

## CEM120 Firmware Upgrade History

V20171027 **Hand controller firmware initial release**  
V20171031 **Mount firmware package initial release**

V20180205 **Firmware Upgrade for HC**  
V20180202 **Mount firmware package upgrade**

### **Improvements:**

- EC and EC2 tracking improvement
- Push-to function improvement
- Goto accuracy

### **Bug Fixed:**

- PEC data check error in CEM120

V20180206 **Firmware Upgrade for HC**  
V20180620 **Mount firmware package upgrade**

### **Improvements:**

- Atmospheric refraction is taking into account

### **Bug Fixed:**

- Corrected the bug that if "Enable auto-guiding of RA axis" is unchecked during auto guiding, the mount RPEC may not respond
- Tracking may be dropped occasionally
- A bug that can't set Zero Position as Current Parking Position. The Park command may park the mount somewhere else
- Multiply Sync to Target on a same star may set mount to auto slew
- Can't perform GOTO Zero Position right after EC mount encoder calibration and power cycling. The mount may start auto slewing

V20190312 **Firmware Upgrade for HC**  
V20190318 **Mount firmware package upgrade**

### **What has been done in firmware:**

- Implemented new algorithm;
- Fixed bugs that affect goto, park to Zero Position;
- Fixed bug that affects autoguiding;
- Fixed bugs that affect meridian flipping;
- Fixed bug that cause Park Position errors;
- Enabled dual-axis tracking for deep sky objects and stars;
- Modified 1,2 and 3 star alignment in hand controller.

### **Improvements:**

- The new firmware and Commander prevented to park the mount at current position while the mount is pointing below horizon.

### **Notes about Pointing State:**

- Pointing State is only available for Slew in Commander
- The Meridian position limit needs be set to pass meridian, i.e., 1-14 degree
- The Pointing State will only be active when the mount is moving into this range. For example, if the Position Limit is 11 degree, when the mount is between -11 to 11 degree of Meridian, the Point State will be active.

- There will be discrepancies due to the alignment model or atmospheric refraction consideration
- For astronomic software, such as SGP, does not rely on the states. There is a Set PierSide command to force the meridian flip.

#### V20190718 **Mount firmware package upgrade**

##### ***What has been done in firmware:***

- Improved CEM120EC/EC2 tracking stability under heavy payload
- Addressed sometime mount may run away during guiding

#### V20191120 **Mount firmware package upgrade**

##### ***Bug Fixed***

- Fixed a bug that change of GPS status during autoguiding may disable DEC guiding;
- Fixed bug related to barometer jumping

#### V20200110 **Firmware upgrade for hand controller**

##### ***Bug fixed:***

- Fixed bug that customizing comet causes hand controller frozen

#### FW210605 **Firmware package upgrade for mount and 8410 hand controller**

***Main: V210605, RA: 210420, DEC: 210420, 8410HC: V210605***

#### FW210420 **Firmware upgrade for 8407+ hand controller**

***Matching 8407+ HC firmware: V210420***

##### ***New:***

- New 8410HC was introduced which does not have a 4P4C RS232 port. 8410 HC firmware will be included in the FW package and upgraded via mount connection
- Implemented Selection of MAX slew speed

##### ***Bug fixed:***

- Optimized auto guiding performance, especially DEC