High Altitude Weather Balloon Project: Project Log Part 1

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ABSTRACT
This paper describes the current state of the high altitude weather balloon project as of February 1, 2008. The high altitude weather balloon project is a project run through the Applied Science Research class at Menlo School. The goal of the project is to launch a weather balloon into near space, approximately 100,000 feet.

Keywords
high altitude, weather balloon, ATV, PIC microcontroller

1. INTRODUCTION

Current work on the high altitude weather balloon project has been confined to high level design, purchasing needed parts, and preparing the PIC Microcontroller for serial interfacing.

2. PARTS PURCHASING

2.1 Ordered Parts

The current parts that have already been ordered are:

Rockwell GPS Module	$31.99
5.0M Pixel Webcam	$11.88
GPS Passive Antenna	$8.94
Sensors	$41.07
Total	$93.88
Budget	$300.00
Remaining Budget	$206.12

2.2 Parts Still Needed

The parts that are still required for this project are:
Flash Memory Chip
Terminal Node Controller
Handheld Radio Transceiver
Mobile Radio Transceiver
ATV Transmitter

Video-Text Overlay Board

Balloon
Flight cord
Parachute
Cutdown device
Flight box

2.3 Parts Already Owned

The parts that I already own are:
PIC Microcontroller P16F917

3. DEVICE INTEGRATION

Because many of the parts have not come in yet, the author of this paper has not been able to get a fully functional device layout. However, the integration with the PIC Microcontroller has been laid out, as shown in .

4. SERIAL INTERFACE

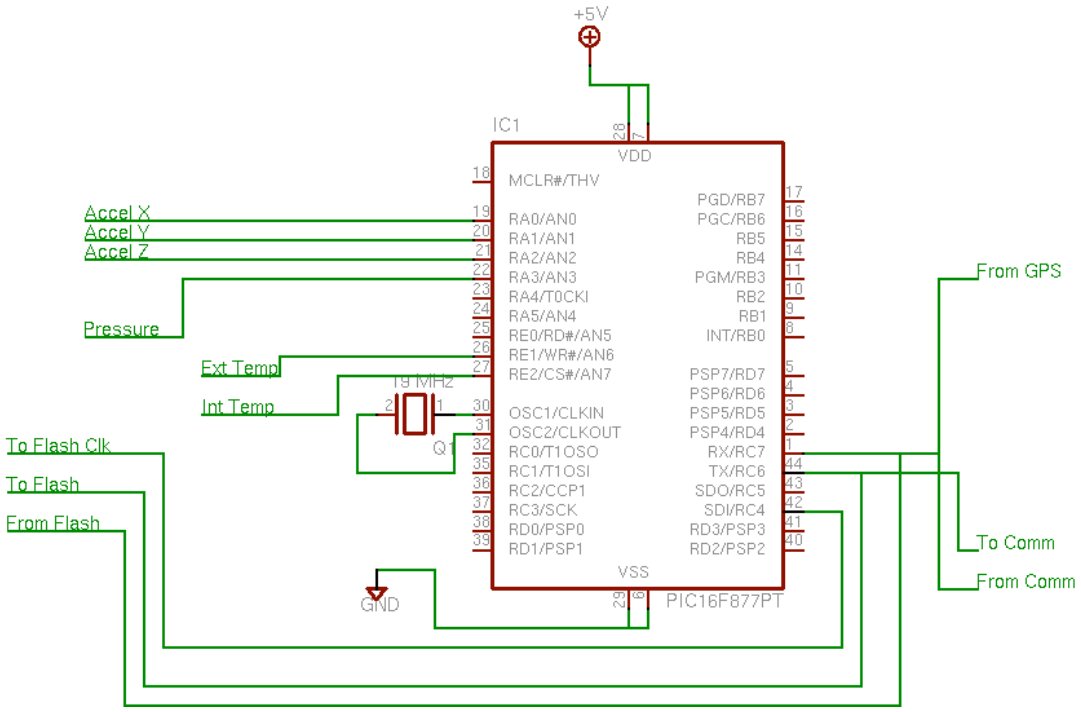

Figure 1: **This figure shows the schematic of the PIC integrated with the other components of the High Altitude Weather Balloon Project Flight Computer. The PIC shown in this diagram is a PIC16F887, but is essentially the same as the PIC16F917, which is the chip in the actual flight computer.**

Before beginning to set up the interface with the GPS, flash memory, and radio transceiver, the PIC must be able to seamlessly transmit serial data. While the author of this paper has successfully transmitted serial data, the transmitted data was at incorrect baud rates and was therefore unable to be read by the computer, see appendix 1. The baud rate output, as read via an oscilloscope was approximately 8860 baud to 9091 baud. This is much lower than the desired baud rate of 9600. The design circuit used to convert the PIC output to PC input was a MAX232 chip circuit. The circuit converts the +5 to 0 V levels of the PIC to +5 to -5 V inverted levels needed by the RS232. This circuit, however, does not change the baud rate, as can be seen in appendix 1. This may be able to be fixed via an external crystal resonator for the PIC Microcontroller, which would allow for a more precise operation frequency.

5. REFERENCES

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http://www.gpskit.nl/gps-readme.html

6. APPENDIX 1

This appendix shows the data output of the PIC and a MAX232 circuit via an oscilloscope.

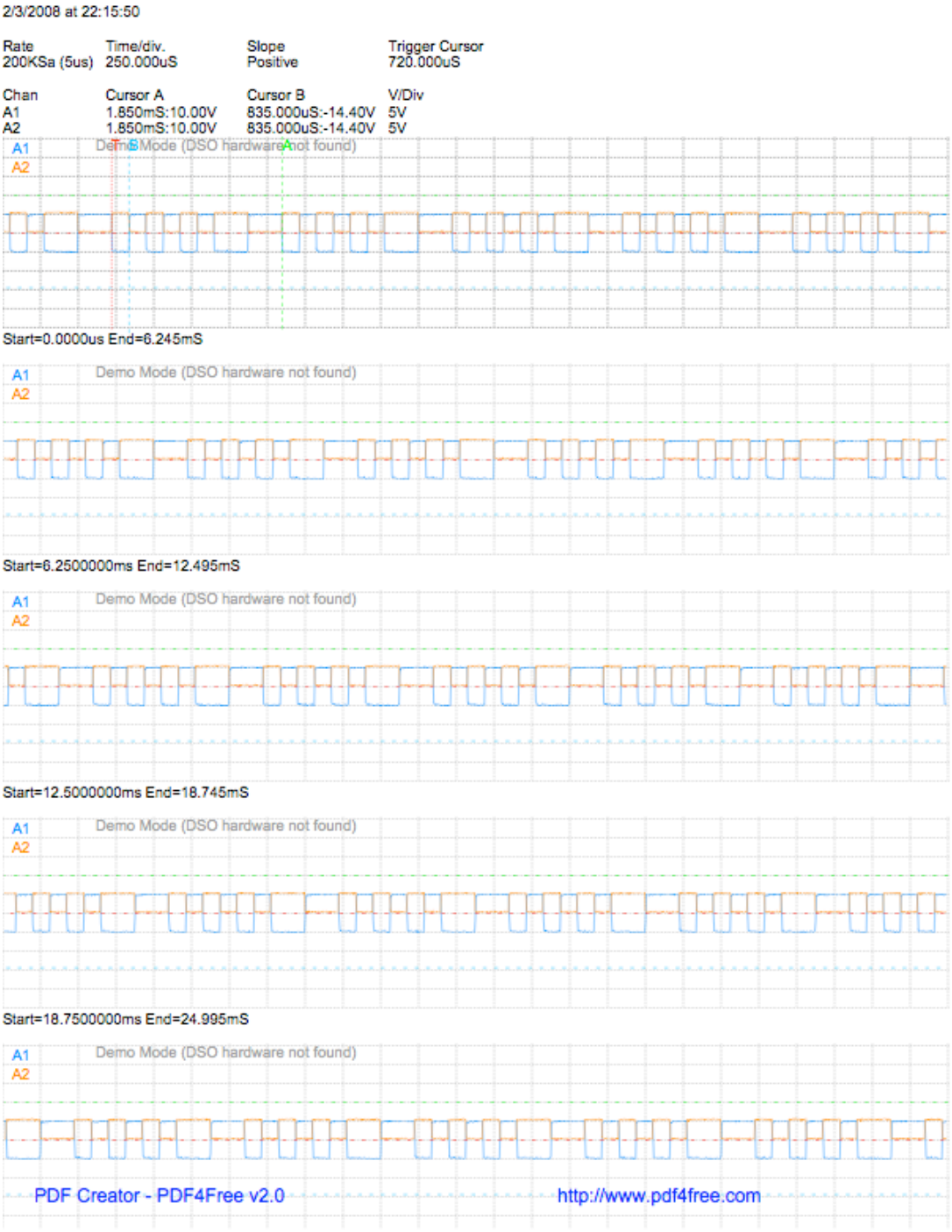

Figure 2: This figure shows the output of the PIC and of the MAX232 circuit. The PIC output is on channel 2, and the MAX232 on channel 1. The MAX232 circuit converts the output levels of the PIC and turns them into readable output for the PC.

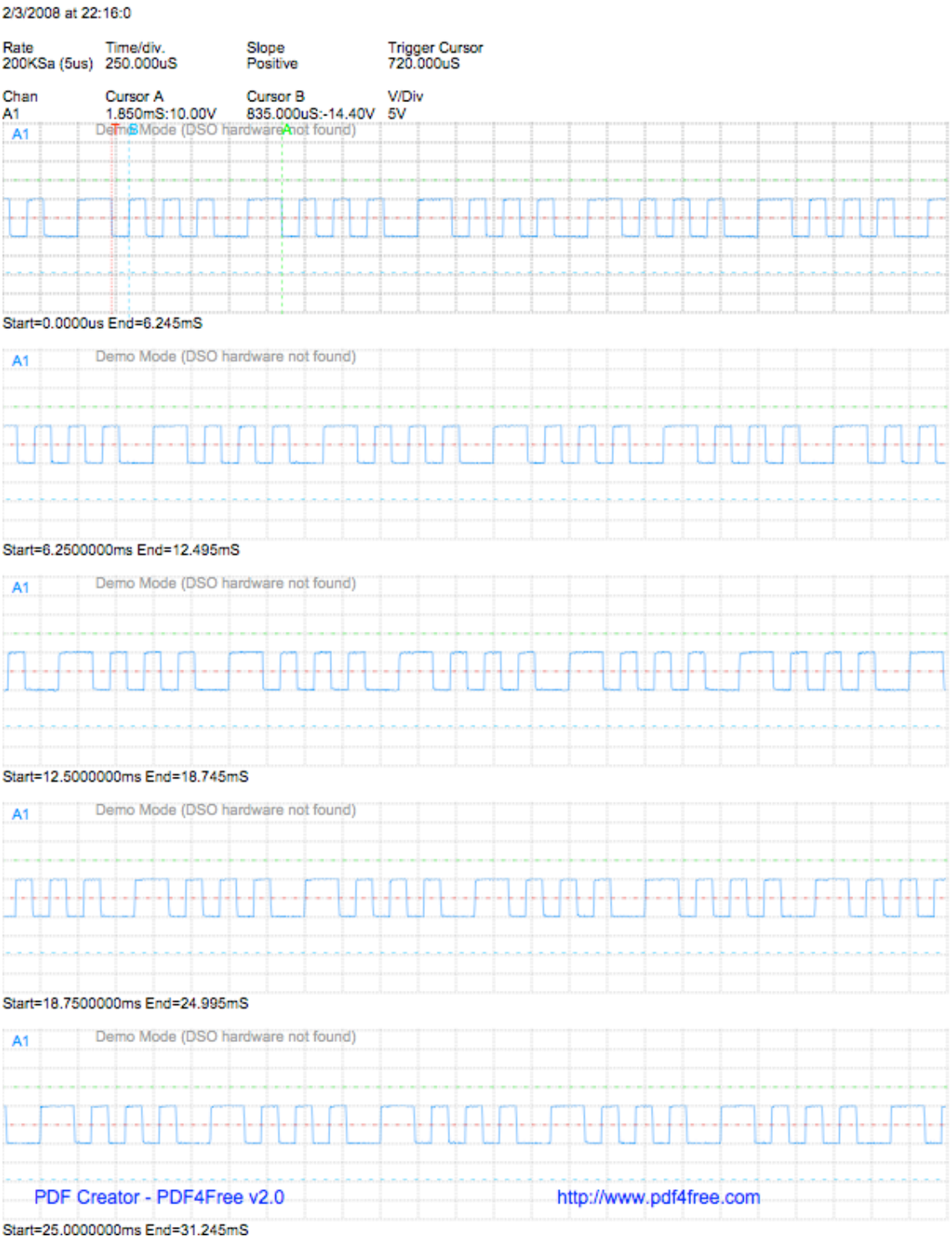

Figure 3: This figure shows data output from just the MAX232 circuit.