

AccessionIndex: TCD-SCSS-T.20140904.004

Accession Date: 4-Sep-2014

Accession By: Dr.Brian Coghlan

Object name: High-resolution Photoplotter Controller

Vintage: c.1981

Synopsis: Controller for 48-inch x 48-inch photoplotter with 0.0001-inch resolution.

Description:

This is an intelligent controller for a 48-inch x 48-inch photoplotter with 0.0001-inch resolution, built into a VME chassis, designed and built by Dr.Brian Coghlan of the Dept.Computer Science for plotting PCB and integrated circuit layouts. It includes a microcomputer board and a plotter I/O board.

The plotter itself is no longer in existence. It was a rubylith VLSI mask cutting table originally used by Philips, Eindhoven, that had been acquired by Prof.Maurice Whelan of the TCD Dept.Microelectronics, who had previously worked for Philips Research Labs in Eindhoven. Prof.Whelan then gave it to Dr.Brian Coghlan for this project, who retrofitted it with torque motors and two 48-inch Moire-fringe linear transducers with 0.0001-inch resolution. The photoplotting was performed by a gated LED light source.

The microcomputer board was one of the boards employed to teach the 2BA4 Microcoprocessor Design course run by the TCD Dept.Computer Science, where the undergraduate students designed the wiring, wire-wrapped the circuit, then wrote a software monitor in assembly language. It is MC6809-based, with an 8-bit EPROM, 2 x 8-bit HM6116 static RAMs, 2 x R6551 serial interfaces, an R6522 parallel interface, and a simple 8-bit multi-master bus interface with an Intel i8218 bus arbiter.

A multi-master bus backplane was designed for this project.

The plotter I/O board connects into the multi-master bus, using Toko 3701 and 3702 digital 2-axis digital servo controllers, various AD524 instrumentation amplifiers, 2 x Signetics DAC1200 digital-to-analog converters and 2 x SGS L292 torque motor drivers to form two-axis high-resolution servo loops. Timing is provided by an Am9513 timer/counter.

This was an interesting behemoth but was quickly made redundant by the emergence of commercial photoplotters.

Accession Index	Object with Identification
TCD-SCSS-T.20140904.004.01	High-resolution Photoplotter Controller Chassis.
TCD-SCSS-T.20140904.004.02	High-resolution Photoplotter Controller Microcomputer board.
TCD-SCSS-T.20140904.004.03	High-resolution Photoplotter Controller Plotter I/O board.
TCD-SCSS-T.20140904.004.04	High-resolution Photoplotter Controller Backplane. (plus 2 x unpopulated spare backplane PCBs)
TCD-SCSS-T.20140904.004.05	High-resolution Photoplotter Controller PSU.



Figure 1: High-resolution Photoplotter Controller three-quarter view

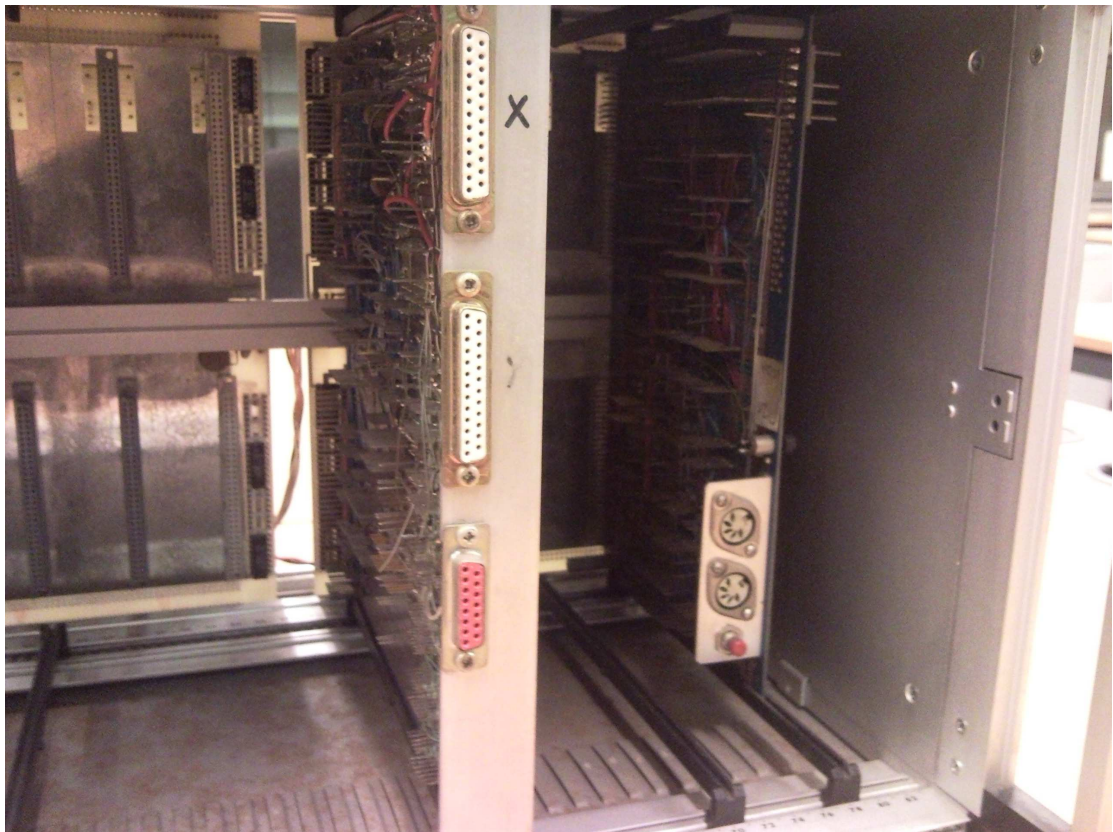


Figure 2: High-resolution Photoplotter Controller front view with the plotter I/O board at left and the microcomputer board at right

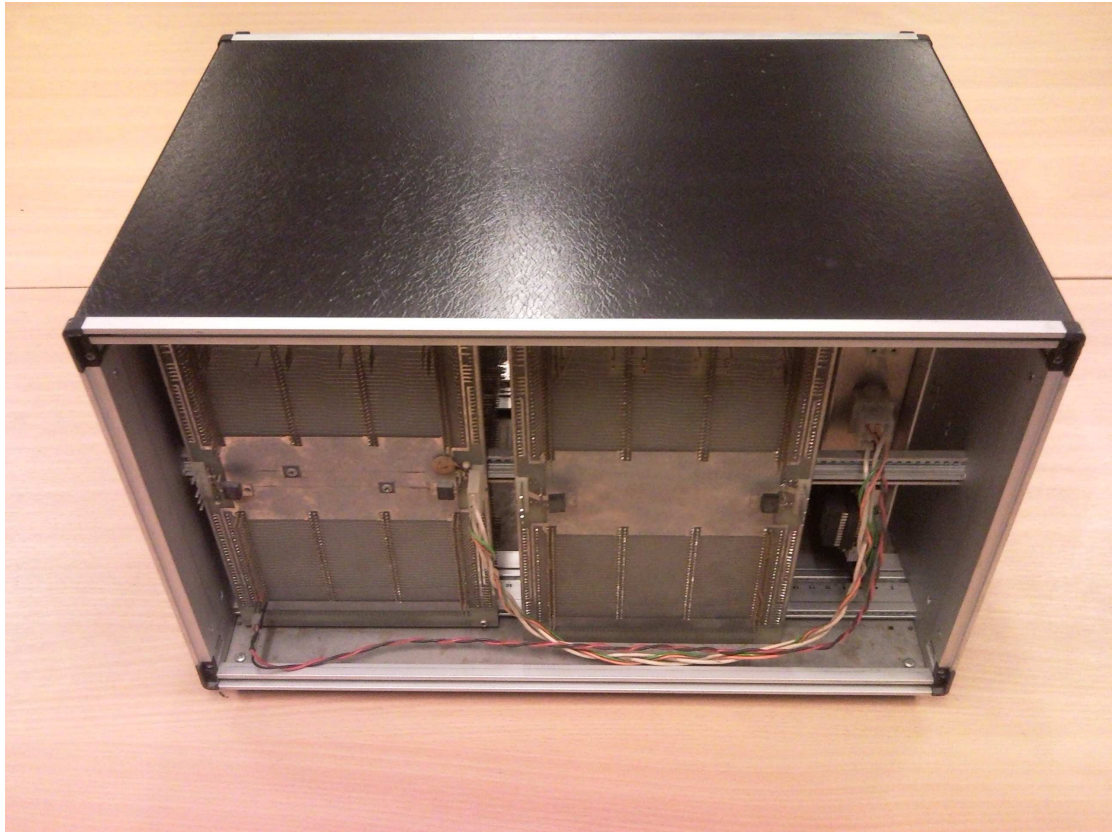


Figure 3: High-resolution Photoplotter Controller rear view showing the multi-master bus backplane

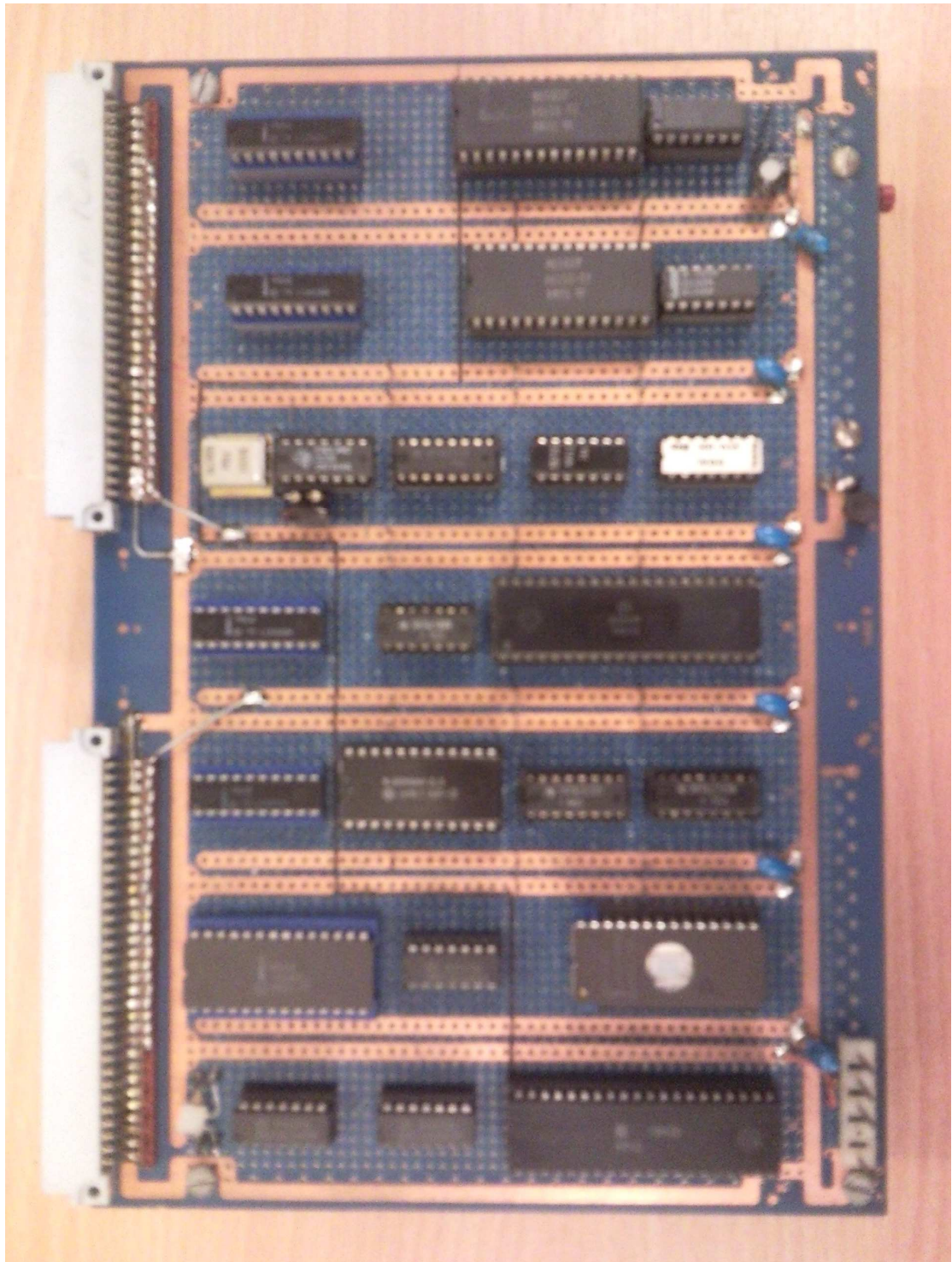


Figure 4: High-resolution Photoplotter Controller microcomputer board top view

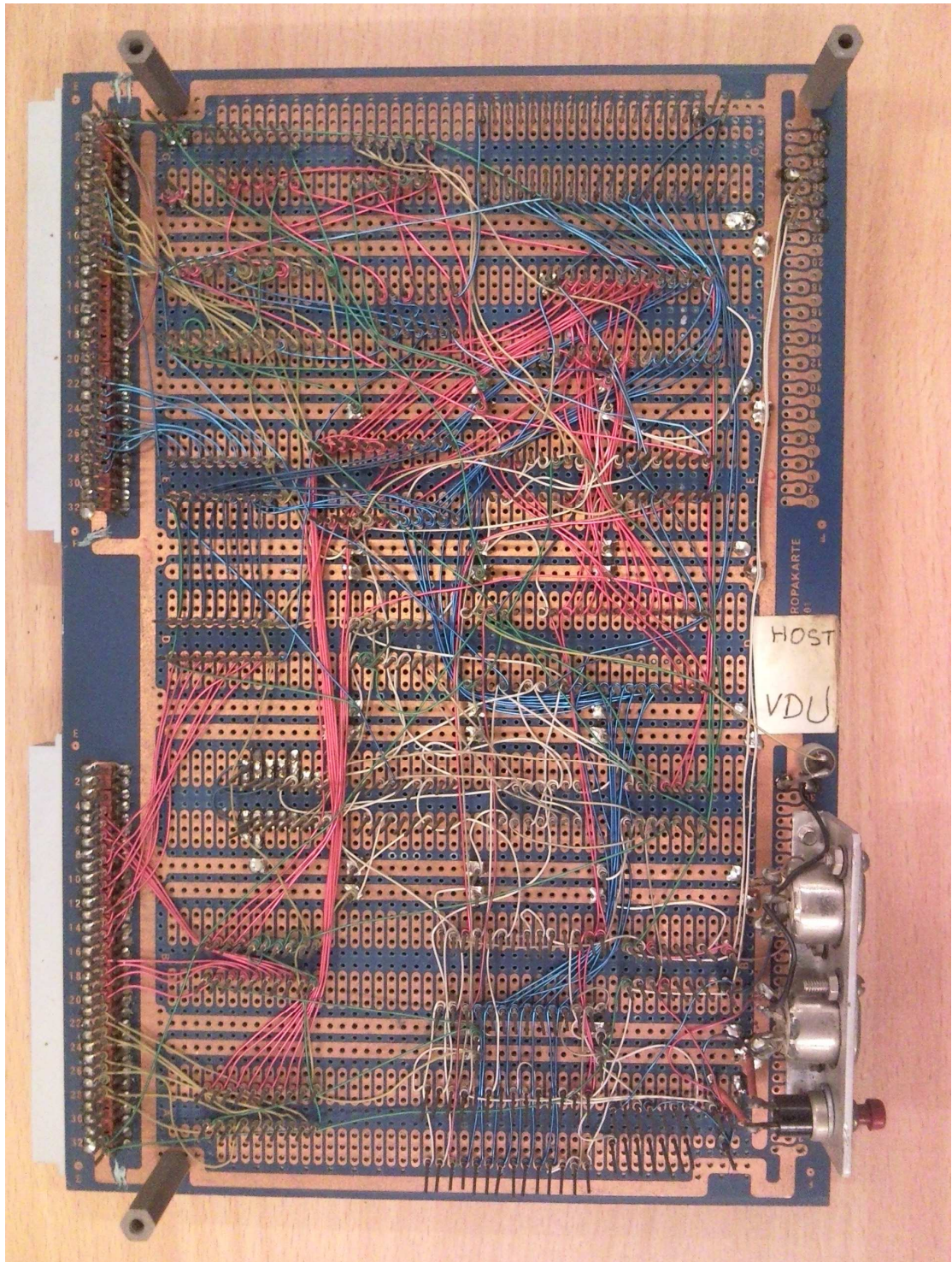
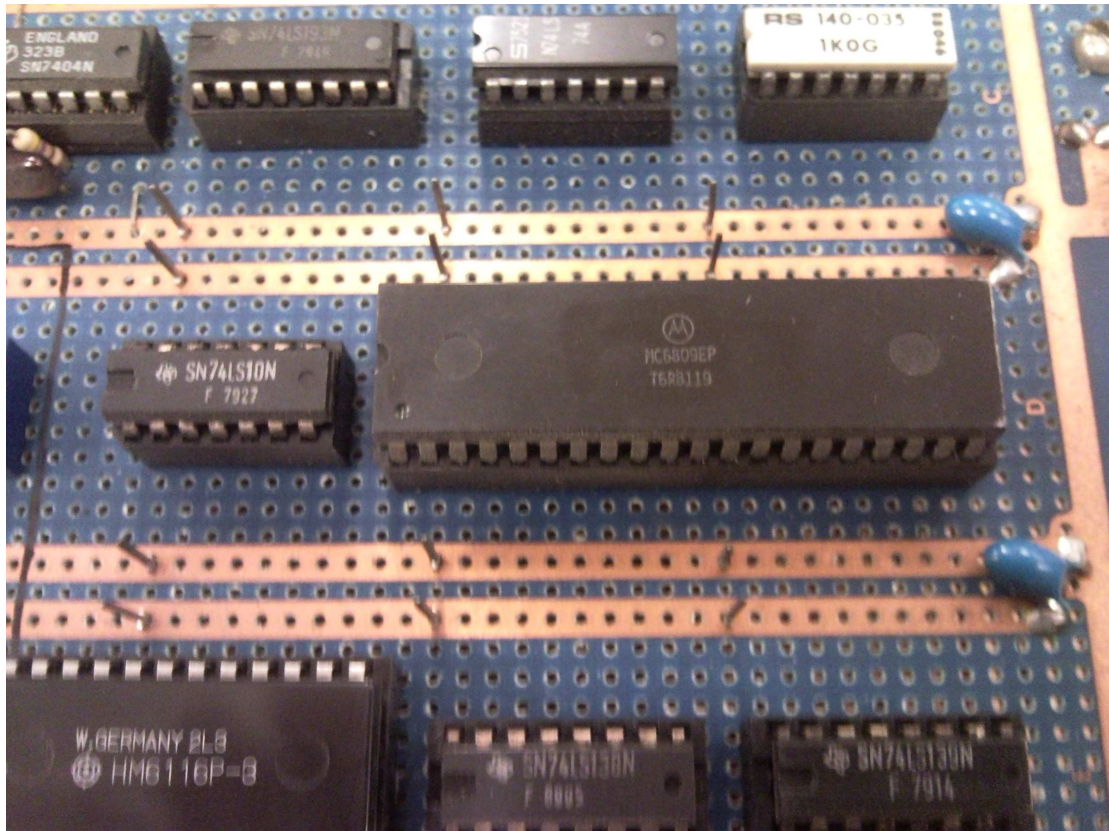
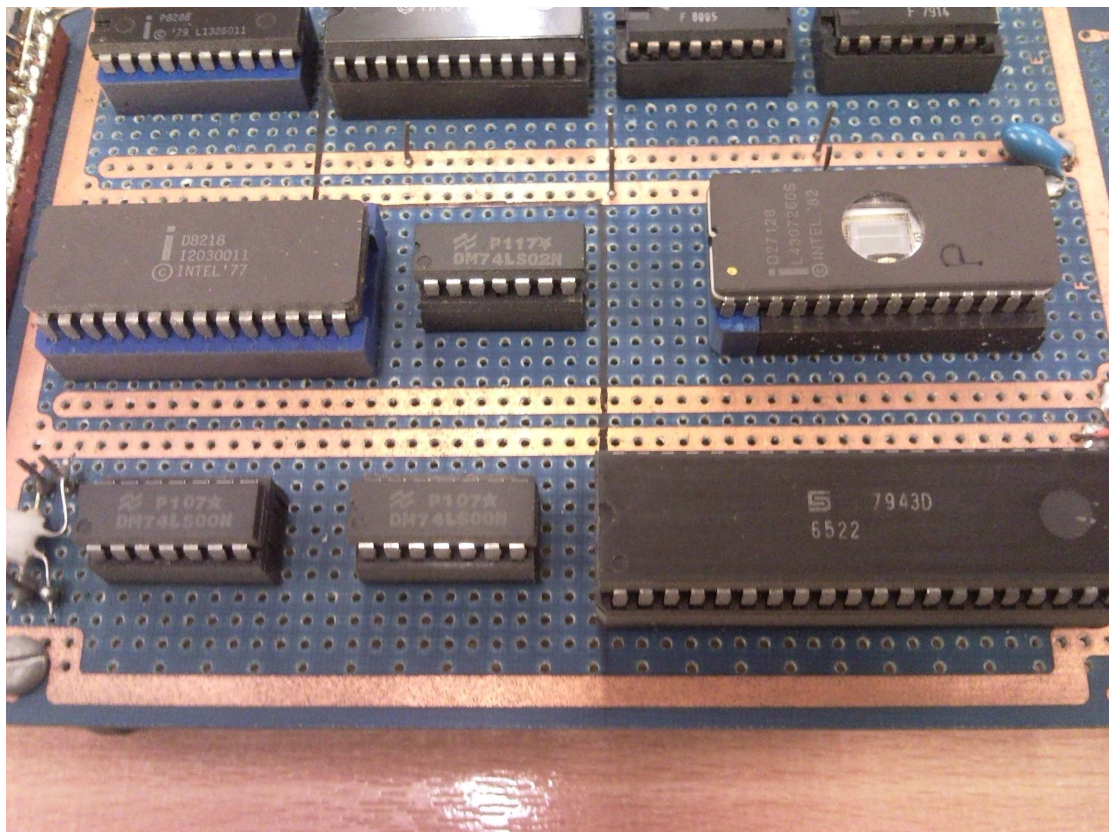


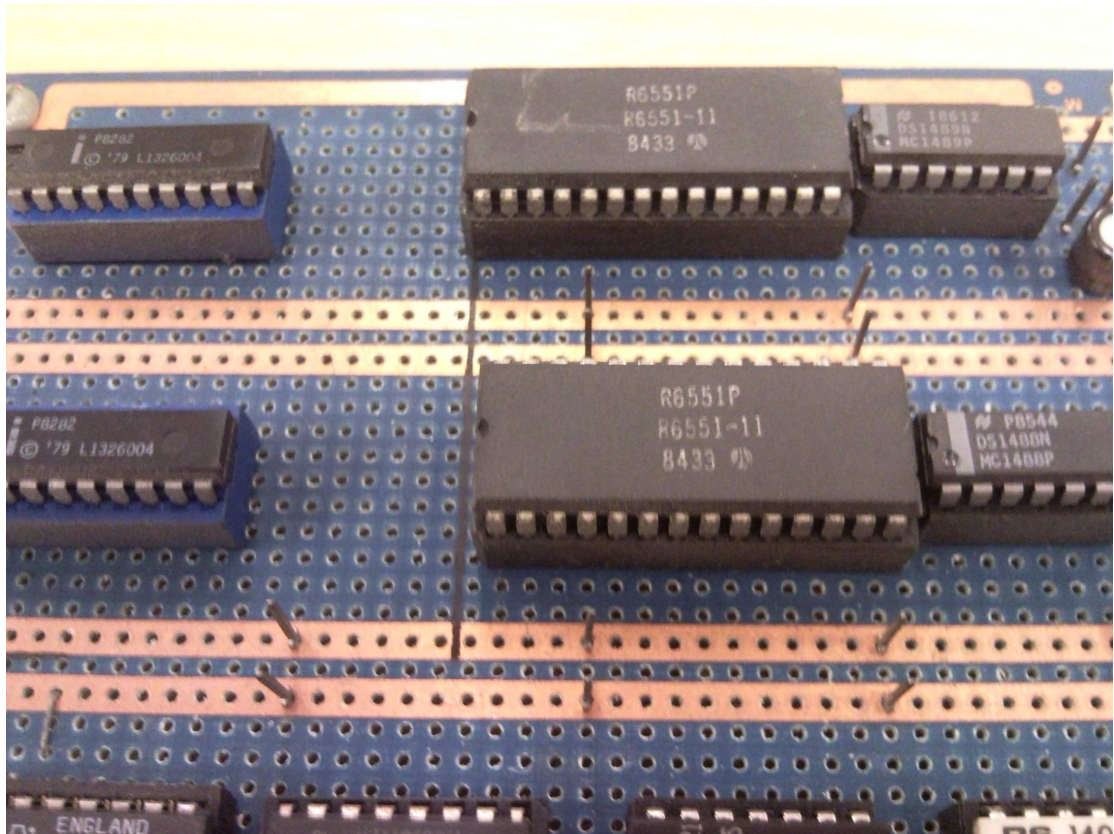
Figure 5: High-resolution Photoplotter Controller microcomputer board bottom view



*Figure 6: High-resolution Photoplotter Controller microcomputer board
MC6809 microprocessor*



*Figure 7: High-resolution Photoplotter Controller microcomputer board
R6522 parallel interface and Intel i8218 bus arbiter*



*Figure 8: High-resolution Photoplotter Controller microcomputer board
2 x R6551 serial interfaces*

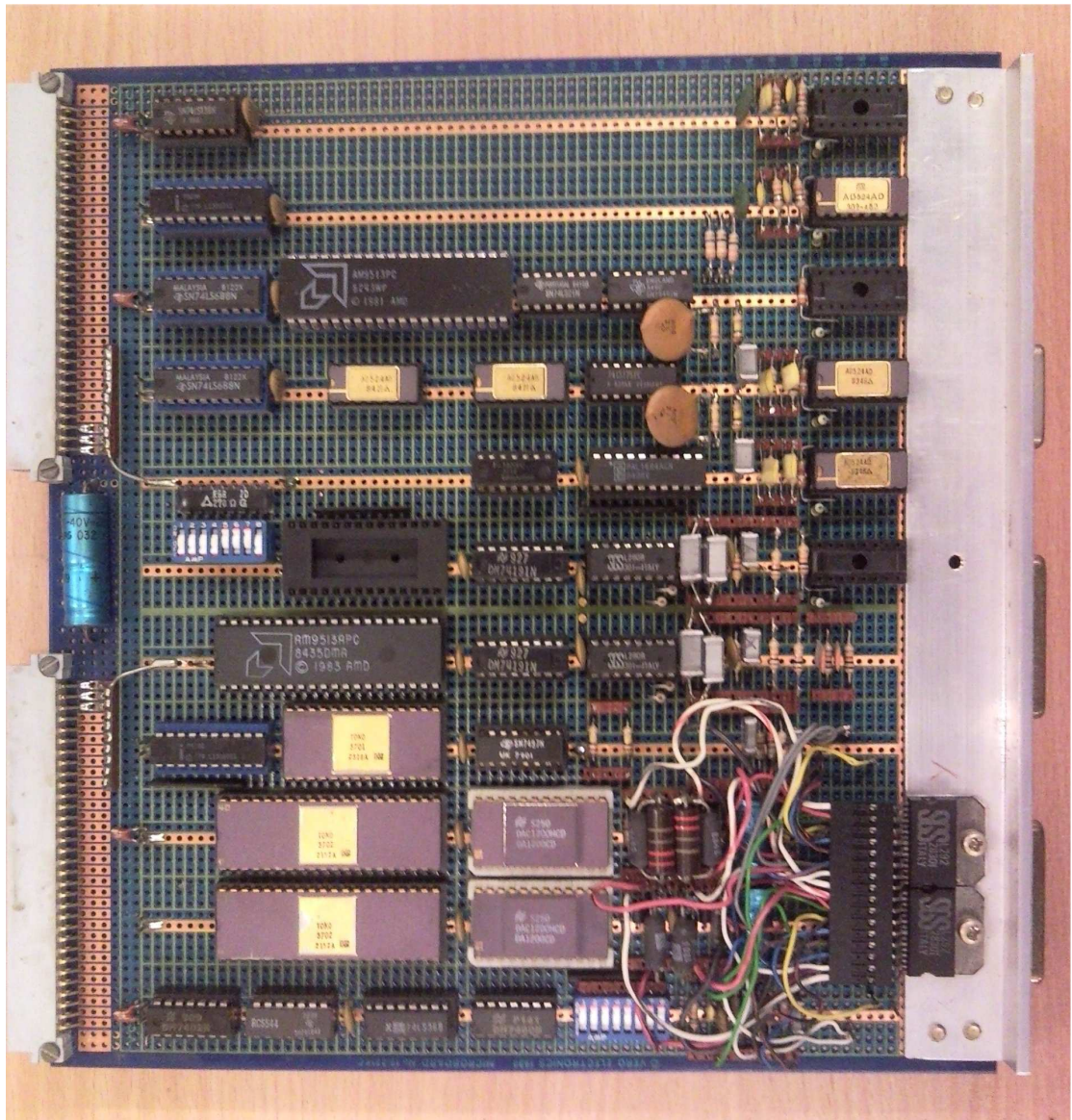


Figure 9: High-resolution Photoplotter Controller plotter I/O board top view

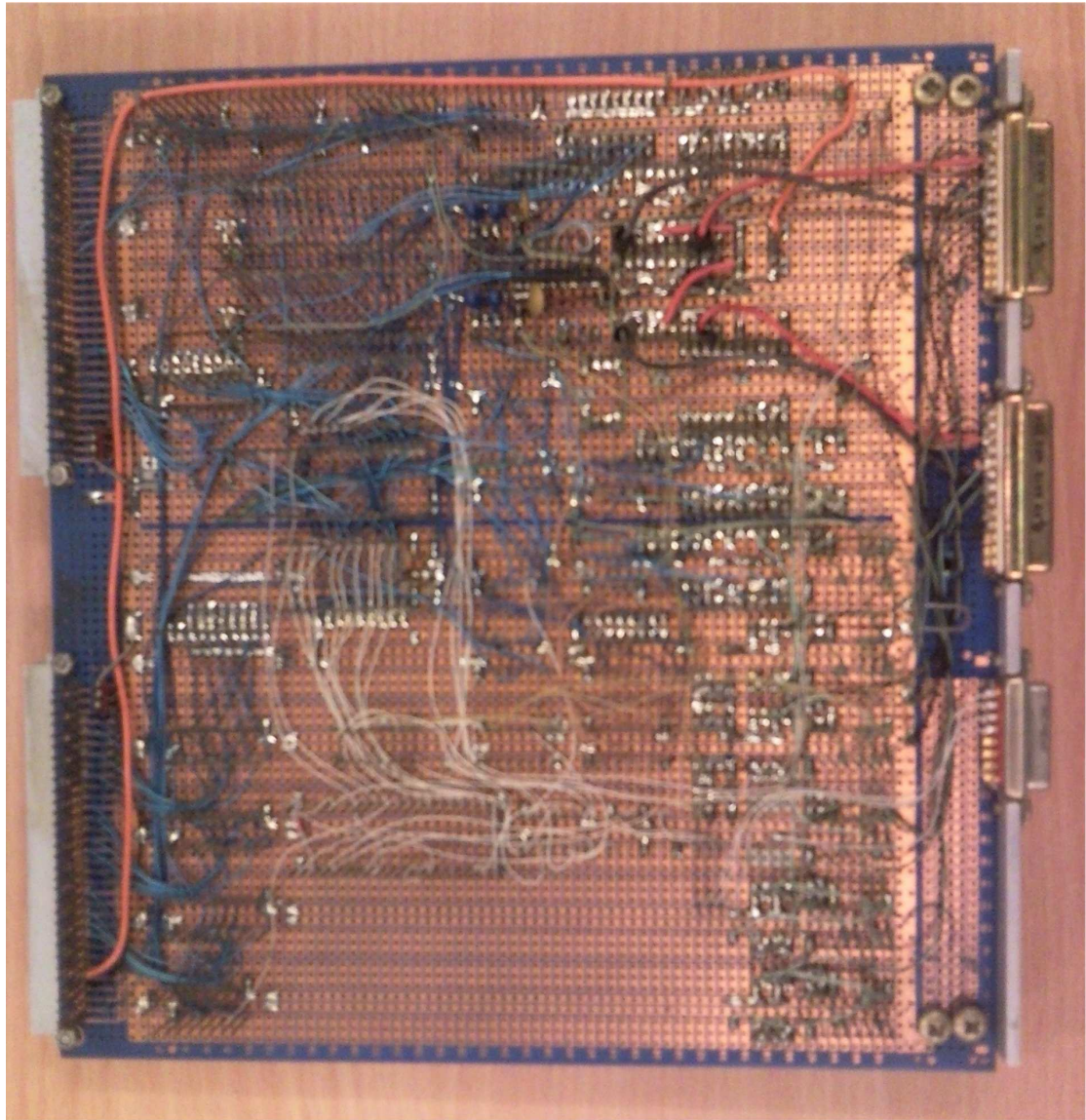


Figure 10: High-resolution Photoplotter Controller plotter I/O board bottom view

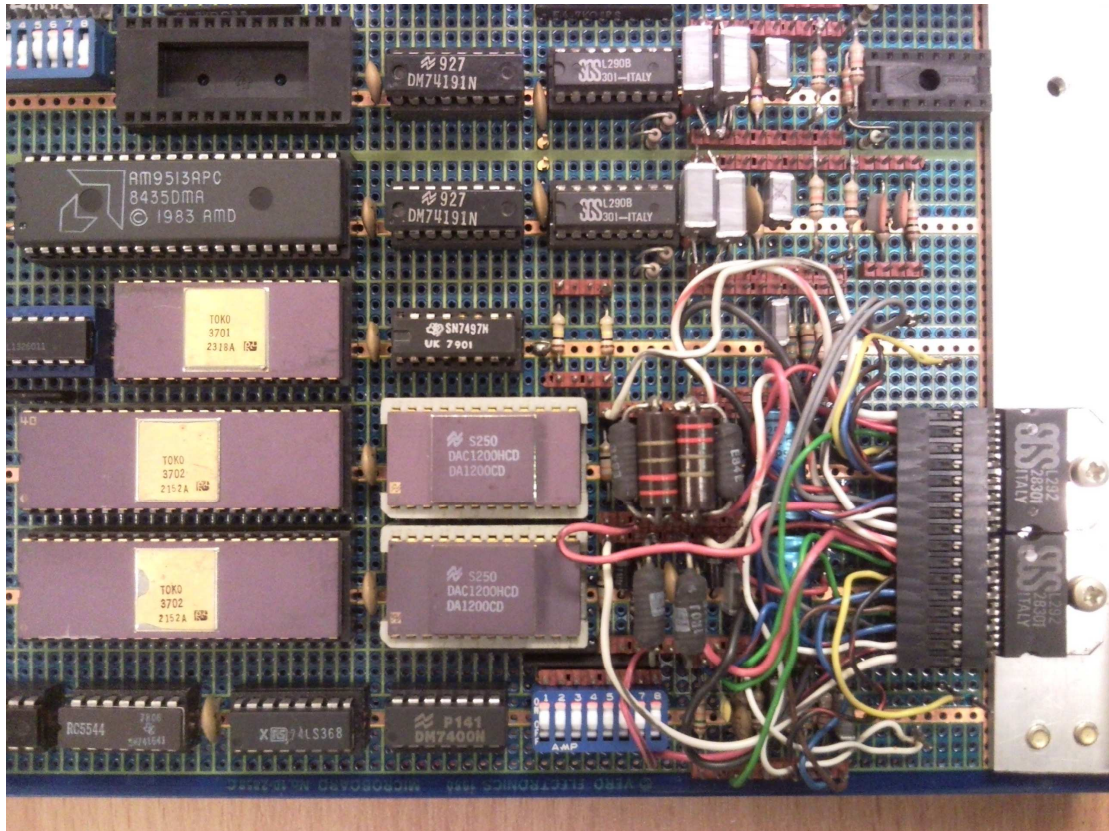


Figure 11: High-resolution Photoplotter Controller plotter I/O board digital servo controllers, DAC1200 D/A converters and SGS L292 drivers

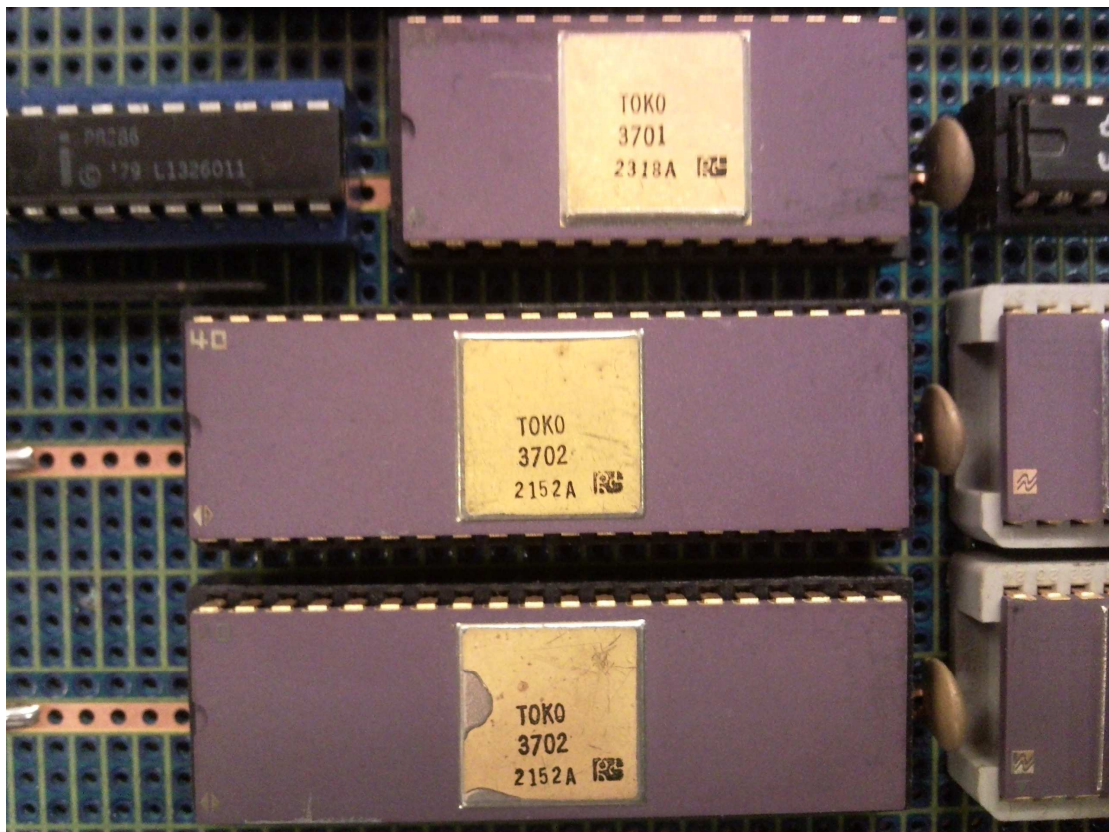
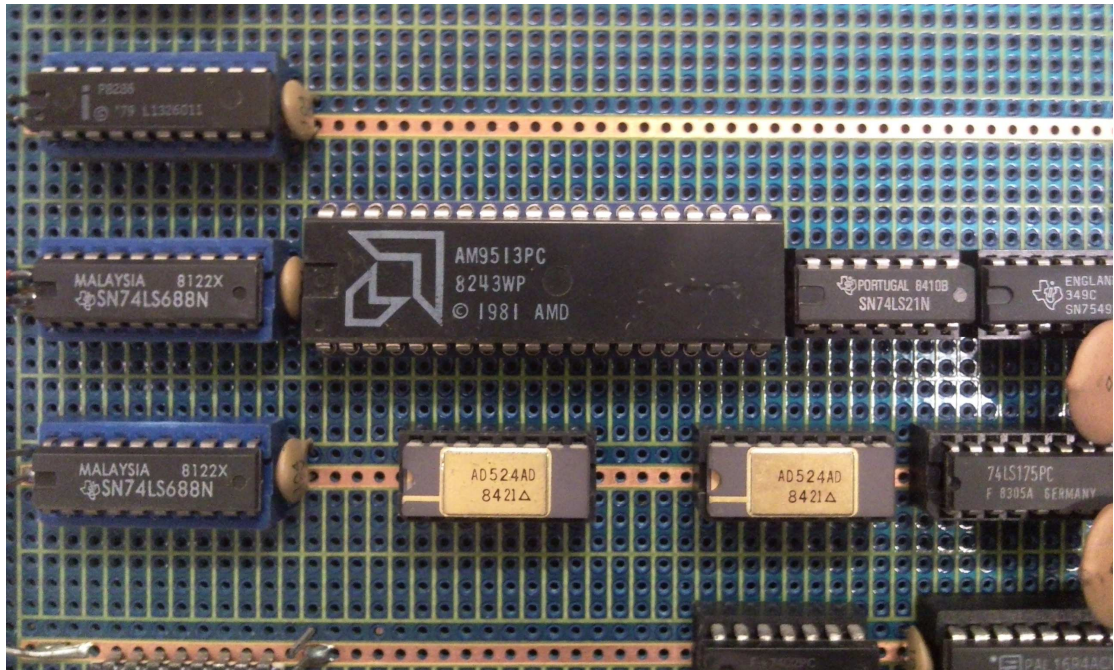
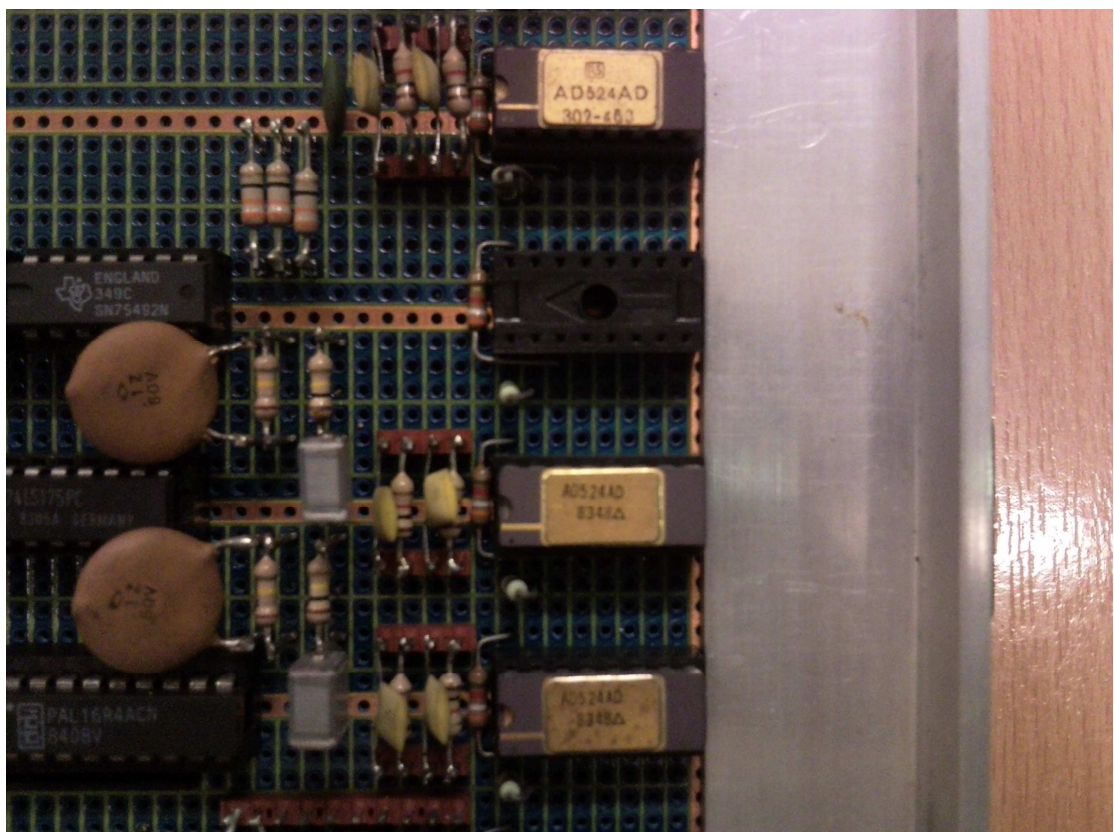


Figure 12: High-resolution Photoplotter Controller plotter I/O board Toko 3701 and 2 x 3702 digital 2-axis digital servo controllers



*Figure 13: High-resolution Photoplotter Controller plotter I/O board
Am9513 timer/counter and 2 x AD524 instrumentation amplifiers*



*Figure 14: High-resolution Photoplotter Controller plotter I/O board
3 x AD524 instrumentation amplifiers*