DEVELOPMENT OF SPACEWIRE BASED DATA ACQUISITION SYSTEM FOR THE X-RAY CCD CAMERA ON BOARD ASTRO-H

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Short Paper

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ABSTRACT

The Japanese 6th X-ray astronomy satellite, ASTRO-H, is scheduled to be launched in 2014. One of the mission instruments is an X-ray CCD camera system called SXI (Soft X-ray Imager). SXI uses a 2x2 CCD array, whose CCD chip is the largest among the X-ray CCD detectors flown in space. The information network of ASTRO-H is based on SpaceWire (SpW), and the SXI data are acquired on it. This paper presents the development of the digital part of the SXI breadboard model (BBM) including SpW link.

The digital part consists of four components: (1) a Sequencer, (2) a DE I/F, (3) a SpaceCube and (4) a POSIX computer. The Sequencer and the DE I/F are composed of two Universal SpW Boards. The board is a prototype of ASTRO-H Mission I/O Board and is developed by Mitsubishi Heavy Industries Ltd. It has SpW interface and two FPGAs. Sequencer provides timing clocks for both the analogue and digital systems; the former drives a CCD and the latter processes its outputs. The DE I/F acts as the digital system, which receives ΔΣ-ADC output from analogue part and stores the data in on-board SDRAMs. SpW links the DE I/F and the SpaceCube. The POSIX computer communicates with SpaceCube with TCP/IP on Ethernet: the SpaceCube works as a protocol converter. The DAQ software based on "SpaceWire/RMAP Library" by T. Yuasa runs on the POSIX computer. A running test showed that the DAQ was stable more than 24 hours.