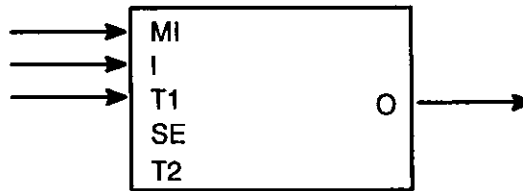


13.0 FUNCTION GENERATOR

This function can be used in AutoMax Control Block tasks and UDC Control Block tasks.



Function

$$\text{subscript.remainder} = \frac{\text{INPUT} * (\text{table_size} - 1)}{(\text{max_input} + 1)}$$

$$\text{OUTPUT} = \text{TABLEn} \% (\text{subscript}) + [(\text{TABLEn} \% (\text{subscript} + 1) - \text{TABLEn} \% (\text{subscript})) * \text{remainder}]$$

OUTPUT is the result of linear interpolation between two points in the table.

Program Statement

```
CALL FUNCTION(INPUT = input%,                                &
              MAX_INPUT = max_input,                          &
              SELECT = select@,                                &
              TABLE1 = table1%,                               &
              TABLE2 = table2%,                               &
              OUTPUT = output%)
```

Inputs

MI (MAX_INPUT) =

The largest possible value of INPUT, type INTEGER. Must be entered explicitly as a numeric literal equal to $(2^{**}n) - 1$ where n is an integer equal to or greater than 1 or equal to or less than 15.

I (INPUT) =

INTEGER signal input. This parameter must be specified. It must be specified as a variable name only (literal value not accepted).

T1 (TABLE) =

INTEGER look up table 1. This parameter must be specified. It must be specified as a variable name only (literal value not accepted). It must be defined as an array with the size (number of points) equal to $(2^{**}m) + 1$ where m is an integer less than or equal to n for MAX_INPUT. This array definition occurs when defining the variable using a LOCAL or COMMON statement in the task [LOCAL TABLE1 %(16)]. Values must be calculated and stored for all points in the array.

LOCAL TABLE1%(16), for example, will index into the array beginning with the first element, which has the subscript zero(0), not 1. Therefore, to define an array having the number of elements of 2^{m+1} , 2^m is used when defining the array. To define the common array "FUNCTION_TBL" with 17 elements ($2^4 + 1$) and a local array "TABLE1%" with 9 elements ($2^3 + 1$), the definition statements would be:

```
10 COMMON FUNCTION_TBL%(16)
20 LOCAL TABLE1%(8)
```

SE (SELECT) =

BOOLEAN TABLE. The default for the parameter is FALSE. When FALSE, TABLE1 will be selected; otherwise, TABLE2 will be selected.

T2 (TABLE2) =

INTEGER look up table 2. This parameter is optional. If specified, it must be as a variable name only (literal value not accepted). The same table definition specifications as for TABLE1 apply. If TABLE2 is specified, SELECT should also be specified, and vice versa. If specified, TABLE2 must be the same size as TABLE 1.

Outputs

O (OUTPUT) =

INTEGER signal output. This parameter must be specified. If SELECT is FALSE, OUTPUT will be obtained from TABLE1; otherwise, OUTPUT will be obtained from TABLE2. OUTPUT is linearly interpolated between points in the table.

If INPUT goes negative, the computed value for output will be negated as well. This will have the effect of folding the function defined in the table from the first quadrant to the third quadrant (assuming the table entries are in the first quadrant).