



SOLARBOTICS[®] Ltd.

www.solarbotics.com

toll-free: 1-866-276-2687

Product Catalogue 8 2005/2006

KITS

All kits require soldering!

THE SOLARBOTICS SKILL RATINGS

- Skill rating 1-2 is suitable for beginners, as the documentation includes instructions and details useful for those just getting started in electronics, like how to solder, and how to identify the parts.
- Skill rating 2-3 requires the builder to have some mastery of using mechanical tools necessary to successfully build the kit, like wire bending, and electronic tuning.
- Skill rating 4-5 is for builders who are confident in their ability to properly install, configure, and tweak an advanced kit with a considerable number of components.

Review the kit documentation on our website for full details

PHOTOPOPPER PHOTOVORE KIT

The Photopopper is a solar-powered, light-seeking, obstacle-avoiding BEAM robot. By using very small, high-efficiency motors, this active little robot can cover a meter (3.3 feet) in under 2 minutes!

K PP **\$45USD / \$57CAD**



Skill: 3/5

SOLARSPEEDER SOLAROLLER KIT

This solar-powered car can cover 3 meters (10 feet) in under 40 seconds in direct sunlight. These little speed-demons use our special high-efficiency RPM2 pager motors, and utilize the same Solarengine technology found in our Photopopper Photovore. Simple to construct and a blast to watch in the sunlight.

K SS **\$25USD / \$30CAD**



Skill: 1.5/5

MAGBOT SUNDANCER KIT

This kit lets you build a mechanical-looking butterfly or insect that makes an ideal executive desk toy. When placed in a sunny location, it reflects the patterns on its silver/gold wings onto the ceiling which move every time the SunDancer sways on its own self-induced "electromagnetic wind".

K SD **\$35USD / \$39.50CAD**



Skill: 1.5/5

Skill: 2/5



SUNSWINGER PENDULUM KIT

The SunSwinger solar-powered pendulum is hypnotically cool. Powered by a subtle string of tiny SCPD solar cells, this device creates swinging, motorless motion!

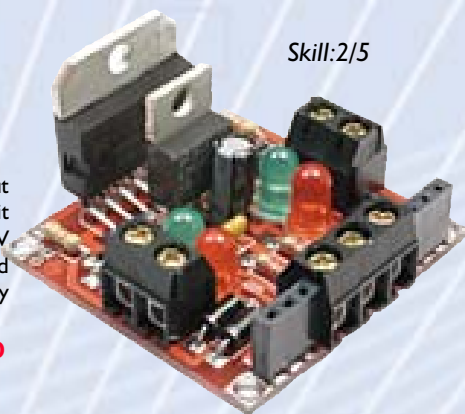
K PN **\$29.50^{USD}** / **\$37.95^{CAD}**

L298 COMPACT MOTOR DRIVER KIT

The L298 motor driver IC is a very popular, but hard to use chip. Our Compact Motor Driver kit tames this beast, and offers extra features like 5V regulated logic power output, indicator LEDs and robust screw terminal connectors, all in a tidy bundle!

K CMD **\$17.95^{USD}** / **\$22.50^{CAD}**

Skill: 2/5



L293D MOTOR DRIVER KIT

The 'Secret' L293D motor driver kit replaces the guts of a standard servo and turns it into a logic-signal controlled gear motor! The SGS Thompson L293D is configured to provide up to 1.2A and 36V - much higher than what a standard servo electronics are designed for!

This kit fits inside a standard servo body, like our SERVO or GM4 clear servo gear motor. The indicator LEDs on the kit also make for a cool lightshow in the clear servo case, or as part of a breadboard-mounted motor driver.

Don't want to drive a servo? This kit can drive all Solarbotics gear motors.

Skill: 1/5

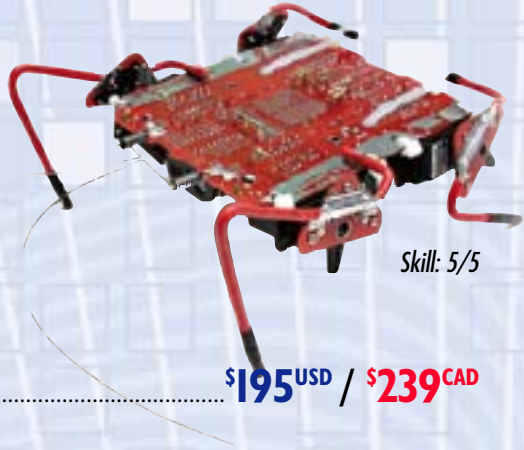


K SMD **Single Unit Price \$12.50^{USD} / \$15.75^{CAD}**
..... **or 2 or more for \$10^{USD} / \$12.50^{CAD} ea**

SCOUTWALKER II

FOUR MOTOR WALKING ROBOT KIT

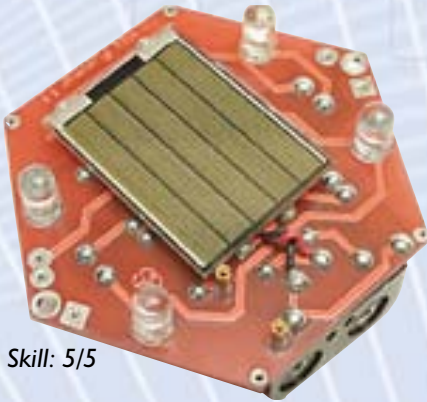
The ScoutWalker II is another robot based on Mark Tilden's microprocessor-less technology. This four-motor walker uses six identical chips in different Bicore arrangements to turn on the spot and reverse, based on the input of the two tactile sensors. Extra "breadboard" space is available to add your own circuit modifications too!



Skill: 5/5

\$195 USD / \$239 CAD

K W2



Skill: 5/5

HEXPUMMER

SOLAR NIGHT STROBE KIT

This little kit is a good introduction into soldering chips and components. When finished, you have a solar-powered, night-activated dazzler. Comes with four high-intensity LEDs that "PUMM" when the lights go out. That is, they turn on STRONG, then slowly fade away!

\$25 USD / \$30 CAD

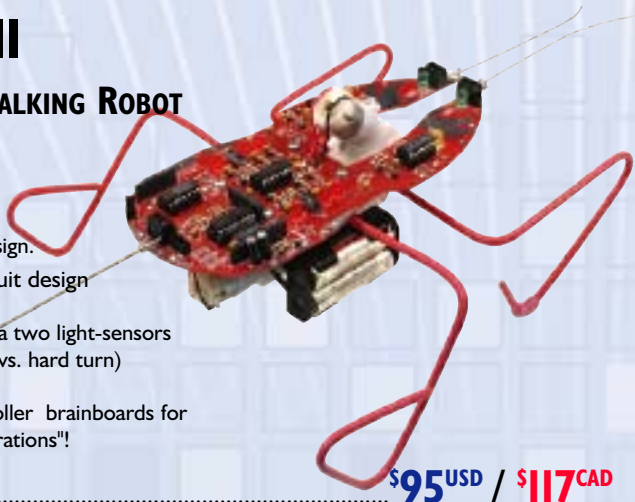
K HP

SCOUTWALKER III

ADEPT TWO-MOTOR WALKING ROBOT

The ScoutWalker III utilizes advanced BEAM circuitry to provide considerable agility in a two-motor walking robot design.

- Robust BEAM Microcore circuit design
- Steel subframe construction
- Built-in phototropic behavior via two light-sensors
- Two-stage turning gaits (gentle vs. hard turn)
- Dual tactile sensor
- Accepts Sumovore microcontroller brainboards for building "horse and rider" configurations!



\$95 USD / \$117 CAD

K W3

THE TURBOT TUMBLING ROBOT

The xenomorphic Turbot is nothing like any other robot you've seen! Designed with no default sense of up or down, left or right, the Turbot scrambles over the landscape, easily tackling obstacles equal in height to itself!

The Turbot's two arms let it reach, scrape, hook and claw its way over any obstacle. If something does manage to become ensnared, Turbot releases its prize so it can continue on chasing the light!



Skill: 3/5

Solarbotics has been researching Turbots for a good, long time, having had the privilege to examine Mark W. Tilden's original Turbots. Now, we're pleased to release our Turbot Kit to anybody interested in these highly dynamic, personable robots.

K TB.....

\$59.95^{USD} / \$74.95^{CAD}

Symet Parts Bundle



These aren't kits, as much as they are an inexpensive bag of components so you can build yourself a Symet along the lines of the PMK Trimet. Basic instructions included on how to free-form a 1381 or Flashing LED-based Solarengine, and how to assemble the mechanics.

The Symet parts bundle includes:

- 3904 & 3906 transistors
- 2.2k resistor
- 4 1000 μ F capacitors
- 3.3V Solarcell
- RM1a
- 3 large paperclips

- and depending on what version you order, a Flashing LED or a 1381J trigger & diode
- Print-outs of free-forming instructions

Note: The 1381 version is a bit harder to build, but more power-efficient. The FLED version is easier, and takes a bit longer between movements.

Please note that to bring this package to you at such a great price, we cannot offer the same 100% satisfaction guarantee as we do for our full kits.



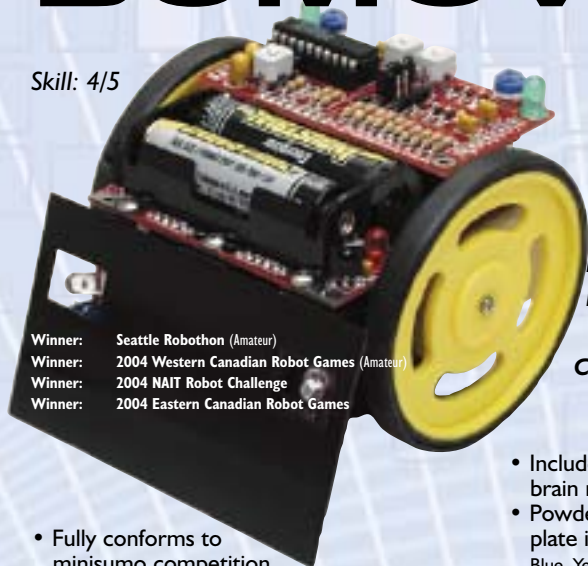
Skill: 3/5

SYMFLLED or SYM1381

\$12.75^{USD} / \$16.50^{CAD}

SUMOVORE!

Skill: 4/5



Winner: Seattle Robathon (Amateur)
 Winner: 2004 Western Canadian Robot Games (Amateur)
 Winner: 2004 NAIT Robot Challenge
 Winner: 2004 Eastern Canadian Robot Games

There is no better Mini-Sumo kit!

Faster, less expensive, with more sensors than competitive kits. The SUMOVORE took over 500 man-hours to design, test, and redesign. Over 20 prototypes built leading to this design that make it the best of it's class.

**Check the stats and see for yourself!
 100% Satisfaction Guarantee**

- Fully conforms to minisumo competition requirements
- 9V operation (6 AA's) (batteries not included)
- Powerful 143:1 gear motors (not servos)
- Up to FIVE front edge sensors
- Two active IR opponent detection sensors
- Modular electronics spread between a mainboard and two daughterboards

- Includes "advanced behavior" discrete brain module
- Powder-coated steel (not aluminum!) front plate in multiple colours (Black, White, Red, Blue, Yellow, Mottled black/silver)
- Custom made 2-5/8" diameter wheels in multiple colours (Black, Red, Blue, Yellow)
- Full schematics included for custom hacking
- One optional rear IR detection sensor, operable in active or passive mode
- Optional built-in line-follower mode; easily activated

K SV.....Regular Price \$89^{USD} / \$109.50^{CAD}

SUMOVORE ADD-ONS

Sumovore BS2 Brainboard Add-On - The Basic Stamp II Brainboard Add-on lets you interface your own BS2 / Stamp Stack / Atom Stack compatible microcontroller to your Sumovore. Pull the default "discrete brain", plug this in, add your own controller and load your code! (Sample code available from Solarbotics.com)



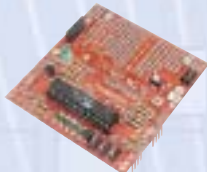
K SV-BS2.....\$15.00^{USD} / \$19.75^{CAD}

HSS2 Basic Stamp 2 compatible Microcontroller - Need the microcontroller to go with your BS2 brainboard? The HVVTech Stamp Stack II is functionally identical to the Parallax Basic Stamp II but comes on a PCB with a breadboard friendly pin header.



HSS2.....\$35.00^{USD} / \$44.00^{CAD}

Sumovore Atmel Mega8 Brainboard Add-on - This Atmel Mega8 add-on brainboard replaces the standard discrete logic brain with a powerful, programmable microcontroller!



See website for free programming tools and sample code.

K SV-Atmel.....\$19.95^{USD} / \$26.95^{CAD}

Sumovore PIC 16F877A Brainboard Add-on - The PIC-style microcontroller is among the most popular with robot builders, and this Brainboard add-on makes it easy to interface the PIC 16F877A with your Sumovore.



See website for sample code.

K SV-PIC.....\$24.95^{USD} / \$33.50^{CAD}



The Sumovore Baseplate Upgrade Kit - Our initial release of the Sumovore revealed that our motor & battery pack mounting solution wasn't as robust as it should have been. Our solution was to engineer a steel plate that makes your Sumovore motor and battery pack mounting much more secure.

Besides increasing the stiffness of the chassis, it also increases the mass for better traction! Just to reiterate: You **DO NOT** need this if you are ordering a Sumovore now. It is only useful retrofitting ziptie versions.

K SV-UPGI\$6.95^{USD} /\$8.75^{CAD}

Sumovore Front Plate - Now available for your mini sumo... replacement front plates available in 5 colours - Black, red, mottled black/silver, blue and yellow OR, feel free to buy one to bolt to the front of your car - we won't mind. These powder-coated steel plates will look equally good on a '88 Civic or '05 Cadillac. Really!

SVFP\$5.00^{USD} ea /\$6.25^{CAD} ea

Bicore Experimenter's PCB



FRONT



BACK

This printed circuit board is a collection of easy-to-use BEAM circuits on a snap-apart printed circuit board (PCB). Modules include: Bicores (breadboard, single, dual, buffered), multiplexors, motor drivers, servo drivers, solarengines (2 types), charging/switch circuits, tiny breadboards, AND even leg mounting pads to easily attach legs to servos! Each module is well documented, with application notes, and the PCB itself is very well labeled for ease of use. This board is IDEAL for robot experiments using BEAM Bicore technology!

What you get on a Bicore Experimenter's PCB:

- 3 x BC1 - Bicore breadboard
- 6 x BC2 - triple-buffered single Bicore
- 3 x BC3 - dual double-buffered, separately enabled Bicores
- 3 x IMx - inverting multiplexors
- 2 x MD2 - 8-channel motor driver
- 2 x SC1 - ServoCore hobby servo Bicore
- 4 x PM3 - 1/2 sized Maxim 8212 configurable hysteresis solarengine
- 6 x MSE - 1/2 sized Miller 1381-based solarengine
- 3 x Chg - 1/4 sized charging jack/switch boards
- 9 x BB - 1/4 sized breadboards
- 10 x LMPI - solderable leg mounting pads you can attach to servo arms

visit
solarbotics.com
for BEP construction
projects!

Skill: 5/5

BEP\$35^{USD} / \$45^{CAD}

PARTS BUNDLE: We've assembled a LARGE bundle of parts to help you get started with your Bicore experiments, including resistors, capacitors, tiny LEDs, 74AC240s, 74HCT240s, solarcells, and storage capacitors (and more). There's a 74xx240 - style chip for each module, and a wide variety of component values so that you can get practically all your modules operational! There are no junk parts in this bundle - you'll make good use of every part. (See our website for a complete parts listing)
Complete with a BEP, this bundle is a \$75 savings (\$90 CAD) over buying the parts individually!

BEP BUNDLE.....\$140^{USD} / \$175^{CAD}

Gear Motors

At Solarbotics, we carry inventory that will fulfill all your small-to-medium robot gear motor requirements. The GM2, 3, 6, 7, 8, 9, & 10 were all designed by Mark Tilden specifically to be suitable for robotics, with performance and tolerances that are not usually found in motors this inexpensive! The rest of our gear motor selection consists of unusual and very interesting units that we hope you find as interesting as we do!



GM2

The 224:1 GM2/3 gear motors are quite strong, rated ~45RPM with over 50in*oz at 6V, with a built-in (over-rideable) 40in*oz safety torque clutch. (GM2 is easy to hack into a 14:1 motor - details online!)



GM3

GM2 / GM3.....\$7.00^{USD} ea / \$9.00^{CAD} ea
.....or 2 for \$5.50^{USD} ea / \$6.95^{CAD} ea



GM6

The GM6/7 series of gear motor are smaller 120:1 versions of the GM2/3. They're speedier, and have proven themselves as effective mini-sumo robot motors. Offering ~164RPM with over 20in*oz torque at 6V, whatever you put on the



GM7

2mm spined output shaft is going to move well!

GM6/GM7.....\$7.00^{USD} ea / \$9.00^{CAD} ea
.....or 2 for \$5.50^{USD} ea / \$6.95^{CAD} ea



The GM4 uses the strong GWS05 servo mechanics without the servo electronics. Ideal for replacing standard servos when

you have an appropriate motor driver circuit (see our 'K SMD', which fits right inside!). Complete with continuous-rotation output gear, and accessory pack!

GM4\$15.50^{USD} ea / \$19.50^{CAD} ea
.....or 2 for \$12.00^{USD} ea / \$15.00^{CAD} ea



GM8

These 143:1 GM8/9 gear motors are shaped similar to their GM2/3 brethren, but are just a wee bit thicker.



GM9

At ~79RPM with over 43 in*oz torque, they're what we use in our award-winning Sumovore robot kits!

GM8 / GM9.....\$7.00^{USD} ea / \$9.00^{CAD} ea
.....or 2 for \$5.50^{USD} ea / \$6.95^{CAD} ea



The GM10 is an 81:1 pager-powered gearbox that in standard configuration is an auto-centering actuator. One clip, and you have a speedy 5gram gear motor. We even made the GM10W wheel to mate with it!



GM10\$12.00^{USD} ea / \$15.50^{CAD} ea
.....or 2 for \$9.75^{USD} ea / \$11.95^{CAD} ea

The Sanyo GM11 and GM14 gear motors are very impressive with their full-metal gearbox. With the GM11's speedy 75.7:1 and the GM14's torquey 297.1:1 reduction ratio, we've got your application covered!

GM11 - 75.7:1.....\$23.00^{USD} ea / \$29.00^{CAD} ea
GM14 - 297.1:1.....\$23.00^{USD} ea / \$29.00^{CAD} ea



GM15: A 25:1 Planetary gear motor 6mm in diameter. Need we say more? Ok, how about one cubic inch robots? (Check out nano-sumo!)

GM15.....\$19.00^{USD} ea / \$24.00^{CAD} ea
or 2 for \$15.00^{USD} ea / \$18.50^{CAD} ea



The GWS S03N servo is an inexpensive and powerful standard-sized work-horse servo. Complete with full accessory pack.

SERVO.....\$15.00^{USD} ea / \$22.00^{CAD} ea

GM2 / GM3/ GM8/ GM9 Wheel Combo Deal



Choose a red, black, blue or yellow wheel to complement your GM2, GM3,

GM8 OR GM9 gear motor, and save! Each set also comes with two traction bands.

Let us know what colour you want, or you'll get what we think you want!

GM2PW, GM3PW, GM8PW or GM9PW
\$10.00^{USD} ea / \$12.75^{CAD} ea
or 2 for \$7.75^{USD} ea / \$9.75^{CAD} ea

GM10 Wheel Combo Deal



Get a wheel to mate with the GM10 and save! Choose from red, yellow, light grey, blue or black. Comes with two traction bands. Again, let us know what colour you want, or it's luck-of-the-draw for you!

GM10PW\$13.75^{USD} ea / \$14.25^{CAD} ea
or 2 for \$10.60^{USD} ea / \$13.00^{CAD} ea

SOLARBOTICS GEAR MOTOR STATS

Part #	Description	Gear Ratio	Unloaded RPM	Unloaded Current (mA)	Stall Torque (in°oz)	Stall Current (mA)	Dimensions (mm)		Weight (g)	
							Length	Width		Height
GM2	Offset / Inline	224:1	48	67	53	494	55	48	23	37
GM3	90° Degree	224:1	47	67	55	499	70	22.5	37	37
GM4	Servo Body	325:1:1	111	60	57	729	40.6	20	38	45
GM6	Mini Offset / Inline	120:1	171	72	11.4	531	37	21	27	20
GM7	Mini 90° Degree	120:1	177	99	11.5	482	53	13	19	20
GM8	Offset / Inline	143:1	78	67	32	521	55	48	23	32
GM9	90° Degree	143:1	82	84	32	536	70.5	27	23	33
GM10	Centering Pager Gearmotor	81:1	376	55	1.7	197	14.3	25.4	28.8	5
GM11	Metal Gearhead	75.7:1	281	94	8.3	558	29	12	10	8.3
GM12	Metal Gearhead	134.5:1	159	94	12.6	526	29	12	10	8.3
GM13	Metal Gearhead	196.6:1	106	92	17.2	499	29	12	10	8.3
GM14	Metal Gearhead	297.1:1	74	67	25.5	487	29	12	10	8.3
GM15	Pager Gear motor	25:1	2220	74	-	-	20	6	6	1.2

Motors



These are definitely a rare find. Ever wonder what Mark Tilden used to build his original BEAM devices out of? These (His original Photovore, T.H.A.B. jumper, and SunSpinner)! These are high-precision tape transport mechanisms with 2 motors - one large pancake motor, and one worm-reduction gear motor! They also have quite a variety of belts & screws, a beautiful brass pulley wheel, rubber capstan pinch roller, a fine spring (what the original "omni-touch" tactile sensors were built with), and a fine coil (pancake motor encoder output). See our website for more details about this mechanism.

MCM2 **\$6.75^{USD}** ea / **\$8.60^{CAD}** ea
or 2 for **\$5.95^{USD}** ea / **\$7.59^{CAD}** ea



This general application BEAM motor is really quite good for solarengine designs needing torque, and small battery-powered robots. Output shaft fits RW or PRet-style accessories!

RM1A **\$2.85^{USD}** ea / **\$3.50^{CAD}** ea
or 2 for **\$2.35^{USD}** ea / **\$2.89^{CAD}** ea



A high power motor that fits in the same form factor as used by the GM2/GM3 and GM8/GM9 style gear motors. When retrofitted (an easy process after removing the GM2/3/8/9 motor strap), it nearly triples the output speed and doubles the torque!

Be forewarned - the increase in power output comes with a sizeable increase in power consumption! When used in a GM2/3/8/9, the power output is considerably higher.

RM2 **\$2.25^{USD}** ea / **\$2.75^{CAD}** ea
or 2 for **\$1.90^{USD}** ea / **\$2.35^{CAD}** ea



This is the standard motor that is built in to the GM2/3/8/9. Nominally runs at 6VDC and consumes roughly 35mA.

If you've blown up your GMx motor, you're in luck! We've got replacements! :)

RM3 **\$2.00^{USD}** ea / **\$2.50^{CAD}** ea
or 2 for **\$1.75^{USD}** ea / **\$2.15^{CAD}** ea



Quality pager motors are getting harder to find now that cheap clones are everywhere. Be assured that our RPM2 pager motors are factory-fresh, and very high quality.

At 1.5V, it draws only 17.5mA @ 9700rpm, and 120mA stalled. At 3V, it draws 32.1mA @ 31900, and 260mA stalled.

RPM2 **\$3.95^{USD}** ea / **\$4.98^{CAD}** ea
or 2 for **\$3.45^{USD}** ea / **\$4.40^{CAD}** ea



Pager motor technology has made it easier for us to find a suitable replacement for the original TPM for substantially less!

Want to build something itty bitty? Try these: Just

0.158" diameter and an overall length of 0.74" with an output shaft diameter of 0.026".

Performance at 1.5V is 12.4mA unloaded (36.8mA stall) at 10,100RPM.

At 3V, current is 17.6mA free (73mA stall) at 20300RPM! And just for fun, 5V give 20.3mA free (117mA stall) at 32,500RPM!

TPM2 **\$4.95^{USD}** ea / **\$6.10^{CAD}** ea
or 2 for **\$4.40^{USD}** ea / **\$5.45^{CAD}** ea



This vibrating disk motor measures 14mm dia. and 3.5mm thick (0.55" dia. x 0.15" thick). It's quite unique in that it is fully self-contained - no visible moving parts.

These have been a favorite toy around the office - when they're connected to a Solarengine circuit, they shake all over the place!

VPM **\$3.90^{USD}** ea / **\$4.80^{CAD}** ea
or 2 for **\$3.50^{USD}** ea / **\$4.30^{CAD}** ea

We often get requests asking "What motor would be the best for my robot?". Well, the chief factors to take into account are how much power do you have, and how much strength do you need? Small robots using only a pair of AAA cells can be built using direct-drive RM1A or RPM2 motors, because the robot will be small and light.

Larger walking robots or sumo-robots powered by 6V or more need more motor power for pushing and moving their mass around, so a GM8 or GM9 is preferable.

Let the robot's ultimate purpose guide your selection, and if the result isn't quite what you expected, remember you can always build another!

Motor, Gear Motor & Servo Accessories



Gear Motor Tread Links - Sometimes you just have to have treads, especially if you need a high-mobility solution for your robotics project. These 23mm (7/8") wide x 12mm (1/2") long tread links are very well designed, using 1/16" steel pins press-fit into precision CNC-drilled (not molded!) mounting holes.

These treads will most likely outlive your robot! Made of hard ABS plastic (in black or yellow), these are ideal for the wild environments of shag carpeting and linoleum (the most common habitat for hobby robots...), as they won't cause too much friction when turning on the spot. But if you need more traction, you can easily glue on rubber feet for more grip! Note: A minimum of 14 links is required for each track, using the default cogs and idlers.

GMT **\$1.00^{USD}** ea / **\$1.25^{CAD}** ea
or 2 for **\$0.91^{USD}** ea / **\$1.14^{CAD}** ea
 10-19 for **\$0.77^{USD}** ea / **\$0.96^{CAD}** ea
 20+ for **\$0.62^{USD}** ea / **\$0.78^{CAD}** ea



Gear Motor Tread Cogs - These cogs let you interface our popular GM2/3/8/9 series gear motors with the very cool GMT tread links. They've been precision molded to mate with the gear motor's double-flat output shafts. They're so precise and snug, you might not even need to use the included mounting screw to lock the cogs on! The GMT Cog measures 38mm (1.5") diameter x 15mm (19/32") wide, and is made of the same long-life ABS plastic the tread links use.

GMTC **\$2.25^{USD}** ea / **\$2.81^{CAD}** ea



Gear Motor Tread Idlers - You only need one motor per side on a tracked vehicle, but you'll need at least one idler wheel to stretch the tread between two points on your robot! This idler matches the same dimensions as the driver cog (38mm dia x 15mm wide), but is drilled out to 1/4" (6.4mm), which lets you use a standard #8 bolt as the idler axle.

GMTI **\$2.25^{USD}** ea / **\$2.81^{CAD}** ea



Gear Motor and Tread Package - Ready to build a caterpillar tread drive for your next robot? Here's a package that makes the job easy. It includes a pair of GM2/3/8/9 style gear motors, two GMTI idlers, two GMTC driver cogs (keyed to fit the GM2/3/8/9), and forty GMT links and pins sets (20 per side). Get the set, and save more than 20% over buying the parts individually!

GMPKpg **\$39.95^{USD}** ea / **\$49.95^{CAD}** ea



GM10 Wheel - This 25mm (1") diameter is custom made to mate with the GM10 pager gear motor. Ideal for Microsumo robots! Available in blue, black, light grey, red & yellow.

GM10W-x **\$2.35^{USD}** ea / **\$2.90^{CAD}** ea
or 2 for **\$2.00^{USD}** ea / **\$2.50^{CAD}** ea



Looking for a good way to attach a wheel to a servo? Check this out - this wheel is designed to mate with most standard servo output shafts (excluding Hitec), and comes with a pair of black rubber traction bands. Available in black, red, light blue and yellow. The hubs measure 65mm (2-5/8") x 7.62mm (0.3") wide, and are specially injected molded for a high degree of rotational accuracy (no wobbles!).

SW-x **\$3.50^{USD}** ea / **\$4.40^{CAD}** ea
or 2 for **\$3.00^{USD}** ea / **\$3.75^{CAD}** ea



The high coefficient of friction on these soft rubber bands generate excellent traction on the

GMPW series of wheels. Available in green, blue or black.

TB-x **\$0.45^{USD}** ea / **\$0.65^{CAD}** ea



Gear Motor 2/3/8/9 Traction Tires - Although the rubber traction-bands on the standard GMPW series wheels are good (and even better when double-layered), you need some "great grips" when you start playing mini-sumo in the advanced leagues. Specially molded to offer maximum traction, these 14 durometer Shore 'A' elastomer tires are the easiest way to upgrade your Sumovore to top-level competitiveness. As they are thicker than traction bands, they also increase the rolling diameter of the wheel from 67mm to 71mm. Note: Tires sold individually (not as pairs)

GMTT **\$4.00^{USD}** ea / **\$5.00^{CAD}** ea
or 2 for **\$3.00^{USD}** ea / **\$3.75^{CAD}** ea



These 30mm diameter, 7mm thick wheels fit snugly onto the double-flat output shaft. Each wheel has four edge mounting holes suitable for taking a #2x1/4" sheet metal screw, which are ideal locations for attaching larger wheels! Comes complete with motor shaft mounting screw and washer.

GMW **\$1.00^{USD}** ea / **\$1.30^{CAD}** ea



Need a wheel for your GM 2/3/8/9 gear motor? Attach one of these wheels to it! This 65mm (2-5/8") x 7.62mm (0.3") wide ABS plastic wheel keys onto the larger GM series of motors double-flat output shaft, and comes with a pair of black rubber traction bands. Available in black, red, light blue, and yellow. We like to double-layer the traction bands for even more grip in the mini-sumo ring!

GMPW-x **\$4.00^{USD}** ea / **\$4.95^{CAD}** ea
or 2 for **\$3.25^{USD}** ea / **\$4.00^{CAD}** ea

Motor Accessories



Wheel Watcher Rotation Encoder for GM2/3/8/9 - This "Incremental quadrature encoder system" is specially designed by Nubotics to retrofit to our GM2, GM3, GM8 or GM9 gear motor. If you need to control a robot for dead reckoning, tracking odometry (distance travelled), stalled motor, or closing

the feedback loop for position/velocity/acceleration, this is your solution.

- 32 stripe codewheel
- 128 clocks per rotation
- Mates with GMPW / SW wheels

The Nubotics documentation contains all assembly & application notes to successfully implement your Wheel Watcher. This kit contains a single preassembled sensor board, codewheel, and wiring kit. Note: The GM2 & GM3 need GMWWS spacer for proper operation, due to their longer output shafts. So unless you're comfortable in cutting down the shafts on your own, these are the ideal solution.

GMWW02 **\$22.00^{USD}** ea / **\$27.50^{CAD}** ea
Dual Pack for **\$42.00^{USD}** ea / **\$52.50^{CAD}** ea



Wheel Watcher Spacer for GM2/3 - Due to the longer shaft lengths on the GM2 and GM3, the encoder wheel reflector is a bit too far away from the sensors on the Wheel Watcher. Use this spacer to bring

the reflector back into range.

GMWWS **\$1.95^{USD}** ea / **\$2.45^{CAD}** ea



1/4" Fuseclip motor mount, great for holding the standard Pager motor

MMFC **\$0.20^{USD}** ea / **\$0.25^{CAD}** ea



3/16" Fuseclip motor mount, usable for holding the Tiny pager motor (when squished slightly).

TMM **\$0.20^{USD}** ea / **\$0.25^{CAD}** ea



10mm OD, 1.5mm ID, 7mm wide. The same as used in our SolarSpeeder kit. Ideal for you do-it-yourself Solaroller builders who plan on entering competition.

RW **\$1.00^{USD}** ea / **\$1.30^{CAD}** ea



PRet - Plastic Retainer - The PRet plastic retainer is a plastic nub designed to press-fit onto a 1.5mm shaft (like our RM1a). We use it as a hub for making micro wheels out of silicon tubing stretched over the PRet!

PRet..... **\$0.25^{USD}** ea / **\$0.30^{CAD}** ea
or 2 for **\$0.20^{USD}** ea / **\$0.25^{CAD}** ea



After being frustrated after stripping too many hex wrenches while tightening RW2 wheels onto motor shafts, we decided to get some good hex wrenches. These Bondhus brand hex wrenches have been doing a great job for us. They're an ideal companion for any RW2 users!

HexW050 **\$0.35^{USD}** ea / **\$0.50^{CAD}** ea



This is a beautifully machined aluminum hub with a generously thick rubber tire for maximum traction (excellent for minisumo!).

The assembly measures in at 31.2mm (1.23in) diameter and 11.2mm (0.44in) wide,

drilled for a 1/8in. (3.18mm) axle - a nice, fat, beefy wheel ideal for small robots! Secure it to your motor shaft with the included 4-40 hex set screw.

Note: As this wheel is drilled for a 1/8in. axle, mounting it on our GM6/7 gear motor (a 2.1mm shaft) will not quite give you a true-running wheel. You will need to create a spacer sleeve to make up the difference to make it spin true.

RW2 **\$3.50^{USD}** ea / **\$4.35^{CAD}** ea
or 2 for **\$3.00^{USD}** ea / **\$3.75^{CAD}** ea



GM11-14 Mounting Bolt - This 1.7 (dia) x 0.35 (mm/thd) x 4mm long bolt exactly matches the unique thread on the two boltholes on the faceplates of the GM11/12/13/14 gear motors.

M1.7x0.35 **\$0.20^{USD}** ea / **\$0.25^{CAD}** ea

It's easy for us to pick what items we should bring to market. If we find something that makes us instinctively want to build a robot around it, we know it's something you'll like too!

That's why you won't find many "run of the mill" products at Solarbotics. We try to fulfill your need for the truly unique and useful!



201 35th Ave N.E., Calgary, Alberta T2E 2K5 Canada
Toll Free: 1-866-276-2687 Ph: (403) 232-6268 Fax: (403) 226-3741
 www.solarbotics.com / sales@solarbotics.com

SHIPPING INSTRUCTIONS

- Orders processed in currency based on destination. US and International Orders processed using the USD price listed, and Canadian using CAD price listed - no exceptions! Orders received calculated in the wrong currency will be returned.
- Visa, MasterCard, PayPal (paypal@solarbotics.com), AMEX (Canada only), USD / CAD Money Orders and cheques are acceptable forms of payment. (Expect delays for clearance of cheques). Please make cheques or money orders payable to Solarbotics Ltd. Money orders must be international US Dollar - if it says "negotiable in US and possessions only", it will be returned to you!
- When there are price discrepancies between the catalog and our website, the website will be taken as correct.

Base Shipping Rates:

	<u>Ground</u>	<u>Expedited</u>	<u>Xpresspost</u>	<u>Purolator</u>
Canada 1 (West)		\$6.25 (3-5 bd*)	\$8.50 (2-3 bd*)	\$16.50 (1-2 bd*)
Canada 2 (East)		\$7.25 (5-7 bd*)	\$9.50 (3-4 bd*)	\$18.50 (1-2 bd*)
Canada 3 (Atlantic)		\$7.75 (7-9 bd*)	\$9.75 (3-5 bd*)	\$19.50 (1-2 bd*)
USA	\$5.00 [†] (1-3 wks**)	\$9.50 (6-12 bd*)	\$13.95 (5-7 bd*)	\$21.75 (1-2 bd*)
Europe, Australia	\$6.00 [†] (4-8 wks**)	\$9.95 [‡] (2-4 wks**)	\$36.00 (6-12 bd*)	\$33.00 (2-4 bd*)
All other countries	\$6.00 [†] (6-10 wks**)	\$9.95 [‡] (2-6 wks**)	\$40.00 (6-12 bd*)	\$50.00 (3-5 bd*)

*bd - business days

**wks - weeks

[†]Not insurable or trackable

NOTE:

- Orders containing books or sintra will have extra shipping charges applied
- Over 1kg / \$100 value / non-standard shipping package - to be calculated & quoted by Solarbotics and confirmed by you before shipping.
- Taxes, duties, brokerage fees, etc., are the responsibility of the importer (that's you). These fees are outside the knowledge and control of Solarbotics Ltd. Please contact your local taxation office for details.
- Please call us regarding bulk discounts and purchase orders (credit references required).

**Solarbotics Ltd. offers a
 100% satisfaction guarantee
 on all our products.**

**If you have a problem with
 anything, please contact us for
 immediate service.**

- Please call Monday to Friday, 9am to 6pm Mountain Standard Time.
- **Product availability and prices are subject to change without notice.**
- **Pricing Terminology:**
 USD - US Dollars
 CAD - Canadian Dollars
 EA - each (as in price per each item)

ORDER FORM - CATALOG 8

SHIP TO: _____ Date: _____

Name: _____

Company: _____

Address: _____

City: _____ Province/State: _____ Postal Code/Zip: _____

Country: _____ Email: _____

Phone(required): _____ Fax: _____

If Billing Address is different than shipping address, please list here:

Name: _____

Address: _____

City: _____ Province/State: _____ Postal Code/Zip: _____

Country: _____ Phone: _____

Payment Enclosed: <input type="checkbox"/> Check <input type="checkbox"/> Domestic (CDN) Money Order/Bank Draft <input type="checkbox"/> International (USD) Money Order/Bank Draft	
Payment by Credit Card: <input type="checkbox"/> Mastercard <input type="checkbox"/> Visa <input type="checkbox"/> Amex <small>(Canada Only)</small>	
Card # _____	Expiry Date _____
Cardholder Signature (required) _____	<ul style="list-style-type: none"> If order destination is within Canada, use the CAD price listed. Other destinations, use the USD price listed. Orders not calculated in proper currency will be refused.

QUANTITY	PART#	DESCRIPTION	PRICE EACH	TOTAL
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
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6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____
11.	_____	_____	_____	_____
12.	_____	_____	_____	_____
13.	_____	_____	_____	_____
14.	_____	_____	_____	_____
15.	_____	_____	_____	_____

SEE REVERSE SIDE OF ORDER FORM FOR MORE INSTRUCTIONS	SHIPPING & HANDLING: _____ SUBTOTAL: _____ APPLICABLE TAXES (CANADA ONLY GST/HST): _____ TOTAL: _____
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Please see reverse for approx. shipping costs. Send order to:



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 Toll Free: 1-866-276-2687 (1-866-B-ROBOTS)
 Ph:(403) 232-6268 Fax: (403) 226-3741
www.solarbotics.com

Other Useful Solarbotics Information:

Product Support

Solarbotics stands fully behind our products. If you find any defect with your purchase, we will be happy to exchange it for you.

* Solarbotics is proud to offer a 30 day money back guarantee on all of the product that we sell. Please note the following conditions:

- All products returned must be in resalable condition. Products that have been used, damaged or somehow altered will not be accepted for return and will be shipped back at the owner's expense.
- All shipping fees are non-refundable.
- Please call us to request an RMA to ensure our knowledge of the return.
- Determining appropriate shipping methods and their associated costs for returning goods is the responsibility of the customer.
- Customer credits will be applied upon receipt of the returned item to our offices.

Kit Support

All of our kits come with a 100% satisfaction guarantee, as happy owners build happy robots! If for any reason you are having some troubles with your kit, we offer assistance in this order:

- Free-of-charge telephone support. Call us on our **toll-free line (866-276-2687)** for all the support you need. If telephone support doesn't resolve your problem...
- ...we will gladly repair your kit for you. This means we won't finish building it for you, but we'll repair any problems that are causing the failure. This includes parts and labour free. Call us to get an RMA (Returned Merchandise Authorization), ship it back as described below, and we'll take care of your sick robot.

Return Policy:

Solarbotics stands completely behind our products. This said, we do have a few minor rules regarding taking care of any returns:

Shipping Robots for Repair / Refund

We NEED the RMA before we can accept a return or repair.

To arrange for return of a product, first email tech support at info@solarbotics.com or phone us at **1-866-276-2687** to determine what is the best course of action. If we determine that your product should be sent back to us, place your item in sturdy packaging, and return it to Solarbotics at the address listed on page 13 of this catalog.

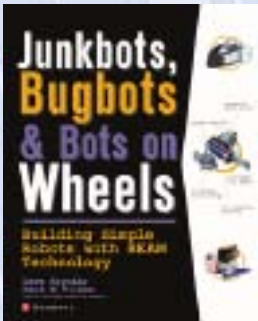
Note

- If you are shipping your item back from outside of Canada, we need the customs documentation labeled: 'Items returned for Repair' and place a cost of \$5 for Declared Value.
- Items not appropriately marked for customs often show up with funds owing (like Solarbotics had ordered the robot from you, and the Canadian Government wants their taxes on it), we cannot accept it and it will be returned back to you.

Privacy Policy

Solarbotics Ltd. is a limited company in the Province of Alberta, Canada, and complies with the Personal Information Protection Act. For full details, please visit our website at: <http://www.solarbotics.com/contact/privacy.php>. In short, we're not evil. We hate nosy businesses too, and only require from you the minimum fundamental information needed to process your orders. What information we do have, we keep private, and do not share.

BOOKS AND MEDIA



Junkbots, Bugbots and Bots on Wheels: Building Simple Robots with BEAM Technology

What can we say? This title is written by Solarbotics' founder, with contributing chapters by Mark Tilden. With seven detailed BEAM projects of varying complexity, and a healthy dose of useful BEAM information, this book is an excellent source for any aspiring BEAM roboticist, or educator looking for an inexpensive way to bring robotics into a classroom.

JBB.....\$23.00^{USD} ea / \$29.00^{CAD} ea

see: Junkbots.solarbotics.com



Absolute Beginners Guide to Building Robots - Absolute Beginner's Guide to Robots is well-written, inviting, and action-packed, with engaging ideas and fascinating factoids about robots and robot-related arts and sciences. You are led gently into the intimidating world of robotics, but nearly 400 pages later, you emerge with a respectable knowledge of robot history, the major fields and "schools" of robotics today, and the basic skills and resources needed to create hobby robots.

ABG\$19.00^{USD} ea / \$25.00^{CAD} ea

With all the new books on the shelves about robotics, we've done our bit to keep an eye on what books are actually good for building robots or learning about robotics. We then put together parts bundles that make it easy for you to get what you need to be successful.

Before ordering a book, it's wise to get a feel for it. The titles we carry can be reviewed at the following locations:

"Junkbots, Bugbots & Bots on Wheels":

<http://junkbots.solarbotics.com>

(and has a free sample project)

**"Robot Building for Beginners"
and "Intermediate Robot Building":**

<http://robotroom.com/>

"Absolute Beginners Guide to Building Robots":

<http://www.streettech.com/robotbook>

Some of the parts bundles we carry are listed here, but there are more on our website. So don't just read about robotics, get to work and start building too - that's where the fun is!

David Cook's Books and Support Materials



"Robot Building for Beginners" by David Cook. - This is one of the most impressive absolute-beginner books we can recommend. Unlike other books that

gloss over core material by leaping into a multitude of small projects, Cook builds a line-following robot by exploring in great detail the parts, tools, and techniques needed to complete the project. An excellent "ground-level" robotics book, and is an ideal companion to "Junkbots"!

RBFB.....\$26.00^{USD} ea / \$32.00^{CAD} ea

No, no, it's not a snack to feed your latest creation, it's the printed circuit board that accompanies the project in the "Robot Building for Beginners", by David Cook. This circuit board is the one Cook uses to build the "Sandwich Line Following Robot," with the final result being a line-following robot using LED illumination.



SandPCB.....\$12.00^{USD} ea / \$15.00^{CAD} ea

The Roundabout is the project robot for David Cook's latest book, "Intermediate Robot Building". These parts provide all the companion elements to fully complete all the projects in the book.

Roundabout Motherboard PCB



This is one of the three project PCBs from the above book. As the base unit, it houses the sensors, motor drivers, power regulation and basic logic systems of the Roundabout robot.

RNDMPCB.....\$12.00^{USD} ea/\$15.00^{CAD} ea

Roundabout Daughterboard PCB



This daughterboard unit serves as the base to an add-on micro-processor (not included) that supplants the 74AC14 logic chip that is the original brains on the motherboard.

RNDPCB.....\$12.00^{USD} ea/\$15.00^{CAD} ea

Roundabout Floorboard PCB



This floorboard houses a pair of TSL257 light-to-voltage photodiode sensors (included), and the support electronics for the LED illuminator circuitry (not included).

RNDPCB.....\$12.00^{USD} ea/\$15.00^{CAD} ea



"Intermediate Robot Building" by David Cook - This book covers all aspects of robot building, from mechanical, to electronics to microcontroller selection.

IRB.....\$35.00^{USD} ea / \$44.00^{CAD} ea

Skill: 2/5



Sandwich PCB & Components - This kit comes complete with the components necessary to build a "Sandwich" Robot, with the exception of the DPDT switch and Molex headers (which

are optional and do not affect the performance of the robot). Red LEDs substitute the white ones used in the book.

Please let us know what your color preference is for the wheels (red, blue, yellow or black), otherwise we'll pick some out for you!

K SAND.....\$49.70^{USD} ea / \$62.00^{CAD} ea

Roundabout KX8 Microcontroller



The 68HC908KX8 microcontroller is used with the above Roundabout daughterboard as a replacement brain for the Roundabout project robot.

KX8.....\$12.00^{USD} ea/\$15.00^{CAD} ea

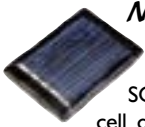
Roundabout Package Deal



Includes all of the above printed circuit boards and the preprogrammed microcontroller at a savings!

RND Deal.....\$40.00^{USD} ea / \$49.25^{CAD} ea

SOLARCELLS



NEW! 24 x 33mm Polycrystalline Solar Cell - As our next-generation replacement for the venerable SC2433, this similar-sized polycrystalline cell offers a nominal 2.3V and 16mA in a 24x33mm package.

SCC2433-A.....\$6.50^{USD} ea / \$8.25^{CAD} ea
or 2 for \$5.00^{USD} ea / \$6.25^{CAD} ea

Solarbotics is presently finding newer and better solar cells for BEAM applications. Check our website for our latest finds!



NEW! 37 x 66mm Polycrystalline Solar Cell

The next in our series of small-scale, high voltage solar cells is the SCC3766. Nominally rated at 6.7V and 30mA, our direct-sunlight tests show just over 8V open-circuit, and 44mA short-circuit!

SCC3766...\$11^{USD} ea / \$13.75^{CAD} ea
 or 2 for \$8.25^{USD} ea / \$10.30^{CAD} ea



37x33 PolyCrystalline Solar Cell - This epoxy-encapsulated solar cell generates 6.7V and 15mA in a very sturdy and easy-to-solder panel..

SCC3733.....\$8.00^{USD} ea / \$9.85^{CAD} ea
or 2 for \$6.25^{USD} ea / \$7.75^{CAD} ea



These Siemens BPW-34 1/8" square clear-epoxy encapsulated photodiodes act quite well as solarcells, generating 0.47V (open circuit) and 1.8mA (short circuit) in noon-day sunlight. NOTE: You will need a minimum of 6 wired in series to generate sufficient voltage to run most solarengine circuits. Check our website for the full datasheet.

SCPD.....1 for \$1.25^{USD} ea / \$1.60^{CAD} ea
10 for \$1.00^{USD} ea / \$1.30^{CAD} ea

SOLARCELLS: An easy way to estimate how much voltage a solarcell produces is by counting the cells (the stripes) in the panel, and dividing by 2. For example, our SCC3733 has 12 cells. Divided by 2 equal approximately 6V, which is right in the ballpark!

When wiring up solarcells, treat them just like batteries. Put them in series (plus to minus, plus to minus) for more voltage, and in parallel (plus to plus, minus to minus) for more current. If you want better low-light performance, wire them in series. For better daylight performance, wire them in parallel!



- ALL Solarbotics kits documentation is available online for your review. Learn more about the kits before you buy!
- Solarbotics publishes full schematics of our kits to make customizing easier!
- Solarbotics offers volume discounts. Contact us for a quote!
- No wimpy plastic snap-together blocks in our kits - use REAL construction techniques to build your robot!

CAPACITORS



We use the cp0.001 μ F capacitor for motor noise suppression and IR sensor tuning. Small can be useful!

CP0.001 μ F.....\$0.25^{USD} ea / \$0.30^{CAD} ea



A standard monolithic ceramic capacitor. This small-value monolithic capacitor is useful with high-frequency bicore circuits. A typical AC240 Bicore with a 1K suspended resistor will run near 38KHz using these capacitors.

CP0.01 μ F.....\$0.25^{USD} ea / \$0.30^{CAD} ea



These 0.1 μ F monolithic capacitors are quite suitable for Bicore and Microcore experiments

CP0.1 μ F.....\$0.25^{USD} ea / \$0.30^{CAD} ea



Like the 0.1 μ F caps, these 0.22 μ F monolithic capacitors are quite suitable for Bicore and Microcore experiments that require longer delays

CP0.22 μ F.....\$0.35^{USD} ea / \$0.45^{CAD} ea



These 0.47 μ F monolithic capacitors are quite suitable for Bicore and Microcore experiments that require even longer delays or power stabilization

CP0.47 μ F.....\$0.35^{USD} ea / \$0.45^{CAD} ea



These 1.0 μ F monolithic capacitors are expensive, but they aren't polarity sensitive like regular tantalum capacitors

CPI.0 μ F.....\$0.65^{USD} ea / \$0.80^{CAD} ea



These 6.8 μ F monolithic capacitors are quite suitable for Bicore and Microcore experiments that require even longer delays or power stabilization.

CP6.8 μ F.....\$0.65^{USD} ea / \$0.80^{CAD} ea



This 16V 22 μ F electrolytic capacitor is ideal for cushioning circuit power surges.

CP22 μ F.....\$0.25^{USD} ea / \$0.30^{CAD} ea



330 μ F 16V Electrolytic Capacitor - Looking for a small electrolytic cap? This 330 μ F 16V unit is pretty small - only 8.15mm (0.32") diameter by 12mm (0.47") long!

CP330 μ F.....\$0.35^{USD} ea / \$0.50^{CAD} ea



A very small 6.3 volt 1000 μ F capacitor - only 8mm diameter by 13mm long (5/16" x 1/2")

CP1000 μ F.....\$0.80^{USD} ea / \$1.00^{CAD} ea

.....or 10 for \$0.60^{USD} ea / \$0.80^{CAD} ea



This 3300 μ F 6.3V unit is the same type we use in our SunDancer Kit

CP3300 μ F.....\$1.75^{USD} ea / \$2.00^{CAD} ea



This 4700 μ F 6.3V unit is the same type we use in our Photopopper Kit. We simply haven't found another capacitor with as much density for its size!

CP4700 μ F.....\$2.00^{USD} ea / \$2.50^{CAD} ea



Electrolytic Capacitor - 4700 μ F 16V. This higher voltage version is used in the Junkbots minisumo. This capacitor is less appropriate for solar applications where weight is best kept to a minimum. The increase in voltage range comes at a sizable increase in volume. 0.640" diameter with a body length of 1.215".

CP4700 μ F-16V...\$2.00^{USD} ea / \$2.50^{CAD} ea



Panasonic AL Gold series 0.33 FARAD 2.5 volt, 6.8mm diameter, 21mm long (0.27" dia x 0.83" long). Makes for impressive action when it fires!

CP33F.....\$5.00^{USD} ea / \$6.50^{CAD} ea

.....or get 2 for \$4.00^{USD} ea / \$5.25^{CAD} ea



Panasonic AL Gold series 1.0 FARAD 2.5 volt, 8.2mm diameter by 23mm long (0.32" dia. x 0.9" long). These are much like the 0.33F caps, but just a little larger in diameter, with 3 times the power-storage ability!

CPI.0F.....\$6.50^{USD} ea / \$8.25^{CAD} ea

.....or get 2 for \$5.00^{USD} ea / \$6.50^{CAD} ea



1.0F - Aerogel Super Capacitor is very small,

measuring 11mm long x 8mm diameter (7/16" x 5/16" dia.) capacitors store 1 Farad at 2.5 volts (3V surge), and weigh only 1 gram (0.035oz). With only 0.4 ohms resistance, it can dump power **quite** well!

CPAG1.0F.....\$5.00^{USD} ea / \$6.15^{CAD} ea

.....or 2 for \$4.00^{USD} ea / \$4.95^{CAD} ea

.....or 10 for \$3.25^{USD} ea / \$4.00^{CAD} ea

TRANSISTORS & FETs



2N3904 NPN small signal transistor, as used in most basic solarengine designs. Can't find them or trust the ones you pick up from your local electronics store? These are pulled from the stock we build our own kits from.

TR3904 **\$0.15^{USD}** ea / **\$0.20^{CAD}** ea



2N3906 PNP small signal transistor, as used in most basic solarengine designs. Can't find them or trust the ones you pick up from your local electronics store? These are pulled from the stock we build our own kits from.

TR3906 **\$0.15^{USD}** ea / **\$0.20^{CAD}** ea



This 2N2222 NPN transistor is similar to the TR3904 above, but can deliver higher maximum current at better efficiency ratings. Got a demanding design? Substitute one of these into where the TR3904 should go.

TR2222 **\$0.15^{USD}** ea / **\$0.20^{CAD}** ea



This 2N2907 PNP transistor is similar to the TR-3906 above, but can deliver higher maximum current at better efficiency ratings. This is the complementary transistor to the 2N2222

TR2907 **\$0.15^{USD}** ea / **\$0.20^{CAD}** ea



Although somewhat more expensive than the transistors, there are some designs that absolutely rock when a low-voltage Zetex FET like this is used. It's a good substitute for where 2N7000 or similar N-channel FETs are required.

TRZVN2106 **\$1.00^{USD}** ea / **\$1.30^{CAD}** ea



This is the P-channel complement to the TR-ZVN2106 FET. Exactly what's needed for building a motor-driving H-bridge circuit.

TRZVP2106 **\$1.00^{USD}** ea / **\$1.30^{CAD}** ea

CHIPS & ICs



Panasonic 1381 Triggers - These are ideal for electronics hobbyists who want to use some of the latest CMOS technology to make their own solarengine designs. We stock 9 "flavours": C (2.0V); E(2.2V); G(2.4); J (2.7V); L (3.0V); N (3.4V); Q (3.8); S (4.0V); and U (4.6V) Please note that the triggers operate in the range listed to +0.2V of their rating (i.e.: a C trigger will trigger between 2.0 and 2.2V)

1381x **\$1.75^{USD}** ea / **\$2.25^{CAD}** ea
.....or 10 for **\$1.40^{USD}** ea / **\$1.80^{CAD}** ea



1-of-4 decoder chip, good for twisting into motor h-bridge controllers or drivers

74AC139 **\$0.75^{USD}** ea / **\$1.00^{CAD}** ea



Inverter chip with hysteresis, has 6 gates. Otherwise known as the heart of MicroCore Technology.

74AC14 **\$0.75^{USD}** ea / **\$1.00^{CAD}** ea



Octal buffer chip, or better known as The Bicore Chip. There is a multitude of BEAM purposes for this chip.

74AC240 **\$1.00^{USD}** ea / **\$1.30^{CAD}** ea



Octal Buffer Chip. Draws less power but can't drive as heavy loads as the 74AC240. Great for solar applications.

74HCT240 **\$1.25^{USD}** ea / **\$1.60^{CAD}** ea



Octal Buffer chip. Has 8 channels of buffering power for driving motors from Micro/Bicore signals. (80mA per channel)

74AC245 **\$1.00^{USD}** ea / **\$1.30^{CAD}** ea



SGS Thompson motor driver chip. Designed for up to 4 amps of motor drive power for battery-powered applications.

L298 **\$5.25^{USD}** ea / **\$6.50^{CAD}** ea



The very popular L293D motor driver chip is a workhorse in the small robot field. This 4 watt IC can handle two motors drawing 600mA each (spiking to 1.2A), between 4.5 and 36 volts.

We've tested many small motor driver chips, and this one still ranks among the best.

L293D **\$3.25^{USD}** ea / **\$4.00^{CAD}** ea



The Maxim 8212 voltage monitor fills the void of voltage ranges missed by the 1381x series of voltage triggers. Three resistors set the voltage detection level and the reset voltage drop, making for a very convenient core to a solarengine circuit. This IC is part of our PM3 module in our Bicore Experimenter's PCB.

8212 **\$3.50^{USD}** ea / **\$4.75^{CAD}** ea

Got a cool BEAM Robotics project? Get a free website on solarbotics.net and share it with the world!



CHIPS & ICs



This quad bipolar analog switch has gained some attention in the BEAM community as a simple way of routing analog signals in our control circuits.

74HC4066\$0.75^{USD} ea / \$1.00^{CAD} ea



The HC family of octal buffers is very similar to the HCT in regards to drive current, but the switching threshold for the HC is close to half of the chip supply voltage.

74HC240\$1.00^{USD} ea / \$1.30^{CAD} ea



Quad 2-Input Exclusive-OR logic chip. The 74HC86 is a high-speed Si-gate CMOS device that provides the EXCLUSIVE-OR function. We use this chip in our new ScoutWalker III kit.

74HC86\$0.75^{USD} ea / \$1.00^{CAD} ea



The "Herbie" chip! - This very cool little op-amp was designed originally for powering small speakers in portable electronics, but it suitably runs motors too! Good for up to 15V, dissipating 1.25W maximum, it's got some power. We've measured the input impedance near 50K, and output impedance at about 10 ohms - good enough for driving small motors!

LM386\$0.50^{USD} ea / \$0.75^{CAD} ea



In response to the interest generated by Bruce Robinson's Hider on the BEAM mailing list, we're offing the LM324 Op-amp. This chip contains four independent operational amplifiers with supply voltages up to 32V!

LM324\$0.50^{USD} ea / \$0.75^{CAD} ea



The LM339 is another handy chip that is finding a new audience in the BEAM world. It contains a quad of comparators (similar to op-amps) with open collector outputs.

Similar in operation to the LM393 but with twice as many comparators.

LM339\$0.50^{USD} ea / \$0.75^{CAD} ea



The LM393 is the chip at the heart of the popular "sandwich bot" project featured in David Cook's "Robot Building for Beginners" (which we sell...). This IC contains a pair of independant comparators with open collector outputs.

LM393\$0.50^{USD} ea / \$0.75^{CAD} ea



The LM2937 is a 500mA "Low Drop-Out" (LDO) 5 volt regulator. Low drop out means it needs only 6 volts to do a good job of regulating, where other chips need at least 7.5 volts. We use this chip in our Sumovore Mini-sumo kit to regulate the digital electronics' voltage.

LM2937\$1.50^{USD} ea / \$2.10^{CAD} ea



The LM555 is simply one of the most popular parts in the history of electronics. You'll eventually need one of these on your electronics workbench!

LM555\$0.75^{USD} ea / \$1.00^{CAD} ea



Atmel Mega8L Microcontroller - The ATmega8L is a refined 8 bit microcontroller with 8kb of program memory and 1K of SRAM. Runs at speeds up to 16MHz producing 8 MIPS (about 2000 times faster than a B52).

ATMega8L\$3.50^{USD} ea / \$4.95^{CAD} ea



PIC 16F877A Microcontroller - The '877 is an incredible little device powered by a 20MHz/4MIPS processor. It contains this impressive feature-set:

- 33 programmable Input/Output (I/O) lines
- Eight 10-bit analog-to-digital converters (ADCs)
- Two Pulse-width modulation (PWM) channels
- Only 35 instructions
- Two analog comparators
- In-Circuit Programmability
- 8kB flash memory, 368 bytes RAM, 256 bytes EEPROM

PIC16F877A\$7.50^{USD} ea / \$9.95^{CAD} ea

*New to electronics & robotics?
Don't let the vast variety of parts
and pieces scare you! Start slow -
pick a project or two from a book
or website, and get just those
pieces.*

*Gather some junk electronics, and
keep them handy for when you
don't have what you need.
And if at all possible, find a friend
to work with! Share your parts,
knowledge, and have some fun!*

RESISTORS



Resistors: 100 470 1.0k 2.2k 4.7k 10k
47k 100k 220k 240k 300k 360k 470k
680k 1.0M 1.3M 1.5M 2.2M 2.7M 3.3M

3.6M 3.9M 4.3M 4.7M 5.1M 5.6M 6.2M 6.8M 7.5M 8.2M 9.1M 10M
5% accuracy 1/4 watt resistors to get you started with your
BEAM experiments.

.....\$0.20^{USD} ea / \$0.25^{CAD} ea



Resistor Bundles:
Cheaper than the individual resistors,
and in convenient sets

of 10 pieces each of four values!

RB1: 100ohm, 470ohm, 1k, 2.2k

RB2: 4.7k, 47k, 100k, 220k

RB3: 300k, 360k, 470k, 680k

RB4: 1M, 1.5M, 2.2M, 3.6M

RB5: 3.9M, 4.3M, 4.7M, 5.1M

RB6: 5.6M, 6.2M, 6.8M, 7.5M

RB7: 7.5M, 8.2M, 9.1M, 10M

.....\$2.00^{USD} / \$2.75^{CAD} bundle



The TR10k is a single-turn 10k trimpot that we use in our Sumovore Mini-sumo robot kit for edge-detection sensitivity purposes.

RT10k\$1.00^{USD} ea / \$1.35^{CAD} ea



This 20k 20-turn trimming potentiometer is much like the 100k version, except the adjustment screw is on the narrow side, opposite the three inline leads.

RT20k\$2.50^{USD} ea / \$3.25^{CAD} ea



100k 20-turn 8mm square trimpot, with triangle leg orientation. These are the same as used on the Photopopper kit - an excellent, small, accurate trim potentiometer.

RT100k\$2.50^{USD} ea / \$3.25^{CAD} ea



The TR2M is a single-turn 2 megaohm trimpot we use in our Sumovore Mini-sumo robot kit for startup / reverse-and-turn timer tuning.

RT2M\$1.40^{USD} ea / \$1.95^{CAD} ea



Triptom Adjusting Tool - This plastic-handled triptom adjusting tool has a steel slot-bit on each end. One bit is exposed (like a traditional

screwdriver) for internal adjusting, and the other end has a recessed bit for adjusting exposed screw heads.

This tool makes tuning PhotoPoppers and Sumovores much easier!

TAT\$3.75^{USD} ea / \$4.60^{CAD} ea

LEDs



These Green LEDs have a tiny built-in circuit to make them flash. Besides being good for blinking, they also have been used as triggers for various Solarengine circuits.

FLED\$1.50^{USD} ea / \$1.85^{CAD} ea



These water-clear, standard sized TI-3/4 LEDs are noticeably brighter than other LEDs this size. They're the same as what we use in our HexPumper Kit. Get the special "10 for" pricing by

combining the various Ultrabright LED colours (green, yellow, red).

UBLED-x\$0.75^{USD} ea / \$1.00^{CAD} ea

.....or 10 for \$0.45^{USD} ea / \$0.70^{CAD} ea



Tiny LEDs by HP, SMT sized, but with longer legs for easier soldering. These amazing little devices glow a brilliant red (or green, or yellow...) when lit up with 10mA, and will offer visible light with as little as 3mA. Perfect for indicators on micro/bicore designs. Also good with solar applications, like when run in parallel (reverse biased) with the "Major Henry" coil. It will blink using the back EMF generated by the coil! We simply haven't seen comparable LEDs to these at any price. Available in red, yellow or green

TLED-x\$1.00^{USD} ea / \$1.30^{CAD} ea

.....or 10 for \$0.80^{USD} ea / \$1.04^{CAD} ea



Standard LED - These TI-3/4 LEDs are the same as what we use in several of our kits. They are rated 20mA continuous current, but will operate fine on as low as 5mA. Available in green, yellow or red!

SLED-x\$0.35^{USD} ea / \$0.50^{CAD} ea

.....or 10 for \$0.25^{USD} ea / \$0.35^{CAD} ea



This Fairchild QED233 infrared emitting LED is a nice complement to our PNA4602 IR detector. We use these in our Sumovore Mini-sumo kits!

IR-LED Emit\$0.60^{USD} ea / \$0.75^{CAD} ea

Solarbotics attends robot related events in many parts of North America throughout the year. If you see us, stop by and say Hi! We're always happy to hear from our customers and get feedback on our products.

PINs

Carrier and pin sockets are cheap insurance against having to desolder a part and possibly damaging your robot. If you've ever had to remove a soldered-in IC, you'll recognize the value of these parts!



The idea of a DIP socket is to allow easy insertion/replacement of chips in existing circuits. With the way we abuse ICs in BEAM technology, it's a good idea to use these where possible!

This 8 pin model is useful for mounting ICs like the LM386 (audio op-amp), LM393 (op-amp), and the 8212 (voltage trigger) ICs.

DC-8Pin.....\$0.20^{USD} ea / \$0.30^{CAD} ea



The 14-pin version is suitable for mounting the 74AC14, 74HC4066, 74AC86, LM339 and LM324

DC-14Pin.....\$0.25^{USD} ea / \$0.35^{CAD} ea



The 16 pin version is usable with the L293D (motor driver), and 74AC139 (motor logic) ICs.

DC-16Pin.....\$0.25^{USD} ea / \$0.35^{CAD} ea



This 20-pin version is suitable for use with the 74XX240 and 74XX245 type ICs.

DC-20Pin.....\$0.25^{USD} ea / \$0.35^{CAD} ea



This wide 0.6" 24-pin carrier fits the Basic Stamp 2 series of microcontrollers.

DC-24W.....\$0.35^{USD} ea / \$0.50^{CAD} ea



We use them for the Atmel ATMega8!

DC-28pin.....\$0.35^{USD} ea / \$0.50^{CAD} ea



This 40-pin wide carrier fits the PIC16F877A microcontroller.

DC-40W.....\$0.35^{USD} ea / \$0.50^{CAD} ea



Long Augut Socket pins for sensors, rocker points, or anything else you can think of! Measures 18mm (3/4") long.

APin\$0.20^{USD} ea / \$0.25^{CAD} ea



These strip headers are snappable, so you can 'snik' off exactly how many you need off a strip of 32 pins. Or take them off individually so you can mount them in a circuit for easy resistor/capacitor/transistor replacement.

SPin32.....\$2.00^{USD} ea / \$2.50^{CAD} ea

Solarbotics.net is a free community server that Solarbotics sponsors. For too long we've felt that the BEAM Robotics community was too scattered and out of touch. To fix that, we offer free, high-quality web accounts on a dedicated server to anybody who wants to showcase their robots and projects.

We now host over 100 individual BEAM websites!

If you want to learn about building robots, or figure out how to set up a circuit, shape robot legs, look at pictures, or...well, there's LOTS of great information here!

SWITCHES



Narrow PC Mount SPDT power switch, same as used on our and Sumovore kits.

SWT1 **\$1.25^{USD}** ea / **\$1.75^{CAD}** ea



Standard PC Mount SPDT Power switch, same as used on our ScoutWalker 2 kit.

SWT2 **\$4.25^{USD}** ea / **\$5.25^{CAD}** ea



Double-pole double-throw Micro Slide Switch - Ideal for switching sensor hookups (turn that photovore into a photophobe), or for a tiny power switch.

SWT3 **\$0.50^{USD}** ea / **\$0.65^{CAD}** ea
or 4 for **\$0.39^{USD}** ea / **\$0.49^{CAD}** ea



Micro double-pole double-throw switch. This is an ideal way to rig up a motor to a battery with a left/stop/right capability.

SWT4 **\$0.60^{USD}** ea / **\$0.75^{CAD}** ea
or 4 for **\$0.49^{USD}** ea / **\$0.60^{CAD}** ea



This micro double-pole double-throw switch is like the SWT3, but the lever is on the top of the switch body.

SWT7 **\$0.50^{USD}** ea / **\$0.65^{CAD}** ea
or 4 for **\$0.39^{USD}** ea / **\$0.49^{CAD}** ea



This is a single-pole double-throw switch that is useful for tactile sensors.

The metal tab is solderable, but it works best to use an acid-based flux or silver solder such as the kind found at a hardware store. Hydro-X doesn't quite do the job without more aggressive flux.

SWT9 **\$3.00^{USD}** ea / **\$3.70^{CAD}** ea
or 4 for **\$2.35^{USD}** ea / **\$2.90^{CAD}** ea



SWT10 - SPST Pushbutton Switch - These 2-pin single-pole single-throw switches are great for small circuits, and we use them in our Sumovore Add-on boards.

SWT10 **\$0.45^{USD}** ea / **\$0.60^{CAD}** ea
or 4 for **\$0.35^{USD}** ea / **\$0.45^{CAD}** ea



This 5V relay handles 1A at 120VAC or 2A at 24VDC. Coil current draw is about 40mA at 5V also, the coil is not polarity sensitive. The relay pinout is stamped onto the bottom for handy reference. These relays are ideal for the "Junkbots" book projects requiring relays.

REI **\$3.25^{USD}** ea / **\$4.00^{CAD}** ea
or 4 for **\$2.75^{USD}** ea / **\$3.40^{CAD}** ea

SENSORS



Want some really fine, surgical-grade stainless-steel spring tubing? These are ideal as compliant legs on small creatures, and as tactile sensors on larger ones. 1.77mm / 0.07" OD. NOTE: You may have to use silver alloy solder and/or a high temperature soldering iron to make successful connections to this spring tubing (but boy is it worth it!).

TACT1 **\$0.50^{USD}** / **\$0.65^{CAD}** /10" length



Looking for a touch sensor suitable for your next BEAM project but don't want to rip the ones off your Photopopper kit? Here - use this identical set instead!

TACT2 **\$4.50^{USD}** / **\$5.75^{CAD}** /pair



Heavier duty touch sensors than the TACT2, more suited to walking robots.

TACT3 **\$5.00^{USD}** / **\$6.50^{CAD}** /pair



A Siemens SFH 205f Wide Field of View Infrared Photodiode Detector - As used in the Photopopper kit. Full details are available in the datasheet on our website

IRI **\$1.25^{USD}** ea / **\$1.65^{CAD}** ea



Light sensitive resistor - A nice small CDS cell, great for robot eyes. Bright light resistance measures ~160 ohm and ~700K ohm for dark resistance.

These little guys measure 4mm x 3.5mm (5/16" x 1/8") across the face with long 4cm (1.5") long leads.

CDS **\$1.25^{USD}** ea / **\$1.65^{CAD}** ea



robot kit.

The Fairchild QRD1114 is an infrared opto-reflector sensor with about a 3mm (1/8") range. This makes it ideal as a robot's edge or line sensor, which is why we use it in our Sumovore Mini-sumo

QRD1114 **\$1.25^{USD}** ea / **\$1.65^{CAD}** ea



The Panasonic PNA4602 is a superior 38kHz-tuned infrared receiver / decoder. Usually used for detecting and decoding TV remote signals, it's also well suited for building object-

detection circuits, like in our Sumovore Mini-sumo robot kit

PNA4602 **\$1.50^{USD}** ea / **\$1.90^{CAD}** ea

MISCELLANEOUS ITEMS



These lightweight leg mounting pads are designed with large solderable areas where you attach legs of your own design to any standard servo arm. It also has extra pads and holes for additional mechanical mounting of sensors and wiring. Each LMPI comes with 3 screws for attachment to servo arms. These are a great companion for our own WLEG stiff copper wire - it's what we designed these for!

LMPI **\$0.75^{USD} / \$1.00^{CAD}** per pair



These LMPs are exactly like the ones we use on our own ScoutWalker 2 kit. They're a bit larger and thicker than the LMPI, and can put up with lots of abuse.

Each LMP2 comes with 3 screws for attachment to servo arms

LMP2 **\$1.00^{USD} / \$1.25^{CAD}** per pair



These Major Henry coils measure 20.7mm (0.813") in diameter, 1.5mm (0.06") thick, and have a measured inductance of 1.03 millihenries (not microhenries!) with about 11 ohms resistance. These coils give a substantial kick when powered by a standard solarengine in a strong magnetic field.

CMH **\$2.00^{USD} ea / \$2.50^{CAD} ea**



This PVC measures approximately 8"x12" sheet and has excellent robot-building characteristics. Smooth and easy-to-form with a knife, it glues very well with superglue and epoxy. Ideal for building robot bodies!

Available in dark red, bright yellow, dark blue, black and white.

SIN2mm-W (white only)
..... **\$2.75^{USD} ea / \$3.40^{CAD} ea**

SIN3mm-R, DB, Y, B, W (Red, Dark Blue, Yellow, Black)
..... **\$3.00^{USD} ea / \$3.75^{CAD} ea**

SIN6mm (White or Black)
..... **\$5.50^{USD} ea / \$6.75^{CAD} ea**



This 0.032" Hydro-X solder has water-soluble flux. Scrub it off under running water for a clean board! Note: Flux resistance is around 2 megohms, so flux cleaning is a must for bi/microcore circuits.

SHX **\$1.00^{USD} ea / \$1.30^{CAD} ea** (12' length)



Called "Gummy Legs" because this 10-gauge solid copper wire is strong, yet reformable into different shapes.

Wleg **\$3.00^{USD} / \$3.50^{CAD}** for 3' length



These 3/4" Neodymium magnets are very strong. Great for Magbot experiments. Solderable chrome finish

Mag1 **\$2.50^{USD} ea / \$3.25^{CAD} ea**



Tiny magnet measuring 3/8" long by 3/16" wide and 1/16" thick are chrome plated for easy soldering.

These magnets are strong enough to be stacked end to end to reach a height of 8 feet! This means a single magnet can hold 256 others!!

Mag2 **\$1.65^{USD} ea / \$2.30^{CAD} ea**
..... or 4 for **\$1.25^{USD} ea / \$1.75^{CAD} ea**



These one-piece molded safety glasses are ideal for workshop environments where wear-and-tear on the equipment is to be expected. Keep your eyes intact - there's no robotic replacement yet!

SG1 **\$5.00^{USD} ea / \$6.25^{CAD} ea**



These safety glasses are a bit more robust than the SG1 type, with a better quality nose-bridge and arms. Worth the extra for the comfort!

SG2 **\$6.50^{USD} ea / \$8.00^{CAD} ea**



This dual 'AA' battery holder comes with 6' leads.

BHoldAAx2 **\$2.50^{USD} ea / \$3.25^{CAD} ea**



Have 6V from four AA cells. Practically a necessity for mobile robots!

BHoldAAx4 **\$2.50^{USD} ea / \$3.25^{CAD} ea**



Ideal for building smaller devices around, this dual AAA holder has solderable pins instead of wire leads.

BHoldAAA **\$2.50^{USD} ea / \$3.25^{CAD} ea**



9V Battery Snap Connector - Standard 9V battery connector.

BHold9V **\$0.75^{USD} ea / \$1.00^{CAD} ea**



Standard IN914 Silicon Diode for general purpose circuit design

D1 **\$0.12^{USD} ea / \$0.15^{CAD} ea**



Low Voltage Schottky diode. Excellent low-voltage dropout, only 0.36V @ 50mA! Limited stock item!

D2 **\$0.50^{USD} ea / \$0.75^{CAD} ea**



Low voltage Schottky diode, but with 1 amp rating. Good for motor driver snubbing diodes.

D3 **\$0.30^{USD} ea / \$0.40^{CAD} ea**

Visit Solarbotics.com's "Resources" page for a full index of datasheets, documentation, movies, and resources dealing with Solarbotics product!

MISCELLANEOUS ITEMS



2 Position Terminal Block -The 2-position terminal block has proven to be a sturdy, modular way to mount tactile sensors on our ScoutWalker 3, and we've had requests to make them available themselves so you can reproduce this convenient way of building a tactile sensor.

Just combine it with a TACTI spring sensor and a paperclip (borrowing the instructions from the ScoutWalker 3 manual), and you're set!

TBLK2 **\$1.00^{USD}** ea / **\$1.25^{CAD}** ea
or 2 for **\$0.75^{USD}** ea / **\$1.00^{CAD}** ea



3 Position Terminal Block -The 3-position terminal block has proven to be a sturdy, modular way to mount tactile sensors on our ScoutWalker 3, and we've had requests to make them available themselves so you can reproduce this convenient way of building a tactile sensor.

Just combine it with a TACTI spring sensor and a paperclip (borrowing the instructions from the ScoutWalker 3 manual), and you're set!

TBLK3 **\$1.00^{USD}** ea / **\$1.25^{CAD}** ea
or 2 for **\$0.75^{USD}** ea / **\$1.00^{CAD}** ea

- *Solarbotics offers volume discounts - contact us for pricing!*
- *No wimpy plastic snap-together blocks in our kits - use REAL construction techniques to build your robot!*

RECHARGEABLE BATTERIES

BattR4 - 3.6V / 170mA Pyramid - This 3.6V 170mAh rechargeable Ni-Cad battery contains three cells in pyramid configuration. The pack is 5cm x 2.5cm x 1.2cm tall (2" x 1" x 1/2"). Complete with 2 attached wires for ease of power hookup.

BattR5 - 3.6V / 170mA Stacked - This 3.6V 170mAh Rechargeable Ni-Cad battery contains three vertically stacked cells. Pack measures 1.6cm tall and 2.5cm diameter (5/8" x 1" dia.). Complete with spot welded solder tabs.

BattR6 - 3.6V / 280mA Flat Rechargeable Battery Pack - This 3.6V 280mAh Rechargeable Ni-Cad battery contains three cells arranged side-by-side for a nice flat battery pack. Dimensions are 7.6cm x 2.5cm wide x 1cm high (3" x 1" x 3/8"). Comes with attached wires.

BattR7 - 3.6V / 280mA Triangular - This 3.6V 280mAh rechargeable Ni-Cad battery pack contains three cells in a triangular configuration. Each side measures 10cm x 0.95cm thick (2" sides x 3/8" thick). Complete with attached wires.

BattR8 - 3.6V / 280mA Triangular - This 3.6V 280mAh rechargeable Ni-Cad battery contains three cells in a right triangle configuration. It measures up with a 5cm base x 1.9cm tall (2" base x 3/4" inch tall). Comes with attached wires.

BattR9 - 3.6V / 300mA Triangular - This 3.6V 300mAh rechargeable Ni-Cad battery contains three cells in a triangular arrangement measuring 2.9cm tall with 2.9cm wide side (1.125" tall x 1.125 wide). Comes with attached wires.

BattR10 - 4.8V / 60mAh Stacked - This 4.8V 60mAh rechargeable Ni-Cad battery contains four vertically-stacked cells. The pack measures 2.4cm long and 1.6cm in diameter (1" * 5/8"). Comes with spot-welded solder tabs at each end, and can be PCB mounted.

BattR11 - 4.8V / 280mA Stacked - This 4.8V 280mAh rechargeable Ni-Cad battery contains a pair of stacked cells measuring 5cm wide x 2.5cm wide x 1.5cm tall. Complete with spot welded solder tabs. Probably the most suitable pack for medium-sized battery powered bots with more than two motors.

BattR12 - 4.8V / 280mA Stacked - This 4.8V 280mAh rechargeable Ni-Cad battery contains four large disc cells vertically stacked. The pack measures 3.3cm tall x 2.5cm dia (1 1/4" x 1" dia.). Complete with spot welded solder tabs, this is about the smallest practical 4.8V pack you'll want to use on a 'bot.

BattR13 - This 4.8V 300mAh rechargeable Ni-Cad battery contains four 2/3AA cells arranged in a parallelogram fitting in a 2.9cm square (1-1/8" square). Complete with spot-welded solder tabs.

INEXPENSIVE AND USEFUL

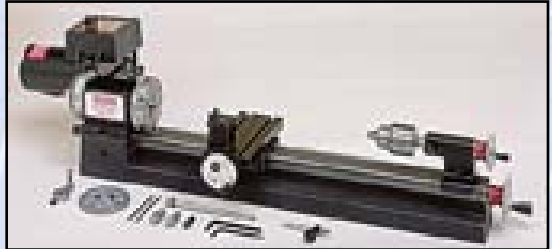
Any single battery **\$0.50^{USD}** ea / **\$0.75^{CAD}** ea
4 or more batteries **\$0.25^{USD}** ea / **\$0.40^{CAD}** ea

SHERLINE LATHES, MILLS AND ACCESSORIES

**Solarbotics is a
Sherline Machine Tools Distributor!**



The 8-direction 2000 mill is ideal for building intricate robot parts



The 4000 series lathe is a workhorse ideal for building circular parts. Easily converted to a small mill too!

Solarbotics has been using Sherline equipment in the development of our own products. We're so impressed with their capabilities as robot-development tools, we now carry the product line!

**As an Alberta-based company, Solarbotics does not charge or collect PST for orders received from other Canadian Provinces.*



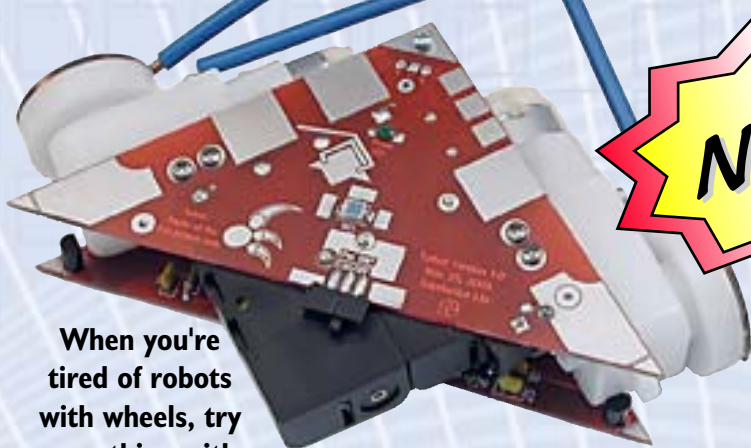
The 5400 series of 3-direction mills offer sturdy milling capabilities in a small package. It's the most-used Sherline device at Solarbotics!



The 6000 series is for you if you want a **complete** machining setup. Not much you can't build with this package!

For details and pricing, visit our website at www.solarbotics.com or contact us directly with your questions.

THE TURBOT TUMBLING ROBOT



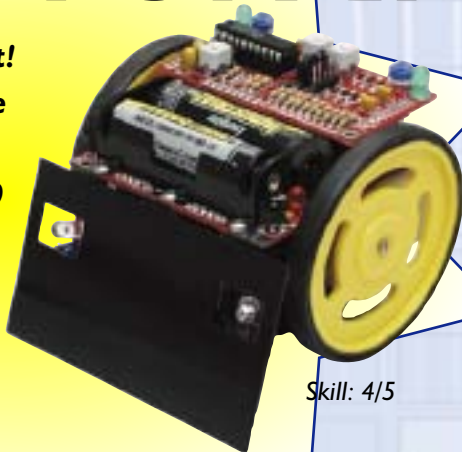
When you're tired of robots with wheels, try something with legs...but doesn't walk!

\$59.95^{USD} / \$74.95^{CAD}

See page 5 for more info!

SUMOVORE!

**There is no better Mini-Sumo kit!
Faster, less expensive, with more sensors than competitive kits.
The SUMOVORE took over 500 man-hours to design, test, and redesign. Over 20 prototypes built leading to this design that make it the best of it's class.**



Skill: 4/5

See page 6 for more details and add-ons!