Platform MX6
Software option S000
Counter Encoder Interface

1   Identification

Identification	
Option ID	S000
Order number	S-05000201-0000
Short name	Counter Encoder Interface
Brief description	With this software option, it is possible to operate a local input of the device as fast counter or encoder.
Revision ID document	V3.0

2   System requirements and restrictions

System requirements and restrictions	
Supported platforms and devices	Berghof PLC devices of the MX6 platform (e.g.: CCs, DCs). Additional information regarding availability and compatibility can be found in options section of the product catalog.
Firmware	MX6-PLC from version 1.7.1, CODESYS ab 3.5 SP7 Patch 4
Additional requirements	— Hardware support for counter/encoder function by the device. — For detailed information on availability, number and other technical details of the counter and encoder functions, please consult the device's manual.
Restrictions	— Differenatial Encoder not supported — RS422 (TTL, 5V) not supported

3   Product description

With this software option it is possible to enable dedicated inputs of MX6 series PLC devices as counter or encoder inputs.

Depending on the hardware, up to two counter and two encoder inputs are supported with one capture. Various operating modes and combinations can be selected for these. The counter/encoder functionality is parameterized directly in CODESYS via the IO description of the devices. Furthermore, the operating modes can be parameterized via the Berghof Extension Bus Library from the PLC application.

For example, the following constellations can be selected:

Modes of operation					
CODESYS	**Operating mode**	**Counter IN (C1)**	**Counter IN (C2)**	**Counter IN (C3)**	**Counter IN (C4)**
Counter/Encoder 0	Counter Up	UP	-	-	[CAPTURE]
Counter/Encoder 0	Counter UpDown	UP	DOWN	-	[CAPTURE]
Counter/Encoder 0	Pulse Direction	PULSE	DIRECTION		[CAPTURE]
Counter/Encoder 0	Encoder	A	B	-	[CAPTURE]
Counter/Encoder 1	Counter Up	-	-	UP	
Counter/Encoder 1	Counter UpDown	-	-	UP	DOWN
Counter/Encoder 1	Pulse Direction	-	-	PULSE	DIRECTION
Counter/Encoder 1	Encoder	-	-	A	B

Note: Only Counter/Encoder 0 has the capture functionality. The capture input is combined with the Counter/Encoder 1 inputs. When using the capture functionality Counter/Encoder 1 function is limited.

4   Technical data

| Technical data	
Functions	Counter Up, UpDown, Pulse Direction, Encoder, Capture
Signal voltage	(1): DC 15...28 V (0): DC –3...3V
Signal frequency	Up to 500kHz
Min. pulse width	1 µs

5 Quick Start Guide

The following describes briefly how to parameterize the counter/encoder functionality under CODESYS and how to access it.

5.1 Adding the IO description

First, the slot for the internal IO cards must be added to the device tree with the CODESYS function 'Add Device':
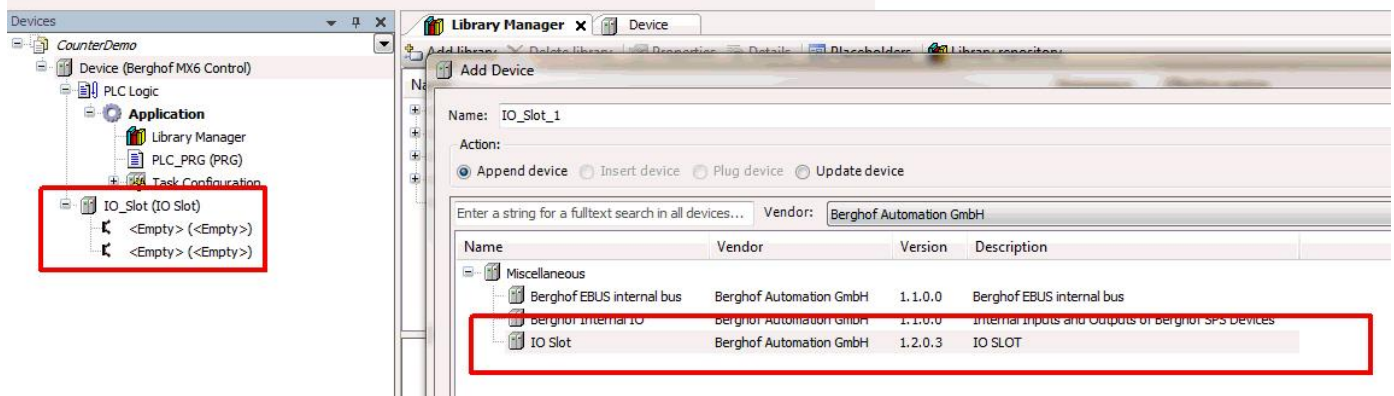
The appropriate IO description is now plugged into the first slot via the 'Plug Device' function.
In this case we choose the maximum description:
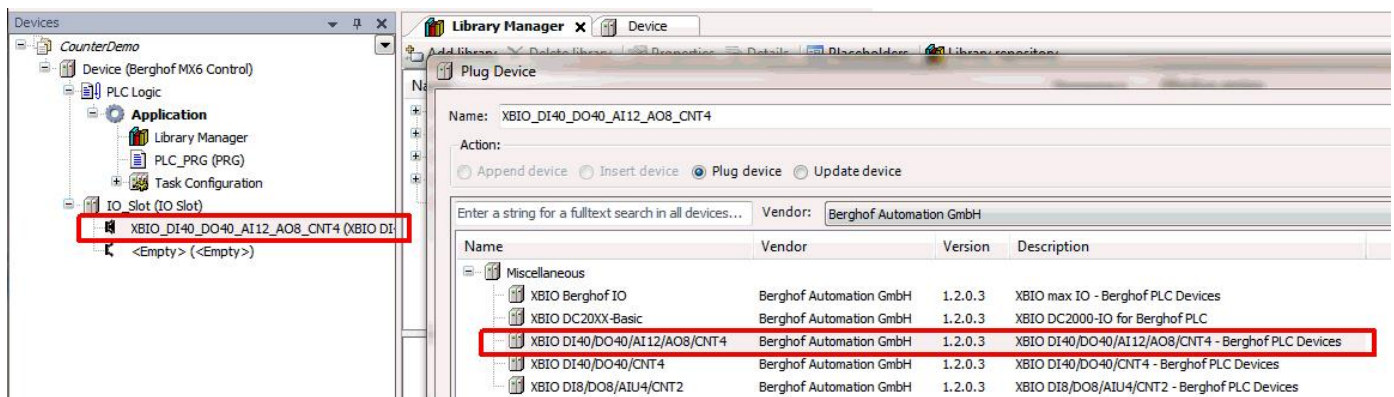
Note: The IO descriptions of the XBIO modules are so compatible with each other that IO descriptions can also be used on devices that have more functionality than the underlying hardware really offers. IOs that are not present are not changed during operation and remain in their initial state. This means that the same PLC application can be used with different expansion levels without changing the IO configuration on hardware.
A smaller IO description can also be selected for a device.

5.2 Setting the operating modes

To configure the parameters for operation, select the 'BGH Slot Bus Parameters' tab in the device description. There, scroll to the 'Counter/Encoder Settings' folder and select the desired function for the counter:
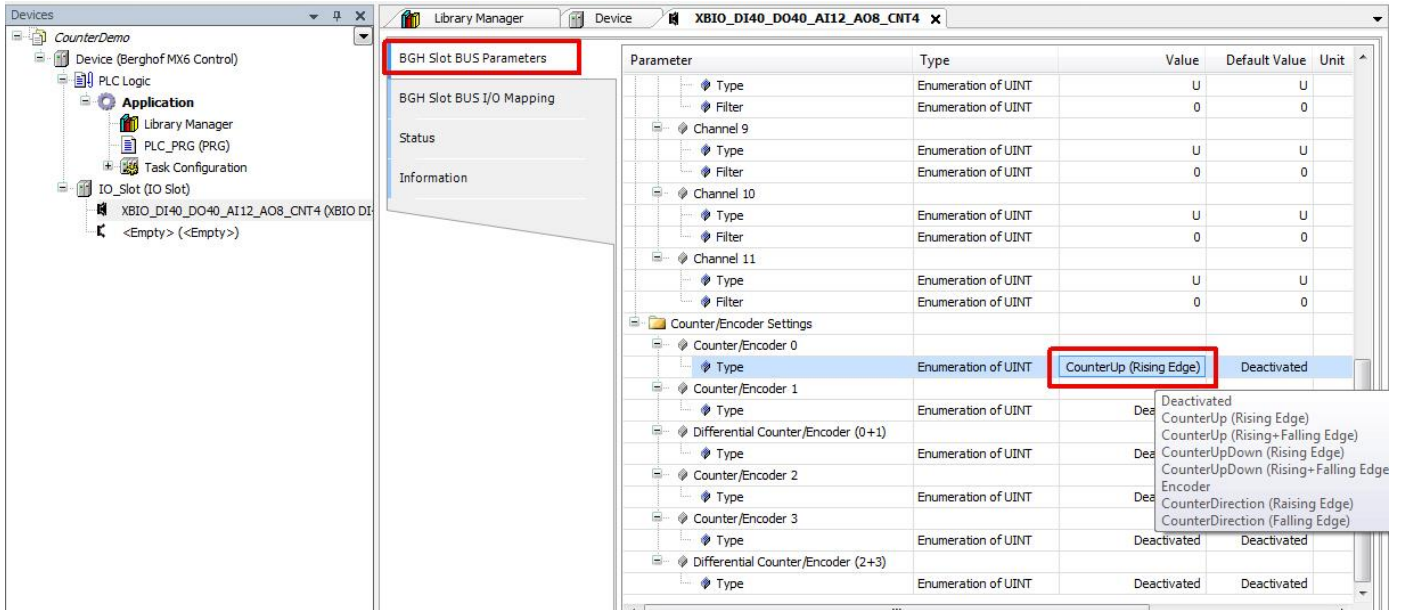
The desired counters or encoder values can then be called up during operation via the IO image:
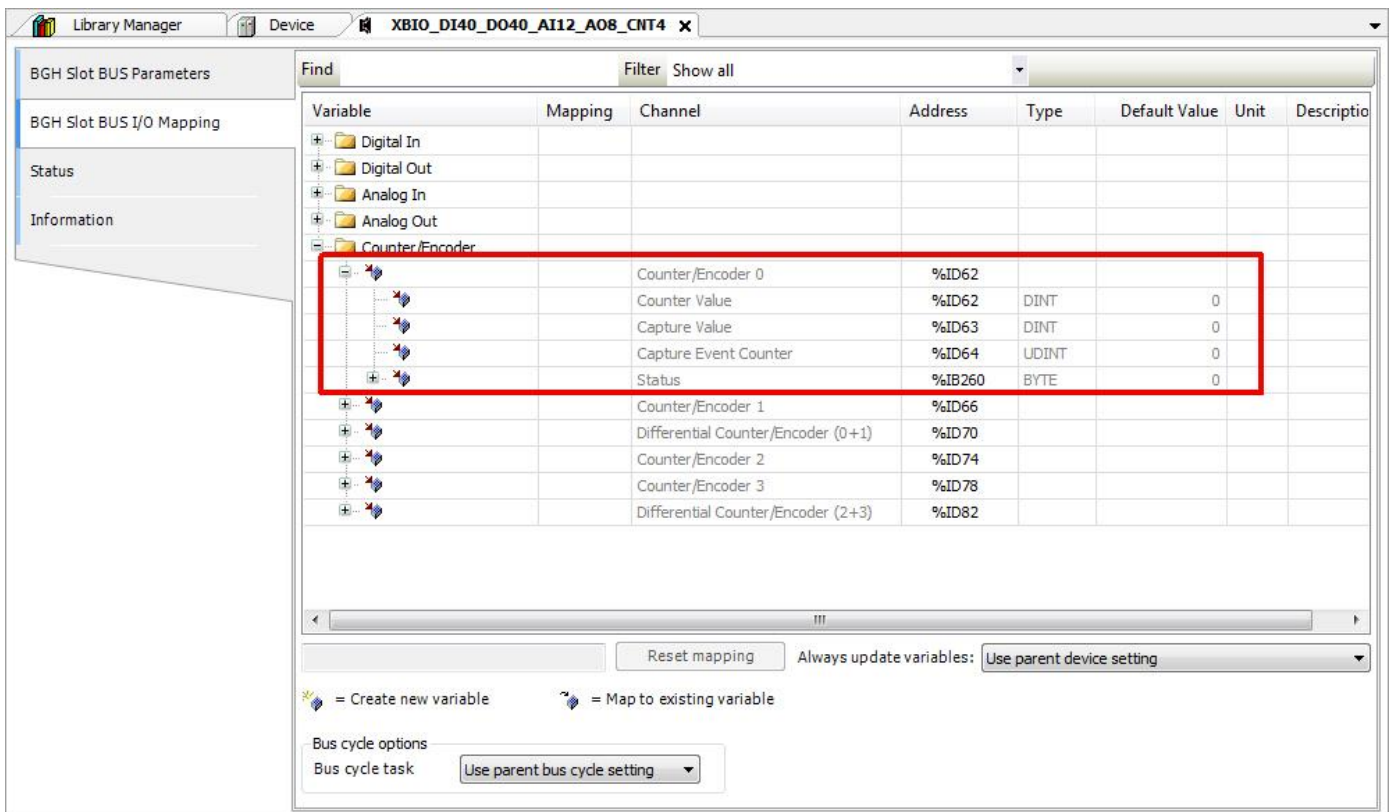
5.3 Further operating instructions

When operating the counters/encoders, the following must be observed:

— The IOs should also be updated in Stop (CODESYS option in the device settings) to correctly process counting pulses generated in Stop mode.
— After a reset COLD, WARM or ORIGIN the counter values are 0 and the counter registers of the hardware are reset to default values.
— If the bus cycle task is slower than 2*8ms, the first bit (update time violation) in the status of the respective counter/encoder is set to 1. In this case, counting pulses may have been lost. This bit can only be deleted by a reset of the PLC application or a boot process.