

ABSOLUTE GPS TIME EVENT GENERATION AND CAPTURE FOR REMOTE LOCATIONS

HiRes Collaboration

The HiRes experiment operates fixed location and portable lasers at remote desert locations to generate calibration events. One physics goal of HiRes is to search for unusual showers. These may appear similar to upward or horizontally pointing laser tracks used for atmospheric calibration. It is therefore necessary to remove all of these calibration events from the HiRes detector data stream in a physics blind manner. A robust and convenient "tagging" method is to generate the calibration events at precisely known times. To facilitate this tagging method we have developed the GPSY (Global Positioning System - YAG) module. It uses a GPS receiver, an embedded processor and additional timing logic to generate laser triggers at arbitrary programmed times and frequencies with better than 100nS accuracy. The GPSY module has two trigger outputs (one microsecond resolution) to trigger the laser flash-lamp and Q-switch and one event capture input (25nS resolution). The GPSY module can be programmed either by a front panel menu based interface or by a host computer via an RS232 serial interface. The latter also allows for computer logging of generated and captured event times. Details of the design and the implementation of these devices will be presented.