Dynamic memory allocation

FAQ No.0006

Part	Version	Revision	Date	Status
en	6.2.3.0	001	2019-01-01	Released

Content

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Introduction

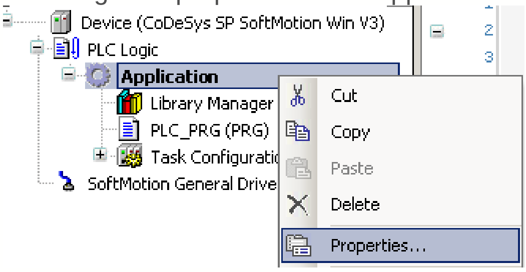
This document gives a little introduction to dynamic memory allocation on C6 Econ/Perform.

Note: Memory allocation can cause high jitter and long cycle times (Best to use in initialization steps).

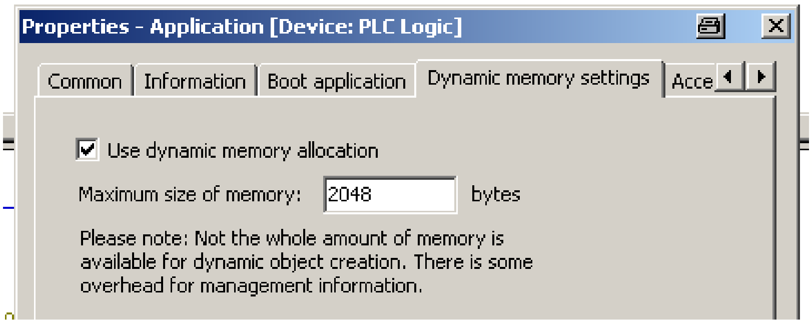
__NEW, __DELETE (CoDeSys RTE V3.x)

The CoDeSys RTE V3 supports some functions for dynamic memory management which are NOT part of the IEC 61131-3 standard.
This method is not working for C6 Compact.

To use this features you have to change the properties of the application.



Then choose how much memory you want to use:

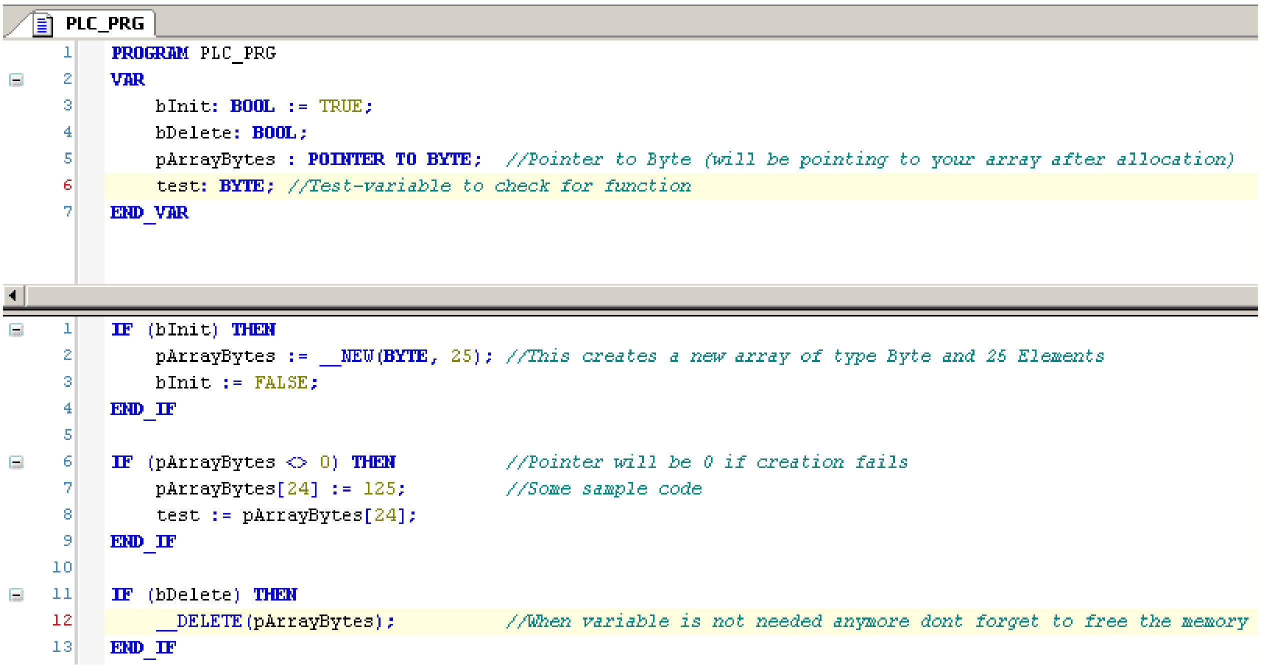


☑ Use dynamic memory allocation

Maximum size of memory: 2048 bytes

Please note: Not the whole amount of memory is available for dynamic object creation. There is some overhead for management information.

Note: When you update the Device this settings will be lost!
Use the __NEW Operator to allocate the memory you need.
When you don’t need the memory anymore do not forget to free the memory with __DELETE!
Here is a sample to create an Array of 25 bytes total:



```
PROGRAM PLC_PRG
VAR
    bInit: BOOL := TRUE;
    bDelete: BOOL;
    pArrayBytes : POINTER TO BYTE;  //Pointer to Byte (will be pointing to your array after allocation)
    test: BYTE; //Test-variable to check for function
END_VAR
```

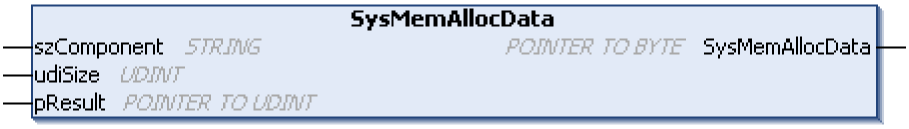
```
IF (bInit) THEN
    pArrayBytes := __NEW(BYTE, 25); //This creates a new array of type Byte and 25 Elements
    bInit := FALSE;
END_IF

IF (pArrayBytes <> 0) THEN          //Pointer will be 0 if creation fails
    pArrayBytes[24] := 125;         //Some sample code
    test := pArrayBytes[24];
END_IF

IF (bDelete) THEN
    __DELETE(pArrayBytes);          //When variable is not needed anymore dont forget to free the memory
END_IF
```

SysMemAllocData, SysMemFreeData (CoDeSys RTE V3.x)

This version is using the SysMem-system library from CoDeSys. There are many functions to allocate and free different types of data for different types of memory.
This method is not working for C6 Compact.

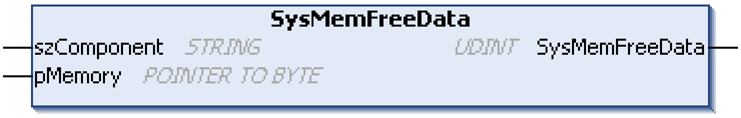
In this How-to only the SysMemAllocData and SysMemFreeData will be explained.

SysMemAllocData



szComponent (STRING)	Set a name to the memory area you want to allocate. This name is used later to free the memory
udiSize (UDINT)	The size in BYTES(!) you want to allocate
pResult (PTR)	Error Code (0 means no error)
SysMemAllocData	Returns a Pointer when memory is allocated properly

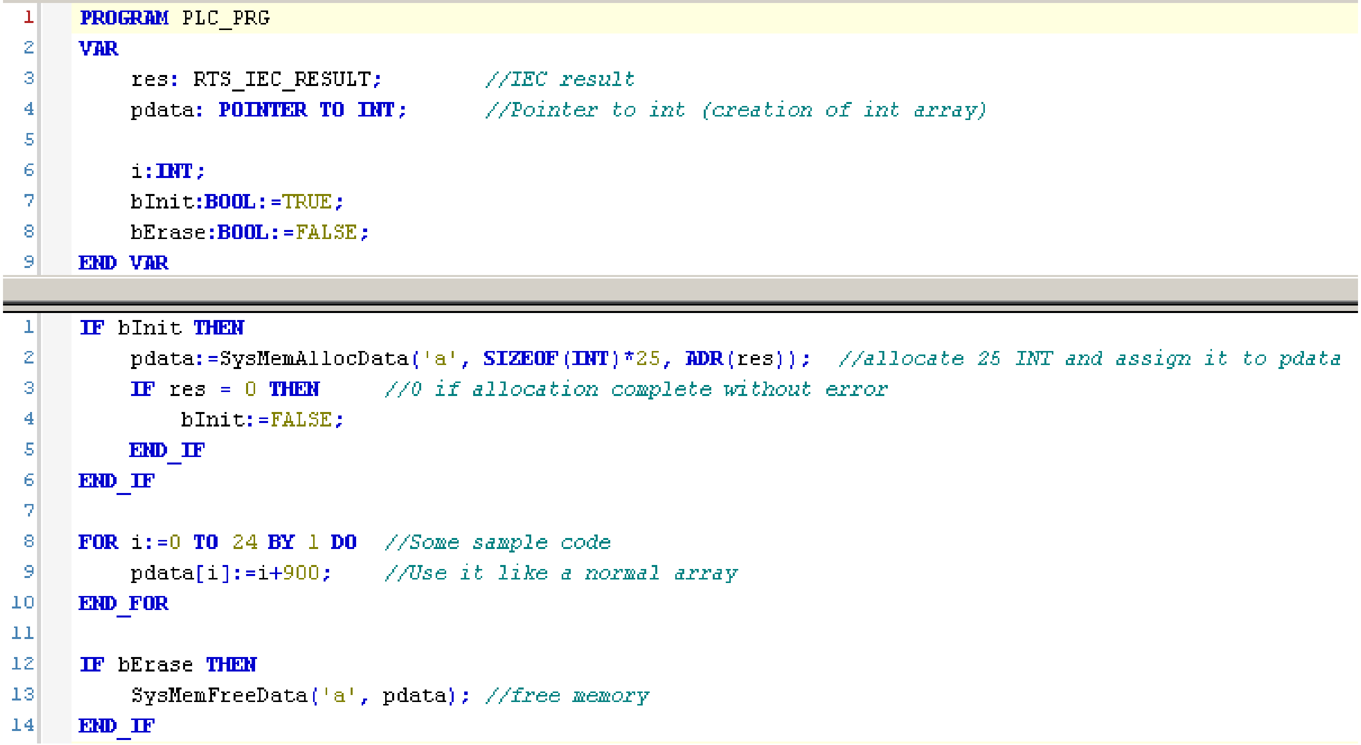
SysMemFreeData



szComponent (STRING)	Use the name chosen with SysMemAllocData
pMemory (PTR)	Pointer to the allocated memory
SysMemFreeData	Error Code (0 means no error)

Sample

Creation of INT-Array:



```
PROGRAM PLC_PRG
VAR
    res: RTS_IEC_RESULT;        //IEC result
    pdata: POINTER TO INT;      //Pointer to int (creation of int array)

    i:INT;
    bInit:BOOL:=TRUE;
    bErase:BOOL:=FALSE;
END_VAR
```

```
IF bInit THEN
    pdata:=SysMemAllocData('a', SIZEOF(INT)*25, ADR(res));  //allocate 25 INT and assign it to pdata
    IF res = 0 THEN     //0 if allocation complete without error
        bInit:=FALSE;
    END_IF
END_IF

FOR i:=0 TO 24 BY 1 DO  //Some sample code
    pdata[i]:=i+900;    //Use it like a normal array
END_FOR

IF bErase THEN
    SysMemFreeData('a', pdata); //free memory
END_IF
```

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