

STEPPER DRIVER AUDIBLE NOISE TEST 2/21 KJG

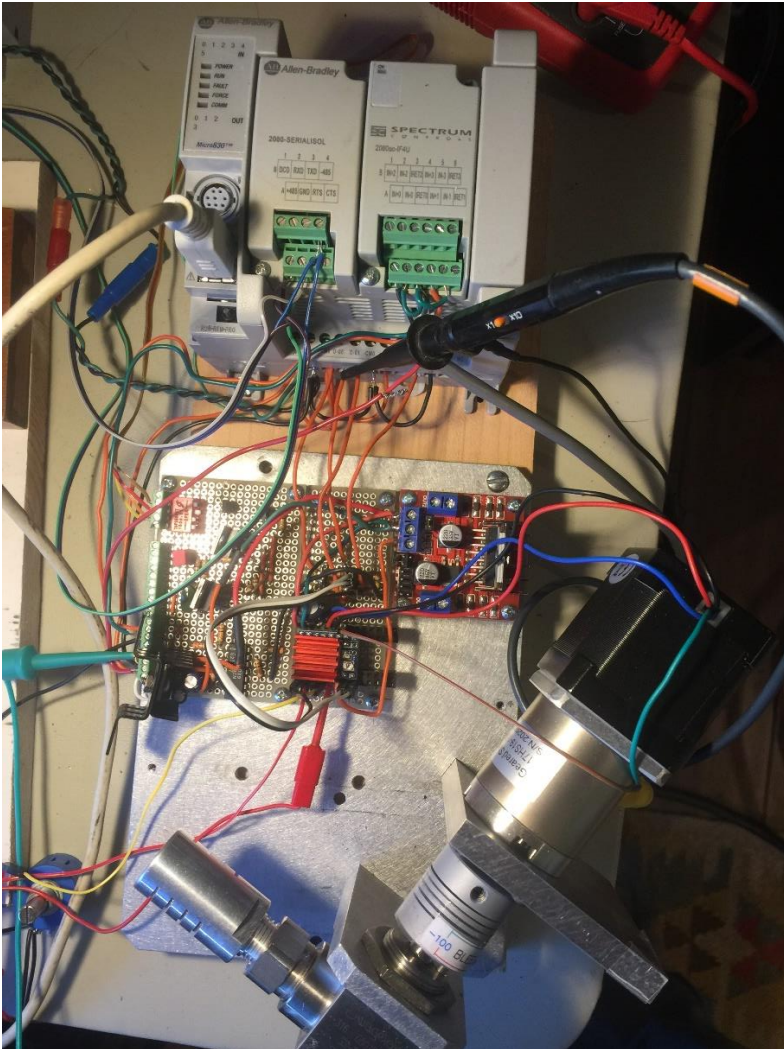
This was an unscientific noise comparison test of three stepper motor drivers. The drivers tested were:

1. TI 8825, older technology in wide use.
2. Toshiba TB67S249FTG, using their ADCS algorithm.
3. Allegro A5984, newer design with their APFD algorithm.

The hardware platform was an Allen Bradley Micro 830 PLC with motion control providing the drivers with Step and Direction inputs. The motor was a StepperOnline 17HS19-1684S-PG100. An iPhone running the Octave RTA app was used to measure the noise. The iPhone was placed adjacent to the motor in the same manner for all three tests. The signal sent to the drivers was identical for all three tests. The Direction line was pulled low while the Step line was a pulse signal at 1981 Hz. All three drivers were setup for half stepping.

The Toshiba and the Allegro drivers were compared to the TI 8825, using the TI 8825 as a baseline reference. The results of the testing indicate very little difference in the noise generated by the drivers as detected by ear. The Toshiba is significantly noisier by numerical measurement than the TI driver, while the Allegro driver is a bit quieter. Again, the differences are not perceptible by ear.

Conclusion: Based on this hardware configuration and the driver configuration, no perceptible improvement over the TI 8825 was observed.



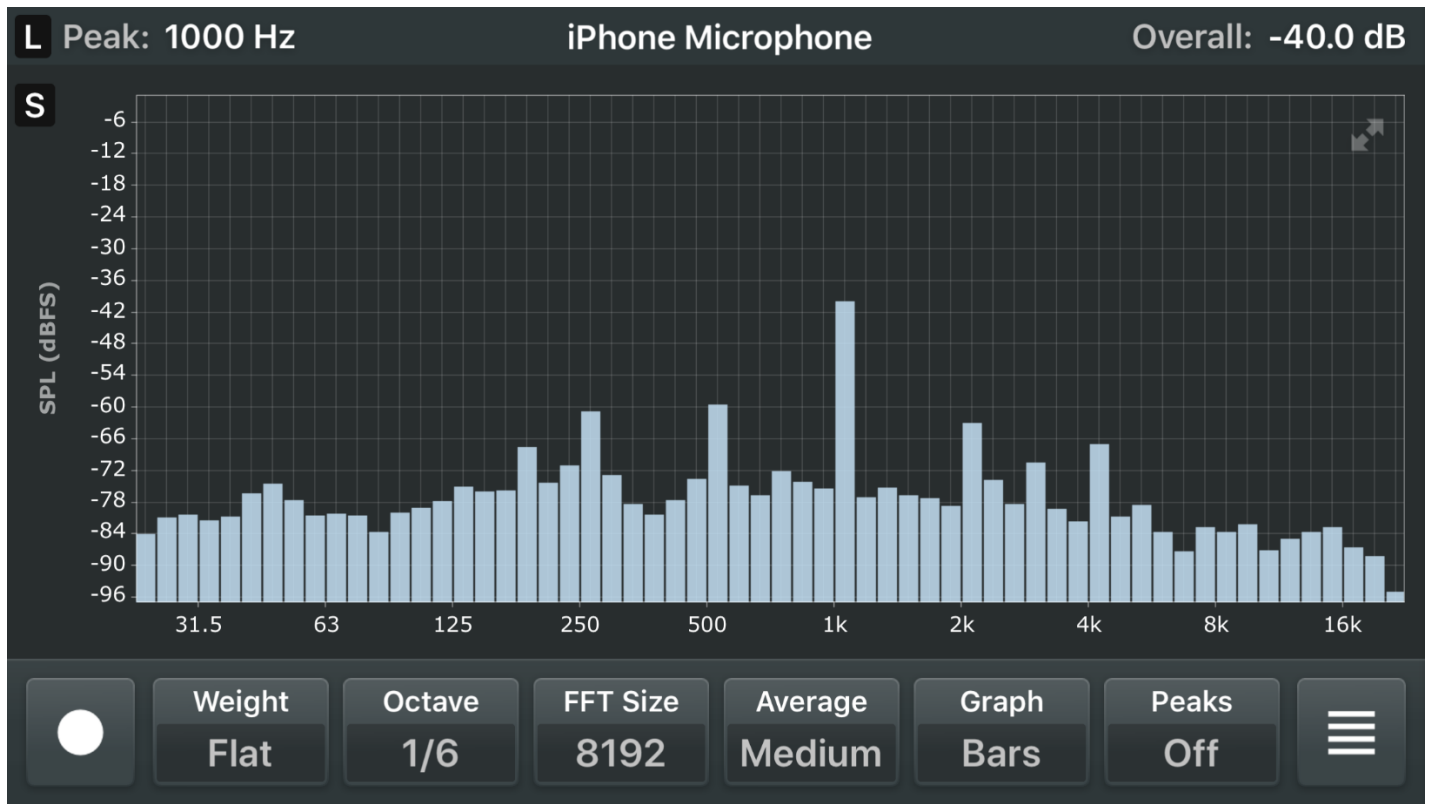


Figure 1 Toshiba TB67S249FTG Driver Noise

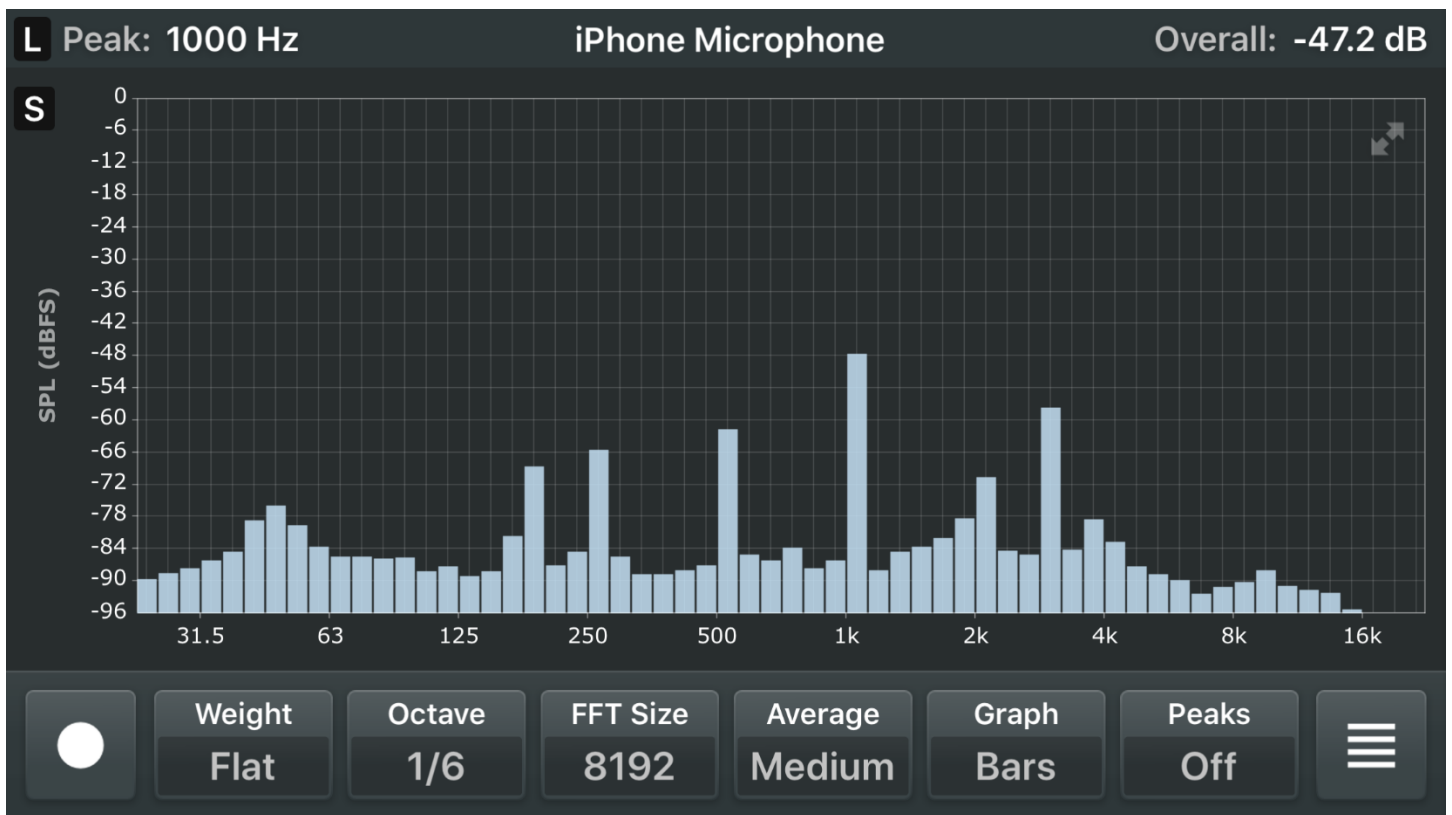


Figure 2 TI 8825 Driver Noise

The Toshiba driver is supposed to be quieter but my test shows it's noisier across the frequency band. Overall, it's 7.2 db noisier... My ear can't really tell the difference... Peak at 1000 Hz is higher for Toshiba ~ -40 db, TI ~ -48 db. 3rd harmonic is lower for Toshiba at 2800 Hz.

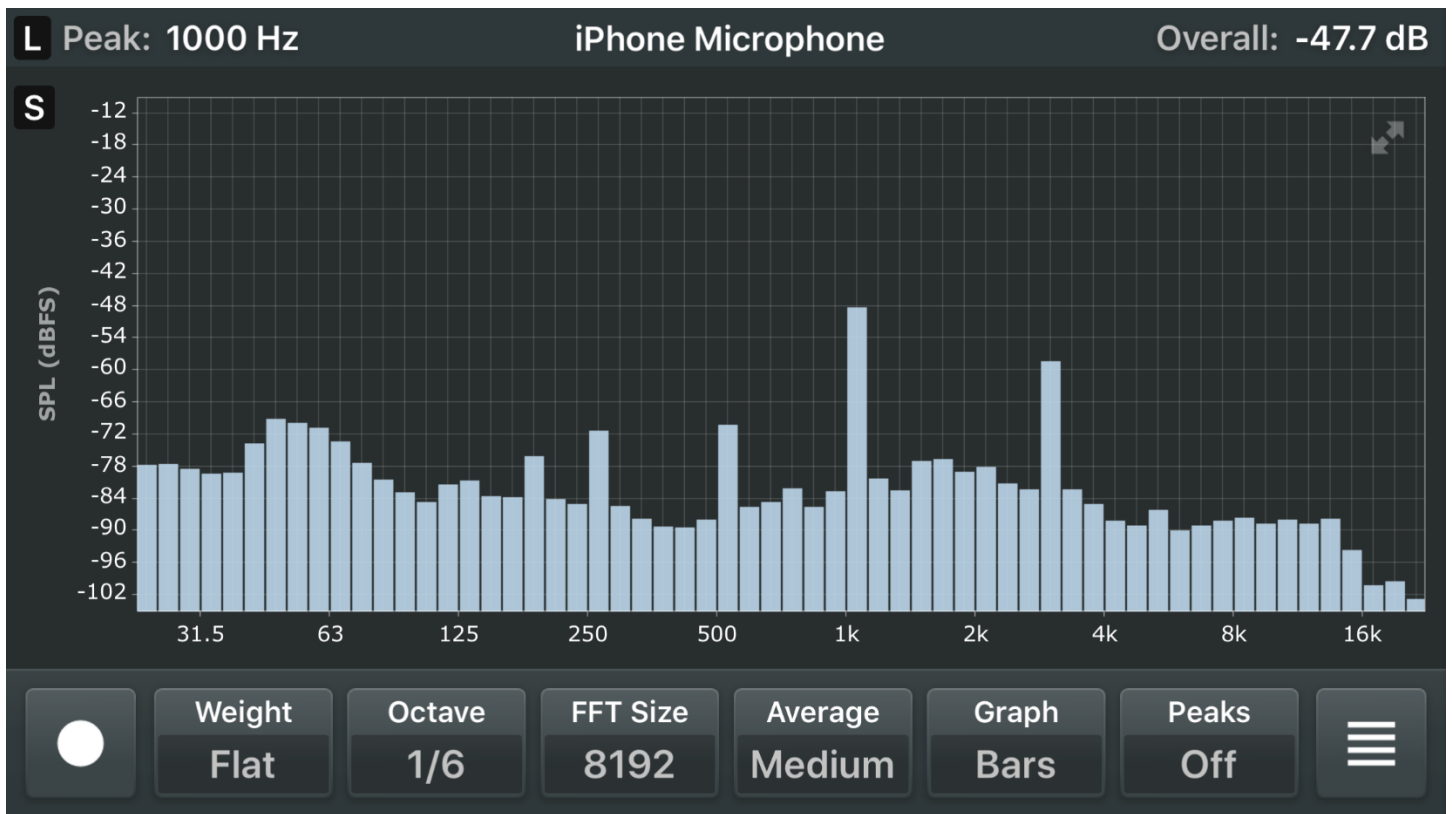


Figure 3 Allegro 5984 driver

The Allegro 5984 is another driver that claims to be quieter and smoother than the TI 8825. It is in fact, quieter by $\frac{1}{2}$ db. Not much improvement. The peak at 1000 Hz is identical to the TI8825. 3rd harmonic is about the same as the TI8825.