ECE3120: Computer Systems Chapter 7: Interfacing I/O Devices

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- □ Prev...
 - Interfacing with Simple input devices

- □ Today...
 - Interfacing with a D/A converter

The AD7302 D/A Converter (1 of 2)

- □ A dual-channel 8-bit D/A converter made by Analog Devices
- □ The AD7302 converts an 8-bit digital value into an analog voltage.
- □ The block diagram is shown in Figure 7.24. The AD7302 is designed to be a memory-mapped device. The CS signal must be low for this chip to work.
- □ The AD7302 needs a reference voltage to operate. The reference voltage could be external one (from the REFIN pin) or the internal VDD.
- □ Each conversion takes about 2 us to complete.

The AD7302 D/A Converter (2 of 2)

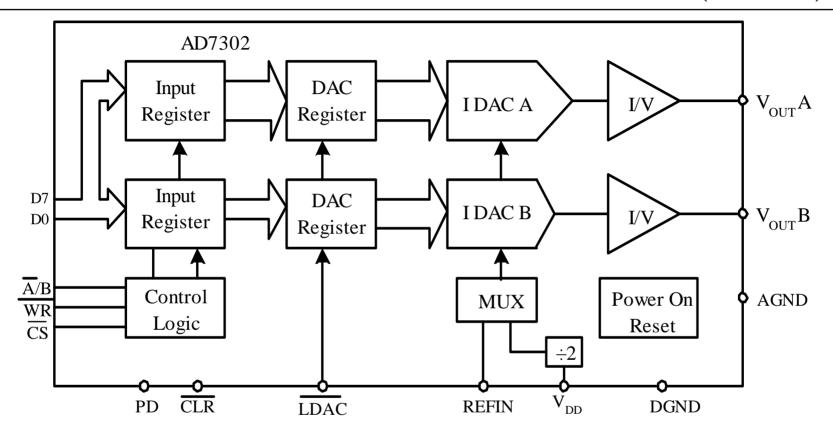


Figure 7.24 Functional block diagram of the AD7302

- The output from either DAC is given by $V_{OUT}A/B = 2 \times V_{REF} \times (N/256)$

Vref=Vdd/2

where, N is the digital value to be converted.

Using the AD7302 to Generate Sawtooth Waveform

- □ Configure PB7...PB0, PJ0...PJ1 for output.
- Output the digital value from 0 to 255 and repeat. For each value, pull the PJ0 to low and then to high so that the value on pins PB7..PB0 can be transferred to the AD7302.
- □ Pull the signal PJ1 to low during the process.

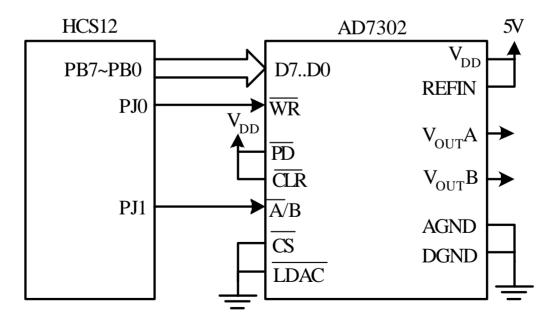


Figure 7.44 Circuit connection between the AD7302 and the HCS12

Example 7.11 Write a program to generate a sawtooth waveform from $V_{OUT}A$ pin.

The assembly program is as follows:

```
#include "hcs12.inc"
                   $1500
         org
         movb
                   #$FF,DDRB
                                      ;configure port B for o/p
         bset
                   DDRJ,$03
                                      ;configure PJ1 &PJ0 for o/p
         bclr
                   PTJ,$02
                                      ;select VoutA o/p
Loop
                   PORTB
         inc
                                      increase the output by one step
         bclr
                   PTJ,$01
                                      generate a rising edge on PJ0 pin
                   PTJ,$01
         bset
                                      • ,,
```

ADD NINE MORE BSET INSTRUCTIONS TO PROVIDE 2 US FOR DA CONVERSION

bra loop end

Next...

- □ Timer Functions
- □ Read Chapter 6.1-6.5