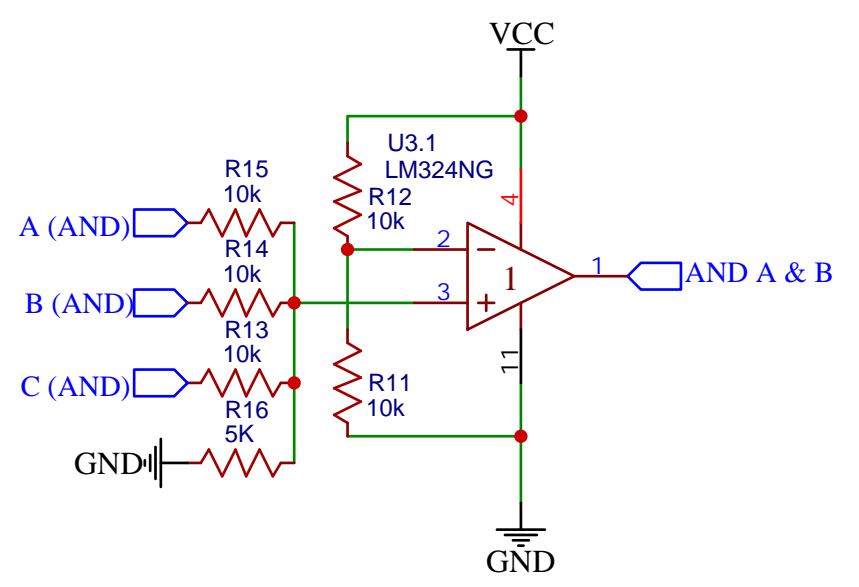


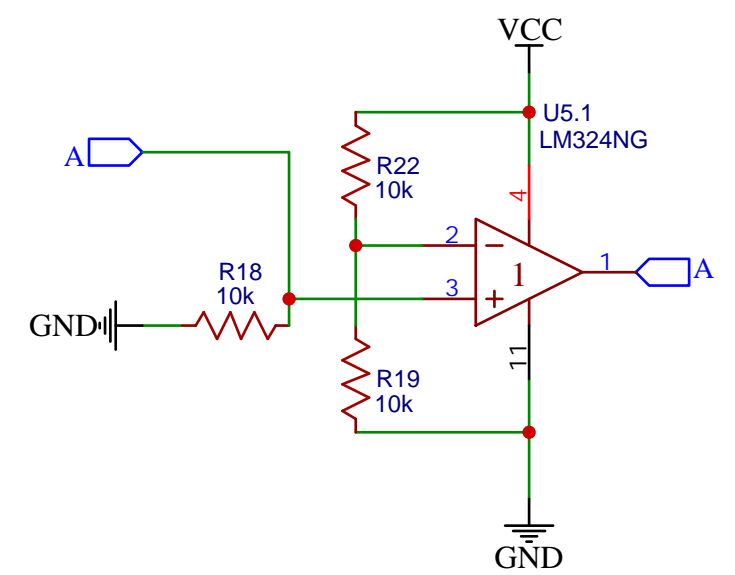
AND GATE (2 inputs) Note resistors are balanced

NAND GATE (2 inputs) Note resistors are balanced

INVERTER



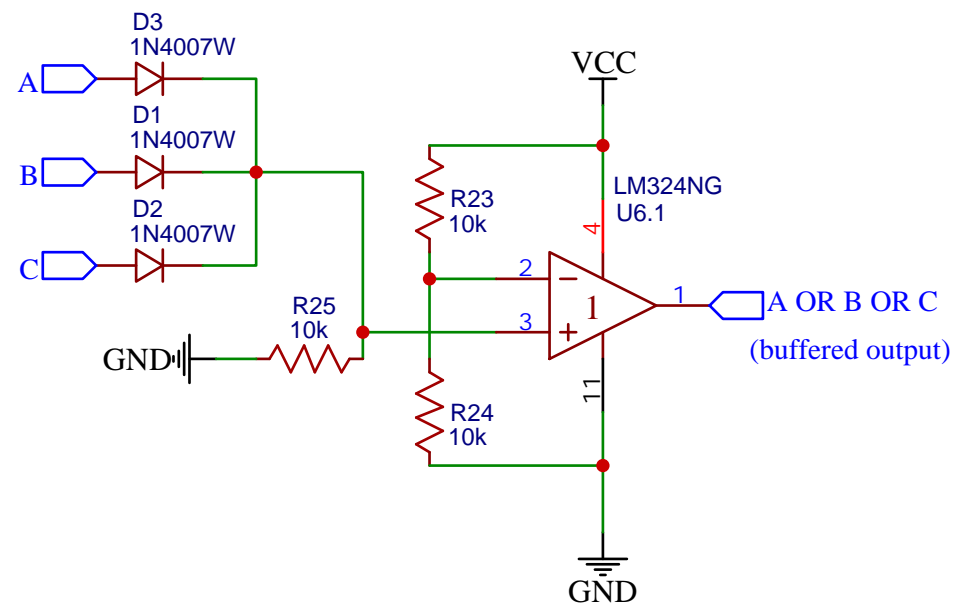
AND GATE (3 inputs) Note resistors are NOT balanced due to "maths", For lack of a better more complex explanation: need to be a odd number of resistors, of equivalent value, or the resistor to ground, must be halved in value from the inputs.



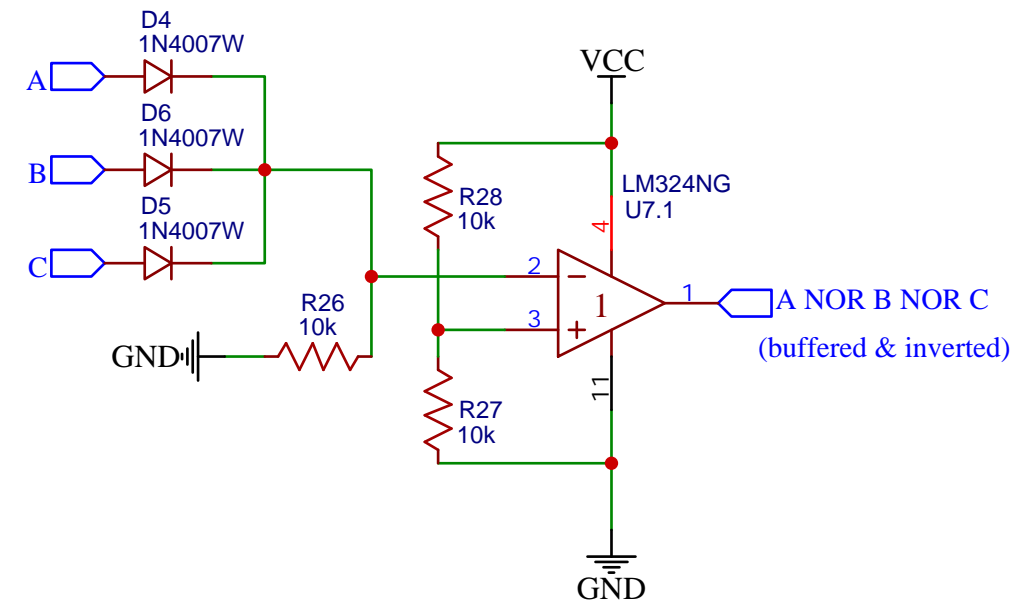
a VCC of +12 is assumed

BUFFER

TITLE:		REV: 1.0
Basic Building blocks		Sheet: 1/1
	Company: Z80-Dad / D. Collins	
	Date: 2021-11-02	Drawn By: dave collins



BUFFERED DRL 3 input OR




BUFFERED DRL 3 input NOR

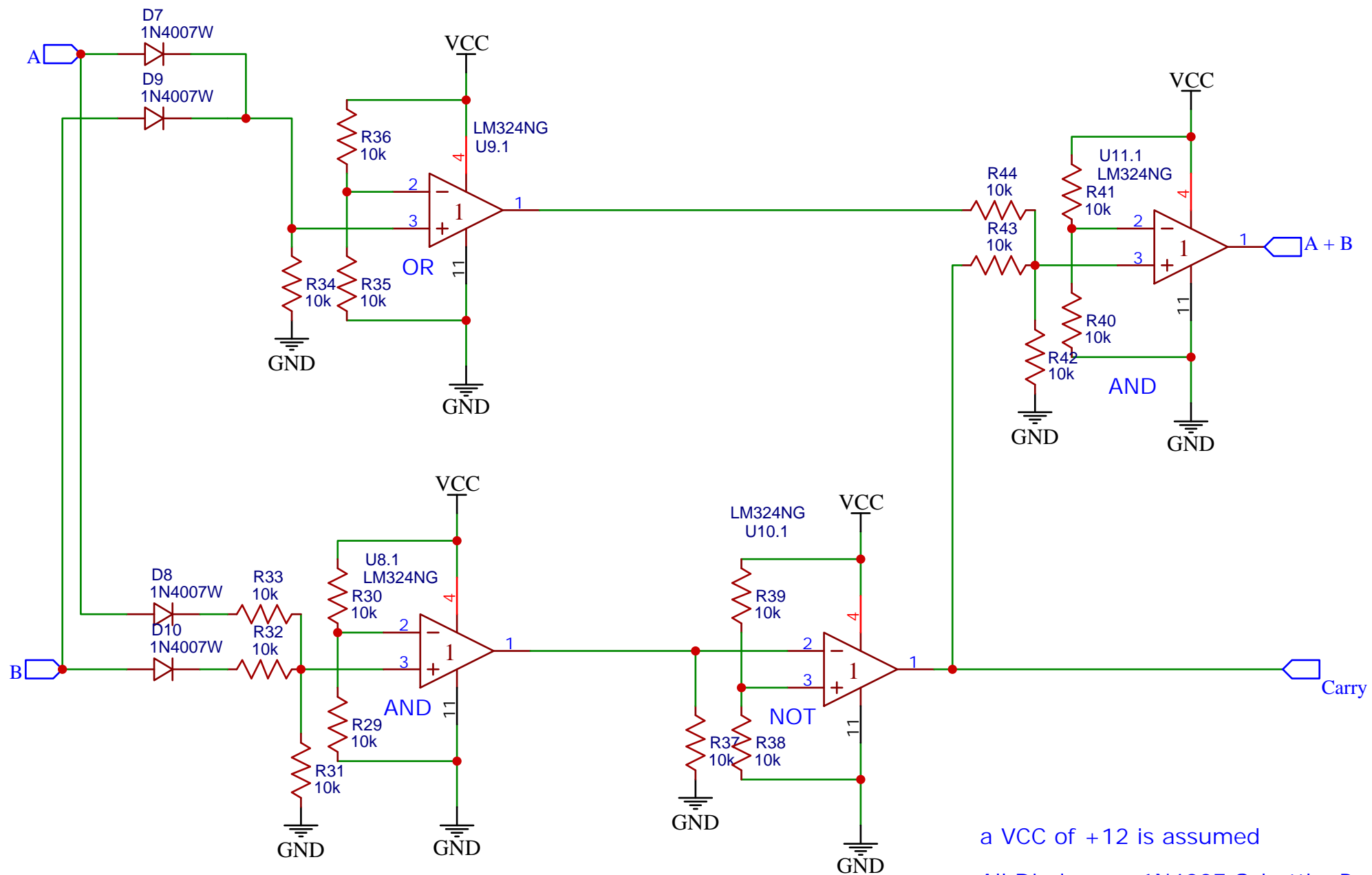
All Diodes are 1N4007 Schottky Power Diodes 1A.
 Switching diodes might be used, just be conscious of
 the current on the output ranging between 10 and 40 mA
 OP AMP's can drive a ton of current, my recommendation is to plan for
 at least 40mA potential, and consult your specific diode's datasheet

a VCC of +12 is assumed

All Diodes are 1N4007 Schottky Power Diodes 1A.
 Switching diodes might be used, with current limiting
 resistor, however this may effect the performance of the gate.
 OP AMP's can drive a ton of current, my recommendation is to plan for
 at least 40mA potential.

a single gate in this configuration can draw upwards of 2mA.

TITLE: OR Gates		REV: 1.0
	Company: Z80Dad / D. Collins	Sheet: 1/1
	Date: 2021-11-02	Drawn By: dave collins



a VCC of +12 is assumed

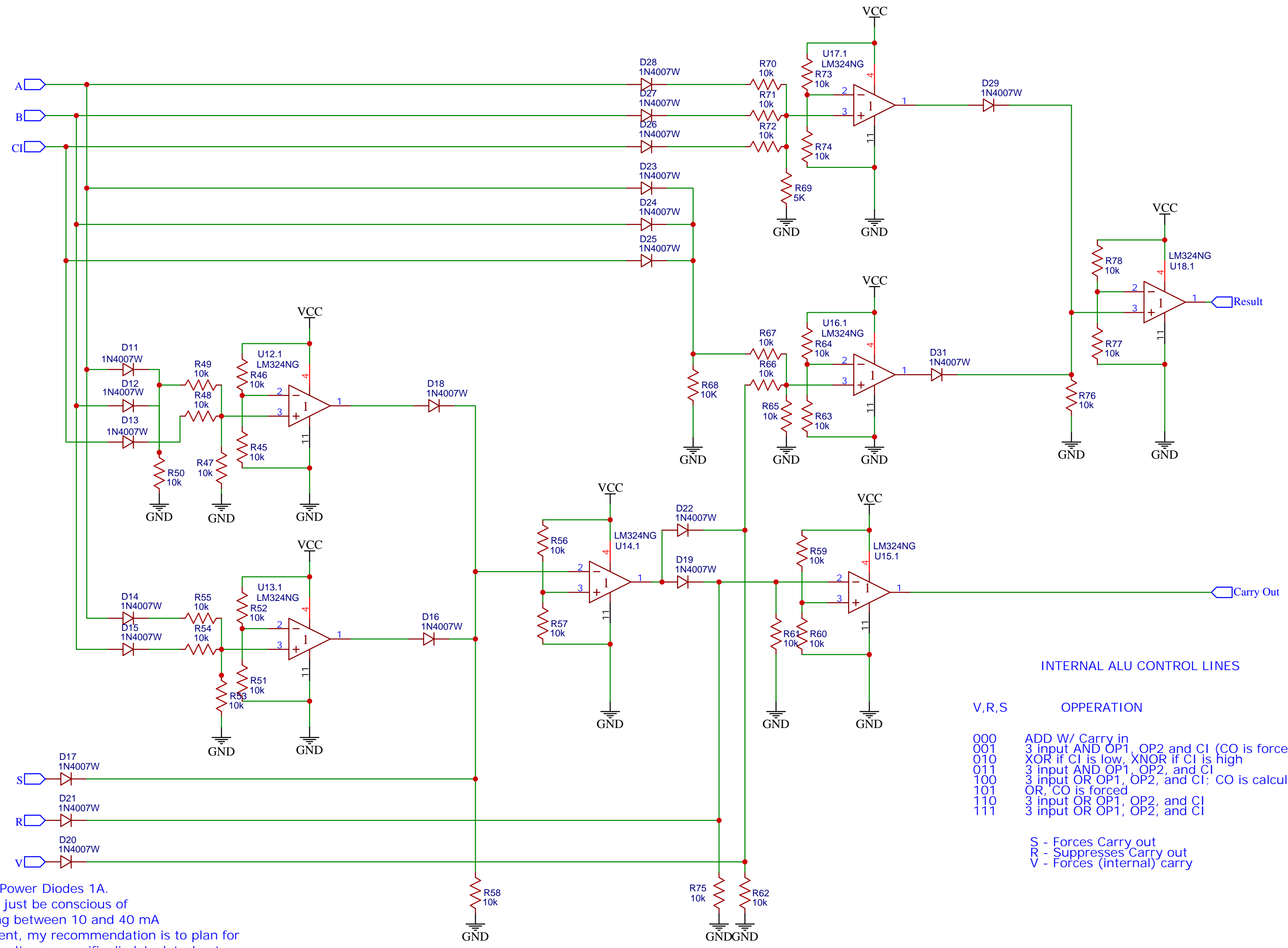
All Diodes are 1N4007 Schottky Power Diodes 1A.
 Switching diodes might be used, just be conscious of the current on the output ranging between 10 and 40 mA
 OP AMP's can drive a ton of current, my recommendation is to plan for at least 40mA potential, and consult your specific diode's datasheet

D8, D10 are needed to prevent a small potential from making it's way to the A&B input of the OR gate
 When only a single input is HIGH. This is due to how a summer circuit preforms, on an op amp.

It's unlikely to trigger a high pulse, however it is possible as I ran into this building a full adder on the bread board.

A good rule of thumb when linking inputs together is to isolate them.

TITLE: Half-Adder Example		REV: 1.0
	Company: Your Company	Sheet: 1/1
	Date: 2021-11-02	Drawn By: dave collins



a VCC of +12 is assumed

All Diodes are 1N4007 Schottky Power Diodes 1A.
 Switching diodes might be used, just be conscious of
 the current on the output ranging between 10 and 40 mA
 OP AMP's can drive a ton of current, my recommendation is to plan for
 at least 40mA potential, and consult your specific diode's datasheet

a single gate in this configuration can draw upwards of 2mA. this entire circuit draws between 47 & 50 mA.

Special thank you to Ken Shirriff, for his blog and excellent write up on the 4-bit ALU of the Z80 CPU.
 you can view his write up at: <https://www.righto.com/2013/09/the-z-80-has-4-bit-alu-heres-how-it.html>

INTERNAL ALU CONTROL LINES

V,R,S	OPERATION
000	ADD W/ Carry in
001	3 input AND OP1, OP2 and CI (CO is forced)
010	XOR if CI is low, XNOR if CI is high
011	3 input AND OP1, OP2, and CI
100	3 input OR OP1, OP2, and CI; CO is calculated
101	OR, CO is forced
110	3 input OR OP1, OP2, and CI
111	3 input OR OP1, OP2, and CI

S - Forces Carry out
 R - Suppresses Carry out
 V - Forces (internal) carry

TITLE: Z80 1-Bit ALU "Cell" Example		REV: 1.0
EasyEDA	Company: Z80Dad / D. Collins	Sheet: 1/1
	Date: 2021-11-02	Drawn By: dave collins