Sparrow Project Notes

The following information is for the 3 Sparrow projects that will be inserted into the Leo Hano rocket at the ULSI flight in April 2010.

Input and Output

A Sparrow unit has two serial ports.   Both of these ports require the following setup
- Baud rate – 9600
- Data bits – 8
- Stop bit – 1
- Parity – none
- Flow control – none
- True or inverted – true

Main Serial port

The main serial port is located on the breadboard that contains the Basic Stamp 2pe/2p controller. It is on the very top of the breadboard, it is the set of 4 pin connectors that is missing the second pin. This is where you connect the Parallax Prop Plug.
On the Basic Stamp Controller, this is the only available port to use.

Pin (top to bottom)	Prop Plug assignment	Basic Stamp 2pe (Sparrow10) pin assignment	Basic Stamp 2p (Sparrow12) pin assignment	Basic Stamp 2 (Sparrow1) pin assignment
1	VSS	4	4	4
2 (missing pin)	RES			
3	<TX	7	7	6
4	>RX	8	8	7

Debug/Programming port

This port is needed to upload controller code. Normally this port will not be used and will not be available on the Sparrow 1 unit. Will also need two .1µF capacitors in this setup.

DB9 pin assignment	BS2/BS2p/BS2pe pin assignment	Notes
2	1	
3	2	
4	3	Need to place one .1µF capacitor between DB9-pin4 and controller-pin3. Second .1µF capacitor goes between DB9-pin4 to DB9-pin5
5	4	The second .1µF capacitor goes between DB9-pin4 to DB9-pin5

Switches

Power switch – is a toggle switch with a plastic cover located on the opposite side of the breadboards.
DIP switch – located on the breadboard #2.
- Switch #1 – mode. Off is setup mode, On is mission mode.
- Switch #2 – not used at this time.

LED

A LED is located on the opposite side of the breadboard. When the power switch is turned on it will do one of the following:

- If DIP switch #1 is off then the LED will flash on and off rapidly and then turn off.
- If DIP switch #1 is on then the LED will do the following. You can turn off the unit during the countdown sequence to stop it. If the unit is turned on again the countdown sequence will start from the beginning. This sequence is roughly 60 seconds long.
    - The countdown sequence of:
        - Blink slowly 5 times.
        - Off for 4 seconds
        - Blink slowly 4 times
        - Off for 4 seconds
        - Blink slowly 3 times
        - Off for 4 seconds
        - Blink slowly 2 times
        - Off for 4 seconds
        - Blink slowly 1 time
        - Off for 4 seconds
    - The actual mission starts
        - LED on
            - get the data from the sensor
            - Store that data in the controller's EEPROM
            - Update it's event counter
        - LED off
            - Delay pause

List of Projects for the Leo Hano flight

Project name	Use	Controller	LED Color	Project unit number	Version
Sparrow1	Temperature	Basic Stamp 2	Green	6	
Sparrow10	Acceleration	Basic Stamp 2pe	Red	3	V1.21
Sparrow12	Acceleration	Basic Stamp 2p	Orange	2	

Sparrow Project checklist

Items needed

- Sparrow unit
- Fresh 9 volt alkaline battery
- 3/4 inch wide masking tape or alternate tape types
    - Electrical tape
    - Wider masking tape (up to 2 inches wide)
- #8 X-acto knife (need this to cut the tape holding the battery)
- Parallax Prop Plug interface
- Payload carrier tube

Preflight

- Set the power switch to the OFF position
- Set DIP switch #1 to the OFF position
- Connect a fresh 9 volt alkaline battery to the battery clip
- Wrap 6 to 7 layers of 3/4 inch wide masking tape to secure the battery to the wood board
- Set the power switch to the ON position
- The LED will flash. If this doesn't happen then either replace the battery or check the power connections to the unit
- Set the power switch to the OFF position.
- Set DIP switch #1 to the ON position
- Optional power on test sequence
    - Set the power switch to the ON position.
    - The LED will blink 5 times, then the LED will be off for 4 seconds, then the LED will blink 4 times then will be off for 4 seconds.
    - Set the power switch to the OFF position.
- Test fit the Sparrow unit to the payload carrier tube.

Inserting the unit into the rocket

- Pick a carrier tube
- Open top cover of carrier tube
- Verify that DIP switch #1 on Sparrow unit is set to the ON position.
- When ready, turn on the power to Sparrow unit

- o If the LED is blinking then place the unit into the carrier tube.
- o Close the carrier tube
- o Insert the carrier tube into the payload bay

Payload integrated to Leo Hano rocket

Rocket Pre-Flight:

- ◊ Payload Carrier Integrated to Payload Section
- ◊ Nosecone/GPSFlight Powered and Secured
- ◊ Nosecone attached to Payload Section
- ◊ Payload secured to Shock Cord Tether
- ◊ Drogue Chute folded
- ◊ Drogue Chute Nomex wrapped
- ◊ Drogue Chute secured to Aft Blkhd Payload Section
- ◊ (2) Drogue Chute Pyros (3g, short leads) connected to Avionics Section
- ◊ Shock Cord Tether secured to Fore Blkhd Avionics Section
- ◊ Drogue Chute Packed
- ◊ Payload/Avionics Sections integrated
  [Payload A-Blkhd/Drog. Chute/Nomex/Pyros/Avionics F-Blkhd]
- ◊ Shock Cord Tether (via Motor Mount) secured to Fore Eye-bolt of Motor Casing
- ◊ Motor Inserted into Motor Mount and secured via Retaining Ring
- ◊ Drogue Pyros (2) connected to Avionics
- ◊ (2) Main Chute Pyros (4g, long leads) fed through Aft Avionics Blkhd
- ◊ Main Chute Pyros connected to Avionics
- ◊ Avionics inserted into Avionics Bay
- ◊ Aft Avionics Bkhd secured to Avionics Bay via (3) Wing Nuts
- ◊ Shock Cord Tether attached to Aft Avionics Blkhd of Avionics Section
- ◊ Main Chute folded
- ◊ Main Chute Nomex wrapped
- ◊ Main Chute secured to Aft Blkhd of Avionics Section
- ◊ Main Chute Pyros placed against the Fore Blkhd of Booster Section
- ◊ Main Chute Packed
- ◊ Avionics/Booster Sections integrated
  [Avionics A-Blkhd/Main Chute/Nomex/Pyros/Booster F-Blkhd]

General/Overall:

- ◊ Fins Secured
- ◊ Air Pressure Sensors holes clear

◊   Rail Buttons Usable
◊   Brake shoes deployed

Clearance to Pad

At the Pad:
◊   Rocket Slid onto Rail (no constraints)
◊   Avionic Armed/Consistent signals
◊   Igniter inserted into Motor
◊   Rocket/Rail Righted to vertical
◊   Igniter leads connected to Electronic Launch System
◊   Continuity Test

At the launch site after the rocket has landed

o   Remove the unit from the carrier tube
o   Check to see if the LED is blinking
o   Turn the power off
o   Set the DIP switch #1 to off

Transferring the data to a computer
There is a possibility you might have to replace the 9 volt battery.
o   Verify that the DIP switch #1 is set to the OFF position
o   Connect a Parallax Prop Plug to the main serial connector (the one with the missing second connector. The Prop Plug labeled RES should be over the missing connector
o   Get ready to do a data capture on the computer
o   Turn on the power to the Sparrow unit
    o   Sparrow1 will automatically dump it's data content out
    o   For Sparrow10 and Sparrow12 you will need to select the option to dump the EEPROM contents.
o   When done with the data capture, stop it.
o   Turn off the Sparrow unit
o   Disconnect the Prop Plug from the Sparrow unit