You have 4 choices for startup.

Quick Start - This selection will take you to menu's to select your "Mount Type", Enter your "Location", then "Time, Time Zone and Date" Then you will go to the "Main Screen" This also does a "Cold Start".

Cold Start - A cold start wipes out all stored modeling. You need to have your mount positioned at want is called CWD. This is with the counter weights down, and the Declination pointed towards Polaris in the Northern Hemisphere, and the Southern Cross in the Southern Hemisphere.

Warm Start - This is basically the same as a cold start, but does not wipe out any models build. It also remembers all your setting. You still must start with the mount pointed to CWD position as in a cold start. If you have models build, but have moved your Right Ascension axis or Declination axis, but not the location of the mount itself, then you can use this startup mode.

Warm Restart - This mode also remembers your modeling and all setting. You can only use this mode if, and only if you have not moved both the Right Ascension axis or Declination axis and also have not moved the mount in position.

If this is your first time operating the mount select the Quick Start option. All buttons do take you to the appropriate menu. There is also a menu that can select which default mode the Gemini-2 starts up in.

You will see this menu if you have "Ask if possible" selected as the default start up mode. That menu is under "Mount" then "Startup" in a later menu.

Interactive Hand-Controller Menus - click on green buttons to Navigate

This is the main menu where all other functions can be Navigated from:

The Top box has 2 messages lines that displays the current status in the top and the previous in the second line. This sometimes changes when other functions are being preformed also, such as GOTO's.

The four diamond buttons are movement buttons. The top and bottom button are for the Dec, and the left and right button are for RA. They will move the mount at the speed selected by the speed button on the lower left. The Speed button will take you through Slew, Move, Center and Guide speeds, and then back to Slew.

Now the direction buttons have two modes of operation. If you push down and slide you finger off the button the mount will keep moving in the direction of the button until you press it again. If you press and hold, and the let off without sliding your finger off, it works like a normal button.

Since the graphics screen is not multi-touch, if you use the finger slide off method, and touch the opposite button, the mount will speed up. The speeds are in the same order as the speed button.

The Menu button will take you to Main-Selection-Menu. The "GOTO" button will take you to the GOTO menu where you select a Catalog, The Solar System, Coordinate input, Do a bookmark, or Park the mount.

The buttons on the back of the hand controller work like the buttons do on the Gemini-1, and are multi-touch.

Need help aligning the mount?

Polar Align Assist

Assistance building a model?

Modeling

Tour a catalogue?

Catalog Tour

BACK

Before using this menu, I suggest that you set your safety limits.

We are going to select modeling from this screen. The Polar Align Assist has to be done before a model is built. It will help you get within about 1 to 2 degrees of the pole.

The catalog tour lets you tour catalog objects that are above the horizon.

Please select Modeling.

Some misconceptions about modeling. Modeling helps to provide better tracking: Nope this is wrong. Modeling only helps provide for better GO-TO's. The only thing that really helps accurate tracking is a excellent Polar alignment. If your polar alignment is dead on, and your time, time zone offset, latitude and longitude are dead on, then the G2 should provide accurate tracking, but of course other factors such as gear slop, mount imperfections, balance imperfections, and atmospheric refraction can cause tracking errors, you might not see perfect tracking.

you can also get to this screen from Menu--> Function

Custom Mount ●

GM8 ●

G-11 ●

HGM-200 ●

MI-250 ●

Titan25 ●

Titan50 ●

NEXT

This menu is where you select your mount type. The default is Titan25.

However Titan25 mounts are no longer being sold as new mounts. All new Titans are Titan 50.

You would select your mount type then hit next.

Catalog Object

Solar System

Coordinate Input

Bookmark

Park

Bright Star

BACK

This is the MAIN GOTO Menu.

You can go to the list of catalogs stored in the hand controller,

The Solar System selection screen,
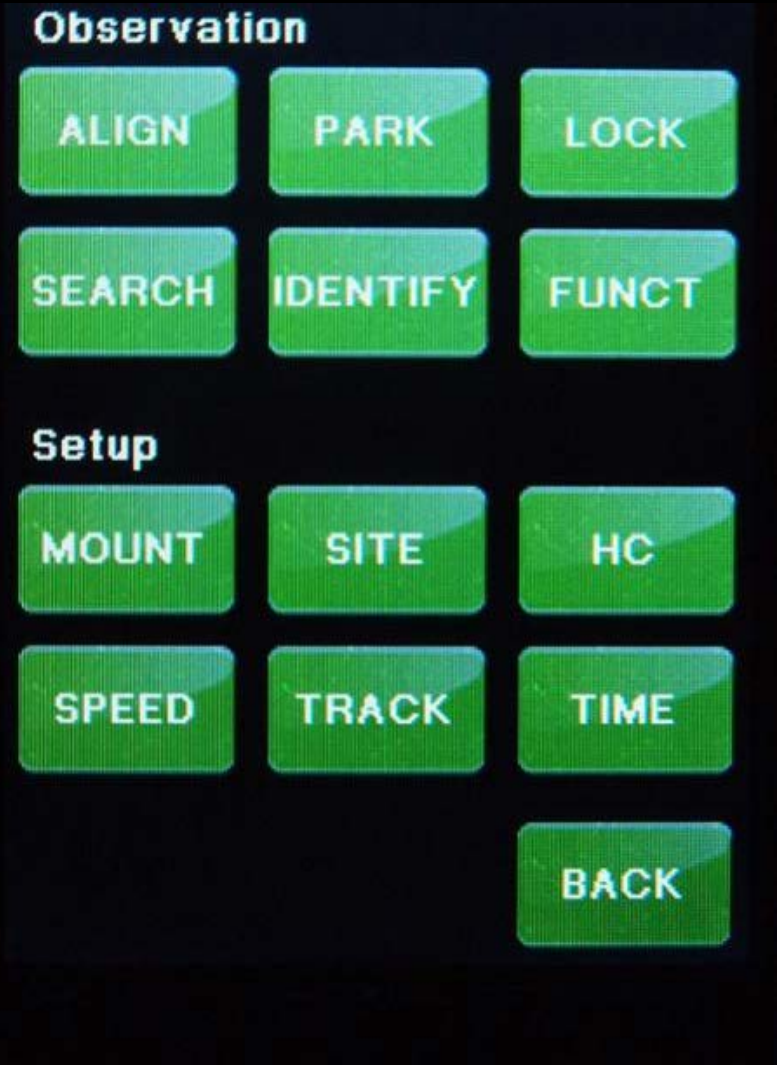
The coordinate Input screen,

The Bookmark screen,

and the Park mount screen from this menu.

There is also a Bright Star button that will take you directly to the BSL catalog.

Observation

ALIGN   **PARK**   **LOCK**

SEARCH   **IDENTIFY**   **FUNCT**

Setup

MOUNT   **SITE**   **HC**

SPEED   **TRACK**   **TIME**

BACK

This is the main selection screen menu.

Each of the selections on the screen may have one or more sub-menu.

We will go to the hand-controller menu items next.

Clicking on the HC button on the left will take you to that menu.

However all buttons work.

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

BSL

Combined_Constellation_Stars

IC

LBN

LDN

Messier

NGC

PN

DOWN   **UP**   **BACK**

Here you can select which catalog you would like to use for the tour. The catalog tour will only bring up stars and objects that is above the horizons.

Hitting on a Catalog will take you to the normal Alphanumeric keypad menu where you spell out the item you what to see.
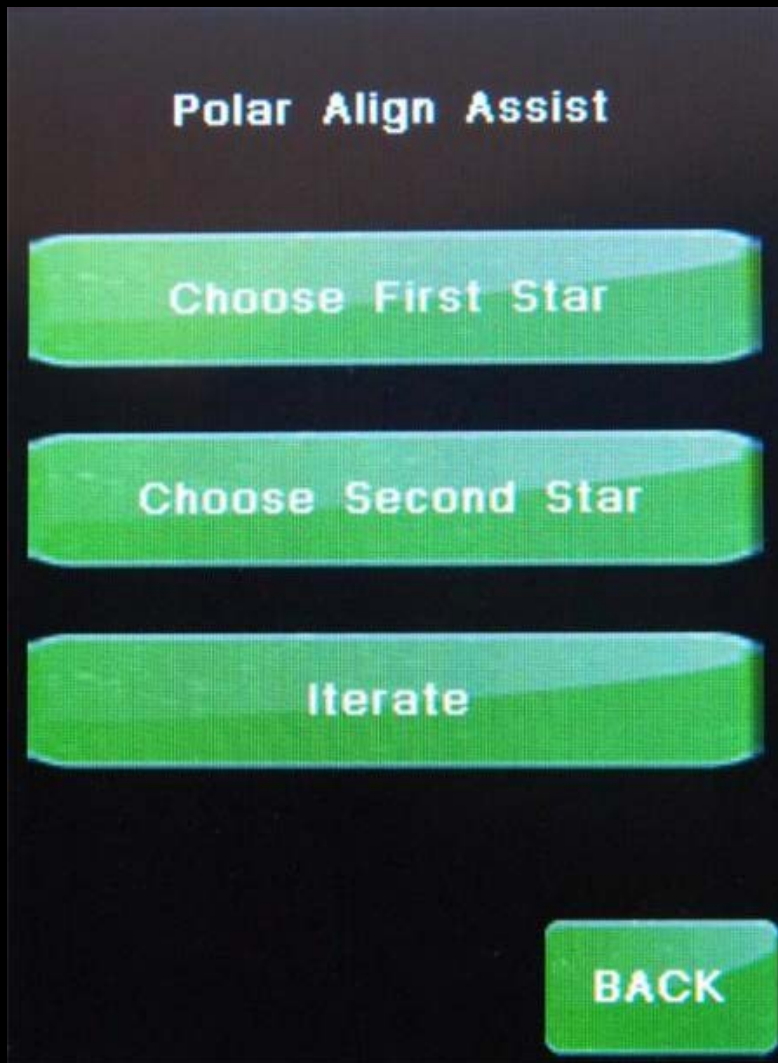
Hitting the back key will take you to the main menu.

For this Demo please select BSL catalog

Copyright by http://www.gemini-2.com

This routine is designed to help get the mount polar aligned to within one degree of either the north or south pole. This routine will take at least 3 iterations to get as close as a polar scope can get you. YOU CANNOT HAVE A MODEL BUILT AND EXPECT THIS ROUTINE TO WORK. Do it after doing a cold start.

Polar Align Assist

Choose First Star

Choose Second Star

Iterate

BACK

1. *It is very important that you do as accurate a Counter-Weight-Down, and Pointing the Dec to the pole as you can before powering on the Gemini-2. This will help this alignment be more accurate.*
2. *After you have cold started select "Menu"--> "Align -->more.. -->Polar Align Assist" menu item.*
3. *You will be in the menu of Choose First Star, Choose Second star and Iterate.*
4. *You will need to select 2 stars for this alignment process. The first one should be near the celestial equator (Dec. near 0) and within about 20° of the eastern or western horizon (about + or - six hours east or west). The other star should be near the meridian (such as Polaris in the northern hemisphere).*
5. *Use the UP and Down buttons to scroll through the list of stars and select the first one by using the selecting it. Once again the Gemini-2 will display the Choose first star, Choose Second Star.*

6. *Choose the second star and select a star from the menu of stars. Scroll through the list and select the second star. The menu will again return to the Choose First Star, Choose Second star and Iterate menu.*
7. *Select the Iterate button and the mount will slew to the first star. Once it reaches the star, "center object" will appear on the display. If the star is the one near the meridian, center the star only using the mount's elevation adjustment knob (ignore azimuth). If it is in the western or eastern part of the sky, center the star using only the mount's azimuth adjustment knob (ignore elevation).*
8. *Press the Iterate button and the telescope will slew to the other star. Center it using the procedure described above. Repeat this about 3 times, each time pressing the Iterate button to slew back and forth between the two stars. When you are finished, press the Back button.*
9. *You can expect to get to within one degree of the pole using this method. IMPORTANT: Because this method depends on the mount pointing to where the stars should be if the mount were polar aligned, you cannot use this function if modeling parameters have already been calculated. You*

should only use it after a Cold Start before you do any Alignments, or immediately after selecting the "Reset Alignment" menu item.

10. *Lets get started, Hit Choose First Star.*

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Interactive Hand-Controller Menus - click on green button to Navigate

This is the Semi Automatic Modeling Function.

It will automatically pick a star that should be above the horizon and on the east side. (it probably will not be the same star shown in the menu on the left.) If you do not want the star it picks simply hit the East button and it will pick another.

If you want to do a star on the West, just hit the West button. *(Note: if you hit the west button and the mount thinks it can reach it without doing a meridian flip, it will try and go to it without the flip. You really need to make sure that your limits are set. If they are not, then the mount could hit and do damage to your telescope or mount.*
See Menu-->Mount--Limits) For some reason, my Gemini will not let me pick a Western star, without taking the DEC through 90 degrees using the main menu. See note below Picture.
Also stars on the west side that are close to the meridian can be added to the East model. If the mount does not pass 90 degrees Dec (IE do a meridian flip, then you are still building a model on the east. The same holds true when going from a model being built on the west to the east. This is actually designed this way to help refine each model as you move from east to west or west to east.

If you are happy with the star it selects, then hit "GOTO". This tutorial does not let you select different stars - so Please hit GOTO.

NOTE: My Gemini-2 always tries to start on the West side. To make it start on the East side, I have to go to the main menu, and use the DEC button until DEC moves up to 90 degrees and then back down at least a half degree. Then going to the Semi-Automatic Model function will start on the East side. I have no explanation why this happens with my system. Sometimes even though it shows that it is going to do a West model, the star it picked is on the East

The screen shows:

Telescope Model Builder
Model 1 (East)

Unukalhai α SER
HA: −3.7h   El: 32°

East   West

GoTo

Reset   BACK

Courtesy of http://Gemini-2.com

Safety Limits

Set Limit Here!

Eastern Position:

114:00

Western Position:

123:00

Western GoTo Limit:

2:30

BACK

This is the Safety Limit setting screen. It is also described on the http://www.gemini-2.com/hc-English/En-limits.php.

Note: Safety Limits may not take effect until you power down and back up. This has been my experience. The writer of the code says they take effect when set.

The limits can be set either using the Web interface, on the Mount Selection Page, See Fig 7. or on the hand controller see figure 8 left. (it is under Menu-->Mount-->Limits
Note that the Web limits are set for left and right side, while the hand controller uses East and West. If using the hand controller, follow these steps. (The hand controller method only works correctly on August 16 or later firmware.)

1. *Turn off tracking by placing the mount into Terrestrial mode. Menu->Track->Terrestrial*
2. *Move the RA using the Left-Right buttons to the Eastern Limit. Loosen the clutch in Dec. Make sure you can spin the telescope 360 degrees in Dec without it hitting the mount. Use the Menu->Mount->Limits->"Set Limits Here" button, to set the Eastern Limit.*

3. *Move the RA using the Left-Right buttons to the Western Limit. Loosen the clutch in Dec. Make sure you can spin the telescope 360 degrees in Dec without it hitting the mount. Use the Menu->Mount->Limits->"Set Limits Here" button, to set the Western Limit. You now have set the Limits*
4. *The Western Goto Limit determines how far pass the meridian that the Gemini-2 will do a flip. It is calculated like this. Note that the Meridian is at 90 degrees. The point of Meridian Flip = Western Safety Limit - Goto Limit. An example is if you have the Western Safety limit set to 100 degrees - The Western GoTo limit of 2.5 degrees (default) you end up with a point of flip of 97.5 degrees, or 7.5 degrees past the meridian. Any target selected that is past this will do a meridian flip. Any target on the East side (Northern Hemisphere) will not do a meridian flip.*

Copyright by http://www.gemini-2.com

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Interactive Hand-Controller Menus - click on green button to Navigate

No GPS data received!
Set up Location and Time!

Select Predefined Site:

Hollywood

Phoenix, AZ

Berlin, GER

Sydney, NSW

Active Settings:

Longitude   -112:04

Latitude   33:26

Timezone   -7:00

Query GPS   NEXT

You have to enter your coordinates into the latitude and longitude, don't worry about the offset, we will do that on the next screen. If you select the different locations, you can see the sign change on the display. Notice that the Longitude is Negative in the USA and Positive in Europe

Touch in the Longitude box. When you do the Longitude entry screen will appear.
Do what is indicated in that screen. After that you will be brought back to this screen.

Touch in the Latitude box, You will be taken to a screen similar to the one you just filled out. After filling out that screen you will be brought back here again.

Hit the Next button. You will be taken to a screen similar to Fig 6.

Note: the Hemisphere is selected totally by the sign of the Latitude in the Gemini-2. Positive for Northern Hemisphere and negative for Southern Hemisphere. It was the same in the Gemini-1 also. No switches to change at all.

The Query GPS button will have the Gemini-2 try and get the GPS coordinates from a GPS unit hooked to Serial Port 1

The speed of this ports defaults to 4800 baud for GPS use. It's speed is set in the Web interface under Serial Tab.

Note: If you are using a GPS receiver to get the time, then the offset does not matter. The Gemini-2 only uses UTC time for all it's calculations, and a GPS returns UTC time only. You can disregard the time screen when using a GPS receiver.

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Bookmark #:

0   Set Here!

Right Ascension:

00:00:00

Declination:

+00:00:00

GoTo   SET   BACK

This menu will let you create custom bookmarks that you can save and return too.

You can create up to 10 bookmarks.

You enter the RA and DEC by clicking on the Green boxes for each, which will take you to a menu to enter the value. Note: The values are entered in Hours 0-23):Minutes (0-59):seconds (0-59) for RA and
Degrees(+/-0 to 90):Minutes (0 to 59): and seconds (0-59).

Use the Set button on the bottom of the screen to store them.

The Set Here Button will set the bookmark at the current mount position.

Use the GOTO button to go to the current bookmark.

Park at CWD Position	Park at CWD Position
Park at Home Position	Park at Home Position
Set Home Position	Set Home Position
Park at Zenith	Park at Zenith
Sleep Telescope	Wakeup Telescope
BACK	BACK
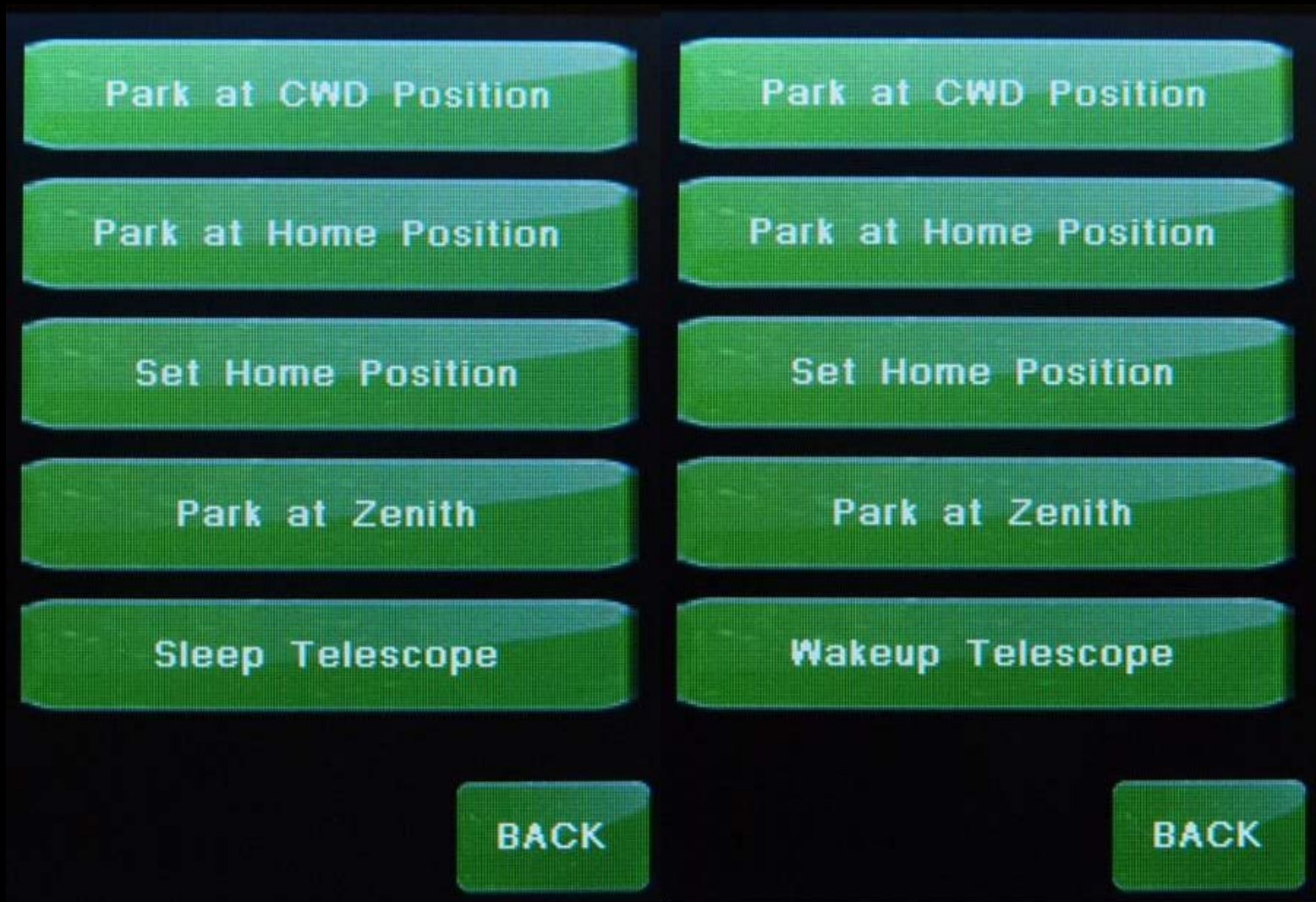
Park Menu

This menu provides 3 park positions and the capability to stop tracking and start tracking.

The Park at CWD (counter weight down) will park the mount where it was positioned when you first turned it on. It assumes this is the CWD position. Parting the mount should stop all tracking.

You use this startup position for COLD STARTS and WARM STARTS. If you have already built a model, you will need to go to a star, center it, and do a SYNCHRONIZE so that the telescope really knows where it is.

Once you set a HOME position, you can park at that HOME position and start up by using a WARM RESTART from that position. No SYNCHRONIZE is needed assuming you have already built a model. To set a home position, move the telescope to the desired Home position. Then hit the Set Home position button. Note: that all park, and home positions are either relative to the CWD position.

You can stop tracking by using the Sleep Telescope button and start tracking again by using the Wakeup Telescope button. Note: the latest version of this function has been changed into one button that changes between Sleep Telescope (left menu) and Wakeup Telescope (right menu). Shown by providing both menus side by side.

There has been added a Part at Zenith button. This parks the telescope straight up. This could be used to talk flats.

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+3	Mekab α CET	29
+0	Pollux β GEM	24
+0	Procyon α CMi	46
−3	Regulus α LEO	19
+1	Rigel β ORI	60
+0	Sirius α CMa	72
+2	Zaurak ϒ ERI	51
+5	Achernar α ERI	37

DOWN   UP   BACK

This menu show your the Bright Star Catalog without having to go to through the catalogs selection menu. Clicking on any of the stars will do a "GOTO Command" to that Star. Only stars above the horizon are shown.

The number to the left of the name is the hour angle of that star.

The number to the right is the Dec angle of that star.

The BACK button takes you all the way back to the main menu.

Copyright by http://www.gemini-2.com

Object Name:

HC RA/DEC

Right Ascension:

13:37:14

Declination:

-07:08:33

JD2000   Flip

GoTo   BACK

This is the coordinate entry screen. Enter the RA and Dec in hours:minutes:seconds format and hit GOTO. The GOTO button is not active in this demo.

On the Object Name, you can give these coordinates a custom name.

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Sun	Mercury	Venus
Moon	Mars	Jupiter
Saturn	Uranus	Neptune
Pluto		
	BACK	

This is the solar system menu.
Notice that some of the buttons are shown in almost white with white text, while others are Green. With white text.

The white button and white text indicates that these items are not visible at this time.

In this menu only Venus Moon, Mars and Jupiter are visible. Clicking on one of them would take you to the normal "GOTO" menu (not demonstrated at this time)

Only the Saturn and the back buttons works for this Tutorial.

BSL

Combined_Constellation_Stars

IC

LBN

LDN

Messier

NGC

PN

DOWN **UP** **BACK**

This is a list of the Catalogs contained in the hand controller. It is by no means the complete list of catalogs. For this interactive demo, we are only going to the BSL (Bright Star List), so click in the BLS square to continue.

You can also use the up and down buttons to scroll the list of catalogs.

GoTo Bright Star

Reset Model

Alignment

Store Model

Synchronize

Reload Model

Model Parameters

Polar Align Assist

Undo Last Alignment

Polar Axis Correction

More ...

BACK

BACK

These two menus are the alignment control menus.

You can go to a bright star, Do an alignment, Synchronize the mount to a star, Check the Model Parameters, Undo the last alignment star, Completely Reset the model to none, Store a current model onto the micro-SDcard, Reload a stored model from the micro-SDcard, Do a Polar Align Assist if no model is stored, and Do a Polar Axis Correction if a model does exist.

There are other menus that provide some of the functions of this menu, such as the main menu.

The Alignment and Synchronize buttons expects you to already be pointing and centered on a bright star/object.

Copyright by http://www.gemini-2.com

Type | **Gearing** | **Limits**

TVC | **PEC** | **Network**

Startup

BACK

From this menu is where you start all the mount parameters.

Type - select your mount type.

Gearing - if you have a custom mount this is where you set your gear ratios.

Limits - This is where you set your mount limits.

TVC - this is where you set the Dec backlash compensation.

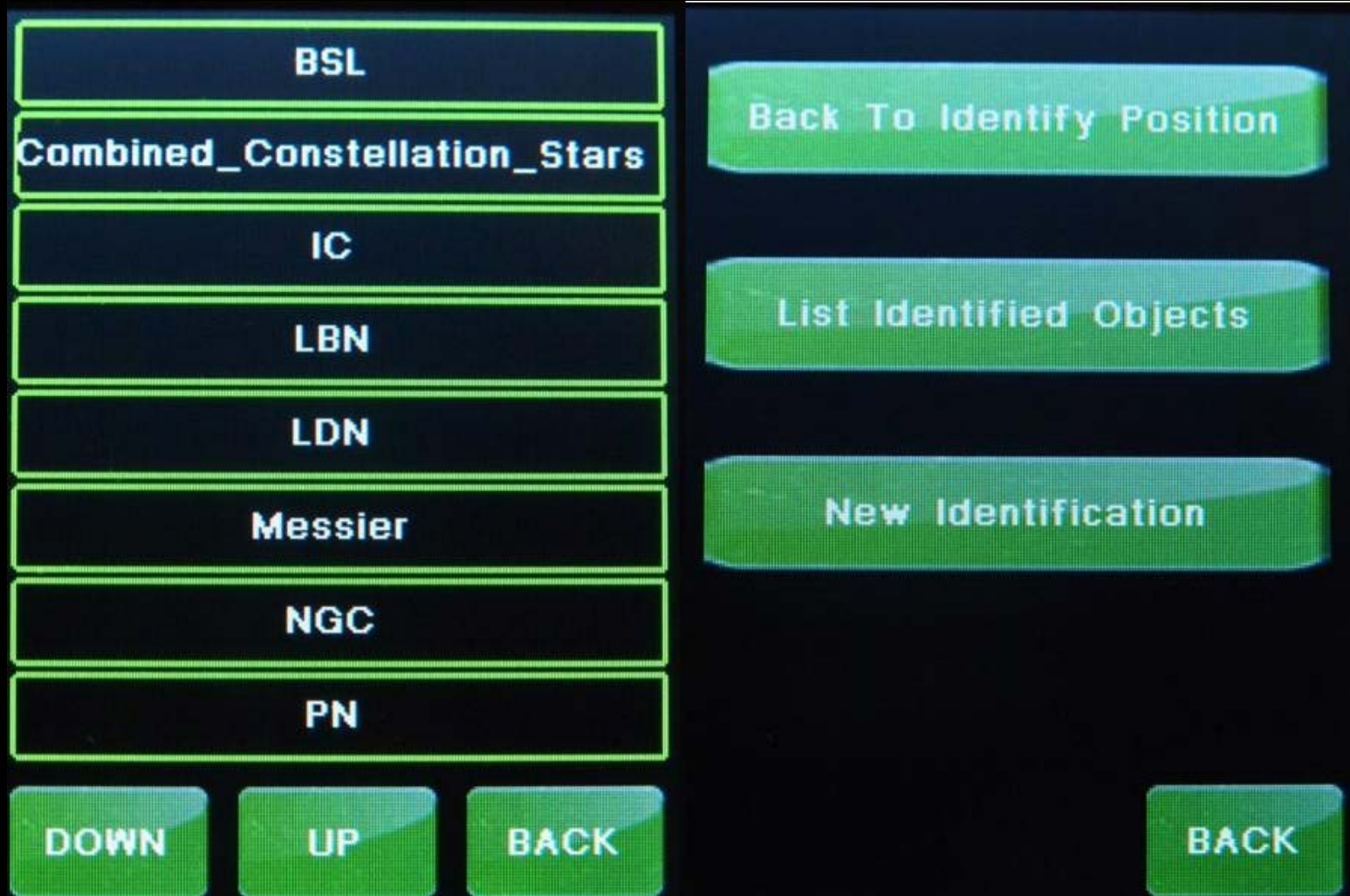*PEC - This is where you can compensate for periodic error of the worm gear.*

Network - This is where you set up your network setting.

Startup - this is where you setup the default startup mode.

BSL

Combined_Constellation_Stars

IC

LBN

LDN

Messier

NGC

PN

DOWN   UP   BACK

Back To Identify Position

List Identified Objects

New Identification

BACK

This 2 menus identifies up to ten celestial objects that lie within a range of about 10 degrees from where the telescope is currently pointing.

The menu on the right will not normally come up, until you have identified a catalog from the left menu.

The left menu lets you select the catalog from which the stars will be identified from, and the right menu will let you go between objects that have been identified.

Those objects nearest the central axis are listed first, and the selection is refined as you designate the object's catalog, type, and maximum magnitude (These latter items appear in the menu tree as submenus of each other).

You can scroll through the list of identified objects with the Up and Down buttons. As each object is displayed, it becomes the "selected object," with coordinates and data available in the information buffer. The Object menu showing the objects is not shown, as it varies too much.

Field of View [']   5

Search Cycles   5

This menu allows you to search around where the mount is pointing. The field of view is in arc seconds, and the search cycles is how many times the mount will make a circle at the arc seconds of deviation from center.

SEARCH   BACK

Screen locked!
Tap here 3 times to unlock.

16:39:46   +90:00:00

SLEW   19:47:12

The Screen Locked screen. This screen locks the graphics screen, so that if you are using the tactile buttons, you do not accidently push on one of the graphics screen buttons.

Tap in the upper box 3 times to return to the normal graphics screen.

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Language   Display   SD Card

Buttons   Mode

Store Settings   BACK
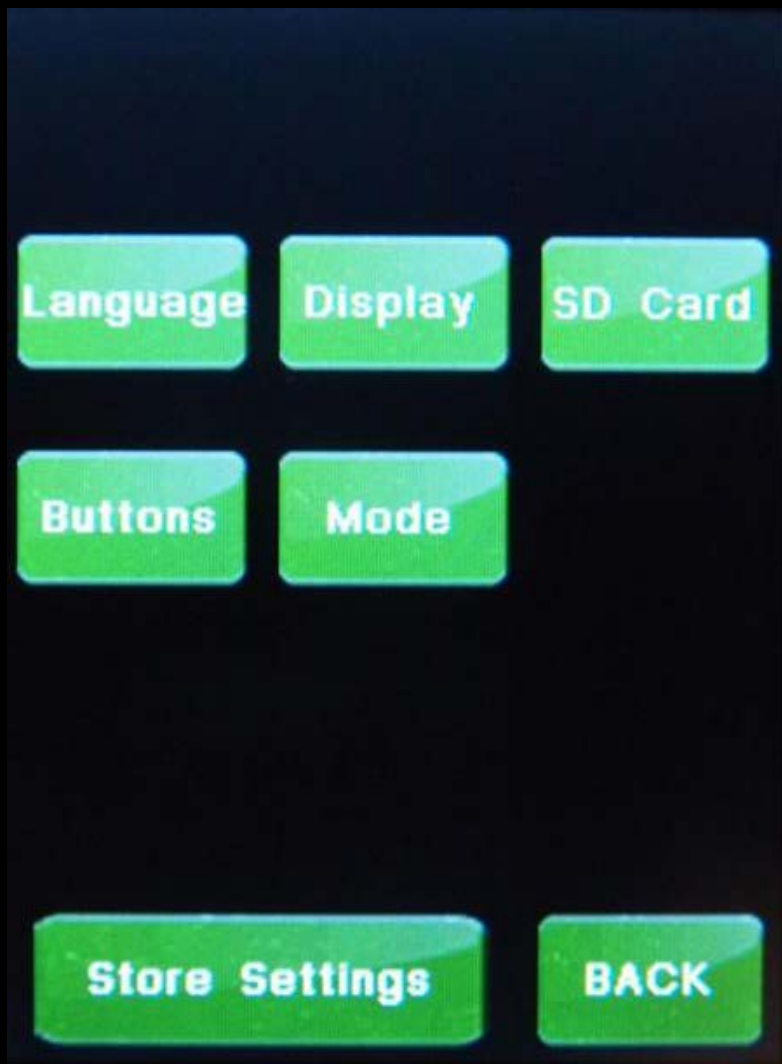
This menu has the Language, Display, SD Card, Buttons, and Mode selection sub-menus.

We will do each menu in the order above.

Clicking on one of the button on the left will take you to that menu.

The back button will take you to the previous menu.

The Store Settings button stores all the setting you made from the sub-menus of this menu. You must select this to store the setting.

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Interactive Hand-Controller Menus - click on green button to Navigate

Losmandy Gemini Level 5.00

Select Predefined Site:

Hollywood

Phoenix, AZ

Berlin, GER

Sydney, NSW

Active Settings:

Longitude   −112:04

Latitude   33:26

Timezone   −7:00

Query GPS   **BACK**

You have to enter your coordinates into the latitude and longitude, don't worry about the offset, we will do that on the next screen. If you select the different locations, you can see the sign change on the display. Notice that the Longitude is Negative in the USA and Positive in Europe

Touch in the Longitude box. When you do the Longitude entry screen will appear.
Do what is indicated in that screen. After that you will be brought back to this screen.

Touch in the Latitude box, You will be taken to a screen similar to the one you just filled out. After filling out that screen you will be brought back here again.

Hit the Next button. You will be taken to a screen similar to Fig 6.

Note: the Hemisphere is selected totally by the sign of the Latitude in the Gemini-2. Positive for Northern Hemisphere and negative for Southern Hemisphere. It was the same in the Gemini-1 also. No switches to change at all.

The Query GPS button will have the Gemini-2 try and get the GPS coordinates from a GPS unit hooked to Serial Port 1

The speed of this ports defaults to 4800 baud for GPS use. It's speed is set in the Web interface under Serial Tab.

Note: If you are using a GPS receiver to get the time, then the offset does not matter. The Gemini-2 only uses UTC time for all it's calculations, and a GPS returns UTC time only. You can disregard the time screen when using a GPS receiver.

Manual Slewing Speed   800
GoTo Slewing Speed   800
Centering Speed   20
Guiding Speed x10   5
Move Speed   100

MOVE-   MOVE+   BACK

This menu lets you select the speed that each speed runs at. For larger loads, I recommend setting the slew speed to 400 or 600.

These speed are selected from the main menu with the Speed button.

The MOVE- and MOVE+ buttons change the move speed.

Tapping in the Guide Speed x10 box, or the Centering Speed box, or the GoTo Slewing Speed box, or the Manual Slewing box will bring up a menu that lets you enter the speed for each of these boxes. Menu not shown for Demo.

This is where you can set the tracking speed.

This is page 1 of 3 on this subject.

The RA and Dec Divisor can be changed to provide a custom tracking speed if necessary.

1. *Telescope Speeds: Gemini allows tracking in 6 speeds: Sidereal, Lunar, Solar, Adaptive King Rate, Closed Loop, Comet/User Defined, and Terrestrial (tracking turned off). In addition, the Hand Controller permits the user to move the telescope in both RA and Dec in 3 speeds that are established in the setup menu: Guiding, Centering, and Slewing. The user can also perform go to movements of the telescope at a separate speed that is also established in the Web Mount setup menu. When a "GOTO" operation occurs, the telescope moves at "GOTO" Speed, and then slows down to Centering Speed as it approaches its target. Telescope parking is a separate command that disables tracking and moves the mount to a predetermined Home position – by default, counterweight down with the telescope pointing to Celestial North. Finally, all telescope movement stops and an alarm sounds when the mount slews to either its Eastern or Western safety limit. A warning also sounds when the mount approaches its Western limit while tracking.*

Sidereal
King
Lunar
Solar
Terrestrial
Closed Loop
Comet/User Defined

RA Divisor   448771

DEC Divisor   0

BACK

2. *None/Terrestrial Speed: This rate turns tracking off completely and allows you to observe stationary objects such as points on land, or geosynchronous satellites. It is also useful for keeping the telescope from exceeding its safety limits when the Gemini must be left on for extended periods of time between observations.*

GOTO PAGE OF 2 OF 3

Timezone:

-07

Civil Date:

05/29/12

Civil Time:

00:08:27

JD: 2456076.797546

LMST: 16:09:04

SET   BACK

Here is where you enter your date and time, and your time zone offset. The time is entered in local military time format. IE 1.00 PM would be 13:00:00, The date and time will be converted to UTC time and date internal for use.

Touching on each entry on the screen on the left will take you to the setup/Entry screen for that function. Lets do "Offset", "Date" and then "Time" in that order. Each screen will bring you back here after setting each function. Once all are entered you will come back here and hit the "Set" button and then the next button. Please Note that the time you set, will not take effect until you hit the "Set" button on this screen.

The Time just above the Next button is the calculated Sidereal time. If you would like to make sure it is correct go to http://tycho.usno.navy.mil/sidereal.html and enter your longitude. It will show your sidereal time and you can compare them to make sure everything is correct.

Note: If you are using a GPS receiver to get the time, then the offset does not matter. The Gemini-2 only uses UTC time for all it's calculations, and a GPS returns UTC time only. You can disregard this screen when using a GPS receiver.

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1AB	2CD	3EF	4GH
5IJ	6KL	7MN	8OP
9QR	0ST	−+	UVW
XYZ	:	Del	Ent

Here you enter a selection letter or number to start the menu selection. Holding down a Key circles through the letters of that key much like on a cell phone.

For this demo, we are going to leave the entry blank and just hit the "ENT" key.

Now hit the "ENT" Key

+0	Aldebaran α TAU	72
+4	Algenib γ PER	33
+4	Alpheratz α AND	39
−1	Betelgeuse α ORI	54
+0	Capella α AUR	72
+4	Caph β CAS	43
−2	Castor α GEM	47
+3	Diphda β CET	18

DOWN   UP   BACK

The first one should be near the celestial equator (Dec. near 0) and within about 20° of the eastern or western horizon (about + or - six hours east or west).

I don't see one I like for this demo so hit the down button and lets look further

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

Telescope Model Builder
Model 1 (East)

Zosma δ LEO

HA: +0.8h   El: 72°

[East]   [West]

[GoTo]

[Reset]   [BACK]

This is the Semi Automatic Modeling Function.

It will automatically pick a star that should be above the horizon and on the east side. (it probably will not be the same star shown in the menu on the left.) If you do not want the star it picks simply hit the East button and it will pick another.   I keep hitting the West button until I was sure that I had picked a star that would cause a Meridian Flip.

Also stars on the west side that are close to the meridian can be added to the East model. If the mount does not pass 90 degrees Dec (IE do a meridian flip, then you are still building a model on the east. The same holds true when going from a model being built on the west to the east. This is actually designed this way to help refine each model as you move from east to west or west to east.

If you are happy with the star it selects, then hit "GOTO". This tutorial does not let you select different stars - so Please hit GOTO.

NOTE: For the Demo, I keep hitting West until a start came up that I was sure would cause a Meridian Flip.

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GoTo done: Unukalhai α SER

15:45:12   +06:17:09

CENTER   20:16:41

SPEED   MENU   GoTo

You now have to center the object using either the buttons the front of the Hand controller or the buttons on the back of the hand controller. If you have what is called a Standard (Classic) hand controller hooked up to the Standard Hand controller port, you can use that also. You can also use the Web interface, or the ASCOM hand controller. Basically, any method that will center the star will work.

But please NOTE that YOU HAVE TO COME BACK HERE AND HIT THE GOTO BUTTON after centering the star.

Hit the GOTO button now.

2:30

1	2	3	4
5	6	7	8
9	0	–	:
		Del	Ent

The Western Goto Limit determines how far pass the meridian that the Gemini-2 will do a flip. It is calculated like this. Note that the Meridian is at 90°. The point of Meridian Flip = Western Safety Limit - Goto Limit. An example is if you have the Western Safety limit set to 100° - The Western GoTo limit of 2.5° (default) you end up with a point of flip of 97.5°, or 7.5 degrees past the meridian. Any target selected that is past this will do a meridian flip. Any target on the East side (Northern Hemisphere) will not do a meridian flip.

$100° - 90° = 10° - 2.5° = 7.5°$.
or $90° + 7.5° = 97.5°$ (point of flip)

Note: Safety Limits may not take effect until you power down and back up. That has been my experience, however the writer of the firmware says they take effect when set.

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

```
123:00
```

1 2 3 4

5 6 7 8

9 0 - :

Del Ent

Note that the Web limits are set for left and right side, while the hand controller uses East and West. If using the hand controller, follow these steps. (The hand controller method only works correctly on August 16 or later firmware.)

1. *Turn off tracking by placing the mount into Terrestrial mode. Menu->Track->Terrestrial*
2. *Move the RA using the Left-Right buttons to the Western Limit. Loosen the clutch in Dec. Make sure you can spin the telescope 360 degrees in Dec without it hitting the mount. Use the Menu->Mount->Limits->"Set Limits Here" button, to set the Western Limit.*
3. *Hit Ent to go back to the previous menu.*

Note: Safety Limits may not take effect until you power down and back up. That has been my experience, however the writer of the firmware says they take effect when set.

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114:00

1	2	3	4
5	6	7	8
9	0	-	:
		Del	Ent

Note that the Web limits are set for left and right side, while the hand controller uses East and West. If using the hand controller, follow these steps. (The hand controller method only works correctly on August 16 or later firmware.)

1. Turn off tracking by placing the mount into Terrestrial mode. Menu->Track->Terrestrial
2. Move the RA using the Left-Right buttons to the Eastern Limit. Loosen the clutch in Dec. Make sure you can spin the telescope 360 degrees in Dec without it hitting the mount. Use the Menu->Mount->Limits->"Set Limits Here" button, to set the Eastern Limit.
3. Hit the Ent button to return to the previous menu.

Note: Safety Limits may not take effect until you power down and back up. That has been my experience, however the writer of the firmware says they take effect when set.

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Timezone:

-07

Civil Date:

04/09/12

Civil Time:

20:44:03

JD: 2456027.655602

LMST: 09:30:55

SET   NEXT

Here is where you enter your date and time, and your time zone offset. The time is entered in local military time format. IE 1.00 PM would be 13:00:00, The date and time will be converted to UTC time and date internal for use.

Touching on each entry on the screen on the left will take you to the setup/Entry screen for that function. Lets do "Offset", "Date" and then "Time" in that order. Each screen will bring you back here after setting each function. Once all are entered you will come back here and hit the "Set" button and then the next button.   Please Note that the time you set, will not take effect until you hit the "Set" button on this screen.

The Time just above the Next button is the calculated Sidereal time. If you would like to make sure it is correct go to http://tycho.usno.navy.mil/sidereal.html and enter your longitude. It will show your sidereal time and you can compare them to make sure everything is correct.

Note: If you are using a GPS receiver to get the time, then the offset does not matter. The Gemini-2 only uses UTC time for all it's calculations, and a GPS returns UTC time only. You can disregard this screen when using a GPS receiver.

Copyright by http://www.gemini-2.com

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

33:26

1	2	3	4
5	6	7	8
9	0	–	:

Del   Ent

This is where you enter Latitude. Latitude is positive for the northern hemisphere and negative for the southern hemisphere. You enter degrees and minutes just like you did for the Longitude.

After you enter latitude hit "ENT", you will be taken back to the site menu.

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-112:04

1	2	3	4
5	6	7	8
9	0	–	:
		Del	Ent

If you touch in the top where the -112:04 is displayed, it will go blank. You can now enter the new Longitude. You only enter degrees and minutes. This entry screen will not take seconds, so round the minutes to the nearest minute. PLEASE NOTE: the minutes are from 0 to 59. This is not a decimal part of the degrees. IE: the -112:04 is equal to -112.0667 degrees.

Please note that these entries do not modify the permanent setting. If you press on any of the sites in figure 3 above, you will loose these setting.

Hit the "ENT" key, and you will be taken back to the previous menu.

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20:44:03

1	2	3	4
5	6	7	8
9	0		:
		Del	Ent

This is the screen where you enter your Right Ascension or Declination Enter them in Hours : Minutes : Seconds

GoTo done: Saturn
GoTo Saturn

13:37:15   -07:08:34

SLEW   20:03:48

SPEED   MENU   GoTo

This is what the GOTO Saturn menu would look like when the slew to Saturn is done.

As you can see, the previous command has dropped to the second line in the top box.

You can use either the Menu or GoTo to return to previous menus.

If you select the GoTo button, then you can go through the rest of the GoTo selections.

The name of the stars are selected alphabetically. We are going to enter a V to see if we can go to Vega. Hold down the UVW key till a V appears. You can enter as many letters as you want. Now Press the UVP button

This screen has no way to get to the previous screen. You would have to hit "ENT", and then on the next screen use the back button, which will take you back to the main "GOTO" screen.

The Del key only deletes entered letters/numbers.

Interactive Hand-Controller Menus - click on green button to Navigate

SAO

Sh2

Southern_Constellation_Stars

WDS
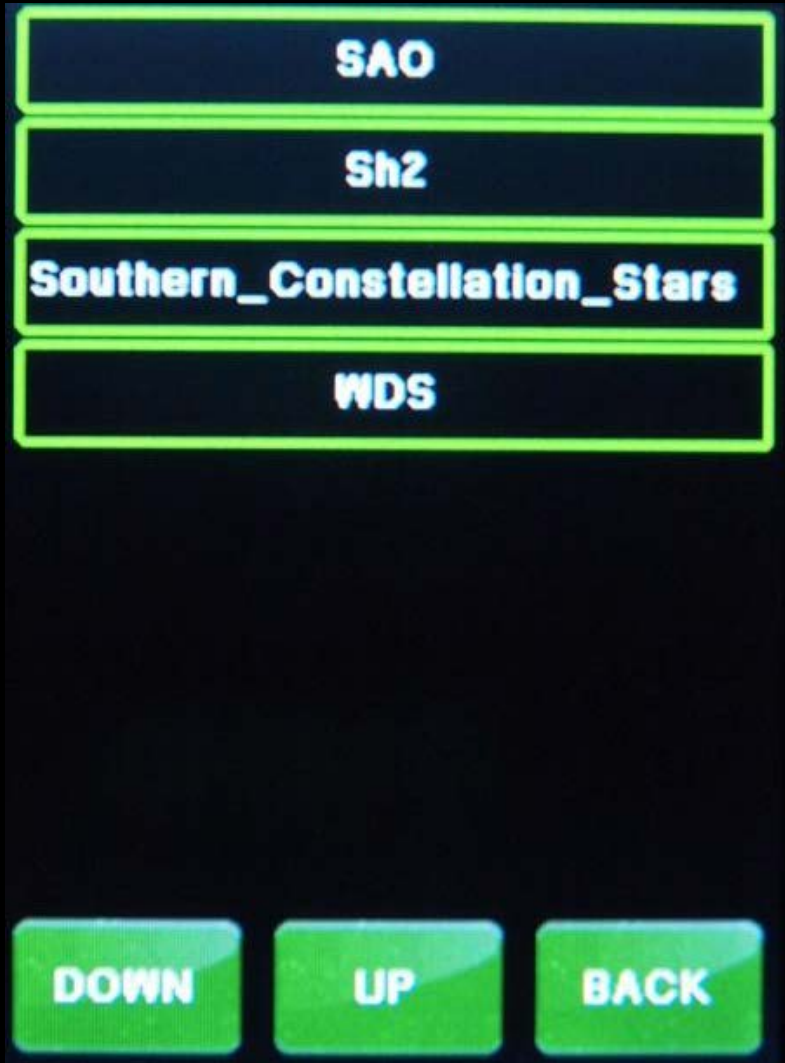
This is a list of the Catalogs contained in the hand controller. It is by no means the complete list of catalogs. For this interactive demo, we are only going to the BSL (Bright Star List), so click the UP button and then select BSL in that menu.

You can also use the up and down buttons to scroll the list of catalogs.

DOWN   **UP**   **BACK**

Copyright by http://www.gemini-2.com

Polar Align Correct

Please center the object using Az and/or El knobs!

Done!

Press Done to start building a new model.

BACK

__PAC__ - This is the PAC or Polar Align Correct menu. It will only show up after a model is built. Using it will wipe out any model your built.

In using the alignment script, pay attention to when you have a star that is nearly straight up in the sky. Ideally, you'll want one that is a little south (if you happen to be in the northern hemisphere) or vice versa if you're in the southern hemisphere. That'll put it near that intersection.

When you come to this page from any other location, the star that the telescope was pointed at, is what you are going to re-center on. The telescope will move off of that object by the amount of Polar Error that it has calculated from doing an alignment.

You can do the PAC on any target once the button shows up in the startup. You'll just get better results using a target near that intersection.

The centering will be done using the Alt and AZ adjustment on the mount --- not using the slew controls on the directional paddle.

Take your time and be patient!

Note that once you've hit the "done" button, the PAC alignment will discard the previously built pointing model, so you'll start over again, and take you back to the main menu. The suggestion is to do the PAC twice to get good results.

Also I would suggest that you use a camera and software that provides cross-hairs to do this alignment with. With the telescope pointed almost vertical you are going to have a hard time seeing through an eyepiece.

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Interactive Hand-Controller Menus - click on green button to Navigate

HA Index Error	-772
DEC Index Error	930
Polar Axis Azimuth	1842
Polar Axis Elevation	803
Non-Perpendicularity	0
Non-Perpendicularity	0
Counterweight Flexure	0

BACK

This screen shows the mount alignment parameters that the current model has.

To select between models to see the other model, you have to use the web interface modeling page and select either model 1 (east) or model 2 (west).

The math behind calculating these errors:
1st alignments set the index parameters ID, IH.

2nd..5th alignments calculate MA, ME additionally.

6th..9th alignment add CH and NP non-perpendicularity parameters to the model.

From 10th alignment up counterweight flexure DAF is added.

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

Train PEC

BACK
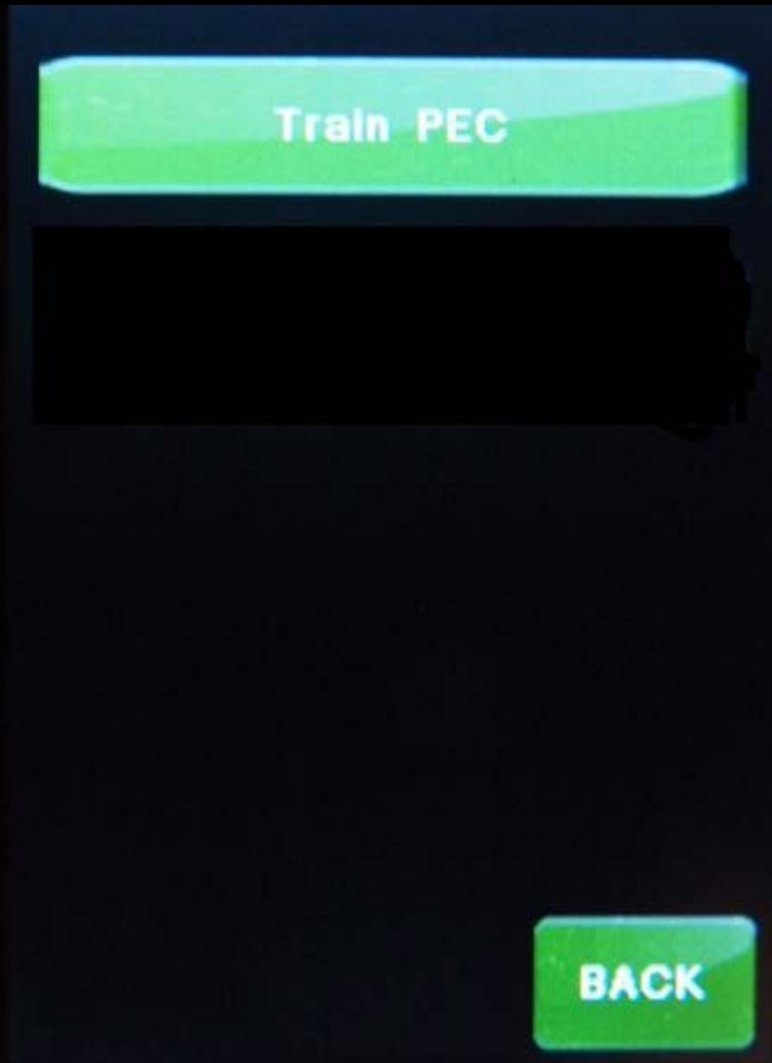
This is the PEC menu when the PEC has not been trained. Clicking on the Train PEC button will take you to a menu that looks like the main menu.

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Cold Start

Warm Start

Warm Restart

Ask, if possible

Restart Mount

BACK

This is where you can set the default startup mode. If you select "Ask, if Possible" then the Gemini-2 will prompt you for the startup mode, unless it determines a Cold Start is the only possible mode.

Also by hitting the Restart mount button, the mount will be started from the beginning.

How it starts will be determined by which mode was selected.

For this demo, We have Ask, If possible selected, so if you press Restart mount, it will go to the startup menu.

If Cold start is selected it will go to the Function menu, where PAA, Modeling or Catalog Tour can be selected.

If Warm Start or Warm Restart is the selected mode, then it will go to the main menu.

Custom Mount

GM8

G-11

HGM-200

MI-250

Titan25

Titan50

BACK

This menu is where you select your mount type. The default is Titan25.

However Titan25 mounts are no longer being sold as new mounts. All new Titans are Titan 50.

You would select your mount type then hit next.

DEC Axis TVC   5

TVC Menu is used to set the Dec backlash compensation. Note that the first movement after setting the TVC is ignored. This is because you might be in a have mesh of the gears.

BACK

RA Worm Gear	-360
DEC Worm Gear	-360
RA Spur Gear	25
DEC Spur Gear	25
RA Motor Encoder	256
DEC Motor Encoder	256

BACK

Custom Gearing

See the default setting page for the gear ratios used in each mount type.

The gears shown are for a MI-250

IP Address:

192.168.0.150

Netmask:

255.255.255.0

Default Gateway:

192.168.0.1

Primary DNS Server:

192.168.0.1

DHCP: ✓   **BACK**

Network Setting menu
This is where you can set up your network setting. It is also where you will see what the Gemini has set the IP address to if you are using DHCP setting. Notice that in the picture at the left that the IP address is 192.168.0.150, this is not the default IP address of 192.168.0.111, because it was set by DHCP. There is a web page that describes how to setup and connect your Gemini to your computer. See http://www.gemini-2.com/ConnectingtoG2.htm

This menu lets you select the speed that the buttons on the back (tactile) work in. These buttons works in one of three modes: the Visual Mode, the Photo Mode and the All Speeds Mode.

You can move both axes simultaneously in all 3 modes. You select the mode by use of this menu. Like some other settings, it is remembered permanently and will be in effect even after powering off and on again.

The Visual Mode - In visual mode, the Guiding Speed is not available. When you press a button, the telescope moves at Centering Speed. Momentarily pushing the opposite button (tactile buttons only) lets the system accelerate to the manual slewing speed. If you are moving both axes, both will speed up. Ramping up and down in speed occurs independently for both axes. This mode is intended for visual observing and for looking up objects. The auto-guider port is not active in this mode.

The Photo Mode - In Photo Mode, Guiding Speed is the principal speed, so pressing a Hand Controller directional button moves the telescope at the selected Guiding Speed; Slewing Speed is not available. Acceleration to Centering Speed is available in four stages (to allow easy centering of an object in the field of view or on a CCD chip) by pressing the opposite tactile button while Gemini is guiding: Pressing the opposite button once changes to 1/8 of Centering Speed to allow fine centering of the target.

Photo Mode ○

Visual Mode ○

All-Speeds Mode ○

BACK

Then, after about 2 seconds, the speed will increase to ¼ Centering Speed, after another 2 seconds to ½ Centering Speed, and finally to full Centering Speed. Pressing the opposite button twice changes to full Centering Speed immediately. If you want to guide a photograph manually, you may plug a Standard (not Deluxe) Hand Controller into Gemini's auto-guider port. This way you are sure that you cannot accidentally move the scope at centering speed while guiding. The LED on the standard Hand Controller will not be illuminated when plugged into the auto-guider port.

The All Speeds Mode In this mode, all speeds are available, from Guiding Speed to Slewing Speed, by using the opposite-button trick. You can use this mode, for example, while drift aligning, when you need very fine centering of a star at the crosshairs and a fast move from the meridian to the eastern or
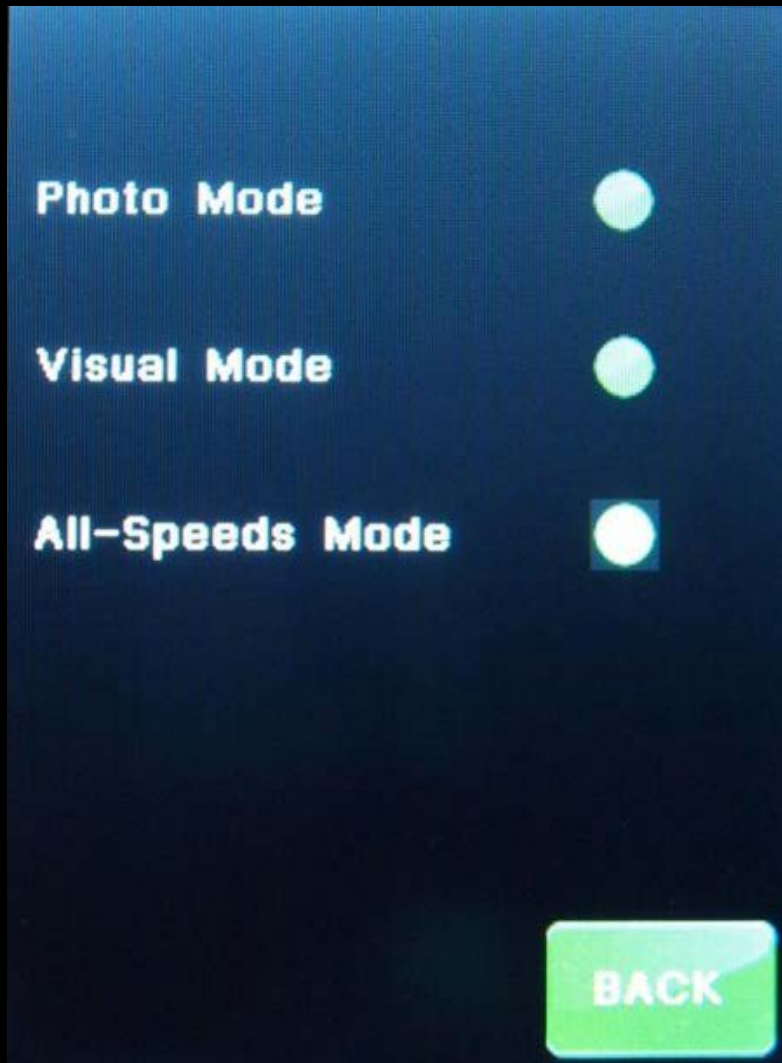
western horizon. However, for normal observing, you'll probably select either the Visual or Photo Mode.

western horizon. However, for normal observing, you'll probably select either the Visual or Photo Mode.

Flip RA

Flip DEC

Flip Tactile RA

Flip Tactile DEC

Allow Speeding up

BACK

This menu lets you swap the buttons on the front and on the back of the hand controller. The buttons on the back are called tactile buttons.

The Allow Speeding up enables/disables the "opposite button trick" for speeding up movements using the tactile buttons. (buttons on the back of the Hand Controller.)

How the Allow Speeding up works:
If you uncheck this box, the buttons work in a very safe manner. Not only that a movement will never speed up to the next stage, pushing both "opposite" button while the other button is still pressed - ignores the first button and changes the direction for guiding and centering speeds. Movement stops if the button pressed as the last one is released - Ramps down a Move or Slew movement.

With the "Allow Speeding Up" box checked the HC buttons work like the G1 HC buttons worked: Within the mode selected (Photo mode: Guiding can be accelerated to slewing, Visual Mode: Centering to Slewing, ...) with the "opposite key" trick.. The Speed setting on the main screen defines the starting speed.

Interactive Hand-Controller Menus - click on green button to Navigate
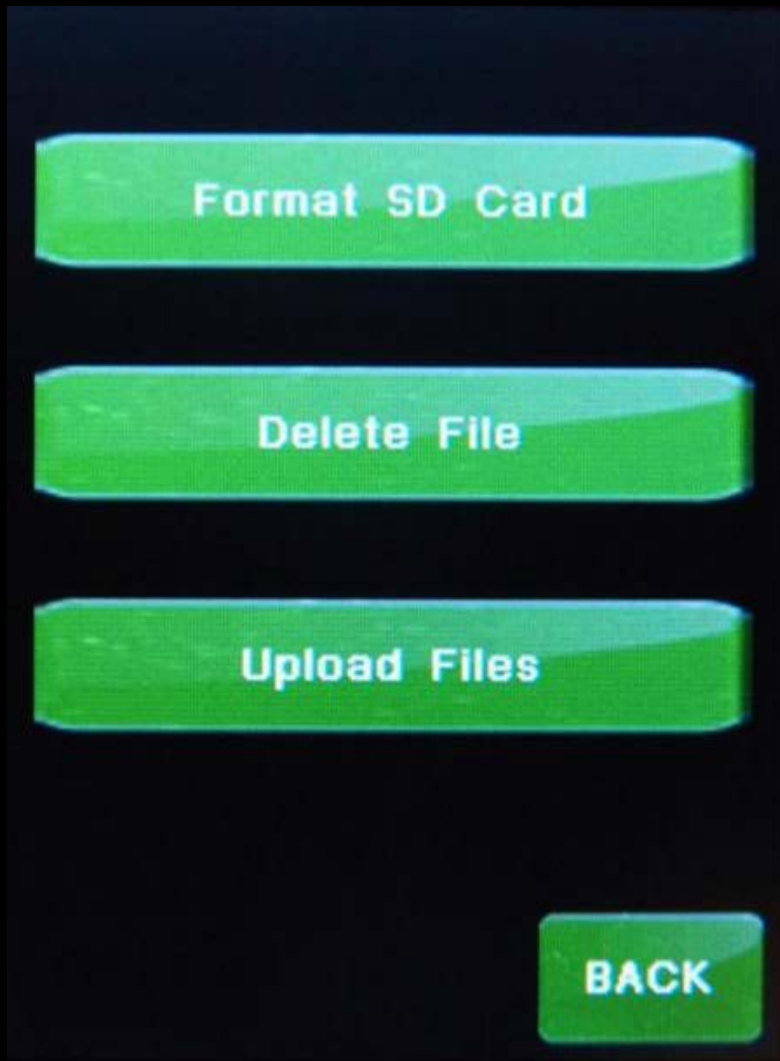
This menu will let you format the micro-SDcard in the hand-controller, Delete files and catalogs from it, or upload files/catalogs to it.

The Format selection will completely wipe out the micro-SDcard of all if its files. Once that is done, you can reload the files by putting them in the HCFirmware directory of the main units micro-SDcard, and then hitting Upload Files. When you select format SD card another screen will come up asking if you are sure, No or Yes.

The Delete File button will bring up the list of catalogs and any other file stored in the catalog directories. You can only delete whole catalogs, not the individual entries in them. The reason for this is that a catalog is really a single file.

You can also use this Upload Files to upload additional catalogs to the hand controller. You can create your own custom catalogs and upload them this way. The easiest way to do this is use the Windows File Explorer in an FTP mode. Do this by typing *ftp://admin@gemini* into the file manager bar at the top of Windows explorer. (not an Internet browser) If you have your Gemini-2 connected to your computer via Ethernet, then you should see the contents of the *G2 main micro-SDcard contents.*
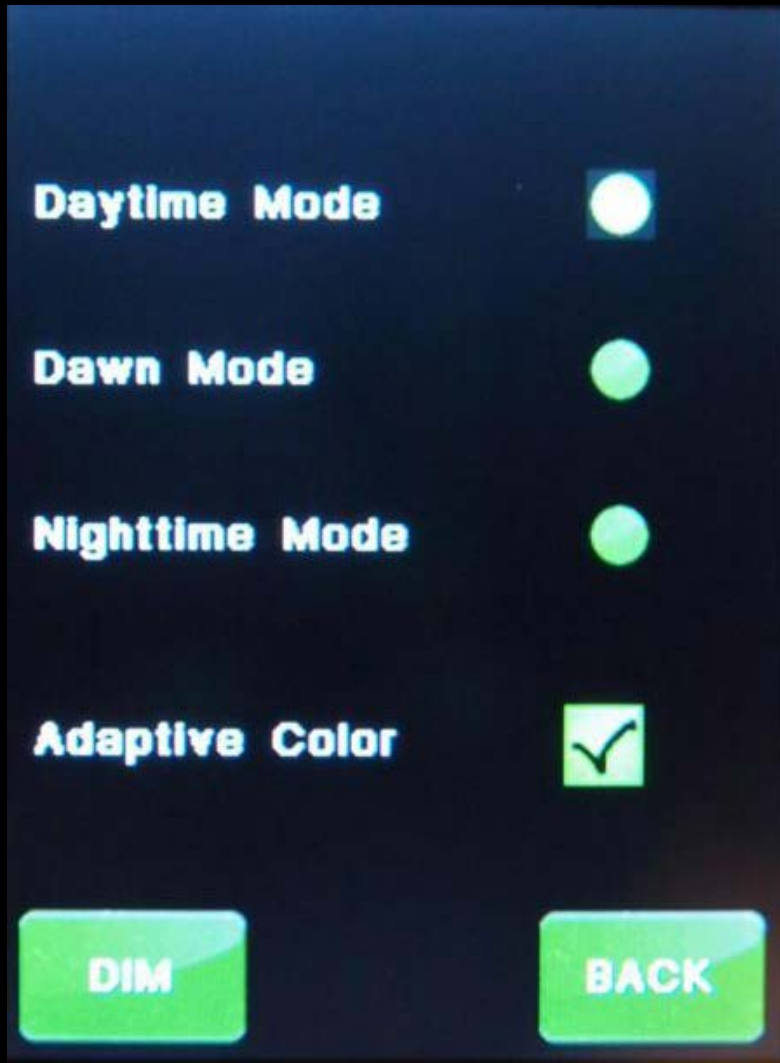
YOU CANNOT USE THIS UPLOAD FILES FUNCTION TO DO A FIRMWARE UPDATE. **If you would like to learn how to build your own catalogs, visit this wonderful site:**
http://garriou.didier.perso.neuf.fr/gemini_anglais.htm

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Daytime Mode

Dawn Mode

Nighttime Mode

Adaptive Color

DIM   BACK

This screen allows you to select the screen color you what to view the hand controller in. If the adaptive color check-box is checked, then the screen will change color automatically. Here is how it does that:

The color change is only done at startup. The altitude of the sun is calculated. Above horizon screen will be green, down to 10 degrees below horizon blue. Below 10 degrees, the color that was saved will be used. So your site and time have to be set correctly for this to happen.

If the adaptive color is unchecked, the screen will startup in what ever color is checked.

The nighttime mode screen uses X to indicate a button push. This is because the screen is so dark that a change in high-lights cannot be distinguished.
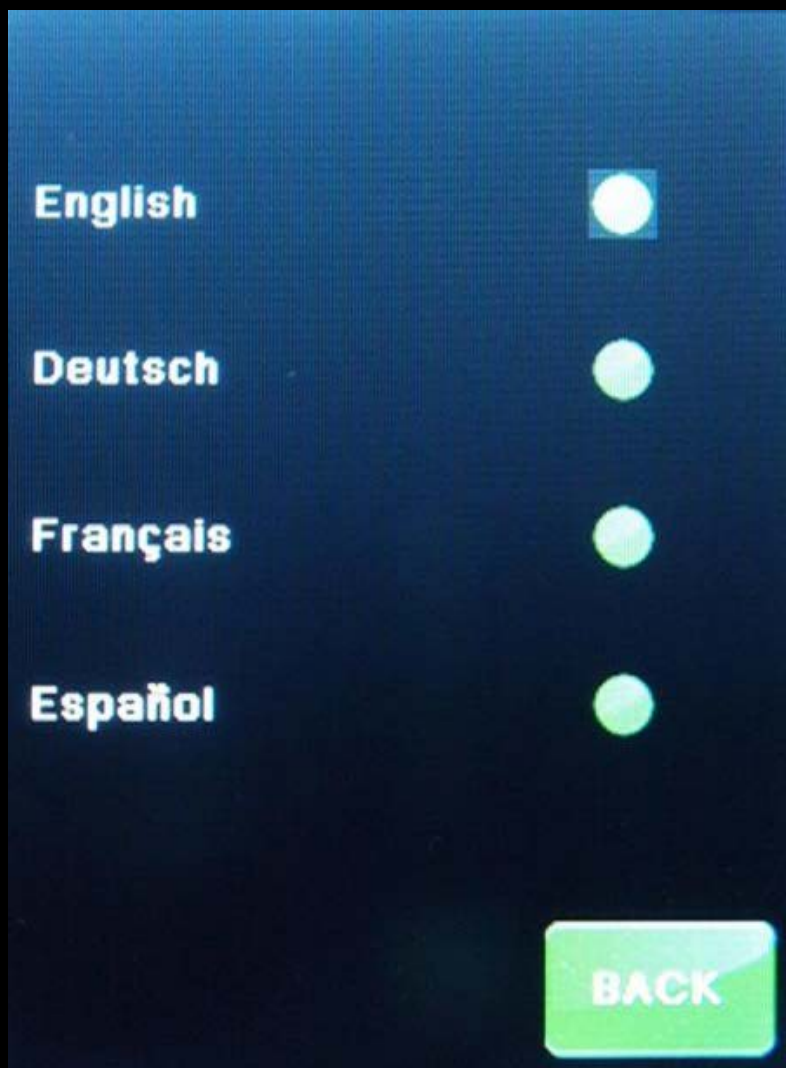
The Dim button will dim the display in 8 Steps. When not in the brightest setting a BRIGHT button will also be shown.

There is a chart on how the screen reacts on the default setting page

English

Deutsch

Français

Español

BACK

*Here you can select from
English,
Deurtsch (German),
Français (French) and
Español (Spanish) languages.
by clicking in one of the circles.*

-07

1 2 3 4

5 6 7 8

9 0 — :

Del Ent

Here is where you set your time zone offset from UTC. Note: you do have to compensate for daylight saving time in this offset. Positive offsets do not need a leading zero if they are only one digit. The Gemini 2 will take care of that. Notice offsets West of UTC is negative, and East is positive.

The date, time and this offset is used to compute the correct UTC time and date for the Gemini-2 to calculate all of the star locations, along with your latitude and longitude. The more accurate you can set the time, the more accurate your first star go to will be. Once you align on your first star, then the Gemini-2 will make corrections from that star, and any more stars you align on.

Hit "ENT" and go back to Site Menu.

If you would prefer to only work in UTC, and not have to worry about daylight saving time changes, put 0 in this screen, and then Enter the UTC time and UTC date in the Time and DATE locations menus. The Gemini-2 will be perfectly happy using only UTC.

Interactive Hand-Controller Menus - click on green button to Navigate

33:26

1 2 3 4

5 6 7 8

9 0 — :

Del Ent

This is where you enter Latitude. Latitude is positive for the northern hemisphere and negative for the southern hemisphere. You enter degrees and minutes just like you did for the Longitude. PLEASE NOTE: that the minutes are entered as 0 to 59, not decimal parts of the degree.

After you enter latitude hit "ENT", you will be taken back to the site menu.

-112:04

If you touch in the top where the -112:04 is displayed, it will go blank. You can now enter the new Longitude. You only enter degrees and minutes. This entry screen will not take seconds, so round the minutes to the nearest minute. PLEASE NOTE: the minutes are from 0 to 59. This is not a decimal part of the degrees. IE: the -112:04 is equal to -112.0667 degrees.

Please note that these entries do not modify the permanent setting. If you press on any of the sites in Site selection menu, you will loose these setting.

Hit the "ENT" key, and you will be taken back to the Site selection menu.

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Page 2 of 3 continued.

Sidereal ○

King ○

Lunar ○

Solar ○

Terrestrial ○

Closed Loop ○

Comet/User Defined ○

RA Divisor 448771

DEC Divisor 0

BACK

3. **and Moon are slightly elliptical, the apparent speed of Moon and Sun will change. When you select the lunar or solar tracking rates, the tracking speed will be calculated based on the actual position and the position one hour later. Because the Moon orbits the Earth, its RA and Dec. change during the course of the night. The lunar tracking rate compensates for the RA component of that change; there is no compensation for the changes in Dec. While sidereal rate can certainly be used for visual lunar observing, the lunar rate will do a better job keeping the Moon centered in the telescope's field of view. Since the Moon is relatively near the Earth, even the location on Earth where you are observing must be taken into account. The lunar tracking rate therefore takes the parallax into account by calculating topocentric instead of geocentric positions. Gemini computes the tracking rates by calculating the current position of the Sun or Moon and the position one hour later.**

4. **While the tracking rate for the (distant) Sun will not change much during an observing session, the tracking rate for the Moon might vary significantly as its parallax changes moving from the horizon to higher elevations and vice-versa.**

You can reselect the lunar tracking rate periodically throughout the observing session to allow Gemini to recalculate the correct rate as needed. Because the Earth is orbiting the Sun, the Sun's RA and Dec. do change during the course of the day, but much more slowly than the Moon's. The solar tracking rate again compensates for the RA component of that change, but not for the Dec. Since the difference between solar and sidereal rate is only about 4 minutes a day, you will see little difference between the two over a short period of time.

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus

Here is where you set your time zone offset from UTC. Note: you do have to compensate for daylight saving time in this offset.   Positive offsets do not need a leading zero if they are only one digit. The Gemini 2 will take care of that. Notice offsets West of UTC is negative, and East is positive.

The date, time and this offset is used to compute the correct UTC time and date for the Gemini-2 to calculate all of the star locations, along with your latitude and longitude. The more accurate you can set the time, the more accurate your first star "GOTO" will be. Once you align on your first star, then the Gemini-2 will make corrections from that star, and any more stars you align on.

Hit "ENT" and go back to the previous menu.

If you would prefer to only work in UTC, and not have to worry about daylight saving time changes, put 0 in this screen, and then Enter the UTC time and UTC date in the Time and DATE locations. The Gemini-2 will be perfectly happy using only UTC

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This is the date setting screen. You set your local civil date. It is in Day (two digits) . Month (two digits) . year (four digits).
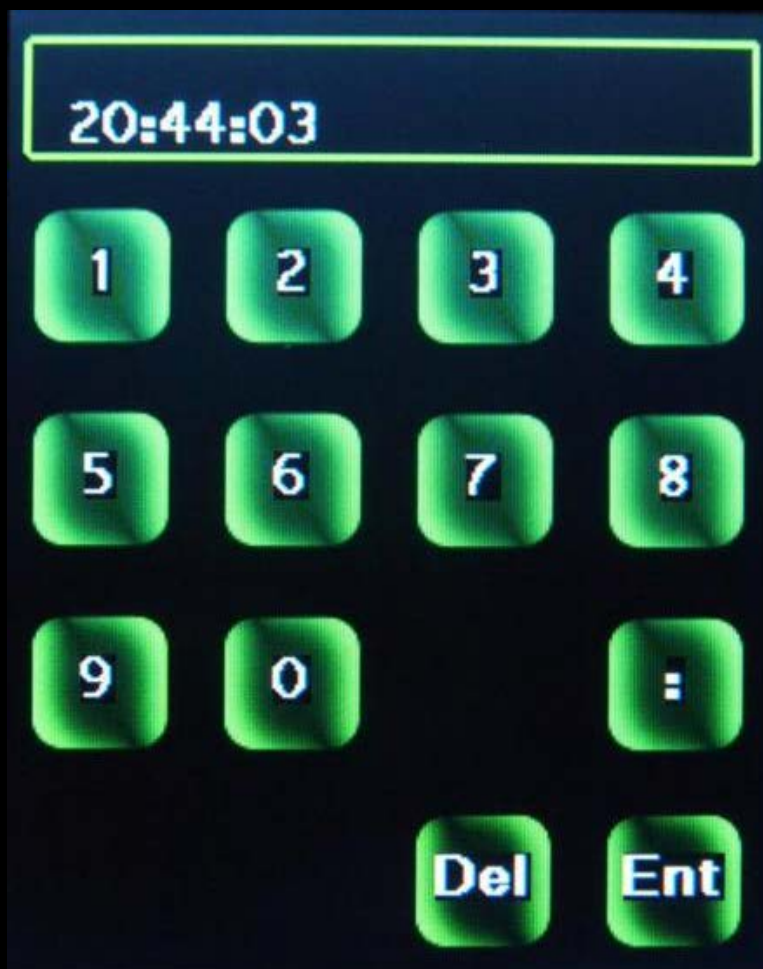
Hit "ENT" and go back to the previous menu.

NOTE: If you use Zero as the offset, and your local time is not UTC, you will need to enter the UTC date in this menu, for the Gemini-2 to would only with UTC time and Date.

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20:44:03

1	2	3	4
5	6	7	8
9	0		:
		Del	Ent

This is the screen where you enter your local time. Enter your time in 24 hour format. Put one: between Hours: Minutes: Seconds

Normally, I enter the time at least 30 seconds in the future. This gives me time to get back on time / date screen (click "ENT" to go back) then click the "Set" button on this screen to set the correct time.

NOTE: Again, if you only use the UTC time by adjusting the offset to zero, then enter the UTC time in this screen.

Object Name:
Adara CMa
Object Information:

No information available!

Right Ascension:
06:58:36
Declination:
−28:58:19

JD2000 ✓   Flip ☐

GoTo   NEXT   BACK

This is an example of one of the stars that will come up. If you noticed, I had not even entered a selection letter in the top menu of the previous screen.

Here you can select to use JD2000 coordinates system or JNOW coordinates system. JD2000 is default.

If you what the mount to try and do a flip to get to the star select that.

Note that the mount will only do a flip if it can safely reach the star by doing a flip, otherwise it will ignore it.

Hitting the GoTo button will take you to the Star.

Hitting the NEXT button will pick the next star/object.

Now that you see how the catalog tout works, please hit back. This will take you to the main GoTo menu.

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Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

-6	Dubhe α UMa	23
+2	Hamal α ARI	61
+5	Markab α PEG	19
+1	Mekab α CET	56
+3	Mirak β AND	53
+1	Mirfak α PER	71
+2	Polaris α UMi	34
-3	Pollux β GEM	43

DOWN   **UP**   **BACK**

The first one should be near the celestial equator (Dec. near 0) and within about 20° of the eastern or western horizon (about + or - six hours east or west).

I choose Dubne for my first star so for this demo please click on Dubne.

Notice the numbers on the left are the hour angles of the RA and the numbers on the right are the Dec in degrees.

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GoTo Zosma & LEO

10:18:43   +59:37:17

CENTER   20:21:38

SPEED   MENU   GoTo

You now have to center the object using either the button the front of the Hand controller or the buttons on the back of the hand controller. If you have want is called a Standard (Classic) hand controller hooked up to the Standard Hand controller port, you can use that also. You can also use the Web interface, or the ASCOM hand controller. Basically, any method that will center the star will work. But please NOTE that YOU HAVE TO COME BACK HERE AND HIT THE GOTO BUTTON after centering the star.

Hit the GOTO button now.

Interactive Hand-Controller Menus - click on green button to Navigate

Telescope Model Builder
Model 1 (East)

Unukalhai α SER
HA: −3.7h   El: 32°

East   **West**

Align

Reset   **BACK**

You will hit "ALIGN" if this STAR is acceptable. If not just hit East or West to go to the next star selection. Hitting Align will also take you to the menu that shows the alignment errors for your mount.

The reset is to clear the last star added to the alignment.

Please hit Align for this Demo

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus

-07

1 2 3 4

5 6 7 8

9 0 — :

Del Ent

Here is where you set your time zone offset from UTC. Note: you do have to compensate for daylight saving time in this offset. Positive offsets do not need a leading zero if they are only one digit. The Gemini 2 will take care of that. Notice offsets West of UTC is negative, and East is positive.

The date, time and this offset is used to compute the correct UTC time and date for the Gemini-2 to calculate all of the star locations, along with your latitude and longitude. The more accurate you can set the time, the more accurate your first star "GOTO" will be. Once you align on your first star, then the Gemini-2 will make corrections from that star, and any more stars you align on.

Hit "ENT" and go back to the previous menu.

NOTE: If you set the time-zone offset to Zero (0) and use UTC time on the Time set screen, then you never have to worry about daylight time changes. You will also have to use the UTC date.

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Interactive Hand-Controller Menus - click on green button to Navigate

04/09/12

1 **2** **3** **4**

5 **6** **7** **8**

9 **0** **/**

Del **Ent**

This is the date setting screen. You set your local civil date. It is Month (two digits) / Day (two digits) / Year (two digits).

NOTE: the German, French and Spanish menu use the European style of date entry:
Day (two digits).Month(two digits).Year(four digits) such as 09.04.2012

Hit "ENT" and go back to the previous menu.

NOTE: If you use Zero as the offset, and your local time is not UTC, you will need to enter the UTC date in this menu, for the Gemini-2 to would only with UTC time and Date.

20:44:03

1 2 3 4

5 6 7 8

9 0 :

Del Ent

This is the screen where you enter your local time. Enter your time in 24 hour format. Put one: between Hours: Minutes: Seconds

Normally, I enter the time at least 30 seconds in the future. This gives me time to get back on time / date screen (click "ENT" to go back) then click the "Set" button on this screen to set the correct time.

NOTE: Again, if you only use the UTC time by adjusting the offset to zero, then enter the UTC time in this screen.

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

V

1AB	2CD	3EF	4GH
5IJ	6KL	7MN	8OP
9QR	0ST	-+	UVW
XYZ	:	Del	Ent

We now have a V selected in the upper menu. When we hit "ENT" to go to a star starting in this case with a V.

The Del key only deletes entered letters/numbers.

Copyright by http://www.gemini-2.com

PEC trained!

20:33:22   +90:00:00

GUIDE   12:57:13

SPEED   MENU   GoTo

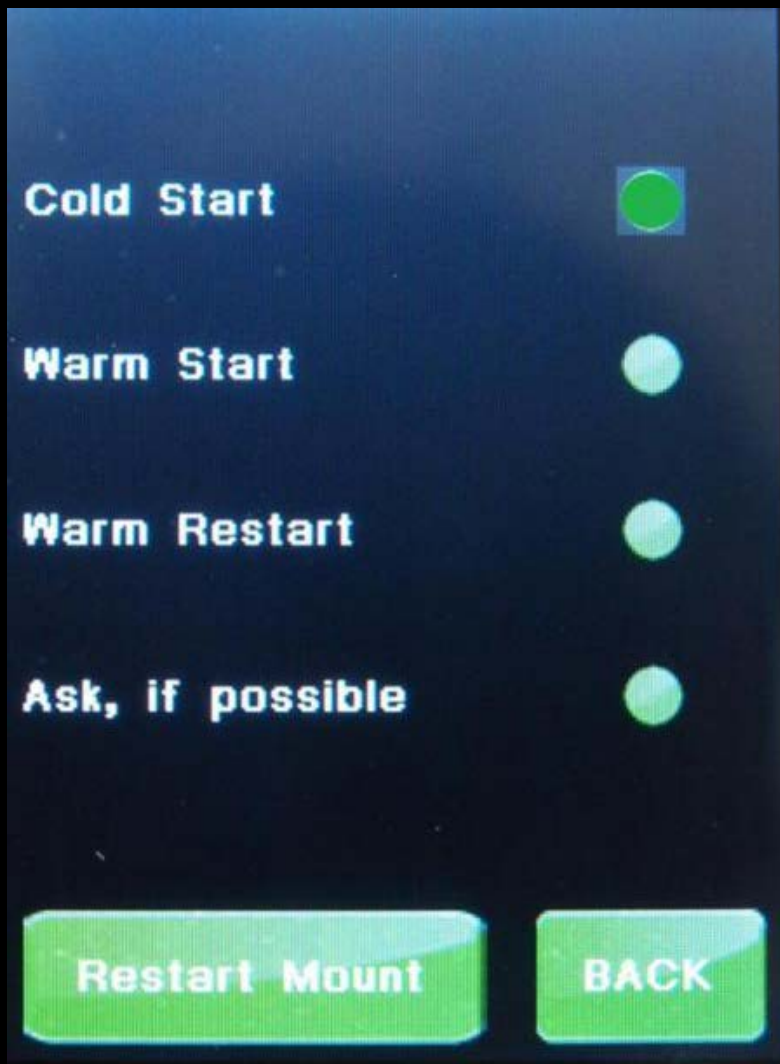As you can see the message has changed to "PEC Trained"

To see the PEC menu again, you will have to go through all the menus again starting with "MENU-->Mount-->PEC"

To see what the PEC menu will look like after PEC is Trained, Click on the PEC Trained in the left menu.

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Interactive Hand-Controller Menus - click on green button to Navigate

Cold Start ⬤

Warm Start ⬤

Warm Restart ⬤

Ask, if possible ⬤

Restart Mount   **BACK**

This is where you can set the default startup mode. If you select "Ask, if Possible" then the Gemini-2 will prompt you for the startup mode, unless it determines a Cold Start is the only possible mode.

Also by hitting the Restart mount button, the mount will be started from the beginning.

How it starts will be determined by which mode was selected.

For this demo, We have Ask, If possible selected, so if you press Restart mount, it will go to the startup menu.
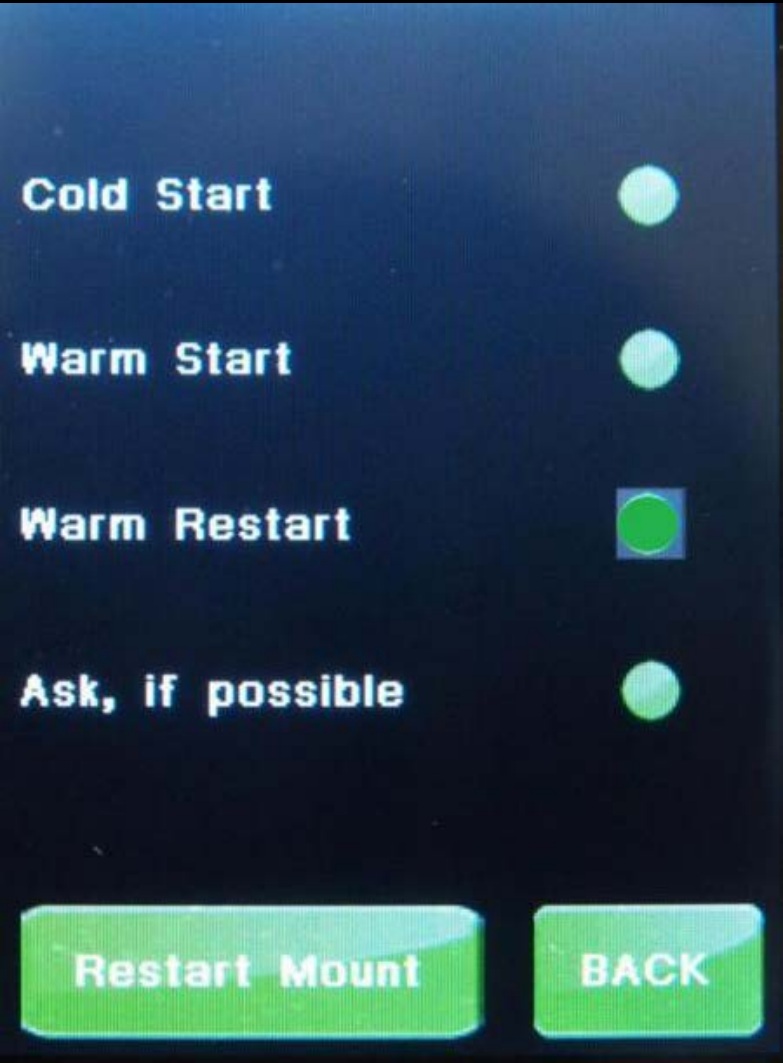
If Cold start is selected it will go to the Function menu, where PAA, Modeling or Catalog Tour can be selected.

If Warm Start or Warm Restart is the selected mode, then it will go to the main menu.

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Cold Start

Warm Start

Warm Restart

Ask, if possible

Restart Mount   BACK

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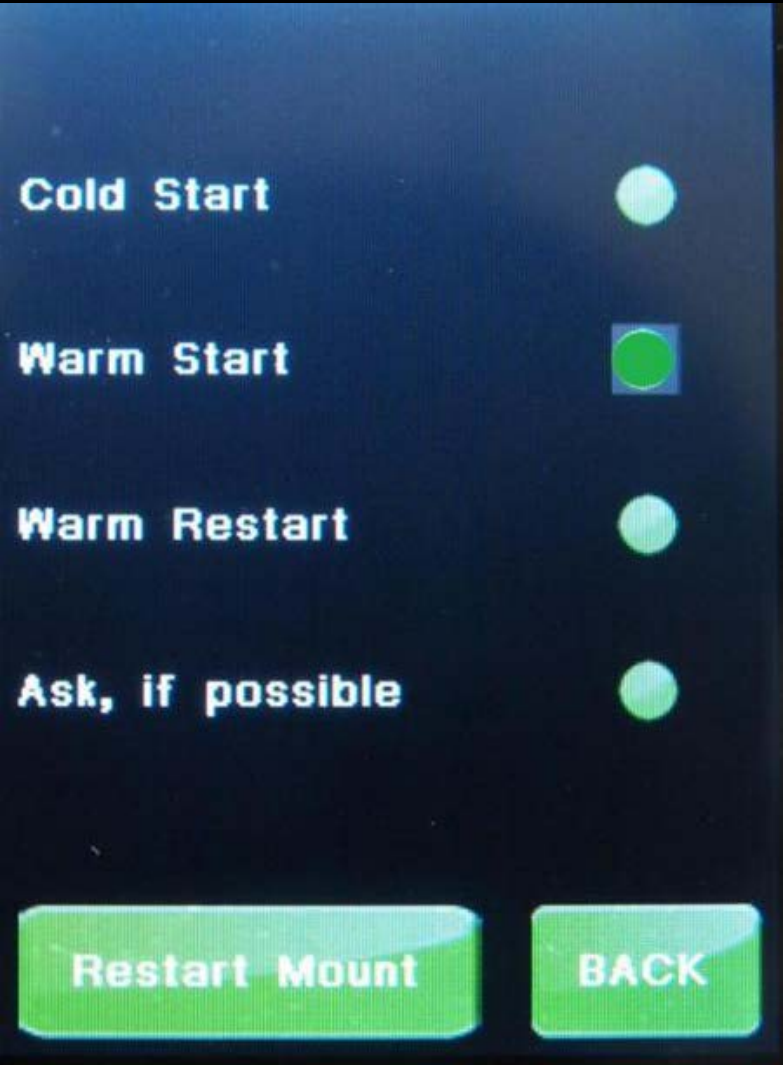
If Cold start is selected it will go to the Function menu, where PAA, Modeling or Catalog Tour can be selected.

If Warm Start or Warm Restart is the selected mode, then it will go to the main menu.

Cold Start

Warm Start

Warm Restart

Ask, if possible

Restart Mount   **BACK**

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If Cold start is selected it will go to the Function menu, where PAA, Modeling or Catalog Tour can be selected.
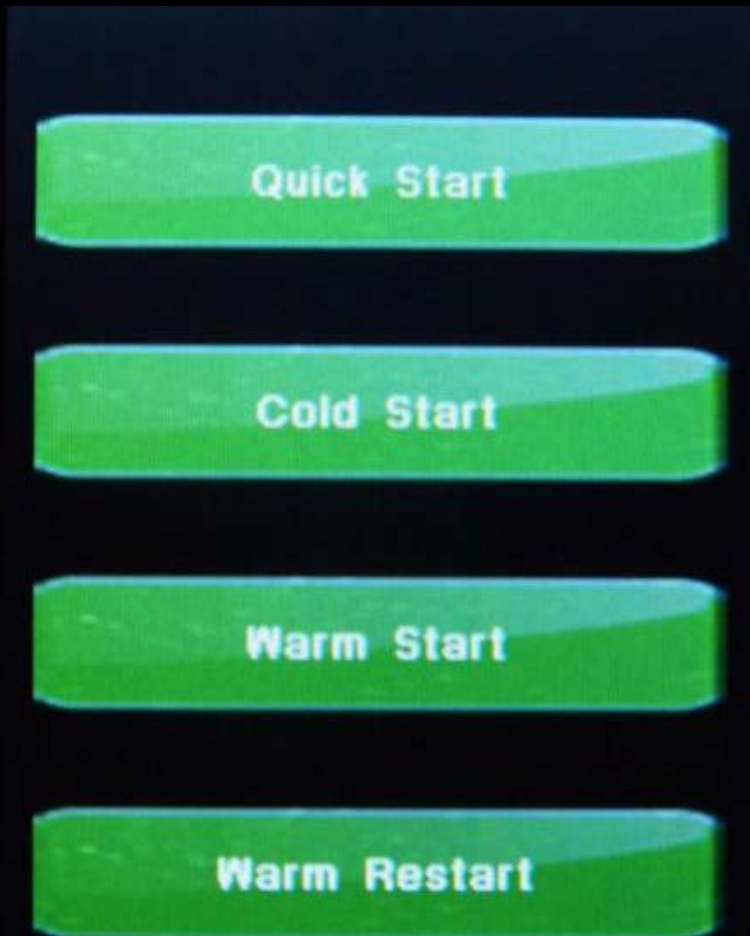
If Warm Start or Warm Restart is the selected mode, then it will go to the main menu.

You have 4 choices for startup.

Quick Start - This selection will take you to menu's to select your "Mount Type", Enter your "Location", then "Time, Time Zone and Date" Then you will go to the "Main Screen" This also does a "Cold Start".

Cold Start - A cold start wipes out all stored modeling. You need to have your mount positioned at want is called CWD. This is with the counter weights down, and the Declination pointed towards Polaris in the Northern Hemisphere, and the Southern Cross in the Southern Hemisphere.

Warm Start - This is basically the same as a cold start, but does not wipe out any models build. It also remembers all your setting. You still must start with the mount pointed to CWD position as in a cold start. If you have models build, but have moved your Right Ascension axis or Declination axis, but not the location of the mount itself, then you can use this startup mode.

Warm Restart - This mode also remembers your modeling and all setting. You can only use this mode if, and only if you have not moved both the Right Ascension axis or Declination axis and also have not moved the mount in position.

Quick Start

Cold Start

Warm Start

Warm Restart

If this is your first time operating the mount select the Quick Start option. All buttons do take you to the appropriate menu. There is also a menu that can select which default mode the Gemini-2 starts up in.

You will see this menu if you have "Ask if possible" selected as the default start up mode. That menu is under "Mount" then "Startup" in a later menu.

Courtesy of http://Gemini-2.com

This is some of the default setting on the Gemini-2

This is the default Gearing settings for the different types of mounts, in the Gemini-2

	Titan 50	Titan 25	G11	MI-250	G8	HGM200
RA Worm	-270	-270	360	-360	180	-360
Dec worm	-250	-270	360	-360	180	-360
RA Spur Gear	50	25	25	25	25	25
DEC Spur Gear	50	25	25	25	25	25
RA Motor Encoder	256	256	256	256	256	256
Dec Motor Encoder	256	256	256	256	256	256

How the color setting react in Gemini-2 hand controller

Adaptive Color Checked*	Startup Daytime	Startup Sunset	Startup Night
Daytime mode selected	Green	Green	Green
Dawn mode selected	Green	Blue	Blue
Nighttime mode selected	Green	Blue	Red
Adaptive color Not Selected			
Daytime mode selected	Green	Green	Green
Dawn mode selected	Blue	Blue	Blue
Night time mode selected	Red	Red	Red

*If Adaptive color is selected + Daytime Mode Selected, and the Gemini is started up before Sunset, it will turn blue at shortly after sunset, and then red later in the night.
If Adaptive color is selected + Dawn Mode Selected, and the Gemini is started up after Sunset, it will start blue and, and then red later in the night.

Copyright by http://www.gemini-2.com

0.0.0.64

1	2	3	4
5	6	7	8
9	0		.
		Del	Ent

You can set the desired Primary DNS server here.

This setting normally is not that critical, as it normally used for a Ethernet device to find a Domain Name Server, so that a domain name can be changed into an IP address.

If your system cannot find Http://Gemini then try setting this to the default address of your router base IP address.

Copyright by http://www.gemini-2.com

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

192.168.0.1

1 2 3 4

5 6 7 8

9 0 .

You can set the desired Default Gateway here. This is normally the default address of your router base IP address.

Del Ent

Copyright by http://www.gemini-2.com

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

255.255.255.0

1	2	3	4
5	6	7	8
9	0		.

Del Ent

You can set the desired NETMASK here.

In just about all cases the net mask should be set to 255.255.255.0

Copyright by http://www.gemini-2.com

You can set the desired IP address that you want the Gemini-2 to use to connect to your computer with. The default is 192.168.0.111

A similar menu (not shown) is used to set the net mask. In just about all cases the net mask should be set to 255.255.255.0

Copyright by http://www.gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

BSL

Combined_Constellation_Stars

IC

LBN

LDN

Messier

NGC

PN

DOWN   **UP**   **BACK**

This menu will let you Delete any of the catalogs from the micro-SDcard You can only delete whole catalogs, not the individual entries in them.

Clicking on any of the catalogs will delete it from the Hand Controller SDcard. You will be prompted for a confirmation menu before deleting the file.
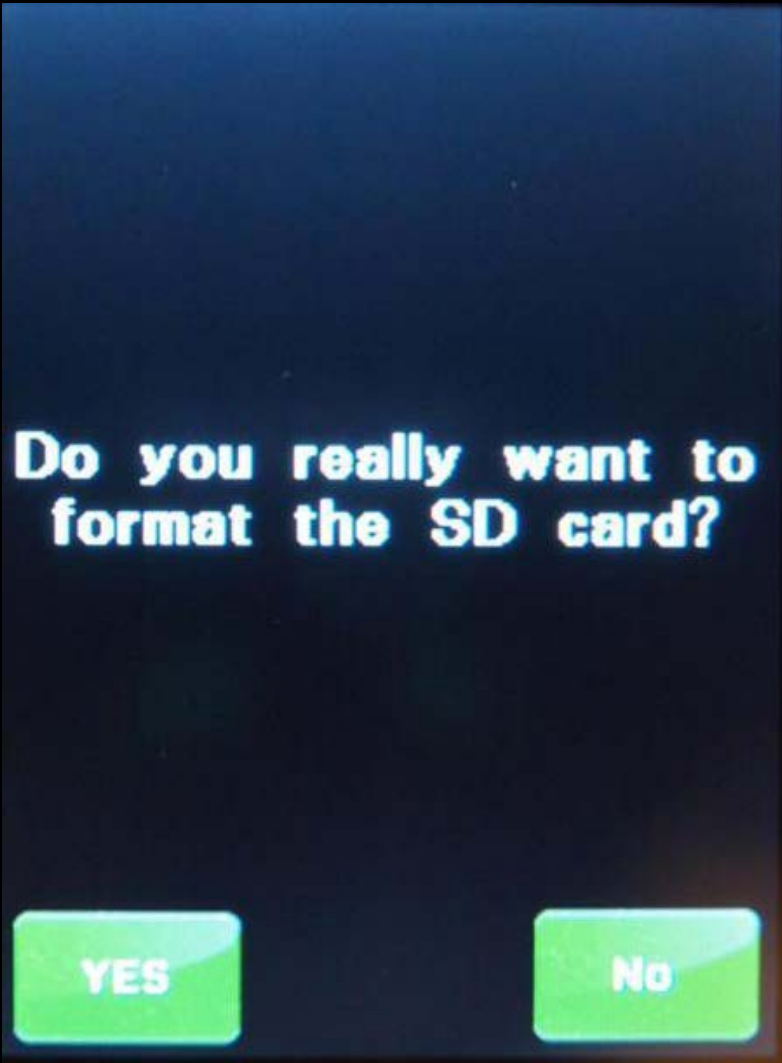
You can select on any Catalog name to see the confirmation menu, or hit back to return to the SDcard menu.

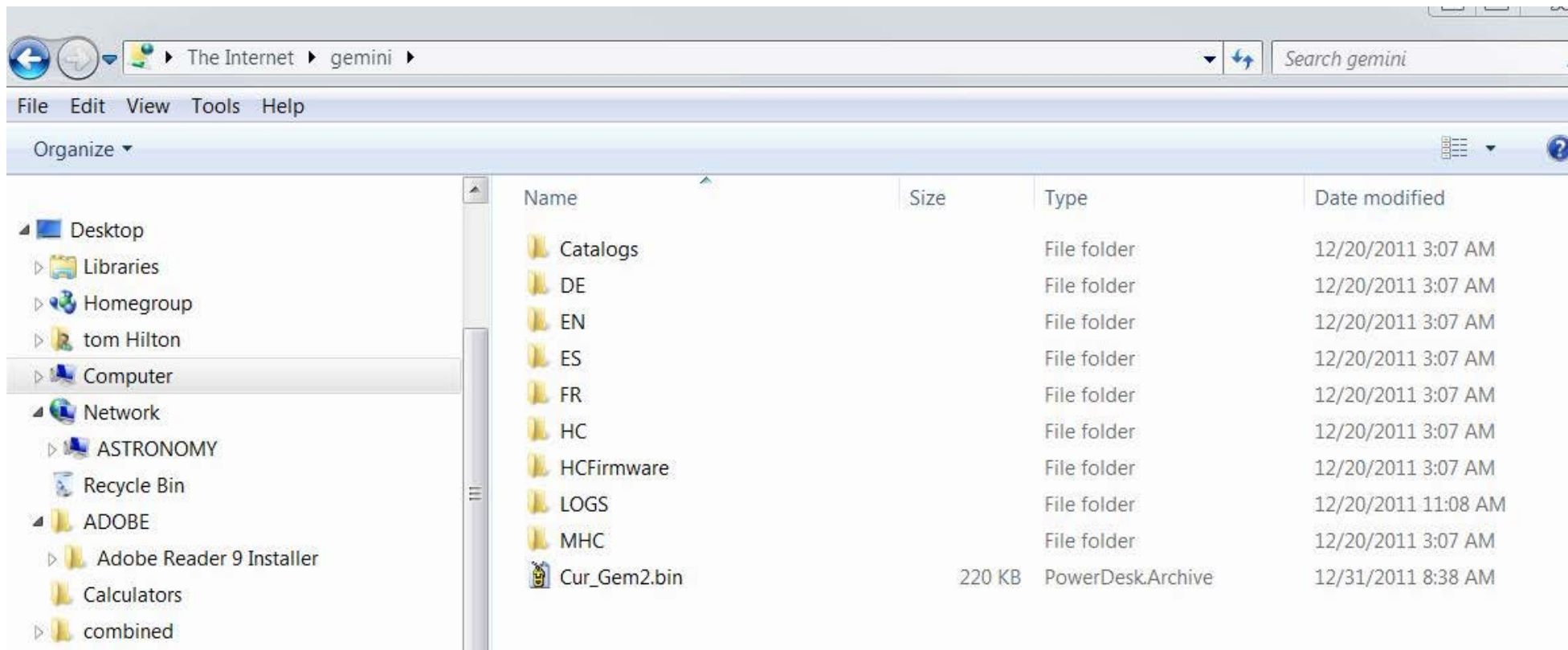*You also may use the up and down buttons.*

Format Yes? No?

If you press YES, the micro-SDcard in the hand controller will be formatted, and the directory structure will be put back. However none of the files will be put back.

You can restore the catalogs by putting them in the Firmware directory of the micro-SDcard in the main Gemini-2 unit. You can also put the GemLogo.b16 file in the same directory, and it will also be uploaded to the correct location.

You would then use the Upload Files command from the SD card menu, to cause all the files in the Firmware directory to be uploaded to the hand controller.

NOTE: the upload Files button does not upload the programing file gemhc.bin to the hand controller. That is only done when the hand controller is powered up, either by turning the complete Gemini-2 unit off and on, or unplugging and re-plugging the hand controller when power is applied to the main Gemini-2 unit.

Page 3 of 3 continued.

Sidereal
King
Lunar
Solar
Terrestrial
Closed Loop
Comet/User Defined

RA Divisor 448771
DEC Divisor 0

BACK

5. *Adaptive King Tracking Speed: In the absence of the Earth's atmosphere, sidereal rate tracking would be all that is needed to accurately track objects with fixed RA and Dec. coordinates (any object outside the solar system). However, because the Earth's atmosphere refracts (bends) light, it complicates the situation. The light from an object close to the horizon must pass through more atmosphere than an object higher in the sky. It is therefore subject to more refraction, causing the object to appear to be slightly higher in the sky than it actually is. This is called refraction. As the object climbs higher in the sky, it is subject to less and less refraction, and catches up with its refracted image. This means that objects appear to move at a rate slightly slower than sidereal rate when they are close to the horizon. Several methods have been devised to compensate for this effect called "differential refraction."*
The King method (published 1931 by Edward Skinner King) helps to avoid star trailing in photographs caused by differential refraction. Differential refraction may especially affect wide field photographs with long exposures.

King proposed two measures: • Offsetting the polar axis slightly towards the zenith, and • Adjusting the tracking rate. The values necessary to accomplish this depend on the geographical coordinates of the observing site and the declination of the object being photographed. Gemini's Adaptive King rate tracking varies the tracking speed to match the required value for the selected object's declination. The user must offset the elevation of the polar axis himself.

6. *Closed Loop Tracking Speed: The preceding discussion of tracking rates assumes that the mount is accurately polar aligned, allowing tracking to be accomplished using only the RA motor. However, for visual observing sessions, there is no need for extremely accurate polar alignment. By selecting Closed Loop tracking, Gemini can accurately track an object even if polar alignment is off several degrees in any direction. Gemini does this by comparing the coordinates of the object being tracked with the actual coordinates of the telescope. If the coordinates do not match, Gemini makes slow corrections in both RA and Dec. axes to point the telescope back at the object. This process of compare and correct is done about 22 times per second. Although Closed*
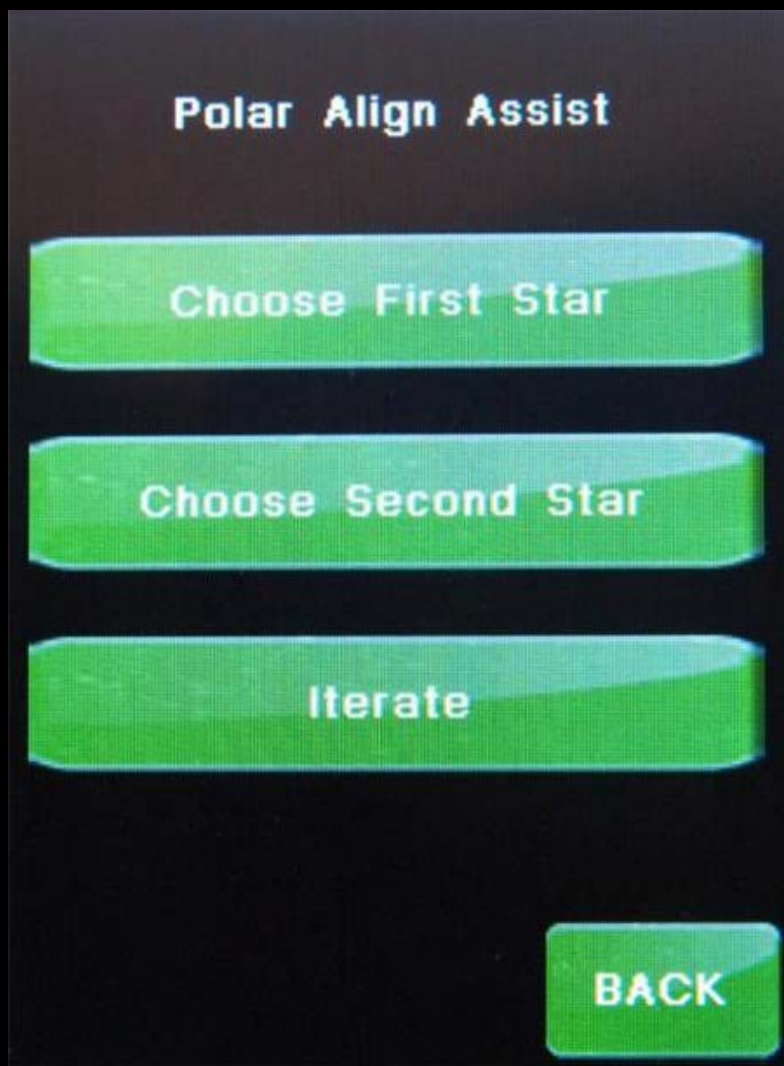
Loop tracking will keep an object centered for a long time, it is not a substitute for a good polar alignment – especially if you intend to photograph extended objects. A misaligned polar axis will lead to field rotation, an effect where objects in the field of view will rotate around the center. However, after having done a good polar alignment, Closed Loop tracking can be used to photograph slow moving objects, such as minor planets or comets. This can work even if the object moves at a varying speed, by repeatedly sending actual coordinates to the Gemini using a computer. Because Gemini uses modeling parameters to calculate coordinates, Closed Loop tracking is only available after a pointing model has been established.

7. <u>*Comet/User Tracking Speed:*</u> *This rate is very complex and a separate web page will be generated for it, at a much later date.*

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Polar Align Assist

Choose First Star

Choose Second Star

Iterate

BACK

We now have to choose the second star. So hit Choose Second Star.

Telescope Model Builder
Model 0 (West)

Zosma δ LEO
HA: +0.8h   El: 71°

East

West

Align

Reset

BACK

You will hit "ALIGN" if this STAR is acceptable. If not just hit East or West to go to the next star selection. Hitting Align will also take you to the menu that shows the alignment errors for your mount.

The reset is to clear the last star added to the alignment.

Please hit Align to continue this Demo

Model 1 (East)

HA Index Error	591
DEC Index Error	363
Polar Axis Azimuth	0
Polar Axis Elevation	0
Non-Perpendicularity	0
Non-Perpendicularity	0
Counterweight Flexure	0

[UnDo]   [Switch]   [BACK]

Notice that you only have only one or 2 entries for the Error Index. Only the HA Index Error and Dec Index Error is calculated on the first star.

You have just added your first star to the East model.

You use the BACK button to take you to the next Star selection screen.

The Switch button will switch the Error screens between the East and West model Error screens.

The UNDO button will remove the Last star added to the model.

Please hit Back for this Demo

This screen shows the mount alignment parameters that the current model has.

The math behind calculating these errors:
1st alignments set the index parameters ID, IH.

2nd..5th alignments calculate MA, ME additionally.

6th..9th alignment add CH and NP non-perpendicularity parameters to the model.

From 10th alignment up counterweight flexure DAF is added.

Copyright by http://www.gemini-2.com

Object Name:
Vega α Lyr
Object Information:

No information available!

Right Ascension:
18:36:55
Declination:
+38:47:00

JD2000 ✓   Flip ☐

Below Horizon!

| GoTo | NEXT | BACK |

It just happens that the Vega screen was selected.

But notice the message "Below Horizon!"

There is a check box for JD2000, it is recommend that you keep this checked.

The Flip box if checked will let the mount try and flip to reach the target. It does not enforce a flip, but if the mount can do a flip and reach the target safely, then it will.

If the only way the mount can reach the target safely is to do a flip, it will, even if the Flip box is not checked.

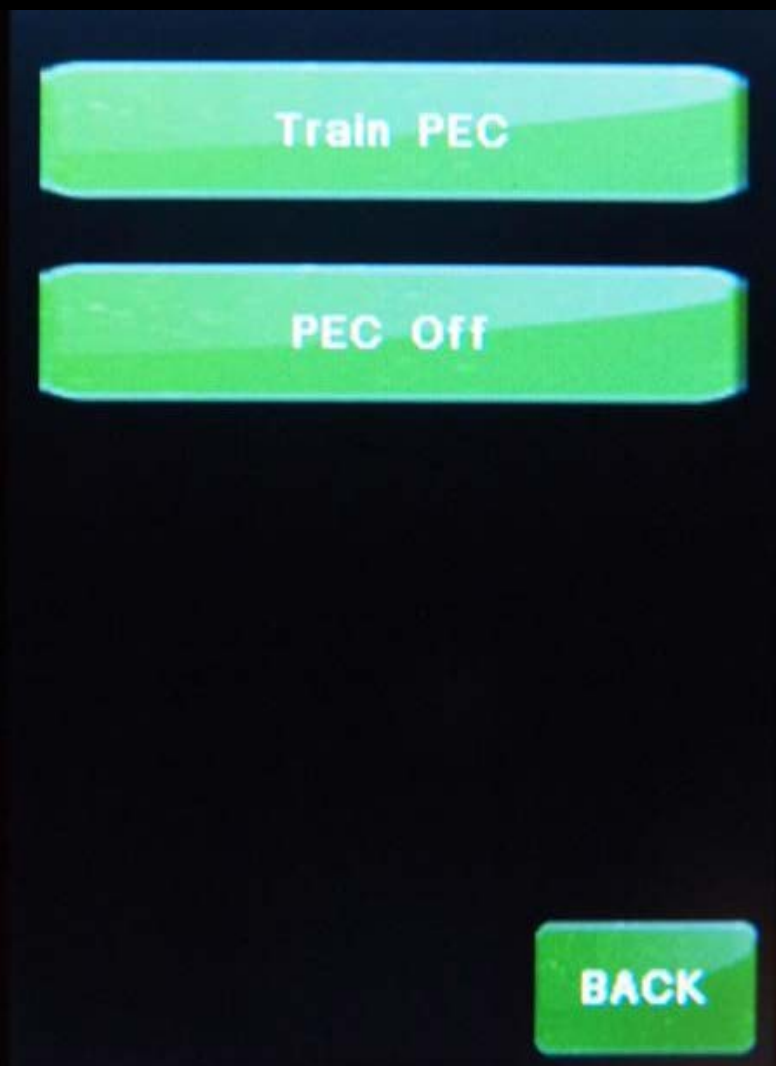*Since Vega is below the Horizon, lets hit the next button and see if there are any more stars that started with a V.*

Hit the NEXT button.

Train PEC

PEC Off

This menu will appear if you have a PEC curved saved.

You can retrain PEC or turn PEC off.

Notice that the turn PEC On and turn PEC off button alternates with each other.

BACK

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Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

Need help aligning the mount?

Polar Align Assist

Assistance building a model?

Modeling

Tour a catalogue?

Catalog Tour

BACK

Before using this menu, I suggest that you set your [safety limits](#).

We are going to select modeling from this screen. The Polar Align Assist has to be done before a model is built. It will help you get within about 1 to 2 degrees of the pole.

The catalog tour lets you tour catalog objects that are above the horizon.

Please select Modeling.

Some misconceptions about modeling. Modeling helps to provide better tracking: Nope this is wrong. Modeling only helps provide for better GO-TO's. The only thing that really helps accurate tracking is a excellent Polar alignment. If your polar alignment is dead on, and your time, time zone offset, latitude and longitude are dead on, then the G2 should provide accurate tracking, but of course other factors such as gear slop, mount imperfections, balance imperfections, and atmospheric refraction can cause tracking errors, you might not see perfect tracking.

you can also get to this screen from Menu--> Function

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20:16:33   +90:00:00

SLEW   12:48:54

SPEED   **MENU**   **GoTo**

This is the main menu where all other functions can be Navigated from:

The Top box has 2 messages lines that displays the current status in the top and the previous in the second line. This sometimes changes when other functions are being preformed also, such as GOTO's.

The four diamond buttons are movement buttons. The top and bottom button are for the Dec, and the left and right button are for RA. They will move the mount at the speed selected by the speed button on the lower left. The Speed button will take you through Slew, Move, Center and Guide speeds, and then back to Slew.

Now the direction buttons have two modes of operation. If you push down and slide you finger off the button the mount will keep moving in the direction of the button until you press it again. If you press and hold, and the let off without sliding your finger off, it works like a normal button.

Since the graphics screen is not multi-touch, if you use the finger slide off method, and touch the opposite button, the mount will speed up. The speeds are in the same order as the speed button.

The Menu button will take you to Main-Selection-Menu. The "GOTO" button will take you to the GOTO menu where you select a Catalog, The Solar System, Coordinate input, Do a bookmark, or Park the mount.

The buttons on the back of the hand controller work like the buttons do on the Gemini-1, and are multi-touch.

Copyright by http://www.gemini-2.com

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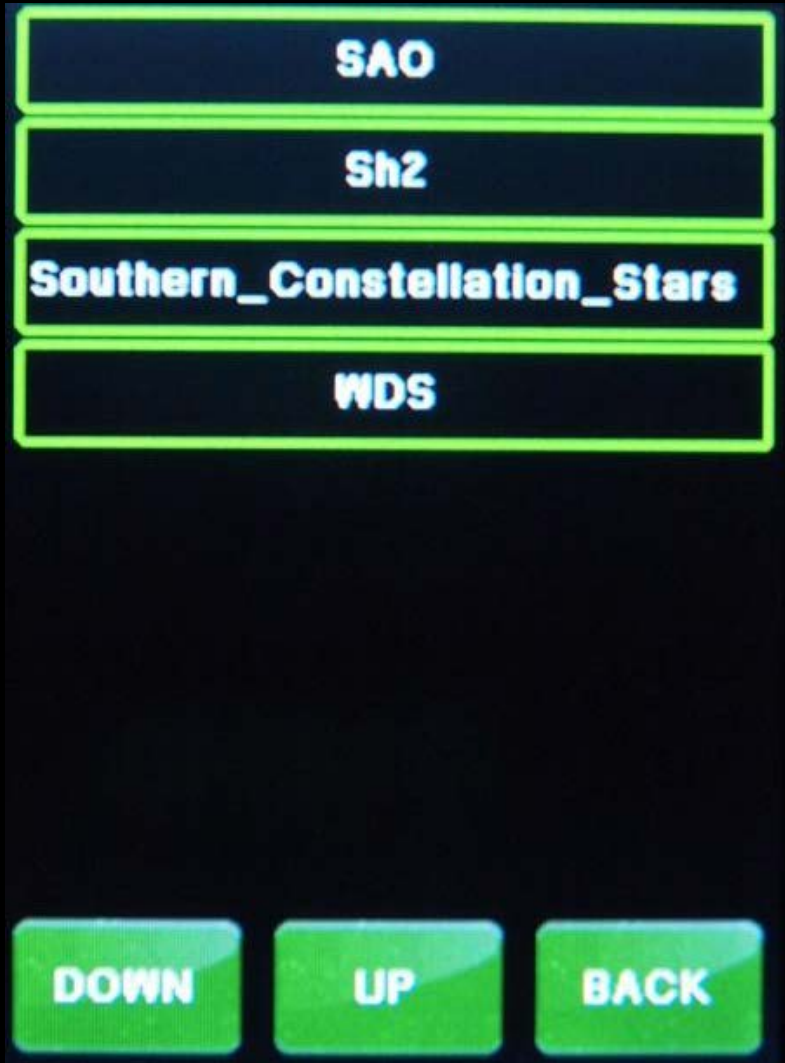
The buttons on the back of the hand controller work like the buttons do on the Gemini-1, and are multi-touch.

SAO

Sh2

Southern_Constellation_Stars

WDS

This menu will let you Delete any of the catalogs from the micro-SDcard You can only delete whole catalogs, not the individual entries in them.

Clicking on any of the catalogs will delete it from the Hand Controller SDcard. You will be prompted for a confirmation menu before deleting the file.

You can select on any Catalog name to see the confirmation menu, or hit back to return to the SDcard menu.

You also may use the up and down buttons.

DOWN   UP   BACK

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Are you sure you want to delete this file?

YES   **No**

This menu will let you Delete any of the catalogs from the micro-SDcard You can only delete whole catalogs, not the individual entries in them.

Clicking on any of the catalogs will delete it from the Hand Controller SDcard.

Courtesy of http://Gemini-2.com

Interactive Hand-Controller Menus - click on green button to Navigate

+0	Aldebaran α TAU	72
+4	Algenib ϒ PER	33
+4	Alpheratz α AND	39
−1	Betelgeuse α ORI	54
+0	Capella α AUR	72
+4	Caph β CAS	43
−2	Castor α GEM	47
+3	Diphda β CET	18

| DOWN | UP | BACK |

The other star should be near the meridian (such as Polaris in the northern hemisphere).

I am going to choose Capella, so for this demo click on Capella.

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Model 0 (West)

HA Index Error	76
DEC Index Error	-352
Polar Axis Azimuth	0
Polar Axis Elevation	0
Non-Perpendicularity	0
Non-Perpendicularity	0
Counterweight Flexure	0

[UnDo] [Switch] [BACK]

Notice that you only have only one or 2 entries for the Error Index. Only the HA Index Error and Dec Index Error is calculated on the first star.

You use the BACK button to take you to the next Star selection screen.

The Switch button will switch the Error screens between the East and West model Error screens.

The UNDO button will remove the Last star added to the model.

Please hit Back for this Demo

Telescope Model Builder
Model 1 (East)

Zuben Elgenubi α LIB

HA: −2.8h   El: 26°

East   **West**

GoTo

Reset   **BACK**

You are now adding the second star to the model. If you do not want this star, hit the East button.

If you want to do a star on the West, just hit the West button. (Note: if you hit the west button and the mount thinks it can reach it without doing a meridian flip, it will try and go to it without the flip. You really need to make sure that your limits are set. If they are not, then the mount could hit and do damage to your telescope or mount.

See Menu-->Mount--Limits) For some reason, my Gemini will not let me pick a Western star, without taking the DEC through 90 degrees using the main menu. See note below Picture.

Also stars on the west side that are close to the meridian can be added to the East model. If the mount does not pass 90 degrees Dec (IE do a meridian flip, then you are still building a model on the east. The same holds true when going from a model being built on the west to the east. This is actually designed this way to help refine each model as you move from east to west or west to east.

If you are happy with the star it selects, then hit "GOTO". This tutorial does not let you select different stars - so Please hit GOTO.

Object Name:

Vindemiatrix Vir

Object Information:

No information available!

Right Ascension:
13:02:09

Declination:
+10:57:32

JD2000 ✓   Flip
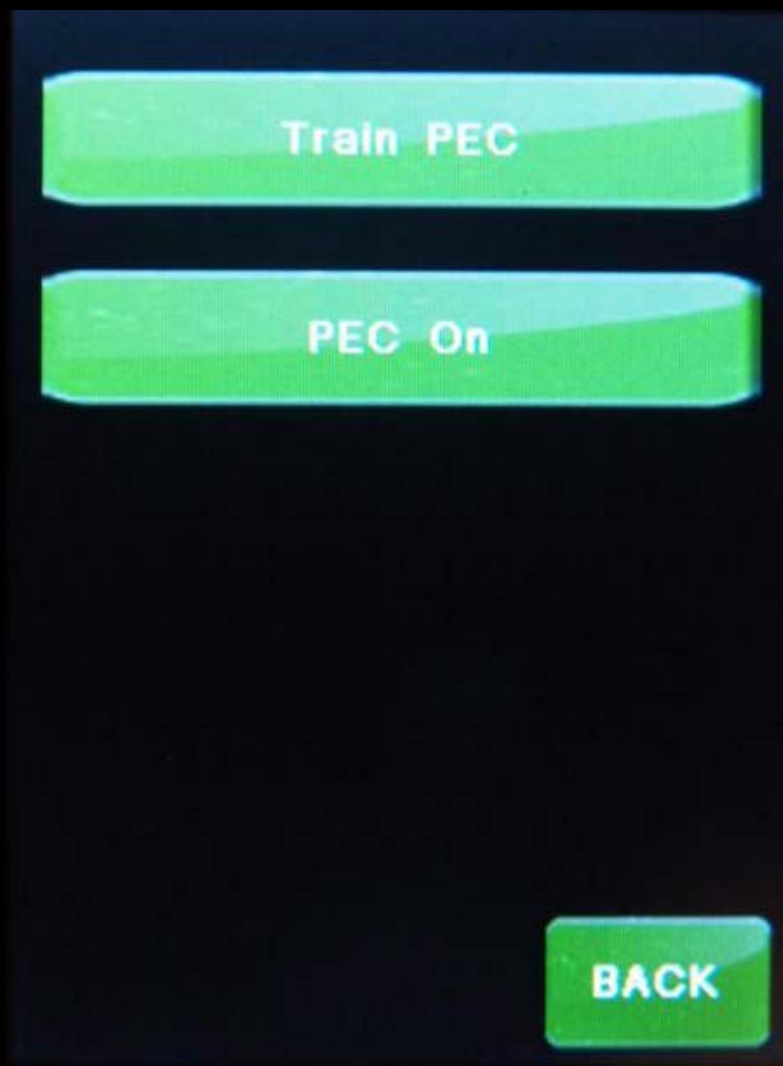
GoTo   **NEXT**   **BACK**

Well there is another star that starts with a V in the list. "Vindemiatrix"

Lets select the "GOTO" button.

Copyright by http://www.gemini-2.com

Train PEC

PEC On

This menu will appear if you have a PEC curved saved.

You can retrain PEC or turn PEC on.

Notice that the turn PEC On and turn PEC off button alternates with each other.

BACK

Copyright by http://www.gemini-2.com

Polar Align Assist

Choose First Star

Choose Second Star

Iterate

BACK
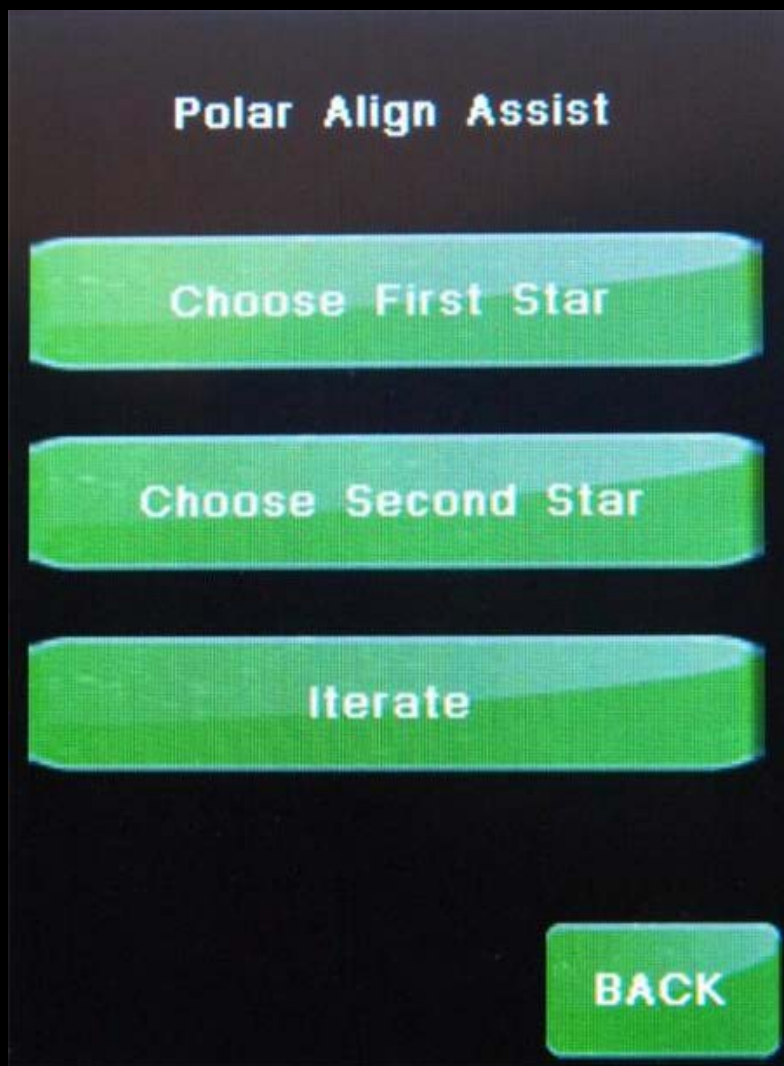
Now that we have picked 2 stars hit Iterate. The routine will first show a "GOTO" menu, going to the first star you picked.
and then will show the next menu.

Hit Iterate.

Telescope Model Builder

Model 0 (West)

Regulus α LEO

HA: +1.9h   El: 54°

East   West

GoTo

Reset   BACK

We are now entering the Second star for the West side.

If you are happy with the star it selects, then hit "GOTO". This tutorial does not let you select different stars - so Please hit GOTO.

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GoTo done: Zuben Elgenubi α
GoTo Zuben Elgenubi α LIB

14:51:29   −16:05:31

CENTER   20:17:59

SPEED   MENU   GoTo

You now have to center the object using either the button the front of the Hand controller or the buttons on the back of the hand controller. If you have want is called a Standard (Classic) hand controller hooked up to the Standard Hand controller port, you can use that also. You can also use the Web interface, or the ASCOM hand controller. Basically, any method that will center the star will work.

But please NOTE that YOU HAVE TO COME BACK HERE AND HIT THE GOTO BUTTON after centering the star.

Hit the GOTO button now.

GoTo done: Vindemiatrix Vir

13:02:45   +10:53:38

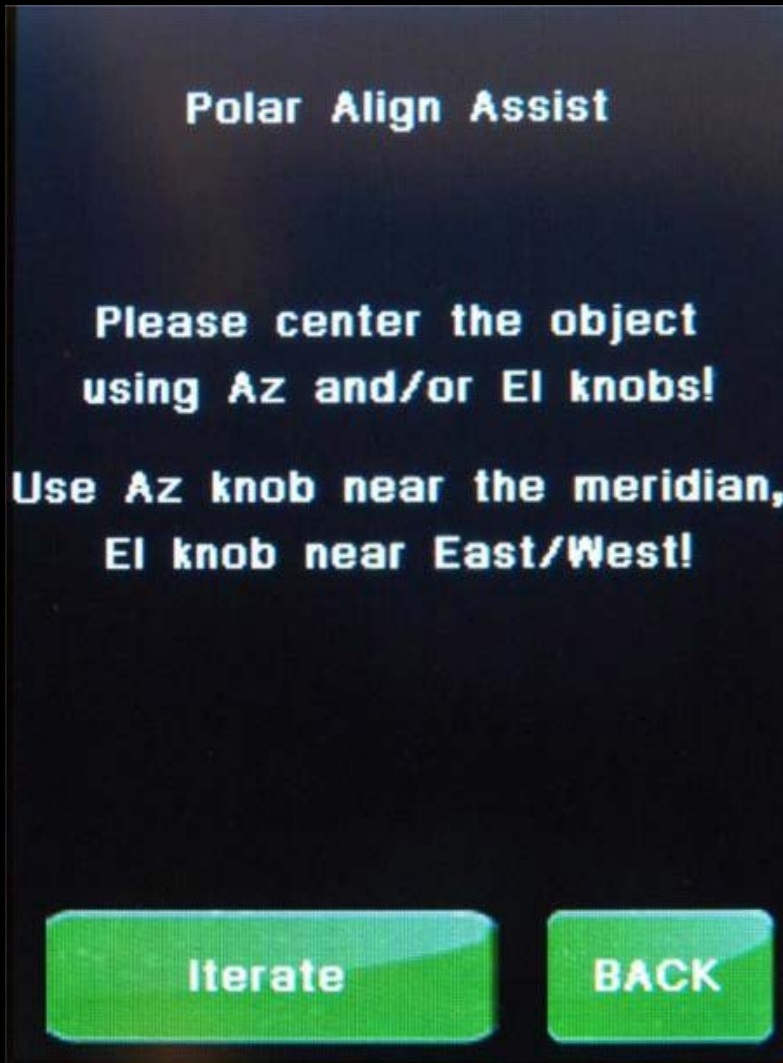SLEW   20:03:03

SPEED   MENU   GoTo

Go to Vindemiatrix is done.

To go to more stars you would hit the GOTO and repeat the process.

I suggest hitting GOTO and we will explore the next menu option.

Polar Align Assist

Please center the object
using Az and/or El knobs!

Use Az knob near the meridian,
El knob near East/West!

Iterate   **BACK**

Please follow the instruction and center the first star.

Once you have centered the star, then hit Iterate. It will take you to the next star, and then show a menu just like this one.

Please hit Iterate

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GoTo done: Regulus α LEO
GoTo Regulus α LEO

10:09:04   +11:59:12

CENTER   20:23:01

SPEED   MENU   GoTo

You now have to center the object using either the button the front of the Hand controller or the buttons on the back of the hand controller. If you have want is called a Standard (Classic) hand controller hooked up to the Standard Hand controller port, you can use that also. You can also use the Web interface, or the ASCOM hand controller. Basically, any method that will center the star will work. But please NOTE that YOU HAVE TO COME BACK HERE AND HIT THE GOTO BUTTON after centering the star.

Hit the GOTO button now.

Telescope Model Builder
Model 1 (East)

Zuben Elgenubi α LIB

HA: −2.8h   EI: 26°

[East]   [West]

[Align]

[Reset]   [BACK]

You will hit "ALIGN" if this STAR is acceptable. If not just hit East or West to go to the next star selection. Hitting Align will also take you to the menu that shows the alignment errors for your mount.

The reset is to clear the last star added to the alignment.

Please hit ALIGN for this Demo

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Catalog Object

Solar System

Coordinate Input

Bookmark

Park

Bright Star

BACK

Lets Now look at the Solar System menu.

Please click on Solar System

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Polar Align Assist

Please center the object
using Az and/or El knobs!

Use Az knob near the meridian,
El knob near East/West!

Iterate   **BACK**
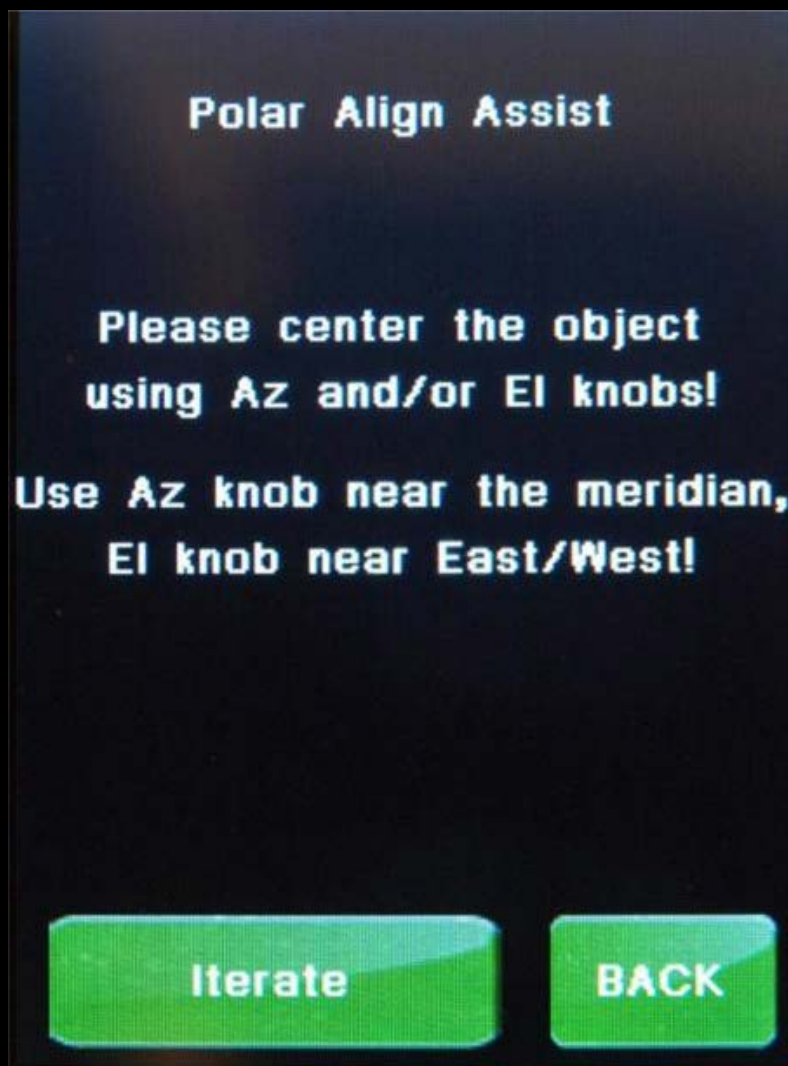
Please follow the instruction and center the second star.

Now you really want to do this routine about 3 times to get within 1 degree of the pole. Each time you should get closer.

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Interactive Hand-Controller Menus - click on green button to Navigate

Telescope Model Builder
Model 0 (West)

Regulus α LEO
HA: +1.9h   El: 54°

East   West

Align

Reset   BACK

You will hit "ALIGN" if this STAR is acceptable. If not just hit East or West to go to the next star selection. Hitting Align will also take you to the menu that shows the alignment errors for your mount.

The reset is to clear the last star added to the alignment.

Please hit Align for this Demo

Hit the GOTO button now.

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Model 1 (East)

HA Index Error	591
DEC Index Error	363
Polar Axis Azimuth	0
Polar Axis Elevation	0
Non-Perpendicularity	0
Non-Perpendicularity	0
Counterweight Flexure	0

UnDo   **Switch**   **BACK**

Notice that you only have only one or 2 entries for the Error Index. Only the HA Index Error and Dec Index Error is calculated on the first star. On the second star which this is, Polar Axis Azimuth and Polar Axis Elevation should have been calculated. Since I made no centering adjustments, the errors stayed the same for this Demo.

You use the BACK button to take you to the next Star selection screen.

The Switch button will switch the Error screens between the East and West model Error screens.

The UNDO button will remove the Last star added to the model.

Please hit Back for this Demo to go to the next alignment star.

Model 0 (West)

HA Index Error	76
DEC Index Error	-352
Polar Axis Azimuth	0
Polar Axis Elevation	0
Non-Perpendicularity	0
Non-Perpendicularity	0
Counterweight Flexure	0

[UnDo] [Switch] [BACK]

Notice that you only have only one or 2 entries for the Error Index. Only the HA Index Error and Dec Index Error is calculated on the first star.

You use the BACK button to take you to the next Star selection screen.

The Switch button will switch the Error screens between the East and West model Error screens.

The UNDO button will remove the Last star added to the model.

Please hit Back for this Demo

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Telescope Model Builder
Model 1 (East)

Arcturus α BOO
HA: −2.2h   El: 57°

East

West

GoTo

Reset

BACK

You are now adding the Third star to the model. It is done the same way you added the first star.

If you are happy with the star it selects, then hit "GOTO". This tutorial does not let you select different stars - so Please hit GOTO.

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Telescope Model Builder
Model 0 (West)

Alphard α HYA
HA: +2.6h   El: 32°

[East]   [West]

[GoTo]

[Reset]   [BACK]

We are now entering the Third star for the West side.

If you are happy with the star it selects, then hit "GOTO". This tutorial does not let you select different stars - so Please hit GOTO.

GoTo done: Arcturus α BOO
GoTo Arcturus α BOO

14:16:31   +19:07:58

CENTER   20:19:06

SPEED   MENU   GoTo

You now have to center the object using either the button the front of the Hand controller or the buttons on the back of the hand controller. If you have want is called a Standard (Classic) hand controller hooked up to the Standard Hand controller port, you can use that also. You can also use the Web interface, or the ASCOM hand controller. Basically, any method that will center the star will work.

But please NOTE that YOU HAVE TO COME BACK HERE AND HIT THE GOTO BUTTON after centering the star.

Hit the GOTO button now.