

IDP3 Bad Pixel Repair (Main Widget Edit Menu)

The Bad Pixel Repair function is designed to replace the bad pixels in images that are identified in a number of ways with new pixel values derived from either Gaussian interpolation or neighbor box medians. The repaired images may be saved to disk and/or IDP3 memory. The repair may be applied to one or more loaded images depending on how many images are ON. The widget is divided into three distinct sections: **Bad Pixel Identification**, **Bad Pixel Repair Method**, and **Save Results**.

Bad Pixel Identification

Select Types: List Mask Value > Value < Value NaN

Bad Pixel List: Browse

Bad Pixel Mask: Browse

Bad Pixel Value in Mask: Use Internal Mask

Bad Pixel Values in Image

Value: Greater Than: Less Than:

Bad Pixel Repair Method

Gaussian Interpolation Neighbor (Box) Median

Kernel Diameter (pixels): Box Size:

FWHM

Save Results to:

IDP3: Name and/or Append (single), Append (multiple)

File: Name and/or Append (see above) and Path

Name: Append:

Path:

Compute Help Done

Identify pixels for repair by:

List File

Pixel Mask

Specific Value, Greater than Value, Less than Value

Methods for repairing bad pixels: Gaussian Interpolation or Neighbor (Box) Median.

Where to save results: IDP3 memory and/or file written to disk.

Bad Pixel Identification

Bad pixels may be identified in any of six ways: **List**, **Mask**, **Value**, **Greater than Value**, **Less than Value**, and **NaN's**. The identification methods to be used are chosen in the **Select Types** button list.

List: X and Y pixel positions are read from the file specified in the **Bad Pixel List** Field. The user may **Browse** to find the appropriate file.

Mask: Bad pixels are identified in the mask image specified by the filename in the **Bad Pixel Mask** Field. The user may **Browse** to find the appropriate file. Only **FITS** format images are supported. The user must specify the value of the bad pixels in the mask in the **Bad Pixel Value in Mask** Field. If an internal mask has been loaded for the current image, it may be used to identify the bad pixels when **Use Internal Mask** is selected.

Value: Bad pixels may be identified as all pixels in the image with a given value as specified in the **Value** Field.

Greater than Value: Bad pixels may be identified as all pixels in the image with values greater than the value specified in the **Greater Than** Field.

Less than Value: Bad pixels may be identified as all pixels in the image with values less than the value specified in the **Less Than** Field.

NaN's: NaN's are identified as data are loaded and the pixel values are replaced with zeroes. A list of these pixel locations is carried in the image structure and may be used to identify the pixels to be repaired.

Multiple methods may be specified simultaneously and the results of each identification method are combined in a final mask for repairing data.

Bad Pixel Repair Method

Bad pixels may be repaired by **Gaussian Interpolation** or a **Neighbor (Box) Median**.

Gaussian Interpolation: This algorithm was written by Inseok Song and Glenn Schneider. It requires two inputs: The **Kernel Diameter** in integer pixels, nominally defined as $\text{Round}(2.2 * \lambda/D)$ and the **Full Width Half Maximum**. Reasonable values for the input radius and FWHM for NICMOS F160W images are 5 and 2.2.

Neighbor (Box) Median: This method requires an integer **Box Size** specified in pixels. The box must be square. If more than 2 pixels in any box are bad no repair is made and an error is reported. In the case of two bad pixels within a repair box, each bad pixel is repaired independently. The first is repaired with a box median centered about itself, excluding the second bad pixel. The second is repaired with a box median centered about itself and if the first bad pixel falls within the second box it is excluded from that median computation.

Save Results

The final repaired image may be saved to memory (*IDP3 images structure*) and/or disk (*File*). When a single image is repaired (only one image is **ON**) the user may specify a new filename in the **Name** and **Path** Fields or an Append string in the **Append** Field to be applied to the original filename for the output filename. When multiple images are **ON**, the user **MUST** supply an Append string which is applied to the original input filenames in order to keep the output names unique.

The bad pixel repair is always applied to the original image as loaded into IDP3. If the repaired image or images are saved to disk, any translation, rotation, etc. than has been applied to the image previously in the IDP3 session are lost. If the images are saved to memory translations, rotations, etc. are retained in the new image entry in the *images structure*. All of the specified operations will be applied to the data before the final image is displayed.