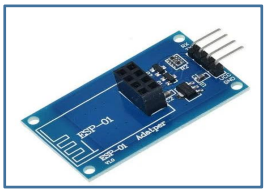
Tree 16 SSR Sequencer BOM

BOM and discussion and images.

You have two options here; Ethernet OR WiFi. I have Arduino code for either or but not both.

BOM#1- Arduino Mega w/Ethernet SunFounder Ethernet Shield W5100+Mega2560 Board Starter Kit for Arduino The above link allows the purchase of Mega w/Ethernet or just Mega.

BOM#2 If you have Selected WiFi Without Ethernet. You need just the MEGA and ESP8266
Arduino WiFi shield Makerfocus Arduino WiFi Shield
Makerfocus 4pcs ESP8266 ESP-01S WiFi Serial Transceiver Module with 1MB Flash for Arduino.
Also, I used a Adapter Board for ESP01.
Amazon link to Serial Adapter Module Board for ESP-01 This link is now dead. Try the one below.
ESP8266 Serial Wi-Fi Wireless ESP-01 Adapter Module 3.3V 5V Compatible Arduino
This adapter board impacts the Voltage 5V not 3.3 and the Rx, Tx connection.



BOM#3- 2x 8 Channel SSR SainSmart 8 channel Solid State Relay module
I typically use 2 of these to make a total of 16 channels per enclosure. I have done 32 channels per enclosure but that is cramped. The SSR module comes with screw terminals on the logic input and VCC pins. I remove the screw terminals and solder 2.54mm pins so that the jumper wires connect. This requires some effort but I think it eases assembly; but this step is optional.

BOM#4- AC to DC 9V Adapter to power Mega 2 options I found on Amazon
1) LitStar 9V 1.5A AC DC Power Supply Adapter Cable for Arduino UNO MEGA, 5.5mm x 2.1mm & 2.5mm Plug (8.2ft)

2) Need to reverse polarity on output**. This seems like a big deal, but with my mounting scheme I shorten the wire and solder it back onto the Power Supply board. So if you are mindful, it is no extra work.** LitStar 9V 2A AC/DC Power Supply Adapter, 10ft US Wall Charger, DC Plug 5.5 x 2.1mm Compatible with for 9 Volt 100mA~2000mA Equipment (Note Tip Negative)

BOM#5- WeatherProof Electrical Container
SOCKiTBOX 100533212 Weatherproof Black Large

BOM#6- Input Power Cord 16 awg for input. Cut off the IEC connector and attach tab quick disconnect.
Monoprice Power Cord – NEMA 5-15P to IEC 60320 C13,16awg, 15A, 3-prong, 3ft.

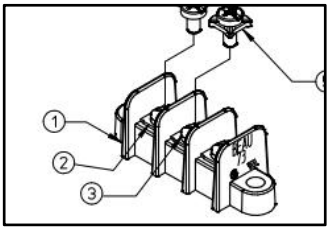
BOM#7**-** Output power cords from SSR to lights. I use 3 prong power cords with the ground connected. I admit this is overkill since the AC lights are all two prong but I use outdoor 3 prong extension cords.
Monoprice Desktop Computer Power Cord - IEC 60320 C14 to NEMA 5-15R, 18AWG, 10A/1250W, SVT, 125V, Black, 6ft

Alternatively, My 32 relay box uses SPT1 wire with vampire plugs.
https://www.actionlighting.com/ **Action Lighting™, Inc.**SPT 1 / SPT 2 Vampire Zip Cord Receptacle White Pack(12plugs) 100SPTPLUG-White100FT SPT1 WHITE WIRE WITH MALE PLUG - 100SLAICEXW

BOM#8- **Jumper Wires Similar to these**

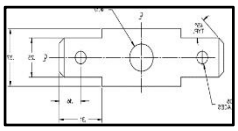
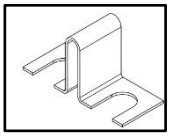
- EDGELEC 120pcs 30cm Dupont Wire male to Female Breadboard Jumper Wires 11.8 inch 1pin-1pin 2.54mm Connector Multicolored Ribbon Cables DIY Wires Length
- Premium Breadboard Jumper Wires 22AWG, Now with 20% More Red and Black Jumpers, Square Head 0.1'' 10 Colors Total 120-Pack by Hellotronics (30CM, M/F)
- Pololu 
  - Wires with Pre-Crimped Terminals 10-Pack M-F 12" Red
- Pololu 
  - 0.1" (2.54mm) Crimp Connector Housing: 1x1-Pin 25-Pack

BOM#9- Terminal Blocks 5x and Tabs(below) Mouser link 538-38730-0104
Molex Terminal Block 38730-0104 for 4 terminal places
J_TermBlk_1; J_TermBlk_2; J_TermBlk_3; J_TermBlk_4; J_TermBlk_5



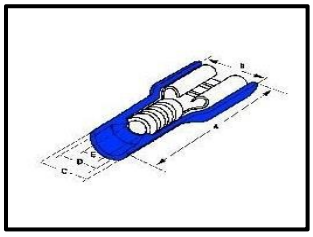
Molex Terminal Block Tabs Links are Mouser



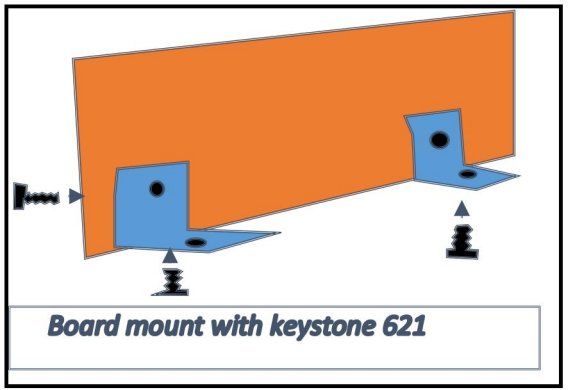



0.25” Vertical Quick Disconnect Tabs 538-38002-1010
0.25” Angled Quick Disconnect Tabs 538-38002-1335
0.25” Flat Quick Disconnect Tabs 538-38002-1333
Terminal Slot (jumper between Terminals over barrier) 538-38002-1352
I create a BUSS for Ground and Neutral Return using terminal blocks, tabs and jumpers with Quick Disconnects for easy assembly/repair. I stack a vertical, angled and maybe a flat to provide 6 tabs per terminal place. The jumper over the barrier allows connection of 2 terminal places. For example, 6 + 6 tabs with jumper or 12 total GNDs and 12 total AC Neutrals. One tab for input and 11 outputs for distribution of GND and AC Neutral. 16 output cords with 16 GND and 16 AC neutral connections plus GND & AC neutral inputs 2 per terminal block(4); 36 tabs total on two terminal blocks. Note; GND & AC neutral remain independent (no cross connects) on the terminal block.

Nylon Spade Quick Disconnect Connectors Kit, Electrical Insulated Terminals, Male and Female Spade Wire Crimp Terminal. These crimp onto your power cables for quick connect disconnect to tabs in terminal blocks. This image is from molex but many are available.
Standard Quick-Disconnect terminals
Nylon Spade Quick Disconnect Connectors Kit

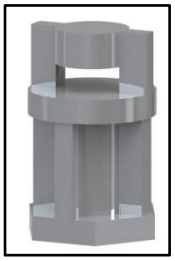


BOM#11- Vertical Board Mount 4x
Mouser Link 534-Mouser link 534-612 Keystone Electronics. Not shown in schematic. Uses 4-40 screws not listed in BOM. These are used to mount 2x SSR Module boards vertically in SockitBox. The SSR boards stand up edge wise



from the bottom of the socket box screw terminals near top of Box. The screws through the bottom of SockitBox seal nicely.

BOM#12- Board Mount Edge Corner

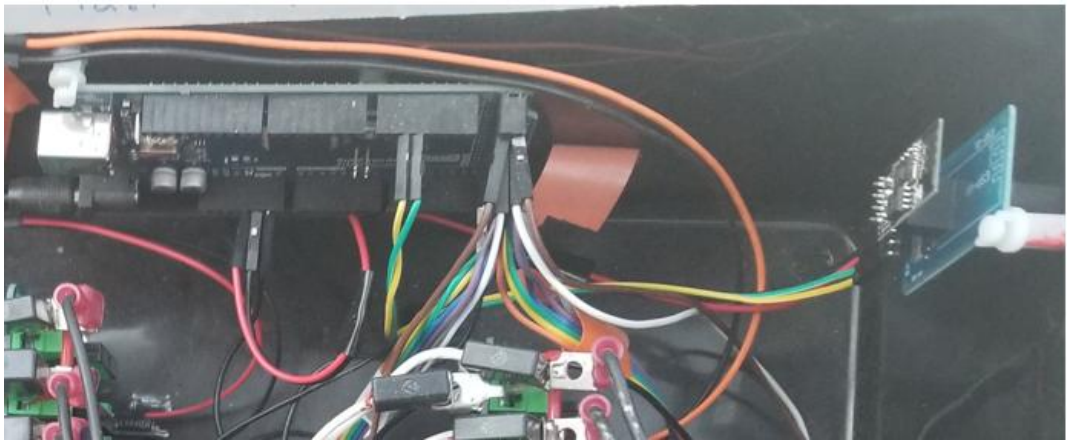


DigiKey # RPC1449-ND Manufacturer Essentra Components TCEHCBS-6-01
Board Support Corner, Edge Holding / Screw Mount Nylon 0.375" (9.53mm) 3/8"
DigiKey # RP1007-ND Manufacturer Essentra Components TCEHCBS-4-01
Board Support Corner, Edge Holding / Screw Mount Nylon 0.250" (6.35mm) 1/4"
Board Spacers or similar
DigiKey # 492-1090-ND Manufacturer Bivar Inc. MFG # 9911-312 Board spacers\

Mouser Essentra TCEHCBS-14-01 I use 2 of the longer ones to hold the WiFi shield/module on the corners.

Mounting for Arduino Mega Board on side of Socket Box. The standard Board spacers and standoffs work well if you have room. I found the Edge/Corner mounts to be very useful due to board space constraints. My mounting was about half spacers and half Edge/Corner mounts. The Edge/Corner mounts need a tight tolerance to work well.

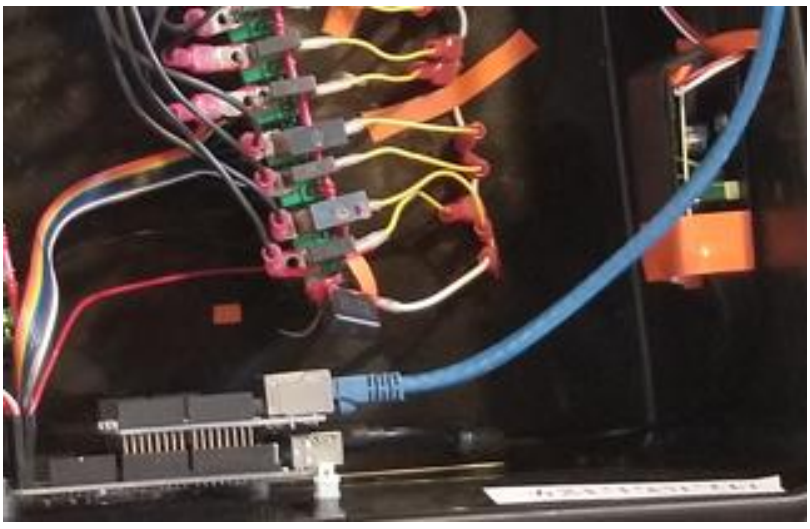
WIFI Version



WiFi Module mounting using TCEHCBS-14-01 2x . The Green Yellow wires ~11 inches go to Serial TX2 and RX2

Both the Arduino Mega and WiFi ESP-01 mounted to the sides of the Socket Box with the SSR modules mounted to the bottom edge wise. I use Crimp on tab Quick Disconnects on all the 120V AC lines to and from the SSR modules and the terminal blocks.

ETHERNET Version



This image shows the Ethernet shield attached to the Arduino Mega with Ethernet cord. The power supply is mounted to the side with wires soldered to the board. The plastic power supply housing is used to mount the supply to the side of the Sockit Box.

The Black square components are the snubbers RC circuit to reduce surges.

RE120033 surge Protector, Roxburgh EMC