Functional description of the Basic Stamp Experimental board

The Basic Stamp Experimental Board consist of 13 separate circuit modules. The positions and the name of the modules are the same on the schematic and the PCB. It makes easy to find the circuit parts.

Power

The power module supplies the digital supply voltage (5V) and the analog supply voltage (6V) for the op. amp LM324.

Input voltage requirement:	9-18 VDC
	7-12 VAC
Input current requirement:	1000 mA

Basic Stamp I.

The Basic Stamp I. module consists of two Basic Stamp I circuit. The A is a DIP version with a burn-out reset circuit (T1, R18, R19, R33, R36). The B is a SIP version, BS1-IC. They can be programmed separately by the PC through two 3 pin terminals A and B. The programming cable is part of the Stamp Development Kit and it has to connect to the PCs parallel port. The Stamps output pins are wired to the A and B side of a two-row pin connector. The experimental circuitry can be built up with the attached wire in the white drawer.

Basic Stamp II.

The Basic Stamp II. module has a 24 pin IC socket for the BS2-IC. There is a 9 pin D sub terminal for programing connection to the PC. The programming cable is part of the Stamp Development Kit and it has to connect to the PCs serial port. All pins of the BS2-IC are wired to a pin connector and labeled on the board.

RS-232 (Serial interface)

The RS-232 module is a voltage converter interface between the stamps 5V signals and the RS-232 signals (+15V, -15V). The input voltage of the RS-232 signals are limited by the D6 diode. The output signal steals the negative voltage from the idle RS-232 input line through D7 and C7. Therefor the communication can be only in simplex mode. This is not a limitation, because the Stamps can handle the serial lines only in a sequence.

Serial connection:	TXD of terminal to pin 2
	RXD of terminal to pin 3
	GND of terminal to pin 5

Display

The Display module consists of an LED display (7 segment) and a 4096 CMOS driver IC. The 4096 is basically an 8 stage shift register with serial input and data latch for each stage output. Data is shifted on the positive clock transition. Data from each stage of the shift register is latched on the negative transition of the strobe input.

Push-button

The Pushbutton module has 4 pushbuttons with active LOW signal.

Switches

The Switches module supplies four static logical signals set by the 4 separate slide switches.

Speaker
The Speaker module has a piezo buzzer, which can drive directly by the Stamps outputs.

Potentiometer
The R15 potentiometer and the C3 capacitor serial with it give a signal for the Stamp POT instruction.

LEDs
The LEDs module has four separate LED lamps. LOW signal can turn on the LED lamps.

Net
This basic circuitry makes possible to built up a network from Stamps using the serial instructions (SERIN, SEROUT).

Drivers
The Drivers module is a power buffer interface. The ULN2803 IC, an eight Darlington connected transistor array is ideally suited for interfacing low logic level and the high current/voltage requirement of lamps, relays, motors etc. The ICs feature open collector outputs and free wheeling clamp diodes for transient suppression (C screw terminal output). The maximum rating of each open collector output is: Ic=500mA, Vo=50V. So we can use from a separate power supply. Its recommended to connect this separate power to the C terminal point too (Clamp diodes common point). We can not use the IC at the max. rating continuously or simultaneously on each Darlington, because of the dissipation of the package. Each stage is an inverter principally. Each two darlington is connected parallel to lower the dissipation. It results four power inverter channel in the module (1, 2, 3, 4 output terminal).
The fifth channel is a separate Darlington transistor with embedded clamp diode, BD645 (M output terminal). It has a higher max. power (3A, 60V). Heat sink is recommended at higher last.

DRIVER TERMINAL (J3):	U	+5V
	C	Clamp diode common point of ULN2803
	1	1. channel of ULN2803
	2	2. channel of ULN2803
	3	3. channel of ULN2803
	4	4. channel of ULN2803
	G	GND
	U	+5V
	M	Open collector of BD645 (ref. Motor)
	G	GND

PWM-D/A
This module uses the PWM instruction. The module consists of two identical channels (IN1 and IN2 inputs). Each channel has a digital output (DIG1, DIG2) and an analog output (ANA1, ANA2). The digital output is buffered by an op. amp. inverter. The analog output is a slow programmable voltage generator (D/A converter) using an RC integrator and an op. amp. If the pulse width is changed in the PWM, the analog voltage will change too. The 6V analog power is the supply voltage of the op. amp. raise the linearity of the conversion in the output range of 0-5V. The LM324 ICs consistsof four separate op. so it is well suited for the modules circuitry.

Basic Stamp Application Board
Parallax Inc.