map

keys:	**[from]**	*<number>*	source picture
	[to]	*<number>*	output picture
	with	*<number>*	picture containing map function or histogram
	range	*<n1>, <n2>*	range of source picture spanned by map function
options:	**gaussian**		map source so that output is a histogram with a gaussian profile, if ***with*** specifies a histogram

Use **map** for arbitrary pixel value mapping, linear or non-linear, and for histogram equalisation or shape forcing.

Examples

```
map 1 to 2 with 3 range 1.2,3.5
```

This command replaces the pixel values for picture 1 with the values stored in the 1-D picture 3, over the range 1.2 to 3.5, and stores the mapped result as picture 2.

```
histogram 50 to 3; map 50 with 3
```

This command equalises the histogram of picture 50.

```
histogram 50 to 3; map 50 to display with 3 gaussian
```

This command displays picture 50 stretched so as to show a histogram with a gaussian profile.

Description

map works in the following two modes:

- arbitrary pixel value mapping
- histogram equalisation

Use the **with** key to specify a picture containing the mapping function or histogram.

Usually, you map using a tabulated mapping function that you provide directly as a 1-D picture. **map** treats the map pixels as defining replacement pixels over the source range *min* to *max*, using bilinear interpolation where necessary to extend these to form a continuous function. You can specify a range other than *min*, *max* using the **range** key.

Alternatively, you can map using a *Histogram* picture (produced from the picture you wish to map). In this case, **map** generates the actual mapping function itself in such a way as to equalise the

map

output picture histogram. This is a standard method of contrast-stretching in pictures with poor initial contrast. Since equalisation in fact often overdoes it, you may like to use the additional **gaussian** option, which produces an output histogram which is gaussian in shape, falling by a factor *exp(–2)* at both ends.

Note that finite numbers of distinct pixel values and/or histogram channels usually mean that the final histogram has the target shape only when averaged over a few neighbouring channels. The visual impact of this imperfection is however negligible.

Note that you can use the **xwires...graph** command to draw a map directly with the display cursor or use a display lut recovered using **lut**. *Byte* source pictures are mapped efficiently using a look-up-table approach.

Notes

multi-layer pictures: all layers processed
forms used internally: integer (for byte data), 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
with	picture 999	valid picture number
range	values held in *min, max*	positive real numbers