# MPj Equinox

## Operation Manual

# Contents

# Copyright

# Contacting Microprojects

```
email:     microprojects@mac.com
           mpj@total.net

web:       www.total.net/~mpj
```

# MPj Equinox Downloads

```
iDisk:     microprojects
web:       www.total.net/~mpj has URL
register:  www.total.net/~mpj has URL
           MPj Equinox has a register menu item
           www.regsoft.net
```

# Introduction

After not working on the original MPj Astro for several years, I decided to start over on a new program. I wanted MPj Equinox to be observational based, have more user control over just about everything, 'carbonize' it for Mac OS X, control a telescope (which ended up including voice control), and generally be an astronomy program that I would want to use myself.

I hope you find MPj Equinox useful and enjoyable. If you have a telescope, try connecting it to MPj. Add your own photographs, modify the database, add voice scripts, design your own constellations and select the colors that you like. I have tried to give you lots of things to do.

And please, support Mac shareware. *This is not a free program.* If you use MPj Equinox please register.

# This Manual

I do not mind reading manuals but for those of you who do I will make this as painless as possible. I will not document the obvious, but many features in MPj Equinox do need some explanation. This manual is designed so that you can look up just the information you are looking for. You do not have to read the entire manual unless you want to.

The sections in this manual describe the various dialogs, commands  and windows in MPj Equinox. I have not described every menu item, button and command - life is too short. However, all the features that require some description or explanation are covered.

Any feature that requires registration to be active is clearly marked. This is also an incentive, I hope, for you to pay me!

This manual is, for the most part, text only. If I included screen captures of all the windows, dialogs and tabs the descriptions would probably make more sense but would also add to the download size. So print out this manual and follow along while you actually use MPj Equinox.

# Initial Setup

When MPj Equinox launches for the first time it builds the database and sets up the Home location according to the Mac location information. If you want a different Home location, see the Setup Dialog, Location tab section of this manual. MPj Equinox will start up a lot faster after the first time because the database will have been built.

You can adjust the default start-up time in the Setup Dialog, Date/Time tab. MPj Equinox always starts up at the current date, default time and Home location. You might also want to investigate the other tabs in the Setup Dialog. Most of the entries should be obvious, but more detailed information is available under different headings in this manual.

Once you save any setup changes the next step is to design the sky display the way you like. For example, you probably will want to turn on constellations. You do this from the Identify menu, or you can open the Identify window (under the Windows menu) and use the buttons. MPj Equinox can remember these selections when you Quit, so the next time you start up the sky display will appear the way you left it.

If you have a telescope you can enter your telescope and eyepiece information. Go to the Telescope Dialog section of this manual for help in setting up your telescope information.

You now have a basic setup, so go investigate and have fun.

# Setup Dialog

The Cancel button leaves the dialog with no changes. The Apply All button will activate any changes you make under any tab for this session, but the changes will not be active the next time you start up. The Save All button will make the changes active and save them in the MPjPref file so that they will be active the next time you start up.

## Date/Time Tab

This dialog allows you to manually enter the date and time, establish the default time, elect to start up at the Mac clock time and select daylight savings. The Julian Day entry allows you to set the date and time by a julian day number. After you enter the julian day select the "Process JD" button to calculate the date and time.

## Location Tab

This dialog allows you to manually enter different locations, select cities from two lists (US and world), save your Home and four other locations. The cities lists and location save panels are displayed by clicking on the disclosure triangles.

Registration: you can modify the US and world cities lists yourself. See the Build Database section of this manual.

## Options Tab

Most of the option choices should be obvious, but the following need a little explanation.

**Astronomical Twilight**: use astronomical twilight definition vs. civil definition. Astronomical twilight is much darker (to be considered still in twilight) and lasts longer.

**Limit Photo Window Size**: this will limit photographs shown in the sky display to a maximum of 300 pixels. If this option is not checked any photo will be displayed at its original size or what fits in the sky display.

**Remember Window Positions**: start up MPj Equinox with the same windows displayed, in the same position and the same size as they where when you last Quit.

**Remember Identify List**: start up MPj Equinox with the same list of Identify menu items selected as where selected when you last Quit. If you want MPj Equinox to always start up with the same selections, set up the sky display the way you want, Quit, start up again and uncheck this option.

**Photo Horizon**: display a photograph for the horizon as opposed to the flat colour. Unless you have a very fast Mac, this option can slow down performance.

**Use Custom Colors**: the items listed on the right side of this dialog can have their colours set by you. The default colours of MPj Equinox are never lost, but check this option and your custom colours will be used.

**Use Custom Constellations**: you can build your own constellations if you have registered. This  option switches between the standard constellations and your custom ones.

## Info Panel Tab

The Info Panel appears at the bottom of the sky display. You can select what information you wish to appear, in what order, by dragging and dropping the available information to the panel display in the dialog. To remove an item, click the item in the dialog panel. NOTE: not all of your selections may appear in the sky display panel depending on your monitor size. If there is not enough room, items on the right side of the panel are dropped.

## Arrow Keys Tab

The keyboard arrow keys are a convenient way to move around the sky, zoom in and out and change the time. You can establish how much of a change each key press

produces by making your selections here. The Var (Variable) entry may be the best choice for display changes. This selection will automatically alter the amount of change caused by each key press based on the current view angle. This has the effect of moving the sky an equal amount visually no matter what the view angle. NOTE: display changes made by holding down an arrow key are speed limited to prevent the sky display from becoming just a blur on very fast Macs.

# Filter Dialog

The Cancel button leaves the dialog with no changes. The Apply All button will activate any changes you make under any tab for this session, but the changes will not be active the next time you start up. The Save All button will make the changes active and save them in the MPjPref file so that they will be active the next time you start up.

## Stars Tab

The magnitude slider allows you to adjust how many stars appear in the sky display. The naked eye limit with very dark skies is 6th magnitude. If you are observing under light polluted skies, you can adjust this setting to more accurately display what you can actually see. If you move the slider beyond 6th magnitude all stars up to 8th magnitude can be displayed, however weird that makes the sky appear. NOTE: the Telescope View window always displays stars to 8th magnitude.

The **brightness** and **contrast** sliders allow you to adjust the visual appearance of the sky display. These controls can accommodate differences in monitors and personal preference. Play around with these sliders to produce the effect that you like.

The **Double** and **Variable** check boxes allow you to display double and variable stars with special symbols. These stars are always visible (if within magnitude limits) but these choices allow you to find them easily.

The **Stars with Planets** checkbox identifies those stars that are known to have planets. As this list is rapidly changing you can update the list by modifying the star database.

Note: there is no Precession option listed. Precession calculations are used automatically if the date is plus/minus 10 years from J2000.

Registration: You can modify the star database yourself. See the Build Database section of this manual.

## Deep Sky Tab

The slider controls the magnitude limit for all deep sky objects. The check list allows you to further refine what deep sky objects are displayed. The Best selection is a list of the best deep sky objects observable with amateur telescopes.

Registration: You can modify the deep sky database yourself, including what objects appear in the Best list. See the Build Database section of this manual.

## Planets Tab

This dialog controls which planets are displayed by magnitude limit and checkbox. A planet must be checked and within the magnitude limit to be displayed.

The **3X** checkbox will display the sun and moon three times there actual size. Visually, the sun and moon look bigger in the sky than they appear in the sky display, so this setting helps the sun and moon look "right". However, they are really not this size, and this setting should never be used if you are observing occultations, eclipses or any event where the actual size is required.

**High Precision Calculations** should be checked unless you have a very slow Mac. This option must be checked to see Saturn's satellites and have the most accurate calculations of Jupiter's satellite events.

The **Planet Path** entries define how the planet path plot for the selected planet is calculated. The % of Orbit defines how much of the planet's total orbit to calculate and the Future is how much of that path is plotted into the future from the current planet position. Note: to display the planet path, choose the Planet Path item in the Identify menu and then click on a planet in the sky display.

## Comets Tab

This dialog adjusts the magnitude limits for comets and minor planets. The check boxes must be checked to display these objects.

Registration: A new comet database and a new minor planet database can be downloaded from the Minor Planet Center. See the Build Database section of this manual.

# Telescope Dialog

This dialog controls the Telescope View window. The Cancel button leaves the dialog with no changes. The Apply All button will activate any changes you make under any tab for this session, but the changes will not be active the next time you start up. The Save All button will make the changes active and save them in the MPjPref file so that they will be active the next time you start up.

## Telescope Tab

You can define up to three telescopes. This dialog can be used to "try out" different size telescopes and to allow more detailed views in the Telescope View window. Limit your telescope IDs to eight characters - that is all that can be displayed in the Telescope View window.

If you have no idea of what to enter, here is the information for the NexStar 8 telescope.

> Focal length: 2032mm
> Aperture: 8 inches
> ID: NexStar8
> Reverse: E/W
> Finder: Laser Dot
> Type: NexStar

## Eyepieces Tab

You can enter up to ten eyepieces. You can "try out" different eyepieces to see what effect they will have with your telescope. If your eyepieces do not list their field of view, most good eyepieces are around 50 degrees.

If you have no idea of what to enter, try this eyepiece set: 40mm, 20mm, 10mm, 5mm all with a field of view of 50 degrees.

# Find Dialog

The Find Dialog (requires registration) allows you to search for some object in the database. You can enter a star name (sorry, no SAO numbers), constellation name, planet name, deep sky object name, Messier number or NGC number, comet name or id or a minor planet name. The Find button will either not find the object (could be filtered out - see the Edit/Select All menu item), find the object but state that it is below the current horizon, or state that the object has been found. If the object has been found you can select the Locate button to center the object in the sky display, select the Track button to center the object in the Telescope View window and begin tracking the object or select the Cancel button to just leave the dialog.

# Menus

Hopefully most of the menus and menu items are obvious, but here are a few descriptions about items that are a bit tricky.

## File / Print

The Print command (requires registration) prints a copy of the current sky display with a white background and non-antialiased stars. Whatever selections you have in the Identify menu will appear in the printout. The printout will also include the current location and date and time, a symbols list and the position of Jupiter's satellites. Note: if you have the Milky Way selected and are printing to a PostScript printer, the Milky Way will not be printed (this is a PostScript vs. Mac region thing).

## File / Print Visible Objects

The Print Visible Objects command (requires registration) prints a list of all the objects currently visible. This command observes all filters, so the list can be organized by identified objects and filter settings.

## File / Open OrbiTrack

The OrbiTrack application plots satellite positions from AMSAT data files. Select the "Voyager" format for the OrbiTrack output files. Once produced, the Open OrbiTrack menu item can read these files and  plot the satellite path in the sky display. The OrbiTrack application can be downloaded from:

```
www.macupdate.com/info.php/id/6094"
```

The AMSAT data files can be downloaded from:

```
www.amsat.org/amsat/keps/menu.html"
```

## File / Open Tour

This command opens the selected tour file and sets up the tour window. Tour files are built by clicking on objects in the sky display, but this build function is not available until MPj Equinox is registered.

## Edit / Copy

The copy command will put a PICT image of the entire sky display onto the clipboard. If you wish to copy only a section of the sky display, first Control + Drag a copy marquee over the area of the display you want to copy, then use the copy command. You can also copy the Telescope View, Solar System and Earth windows.

## Edit / Show All

This command disconnects all the filters used to organize the sky display. Everything in the database is displayed. The only use for this command is for the Find Dialog, which observes all filters. With this command you can search the entire database for an object, even if it is normally not visible because of some filter limit.

## View / Night Vision

Night Vision mode draws all displays in red. If you go to another application while MPj Equinox is running in this mode the main screen will remain red. It is suggested that you turn off Night Vision mode or quit before going to another application. Although unlikely, if your screen gets "stuck" in red go to the display preferences and re-select your normal color profile.

## Windows / Earth

This window displays the earth with day and night shown. It can be animated at various rates and the earth can be rotated. This window requires QuickTime 5.0.2+ to work.

## Windows / Shortcuts

This window lists the various keypress combinations that are available. Most are straight forward but a few may need a bit of explanation.

**Control+Drag**: forms a rectangular copy marquee in the sky display, Telescope View window or Solar System window to form the region of the display that the copy command (command+C) will put onto the clipboard.

**Option+Drag**: draws a line between the starting cursor position and the current cursor position and displays the angular separation between those two points. This is used primarily to calculate how close two objects are during conjunctions.

**Option+L key**: this key combination toggles the constellation names on and off. It is useful if you want to learn the constellations with the connecting lines visible but not the names.

## Connect

Registration: This menu is enabled only when MPj Equinox has been registered. It allows you to connect to a telescope or GPS. If a telescope is found, and its type can be determined, the connection is made. MPj Equinox then switches to the current Mac time and the Telescope View window is displayed at the current telescope position. Telescope connection can also be made by voice command - see the voice command section of this manual for more information. If a GPS unit is found, MPj Equinox will adjust to the transmitted location and the Mac clock will be set. The GPS unit is then automatically disconnected.

# Database

Registration: This menu is enabled only when MPj Equinox has been registered. The menu items allow you to build a new database from text files contained in the MPjBuild folder. Note: before modifying any database, make a copy of the database text file and modify only the copy. That way, if you really screw it up, you can always get back to the original database. The files use a tab separated value (tsv) format, so they can be imported and exported from spreadsheets.

**Build Star**: you can modify the star database, but be careful here. This is a VERY large file with about 65k lines (records). Excel is the only spreadsheet programme that I am aware of that can handle that many records. Also, fields that have no data, like a name or id, should not be left empty - use a space character instead ( 'tab-tab' may crash where 'tab-space-tab' will work). Also, the first field of this file is the number of records it contains. If you add or delete stars you must correct this number. To update the "stars with planets" list, set the D/V code to 4 for stars that have planets. NOTE: do not delete any stars or insert stars in the first quarter of the list. If you do the constellations can get very messed up.

**Build Deep Sky**: the header identifies the fields, but note the following. The first number is the number of objects (records) in the file. This must be corrected if you add or delete objects. The Size field is the angular size of the object in minutes of arc. The Best field is set to 1 if you want to include it in the Best filter option. You can omit the XYZ fields - they make the build go faster but if absent MPj Equinox will calculate them for you from the RA and Dec values. But do not simply leave those fields blank - use spaces.

**Build Cities List**: the first number in the header is the number of cities listed - it must be correct. The names should include the state or country. Just follow the examples given and you should be able to modify these lists easily. Any text edit programme is enough. This menu item builds both US and world lists at the same time.

**Build Constellations**: custom constellations are not built with a text file (you can thank me later). Turn this menu item on and the sky display goes into a custom constellation build mode. Note: this item is not enabled until you check the custom constellations option in the Setup Dialog, Options tab. Custom constellations are built with individual line segments, not continuous lines. Click on the first star, then click on the second star to form a line. If the line is to continue on, click on the second star again and then on the third star to form the second line. Option click on two stars to delete a line segment between them. With a little practice you can build up constellations very quickly. When you are done unselect the menu item and your new lines will be saved. You do not have to build everything at one time. Do a few constellations, save them and do some more next time. The custom constellations database begins as a duplicate of the standard constellations.

**Build Constellation Names**: you can rename the custom constellations with this file. This might be desirable if you are changing the language, designing a different set of constellations altogether or changing from the astronomical names to popular names (like Big Dipper or Teapot). Again, get the number of records right in the first field if you change the total number of constellations. The RA and Dec values list where you would like the name to appear in the sky (hopefully somewhere within the constellation!). You can not change the default constellation names.

**Build Comets**: do not modify the Soft00Cmt.txt file. Download a more recent one from the Minor Planet Center at:

```
cfa-www.harvard.edu/iau/Ephemerides/SoftwareEIs.htlm
```

Put this file into the MPjBuild folder and rebuild the comet database.

**Build Minor Planets**: do not modify the Soft00Bright.txt file. Download a more recent one from the Minor Planet Center at the link above. Put this file into the MPjBuild folder and rebuild the minor planet database.

**Build Tour**: this menu item puts the sky display into a tour building mode. The idea is that you can build up a list of objects that you would like to see in an evening's observation. Then, once outside and connected to your telescope, you can easily go from one object to the next by saying "Go to next" or clicking the space bar. To build the list, just select this menu item, click on the objects you would like to be in the tour, in the order that you would like to observe them, and then unselect the menu item when you are done. When you unselect the menu item a dialog appears that allows you to save the file under whatever name you like. You can build as many tour files as needed.

**Build Custom Horizon**: the supplied text file gives examples of how to create a horizon that matched your observing site. It even defines a house outline.

**Do NOT modify the BuildConstNames or BuildConstBoundary files in the MPjBuild folder.**

# Telescope View Window

From this window you can view the sky as it would appear through a telescope - well, sort of. You can select which telescope and eyepiece to use. The telescope and eyepiece choices come from the definitions built in the Telescope Dialog. The default setting is a 6 degree binocular view. The power slider control allows you to adjust the power from about 6 to over 2000 power, bypassing the telescope settings. The bottom panel displays the power and field of view for the current telescope/eyepiece combination and the right ascension and declination. The arrow buttons allow you to shift the display up, down, left or right. To center an object in the telescope view, command + click on that object in the sky display, find the object in the Find Dialog and select Track or use voice commands.

When you track an object, if that object has a photograph in the MPjPhoto folder, the photo will be displayed in the Telescope View window. The size of the photo will be adjusted to match the size of the object and the current field of view of the telescope/ eyepiece combination. If a deep sky object has no size definition in the database, no photo will be displayed even if it exists in the MPjPhoto folder. See the section on photographs in this manual for more information.

Registration: If you are connected to a telescope, the LED turns from red to green. The green LED blinks every time a new position is read from the telescope. The LED turns yellow if the telescope is slewing. When you track a new object (command + click, Find Dialog, Tour or voice command), the telescope will automatically slew to the new object. Note: if the object is not centered in the telescope, adjust the telescope position to center the object, then click on the Sync button in the Telescope View window. The correction will be calculated and then applied to the tracking command the next time you slew to a new object. This does help to center objects with your telescope, especially if the objects are reasonably close together, but don't expect miracles. To remove this correction click on the Clear button. The arrow buttons will slew a Meade telescope but not Celestron (NexStar scopes do not have the required commands).

You can use the Telescope View window to view events like Jupiter's satellite eclipses and transits, conjunctions, eclipses, etc. Use the power slider control for the maximum object size.

## Solar System Window

The Solar System window displays the planets and their orbits in three dimensions. Each dimension has a scroll bar that can be adjusted. The time buttons in the sky display control window modify the solar system time when the Solar System window is displayed, but the time values for each button are changed. If you are displaying comets and minor planets, click on the object and its orbit will be displayed as well. Option + click in the window to remove the star background.

This takes a little getting used to, to visualize the orbits in 3D, but these orbit plots are mathematically correct (well, I think they are). As you move the scroll bar controls around you can get a sense of the orbits in 3D. The line in the top left graphic indicates the position of the vernal equinox.

## Photographs

Photographs are linked to MPj Equinox by their file name, and should be placed in the MPjPhoto folder. The photo's name must match an equivalent name in the MPj Equinox database. For example, if you have a photo of the Orion Nebula, the photo's file name must be 'Orion Nebula', 'M42' or 'NGC 1976'. File extensions JPEG, PICT, TIFF and GIF can be used.

Photographs can be of any file type that QuickTime can convert. So JPEG, TIFF, PICT, Photoshop files and many other formats are acceptable.

If you double click on an object in the sky display, the MPjPhoto folder is searched for a matching file. If you have the Setup Dialog, Options, Limit Photo Size option checked, the photograph will be drawn in a window with it's largest dimension at 300 pixels. If this option is not checked, the photograph will be drawn in a window the size of the photograph or the size of the sky display, whichever is smaller.

The Telescope View window and the sky display (if the "Deep Sky Photos" menu item is selected) also search for photographs of any deep sky objects. If one is found, the photograph will be drawn rather than the object's size circle. The size of the drawn image will be based on the object's size and the current telescope and eyepiece combination. If an object does not have a size entry in the database, no photo will be drawn even if it exists in the MPjPhoto folder.

In order to have deep sky objects appear close to how they actually look in your telescope, images that you use should be modified (if you have software to do it). First, crop the photo to enclose just the object. Photos do not have to be square. Make sure the edges of the photo are completely black. And you should probably darken the image down quite a bit. I doubt that your little 3" scope is going to show you the object like a two hour exposure from the Hubble telescope. You might also desaturate the image some as your night vision can not see a nebula in brilliant colour.

I have included two photographs as examples, the Hercules Cluster and the Orion Nebula. Even though I darkened the original images down, and desaturated the colours, you would still need a very large telescope to approach actually seeing these objects like the photo. However, there is also no point in turning every photo you use into a dim smudge.

# Telescope Connection

Registration: You can not connect MPj Equinox to a telescope until you have registered.

MPj Equinox can connect to two types of telescopes - Celestron NexStar and Meade ETX Autostar. I have tested MPj Equinox with a NexStar 8 and a Meade ETX 90. Note: If you have a Meade Autostar, make sure the firmware has been upgraded to the latest release. My original version of firmware did not work. Most telescope stores will do this for you. The connection protocol is fixed at 9600 8N1.

There is a bit of work that you have to do to connect your telescope to MPj Equinox, but I think it is worth the effort and not really all that difficult. First, both telescope types use a RS-232 interface. Macs don't have a RS-232 interface and never have. Older Macs have a RS-422 interface (the serial ports) and current Macs have a USB interface. If you have a USB Mac, you must get a USB to Serial converter. I use the Keyspan device and it has worked perfectly. Note: if you are connecting under OS X,

you need the Keyspan OS X driver. Go to `www.keyspan.com` for the free driver.

If you have the PC cable supplied by the telescope manufacturer, you can use the Keyspan High Speed USB Serial Adaptor that has a DB9 connector. The Keyspan USB Twin Serial Adaptor requires a Mac modem DIN8M to DB9M cable. Another route is to use a Mac modem DIN8M to DB25M cable and a DB25 to DB9 adaptor. In either case just make sure that pin 4 and pin 8 at the DIN8 end are connected - the Mac modem cable should do this.

You can also solder together the required cable and connector. Don't panic, it is not as difficult as it sounds, but you really do need to solder the wires - don't try just twisting them together.  If you have the crimping tools required, you can ignore my simple strip and solder approach. It would be nice if Meade and Celestron made a Mac cable, but to my knowledge neither does. Note that the RS-232 wiring on the Celestron and the Meade are not the same.

There are some things to be careful about. One, the telephone connector you need for the telescope is NOT the connector you plug into your wall socket. It is a RJ-22 plug and is smaller than the normal RJ-11. It is the connector that is used on the handset cord - that coiled cord that goes between the telephone and the handset. You probably have several old ones around.  Also, those coiled cords have very small stranded wires in them that are impossible to twist together and difficult to handle.

RS-232 is not intended for long distances, so keep the cable length to a minimum, say 2 meters (6 feet). Use a Mac printer cable (ADB cables don't work) for most of the length - the coiled telephone handset cord should be cut as short as possible.

The required wiring connections are diagrammed below. Note that connecting the RxD+ line to ground turns the Mac (and Keyspan) RS-422 signal into the required RS-232 signal. After you strip the wires and solder them together, separate your solder joins with electrical tape and test your connections very carefully with a volt meter before you connect your Mac and your telescope. Don't come to me if your Autostar starts to smoke.

So, you now have your tested cable and you are ready to try out the connection. I suggest you try this inside the first time so you can see what you are doing. First, plug in the cable to your telescope and your Mac (or Keyspan converter which is connected to your Mac's USB jack). Then turn on your telescope and Mac. Don't plug in either end of the cable with either device powered up.

Align your telescope as you normally do. OK, so you are inside and its daylight - fake it! One note, if you tell your telescope it is 10:00 PM, make sure you set the Mac's clock to 10:00 PM as well - MPj Equinox will lock onto the Mac clock as soon as the connection is made. Start up MPj Equinox, go to the Connect menu and select the telescope menu item. If a successful connection is made, the Telescope View window will appear showing you where the telescope is pointing. The green LED will blink every time it reads a good position from the telescope (about once every five seconds). Note: it is normal for MPj Equinox to miss a read every so often - both
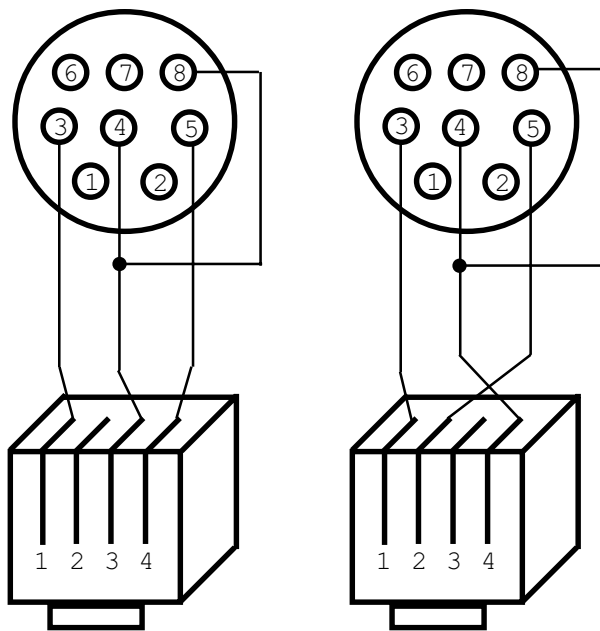
Mac printer cable male plug, looking at pins.

RJ-22 telephone plug, with clip on bottom and phone line going away from you.

1: DTR      Not connected
2: DSR      Not connected
3: TxD-     NexStar 1 / Autostar 1
4: Ground  NexStar 3 / Autostar 4
5: RxD-     NexStar 4 / Autostar 2
6: TxD+    Not connected
7: Not used
8: RxD+    Mac pin 4 (Ground)

NexStar          Autostar

Meade and Celestron occasionally send back garbage that has to be filtered out. If the connection times out for some reason (LED turns red), just connect again from the Connect menu.

Command+click on some object in the sky display and the telescope should automatically slew to that object in the sky. The LED will turn yellow during the slew. If all this works, congratulations on your soldering job and enjoy. And to truly amaze your family and friends, read the Voice Commands section of this manual and get your telescope to move by voice alone. I have had people literally laugh to the point of tears the first time they saw this happen.

# GPS Connection

Registration: You can not connect MPj Equinox to a GPS until you have registered.

To connect a GPS unit to MPj Equinox you need the GPS manufacturer's cable and a USB to serial adaptor. The connection protocol is fixed at 4800 8N1.

You may have problems connecting your GPS to the Mac serial port. I was never able to get my Magellan GPS to talk to MPj Equinox. Magellan's answer was that their units are designed to connect to a PC. Their unbelievable ignorance aside, I suspect the problem was too much cabling and the battery powered GPS could not meet the RS-232 voltage levels required. However, others have successfully connected their GPS units to MPj Equinox.

The Connect menu has a GPS menu item as well as the Telescope item and you can connect with a voice command as well. MPj Equinox will scan the NMEA data

stream coming from the GPS looking for a "GLL" message. If it finds the message the MPj latitude and longitude will be automatically set. The Mac clock will also be updated so that when you connect to your telescope and MPj Equinox starts updating in real time, the clock time will be accurate. If the Mac clock can not be set a dialog will tell you how much time to set the clock ahead or back yourself.

After the location and time have been read the GPS is automatically disconnected. You should unplug the GPS from the Mac serial port before connecting to a telescope.

# Voice Commands

To control MPj Equinox (and your telescope) with voice commands you must have Speakable Items installed on your Mac. Some older Macs and OS do not have this, but recent Macs and OS X do. Here is how it works - you use Speakable Items to listen to your voice and translate that into a command phrase that matches the file name of an AppleScript. The AppleScript runs and tells MPj Equinox what to do.

I will leave setting up Speakable Items to you. It takes a bit of fiddling and practice to get Speakable Items to consistently understand you, but it can be done. The real work on your part is writing the AppleScripts. Oh, don't go into a panic. Even if you have never written one before, it is easy and I have given you lots of scripts ready to use and samples of how to write your own.

Remember that Speakable Items looks for an AppleScript file name. If you don't like my commands, like 'Track Jupiter', you do not have to modify the script to use a different command phrase. Just rename the file (for example: "Go find me Jupiter, eh"), and you now have a new voice command to track Jupiter.

Each script file can do one thing and only one thing. You can not have one script that will search for any and all objects. That is why you may end up wanting to write lots of scripts - one for each object that you want to find under voice control. I have supplied several scripts that you can open with the Script Editor and modify yourself. Simply change the object in quotes to the object you want and Save As to a new file name that will be the command to use (save as Run Only unless you want to modify it in the future). Not hard, just don't change anything in the script other than the object name. Here is an example:

```
tell application "MPj Equinox"
    try
    activate
        Track Object "Jupiter"
    on error
        say "Track command failed."
    end try
end tell
```

Just change the `Track Object "Jupiter"` to `Track Object "NGC 1976"` and save the file name to "Track Orion Nebula" or whatever command you like.

There is a way to avoid having to write any scripts at all, and yet be able to have MPj Equinox track anything you want by voice command. You set up a Tour file - see that section in this manual - and then you can move through the list by simply saying 'Go to next' or 'Go to previous'. The idea is that you can create a tour file before an evening's viewing, and then once outside and set up all you have to do is move through the tour to see everything in your list.

Look around the supplied scripts and you can see that you can also change the sky display by voice commands as well as track things. I thought this might be useful if you are in total darkness and do not want to fumble with a keyboard and mouse to change the sky display. Note: you can automatically connect to your telescope or GPS by voice command.

**IMPORTANT:**
Before any of this works you need to tell Speakable Items about MPj Equinox. You do this by turning on Speakable Items, starting up MPj Equinox, and then saying "Make this application speakable". Speakable Items then creates a folder called MPj Equinox and you put all the AppleScripts into that folder. OS 9 creates that folder at System Folder:Apple Menu:Speakable Items:Applications and OS X creates it at Home/Library/Speech/Speakable items/Application Speakable Items. Inside the MPj Scripts folder you will find a set of scripts for OS 9 or OS X. Be sure to use the correct set of scripts for your OS.

# Last Word

There is nothing quite like being out in a field, under a dark summer sky, looking through a telescope and letting your imagination transport you millions of kilometers away. I hope that MPj Equinox can, in some small way, help you in that journey.

Clear skies!

Darryl Robertson

For Theresa

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