
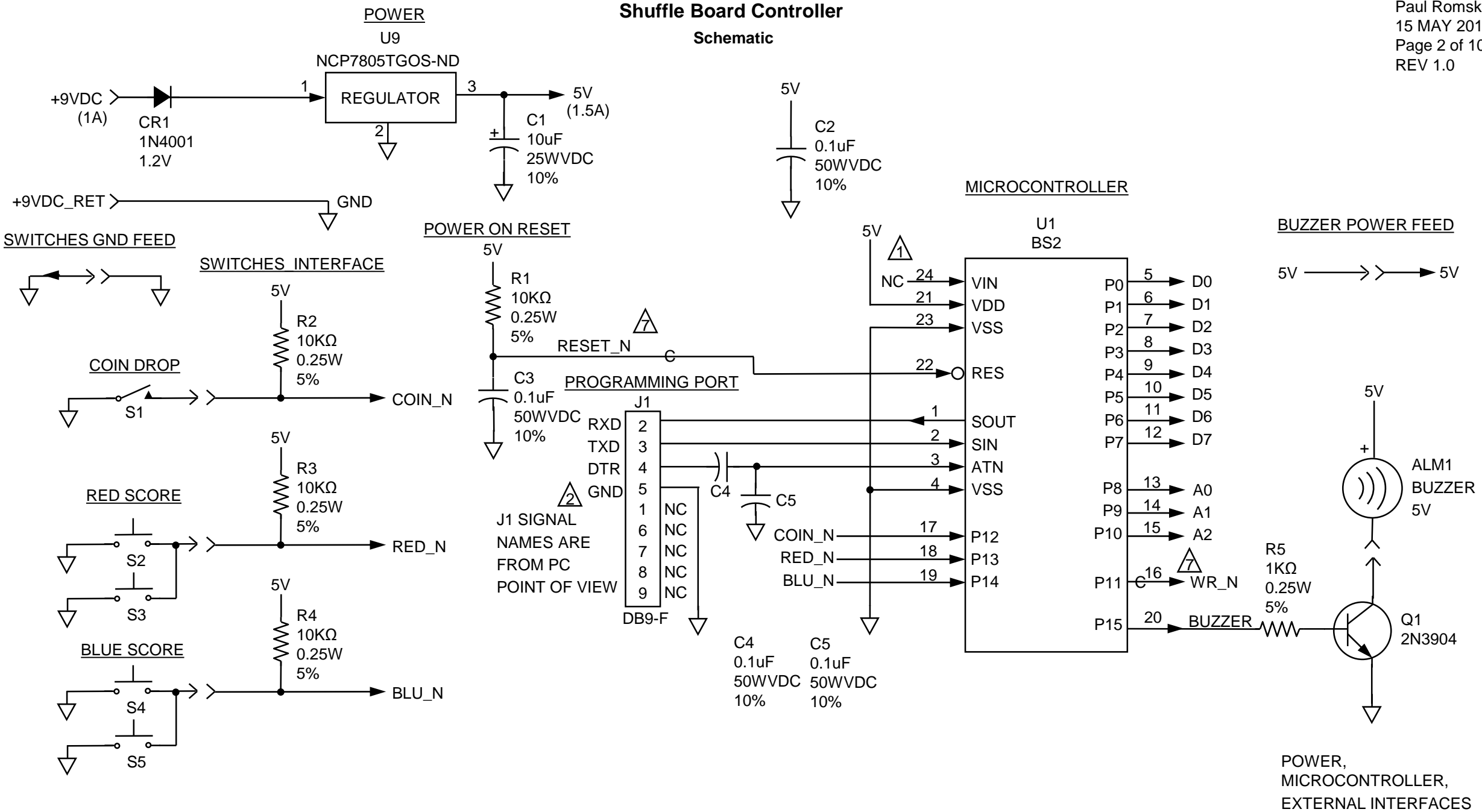


NOTES:

1. NC DENOTES PIN IS A "NO CONNECT" (NC PINS ARE NOT CONNECTED TOGETHER).
2. THE INCLUDED FILE CONTAINS THE U1 PROGRAM: Shuffle_Board_Controller_V1_0.exe
3. DOWNLOAD THE PARALLAX BS EDITOR 2.5.3 AND FTDI DRIVER (BOTH FREEWARE) TO PROGRAM THE FILE IN NOTE 2.
4. THE PARALLAX DOWNLOAD WEBSITE URL IS: <https://www.parallax.com/downloads/basic-stamp-editor-software-windows>
5. IF BRIGHTER LEDS ARE DESIRED (20 mA MAX), CHANGE ALL R_{Ln} VALUES to 90 Ω .
6. IF USING THE ORIGINAL SCORING GLASS, ALL LEDS SHOULD HAVE A DIFFUSER FOR A WIDER ILLUMINATION AREA.
7.  DENOTES CRITICAL SIGNALS THAT MUST BE WIRED FIRST. KEEP ALL CRITICAL WIRES CLOSE TO PROTO BOARD AND AWAY FROM OTHER WIRES THAT RUN MORE THAN 25mm IN PARALLEL. WIRES MAY CROSS CRITICAL WIRES AT RIGHT ANGLES. KEEP ALL TRANSISTOR TO LED WIRES AWAY FROM CRITICAL WIRES AS POSSIBLE.

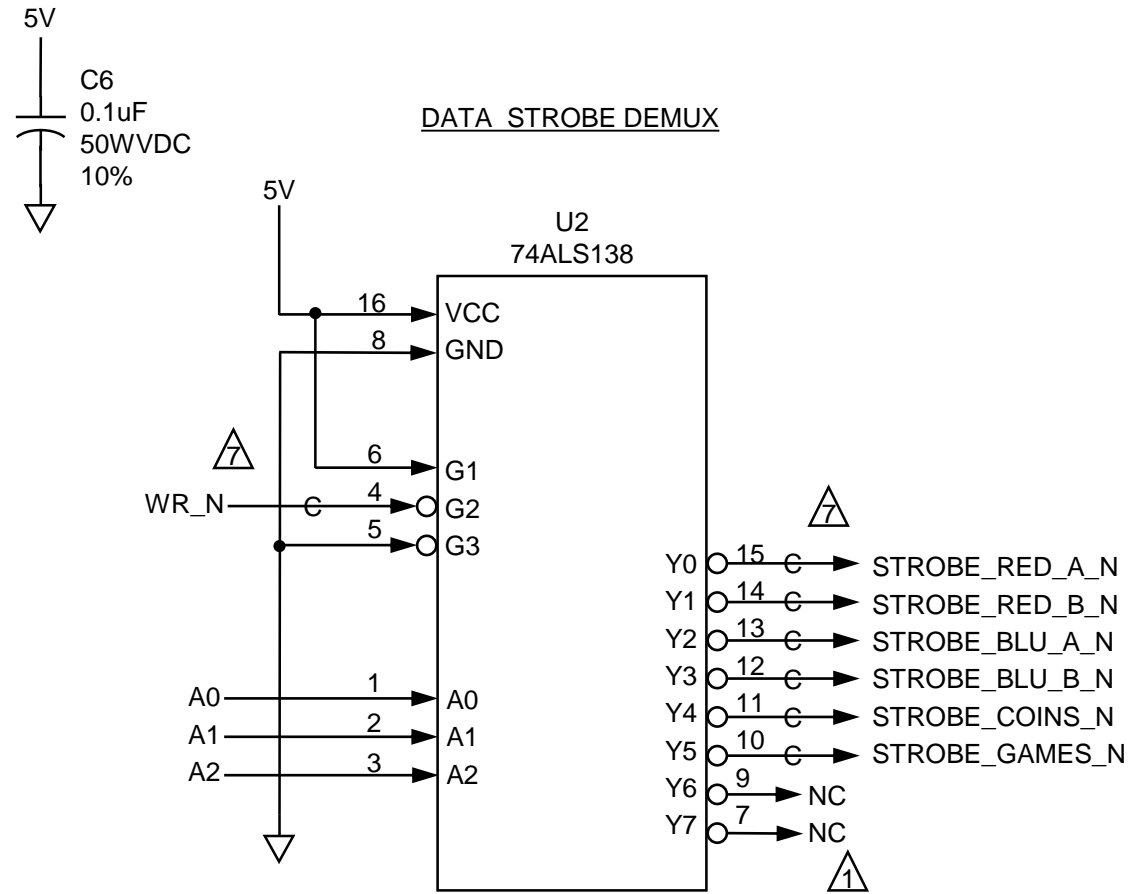
Shuffle Board Controller Schematic



POWER,
 MICROCONTROLLER,
 EXTERNAL INTERFACES

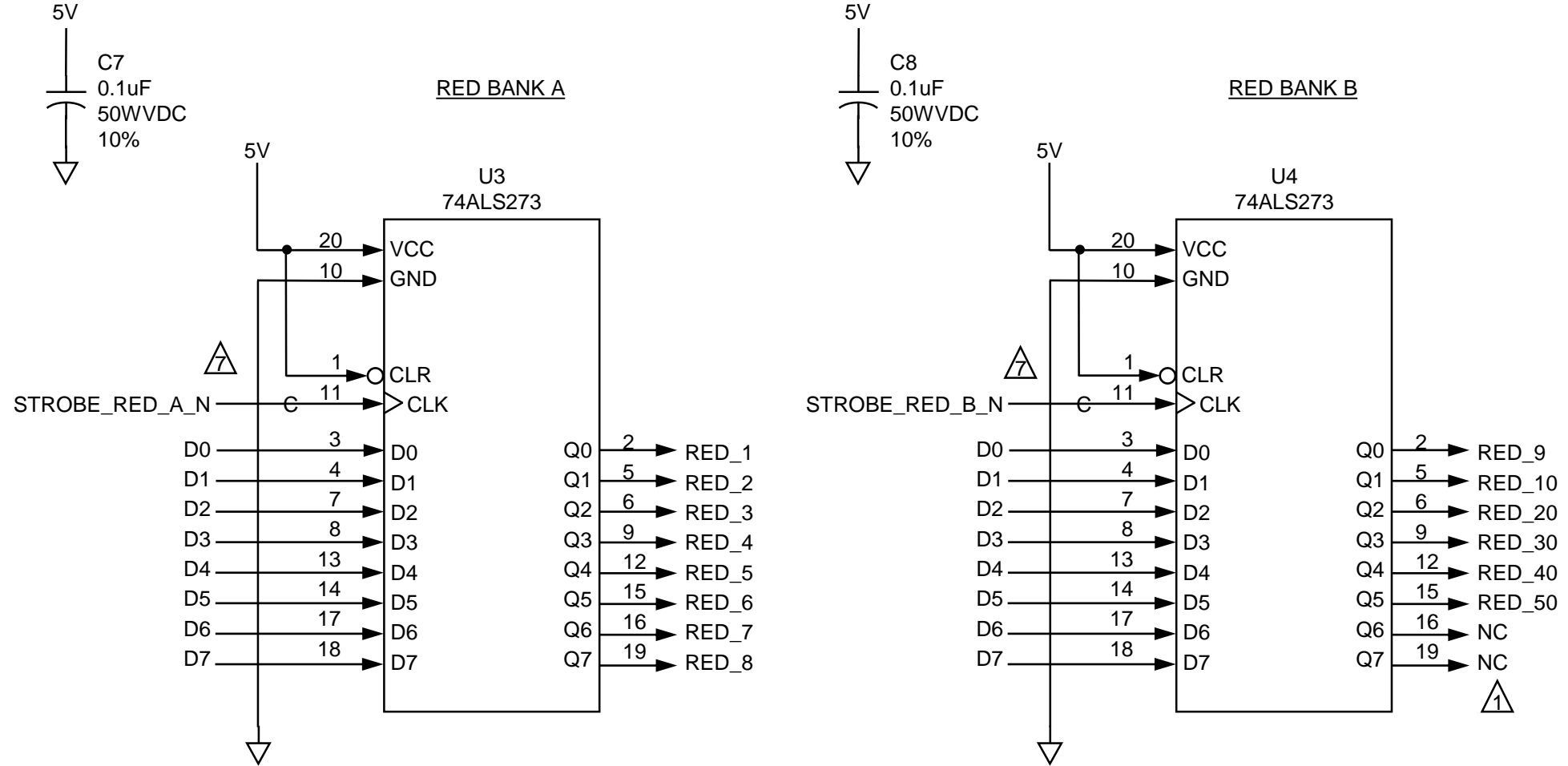
Shuffle Board Controller

Schematic

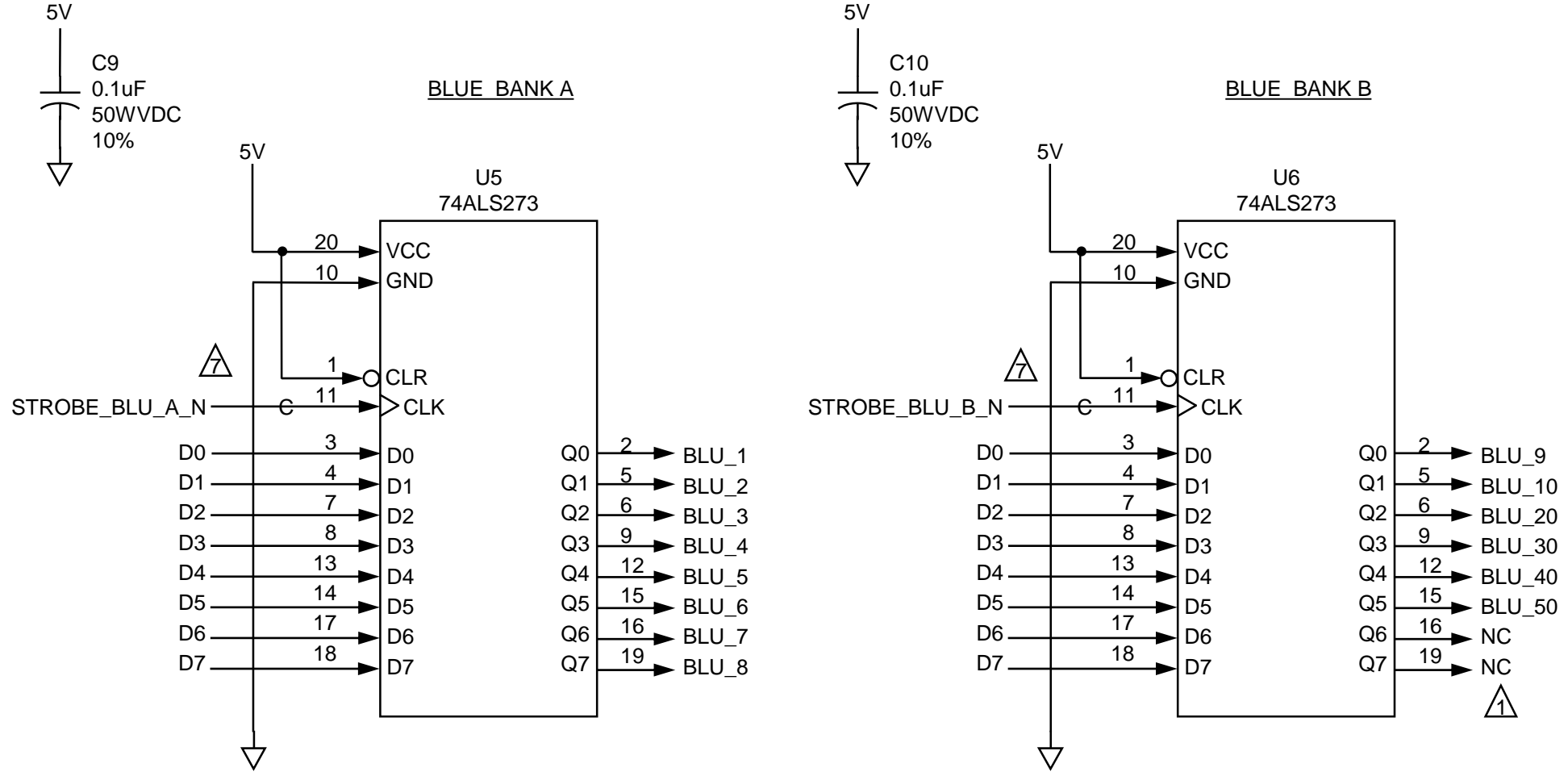


Shuffle Board Controller

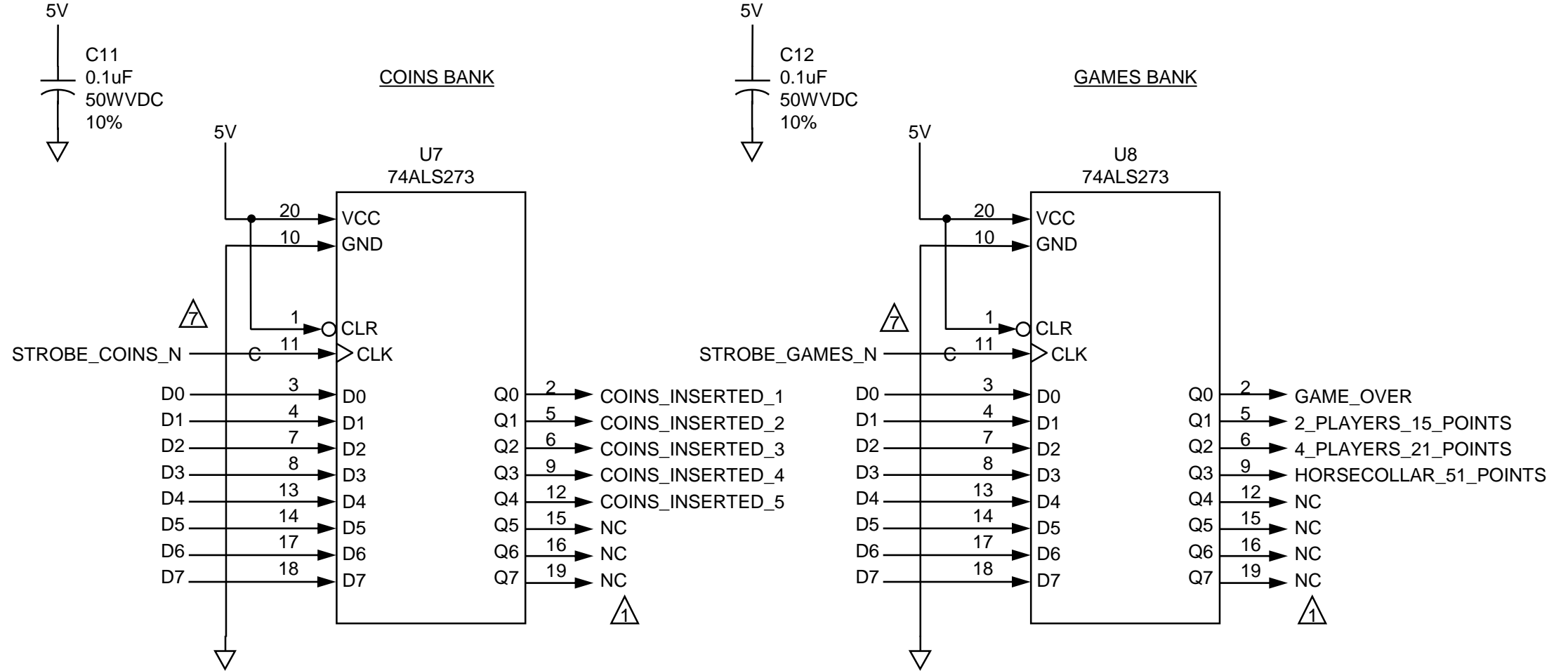
Schematic



Shuffle Board Controller Schematic



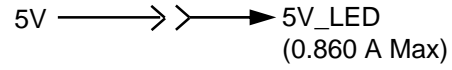
Shuffle Board Controller Schematic



Shuffle Board Controller

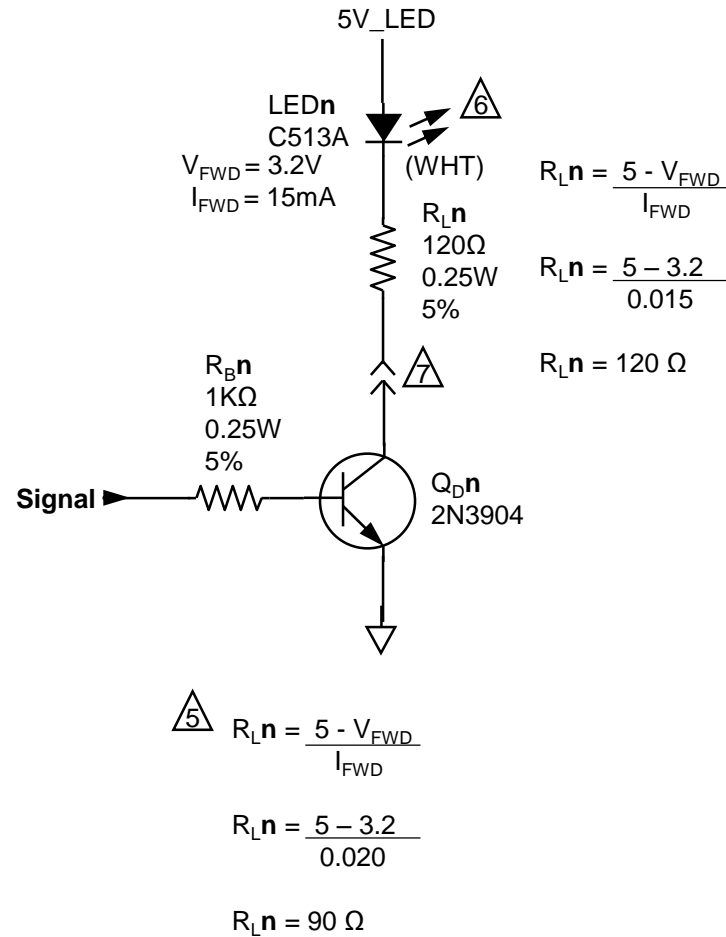
Schematic

LED POWER FEED



LEDs = C513A-WSN-CY0Z0231

SINGLE LEDS AND DRIVERS



Reference Designators

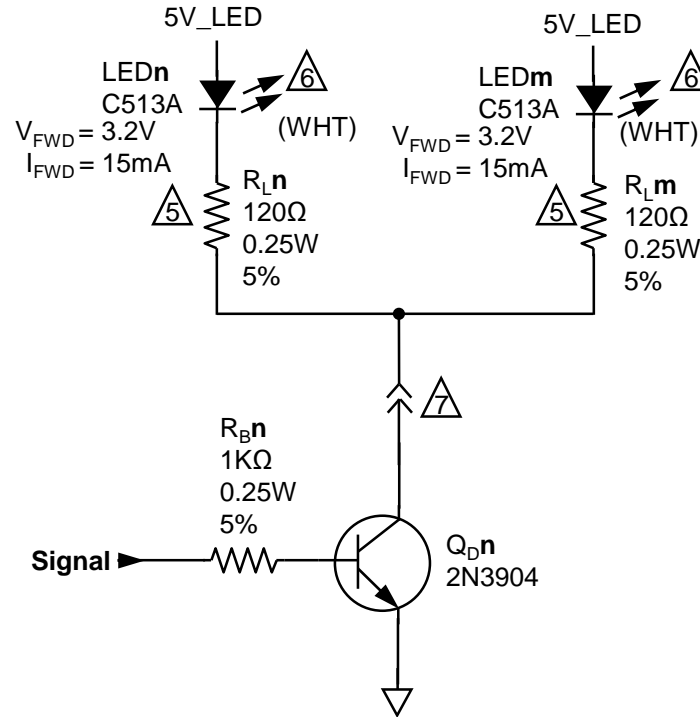
Signal	R _{Bn}	R _{Ln}	Q _{Dn}	LEDn
RED_1	1	1	1	1
RED_2	2	2	2	2
RED_3	3	3	3	3
RED_4	4	4	4	4
RED_5	5	5	5	5
RED_6	6	6	6	6
RED_7	7	7	7	7
RED_8	8	8	8	8
RED_9	9	9	9	9
RED_10	10	10	10	10
RED_20	11	11	11	11
RED_30	12	12	12	12
RED_40	13	13	13	13
RED_50	14	14	14	14
BLU_1	15	15	15	15
BLU_2	16	16	16	16
BLU_3	17	17	17	17
BLU_4	18	18	18	18
BLU_5	19	19	19	19
BLU_6	20	20	20	20
BLU_7	21	21	21	21
BLU_8	22	22	22	22
BLU_9	23	23	23	23
BLU_10	24	24	24	24
BLU_20	25	25	25	25
BLU_30	26	26	26	26
BLU_40	27	27	27	27
BLU_50	28	28	28	28
COINS_INSERTED_1	29	29	29	29
COINS_INSERTED_2	30	30	30	30
COINS_INSERTED_3	31	31	31	31
COINS_INSERTED_4	32	32	32	32
COINS_INSERTED_5	33	33	33	33

Shuffle Board Controller

Schematic

LEDs = C513A-WSN-CY0Z0231

DUAL LEDS AND DRIVERS



Reference Designators

Signal	R _{Bn}	R _{Ln,m}	Q _{Dn}	LED _{n,m}
2_PLAYERS_15_POINTS	34	34, 35	34	34, 35
4_PLAYERS_21_POINTS	35	36, 37	35	36, 37
HORSECOLLAR_51_POINTS	36	38, 39	36	38, 39
GAME_OVER	37	40, 41,	37	40, 41
LOGO (Signal is 5V - Always On)	38	42, 43	38	42, 43

Shuffle Board Controller

Parts List

Paul Romsky
15 MAY 2017
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Item	Ref Designators	Supplier	Supplier Part Number	Qty	Cost USD		Description
					Each	Total	
1	U1	DIGIKEY	STAMP2-ND	1	\$49.00	\$49.00	MICROCONTROLLER, PSTAMP2, DIP, PARALLAX
2	U2	DIGIKEY	296-1485-5-ND	1	\$0.95	\$0.95	MICROCIRCUIT, DEMUX, 74ALS138, DIP
3	U3-U8	DIGIKEY	296-1493-5-ND	6	\$1.31	\$7.86	MICROCIRCUIT, OCTAL D FLIP/FLOP, WITH CLEAR, 74ALS273, DIP
4	U9	DIGIKEY	497-1443-5-ND	1	\$0.44	\$0.44	MICROCIRCUIT, VOLTAGE REGULATOR, LINEAR, 3V-35V IN, 5V 1.5A OUT, TO-XXX
5	Q1, QD1-QD38	DIGIKEY	2N3904-APCT-ND	39	\$0.19	\$7.41	TRANSISTOR, NPN, 2N3904, TO-93
6	RL1-RL43	DIGIKEY	CF14JT120RCT-ND	43	\$0.10	\$4.30	RESISTOR, 120 OHM, 0.25W 5%, AXIAL
7	R5, RB1-RB38	DIGIKEY	CF14JT1K00CT-ND	39	\$0.10	\$3.90	RESISTOR, 1K OHM, 0.25W 5%, AXIAL
8	R1-R4	DIGIKEY	CF14JT10K0CT-ND	4	\$0.10	\$0.40	RESISTOR, 10K OHM, 0.25W 5%, AXIAL
9	C2-C12	DIGIKEY	BC3324-ND	11	\$0.20	\$2.20	CAPACITOR, 0.1 UF, 50WVDC, 10%, THROUGH HOLE
10	C1	DIGIKEY	493-13398-ND	1	\$0.43	\$0.43	CAPACITOR, 10 UF, 25WVDC, 5%, RADIAL
11	CR1	DIGIKEY	1N4001GDICT-ND	1	\$0.33	\$0.33	DIODE, SIGNAL, 1N4100, THROUGH HOLE
12	LED1-LED43	DIGIKEY	C513A-WSN-CY0Z0231-ND	43	\$0.25	\$10.75	DIODE, LED, WHITE, 5mm, T 1 3/4, VFWD 3.2V, 20mA
13	ALM1	DIGIKEY	102-1285-ND	1	\$2.28	\$2.28	BUZZER, 5VDC
14	J1	DIGIKEY	AE10921-ND	1	\$0.77	\$0.77	CONNECTOR, DB-9, FEMALE, RIGHT ANGLE, THROUGH HOLE
15	A1	DIGIKEY	V1224-ND	1	\$32.74	\$32.74	PROTO BOARD, PLATED, DUAL POWER BUS, 6.30" L X3.94" W
16	XU1	DIGIKEY	ED3051-5-ND	1	\$0.28	\$0.28	SOCKET, DIP, 24 PIN 600 MILL WIDE
17	XU2	DIGIKEY	ED3046-5-ND	1	\$0.19	\$0.19	SOCKET, DIP, 16 PIN 300 MILL WIDE
18	XU3-XU8	DIGIKEY	ED3054-5-ND	6	\$0.26	\$1.56	SOCKET, DIP, 20 PIN 300 MILL WIDE
19	-	DIGIKEY	C2003W-100-ND	AR	\$15.11	\$15.11	WIRE, 24 AWG, STRANDED COPPER, WHITE, 100 FOOT ROLL
20	-	DIGIKEY	SMDSW.020 1OZ-ND	AR	\$5.03	\$5.03	SOLDER, 63/37 TIN/LEAD, 24 AWG, 1 OZ, FLUX NO CLEAN, OR EQUIV
					GRAND TOTAL	\$145.93	

PARTS LIST

AR = As Required

Shuffle Board Controller

Additional Parts List

THE ADAPTER IS DISCONNECTED AFTER PROGRAMMING U1 AND IS REUSABLE FOR OTHER BS2 PROJECTS

Item	Ref Designators	Supplier	Supplier Part Number	Qty	Cost USD		Description
					Each	Total	
1	ADAPTER1	DIGIKEY	28030-ND	1	\$18.07	\$18.07	ADPATER, USB TO SERIAL, PARALLAX
				GRAND TOTAL		\$18.07	

SUGGESTED PARTS IF SWITCHES ARE NOT INCLUDED IN THE EXISTING SHUFFLE BOARD

Item	Ref Designators	Supplier	Supplier Part Number	Qty	Cost USD		Description
					Each	Total	
1	S2, S3	DIGIKEY	1568-1476-ND	2	\$1.95	\$3.90	SWITCH, PUSHBUTTON, RED, MOMENTARY
2	S4, S4	DIGIKEY	1568-1477-ND	2	\$1.95	\$3.90	SWITCH, PUSHBUTTON, BLUE, MOMENTARY
3	S1	DIGIKEY	1568-1479-ND	1	\$1.95	\$1.95	SWITCH, PUSHBUTTON, BLACK, MOMENTARY
				GRAND TOTAL		\$9.75	