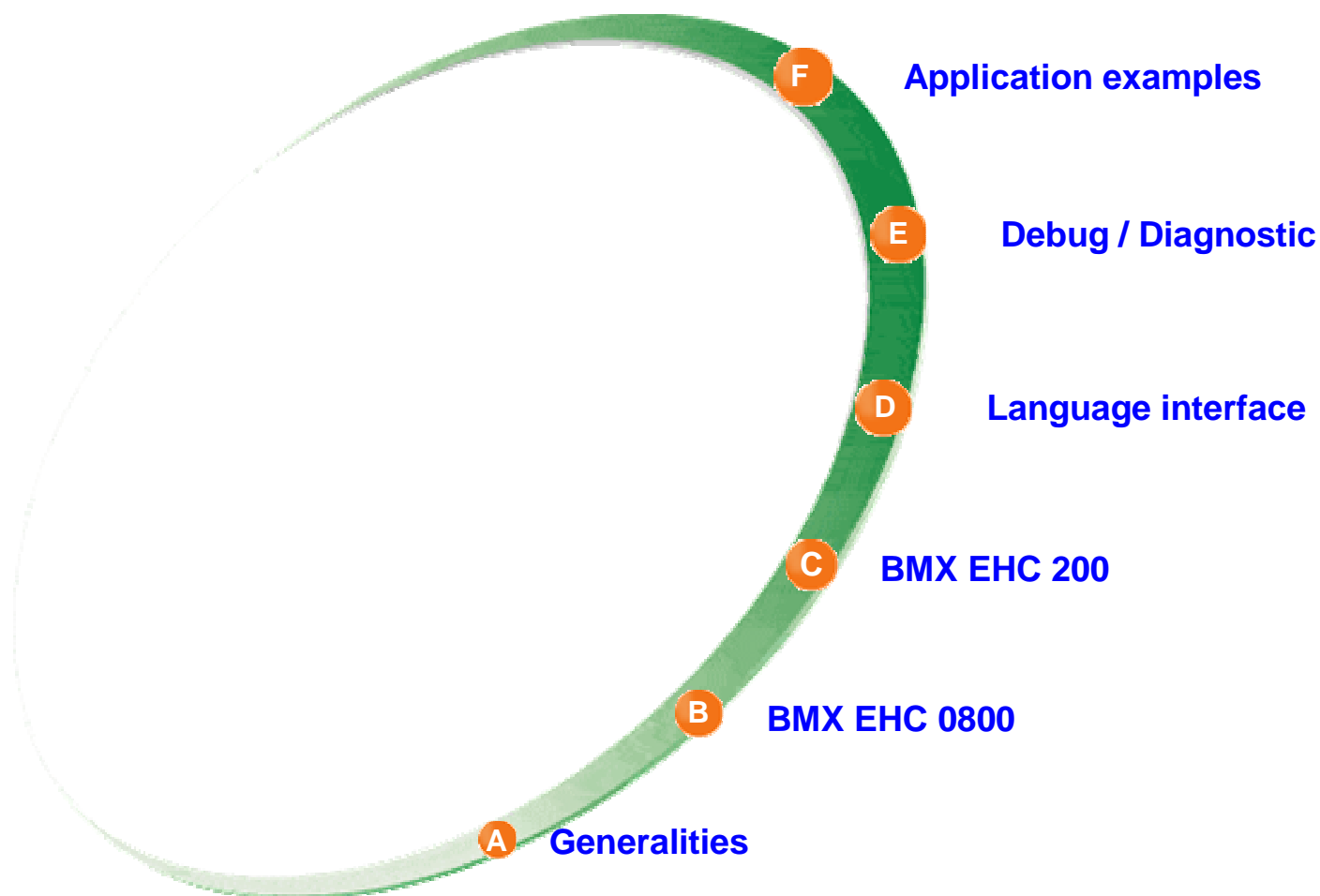


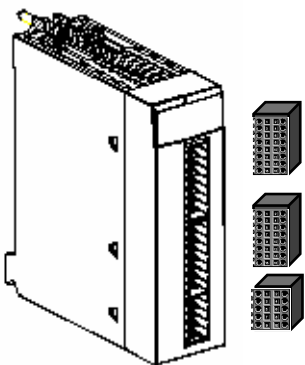
M5 - MODICON M340 : Counting Offer





A – Generalities

Count module BMX EHC 0200, BMX EHC 0800



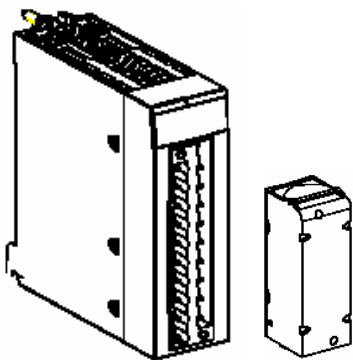
Counting modules are standard format modules that enable pulses from a sensor to be counted at a maximum frequency of 60 KHz (**BMX EHC 0200**) or 10 KHz (**BMX EHC 0800**).

Each module has several counting channels:

BMX EHC 0200

2 channels for the **BMX EHC 0200** module

8 channels for the **BMX EHC 0800** module



BMX EHC 0800

These modules may be installed in any available slot in a MODICON M340 PLC station rack.

Count module BMX EHC 0200, BMX EHC 0800

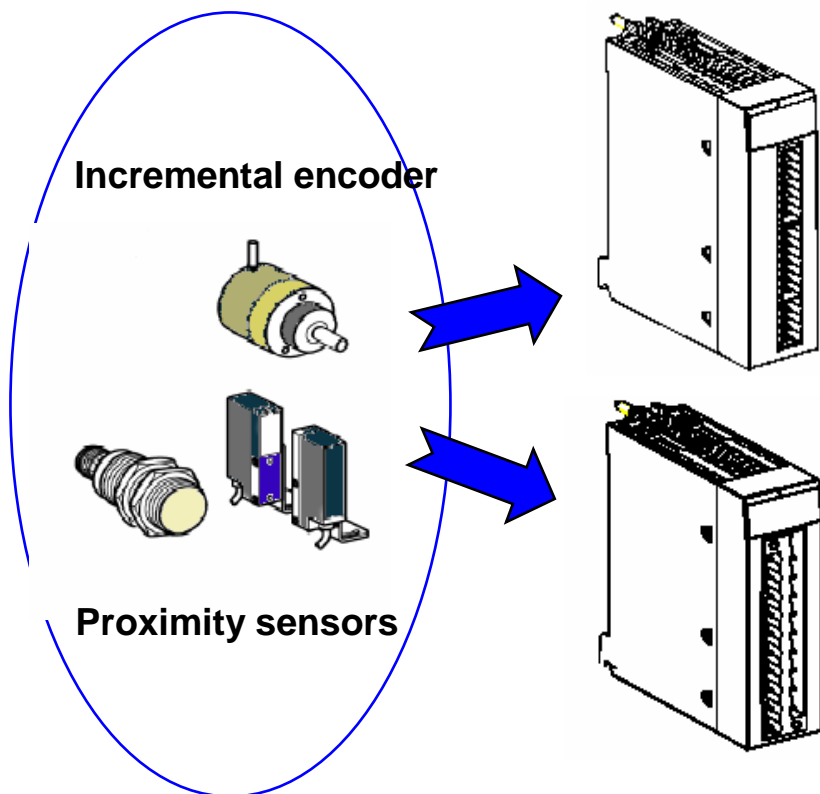
■ Sensors used on the channels

The sensor used on each channel can be:

- A 2 or 3 wire proximity sensor 24V.

When using a mechanical contact output, it is necessary to raise the channel's immunity in order to curb the closing bounces of the contact.

- An incremental signal encoder with 10-30 VDC output (Totem Pole encoder).



Count module BMX EHC 0200, BMX EHC 0800

■ At a Glance :

The counting modules can be installed in any available slot of a MODICON M340 configuration, on the condition that the following are used to the maximum:

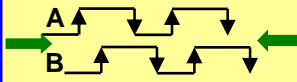
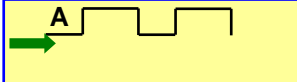
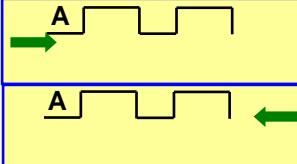
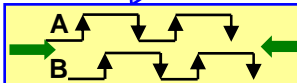
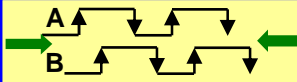
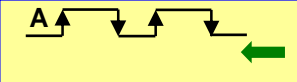
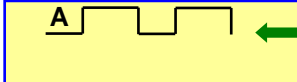
20 "application-specific" channels in a **BMX P34 1000** configuration.

36 "application-specific" channels in a **BMX P34 2010 / 2020 / 2030** configuration.

Each channel configured is seen by the processor like a channel used.

Count module BMX EHC 0200, BMX EHC 0800

■ At a Glance : The Counting functionalities

Mode	BMX EHC 0200 (32 bits)	BMX EHC 0800 (16 bits)
modulo loop counter mode (Up/Down counting mode on modulo)	Up / Down Counting between a modulo (InA,InB) 	
modulo loop counter mode (Up Counting mode on modulo)		Up Counting between a modulo (InA) 
Up / Down counting mode (Up/Down counting mode)		Up / Down Counting (InA) 
dual phase counting mode (Up / Down counting mode)		Up / Down Counting (InA, InB) 
free large counter mode (Up/Down counting mode)	Counting or Downcounting (InA,InB) 	
one shot counter mode (Down counting)	Downcounting (InA) 	Downcounting (InA) 

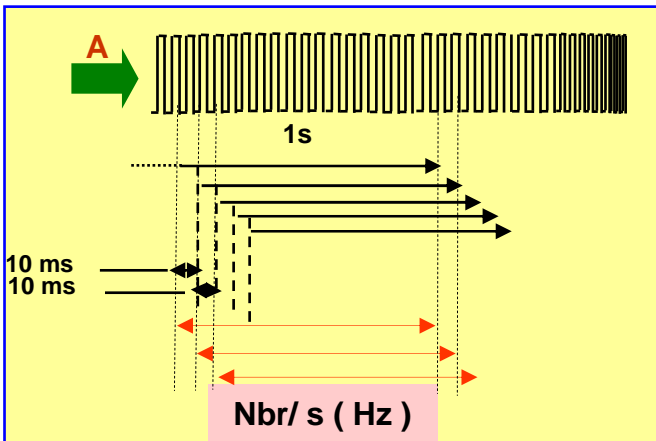
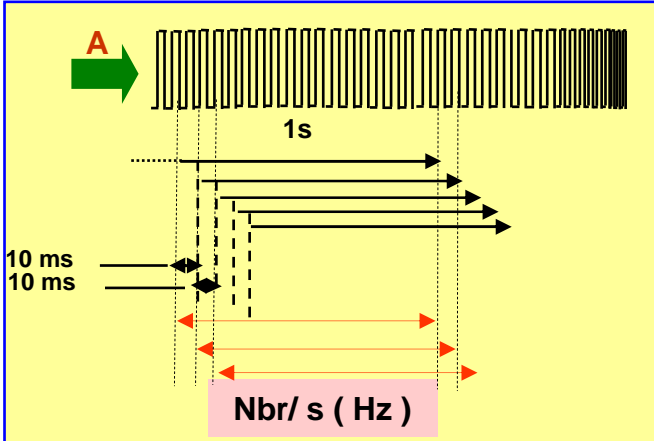
Count module BMX EHC 0200, BMX EHC 0800

■ At a Glance : The Counting functionalities

Mode	BMX EHC 0200 (32 bits)	BMX EHC 0800 (16 bits)
Event counting mode (event counting mode)	<p>Counting the pulse on InA (min 5μs) according with an internal timer</p>	<p>Counting the pulse on InA (min 50μs) according with an internal timer</p>

Count module BMX EHC 0200, BMX EHC 0800

■ At a Glance : The measuring functionalities (the more)

Mode	BMX EHC 0200 (32 bits)	BMX EHC 0800 (16 bits)
Frequency mode (frequency mode)	<p>On InA the module provide a frequency in Hz</p> 	<p>On InA the module provide a frequency in Hz</p> 

Count module BMX EHC 0200, BMX EHC 0800

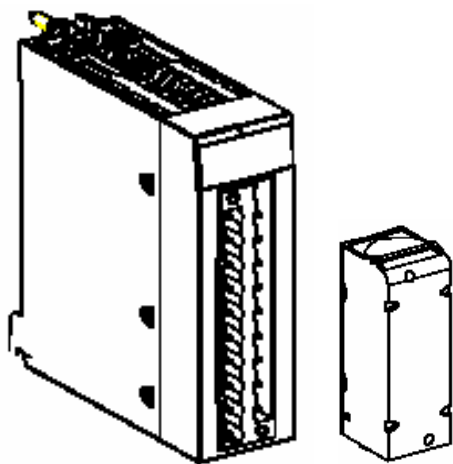
■ At a Glance : The measuring functionalities (the more)

Mode	BMX EHC 0200 (32 bits)	BMX EHC0 800 (16 bits)
Ratio 1 (Ratio between : InA and InB)	Ratio 1: is used to divide two frequencies (InA, InB) $(f(A)/f(B)) \times 1000$	
Ratio 2 (Difference between InA and InB)	Ratio 2: is used to subtract two frequencies (InA, InB) $f(A) - f(B)$	
Period measuring mode (Time between two event)	allows you to: - Time between two events. InA to InA - duration of an event. InA to InA	

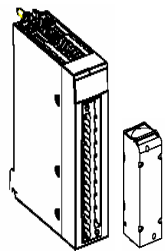
Count module BMX EHC 0200, BMX EHC 0800

■ At a Glance : **Pulse modulation (the more)**

Mode	BMX EHC 0200 (32 bits)	BMX EHC0 800 (16 bits)
Pulse width modulation	The module uses an internal clock generator to supply a periodic signal at the module's Q0 output.	



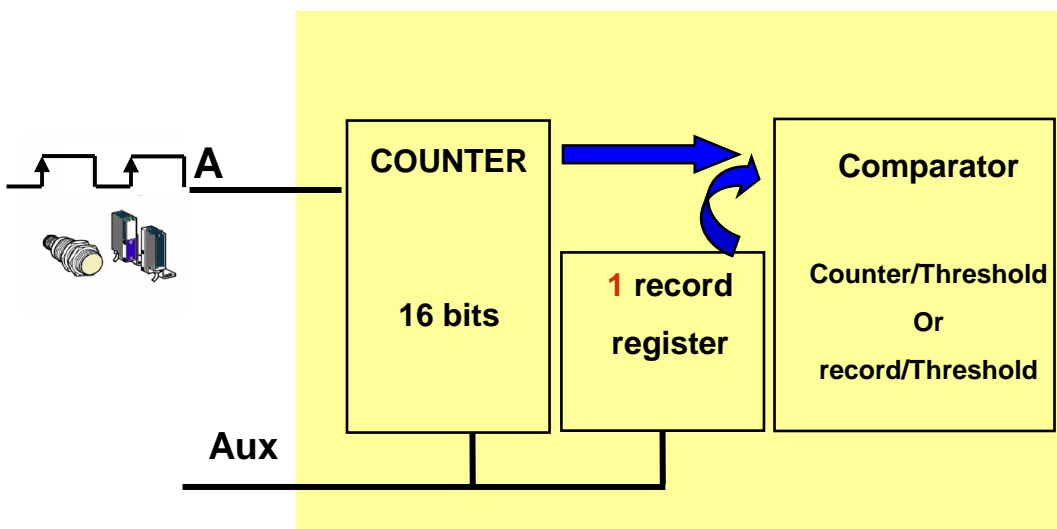
B – BMX EHC 0800

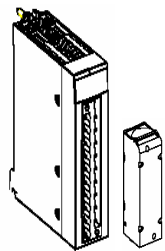


BMX EHC 0800

We can use this module in the following counting mode :

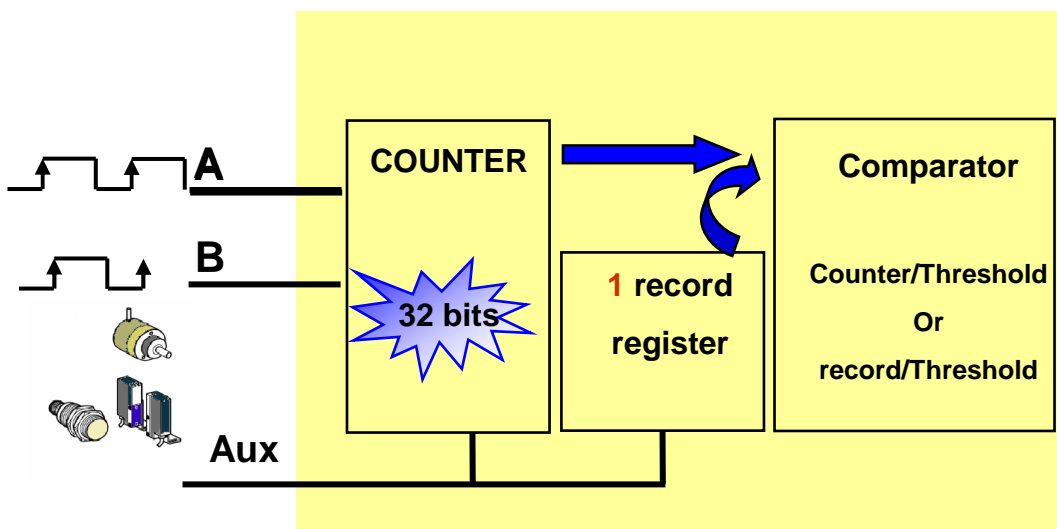
- **Up / down counting mode** (up/down counting)
Infinite count
- **One shot counter** (down counting)
Preset & start
- **Modulo loop counter mode** (up counting on modulo)
Reset & record
- **Event counting Mode**
Trigger in
- **Frequency Mode**
Scalling / Calibration / Fast adaptation
- **Up/down counting dual phase mode**
(up/down counting 32 bits)
Reset & record / Infinite encoder /
Slack delete





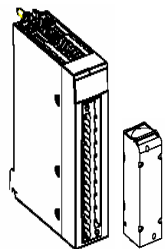
BMX EHC 0800

We can use this module in the following counting mode :



- **Up / down counting mode** (up/down counting)
Infinite encoder
- **One shot counter** (down counting)
Preset & start
- **Modulo loop counter mode** (up counting on modulo)
Reset & record
- **Event counting Mode**
Trigger in
- **Frequency Mode**
Scaling / Calibration / Fast adaptation
- **Up/down counting dual phase mode**
(up/down counting 32 bits)
Reset & record / Infinite encoder /
Slack delete

BMX EHC 0800: Hardware



BMX EHC 0800

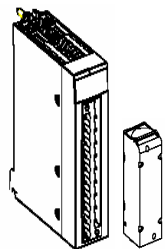
■ General Characteristics

Module type BMX EHC 0800		8 counting channels*
Size for the count		16 bits
Maximum frequency at counting inputs		10 K Hz
Input / Output Maximun by count channel	Input	2 inputs 24Vdc**
	Output	0
Power supply	Sensor supply voltage	19,2 30 Vdc
	Sensor supply current	40 mA max
Hot replacement		Yes (You need to ENABLE the channel)
Scan time of the module		5 ms

*** 1 Channel 32 bits used is equal to 2 Channels 16 bits**

**** In 32 bits**  **3 inputs**
**** In 16 bits**  **2 inputs**

BMX EHC 0800



■ INPUTs Characteristics

Module type		BMX EHC 0800	2 counting channels
Input by Channel			2 or 3 (According with the channels configuration) In A / In B / In AUX
Voltage			30 Vdc
In A / In B / In AUX	State 1	Voltage : > 11 V / 30 Vdc / Current : 10 mA (24Vdc)	
	State 0	Voltage : < 5 Vdc / Current : 10 mA	



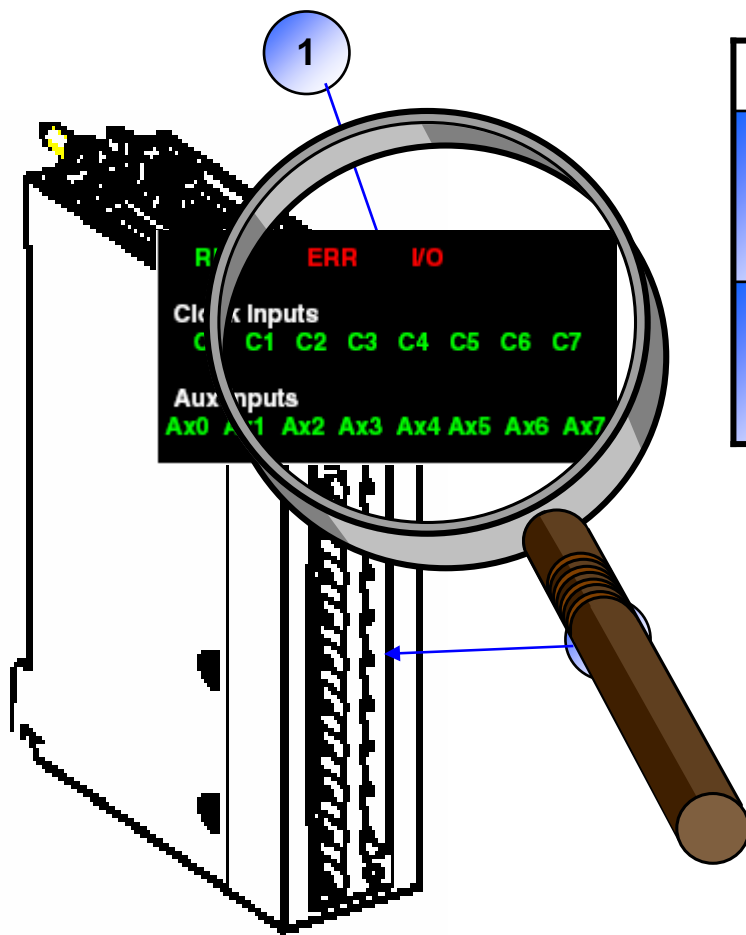
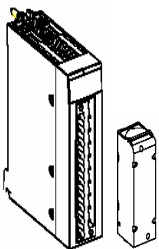
Why 2 or 3 inputs by channels ?

According with the Configuration the module 2 or 3 inputs will be used :

3 Inputs : **Counting mode dual phase** (32 bits) **In A, In B, In AUX**

2 Inputs : **All the other modes** (16 bits) **In A, In AUX**

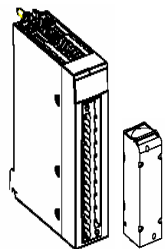
BMX EHC 0800



	Description
1	Module and channels state.
2	20-pin connector to connect all the counter sensors

■ The display in front of the module allows a quick diagnostic of the module, it is shared in two part :

- General information
- State of the I/O



BMX EHC 0800

RUN

ERR

I/O

Clock Inputs

C0 C1 C2 C3 C4 C5 C6 C7

Aux Inputs

Ax0 Ax1 Ax2 Ax3 Ax4 Ax5 Ax6 Ax7

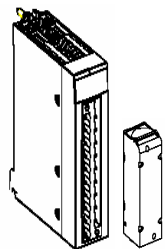
LEDs	ERR	RUN	I / O	C0	C1	C2	C3	C4	C5	C6	C7
Module out of service	●										
Fault on the module	✕	●	✕								
Module not configured	F ●	✕	●								
Module lost communication	✕	F ●									
Input Vcc Fault (all)	●	✕	✕	S ●	→						
The flashing Channel(s) has(ve) a ajusting fault	●	✕	✕	S ●	→						
Operationnal mode OK	✕	●	●								

On
✕

Quick Flashing
●

Slow Flashing
●

Off
●



BMX EHC 0800

RUN	ERR	I/O					
Clock Inputs							
C0	C1	C2	C3	C4	C5	C6	C7
Aux Inputs							
Ax0	Ax1	Ax2	Ax3	Ax4	Ax5	Ax6	Ax7

LEDs	ERR	RUN	I/O	C0 or Ax0	C1 or Ax1	C2 or Ax2	C3 or Ax3	C4 or Ax4	C5 or Ax5	C6 or Ax6	C7 or Ax7
All channels are operationnal	●	×	●								
Voltage on C0 or Ax0	●	×	●	×							
Voltage on C1 or Ax1	●	×	●		×						
Voltage on C2 or Ax2	●	×	●			×					
Voltage on C3 or Ax3	●	×	●				×				
Voltage on C4 or Ax4	●	×	●					×			
Voltage on C5 or Ax5	●	×	●						×		
Voltage on C6 or Ax6	●	×	●							×	
Voltage on C7 or Ax7	●	×	●								×

On
×

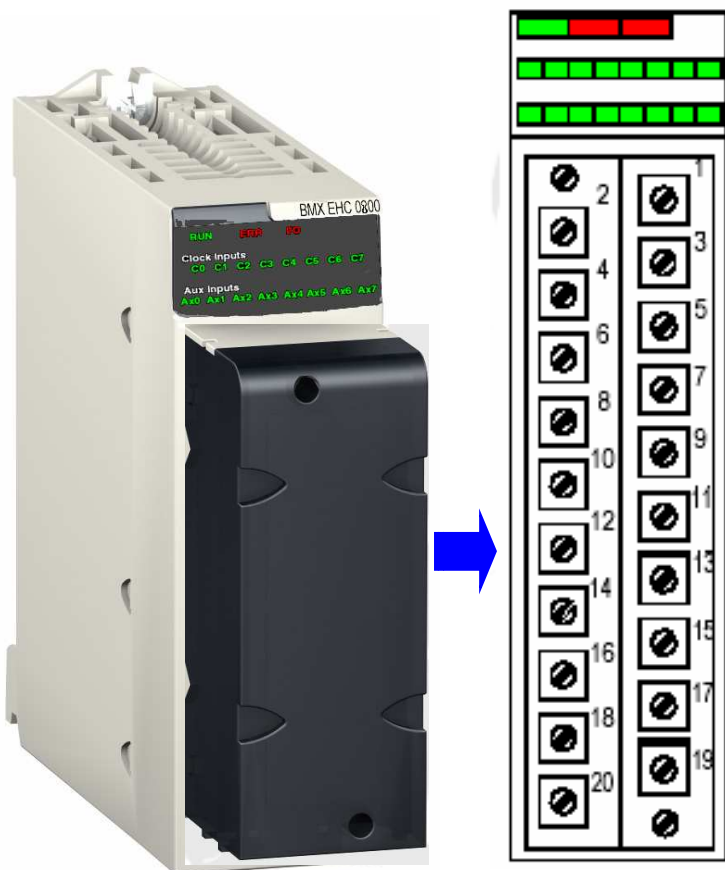
Quick Flashing
●

Slow Flashing
●

Off
●

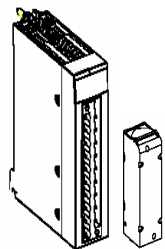
BMX EHC 0800

■ Wiring



IN_A input channel 0	2	1	IN_AUX input Channel 0
IN_A input channel 1	4	3	IN_AUX input channel 1 or IN_B input channel 0
IN_A input channel 2	6	5	IN_AUX input channel 2
IN_A input channel 3	8	7	IN_AUX input channel 3 or IN_B input channel 2
IN_A input channel 4	10	9	IN_AUX input channel 4
IN_A input channel 5	12	11	IN_AUX input channel 5 or IN_B input channel 4
IN_A input channel 6	14	13	IN_AUX input channel 6
IN_A input channel 7	16	15	IN_AUX input channel 7 or IN_B input channel 6
Vcc + Sensors supply	18	17	Vcc + Sensors supply
Ground	20	19	Ground

BMX EHC 0800: Software



BMX EHC 0800

■ Configuration : Module

8 channel generic counter

BMX EHC 0800

- Counter 0
- Counter 1
- Counter 2
- Counter 3
- Counter 4
- Counter 5
- Counter 6
- Counter 7

I/O objects

I/O variable creation

Prefix for name:

Type:

Create

Objects

Channel: ☒ %CH

Configuration: ☒ %KW ☒ %KD ☒ %KF

System: ☒ %MW

Parameter: ☒ %MW ☒ %MD ☒ %MF

Command: ☒ %MW ☒ %MD ☒ %MF

Implicits: ☒ %I ☒ %IW ☒ %ID ☒ %IF ☒ %IERR

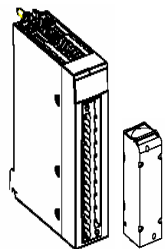
☒ %Q ☒ %QW ☒ %QD ☒ %QF

Update

	Address	Name
1	%CH0.1.MOD	ehc800
2	%IO.1.MOD.ERR	ehc800.MOD_ERROR
3	%MW0.1.MOD	ehc800.EXCH_STS
4	%MW0.1.MOD.1	ehc800.EXCH_RPT
5	%MW0.1.MOD.2	ehc800.MOD_FLT

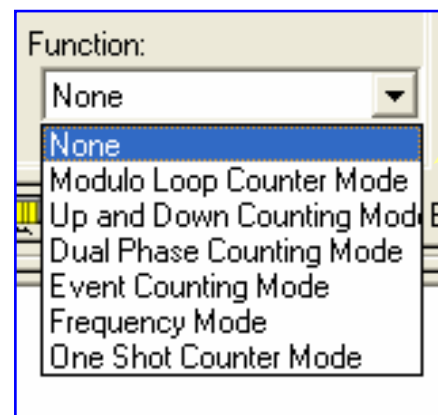
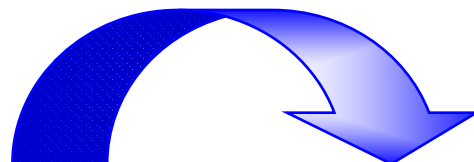
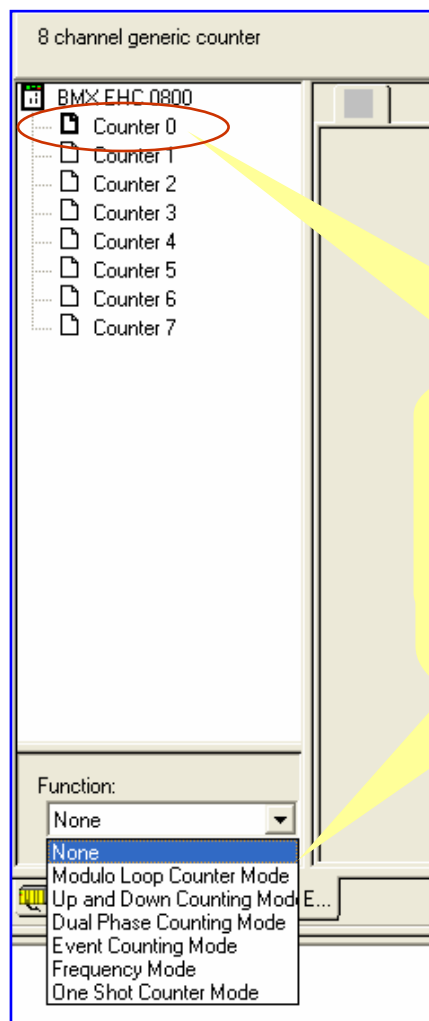
The possibility to manage the I/O object

With

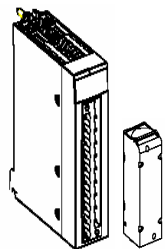


BMX EHC 0800

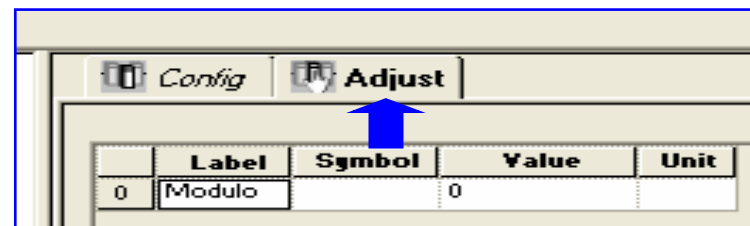
■ Configuration : Channel



BMX EHC 0800



■ Configuration : Channel



8 channel generic counter

Up Counting between 0 and modulo -1 (InA, InAux)

BMX EHC 0800

- Counter 0 - Modulo Loop Counter Mode
- Counter 1
- Counter 2
- Counter 3
- Counter 4
- Counter 5
- Counter 6
- Counter 7

Function: Modulo Loop Counter Mode

Task: MAST

Position **record** and **reset** On a raising or falling edge

Config Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input AUX Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Scaling Factor		1	
4	Synchro Edge		Rising edge on AUX	
5	Event		Disable	
6	Event Number			

Modulo-1

0

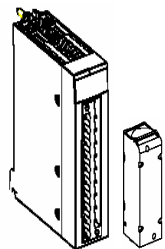
Valid sync

Aux

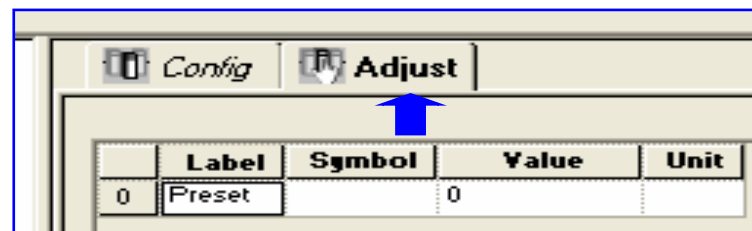
OT

RECORD /RESET

BMX EHC 0800



■ Configuration : Channel



8 channel generic counter

Up / Down counting (-32767 to 32768) (InA, InAux)

BMX EHC 0800

- Counter 0 - Up and Down Counting Mode
- Counter 1
- Counter 2
- Counter 3
- Counter 4
- Counter 5
- Counter 6
- Counter 7

Aux = 1 the counter increase.
Aux = 0 the counter decrease

Function:
 Up and Down Counting Mode

Task:
 MAST

Config Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input AUX Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Scaling Factor		1	
4	Counting Behavior		Lock on limits	
5	Event		Disable	
6	Event Number			

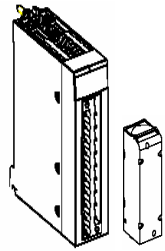
A

Aux

32768

-32767

BMX EHC 0800



■ Configuration : Channel

Config Adjust				
	Label	Symbol	Value	Unit
0	Preset		0	
1	Hysteresis (slack)		0	

8 channel generic counter Up / Down counting 32 bits (-2147483648 to 2147483647) (InA,InB,InAux)

BMX EHC 0800

- Counter 0 - Dual Phase Counting Mode
- Counter 1
- Counter 2
- Counter 3
- Counter 4
- Counter 5
- Counter 6
- Counter 7

Function: Dual Phase Counting Mode

Task: MAST

Config Adjust				
	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input B Filter		Without	
2	Input AUX Filter			
3	Input Supply Filter			
4	Counting Interval			
5	Scaling Factor			
6	Synchro Edge			
7	Counting Behaviour			
8	Event			
9	Event Number			

2exp31

0

- 2exp31

slack

Preset

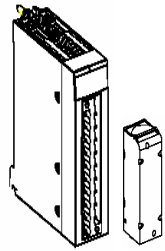
-2exp31

Aux

record/
PRESET

Eg : In adjust mode we may provide a value in **Hysteresis (slack)** in order to compensate a Slack when we reverse the counting sens

BMX EHC 0800



■ Configuration : Channel

Config Adjust

	Label	Symbol	Value	Unit
0	Preset		0	

8 channel generic counter

Down counting (InA, InAux)

BMX EHC 0800

- Counter 0 - One Shot Counter Mode
- Counter 1
- Counter 2
- Counter 3
- Counter 4
- Counter 5
- Counter 6

In this function the counter is Preset to an adjusting value as soon as a raising edge is present on the AUX input if VALID SYNC = 1, when the value = 0 we will wait the next raising edge on AUX

Function: One Shot Counter Mode

Task: MAST

Config Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input AUX Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Scaling Factor		1	
4	Synchro Edge		Rising edge on AUX	
5	Event		Disable	
6	Event Number			

A

Preset

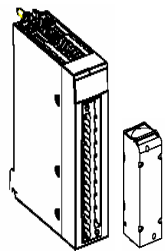
0

Valid sync

Aux

PRESET / START

Stop



BMX EHC 0800

■ Configuration : Channel

8 channel generic counter

Event Counting mode (InA, InAux)

BMX EHC 0800

- Counter 0 - Event Counting Mode
- Counter 1
- Counter 2
- Counter 3
- Counter 4
- Counter 5
- Counter 6
- Counter 7

The minimum width for **A** is 50µs

Function: Event Counting Mode

Task: MAST

Config

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input AUX Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Synchro Edge		Rising edge on AUX	
4	Time Base		1s	
5	Event		Disable	
6	Event Number			

A

Valid sync

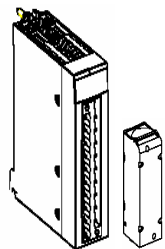
Aux

TRIGGER

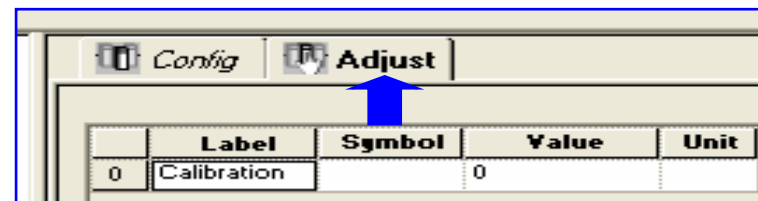
Nbr event

t

BMX EHC 0800



■ Configuration : Channel



8 channel generic counter

Frequency mode (InA)

BMX EHC 0800

- Counter 0 - Frequency Mode
- Counter 1
- Counter 2
- Counter 3
- Counter 4
- Counter 5
- Counter 6
- Counter 7

The counter is refresh is 10 ms

If the frequency increase or decrease suddenly (+/- 15%) the module will calculate the new frequency each 100 ms

Function: Frequency Mode

Task: MAST

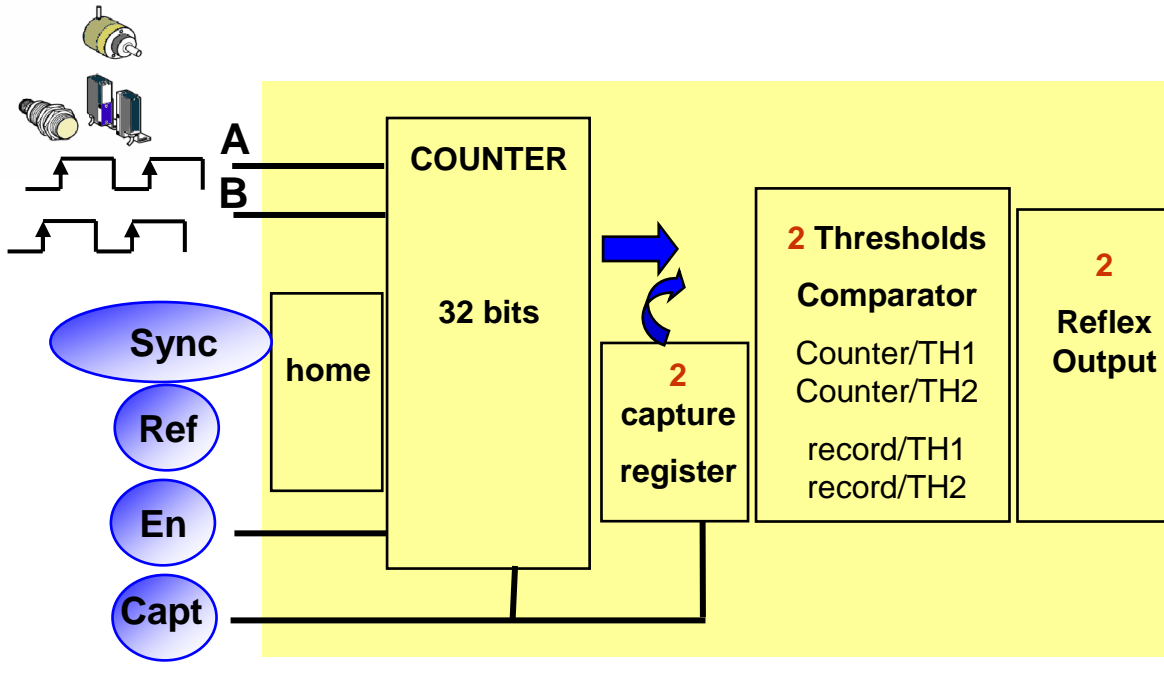
Config Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input Supply Fault		General IO Fault	
2	Scaling Factor		1	
3	Event		Disable	
4	Event Number			



C – BMX EHC 0200

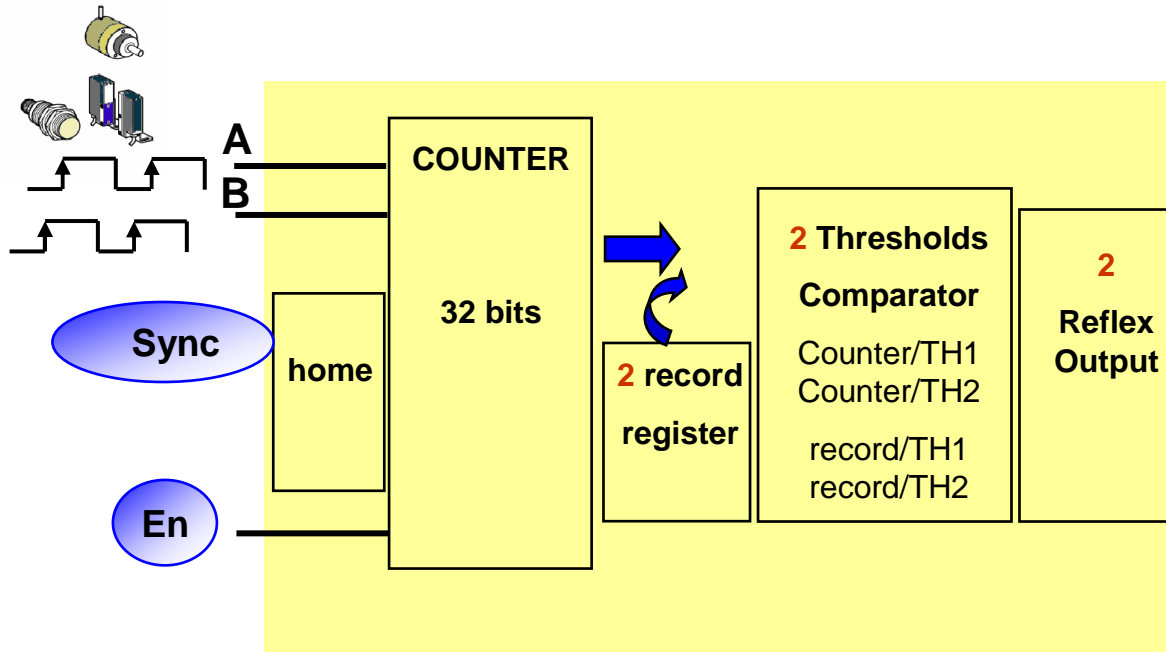
BMX EHC 0200



We can use this module in the following counting mode :

- **free large counter mode** (Up / down counting mode)
 - Infinite encoder / Slack delete /
 - Scalling
 - Homing & record **Sync** **Ref**
 - Learning **Capt**
- **modulo loop counter mode** (Up/Down counting modulo)
 - Reset & record **Sync**
- **One shot counter mode** (Down counting mode)
 - Preset & Start in **Sync** **Ref**
- **Event Mode**
 - Trigger in **Sync**

BMX EHC 0200



We can use this module in the following mesuring mode :

- **Frequency mode**
 - Scaling / Calibration / Fast adaptation
- **Ratio1 mode** (Ratio between InA and InB)
 - Calibration / Alarm
- **Ratio 2 mode** (Difference between InA and InB)
 - Calibration / Alarm
- **Period mode**
 - Gate in **Sync** (blue oval)
 - Alarm

BMX EHC 0200: Hardware

BMX EHC 0200



■ General Characteristics

Module type		BMX EHC 0200	2 counting channels
Maximum frequency at counting inputs			60 K Hz
Input / Output Maximum by count channel	Input	6 inputs 24Vdc	
	Output	2 Outputs 24Vdc	
Power supply	Sensor supply voltage	19,2 30 Vdc	
	Sensor supply current	40 mA max	
	Actuator supply current	500 mA / output - 2 A / Module	
Power distribution to sensors			Yes (Short circuit limit 300 mA)
Hot swap			Yes (You need to ENABLE the channel)
Reflex time on OUTPUT (Excepted COUNT LOW and COUNT HIGH)			500 µs
Reflex time on OUTPUT COUNT LOW or COUNT HIGH			200 µs without jitter
Scan time of the module			1 ms

BMX EHC 0200



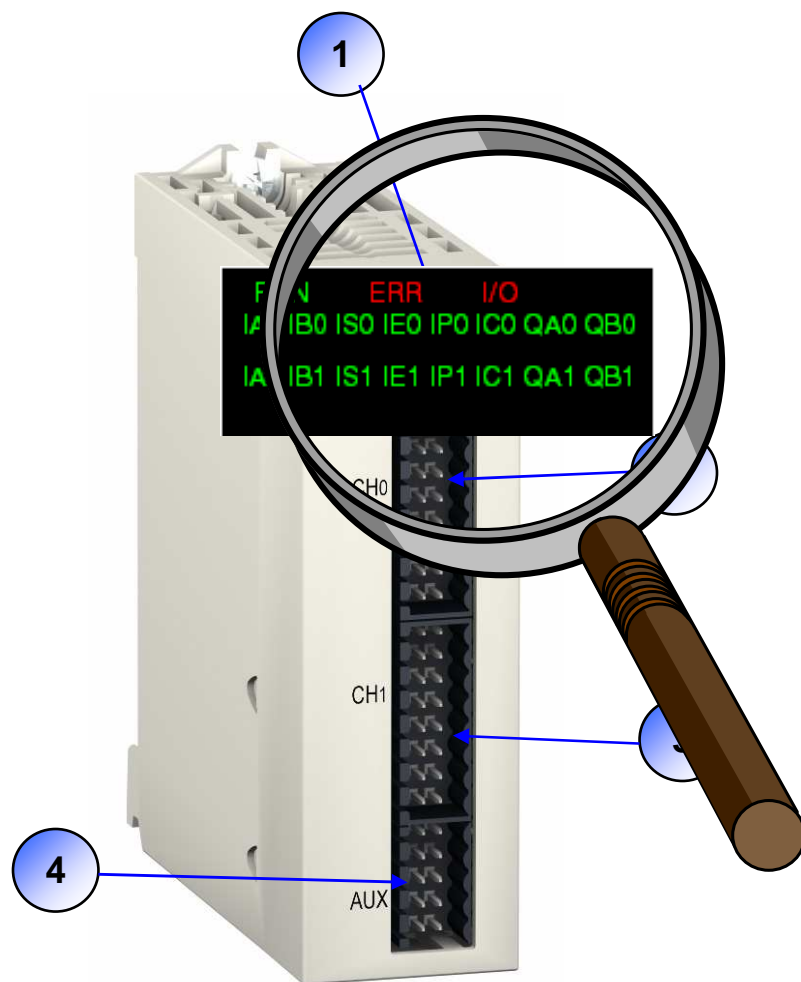
■ INPUTs Characteristics

Module type BMX EHC 0200		2 counting channels
Input by Channel		6 In A / In B / In SYNC / In ENABLE, In REFERENCE / In CAPTURE
Voltage		30 Vdc
In A / In B / In SYNC / In ENABLE In REFERENCE / In CAPTURE	State 1	Voltage : > 11 Vdc TO 30 Vdc / Current : 6 Ma (24Vdc)
	State 0	Voltage : < 5 Vdc / Current : < 1,5 ma

■ OUTPUTs Characteristics

Module type BMX EHC 0200		2 counting channels
Output by Channel		2
Voltage		19,230 Vdc
Current max		0.5 A by channel / 1 A for the module
Leakage current at state 0		0.1 mA
Voltage drop at state 1		3 Vdc max

BMX EHC 0200



	Description
1	Module and channels state.
2	16-pin connector to connect the counter 0 sensors
3	16-pin connector to connect the counter 1 sensors
4	10-pin connector to connect: <ul style="list-style-type: none"> - Auxiliary outputs - Power supply

■ The display in front of the module allows a quick diagnostic of the module, it is shared in two part :

- General informations
- State of the I/O



BMX EHC 0200

RUN ERR I/O
 IA0 IB0 IS0 IE0 IP0 IC0 QA0 QB0
 IA1 IB1 IS1 IE1 IP1 IC1 QA1 QB1

LEDs	ERR	RUN	I / O	Q0	Q1	Ic	Ip	Ie	Is	IB	IA
Module out of service	●										
Fault on the module	✕	●									
Module not configured	F ●	✕	●								
Module lost communication	✕	F ●									
Input Vcc Fault (all)	●	✕	✕			S ●	→				
Output Vcc Fault (all)	●	✕	✕	S ●	→						
Q0 short circuit	●	✕	✕	F ●							
Q1 short circuit	●	✕	✕		F ●						
The flashing Channel(s) has(ve) a adjusting fault	✕	✕	●	S ●							
Operationnal mode OK	●	✕	●								

On
✕

Quick Flashing
●

Slow Flashing
●

Off
●



BMX EHC 0200

RUN ERR I/O
 IA0 IB0 IS0 IE0 IP0 IC0 QA0 QB0
 IA1 IB1 IS1 IE1 IP1 IC1 QA1 QB1

LEDs	ERR	RUN	I / O	Q0	Q1	Ic	Ip	Ie	Is	IB	IA
All channels are operationnal	●	×	●								
Voltage on Q0	●	×	●	×							
Voltage on Q1	●	×	●		×						
Voltage on Ic	●	×	●			×					
Voltage on Ip	●	×	●				×				
Voltage on Ie	●	×	●					×			
Voltage on Is	●	×	●						×		
Voltage on Ib	●	×	●							×	
Voltage on Ia	●	×	●								×

On



Quick Flashing



Slow Flashing

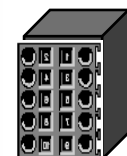
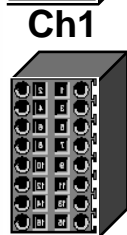
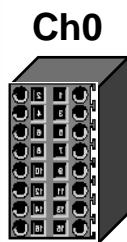


Off



BMX EHC 0200

■ Wiring



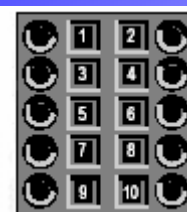
(X2)



(X2)

Pin number	Symbol
1 . 2 . 7 . 8	24V Sensor
5 . 6 . 13 . 14	Gnd Sensor
15 . 16	Ground
3	Input A
4	Synchro Input
9	Input B
10	Enable Input
11	Ref Input
12	Capt Input

(X1)



(X1)

Pin number	symbol
1	24 V _ IN
2	GND _ IN
5	Q1 ch0
6	Q0 ch0
7	Q1 ch1
8	Q0 -ch1
9	24V _ OUT
10	GND _ OUT

BMX EHC 0200: Software

BMX EHC 0200



■ Configuration : Module

2 channel generic counter

BMX EHC 0200

- Counter 0
- Counter 1

I/O objects

I/O variable creation

Prefix for name:

Type:

Comment:

Create

	Address	Name
1	%CH0.1.MOD	ehc800
2	%IO.1.MOD.ERR	ehc800.MOD_ERROR
3	%MW0.1.MOD	ehc800.EXCH_STS
4	%MW0.1.MOD.1	ehc800.EXCH_RPT
5	%MW0.1.MOD.2	ehc800.MOD_FLT

I/O Objects

Configuration:

System: ☒ %KW ☒ %KD ☒ %KF

Status: ☒ %MW

Parameter: ☒ %MW ☒ %MD ☒ %MF

Command: ☒ %MW ☒ %MD ☒ %MF

Implicits: ☒ %I ☒ %IW ☒ %ID ☒ %IF ☒ %IERR

☒ %Q ☒ %QW ☒ %QD ☒ %QF

Update

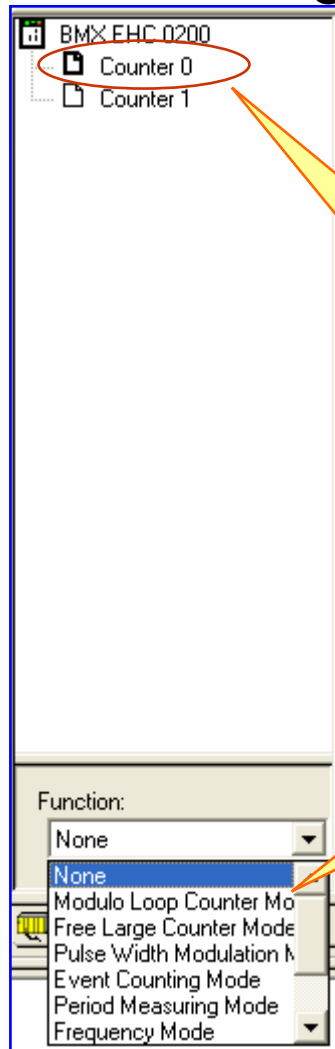
The possibility to manage the I/O object

With ge
abo

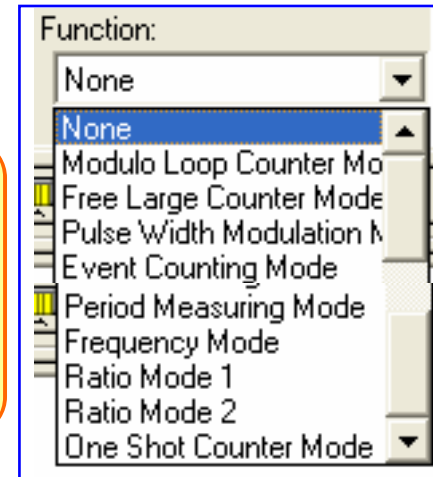
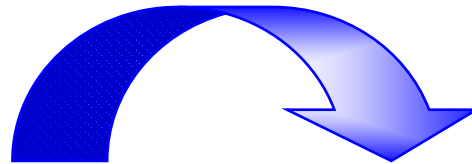
BMX EHC 0200



■ Configuration : Channel



You select a channel then it's possible to define the function associated



According to the function selected a dedicated configuration screen will be open

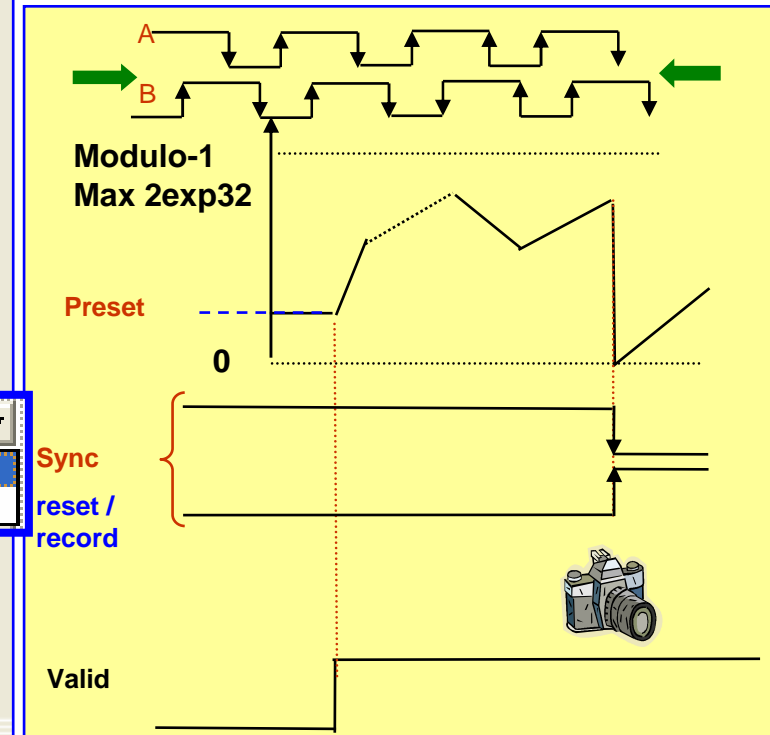
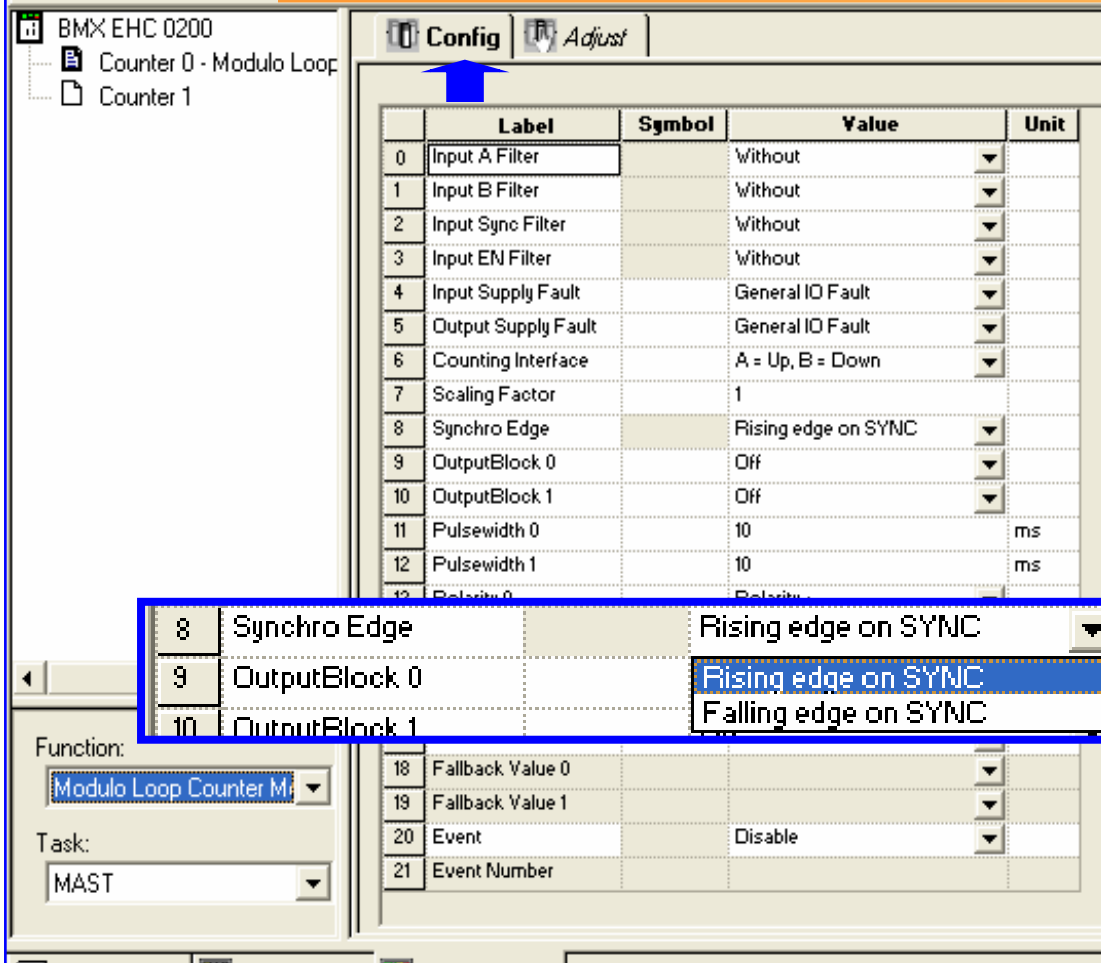
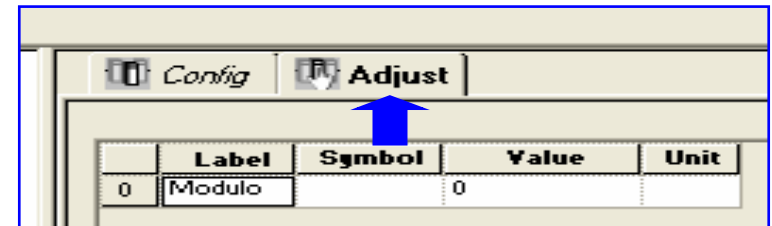
BMX EHC 0200

■ Configuration : Channel

2 channel generic counter

Up / Down counting between 0 and modulo -1

(InA, inB, InAux)



BMX EHC 0200



■ Configuration : Channel

Config		Adjust		
	Label	Symbol	Value	Unit
0	Preset		0	
1	Hysteresis (slack)		0	

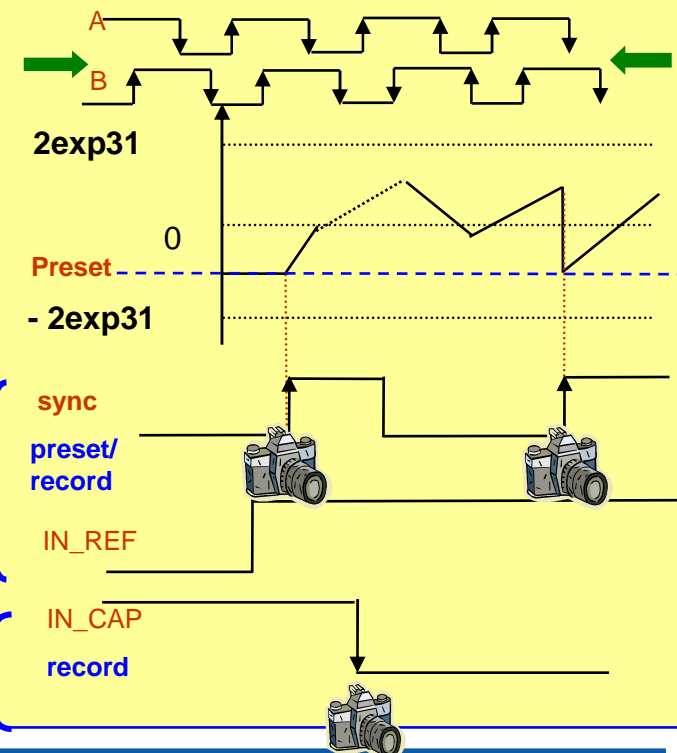
2 channel generic counter

Up / Down counting (-2147483648 to 2147483647)

(InA, InB, InAux)

BMX EHC 0200		Config		
Counter 0 - Free Large Counter Mode				
Counter 1				
	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input B Filter		Without	
2	Input Sync Filter		Without	
3	Input EN Filter		Without	
4	Input REF Filter		Without	
5	Input CAP Filter		Without	
6	Input Supply Fault		General IO Fault	
7	Output Supply Fault		General IO Fault	
8	Counting Interface		A = Up, B = Down	
9	Scaling Factor		1	
10	Preset Mode		Rising Edge on SYNC	
11	Counting Behavior		Lock on limits	
12	Capture 0 Setting		Preset condition	

10	Preset Mode	Rising Edge on SYNC and REF = 1
11	Counting Behavior	Rising Edge on SYNC Rising Edge on REF Rising Edge on SYNC and REF = 1
12	Capture 0 Setting	1st Rising Edge on SYNC after REF = 1 1st Rising Edge on SYNC after REF = 0
13	OutputBlock 0	
14	OutputBlock 1	
12	Capture 0 Setting	Falling edge in CAP
13	OutputBlock 0	Preset condition
14	OutputBlock 1	Falling edge in CAP



BMX EHC 0200



■ Configuration : Channel

Config Adjust				
	Label	Symbol	Value	Unit
0	Preset		0	
1	Hysteresis (slack)		0	

2 channel generic counter

Up / Down counting (-2147483648 to 2147483647)

(InA, InB, InAux)

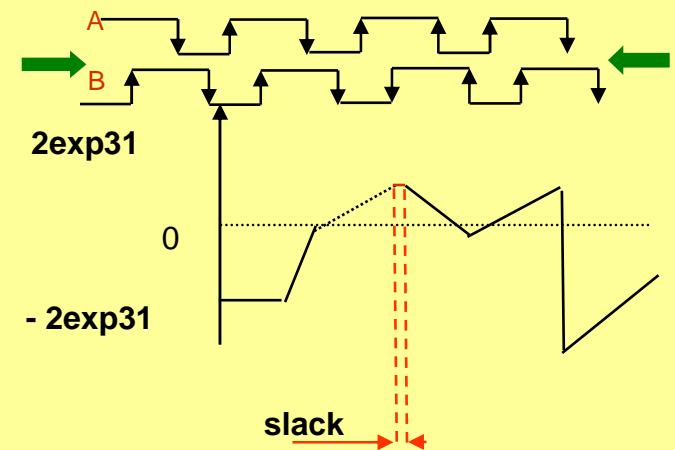
BMX EHC 0200				
Counter 0 - Free Large Counter Mode				
Counter 1				
Config Adjust				
	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input B Filter		Without	
2	Input Sync Filter		Without	
3	Input EN Filter		Without	
4	Input REF Filter		Without	
5	Input CAP Filter		Without	
6	Input Supply Fault		General IO Fault	
7	Output Supply Fault		General IO Fault	
8	Counting Interface		A = Up, B = Down	
9	Scaling Factor		1	
10	Preset Mode		Rising Edge on SYNC	
11	Counting Behavior		Lock on limits	
12	Capture 0 Setting		Preset condition	
13	OutputBlock 0		Off	
14	OutputBlock 1		Off	
15	Pulsewidth 0		10	ms
16	Pulsewidth 1		10	ms
17	Polarity 0		Polarity +	
18	Polarity 1		Polarity +	
19	Fault Recovery		Latched off	
20	Fallback 0		Without	
21	Fallback 1		Without	
22	Fallback Value 0			
23	Fallback Value 1			

Function:

Free Large Counter Mode

Task:

MAST



Eg : In adjust mode we may provide a value in **Hysteresis (slack)** in order to compensate a Slack when we reverse the counting sens

BMX EHC 0200



■ Configuration : Channel

Config

Adjust

	Label	Symbol	Value	Unit
0	Preset		0	

2 channel generic counter

Down counting

(InA, InAux)

BMX EHC 0200

Counter 0 - One Shot Counter Mode

Counter 1

Config

Adjust

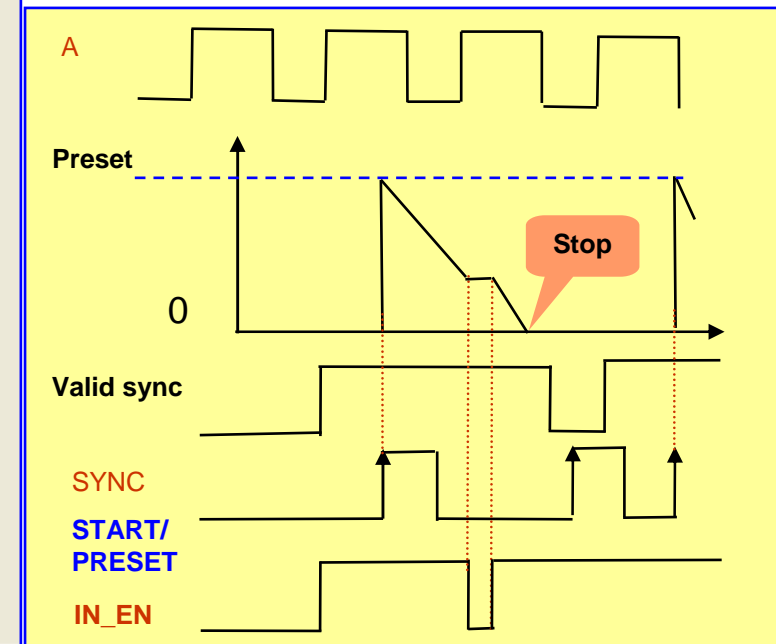
	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input Sync Filter		Without	
2	Input EN Filter		Without	
3	Input Supply Fault		General IO Fault	
4	Output Supply Fault		General IO Fault	
5	Scaling Factor		1	
6	Synchro Edge		Rising edge on SYNC	
7	OutputBlock 0		Off	
8	OutputBlock 1		Off	
9	Pulsewidth 0		10	ms
10	Pulsewidth 1		10	ms
11	Polarity 0		Polarity +	
12	Polarity 1		Polarity +	
13	Fault Recovery		Latched off	
14	Fallback 0		Without	
15	Fallback 1		Without	
16	Fallback Value 0			
17	Fallback Value 1			
18	Event		Disable	
19	Event Number			

Function:

One Shot Counter Mode

Task:

MAST



BMX EHC 0200

Same function than **BMX EHC 0800**

■ Configuration : Channel

2 channel generic counter

Event counting mode

(InA, InAux)

BMX EHC 0200

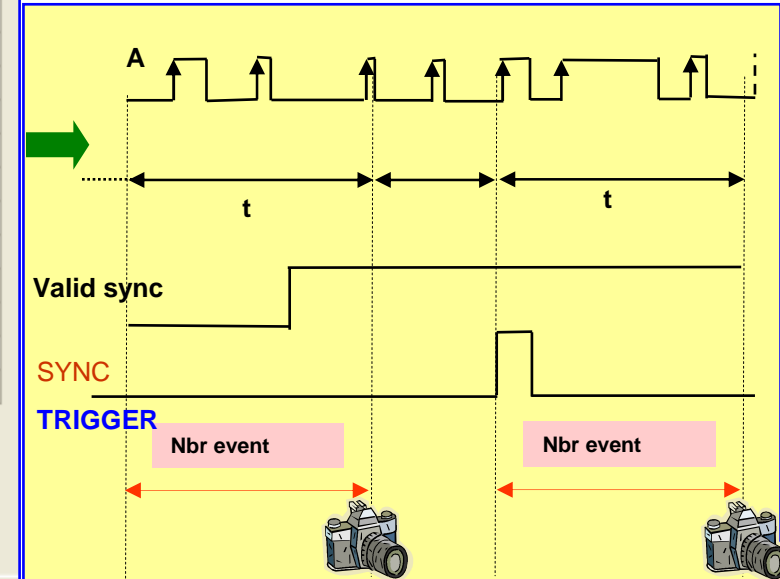
- Counter 0 - Event Counting Mode
- Counter 1

Config

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input Sync Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Output Supply Fault		General IO Fault	
4	Synchro Edge		Rising edge on SYNC	
5	Time Base		1 s	
6	OutputBlock 0		Off	
7	OutputBlock 1		Off	
8	Pulsewidth 0		10	ms
9	Pulsewidth 1		10	ms
10	Polarity 0		Polarity +	
11	Polarity 1		Polarity +	
12	Fault Recovery		Latched off	
13	Fallback 0		Without	
14	Fallback 1		Without	
15	Fallback Value 0			
16	Fallback Value 1			
17	Event		Disable	
18	Event Number			

Function: Event Counting Mode

Task: MAST



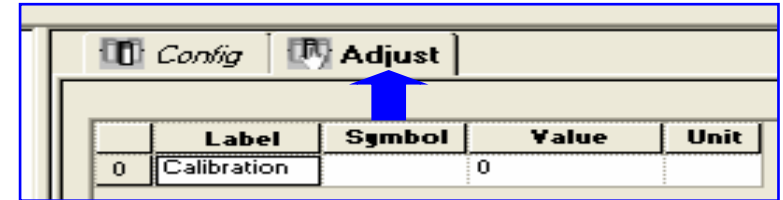
BMX EHC 0200



■ Configuration : Channel

2 channel generic counter Frequency mode

(InA, InAux)



BMX EHC 0200

- Counter 0 - Frequency Mode
- Counter 1

Config Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input Supply Fault		General IO Fault	
2	Output Supply Fault		General IO Fault	
3	Scaling Factor		1	
4	OutputBlock 0		Off	
5	OutputBlock 1		Off	
6	Pulsewidth 0		10	ms
7	Pulsewidth 1		10	ms
8	Polarity 0		Polarity +	
9	Polarity 1		Polarity +	
10	Fault Recovery		Latched off	
11	Fallback 0		Without	
12	Fallback 1		Without	
13	Fallback Value 0			
14	Fallback Value 1			
15	Event		Disable	

Function:

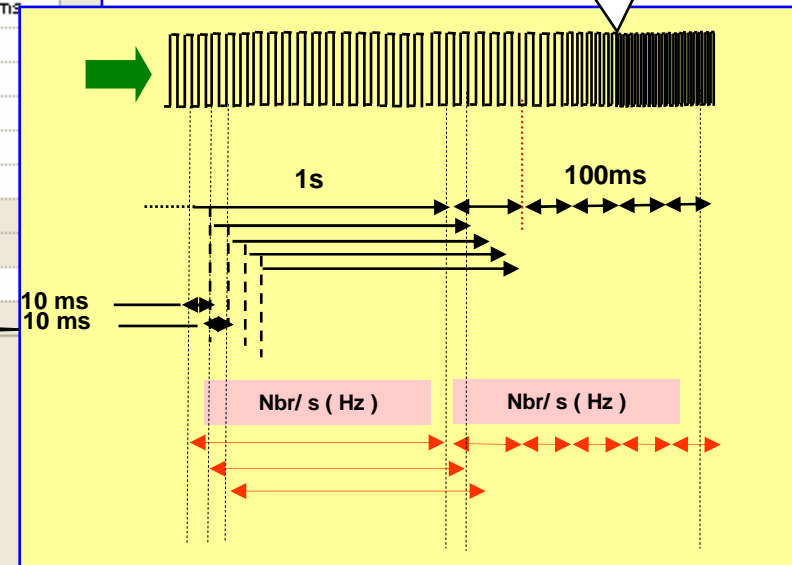
Frequency Mode

MAST

The counter is refresh is 10 ms

Same function than **BMX EHC 0800**

At the beginning or If the frequency increase or decrease suddenly ($\pm 15\%$) the module will calculate the new frequency after 100 ms



BMX EHC 0200



■ Configuration : Channel

2 channel generic coun

Period mode

(InA, InAux)

BMX EHC 0200

Counter 0 - Period Measuring Mode

Counter 1

Config

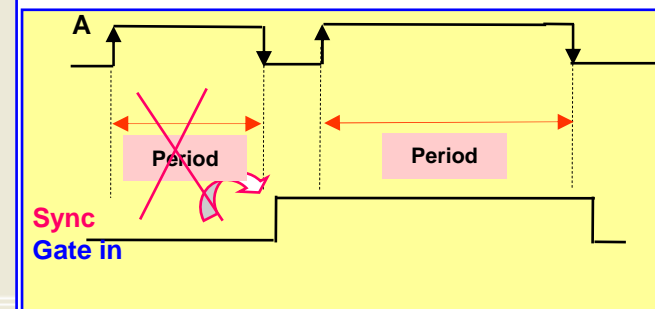
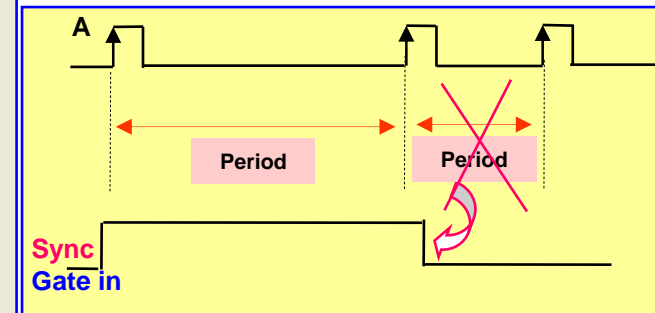
	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input Sync Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Output Supply Fault		General IO Fault	
4	Resolution		100 μ s	
5	Mode		Edge to Edge on A	
6	Time Out		2147483647	
7	OutputBlock 0		Off	
8	OutputBlock 1		Off	

Event configuration

5	Mode	Edge to Edge on A
6	Time Out	Edge to Edge on A
7	OutputBlock 0	Edge to Opposite on A

Unit used for the period

4	Resolution	100 μ s
5	Mode	1 μ s
6	Time Out	100 μ s
		1 ms



BMX EHC 0200



■ Configuration : Channel

2 channel generic co Ratio between InA and InB

(InA, InB)

Config Adjust

	Label	Symbol	Value	Unit
0	Calibration		0	

BMX EHC 0200

- Counter 0 - Ratio Mode
- Counter 1

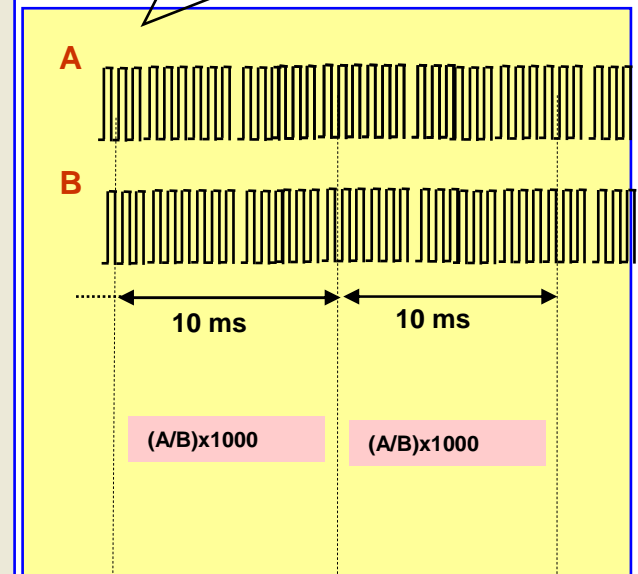
Config Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input B Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Output Supply Fault		General IO Fault	
4	Absolute Limit		60000000	
5	OutputBlock 0		Off	
6	OutputBlock 1		Off	
7	Pulsewidth 0		10	ms
8	Pulsewidth 1		10	ms
9	Polarity 0		Polarity +	
10	Polarity 1		Polarity +	
11	Fault Recovery		Latched off	
12	Fallback 0		Without	
13	Fallback 1		Without	
14	Fallback Value 0			
15	Fallback Value 1			
16	Event		Disable	
17	Event Number			

Function: Ratio Mode 1

Task: MAST

In this case the calibration will be apply only on the InA



BMX EHC 0200



■ Configuration : Channel

Config

Adjust

	Label	Symbol	Value	Unit
0	Calibration		0	

2 channel generic co Ratio between InA and InB

(InA, InB)

BMX EHC 0200

Counter 0 - Ratio Mode

Counter 1

Config

Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input B Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Output Supply Fault		General IO Fault	
4	Absolute Limit		60000000	
5	Output Block 0		Off	
6	Output Block 1		Off	
7	Pulsewidth 0		10	ms
8	Pulsewidth 1		10	ms

Function:

Ratio Mode 1

Task:

MAST

User can specify a limit value witch defined how big can be the expected ratio.

If the ratio exceeds this defined value, the Counter Current Value register hold the limit value and it becomes invalid.

By default the MAX 60 kHz

BMX EHC 0200



■ Configuration : Channel

2 channel generic co

Difference between InA and InB

(InA, InB)

Config Adjust

	Label	Symbol	Value	Unit
0	Calibration		0	

BMX EHC 0200

- Counter 0 - Ratio Mode :
- Counter 1

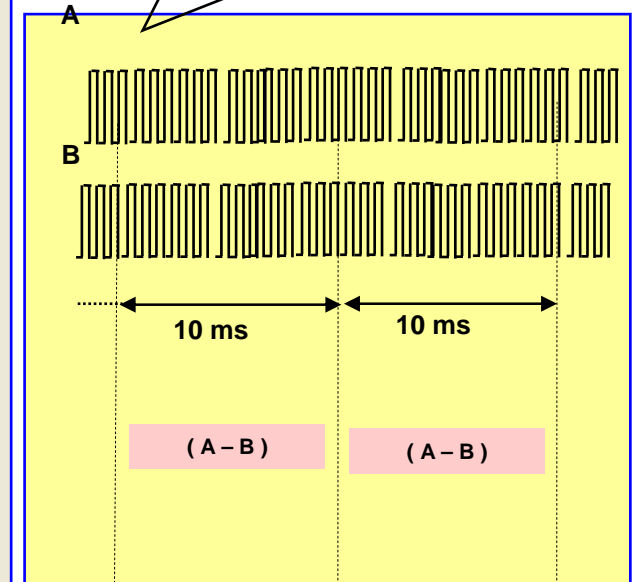
Config Adjust

	Label	Symbol	Value	Unit
0	Input A Filter		Without	
1	Input B Filter		Without	
2	Input Supply Fault		General IO Fault	
3	Output Supply Fault		General IO Fault	
4	OutputBlock 0		Off	
5	OutputBlock 1		Off	
6	Pulsewidth 0		10	ms
7	Pulsewidth 1		10	ms
8	Polarity 0		Polarity +	
9	Polarity 1		Polarity +	
10	Fault Recovery		Latched off	
11	Fallback 0		Without	
12	Fallback 1		Without	
13	Fallback Value 0			
14	Fallback Value 1			
15	Event		Disable	
16	Event Number			

Function: Ratio Mode 2

Task: MAST

In this case the calibration will be apply only on the InA



BMX EHC 0200



■ Configuration : Channel

2 channel generic co Pulse Emulation

(Output Q0)

BMX EHC 0200

- Counter 0 - Pulse Width I
- Counter 1

Config

	Label	Symbol	Value	Unit
0	Input Sync Filter		Without	
1	Synchro Edge		Rising edge on SYNC	
2	Input EN Filter		Without	
3	Input Supply Fault		General IO Fault	
4	Output Supply Fault		General IO Fault	
5	Polarity 0		Polarity +	
6	Polarity 1		Polarity +	
7	Fault Recovery		Latched off	
8	Fallback 0		Without	
9	Fallback 1		Without	
10	Fallback Value 0			
11	Fallback Value 1			

Function:

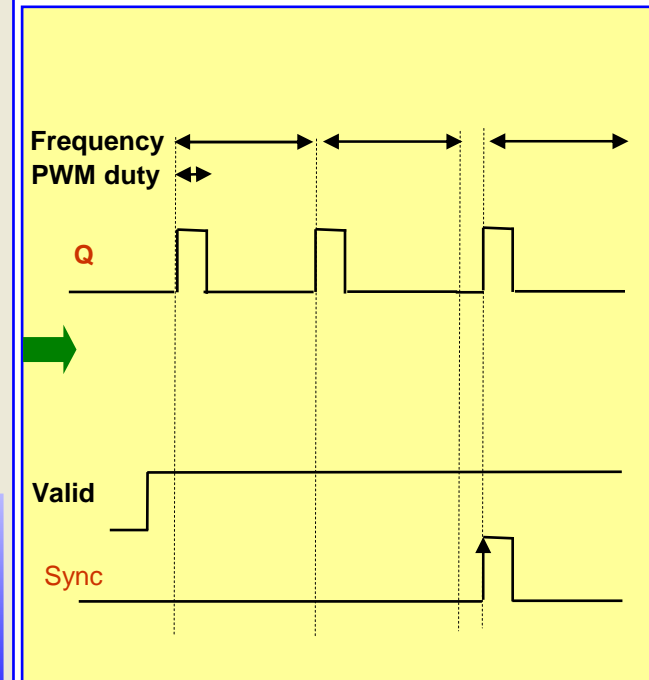
Pulse Width Modulation I

Task:

MAST

The Q0 output will be set according with two parameters:

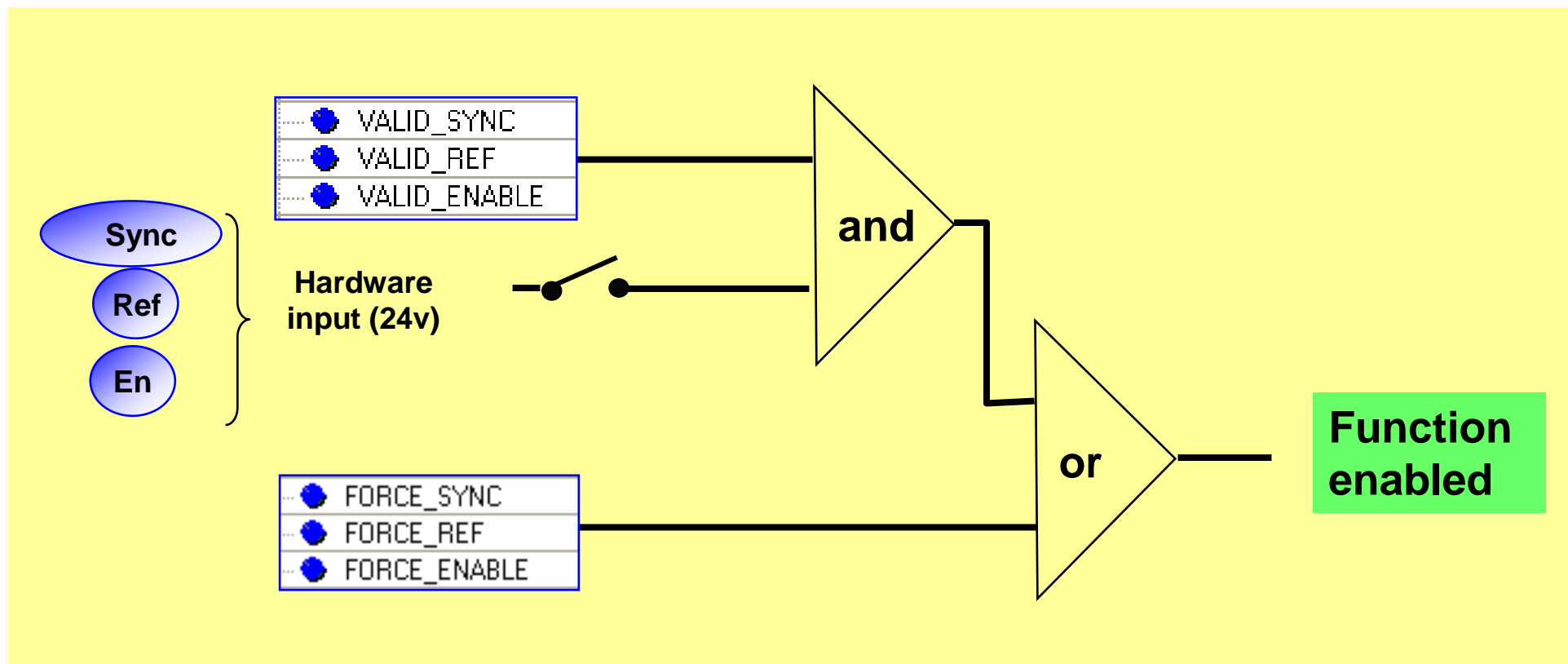
- PWM_FREQUENCY
- PWM_DUTY



BMX EHC 0200



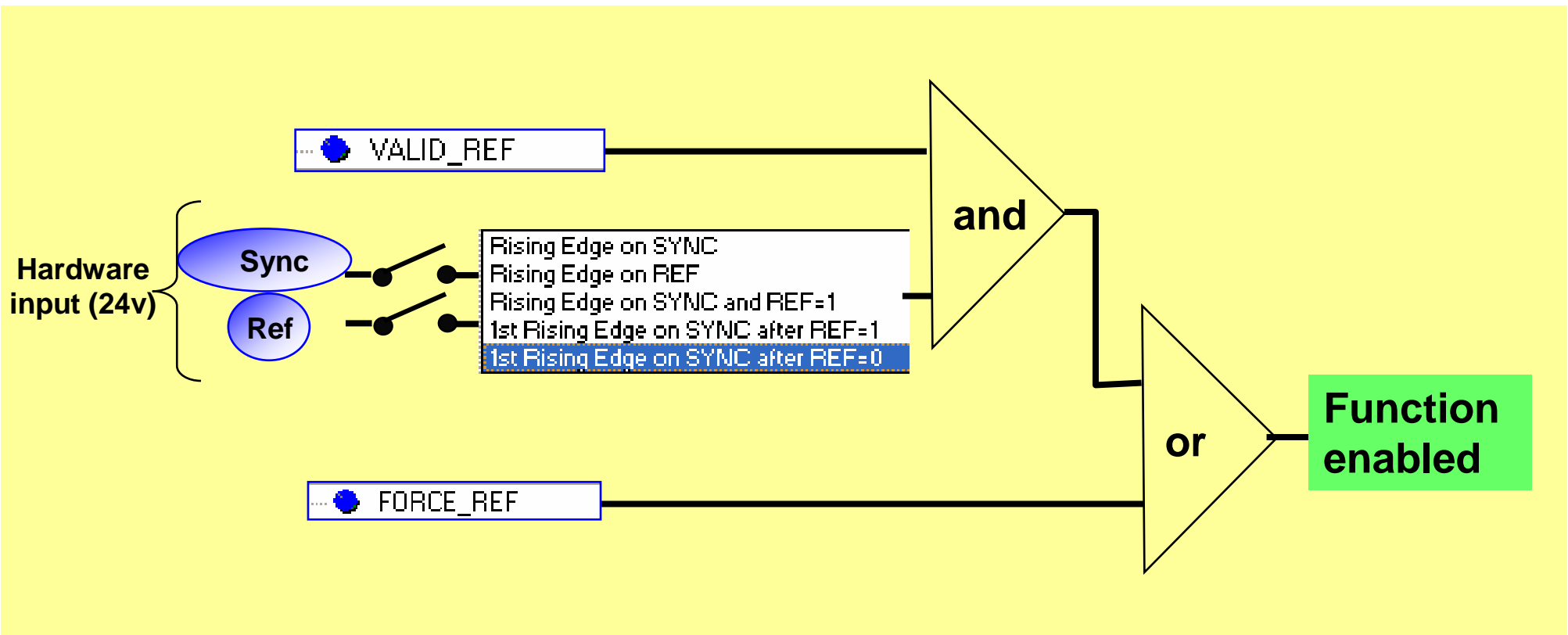
■ How to manage the function



BMX EHC 0200



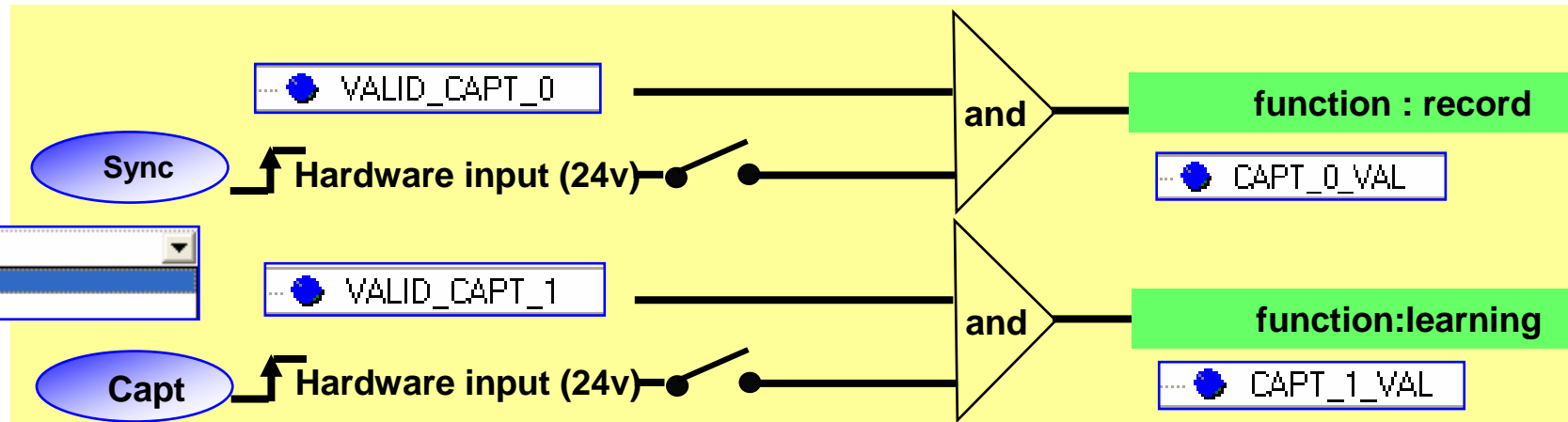
- How to preset and start the counting in the FREE LARGE COUNTING



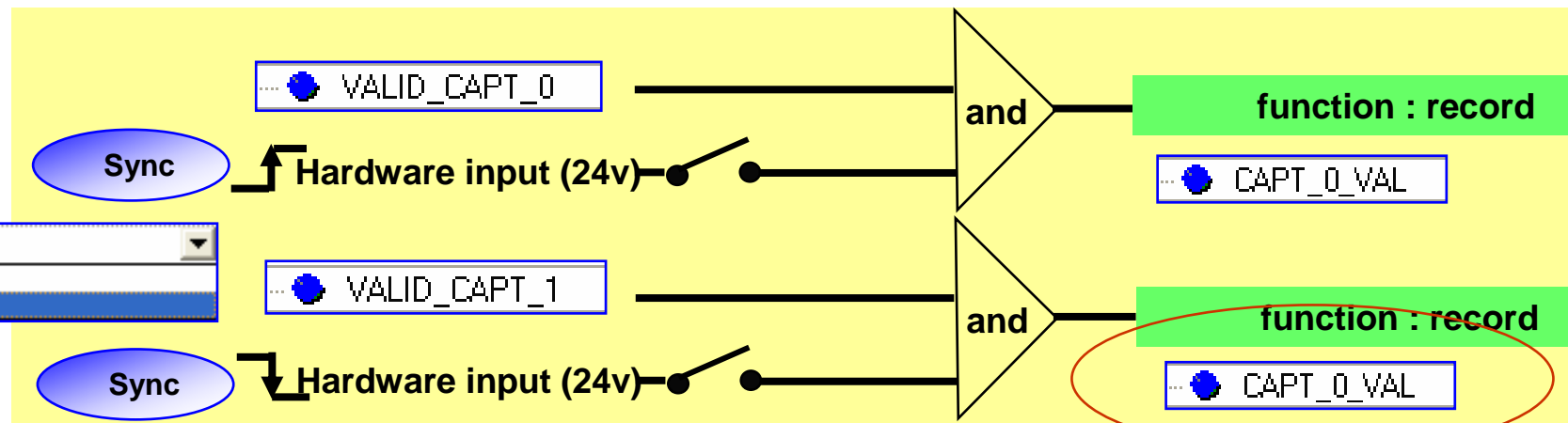
BMX EHC 0200



■ How to manage the CAPTURE bit in the FREE LARGE COUNTER MODE



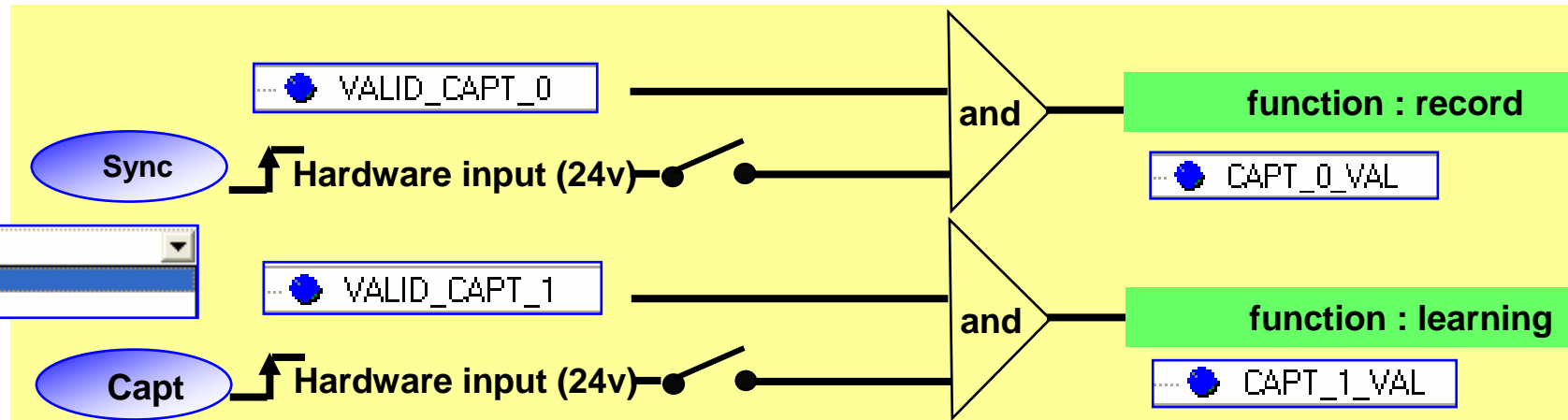
Or according with the configuration



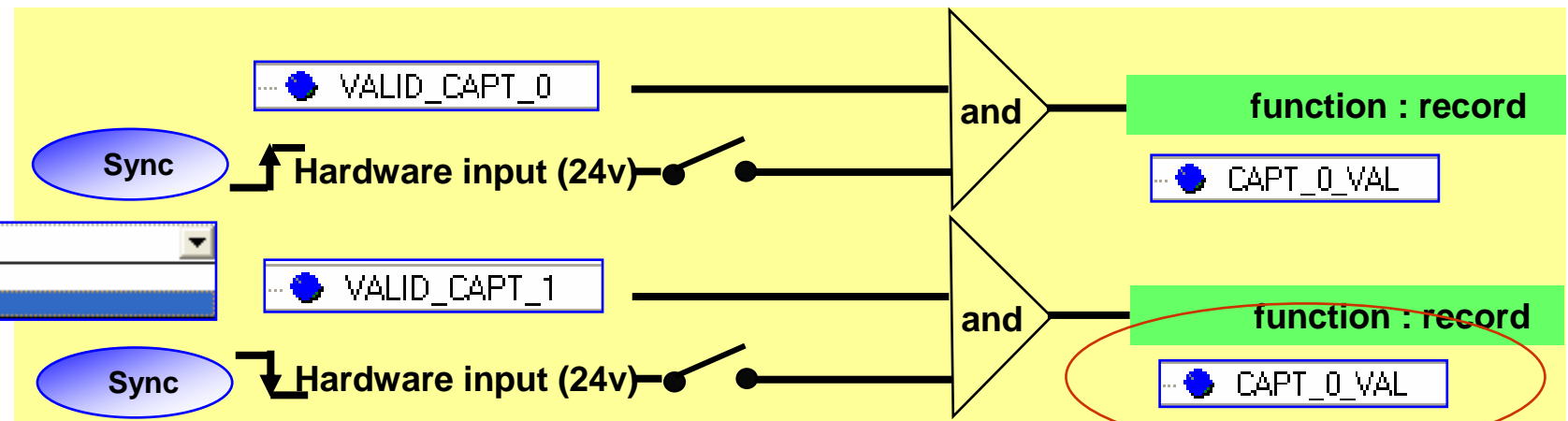
BMX EHC 0200



- How to manage the CAPTURE bit in the **FREE LARGE COUNTER MODE**



Or according with the configuration



BMX EHC 0200



■ Comparing and thresholds

- Compare block operates automatically in the following modes:

Frequency mode

Period mode

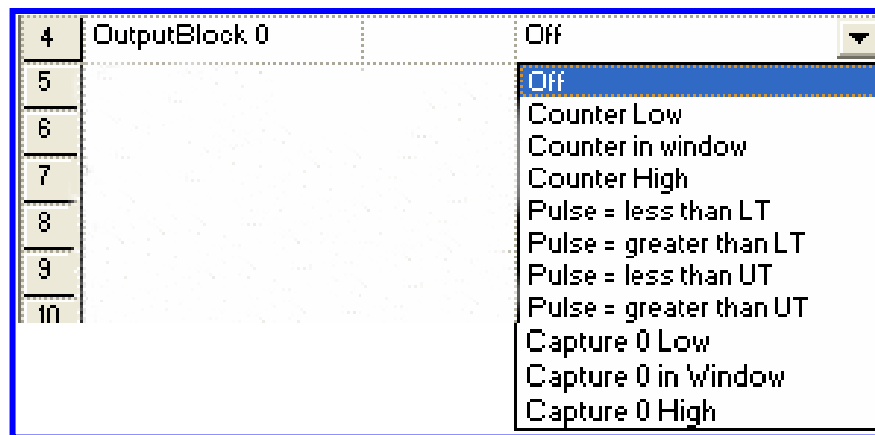
Ratio mode,

One Shot Counting

Modulo Loop Counting

Free-Large-Counting

- The compare block compare :



} The actual value with the Thresholds

} The records values with the Thresholds

- According with the configuration done it's possible to :

Set, reset or generate a pulse on %Q0 and/or %Q1



D – Language interface

BMX EHC 0200 BMX EHC 0800

■ Addressing

The screenshot displays the Schneider Electric Modicon M238 software interface. At the top, a rack of modules is shown with slots 0 through 7. Slot 6 contains the BMX EHC 0200 module, which is circled in red. To the left of the rack, a red square icon is also circled in red. Below the rack, the configuration details for the BMX EHC 0200 module are shown. The module is identified as 'Counter 0 - Modulo Loop Counter Mode (Ex_4_Count_1)' and 'Counter 1 - Frequency Mode (Ex_4_Freq_1)'. Below this, a table shows the configuration for the counter.

Reference	Label	Symbol	Value
0	%ID0.6.0.2	Counter value	Ex_4_Count_1.COUNTER_CURRENT_VALUE

BMX EHC 0200

BMX EHC 0800

IODDT on the count module

Name	Type	Address	Va...	Comment
Ex_4_Count_1	T_UNSIGN...	%CH0.6.0		IODDT for counting module channel 0
CH_ERROR	BOOL	%I0.6.0.ERR		Channel error
OUTPUT_0_Echo	EBOOL	%I0.6.0.0		Logical state of Output 0
OUTPUT_1_Echo	EBOOL	%I0.6.0.1		Logical state of Output 1
OUTPUT_BLOCK_0	EBOOL	%I0.6.0.2		Output Block 0 state
OUTPUT_BLOCK_1	EBOOL	%I0.6.0.3		Output Block 1 state
INPUT_A	EBOOL	%I0.6.0.4		Physical Input A state
INPUT_B	EBOOL	%I0.6.0.5		Physical Input B state
INPUT_SYNC	EBOOL	%I0.6.0.6		Physical Input Sync (or Aux) state
INPUT_EN	EBOOL	%I0.6.0.7		Physical Input Enable state
INPUT_REF	EBOOL	%I0.6.0.8		Physical Input Preset state
INPUT_CAPT	EBOOL	%I0.6.0.9		Physical Input Capture state
COUNTER_STATUS	INT	%Iw0.6.0.0		Main status register
RUN	BOOL	%Iw0.6.0.0.0		Counter is Running in One Shot Counting Mode
MODULO_FLAG	BOOL	%Iw0.6.0.0.1		Flag set by a modulo crossing event
SYNC_REF_FLAG	BOOL	%Iw0.6.0.0.2		Flag set by a Preset or Sync processing event
VALIDITY	BOOL	%Iw0.6.0.0.3		Main Numerical current value is safe
HIGH_LIMIT	BOOL	%Iw0.6.0.0.4		Main Numerical current value locked at high Limit
LOW_LIMIT	BOOL	%Iw0.6.0.0.5		Main Numerical current value locked at low Limit
COMPARE_STATUS	INT	%Iw0.6.0.1		Field of Comparison result bits
COUNTER_LOW	BOOL	%Iw0.6.0.1.0		Numeral current value is less than the Lower Threshold
COUNTER_WIN	BOOL	%Iw0.6.0.1.1		Numeral current value is within the thresholds
COUNTER_HIGH	BOOL	%Iw0.6.0.1.2		Numeral current value is greater than the Threshold(s)
CAPT_0_LOW	BOOL	%Iw0.6.0.1.3		Capture 0 less than the Lower Threshold
CAPT_0_WIN	BOOL	%Iw0.6.0.1.4		Capture 0 within the Thresholds
CAPT_0_HIGH	BOOL	%Iw0.6.0.1.5		Capture 0 greater than the Threshold(s)



E – Debug / Diagnostic

BMX EHC 0200 BMX EHC 0800

Debug and Diagnostic

2 channel generic counter Version : 1.00

BMX EHC 0200

- Counter 0 - Modulo Loop Counter Mod
- Counter 1 - Frequency Mode (Ex_4_Fr

Config Adjust **Debug** Fault

	Reference	Label	Symbol	Value
0	%ID0.6.0.2	Counter value	Ex_4_Count_1.COUNTER_CURRENT_VALUE	11
1	%IW0.6.0.0.3	Counter Valid	Ex_4_Count_1.COUNTER_STATUS	Yes
2	%IW0.6.0.1.0	Counter low	Ex_4_Count_1.COMPARE_STATUS	No
3	%IW0.6.0.1.1	Counter in window	Ex_4_Count_1.COMPARE_STATUS	No
4	%IW0.6.0.1.2	Counter high	Ex_4_Count_1.COMPARE_STATUS	No
5	%IW0.6.0.0.5	Counter in low limit	Ex_4_Count_1.COUNTER_STATUS	No
6	%IW0.6.0.0.4	Counter in high limit	Ex_4_Count_1.COUNTER_STATUS	No
7	%ID0.6.0.4	Capture value	Ex_4_Count_1.CAPT_0_VALUE	0
8	%IW0.6.0.1.3	Capture low	Ex_4_Count_1.COMPARE_STATUS	No
9	%IW0.6.0.1.5	Capture high	Ex_4_Count_1.COMPARE_STATUS	No
10	%QW0.6.0.0.3	Capture enable	Ex_4_Count_1.FUNCTIONS_ENABLING	0
11	%IO.6.0.4	Input A	Ex_4_Count_1.INPUT__A	1
12	%IO.6.0.5	Input B	Ex_4_Count_1.INPUT__B	0
13	%IO.6.0.6	Input SYNC	Ex_4_Count_1.INPUT_SYNC	1
14	%QW0.6.0.0.0	SYNC enable	Ex_4_Count_1.FUNCTIONS_ENABLING	0
15	%Q0.6.0.4	SYNC force	Ex_4_Count_1.FORCE_SYNC	Yes
16	%IW0.6.0.0.2	SYNC state	Ex_4_Count_1.COUNTER_STATUS	0
17	%Q0.6.0.8	SYNC reset	Ex_4_Count_1.SYNC_RESET	0
18	%IO.6.0.7	Input EN	Ex_4_Count_1.INPUT_EN	1
19	%QW0.6.0.0.2	EN enable	Ex_4_Count_1.FUNCTIONS_ENABLING	1
20	%Q0.6.0.6	Counter enable	Ex_4_Count_1.FORCE_ENABLE	0
21	%IO.6.0.0	Output 0 state	Ex_4_Count_1.OUTPUT_0_Echo	0
22	%Q0.6.0.0	Output 0 cmd	Ex_4_Count_1.OUTPUT_0	0
23	%IO.6.0.1	Output 1 state	Ex_4_Count_1.OUTPUT_1_Echo	0
24	%Q0.6.0.1	Output 1 cmd	Ex_4_Count_1.OUTPUT_1	0
25	%Q0.6.0.7	Counter reset	Ex_4_Count_1.FORCE_RESET	0
26	%IO.6.0.2	Output latch 0 state	Ex_4_Count_1.OUTPUT_BLOCK_0	0
27	%Q0.6.0.2	Output latch 0 enable	Ex_4_Count_1.OUTPUT_BLOCK_0_ENABLE	0

Unforce

Function:
Modulo Loop Counter Mode

Task:
MAST

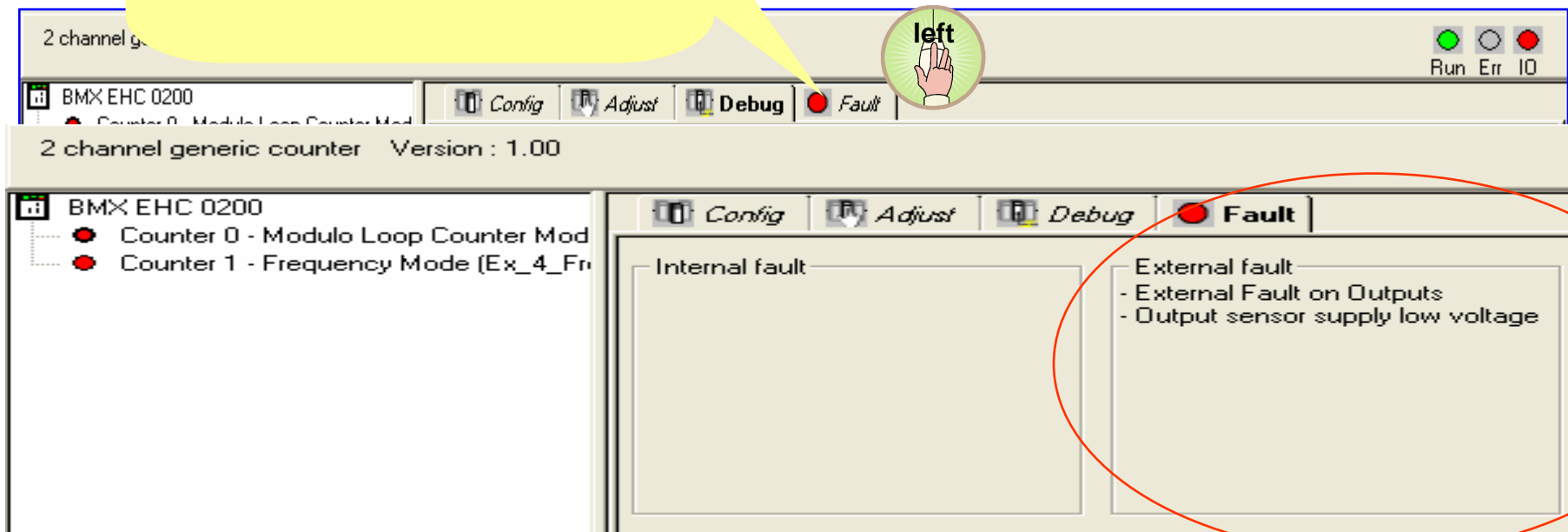
It will be possible to force or not all the values

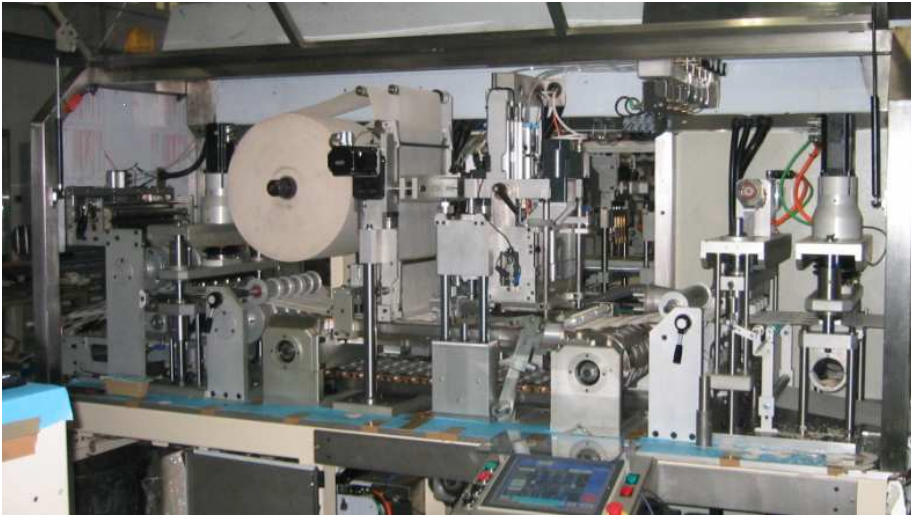
Force to 0
Force to 1
Unforce
Set
Reset

BMX EHC 0200 BMX EHC 0800

Debug and Diagnostic

To diagnose a fault UNITY
provides a specific screen
Fault, in this screen the fault is
displayed in a easy form





F – Application example

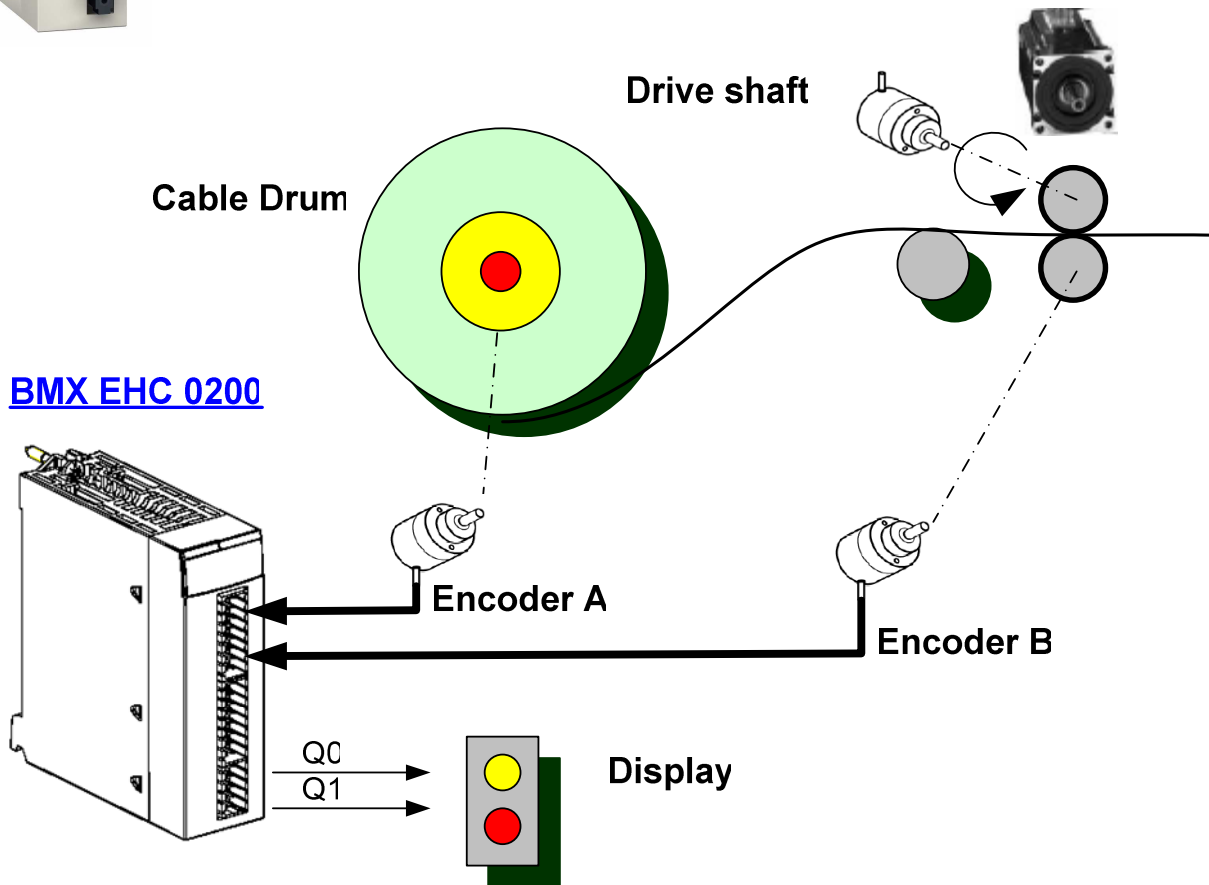


Application example :

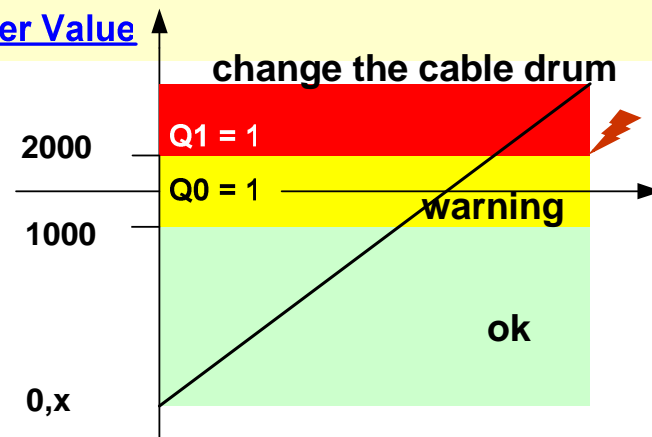
the goal of this application is to know if the roller 'Cable drum' is empty or not, so we will check the speed between the Master (motor) and the slave to obtain this information.

Function used : **RATIO 1**

BMX EHC 0200



Counter Value



Configuration of Channel 0

Function > «Ratio1»
 Output_Block0 > « Counter Window»
 Output_Block1 > « Counter High »

Debug or program

Upper_TH_Value := 2000
 Lower_TH_Value := 1000
 Compare_Enable := 1;
 Output_Block0_Enable:= 1;
 Output_Block1_Enable:= 1;



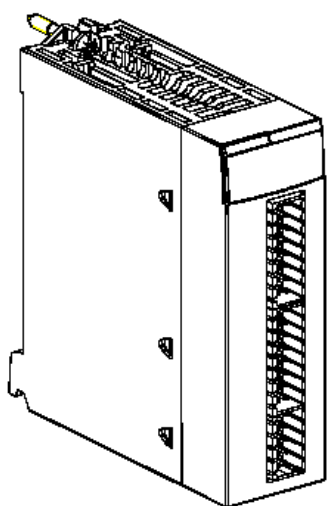
Application example :

the goal of this application is to determine simply the length of each small piece on the convoyor.

Function used : **PERIOD mode**

Constant speed
60 m/mn
(1mm / 1 ms)

BMX EHC 0200



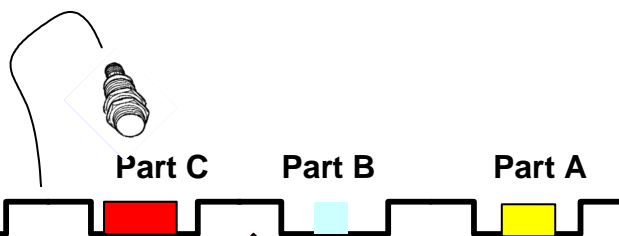
InA

In Sync

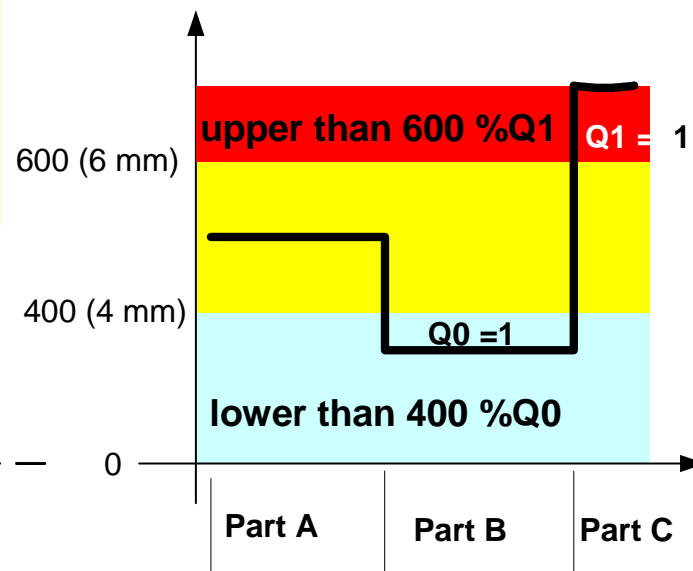
Q0

Q1

Measure Accuracy = 0.01 mm
@ 60 m/mm
Without encoder



Counter Value



Configuration of Channel 0

Function	> « Period Meter »
Mode	> « Edge to Opposite »
Resolution	> « 1 μ S »
Output_Block0	> « Counter Low »
Output_Block1	> « Counter High »

Debug or program

Upper_TH_Value	:= 600 ;
Lower_TH_Value	:= 400;
Compare_Enable	:= 1;
Output_Block0_Enable	:= 1;
Output_Block1_Enable	:= 1;



Application example :

the goal of this application is to drill a hole 50mm from the detection of the leading edge of the piece.

Function used : **FREE LARGE COUNTER**

Configuration of Channel 0

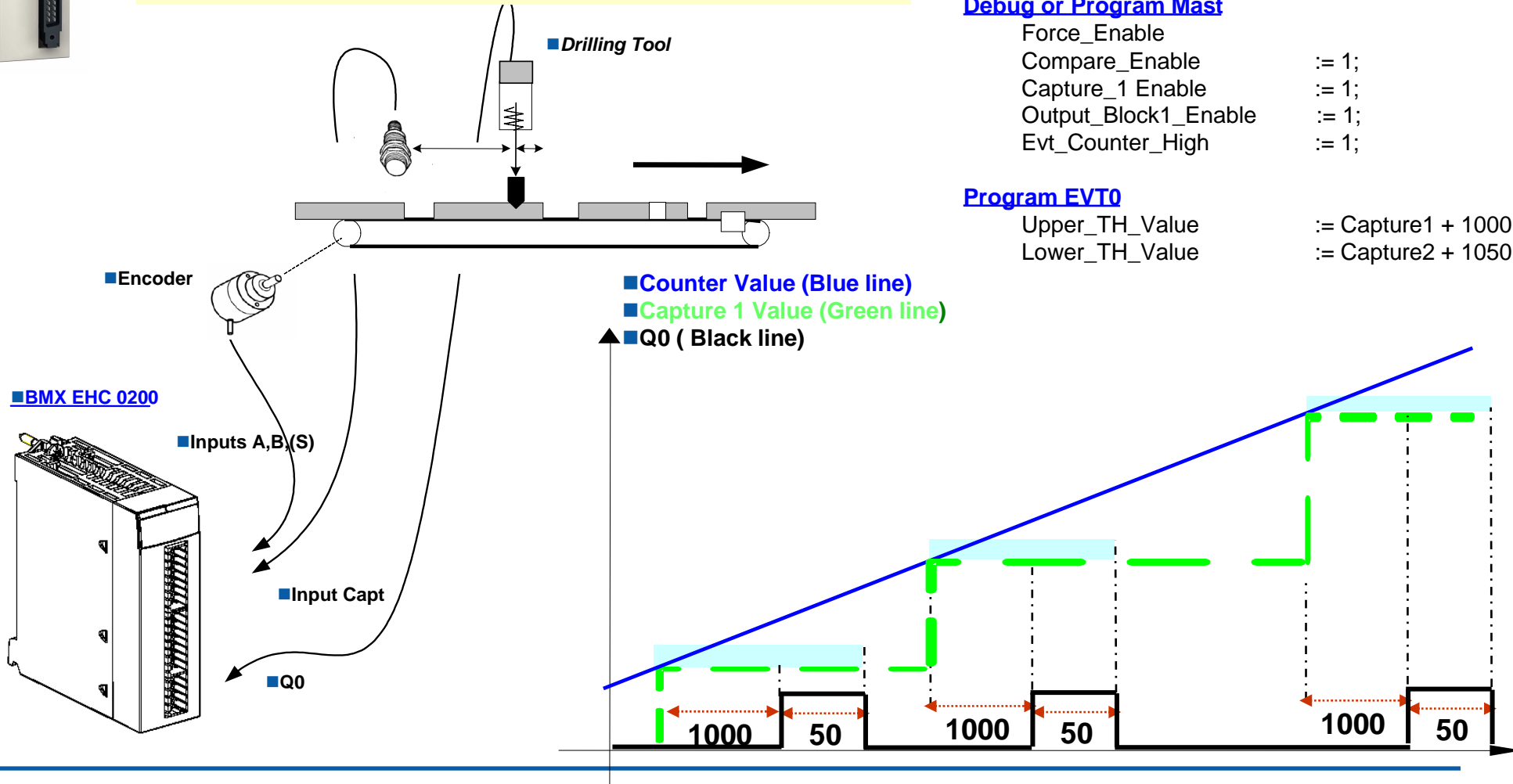
Function > « Free Large Counter »
 Interface > « Quad X 4 »
 Output_Block0 > « Counter Window »
 Event Task 0

Debug or Program Mast

Force_Enable
 Compare_Enable := 1;
 Capture_1_Enable := 1;
 Output_Block1_Enable := 1;
 Evt_Counter_High := 1;

Program EVT0

Upper_TH_Value := Capture1 + 1000 ;
 Lower_TH_Value := Capture2 + 1050

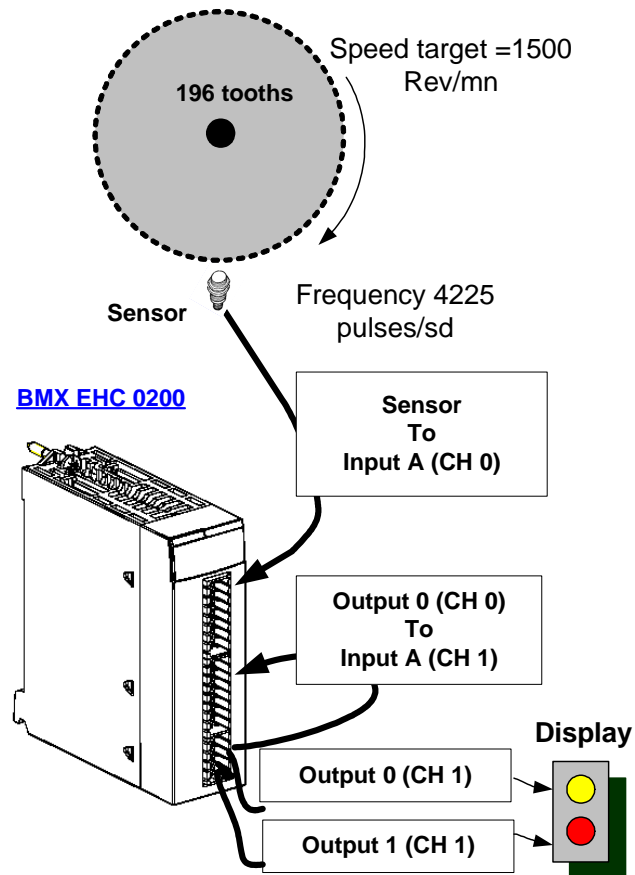




Application example :

the goal of this application is to read the speed of the wheel in order to realize a regulation :

This speed must be know often (<5ms) and with a high occurance.



Configuration/Adjust of Channel 0

Function
Output_Block0
Output_Block1
Modulo

> « Modulo Loop »
> « Counter Low »
> « None »
> = 50

of Channel 1

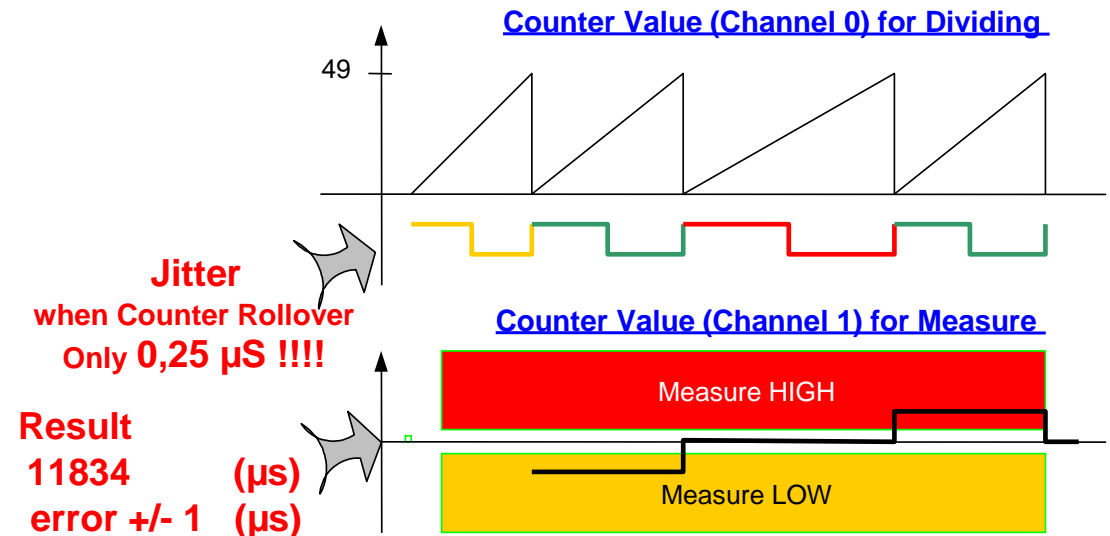
> « Period Meter »
> « Counter Low »
> « Counter High »

Debug or Program Mast For Channel 0

Force_Enable := 1;
Force_Sync := 1;
Compare_Enable := 1;
Output_Block0_Enable := 1;
Output_Block0_Enable := 0;
Upper_TH_Value := 50;
Lower_TH_Value := 25;

For Channel 1

:= 0;
:= 1;
:= 1;
:= 1;
:= 1;
:= 11850
:= 11820



Counting offer

