AO Guide for vlbis1 + RDBE2&4 + Mark6

by Luis Quintero, 29Sep2021
Electronics Department, Arecibo Observatory

Devices and Network Interfaces

vlbis1 (Field System server):

eth0	192.231.93.202	1GbE RJ45	AONET
eth1	**192.168.4.1**	1GbE RJ45	VLBINET
credentials:	oper / naic305m	root / naic305mFS	
vnc:	vlbis1:2	123456	

mark6 (Recorder):

eth0	192.231.96.196	1GbE RJ45	AONET
eth1	**192.168.4.113**	1GbE RJ45	VLBINET
eth4	192.168.1.2	10GbE SFP+	Not connected
eth5	192.168.1.3	10GbE SFP+	Not connected
eth6	192.168.1.4	10GbE CX4	rdbe2 direct connection
eth7	192.168.1.5	10GbE CX4	rdbe4 direct connection
credentials:	oper / FS)@repo	root / t35T%mk64101	

rdbe2 (Sampler/Formatter):

eth0	**192.168.4.12**	VLBINET	1GbE RJ45	For VLBI commands
XPort	192.168.4.15	VLBINET	10/100 RJ45	For power cycle
credentials:	root / naic305m			

RDBE0 (dbe0) in /usr2/control/rdbead.ctl

rdbe4 (Sampler/Formatter):

eth0	**192.168.4.16**	VLBINET	1GbE RJ45	For VLBI commands
XPort	192.168.4.17	VLBINET	10/100 RJ45	For power cycle
credentials:	root / naic305m			

RDBE1 (dbe1) in /usr2/control/rdbead.ctl

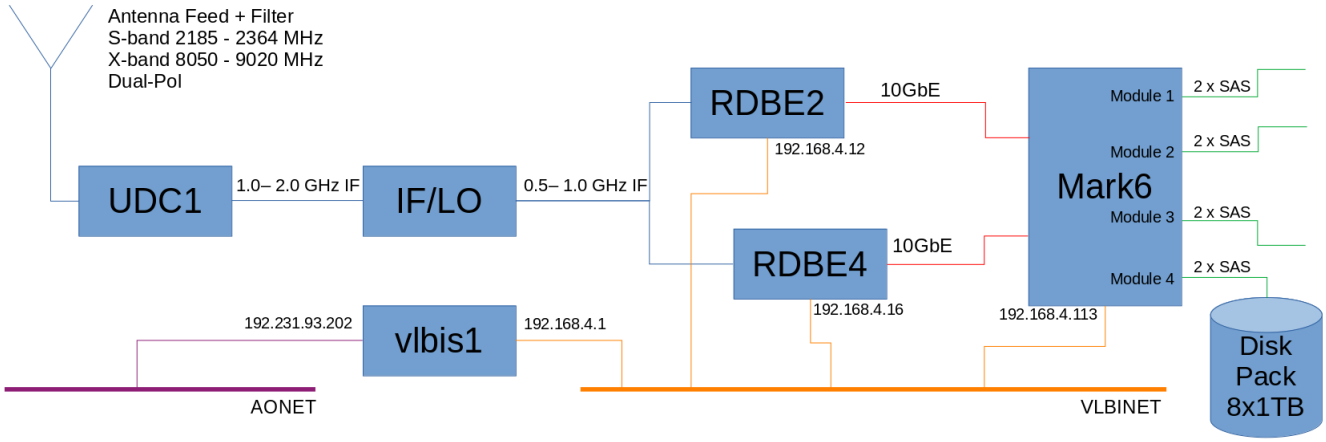

Figure 1. Simplified VLBI Block Diagram of Current Configuration

Field System (FS) in vlbis1

Folders in /usr2/:

fs	->	fs-9.13.0	Original FS code, do not change
proc	->	proc_github	Scripts
sched	->	sched_github	Schedule files
st	->	st-0.0.0_github	Station specific code
control	->	control_github	Configuration files

The recording devices are configured in the following files:

File	Device	Field System Name
/usr2/control/mk5ad.ctl	Mark6 / 192.168.4.113	mk5
/usr2/control/rdbead.ctl	RDBE2 / 192.168.4.12	dbe0
	RDBE4 / 192.168.4.16	dbe1

You can send Mark6 commands from the Field System using **mk5=**, see Fig 2. for examples.

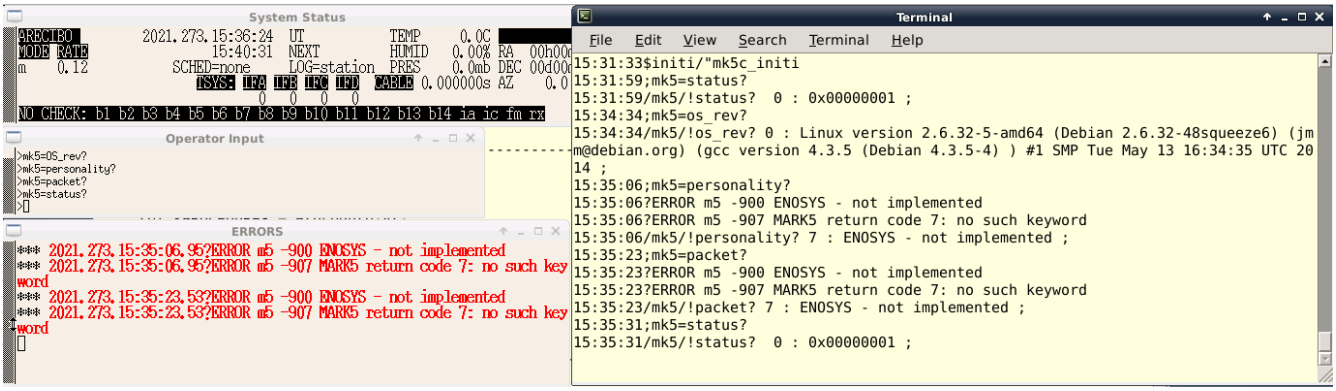

Figure 2. Commands to Mark6 from Field System Operator Input in vlbis1

You can send RDBE commands from the Field System using the **rdbe_cmd=**, see Fig 3. for examples.

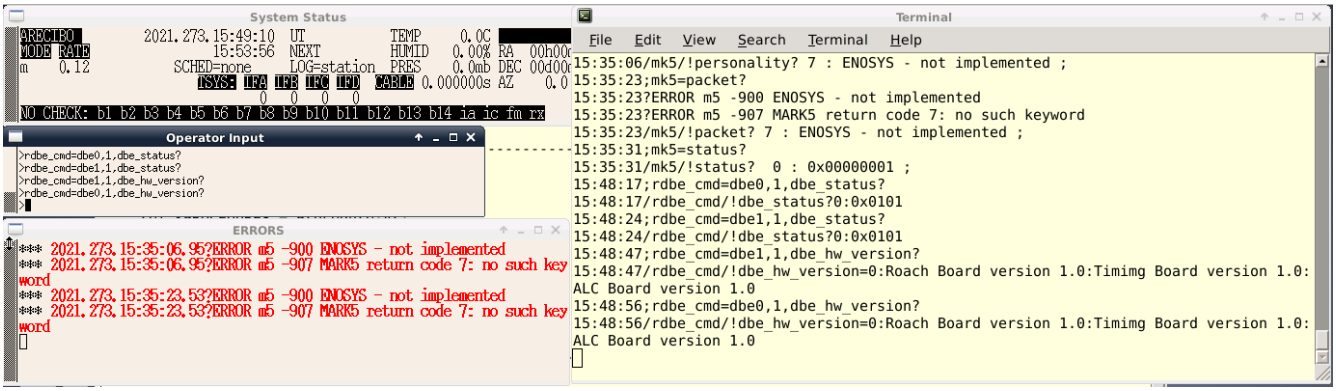

Figure 3. Commands to RDBEs from Field System Operator Input in vlbis1

Mark6 Scan in Module 4 Disk-pack

The Field System talks to the Mark6 recorded via a tool called **jive5ab** using standard Mark5C commands.

From VLBI Experiment (VEX) file to Mark6 files in disk-pack:

We are going to use the following example file: @vlbis1: /usr2/sched_github/**er047d.vex**

Arecibo station will record scans from **No0128 to No0148**

vex2snap produces the experiment schedule file: /usr2/sched_github/**er047dar.snp**

The data was recorded in the Mark 6 **disk-pack module 4**

To check the data, login in Mark6 (credentials: oper / FS)@repo)

The first scan (No0128) is split (52 x 256MB files) in the **eight hard drives** as follows:

```
oper@Mark6-4XXX:~$ ls /mnt/disks/4/0/data/er047d_ar_no0128/
        er047d_ar_no0128.00000000  er047d_ar_no0128.00000024  er047d_ar_no0128.00000048
        er047d_ar_no0128.00000008  er047d_ar_no0128.00000032
        er047d_ar_no0128.00000016  er047d_ar_no0128.00000040
oper@Mark6-4XXX:~$ ls /mnt/disks/4/1/data/er047d_ar_no0128/
        er047d_ar_no0128.00000005  er047d_ar_no0128.00000021  er047d_ar_no0128.00000037
        er047d_ar_no0128.00000013  er047d_ar_no0128.00000029  er047d_ar_no0128.00000045
...
oper@Mark6-4XXX:~$ ls /mnt/disks/4/7/data/er047d_ar_no0128/
        er047d_ar_no0128.00000003  er047d_ar_no0128.00000027  er047d_ar_no0128.00000051
        er047d_ar_no0128.00000011  er047d_ar_no0128.00000035
        er047d_ar_no0128.00000019  er047d_ar_no0128.00000043
```

To list the scans available in the mounted disk-pack(s), use @mk6: **vbs_ls -6**

You should see **er047d_ar_no0128** in the scans list

To **mount** the scan in one file: @mk6: **vbs_fs -6 -I er047d_ar_no0128 ~/data/tmp/er047dar**

The scan is available in one single file (~13GB): **~/data/tmp/er047dar/er047d_ar_no0128**

There is one more tool to delete scans: **vbs_rm** (use --help parameter for more info)

To **unmount** the scan you can **kill the process** correspondent to the running vbs_fs command

Other Software Tools in vlbis1

roachpower.py: use to power up, power down or reboot over the network the RDBE. This is done via the XPort connection at the Roach boards. The command accepts the RDBE ID number (four available) that is listed in the -h/--help parameter.

vlbish: command line terminal to send directly commands (no Field System in the middle) to the RDBEs and Mark6. Exit the terminal with the **quit** command.

Fig 4. shows an example for rdbe2 and rdbe4. There is a **"/"** separator between the device and the command. Once you enter the device name the first time, you don't have to type it for the following commands.

```
oper@vlbis1:~$ vlbish
Welcome to vlbish $Id$ [history nomysql noevlbilookup]
 q to quit, h for help
> rdbe2/dbe_status?
192.168.4.12:5000/!dbe_status?0:0x0101;
rdbe2> rdbe4/dbe_status?
192.168.4.16:5000/!dbe_status?0:0x0101;
rdbe4> rdbe2,rdbe4/dbe_status?
192.168.4.12:5000/!dbe_status?0:0x0101;
192.168.4.16:5000/!dbe_status?0:0x0101;
rdbe2,rdbe4> dbe_sw_version?
192.168.4.12:5000/!dbe_sw_version=0:rdbe_server 2.0.5:HAL version 1.0 PFB:Linux 2.6.25;
192.168.4.16:5000/!dbe_sw_version=0:rdbe_server 2.0.5:HAL version 1.0 PFB:Linux 2.6.25;
rdbe2,rdbe4> dbe_hw_version?
192.168.4.12:5000/!dbe_hw_version=0:Roach Board version 1.0:Timimg Board version 1.0:AL
192.168.4.16:5000/!dbe_hw_version=0:Roach Board version 1.0:Timimg Board version 1.0:AL
rdbe2,rdbe4>
```

Figure 4. RDBE commands from vlbish

Fig 5. shows the example for the Mark6 recorder. You can see that not all the commands in the documentation are implemented.

```
oper@vlbis1:~$ vlbish
Welcome to vlbish $Id$ [history nomysql noevlbilookup]
 q to quit, h for help
> mark6/status?
mark6:2620/!status?  0 : 0x00000001 ;
mark6> personality?
mark6:2620/!personality? 7 : ENOSYS - not implemented ;
mark6> DTS_id?
mark6:2620/!dts_id? 0 : - : 26-Jun-2019 23h23m19s : 1 : Mark6-4XXX : 0 : 0 : -  : - : -  ;
mark6> record?
mark6:2620/!record?  0 : off ;
mark6>
```

Figure 5. Mark6 commands from vlbish

Mark6 Disk-packs Use

Work in progress! Procedure for mount/unmount safely!

DDC Personality

Work in progress! Configuration, data format, quantization, alc/levels check

VLBI NET Devices

Current content of /etc/hosts in vlbis1 (running a DHCP server for VLBINET):

192.168.4.14	rdbe1	192.168.4.15	rdbe1x
192.168.4.12	**rdbe2**	192.168.4.13	rdbe2x
192.168.4.10	rdbe3	192.168.4.11	rdbe3x
192.168.4.16	**rdbe4**	192.168.4.17	rdbe4x
192.168.4.113	**mk6**		
192.168.4.1	**vlbis1**		