

Current Diagnostics Procedure

- Frontend must be booted to run in development mode.
- Diagnostic setup and running only available directly through frontend.
- Diagnostic signal is continuous pulses at RF frequency.
- Greychip configuration is unique to diagnostic mode to avoid saturation.
- All channel tests are performed serially.
- After each test, data is pulled from closed orbit buffers (?).
- Signal magnitudes are calculated for each test and stored in an ASCII file.

Proposed Changes

- Use closed orbit Greychip configuration
- Setup test signal for bunch pattern that doesn't saturate A/D or filters
- Only run during beam off conditions
- No need to reboot/reconfigure system

Proposed Changes Cont'd

- Run signal tests in parallel
- Do all proton “A” plates then “B” plates and repeat with pbar plates
- Measure: all off, direct input, A to B and vice versa, A to B and direct (and vice versa)

Frontend Storage

- Store measured values in another buffer.
- Store raw I-Q values and timestamps for each measurement.
- One closed orbit measurement/test.
- 5 measurements/channel: off, direct in, in from opposite channel, direct in and to opposite channel, in from opposite channel with direct in.

Proposed Frontend Commands

- Enable/Disable diagnostic source / status
- Set channel switches individually / status
- Set diagnostic mode (include no-beam override flag).
- Run diagnostic measurement.

Applications

- W25: Enable/Disable diagnostic source for a house, set switches for individual channels.
- Global BPM: Run diagnostic test on one or all houses.
- Retrieve diagnostic data and examine time-stamps.
- Compare diagnostic data to saved diagnostic data and flag any data out of tolerance.
- Save diagnostic data (indefinitely) as new reference for determining out of tolerance measurements.