

**quadcross()** — Quad-precision cross products

Syntax Diagnostics	Description Also see	Remarks and examples	Conformability
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## Syntax

*real matrix* `quadcross(X, Z)`

*real matrix* `quadcross(X, w, Z)`

*real matrix* `quadcross(X, xc, Z, zc)`

*real matrix* `quadcross(X, xc, w, Z, zc)`

*real matrix* `quadcrossdev(X, x, Z, z)`

*real matrix* `quadcrossdev(X, x, w, Z, z)`

*real matrix* `quadcrossdev(X, xc, x, Z, zc, z)`

*real matrix* `quadcrossdev(X, xc, x, w, Z, zc, z)`

where

*X*: *real matrix X*  
*xc*: *real scalar xc*  
*x*: *real rowvector x*  
*w*: *real vector w*  
*Z*: *real matrix Z*  
*zc*: *real scalar zc*  
*z*: *real rowvector z*

## Description

`quadcross()` makes calculations of the form

$$X'X$$

$$X'Z$$

$$X'\text{diag}(w)X$$

$$X'\text{diag}(w)Z$$

This function mirrors `cross()` (see [M-5] `cross()`), the difference being that sums are formed in quad precision rather than in double precision, so `quadcross()` is more accurate.

`quadcrossdev()` makes calculations of the form

$$(X: -x)'(X: -x)$$

$$(X: -x)'(Z: -z)$$

$$(X: -x)'\text{diag}(w)(X: -x)$$

$$(X: -x)'\text{diag}(w)(Z: -z)$$

This function mirrors `crossdev()` (see [M-5] `crossdev()`), the difference being that sums are formed in quad precision rather than in double precision, so `quadcrossdev()` is more accurate.

## Remarks and examples

[stata.com](https://www.stata.com)

The returned result is double precision, but the sum calculations made in creating that double-precision result were made in quad precision.

## Conformability

`quadcross()` has the same conformability requirements as `cross()`; see [M-5] `cross()`.

`quadcrossdev()` has the same conformability requirements as `crossdev()`; see [M-5] `crossdev()`.

## Diagnostics

See *Diagnostics* in [M-5] `cross()` and *Diagnostics* in [M-5] `crossdev()`.

## Also see

[M-5] `cross()` — Cross products

[M-5] `crossdev()` — Deviation cross products

[M-4] `statistical` — Statistical functions

[M-4] `utility` — Matrix utility functions