VOLTES FLY

User Manual

Group 3

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Introduction

Voltes Fly is a low cost vestibular cueing flight simulator which allows the user to take part in a virtual world where they become pilots of a Cessna 172 and other smaller aircraft. This project have been developed at the University of Central Florida by three members; Hector Bermudez, Joe Paolini and Manuel Arredondo. Throughout two semesters these members researched, designed, prototyped, and implemented a fully functional fly simulator. This user manual includes a brief hardware description, system setup instructions, software execution, and parts replacement.

Hardware Description

The Printed Circuit Board was designed with the purpose of having an easy access to all components; in the event that any of them needed to be replaced, it could be done easily and quickly. Figure 1 shows the final prototype of the PCB.

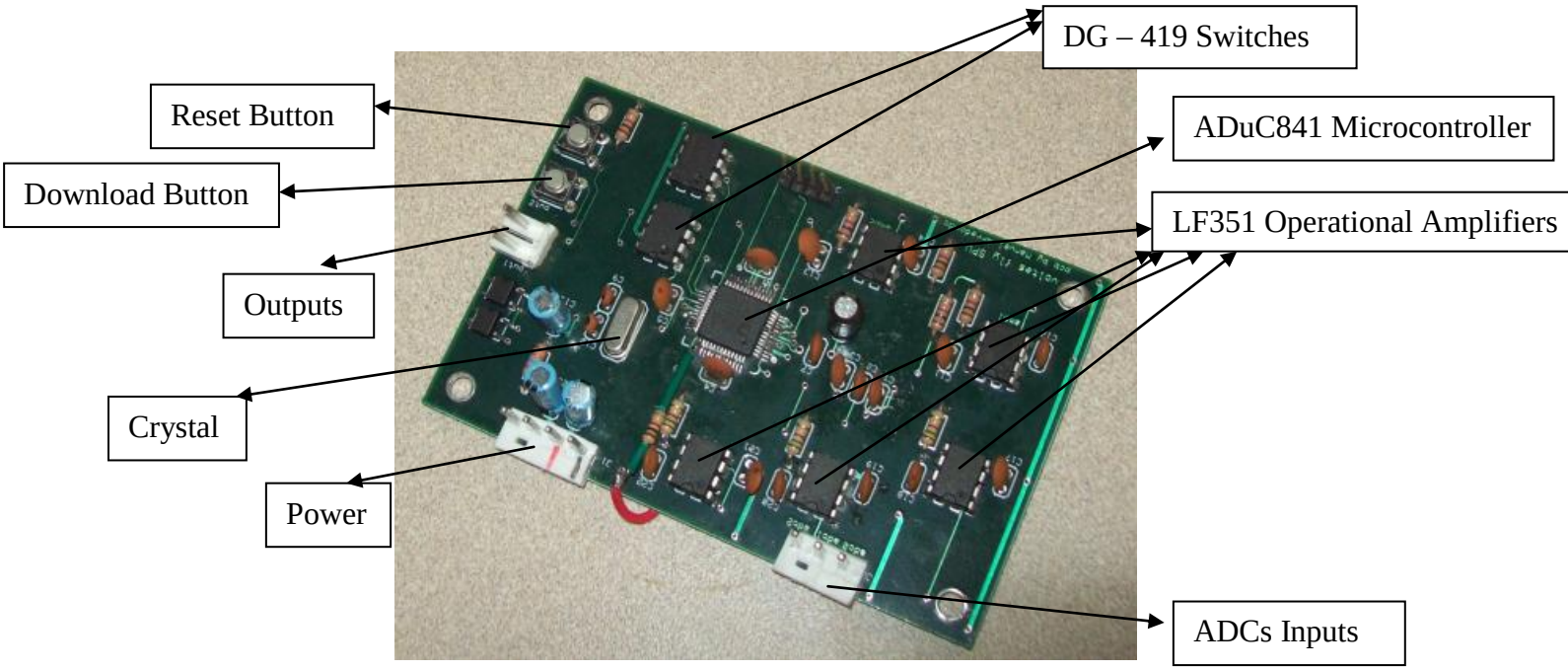

Figure 1 Printed Circuit Board Main Components Layout

Table 1 shows a detailed list of all the components needed to build the PCB and their values.

Hardware Component	Value
C1 – C7, C11 - C14, C17 – C22	.1uF
C8	.47uF
C9, C10	20pF
C15, C16, C23	10uF
Cristal	11 Mhz
2 Diodes	-
R1 – R5, R10	1K
R6	1.6 K
R7 – R9	1.5 K
U1	ADUC841
U2 – U5, U8	LF351

Table 1. Parts List

It is important to mention the fact that the 2 DOF Motion Base was provided by **Servos & Simulation Inc[1],** a company located in Orlando, Florida. Therefore, if someone wants to reproduce this project, a platform like this should be acquired a priori.

Recommended minimum hardware requirements to RUN the IOS:

- **Windows XP or higher.**
- **AMD Athlon 64x2 running at 2.51GHz or equivalent.**
- **Nvidia Geforce 6150SE nForce430 graphics card.**
- **2 GB of RAM.**

Parts Replacement

If any parts stop functioning, replacements can be ordered not only from any electronic local stores but also online. The mounting of all parts requires a bit of soldering, and might be difficult for a novice welder, specifically if especially if the part that needs to be replaced is the microprocessor.

If the board goes bad, a new board would have to be milled, as it was custom made during out project and cannot be purchased from a vendor. The CAD files are available in our documentation and website.

System Setup Instructions & Software Execution

Step	Instruction
1.	Attach power to Printed Circuit Board.
2.	Attach Serial RS232 cable from Flight Computer to Printed Circuit Board.
3.	Run IOS. See Figure 2.
4.	Turn on Flight Computer. Figure 3 – Start Flight Computer Button.
5.	Turn On Instrument Computer. Figure 3 – Start Instrument Computer Button.
6.	Remotely execute XPlane. See Figure 3 – Start XPlane Button.
7.	Verify that every sub system is properly functioning under the Health Tab. See Figure 3.
8.	Set flight parameters on XPlane.
9.	Run Motor Test. Figure 3 – Run Motor Test Button.
10.	Start simulation. See Figure 3 – Start Button.
11.	Verify that the simulation is running properly by checking every parameter under the Flight Parameters Tab. See Figure 4.

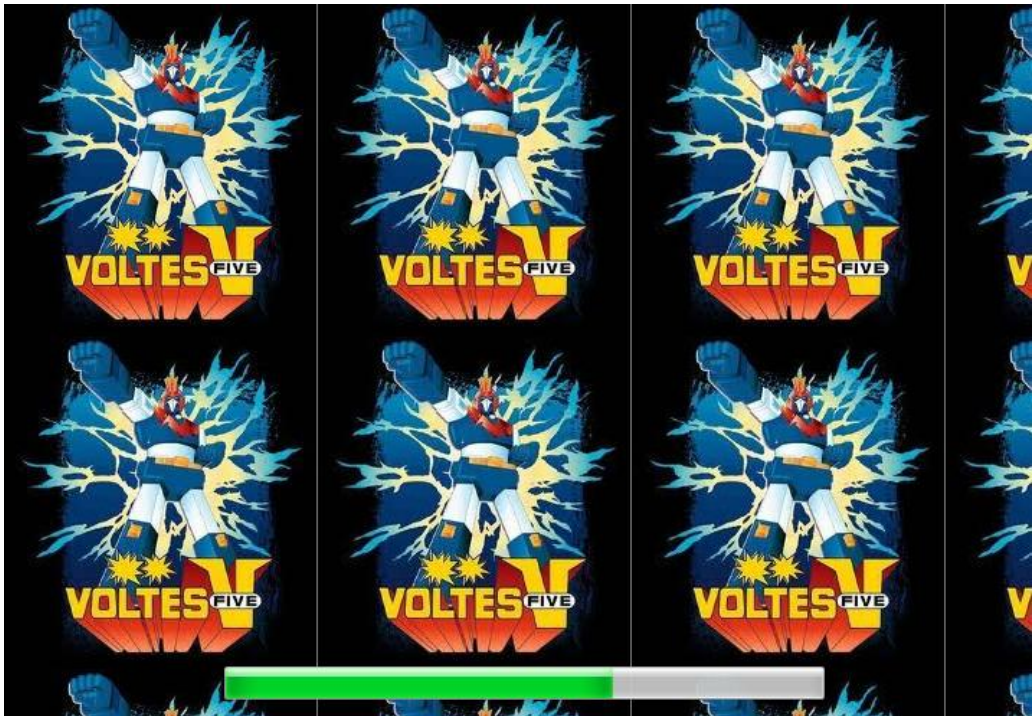

Figure 2. Loading IOS

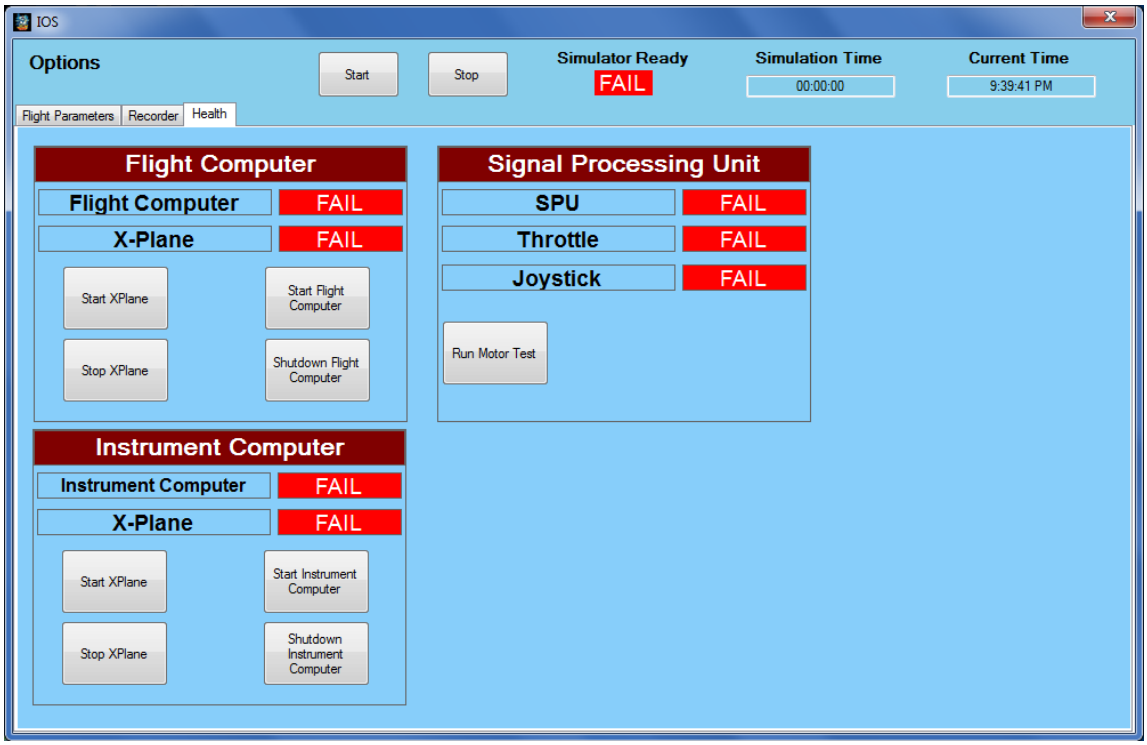

Figure 3 IOS's Health Tab

Note: Once the IOS finishes loading and the operator confirm that every subsystem is up and running, the operator can access the Flight Parameter Tab in order to check if the simulation is running properly. The Heartbeat parameter is very important since is an indicator that the communication between the IOS and the SPU is flowing properly.

If the operator wishes to record some of the flight variables, the only thing that he should do is open the "Recorder Tab" and make click on the "Start Button". The data may be seen once the operator make a click on the "Stop" button and then click on either "View Results" or the "View Plot" button (See Figure 5).

Figure 4 IOS's Flight Parameters Tab

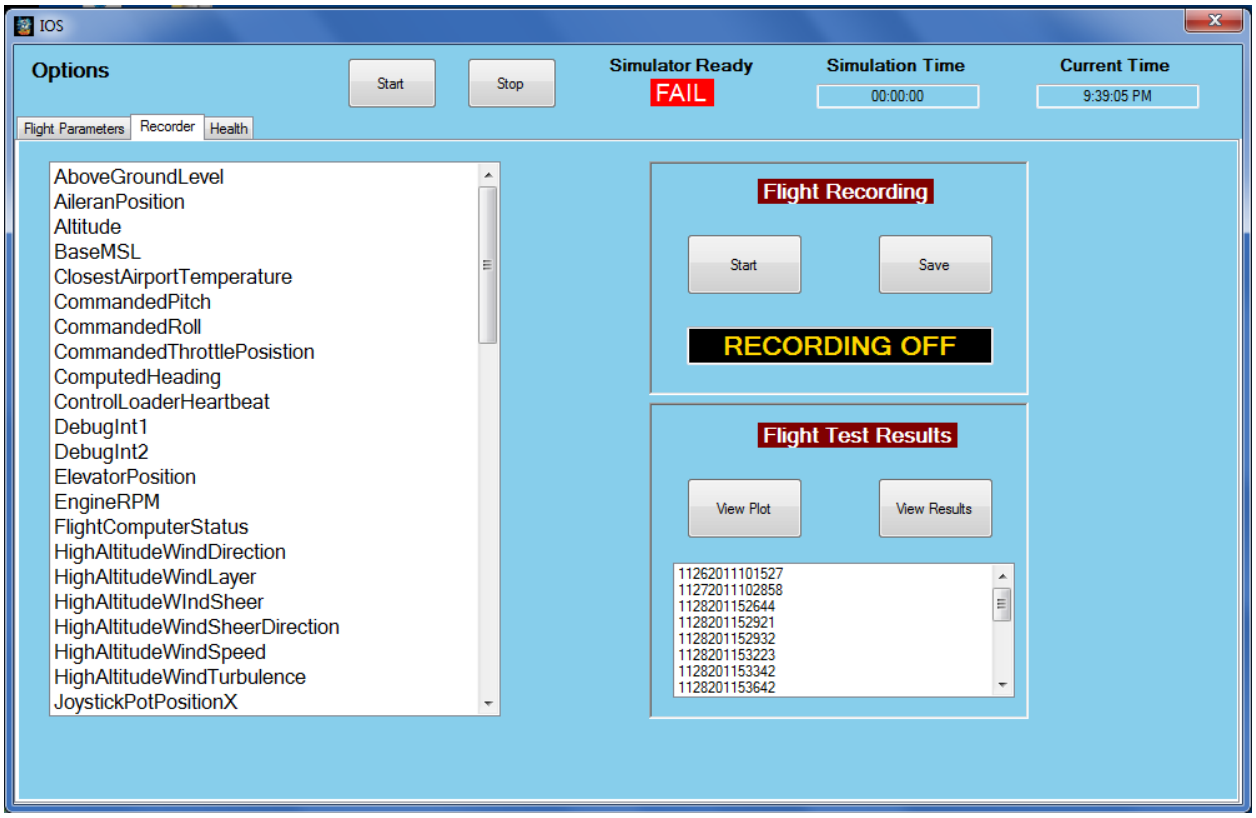

Figure 5 IOS's Recorder Tab