The Re-Boat Controller

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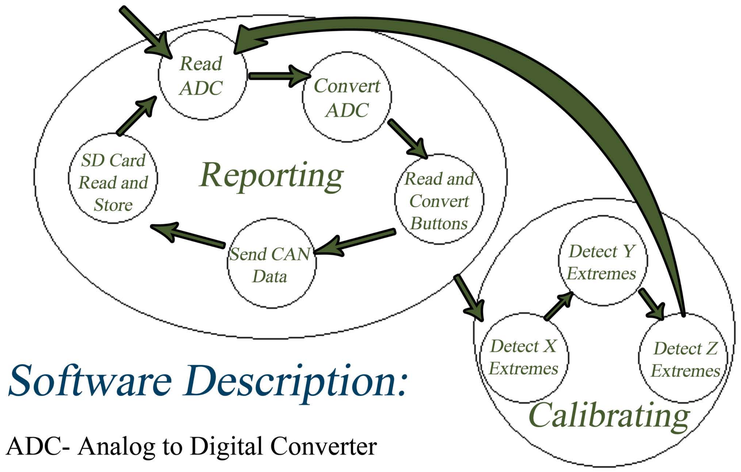
Overview:

The ReBoat Controller is to provide a Joy-stick interface for controlling the Atlantis autonomous catamaran when autonomous control is not available, using a joystick and an Infineon XC164CS Microcontroller.

Actual photo of The Atlantis which is 7.2 meters long and has a wing 5.37 meters high.

Basic Software Algorithm:



Software Description:

ADC- Analog to Digital Converter

CAN- Controller Area Network, Connecting all subsystems on the boat.

SD- Secure Digital mass storage device interface.

Reporting takes in the analog readings from the x, y, z positions of the joystick and then converts them to a digital value.

It then reads the buttons and sends these values along with the new x, y, z values through the CAN bus and writes it on the SD card.

If the calibration button is pressed at any time during the reporting state, it triggers an interrupt that will automatically start calibration.

The calibration takes in the extremes of each of the x, y, z coordinates so we have a starting point for the A to D conversion.

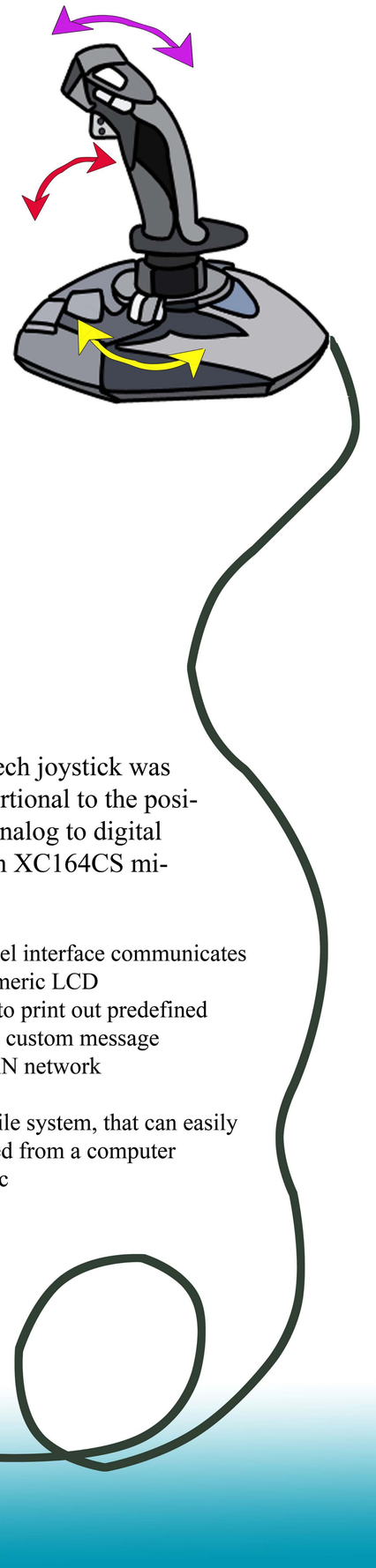
Functionality:

The Catamaran works on a three dimension "Attitude" system:

Roll- The the rotation around the longitudinal axis.

Pitch- The rotation around the transverse axis.

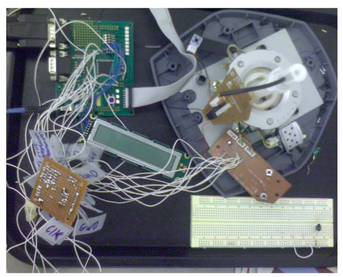
Yaw- The rotation around the vertical axis.



Hardware:

Joystick:

To accomplish this a standard three axis Logitech joystick was modified to provide three voltage outputs proportional to the position of each axis. These outputs connected the analog to digital converter peripheral within the systems Infineon XC164CS microcontroller.



All components are to be confined to a PCB and enclosed in the original joystick packaging

LCD- A 8-bit parallel interface communicates the a 20x2 alphanumeric LCD
The display is able to print out predefined messages as well as custom message received via the CAN network

SD-Uses a FAT16 file system, that can easily be read and modified from a computer
Logs all CAN traffic