The Ultra-Fast Flash Observatory (UFFO) Pathfinder for Gamma-Ray Bursts (GRBs) consists of two telescopes. The UFFO Burst Alert & Trigger Telescope (UBAT) handles the detection and localization of GRBs, and the Slewing Mirror Telescope (SMT) conducts the measurement of the UV/optical afterglow. UBAT is equipped with an X-ray detector, analog and digital signal readout electronics that detects X-rays from GRBs and determines the location. SMT is equipped with a stepping motor and the associated electronics to rotate the slewing mirror targeting the GRBs identified by UBAT. First the slewing mirror points to a GRB, then SMT obtains the optical image of the GRB using the intensified CCD and its readout electronics. The UFFO Data Acquisition system (UDAQ) is responsible for the overall function and operation of the observatory and the communication with the satellite main processor. In this paper we present the design and implementation of the electronics of UBAT and SMT as well as the architecture and implementation of UDAQ.