

DAC820d: Calibration & Test

Cascina, 25/05/09

1 Introduction

DAC820d offers the possibility to calibrate zero crossing distortion, gain and offset for each channel. To calibrate the zero crossing distortion, we generate a very low level signal (sine wave $100 \mu V_{pp}$ at 10Hz) that easily allow to see and correct it (in the time domain) .

We choose 10 Hz as reference frequency for all our measurement, because it is far from the cutting frequency of antialiasing filters, (set around 3.4kHz).

To calibrate gains, standard signal is $2.1V_{pp}$ at 10Hz.

We assume to have a vme crate equipped with one RIO cpu, one DSP, one ADC and the DAC to be tested.

1.1 Preliminary check and settings

- First check: Vcc, +15, -15 led on.
- 50 ohm termination jumper JP1: ON if the DAC is the last of the clock chain (JP1 is bottom left, near the front panel).
- Shells
 - Open a first shell for DSP server using ssh
Connect to `ctrl18.virgo.infn.it` using the `virgorun` account.
Then connect to the rio CPU by:

```
telnet rio101a(account:virgorun)
```

- Open a second shell for Damping client
Connect to `ctrl18.virgo.infn.it` using the `virgorun` account.
- Open a third shell for `dbase.dat`, text file where you can save calibration values.

```
Connect to ctrl18.virgo.infn.it using the virgorun account.
```

```
ncedit /virgoData/Sa/Damping/dbase.dat
```

1.2 Board configuration (optional)

- Address settings:

telnet rio101a (account virgorun, psw: grav...)

/virgoDev/Sa/ServerDamping/v0r2/RIO806X/dspmap.exe -e

you can set:

- VME address (9001xx00 where xx is serial number converted to hexadecimal)
- VBex address (40, 48, 50, ...)
- Board type (3 = ADC, 4 = DAC)
- Serial Number (first remove JP3)

Switch off the crate (reset the dsp/rio) in order to apply the modification.

1.3 Test 1: DAC sign

In the first shell, Start EServerDSP: Use the alias **ES**.

You should wait until doesn't appear "DSP is Idle"

In the second shell:

cd DACtest

Start the Damping interface using the alias Damping:

type: **Damping** rio101 "your name".

Load signtest dsp program.

HHL alldac

We generate a sinewave signal at 10Hz (2 V_{pp}), added to a DC level of 1V.
In this way you can easily check if each channel has the right sign.

1.4 Test 2: Harmonic distorsion

In the second shell:

HHL alldac

Set the COMB gain to 0.0001, then

CQQD

H

Check in the DSP Server shell that the program has been downloaded correctly.

Turn the trimmer to minimize the distortion (to reconstruct a sine wave signal).

1.5 Test 3: Gain Adjustment

We generate a sine wave signal at 10Hz, with amplitude $2.1V_{pp}$.

For each channel measure the output voltage and write it to **dbase.dat** (/virgoDev/Sa/Damping/dbase.dat).

1.6 Test 4: Offset Adjustment

Set at zero the comb gain, and measure the output offset (in the time domain), write each value to dbase.dat (with the opposite sign).