phr

keys:	[from]	<number>	source picture
	[to]	<number>	output picture

Use **phr** to *phase-randomise* a *Fourier* transform, that is, to assign it random phases while preserving its modulus. You can use this type of filter to test for significant local ordering in disordered pictures with strongly 'coloured' spectra.

Examples

```
phr 1 to 2
```

This command randomises the phase of picture 1 and stores the result as picture 2.

Description

You must specify a *Fourier* source picture with **phr**. If the origin is at the left of the picture, **phr** assumes a half-plane transform with conjugate symmetry and preserves the symmetry.

You use the *phase randomisation* test in the following way. Take an original picture showing signs of local order (for example, small patches of fringes throughout the image) and compare it visually with a phase-randomised version that you produce using the command sequence **fourier; phr; image.** The two images will invariably differ in specific detail, but if they have the same general texture, you can deduce that the structures apparent in the original picture only reflect *white noise*, suitably filtered to impose a particular power spectrum. This is because the transform of white noise has random phases.

For **phr** to preserve conjugate symmetry, ensure that the column length of the picture is not greater than the maximum row length supported by your installation. Type **show system** to see your installation limits.

The random number generator 'seed' is held in Semper variable *rnm*, and you can initiate reproducible 'random' sequences by setting this yourself.

Notes

multi-layer pictures:	faulted
forms used internally:	complex
variables set and used:	*rnm* (random number generator seed – in the range 0 to 1)
see also:	**fourier, image, show system**

phr

Defaults and Ranges

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