

Project Documentation

File: CtrlX_PW_02_2025_V1_0_Solution.project

Date: 24.02.2025

Profile: ctrlX PLC 1.20.7

Table des matières

1	Dossier: PW_DUT	3
1.1	DUT: ST_Conveyor	3
1.2	DUT: ST_MotorConveyor	3
1.3	DUT: ST_StationConveyor	3
1.4	DUT: ST_StationOutput	4
2	Dossier: PW_POU	4
2.1	POU: FB_Drive	4
2.2	POU: FB_OutStation	5
2.3	POU: FB_Station	6
3	POU: PRG_Student	7
4	: Project Settings	9

1 Dossier: PW_DUT

1.1 DUT: ST_Conveyor

```
1      (*
2          www.hevs.ch
3          Institut Systemes Industriels
4          Project:      Projet No: PW_02
5          Author:       Cedric Lenoir
6          Date:         2024 January 16
7
8          Summary:      Main structure for conveyor.
9      *)
10     TYPE ST_Conveyor :
11     STRUCT
12         cm01      : ST_StationConveyor ;
13         cm02      : ST_StationConveyor ;
14         cm03      : ST_StationConveyor ;
15         cmOut     : ST_StationOutput ;
16         cmDrive   : ST_MotorConveyor ;
17     END_STRUCT
18     END_TYPE
19
```

1.2 DUT: ST_MotorConveyor

```
1      (*
2          www.hevs.ch
3          Institut Systemes Industriels
4          Project:      Projet No: PW_01
5          Author:       Cedric Lenoir
6          Date:         2023 October 11
7
8          Summary:      List of of components for a motor of a conveyor.
9      *)
10     TYPE ST_MotorConveyor :
11     STRUCT
12         bK_ActivatePositiveDirection      : BOOL ;
13         bK_ActivateNegativeDirection      : BOOL ;
14     END_STRUCT
15     END_TYPE
16
```

1.3 DUT: ST_StationConveyor

```
1      (*
2          www.hevs.ch
3          Institut Systemes Industriels
4          Project:      Projet No: PW_01
5          Author:       Cedric Lenoir
6          Date:         2023 October 11
7
8          Summary:      List of of components for a station of a conveyor.
9      *)
10     TYPE ST_StationConveyor :
11     STRUCT
12         bButton : BOOL ;
13         bLed    : BOOL ;
14         bSensor : BOOL ;
15     END_STRUCT
16     END_TYPE
17
```

1.4 DUT: ST_StationOutput

```
1      (*
2          www.hevs.ch
3          Institut Systemes Industriels
4          Project:      Projet No: PW_01
5          Author:       Cedric Lenoir
6          Date:         2024 January 14
7
8          Summary:      ST_OutputConveyor extends ST_StationConveyor.
9      *)
10     TYPE ST_StationOutput EXTENDS ST_StationConveyor :
11     STRUCT
12         bBuzzer      : BOOL ;
13     END_STRUCT
14     END_TYPE
15
```

2 Dossier: PW_POU

2.1 POU: FB_Drive

```
1      (*
2          www.hevs.ch
3          Institut Systemes Industriels
4          Project:      Projet No: PW_02
5          Author:       Cedric Lenoir
6          Date:         2024 January 16
7
8          Summary:      Manage drive for motor conveyor.
9      *)
10     FUNCTION_BLOCK FB_Drive
11     VAR_INPUT
12         Enable      : BOOL ;
13     END_VAR
14     VAR_IN_OUT
15         ioDrive      : ST_MotorConveyor ;
16         stationOne    : FB_Station ;
17         stationTwo    : FB_Station ;
18         stationThree  : FB_Station ;
19         stationOut    : FB_OutStation ;
20     END_VAR
21     VAR_OUTPUT
22     END_VAR
23     VAR
24     END_VAR
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```

2.2 POU: FB_OutStation

```
1      (*
2          www.hevs.ch
3          Institut Systemes Industriels
4          Project:      Projet No: PW_02
5          Author:       Cedric Lenoir
6          Date:         2024 January 16
7
8          Summary:      Manage One station for a conveyor.
9      *)
10     FUNCTION_BLOCK FB_OutStation
11     VAR_INPUT
12         Enable      : BOOL ;
13     END_VAR
14     VAR_IN_OUT
15         ioStation   : ST_StationOutput ;
16     END_VAR
```

2.2 POU: FB_OutStation

```
17  VAR_OUTPUT
18      diCounter    : DINT ;
19      stop          : BOOL ;
20      release       : BOOL ;
21  END_VAR
22  VAR
23      // Used to count the number of inputs in station
24      rTrigIn       : R_TRIG ;
25      // Reset Counter if TON for more than 2 seconds
26      tonResetCounter : TON ;
27  END_VAR
28
```

```
1  IF Enable THEN
2      rTrigIn ( CLK := ioStation.bSensor ) ;
3
4      IF rTrigIn.Q THEN
5          diCounter := diCounter + 1 ;
6          release := FALSE ;
7          stop := TRUE ;
8      END_IF
9      IF ioStation.bButton THEN
10         release := TRUE ;
11         stop := FALSE ;
12     END_IF
13     ioStation.bLed := stop ;
14
15     tonResetCounter ( IN := ioStation.bButton ,
16                     PT := T#2S ) ;
17
18     IF tonResetCounter.Q THEN
19         diCounter := 0 ;
20     END_IF
21
22     ioStation.bBuzzer := stop ;
23 END_IF
24
```

2.3 POU: FB_Station

```
1  (*
2      www.hevs.ch
3      Institut Systemes Industriels
4      Project:      Projet No: PW_02
5      Author:       Cedric Lenoir
6      Date:         2024 January 16
7
8      Summary:      Manage One station for a conveyor.
9  *)
10  FUNCTION_BLOCK FB_Station
11  VAR_INPUT
12      Enable      : BOOL ;
13  END_VAR
14  VAR_IN_OUT
15      ioStation   : ST_StationConveyor ;
```

2.3 POU: FB_Station

```
16  END_VAR
17  VAR_OUTPUT
18      diCounter    : DINT ;
19      stop         : BOOL ;
20      release      : BOOL ;
21  END_VAR
22  VAR
23      // Used to count the number of inputs in station
24      rTrigIn      : R_TRIG ;
25      // Reset Counter if TON for more than 2 seconds
26      tonResetCounter : TON ;
27  END_VAR
28
```

```
1  IF Enable THEN
2      rTrigIn ( CLK := ioStation.bSensor ) ;
3
4      IF rTrigIn.Q THEN
5          diCounter := diCounter + 1 ;
6          release := FALSE ;
7          stop := TRUE ;
8      END_IF
9      IF ioStation.bButton THEN
10         release := TRUE ;
11         stop := FALSE ;
12     END_IF
13     ioStation.bLed := stop ;
14
15     tonResetCounter ( IN := ioStation.bButton ,
16                     PT := T#2S ) ;
17
18     IF tonResetCounter.Q THEN
19         diCounter := 0 ;
20     END_IF
21 END_IF
22
```

3 POU: PRG_Student

```
1  (*
2      Practical Work 01 / Write your first PLC Code here
3
4      www.hevs.ch
5      Institut Systemes Industriels
6      Project:      HEVS Pack 2022
7      Author:       Cedric Lenoir / Christophe Truffer
8      Date:         2025 January 29
9  *)
10 PROGRAM PRG_Student
11 VAR
12     diMyLoop          : DINT ;
13     emConveyor        : ST_Conveyor ;
14     testMode          : BOOL ;
15
```

3 POU: PRG_Student

```
16         fbStationOne           : FB_Station ;
17         fbStationTwo           : FB_Station ;
18         fbStationThree         : FB_Station ;
19         fbOutStation           : FB_OutStation ;
20         fbDrive                 : FB_Drive ;
21     END_VAR
22
```

```
1     diMyLoop := diMyLoop + 1 ;
2
3     //
4     // Manage inputs
5     //
6     // cm01
7     emConveyor.cm01.bButton := GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_0 ;
8     emConveyor.cm01.bSensor := GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_4 ; // UA_DigitalInput_32_Input_0_4;
9     // cm02
10    emConveyor.cm02.bButton := GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_1 ;
11    emConveyor.cm02.bSensor := GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_5 ;
12    // cm03
13    emConveyor.cm03.bButton := GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_2 ;
14    emConveyor.cm03.bSensor := GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_6 ;
15    // cmOut
16    emConveyor.cmOut.bButton := GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_3 ;
17    emConveyor.cmOut.bSensor := NOT GVL_Abox.uaAboxInterface.uaDigitalIn .
    Input_0_7 ; // Signal inverted
18
19
20    // Execute Control Modules
21    fbStationOne ( Enable := NOT testMode ,
22                  ioStation := emConveyor.cm01 ) ;
23    fbStationTwo ( Enable := NOT testMode ,
24                  ioStation := emConveyor.cm02 ) ;
25    fbStationThree ( Enable := NOT testMode ,
26                    ioStation := emConveyor.cm03 ) ;
27
28    fbOutStation ( Enable := NOT testMode ,
29                  ioStation := emConveyor.cmOut ) ;
30
31
32    fbDrive ( Enable := NOT testMode ,
33              ioDrive := emConveyor.cmDrive ,
34              stationOne := fbStationOne ,
35              stationTwo := fbStationTwo ,
36              stationThree := fbStationThree ,
37              stationOut := fbOutStation ) ;
38
39    //
```



```
40      // Manage outputs
41      //
42      GVL_Abox . uaAboxInterface . uaDigitalOut . Output_0_0 := emConveyor . cm01 .
      bLed ;
43      GVL_Abox . uaAboxInterface . uaDigitalOut . Output_0_1 := emConveyor . cm02 .
      bLed ;
44      GVL_Abox . uaAboxInterface . uaDigitalOut . Output_0_2 := emConveyor . cm03 .
      bLed ;
45      GVL_Abox . uaAboxInterface . uaDigitalOut . Output_0_3 := emConveyor . cmOut .
      bLed ;
46      GVL_Abox . uaAboxInterface . uaDigitalOut . Output_0_4 := emConveyor . cmDrive .
      bK_ActivatePositiveDirection ;
47      GVL_Abox . uaAboxInterface . uaDigitalOut . Output_0_5 := emConveyor . cmDrive .
      bK_ActivateNegativeDirection ;
48      GVL_Abox . uaAboxInterface . uaDigitalOut . Output_0_6 := emConveyor . cmOut .
      b buzzer ;
49
50
```

4 : Project Settings

Analyse statique Light:

Variables non-utilisées (#33): 0
Zones de mémoire chevauchées (#28): 0
Accès simultané (#6): 0
Accès en écriture multiple sur la sortie (#4): 0
Usage multiple du nom (#27): 0
Rapport instances temporaires de bloc fonctionnel (#167): 0
Opération suspecte sur chaîne (#175): 0