SOP TO CONTROL GAB

D.K.Nanaware/Ajith Kumar. <u>Mon Sep. 2,2013</u>

TOC

Title	Page No
REMOTE MODE	
1 <u>Online GAB Control.</u>	- 58 T/ 2
1.1 <u>Using runfile</u>	
1.2 Using Online Commands	3
2 <u>Local Oscillator</u>	5
2.1 Synthesizer-1 Signal Generator.	5
2.2 Synthesizer-2 FSW.	5
LOCAL MODE	
3 Local GAB Control	7
3.1 Generating Control Word	8
3.2 <u>Method -1</u>	8
3.2 <u>Method-2</u>	9
3.3 Local Osillator Frequency Setting	7
Annexture – I <u>LO FREQUENCIES</u>	11
Annexture – II <u>32 BIT MASK DETAILS</u>	12
Annexture – III ATTENUATION VALUES	13
Annexture - IV Web Interface Windows.	14

ONLINE GAB CONTROL

\$ SOP To Control the new GMRT Analog Backend (GAB) using the ONLINE \$
\$ Version 1.0 MAY 01, 2013 JPK \$

1. Following antennas are having GAB systems, except these antennas GAB won't work

ante 8 8 17 25 20 12 27 15 29

W01, E02, W05, C06, C10, S02, W04, S04

2. gabserver program always run as a deamon on elab@loconf pc, make sure that the program is running. If gabserver is not up, please start using the following commands.

ssh -Y elab@loconf >cd /home/elab/gab/ >./gabserver

- 3. start the ONLINE client >gabcli
- 4. ONLINE Commands

ante 8 8 17 25 20 12 27 15 29 cp 0;defs 0;subar 0 // or any subarray

Check gab Communications >initgab

To SET GAB through *runfile*

> cdset0 or cdset<X> x= user number to edit setupnew.txt for GAB settings at the end > run set0gab // or set<X>gab X=0,1,2,3,4,5 user numbers

USING ONLINE COMMANDS

LO Less than 600 000 KHz must be set manually. [<u>manuale setting of LO</u>] # no online command, to set LO below 600 000KHz.

to set LO

>stgablo('1400000','1400000') // LO values from 600000to 1500000 KHz

to setgab attn

>stgabattn('10.0','10.0') // Attenuation values in the range of 0 to 31.5 insteps of 0.5

to set custom <u>32 bit DIGITAL MASK</u> -- For test purpose
>stgabconf('XXXXXXX') D0 to D7 HEX word (total lenght 8)

- (i) To set GAB sub-system, any sub-set of antennas from above eight antennas can be configured/selected through any user.
- (i) If GAB command issued other than these <u>eight antenna</u> or antenn mask contain any other antenna than above <u>eight GAB systems antennas</u>, ONLINE GAB commands will respond by "INVALID Antenna" message.
- (iii) If GAB attenuations are set directly without configuring the GAB, ONLINE will give information "ANTENNA NOT SET". This is precautionary message that GAB sub-system is un-set and need to SET.

Runfile:

Runfile is alias command 'cdsetX'. \underline{X} is user number to edit <u>setupnew.txt</u>. It is a configuration file. cdsetX opens setupnew.txt file. Do necessary changes into this file save and close with :wq command. It will generate setXgab command file. Then issue command 'run setXgab'.

setupnew.txt file contents for GAB.

```
* set GAB LO [600 - 1500 MHz in-steps of 500 kHz]
* Direct Path enabled below 600 MHz
500000
500000
* set GAB ATTEN 0.0 to 31.5 in steps of 0.5 dB [D0-D5, D15-D20]
10.0
10.0
* Antenna or Noise Input [ANT RF(0), VGA CAL(1), BUF or TEST CAL(2) ] [D6-7, D21-22]
0
0
* Mixer (0) or Direct Path (1) [D8, D23]
0
0
*0 SYNTHESIZER, 1 SIGGEN inputs [D30,D31]
1
1
* FilRF [0,1,2,3,4,5,6,7] [D9-11, D24-26]
0
0
* LPF [100 MHz, 200 MHz, 400 MHz, Direct Path(0)] [D12-13, D27,28]
0
0
* Spare [D14,D29]
0
0
```

LOCAL OSCILLATOR SETTING

GAB Local Osillator Frequency can be set using FSW synthesizer or Signal Generator.

Selection of LO from FSW synthesizer or Signal generator must be selected in runfile file.

LOCAL OSILLATOR FREQUENCIES below 600 MHz MUST BE SET MANUALLY USING SIGNAL GENERATOR (SYNTHESIZER-1) with necessary changes in cdsetX file.



SYNTHESIZER-2 FSW: This is Default mode of LO setting.

to set LO

>stgablo('1400000','1400000') // LO values from 600000to 1500000 KHz

LOCAL MODE

This mode enables user to set the GAB parameters from local machine.

Machine name IP

loconf. 192.168.4.65.

User Name elab Password .elab123

Login to loconf machine using above username and password.

Open brower either using firefox icon or

Open xterm, then type command firefox.

Type mcm ip address (http://192.168.30. XX) in url bar and press enter.

Here XX stands for mcm address. Antenna name and mcm address is given in Annexture-IV

As you press enter, It shows MCM monitoring in browser.

At the bottom of MCM Monitoring Window TO SET NEW MCM button. Press It. It will open New MCM Control window in new tab.

This page will show Set 32 Digital Output. And SET LO Frequency Here we can enter 32 Bit mask using hex code.

To Set LO From New MCM Control window

	Set LO Frequency	
Choose LO1	Choose LO2	SUBMIT

LO possible is from 600 MHz to 1450 MHz. To set LO below 600 Mhz,Use signal Generator, and set synth-1 in 32 bit word.

Generating Control Word

32 Bit mask's hex code can be generated for required GAB setting by two methods

1. type genwordgab in xterm.

2. open gabwordforgab.ods file using Libreoffice/openoffice.

1. TYPE genwordgab IN XTERM.

It will open gabword.set file,Do necessary changes in it.Save and Close this file.To save and Close this file type :wq. It will give 32 bit Mask on xterm. **001F803F** Type this mask in New MCM Control windows.

Set 32 Digital Output								
001F	803F	SUBMIT						

Press SUBMIT button set 32 Digital Outputs.

File: GABWORD.SET (For Method -1)

```
# GAB CONTROL SET FILE
# CH-1 CH-2
# 1 = ON 0 = OFF
# Attenuation [ bits D5----D0 ]
10.0 10.0
# Antenna or Noise Buffer [ DEFAULT: 0 antenna]
0.0
# Antenna or Noise VGA [ DEFAULT:0 for antenna ]
0.0
# Direct or Mixer [ DEFAULT: 0=>Mixer 1=> DIRECT PATH ]
11
# Filter Select [0 - 7] [ DEFAULT: 0]
0.0
# LPF Select [ 100MHz 200 Mhz 400MHz DEFAULT: 0 - 100 MHZ ]
0.0
#spare [not used]
0 0:
# Synthesize or Signal Generator [ DEFAULT: 0 -FSW; 1- Signal Generator ]
0 0
```

2. open gabwordforgab.ods file using Libreoffice/openoffice.

open *gabwordforgab.ods* and enter appropriate values in gray shaded cells. It will show the XXXX hex word.

Enter this word in bwoser window Titled "New MCM Control Window"

press submit button.

GAB CONTROL WORD

		1	DKN-Jul	01,2013			
	CH-1	CH-2					
	$\mathbf{\bullet}$	0					
Attenuation in dB	0	U					
(0.0-31.5)							
1=VGA Cal In					-	\mathbf{O}	$\sim -$
2=Buffer and	0	0		()()		80	\prec
4=Conversion S/W	-	-		00	- 1	00	51
RF Filter (0 – 7)	0	0					
BB Filter (0 – 2)	0	0					
Spare (0)	0	0					
Synth (0/1)	0	0					

BB Filter (0 – 3)							
0	100MHz						
1	200MHz						
2	400MHz						
3	NA						

RX PIU	
0	Mixer Path
1	VGA cal In
2	Buffer
4	Direct

MCM Address

Sr No	ANTENNA NAME	MCM No (XX) http://192.168.30 .XX	RACK	CHANNEL-01	CHANNEL-02
1	C06	13	А	A11	A12
2	C10	15	А	A21	A22
3	W01	4	В	B11	B12
4	W05	5	В	B21	B22
5	W06	7	С	C11	C12
6	E02	6	С	C21	C22
7	S02	8	D	D11	D12
8	S04	3	D	D21	D22

Here table shows MCM Address assigned to each Antenna and cable connection.



ANNEXTURE - I

LOCAL OSCILLATOR FREQUENCIES :

Existing Front End.

RF	LO MHz	
235		
325	450	
610	700	
1060	1120	
1170	1240	
1280	1350	
1390	1450	
1420		

Upgraded Front End.

RF	RF band MHz	LO MHz	Mode
235	130-260		
327	250-500	500	Signal Generator ONLY
610	550-900	900	FSW / Signal Generator
1060		1120	FSW / Signal Generator
1170		1230	FSW / Signal Generator
1280		1340	FSW / Signal Generator
1390		1450	FSW / Signal Generator
Full Band		1450	FSW / Signal Generator

Below 600 MHz Local Oscillator, Signal Generator of Agilent make N9310A is used which has range frequency range of 9KHz to 5GHz Located in rack of GAB system.

ANNEXTURE-II

32 BIT MASK DETAILS:

This 32 bit control word can set attenuation and select various inputs in the GAB system.Bits used details as follows.

3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	9	8	7	<mark>6</mark>	<mark>5</mark>	<mark>4</mark>	3	2	1
S2	S1	S P	LP	F	Fil	ter2	2	С	В	V	Att	enu	atio	on2			S P	LP	F	Fil	terl		С	В	V	AΤ	Ten	uati	on1		

Attenuation 1/2: Values can be set are 0.0 - 31.5 dB.

- S1/2 : Synthesiser-2(FSW) or Snthesizer-2 (Signal Generator).
- SP : Spare.
- C : Mixer or Direct path selection.Default is Mixer -0 Bit-9
- B : Buffer Cal Input Selection.
- V : VGA Cal input Selection.

Decimal	Bit 9	Bit 8	Bit 7	Selected Input
0	0	0		RF Input (mixer)
1	0			VGA Cal Input (mixer)
2	0		0	Buffer Cal Input (mixer)
4		0	0	Direct Path
5	1	0	1	Direct Path+ VGA CAL Input
6	1	1	0	Direct Path+ Buffer Cal Input

ANNEXTURE-III

Attenuation Table for GAB OUTPUT = -13 dBm (+/-1 dBm) as on 13/08/2013

		600 MHz BANI	D		1280 MHZ
		400MHz	100Mhz	200Mhz	
C06	Ch1	10	4.65	7.25	15
	Ch2	10	5.08	7.4	21
C10	Ch1	10	5.09	7.26	
	Ch2	10	4.93	7.33	
W01	Ch1	10	4.99	7.52	
	Ch2	10	5.34	7.67	9
W04	Ch1	10	4.96	7.62	0
	Ch2	10	3.29	7.63	4
C04	Ch1	10	4.16	7.66	10.5
	Ch2	10	-1.61	6.77	17
E06	Ch1	10	4.89	7.38	21
	Ch2	10	4.85	2.25	18
S02	Ch1	10	4.62	7.51	0
	Ch2	10	5.13	7.55	0
S04	Ch1	10	5.14	7.42	4
	Ch2	10	5.15	7.41	4

ANNEXTURE-IV

Web Interface windows.

MCM New Monitoring Window

New MCM Monitoring Window - Mozilia Firefox (on loconf.gmrt.ncra.tifr.res.in)							
<u>File Edit View History B</u> ookmarks Tools Help					12		
💠 🔹 🏟 🙁 🏫 💿 http://192.168.30.20/				☆ 🔹 Google	Q		
🛅 Most Visited ▼ 🛛 👯 CentOS 🛛 💭 Support ▼							
New MCM Monitoring Window × New MCM Control Window	v ×				•		
					-		

01	0.0	0.2	0.4	05	0.00				10		10	10	14	15	10
01 125 4.51	121 4.54	124 4.52	04 122 4.53	05 118 4.55	117 4.56	976 0.02	979 0.00	166 4.30	10 1304 -1.71	827 0.81	948 0.17	13 776 1.08	823 0.83	15 825 0.82	826 0.81
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
822 0.83	824 0.82	827 0.81	980 0.00	131 4.48	426 2.93	830 0.79	352 3.32	160 4.33	123 4.53	362 3.26	770 1.11	345 3.35	845 0.71	832 0.78	824 0.82
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
123 4.53	128 4.50	128 4.50	128 4.50	128 4.50	128 4.50	982 -0.01	975 0.02	171 4.27	1232 -1.33	830 0.79	369 3.23	800 0.95	832 0.78	830 0.79	826 0.81
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
833 0.78	826 0.81	827 0.81	980 0.00	136 4.46	424 2.94	832 0.78	347 3.34	782 1.05	828 0.80	823 0.83	826 0.81	829 0.80	827 0.81	829 0.80	828 0.80
						<i></i>									
							MCM S	TATUS							
МСМ Т	ime		22:33:	37	02-	08-2013		Clock I	requen	су	60.00	MHz			
Spectr	um Spre	ader	Norma	l (0-50M	Hz) Normal (>50MHz)			Clock I	Doubler		On				
Digital	Mask		D59F		AB3F			Clock I	Divided	Ву	1				
								UN-							
						ANALO	G BAC	KEND S	STATUS	5					
LO Fre	equency		450.0	MHz	450.0 MHz			Attenuation							
Filter			223		144			LPF					122		
Path								Source							
								A			10-21				

New MCM Co	ntrol Window				
۷	New MCM Control Window -	Mozilla Firefox (on lo	conf.gmrt.ncra.tifr.res.in)		_ = >
<u>Eile Edit View History Bo</u>	okmarks <u>T</u> ools <u>H</u> elp				÷,
4 4 - 🗞 🖸 🍓	http://192.168.30.20/MCM_Set.zhtml			☆ ▼ Google	Q
🛅 Most Visited 🔻 🔹 CentOS	[™] Support ▼				
New MCM Monitoring Windo	w × New MCM Control Window ×				•
	New 1	MCM Control	Window		
	IP: 192.168.30.20	Antenna :	System : Analog Back End		
		ET 22 Digital Outpu			
	2	SET 32 Digital Outpu		_	
	0000	0000	Submit		
		SET LO Frequency			
	Choose LO1 ≑	Choose LO2	Submit		
		RFI Test			
	Spectrum Spreader	Choose SS 🛟			
	Frequency Doubler	Choose FDB			
	Frequency Divider	Choose FDV \$	Submit		
Done					