DE1.3 Electronics 1

Workaround for a common fault in ESP32 relating to DAC output

Background

A number of students experience a common problem with the DAC output on Pin26. The symptom is that for unknown reason, signal generator can only provide an analogue output voltage between around 1.6V and 3.3V. Instead of outputting say, 1V, the DAC outputs 1.6V+0.6V, or around 2.2V. However, all digital signals work properly. All analogue outputs above 1.65V also work perfectly. This document explain which part of Lab 1 – 3 that can proceed with this fault, and what workaround that one may follow.

Lab 1 – Signals and Scope

- Tasks 1 to 4 – Unaffected.
- Task 5 – You can complete the table for voltage settings at 2.0V or above.
- Task 6 – As long as you use sine wave where the minimum voltage is above 1.65V, the signal is unaffected. Any signal that stray below 1.65V is "reflected" at 1.65V due to the fault of the DAC circuit inside the ESP32.
- Task 7 – Unaffected.
- Task 8 – No workaround – skip this one.
- Task 9 – Unaffected.
- Task 10 – Tests 1, 3, 4, 6 unaffected. Can't really do 2 and 5.

Lab 2 – Electronic Circuits

- Task 1 – As long as you keep the voltage at 1.65V and above, this task can proceed.
- Task 2 – Again keep Vout above 1.65V, you can proceed.
- Task 3 – Unaffected, but keep sine wave above 1.65V at all times.
- Task 4 – Unaffected.
- Task 5 – Unaffected.
- Task 6 – Unaffected.
- Task 7 – In determining the frequency response of the signal, keep the sine wave above 1.65V, it will work. The NOISY signal is not perfect, but will still demonstrate the low pass filtering effect and reduction in the noise portion of the signal.
- Task 8 – Unaffected.
- Task 9 – Unaffected. The LED will not turn On when Vdc is below 1.65V anyway.
- Task 10 – Unaffected.

Lab 3 – Amplifier Circuits

- This lab mostly uses sine wave signal from the signal generator. It is mostly unaffected as long as you only use sine wave signal above 1.65V at all times.