

# ***Astro-Physics***

## **Keypad v4.x Database Reload Using Java Loader**

### ***Requires GTOCP4 with P02-01 or Later***

**Print this page** for reference during the procedure.

This Java Loader REQUIRES:

- GTOCP4 control box with version P02-01 or later firmware
- Keypad with v4.12 through v4.19.5. Do NOT use for v5 keypad firmware

## **What is Code vs Database Firmware for the GTO Keypad?**

The GTO Keypad firmware consists of two separate parts that occupy two separate memory areas in the Keypad:

- **Code (Program) firmware:** Code firmware contains all program logic for the functions, menus, entry screens and all other aspects concerned with the operation of the keypad. It also includes the calculated values of the solar system objects and calibration stars. The keypad version number displays when you start your keypad. This procedure does not include firmware upgrades to the program.
- **Database firmware:** The database firmware contains the information in the object database. This includes the catalog name, common name, RA and Declination coordinates, magnitude, object type, and constellation where the object is located. All keypads up to and including versions of 4.19.5 of the program firmware have the database level:1. The database remains in memory even when the program version changes. It does not need to be reloaded unless the database corrupts.

## **How do I know when the database must be reloaded?**

You only need to reinstall your database if it becomes corrupted, e.g., the following information displays incorrectly for your target object: coordinates, object type, constellation, or magnitude. You may suspect this if you attempt to slew to an object catalog (Messier, NGC, etc) and your telescope moves to the wrong location or indicates that the object is below the horizon (and you know it is not). Check the coordinates of that item on the keypad (refer to your manual for instructions on how to do this). If the data is not correct, proceed with these instructions.

NOTE: Even when the database is corrupted, your keypad will slew to stars and planets correctly since the calculations and data for these objects reside in a different memory location.

Known causes of database corruption:

- If your keypad is dropped or suffers a blow that causes the internal battery to shift from its position momentarily and lose contact. This is unlikely to happen to keypads with serial number 1568GTO or later due to the different configuration of the battery.
- Your keypad battery needs to be changed. Battery life is estimated to be 5 years at room temperature. If you reload the database and it corrupts again a short time later, the battery may not have enough voltage.

## **Install Java and FTDI Drivers**

The Java 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 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.

- 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.

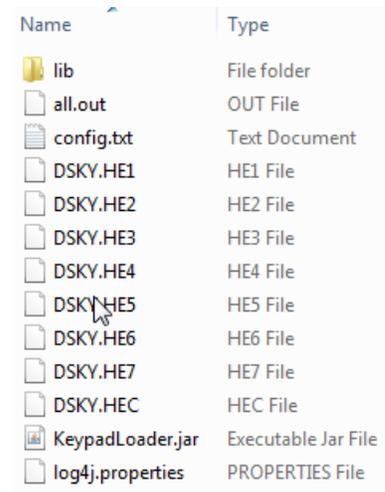
## Download and Save the Zip File

### 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.

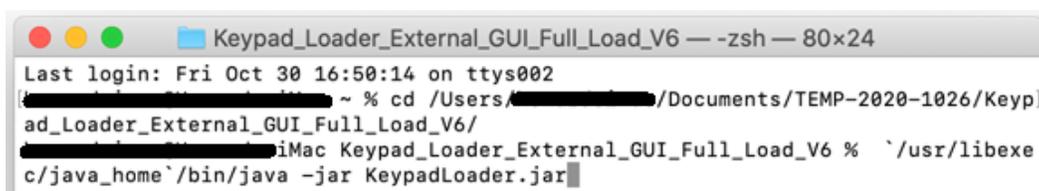


Name	Type
lib	File folder
all.out	OUT File
config.txt	Text Document
DSKY.HE1	HE1 File
DSKY.HE2	HE2 File
DSKY.HE3	HE3 File
DSKY.HE4	HE4 File
DSKY.HE5	HE5 File
DSKY.HE6	HE6 File
DSKY.HE7	HE7 File
DSKY.HEC	HEC File
KeypadLoader.jar	Executable Jar File
log4j.properties	PROPERTIES File

### 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. Note, the screen sample is from an earlier version of the keypad loader.



```
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

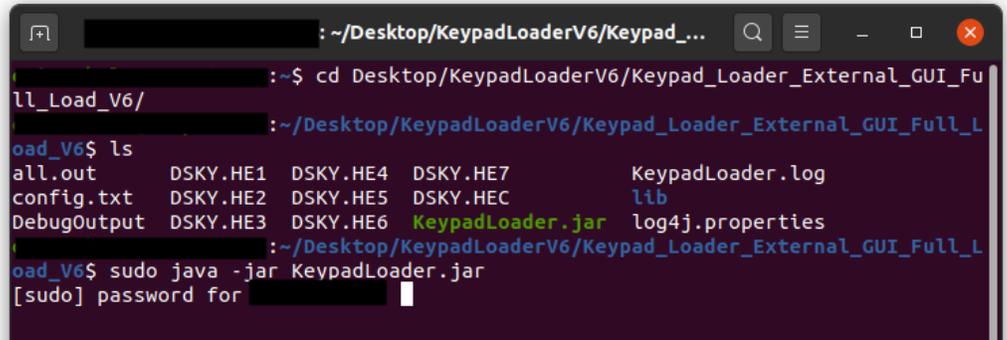
keypad loader must be run

as root, to have access to the

serial ports. Note, the screen

sample is from an earlier

version of the keypad loader.



```
~/Desktop/KeypadLoaderV6/Keypad_...
:~$ cd Desktop/KeypadLoaderV6/Keypad_Loader_External_GUI_Fu
ll_Load_V6/
~/Desktop/KeypadLoaderV6/Keypad_Loader_External_GUI_Full_L
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
~/Desktop/KeypadLoaderV6/Keypad_Loader_External_GUI_Full_L
oad_V6$ sudo java -jar KeypadLoader.jar
[sudo] password for
```

## Setup the System for the Upgrade

The database load process is slow due to the rate at which data can be downloaded into the keypad through the control box. Once you get the download started, it may take an hour or so to complete. It will run unattended, but you will need to allow enough time for the process to complete.

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

1. All keypads with firmware v4.12 or higher, regardless of serial number, can upload the database. There is no memory restriction as there is for the code load. Do not use with v5 keypad firmware.
2. Your GTOCP4 control box **MUST** have version VCP4-P02-01 or later for this download. If you do not have a P02-xx version or you are attempting to use a GTOCP1, 2 or 3, the keypad will not recognize your control box.
3. 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.
4. Connect your GTOCP4 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 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 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.

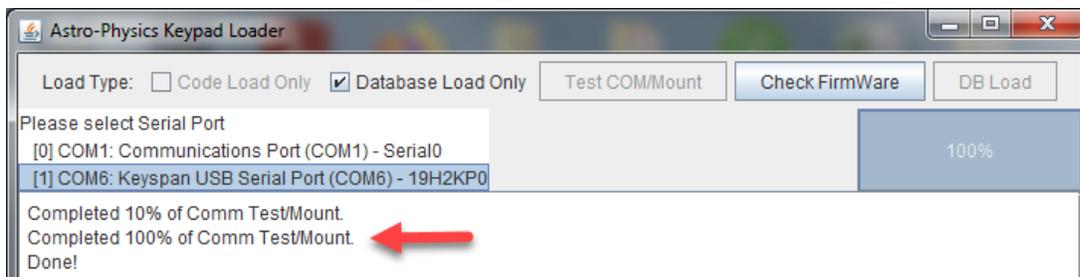
# Mount and COM Port Test Procedure

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 and click on the KeypadLoader.jar file.
5. The loader will display your download and COM port options.
  - a) Select Database Load Only to load just the database. IMPORTANT: If you decide that you want to upgrade the code also, you must refer to the instructions on this webpage: <https://www.astro-physics.com/keypad-4195/> For that procedure, your GTOCP4 must have version P02-08 and your keypad serial number must be 1565GTO or higher due to higher memory requirements for v4.19.5.
  - b) Select the appropriate COM port.



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

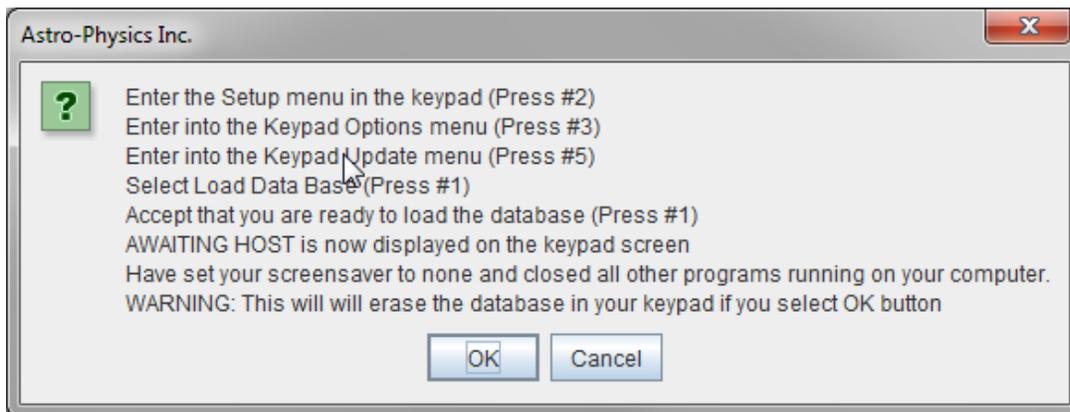


7. Click the Check Firmware button. The program will query the control box to be sure that it has the appropriate software to proceed with the download. If you have the correct software, the box will display a second "Done!" and the DB Load button will become active.
  - If successful, proceed to the Keypad Database Load section.
  - If you get an error message, check all cables and connections. Close the Keypad Loader program and start again.

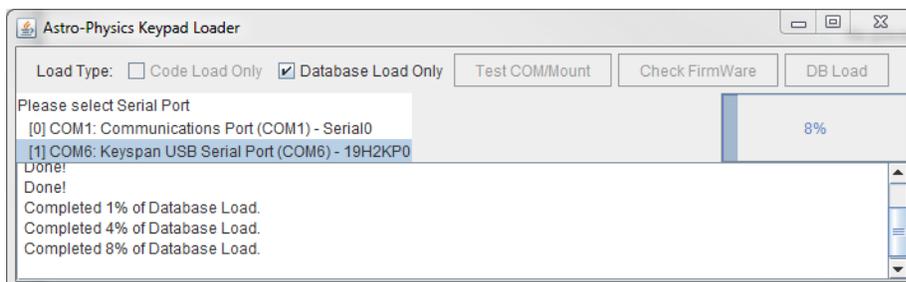
# Keypad Database Load

Please follow these steps in order. If the power is interrupted, restart from step 1.

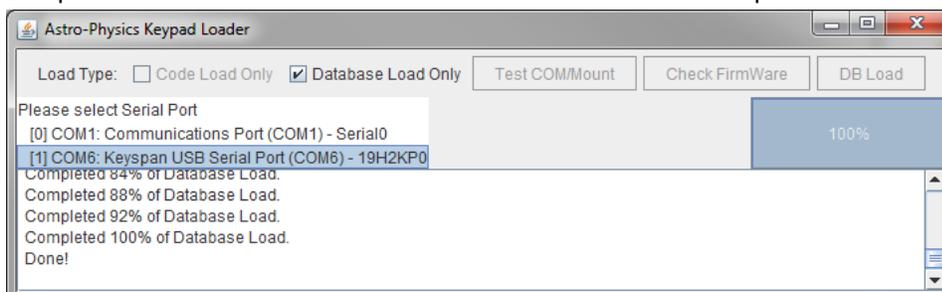
1. Plug in the keypad and be sure that the power cable is connected to the GTO control box and locked in place. The motor cables do not need to be attached.
2. Turn the power on if it is not on already.
3. If your Auto-Connect is set to YES, the main menu will appear. If set to NO, you will have to enter all required information to get to the main menu.
4. Press the DB Load button in the keypad loader screen on your computer. The following screen will appear. Follow all instructions and click OK.



5. The keypad screen will display “—CONNECTED—“while the database is loading.
6. As mentioned previously, the load process is slow due to the rate at which data can be downloaded into the keypad through the control box. The computer dialog box will provide an estimate of the data that has downloaded into your keypad.



7. When the load is complete, the keypad will display “Done. Press MENU to exit” and the dialog box on the computer will indicate that 100% of the database load has completed.



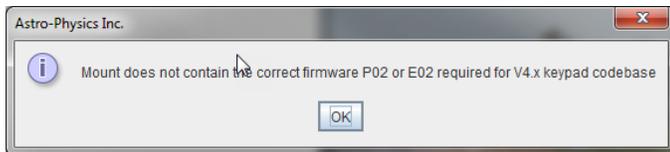
8. Power cycle the control box to begin your session, assuming that you are connected to your mount.

## Error Messages

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



**Control box does not have correct firmware to load database with this Java Keypad Loader.**



## 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.

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