

16 High Power LEDs Knight Rider Light - Arduino Compatible

This is a Knight Rider LED Light and it is one of the best Arduino projects for beginners. This board drives 16 high-power LEDs to turn them ON one by one sequentially. This is an open-source Arduino compatible project that contains 16 high current MOSFETs, Atmega328 microcontroller, 5V regulator etc. The gate of IRLR7843 MOSFETs is connected to the I/O pins of the Atmega328 chip. Screw terminals are provided to connect the LEDs and power supply. Additional 2 x tactile switches and one connector for analog input are provided for further experiments. Operating power supply 12V to 15V DC, each output can drive 1A constant current load (1W to 12 W LED) without cooling and load up to 2A with forced cool air.

Features

- Operating Power Supply 12 to 15V DC
- Load: Each Channel up to **1Amp** Constant @ room Temperature, **2Amps** Constant with Fan
- LED 1W to 12W (12-24W with proper cooling using Fan)

Components and Operations

- R1>>Pullup for Reset Pin,
- R3, R15, R23, R31, R7, R17, R25, R33, R11, R19, R27, R35, R13, R21, R29, R37>> Optional Series Resistors for current limiting
- R4, R16, R24, R32, R8, R18, R26, R34, R12, R20, R28, R36, R14, R22, R30, R38>> Current Limiting Resistors for MOSFET Gate
- CN11, CN10, CN9, CN8, CN6, CN5, CN4, CN3, >> LED -/Cathode
- CN2 >> LED +/Anode
- Cn1>> 12 to 15V Power Input
- Capacitor C1, C8, C9>> DC Bus Filter Capacitors
- Capacitor C2, C3 >> DC Filter Capacitors for 5V Supply
- LM78M05>> 5V Regulator provides 5V to Micro-Controller from 12V Supply
- U1 ATMEGA328 >> Micro-Controller Loaded with Arduino Code
- C6 >> Filter Capacitor for Ref Voltage
- Crystal Y1, C4, C5, R6 >> Oscillator for Atmega328 Micro-Controller
- SW1, SW2, R2, R5, R10, C7, R9, CN7, >> Optional for additional development

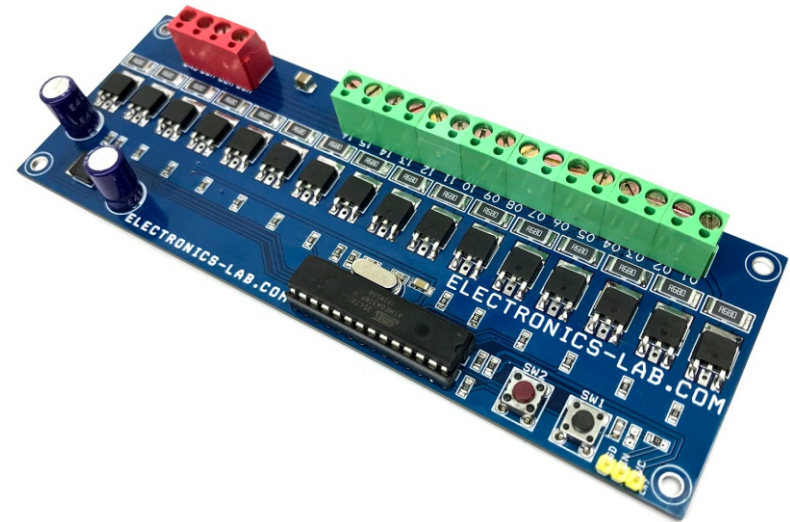
Arduino Pins

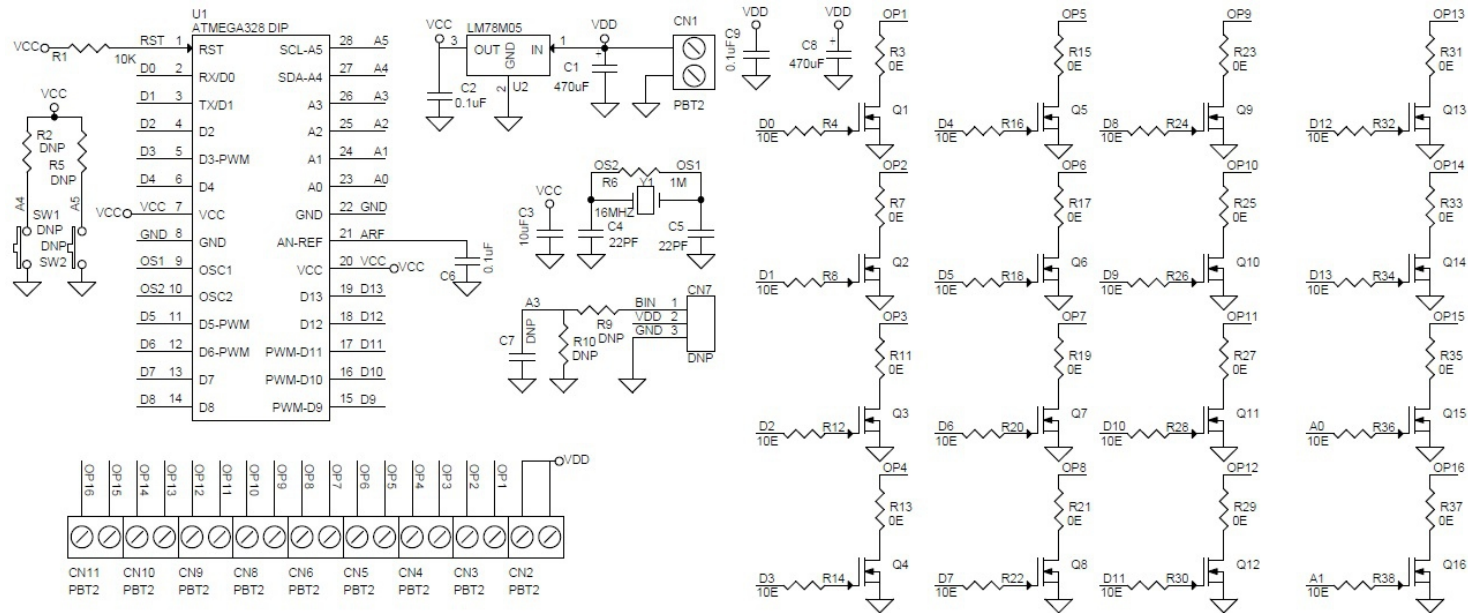
- D0, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, A0, A1 >> 16 LEDs
- A4, A4 >> Optional Tactile Switches
- A3>> Optional Analog Input

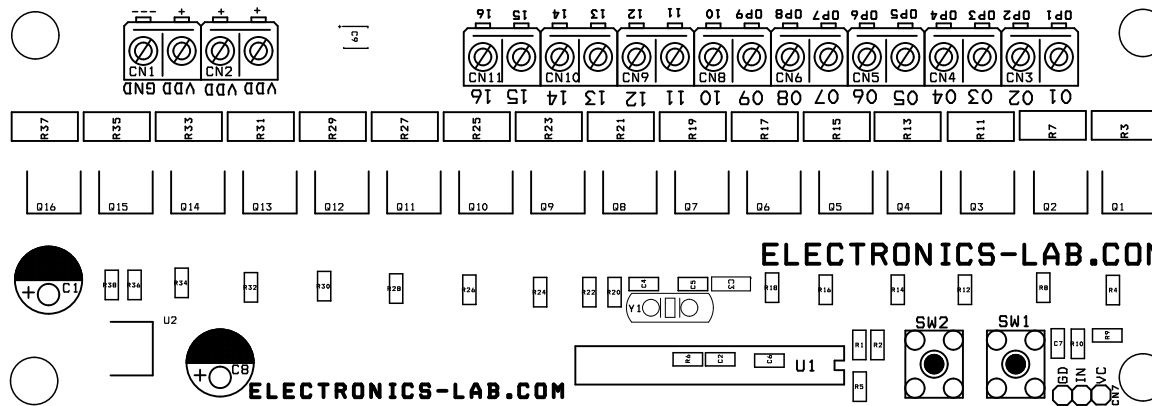
Note: This is an open-source Arduino compatible project, can be used in many other applications which requires 16 channel high power drivers. This board can drive 12V LEDs directly, if LEDs doesn't have series resistor or constant current circuitry, use series resistors R3, R15, R23, R31, R7, R17, R25, R33, R11, R19, R27, R35, R13, R21, R29, R37

Arduino example code is provided, follow the instructions below to load the Arduino Code into a new ATMEGA328 chip

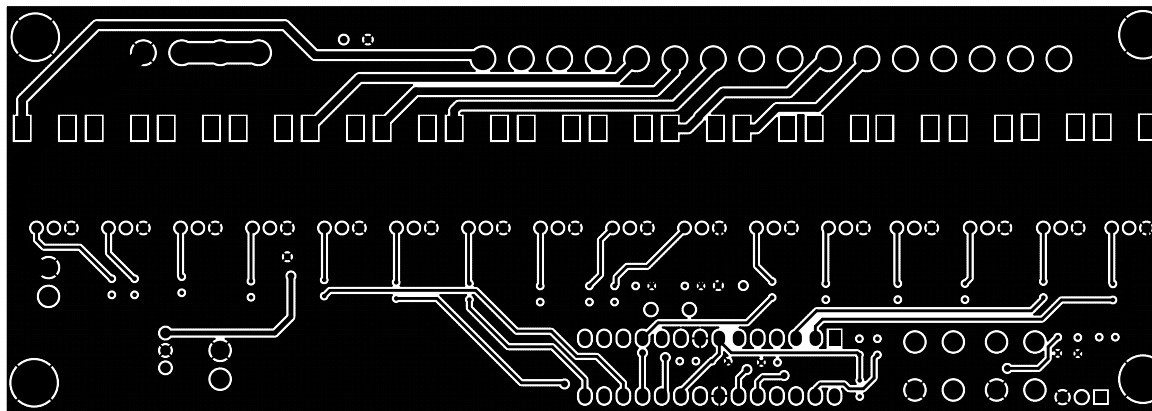
<https://www.arduino.cc/en/Tutorial/BuiltInExamples/ArduinoToBreadboard>



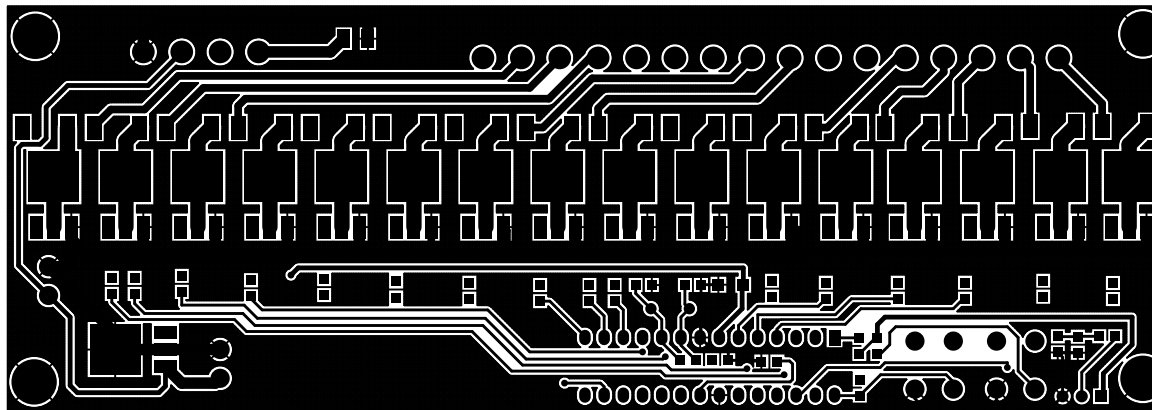




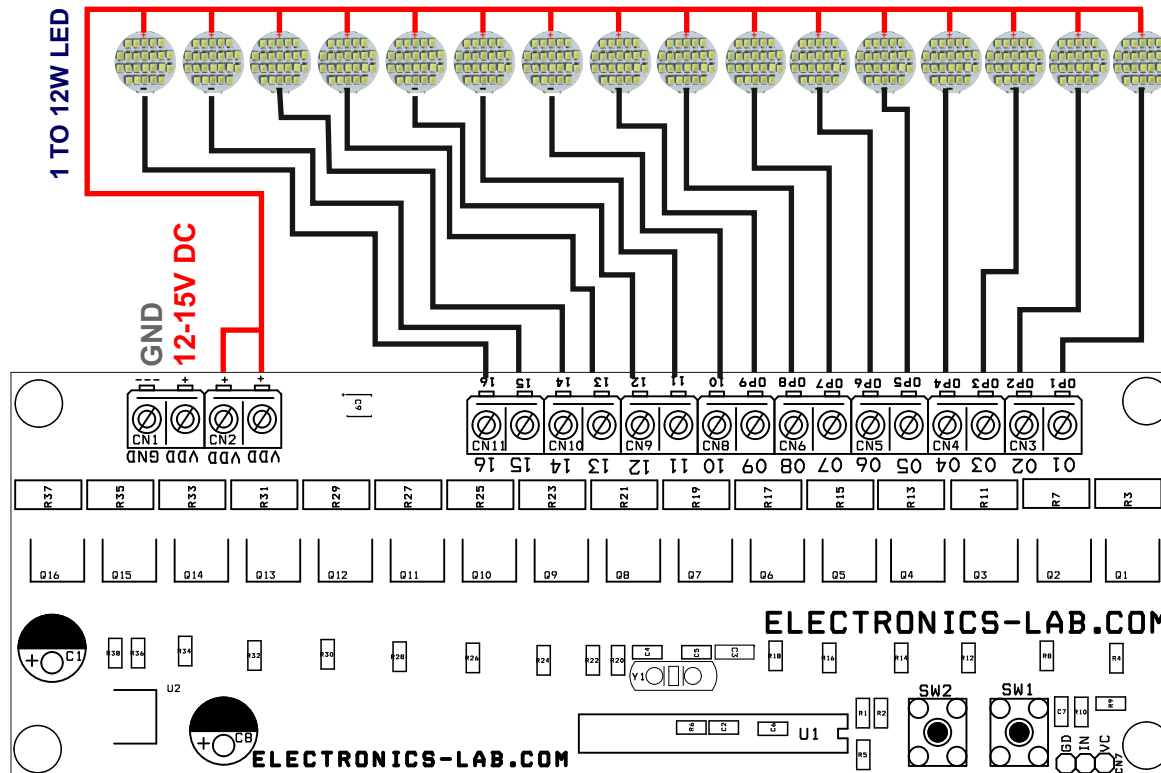
SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER





BOM				
NO.	QNTY.	REF	DESC.	SUPPLIER/MANUFACTURER
1	10	CN1,CN2,CN3,CN4,CN5,CN6,CN8,CN9,CN10,CN11	2 PIN SCREW TERMINAL 5.08MM PITCH	DIGIKEY 277-1247-ND
2	8	SW1,SW2,R2,R5,CN7,C7,R9,R10	DNP	OMIT
3	2	C1,C8	470uF/25V ELECTROLYTIC	DIGIKEY 1189-1869-ND
4	3	C2,C6,C9	0.1uF/50V SMD SIZE 0805	YAGEO
5	1	C3	10uF/25V SMD SIZE 1210	YAGEO
6	2	C4,C5	22PF/50V SMD SIZE 0805	YAGEO
7	16	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8,Q9,Q10,Q11,Q12,Q13,Q14,Q15,Q16	IRLR7843 DPAK	DIGIKEY 448-IRLR7843TRLPBFCT-ND
8	1	R1	10K 5% SMD SIZE 0805	YAGEO
9	16	R3,R7,R11,R13,R15,R17,R19,R21,R23,R25,R27,R29,R31,R33,R35,R37	0E OR AS PER APPLICATION SIZE 2512	DIGIKEY CR2512-J/-000ELFCT-ND
10	16	R4,R8,R12,R14,R16,R18,R20,R22,R24,R26,R28,R30,R32,R34,R36,R38	10E 5% SMD SIZE 0805	YAGEO
11	1	R6	1M 5% SMD SIZE 0805	YAGEO
12	1	U1	ATMEGA328 DIP	DIGIKEY ATMEGA328P-PU-ND
13	1	U2	LM78M05 DPAK	DIGIKEY-MC78M05CDTGOS-ND
14	1	Y1	16MHZ THT	DIGIKEY X1103-ND

