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OPERATING PROCEDURE
FOR
RUNNING GWB - III (ver 2)

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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.

GWB-III (version 2) is the latest release which has been explained in this document. GWB-III (version 2) accepts 32 input connections. These 32 input connections can be configured in following two ways:

1. 32 antennas Single polarization inputs. (Using Single Pol-130 mode).
2. 16 antennas Dual polarization inputs. (Using Total Intensity and Full Stokes modes).

In this release, of GWB Users can configure the antenna connections as explained above. In addition to this, 400 MHz wide band observations with 16 K spectral channels can be configured. Also Beam modes are available for pulsar observations with varying beam integration values (in ms), which is explained in Appendix.

This release also supports multi-sub-array observations.

Available Modes : Interferometry and Beamformer

1. Single POL mode : 32 antennas Single Pol at 200MHz BW or 400MHz BW.
   Beamformer : IA/PA only single stoke.
2. Total Intensity mode : 16 antennas Both Pols at 200MHz BW or 400MHz BW.
   Beamformer : IA/PA only single stoke
3. Full Polar mode : 16 antennas Both Pols at 200MHz or 400MHz BW
   Beamformer : IA/PA at single stoke + PA at 4 stokes

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
	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
	8192	8192
	16384	16384
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
Beam Stokes	1 Stokes/ 4 Stokes.	1/4 respectively
Beam Integration	A range of values	Appendix 1 and Appendix 2
BITS	8	8 (for ACQ BW <= 200 MHz)
	4	4(for ACQ BW > 200 MHz

Chapter 2: Open GWB Correlator widget and configure the parameters

logon to **observer@astro8** and enter commands as:
cd ~/bin/gwbIII/ver2/
./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/ver2'* directory.

Before starting the gwb correlator chain (from astro8). It needs to set up some Important parameters at the beginning viz., gwb 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 gwb correlator in different modes. And sampler and hosts settings window generates the sampler.hdr (for antenna connections to the gwb 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, for each relevant sub-array
                    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. Note that GWB (GPU) RF frequency is the same as GAB LO frequency.

From the GWB 3.2 DASCONSOLE window go to “Edit->Preferences(Ctrl + P) to pop up the settings interface. This will open “Preferred Settings” Interface. In First tab user can set the parameters to configure GWB.

2.1.1 Single POL

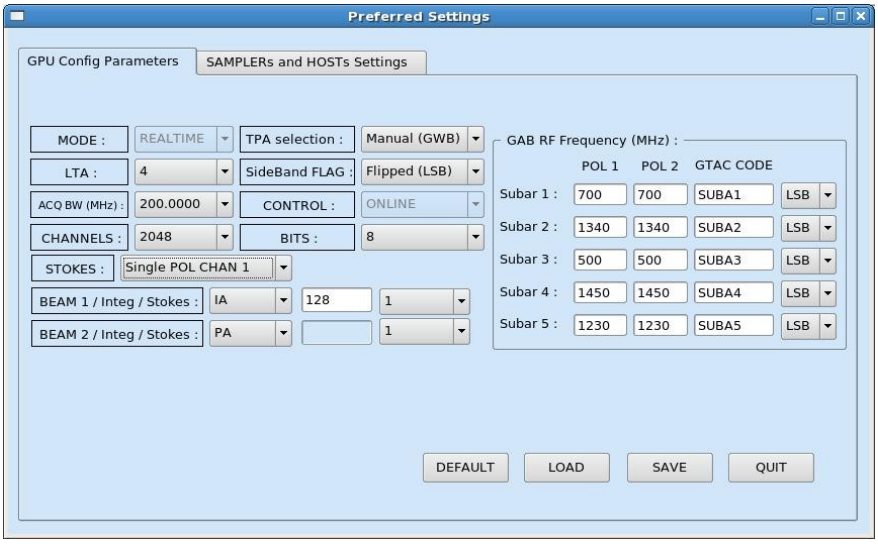


Illustration 1: GWB configuration parameters to save gpu.hdr file for Single channel USB 130 data acquisition

2.1.2 Total Intensity

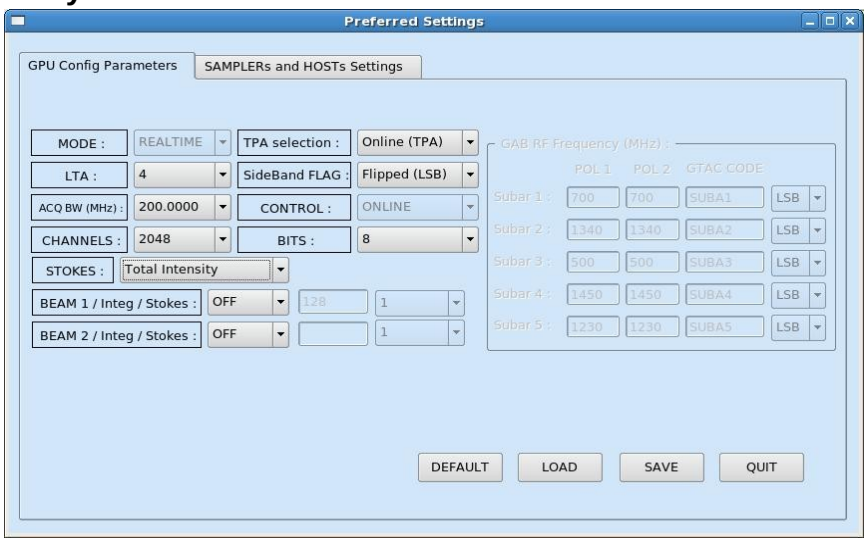


Illustration 2: GWB configuration parameters to save gpu.hdr file for Total Intensity data acquisition

2.1.3 Full Stokes

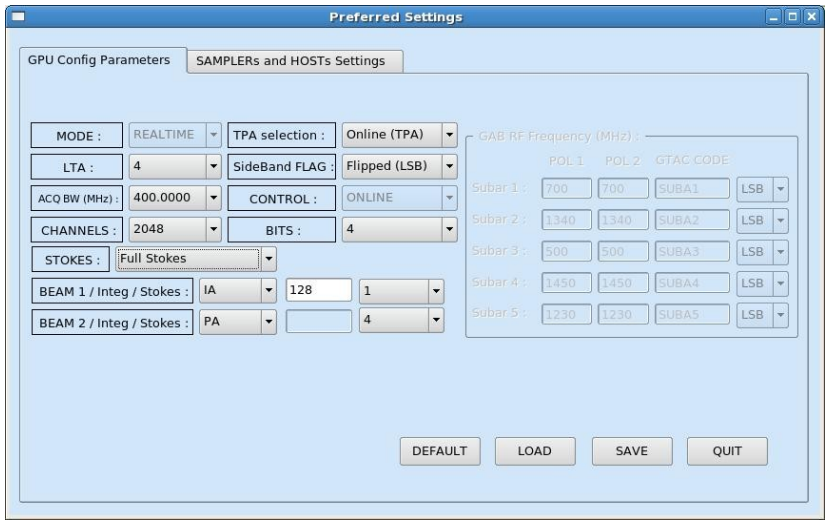


Illustration 3: GWB configuration parameters to save gpu.hdr file Full Stokes data acquisition

2.2 Sampler Settings

Here we present sampler settings for all three modes available with the GWB-III discussed above.

2.2.1 Single POL CHAN 1

In order to acquire data at GWB with Single polarization (channel 1 or channel 2), User has to make the cable connections in the correlator room wall panel as given below. The cable numbers are tagged to the cables.

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

```
Note : Do not make any changes in the 'Samplers and Hosts Settings' widget in
           the Sampler settings  side.
```

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.

First make the cable connections in the correlator room wall panel. Then make changes in the 'Samplers and Hosts Settings' widget and click the 'save' button.

From GUI:

From the GWB 3.2 DASCONSOLE window go to “Edit->Preferences(Ctrl + P) to pop up the settings interface. This will open “Preferred Settings” Interface. In the second tab (SAMPLER's and HOST's Settings) user can select the antenna connections to the GWB sampler as per the connections made on wall panel.

User can set up the GWB Hosts machine configuration to run the GWB programs and scripts for data acquisition.

An example cable connections and the corresponding settings in the widget is given below.

Cable connections :

		130 pol			175 pol
1. CO12	-	C00	17. CH23	-	C00
2. C014	-	C04	18. CH25	-	C04
3. CHB21	-	C06	19. CH49	-	C06
4. CHB23	-	C09	20. CHB50	-	C09
5. CO16	-	C10	21. CH27	-	C10
6. CO18	-	C11	22. CH29	-	C11

7. CHB25	-	C13	23. CHB54	-	C13
8. CHB27	-	C14	24. CHB56	-	C14
9. CH13	-	E02	25. CHB41	-	E02
10. CH15	-	E06	26. CHB43	-	E06
11. CHB29	-	S02	27. CHB59	-	S02
12. CH33	-	S04	28. CHB19	-	S04
13. CH17	-	S06	29. CHB45	-	S06
14. CH21	-	W01	30. CHB47	-	W01
15. CH43	-	W04	31. CHB11	-	W04
16. CH45	-	W06	32. CHB17	-	W06

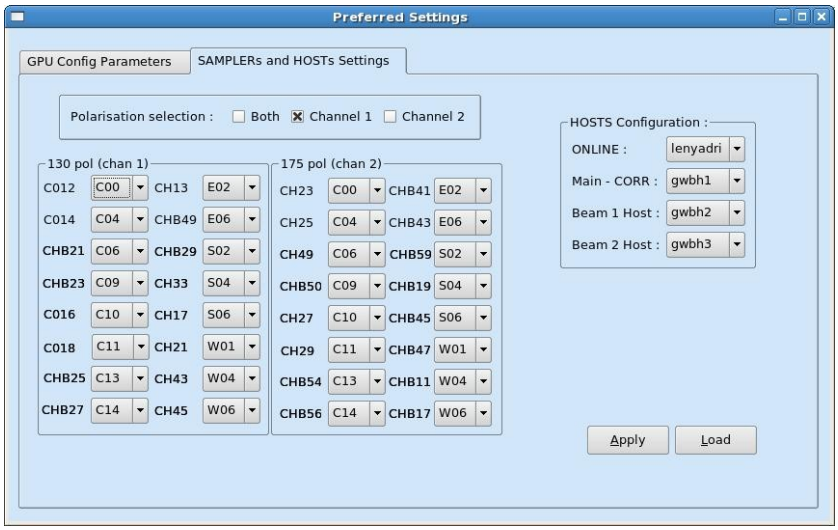


Illustration 4: Sampler for single pol and Host machine settings for GWB correlator

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 in the correlator room wall panel. Then make changes in the 'Samplers and Hosts Settings' widget.This is similar method as explained for Total Intensity mode above.

2.3 Hosts Machine Setup

This setting depends on which online machine and host machines are being used for observation.

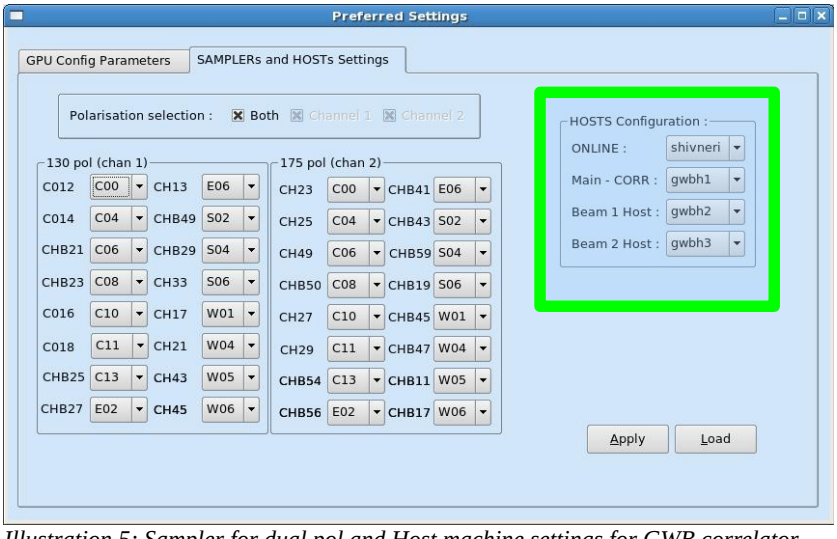


Illustration 5: Sampler for dual pol and Host machine settings for GWB correlator

2.4 Starting acquisition and recording

1. Go to the gwb-dasconsole
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 compute nodes and host machines.
   - "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. For details see section "2.3 Host Machine Setup"

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. 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 ..
6. Start sockcmd.sh, collect, and dass-srv (from online machine) for gwb.
   ssh -X observer@lenyadri
   cd /odisk/online1/gsbe/dassrv-gpu/
   ./dassrv_released
7. This is also aliased as **`gwbdassrv`** on online machine (shivneri). 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.

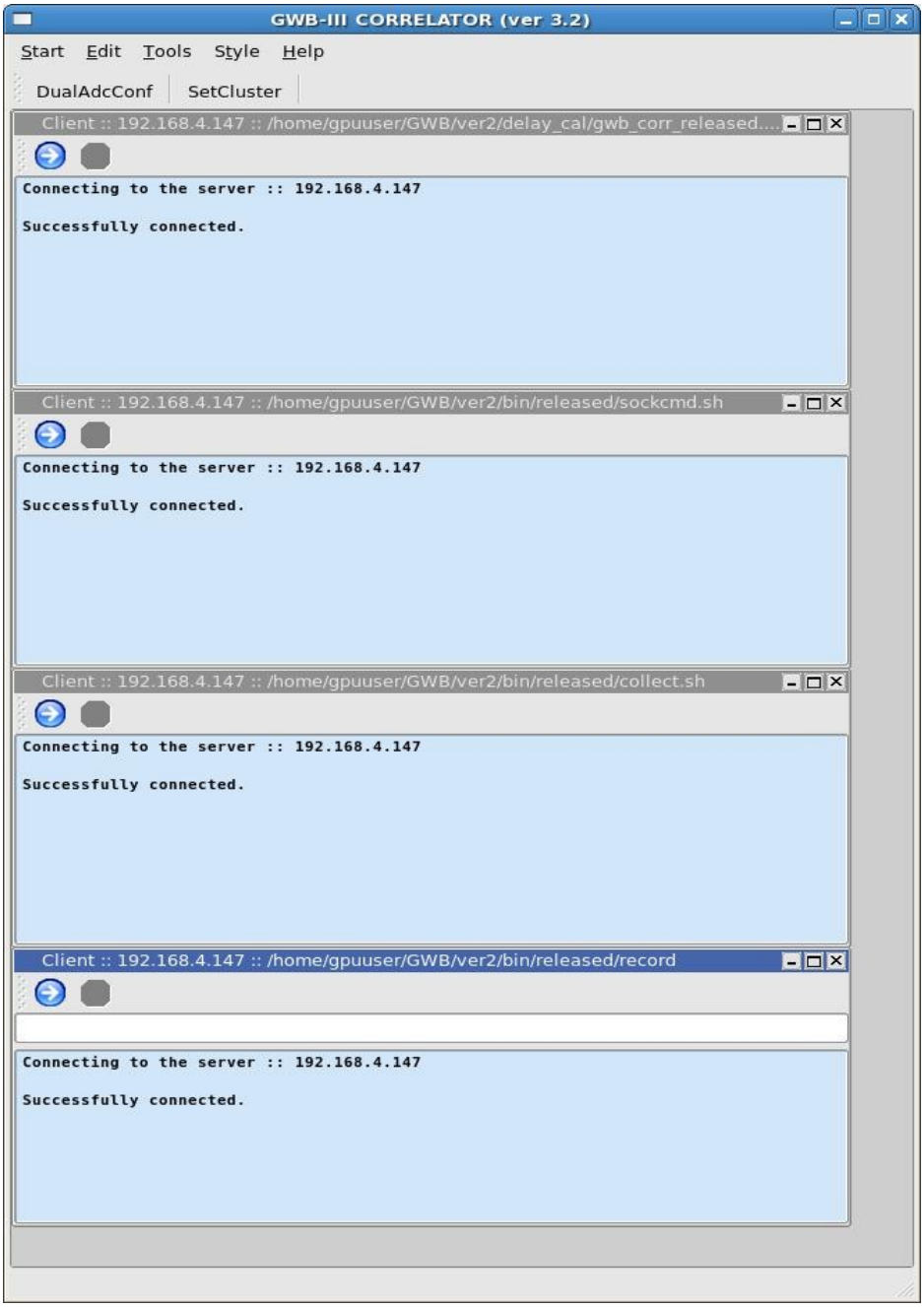


Illustration 6: GWB 3.2 data acquisition window (GWB 3.2 DASCONSOLE)

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-v3.2 initndas
```

gwbcmd3.2 is the modified getcmd program, specially designed for acquiring data for multi-sub-array observations.

After this command, wait for the message “correlator ready for set cluster commaand” in the first window. The message looks as given below :

correlator ready for set_cluster command in node 4
correlator ready for set_cluster command in node 5
correlator ready for set_cluster command in node 7
correlator ready for set_cluster command in node 6
correlator ready for set_cluster command in node 3
correlator ready for set_cluster command in node 3
correlator ready for set_cluster command in node 4
correlator ready for set_cluster command in node 5
correlator ready for set_cluster command in node 7
correlator ready for set_cluster command in node 6
correlator ready for set_cluster command in node 1
correlator ready for set_cluster command in node 0
correlator ready for set_cluster command in node 0
correlator ready for set_cluster command in node 1

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 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-v3.2 strtndas                      ;for subar 4.
gwbcmd-v3.2 stpndas
gwbcmd-v3.2 strtndas <subar number>       ;for multi-sub-array observation.
gwbcmd-v3.2 stpndas <subar number>
```

11. 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/ver2/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.

    DASMON is working fine, but taking some time in processing, hence running slower. Debugging on this issue is in process.

12. 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'.

13. 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.

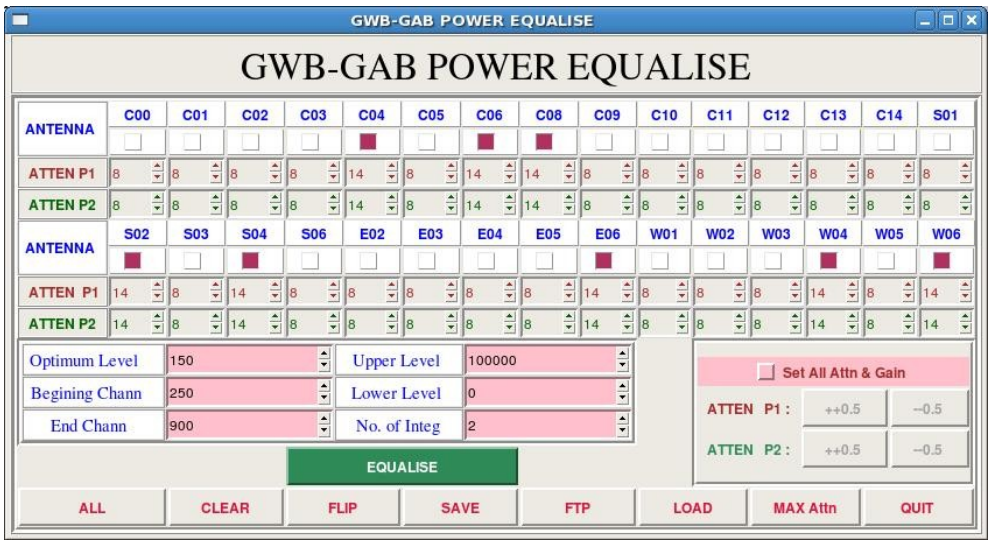


Illustration 7: GWB-GAB power Equalise Window

CHAPTER 3. Running Pulsar Observations

GWB 3.2 Allows user to observe pulsars. Using GWB 3.2 Pulsar interface. For this, user has to select the values at GWB BEAM1 and GWB BEAM2, with allowed combinations. User can do phasing, configure GAC, Configure Pulsar mode, and run his/her observations with as per requirement.

3.1 Running Phasing on GWB data :

This can be invoked from GWB-CORRELATOR Main Window from " **Tools -> Pulsar Tools -> GWB Phasing**", or pressing **Alt+P** as an accelerator.

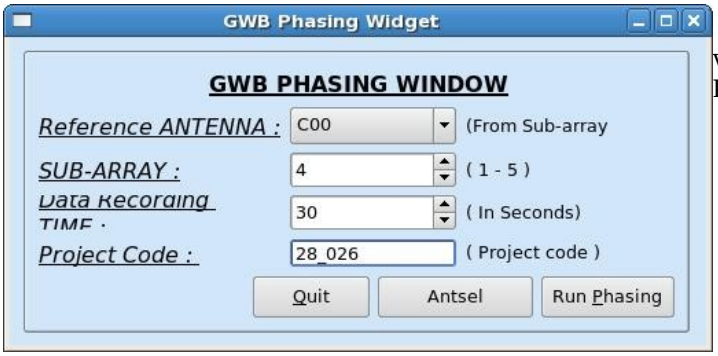


Illustration 8: Phasing widget to run and apply phasing iteration on GWB.

This utility temporarily provided with small tool which calls the phase_gwb.pl from online machine. Phasing Widget allows to choose the following :

- **Reference Antenna** Name for selected sub-array.
- **Sub-array** Number for which to carry phasing iteration.
- **Data recording Time** on which Phasing will work for the solutions.
- **Project Code** to be entered for related subarray which is used.

Note : Antenna selection Button is provided, but code for Antsel is not yet ready.

3.2 GAC selection:

GAC (GMRT Array Combiner) is the tool to configure the set of antennas into possible Beam configurations. In some way, this can be done as per the requirement of the user. This allows user to select and deselect the antennas for particular beam configuration.

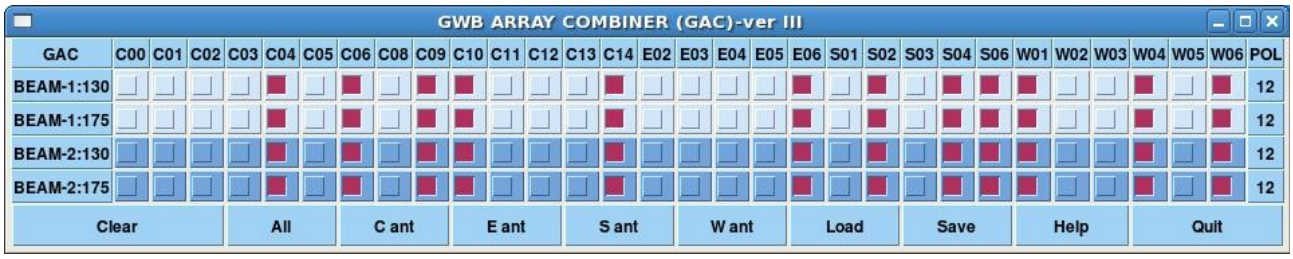


Illustration 9: GAC showing antennas selected (marked in Red) for Beam data acquisition.

3.3 Pulsar Configuration:

Pulsar configuration involves the setting up the values for beam former scaling parameter. This is nothing but the multiplication of beam data by the selected number.

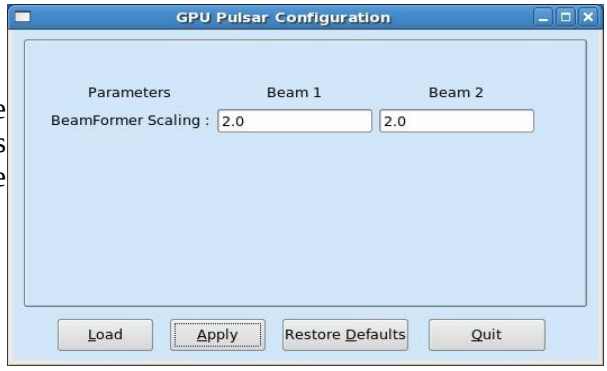


Illustration 10: BeamFormer scaling selected as 2.0 for each beam.

3.4 Starting Pulsar Acquisition GUI (Beam1 and Beam2) :

1. logon to **observer@astro8** and enter commands as :
   cd ~/bin/gwbIII/ver2/
   ./gwbcorr
   This will open a qt interface for gwb 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/ver2' directory.
   OR
   This can Also be Started from the main GPU-CORRELATOR Window as Explained above in earlier section GWB-CORRELATOR .
   The GUI has two workspaces. First for Beam 1 and the other for beam 2. In each workspaces , client windows can be opened from start menu.

1. On Menubar go to "**Start -> All Windows"** or "**Ctrl+N"** or go to "**Start -> BEAM1 - Windows -> All "** to open all client processes to run gwb incoherent array pulsar mode processes on gwbh2(192.168.4.148).

   This will popup the client processing windows for Beam 1 host machine (set from the Preferences of the Main DasConsole GUI), in the following order :
   1. "**192.168.4.148::bm1_process_psr**":
      It can also be termed as incoherent array pulsar data acquisition and processing client.
   2. "**192.168.4.148::collect_psr**":
      This dumps the incoherent array pulsar data into the Shared memory.
   3. "**192.168.4.148::bm1_record_psr**":
      one can write the acquired incoherent pulsar data into specified .raw format file as per requirement.

2. Start the clients processes, **bm1_process_psr** and **collect_psr** by pressing Blue (start) button on the Client windows.

3. On the ToolBar There are Four Different Buttons viz., InitBm1, StartBm1, StopBm1, FinishBm1, etc.

4. On Menubar go to "**Start -> All Windows"** or "**Ctrl+N"** or go to "**Start -> BEAM2 - Windows -> All "** to open all client processes to run gwb coherent array pulsar mode processes on gwbh3(192.168.4.149).

This will popup the client processing windows for Beam 2 host machine (set from the Preferences of the Main DasConsole GUI), in the following order :

1. "**192.168.4.149::bm1_process_psr**":
   It can also be termed as incoherent array pulsar data acquisition and processing client.
2. "**192.168.4.149::collect_psr**":
   This dumps the incoherent array pulsar data into the Shared memory.
3. "**192.168.4.149::bm2_record_psr**":
   one can write the acquired incoherent pulsar data into specified .raw format file as per requirement.

5. Start the clients processes, **bm2_process_psr** and **collect_psr** by pressing Blue (start) button on the Client windows.

6. **bm1_record_psr** and **bm2_record_psr** is added with option "-c PRJCODE" with existing options available. This will generate the binary header file with extension "*.bhdr*". User can see the content of this binary header file by using command as:
   `read_bhdr FILE.bhdr` on the relevant beam hosts machines.

7. On the ToolBar There are Four Different Buttons viz., InitBm2, StartBm2, StopBm2, FinishBm2, etc.

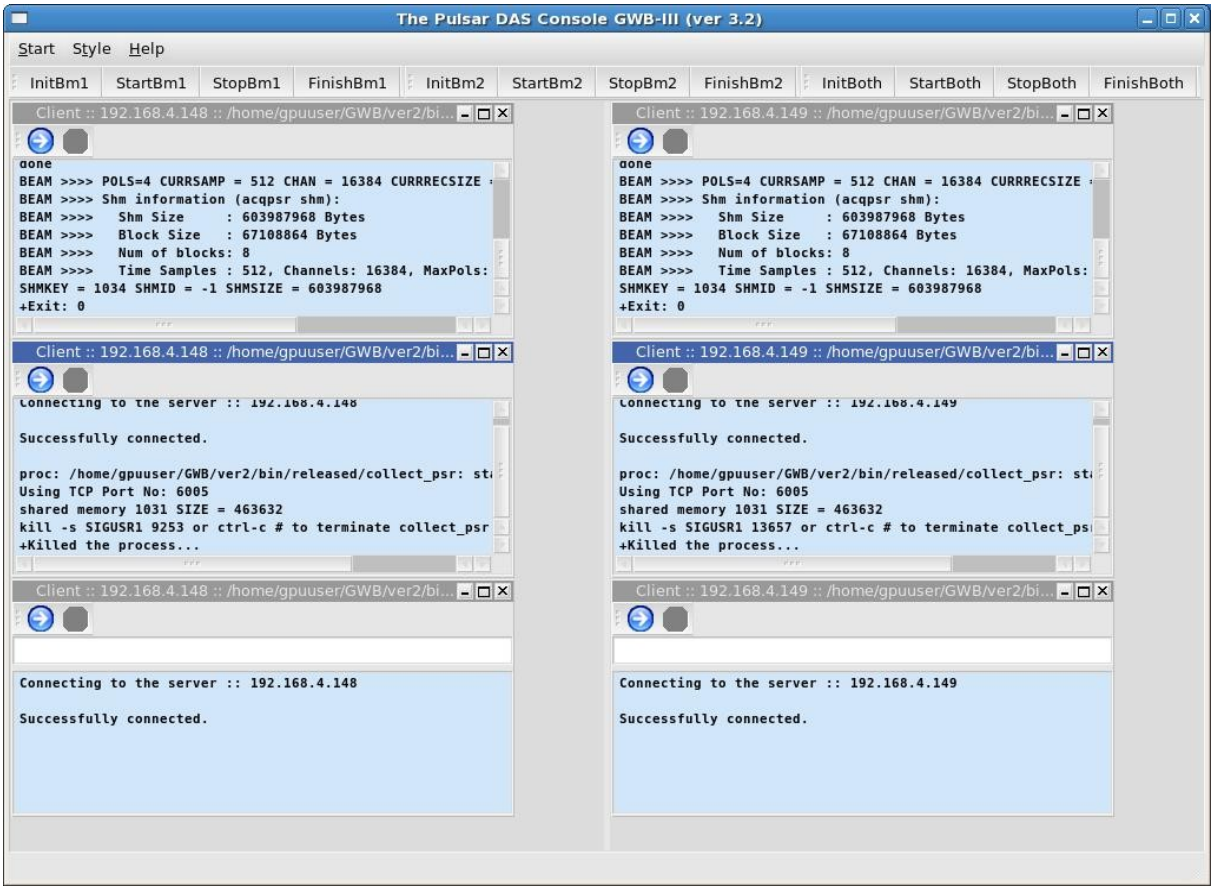


Illustration 11: Pulsar Data acquisition Interface (Pulsar DAS) showing PA and IA processes.

8. In addition to this, There are Buttons to control data for pulsar beams which are named by InitBoth, StartBoth, StopBoth, FinishBoth. These four buttons will control the process in simultaneously, If user is working with the Both Beam data.

    1. InitBm1/InitBm2/InitBoth :
        Initializes the beam1 and beam2 Process Pulsar Beam Acquistion.
    2. StartBm1/StartBm2/StartBoth :
        Starts the pulsar DATA acquisition for beam1 and beam2 collect pulsar.
    3. StopBm1/StopBm2/StopBoth :
        Stops the pulsar DATA acquisition for beam1 and beam2 collect pulsar.
    4. FinishBm1/FinishBm2/FinishBoth :
        Halts the beam1 and beam2 Processes Pulsar Beam acquisition.

    Note : All The above pulsar command process execution under Toolbar Buttons, can also be done from online machine terminal with commands as :
    1. ***gwb3_bm1.finish* / gwb3_bm2.finish****
    2. ***gwb3_bm1.init* / gwb3_bm2.init****
    3. ***gwb3_bm1.start* / gwb3_bm2.start****
    4. ***gwb3_bm1.stop* / gwb3_bm2.stop****

3.5 Multi-sub-array observations:

This is the most awaited feature of GWB 3.2. For this user has to split up the working antennas into two or more sub-arrays as per their requirement, and start the individual PROJECT from the ONLINE, for each of the sub-array. This works with both ONLINE and MANUAL TPA selection explained in section 3.6.

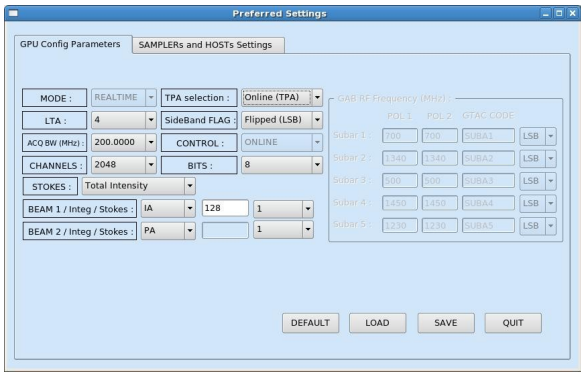


Illustration 12: Online TPA selection – In this case No need to enter the values at GUI. ACQ straightaway reads the TPA parameters given at ONLINE for relevant sub-array. Irresepctive of the values of GAB RF/LO, GTAC CODE, SideBand FLAG etc. Here, user needs to confirm that TPA parameters and Frequency settings done at GAB, GWB are matching. If not then it may result in bad data.

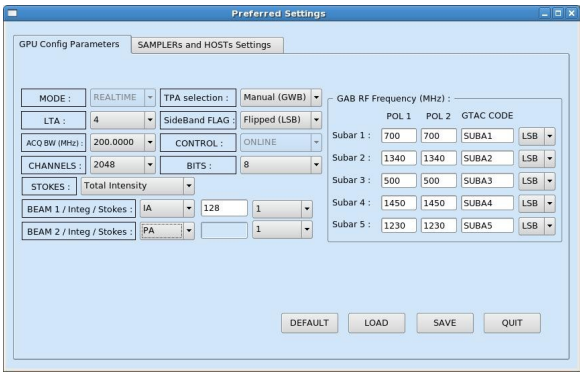


Illustration 13: Manual TPA selection – for this user has to provide the PRJCODE entered at online for given particular sub-array, so that the GAB RF/LO Frequency entered at GUI for relevant sub-array will be taken calculation of TPA, along with selected SideBand FLAG. Otherwise, ACQ will consider the TPA values given at the ONLINE, which may be wrong considering the values set at GAB.

3.6 TPA selection:

There are two ways in which TPA can be set for GWB, i.e. Online and Manual. As explained in Illustrations 12 and 13 above. For **Online TPA** user has to enter values as:

tpa $(GABLO)_{p1}$ $(GABLO)_{p2}$ $(GABLO+70)_{p1}$ $(GABLO+70)_{p2}$ 70 70 ==> FOR LSB
tpa $(GABLO)_{p1}$ $(GABLO)_{p2}$ $(GABLO-70)_{p1}$ $(GABLO-70)_{p2}$ 70 70 ==> FOR USB

In case of **Manual TPA** the tpa values will be calculated by GWB ACQ using GAB RF/LO values entered at relevant sub-arrays.

Chapter 4: 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/ver2/bin/released/clear_all_node_shm.csh* // for shm
   b. */home/gpuuser/GWB/ver2/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	ROACH 1
CO14	gwbcorr1	
CHB21	gwbcorr1	
CHB23	gwbcorr1	
CO16	gwbcorr2	ROACH 2
CO18	gwbcorr2	
CHB25	gwbcorr2	
CHB27	gwbcorr2	
CH13	gwbcorr3	ROACH 3
CH15	gwbcorr3	
CHB29	gwbcorr3	
CH33	gwbcorr3	
CH17	gwbcorr4	ROACH 4
CH21	gwbcorr4	
CH43	gwbcorr4	
CH45	gwbcorr4	

CH23	gwbcorr5	ROACH 5
CH25	gwbcorr5	
CH49	gwbcorr5	
CHB50	gwbcorr5	
CH27	gwbcorr6	ROACH 6
CH29	gwbcorr6	
CHB54	gwbcorr6	
CHB56	gwbcorr6	
CHB41	gwbcorr7	ROACH 7
CHB43	gwbcorr7	
CHB59	gwbcorr7	
CHB19	gwbcorr7	
CHB45	gwbcorr8	ROACH 8
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 frequency, +20 dbm power level, RF ON

Appendix - 1 BEAM INTEGRATION TABLE – for 200MHz 8-bit mode

This appendix gives the possible values for beam integration. The values are different for different no. of spectral channels. Below given are the values for both four stokes and single stokes. The corresponding sampling periods in milliseconds are also given

Note : All the values may not support pulsar das recording(writing beam data to disk)

Accurate Sampling period calculation :

Time(ms) = (No. of channels x 2 x No. of FFTs) / (400 x 10^3)

Channels	Stokes	No. of FFTs	Time(ms)
16384	4	32(max)	2.6
		16	1.3
		8(min)	0.65
	1	32(max)	2.6
		16	1.3
		8	0.65
		4	0.32
		2(min)	0.16
8192	4	64(max)	2.6
		32	1.3
		16	0.65
		8(min)	0.32
	1	64(max)	2.6
		32	1.3
		16	0.65
		8	0.32
		4	0.16
		2(min)	0.08
4096	4	256(max)	5.2
		128	2.6
		64	1.3
		32	0.65
		16	0.32
		8(min)	0.16
	1 1	256(max)	5.2
		128	2.6
		64	1.3

		32	0.65
		16	0.32
		8	0.16
		4(min)	0.08
		2(min)	0.04
2048	4	256(max)	2.6
		128	1.3
		64	0.65
		32	0.32
		16	0.16
		8(min)	0.08
	1	256(max)	2.6
		128	1.3
		64	0.65
		32	0.32
		16	0.16
		8	0.08
		4	0.04
		2(min)	0.02
1024	4	256(max)	1.3
		128	0.65
		64	0.32
		32	0.16
		16	0.08
		8(min)	0.04
	1	256(max)	1.3
		128	0.65
		64	0.32
		32	0.16
		16	0.08
		8	0.04
		4	0.02
		2(min)	0.01

Appendix - 2 BEAM INTEGRATION TABLE – for 400MHz 4-bit mode

This appendix gives the possible values for beam integration for 400MHz 4-bit mode. The values are different for different no. of spectral channels. Below given are the values for both four stokes and single stokes. The corresponding sampling periods in milliseconds are also given

Note : All the values may not support pulsar das recording(writing beam data to disk)

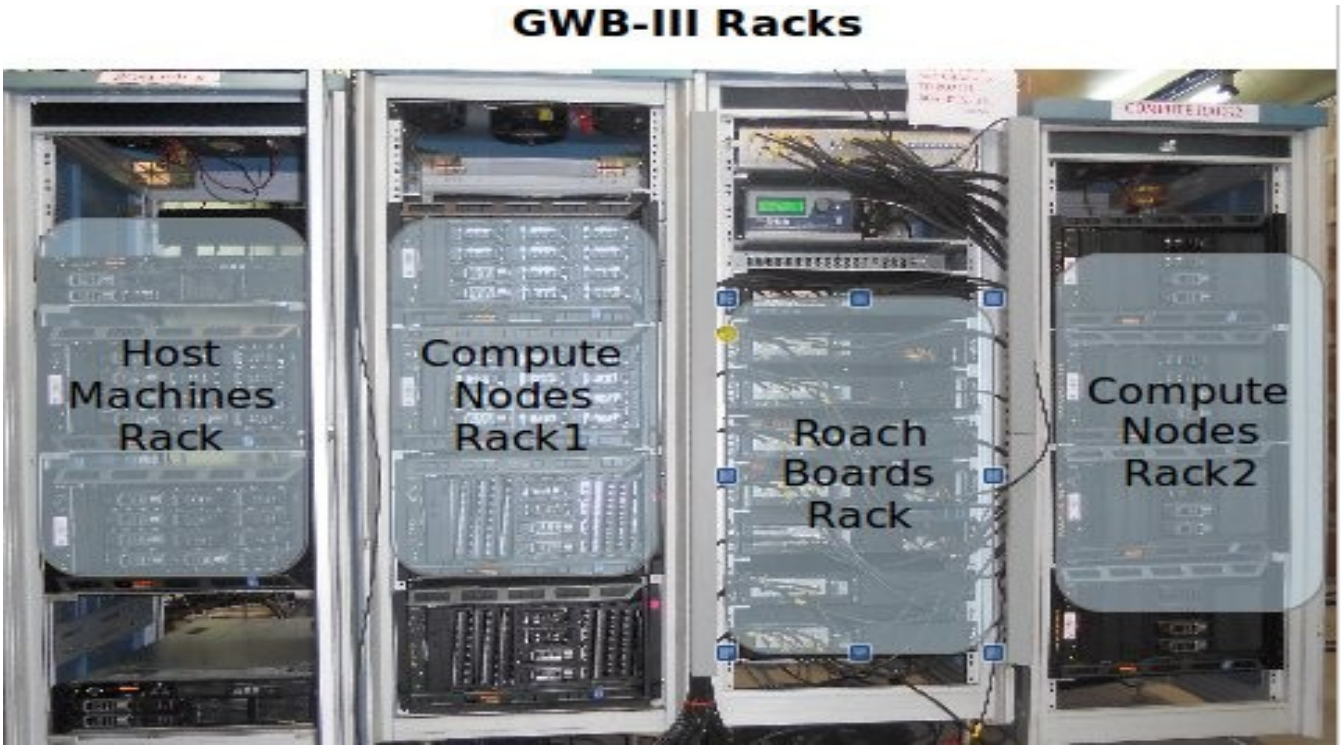
Accurate Sampling period calculation :

Time(ms) = (No. of channels x 2 x No. of FFTs) / (800 x 10^3)

Channels	Stokes	No. of FFTs	Time(ms)
16384	4	32(max)	1.3
		16(min)	0.65
	1	32(max)	1.3
		16	0.65
		8	0.32
		4(min)	0.16
8192	4	64(max)	1.3
		32	0.65
		16(min)	0.32
	1	64(max)	1.3
		32	0.65
		16	0.32
		8	0.16
		4(min)	0.08
4096	4	256(max)	2.6
		128	1.3
		64	0.65
		32	0.32
		16	0.16
	1	256(max)	2.6
		128	1.3
		64	0.65
		32	0.32
		16	0.16
		8	0.08
		4(min)	0.04

2048	4	256(max)	1.3
		128	0.65
		64	0.32
		32	0.16
		16(min)	0.08
	1	256(max)	1.3
		128	0.65
		64	0.32
		32	0.16
		16	0.08
		8	0.04
		4(min)	0.02
1024	4	256(max)	0.65
		128	0.32
		64	0.16
		32	0.08
		16(min)	0.04
	1	256(max)	0.65
		128	0.32
		64	0.16
		32	0.08
		16	0.04
		8	0.02
		4(min)	0.01

Appendix - 3 POWER ON/OFF PROCEDURE



1. Switch OFF procedure

a. Switch off the ROACH UNITS in the ROACH boards rack by holding down the Black switch on the front panel for ~5 sec.

b. Switch off the Clock generator. This feeds clock signal of 800 MHz, +20dBm to the ROACH borads.

c. No need to switch off the SMPS used for PPS unit. This will get switched off directly from mains.

d. No need to switch off the infiniband switch. This will get switched off directly from mains.

e. Halt the control PC (192.168.4.68) which is a 1U pc in the GWB rack.
NOTE : a. ssh -X root@192.168.4.68 (gmrttifr) b. sudo halt -p

f. Halt the compute nodes in Compute Nodes Racks 1 and 2 and host nodes in Host machines Rack by executing the script shutdown.sh in gwbh1 home folder.
NOTE : a. ssh -X gpuuser@gwbh1 b. ./shutdown.sh

Note : Control PC is in GWB-II Racks (see picture below)
Guide : Please look at the picture below for location of Clock, ROACH boards, Compute Nodes and Host Machines.

GWB-III Racks

GWB-II Racks

2. Switch ON procedure

a. Switch ON the control PC (192.168.4.68).
b. Make sure the infiniband switch is ON.
c. Make sure the PPS unit is Switched ON.
d. Switch ON the Clock Generator. Set the frequency to 800 Mhz, amplitude to +20dBm, RF ON.

Instructions on How to set clock settings :

1. Power ON the clock geneator by clicking the POWER button at botton left hand corner.
2. Set the clock to 800MHz. By clicking on the FUNCTION knob the cusrsor can be moved and value can be changed by rotating the knob.
3. Set the amplitude to +20dBm using the FUNCTION knob.
4. Click on the RF STANDBY button to turn RF ON.

e. Switch ON the ROACH UNITS in the ROACH BOARDS rack by holding down the Black switch on the front panel for ~2 sec.

f. Swich ON the compute nodes and host machines.

Appendix – 3 GWB III NETWORK DIAGRAM

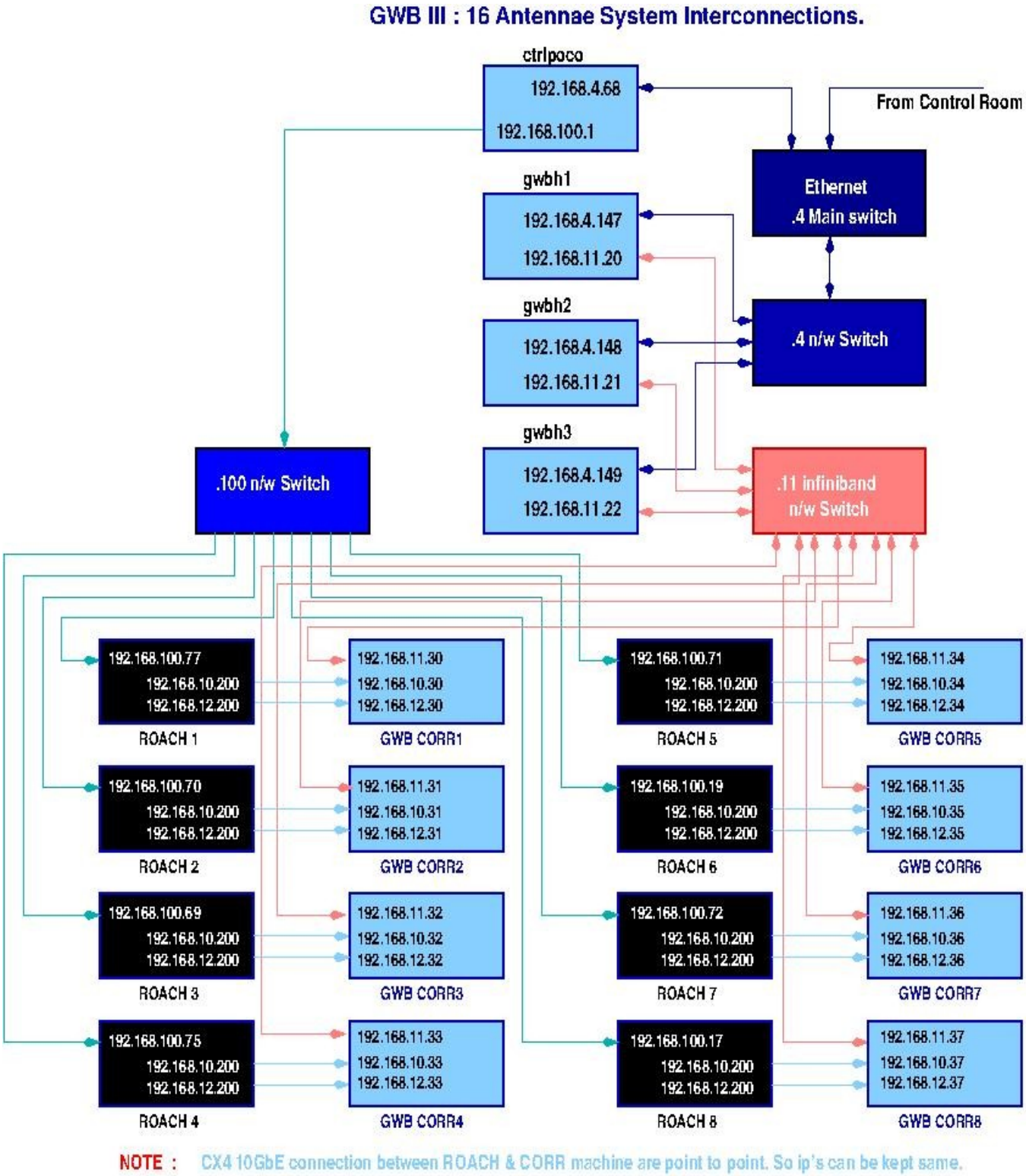


Image Courtesy : Irappa M. Halagalli