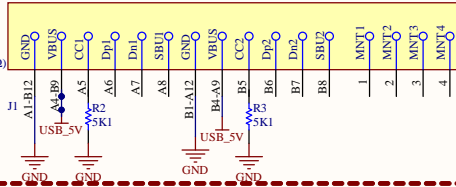


ANALOG SECTION

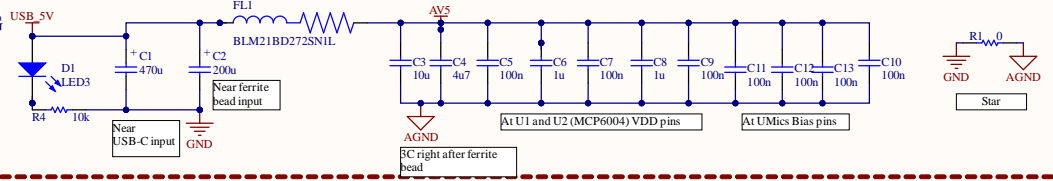
Sound Direction Indicator - Sheet 1 of 2

POWER INPUT

USB-C / CC Pull-downs (5.1kΩ)

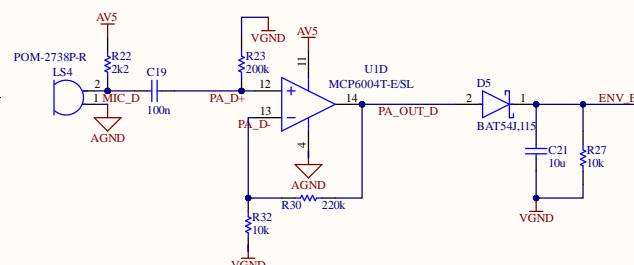
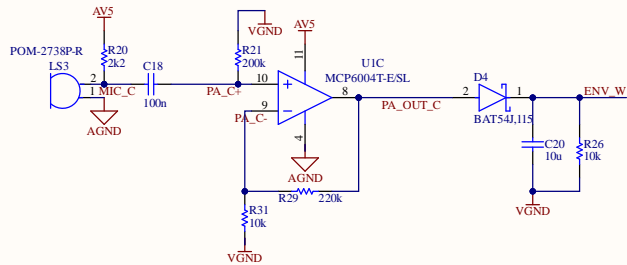
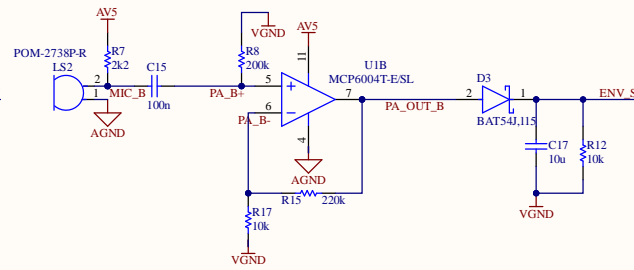
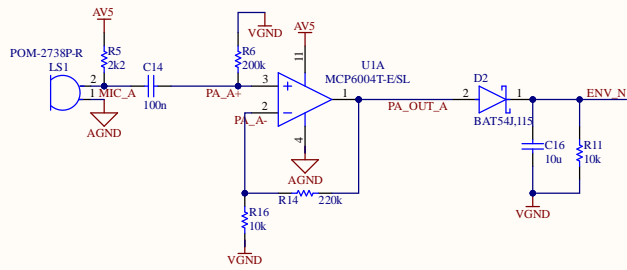


POWER FILTERING



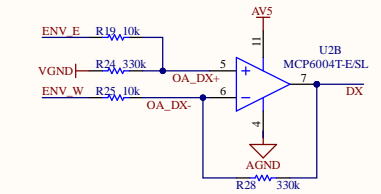
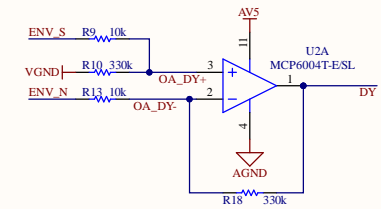
MIC SIGNAL CHAIN (PREAMP + ENVELOPE)

U1 (MCP6004) | Preamp Gain $\approx 23\times$ | Envelope $\tau \approx 100\text{ms}$ | Output: ENV_N/E/S/W | Outputs centered at VREF

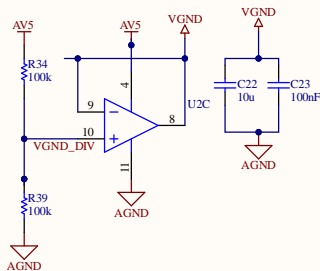


DIRECTION

Subtracts opposite envelopes to determine sound source axis
X: East - West | Y: North - South | Gain = $33\times$ | Reference: VREF

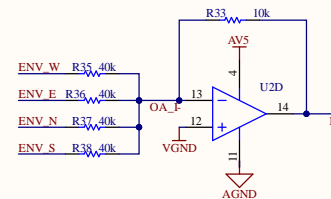


VGND GENERATOR (MID-RAIL)



ANALOG SUMMER

$$I_{OUT} = VREF + (ENV_N + ENV_E + ENV_S + ENV_W) / 4$$

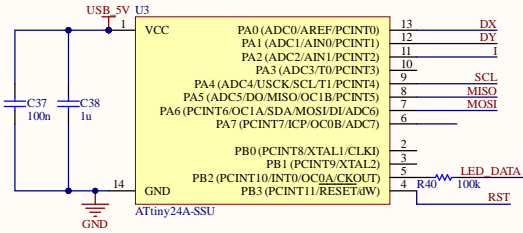


Title		
Sound Direction Indicator		
Size	Number	Revision
A3		
Date:	2/08/2026	Sheet of
File:	C:\Users\...\Analog.SchDoc	Drawn By:

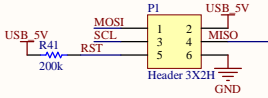
DIGITAL SECTION
Sound Direction Indicator - Sheet 2 of 2

MICROCONTROLLER

ATtiny24A-SSU | 8MHz Internal RC | 3x ADC inputs (DX, DY, Intensity) | 1x GPIO output (LED data)

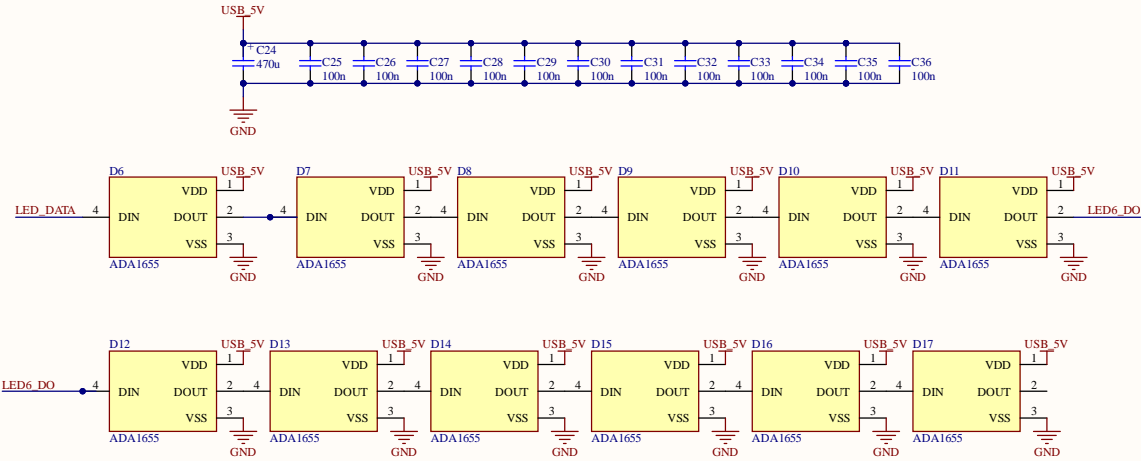


ISP PROGRAMMING



LED RING

12x WS2812B (5050 package) | Single-wire protocol (800kHz) | Accent colors: Blue (moderate), Red (loud)
local 100nF capacitor to suppress high-frequency PWM switching noise | Bulk pass for LEDs low frequency switching noise



Title			Sound Direction Indicator		
Size	Number		Revision		
A3					
Date:	2/08/2026		Sheet of		
File:	C:\Users\...\Digital_SchDoc		Drawn By:		



Line #	Name	Description	Designator	Revision ID	Revision State	Revision Status	Quantity	Manufacturer 1	Manufacturer Part Number 1	Manufacturer Lifecycle 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Subtotal 1
	Custom item 1				Not managed		0							
	Custom row 1				Not managed		0							
	470u	Polar capacitor	C1, C24		Not managed		2							
	200u	Polar capacitor	C2		Not managed		1							
	10u	None polar capacitor	C3, C16, C17, C20, C21		Not managed		5							
	4u7	None polar capacitor	C4		Not managed		1							
	100n	None polar capacitor	C5, C7, C9, C10, C11, C12, C13, C14, C15, C18, C19, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37		Not managed		24							
	1u	None polar capacitor	C6, C8, C38		Not managed		3							
	Cap Semi	Capacitor (Semiconductor SIM Model)	C22		Not managed		1							
	Cap Semi	Capacitor (Semiconductor SIM Model)	C23		Not managed		1							
	LED3	Typical BLUE SiC LED	D1		Not managed		1							
	BAT54J, 115	DIODE SCHOTTKY 30V 200MA SOD323F	D2, D3, D4, D5		Unknown server		4							
	ADA1655	WS2812B 5050 RGB LED with Integrated Driver Chip - 10 Pack	D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17		Not managed		12							
	BLM21BD2725N1L	2.7 kOhms @ 100MHz 1 Signal Line Ferrite Bead 0805_2012 Metric_ 200mA 800mOhm	FL1		Not managed		1							
	USB4110-GF-A	CONN USB 2.0 TYPE-C R/A SMT	J1		Unknown server		1							
	POM-2738P-R	MIC COND ANALOG OMNI - 38DB	LS1, LS2, LS3, LS4		Unknown server		4							
	Header 3X2H	Header, 3-Pin, Dual row, Right Angle	P1		Not managed		1							
	0	Standard resistor	R1		Not managed		1							
	5K1	Standard resistor	R2, R3		Not managed		2							
	10k	Standard resistor	R4, R9, R11, R12, R13, R16, R17, R19, R25, R26, R27, R31, R32, R33		Not managed		14							
	2k2	Standard resistor	R5, R7, R20, R22		Not managed		4							
	200k	Standard resistor	R6, R8, R21, R23, R41		Not managed		5							
	330k	Standard resistor	R10, R18, R24, R28		Not managed		4							
	220k	Standard resistor	R14, R15, R29, R30		Not managed		4							
	100k	Standard resistor	R34, R39, R40		Not managed		3							
	40k	Standard resistor	R35, R36, R37, R38		Not managed		4							
	MCP6004T-E/SL	None	U1, U2		Unknown server		2							
	ATTiny24A-SSU	8-bit AVR Microcontroller, 20MHz, 1.8-5.5V, 2KB Flash, 128 Bytes EEPROM, 128 Bytes SRAM, 14-pin SOIC, Industrial Grade (-40°C to 85°C), Pb-Free	U3		Unknown server		1							