## Electronic Supplementary Material (ESI) for Analytical Methods. This journal is © The Royal Society of Chemistry 2019

Motor Bracket  Shark Coupler  April 20 Aloy S	Stepper Motor Hybrid Bipolar 12V ys Steel L Bracket for Nema 17 Coupler Smm to 8mm Nema 17 Motor Shaft sision. Alloy Steel, M8 x 1.5mm Thread, 300mm Long stic M8 x 1.5mm Pitch Flange Nut 3uide Rail (500 mm)	1568-1105-ND  Coupler 5-8mm 7549K64 9867K124 9867K124 9867K124 9867K124 9867K124 9867K2 480-2324-ND 1866-2047-ND 2092-KPJX-PM-4S-S-ND CP3-1001-ND 1951-2251-ND 1951-22714-ND 1091-1139-ND 255-1118-ND 243904FS-ND BAS316RRGCT-ND LM358NNS/NOP8-ND PWR2207-22-R-100F-ND RNCP1206FTD10K0CT-ND P100BCCT-ND P100BCCT-ND P100BCCT-ND P100BCCT-ND 160-1404-1-ND 2N3904FS-ND	Digikey Amazon Amazon MeMaster MeMaster MeMaster MeMaster MeMaster MeMaster Digikey	1 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	pack each each pack each each each each each each each each	\$ 10.99 \$ 10.99 \$ 71.05 \$ 14.48 \$ 17.50 \$ 35.00 \$ 51.11 \$ 9.36 \$ 59.66 \$ 2.64 \$ 37.30 \$ 37.30 \$ 3.00 \$ 3.00 \$ 5 0.21 \$ 3.94 \$ 3.02 \$ 3.94 \$ 3.02 \$ 3.94 \$ 3.02 \$ 3.	2 \$ 2 \$ 2 \$ 2 \$ 2 \$ 3 \$ 3 \$ 5 2 \$ 5 1 \$ 5	5 7. 5 21. 5 142. 5 5. 5 35. 6 55. 6 5
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SB Cable  CABLE USB SB Serial Converter  MOD USB St SB Cable  Male A to Male A to Male A to Male dicrocontroller  Ardurino MEG Ardurino MEG Ardurino MEG Ardurino MEG Fluidic Components  Imp Ismatec OEM alve  Fluidic Components  Imp Ismatec OEM alve  PEEK Manifo alve  3-way Isolatic ubing Connector  Peristatilic Pu ubing Connector  Using Connect	Cable A Male to B Male 0.52' (160.0mm) Shielded	A142582-ND	Digikey	1	each	\$ 5.77	1 \$	5 5
SB Serial Converter  MOD USB SI  SB Cable  Male A to Ma  Increocntroller Adafruit Moto CoolDrive® C  Fluidic Components  ump  Ismatec OEM alve TitanEX™ 10  alve PEEK Manifo alve Deling Connector Ubing Conn	SB 2.0 A-MINI A M-M 1'	380-1427-ND	Digikey	1	each		2 \$	
SS Cable  Male A to Ma Incrocontroller Arduino MEG  river Addriuit Moto  river CoolDrive® C Fluidic Components  Imp Ismatec OEM alve TitanEX™ 10  alve PEEK Manifo  alve PEEK Manifo  alve PEEK Manifo  alve PEEK Manifo  alve Peek TitanEX™ 10  alve Peek Manifo  alve Onnector Peristaltic Pu  ubting Connector Two Piece Fi  ubting Connector One-Piece Fi  ubting Connector Conical Adap  ubting Connector Finageless Fi  albeing Connector Finageless Fi  albeing Connector Finageless Fi  acrews 18-8 Stainles  crews 18-8	S SERIAL 5V EMBEDDED PCB	768-1017-ND	Digikey	1	each		1 \$	
licrocontroller Arduino MEG driver Adafruit Moto river CoolDrive® C Fluidic Components  ump Ismatec OEM alve TitanEX™ 10 alve PEEK Manifo alve 3-way Isolatic ubing Connector Peristatile Pu ubing Connector One-Piece Fi ubing Connector Gonical Adap ubing Connector Flangeless Fi conical Adap ubing Ismatec SCO ubing Connector Flangeless Fi crews 18-8 Stainles	Male B Usb Cable - 2m	WM17103-ND	Digikey	1			1 \$	
river Adafruit Moto river CoolDrive® C Fluidic Components  ump Ismate. OEM alve TitanEx™ 10 alve PEEK Manifo alve 3-way Isolatic ubing Connector Peristaltic Pu ubing Connector Une Piece Fi ubing Connector One-Piece Fi ubing Connector Uning Uni	EGA2560 (ATMEGA2560)	1050-1018-ND		1	each		1 \$	
triver CoolDrive® C Fluidic Components  ump Ismatec OEM alve TitanEX™ 10 alve PEEK Manifo alve 3-way Isolate ubing Connector Peristaltic Pu ubing Connector Two Piece Fi ubing Connector Conical Adap ubing Connector Conical Adap ubing Connector Flangeless Fi ubing Using Connector Ismatec SC0 ubing Connector Ismatec SC0 ubing Ismatec SC0 ubing Ismatec SC0 screws 18-8 Stainles crews 18-8 Stainles		1528-1187-ND	DigiKey	1			1 \$	
Fluidic Components  Tump Ismatec OEM TitanEX™ 10  Talve TitanEX™ 10  Talve PEEK Manifo  Talve 3-way Isolatic  Ushing Connector Peristatilic Pu  Ushing Connector Two Piece Fi  Ushing Connector One-Piece Fi  Ushing Connector Conical Adap  Ushing Connector Fiangeless Fi  Ushing Ismatec SC00  Ushing Ismates SC00  Ushing Ismates SC00  Ushing Screws  18-8 Stainles  Ecrews 18-8 Stainles  Ecrews 18-8 Stainles  Ecrews 18-8 Stainles	® ONE Single Valve Driver	161D1X1K0	DigiKey	1				
ump Ismatec OEM alve TitanEX™ 10 alve PEEK Manifo alve PEEK Manifo alve 3-way Isolati ubing Connector Peristaltic Pu ubing Connector Two Piece Fit ubing Connector One-Piece Fi ubing Connector Conical Adap ubing Connector Flangeless Fit ubing Ismatec SC0t ubing Ismatec SC0t screws 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles	8 ONE Single Valve Driver	161DIX IKU	Nresearch		each	\$ 19.5U	3 \$	50
alve TitanEX™ 10 alve PEEK Manifo alve PEEK Manifo alve 3-way Isolatic Publing Connector Peristaltic Pu ubing Connector Two Piece Fit ubing Connector One-Piece Fi ubing Connector Conical Adap ubing Connector Finageless Fi allegeless Fi ubing Connector Finageless Fi ubing Ismatec SC01 ubing Ismatec SC01 ubing Ismatec SC01 ubing Ismatec SC01 screws 18-8 Stainles crews 18-8 Stainles cr	EM REGLO ICC Digital Peristaltic Panel Mount Pump; 3-Channel, 8-Roller	EW-78001-45	Cole-Parmer	1	oach	\$ 1,809.00	1 6	1,809
alve PEEK Manifo alve 3-way Isolatic bubing Connector Peristatilic Pu ubing Connector Two Piece Fi ubing Connector One-Piece Fi ubing Connector One-Piece Fi ubing Connector Conical Adap ubing Connector Flangeless Fi ubing Ismatec SC0 ubing Ismatec SC0 Scrows 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles								
alve 3-way Isolatic ubing Connector Peristalite Pu ubing Connector Two Piece Fil ubing Connector One-Piece Fi ubing Connector Conical Adap ubing Connector Filangeless Fi ubing Connector Filangeless Fi ubing Ismatec SC0 ubing Ismatec SC0 Screws 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles	10 Position/11 Port With PCB (IDEX-HS; MLP778-606)	00420MV	Cole-Parmer	1		\$ 983.18	1 \$	
ubing Connector Peristaltic Pu ubing Connector Two Piece Fit ubing Connector One-Piece Fit ubing Connector Conical Adap ubing Connector Flangeless Fi ubing Ismatec SC00 ubing Ismatec SC00 Screws 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles crews 18-8 Stainles	nifold Assembly 5 Port, for 1/16" OD (IDEX-HS; P-154)	02023-10	Cole-Parmer	1	each		1 \$	
ubing Connector         Two Piece File           ubing Connector         One-Piece File           ubing Connector         Conical Adap           ubing Connector         Flangeless File           ubing         Ismatec SC0           ubing         Idex 1527L C           Screws           crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles	lation Standard, 24VDC; 10-32 Porting	HP161T032	Nresearch	1	each		3 \$	
ubing Connector         One-Piece Fi           ubing Connector         Conical Adap           ubing Connector         Flangeless Fi           plangeless Fi         Brangless Fi           ubing         Ismatec SC0           ubing         Lex 1527L C           Screws         18-8 Stainles           rews         18-8 Stainles           rews         18-8 Stainles	Pump Clips	EW-78016-98	Cole-Parmer	1	each	\$ 58.00	3 \$	174
ubing Connector         Conical Adap           ubing Connector         Flangeless Fi           ubing         Ismatec SCOI           ubing         Idex 1527L C           Screws           crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles	Fitting Sets for 3-way Valves (set of 10)	10239109-10	Nresearch	10	pack	\$ 31.09	9 \$	27
ubing Connector         Flangeless Fi           Ibing         Ismatec SC0t           Ibing         Idex 1527L C           Screws           rews         18-8 Stainles           rews         18-8 Stainles           rews         18-8 Stainles           rews         18-8 Stainles	Fingertight 10-32 Coned, for 1/16* OD (IDEX-HS; F-120X)	02013-41	Cole-Parmer	10	pack	\$ 56.66	6 \$	34
Jobing Connector         Flangeless Fi           Jobing         Ismatec SC0           Jobing         Idex 1527L C           Screws           crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles	dapter Assembly, for Rigid Tubing to Soft Tubing (IDEX-HS; P-794)	02014-54	Cole-Parmer	1	each	\$ 19.80	6 \$	118
ubing         Ismatec SC00           ubing         Idex 1527L C           Screws           crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles	s Fitting Blue Delrin®, 1/4-28 Flat-Bottom, for1/16" OD (IDEX-HS; XP-206)	EW-00414-LW	Cole-Parmer	25	pack	\$ 55.77	6 \$	13
Lower Screws         Idex 1527L C           Screws         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles	C0053T 3-Stop LMT-55 Tubing, 0.51mm ID, 12/pk	EW-97619-18	Cole-Parmer	12	pack		3 \$	
Screws         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles	L Chromatography Tubing, Natural FEP, 1/16" OD x 0.010" ID x 50 ft L	EW-02015-05	Cole-Parmer	50	feet		\$	
crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles           crews         18-8 Stainles		W	3	S. 10		100	- 12	
crews 18-8 Stainles crews 18-8 Stainles	iless Steel Low-Profile Socket Head Screws; M3 x 0.5 mm Thread, 6 mm Long	92855A307	McMaster	25	pack	\$ 5.75	\$	
crews 18-8 Stainles	lless Steel Low-Profile Socket Head Screws; M3 x 0.5 mm Thread, 0 mm Long	92855A310	McMaster	25	pack		\$	
	lless Steel Low-Profile Socket Head Screws; M3 x 0.5 mm Thread, 10 mm Long	92855A316	McMaster	25	pack		\$	
urews 18-8 Stainles					-			
40.00	iless Steel Low-Profile Socket Head Screws; M4 x 0.7 mm Thread, 16 mm Long	92855A416	McMaster	25	pack		\$	
	lless Steel Low-Profile Socket Head Screws; M5 x 0.8 mm Thread, 10 mm Long	92855A510	McMaster	50	pack		\$	
		92220A311	McMaster	10			\$	
	Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch)	92220A123	McMaster	10	pack		\$	
	l Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch)	92000A106	McMaster	100	pack		\$	i
ut High-Strength	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) d 18-8 Stainless Steel Pan Head Phillips Screws; M2.5 x 0.45mm Thread, 10mm Long	90685A037	McMaster	25	pack	\$ 8.49	\$	í
ut High-Strength	l Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch)	90685A039	McMaster	100	pack	\$ 9.68	\$	5
	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) d 18-8 Stainless Steel Pan Head Phillips Screws; M2.5 x 0.45mm Thread, 10mm Long	90591A270	McMaster	100	pack	\$ 2.22	\$	5
	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25* Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2* Long (MSwitch) 18-8 Stainlass Steel Pan Head Phillips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut: Class 10, M3 x 0.5 mm Thread	1556A24	McMaster	1	each		11 \$	5 4
	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25* Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2* Long (MSwitch) d 18-8 Stainless Steel Pan Head Phillips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread	94868A631	McMaster	1			8 \$	
	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) I 8-8 Stainless Steel Pan Head Philips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread gth Steel Hex Nut; Class 10, M4 x 0.7 mm Thread d Steel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Corner Bracket, 7/8" x 7/8" x 5/8"	9540K743	McMaster		pack		\$	
TO THE WAY TO SHARE THE PARTY OF THE PARTY O	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) d 18-8 Stainless Steel Pan Head Phillips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread ngth Steel Hex Nut; Class 10, M4 x 0.7 mm Thread d Steel Hex Nut; Wedium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength; Class 8, M2.5 x 0.45 mm Thread d Steel Corner Farcket, 7/8" x 7/8" x 5/8" hreaded Hex Standoff; 18-8 Stainless Steel, 10mm Hex, 16mm Long, M4 x 0.7mm Thread			.0	Face	- 0.00		
PML Fluidic Chip	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) I 8-8 Stainless Steel Pan Head Philips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread gth Steel Hex Nut; Class 10, M4 x 0.7 mm Thread d Steel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Corner Bracket, 7/8" x 7/8" x 5/8"		12.27.00.00				121	
nip Holder Fluidic Conne	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) I 8-8 Stainless Steel Pan Head Philips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread gth Steel Hex Nut; Class 10, M4 x 0.7 mm Thread d Steel Hex Nut; Medium-Strength; Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength; Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength; Class 8, M2.5 x 0.45 mm Thread d Steel Hex Standoff; 18-8 Stainless Steel, 10mm Hex, 16mm Long, M4 x 0.7mm Thread umper with Unthreaded Hole		Micronit	1	each	\$ 1,530.00	1 \$	1,530
errules 5 Fluidic PRC	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) d 18-8 Stainless Steel Pan Head Phillips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread ngth Steel Hex Nut; Class 10, M4 x 0.7 mm Thread d Steel Hex Nut; Wedium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength; Class 8, M2.5 x 0.45 mm Thread d Steel Corner Farcket, 7/8" x 7/8" x 5/8" hreaded Hex Standoff; 18-8 Stainless Steel, 10mm Hex, 16mm Long, M4 x 0.7mm Thread	FC_PRO_CH4515	Micronit	5	pack	\$ 113.00	6 \$	135
	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) I 8-8 Stainless Steel Pan Head Philips Screws; M2.5 x 0.45mm Thread, 10mm Long night Steel Hex Nut; Class 10, M3 x 0.5 mm Thread gith Steel Hex Nut; Class 10, M4 x 0.7 mm Thread d Steel Hex Nut; Kedium-Strength; Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength; Class 8, M2.5 x 0.45 mm Thread d Steel Corner Bracket, 7/8" x 7/8" x 5/8" nreaded Hex Standoff; 18-8 Stainless Steel, 10mm Hex, 16mm Long, M4 x 0.7mm Thread umper with Unthreaded Hole nnect PRO Chip Holder with 4515 Inserts			J				
ebubbler Debubbler	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) I de 8-Stainless Steel Pan Head Philips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread disteel Hex Nut; Class 10, M4 x 0.7 mm Thread disteel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread disteel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread disteel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread disteel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread disteel Corner Bracket, 776" x 78" x 5/8" hreaded Hex Standoff; 18-8 Stainless Steel, 10mm Hex, 16mm Long, M4 x 0.7mm Thread umper with Unthreaded Hole nnect PRO Chip Holder with 4515 Inserts	FC_PRO_CH4515 FC_PRO_FFKM_KIT.05			each	\$ 149.00	3 \$	447
nip Fluidic Chip f	I Low-Profile Socket Head Screw; Black Oxide, 2-56 Thread Size, 0.25" Long (2Switch) I Low-Profile Socket Head Screw; Black-Oxide, 4-40 Thread Size, 1/2" Long (MSwitch) d 18-8 Stainless Steel Pan Head Phillips Screws; M2.5 x 0.45mm Thread, 10mm Long ngth Steel Hex Nut; Class 10, M3 x 0.5 mm Thread d d Steel Hex Nut; Class 10, M4 x 0.7 mm Thread d d Steel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Medium-Strength, Class 8, M2.5 x 0.45 mm Thread d Steel Hex Nut; Addium-Strength, Class 8, M2.5 x 0.45 mm Thread more Bracket, 7/8" x 7/8" x 5/8" hreaded Hex Standoff; 18-8 Stainless Steel, 10mm Hex, 16mm Long, M4 x 0.7mm Thread umper with Unthreaded Hole nnect PRO Chip Holder with 4515 Inserts PRO Ferrules		DarwinMicrofluidics PMLab/Bio-Vitro	1				

**Supplemental Table 1:** Complete part list and price breakdown. The total cost of materials is roughly \$6,500.