
PARALLAX, INC.
2005
PRODUCT CATALOG
2005
PARALLAX INC
www.parallax.com

CONTACT INFORMATION

Parallax, Inc.

599 Menlo Drive, #100

Rocklin, CA 95765

USA

Telephone (including International Callers):

Office: (916) 624-8333

Fax: (916) 624-8003

Callers in the United States:

Toll-Free Sales: 888-512-1024

Toll-Free Tech Support: 888-99-STAMP (78267)

Office/Sales/Technical Support hours are Monday-Friday from 7:00 a.m. to 5:00 p.m., Pacific Time.

Internet:

www.parallax.com

www.stampsinclass.com

E-mail:

support@parallax.com

sales@parallax.com

stampsinclass@parallax.com

javelintech@parallax.com

sxtech@parallax.com

info@parallax.com

Note: As our catalogs are referred to by our customers for many months, we reserve the right to change prices without notice. Prices may vary between our ads and our catalogs. Product description, typographic, pricing, and photographic errors are unintentional and subject to change.

"I would like to formally compliment your fine staff for their help with my first BS2 project. Even when an answer was not available right away, they took the time to e-mail me to let me know they were still on it. The code provided was the perfect starting point that I needed. The ordering process was awesome too. Oddly enough, I got a call from a competitor just yesterday doing a satisfaction survey. You guys outshined them in every respect! Keep up the great work."

Chris Tacklind
Tacklind Design Consulting

Catalog design and layout by Jen Jacobs and Larissa Crittenden
Product photography, line drawings, and schematics by Rich Allred

TABLE OF CONTENTS

Welcome to the Parallax 2005 Product Catalog...

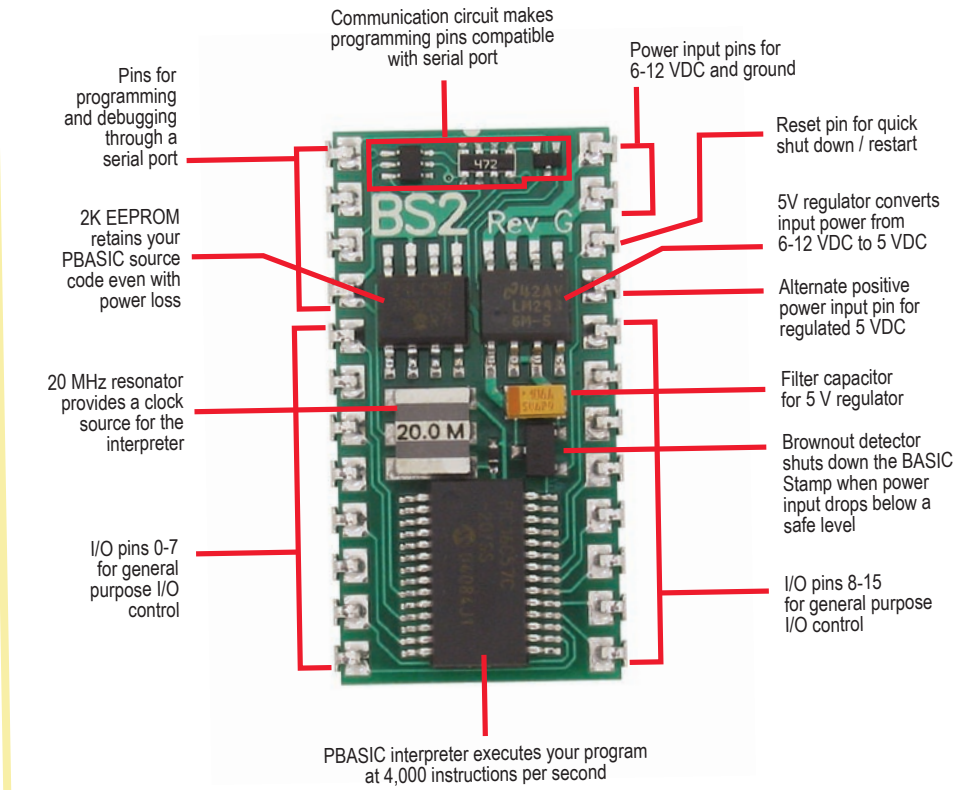
Yes, it's that time again - a new catalog is here for you to enjoy. We hope you gain knowledge of new products and are entertained by some really neat applications. To build a bridge to the 2005 catalog, we looked back upon the year of 2004 and selected 8 highlights in case you weren't along for the ride.

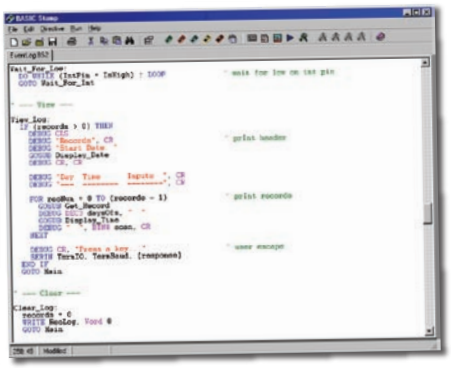
1) Special offers are now introduced on eBay
2) A UK double-decker bus features Parallax robots
3) RadioShack carries Parallax Kits in 6,200+ stores
4) Free SX/B Compiler is released for SX customers
5) New discussion forums opened at http://forums.parallax.com
6) RoboNexus conference brought us closer to customers
7) USB Board of Education offers new solution
8) Our Stamps in Class team taught over 20 Educator's Courses

What's in store for 2005? The best way to stay tuned is by visiting our web site and being a part of our promotional newsletter. If you haven't registered already, just visit our RESOURCES section at www.parallax.com and select Promotional E-mail Sign-Up. We will share the latest and greatest news with you in either html or text.

Parallax staff posing with an order. (09/2004)

Anatomy of a BASIC Stamp 2 Microcontroller Module





Programming in PBASIC

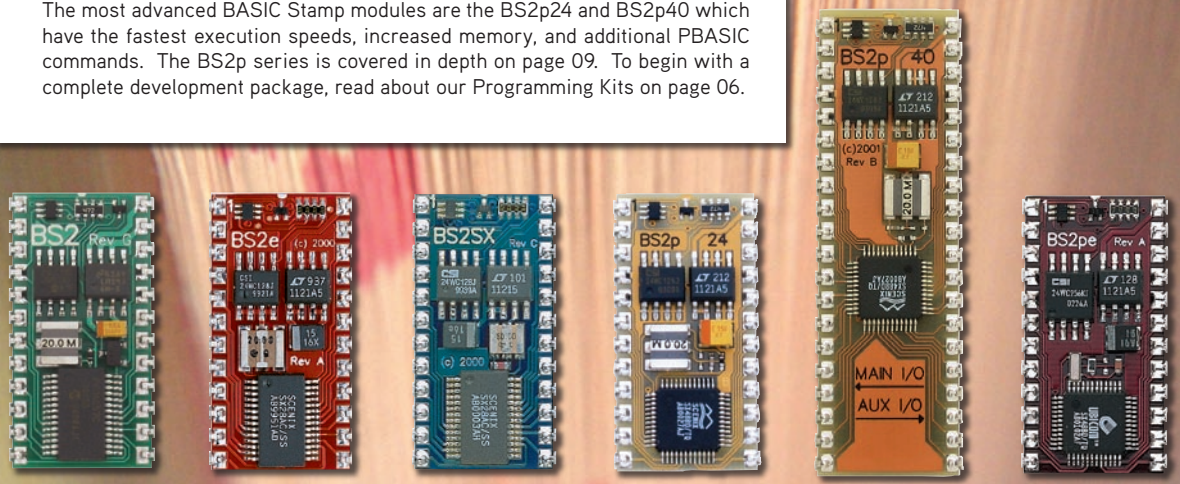
Even if the above diagram looks as familiar as a Greek Olympic Guide, you'll discover that it's easy to program in PBASIC. This is a very simple, elegant, and powerful language that allows anyone to program a microcontroller. And in case you were wondering, PBASIC stands for Parallax Beginner's All-purpose Symbolic Instruction Code. The foundation of our language is designed around standard BASIC and the commands are terms such as PULSOUT or SERIN which are hardware driven commands. The beauty of the BASIC Stamp microcontroller is that you have the power to tell it exactly what to do, without going through any extra processes. This means high reliability and no guesswork. Using PBASIC allows you to save valuable time because the learning curve is short and the sample code and resources are abundant.

Free PBASIC Programming Software

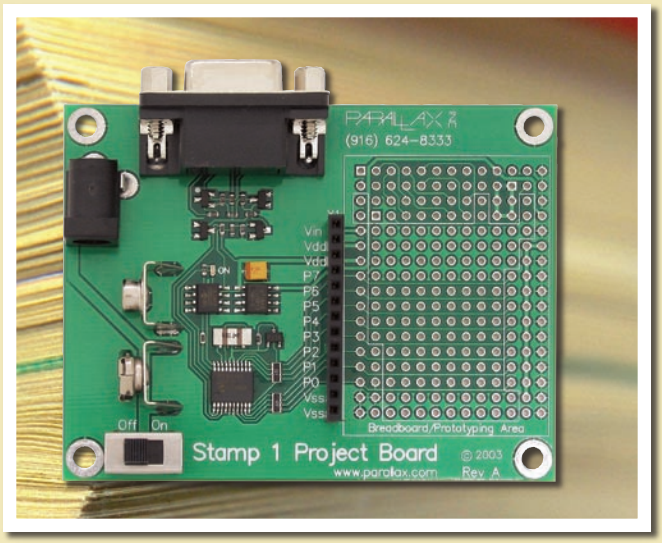
All of our programming software is available for free downloading on our web site. The software is also distributed in the Parallax CD-ROM which contains product documentation, support, etc. The CD-ROM is included in all of our starter kits and is also available for separate purchase (#27000; $3.00).

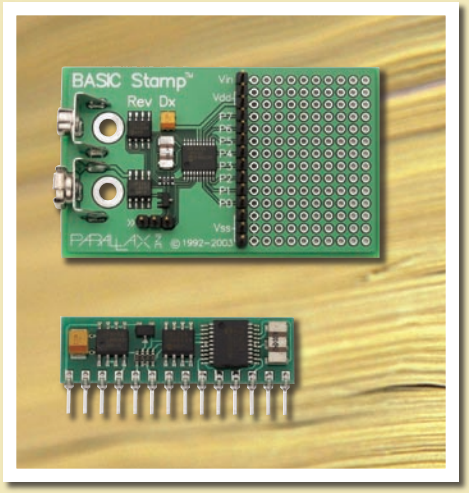
BASIC Stamp® 2 Module Comparison

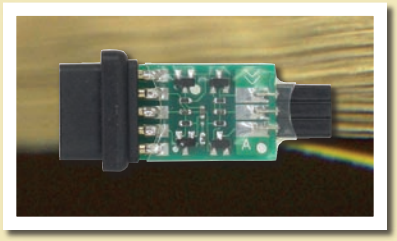
Our BASIC Stamp 2-style modules continue to be the most popular choice in consumer microcontrollers due to the ease of use and enormous amount of educational support. We recommend that all new customers begin with the BS2-IC. Upon mastering the abilities of the BS2-IC, you may then consider implementing other modules as needed based on the goals of your projects. Each module's features vary to provide you with flexibility to solve problems. The most advanced BASIC Stamp modules are the BS2p24 and BS2p40 which have the fastest execution speeds, increased memory, and additional PBASIC commands. The BS2p series is covered in depth on page 09. To begin with a complete development package, read about our Programming Kits on page 06.



Name of module:	BASIC Stamp 2	BASIC Stamp 2e	BASIC Stamp 2sx	BASIC Stamp 2p24	BASIC Stamp 2p40	BASIC Stamp 2pe
Processor Speed:	20 MHz	20 MHz	50 MHz	20 MHz Turbo	20 MHz Turbo	8 MHz Turbo
Program Execution Speed:	~4,000 instructions/ second	~4,000 instructions/ second	~10,000 instructions/ second	~12,000 instructions/ second	~12,000 instructions/ second	~6,000 instructions/ second
RAM Size:	32 bytes (6 I/O, 26 Variable)	38 Bytes (12 I/O, 26 Variable)	32 Bytes (6 I/O, 26 Variable)	38 Bytes (12 I/O, 26 Variable)	38 Bytes (12 I/O, 26 Variable)	38 Bytes (12 I/O, 26 Variable)
Scratchpad RAM:	N/A	64 Bytes	64 Bytes	128 Bytes	128 Bytes	128 Bytes
EEPROM (Program) Size:	2K Bytes, ~500 instructions	8 x 2K Bytes, ~4,000 instructions	8 x 2K Bytes, ~4,000 instructions	8 x 2K Bytes, ~4,000 instructions	8 x 2K Bytes, ~4,000 instructions	16 x 2K Bytes (16K for source), ~4,000 instructions
Voltage Requirements	5-15 VDC	5-12 VDC	5-12 VDC	5-12 VDC	5-12 VDC	5-12 VDC
Current Draw @ 5V	3 mA Run/ 50 µA Sleep	25 mA Run/ 200 µA Sleep	60 mA Run/ 500 µA Sleep	40 mA Run/ 350 µA Sleep	40 mA Run/ 350 µA Sleep	15 mA Run/ 150 µA Sleep
Source/Sink Current per I/O	20 mA/25 mA	30 mA/30 mA	30 mA/30 mA	30 mA/30 mA	30 mA/30 mA	30 mA/30 mA
Source/Sink Current per Unit	40 mA/50 mA per 8 I/O pins	60 mA/60 mA per 8 I/O pins	60 mA/60 mA per 8 I/O pins	60 mA/60 mA per 8 I/O pins	60 mA/60 mA per 8 I/O pins	60 mA/60 mA per 8 I/O pins
PBASIC Commands	42	45	45	61	61	61







BASIC Stamp 1 Microcontroller Modules and Project Boards

All BASIC Stamp 1 microcontrollers (including the Project Board) are now rated for industrial temperatures (-40° C to +85° C (-40° F to +185° F)).

BASIC Stamp Rev.Dx Module; #27100; $34.00 - The original BASIC Stamp module. Often underestimated, but powerful enough for many of your applications. BASIC Stamp microcontroller and soldering prototype board all in one package.

BASIC Stamp 1 Module; #BS1-IC; $29.00 - Equivalent to the Rev.Dx, only in a 14-pin package. Ideal fit for applications with tight space limitations. Very low cost allows for inclusion in high-production projects and saves time over designing your own board. You may want to consider adding the Super Carrier Board (page 30) with the BS1-IC.

BASIC Stamp 1 Project Board; #27112; $29.00 - This project board has a BASIC Stamp 1 microcontroller and Serial Adapter built onto the board! The board includes a 9V battery clip, a mechanically interlocked 2.1 mm power jack, DB-9 connector for programming, and LM2936 regulator providing 40 mA for your projects.

BASIC Stamp 1 Serial Adapter; #27111; $4.95 - Add Windows® programming to your BASIC Stamp 1 module (BS1-IC). One end plugs into your serial cable and the other into a 3-pin header.

BASIC Stamp Discovery Kit

#27207; $169.00 - This is the ultimate combination to get started with BASIC Stamp programming. Everything you need to program BASIC Stamp modules (except for the PC and power supply) is included. The BASIC Stamp Discovery Kit contains the BASIC Stamp 2 module, Board of Education® carrier board and the *What's A Microcontroller? (WAM?)* parts and text.

The step by step learning approach of the *WAM?* guide and the most complete technical manual covering the BASIC Stamp microcontroller make this kit ideal as your first introduction to the world of Parallax microcontrollers. The Discovery Kit ships with a components package that includes jumper wires, handy tact switches, LEDs, a servo, and more all to get you building projects in no time upon opening the box. Whether you're an engineer being introduced to the BASIC Stamp microcontroller for the first time or if you're making your first foray into the high tech world of embedded systems, this kit is definitely a great place to start.

New retail packaging!

You will be able to do the following with this kit:

- **Program the BASIC Stamp 2 microcontroller using a cable connected to your PC.**
- **Build 40+ hands-on activities using a solderless breadboard.**
- **Learn how to write your very own PBASIC (Parallax BASIC) programs.**
- **Solve real world engineering problems with a microcontroller.**

If you have determined that you would like to work specifically with the BS1-IC or the BS2SX-IC, then you're able to get a complete package which includes a programming board, serial cable, and BASIC Stamp Manual in addition to the BASIC Stamp module. *Please note that neither kit includes a components kit or introductory WAM? guide as featured on the preceding page.*

BASIC Stamp 1 Starter Kit; #27205; $109.00 - The BASIC Stamp 1 Starter Kit now includes a special BS1 Serial Adapter that allows you to program in the Windows environment instead of DOS. Connect the BS1 Adapter (shown on page 05) and connect the serial cable to the DB-9 port on the Super Carrier Board which is included in this kit.

BASIC Stamp 2sx Starter Kit; #27206; $169.00 - The BS2SX/BOE Starter Kit includes BS2SX-IC module, BASIC Stamp manual, Board of Education (Rev. C), CD-ROM, and Serial Cable.

A power supply is NOT included with our Starter Kits. For the complete list of power supplies we offer, please see page 68.

the revised *BASIC Stamp Syntax and Reference Manual v2.1*

A complete reference for all versions of the BASIC Stamp programming language, including the new PBASIC 2.5 commands and enhancements. Featuring:

- An illustrated tour of the BASIC Stamp Editor software, including features new to version 2.1
- Detailed PBASIC 1.0, 2.0 and 2.5 syntax support in an easy-to use alphabetized reference
- Example programs demonstrating all commands
- Schematics for 6 BASIC Stamp models: the BS1, BS2, BS2e, BS2sx, BS2p, and BS2pe
- New conditional compilation techniques for code that will run on any BASIC Stamp.

For beginners or experts, this 450+ page manual is the most comprehensive resource available to maximize your BASIC Stamp projects!

StampWorks Experiment Kit

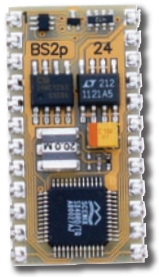
- First release Q1 2001
- Activities centered around the NX-1000 board
- Includes the BS2-IC module, hand tools and much more!

StampWorks Experiment Kit

#27297; $349.00 - This all-in-one kit takes you beyond theory, throwing you head-first into a well-written collection of 31 experiments that will teach you first class BASIC Stamp programming. With StampWorks, you'll learn to get the most out of the BASIC Stamp microcontroller and to increase its versatility by connecting to popular active and passive components. Includes the hand tools you'll need to assemble the experiments. Written by the popular Nuts & Volts Stamp Applications columnist Jon Williams - 200 pp. Note: The kit includes BASIC Stamp 2 module and source code, but if you prefer to use the other BASIC Stamp modules (BS2e, BS2sx, BS2p, BS2pe) then you can download code for them online.

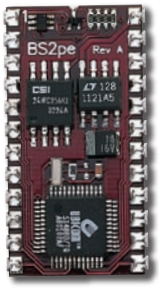
About the Author: Jon Williams was a long time Parallax customer prior to his employment with Parallax in 2000. With over 10 years of BASIC Stamp programming experience, Jon proves his helpfulness and technical know-how on a daily basis through our Discussion Forums. Our customers appreciate his dedication and responsiveness to covering an array of issues, questions, and projects. He also continues to author the popular "Stamp Applications" column, a monthly feature in Nuts & Volts magazine. If you have any column ideas, you may reach him at jwilliams@parallax.com

A BETTER WAY TO COMMUNICATE USING THE BASIC STAMP: THE BS2P MODULES



The BASIC Stamp 2p module (BS2p24 & BS2p40) has several advantages over all previous BASIC Stamp microcontrollers. It is 3 times faster than a BS2 and 20% faster than the BS2sx. Commands for interfacing with parallel LCDs, I²C devices and Dallas Semiconductor 1-Wire parts have been added along with a polled interrupt capability. Available in a pin-compatible format to other BS2 variants, or as a 40-pin module (with 16 extra I/O pins!). The BS2p24 may be interfaced with any Parallax carrier board with a 24-pin socket.

BASIC Stamp 2p 24-pin module; #BS2P24-IC; $79.00
BASIC Stamp 2p 40-pin module; BS2P40-IC; $89.00



...WE EVEN HAVE ONE WITH MORE EEPROM, THE BS2PE

The BS2pe has all the commands of the BS2p (LCD, I²C and 1-Wire) but twice the EEPROM size, 32 K (16 K for program) and much lower power consumption. Ideal for those who use the BS2p and would like a battery-powered or data-logging application. The program execution speed is 6,000 instructions/second compared to the BS2p at 12,000 instructions/second. The wake up interval is less than one millisecond, so the long term average current in SLEEP is much less. For low power or data logging applications, this will extend battery life and increase reliability.

BASIC Stamp 2pe module; #BS2PE-IC; $75.00

The "P" stands for Possibilities.

What sets the BASIC Stamp 2p Modules apart from the rest ? **Plenty.** Special PBASIC commands, polled-interrupt capability, and the ability to work with I²C and 1-Wire devices just to name a few.

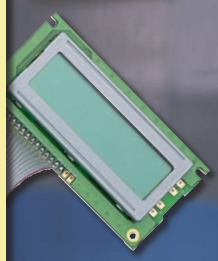
Special PBASIC commands (I2CIN and I2COUT) are available only with the BS2p series.

The I²C® bus is a synchronous, two-wire bi-directional bus.

A device (or devices) that control messages on the bus is called a master. Devices that respond to the messages are slaves. The BS2p series may only serve as a master.

WORKS WITH PARALLEL LCDS AND REQUIRES 1/10TH THE CODE OF A REGULAR BS2. THE THREE COMMANDS USED ARE LCDIN, LCDOUT, LCDCMD.

LCDS ARE USED IN A WIDE RANGE OF PRODUCTS AS THEY PROVIDE AN EFFICIENT METHOD OF CONVEYING A LOT OF INFORMATION IN A VERY SMALL PACKAGE. WITH A BIT OF PROGRAMMING, A STANDARD CHARACTER LCD CAN EVEN DISPLAY CUSTOM CHARACTERS MAKING THEM EVEN MORE VALUABLE AS A DISPLAY DEVICE.



The MCP23016 is one of our favorite I²C devices because it gives us sixteen bits of additional I/O at a cost of only two BASIC Stamp pins.

Polled-interrupt - a specific type of I/O interrupt where the processor queries the I/O interface in-between each high-level instruction. Normally, the processor does not indicate which device caused the interrupt.

Polled-interrupt options:

- Set an output pin to specified state
- Run another program
- Wait (pause program) until interrupt condition occurs

1-Wire® devices lower system cost and simplify design with an interface protocol that supplies control, signaling, and power over a single-wire connection. A variety of identification, sensor, control, and memory functions are available in traditional IC packages, ultra-small CSPs, and stainless-steel-clad iButtons®. 1-Wire products are especially useful in security applications as every device has a unique 64-bit serial number.

iButtons (not available from Parallax) can be used to identify and authenticate, time- and date-stamp events, guard property, and track inventory.

NX-1000 24/40 Development Board; #28137; $199.00
The NX-1000 24/40 Development Board's design is based on the original NX-1000 but includes components which are specifically for the BS2p24, BS2p40, and BS2pe *(sold separately)*. The socket accepts any 24-pin or 40-pin BASIC Stamp Microcontroller (BS2P40), and the Javelin Stamp module. This board also includes a parallel LCD and cable.

Here is the list of NX-1000 24/40 socketed components:

- RJ-11 for Blue Dot Receptor cable
- DS1621
- L272M DC Motor Driver
- PCF8574A
- DS1307

BASIC Stamp 2p24 Professional Starter Kit; #27235; $209.00
BASIC Stamp 2p40 Professional Starter Kit; #27238; $219.00
Each of the BS2p24 and BS2p40 Professional Starter Kits are presented to engineers with a sampling of components such as a DS1822 thermometer and RTC w/RAM to test and get an immediate hands-on feel for the capabilities of the BS2p modules. This is especially handy when referring to the Philips I²C components and Dallas Semiconductor 1-Wire components since the BS2p has special PBASIC commands to make interfacing very straightforward. A polled interrupt capability is also a key feature of the BS2p series. The **BS2p 24/40 Demo Board (#45187; $89.00)** is also sold separately.

BS2p Plus Pack; #45184; $69.99 *(not pictured)*
This collection of parts is designed to interface with the BS2p modules and BS2p 24/40 Demo Board. Includes 2x16 LCD display w/cable, DS1822, DS2890-000, DS2405, 8 bit I/O Expander PCF8574P, 8-bit A/D and D/A PCF8591P, and RTC w/RAM PCF8583PN, and more.

Stamps in Class History

The Stamps in Class™ program was created in 1998 to support education. To this day, we strive to provide educators with support materials to teach students a range of microcontroller-related skills. This includes disciplines such as programming, robotics, analog and digital, electronics, and process control. The keys to jump-starting Stamps in Class were the release of the Board of Education® programming platform (BOE; page 15), the availability of free educational texts via downloads, and the launching of our popular BASIC Stamp Educator's Courses. This 3-pronged effort of hardware, student guides, and training provided educators with a complete solution.

The BS2-IC microcontroller and the Board of Education platform have inspired students around the world to embark on engineering career paths. Today, Educator's Courses are held across the United States and in such places as Canada, New Zealand, The Netherlands, and Hong Kong. The combination of industry-quality hardware/electronics with hands-on training and free software, documentation, and support provides educators and students with the opportunity to learn and teach on the cutting edge.

The Parallax Stamps in Class team consists of six authors, some within Parallax and others in universities. In 2003 we added a full-time editor to ensure that our texts were meeting professional editing standards. In 2004 the editor and authors began to explore the applicability of different curriculum standards so Parallax can provide more direction to our educators using microcontrollers. Each book requires approximately one to three years to develop, test, and distribute the first print. The Stamps in Class books are all available for free download and duplication by educators when used with the recommended Parallax Stamps in Class hardware.

Ready to get started with Stamps in Class?

Use this handy flowchart to plot your path through the Stamps in Class tutorials. Once you have chosen texts that interest you, see how our different hardware kits work together on the hardware relationships overview (pages 14 and 15). If you are an educator, choose an introductory tutorial and follow the path along whichever subject track will be most applicable for your students.

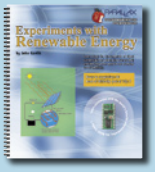
Please note: while you can start with the *Robotics with the Boe-Bot* text, it is recommended that you have your class complete the *What's a Microcontroller?* text first. *What's a Microcontroller?* is our most complete introductory text that will explain all aspects of PBASIC programming to your students. Those students/classes who are already skilled in programming and circuit interacting do not need to complete the introductory texts to use to our higher level tutorials. Parallax's educational paths do not necessarily require a completion of the entire progression.

Prerequisite

What's a Microcontroller?
Difficulty (1 to 10): 3
Hours to complete: 40
Details: see page 16

LEGEND:
= required
= optional

Sensors & Industrial

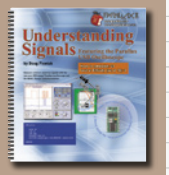


Experiments with Renewable Energy
Difficulty (1 to 10): 7
Hours to complete: 50
Note: Coming soon

Applied Sensors
Difficulty (1 to 10): 8
Hours to complete: 60
Details: see page 24

Industrial Control
Difficulty (1 to 10): 8
Hours to complete: 60
Details: see page 25

Measuring Signals



Understanding Signals
Difficulty (1 to 10): 4
Hours to complete: 35
Details: see page 20

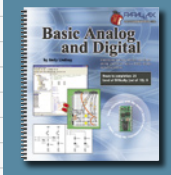
Robotics

Robotics with the Boe-Bot
Difficulty (1 to 10): 4
Hours to complete: 60
Details: see page 18

IR Remote for the Boe-Bot
Difficulty (1 to 10): 7
Hours to complete: 15
Details: see page 19

Advanced Robotics with the Toddler
Difficulty (1 to 10): 9
Hours to complete: 50
Details: see page 22

Analog/ Digital



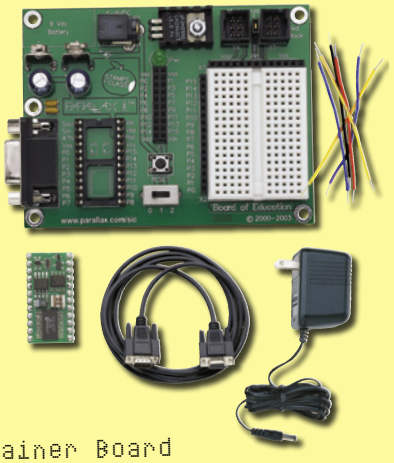
Basic Analog and Digital
Difficulty (1 to 10): 4
Hours to complete: 60
Details: see page 26

Logic

Elements of Digital Logic
Difficulty (1 to 10): 4
Hours to complete: 60
Details: see page 26

Note: EODL is independent of the BASIC Stamp through the first 8 of 9 chapters.

Hardware Relationships Among Tutorials...



The Following tutorials require the Board of Education Full Kit [#28102]:

- What's a Microcontroller? [page 16]
- Robotics with the Boe-Bot [page 18]
- Basic Analog and Digital [page 26]
- Understanding Signals [page 20]
- Applied Sensors [page 24]
- Industrial Control [page 25]

Two of our texts have unique hardware requirements...

- Elements of Digital Logic [page 26]
- Advanced Robotics with the Toddler [page 22]

Elements of Digital Logic uses the Digital Trainer Board [included in the EODL parts kit] for its experiments. The completion of the Chapter 9 experiment requires a BASIC Stamp 2 module [not included], which plugs directly into the Digital Trainer Board.

Advanced Robotics with the Toddler is available only as a full kit. The Toddler robot is programmed using a special Toddler board that has a BASIC Stamp 2 microcontroller built right onto it!

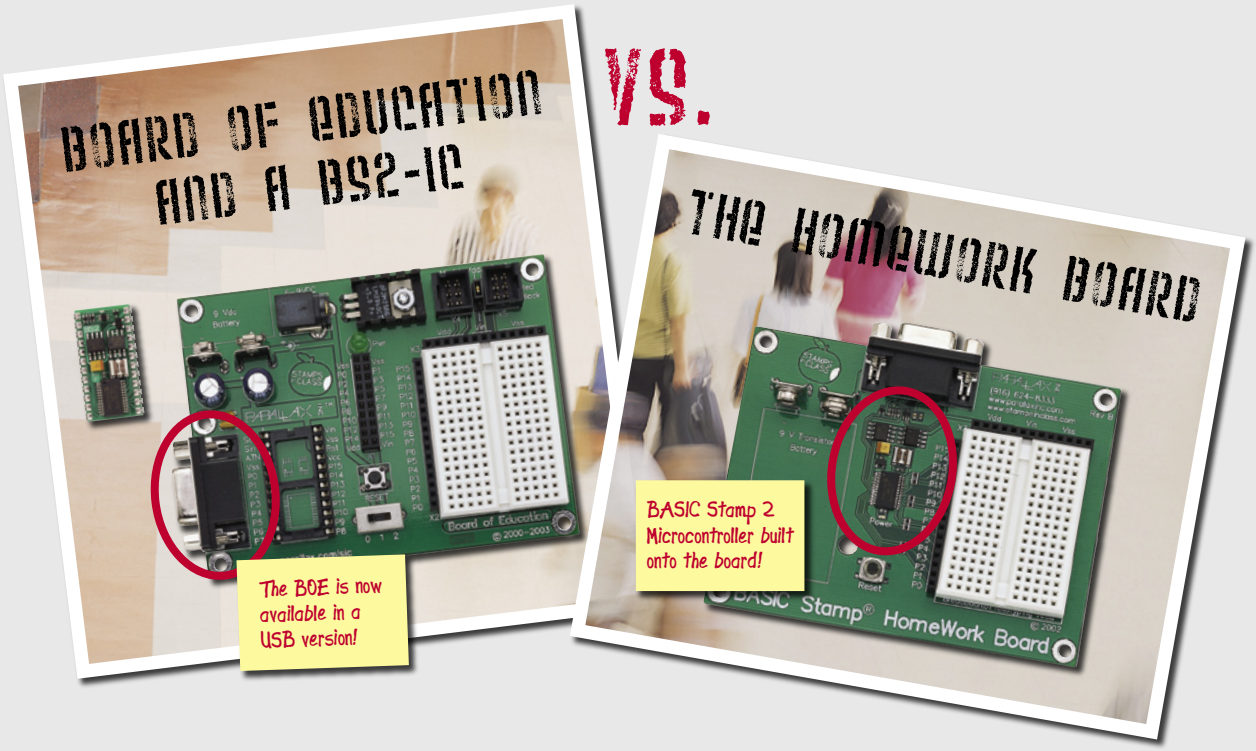
Coming Soon...
- Experiments with Renewable Energy

Board of Education Full Kit *(pictured above)***; #28102; $119.00** - The Board of Education (BOE) Full Kit is our most popular educational kit. It includes the minimum equipment requirements for the Stamps in Class series. In addition to the Board of Education, it includes the BASIC Stamp 2 module (#BS2-IC; page 04), serial cable, power supply, jumper wires, and CD-ROM with software and documentation. This is the lowest cost platform of choice for the Stamps in Class curriculum or for your own BASIC Stamp experiments. With the BOE Full Kit you'll need only to add a tutorial and parts kit to begin your BASIC Stamp explorations. ***If this is your first experience with the BASIC Stamp microcontroller, you may want to consider selecting the BASIC Stamp Discovery Kit (#27207; page 06).***

10 Pack

BASIC Stamp HomeWork Boards; #28158; Available only as a 10-Pack $400.00; or 20-Pack $750.00 - The HomeWork Board™ (HWB) was designed to be a low cost BASIC Stamp 2 platform for take-home or dedicated projects. Its similarity to the Board of Education has allowed it to become a viable replacement for the BOE/BS2 combination. You should note that the HomeWork Board doesn't have servo connections or a power supply jack, so we recommend the BOE if you plan to conquer *Robotics with the Boe-Bot*. *What's a Microcontroller?*, *Understanding Signals*, and *Applied Sensors* have been revised to support both Board of Education and HomeWork Board platforms. ***Educators Note: Using HomeWork boards requires a few technical work-arounds for most Stamps in Class tutorials and is considered ideal for student take-home projects and dedicated projects.***

The HomeWork Board is included in Radio Shack's popular Parallax BASIC Stamp What's a Microcontroller Kit (a.k.a. Summer Special). Check www.radioshack.com for more information (Radio Shack part #276-625).



The BASIC Stamp microcontroller is most commonly used in classrooms and laboratories in the 24-pin version socketed in the Board of Education. Our Stamps in Class tutorials were originally written with the BS2/BOE in mind. This is absolutely our best hardware for Stamps in Class and our preference for the most versatile user experience.

A potential alternative is the BASIC Stamp HomeWork Board, a low-cost board similar to the Board of Education with a BASIC Stamp 2 microcontroller built right into the PCB. The lower cost HomeWork Board makes it ideal for take-home projects and dedicated uses. Read the table below for a comparison of features:

	BASIC Stamp 2 / Board of Education	BASIC Stamp HomeWork Board
Cost	~$119/each in Board of Education Full Kit (#28102; quantity discounts available)	$40/each, but available only in 10-packs (#28158)
BASIC Stamp	BASIC Stamp 2 (#BS2-IC) module may be removed from the board for other projects	BS2 module built directly on to the printed circuit board
I/O Protection	None, requires attentive wiring/programming	220 ohm resistors built into each I/O pin
Size	3" x 4"	3" x 4"
Power Supply	9V battery / 2.1 mm jack for wall-pack provides 5V and unregulated input voltage	9V battery only (not included)
Voltage Regulator	LM2940 can sink/source up to 1 Amp, plenty of power for small robotics, hobby and educational projects	LM2936 sink/source up to 50 mA, enough for small projects unless a second power supply is introduced
Servo Ports	(4) servo connections	None, but may be done on breadboard with 3-pin headers
Support provided in Stamps in Class tutorials	All Stamps in Class books *Advanced Robotics with the Toddler* and *Elements of Digital Logic have their own unique hardware, utilizing the BS2-IC.*	Specific support in *What's a Microcontroller?*, *Robotics with the Boe-Bot*, *Applied Sensors*, and *Understanding Signals*.

The HomeWork Board may appear less robust, but it's a favorite of many customers and every bit as capable as a Board of Education depending on how you provide power. On the HomeWork Board, the power LED is only lit while the BASIC Stamp microcontroller is running a program, so you could put it in SLEEP/NAP for months and still use the same 9V battery.

Our most popular introductory tutorial, What's a Microcontroller? is the best place to begin learning BASIC Stamp programming. The text is highly developed with over 40 hands-on activities and complete PBASIC 2.5 support. This tutorial is perfect for aspiring engineers; embedded control engineers will continue to be in high demand.

What's a Microcontroller?

Parts Kit & Text; #28152; $65.00
Parts only; #28122; $39.00

As titled, *What's a Microcontroller?* (*WAM*) answers the question of how to design customized, intelligent inventions using the BASIC Stamp 2 module. The activities incorporate a variety of fun and engaging experiments that appeal to one's imagination using motion, light, sound, and tactile feedback to introduce new concepts. These activities are designed to introduce the user to many basic principles in the fields of computer programming, electricity and electronics, mathematics, and physics. Many of the activities facilitate a hands-on presentation of design practices used by engineers and technicians in the creation of modern machines and appliances, using inexpensive and easy to obtain parts. This text is designed to accommodate a wide range of ages and skill levels.

The *What's a Microcontroller?* (v2.0+) activity highlights include the following which are all intended to enhance multisensory involvement:

- Reaction timer game
- Potentiometer-controlled servo
- 7-segment LED light meter
- Nokia cell phone ring tone player

The last activity in each chapter typically involves an example project that makes the concepts that were introduced up to that point more tangible. The first activity in a given chapter is hands-on so that students can discover how the electrical/electronic component works before controlling/sensing it with the BASIC Stamp microcontroller and a program. The intermediary activities introduce techniques that either support the project in the previous activity or one of the projects from the aptly titled "Projects" section at the end of the chapter.

Throughout the text, you are writing and downloading PBASIC code to a BASIC Stamp module, building circuits on a breadboard, and implementing them with components which include: LEDs (light emitting diodes), a 7-segment display, resistors, capacitors, a piezo speaker, pushbuttons, and a servo. Upon completion of *WAM*, you will have a solid understanding of writing your own PBASIC programs and building custom circuits to get the results you want.

Hours needed to complete: 40

Level of Difficulty (1–10): 3

Note: *The Board of Education Full Kit (#28102) is required to use this Stamps in Class text. The HomeWork Board is also fully supported in this text. For an even more complete starting point, check out the BASIC Stamp Discovery Kit on page 06.*

Interview with the Author: Andy Lindsay

Andy Lindsay has re-written the *What's a Microcontroller?* text after collecting observations and educator feedback while traveling the nation teaching Parallax Educators Courses. Andy received his Bachelor of Science degree in Electrical and Electronic Engineering at CSU, Sacramento. When he's not busy writing educational tutorials, Andy is a Product Engineer at Parallax. In addition to authoring *WAM*, Andy has also written *Basic Analog and Digital*, *Robotics with the Boe-Bot, and IR Remote for the Boe-Bot.*

Q. Wow! *What's a Microcontroller?* Version 2.0 has some major improvements. How long did this take you to write?
A. The book has been in the making for about three years. Each Educator's Course helped develop it. The actual writing and editing process took about four months.

Q. What is your favorite aspect about the new revision of *WAM*?
A. It shows people how to make their own inventions. A programmable brain and circuits used to be for engineers only. Now, any *WAM* graduate can do it.

Q. What do you hope those who read the book get out of it?
A. Some fun and excitement while doing the activities, the confidence to learn more about programming and electronics, and the skills to start inventing.

Q. You're pretty good at this. What are you working on next?
A. Thanks! *WAM* is like a collection of building blocks that can be used in machines, appliances, and robots. Next, it's more books with more building blocks...

ROBOTICS WITH THE BOE-BOT

Robotics Parts Kit and Text; #28154; $129.00
Robotics Parts only; #28124; $119.00

The *Robotics with the Boe-Bot* tutorial is designed to meet the needs for everyone from middle school students to University engineering students to hobbyists to scientists. After all, the BASIC Stamp module used to control this robot is the same microcontroller used in professional applications. Once you have completed *Robotics with the Boe-Bot*, you will be confident with programming, building circuits, reading schematics, and solving problems with a microcontroller.

The programming of the Boe-Bot® robot is covered in complete detail, beginning with the explanation of servo motors. You'll learn how to use PBASIC commands that will give you complete control of this robot. The first activities start with controlling the robot by sending commands to the servos for traveling predetermined distances and making turns with no concern for the robot's environment. As you proceed through the Robotics text, you'll become familiar with advanced programming techniques to use with sensors for ultimate control, feedback, and autonomous navigation. Frequency sweep programming will allow you to even make one Boe-Bot follow another, or as a solo activity you can make the robot follow the edge of a table without falling off!

Note: *For the lowest cost, all-in-one kit, order the Boe-Bot Robot Kit as featured on page 36. If you are ordering only the Robotics parts kit (#28124) you will also need to order a Board of Education Full Kit (#28102; page 14). The HomeWork Board is also fully supported in this text.*

Hours needed to complete: 40
Level of Difficulty (1-10): 5

IR Remote for the Boe-Bot
Book only; #70016; $15.00
Book & Parts kit; #28139; $24.95
Parts kit only; #29122; $12.95
This 175 page text focuses on adding infrared communication and control to the Boe-Bot robot. With this text, you'll learn how to directly control the Boe-Bot game-controller style, remotely set roaming speed and distance, combine remote control and autonomous roaming functions, and remotely select autonomous roaming modes. New programming techniques introduce designing user interfaces and menu systems. The final project makes the BASIC Stamp an IR remote command sequence interpreter for a remotely programmable Boe-Bot. Now how about that for some advanced robotics programming?!

The IR Remote for the Boe-Bot text is a continuation of the *Robotics with the Boe-Bot* text which is included in the Boe-Bot Full Kit (#28132; page 36) and the Robotics parts and text (#28154). To complete the activities, you will need a fully assembled Boe-Bot with the electronic components from the kit, and a universal programmable remote control that supports a Sony TV. Parallax sells the type of remote control (#020-00001; $10.00) which Andy Lindsay used to develop the text. ***Note:*** *Andy Lindsay is also the Author of WAM, BAAD, and Robotics with the Boe-Bot.*

BUSINESS BRIEFING:

The Parallax Partnership with RadioShack

RadioShack

Depending on your age, you might remember daily trips to RadioShack in the seventies and eighties. Between the TRS-80 computers, CB radios, 300-in-1 electronic kits and Forrest M. Mimms books you found yourself in experimenter's heaven! In the nineties RadioShack seemed to divert their attention to cell phones and electronic toys. This aided our discovery of on-line electronic component suppliers, but left us without a decent selection of components quickly available near our homes.

In 2004, RadioShack demonstrated renewed interest in the hobby and experimenter electronics market. If you visit their stores now, you will find a selection of Parallax BASIC Stamp products and an improved component section. Six to eight-foot tray sections in most stores provide commonly-used electronic parts. And the selection has even improved.

Our partnership with RadioShack was launched with a '50% off all components' ad campaign. Parallax is working closely with RadioShack to introduce modern sensors, quality robotics hardware and BASIC Stamp microcontrollers to all factory stores in 2005.

Understanding Signals

Parts and Text: #28119; $149.00

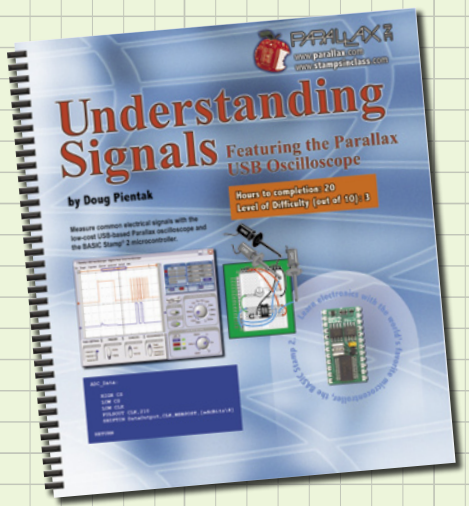
This 144-page Stamps in Class guide shows you how to generate, view and measure a variety of wave forms with the Parallax USB Oscilloscope and BASIC Stamp-controlled circuits. Each activity includes an example circuit and PBASIC code, directions for configuring the oscilloscope and placing the probes, and screen captures of the Parallax USB Software interface displaying the signal.

The Understanding Signals Student Guide is an excellent kit to accompany the Robotics with the Boe-Bot and What's a Microcontroller? texts and may be completed concurrently or alone. A cost effective approach to learn about electrical signals readings with a USB digital oscilloscope. Running the experiments in this text requires the Parallax USB Oscilloscope (included in #28119) and a Board of Education with a BASIC Stamp 2 or a HomeWork Board (not included).

Topics include:

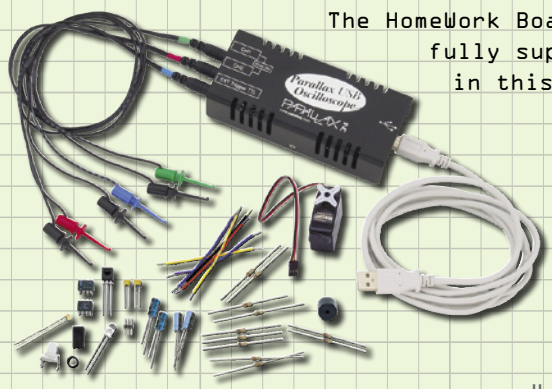
* Analog inputs from photoresistors and A/D converters
* RC-time in resistor-capacitor networks
* Asynchronous serial communication between the PC and a BASIC Stamp module
* Synchronous serial communication between a BASIC Stamp and ADC0831 A/D converter
* Single and dual sine waves
* Servo pulse signals over an entire range of motion
* Pulse width modulation with infrared
* Decoding of handheld infrared remote control signals
* Voltage amplification and inversion with DC offset with an op-amp
* BASIC Stamp 2 source code for the experiments in the book are available for download on our website.

Our decision to integrate this scope into our educational program came about from our technicians using it at their desks, educators ordering several for their classes and requesting supporting tutorials, and general strong popularity among the BASIC Stamp community. The activities in Understanding Signals focus on waveforms common to circuits in other Stamps in Class guides, making this a perfect companion to enhance understanding of other Stamps in Class activity.



Hours needed to complete: 20
Level of Difficulty (1-10): 3

The HomeWork Board is fully supported in this text.

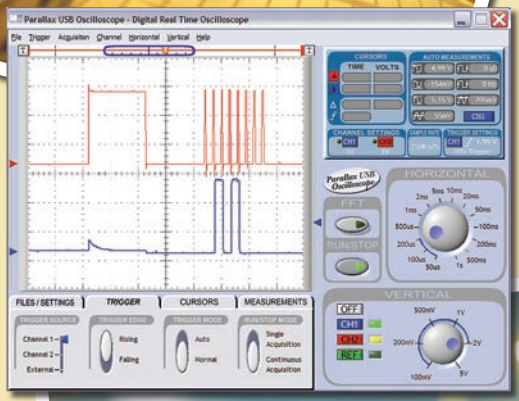


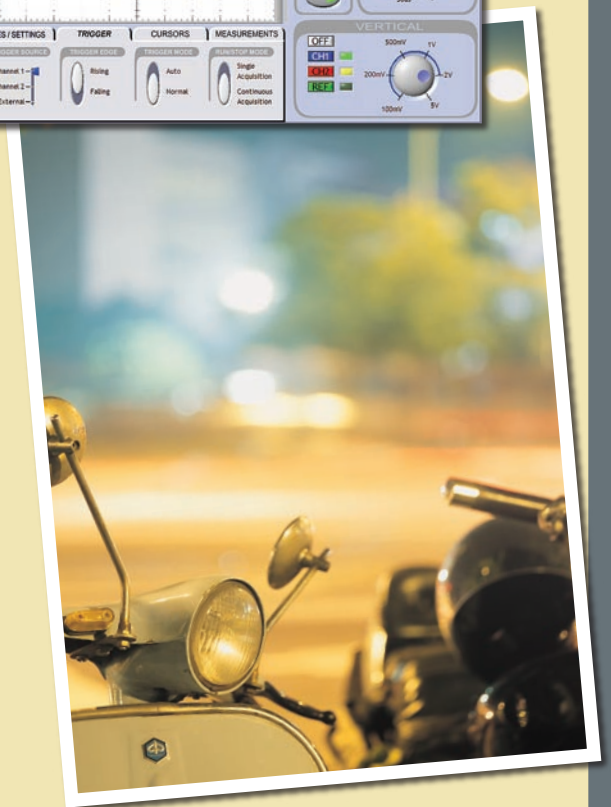
ABOUT THE PARALLAX USB OSCILLOSCOPE

Parallax USB Oscilloscope; #28014; $129.00

The oscilloscope hardware connects to your PC via the included USB cable. The hardware is small, portable, elegant and requires no power supply. The case is powder-coated aluminum.

All oscilloscope controls are managed through a point-and-click PC interface. The software provides an easy method of obtaining quality screen captures for reports and live demonstrations. You will have the ability to measure acquired waveforms with easy-to-use cursors. Common scope features including trigger settings, waveform measurements (MIN, MAX, frequency, period), ability to save customized setups, and BMP screen captures are standard in the software. Special features include 3 cursor functions with the option to snap to the waveform. The cursors operate in zoom mode, allowing close viewing and precise measuring of signals.





Digital Oscilloscope Technical Specifications:

- 2 Channels
- 1 Ms/s Max Sample Rate with One Channel
- 500 Ks/s Sample Rate with Two Channels
- 20 Vpp Maximum Input for Channels 1 and 2
- 200 kHz Bandwidth
- 8-Bit Vertical Resolution
- 1 M Ohm Input Impedance
- Trigger on Rising or Falling Edge at any Voltage
- Variable Trigger voltage on Channels 1 and 2
- Horizontal Trigger Position Settings at 10%, 50%, and 90%
- Auto and Normal Trigger Modes
- 3 probes
- USB 1.1 Support
- Size: 5 x 2.25 x 1.5 in (12.7 x 5.7 x 3.8 cm)
- Weight: 8 oz (227 gm)

Advanced Robotics with the Toddler (Blue); #27311; $249.00

Hardware - The Toddler® robot is a high quality robot CNC-machined from aluminum and brass. The aluminum parts are brushed, anodized, and acid-etched to make the perfect finish (put the legs on a buffing wheel for a silver shine!). The package includes body parts, legs, ankles, control linkages, screws/nuts/standoffs, etc. Requires 2-3 hours to assemble and tune. The aluminum parts have holes, slots and configurable mounting angles for your own customization. A complete parts listing is available online in the "ROBOTICS" section.

Electronics - The Toddler robot is controlled by a surface mounted BASIC Stamp® 2 module. Four infrared sensors and receivers, LEDs, servos for tilt and stride, resistors/capacitors, speaker, photoresistors complete the control system.

4.8V Mini Standard Servo

- Dimensions (inches) 1.38 x 0.67 x 1.26
- Weight 26.6 g
- Speed (sec/60°) - 0.19
- Torque (oz-in) - 47

Documentation - Includes the 227-page *Advanced Robotics with the Toddler* student guide.

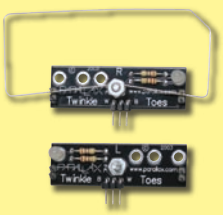
Education - Walking robots have mechanical and software interdependencies that require in-depth examples and explanation. The *Advanced Robotics* text is an exploration to the Toddler robot's necessary movements. Students using the Toddler robot will learn advanced embedded programming with PBASIC, efficient code development, sensor feedback, and general control. Because of the number of possible movements (34) we consider the Toddler to be appropriate for those aged 14 and above. Previous experience with the Boe-Bot robot (#28132) is helpful although it is not a prerequisite.

The Toddler Robot Kit is also offered in the color Gold (See book cover above; #27310; $249.00). Limited quantities are available in this color.

Toddler Accessories - Consider adding such sensors as the Memsic Accelerometer or Toddler Bumper Sensors. Each sensor is sold separately from the Toddler Robot Kit and is documented extensively in Chapters 8 & 9 of the *Advanced Robotics with the Toddler* text.

Memsic 2125 Dual-Axis Accelerometer; #28017; $29.00 - The Memsic Accelerometer is used for incline measurement.

Toddler Bumper Sensors; #27312; $29.00 - These physical sensors provide feedback to the Toddler robot. The pair mounts easily to the Toddler's feet.



STAMPS IN CLASS TEXT AUTHORING AND REVISION PROCESS

```
' {$STAMP BS2}
' {$PBASIC 2.5}

DO

  LISTEN:       ' Meet teachers at BASIC Stamp Educator's Courses,
                ' community events and online Forums; collect customer
                ' feedback to learn what is needed most for our next
                ' educational series, and how existing texts can be
                ' improved.

  EXPERIMENT:   ' Develop fun and engaging BASIC Stamp applications that
                ' teach a broad range of programming and engineering
                ' concepts.

  CREATE:       ' Write, illustrate, test-drive, correct, format and proof.

  SHARE:        ' Drafts posted to Parallax Educators Forum and sent to
                ' select customers and teachers for beta-testing.

  EDIT:         ' Incorporate teacher and beta-tester feedback into the
                ' final draft before publishing.

  PUBLISH:      ' Announce the text is available in print, and as free
                ' PDF on Parallax Forums, www.parallax.com, and Parallax
                ' CD-ROM.

  DISTRIBUTE:   ' Help customers select products that will best fit their
                ' needs; process phone, fax, e-mail, and online orders.

  SUPPORT:      ' Hold BASIC Stamp Educator's Courses in the U.S. and
                ' abroad; provide support via Parallax Forums, e-mail,
                ' and telephone.

LOOP
```

The Parallax Educational Team handles all the functions of the Stamps In Class program including: providing technical support, teaching BASIC Stamp Educator's courses, authoring curriculum, editing and formatting texts, processing sales orders, and much more.

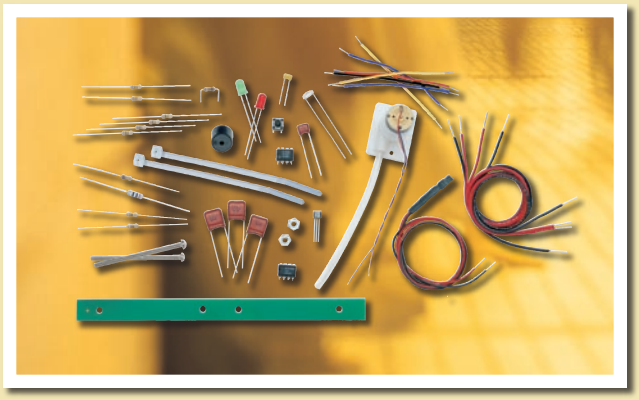


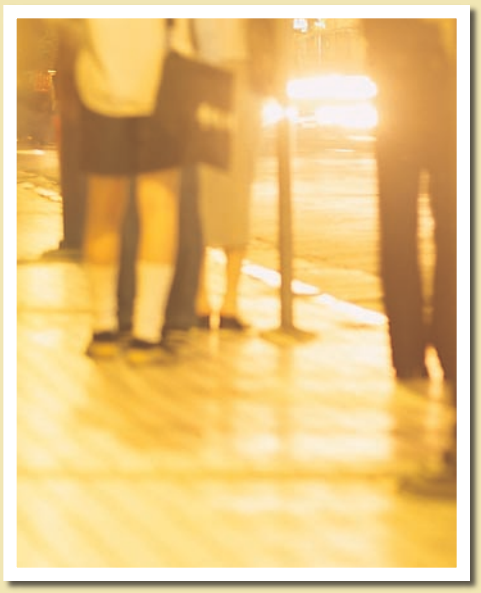





Top row: Andy Lindsay, Aristides Alvarez, Chantal Woods-Jones, and Jim Carrey.
Bottom row: Ken Gracey, Kris Magri, Paul Bouchard, and Stephanie Lindsay.
Holding the camera: Rich Allred.

Build a data logger system with the BASIC Stamp microcontroller and the Applied Sensors Student Guide.





***Applied Sensors* Parts and Text; #28153; $79.00**
***Applied Sensors* Parts only; #28126; $59.00**

Applied Sensors was written by Dr. Tracy Allen of Electronically Monitored Ecosystems of Berkeley, California. The 201-page tutorial is the most complete primer on BASIC Stamp program structuring, sensor calibration, and serial communication in the Stamps in Class series. Recently, the text received upgraded schematics, drawings, and source code support for PBASIC 2.5 (as supported in the BASIC Stamp Windows Editor v2.0 (and above)).

The aforementioned concepts are taught using an earth science theme with emphasis on resistor/capacitor networks, serial communication, and data logging. The final *Applied Sensors* experiment (which is a favorite of many customers) consists of an environmental data logger that measures air temperature, water temperature, light levels, and electrical conductivity of water. Two stainless steel screws are used to determine the water level in a cup, and the pump is controlled to maintain the water level. A speaker provides Morse code sound feedback of each sensor parameter as it is logged to the BASIC Stamp module's EEPROM. The BASIC Stamp module's DEBUG command is used to receive all of the data into a PC where it may be pasted into a spreadsheet or other program for analysis.

Board of Education Full Kit (#28102) is required to use this Stamps in Class text.
The HomeWork Board is also fully supported in this text.

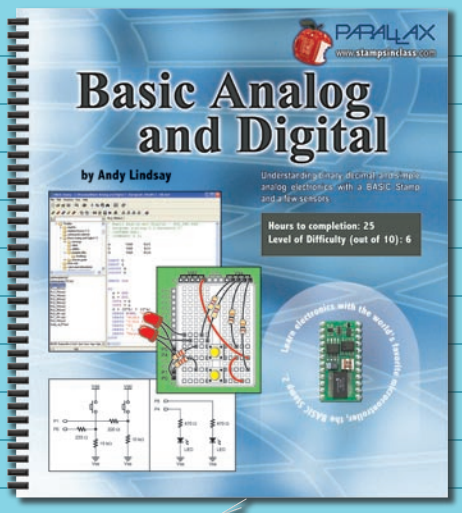
Learn to control a factory in the PBASIC language with the Industrial Control™ Student Guide.

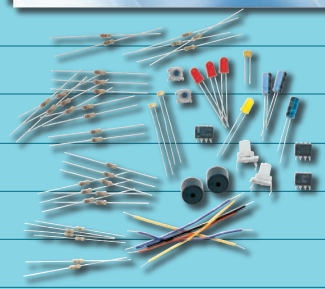
Industrial Control **Parts and Text; #28156; $59.00**
Industrial Control **Parts only; #27340; $39.00**

The *Industrial Control* text is an educational tutorial on controlling processes with the BASIC Stamp Module, from very small to very large! The text illustrates programming for monitoring and control of a variety of processes and focuses on electronic principles involved. The text guides the reader through the basic programming concepts of sequential, looping and condition process flow. Through the use of a high-speed fan and optical sensor, the electronics and programming are explored to accurately measure and control the speed of the fan. Using an incubator system of a resistive heater and temperature sensor, the text teaches principles of sensing and methods of process control (on-off, differential gap, Proportional-Integral-Derivative) applicable to much large industrial systems. The text also focuses heavily on the principles and use of operation amplifiers, and the means to interface to much larger high voltage systems with the BASIC Stamp. *Industrial Control* uses StampPlot Pro in an interactive manner which allows readers to monitor and control their processes through a PC-based graphical user interface. Means of developing custom interfaces by the reader are also explored.

Industrial Control was written by Martin Hebel and Will Devenport, two professors from Southern Illinois University in the Electronic Systems Technologies program. Barry Shiahan, a professor at California State University, Long Beach, was a contributing author.

Board of Education Full Kit (#28102) is required to use this Stamps in Class text.





Basic Analog and Digital **Parts and Text;**

#28155; $45.00

Basic Analog and Digital is a 162-page tutorial that covers the essentials of 8-bit A/D and D/A conversion using a BASIC Stamp module. The text introduces PBASIC commands for A/D conversion with resistor/capacitor circuits, interfacing an ADC0831 8-bit A/D converter, scaling analog outputs into meaningful digital values, analyzing time-varying signals, and using PWM as analog output. These concepts are conveyed using potentiometers, LEDs, speakers, photoresistors, and buttons. The text was written by Andy Lindsay of Parallax, and is available for purchase or download.

Board of Education Full Kit (#28102) is required to use this Stamps in Class text.

Elements of Digital Logic **Parts and Text;**

#28201; A bargain at just $59.00!

The *Elements of Digital Logic* is a hands-on introductory logic course that is relevant for today's student. The course covers the following topics: basic, combinational, sequential logic, problem solving methods and solution design. Along the way, the student is exposed to: simple DC circuit theory, schematic symbols, number systems, simple BASIC Stamp 2 programs. Successful completion of this course gives the student two possible methods of solving real-world problems. The hands-on approach of this tutorial produces a confident student possessing practical problem solving skills. Appendices are provided as reference material so that this book may "stand alone" for individual instruction.

The Board of Education is not required. A BASIC Stamp 2 module (#BS2-IC, not included) is needed for the optional final experiment.

www.parallax.com
toll-free 888-512-1024

All of us at Parallax feel lucky to be part of such a sound line of products. In today's hectic and fast-paced world, it's rare for people to take the time to provide positive feedback. We feel very fortunate when we receive praise from a customer about our products or services. A couple of our testimonials are posted on this page.

"Dear Parallax,
I just received word that I have been selected as the 2004 RadioShack Teacher of the Year for the State of Arkansas. This award is given for innovative uses of technology in the classroom. I feel that Parallax had a great deal to do with my being selected. I have mentored and encouraged many students who have used the BASIC Stamp 2 module for science projects, robotics, and special school projects. The ease with which a high school student can quickly master the PBASIC programming and the clear instructions and illustrations given in the Stamps In Class courses makes students' success a forgone conclusion. Please keep updating the curriculum and keep developing new sensors. It has really made a difference in the interest that my students take in science and it has given me a creative outlet that has enhanced my professional development. Thanks again."

Scott Ausbrooks
Harmony Grove High School
Benton, Arkansas

"I would like to thank you and your company for your energetic and unfailing dedication to education. I have been on the Parallax Educators forum for a short while, and am impressed with the new curriculum you folks are generating. I have obviously been aware of your generosity in lending hardware, and making free curriculum available, but I continue to be amazed at the new experiments, and improvements to the old ones, that is ongoing. I wish kids in schools could spend more time working hands-on with the BASIC Stamp stuff and electronics curriculum, rather than unending hours listening to factual litanies. If we could teach our kids to think, and enjoy doing so, our country would be much better served! Thanks!"

Charlie Knox
Math/Science Instructor
Southwest Wisconsin Technical College

Parallax Forums
(http://forums.parallax.com)

The Parallax User's Support forum is a place where all customers are welcome to discuss ideas, projects, code, and anything else as listed in the individual group descriptions on the next page. The groups are web-based and allow for e-mail notification of postings, files/images posting, and include several other desirable features as highlighted on this page.

Customers are undoubtedly the largest group of forum participants and we couldn't be more appreciative of their contributions. The group's activity and spirit is such that messages are responded to very quickly and you can track specific topical threads via e-mail notices or by visiting the web site. The Parallax technical support department is very active in the groups as well as engineering staff and customer service.

Screen shot of discussion on Parallax Forums site

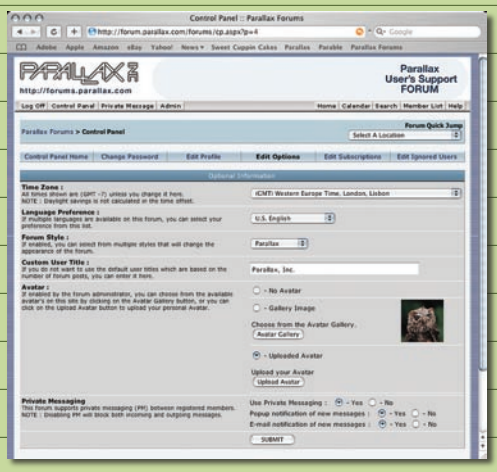
Features of our Forums:

- Quick response time to your questions and ideas from fellow Parallax users
- Image and file attachments
- No spam or advertising
- Helpful search function for all groups
- Web-based postings with e-mail notification
- Reliable archiving for entire history of all groups

Please note that if you are seeking a direct response from a specific Parallax department please contact us using one of the methods as described on page 80 since we can't guarantee to read every posting.

A list of the available groups in the Parallax forums is provided below with a short description. All may be reached at the same web site address of http://forums.parallax.com.

- **Parallax Forum Support** - Suggestions, questions and answers related to the features and use of the forums site.
- **BASIC Stamp** - Project ideas, support and related topics for the Parallax BASIC Stamp microcontroller.
- **Stamps In Class** - Students and customers discuss educational projects.
- **Parallax Educators** - For registered educators only. Teacher's guides are posted in this hidden group. Discussions include everything from Stamps In Class activities to new text development. E-mail us at stampsinclass@parallax.com to register.
- **Javelin Stamp** - Support and discussion for the Parallax Javelin Stamp module, a Java-programmable microcontroller.
- **Robotics** - For the Parallax Boe-Bot, Toddler, SumoBot, HexCrawler, and QuadCrawler though any general robotics topic will do.
- **SX Microcontroller, SX/B Compiler, and SX-Key Tool** - For developers using the Ubicom SX chip or seeking SX programming assistance.
- **Translators** - This is a forum for members interested in contributing to the translation of Parallax literature freely available from the Parallax web site.
- **The Sandbox** - Off-topic posts pertaining to electronics and hardware, feature requests, consulting, etc.
- **Test Forum** - Use this forum to test signatures, posts, etc.

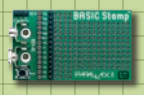


Forum members are able to customize the look and the functionality of their forums experience in the Control Panel. Subscribe to e-mail notification, upload your own avatar, and much, much more!

PROGRAMMING AND DEVELOPMENT BOARDS

Super Carrier Board; #27130; $49.00 - Supports the BS1-IC and all 24-pin BASIC Stamp modules. Solder pad prototyping space and holes placed to accommodate DIP ICs make this board a great choice for permanent applications.

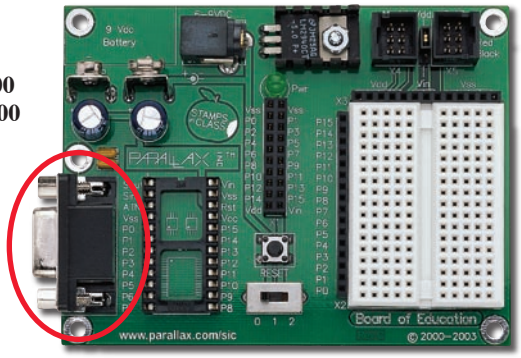
BASIC Stamp 2 Carrier Board; #27120; $24.00 - A low-cost programming board suitable for small 24-pin BASIC Stamp projects.



BASIC Stamp 1 Carrier Board; #27110; $7.00 - BS1-IC programming board. Note: Board does not have a serial interface (BS1 Serial Adapter, #27111, must be purchased separately).

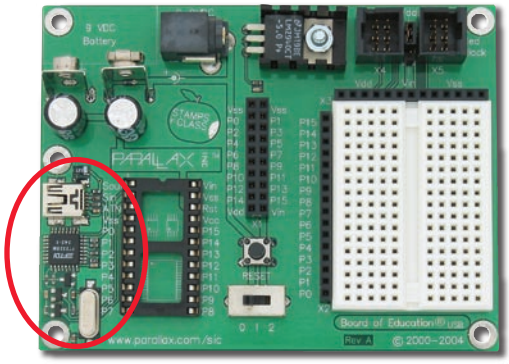
BOARD OF EDUCATION ("BOE")

Board of Education - Serial version; #28150; $65.00
Board of Education - USB version; #28850; $65.00
Board of Education Full Kit (page 14); #28102; $119.00
BASIC Stamp Discovery Kit (page 06); #27207; $169.00



The Board of Education programming board (Rev. C) includes a handy power switch and a servo jumper, making it surpass the features of previous BOE versions. And to make it even better, we now offer a USB-version in addition to the standard serial port mainstay!

On the serial and USB versions of the BOE, the jumper near the servo connectors will select either Vdd (5 V) or Vin (unregulated input voltage) to power the servos. The three-position power switch is either off (0), power to everything but servo connectors (1), or power to everything (2).



The BOE was originally designed in coordination with our educational customers to teach microcontroller programming and this remains today as the most popular use. The majority of the Stamps in Class student guides (i.e. Robotics with the Boe-Bot) require a BASIC Stamp 2 module with a Board of Education carrier board (see page 14). Even if you aren't using our SIC curriculum, the ease of use and expandability make the BOE an ideal project board for any BASIC Stamp 2 microcontroller experimentation.

Our Board of Education programming board (#28150 and #28850) does not include a BASIC Stamp 2 module so you will need to purchase one separately or find a starter kit which matches your needs. Potential options with a BASIC Stamp 2 module (BS2-IC) include the designed-for-education "BOE" Full Kit (#28102) and the most comprehensive BOE-based selection, the BASIC Stamp Discovery Kit (#27207).

NX-1000 Development Board with LCD

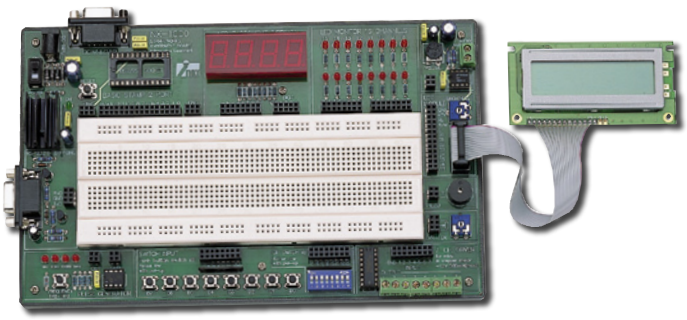
#28135; $179.00

The NX-1000 Board is well-documented by the StampWorks manual which is included in the StampWorks Experiment Kit (#27297; page 08). The NX-1000 is a high-quality prototype and experiment platform for all 24-pin BASIC Stamp modules as well as the Javelin Stamp module. You will find that the board is very durable due to the double-sided plating construction and sound craftsmanship. The NX-1000 provides socket ports for each BASIC Stamp I/O pin. The package also includes printed documentation, schematics, and source code examples for the BS2-IC. A parallel LCD with cable is included.

These are the features of the NX-1000 board:

- Audio amplifiers with screw terminals for 8 ohm speakers
- 510 ohm resistors allow more LED driving
- Quality slide power switch
- Plated-through PCB
- DB-9 connector for program download and debug
- 16 LEDs to monitor I/O pin status
- 4-digit LED 7-segment display common cathode, multiplexed
- 8 pushbutton switches (active low without pull-up resistors)
- 8 DIP switches (with built-in pull-up resistors)
- ULN2003 high-current driver for relay and stepper motors
- Pulse generator for 1 Hz, 10 Hz, 100 Hz, and 1 kHz
- RS-232 interface port for communication with COM program
- Socket for 24-pin BASIC Stamp modules
- Parallel LCD module with connector and brightness control
- Piezo speaker
- 10K potentiometer
- 2.5” x 7” breadboard with 800 contact points
- 5.5” x 9” overall dimensions
- 7.5V DC 1 Amp power supply with polarity protection

A BASIC Stamp module or Javelin Stamp module is not included with this programming board.

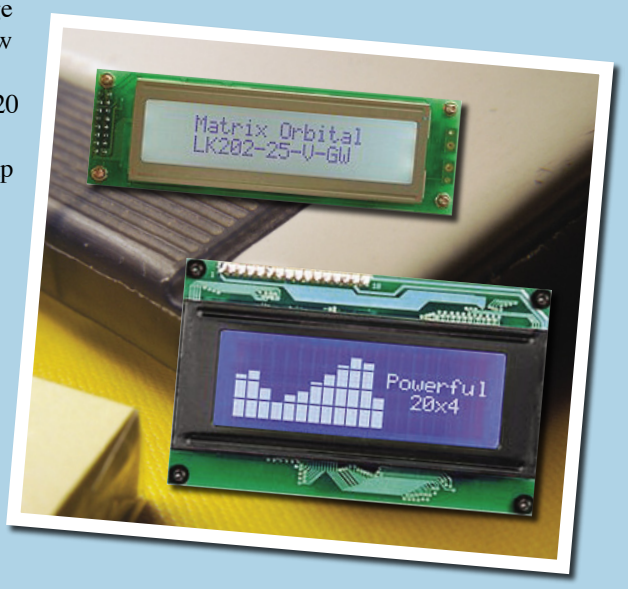


Serial LCDs

2x16 Serial LCD; #27910; $49.00
2x16 Serial LCD - Backlit; #27923; $59.00
These very popular LCD's each consist of a Supertwist 2x16 LCD with the original LCD Serial Backpack interface factory installed. These displays are the right choice if you require a small footprint and low current draw (2-3 mA without backlight). Commands allow scrolling, cursor positioning, and ASCII character support. Displays have a 2400/9600 baud serial input and posts for connecting to +5V, ground, and I/O.

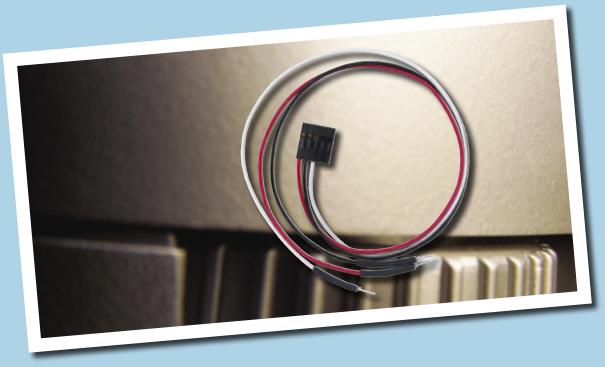
Display Size: 80 x 36 mm

2x20 Serial LCD with Keypad Interface; #30057; $79.95
4x20 Serial LCD with Keypad Interface; #30058; $99.95
Display text, horizontal and vertical bar graphs and large digits with these high level serial LCDs. They also allow for line wrapping, scrolling, contrast, backlight and time-out setting (up to 180 min). The display on the 4x20 LCD is a sharp inverse blue with white backlight. Both LCD modules have been pre-modified for BASIC Stamp module-compatibility (TTL level).



2 x 20 Display Size:
* Module: 116.0 (L) x 37.0 (W) x 27.5 mm (T)
* Display: 82.2 (L) x 18.2 mm (W)
* Character: 3.20 x 5.55 mm

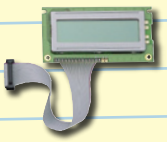
4 x 20 Display Size:
* Module: 98.0 (L) x 60.0 (W) x 27.5 mm (T)
* Display: 76.3 (L) x 25.0 mm (W)
* Character: 2.95 x 4.75 mm



LCD Serial Cable; #27946; $5.00
Handy cable lets you plug your serial LCD into a breadboard. Makes quick work of a sometimes complicated task when you "just need to get it working".

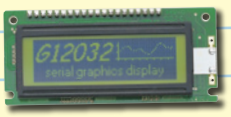
Even More LCDs

2x16 Parallel LCD; #603-00006; $29.00

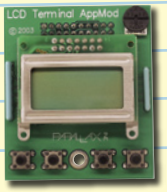


This Hitachi-compatible parallel LCD goes well with the BS2p24 module and the BS2p24/40 Demo Board due to the special LCD commands in the BS2p series.

120x32 Graphic Serial LCD; #27936; $109.00



This LCD can display text in four different sizes, allowing you to format the screen as 4 lines of 20 small characters or 2 lines of 10 large characters, or mix font sizes freely to achieve special effects. The real treat, however, is the graphic capabilities. Plotting points, drawing lines, and displaying full-screen pictures is easy with a 4 KB non-volatile EEPROM. The package includes a 3.5" disk with extensive HTML manual, a graphics conversion / downloading utility program, and examples using the BASIC Stamp 2 module. **Size: 80 x 36 mm**

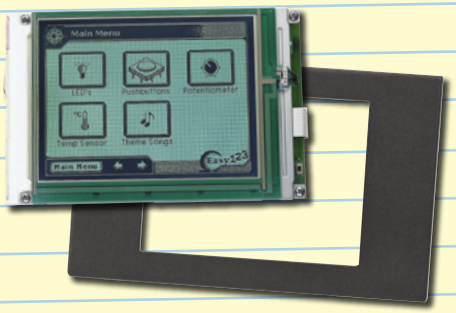


LCD Terminal AppMod; #29121; $39.00

This low-cost display is excellent for your smaller projects. The module has a 2x8 display, 4 pushbuttons, and will connect to any programming board that has a 2x10 AppMod header. **Module Size: 60.3 (L) x 50.8 (W) mm**

Easy GUI™ 5.7" Starter Kit with Bezel; #30053; $399.00

The Amulet Technologies GUI Starter Kit includes a 1/4 VGA, 5.7" diagonal monochrome display with a CCFL backlight, a fully-integrated analog touch panel, and the Amulet Controller Board. In addition, you will receive a serial cable, development software CD, stylus touchpen, AC power adapter, and a high quality bezel for mounting. **Size: 201 x 124 mm**



Key Features of the Amulet Graphical User Interface Solution:

HTML-Based GUI Creation – create and edit quickly using drag-and-drop HTML tool

Compiler Included – converts from HTML, JPEG, and GIF into small, quickly-executable Amulet µHTML pages

Dedicated GUI Chip – manages the GUI, interacts with the user, and controls the LCD – Frees up your BASIC Stamp module

Combination Chip – The chip is a combination LCD controller chip and user interface chip

www.parallax.com
toll-free 888-512-1024

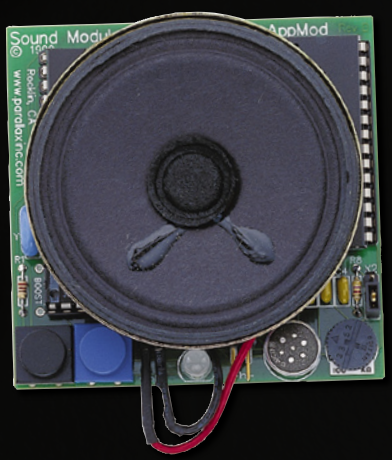
Audio Amplifier Appmod

#29143; $29.00

The BASIC Stamp microcontroller has two commands to generate sounds: DTMFOUT and FREQOUT. To make the most of these commands an audio amplifier circuit may be used. The Audio Amplifier AppMod makes it easy and is a great way to add sound output to your BASIC Stamp application. Features include 125 mW amplifier, adjustable volume control, built-in speaker, and a selectable external speaker connection.

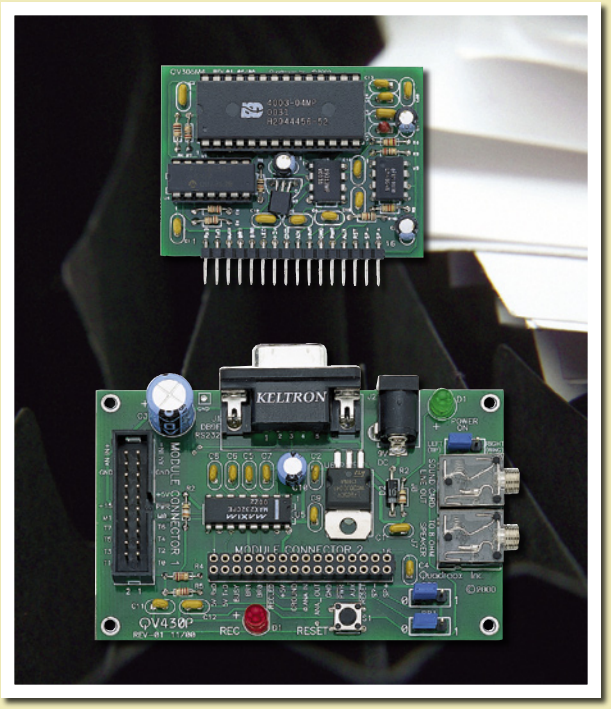
Since this board is built in Parallax standard AppMod format, it plugs right in to a Board of Education carrier board, BASIC Stamp Super Carrier Board, BS2p Demo Board, and the SumoBot and Toddler Boards. The Audio Amplifier AppMod employs an industry-standard LM386 audio amplifier. Raw audio output is taken from BASIC Stamp pin 10 and filtered prior to amplification; this converts the pulse-width modulation output of the BASIC Stamp module to sinusoidal waves for the best audio quality. The amplified signal is fed to an onboard 8 ohm speaker. You may connect an external speaker for even better quality sound and volume.

ISD Sound Module AppMod



#29111; $89.00

The Sound Module is a small recording and playback studio. With an 8 kHz bandwidth, both voice and music are handled with good quality. There is a small microphone on-board for recording, or you can use the line-in connection for a direct recording. Similarly, the sound produced can be heard using the miniature speaker, or can be directed to the line-out jack. There are 150 message slots, each 0.4 seconds, for a total of 60 seconds of sound. You may use these message slots as one large message, 150 very short messages, or any permutation thereof. These message slots may be recorded and played individually or in contiguous groups using a BASIC Stamp or any other intelligent device capable of RS-232 (TTL level) communication. BS2-IC and Board of Education carrier board recommended, but not required.



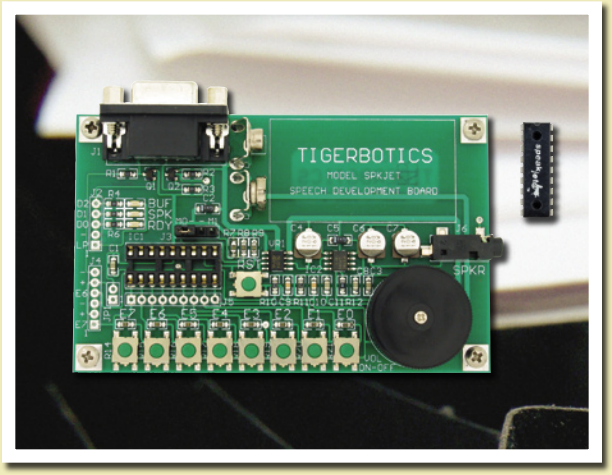
Quadravox QV306M4P Playback Module; #27967; $79.00
This device is pre-programmed with 240 sound files: numbers, measurements, days and technical terms. Playing any of these "files" is as simple as sending the file number from your BASIC Stamp module serially. A speaker is required (but not included) for playback.

Quadravox QV430P Sound Programmer; #27968; $79.00
If you are ready to play some Windows *.wav files from your QV306M4P (#27967), or if you want to put some additional words or files into the QV306M4P module you'll need the QV430 programmer. A mini-jack cable is required (but not included) to connect the QV430P to your PC's sound card headphone jack or speaker out jack as well as a mini-jack for your speaker.

Emic Text-to-Speech Module; #30006; $79.00
This SIP module will let your robot speak, provide a real human-console interface to your control system, or simply provide some entertainment to your BASIC Stamp microcontroller projects. Based on the Winbond WTS701, this device intelligently handles values, sentences, numbers and common abbreviations with an extremely natural female voice with simple serial string sentences.

Tigerbotics SpeakJet Development Board; #30074; $34.00
The Tigerbotics SpeakJet Development Board is a very easy to use development board for the popular SpeakJet Chip. The board features surface mount construction and is very compact, allowing for a convenient installation in your target application. It is easily interfaced to any of our BASIC Stamp 2 microcontrollers.

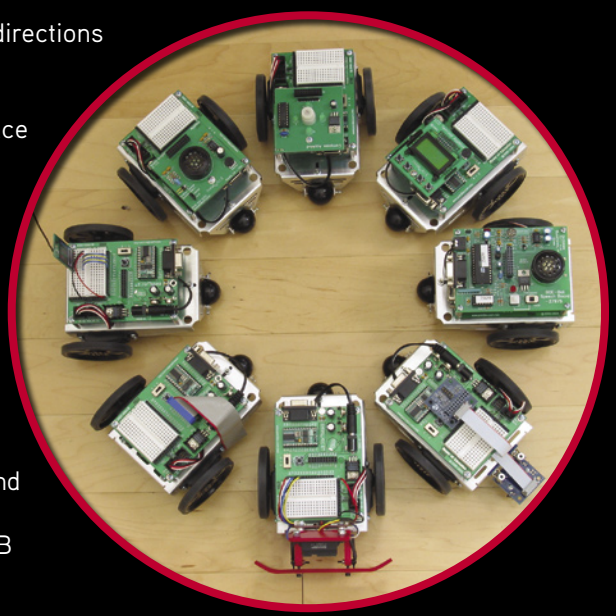
SpeakJet Chip; #30075; $24.99
The SpeakJet is a self-contained, single chip voice and complex sound synthesizer programmed with 72 speech elements (allophones), 43 sound effects, and 12 DTMF tones. It may be controlled directly or by the BASIC Stamp microcontroller using just one I/O pin. The SpeakJet uses a mathematical sound algorithm to control an internal five channel sound synthesizer to generate on-the-fly, unlimited vocabulary speech synthesis and complex sound generation.

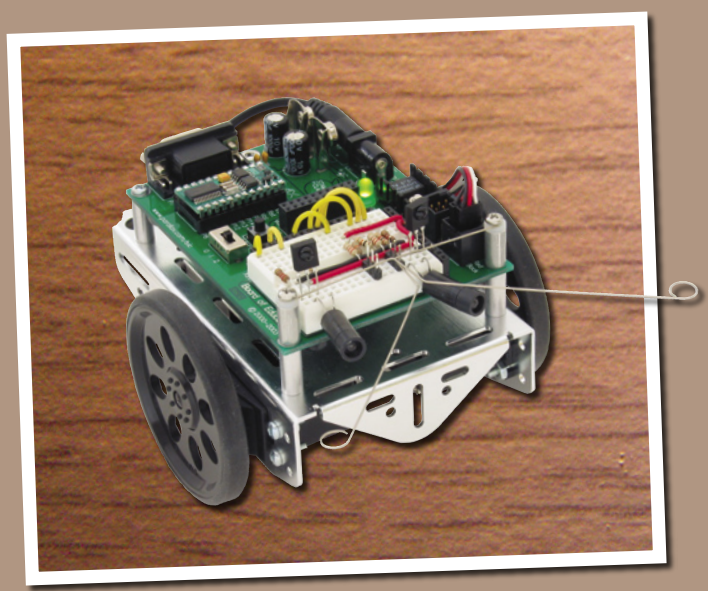


TOP SECRET ROBOT PROJECTS

The Boe-Bot robot is a highly flexible platform. The slots and holes throughout the chassis may be used for any kind of add-on you create. Customers commonly mount X-10 wireless cameras, smaller robotic arms and sonar rangefinders to the chassis with a few screws or double-sided sticky tape. In addition, Parallax offers many pre-built modules which plug directly into the black AppMod header in the middle of the Board of Education.

- ***Compass AppMod*** – eight heading directions with serial feedback
- ***LCD Display Terminal*** – quick connections and handy user interface with a 2x8 parallel LCD
- ***Audio Amplifier AppMod*** – highly audible sound effects and music
- ***Boe-Bot Speech Board*** – speech phoneme talking behavior
- ***RF KeyChain Remote Control*** – manual pushbutton control
- ***Line Follower*** – follow a black stripe on the ground
- ***Gazbot Infrared / Bump Sensor*** – combine infrared and switches and your robot will rarely get stuck
- ***TCS230 Color Sensor*** – detects RGB color values



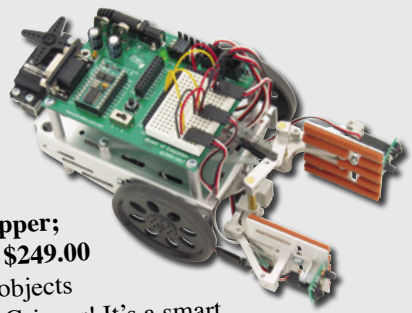


Boe-Bot Robot Kit; #28132; $229.00
A perfect robot for beginners to experienced roboticists. The Boe-Bot is a Board of Education programming board and BS2-IC module mounted on a chassis with Parallax Continuous Rotation servos and wheels. Hardware, electronics, software, and complete step-by-step manual (*Robotics with the Boe-Bot*) are included.

For more detailed product information, see page 18.

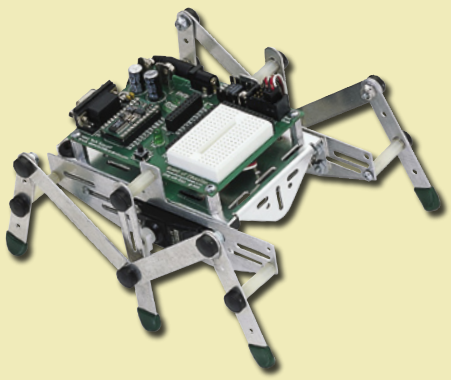
Grip, Crawl, Climb, or Detect

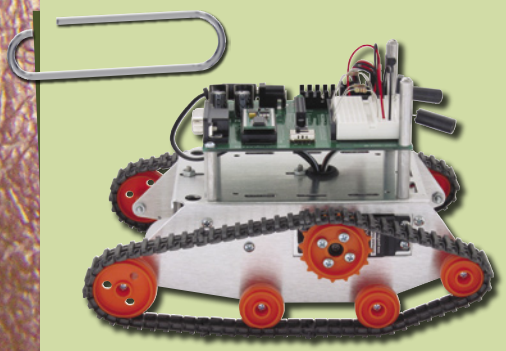
(Boe-Bot robot sold separately)



The Gripper; #28200; $249.00
Pick up objects with the Gripper! It's a smart gripper with infrared sensors so you can program it to find and pick up objects that fit in its grasp. The Gripper is controlled by only one servo and is included with a complete printed manual and sample source code to get you started.

Crawler Kit; #30055; $39.00
Make your Boe-Bot robot a Crawler by adding on this conversion kit. Includes printed documentation with detailed assembly instructions.





Tank Tread Kit; #28106; $34.95
Turn your Boe-Bot robot into a tank with this add-on kit. Simply remove the wheels from your Boe-Bot robot and attach the gears and tread to give your Boe-Bot robot the ability to traverse unfriendly terrain.

GazBot Infrared Distance Sensor; #28013; $59.95
Solve mazes using infrared and a bumper. This device uses an analog distance finder to notify your BASIC Stamp module that an object lies ahead. Should the object be outside of the view of the distance sensor, the bumper system takes over with dual switches to detect left, right and head-on contact with obstacles.

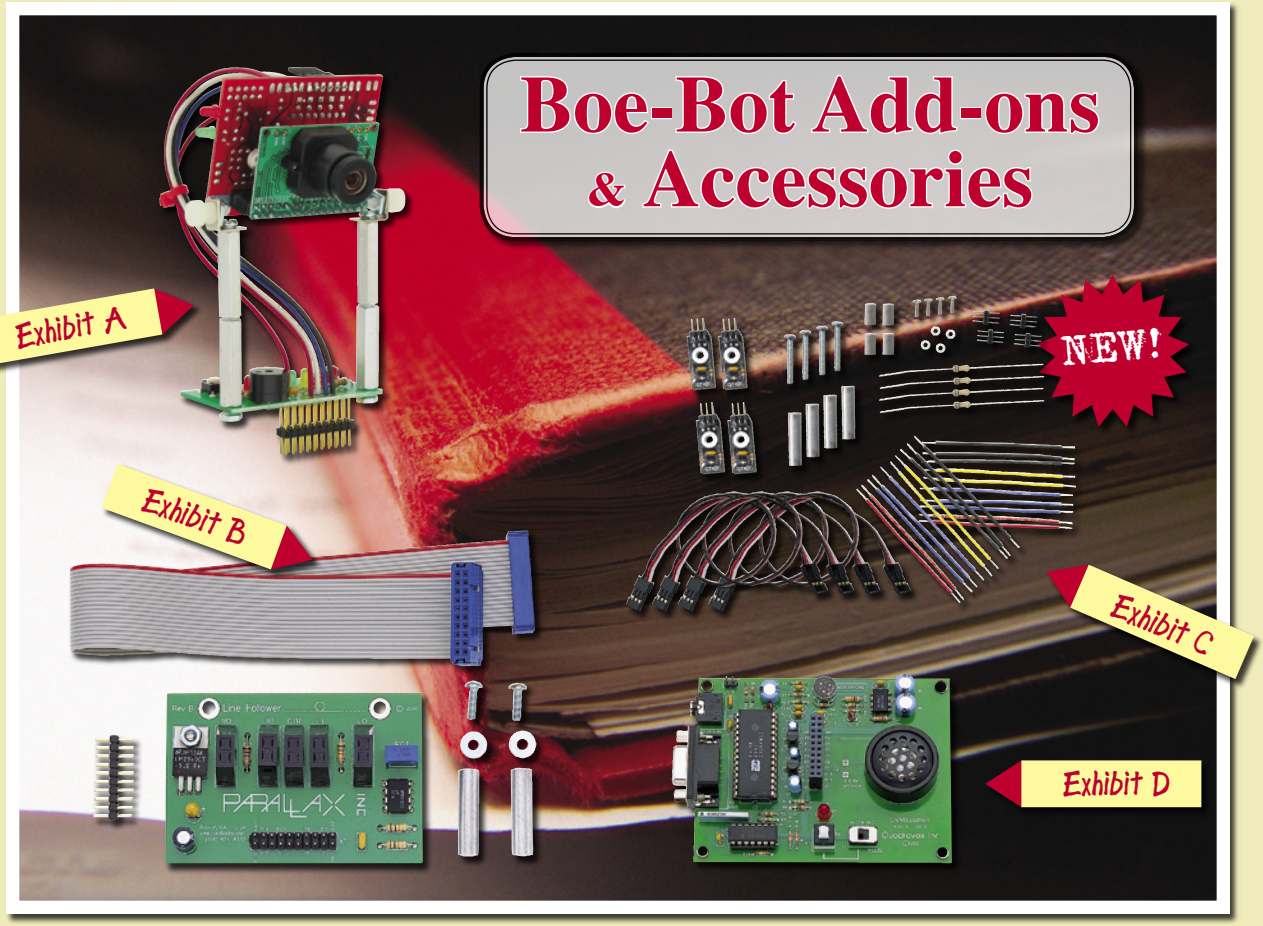


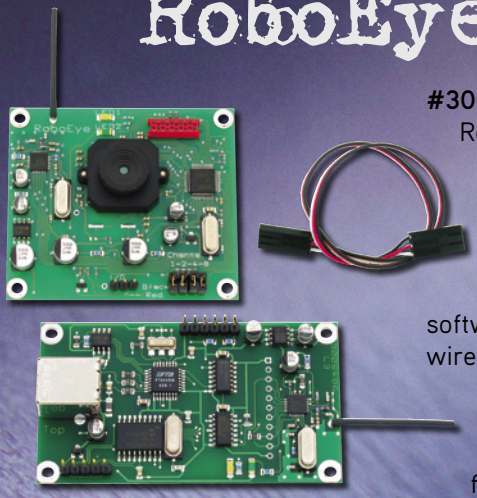
Exhibit A: Boe-Bot CMUcam AppMod; #30051; $149.00
Track images with the brand new Boe-Bot CMUcam AppMod! This robotic accessory was designed specifically for the Parallax Boe-Bot robot. The CMUcam ships with printed documentation and CD-ROM with demo programs.

Exhibit B: Line Follower AppMod; #29115; $69.00
Line following and table edge detection are not a problem for this popular add-on. The Line Follower Module uses a multi-sensor array over which you have complete programmatic control. This level of control allows you to develop line following algorithms that range from simple to advanced. Since the module uses reflective sensors, it contains a threshold adjustment that can tune the sensor array to the ambient light conditions. The module connects to the 2x10 Application Module socket on Board of Education via the simple ribbon cable and male-male header.

Exhibit C: QTI Line Follower Appkit; #28108; $29.00
Looking for a different line following option? This add-on kit uses QTI infrared emitter/receiver modules *(also sold singly on pg. 47)* to easily enhance the line following capability of your Boe-Bot robot. The QTI sensors mount underneath the front of the Boe-Bot chassis, and can be positioned to adjust to different width lines. Learning to use the QTI is easy with these illustrated instructions and example BASIC Stamp code

Exhibit D: QV356 Boe-Bot Speech Board; #27975; $119.00 *(limited quantities available)*
The QV356 Boe-Bot Speech Board ships with 220 professionally pre-recorded robotic words including distances, units of measurement, nouns, objects, etc. Words are replayed under BASIC Stamp serial control through the on-board audio amplifier. The speaker circuit can be used with the BASIC Stamp FREQOUT command for amplified sound effects playback. No programming tools are required. The QV356 ships with a 2x10 header to mate with the Board of Education (required - sold separately) and all required standoffs and screws to mount the board on top of the Boe-Bot.

RoboEye

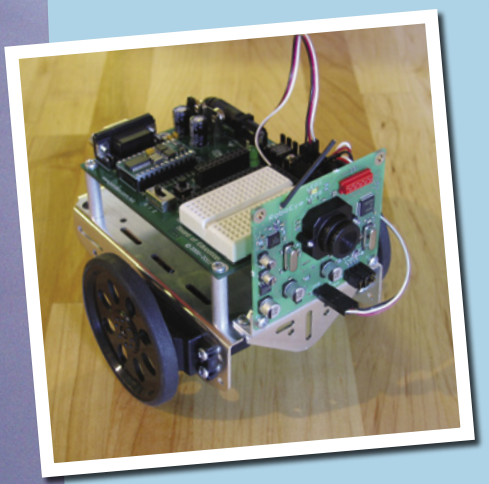


#30008; $229.00

RoboEye provides both a simple and sophisticated method of robotics vision and control. In its simple form, the RoboEye Sensor sends a 168 x 120 pixel image over a 2.4 GHz wireless band for display on your PC using the RoboEye software. An additional serial I/O line may be used to send control commands or data between the RoboEye software terminal and a BASIC Stamp microcontroller. The wireless data link includes built-in error checking.

The RoboEye package includes: (1) RoboEye Sensor Module, (1) RoboEye USB Module, (1) 3-pin 10" female/female cable, (1) Lens and lens holder (black plastic), (2) Collection of brackets, nuts, screws. The RoboEye PC software and BASIC Stamp source code is available for download. Enter #30008 in the search field at **www.parallax.com**. ***Note:*** *USB A to B cable sold separately (#805-00007; pg. 67)*

TOP SECRET: Robotic Vision Analysis with RoboEye



Spy on your nerd friends!

Vision is among the most interesting sensor additions you can add to your robot. However, the complexity lies in the amount of data that must be processed by the robot's microcontroller from the camera sensor. RoboEye provides a functional alternative - the image is transmitted wirelessly from the robot to your PC. Within the RoboEye software, you can view the image from a USB-compatible receiver, with the additional benefit of a serial I/O control line between the robot and the PC (similar to the BASIC Stamp's DEBUG window).

But the big benefit lies with an open-sourced image protocol. This lets developers stream and analyze the image with a PC, keeping the robot's microcontroller free to manage sensors, motion and other mission-critical feedback. The PC may also be used to send control commands back to the robot, but in the simplest form it provides an image from the robot.

Compass AppMod

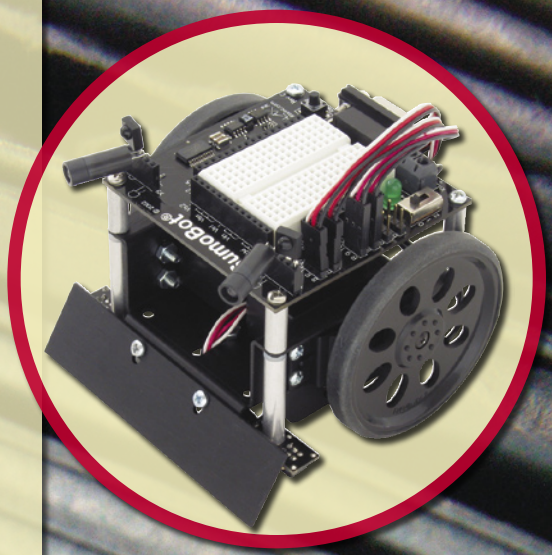
#29113; $49.00

The Compass AppMod is a low-cost, direct-interface direction sensor that is perfect for many applications, particularly with Boe-Bot robots. 8 directions are depicted with 4 LEDs. Ideal for robotic maze contests.

SUMOBOT® ROBOT

#27400; $149.00

Get started in autonomous robotics and compete in sumo competitions with our SumoBot robot. It's designed, tested, and manufactured by the same pros that developed the popular Boe-Bot and Toddler robots. The SumoBot robot is a competition-ready robot designed within the Northwest Robot Mini-Sumo Tournament rules. This little pusher will locate and knock its opponent right out of the ring while detecting the outside circle should an escape move be necessary.



The electronics consist of a surface-mounted BASIC Stamp 2 module, and infrared sensors to detect your opponent and the edge of the Sumo Ring. The hardware package includes the black anodized aluminum chassis and scoop, servo motors, wheels, 4AA power pack (batteries not included) mounting standoffs and screws.

The documentation takes you from basic moves to one-on-one combat. Beginning to mid level source code is provided and explained thoroughly so you have a complete understanding of all bases. Once you have built and programmed everything covered in the manual, you'll be ready to write your own code and compete. For local events, use your favorite web search engine and enter "sumobot competition."

SUMOBOT COMPETITION AT DEVCON 2004

A Sumobot Competition was held at Windows Embedded Devcon 2004 by Mike Hall. A video of the event is available on **MSDN Channel9** for downloading via Mike Hall's blog (http://blogs.msdn.com/mikehall/)

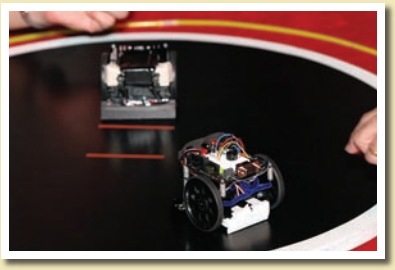
Below is an exchange of thoughts related to the SumoBot...

Saturday, Aug 7, 2004 3:53 PM

At previous Windows Embedded Developers Conferences we've had "Ultimate Architect" competitions that have had delegates using Erector sets to build devices to carry beer glasses (full of beer), or shot glasses - this year we wanted to have a competition that involved writing code, and also having fun - SumoBot seemed to be the right choice - everyone had a great time - perhaps next year we can use Windows CE, Windows XP Embedded, or SPOT !

Sunday, Aug 8, 2004 6:47 PM

Nice job Ref (Mike), this was a victory for "social engineering", "Academic" had a big team behind him, he was eliminated but when another contestant was needed for the final round...The SumoBots were the life of the party (and that's with all the ice cream you wanted). It was fun, but I don't know how the contestants found the time to prepare their SumoBots with so many sessions and venders wares to see. Glad you brought along the camera Mike, so we could relive the excitement!

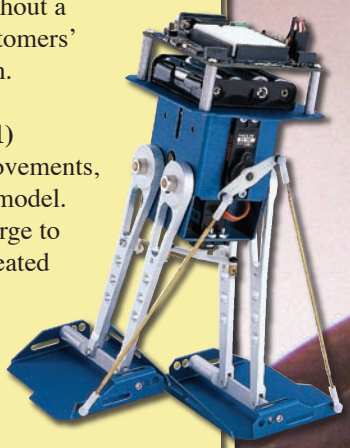


The Toddler Robot History

Dual-servo walking robot finds his way around

There's something unique about simplicity, especially when you study the Parallax Toddler's walking behavior and see how it only takes a couple of servos and a BASIC Stamp to move around like more complex walking robots.

The Toddler robot has been the fascination of one of our staff, Ken Gracey. Toddler was developed entirely through experimentation, without any calculated considerations towards kinematics. This is often to the surprise of the university-level mechatronics professors who request their students evaluate the physics of this robot. Without a doubt, Parallax has learned more from our customers' research on this robot than we have on our own.

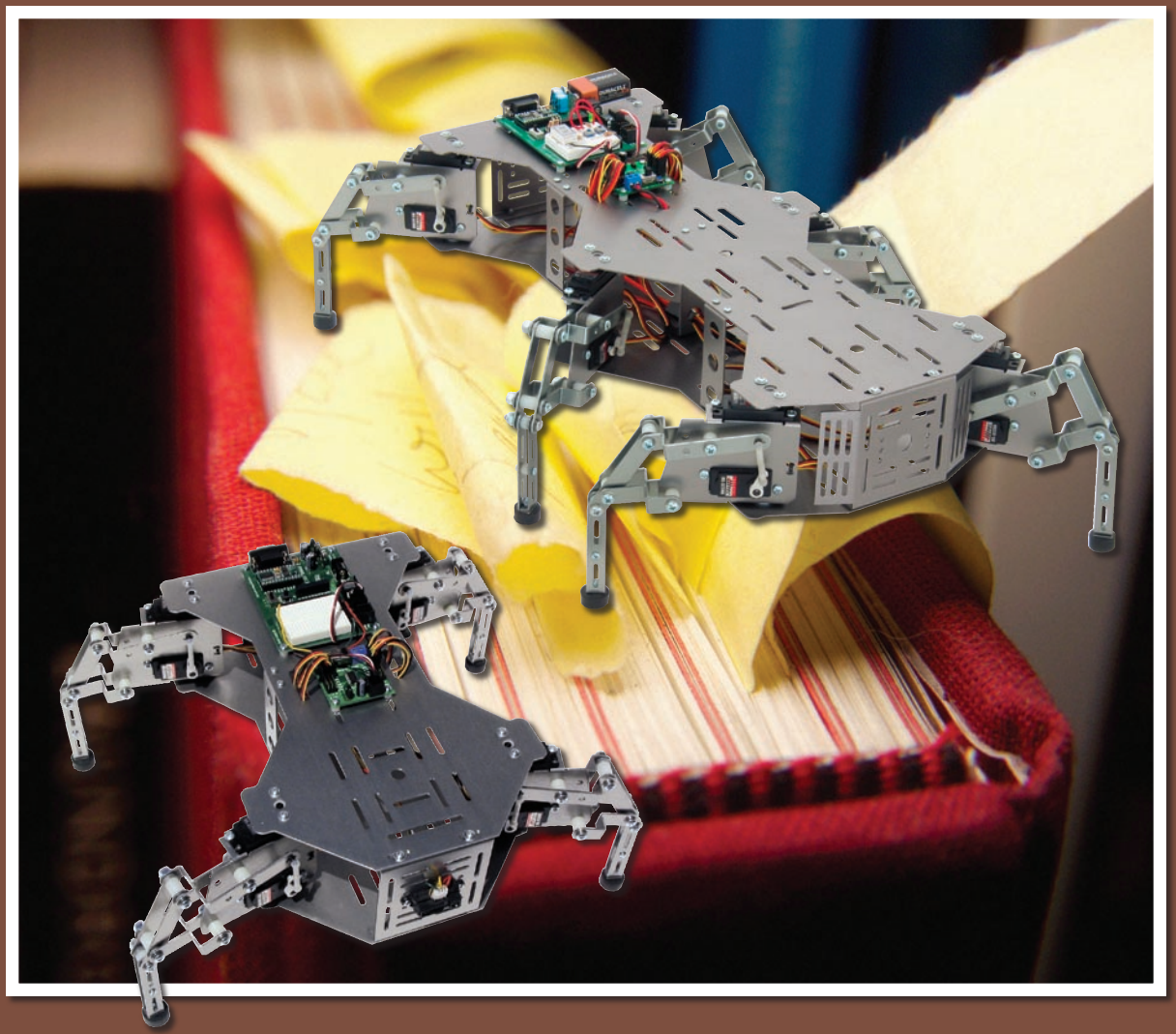


Although the **Production Toddler (right; #27311)** remains essentially the same except with minor improvements, most of the prototypes were developed before and after the production model. Initially, the **Chrome Toddler prototype (above left)** proved to be too large to turn though he was a crowd pleaser. Smaller and smaller versions were created until the mechanics proved functional, then it became a matter of design and materials to see if production was feasible.

Most recently, Toddlers have been prototyped in the 3.5" height – about one-third the height of the production Toddler **(pictured at left, Mini-Toddler™ Prototype)**. The Mini-Toddler is largely a desk robot. In these small sizes, making decisions about electronics takes precedence over mechanical considerations. Choosing connectors, processors and sensors adds "small size" as an additional requirement to price, function and package type. Additionally, what used to be CNC-stamped aluminum needs to become a machined (or molded) part for precision.

Some of the places you've seen Toddler include Fox TV's John Doe program, where they were used to reenact a crime scene. On our web site you can also find the **Dancing Toddler Troupe (right)** – a troupe of RF-networked robots that do the "hokey pokey" dance.

Toddler Robot Kit - Blue; #27311; $249.00
Toddler Robot Kit - Gold (limited quantities available); #27310; $249.00



WALKING IN STYLE: THE HEXCRAWLER AND THE QUADCRAWLER

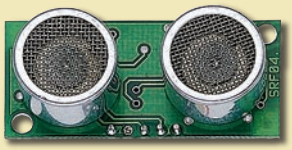
Parallax partners with CrustCrawler to provide serious roboticists with a winning pair of multiple-legged crawling robots. We focus on designing the best possible control system and electronics while CrustCrawler designs the actual robot and all moving parts. Each robot kit includes the following for the control system: BASIC Stamp 2 microcontroller, Board of Education programming board, Parallax Servo Controller, Hitec Servos. Upper and lower decks are identical on each respective bot offering you several BOE-mounting options. In 2005, both kits will be offered as a 2 Degrees of Freedom Kit (2DOF) or 3 degrees of Freedom (3DOF) kit. For pricing and a detailed description of the 3DOF version visit the online Robotics section.

It's very rewarding to build, program, and watch your "Hex" or "Quad" conquer rough terrain or complete a complicated walking sequence. To give you an idea of the scale, the Quad is approximately 12" in length while the Hex is over 19"! The chassis are made of super rigid yet light .063 Gauge 5052 aluminum with type II anodizing for weather and scratch resistance. Visit our Robotics Video Gallery online to see the action.

Prior to making your purchase, we recommend that you read the individual resource pages in our Robotics section so you're able to understand the complexity of these beasts. It's helpful that you have previous PBASIC programming and circuit-building experience before embarking to this level. Once you have decided to take the leap, you'll be up and running with the printed manual, downloadable source code, and robotics forum. Along the way, you will need to provide a 7.2 V NiMH or 6 cell NiCd rechargeable battery pack, AC/DC Digital peak charger, zip ties (optional), and sensors (optional).

HexCrawler Robot Kit; #30063; $695.00
QuadCrawler Robot Kit; #30073; $495.00

Ultrasonic Rangefinder



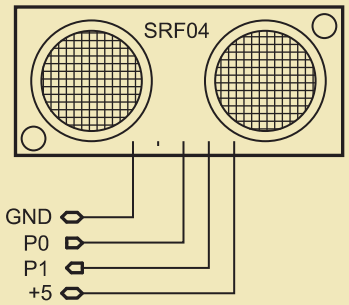
#28015; $36.00

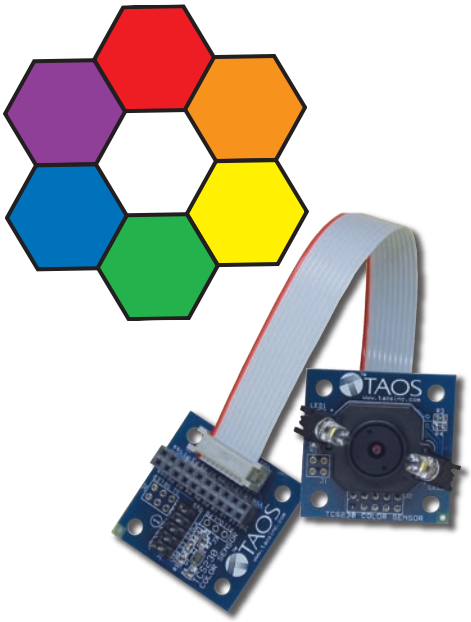
The SRF04 works by transmitting an ultrasonic (well above human hearing range) pulse and measuring the time it takes to "hear" the pulse echo. Output from the SRF04 is in the form of a variable-width pulse that corresponds to the distance to the target. From a BASIC Stamp module's perspective it's a snap to interface with this device. The documentation is only available as a free download.

Features:

- Voltage - 5 volts
- Current - 30 mA Typ. 50mA Max.
- Frequency - 40 kHz
- Maximum Range - 3 m
- Minimum Range - 3 cm
- Sensitivity - Detect 3 cm diameter broom handle at > 2 m
- Input Trigger - 10 uS Min. TTL level pulse
- Echo Pulse - Positive TTL level signal, width proportional to range.
- Small Size - (1.7 in x .8 in x .7 in height) 43 mm x 20 mm x 17 mm height

Please note: The user is required to solder four (4) wires (not included) to the SRF04 module. Please use caution with soldering and connecting the wires since improper soldering may burn holes through the solder pads and damage the sensor.





TCS230 Color Sensor Evaluation Kit; #30054; $79.00

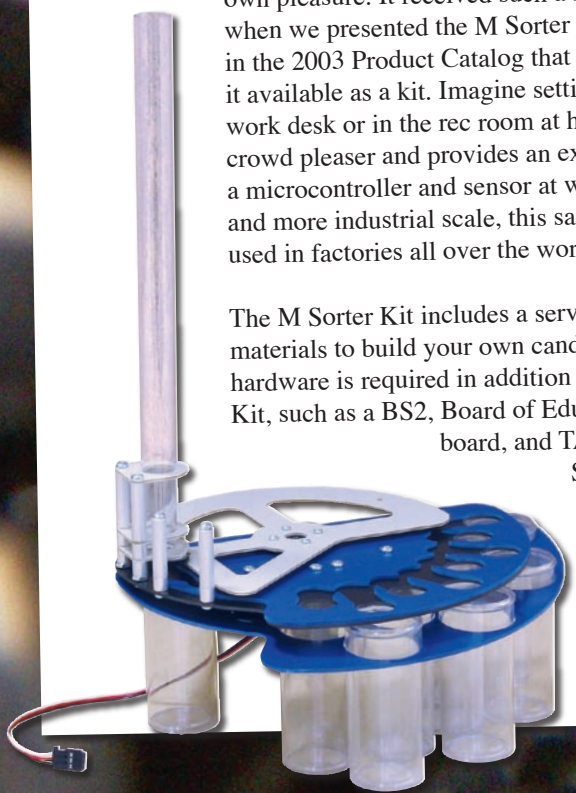
The TCS230 sensor module set is comprised of a complete color detector, including a TAOS TCS230 RGB sensor chip, white LEDs, collimator lens, AppMod adapter board, and connecting cable. It interfaces easily to any BASIC Stamp module, either through an AppMod socket or connected directly, and can detect and measure a nearly limitless range of visible colors. Applications include color edge-following robots, sorting by color, and color matching, to name just a few. The TCS230 has an array of photodetectors, each with either a red, green, or blue filter, or no filter (clear). The filters of each color are distributed evenly throughout the array to eliminate location bias among the colors. Internal to the device is an oscillator which produces a square-wave output with a frequency proportional to the intensity of the chosen color.

Sensing & Sorting Color

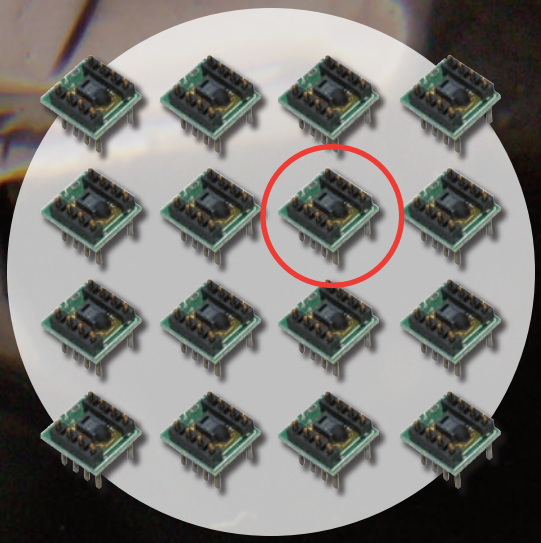
M Sorter Kit; #30067; $89.00

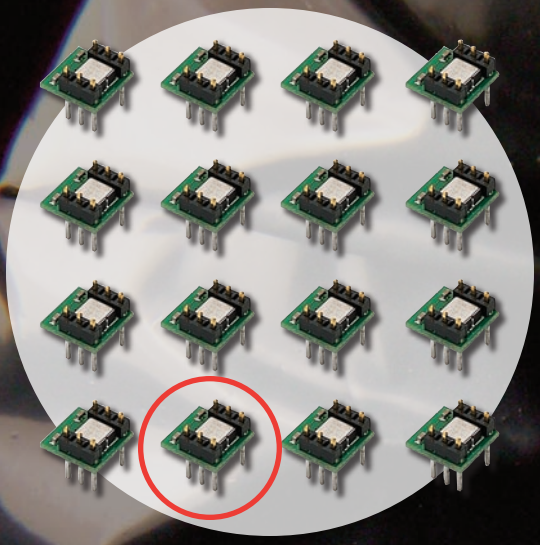
This kit was originally just a one-off device for our own pleasure. It received such a strong response when we presented the M Sorter as an application in the 2003 Product Catalog that we had to make it available as a kit. Imagine setting this on your work desk or in the rec room at home! It's quite the crowd pleaser and provides an excellent demo of a microcontroller and sensor at work. On a larger and more industrial scale, this same technology is at used in factories all over the world.

The M Sorter Kit includes a servo and the necessary materials to build your own candy sorter. Additional hardware is required in addition to the M Sorter Kit, such as a BS2, Board of Education carrier board, and TAOS TCS230 Color Sensor. *Visit the M Sorter pages online to see all 4 kit options.*



Sensing Movement, Temperature, and Humidity.





Memsic 2125 Dual-Axis Accelerometer; #28017; $29.00

Our most popular sensor, the Memsic 2125 is a low-cost, dual-axis thermal accelerometer capable of measuring dynamic acceleration (e.g. vibration) and static acceleration (e.g. gravity) with a range of ±2 g. The Memsic 2125 draws a low amount of current during operation - less than 4 mA at 5 VDC. Commercial operating range of 0° to 70° C (with an optional temperature compensation output pin where a high degree of precision is required) with simple, pulse output of g-force for X and Y axis. For integration into existing applications, the Memsic 2125 is electrically compatible with other popular accelerometers.

A sampling of possible BASIC Stamp applications with the Memsic 2125 include:

- Dual-axis tilt sensing for autonomous robotics applications
- Single-axis rotational position sensing
- Movement/Lack-of-movement sensing for alarm systems
- R/C hobby projects such as autopilots

Sensirion SHT1x Temperature/Humidity Sensor; #28018; $29.00

Humidity is notoriously difficult to measure. Some of the scientific and electronic considerations to measuring humidity include: analog to digital interface and external circuitry which might require op-amps or oscillator circuitry; temperature compensation adjustments to calculate dew point; calibration against a known humidity source; mounting, protection and response time in the real-world.

The Sensirion SHT1x addresses many of these issues head on. It is a smart sensor for both humidity and temperature, and it comes from the factory in a tiny package that incorporates the analog to digital interface. All that the BASIC Stamp has to do is read out the humidity and temperature values through the two-wire digital serial interface. The only math required is a simple scale and offset.

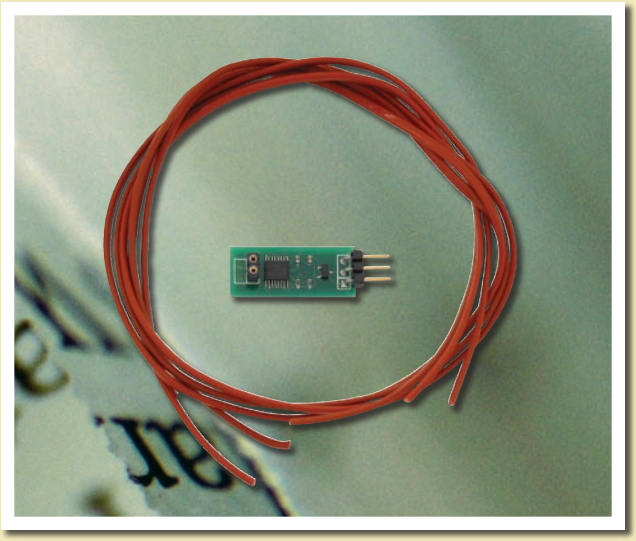
The SHT1x is factory calibrated so that it returns temperature with a resolution of 0.01 degrees Celsius and relative humidity with a resolution of 0.03 percent. The accuracy is better than most other sensors too. Worst-case temperature accuracy is +/- 2 degrees C - but in the "room temperature" range the accuracy better than +/- 1 degree C. The relative humidity sensor is similarly accurate: +/- 3.5% in the range 20% to 80%. This is quite remarkable for a low-cost sensor.

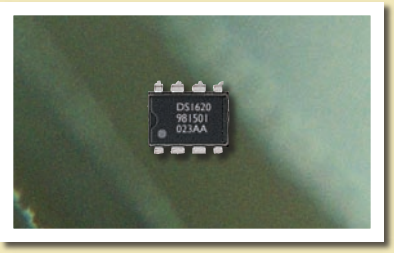
Excellent for commercial or home-based projects that require such readings.

For an idea of how to use this sensor, check out the Memsic Accelerometer "Mission" on page 68.

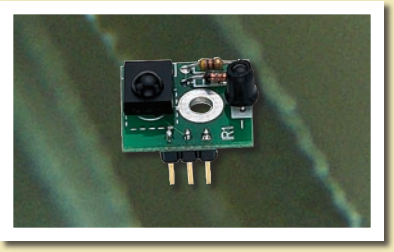
Flexiforce Sensor Demo Kit; #30056; $25.00
The Flexiforce is a single element pressure sensor that measures force between two surfaces. The active sensing area is a .375" diameter circle at the end of the sensor. The Flexiforce has an ideal output for A/D conversion - 0 V is no force and 4.2 V is 100 lbs. The RCTIME command may be used with a LOOKUP table or calibration formula to execute some math to make the output useful. The kit includes a 220 ohm resistor, 0.1 uF and 0.01 uF capacitors, Flexiforce sensor, and printed documentation.

DS2760 Thermocouple Kit; #28022; $29.95
Thermocouples provide a low-cost, reliable means of measuring temperature over a wide range. The Parallax DS2760 Thermocouple Module provides a complete connection between the BASIC Stamp microcontroller and a standard thermocouple element. Features: 1-Wire interface; Cold Junction measurement: 0° C to +127° C (0.125° C resolution); and Low power consumption.

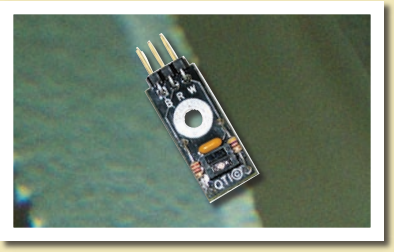




DS1620 Temperature Sensor; #604-00002; $6.80
The DS1620 is a complete digital thermometer on a chip, capable of replacing the normal combination of temperature sensor and analog-to-digital converter in most applications. The DS1620 is able to measure temperature in units of 0.5° Centigrade (C) from -55° C to +125° C. [In Fahrenheit (F), units of 0.9° F and a range of -67° F to +257° F.]



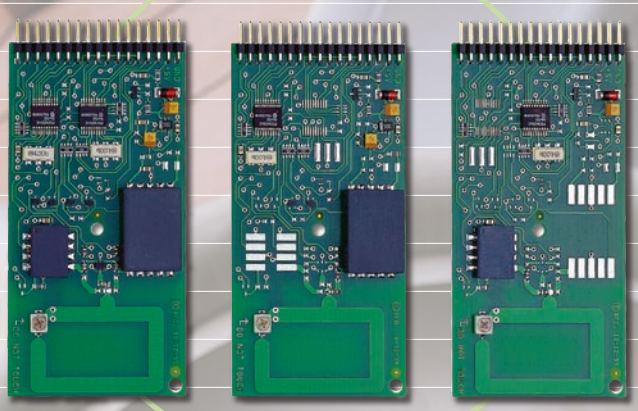
SSIR Detector; #28019; $14.95
Also known as Swanson Sensors, this infrared emitter/detector consists of an infrared LED and 38 kHz modulated receiver. Using example code from the SSIR manual, this device is easily used for object detection up to a distance of 1 foot or more. The current draw is 2.6 mA. Note: Due to the single I/O pin interface this device can not be used for distance detection.



QTI Sensor; #555-27401; $5.95
The QTI Sensors were originally meant to sense the outer rim of a SumoBot ring; however these little line sensors can serve other purposes. The Parallax QTI sensor uses a QRD1114 infrared (IR) reflective sensor to determine the reflectivity of the surface below it (dark surface = low; light surface = high).

RF Modules

for your next wireless task

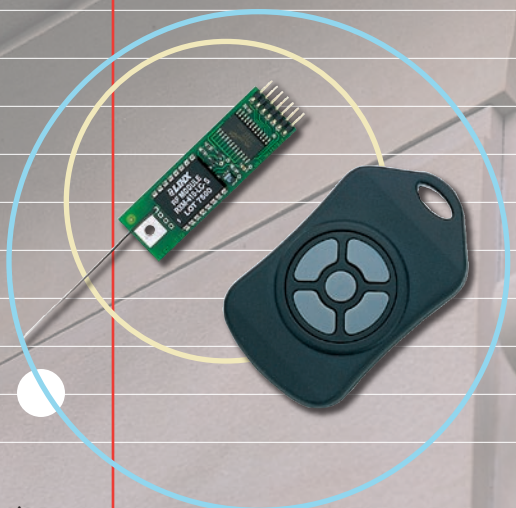


The 3 RF solutions below all include built-in RF noise filtering, a high performance loop antenna, and don't require a ground plane. Data transmission is in encoded or switch mode which offers you the greatest flexibility for handling information. The range is approximately 250 feet and they communicate at 9600 baud.

- **433 MHz RF Transmitter; #27986; $59.00** - This SIP/Dual-Mode Transmitter is designed to work with the RF Receiver.
- **433 MHz RF Receiver; #27987 ; $89.00** - This SIP/Dual-Mode Receiver communicates with the RF transmitter above.
- **433 MHz RF Transceiver; #27988; $119.00** - Two Transceivers are required to complete bidirectional communications. Each unit may send or receive, but not at the same time. This combination provides the most flexibility for your RF project.

If you don't need the range of the previously mentioned RF devices, then this set of 3 RF modules may be the perfect fit. With a range of 150 feet, these compact and easy-to-connect modules allow you to send data back and forth between 2 or more BASIC Stamp modules. Each unit contains a solid antenna (2").

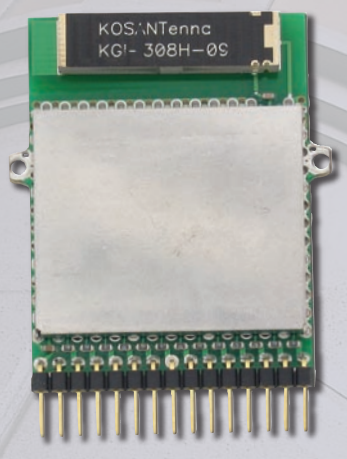
- **433 MHz SIP/Solid Antenna Receiver; #27995; $59.00** - Allows you to receive raw data at 9600 baud; compatible with transmitter below.
- **433 MHz SIP/Solid Antenna Transmitter; #27996; $39.00** - Capable of sending raw data to the above receiver.
- **433 MHz SIP/Solid Antenna Transceiver; #27997; $95.00** - This RF module gives you the ability to send and receive raw data. Bidirectional communication requires 2 transceivers.



The RF Keychain Transmitter and Receiver works just like the small keychain available with today's cars. Range is 150 feet (line of sight).

- **418 MHz Receiver (SIP/wire/sw); #28004; $69.00** - This is a 7-pin module that plugs into your Parallax programming board (i.e. Board of Education). Transmission range is 150 feet. The pair is used to send and receive up to five remote control commands.
- **418 MHz Keychain Transmitter (KC/loop/sw); #28005; $20.00** - This device operates in switch mode - press a button on the keychain transmitter and the receiver pin goes "high". The transmitter has five buttons and the receiver has five outputs. The pair is used to send and receive up to five remote control commands.

Advanced RF Modules



SureLink Transceiver Module; #30065; $99.95

The SureLink module is an RF wireless transceiver operating at 900 MHz. This module and the QuickLink Demo board are designed to comply with FCC Part 15 Rules and Regulations.

Since the SureLink module is a transceiver, you will need to have 2 SureLink Modules for bi-directional communication. The product documentation outlines 3 modes of operation (Demo Mode, Cable Link Mode, and Stand Alone Mode) which allows you to set the appropriate configuration for your application.

QuickLink Demo Board; #30066; $89.95

The QuickLink Demo Board is designed to work specifically with the SureLink Transceiver. This Demo Board and the SureLink Module are designed to comply with FCC Part 15 Rules and Regulations.

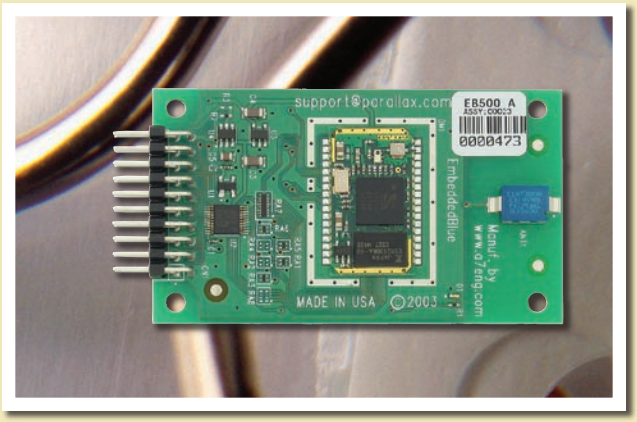
Key Technical Features of the SureLink Module and the QuickLink Demo Board:

- Data DTE transfer rates of 1200 Baud to 115 k Baud
- RF Transfer rates from 48000 bps to 76.8 kbps
- Range up to 1000 feet (dependent upon environment)
- Scratchpad flash memory of 128 bytes
- Long battery life of up to 5 hours of operation
- 16 run-time selectable channels
- Data Encryption mode allows you to send data discreetly (128-bit key code)
- Built-in error correction for all data transmissions
- Free PC software (available online at www.parallax.com)

Bluetooth technology for the BASIC Stamp!

EMBEDDEDBLUE EB500 TRANSCEIVER APPMOD; #30068; $99.00

The EmbeddedBlue eb500 Transceiver AppMod provides standard Bluetooth connectivity for BASIC Stamp applications without the need for detailed Bluetooth knowledge. Engineers, educators, hobbyists, and OEMs can take advantage of advanced wireless connectivity with this easy to use module. It is designed and manufactured by A7 Engineering based on specifications provided by Parallax, the exclusive distributor of the EmbeddedBlue Application Module. The communication potential with Bluetooth is rather amazing when compared to proprietary RF, especially with the proliferation of Bluetooth enabled hardware devices. The documentation includes a detailed overview and sample source code for EmbeddedBlue projects with the BASIC Stamp 2 series, including interfacing to standard Bluetooth devices.



Technical Specifications include:

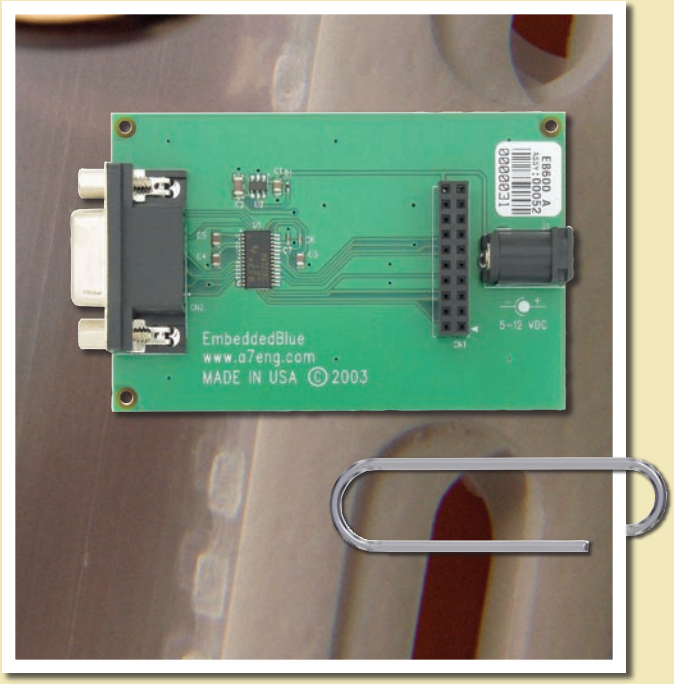
- Frequency: 2.4 GHz FHSS (Frequency Hopping Spread Spectrum)
- Transmit Power: 4 dBm (max) class 2 operation
- Open field range: 300 feet
- Bluetooth: Compliant with the v1.1 standard
- Receiver Sensitivity at 0.1% BER: -85 dBm

Key Features:

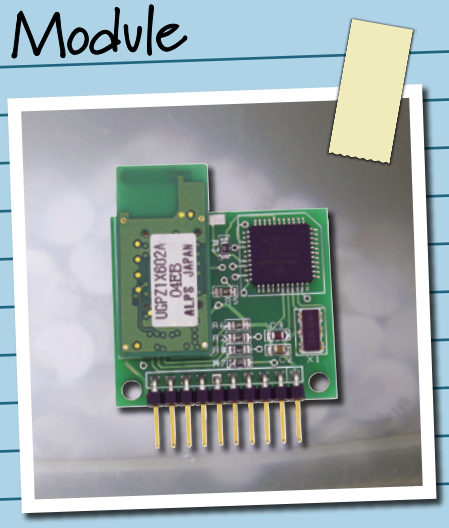
- Easy integration with the BASIC Stamp 2 series modules for point-to-point communication
- Seamless connectivity with standard Bluetooth devices
- Perfect for wireless cable replacement

EMBEDDEDBLUE EB600 PC ADAPTER; #30069; $99.00

The eb600 PC Adapter in conjunction with an EmbeddedBlue Transceiver AppMod provides Bluetooth connectivity for devices containing an RS-232 serial port without having to know the details of Bluetooth technology. All customers can take advantage of advanced wireless connectivity with this Bluetooth setup. The eb600 PC Adapter hosts a Parallax AppMod header into which an eb500 is inserted. The eb600 PC Adapter connects to a serial port on devices such as Personal Computers, printers, or any device having an RS-232 serial port. The eb500 module provides a point to point connection much like a standard serial cable. Connections are made dynamically and can be established between two eb500 modules or an eb500 module and a standard Bluetooth v1.1 device. Devices can be dynamically discovered and connected in an ad-hoc manner. If, however, the eb600 is attached to a dumb device, such as a printer or terminal, the eb500 will only be able to accept connections, not initiate connections with other Bluetooth devices.



FlexiPanel Bluetooth Module



#30070; $99.00

The FlexiPanel Module allows any BASIC Stamp 2 module (BS2, BS2e, BS2p24, BS2p40, BS2pe) to create an operator interface on remote devices such as a Pocket PC and other computers via a Bluetooth link. The key to FlexiPanel technology is the standardized communication link (patents pending). The FlexiPanel software on remote device is free and does not need to be customized for your device. FlexiPanel modules, processors and licenses allow electronic devices to communicate with all remote devices running FlexiPanel software. The FlexiPanel Module manages the user interface features for you.

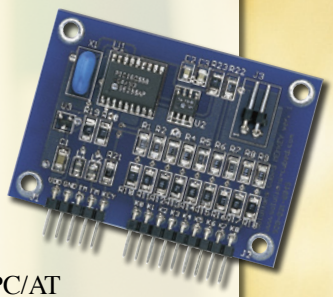
The FlexiPanel module acts like a memory device which stores all the controls that appear on the remote FlexiPanel operator interface. The BASIC Stamp 2 module of your choice (the host controller) communicates via TTL-level serial and can read or write values as desired. If a remote device comes in range, the FlexiPanel module transmits the control information to it and the controls are displayed. If the controls are modifiable, the user may make adjustments and transmits these back to the FlexiPanel module.

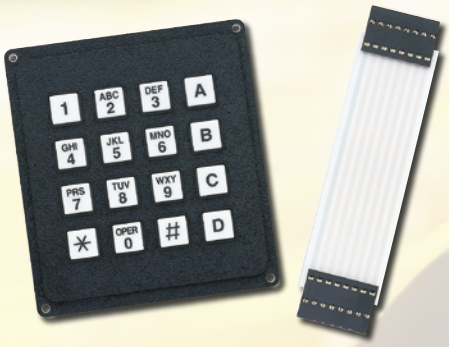
The FlexiPanel is manufactured and designed by FlexiPanel Ltd. (www.flexipanel.com) of Paris, France. Parallax is proud to be the worldwide exclusive distributor of the FlexiPanel module.

Note: Due to the advanced nature of the software and documentation, it is only available in the Downloads area from the FlexiPanel web site at ***www.flexipanel.com***.

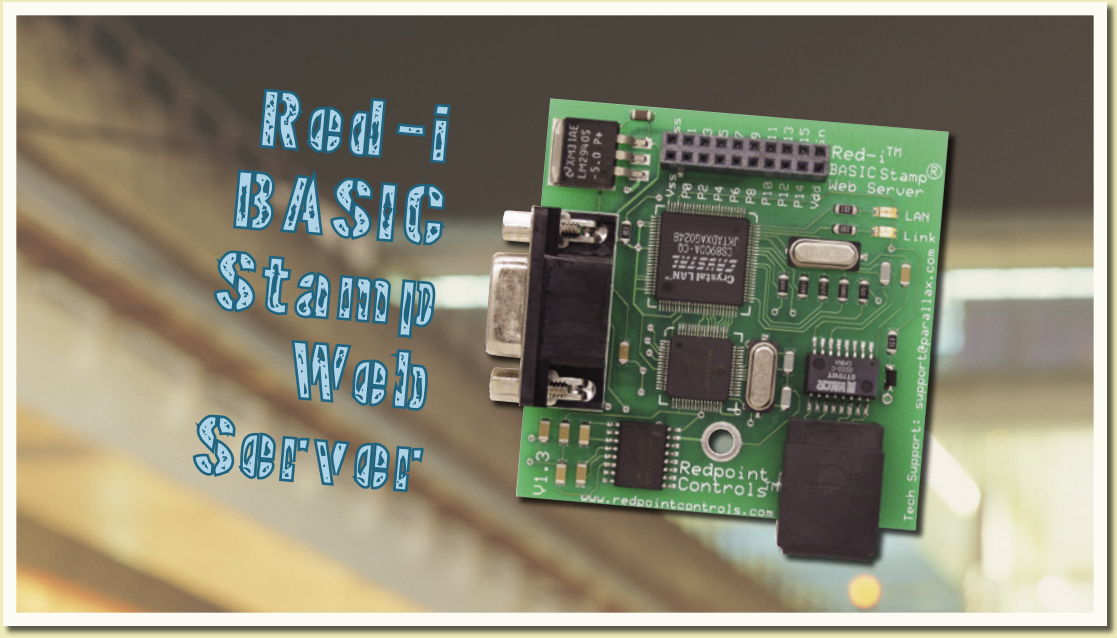
MAKE THE CONNECTION

Stamp Modem AppMod; #29116; $99.00
The Stamp Modem provides a functional and easy-to-use modem interface to a BASIC Stamp module. The Stamp Modem is based on the Cermetek CH1786, an FCC part 68 pre-approved modem with a V.22 bis full AT command set. Stamp Modem is connected to Parallax boards on the 2x10 AppMod connector and secured with a screw and standoff. Power, ground, and BASIC Stamp I/O connections are conveniently connected through this header. This product takes care of all of the connections you need to use a modem reliably and it's small, too. The Stamp Modem requires a Board of Education carrier board (#28150), or Super Carrier Board (#27130) *not included*.

MEMKey; 27963; $39.00

Use this Matrix keypad decoder to add user input to your BASIC Stamp. The MEMKey is a programmable keypad encoder which supports both a simple serial communication protocol and the standard PC/AT communication protocol using a matrix keypad as large as 4x5. The MEMKey has 64 bytes of EEPROM and will retain features even with power removed.



4x4 Matrix Keypad; #27944; $19.00; 4x4 Matrix Keypad Cable; #27943; $9.00
Recommended keypad for use with the MEMKey. This 4x4 Grayhill keypad has an operational life of 3 million cycles.



#30005; $99.00
The Red-i BASIC Stamp Web Server is a fully functional microcontroller-based web server and email client. Ethernet connectivity and the ability to send email messages to any account are the key features of this device. The Red-i BASIC Stamp Web Server is very easy to interface to your current applications since it plugs into the AppMod header as found on such programming boards as the Board of Education carrier board, BS2p Demo Boards, SumoBot Board, Toddler Board, and Super Carrier board.

Our online Downloads section contains a 14 page instructional manual, and a 1 page Quick Start Guide to make it easy for you to get your BASIC Stamp projects connected to the web! Read the manual to learn more about the following topics: Configuration Software, Downloading Files, Web Interface, Sending Email, Stamp-to-Stamp Messaging, Registers, Examples, and Electrical Specifications.

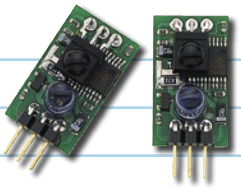
Here is a list of the features:

* 10 Mbps 10-BaseT Ethernet connection
* Serve up to 100 Kbytes of web files (i.e. htm, txt, zip, jpg)
* Update the contents of any web page
* Receive data from HTML Form POST messages
* 1200 bytes of accessible RAM to store web variables
* Send email messages
* Stamp-to-Stamp Communication over the internet via UDP

Important note: In addition to purchasing the Red-i BASIC Stamp Web Server, you will need the following:

* BASIC Stamp 2 module or higher
* BASIC Stamp programming board with AppMod header
* RJ-45 Ethernet cable
* DB9F-DB9M COM cable

IR Buddy Pair; #28016; $39.00



The Infrared Buddy is a handy communication companion for your BASIC Stamp projects. The IR Buddy lets you send and receive data and remote control commands from a single BASIC Stamp pin. The IR Buddy's on-chip 8-byte buffer holds data and remote control commands so your program doesn't have to wait around for them to arrive.

Stache Field Programmer; #27330; $99.00

The Stache is a palm-size module for loading up to 15 PBASIC programs into any model of BASIC Stamp 2 Microcontroller under field conditions. Any PBASIC program you write on a PC can be downloaded into the Stache, after which you can transport the Stache to another location and deliver the program to your BASIC Stamp module with a press of a button. The product was created by EME Systems of Berkeley, California. EME Systems has additional technical data on the product at **www.emesystems.com**, but of course the Stache product is shipped with complete user documentation.

The Stache is essential for anyone who sets up BASIC Stamp-based equipment in difficult locations, outdoors, in factories, schools, competitions, or even on the other side of a room - anywhere you do not want to carry or operate a PC. There are no cables to attach, no software to boot, no ports to configure, and no need to have on-site personnel or customers see your program code. The Stache can be operated by untrained personnel, working in less than ideal conditions, where the process of loading a program into the BASIC Stamp microcontroller must be fast, foolproof and secure.

X-10 Powerline Interface; #27940; $20.00 *(not pictured)*
The X-10 Powerline Interface provides the necessary circuitry to connect BASIC Stamp 2 I/O lines to your AC power system. This interface is necessary if you want to transmit X-10 signals over the wiring in your house or business. *For use in the USA and Canada only.*

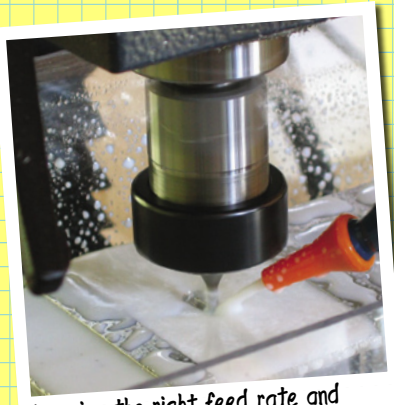
X-10 Appliance/Lamp module (on/off only); #27941; $18.00 *(not pictured)*
This 3 pronged module can be used to control lamps and appliances, but does not support dimming with lamps.

X-10 Lamp module (on/off and dimming); #27942; $16.00 *(not pictured)*
This 2 pronged module can only be used with lamps and it supports dimming functions.

Mission:

Measure Milling Machine Spindle RPM using a Melexis 90217 Hall-Effect Sensor

Measuring RPM on radio-controlled helicopters, robotic wheels and textile manufacturing machinery are common tasks. Depending on the application, using a hall-effect sensor could require mounting two or more magnets to a spinning disk, but if a magnet can be mounted to the center of rotation then the Melexis 90217 sensor can be used to detect a simple change in magnet force with each revolution.

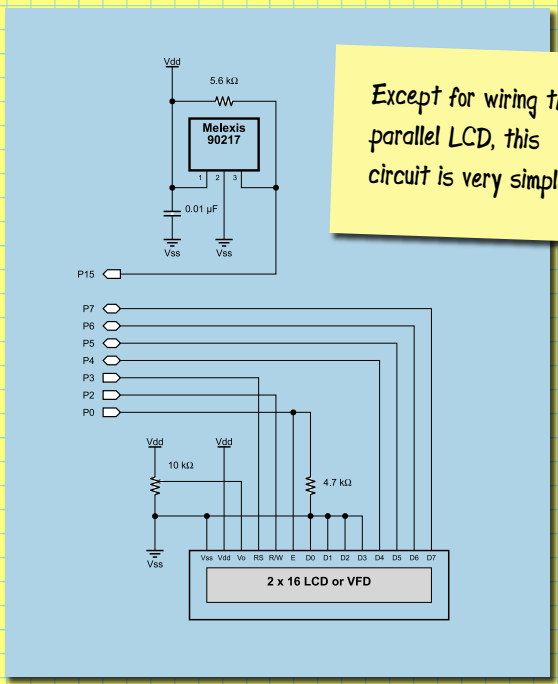


Knowing the right feed rate and RPM on your CNC mill helps produce the best parts.

CNC milling machines – particularly the desktop variety – often need some spindle RPM feedback for getting the right feed rate for cutting aluminum. It makes the difference between a smooth, clean robotic part or a galled, over-heated razor-sharp hack.

The Wabeco CNC machines (distributed in the U.S. by www.mdaprecision.com) have easy access to the spindle's center of rotation where a magnet can be mounted. Simply remove the cap, drill or machine a hole in the middle for a magnet and position the Melexis 90217 a few millimeters from the top and you'll have a very reliable, non-contact RPM sensor. This example used a Noritake 2x16 VFD with a bargraph for display. Any BASIC Stamp 2 series module can be used for this project. Example code to count RPMs:

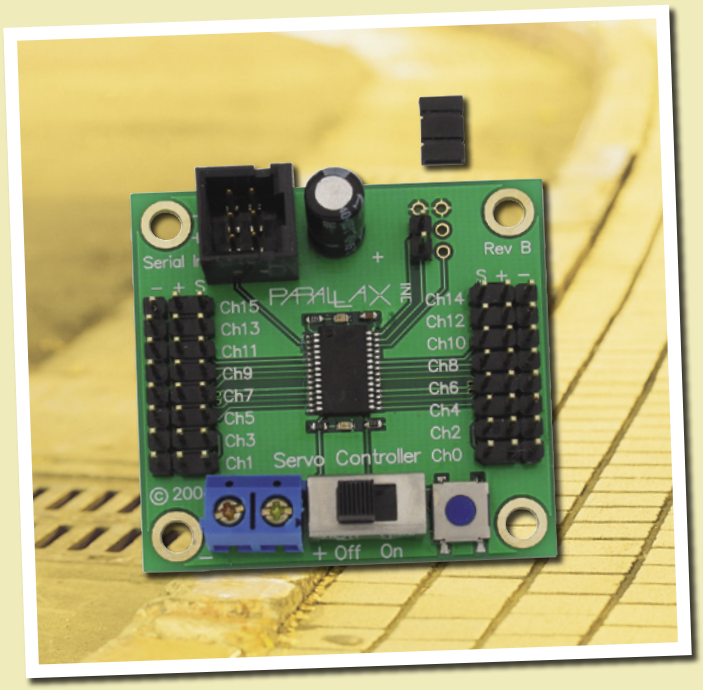
```
COUNT SpeedIn, 1000, pulses     ' count RPMs for one second
```



Except for wiring the parallel LCD, this circuit is very simple.

Bargraph display showing RPM and percent of maximum speed (7500 RPM on this machine).

This entire application with BASIC Stamp source code is available for download from www.parallax.com.



Parallax Servo Controller

#28023; $39.00

The Parallax Servo Controller (PSC) controls up to 16 servos, and may be networked together so that two PSC's can control 32 servos using a single I/O line. Luckily for you and your Parallax microcontroller, the PSC manages all of the servo pulses which enables your BASIC Stamp module or Javelin Stamp module to take care of more important aspects of the application. There is no doubt that you will appreciate the value of this device and enjoy the easy to use advanced features (selectable baud rate, servo ramping, position reporting).

Servos...

Standard Servo; #900-00005; $12.00
The Parallax Standard Servo is made exclusively by Futaba. Servos may be controlled directly from a BASIC Stamp I/O pin by using the PULSOUT command. ~180° range of motion; 4.5 - 9.5 VDC.

Continuous Rotation Servo; #900-00008; $13.00
The Parallax Continuous Rotation Servo is made for us exclusively by Futaba. It's recommended for robotics projects and includes an adjustable potentiometer port to manually center the servo. Servos may be controlled directly from a BASIC Stamp I/O pin by using the PULSOUT command. The servo is an S148 that has been modified for continuous rotation. 4.5 - 6.5 VDC.

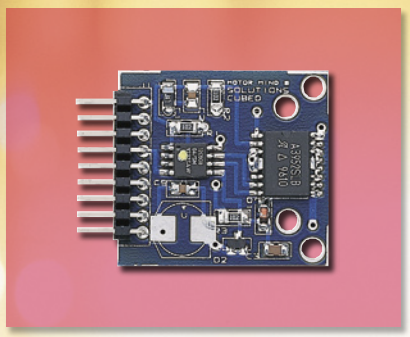
Stepper Motor...

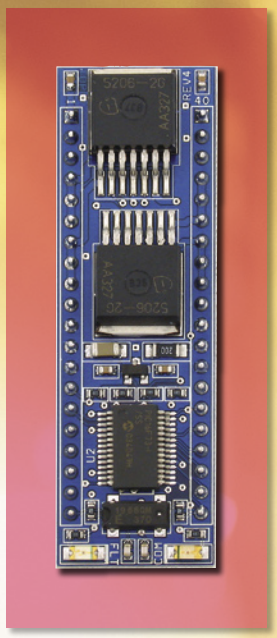
Stepper Motor; #27964; $12.00
Stepper motors are ideal for precision control, and may be easily operated in forward and reverse directions at varying speeds. The four-phase motor has a step angle of 3.6 degrees and requires 12 VDC for operation.

Visit page 58 for information on our Motor Controllers.

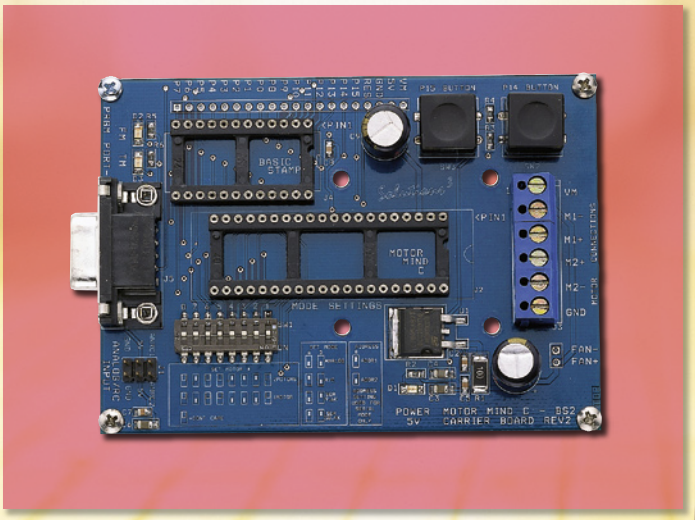
DC Motor Control

Motor Mind B; #27961; $29.00
The Motor Mind B provides DC motor speed and directional control up to 30 VDC. Works with a one or two-wire, 2400 baud serial interface. Optional tachometer to read inputs up to 65,528 Hz. The module supports peak currents as large as 3.5 A and continuous currents of 2 A, and has an external emergency override input brake that shuts down the motor. *Size is 4.1 W x 3.4 L x 1.0 D cm* (9-pin SIP package). Includes heat sink.





Motor Mind C;
#30001; $55.00
The Solutions Cubed Motor Mind C answers many customer requests for improvements to their popular Motor Mind B. The Motor Mind C has been designed to function as a versatile DC motor control system for controlling one or two motors. The module is ideal for use in small robotics projects for controlling two-wheel axles.



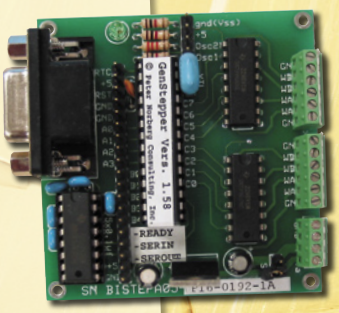
Motor Mind C BASIC Stamp 2 Carrier Board;
#30002; $49.00
The Motor Mind C Carrier Board was designed to simplify connectivity to and ease control of the Motor Mind C. It's the easiest way to implement application notes published by Solutions Cubed using our BASIC Stamp modules. Includes one socket for any 24-pin BASIC Stamp module and one socket for the Motor Mind C.

From our customers...

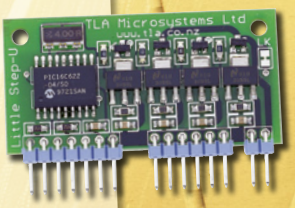
"First let me say thank you so much for your generous and kind service on the day I called. Even in this age of 'service is king' I still don't run into many organizations that know how to deliver it as well as your example. I am now a staunch supporter of Parallax and your products and will do what I can to spread the word. Oh, and your web site is second to none. The depth of information and resources available plus the ease of navigation makes it a joy to experience. It is clear beyond any doubt that Parallax has a wholehearted focus on education and knows what they are doing. All I can do is echo what I am sure you have heard innumerable times and that is keep up the awesome work. My sons will enjoy hours of learning and will be way ahead of others because of your products."

James Fisk
Indianapolis, Indiana

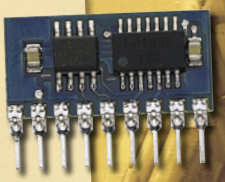
ADDITIONAL MOTOR CONTROL



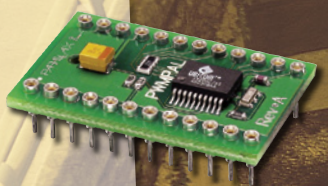
Bi-Step Motor Controller A06; #30004; $99.00
The BiStep Motor Controller includes the capability of driving one or two stepper motors, each of which being either unipolar (4-pole) or bipolar (2-pole). This unit is a good choice for those designing products using linear actuators, especially since the microstepping features will reduce noise levels and can increase positional accuracy by a significant amount.



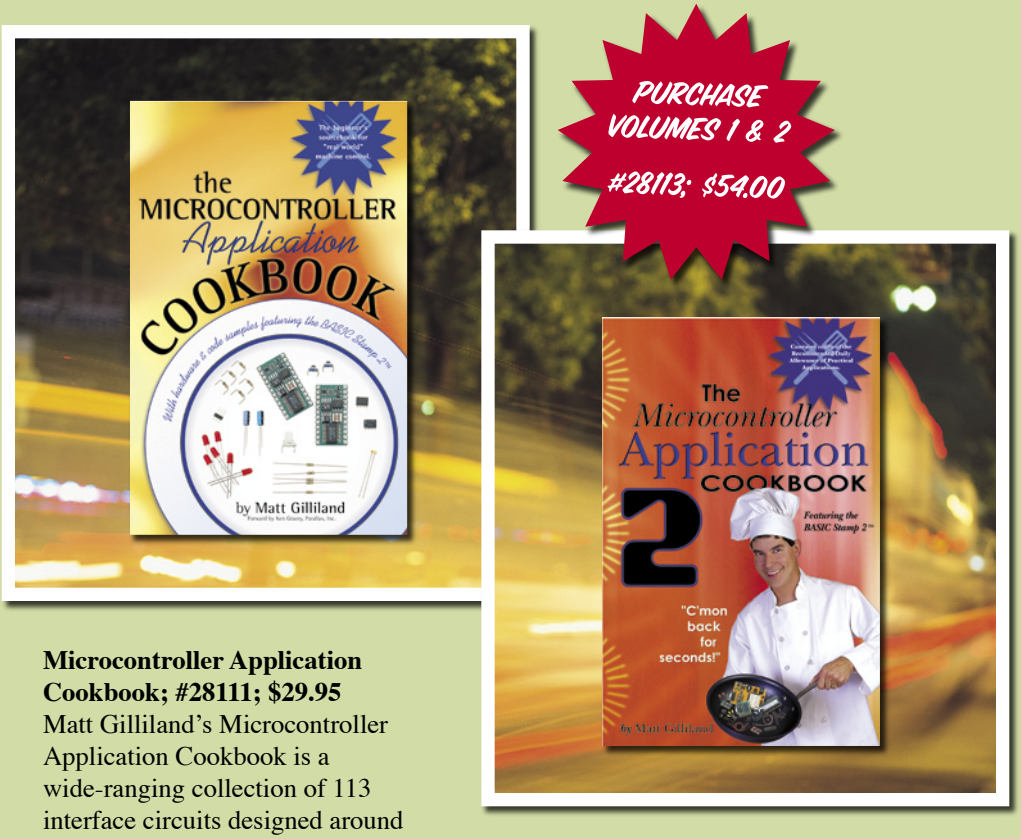
Little Step-U Motor Controller; #27938; $69.00
The Little Step-U Motor Controller is a complete, serially controlled drive system for unipolar stepper motors. Using an intelligent module allows the host system to concentrate on the task at hand while the Little Step-U performs all calculations and operation of the motor. The desired operating speed, ramp time and drive mode can be configured once and then a single command used as required, to move to fixed or relative positions. While the motor is in motion, a BUSY output is active and the movement can be optionally interrupted by one of the two external inputs.



Micro Dual Serial Motor Controller; #30052; $23.00
Using one serial output from the BASIC Stamp module, this motor controller can independently set each motor to go forward or backward at any of 127 speeds. To control additional motors, you can connect multiple motor controllers to the same serial line. The Pololu controller supports a low range of voltages and comes pre-assembled. It measures only .9 x .45 inches and is compatible with all BASIC Stamp microcontrollers. In addition to the Pololu controller, you will need a BASIC Stamp module, programming board and motor(s).



PWMPAL; #28020; $29.00
The PWMPAL is an intelligent peripheral that adds up to four PWM output channels and up to four control/counter input channels to the BASIC Stamp microcontroller. A BASIC Stamp module is required to use the PWMPAL and is sold separately.



Microcontroller Application Cookbook; #28111; $29.95
Matt Gilliland's Microcontroller Application Cookbook is a wide-ranging collection of 113 interface circuits designed around the BASIC Stamp 2 module. For somebody getting started with microcontrollers, designing the circuit can be the most challenging part of building a project. Sifting through timing diagrams trying to figure out how to interface an A/D converter or controlling a high-voltage circuit with a solid state relay can be a challenge.

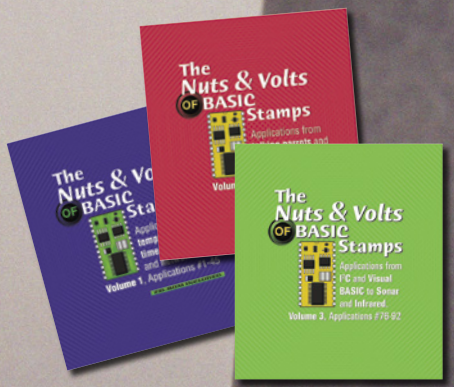
With this book you'll be able to assemble a circuit casserole from a collection of ingredients. Suppose you wanted to automate your greenhouse. The book includes examples of controlling solenoid valves with solid state relays (water distribution), simple DC-motor control with H-bridge circuits (roof vents), linear temperature sensors, humidity sensors and photocells. Cook up an application that waters the plants in the morning, opens the greenhouse vents when it's too hot or humid and powers the microcontroller from solar energy! Published by Woodglen Press - 248 pp.

Microcontroller Application Cookbook Vol. 2; #28112; $29.95
Matt Gilliland's Microcontroller Application Cookbook 2 builds on the success from the first culinary book with a new collection of 154 interface circuits designed around the BASIC Stamp 2 module. Many of our customers have all of the necessary BASIC Stamp hardware but are hungry for additional project ideas and circuits. Well, Matt has delivered a sequel that won't leave you disappointed! Published by Woodglen Press - 248 pp.

BASIC Stamp Manual; #27218; #34.95 *(pg. 07)*
Complete PBASIC reference guide for BASIC Stamp modules. This manual details command syntax and examples with circuits you can easily build.

StampWorks Manual; #27220; #49.00
A well-written collection of 31 experiments that will teach you first class BASIC Stamp programming. Written by popular Nuts & Volts "Stamp Applications" columnist Jon Williams. *See pg. 08 for information on the complete StampWorks Programming Kit.*

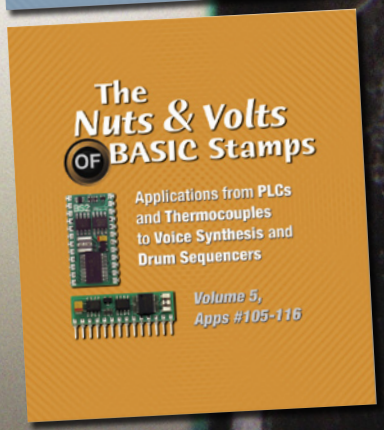
BASIC Stamp Applications



The Nuts & Volts of BASIC Stamps are a favored Parallax technical pick and are a tremendous informational resource for all PBASIC programming projects. Note: Volumes 1, 2 & 3 are only available as free downloads from our website or from the Parallax CD.

Limited Quantities left of the printed version!

Nuts & Volts of BASIC Stamps Volume #4; #70010; $14.95
The fourth volume includes applications from GPS and MIDI to the BASIC Stamp 1 module and PBASIC 2.5, this text consists of a year's worth of BASIC Stamp applications columns published in Nuts & Volts magazine. This 234-page book includes explanations, schematics and source code for numerous projects. Source code for these projects may also be downloaded from the Nuts & Volts of Stamp Applications section of our web site, or from the Parallax CD.

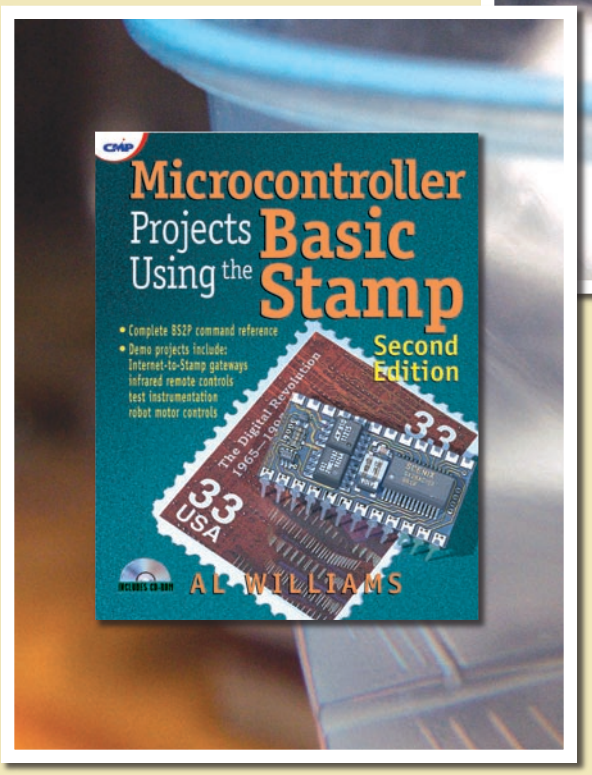


Nuts & Volts of BASIC Stamps Volume #5; #70015; $14.95
We just keep on providing you with more applications! Volume 5 contains the entire collection of Nuts & Volts Stamp Applications columns for 2004. Includes popular columns that highlight topics such as IR distance measuring for Halloween props, remote control with Bluetooth, a drum sequencer, using the Javelin Stamp as the brain for a PLC, and more.

www.parallax.com
toll-free 888-512-1024

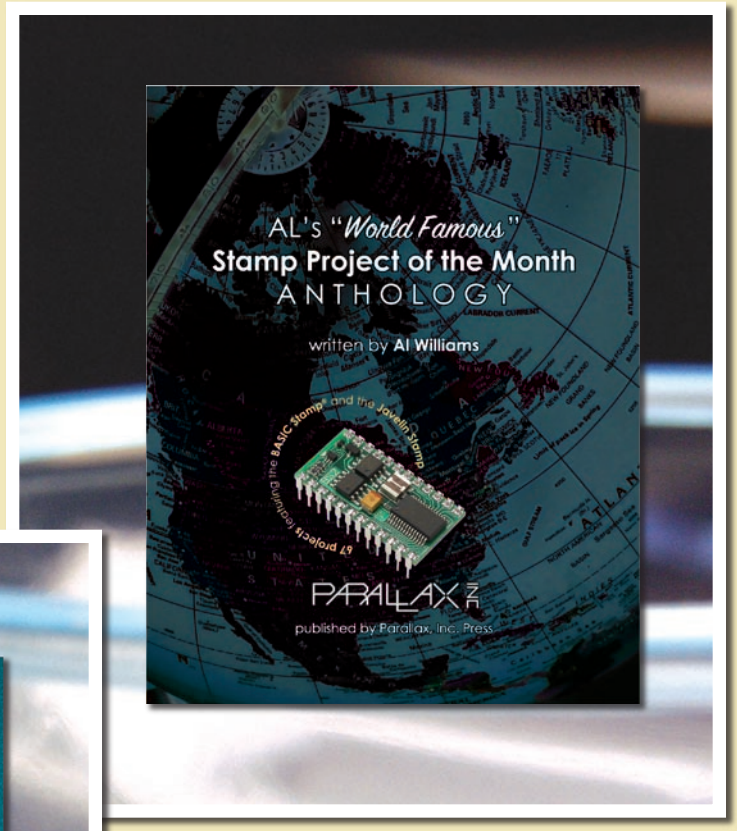
BASIC Stamp programming books written by Al Williams

Engineer and author Al Williams is a long-time Parallax BASIC Stamp enthusiast and frequent poster in the Parallax Forums (page 28-29). He has written books and columns on both BASIC Stamp programming and programming with the Ubicom SX microcontroller (page 78).



Microcontroller Projects Using the BASIC Stamp; #27952; $44.95

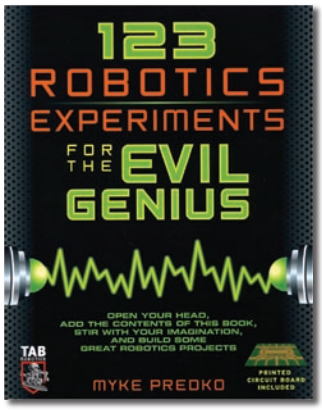
The second edition with a section devoted to the BS2p is a valuable resource for all BASIC Stamp programmers. Due to the range of topics covered, this book is recommended for beginners and advanced users alike. Al Williams' definitive guide will assist you with building your own electronic game, a robot, or an automated manufacturing process. All you need to get started is a PC, BASIC Stamp module, a cable, and programming board. Each chapter includes exercises and source code. ISBN 0-87930-587-8 by Parallax, Inc. Publishing (407 pp.)



Al's "World Famous" Stamp Project of the Month Anthology; #70013; $19.95

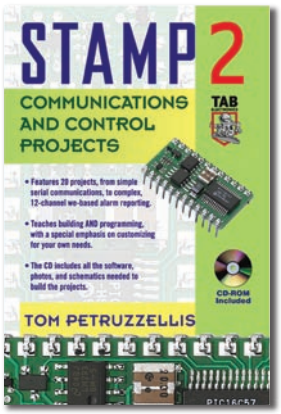
Since December 1997 BASIC Stamp enthusiast and engineer Al Williams published a "Stamp Project of the Month" column on his web site. These columns were replaced each month with a new one and the archives were maintained by Al Williams off-line. The entire collection of 67 columns is available in the printed book Al's "World Famous" Stamp Project of the Month Anthology.

Al's columns provide detailed examples of BASIC Stamp applications with popular electronic and hardware interfaces. From time to time, Al also featured projects with the SX chip or Javelin Stamp module. Through an agreement with Parallax, Inc. Press, Al Williams is making the collection of columns available in this printed book. For many of the columns Al created companion PC/PDA/internet software to communicate with the BASIC Stamp module through the PC's serial port. All of these programs, plus the BASIC Stamp source code files, are available for download at www.parallax.com. ISBN 1-928982-25-5 by Parallax, Inc. Publishing (420 pp.).



123 Robotics Experiments for the Evil Genius; #70012; $24.95

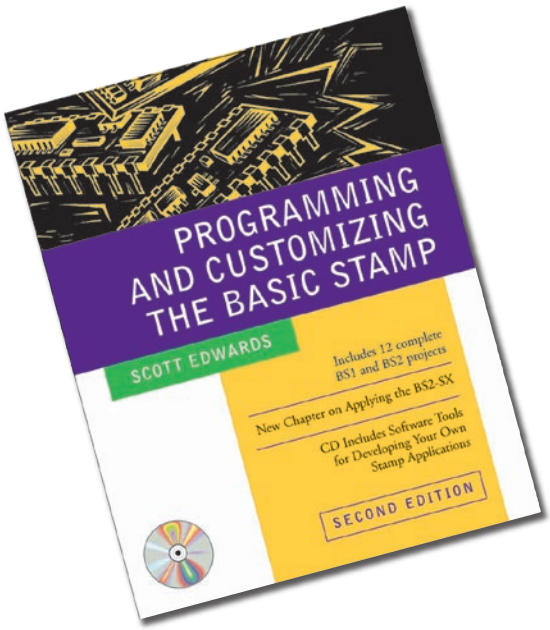
Parallax is excited to present you with this book by robotics guru Myke Predko (published by McGraw-Hill). Experiments #76-123 feature the BASIC Stamp 2 module! BS2 related experiments include the following topics: Variable and Data Types, ASCII Characters, Conditionally Looping, Musical Tone Output, Resistance Measurement, Sensors, Motor Control, and more.



Stamp 2 Communications and Control Projects; #70004; $19.95

With the help of detailed schematics, informative photos and an insightful CD-ROM (included with the book), Stamp 2 Communications and Control Projects leads you step by step through 24 communications-specific projects. As a result, you'll gain a firm understanding of the BASIC Stamp 2 microcontroller and its programming methodologies- as well as the ability to customize it for your own needs and operating system.

...more books



Programming and Customizing the BASIC Stamp; #27956; $34.95

Programming and Customizing the BASIC Stamp is a friendly introduction to working with the BASIC Stamp microcontroller. Covers a few fundamentals of circuitry and electronics including Ohm's law. The book presents ten complete projects ranging from a simple dial-up timer to a sophisticated network terminal with display and keypad. Each project is a learning experience, with common-sense explanations of the whys and hows of the circuits and techniques used. The book is a great start if you have no programming or electronic skills. Scott Edwards also authored the original Nuts & Volts (http://www.nutsvolts.com) "Stamp Applications" column. Includes CD ROM. 380 pages.

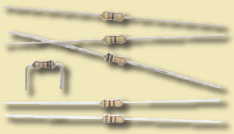
Download it at
www.parallax.com

The downloads section on our web site is one of the most highly visited sections due to the vast amount of available software and documentation. The most downloaded item is the BASIC Stamp Windows editor since we continually offer the latest feature-rich version for free downloading. The Stamps in Class guides are also in the top 5 as well as the BASIC Stamp manual. If you're constantly seeking out technical information on a certain product or if it's 2 a.m. and you want to read 500+ pages of Nuts & Volts "Stamp Application" columns, then you need to visit the Downloads section at parallax.com. Our goal is to provide you with as much information as possible whether you're reviewing a product prior to purchase or if you're deep in development. If you need technical assistance feel free to e-mail us at support@parallax.com.

Here is our list of the top 11 downloads:

11. StampDAQ software
10. *Industrial Control* text
9. HomeWork Board documentation
8. Nuts & Volts "Stamp Application" Columns
7. *Applied Sensors* text
6. StampPlot software
5. *What's a Microcontroller?* text
4. Boe-Bot Video Gallery
3. *Robotics with the Boe-Bot* text
2. *BASIC Stamp Manual*
1. BASIC Stamp Windows Editor

RESISTORS



resistor - *noun* : an electrical device that resists the flow of electrical current.

10 Ω resistor	#150-01000	$0.60
100 Ω resistor	#150-01011	$0.15
1 K Ω resistor	#150-01020	$0.20
10 K Ω resistor	#150-01030	$0.20
100 K Ω resistor	#150-01040	$0.15
15 K Ω resistor	#150-01530	$0.15
2 K Ω resistor	#150-02020	$0.15
20 K Ω resistor	#150-02030	$0.15
220 Ω resistor	#150-02210	$0.20
270 Ω resistor	#150-02710	$0.15
470 Ω resistor	#150-04710	$0.20
4.7 K Ω resistor	#150-04720	$0.20
resistor heater	#800-00028	$8.60

CAPACITORS

capacitor - *noun* : a device giving capacitance and usually consisting of conducting plates or foils separated by thin layers of dielectric (as air or mica) with the plates on opposite sides of the dielectric layers oppositely charged by a source of voltage and the electrical energy of the charged system stored in the polarized dielectric.

100 pF capacitor	#200-01010	$0.43
0.01 uF capacitor	#200-01031	$0.15
0.1 uF capacitor	#200-01040	$0.15
0.22 uF capacitor	#200-02240	$0.27
0.68 uF capacitor	#200-06840	$1.50
1 uF capacitor*	#201-01050	$0.75
10 uF capacitor	#201-01060	$0.20
10 uF capacitor*	#201-01062	$0.75
1000 uF capacitor	#201-01080	$0.40
3300 uF capacitor	#201-03080	$1.41

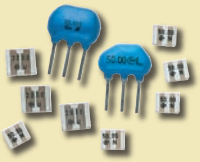
* electrolytic

POTENTIOMETERS

potentiometer - *noun* : a variable resistor with three terminals, the third being an adjustable center terminal; used to adjust voltages in radios and TV sets. Also called: **pot.**

1 K potentiometer	#152-01010	$1.95
10 K potentiometer	#152-01031	$0.95
10 K multi-turn	#152-01032	$2.95
100 K potentiometer	#152-01040	$1.59
100 K solid-state	#152-01041	$4.41
100 K potentiometer	#152-01043	$1.95

RESONATORS



resonator - *noun* : an electrical circuit that combines capacitance and inductance in such a way that a periodic electric oscillation will reach maximum amplitude.

4 MHz resonator	#250-04050	$1.50
20 MHz resonator	#250-02060	$2.48
50 MHz resonator	#250-05060	$1.66
4 MHz resonator*	#250-14050	$1.65
20 MHz resonator*	#250-12060	$1.66
50 MHz resonator*	#250-15060	$1.53

* surface mount

SWITCHES

switch - *noun* : A device used to break or open an electric circuit or to divert current from one conductor to another.

pushbutton	#400-00001	$1.29
tact switch	#400-00002	$1.95
keyswitch	#400-00003	$0.75

optoelectronics

LED (Light Emitting Diode) - *noun* : LEDs are just tiny light bulbs that fit easily into an electrical circuit. But unlike ordinary incandescent bulbs, they don't have a filament that will burn out, and they don't get especially hot. They are illuminated solely by the movement of electrons in a semiconductor material, and they last just as long as a standard transistor.

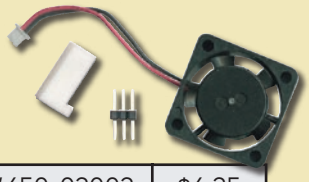
green LED	#350-00001	$0.60
2 mm red LED	#350-00002	$2.50
infrared LED	#350-00003	$1.50
red LED	#350-00006	$0.60
yellow LED	#350-00007	$0.60
photoresistor	#350-00009	$1.95
blue-enhanced photodiode	#350-00012	$6.60
infrared receiver	#350-00014	$3.95
IR transmitter assembly kit	#350-00017	$2.40
infrared transistor	#350-00018	$1.29
green 7-segment LED	#350-00027	$1.50
LED standoff	#350-90000	$0.95
LED light shield	#350-90001	$0.95

transistors

transistor - *noun* : a solid-state electronic device that is used to control the flow of electricity in electronic equipment and consists of a small block of a semiconductor with at least three electrodes; used in a circuit as an amplifier, detector, or switch.

5.1 v zener diode	#153-00001	$0.50
MOSFET 60 v, N-channel (BS170)	#153-00002	$0.50
2N3904 transistor	#500-00001	$0.30
2 A high gain transistor (ZTX1048A)	#500-00004	$3.60
Darlington transistor array (ULN2803A)	#500-00005	$1.50

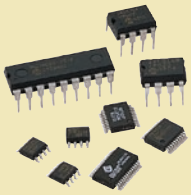
electrical connectors



connection - *noun* : a physical link between two or more points.

20-pin extended header	#450-02002	$4.25
20-pin header	#450-02003	$2.95
3-pin header (long)	#451-00303	$0.45
DB9 male connector	#452-00005	$3.05
RJ11 jack	#452-00006	$1.90
DB9 female connector	#452-00008	$1.40
terminal housing for fan	#452-00017	$0.90
12 VDC brushless fan	#700-00040	$14.90
breadboard	#700-00012	4.95

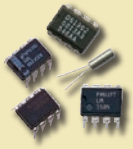
eeproms



EEPROM - *noun* : short for Electrically Erasable Programmable Read-Only Memory. EEPROM is a special type of PROM that can be erased by exposing it to an electrical charge. Like other types of PROM, EEPROM retains its contents even when the power is turned off. Also like other types of ROM, EEPROM is not as fast as RAM.

256 byte EEPROM (93LC56/P)	#602-00005	$3.00
2048 byte EEPROM (24LC16B/P)	#602-00001	$5.00
2048 byte EEPROM (24LC16B/SN)	#602-10007	$5.00
4 K EEPROM (24LC32A-I/P)	#604-00020	$2.40
8 K EEPROM (X25650P)	#602-00008	$10.50
16 K EEPROM (24LC128P)	#602-00013	$5.00

ICs



integrated circuit - *noun* : A complex set of electronic components and their interconnections that are etched or imprinted on a single chip. Also called: **IC**

74HC595 Serial to Parallel	#602-00009	$1.77
74HC595 Parallel to Serial	#602-00010	$0.55
LM358 dual op-amp	#602-00015	$0.51
8-digit LED driver	#603-00001	$20.00
Cermetek modem	#603-00011	$69.00
12-bit A/D converter	#604-00001	$10.50
DS1620 digital thermometer	#604-00002	$6.80
DTMF transceiver	#604-00003	$5.24
DS1302 real time clock (RTC)	#604-00005	$4.98
XTAL 32.768 KHz	#251-03230	$2.25
555 timer IC CMOS	#604-00009	$2.00
10 K digital potentiometer	#604-00010	$3.25
DS1802 thermometer	#604-00013	$4.95
digital potentiometer DS2890	#604-00015	$4.00
digital switch DS2405	#604-00016	$2.00
8-bit I/O expander	#604-00017	$5.18
8-bit A/D & D/A	#604-00018	$7.23
RTC w/RAM (PCF8583PN)	#604-00019	$6.90
MAX1270 12-bit A/D	#604-00026	$29.95
floating point coprocessor (uM-FPU)	#604-00030	$14.95
LM34 temperature probe	#800-00027	$7.90

Hardware

hardware - *noun* : instrumentalities (tools or implements) made of metal.

4/40 screw	#700-00002	$0.60
4/40 nut	#700-00003	$0.15
polyethylene ball	#700-00009	$3.95
flathead screw	#700-00016	$0.10
water pump	#700-00018	$12.50
cable tie	#700-00019	$0.57
2" 4/40 screw	#700-00020	$0.55
Boe-Bot chassis	#700-00022	$23.50
cotter pin	#700-00023	$0.30
4/40 lock nut	#700-00024	$0.12
13/32 rubber grommet	#700-00025	$0.65
9/32 rubber grommet	#700-00026	$0.33
double female 1/2" standoff	#700-00027	$0.36
1/4" 4/40 screw	#700-00028	$0.20
4/40 nylon nut	#700-00036	$1.29
whisker wire	#700-00056	$3.00
1" round standoff	#700-00060	$0.25
7/8" panhead screw	#710-00007	$0.30
3/8" round standoff	#713-00001	$0.43
1 wheel and 2 rubber band tires	#721-00001-721-00002	$3.95

Servos

servo - *noun* : A motor that controls the action of the mechanical device in a servomechanism.

standard servo	#900-00005	$12.00
continuous rotation servo	#900-00008	$13.00
mini servo	#900-00010	$15.00

CABLES AND POWER SUPPLIES

cable - *noun* : A bound or sheathed group of mutually insulated conductors.

power supply - *noun* : a source of electricity for a device, which converts, regulates, and transmits the external power for the device

24 VDC 600 mA power supply	#750-00004	$19.00
12 V 1 Amp power supply	#750-00007	$8.50
9 V 300 mA power supply	#750-00008	$8.00
7.5 VDC 1 Amp power supply	#750-00009	$10.00
AA battery holder	#700-00038	$9.95
AA battery holder with tinned leads	#753-00001	$6.95
parallel cable (BS1)	#800-00001	$19.00
serial cable (BS2)	#800-00003	$10.00
3" jumper wires (bag of 10)	#800-00016	$1.99
16" red jumper wire	#800-00021	$0.69
16" black jumper wire	#800-00022	$0.69
USB-to-Serial adapter	#800-00030	$34.00
10" servo extension cable	#805-00001	$5.95
Blue Dot receptor cable	#805-00004	$11.95
Sharp sensor cable	#805-00005	$2.95
USB Cable A to Mini B	#805-00006	$6.95
USB Cable A to B	#805-00007	$5.95
CB sound generator	#900-00001	$1.95

Easy One-Stop Shopping with the Parallax Component Shop.

Customers have grown to like our Component Shop to obtain additional parts or replacement parts with ease. The items on these Component Shop pages are intended to be available for online ordering from the Component Shop at parallax.com.

Using our web site is the fastest way to order these hard to find components with lengthy part numbers. The Component Shop is located within the "Products" section of our website. By ordering online, you will save on shipping charges. If available, volume discounts are shown online.

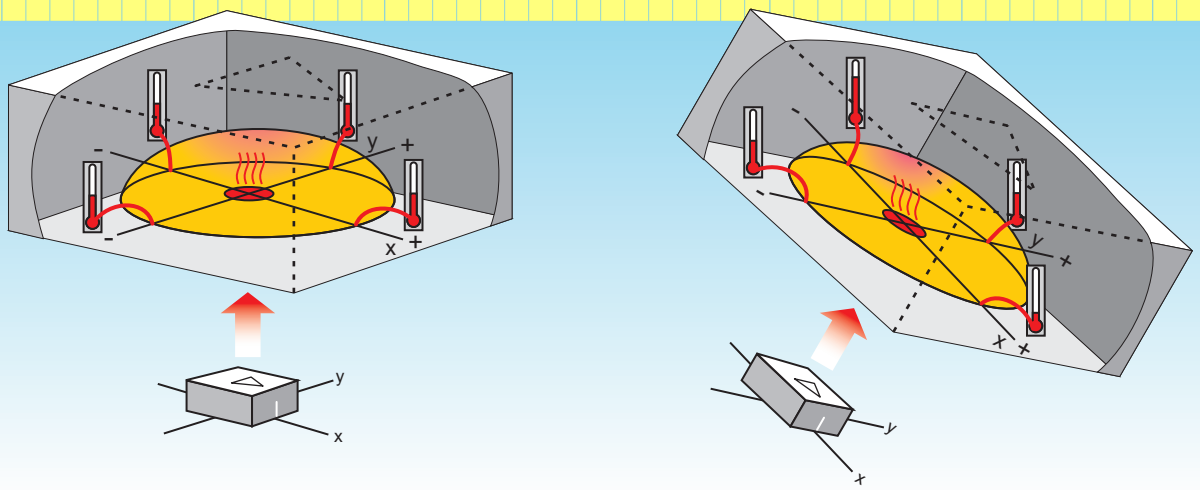
Please Note: We do have a $10 minimum on Component Shop orders.

MISSION CRITICAL:
UNDERSTANDING THE BASICS OF AN ACCELEROMETER

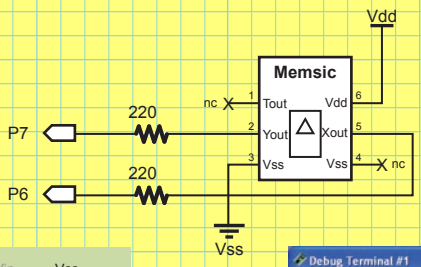
Popular sensor helps your robot figure out which way is up

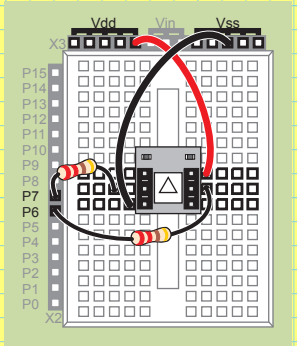
With the ability to detect acceleration, vibration, impact, tilt, and rotation, the Memsic MX2125 accelerometer gets designed into everything from personal electronics to cars to specialized biomedical devices. Parallax's partnership with Memsic (www.memsic.com) brings this widely utilized industry sensor within the reach of anyone who knows how to program a BASIC Stamp. To compliment the easy to use and breadboard-friendly Memsic 2125 module, we will release an accelerometer Stamps in Class text in 2005. Its unique activities and projects will help you incorporate accelerometers into your own inventions.

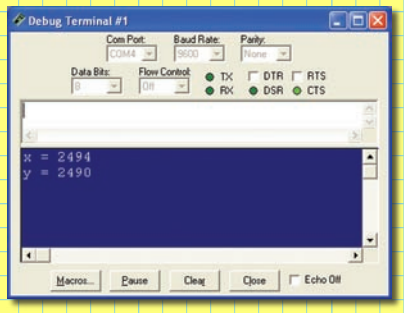
How does the MX2125 work? A heating element in the center of its gas filled chamber causes a pocket of hotter gas to rise to the top, while the cooler gas settles to the bottom. Four temperature sensors around the outside of the chamber measure the heated gas pocket's X and Y coordinates. The MX2125 then transmits these X and Y values as a series of pulses that are easily measured and decoded by the BASIC Stamp. With a few simple calculations, these values can be used in projects to determine acceleration, deceleration, tilt on the horizontal plane and rotation on the vertical plane.

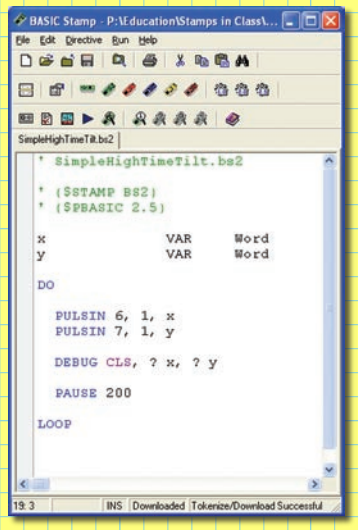


Try this example to see the accelerometer tilt detection in its simplest form.

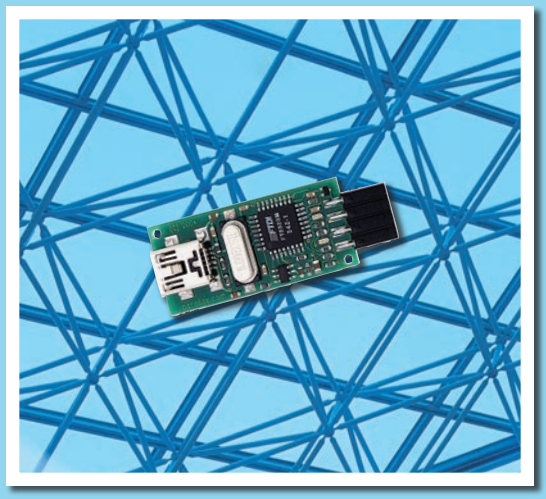








Starting with this example, our educational student guide introduces tilt, G-force and angular rotation. A search on our web site will also reveal tilt mode BASIC Stamp video games, an R/C airplane autopilot, the Toddler walking robot, and other application examples.



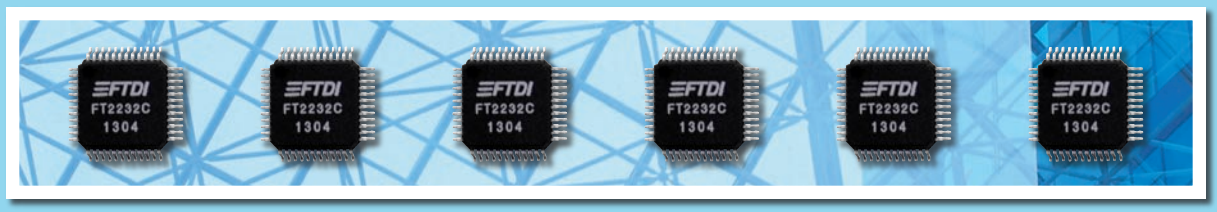
Parallax USB2SER Development Tool; #28024; $29.00

The Parallax USB2SER development tool provides a USB to 4-pin serial interface for microcontroller developers. This device is a mini development tool based on the FTDI232BM USB to Serial UART interface chip. We created this development tool in order to provide microcontroller developers (like our BASIC Stamp customers) with easy access to a PC's USB port using the FTDI virtual device drivers. This tool is also a reference design for customer-based applications using the FTDI chip in-circuit.

USB Control with FTDI and Parallax

FTDI USB Chip Distribution
Parallax is now a United States distributor for Future Technology Devices International, the leader in USB to serial/parallel interface chips. As USB is replacing serial ports on newer PCs, Parallax chose FTDI as the solution for our Board of Education and USB2SER development tool.

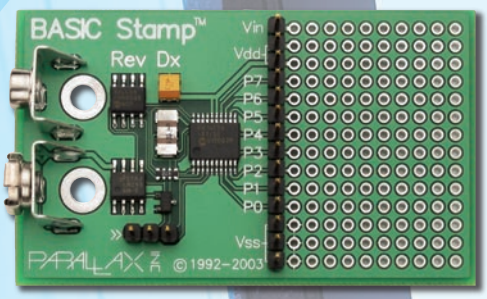
These chips have proven their abilities under multiple operating systems with FTDI's free, top-notch virtual COM port drivers for PCs, Macs, Linux and CE operating systems. The virtual COM port driver interface is just like a serial port with extended data rates. FTDI chips are state-machine based and require no firmware. They can access an optional external EEPROM upon power-up which contains your own USB vendor and product ID should you require this feature. If you are a developer looking for an FTDI or SX chip sample, then visit us online to request free sample development chips.



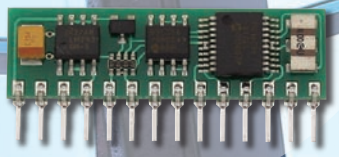
FTDI chips are LQFP-packaged devices with USB 1.1/2.0 full-speed support
Having chosen FTDI as our USB partner, we decided that our customers would benefit from using these chips in their own projects so we formalized a United States distribution agreement. FTDI's company philosophy is similar to ours: provide an easy-to-use quality product line with complete professional support. Complete pricing is provided online.

FTDI Chip	Parallax Part #	Description
FT232BM	604-00031	USB to serial TTL-level UART up to 3 MBit/s.
FT245BM	604-00032	USB to parallel FIFO up to 1 Mbyte/s.
FT2232C	604-00033	Dual-channel configurable FT232BM or FT245BM with multi-protocol synchronous serial engine (for SPI, JTAG, etc.) with data rates up to 5.6 Mbit/s.
FT8U245AM	604-00034	First-generation of the FT245BM. Not recommended for new designs but still available.
FT8U232AM	604-00037	First-generation of the FT232BM. Not recommended for new designs but still available.

INDUSTRIALIZE!



BASIC Stamp Rev.Dx; #27100; $34.00



BASIC Stamp 1; #BS1-IC; $29.00

BASIC Stamp 2i; #BS2I-IC; $54.00

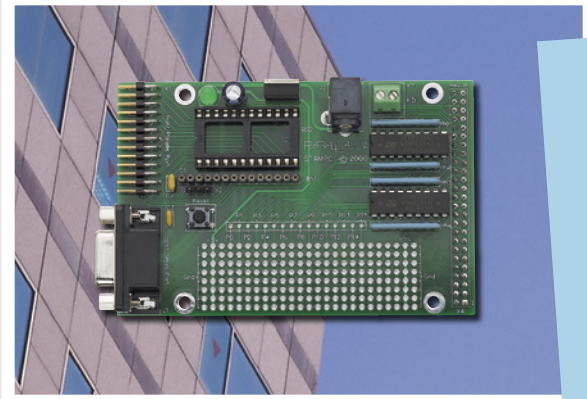
The robustness and reliability of the BASIC Stamp has been proven by its 10-year+ track record and use in a countless number of demanding applications. The BASIC Stamp module has operated successfully in deep sea projects, Antarctic expeditions, space shuttle explorations, and the desert conditions of Mongolia. This makes it naturally suitable for meeting industrial requirements. To give customers extra flexibility we manufacture a special industrial version of the BASIC Stamp 2 (#BS2I-IC) which is designed to handle a temperature range of -40° C to +85° C (-40° F to +185° F). In 2004, we equipped the BASIC Stamp Rev Dx (#27100) and BASIC Stamp 1 module (#BS1-IC) to be industrial-rated in their standard forms, ensuring our commitment to manufacturing tough products.

In addition to the BASIC Stamp module options, we offer a variety of products to help you design control systems and high voltage/current applications. The Stamp PLC is worthy of special recognition due to its adeptness to replace costly PLC systems. Unlike other industrial control products, you have complete control over the software saving you valuable time and money. At a fraction of a cost of other systems, all you need to add is a BASIC Stamp module or Javelin Stamp module depending on your programming preferences.

Three models of the BASIC Stamp microcontroller are rated for industrial use:

BASIC Stamp Rev.Dx; #27100; $34.00
BASIC Stamp 1; #BS1-IC; $29.00
BASIC Stamp 2i; #BS2I-IC; $54.00

www.parallax.com
toll-free 888-512-1024



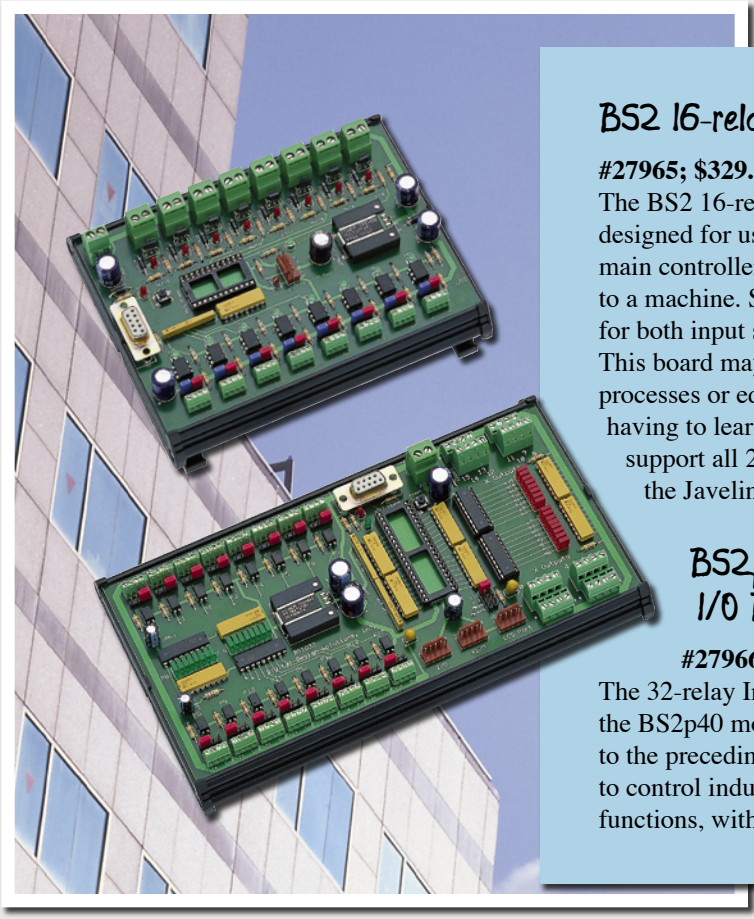
Stamp Controller Interface Board

#27945; $69.00

The Stamp Controller Interface allows the BASIC Stamp microcontroller to connect directly to industrial type digital I/O control boards produced by Opto22, Grayhill, Allen-Bradley, and others that accept 0-5 VDC voltage control levels. These optically isolated modules are ideal for interfacing microcontrollers to the real world, and are more reliable by providing proper isolation. The Stamp Controller Interface accepts all 24-pin BASIC Stamp modules *(sold separately)* and has a parallel port connection for monitoring the status of I/O pins.

The Stamp Controller Interface Board (above) connects directly to the Opto 22 8-channel I/O mounting rack (not pictured) for an easy high-current switching solution. The Opto 22 I/O board accommodates up to eight I/O modules. The board uses a 5 VDC power supply from the Stamp CI for control power. When connected to the Stamp CI Board the BASIC Stamp can control all 8 relays simultaneously.

Opto 22 8-Channel I/O Module Rack; #27320; $59.00
Output 60 VDC Module; #27321; $18.00
Output 120 VAC Module; #27322; $18.00
Input 120 VAC Module; #27323; $19.00
Output 10-32 VDC Module; #27324; $19.00



BS2 16-relay Industrial I/O Board

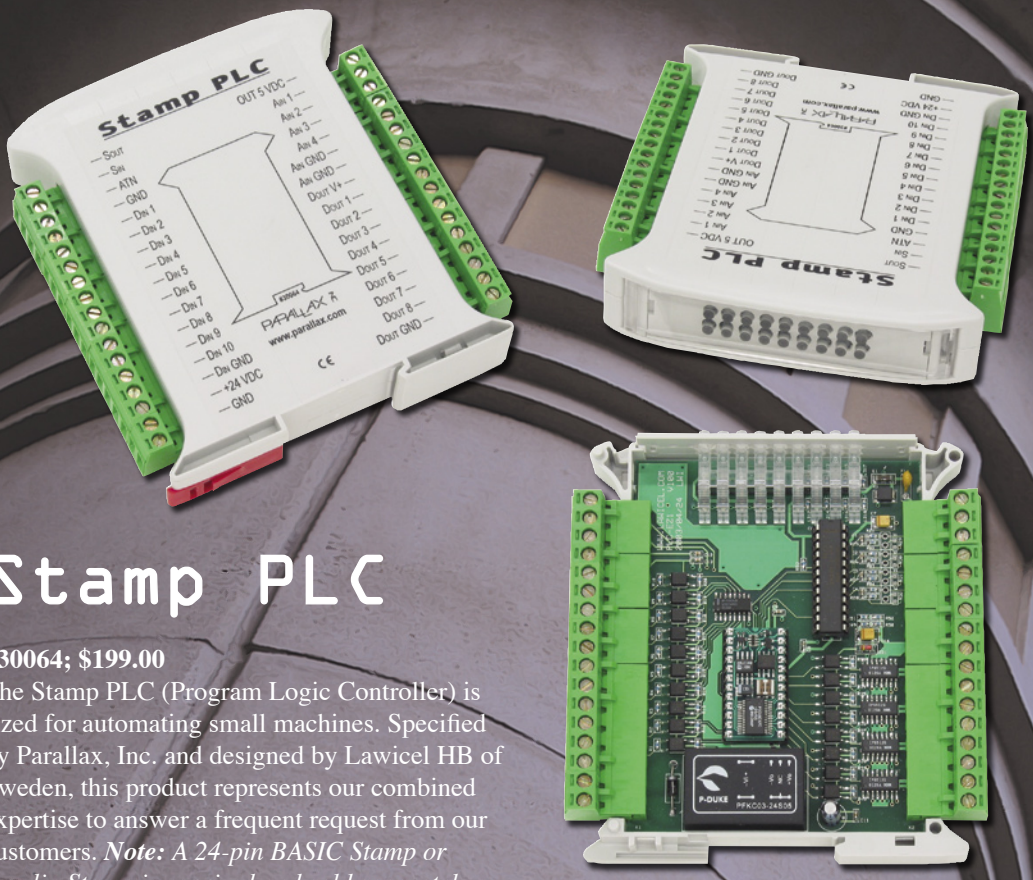
#27965; $329.00

The BS2 16-relay Industrial I/O Board was designed for use in industrial machinery as a main controller, or as a controller to add features to a machine. Standard 24 VDC power is used for both input sensors and output load devices. This board may be used to control industrial processes or equipment functions, without having to learn ladder logic. It was designed to support all 24-pin Basic Stamp modules and the Javelin Stamp module.

BS2p40 32-relay Industrial I/O Board

#27966; $399.00

The 32-relay Industrial I/O Board will support the BS2p40 module (sold separately). Similar to the preceding board, this board may be used to control industrial processes or equipment functions, without having to learn ladder logic.



Stamp PLC

#30064; $199.00

The Stamp PLC (Program Logic Controller) is sized for automating small machines. Specified by Parallax, Inc. and designed by Lawicel HB of Sweden, this product represents our combined expertise to answer a frequent request from our customers. ***Note:*** *A 24-pin BASIC Stamp or Javelin Stamp is required and sold separately.*

PLCs are microcontrollers that are packaged to withstand the hazards of an industrial environment. Stamp PLC inputs and outputs are optically isolated, fully protected, and the electronics are electrically tough and rather immune to noise typically present in industrial environments. Stamp PLC is housed by a strong and sleek enclosure that offers an integral DIN rail mount. Unlike other PLCs which may have proprietary code, you write the code (in PBASIC or Java) for the Stamp PLC and customize it to fit your needs. This non-restrictive power will allow you to design and modify your systems much faster.

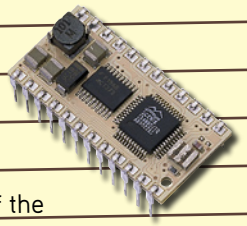
PRGPAL; #28025; $79.00

The PRGPAL (Piezo Resistive Gage Signal Conditioning and Alarm Control) is an intelligent peripheral that digitizes the signal of piezo resistive bridged type sensors for connection to the BASIC Stamp. PRGPAL channels can be configured to operate under software control to accommodate the typical bridged circuits used by pressure and load cells. The PRGPAL has two input channels that can perform a 16-bit counters subtraction on the sensor's plus and minus senses. Communication with the PRGPAL is handled through a bi-directional serial connection on pin P0 of the BASIC Stamp. The Parallax AppMod communications protocol is used, allowing baud rates of 9600, 19,200 and 38,400 baud. The PRGPAL is a "smart socket" module that mounts underneath a BASIC Stamp module *(sold separately)*.

Examples of PRGPAL Uses:

- Sensing and measuring pressures and mass loads
- Alarming alerts for overload conditions
- Background running of sensing devices

Javelin Stamp Module



#JS1-IC; $89.00

The Javelin Stamp is a 24-pin DIP module programmed in a subset of the Sun Microsystems Java language.

What makes Java special? Java is both structured and object oriented, yet remains elegant and easy for beginners to master. A structured language uses a well-defined, modular approach, which allows for easy code reuse. Object-oriented means that code modules (objects) within the program can send messages to each other. Large scale objects are written and stored in separate templates called class files. If your project needs a pair of temperature sensors, you need only create one class file that defines the behavior of the temperature sensor – there is no need for redundant code. Another great feature of object-oriented programs is that one object can be built on the existing behaviors of another.

The Java programming language is not the only thing that makes the Javelin Stamp uniquely different from BASIC Stamp modules: 32 k bytes of RAM/program space (leftover space can be used for variables, arrays, and serial buffers); 32 k bytes of non-volatile EEPROM; buffered serial communications up to six Virtual Peripheral devices, including UARTs, PWM, A/D, timers, etc., can run in the background; 8000 instructions/second execution speed (not including background processes which run independently of foreground tasks). The Javelin Stamp is compatible with any BASIC Stamp programming board with a 24-pin DIP socket.

Javelin Stamp Starter Kit

#27237; $239.00

Everything that you need to begin your quest for Java programming success is included in this Starter Kit: the Javelin Stamp, a demo board, software, manual, serial cable and some electronic components. The Javelin Stamp Demo Board is only available with the kit and it has a second, configurable RS-232 port and 2 servo port connections.

www.parallax.com
toll-free 888-512-1024

Are you ready to take the step from PBASIC programming to Assembly? Try the SX line of tools and chips.

Visit www.parallax.com/sx for a more complete listing of SX tools and chip availability.

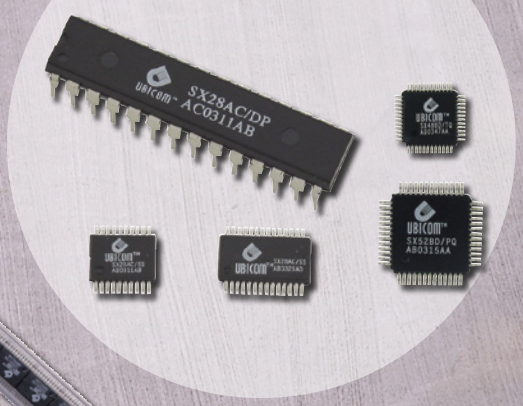
Parallax has been appointed the Master Distributor for the Ubicom SX microcontroller. This means Parallax and our distributors will:

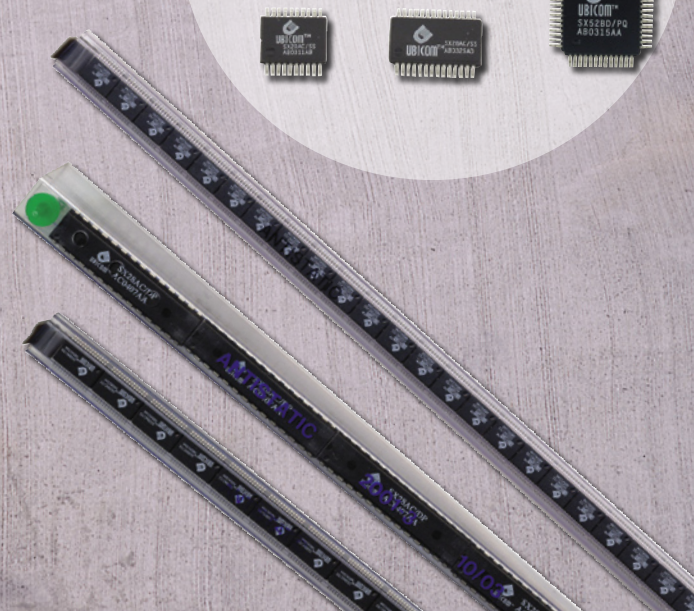
- Provide very low-cost SX-Key® programming tools
- Increase our technical service, sales support and distribution for the SX
- Provide low-cost SX chips with hassle-free, on-line or traditional ordering
- Stock production quantities of all SX chip packages for immediate delivery with no lead time
- Develop university program support
- Ensure a long-term, reliable supply for our customers

Part #	Pins	I/O	EE/Flash	RAM
SX20AC/SS	20	12	2K bytes	136 bytes
SX28AC/DP	28	20	2K bytes	136 bytes
SX28AC/SS	28	20	2K bytes	136 bytes
SX48BD	48	36	4k x 12 words	262 bytes
SX52BD	52	40	4k x 12 words	262 bytes

The SX28AC/SS is going Green!

Due to demand, Ubicom has made the decision to offer an additional SX device - an SX28AC/SS in a Green (environmentally non-hazardous) package. This will be exactly the same as the previous SX28AC/SS functionally and in physical dimensions, but the mold compound and die attach epoxy meet the ROHS standards.





SX Tech Tool Kit LITE; #45180; $99.00
The popular SX Tech Tool Kit LITE with the SX-Key Manual v2.0 is an excellent starting point to get you developing SX projects with Parallax's SX-Key programming tool. Upon receiving the kit, you will be able to program SX chips within the hour. *Kit includes*: SX-Key Rev F, SX Tech Board, (2) SX28AC/DP 50 MIPS chips, (1) Murata 50 MHz resonator, (1) Murata 4 MHz resonator, SX-Key Manual v2.0, CD-ROM (software, PDF SX-Key Manual), 4-pin header, and a Serial Cable. A 7.5 VDC power supply is not included. Note: we recommend that our international customers order this kit to reduce shipping costs.

Note: A 7.5 V, 1000 mA DC supply (#750-00009) is recommended for use with the SX Tech Tool Kits.

SX Tech Tool Kit PLUS; #45181; $129.00
This kit is the most complete SX-Key programming tool package offered by Parallax, with everything you'll need except for a 7.5 VDC power supply. The PLUS kit includes all the contents of the SX Tech Tool Kit LITE plus 2 extra books: *Programming the SX Microcontroller a Complete Guide* by Gunther Daübach, and *Exploring the SX Microcontroller with Assembly and BASIC Programming* by Al Williams.

SX/B: Now you can program the SX Microcontroller with this FREE BASIC Compiler

This year Parallax provides you with a very unique addition to our SX product line – a BASIC compiler known as SX/B. SX/B is a BASIC language compiler for the Ubicom SX18/20/28 microcontroller designed to meet two specific goals:

- Expedite the task of the professional engineer by creating a simple, yet robust high-level language for the SX28. This allows SX-based projects to be prototyped and coded quickly.
- Assist the student programmer wishing to make the transition from pure high-level programming (i.e., BASIC Stamp) to low-level programming (SX assembly language).

SX/B is a non-optimizing, inline compiler. What this means is that each BASIC language statement is converted to a block of assembly code in-line at the program location; no attempt is made to remove redundant instructions that would optimize code space. This allows the advanced programmer to modify code as required for specific projects, and -- perhaps more importantly -- provides an opportunity for the student to learn SX assembly language techniques by viewing a 1-for-1 (from BASIC to assembly language) output.

Programming an SX chip is not as easy as programming a BASIC Stamp. Once you get past the basic programming of LED blinking, managing servos and driving LCDs you will need to learn about the SX chip's interrupt service routine, page/bank switching and timing considerations to really take advantage of the SX chip's capabilities.

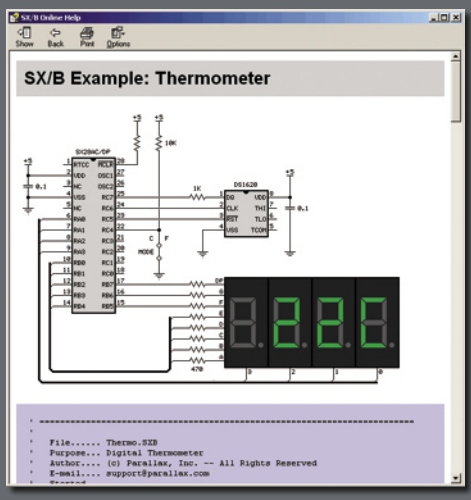
SX/B Instruction Set - *The SX/B Instruction Set includes a combination of BASIC Stamp 1 and 2 commands and some unique to SX/B.*

• ASM	ASM Instruction(s) ... ENDASM
• BRANCH	BRANCH Offset, Label0 {, Label1, Label2, ...}
• DATA	DATA Const0 {, Const1, Const2, ...}
• DEC	DEC ByteVar
• END	END
• FOR ... NEXT	FOR ByteVar = StartVal TO EndVal {STEP {-}StepVal} ... NEXT
• GET	GET Location, ByteVar {, ByteVar, ...}
• GOSUB	GOSUB Label ... RETURN
• GOTO	GOTO Label
• HIGH	HIGH Pin
• IF ... THEN	IF Condition [THEN | GOTO] Label
• INC	INC ByteVar
• INPUT	INPUT Pin
• INTERRUPT	INTERRUPT Instruction(s) ... RETURNINT {Cycles}
• LET	{LET} Expression
• LOOKDOWN	LOOKDOWN Target, Value0, {Value1, Value2, ...} ByteVar
• LOOKUP	LOOKUP Index, Value0, {Value1, Value2, ...} ByteVar
• LOW	LOW Pin
• OUTPUT	OUTPUT Pin
• PAUSE	PAUSE Value1 {[, | *] Value2}
• PAUSEUS	PAUSEUS Value1 {[, | *] Value2}
• PULSIN	PULSIN Pin, State, ByteVar {, Resolution}
• PULSOUT	PULSOUT Pin, Duration {, Resolution}
• PUT	PUT Location, Value {, Value, ...}
• PWM	PWM Pin, Duty, Duration
• RANDOM	RANDOM ByteVar1 {, ByteVar2}
• RCTIME	RCTIME Pin, StartState, ByteVar {, Resolution}
• READ	READ Label {+ Offset}, ByteVar {, ByteVar, ...}
• RESETWDT	RESETWDT
• REVERSE	REVERSE Pin
• SERIN	SERIN Pin, BaudMode, ByteVar {, Timeout, Label}
• SEROUT	SEROUT Pin, BaudMode, Value
• SHIFTIN	SHIFTIN DPin, CPin, ShiftMode, ByteVar {\Count}
• SHIFTOUT	SHIFTOUT DPin, CPin, ShiftMode, Value {\Count}
• SLEEP	SLEEP
• SOUND	SOUND Pin, Note, Duration
• TOGGLE	TOGGLE Pin

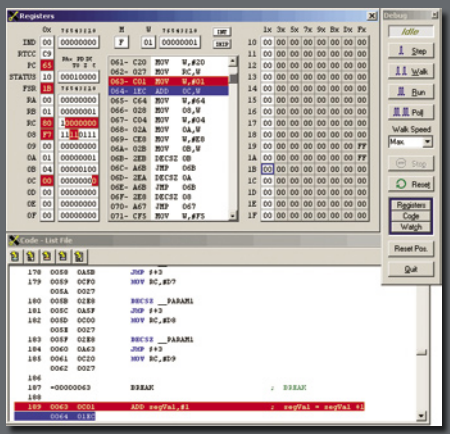
SX/B Keywords are highlighted for easy coding.

SX/B Integration into SX-Key Software

The SX/B Compiler is efficiently integrated into the SX-Key IDE.



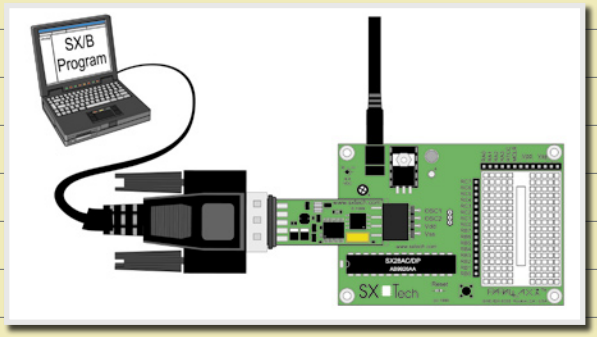
Professionally developed on-line help file provides examples, syntax reference and tips for programming the SX chip. All of the documentation you'll need is readily available in the on-line help.



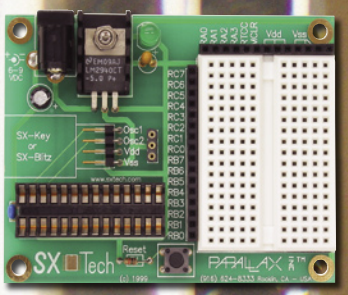
Live debugging with the SX shows your BASIC code in-line with assembly.

Programming the SX28AC/DP with the SX-Key

Programming the SX28AC/DP chip requires the SX-Key tool, the SX Tech Board and an external oscillator (if you want to run at 50 MHz). All of these components are included in the SX Tech Tool Kits. The process of programming and debugging an SX chip is quite simple:



- Write your SX/B code in the SX-Key IDE
- Compile and download to the SX28AC/DP to run
- Or, compile, download and debug to watch certain variables, registers or to step through your BASIC code

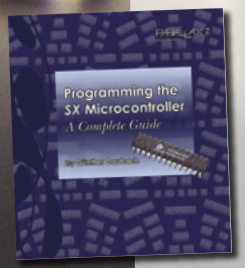


SX Tech Board; #45205; $39.00
The SX Tech board is our project area for the SX microcontroller. Simply plug in the SX-Key, power, and build a project on the breadboard. SX I/O ports and control lines are brought to the SIP headers on the side of the board and accessed by jumper wires. With this board you'll be able to learn from the *Introduction to Assembly Language Programming* Tutorial found in the SX downloads section. *An SX chip is NOT included.*

SX-Key Rev. F (alone); #552-00007; $89.00
The SX-Key is Parallax's primary development tool for the SX line of microcontrollers from Ubicom, supporting every chip that is commercially available. Supported by the SX-Key software, the SX-Key programming tool can program SX chips in-system and perform in-circuit source-level debugging. Also at the user's fingertips is an on-board programmable clock. The frequency output of this clock is adjusted from the software with a slider bar between 400 kHz and 100 MHz. The software operates on a Windows platform and is compatible with Win98/NT/2K/XP.

SX PROGRAMMING BOOKS

***Exploring the SX Microcontroller with Assembly and BASIC Programming*; #70014; $19.95**
This book written by Al Williams is highly recommended as your first introduction to the SX Microcontroller and assembly language. This 3rd edition has been revised to include assembly and BASIC code examples with the new SX/B compiler, which is integrated into the SX-Key IDE and distributed for free. *Exploring the SX Microcontroller with Assembly and BASIC Programming* provides assembly and BASIC code listings for typical circuits using the SX28. These circuits include indicator lights, pushbutton control switches, A/D and D/A conversion for reading sensors, RS232 communication, and LCD displays. The book is very easy to read and progresses in a step-wise fashion, building on prior circuits.

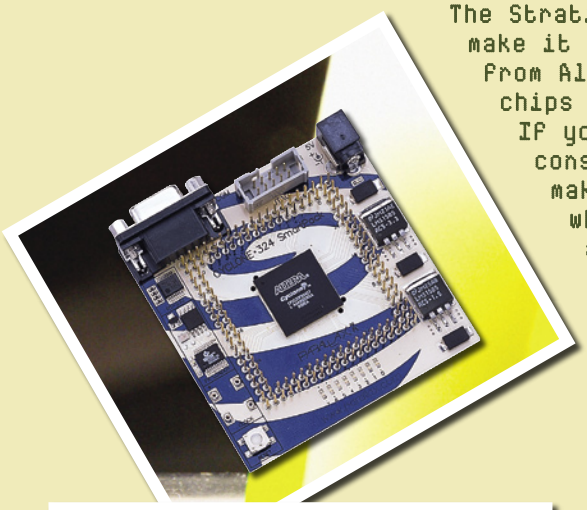


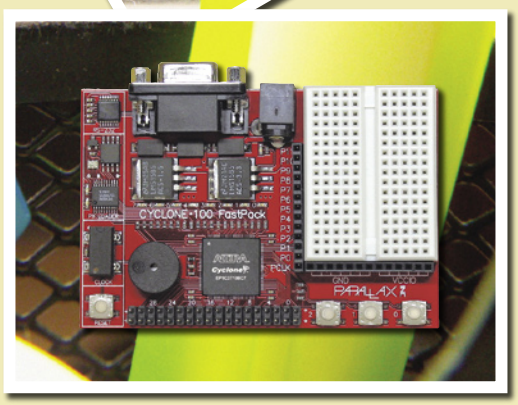
***Programming the SX Microcontroller: A Complete Guide*; #70002; $29.95**
If you're ready to learn assembly language programming and the SX architecture, this is the book. The book begins with a step-by-step tutorial demonstrating the Parallax SX-Key software and programming tool. This covers the SX-Key debugger, registers/code windows while developing timing-based programs. The following chapters of the book provide detailed explanations of architecture including register use, memory configuration, interrupts and stack management. Short program examples are used to demonstrate arithmetic and logic instructions, Virtual Peripherals and UARTs. Applications examples in the second half of the book include function generators, pulse width modulation, analog to digital conversion, reading keypads, controlling LED displays, serial bus communication, and programming the SX Tech Bot.

***SX-Key Development System Manual*; #45111; $35.00**
The SX-Key Development System Manual was revised for improvements made to the SX-Key IDE Version 2.0. The manual is a complete hardware and assembly language reference for the Parallax SX-Key hardware and software.

Altera FPGA Tools

The Stratix and Cyclone SmartPacks and FastPack make it easy for you to explore powerful FPGAs from Altera. FPGAs are reconfigurable logic chips which contain many thousands of gates. If you've ever wanted to break beyond the constraints imposed by microcontrollers and make your own systems instead, this is what you need. These FPGA boards are for advanced customers and are not related to the BASIC Stamp microcontroller line of products.



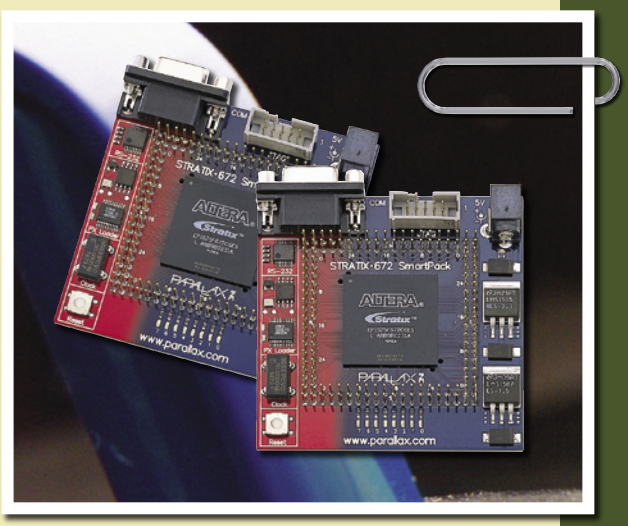


Cyclone SmartPack with EP1C20; #60003; $ 295.00
Cyclone FastPack with EP1C3; #60004; $195.00
The Cyclone is a cost-reduced version of the Stratix. Built in the same technology, the Cyclone is similar to the Stratix, but lacks the 512kb RAMs and DSP blocks. The Cyclone Family may be programmed in AHDL, Verilog, or VHDL.

Cyclone FPGA Overview	EP1C20	EP1C3
Logic Elements	20,060	2,910
M4K RAM Blocks	64	13
Total RAM Bits	294,912	59,904
PLLs	2	1
Maximum User I/O Pins	301	104

Stratix SmartPack with EP1S10; #60002; $395.00
Stratix SmartPack with EP1S25; #60001; $495.00
The SmartPacks are based on the Stratix chip from Altera. The Stratix has scalable RAMs, DSP blocks, and PLLs, all meshed in an enhanced logic fabric. And it's FAST - built in a 0.13m all-copper process, the RAMs are rated for 300 MHz operation. The PLLs will step up nominal input frequencies to 400+ MHz. The SmartPack board hosts a Stratix EP1S10/EP1S25 device, power supplies, loader/non-volatile booter, clock, 128 I/Os, filtering for all 6 PLLs, a reset button, and 8 LEDs. The SmartPack EP1S10 comes with Altera's Quartus II Web Edition software.
Note: *The EP1S25 device requires Quartus II Full Edition from Altera (www.altera.com).*

Stratix Device Overview	EP1S10	EP1S25
Logic Elements	10,570	25,660
M512 RAM Blocks	94	224
M4K RAM Blocks	60	138
M512K RAM Blocks	1	2
DSP Blocks	6	10
PLLs	6	6



Online Ordering at www.parallax.com is the most popular way to order products from Parallax.

Why do customers shop online?

- **Order entry process is secure, fast, and easy to understand**
- **Order confirmation and tracking number are sent via email**
- **Exclusive sales and promotions**

Online orders may be placed anytime through our secure server on www.parallax.com. On-line orders require Visa, MasterCard, or American Express and are shipped UPS only. Orders received before 2 p.m. PT will be shipped the same business day if all items are in stock. Orders received after 2 p.m. will be processed for shipment the following business day (Parallax's regular business hours are Monday through Friday, 7 a.m. - 5 p.m. PT).

If you are unable to connect to the internet or if you prefer not to order online, we have several alternatives for you. Please feel free to contact our Sales Department at sales@parallax.com or call toll-free 888-512-1024 if you have any questions regarding Parallax ordering policies, prices, and related information.

Phone Orders may be placed by telephone during the hours of 7 a.m. to 5 p.m. PT. Customers in the continental United States may call toll-free 888-512-1024, and international customers dial (916) 624-8333.

Fax your pre-approved Purchase Orders to the attention of the Sales Department at (916) 624-8003. PO's must have a minimum purchase amount of $100, and contain an authorized signature. To apply for Net 30 terms contact our sales department at 888-512-1024.

Mail us Purchase orders, pre-paid orders with a personal check or money order addressed to:

Parallax, Inc.
Attn: Accounting Dept.
599 Menlo Drive, #100
Rocklin, CA 95765, USA

Note: *Please write "Order Enclosed" on the envelope.*

...always read the fine print.

International Customers

We encourage international customers to purchase through our distributors. Distributors provide reasonable prices as a result of consolidating their shipments, working with local customs offices and using preferred freight carriers. This usually results in a savings for the international customer.

Should you decide to place an international online order, the cost of shipping will be higher than if you order through a local distributor. Parallax is NOT responsible for any brokerage, customs fees, VAT, or country taxes that may be due upon the receipt of the package. The actual value of all orders is indicated on the invoice, and restatements using lower values are not permitted. The cost of the order would be higher than if you ordered directly from a distributor in your area.

Authorized Parallax Distributors

You may order directly from us or from any of our authorized distributors. For a complete listing of Authorized Distributors, please visit our website. www.parallax.com/html_pages/company/distributors/distributors.asp.

Ordering Policies

Payment Terms - Orders may be paid with VISA, MasterCard, American Express, check, or money order. Sorry, no C.O.D.s. Contact us at sales@parallax.com for wire transfers. Customers desiring Net 30 days payment terms must submit three credit references and bank information and place their first order with a check or credit card. Approval for Net 30 days payment terms normally requires 2-5 days before the first order is shipped.

Shipping Methods - Domestic orders placed on-line are sent by available UPS methods. International orders placed on-line use UPS Worldwide Express. Orders placed by telephone or fax have the additional methods available: U.S. Priority Mail, DHL Worldwide, Airborne Express, or Federal Express.

California Sales Tax - All orders shipped to California addresses will be charged Placer County sales tax of 7.25%, unless you have a tax exemption certificate on file with Parallax.

Warranty, Repairs, and Money Back Guarantee

Quality Assurance- Parallax, Inc. has stringent quality control procedures in place to insure the best quality products.

90 Day Limited Warranty- Parallax, Inc. warrants its products against defects in materials and workmanship for a period of 90 days. If you discover a defect, Parallax, Inc. will, at its option, repair, replace, or refund the purchase price. After 90 days, products can still be sent in for repair or replacement, but there will be a $10.00 USD minimum inspection/labor/repair fee (not including return shipping and handling charges).

14-Day Money-Back Guarantee- If, within 14 days of having received your product, you find that it does not suit your needs, you may return it for a refund. Parallax, Inc. will refund the purchase price of the product in the same payment form, excluding shipping/handling costs, once the product is received. This refund does not apply if the product has been altered or damaged. If you decide to return the products after the 14-day evaluation period, a 20% restocking fee will be charged against the credit.

Disclaimer- Warranty does not apply if the product has been altered, modified, or damaged. Parallax, Inc. makes no other warranty of any kind, expressed or implied, including any warranty of merchantability, fitness of the product for any particular purpose even if that purpose is known to Parallax, Inc., or any warranty relating to patents, trademarks, copyrights or other intellectual property. Parallax, Inc. shall not be liable for any injury, loss, damage, or loss of profits resulting from the handling or use of the product shipped. A finance charge of 1.5% per month (18% annual percentage rate) will be charged on all past due amounts. Reasonable attorney fees will also be charged by seller in the event of any action proceeding for collection of the sums billed on the invoice.

How to return a product- When returning, you must first call the Sales Department (toll free 888-512-1024) for a **Return Merchandise Authorization number**. No packages will be accepted without the RMA number clearly marked on the outside of the package. After inspecting and testing, we will return your product, or its replacement using the same shipping method used to ship the product to Parallax, Inc. within 15 days. In your package, please include a note with a brief explanation of the problem.

Parallax, Inc.
599 Menlo Drive, #100
Rocklin, CA 95765
USA

WWW.PARALLAX.COM