FreeGo2

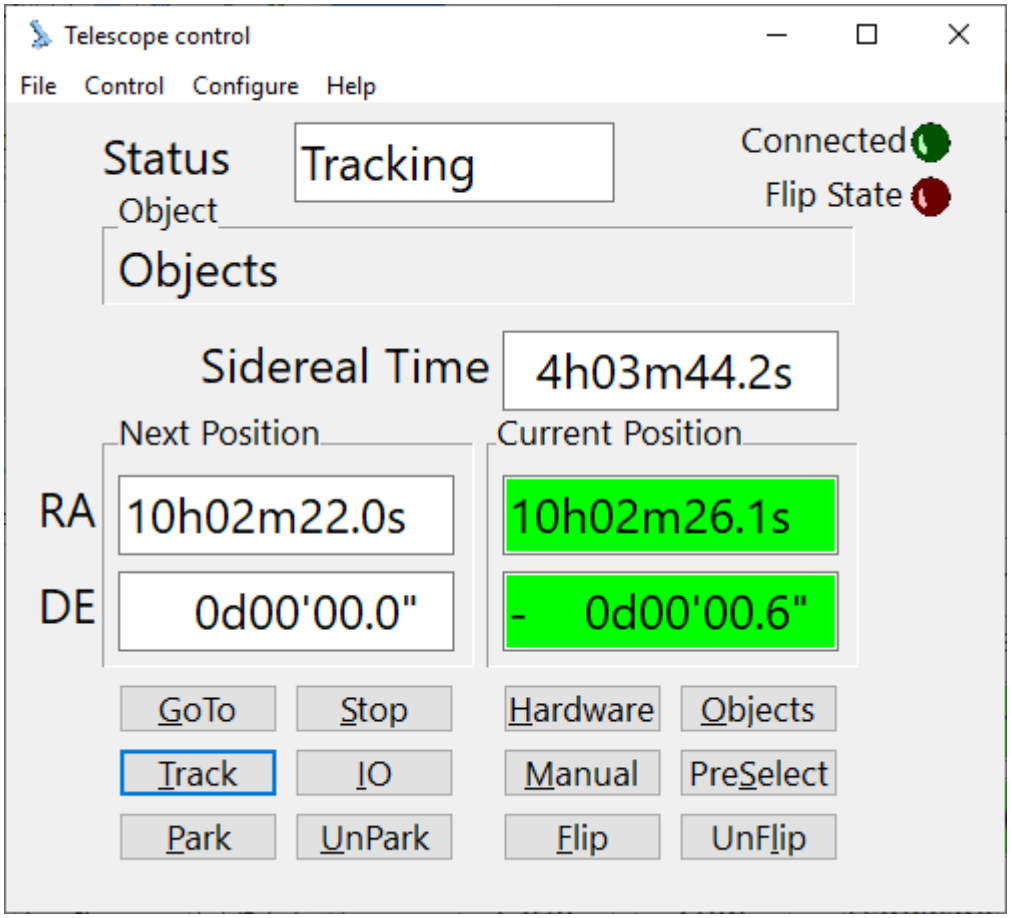
Telescope control program

Version 1.3

Table of Contents

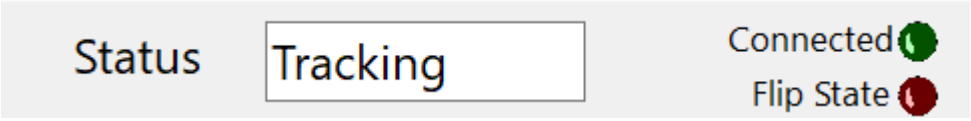
1 Main Window

Controling the telescope is done by the main window.

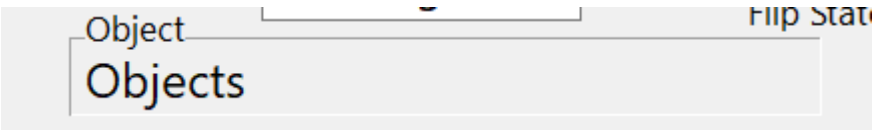


The Main view of the FreeGo2 controller software displays a number of basic functions.

1.1 Status

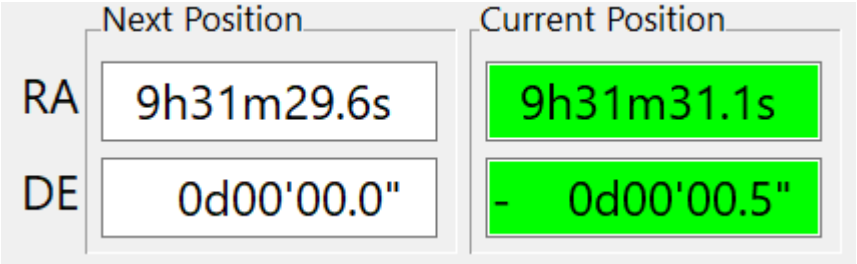


On top there is the State of the control. This can contain Stop, Tracking, Pointing, Moving, Park Move , Parked and if enabled Flip Move. On the right there is an indication light "connection" which indicates that the FreeGo2 controller software is connected over TCP/IP with other software. This can be stellarium, FreeGo2-remote display, ASCOM-driver, INDI-drive or other network connected applications.



The Object part displays warnings or other messages and objects selected with the Objects function or Preselect function.

1.2 Position



Central in the window is the current local sidereal time Next Position and Current Position.
The sidereal time is calculated from the system time and date, so is as accurate as the PC system clock. Next and Current Position are Given in Right Ascension (top value) and Declination (bottom value).

1.3 Control

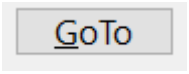
At the bottom there are a number of buttons to control the status of the telescope and object select functions.

Goto: will slew the telescope to the "Next Position" RA/Dec.
Stop: will abort any movement
Track: will start tracking the current RA/Dec position
IO Control: opens a window with configurable signals.
Park: move to preconfigured Park position In Parked position all functions are blocked except the UnPark button.
UnPark: Unblock Park and start tracking from this position
Hardware: This button opens a window with hardware information.
Objects: This button opens a window with a list of objects.
ManualManual: This button opens a window with movement buttons.
Preselect: This button opens a window with preselected objects

If meridial flip is enabled and auto flip is disabled then these buttons appear. These setting can be done in the Configure/Parameters window

Flip: This button activates flipped mode. It will enter "Flip Move" state until in flipped state.
UnFlip: This button returns the telescope in original state (again through "Flip Move" state.

1.3.1 Goto

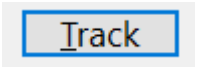


The Goto button initiates a slew to coordinates entered in the Next Position fields. The Next Position fields can be filled manualy but most of the time this wel be done by external programs like Stellarium or other programs with ASCOM or INDI.

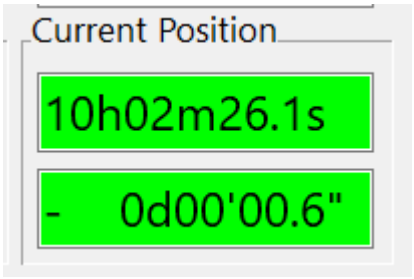
1.3.2 Stop

Stop button. Stops all actions in a controlled manner.

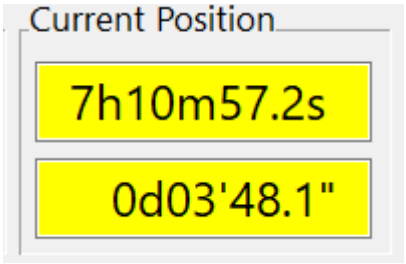
1.3.3 Track



Start Tracking current position. If current position is within configured range the background becomes green. If slewing to object state will change from pinting to tracking when within the configured range.

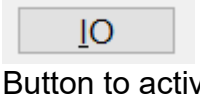


if Meridial flip is enabled the background turns yellow when past the meridian.



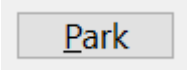
The colors of the background can be changed.

1.3.4 IO Control



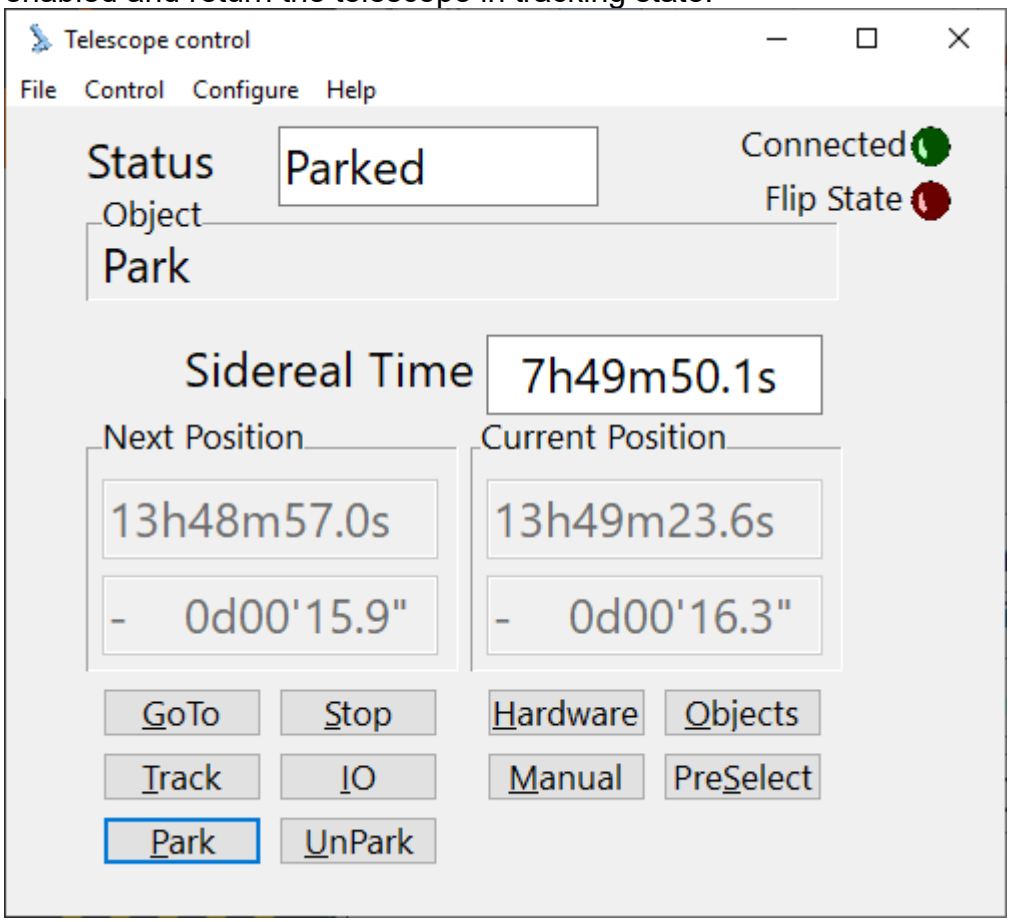
Button to activateIO Control Window To manipulate the extra IO ports on the FreeGo2 board.

1.3.5 Park



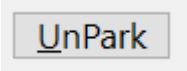
Start park function. The status will show "Park move" to indicate the telescope is moving towards the configured park position.

When the telescope reached the park position the background of "Next Position" and "Current Position" will be turned gray to indicate the system is locked. no buttons or commands will be executed. Only UnPark will be enabled and return the telescope in tracking state.



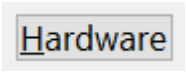
When the program was shutdown in parked state it will be in parked state when tunred on again.

1.3.6 UnPark



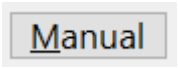
Unpark button Unlocks the system from Park. When the program was shutdown in parked state it will be in parked state when tunred on again.

1.3.7 Hardware



Hardware button activates the Hardware window which shows hardware information.

1.3.8 Manual



Manual button activates the Manual buttons window. With these button the telescope can be moved in any direction.

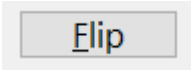
1.3.9 Objects

Objects button activates the Objects window where ojbects form a given file can be selected for got coorinates.

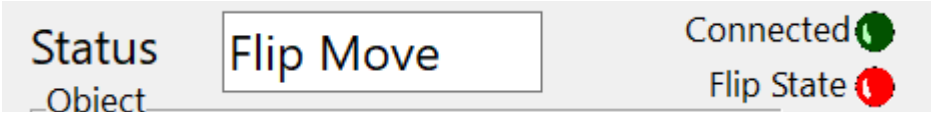
1.3.10 Preselect

Preselect button activates the Preselect window where a list of preselected objects can be manipulated and used for goto command.

1.3.11 Flip

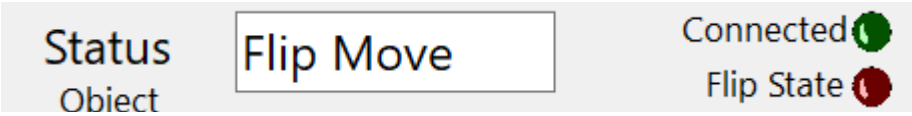


This button will be showed when meridian flip is enabled and auto flip is disabled.
When flip is activated the telescope will rotate the weight from east to west over 180 degrees and rotate the tube around to view the same coordinate. During this move state will show "Flip Move". The "flip state" indicates if telescope is in flipped state or not. Flip button will only work when the telescope is not in flipped mode and only of the telescope is near the meridian.



1.3.12 UnFlip

UnFlip returns the telescope to normal state. This button will only work in flipped state and only if the telescope is near the meridian. During this move state will show "Flip Move".

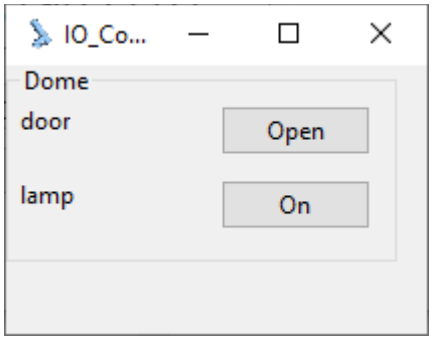


1.4 Menu

- File
  - Objects Open Object list from file. A previously selected file will be remembered.
  - Preselect Open a file with preselected objects. This list can be edited and saved.
- Exit Before leaving the program the settings are saved if the autosave parameter is set.

- Control This menu contains all functions of the buttons on the main window except for the object views which are under menu-item File
  - Manual Opens a window with buttons to move the telescope.
  - Hardware Opens a Window with hardware data
  - IO Control Opens window with configurable buttons for digital IO
  - Goto Starts moving the telescope to "Next position"
  - Track Keep telescope on current selestial position
  - Stop Stop all movement in a graceful way
  - Park Move telecope to a predefined position and block all commands except UnPark
  - UnPark Unblock the telescope from parked state.
  - Flip Flip telescope to the other side of peer
  - UnFlip Return telescope to normal peer side
- Configure
  - Parameters: Activate Parameter configuration window
  - Language: Select display language
  - Factory Defaults: Reset all settings of the PC software back to original state
  - Initialize: Align with fixed telescop position
  - Star Calibrate: Align with telescope with selected star
  - Calibrate Current: Align current position as Goto position
  - Set Park Position: Set current position as Park position
- Help
  - Help File: show this helpfile
  - About: Information window

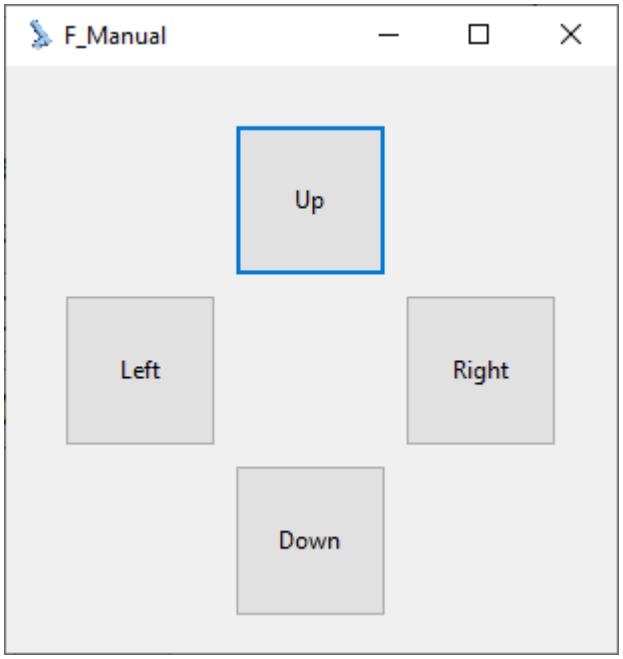
2 IO Control



2.1 IO control window

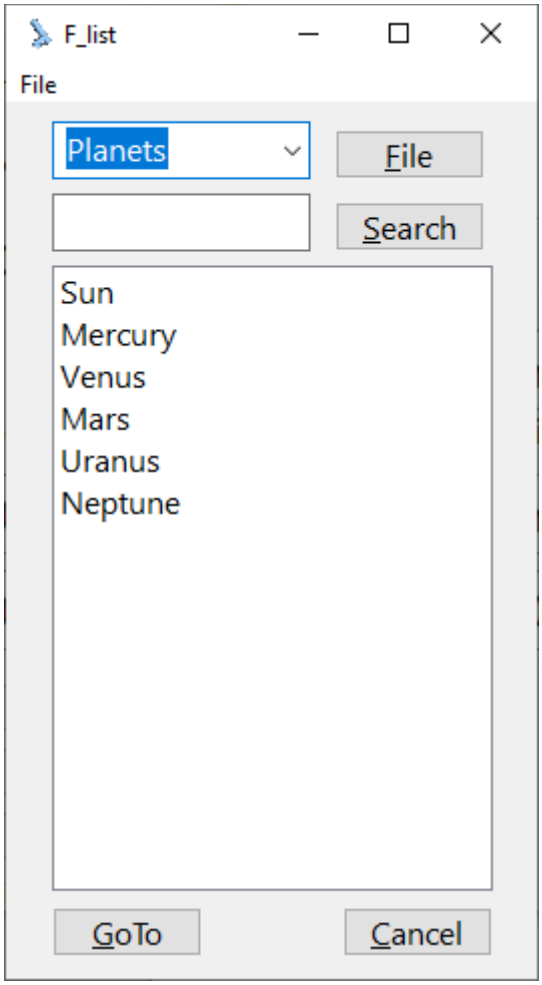
This window can contain buttons to control output signals on the IO port and display signals from the input signals from the IO port. Content of this window is controlled by a configuration file “ioconfig.txt”.

3 Manual



Manual moving or slewing the telescope can be done by hand. This Window gives you this possibility. Left is RA+ right is RA- up is
DE+ down is DE-
If Manual Auto is on then the movement speed will increase gradually to maximum as long as the button is held down.
If Manual Auto is off a button will appear in the middle of the window. Pressing this button will switch speeds between "Low", "Mid" and "High"

4 Object

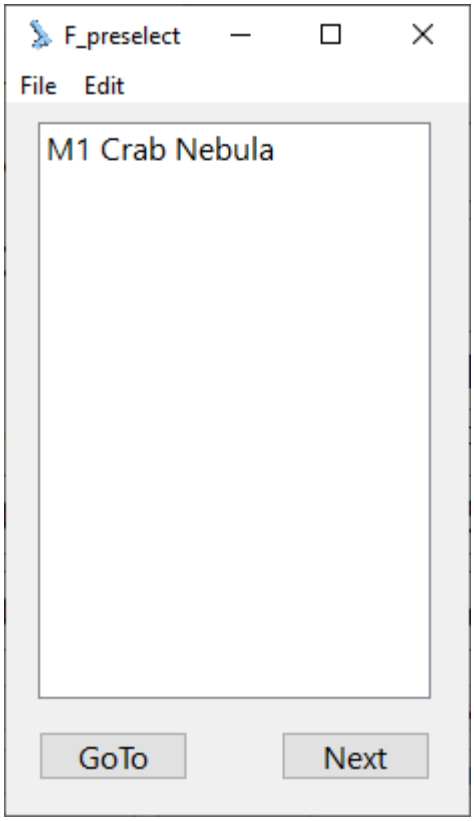


This windows gives the possibility to load a object file. Two files are included: A list of all Messier objects and NGC catalog. In this window it is possible to select a planet. Default it shows only the planets above the horizon at that particular time. The default viewed file is configured in the parameters windows under tab Objects.

- File
  - Open Open a file dialog to select an objects file (default extension .lst)

5 PreSelect

5.1 Preselect window



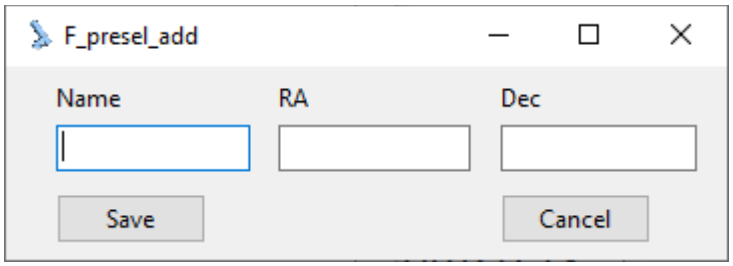
The PreSelect windows gives the possibility to create a list of objects, that later can be used to subsequently point to the selected objects. The list can be selected from known object list, used in the Object window, or manually or from Stellarium. Select an object from the list and press GoTo. To select the next object press Next. When the last object in the list is selected and Next is pressed th first object will be selected.

5.2 Menu

- File
  - Load — It is possible to load a previously created object list.
  - Save — A created object list can be saved to be used later or copied to an other computer.
  - Exit — Close the current list window.
- Edit
  - Add — With this function a object select window apears to select an object to add to the preselect list.
  - Remove — A previously created line in the objects list can be deleted
  - Upmove — To change the order of the object list this option moves the selected item one row up
  - Downmove — This option move the selected item one row down

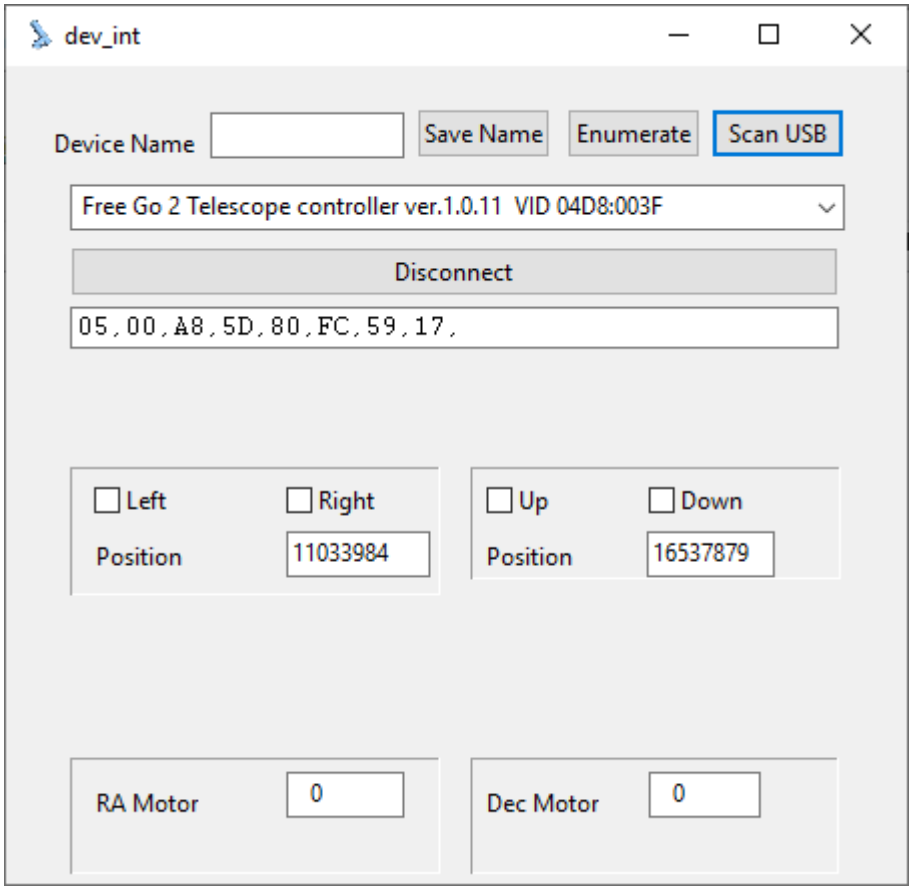
- ManualAdd This function opens a window to enter an object.

5.3 Manual Add



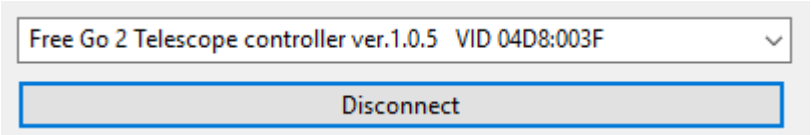
In this window Name, RA and Dec of an object can be entered which will be included in the list when pressing Save. When tis window is active it is possible to send coordinates of an object from a star-chart program by selecting an object and give a got command in the star-chart program. This sends the coordinates to the Freego2 program and enters them in the RA and DE field. A name can then be added and saved to the list.

6 Hardware



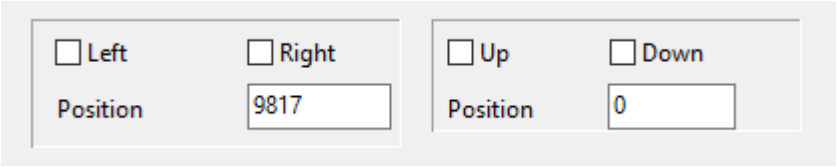
Hardware data presentation window.
Displays information about the USB connection and information to and from the FreeGo2-board.

Device Name: If you have more than one device connected you can give them each a different name. To differentiate between same type of boards they can be enumerated. The device version will be extended with a number



Normally there is only one FreeGo2-board connected to the PC. This board will be recognized by the software and connected. If there are more boards connected or if you want to use the simulator without unplugging the FreeGo2-board you can Disconnect, select an other device and connect again.

Control data as it is received from the board



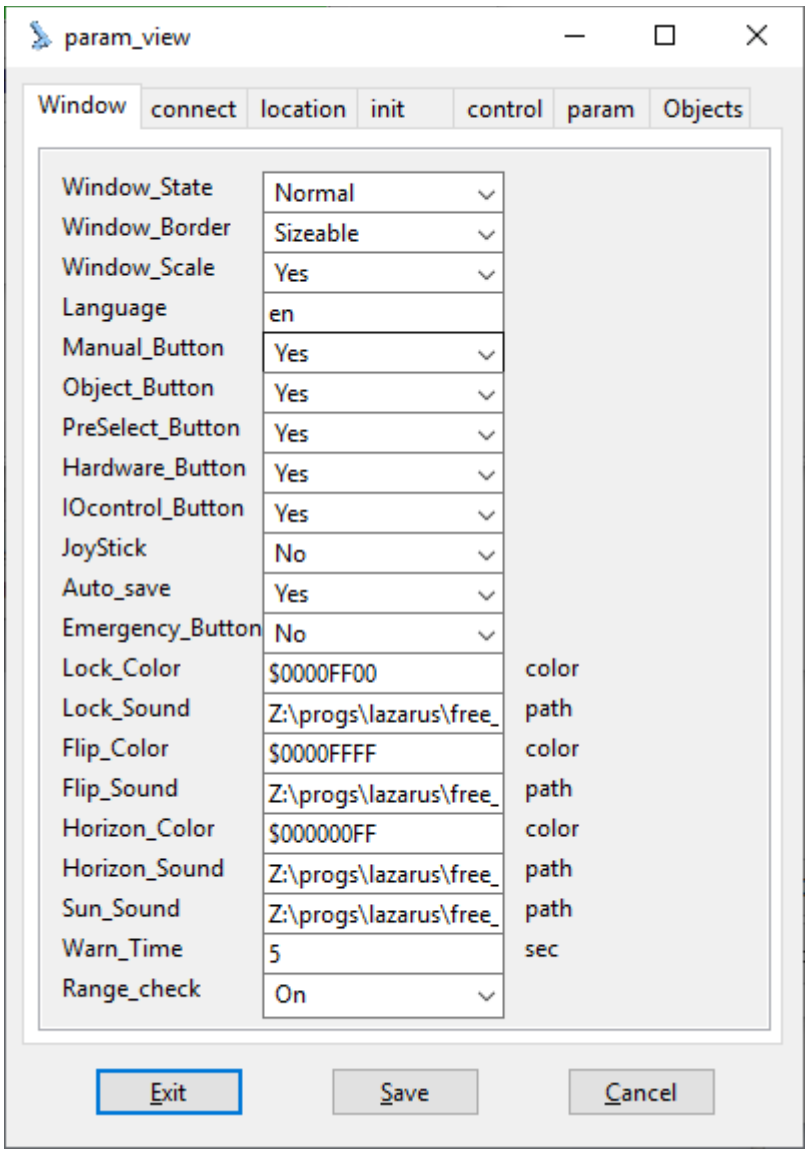
Information from horizontal (RA) en vertical (DE) position and ST4 or handbox movement indicators.

motor control data as it is transmitted to the board

7 Configure

7.1 Parameters

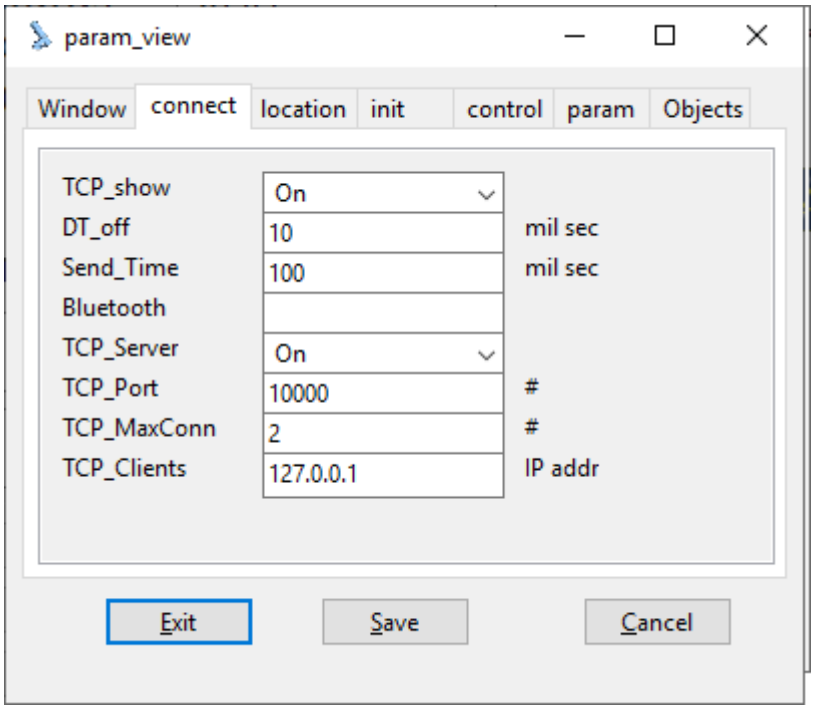
7.1.1 Window



Window state: selection posibility is the standard window state Normal,Minimized and Maximized at the start of the program.
Window Border: select None or Sizable
Window Scale: Select if main windows items are sizable or not.
Language: the value of the language file extension. Language file is in the same folder as the executable and is named free_goto.lng.xx, where xx is the language. Default the program has 2 languages en, nl, de and fr.
Button values: Manual, Object,PreSelect,Hardware,Ioconttol and Emergency. All these buttons can be made visible or not.
JoyStick: select movement buttons or a Joystick in the Manual window.

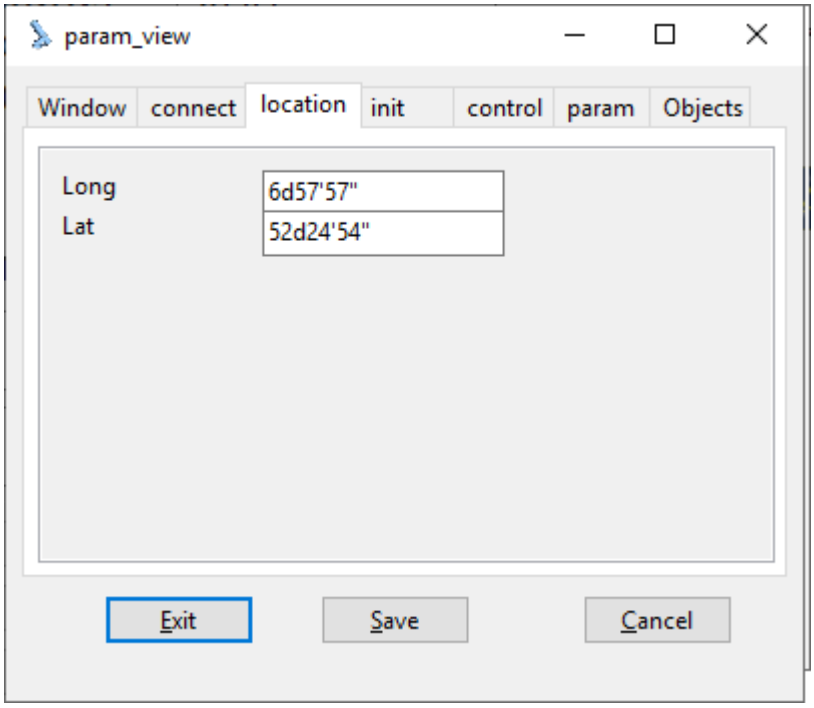
Auto Save: if selected the configuration settings will be saved on closing the program.
Lock Color
Lock Sound
Flip Color
Flp Sound
Horizon Color
Horizon Sound
Sun Sound
Warn Time
Range check

7.1.2 connect



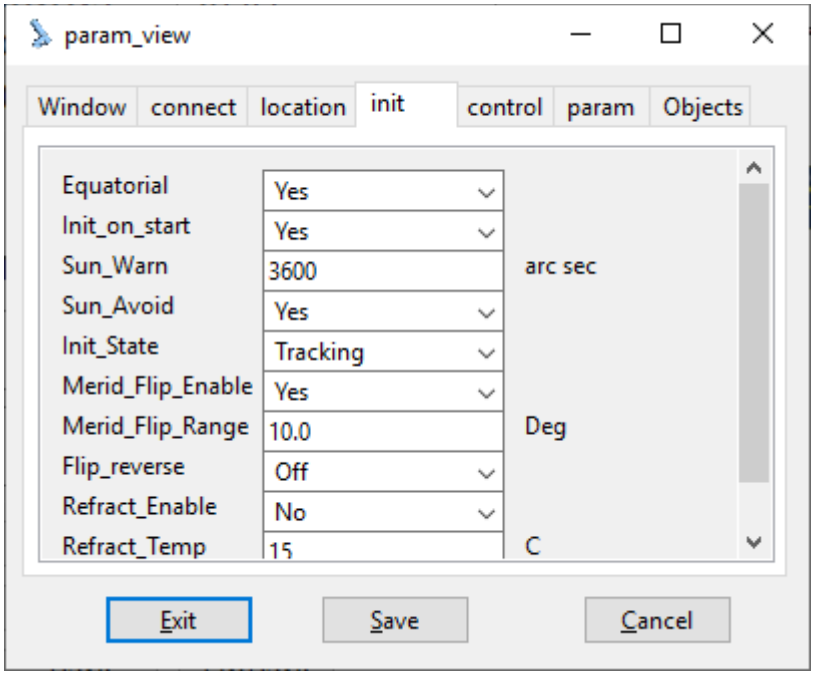
TCP show
DT_off
Send Time
Bluetooth
TCP Server
TCP Port
TCP MaxConn
TCP Clients

7.1.3 location



Long
Lat

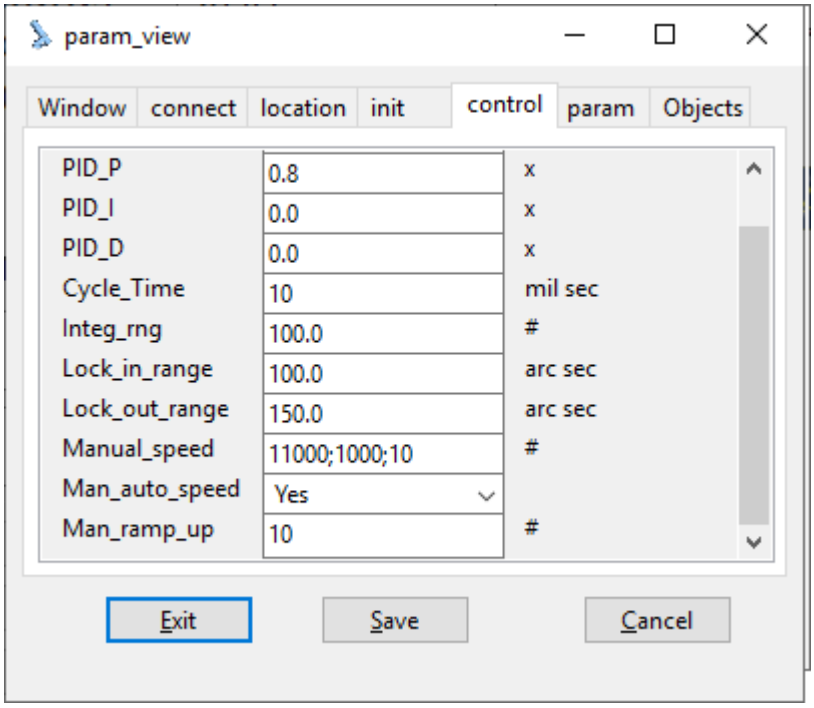
7.1.4 init



Equatorial
Init on start
Sun Warn

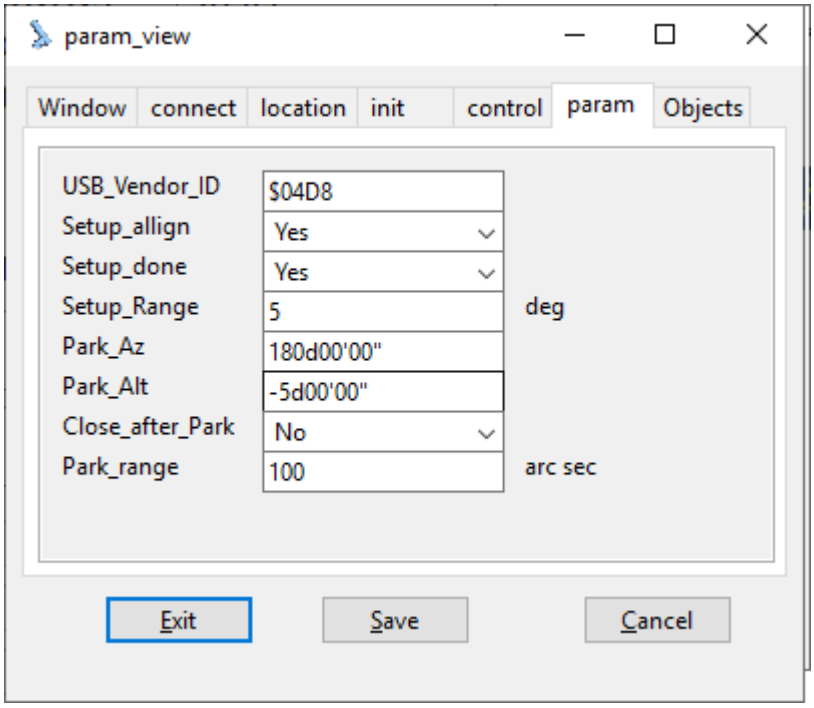
Sun Avoid
Init State
Merid Flip Enable
Merid Flip Range

7.1.5 control



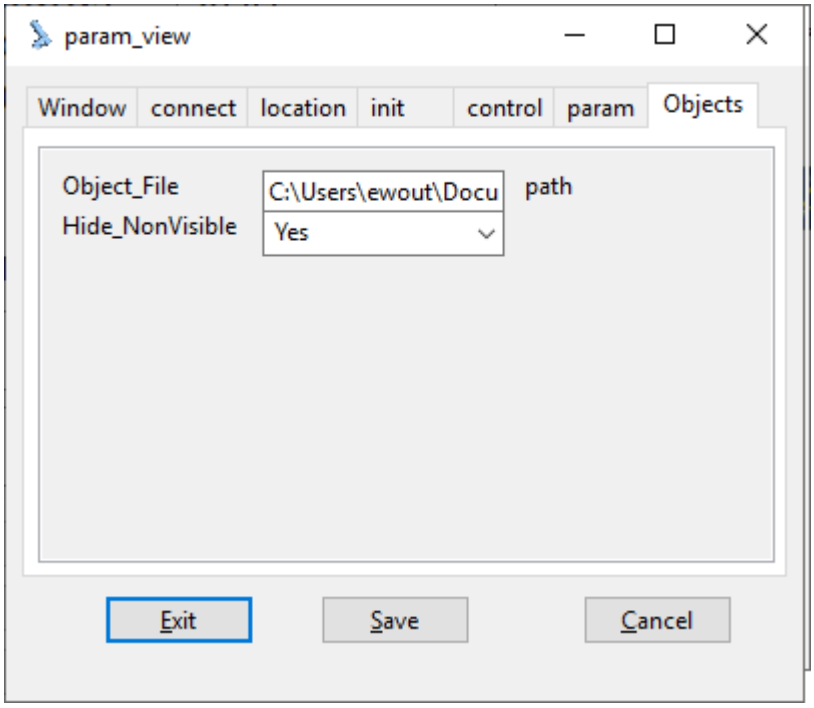
PID P
PID I
PID D
Cycle Time
Integ rng
Lock in range
Lock out range
Manual speed
Man auto speed
Man ramp up

7.1.6 param



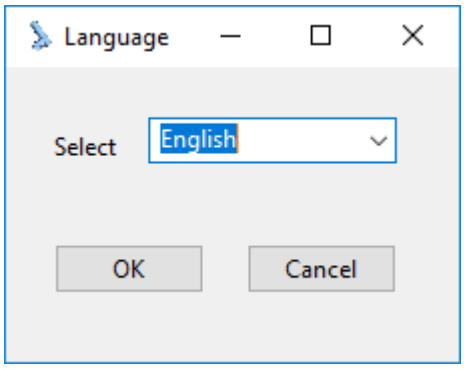
USB Vendor ID	USB Vendor ID number
Setup align	Should a aling be initiated at startup
Setup done	Indication that setup is done
Setup Range	movement range for direction indication
Park Az	Horizontal park position (in Azimuthal coaridates)
Park Alt	Vertical park position
Close after Park	Close the program if park position is reached
Park range	Approach range value for parked detection

7.1.7 Objects



Object File
Hide NonVisible

7.2 Language



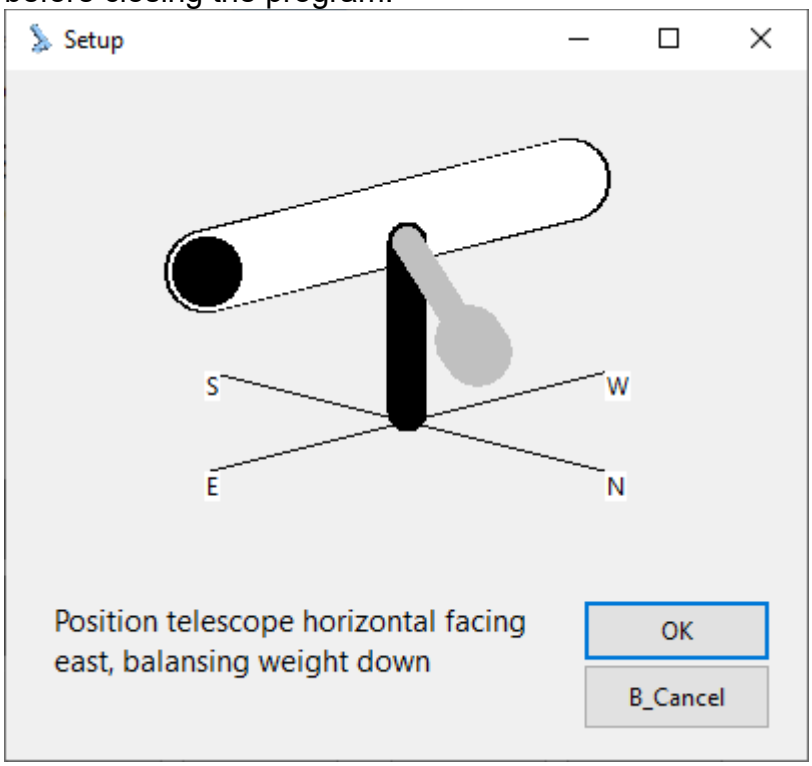
7.3 Factory Defaults

This function resets all settings of the Freego2 PC software. The settings are as the program started for the first time.

This does not change any settings on the FreeGo2-board

7.4 Initialize

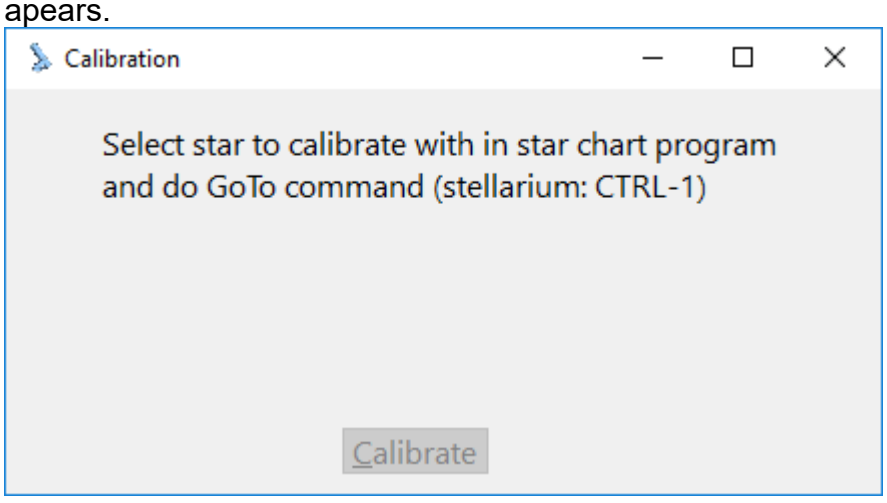
If the telescope is configured with incremental encoders this window will popup every time you start the program unless you parked the telescope before closing the program.



When Ok is pressed the program assumes the telescop is facing eat and aligns with the current RA/DE coordinates

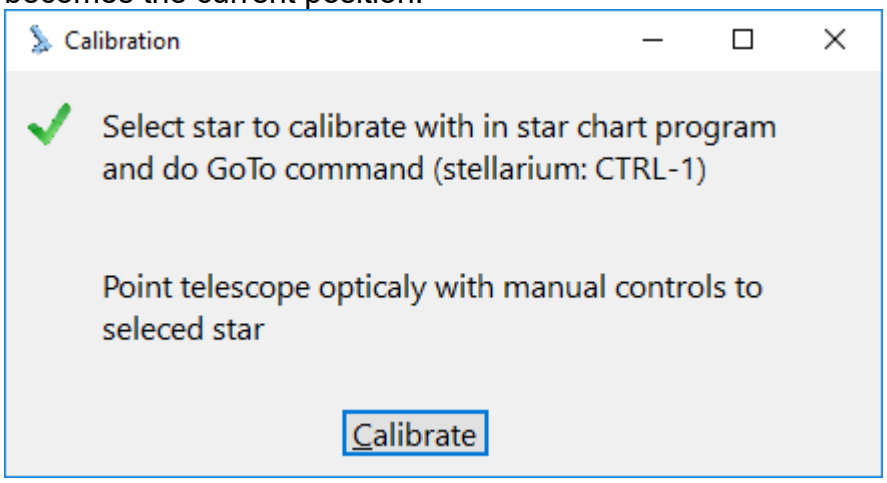
7.5 Star Calibrate

Star calibrate is a one star alignment procedure. When started a window apears.



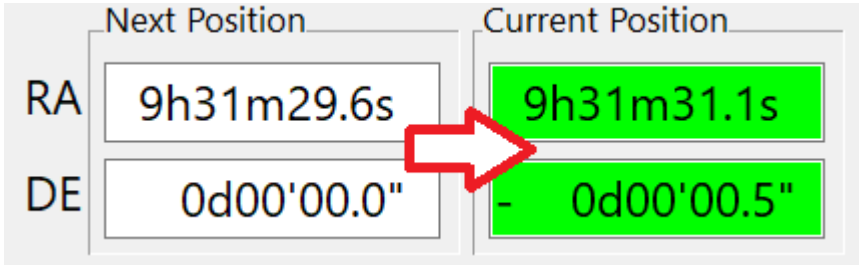
Select a star you have in your telescope with your star chart program (e.g. Stellarium) and give the goto command in your star chart program. The freego2 program locks these coordinates in the Next position fields but does

not automaticaly moves to the given coordinates (as a normal goto would do). Now move the telescope with manual buttons so it views the selected star in the center of your eye-piece and clock "Calibrate" so the Next position becomes the current position.



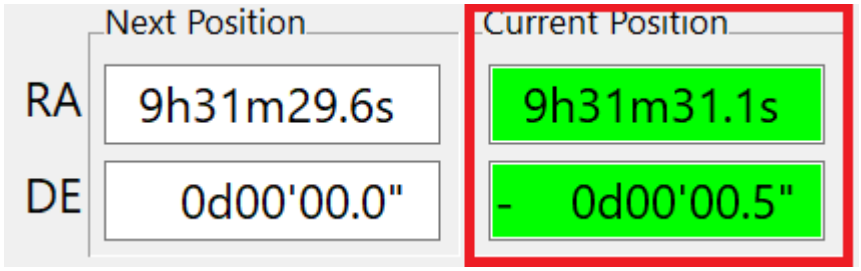
This procdure can be done in the reverse order. So first move the telescope to a star, then do Star Calibrate, select the star in starchart program give goto command (in starchart program) and press Calibrate button (the selected star from starchart program is already in telescope view center)

7.6 Calibrate Current



This Command assumes that the "Next Position" is the current position. This way a quick calibration is possible by a "GOTO' command to an object, put the object in the center of the eye-piece and click "Calobrate current".

7.7 Set Park Position



The set park position takes the current RA/DE position of the telescope and converts this to Az/Alt coordinates and stores these values. This way the park position is relative to the mount (earth) and not celestial coordinates.