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1. Introduction

A quick guide to creating and using a User Function Block in IEC61131-3 programming.

2. Create a new IEC61131-3 Task

Start Motion Perfect v4 and connect to the Motion Coordinator in Sync Mode. If you already have an IEC61131-3 task then go to section 3 and use that task.



The IEC 61131-3 Task appears in the Controller Tree window.

Select "File/Program" then New

Choose the type IEC 61131-3 task.

Name the task and click OK.





3. Create a new User Function Block

Right-Click the task name, called IEC_TASK in this example.

Select Add New IEC61131-3 Program ...

🔯 Add Program 🛛 🗙	Name the User Function.
Program Name: Set_Outputs	Coloct the language to use in this case (tructured Taut
Description:	select the language to use, in this case structured rext.
Language	Select User defined function block
Execution type	
O Main program	
O Sub-program	Click ADD
 User defined function block 	
Open variables editor when this dialog is closed	
Add Cancel	

4. Enter the details of the user function block

This example function will take an input from a 16 bit integer and place the bit pattern on the digital IO as ON/OFF states.

It requires one input variable. This must be declared in the variables for the user function block.

1. Open the Variables window:

Set_Outputs ×	~
	= 12 👷 🍋 🗖 🔁 🖘 🖕
2. Click on the function name	
3. Click the Dutton.	"IEC_TASK" Variables
4. Select Add new input variable	Name Type
5. Name the variable and give it type INT	🗉 🚮 Task variables
	🗉 🛃 RETAIN variables
	Set_Outputs
8 🖶 🗤 🖓 (*) 🚺 💭 🖬 🗤 🖓 👘 🎫	
Name Type	
🕀 🚰 Task variables	
🕀 🚽 RETAIN variables	
🖃 🖻 Set_Outputs	

VAL

INT



The routine uses a Trio Function Block to write to the Outputs.

Function Blocks are found in the ToolBox.





In Structured Text, TC_OP has this syntax:

TC OP(Index(*INT*), Value(*BOOL*))

As this switches only one output, we will put it in a For loop so that it is repeated 16 times. For the 16 outputs.

Here is the program for our Function Block.

```
// Set outputs 8 to 23 according to the bit pattern in VAL
For i := 0 To 15 Do
    op_bit := TestBit( VAL, i );
    TC_OP( 8 + any_to_int(i), op_bit);
End For;
```

The program uses 2 other standard IEC functions; TestBit and any_to_int.

2 further variables are used. i is the index used in the For loop. op_bit is the bit state for the selected bit in VAL. These 2 variables must be declared as private.

"IEC_TASK" Variables		→			
X 🗈 🕮 🤊 (** 🗈 🔭 🖬 🕼 🛠 🕄 📮					
Name	Туре				
🗉 🚮 Task variables					
🗉 🛃 RETAIN variables					
🖃 🖻 Set_Outputs					
VAL	INT				
i	DINT				
op_bit	BOOL				





The user function and its variables, in text form.

5. Apply the User Function Block

Create a new Main Program of the type required. The User function is written in ST, but it can be included into any other program type.

Open the toolbox and find the new User Function Block.

Toolbox	- - 4 ×
(Type text to search for)	٩
Function Blocks - Conversions	^
Function Blocks - Counters	
Function Blocks - IEC 61131-3 Libraries	
Function Blocks - Maths	
Function Blocks - Miscellaneous	_
Function Blocks - My function blocks	
F== Set_Outputs	- 11
Function Blocks - PID	
Function Blocks - Plus!	
Function Blocks - Registers	
Function Blocks - Registers (typed)	
Function Blocks - Selectors	
Function Blocks - Standard	
Function Blocks - Strings	- 7
Function Blocks - Timers	~

The User Function Block can be dragged into the chosen program, and the input VAL connected to a suitable variable of type INT.



i ≒ =\$ ++ ₩ ₩ ~+ 0+	+B 년 → HKA = → [±] ! ► M /3 ⊄ (1 II II ● [±]
R1	MySetOP En Set_Outputs
	Output_bits=VAL
_	
	Example in Ladder



Example in Function Block Diagram

	(j II 🖬 🥥 🗃 🖕		
MySetOF(VAI	:= output_bits);		

Example in Structured Text



Example variables list showing Output_bits