

Java Field System Log File Client

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1. Introduction

`jfslog` is a Java program originally devised to help occasional users monitor VLBI observations at the 40m telescope. Fs log files get constantly updated and users not familiar with it have a tendency to ignore the flow of messages. The FS already provides some utilities to display the observation status but we believed that unifying them in a single window and adding a graphical representation of the system temperatures that upgrades along time may be appealing and easily followable by observers. All information displayed is obtained from the LOG file and not from shared memory. This property allows to run this application outside the FS host. It is also possible to transfer in real time the log file to a third host and view it from there.

`jfslog` can be used by other VLBI stations provided its configuration file is properly setup.

2. Installation

`jfslog` is intended to be used at the FS PC but it may be used in other hosts. In the latter case, the log file should be transferred from the FS in real time.

The following instructions are for a Debian Linux host running “Lenny” or “Etch”.

- Login as root or use `sudo`
- Install Java 6 runtime virtual machine Debian package from Sun.

```
apt-get install sun-java6-jdk
```

- Make sure that your system will use the Sun JRE (Java Runtime Environment) and not an alternative one:

```
update-java-alternatives -s java-6-sun
```

- Check that the previous command was performed correctly.

```
update-java-alternatives -l
```

You may get a list with JREs. The first line tells you which JRE is the default one. For example, you could get the following list:

```
java-6-sun 63 /usr/lib/jvm/java-6-sun
java-gcj 1042 /usr/lib/jvm/java-gcj
```

- Login as oper.
- Create directory `fslog` under the oper home directory and change to that folder:

```
cd
mkdir fslog
cd fslog
```

- Download jar file contains the “jfslog” from the server where it is available:

```
wget jfslog.jar
```

- Untar the file

```
jar xf jfslog.jar
```

alma/fslog class files and subdirectories config and lib will be created.

- Edit file config/fslogconfig.xml and modify variables type and number with appropriate values. If you are using VCs instead of BBCs modify the type to VC. If your equipment only has 8 BBCs set number to 8.

3. Running “jfslog”

To run this application from any directory in the host we recommend to set an alias which you can store in file `.cshrc` if using a standard FS shell, or `.bashrc` if you are using a bash shell. In the former case do as follows:

```
alias jfslog 'java -classpath $HOME/fslog:$HOME/fslog/lib/jcommon-1.0.16.jar:
$HOME/fslog/lib/jfreechart.jar:$HOME/fslog/config alma/fslog/LogFileGUI'
```

The instruction should be in a single line with no spaces in between. In this report it has been split to read it easily.

To run it just type the application alias followed by the configuration file and the log file you want to monitor and the graphical window will pop up:

```
jfslog [configfile] logfile
```

If the configuration file is not supplied it will be searched in the following path:

```
/usr2/oper/fslog/config
```

The log file should be written with its full path unless the application is run in the same directory as the log file. For example:

```
jfslog /usr2/log/ep066ys.log
```

Figure 1 shows an example of the application being run in Yebes.

3.1. Running ‘jfslog’ in a different host

It is possible to run this application on a third host, instead of the Field System PC. This may be interesting if the FS host CPU is not fast enough or it does not have enough RAM. In this case the log file should be transferred in real time to this third host using the same script that JIVE supplied for copying automatically the log files to the Mark5. The script is included here, although it has been slightly patched to remove all mk5 references, and instead includes two new lines for easy configuration.

Before running it, it is necessary to modify `username` and `targethost` variables with the username and host where this application will run.

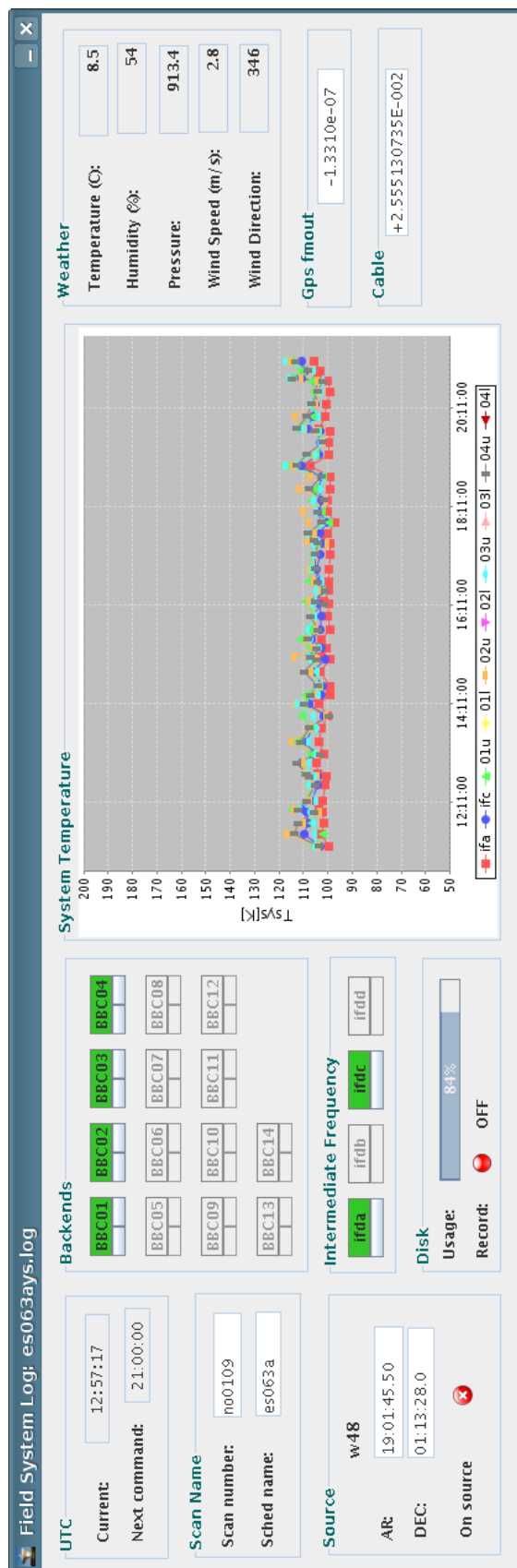


Figura 1: jfslog snapshot

```
#!/bin/sh
#####
# Configuration: edit as required
#####

export username=user
export targethost=host.hostdomain
export targetdir=/home/almamgr
export logpath=/usr2/log
export interval=60 # time between checks of log status
export timeout=30 # minutes

#####
# Actual program
#####

# Get most recently changed logfile
while true
do
    until test `find /usr2/log -maxdepth 1 -name '*.log' -mmin -$timeout | wc -l` -gt 0
    do
        echo "$0: No active log file; sleeping"
        sleep $interval
    done

    export logfile=`ls -t $logpath/*.log | head -n 1`
    export log=`basename $logfile`

    tail -n +0 -f $logfile | ssh $username@$targethost "cat > $targetdir/$log" &
    export subproc=$!
    echo "$0: Copying $logfile to $username@$targethost:$targetdir/$log (PID $subproc)"

    until test `find $logfile -mmin +$timeout | wc -l` -ne 0
    do
        sleep $interval
    done
    echo "$logfile more than $timeout minutes old: stopping copying (PID $subproc)";
    kill $subproc || print "Can't find subprocess $subproc"
done
```

Ideally the FS ssh public key should be included in `$HOME/.ssh/authorized_keys2` at the host PC, to avoid entering the password.

4. Description

Information is displayed in a 1280×600 window divided in several panels. Below is a description of each panel and in cursive font the way the program works to fill in the values. You may skip the latter if you are just looking for description of the window.

■ Date time panel

This panel shows two boxes: current UTC time read from the computer and next programmed command or sequence of commands.

How it works

Date and time is obtained from the FS computer. If the FS time or the Mark5B computer time are not synchronized with the FS computer time, the time displayed in the window will differ from the formers. The next command time is calculated by reading a log line

that starts by `:!` followed by an absolute date and/or time. This time is in FS time and you may notice a difference between the current time and the “Next command time”. It happens quite frequently that when the next command time is reached the current time is farther from that value. This will happen until a line starting with `!` is found in the log file.

- Scan and schedule panel

This panel displays the current scan number and the schedule name.

How it works

Line “`scan_name=`” is parsed and the scan number and name are obtained from it.

- Source panel

This panel shows the source name, its equatorial coordinates, and if the telescope is on or off source.

How it works

The source name and coordinates are obtained parsing the last read line which starts with “`source=`”

On source status requires that “`flagr`” works properly in your station. If while parsing the log file, a source command (`source=`) is read, the on-source icon will be set to red cross. If a `flagr` line without `acquire` substring is read the on-source icon will be set to a red cross. The on-source icon will only be set to a green tick when a `flagr` line with substring `acquire` is found.

- Disk space usage panel

This panel shows the disk usage space and the recording status. The disk usage space is a progress bar and the record status is a LED which lights green.

How it works

The recording status is obtained by parsing lines which contain string `disk_record=on`, or `disk_record=off`. In the former case the LED will light green and text `ON` will appear. In the latter case the LED will light red and text will be `OFF`.

The disk usage progress bar is computed from the disk size and the last disk pointer available at the log. The disk size is obtained by parsing a line which contains string `banck_check`, like the following line:

```
2009.304.11:13:53.41/banck_check/4000/1024,
```

The first field after the “/” is the disk size in Gb. The current disk pointer is obtained from parsing lines which contain string `disk_pos`, like here:

```
disk_pos/739733683200,731079859200,739733683200
```

The first field after the “/” indicates the write pointer position in bits. To convert it to Gb this value is divided by $8 \cdot 10^9$. The percentage is obtained by dividing the write pointer position by the total disk space.

- BBC panel

This panel shows a number of BBCs/VCs boxes, with two or one small buttons below each BBC box. The number of BBCs/VCs displayed is determined in the configuration panel. The boxes may be in grey, green, yellow or red. If the BBCs/VCs are not detected in a given log they remain in grey. Usually some or all BBC boxes get some color.

Boxes will light green when the total power, lock status and 1 PPS status is correct. The accepted total power for a correct operation is setup in the configuration file. Two values are provided. If the current value is over the limit the BBC will be considered to be working correctly. If the total power is between both values, it will be considered that the BBCs are working almost correctly and they will be displayed in yellow. If the total detected power is below both limits they will light in red. If the LO is not locked the BBC will light in red. If the BBC lacks 1 PPS, it will light in yellow.

It is possible to see the BBC/VC status by hovering the mouse on top of each BBC box. A small text window will pop up showing the BBC/VC line from the log file. The window will disappear after some seconds. Please make sure the application window is focused before using this feature.

The small boxes, 1 for VCs, 2 for BBCs, allow to control if T_{sys} for that channel is displayed. Terminals with VCs only have got one total power detector, terminals with BBCs get power from the upper side band (left button) and from the lower side band (right button).

How it works

The application determines which BBCs or VCs are being used in an experiment by looking for lines which contain /bbcxx= or /vcxx= strings. Usually these lines only appear at the beginning of the experiment in which the setup procedures are echoed in the log. Verbosity level is decreased after the first scan.

The LO lock status, 1 PPS status and total power is obtained by parsing lines which contain string bbcxx/ or vcxx/ where xx are natural numbers.

- IF panel

This panel has the same philosophy as the BBC one. VLBA terminals have 4 IFs, while Mark3/Mark4s have 2 IFs. Only the boxes used in the log file are colored, and the rest are displayed in grey. These boxes may light in green, red or yellow, according to the total power detected. If the power is in the valid working interval the box is in green while if it is below or over these values it is displayed in red. Each box has a small button below that allows to switch on/off its T_{sys} graph in the system temperature panel.

As in the BBC panel it is possible to see the BBC/VC status by hovering the mouse on top of each IF box. A small text window will pop up showing the IF line from the log file. The window will disappear after some seconds. Please make sure the application window is focused before using this feature.

How it works

Information is obtained by parsing lines which contain string /ifdab/ or /ifdcd/ in VLBA terminals, or /ifd/ in Mark3/Mark4 terminals. Total power is the last field in the line.

- System temperature panel

This is possibly the most useful panel in the application since it is a powerful tool to assess the quality of the observation, (aside from phase issues). System temperature for each channel is displayed in a graph window where the vertical axis is T_{sys} and the horizontal axis, time. Each channel is depicted with a different symbol and colour. The color and shape coding is displayed at the bottom of the graph window. The graph holds a maximum of 50 points per channel. When the limit is reached old points are removed from the right and new points are added to the left. Hence the application works as a hardware chart recorder.

It is possible to remove channels by pressing on the buttons below the BBC boxes, in the BBC panel, or below the IF boxes in the IF panel. If the button is pressed, the line and points for that channel will be removed from the graph and from the legend below, although the scale will not be recomputed.

The vertical scale, maximum and minimum limits are set in the configuration file. The horizontal axis is updated with time.

It is possible to zoom in by using the left mouse button and selecting a rectangular box. The right mouse button may be used to zoom out or to control the scale of the individual axis. The menu should be easy enough to be used by users. If the area is zoomed using the left mouse button data will get updated in the plot if within the limits.

How it works

Data are obtained by parsing lines which contain substring /tsys/. These lines contain the channel plus the system temperature value separated by commas. Below we include an example from a VLBA terminal:

```
tsys/11,176.4,1u,191.5,2u,143.6,3u,73.5,4u,71.4,5u,46.9,6u,51.4
```

The channel code which precedes the system temperature is used in the legend for the graphical window.

Dots and curves in the graph are depicted using JFreeChart Java package. All tools from this package are available in the graph from the right mouse button click. The displayed menu should be in the original Java installation language

- Weather panel

This panel shows temperature in degrees centigrades, humidity in %, pressure in mbar, wind speed in m/s and wind direction in degrees (orientation is the same as azimuth). Some stations may have not implemented wind speed and wind direction. In that case these boxes will remain empty. If the wind speed is over a given warning limit the box will light in yellow and if it is over the error limit the box will light in red. Both values can be adjusted in the configuration file. Red should mean that the antenna is been run

under dangerous conditions and should be parked or stowed. Yellow is a warning for the operators or observers.

How it works

The data are obtained by parsing lines which contain substring /wx/. The first parameter is temperature, the second pressure, the third one humidity, the fourth wind speed and the last one wind direction. The wind speed limits which set the wind speed box color are setup in the configuration file. Two variables govern this behaviour: max_warning_limit and max_error_limit

■ gps-fmout panel

This panel displays information on the gps formatter 1 PPS tick comparison. Units should be seconds. This box will also be displayed in red if the values are outside the allowed range.

How it works

This value is obtained by parsing lines which contain substring /gps-fmout/ or /fmout-gps/. The value is obtained from the first field after the "/" and its units are in seconds

■ cable panel

This panel shows the cable cal value. It is useful for geodetic observations, since astronomy observations do not require it.

How it works

This value is obtained by parsing lines which contain substring /cable/. The value is obtained from the first field after the "/".

5. Configuration file

The configuration file is located in subdirectory `config` and contains variable names and values to tune this application. This file is written according to XML syntax and is composed of 5 sections. Below we include an example:

```
<?xml version="1.0"?>
<fslogreader>
<vconverter
type = "BBC"
number = "14"
min_error_limit="10000"
min_warning_limit="15500"
/>
<tsys
min_value = "20"
max_value = "200"
/>
<if
min_error_limit="1000"
```

```

min_warning_limit="4000"
max_warning_limit="60000"
max_error_limit="65000"
/>
<weather>
<wind
max_warning_limit="10.0"
max_error_limit="15.0"
/>
</weather>
<gpsfmout
min_error_limit="-2.0e-6"
max_error_limit="2.0e-6"
/>
</fslogreader>

```

- Section “vconverter”. This section is used to define the number and type of videoconverters available at the VLBI equipment. Available types are BBC and VC. Variables `min_error_limit` and `min_warning_limit` are used to set the limits at which the BBC boxes should be shown in red and yellow respectively if the total power detected is below these numbers. For example, if the total power with a given BBC power detector is below the limit given by variable `min_error_limit` the box will be displayed in red. If the value is between `min_error_limit` and `min_warning_limit` the box will be displayed in yellow. If it is over both values it will be displayed in green.
- Section “tsys”. This section is used to control the T_{sys} lower and higher limits in the vertical axis graphical panel.
- Section “if”. As with the “vconverter” section, this is used to define the ranges where the IF box will be displayed in green, yellow or red, according to the total power detected. If the total power is below `min_error_limit` or over `max_error_limit` the IF box will be displayed in red. If the total power is in the range between `min_error_limit` and `min_warning_limit` or between `max_warning_limit` and `max_error_limit` the IF box will be displayed in yellow. In any other cases it will be displayed in green. Units are arbitrary counts.
- Section “weather”. This section controls the wind speed box colour if the values are outside the specified range. If the wind speed is below `max_warning_limit` the box will be displayed in grey. If the wind speed is between `max_warning_limit` and `max_error_limit` the box will be displayed in yellow. If the wind speed is over `max_error_limit` it will be displayed in red. Units are the same as the ones in the Field System log, and should be m/s.
- Section “gps-fmout”. This section controls the gps-fmout box colour. If the measured value is within the range defined by `min_error_limit` and `max_error_limit` the gps-fmout box will be displayed in grey color. In any other case it will be displayed in red.

6. Errors and problems

If the window does not get updated please check your schedule has not been halted. Most experiments, when started, are halted until you type in the oprin window:

```
mk5relink
```

On source status requires that flagr works properly in your station. If a flagr line without `acquire` substring is read the on-source LED will be set to red. The on-source LED will only be set to green when a flagr line with substring `acquire` is found.