

# *Octolively*

Open source Interactive LED Soldering Kits

## **Introduction**

Octolively is a tileable, digital interactive LED module filled with ultrabright LEDs that respond in complex and gentle ways to stimulus provided by human interaction.

Each Octolively module is 4 X 8 inches in size, and features eight huge (10 mm) ultrabright LEDs, spaced along a two-inch grid. Each Octolively module also has eight infrared proximity sensors — one for every LED — to detect nearby motion, even in total darkness. The modules can be tiled edge-to-edge, seamlessly, in any size or shape of rectangular array. You can use them to cover a full wall, or just make a long strip or border as narrow as 4 inches wide.

Octolively modules come pre-programmed with eight different effects that respond to motion and gradually fade back to idle when there is no motion, making them ideal for interactive LED walls, bar tops, and coffee tables. You can switch between the different effects with a button press: Gently fading trails after your motion, a "heat" mode that gets brighter as it detects more motion, simple positive and negative "shadow" effects that light the LEDs— or darken them — wherever you touch, ripple, sparkle, and a "melting" mode where activated pixels fade only very slowly.

Each Octolively module is controlled by an on-board microcontroller and functions as a self-contained, stand-alone device. You do need to provide power (5 V DC), but no central computer nor complex communication wiring is needed. Because it's self contained, there is no trade-off between array size and performance.

## General Specifications

- Kit type: Through-hole soldering kit
- Assembly instructions: Detailed, photo-heavy assembly guide, provided online
- Assembly time: 30-60 minutes per module (typical)
- RoHS compliance: All kit components are RoHS compliant (lead free)
- Hardware license: Fully open source hardware (TAPR OHL)
- Firmware license: Fully open source software (GPL)
- Documentation is located at: <http://wiki.evilmadscience.com/Octolively>

## Physical dimensions:

- Module size: 4 X 8 inches (10.16 X 20.32 cm) wide
- Circuit board thickness: 1/16" (1.6 mm) nominal
- Overall thickness: Allow 0.75" clearance above and below circuit board
- Mounting holes: 4, 0.25" x 25" from each corner, 6-32 clearance.
- Included standoffs: 6-32 x 0.75" long aluminum threaded round (4)
- Included fasteners: 6-32 x 1/4" button socket cap head screws (4)
- Shipping weight: 0.35 Lb/module

## LEDs and sensors

- LEDs per module: 8
- LED grid spacing: 2 X 2" (50.8 X 50.8 mm) grid
- LED type: Ultrabright, 10 mm OD, with wide viewing-angle diffused lens except as specified.
- LED color: Warm white, standard cool white, white (clear lens), blue, green, or red. Other styles available upon request.
- Sensors per module: 8
- Sensor type: Near-infrared proximity detector (active/passive)
- Sensor range (active): 10 cm (typical), in dark room
- Sensor range (passive): Unlimited, for detection of light and shadows from IR light sources such as IR LEDs, incandescent lamps, and sunlight
- Surface types: Can be operated below most clear glasses and plastics, with or without surface frosting.

**Microcontroller and interfaces:**

- Microcontroller: ATmega164, pre-programmed for stand-alone operation
- MCU socket: 40-pin socket (standard)
- Clock source: 8 MHz internal RC (standard)
- Optional clock sources: location provided for 16 MHz crystal or 3-pin ceramic resonator
- User input: Single tactile button switch
- Programming interface: Standard 6-pin AVR ISP (ICSP/SPI)
- Edge-connector network: 4-way broadcast, software only, unsupported
- Additional network and serial interfaces: none

**Standard firmware features:**

- Response functions: 8 response effects, selectable by button press
- Proximity sensor sensitivity: 4 levels, selectable by button press
- Configuration storage: Internal EEPROM, automatic

**Tiling:**

- Edge-to-edge tiling: Seamless, both directions
- Maximum grid size: no set limit
- Configurations allowed: any rectangular array

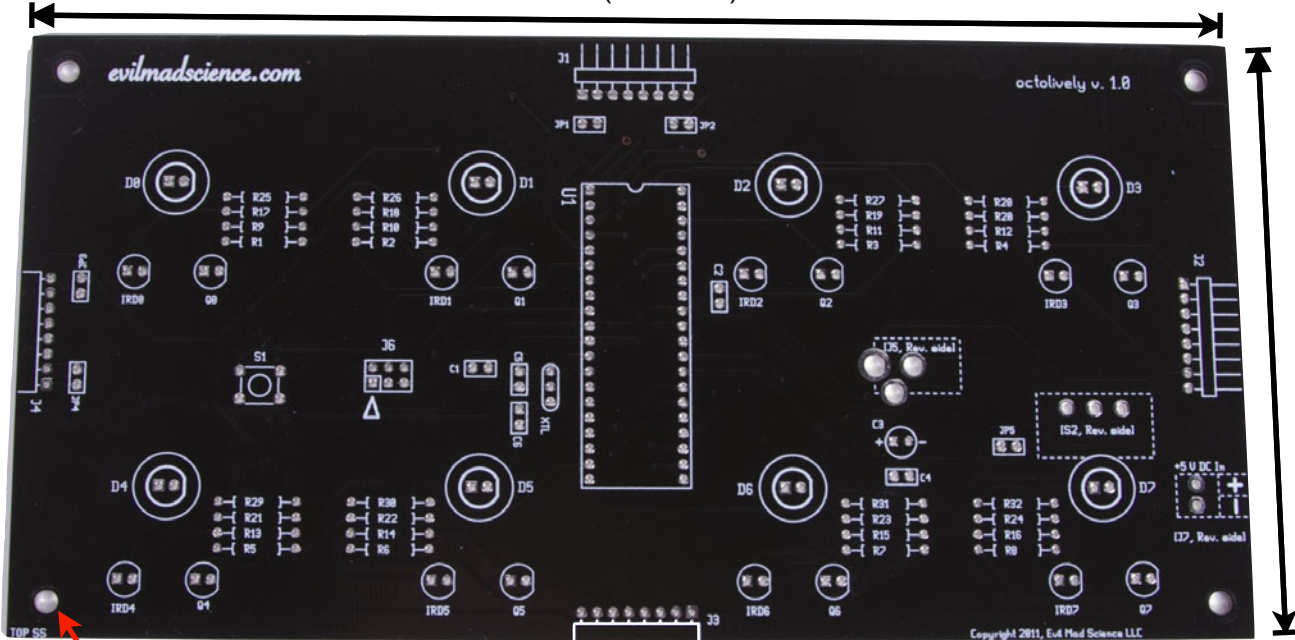
**Power requirements:**

- Input voltage: 5 V DC, regulated
- Current requirement: 200 mA capacity per panel
- Idle current: 50 mA (typical)
- Current rating of power switch and edge connectors: 4 A
- Input power source: 2.5 × 5.5 mm jack (standard) or 2.1 × 5.5 mm jack (optional)
- Screw terminal power input: Two-position 3.5 mm terminal (optional)

Bare PCB

8 inch (20.32 cm)

4 inch  
(10.16 cm)

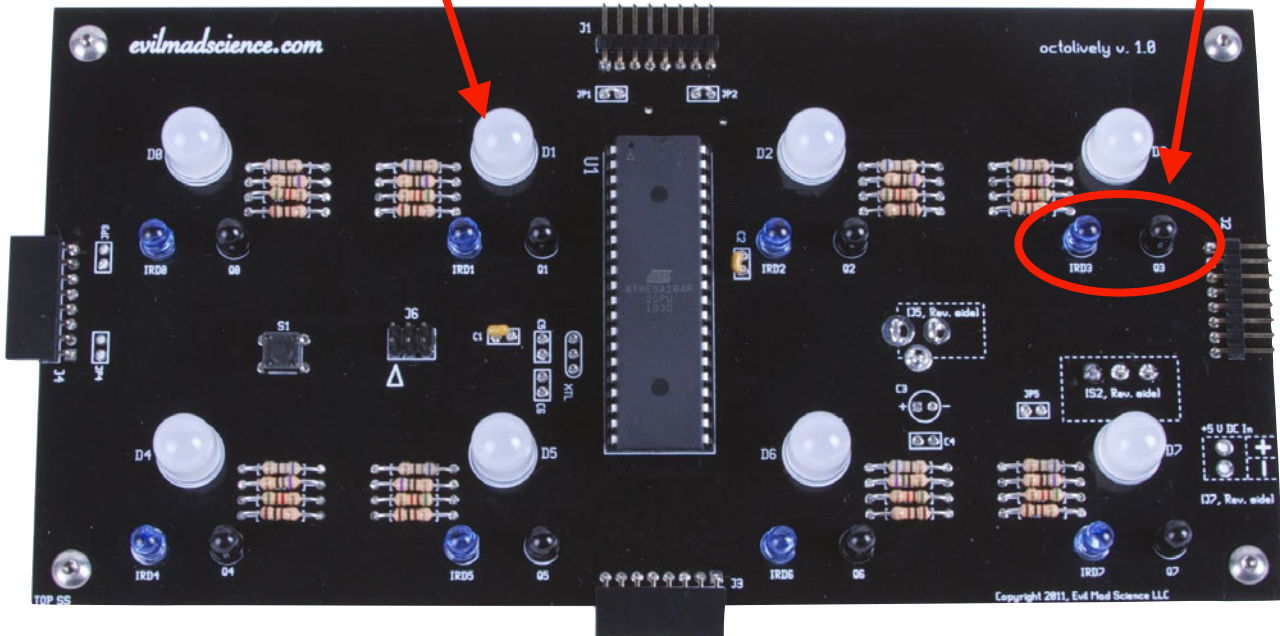


Mounting holes: 6-32 clearance (4),  
located 1/4" X 1/4" from each corner

Visible LEDs (8), 10 mm diffused-lens type, standard

Sensor clusters (8)

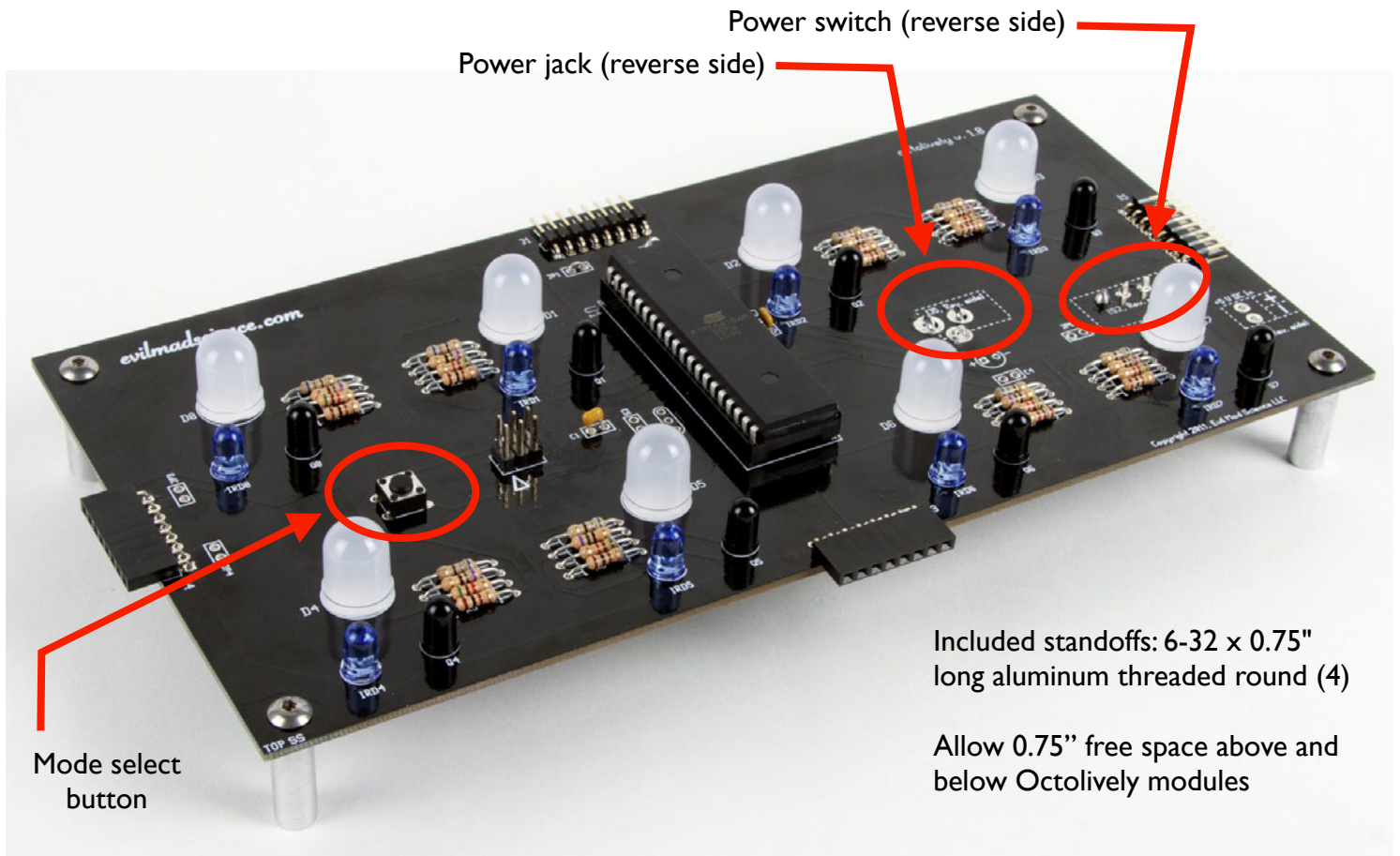
Assembled view



*Octolively*

Edge connectors (M/F)

Assembled view (oblique)



## Tiling

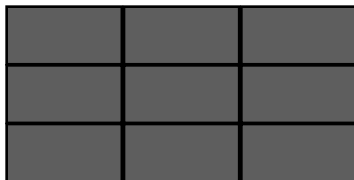
Octolively modules can be deployed in any rectangular array. A few possible arrangements are shown here.



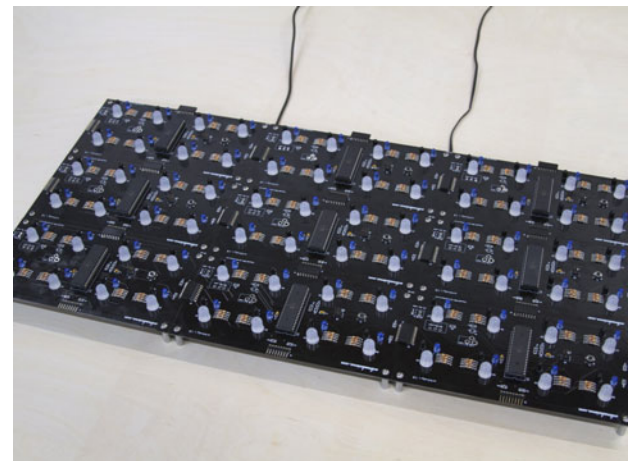
8-inch wide strip array



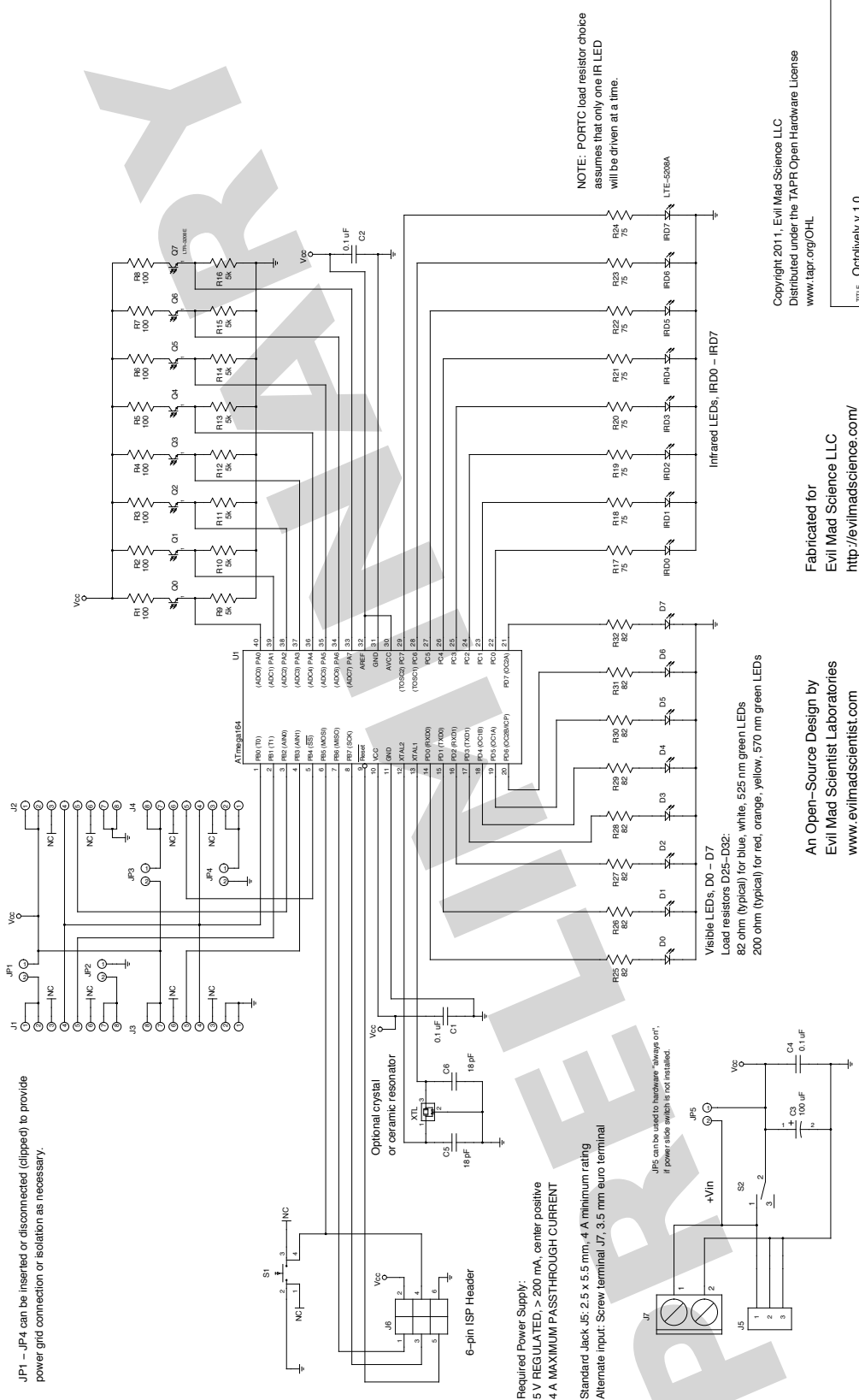
4-inch wide strip array



Wider arrays by 2D tiling



# Electrical Schematic



JP1 - JP4 can be inserted or disconnected (clipped) to provide power grid connection or isolation as necessary.

Required Power Supply:  
 5V REGULATED > 200 mA, center positive  
 4 A MAXIMUM PASSTHROUGH CURRENT

Standard Jack J5: 2.5 x 5.5 mm, 4 A minimum rating  
 Alternate input: Screw terminal J7, 3.5 mm euro terminal

JPS can be used to hardware "always on",  
 if power slide switch is not installed.

NOTE: PORTC load resistor choice  
 assumes that only one IIR LED  
 will be driven at a time.

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 Evil Mad Scientist Laboratories  
[www.evilmadscientist.com](http://www.evilmadscientist.com)

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| DRAWN BY | Wendell H. Oakley |
| PAGE     | 1 OF 1            |