SPEDE instrument paper

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Abstract

This paper describes the SPEDE (Spacecraft Potential, Electrons, and Dust Experiment) instrument on-board the SMART-1 satellite of European Space Agencument on-

2.3 Monitoring of plasma density and waves in the Earth’s magnetosphere and in the Solar Wind

3.2 Basic modes of operation

The basic modes of operation are

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the sensor foil/wire and the spacecraft ground including boom structure. The boom has a diameter of 22mm at the tip, which is covered by a lid from the same sensor foil material, electrically connected to the guard layer. For low density plasma the 10 cm x 2.5 cm probe cylinder can be considered spherical.

Figure 6: SPEDE measurement electronics diagram.

The measurement result is the frequency coming from the VFC, compared with the internal fixed 16MHz clock frequency. Using a measurement window defined by the 16 MHz clock as e.g. 1 sec the number of observed VFC pulses correspond directly to the VFC frequency averaged over the measurement window. Defining the measurement window by e.g. 150 VFC pulses, the number of observed 16 MHz clock pulses give the average pulse length of the VFC signal. The nominal measurement windows are 998 ms and 4 ms, or alternatively 20 or 150 reference clock pulses.

3.4.1 Technology aspects

reference voltage and reference ground. While the reference is rather stable, a temperature dependence