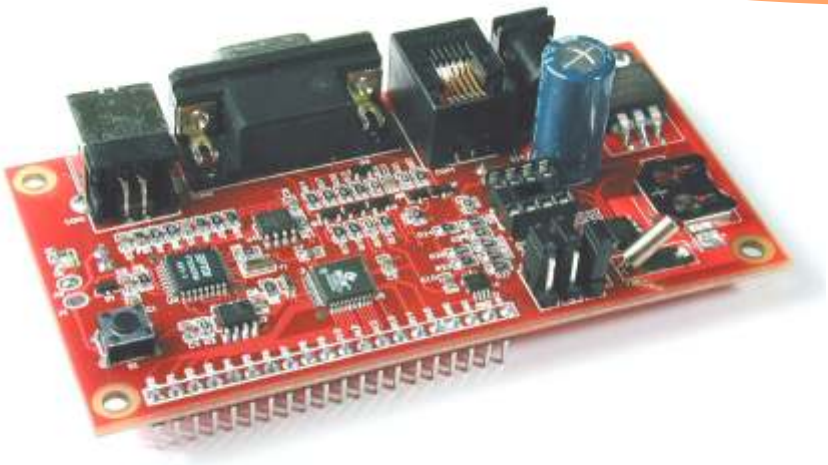
Stamp Stack 2P

Experimenter's Board

Feature Rich,
Basic Programmable,
Experiment Board



- 100% BASIC Stamp™ 2P24 Compatible
- Plugs onto any solderless breadboard
- Reverse-Polarity Protected with Power Indicator
- Programmable via USB or RS-232
- Expandable up to 1 Meg Additional Data Memory
- Regulated +5VDC @ 500 mA Output
- Real-Time Clock + 4 Channels of 10-Bit A/D

www.hvwtech.com
www.solarbotics.com

SKU #25055
DocRev: June 11, 2008

The Stamp Stack 2P Experimenters Board is a feature-rich, development platform which includes the Parallax Basic Stamp 2P24 processor. The Stamp Stack 2P Experimenters Board is well suited to a variety of educational, experimental and industrial applications.

Features:

- Bulletproof power supply (reverse polarity, over current, thermal overload, and short circuit protected)
- One-Wire and I2C busses on-board
- 4 channels of 10-bit Analog to Digital Converter (ADC)
- Real Time Clock (RTC) with battery backup
- I2C RAM/ROM expansion socket (up to 1 Megabit extra data memory)
- USB and RS-232 Programmability

Board Layout (Refer to figure 1)

1) USB Programming Connector
2) RS-232 (Serial) Programming Connector
3) BlueDot jack for Dallas iButtons (enable via jumper J5)
4) Power Input Connector for 5 to 12 VDC (2.1mm jack, tip positive)
5) Backup Battery Holder for RTC (CR1216 Coin Cell)
6) On-Board Bus Enable Jumpers
7) AN0 .. AN3—Analog to Digital Converter (ADC) inputs
8) P0 .. P15—Stamp Stack 2P24 Digital I/O
9) Power Output Pins (to breadboard +5VDC @ 500 mA MAX)

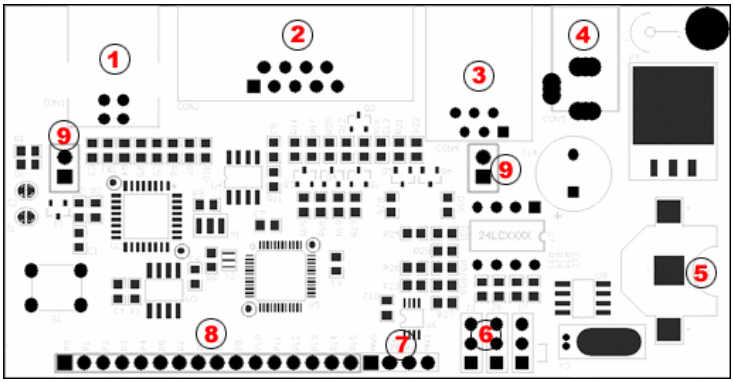


Figure 1—Board Layout

On-Board Serial Interfaces

I2C

Each I2C device on the bus has a unique address and can share the bus with up to 127 I2C devices. *The onboard RTC and ADC both use the I2C bus to communicate with the Stamp 2p Interpreter. The I2C bus must be enabled to use either of these features.* To enable the I2C bus, jumper J7 must be shorting the middle and lower pins as shown in Figure 2 (this is the default setting from the factory). See the PBASIC command reference for information on how to use the I2CIN and I2COUT commands. **NOTE:** Enabling the I2C bus connects 1k Ohm pullup resistors to I/O pins P8 (SDA) and P9 (SCL). Pins P8 and P9 should not be used for any purpose other than extending the I2C bus to off-board I2C devices.

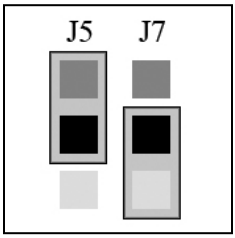


Figure 2—Jumpers

Dallas 1-Wire / iButton

A variety of 1-Wire identification, sensor, and memory 1-wire devices are available in traditional IC packages, as well as the more industrial and portable stainless-steel-clad iButtons. The Stamp Stack 2p Experimenters Board has an RJ-11 (telephone-style) jack for connecting a “Blue Dot” receptor. The Blue Dot receptor allows you to make connection to iButton F5 cans so you can exchange data. To use the 1-wire interface, you must enable it via jumper J5 (shown *disabled* in Figure 2 (the default setting)). For more information on the iButton and available 1-Wire devices visit the Maxim/Dallas Website at www.maxim-ic.com. See the PBASIC command reference for information on how to use the OWIN and OWOUT commands.

NOTE: Enabling the 1-wire bus connects a 1k Ohm pullup resistor to I/O pin P15. This pin should not be used (except to connect 1-wire deivces) when the bus is enabled.

Getting Started

To get started you will need:

- The CR1216 Coin cell (included)
- A power supply (6VDC @ 500 mA, such as our SKU# 34010)
- A USB (SKU# 14070) or Serial cable (SKU# 14010)
- A Breadboard (optional, but recommended)
- USB drivers (if you will be programming via USB)
- The BASIC Stamp Programming Editor Software

1) If you will be programming the Stamp Stack via USB, download and install the USB drivers now. See the section “Installing USB Drivers” for more information. No drivers are required for RS-232 serial programming.

2) Insert the CR1216 cell into it’s holder (#5 In figure 1).

3) Mount the Stamp Stack 2P to the breadboard such that the power output pins (#’ 9 in figure 1) sit in the power rail of the breadboard

4) Apply power to the Power Input Connector (#4 in figure 1).

CAUTION: Ensure that no other power supply is powering the same power rail as that of the Stamp Stack. If the Stamp Stack is not mounted in a breadboard, ensure that it is not placed on a conductive surface as the power output pins on the bottom of the board could short together.

5) Connect either a USB or Serial cable between the Stamp Stack and the PC.

NOTE: Only ONE interface can be used at a time. If both the RS-232 and the USB ports are connected at the same time, the Stamp Stack will not be able to communicate with either port.

6) Install and run the BASIC Stamp Editor software

7) Open a New Debug window by clicking on the icon in the toolbar or using the keyboard shortcut <CTRL-D>. From the “Com Port” drop down box in the debug window, select the COM port that is connected to the Stamp Stack. NOTE: If you are using the RS-232 Serial programming port, the COM port will probably be COM1 or COM2. For USB users, the COM port will probably be COM6 or higher.

8) Press the RESET button on the Stamp Stack.

The test program will begin running. The program reads the 4 channels of ADC and sets the RTC to 5 am and starts it running. If you try running a wire from the positive supply rail of the breadboard to the ADC pins, you can watch the value change on each channel.

This completes the functional verification and you can now begin programming your Stamp Stack. This program can be downloaded form the HVWTech.com website so you can use the code in your projects.

On-Board I2C Peripheral Devices

Real Time Clock (Dallas 1307)
A real-time clock (RTC) is an embedded hardware clock that keeps track of the time and date. It is used in many kinds of embedded applications including data logging, scheduling, and remote monitoring. Besides time functions the DS1307 RTC also allows for 55-bytes of battery backup SRAM that is available to the user. NOTE: The RTC requires a CR1216 coin cell battery (included) for reliable operation and to keep the time when power to the Stamp Stack is removed.

Analog to Digital Converter (MAX 1136)
The MAX1136 is a 4 channel successive approximation converter that generates a 10-bit digital number that is representative of the input voltage applied to that channel.

I2C Serial RAM/ROM Expansion Socket (U7 8-Pin Socket)
The Stamp Stack 2P24 Experimenters board provides a memory expansion socket (U7) for the addition of an I2C Serial EEPROM (e.g 24LC1025) of up to 1 Megabit* in size The Stamp Stack 2P Experimenters Board supports any and all Microchip 24LCXXX Serial EEPROMs.

*EEPROMs larger than 512 Kbits require that J5 (found directly under the EEPROM Socket on the bottom side of the PCB, see Figure 3) be shorted with some solder. This modification allows large EEPROMS to be addressed correctly. 1 Megabit = 1024 Bits = 128 KBytes

NOTE: To render an EEPROM in the expansion socket (U7) Read Only, short J4 solder jumper (located on the back side of the PCB directly under the Expansion Socket, see Figure 3). This connects the EEPROMs' WP pin to Vdd. This will prevent the Interpeter from writing to the EEPROM.

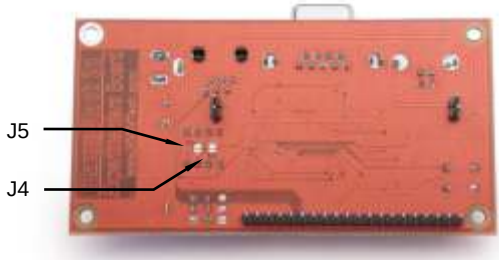


Figure 3 - EEPROM solder jumpers

Installing USB Drivers

USB Driver Quick Start *(Skip this section if you will not be using USB)*

> **Note:** Detailed installation instructions are available as a separate document available for download from the Stamp Stack product page or the "Resources" section of the HVWTech.com website.

- Download the drivers from the HVWTech.com website.
- Unzip the drivers to a convenient folder
- Connect the Stamp Stack 2P Experimenters board to an available USB port. The "Found New Hardware" wizard dialog will appear.
- When prompted, select "Search for a Suitable Driver" and click Next
- Select "Specify a location" and click Next
- Click the Browse button and navigate to the folder where the drivers were unzipped. Click next to continue and follow the instructions.

> **NOTE:** Some Windows installations (notably XP and Win2K) will require that the installation process be done TWICE (once for hardware and once for the COM drivers).

> **NOTE:** Windows may produce an error message claiming the drivers are not certified. This error can be safely ignored.

Technical Support

Symptom or Error Message	Probable Cause(s) / Solution(s)
Power LED (D1) is not lit	-No power. Apply +5 to +12 VDC
"Loopback" and "Echo" Status Fields say "No" when you try to Identify the Stamp	-The serial link between the PC and the Stamp is broken. Check that the serial cable, or the USB cable, is properly connected.
USB cable is connected but my system doesn't see the Stamp Stack 2P Experimenters Board	-If you are running through a hub try connecting the Experimenters Board directly to your computer - Check to make sure the USB drivers are properly installed.
When I try to read the I2C bus all I get is 255	- Make sure that the I2C bus is enabled (J7) and that pins P8 and P9 are not being used for anything other than I2C devices.
"Loopback" is "Yes" and "Echo" is "No" when you try to Identify the Stamp	- Serial Link is good but the editor cannot communicate with the Interpreter. Check power.
The Real Time Clock is behaving erratically.	-Ensure that a CR1216 coin cell is installed in the battery holder. Check that there is approximately 3 volts on the battery.

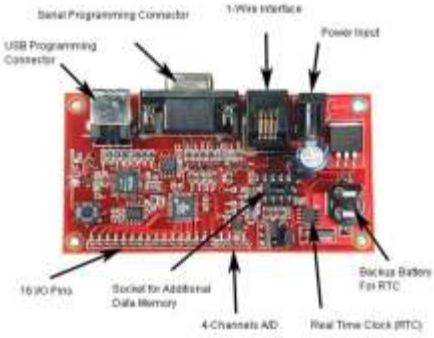
Technical support is available if you are having problems. If you need help, please provide as much detailed information as possible.

E-mail: support@HVWTech.com
Phone: (403) 730-8603 (Monday - Friday 9am – 5pm Mountain time)

**** Please contact us *before* sending a Stamp Stack 2P Experimenters Board for repair ! ****

The Stamp Stack 2p Experimenters Board

All the advanced aspects of the renowned BASIC Stamp 2p24 module plus many cool features, all on one board!



Other products from HVW Technologies:

Soldering Equipment: Irons, stations, desoldering pumps and solder

Stamp Stack II-SX: The power and memory of the BS2-SX on a breadboard!

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