

| MATX      | Matrix                 |                        |        |        |                   |                   |
|-----------|------------------------|------------------------|--------|--------|-------------------|-------------------|
| g-shift   | $R_{nn} \rightarrow V$ | $V \rightarrow R_{nn}$ | STOVEL | RCLVEL |                   |                   |
| f-shift   | IDENT                  | DIM                    | DIMgr  | DIMN#  | <del>CNCATS</del> | <del>CNCATR</del> |
| unshifted | NEW                    | $[M]^T$                | EDIT   | EDITN  | SIM EQ            | VECTOR            |
| Page 1    | F1                     | F2                     | F3     | F4     | F5                | F6                |

Prev menu [https://47calc.com/doc/C47/Menus/C47\\_Menu\\_MATRS\\_page\\_1.pdf](https://47calc.com/doc/C47/Menus/C47_Menu_MATRS_page_1.pdf)

Next menu [https://47calc.com/doc/C47/Menus/C47\\_Menu\\_MATX\\_page\\_2.pdf](https://47calc.com/doc/C47/Menus/C47_Menu_MATX_page_2.pdf)

Ref 1 [https://47calc.com/doc/Application%20Notes/AN0020\\_C47\\_R47\\_Matrix\\_and\\_Vector.pdf](https://47calc.com/doc/Application%20Notes/AN0020_C47_R47_Matrix_and_Vector.pdf)

| Level   | Label              | Type                | FullName                      | Extended description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Category          | Flag  | Catalog            | Default |
|---------|--------------------|---------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------|--------------------|---------|
| Menu p1 | MATX               | MENU                | Matrix                        | Matrix functions ; a matrix is displayed in X and shown in other stack registers as [m×n Matrix] or [m×n C Matrix] when containing complex element(s) ; Ref : <a href="https://47calc.com/doc/Application%20Notes/AN0020_C47_R47_Matrix_and_Vector.pdf">https://47calc.com/doc/Application%20Notes/AN0020_C47_R47_Matrix_and_Vector.pdf</a> ; Info : monadic functions work per matrix element (except 1/x, which is a shortcut for [M] <sup>-1</sup> , use -1 y* instead ; and $\sqrt{x}$ , which is a shortcut for MSQRT, use 0.5 y* instead) ; in edit mode, all functions work per element ; use registers to input calculation results | Matrix operations |       | MATX               |         |
| F1      | NEW                | Command (submnu)    | New matrix                    | Create new matrix with Y rows and X columns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Matrix operations |       | M.NEW              |         |
| F2      | [M] <sup>T</sup>   | Function (monadic)  | Transpose matrix              | Transpose matrix in X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Matrix operations |       | [M] <sup>T</sup>   |         |
| F3      | EDIT               | MENU (item, nonpgm) | Edit matrix                   | Open matrix editor for matrix in X ; Info : CAT.MENUS M_EDIT ; MIM = Matrix Input Mode ; [ $\blacktriangle$ ] or [ $\blacktriangledown$ ] to move up or down one position ; Ref : 1/x, which is a shortcut for [M] <sup>-1</sup> , use -1 y* instead ; and $\sqrt{x}$ , which is a shortcut for MSQRT, use 0.5 y* instead                                                                                                                                                                                                                                                                                                                   | Matrix operations |       | M.EDIT             |         |
| F4      | EDITN              | MENU (item, nonpgm) | Edit matrix (named)           | Open matrix editor for matrix in register or variable ; TAM : M.EDITN __ Tam menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Matrix operations |       | M.EDITN            |         |
| F5      | SIM EQ             | MENU (item)         | Matrix simultaneous equations | Matrix simultaneous equations : Mat A · Mat X = Mat B, where Mat A is the equation coefficient matrix and Mat B is the equation result vector ; Mat X is the equation solution vector ; TAM : SIM_EQ __ TamNonReg menu to enter number of equations ; Info : CAT.MENUS M_SIMQ                                                                                                                                                                                                                                                                                                                                                               | Matrix operations |       | SIM_EQ             |         |
| F6      | VECTOR             | MENU                | Vector menu                   | Vector functions ; Ref : <a href="https://47calc.com/doc/C47/Reference/C47_Vector_display.pdf">https://47calc.com/doc/C47/Reference/C47_Vector_display.pdf</a> ; Info : Vectors are stored internally as rectangular and calculation results are presented in rectangular format ; to edit a vector, first put it in rectangular format ; vector TI's are shown for values in X only and a small font may be used ; vector TI's are minimised if the stack changes or [EXIT] is pressed (only ijk or r0k or p0k is shown, without subscripts or brackets)                                                                                   | Vector operations |       | VECTOR             |         |
| fF1     | IDENT              | Command             | New identity matrix           | Create new identity matrix with Y rows and X columns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Matrix operations |       | M.IDENT            |         |
| fF2     | DIM                | Function (monadic)  | Dimension (flow)              | Set dimension of matrix (named register or variable) to Y rows and X columns ; refloes elements by row and cuts off excess elements or pads with zero elements ; creates a new matrix if necessary ; TAM : M.DIM __ Tam menu ; Info : also see function DIMgr                                                                                                                                                                                                                                                                                                                                                                               | Matrix operations |       | M.DIM              |         |
| fF3     | DIMgr              | Function (monadic)  | Dimension (grow)              | Set dimension of matrix (named register or variable) to Y rows and X columns ; cuts off rows and columns or pads with zero element rows and columns ; creates a new matrix if necessary ; TAM : M.DIMgr __ Tam menu ; Info : also see function DIM                                                                                                                                                                                                                                                                                                                                                                                          | Matrix operations |       | M.DIMgr            |         |
| fF4     | DIMN#              | Command             | Matrix dimension? (named)     | Get dimensions of matrix in register or variable ; TAM : M.DIMN# __ Tam menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Matrix operations |       | M.DIMN#            |         |
| fF5     | CNCATB             | Command (strike)    | Concatenate (bottom)          | Concatenate matrices (bottom) ; TAM : M.CNCTB __ Tam menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Matrix operations |       | M.CNCTB            |         |
| fF6     | CNCATR             | Command (strike)    | Concatenate (right)           | Concatenate matrices (right) ; TAM : M.CNCTR __ Tam menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Matrix operations |       | M.CNCTR            |         |
| gF1     | R <sub>nn</sub> →V | Command             | Fill matrix from registers    | Fill matrix or vector in X from ascending range of registers starting with register nn (TAM), where numbers of registers depends on size of matrix or vector ; TAM : R <sub>nn</sub> →V __ TamIndirect menu ; Ref : <a href="https://47calc.com/doc/C47/Reference/C47_Registers.pdf">https://47calc.com/doc/C47/Reference/C47_Registers.pdf</a>                                                                                                                                                                                                                                                                                             | Matrix operations | 3Dxyz | R <sub>nn</sub> →V |         |
| gF2     | V→R <sub>nn</sub>  | Command             | Copy elements to registers    | Copy elements of matrix or vector in X to ascending range of registers, starting with register nn (TAM), where numbers of registers depends on size of matrix or vector ; TAM : V→R <sub>nn</sub> __ TamIndirect menu ; be careful when using the range of stack registers (100-107) ; Ref : <a href="https://47calc.com/doc/C47/Reference/C47_Registers.pdf">https://47calc.com/doc/C47/Reference/C47_Registers.pdf</a>                                                                                                                                                                                                                    | Matrix operations | 3Dxyz | V→R <sub>nn</sub>  |         |
| gF3     | STOVEL             | Command             | Store X into vector element   | Store X into element n (TAM) of vector or matrix in Y ; Shortcut : [ST0] - ...VEL <sub>nn</sub> ; TAM : STOVEL __ Tam menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Matrix operations |       | STOVEL             |         |
| gF4     | RCLVEL             | Command             | Recall vector element         | Recall element n (TAM) of vector or matrix in X ; Shortcut : [RCL] - ...VEL <sub>nn</sub> ; TAM : RCLVEL __ Tam menu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Matrix operations |       | RCLVEL             |         |
| gF5     |                    |                     |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |       |                    |         |

| Level | Label | Type | FullName | Extended description | Category | Flag | Catalog | Default |
|-------|-------|------|----------|----------------------|----------|------|---------|---------|
| gF6   |       |      |          |                      |          |      |         |         |

| p1  | MATX                   | Link                                                                                                                                        |
|-----|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| F1  | NEW                    |                                                                                                                                             |
| F2  | $[M]^T$                |                                                                                                                                             |
| F3  | EDIT                   | <a href="https://47calc.com/doc/C47/Menus/C47_Menu_EDIT_MATX_page_1.pdf">https://47calc.com/doc/C47/Menus/C47_Menu_EDIT_MATX_page_1.pdf</a> |
| F4  | EDITN                  | <a href="https://47calc.com/doc/C47/Menus/C47_Menu_EDITN_page_1.pdf">https://47calc.com/doc/C47/Menus/C47_Menu_EDITN_page_1.pdf</a>         |
| F5  | SIM EQ                 | <a href="https://47calc.com/doc/C47/Menus/C47_Menu_SIM_EQ_page_1.pdf">https://47calc.com/doc/C47/Menus/C47_Menu_SIM_EQ_page_1.pdf</a>       |
| F6  | VECTOR                 | <a href="https://47calc.com/doc/C47/Menus/C47_Menu_VECTOR_page_1.pdf">https://47calc.com/doc/C47/Menus/C47_Menu_VECTOR_page_1.pdf</a>       |
| fF1 | IDENT                  |                                                                                                                                             |
| fF2 | DIM                    |                                                                                                                                             |
| fF3 | DIMgr                  |                                                                                                                                             |
| fF4 | DIMN#                  |                                                                                                                                             |
| fF5 | <del>ENCATB</del>      |                                                                                                                                             |
| fF6 | <del>ENCATR</del>      |                                                                                                                                             |
| gF1 | $R_{nn} \rightarrow V$ |                                                                                                                                             |
| gF2 | $V \rightarrow R_{nn}$ |                                                                                                                                             |
| gF3 | STOVEL                 |                                                                                                                                             |
| gF4 | RCLVEL                 |                                                                                                                                             |
| gF5 |                        |                                                                                                                                             |
| gF6 |                        |                                                                                                                                             |