

# Image Band Correlation

You can use the Image Band Correlation window in the Display process in TNTmips to explore the distribution of spectral values between one or more pairs of image bands. Open the Image Band Correlation window from the Display Manager by right-clicking on any raster layer in the layer list and choosing Image Band Correlation from the popup menu. If you clicked on an RGB raster layer, the Image Band Correlation window is automatically populated using the 3 bands in the layer. Otherwise you are prompted to choose 2 or more grayscale (integer or floating-point) image bands (with matching dimensions) for analysis.

## Overview

The Image Band Correlation window shows a 2D scatterplot of band values for each pair of spectral bands among those selected. The illustration below left shows the correlation

window with a single pair of image bands selected. The optional histogram for each input band is shown along the edges of the scatterplot. The correlation coefficient and band statistics are listed in the scrollable pane in the bottom part of the window along with the equation of the regression line that is automatically computed for each pair of bands. If the image in the View has the same extents and dimensions as the bands you are analyzing, moving the mouse over the image in the View highlights the 2D scatterplot positions corresponding to a small target area around the cursor location. As described in the Technical Guide entitled *Spatial Display: Highlight Image Cells from Correlation Plot*, you can also use the Highlight within Range tool to outline a rectangular area of the scatterplot, highlight the corresponding cells in the View, and optionally save a binary mask raster from the highlighted cells.

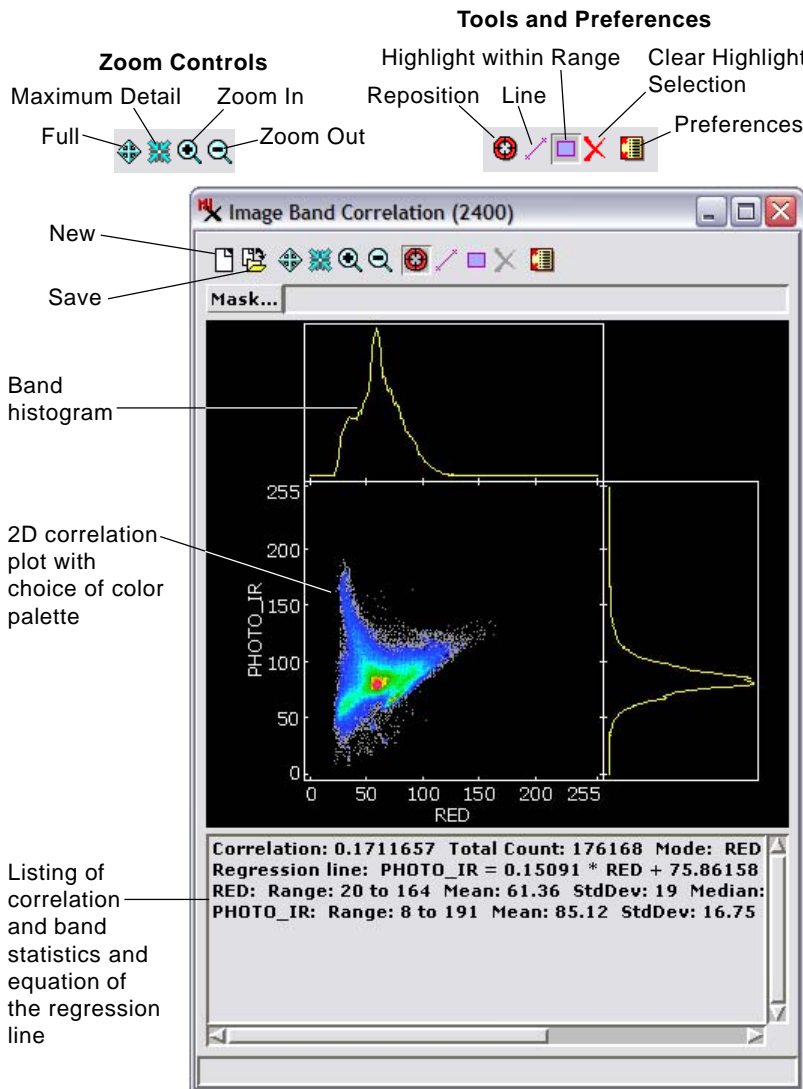
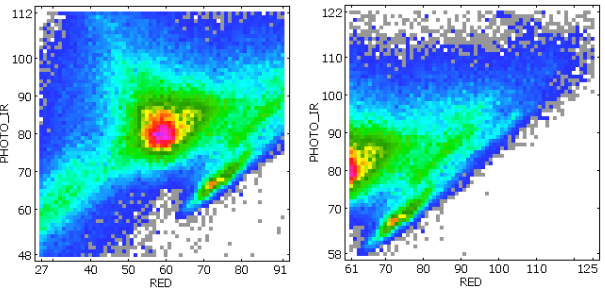


Image Band Correlation window showing correlation plot for two bands of a Landsat scene extract. The RED band is the X axis and the PHOTO\_IR band is the Y axis.



You can use the zoom controls to zoom the scatterplot within its frame. The Reposition tool allows you to drag a zoomed scatterplot within its frame.

## Zoom and Reposition

You can resize the Image Band Correlation window to change the size of the drawing area used to show the correlation scatterplots. The zoom icon buttons shown to the left also allow you to change the zoom level of the scatterplots. You can zoom in, zoom out, show the full dimensions of each scatterplot, or zoom to show the maximum detail of the scatterplots.

If you have zoomed in, the Reposition tool allows you to drag a scatterplot around within its rectangular frame to view the desired portion of the plot.

## Line Tool

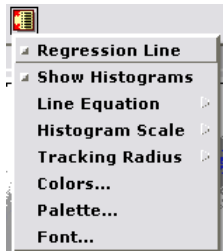
You can investigate linear trends within the scatterplot using the Line tool. Use this tool to draw, reposition, and resize a two-point line anywhere within the scatterplot. As shown in the illustration on the reverse, the equation of this line is automatically shown at the top of the scrollable text pane at the bottom of the window. (over)

## Highlight within Range Tool

The Highlight within Range tool allows you to draw a rectangle anywhere within a scatterplot to set a range of cell values within each band in that pair. Right-click after setting the rectangle to highlight cells with values within both of those ranges in the View window. This tool is described and illustrated in detail in the Technical Guide entitled *Spatial Display: Highlight Image Cells from Correlation Plot*.

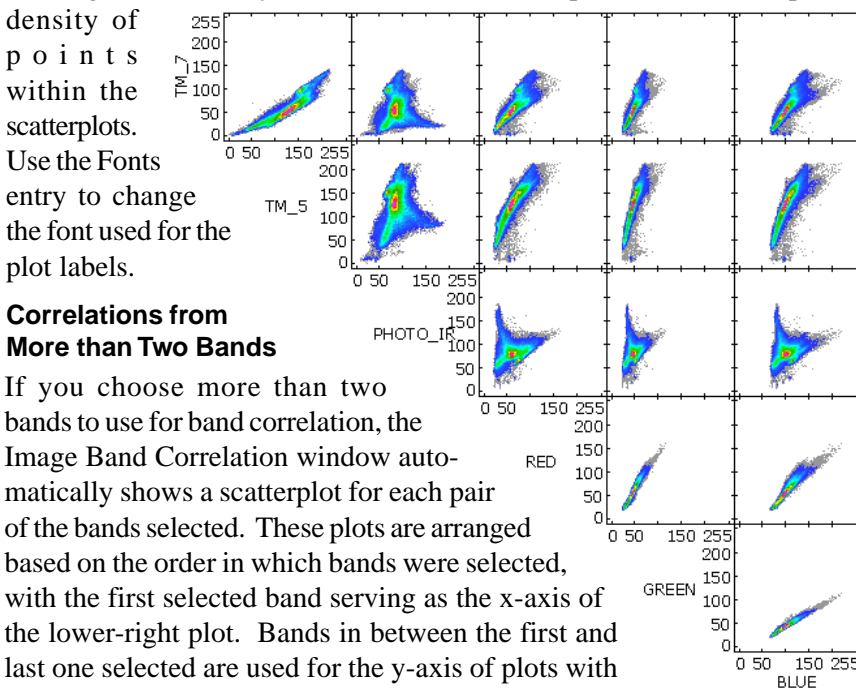
## Saving Results

The Save icon button provides a dropdown menu that you can use to save various results of the image band correlation. You can save the correlation plot pane as a raster object, save a text file with the correlation statistics and a listing of cell counts for each cell value pair, or save a text file with just the correlation statistics. If you have used the Highlight with Range tool to highlight image cells based on ranges in a correlation plot, you can save the highlighted cells as a binary raster object.



## Preferences

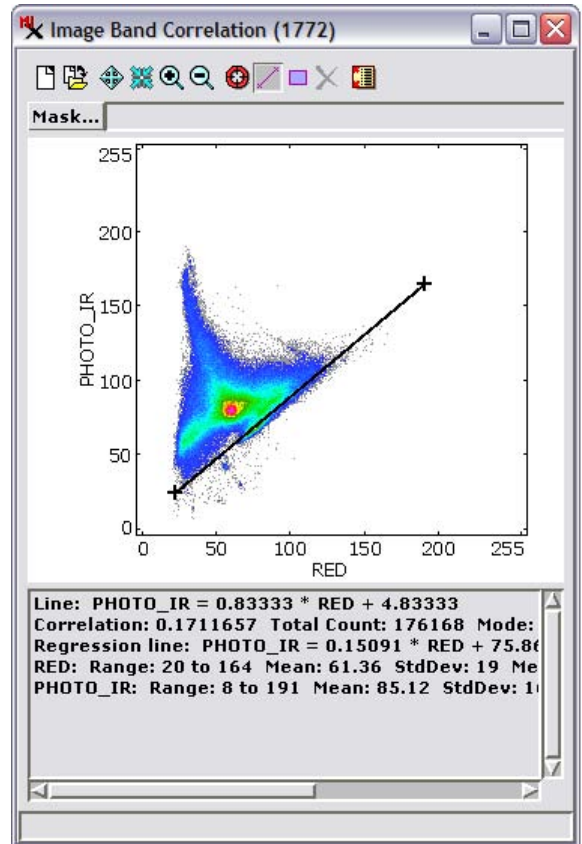
You can use toggle entries on the Preference icon button's menu to show or hide the regression line and histograms in the correlation plot. You can select the form of the line equation to show in the window listing and choose a linear or logarithmic scale for the histograms. The Tracking Radius entry allows you to set the radius (in screen pixels) of the area around the cursor in the View pane that is used to highlight pixels in the correlation plot. The Colors entry allows you to change the colors used for the background and other elements of the correlation plot. The Palette entry opens a dialog from which you can choose the color palette used to map the density of points within the scatterplots. Use the Fonts entry to change the font used for the plot labels.



## Correlations from More than Two Bands

If you choose more than two bands to use for band correlation, the Image Band Correlation window automatically shows a scatterplot for each pair of the bands selected. These plots are arranged based on the order in which bands were selected, with the first selected band serving as the x-axis of the lower-right plot. Bands in between the first and last one selected are used for the y-axis of plots with the previous bands and the x-axis of plots with the later bands (see the illustration of plots of 6 bands immediately to the right). If you open the Image Band Correlation window for an RGB raster layer, it automatically shows plots for the three possible pairings of the three input bands (far right).

Band correlation plots for the six pairings of six image bands of a Landsat Thematic Mapper image.



The Line tool allows you to draw a two-point line within a scatterplot and see the equation of the line in the listing below the plot.

