

# HOWTO Debayer Captured Images

## Using PIPP (Planetary Imaging PreProcessor)

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### Abstract

When capturing data using a raw colour space, such as RAW8 or RAW16, SharpCap (and other image capture programs) will display colour on the screen but saved files will appear to be monochrome and may display a grid pattern. Additional software is required to generate the colours – a process known as debayering. This document describes how to use the program PIPP to debayer single or multiple images.

## Table of Contents

1	Introduction .....	3
2	Further Resources .....	3
3	Overview .....	4
4	Which Debayer Pattern? .....	5
5	Debayer Process.....	6

## Version History

Version	Date	Comment
1.0	13 <sup>th</sup> July 2017	Initial release.
1.1	17 <sup>th</sup> July 2017	Minor formatting edits, no content change.

## 1 Introduction

When capturing data using a raw colour space, such as RAW8 or RAW16, SharpCap (and other image capture programs) will display colour on the screen but saved files will appear to be monochrome and may display a grid pattern. Additional software is required to generate the colours – a process known as debayering. This document describes how to use the program [PIPP](#) to debayer single or multiple captured images.

The question was raised on the SharpCap Forums relating to using a ZWO 224MC camera – see post <https://forums.sharpcap.co.uk/viewtopic.php?f=19&t=228> . The process described below can be applied to *any manufacturer/camera model*.

Thanks to SharpCap Forum user *LarryH* for providing the images to enable development of the document and for testing out the debayer process described below.

## 2 Further Resources

Information on the RAW8 format can found at <http://docs.sharpcap.co.uk/2.9/#RAW8> .

Information on the Bayer filter mosaic can be found at [https://en.wikipedia.org/wiki/Bayer\\_filter](https://en.wikipedia.org/wiki/Bayer_filter) .

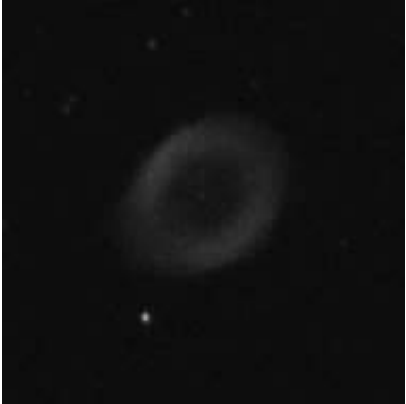

A PIPP example to debayer a raw video can be found at <https://sites.google.com/site/astropipp/example-uasge/example1A> .

### 3 Overview

A ZWO ASI224MC camera was used for the capture of the M57 nebula. These were the outline steps:

1. SharpCap was used with *Colour Space RAW8* to capture 24 x 8 second frames as PNG files.
2. The 24 PNG files were processed in PIPP using an RGGB debayer pattern.
3. The 24 debayered PNG files were stacked using [Deep Sky Stacker](#).

These are 'before' and 'after' snips of the main object in the individual images.

	
Single frame from SharpCap (mono)	After debayering with PIPP (colour)

This was final (cropped) output from Deep Sky Stacker and is a good demonstration of the value of stacking (when comparing with the single colour frame above).



## 4 Which Debayer Pattern?

There are four debayer patterns:

- GRBG
- GBRG
- BGGR
- RGGG





The question will arise – “how do I know which debayer pattern to use for my camera?” For this camera, a Google search for *zwo asi224mc debayer pattern* turned up <http://zwoug.org/viewtopic.php?f=21&t=2077> . The answer, directly from the company owner on the ZWO User Forum, was RGGG. Further research gave the following debayer patterns for other ZWO camera models:

- ASI174MC, GBRG
- ASI1600MC-cool, GBRG
- ASI071MC, RGGG

An Altair GPCAM V1 COLOR has a debayer pattern of GBRG.

Different camera manufacturers/models use different Bayer patterns. Most camera manufacturers have user forums and these are a useful source of information. If all else fails, then try each of the four Debayer pattern options in PIPP (see below) until the output looks right.

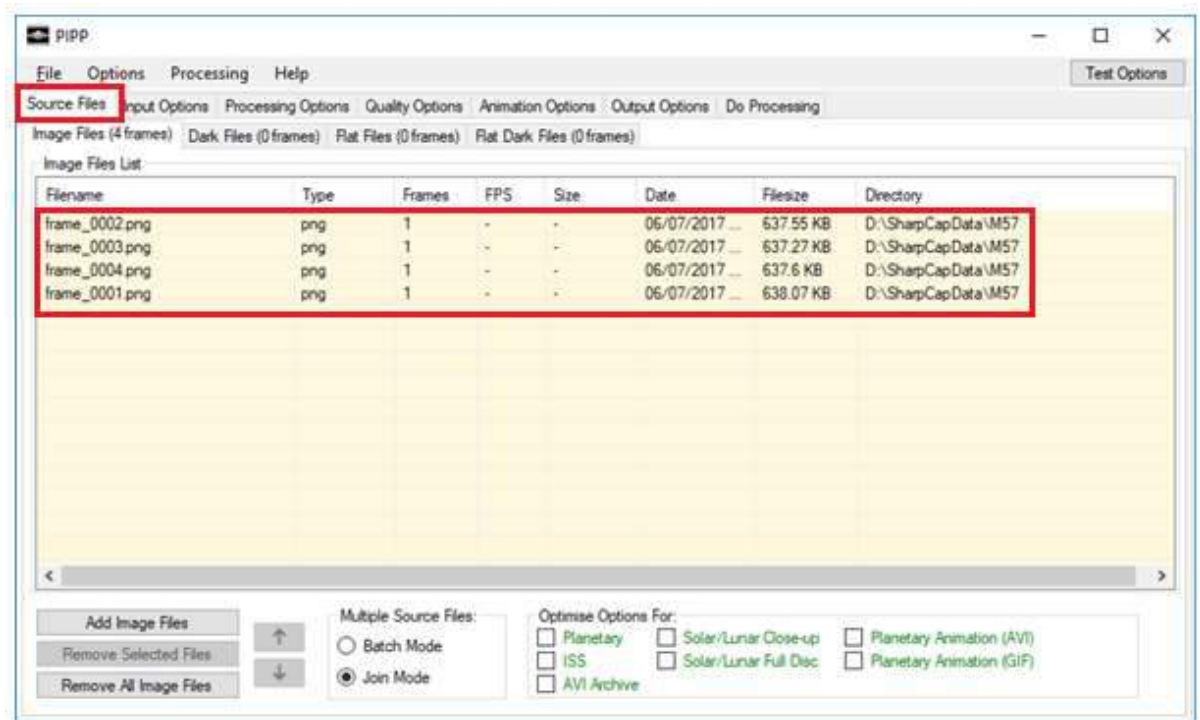
### PIPP Debayer Patterns

Colour Debayer Options		
Bilinear	GRBG	
Debayer Algorithm:	Debayer Pattern:	
Colour Debayer Options		
Bilinear	GBRG	
Debayer Algorithm:	Debayer Pattern:	
Colour Debayer Options		
Bilinear	BGGR	
Debayer Algorithm:	Debayer Pattern:	
Colour Debayer Options		
Bilinear	RGGG	
Debayer Algorithm:	Debayer Pattern:	

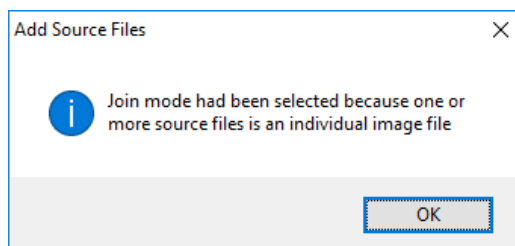
## 5 Debayer Process

The program PIPP can bulk process several files by applying the same processing parameters to each file. The following example uses four files – frame\_0001.png, frame\_0002.png, frame\_0003.png, frame\_0004.png – to demonstrate this. Follow the steps below to debayer single or multiple files using PIPP.

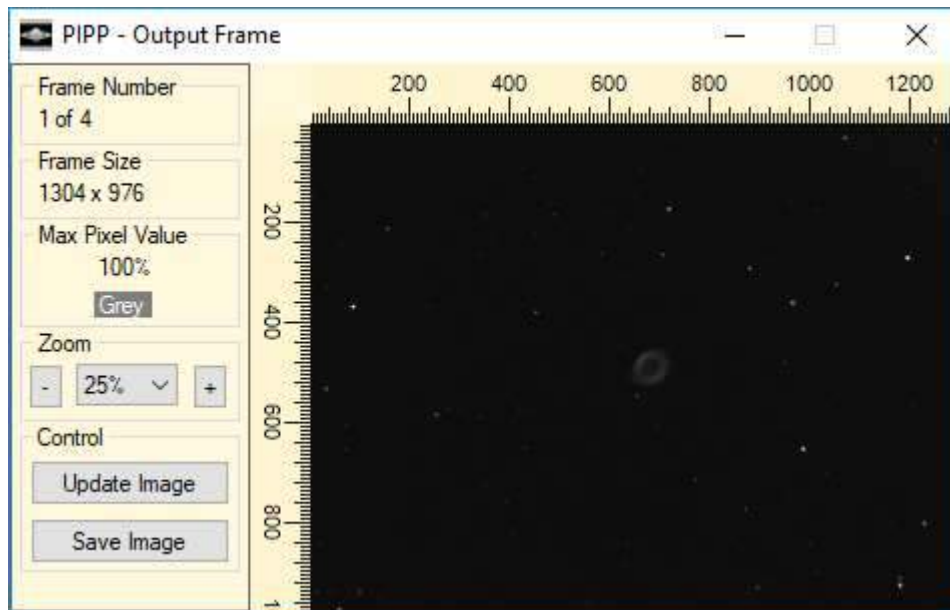
1. Drag and drop the file(s) to be processed onto the PIPP *Source Files* tab.



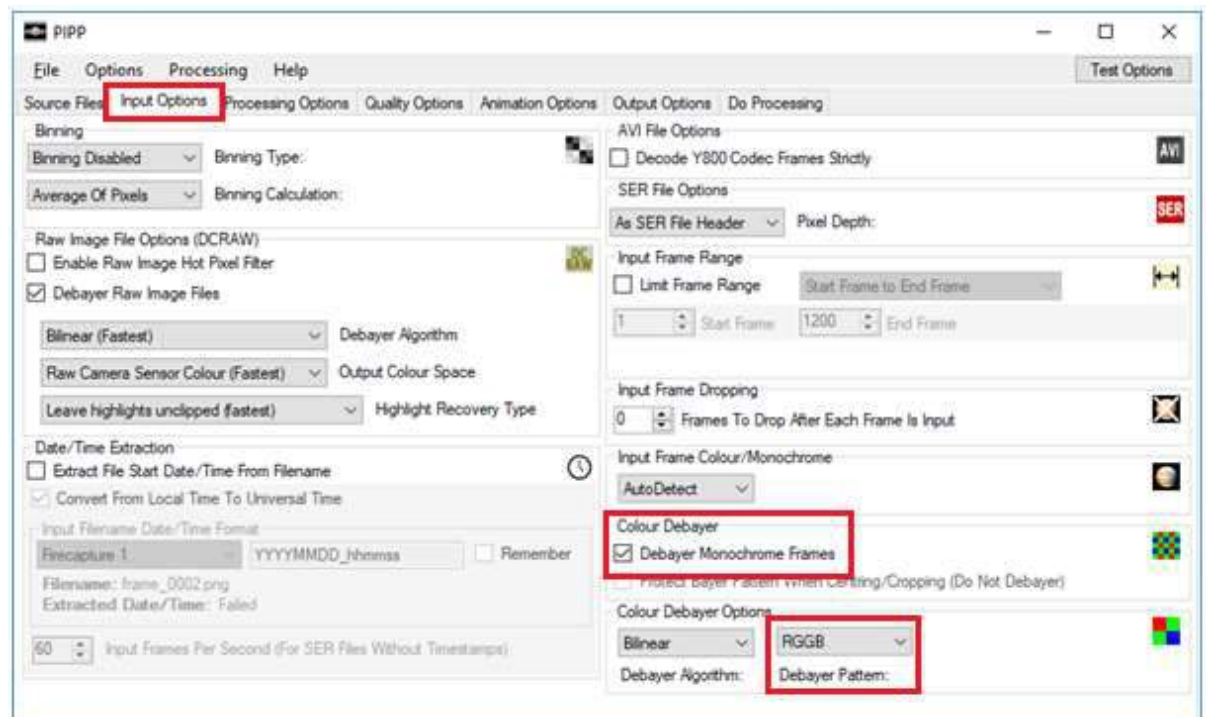
2. The *Join Mode* message appears, press *OK* to continue.



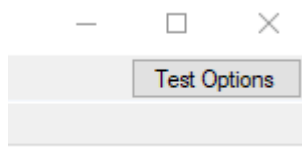
3. The *PIPP - Output Frame* will appear, showing the monochrome image.



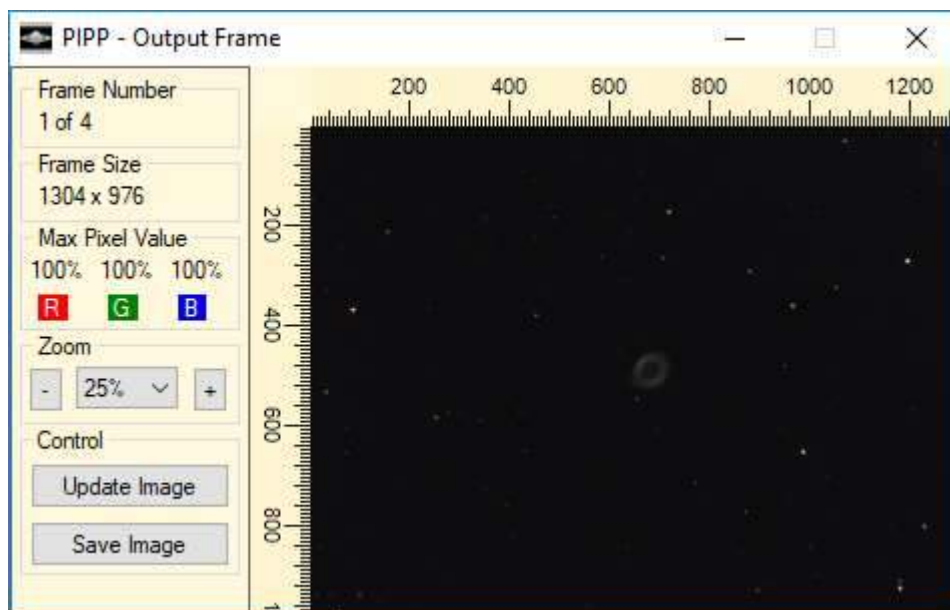
4. From the *Input Options* tab, Select *Debayer Monochrome Frames* and *Debayer Pattern RGGB* (RGGB is appropriate for a ZWO ASI224MC camera, for a different model of camera choose an appropriate pattern from the *Debayer Pattern* dropdown)



5. Press the *Test Options* button at the top right of the PIPP window. The *Test Options* button can be used anywhere during the PIPP process to check that selected options give the desired result.

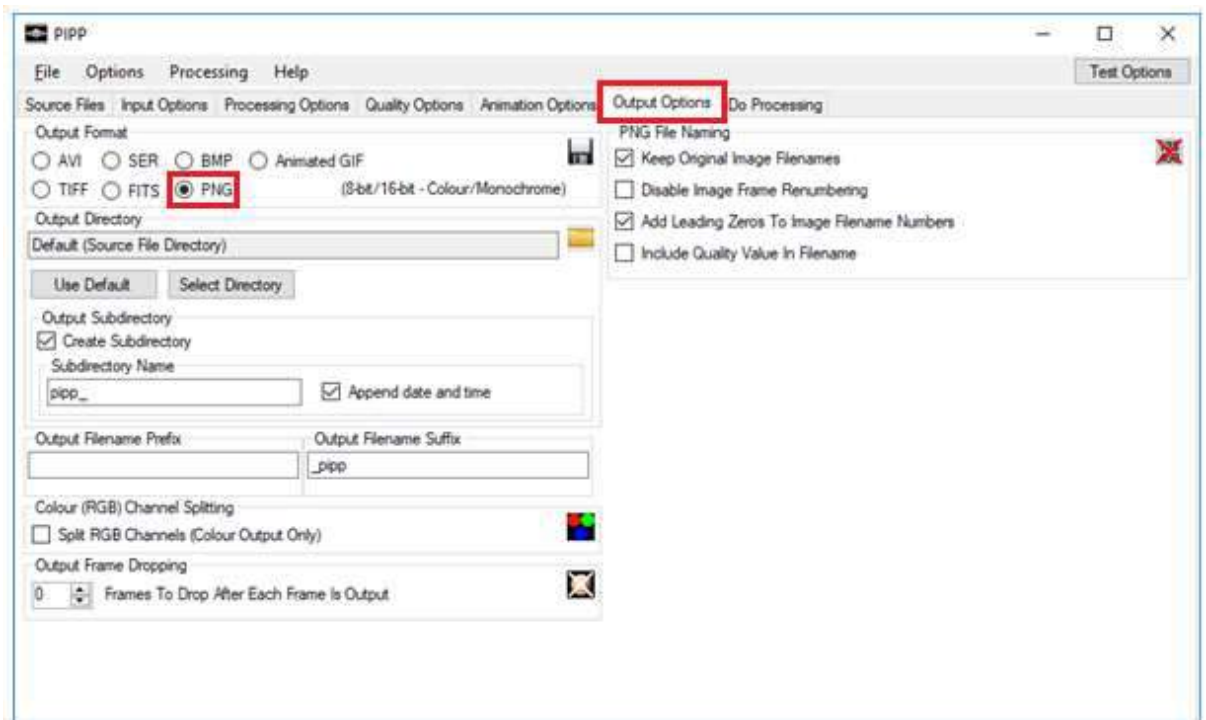


6. The *PIPP - Output Frame* left hand panel will change to reflect the effect of the Debayer Pattern selection.

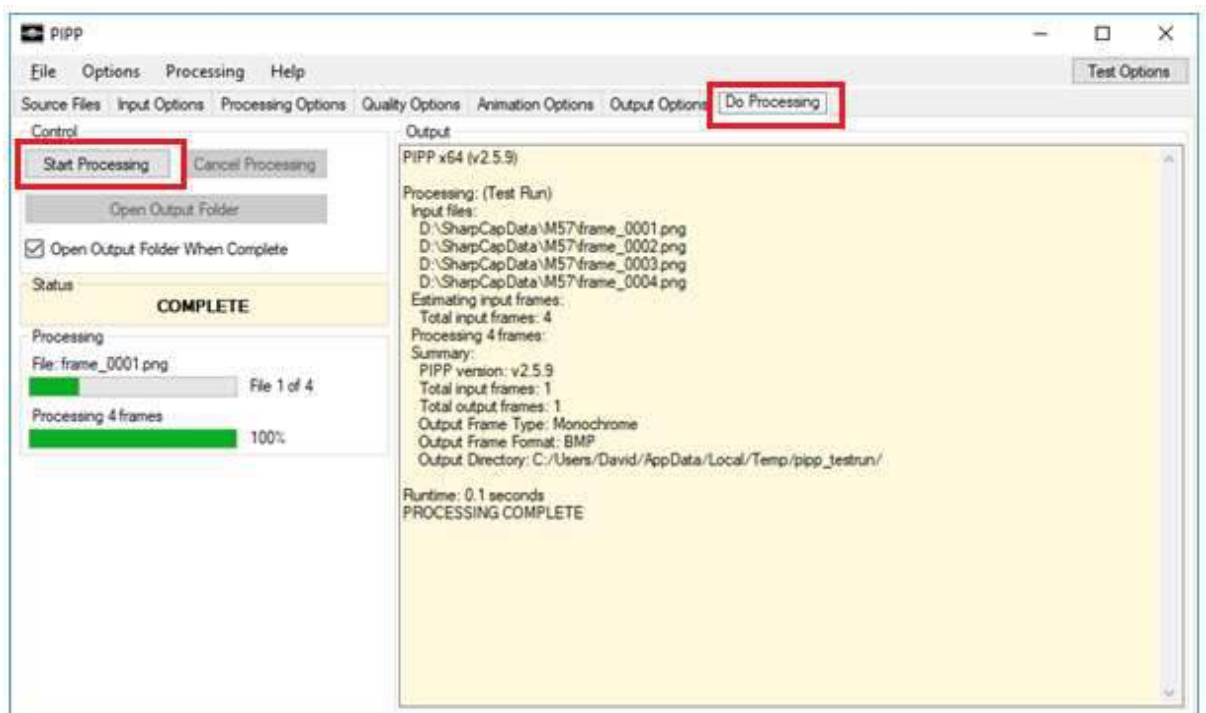




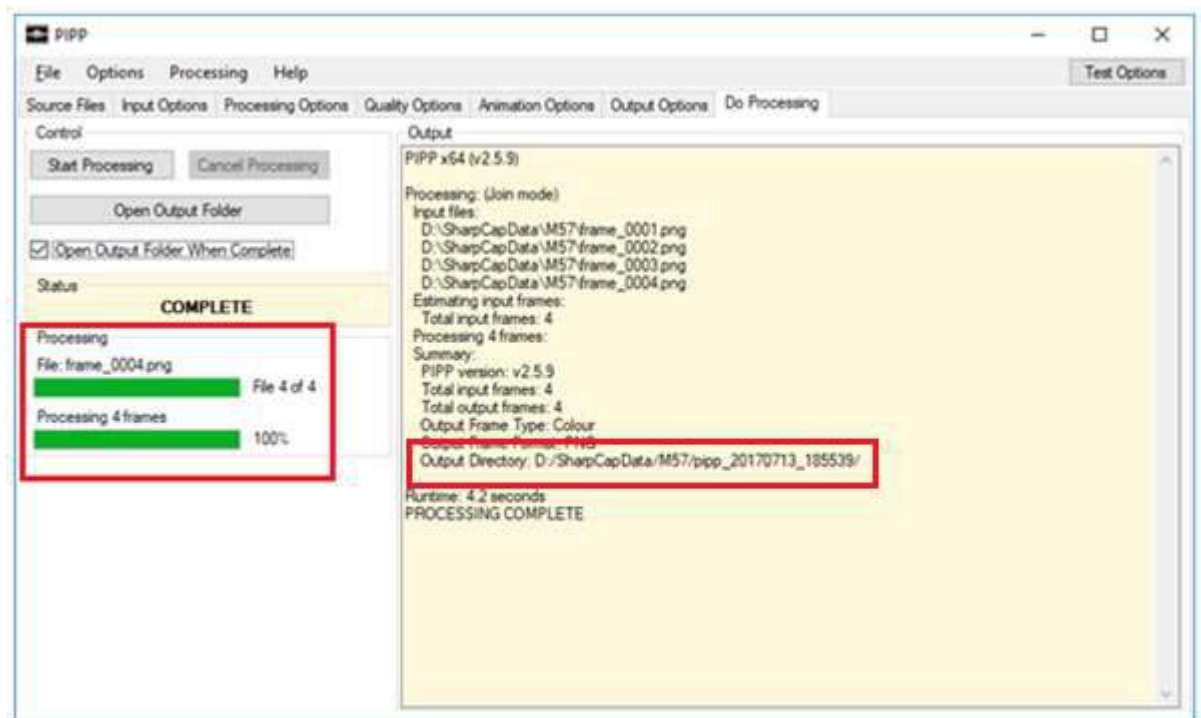
7. On the *Output Options* tab, selected the desired output file format, *PNG* in this case.



8. On the *Do Processing* tab, click the *Start Processing* button.



9. When the processing has completed, the processed files will be found in the folder indicated in the processing summary. The *Output Directory* will usually be found in the source file folder as a sub folder (with a name of the form *pipp\_YYYYMMDD\_HHMMSS*).



10. The processed files will have colour and are now ready to be stacked in Deep Sky Stacker or another suitable program.