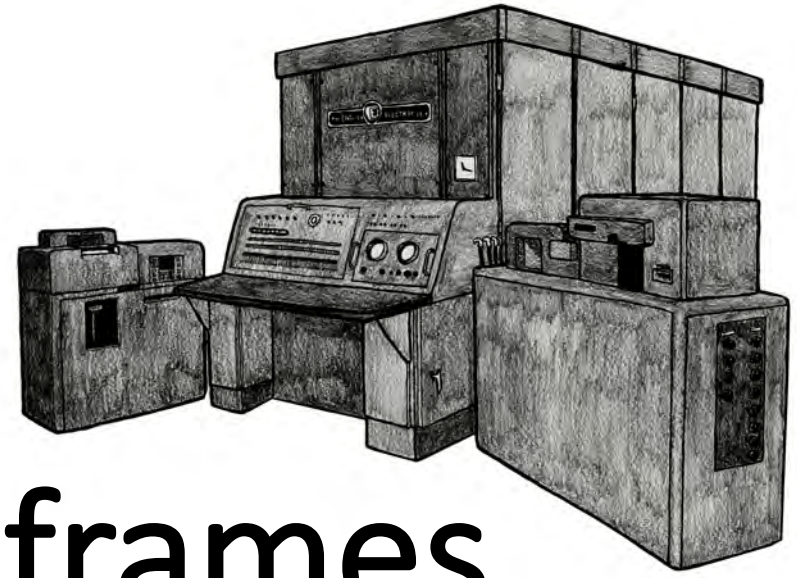
University of Glasgow

School of Computing Science



Resurrecting mainframes

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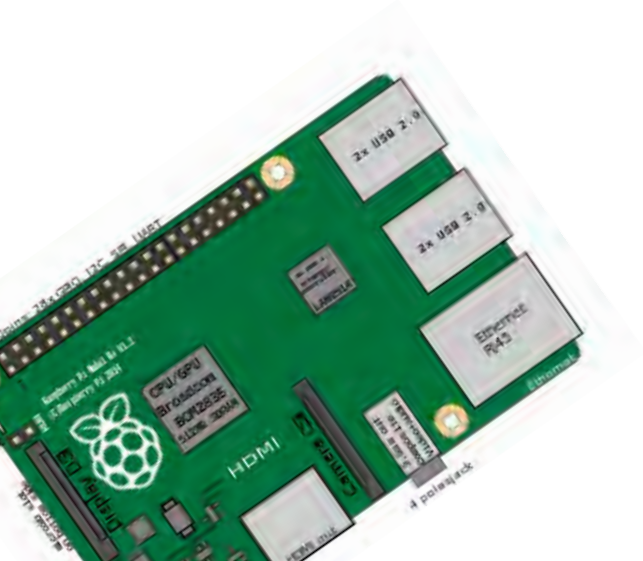
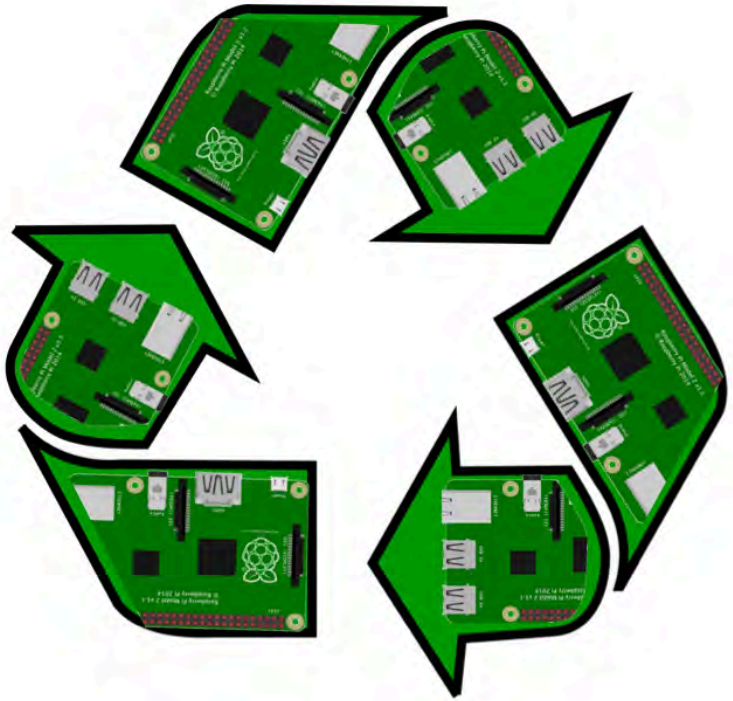


60 YEARS OF COMPUTING AT GLASGOW

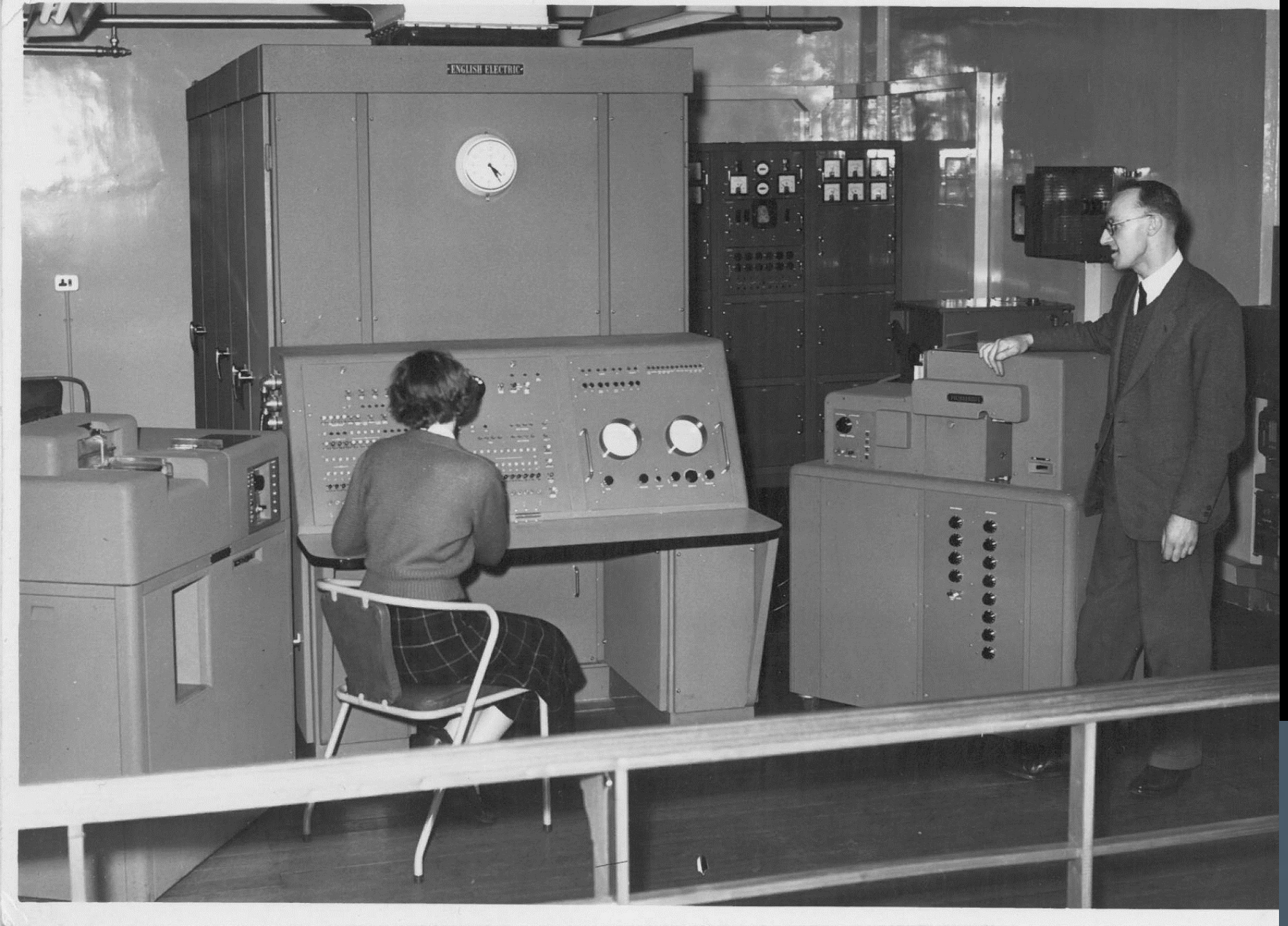


picycle.org

- (1) Put your Raspberry Pi back into its original box.
- (2) Put your packaged Pi into a Jiffy bag.
- (3) Address the parcel **FREEPOST PICYCLE**.
- (PI) Optionally, include a note with:
  - your email address
  - your full name
- (4) Drop your parcel in a Royal Mail post box

EPSRC

Pioneering research and skills



DEUCE installed 1958

60 YEARS OF COMPUTING AT GLASGOW

IDEA – let’s celebrate our first computer

- we  an excuse for a party
- a Scottish computing milestone
- rebuild is a neat practical project
- great exhibit for museums etc

Specs of the DEUCE

English Electric DEUCE	Raspberry Pi 3
1 MHz clock	1.2 GHz clock
1 kB memory, mercury delay lines	1 GB memory, silicon SDRAM
9kW power consumption	1W power consumption
$9m^2$ floor space	$0.005m^2$ area

Instruction Encoding

ARM 32-bit

- `cond | opcode | set_flags | dest | source1 | source2`
- `1110 |  0100  |   0      | 0000 |  0001   | 0002`
- This is ADD from r1, r2 into r0, unconditionally, without setting flags
- `ADD r0 <- r1, r2`

DEUCE

- `next | source | dest | char | wait | timing | go`
- ` 000 | 00001  | 11001|   00 | 00100| 00101  | 1`
- This is ADD from line 1, 8th word, into temporary storage, waiting 9 cycles to execute next instruction

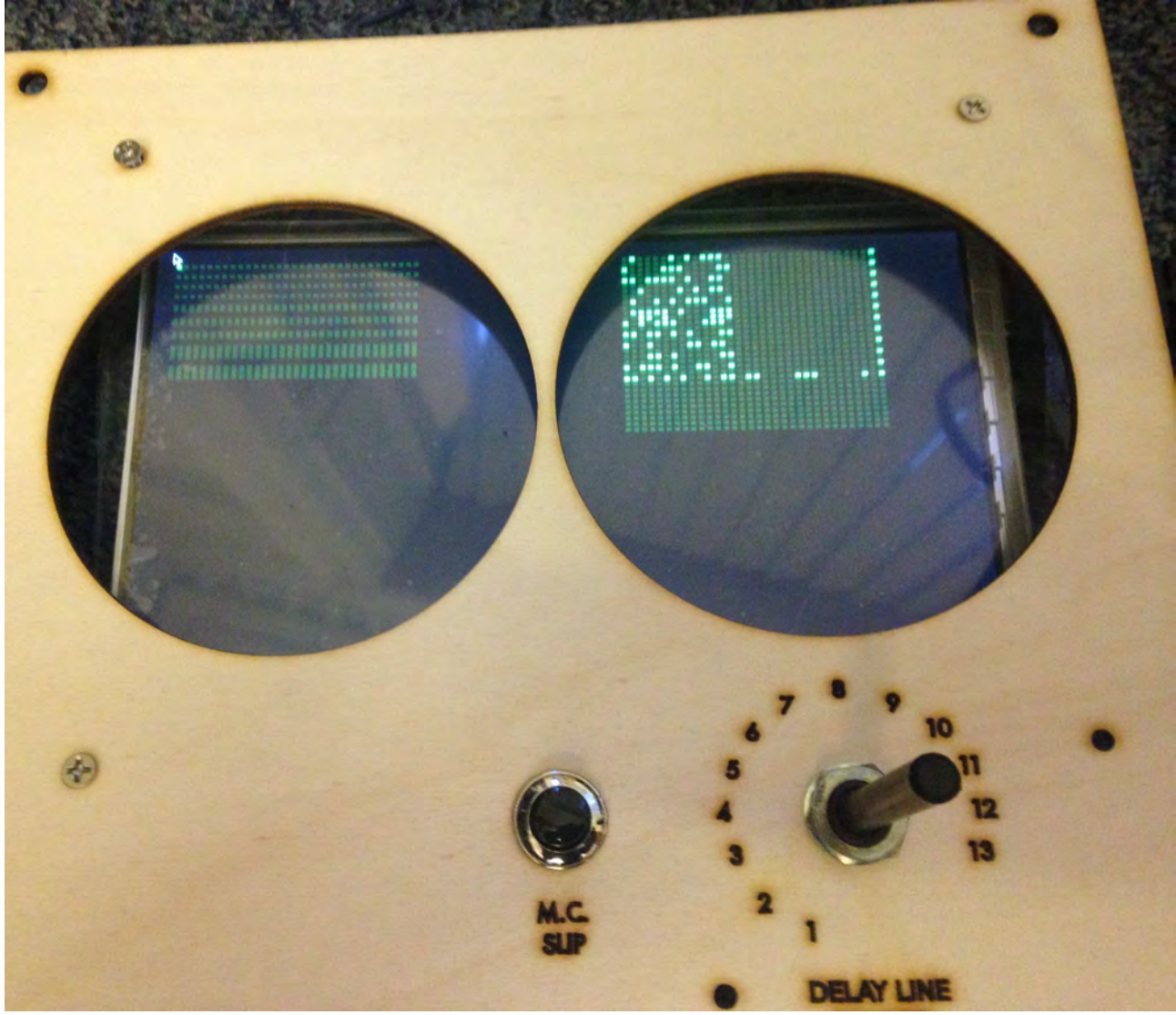
Link to Alan Turing

HOWTO develop an emulator

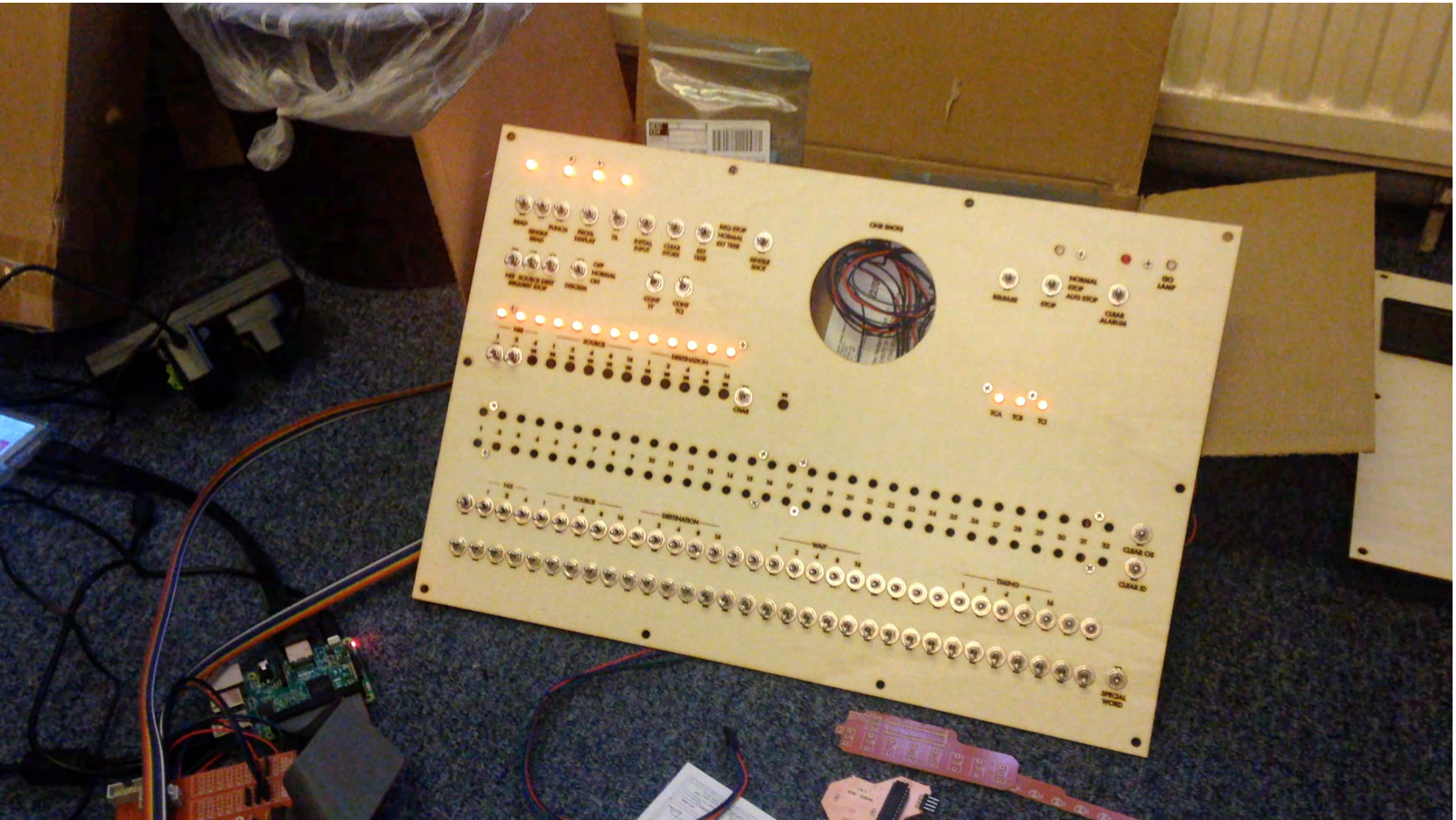
- ***Software*** to replicate original machine components and behaviour
- ***Hardware*** to present an authentic user interface

Shopping list

- one Pi 3
- Mini HDMI screen
- Laser cut front panel
- lots of LEDs and switches
- Custom PCBs
- lots of wires
- soldering



DEUCE blinkenlights



Current Project Status

- Software emulator 80% complete
- Front panels constructed, still need assembling
- Switches and LEDs need soldering in place
- Driver software to interface hardware with emulator not started
- Housing / mounting to be decided

- Due to appear in June at

Questions

- What kind of case/housing should we use for our DEUCE interface?
- How can we make this exhibit fun and interactive?
- Where will we find a telephone dial for the console?
- What’s the best ‘drop-in’ educational computing experience you have ever had?