

# M258/LMC058 CANOpen performance and recommendations

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## M258/LMC058 CANOpen performance and recommendations

### Scope

The aim of this document is to explain how to use more than 32 slaves on CANOpen bus on M258/LMC058 in SoMachine V3.0.

This document is intended for user of SoMachine V3.0 with a FW version of M258/LMC058  $\geq$  2.0.2.32.

### SoMachine Configuration

In SoMachine, the user is able to add up to 63 slaves on CAN0 and on CAN1.

The total number of RPDOs and TPDOs for all CANOpen slaves is limited by the total number of IOs.

The limitation of devices and PDOs is:

63 slaves and a maximum of 252 RPDOs and 252 TPDOs on CAN0  
 Or  
 { 63 slaves and a maximum of 126 RPDOs and 126TPDOs on CAN0  
 63 slaves and a maximum of 126 RPDOs and 126TPDOs on CAN1

If you exceed this limit, you should have some troubles with building your application with other IO devices.

### Performances

The performance of a configuration with more than 32 devices strongly depends on the CANOpen slaves.

Indeed, it depends on:

- Number of PDOs per slaves. If many PDOs per second are sent by the slave, it increases the cycle time of the task which handle CAN.
- Configuration of the slave. If the slave has some Heartbeat, Nodeguard or Emergency handling, it increases the cycle time of the IEC Task which handle CAN.
- Cycle time of the IEC task which manages CANOpen bus. Indeed, the higher the cycle time is, the greater the number of PDOs per cycle will be and so the higher the execution of the task will be.

The performance below is computed with some standard CANOpen slaves (Drives and remote IOs) configured with some heartbeat and emergency management with a cycle time adapted:

$$\text{Execution time (ms)} = 0,1 * \text{Number of PDOs} + 1.1$$

$$(\text{Number of PDOs} = \text{Nb of TPDOs} + \text{Nb of RPDOs})$$

This equation is only estimation on the execution time of the IEC task which manages CAN. With this estimation, the user can configure the cycle time of the task that manages CAN.

The recommendation for the cycle time is:

$$\text{Cycle time (ms)} = 1.5 * \text{Execution time}$$

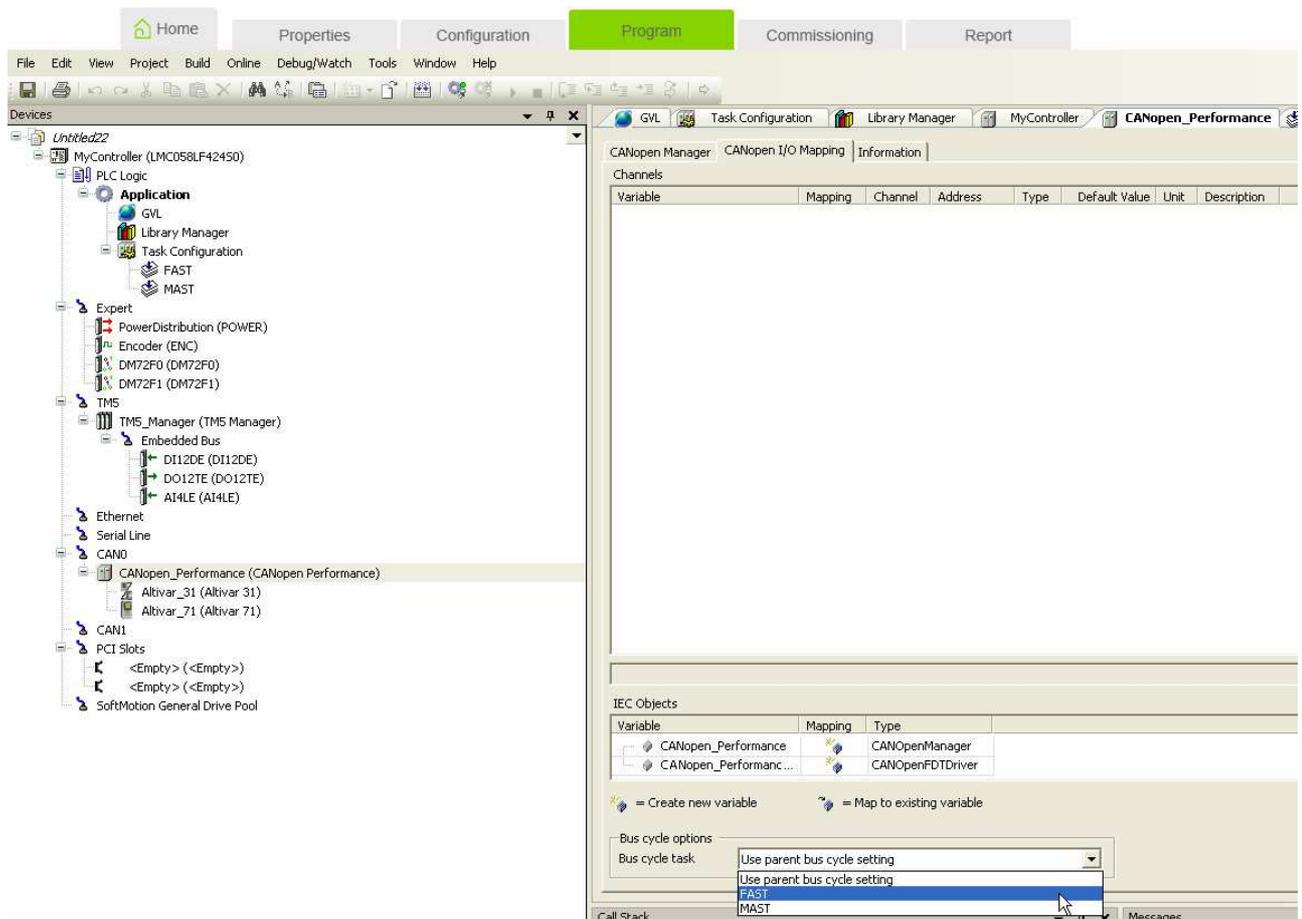
This recommendation is intended to avoid some watchdog expiration in the application in a one single task application.

If the application is multi-task, the user should increase this cycle time.

**Samples of configurations**

Execution time (ms)	Nb slaves & PDOs on CAN0	Nb slaves & PDOs on CAN1
23.6 ms	63 slaves with 225 PDOs	0
43.2 ms	63 slaves with 225 PDOs	63 slaves with 199 PDOs

The user can change the IEC task by doing this:



## Cabling

If the configuration with the M258/LMC058 requires more than 32 slaves, you must be aware that the cabling of the CAN devices must be done very carefully.

With more than 32 devices, we recommend to slow down the speed of the CAN Bus (250 or 500 KBauds) and to not use some RJ45 CAN cable if possible.