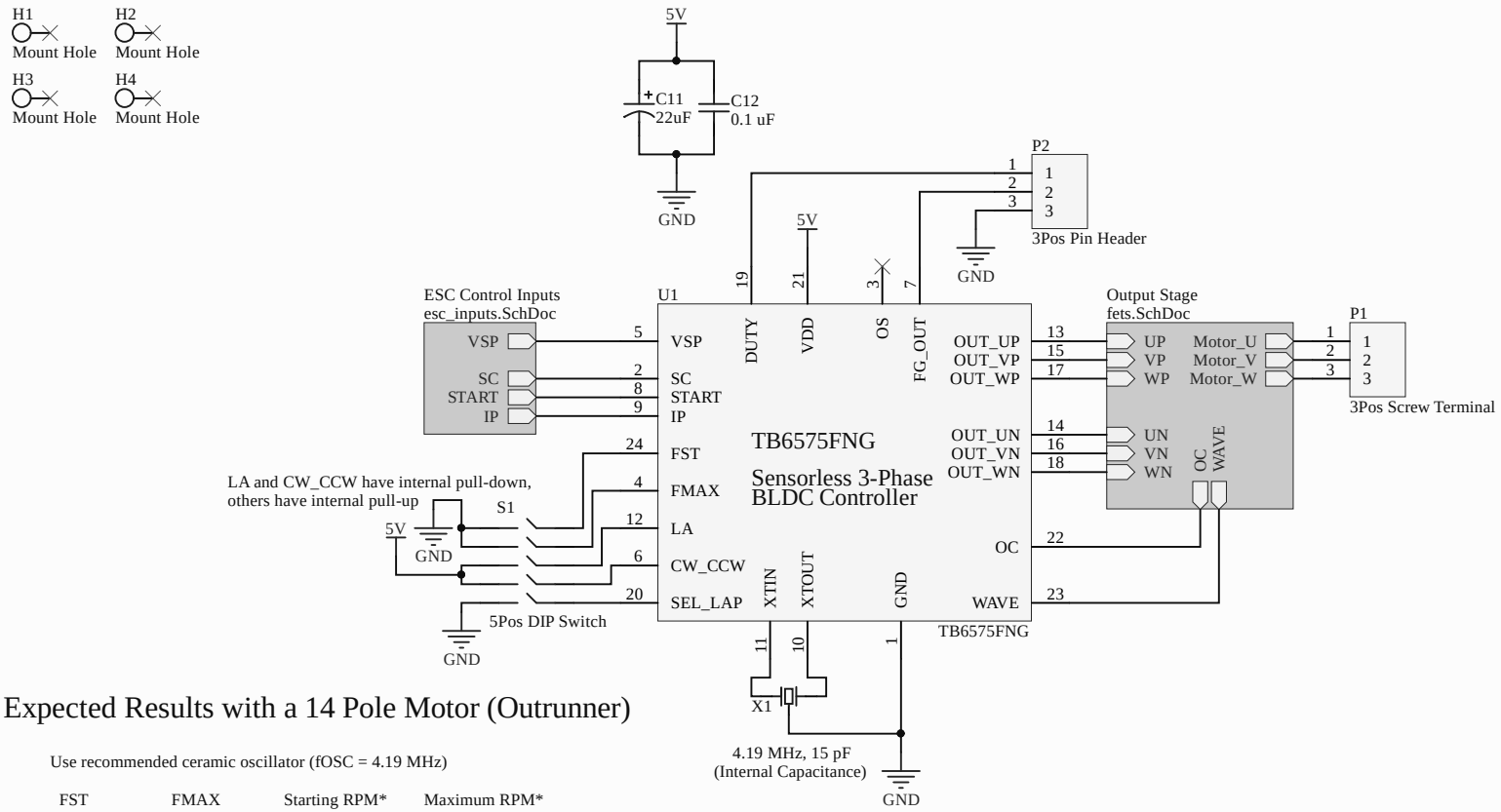

Expected Results with a 14 Pole Motor (Outrunner)

Use recommended ceramic oscillator (fOSC = 4.19 MHz)

FST	FMAX	Starting RPM*	Maximum RPM*
High (Open)	High (Open)	91	23382
High (Open)	Low	91	11691
Low	High (Open)	23	2923
Low	Low	23	1462

* RPM = (Hz / (poles / 2)) * 60s, sample motor has 14 poles

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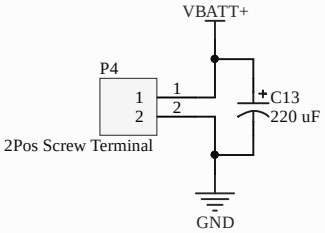
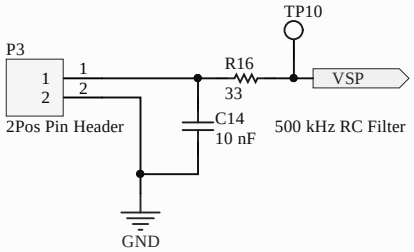
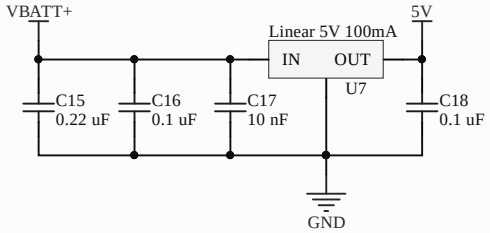
Main Power Input



Main Control Input



5V Regulation



Output PWMs have 20mA drive strength, linear regulation makes sense

Start-up and Timing Control

From the datasheet:

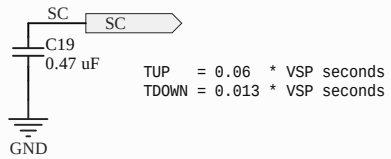
The most appropriate conditions for startup must be determined by doing an experiment by changing C1 C2, R1, Fst and VSP.

Capacitor on SC is C1, controls TUP and TDOWN which are the rise and fall time of the voltage on SC with respect to VSP:

```
TUP   = C1 * VSP / 3.8uA
TDOWN = C1 * VSP / 36uA
```

This controls the duty cycles for initial DC excitation and forced commutation mode it has to be a static configuration because sensorless feedback isn't reliable yet

Application circuit uses 0.47 uF, we will start with that as well

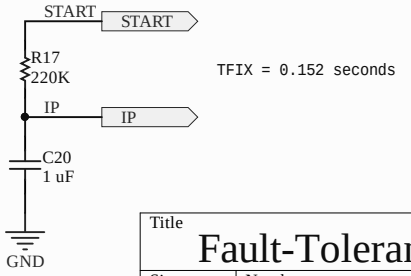



```
TUP   = 0.06  * VSP seconds
TDOWN = 0.013 * VSP seconds
```

START is an output and IP is an input, when the voltage on IP reaches VDD/2, the DC excitation period is over. A DC excitation puts the rotor in a known position so that the normal BLDC cycles can follow.

```
TFIX = 0.69 * C2 * R1
```

Application circuit uses 220k R1 and 1 uF C2:




```
TFIX = 0.152 seconds
```

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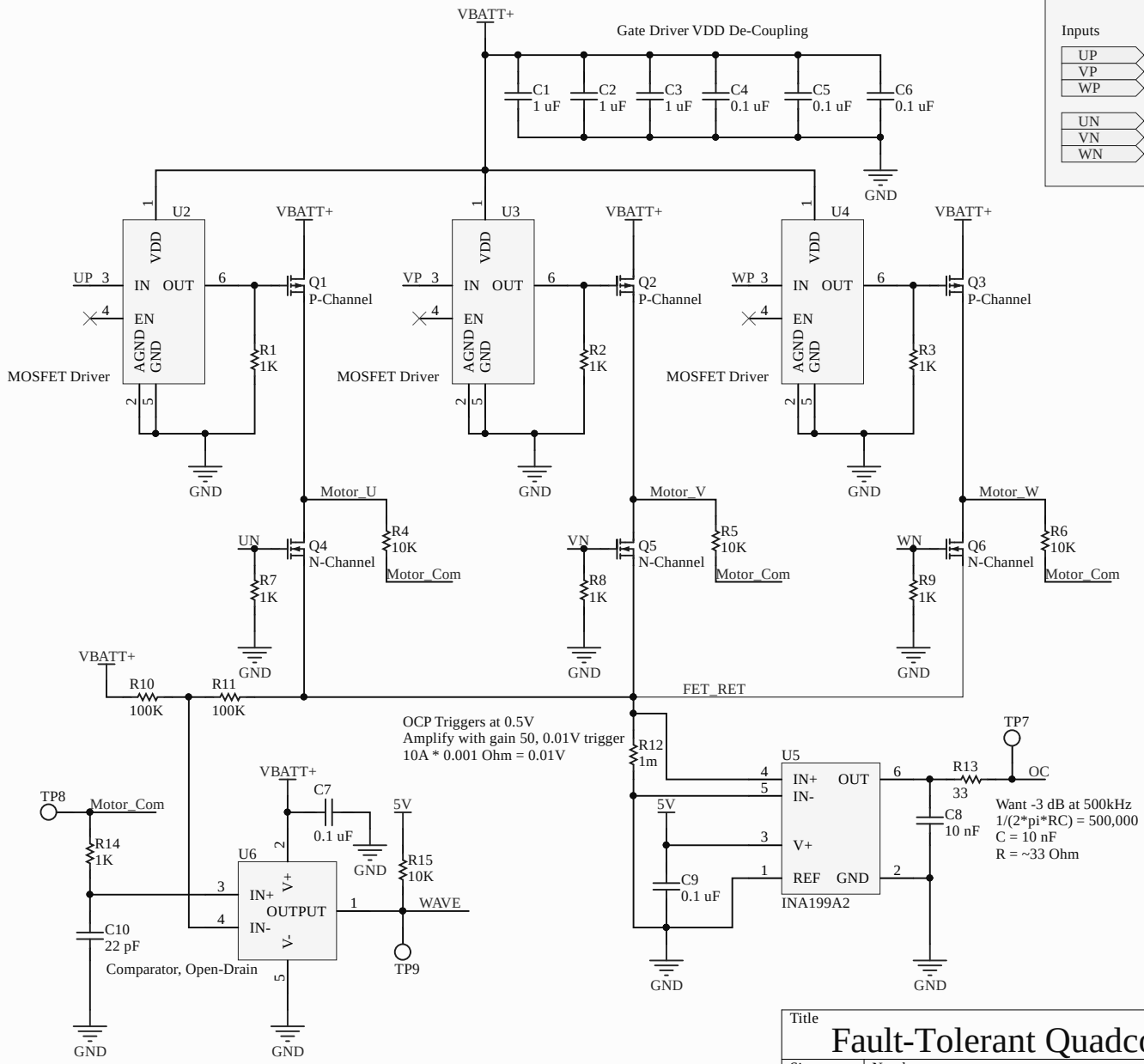

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Date: 10/31/2018		Sheet 2 of 3
File: C:\Users\..\fets.SchDoc		Drawn By: Vaughn Kottler