OPERATING PROCEDURE
FOR
RUNNING GWB - III

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Abstract

This document will provide you the information and standard operating procedure (or SOP) in a way to configure and run the new broadband **GPU** based **GMRT Wide-band Back-end** (**GWB-III**) and its related applications.

Chapter 1: GWB PARAMETERS

1.1 Available gwb_config parameter selections and resultant values

GWB Parameter	GUI Selection	Resultants in hdr file
MODE	REALTIME	0
LTA	32	0.671088 * 32 = 21.474816 sec
	16	0.671088 * 16 = 10.737408 sec
	8	0.671088 * 8 = 5.368704 sec
	4	0.671088 * 4 = 2.684352 sec
	2	0.671088 * 2 = 1.342176 sec
	1	0.671088 sec
ACQ BW	400 MHz	400.0000 (Not released)
	200 MHz	200.0000
	150 MHz	150.0000 (Not released)
	100 MHz	100.0000 (Not released)
	50 MHz	50.0000 (Not released)
CHANNELS	512	512
	1024	1024
	2048	2048
	4096*	4096(Not released)
	8192*	8192(Not released)
	16384*	16384(Not released)
STOKES	Single-Pol-USB 130	1
	2 STOKES	2
	4 STOKES	4
CONTROL	ONLINE	1
TPA SELECTION	Online (tpa)	1
	Manual (GWB)	0
SIDEBAND FLAG	Flipped (LSB)	1
	Normal (USB)	-1
GAB LO FREQUENCY	LO 130 & LO 175	LO SET at GAB taken as RF for GWB.
GAIN	ON/OFF	1/0 respectively.
FSTOP	ON/OFF	1/0 respectively.
Beam – 1 / Beam - 2	OFF/IA/PA	0/1/2 respectively.(Not released)
Beam Stokes	1 Stokes/ 4 Stokes.	1/4 respectively.(Not Released)
Beam Integration	128	No. of FFT's = 128 (sampling period 1.3ms) (Not Released)
BITS	8	8

Chapter 2: Running Interferometry Observations

Before starting the gwb correlator chain (from astro8). It needs to set up some Important parameters at the beginning viz., gpu-config, sampler and hosts settings etc. gwb-config generates a gpu.hdr file, which contains all necessary parameters with available options to set up the gpu correlator in different modes. And sampler and hosts settings window generates the sampler.hdr (for antenna connections to the gpu samplers) and hosts.dat (host machines entries with their socket ID's) files.

2.1 GWB Config Parameters

Below gives the parameter lists, which are saved/changed from the GWB Config window.

```
MODE            :       Sets the GWB operating mode (default is REALTIME, and selection is disabled
                        from GUI).
LTA             :       Minimum data acquisition rate for GWB, can be set to 1, 2, 4, 8, 16 and 32.
ACQ BW          :       selectable from the available bandwidth modes, viz. 50, 100, 150, 200, 400
                                MHz.
CHANNELS        :       User selectable range of channels available for the given GWB ACQ BW.
STOKES          :       STOKES parameter selections (Single POL USB-130, Total Intensity, Full
                        Stokes).
TPA Frequency   :
                    1)  Online : This will take TPA parameters from online machine, and disables the
                        Sideband Flag and  GAB LO entries at GUI.
                    2)  Local : This enables user to choose sideband, and  GAB LO Entries.
                        1.  Flipped (LSB- decreasing frequency over channels, RF < LO).
                        2.  Normal (USB – increasing frequency over channels, RF > LO).
GAIN            :       Default is ON.
FSTOP           :       Default is ON.
Beam1/Beam2     :       It can be set as IA(0) or PA(1) with beam stokes as 1 or 4.
Beam Integ      :       It can be set as 128 or 64 FFTs which corresponds to 1.3 ms or 0.65 ms
BITS            :       No. of bits per ADC samples
```

Now we present all three modes available with the GWB-III; for each mode we present a screen-shot and also provide the sample **gpu.hdr** file. Note that GWB (GPU) RF frequency is the same as GAB LO frequency.

2.1.1 Single POL CHAN 1

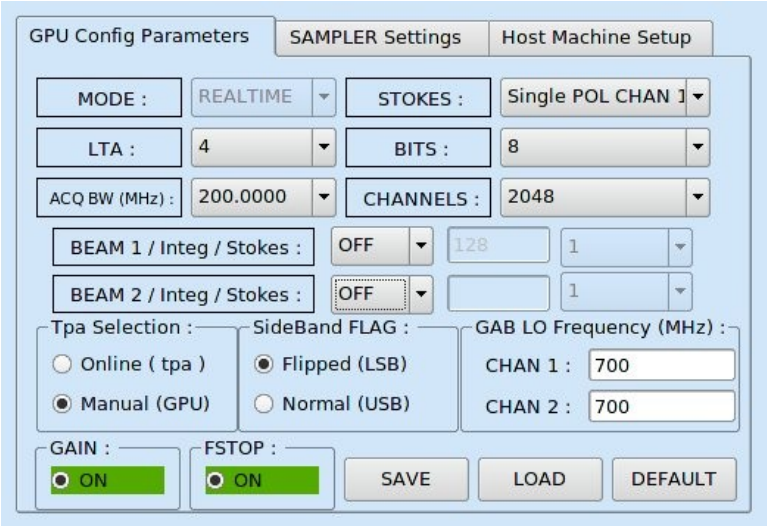

Illustration 1: GWB configuration parameters to save gpu.hdr file for Single channel USB 130 data acquisition

Below we also show corresponding `**gpu.hdr**' file, which is for GMRT observing assistants and not for

general user.

gpu.hdr (sample file)

```
{ Corrsel.def
GPU_MODE     = 0              /* 0 - Realtime, 1 - RawDump          */
GPU_LTA      = 4              /* Value can be : 1,2,4,8,16,32 etc.  */
GPU_ACQ_BW   = 200.0000       /* 50, 100, 150, 200, 400 MHz. etc     */
GPU_FINAL_BW= 0               /* 0,4,8,16,32,64,128 As frac of Nyq, Val = OFF */
GPU_EDGE_FRQ= 0.000000        /* Freq Entry in steps of Nyq, Val = 0 */
GPU_CHAN_MAX= 2048            /* 512, 1024, and 2048 are possible.  */
GPU_CHAN_NUM= 0:2047:1        /* any range i:j:1;for i,j<chan_max   */
GPU_STOKES   = 1             /* 1 SinglePolUSB-130; 2 Total_Intensity; 4 Full_Stokes   */
GPU_RF       = 700  700      /* 150 235 325 610 610D 1060 1170 1280 1390 1420  */
GPU_LO-1     = 540  540      /* are in respective values of GWB RF  */
GPU_SIDEBAND= 1              /* 1 : LSB (LO > RF) and -1 : USB (LO < RF)  */
GPU_CNTRL    = 1              /* 0 -LOCAL, 1 -ONLINE, 2 -MANUAL     */
GPU_FSTOP    = 1              /* 1 - ON, 0 - OFF                    */
GPU_BEAM_1   = 0:1          /* 0-OFF,1-IA,2-PA */
GPU_BEAM_2   = 0:1          /* 0-OFF,1-PA,2-PA */
GPU_BM_INT   = 128              /* BEAM INTEGRATION (No. OF FFT CYCLES) i.e. 128
GPU_GAINEQ   = 1              /* 1 - ON, 0 - OFF                    */
GPU_TPA      = 1              /* 0 - From online tpa, 1 - From GWB GUI. */
GPU_BITS     = 8
}Corrsel
*
END_OF_HEADER                   /*  VERSION RELEASED */
```

2.1.2 Total Intensity

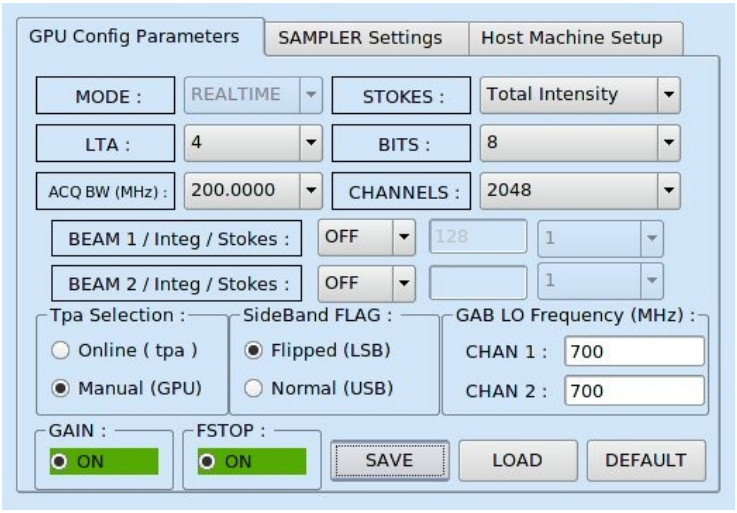

Illustration 2: GWB configuration parameters to save gpu.hdr file for Total Intensity data acquisition

Below we also show corresponding `**gpu.hdr**' file, which is for GMRT observing assistants and not for general user.

gpu.hdr (sample file)

```
{ Corrsel.def
GPU_MODE     = 0              /* 0 - Realtime, 1 - RawDump          */
GPU_LTA      = 4              /* Value can be : 1,2,4,8,16,32 etc.  */
GPU_ACQ_BW   = 200.0000       /* 50, 100, 150, 200, 400 MHz. etc     */
GPU_FINAL_BW= 0               /* 0,4,8,16,32,64,128 As frac of Nyq, Val = OFF */
GPU_EDGE_FRQ= 0.000000        /* Freq Entry in steps of Nyq, Val = 0 */
GPU_CHAN_MAX= 2048            /* 512, 1024, and 2048 are possible.  */
```

```
GPU_CHAN_NUM= 0:2047:1       /* any range i:j:1;for i,j<chan_max   */
GPU_STOKES  = 2             /* 1 SinglePolUSB-130; 2 Total_Intensity; 4 Full_Stokes   */
GPU_RF      = 700  700      /* 150 235 325 610 610D 1060 1170 1280 1390 1420  */
GPU_LO-1    = 540  540      /* are in respective values of GWB RF  */
GPU_SIDEBAND= 1             /* 1 : LSB (LO > RF) and -1 : USB (LO < RF)  */
GPU_CNTRL   = 1              /* 0 -LOCAL, 1 -ONLINE, 2 -MANUAL     */
GPU_FSTOP   = 1              /* 1 - ON, 0 - OFF                    */
GPU_BEAM_1  = 0:1          /* 0-OFF,1-IA,2-PA */
GPU_BEAM_2  = 0:1          /* 0-OFF,1-PA,2-PA */
GPU_BM_INT  = 128              /* BEAM INTEGRATION (No. OF FFT CYCLES) i.e. 128
GPU_GAINEQ  = 1              /* 1 - ON, 0 - OFF                    */
GPU_TPA     = 1              /* 0 - From online tpa, 1 - From GWB GUI. */
GPU_BITS    = 8
}Corrsel
*
END_OF_HEADER                   /*  VERSION RELEASED */
```

2.1.3 Full Stokes

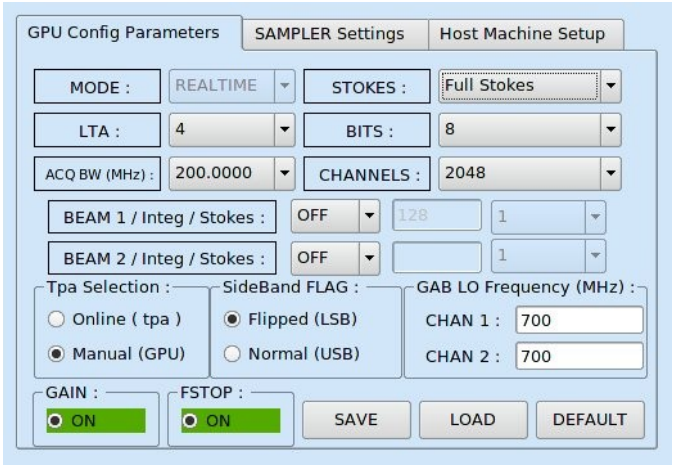

Illustration 3: GWB configuration parameters to save gpu.hdr file Full Stokes data acquisition

Below we also show corresponding `**gpu.hdr**' file, which is for GMRT observing assistants and not for general user.

gpu.hdr (sample file)

```
{ Corrsel.def
GPU_MODE    = 0              /* 0 - Realtime, 1 - RawDump          */
GPU_LTA     = 4              /* Value can be : 1,2,4,8,16,32 etc.  */
GPU_ACQ_BW  = 200.0000       /* 50, 100, 150, 200, 400 MHz. etc     */
GPU_FINAL_BW= 0              /* 0,4,8,16,32,64,128 As frac of Nyq, Val = OFF */
GPU_EDGE_FRQ= 0.000000       /* Freq Entry in steps of Nyq, Val = 0 */
GPU_CHAN_MAX= 2048           /* 512, 1024, and 2048 are possible.  */
GPU_CHAN_NUM= 0:2047:1       /* any range i:j:1;for i,j<chan_max   */
GPU_STOKES  = 4             /* 1 SinglePolUSB-130; 2 Total_Intensity; 4 Full_Stokes   */
GPU_RF      = 700  700      /* 150 235 325 610 610D 1060 1170 1280 1390 1420  */
GPU_LO-1    = 540  540      /* are in respective values of GWB RF  */
GPU_SIDEBAND= 1             /* 1 : LSB (LO > RF) and -1 : USB (LO < RF)  */
GPU_CNTRL   = 1              /* 0 -LOCAL, 1 -ONLINE, 2 -MANUAL     */
GPU_FSTOP   = 1              /* 1 - ON, 0 - OFF                    */
GPU_BEAM_1  = 0:1          /* 0-OFF,1-IA,2-PA */
GPU_BEAM_2  = 0:4          /* 0-OFF,1-PA,2-PA */
GPU_BM_INT  = 128              /* BEAM INTEGRATION (No. OF FFT CYCLES) i.e. 128
GPU_GAINEQ  = 1              /* 1 - ON, 0 - OFF                    */
GPU_TPA     = 1              /* 0 - From online tpa, 1 - From GWB GUI. */
GPU_BITS    = 8
```

```
}Corrsel
*
END_OF_HEADER                    /*  VERSION RELEASED */
```

2.2 Sampler Settings

Here we present sampler settings for all three modes available with the GWB-III discussed above. GUI is not yet ready for this part and hence the user has to edit the files in host machine according to the antennas connected. We are giving sequence of the cable numbers to be connected and corresponding entries to be made in the sampler files of host machine.

2.2.1 Single POL CHAN 1

First make the cable connections and then edit the file sampler_1pol.hdr in gwbh2 machine. User must also specify the polarization(either 130 or 175) in the sampler file.

Steps to edit sampler_1pol.hdr file

Step1: Open a terminal and login to gwbh2 machine (ssh gpuuser@gwbh1)

Step2: Enter password if asked (password : gmrt123)

Step3: Go to location /home/gpuuser/GWB/ver1/bin/released/SYS_FILES (cd /home/gpuuser/GWB/ver1/bin/released/SYS_FILES)

Step4: Open the file sampler_1pol.hdr and edit it corresponding to the cable connections made. (vim sampler_1pol.hdr)

Following are the cable connections and sampler file for single pol chan 1 (130 polarization) mode. We are giving it as an example. Users can have their own sequence but he/she has to ensure that the same sequence is maintained in the sampler files in host machine. For example, the antenna connected to cable number CHB21 should be third entry in sampler_1pol.hdr file in host machine. Similarly, antenna connected to cable CH33 should be twelfth entry in sampler_1pol.hdr in host machine.

Example :

Cable connections :

1. CO12	-	C00	17. CH23	-	E04
2. C014	-	C01	18. CH25	-	E05
3. CHB21	-	C02	19. CH49	-	E06
4. CHB23	-	C03	20. CHB50	-	S01
5. CO16	-	C04	21. CH27	-	S02
6. CO18	-	C05	22. CH29	-	S03
7. CHB25	-	C06	23. CHB54	-	S04
8. CHB27	-	C08	24. CHB56	-	S06
9. CH13	-	C09	25. CHB41	-	W01
10. CH15	-	C10	26. CHB43	-	W02
11. CHB29	-	C11	27. CHB59	-	W03
12. CH33	-	C12	28. CHB19	-	W04
13. CH17	-	C13	29. CHB45	-	W05
14. CH21	-	C14	30. CHB47	-	W06
15. CH43	-	E02	31. CHB11	-	C07

16. CH45 - E03 32. CHB17 - S05

sampler_1pol.hdr (sample file)

Below we also show corresponding `**sampler_1pol.hdr**' file, which is for example cable connections given above not for general user. Following is the sampler file for Single POL chan 1

```
{ Sampler.def
*  All the even numbered are lower pipelines of the samplers.
*  All the odd  numbered are upper pipelines of the samplers.
* SamplerId  = Ant Band
*
* Top bin ( Cable starts from 0 )
* SampId = Ant BandId FftId
SMP000  = C00 USB-130 000
SMP001  = C01 USB-130 001
SMP002  = C02 USB-130 002
SMP003  = C03 USB-130 003
SMP004  = C04 USB-130 004
SMP005  = C05 USB-130 005
SMP006  = C06 USB-130 006
SMP007  = C08 USB-130 007
SMP008  = C09 USB-130 008
SMP009  = C10 USB-130 009
SMP010  = C11 USB-130 010
SMP011  = C12 USB-130 011
SMP012  = C13 USB-130 012
SMP013  = C14 USB-130 013
SMP014  = E02 USB-130 014
SMP015  = E03 USB-130 015
SMP016  = E04 USB-130 016
SMP017  = E05 USB-130 017
SMP018  = E06 USB-130 018
SMP019  = S01 USB-130 019
SMP020  = S02 USB-130 020
SMP021  = S04 USB-130 021
SMP022  = S03 USB-130 022
SMP023  = S06 USB-130 023
SMP024  = W01 USB-130 024
SMP025  = W02 USB-130 025
SMP026  = W03 USB-130 026
SMP027  = W05 USB-130 027
SMP028  = W04 USB-130 028
SMP029  = W06 USB-130 029
SMP030  = C07 USB-130 030
SMP031  = S05 USB-130 031
 } Sampler
END_OF_HEADER
```

2.2.2 Total Intensity

In this mode only co-polar data will be recorded, uses 16 antennas in dual polarization (only records of Chan1-Chan1 and Chan2-Chan2 polarizations are made). Note that this is a sub-set of Full Stokes mode discussed in Section 3.2.3 below.

First make the cable connections and then edit the file sampler_dual.hdr in gwbh2 machine. User must also specify the polarization(either 130 or 175) in the sampler file.
Steps to edit sampler_dual.hdr file

Step1: Open a terminal and login to gwbh2 machine (ssh gpuuser@gwbh1)

Step2: Enter password if asked (password : gmrt123)

Step3: Go to location /home/gpuuser/GWB/ver1/bin/released/SYS_FILES (cd /home/gpuuser/GWB/ver1/bin/released/SYS_FILES)

Step4: Open the file sampler_dual.hdr and edit it corresponding to the cable connections made. (vim sampler_dual.hdr)

Following are the cable connections and sampler file for Total Intensity mode. We are giving it as an example. Users can have their own sequence but he/she has to ensure that the same sequence is maintained in the sampler files in host machine.

Example :

Cable connections :

		130 pol			175 pol
1. CO12	-	C00	17. CH23	-	C00
2. C014	-	C01	18. CH25	-	C01
3. CHB21	-	C02	19. CH49	-	C02
4. CHB23	-	C03	20. CHB50	-	C03
5. CO16	-	C04	21. CH27	-	C04
6. CO18	-	C05	22. CH29	-	C05
7. CHB25	-	C06	23. CHB54	-	C06
8. CHB27	-	C08	24. CHB56	-	C08
9. CH13	-	C09	25. CHB41	-	C09
10. CH15	-	C10	26. CHB43	-	C10
11. CHB29	-	E02	27. CHB59	-	E02
12. CH33	-	E06	28. CHB19	-	E06
13. CH17	-	S02	29. CHB45	-	S02
14. CH21	-	S04	30. CHB47	-	S04
15. CH43	-	W04	31. CHB11	-	W04
16. CH45	-	W06	32. CHB17	-	W06

sampler_dual.hdr (sample file)

Below we also show corresponding `**sampler_dual.hdr**' file, which is for example cable connections given above not for general user. Following is the sampler file for Total Intensity mode

```
{ Sampler.def
*  All the even numbered are lower pipelines of the samplers.
*  All the odd  numbered are upper pipelines of the samplers.
* SamplerId  = Ant Band
*
* Top bin ( Cable starts from 0 )
* SampId = Ant BandId FftId
SMP000  = C00 USB-130 000
SMP001  = C00 USB-175 001
SMP002  = C01 USB-130 002
SMP003  = C01 USB-175 003
SMP004  = C02 USB-130 004
```

```
SMP005  = C02 USB-175 005
SMP006  = C03 USB-130 006
SMP007  = C03 USB-175 007
SMP008  = C04 USB-130 008
SMP009  = C04 USB-175 009
SMP010  = C05 USB-130 010
SMP011  = C05 USB-175 011
SMP012  = C06 USB-130 012
SMP013  = C06 USB-175 013
SMP014  = C08 USB-130 014
SMP015  = C08 USB-175 015
SMP016  = C09 USB-130 016
SMP017  = C09 USB-175 017
SMP018  = C10 USB-130 018
SMP019  = C10 USB-175 019
SMP020  = E02 USB-130 020
SMP021  = E02 USB-175 021
SMP022  = E06 USB-130 022
SMP023  = E06 USB-175 023
SMP024  = S02 USB-130 024
SMP025  = S02 USB-175 025
SMP026  = S04 USB-130 026
SMP027  = S04 USB-175 027
SMP028  = W04 USB-130 028
SMP029  = W04 USB-175 029
SMP030  = W06 USB-130 030
SMP031  = W06 USB-175 031
 } Sampler
END_OF_HEADER
```

2.2.3 Full Stokes

In this mode the correlator records both the co-polar and the cross-polar data. 16 antenna dual polarization (Full Stokes mode records all products of polarizations).

First make the cable connections and then edit the file sampler_dual.hdr in gwbh2 machine. User must also specify the polarization(either 130 or 175) in the sampler file.
Steps to edit sampler_dual.hdr file

Step1: Open a terminal and login to gwbh2 machine (ssh gpuuser@gwbh1)

Step2: Enter password if asked (password : gmrt123)

Step3: Go to location /home/gpuuser/GWB/ver1/bin/released/SYS_FILES (cd /home/gpuuser/GWB/ver1/bin/released/SYS_FILES)

Step4: Open the file sampler_dual.hdr and edit it corresponding to the cable connections made. (vim sampler_dual.hdr)

Following are the cable connections and sampler file for Total Intensity mode. We are giving it as an example. Users can have their own sequence but he/she has to ensure that the same sequence is maintained in the sampler files in host machine.

Example :

Cable connections :

		130 pol			175 pol
1. CO12	-	C00	17. CH23	-	C00
2. C014	-	C01	18. CH25	-	C01
3. CHB21	-	C02	19. CH49	-	C02

4. CHB23	-	C03	20. CHB50	-	C03
5. CO16	-	C04	21. CH27	-	C04
6. CO18	-	C05	22. CH29	-	C05
7. CHB25	-	C06	23. CHB54	-	C06
8. CHB27	-	C08	24. CHB56	-	C08
9. CH13	-	C09	25. CHB41	-	C09
10. CH15	-	C10	26. CHB43	-	C10
11. CHB29	-	E02	27. CHB59	-	E02
12. CH33	-	E06	28. CHB19	-	E06
13. CH17	-	S02	29. CHB45	-	S02
14. CH21	-	S04	30. CHB47	-	S04
15. CH43	-	W04	31. CHB11	-	W04
16. CH45	-	W06	32. CHB17	-	W06

sampler_dual.hdr (sample file)

Below we also show corresponding `**sampler_dual.hdr**' file, which is for example cable connections given above not for general user. Following is the sampler file for Total Intensity mode

```
{ Sampler.def
*  All the even numbered are lower pipelines of the samplers.
*  All the odd  numbered are upper pipelines of the samplers.
* SamplerId  = Ant Band
*
* Top bin ( Cable starts from 0 )
* SampId = Ant BandId FftId
SMP000  = C00 USB-130 000
SMP001  = C00 USB-175 001
SMP002  = C01 USB-130 002
SMP003  = C01 USB-175 003
SMP004  = C02 USB-130 004
SMP005  = C02 USB-175 005
SMP006  = C03 USB-130 006
SMP007  = C03 USB-175 007
SMP008  = C04 USB-130 008
SMP009  = C04 USB-175 009
SMP010  = C05 USB-130 010
SMP011  = C05 USB-175 011
SMP012  = C06 USB-130 012
SMP013  = C06 USB-175 013
SMP014  = C08 USB-130 014
SMP015  = C08 USB-175 015
SMP016  = C09 USB-130 016
SMP017  = C09 USB-175 017
SMP018  = C10 USB-130 018
SMP019  = C10 USB-175 019
SMP020  = E02 USB-130 020
SMP021  = E02 USB-175 021
SMP022  = E06 USB-130 022
SMP023  = E06 USB-175 023
SMP024  = S02 USB-130 024
SMP025  = S02 USB-175 025
SMP026  = S04 USB-130 026
```

```
SMP027  = S04 USB-175 027
SMP028  = W04 USB-130 028
SMP029  = W04 USB-175 029
SMP030  = W06 USB-130 030
SMP031  = W06 USB-175 031
 } Sampler
END_OF_HEADER
```

2.3 Hosts Machine Setup

Below we also show corresponding `**hosts.dat**' file, which is for GMRT observing assistants and not for general user. Host machines for online, correlator (both interferometry and pulsar's) are set.

hosts.dat (sample file)

```
lenyadri 192.168.1.13    6001  ComSock4
gwbh1    192.168.4.147   6002  LogSock4
gwbh2    192.168.4.148   6002  LogSock4
gwbh3    192.168.4.149   6002  LogSock4
```

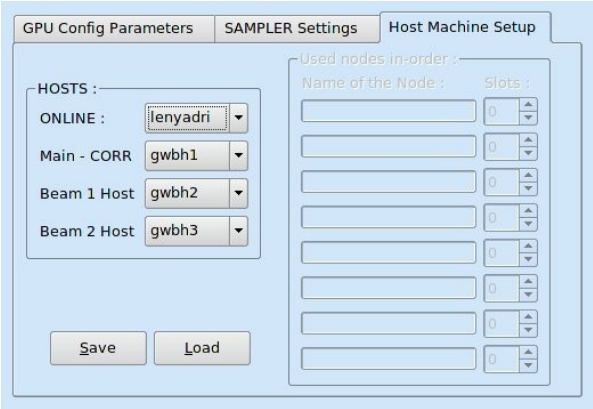

Illustration 4: Host machine settings for correlator (hosts.dat & host.list)

NOTE : host.list file modification through gui (used nodes in order) is disabled.

2.4 Steps to Run GWB Correlator and Applications

1. logon to **observer@astro8** and enter commands as:
   cd ~/bin/gwbIII/ver1/
   ./gwbcorr
   This will open a qt interface for gwbIII correlator (gwb-dasconsole).
   NOTE : files *gpu.hdr, sampler.hdr, sampler_1pol.hdr, sampler_dual.hdr, default.hdr, hosts.dat, host.list*, must be available in the *'~/bin/gwbIII/ver1'* directory.

2. On Menubar go to "**Start -> Open All Windows"** or "**Ctrl+O"** or go to "**Start -> GWB - Windows -> Sockcmd "** to open all client processes to run gwb with sockcmd and online dassrv processes, or "**Start -> GWB - Windows -> Getcmd "** to run gwb without sockcmd and dassrv processes.

   This will popup the client workspaces for each command with following order:
   - "192.168.4.147**::gwb_corr_released.sh**":
     It can also be termed as acquisition client. This starts and broadcasts the acquisition processes to the gpunode6, gpunode5, gpunode4, gpunode3.

- "192.168.4.147**::sockcmd.sh**": (can be started only when GWB running with sockcmd mode)
  This sets up the communication between online and correlator and gives acknowledgments to the commands from the correlator to the online and vice versa.
- "192.168.4.147**::collect.sh**":
  This dumps the Astronomical data into the buffer and keeps it there for a while and removes it as per the FIFO logic.
- "192.168.4.147**::record**":
  one can write the acquired data into specified lta format file as per requirement.

3. On Menubar go to "**Edit -> Preferences"** (or use accelerator "**CTRL+P"**).
   This opens the tab-widget to set the parameters for gpu.hdr, hosts.dat, sampler_1pol.hdr and sampler_dual.hdr files. On the tab-widget there are three tabs named
   1. Configuring GWB Parameters:
      Using this user can set various available GWB modes, and related parameters, this is depend on the user's choice or requirement, what kind of data he needs. (e.g. Interferometry-continuum, Interferometry-line, and Interferometry-Pulsar etc).

   2. configuration of SAMPLER settings:
      Steps given in section 2.2 Sampler Settings

   3. Host Machine Setup:
      In this User will be asked to set the Host machines used for the GWB (GPU) correlator. Please, do not bother about the disabled GUI part in this tab.

4. Configure **Dual ADC config**:
   From MenuBar select **"Start ->DualAdcConfig**" or With a single click on **DualAdcConfig** (visible on Toolbar) button one can configure this. This sets the GWB Roach boards in programmed mode, It takes about 40 seconds to configure. During That time GUI will be frozen intentionally for user interactions.
5.

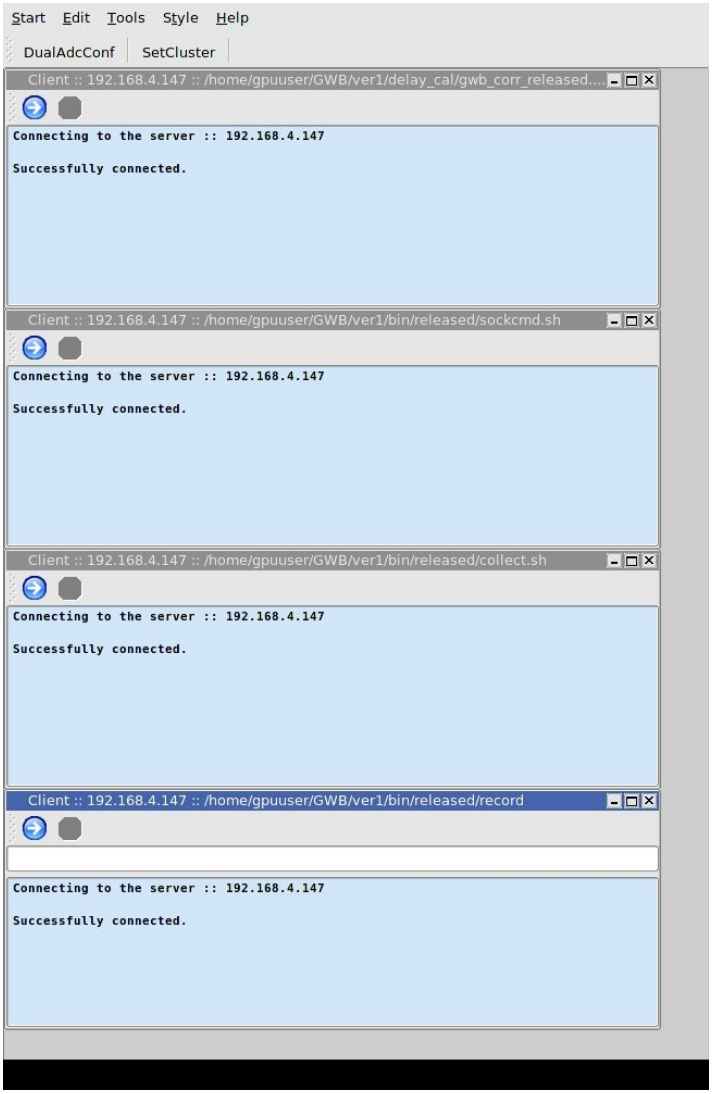

Illustration 5: GWB Data acquisition Console

6. Now, click the **start button** (blue icon button) of first client window named "gwb_corr_released.sh" and wait till it says:
   gmrt_correlator : Waiting For Initialization Cmd ..

7. Start sockcmd.sh, collect, and dass-srv (from online machine) for gwb.
   ssh -X observer@lenyadri
   cd /odisk/online1/gsbe/dassrv-gpu/
   ./dassrv_released
   In Case, if you are running GWB, in **"getcmd"** mode, then there is no need to start both sockcmd.sh and dassrv-gpu processes, user just have to start the process "collect" only.
8. Enter initndas command from online user0.
   allant;cmode 1; tpa(11)=15; initndas'/temp2/data/gsb.hdr' **(GWB ONLY).
   allant;cmode 9; tpa(11)=15; initndas'/temp2/data/gsb.hdr' **(GSB + GWB).
   For getcmd mode :
   On the online machine terminal, enter command
   gwbcmd-v3 initndas

9. Setup the cluster acquisition :
   On Menubar go to "**Start**-> **SetCluster"** or With a single click on **setCluster** (visible on Toolbar) one can setup this. This takes about 5 seconds to set.

10. Start project from online machine...
    For Sockcmd mode :
    allant;subar 4; prjobs'';prjtit'';initprj(1,'GWBTST') **(GWB ONLY).
    allant;subar 4; prjobs'';prjtit'';initprj(15,'GWBTST') **(GSB + GWB).
    For getcmd mode :
    On online machine terminal, enter command
    gwbcmd-v3 initprj *;for subar 4.*
    gwbcmd-v3 initprj <subar number> ;for multi-sub-array observation.

11. Start and stop scan as per requirement and one can start record for the same.
    To record the data in record window type in the format as :
    GWBTST /data2/gpuuser/gwbtst_26jan2014.lta
    GWBTST /data2/gpuuser/gwbtst_26jan2014.lta 4

    For GWB with Sockcmd mode default commands strtndas and stpndas from online user / subar controller (command file) can be used.

    Recording (start and stop scans) using getcmd :
    gwbcmd-v3 strtndas *;for subar 4.*
    gwbcmd-v3 stpndas
    gwbcmd-v3 strtndas <subar number> *;formulti-sub-array observation.*
    gwbcmd-v3 stpndas <subar number>

12. Starting **DASMON** :
    Dasmon is released, and can be started with following command :
    login to gwbh1 : **ssh -X gpuuser@gwbh1**
    enter commands as : **/home/gpuuser/GWB/ver1/bin/released/dasmon.pl**

    Also, DasMon Can be Started from the main DasConsole GUI from
    "**MenuBar->Tools->Interferometry->GWB DasMon" or *CTRL + M*** as an accelerator.

13. Starting Power Equalisation Program :
    GWB Power Equalise GUI Can be Started from the main DasConsole GUI from

"**MenuBar->Tools->Interferometry->GWB_PowerEq" or CTRL + E** as an accelerator. This can also be done as explained in later section 'GAB - GWB Power Equalise'.

14. Running **Offline Data analysis programs** :
    1. ltahdr , listscan, gvfits, dasmon tools are released for further analysis.
    2. tax, xtract, rantsol are not yet released for this in order to use these tool please copy the file to astro0 or any other NIS machines where it works.
       For some cases user has to set fmt as :***fmt = ist%10.5f;base{chan{a%31.4f;p%8.1f}};\n***

2.5 GAB Power Equalise

Power Equalise program is released for GWB, which uses the output self visibility data from GWB and equalizes the power levels at GAB (GMRT Analog Backend) system.

Steps to follow (with GUI)

GWB Power Equalise GUI Can be Started from the main DasConsole GUI from
"**MenuBar->Tools->GWB_PowerEq" or CTRL + E** as an accelerator (as explained earlier in GWB-CORRELATOR).
Also, The same can be started manually as follows:

1. Select the antennas connected to the GAB and GWB.
2. Initially make all GAB attenuation's same for both the polarization's, as set in the cdsetX file, or change Attenuation's to MAXIMUM, by clicking on button 'MAX Attn', apply it to GAB accordingly.
3. Set the Optimum level, Begining channel, End channel, Upper level, Lower level and Integrations as per requirement.
4. Click on the button save to generate text files as per selected gui options.
5. Click the button 'EQUALISE' to start first iteration.
6. Run the process 'run gwblev' from userX window from online(2-3 times).
7. Repeat steps 5 and 6 till optimum level is attained.

Steps to Power Equalisation (without GUI)

1. **ssh -X gpuuser@gwbh1**
2. Edit the file ***/home/gpuuser/GWB/PowerEq/gab_attn.cur*** set the attenuation values for both polarisation to values which are already set from cdsetX file for GAB.
3. Run the following command
   power_eq -o 100 -c 1 -u 100000 -l 0 -b 100 -e 20000 -i 2 -m shivneri
   Or
   power_eq -o 100 -c 1 -u 100000 -l 0 -b 100 -e 20000 -i 2 -m lenyadri
   *Note that -**h** option for above program will print help regarding the options used by it.*
   This will generate the new attenuation values for the selected or required antennas and modifies the above **gab_attn.cur** file (Content of the file will be as given below).
4. After this, From Online userX please run "run gwblev" 2-3 times.
5. Repeat steps 3 and 4 till the optimum power levels at GWB output are achieved.

Content of *gab_attn.cur*

```
#ANT SEL ATTN130 ATTN175
C00 0 8  8
C01 0 8  8
C02 0 8  8
C03 0 8  8
```

```
C04 1 14  14
C05 0 8   8
C06 1 14  14
C08 1 14  14
C09 0 8   8
C10 0 8   8
C11 0 8   8
C12 0 8   8
C13 0 8   8
C14 0 8   8
S01 0 8   8
S02 1 14  14
S03 0 8   8
S04 1 14  14
S06 0 8   8
E02 0 8   8
E03 0 8   8
E04 0 8   8
E05 0 8   8
E06 1 14  14
W01 0 8   8
W02 0 8   8
W03 0 8   8
W04 1 14  14
W05 0 8   8
W06 1 14  14
```

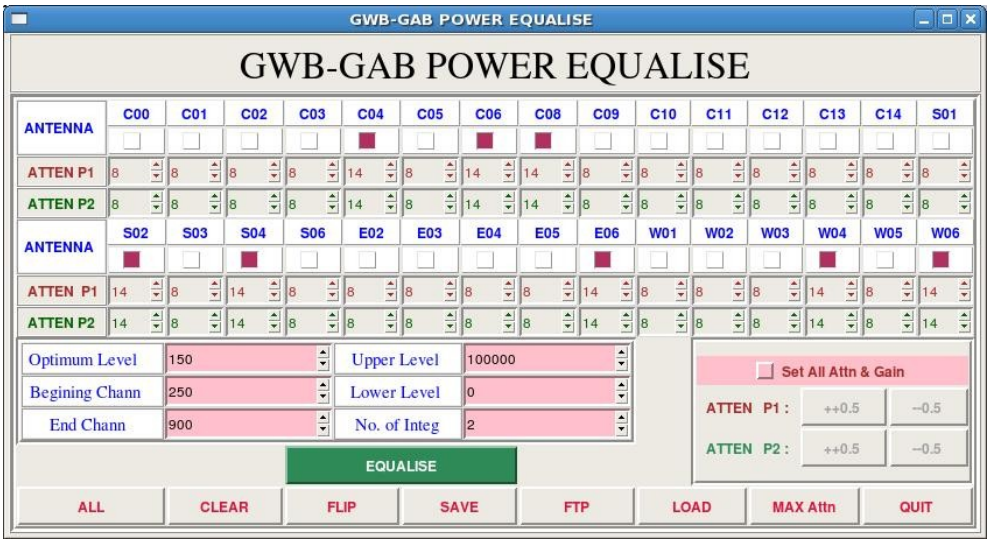

Illustration 6: GWB-GAB power Equalise Window

Chapter 3: Troubleshooting

Some Quick Checks

If acquisition program fails to run then check for the following :

1. Machines required to run gpu cluster are ON.
2. Check for the Processes DualAdcConfig and SetCluster are getting executed sucessfully, If not then **GWB ROACH-BOARDS may not be communicating / hanged / not in sync** with each other. Sometimes extension of this can be observed in acquisition program **"gwb_corr_released.sh"**
3. Check for the processes , shared memory segment which are not closed properly. According clear those processes and shared memory segments,using following commands on gwbh1
   a. */home/gpuuser/GWB/ver1/bin/released/clear_all_node_shm.csh* // for shm
   b. */home/gpuuser/GWB/ver1/bin/released/kill_all_nodes.csh* // for orte-clean
4. Check for background mpi processes and clear the same.

IMPORTANT Notes

i. GWB (GPU) can be run in parallel with GSB.
   1. Using above mentioned procedure. i.e. Using sockcmd.sh and dassrv-gpu processes.

2. Using getcmd mode, while GSB is already running. No need to start sockcmd.sh and dassrv-gpu processes.
3. Options to start client windows with sockcmd.sh and without sockcmd.sh are available in “Start->Gwb -Windows” options. And use gpucmd commands from online machine with arguments as initndas, initprj, strtndas, stpndas, etc.
4. If no subar number is provided for gpucmd command then it will be executed for subar 4**.**

ii. Dasmon is released, and can be started with following command :
ssh -X gpuuser@gwbh1 -f dasmon

Antenna connections to GWB Roach boards

Cable No:	GWB Node No
CO12	gwbcorr1
CO14	gwbcorr1
CHB21	gwbcorr1
CHB23	gwbcorr1
CO16	gwbcorr2
CO18	gwbcorr2
CHB25	gwbcorr2
CHB27	gwbcorr2
CH13	gwbcorr3
CH15	gwbcorr3
CHB29	gwbcorr3
CH33	gwbcorr3
CH17	gwbcorr4
CH21	gwbcorr4
CH43	gwbcorr4
CH45	gwbcorr4
CH23	gwbcorr5
CH25	gwbcorr5
CH49	gwbcorr5
CHB50	gwbcorr5
CH27	gwbcorr6
CH29	gwbcorr6
CHB54	gwbcorr6
CHB56	gwbcorr6
CHB41	gwbcorr7
CHB43	gwbcorr7
CHB59	gwbcorr7
CHB19	gwbcorr7
CHB45	gwbcorr8
CHB47	gwbcorr8
CHB11	gwbcorr8
CHB17	gwbcorr8

In case of dual polarization observations please connect the first 16 cables to first channel (polarization 1) and next 16 to another channel(polarization 2).

Settings on signal generator : 800MHz frequecy, +22 dbm power level, RF ON