

## Observations: EHT with R2DBE

### Prerequisites

- Go through the [setup instructions](#) and verify that the system is up and running.
- Make sure that the modules have been [initialized, grouped and labeled](#).

### Mark6 Preparation

The following steps are documented for "recorder1" and should be repeated for all other recorders

- Make sure the correct modules are loaded into recorder1 according to the module labels.
- Make sure all keys on recorder1 are turned on (horizontal position)
- in the "Mark6-1" desktop tab on mrt-vlbi2: open a terminal and log into recorder1 as user oper.

```
ssh -Y recoder1
```

- restart the dplane/cplane daemons:

```
m6service_restart
```

wait for the cplane and dplane log windows to appear.

- check if the input streams have been defined. Start `da-client` and issue:

```
input_stream?
```

This should report two output streams:

```
!input_stream?0:0:STREAM34:vdif:8224:50:42:eth5:172.16.5.1:0:34:STREAM12:vdif
```

if there are no output streams reported quit `da-client` and run in a terminal:

```
m6_addstreams_eht
```

start `da-client` and verify that the streams have been defined.

- check that the module group is open for recording. In `da-client` issue:

```
mstat?1
```

```
mstat?2
```

```
mstat?3
```

```
mstat?4
```

all four modules should have the "open" state:

```
>> mstat?1
```

```
<< !mstat?0:0:1234:1:MPI%6434/64008/4/
```

```
8:8:8:58175:64008:open:ready:sg;
```

```
>> mstat?2
```

```
<< !mstat?0:0:1234:2:MPI%6435/64008/4/
8:8:8:58175:64008:open:ready:sg;
>> mstat?3
<< !mstat?0:0:1234:3:MPI%6436/64008/4/
8:8:8:58176:64008:open:ready:sg;
>> mstat?4
<< !mstat?0:0:1234:4:MPI%6437/64008/4/
8:8:8:58176:64008:open:ready:sg;
```

if any other state than "open" is reported issue:

```
group=open:1234
```

verify the results by issuing again the mstat?1...mstat?4 commands

The modules on recorder1 are now ready for recording. Repeat the steps for the other recorders.

## Schedule Preparation & Execution

There are two alternative ways at the moment for downloading and starting the schedule. The preferred one is the new "Method A", in case of problems revert to "Method B"

### Method A:

- log-into the control computer as user oper (from mrt-vlbi2):

```
ssh -Y vlbi2 -l oper
```

- execute the vmonstartschedule script:

```
vmonstartschedule.bash -p EHT2018 {schedule}
```

where:

*{schedule}* should be replaced by the track name to download and start e.g. e18c21

*EHT2018* is the project code (will be different for future sessions)

This script will:

- download the most recent vex-schedules from a central server to /home/oper/Control/Schedules/EHT2018
- copy the schedules to all four recorders into /home/oper/vex
- translates the vex schedules to xml into /home/oper/vex
- start the schedules on all four recorders by starting M6\_CC in the background.

**Note:** to stop the schedules issue:

```
vmonstopschedule.bash
```

- Start the automatic gain control:

```
start_eht.py /home/oper/Control/Schedules/EHT2018/{schedule.xml}
```

**Method B:**

- Download the vex-schedules

On mrt-vlbi open a browser and download the vex-schedules from the EHT-wiki; e.g. from

[https://eht-wiki.haystack.mit.edu/Event\\_Horizon\\_Telescope\\_Home/Observing/2018\\_April/Schedules/Schedules\\_to\\_Observe](https://eht-wiki.haystack.mit.edu/Event_Horizon_Telescope_Home/Observing/2018_April/Schedules/Schedules_to_Observe)

(example from the 2018 session; find the correct link for the current campaign)

(typically found on the EHT wiki) and copy them to /home/oper/shared/schedules on the control computer.

- Copy the schedules to the control computer:

```
scp {vex-files} oper@vlbicc:/home/oper/shared/schedules
```

- Translate the vex schedule on any of the recorders (as user oper):

```
cd /home/oper/shared/schedules
vex2xml.py -f {vex-file} -s {code}
```

**NOTE: the two letter code given as {code} must match exactly (case-sensitive!) the code assigned to Pico by the vex file. Normally it is Pv. If in doubt open the vex-file and check the \$STATION section.**

This will create an output file named like the vex file but with an .xml extension (hereafter {schedule.xml})

Open the created {schedule.xml} file and verify that it is not empty. If it is empty check again the two letter station code you have given in the last step.

- Start the schedules:  
log-into all 4 recorders:

```
cd /home/oper/shared/schedules
M6_CC -f {schedule.xml}
```

Note: starting the schedules can be done at any point prior to the session.

- Start the automatic gain control:  
on the control computer (as user oper):

```
start_eht.py /home/oper/shared/schedules/{schedule.xml}
```

## Field System

The field system is used for driving the telescope and to log information relevant to the observations

- Download the schedule and copy it to /usr2/sched on mrt-vlbi (the standard VLBI PC).
- Log into mrt-vlbi as user oper
- create field system files from the vex schedule

```
cd /usr2/sched
drudg {vexfile}
  select station code (typically Pv)
  select option 3 (=make snap) <enter>
  select option 0 (quit)
```

This will create a file:

```
/usr2/sched/schedulename.snp
```

where *schedulename* is the name of the vex-schedule + pv (e.g. e17j28pv)

- start the field system. On mrt-vlbi go to the "Field System" desktop. Click on the "Field System" icon.
- Ignore any errors concerning dbbc or mk5
- In the *oprin* terminal issue:

```
schedule=schedulename
```

## Troubleshooting

Restarting daemons: need new input\_streams, m6service