Merge

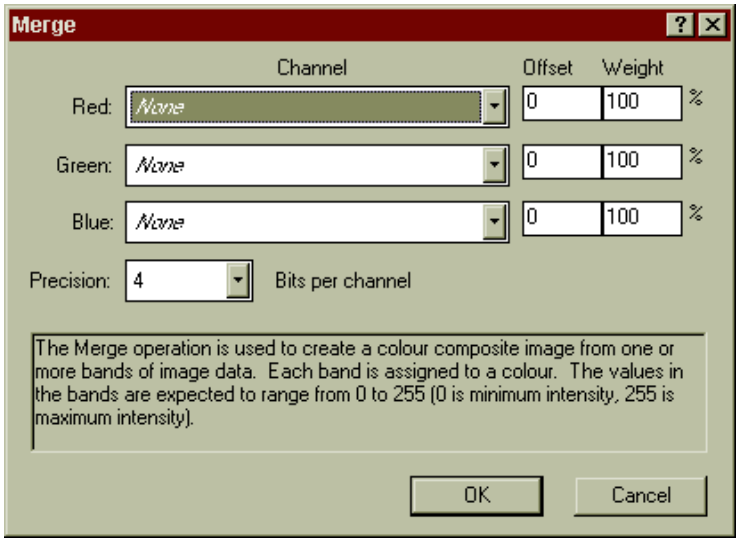
Generate a Colour Composite from Multi-band Data

Examples

- Creating a False Colour Composite From Three TM Bands

Dialog Box

- Using the operation dialog box interface
- Using the dialog box interface to create or edit scripts



The **Merge** operation is use to create true colour composites and false colour composites from multiple channel data. You may use up to three map layers of light intensity information with values ranging from “0”, no light, to ”255”, full intensity. The operation is commonly used with multi-channel remote sensing imagery such as those produced by the Landsat Thematic Mapper and the SPOT satellite.

Channel

There are three **Channel** drop-down lists that allow you to specify up to three map layers of colour intensity data. Each of the three map layers are assigned to one of the three colour output channels: **Red**, **Green**, and **Blue**.

The input map layers are expected to have a value range from “0” to “255”. If a channel is unassigned (missing the corresponding modifier), the **Merge**

operation supplies a constant value of "255" (full intensity) to the composite calculation.

Offset

There are three optional fields that you can use to indicate an offset value to be added to the values of the map layer assigned to the corresponding colour channel (Red, Green, and Blue). They are used to shift the numeric range (increase or decrease the brightness) of the channel content in the output image. An offset of zero is assumed if no other value is specified.

You can specify positive and negative shifts. For example, if the range of values for the red channel of the input map layer is "34" through "73" and you specify a **Red offset** of "-27", the red range in the calculation of the output map layer would be shifted to "7" through "46", darkening the red component.

Weight

There are three optional fields that you can use to indicate the weighting factor (expressed as a percent) to be applied to the values in the map layer assigned to the corresponding colour channel (Red, Green, and Blue).

Values greater than "100" will increase (stretch) the contrast. Values less than "100" will decrease (compress) the contrast. A weight of 100% is assumed if no modifier is specified.

Use a weight of "0" to disable a channel (this is useful when there is no map layer assigned to a particular channel) and you don't want the default value of "255" assigned to an unassigned channel. You can also reduce the default intensity of "255" by assigning a colour **Weight** value of less than 100%.

Precision

The **Precision** drop-down list is used to specify the level of precision (or channel depth) to be used in the output map layer. The greater the depth, the greater the number of output zones, the higher the colour precision, and the longer the operation will take to execute.

The default precision is 4 bits, allowing each channel to contribute 16 levels of intensity information to the output map layer with the potential of generating 4 096 output zones. The maximum precision is 5 bits (32 levels per channel with 32 767 potential zones); the minimum precision is 2 bits (4 levels per channel with 64 potential zones).

Syntax

Syntax and type conventions
Using the Script window interface
Using the dialog box interface to create or edit scripts

MFworks Operations

```
Merge
      [RedMap map] [RedOffset value]
      [RedWeight value]
      [GreenMap map] [GreenOffset value]
      [GreenWeight value]
      [BlueMap map] [BlueOffset value]
      [BlueWeight value]
      [Precision value];
```

`Merge`

The **Merge** statement is used to create true colour or false colour composite from up to three map layers specified by the **RedMap**, **GreenMap**, and **BlueMap** modifiers.

`RedMap map`
`GreenMap map`
`BlueMap map`

These modifiers specify the input map layers, or "colour" bands, to be assigned to each of the Red, Green, and Blue colour channels in the output map layer composite image.

The input map layers are expected to have a value range from "0" to "255". If a channel is unassigned (missing the corresponding modifier), the **Merge** operation supplies a constant value of "255" (full intensity) to the composite calculation. Assign a **ColourWeight** value of "0" to disable an unassigned channel.

`RedOffset value`
`GreenOffset value`
`BlueOffset value`

These modifiers indicate the offset value to be added to the values in the band assigned to the corresponding colour channel (Red, Green, and Blue). They are used to shift the numeric range (increase or decrease the brightness) of the channel content in the output image. An offset of "0" is assumed if no modifier is specified.

You can specify positive and negative shifts. For example, if the range of values for the red channel of the input map layer is "34" through "73" and you specify a **RedOffset** of "-27", the red range in the calculation of the output map layer would be shifted to "7" through "46", darkening the red component.

`RedWeight value`
`GreenWeight value`
`BlueWeight value`
These modifiers indicate the weighting factor (expressed as a percent) to be applied to the values in the band assigned to the corresponding colour channel (Red, Green, and Blue).

Values greater than “100” will increase (stretch) the contrast. Values less than “100” will decrease (compress) the contrast. A weight of 100% is assumed if no modifier is specified.

Use a weight of “0” to disable a channel (this is useful when there is no map layer assigned to a particular channel) and you don’t want the default value of “255” assigned to an unassigned channel. You can also reduce the default intensity of “255” by assigning a **ColourWeight** value of less than 100%.

`Precision value`
The **Precision** modifier is used to specify the level of precision (or channel depth) to be used in the output map layer. The greater the depth, the greater the number of output zones, the higher the colour precision, and the longer the operation will take to execute.

The default precision is 4 bits, allowing each channel to contribute 16 levels of intensity information to the output map layer with the potential of generating 4 096 output zones. The maximum precision is 5 bits (32 levels per channel with 32 767 potential zones); the minimum precision is 2 bits (4 levels per channel with 64 potential zones).

Details

The **Merge** operation creates colour composite images from multiple channel “light” intensity data sets such as those generated by remote sensing platforms like the Landsat Thematic Mapper and the SPOT satellite. Use of this operation requires a good working knowledge of Remote Sensing imagery and an understanding of colour theory.

The **Merge** operation allows you to generate a colour composite image from one or more map layers of intensity data. Each map layer representing the intensity information of a specific light band is explicitly assigned to one of three colour channels: Red, Green, and Blue. The values in the bands should range from “0” to “255” (“0” is minimum intensity and “255” is maximum intensity).

The **Merge** operation has an optional numeric modifier that is used to shift the intensity value to control band brightness. This modifier is additive when a positive value is specified and subtractive when a negative value is specified. The **Merge** operation also has an optional numeric modifier that

is used to stretch or compress the intensity value range to control band contrast. This modifier is applied as a weighting factor. Together they are applied in the following fashion to determine the contribution of each channel to the final composite image:

Channel contribution = (input value + offset) * (weight/100)

The channel contribution value will be adjusted to fit within the “0” to “255” value range. A precision setting determines the colour depth of the image.

What Do I Need?
You require up to three map layers with the same coverage, cell resolution, origin, and orientation. Each image should have values ranging from “0” to “255”. Typically the data source for these images in multiple band remote sensing imagery.

Troubleshooting Error Messages
Here are some of the most common error messages for the **Merge** operation with suggestions on what to do if you see them:

Error, the precision value must be between 2 and 5.

The output colour precision can range from 2 bits (4 levels per channel, 64 potential zones) to 5 bits (32 levels per channel, 32 767 potential zones).

Error, the map weight must be a positive number.

The weighting value for band must be a positive value. This number is expressed as a percent.