

Experiment 7 : ADC/DAC

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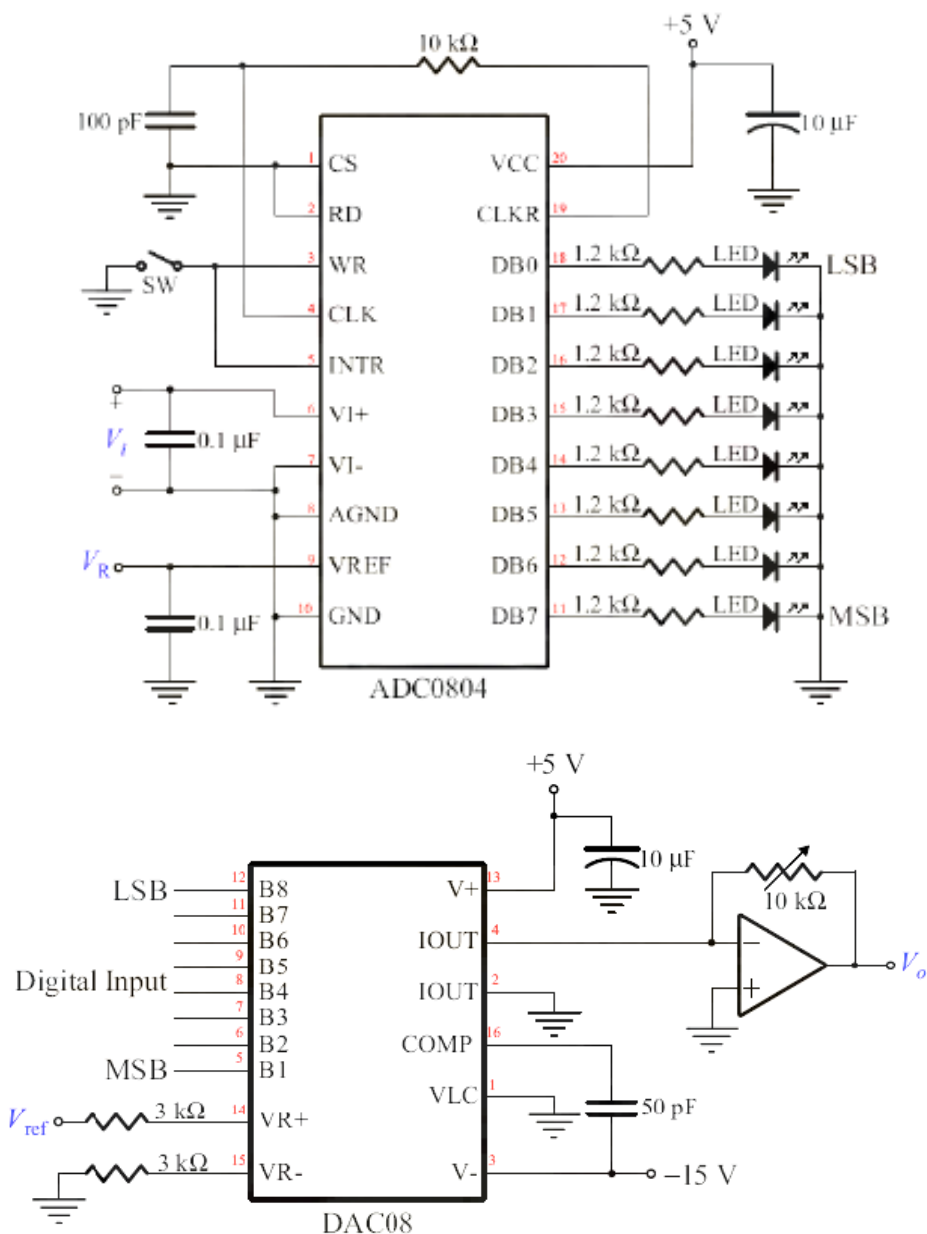
Class Number : 三早

1. Experiment Objectives

1.1. To study another group of analog IC circuits of great importance, data converters.

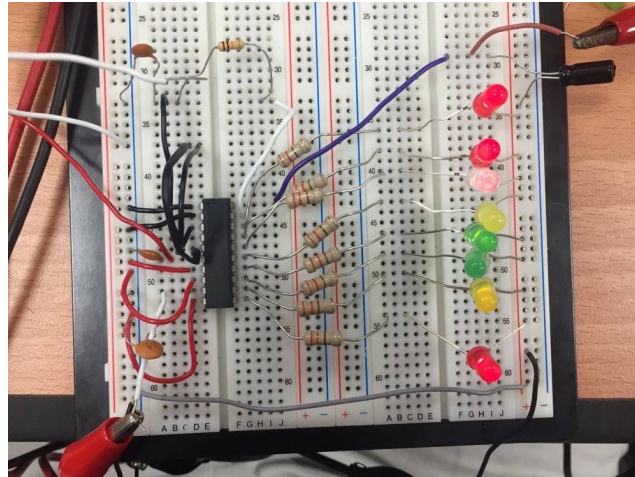
1.2. Be familiar with ADC/DAC circuits.

2. Experiment Setups



3. Labs Work

3.1. Analog voltage value to digital output



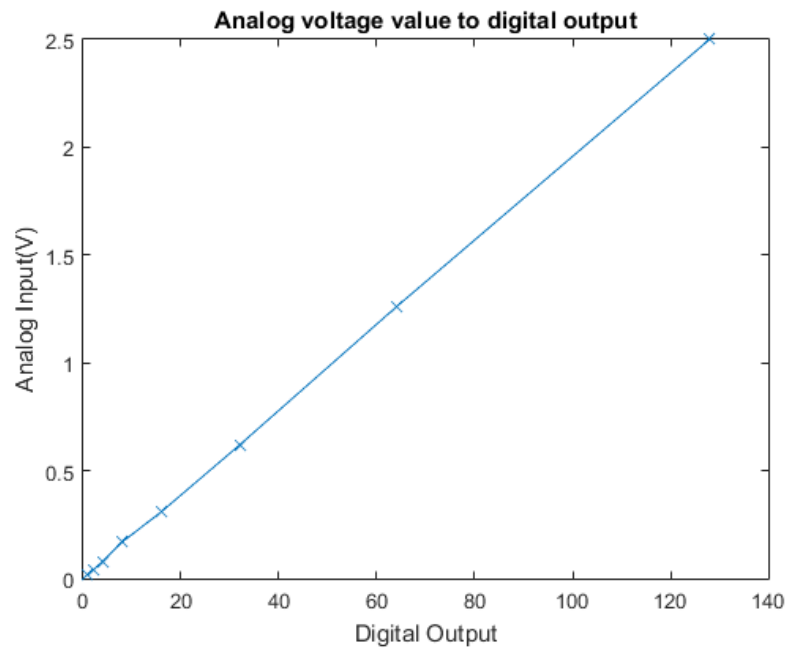
Analog input V_{in} (V)	Digital output (binary)	Digital output (decimal)
0.0155	0000 0001	1
0.0389	0000 0010	2
0.0809	0000 0100	4
0.1686	0000 1000	8
0.3052	0001 0000	16
0.6270	0010 0000	32
1.2529	0100 0000	64
2.5086	1000 0000	128

3.2. Analog voltage value to analog output through ACD/DAC

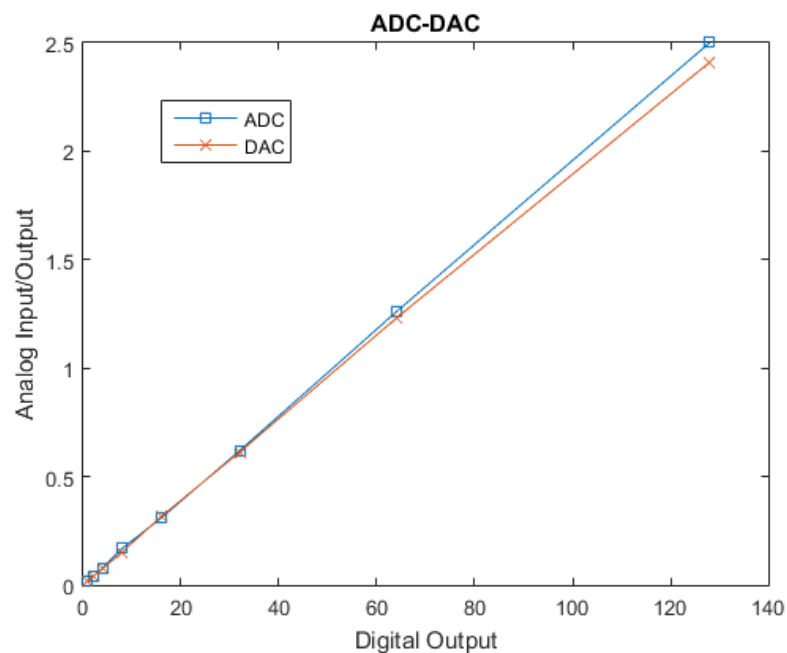
Analog input V_{in} (V)	Digital output (binary)	Analog output V_{out} (V)	Quantization error $V_q = V_{out} - V_{in}$
0.0160	0000 0001	0.0192	0.0032
0.0390	0000 0010	0.0400	0.0010
0.0800	0000 0100	0.0769	-0.0031
0.1700	0000 1000	0.1535	-0.0165
0.3100	0001 0000	0.3169	0.0069
0.6200	0010 0000	0.6137	-0.0063
1.2600	0100 0000	1.2307	-0.0293
2.5000	1000 0000	2.4100	0.0900

4. Labs Questions

4.1. HW#1



4.2. HW#3



4.2.1. The errors of the ADC/DAC circuits were actually relatively small, mostly ranging from 0.3% to 3%, the cause of such error was probably due to the effect of the instrumental mismatch such as the voltage supplier.

4.2.2. Also, if the the ground of separate circuits were not connected, the experiment result will certainly be unacceptable due to the fact that the null voltage point of either circuit was different.