RC Light System Output

J1 INPUT

Pin	Name
1	GND
2	+5v
3	VCC
4	DATA
5	CLOCK
6	LATCH

J2 CHAIN

Pin	Name
1	GND
2	+5v
3	VCC
4	DATA
5	CLOCK
6	LATCH

+5V VCC

SER_DATA
SER_CLK
SER_LATCH

GND

U1 74HC595

Pin	Name		Name	Pin
16	VCC			
14	SER	QA	15
11	SRCLK	QB	1
10	SRCLR	QC	2
		QD	3
		QE	4
12	RCLK	QF	5
13	OE	QG	6
		QH	7
8	GND	QH'	9

GND

Sheet: Ports

FL_A
FL_B
BR_A
BR_B
BL_L
BL_R
EX_A
EX_B

File: Ports.sch

+5V

C1
100nF

GND

Takes serial input then outputs it onto LED "ports". Each port is paired and can be linked, this can work to create a brighter mode for the LEDs connected (or burn something if you skipped doing the math). Modules can be chained for more outputs.
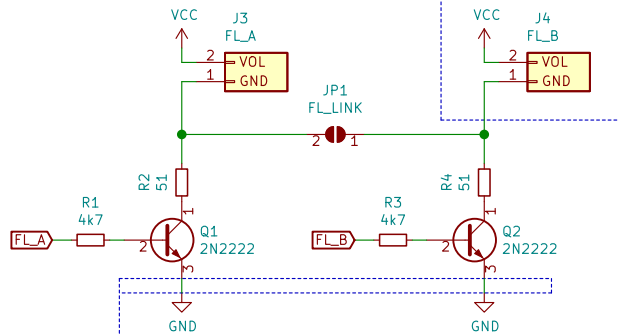
VCC when calculating LED loading resistors have been assumed to be at 8V, but you're really supposed to do the actual calculations using real information about how you're wiring it up and the components you're using.

https://ledcalculator.net/

Assuming 2 WHITE LEDs in series, 3.5V voltage drop and 20mA current.

When linked, double R2/R4 value as starting point. Unlinked, 2x LEDs for FL_A and FL_B if needed.
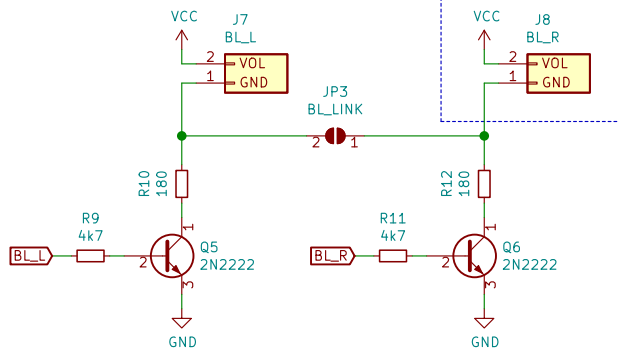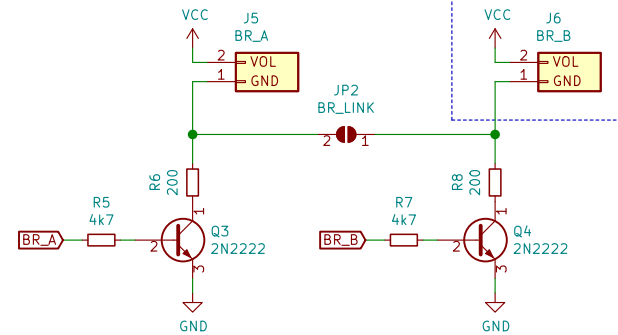
When linking the ports, you would generally not install these parts.

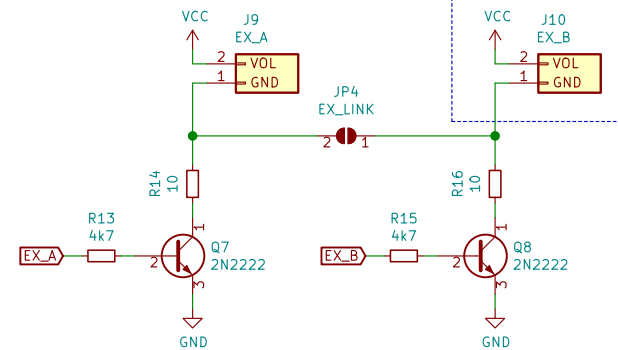Assuming 2 RED LEDs in series, 2.1V voltage drop and 20mA current.

When linked, double R6/R8 value as starting point. Unlinked, 2x LEDs for BR_A and BR_B if needed.

When linking the ports, you would generally not install these parts.

VCC   J3 FL_A
      2 VOL
      1 GND
JP1 FL_LINK
R2 51
R1 4k7
FL_A
Q1 2N2222

VCC   J4 FL_B
      2 VOL
      1 GND
R4 51
R3 4k7
FL_B
Q2 2N2222
GND   GND

There should be a 1 Ohm resistor between the emitter and ground here, but it's large enough as it is. Use transistors somewhat equal to eachother. I'll add it to SMD-version if I get around to it. If in doubt, don't link the pairs.

VCC   J5 BR_A
      2 VOL
      1 GND
JP2 BR_LINK
R6 200
R5 4k7
BR_A
Q3 2N2222

VCC   J6 BR_B
      2 VOL
      1 GND
R8 200
R7 4k7
BR_B
Q4 2N2222
GND   GND

Assuming 2 ORANGE LEDs in series, 2.2V voltage drop and 20mA current.

When linked, double R10/R12 value as starting point. Unlinked, 2x LEDs for BL_L and BL_R if needed.

When linking the ports, you would generally not install these parts.

Assuming LEDs with resistors already in the lead, resistor as failsafe.

When linking the ports, you would generally not install these parts.

VCC   J7 BL_L
      2 VOL
      1 GND
JP3 BL_LINK
R10 180
R9 4k7
BL_L
Q5 2N2222

VCC   J8 BL_R
      2 VOL
      1 GND
R12 180
R11 4k7
BL_R
Q6 2N2222
GND   GND

VCC   J9 EX_A
      2 VOL
      1 GND
JP4 EX_LINK
R14 10
R13 4k7
EX_A
Q7 2N2222

VCC   J10 EX_B
      2 VOL
      1 GND
R16 10
R15 4k7
EX_B
Q8 2N2222
GND   GND

RN1 10k
FL_A FL_B BR_A BR_B BL_L BL_R EX_A EX_B
GND

Each port is paired, and can be linked to essentially halve the resistance for that port (if you used equal loading resistors).

Sheet: /Ports/
File: Ports.sch
Title: RC Light System Output Ports
Size: A4   Date:
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