

Operation Mode

Operation Mode	Description	Number of counter/frequency sets
00	Dir/Pulse counting mode	4 sets
01	Up/Down counting mode	4 sets
02	Frequency mode	8 sets
03	Up counting mode	8 sets

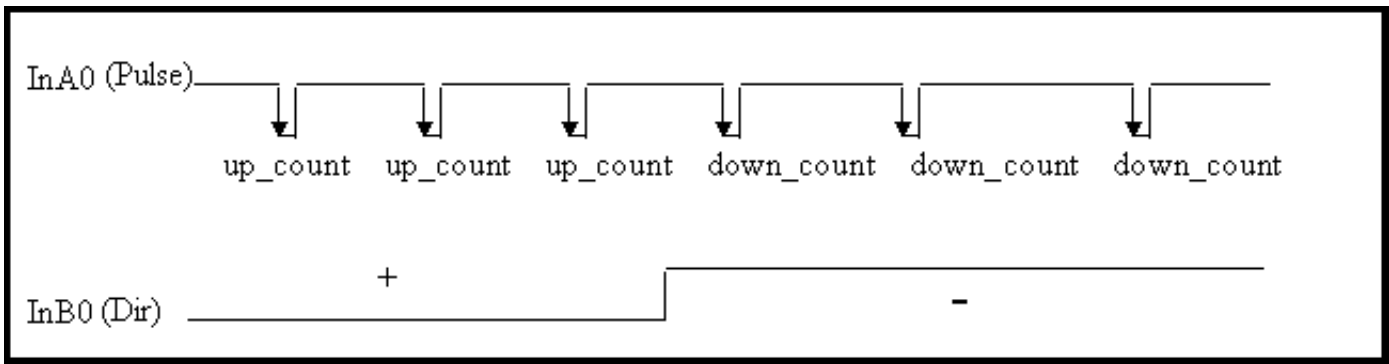
The input channels mapping table and working modes are indicated below:

	Mode 00	Mode 01	Mode 02	Mode 03
A0	Pulse 0	Up 0	Frequency 0	Up 0
B0	Dir 0	Down 0	Frequency 1	Up 1
A1	Pulse 2	Up 2	Frequency 2	Up 2
B1	Dir 2	Down 2	Frequency 3	Up 3
A2	Pulse 4	Up 4	Frequency 4	Up 4
B2	Dir 4	Down 4	Frequency 5	Up 5
A3	Pulse 6	Up 6	Frequency 6	Up 6
B3	Dir 6	Down 6	Frequency 7	Up 7

- CountN = the counter value for channel N, 32bit wide, from -2147483648 to 2147483647
- OverflowN = the counting overflow number for channel N, 16bit wide, from -32768 to 32767
- Total Counting Value bit = 32bit + 16bit = 48bit

Mode 00: Pulse /Dir Counting

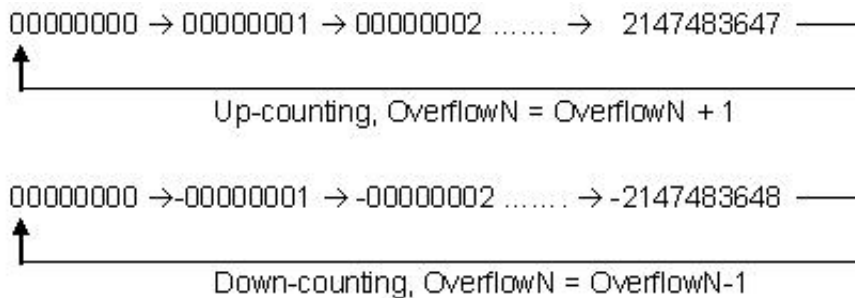
The counter operation for mode 00 (Dir/Pulse mode) is as follows:



When InB0 is used as Dir, if InB0 is High, counter_0 will be increased by one for every falling edge of InA0.

If InB0 is Low, counter_0 will be decreased by one for every falling edge of InA0.

The counter operation is given as follows:

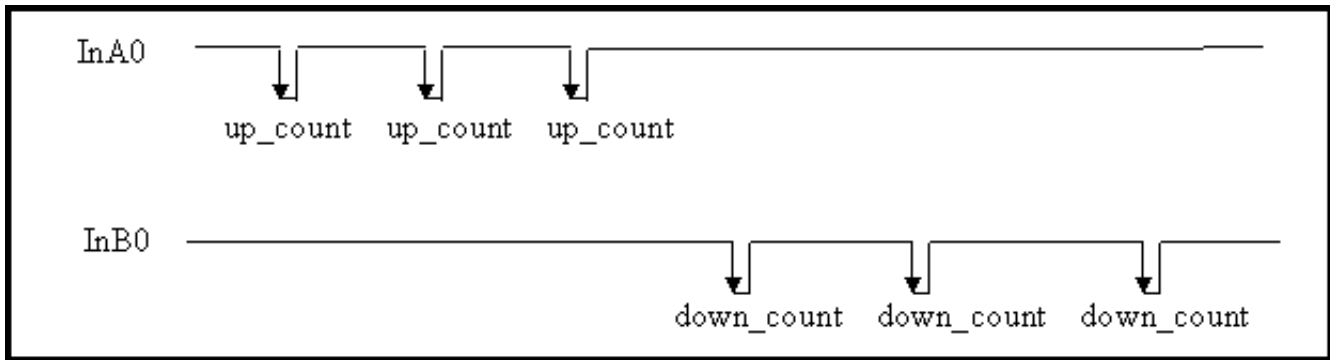


Pulse/Dir Counter	Counting Variable	Total Counting Value
A0, B0	Count0, Overflow0	Count0 + Overflow0 * 2147483648
A1, B1	Count2, Overflow2	Count2 + Overflow2 * 2147483648
A2, B2	Count4, Overflow4	Count4 + Overflow4 * 2147483648
A3, B3	Count6, Overflow6	Count6 + Overflow6 * 2147483648

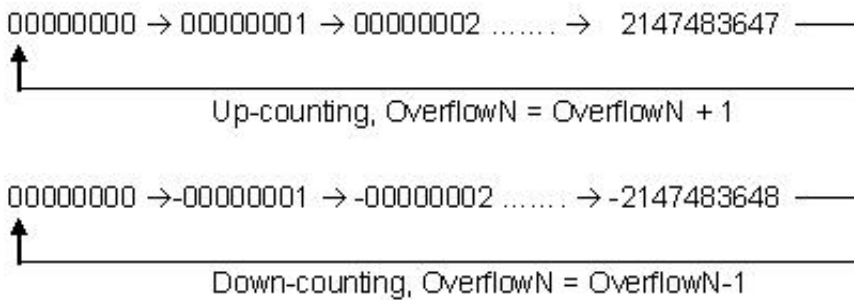
- CountN = the counter value for channel N, 32bit wide, from -2147483648 to 2147483647
- OverflowN = the counting overflow number for channel N, 16bit wide, from -32768 to 32767
- Total Counting Value bit = 32bit + 16bit = 48bit

Mode 01: Up/Down Counting

The counter operation for mode 01 (Up/Down mode) is as follows:



When InA0 is used as a UP_clock and InB0 is used as a DOWN_clock. The counter_0 will be increased by one for every falling edge of InA0 and decreased by one for every falling edge of InB0.

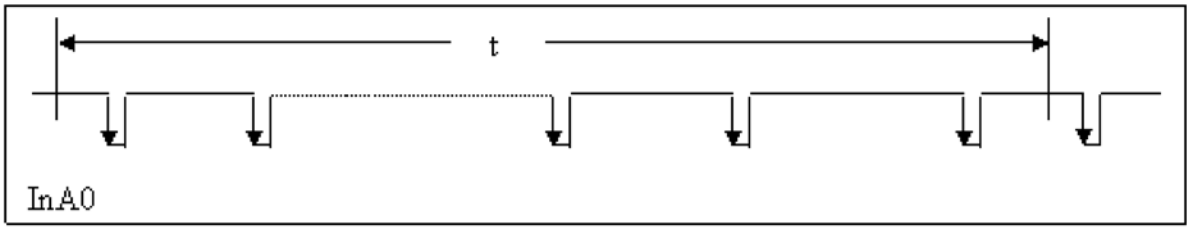


Up/Down Counter	Counting Variable	Total Counting Value
A0, B0	Count0, Overflow0	Count0 + Overflow0 * 2147483648
A1, B1	Count2, Overflow2	Count2 + Overflow2 * 2147483648
A2, B2	Count4, Overflow4	Count4 + Overflow4 * 2147483648
A3, B3	Count6, Overflow6	Count6 + Overflow6 * 2147483648

- CountN = the counter value for channel N, 32bit wide, from -2147483648 to 2147483647
- OverflowN = the counting overflow number for channel N, 16bit wide, from -32768 to 32767
- Total Counting Value bit = 32bit + 16bit = 48bit

Mode 02: Frequency Mode

The frequency operation for mode 02 is as follows:



Frequency	Frequency Variable
A0	Frequency0
B0	Frequency1
A1	Frequency2
B1	Frequency3
A2	Frequency4
B2	Frequency5
A3	Frequency6
B3	Frequency7

Period of update time $t = 0.33$ second is the default setting. A user defined command can be used to change the value of t for special applications.

Frequency = Counter value / Period of scan time t

Assume $t = 0.1$ seconds,

If count = 1 à frequency = $1/(0.1/1) = 10$ Hz

If count = 10 à frequency = $1/(0.1/10) = 100$ Hz

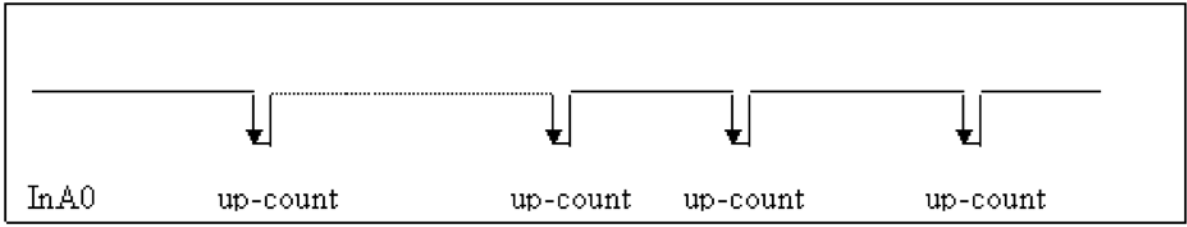
All frequency channels will be updated every 0.1 seconds for $t = 0.1$ seconds.

The software driver provides three ways to adjust t . They are Auto select, Low and High Frequency. (The default is Auto select) The default configuration data is as follows:

- Auto Frequency = The frequency channel will be updated every 330 millisecond ;
- Low Frequency = The frequency channel will be updated every 1000 millisecond ;
- High Frequency = The frequency channel will be updated every 100 millisecond ;

Mode 03: Up Counting

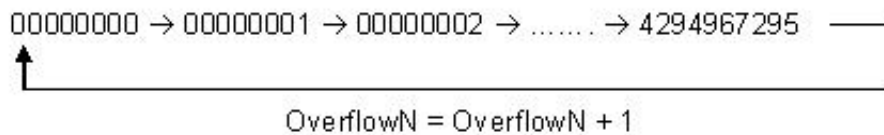
The counter operation for mode 03 is as follows:



Counter_0 will increment by one for every falling edge of InA0

Up Counter	Counting Variable	Total Counting Value
A0	Count0, Overflow0	Count0 + Overflow0 * 4294967296
B0	Count1, Overflow1	Count1 + Overflow1 * 4294967296
A1	Count2, Overflow2	Count2 + Overflow2 * 4294967296
B1	Count3, Overflow3	Count3 + Overflow3 * 4294967296
A2	Count4, Overflow4	Count4 + Overflow4 * 4294967296
B2	Count5, Overflow5	Count5 + Overflow5 * 4294967296
A3	Count6, Overflow6	Count6 + Overflow6 * 4294967296
B3	Count7, Overflow7	Count7 + Overflow7 * 4294967296

The counter operation is as follows:



- CountN = current counter value for channel N, 32bit wide, from 0 to 4294967295
- OverflowN = The counting overflow number for channel N, 16bit wide, from 0 to 65535
- Total Counting Value = CountN + OverflowN * 4294967296
- Total Counting Bit = 32bit + 16bit = 48bit