

## PRODUKTINFORMATION

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—— Vi reserverar oss mot fel samt förbehåller oss rätten till ändringar utan föregående meddelande ——

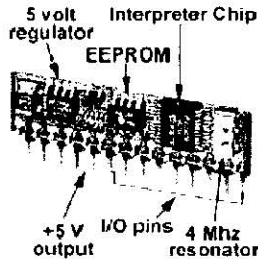
**ELFA artikelnr.**

**Antal sidor: 07**

**73-192-05 BS1 Starter kit**  
**73-192-13 BS1 Modul**  
**73-193-04 BS2 Starter kit**  
**73-193-12 BS2 Modul**

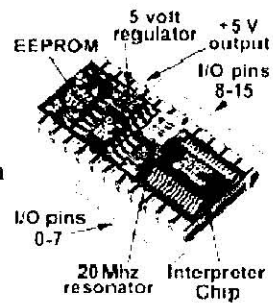


## BASIC Stamp General Information



BASIC Stamps are small computers that run Parallax BASIC (PBASIC) programs. They have fully programmable I/O pins that can be used to directly interface to TTL-level devices, such as buttons, LEDs, speakers, potentiometers, and shift registers. And with just a few extra components, these I/O pins can be connected to non-TTL devices, such as solenoids, relays, RS-232 networks, and other high current/voltage devices.

Though they are available in various physical packages, all versions of BASIC Stamps have the same logical design, consisting of a 5-volt regulator, resonator, serial EEPROM, and PBASIC interpreter. A tokenized PBASIC program is stored in the non-volatile serial EEPROM, which is read from and written to by the interpreter chip. This interpreter chip fetches the instructions one at a time and performs the appropriate operation on the I/O pins or internal structures within the interpreter. Because the PBASIC program is stored in an EEPROM, it may be programmed and reprogrammed almost endlessly, without the need to first erase the memory, as with most PICs. To program BASIC Stamps, you just connect them to an IBM PC or compatible and run our editor software to edit and download your program.



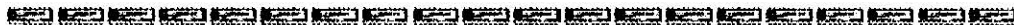
The BASIC Stamp I has 8 I/O pins, holds 80 to 100 instructions and executes an average of 2000 instructions/sec. The BASIC Stamp II has 16 I/O pins plus two synchronous serial pins, holds 500 to 600 instructions and executes an average of 4000 instructions/sec. For more information on size and configuration, view our BASIC Stamp Comparison data.



For more answers to common questions, download the BASIC Stamp Frequently Asked Questions (FAQs) list. It contains approximately 70 common BASIC Stamp questions and answers.

### BASIC Stamp E-Mail List

Learn from other BASIC Stamp users who are active on this mailing list. To join this list simply send e-mail to [majordomo@parallaxinc.com](mailto:majordomo@parallaxinc.com), and type "subscribe stamps" in the body of the message. If you prefer, you can subscribe using our on-line subscription form. You can also search past posts to the BASIC Stamps mailing list.

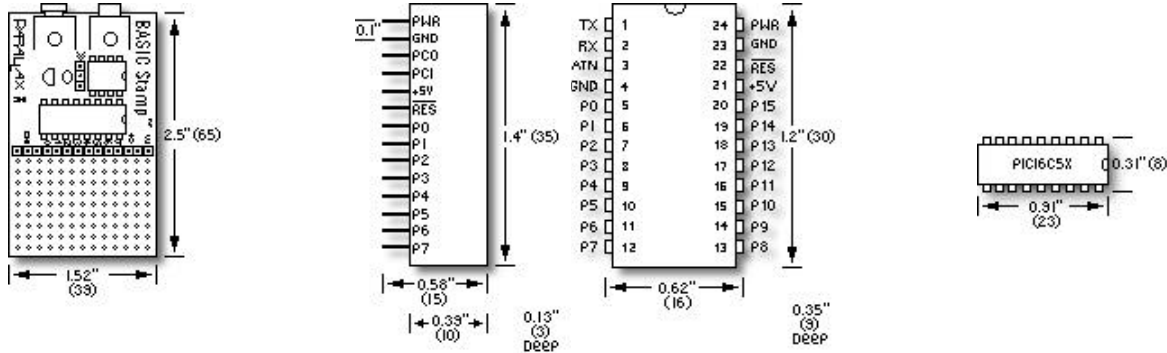




## BASIC Stamp Modules



The BASIC Stamps are available in a number of different package types:

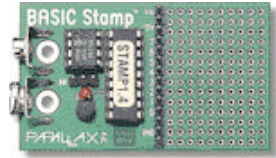
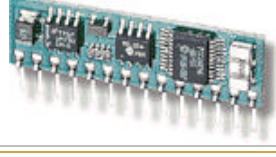



**PC Board** -- The original "Version D" is a complete PC board with prototype area and battery clips.

**Surface Mount** -- The newer "BS1-IC" and "BS2-IC" are 14- and 24-pin modules utilizing surface mount components to provide the smallest package possible. These modular BASIC Stamps have corresponding "carrier boards" which provide the usual prototype area and battery clips, if necessary. Schematics of these modules are available in .gif format.

**Chip** -- The PBASIC interpreter chips may be purchased separately and integrated directly into production products. Additionally, the BASIC Stamp I editor now includes the ability to program a PIC16C58 with your PBASIC code!

The table below shows the complete package types available, as well as a comparison between the BASIC Stamp I and BASIC Stamp II.

	<b>BASIC Stamp I</b>	<b>BASIC Stamp II</b>
	Version D -- #27100  BS1-IC 	 BS2-IC
<b>I/O Lines</b>	8	16, plus 2 RS-232 I/Os
<b>EEPROM (Program &amp; Data)</b>	256 bytes	2048 bytes
<b>RAM (Variables)</b>	7 word registers; all are byte addressable, two are bit addressable	16 word registers; all are byte, nibble and bit addressable
<b>Max. Program Length</b>	~80 instructions	~500 instructions
<b>Clock Speed</b>	4-MHz	20-MHz
<b>Program Execution Speed</b>	2000 instructions/sec.	4000 instructions/sec.
<b>Current Requirements</b>	2 mA running, 20 uA in sleep modes	7 mA running, 50 uA in sleep modes
<b>Environment</b>	0° to 70° C (32° to 158° F), 70% non-condensing humidity	0° to 70° C (32° to 158° F), 70% non-condensing humidity
<b>Serial I/O Speed</b>	TTL serial @ 300 - 2400 baud (I/O pins)	TTL and RS-232 serial @ 300 - 50K baud (I/O pins or serial port) (0 - 19200 baud with flow control)
<b>Package</b>	PC board (Ver. D), 14-pin SIP module (BS1-IC)	24-pin DIP module
<b>Processor</b>	PIC16C56	PIC16C57
<b>PC Programming Interface</b>	Parallel port	Serial port
<b>Prototype Area</b>	Built-In (Ver. D), Optional carrier board (BS1-IC)	Optional carrier board
<b>I/O Instructions</b>	BUTTON HIGH INPUT LOW OUTPUT POT PULSIN PULSOUT PWM REVERSE SERIN SEROUT SOUND TOGGLE	BUTTON COUNT DTMFOUT FREQOUT HIGH INPUT LOW OUTPUT PULSIN PULSOUT PWM RCTIME REVERSE SERIN SEROUT SHIFTIN TOGGLE XOUT



## PBASIC Instruction Set



The following gives a complete list of PBASIC commands for both versions of the Stamp. It does not include arithmetic or logical operators. Many enhancements were made to the PBASIC language with the release of the BASIC Stamp II and thus some commands only exist on one version of the BASIC Stamp. For more detailed information on the differences between PBASIC1 and PBASIC2, download the BASIC Stamp I to BASIC Stamp II Conversion document.

- <sup>1</sup> Indicates instruction is only available on BASIC Stamp D and BS1-IC.
- <sup>2</sup> Indicates instruction is only available on BS2-IC.

### BRANCHING

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IF . . . THEN	Compare and conditionally branch.
BRANCH	Branch to address specified by offset.
GOTO	Branch to address.
GOSUB	Branch to subroutine at address.
RETURN	Return from subroutine.

### LOOPING

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FOR . . . NEXT Establish a FOR - NEXT loop.

### NUMERICS

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<sup>1</sup> LET	Perform variable manipulation, such as A=5, B=A+2, etc. Possible operations are add, subtract, multiply, divide, max. limit, min. limit, and logical operations AND, OR, XOR, AND NOT, OR NOT, and XOR NOT.
LOOKUP	Lookup data specified by offset and store in variable. This instruction provides a means to make a lookup table.
LOOKDOWN	Find target's match number (0-N) and store in variable.
RANDOM	Generate a pseudo-random number.

### DIGITAL I/O

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INPUT	Make pin an input
OUTPUT	Make pin an output

REVERSE	If pin is an output, make it an input. If pin is an input, make it an output.
LOW	Make pin output low.
HIGH	Make pin output high.
TOGGLE	Make pin an output and toggle state.
PULSIN	Measure an input pulse.
PULSOUT	Output a timed pulse by inverting a pin for some time.
BUTTON	Debounce button, perform auto-repeat, and branch to address if button is in target state.
2 SHIFTIN	Shift bits in from parallel-to-serial shift register.
2 SHIFTOUT	Shift bits out to serial-to-parallel shift register.
2 COUNT	Count cycles on a pin for a given amount of time (0 to 125 kHz, assuming 50/50 duty cycle).
2 XOUT	Generate X-10 powerline control codes. For use with X-10 lamp and appliance control modules.

## SERIAL I/O

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SERIN	Serial input with optional qualifiers and variables for storage of received data. On the Stamp D and BS1-IC, baud rates of 300, 600, 1200, and 2400 are possible. On the BS2-IC, any baud rate (up to 50k baud) is possible. Also, the BS2-IC has a serial input time-out function.
SEROUT	Send data serially. On the Stamp D and BS1-IC, data is sent at 300, 600, 1200, or 2400 baud. On the BS2-IC, data is sent at any baud rate (up to 50k baud).

## ANALOG I/O

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PWM	Output PWM, then return pin to input. This can be used to output analog voltages (0 to 5 V) using a capacitor and resistor.
1 POT	Read a 5 to 50K potentiometer and scale result.
2 RCTIME	Measure an RC charge/discharge time. Can be used to measure potentiometers (faster than POT on Stamp D and BS1-IC).

## SOUND

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2 FREQOUT	Generate one or two sine waves of specified frequencies (each from 0 to 32767 Hz).
2 DTMFOUT	Generate DTMF telephone tones.
1 SOUND	Play notes. Note 0 is silence, notes 1 to 127 are ascending tones, and notes 128 to 255 are white noises.

## EEPROM ACCESS

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2 DATA	Store data in EEPROM before downloading BASIC program (BS2-IC).
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<b>1</b> EEPROM	Store data in EEPROM before downloading BASIC program (Stamp D and BS1-IC)
READ	Read EEPROM byte into variable.
WRITE	Write byte into EEPROM

### TIME

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PAUSE	Pause execution for 0 to 65536 milliseconds.
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### POWER CONTROL

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NAP	Nap for a short period. Power consumption is reduced.
SLEEP	Sleep for 1 to 65535 seconds. Power consumption is reduced to 20 $\mu$ A (Stamp D and BS1-IC) or 50 $\mu$ A (BS2-IC).
END	Sleep until the power cycles or the PC connects. Power consumption is the same as SLEEP instruction.

### PROGRAM DEBUGGING

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DEBUG	Sends variables to PC for viewing.
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