Lenco Lucille LCD initialisation sequence

v1.3 06 Feb 2021

LCD 10 pin interface : RST, RS, CS, SCL, SDA, GND, VDD, CAP, CAP, VLCD

RST	Reset, hardware reset.
RS	Register select, select data or command register.
CS	Chip select, active low, transitions on the falling edge of SCL. Held low for duration of a byte, or continuously for the duration of a byte sequence.
SCL	Clock, 17uS (21uS between clock pulses), only present during CS period.
SDA	Data, write clocked on rising edge of SCL. Sent most-significant-bit first, 8 bit words, 135uS delay between bytes.
GND	0V
VDD	+3.3V, LCD logic power supply.
CAP, VLCD	LCD power, generated higher supply voltage

From the instruction codes sent, it appears to have a Sitronix ST7032 compatible controller.

LCD initialisation:

```
39 1c 5d 7c 6a 38 0c 06 01 01
40 00 11 0e 0a 0e 11 00 00 48 0e 11 11 11 1f 00 00 50 0e 11 11 11 1f 1f
00 00 58 0e 11 11 1f 1f 1f 00 00 60 0e 11 1f 1f 1f 1f 00 00 68 00 1f 11 11
11 11 1f 00 70 00 1f 1f 1f 1f 1f 1f 00 78 00 04 0e 0e 1f 1f 04 00 80
20 20 20 57 65 6c 63 6f 6d 65 20 74 6f 20 20 20 c0 20 20 20 20 20 52 61 64
69 6f 20 20 20 20 20 20
```

Initial code, each byte written with a single pulse to the CS line, 1.5mS between writes

`39` Function set -
Turn ON extended instruction set,
8 bit,
2 lines,
5x8 font

`1c` Extended instruction - Internal OSC frequency
183Hz frame rate,
1/4 Bias

`5d` Extended instruction - Power/ICON control/Contrast set
ICON display ON,
Booster circuit ON,
Contrast set (high nibble) = 01

`7c` Extended instruction -
Contrast set(low nibble) = C0

`6a` Extended instruction - Follower control
Turn ON internal follower circuit
1.5 follower ratio

(should be 200mS delay for power to stabilise)

38 Function set -
Turn OFF extended instruction set,
8 bit,
2 lines,
5x8 font

0c Display on, cursor off, blink off

06 Entry mode increment, shift

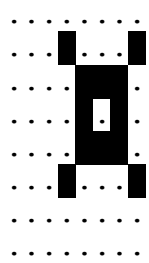
01 Clear display, set cursor address 0

3mS delay then writes a single byte

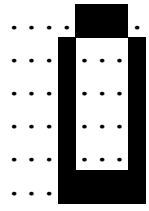
01 Clear display, set cursor address 0

Second initialisation sequence after 3mS, 136uS between bytes
The following bytes are each written during a CS pulse duration
Write to character generator (characters 0, through 7 are written)

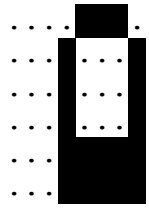
40 CGRAM 0x00



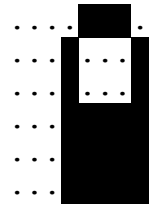
48 CGRAM 0x08



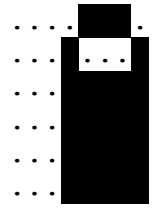
50 CGRAM 0x10



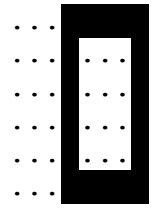
58 CGRAM 0x18



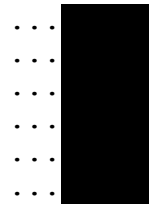
60 CGRAM 0x20



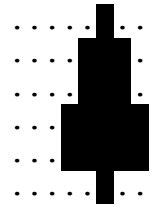
68 CGRAM 0x28



70 CGRAM 0x30



78 CGRAM 0x38



Display startup message

```
80    DRAM 00 - Position cursor line 1, character 1
"    Welcome to    "
20
20
20
57
65
6c
63
6f
6d
65
20
74
6f
20
20
20
```

```
c0    DRAM 40 - Position cursor line 2, character 1
"      Radio        "
20
20
20
20
20
52
61
64
69
6f
20
20
20
20
20
20
20
```