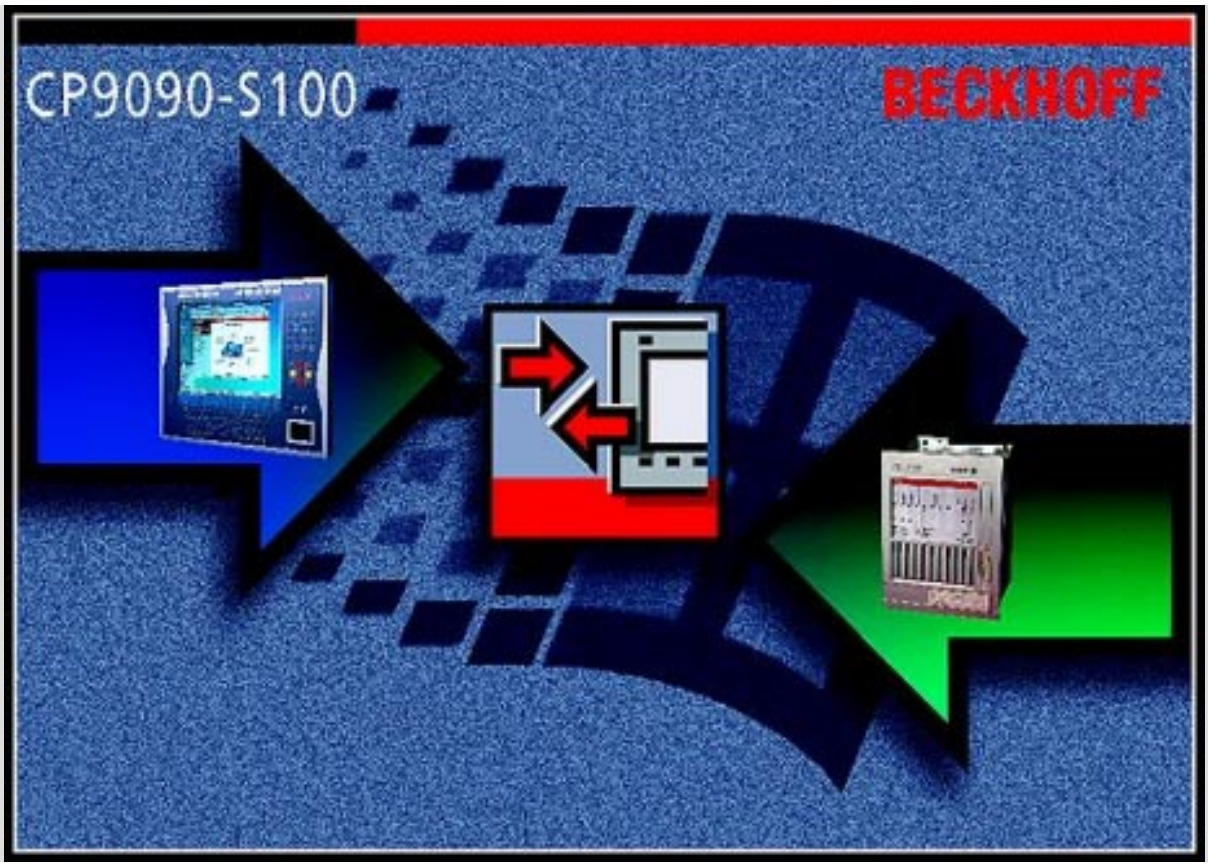


Beckhoff® TwinCAT

The Windows Control and Automation Technology

CP9090-S100: ActiveX Component for CP9030

Last change: 23.01.2001

BECKHOFF

Contents

CP9090-S100: ActiveX Component for CP9030

1. Overview

The CP9090-S100 ActiveX component serves the purpose to access the Beckhoff CP-Link card CP9030.

Characteristics

- Configuration of Beckhoff CP-Link card CP9030
- Enables access to additional control-devices (e.g. SKeys, LEDs, poti for override...)
- Enables access for locking the CP (e.g. keys, mouse, touch...)
- Enables access of USV signals

Requirements

- Microsoft Windows 9x / Win NT / Win2K
- Please work with current Service Packs.

CP9090-S200 includes...

The install version includes:

- CP9090-S100 ActiveX-component
- Documentation (PDF and HTML)
- Demo application

2. Installation

Start the "SETUP.EXE" program from disk 1/x to install the CP9090-S100 component under Windows 9x / NT.

Files and folders

Following files will be installed / updated

WINDOWS\SYSTEM(32) folder:

- CpLink9x.dll
- Atl.dll
- Ole32.dll
- Oleaut32.dll
- TcMM.sys
- TcMMHelper.dll
- TcW9xMMHelper.dll

WINDOWS\HELP:

- Cp9090-S100.chm

Help

If CP9090-S100 help files appears "empty", please install HTML-HELP-runtime-files by starting "hhupd.exe" file from the CD first.

It is recommended, that you are familar with Beckhoff CP-card. The CD contains detailed technical information.

Support

in the event of problems/questions, please contact:

Beckhoff Industrie Elektronik

Eiserstr. 5

33415 Verl

Tel: 05246-963-157

Fax: 05246-963-199

Email: mailto:info@beckhoff.com Internet: http://www.beckhoff.com

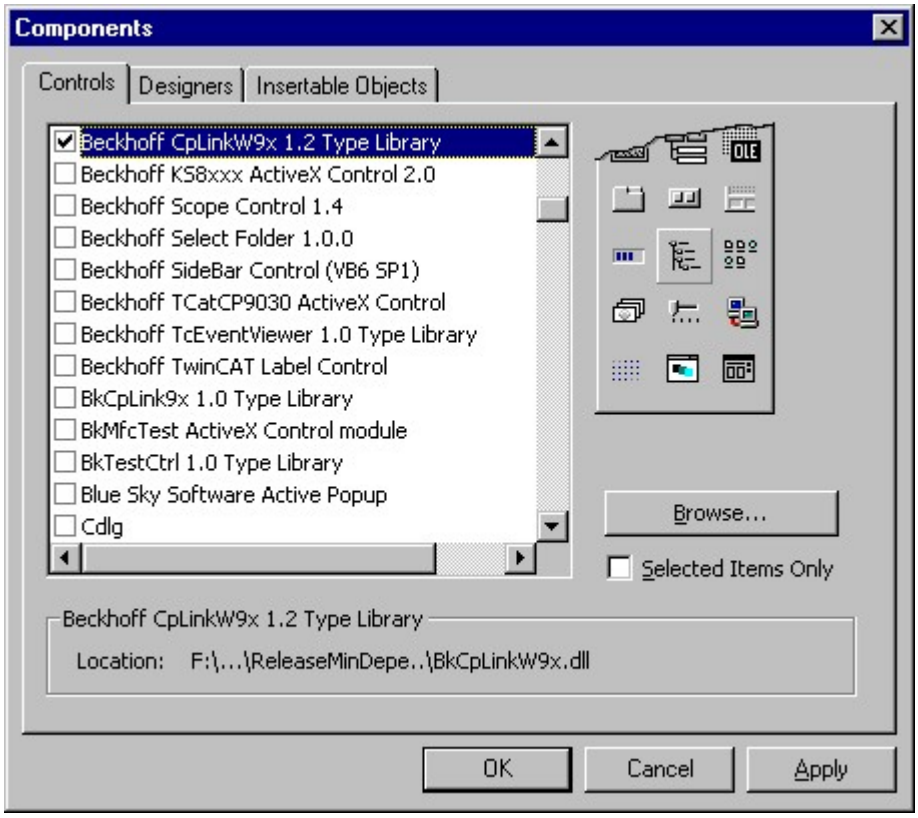
Please provide a detailed decription of the error as well as information abaout the operation system (Win9x, NTx Service Packs), and the language selected (german, english), etc.

You will find the version number of the CP9090-S100 component in the 'Properties menu' of the CpLink9x.dll file.

3. Integration in applications

Integration in Visual Basic

CP9090-S100 ActiveX component can be used in Visual Basic. To do this, select the "Components.." command under the "Project' menu item in Visual Basic and mark the 'Beckhoff CpLinkW9x x.x Type Library" entry.



CP9090-S100 ActiveX component the appears in the Visual Basic toolbox.

Integration in Visual C++

Under construction

4. Properties

AkkuCharged

Returns the status of the USV.

```
HRESULT AkkuCharged(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
[out, retval]
TRUE if Akku charged. FALSE if not.

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bAkkuCharged as Boolean
bAkkuCharged = CP9030W9x1.AkkuCharged
```

AkkuCharging

Returns the status of the USV.

```
HRESULT AkkuCharging(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameter

pVal
[out, retval]
TRUE if Akku charging. FALSE if not.

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bAkkuCharging as Boolean
bAkkuCharging = CP9030W9x1.AkkuCharging
```

AkkuNotPresent

Returns the status of the USV.

```
HRESULT AkkuNotPresent(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
[out, retval]
TRUE if not present. FALSE if present

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bAkkuNotPresent as Boolean
bAkkuNotPresent = CP9030W9x1.AkkuNotPresent
```

AkkuVoltageOk

Returns the status of the USV.

```
HRESULT AkkuVoltageOk(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameter

pVal
[out, retval]
TRUE if voltage Ok. FALSE if not.

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bAkkuVoltageOk as Boolean
bAkkuVoltageOk = CP9030W9x1.AkkuVoltageOk
```

AkkuWaiting

Returns the status of the USV charger.

```
HRESULT AkkuWaiting(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameter

pVal
[out, retval]
TRUE or FALSE

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bAkkuWaiting as Boolean
bAkkuWaiting = CP9030W9x1.AkkuWaiting
```

CnfErr

Returns the status of the CP configuration.

```
HRESULT CnfErr(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
[out, retval]
TRUE or FALSE

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bCnfErr as Boolean
bCnfErr = CP9030W9x1.CnfErr
```

ComErr

Returns the status of the CP communication.

```
HRESULT ComErr(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
[out, retval]
TRUE if error existing, otherwise FALSE.

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bComErr as Boolean
bComErr = CP9030W9x1.ComErr
```

CycleEnabled

Sets / returns the status of cycle to check status of e.g. SKeys.

```
CycleEnabled(
        [out, retval] VARIANT_BOOL* pVal
);


HRESULT CycleEnabled(
        [in] VARIANT_BOOL pVal
);
```

Parameters

pVal
TRUE or FALSE

Comment

To modify the length of interval use property "CycleInterval". Default interval is 300ms.
If "CycleEnabled" is "TRUE", CP9090-S100 will cyclic check the status of e.g. SKeys.

If status changed, an event will be fired.

Sample VB-Syntax

```
Dim bCycleEnabled as Boolean

CP9030W9x1.CycleEnabled = TRUE

bCycleEnabled = CP9030W9x1.CycleEnabled
```

CycleInterval

Sets / returns the length of cycle interval for checking the status of e.g. SKeys.

```
HRESULT CycleInterval(
        [out, retval] short* pVal
);


HRESULT CycleInterval(
        [in] short pVal
);
```

Parameters

pVal
Length of interval in ms

Comment
Activate the cycle interval with property "CycleEnabled".

Sample VB-Syntax

```
Dim iCycleInterval as Integer

CP9030W9x1.CycleInterval = 500
CP9030W9x1.CycleEnabled = TRUE

iCycleInterval = CP9030W9x1.CycleInterval
```

DeviceAddr

Sets/ returns the address of CP9030 device.

```
HRESULT DeviceAddr(
        [out, retval] CP_DEVICEADDR* pVal
);


HRESULT DeviceAddr(
        [in] CP_DEVICEADDR pVal
);
```

Parameters

pVal
Address 0xC8000 – 0xE7800

Comment

The CP9030 device has to be configured via dip-switch SW400.

Sample VB-Syntax

```
Dim lDeviceAddr as CP_DEVICEADDR

CP9030W9x1.DeviceAddr = CPAddr_0xC8800
lDeviceAddr = CP9030W9x1.DeviceAddr
```

Definition CP_DEVICEADDR

```
typedef enum CP_DEVICEADDR
{
    CPAddr_0xC8000 = 0xC8000,
    CPAddr_0xC8800 = 0xC8800,
    CPAddr_0xC9000 = 0xC9000,
    CPAddr_0xC9800 = 0xC9800,
    CPAddr_0xCA000 = 0xCA000,
    CPAddr_0xCA800 = 0xCA800,
    CPAddr_0xCB000 = 0xCB000,
    CPAddr_0xCB800 = 0xCB800,
    CPAddr_0xCC000 = 0xCC000,
    CPAddr_0xCC800 = 0xCC800,
    CPAddr_0xCD000 = 0xCD000,
    CPAddr_0xCD800 = 0xCD800,
    CPAddr_0xCE000 = 0xCE000,
    CPAddr_0xCE800 = 0xCE800,
    CPAddr_0xCF000 = 0xCF000,
    CPAddr_0xCF800 = 0xCF800,
    CPAddr_0xD0000 = 0xD0000,
    CPAddr_0xD0800 = 0xD0800,
    CPAddr_0xD1000 = 0xD1000,
    CPAddr_0xD1800 = 0xD1800,
    CPAddr_0xD2000 = 0xD2000,
    CPAddr_0xD2800 = 0xD2800,
    CPAddr_0xD3000 = 0xD3000,
    CPAddr_0xD3800 = 0xD3800,
    CPAddr_0xD4000 = 0xD4000,
    CPAddr_0xD4800 = 0xD4800,
    CPAddr_0xD5000 = 0xD5000,
```

```
    CPAddr_0xD5800 = 0xD5800,
    CPAddr_0xD6000 = 0xD6000,
    CPAddr_0xD6800 = 0xD6800,
    CPAddr_0xD7000 = 0xD7000,
    CPAddr_0xD7800 = 0xD7800,
    CPAddr_0xD8000 = 0xD8000,
    CPAddr_0xD8800 = 0xD8800,
    CPAddr_0xD9000 = 0xD9000,
    CPAddr_0xDA000 = 0xDA000,
    CPAddr_0xDA800 = 0xDA800,
    CPAddr_0xDB000 = 0xDB000,
    CPAddr_0xDB800 = 0xDB800,
    CPAddr_0xDC000 = 0xDC000,
    CPAddr_0xDC800 = 0xDC800,
    CPAddr_0xDD000 = 0xDD000,
    CPAddr_0xDD800 = 0xDD800,
    CPAddr_0xDE000 = 0xDE000,
    CPAddr_0xDE800 = 0xDE800,
    CPAddr_0xDF000 = 0xDF000,
    CPAddr_0xDF800 = 0xDF800,
    CPAddr_0xE0000 = 0xE0000,
    CPAddr_0xE0800 = 0xE0800,
    CPAddr_0xE1000 = 0xE1000,
    CPAddr_0xE1800 = 0xE1800,
    CPAddr_0xE2000 = 0xE2000,
    CPAddr_0xE3000 = 0xE2800,
    CPAddr_0xE3800 = 0xE3800,
    CPAddr_0xE4000 = 0xE4000,
    CPAddr_0xE4800 = 0xE4800,
    CPAddr_0xE5000 = 0xE5000,
    CPAddr_0xE6000 = 0xE6000,
    CPAddr_0xE6800 = 0xE6800,
    CPAddr_0xE7000 = 0xE7000,
    CPAddr_0xE7800 = 0xE7800

} CP_DEVICEADDR;
```

DeviceInfo

Returns information about CP9030 device.

```
HRESULT DeviceInfo(
        [out, retval] BSTR* pVal
);
```

Parameters

pVal
Type and Version of CP9030 device

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim szInfo as String

szInfo = CP9030W9x1.DeviceInfo
```

DeviceOpen

Sets / returns the status of CP9030 communication port (open or close)

```
HRESULT DeviceOpen(
        [out, retval] VARIANT_BOOL* pVal
);


HRESULT DeviceOpen(
        [in] VARIANT_BOOL pVal
);
```

Parameters

pVal
TRUE if open, FALSE if not

Comment

You have to set the property "DeviceAddr" before setting "DeviceOpen" to TRUE.
If this function failed, check the property "DeviceAddr".

Sample VB-Syntax

```
Dim bDeviceOpen as Boolean

CP9030W9x1.DeviceOpen = True
bDeviceOpen = CP9030W9x1.DeviceOpen
```

DisplayOff

Sets / returns the status of the display connected to CP9030.

```
HRESULT DisplayOff(
        [out, retval] VARIANT_BOOL* pVal
);


HRESULT DisplayOff(
        [in] VARIANT_BOOL pVal
);
```

Parameter

pVal
TRUE or FALSE

Sample VB-Syntax

```
Dim bDisplayOff as Boolean

CP9030W9x1.DisplayOff = True
bDisplayOff = CP9030W9x1.DisplayOff
```

EnableUPS

Enables / disables UPS features of CP9030.

```
HRESULT EnableUPS(
        [out, retval] VARIANT_BOOL* pVal
);


HRESULT EnableUPS(
        [in] VARIANT_BOOL pVal
);
```

Parameters

pVal
TRUE or FALSE

Sample VB-Syntax

```
Dim bEnableUPS as Boolean

CP9030W9x1.bEnableUPS = True
bEnableUPS = CP9030W9x1.EnableUPS
```

ExtVoltageOk

Returns the status of the external CP9030-voltage.

```
HRESULT ExtVoltageOk(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
TRUE if external voltage is OK. FALSE if not OK.

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim bExtVoltageOk as Boolean

bExtVoltageOk = CP9030W9x1.ExtVoltageOk
```

IdentSwitch

Returns the settings of Ident-Switch SW500 of CP9030.

```
HRESULT IdentSwitch(
        [out, retval] short* pVal
);
```

Parameters

pVal
[out, retval]
Range 0..15

Comments
Property is "Read only"

Sample VB-Syntax

```
Dim iIdentSwitch as Integer

iIdentSwitch = CP9030W9x1.IdentSwitch
```

KbdOff

Sets / returns the status of keyboard connected to CP9030.

```
HRESULT KbdOff(
        [out, retval] VARIANT_BOOL* pVal
);


HRESULT KbdOff(
        [in] VARIANT_BOOL pVal
);
```

Parameters

pVal
TRUE = hidden keyboard. FALSE enables keyboard

Comment

To use this feature of locking the keyboard you have to close jumper J300 on CP9030 device first.

Sample VB-Syntax

```
Dim bKbdOff as Boolean
…
CP9030W9x1.KbdOff = True
bKbdOff = CP9030W9x1.KbdOff
```

KbusErr

Returns the error status of Kbus communication.

```
HRESULT KbusErr(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
TRUE if KBus error existing. FALSE if no error

Comment
Property ist "Read only"

Sample VB-Syntax

```
Dim bKbusErr as Boolean

bKbusErr = CP9030W9x1.KbusErr
```

Led

Sets / returns the status of LED on control panel connected tp CP9030.

```
HRESULT Led(
        [in] short nIndex,
        [out, retval] VARIANT_BOOL* pVal
);

HRESULT Led(
        [in] short nIndex,
        [in] VARIANT_BOOL pVal
);
```

Parameters

nIndex
: Number of LED (1..27)

pVal
: TRUE or FALSE

Sample VB-Syntax

```
Dim bLed07 as Boolean

CP9030W9x1.Led(7) = True
bLed07 = CP9030W9x1.Led(7)
```

PdCycles

Returns the number of process-data communications of CP9030.

```
HRESULT PdCycles(
        [out, retval] short* pVal
);
```

Parameters

pVal
0..255 (cyclic)

Comment
- Property is "Read only"
- CP9030 increments this value for each process data-cycle.

Sample VB-Syntax

```
Dim iPdCycles as Integer

iPdCycles = CP9030W9x1.PdCycles
```

PDLenErr

Returns the error status for length of output-process-data.

```
HRESULT PDLenErr(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
TRUE if error, FALSE if no error

Comment
- Property is"Read only"
- If this error is existing, check the property „PDOutWLen". (see although method „Reset")

Sample VB-Syntax

```
Dim bPDLenErr as Boolean

bPDLenErr = CP9030W9x1.PDLenErr
```

PDInWLen

Returns the length of process-input-image of CP9030.

```
HRESULT PDInWLen(
        [out, retval] short* pVal
);
```

Parameters

pVal
Number of words.

Comment
Property ist "Read only"

Sample VB-Syntax

```
Dim iPDInWLen as Integer

iPDInWLen = CP9030W9x1.PDInWLen
```

PDOutWLen

Sets / returns the length of process output-image of CP9030.

```
HRESULT PDOutWLen(
        [out, retval] short* pVal
);


HRESULT PDOutWLen(
        [in] short pVal
);
```

Parameters

pVal
Number of words.

Comment

Property „PDLenErr" signals an error of CP9030, so you have to set property „PDOutWLen" to correct word-length of process-output-image.
Calling he methode „Reset" will initiate a reset of CP9030-firmware.

Sample VB-Syntax

```
Dim iPDOutWLen as Integer

iPDOutWLen = CP9030W9x1.PDOutWLen
```

SKey

Returns the status of specified SKey on control panel connected to CP9030.

```
HRESULT SKey(
        [in] short nIndex,
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

nIndex
Number of SKey, 1..27

pVal
TRUE if SKey pressed. FALSE if not pressed

Comment

You can poll the state of an SKey by reading the property "SKey". If you set "CycleEnabled" to TRUE, SKey-events will be fired if state of an SKey changed.

Sample VB-Syntax

```
Dim bSKey01 as Boolean

bSKey09 = CP9030W9x1.SKey(9)
```

UpsDelay

Sets / returns the time for the delay before the UPS switches off.

```
HRESULT UpsDelay(
        [out, retval] CP_UPSDELAY* pVal
);

HRESULT UpsDelay(
        [in] CP_UPSDELAY pVal
);
```

Parameters

pVal
Index with the delay time for the UPS to switch off.

Index	Delay in seconds
0	0
1	2
2	5
3	10
4	15
5	25
6	40
7	60
8	90
9	120
10	150
11	180
12	210
13	240
14	270
15	300

Example in VB syntax

```
Dim lUpsDelay as CP_UPSDELAY

CP9030W9x1.UpsDelay = CPUpsDelay_10
lUpsDelay = CP9030W9x1.UpsDelay
```

Definition of the CP_UPSDELAY constants:

```
typedef
enum CP_UPSDELAY
{
        CPUpsDelay_0 = 0,
        CPUpsDelay_2 = 0x1,
        CPUpsDelay_5 = 0x2,
        CPUpsDelay_10 = 0x3,
        CPUpsDelay_15 = 0x4,
        CPUpsDelay_25 = 0x5,
        CPUpsDelay_40 = 0x6,
        CPUpsDelay_60 = 0x7,
        CPUpsDelay_90 = 0x8,
        CPUpsDelay_120 = 0x9,
        CPUpsDelay_150 = 0xa,
        CPUpsDelay_180 = 0xb,
        CPUpsDelay_210 = 0xc,
        CPUpsDelay_240 = 0xd,
        CPUpsDelay_270 = 0xe,
        CPUpsDelay_300 = 0xf
} CP_UPSDELAY;
```

5. Methods

AutoCfgPDOutWLen

The method permits the length of the process output image of the CP9030 to be set automatically.

```
HRESULT AutoCfgPDOutWLen(
        [out, retval] VARIANT_BOOL* pVal
);
```

Parameters

pVal
TRUE if successful, otherwise FALSE

Remark

If the property "PDLenErr" displays an error condition of the CP9030, it is necessary to enter the actual word length of the process output image via the property "PDOutWLen". By calling the method "AutoCfgPDOutWLen", the word length of the process output image is automatically configured and set. If the property "PDOutWLen" is set manually, it is necessary subsequently to perform a "Reset" of the CP9030 firmware. Calling the "Reset" method will initiate a restart of the CP9030 firmware, and the new configuration will be adopted.

The AutoCfgPDOutWLen method autonomously determines the length of the process output image by executing the following cycle of actions

- incrementing the word length of the process output image (-> "PDOutWLen")
- initiating a restart of the CP9030 firmware (-> "Reset")
- checking the error state (-> "PDLenErr")

Example in VB syntax

```
Dim bResult as Boolean


bResult = CP9030W9x1.AutoCfgPDOutWLen
```

ReadPhysData

Returns the value from DP-Ram of CP9030.
Use this methode to access additional devices e.g. Poti.

```
HRESULT ReadPhysData(
        [in] long PhysOffset,
        [in, out] VARIANT* pVal
);
```

Parameter

PhysOffset
[in]
Offset in DPRam (Input: 0x0000 .. 0x03FF)

pData
[in, out]
Databuffer, following variant-types are implemented:
(VT_BYREF und VT_UI1)
(VT_BYREF und VT_I2)
(VT_BYREF und VT_I4)
(VT_BYREF und VT_R4)
(VT_BYREF und VT_R8)

Comment
You should be familiar with DP-Ram of CP9030 !!

Sample VB-Syntax

```
Dim iData as Integer
Dim lData as Long
Dim bData as Byte
call CP9030W9x1.ReadPhysData(&H104&, lData)' Read 4 bytes
call CP9030W9x1.ReadPhysData(&H104&, iData)' Read 2 bytes
call CP9030W9x1.ReadPhysData(&H104&, bData)' Read 1 bytes
```

WritePhysData

Setss the value in DP-Ram of CP9030.
Use this methode to access additional devices e.g. Poti.

```
HRESULT WritePhysData(
        [in] long PhysOffset,
        [in, out] VARIANT* pData
);
```

Parameters

PhysOffset
[in]
Offset in DPRam (Input: 0x0000 .. 0x00FF)

pData
[in, out]
Databuffer, following variant-types are implemented:
(VT_BYREF und VT_UI1)
(VT_BYREF und VT_I2)
(VT_BYREF und VT_I4)
(VT_BYREF und VT_R4)
(VT_BYREF und VT_R8)

Comment
You should be familiar with DP-Ram of CP9030 !!

Sample VB-Syntax

```
Dim iData as Integer
Dim lData as Long
Dim bData as Byte
call CP9030W9x1.WritePhysData(&H0&, lData)' Write 4 bytes
call CP9030W9x1.WritePhysData(&H0&, iData)' Write 2 bytes
call CP9030W9x1.WritePhysData(&H0&, bData)' Write 1 bytes
```

Reset

Executes a reset of CP9030-firmware.

```
HRESULT Reset();
```

Comment
See: Property „PDLenErr"

Sample VB-Syntax

```
CP9030W9x1.Reset
```

TriggerCheckOnChange

With this method you can trigger cyclic checking of the status of the SKeys or of the process data image (e.g. with a multimedia timer).

```
HRESULT TriggerCheckOnChange();
```

Parameters

None

Remark

Every time the trigger method is called, then if the status of the process data input image or of the SKeys has changed, the corresponding event - SKeyDown, SkeyPress or SKeyUp - is called.

Example in VB syntax

```
Private Sub Timer1_Timer()

    Call BkCp9030W9x1.TriggerCheckOnChange

End Sub
```

6. Events

SKeyDown

Occurs once when the user presses a SKey and the property "CycleEnabled" is TRUE.

```
HRESULT SkeyDown(
        [in] short Index
);
```

Parameters

Index
Number of SKey, 1..27

Comment

You can poll the state of an SKey by reading the property "SKey". If you set "CycleEnabled" to TRUE, SKey-events will be fired if state of an SKey changed.

Sample VB-Syntax

```
Sub CP9030W9x1_SkeyDown(ByVal Index As Integer)
    ' add code here

End Sub
```

SKeyPress

Occurs while the user presses a SKey and the property "CycleEnabled" is TRUE.

```
HRESULT SkeyPress(
        [in] short Index
);
```

Parameters

Index
Number des SKey, 1..27

Comment

You can poll the state of an SKey by reading the property "SKey". If you set "CycleEnabled" to TRUE, SKey-events will be fired if state of an SKey changed.

Sample VB-Syntax

```
Sub CP9030W9x1_SkeyPress(ByVal Index As Integer)
    ' add code here

End Sub
```

SKeyUp

Occurs once when the user releases a SKey and the property "CycleEnabled" is TRUE.

```
HRESULT SKeyUp(
        [in] short Index
);
```

Parameters

Index
Number des SKey, 1..27

Comment

You can poll the state of an SKey by reading the property "SKey". If you set "CycleEnabled" to TRUE, SKey-events will be fired if state of an SKey changed.

Sample VB-Syntax

```
Sub CP9030W9x1_SkeyUp(ByVal Index As Integer)
    ' add code here

End Sub
```

OnChangeInImage

Occurs once when the process input image changes.

```
HRESULT OnChangeInImage(
        [in] long PhysOffset
);
```

Parameters

PhysOffset
Byte-Offset of input image of CP9030 (0x0000 … 0x01FF) which changed

Comment
To avoid unnecessary cyclic polling of e.g. SKey-status, you can implement event-driven code in this event.

Sample VB-Syntax

```
Sub CP9030W9x1_OnChangeInImage(ByVal PhysOffset as Long)
    ' add code here

End Sub
```

7. Samples

Overview

Description	Sourcecode
Sample 1: Integration into Visual Basic	Sample01.exe