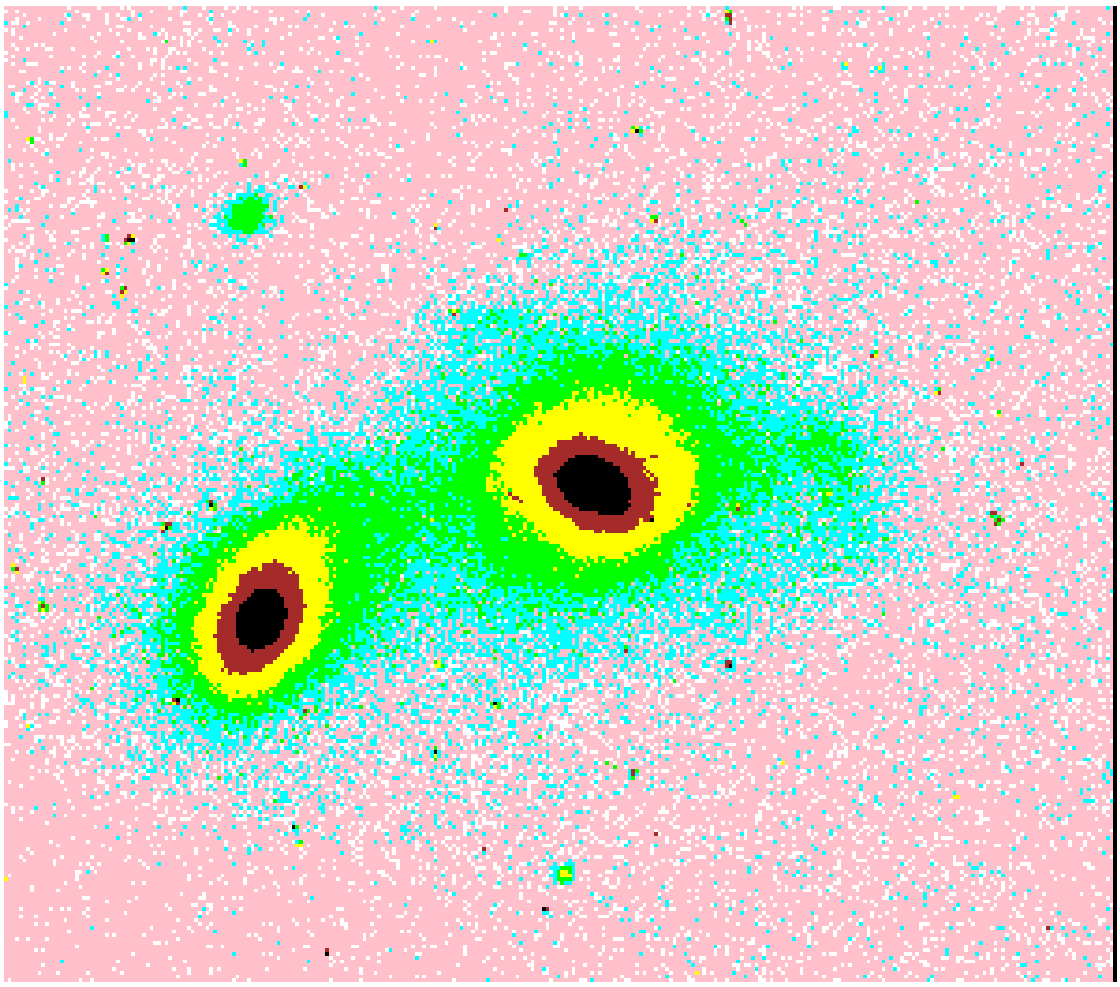
XNICS

Software Maintenance Guide

Version 1.0

Vladimir Gavryusev

Preprint n.10/2000



CAISMI CNR,
Largo E.Fermi 5, 50125, Firenze (Italia)

September 4, 2000

Acknowledgments

The Xnics software package and this manual have been developed by Vladimir Gavryusev at the Centro per l'Astronomia Infrarossa e lo Studio del Mezzo Interstellare del CNR and Osservatorio Astrofisico di Arcetri in the close contact with F. Lisi, C. Baffa, S. Gennari, E. Oliva, M. Sozzi, E. Giani and A. Checcucci.

Many implemented features are the result of their suggestions given during the NICS development.

Contents

Release notes **4**
Version 1.00 4

Introduction **5**

1 File System of Xnics **6**
1.1 Binary Files 7
1.2 Data Directory 7
1.3 Jobs Directory 8
1.3.1 Jobs Template File 8
1.4 Resource Directory 12
1.4.1 Resource File XNics 13
1.4.2 Bitmaps 20
1.4.3 Motors Initial Sequence 23
1.4.4 Sensors Initial Sequence 23
1.4.5 Colormaps 24
1.4.6 Wave Forms Mnemonics 24
1.4.7 Wave Forms Files 25
1.4.8 Mosaic Directory 31
1.5 Work Modes Directory 32
1.5.1 Observation Modes Table 32
1.5.2 Translation Tables for the Motors 44
1.5.3 Imaging List Menus 47
1.5.4 Spectrometry List Menus 51
1.6 Software Compilation 56

2 Instruments Tuning **57**
2.1 NICSgate Debug Monitor 57
2.2 Bias Setting 60
2.3 Motors in Debug Mode 60

Bibliography **63**

List of Figures

2.1 Setup Xnics Menu 57
2.2 The NICSgate Debug Monitor Widget 58
2.3 Bias Setting Menu 61
2.4 The menu for the Manual Control of the Motors 62

Release notes

Version 1.00

This is a description of software maintenance, including all relevant files and the instruments tuning procedures (from the point of view of supporting software) of the first production version of the **Xnics**, released at 20.07.2000 for the commissioning stage of the **NICS** (Near Infrared Camera-Spectrometer) at **TNG** (Telescopio Nazionale Galileo), La Palma, Spain. The software supports all basic measurement tasks as well as contains the functionality intended for the instruments development and their tuning. The user interface is X11 widget based interface (created upon ATHENA widget set). The software is created as a network distributed software, while basically is executed on the PC dedicated for the measurements.

The manual contains the information necessary for the maintenance of the software file system, including the default contents of all relevant files. The user interface for the instruments tuning is also described.

The information how to use *xnics* in the real measurements one can find in *XNICS. User's Guide*[3]. The other programming details concerning the software are described in *XNICS. Programmer's Guide*[4].

Introduction

This manual describes the structure of the environment — file system organization and the contents of all necessary files — used by the software **Xnics** (**X**11 **nics**, which was created for the real time control of the measurements using the Arcetri two-dimensional infrared instrument **NICS** (Near Infrared Camera-Spectrometer) [1,2]

The information how to use it in real measurements one can find in *XNICS. User's Guide*[3]. The other programming details concerning the software are described in *XNICS. Programmer's Guide*[4].

The file structure of the Xnics software exists on the PC dedicated for the control of the measuring device (**NICS**) under dedicated account *nics*. The name of the account is irrelevant. Only the file structure is important. The `nics` account is configured to provide the user by Windows95-like screen look-and-feel, using one of the standard Linux window managers, fvwm95. The use of this window manager is arbitrary, but the X11 system running at this account is obligatory. The *xnics* is X11 client and needs for its execution running X11 system, as well as all its shared libraries.

There is some other restricted set of the system elements required by the *xnics*, which will be described in Section 1.6.

For the execution of the *xnics* in the current release, the computer should have two serial ports, connected one with the telescope, another with the motor controller.

Chapter 1

File System of Xnics

The root directory of the software in the root directory of the mentioned account is *nics*. It contains the sub-directories:

- *bin* with all executable files.
- *data* where the fits files, obtained during the measurements, are stored.
- *jobs* with the job files (the files with the definition of the observation tasks to execute in the **automatic** mode of the measurements during a session.).
- *resource* with the resource files — all the files necessary for the software execution and some templates.
- *src* the root directory of the source files.
- *tmp* the files with necessary system elements, usually not belonging to the standard distributions — fits library and some headers.
- *vbin* files with powerful editor, used for the software development. It is irrelevant for the software execution, but facilitates a lot the files editing.

Only first four directories, *bin, data, jobs* and *resource* are **obligatory** for the *xnics*.

We describe also the compilation process in the Section 1.6. It could be useful if for some reason the binary modules are lost.

There are also some other directories with the sources or some additional files, but they are related only to software development and maintenance and the user **should never touch them**.

Two files, very relevant to the measurement session, the resource file with a description of a look-and-feel of the user interface widgets, `XNics` as well as the current state snap-shot file, `xnics.ini` are in the account root directory.

It does not matter in reality, where resides the root directory (*nics*) of the *xnics* software and how it is named. Any other name and place can be used, but:

- **the internal structure must be as described above;**
- **the *bin* sub-directory must be included into the account path;**
- **the correct *absolute* path to the software root directory must be included into resource file `XNics` as the values of two resources — rootDirectory and hardwareRootDirectory;**
- **the correct *absolute* path to the `transnix.btl` binary file (normally in the *bin* sub-directory) must be included into resource file `XNics` as the value of the resource bootFile.**

1.1 Binary Files

Two binary modules of *xnics* software, `xnics` and `NICSgate` reside in the *bin* sub-directory. Both these files are copied here during the software compilation. There could be also some old versions of these files.

Two other files, `transnix.btl` and `kernel56.560` contain the binaries of the boot module and DSP kernel, correspondingly, of the software residing in the transputer network. They are booted by *NICSgate* into the transputer network during the initialization phase. The sources of these programs are in *src/transnix* directory and are written in OCCAM. Here we do not touch their creation.

The *xnics* will still work, if these nodules are absent or broken, but all the *transnix* related functionality will not be available.

Two modules `SubtrSky` and `Subtract2` do the subtraction of the sky value from the image and the subtraction of one image from another. These auxiliary programs are called from the *DisplayFrame* menu of *xnics*. Thus their absence or problems with functionality is important for the availability of the corresponding features, but do not influence the main functionality of the *xnics*. These files are copied here during the software compilation. They can be used also from any *xterm* session manually. After making the subtractions they start *SAOimage* viewer to show results. Used without parameters they print the string of their correct usage.

1.2 Data Directory

The main purpose of the *data* directory is for the storage of the files with acquired data. The files created during a given session are saved inside the

sub-directory of the *current* day, created automatically. The "session day" is started at 12:00 instead of 00:00, to cover the session, beginning usually in the evening and finishing in the morning. The subdirectory name consists of two digits for year, two digits for the month and two for the day. Thus the name *000716* means 16 July 2000.

The personal, maintaining the *xnics* software, is responsible to move all the measurements data to other storage devices and to keep enough space on a hard disk for the current measurements.

Xnics creates in a *data* directory two *log* files, one is the session log `xnics.log`, another is the `sensors.log`.

The *xnics* **never** removes them, just updates. **It is the responsibility of the personal, maintaining the *xnics* software, to clean them from time to time.**

1.3 Jobs Directory

The *jobs* directory is intended to contain the *observer*-defined job-files with the observation programs. The only file which should reside here always, is a template file `test.job`. Its absence does not influence the *xnics* functionality at all. But the users should have an example, how to prepare their own jobs correctly.

The files `script1{2,3,4,5}` do the optional part of the observational program. They are intended to contain *any* valid shell script, making necessary auxiliary work projected by an observer. The observer should prepare his/her scripts in advance, check them and copy into the *jobs* directory with one of these **obligatory** names. When the observational program is finished, these scripts should be removed or renamed to permit the others to use this facility.

1.3.1 Jobs Template File

The contents of the jobs template file `test.job` is presented below:

```
The example of the file with the definition of the observation
task.
The file name is any_name.job; should be placed in nics/jobs/
directory.

The lines starting with
                          space, '.', ';', '#'
are comments and skipped.

The lines started with character different from the mentioned
```

```
set when don't have a valid keyword as a first item are
popped-up as possible misprintings.

The keywords could have aliases, which are shown below as
KEYWORD/ALIAS1/ALIAS2....
The keyword should begin in the FIRST position of the line.


Section description:
valid keywords : job  Comment/!

Environment description:
valid keywords : Object/source/object  SingleTimeMode
                 SingleIntTime/tint    Coadds/nint
                 NumberOfGroups/ngroups

valid keywords : ObsMode/obsmode/OBSMODE/mode

valid keywords : Filter/filt Objective/obj Grism/grism Slit/slit
                 Attenuator/att  wl2plate/wl2/plate

Executable keywords:
valid keywords : SingleFrame/frame SingleGroup/group SeveralGroups
                 Mosaic/mosaic/MOSAIC  Source-Sky/check

Special keyword:  System #
# can be a single number from 1 to 5
When this item is read the script script# from jobs directory is
executed immediately.



Any job section MUST be started by  job #
and finished by an executable keyword.

All comments inside this file regard the FOLLOWING lines.


The first job section:
job 1

Comments are valid only for THAT job section where appear.
The number of the comments in the section should be <= 20.
```

```
 The order of the comments in job section is preserved in fits
 files header. Thus one can write several lines of the text.
Comment This text will be added to the fits file header as
Comment a COMMENT keyword
!       This too.

 The source name to point the telescope on;
 currently pops-up a window with request to the operator and asks
 the  confirmation or the break.
Object  test1

 The next settings do exactly  the same as 'by hands' setting of the
 corresponding items in the main menu
SingleIntTime 20
Coadds 2
NumberOfGroups 1

 The parameters of the following keywords should be valid
 items from resources described in   resource/work_modes/.
 The incorrect parameters will lead to termination of the task at
 the execution time.
 The only restriction: ObsMode keyword should be presented BEFORE
 any other definition.  All definitions PRECEDING the ObsMode
 keyword will be skipped.
 The reason: observation mode definitions are supported INDEPENDENTLY
 for EACH different mode; as a result, when one ObsMode was defined and
 described, the next one could be defined too, and the ACTIVE will be
 the LAST ONE. Obviously, the new definitions for the SAME ObsMode
 replace the previous.
 To choose the already predefined ObsMode as an active it is enough
 to re-declare it again without additional definitions.

ObsMode IMA
Filter 1mic
Objective LF

 In the next line it is not necessary to write "magnitudes", the valid
 number is enough.
Attenuator 5 magnitudes

 When this or similar keyword is read, the execution of the described
 above job section is started; there still could be some room for
 the interruption and corrections, but very restricted and, obviously,
```

```
 through the manual mode.
SingleFrame


 Sections are executed one-by-one with step=1 incremented number;
 if the corresponding section is absent the process will be terminated.
 If there are two or more sections with the SAME number, the FIRST one
 ONLY is executed.




job 2
! Another comment to finish inside the fits file

 The source name to point the telescope on is defined by an alias
 keyword;
source  test2

 Next keyword (only obsmodes.tab is valid as a parameter) declare to
 ignore any explicit setting of the Single Integration Time; instead
 the default values written in resource/work_modes/obsmodes.tab will
 be used
SingleTimeMode obsmodes.tab

Coadds 1
NumberOfGroups 1
ObsMode IMAPOL
Filter 1mic

 In the next line it is not necessary to write "degrees", the valid
 number is enough.
wl2plate 45 degrees
Source-Sky


  Below there are several job sections

job 3
Object  test3
SingleIntTime 15
Coadds 2
NumberOfGroups 1
```

```
ObsMode SPEHR
Grism Jn
 In the next line it is not necessary to write ", the valid
 number is enough.
Slit  0.5"
System 2
Mosaic mosaic0

job 4
Object  test4
SingleIntTime 10
Coadds 2
NumberOfGroups 1
ObsMode SPELR
Grism JH
Slit  0.5"
Attenuator 5 magnitudes
Mosaic mosaic1

job 5
Object  test5
SingleIntTime 10
Coadds 2
NumberOfGroups 1
ObsMode SPEPOL
Grism Amici
Slit  0.5"
wl2plate 45 degrees
Mosaic mosaic2


  All following job sections inherit previously defined settings.
  If everything already have been defined above an should not been
  changed --- the job section can be reduced till this one:
job 6
Mosaic mosaic5
```

This file is self-documented. Additional description one can find in [3].

1.4 Resource Directory

The contents of this directory is very important for the *xnics*. The files residing here are indispensible for the *xnics* functionality.

One of the files, the software resource file is necessary too, but normally resides in the *root* of the *account*. The file here is the default file, which should be copied to normal place if the working file is corrupted.

There are files `instrum.bit`, `motor.bit` and `telescop.bit` with the bitmaps of the instruments statuses.

The files `motors.iniseq` and `sensors.iniseq` contain the sequences of the commands sent to the corresponding devices during the initialization phase.

The list of available *colormaps* for the internal image viewer is stored in the file `colormap.txt`.

The valid *waveform mnemonics*, used for the programming of the transnix waveforms, are written in the file `waveform.mnem`.

There is also the fits file `n526a.b.m.fits` with a dummy image used by the *xnics*.

Below we include the default contents of all necessary files to be restored when corrupted.

There are also the directories, where more resource files reside. These directories collect the resource files united by the common aim — the same device or the task. The description of *mosaic* and *waveforms* directories is included in this section. The files from the motors dedicated directory *work_modes* are included into the next section.

1.4.1 Resource File XNics

The resource file can contain the description of *any* X11 resource. Below we present the contents of this file provided for *xnics* by default.

```
*ObserverLabel.font:  *times-bold-i-*-*-140-*-*-*-*-iso8859-1
*ObserverName.font:   *times-bold-i-*-*-180-*-*-*-*-iso8859-1

*Exit.font:    *helvetica-bold-o-*-*-180-*-*-*-*-iso8859-1

*Command*font: *courier-bold-r-*-*-140-*-*-*-*-iso8859-1

*IntegrationLabel.font: *courier-bold-o-*-*-140-*-*-*-*-iso8859-1
*FilterLabel.font:      *courier-bold-o-*-*-140-*-*-*-*-iso8859-1
*MosaicLabel.font:      *courier-bold-o-*-*-140-*-*-*-*-iso8859-1

*Command*ListForm.Command.font:   *times-bold-r-*-*-120-*-*-*-*-iso8859-1
*Command*ListField.font:        *courier-bold-r-*-*-120-*-*-*-*-iso8859-1

*font:         *courier-bold-r-*-*-140-*-*-*-*-iso8859-1
```

```
*Temperature.background:     cyan
*Temperature.foreground:     black
*Pressure.background:     cyan
*Pressure.foreground:     black

*statusForm*Command*background: pink
*statusForm*Command*foreground: MidnightBlue

*Exit.background:     cyan
*Setup.background:    PeachPuff
*Exit.foreground:     red

*IntegrationLabel.background: PeachPuff
*IntegrationLabel.foreground: red
*FilterLabel.background: PeachPuff
*FilterLabel.foreground: red
*MosaicLabel.background: PeachPuff
*MosaicLabel.foreground: red

*Label*background: MistyRose
*Label*foreground: DarkGreen
*Text*background:  PaleGreen

*ExitLabel.font:    *helvetica-bold-r-*-*-140-*-*-*-*-iso8859-1
*ExitLabel.foreground:    MidnightBlue
*ExitForm.background:     red
*ExitForm.foreground:     MidnightBlue
*EXIT.background:     LightBlue
*EXIT.foreground:     red
*CANCEL.background:     green
*CANCEL.foreground:     MidnightBlue

*Command*ListForm.background: green
*Command*ListForm.Dismiss.background: aquamarine
*Command*ListForm.Dismiss.foreground: MidnightBlue
*Command*ListForm.Default.background: gold
*Command*ListForm.Default.foreground: MidnightBlue
*Command*ListField.foreground: MidnightBlue
*Command*ListField.background: PeachPuff

*DisplayFrame*DisplayForm.background: MistyRose
*DisplayFrame*DisplayForm.QUIT.background:  green
*DisplayFrame*DisplayForm.QUIT.foreground:  Red
```

```
*DisplayFrame*DisplayForm.Label*background: PeachPuff
*DisplayFrame*DisplayForm.Label*foreground: red
*DisplayFrame*DisplayForm*Text*background:  PaleGreen
*DisplayFrame*DisplayForm*Text*foreground:  black
*DisplayFrame*DisplayForm.Start SAOimage.background: yellow
*DisplayFrame*DisplayForm.Start SAOimage.foreground: MidnightBlue

*motorstep*background: yellow
*motorstep*foreground: MidnightBlue

*Setup*background:     MistyRose
*Setup.foreground:     red
*Setup*Form*QUIT.background:     green
*Setup*Form*QUIT.foreground:     Red
*Setup*Command*background: aquamarine
*Setup*Command*foreground: MidnightBlue

*Setup*Command*SetupForm1*background:     coral
*Setup*Command*SetupForm1*Label*background: PaleGreen
*Setup*Command*SetupForm1*Label*foreground: MidnightBlue
*Setup*Command*SetupForm1.foreground:     red
*Setup*Command*SetupForm1*Command*background: aquamarine
*Setup*Command*SetupForm1*Command*foreground: MidnightBlue
*Setup*Command*SetupForm1*Form.Label*background: PaleGreen
*Setup*Command*SetupForm1*Form.Label*foreground: MidnightBlue
*Setup*Command*SetupForm1*Form.Text*background: Green
*Setup*Command*SetupForm1*Form.Text*foreground: black

*Command*SetupForm1*background:     MistyRose
*Command*SetupForm1.foreground:     red
*Command*SetupForm1*Command*background: aquamarine
*Command*SetupForm1*Command*foreground: MidnightBlue
*Command*SetupForm1*Form.Label*background: PaleGreen
*Command*SetupForm1*Form.Label*foreground: MidnightBlue
*Command*SetupForm1*Form.Text*background: Green
*Command*SetupForm1*Form.Text*foreground: black

*Setup*Command*AcqForm*background:     MistyRose
*Setup*Command*AcqForm.foreground:     red
*Setup*Command*AcqForm*Command*background: aquamarine
*Setup*Command*AcqForm*Command*foreground: MidnightBlue
*Setup*Command*AcqForm*Form.Label*background: PaleGreen
*Setup*Command*AcqForm*Form.Label*foreground: MidnightBlue
```

```
*Setup*Command*AcqForm*Form.Text*background: Green
*Setup*Command*AcqForm*Form.Text*foreground: black
*Setup*Command*AcqForm*Form.Toggle*background: Green
*Setup*Command*AcqForm*Form.Toggle*foreground: Red

*ObsModes*ObsDevices*background: PaleGreen
*ObsModes*ObsDevices*foreground: black
*ObsModes*ObsDevices*Command*background: Green
*ObsModes*ObsDevices*Command*foreground: red
*ObsModes*ObsDevices*Command*ShadowWidth: 1

*ObsModes*background: cyan
*ObsModes*ImaModes*background: gold
*ObsModes*ImaModes*foreground: MidnightBlue
*ObsModes*SpecModes*background: Yellow
*ObsModes*SpecModes*foreground: MidnightBlue

*ObsModes*ObsDevices*Command*ListForm.background:     white
*ObsModes*ObsDevices*Command*ListForm*Dismiss.background:   green
*ObsModes*ObsDevices*Command*ListForm*Dismiss.foreground:   black
*ObsModes*ObsDevices*Command*ListForm*List1*background:     MistyRose
*ObsModes*ObsDevices*Command*ListForm*List1.foreground:     red
*ObsModes*ObsDevices*Command*ListForm*List2*background:     PeachPuff
*ObsModes*ObsDevices*Command*ListForm*List2.foreground:     MidnightBlue
*ObsModes*ObsDevices*Command*ListForm*List3*background:     magenta
*ObsModes*ObsDevices*Command*ListForm*List3.foreground:     cyan
*ObsModes*ObsDevices*Command*ListForm*List4*background:     PaleGreen
*ObsModes*ObsDevices*Command*ListForm*List4.foreground:     black

*Setup*Command*MotorForm*background:     MistyRose
*Setup*Command*MotorForm.foreground:     red
*Setup*Command*MotorForm*Command*background: aquamarine
*Setup*Command*MotorForm*Command*foreground: MidnightBlue
*Setup*Command*MotorForm*Form.Label*background: PaleGreen
*Setup*Command*MotorForm*Form.Label*foreground: MidnightBlue
*Setup*Command*MotorForm*Form.Text*background: Green
*Setup*Command*MotorForm*Form.Text*foreground: black

*Form*MessageForm*background:     cyan
*Form*MessageForm*foreground:     red
*Form*MessageForm*Command*background: green
*Form*MessageForm*Command*foreground: MidnightBlue
*Form*MessageForm*Command*shadowWidth: 3
```

```
*Command*MessageForm*background:     cyan
*Command*MessageForm*foreground:     red
*Command*MessageForm*Command*background: green
*Command*MessageForm*Command*foreground: MidnightBlue
*Command*MessageForm*Command*shadowWidth: 3

*Label*ShadowWidth: 1
*Scrollbar*ShadowWidth: 0
*ShadowWidth: 5


!for HwInitWidget
*KILL.background:     red
*KILL.foreground:     LightBlue
*DISMISS.background:     green
*DISMISS.foreground:     MidnightBlue
*Clear.background:     yellow
*Clear.foreground:     red
*Scrollbar*background:     orange
*Scrollbar*foreground:     SpringGreen
*Form*Scrollbar*background:     yellow
*Form*Scrollbar*foreground:     SpringGreen

*ImageForm*Scrollbar*background:     orange

*ImageForm*Scrollbar*foreground:     SpringGreen
*ImageForm.maxBar.background:     cyan
*ImageForm.maxBar.foreground:     DarkRed
*ImageForm.minBar.background:     DarkRed
*ImageForm.minBar.foreground:     cyan
*ImageForm*intLabel.font: *times-bold-r-*-*-100-*-*-*-*-iso8859-1
*ImageForm*cxLabel.font:  *times-bold-r-*-*-100-*-*-*-*-iso8859-1
*ImageForm*cyLabel.font:  *times-bold-r-*-*-100-*-*-*-*-iso8859-1
*ImageForm*skyLabel.font: *times-bold-r-*-*-100-*-*-*-*-iso8859-1
*ImageForm*spotLabel.font: *times-bold-r-*-*-100-*-*-*-*-iso8859-1
*ImageForm*intLabel.foreground:   red
*ImageForm*intLabel.background:   PeachPuff
*ImageForm*skyLabel.foreground:   red
*ImageForm*skyLabel.background:   PeachPuff

*Command*background:     aquamarine
*Command*foreground:     MidnightBlue
```

```
*Toggle.background:     aquamarine
*Toggle.foreground:     red

*ImageForm.QUIT.background:  green
*ImageForm.QUIT.foreground:  red

*LCForm1.QUIT.background:  green
*LCForm1.QUIT.foreground:  red
*LCForm1.HELP.background:  aquamarine
*LCForm1.HELP.foreground:  red

*test: FALSE
*rootDirectory: /home/nics/nics
*hardwareRootDirectory: /home/nics/nics
*bootFile: /home/nics/nics/bin/transnix.btl

*IntegrationTimeValue:     5.0
*SingleTimeMode: SetByHands

*IntegrationNumberValue:     3
*IntegrationGroupsValue:     1

*singleIntegration:     0

!*biasQ1: 2800
!*biasQ2: 2850
!*biasQ3: 2800
!*biasQ4: 2800
!*biasQ1: 2400
!*biasQ2: 2500
!*biasQ3: 2400
!*biasQ4: 2400
! le tensioni precedenti sono state trovate il 20/5/2000
!*biasQ1: 1
!*biasQ2: 1
!*biasQ3: 1
!*biasQ4: 1
!*polTension1: 1
! le precedenti tensioni servono per il test dell'elettronica
!-------------------------------------------------------
!*biasQ1: 1670
!*biasQ2: 1610
!*biasQ3: 1630
```

```
!*biasQ4: 1630
!*polTension1: 3000
! le tensioni qui sopra devrebbero essere quelle usate nel Jan2000 per
! il rivelatore scientifico
!
!*biasQ1: 2850
!*biasQ2: 2800
!*biasQ3: 2300
!*biasQ4: 2300
!*polTension1: 3300
!
! Vlaori sopra trovati con lo scientifico calducco (97K) il 22/5/00,
! Q2 non funzionava, comuqnue
!*biasQ1: 2500
!*biasQ2: 3600
!*biasQ3: 2100
!*biasQ4: 2100
!*polTension1: 3300
!
! Vlaori sopra trovati con lo scientifico freddo (75K) il 24/5/00,
! Q2 non funzionava
!*biasQ1: 2450
!*biasQ2: 3600
!*biasQ3: 2150
!*biasQ4: 2120
!*polTension1: 3300
!
! Valori sopra trovati con lo scientifico freddo stabilizzato a 77K
! il 25/5/00, ottimizzati per avere out~=1e4 in signle sampling
! Q2 non funzionava, ricorda che Q1 aveva circuito modificato
!
!
! Valori per multiplexer, 17/7/00  FM & LT
*biasQ1: 2415
*biasQ2: 2110
*biasQ3: 2115
*biasQ4: 2085
*polTension1: 3300

*polTension2: 4000


*sourceX: 520
```

```
*sourceY: 407

*socketBufferSize:    1040
*TimeOutR: 35000
*TelTimeOut: 5
*TelescopeAddress: /dev/ttyS0

*FocusLevel:  .5

*BadPixelLevel: 20000
*SaturationLevel: 17000
*SaturationWarning: 257
```

The most part of this file defines look–and–feel of the *xnics*. The internal resources of the *xnics* all have the default values.

Nevertheless, there are the resources, which **must be defined in this resource file**, such as the biases and the polarimeter tensions, because these values were tuned *after* the compilation of the software. The telescope address is obligatory too.

It is also a good rule to set *rootDirectory*, *hardwareRootDirectory* and *bootFile* in `XNics` file.

Some internal settings were also tuned in the resource file after the compilation, such as timeouts, etc. So the best choice is just to use the default file and then add other resources, if necessary.

The complete description of the *xnics/NICSgate* resources is given in [4], while the description in [3] is aimed for the observer.

1.4.2 Bitmaps

There are three bitmap files, containing in ASCII codes the description of the pictures shown in the status buttons. The codification is X11 standard.

The `telescop.bit` file:

```
#define telescop_width 50
#define telescop_height 50
static char telescop_bits[] = {
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x00,
   0xe0, 0x01, 0x00, 0x00, 0x00, 0x00, 0x00, 0x70, 0x02, 0x00, 0x00,
   0x00, 0x00, 0xb8, 0x04, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1c, 0x09,
   0x00, 0x00, 0x00, 0x00, 0x4e, 0x12, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x34, 0x00, 0x00, 0x00, 0x00, 0x00, 0x03, 0x39, 0x00, 0x00, 0x00,
   0x00, 0x81, 0x1c, 0x00, 0x00, 0x00, 0x00, 0x80, 0x02, 0x0e, 0x00,
```

```
   0x00, 0x00, 0x40, 0x04, 0x07, 0x00, 0x00, 0x00, 0x00, 0x40, 0x89, 0x03,
   0x00, 0x00, 0x00, 0x00, 0x60, 0xd0, 0x01, 0x00, 0x00, 0x00, 0x00, 0x30,
   0x64, 0x00, 0x00, 0x00, 0x00, 0x00, 0x18, 0x10, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x0c, 0x08, 0x00, 0x00, 0x00, 0x00, 0x00, 0x06, 0x07, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x81, 0x01, 0x00, 0x00, 0x00, 0x00, 0xc0, 0xc0, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x40, 0xe1, 0x00, 0x00, 0x00, 0x00, 0x00, 0x80,
   0x62, 0x01, 0x00, 0x00, 0x00, 0x00, 0x40, 0x95, 0x03, 0x00, 0x00, 0x00,
   0x00, 0x20, 0xca, 0x06, 0x00, 0x00, 0x00, 0x00, 0x10, 0xcd, 0x06, 0x00,
   0x00, 0x00, 0x00, 0x88, 0x80, 0x03, 0x00, 0x00, 0x00, 0x00, 0x46, 0x00,
   0x01, 0x00, 0x00, 0x00, 0x00, 0x2a, 0x80, 0x03, 0x00, 0x00, 0x00, 0x00,
   0x14, 0xc0, 0x06, 0x00, 0x00, 0x00, 0x00, 0x18, 0x60, 0x0c, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x60, 0x0c, 0x00, 0x00, 0x00, 0x00, 0x00, 0x38, 0x38,
   0x00, 0x00, 0x00, 0x00, 0x00, 0xf8, 0x3f, 0x00, 0x00, 0x00, 0x00, 0x00,
   0xf8, 0x3f, 0x00, 0x00, 0x00, 0x00, 0x00, 0xf8, 0x3f, 0x00, 0x00, 0x00,
   0x00, 0x00, 0xf8, 0x3f, 0x00, 0x00, 0x00, 0x00, 0xfe, 0x7f, 0xfc, 0xff,
   0x00, 0x00, 0x00, 0x0c, 0x00, 0x00, 0x60, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00};
```

The `instrument.bit` file:

```
#define instrum_width 50
#define instrum_height 50
static char instrum_bits[] = {
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xc0, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xc0, 0x0f, 0x00,
   0x00, 0x00, 0x00, 0x00, 0xc0, 0x7f, 0x00, 0x00, 0x80, 0x00, 0x00, 0x80,
   0xfc, 0x00, 0x00, 0x80, 0x01, 0x00, 0x80, 0xf8, 0x03, 0x00, 0x80, 0x02,
   0x00, 0x80, 0xc8, 0x07, 0x00, 0x80, 0x82, 0x00, 0x80, 0x48, 0x0f, 0x00,
   0x80, 0x82, 0x01, 0x40, 0x44, 0x0f, 0x00, 0x80, 0x82, 0x01, 0x40, 0x44,
   0x0e, 0x00, 0x80, 0x82, 0x03, 0x20, 0x44, 0x0e, 0x00, 0x80, 0x80, 0x02,
   0x20, 0x62, 0x0e, 0x00, 0x80, 0x80, 0x03, 0x20, 0x22, 0x0e, 0x00, 0x80,
   0x80, 0x01, 0x10, 0x22, 0x0e, 0x00, 0x80, 0x80, 0x00, 0x10, 0x22, 0x0e,
   0x00, 0xf0, 0x80, 0x00, 0x10, 0x21, 0x0e, 0x00, 0x90, 0x80, 0x00, 0x10,
   0x31, 0x0e, 0x00, 0x60, 0xe0, 0x00, 0x88, 0x11, 0x0e, 0x00, 0x00, 0xf0,
   0x00, 0x88, 0x10, 0x0e, 0x00, 0x00, 0xf0, 0x00, 0x88, 0x10, 0x0e, 0x00,
   0x00, 0x60, 0x00, 0x84, 0x18, 0x0e, 0x00, 0x00, 0x00, 0x00, 0xc4, 0x08,
```

```
   0x0e, 0x00, 0x00, 0x00, 0x00, 0x44, 0x08, 0x0e, 0x00, 0x00, 0x00, 0x00,
   0x42, 0x08, 0x07, 0x00, 0x00, 0x00, 0x00, 0x62, 0x0c, 0x07, 0x00, 0x00,
   0x00, 0x00, 0x22, 0x04, 0x07, 0x00, 0x00, 0x00, 0x00, 0x31, 0x84, 0x03,
   0x00, 0x00, 0x00, 0x00, 0x19, 0xc4, 0x03, 0x00, 0x00, 0x00, 0xc0, 0x09,
   0xe4, 0x01, 0x00, 0x00, 0x00, 0xe0, 0xff, 0xff, 0x00, 0x00, 0x00, 0x00,
   0xe0, 0xff, 0xff, 0x01, 0x00, 0x00, 0x00, 0xe0, 0xff, 0xff, 0x01, 0x00,
   0x00, 0x00, 0xc0, 0xff, 0xff, 0x01, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00};
```

The `motor.bit` file:

```
#define motor_width 50
#define motor_height 50
static char motor_bits[] = {
   0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
   0x00, 0x00, 0x00, 0x00, 0x80, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xc6,
   0x31, 0x00, 0x00, 0x00, 0x00, 0x00, 0xee, 0x3b, 0x00, 0x00, 0x00, 0x00,
   0x00, 0xff, 0x3f, 0x07, 0x00, 0x00, 0x00, 0xd8, 0xff, 0xff, 0x07, 0x00,
   0x00, 0x00, 0xf8, 0xff, 0xff, 0x07, 0x00, 0x00, 0x00, 0xf0, 0xff, 0xff,
   0x03, 0x00, 0x00, 0x00, 0xf0, 0xff, 0xff, 0x33, 0x00, 0x00, 0x00, 0xff,
   0x3f, 0xfe, 0x3f, 0x00, 0x00, 0x00, 0xff, 0x1f, 0xfc, 0x3f, 0x00, 0x00,
   0x00, 0xfe, 0x1f, 0xfc, 0x1f, 0x00, 0x00, 0x00, 0xfe, 0x18, 0x8c, 0x1f,
   0x00, 0x00, 0x00, 0x7e, 0x30, 0x06, 0x9f, 0x01, 0x00, 0xe0, 0x7f, 0xf0,
   0x07, 0xff, 0x01, 0x00, 0xe0, 0x7f, 0xf0, 0x07, 0xff, 0x00, 0x00, 0x80,
   0xff, 0xf8, 0x8f, 0x7f, 0x00, 0x00, 0x00, 0xff, 0x3f, 0xfe, 0x7f, 0x00,
   0x00, 0x80, 0x8f, 0xdf, 0xfd, 0xf8, 0x00, 0x00, 0xe0, 0x07, 0x2f, 0x7a,
   0xf0, 0x03, 0x00, 0xe0, 0x07, 0x2f, 0x7a, 0xf0, 0x03, 0x00, 0xe0, 0x07,
   0x2f, 0x7a, 0xf0, 0x03, 0x00, 0x80, 0x8f, 0xdf, 0xfd, 0xf8, 0x00, 0x00,
   0x00, 0xff, 0x3f, 0xfe, 0x7f, 0x00, 0x00, 0x80, 0xff, 0xf8, 0x8f, 0xff,
   0x01, 0x00, 0xc0, 0x7f, 0xf0, 0x07, 0xff, 0x01, 0x00, 0xc0, 0x7f, 0xf0,
   0x07, 0xbf, 0x01, 0x00, 0xc0, 0x7e, 0xf0, 0x07, 0x3f, 0x00, 0x00, 0x00,
   0xfe, 0xf8, 0x8f, 0x7f, 0x00, 0x00, 0x00, 0xfc, 0x3f, 0xfe, 0x7f, 0x00,
   0x00, 0x00, 0xfe, 0x1f, 0xfc, 0x7f, 0x00, 0x00, 0x00, 0xfe, 0x1f, 0xfc,
   0x63, 0x00, 0x00, 0x00, 0xe6, 0x1f, 0xfc, 0x07, 0x00, 0x00, 0x00, 0xf0,
   0x3f, 0xfe, 0x0f, 0x00, 0x00, 0x00, 0xf0, 0xff, 0x7f, 0x0e, 0x00, 0x00,
   0x00, 0x70, 0xfe, 0x7f, 0x00, 0x00, 0x00, 0x00, 0x00, 0xfe, 0x7f, 0x00,
   0x00, 0x00, 0x00, 0x00, 0xe7, 0x71, 0x00, 0x00, 0x00, 0x00, 0x00, 0xe3,
```

```
0x01, 0x00, 0x00, 0x00, 0x00, 0x00, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00};
```

1.4.3 Motors Initial Sequence

The file `motors.iniseq` contains the initial settings for the motors:

```
MN
MR1000
MPA
OSB0
1OSC1
2OSC1
3OSC1
4OSC1
5OSC1
6OSC1
7OSC1
7OSA0
A1.5
V2
2A0.5
2V0.3
3V1
ST0
```

Each line contains one of the commands to be sent to the motor controller. The available commands are described in [6].

1.4.4 Sensors Initial Sequence

The file `sensors.iniseq` contains the initial setting for the sensors:

```
CUNIK;CUNI?
SUNIK;SUNI?
SCHNB;SCHN?
CCHNA;CCHN?
SETP77;SETP?
```

Some commands useful for the sensors are described in [5].

1.4.5 Colormaps

The file `colormap.txt` contains the list of the available for *xnics* colormaps:

```
gray scale
inverted gray
temperature
black blue red white
gray square root
red scale
green scale
blue scale
yellow scale
magenta scale
aquamarine scale
red-green scale
red-blue scale
green-blue scale
green-red scale
blue-red scale
blue-green scale
16 colors
16 gray
8 gray
4 gray
```

1.4.6 Wave Forms Mnemonics

The file `waveform.mnem` contains the translation table of the mnemonics used in the wave forms files into the numerical values for the NICS revelator:

```
#
#   Tavola di corrispondenza tra gli mnemonici ed i valori
#   numerici dei segnali del rivelatore di nics
#   12/10/98
#
ZERO    0x0000      # per specificare un valore di tutti zeri
PIXEL   0x0001      # un ciclo (0/1/0) avanza di un pixel
XSYNC   0x0002      # normalmente a 1, a 0 inizializza lo SR di riga
LINE    0x0004      # un ciclo (0/1/0) avanza di una riga
YSYNC   0x0008      # normalmente a 1, a 0 inizializza lo SR di colonna
READ    0x0010      # a 1 alimenta i buffer di uscita
RST0    0x0100      # reset quadrante 1
RST1    0x0200      # reset quadrante 2
```

```
RST2    0x0400      # reset quadrante 3
RST3    0x0800      # reset quadrante 4
RSTX    0x0F00      # reset quadranti 1-4
SOC0    0x1000      # inizio conversione quadrante 1
SOC1    0x2000      # inizio conversione quadrante 2
SOC2    0x4000      # inizio conversione quadrante 3
SOC3    0x8000      # inizio conversione quadrante 4
SOCX    0xF000      # inizio conversione quadrante 1-4
DUMMY   0xFF0A      # SOCX + XSYNC + YSYNC
```

1.4.7 Wave Forms Files

Below there are presented the files with the definitions of the **standard** waveforms for NICS revelator. They reside in the subdirectory *waveforms*. There are seven such files.

The file `wf10.inp` :

```
# wf10.inp
#
# Waveform file in symbolic notation
#
# FILE wf10  -  Init of frame, from G.Comoretto
#
#
#
# 65290 , 2
# 65282 , 10
# 65290 , 2
# 65288 , 4
# 65290 , 2
#
10                              # waveform label
5                               # numero di valori
#
ZERO                  , 2       # dummy, no-op value
YSYNC                 , 10      # init of           ysync
ZERO                  , 2       # dummy, no-op value
XSYNC                 , 4       # init of xsync
ZERO                  , 2       # dummy, no-op value
```

The file `wf20.inp` :

```
#
# Waveform file in symbolic notation
```

```
#
# FILE wf20  -  fast Y shift, from G.Comoretto
#
#
#
#   65294 , 0
#   65290 , 0
#
20                              # label
2                               # numero di valori
#
LINE                 , 0        # Cshift of Y (line) register
ZERO                 , 0        # dummy, no-op value
```

The file `wf30.inp` :

```
# wf30.inp
#
# Waveform file in symbolic notation
#
# FILE wf30  -  initial X shift, from G.Comoretto
#
#
#
#  65304 , 0
#  65304 , 0
#  65304 , 0
#  65304 , 0
#  65304 , 0
#  65304 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65307 , 0
#  65307 , 0
#  65307 , 0
#  65307 , 0
#  65306 , 0
#
30                              # Waveform label
15                               # numero di valori
#
XSYNC + READ           , 0      # init of X (row ) register + read
```

```
XSYNC + READ          , 0      # init of X (row ) register + read
XSYNC + READ          , 0      # init of X (row ) register + read
XSYNC + READ          , 0      # init of X (row ) register + read
XSYNC + READ          , 0      # init of X (row ) register + read
XSYNC + READ          , 0      # init of X (row ) register + read
READ                  , 0      # dummy, no-op value + read
READ                  , 0      # dummy, no-op value + read
READ                  , 0      # dummy, no-op value + read
READ                  , 0      # dummy, no-op value + read
READ + PIXEL          , 0      # shift of X (row ) register + read
READ + PIXEL          , 0      # shift of X (row ) register + read
READ + PIXEL          , 0      # shift of X (row ) register + read
READ + PIXEL          , 0      # shift of X (row ) register + read
READ                  , 0      # dummy, no-op value + read
```

The file `wf40.inp` :

```
# wf40.inp
#
# Waveform file in symbolic notation
#
# FILE wf40  -  Fast X shift , from G.Comoretto
#
#
#
#  65307 , 2
#  65306 , 0
#
40                            # Waveform label
2                             # numero di valori
#
READ + PIXEL          , 2      # shift of X (row ) register + read
READ                  , 2      # dummy, no-op value + read
```

The file `wf50.inp` :

```
# wf50.inp
#
# Waveform file in symbolic notation
#
# FILE wf50  -  X readout     , from G.Comoretto
#
#
#  65306 , 0
```

```
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65306 , 0
#  65307 , 0
#   3866 , 0
#   3866 , 0
#  65306 , 0
#
#
#
50                              # Waveform label
34                              # numero di valori
#
READ                    , 0     # dummy, no-op value + read
READ                    , 0     # dummy, no-op value + read
READ                    , 0     # dummy, no-op value + read
READ                    , 0     # dummy, no-op value + read
```

```
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ                   , 0      # dummy, no-op value + read
READ + PIXEL           , 0      # shift of X (row ) register + read
READ + SOCX            , 0      # start of conversion + read
READ + SOCX            , 0      # start of conversion + read
READ                   , 0      # dummy, no-op value + read
```

The file `wf60.inp` :

```
# wf60.inp
#
# Waveform file in symbolic notation
#
# FILE wf60  -  Start row + reset , from G.Comoretto
#            -  5/11/99 modified for Tino
#
#
#  65306 , 20
#  65307 , 0
#  65306 , 2
```

```
#
#
60                              # Waveform label
3                              # numero di elementi (= numero cicli sotto)
#
# In questo caso il valore dopo READ produce un ritardo di valore
# non ancora definito
#
READ                    , 2      # dummy, no-op value + read
READ + PIXEL            , 0      # shift of X (row ) register + read
READ                    , 0      # dummy, no-op value + read
```

The file `wf70.inp` :

```
# wf70.inp
#
# Waveform file in symbolic notation
#
# FILE wf70  -  X readout clear readout for double correlated sampling
#                          (4 us/pixel) , from G.Comoretto
#
#
#   65290 , 0
#   65294 , 0
#   65290 , 0
#   65290 , 0
#   65290 , 0
#   65290 , 0
#   61450 , 0
#   61450 , 0
#   61450 , 0
#   61450 , 0
#   61450 , 0
#   61450 , 0
#   65290 , 0
#
#
70                              # Waveform label
13                              # numero di valori
#
ZERO                    , 0      # dummy, no-op value
LINE                    , 0      # dummy, no-op value + Y line
ZERO                    , 0      # dummy, no-op value
ZERO                    , 0      # dummy, no-op value
```

```
ZERO                , 0      # dummy, no-op value
ZERO                , 0      # dummy, no-op value
RSTX                , 0      # dummy, no-op value + reset
RSTX                , 0      # dummy, no-op value + reset
RSTX                , 0      # dummy, no-op value + reset
RSTX                , 0      # dummy, no-op value + reset
RSTX                , 0      # dummy, no-op value + reset
RSTX                , 0      # dummy, no-op value + reset
ZERO                , 0      # dummy, no-op value
```

1.4.8 Mosaic Directory

The *mosaic* directory contains the files created by the observers for their observational programs. How create these files is described in [3]. Usually the files should have an extension `.txt`.

Here we represent again the list of the mosaic modes supported by the *xnics* and give a template of such a file.

1. **REL2SOURCE_AD** — the default mode: alpha & delta (right ascension and declination) movements relative to the origin;
2. **REL2LAST_AD** — mode 1: alpha & delta movements relative to the last position;
3. **REL2SOURCE_XY** — mode 2: x & y movements relative to the origin;
4. **REL2LAST_XY** — mode 3: x & y relative to the last position.

The keyword should be placed from the beginning of the line; there can be a comment after it, but the separating space field is obligatory. These keywords may appear in any place of mosaic file changing the subsequent behaviour of the telescope movements elaboration. If there is none of these keywords, the default mosaic mode is assumed.

Below there is an example of such a file:

```
% an example of the mosaic file
% the default movements mode
    0.0   0.0  %  posizione "0"
   -35.   35.  %  posizione "1"
   110.    0.  %  posizione "2"
    0.  -110.  %  posizione "3"
  -110.    0.  %  posizione "4"
REL2LAST_AD  change the movements mode
    0.0   0.0  %  posizione "5"
```

```
   -35.   35.  %  posizione "6"
   110.    0.  %  posizione "7"
    0.  -110.  %  posizione "8"
  -110.    0.  %  posizione "9"
REL2SOURCE_AD  change the movements mode back to default.
    0.0   0.0  %  posizione "10"
   -45.   45.  %  posizione "11"
   100.    0.  %  posizione "12"
    0.  -100.  %  posizione "13"
  -120.    0.  %  posizione "14"
%
```

1.5 Work Modes Directory

The directory `work_modes` contains the table with the description of all the modes of the observations possible with *xnics*. This table, stored in the file `obsmodes.tab`, is written using the *mnemonics* for the definition of the motors positions. To translate these mnemonics into the number of the steps defining the necessary movement distance of the motor from the home position the files `motor#.pos` are used. Here `#` is the corresponding motor number, from 1 to 7.

There are also the list-menus for all the observation modes, invoked by the corresponding device button in the *parameter panel* of the *xnics* main menu.

All these files are created by Tino Oliva.

1.5.1 Observation Modes Table

The mnemonics from this table should be used in a job file. The `obsmodes.tab` is presented below:

```
#
# Tabellona con tutte le informazioni per i vari modi di osservazione NICS
# Descrizione colonne.
#
# Modes, menus
#
# Motor positions
#       (1) Camera wheel position (name)
#       (2) Array focus position (steps)
#       (3) Lyot stop position (in/out)
#       (4) Filters wheel position (name)
#       (5) Grisms wheel position (name)
```

```
#       (6) Aperture wheel position (name)
#       (7) Aperture sector paddle (name)
#
# DIT:  Suggested DIT
# Will probably add other details of integration setup
#
# Mode, menus                  motor_positions                        DIT
#                         (1)   (2)   (3)  (4)   (5)   (6)  (7)
#-------------------------------------------------------------------------
# image mode:  IMA filter camera(objective) grey(attenuator)#
#
#
   IMA  dark   LF  G0    LF    any  any close  any   any   any       30
   IMA  dark   LF  G5    LF    any  any close  any   any   any       30
   IMA  dark   LF G10    LF    any  any close  any   any   any       30
   IMA  dark   SF  G0    SF    any  any close  any   any   any       30
   IMA  dark   SF  G5    SF    any  any close  any   any   any       30
   IMA  dark   SF G10    SF    any  any close  any   any   any       30
   IMA  1mic   LF  G0    LF    LF1  out  1mic  open    LF open       30
   IMA  1mic   LF  G5    LF    LF1  out  1mic grey5    LF open       30
   IMA  1mic   LF G10    LF    LF1  out  1mic grey9    LF open       30
   IMA  1mic   SF  G0    SF    SF1  out  1mic  open    SF open       60
   IMA  1mic   SF  G5    SF    SF1  out  1mic grey5    SF open       60
   IMA  1mic   SF G10    SF    SF1  out  1mic grey9    SF open       60
   IMA    Jn   LF  G0    LF    LF1  out    Jn  open    LF open       30
   IMA    Jn   LF  G5    LF    LF1  out    Jn grey5    LF open       30
   IMA    Jn   LF G10    LF    LF1  out    Jn grey9    LF open       30
   IMA    Jn   SF  G0    SF    SF1  out    Jn  open    SF open       60
   IMA    Jn   SF  G5    SF    SF1  out    Jn grey5    SF open       60
   IMA    Jn   SF G10    SF    SF1  out    Jn grey9    SF open       60
   IMA     J   LF  G0    LF    LF1  out     J  open    LF open       30
   IMA     J   LF  G5    LF    LF1  out     J grey5    LF open       30
   IMA     J   LF G10    LF    LF1  out     J grey9    LF open       30
   IMA     J   SF  G0    SF    SF1  out     J  open    SF open       60
   IMA     J   SF  G5    SF    SF1  out     J grey5    SF open       60
   IMA     J   SF G10    SF    SF1  out     J grey9    SF open       60
   IMA     H   LF  G0    LF    LF1  out     H  open    LF open       20
   IMA     H   LF  G5    LF    LF1  out     H grey5    LF open       20
   IMA     H   LF G10    LF    LF1  out     H grey9    LF open       20
   IMA     H   SF  G0    SF    SF1  out     H  open    SF open       40
   IMA     H   SF  G5    SF    SF1  out     H grey5    SF open       40
   IMA     H   SF G10    SF    SF1  out     H grey9    SF open       40
   IMA    K'   LF  G0    LF    LF1  out    K'  open    LF open       20
```

```
   IMA    K'   LF  G5    LF    LF1  out    K' grey5    LF open       20
   IMA    K'   LF G10    LF    LF1  out    K' grey9    LF open       20
   IMA    K'   SF  G0    SF    SF1  out    K'  open    SF open       40
   IMA    K'   SF  G5    SF    SF1  out    K' grey5    SF open       40
   IMA    K'   SF G10    SF    SF1  out    K' grey9    SF open       40
#   IMA     K   LF  G0    LF    LF1  out     K  open    LF open       20
   IMA     K   LF  G0    LF    LF1  out  Kflat open    LF open       20
   IMA     K   LF  G5    LF    LF1  out     K grey5    LF open       20
   IMA     K   LF G10    LF    LF1  out     K grey9    LF open       20
   IMA     K   SF  G0    SF    SF1  out     K  open    SF open       40
   IMA     K   SF  G5    SF    SF1  out     K grey5    SF open       40
   IMA     K   SF G10    SF    SF1  out     K grey9    SF open       40
   IMA   HK'   LF  G0    LF    LF1  out   HK'  open    LF open       20
   IMA   HK'   LF  G5    LF    LF1  out   HK' grey5    LF open       20
   IMA   HK'   LF G10    LF    LF1  out   HK' grey9    LF open       20
   IMA   HK'   SF  G0    SF    SF1  out   HK'  open    SF open       40
   IMA   HK'   SF  G5    SF    SF1  out   HK' grey5    SF open       40
   IMA   HK'   SF G10    SF    SF1  out   HK' grey9    SF open       40
   IMA    SW   LF  G0    LF    LF1  out  open    SW    LF open       20
   IMA    SW   LF  G5    LF    LF1  out grey5    SW    LF open       20
   IMA    SW   LF G10    LF    LF1  out grey9    SW    LF open       20
   IMA    SW   SF  G0    SF    SF1  out  open    SW    SF open       40
   IMA    SW   SF  G5    SF    SF1  out grey5    SW    SF open       40
   IMA    SW   SF G10    SF    SF1  out grey9    SW    SF open       40
   IMA    Zn   LF  G0    LF    LF1  out    Zn  open    LF open       30
   IMA    Zn   LF  G5    LF    LF1  out    Zn grey5    LF open       30
   IMA    Zn   LF G10    LF    LF1  out    Zn grey9    LF open       30
   IMA    Zn   SF  G0    SF    SF1  out    Zn  open    SF open       60
   IMA    Zn   SF  G5    SF    SF1  out    Zn grey5    SF open       60
   IMA    Zn   SF G10    SF    SF1  out    Zn grey9    SF open       60
   IMA   Brg   LF  G0    LF    LF1  out   Brg  open    LF open       60
   IMA   Brg   LF  G5    LF    LF1  out   Brg grey5    LF open       60
   IMA   Brg   LF G10    LF    LF1  out   Brg grey9    LF open       60
   IMA   Brg   SF  G0    SF    SF1  out   Brg  open    SF open       60
   IMA   Brg   SF  G5    SF    SF1  out   Brg grey5    SF open       60
   IMA   Brg   SF G10    SF    SF1  out   Brg grey9    SF open       60
   IMA    H2   LF  G0    LF    LF1  out    H2  open    LF open       60
   IMA    H2   LF  G5    LF    LF1  out    H2 grey5    LF open       60
   IMA    H2   LF G10    LF    LF1  out    H2 grey9    LF open       60
   IMA    H2   SF  G0    SF    SF1  out    H2  open    SF open       60
   IMA    H2   SF  G5    SF    SF1  out    H2 grey5    SF open       60
   IMA    H2   SF G10    SF    SF1  out    H2 grey9    SF open       60
   IMA  FeII   LF  G0    LF    LF1  out  FeII  open    LF open       60
```

```
   IMA  FeII   LF  G5    LF    LF1  out  FeII grey5    LF open       60
   IMA  FeII   LF G10    LF    LF1  out  FeII grey9    LF open       60
   IMA  FeII   SF  G0    SF    SF1  out  FeII  open    SF open       60
   IMA  FeII   SF  G5    SF    SF1  out  FeII grey5    SF open       60
   IMA  FeII   SF G10    SF    SF1  out  FeII grey9    SF open       60
   IMA Kcont   LF  G0    LF    LF1  out Kcont  open    LF open       60
   IMA Kcont   LF  G5    LF    LF1  out Kcont grey5    LF open       60
   IMA Kcont   LF G10    LF    LF1  out Kcont grey9    LF open       60
   IMA Kcont   SF  G0    SF    SF1  out Kcont  open    SF open       60
   IMA Kcont   SF  G5    SF    SF1  out Kcont grey5    SF open       60
   IMA Kcont   SF G10    SF    SF1  out Kcont grey9    SF open       60
   IMA Hcont   LF  G0    LF    LF1  out Hcont  open    LF open       60
   IMA Hcont   LF  G5    LF    LF1  out Hcont grey5    LF open       60
   IMA Hcont   LF G10    LF    LF1  out Hcont grey9    LF open       60
   IMA Hcont   SF  G0    SF    SF1  out Hcont  open    SF open       60
   IMA Hcont   SF  G5    SF    SF1  out Hcont grey5    SF open       60
   IMA Hcont   SF G10    SF    SF1  out Hcont grey9    SF open       60
#
# Note that grey filters cannot be used with Ks setup
#
   IMA    Ks   LF  G0    LF    LF1  out     K    K'    LF open       20
   IMA    Ks   SF  G0    SF    SF1   out     K    K'    SF open       40
#
#--------------------------------------------------------------------------
# imaging polarimetry mode:  IMAPOL filter plate_ange
#
IMAPOL  dark   P0        LF    any  any close  any    any  any       60
IMAPOL  dark  P45        LF    any  any close  any    any  any       60
IMAPOL  1mic   P0        LF    LF1  out  1mic  Woll    SF   P0       30
IMAPOL  1mic  P45        LF    LF1  out  1mic  Woll    SF  P45       30
IMAPOL    Jn   P0        LF    LF1  out    Jn  Woll    SF   P0       30
IMAPOL    Jn  P45        LF    LF1  out    Jn  Woll    SF  P45       30
IMAPOL     J   P0        LF    LF1  out     J  Woll    SF   P0       30
IMAPOL     J  P45        LF    LF1  out     J  Woll    SF  P45       30
IMAPOL     H   P0        LF    LF1  out     H  Woll    SF   P0       30
IMAPOL     H  P45        LF    LF1  out     H  Woll    SF  P45       30
IMAPOL    K'   P0        LF    LF1  out    K'  Woll    SF   P0       30
IMAPOL    K'  P45        LF    LF1  out    K'  Woll    SF  P45       30
IMAPOL     K   P0        LF    LF1  out     K  Woll    SF   P0       30
IMAPOL     K  P45        LF    LF1  out     K  Woll    SF  P45       30
IMAPOL   HK'   P0        LF    LF1  out   HK'  Woll    SF   P0       30
IMAPOL   HK'  P45        LF    LF1  out   HK'  Woll    SF  P45       30
IMAPOL    Zn   P0        LF    LF1  out    Zn  Woll    SF   P0       30
```

```
IMAPOL    Zn  P45        LF    LF1  out    Zn  Woll    SF  P45       30
IMAPOL   Brg   P0        LF    LF1  out   Brg  Woll    SF   P0       30
IMAPOL   Brg  P45        LF    LF1  out   Brg  Woll    SF  P45       30
IMAPOL    H2   P0        LF    LF1  out    H2  Woll    SF   P0       30
IMAPOL    H2  P45        LF    LF1  out    H2  Woll    SF  P45       30
IMAPOL  FeII   P0        LF    LF1  out  FeII  Woll    SF   P0       30
IMAPOL  FeII  P45        LF    LF1  out  FeII  Woll    SF  P45       30
IMAPOL Kcont   P0        LF    LF1  out Kcont  Woll    SF   P0       30
IMAPOL Kcont  P45        LF    LF1  out Kcont  Woll    SF  P45       30
IMAPOL Hcont   P0        LF    LF1  out Hcont  Woll    SF   P0       30
IMAPOL Hcont  P45        LF    LF1  out Hcont  Woll    SF  P45       30
#
#-------------------------------------------------------------------------
# low resolution spectroscopy: SPELR  grism slit grey(attenuator)#
#    NB:  grism=view# means using  a certain filter to look at the slit
#               and check if object is centered. Only SW and K
#               filters are foreseen at the moment
#
#         slit=none means slitless (could be useful to determine efficiencie
#
 SPELR  dark  0.5  G0    LF    any  any close  any   any   any       60
 SPELR  dark  0.5  G5    LF    any  any close  any   any   any       60
 SPELR  dark  0.5 G10    LF    any  any close  any   any   any       60
 SPELR  dark 0.75  G0    LF    any  any close  any   any   any       60
 SPELR  dark 0.75  G5    LF    any  any close  any   any   any       60
 SPELR  dark 0.75 G10    LF    any  any close  any   any   any       60
 SPELR  dark  1.0  G0    LF    any  any close  any   any   any       60
 SPELR  dark  1.0  G5    LF    any  any close  any   any   any       60
 SPELR  dark  1.0 G10    LF    any  any close  any   any   any       60
 SPELR  dark  1.5  G0    LF    any  any close  any   any   any       60
 SPELR  dark  1.5  G5    LF    any  any close  any   any   any       60
 SPELR  dark  1.5 G10    LF    any  any close  any   any   any       60
 SPELR  dark  2.0  G0    LF    any  any close  any   any   any       60
 SPELR  dark  2.0  G5    LF    any  any close  any   any   any       60
 SPELR  dark  2.0 G10    LF    any  any close  any   any   any       60
 SPELR  dark none  G0    LF    any  any close  any   any   any       60
 SPELR  dark none  G5    LF    any  any close  any   any   any       60
 SPELR  dark none G10    LF    any  any close  any   any   any       60
 SPELR AMICI  0.5  G0    LF    LF1  out  open Amici   0.5 open       60
 SPELR AMICI  0.5  G5    LF    LF1  out grey5 Amici   0.5 open       60
 SPELR AMICI  0.5 G10    LF    LF1  out grey9 Amici   0.5 open       60
 SPELR AMICI 0.75  G0    LF    LF1  out  open Amici  0.75 open       60
 SPELR AMICI 0.75  G5    LF    LF1  out grey5 Amici  0.75 open       60
```

```
SPELR AMICI 0.75 G10    LF    LF1  out grey9 Amici  0.75 open       60
SPELR AMICI  1.0  G0    LF    LF1  out  open Amici   1.0 open       60
SPELR AMICI  1.0  G5    LF    LF1  out grey5 Amici   1.0 open       60
SPELR AMICI  1.0 G10    LF    LF1  out grey9 Amici   1.0 open       60
SPELR AMICI  1.5  G0    LF    LF1  out  open Amici   1.5 open       60
SPELR AMICI  1.5  G5    LF    LF1  out grey5 Amici   1.5 open       60
SPELR AMICI  1.5 G10    LF    LF1  out grey9 Amici   1.5 open       60
SPELR AMICI  2.0  G0    LF    LF1  out  open Amici   2.0 open       60
SPELR AMICI  2.0  G5    LF    LF1  out grey5 Amici   2.0 open       60
SPELR AMICI  2.0 G10    LF    LF1  out grey9 Amici   2.0 open       60
SPELR AMICI none  G0    LF    LF1  out  open Amici    LF open       60
SPELR AMICI none  G5    LF    LF1  out grey5 Amici    LF open       60
SPELR AMICI none G10    LF    LF1  out grey9 Amici    LF open       60
SPELR    IJ  0.5  G0    LF    LF1  out  open    IJ   0.5 open       60
SPELR    IJ  0.5  G5    LF    LF1  out grey5    IJ   0.5 open       60
SPELR    IJ  0.5 G10    LF    LF1  out grey9    IJ   0.5 open       60
SPELR    IJ 0.75  G0    LF    LF1  out  open    IJ  0.75 open       60
SPELR    IJ 0.75  G5    LF    LF1  out grey5    IJ  0.75 open       60
SPELR    IJ 0.75 G10    LF    LF1  out grey9    IJ  0.75 open       60
SPELR    IJ  1.0  G0    LF    LF1  out  open    IJ   1.0 open       60
SPELR    IJ  1.0  G5    LF    LF1  out grey5    IJ   1.0 open       60
SPELR    IJ  1.0 G10    LF    LF1  out grey9    IJ   1.0 open       60
SPELR    IJ  1.5  G0    LF    LF1  out  open    IJ   1.5 open       60
SPELR    IJ  1.5  G5    LF    LF1  out grey5    IJ   1.5 open       60
SPELR    IJ  1.5 G10    LF    LF1  out grey9    IJ   1.5 open       60
SPELR    IJ  2.0  G0    LF    LF1  out  open    IJ   2.0 open       60
SPELR    IJ  2.0  G5    LF    LF1  out grey5    IJ   2.0 open       60
SPELR    IJ  2.0 G10    LF    LF1  out grey9    IJ   2.0 open       60
SPELR    IJ none  G0    LF    LF1  out  open    IJ    LF open       60
SPELR    IJ none  G5    LF    LF1  out grey5    IJ    LF open       60
SPELR    IJ none G10    LF    LF1  out grey9    IJ    LF open       60
SPELR    JH  0.5  G0    LF    LF1  out  open    JH   0.5 open       60
SPELR    JH  0.5  G5    LF    LF1  out grey5    JH   0.5 open       60
SPELR    JH  0.5 G10    LF    LF1  out grey9    JH   0.5 open       60
SPELR    JH 0.75  G0    LF    LF1  out  open    JH  0.75 open       60
SPELR    JH 0.75  G5    LF    LF1  out grey5    JH  0.75 open       60
SPELR    JH 0.75 G10    LF    LF1  out grey9    JH  0.75 open       60
SPELR    JH  1.0  G0    LF    LF1  out  open    JH   1.0 open       60
SPELR    JH  1.0  G5    LF    LF1  out grey5    JH   1.0 open       60
SPELR    JH  1.0 G10    LF    LF1  out grey9    JH   1.0 open       60
SPELR    JH  1.5  G0    LF    LF1  out  open    JH   1.5 open       60
SPELR    JH  1.5  G5    LF    LF1  out grey5    JH   1.5 open       60
SPELR    JH  1.5 G10    LF    LF1  out grey9    JH   1.5 open       60
```

```
SPELR    JH  2.0  G0    LF    LF1  out  open    JH   2.0 open       60
SPELR    JH  2.0  G5    LF    LF1  out grey5    JH   2.0 open       60
SPELR    JH  2.0 G10    LF    LF1  out grey9    JH   2.0 open       60
SPELR    JH none  G0    LF    LF1  out  open    JH    LF open       60
SPELR    JH none  G5    LF    LF1  out grey5    JH    LF open       60
SPELR    JH none G10    LF    LF1  out grey9    JH    LF open       60
SPELR   JK'  0.5  G0    LF    LF1  out  open   JK'   0.5 open       60
SPELR   JK'  0.5  G5    LF    LF1  out grey5   JK'   0.5 open       60
SPELR   JK'  0.5 G10    LF    LF1  out grey9   JK'   0.5 open       60
SPELR   JK' 0.75  G0    LF    LF1  out  open   JK'  0.75 open       60
SPELR   JK' 0.75  G5    LF    LF1  out grey5   JK'  0.75 open       60
SPELR   JK' 0.75 G10    LF    LF1  out grey9   JK'  0.75 open       60
SPELR   JK'  1.0  G0    LF    LF1  out  open   JK'   1.0 open       60
SPELR   JK'  1.0  G5    LF    LF1  out grey5   JK'   1.0 open       60
SPELR   JK'  1.0 G10    LF    LF1  out grey9   JK'   1.0 open       60
SPELR   JK'  1.5  G0    LF    LF1  out  open   JK'   1.5 open       60
SPELR   JK'  1.5  G5    LF    LF1  out grey5   JK'   1.5 open       60
SPELR   JK'  1.5 G10    LF    LF1  out grey9   JK'   1.5 open       60
SPELR   JK'  2.0  G0    LF    LF1  out  open   JK'   2.0 open       60
SPELR   JK'  2.0  G5    LF    LF1  out grey5   JK'   2.0 open       60
SPELR   JK'  2.0 G10    LF    LF1  out grey9   JK'   2.0 open       60
SPELR   JK' none  G0    LF    LF1  out  open   JK'    LF open       60
SPELR   JK' none  G5    LF    LF1  out grey5   JK'    LF open       60
SPELR   JK' none G10    LF    LF1  out grey9   JK'    LF open       60
SPELR    HK  0.5  G0    LF    LF1  out  open    HK   0.5 open       60
SPELR    HK  0.5  G5    LF    LF1  out grey5    HK   0.5 open       60
SPELR    HK  0.5 G10    LF    LF1  out grey9    HK   0.5 open       60
SPELR    HK 0.75  G0    LF    LF1  out  open    HK  0.75 open       60
SPELR    HK 0.75  G5    LF    LF1  out grey5    HK  0.75 open       60
SPELR    HK 0.75 G10    LF    LF1  out grey9    HK  0.75 open       60
SPELR    HK  1.0  G0    LF    LF1  out  open    HK   1.0 open       60
SPELR    HK  1.0  G5    LF    LF1  out grey5    HK   1.0 open       60
SPELR    HK  1.0 G10    LF    LF1  out grey9    HK   1.0 open       60
SPELR    HK  1.5  G0    LF    LF1  out  open    HK   1.5 open       60
SPELR    HK  1.5  G5    LF    LF1  out grey5    HK   1.5 open       60
SPELR    HK  1.5 G10    LF    LF1  out grey9    HK   1.5 open       60
SPELR    HK  2.0  G0    LF    LF1  out  open    HK   2.0 open       60
SPELR    HK  2.0  G5    LF    LF1  out grey5    HK   2.0 open       60
SPELR    HK  2.0 G10    LF    LF1  out grey9    HK   2.0 open       60
SPELR    HK none  G0    LF    LF1  out  open    HK    LF open       60
SPELR    HK none  G5    LF    LF1  out grey5    HK    LF open       60
SPELR    HK none G10    LF    LF1  out grey9    HK    LF open       60
SPELR viewS  0.5  G0    LF    LF1  out  open    SW   0.5 open       20
```

```
 SPELR viewS  0.5  G5    LF    LF1  out grey5    SW   0.5 open       20
 SPELR viewS  0.5 G10    LF    LF1  out grey9    SW   0.5 open       20
 SPELR viewS 0.75  G0    LF    LF1  out  open    SW  0.75 open       20
 SPELR viewS 0.75  G5    LF    LF1  out grey5    SW  0.75 open       20
 SPELR viewS 0.75 G10    LF    LF1  out grey9    SW  0.75 open       20
 SPELR viewS  1.0  G0    LF    LF1  out  open    SW   1.0 open       20
 SPELR viewS  1.0  G5    LF    LF1  out grey5    SW   1.0 open       20
 SPELR viewS  1.0 G10    LF    LF1  out grey9    SW   1.0 open       20
 SPELR viewS  1.5  G0    LF    LF1  out  open    SW   1.5 open       20
 SPELR viewS  1.5  G5    LF    LF1  out grey5    SW   1.5 open       20
 SPELR viewS  1.5 G10    LF    LF1  out grey9    SW   1.5 open       20
 SPELR viewS  2.0  G0    LF    LF1  out  open    SW   2.0 open       20
 SPELR viewS  2.0  G5    LF    LF1  out grey5    SW   2.0 open       20
 SPELR viewS  2.0 G10    LF    LF1  out grey9    SW   2.0 open       20
 SPELR viewS none  G0    LF    LF1  out  open    SW    LF open       20
 SPELR viewS none  G5    LF    LF1  out grey5    SW    LF open       20
 SPELR viewS none G10    LF    LF1  out grey9    SW    LF open       20
 SPELR viewK  0.5  G0    LF    LF1  out     K  open   0.5 open       15
 SPELR viewK  0.5  G5    LF    LF1  out     K  grey5  0.5 open       15
 SPELR viewK  0.5 G10    LF    LF1  out     K  grey9  0.5 open       15
 SPELR viewK 0.75  G0    LF    LF1  out     K  open  0.75 open       15
 SPELR viewK 0.75  G5    LF    LF1  out     K  grey5 0.75 open       15
 SPELR viewK 0.75 G10    LF    LF1  out     K  grey9 0.75 open       15
 SPELR viewK  1.0  G0    LF    LF1  out     K  open   1.0 open       15
 SPELR viewK  1.0  G5    LF    LF1  out     K  grey5  1.0 open       15
 SPELR viewK  1.0 G10    LF    LF1  out     K  grey9  1.0 open       15
 SPELR viewK  1.5  G0    LF    LF1  out     K  open   1.5 open       15
 SPELR viewK  1.5  G5    LF    LF1  out     K  grey5  1.5 open       15
 SPELR viewK  1.5 G10    LF    LF1  out     K  grey9  1.5 open       15
 SPELR viewK  2.0  G0    LF    LF1  out     K  open   2.0 open       15
 SPELR viewK  2.0  G5    LF    LF1  out     K  grey5  2.0 open       15
 SPELR viewK  2.0 G10    LF    LF1  out     K  grey9  2.0 open       15
 SPELR viewK none  G0    LF    LF1  out     K  open    LF open       15
 SPELR viewK none  G5    LF    LF1  out     K  grey5   LF open       15
 SPELR viewK none G10    LF    LF1  out     K  grey9   LF open       15
#
#--------------------------------------------------------------------
# spectro-polarimetry: SPEPOL grism slit plate_angle(P0-P45)
#
SPEPOL  dark  0.5  P0    LF    any  any close  any   any   any       60
SPEPOL  dark  0.5  G5    LF    any  any close  any   any   any       60
SPEPOL  dark 0.75  P0    LF    any  any close  any   any   any       60
SPEPOL  dark 0.75 P45    LF    any  any close  any   any   any       60
```

```
SPEPOL  dark  1.0  P0    LF    any  any close  any   any   any       60
SPEPOL  dark  1.0 P45    LF    any  any close  any   any   any       60
SPEPOL  dark  1.5  P0    LF    any  any close  any   any   any       60
SPEPOL  dark  1.5 P45    LF    any  any close  any   any   any       60
SPEPOL  dark  2.0  P0    LF    any  any close  any   any   any       60
SPEPOL  dark  2.0 P45    LF    any  any close  any   any   any       60
SPEPOL  dark none  P0    LF    any  any close  any   any   any       60
SPEPOL  dark none P45    LF    any  any close  any   any   any       60
SPEPOL AMICI  0.5  P0    LF    LF1  out  Woll Amici   0.5   P0       60
SPEPOL AMICI  0.5 P45    LF    LF1  out  Woll Amici   0.5  P45       60
SPEPOL AMICI 0.75  P0    LF    LF1  out  Woll Amici  0.75   P0       60
SPEPOL AMICI 0.75 P45    LF    LF1  out  Woll Amici  0.75  P45       60
SPEPOL AMICI  1.0  P0    LF    LF1  out  Woll Amici   1.0   P0       60
SPEPOL AMICI  1.0 P45    LF    LF1  out  Woll Amici   1.0  P45       60
SPEPOL AMICI  1.5  P0    LF    LF1  out  Woll Amici   1.5   P0       60
SPEPOL AMICI  1.5 P45    LF    LF1  out  Woll Amici   1.5  P45       60
SPEPOL AMICI  2.0  P0    LF    LF1  out  Woll Amici   2.0   P0       60
SPEPOL AMICI  2.0 P45    LF    LF1  out  Woll Amici   2.0  P45       60
SPEPOL AMICI none  P0    LF    LF1  out  Woll Amici    SF   P0       60
SPEPOL AMICI none P45    LF    LF1  out  Woll Amici    SF  P45       60
SPEPOL    IJ  0.5  P0    LF    LF1  out  Woll    IJ   0.5   P0       60
SPEPOL    IJ  0.5 P45    LF    LF1  out  Woll    IJ   0.5  P45       60
SPEPOL    IJ 0.75  P0    LF    LF1  out  Woll    IJ  0.75   P0       60
SPEPOL    IJ 0.75 P45    LF    LF1  out  Woll    IJ  0.75  P45       60
SPEPOL    IJ  1.0  P0    LF    LF1  out  Woll    IJ   1.0   P0       60
SPEPOL    IJ  1.0 P45    LF    LF1  out  Woll    IJ   1.0  P45       60
SPEPOL    IJ  1.5  P0    LF    LF1  out  Woll    IJ   1.5   P0       60
SPEPOL    IJ  1.5 P45    LF    LF1  out  Woll    IJ   1.5  P45       60
SPEPOL    IJ  2.0  P0    LF    LF1  out  Woll    IJ   2.0   P0       60
SPEPOL    IJ  2.0 P45    LF    LF1  out  Woll    IJ   2.0  P45       60
SPEPOL    IJ none  P0    LF    LF1  out  Woll    IJ    SF   P0       60
SPEPOL    IJ none P45    LF    LF1  out  Woll    IJ    SF  P45       60
SPEPOL    JH  0.5  P0    LF    LF1  out  Woll    JH   0.5   P0       60
SPEPOL    JH  0.5 P45    LF    LF1  out  Woll    JH   0.5  P45       60
SPEPOL    JH 0.75  P0    LF    LF1  out  Woll    JH  0.75   P0       60
SPEPOL    JH 0.75 P45    LF    LF1  out  Woll    JH  0.75  P45       60
SPEPOL    JH  1.0  P0    LF    LF1  out  Woll    JH   1.0   P0       60
SPEPOL    JH  1.0 P45    LF    LF1  out  Woll    JH   1.0  P45       60
SPEPOL    JH  1.5  P0    LF    LF1  out  Woll    JH   1.5   P0       60
SPEPOL    JH  1.5 P45    LF    LF1  out  Woll    JH   1.5  P45       60
SPEPOL    JH  2.0  P0    LF    LF1  out  Woll    JH   2.0   P0       60
SPEPOL    JH  2.0 P45    LF    LF1  out  Woll    JH   2.0  P45       60
SPEPOL    JH none  P0    LF    LF1  out  Woll    JH    SF   P0       60
```

```
SPEPOL    JH none P45    LF    LF1  out  Woll    JH    SF  P45        60
SPEPOL   JK'  0.5  P0    LF    LF1  out  Woll   JK'   0.5   P0        60
SPEPOL   JK'  0.5 P45    LF    LF1  out  Woll   JK'   0.5  P45        60
SPEPOL   JK' 0.75  P0    LF    LF1  out  Woll   JK'  0.75   P0        60
SPEPOL   JK' 0.75 P45    LF    LF1  out  Woll   JK'  0.75  P45        60
SPEPOL   JK'  1.0  P0    LF    LF1  out  Woll   JK'   1.0   P0        60
SPEPOL   JK'  1.0 P45    LF    LF1  out  Woll   JK'   1.0  P45        60
SPEPOL   JK'  1.5  P0    LF    LF1  out  Woll   JK'   1.5   P0        60
SPEPOL   JK'  1.5 P45    LF    LF1  out  Woll   JK'   1.5  P45        60
SPEPOL   JK'  2.0  P0    LF    LF1  out  Woll   JK'   2.0   P0        60
SPEPOL   JK'  2.0 P45    LF    LF1  out  Woll   JK'   2.0  P45        60
SPEPOL   JK' none  P0    LF    LF1  out  Woll   JK'    SF   P0        60
SPEPOL   JK' none P45    LF    LF1  out  Woll   JK'    SF  P45        60
SPEPOL    HK  0.5  P0    LF    LF1  out  Woll    HK   0.5   P0        60
SPEPOL    HK  0.5 P45    LF    LF1  out  Woll    HK   0.5  P45        60
SPEPOL    HK 0.75  P0    LF    LF1  out  Woll    HK  0.75   P0        60
SPEPOL    HK 0.75 P45    LF    LF1  out  Woll    HK  0.75  P45        60
SPEPOL    HK  1.0  P0    LF    LF1  out  Woll    HK   1.0   P0        60
SPEPOL    HK  1.0 P45    LF    LF1  out  Woll    HK   1.0  P45        60
SPEPOL    HK  1.5  P0    LF    LF1  out  Woll    HK   1.5   P0        60
SPEPOL    HK  1.5 P45    LF    LF1  out  Woll    HK   1.5  P45        60
SPEPOL    HK  2.0  P0    LF    LF1  out  Woll    HK   2.0   P0        60
SPEPOL    HK  2.0 P45    LF    LF1  out  Woll    HK   2.0  P45        60
SPEPOL    HK none  P0    LF    LF1  out  Woll    HK    SF   P0        60
SPEPOL    HK none P45    LF    LF1  out  Woll    HK    SF  P45        60
SPEPOL viewS  0.5  P0    LF    LF1  out  open    SW   0.5   P0        20
SPEPOL viewS  0.5 P45    LF    LF1  out  open    SW   0.5  P45        20
SPEPOL viewS 0.75  P0    LF    LF1  out  open    SW  0.75   P0        20
SPEPOL viewS 0.75 P45    LF    LF1  out  open    SW  0.75  P45        20
SPEPOL viewS  1.0  P0    LF    LF1  out  open    SW   1.0   P0        20
SPEPOL viewS  1.0 P45    LF    LF1  out  open    SW   1.0  P45        20
SPEPOL viewS  1.5  P0    LF    LF1  out  open    SW   1.5   P0        20
SPEPOL viewS  1.5 P45    LF    LF1  out  open    SW   1.5  P45        20
SPEPOL viewS  2.0  P0    LF    LF1  out  open    SW   2.0   P0        20
SPEPOL viewS  2.0 P45    LF    LF1  out  open    SW   2.0  P45        20
SPEPOL viewS none  P0    LF    LF1  out  open    SW    SF   P0        20
SPEPOL viewS none P45    LF    LF1  out  open    SW    SF  P45        20
SPEPOL viewK  0.5  P0    LF    LF1  out     K  open   0.5   P0        20
SPEPOL viewK  0.5 P45    LF    LF1  out     K  open   0.5  P45        20
SPEPOL viewK 0.75  P0    LF    LF1  out     K  open  0.75   P0        20
SPEPOL viewK 0.75 P45    LF    LF1  out     K  open  0.75  P45        20
SPEPOL viewK  1.0  P0    LF    LF1  out     K  open   1.0   P0        20
SPEPOL viewK  1.0 P45    LF    LF1  out     K  open   1.0  P45        20
```

```
SPEPOL viewK  1.5  P0    LF    LF1  out     K  open   1.5   P0        20
SPEPOL viewK  1.5 P45    LF    LF1  out     K  open   1.5  P45        20
SPEPOL viewK  2.0  P0    LF    LF1  out     K  open   2.0   P0        20
SPEPOL viewK  2.0 P45    LF    LF1  out     K  open   2.0  P45        20
SPEPOL viewK none  P0    LF    LF1  out     K  open    SF   P0        20
SPEPOL viewK none P45    LF    LF1  out     K  open    SF  P45        20
#-------------------------------------------------------------------------
# high resolution spectroscopy: SPEHR  grism slit
#
 SPEHR  dark  0.5        LF    any  any close  any   any   any        60
 SPEHR  dark 0.75        LF    any  any close  any   any   any        60
 SPEHR  dark  1.0        LF    any  any close  any   any   any        60
 SPEHR  dark  1.5        LF    any  any close  any   any   any        60
 SPEHR  dark  2.0        LF    any  any close  any   any   any        60
 SPEHR  dark none        LF    any  any close  any   any   any        60
 SPEHR  1mic  0.5        LF    LF1  out  1mic    J4   0.5 open       60
 SPEHR  1mic 0.75        LF    LF1  out  1mic    J4  0.75 open       60
 SPEHR  1mic  1.0        LF    LF1  out  1mic    J4   1.0 open       60
 SPEHR  1mic  1.5        LF    LF1  out  1mic    J4   1.5 open       60
 SPEHR  1mic  2.0        LF    LF1  out  1mic    J4   2.0 open       60
 SPEHR  1mic none        LF    LF1  out  1mic    J4    LF open       30
 SPEHR    Jn  0.5        LF    LF1  out    Jn    J4   0.5 open       60
 SPEHR    Jn 0.75        LF    LF1  out    Jn    J4  0.75 open       60
 SPEHR    Jn  1.0        LF    LF1  out    Jn    J4   1.0 open       60
 SPEHR    Jn  1.5        LF    LF1  out    Jn    J4   1.5 open       60
 SPEHR    Jn  2.0        LF    LF1  out    Jn    J4   2.0 open       60
 SPEHR    Jn none        LF    LF1  out    Jn    J4    LF open       30
 SPEHR     J  0.5        LF    LF1  out     J    J4   0.5 open       60
 SPEHR     J 0.75        LF    LF1  out     J    J4  0.75 open       60
 SPEHR     J  1.0        LF    LF1  out     J    J4   1.0 open       60
 SPEHR     J  1.5        LF    LF1  out     J    J4   1.5 open       60
 SPEHR     J  2.0        LF    LF1  out     J    J4   2.0 open       60
 SPEHR     J none        LF    LF1  out     J    J4    LF open       30
 SPEHR     H  0.5        LF    LF1  out     H    J4   0.5 open       60
 SPEHR     H 0.75        LF    LF1  out     H    J4  0.75 open       60
 SPEHR     H  1.0        LF    LF1  out     H    J4   1.0 open       60
 SPEHR     H  1.5        LF    LF1  out     H    J4   1.5 open       60
 SPEHR     H  2.0        LF    LF1  out     H    J4   2.0 open       60
 SPEHR     H none        LF    LF1  out     H    J4    LF open       20
#
# Alternativa da considerare
#
# SPEHR     H  0.5        LF    LF1  out     H    K3   0.5 open       60
```

```
# SPEHR     H 0.75        LF    LF1  out     H    K3  0.75 open       60
# SPEHR     H  1.0        LF    LF1  out     H    K3   1.0 open       60
# SPEHR     H  1.5        LF    LF1  out     H    K3   1.5 open       60
# SPEHR     H  2.0        LF    LF1  out     H    K3   2.0 open       60
# SPEHR     H none        LF    LF1  out     H    K3    LF open       20
#
 SPEHR    K'  0.5        LF    LF1  out    K'    K3   0.5 open       60
 SPEHR    K' 0.75        LF    LF1  out    K'    K3  0.75 open       60
 SPEHR    K'  1.0        LF    LF1  out    K'    K3   1.0 open       60
 SPEHR    K'  1.5        LF    LF1  out    K'    K3   1.5 open       60
 SPEHR    K'  2.0        LF    LF1  out    K'    K3   2.0 open       60
 SPEHR    K' none        LF    LF1  out    K'    K3    LF open       20
 SPEHR     K  0.5        LF    LF1  out     K    K3   0.5 open       60
 SPEHR     K 0.75        LF    LF1  out     K    K3  0.75 open       60
 SPEHR     K  1.0        LF    LF1  out     K    K3   1.0 open       60
 SPEHR     K  1.5        LF    LF1  out     K    K3   1.5 open       60
 SPEHR     K  2.0        LF    LF1  out     K    K3   2.0 open       60
 SPEHR     K none        LF    LF1  out     K    K3    LF open       15
 SPEHR    Kb  0.5        LF    LF1  out cut19    K3   0.5 open       60
 SPEHR    Kb 0.75        LF    LF1  out cut19    K3  0.75 open       60
 SPEHR    Kb  1.0        LF    LF1  out cut19    K3   1.0 open       60
 SPEHR    Kb  1.5        LF    LF1  out cut19    K3   1.5 open       60
 SPEHR    Kb  2.0        LF    LF1  out cut19    K3   2.0 open       60
 SPEHR    Kb none        LF    LF1  out cut19    K3    LF open       15
 SPEHR Klong  0.5        LF    LF1  out cut19    J4   0.5 open       60
 SPEHR Klong 0.75        LF    LF1  out cut19    J4  0.75 open       60
 SPEHR Klong  1.0        LF    LF1  out cut19    J4   1.0 open       60
 SPEHR Klong  1.5        LF    LF1  out cut19    J4   1.5 open       60
 SPEHR Klong  2.0        LF    LF1  out cut19    J4   2.0 open       60
 SPEHR Klong none        LF    LF1  out cut19    J4    LF open       15
 SPEHR viewS  0.5        LF    LF1  out  open    SW   0.5 open       15
 SPEHR viewS 0.75        LF    LF1  out  open    SW  0.75 open       15
 SPEHR viewS  1.0        LF    LF1  out  open    SW   1.0 open       15
 SPEHR viewS  1.5        LF    LF1  out  open    SW   1.5 open       15
 SPEHR viewS  2.0        LF    LF1  out  open    SW   2.0 open       15
 SPEHR viewS none        LF    LF1  out  open    SW    LF open       15
 SPEHR viewK  0.5        LF    LF1  out     K  open   0.5 open       15
 SPEHR viewK 0.75        LF    LF1  out     K  open  0.75 open       15
 SPEHR viewK  1.0        LF    LF1  out     K  open   1.0 open       15
 SPEHR viewK  1.5        LF    LF1  out     K  open   1.5 open       15
 SPEHR viewK  2.0        LF    LF1  out     K  open   2.0 open       15
 SPEHR viewK none        LF    LF1  out     K  open    LF open       15
#
```

```
#-----------------------------------------------------------------------
#
# Focusing mode, 1 parameter: pyramid in/out
#   (needs first an image without pyramid and then 1 with it)
# Focusing must always be performed with the same filter and camera.
#
 FOCUS    IN            LF     LF1  out    Jn focus   LF  open       30
 FOCUS   OUT            LF     LF1  out    Jn  open   LF  open       30
#
# Maialate di Tino
#
   IMA  open   LF  G0    LF    LF1  out  open  open   LF  open       30
   IMA  open   SF  G0    SF    LF1  out  open  open   LF  open       30
```

1.5.2 Translation Tables for the Motors

The file `motor1.pos` contains:

```
# 100000 steps = 1 complete revolution of camera wheel
# Valori determinati con il laser  a freddo il 23/05/00
#
# IMPORTANTE: questi valori si riferiscono allo "0" definito da
# un "Reset-", se si fa un "Reset+" i valori diminuiscono di circa
# 350 steps
#
# La terza colonna da' i valori necessari per posizionare l'immagine del
# laser, allineato sul colliamtore, al centro dell'array
#
#     nome       step(da Reset-)
#           ottimi x laser riflesso     valori per centrare il laser su arra
#
#        SF       7700                          7860  circa
#        PR      32700
#        LF      57600                         57780  circa
#     close      82400
#
#
# Valori determinati al caldo per avere la sfera centrata (15/6/00)
#
        SF       7800                          7860  circa
        PR      32800
        LF      57800                         57780  circa
     close      82800
```

The file `motor2.pos` contains:

```
# 0= negative limit switch; other limit switch at ~ 8500
#
LF1  2300
SF1  6800
PR1  2600
```

The file `motor3.pos` contains:

```
#
# Tutte le posizioni in steps riferite ad un Reset-
#
# Il laser allineato sul collimatore tocca il bordo (si inizia a vedere
# sull'array) a 27300 steps
#
     out           0
      in       35000
```

The file `motor4.pos` contains:

```
# 60000 step = complete revolution of filter wheel
#
#  IMPORTANTE: tutti i valori sotto sono riferiti a Reset-
#
#  23/5/2000 : determinato centro posizione aperta come media dei bordi
#              dove si vignetta il laser allineato sul collimatore
#              start=7350 end=9660 => center=8505
#  24/5/2000 : corretti tutti valori accordingly
#
#     nome       step               giri            deg
#
     grey5       2813             2.8128        16.88
     grey9       5659             5.6590        33.95
      open       8505             8.5050        51.03
     close      11351            11.3510        68.11
         K      14197            14.1972        85.18
        K'      17043            17.0432       102.26
         H      19889            19.8893       119.34
         J      22735            22.7353       136.41
        Jn      25582            25.5815       153.49
      1mic      28428            28.4275       170.57
      Woll      31390            31.3898       188.34
     cut19      34352            34.3522       206.11
```

```
       Brg      37198            37.1982       223.19
     Kcont      40044            40.0443       240.27
      FeII      42890            42.8903       257.34
     Hcont      45737            45.7365       274.42
       H2*      48582            48.5825       291.49
    CH4_s*      51429            51.4287       308.57
    CH4_l*      54275            54.2747       325.65
#      HK'*      57121             57.1990       343.19
#
# K_flat e' quello in piano, per l'allineamento
#
     Kflat      57121            57.1207       342.72
        Ge      59967            59.9668       359.80
#         Z*     59967             59.9668       359.80
```

The file `motor5.pos` contains:

```
#  60000 step = 1 complete revolution of grism wheel
#     nome       step               giri             deg
#
        K'       1250             1.2500         7.50
     close       4542             4.5425        27.25
        JH       8126             8.1257        48.75
        J4      11709            11.7088        70.25
        SW      15292            15.2920        91.75
       JK'      18875            18.8752       113.25
      Woll      22458            22.4582       134.75
        HK      26041            26.0413       156.25
        IJ      29624            29.6245       177.75
        K3      33208            33.2077       199.25
     grey9      36791            36.7908       220.74
       IK*      40374            40.3740       242.24
     grey5      43957            43.9572       263.74
      Free      47540            47.5402       285.24
     Amici      51539            51.5387       309.23
      open      55246            55.2463       331.48
     focus      58248            58.2482       349.49
```

The file `motor6.pos` contains:

```
# 200000 step = 1 complete revolution of aperture wheel
#     nome       step               giri             deg
#
      Mask       7005             7.0050        12.61
```

```
       1.5      28717           28.7172        51.69
      0.75      50429           50.4294        90.77
        LF      72141           72.1411       129.85
       2.0      93853           93.8533       168.94
        SF     115566          115.5656       208.02
       1.0     137278          137.2778       247.10
        U5     149249          149.2489       268.65
        U4     154093          154.0928       277.37
        U3     158937          158.9367       286.09
     close     163780          163.7800       294.80
        U2     168624          168.6239       303.52
        U1     173468          173.4678       312.24
       0.5     185293          185.2928       333.53
```

The file `motor7.pos` contains:

```
#     nome       step              giri            deg
#
      open          0            0.0000         0.00
        P0      25000           25.0000        45.00
       P45      47222           47.2222        85.00
```

1.5.3 Imaging List Menus

For the *Normal Imaging* the setting of three devices, controlled by next three files must be done.

The file `IMA_1.menu`:

```
#
# Imaging (IMA) mode
#
# Menu to pop-up when key "filter" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description          Command  Second comment/warning
#
# Broad band filters
#
```

```
"1mic   (0.96-1.10)"    1mic
"Jn     (1.17-1.33)"     Jn
"J      (1.10-1.39)"     J      "J has lower efficiency than Jn"
"H      (1.48-1.78)"     H
"K'     (1.95-2.30)"     K'
"K      (2.02-2.36)"     K
#"Ks     (2.02-2.30)"     Ks     "Ks cannot be used with grey filters"
#"HK'    (1.47-2.30)"     HK'
"SW     (0.90-1.80)"     SW  "SW is meant for deep imaging, not for photomet
---------------------------------   #end of broad band filters list
#"                   "
#
#-Medium band filters
#
#"Zn     (0.996-1.069)"   Zn
#"CH4s   (1.530-1.630)"   CH4s
#"CH4l   (1.640-1.740)"   CH4l
#
#---------------------------------   #end of medium band filters list
# Narrow band filters
#
#"                   "
"Brg    (2.150-2.182)"   Brg
#"H2     (2.106-2.138)"   H2
"Kcont  (2.253-2.287)"   Kcont
"FeII   (1.632-1.656)"   FeII
"Hcont  (1.558-1.582)"   Hcont
---------------------------------   #end of narrow band filters list
#
"Dark               "   dark
---------------------------------  # End of standard modes
#
# Maialate di Tino
#
"Open               "   open
=================================  #end of file
```

The file `IMA_2.menu`:

```
#
# Imaging (IMA) mode
#
# Menu to pop-up when key "objective" is hit.
#
```

```
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description                 Command  Second comment/warning
#
"LF (0.25\"/pix)"               LF
"SF (0.13\"/pix)"               SF
#
# Queste sono alternative su come dare l'informazione sul campo.
#
#"LF (4.2'x4.2')"
#"SF (2.2'x2.2')"
#"LF (4.2'x4.2' 0.25\"/pix)"
#"SF (2.2'x2.2' 0.13\"/pix)"
=================== end
```

The file `IMA_3.menu`:

```
#
# Imaging (IMA) mode
#
# Menu to pop-up when key "attenuator" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description          Command  Second comment/warning
#
"None  "                 G0
"5 magnitudes "          G5
"10 magnitudes "         G10
============== end ====================
```

For the *Imaging & Polarimetry* mode the following two files are used for the corresponding settings:

The file `IMAPOL_1.menu`:

```
#
# Imaging-polarimetry (IMAPOL) mode
#
# Menu to pop-up when key "filter" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 mir
#
# Description          Command  Second comment/warning
#
#-- Broad band filters
#
"1mic   (0.96-1.10)"    1mic
"Jn     (1.17-1.33)"     Jn
"J      (1.10-1.39)"     J      "J has lower efficiency than Jn"
"H      (1.48-1.78)"     H
"K'     (1.95-2.30)"     K'
"K      (2.02-2.36)"     K
#"HK'    (1.47-2.30)"     HK'
"SW     (0.90-1.80)"     SW  "SW is meant for deep imaging, not for photomet
#"                  "
#
#----- Medium band filters (use different colours?)
#
#"Zn     (0.996-1.069)"   Zn
#"CH4s   (1.530-1.630)"   CH4s
#"CH4l   (1.640-1.740)"   CH4l
#
-- Narrow band filters
#
#"                  "
"Brg    (2.150-2.182)"   Brg
#"H2     (2.106-2.138)"   H2
"Kcont  (2.253-2.287)"   Kcont
"FeII   (1.632-1.656)"   FeII
"Hcont  (1.558-1.582)"   Hcont
#
---------------
"Dark              "   dark
```

```
=================end ======================
```

The file `IMAPOL_2.menu`:

```
#
# Imaging-polarimetry (IMAPOL) mode
#
# Menu to pop-up when key "wl/2 plate" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description          Command  Second comment/warning
#
" 0 degrees  "          P0
"45 degrees  "          P45
==================end=========================
```

1.5.4 Spectrometry List Menus

The *Spectrometry* mode has three sub-modes — *Low Res*olution, *High Res*olution and *Spectrometry & Polarimetry*.

For the *Low Res*olution observation mode there are three files with menus.

The file `SPELR_1.menu`:

```
#
# Spectroscopy Low Resolution (SPELR) mode
#
# Menu to pop-up when key "grism" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description          Command  Second comment/warning
#
#"Amici  (0.80-2.50)"  AMICI     "Be careful with differential refraction!"
```

```
"Amici  (0.80-2.50)"  AMICI
"IJ     (0.88-1.45)"    IJ
"JH     (1.10-1.75)"    JH
"JK'    (1.15-2.30)"    JK'
"HK     (1.65-2.50)"    HK
------------------------------
"Slit view blu (SW)"  viewS
"Slit view red (K) "   viewK
------------------------------
"Dark               "   dark
=================end================
```

The file `SPELR_2.menu`:

```
#
# Spectroscopy Low Resolution (SPELR) mode
#
# Menu to pop-up when key "slit" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 mir
#
# Description          Command  Second comment/warning
#
"0.5\"  "              0.5
"0.75\" "              0.75
"1.0\"  "              1.0
"1.5\"  "              1.5
"2.0\"  "              2.0
--------------------------------
"Slitless"             none
=================end===============
```

The file `SPELR_3.menu`:

```
#
# Spectroscopy Low Resolution (SPELR) mode
#
# Menu to pop-up when key "attenuator" is hit.
#
```

```
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description          Command  Second comment/warning
#
"None  "                 G0
"5 magnitudes "          G5
"10 magnitudes "         G10
======================end=============
```

For the *High Res*olution observation mode there are two files.
The file `SPEHR_1.menu`:

```
#
# Spectroscopy High Resolution (SPEHR) mode
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description          Command  Second comment/warning
#
"1mic   (0.96-1.10)"    1mic
"Jn     (1.17-1.33)"     Jn
"J      (1.10-1.39)"     J      "J has lower efficiency than Jn"
"H      (1.48-1.78)"     H
"K'     (1.95-2.30)"     K'
"K      (2.02-2.36)"     K
"Kbroad (1.93-2.36)"    Kb    "Kbroad has lower efficiency than K, K'"
"Klong  (2.20-2.50)"  Klong
--------------
"Slit view blu (SW)"  viewS
"Slit view red (K) "  viewK
---------------
"Dark              "   dark
===============end==================
```

The file `SPEHR_2.menu`:

```
#
# Spectroscopy High Resolution (SPEHR) mode
#
# Menu to pop-up when key "slit" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 mir
#
# Description          Command  Second comment/warning
#
"0.5\"  "              0.5
"0.75\" "              0.75
"1.0\"  "              1.0
"1.5\"  "              1.5
"2.0\"  "              2.0
-------------------
"Slitless"             none
====================end=======================
```

And, finally, there are three menus for the *Spectrometry & Polarimetry* observation mode.

The file `SPEPOL_1.menu`:

```
#
# Spectro-polarimetry (SPEPOL) mode
#
# Menu to pop-up when key "grism" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 mir
#
# Description          Command  Second comment/warning
#
#"Amici  (0.80-2.50)"  AMICI     "Be careful with differential refraction!"
"Amici  (0.80-2.50)"  AMICI
"IJ     (0.88-1.45)"    IJ
```

```
"JH     (1.10-1.75)"    JH
"JK'    (1.15-2.30)"    JK'
"HK     (1.65-2.50)"    HK
----------------------------------------
"Slit view blu (SW)"  viewS
"Slit view red (K) "  viewK
----------------------------------------
"Dark              "   dark
================================end==============
```

The file `SPEPOL_2.menu`:

```
#
# Spectro-polarimetry (SPEPOL) mode
#
# Menu to pop-up when key "slit" is hit.
#
# Description appears in the menu
#
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 minute)
#
# Description          Command  Second comment/warning
#
"0.5\"  "              0.5
"0.75\" "              0.75
"1.0\"  "              1.0
"1.5\"  "              1.5
"2.0\"  "              2.0
------------------------------
"Slitless"             none
====================end===============
```

The file `SPEPOL_3.menu`:

```
#
# Spectro-polarimetry (SPEPOL) mode
#
# Menu to pop-up when key "wl/2 plate" is hit.
#
# Description appears in the menu
#
```

```
# Command is the keyword to search in the file with setup of observing-modes
#
# Second comment/warning should appear/pop-up in a separate window when the
# grism is selected (this comment/warning should then disappear after ~1 mir
#
# Description          Command  Second comment/warning
#
" 0 degrees  "          P0
"45 degrees  "          P45
====================end=============
```

1.6 Software Compilation

The `src` directory contains the source files of the software.

The compilation process is supported by standard programming tool **make**. Source texts for both parts of the software are placed into two corresponding sub-directories (`xnics` and `nicsgate`) of the top source directory (`src`). The `src` directory has a file `Makefile`. The sub-directories contain the source files of the corresponding parts of the software. The files generally contain the programm material for the support of one certain task or the small number connected tasks and have indicative names. As usually, there are some miscellaneous routines which are typically in the file with the name `xutil.c`. Each part of the software can be compiled independently using **make**. For the compilation is used free distributed broadly available GNU `gcc` compiler. After the compilation both modules, *xnics* and *NICSgate* are moved to the `bin` directory.

The *xnics* uses the standard `C` and `X11R6` libraries, including `3D` library of Athena Widget Set. Obviously, the standard version of this library can be used influencing only a little bit the widgets look.

The *nicsgate* uses additionally support for the fits files maintenance, provided by `libfitscio.a`. This library should reside in the `/usr/local/lib` directory. If it for some reasons is lost, there is its copy in the `tmp` directory of the *xnics* file system. There are also the corresponding *headers*, which should reside in the `/usr/local/include` directory. The special driver is used for the support of the *transnix link*. The files `link.c` and `link.h` should be placed in the proper system directory.

There is also the sub-directory `subtract` with auxiliary programs. Their compilation is also supported by *make*. The binary modules are copied automatically into the `bin` directory.

The `transnix` contains all the material of the OCCAM program residing in the transputer network of the NICS electronics. We do not describe its compilation here.

Chapter 2

Instruments Tuning

To provide the instrument developers by the means to investigate the difficult situations and to tune the different parameters of the instruments, there is a special *debug mode* of the *xnics*.

The *NICSgate Debug Monitor* can be started from *Setup* menu (Fig. 2.1).

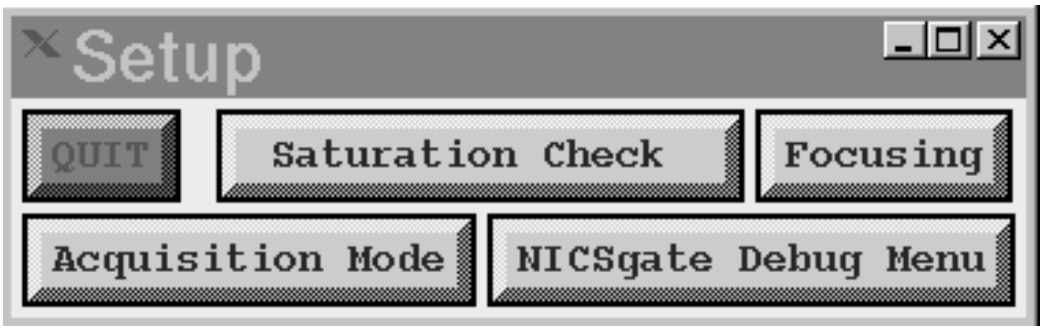


Figure 2.1: Setup Xnics Menu

The widget with *NICSgate Debug Monitor* menu (Fig. 2.2) will be popped-up. **This menu is intended only for software maintenance and the instruments tuning**.

2.1 NICSgate Debug Monitor

There are many options provided by the *NICSgate Debug Monitor*. Some of them concern the NICS electronics, or, better, the program which controls it, the *transnix*.

The user can boot into the NICS electronics the chosen binary image of the program. To this end the absolute path to the desired binary module should be provided and then the corresponding button should be pressed.

It is possible to reset the link to the electronics in the case of the problems with its driver. When the booted program does not work correctly it is a

usual situation. To execute the another boot, it is necessary first to reset the link (the driver).

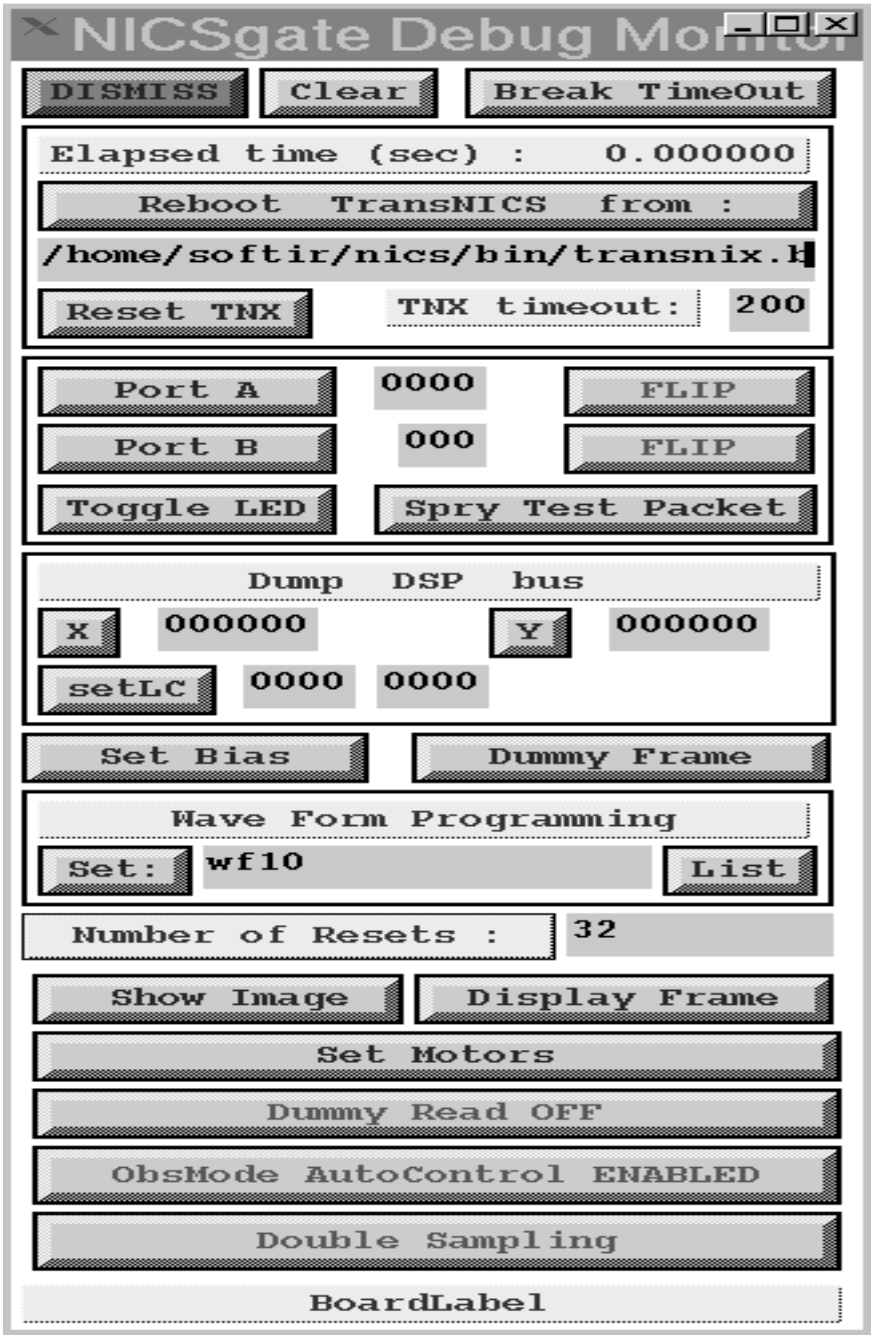


Figure 2.2: The NICSgate Debug Monitor Widget

There is the possibility to change the timeout, which is used to control from the *xnics* side the flow of the transnix events. It is an important parameter for the overall functionality of the software. On its correct value

depends the stability of the events processing.

The next panel is intended to permit the several actions on the different internal parts of the NICS electronics. It is possible to set the desirable value for both internal ports, **A** and **B**, and to initiate on each of them the "flip" process - the change of the chosen for the port setting every two seconds to the complimentary state. For this purpose the the masks `0x7FFF` for the Port A and `0xFFFF` for the Port B are used. **To stop the "flip" process the user should use the button** **Break TimeOut**. All other buttons during the "flip" process are insensitive. The value for each port can be written in the corresponding text window. To send the command to execute the chosen setting it is necessary to click on the corresponding button Port A or Port B.

The user also can send the commands to toggle the electronics LED by the button Toggle LED, and to spray the test packet through the transputer network by the button Spray Test Packet.

Then there is the possibility to dump the **X** and **Y** registers of the DSP and set the LC value.

The button Set Bias pops-up the menu for the bias setting (Section 2.2).

The button Dummy Frame sends a request to the *transnix* to send back the dummy image. It can be used to check the correctness of the data transmission from *transnix* to *xnics*.

The image can be immediately (after receiving, of course) analyzed using the internal viewer. It can be popped-up by the Show Image button. There is also the possibility to use the facilities of the external viewer from Display Frame[3].

The button Set Motors pops-up the corresponding menu (Section 2.3).

There is the panel which permits to load into the electronics any desirable *WaveForm*. The waveform file name should have an extension `.inp`. This name (without extension) can be written in the panel text window or chosen from the list of the corresponding resource directory (`resource/waveforms`) contents, accessible through the List button. To load the chosen file one should click on the button Set:.

Some parameters of the *integration* command (the command which sets the parameters of the data acquisition and starts them,[5]), can be changed too. Among them there is the *Number of Resets* before the integration. By default *xnics* uses 32. Then there is *Dummy Read* flag, which can be set **Off** (default) or **On**. The corresponding button changes its color for different setting. Another two-values parameter is Double Sampling (default) or Single Sampling.

Note.

- When there are done the changes through the *NICSgate Debug Monitor*, the normal way of the *xnics* session is modified. So the most of its normal functionality is not accessible. *Xnics* returns to its normal proceeding *when* the *NICSgate Debug Monitor* menu is closed. It could be very inconvenient. To resolve this problem may be used the button Clear. The following rule should be used: first do the necessary setting, etc., using the *NICSgate Debug Monitor* then click on the button Clear. The *xnics* is turned to its standard functionality and any normal acquisition task can be executed.

- Any new activity on the *NICSgate Debug Monitor* menu (except the innocent pop-up of the sub-menus and the text writing) again preclude the normal task execution.

Another problem of the similar origin comes when the motors are set **manually** through the corresponding menu (2.3). The standard way of *xnics* to control the motors is too very restrictive. **No non-standard positions are permitted.** *Xnics* **always** sets the motors positions in the correspondence with the chosen *Observation Mode*. And **without the complete settings** for the given *Observation Mode* mode the acquisition task **can not be started**.

To permit the data acquisition **at any motors positions** there is the two-values button, having a label ObsMode AutoControl ENABLED, which can be changed to ObsMode AutoControl DISABLED. It changes also the color when pressed.

2.2 Bias Setting

The Fig. 2.3 presents the menu intended for the interactive bias setting. **Note**, that the real setting is executed only when the corresponding **button** is pressed. The change of the value in the text windows does not change the settings in the NICS electronics.

This menu permits to tune the biases and the polarimeter tensions for the better functionality of the NICS. Usually after the change of the parameter the acquisition should be done, the resulting image controlled and so on.

2.3 Motors in Debug Mode

For the development of the instrument and the tuning of its functionalities it is necessary to have the possibilities to move any motor to any possible position and, probably, to make the data acquisition in this non-standard

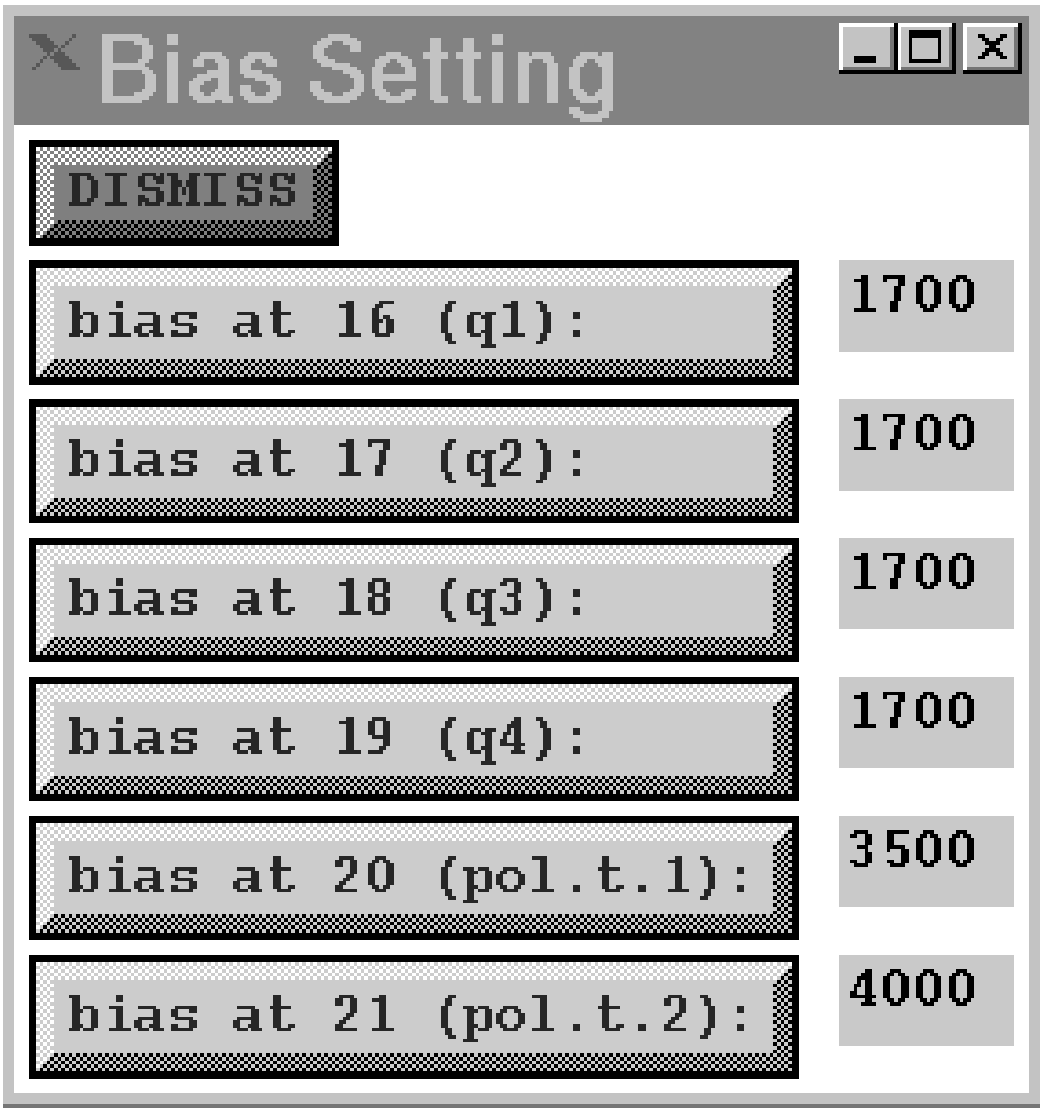


Figure 2.3: Bias Setting Menu

environment. For this purpose the *Motor's Control* menu (Fig. 2.4) provides the possibility to set any position of the chosen motor and to make its reset in positive or negative directions. Also any valid motor controller command can be send to it by the direct definition.

The upper pair, the button Send Any Serial Command: and the adjacent text window should be used to compound the desirable command from the valid set [6] and then send it to the motor controller. Some useful commands are presented below:

- **G** : start the movements of all motors. The destination should be set before.

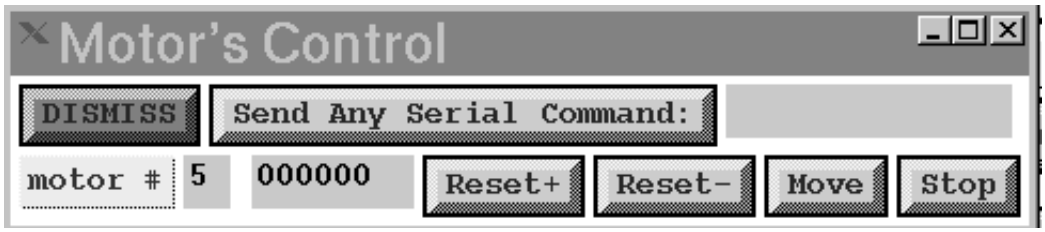


Figure 2.4: The menu for the Manual Control of the Motors

- **S** : stop the movements of all motors.
- **PR** : report the positions of all motors. In form `#PR`, where `#` is any number from 1 to 7, reports the position of the only mentioned motor.
- **R** : report the statuses of all motors. The form for a single motor is as mentioned above.

The message widget with results of the command execution and with received response of the motor controller, when it was interrogated, is normally popped-up. The *xnics* tries to maintain always the correct internal state of the motors, including their positions. Because of this the certain level of the attention is needed. While the user can think that he/she has issued a single command, when the issued command changes the motor position, the additional command, asking the resulting position is send automatically. The command (movement) execution time could be long (even minutes), thus the user can send another and another command. This can create some break in the internal protocol, because only finite (and small) number of such, practically incorrect, commands can be supported effectively. It is not fatal, but may be misleading. Thus, **do not send the next command before you are sure that the previous is executed**. If the several motors should be moved simultaneously, first set their positions and then start their movements by the command **G**.

The line of the fields at the bottom of the menu provides the usual set of the actions on a single chosen motor. There is the field for the motor number definition. Then follows the text field for the desired position (in motor steps), and the set of the buttons Reset+, Reset-, Move and Stop. Their meaning is obvious from the labels.

Bibliography

[1] Lisi, F., Baffa, C., Gennari, S., Oliva, E., 1999, "**Nics**, the near IR imager/spectrometer of the TNG", International Meeting on Astronomical Technologies, S.Agata, Memorie della Societá Astronomica Italiana, in press.

[2] Comoretto, G., Baffa, C., Gavryusev, V., Lisi, F., Sozzi, M., 1999, "The Data Acquisition System for Nics — Hardware Solutions", International Meeting on Astronomical Technologies, S.Agata, Memorie della Societá Astronomica Italiana, in press.

[3] Gavryusev, V., 2000, "XNICS. User's Guide", Arcetri Astrophysical Preprint, n.8/2000.

[4] Gavryusev, V., 2000, "XNICS. Programmer's Guide", Arcetri Astrophysical Preprint, n.10/2000.

[5] Baffa, C., 2000, "Il Protocollo Transnix-Xnics", Arcetri Technical Report, n.2/2000.

[6] OEM Series Software Reference Guide, 1993, Compumotor Division of Parker Hannifin Corporation, p/n 88-013785-01 A.