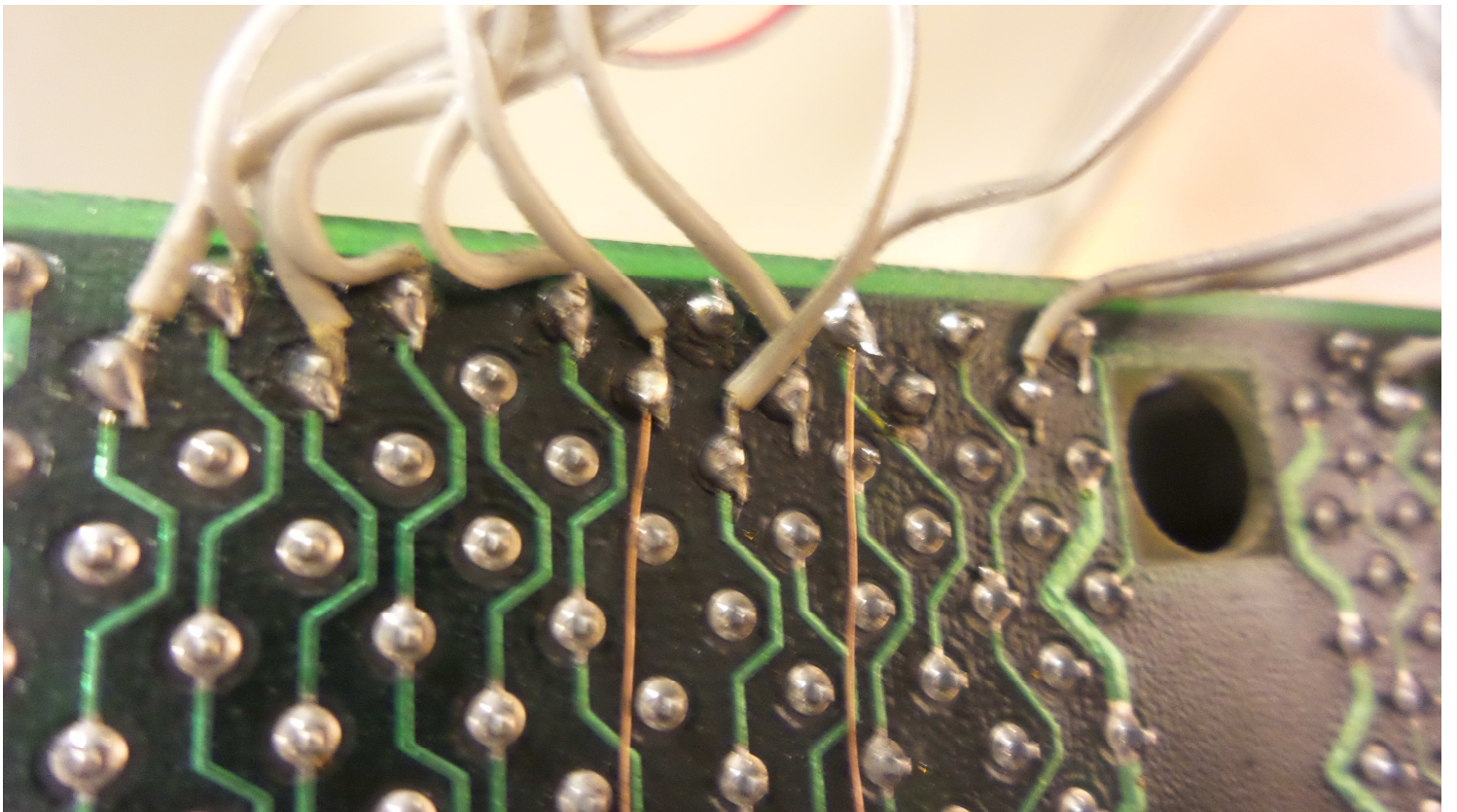


Figure 32: Qbus Backplane connections

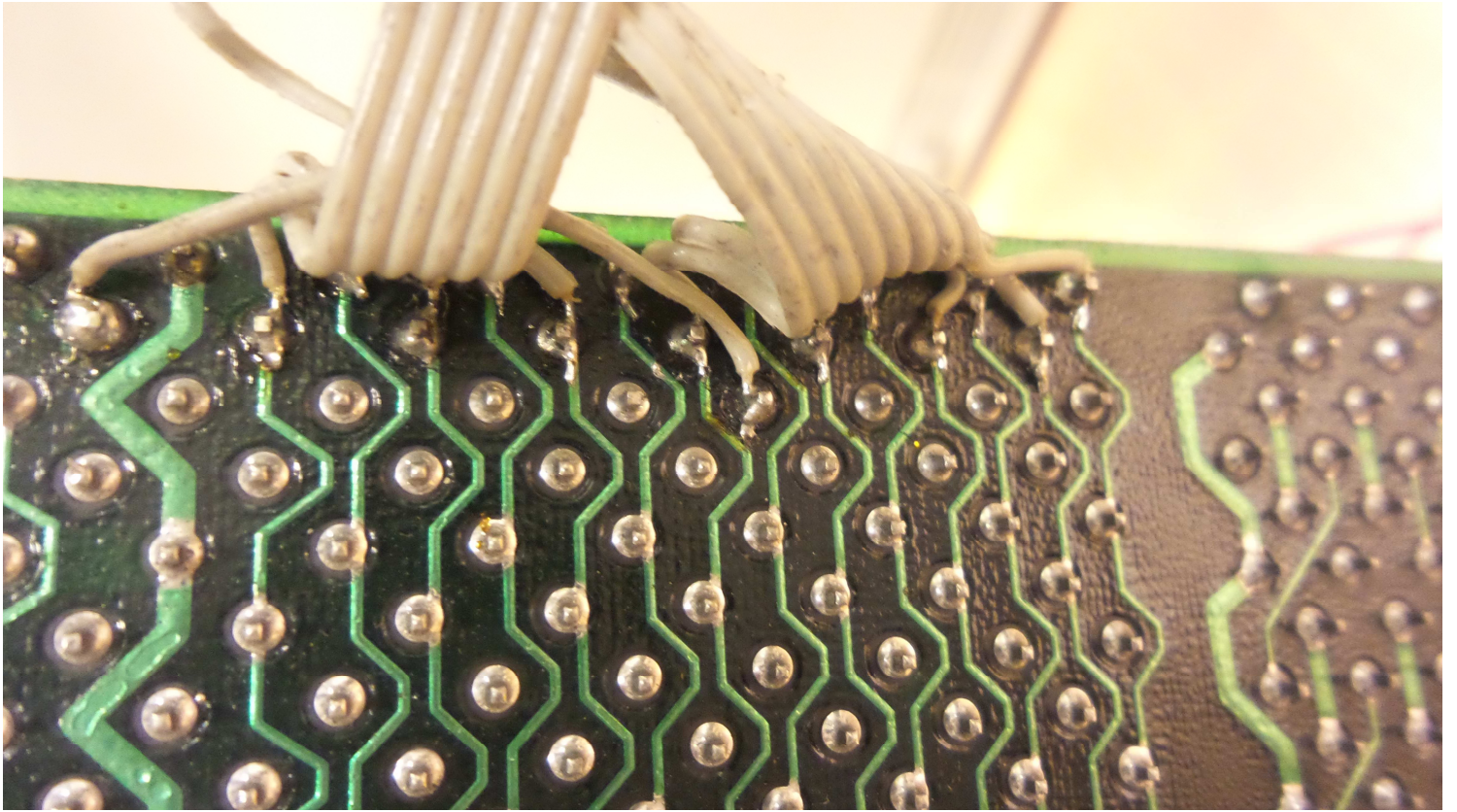


Figure 33: Qbus Backplane connections