# A Simple Hand Controller for Astro-Physics Mounts Operating Manual by C.Y. Tan (3. Sep. 2018)



## 1  License

## 2  Introduction

It is well-known, that the new GTOCP4 control box can be controlled with a phone or a pad. However, I really like the feel of real buttons in a controller rather than using "virtual" buttons on a phone or pad. This means that the only solution that Astro-Physics (AP) has for people like me is to buy their AP keypad.

If I had the AP keypad, I will mainly use it for Polar aligning with PoleMaster (lately with SharpCap

`Pro` as well) and for recalibrating (which is the same as syncing for all other mounts). After polar alignment and recalibrating, `PHD2` will be used for guiding the scope. Therefore, the AP keypad will only be used at the start of my imaging session, and no more. Thus, it is hard for me to justify spending $1000 for an AP keypad when I will hardly use.

I had to figure out a solution.

And here's my solution:
- I have built a simple hand controller for my `Mach1GTO`. Its purpose is **not** to replace the AP keypad because it does not initialize the `GTOCP4`, have any star database or goto capability etc. My goal is to just move the mount for calibrating the mount to a star and be compatible with PoleMaster.

# 3   The hand controller hardware guide

The hand controller plugs into the `GTOCP3` or `GTOCP4` keypad port.



The hand controller does **NOT** have the `RECAL` option. This is a deliberate design decision. This is so that there will never be any confusion about which device will `RECAL` – it will always be the computer that is connected to the mount.

## 3.1  The buttons and joystick action guide

The actions associated with the buttons and joystick are defined in the table shown below. The shortcuts for that are used in this manual are also defined here.

| Button | Description | Shortcut |
|--------|-------------|----------|
| Menu | When pressed, the hand controller goes back to the main menu. It also stops the mount from slewing. | MENU |
| Back | When pressed, the hand controller goes back to the previous menu. It also stops the mount from slewing. | BACK |
| Reset | Resets the hand controller. | RESET |
| Joystick UP/DOWN | In the menu environment, UP/DOWN, moves the cursor up and down. In the navigation environment, UP/DOWN is mapped to North/South slews. | ⇧/⇩ |
| Joystick LEFT/RIGHT | In the menu environment, LEFT/RIGHT acts like a swipe. RIGHT moves to the next selected submenu. LEFT goes back to the previous menu. In the navigation environment, LEFT/RIGHT is mapped to East/West slews. | ⇦/⇨ |
| Joystick Button | In the menu environment, the joystick button acts like the return key. In the navigation environment, the joystick button cycles through the slew rates. | ◉ |

# 4 How to use

The hand controller can be connected to the GTOCP3 or GTOCP4 keypad port before power up. If it is connected before power up, the controller has to be RESET before use. This is to establish a reliable serial connection with the mount.

Once powered up, you can start using the hand controller.

## 4.1 Menu actions
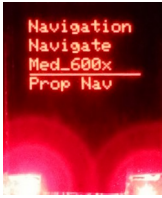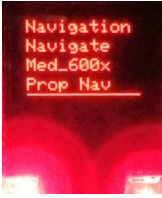
Everything starts from the Main Menu.

Move through each menu item by ⇧/⇩, and select it with ◉, or use ⇨.

In order to get back out of any control panel or submenu, just use MENU or use BACK. Pressing these buttons also stops the mount from moving. This is one way to stop the mount if anything goes wrong during a slew.

## 4.1.1 Navigation menu

| | | |
|---|---|---|
| Selecting <u>Navigation</u> brings up the Navigation submenu which has 3 submenu items. | Selecting the <u>Navigate</u> menu brings up the control panel that allows the user to move the mount. | This panel allows the user to move the mount. The slew rate is cycled with ◉. The numbers represent the slew rate, 0: stopped, 1: 12x, 2: 64x, 3: 600x, 4: 1200x. |
| | Selecting the <u>???_???x</u> menu brings up the slew speed menu. <u>???_???x</u> displays the current default slew speed. | Use ◉ to cycle through the slew rates. Possible rates are: Fine_12x, Slow_64x, Med_600x and Fast_1200x. |
| | Move the mount with proportional control using <u>Prop Nav</u>. The slew rate depends on the position of the joystick. | As the joystick is pushed from its home position, the slew rate starts from 12x, 64x, 600x and then finally 1200x at its maximum position. |

## 4.1.2 PoleMaster menu

The PoleMaster menu items makes the hand controller compatible with the calibration routine of PoleMaster or SharpCap Pro. The three menu items are the sequence of actions that the PoleMaster calibration routine will go through during Polar alignment.

| | | |
|---|---|---|
| <br>Selecting PoleMaster brings up the submenu items designed for ease of use with the PoleMaster calibration routine. | <br>Select the Set home menu item to remember the position of the mount before the start of the PoleMaster calibration routine. | |
| | <br>The RA move menu item brings up the control panel for moving the telescope in RA at 1200x speed. | <br>In this control panel, the mount can only move in RA, i.e. East or West at full speed at 1200x. |
| | <br>Selecting Go home moves the mount back to the position that was selected by Set home. | |

### 4.1.3 LED lights menu

| | |
|---|---|
|  |  |
| Selecting <u>LED lights</u> brings up the control panel for adjusting the brightness of the LEDs that illuminate the Menu and Back buttons. | Use ⇐/⇒ to set the brightness of the LEDs. |

# 5   Support

As usual, for any open source project, you build and use the hand controller at your own risk. No warranty is implied.

However, questions can be submitted to <u>issues</u>, but answers to questions are again not guaranteed.