

Nota de Aplicação

Comunicação CanOpen entre HMISCU e OTB



Versão: • V1.0



Suporte Técnico Brasil

Schneider
Electric

Especificações técnicas

Hardware:

HMISCU6B5

OTB1C0DM9LP

Firmware:

V1.0

V2.20

Software:

SoMachine

Versão:

V3.1 + SP3.1



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Arquitetura

• Especificações técnicas

CANopen Capabilities

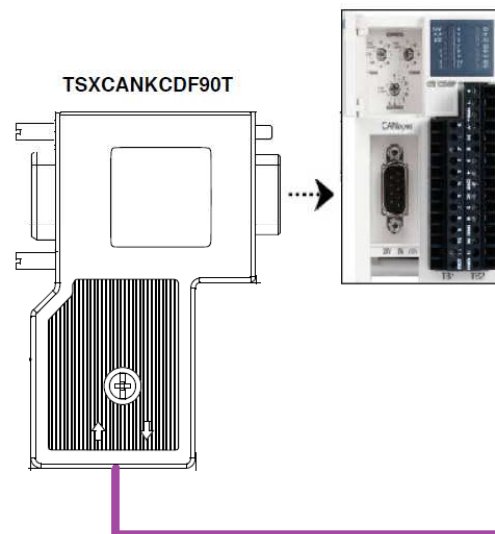
The table describes the HMISCU CANopen master features:

Maximum number of slaves on the bus	16 CANopen slave devices
Maximum length of CANopen fieldbus cables	According to the CAN specification (see Cable Length and Transmission Speed).
Maximum number of PDOs managed by the master	32 TPDOs + 32 RPDOs

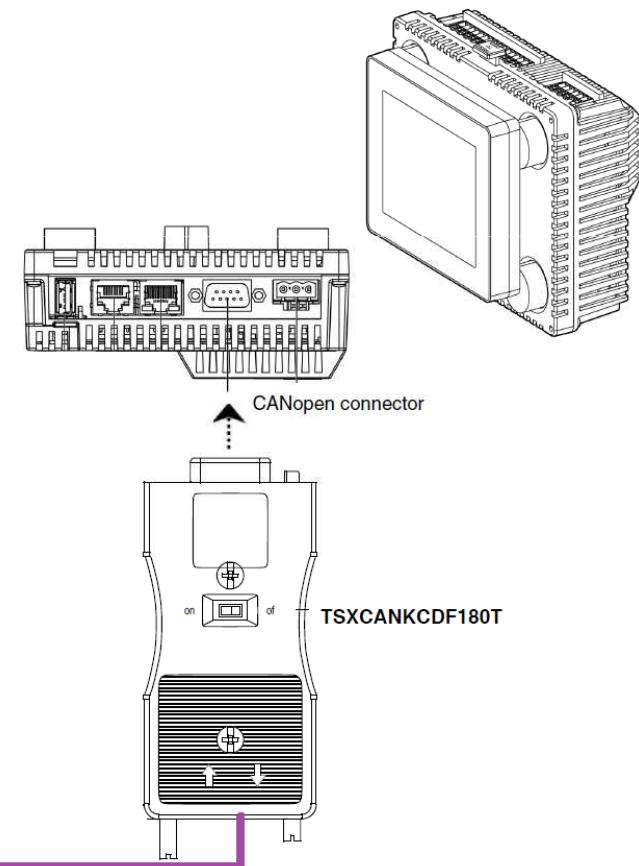
For each additional CANopen slave,

- the application size increases by an average of 10 kbytes, which can result in a memory size overload.
- the configuration initialization time at the startup increases, which can lead to a watchdog condition.

Although HMISCU does not restrict you from doing so, we recommend that you not exceed 16 CANopen slave modules (and/or 32 TPDOs and 32 RPDOs) for sufficient performance tolerance and to avoid performance degradation.



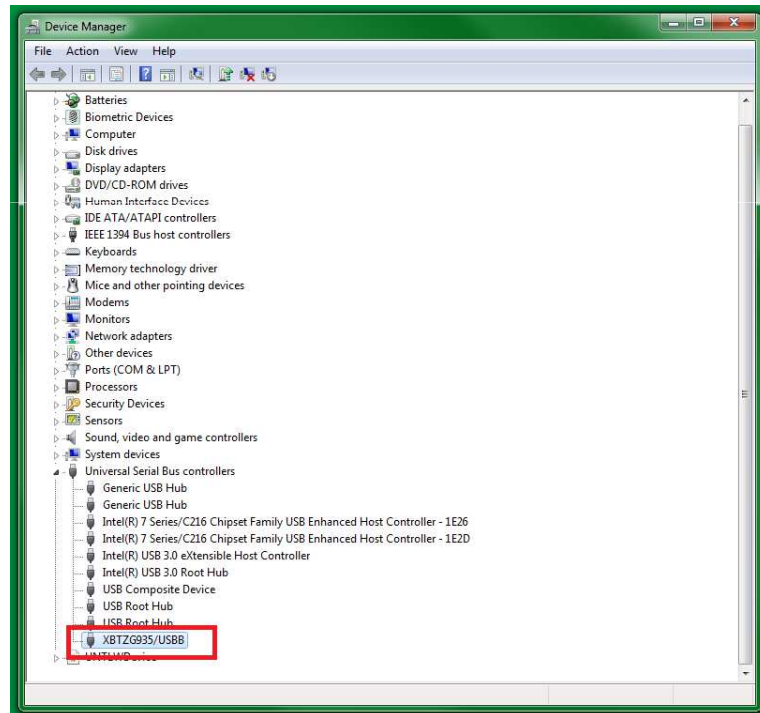
Signal	Color
CAN_GND	Black
CAN_H	White
CAN_L	Blue
CAN_V+	Red



HMISCU

- Driver:

Para uma análise preliminar, verificar se o driver está instalado e reconhecido pelo computador no Gerenciador de dispositivos :



(exemplo considerando o Windows 7 – 64 bits)

Em caso do driver não estar instalado, pode ser necessário:

- Reparar a instalação do SoMachine até a conclusão da instalação do SoMachine Gateway;

- Ou somente executar a instalação do SoMachine Gateway a partir da pasta de instalação do SoMachine.

SoMachine

• Escolha do hardware:

Características HMISCU6B5:



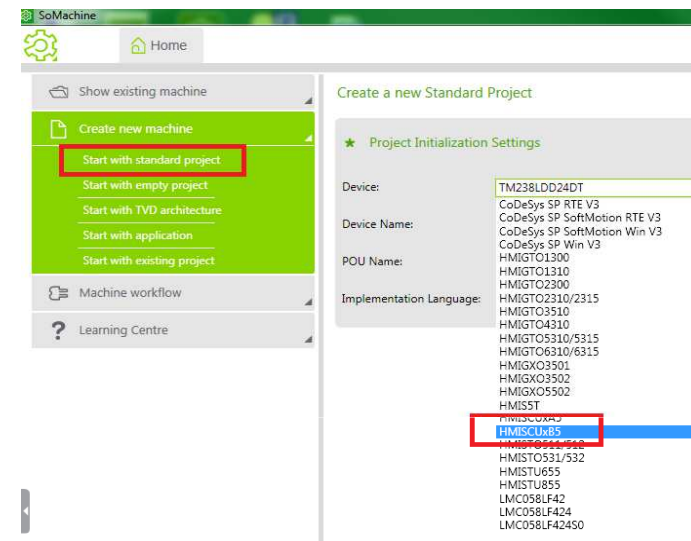
HMISCU6B5

Magelis HMISCU.A5 Small HMI controllers for control of simple machines							
Complete products 24 V (Screen module + Controller module)							
Type of screen	No. of ports	Application memory capacity	Compact Flash memory	Integrated I/O	No. of Ethernet ports	Reference	Weight kg/lb
3.5" QVGA color TFT	2 USB 1 COM1 1 CANopen	128 MB	No	16 digital I/ 10 digital O	1	HMISCU6A5	0.512/ 1.129

Características CanOpen:

CANopen port	Standards			DS 301 V4.02, DR 303-1							
	Class			Conformity class M20, limited to 16 slaves							
	Data rate	Max. length	m	20	50	100	125	250	500	1000	
		Data rate	Kbps	1000	800	500	425	250	125	50	
	No. of slaves			16 max. with max. limit of: 64 TPDOs and 64 RPDOs							

Seleção do modelo HMISCU6B5:



Seleção da linguagem de programação:

Create a new Standard Project

★ Project Initialization Settings

Device: HMISCUx85

Device Name: HMISCUx85

POU Name: POU

Implementation Language: Continuous Function Chart (CFC)

Sequential Function Chart (SFC)

Structured Text (ST)

Continuous Function Chart (CFC)

Function Block Diagram (FBD)

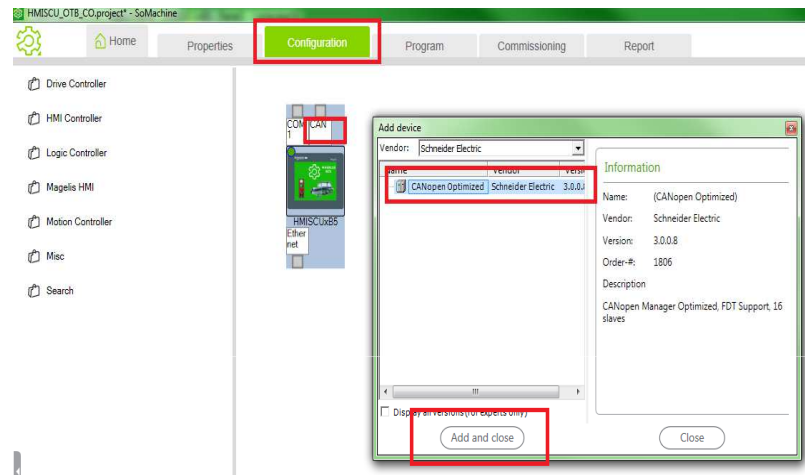
Ladder Logic Diagram (LD)

Instruction List (IL)

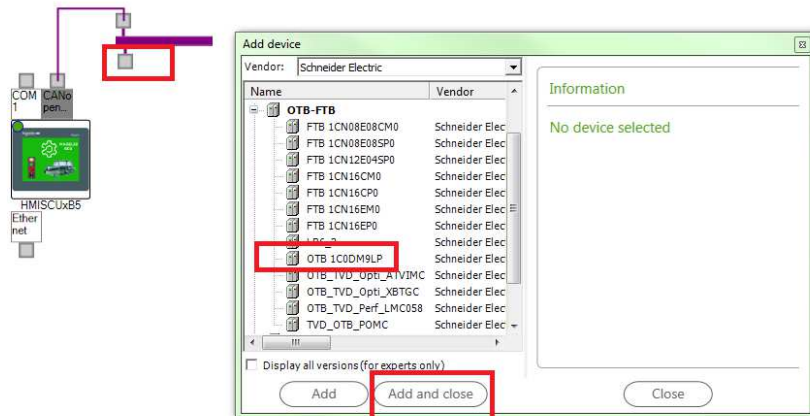
SoMachine

• Configuração CanOpen:

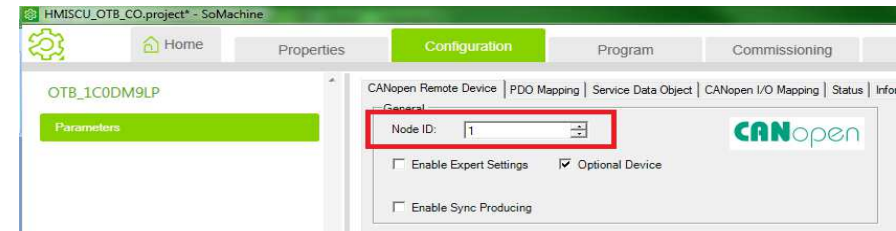
Configuração do Mestre CanOpen:



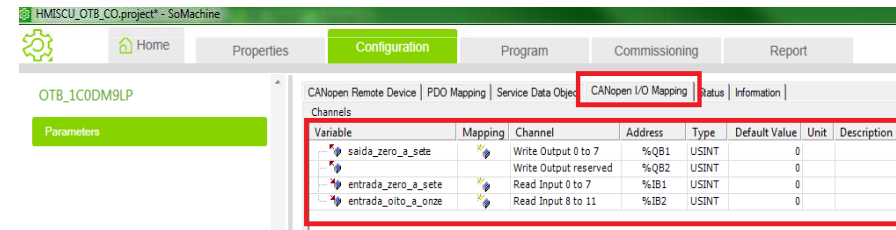
Seleção da OTB como escravo CanOpen:



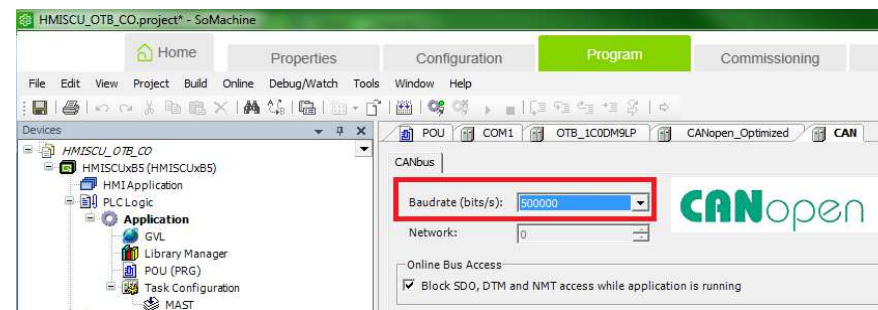
Endereço da OTB CanOpen:



Variáveis da OTB CanOpen:



Baudrate CanOpen:

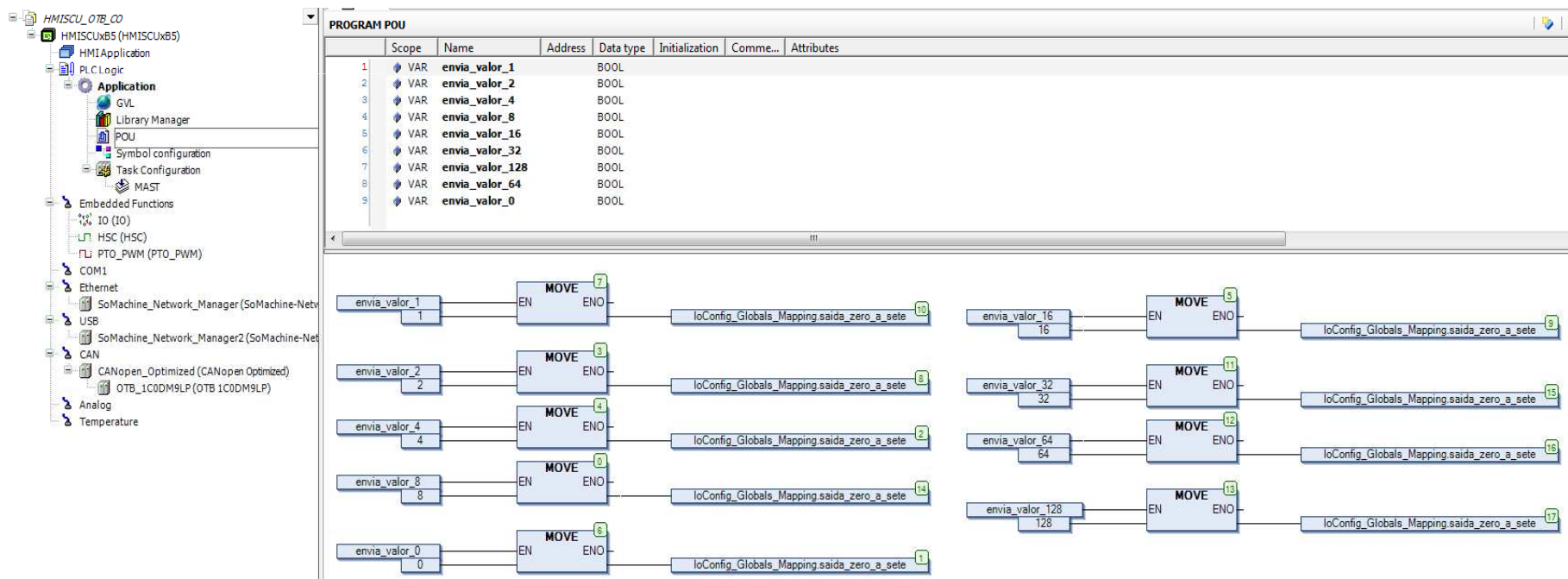


SoMachine

- Escrita na OTB:

Criação de uma **POU** em linguagem **CFC** para acionar cada da OTB. Em combinação binária, ao escrever o valor **1** na variável de saída **saida_zero_a_sete**, a saída **Q0** é ativada, assim, ao escrever **128** na variável de saída **saida_zero_a_sete**, a saída **Q7** é ativada.

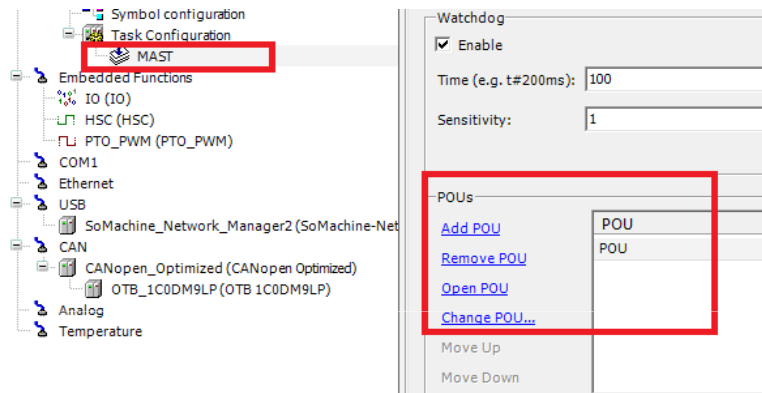
Ao escrever **0** na variável de saída **saida_zero_a_sete**, as saídas são desativadas.



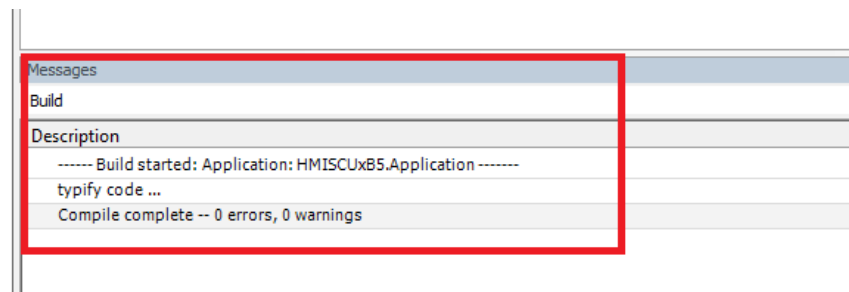
SoMachine

- Escrita na OTB:

Adicionar a **POU** na **MAST**:



Para realizar uma pré-compilação da porta lógica, pode-se utilizar o menu **Build**, opção **Build All** e na barra de mensagens obtém-se o status:

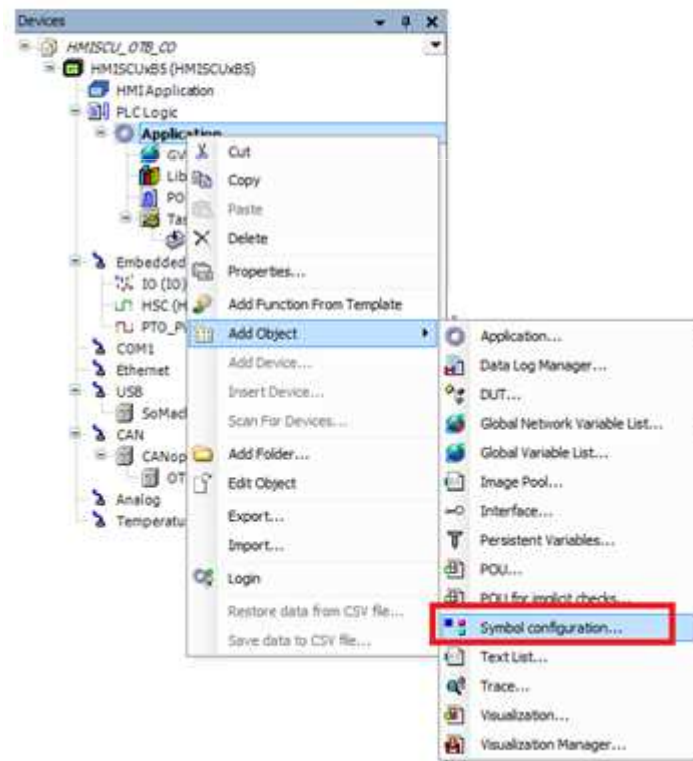


SoMachine

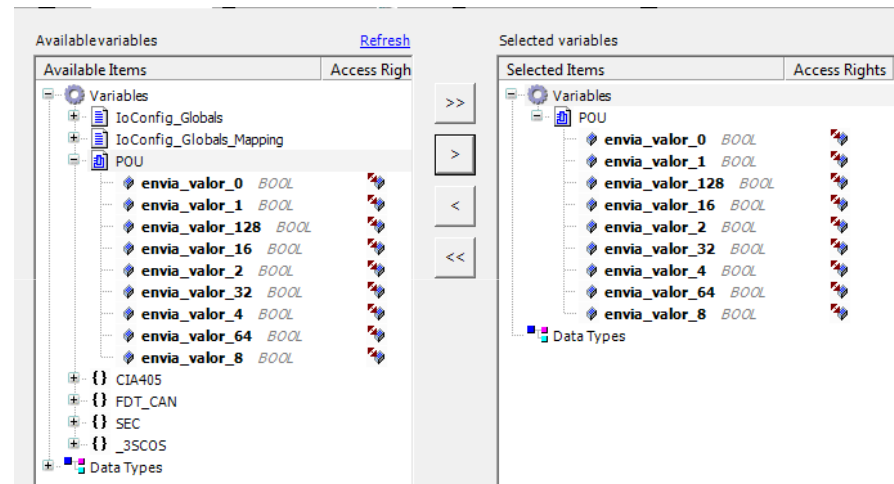
- Escrita na OTB:

Para a escrita ocorrer através da tela gráfica, é necessário exportar as variáveis para o Vijeo-Designer.

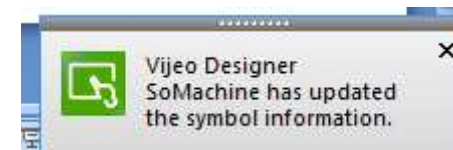
Assim, utiliza-se o **Symbol Configuration**:



No **Symbol Configuration**, selecionar as variáveis que sejam ser tranferidas para a tela gráfica:



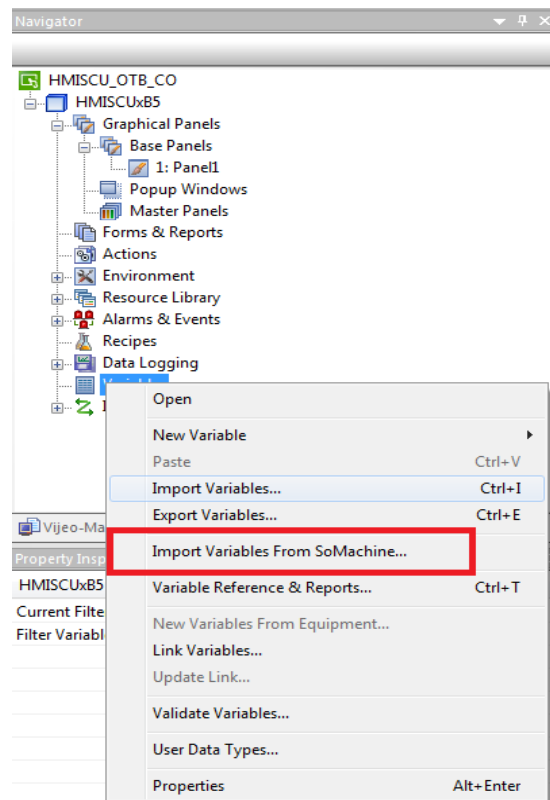
As variáveis são atualizadas do SoMachine para o Vijeo-Designer:



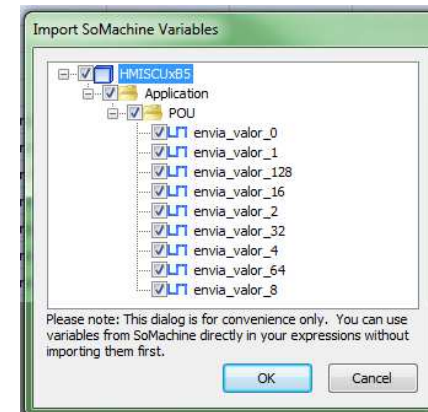
Vijeo-Designer

- Importar variáveis:

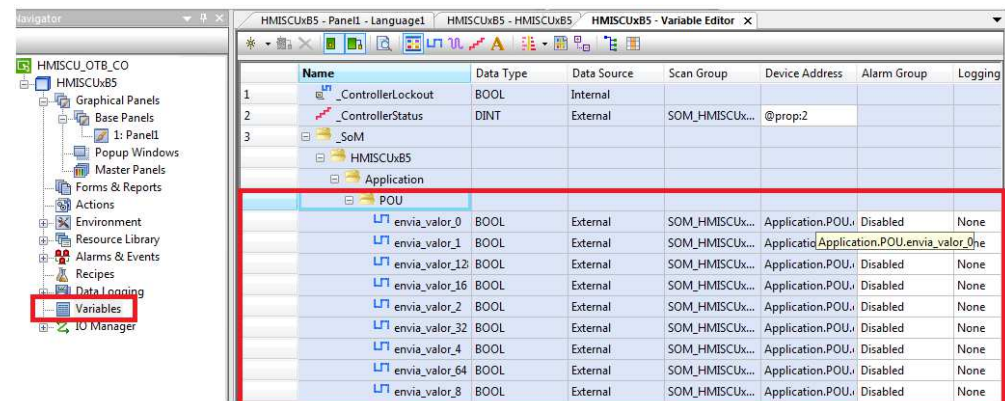
Para importar as variáveis do SoMachine para o Vijeo-Designer, utilize a opção abaixo em destaque:



Selecionar o grupo de variáveis exportadas:



Em **Variables**, as variáveis foram importadas:



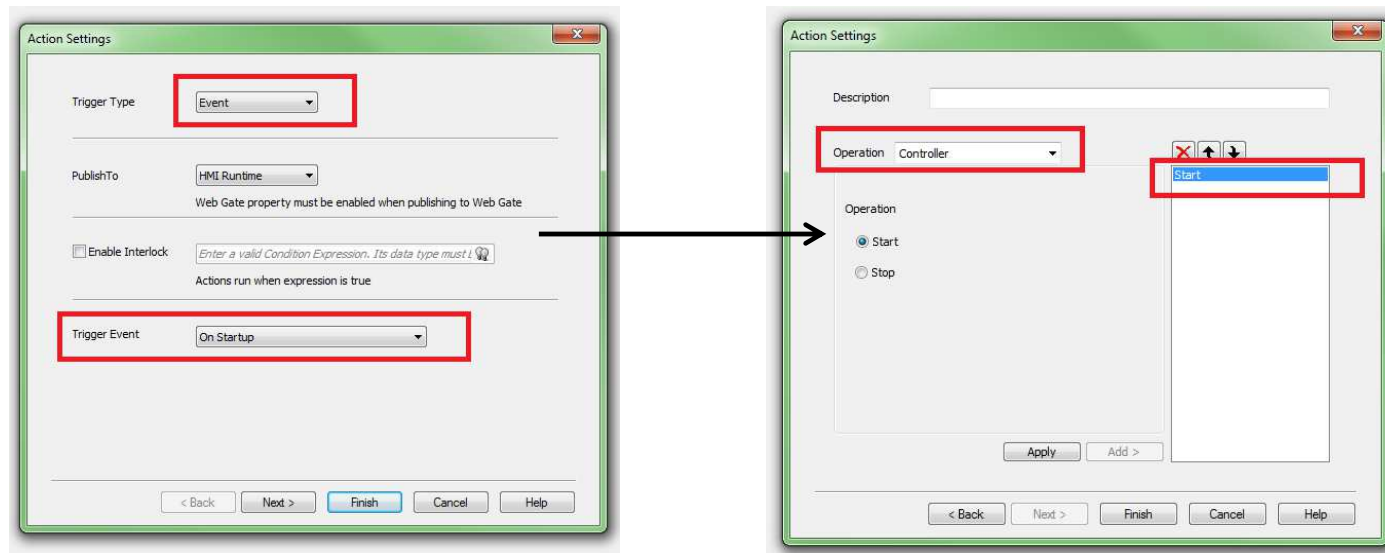
Vijeo-Designer

- CoDeSys runtime stopped:

A CPU da HMISCU inicializa em modo STOP e após o download da aplicação pelo SoMachine, no rodapé da tela da HMISCU ilustra a seguinte mensagem:



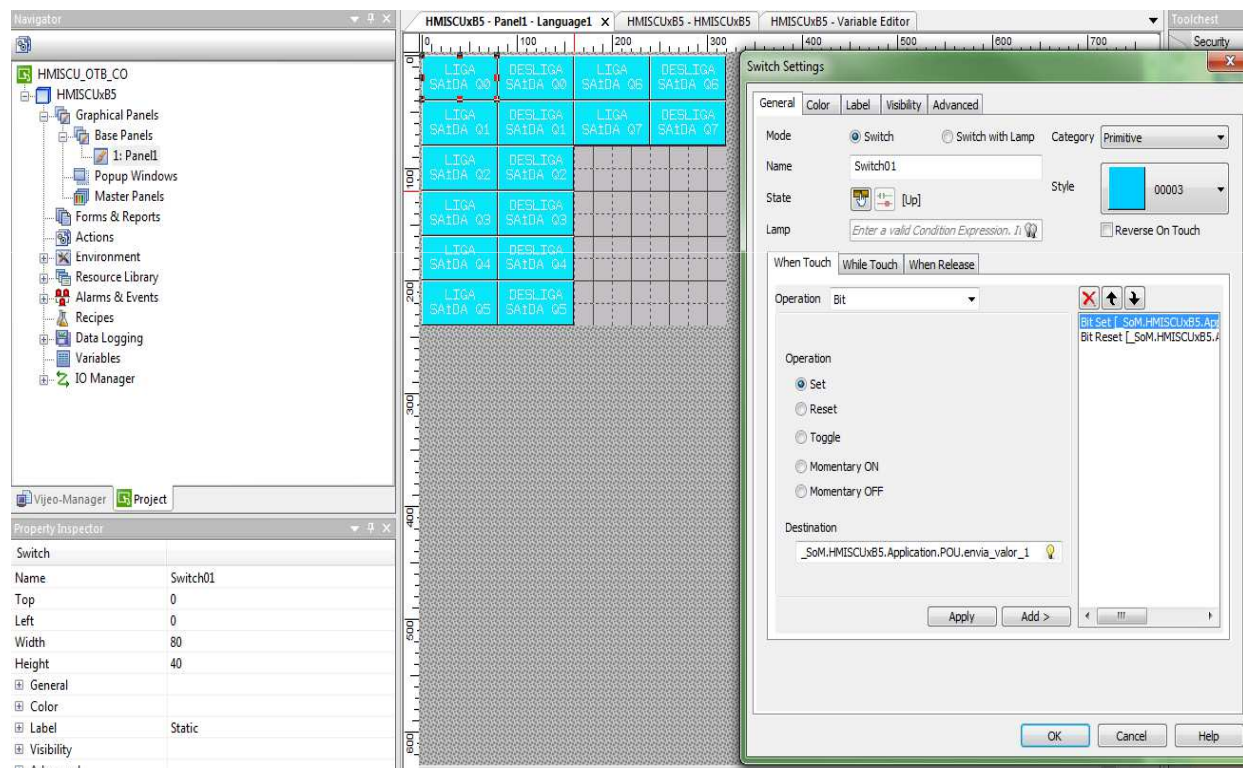
A configuração no SoMachine para inicialização da lógica do controlador em modo RUN, requer que no Vijeo-Designer seja criada uma **Action**:



Vijeo-Designer

- Envia valor para OTB:

Utilizando as operações **SET** e **RESET**, criou-se um conjunto de botões para cada saída. Vide exemplo abaixo com a saída **Q0** que foi replicado para as demais saídas, de acordo com cada valor da combinação binária:



_SoM.HMISCUx85.Application.POU.envia_valor_1 – Operação SET – LIGA SAÍDA Q0
_SoM.HMISCUx85.Application.POU.envia_valor_0 – Operação RESET – DESLIGA SAÍDA Q0

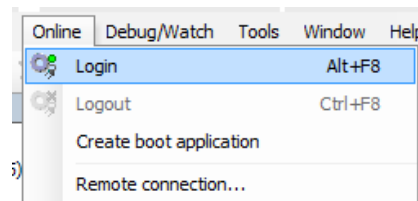
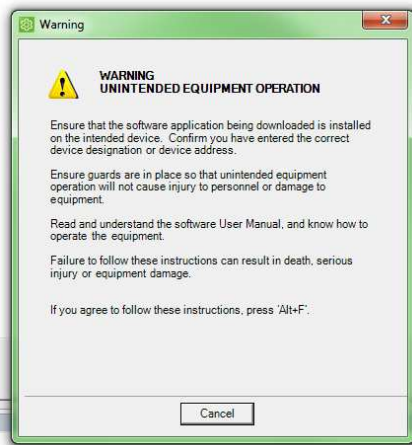
SoMachine

• Download de aplicação:

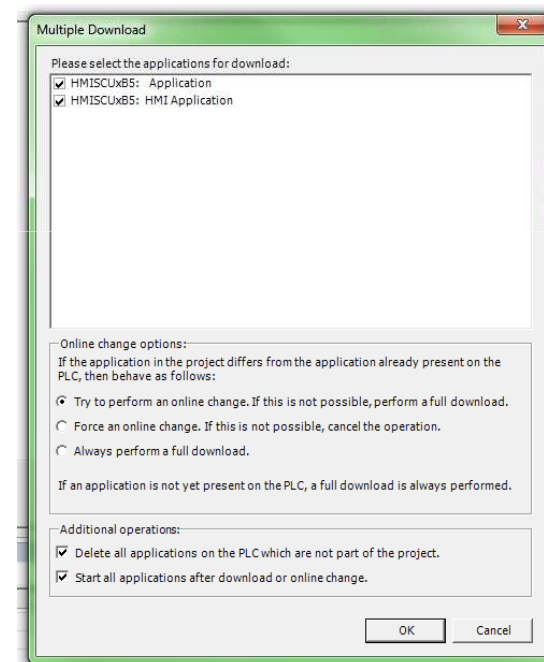
Em **Communication Settings**, adicionar um novo Gateway, scanear a rede e em seguida realizar um **Set Active Path**:



Confirmar o Login através pressionando **ALT + F** e em seguida realizar o **Login** para download da aplicação:



Após o **Login**, realizar o **Multiple Download**:



OTB1C0DM9LP

• Configuração de endereçamento e Baudrate:

Para a configuração padrão (somente com o módulo remoto), o endereçamento é descrito abaixo:

Summary

The encoder wheels of the Advantys OTB CANopen module OTB 1C0DM9LP are used to define the address of the island on the network.

Island Addresses

The CANopen interface module reads the address of the island indicated by the upper encoder wheels every time the island is powered up.

The address of the island is a numerical value between 1 and 127, which must be different from all other island addresses on the network. If the configured address is prohibited, the network interface module will not communicate.

Configuring the Island Address

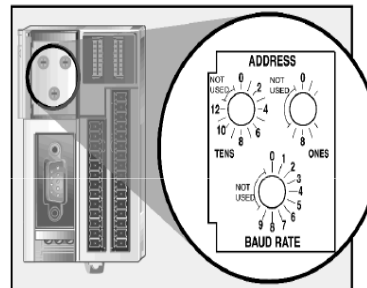
The instructions for configuring the address of the island are described in the following table.

Step	Action	Comment
1	All power supply to the island must be OFF.	The changes you make will be detected on the next power up.
2	Select an island address.	Select an address that is not currently being used on your field bus network.
3	Adjust the upper encoder wheels: - Left encoder wheel: 0 to 12 (tens), - Right encoder wheel: 0 to 9 (unit figures).	Use of addresses 0, 128 and 129 is prohibited.
4	Power up the island in order to implement the new configuration.	The network interface module reads the encoder wheel adjustments only on power up.

Field Bus Communication

The Advantys OTB interface module communicates when the encoder wheels are configured to a valid and unique CANopen address. If the island has an invalid address, it cannot communicate with the master. To establish communication, configure the encoder wheels to a valid address and power up the island.

Physical Description



Network Speed

Summary

A thumbwheel on the Advantys OTB CANopen OTB 1C0DM9LP module is used to define the network speed.

Network Speed

The CANopen network interface module reads the address and baud rate indicated by the thumbwheels each time the module is powered up.

Network speed configuration

The instructions for configuring the baud rate are given in the table below.

Step	Action	Comment
1	All power supplies to the OTB network interface module must be off.	The changes you make will be detected on the next power-up.
2	Select the rate in bauds to be used for CANopen fieldbus communications.	The rate configuration depends on your system and network specifications.
3	Set the lower thumbwheel to the position corresponding to the required rate.	Use the following rate selection table.
4	Power up the OTB network interface module again to apply the new configuration.	The network interface module only reads the thumbwheel parameters on power-up.

Rate Selection Table

Position (Lower Thumbwheel)	Baud rate
0	10 Kbps
1	20 Kbps
2	50 Kbps
3	125 Kbps
4	250 Kbps
5	500 Kbps
6	800 Kbps
7	1 Mbps
8	Automatic detection
9	Default rate (250 kbps)

NOTE:

- If the rate selected is incorrect, the OTB module generates a Bus OFF.
- Position 8 is used to detect the bus transmission speed automatically. The search starts at 1 Mbps, then gradually reduces the baud rate in increments until communication is established on the bus. Automatic detection only works on an operational CANopen network with an active master.
- In automatic detection mode, at least one of the slaves present on the network must be configured with the same speed as the Master.

OBS: Em configurações com módulos de expansão **TM2**, é necessário o software Advantys para gerar o arquivo de configuração **EDS** com a configuração da ilha para ser importado no SoMachine (Device Repository).

Comunicação CanOpen

• Diagnósticos:

Status LED

The table describes the CAN status LED:

Marking	Description	LED	
		Color	Description
CAN STS	CAN port status	Green / Red	See CAN STS status LED below

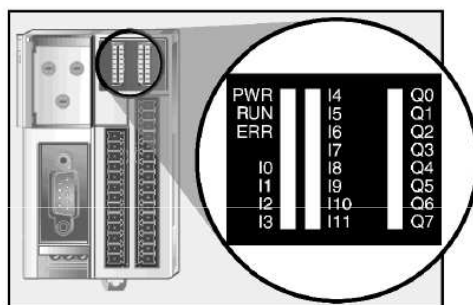
The table describes the CAN STS status LED:

CAN0 LED	CANopen Status	Description
OFF	No CANopen configured	CANopen is not active in the application.
Single flash red / with green ON	Acceptable detected error limit threshold has been reached	The controller has detected that the maximum number of error frames has been reached or exceeded.
Double flash red / with green ON	Node Guarding or Heartbeat event	The controller has detected either a Node Guarding or Heartbeat exception for the CANopen master or slave device.
Red ON	Bus off	The CANopen bus is stopped.

CAN0 LED	CANopen Status	Description
Green ON	The CANopen bus is operational.	

NOTE: CanOpen LED is mounted alongside the cover.

The illustration below shows the LEDs used by the CANopen Advantys OTB network interface module:



CANopen Communication LEDs

Standard DRP303-3 defines the RUN and ERR LEDs and their different states. The table below describes the conditions being displayed, and the colors and types of flashing used by the CAN ERR and CAN RUN LEDs to display the normal operating modes and error conditions of an Advantys OTB CANopen network interface module.

LED	Type of Flashing	Description
CAN ERR (red)	Off	No error.
	Random flashing	Auto-baud: Automatic search for the bus communication speed.
	Flashing: 1 flash	Warning limit reached. An internal error counter in the CAN controller has reached or exceeded the error frame limit threshold (error frame).
	Flashing: 2 flashes	Error control event. Detection of a guard event (NMT-Slave or NMT-master) or a heartbeat event (Heartbeat consumer)
	Flashing: 3 flashes	Synchronization error: message not received within the defined period. (See Object 1006H (see page 232)).
CAN RUN (green)	On	Bus OFF. OTB module status: Bus OFF.
	Random flashing	Auto-baud: Automatic search for the bus communication speed.
	Continuous flashing	Module status: Pre-operational.
	Flashing: 1 flash	Module status: Stopped.
	On	Module status: Operational.

Avisos Importantes

- Equipamentos elétricos devem ser instalados, operados e manuseados apenas por pessoas qualificadas.
- Uma pessoa qualificada é aquela que tem habilidades e conhecimentos relacionados com a construção, instalação e operação de equipamentos elétricos e recebeu treinamento adequado para reconhecer e evitar os perigos envolvidos.
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