Bill of Materials

REFDES Connectors	Quantity	Value	Tolerance	Function	MFG	MFG P/N CO	Part Description NNECTORS	Package	Datasheet Link	Vendor	Vendor P/N	Comments
							Fixed Terminal					
P1, P2		2		Detter Connection Serous Terminal	TE Connectivity / AMP	282834-2	Blocks 2P SIDE	TIL 0 E4mm nitch	http://www.te.	Maugar	571-282834-2	This part is generic
-1, FZ		2		Battery Connection - Screw Terminal	AIVIE	202034-2	ENTRY 2.54mm Fixed Terminal	TH - 2.54mm piton	com/catalog/pn/en/2	Mouser	571-202034-2	This part is generic.
				Alternate Input Connection Block -	TE Connectivity /		Blocks 3P SIDE		http://www.te.			
P3, P4		2 DNI		Screw Terminal	AMP	282834-3	ENTRY 2.54mm	TH - 2.54mm pitch	com/catalog/pn/en/2	Mouser	571-2828343	This part is generic.
					Johnson / Emerson		Test Plugs & Test					
					Connectivity		Jacks BINDING	Panel Mount -	http:			
BP1		1 YELLOW		Input Connector - Binding Post	Solutions	111-0107-001	POST YELLOW	Solder or Screw	//emersonconnectiv	Mouser	530-111-0107-1	This part is generic.
					Johnson /		Test Dives 9 Test					
					Emerson Connectivity		Test Plugs & Test Jacks BINDING	Panel Mount -	http:			
BP2		1 WHITE		Input Connector - Binding Post	Solutions	111-0101-001	POST WHITE	Solder or Screw	//emersonconnectiv	Mouser	530-111-0101-1	This part is generic.
					Johnson /							
					Emerson Connectivity		Test Plugs & Test Jacks BINDING	Panel Mount -	http:			
BP3		1 BLACK		Input Connector - Binding Post	Solutions	111-0103-001	POST BLACK	Solder or Screw	//emersonconnectiv	Mouser	530-111-0103-1	This part is generic.
					Johnson /							
					Emerson		Test Plugs & Test Jacks BINDING	Panel Mount -	http:/			
BP4, BP5, BP6		3 RED		Input Connector - Binding Post	Connectivity Solutions	111-0102-001	POST RED	Solder or Screw	http: //emersonconnectiv	Mouser	530-111-0102-1	This part is generic.
51 1, 51 0, 51 0		0 1120		input connector Binaing Foot	Colutionic		1 GOT NED	Through-Hole with			000 111 0102 1	
								Panel-Mount Face,				
BNC1, BNC2,		4		Output Connector DNC	TE Connectivity /	5007464 6	RT/A BNC 50	Right-Angle	http://www.te.	Mausar	E74 E007464 6	This part is generic
BNC3, BNC4 Resistors/Jumpers	rs	4		Output Connector - BNC	AMP	5227161-6 RESIST	Ohms, PCB-Mount ORS/JUMPERS	Launch	com/catalog/pn/en/	Mouser	571-5227161-6	This part is generic.
resistors/oumpen	3			Gain Resistor for U1, U3, U4, U5		MFR-25FBF52-	RES 11K OHM		http://www.yageo.			
G1, G3, G4, G5		4 11k	1%	(respectively)	Yageo	11K	1/4W 1% AXIAL	TH	com/documents/rec	Digikey	11.0KXBK-ND	This part needs 1% tolerance.
									http://www.			
				Single-Pole HPF - goes between	Stackpole		RES 2M OHM		seielect. com/Catalog/SEI-			This part is generic (it doesn't really need 1%
R1		1 2M	1%	differential amplifier gain stages	Electronics Inc.	RNF14FTD2M00	1/4W 1% AXIAL	тн	RNF_RNMF.pdf	Digikey	RNF14FTD2M00C	
_						MFR-25FBF52-	RES 2.1K OHM		http://www.yageo.			
R2		1 2.1k	1%	Gain Resistor for U2	Yageo	2K1	1/4W 1% AXIAL	TH	com/documents/rec	Digikey	2.10KXBK-ND	This part needs 1% tolerance.
					Panasonic				http://industrial. panasonic.			
R3, R4, R5, R6,					Electronic		RES 43K OHM		com/www-			PART IS OBSOLETE! Needs replacement
R7, R8		6 43k	5%	Offset Adjust leg resistors	Components	ERD-S2TJ433V	1/4W 5% AXIAL	TH	data/pdf/AOA0000/	Digikey	P43KBACT-ND	identified.
							RES 300 OHM		http://www. seielect.			This part is generic (size it to match how bright you want the indicator LEDs to be - but
					Stackpole		1/4W 5%		com/catalog/SEI-		CF14JT300RCT-	remember that brightness costs you battery
R9, R10		2 300	5%	Indicator LED limit resistors	Electronics Inc.	CF14JT300R	CARBON FILM	TH	CF_CFM.pdf	Digikey	ND	life).
R11		0 DNI		this is a bug/error (with C2)								
R12, R13, R14		0 DNI		Jumpers (0 Ohm) - Connects P3 pins to BP1, BP2 and BP3 (respectively)								This part is generic.
Capacitors		UDNI		to BF1, BF2 and BF3 (respectively)		 C/	PACITORS					This part is generic.
				C1 = Single-Pole HPF - goes between	1							
04 000 000		0.4.5	100/	differential amplifier gain stages. C20,	TDK Os manting	FILOONEDAAAOEIL	CAP CER 1UF		http://product.tdk.	Disilian	445 0054 ND	This washing and and
C1, C20, C22 C2		3 1uF 0 DNI	10%	C22 = Decoupling Capacitors this is a bug/error (with R11)	TDK Corporation		10V 10% RADIAL	TH, RADIAL	com/capacitor/lead	Digikey	445-2851-ND	This part is generic.
C3, C5, C7, C9,		U DINI										
C11, C14, C15,					Vishay BC		CAP CER 0.47UF		http://www.vishay.			
C18, C19		9 0.47uF	10%	Decoupling Capacitor (two per IC)	Components	K474K20X7RF5UF	50V 10% RADIAL	TH, RADIAL	com/docs/45171/ks	Digikey	BC2689CT-ND	This part is generic.
C4, C6, C8, C10, C12, C13, C16,					Vishay BC		CAP CER 0.1UF		http://www.vishay.			
C17, C21		9 0.1uF	10%	Decoupling Capacitor (two per IC)	Components	K104K15X7RF5TL	2 50V 10% RADIAL	TH, RADIAL	com/docs/45171/ks	Digikey	BC1084CT-ND	This part is generic.
Potentiometers						POTE	NTIOMETERS					
DOT / DOTO					Panasonic		POT 10K OHM		http://www.			
POT1, POT2, POT3		3 10k	20%	Offset Adjust Knob for Single-Ended Amplifiers	Electronic Components	EVU-F2AF30B14	9MM VERT NO	тн	panasonic. com/industrial/comp	Digikey	P3C3103-ND	This part was selected for its value (10k), it's linearity, its shaft type, and its shaft length.
Switches		0 TOK	2070	7 unpiniers	Componenta		WITCHES		commuduation	Digitey	1 000100 110	incurry, to chart type, and to chart longin.
									http://www.			This part is fairly generic. It was picked
							SWITCH TOGGLE		nkkswitches.			because it's got a nice clicking action and it's
S2 Active		1 SPDT, 0.4VA, 28V		Power Toggle Switch	NKK Switches	M2012SS1G03	SPDT 0.4VA 28V	TH, Panel-Mount	com/pdf/MtogglesB	Digikey	360-1800-ND	panel-mount SPDT.
Components						ACTIVE	COMPONENTS					
				Power Supply N-Fet - Connects								
o				Batteries to respective power supply	Alpha & Omega		MOSFET N-CH	01/T TO 050	http://www.aosmd.			PART IS OBSOLETE! Needs replacement
Q1, Q2		2		rails when S2 is toggled.	Semiconductor Inc	AOD4102	30V 19A TO-252	SMT, TO-252	com/res/data_shee http://www.analog.	Digikey	785-1104-1-ND	identified. This part was specifically picked for its
		4 G = 10		Instrumentation Amplifier - Gain = 10	Analog Devices	AD623ANZ	LP 8DIP	8-DIP	com/static/imported	Digikey	AD623ANZ-ND	performance.
U1, U3, U4, U5							IC AMP INST R-R		http://www.analog.			This part was specifically picked for its
				Instrumentation Amplifier - Gain = 100	Analog Devices	AD627ANZ	25MA 8DIP DS/DIODES	8-DIP	com/static/imported	Digikey	AD627ANZ-ND	performance.
U2		1 G = 100				LE	03/010023					
		1 G = 100										
U2 LEDs/Diodes		1 G = 100			Everlight		LED SS ALGAAS		http://media. digikey.			
U2 LEDs/Diodes					Electronics Co.		SUP RED CLEAR		digikey. com/PDF/Data%			This part is generic (pick any same-sized LED
U2 LEDs/Diodes VEE_LED, VCC_LED		1 G = 100 2 RED		Power Supply Indicator LEDs	Electronics Co. Ltd.	MV8112	SUP RED CLEAR 5MM	TH, RADIAL	digikey. com/PDF/Data% 20Sheets/Everlight		1080-1134-ND	This part is generic (pick any same-sized LED you like, as long as Vf < 2.5V).
U2 LEDs/Diodes VEE_LED, VCC_LED					Electronics Co. Ltd.		SUP RED CLEAR 5MM		digikey. com/PDF/Data%		1080-1134-ND	you like, as long as Vf < 2.5V).
J2 _EDs/Diodes /EE_LED, /CC_LED					Electronics Co. Ltd.		SUP RED CLEAR 5MM		digikey. com/PDF/Data% 20Sheets/Everlight		1080-1134-ND	This part is generic (pick any same-sized LED you like, as long as Vf < 2.5V). This part requires hand-modifications to the lid and body in order to accommodate the:
U2					Electronics Co. Ltd.		SUP RED CLEAR 5MM ARTS (NOT IN CIR	4-11/16"L x 3-	digikey. com/PDF/Data% 20Sheets/Everlight ED ON SCHEMATIC) Minute Man	1080-1134-ND LMB Heeger KAB- 3432BLK	you like, as long as Vf < 2.5V). This part requires hand-modifications to the lid

Bill of Materials

Quantity	Value	Tolerance	Function	MFG	MFG P/N	Part Description	Package	Datasheet Link	Vendor	Vendor P/N	Comments
	3		Knobs fit over potentiometer slotted-D shaft. Act as indicator, make it easier to adjust the potentiometer, and also help hold the board to the enclosure lid	Eagle Plastic	450-4760	Knobs & Dials SOFT TOUCH D SHAFT		http://www. mouser. com/ds/2/209/EPD-	Mouser	450-4760	This part is generic.
			The batteries! One battery pack provides the +3V supply (via P1), the	Eagle Plastic		Battery Holders, Snaps & Contacts 2XAA 6" LDS		http://www. mouser.			This part is pretty generic - the important feature here is that it have a lid (or way to loc in the batteries well) and pigtail leads instead of pins.
	5		Allows Removal/Repair of Instrumentation Amplifiers (because they're expensive!)	TE Connectivity / AMP	1-390261-2	CONN IC SOCKET VERT 8POS TIN	8-DIP	http://www.te.		A100204-ND	This part is generic.
	4		Used with a nut to improve splash- protection	TE Connectivity / AMP	330620	RF Connectors INSULATION BUSHING		http://www.te. com/catalog/pn/en/	Mouser	571-330620	This part can't easily be fudged.
	1/2-28 UNEF-28 (extra fine threaded nut - 4 0.109 inches thick)		Holds the BNC connector into the enclosure body, and seals against the sealing ring.	TE Connectivity / AMP	1-329631-2	JAM NUT 0.623" BRASS 1/2-28	1/2-28 threaded	http://www.te. com/commerce/Do	Digikey	A1128-ND	These guys are also often called "Panel Mour Nuts." It would be great if they shipped with the BNC connectors, but that's not super- common. So, you have to buy them separately.
	1 Version 1.0			Advanced Circuits		Custom PCB			Advanced Circuits		This part is custom. Use the provided gerbers and fab up a PCB!
					MISCELLANEOU	JS ASSEMBLY MATE	RIALS				
	2 1 inch strips		Use to affix the battery holders to the bottom of the enclosure and keep things from rattling around.								This part is epically generic. Pick your favorite double-sided foam tape from your local office supply or hardware store.
			Use to make fake light-pipes for the enclosure (because drilling press-fit holes for real light pipes can be a pain)						McMaster-Carr	7556A33	Any clear, 1-5 minute, aluminum-bonding 2- part epoxy will work for this. Pick it up at your local hardware store because they tend to have a good selection of 3-5 minute translucent 2-part epoxies in easy-to-use dispensing syringes. Ive also provided a McMaster-Carr P/N for a 1-minute epoxy that should work.
		3 2 2xAA 5 4 1/2-28 UNEF-28 (extra fine threaded nut - 0.109 inches thick) 1 Version 1.0	3 2 2xAA 5 4 1/2-28 UNEF-28 (extra fine threaded nut - 4 0.109 inches thick) 1 Version 1.0	X Knobs fit over potentiometer slotted-D shaft. Act as indicator, make it easier to adjust the potentiometer, and also help hold the board to the enclosure lid. 3 1 Z 2xAA 2 2xAA 3 1 Z 2xAA 2 2xAA 3 4 4 4 1/2-28 UNEF-28 (extra fine threaded nut - 4 0.109 inches thick) 4 1 Version 1.0 2 1 inch strips 2 1 inch strips 2 1 inch strips	Among Linking Knobs fit over potentiometer slotted-D shaft. Act as indicator, make it easier to adjust the potentiometer, and also help hold the board to the enclosure iid. Eagle Plastic Devices 3 IId. Eagle Plastic Devices 2 2xAA The batteries! One battery pack provides the +3V supply (via P1), the other provides the +3V supply (via P2). Devices Eagle Plastic Devices 5 Instrumentation Amplifiers (because they're expensive!) TE Connectivity / AMP 4 Used with a nut to improve splash-protection TE Connectivity / AMP 1/2-28 UNEF-28 (extra fine threaded nut - with enclosure body, and seals against the threaded nut - with external fine. Holds the BNC connector into the enclosure body, and seals against the threaded nut - with external fine. TE Connectivity / AMP 1 Version 1.0 Advanced Circuits 2 1 inch strips Use to affix the battery holders to the bottom of the enclosure and keep things from rattling around.	Among Among Knobs fit over potentiometer slotted-D shaft. Act as indicator, make it easier to adjust the potentiometer, and also help hold the board to the enclosure lid. Eagle Plastic 3 Id. 2 2xAA The batteries! One battery pack provides the +3V supply (via P1), the other provides the +3V supply (via P2). Eagle Plastic 5 The batteries! One battery pack provides the +3V supply (via P2). Devices 12BH325/C-GR 4 they revolve splash- protection TE Connectivity / AMP 1-390261-2 4 protection TE Connectivity / AMP 330620 1/2-28 UNEF-28 (extra fine threaded nut - 4 easing ring. TE Connectivity / AMP 1/2-28 UNEF-28 (extra fine threaded nut - 4 Advanced Circuits 1/2-28 UNEF-28 (extra fine threaded nut - 4 Advanced Circuits 1/2-28 UNEF-28 (extra fine threaded nut - 4 Advanced Circuits 2 1 inch strips <	Amod Knobs fit over potentiometer slotted-D shaft. Act as indicator, make it leasier to adjust the potentiometer, and also help hold the board to the enclosure lid. Eagle Plastic Devices Knobs & Dials SOFT TOUCH D Beatlery Holders, Soft TOUCH D Beatlery Holders, MISCELLANEOUS ASSEMBLY MATE Beatlery Holders, It Miscellaneous Assemblery Mater Soft Touch D Beatlery Holders, Miscellaneous Assemblery Mater Soft Touch D Beatlery Holders, Miscellaneous Assemblery Mater Soft Touch D Beatlery Holders, It Miscellaneous Assemblery Mater Soft Touch D Beatlery Holders, It Miscellaneous Assemblery Mater Soft Touch D Beatlery Holders, It Beatlery Holders, It Miscellaneous Assemblery Mater Soft Touch D Beatlery Holders, It Beatlery Holders, It Beatlery Holders, It Be	And W Knobs fit over potentiometer slotted: shaft. Act as indicator, make it easier to adjust the potentiometer slotted: shaft. Act as indicator, make it easier to adjust the potentiometer slotted: help hold the board to the enclosure lid. Eagle Plastic Eagle Plastic Knobs & Dials SOFT TOUCH D 3	3	And and a state of the store potentiometer solited-D shaft. Act as indicator, make it easily help hold the board to the enclosure lid. Knobs & Dials SOFT TOUCH D mouser. Intp://www. mouser. 3	And Participant Knobs & Trong potentiometer solited-D shaft. Act as indicator, make it easily to adjust the potentiometer, and also help hold the board to the enclosure it adjust the potentiometer, and also help hold the board to the enclosure it adjust the potentiometer, and also help hold the board to the enclosure it adjust the potentiometer, and also help hold the board to the enclosure it adjust the potentiometer, and also help hold the board to the provides the -3V supply (via P1), the other provides the -3V supply (via P2). Eagle Plastic Devices Knobs & Dials SOFT TOUCH D SHAFT http://www. mouser. COVER http://www. mouser. 2 2xAA