K O N K O L Y   O B S E R V A T O R Y

G U I D E   T O   T H E   S C H M I D T   T E L E S C O P E

Dec. 4 1998

WARNING: THIS MANUAL IS NO WAY A SUBSTITUTE FOR AN INTRODUCTION TO THE TELESCOPE AND CAMERA BY A STAFF ASTRONOMER!

TELESCOPE DATA

Diameter: 60/90 cm

Focal length: 180 cm

Optical design: Schmidt

Field of view: 5 degrees, 160 x 160 sq.mm

Manufacturer: Carl Zeiss Jena

Year of installation: 1962

Instrumentation: 2 deg. and 5 deg. objective prism,
photographic plate, CCD camera

OBSERVATORY DATA

Location: Piszkesteto, Matra Mountains, Hungary

Latitude: +47deg 55.1

Longitude: +19deg 53.7

Height above the sea level: 958m

Time zone: MET

TELESCOPE OPERATION

- Switch on the main power switches (at the entrance of the dome);

- switch on the telescope (main switch on the console);

- disconnect fire alarm cable;

- open the dome;

- remove telescope covers;

......

- replace telescope covers;

- move the telescope to vertical position;

- close the dome, and rotate it to the initial position;

- connect fire alarm cable;

- switch off the telescope;

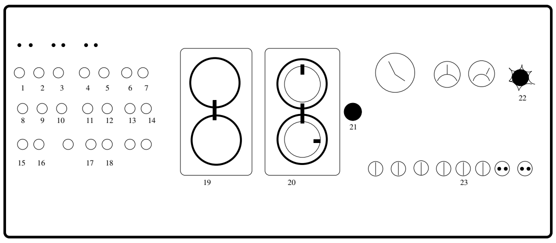
- switch off the main power switches.

More details and technical instructions can be found in Hungarian, in "Parallaktikus, villa-felerositesu 90cm-es tukorteleszkop leirasa es hasznalati utasitasa" manual in the dome.

In case of any technical problem with the dome or the telescope, contact Miklos Racz (racz@konkoly.hu) .

No instrumentation should be installed or modified without the permission of the technical deputy director.

Publications using observations made at Piszkesteto should contain an acknowledgement, and should appropriately refer to the telescope and detector.



Decl. +: 1	R.A. +: 8	Main switch ON: 15	Dome-rotating left: 17	Decl. scale : 19	
Decl. off: 2	R.A. off : 9	Main switch OFF: 16	Dome-rotating right: 18	R.A. / H.A. scale : 20	
Decl. - : 3	R.A. - : 10				dome-opening: 23
fine Decl. I + : 4	fine R.A. I + : 11	fine Decl. II. + : 6	fine R.A. II. + : 13	sideral clock adjust: 21	
fine Decl. I - : 5	fine R.A. I - : 12	fine Decl. II. - : 7	fine R.A. II. - : 14	consol illumination: 22	

User Guide for the AT 200 CCD camera at the Schmidt telescope

Janos Kelemen

General description: The camera replaces the original photographic casette unit at the end of the focusing rod. The base plate and the screws are identical to the photographic casette unit. The longer side of the (1536 x 1024) CCD chip is parallel to the right ascension direction. In this case the blue tab on the grey camera house is up. Without the filterwheel unit the entrance of the camera house is covered by a plastic dustcap. It has to be removed before the observations and replaced after finishing the observations. The cooling of the camerahead is made by a liquid cooling unit (LCU). The LCU located on the south side of the telescope fork and the coolant circulates in a transparent plastic pipeline. In the pipeline the coolant must circulate continuously without air bubbles. Before the observation the bubbles (if any) gathered in the loops should carefully forced in the direction of the LCU. The electronic control unit should be switched on only after the bubble free stationary flow in the pipeline.

Switch on check list:

1/ Control the camerahead

- electronic connectors, plugs etc.

- the pipeline connectors must be dry without any leakage.
  In the case of leaking observations are prohibited!

- remove the plastic dustcap from the camerahead (without filterwheel only)

2/ In the dome lower level in the grey electronic fusebox, connect the plug of the white cable to the connector. Only after this can switch on the LCU and the camera electronics.

3/ In the telescope level of the dome, switch on the LCU which is mounted onto the south side of the telescope fork. Be sure that the LCU is operating!

4/ Check the liquid circulation and carefully force the bubbles (if any exists) in the direction of the LCU.

5/ Switch on the PC in the heated box. If the ambient temperature is above 15 deg. Celsius the heating is not necessary, in winter or if the ambient temperature is below 15 deg. Celsius switch on the heater if it is still not working.

6/ Switch on the camera control electronic unit which is located on the telescope tube. If the power is on, on the front side of the unit a numeric display indicates the temperature of the detector. Do not change the settings. After reaching the stabile detector temperature somewhere between -37 - -40 deg. Celsius you can be sure it is in the optimal range.

7/ After reaching the ideal detector temperature (about 10 minutes) the observation can be started. The camera control software package PMIS is ready after starting the WINDOWS and click on the PMIS icon.

8/ After the observations the switch off sequence has a reverse order.

VERY IMPORTANT! After switch off the camerahead control unit you must wait 10 minutes until switching off the liquid cooling unit!

Ask Janos Kelemen (URL: http://www.konkoly.hu/staff/kelemen.html, e-mail: kelemen@konkoly.hu) if you need more help.

CCD FACT SHEET

Camera

Manufacturer: Photometrics

Chip: KAF-1600, UV-coated

Manufacturer: Kodak

Size: 1536 X 1024

Pixel size: 9 micron

Dark current: 0.009 electron/pixel/sec at -40 deg C

Gain:

nominal	measured	noise (e/RMS)
4	5.35	14.6
1	1.28	13.5

Linearity: 0.1 %

Bias: 101 ADU 1 gain

Full well cap.: 87 ke

THE PMIS SOFTWARE

Robert Szabo

The PMIS Image Processing Software program is a Microsoft Windows compatible software product designed to completely control the Photometrics Camera. Here we summerize the most essential and often used Menu items and macros.

- Start the program by clicking on PMIS icon under Windows

Camera Window

It's useful first to have a look at the camera window. Camera menu provides access to the camera initialization dialog as well as camera control functions. Click on Camera/Initialize, and you will find Camera type (KAF 1600), Camera (readout) Speed (200 kHz), Columns(1536) Rows(1024) etc. These values define the physical size and valid acquisition region of the imaging surface and are usually fixed. The Acquisition Parameters dialog box allows you to change the area to be used for subsequent image acquisition. For example, to access the whole physical surface of the camera, set Serial/Parallel Subarray Origin to 0, and Ser./Par. Subarray Size to 1536/1024. The binning factors, and camera gain also can be modified in this dialog box.

The Main Window
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Image submenu

The Image/New Image menu item creates a new image data area and an associated display window to be used by subsequent image acquisition and display.

Macros submenu

The most efficient and the simplest way to take exposures, execute observing blocks and store data in standard format is running macros. The Macros submenu offers you to create a new, or edit and run an existing macro. These macros are written in CLI format which is the command line interpreter of PMIS. Single CLI commands can be executed from the Main Menu window, too. By running expf.cmd macro you can take exposures with the same exposition time and filter. Tserfits.cmd was written to get exposures with three different filters and exposure times. Also these macros control data storage in fits format, and can repeat an observing sequencexs several times creating incremented file names. Of course every existing macro can be modified; in the header of the files one can find descriptive lines helping to understand the function of the macro. It's convenient to develop new macros for every specific observing runs and requirements.

Options submenu
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offers choice between monochrome and pseudo-color image-display. Another important function modifies LUT (look up table), where low intensity and low contrast parts of the image can be made visible.

Help submenu
----
provides on-line information about using PMIS.

The Image Window
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also contains submenus, such as File, Acquire, Process, Display, ROI, Plot, Options and User.

The first one is to save, import and print images unless they are saved by above mentioned macros. From File submenu it's only possible to save PMI format or fits format images without header. Therefore strongly recommended to use the easy-to-handle macros for that purpose. On the other hand import and display fits files is also not supported by the program ...

The Acquire submenu allows the user to change the position and the size of image areas acquired from the camera, and the binning factors. Acquires/Focus performs continuous exposures on a rectangular area of the camera surface until the user press <Esc> key. It's a useful tool to focus the telescope.

Process performs image processing and mathematical operations using one or more image operands. We mention here only one feature: data scaling. Most astronomical frames can be best fitted to human eye using Optimal non-linear method. Try it.

Display menu items can be used for zoom or squeeze images. One frame can fill the whole monitor window. Also a sequence of images can be shown as a movie.

ROI is an option that supports creating subregions of images defined by a rectangular or polygonal boundary, called "Region Of Interest". Though the whole image is read out, certain manipulation can be restricted to the subregion of interest.

Plot menu provides access to graphical representations of image pixel data or image pixel statistics. Intensities along a straight line can be plotted; histogram displays the pixel intensity distribution in the image, or active ROI. 3D view shows intensity in the form of a simulated 3D surface.

Please read PMIS User's Manual for more details in the Observatory's library.

BUGS: If there is small free space on disks, Windows might slow down, and operate erroneously.

PISZKESTETO/90cm SCHMIDT TELESCOPE

PC/Linux usage - Backing up data to DAT tape

Andras Holl

The CCD camera software runs under MS-Windows. To save your data to DAT tape, however, the PC has to be re-booted in Linux.

- RE-BOOTING TO LINUX

  From DOS, type: linux (Enter)
  and wait for the login prompt.

- LOGIN

  Regular Konkoly. Obs. staff observers should have an account.
  Ask the System Manager (A. Holl) for one.
  Guest observers should use a guest account. They should get the password from the system manager, of from the person responsible for the scheduling.

```
login: guestxxx
passwd: .........
```

  Do not tell the password to others!

- DOS DISKS

```
DOS drive C: -> /dos1
    drive D: -> /dos2or: removable cartridge pertition: -> /dos2)
```

  Users should mount /dos2 manually (e.g. mount /dos2).

- LINUX

```
Use the familiar UNIX commands.
- df        (to see disk filesystem usage)
- cd /dos1
```

```
- X-WINDOWS

  Optionally, you might start X-Windows with:   startx
  Exit from the windowing system with menu : (left mouse button) Exit Fvwm

  BUG: The pointer is off horizontally by about 1 cm. X usage is
  not recommended till the bug is not fixed.
```

```
- PMI FILE CONVERSION, FITS FILE COMPRESSION, BYTESWAP

  If you have saved your data in .pmi format (the native format of
  the CCD camera software), you might convert it to FITS from Linux.
  The pmiconv utility can do simple conversion (With a minimal FITS
  header), can put the DOS filename and file date info to FITS
  header records, or can prompt you for FITS keyword values.
  The csom utility can be used to compress the files, to FITS COMPRESS
  standard files. Compression saves space and speeds up writing the
  files to the tape. The same csom utility can be applied at the
  Konkoly Obs. workstations at Budapest to decompress the files.
  To use the files on the workstation, you need to swap the data bytes.
  For this, use the swap utility.


  - pmiconv [-q] [-d] [-s] [-v] [-h] <filenames>
    (for example: pmiconv -s -v *.pmi )
    the -h switch gives help


  The following are optional:

  - csom -c|d [-h] [-v] <filenames>
    (for example: csom -c -v *.fits )
    the -h switch gives help

  - bswap   [-v] [-h] <filename-list>
            -h help
            -v verbose
            -n filename case conversion
```

(for example: bswap -v pleiades.fits)

- DAT TAPE BACKUP

Use 60m or 90m DAT (DDS) cartridges.
You should keep a journal on your files backed up to the tape
(file number, size, identifier, date, backup method (tar)).

- Load tape, and wait till the light is blinking

```
- mt -f /dev/nst0 fsf <n>      (where <n> is a number of files to skip)
- tar cvf /dev/nst0 ./<directory>  (where <directory> is the path of your data)
  (If you are in the parent directory of your data.)
- mt -f /dev/nst0 rewind     (wait till the light is blinking)
- Unload the tape with pressing the button
```

- BUGS

  Sometimes the PC boots and does not recognize the SCSI DAT drive
  unit. (Watch the boot messages. Noo SCSI boot device is all right.)
  Solution: re-boot the PC.

- LOGOUT

exit (Enter)

NEVER TURN POWER OFF without halting Linux properly!

- HALT LINUX

Press <Ctrl> <Alt> <Del> to reboot in DOS,
then you might switch off the PC.

- READ BACK YOUR DATA

You can read back data in Budapest, on the Konkoly Obs.
workstations (or on the same Linux PC at Piszkesteto),

```
- tar tf <tapedevice>      (table of contents)
```

```
  - tar cvf <tapedevice>     (read back the files)


- CLEANUP

  Delete your data from the DOS area after backup.
  It is wise, however, to check your backup before erasing your data. You
  might talk to the next observer, and if there is enough room on
  the hard disk, you might check your backup in Budapest (or at your
  observatory), and send an all-right message when the data is safe.


- MORE HELP

  You can find more help (and the names of tape devices) in :

  -> A. Holl: Guide to the Konkoly Observatory computer system
     Occasional Technical Notes of the Konkoly Obs., No. 2.
     (URL: http://www.konkoly.hu/konkoly/computers/locguide.txt)

  -> A. Holl: Survival guide for the Konkoly Observatory Computer System
     Occasional Technical Notes of the Konkoly Obs., No. 4.
     (URL: http://www.konkoly.hu/konkoly/computers/survguide.txt)

  Ask Andras Holl (URL: http://www.konkoly.hu/staff/holl.html,
  e-mail: holl@konkoly.hu) if you need more help.

  Linux guides:

  -> On the Konkoly Obs. Bp. workstations: /doc/software/linux
  -> Linux User's Guide, Official Red Hat Ver. 4.1
  -> Info Magic (Slackware) LINUX Installation & getting started guide
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