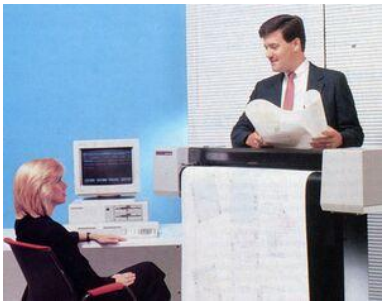
Plotters at XPUB



HP DraftPro DXL, promotion photo (1988), found in the HP Museum: http://www.hpmuseum.net/display_item.php?hw=393

HP DraftPro DXL/EXL user manual (10.4MB PDF)

HP DraftPro EXL

A0+ pen plotter.

Currently borrowed from Varia. It was a gift from Gijs (OSP).

`http://hpmuseum.net/display_item.php?hw=393`

- **state**: works
- **attitude**: this plotter needs to have paper loaded before you start chiplotle; the center point lies at the right bottom of the paper, it works with negative numbers;
- **demo plot**: press `P1 + P2` simultaneously (the buttons with a small 1 and 2)
- **user manual**: `http://www.hpmuseum.net/document.php?hwfile=3232` + `http://www.hpmuseum.net/collection_document.php` (list of HP museum user manuals, in case the download link above does not work)
- **language**: HPGL (HP graphics language)

HP 7475A

A4/A3 plotter

`https://www.hpmuseum.net/display_item.php?hw=74`

- **demo plot**: hold down the `P1 + P2` keys and turn on the power
- **user manual**: `https://archive.org/details/HP7475AInterfacingandProgrammingManual`

There are two of these at XPUB:

`xml-plotter-1`

- **state**: works
- **repair log**: `Printing/xml-plotter-1`

`xml-plotter-5`

- **state**: carousel driver needs to be replaced
- **repair log**: `Printing/xml-plotter-5`

HP ColorPro

A4 plotter

`http://hpmuseum.net/display_item.php?hw=80`

- **state**: unknown

HP 7440A

A4 plotter

This plotter works with 230v, but it needs a special power supply (0v - 10v - 20v) - `info in the hp museum`

- **user manual**: `https://userequip.com/files/specs/1504/HP%207440A%20Operating.pdf`
- **in the HP museum**: `http://hpmuseum.net/display_item.php?hw=80`
- **status**: works with a parallel port, and is currently connected with an adapter to a serial port, connected to another adapter to USB

Hp 7440A advertisement image

TAXAN X-Y KPL710

A3 plotter

The plotter was given to Joak by Thomas Walskaar, we're not sure who gave it to him.

- **state**: works
- **user guide**: File:Taxan kpl710 x-y plotter.pdf
- **repair log**: Printing/xml-plotter-3

Dip switch settings:

```
1   2   3   4  5   6  7  8
OFF OFF OFF ON OFF ON ON ON
```

User guide for the TAXAN X-Y KPL710 plotter, (PDF)

BBC Metrawatt SE-283

- **repair log**: Printing/xml-plotter-2

HP 7550A

A4/A3/A2 plotter, with a paper feeder!

- **state**: Currently not working, the carousel is missing

HPGL

Hewlett-Packard Graphics Language (HPGL) is a common plotter language that most plotters speak.

- There is a HPGL book in the studio/library!
- HP-GL Reference Guide
- http://paulbourke.net/dataformats/hpgl/
- https://www.isoplotec.co.jp/HPGL/eHPGL.htm

```
IN;IP0,0,4000,4000;SC0,100,0,100;
SP1;
PA0,0;
PD;
PA100,0;
PA100,100;
PA0,100;
PA0,0;
PU;
```

CLI

Most plotters connect to this socket on a Linux machine:

```
/dev/ttyUSB0
```

Add your user to the dialout group first:

```
$ useradd USERNAME dialout
```

Then configure how your computer and the plotter communicate, these settings should work with most plotters:

```
$ stty 9600 parodd parenb ixon ixoff -F /dev/ttyUSB0
```

Then send a file with cat:

```
$ cat myfile.hpgl > /dev/ttyUSB0
```

Chiplotle

Chiplotle is an HPGL plotter driver that implements and extends the HPGL (Hewlett-Packard Graphics Language) plotter control language. It provides direct control of your HPGL-aware hardware via a standard usb<->serial port interface. Chiplotle is also a general purpose vector drawing library with functions for creating and transforming shapes, which can then be sent directly to your HPGL plotter for printing.

Chiplotle is written and maintained by Víctor Adán and Douglas Repetto.

- Main web page: http://sites.music.columbia.edu/cmc/chiplotle/
- Documentation: https://chiplotle.readthedocs.io/en/latest/index.html
- More documentation: http://sites.music.columbia.edu/cmc/chiplotle/manual/chapters/tutorial/intro.html

Use

Connect to plotter to computer with usb.

Start the plotter.

Wait! until the plotter is fully running.

Activate the venv you made.

In **Linux**:

```
$ source FOLDERNAME/bin/activate
```

In **Windows** (using Powershell):

```
$ FOLDERNAME\Scripts\Activate.ps1
```

Now you can start chiplotle:

```
$ chiplotle3
```

It should automatically detect the plotter...

If it doesn't, you can try to turn the plotter on and off, or load paper.

Once the plotter is detected, you can send a HPGL file to plotter:

```
plotter.write_file('FILENAME.hpgl')
```

When you're done, close chiplotle with:

```
exit()
```

Install

Install pip, venv

First install pip and the virtual environment python module, if you don't have them yet.

On **Linux**:

```
$ sudo apt install python3-pip
$ sudo apt install python3-venv
```

On **Mac** and **Windows**:

follow the instructions at `https://www.python.org/`.

Make a virtual environment

On **Linux** and **Mac**:

```
$ python3 -m venv FOLDERNAME
```

For example:

```
$ python3 -m venv plotter-venv
```

On **Windows**:

```
py -m venv FOLDERNAME
```

For example:

```
$ py -m venv plotter-venv
```

Activate the virtual environment

On **Linux** and **Mac**:

```
$ source FOLDERNAME/bin/activate
```

On **Windows** (using Powershell):

```
FOLDERNAME\Scripts\Activate.ps1
```

You can exit again by writing `deactivate`.

Install Chiplotle

Install Chiplotle inside this virtual environment (the Python library to speak HPGL to the plotter):

```
$ pip install Chiplotle3
```

Run Chiplotle

See `#Use`.

Errors

Windows: Script Execution Policy

See: https://www.makeuseof.com/enable-script-execution-policy-windows-powershell/

Mac: ImportError: module not found "imp"

?

Windows: "port" not found (?)

```
File "C:\Users\aless\OneDrive\Desktop\PENPLOTTER_venv\lib\site-
packages\serial\serialutil.py", line 268, in port
   raise ValueError('"port" must be None or a string, not {}'.format(type(port)))
ValueError: "port" must be None or a string, not <class 'int'>
```

Alessia and Manetta spend an hour on this error on Nov 13th 2023, but did not figure it out. There is little documentation on using Chiplotle on Windows unfortunately. A next step could be do open `serialutil.py` to see if the error can be resolved directly there.

It's the next day now, we looked into this again and solved it!

First, edit your Chiplotle config file, which is stored in your home folder, which you can edit on Linux/Mac with:

```
$ nano ~/.chiplotle/config.py
```

or on Windows:

```
> notepad C:\Users\USERNAME\.chiplotle\config.py
```

Change this line:

```
serial_port_to_plotter_map = None
```

into:

```
serial_port_to_plotter_map = {'COM4' : 'HP7475A'}
```

or use another plotter model number.

Secondly, you need to also edit a Python script within the Chiplotle library, which you can open on Linux/Mac with:

```
$ nano PATH-TO-YOUR-VENV/chiplotle3/src/chiplotle3/plotters/baseplotter.py
```

or on Windows:

```
> notepad PATH-TO-YOUR-VENV\chiplotle3\src\chiplotle3\plotters\baseplotter.py
```

Then edit the following on line 196:

```
@property
def _buffer_space(self):
    self._serial_port.flushInput()
    self._serial_port.write(self._hpgl.B().format.encode())
    bs = self._read_port()
    return int(bs)
```

and just change the last line:

```
@property
def _buffer_space(self):
    self._serial_port.flushInput()
    self._serial_port.write(self._hpgl.B().format.encode())
    bs = self._read_port()
    return int(128)
```

Now Chiplotle should work.

Raspberry Pi

Numpy error:

```
libopenblas.so.0: cannot open shared object file: No such file or directory
```

Install the missing library:

```
$ sudo apt install libopenblas-dev
```

Inkscape

The plot function is under: `export > plot`

Error: pySerial is not installed.

Please follow these steps:

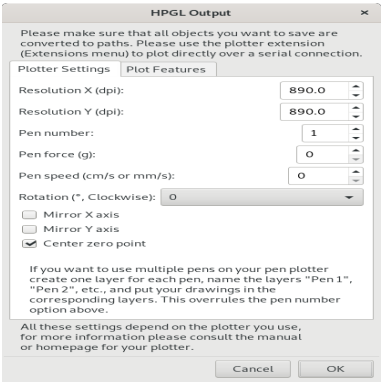
1. Download and extract (unzip) this file to your local harddisk: `https://pypi.python.org/packages/source/p/pyserial/pyserial-2.7.tar.gz`
2. Copy the "serial" folder (Can be found inside the just extracted folder) into the following Inkscape folder: `/usr/????????`
3. Close and restart Inkscape

Make a vector file in Inkscape.

Save it as a `HPGL` file. See the image on the right for the settings.

For example: A3 landscape

Tip (!): landscape file = portrait plot. Make a **landscape** document, it plots in portrait orientation on the plotter (weird, but works)



Example settings of a A3 landscape .hpgl file. However, the resolution is something you need to figure out for each plotter. Also, each plotter places the center point differently, sometimes really in the middle, sometimes at the bottom right corner. So it depends if you should enable this here or not... To be figured out :).

Example settings of a A3 landscape .hpgl file. However, the resolution is something you need to figure out for each plotter. Also, each plotter places the center point differently, sometimes really in the middle, sometimes at the bottom right corner. So it depends if you should enable this here or not... To be figured out :).

Pens

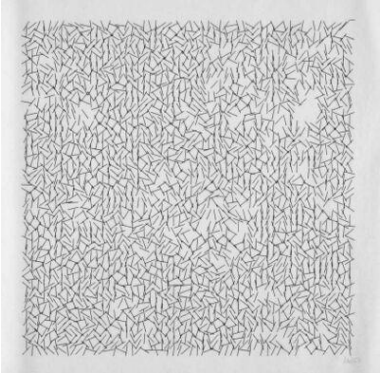
HP Fiber Tip Plotter Pens S Style Pens:

- $ 22 for 5: https://www.draftingsteals.com/catalog-plotters---plotter-supplies-plotter-pens-fiber-tip-plotter-pens.html

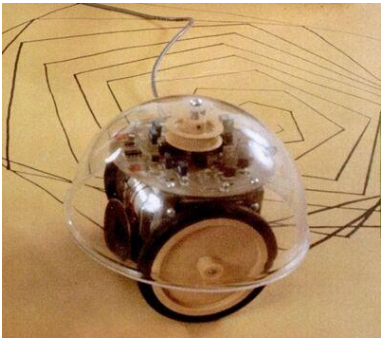
3d printable adapters for pens:

- https://github.com/juliendorra/3D-printable-plotter-adapters-for-pens-and-refills

References

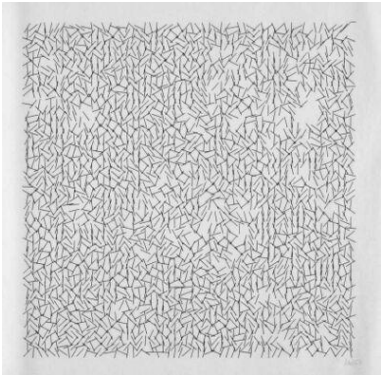


Vera Molnar, *Interruptions* (1968/69), open series, plotter drawing, 28.5 x 28.5 cm, source

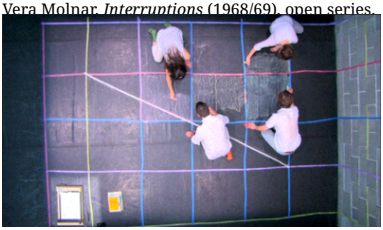


One of the turtles made at MIT in the 1980s, apparently this one is called the *Terrapin Turtle* source

References

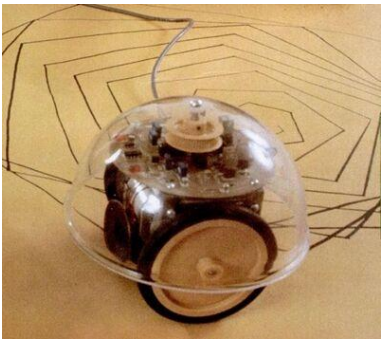


Vera Molnar, *Interruptions* (1968/69), open series.

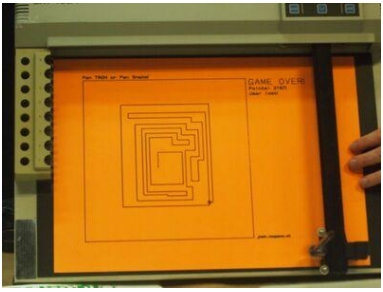


Up pen down, research, fonts and workshops by OSP (since 2012)

Botopera at Constant V, by Gijs de Heij, An Mertens, Anne Laforette, Antonio Roberts, Michael Murtaugh, more documentation (2015)



One of the turtles made at MIT in the 1980s, apparently this one is called the *Terrapin Turtle*

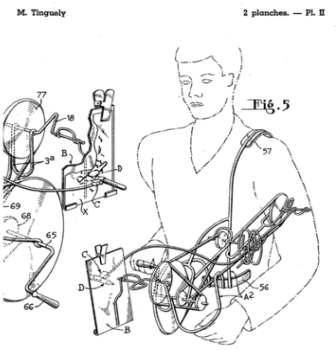


Pensnake in action at Zinecamp 2022

Tim Lewis "Auto-Dali Prosthetic" (2000)

EMSAllure Plotters at XPUB
EMSElfin Plotters at XPUB
EMSFelix Plotters at XPUB
EMSNixish Plotters at XPUB
EMSNixishItalic Plotters at XPUB
EMSOsmotron Plotters at XPUB
EMSReadability Plotters at XPUB
EMSReadabilityItalic Plotters at XPUB
EMSTech Plotters at XPUB
HersheyGothEnglish Plotters at XPUB
HersheySans1 Plotters at XPUB
HersheySansMed Plotters at XPUB
HersheyScript1 Plotters at XPUB
HersheyScriptMed Plotters at XPUB
HersheySerifBold Plotters at XPUB
HersheySerifBoldItalic Plotters at XPUB
HersheySerifMed Plotters at XPUB
HersheySerifMedItalic Plotters at XPUB

Hershey Text stroke font Inkscape extension



Jean Tinguely Patent Appareil à dessiner et à peindre [Device to draw and paint]

- Vera Molnár, women in early computer art (since 1940s) + Monoskop page
- New Tendencies movement, five international exhibitions in Zagreb, Croatia/Yugoslavia (1961-1973)
- Compas 68 (Dutch group around 1968/1969)
- Seymour Papert, Talking Turtle (1983)
- Mindstorms: children, computers, and powerful ideas, by Seymour Papert (1980)
- A Logo Primer, by the LOGO Foundation
- The Concept of a Metafont, by Donald Knuth published in Visible Language (1982)
- Pseudoplotter, an experimental art-zine about free non objective drawing in the spirit of Paul Klee's 'Pedagogical Sketchbook', by Marc van Elburg (2013)
- Drawing Curved, a collection of texts and images concerned with digital curvature, by Pierre Huyghebaert, Colm O'Neill with contributions by Femke Snelting (2018)
- REMAP, a hybrid sonic drawing device and interactive installation, by Signal-to-Noise (2015-2016)
- Up Pen Down research, fonts and workshops series by OSP (Oct 2017) + workshop (Oct 2015) + workshop at the ESAD Valence Grenoble (2012/2013) + publication outcome
- Hersey Text, a stroke font Inkscape extension + link + wiki or see `extensions > text > hershey text`
- Botopera, performance and installation by Gijs de Heij, An Mertens, Anne Laforette, Antonio Roberts, Michael Murtaugh (2015)
- Pensnake, by Joak (2022), pictures from Zinecamp 2022

I asked on the PPP chats if anyone knew any specific contexts/places where pen plotter enthusiasts meet, and the following links were send in return. Also, interestingly enough two people jokingly warned me for a recent attention shift they observed from pen plotting to nfts and AI, placing pen plotting into the field of generative art. – Manetta (talk) 13:20, 21 November 2023 (CET)

- https://bm.raphaelbastide.com/?searchterm=&searchtags=plotter+ (Raphaël Bastide's plotter bookmarks)

- https://ivan-murit.fr/
- https://mastodon.art/@thresfold@genart.social
- https://mastodon.design/@rmfrt
- https://twitter.com/Julien_Espagnon
- https://genart.social/@mwebster
- http://v3ga.art/

Tools/tutorials/techniques

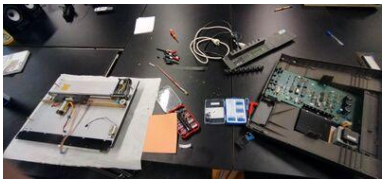
- Upgrade for your DIY plotters: cross hatching
- Cross hatching in Processing
- Color layering with Ghostscript, Gimp & Inkscape

this pen plotter is (not) made to die

Printing repair sessions wiki page, initiated by Joak in 2023

Monday 30 + Tuesday 31 Oct 2023

Joak: On Monday (30/10/2023) and Tuesday (31/10/2023) I will be helping to repair the pen plotters between 5:15pm and 7:30pm. You have probably seen all the different (broken) pen plotters in the XML or Studio, these come from WDKA and other places. Most of them need probably just a small fix, some have a complex problem. These two evenings are just a start. I think by the end of this term 3/4 of the pen plotters should be working again.



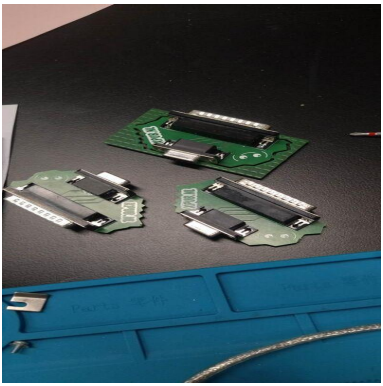
this pen plotter is (not) made to die

If you are interested, just pass by. No previous knowledge of electronics, programming or pen plotters are required. These repair evenings are intended as an introduction to these topics. Everyone is welcome. Modus operandi: You will get an pen plotter on your table and step by step you will repair it over the next weeks or you will even modify it and do some imaginary (but still real) drawing tool/device.

Location: aquarium or studio

The plan is to do in the second trimester the same with (electronic) typewriters and in the third trimester with dot-matrix-printer!

The DB9 to DB25 adapters were soldered. You can get the PCB files here: https://git.xpub.nl/XPUB/adapter



Plotter adapter

Plotters were opened, cleaned and inspected.

A borken part (the so called "Geneva Drive Wheel mechanism") was 3d printed for Printing/xml-plotter-1, a flipping part that let's the pen carousel rotate: https://www.thingiverse.com/thing:4696713 + https://www.youtube.com/watch?v=G5_YltaYZsg

the 3d printer Geneva Drive Wheel mechanism

Monday 13 + Tuesday 14 November

Victor and Joak looked into the alignment issue of HP 7475A, maybe its really a mechanical issue. It was solved?

Alessia, Thijs, Joak and Manetta worked on the TAXAN_X-Y_KPL710, see the repair log here: Printing/xml-plotter-3.

Monday 27 November

Plotter party!!! 🎉

See also

- Xpub-inventory
- Category:Printers
- Category:XML
- Category:Cookbook

This booklet is printed for the *plotter party* at the XPUB studio on Monday 27 November 2023. Printed on default paper from the Canon machines at the PZI/WdKA, compiled with User:Manetta/Booklet.sh using the *Pen plotters* PZI wiki page (https://pzwiki.wdka.nl/mediadesign/Pen_plotters) and Weasyprint. The header font that is used is *Compagnon*, by Juliette Duhé, Léa Pradine, Valentin Papon, Chloé Lozano, Sébastien Riollier. Distributed by velvetyne.fr; and the background image at the cover is made with the *Hershey Text* stroke font Inkscape extension! The other fonts are default browser fonts ;).