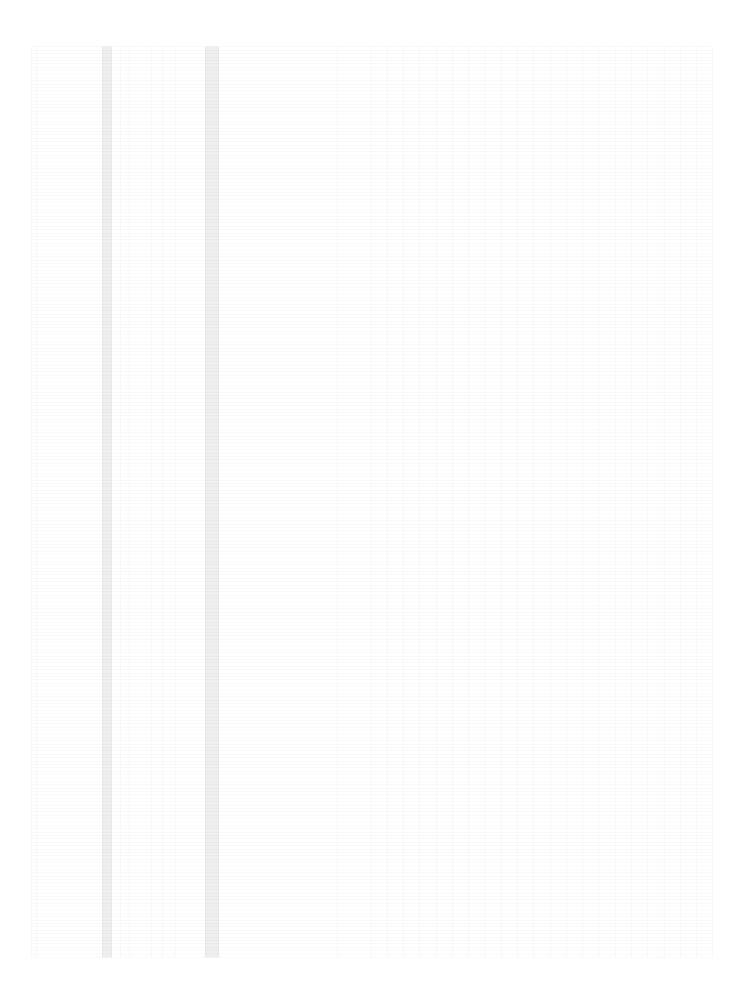
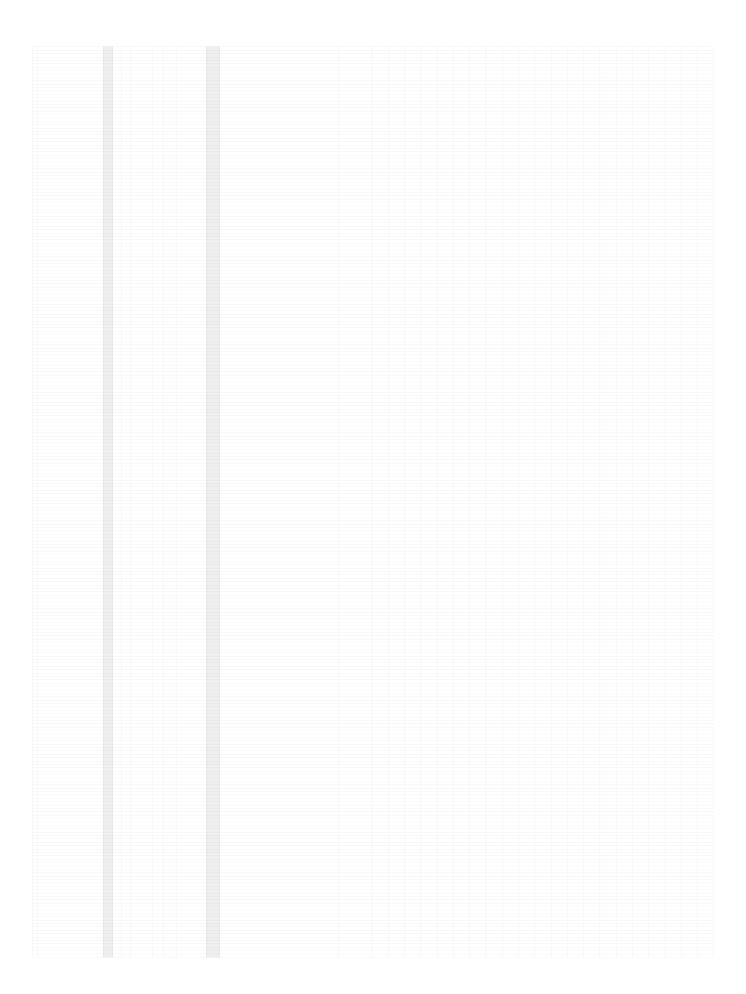
| WoodenHaptics.org Bill of Materials and Recommended Equipment | | led part cost w/o motor & enc.: | E962.23 €962.23 €1,420.78 €1,420.78 | | | | | |
|--|----------------------|--|--|------------------------------|--------------------------|--|---|--------|
| We will try to reduce the number of distributors to reduce complexity | Estimat | ted motor & encoder cost: ted PC connection cost: ted required tools cost: | €811.29 €51.61 | | | | | |
| Maxon, Farnell and Misumi is easy to access globally Other distributors might be tricky in some parts of the world Let us know your experience in the forum of woodenhaptics.org | | led required tools cost: led total* part cost for kit: | €198.95 €0.00 €3,391.25 €2,434.62 | | | | | |
| *) No labour cost included, i.e. for laser-cutting or soldering. | 1 EUR in | | kr9.45 | | | | | |
| Largest costs are in the motors, drivers and PCle card that could be re-used in several projects if you so wish. Required tools | 1 EUR ir 1 EUR ir | | \$1.19 CHF1.03 | | | | | |
| (except laser-cutter and soldering tools) are included. | | Suggested dis | stributor (Europe) part n | umber | F-11 | | | |
| Our Name qu | antity Maxon | Farnell Misumi | Elektrokit Tecni-cable | Other Distributor | Estimated Unit Cost € | Full name | Notes | Sum Co |
| MECHANICS | | | | | | | | |
| Raw Material | | | | | | | | |
| 6 mm birch plywood A2 sheet (594 x 420 mm) (alternatives possible) | 5 | | | Local / cutlasercut.com | €5.29 | | | |
| Construction Hardware: Base M3x10 (for motor) | 6 | CB3-10 | | | €0.09 | | | |
| M3x35 | 6 | CB3-35 | | | €0.12 | | | |
| M3x50 M5x90 | 6 | CB3-50 CB5-90 | | | €0.24 €0.30 | | | |
| M3x22 6x10x1 washer | 10 6 | CB3-22 WSSB10-6-1 | | | €0.10 €1.05 | | | |
| 10x55x4x5 capstan (10x55 shaft (RDOF10-55) ok if 10mm coupler) 10x22x6 bearing | 1 2 | SFRMHP10-55-F5-P4 SB6900ZZ | 1 | | €7.36 €5.60 | | | |
| Flexible Coupler that fits motor shaft diameter and 4 (10) mm capstan | 1 | CPL25-6-10 | | | €28.80 | | | |
| For smaller motor, use CPL12-3-4 or CPL12-4-5 3x20 dowel pin | 4 | MS3-20 | | | €0.08 | | | |
| 3x40 dowel pin 3x60 dowel pin (Substitute with MS3-40) | 7 5 | MS3-40 MS3-40 | | | €0.20 €0.20 | | | |
| Construction Hardware: Body A | | | | | | | | |
| M3x10 (for motor) 8x22x7 bearing | 12 | CB3-10 B608ZZ | | | €0.09 | | | |
| 10x22x6 bearing | 4 | SB6900ZZ | | | €5.60 | | | |
| M3x22 M3x18 | 7 16 | CB3-22 CB3-18 | | | €0.10 €0.09 | | | |
| M3x45 M6/1.0 nut | 6 | CB3-45 LBNR6 | | | €0.17 €0.32 | | | |
| M4x45 full thread (thread M4/0.75) M4/0.75 nut | 1 | ACB4-45 LBNR4 | | | €0.35 €0.28 | | | |
| 8x60 Shoulder bolt | 1 | MSB8-60 | | | €0.80 | | | |
| 8x110 Shoulder bolt (firread M6/1.0) 8x05 Belleville (spring) washer | 1 | MSB8-110 SSRBW8 | | | €1.00 €1.05 | | | |
| 8x14x05 shim Flexible Coupler (25x10x6 or 16x6x5) | 6 | CIMR8-14-0.5 CPL25-6-10 | | | €0.50 €28.80 | | | |
| 10x55x4x5 capstan (10x55 shaft (RDOF10-55) ok if 10mm coupler) | 2 | SFRMHP10-55-F5-P4 | 1 | | €7.36 | | | |
| Construction Hardware: Body B | | CIMR8-14-0.5 | | | co :- | | | |
| 8x14x05 shim 8x05 Belleville (spring) washer | 1 | SSRBW8 | | | €0.42 | | | |
| 3x25 pin M3x22 | 9 | MS3-25 CB3-22 | | | €0.20 €0.10 | | | |
| 8x22x7 bearing M4x45 full thread (thread M4/0.75) | 4 | B608ZZ ACB4-45 | | | €1.80 €0.35 | | | |
| M4/0.75 nut | 1 | LBNR4 | | | €0.28 | | | |
| | | | | | | | | |
| Construction Hardware: Body C M3x30 | 4 | CB3-30 | | | €0.12 | | | |
| M3x18 3x20 dowel pin | 2 | CB3-18 MS3-20 | | | €0.09 | | | |
| 3x35 dowel pin (3x30 preferred) 8x60 shoulder bolt | 4 | MS3-35 MSB8-60 | | | €0.20 €0.80 | | | |
| 8x14x05 shim | 9 | CIMR8-14-0.5 | | | €0.42 | | | |
| 8x05 belleville (spring) washer M6 nut (1mm thread) | 1 | SSRBW8 LBNR6 | | | €1.05 €0.32 | | | |
| Construction Hardware: Body C' | | | | | | | | |
| M4x45 full thread (thread M4/0.75) M4/0.75 nut | 1 | ACB4-45 LBNR4 | | | €0.35 €0.28 | | | |
| M3x22 | 7 | CB3-22 B608ZZ | | | €0.10 | | | |
| 8x22x7 bearing 3x35 dowel pin | 4 | MS3-35 | | | €1.80 €0.20 | | | |
| M3x35 8x14x05 shim | 6 | CB3-35 CIMR8-14-0.5 | | | €0.12 €0.42 | | | |
| Construction Hardware: Cabling | | | | | | | | |
| Wire rope (more threads preferable) Double ferrule (for crimping onto wire rope) | 10 20 | | 603.000.540 115.000.700 | | €0.89 | 0.54mm 7x7 A4-AISI 316 Stainless Steel Cable MBL 16kgs - 603.000.540 Code 0.7 Double Copper Ferrule | | |
| Turnbuckle (spannschloss) | 1 | | 115.000.700 | Hobbykellershop.eu: 018-3051 | | Spannschloss M2.5 - High Precision | | |
| Required Tools for Mechanics Workbench | | | | | | | | |
| Arbor Press Wire rope cutter | 1 | | 100.004.062 | Schuchardt Maskin smaskin.se | | Verkstadspress (1 tonne recommended) Budget Wire Rope Cutter up to 3mm Diameter - 100.004.062 | Chose a larger next time Chose a better and more expensive | |
| Wire rope ferrule crimper (you really need this) Torch | 1 | | 115.007.023 | Teknikmagasinet.se 340927 | | TECNI®Cable Crimp Tool for Double Copper Ferrules - 115.007.023 | | |
| Torch gas | 1 | | | Teknikmagasinet.se 340927 | €3.17 | | | |
| Hex keys Adjustable wrench | 1 | | | Local Local | €8.00 €8.00 | | | |
| Other | | | | | | | | |
| Rubber feet (from a computer case; SilverStone Milo ML05B Black) | 4 | | | | €1.00 | | | |
| ELECTRONICS | | | | | | | | |
| Electronics Box | | | | | | | | |
| WoodenHaptics Motherboard (see below) WoodenHaptics DAQ Extension board (see below) /or/ | 1 | | | | | | | |
| mbed.org LPC1768 (OM11043) M3 extension board (for USB experime Maxon 50/5 driver module (could eventually be custom made) | 0 3 438725 | 1761179 | | | | NXP OM11043 LPC1768, MBED PROTOTYPING BOARD, KIT ESCON Module 50:6, 4-O Servocontroller for DC/EC motors, 5/15 A, 10 - 50 VDC | The chip alone is only 90kr | |
| | J =30725 | | | | C140.04 | Sold money, or on, to so vide | | |
| Power Supply 48V power supply, at least 5A (should probably be 9A) | 1 | | | Elfa.se 69-655-94 | €148.57 | Nåtaggregat med fast utspänning 4358 VDC CH -, DE -, EA-PS548-05R | Should be replaced | |
| Motors & Encoders | | | | | | | | |
| faxon 40mm (148877) & 500 CPR Encoder (110514) combination faxon 30mm | 3 200116 0 310009 | | | | €473.59 | | | |
| faxon 25mm | 0 118755 | | | | | | | |
| Electric Cables | | 1207229 | | | 00.00 | DDO DOMED SI SEVINO DDAID 49MM DI ACV SM DDO DOMED DETRAGOS OF STANDO DDAIS | | |
| 2mm sleeves (5m) fale 10 pin cable head (for extending enc.cables) | 3 | 1297228 | 41011859 | | €1.66 | PRO POWER, SLEEVING, BRAID, 12MM, BLACK, 5M, PRO POWER-PETBK12BG5-SLEEVING, BRAID, 12MM, BLACK, 5M IDC hane kabel 10-pol 2.54mm | | |
| emale 10 pin cable head (for extending enc. cables) 0 pin flat cable, per meter (for extending enc. cables) | 3 5 | | 41000574 31670207 | | | IDC hona kabel 10-pol guld 2.54mm Flatkabel grå 10 ledare 1.27mm /m | | |
| PC Connection | | | | | 22.50 | | | |
| Sensoray S826 | 1 | 2047040 | | www.enciris.com | | http://www.sensoray.com/products/826.htm | Order directly or through distributor | |
| AQ Cable 26-pin AQ Cable 50-pin | 1 | 2217642 2217690 | | | | AMPHENOL FC26800-0 LEAD, 2.54MM, F/F, 600MM, 26WAY AMPHENOL FC50800-0 LEAD, 2.54MM, F/F, 600MM, 50WAY | | |
| | | | | | | | | |
| ELECTRONICS CIRCUIT BOARDS | | | | | | | | |
| WoodenHaptics Motherboard | | | | | | | | |
| PCB manufacturing (price based on order of 2 units) motor & high pwr connectors | 1 4 | 1761541 | | pcb-pool.com | €69.00 | IMO PRECISION CONTROLS 20.155MH/2 HEADER, 3.5MM, HORIZ, 2WAY | | |
| vertical connectors (4) | 0 | 1761550 | | | €0.31 | IMO PRECISION CONTROLS 20.155MV/2 HEADER, 3.5MM, 2WAY | | |
| cable block high pwr 10 pin encoder connector | 3 | 1761532 2215290 | | | €0.90 | IMO PRECISION CONTROLS 20.1550M/2 TERMINAL BLOCK, 3.5MM, 2WAY MULTICOMP MC9A22-1034 HEADER, THT, RIGHT ANGLE, 2.54MM, 10WAY | | |
| 10 pin STRAIGHT encoder header (3x) micro usb connector, smd (non-reversed) | 0 | 2215304 1645325 | | | €1.48 | 61201021621 HEADER, THT, VERTICAL, 2.54MM, 10WAY HIROSE(HRS) ZX62-B-5PA(11) MICRO USB, B TYPE, RECEPTACLE | | |
| 20 pin socket (to ext. board) | 2 | 1593469 1593460 | | | | MULTICOMP 2212S-20SG-85 SOCKET, PCB, 1 ROW, 20WAY | | |

| 12 pin escon socket (1 pin discarded) | 3 | 1593465 | | €0.18 MULTICOMP 2212S-12SG-85 SOCKET, PCB, 1 ROW, 12WAY | | €0.4 |
|--|---|---------|--------------------|--|-------------------------------------|-------|
| Encoder driver | 3 | 1103045 | | €1.02 TEXAS INSTRUMENTS AM26LS32ACD IC, DIFF LINE RECEIVER QUAD, 26LS32 | | €3.0 |
| | | | | | | €0.0 |
| WoodenHaptics DAQ Extension Board | | | | | | €0.0 |
| PCB manufacturing (price based on order of 6 units) | 1 | | pcb-pool.com | €15.70 | | €15.7 |
| 50 pin daq connector | 1 | 2215272 | | €1.93 AMPHENOL T816150A1S102CEU HEADER, L/LATCH, STR, 2.54MM, 50WAY | Should be replaced with low profile | €1.9 |
| 26 pin daq connector | 1 | 2217535 | | €1.71 AMPHENOL T816126A1S102CEU HEADER, L/LATCH, STR, 2.54MM, 26WAY | Should be replaced with low profile | €1.7 |
| 44 pins (50) ext. board | 1 | 3418388 | | 62.76 TE CONNECTIVITY / AMP 5-826629-0 HEADER, 1ROW, 50WAY | | €2. |
| | | | | | | €0.0 |
| Box Enclosure Mounting | | | | | | €0.0 |
| Distance screws | 4 | 1466725 | | 60.30 ETTINGER SPACER, M3X, 5-VZK ETTINGER-05.13.051-SPACER, M3X, 5-VZK | | €1.2 |
| M3x6 screws (preferably M3x4 screws that comes with computers) | 4 | 1419986 | | 60.02 DURATOOL-M36 PRSTMCZ100-SCREW, STEEL, BZP, 6MM, M3, PK100 | | €0.0 |
| M3 washers | 4 | 1377536 | | 60.01 DURATOOL M3 BRASS FULL WASHER WASHER, FULL, BRASS, M3 | | €0.0 |
| | | | | | | €0.0 |
| Recommended Equipment for Electronics Workbench | | | | | | €0.0 |
| Proper soldering station | 0 | 1447700 | | €375.13 WELLER WD 1000T (EU) SOLDERING STATION, 80W, 50DEG-450DEG, EU | | €0.0 |
| Proper oscilloscope (not really needed, for testing only) | 0 | 2191868 | | €823.17 TEKTRONIX DPO2002B OSCILLOSCOPE, 2CH, 70MHZ, 1GSPS | | €0.0 |
| Solder cleaner | 0 | 1792731 | | 64.86 WELLER CLEANER, WOOL, BRASS, WDC, PK2 WELLER-T0051384099-CLEANER, WOOL, BRASS, WDC, PK2 | | €0.0 |
| Solder activator | 0 | 873895 | | 68.76 WELLER TIP ACTIVATOR, LOW TEMP, 25G WELLER-TIP ACTIVATOR-TIP ACTIVATOR, LOW TEMP, 25G | | €0.0 |
| Solder 1.2 mm tip | 0 | 1282099 | | 64.86 WELLER TIP, SOLDERING IRON, ROUND, BENT, 1.2MM WELLER-LTF-TIP, SOLDERING IRON, ROUND, BENT, 1.2MM | | €0.0 |
| Solder 0.5 mm tip | 0 | 1282096 | | 64.97 WELLER TIP, SOLDERING IRON, ROUND, 0.5MM WELLER-LT1SA-TIP, SOLDERING IRON, ROUND, 0.5MM | | €0.0 |
| Organizer cabinet (Sortimentskåp) | 0 | 1367091 | | €21.67 RAACO CABINET, ORGANISER, 44COMPARTMENT | | €0.0 |
| De-soldering | 0 | | | | | €0.0 |
| Tweezers | 0 | 1617218 | | €81.80 DURATOOL-D00840-TWEEZERS SET, ESD SAFE, 6PC | | €0.0 |
| Hack-cables | 0 | | | | | €0.0 |
| Thin lead | 0 | | | | | €0.0 |
| Thicker lead | 0 | | | | | €0.0 |
| Scalpel | 0 | | | | | €0.0 |
| Precision cutter | 0 | | | | | €0.0 |
| Electrostatic mat kit with wristband and earth connector | 0 | 1736631 | | €110.69 MULTICOMP 069-0007 ESD WORKSTATION KIT, BLACK 0.7X1M | | €0.0 |
| Heat gun | 0 | 2473569 | | €126.24 STEINEL HL 2020 E EURO | | |
| Heat gun accessory for (reflector) for crimp tubes | 0 | 3116797 | | €15.34 STEINEL-070519-NOZZLE, REFLECTOR, SMALL | | |
| | 0 | | | | | €0.0 |
| | | | | | | €0.0 |
| COMPUTER (OPTIONAL) | | | | | | €0.0 |
| ITX Motherboard AM1 (MSI AM1I) | 0 | | Komplett.se 811857 | 625.29 MSI AM1I. Socket-AM1 mini-ITX. DDR3. 1x-PCIe-x16. GbLAN. USB3.0. VGA. DVI. HDMI | | €0.0 |
| CPU (AMD Athlon 5350 APU) | 0 | | Komplett.se 809078 | 646.48 AMD Athlon 5350 Socket-AM1. Quad Core. 2.05GHz. 2MB. 25W. 28mm. Radeon R3-series. Boxed w/fan | | €0.0 |
| PSU Small form factor | 0 | | Komplett.se 802785 | 639.37 Silverstone ST30SF 300W PSU SFX. 80 Plus Bronze. Standard. 1x 6pin PCIe. 3x SATA. 2x Molex. 1x FD | | €0.0 |
| Wireless keyboard/trackpad combo | 0 | | Komplett.se 645476 | €24.55 Logitech Wireless Touch Keyboard K400 | | €0.0 |
| Case SilverStone Milo ML05B Black | 0 | | inetse | 663.39 SilverStone Milo ML05B Svart | | €0.0 |
| PCIe flexible riser | 0 | | inetse | €10.48 ASRock BTCPro Kit (PCIe riser) | | €0.0 |

| Moderaphics on the Alberta and Secure and Engineer | Salimating part cost who mater & enc. 91,852.33 | | | | |
|--|--|--|--|--|--|
| We will by to reduce the number of distribution to reduce completely Mason, Parked and Masurin every to access globally. Other distributions enging the shally as some parts of the world. Let us thelve your expension in the follows of encodering-plots ong. | Estimated part cost win mater & and. 41,823.3 Estimated enter & encoded cost. 4006.30 Estimated removables cost. 4011.20 Estimated reproduction cost. 4111.20 Estimated reproduction cost. 4111.20 Estimated response cost. 4111.20 Est | | | | |
| Let us know your experience in the Source of wooderstapping any 7 No bloom continuated, i.e. for base-outing or soldering. | | | | | |
| This below soci reclaims, i.e. for later-sulting or soldering, Larger closes are in the relation, driven and Pich and that close he is useful in second proposite if you as with. Required book pushing bear order and soldering body also which also. | 1 SLAY IN 1800 N/5-68 1 SLAY IN 1800 S1 1/5 1 SLAY IN COP COP 100 Cop 1 N/5 | | | | |
| Our Name qual | Engagesind dishiftutor (Europe) part number Analy Mason Farest Mauni Elektruki Touri-cubb Other Dishiftutor | Did Cod 6 Pull name | Notes 2: | | |
| | B Local / outlinemat.com | 6.2 | | | |
| | | | | | |
| Controllers National Association (Controllers National Association (Contro | E C33 15 C33 16 | 60 60 60 60 60 60 60 60 60 60 60 60 60 6 | | | |
| Ex10x1 washer 10x85x4dd captain (10x85 shall (MDXP 10:85) ox if 10xm couple() 10x25x5 bearing Product Coupler Styl No. Novement which | 6 W33810-0-1 1 SPRSSPT0-03-F0-F0 2 SBRSSCZ 1 CFL-12-6-0 | C36 C36 G86 | | | |
| ALT For other motion shadow use CPL12-3 d ets (from your shadou divers) 2.00 diversi prin 2.00 diversi prin 2.00 diversi prin | 1 CP-12-66 6 M30-20 7 M30-60 8 M30-60 | 6038 6030 | | | |
| Self disset jet (Substitute with MES-40) Construction Merchanic Bioly A | 9 MID-60 | 60.20 | | | |
| Controlled Testing Miles (Miles Service) Miles Service Miles Service) Miles Service M | 2 | 68 68 68 68 68 68 68 68 68 68 68 68 68 6 | | | |
| MOVE MOVE MATERIAL MA | 56 CED-56 6 CED-65 1 LENNS | 6039 6037 | | | |
| Miled Sal Owead (Newad Mali C 79) Mile C 79 and Radio Shoulder Sold Radio Shoulder Sold Radio Shoulder Sold | 1 ACBI-65 1 LISON 1 MISS-60 1 MISS-100 | 633 632 635 | | | |
| Each behavior (apong/washer Bold-60 sizes People During washer People Couper that his hom moter shall and 4 mm capitals | 1 3399968 6 CMR6 1603 2 CPL12-66 | 41.00 40.00 419.00 | | | |
| 15x85x6x6 septian (10x85 shaft (PEXCP 10x85 six 6 10xxxx sougher) Construction Mentwerk Body III | 3 37908973 55 75 74 | ea | | | |
| Contribution Seed Process (Contribution Seed Pro | 1 COMPS 14-0.3 1 33/99/08 9 MIX-32 11 CR3-22 4 BISSEZ 1 ACM-64 LIADROM | 65 63 63 63 63 63 | | | |
| Sozial Seasing Stoods full Denied (Brinal MSTC 79) SNCC 78 red | 4 BESEZ 1 ACRE-45 1 LENNA | 6130 6030 6028 | | | |
| | | | | | |
| Continuation Mendware Buildy C Million | COAM COAM COAM COAM COAM COAM COAM COAM | 632 628 629 620 630 630 630 630 | | | |
| Table shoulder built facilitative (spring) waster facilitative (spring) waster | 1 MIRE 40 9 CARRE 14 GS 1 SINWAR | 6030 6030 6130 | | | |
| con roa (over come) Conditudior Hardware Bioly C' MindS full thread (Newad MinD TS) | 1 ACM-65 | 633 | | | |
| Conditional relationer Body C best True of Denset Meet Dity Meet True Meet T | 1 ACB4-03 1 L3094 7 C33-22 2 B80522 4 M3-29 3 C33-29 3 C33-29 6 CM8-14-03 | 638 638 638 635 635 630 | | | |
| null dised ph MD-DS MD-DS WW | MISS 38 3 CR3-38 6 CAME 140-3 | 633 630 | | | |
| Construction Members: Calling Wite sper To* one, Edit mit (sone threads perkrader) Double bruike for company and were rape) Tumbucke (spannachises) | 10 603,000,040 20 110,000,700 1 94,000,400,400,400,400,400,400 | | | | |
| Turribudde (spannedbloss) Prequired Turis for Shuhanous (Statzbench) Abor Press. | | | Close a lister out has | | |
| Program Tunk for Studentiss Studentiss Advan Press This repro stude This repro stude This repro stude This reproduction | Third Control State | SECTION ANALYSIAN PROMOTED AND ANALYSIAN SECTION AND ANALYSIAN SEC | Chose a terter and none expension | | |
| Touth-gas Hex keys Miss dear key 12 mm for Section couples. Advanced mismits | Tonobragased as 30707 Look 1 | 637 638 | | | |
| CONNECTION ASSESSMENT OF THE STATE OF THE ST | 4 | 61.00 | | | |
| Rubber Hed (Suice a simple cost, the Million Mills Mil | | | | | |
| Electronic Size Wooden Replica Sold Padentian Sound (see Selline) Wooden Replica DAS Endowskin Sound (see Selline) A Visit of A VIsit Selline Sound (see | 1 1 0 3 08029 | | Tanana manaya | | |
| A.1.1 ridead org NCS exhancion board (for USIN experimental) Tilleach SOS diffeer module-yould eventually fee outsion mades #Flower Supply 48Y power supply, at least 54 (should probably be 8A) | 3 (873) | #13738 ESCONMobile 501, 4-Q Sevoumballer for OCSIC rollon, 515 A, 15 - 50 VDC | The disp alone is only 80w | | |
| Miles & Engages | 1 SEAR 0-055-01 | endata? hatagayasi med bishahakining kS. BEYDC CH \ DB \ BAYBBS GRP excellent | Should be replaced | | |
| Males 60mm (MEET?) & 500 CPR Encoder (110514] continues AT Males 20mm AT Males 20mm | 3 200118 6 210009 0 110788 | NOOL DE | | | |
| Blacks Cables 12km sterves (fill) Male 10 pin cable head (for extending enc. cables) | | SEED PROFOSER, SEEDING, SHAD, DAM, SEACK SM, PROFOSER PETERCOSOS-SEEDING, SHAD, DAM, SEACK SM STEEL CE Laws Made 150-put 2 Marin SEED TO CE Laws Ander 150-put 2 Marin SEED TRAINING ST TO Made 2 Thronto III | | | |
| Penale 13 pin catife head (for extending enc. catifes) 13 pin fail catife, per meter (for extending enc. catifes) PC (**constitute*) | | | | | |
| Show the CHEPA & SECT PR S AND CYTE AND COLOR | 1 2717647 1 2717648 | 6782.73 DELEGO AMPRICA PERSON AND AND AND AND AND AND AND AND AND AN | Order directly or through distributor | | |
| | | | | | |
| RECEIVEDNESS CHROUTE DOMENTS FOR annulation gives based on one of 2 and 6 which he happ a mention on the 2 and 6 which he happ a mention on the 2 and 6 to the happ a mention of 2 and 6 to the happ a mention of 2 and 6 to the happ a mention of 2 and 6 to the happ a mention of 2 and 6 to the happ a mention of 2 and 6 to the happ a mention of 2 to the happen and 2 | 1 (2015) | 4830 603) MO PRECISION CONTRALS 20 1888492 HEACHY, JURIAN HOPEZ, PARAN | | | |
| ALT vertical connections (III) cable block high pair 15 pin encoder connector | 1 1 1 1 1 1 1 1 1 1 | BEST OF PROCESSO CONTREAD IN THROSE ARROYS ADM A STORY 2004 SETS AND PROCESSO CONTREAD IN THROSE ARROYS ADM A STORY 2004 SETS AND PROCESSO CONTREAD IN THROSE ARROYS AND A STORY AND A STO | | | |
| ALT 10 pin STMACHT enabler header (3x) misse und-connection and plan-reversed) SWITCH 20 pin solded (3x etc.) board distribution of plants to deligate (3x etc.) | 0 1642219 1 1643228 2 1553269 | HORSE VISIONALLY HORSER, THE , VARIENCE, ZARAM, TORRAY 1 AM HORSE STATE AND A | | | |
| Til pin (241) essain sacket ALT 12 pin essain sacket (1 pin dissarded) | 3 166/305 160/307 3 163/465 | 403 MATICORP 2023-080-08 SOCIAT, POLI, TROSE, GARY 438 MARTICO SIGN-090-01-00 RECEPTACE, 3 BRIM, CURE, TANNY 4019 MATICORP 2012-1810-08 GOOD, POLI, THOSE, TSIRNY 4019 MATICORP 2012-1810-08 GOOD, POLI, THOSE, TSIRNY 4120 TONO RETURNING MADILIZANCO C, CIPT LIM RECENTRIC CARA, 28LEDI | | | |
| Encoder diver Wooden Replace ZAQ Extension Board | | | | | |
| For section of the base of the | 1 2217139 pill-piati dani 1 2217139 1 2417138 | #3370 #330 AMPHINGS, TSHYSIANIANIZCEU HIRADIN, CLAYCH, STM, ZAMMI, ROWNY #371 AMPHINGS, TSHYSIANIANIZCEU HIRADIN, CLAYCH, STM, ZAMMI, DWWY #279; TS CORRECTIVITY / AMP & DRINCH & PRACER, TLAYCH, STM, ZAMMI, DWWY | Should be replaced with tim profile Should be replaced with tim profile | | |
| Bus Endoure Mountry Oxforce screen | | 40.00 ETTIMOR REPORTED REAL STATE OF THE STA | | | |
| more servers prevently MSM doleral that comes with computers) MSI wishers Preventended Structured for Statement with servers | 4 1000729 4 1479888 4 1377336 | | | | |
| O.Stimmhea key for encoders (these will be stipped with some enc.) Proper soldering station Proper soldsecope (not really needed, for testing only) | 0 0 1667700 0 2791888 | CERTICAL WILLIAM WID 1000 (BLI) BOLDERMAN SYMMON, BOW, BODED 48000 0, BLI 682337 THAT WORKS OF CROSCOR GRICAL DISCOPE, SON, TWING, TORPS | | | |
| Subser cleaner Subser activation Subser 1.2 min by Subser 0.2 min by | 1447700 2 2914888 2 2914888 2 2812899 2 135399 2 135398 | SERIES ON LINE FOR LINE FOR SERIES STORMS, DET MEDIES AND SERIES A | | | |
| Organium catinet (Statismentology) De-statisming Tweedess high Investigations conspict phy | 0 1367991 0 0 | 421 ST RAACO CASINET, CHONNESS , 46COSPANTISSIST | | | |
| Mack cabbs This had Thisker had Supple | 0 | | | | |
| Process safer Shallocate windows Mid. | 0 0 0 | | | | |
| COMPUTER (OPTIONAL) | D Kungastas S11867 | 438.28 MEAMIL Bulandati new ITX, DDPD, to PCIo v34, GMAN, USBS 2, VGA, GVI, HEMI | | | |
| TEX Michielousia Serii, (ASS AARTO, CPC (MICHIELORIO) SERII-APPO) PRU Sinuali Numb Nation Vinnessa Naphoneliini Angel combo Caso Silv Michielo Mich ACOTI Minish | | CESS VIEW AND TO MAN AND RESERVE CONTROL TO PICK AND GRAND CREEK VIA CONTROL TO MAN AND AND AND AND AND AND AND AND AND A | | | |
| PCIe faulie rier | 0 Indian | \$30.00 ASTRUM ETCPIO EX (PCIo 6640) | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |





| | Ew 180 344 | | | |
|--|--|--|--|---|
| Visiodestication on SEL of Materials and Recommended Equipment Viewell by to reduce the number of distribution to reduce complexity | Eur | 1 879 13 863 1 886 | | |
| We will by its reduce the number of distributions is reduce complexely. Names, Parised and Materials every to access globally. Other distributions regift be shown you seen parts of the wind! Let us know your expendence in the Source of woodershiption any. | Estimated required tools cost: 190 200 | 1780 | | |
| 7 No below cost included, i.e. for taken-surling or collecting. Largest costs are in the incloss, drivers and PCIn candition costs. | 1 EUR is SEX NAME 1 EUR is USD \$1.08 1 EUR is OP OP1.07 | | | |
| This block controlleds, i.e. for later-unling or scienting, Largest code, are in the malatin, drives and PCH one of this could be re-well in recent project. If they are with. Required tools (most) taken-unless and authoring facility are solubles. | 1 SUR II OF OFFICE Suggested distributor (Europe) part cumber titly Mason Farnet Mason Statutet Text sales Other | . Introduced | | |
| MECHANICS (co | | Ballmaind Deli Coal 4 Sa | | Min |
| MECHANICS Flav Material 6 min to the physical At sheet (186 x 422 min) pillernatives possible) | S Local I | Continuence 45.27 | 40.00 40.00 40.07 | |
| Conductor Medican dase 30x10 (Sr maler) | 6 CB19 | ### Company of the Co | 500 500 500 500 500 500 500 500 500 500 | |
| Companies reviewed ages of the companies | | 60.12 60.24 60.30 | 40.00 41.00 41.00 | |
| Solida sealer 13-distribut capital (10-distribut (PDOF10-distribut capital) 10-distribut capital (10-distribut (PDOF10-distribut capital) | 6 WESSTORT 1 SPECIFIC SEPERA | 60.10 61.00 67.36 | 623 623 | |
| Finality Couper Stat Sta Seen motor shall and 4 mm capetan ALT For other motor shalls use CPLT2-34 etc (from your shall to descript TATE disease on | 1 CF11246 0 MIN- | 419.00 419.00 | ************************************** | |
| and disset pin Tall disset pin Tall disset pin (Rubellide with MEZ-40) | 7 MID-00 8 MID-00 | 60.38 60.30 60.30 | 62 | |
| Construction Manhager Body A. MSA10 (for make) | 13 089 10 | 60.39 | ************************************** | |
| SciZut Searing 10ciZut Searing NOciZut | 2 8806ZZ 4 3886GZZ 7 CR3-22 | 41.80 45.60 60.10 | 43.60 42.70 46.75 | |
| MSHS MHS and | 16 CE3-16 6 CE3-46 1 LENDER | 40.39 40.37 40.32 | 41.64 4100 40.33 | |
| Milet Mr Over (Event Milet 79) Milet 79 Auf Bell Shauler but | 1 AC86-46 1 LERMA 1 MIRE-40 | 60.39 60.28 60.80 | 6038 6038 6030 | |
| Butto Shoulder but (Shread MSTLD) Butto Selevite (spring) washer Buttoo's store | 1 MINIO 10 1 339998 6 CARRE 14-03 | 61.00 61.00 60.00 | 4100 4100 | |
| Pleasant Couples that this time moter shaft and it men capitals. 10-05 education (10-05 educt (FEXXF10-05) out it 10 min couples) | 2 CPL1244 2 3PRSSP10 05 F6 F4 | 479.00 47.38 | 438.00 614.72 40.00 | |
| Construction Mentioner Body III Socked store Social Sedeville (Social Inside) | 1 CAMB 14-03 1 SAMEON | 60.62 61.00 | 4000 4000 4100 | |
| NATION NATION NATIONAL NATIONA | 9 M329 11 CR322 4 M00ZZ | 60.20 60.10 61.60 | 6130 6130 | |
| Miles fol Dead (Event MCC79) MCC76 Ad | 1 ACBI-45 1 LIRON | 60.35 60.28 | 40.35 40.28 | |
| Construction Menthrane Body C | | | 40.00 40.00 | |
| MOUTS 300 deed pit 300 deed pit | 2 (30 H) 2 (40 H) 2 (40 H) | 60.00 60.00 60.00 | 63 64 64 64 64 64 65 64 65 64 65 | |
| Sold dissel pin (Sold preferred) Sold shoulder built Sold-Gill sizes | 1 MINIO 30 1 CAMIN 10 CA | 60.00 60.02 | 635 637 | |
| Mil out (house broad) Mil out (house some with hour cap man had not not out to hour cap | 4 C33-30 2 C33-14 3 M33-30 4 M33-30 4 M33-30 1 M | 60.32 60.38 60.38 60.36 60.36 60.30 61.32 61.32 60.32 | 40.33 | |
| rued ball door broad Construction Hardware Body C' | | -Comment | 40.00 40.00 | |
| models full thread (Newad MATC 79) MISC 79 cm2 MISC 22 MISC 75 cm2 MISC 22 MISC 75 cm2 MISC 22 | 1 ACR6-49 1 LIADMA 2 CR3-22 2 BRIGGEZ 4 MIN-33 3 CR3-33 3 CR3-31 4 MIN-33 | 60.38 60.36 60.30 61.80 60.32 60.32 | 623 623 | |
| 2021 dissel yes Milital | 4 M33-33 3 C33-33 | 60.00 60.00 60.00 | 6235 6235 | |
| Construitor Northwee Califory | | 6.0 | 45.00 45.00 | |
| Whe rige TuT care, CSI nex (name threads preferable) Double Serule for company onto were riger(Turnbuside (spannes/local) | 70 8ES 300 MS 20 118.000 700 1 MASSay | 60.09 60.24 byketlenshop au 018-0081 6E.17 | Team unafaire Trd And 2013 198 Statement State Caller Mills. 18th ja - 6033 500 560 64.17 Claude - O' Disclate Callegor Pension 64.17 Caller State - Page Processor 64.17 Capacida Mills 54.3 1 - High Processor | |
| Mequinal Tools for Shichards (Stinbards) Adolf Prints | | urhand Mason snassance 491.77 | 1 | Ocus signi end trus Ocus sideri end mas seguinas |
| Who ripe suber Who ripe berule unriper (you really reed thin) Tarch | 1 100.004.002 1 116.007.023 1 264.46 | ### ################################## | 49.90 Budger Wer Right Culter up to John Dakenter - 100.004.00 T TECHNICASE Crimy York for Double Copper Penulse - 116.007.023 494.20 | Oxes a folior and not requires a |
| Total-gas Has keys Mino then key 1.3mm (NEC II) for Texable couplins | 1 Section 1 Local Digital | thragacret se 363527 43.56 4 48.00 Nay | 63.76 68.00 | |
| Alpublis world: | 1 Line | 48.00 | 68.00 60.00 60.00 | |
| Mulder feet (how a sumputer case, SilvedSture Milo MCSSS Black) ELECTRONICS | • | 41.00 | 64.00 60.00 60.00 | |
| See a service of the second see a second second see a second se | , | | 40.00 40.00 40.00 | |
| Woodenhaptics DND Extension board (see below) (in/ robed ong MD extension board (for USE experimental) | 1 0 1 1701179 | 411.45 | 45.00 431.43 NOP CINTINGS LPCCINE, MEED PROPOSTYPAG BIOARD, RIT 45.00 | The objection is only title |
| Power Supply 18 2V power supply SA | 1 Looke | 160.AB 437.87 | 40.00 40.00 Interig PowerDaid 80 40.00 | |
| Streibt Caline 12nns sheves (Sin) Miles 12 on sidle hard for extended on an | 1 1287238 43211899 | 60 | 45.00 43.00 PRO FOWER, SLEEVING, BRAID, TUMM, BLACK, BM, PRO POWER PETEK (2803-BLEEVING, BRAID, TUMM, BLACK, 1 46.07 DC Date Male 12-on 2.54mm | |
| Pernals 12 pin cattle head (für extending enc. cables) 12 pin fall cable, per meter (für extending enc. cables) | 3 43311889 3 43000074 8 23670207 | 60.7.55 63.52 61.66 60.37 | 41.10 IDC haza kallet 15-jost guid 2.06-len. 42.13 Fabballet gill 10 tedate 1.27-len. hs 40.00 | |
| PC Connection Sensorary SISS DAS Colds Street | | eror oz 66.72 | #0.00 | Oak deally is trough delibeat |
| DAQ Cable 80 yes | 0 2217843 0 2217849 | 6707 03 64.52 67.00 | 4000 AMPHRINGL PCM0000-0 LEACH, 2 MANN, FIF, 800MM, 500MY 4500 | |
| Millers, Encaders & Current disser Mason 20mm (210000) & 500 CPR Encader continuation Mason 505 disser module (could eventually be custom make) | 3 310009 3 438728 | 63640 65638 | Total 4.08.29 83CON Make 806, 4-Q Several Make 10 CRIC makes, 915.5, 10 - 50 VDC | |
| ELECTRONICS CIRCUIT BOARDS | | | 40.00 40.00 | |
| Micolandeptic Michelsond PCE manufacturing price based on order of 2 units; motor & high per connectors. | 1 4 7701041 | 609.30 60.31 | 40:00 488:00 41:20 (MD PPRECISION CENTROLIS 20.1586642 HEADERS, 3.6666, HOMEZ, 2000) | |
| cable block high pair 10 pin encoder connector must sell connector, and pion revented; triade one with higher next | 4 1701832 3 2211290 1 2292793 | 633 633 | 43.33 BIO PRECISION CONTROLIS 26 1900HZ TEPMANN, BLOCK, 3.8MM, ZWAY 41.00 AMPHENUL TRZTITOANTIOCEU KIESEN DIALE KIESENSIII, RIGH ANGE, TEXT Series, 13 KINSAN, 6-3 MYAKINAPORP, Z.S. 41.47 | 666 |
| 20 pm socket (is est boset) 4 pm socket (is est boset) 18 pm (248) escon socket | 2 195369 1 195960 3 1968309 | 6235 6036 6244 | 64.08 INLENCOMP 22'128-0080-88 SOCKET, PCR, 1 HOW, 30WAY 6238 INLENCOMP 22'128-0680-88 SOCKET, PCR, 1 HOW, 40WAY 6108 SIMMING 280 109-10-0 PKECHTACKE, SWAMI, CUMA, 18WAY 6108 SIMMING 280 109-10-0 PKECHTACKE, SWAMI, CUMA, 18WAY | |
| 12 pin-recon scoket (1 pin discarded) Broader driver | 1 (70%) (4 (| 60.35 60.31 60.35 60.36 60.36 60.36 60.36 60.36 61.32 | THE STATE OF THE S | |
| Woodwinkplace CRQ Edwinson Bland PCB manufacturing price based on order of 6 units; 50 pm day connector | 0 pilopi 0 2711339 | post com #15.70 #1.52 | THE STATE OF THE S | Book to replace with the profile |
| 46 pms (50) ext. board | 0 2277338 0 2277338 0 3418388 | 902.000 61570 6152 6171 6279 | 4E.00 AMPHENOL TENETON-TENEDOLIU HEACER, LLANCI, STR. Z-BERK, 3000Y 4E.00 TE.CONGECTENTY / AMP S-ZORGE O HEACER, 1950Y, 500AY 4E.00 | The act on expected on the price. The act on expected on the price. The act on expected on the price. |
| Star Endours Mounting Distance screen Mod screen (orderedly Mod screen flat comes with consulter) | 4 1686725 4 1679886 4 1377536 | 60.30 60.32 60.31 | 40.00 41.00 STTPMOSER SPACER, MSM, 8-VZK STTRAUSER OB 13.001-SEPRICER, MSK, 8-VZK 40.00 SUMMATIOCA MSM PRISTMOCESSO-SICKERY, STEEL, MSP, 6866, MSJ, PK100 | |
| NO washes Assume and Equipment for Electronic Workland | 4 1377536 | 60.01 | 45.00 DURATICE, NO BRASE FELL BRAHER VARIHER, FELL BRASE, MS 45.00 45.00 | |
| Section Sectio | 0 0 1667700 0 2791888 | 6373.84 6800.97 | COMPANY OF THE PROPERTY OF THE | |
| Soler claser Soler 12 non Sp | 0 1447700 0 17015868 0 170273 0 1702708 0 1702708 0 1702708 | 6373.84 6820.37 64.89 68.77 64.88 64.58 421.60 | 4000 WILLER CLEANER, WOOL, BRUER, WOC, PKZ WILLER TOOLTBOOK-LEANER, WOOL, BRUER, WOC, PKZ 4000 WILLER TO ACTIVATOR, LOSE TEMP, 300 WILLER TO ACTIVATOR TO ACTIVATOR, USE TEMP, 300 4000 WILLER TO PK OLDERING STORN, PICEMS, BERT, TEMP SELECTOR, TO SCIENCEN STORN, ROUGH, SINCY, TEMP | |
| Salater 0.5 non tip Organizer calcred (Salatnentskap) De salatering | 0 13839M 0 1387981 0 | 66.36 621.80 | 40.00 VABLER TIP, SCLIDERING PICH, ROCKED, GAME HELLER LTTAK TIP, SCLIDERING PICH, ROCKED, GAMM 40.00 JANACO CARINET CREAMSER, 46COMPARTMENT 40.00 | |
| Tweezen http://www.tmbd/contook.com/pdf.php Hack-cables Thin had | 0 0 | | 4000 4000 4000 | |
| Thise had Sulpel Process safer | 0 0 0 | | #0.00 #0.00 | |
| Shelloratic wisiband Mal | 0 0 | | 40:00 40:00 40:00 | |
| COMPUTER (OPTIONAL) TX Middledoors RRT (MIS ANTI) CPU (MICHARIAN SISTEMPO) PRO SINGUI for India | 0 Kanyi | (MEAN STREET 425.21 (MEAN STREET 465.33 (MEAN STREET 435.24 | 4000 4000 SIELEMEN, SLAMM-ANT HIGH TIX, CORN, TO P'CH-VIR, CIELAN, LURS C, VON, DON, DON, DON, HORM 4000 AND ARRIVE SIES SLAMM-ANT, GAME CIE. J. ZORDAN, JAMES, STAY, 2010, TRANS, RABANIN TO SAME WISH 4000 SIEMMANIN STEED SOUTH STAY, DON TO PIN BROWN STANDERS, THE SAME STAY, SANS, 24 Maris, 16 PO | |
| CPU (MICHARIAN ISSEMPO) PRIS SIRVAIL Bare State Viteress keytoner/Stackpad contoo Case Silver/Silver-Silver | E Kongi D Kongi D Kongi | phelius 201001 435.21 phelius 2010019 466.33 phelius 2010019 435.33 phelius 201019 435.47 phelius 201019 435.47 413.39 | 45.00 Shawshire STXSEP 200V PRU SPX, 80 Plus Blocks, Standard, to 6px PCIs, 2s SXXS, 2s Males, to PD 45.00 Lugania Weekers Trach Replaced RIDO 45.00 Shamilton Monthage Monthage And Standard RIDO | |
| PCe Seuble riser | e total | 410.64 | 40.00 ASPAIA STOPIS KE/PCIe (Isse) 40.00 40.00 | |
| | | | 40.00 40.00 40.00 | |
| | | | #0.00 #0.00 | |
| | | | 40.00 40.00 40.00 | |
| | | | CES BERNES PER SERVICE | |
| | | | 60.00 60.00 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| 6 | CB3-10 |
|----|-------------------|
| 6 | CB3-10 CB3-35 |
| 4 | CB3-50 |
| 6 | CB5-90 |
| | CB3-22 |
| 10 | |
| 6 | WSSB10-6-1 |
| 1 | SFRMHP10-55-F5-P4 |
| 2 | SB6900ZZ |
| 1 | CPL12-4-5 |
| 4 | MS3-20 |
| 7 | MS3-40 |
| 5 | MS3-40 |
| 12 | CB3-10 |
| 2 | B608ZZ |
| 4 | SB6900ZZ |
| 7 | CB3-22 |
| 16 | CB3-18 |
| 6 | CB3-45 |
| 1 | LBNR6 |
| 1 | ACB4-45 |
| 1 | LBNR4 |
| 1 | MSB8-60 |
| 1 | MSB8-110 |
| 1 | SSRBW8 |
| 6 | CIMR8-14-0.5 |
| 2 | CPL12-4-5 |
| 2 | SFRMHP10-55-F5-P4 |
| 1 | CIMR8-14-0.5 |
| 1 | SSRBW8 |
| 9 | MS3-25 |
| 11 | CB3-22 |
| 4 | B608ZZ |
| 1 | ACB4-45 |
| 1 | LBNR4 |
| 4 | CB3-30 |
| 2 | CB3-18 |
| 2 | MS3-20 |
| 4 | MS3-35 |
| 1 | MSB8-60 |
| 9 | CIMR8-14-0.5 |
| 1 | SSRBW8 |
| 1 | LBNR6 |
| 1 | ACB4-45 |

| 1 | | LBNR4 | |
|---|--|--------------|--|
| 7 | | CB3-22 | |
| 2 | | B608ZZ | |
| 4 | | MS3-35 | |
| 3 | | CB3-35 | |
| 6 | | CIMR8-14-0.5 | |

| will try to reduce the number of distributors to reduce complexity xon, Farnell and Misumi is easy to access globally er distributors might be tricky in some parts of the world us know your experience in the forum of woodenhaptics.org to labour cost included, i.e. for laser-cutting or soldering. gest costs are in the motors, drivers and PCle card that could re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Suggest Name | | Other e | encoders lectronics ed total* ed requir | s and current drivers s part cost for kit: red tools cost: | (|
|--|---|--|--|---|--------------|
| con, Farnell and Misumi is easy to access globally er distributors might be tricky in some parts of the world us know your experience in the forum of woodenhaptics.org to labour cost included, i.e. for laser-cutting or soldering. It is gest costs are in the motors, drivers and PCIe card that could re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Sugges | | Other e Estimat Estimat | lectronics ed total* ed requir | s part cost for kit: | (|
| con, Farnell and Misumi is easy to access globally er distributors might be tricky in some parts of the world us know your experience in the forum of woodenhaptics.org to labour cost included, i.e. for laser-cutting or soldering. It is gest costs are in the motors, drivers and PCIe card that could re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Sugges | | Estimat 1 EUR i | ed total* ed requir | part cost for kit: | |
| er distributors might be tricky in some parts of the world us know your experience in the forum of woodenhaptics.org lo labour cost included, i.e. for laser-cutting or soldering. gest costs are in the motors, drivers and PCIe card that could re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Sugges | | Estimat | ed requir | | |
| us know your experience in the forum of woodenhaptics.org lo labour cost included, i.e. for laser-cutting or soldering. gest costs are in the motors, drivers and PCIe card that could re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Sugges | | 1 EUR ii | | ed tools cost: | |
| lo labour cost included, i.e. for laser-cutting or soldering. gest costs are in the motors, drivers and PCle card that could re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Sugges | | 1 EUR ii | | ed tools cost: | |
| gest costs are in the motors, drivers and PCIe card that could re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Sugges | | | n SEK | | |
| re-used in several projects if you so wish. Required tools cept laser-cutter and soldering tools) are included. Sugges | | 1 EUR ii | . 0_1 | | kr9.4 |
| cept laser-cutter and soldering tools) are included. Sugges | | | n USD | | \$1.0 |
| Sugges | | 1 EUR i | n CHF | | CHF1.0 |
| | | | | | |
| r Name | ted distrib | utor (Eu | rope) par | t number | |
| | quantity | Maxon | Farnell | Misumi | Elektrok |
| MECHANICS | | | | | |
| | | | | | |
| Raw Material m birch plywood A2 sheet (594 x 420 mm) (alternatives possible) | 5 | | | | |
| in birdi piywood A2 sheet (554 X 420 min) (alternatives possible) | J | | | | |
| Construction Hardware: Base | | | | | |
| x10 (for motor) | 6 | | | CB3-10 | |
| x35 | 6 | | | CB3-35 | |
| x50 | 4 | | | CB3-50 | |
| κ90 | 6 | | | CB5-90 | |
| x22 | 10 | | | CB3-22 | |
| 0x1 washer | 6 | | | WSSB10-6-1 | |
| 55x4x5 capstan (10x55 shaft (RDOF10-55) ok if 10mm coupler) | 1 | | | SFRMHP10-55-F5-P4 | |
| <u>-</u> | | | | | |
| · | - | | | CPL12-4-5 | |
| , , , | | | | | |
| · | | | | | |
| · | | | | | |
| 0 dowel pin (Substitute with MS3-40) | 5 | | | MS3-40 | |
| Construction Hardware: Body A | | | | | |
| x10 (for motor) | 12 | | | CB3-10 | |
| 2x7 bearing | 2 | | | B608ZZ | |
| 22x6 bearing | 4 | | | SB6900ZZ | |
| x22 | 7 | | | CB3-22 | |
| x18 | 16 | | | CB3-18 | |
| x45 | 6 | | | CB3-45 | |
| /1.0 nut | 1 | | | LBNR6 | |
| x45 full thread (thread M4/0.75) | 1 | | | ACB4-45 | |
| 0.75 nut | 1 | | | LBNR4 | |
| 0 Shoulder bolt | 1 | | | MSB8-60 | |
| 10 Shoulder bolt (thread M6/1.0) | 1 | | | MSB8-110 | |
| F Dolloville (apring) weeker | 1 | | | CCDDWO | |
| 5 Belleville (spring) washer | | | | SOKRAAQ | |
| 4x05 shim kible Coupler that fits 5mm motor shaft and 4 mm capstan | 6 | | | SSRBW8 CIMR8-14-0.5 | |
| 2:xillino 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 2x6 bearing ble Coupler that fits 5mm motor shaft and 4 mm capstan other motor sharfts use CPL12-3-4 etc (from your shaft to 4mm) dowel pin dowel pin dowel pin (Substitute with MS3-40) Construction Hardware: Body A 10 (for motor) x7 bearing 2x6 bearing 22 18 15 10 nut 45 full thread (thread M4/0.75) 1.75 nut Shoulder bolt | 2x6 bearing 2 ble Coupler that fits 5mm motor shaft and 4 mm capstan 1 other motor sharfts use CPL12-3-4 etc (from your shaft to 4mm) 0 dowel pin 4 dowel pin (Substitute with MS3-40) 5 Construction Hardware: Body A 10 (for motor) 12 x7 bearing 2 2x6 bearing 4 22 7 18 16 45 6 .0 nut 1 45 full thread (thread M4/0.75) 1 .75 nut 1 Shoulder bolt (thread M6/1.0) 1 | 2x6 bearing ble Coupler that fits 5mm motor shaft and 4 mm capstan 1 other motor sharfts use CPL12-3-4 etc (from your shaft to 4mm) 0 dowel pin 4 dowel pin 7 dowel pin (Substitute with MS3-40) 5 Construction Hardware: Body A 10 (for motor) 12 x7 bearing 2 2x6 bearing 4 22 7 18 16 15 10 0 nut 11 Shoulder bolt (thread M6/1.0) 1 | 2x6 bearing ble Coupler that fits 5mm motor shaft and 4 mm capstan there motor sharfts use CPL12-3-4 etc (from your shaft to 4mm) dowel pin dowel pin dowel pin (Substitute with MS3-40) Construction Hardware: Body A 10 (for motor) 2x7 bearing 2x8 bearing 4 22 18 16 15 10 nut 11 15 full thread (thread M4/0.75) 17 18 19 10 Shoulder bolt (thread M6/1.0) | 2 SB6900ZZ |

| Construction Hardware: Body B | | |
|--|----|---------------|
| 8x14x05 shim | 1 | CIMR8-14-0.5 |
| 8x05 Belleville (spring) washer | 1 | SSRBW8 |
| 3x25 pin | 9 | MS3-25 |
| M3x22 | 11 | CB3-22 |
| 8x22x7 bearing | 4 | B608ZZ |
| M4x45 full thread (thread M4/0.75) | 1 | ACB4-45 |
| M4/0.75 nut | 1 | LBNR4 |
| Construction Howking to Book C | | |
| Construction Hardware: Body C | 4 | CD2 20 |
| M3x30 | 4 | CB3-30 |
| M3x18 | 2 | CB3-18 |
| 3x20 dowel pin | 2 | MS3-20 |
| 3x35 dowel pin (3x30 preferred) | 4 | MS3-35 |
| 8x60 shoulder bolt | 1 | MSB8-60 |
| 8x14x05 shim | 9 | CIMR8-14-0.5 |
| 8x05 belleville (spring) washer | 1 | SSRBW8 |
| M6 nut (1mm thread) | 1 | LBNR6 |
| M4 35 mm screw with "nut" cap | 1 | HXN-STC-M4-35 |
| Red ball door knob | 1 | |
| Construction Hardware: Body C' | | |
| M4x45 full thread (thread M4/0.75) | 1 | ACB4-45 |
| M4/0.75 nut | 1 | LBNR4 |
| M3x22 | 7 | CB3-22 |
| 8x22x7 bearing | 2 | B608ZZ |
| 3x35 dowel pin | 4 | MS3-35 |
| M3x35 | 3 | CB3-35 |
| 8x14x05 shim | 6 | CIMR8-14-0.5 |
| Construction Hardware: Cabling | | |
| Wire rope 7x7 core, 0.54 mm (more threads preferable) | 10 | |
| Double ferrule (for crimping onto wire rope) | 20 | |
| Turnbuckle (spannschloss) | 1 | |
| Required Tools for Mechanics Workbench | | |
| Arbor Press | 1 | |
| Wire rope cutter | 1 | |
| Wire rope ferrule crimper (you really need this) | 1 | |
| Torch | 1 | |
| Torch gas | 1 | |
| Hex keys | 1 | |
| Mini-hex key 1.3mm (M2.5) for flexible couplers | 1 | |
| Adjustable wrench | 1 | |
| Other | | |
| Rubber feet (from a computer case; SilverStone Milo ML05B Black) | 4 | |
| ELECTRONICS | | |

| Electronics Box | | | | |
|---|-----------------------|--------|-------------------------------|---------|
| WoodenHaptics Motherboard (see below) | 1 | | | |
| WoodenHaptics DAQ Extension board (see below) /or/ | 0 | | | |
| mbed.org M3 extension board (for USB experimental) | 1 | | 1761179 | |
| Power Supply | | | | |
| 19.5V power supply 5A | 1 | | | |
| Electric Cables | | | | |
| 12mm sleeves (5m) | 1 | | 1297228 | |
| Male 10 pin cable head (for extending enc.cables) | 3 | | | 4101185 |
| Female 10 pin cable head (for extending enc. cables) | 3 | | | 4100057 |
| 10 pin flat cable, per meter (for extending enc. cables) | 5 | | | 3167020 |
| PC Connection | | | | |
| Sensoray S826 | 0 | | | |
| DAQ Cable 26-pin | 0 | | 2217642 | |
| DAQ Cable 50-pin | 0 | | 2217646 | |
| Motors, Encoders & Current driver | | | | |
| Maxon 30mm (310009) & 500 CPR Encoder combination | 3 | 310009 | | |
| Maxon 50/5 driver module (could eventually be custom made) | 3 | 438725 | | |
| ELECTRONICS CIRCUIT BOARDS | | | | |
| WoodenHaptics Motherboard PCB manufacturing (price based on order of 2 units) | 1 | | | |
| motor & high pwr connectors | 4 | | 1761541 | |
| cable block high pwr | 4 | | 1761532 | |
| 10 pin encoder connector | 3 | | 2215290 | |
| micro usb connector, smd (non-reversed) SWITCH | 1 | | 1645325 | |
| 20 pin socket (to ext. board) | 2 | | 1593469 | |
| 4 pin socket (to ext. board) | 1 | | 1593460 | |
| 18 pin (2x9) escon socket | 3 | | 1668305 | |
| 12 pin escon socket (1 pin discarded) | 3 | | 1593465 | |
| Encoder driver | 3 | | 1103045 | |
| | | | | |
| WoodenHaptics DAQ Extension Board | 0 | | | |
| WoodenHaptics DAQ Extension Board PCB manufacturing (price based on order of 6 units) | U | | 2217539 | |
| WoodenHaptics DAQ Extension Board PCB manufacturing (price based on order of 6 units) 50 pin daq connector | 0 | | | |
| PCB manufacturing (price based on order of 6 units) 50 pin daq connector | | | 2217535 | |
| PCB manufacturing (price based on order of 6 units) 50 pin daq connector 26 pin daq connector | 0 | | 2217535 3418388 | |
| PCB manufacturing (price based on order of 6 units) 50 pin daq connector 26 pin daq connector | 0 | | | |
| PCB manufacturing (price based on order of 6 units) 50 pin daq connector 26 pin daq connector 44 pins (50) ext. board Box Enclosure Mounting | 0 | | | |
| PCB manufacturing (price based on order of 6 units) 50 pin daq connector 26 pin daq connector 44 pins (50) ext. board Box Enclosure Mounting Distance screws | 0 0 | | 3418388 | |
| PCB manufacturing (price based on order of 6 units) 50 pin daq connector 26 pin daq connector 44 pins (50) ext. board | 0 0 0 | | 3418388 1466725 | |
| PCB manufacturing (price based on order of 6 units) 50 pin daq connector 26 pin daq connector 44 pins (50) ext. board Box Enclosure Mounting Distance screws M3x6 screws (preferably M3x4 screws that comes with computers) | 0 0 0 4 4 | | 3418388 1466725 1419986 | |

| Proper soldering station | 0 | 1447700 | |
|---|---|---------|--|
| Proper oscilloscope (not really needed, for testing only) | 0 | 2191868 | |
| Solder cleaner | 0 | 1792731 | |
| Solder activator | 0 | 873895 | |
| Solder 1.2 mm tip | 0 | 1282099 | |
| Solder 0.5 mm tip | 0 | 1282096 | |
| Organizer cabinet (Sortimentskåp) | 0 | 1367091 | |
| De-soldering | 0 | | |
| Tweezers http://www.lindstromtools.com/pdf.php | 0 | | |
| Hack-cables | 0 | | |
| Thin lead | 0 | | |
| Thicker lead | 0 | | |
| Scalpel | 0 | | |
| Precision cutter | 0 | | |
| Electrostatic wristband | 0 | | |
| Mat | 0 | | |
| | | | |
| COMPUTER (OPTIONAL) | | | |
| ITX Motherboard AM1 (MSI AM1I) | 0 | | |
| CPU (AMD Athlon 5350 APU) | 0 | | |
| PSU Small form factor | 0 | | |
| Wireless keyboard/trackpad combo | 0 | | |
| Case SilverStone Milo ML05B Black | 0 | | |
| PCIe flexible riser | 0 | | |
| T GIO HOARDIO HOOF | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| - | | | |
|---|--|--|--|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| - | | | |
|---|--|--|--|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |