ctrlX AUTOMATION

Introduction

This article shows how to setup the communication configuration between the EtherCAT master of the ctrlX CORE and an S20 EtherCAT bus coupler with S20-IOL-8 IO-Link Master using the EtherCAT App and the PLC App with S20 configuration libraries so you can read IO-Link sensors on the Data Layer.

Prerequisites

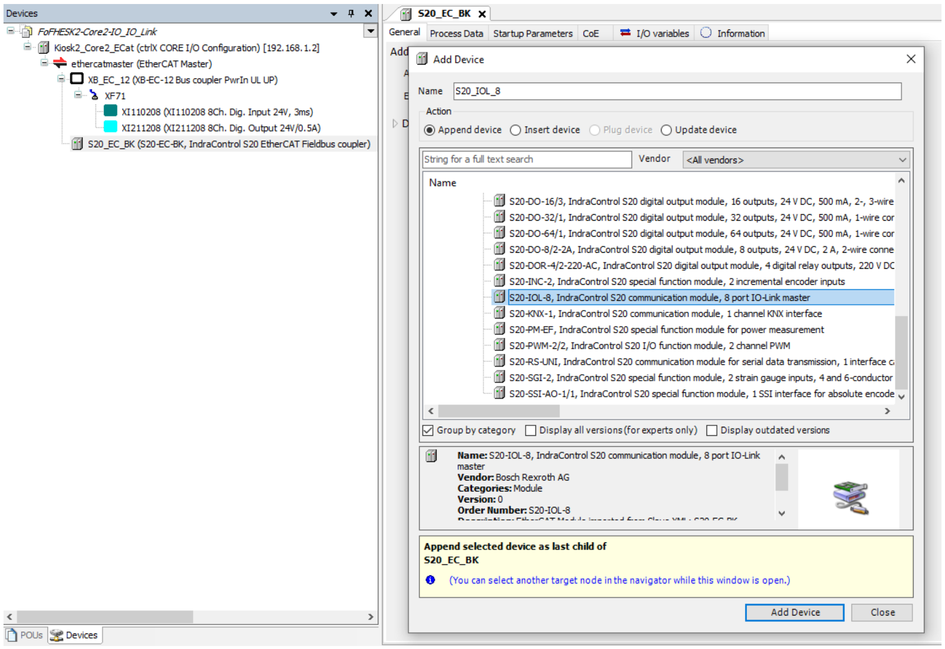
- ctrlX CORE with system image 1.18 or higher
- EtherCAT App version 1.18 or higher
- PLC App version 1.18 or higher
- ctrlX WORKS version 1.18 or higher
- Familiarity with connecting to and setting up a ctrlX CORE

Video Demonstration

https://www.youtube.com/watch?v=LpDT30W3cq4

EtherCAT Master IO Configuration

In ctrlX IO Engineering, scan for devices and apply them to the IO project. Then under the S20 EtherCAT bus coupler, manually add the S20-IOL-8 module. Make sure all devices on the EtherCAT bus coupler are in the correct order.



Devices

- FoFHESK2-Core2-IO_IO_Link
  - Kiosk2_Core2_ECat (ctrlX CORE I/O Configuration) [192.168.1.2]
    - ethercatmaster (EtherCAT Master)
      - XB_EC_12 (XB-EC-12 Bus coupler PwrIn UL UP)
        - XF71
          - XI110208 (XI110208 8Ch. Dig. Input 24V, 3ms)
          - XI211208 (XI211208 8Ch. Dig. Output 24V/0.5A)
      - S20_EC_BK (S20-EC-BK, IndraControl S20 EtherCAT Fieldbus coupler)

Add Device

Name: S20_IOL_8

Action: ● Append device ○ Insert device ○ Plug device ○ Update device

String for a full text search   Vendor: <All vendors>

Name
- S20-DO-16/3, IndraControl S20 digital output module, 16 outputs, 24 V DC, 500 mA, 2-, 3-wire
- S20-DO-32/1, IndraControl S20 digital output module, 32 outputs, 24 V DC, 500 mA, 1-wire cor
- S20-DO-64/1, IndraControl S20 digital output module, 64 outputs, 24 V DC, 500 mA, 1-wire cor
- S20-DO-8/2-2A, IndraControl S20 digital output module, 8 outputs, 24 V DC, 2 A, 2-wire conne
- S20-DOR-4/2-220-AC, IndraControl S20 digital output module, 4 digital relay outputs, 220 V DC
- S20-INC-2, IndraControl S20 special function module, 2 incremental encoder inputs
- S20-IOL-8, IndraControl S20 communication module, 8 port IO-Link master
- S20-KNX-1, IndraControl S20 communication module, 1 channel KNX interface
- S20-PM-EF, IndraControl S20 special function module for power measurement
- S20-PWM-2/2, IndraControl S20 I/O function module, 2 channel PWM
- S20-RS-UNI, IndraControl S20 communication module for serial data transmission, 1 interface c
- S20-SGI-2, IndraControl S20 special function module, 2 strain gauge inputs, 4 and 6-conductor
- S20-SSI-AO-1/1, IndraControl S20 special function module, 1 SSI interface for absolute encode

☑ Group by category ☐ Display all versions (for experts only) ☐ Display outdated versions

Name: S20-IOL-8, IndraControl S20 communication module, 8 port IO-Link master
Vendor: Bosch Rexroth AG
Categories: Module
Version: 0
Order Number: S20-IOL-8

Append selected device as last child of S20_EC_BK

(You can select another target node in the navigator while this window is open.)

Then download the configuration to the ctrlX CORE. If the 'D' status indicator LED on the S20-IOL-8 module is not active at this point, cycle the EtherCAT master.

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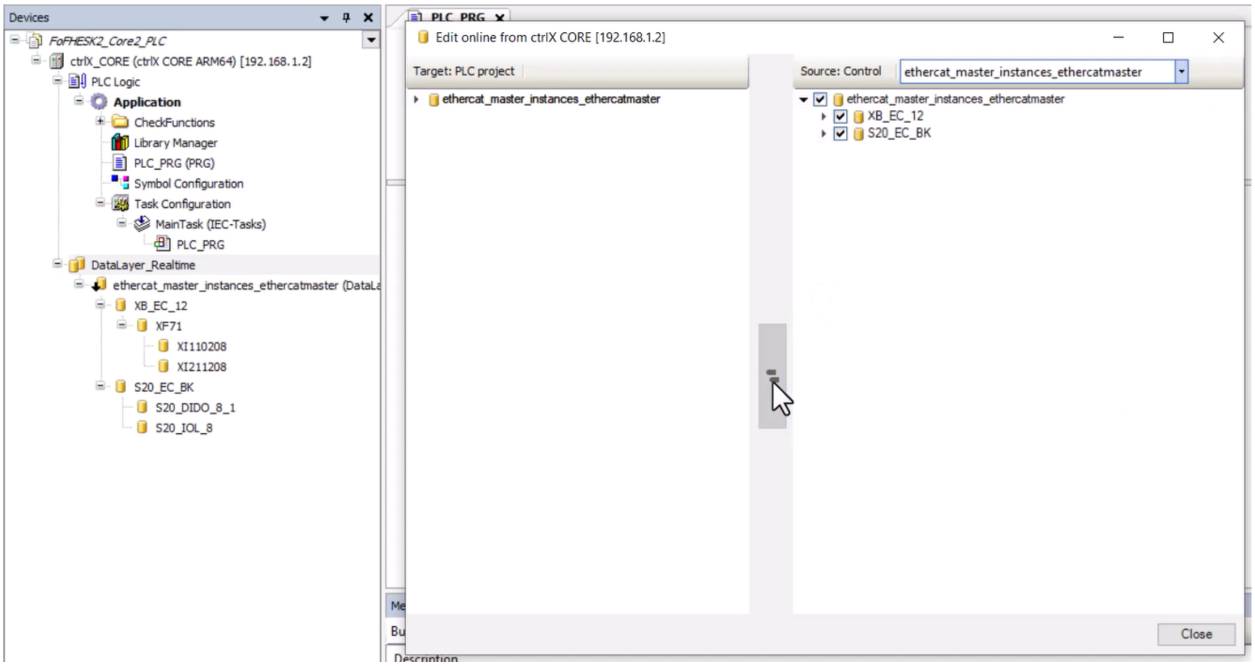
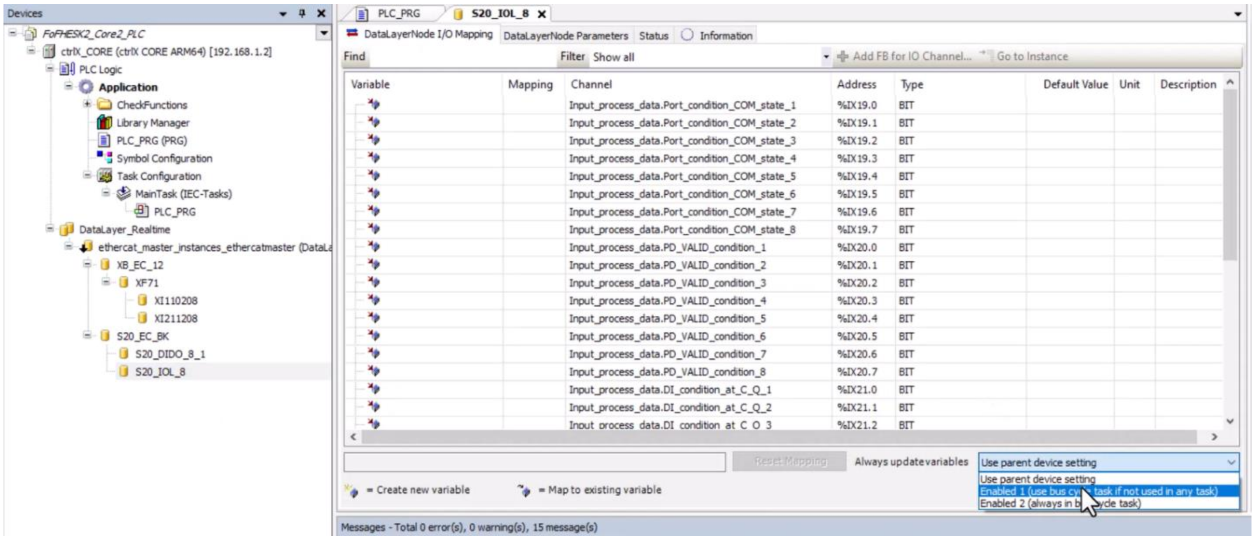
PLC Configuration

In the PLC engineering software, add the EtherCAT master info to the Data Layer.



Enable the S20-IOL-8 in the Data Layer.



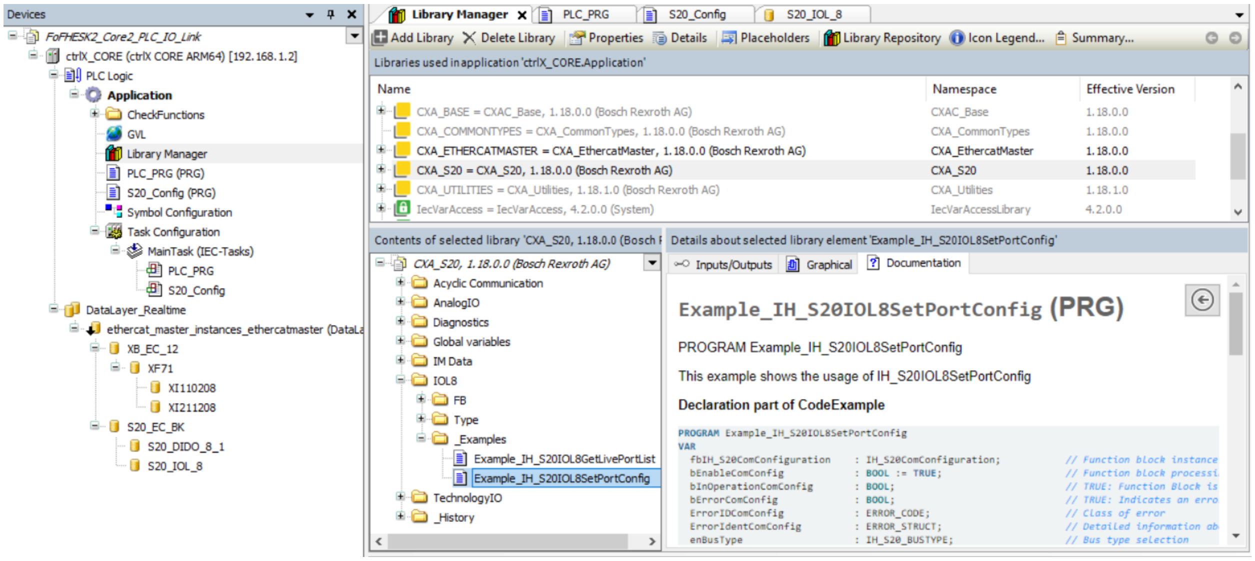
Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
		Input_process_data.Port_condition_COM_state_1	%IX19.0	BIT			
		Input_process_data.Port_condition_COM_state_2	%IX19.1	BIT			
		Input_process_data.Port_condition_COM_state_3	%IX19.2	BIT			
		Input_process_data.Port_condition_COM_state_4	%IX19.3	BIT			
		Input_process_data.Port_condition_COM_state_5	%IX19.4	BIT			
		Input_process_data.Port_condition_COM_state_6	%IX19.5	BIT			
		Input_process_data.Port_condition_COM_state_7	%IX19.6	BIT			
		Input_process_data.Port_condition_COM_state_8	%IX19.7	BIT			
		Input_process_data.PD_VALID_condition_1	%IX20.0	BIT			
		Input_process_data.PD_VALID_condition_2	%IX20.1	BIT			
		Input_process_data.PD_VALID_condition_3	%IX20.2	BIT			
		Input_process_data.PD_VALID_condition_4	%IX20.3	BIT			
		Input_process_data.PD_VALID_condition_5	%IX20.4	BIT			
		Input_process_data.PD_VALID_condition_6	%IX20.5	BIT			
		Input_process_data.PD_VALID_condition_7	%IX20.6	BIT			
		Input_process_data.PD_VALID_condition_8	%IX20.7	BIT			
		Input_process_data.DI_condition_at_C_Q_1	%IX21.0	BIT			
		Input_process_data.DI_condition_at_C_Q_2	%IX21.1	BIT			
		Input_process_data.DI_condition_at_C_Q_3	%IX21.2	BIT			

Always update variables: Use parent device setting

- Use parent device setting
- Enabled 1 (use bus cycle task if not used in any task)
- Enabled 2 (always in bus cycle task)

Messages - Total 0 error(s), 0 warning(s), 15 message(s)

Add the CXA_S20 library, then add the example code for IH_S20IOL8SetPortConfig and IH_S20IOL8GetLivePortList, in the IOL8 folder, to a POU in your program. You only need one instance of IH_S20ComConfiguration.



Libraries used in application 'ctrlX_CORE.Application'

Name	Namespace	Effective Version
CXA_BASE = CXAC_Base, 1.18.0.0 (Bosch Rexroth AG)	CXAC_Base	1.18.0.0
CXA_COMMONTYPES = CXA_CommonTypes, 1.18.0.0 (Bosch Rexroth AG)	CXA_CommonTypes	1.18.0.0
CXA_ETHERCATMASTER = CXA_EthercatMaster, 1.18.0.0 (Bosch Rexroth AG)	CXA_EthercatMaster	1.18.0.0
CXA_S20 = CXA_S20, 1.18.0.0 (Bosch Rexroth AG)	CXA_S20	1.18.0.0
CXA_UTILITIES = CXA_Utilities, 1.18.1.0 (Bosch Rexroth AG)	CXA_Utilities	1.18.1.0
IecVarAccess = IecVarAccess, 4.2.0.0 (System)	IecVarAccessLibrary	4.2.0.0

Contents of selected library 'CXA_S20, 1.18.0.0 (Bosch R

Details about selected library element 'Example_IH_S20IOL8SetPortConfig'

Example_IH_S20IOL8SetPortConfig (PRG)

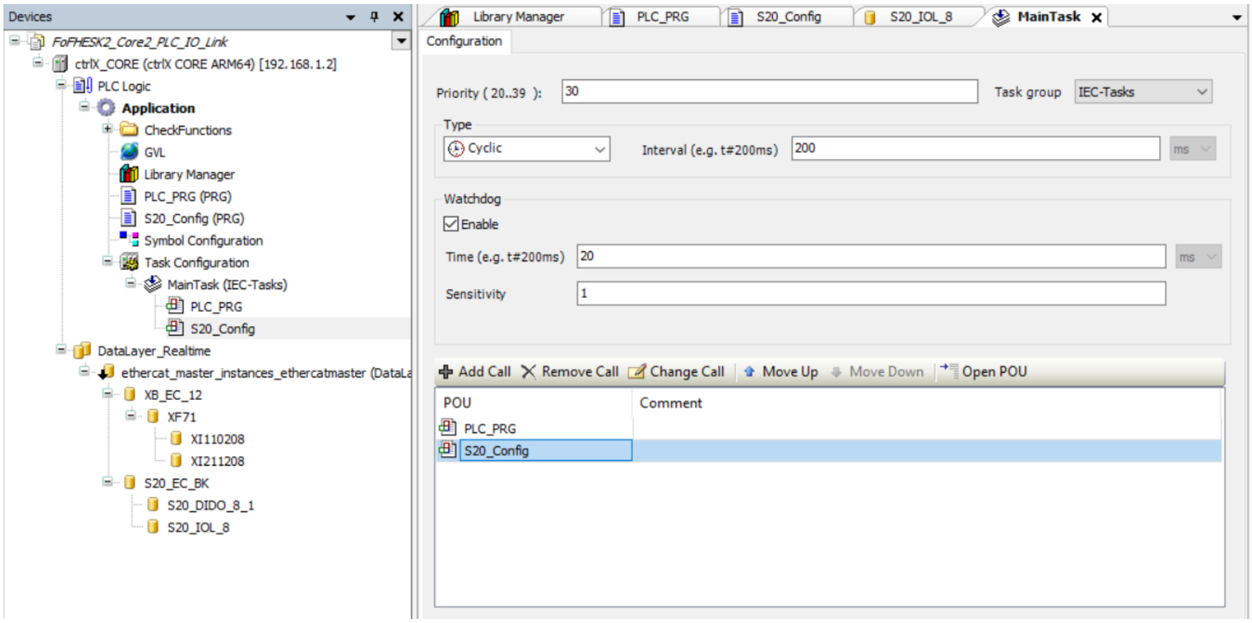
PROGRAM Example_IH_S20IOL8SetPortConfig

This example shows the usage of IH_S20IOL8SetPortConfig

Declaration part of CodeExample

```
PROGRAM Example_IH_S20IOL8SetPortConfig
VAR
  fbIH_S20ComConfiguration    : IH_S20ComConfiguration;        // Function block instance
  bEnableComConfig            : BOOL := TRUE;                  // Function block processi
  bInOperationComConfig       : BOOL;                          // TRUE: Function Block is
  bErrorComConfig             : BOOL;                          // TRUE: Indicates an erro
  ErrorIDComConfig            : ERROR_CODE;                    // Class of error
  ErrorIdentComConfig         : ERROR_STRUCT;                  // Detailed information ab
  enBusType                   : IH_S20_BUSTYPE;                // Bus type selection
```

Remember to add the configuration POU to the Main_task.



Priority (20..39): 30

Task group: IEC-Tasks

Type: Cyclic

Interval (e.g. t#200ms): 200 ms

Watchdog

☑ Enable

Time (e.g. t#200ms): 20 ms

Sensitivity: 1

POU	Comment
PLC_PRG	
S20_Config	

After building the code, Login to the ctrlX CORE and download the code. Execute IH_S20IOL8SetPortConfig to activate the IO Ports on the S20-IOL-8 IO-Link Master. Then execute IH_S20IOL8GetLivePortList. The array assigned to IH_S20IOL8GetLivePortList will now contain the configuration data for all IO-Link sensors connected to the S20-IOL-8 IO-Link Master.

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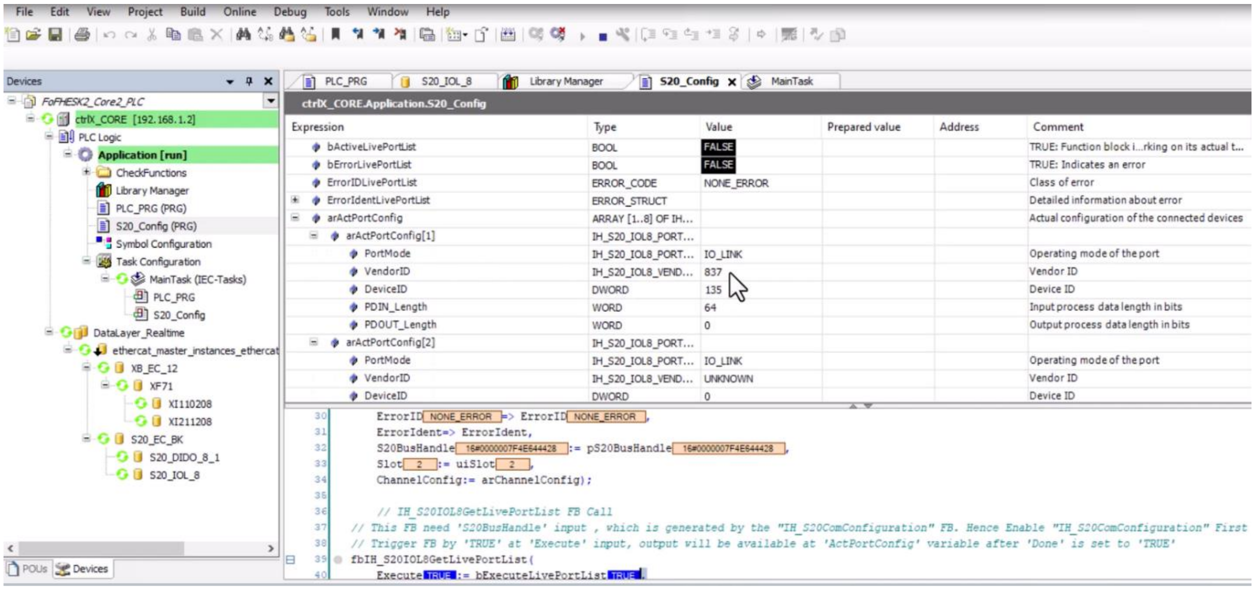

ctrlX_CORE.Application.S20_Config

Expression	Type	Value	Prepared value	Address	Comment
bActiveLivePortList	BOOL	FALSE			TRUE: Function block i...rking on its actual t...
bErrorLivePortList	BOOL	FALSE			TRUE: Indicates an error
ErrorIDLivePortList	ERROR_CODE	NONE_ERROR			Class of error
ErrorIdentLivePortList	ERROR_STRUCT				Detailed information about error
arActPortConfig	ARRAY [1..8] OF IH...				Actual configuration of the connected devices
arActPortConfig[1]	IH_S20_IOL8_PORT...				
PortMode	IH_S20_IOL8_PORT...	IO_LINK			Operating mode of the port
VendorID	IH_S20_IOL8_VEND...	837			Vendor ID
DeviceID	DWORD	135			Device ID
PDIN_Length	WORD	64			Input process data length in bits
PDOUT_Length	WORD	0			Output process data length in bits
arActPortConfig[2]	IH_S20_IOL8_PORT...				
PortMode	IH_S20_IOL8_PORT...	IO_LINK			Operating mode of the port
VendorID	IH_S20_IOL8_VEND...	UNKNOWN			Vendor ID
DeviceID	DWORD	0			Device ID

```
        ErrorID NONE_ERROR => ErrorID NONE_ERROR ,
        ErrorIdent=> ErrorIdent,
        S20BusHandle 16#0000007F4E644428 := pS20BusHandle 16#0000007F4E644428 ,
        Slot 2 := uiSlot 2 ,
        ChannelConfig:= arChannelConfig);

        // IH_S20IOL8GetLivePortList FB Call
    // This FB need 'S20BusHandle' input , which is generated by the "IH_S20ComConfiguration" FB. Hence Enable "IH_S20ComConfiguration" First
    // Trigger FB by 'TRUE' at 'Execute' input, output will be available at 'ActPortConfig' variable after 'Done' is set to 'TRUE'
    fbIH_S20IOL8GetLivePortList(
        Execute TRUE := bExecuteLivePortList TRUE ,
```

Use the data acquired from the array tied to IH_S20IOL8GetLivePortList to populate the array tied to IH_S20IOL8SetPortConfig. Then execute IH_S20IOL8SetPortConfig again to load the correct port configuration data. In the array tied to IH_S20IOL8SetPortConfig, any unused ports should be disabled to avoid an error signal on the S20-IOL-8 module.