Pac-Man

A hand-held version of the classic video game in the shape of one of the ghosts.

Construction

First fit and solder the resistors (R1 and R2) to the circuit board and trim their legs. Identify the resistors by the coloured stripes on the body.

Next fit the chip socket (IC1) matching the notch in the socket against the notch in the symbol on the board. Care should be taken when soldering this component to avoid solder bridges between the pins. It is not recommended that the chip is soldered directly to the board.

Fit and solder the capacitors, paying attention to the polarity of the electrolytics (C1 and C2) (negative is marked by a stripe on the side of the body). The tantalum capacitor (C3) should be fitted such that the shorter leg is by the minus sign. The ceramic capacitors (C4 and C5) can be fitted either way around.

Bend the legs of the regulator (REG1) at right angles and solder it such that the metal heatsink is flat on the board and the side with the writing is facing upwards.

Solder the piezo (PIEZO) and the pushbuttons (S1 to S4) to the board.

Bend the legs of the chip inwards slightly and fit it in its socket matching the small notch in the chip to the notch in the socket.

Fit the battery box to the back of the board using a couple of sticky pads to hold it in place then solder its two legs to the front of the board. See picture below.

The software includes a power-on self-test. Insert 3 AA cells in the battery box, observing the correct polarity, and the piezo should beep twice after a second or so if the board is functioning correctly. Remove the cells.

Push fit the LCD to the circuit board using the set of holes at the top of the board then test again with the AA cells. If the board is completely working (you will see the *Pac-Man* maze) then the display can be soldered in position or left as a push fit. The remaining sticky pads and nylon bolts/spacers/nuts can be used to secure it in place if desired.

Note the ICSP holes are used in development for re-programming the microcontroller.

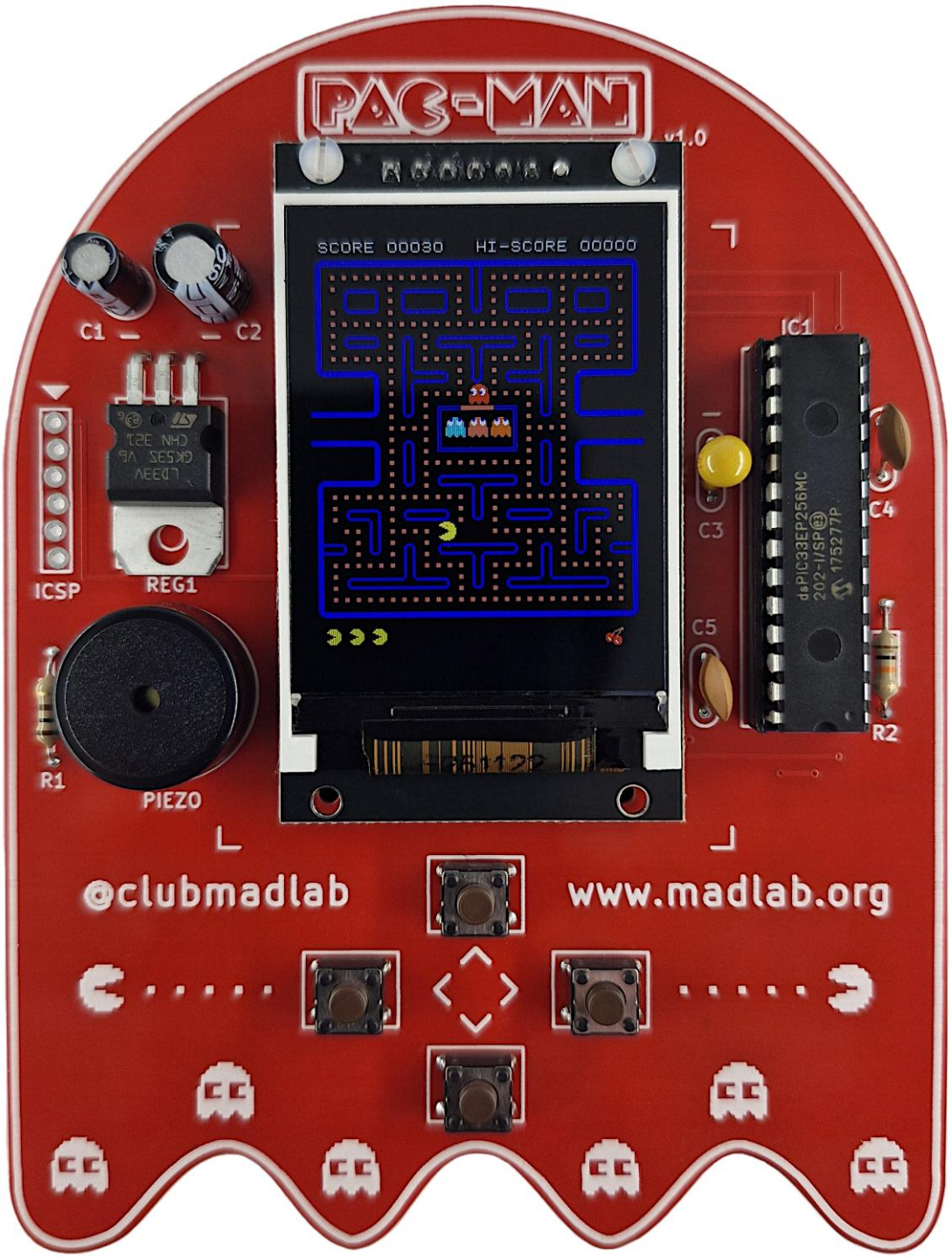
How to play

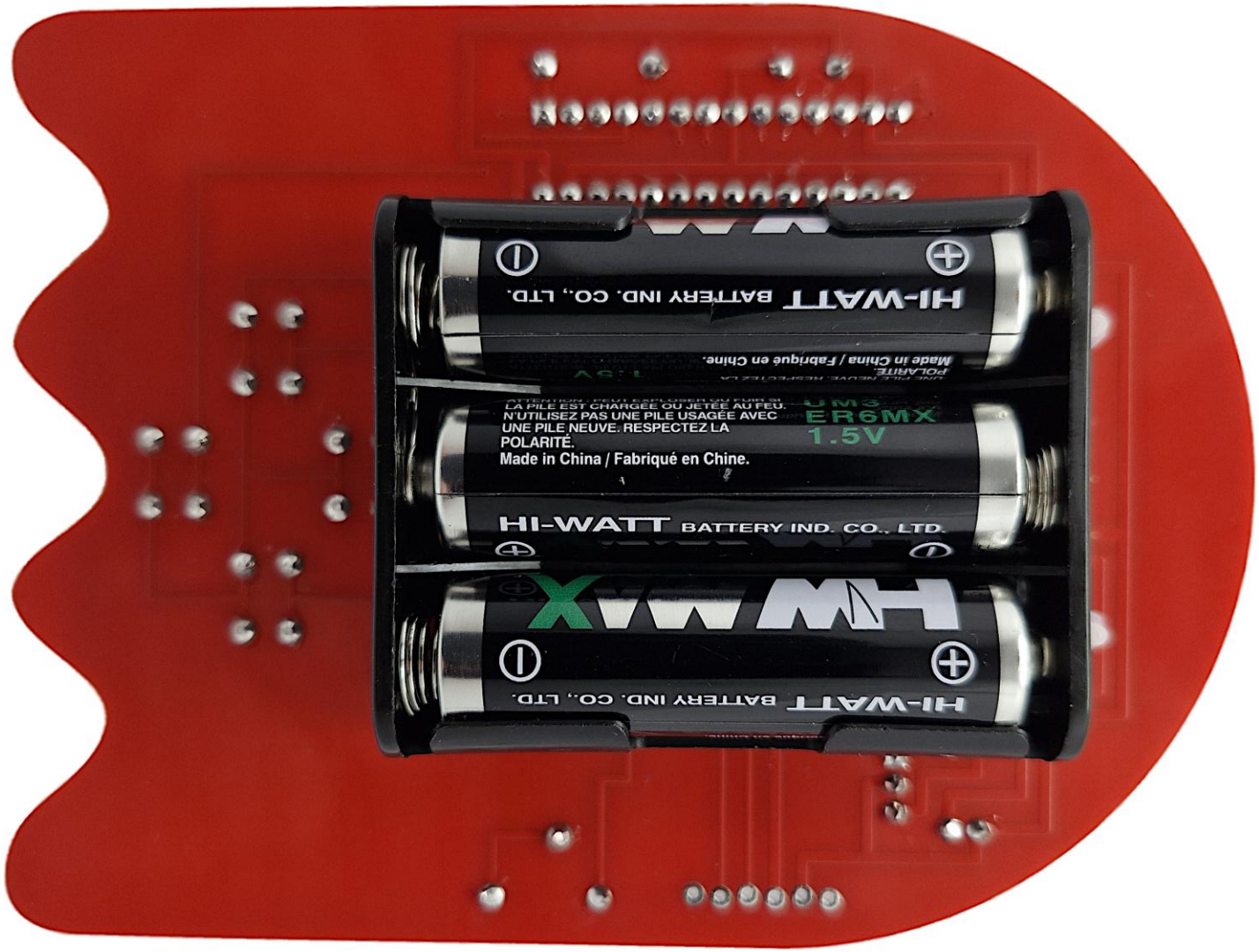
The game play is as per the classic version of *Pac-Man*. The four pushbuttons move your character in the principal directions around the maze. Eat the dots to accumulate points while avoiding the ghosts. Eat the larger flashing pellets in the corners of the maze to turn the ghosts blue. While the ghosts are blue they are vulnerable and can be killed. However they are resurrected a short while later and return to the maze. Eat all the dots and pellets to complete a level.

Pressing both left and right pushbuttons at the same time and holding them for a fraction of a second pauses the game. Press any pushbutton to resume.

Press the up button then press the left and right buttons at the same time (so that all three pushbuttons are simultaneously pressed) to enable infinite lives.

A screen saver operates after 10 minutes of inactivity to save the display from burn-in. In sleep mode the current drain on the battery is reduced to a minimum. It’s a good idea though to remove the cells when not in use.

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Component list

Resistors

R1	100R (brown, black, brown, gold)
R2	10k (brown, black, orange, gold)

Capacitors

C1	10uF electrolytic (blue or black)
C2	100uF electrolytic (blue or black)
C3	10uF tantalum (yellow/brown, beaded)
C4, C5	100nF ceramic (brown, marked ‘104’)

Semiconductors

REG1	LD1117V33 LDO 3.3V 0.8A regulator (black/silver)
LCD	2.0” 240 x 320 LCD display with 7-way SIL header
IC1	dsPIC33EP256MC202/502 microcontroller + 28-pin socket

Miscellaneous

PIEZO	piezo speaker
S1 - S4	miniature tactile pushbutton
BATTERY	3 x AA battery box

PCB

Nylon bolts, nuts, spacers x 2

Sticky pads x 4

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