

# Appendices

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## Appendix I: WILDFIRE Command List for IRIM

WILDFIRE mode image names (Sun based IR systems) follow the naming convention: "filename"//".XXX" (e.g., n1\_001) where "filename" is an observer controlled parameter, and the number "XXX" is sequentially numbered (being automatically incremented for each exposure until a new value is declared, either at a new object or new night). If you correctly set 'oldirafname = yes' when reading the data from tape, the image names will be restored to their original names and match the log sheets.

A list of available commands within the WILDFIRE instrument control window is:

SYSTEM LEVEL	
<i>! commands</i>	execute the commands in csh or run csh
<i>? command</i>	give help on a command
<i>ed name</i>	call up an editor on a proc
<i>help name</i>	display help for one of these topics
<i>man name</i>	display a man page for a given topic
<i>source program</i>	temporarily include tcl program within recognized system; need to source again after powerup or go (full path name required)

DETECTOR	
activate	activate the detector
deactivate	deactivate the detector
setup irim	set up the default IRIM voltages and prompt for activation
WILDFIRE	
startwf	initiate bootstrapping and downloading of the WILDFIRE system
exit	deactivate the array and exit the WILDFIRE controller
trouble	open troubleshooting session (do NOT enter in Instrument Control window)
hung	attempts to complete link protocol; used as part of the restart procedure when WILDFIRE is hung (INSTRUMENT CONTROL window unresponsive and data collection stalled); <b>must be entered in Console window</b>
HOUSEKEEPING	
status [ s v t f]	display a status screen; (general status  s ; voltages v ; temperatures t ; filters  f )
longheaders [on off]	will disable/enable house keeping data in the header
tcp_[on off]	enable/disable link to TCP for telescope status info and offsetting
PARAMETER FILES	
<b>Note: a parameter has two attributes, its value and flags indicating whether the parameter and its value should be displayed and/or queried when the <i>ask</i> or <i>observe</i> tasks are run.</b>	
lpar	list the names of the available parameter files

plist	list all the current parameters
psave <i>filename</i>	save the current parameter set (values and ask/display flags) to the named parameter file
puse <i>filename</i>	load the named parameter file
ped	edit the current parameter file selected by 'puse' asking all questions without regard to their query status
ask	
eask	prompt for the 'eask' selected subset of parameters within the current parameter set
	iterate through all the known parameters, allowing the user to specify which parameters are queried and which are displayed. After each question an "l" signifies display only; "a" signifies query; "la" will list the current value (which may be selected by [cr]) or accept a new entry

## ACCESSING INDIVIDUAL PARAMETERS

?coadds	returns the number of coadds for next image
coadds [n]	set the number of coadds for next image; if no argument given, will prompt with current value
?lnrs	returns the number of low noise reads per coadd
lnrs [n]	sets the number of low noise reads per coadd; must be <=16!
pics [n]	sets number of pictures to be taken at each observe/go. When no argument given, prompts with current value
set-time [f]	
nextpic [n]	sets the integration time (to millisec level); when no argument given, prompts with current value
header_dir	sets the picture index appended to filename to [n]; when no argument given, prompts with current value
pixel_dir	
mode	sets IRAF path for image headers
title	sets IRAF path for pixel files

comment	sets operational mode for array readout (stare, sep, hphot)
set fdly [f]	sets title field for IRAF image header
resetoffset	sets comment line within IRAF image header
filename <i>filename</i>	<p>set the reset-read delay time to [f] seconds</p> <p>reset the "offset" values in the header to 0,0</p> <p>sets the IRAF image "filename". The path is is not included in "filename"; if no argument given, will prompt with current value. For IRIM, a "%d" or "%03d" should be inserted where the picture number should be placed. If no field is given, "%03d" will be appended. The format will be: "filename"//"nextpic" WARNING!! SAVED IMAGES WILL OVERWRITE EXISTING IMAGES IF THE FULL FILENAMES CONFLICT!!</p>
<b>OBSERVING</b>	
observe	perform one observation using current parameter set, prompting for key parameters
go	initiate an observation using the previously set parameters
abort	abort an observation (enter in Instrument Control window)
save only	enter immediately following an abort to ensure that future images are saved to disk
fwl to [n]	position filter wheel to filter [n] by name or number
fwl ?pos	query current filter wheel position
help filters	display list of current filters
east [n]	move telescope [n] arcseconds east
west [n]	move telescope [n] arcseconds west
north [n]	move telescope [n] arcseconds north
south [n]	

toffset [e] [n]	move telescope [n] arcseconds south
zs [z1] [z2]	move telescope [e] arcsecs east and [n] arcsecs north: + for north/east; - for south/west
zs 0 0	set zscale values [z1] and [z2] for the image display
movie	enables autoscaling for the image display  begin observe/display loop. NOTE: parameters (filename, running number, integration time, coadds, etc.) will be those of previous observation or 'ask' routine unless specifically reset!!!! Movie frames are saved to disk and should be deleted periodically. It helps to use a filename like "junk" when using movie. Terminate movie with <i>end</i> [CR] in Instrument Control window.

## Appendix II: Troubleshooting

As with all Kitt Peak instrumentation, nothing is ever supposed to *malfunction*. On the rare occasions when something seems to go wrong, either by pilot error, exquisite software gotchas, or hardware failures, recovery can in many cases be fairly simple. In particular, hangups in the instrumentation software can usually be corrected without resorting to rebooting the computer, which should be considered a last resort.

The following tables cover situations which may arise with the Instrument Computer or IRIM itself. Some situations are not covered in this manual, since the recommended recovery could involve procedures which are potentially harmful if done incorrectly. In these cases, the user is requested to call for technical assistance from the Observatory staff.

### Instrument Hardware

no signal	Mirror covers, dark slide closed. If stars visible on TV, check <code>fwl ?pos</code> for proper filter position. Check <code>status s</code> for proper temperatures, voltages. Check that green LED in analog electronics box is lit. If the detector has been accidentally deactivated, program will not sense this; <code>observe</code> will work, but return pixel values near zero in image.
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poor hold time	Pressure in vacuum jacket rising. If LN <sub>2</sub> hold time steadily decreases and/or the outside of IRIM becomes noticeably cold it will be necessary to pump on the vacuum jacket with the portable Tribodyn pump. Call for technical assistance.
"JAMMED" motors	The motor code checks the motor encoder positions periodically during a motor motion. A discrepancy in the actual and calculated encoder readings will stop the motion and return a message "servo [n] failed -- JAMMED". This does not necessarily indicate physical jamming. Repeating the motor command will often complete the motion successfully.
bootstrap failure	If the <code>startwf</code> procedure fails during the "bootstrapping node ..." process, a likely culprit is a bad (or incorrect, if the failure occurs on the initial setup) fiber optic connection. Check the three status LEDs visible through sight holes on the DCU. The top LED should be green if there is power to the instrument; the two lower LEDs should be off. If either the middle (channel 1) or lower (channel 2) LED is red, there is a fiber continuity problem in that channel. There is a duplicate set of LEDs in the Heurikon DSP box in the computer room; it is necessary to remove the front cover to view them. A bad fiber channel will require the substitution of one of the spare fibers. Call for assistance.

## WILDFIRE RESTART PROCEDURES

The following procedures are intended as a guide for restoring the WILDFIRE system following various levels of system failure. Re-booting the computer and cycling power to the instrument or DSP in the Heurikon box in the computer room are not normal WILDFIRE operations and should not be done without proper consultation, or unless the specific conditions below are valid. These procedures are listed roughly in order of increasing severity, so unless a specific condition has occurred (e.g., DSP power cycling), try the less dramatic procedures first.

**The instrument power is controlled by the small switchbox next to the observer terminal when the switch on the instrument power supply in the computer room is in the "remote" position.**

An extensive troubleshooting library may be consulted by entering `trouble` in any active window (except the Instrument Control window). The resulting interactive session can be used to diagnose and correct problems.

## **INSTRUMENT STATUS WINDOW HAS VANISHED:**

If the Instrument Status window has vanished, first check to see if it has simply been closed. Type `fireproc` (or `!fireproc` if necessary) from an active window and look for the "hkserv" process.

If the process is present, the window has been closed, and it will be necessary to locate and open it. If the icon is not visible, it may be hiding behind one of the open windows. In OpenWindows, one can check the "windows" item in the menu for the status of all operating windows; if the Instrument Status window is present, open it and continue observing.

If the Instrument Status window has died, perform the SIMPLE RESTART procedure below.

## **SIMPLE RESTART:**

If WILDFIRE has crashed (Instrument Status window has vanished and could not be found by above procedures), and/or the "[hostcomputer]" prompt has returned to the Instrument Control window, the following steps within the Instrument Control window should restore operation:

- If the "%" prompt is present, first enter `exit` to cleanly exit the processes and get the "[hostcomputer]" prompt
- At the "[hostcomputer]" prompt, enter: `restart IRIM`, answering 'y' to question about windows (note CAPS)
- Enter `setup irim`, answering 'y' to question about detector activation
- Enter the proper bias for the detector (nominal 1.0) and push the blue button on the instrument ACU
- Enter `puse [parameter_file]` to restore the parameter file active before the crash
- Verify "pixel\_dir", "header\_dir", and "nextpic" with `plist` or `ped` to make sure data will still be going to the desired location and will not overwrite existing data
- Reload any scripts with the `source` command
- Continue observing

[NOTE: If the power to the instrument and/or the Heurikon DSP box in the computer room has been interrupted or the computer has been rebooted, this procedure may not be sufficient. See below for more specific procedures]

## **STALLED SYSTEM RESTART:**

If WILDFIRE is hung (Instrument Control window unresponsive and data collection stalled):

- Enter `^C ^C` in the Instrument Control window
- Enter `hung` several times in the Console window until either the WILDFIRE "%" prompt or the UNIX "[hostcomputer]" prompt returns in the Instrument Control window
- If you see the "%" prompt first, type `exit` in the Instrument Control window; the "[hostcomputer]" prompt will return
- When you see the "[hostcomputer]" prompt in the Instrument Control window, proceed with the SIMPLE RESTART procedure above

### **TOTALLY STALLED SYSTEM RESTART:**

If the STALLED SYSTEM procedure fails to return the UNIX prompt, or an examination of the operating processes by entering `ps ax` in the Console window reveals a process which cannot be halted via the `kill -9 [process number]` command, it will be necessary to reboot the instrument computer.

- Turn the instrument power OFF before rebooting
- Reboot the instrument computer with the [L1 A] or [Stop A] keys, then enter `boot`
- Login as "[telescope]" on the instrument computer with the current password
- Go to the Instrument Control window and continue with the RESTART procedure below

### **RESTART AFTER INSTRUMENT POWER INTERRUPTION:**

If the power to the instrument was interrupted but the black Heurikon DSP box in the computer room remained powered up and the computer was not rebooted:

- In the Instrument Control window, enter `startwf`, following the interactive startup procedure, turning the instrument power ON when requested
- Enter `setup irim`, answering 'y' to question about detector activation
- Enter the proper bias for the detector (nominal 1.0) and push the blue button on the instrument ACU
- Enter `puse [parameter_file]` to restore the parameter file active before the crash
- Verify "pixel\_dir", "header\_dir", and "nextpic" with `plist` or `ped` to make sure data will still be going to the desired location and will not overwrite existing data



- Reload any scripts with the `source` command
- Continue observing

### **RESTART AFTER HEURIKON DSP BOX POWER INTERRUPTION:**

If the black Heurikon DSP box in the computer room has been powered down, then it is necessary to do the following. NOTE: THE ORDER OF THESE STEPS IS IMPORTANT. IF THE DSP BOX IS POWERED DOWN, REBOOTING THE INSTRUMENT COMPUTER IS NECESSARY. MAKE SURE NO ONE ELSE IS USING THE INSTRUMENT COMPUTER AT THE TIME. IF ONLY THE POWER TO THE INSTRUMENT HAS BEEN INTERRUPTED, PERFORM THE PROCEDURE ABOVE. WHENEVER THE INSTRUMENT COMPUTER IS REBOOTED, THE INSTRUMENT POWER MUST BE OFF AND THE HEURIKON DSP POWER ON!

- Verify that the Heurikon DSP box is powered up
- Turn OFF power to the instrument
- Turn the DSP power OFF for 30 sec, then ON
- Reboot the instrument computer with the [L1 A] or [Stop A] keys, then enter `boot`
- When rebooting complete, login as "[telescope]" on the instrument computer, with current password
- Go to the Instrument Control window and enter `startwf`. Follow the interactive procedure.
- Turn ON the instrument power when requested by `startwf`
- In the Instrument Control window, enter `setup irim`, answering 'y' to question about detector activation
- Enter the proper bias for the detector (nominal 1.0) and push the blue button on the instrument ACU
- Enter `puse [parameter_file]` to restore the parameter file active before the crash
- Verify "pixel\_dir", "header\_dir", and "nextpic" with `plist` or `ped` to make sure data will still be going to the desired location and will not overwrite existing data
- Reload any scripts with the `source` command
- Continue observing

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## **Appendix III: TCL Scripts**

Scripts are a powerful tool for executing a sequence of tcl commands, including telescope motions, instrument motor commands, and observations, as a single executable program. Many of the wildfire commands are simply protected scripts within the wfire/tcl directory. Observers may generate their own scripts in the "public" directory /data2/[telescope]/tclSamples. One approach is to browse through the existing scripts to find one which performs a function similar to that desired, copy it to a new file, and edit it as required. **It is important to note that the first line contains the basename of the script, and must be edited to reflect the new name of a script created in this manner.**

```
proc do_dither {} {
#*****
#*****
# do_dither - take two pictures scanning the telescope across a NxM field.
#               the pair of pictures at each location are separated by 20
#               arcseconds. the telescope is returned to the center of the
#               field when done. the field is ewnum*size arcseconds
#               by nsnum*size arcseconds centered at the starting point.
NxMx2
               pictures are taken.
#*****
#*****
    global north east
    if ![ yorn "Is the telescope set to the center of the field? "]
then {
        error "telescope not set"
    }

    resetoffset

    puts stdout "Enter number of positions to take in E/W direction: "
    set ewnum [readline]
    puts stdout "Enter number of positions to take in N/S direction: "
"
    set nsnum [readline]
    puts stdout "What is the separation between pictures in arc
seconds? "
    set size [readline]
    puts stdout "What is the dither between pictures in arc seconds? "
"
    set dithr [readline]

    plist
    puts stdout "Positions: E/W = $ewnum"
    puts stdout "           N/S = $nsnum"
    puts stdout "Separation      = $size arc seconds"
    puts stdout "Dither size    = $dithr arc seconds"

    if ![ yorn "Do You want to continue? (y/n) "] then {
        error "safe exit."
    }

    set edist [expr "$size * $ewnum"]
}
```

```

set ndist [expr "$size * $nsnum"]

set iew [expr "((($sewnum + 1) / 2.0) * $size)"]
set iew [expr "$iew + $size"]
set ins [expr "((($nsnum + 1) / 2.0) * $size)"]

east $iew
north $ins

puts stdout "Hit return to abort dodither."
for {set i 1} {$i <= $nsnum} {incr i} {
    south $size
    sleep 1
    west [expr "$size * 2"]
    sleep 1
    for {set j 1} {$j <= $sewnum} {incr j} {
        sleep 3
        puts stdout "taking position $i,$j"
        go
        east $dithr
        go
        west $dithr
        west $size
        if [select] then {
            error "Aborting dodither"
            break;
        }
    }
    east [expr "($sewnum + 2) * $size"]
}
north $north
east $east
}

```

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