TRIO
MOTION | TECHNOLOGY

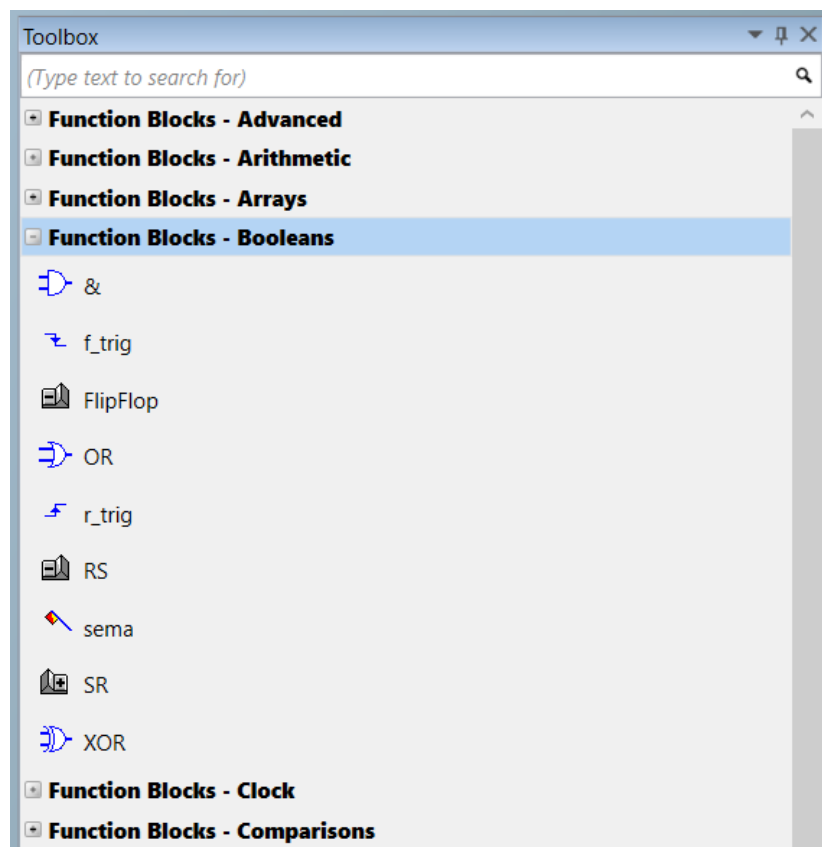|	
Doc No.:	**AN-373**
Version:	**1.0**
Date:	**09 May 2017**
Subject:	**Adding simple functions to Ladder**

APPLICATION NOTE

1. Requirement

To add Rising Edge, Flip-Flop and Timer functions to a Ladder program.
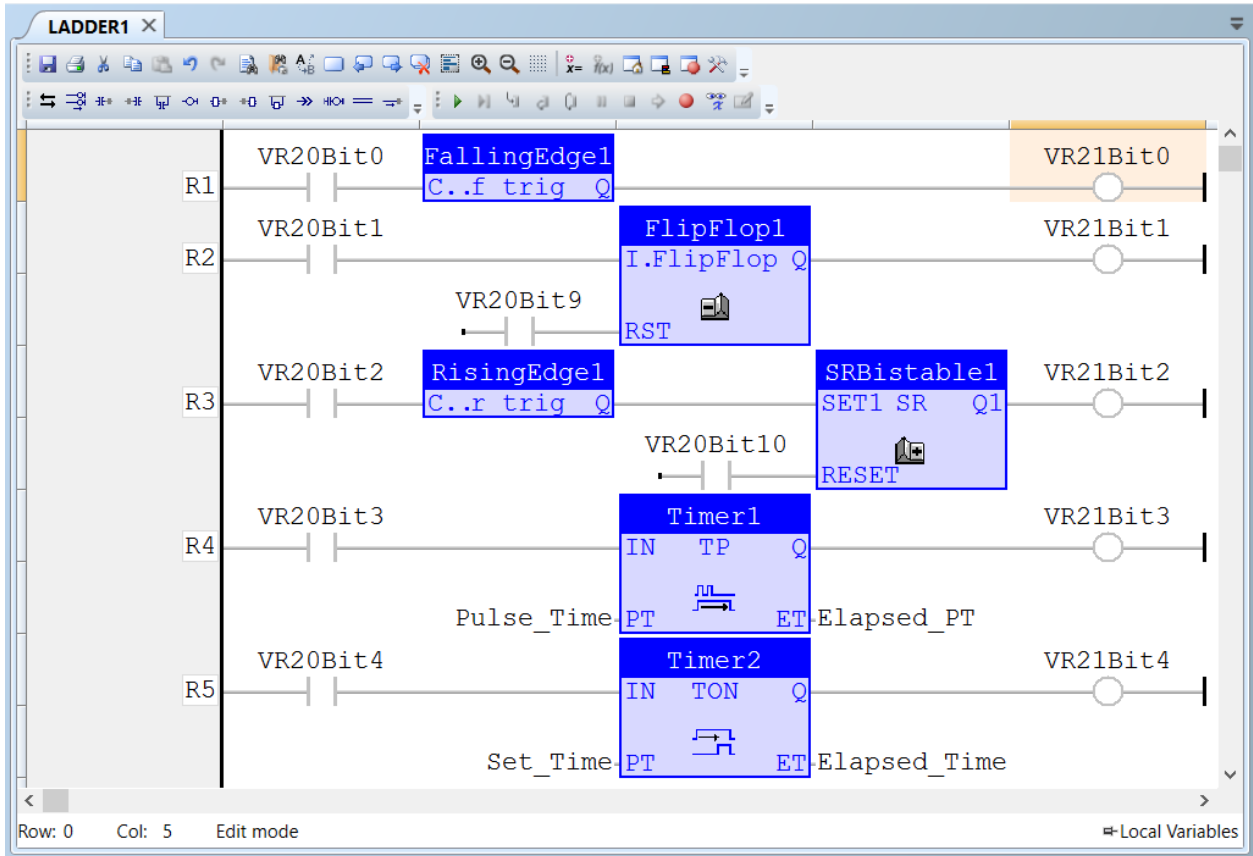
2. Toolbox

Open the toolbox, select the required function blocks and drag them to the required position on the Ladder.
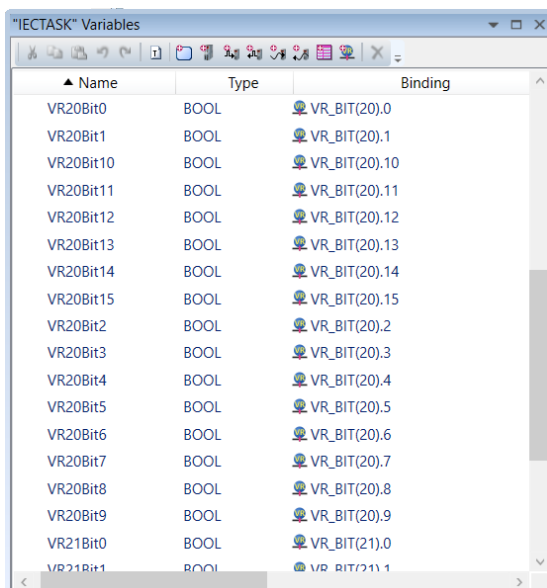
3. Assign instance names to the Function Blocks

As you put the functions into the Ladder, the editor will ask for names if they are needed. Names like RisingEdge1 were used in this example. More meaningful names can be used in the real application.

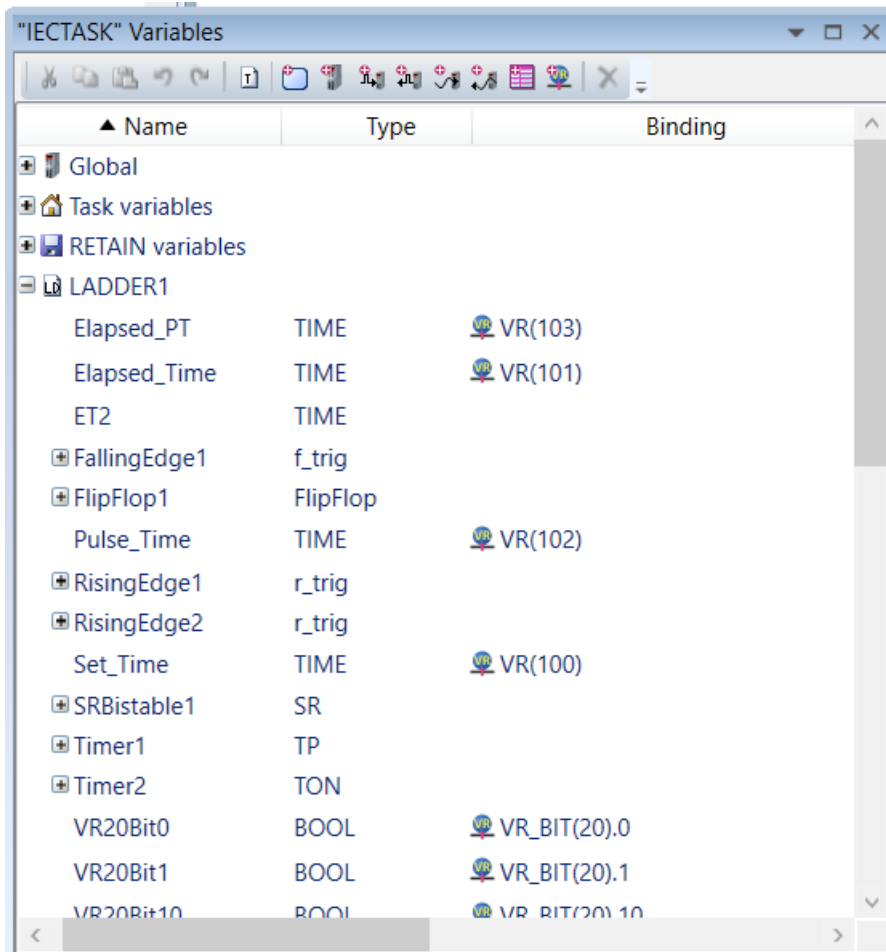# 4. Bind contacts and coils as required

Usually the contacts will be inputs and the coils will be outputs. In this example they are bound to bits in global VR variables.

5. Set up TIME variables for the timers

Timers need times as input and output as type TIME. In this case the variables are bound to VRs. The VR value is always in milliseconds.

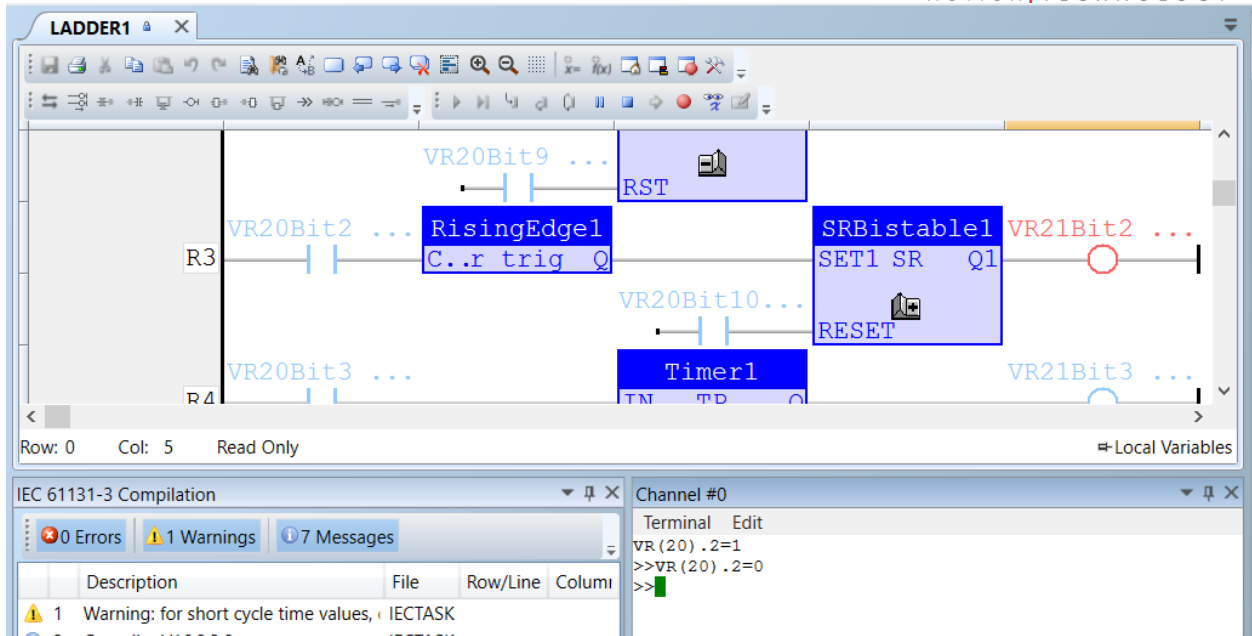| "IECTASK" Variables			
▲ Name	Type	Binding	
⊞ 🛢 Global			
⊞ 🏠 Task variables			
⊞ 💾 RETAIN variables			
⊟ 📖 LADDER1			
Elapsed_PT	TIME	VR(103)	
Elapsed_Time	TIME	VR(101)	
ET2	TIME		
⊞ FallingEdge1	f_trig		
⊞ FlipFlop1	FlipFlop		
Pulse_Time	TIME	VR(102)	
⊞ RisingEdge1	r_trig		
⊞ RisingEdge2	r_trig		
Set_Time	TIME	VR(100)	
⊞ SRBistable1	SR		
⊞ Timer1	TP		
⊞ Timer2	TON		
VR20Bit0	BOOL	VR_BIT(20).0	
VR20Bit1	BOOL	VR_BIT(20).1	
VR20Bit10	BOOL	VR_BIT(20).10	

6. Set the time values and run the program

In Motion Perfect terminal 0, the time values are set in VR(100) and VR(102).

```
>>vr(100)=10000
>>vr(102)=5000
```
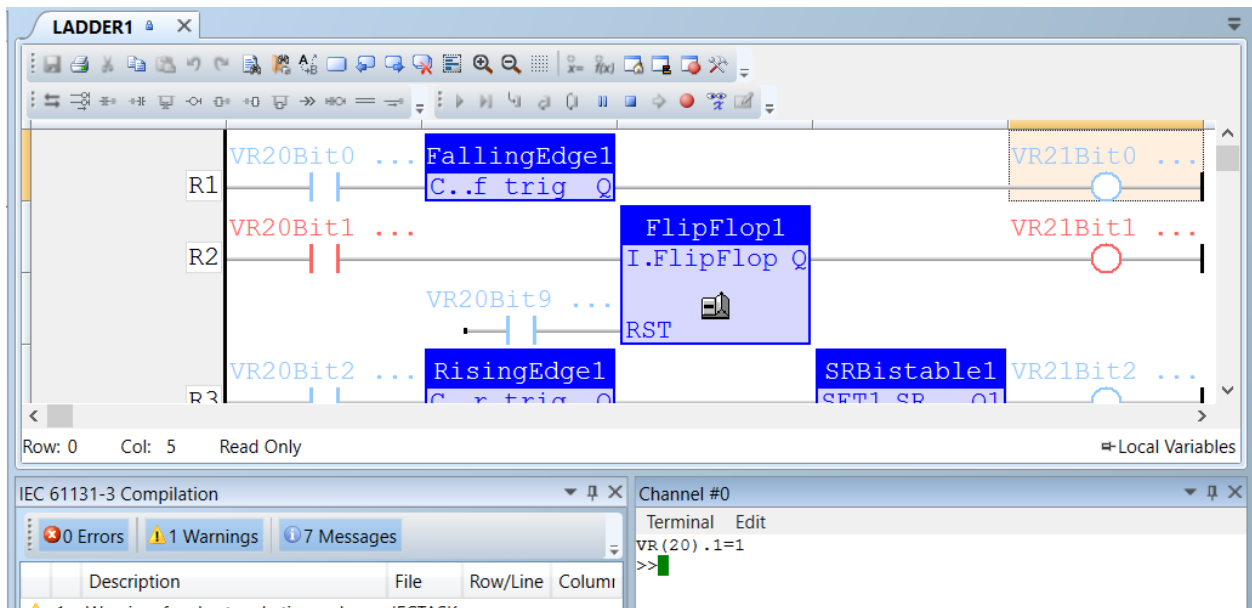
In this case 10 seconds and 5 seconds.

VR(20) bits are then set to trigger the different functions.

6.1. Falling Edge

There is a pulse on the Q output when VR(20) bit 0 goes to 0. It is difficult to see it.

6.2. Rising edge

To make it easier to "see" the rising edge pulse, the output is connected to a SR bistable which will latch the value.

Setting the input High. The SR output is set because its input was pulsed from the Rising Edge Q output.

Setting the input low again.

6.3. Flip Flop

The flip flop Q goes high when the SET input is pulsed. It goes low when the RST input is pulsed.

Q stays high until the RST input is set.
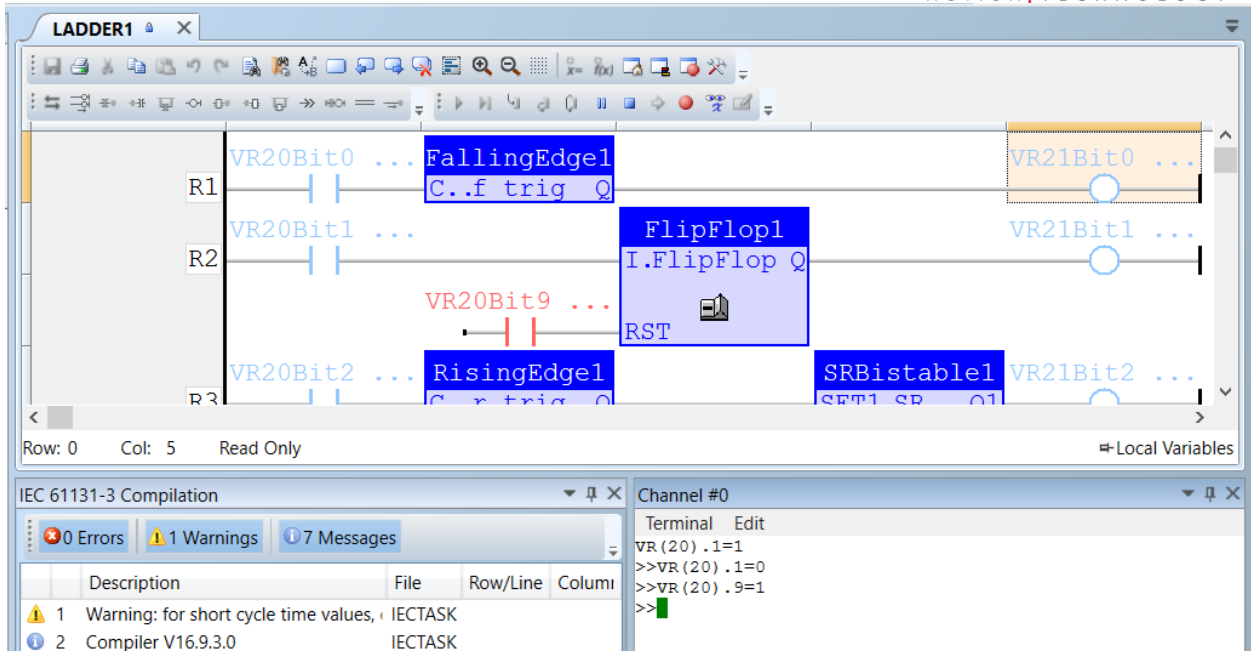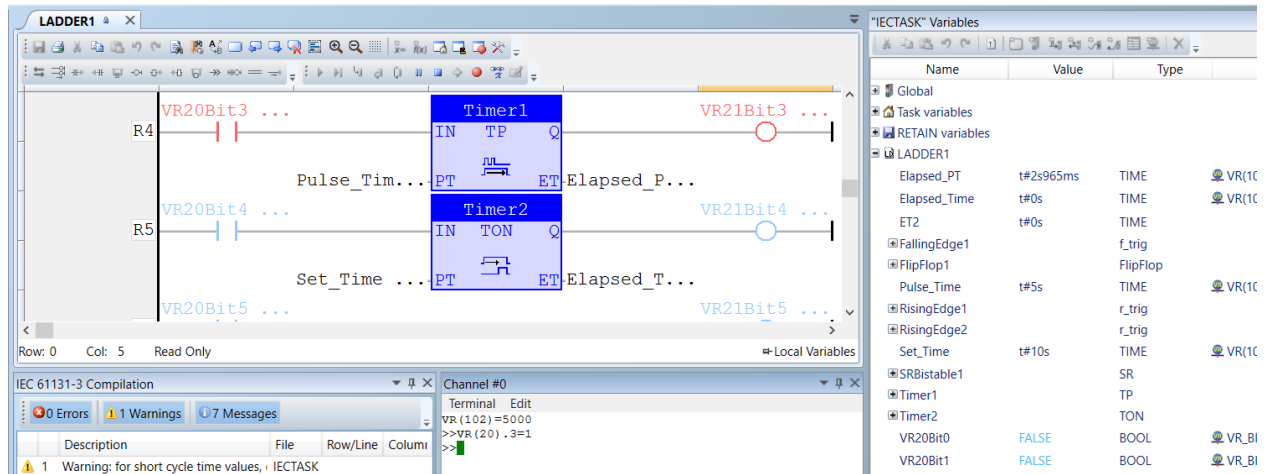
6.4. TON timer

The output goes ON after the elapsed time is finished. In this case 10 seconds.
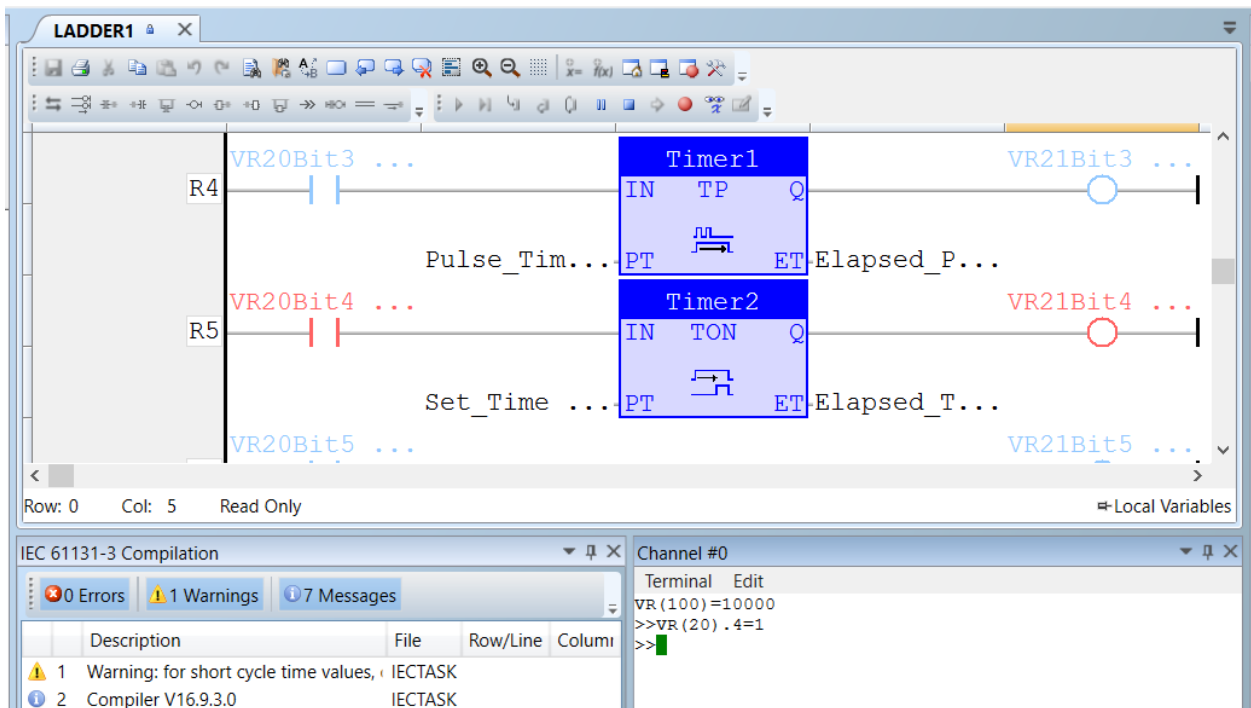
6.5. TP timer
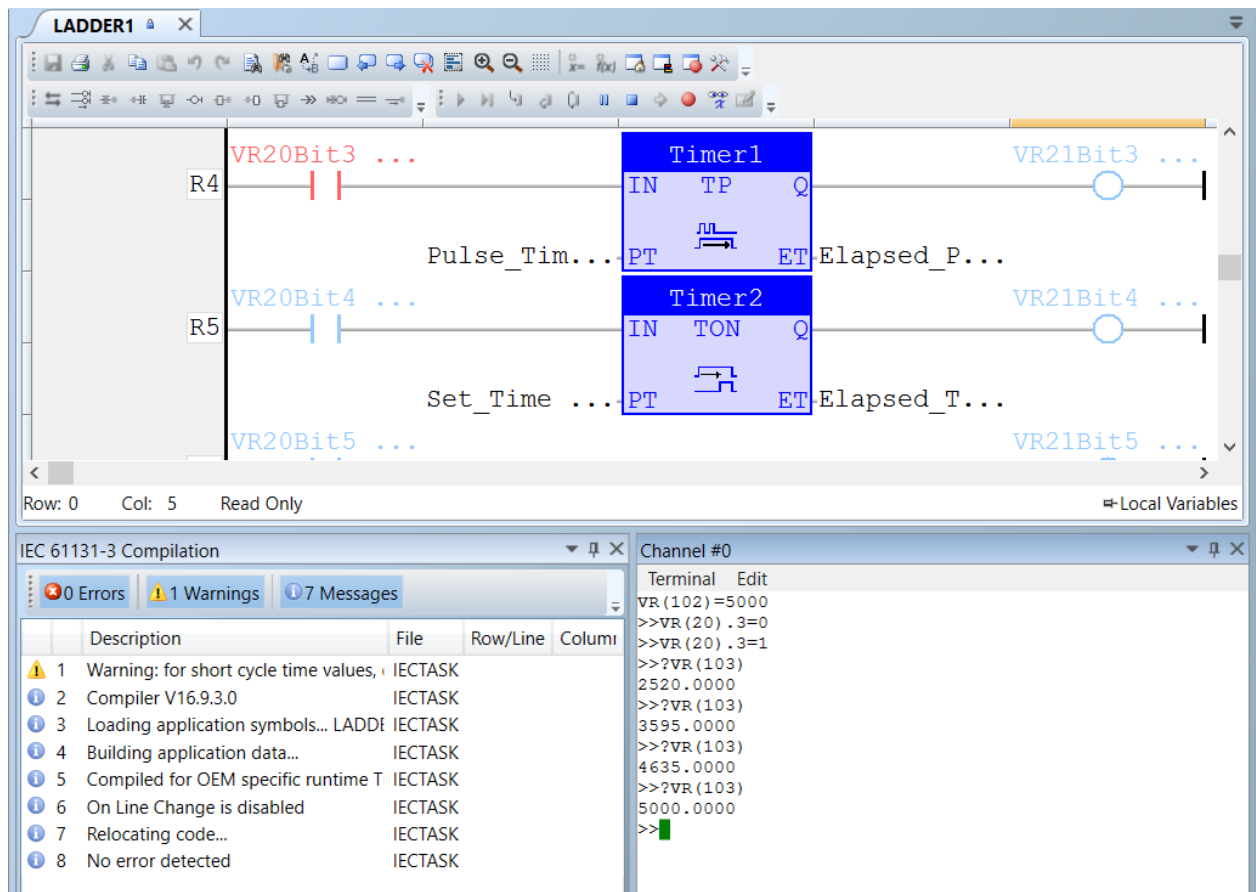
The output goes ON immediately the input is set TRUE. It remains ON for the elapsed time.

You can also see the elapsed time in VR(103)