

# Perplexity

*Perplexity* is a puzzle game of lights and switches.

## **Construction**

First fit and solder the resistors (R1 to R13) 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 electrolytic capacitor (C1) (negative is marked by a stripe on the side of the body). The ceramic capacitor (C2) can be fitted either way around.

Solder the LEDs (L1 to L12) matching the shorter leg (also flat on the rim) to the hole with the line.

Solder the sounder (PIEZO) either way around. If it has a tab covering the top then remove it.

Solder the toggle switches (S1 to S6) either way around. The pins are very close together so take care not to use too much solder. Also be careful not to apply too much heat to the pins as you may melt the plastic parts of the switches. (Note that two of the pins for each switch, the two furthest from the centre of the circuit board, are in fact connected by a track so it doesn't matter if solder bridges them.)

Solder the slide switch (S7) either way around.

Solder the two battery boxes (BATT1 and BATT2) observing the correct polarity (the spring end is negative).

Don't fit the chip into its socket until you have thoroughly checked your construction. Check that all the components have been inserted correctly and that there are no dry joints and no solder bridges between pins. Then match the small notch in the chip to the notch in its socket.

Insert a pair of AAA cells (1.5V primary cells rather than 1.2V rechargeable ones) into the battery boxes observing the correct polarity, and move the slide switch to the ON position.

The software includes a power-on self-test. All the LEDs should flash and the piezo should beep twice if the board is functioning correctly.

## **How to Play**

There are 12 puzzles, or levels, to *Perplexity*. To progress to the next level you must solve the current puzzle. The level is displayed after power-up by the number of LEDs that are lit (1 LED = level #1, 2 LEDs = level #2, and so on).

For each puzzle the objective is simply to get all the lights on. The puzzles are different and different techniques are required to solve them. Some are timing based, some are memory based and some are pure logic.

Try to avoid touching the back of the board with your fingers when using *Perplexity*.

When you complete a level *Perplexity* will flash its LEDs and beep eight times.

If you solve all the puzzles and wish to reset *Perplexity* to level #1 do the following:

- turn the power off
- move all the toggle switches to the 'outwards' position
- turn the power back on
- quickly move all the switches to the 'inwards' position (you have only a couple of seconds to do this)

If this has worked then *Perplexity* will make a long beep and reset.

## **Component List**

### Resistors

R1, R4, R5, R7, R10, R11	22R (red, red, black, gold)
R2, R3, R6, R8, R9, R12	1k (brown, black, red, gold)
R13	100R (brown, black, brown, gold)

### Capacitors

C1	100uF miniature electrolytic (blue or black)
C2	100nF ceramic (brown, marked '104')

### Semiconductors

L1 - L12	8mm superbright red LED
IC1	PIC16F628A microcontroller (B41X) + 18-pin socket

### Miscellaneous

PIEZO	sounder (black)
S1 - S6	SPDT miniature toggle switch
S7	slide switch
BATT1, BATT2	AAA battery box

### PCB

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