Compare Array Values CMPARAY T16

DESCRIPTION

The CMPARAY function allows the user to perform up to 4096 comparisons (as special functions T1 to T6) between:

a) two arrays;
b) each word of an array and a single value.

The CMPARAY function treats a block of adjacent data table locations as a one dimensional array of numerical values. The elements within an array are referenced by an index commencing at word 0.

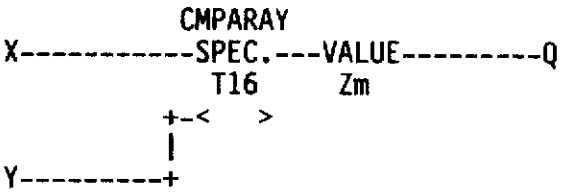
The results of the comparisons are written to an output array where one bit is reserved for each comparison and set ON (1) if the comparison result is true. For word output mode, the array length must be less than or equal to 16 and the results of the comparisons are made available at rung output Q.

FEATURES

- Input array locations and length definable by user.
- User programmable comparison type.
- Dual mode of operation for single word or group output.
- Can compare two arrays against each other or one array against one word.

SPECIFICATION

Control language:-



The mnemonic CMPARAY will not automatically be recognized by older GEM 80 programming units, but can be added as a user defined mnemonic in the 8922 system programmer.

Table 1 Program rung data

Sym	Location	Use	Range
X	Upper rung input	Internal GEM 80 address of input array	Address of data table location obtainable by LOCATE
Y	Lower rung input	Internal GEM 80 address of input array or single numeric value for use in all comparisons.	Address of data table location obtainable by LOCATE ±32767
Zm	Value location	Start of parameter list (4 locations)	Any write enabled table usable by special function
Q	Rung Output	In word output mode: Result of up to 16 comparisons.	1 bit per comparison set ON if result is true
		In group output mode: Item No. of first comparison giving a true result.	0 to 4095
		No true result in either output mode	-1

Table 2 Value data

Sym	Location	Use	Range
EC	Zm	Fault code	See table 3
AL	Zm + 1	Input array length. Negative length selects Y as single value	1 to 4096 for group output; 1 to 16 for word output (SA = 0)
SA	Zm + 2	Internal GEM 80 address of output group	Address of write enabled data table location obtained by LOCATE. Zero for word output
MD	Zm + 3	Comparison type as for special functions T1 to T6	1 to 6 where 1 = EQ 2 = NE 3 = GT 4 = LT 5 = GE 6 = LE

Table 3 Fault codes

Condition	Rung Output	Code in Zm Numeric Value	Code in Zm States ON
Programming error Array length invalid	Q = 0	3	0, 1
Programming error Invalid array address: 1st input array a) not in table usable by specials; or b) extends beyond end of data table area.	Q = 0	5	0, 2
Programming error Invalid array address: 2nd input array a) not in table usable by specials; or b) extends beyond end of data table area.	Q = 0	9	0, 3
Programming error Invalid group address: Output group a) not in table write-enabled by specials; or b) extends beyond end of data area	Q = 0	17	0, 4
Programming error Comparison type invalid	Q = 0	33	0, 5

APPLICATION NOTES

1. Program examples

1.1 Comparing an array with a single value

This would be used to check an array of input values against a known value which might represent a limit. Since the results are bits set (or not), these could be used for alarms.

It could also be used to compare a single input against a list of allowed values, e.g. keyboard input.

This mode is selected by setting the array length (AL) to the negative of the required value.

1.2 Comparing two arrays

This would be used to check an array of input values against an array of previously entered values which might represent limits.

INDUSTRIAL CONTROLS

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