

# DAQ Control Signal Codec for Time of Flight AFP Detector

Wednesday 15 September 2021 16:08 (1 minute)

The particle physics experiments produce the data in the order of tens GB per hour. Due to the limited resources for data storage and offline processing this amount has to be reduced with respect to the events strongly related to the ongoing experiment. Data acquisition (DAQ) system is the key component dedicated to data collecting and storing at different stages of the particle detector system. The Codec takes the commands from the Digital Trigger Module (DTM) in Time-of-Flight (ToF) detector chain at ATLAS Forward Proton (AFP) project. These commands are then encoded and prepared for the fast serial transfer via the 265 m long coaxial cable located between the CERN LHC accelerator and the rack room where the DAQ is placed. As the LHC operating frequency (bunch clock) is 40 MHz the transfer rate of the 5-bit data frames is set to 400 MHz. The received signal at the end of the coax is distorted mainly due to the parasitic capacitance and limited output power of the cable buffer of the transmitter. Therefore, the receiver implements the circuitry for the restoring of the input signal. Then the decoder processes the received data frame and prepares the signals for control of the DAQ. The system as a whole will be thoroughly tested in DESY and CERN and consequently installed at LHC.

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**Session Classification:** Poster Session 3 (Applications in Particle Physics)

**Track Classification:** Applications in Particle Physics