

LED_bar

20131021

This change brightness of LED by PWM.

Reference;

Chapter7.Counter Modules and Circuit Application Lab in Propeller Education kit Labs
AN001-P8X32ACounters-v2.0_2.pdf

LED_bar_0.1.f

We use NCO/PWM counter-mode on PWM for PropForth.

1. Set the I/O pin to output
2. Set the frqa/frqb register
2. Set the phsa/phsb register
4. Configure the ctra/ctrb register

These(demo1 demo2 demo3) use PWM/NCO single-ended counter-mode.

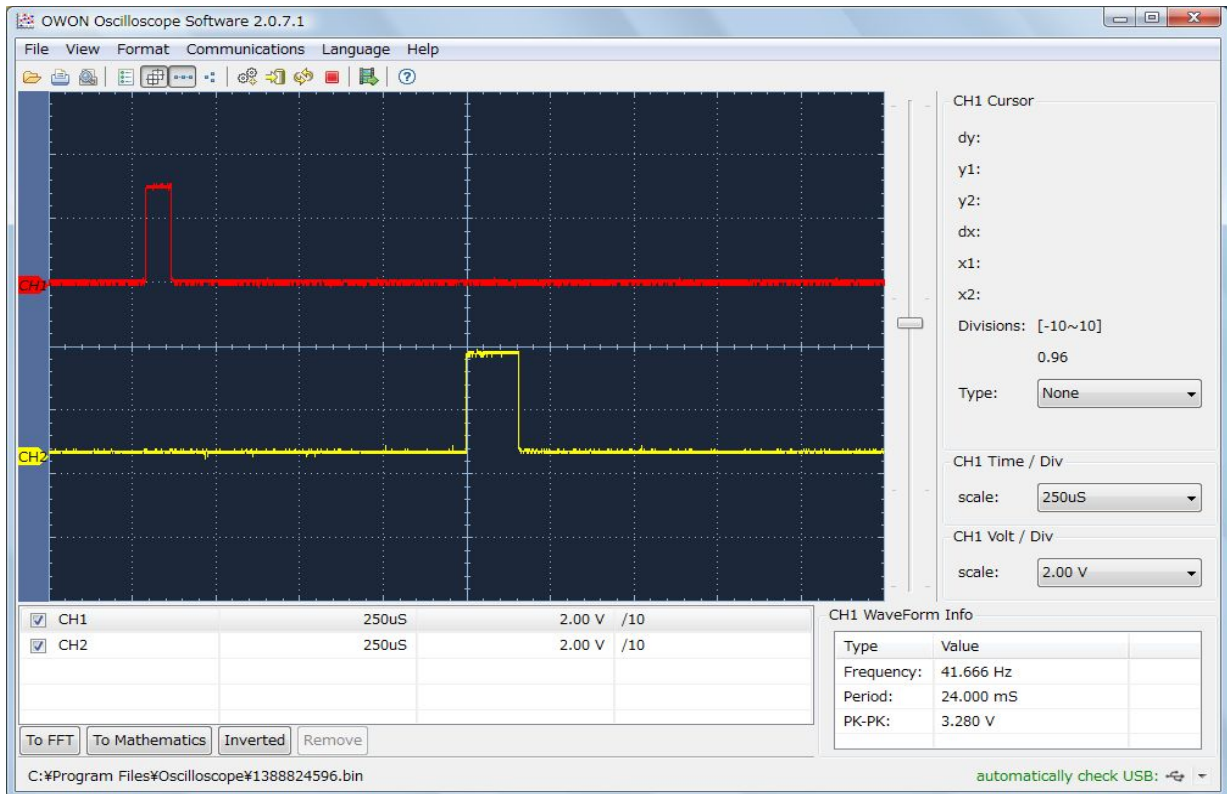
demo1 repeat to display 64level_bright on each element of LED_bar.

demo2 merely is different pattern from demo1.

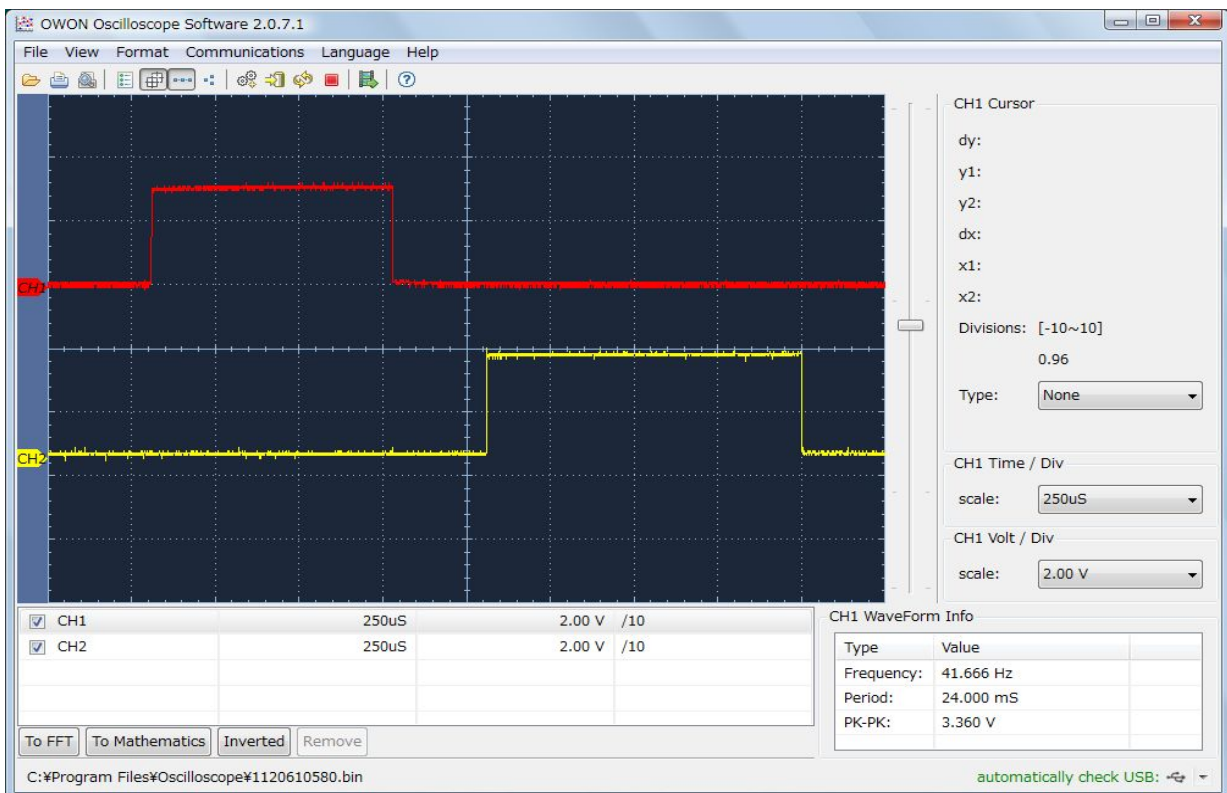
demo3 continue to change bright-level on each element of LED_bar.

It seems no problem.

About demo1



ch1(red) is on P0. ch2(yellow) is on P2



ch1(red) is on P6. ch2(yellow) is on P7

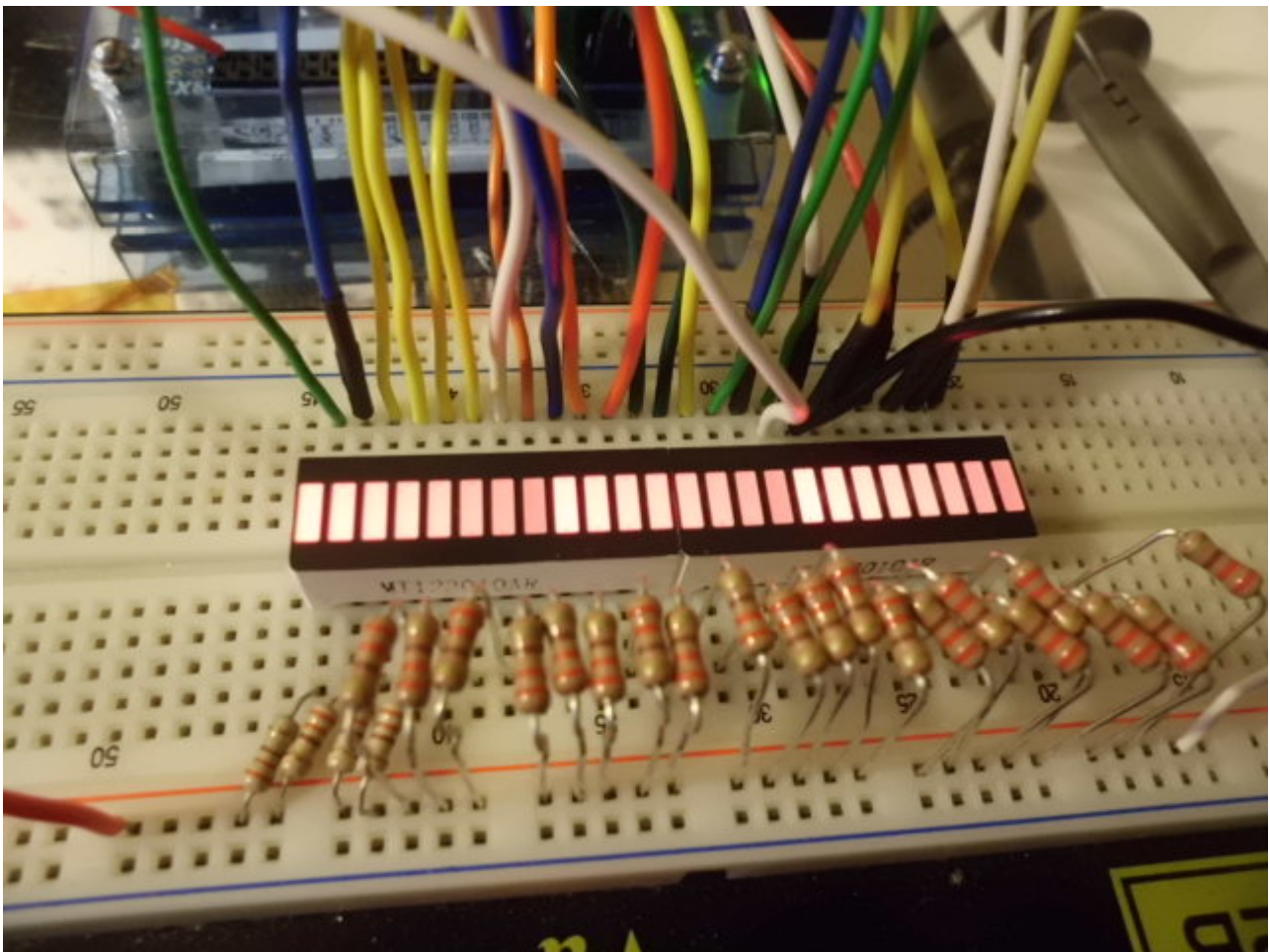
Port	Time1	scale_value	Time2
P0	78usec	5	78.125usec
P1	155usec	10	156.25usec
P2	250usec	16	250usec
P3	360usec	23	359.375usec
P4	460usec	30	468.75usec
P5	580usec	37	578.125usec
P6	720usec	46	718.75usec
P7	940usec	64	1000usec

'Time1' are observing by oscilloscope.

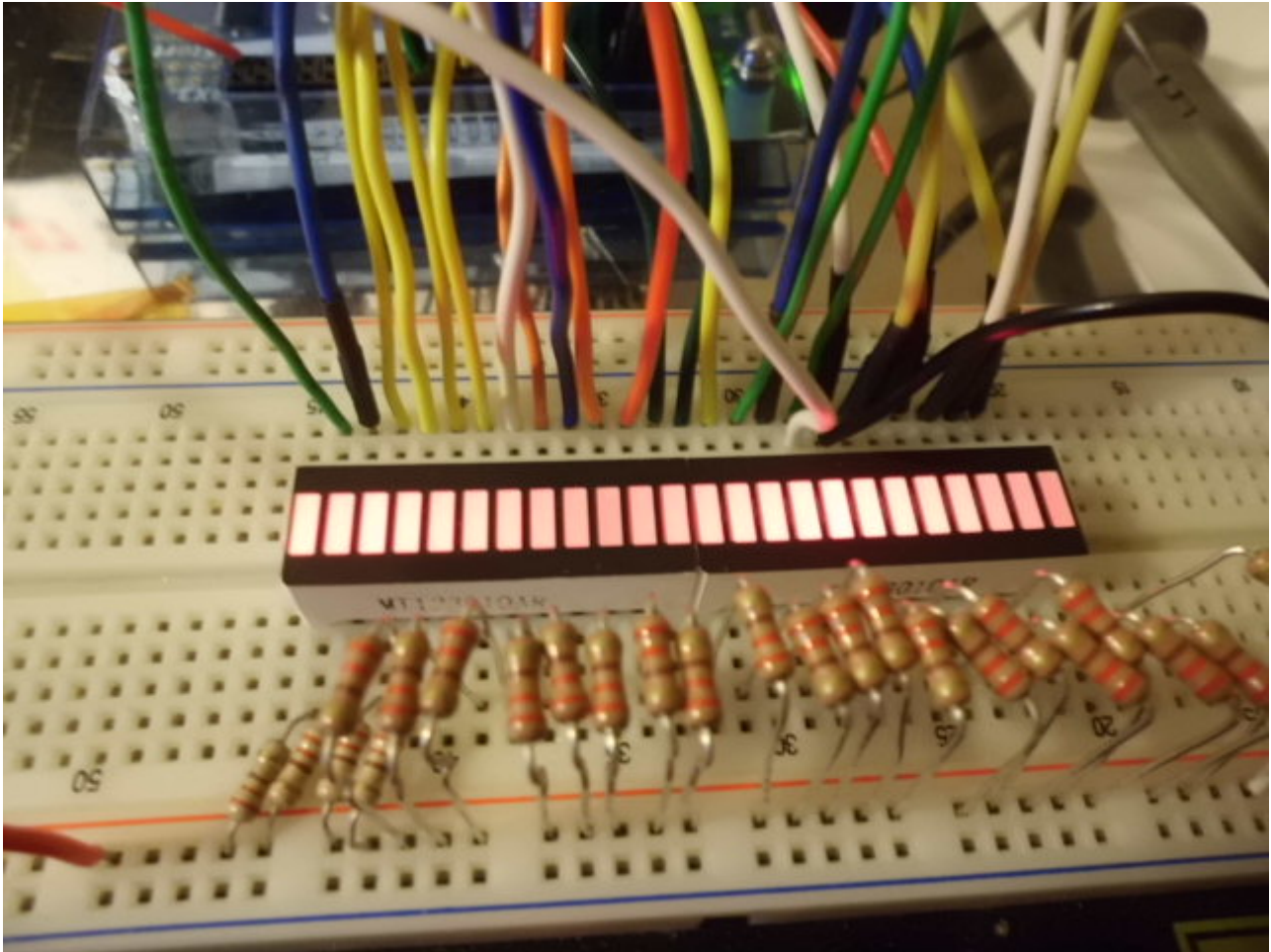
'Time2' are calculating_value.(Reference:single_drive_LED_bar inside LED_bar_0.1.f)

'Time1' are almost same as calculating_value except for P7.

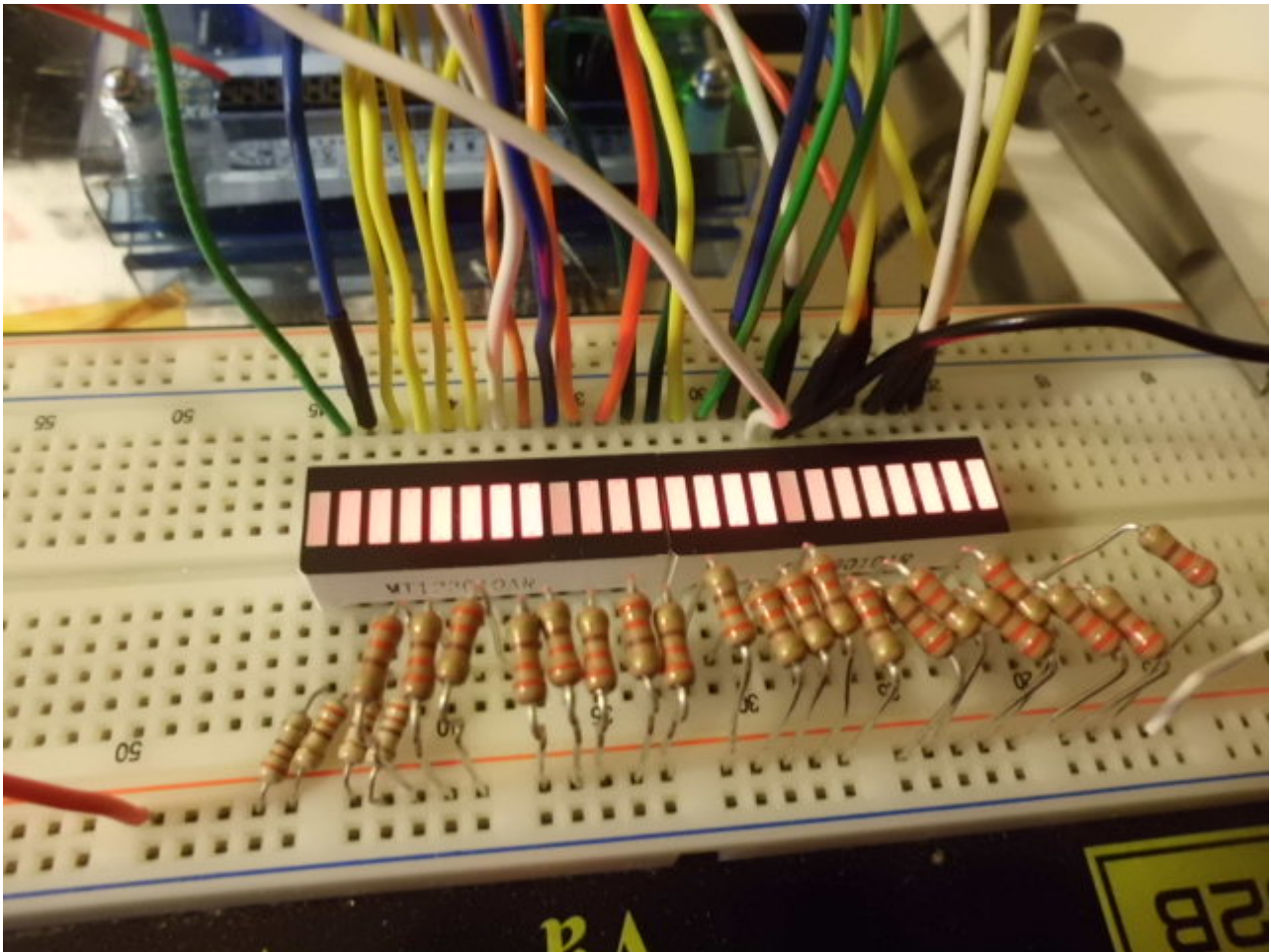
demo1



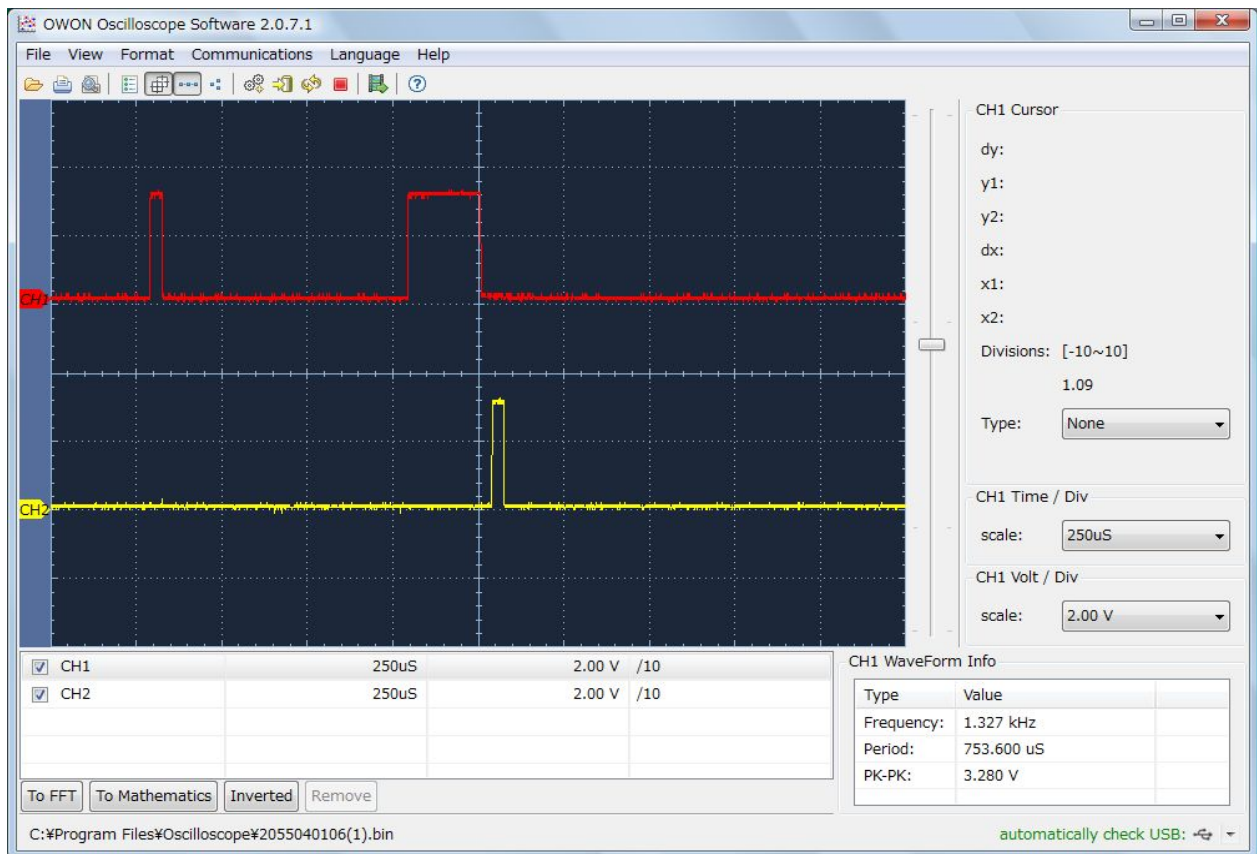
demo2



About demo4



demo4 use PWM/NCO differential counter-mode.
This mode merely reverse bit31-signal at PWM/NCO single-ended counter-mode.
This pattern is same as demo1.
Brightness of LED elements reverse to demo1.



ch1(red) is on P6. ch2(yellow) is on P7

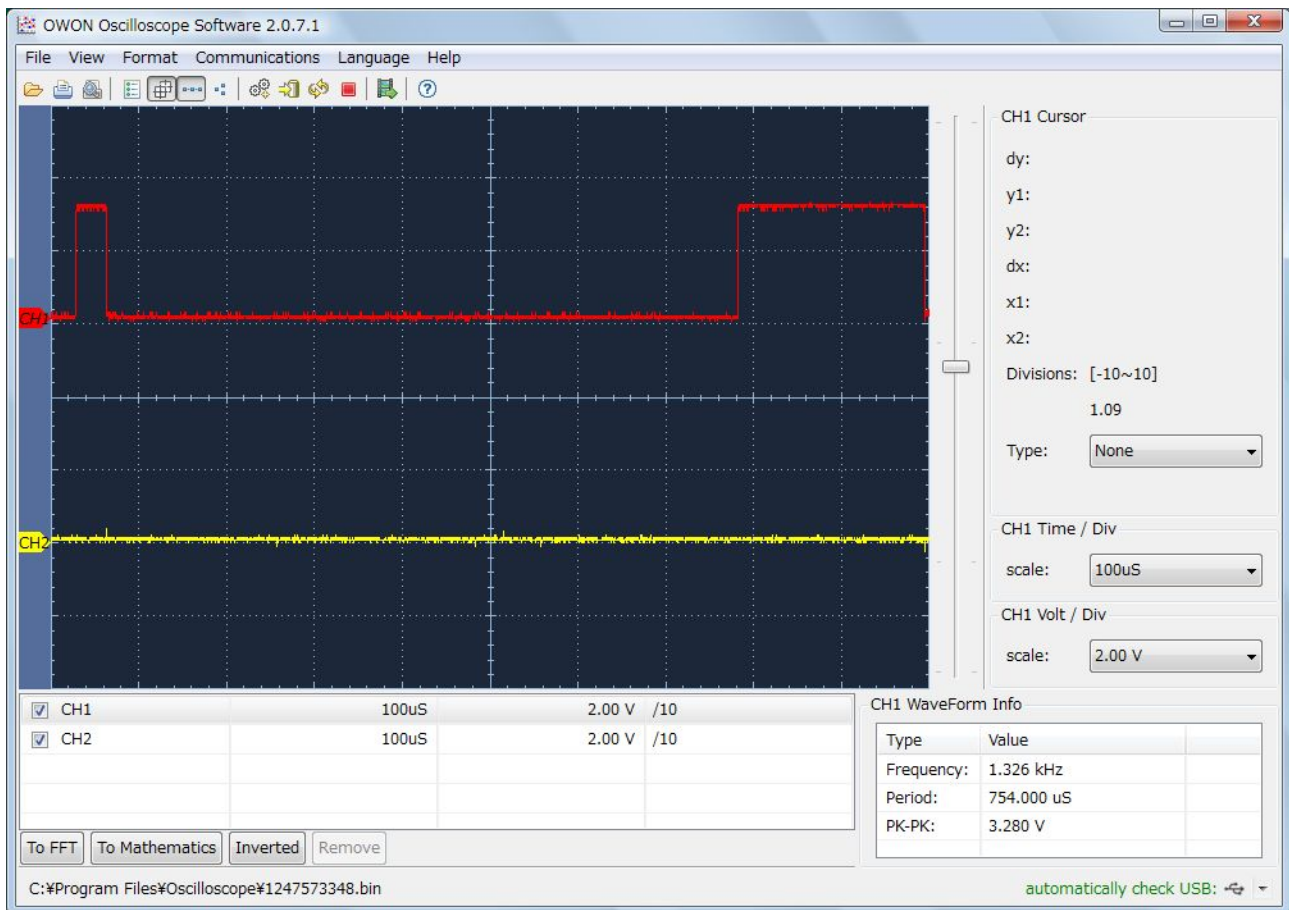
demo4 is bad code. (After setting ctra, phsa is saved)

(Reference:dif_drive_LED_bar inside LED_bar_0.1.f)

But observing this can understand overhead-time of PWM on PropForth.

Hi-pulse position is backward of 1msec

Observing demo4(P6);



ch1(red) is on P6. ch2(yellow) is on P7

This adjust to fit P6's signalend at screen's right

Cycle time is 1msec.

When pulse rise up at left, its position is "ctra COG!" inside "d24 0 do -- loop".

When pulse fall down, its position is "negate phsa COG!".

This time(aproximate 40usec) during high take calculating time phsa.

This delay bit31-output-pulse to backward.

Of course, this overhead-time exist on PWM/NCO single-ended counter-mode.

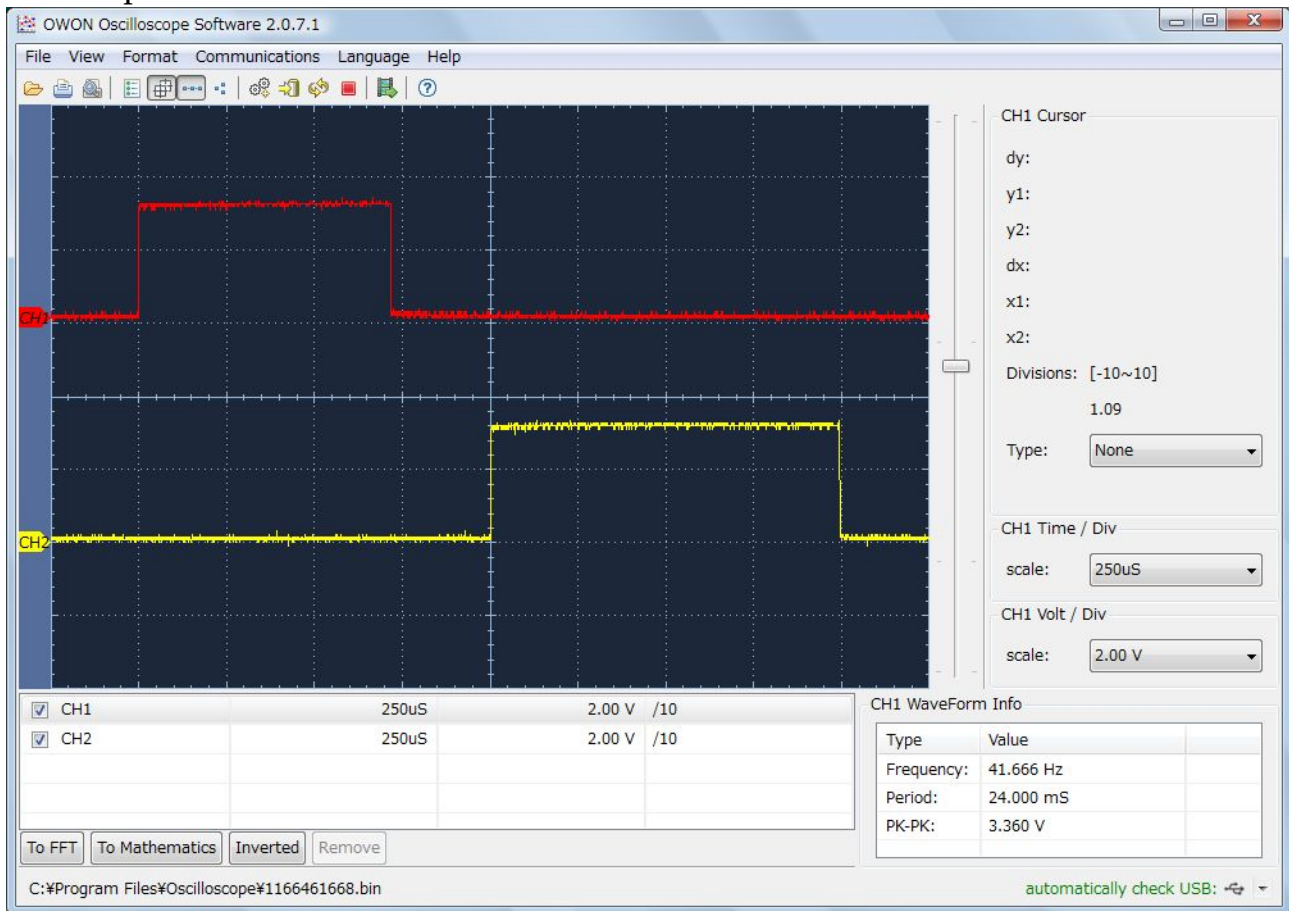
So, P7's Hi-pulse is a little short than 1msec.

About demo5

demo5 use assembler-word as PWM/NCO single-ended mode.

(pattern same as demo1)

P7's Hi-pulse is almost 1msec



ch1(red) is on P6. ch2(yellow) is on P7

demo6 use assembler-word as PWM/NCO differential mode. (pattern same as demo1)

Overhead-time for PWM using counter mode is approximately 40usec by using forth-word.

(if assembler-word, several usecond)

This error occure near duty 100%. (case of PWM/NCO single-ended mode)

When cycle-time is big, I think error can be ignored.

To prevent overhead-time for PWM using counter mode.

1 Increasing cycle time (forth-word)

Cycle time is 1msec on "single_drive_LED_bar".

Changing 1msec to 1.1msec.

Making word to be duty100% = 1msec.

2 Not using max-value on brightness (forth-word)

Brightness level inside LED_level array is maximum d64 on demo1,demo2.

Max value change to d60 incase of max64.

3 Using assembler word.

Calculating time is very short. Not zero.