# acf

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

**acf** calculates *auto-correlation functions* (*Patterson* functions). An *acf* is the inverse transform of the intensity in the Fourier transform of a picture. It can be used as a resolution or directionality criterion, or may help reveal faint periodicities.

## Examples

```
acf 1 2
acf from 1 to 2
```

These commands produce the *acf* of *Image* picture 1 in *Correlation* picture 2.

```
fourier 1 2; acf to 3
```

This command obtains the *acf* of picture 1 in picture 3, leaving the transform in 2.

## Description

The command **acf** performs the following sequence of functions:

- transforms the source picture
- takes the squared modulus
- zeroes the central transform pixel
- inverse transforms
- divides by the final central value

The resulting *acf*, which has a zero mean and a maximum of 1 at the centre, is filed as a *Correlation* picture. You can also supply pictures that are already transformed (*Fourier* or *Spectrum*), in which case **acf** simply picks up the calculation at the appropriate point in the above sequence, so as to calculate the *acf* of the original image picture.

For real source data (that is if the source is a non-*Complex* image or a half-plane *Fourier* or *Spectrum*), the output is floating point and centro-symmetric. For complex source data (complex *Image* or full-plane *Fourier* or *Spectrum*), the output is complex and conjugate-symmetric. For details of picture classes such as *Fourier* and *Spectrum*, refer to *Appendix A: Picture Types*.

# acf

## Notes

| | |
|---|---|
| restrictions: | image size must be a power of two (for example, size 128,128)<br>unsuitable for direct output to display |
| multi-layer pictures: | faulted |
| forms used internally: | fp, complex |

## Defaults and Ranges

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