

# Astro-Physics

## Upgrading Your Keypad to V5.010 - Full Code & Database Load Java Loader

**Keypads with v5.009** – Follow instruction sheet for code load only (don't need database load).  
**Keypads with earlier versions including v4.xx** - **MUST** complete the full load due to database update.

**GTOCP4 and GTOCP5 Control Boxes** – MUST have version VCPx-P02-09 installed (x=4 or 5).

Print this page for reference during the procedure.

### Important Information if you are upgrading from V4.19.5 or earlier version

- **Control box requirements.** A GTOCP4 or GTOCP5 Control Box (GTOCP4/5) with version VCPx P02-09 or later is required. The latest control box software is always recommended. Refer to our website for the latest version: <https://www.astro-physics.com/software-updates/>

The earlier control boxes (GTOCP1, GTOCP2 and GTOCP3) will not function with the new V5 software version.

- **Button changes:** The functions of some of the buttons on the lower row of the keypad have changed. The original button pad will work fine, only the lettering on the buttons will be different than shown in the manual.
  - The original FOC button is labeled RECAL on newer keypads.
  - The original RA DEC REV button is labeled ENT on newer keypads and will function as an enter button.



- **Upgrade keypad button pad.** Your keypad can be upgraded to the new button pad layout if you wish. However, the keypad will have to return to Astro-Physics for retrofit and there will be a cost for this service.
- **Functions that were eliminated.** Two control functions are being eliminated in the new keypad because they are not commonly used with present technology: Reticle brightness and focus adjustment.
- **Current settings will be erased.** Version 5 is a completely new program, and all your settings will be erased. This includes locations, time zone, daylight savings, PEM state and your auto-connect setting. Please be sure to record all the settings that you wish to remember since you will have to re-enter them.
- **Estimated time to load your keypad.** You must load both the program and the database using the instructions below. The program load may take about 15 minutes, however the database load process will take more than an hour; possibly an hour and a half, so plan ahead. The entire process may take 1.5 to 1.75 hrs. The downloads are very slow due to the rate at which data can be transferred into the keypad through the control box.

# Install Java and FTDI Drivers

The v5 Keypad loader can be used on any operating system that can run Java. At AP, we have tested Windows 10, Windows 7, Ubuntu 20, and Mac 10. To use it, you must first install the latest version of Java, and any USB-serial adapter drivers your computer needs.

## Installing Java

Download Java from [www.java.com](http://www.java.com) and run the exe or dmg file. Installation takes just a few clicks. Be sure to use the latest version for your operating system.

## Installing Drivers

Drivers should be installed BEFORE making the initial connection between the computer and the GTOCP4/5.

- USB port on the CP4. You must have the FTDI driver installed for your operating system. Download links can be found at [www.astro-physics.com/software-updates](http://www.astro-physics.com/software-updates).
- Keyspan USB-Serial adapter to connect over serial. Be sure the Keyspan driver is installed.

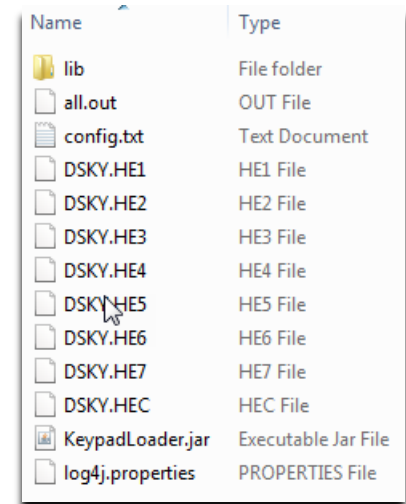
## Download and Save Zip File

### Windows

On Windows, download the keypad loader zip file. Extract the zip file to a new folder, by right clicking the zip file and selecting **Extract All**. You will be given the option to select a destination, with the default destination being your downloads folder. Simply click **Extract** and Windows will unzip the file.

Next, open the unzipped folder and find the file **KeypadLoader**. It will be labeled as an Executable Jar File.

Double click the executable to run the keypad loader program.

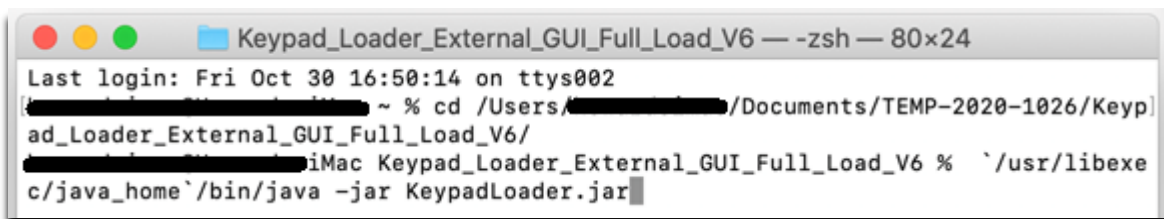


Name	Type
lib	File folder
all.out	OUT File
config.txt	Text Document
DSKY.HE1	HE1 File
DSKY.HE2	HE2 File
DSKY.HE3	HE3 File
DSKY.HE4	HE4 File
DSKY.HE5	HE5 File
DSKY.HE6	HE6 File
DSKY.HE7	HE7 File
DSKY.HEC	HEC File
KeypadLoader.jar	Executable Jar File
log4j.properties	PROPERTIES File

### Mac

On Mac, download the keypad loader zip file. Extract the zip file to a new folder, by double clicking the zip file. This should create a folder of the same name in the directory.

Next, open the unzipped folder and find the executable **KeypadLoader**. It should be labeled as an Executable Jar File. Double click the file, and the program should open. If the program does not open, then you will need to run the executable from the command line, as shown below. First open terminal, then proceed to the folder that holds the **KeypadLoader** file with the cd command. Then, type `'/usr/libexec/java_home'/bin/java -jar KeypadLoader.jar` and the program should run.

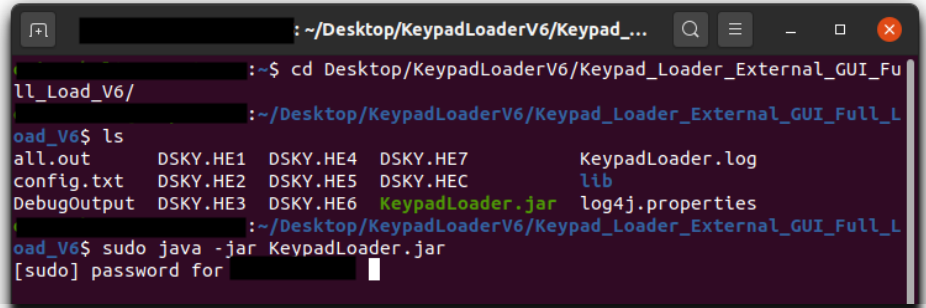


```
Keypad_Loader_External_GUI_Full_Load_V6 — zsh — 80x24
Last login: Fri Oct 30 16:50:14 on ttys002
[REDACTED] ~ % cd /Users/[REDACTED]/Documents/TEMP-2020-1026/Keyp
ad_Loader_External_GUI_Full_Load_V6/
[REDACTED] iMac Keypad_Loader_External_GUI_Full_Load_V6 % `'/usr/libexe
c/java_home`/bin/java -jar KeypadLoader.jar
```

## Linux

On Linux, download the keypad loader zip file. Extract the zip file to a new folder by clicking the zip file and then clicking **Extract** in the upper corner of the window.

Next, open Terminal and use the **cd** command to get into the extracted folder. Finally, type **sudo java -jar KeypadLoader.jar** to run the program, as shown in the screenshot. Enter your password if needed. The keypad loader must be run as root, to have access to the serial ports. Note the screen sample is from a different version of the keypad loader. The one that you are loading will be displayed.



```
~/Desktop/KeypadLoaderV6/Keypad_Loader_External_GUI_Full_L
oad_V6/
oad_V6$ ls
all.out      DSKY.HE1  DSKY.HE4  DSKY.HE7  KeypadLoader.log
config.txt   DSKY.HE2  DSKY.HE5  DSKY.HEC  lib
DebugOutput  DSKY.HE3  DSKY.HE6  KeypadLoader.jar  log4j.properties
oad_V6$ sudo java -jar KeypadLoader.jar
[sudo] password for
```

## Gather Information

Have this information handy to enter for Location 1: latitude, longitude, time zone and daylight savings. Record any other settings from your keypad that you wish to remember and re-enter later.

## Reset Your Keypad if Upgrading from Specific Versions

In specific circumstances, you must reset your keypad due to a major reorganization of the code. Follow the procedures in this section if you are upgrading from these versions:

- Version 4.19.5 or earlier versions.
  - Version earlier than 5.125.2. If your version is 5.125.2 or later, you do NOT have to reset your keypad.
1. This procedure will erase all your settings including locations, time zone, daylight savings, PEM state and your auto-connect setting. Please be sure to record all the settings that you wish to remember since you will have to re-enter them.
  2. Connect the power cable to the GTO control box. Since the motor cables are not needed for the download, you can use just the GTO control box and a power supply or battery. You may wish to remove the control box from the mount for this procedure. The mount does not need to be present.
  3. Turn power on.
  4. Proceed to the Setup Menu.
    - a. Keypad has version 4.19.5 or earlier.
      - i. Select: 2=Setup > 3=Keypad Options > 5=Keypad Update > 2=Reset Keypad
      - ii. Select 1=RESET to set all entered data to zero. The keypad will beep after a few seconds when the process is complete. Press Menu several times to exit.
    - b. Keypad has version 5.124.2 or earlier
      - i. Select: 2=Setup > 4=Kpd,Mnt,Park Opt. > 8=Keypad Update > 2=Reset Keypad
      - ii. Select 1=RESET to set all entered data to zero. The keypad will beep after a few seconds when the process is complete. Press Menu several times to exit.

## Setup the System for the Upgrade

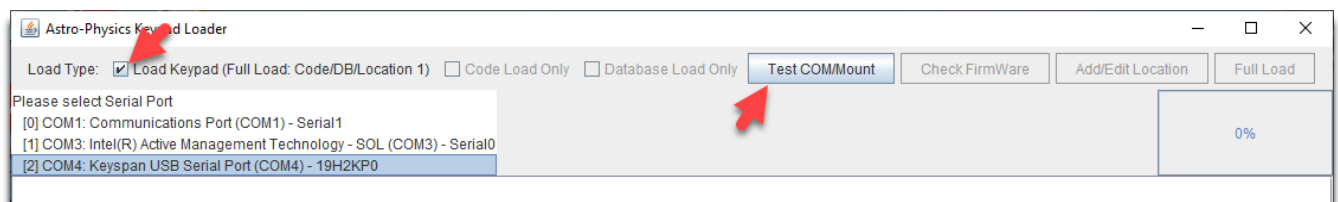
Each operating system will follow the same routine regardless of whether it is a Windows, Mac, or Linux.

1. Your GTOCP4/5 control box **MUST** have the version specified above to function optimally. You may update your control box from the Software Updates page of our website. We recommend that you upgrade to the most recent version.
2. Connect the power cable to the GTO control box. Since the motor cables are not needed for the download, you can simply use the GTO control box and a power supply or battery. You may wish to remove the control box from the mount for this procedure. The mount does not need to be present.
3. Connect your GTOCP4/5 to your computer with one of these options:
  - a. USB Cable. Remember that USB cables should be no longer than 15' (5 meters). To use the USB connection, make sure that you install the FTDI driver on your computer **BEFORE** connecting the cables. The driver can be found at <http://www.ftdichip.com/Drivers/VCP.htm>. Once the driver is installed, simply plug your computer into the GTOCP4/5 using a USB cable. The computer will take a moment to make sure it has the proper driver and designate a COM port.
  - b. Straight-through serial cable. You may plug the cable into either of the two RS-232 ports on the control box. Your serial cable must be "straight-through" (as opposed to a "null modem or cross-wired"). We have 15' Straight-Through Serial Cables available for purchase if you do not already have one. Mounts shipped in recent years included one of these cables. If you require a USB-to-serial adapter, we recommend that you use one with an FTDI chip or the Keyspan adapters. We do **NOT** recommend USB-to-serial adapters with Prolific chips.

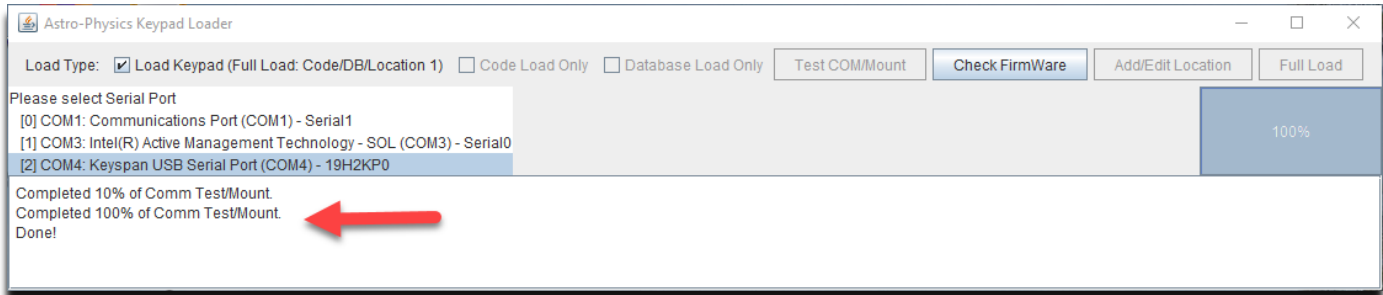
## Mount and COM Port Test Procedure

You must follow these procedures **EXACTLY**. If you do, the process is quite easy. Pay particular attention to what is connected and powered on at various stages.

1. Double check to be sure your cables are connected: power and USB or serial cable. The keypad can be plugged in at this point, however it is not necessary since you will only be testing the mount firmware and COM port.
2. Turn on the power to your control box.
3. Locate and unzip the file that you downloaded onto your computer if you have not already done so. Refer to the instructions above for various computer systems.
4. Follow the directions above to open the KeypadLoader.jar file.
5. The loader will display your download and COM port options.
  - a) Select Load Keypad (Full Load: Code/DB/Location 1) to load both the program code and database.
  - b) Select the appropriate COM port.



6. Click Test/COM Mount button. Results should display as follows:



7. Click the Check Firmware button. The program will query the control box to be sure that it has a minimum version of firmware to work with the keypad correctly. If it detects the required firmware, the box will display a second "Done!" and offer the option to proceed with the upgrade.
- If successful, proceed to the next step.
  - If you get an error message, check all cables and connections. Close the Keypad Loader program and start again.
8. Click the Add/Edit Location Button and enter your latitude, longitude, time zone and daylight savings settings. These values will be entered automatically into Location 1 on your keypad and will be available for you in your first session with this program. Please note that your latitude and longitude must be entered in degrees, minutes, and seconds. If your coordinates are in decimal format, consult the section below entitled: Converting Location Data.

DO NOT use a + or – sign with coordinates. Use E or W for longitude and N or S for latitude.

Note that the Time Zone Minutes field is for ½ and ¼ time zones as found in parts of Australia, the Pacific and Asia.

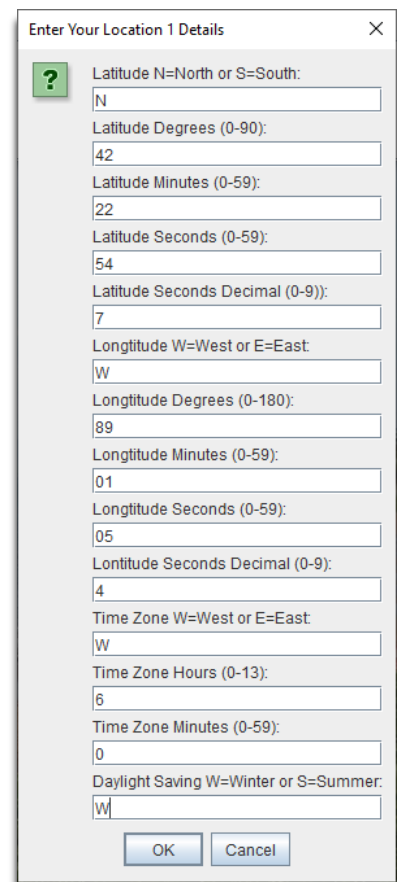
9. Proceed to the next section.

## Keypad Load

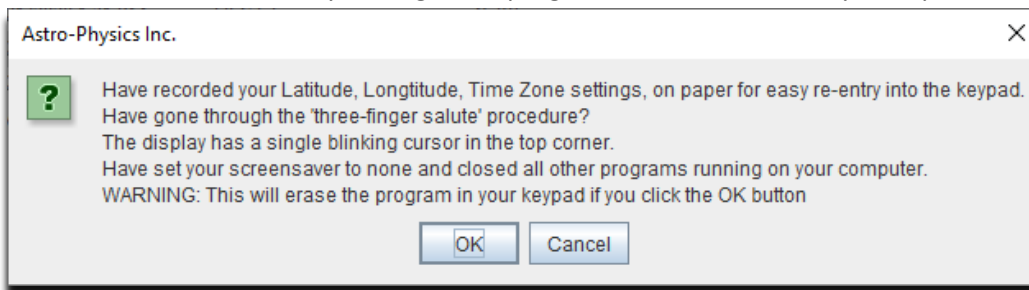
Do not try this procedure unless you have successfully completed the test above. Otherwise, you will erase the current program from your keypad. The screen will be blank, and you will not be able to use it.

Please follow these steps in order. If the process is interrupted, close the loader and restart from step 1 above.

- Turn off the power to the control box.
- Plug in the keypad if not already done and be sure that the power cable is connected to the GTO control box and locked in place. The motor cables do not need to be attached.
- Place the keypad on a solid surface and press any three buttons (except Stop) simultaneously and hold them down. The combination of <Prev, S and Next> work well for those of us with fat fingers! We call this a "three-finger salute". As you are holding these three keys, turn on the power to the control box.

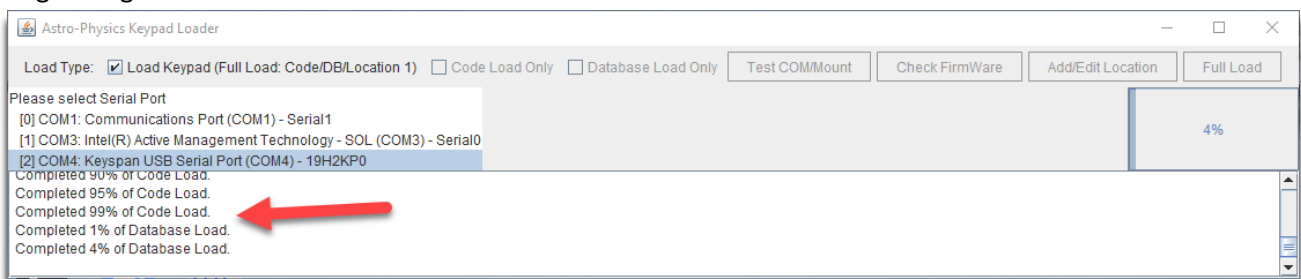


4. A new display will appear on the window of the keypad. At this point, release the three buttons. Then, press the West button to indicate YES for the next four windows and press the E button to indicate NO for the window that displays "Test Flash". This will erase the current program. These are the screen displays and the responses (note, the display says "FN=No", however you will press the "E" button):
  - "Load defaults" - Choose Yes (West)
  - "Are you sure" - Choose Yes (West)
  - "Clear flash" - Choose Yes (West)
  - "Are you sure" - Choose Yes (West)
  - "Test flash" - Choose No (East)
5. Once you have completed the previous step, the keypad will be placed in a ready-to-receive mode. A blank window with the blinking cursor in the upper left corner of the screen will indicate this.
6. Look back to the Keypad Loader on your computer. Select Full Load. The following information screen will appear. Read and click OK. Note that in most cases, the programs running on your computer will not interfere. However, if the load is not successful, try closing other programs or audio files if any are open.



After a few seconds, you will hear a series of beeps from the keypad as uploading begins but will get no audible feedback during the remainder of the upload. At the beep, a "1" will appear in the upper left corner, and the blinking cursor will move to the second space of the second row. The load process is very slow due to the rate at which data can be downloaded into the keypad through the control box. Once you get it started it will take more than an hour, possibly an hour and a half, so plan ahead.

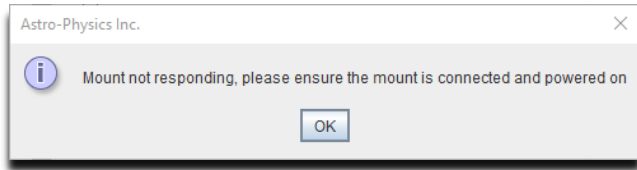
7. As the upload progresses, the white display box within the Keypad Loader will indicate the progress of the load. The load has two sections - the code load and the database load. Each will be indicated on the progress bar. During the load, your keypad will show the words "—CONNECTED—" and scrolling numbers will show that the load is progressing.



9. When the upload is complete, the Keypad will automatically load the location data that you entered and instruct you to power down again. The process is now complete, and you are ready to begin your session.
10. Consult the keypad manual to get started on your first session. Since your location, time zone and DST are already loaded, you have a head start. The time was entered from your computer.

# Error Messages

**Mount not powered on, power cable not connected or serial cable not plugged in**



## Submit Log Files to if You Have any Loading Issues

If the program does not load properly, please locate the log file in the same folder that you found the KeypadLoader.jar program. A log file is automatically created during the download process. Submit this log file to Astro-Physics for evaluation. If you attempt to load the keypad multiple times and wish to keep all the information, please rename the log file before you try again. Otherwise, all the information will be in a single log file, which makes analysis more difficult.

## Converting Location Data

Many websites and GPS units return your location in a decimal number of Lat and Long. i.e. 42.3589 Latitude 89.0409 Longitude.

The keypad's input is in Degrees, Minutes, Seconds.i.e. 42° 21' 32" Latitude 89° 02' 27" Longitude.

DO NOT use a + or – sign for your coordinates. You are provided with a space for E or W for longitude, and a space for No or S for latitude. Use these cardinal directions instead.

If you have access to the internet, download the Default IP Address Calculator and Latitude/Longitude Coordinate Converter from this link: [https://astro-physics.info/tech\\_support/mounts/servo/latlong-ip-calculator.html](https://astro-physics.info/tech_support/mounts/servo/latlong-ip-calculator.html).

It is also relatively easy to calculate the conversion. Using the example above:

1. Separate whole degrees from decimal portion: 42° + 0.3589° Lat. and 89° + 0.0409° Long.
2. Multiply the decimal portion times 60. This will give you the minutes:
3.  $0.3589 \times 60 = 21.534$  Minutes Latitude – DO NOT round – use 21'.
4.  $0.0409 \times 60 = 2.454$  Minutes Longitude – DO NOT round – use 02'.
5. Repeat the multiplication with the decimal portion of the minutes calculated in step 2. This will give the seconds:
6.  $0.534 \times 60 = 32.04$  Seconds Latitude – round to 32".
7.  $0.454 \times 60 = 27.24$  Seconds Longitude – round to 27".
8. Combine: Latitude: 42° + 21' + 32" and Longitude: 89° + 02' + 27".