

QHY5L-II OnLine User Manual

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Please read the User Manual before you first using.

EZPlanetary Step to Step User Guide

<http://qhyccd.com/ccdbbs/index.php?topic=3437.0>

1. Warning for safety using

Important Information for Safe Using

Avoid Camera Drop Into the Telescope Tube

The QHY5L-II is 1.25inch eyepiece design and it may drop into the telescopes and damage the telescope. Please connect the rope on back of the camera to the screw of location ring to avoid this happen.



Make sure your equipment grounded well

Some AC adapter like the computer's , the mount's has power leak. If it is not grounded well. This current may go through this route:

Computer's AC power supply->Computer->USB cable->Camera->Telescope->Mount->Mount's AC power supply.

This current is easy to cause the USB hang,unstable even the USB port damaged. Please avoid this.

2. Items In the Package and Introduction

The following items is in the QHY5L-II (Standard Package Ver2.0)

1. Metal Case



2. QHY5L-II Camera body with the C-Mount Type Interface

(if it is a mono camera it has a Clear AR+AR optic window mounted. If it is a color camera it has a IR cut optic window mounted)

The thread on the Interface is the female C-mount type. It can be connected with a C-mount lens. And you may need some extra spacer to get the correctly backfocus for C-mount lens.

This Backfocus is not suitable for CS-mount lens. If you use the CS-mount lens. Please order the CS adapter for QHY5L-II.

3. Location Ring

This item is used to get the confocal position.



4. 1.25 inch Extender Tube

This item is used to make the QHY5L-II case longer to meet some back focal requirement of some telescope. One side is the C-mount Type male screw and another side is the standard 1.25inch filter screw.



5. USB cable

6. Guide Cable

7. Screw for Location Ring

For premium version 2.0 it has the following items includes:

1. $f=1.25\text{mm}$ 180 degree CS-mount lens for All sky lens

This lens can be used for all sky camera application for remote observatory, meteor monitor, UFO monitor etc. This lens is a eyefish lens with a round image on the QHY5L-II.

QHYCCD also supply some eyefish lens with a little longer focal. Which is not a complete round image. Ask QHYCCD for details.



2. $f=8\text{mm}$ F1.0 fast CS-mount lens for electric view finder

This lens is really fast and sensitivity! It has F1.0 super big aperture. Even in this condition it still give sharp images and good star point. This lens can be used for electric view finder, meteor capture etc.



3. Triptor Adapter

This item is used to connect camera to a triptor. You can also mount the camera onto the telescope plate.



4. Small Triptor

5. CS lens adapter

This item is used to connect the CS-mount lens to the camera. You need to screw off the front part of the camera and install this .

Note: There is no any optic windows is included in this adapter. If you want to use the IR filter. You have to glue a 22mm IR optic window(Ask QHYCCD for order)on it.



6. Two Spacers for lens

Not all the C/CS mount lens has precision back focus. To avoid the back focus is too longer and there is no way to get correct focus. We designed the back focus of C or CS adapter a little shorter than standard. This allow user to use the spacer to get the correct back focus.



7. Two Plastic screws for Triptor adapter

What's the different between Standard Package V1.0 and V2.0

QHYCCD changes some components from V1.0 to V2.0 from April,2013.
This is the describe of changes:

1. The front part of the QHY5-II series is changed. V1.0 has a shorter front part with no thread. V2.0 has a little longer front part with a C-mount style thread.
- 2.The 1.25inch extender has some changes. The V1.0's extender has a M30 male thread and it can screw on the camera body by replace the front part on camera. The V2.0's extender has a C-mount male thread and it can be installed on the front of the V2.0's front part. Do not need to take the front part off then install.
3. In the premium packages there is no C-mount adapter in V2.0's
4. In version 2.0 it may come with a 1.8meter "Belkin" USB cable. In V1.0 some is a 1.5meter USB cable.

3. Driver Installations

Drivers And Software Installation

1. System Driver Installation

- Download the QHY5L-II System Driver from [Download page](#). Read carefully the note on the download area.
- Unzip the file and run the EXE file.
- Do not connect the USB cable at first.
- Wait till the installation finished.
- Connect USB cable
- Windows will find the new device . Wait all driver installed. If it is look for windows update to search the driver please skip it.

Note: It will find the new device twice. First time it will find install the QHY5II_A driver and next time it will find and install QHY5II_B driver. These two driver must be installed. Do not ignore either of them.

After driver installed successfully, You will find the QHY5II_B device in the Device Manager->AstroImaging Equipement->QHY5II_B

2. Use EZPlanetary to get the first light of Camera

You need use EZPlanetary to verify all things ok for this camera. Please do it as the following step:

- Download the EZPlanetary software from [Download page](#).
- Unzip it. It is best to put the software folder other than DISK C. In windows 7 it may require the administrator level sometimes for DISK C. It will cause the software can not save image or INI files into the folder.
- Connect USB cable
- Run the EXE file. If it found the camera , in the title of EZP it will show QHY5L-II
- Select a resolution in the Menu->Camera->QHY5L-II. For example, 1280*960.
- Adjust the gain to 5% and the exposure time to 20ms.
- You should see some image. Try to block the light and see if it changes.

When you first use the EZP. The speed is set to lowest to make sure it can start without no problem. It should be 7FPS at 1280*960. Please check the FAQ to know how to get the best FPS.

3. WDM drivers Installation

QHYCCD supply two WDM drivers.

One WDM is for video broadcast. It will broadcast the video streaming from EZP software. You can use any software support WDM camera to get it. You can also run multiple softwares to get the streaming without problem. The exposure and gain setting and any other setting must be done in the EZP.

Another is a native WDM driver. It can run without the EZP. And you can control the gain, exposure etc from the video parameter setting of WDM driver. But you can not get multiple software for the streaming at the same time in this driver.

Installations:

- Download the WDM driver(Live Video BroadCast Driver and QHY5-II Native WDM driver from the [download page](#).
- Unzip and run the exe file. If windows ask anything please answer run anyway.

Confirm the Driver Installation

First you need to find a Image capture software which support WDM driver. We recommend the [SharpCAP](#) software.

Confirm the BroadCast WDM Driver: You can download the SharpCAP V1.5 and install it.(The lastest V2.0 version can support the QHY5L-II directly. and it do not support wdm support) Then run the SharpCAP software. In the Menu->Camera it list all the camera it found. Please select "Direct Show Cameras(Old style)" ->QHYCCD Camera(WDM). You will see a gray image on it. Please run EZPlanetary and select Menu->Tools->Live BroadCast. The video appear on EZPlanetary will be broadcast to the SharpCAP. You can change the resolutions from SharpCAP control panel. You can change the camera's exposure time and gain from EZPlanetary.

Confirm the Native WDM Driver: Please close EZPlanetary. In the SharpCap software's Menu->Camera please select "Direct Show Cameras(New style)"->QHYCCD Camera(Native WDM). You will see the video image in SharpCap.You can adjust the gain/exposure time from the control panel of SharpCap

4. ASCOM Driver Installation

For autoguiding you need use QHY5L-II's ASCOM driver to connect with the guide software.Most guide software now support the ASCOM cameras. Please following this step to install QHY5L-II ASCOM driver:

- Download the [ASCOM Platform](#) and install it.(If you have installed ASCOM platform before. Do not need to install it again).
- Download the QHY5L-II ASCOM driver from [download page](#).
- Unzip the file and install it.

Confirm the ASCOM Driver Installation:You can use any software which support ASCOM camera. For example, still use the SharpCAP. You can find the "CMOS QHY5LII Camera" In the Menu->Camera->ASCOM Cameras. Select it.

You can adjust the exposure time from the control panel. The default exposure time is 1sec. Maybe it is too long so the imager saturated. You can reduce it and you should see some image on SharpCAP. You can also set other features from the Options in it's control panel.

4. Play with the Software Part 1

Software Quick Start 1

QHY5L-II has both directly API, ASCOM driver, WDM driver so that it get well supported by many software. Here is a quick start guide for some software.

EZPlanetary

Please see <http://qhyccd.com/ccdbbs/index.php?topic=3437.0> for some basic operations.

Some Note:

Offset in Advantage settings. This is used to adjust the offset. Smaller value means lower offset.

HDR in Advantage settings. QHY5L-II's CMOS sensor support HDR capture. Use this setting will enable it. We recommend use HDR in 12bit mode. The 12bit HDR image need to be decompress to 20bit to get linear output. There is still no tools for the HDR decompress till now.

High Gain Boost in advantage settings. Enable this will get a very high gain. But it will bring some vertical FPN noise.

Here is some bugs in EZP3.55. We will improve it in future version.

1.After change the low/high speed 8/12bit and long/short exposure mode, the camera exposure time is not refresh, need to set again.

2.In 12bit mode the dark frame calibration can not work

3.In Histogram->OSC mode there is memory leak issue.

SharpCAP

In current version (V1.5) SharpCAP use the WDM driver to connect QHY5L-II Camera. Please select Menu->Camera->DirectShow Cameras(New Style)->QHY Camera(Native WDM)

You can adjust the exposure time and gain in the SharpCAP's control panel. For exposure time it is 2^n . For example 0 is $2^0=1\text{sec}$ -2 is $2^{-2}=1/4\text{sec}.....$ If you want to get more smooth control you can go to the Menu->Options->Video Capture Filter. There is the exposure time you can get more smooth. Some other advantage options like the USB traffic control, High/Low speed, Color balance control is also here.

Note: SharpCAP v2.0 support QHY5L-II directly without go through WDM. It is under beta testing.

FireCapture

FireCapture can connect with QHY5L-II with both directly connection and the WDM driver. We recommend the directly connection to get best performance and features.

Connect the QHY5L-II and run FireCapture software. It will display a selection list . Choose QHYCCD Camera.

For Mono QHY5L-II here is a bug in the current version: When the first running or the resolution changed. It will have a grid image appear. Please change the Gain the grid image will disappear.

You can adjust the Gain and exposure time at the control panel of FireCapture. You can change the ROI from the Image Panel.

For some advantage features like the USB traffic control, HDR and high/low speed setting. Please click the Gamma button in the control panel.

Other operations please look at the FireCapture's Help document. It is in the help folder of FireCapture.

5. Play with the Software Part 2

PHD Guiding

- 1.Run PHD Guiding software.
- 2.In Menu->Mount please select the On-Camera
- 3.Click the camera button. Select "ASCOM(Later) Camera" The ASCOM camera chooser window will appear. Select "CMOS QHY5LII Camera" in the list. Click the Properties button. Make sure it is in 8bit mode (12bit unchecked)
- 4.Click the telescope button. It will say "Mount connected"
- 5.Click the third button.It will begin to loop preview.Adjust the exposure time and adjust the focus and find a star . Use mouse to select it. And click the "PHD" button. PHD guide software will begin to calibration and guide.

MAXIMDL

You can use MAXIMDL for autoguiding or for deep sky image capture.

For deep sky capture we recommend to use the 12bit mode. For autoguiding if you want to use the on-camera guide port you must select 8bit mode.

Run MAXIMDL. with short key "Ctrl+W" you can find the camera control panel.Click the "Setup Camera" Button in the Setup TAB. Select "ASCOM" in the camera model list.Click "Advanced" button the ASCOM Camera Chooser window will appear. Select "CMOS QHY5LII Camera" in the camera list. Click "ok" "ok" and click the "Connect" button. The camera will be connected.

MetaGuide

<http://www.astrogeeks.com/Bliss/MetaGuide/qhy.html>

6. [FAQ](#)

1. What's the latest version of system driver and EZPlanetary?

The driver is 2013-1-6(High Performance Driver) or 2013-1-7(High Compatible driver)
Software is EZPlanetary V3.55

2. QHY5L-II-Color version. The display image is wrong color , for example, the pink

Wrong debayer sequence. Select GR in menu->camera->color->GR

3. QHY5L-II-Color version is too green

Color balance need to be adjusted. Adjust the red and blue bar to get correct color

4. After connect camera, The image can not get out . The software seems like dead. Only small resolution like 320*240 can be display

The reason is the CPU or mainboard chipset can not runs to match the high FPS. Need to reduce the speed of camera or limite the USB bandwidth.

Following the step in <http://qhyccd.com/ccdbbs/index.php?topic=3500.0>

Another reason is the USB power voltage is not enough. Please refer:

<http://qhyccd.com/ccdbbs/index.php?topic=3951.0>

5. After stack and shape, the QHY5-II image has grid (only for QHY5-II, QHY5L-II has no this issue)

This is an issue of the CMOS sensor MT9M001. Need to switch to manual RGGB offset adjustment. The detail step is

<http://qhyccd.com/ccdbbs/index.php?topic=3490.0>

5. Very low disk write speed

We suggest to use the RAW format to save the image . The data is only 1/3 of the color format. For example, in 1280*1024 or 1280*960 the bandwidth will exceed 100MB/s , Most HDD can not match this speed. While use RAW only 36MB/s-39MB/s .

6. The RAW AVI color is wrong after using stack software converted into color. Image is pink color, or image's

The selected debayer RGGB sequence is wrong. Stack software has four selections. You can test one by one and find the correct color. It is best to

do some experiment to find the correct selection in daylight by capture some color object.

7. How to edit the filename fastly

Select the "use suffix" options in save option window. After exit the save option window the suffix bar in software statu bar will become red. Double click it , the filename suffix can be edit. After edited, double click it again.

8. How to change the file pach fastly

Double click the blue bar in the statu bar.

9. How to change the file format fastly

Double click the green bar in the statu bar.

10. Why flicker or wide scrolling banding appears in the image

This is the flicker of fluorescent lamp(50Hz or 60Hz) .Adjust the exposure time to 20ms(in 50Hz AC area) or 16.6ms(in 60Hz AC area) to avoid this issue

11. Why QHY5L-II stop exposure after 3sec and start a new exposure even exposure time set to above 3sec

To improve the feature of QHY5L-II in long exposure, we add a options called "Long exposure mode" It can be set in the advanced settings. After check it. Any long exposure can be ok. If not cheked, 3sec exposure is limited.

12. Which OS can be supported in this driver/software

windows xp 32bit , windows 7 32 and 64bit windows 8
32bit windows vista 32bit has been tested ok win8-64bit has not
been tested so not sure of it

13. Any requirement of the length of USB cable?

Yes , shorter USB cable is recommand for QHY5-II series camera. Because QHY5-II works close to the max limit of USB2.0 (apporx 39MB/s) . Long cable will cause the USB packet damaged and bad frame increased and even cause all frame lost. The software looks like halt with zero FPS. If must use long cable. the sepcially USB extender cable is required.

14. How to select the combine of gain and exposure time?

Normally speaking , lower gain will give your more smooth image after stacked. So we recommand the gain as lower as possible.For example, for QHY5L-II-MONO gain<=10 is a good value.

15. Why some of USB port runs high FPS better while some is not even in one computer.

Since the QHY5-II series camera works in the limitation of USB2.0. Reach to 36-39MB/s. The performance of USB port will effect the FPS . The USB port performance is not the same due to the layout and route of the USB wire on the mainboard. This will effect the FPS. Please try each port of computer and find out a best one .

16. How to connect MAXIMDL with QHY5-II series.

Need install the ASCOM platform and install the QHY5-II ascom driver or QHY5L-II ascom driver. Then select ASCOM camera in MAXIMDL camera list and select QHY5-II or QHY5L-II in the ascom camera list.

17. How to clean the CMOS sensor

Screw off the front part (the item with optic window) then you can clean the CMOS sensor. The CMOS sensor has AR coating on it. Please take care when clean it. Take some reference of the DSLR sensor clean method and tools for it. Also see this topic

<http://qhyccd.com/ccdbbs/index.php?topic=3604.new#new>

18. QHY5-II Series has small case means bad heat sink?

No. Although QHY5-II series use the ultra compact design. But it still has good heat sink. The heat generated from CMOS sensor is transfer to the shield of QHY5-II directly by the metal constuction inside camera. Because of the QHY5-II camera is contact with the telescope eyepiece tube. So the heat on QHY5-II camera will transfer into the eyepiece tube of telescope and get good heat sink result.

Software Hang when using 12bit capture

There is two possible reason to cause it:

1. System driver is old verison. Please reinstall it and change to new version(13-1-6 or later).You can run EZPlanetary and connect camera and check the title of EZPlanetary.It will display the FW version.
2. Computer or USB cable can not handle high bandwidth in 12bit. Since 12bit has more data, it may cause the USB traffic too busy. You can check off the high speed readout in EZPlanetary or increase the number in the USB bandwidth control in advanced settings.

What's the glass mounted on QHY5-II,QHY5L-II-Mono,QHY5L-II-Color

The QHY5-II and QHY5L-II-Mono are both mono version. It is the clear AR+AR optic windows mounted on it.

The QHY5L-II-Color is color version. It is the IR-CUT windows mounted on it.

When use PHDGuiding, software halt at the capture or calibration

Currently PHDGuiding's directly QHY5-II or QHY5L-II plugin has some bug please do not use this directly driver come with the PHDGuide software.

Please use the ASCOM to connect between camera and PHDGuiding

Gain Setting for Guiding

QHY5L-II ASCOM has 8bit and 12bit mode. In 8bit mode we suggest a higher gain to get more weak star visible. In 12bit mode the low gain is better to get the full dynamic range. The 12bit sample can get the weak signal still visible.

QHY5-II only has 8bit mode. We suggest a high gain for guiding.

Hot Topic

EZPlanetary preview and user guide

<http://qhyccd.com/ccdbbs/index.php?topic=3437.0>

QHY5-II series: How to get best FPS

<http://qhyccd.com/ccdbbs/index.php?topic=3500.0>

QHY5-II only(Not for QHY5L-II) How to remove the slightly grid after stacking and how to avoid the random horizontal banding under high gain

<http://qhyccd.com/ccdbbs/index.php?topic=3490.0>

QHY5-II series: How to connect with HandyAvi to do automaticly meteor capture

<http://qhyccd.com/ccdbbs/index.php?topic=3572.0>

6. Clean the Sensors

7. Warranty and Repair Terms

QHYCCD Warranty, Replace and Repair Conditions

Camera Free Repair Warranty Period

Now QHYCCD give each camera **Two Year** free repair warranty period Except the following items:

CCD/CMOS Sensor TEC module Cables

CCD/CMOS Sensor: Kodak's Sensor is under Kodak's warranty period. It is one year from KODAK send out the sensor to factory. Sony's Sensor is two year from the camera been sold to user.

TEC module: Since TEC module is always under thermal shock. It is under One year warranty.

Cables: Cables is under half year warranty.

Free Repair Warranty Conditions:

1. The electric damage and problem by natural is under free repair warranty. Any conditions due to the wrong operations, incident is not under free repair. Any damage due to the AC bad grounded issue is not under free repair.

The following conditions is not under free repair warranty

a. Defect column appears after some using, not at the start time. If CCD sensor exceed Kodak's warranty period. QHYCCD will not replace the CCD sensor free. User need to pay the cost of sensor and replacement cost. Sony's sensor is no warranty on the defect column after some using.

b. CCD sensor damaged by statics (Due to the ground issue of AC power)

c. Scratch on CCD sensor

d. CCD internal room leak and water come into it. For this condition, we will do specially request from sensor supplier. If they agree to replace we will free replace for user, otherwise it will not under warranty.

e. Low CTE columns (if there is two low CTE column nearby and it can not fixed by defect column tools QHYCCD will replace it)

2. User need to pay the shipment cost of repair to QHYCCD or to QHYCCD dealer.

3.The average repair period is 3 weeks without the shipment period. User can request the **backup camera** to use during this period(See backup Camera request section.Backup camera request service will start from 2013.9)

Replace Conditions

If the camera can not work at the start when arrived. And confirm by dealer or QHYCCD that it is due to the hardware issue . QHYCCD will replace a new camera rather than repair it. If it is the other part problem like the cables, DC201,Powersupply. QHYCCD/Dealer will send another cables/DC201 to user to replace.

If the camera has hardware problem during first one month and there is no scratch and any damaged on the camera case. User can request the replace.

If one camera is still not work after twice repairs. User can request replacement.

Each Cooled CCD(not include the cmos camera) comes with a factory test report. Please read it carefully and test the camera as fast as possible when get the camera.

Backup Camera Request

In order to give better custom service QHYCCD will begin the backup camera request service from 2013.9.

Any user can request the backup camera request service if the camera is sending QHYCCD to repair. Please do it as the following concitions:

1. When send camera to repair. User can ask dealer if there is the same model backup camera in stock and sign a contract of the backup camera using.
2. When the repair camera return please send back the backup camera.
3. The backup camera has a specially color than the normal camera, it is not for ordering. There is no any warrante of the backup camera.
4. If you are satisfied with this backup service of QHYCCD. Please donate the ship cost to the supplier of the backup camera. This will encourage more backup camera available.

Repair working flow

1. Please confirm it is the hardware issue of the camera. Please use EZCAP or EZPlanetary to confirm it. Using other software may not get the true result.
2. Some small problem maybe solved by user's side. It maybe faster than ship back to repair. If you want to do this we will help you to try it. **Note this may make things faster , but it also may make things slower depend one the detail**

hardware issue. If the problem is confirmed and can be solved without ship back. it will be fast. If the problem is confirmed but finally it need to send back to repair. It is slower because it already had taken more time at the diagnosis and test. If you do not want to this. You can write down the detailed issue , attached some pictures and send back to dealer or to QHYCCD.

3. For ship back to QHYCCD factory you need to make a help ticket on QHYCCD website->contact and select "repair department"