Characterization

Temperature and Radiation

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Characterizations for sensor: 1276

TEMPERATURE CHARACTERIZATION

The temperature characterization is conducted using the temperature system CTS T-40/50 at the company facilities. Each sample is exposed at a temperature drift from 10ºC to 75ºC during one hour with measures every second. The data collected during the temperature steps is processed and extracted the lineal regression equation. The regression equation permits to compensate the sensor output against the reference output and eliminate most of the temperature effect on the sensor readout.

Temperature readout (digits)	Sensor Frequency Output (Hz) - y	Reference Frequency Output (Hz) - x
109	45432	44076
130	45520	44208
144	45552	44264

Lineal regression equation: y = mx + b

m: 1,40 b: -18810

Temperature Offset: 88

RADIATION CHARACTERIZATION

The radiation characterization is carried out using the 60-Co source of the Radiation Physics Laboratory at the University of Santiago de Compostela (USC). The radiation procedure consists of a non-biased irradiation of the sample at 30 rad(Si)/h dose rate for an accumulated Total Ionizing Dose (TID) of rad(Si). The measures are carried out before and after the irradiation at the company facilities. From the data collected it is extracted the sensitivity for each sensor.

Pre-irradiation sensor value (Hz) - pre*	Post-irradiation sensor value (Hz) - post*
481.883	-10188.4

Sensor sensitivity: s = (pre-post) / 15

s = 519 Hz/rad

* Temperature compensated

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Temperature readout (digits)	Sensor Frequency Output (Hz) - y	Reference Frequency Output (Hz) - x
109	39984	38968
130	40036	39048
144	40060	39092

Lineal regression equation: $y = mx + b$

m: 1,47 b: -19289

Temperature Offset: 88

RADIATION CHARACTERIZATION

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Pre-irradiation sensor value (Hz) - pre*	Post-irradiation sensor value (Hz) - post*
510.233	-10110.6

Sensor sensitivity: s = (pre-post) / 15

s = 510 Hz/rad

* Temperature compensated