

Mariokart

An Autonomous Go-Kart

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Overview

The Original Goal

- Make department go-kart drive autonomously
- Interface to the existing control system
- Select actuators, motion and distance sensors
- Development of a navigation system
- Have go-kart drive itself around university

Our Goal

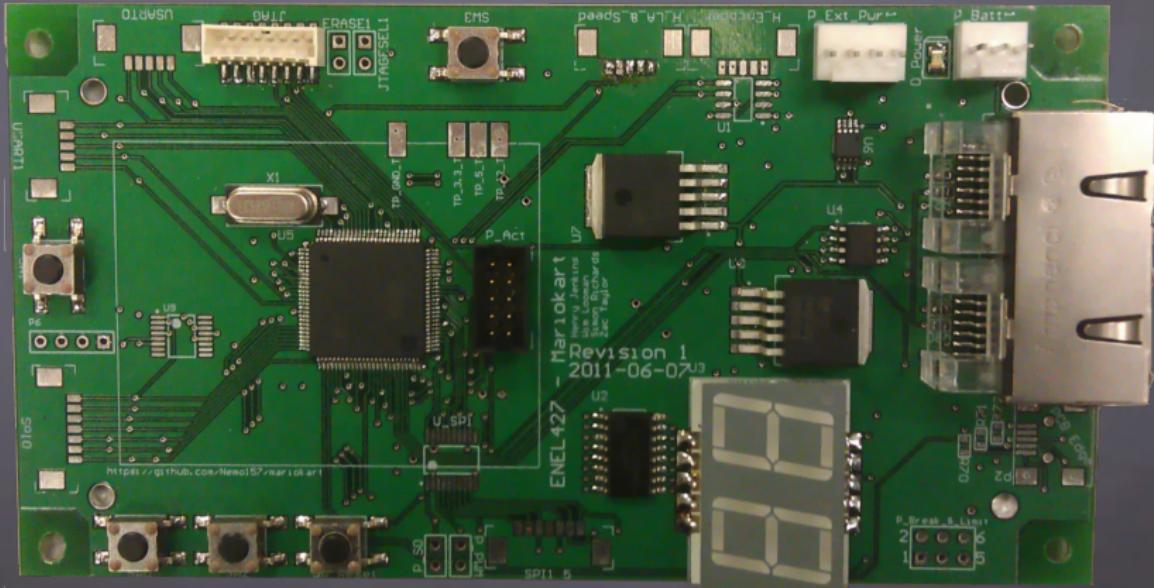
- Sub-goal of drive-by-wire go-kart
- Make a robust platform for future projects

The Go-Kart



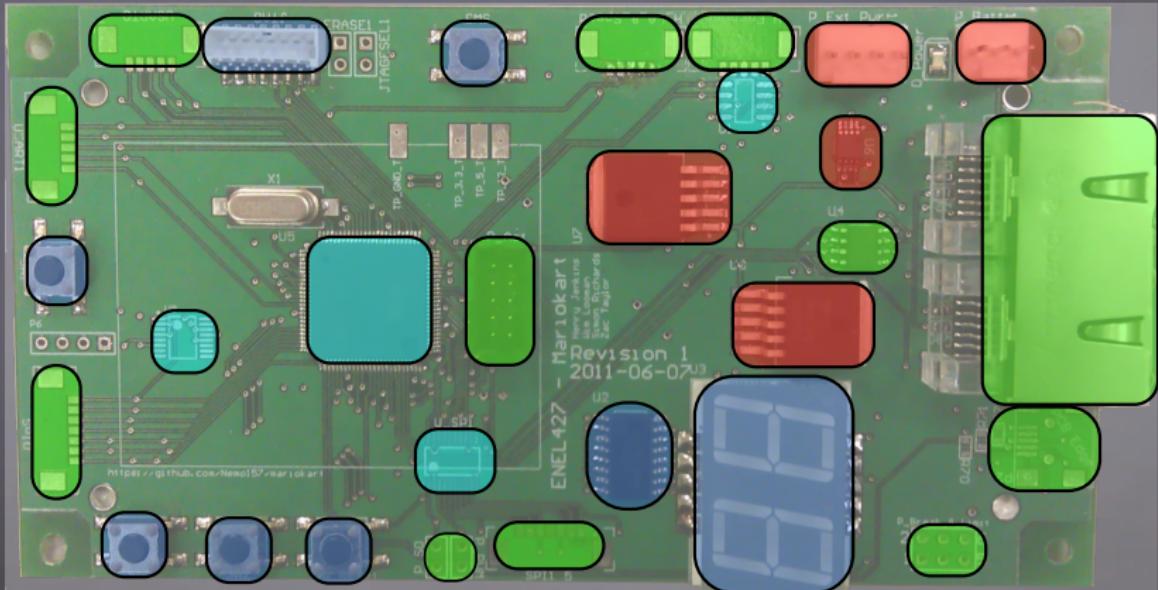
Hardware Layout

PCBs x 5



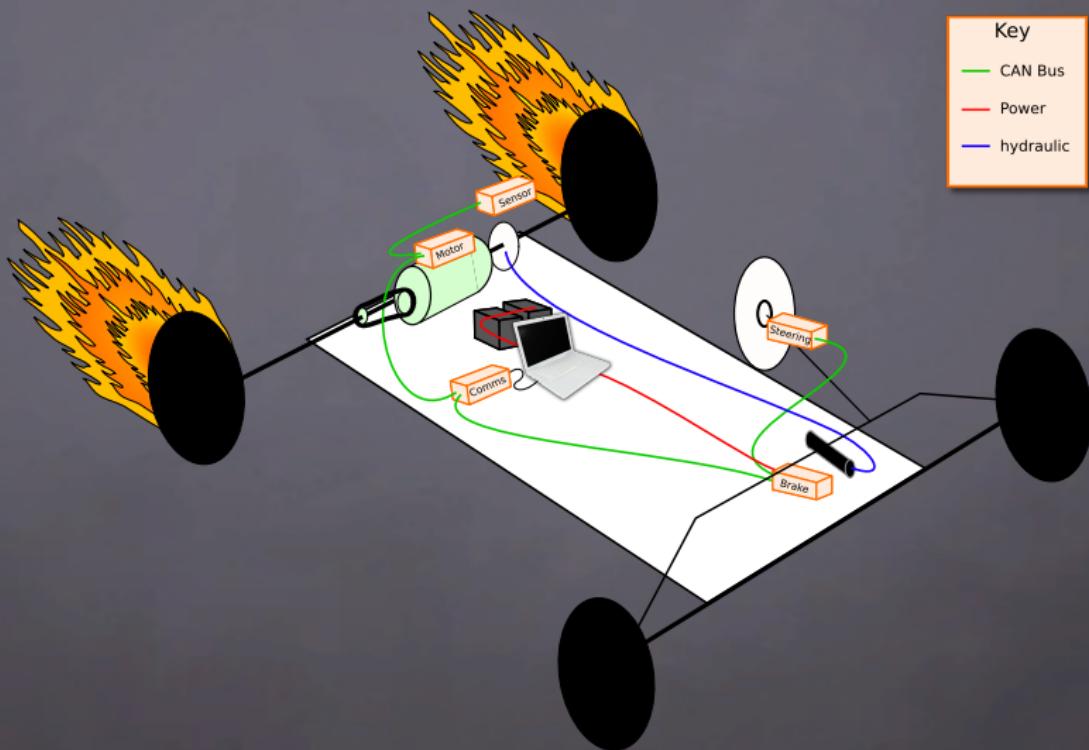
Hardware Layout

PCB Block Diagram



Hardware Layout

Whole kart



How it all communicates

Comms

CAN Bus

- Inter-Board Communications
- Expandable if someone wants to add more nodes

USART

- Two on each board
- One used for debugging

SPI

- Two on each board
- One 5v level logic

USB

- Fast communication with computer

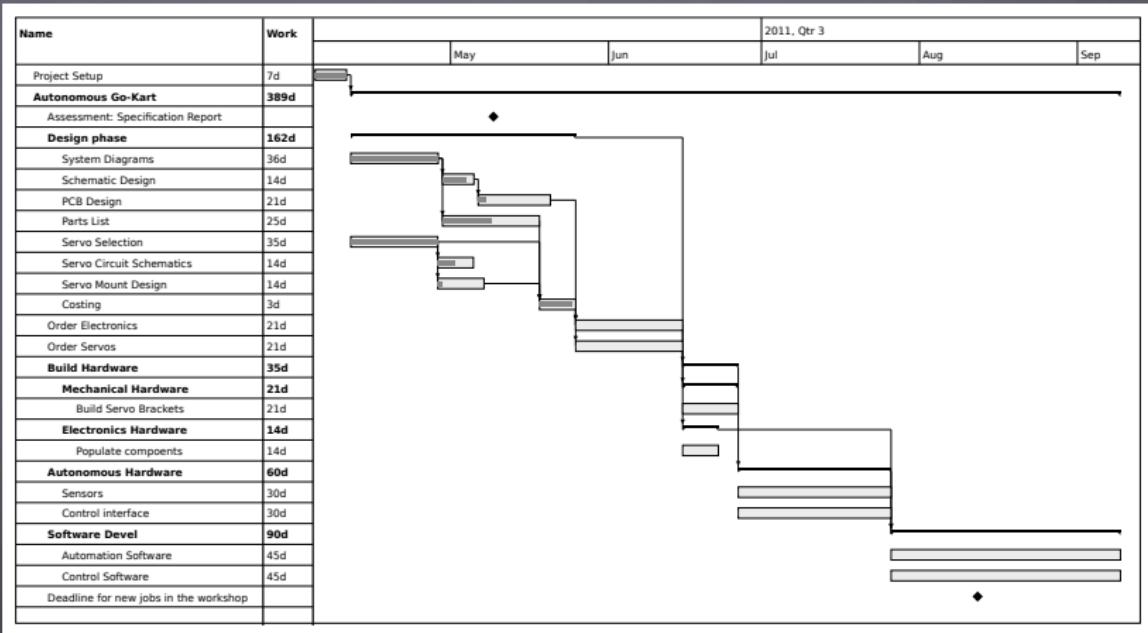
Conclusion

The end...

- All Hardware working
 - ▶ Only 3 minor mistakes on boards
 - ▶ Nice hardware platform for future years
- Project almost stuck to time plan
 - ▶ Although we cut the goal down, we came close to achieving our stepping stone goal.
- Project well documented
 - ▶ Wiki for documentation
 - ▶ Group coding standard adhered to
- Most of all
 - ▶ I learnt a lot
 - ▶ Had a heap of fun



Project time line



Why use Atmel SAM7s

- Required Peripherals
 - ▶ CAN Controller
 - ▶ USB
- Familiarity
 - ▶ Have used SAM7s before
 - ▶ Large Library for Atmel
- Expansible
 - ▶ Spare GPIO
 - ▶ Can do some signal processing

Board Design

Dreaming about Altium

1. Select major components
 - ▶ MCU
 - ▶ Voltage regulators
 - ▶ etc...
2. Select headers and connectors
3. layout schematics
 - ▶ Use sheets to modularise!
4. Connect sheets
5. Layout schematics

Main Schematic

