

# Technical Reference Manual

---

## Content

<b>General Information, Safety Instructions</b>	<b>5</b>
Warranty Information .....	5
Support .....	5
Printing History.....	5
Safety symbols in the manual .....	6
Safety instructions for all DEWETRON DAQ boards.....	7
1 Introduction .....	9
1.1 Key features.....	9
1.2 Overview .....	9
1.3 Requirements for using the ORION-EXP-CNT6 .....	9
1.4 Unpacking .....	9
2 Using ORION-EXP-CNT6.....	11
2.1 Hardware installation .....	11
2.2 Software installation .....	12
3 Functionality .....	13
3.1 Functional overview .....	13
3.2 Counter Selections .....	13
3.3 Input Connector .....	16
3.4 Counter Applications .....	17
3.5 Miscellaneous Functions .....	26
4 Specifications .....	29

# Safety instructions

---

Notes

The information contained in this document is subject to change without notice.

DEWETRON elektronische Messgeraete Ges.m.b.H. (DEWETRON) shall not be liable for any errors contained in this document. DEWETRON MAKES NO WARRANTIES OF ANY KIND WITH REGARD TO THIS DOCUMENT, WHETHER EXPRESS OR IMPLIED. DEWETRON SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. DEWETRON shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory, in connection with the furnishing of this document or the use of the information in this document.

## Warranty Information

A copy of the specific warranty terms applicable to your DEWETRON product and replacement parts can be obtained from your local sales and service office.

## Support

For any support please contact your local distributor first or DEWETRON directly.

For Asia and Europe, please contact:

DEWETRON Ges.m.b.H.  
Parkring 4  
A-8074 Graz-Grambach  
AUSTRIA  
Tel.: +43 316 3070  
Fax: +43 316 307090  
Email: [support@dewetron.com](mailto:support@dewetron.com)  
Web: <http://www.dewetron.com>

The telephone hotline is available  
Monday to Friday between  
08:00 and 17:00 CET (GMT +1:00)

For the Americas, please contact:

DEWETRON, Inc.  
10 High Street, Suite K  
Wakefield, RI 02879  
U.S.A.  
Tel.: +1 401 284 3750  
Toll-free: +1 877 431 5166  
Fax: +1 401 284 3755  
Email: [support@dewamerica.com](mailto:support@dewamerica.com)  
Web: <http://www.dewamerica.com>

The telephone hotline is available  
Monday to Friday between  
08:00 and 17:00 GST (GMT -5:00)

## Restricted Rights Legend

Use austrian law for duplication or disclosure.

DEWETRON GesmbH  
Parkring 4  
A-8074 Graz-Grambach / Austria

## Printing History

Please refer to the page bottom for printing version.

Copyright 2005 © DEWETRON elektronische Messgeraete Ges.m.b.H.

This document contains information which is protected by copyright. All rights are reserved. Reproduction, adaptation, or translation without prior written permission is prohibited, except as allowed under the copyright laws.

All trademarks and registered trademarks are acknowledged to be the property of their owners.

# Safety instructions

---

## Safety symbols in the manual

---



*Indicates hazardous voltages.*

---

**WARNING** *Calls attention to a procedure, practice, or condition that could cause bodily injury or death.*

---

**CAUTION** *Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.*

---

### **WARNINGS**

*The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. DEWETRON Elektronische Messgeraete Ges.m.b.H. assumes no liability for the customer's failure to comply with these requirements.*

---

**All accessories shown in this document are available as option and will not be shipped as standard parts.**

## Safety instructions for all DEWETRON DAQ boards

- The DEWETRON data acquisition boards may only be installed by experts.
- Read your manual before operating the board.
- Observe local laws when using the board.
- DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a DEWETRON sales and service office for service and repair to ensure that safety features are maintained.
- Keep away from live circuits: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.
- DO NOT try to service or adjust the board.
- DO NOT substitute parts or modify equipment.
- Before opening the instrument or computer (experts only) disconnect power!
- Don't touch internal wiring (electrostatic damage is possible).
- Don't use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- Safety of the operator and the unit depend on following these rules.
- Using the board for medical applications only at owner's risk

# General System Information

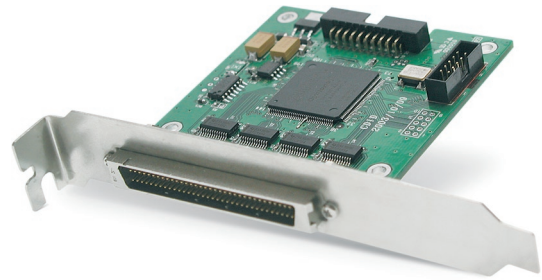
---

Notes

## 1 Introduction

### 1.1 Key features

- Six 32 bit counter
- 32 digital inputs
- Two output channels
- Synchronous data acquisition to DEWE-ORION-1624 board
- Quadrature encoder
- Frequency measurement
- Digital filter on each input signal



### 1.2 Overview

The ORION-EXP-CNT6 board is a powerful device to count events or measure times and frequencies. It has many functions implemented, e.g. quadrature encoder. The device is switchless and jumperless. All settings can be taken by software configuration. There are also miscellaneous functions, like digital filters and digital inputs.

### 1.3 Requirements for using the ORION-EXP-CNT6

Each ORION-EXP-CNT6 board is a device you can get to the DEWE-ORION-1624 board.

To install and use the counter ORION-EXP-CNT6 device you need:

- PC
- WINDOWS 2000 or XP operating system
- DEWE-ORION-1624 board
- ORION-EXP-CNT6 board with Technical Reference Manual (shipped with the board or available on [www.dewetron.com](http://www.dewetron.com) or [ftp.dewetron.com](ftp://ftp.dewetron.com))
- Flat ribbon cable (shipped with the board)
- Device driver (shipped with the board)

Recommended options (not shipped with the board):

- Signal connection
- DEWESoft 6.2 (or higher) or other application software

### 1.4 Unpacking

Transport and store the ORION-EXP-CNT6 in the antistatic plastic package (ESD packaging), where it was originally packed in. Otherwise the device may be damaged by electrostatic discharge. The unpacking and the mounting in your computer should be done in an electrostatic protected area. Don't touch the exposed pins of the connectors! Inspect the device for loose components or other sign of damage before mounting it. Don't install a damaged device into your computer.

# ORION-EXP-CNT6

---

Notes

## 2 Using ORION-EXP-CNT6

### 2.1 Hardware installation

Shut down your computer and remove power. Install the board into your computer. Connect the ORION-EXP-CNT6 board with the enclosed flat ribbon cable to the DEWE-ORION-1624 board, as shown in figure 2-1. When you have finished the hardware installation you can boot up your computer. If an old DEWE-ORION-1624 device driver is installed (below 2.0.0.34), it is recommended to install the device driver which is shipped with the ORION-EXP-CNT6 board (for installing the device driver read the DEWE-ORION-1624 technical reference).

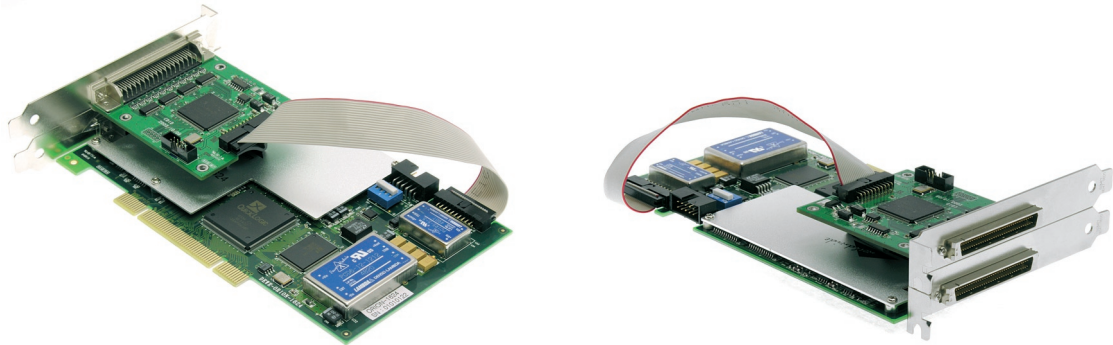


Figure 2-1: ORION-EXP-CNT6 connected to DEWE-ORION-1624

Note: It is possible to use a longer flat ribbon cable with a core pitch of 1 mm, if the enclosed cable is too short. The used connector must be the same type as at the shipped flat ribbon cable. For safety functionality the flat ribbon cable between the DEWE-ORION-1624 board and the ORION-EXP-CNT6 board should not be longer than 30 cm (12 in).

In this case any warranty for the ORION-EXP-CNT6 can not be assumed by DEWETRON.

# ORION-EXP-CNT6

## 2.2 Software installation

The new counter channels are useable immediately in DEWESoft. No additional software needs to be installed. If digital inputs are demanded, the settings of the ORION-EXP-CNT6 can be changed in the hardware setup of DEWESoft, as shown in figure 2-2.

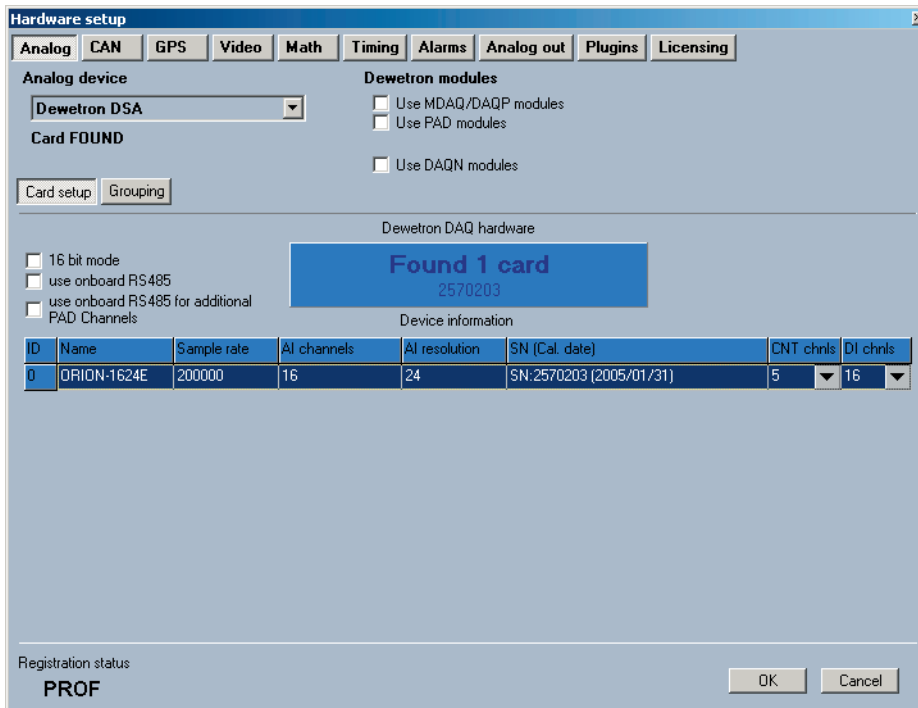


Figure 2-2: DEWESoft hardware setup

## 3 Functionality

This section describes the functionalities offered by the ORION-EXP-CNT6 device.

### 3.1 Functional overview

In each case two counters are paired. Each counter pair can be configured with several input signals via multiplexer. The second counter has an additional connection to the internal input of the first counter of the pair. This connection is used for frequency measurement.

Figure 3-1 shows the board structure for the ORION-EXP-CNT6.

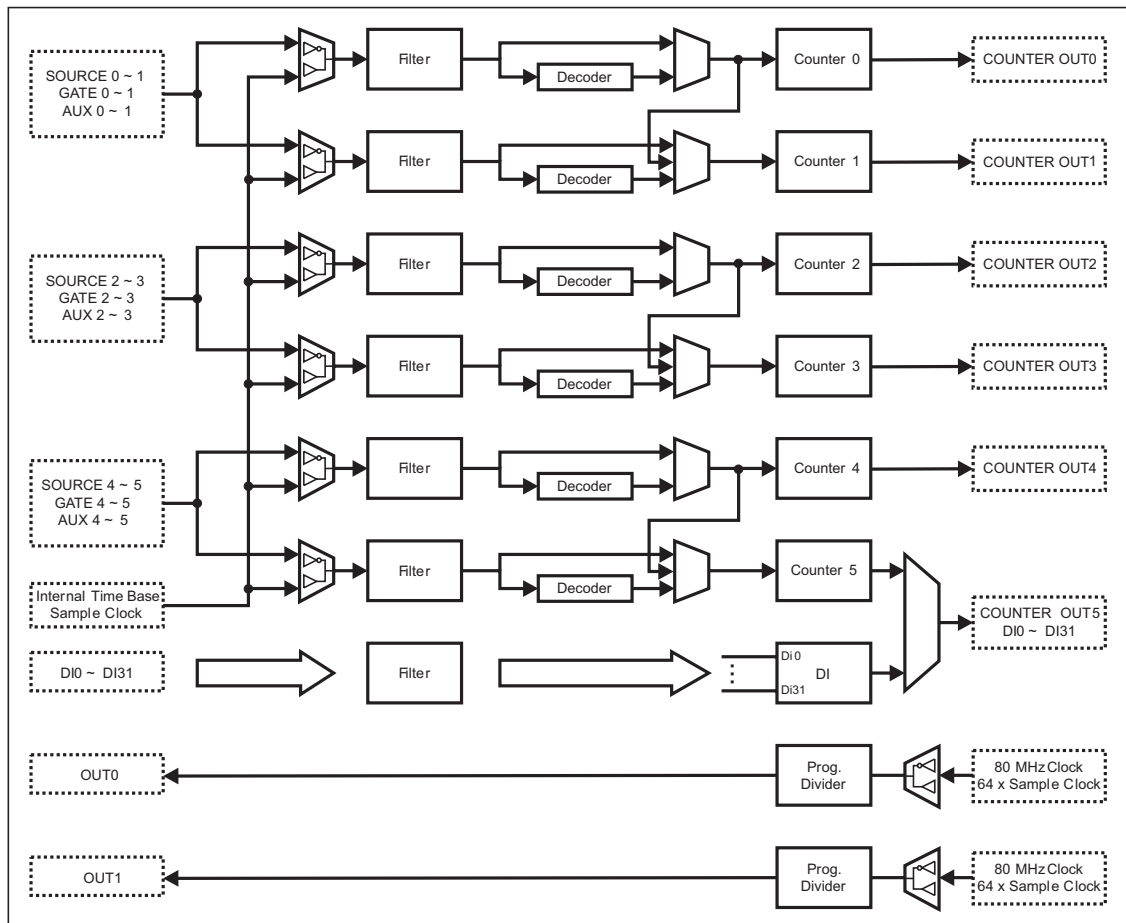


Figure 3-1: Board structure of the counter expansion

## 3.2 Counter Selections

### 3.2.1 Input selection

Each counter has three inputs and one output. The inputs are edge sensitive and have several functions under different applications. The output is a 32 bit value containing the counted events. The counter can be armed via internal signal.

Figure 3-2 shows the counter connections.

# ORION-EXP-CNT6

---

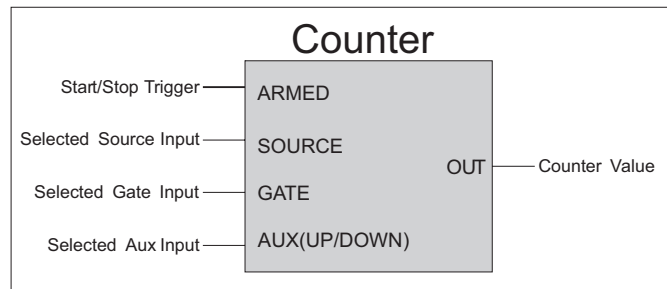


Figure 3-2: Counter connections

Following selections for the inputs are possible.

**Source input:**

- SOURCE
- SOURCE from pair counter
- GATE
- GATE from pair counter
- AUX
- AUX from pair counter
- OUT0
- OUT1
- Sample clock
- Internal time base

**Gate input:**

- SOURCE
- SOURCE from pair counter
- GATE
- GATE from pair counter
- AUX
- AUX from pair counter
- OUT0
- OUT1
- Sample clock

**Aux (Up/Down) input:**

- SOURCE
- SOURCE from pair counter
- GATE
- GATE from pair counter
- AUX
- AUX from pair counter
- OUT0
- OUT1
- Sample clock

### 3.2.1.1 Input inverter

All input channels can be inverted. With this feature it is possible to get the falling edge or the inverted state of a signal, e.g. to count events on the falling edge of the signal. No additional inverter is necessary.

### 3.2.2 Output selection

There are two output channels available. Each channel can be connected to two input signals via multiplexer. It is also possible to invert the input signal, as described in 3.2.1.1. After the input selection the signal passes the programmable divider, where high time and low time of the signal can be varied.

Following selections for the inputs are possible.

- 80 MHz Internal time base
- 64 times sample clock

The output channels are active if the ORION-EXP-CNT6 is in data acquisition mode. Otherwise the output channels are inactive.

### 3.2.3 Other counter selections

#### 3.2.3.1 Reset on start measure

Usually all counters are reset at the start of data acquisition, i.e. that counter value is set to zero at the start of data acquisition. In some applications this is not required. An angle encoder for example is adjusted to the physical zero position at the beginning of a test procedure. By resetting the counter at every start of the measurement this adjustment is lost. Without this reset the counter itself is also active if the acquisition is interrupted between the test cycles. As a result the counter types out the absolute angle position at the measurement output all the time.

#### 3.2.3.2 Count Direction

As default setting the count direction is in up counting mode. Every rising edge at the input will increase the counter value. The ORION-EXP-CNT6 supports also down counting with out the need of an additional input like in the up/down counting mode.

#### 3.2.3.3 No new value available

Especially in every kind of input period time measurement mode (also pulse width or two pulse edge separation measurement) there may be now new information between two samples. Also measuring the line frequency of about 50 Hz with a sample rate of 10 kSamples/sec means, that only after every 200th measurement new input frequency information is available. Another example is the measurement on rotating machines if the sensor output frequency is lower than the sample rate.

Depending on the application between two different output data settings can be chosen at the ORION-EXP-CNT6:

- Repeat last value: last measured cycle time is taken until a new measured cycle time is available.
- Make zero value: as soon as no input information is available the output is set to Zero.

#### 3.2.3.4 Time Base

The frequency of the internal time base can be chosen between 80 MHz, 40 MHz, 20 MHz and 10 MHz. With an internal time base of 80 MHz it is possible to get a time resolution of 12.5 ns. Lower internal time base frequencies causes less time resolution, but longer measurement cycles for specific applications.

# ORION-EXP-CNT6

## 3.3 Input Connector

The device has a 68-pin I/O connector. 43 signals are associated with the I/O connector. The lines are used in several functions under different application contexts. Schematic 3-1 indicates the functionality of each line for counter application contexts for the ORION-EXP-CNT6.

Digital Input	Counter Input	Pin	Signal	Digital Input
-	GND	35 == 1	+5 V	-
-	GND	36 == 2	SOURCE0	-
-	Reserved_D37	37 == 3	GATE0	-
-	Reserved_D38	38 == 4	Reserved_D4	-
-	GND	39 == 5	OUT0	-
-	AUX_U_D0	40 == 6	AUX_U_D1	-
-	GND	41 == 7	SOURCE1	-
-	GND	42 == 8	GATE1	-
-	GND	43 == 9	OUT1	-
DI_1	-	44 == 10	-	DI_0
DI_2	-	45 == 11	GND	-
-	GND	46 == 12	-	DI_3
DI_5	-	47 == 13	-	DI_4
DI_6	-	48 == 14	GND	-
-	GND	49 == 15	-	DI_7
-	GND	50 == 16	-	DI_8
DI_10	-	51 == 17	-	DI_9
DI_11	-	52 == 18	GND	-
DI_12	-	53 == 19	GND	-
DI_13	-	54 == 20	GND	-
-	GND	55 == 21	-	DI_14
-	GND	56 == 22	-	DI_15
DI_17	AUX_U_D5	57 == 23	-	DI_16
DI_18	GATE5	58 == 24	GND	-
-	GND	59 == 25	SOURCE5	DI_19
DI_21	AUX_U_D4	60 == 26	-	DI_20
DI_22	GATE4	61 == 27	GND	-
-	GND	62 == 28	SOURCE4	DI_23
DI_25	AUX_U_D3	63 == 29	-	DI_24
DI_26	GATE3	64 == 30	GND	-
-	GND	65 == 31	SOURCE3	DI_27
DI_29	AUX_U_D2	66 == 32	-	DI_28
DI_30	GATE2	67 == 33	GND	-
-	GND	68 == 34	SOURCE2	DI_31

Schematic 3-1: Description of lines for counter application  
68-pin high density connector AMP 174341-5

## 3.4 Counter Applications

The ORION-EXP-CNT6 board can be used for applications listed below.

- Event Counting
- Gated Event Counting
- Period Time Measurement
- Pulse Width Measurement
- Two Pulse Edge Separation
- Quadrature Encoder (X1, X2, X4, A-Up/B-Down)
- Up/Down Counter
- Frequency Measurement

### 3.4.1 Event Counting

In Event Counting the counter counts the number of pulses that occur on counter source. At every sample clock the counter value is read without disturbing the counting process.

Figure 3-3 shows an example of event counting where the counter counts eight events on *Counter Source*. *Synchronized Value* is the value read by the DEWE-ORION-1624 board at *Sample Clock* (encircled numbers in the figure, e.g. ①, ②).

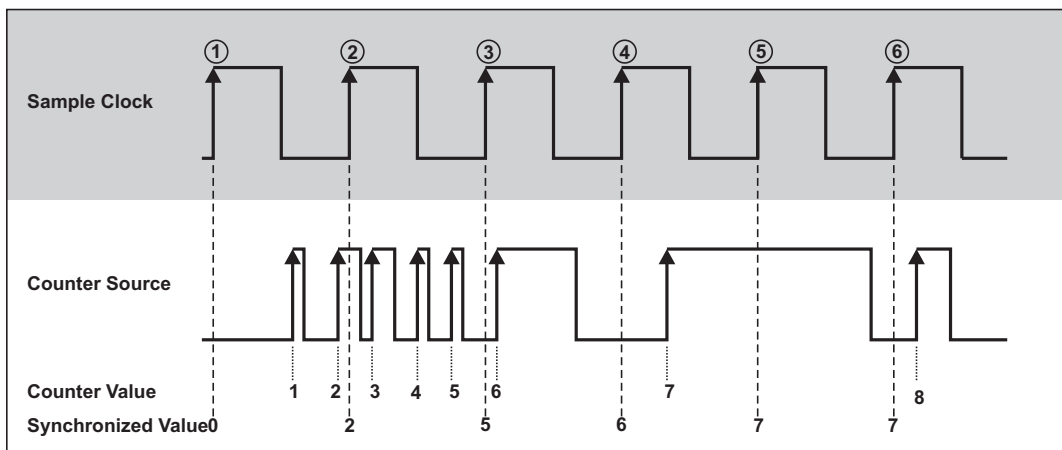


Figure 3-3: Event Counting

*If counting at falling edges is necessary, the input signal has to be inverted. This can be done directly on the ORION-EXP-CNT6 by selecting inverted input.*

### 3.4.2 Gated Event Counting

Gated Event Counting is similar to Event Counting except that the counting process is gated. When *Counter Gate* is active, the counter counts pulses which occur on counter source. When *Counter Gate* is inactive the counter retains the current count value. At every *Sample Clock* the value is read.

Figure 3-4 shows an example of Gated Event Counting where the counter counts three events on *Counter Source*. At ① and ② the counter value is zero, because the gate signal is inactive. At sample clock ③, ④ and ⑤ the actual counter value is read out. At ⑥ the same value as at ⑤ is typed out.

# ORION-EXP-CNT6

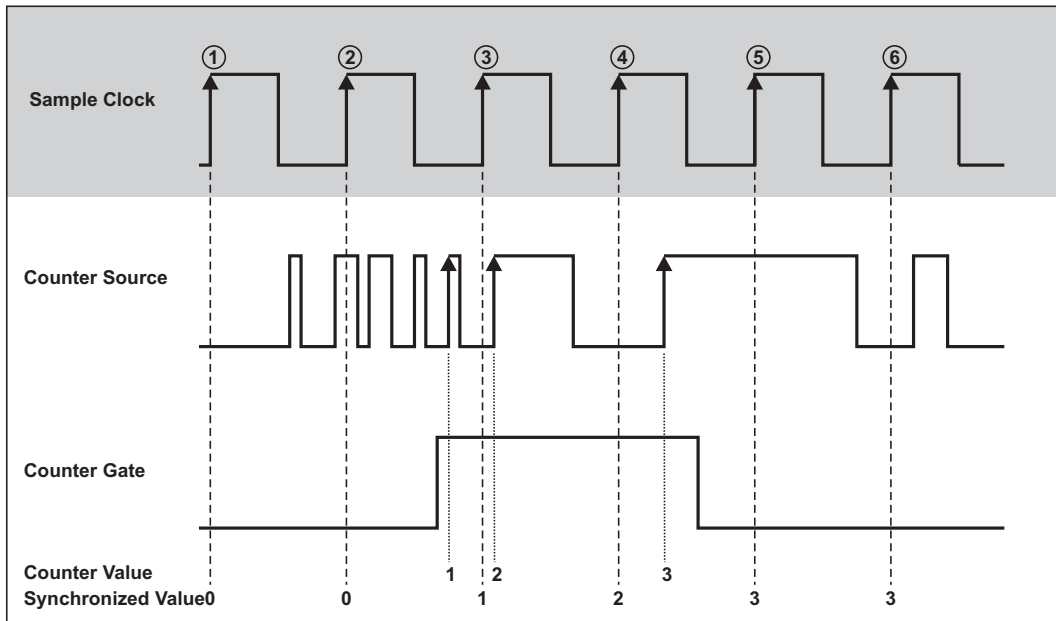


Figure 3-4: Gated Event Counting

*It is also possible, as in Event Counting, to invert the input signals.*

### 3.4.3 Up/Down Counter

The Up/Down Counter counts the rising edges on *Counter Source*. The direction of the counting depends on the signal state on *Counter Aux*. If *Counter Aux* is active (high level), the counter is increasing the counter value; if *Counter Aux* is inactive (low level), the counter is decreasing the counter value.

Figure 3-5 shows Up/Down counting.

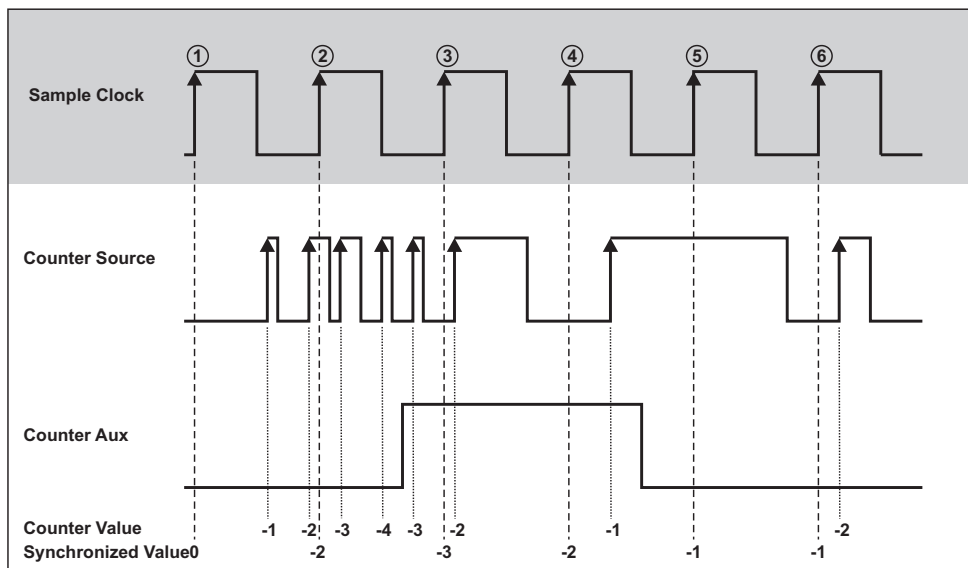


Figure 3-5: Up/Down Counter

## 3.4.4 Period Time Measurement

In Period Time Measurement the counter uses the internal time base to measure the period time of the signal present on *Counter Source*. The counter counts the rising edges of the internal time base which occurs between two rising edges on *Counter Source*. At the completion of the period interval the counter value is stored in a register and the counter starts counting from zero. At every *Sample Clock* (①, ②, ..., ⑥) the register value is read out.

Figure 3-6 shows a Period Time Measurement.

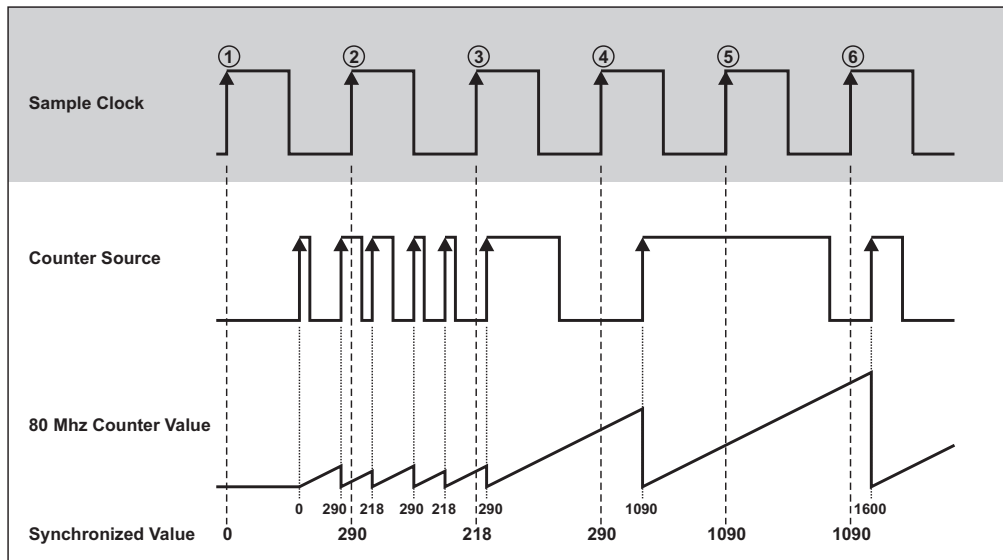


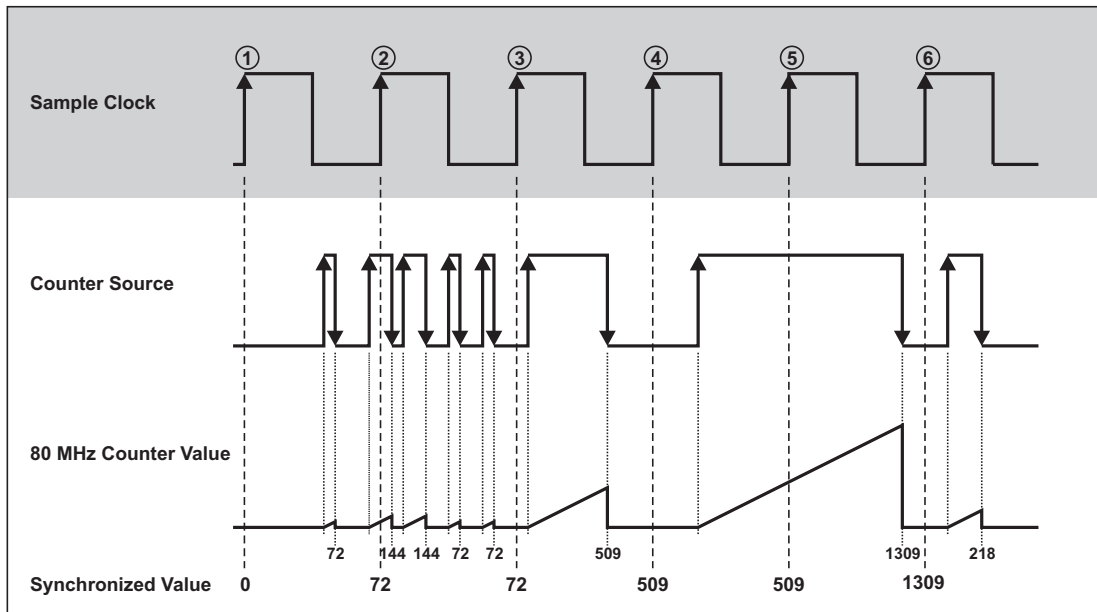
Figure 3-6: Period Time Measurement

## 3.4.5 Pulse Width Measurement

In Pulse Width Measurement the counter uses the internal time base to measure the pulse width of the signal present on *Counter Source*. The counter counts the rising edges of the internal time base after a rising edge occurs on counter source. At the falling edge on *Counter Source* the counter value is stored in a register and the counter is set to zero. With the next rising edge on *Counter Source* the counter starts counting again. At every *Sample Clock* (①, ②, ..., ⑥) the register value is read out.

Figure 3-7 shows a pulse width measurement.

# ORION-EXP-CNT6



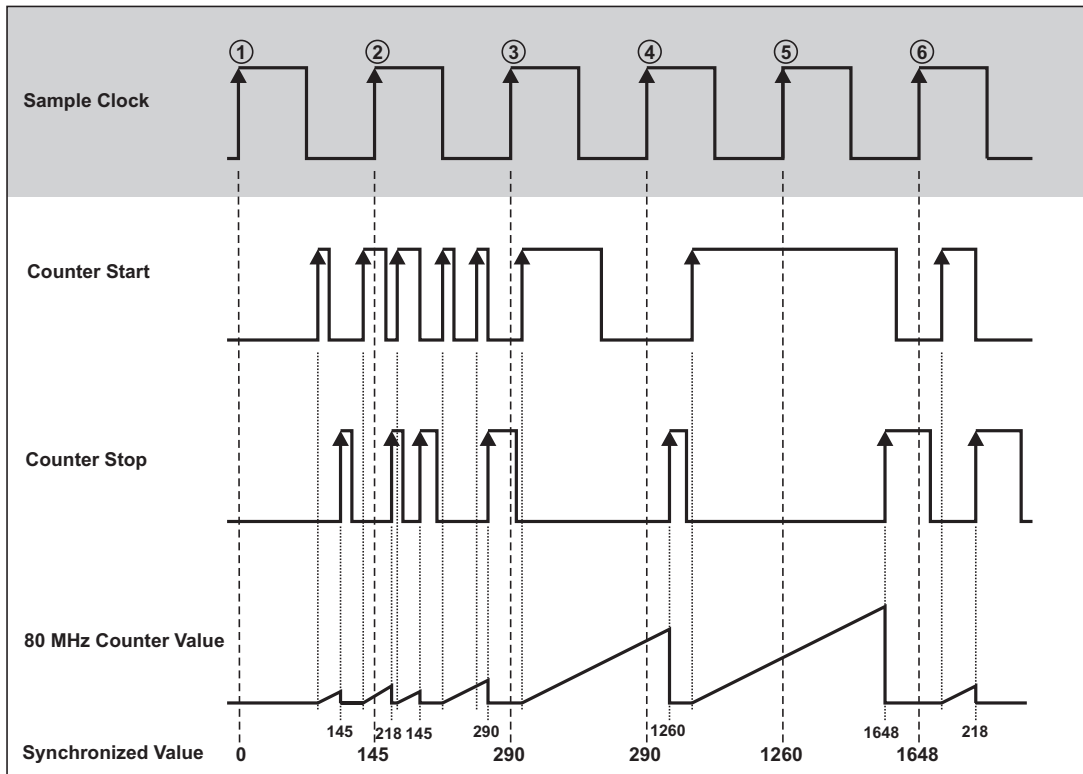


Figure 3-8: Two Pulse Edge Separation Measurement

*If the input signals are inverted the counter takes the falling edges for counting.*

### 3.4.7 Motion Encoder

Motion encoders have usually three channels: channel A, B and Z. Channel A and channel B are providing the square signals for the counter, and have a phase shift of 90°. With this phase shift the decoder is able to recognize the rotation direction of the motion encoder. The third channel types out one pulse at a certain position at each revolution. This pulse is used to set the counter to zero. The amount of counts per cycle at a given motion encoder depends on the type of decoding: X1, X2, X4. All three types are provided by the ORION-EXP-CNT6. Some motion encoders have two outputs, which are working in a different way. Either channel A or channel B providing the square signal, depending on the direction of the rotation. Also this type is supplied by the ORION-EXP-CNT6.

#### 3.4.7.1 Quadrature Encoder

In the first case X1 decoding is explained. When *Input A* leads *Input B* in a quadrature cycle, the counter increments on rising edges of *Input A*. When *Input B* leads *Input A* in a quadrature cycle, the counter decrements on the falling edges of *Input A*. At every *Sample Clock* (①, ②, ..., ⑨) the counter value is read out.

Figure 3-9 shows the resulting increments and decrements for X1 encoding.

# ORION-EXP-CNT6

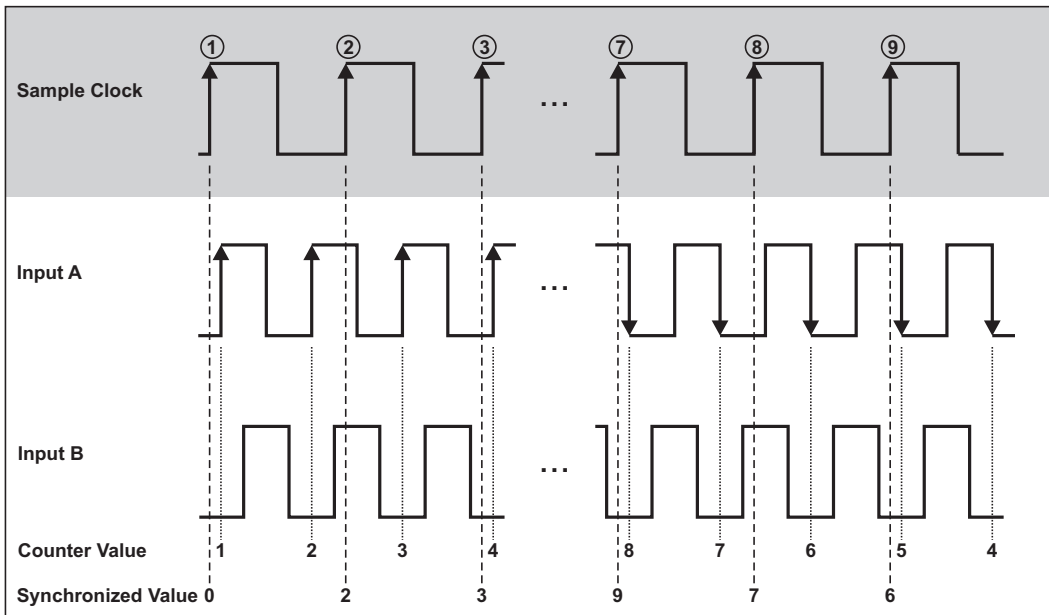


Figure 3-9: Quadrature Encoder X1 Mode

For X2 encoding the rising edges and the falling edges of *Input A* are used to increment or decrement. The counter increments if *Input A* leads *Input B* and decrements if *Input B* leads *Input A*. This is shown in Figure 3-10.

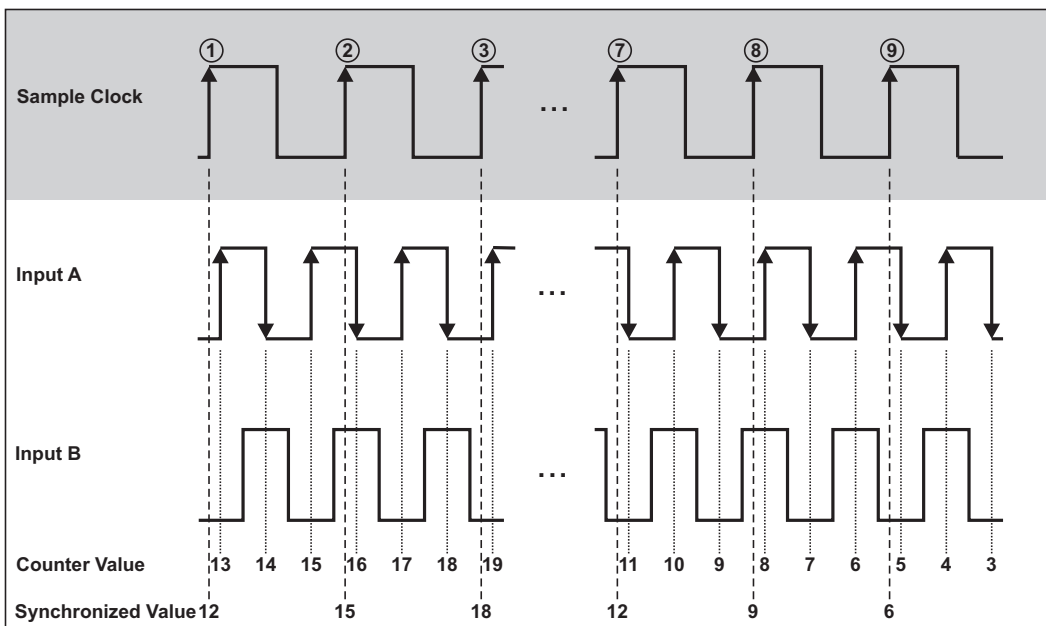


Figure 3-10: Quadrature Encoder X2 Mode

Similarly, the counter increments or decrements on each edge of *Input A* and *Input B* for X4 decoding. The condition for increment and decrement is the same as for X1 and X2.

Figure 3-11 shows the results for X4 encoding.

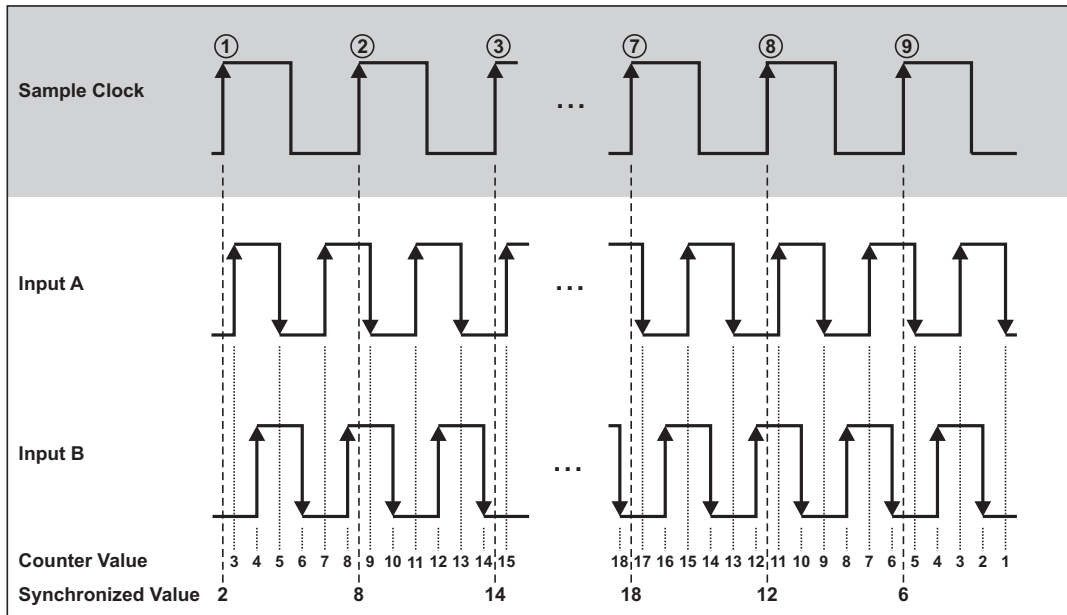


Figure 3-11: Quadrature Encoder X4 Mode

The third channel *Input Z*, which is also referred as the index channel, causes the counter to be reloaded with zero in a specific phase of the quadrature cycle.

Figure 3-12 shows the results for X1 encoding with input Z.

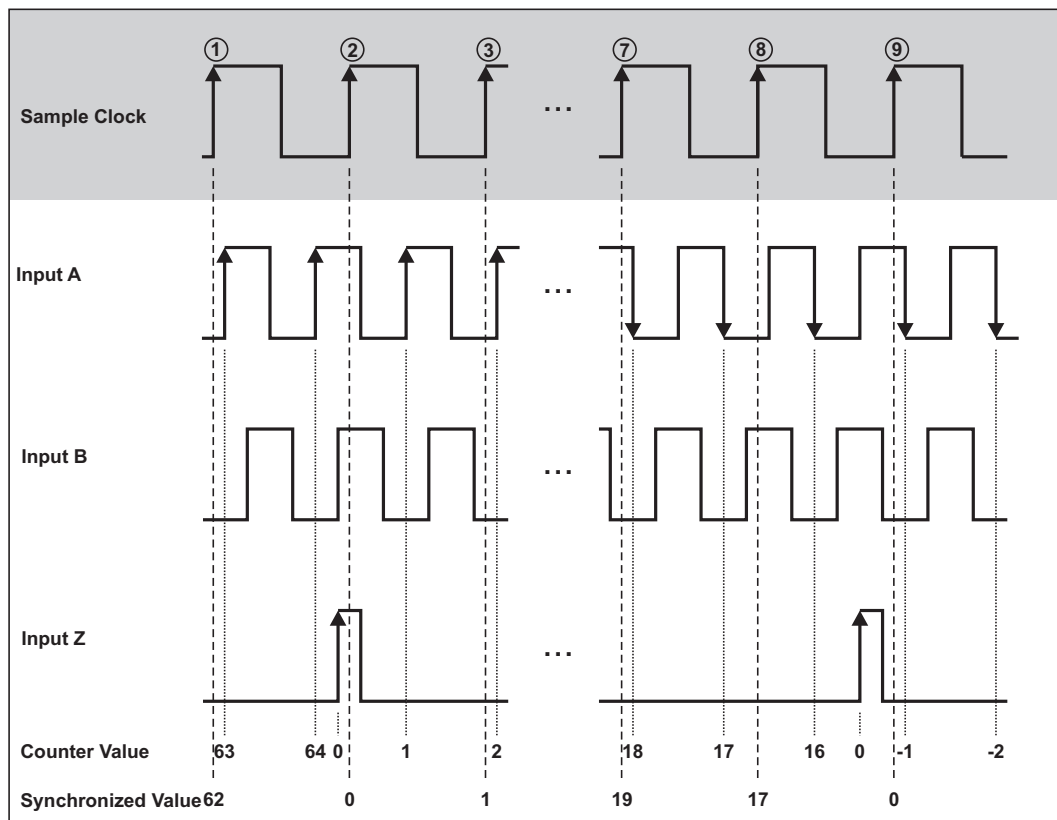


Figure 3-12: Quadrature Encoder with channel Z

# ORION-EXP-CNT6

## 3.4.7.2 A-Up/B-Down Encoder

The A-Up/B-Down Encoder supports two inputs, A and B. A pulse on *Input A* increments the counter on its rising edges. A pulse on *Input B* decrements the counter on its rising edges. At every *Sample Clock* (①, ②, ..., ⑨) the counter value is read out.

This situation is shown in Figure 3-13.

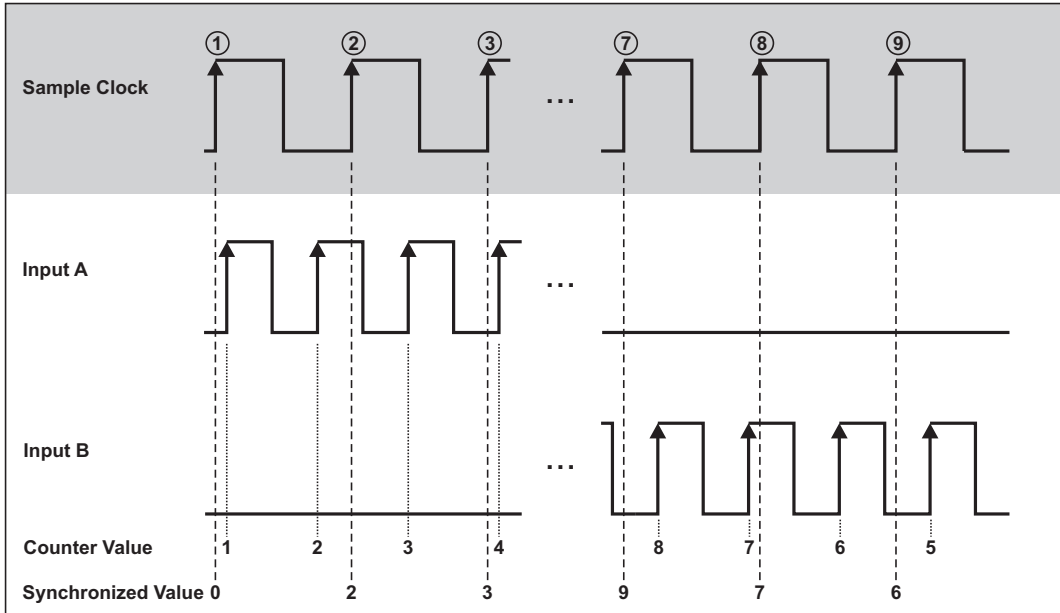


Figure 3-13: A-Up/B-Down Encoder

## 3.4.8 Frequency Measurement

In general it is possible to take the inverse of a period measurement to get the frequency of the input signal. If the period time measurement is done as described in chapter 3.4.4 an inaccuracy of counted internal time base cycles of  $\pm 1$  cycle appears, because the counted cycles of the internal time base depends on the phase of the input signal with respect to the internal time base. For long period times, and therewith low frequencies, the measurement error is negligible. At high frequencies, and therewith short period times, few cycles are counted. In this case the error of  $\pm 1$  cycle becomes significant. Table 3-2 illustrates this problem.

Input Frequency	Number of internal time base cycles	Measurement error of -1 cycle	Measurement error of +1 cycle	Calculated frequency with error of -1 cycle	Calculated frequency with error of +1 cycle
40 kHz	2000	1999	2001	39,98 kHz	40,02 kHz
10 MHz	8	7	9	8,75 MHz	11,25 MHz

Table 3-2: Accuracy at period time measurement

To solve this problem the frequency measurement is done with two counters. At the ORION-EXP-CNT6 in each case two counters are paired, i.e. it have to be used counter 0 and counter 1 or counter 2 and counter 3 or counter 4 and counter 5 for the frequency measurement. The first counter counts the rising edges on *Counter Source*. The second counter counts the rising edges of the internal time base. At every rising edge on *Counter Source* the counter value of the second counter is stored in a register. At every *Sample Clock* (①, ②, ..., ⑨) the values of both counters are read out.

Figure 3-14 shows the frequency measurement.

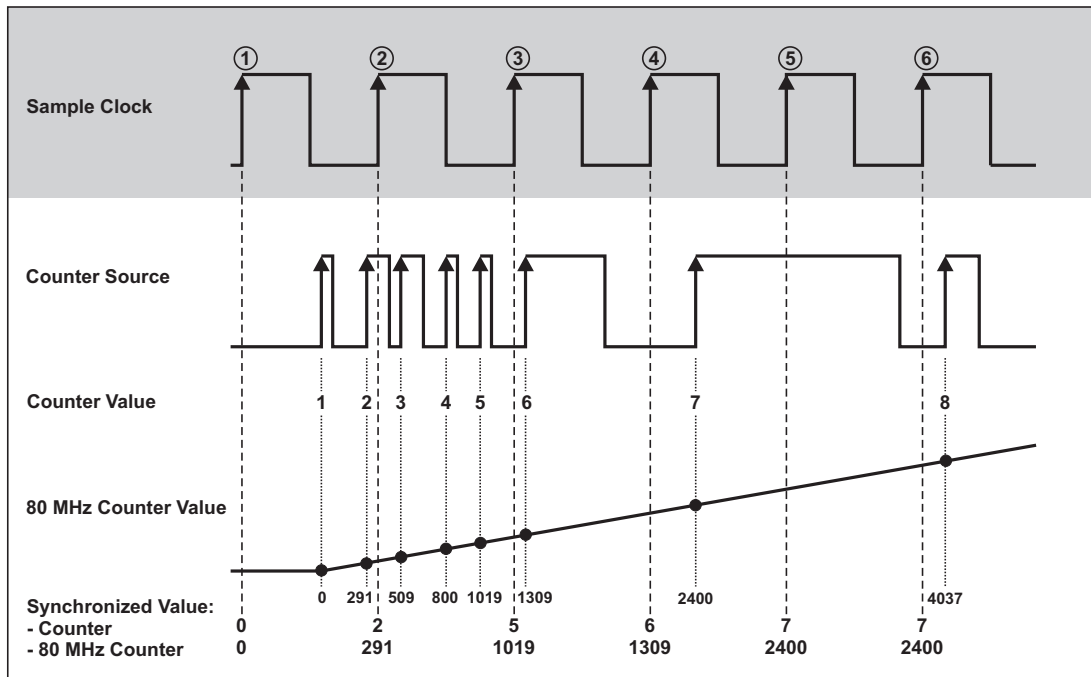


Figure 3-14: Frequency Measurement

The first counter value corresponds to the input frequency, which is of interest. The second counter value corresponds to the internal time base, which is known. With a calculation it is possible to get the input frequency.

The equation for the frequency reads

$$f = \frac{CS_n - CS_{n-1}}{CTB_n - CTB_{n-1}} \cdot f_{TB}$$

- $f$  Calculated frequency
- $f_{TB}$  Frequency of the internal time base
- $CTB_n$  Actual synchronized value from second counter
- $CTB_{n-1}$  Previous synchronized value from second counter
- $CS_n$  Actual synchronized value from first counter
- $CS_{n-1}$  Previous synchronized value from first counter

As an example the frequency measurement at *Sample Clock* ③ is described. The synchronized values are 2 for the first counter and 291 for the second counter at the previous *Sample Clock* ②. At *Sample Clock* ③ the synchronized values are 5 for the first counter and 1019 for the second counter. The time base of the measurement is 40 MHz.

The measured frequency result reads

$$f = \frac{5 - 2}{1019 - 291} \cdot 40 \cdot 10^6 \text{ [Hz]}$$

$$f = 164835 \text{ Hz}$$

*For low frequency input signals the frequency can also be obtained by measure the period time and take its inverse without more inaccuracy.*

# ORION-EXP-CNT6

## 3.5 Miscellaneous Functions

### 3.5.1 Digital Input Channels

Each ORION-EXP-CNT6 has a 32-bit digital input port. If digital inputs are used, the number of available counters is reduced. Table 3-3 shows the context between counters and digital input channels.

Used digital input channels	Available counters
0	6
8	5
16	5
24	4
32	2

Table 3-3: Context between digital input channels and available counters

### 3.5.2 Filters

Each ORION-EXP-CNT6 input has a digital filter, which can be set to various gate times. If the gate time is set to “Off”, no filter is on the input signal.

The filter circuit samples the input signal on each rising edge of the internal time base. If the input signal maintains his state for at least the gate time, the new state is propagated. As an effect the signal transition is shifted by the gate time.

Figure 3-15 demonstrates the function of the filter.

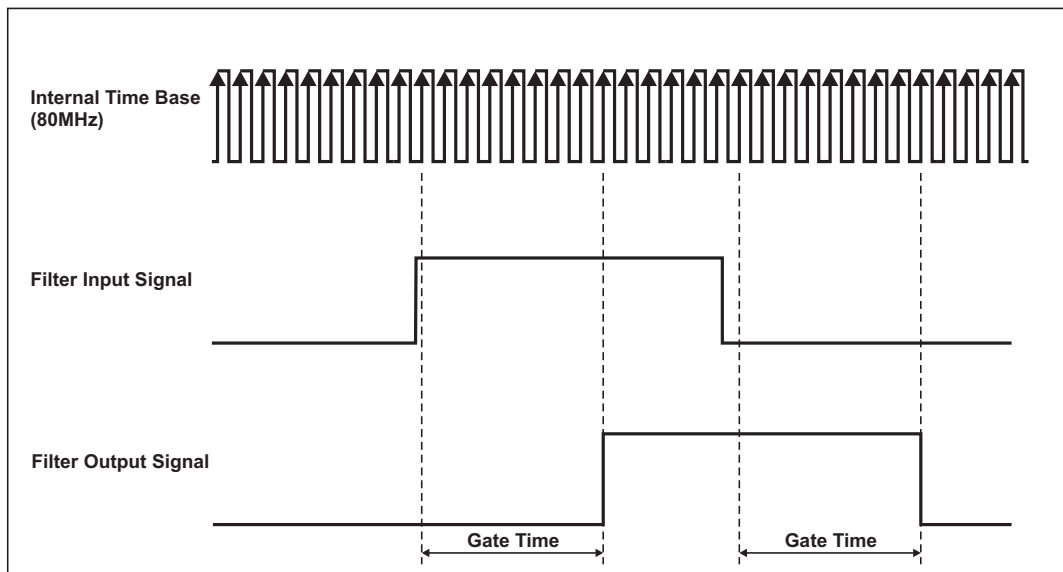


Figure 3-15: Filters

The intent of the filter is to eliminate unstable states, e.g. glitches, chatter, ..., which may appear on the input signal, as shown in Figure 3-16.

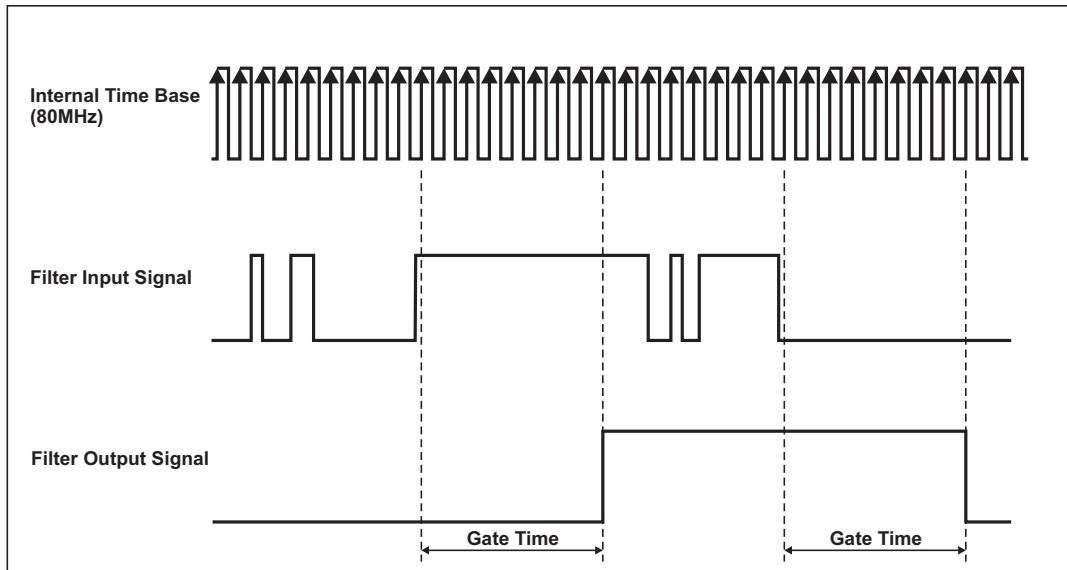


Figure 3-16: Input signal with chatter

It can be chosen between eight filter settings: Off, 100 ns, 200 ns, 500 ns, 1  $\mu$ s, 2  $\mu$ s, 4  $\mu$ s and 5  $\mu$ s. Two examples of filter settings are described. The 100 ns filter will pass all pulse widths (high and low) that are 100 ns or longer. It will block all pulse widths that are 75 ns or shorter. The 5  $\mu$ s filter will pass all pulse widths (high and low) that are 5  $\mu$ s or longer and will block all pulse widths that are 4.975  $\mu$ s or shorter.

The internal sampling clock (time base) is 80 MHz, so the period time amounts 12.5 ns. Pulse widths between gate time minus two internal time base period times may or may not pass, depending on the phase of the input signal with respect to the internal time base.

Table 3-4 contains the properties of all filter settings.

Filter settings	Pulse width to pass	Pulse width to be blocked
100 ns	100 ns	75 ns
200 ns	200 ns	175 ns
500 ns	500 ns	475 ns
1 $\mu$ s	1 $\mu$ s	975 ns
2 $\mu$ s	2 $\mu$ s	1.975 $\mu$ s
4 $\mu$ s	4 $\mu$ s	3.975 $\mu$ s
5 $\mu$ s	5 $\mu$ s	4.975 $\mu$ s
Off	-	-

Table 3-4: Filter Gate Times

# ORION-EXP-CNT6

---

Notes

## 4 Specifications

ORION-EXP-CNT6	
Resolution	32 Bit
Time base	80 MHz
Maximum input frequency	40 MHz
Input signal characteristic	
Compatibility	LVTTL/TTL/CMOS
Configuration	Pull-up with 25 kOhm
Input low level	-0.7 V to 0.8 V
Input high level	2 V to 5 V
Input low current	-150 $\mu$ A
Input high current	10 $\mu$ A
Input capacitance	< 12 pF
Output signal characteristic	
Low voltage level	< 0.4 V @ 4 mA load
High voltage level	> 3 V @ 4 mA load
Input connector	68-pin male, SCSI-II type
Operating temperature	0 to 50 °C
Storage temperature	-20 to 70 °C
Relative humidity	10 % to 90 % noncondensing
Power consumption	0.5 Watt (powered by DEWE-ORION-1624)
Available power at input connector	5 V <sub>DC</sub> , 0.5 A
Dimensions	76 mm x 66 mm (3.0 x 2.6 in.)

Table 3-4: Specifications

# ORION-EXP-CNT6

---

Notes