

Operating Procedure for the **GSB raw voltage recording**

(Version 1.0 , Dec 21st, 2009)

Current supported mode :

Only 16 MHz observed bandwidth with 4bit/sample recording (56 GB/hr for each polarizations)

Recording clusters :

GSB raw voltage dump recording system is consist of 32 nodes :

- (1) Node1-Node16 for acquisition
- (2) Node33-Node48 for recording with 64 * 500 GB storage

Observation set-up :

- (1) "ssh" log-in into jroy@gsbm1
- (2) Open required terminals using `./run_term.csh`
- (3) On "ACQ:SHM-WRITE" : `./run_rawdump.csh 1` (this will start writing the raw data in local shared memory)
- (4) On "ACQ:SHM-READ" :

Edit the " run_rawdump.csh" script for the duration of the scan (e.g. "set buffer_count = 1200" in units of 250ms)

`./run_rawdump.csh 1 3C147` (this will start writing the raw data into disks with a file name like "raw_voltage1.dat.3C147.node0.scan0")

Restart the "run_rawdump.csh" for second scan with source name.

For a continuous scan of more that 30 mins (buffer_count = 7200), the recoding program brake the file recording into the second set of files with "scan1" extension

Data will be written into Node33-Node48 : /mnt/a/jroy, /mnt/b/jroy, /mnt/c/jroy, /mnt/d/jroy (64 data files and 16 timestamp files in total)

Analysis set-up :

On "ANALYSIS" terminal :

1. Edit " /mnt/code/jroy/gsb32/SYS_FILES/source.hdr" : Enter the source and frequency information

```
3C48 0.42866520506972 0.57960269899518 610000000 16666666 540000000 70000000
Source-name>>Precess-RA(rad)>>Precess-DEC(red)>>RF(Hz)>>BW(Hz)>>LO1(HZ)>>LO4(HZ)
```

2. Edit "gsb.hdr" for the keywords in "bold"

```
GSB_LTA = 1 /* 8 - fixed value */
GSB_ACQ_BW = 16.666666 /* 16.666 or 33.333 */
GSB_FINAL_BW = 0 /* 0,4,8,16,32,64,128 */
GSB_CHAN_MAX = 512 /* 256/512 */
GSB_STOKES = 2 /* 2 Total_Intensity; 4 Full_Stokes */
GSB_FSTOP = 1 /* 1 - ON, 0 - OFF */
GSB_RAWCORR = 1 /* 1 - ON(30ms), 0 - OFF */
GSB_IABEAM = 0:30 /* 1 - ON, 0 - OFF,:time res 30/60 */
GSB_PABEAM = 0:30 /* 1 - ON, 0 - OFF,:time res 30/60 */
GSB_RAWBEAM = 0:30 /* 1 - ON, 0 - OFF,:time res 30/60 */
GSB_NNODE = 16 /* no of nodes have raw data */
GSB_PHAS = 0 /* 1 - Load phase table, 0 - init */
```

Choices of keywords :

GSB_LTA = 1 (for 250 ms or 30 ms visibility), 8 (for 2sec visibility)
GSB_RAWCORR = 1 for 30 ms visibility, 0 for other mode

3. Edit "run_offline.csh" :

```
set infile1 = "raw_voltage1.dat.3C48_610"
set infile2 = "raw_voltage2.dat.3C48_610"
set infile3 = "raw_voltage3.dat.3C48_610"
set infile4 = "raw_voltage4.dat.3C48_610"
set timefile = "timestamp_voltage.dat.3C48_610"
set obs_length = 7200 (in units of 250ms)
```

4. Run the "run_offline.csh" : ./run_offline.csh

5. Final visibility products will be in gsbm2:/mnt/raid0/jroy/corr.dat

6. Display of the binary visibility data :

(a). ssh log-in to "jroy@gsbm2"

(b). cd /mnt/code/jroy/bin/rawdump/ANALYSIS/

```
./gtax -v visibility file -o outfile -r refant -b baselines -c chanel -t timesel -n 0/1 -f fftsize
```

7. Data backup : ssh node49a "mt -f /dev/nst0 status" (SDLT 600 tape is connected to node49a)

SOP to convert raw visibility data to Ita data.

1. **SCP data from gsbm2 to pulsar@mithunc:** to your directory in **/data/pulsar/gsbdata/Users_dir/**. **Rest of the conversion to be done in mithunc.**
2. Copy, from pulsar@mithunc:/home1/pulsar/gsb/SYS_FILES/, files **antsys.hdr**, **sampler.hdr**, **scan.hdr** & **corrsel.hdr** to Users_dir. **DO NOT EDIT** sample files kept in SYS_FILES directory.
3. Update **scan.hdr** for **source RA, DEC, MJD_REF, Freq Params.**
4. Update **corrsel.hdr** for "**CHAN_NUM**" which will be either "**0:511:1**" OR "**0:255:1**".
5. Copy pulsar@mithunc:/home1/pulsar/gsb/bin/offline/scIta.csh in Users_dir.
6. Edit scIta.csh in your directory for "**input raw visibility file**" and "**output Ita file**".
7. Use **Itahdr**, **listscan** & **gvfits** from /home1/pulsar/gsb/bin/offline/ for content checking, conversion to FITS.