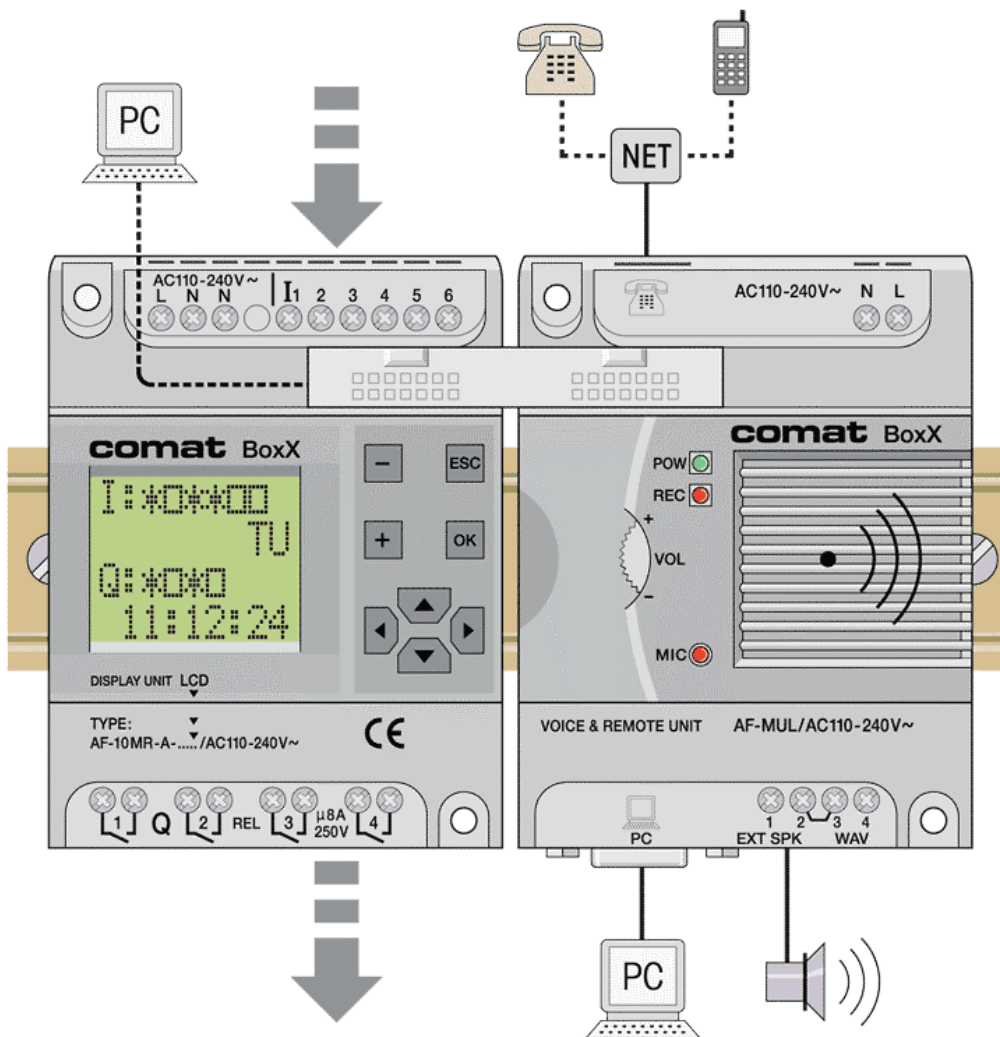
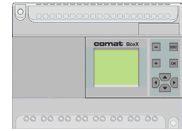


Applications and Examples





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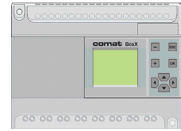
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General notes

General remarks to the examples

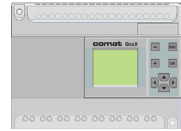
The following examples are single functions which work by them self independently from other programming sequences.

For integration into other program circuits it may be necessary to obey certain rules or to adjust times.

Generally the examples shown are only one of many possible other solutions. Other variation (perhaps more optimized versions) are always possible.

The following solutions are only examples and do not infringe any other rights

The correct function when implemented into other programs and circuits cannot be guaranteed.



Task

1. Numbering of Function Blocks

The Sequence of the function blocks is less important as long as the generated logical signals are longer than the cycle time for the whole program. (i.g. times longer than 100msec.)

Otherwise it is important that the following block has a higher block number than the previous one.

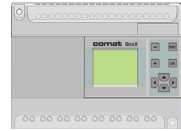
Designation of Inputs and Outputs

- I 1 Reset
- I 2 Set
- Q 1 Output

Control Device

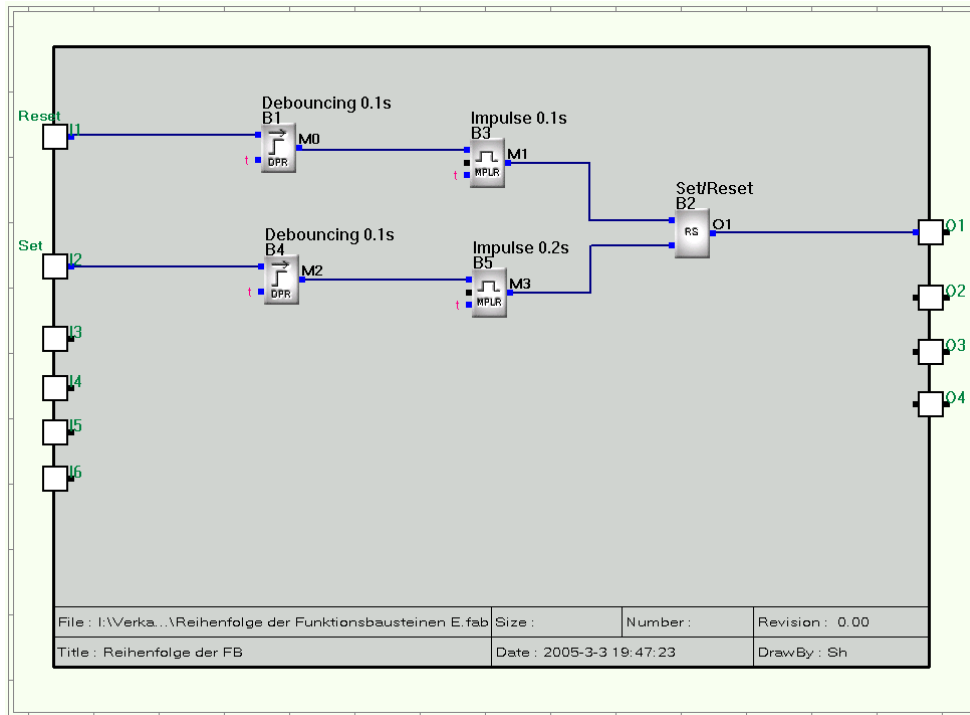
Controller → Comat BoxX

The programming software Quick II shall be used to design the control circuit.



Solution

1. Numbering of Function Blocks

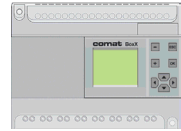


Example for the numbering of Function Blocks.

In this sample the setting of block B2 will work because the generated pulse of B5 is longer than the cycle time. This is not valid for the reset function. The 10msec pulse of B3 is to short. However if B3 will becomes B2 and B2 becomes B3 it works.

Important note:

In simulations both version will work but not after the software has been downloaded to the hardware.



Task

2. Debouncing, noise protection of Inputs

For push button-inputs, 230VAC inputs, etc. it is recommended to delay the input signal.

This avoids that an accidentally activated push button or influence on the line activate unwanted inputs.

Practical values: Delays for push buttons: 50 ÷ 100ms. Delays for static Inputs 10 ÷ 50ms

Designation of Inputs and Outputs

I 1 Push button Input

Q 1 Output 1

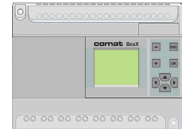
Q 2 Output 2

Q 3 Output 3

Control Device

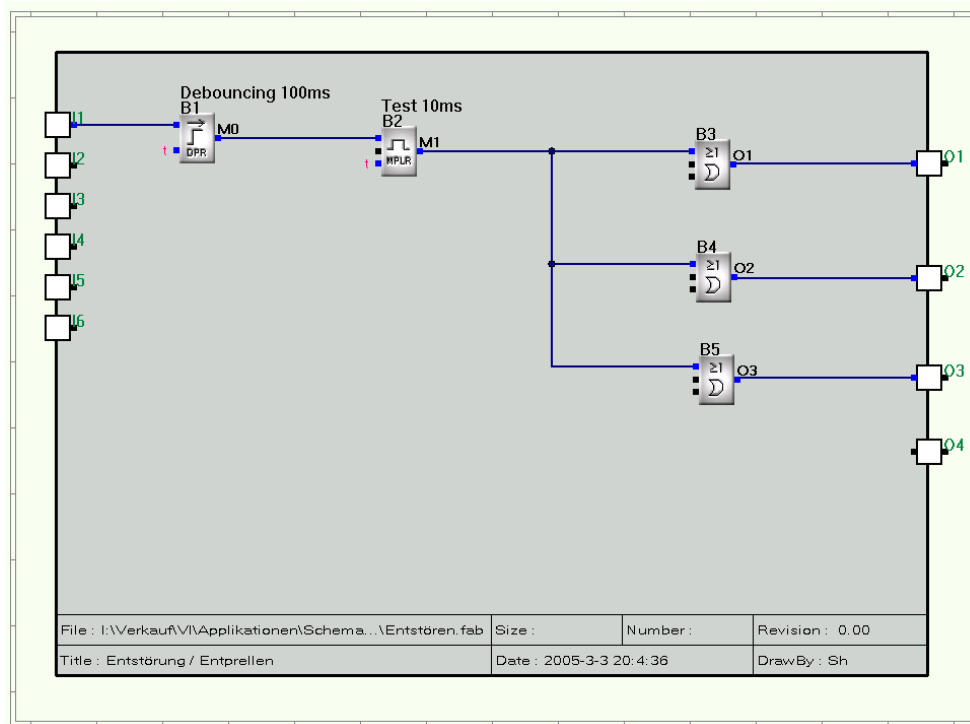
Controller → Comat BoxX

The programming software Quick II should be used to design the control circuit.



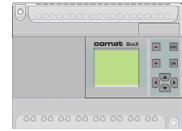
Solution

2. Debouncing, noise protection of Inputs



Example for debouncing and noise protection of Inputs

This sample shows a lamp test. The Input detection of the test button is delayed by 100ms and the test itself is limited to 10s.



Task

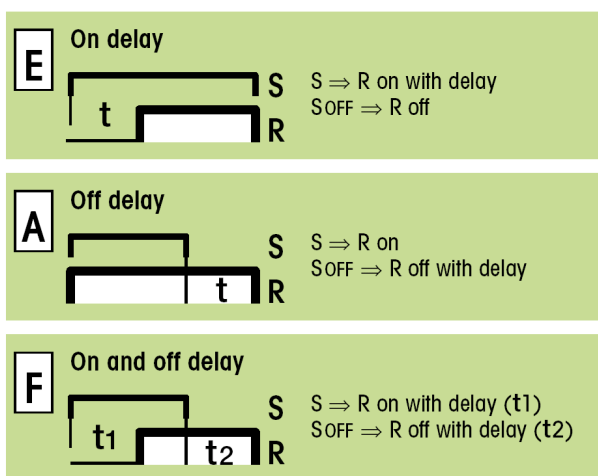
3. Comat Timer Functions E, A, F

The following timing functions should be programmed in Quick II for Comat BoxX:

ON Delay, Comat Function E

OFF Delay, Comat Function A

ON and OFF Delay, Comat Function



Designation of Inputs and Outputs

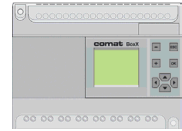
I 1 Signal Input

Q 1 Time and Function dependent Output

Control Device

Controller \rightarrow Comat BoxX

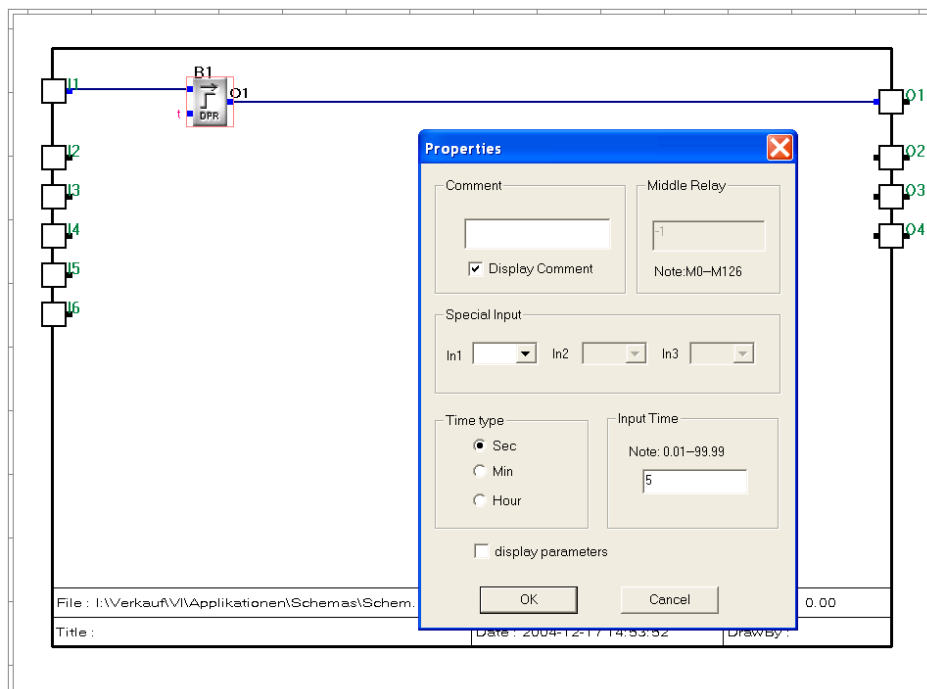
The programming software Quick II should be used to design the control circuit.



Solution

3.1 Comat Delay Function E

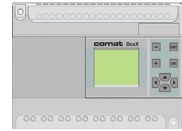
- ON Delay E



Example for an ON delay of 5 seconds (Comat Function E)

Realization with Function Block DPR.

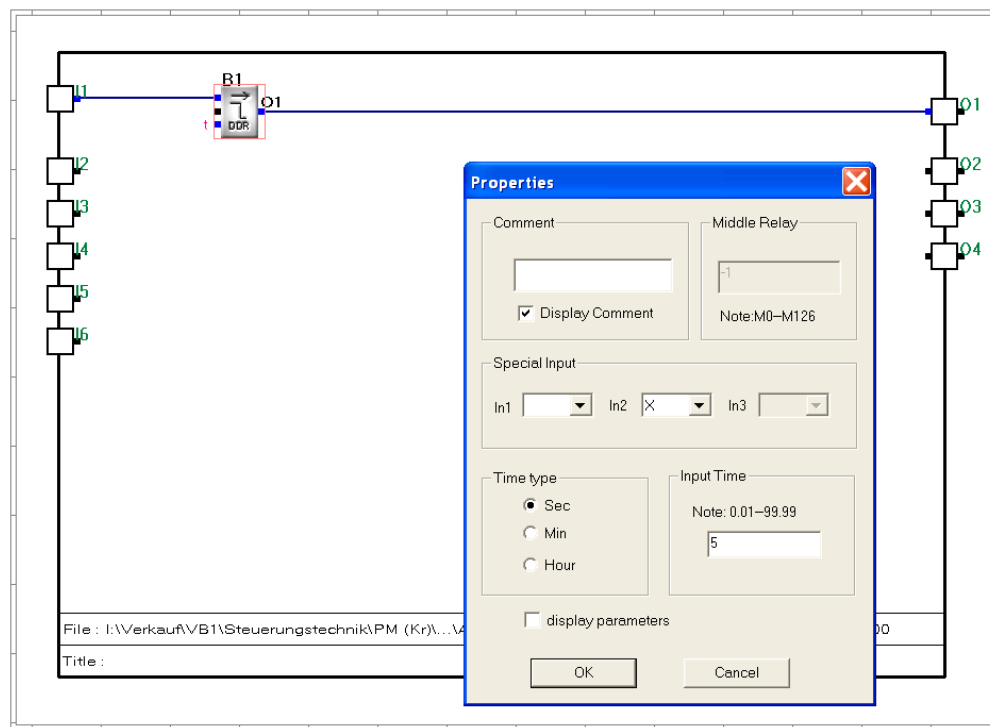
Delay time can be set under Properties after double click onto the DPR Function Block



Solution

3.2 Comat Delay Function A

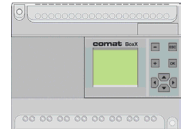
- OFF Delay A



Example for an OFF delay of 5 seconds (Comat Function E)

Realization with Function Block DDR.

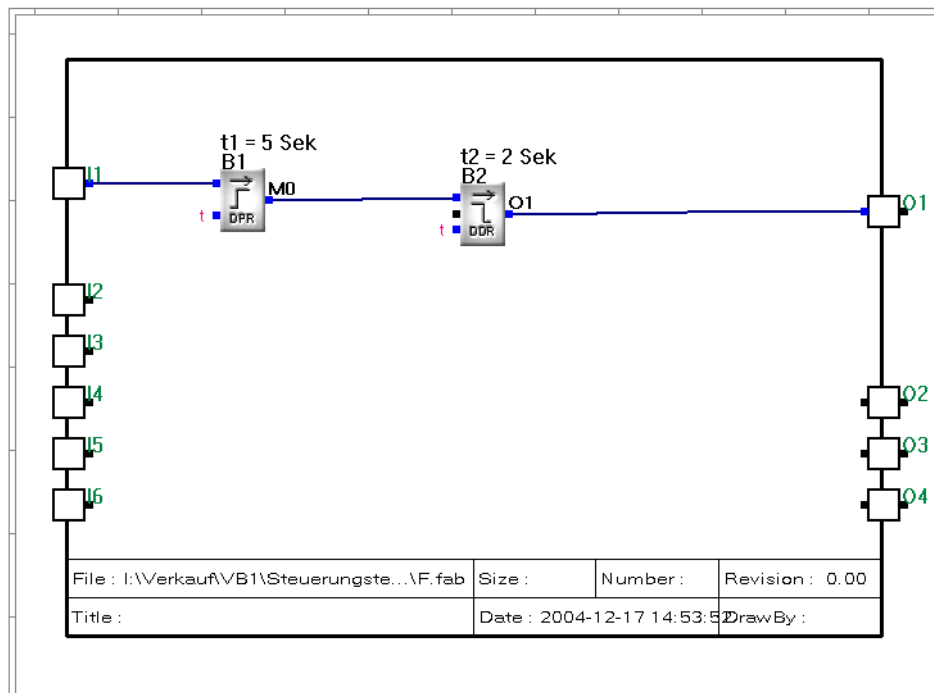
Delay time can be set under Properties after double click onto the DDR Function Block



Solution

3. 3 Comat Delay Function F

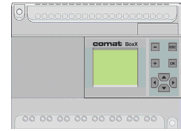
- ON and OFF Delay F



Example for ON delay of $t_1 = 5$ seconds and Off delay of $t_2 = 2$ seconds (Comat Function F)

Realization by logical linking of Function Block DPR and DDR

Delay time t_1 can be set under Properties after double click onto the DPR Function Block and delay time t_2 after double click onto the DDR Function Block



Task

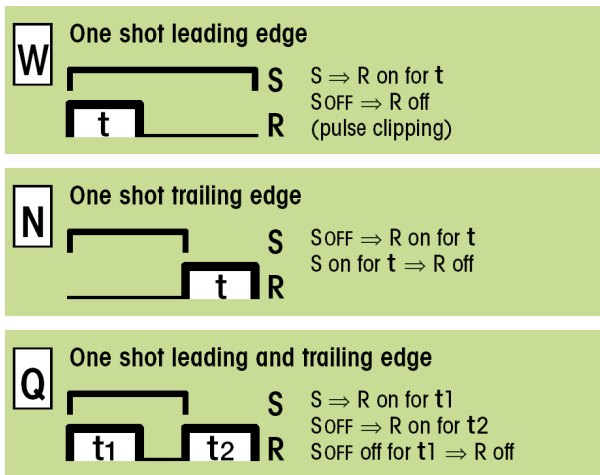
4. Comat Shot timing modes functions W, N, Q

The following shot timing functions should be programmed in Quick II for Comat BoxX:

One shot leading edge, Function W

One shot trailing edge

One shot leading and trailing edge



Designation of Inputs and Outputs

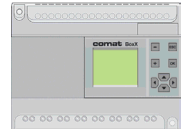
I 1 Signal Input (S)

Q 1 Time and Function dependent Output

Control Device

Controller → Comat BoxX

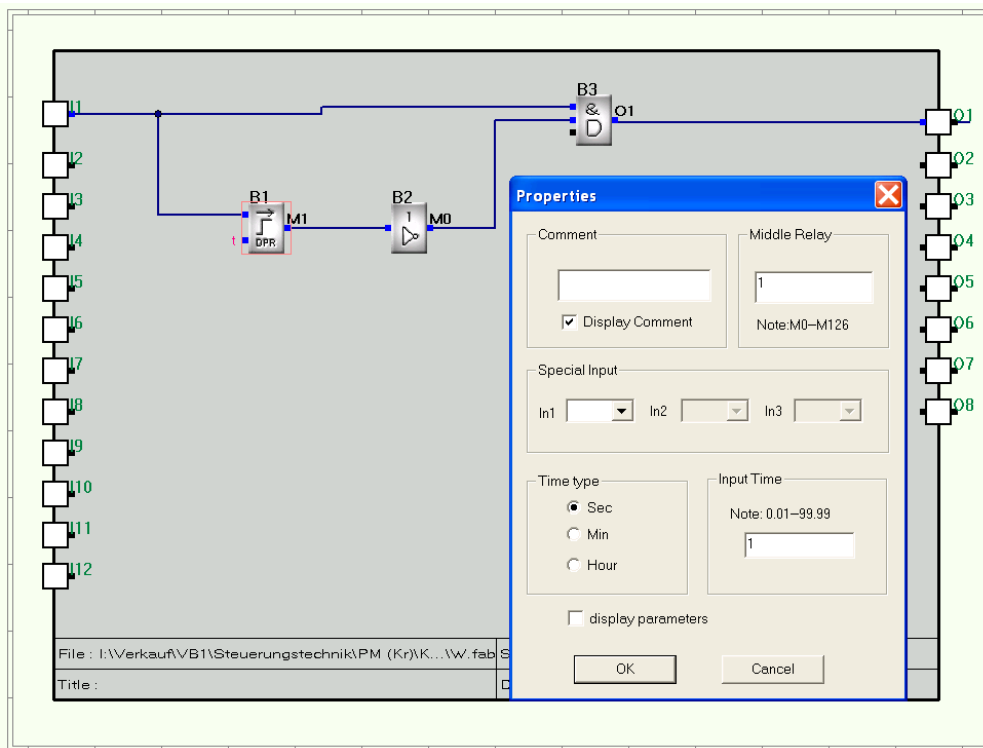
The programming software Quick II should be used to design the control circuit.



Solution

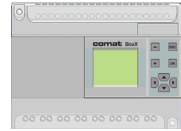
4.1 Comat Shot timing mode W

- One shot leading edge W



Example for a one shot leading edge of 5 seconds (Comat Function W)

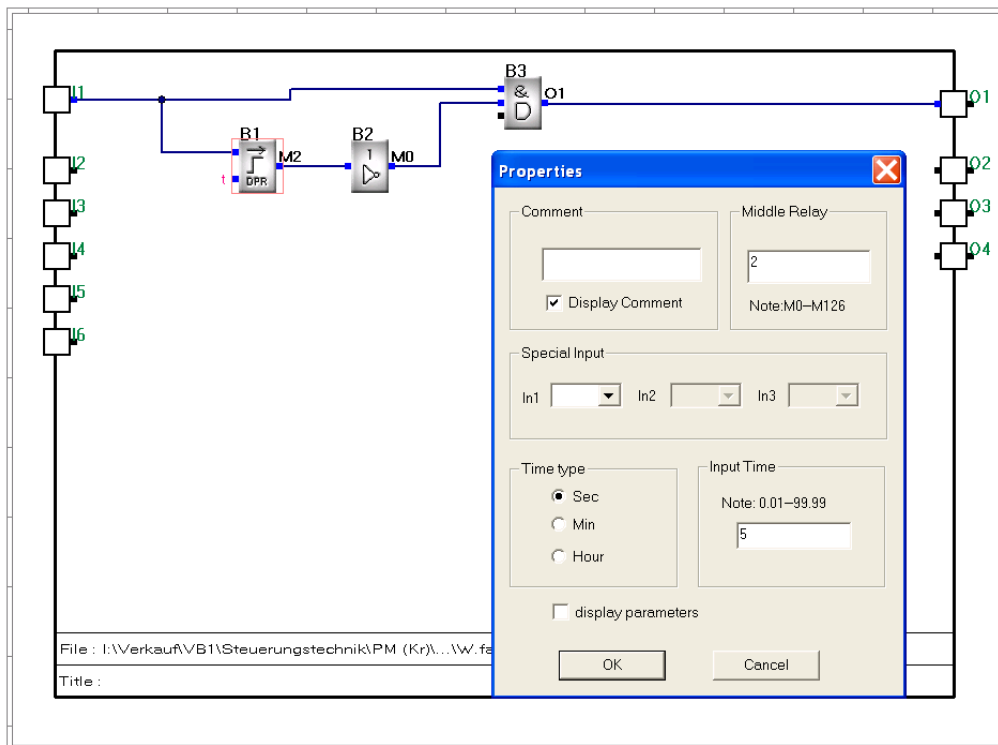
Realization by logical linking of Function Block DPR, NOT and AND.
 Delay time can be set under Properties after double click onto the DPR Function Block.



Solution

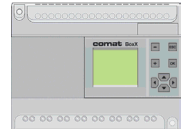
4.2 Comat Shot timing mode N

- One shot trailing edge N



Example for a one shot trailing edge mode of 5 seconds (Comat Function N)

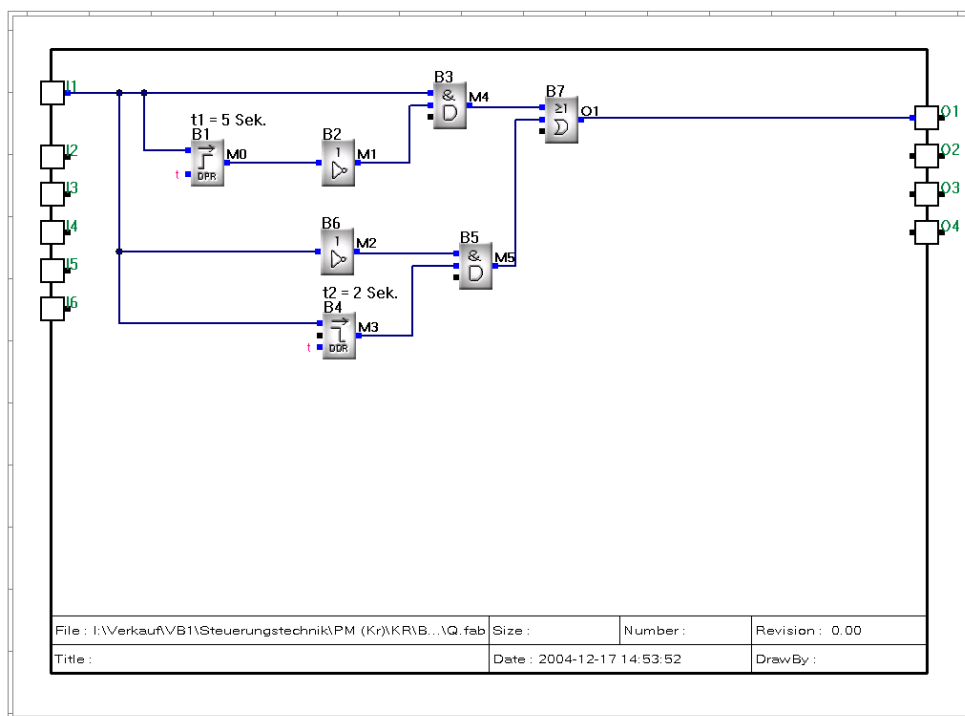
Realization by logical linking of Function Block DDR, NOT and AND.
 Delay time can be set under Properties after double click onto the DDR Function Block.



Solution

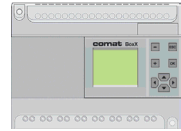
4.3 Comat shot timing mode Q

- One shot leading and trailing edge Q



Example for a one shot leading and trailing edge (Function Q) for $t_1 = 5$ and $t_2 = 2$ seconds

Realized by linking of an OR function block with the part function W and N
 Delay time can be set under Properties after double click onto the DDR Function Block.
 Delay time t_1 can be set under Properties after double click onto the DPR Function Block
 and delay time t_2 after double click onto the DDR Function Block



Task

5. Blinker Functions with pulse or pause start. Comat Functions B, B2, B1

The Quick II function, Repeat timer is in a blinker, with pause start.

Note that pulse/pause times are equal and cannot be adjusted separately.

Blinker 1, Function B

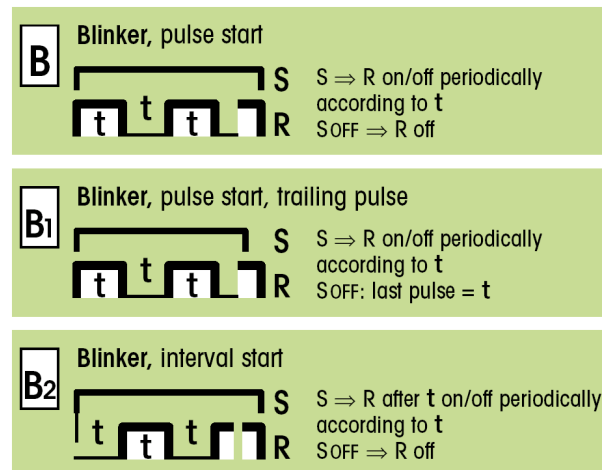
With activation of input 1, the output 1 shall switch ON and OFF with 10sec ON and 10 sec OFF cycles.

Blinker Function 2, B2

A second blinker with pulse start will switch Output 2 ON and OFF in 5 second cycles. This output is dependent of an input

Blinker Function 3, B1

A third blinker, depending on input, shall switch output 3 for 5 seconds ON and 5 seconds OFF with pause start.



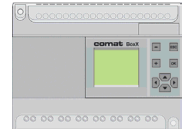
Designation of Inputs and Outputs

- I 1 Blinker 1
- I 2 Blinker 2
- I 3 Blinker 3
- Q 1 Blinker output 1 (Function B)
- Q 2 Blinker output 2 (Function B2)
- Q 3 Blinker output 3 (Function B1)

Control Device

Controller → Comat BoxX

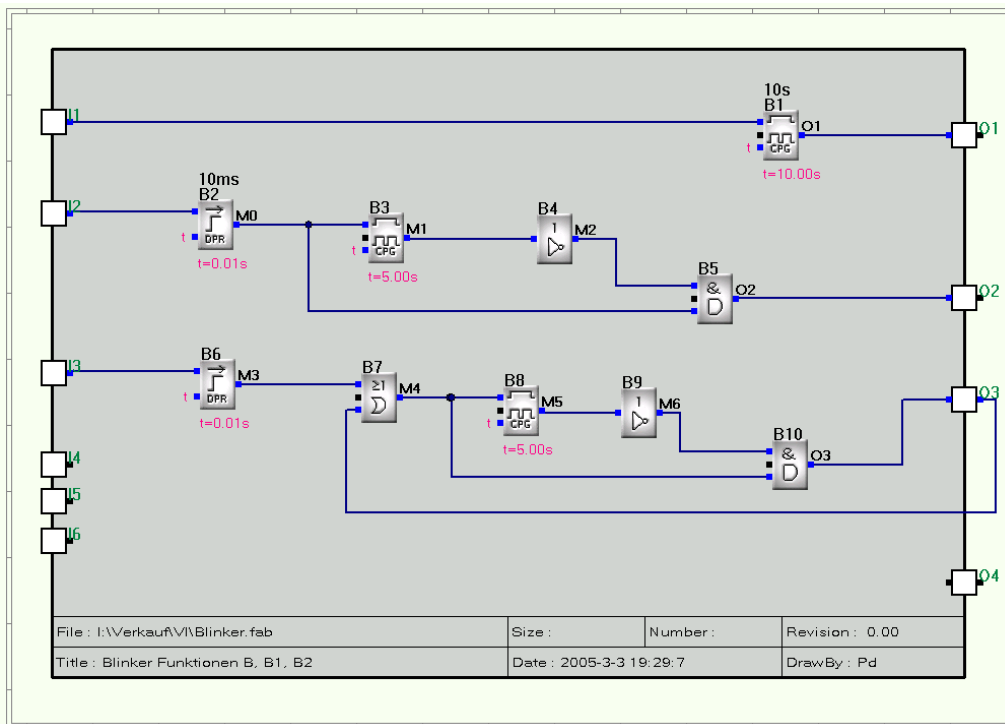
The programming software Quick II should be used to design the control circuit.



Solution

5. Blinking impulse start, blinking pause start (Comat Functions B, B2, B1)

- **Blinker Functions B, B1, B2**



Example for blinkers (Comat Function B, B1, B2).

Blinker 1 is realized with Function Block B1 (10sec) Since this function starts with a pause, additional debouncing is not necessary.

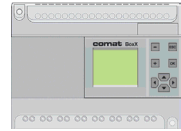
Blinker 2 is activated after debouncing (B2, 10ms).

For direct start (output 2 = ON), output of Function Block 3 must be inverted.

For a correct function, output 2 shall be activated only when input 2 is active. (= 1)

Therefor the AND Function Block (B4) is used.

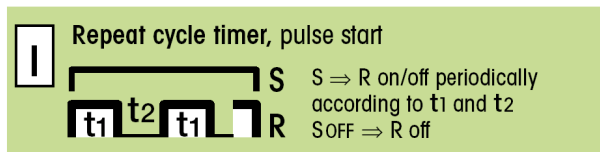
Blinker 3 is similar to blinker 2 but output 3 is reaction coupled via Function Block B8. This way the control input of B8 remains active until the output pulse (pause time of CFG, B8) has elapsed



Task

6. Comat Repeat Cycle Timer. Comat Function I (Example 1)

A cycle timer is required which starts with a pulse of 2 seconds and interrupts for a time of 1 second.



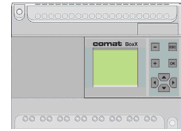
Designation of Inputs and Outputs

- I 1 Signal Input (S)
- Q 1 Time and Function dependent output (R)

Control Device

Controller \rightarrow Comat BoxX

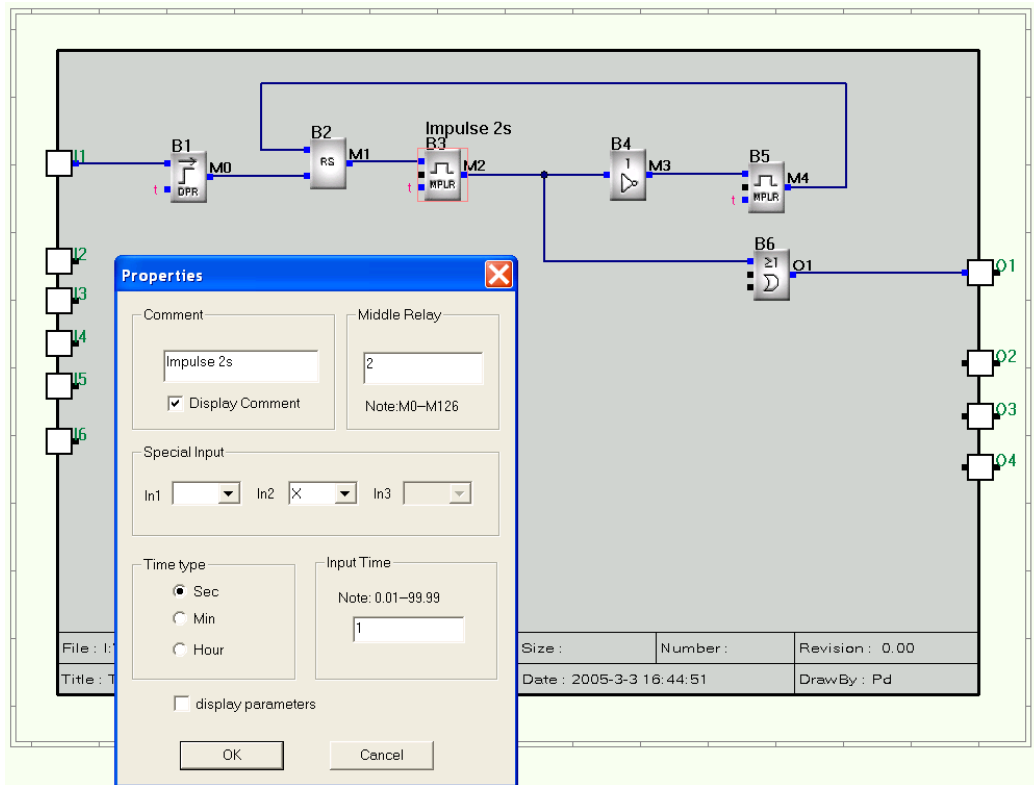
The programming software Quick II should be used to design the control circuit.



Solution

6.1 Comat Repeat Cycle Timer I (Example 1)

- Comat repeat cycle timer I



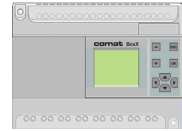
Example for repeat cycle timer (Comat Function I)

Function Block B1 is used for debouncing. Function Block B5 is activated for required time cycle.

Function Block B2 generates a pulse on Q1 via the OR Function Block B6

B3 generates the pause and gives a reset signal to B5 after the time has elapsed.

The cycle is repeated as long as I1 remains “1”

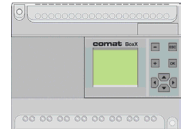


Task

6.2 Comat Repeat Cycle Timer I (Example 2)

Comat repeat cycle timer I

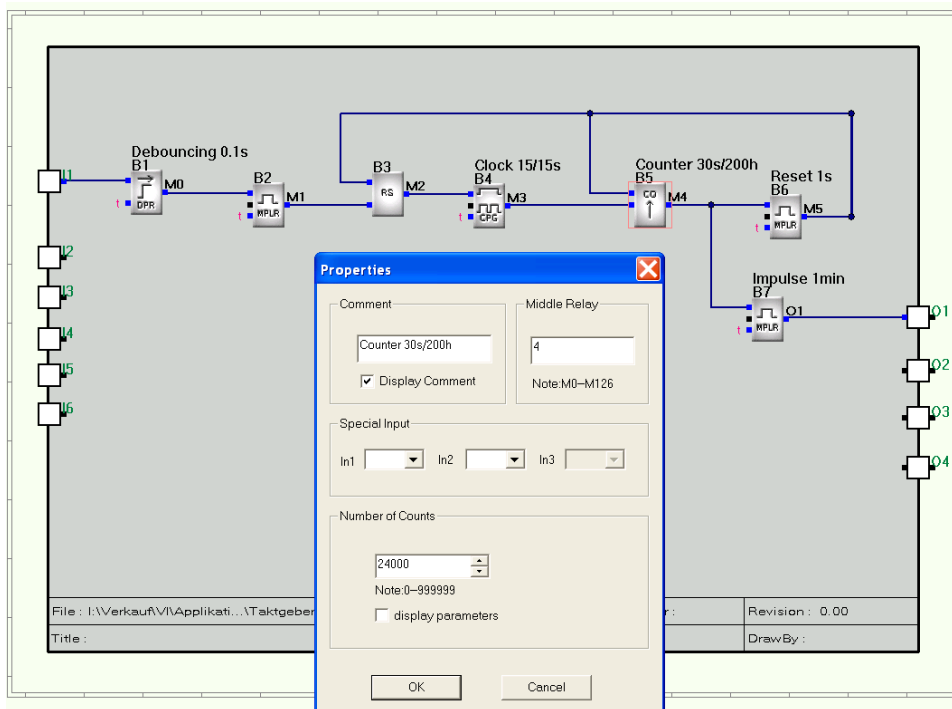
A pulse of 1 minute should be generated every 200 hours.
The pulse is used to switch ON a pump for a short time, to lubricate a gear, etc.
The long time resolution shall be 30 seconds



Solution

6.2 Comat Repeat Cycle Timer I (Example 2)

- Comat repeat cycle timer I

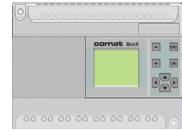


Example for a repeat cycle timer. Every 200h one pulse of 1min

Control input is I1. After debouncing (B1), a pulse is generated for setting function block B2. With this pulse one cycle is started.

A repeat cycle time (B4) starts a 30sec cycle.
The cycles are counted by B5, (24000 x 30sec = 200h)

After the 200h has elapsed, B3 is reset by a 1sec pulse generated by B6.
At the same time a 1 min pulse is given to output Q1.

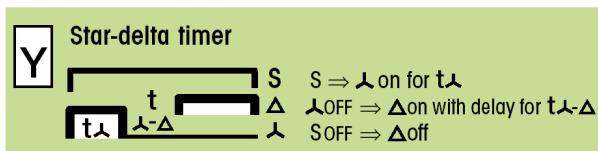


Task

7. Comat Star-Delta Timer Y

A star start of an asynchronous motor is required.
The starting up time is 2 seconds.

The interruption time between Star and Delta switchover should be 75ms



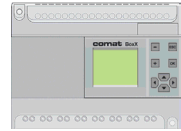
Designation of Inputs and Outputs

- I 1 Signal Input (S)
- Q 1 Star Output
- Q 2 Delta Output

Control Device

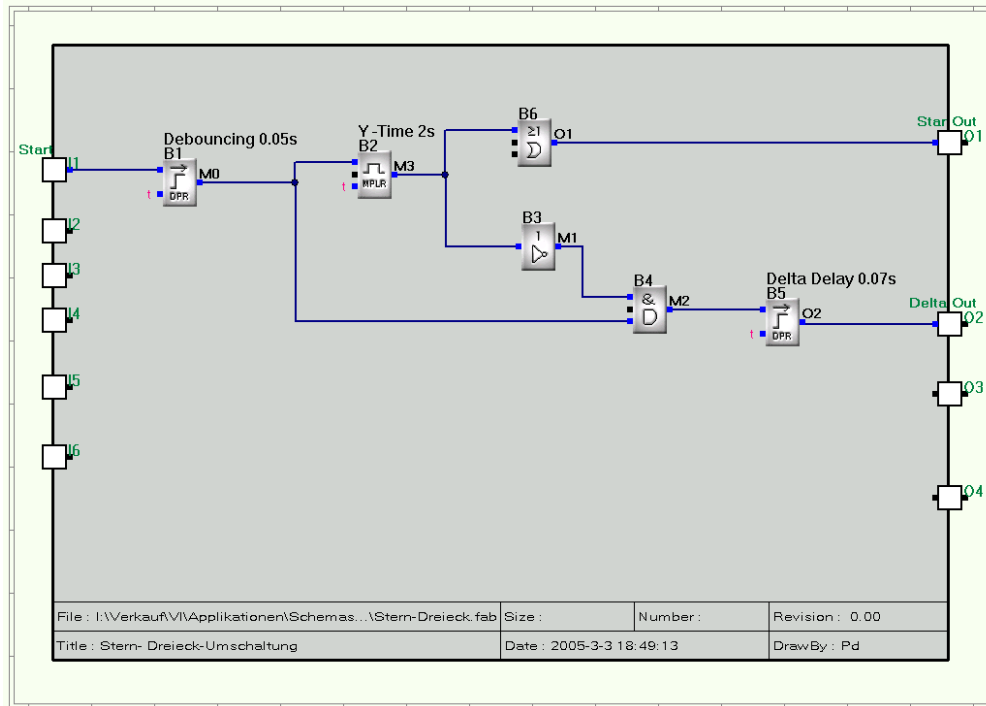
Controller \rightarrow Comat BoxX

The programming software Quick II should be used to design the control circuit.



Solution

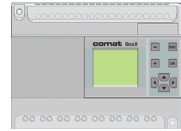
7. Comat Star-Delta Timer Y



Example for a Star-Delta switch over timer

The function is starts with pulse on input 1. Function Block B2 is responsible for the start up time and signal on output Q1 for 2 seconds. With the trailing edge of the start up time the Delta output 2, (Q2) is activated after a interruption time of 75msec (B5).

The output Q2 is activated as long as input 1 is active. (ON)



Task

8. Extremely long timing function

Time functions can be set up to 99.99 hours.

It is possible to cascade several timers. This however reduces the resolution.

A smart solution for a 1000 hours timer with a resolution of 1 minute and an output pulse of 1hour should be programmed

Application example: Pump systems, (i.g. to avoid gasket damage)

Designation of Inputs and Outputs

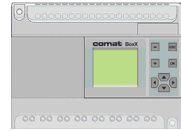
I 1 Input

Q 1 Time and function dependent output

Control Device

Controller → Comat BoxX

The programming software Quick II shall be used to design the control circuit.



Task

9. Sensor for Level monitoring

A level sensor with an output signal of 0-10mV should be connected to a Comat BoxX logic controller.

The BoxX controller is used to monitor the liquid level inside the tank.

A pump is started to reduce the liquid level if the tank is 70% full. (Sensor signal = 7V)

The pumping procedure shall continue until the tank level is reduced to 20% (Sensor signal = 2V)

Designation of Inputs and Outputs

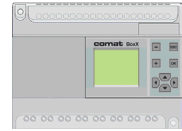
I 1 Level sensor

Q 1 Pump

Control Device

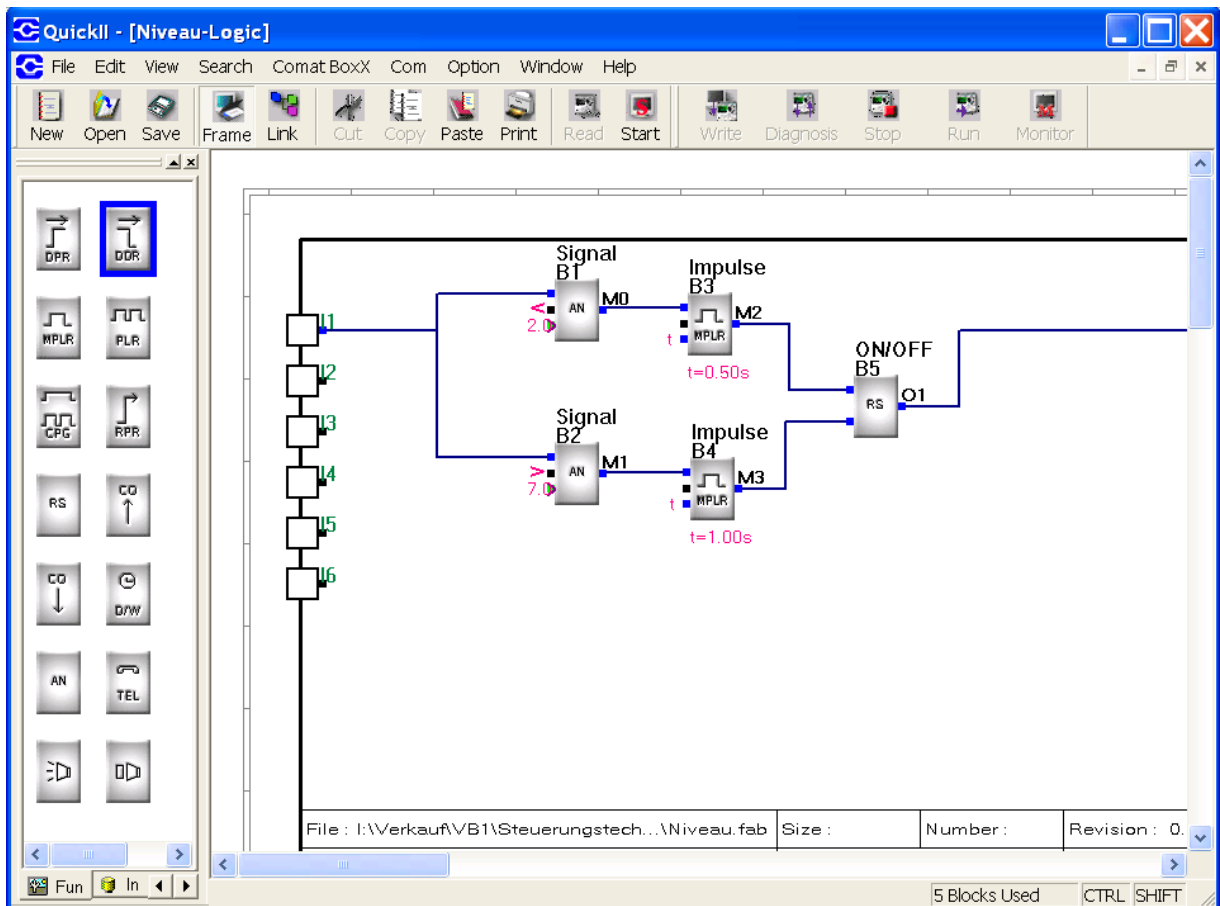
Controller → Comat BoxX

The programming software Quick II should be used to design the control circuit.



Solution

9. Sensor for Level monitoring



Example for programming of a level sensing with hysteresys

Program description

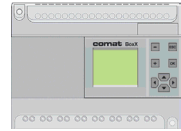
Function Block 1 for determination of sensor signal. (Lower level)

Function Block 2 for determination and evaluation of sensor level (High level)

Function Block 3 Pulse to switch the pump OFF

Function Block 4 Pulse to switch the pump ON

Function Block 5 Pump ON/OFF switch.



Task

10. Light control

The light in a warehouse should be switched ON by a push button and switched OFF automatically after 4 minutes.

After 3 1/2 minutes part of the illumination should go OFF as a pre-warning: "Switch on again or leave the room"

If the pushbutton is pressed within the main lighting time, the light shall go out immediately.

A service function " Light permanently ON " is also requested

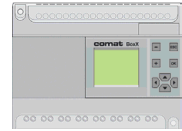
Designation of Inputs and Outputs

- I 1 Key button
- I 2 Light permanent ON
- Q 1 Main light
- Q 2 Part light

Control Device

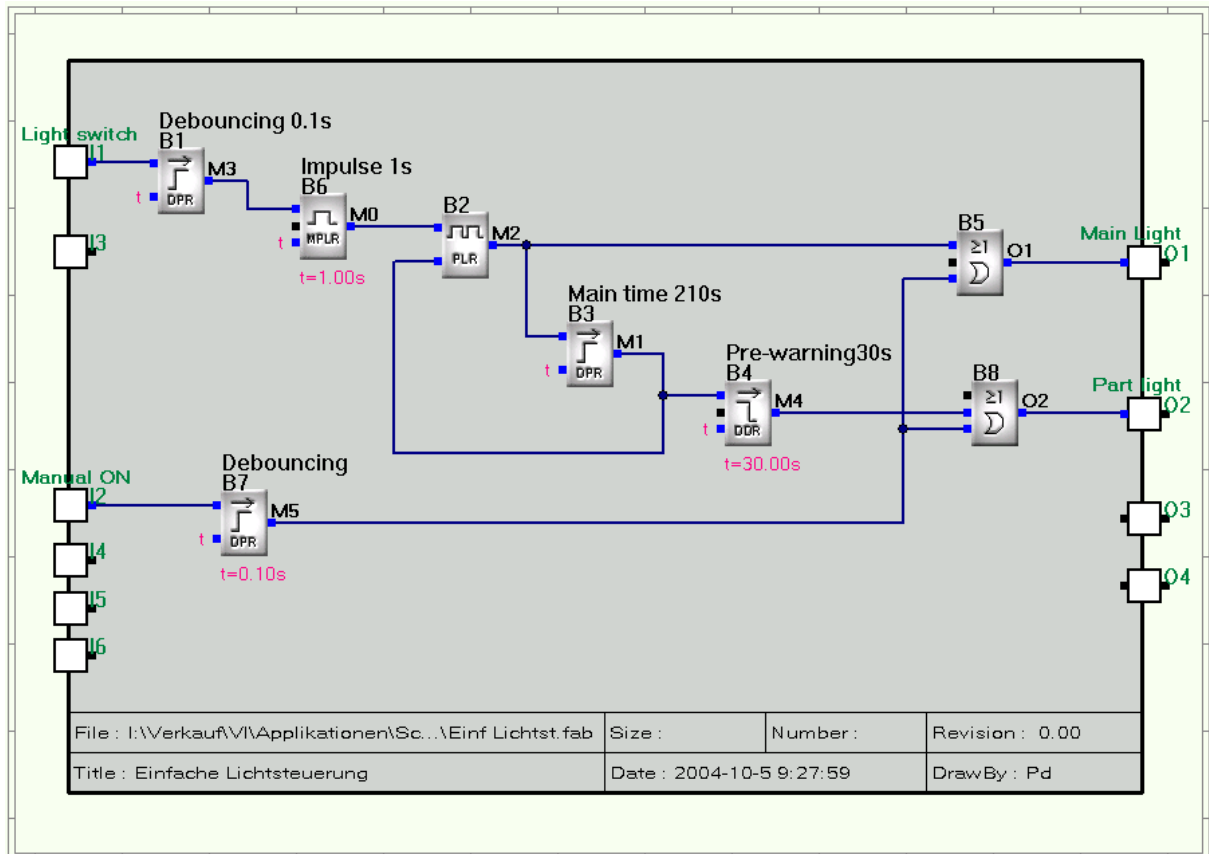
Controller → Comat BoxX

The programming software Quick II should be used to design the control circuit.



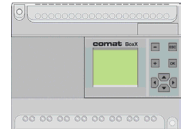
Solution

10. Light control



Example of a light control

The function blocks B1 , B7 are used for debouncing.
 B6 generates a 1sec pulse. This avoids permanent light by blocking the light switch.
 B3 generates the reset pulse after 31/2 min. (210 seconds)
 After this time output 2 is still active for another 30sec (B4).



Task

11. Step by step control

Based on the trigger signal (I1), outputs Q1 to Q4 shall be activated for 5sec one by one (One after each other).

If input 1 is inactivated (0), this sequence will continue to function until the end of the programmed cycle.

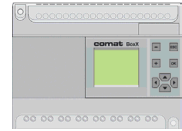
Designation of Inputs and Outputs

- I 1 Trigger signal
- Q 1 Output 1
- Q 2 Output 2
- Q 3 Output 3
- Q 4 Output 4

Control Device

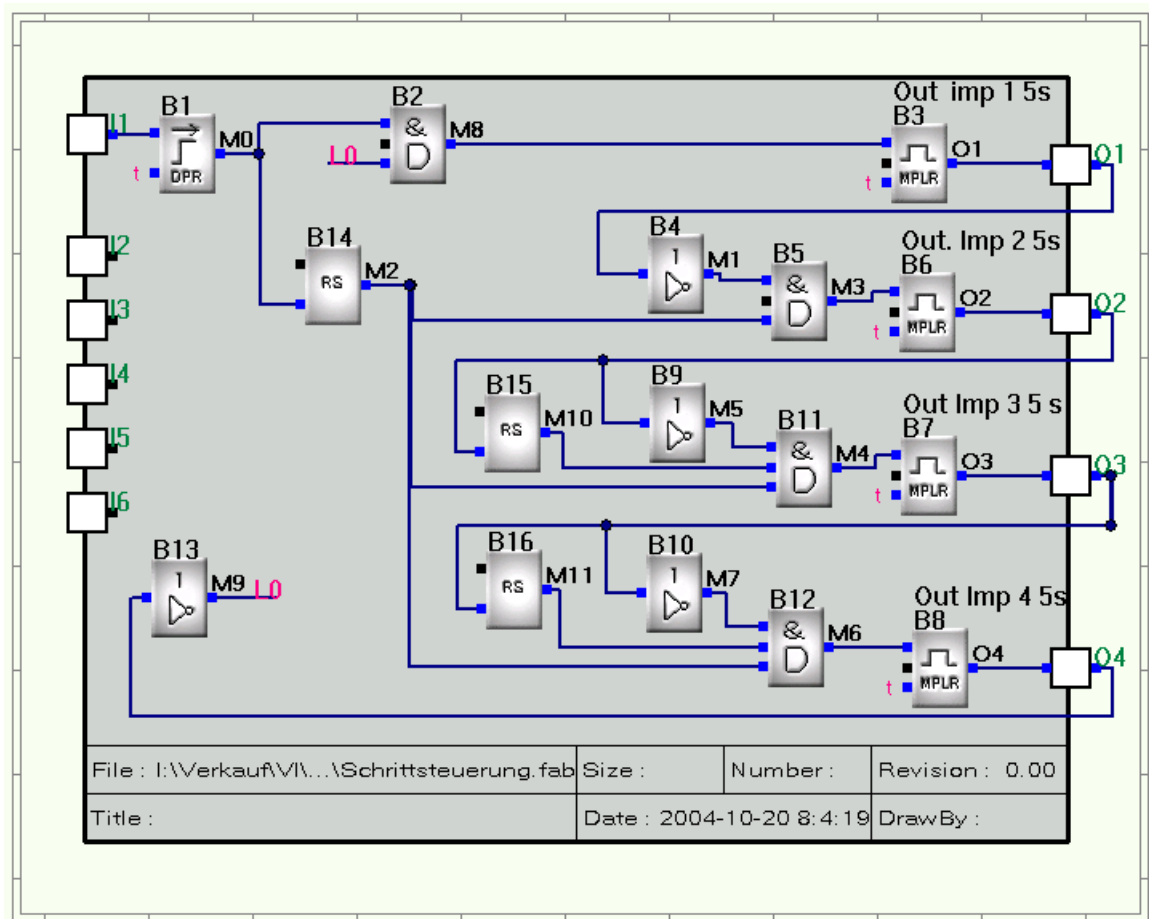
Controller → Comat BoxX

The programming software Quick II shall be used to design the control circuit.



Solution

11. Step by step control



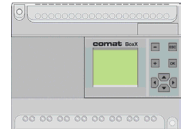
Example of a step by step control

B1 works a debouncer.

B3 generates the first 5sec pulse on output Q1.

The RS Function Blocks (B14, B15, B16) are ensures that outputs Q2, Q3, Q4 are stepped forward only after activation of output Q1.

The numbering (sequence) of the Function Blocks is important otherwise it may be necessary to include some additional Function Blocks to delay the time.



Task

12. Sequential pump control

In a fresh water system the 4 pumps should be started sequentially with a time delay between the starting of each pump to avoid a high inrush current (i.g. after 2 power supply failure).

The 4 pumps must also be switched OFF sequentially one by one. The sequence shall be 20sec apart.

An additional Input should allow to switch OFF all pumps together at the same time.

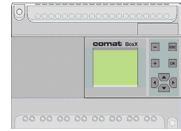
Designation of Inputs and Outputs

- I 1 Start / Stop
- I 2 Graduated OFF-switching OFF
- Q 1 Pump 1
- Q 2 Pump 2
- Q 3 Pump 3
- Q 4 Pump 4

Control Device

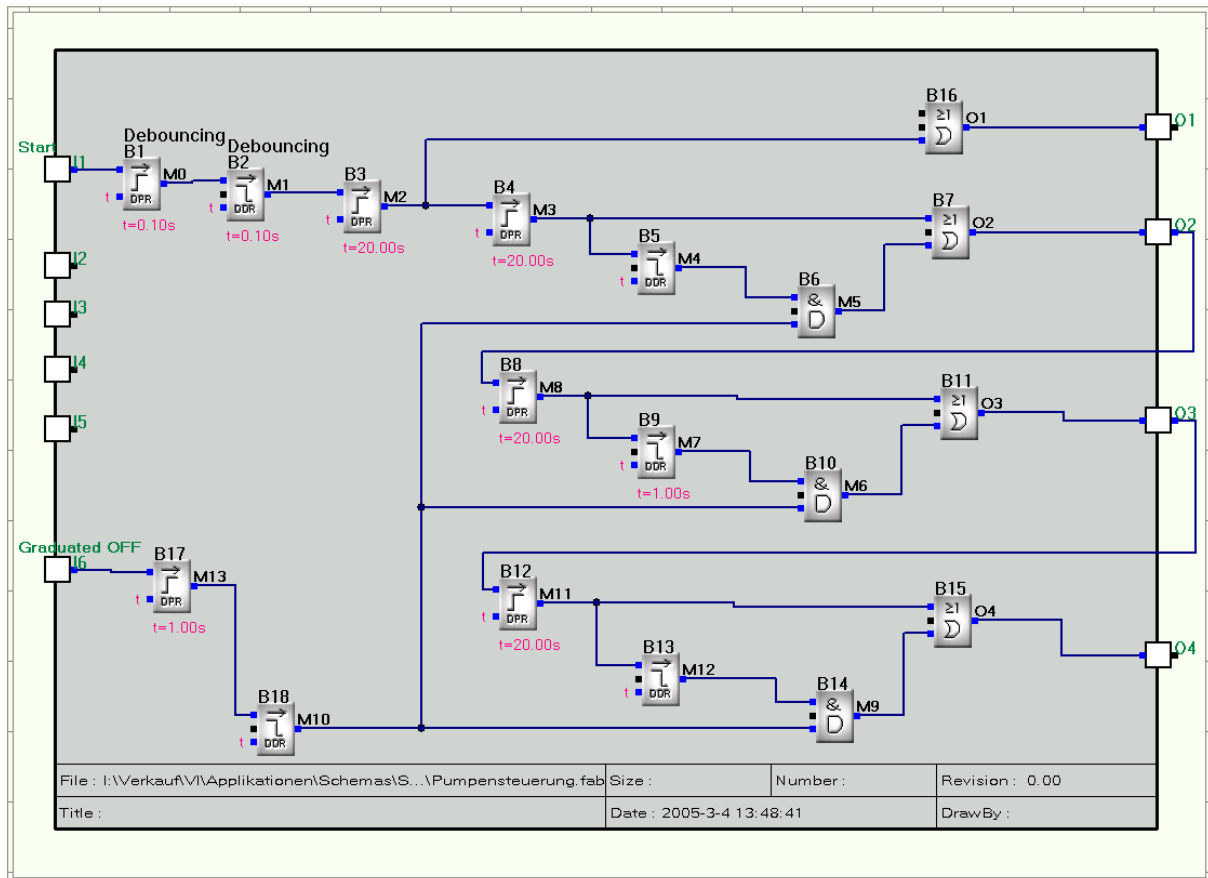
Controller → Comat BoxX

The programming software Quick II shall be used to design the control circuit.



Solution

12. Sequential pump control



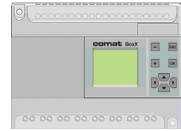
Example of a sequential pump control

Function Blocks B1, B2, B16, B17 have an ON delay time of 0.1sec, only for debouncing.

Function blocks B3, B4, B8, B12 for the sequential ON delay of 20s.

Function blocks B5, B9, B13 are for sequential switching OFF.

This function is only active as long as input 6 is ON.



Task

13. Control of lights in a car park

Lighting control of a public car park should be programmed with a BoxX logic controller. The following requirements must be programmed:

Normal light ON:

Light ON by pressing a push button (impulse)

It should not be possible to turn the light ON permanently by holding onto the button.

The light ON time is 4 minutes. The light shall be partly switched OFF after 4 minutes but can be retriggered to full illumination again by pressing the light push button again.

Manual Light ON (Service function)

The light can be permanently switched ON with a special service switch.

If the permanent ON time exceeds 8 hours an alarm shall be activated which remains until the manual service switch is turned off.

The light is OFF-delayed by 10sec after the manual service switch is turned off. (This allows enough time to leave the car park after the light is switched OFF manually.)

Light permanently ON

From Monday to Friday between 7 to 8 am and 5 to 7 p.m. (during the busy times) the light should be switched ON permanently to avoid damage the florescent lamps.

This permanent light ON function is started when the light is turned on for the first time during this time period.

Exception:

On days with low traffic (i.g. Sundays, Christmas and other Public holidays), this function is not active.

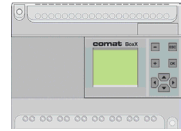
Designation of Inputs and Outputs

- I 1 Light switch
- I 2 Service switch
- Q 1 Part light
- Q 2 Full light
- Q 3 No function
- Q 4 Alarm

Control Device

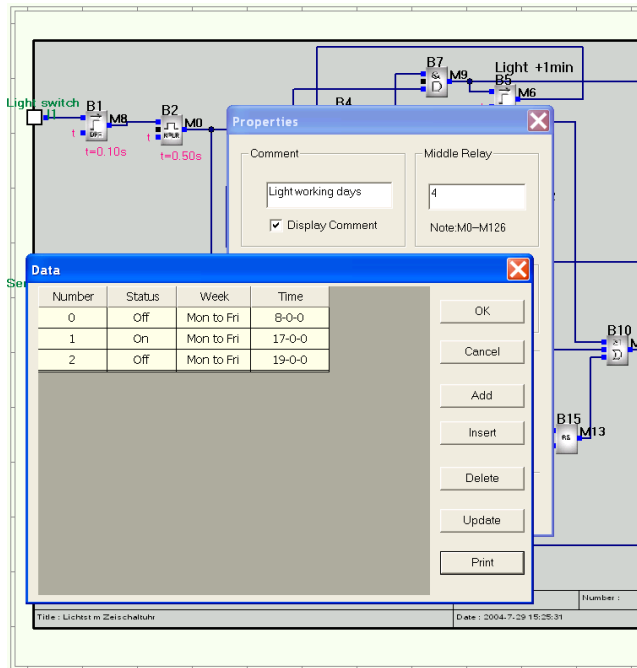
Controller → Comat BoxX either type AF-10.....or AF-20

The programming software Quick II should be used to design the control circuit.

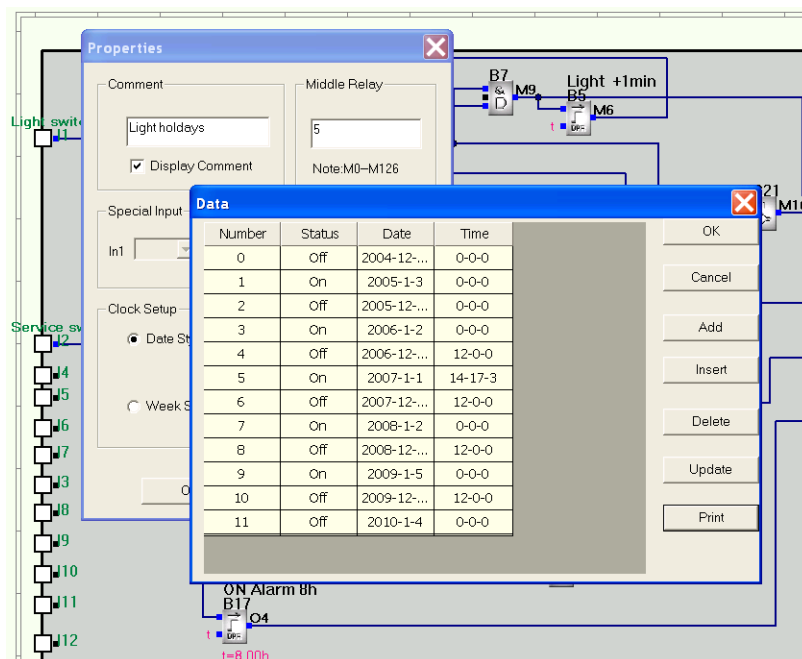


Example

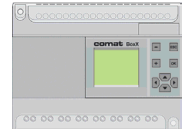
13. Control of lights in a car park



Example for the programming of a permanent light suppression on public holidays.



Example for programming of permanent light ON on working days

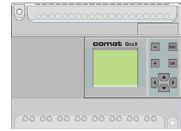


Description

13. Control of lights in a car park

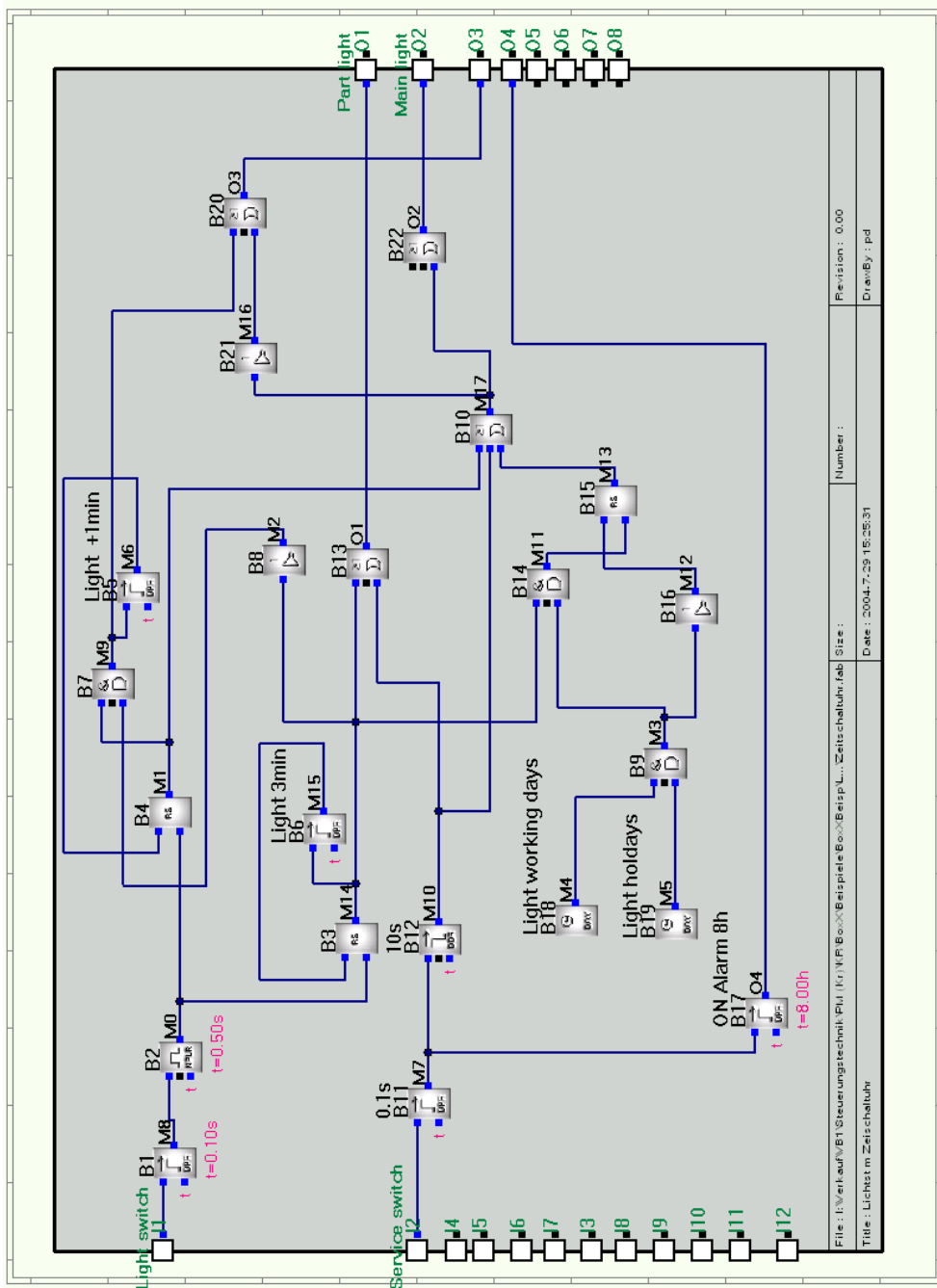
Program description

- Function Block 1** Debouncing of the light push button
- Function Block 2** Generates a pulse from the bush button and avoids permanent light ON by holding onto the light switch.
- Function Block 3 + 6** Light ON for 3 minutes. (During this time it is not possible to retrigger the light.)
- Function Block 4 + 5** By adding an additional time of 1 minute, it is possible to retrigger the light (Restart)
- Function Block 9** Combines (AND) week time switch and calendar clock
- Function Block 10** Combines (OR) Manual ON, Time dependent light ON and light retriggering during retrigger time of 1 minute.
- Function Block 11** Debouncing of service input
- Function Block 12** Delayed OFF of service light
- Function Block 17** Alarm signal if manual ON (service function) more then 8 hours
- Function Block 18** ON in the morning and ON in the evening
- Function Block 19** Permanent ON in the morning and evening (B18) deactivated during holidays
- Funct. Block 20 + 21** Illumination of push button during retrigger time of 1 minute or after light OFF
- Function Block 22** No logical function. Used for simplified linkage during programming

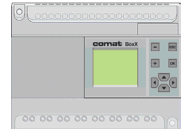


Solution

13. Control of lights in a car park



Example for light control in a car park



Task

14. Watchdog Function

This function is very useful to ensure that the controller or a process is still active.

The unit to be monitored has to generate a pulse sequence periodically which is monitored by the watch dog function.

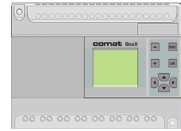
Designation of Inputs and Outputs

- I 1 Impulse input
- Q 1 OK output remote control
- Q 2 Alarm output
- Q 2 OK output self monitoring

Control Device

Controller → Comat BoxX

The programming software Quick II shall be used to design the control circuit.



Task

15. Alarm message over the telephone:

Input one is activated by an alarm (alarm = active)

The alarm activates an alert lamp and triggers a telephone call to someone on duty.

If this call is not answered within 2 minutes, an alternative number is dialed.

A voice message shall inform the other party about the cause of the alarm.

A pre-determined code (by pressing the appropriate telephone key) acknowledges that the alarm has been received.

This alarm can also be acknowledge by a local push button on site.

Designation of Inputs and Outputs

I 1 Alarm input

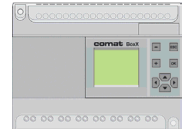
I 2 Local alarm reset

Q 1 Local alarm light

Control Device

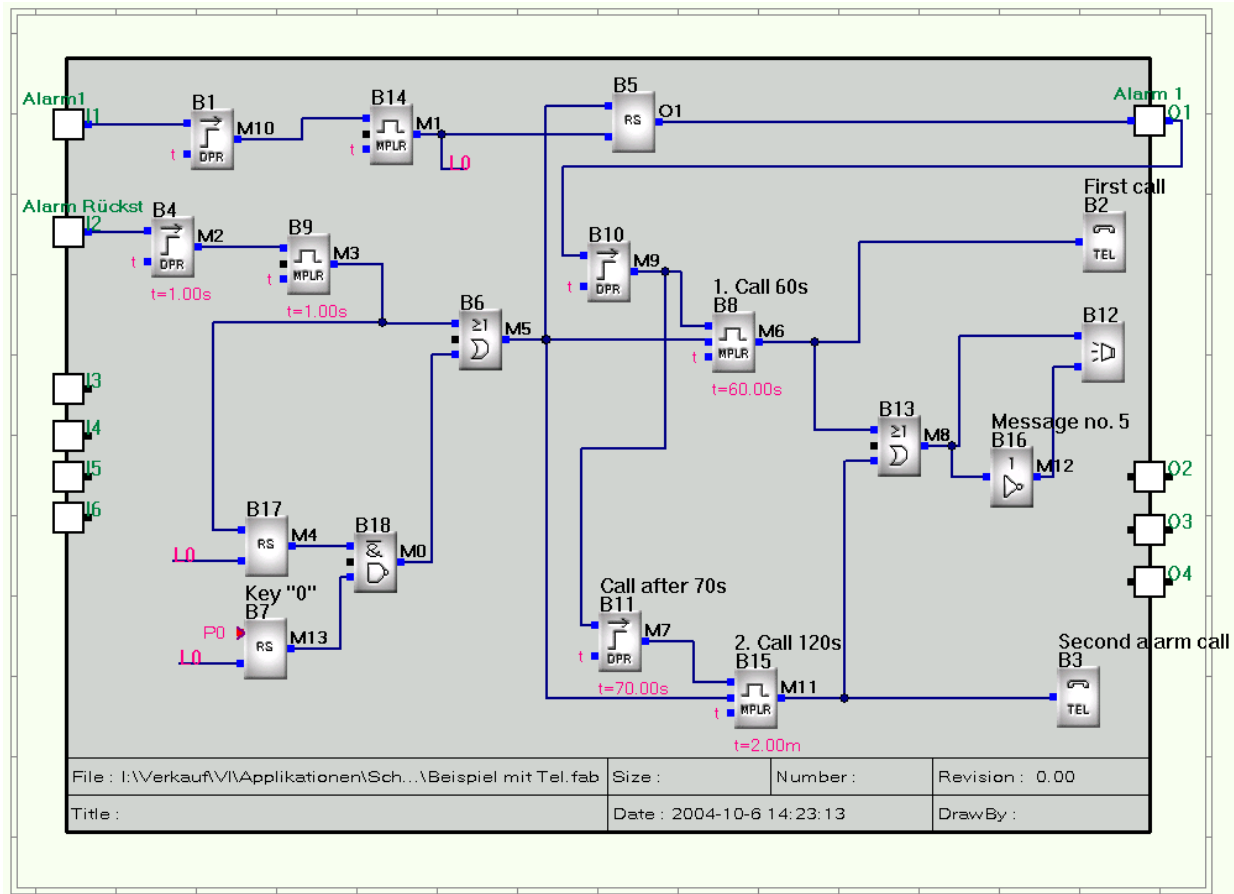
Controller → Comat BoxX

The programming software Quick II should be used to design the control circuit.



Solution

15. Alarm message over the telephone:



Example for alarming over the telephone

B1, B5 are for debouncing. B5 generates a 1 second impulse for alarm status on B6.

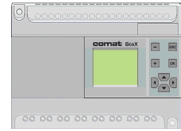
The first telephone alarm (B2) is triggered for 60 seconds (B8) with a time delay (B10). The time delay allows manual resetting before the number is dialed.

If the alarm is not reset during 60 + 10 seconds, (B11) (no replay to the call) the second telephone number will be dialed (B3) and called for 2 minutes (B15).

There are no further steps shown in this example to avoid a complicated diagram.

During the call, the alarm message (B12, for example with message text number 5) will be played.

Alarm reset can be executed either over the manual reset button on I2 or via the control code "0" with the telephone key. (Key "*0") RS Function Block B7



Task

16. 2 status alarms onto 2 telephones

This example describes two different alarms (with priority) to two separate telephone numbers.

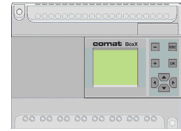
Designation of Inputs and Outputs

- I 1 Input of fire alarm
- I 2 General alarm input (technical defect)
- I 6 Reset input
- Q 1 Alarm onto telephone 1
- Q 2 Alarm onto telephone 2
- Q 3 Emergency output if no call is answered

Control Device

Controller → Comat BoxX AF-10... or AF-20... in combination with AF-MUL...

The programming software Quick II should be used to design the control circuit.



Solution

16. 2 status alarms onto 2 telephones

Execution of this program requires 39 Function Blocks

The alarm inputs are inverted (B38, B39) and debounced with a time delay of 0.2 seconds (B1, B7)

At the same time of alarm activation ($I1 = 0$) the status is memorized on B6. The alert message "Fire" (B27) is activated simultaneously and the telephone number is dialed by B3.

B2 is dialing the alternative second phone number for 30 seconds if the call to the first phone is not answered within 30 seconds. B9 and B14 are responsible for an interrupt between the two calls.

Alternatively the two phone numbers are called until one is answered.

Parallel to the calls, outputs Q1 and Q2 are activated over B15 respective B16. (These two outputs may be used for diagnosis purposes and have no logical function in the example.)

The general alarm is designed in the same way

The "Fire" message has absolute priority over the general alarm. The respective Function Block for that message has therefore the higher block number.

Via B21 acknowledge Function Block B17 is set.

B17 is reset with the phone key "0" (output B17 = 0) This activates message "Alarm reset" (B5) for 5 seconds (B19).

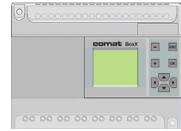
If the alarm Function Blocks are reset, the line will stay open for the time t (B19) over L4

B34 ensures overlapping of time differences to leave the line open.

The local reset (I6) is delayed by 1 second (B29) to ensure that no accidental activation of a push button generates an unwanted reset signal.

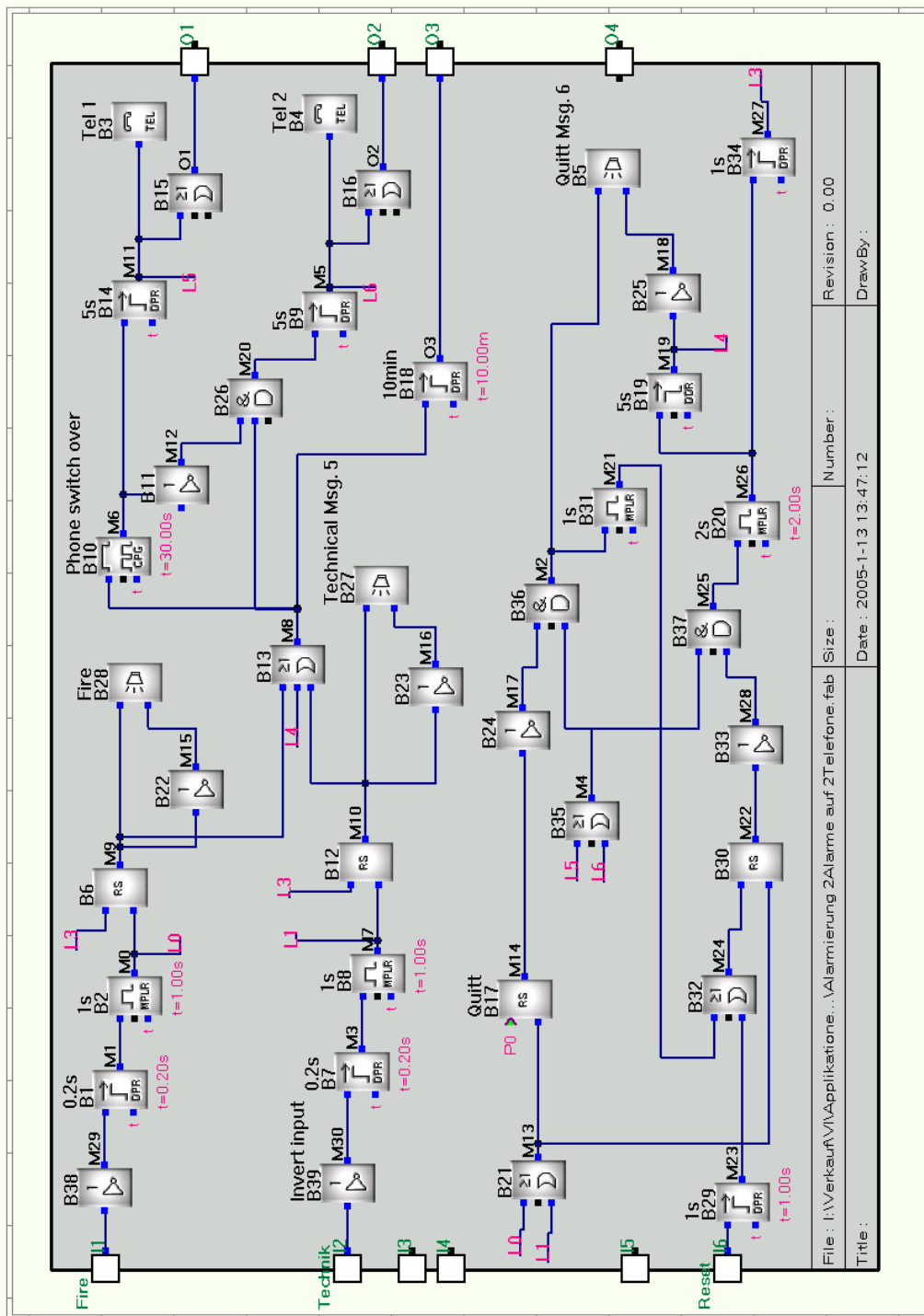
Remark:

The program example above does not show if the call has to be answered with a password. This option can be selected under menu "Option"

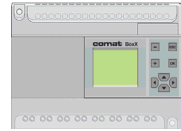


Solution

16. 2 status alarms onto 2 telephones



Example of an alarm message to two telephones



Task

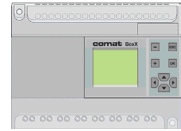
17. Data exchange between 2 Controllers over the telephone network

A simple data exchange over the phone network between two controllers can be programmed

Control Device

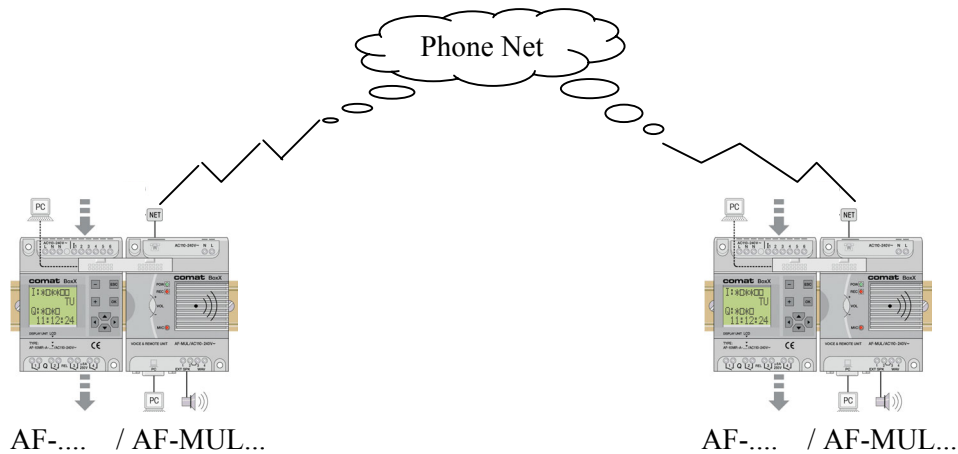
2 Controllers → Comat BoxX AF-10... and 2 voice/telephone modules AF-MUL...

The programming software Quick II should be used to design the control circuit.



Solution

17. Data exchange between 2 Controllers over the telephone network



Example for data exchange between 2 controllers

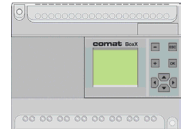
Precedence

Calling and communication set up is performed in the normal way. (Please refer to the AF-MUL manual)

Instead of transmitting voice messages, dual tone signals, previously recorded on the voice module AF-MUL, are sent. (For example “*”, “5”)

The dual tone signals can be used to set or reset the RS Function Blocks respectively to exchange control signals between two controllers.

Dual tone signals can be generated with a phone or with a special signal generator.



Task

18. Call for Help

Inside the elevator on a public parking lot is a HELP push button for emergency calls. By pressing this HELP button a signal is generated to a Comat BoxX combined with the voice/telephone module AF-MUL....

Pressing the Help button initiates the BoxX to call for help.

By answering the call, a voice message will be played.

The receiver can switch over the call with a key code (“*, x”) to the installed phone inside the elevator. This enables a direct conversation between the person in the elevator with the service person.

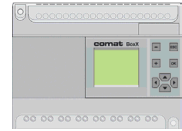
Designation of Inputs and Outputs

- I 1 Input of HELP push button
- I 2 Input of installation
- Q 1 Output installation
- Q 2 Output for a control light
- Q 6 Output for phone activation

Control Device

Controller → Comat BoxX AF-10... or AF-20... in combination with AF-MUL...

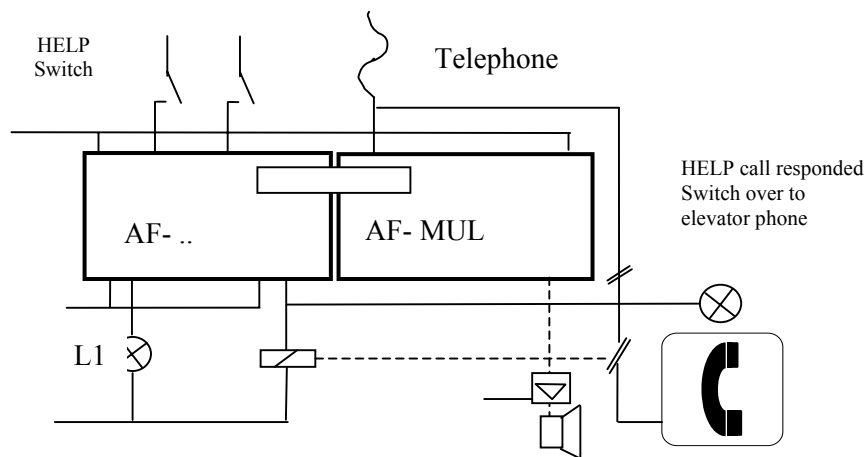
The programming software Quick II shall be used to design the control circuit.



Solution

18. Call for Help

Programming according to previous explanation.
Only the principle diagram is shown



Beispiel einer Alarmierung mit Telephonkommunikation

Function and procedure

HELP button is pressed. This activates the connected voice/phone module AF-MUL which initiates a call to the service person.

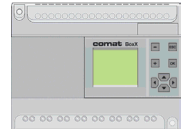
Alarm light 1 is turned ON for local signalization

It is possible to play the help call as well –or only- onto a loud speaker.
(Special terminal for active loud speaker on the AF-MUL voice/telephone module)

The service person acknowledges the call with his phone (mobile phone) keys and switches the call over to the local phone in the elevator.

A direct communication is now possible. In order to avoid that the BoxX disconnects, the code “*” has to be sent every 40 seconds either by the BoxX (Function Block CPG, approx. 20 seconds and Function Block MPLR, approx. 2.5 seconds) or from the receiving phone

Sometimes (after the situation is cleared) the connection is cut of by one of the phones.



Tips, Tricks and Hints

19. Tips, Tricks and Hints

Program Simulation

The simulation of a program (Function "Start") is of considerable help to monitor and verify the programmed circuit. However it should be noted that the simulation does not perform always identical to the program when downloaded to the BoxX. That is specially the case for time critical functions.

Program Emulation

The Program emulation (Function „Diagnosis") works via a serial interface. This results in a speed limitation and fast and short events may not be shown. The emulation can have an influence on the system.

The MUL Function (dialing) does not work together with activated program emulation.

LCD Display

The input / output status on the display is not updated during dialing time of the AF-MUL

Dialing digits, dialing interrupting

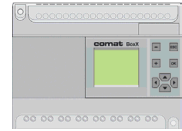
The input (properties, phone code) of "-" will be interpreted as "0".

The input (properties, phone code) of "," will be interpreted as dialling interruption (delay) of about 6 sec.

In all cases it is recommended to implement a interruption before dialing the first digit, because the MUL does not wait for the free line (up to 3 seconds) but starts dialing immediately.

An other situation occurs when the system is part of a company switch board system

Example: "Break interval _ 0 _ Pause _ Digits":",0,0318385577"



Tips, Tricks and Hints

Operation with AF-MUL

The AF MUL can have a different power supply voltage to the BoxX.

It is however important that the AF-MUL is powered up before (or at the least at the same time) as the BoxX. Otherwise it may be possible that the AF-MUL does power up.

It has to be made sure that the “-“ terminals are correctly connected to avoid differential ground current flow between BoxX and MUIL.

Program exchange between BoxX and MUL

Writing and reading is not possible when the MUL is active (calling). This will result in a communication error.

Cycle time speed

The cycle time of the BoxX depends on the size of the program (total number of Function Blocks used), and is slower if the LCD display or the voice module AF-MUL is connected.

Under some circumstances even 10ms pulses can be processed.

As a general rule, signals <100ms will not cause any problems.

Function Block Timers

The time parameter of the Timer Function Bloc can be parameterized in 10ms

A jitter may result if the BoxX is used as a repeat timer for very short cycle length.

