Pulsar v2.59

08. Jan. 2006.

Help for the Win software (Pulsar Commander) and Hand Controller Menu

Safety

The unit is protected against reverse polarity, short circuit of the motor cables and overvoltage. The power cable is fused at 6,3Amp (slow). Removing the motor cables during use will not damage the circuits. If you feel vibration at the DEC motor in standstill, your power supply is noisy. The unit runs from 10 - 24V DC (max recommended value). There is a low voltage warning below 10V (@ on display+beep). Do NOT remove or plug in the PEC cable when the unit is on! If you have a single motor cable version, plug the cable ONLY into the DEC connector of the PULSAR. Units from 2006 have a single motor connector that includes the PEC cable.

General

Pulsar is a universal drive controller that can be user programmed for a wide range of mounts and (bipolar) stepper motors. It uses ONLY the motors to keep the position accurate at all times. You do not need encoders. The unit is LX200 and ASCOM compatible, so you can use it with your favourite Planetarium Program (Carte du Ciel, Guide, Desktop Universe,The Sky, etc).

After setup you must do a one star reference procedure. If you have an observatory the battery powered internal memory will save your coordinates in Alt/Az and you will not need to have a reference next time (see Home position and Clock adjustment).To take full advantage of the services, you will have to enter correct UT (once) and your geographical Lat/Long (after each upgrade)

Many functions are available directly via the hand controller keyboard, so that you can quickly manage routine operations like rate and speed select, recalibrate after GoTo, etc. However, the unit can be PC driven with no hand controller at all. Dedicated software is available (Pulsar Commander, available as free download at the pulsar site).

A unique feature is the real time refraction correction that provides better tracking and more precise GoTo at low elevations. Another interesting feature is the power management software that ensures smooth operation, high torque but very small power loss at the motors, so that they do not heat up and the current draw is low.

A reliable PEC function is provided with the optional worm encoder. Your PEC data will be saved and next time you switch the unit on, activated automatically. Even if you have no encoder there is a possibility to keep the valuable PEC data after shutdown (see synchronize).

There is a range of options like GPS connection (time and coordinates), internal 12V/24V transverter.

Quickstart

Hand Controller Menu navigation

Use the keypad to reach the menus. The North and South push of the Joystick navigates the menu up and down, the West push is Enter, the East is Esc. The button CE also has the Esc function. Icons give a clue to the menus. The controller has a multi level menu structure but most important functions are directly accessed by pressing a button.

Displayed information

The 2x16 character LCD shows Right Ascension (hh,mm,ss and decimals) and Declination (dd,mm,ss). Please note that the last digit may change abruptly due to rounding errors!
R/r shows the status of the joystick swap mode in RA. Upper case is the default.
Rp pole crossed (12h added to the RA value)
D/d shows the status of the joystick swap mode in DEC. Upper case is the default.
p=PEC ON
r=refraction correction ON
e/w shows which side of the Meridian the tube is.
S=Stopped (autostop function, select Sidereal rate to exit!)
@=Low voltage
! = signal from PEC encoder received.
If you press the side button (maplight) the RA worm position counter value appears at top left and the effect of refraction is removed from the values of the coordinates (for information only, values are not actually changed)

IMPORTANT NOTE

Before first use and after software upgrade you must check and enter correct date and time (in UT) and your geographical Lat/Long in decimal format. This is necessary for the correct operation of the driver.

Initializing

Initializing - this is the first step of use. It aligns the telescope with the equatorial coordinate system. Pulsar uses a one star alignment. You must do it every time you set the telescope up in a new position. Polar align the mount first! For permanent setup it is enough to do it once (if you shut down with GoTo Home).

If you have a G40 or G41 mount and live in Europe you can go thru these 6 steps and use the controller (basic functions only). Otherwise please read the complete section below!

1.) Connect the power cable, hand controller and telescope (the order is irrelevant). The PC can also be connected via the serial cable. Switch the unit on! (Note: no connection is possible while the Pulsar is searching for the GPS and this will take cca 20sec after switch-on).
2.) Press button 3 then the joystick to the right for 5-10 seconds – the mount should slew to the west. If not, press button 6, then joystick up, right, 3times down, right, down, right, CE button twice (you have changed the RA motor rotation)
3.) Press the joystick up for 5 seconds! Does the declination increase on the display? If not, press button 4 (D on the display appears in upper case now).
4.) Press the joystick up for 5-10 seconds! Does the telescope move to the North? If not, long press (3sec) button 4 (you have changed the DEC motor rotation)!
5.) Press the top right button, then the joystick up, right, and check the date and time (UT !!)! If incorrect, joystick left, up, right and set the date and time with the number buttons! When ready press the joystick to te right, finally to the left to exit!
6.) Aim the telescope at a known bright star! Press the top right button, then the joystick 3x to the right and browse (joystick up/down) the star database! When you have the correct star on the display press the joystick to te right! Answer on which side of the meridian the tube is (not the star) – to change E/W press the joystick up or down! To finish press the joystick to the right! Now you are ready to use the internal database or a planetarium program to make a GoTo.

ATTENTION!!!

If you want to use Swap tube and the Autostop global functions you MUST initialize using the Hand Controller OR the virtual Hand Controller (PC) OR the Pulsar Commander Init menu (PC)! Using a planetarium software is NOT sufficient.

Please always initialize the mount in the Southern half of ther sky (from E to W)! This is necessary for the correct evaluation of the autostop limits.

Note: you can initialize using an LX200 compatible planetarium program but in this case the controller will miss the Meridian position info. This will lead to incorrect Swap tube and Autostop operation.

Using the Intelligent Features

The features covered in this paragraph are: Home position, Autostop Global, Swap tube, Pole crossing.

Home position

Home position is a parking position where the telescope/mount is left when out of use. When the unit is switched ON it is ready for use without initializing. It is a necessity in an observatory but useful in the field too.

To program the home position:
1 Initialize (on a star in the Southern half of the sky) if not yet done
2 Slew the mount to the desired parking position (the tube must point in the Southern sky and at least a few degrees above the horizon)
3 Enter the Setup/User Parameters/Home position menu and save the position

When you finish the observing session press the Home button for 3 sec. and the mount goes to its parking position, then stops the motors. If you have enabled refraction correction there will be a small motion after the motors have stopped - this is the compensation for refraction.
Now you can switch power OFF.
To start a new session simply switch power ON and go! To enhance positioning accuracy you can fine tune the internal clock (see the Hand Controller menu overview).

Note: please avoid a precisely N-S position of the DEC axis as home position! This may lead to false E/W information at startup. If you have programmed the autostop limits, the home position must be within the limits.

Swap tube (Meridian flip)

This command takes the tube from one side of the mount to another. Swap tube is activated by pressing the bottom left button for 3 sec. This function works only if the tube is already approaching the mount head (in other words the tube and the object are on the same side of the Meridian). In any other case the

command is not accepted (for safety reasons). After the flip is completed the telescope points to the same position as before.

To have an accurate Swap tube it is important to check the orthogonality (at 90 degree) of the DEC and tube optical axis (see the G-41 manual for details). A precise polar alignment is a must.

If the DEC axis starts turning the tube when the RA turning starts the tube might hit the mount. To avoid this there is a programmable delay for the DEC motion. This is programmed in the Swap tube menu.

Pole Crossing

Reaching the Northern sky may be very difficult with long tubes if you must rotate nearly 180 degree in RA. Instead, crossing over the Pole provides simple access. When you give a GoTo command the software optimises the route and decides if it is more economic to approach the target by crossing the Pole or rotating the Hour axis and staying on the same side of the Pole. You can enable this feature in the Pole Crossing menu. The diagram below helps visualizing this feature. If you disable pole crossing some sky positions will not be accessible, depending on the autostop limits.
Pole crossing is set in the Setup/User Parameters/Pole crossing menu.

If you need to use Pole Crossing the Autostop limits must be set so that at either side (E,W) of the mount turning the tube over to North is possible! Otherwise a Pole Cross command near one of the Autostop limits may result in a crash.

Autostop Global

German equatorial mounts do not provide free access to all sky positions because the telescope can hit the pier/mount (or the mount hits itself) as it moves away from the Meridian.
With the Autostop global feature you can teach the controller the limits on both sides of the mount and it will respect these limits during Goto commands. You will be able to slew across the limits manually.
With the scope pointing at 0deg Declination in most cases a 360 deg rotation in RA is possible. However, above a certain DEC limit there is the danger of a crash.
To program the limits, do the following:
1 initialize (e.g. on the Eastern side) as described above

2 slew to the desired Eastern stop position (e.g.: 1 hours East of the Meridian and at +20 deg declination) The Gemini Product Video helps visualizing these stop positions.
4 enter the Setup/User Parameters/Autostop Global menu and save the DEC limit and RA limit
5 press the bottom left button for 3s to swap the tube (if a manual swap is made the driver must be initialized again)
6 slew to the desired Western stop position (e.g.: 1h30m West of the Meridian, +22 deg declination)
7 repeat step 4 and activate the Autostop function (Yes)
8 enter the Pole crossing menu and activate it (Yes)

Now if you make a Goto that is over any of the autostop limits, the mount crosses the pole first, then makes the Goto. If you leave the mount tracking, it will stop at the Western limit. Coordinates are not lost but updated when the Sidereal rate is selected.

The Autostop Diagram shows the forbidden (red) zone for the DEC head of the mount. The red arrow indicates the programmed Western RA limit. For the Eastern tube position the diagram is approx. symmetrical to the Meridian.

The No Go area North of the red limits is reached by crossing the Pole.
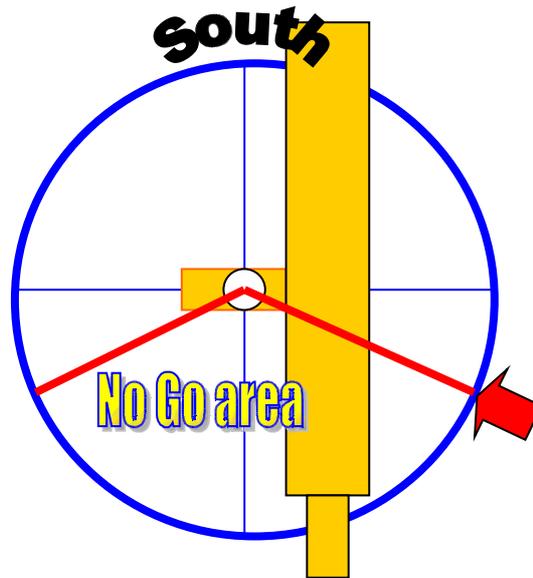
Using your GPS

The Pulsar controller accepts serially connected GPS units using the (4800 baud) NMEA protocoll. Pulsar will ask for the UT and geographical coordinates after it is turned on. This feature allows for the trouble free use of the intelligent features when you are travelling to dark sky locations.

1. Make sure that you have selected NMEA 4800 baud as the communication protocol (Setup/Interface menu on the GPS)!
2. Let he GPS collect the navigation signal, connect it to the Pulsar serial port (with the adapter)!
3. Turn the Pulsar on! It will acknowledge GPS data a few seconds after power up. Now you can remove the cable and use the driver.

You will need a cross cable (this swaps transmit/recieve lines and is available from Gemini or DIY) to connect your GPS to the Pulsar with the serial cable avilable from the GPS manufacturer.

Remote Operation

The German Equatorial mount is not the best choice for a remotely operated telescope but after programming the autostop limits safe operation and access to all sky positions is possible with Pulsar. The only drawback - compared to fork mounts - is the longer GoTo time in some cases and the reduced pointing accuracy that is the result of auxiliary motions.

It is recommended to use reduced GoTo speeds (e.g.:RA6000, DEC7000) and **lightly locked** slip clutches in remote mode. If refraction correction is used, the correction will be executed within 10 sec of the last GoTo. If you start an exposure without a delay the image might be trailed.

Generally speaking, to automate an observatory you will need to have PC control of the following:

Dome/roof opening and closing and possibly rotating
Power On/Off for the driver (Pulsar)
Focusser
Tube dustcap opening/closing

An independent (e.g.: laser beam attached to the tube) home position sensor will add extra security in an emergency.
A UPS is necessary to prevent unwanted system shutdown.
A webcam looking at the telescope is highly recommended.

Astrophotography

Recommended settings
For guided astrophotography set a guide speed of 2-5, depending on the pixel resolution! (2 for 1"/pixel) Your system is well tuned if the residual guiding errors after each correction do not exceed 0.1 - 0.3 pixel. The smallest accepted correction time is 0,2sec.

The Stop Current (Setup/Mount parameters/Stop current) should be close to the Tracking Current (e.g.:750mA – 950mA). Disable refraction correction!

Guiding hints
A pixel resolution smaller than 1"/pixel will not result (under normal sky conditions) in more image detail but more trouble and longer exposures only. It is strongly recommended NOT to go below the actual seeing conditions with the image scale. Alternatively you should set the low threshold for guiding at a higher value during poor seeing conditions. The reason is that seeing changes star positions faster than guiding, so frequent guiding will increase blurring rather than decreasing it. Seeing should be evaluated with the actual imaging instrument as it will vary with aperture (changes significantly above cca. 15cm due to the size of air cells).

It is recommended to disable DEC guiding in one direction to prevent oscillations due to (poor) seeing effects. There are several solutions for this. One

is a switch in the autoguider cable, another is a software switch (like in Astroart) that allows cancelling one of the DEC corrections. Seeing oscillations can be corrected with an AO device only.

For unguided photography program the PEC, use Refraction Correction and set the Stop Current at a value within 10% of the Tracking Current or the same. PEC will be active after recieving the first encoder signal only. This means that there may be about 3 minutes before it will start working after a GoTo.
To get the highest possible tracking precision, programming the PEC at the actual sky position is recommended.
Before using an autoguider cable make sure that it has the correct pinout and orientation! An alternative to cable guiding is the LX200 connection.

PC Menu
Ver 2.13
The Pulsar must be connected to the PC and the appropriate COM port opened before the program will function.

Init

Time: shows the time base of the PC or the Driver.
Com port: select the port used and connect!
Object: lets you select catalogue objects for initializing.
Coordinates: enter coordinates for initializing here.
At the end click OK to refresh the coordinates and then select the correct meridian information!

The area at bottom right serves for catalogue data programming. Pull down the catalogue to be programmed, load the csv file and click Send catalogue. A message "sended" will appear when programming is finished.

GoTo

Please note: copy all csv extension catalogue data files into the operating directory of the Pulsar Commander to reach them from the Commander!

At the top you can scroll the databases or select one and enter the number directly.
You can enter coordinates as the target of a GoTo command.
At left you can toggle options like swap tube or pole crossing.
Recalibrate lets you refresh the coordinates after the errors of a GoTo pointing are corrected by slewing the object in the center of the field of view.

To interrupt the GoTo command, click STOP! You can command the telescope to move to the Home position by clicking at the appropriate box on the status bar.

PEC

You can Load , edit and Save the PEC data table. The encoder signal position is also indicated. This information allows for fine tunig the PEC data by comparing it to a CCD PE graph.

Hand Controller PEC menu

During the learn period the display shows the corrections you have made and the worm counter position. You can check the counter position at any time during normal tracking by pressing the lamp button at the side of the hand unit. A value different from Zero in RA indicates a residual tracking error.

The learning period is 1 worm rotation. There is a 10 sec waiting period before learning starts (beep) and a double beep at the end.

If you are using the optional PEC encoder, PEC data will not be lost when you turn the unit off. It will be reactivated after the first encoder input.

Hints for programming PEC

Choose a night with absolutely no wind and good seeing!
Use a crosshair eyepiece with at least 500x magnification!
Position the telescope around 0 deg. Declination and near the Meridian (PE is the largest here, but drift due to refraction is small)!
Polar align precisely, make a reference and enable refraction correction!
Set the Guide speed to match your magnification (e.g.: 500x - 3)!
The PEC learn algorithm accepts input from the serial port (LX200), the autoguider connector and naturally the joystick. You can use Pempro to train the PEC.

The long term accuracy of the PEC system is based on signals (one at each worm cycle) from an encoder. An exclamation mark (!) acknowledges the signal. If there is no exclamation mark ont he display when the magnet passes the encoder (installed on Gemini mounts), there is a contact problem. Move the plugs around a little! DO NOT UNPLUG THE ENCODER DURING OPERATON! This will reset the driver unit (but not do any harm) on mounts with separate PEC cable.

Setup

The PEC correction values in the table can be edited in a pull down window manner. Click Refresh to read values from the driver and Save to save your work.

Upgrade

This option is in fact part of the Init menu. You can selcect the Upgrade mode, browse the file to be programmed into the flash memory and program.

Note: a power failure or communication error during the upgrade process will lead to severe problems. (a so called forced upgrade will have to be done)

Hand controller

This is an emulation of the hand controller with all the appropriate functions described in the following paragraphs.

Hand Controller Menu

In the tables below the left column contains menu names and short instructions for programming. The right column offers an explanation of the function. The expression "hotkey" refers to the appropriate keyboard buttons. The default values are in bold characters.

The first table contains the parameters of the mount. You find the data in the manual or consult the manufacturer! The default setting is G-40/41. The Microstep resolution is managed automatically.

Mount Parameter (hotkey 6)	RA	DEC
Reduction Total reduction of the drive system.	100 -**432** 15000	**432**
MainGear Reduction of the main gear, used for PEC purposes.	100 -**432** 15000	---
MotorRes step/rev resolution of the stepper motors.	100/**200**/400	100/**200**/400

Rotation L/R This defines the default rotation of the motors. Will depend on actual wiring of the motors. Set it so that tracking is correct.	Left/Right	On hotkey 4.
MountType	Germ/Fork (F disables swap tube and E/W of Meridian menu in Initialize)	
TrackCurr Tracking current (used up to 2x tracking speed)	**800** mA (600 is the recommended minimum)	
GoToCurr The current applied to motors in GoTo.	**1000** mA	
StopCurr The current applied to motors in standstill	**400** mA (Should not be much smaller than tracking curr. to avoid jump at start.)	
Motor Freq The chopper frequency of the driver.	180-**255**, higher value gives more silent operation	

The table below is an overview of all other (user dependent) hand controller menu functions.

Menus in red are ready after Initializing and correct parameter entry (Init, E/W, Lat/Long, Time) only.

Function	Description	
User Parameter **Setup** (hotkey 6 and down)	RA	DEC
Guiding speed	1-9 (9=sidereal)	
Center	10 (1 = 6x sidereal)	
Find	20	
Slew	50	
GoTo speed Can be set separately for RA and DEC.	Max 9999 (7deg/sec)	Max 9999 (7deg/sec)
Ramp All telescopes must accelerate and decelerate. Otherwise the mount will be damaged soon.	1-9 1=small acceleration	1-9 9=high acceleration
Backlash compensation	Not available here	Enter in min, sec of arc.
Swap tube delay	You can enter a delay (in seconds) for the DEC rotation to start later than the RA.	
Pole crossing On/Off	Enables pole crossing for GoTo commands. The mount will not rotate 180 deg in RA if you want to look at the Northern sky.	
Latitude-Longitude in decimals Your observing site's data. The optional GPS module updates it automatically. To be updated after Upgrade!	The longitude is negative to the East (0,-180) and positive to the west (0, 180)	

Autostop Global Using the hand controller find the DEC limit where the tube first hits the pier during RA rotation to the West! This is the **DEClimit** parameter.(Enter the menu, select DEClimit, Save!) Then slew West to the point where you want the tube to stop! This is the **RAlimit** parameter (Enter the menu, select Ralimit and Save!). Now make a swap tube or re-initialize on the other side and repeat the procedure on the Eastern side! Select ON to enable the function!	The mount will stop at the preset RA (saved as distance from the Meridian) limits if DEC is over the limit. Using the joystick, you can slew the mount to cross the limits. To **mobilize the mount** after Autostop, slew out of the limit first, then select **Sidereal** rate. Goto commands going over the limit will be disabled. You can make swap tube to get the green light (or enable the automatic swapping). **S** appears on display if stopped. Use a low speed for remote GoTo and do not overtighten the clutches for safety. **Use remote GoTo at your own risk!!!!**	
Autostop Local Select your object to be tracked first ! Then take the tube in RA to the West until the desired Stop position (where the tube would hit he pier)! Now enter the menu, select **RAlimit** and save the position! Go back to your object, reenter the menu and select ON and relax. The mount will switch into **Still rate** when it reaches the limit.	To **mobilize the mount** after Autostop, slew East first, then select Sidereal rate. This function is designed for sleepy astrophotographers. **S** appears on display if stopped.	
Home pos.save This is the sleeping position of the telescope in your observatory. Slew the scope to this position, enter the menu and save! Works only with valid geographical position and time.	There is an internal battery that keeps the clock running when the unit is switched off. Next time you switch it ON, you can skip Initialize.	
Active speed (only with hotkey 0) Selects the active speed for the pushbuttons.	Menu available also with hotkey 0, or select directly with hotkeys 2,3 (guide speed and progressive).	
Refraction **corr**ection (this is the real time King rate in both directions, plus correction for GoTo positioning)	On/Off **r** on display	On/Off **r** on display

Guest mode enter your password (four digit) and select ON. Only the joystick slew function is active now.	To exit, press Initialize (hotkey-), enter your password! If you forget your PIN: power Off/On.	
Set User rate 1,2,3 (hotkey 7 and up) This rate is superimposed on the tracking rate.	Min,sec,1/100s per minute of time	Deg, min, sec per minute of time
Rate select (hotkey 7)		
Sidereal (default)		
Lunar rate (sec/hr, "/hr)		
Solar rate (sec/hr, "/hr)		
Still e.g.: for terrestrial viewing.	Coordinates will be updated when you exit to Sidereal.	
User Defined **Rate 1,2,3**	Min, sec, 1/100 sec per minute of time	Deg, min, sec/ minute of time
Initialize (hotkey -)		
Select ref object Initializing on reference objects.	Use the databases here! Pulsar will ask for E/W meridian position.	
RA+DEC set	Enter coordinates of the reference object directly.	
Time+Date set	Enter the date and time (in UT)! First time use only.	
Time Date Sid	Check time here!	
GoTo (Hotkey GoTo)	Warning: positions below the horizon are not accessible!	
Select Catalogue Star, M,NGC,USER	You can write your own database in Excel.csv format (for any catalogue, not just user) See the example **star.csv** below!	
Swap tube (only with hotkey1, long press)	Enabled when the tube and the object (where the telescope points) are on the same side of the Meridian. If Autostop global limits are set and Swap tube is enabled, meridian flip will be **automatic** before GoTo (if necessary to avoid the autostop zone)	
GoTo RA DEC	Slews to coordinates.	
GoTo Alt Az	Slews to Alt-Az coordinates.	

GoTo Home (only with hotkey 5, long press) Programming: The mount must be in the desired home position. Enter the User Para menu, Home Pos/Save!	Takes the mount to the user programmed home position. If you turn the unit off this way, it will be ready for use when you switch it on - without initializing again.
PEC (hotkey 8)	
Pec On/Off For RA pec. **p** on diplay shows the status.	The PEC data is not lost after upgrade.
New PEC Wait for the beep to start corrections! Double beep indicates the end.	Starts the learning period. Guide speed is automatically selected, PEC is turned off. After saving the PEC data the correction is automatically turned on in RA.
Synchronize	Synchronizes the PEC data with an arbitrary mark on the worm (when there is no encoder)
System (hotkey 6 and up)	
U/Temp	Shows supply voltage and internal temperature of the driver unit.
Upgrade Takes the unit into the upgrade state. Use AVRprog or Pulsar Commander to program!	Software upgrade is possible in this state. **Note: once entered, you can exit ONLY after programming the Flash memory**.
Reset All Resets all system values.	Use only when there is a software problem.
Backlight	Sets illumination level of the LCD.
Clock adust (the entered value is not affected by upgrades)	You can correct clock frequency here to increase long term accuracy. Unit: **seconds/10 days** Example: you have measured the internal clock to be fast 46secs in 10 days. So you enter +46

Troubleshooting

1. The mount does not track.

Still rate selected (e.g.: auto stop function activated)
You connected the DEC cable to the RA motor. (two connector models only)

2. The mount tracks in the wrong direction.

RA motor rotation incorrect. See: Initialize!

3. Significant RA drift in tracking.

Clock error not corrected. See the system menu in the table above!
Incorrect rate selected (e.g.: Lunar, Solar, User, instead of Sidereal).
Incorrect mount/motor parameters. Check the setup menu!
Refraction correction disabled or incorrect (Initializing info incorrect).
Note: you can correct any residual drift with the user rate. This correction will be accurate for the actual sky position only.

4. GoTo command not executed.

The object is below the horizon.
Incorrect date/time or geographical position setting. See: Initialize.
The object is over the autostop limit and pole crossing is disabled.

5. "Knocking" of the DEC motor at start (affects guiding precision)

Stop current too low. Increase to match the tracking current (setup menu)!

6. "Knocking" of the RA motor during tracking.

Supply voltage too high (over 35V).
Tracking current too low/high. Adjust in Mount setup!
Power supply problem. (Switching mode power controllers are not recommended.)
Motor Frequency is set too high.

7. Mount goes the wrong way in DEC during GoTo or manual slew.

DEC motor rotation setup skipped or you crossed the meridian manually.
Joystick direction swapped accidentally (N/S button pressed).

8. Swap tube command is not accepted.

The actual scope position and the tube are not on the same side of the Meridian.
Setup information is incorrect (including E/W of Meridian).
Swap tube is disabled (see the menu).

9. PEC does not function

PEC turned off (no p on the display appears). Missing magnet in the RA coupling. Magnet inserted with the wrong side out (applicable only if the magnet has been removed). Faulty sensor or contact problem at the mount end. Broken cable. Contact problem inside the driver box.

10. Large GoTo error

Incorrect polar alignment. Database error (check the coordinates). OTA axis not at right angle (90 deg) to the DEC axis (see the G41 manual). Motor stalled during the goto (low supply voltage, small tracking current, too high goto speed.

11. Controller accidentally pushed to upgrade mode

Connect to a PC, start PulsarCommander and connect! After you get the message „Pulsar is in upgrade mode", click the Upgrade tab, then click „Exit upgrade mode"!

Key to the icons of the keyboard

1. Press briefly: swap E/W button setup, press for 3 sec: Swap tube
2   Select Guide speed
3   Select Progressive speed (one push of the joystick gives an offset of cca. 10")
4   Press briefly: Swap N/S button setup, press for 3 sec.: reverse DEC rotation
5   Goto Home position (press for 3 sec)
6   Setup
7   Select tracking rate
8   PEC menu
9   Press briefly: Recalibrate (after GoTo),
10 Select active speed
CE (clear entry or Escape) GoTo menu
-   (toggle +/- sign for coordinate entry) Initialize, Exit Guest mode (PIN needed)
Press any button to emergency stop a GoTo!
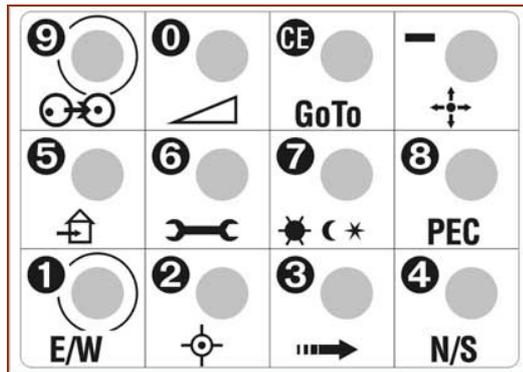
LX200 compatibility

The Pulsar controller accepts many commands from LX200 compatible software. To see the list please visit the Pulsar page at www.astronomy.hu/pulsar.htm Coordinates are handled in the full or compressed format, according to the request of the planetarium software.
Planetarium programs tested with Pulsar: Desktop Universe, Guide7, The Sky, Skymap Pro, Carte du Ciel.
 (note: The Sky does have port problems under W.Millennium. Disable Power Management!)

Autoguider port

Pulsar accepts Meade CCD type autoguider cables. Earlier SBIG cameras with Dsub connectors will need an adapter. Details are on the Pulsar homepage. The
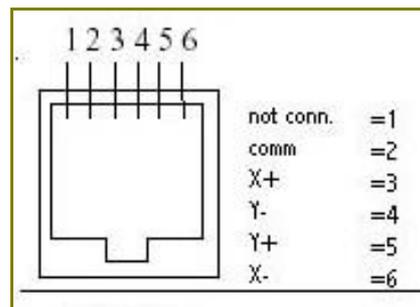

image below shows the Pulsar autoguider socket pinout. STV needs a reversed cable, STAR2000 a direct cable.

System update and catalogue data download

Control software upgrade

Connect the unit (power ON) to the serial port of the PC (cable supplied) and wait until "Searching GPS" is terminated!

0 Launch the Pulsar Commander and open the appropriate port,
1 Start the Upgrade mode,
2 Select the new software pulsar vxy.hex (Browse)
3 Click "Write",
4 When finished, click "Exit"
5 The unit restarts automatically

If you recieve an error message during reading, disregard it and exit!

User parameters (if different from the default) have to be reset after upgrade. Clock adjustment and PEC is NOT affected by the upgrade.

Catalogue data download (the catalogues are in Excel csv format)

0 Connect the unit (power ON) to the serial port of the PC
1 Start the program Pulsar Commander (Please download!)
2 Open the COM port you are using
3 Select the catalogue you want to program in the pull down window of the Init menu (you can overwrite the name here e.g.: USER1 to Planets)
4 Load the catalogue from its directory
5 Click "Send Catalogue"
6 Wait for the "Sent" message (may take several minutes for larger databases)

During catalogue download the tracking function is available.
A Star, Messier and NGC database is available now (as preloaded before shipping). The following data fields are defined: Star (500), Messier (500), User (500), User1 (2000)
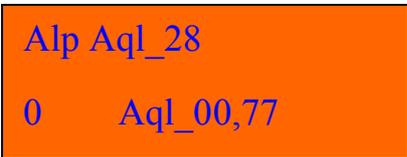NGC (9999). The numbers in parentheses are the capacity limits in entries.

Example for database structure

Excel file format: (csv extension, values must be separated by **;**)

Serial 9999	hh	mm	ss	deg	min	sec	Mag	Data 1 chr	Data 1 chr	Const 4chr	Name 10chr
28	19	50	47	8	52	6	0,77	0	0	Aql	Alp Aql
45	2	7	10	23	27	45	2	0	0	Ari	Alp Ari

Display (1st line from table above)

Alp Aql_28

0   Aql_00,77

You can write your own User Database (500 entry) and can edit all other databases.

Hardware options

The standard shipping package includes:

Driver unit
Hand Controller with 2m (or longer) cable
Power cord extension with banana plugs, alligator clips, cigar lighter pug, RCA plug (please specify)
Serial cable 2m

Options:

Longer cable for the Hand Controller (specify)
Longer Serial cable (specify)
PEC encoder and cable (standard with G-41 mount)
Autoguider cable (specify CCD)
GPS cable adapter

<center>GEMINI TELESCOPE DESIGN</center>