hilbert

keys:	**[from]**	*<number>*	source picture
	[to]	*<number>*	output picture
options:	**left/right**		transform vanishes over left/right half-plane
	zero		set imaginary part of central transform column to zero rather than duplicate real part
	lp		apply low pass linear ramp filter to transform rows

The **hilbert** command calculates the discrete *hilbert* transform of a picture. It adds it as an imaginary part to the picture so that its *fourier* transform vanishes over one half-plane. You can use this operation to analyse images that are formed by one-sided imaging systems.

Examples

```
hilbert 1 2
```

This command copies the real part of picture 1 to *Complex* picture 2, and adds the row by row *hilbert* transform as an imaginary part. The *fourier* transform of picture 2 vanishes over the left half-plane.

```
hilbert right nozero
```

This command produces a picture whose *fourier* transform vanishes over the right half-plane, and whose imaginary row means match the real row means.

Description

The **hilbert** command adds a *hilbert* transform, as imaginary parts, row by row to the image, by suppressing one half of the row *fourier* transforms. You can specify the side using the **left/right** options, (by default the left side is used). The output is a *Complex* picture by default. The imaginary part of the row means (that is, of the central *fourier* component) are set to zero unless you specify option **nozero**, in which case the real part mean is copied across.

A *Hilbert* transformation is a convolution with $\frac{1}{\pi x}$ and is like differentiation in the x direction, with a high-frequency de-emphasis. The convolution uses alternate points only of the source. Specifying the **lp** option causes an additional linear ramp filter to be included in the row transform manipulation, falling from 1 at the centre to zero at the outside. This filter approximates the convolution differently and weights all source points equally.

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Notes

multi-layer pictures: faulted
forms used internally: complex

Defaults and Ranges

keys/options	defaults	range
[from]	current picture, held in the variable *select*	valid picture number
[to]	source picture	valid picture number
left/right	left	
zero	set to zero	