



REVOLUTION IMAGER

INSTRUCTION AND USAGE MANUAL

V1.0

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INTRODUCTION

Welcome to the Revolution Imager, the most amazing way to “See” through your telescope! This manual will help you get the camera connected and show you how to navigate and use the camera menus to start observing quickly. Remember to check the Revolution Imager website <http://www.revolutionimager.com/> for updated information and tips and tricks on how to use the system better.

QUICK START



After unpacking you will need to identify the following pieces:

- 1) Revolution Camera
- 2) Battery
- 3) 7" Color Monitor
- 4) 1.25" Adapter
- 5) .5X reducer
- 6) UV/IR cut filter
- 7) Umbilical Cable including wired remote

Follow these steps to get up and running:

1. Attach white coax cable with wired remote to BNC jack on back of camera
2. Attach round power cord to back of camera. (note there are 2 round power cords, one end goes to the rechargeable battery, the other in the back of the camera, be sure the round power cord after it splits in two goes into the camera)
3. Since you have probably discovered the other round power cord that is on the single end of the Y split, this is the one that plugs into the rechargeable battery

4. Back to the other end of the Y of the umbilical cord you will find a multi-prong cable that must line up with the receiving end of the cable that comes from the 7" Color Monitor. Attach these cables, carefully lining up the pins to each other.
5. Remove the lens cap from the Revolution Camera and screw the 1.25" adapter into the opening.
6. If your telescope has a focal ratio higher than F/4 or if you want wider views you'll probably want to use the included 0.5X focal reducer, this is as simple as screwing the reducer onto the end of the 1.25" adapter.
7. If your telescope is a refractor you'll also want to consider using the included UV/IR cut which will help with focusing and to achieve a tighter focus and nicer looking stars.

Congratulations! You are now ready to go explore The Universe!

Now, Insert the Camera into any 1.25" telescope eyepiece socket, if your telescope can track the stars by counteracting the Earth's rotation you will be able to take longer exposures to see fainter objects! Turn the Battery On, use the wired remote to navigate the camera's menu for longer or shorter exposures to "SEE" fainter detail than your eye ever could.

If you would like more help in setting up the camera you can also view the instructional video on the Revolution Imager website at <http://www.revolutionimager.com/pages/how-to-assemble>

HOW TO USE THE CAMERA

The Revolution Imager features a series of on-screen menus that allow you alter the exposure settings, adjust colours, enable stacking and host of other features. This page will introduce you to the menu system and some of the options.

don't panic!

the revolution imager camera has a lot of options and is extremely versatile and it can be easy to become overwhelmed with all the options available to you, which is why we have provided several pages here with some suggested settings for different types of objects.

However, the key to success with the camera and with most things in astronomy is to experiment with different options and see what happens! You can always use the provided guides to get back to settings that will work for you, so go ahead and have fun. Find something cool? Let us know!

the remote control



The on-screen menus are accessed and navigated using the supplied hand remote. The menus can also be accessed using the 5 buttons on the back of the camera. To access the on-screen menu press the center button on the remote. The directional up/down/left/right buttons are used to move around the menus and the center menu/ok button is used to enter different menus and select items.

When you press the center button of the remote the main menu will be displayed, at this point press the left and right buttons will switch between the main menus available. To enter one of the main menus press the center button. When you're in a main menu use the up and down buttons to move between the available options. **If an option displays a "↵" or "↓" symbol, you can press the center button to open a sub-menu with further options.**

control

The Revolution Imager camera contains a host of features that are useful for astronomical purposes and a number of features are designed for it's day time or night time use a security camera. On this page we will outline the options that you need to use to start observing straight away! Don't forget to view the object specific pages for recommended settings for viewing deep space objects, planets, and terrestrial objects. When using the camera you will generally want to changing a few things, they are:

- **Exposure Time** - the amount of time the camera will spend collecting valuable photons for each frame. Exposure time on the camera is either set to fractions of a second, or multiples of the camera's video framerate which is 1/50th of a second, this table below is a handy reference for exposure times:

setting	time
1/100000, 1/10000, 1/4000, 1/2000, 1/1000, 1/500, 1/250, 1/120, 1/60	Fractional second exposures
AUTO	With this setting the camera picks the exposure time. We recommend using this with the SENSE-UP option.
x2	0.04 seconds or 1/25
x4	0.08 seconds or ~1/12
x8	0.16 seconds or ~1/6
x16	0.32 seconds or ~1/3
x32	0.64 seconds or ~1/2
x64	1.2 seconds
x128	2.56 seconds
x256	5.12 seconds
x512	10.24 seconds
x1024	20.48 seconds



- **Gain** - the amount of boost/amplication the camera will apply to the signal. The Revolution Imager uses a system called "Automatic Gain Control" or "AGC" to apply gain to the image. You can set

the maximum amount of gain, low, medium, or high and the camera will adjust the gain to produce an image.

- **Sense-Up** - A unique feature that allows the camera to auto-pilot with some guidance of the user to find the best exposure and gain for viewing.
- **Stacking** - the number of frames the camera will combine to reduce noise and bring out detail.
- **Brightness** and **Gamma** - these settings affect the overall brightness of the image, brightness is a simple adjustment of brightness whereas gamma effects the brightness of different areas of the image in order to improve brightness and contrast.
- **Color** - options that deal with how color will be handled: full color or black and white. It is also possible to alter the **color balance** which can be useful when imaging the Sun.
- **Exposure Mode** - the camera has different exposure modes, for example Wide Dynamic Range for high contrast objects.
- **Dead Pixel Correction** - The Revolution Imager uses CCD sensor technology. All CCDs suffer from a small amount of dead pixels. The camera is able to try and detect these dead pixels and attempt to correct them.

Menu Versions

□ There are two versions of the on-screen menu on the Revolution Imager and the way you alter options are slightly different between the two, the images in the table below will help you identify which menu version you have. The instructions that follow will have the method for version 1 and version 2.

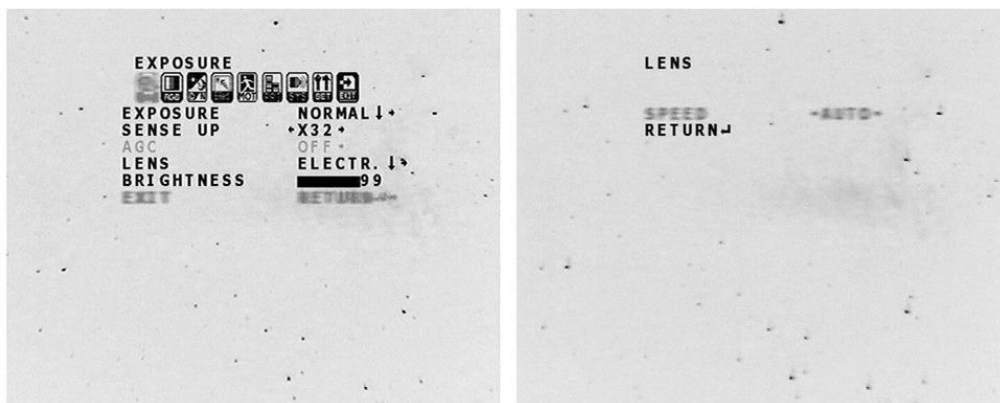
Version 1	Version 2
	

□ When updating any setting, please remember to select "SAVE & EXIT" at the bottom of the menu screen. If you do not select this the camera will reset itself to the previous settings after a short amount of time!

Exposure Time

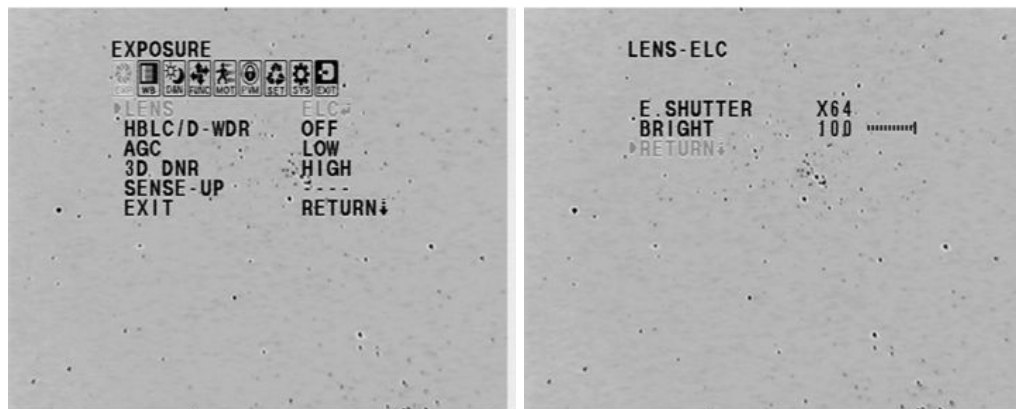
- Menu version 1

Select the EXPOSURE main menu, and then select the "LENS" option and select "ELECTR.". Press the center button to open the exposure time menu when you can select the appropriate exposure time.



- Menu version 2

Select EXPOSURE from the main menu then select the LENS option "ELC", press the center button to select the exposure time



Sense-Up

- Menu version 1
Open the EXPOSURE menu and select "SENSE UP". You can use the left and right controls to select from OFF to X1024. For sense-up to work correctly on this option you must select exposure time "AUTO".
- Menu version 2
Open the EXPOSURE menu and select "SENSE-UP". In order for SENSE-UP to be available you must select exposure time "AUTO". You must also have an AGC level selected, either LOW, MED or HIGH. If "SENSE-UP" displays "----" it is because you have an option other than "AUTO" selected in the exposure time menu.

Brightness

- Menu version 1
Open the EXPOSURE menu and select BRIGHTNESS. You can use the left and right controls to select from 0 to 100.
- Menu version 2
The brightness can be changed by using the "BRIGHT" setting shown above in the LENS sub-menu. Select "ELC." as the LENS option and press the center button to access this menu.

Exposure Mode

- Menu version 1
Open the EXPOSURE menu and select the EXPOSURE option, use the left and right buttons to set the exposure type. The types of exposure are:
 - NORMAL - Normal exposure, the default setting.
 - BLC - Back Light Compensation.
 - WDR - Wide Dynamic Range. The camera will take different exposures and combine them so you can see things that are both dark and bright at the same time.
 - HLI - Highlight. This mode will obscure out parts of the image that are too bright so the dimmer details can be seen

Pressing the center button on the EXPOSURE menu opens a sub-menu where you can make adjustments to the BLC, HLI and WDR settings.

- Menu version 2
Open the EXPOSURE menu and select the "HLBC/D-WDR" option, use the left and right buttons to set the exposure type. The types of exposure are:
 - OFF - Normal exposure, the default setting.

- BLC - Back Light Compensation.
- D-WDR - Wide Dynamic Range. The camera will take different exposures and combine them so you can see things that are both dark and bright at the same time.
- HLI - Hilight. This mode will obscure out parts of the image that are too bright so the dimmer details can be seen

Pressing the center button on the select option menu opens a sub-menu where you can make adjustments to the BLC, HLI and WDR settings.

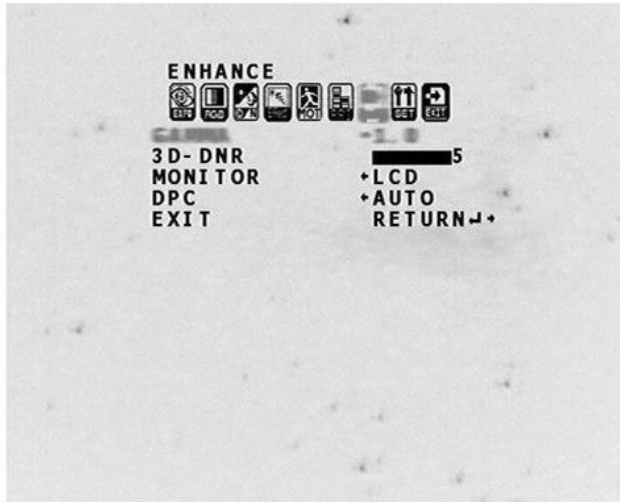
Gain

- Menu version 1
Open the EXPOSURE menu and select the designed gain level from the "AGC" setting. Note: On this version of the menu system this option will be disabled if you have SENSE-UP enabled.
- Menu version 2
Open the EXPOSURE menu and select the desired gain level. On this version of the menu system you must select the maximum gain that SENSE-UP can use.

Stacking

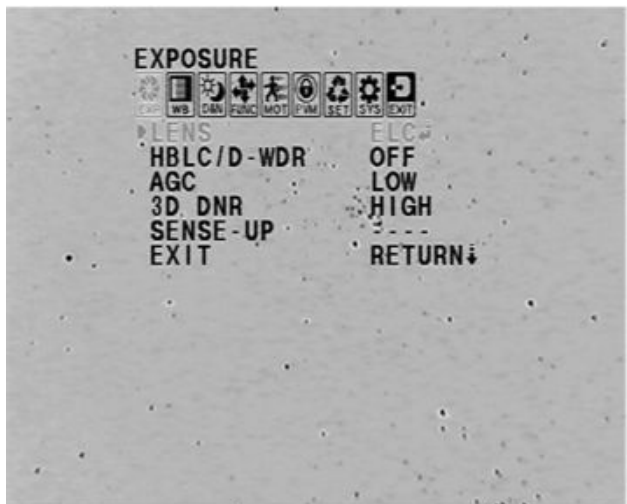
- Menu version 1

Open the ENHANCE menu and scroll down the "3D-DNR", the level can be set between 0-5 using the left and right buttons.



- Menu version 2

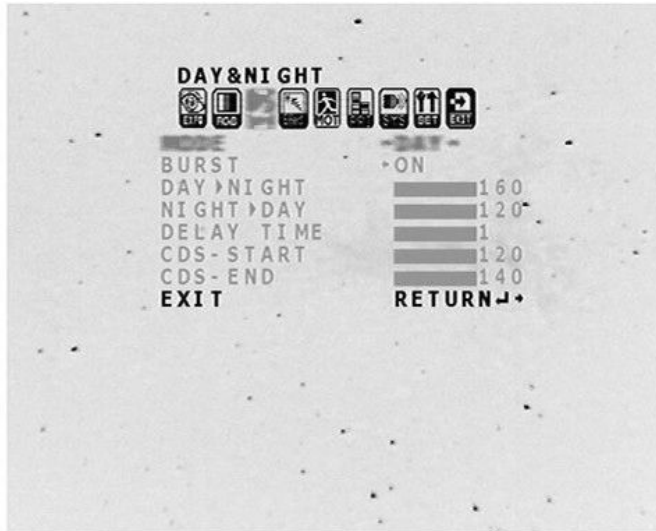
Open the EXPOSURE menu and select "3D DNR" setting from OFF to LOW, MED, OR HIGH.



Color / Black & White

- Menu version 1

Open the "DAY & NIGHT" menu and select "DAY" for color images and "NIGHT" for black and white images.



- Menu version 2

Select "DAY & NIGHT" from the main menu and select the "D&N MODE" option to switch between "COLOR" and "B&W"



Gamma

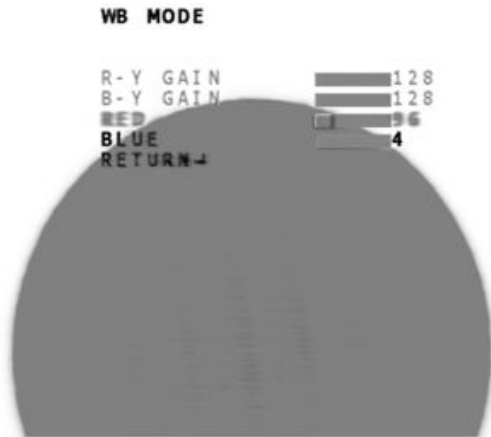
- Menu version 1
Enter the ENHANCE menu and select GAMMA. 1.0 should be considered the "normal" setting for GAMMA and the lower values will increase the brightness.
- Menu version 2
Enter the "FUNCTION" menu and select GAMMA. You can also select USER setting and enter the sub-menu by using the center button which will give you more GAMMA settings. A GAMMA setting of 1.0 should be considered the normal or default setting, with lower values increasing the brightness of the displayed image.



Color Balance

- Menu version 1

Enter the COLOR menu and select MANUAL from the MODE menu. Then scroll down down and alter the RED and BLUE settings to increase the levels of those colors.



- Menu version 2

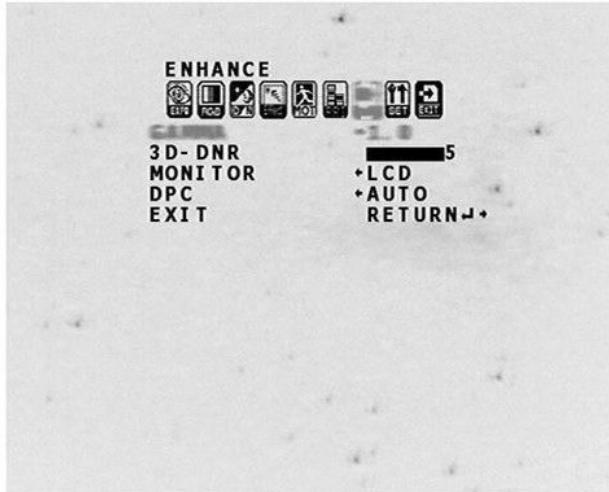
Enter the COLOR menu and select "WB-MANUAL" from the "WB MODE" menu. There you can alter the "M.WB R" value for red and "M.WB B" for blue.



Correct Dead Pixels

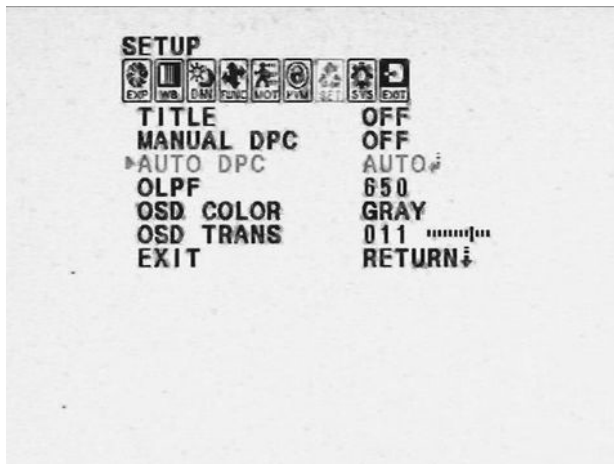
- Menu version 1

Open the "ENHANCE" menu and select scroll to the DPC option and select "AUTO"



- Menu version 2

Open the "SETUP" menu, scroll down to "AUTO DPC" and select the "AUTO" option



Recommended Settings

As you can see, there are plenty of options available to the astronomer using the Revolution Imager system to observe the wonders of the universe! Below you can find some settings we recommend for various kinds of objects you may be looking for, also, remember to check the revolution imager website at <http://www.revolutionimager.com/> for new recommendations, tips and tricks.

Deep Space Objects

Setting / Name	Recommended	When using a filter	Manual / Dim objects
Exposure Mode	NORMAL	NORMAL	NORMAL
Sense-up	X8-X16 for finding objects, X128 for most suburban neighbourhoods depending on your telescope.	X8-X16 to find objects, X256 and higher to view depending on filter type	OFF
Gain	Menu version 1: OFF Menu version 2: HIGH	Menu version 1: OFF Menu version 2: HIGH	Experiment, start with LOW and increase.
Exposure Time	AUTO	AUTO	For fainter objects go as high as X1024 (20 seconds exposure time) this will require steady tracking for your mount, otherwise X128 - X512
Brightness	99 or lower, if your sky background is too bright	99 or lower, if your sky background is too bright	Start at 40 and raise or lower as needed
Gamma	1.0, use lower value for a brighter image	1.0, use lower value for a brighter image	1.0, use lower value for a brighter image
Stacking	Menu version 1: 5 Menu version 2: HIGH	Menu version 1: 5 Menu version 2: HIGH	Adjust for a less noisy image
Color Mode	DAY	NIGHT / B&W	Set as required.

Planets

Setting / Name	Bright Planets	The Moon	Dim Planets
Exposure Mode	NORMAL	WDR	NORMAL
Sense-up	OFF	OFF	x8-x16, up to x128
Gain	OFF	OFF	OFF
Exposure Time	as high as X2 and as low as 1/10000 depending on your telescope and focal length.	as high as X2 and as low as 1/10000 depending on your telescope and focal length.	AUTO
Brightness	99 or lower, if your sky background is too bright	99 or lower, if your sky background is too bright	99 or lower if sky background is too bright
Gamma	1.0, use lower value for a brighter image	1.0, use lower value for a brighter image	1.0, use lower value for a brighter image
Stacking	OFF	OFF	Menu version 1: 5 Menu version 2: HIGH
Color Mode	DAY	NIGHT / B&W	Set as required.