Getting Started with the Teensy Circuits and Programming
Solderless Breadboards

Power bus (red)

Ground bus

(blue) Component bus

Note that the two sides are not connected
Wiring Standards

When possible, use wire colors for different types of signals. The common color assignments are:

• Black: ground
• Red: power
• Other: various signals
Clean Wiring
A clean breadboard will make debugging easier – and it makes circuits more robust
Care with Power

• Only insert components and wires into the breadboard when power is disconnected
• “Wire, check-twice, then power”
  • Never reverse power and ground (this is a very common mistake)
Care with Power

We are using a mixture of 3.3V and 5V components

• Be careful: we can’t always mix and match
• Right now, your Teensy is powered by your computer
• For the houvercraft: the Teensy is powered by connecting 5V to Vin and GND to GND (these lines come from the lower deck)
• The Teensy can provide 3.3V supply (up to 250mA)
• Even though the Teensy uses 3.3V as its base voltage, it is 5V tolerant (but not all 3.3V components will be)
Suggested Wiring Procedure

• Power supply
• Power/ground buses
• Insert primary components
• Wire power/ground for components
• Add signals and remaining components
Debugging Techniques

• Test incrementally
• Test intermediate sub-circuits
Teensy 3.5

- Touch
- MOSI1 RX1
- MISO1 TX1
- SCL2 CAN0TX
- SDA2 CAN0RX
- mis01 tx1
- scl0 mosi0 RX3
- sda0 mis00 TX3
- CS0 RX2
- CS0 TX2
- MOSI0
- MISO0
- 3.3V
- 24
- 25
- 26
- 27
- 28
- Touch
- can0tx
- can0rx
- CS1 RX4
- SCK1 TX4
- 29
- 30
- 31
- 32
- Vin (3.6 to 6.0 volts)
- Analog GND
- 23 A9 PWM
- 22 A8 PWM
- 21 A7 PWM
- 20 A6 PWM
- 19 A5
- 18 A4
- 17 A3
- 16 A2
- 15 A1
- 14 A0 PWM
- 13 LED
- GND
- A22 DAC1
- A21 DAC0
- 39 A20
- 38 A19 PWM
- 37 A18 PWM
- 36 A17 PWM
- 35 A16 PWM
- 34 A15 CAN1RX sda0
- 33 A14 CAN1TX scl0
- SCL1
- SDA1
- CS0 mosi1
- CS0 sck1
- SCL0
- SDA0
- sda0
- scl0
- www.pjrc.com
Teensy 3.5 Reverse Side

Cut to separate VIN from VUSB, if using a battery charger or external power.

Teensy 3.6 pins are not 5 volt tolerant. Do not apply more than 3.3 volts.

Interior:
- Reset
- Program
- GND
- 3.3V
- VBat
- 3V coin cell for RTC

Debug
- GND
- DP
- DM
- 5V
- USB Host Port

USB Power
H = Host
D = Device

Andrew H. Fagg: Embedded Real-Time Systems: Project 0

www.pjrc.com
Teensy 3.1 vs Teensy 3.5

Pinout Compatible → New Pins →
Teensy Programming Interface

Connect the Teensy to your laptop via a USB cable
• Be careful not to torque the USB connection on the Teensy
Demonstration…
General Program Hints

- Use LEDs to show status information (e.g., to indicate what part of your code is being executed)
- Remember: on the Teensy boards, there is a LED connected to port C, bit 5
- Have one LED blink in some unique way at the beginning of your program
- Go slow:
  - Implement and test incrementally
  - Insert plenty of pauses into your code (e.g., with delay ())
Project 0

• Summary:
  • Connect 4 LEDs and a switch to your Teensy board
  • Write a program that: waits for the switch to be pressed, then displays an interesting LED flashing pattern

• Details are on the class web page