

FUN84 TDSP	Convenient instruction for FBs-7SG module Display pattern conversion for 7/16-Segment display	FUN84 TDSP
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Ladder symbol

Execution control — EN↑

Input control — OFF

Input control — ON

84.TDSP

Md :

S :

Ns :

N_L :

D :

N_d :

Md: Operation Mode, 0~3

S : Starting address of being converted characters

Ns : Start of source character, 0~63

N_I : Length of character, 1~64

D : Starting address to store the converted pattern

N_d : Start pointer while storing

S operand can be combined with V · Z · P0~P9
index registers for indirect addressing

Range Operand	HR R0 R3839	OR R3904 R3967	ROR R5000 R8071	DR D0 D3999	K 16/32 bit	Index V · Z P0~P9
Md					0~3	
S	○	○	○	○	○	○
Ns	○	○	○	○	0~63	
N _I	○	○	○	○	1~64	
D	○	○	○*	○		
N _d	○	○	○*	○	0~63	

- This convenient instruction is used to generate the corresponding display pattern for FBs series 7-segment or 16-segment display pannel under the control of FBs-7SG1 or FBs-7SG2 modules.
- When execution control "EN"=1, input "OFF"=0, and input "ON"= 0, this instruction will perform the display pattern conversion, where S is the starting address storing the being converted characters, Ns is the pointer to locate the starting character, N_I tells the length of being converted characters, and D is the starting address to store the converted result, N_d is the pointer to locate the start of storing.

There are 4 kinds of operation mode as below:

Md=0, display pattern conversion for 16-segment display; the source character is the 8-bit ASCII Code, the converted result is the 16-bit display pattern. By the control of M1990, it determines the display direction, where
M1990=0, right to left display ; M1990=1, left to right display

Md=1, Without leading zero display conversion for 16-segment display; the source character is the 8-bit ASCII Code, the converted result is the 16-bit display pattern without leading zero.

Md=2, Non-decoded display pattern conversion for 7-segment display; the source character is the 4-bit nibble code, the converted result is the 8-bit display pattern.

Md=3, Without leading zero display conversion for 7-segment decoded display; the source character is the 4-bit nibble code, the converted result is the 4-bit display pattern without leading zero.

Byte 0 or Nibble 0 of S is the 1st displaying character, Byte 1 or Nibble 1 of S is the 2nd displaying character,...

Ns operand is the pointer to tell where the displaying character starts

N_I operand is the character quantity for conversion

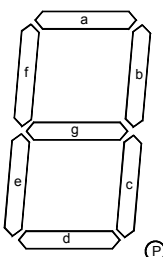
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D operand is the starting address to store the converted display pattern; while Md=0 or 1, one source character of 8-bit ASCII code needs one 16-bit location to store the result; while Md=2, one source character of 4-bit nibble code needs one 8-bit location to store it; while Md=3, one source character of 4-bit nibble code needs one 4-bit location to store it.

Nd operand is the pointer to tell where is the start to store the converted pattern.


- When inputs "OFF"=1, "ON"=0, and "EN"=0/1, the D operand will be filled with the all OFF pattern according to the operation mode, the Nd pointer, and the quantity of NI.
- When inputs "ON"=1, "OFF"=0/1, and "EN"=0/1, the D operand will be filled with the all ON pattern according to the operation mode, the Nd pointer, and the quantity of NI.

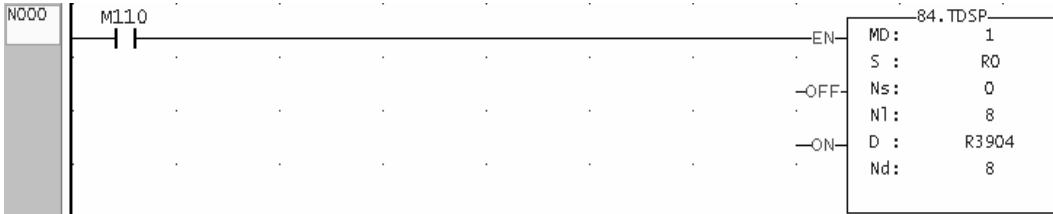
.7-Segment Decode & Non-decode display pattern for 4-bit nibble code

Nibble code		Structure of 7-Segment	Segemnt OFF (0) ON (1)							Display
HEX	BIN		a	b	c	d	e	f	g	
0	0000		1	1	1	1	1	1	0	0
1	0001		0	1	1	0	0	0	0	1
2	0010		1	1	0	1	1	0	1	2
3	0011		1	1	1	1	0	0	1	3
4	0100		0	1	1	0	0	1	1	4
5	0101		1	0	1	1	0	1	1	5
6	0110		1	0	1	1	1	1	1	6
7	0111		1	1	1	0	0	1	0	7
8	1000		1	1	1	1	1	1	1	8
9	1001		1	1	1	1	0	1	1	9
A	1010		0	0	0	0	0	0	1	-
B	1011		1	0	0	1	1	1	1	E
C	1100		0	1	1	0	1	1	1	H
D	1101		0	0	0	1	1	0	1	C
E	1110		0	0	0	1	1	1	1	t
F	1111		0	0	0	0	0	0	0	

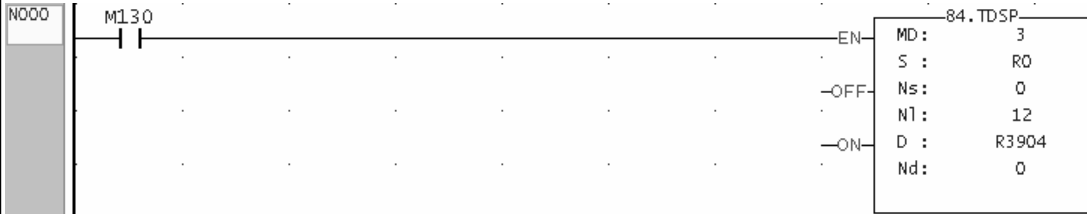
FUN84
TDSPConvenient instruction for FBs-7SG module
Display pattern conversion for 7/16-Segment displayFUN84
TDSP**.16-Segment Display Font Map shown as below:**

MSB LSB	x000	x001	x010	x011	x100	x101	x110	x111
0000								
0001								
0010								
0011								
0100								
0101								
0110								
0111								
1000								
1001								
1010								
1011								
1100								
1101								
1110								
1111								

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<p>. Example 1 : 8-character of text display by using the FBs-7SG2 display module and 16-Segment display pannels; for this application, the FBs-7SG2 module must be set to work at the non-decoded operation mode.</p> <p>The WinProLadder supports the "ASCII Table" editing for easy and convenient text message display; we can create one ASCII Table with the content ' WELCOME ' for testing, and we assign R5000 is the table starting address, then R5000~R5007 will have the folloing contents :</p> <p style="margin-left: 40px;">R5000=2027H (20H= ; 27H=') R5001=4557H (45H=E ; 57H=W) R5002=434CH (43H=C ; 4CH=L) R5003=4D4FH (4DH=M ; 4FH=O) R5004=2045H (20H= ; 45H=E) R5005=2C27H (2CH=, ; 27H=') R5006=4E45H (4EH=N ; 45H=E) R5007=0044H (00H= ; 44H=D)</p> 		
<p>Description :</p> <p>When M100=1, M101=0 and M102=0, the FUN84 will perform the display pattern conversion, where the source (S) begins from the R5000, the start pointer (Ns) is pointed to byte 2, and the quantity (Nl) is 8, it means the contents of R5001~R5004 are the displaying characters; the registers R3904~R3911 will store the converted pattern for text message displaying (D operand begins from R3904, Nd operand is pointed to word 0, Nl operand is 8 for quantity)</p> <p>While M1990=1, the 16-segment pannel will display "WELCOME " ; While M1990=0, the 16-segment pannel will display " EMOCLEW".</p> <p>When M101=1, M102=0, the registers R3904~R3911 will be filled with the all OFF pattern for displaying.</p> <p>When M102=1, the registers R3904~R3911 will be filled with the all ON pattern for displaying.</p>		

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<p>Example 2 : 8-character of display without the leading zero through the second FBs-7SG2 display module and 16-Segment display panels; for this application, the FBs-7SG2 module must be set to work at the non-decoded operation mode.</p>  <pre> graph LR M110[M110] --> EN[EN] subgraph FUN84_TDSP [FUN84 TDSP] MD[MD: 1] S[S: R0] Ns[Ns: 0] N1[N1: 8] D[D: R3904] Nd[Nd: 8] end EN --> FUN84_TDSP </pre> <p>Description :</p> <p>When M110=1, the FUN84 will perform the display pattern conversion, where the source (S) begins from the R0, the start pointer (Ns) is pointed to byte 0, and the quantity (N1) is 8, it means the contents of R0~R3 are the displaying characters; the registers R3912~R3919 will store the converted pattern for message displaying (D operand begins from R3904, Nd operand is pointed to word 8, N1 operand is 8 for quantity).</p> <p>a. R0=0008H R1=0506H R2=0304H R3=0102H</p> <p>The 16-segment pannel will display "12345608"</p> <p>b. R0=0708H R1=0506H R2=0000H R3=0000H</p> <p>The 16-segment pannel will display " 5678"</p> <p>c. R0=3738H R1=3536H R2=3334H R3=3132H</p> <p>The 16-segment pannel will display "12345678"</p> <p>d. R0=3038H R1=3536H R2=3334H R3=3030H</p> <p>The 16-segment pannel will display " 345608"</p>		

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<p>. Example 3 : 4-digit of numeric display and 32-point of external independent LED's display through the control of FBs-7SG1 display module and 4-digit of 7-segment display pannel; also, it needs the extra circuit to control the 32-point of independent LED's display. For this application, the FBs-7SG1 module must be set to work at the non-decoded operation mode.</p> <div><div><div>N000</div><div>M120</div></div><div><div>EN</div><div>08D.MOV</div><div>S : WM0</div><div>D : R3904</div></div><div><div>EN</div><div>84.TDSP</div><div>MD : 2</div><div>S : R0</div><div>—OFF—</div><div>Ns : 0</div><div>Nl : 4</div><div>—ON—</div><div>D : R3906</div><div>Nd : 0</div></div></div> <p>Description :</p> <p>When M120=1, the status of M0~M31 will be copied to the output registers R3904~R3905 to control the display of the 32-point of independent LEDs.</p> <p>The FUN84 also performs the display pattern conversion, where the source (S) begins from the R0, the start pointer (Ns) is pointed to nibble 0, and the quantity (Nl) is 4, it means nibble0~nibble3 of R0 are the displaying characters; the output registers R3906~R3907 will store the converted pattern for displaying (D operand begins from R3906, Nd operand is pointed to byte 0, Nl operand is 4 for quantity)</p> <p>R0=1024H</p> <p>The 7-segment pannel will disply "1024"</p>		

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<p>Example 4 : 12-digit of decoded numeric display without the leading zero through the control of FBs-7SG2 display module and 12-digit of 7-segment display pannels. For this application, the FBs-7SG2 module must be set to work at the decoded operation mode.</p>  <p>Descreiption :</p> <p>When M130=1, the FUN84 will perform the display pattern conversion, where the source (S) begins from the R0, the start pointer (Ns) is pointed to nibble 0, and the quantity (NI) is 12, it means nibble0~nibble11 of R0~R2 are the displaying characters; the output registers R3904~R3906 will store the converted pattern for displaying (D operand begins from R3904, Nd operand is pointed to nibble 0, NI operand is 12 for quantity).</p> <p>a. R2=1234H, R1=5678H, R0=9000H The 7-segment pannel will display "123456789000"</p> <p>b. R2=0000H, R1=5678H, R0=9000H The 7-segment pannel will display " 56789000"</p>		