MyRIO Expansion Board

(Gamma2b, 2018)

Name	Value	Package	Description	Part Number
C1, C2, C3	220 uF (50V)	Radial	Buckpuck cap	P5183-ND
C4, C5, C8, C9	.1 uF?	0805	Lick sensor LP filter	
C6	.1 uF	Radial	Vreg output cap	
C7	.33 uF 50V	Radial	Vreg input cap	
C10	.1 uF	0805	Comparator bypass cap	
D1	2A, 200V	Through hole	Input reverse polarity protection diode	RL203-TPCT-ND
D2, D3	3A, 60V	SMB	Fast recovery Schottky diode for coils. MBRS360	MBRS360BT3GOSCT-ND
Q1, Q3	500mA, 60V	SOT23	Improved NFET for lick detection with higher VDS max	DMN24H3D5L-7DICT-ND
Q2, Q4	200mA, 40V	SOT23	2N3906 PNP for lick detection	MMBT3906FSCT-ND
Q5, Q7, Q9	200mA, 40V	SOT23	2N3906 PNP for Buckpuck ctrl	MMBT3906FSCT-ND
Q6, Q8, Q10	200mA, 40V	SOT23	2N3904 NPN for Buckpuck ctrl	568-4510-1-ND
T1, T2	60V, 4A	SOT-223	Power NFET for soln. Alternate part with better characteristics (protection)	497-3177-1-ND NCV8406ASTT1GOSCT-ND
R1, R3, R38, R42	10M	0805	Lick sense resistor	HMC0805JT50M0CT-ND
R2, R4	500	1206	Soln FET gate drive	
R30, R31	50k	1206	Soln FET pull-down	
R32, R33	1	1206	Soln current sense	
R7, R43	500	axial	Power LED, isolated LED	
R8, R15, R19, R20	500	0805	Opto-isolator LED current limit	
R5, R6, R17, R18	100k	0805	First lick sensor components	
R36, R37, R40, R41	100k	0805	Comparator lick circuit	
R16, R21	100k Pot	Bourne 3362P or 3386P Series	First lick sensor components, sensitivity adjust	3386P-104LF-ND 3362P-104LF-ND
R9, R10, R11, R12, R13, R14, R24, R27, R29	5k	0805	Buckpuck control	
R23,R26	1M	Trimpot	Hysteresis adjust	
R22, R25, R28, R34	10k	axial	Lick sensor LP filter	

R35, R39	30k		Comparator output pull-up	
OK1-OK4	Opto isolator	6-SMD	4N25SM	4N25SM-ND
U1	TVS	SOT-143	TVS Protection diode for lick FETs	CD143A-SR12CT-ND
U2	Comparator	14-SOIC	LP339 open collector, 4 device. Can probably use LM339 or other comparator	296-14609-1-ND 296-6604-1-ND
U3	5V LDO Regulator	DPAK	MC78M05	497-7255-1-ND
	Right Angle BNC Double			ARF2111-ND ACX2286-ND
	Right Angle BNC			A97553-ND, WM5514-ND
	NI MXP Connector			S9207-ND
	Audio jack			CP1-3525N-ND
	DC Barrel Connector			EJ503A-ND
	Switch SPDT		EG2478	EG2478-ND
	Switch 3PDT		To select battery power.	360-3209-ND
		SIP-7	Buckpuck 350 mA, internal current adjustment pot	788-1098-ND

Version History:

Gamma 1a (Fabbed 2017)

1. Eliminated the Teensy
2. Replaced Q1, Q3 NPN with BS170 nFETs and BAS40 protection diode array
    a. Upgraded Q1, Q3 to DMN24H3D5L (240V) and upgraded protection diode array to CMPD2004S (240V)
3. Added alternate lick detection topology (Comparator, LP, Schmitt trigger)

Gamma 1b

1. Fixed ground pour overlap
2. Added current limiting resistors to bases of BuckPuck BJTs
3. Added weak pulldown on solenoid driver FETs

Gamma 2a (Fabbed October 2018)

1. Upgraded FET protection to use TVS data line ESD protection via CD143A
2. Alternate lick detection circuit included and opto-isolated
3. Smart power transistors for solenoid actuation
4. Included switch and indicator to select lick circuit power/isolation

Gamma 2b

1. Fixed miswired pin 5, 6 on lick A circuit opto-isolators
2. Changed lick circuit selection to a jumper instead of solder pad