REVOLUTION IMAGER

R2 INSTRUCTION AND USAGE MANUAL

camera concepts

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 **tonight.**

Before we start digging into the on-screen display options, let's cover a few of the basic concepts of using the Revolution Imager.

Exposure Time

Exposure time is 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 frame-rate 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, 1/100, 1/50	Fractional second exposures
x2	0.04 seconds or 1/25 of a second
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

Gain or "AGC"

The amount of signal boost/amplification the camera will apply to the image. 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. You can, also, set a fixed gain setting and the camera will apply that level of gain permanently.

Noise Reduction or "Stacking"

The Revolution Imager can combine up to 6 consecutive frames to average out noise and produce a smoother image. This process improves the vital signal-to-noise ratio that helps makes those faint-fuzzies that are invisible in your eyepieces visible to you.

Brightness and Contrast

These settings affect the overall brightness of the image, brightness is a simple adjustment of brightness whereas contrast affects the brightness of different areas of the image in order to improve visibility.

Color

There are 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 which imaging the Sun.

Initial Setup

In order to get started make sure the camera is in "CUSTOM" scene mode. Start by pressing the ENTER button, navigate to "SCENE SELECT" using the up and down buttons and select CUSTOM by using left and right keys.

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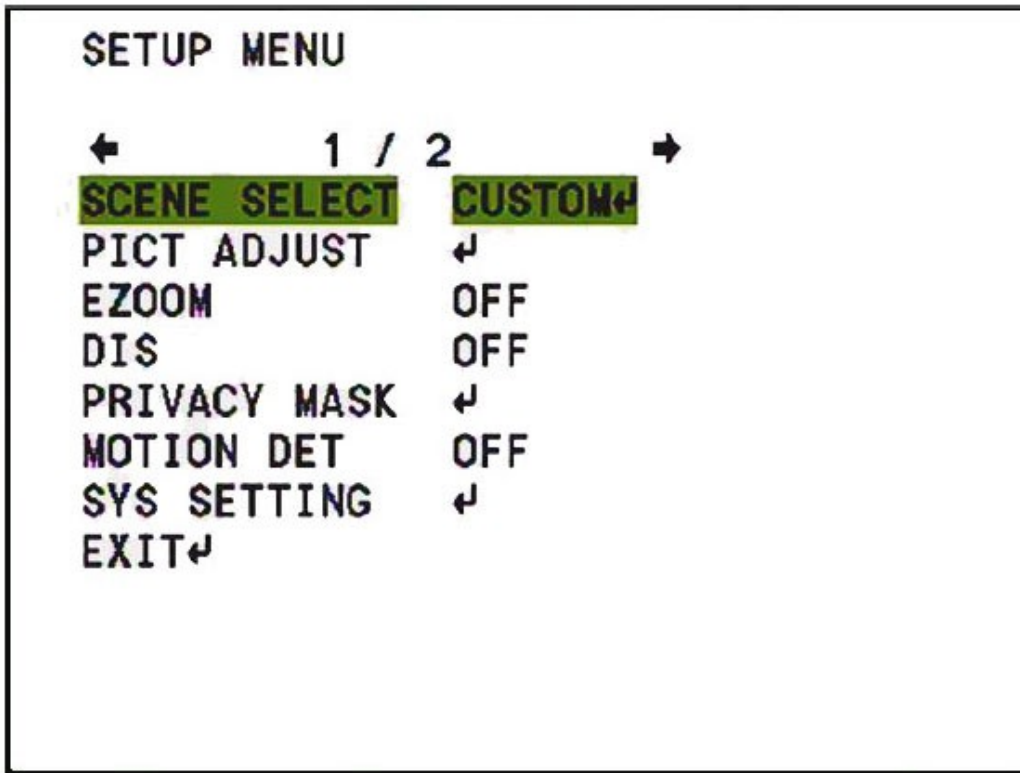
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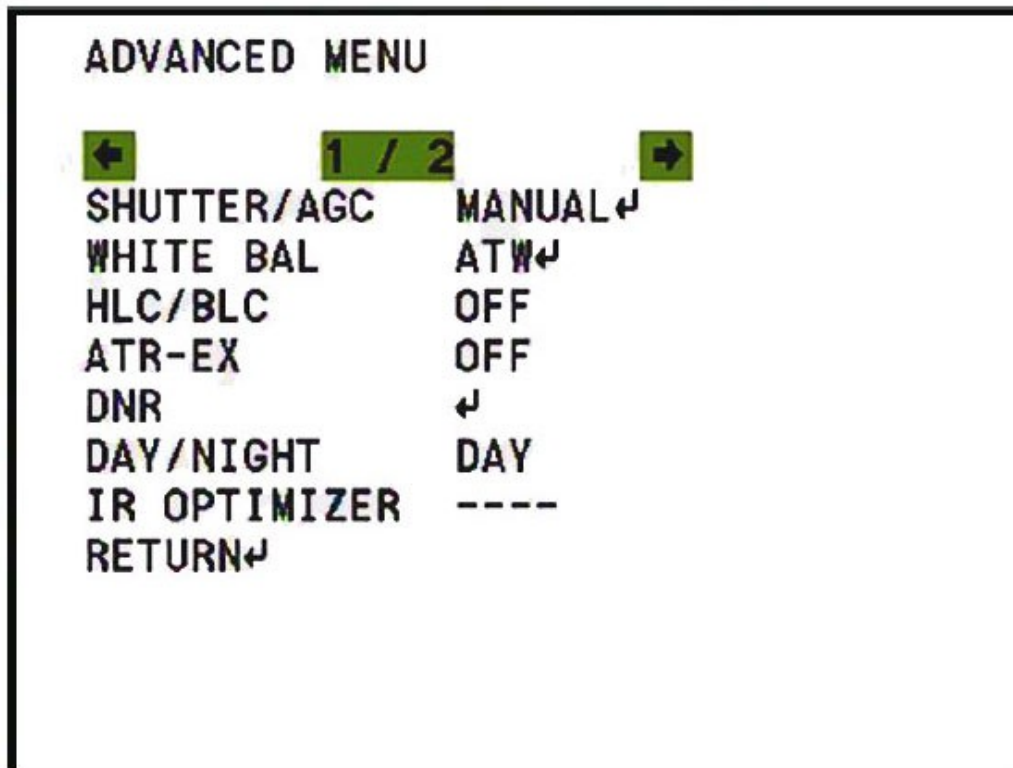
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```
SETUP  MENU

  ←        1 / 2          →
 SCENE  SELECT   CUSTOM↵
 PICT  ADJUST       ↵
 EZOOM            OFF
 DIS              OFF
 PRIVACY  MASK      ↵
 MOTION  DET      OFF
 SYS  SETTING       ↵
 EXIT↵
```

Exposure Mode

Setting the exposure time and gain are the two controls you will use the most when using the Revolution Imager. To enter the menu to alter these scroll to the "SCENE SELECT" item and press the OK button.

```
ADVANCED MENU

←        1 / 2        →
SHUTTER/AGC     MANUAL↵
WHITE BAL       ATW↵
HLC/BLC         OFF
ATR-EX          OFF
DNR             ↵
DAY/NIGHT       DAY
IR OPTIMIZER    ----
RETURN↵
```

The SHUTTER/AGC setting has 3 options that you can change using the left and right buttons.

- AUTO
  - AUTO places the camera in "full autopilot" where it will pick the exposure time and gain and attempt to find the best settings.
- MANUAL
  - MANUAL mode allows you select the exposure time and a maximum gain value that the camera will apply to the image. The camera will auto-adjust the gain value to give you a clear image that isn't blown-out.
- FIX
  - FIX mode allows you select the exposure time and a **fixed** gain value that the camera will apply to the image. This gives you full manual control over what the camera is doing. This mode is useful for viewing very faint objects and focusing.

After selecting the exposure mode you want to use, press the "OK" button to bring up the controls for that mode. We find the best setting for most cases to be "MANUAL" and "FIXED" when focusing.

Exposure Time and Gain

```
MANUAL  SETUP


SHUTTER          1  /  10000
AGC  MAX         6            DB




RETURN↵
```
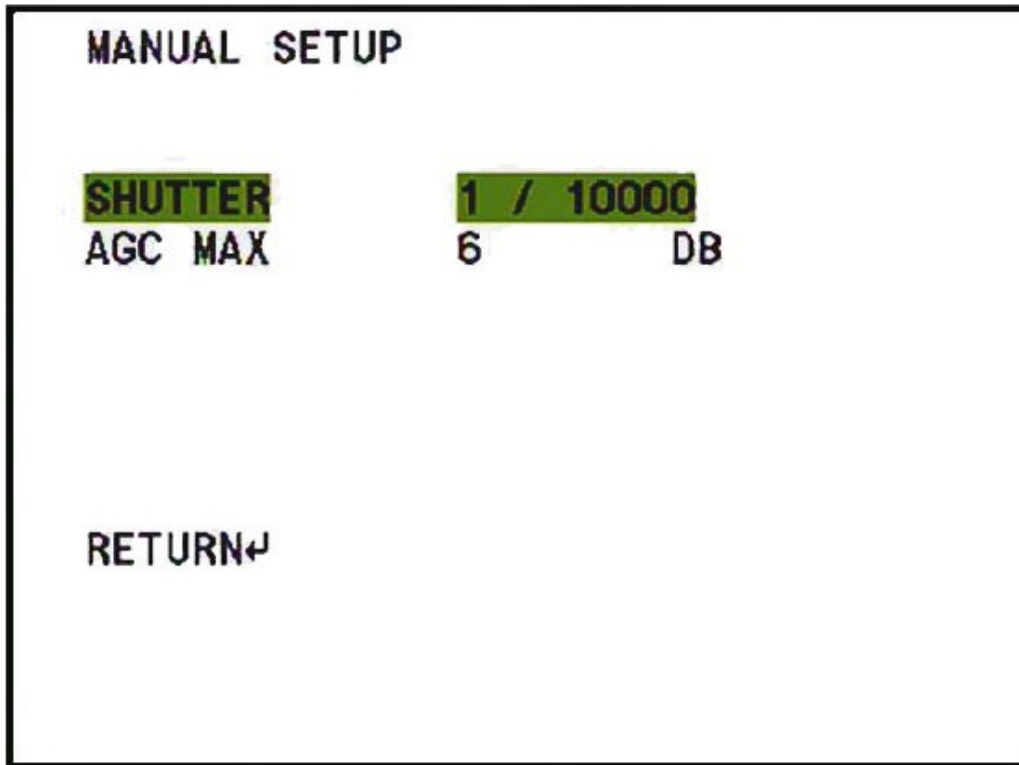
Pressing "OK" on the exposure (SHUTTER/AGC) mode allows you to set the shutter speed (exposure time) and the AGC/gain. Use the up and down and left and right buttons to alter these values. When altering SHUTTER the values marked "FLD" are the extended, long-exposure modes described in the concepts section. The highest value you can select here is "256 FLD" which is 5 seconds.

Noise Reduction / Stacking

```
DNR  SETUP


  LEVEL              ═══════╕        6



  RETURN↵
```
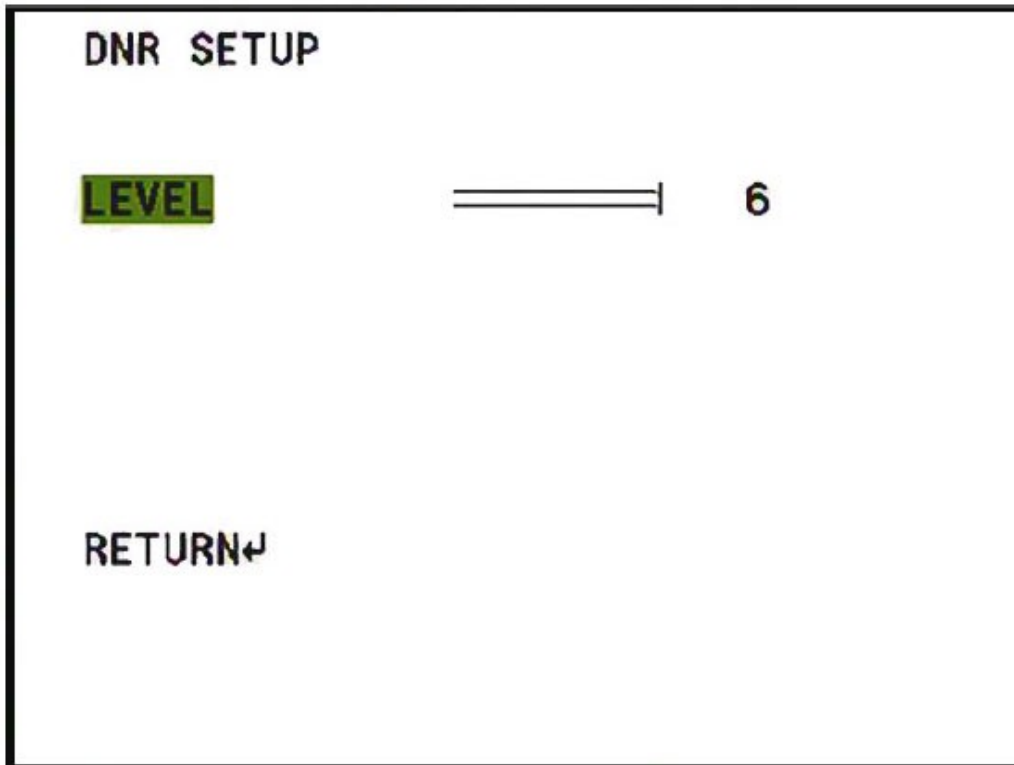
You can instruct the camera to stack up to 6 images to reduce noise which helps bring out those "faint fuzzies." In the Advanced menu after selecting "CUSTOM" from the main menu, select the "DNR" option and use the left and right buttons to increase or decrease the number of stacked frames.

Brightness, Contrast and Other Adjustments

The RI2 has a number of options for adjusting the displayed image that are available in the "PICT ADJUST" option on the main menu. You can use the up-and-down keys to select an option and the left and right keys to adjust.

Note: The BRIGHTNESS setting also affects the amount of gain the R2 will apply when using the "MANUAL" exposure mode. The BRIGHTNESS sets a guideline for the amount of gain applied.

```
PICT ADJUST


BRIGHTNESS      ════╬════  128
CONTRAST        ════╬════   32
SHARPNESS       ════╬════   08
HUE             ════╬════  064
COLOR GAIN      ════╬════  128



RETURN↵
```

Color

The RI2 can be switched between different color modes to control if you want to see the image in full color or in black and white only, which can be useful when using narrow band filters. To change the color mode select the "SCENE SELECT" option in the main menu, scroll down to "DAY/NIGHT" and set DAY for color, NIGHT for black and white, or select AUTO to have the camera decide.
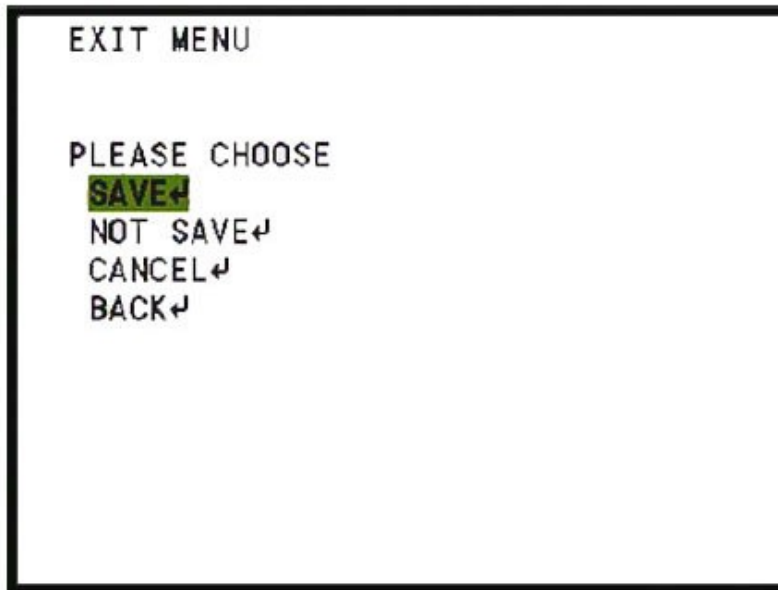
```
ADVANCED MENU

◄        1 / 2        ►
SHUTTER/AGC    MANUAL↵
WHITE BAL      ATW↵
HLC/BLC        OFF
ATR-EX         OFF
DNR            ↵
DAY/NIGHT      DAY
IR OPTIMIZER   ----
RETURN↵
```

Saving your settings

```
EXIT MENU


PLEASE CHOOSE
SAVE↵
NOT SAVE↵
CANCEL↵
BACK↵
```

In order to save your settings for use later return to the main menu and select the "EXIT" option. In that menu you can select the following options:
- SAVE: Save your new settings as the default when you power on the camera.
- NOT SAVE: Discard your new settings and exit the menu.
- CANCEL: Discard your new settings and return to the defaults.
- BACK: Return to the main menu.

Experiments

The key to success with the RI2 is experimentation, and more importantly **fun!** Try different settings and options and see what works for you. Here's some suggestions on things you can try:
1. Try using a red filter, either a #25 or #29 and put the camera in black and white (NIGHT) mode. This allows the camera to see mostly infrared light which can be great for viewing dim galaxies
2. Try enabling the ATR-EX feature in the "ADVANCED MENU" the ATR-EX feature can help increase contrast on some objects.
3. Try using the camera with and without the supplied focal reducer. The focal reducer will give you a wider field of view and decrease the amount of exposure time you

need to view objects, without the focal reducer you will get a larger imager scale and may see more details in some objects

4. Try using the camera with a USB capture card along with SharpCap on windows to use the new live stacking feature to go even deeper in your own backyards.

5. Try using the camera with a USB capture card with SharpCap to capture videos to process in Registax.