

## 1 Basic Operation

The Quiz Buzzer v2 is a quiz buzzer that can handle upto 8 teams.

When any team presses its switch, that team number is displayed on the seven segment LED display accompanied by the buzzer beep. All other teams are immediately locked out, and their presses no longer affect the state of the buzzer. Finally, the quiz master can reset the buzzer and move on to the next question/round.

## 2 What's in the Box

- 1 x Buzzer module
- 8 x Team switches (approx. 10 m length of cable each)
- 1 x Quiz master reset switch (approx. 10 m length of cable)
- 1 x 9 V 2 A DC power supply
- 1 x Copy of Quiz buzzer v2 manual
- 1 x Copy of the GPLv3 (General Public License)

## 3 Setting Up and Use

Please refer to the photo of the buzzer shown for correct location of the power and switch ports.

- Connect the switches for the required number of teams to the buzzer. It is not required that all eight switches be connected. Nor do they have to be connected in consecutive ports.
- Connect the master reset switch to the reset port on the top left of the buzzer.
- Connect the DC power supply to the 9 V DC power port on the top right of the buzzer.
- Power on the buzzer.
- Verify that the power on sequence (default: A-S-Q) comes up accompanied by beeps.
- Enjoy quizzing.



### Caution

Do not leave the LED display lit for prolonged times. Leaving the LED display lit for more than 5 to 10 minutes can result in heating of the LEDs and reduced lifetime.

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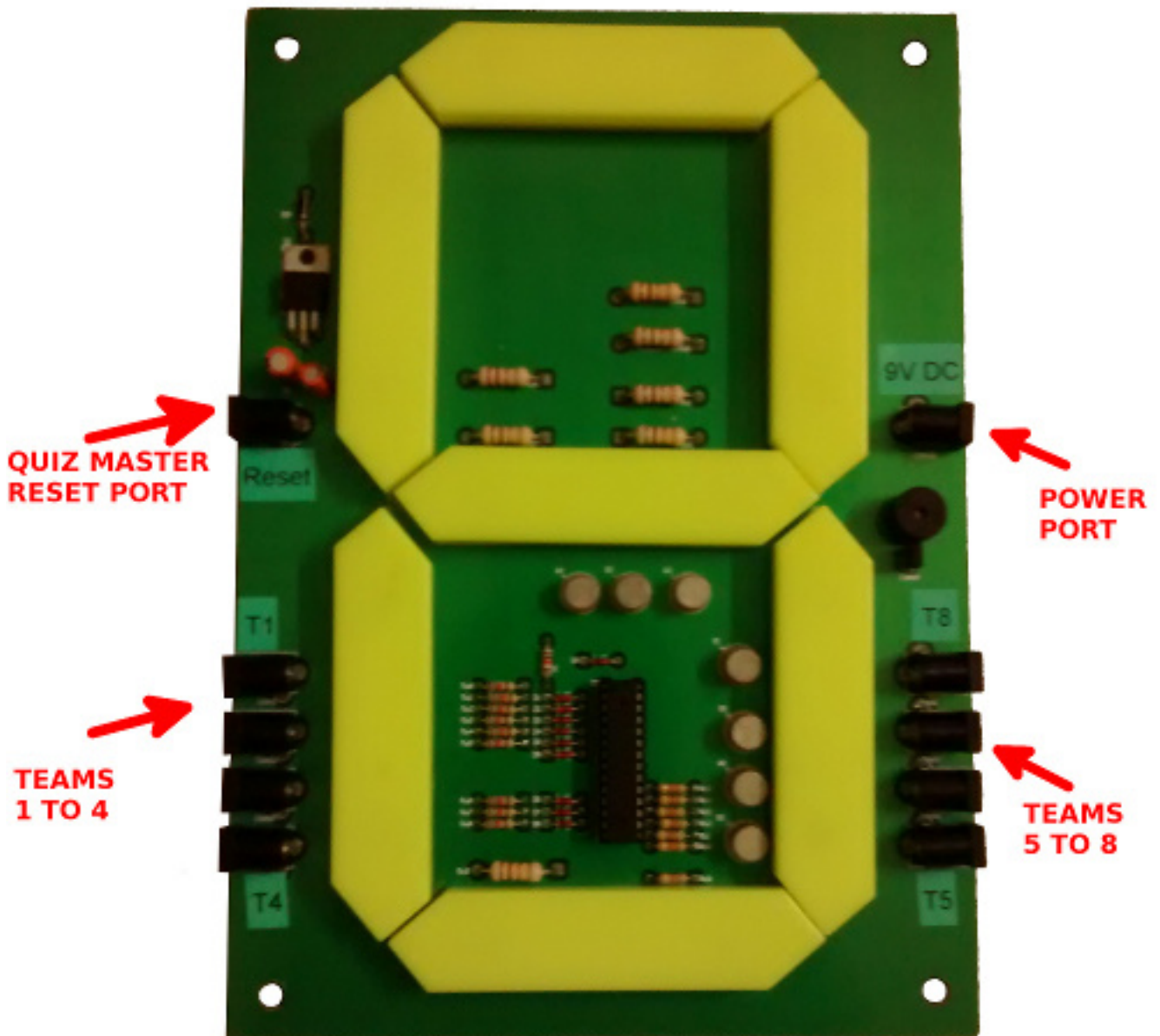
### Important

While protection circuitry has been provided, do not plug in the DC adapter into a switch port.

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**Note**

Any standard 9 V 2 A DC adapter commonly available on the market can be used to power the buzzer. Use of a higher voltage rated adapter can potentially damage the LED segments. Use of a lower current rated DC adapter can potentially cause the buzzer to behave erratically.



## 4 Brief Technical Description

The buzzer is built around an Atmega8 microcontroller. The Atmega8 has the necessary logic to read the inputs from the switches and put the appropriate number on the seven segment LED display.

The LED segments are driven through CL100 transistors. The driving current through the LEDs is controlled by PWM (pulse width modulation). The PWM duty cycle is set in the firmware. The default

program has a PWM duty cycle of 80% corresponding to a per segment current of around 100 to 120 mA.

The buzzer can be powered by any standard 9 V 2 A DC power supply. The LED segments are directly driven off the 9 V source, whereas there is a 7805 regulator on board to convert the 9 V to 5 V for the microcontroller.

The input pins of the microcontroller connected to the switches are protected by diode networks to prevent damage due to accidental insertion of the power adapter into the switch ports.

The buzzer PCB has no ISP (In System Programming) headers for programming the microcontroller. However, you can remove it from the PCB, and connect it to any ISP programmer and program it.

## 5 Freedom

The Quiz Buzzer v2 is open hardware. The hardware schematics, and PCB layouts are licensed under a Creative Commons Attribution-ShareAlike 4.0 International License. The firmware running on the microcontroller is free software distributed under the terms of the GPLv3 (General Public License) license. This manual is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.



## 6 Website

You can download electronic copies and the source for this manual, complete hardware designs, firmware source code, etc. at <https://systemreboot.net/post/quiz-buzzer-v2>

