ENCE461 Schematic Review

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Bring your schematics, printed on A3 paper

1 Common

1. Student names and group number in title block
2. Battery fusing (this is mandatory)
3. Can be powered from USB
4. Use serial wire debug interface for programming
5. 3.3 V MCU regulator can be back driven
6. Short circuit protection for MCU pio pins going to external headers
7. Battery voltage monitoring
8. Do the analogue inputs to the MCU exceed 3.3 V?
9. LEDs for debugging
10. Jumpers for mode configuration
11. Pullup resistors on TWI bus
12. Test points
13. Ground test points
14. Game board interface connects to USART (TXD0/PA6 or TXD1/PA22 to TXD, RXD0/PA5 or RXD1/PA21 to RXD)
15. USB has series termination resistors
16. VBUS detection through voltage divider to PIO pin
17. Power supply filtering for radio (recommend ferrite bead or resistor in series with power rail with parallel capacitor)
18. The radio needs to be connected to SPI pins (MISO/PA12, MOSI/PA13, SCK/PA14)
19. TWI uses TWCK0/PA4 and TWD0/PA3 or TWCK1/PB5 and TWD1/PB4.
20. SAM4S erase pin on testpoint

21. SAM4S has 12 MHz crystal
22. Reset button connected to NRST pin
23. Power on/off button connected to WKUPn pin
24. Avoid PB4–PB5 for general I/O (they default to JTAG pins on reset but can be reconfigured in software)
25. Have external pull-down resistors to ensure chips are disabled on power-up
26. Have a few spare PIO pins connected to pads for last minute mods.

2 Hat board

1. Battery can be charged from USB
2. Fall-back option if IMU does not work
3. Nav-switch or joystick for remote control
4. Drive circuit for piezo tweeter

3 Racer board

1. Fall-back option to drive motors via servo interface using PWM if H-bridge driver fails
2. MOSFET(s) for actuator (if use p-channel MOSFET need transistor to provide sufficient gate voltage to turn MOSFET off)
3. H-bridge driven by four PWM signals (do not use PWMLx)
4. H-bridge AISEN and BISEN pins connected to ground (unless using current control)