



**Application Note**  
**PROFINET IO Controller Programming Example**  
**How to use the API for Acyclic Services**

**Hilscher Gesellschaft für Systemautomation mbH**

**[www.hilscher.com](http://www.hilscher.com)**

DOC130105AN02EN | Revision 2 | English | 2013-07 | Released | Public

## Table of Contents

<b>1</b>	<b>Introduction.....</b>	<b>3</b>
1.1	About this Document.....	3
1.2	List of Revisions .....	3
<b>2</b>	<b>Features of Acyclic Data-Exchange Example Application.....</b>	<b>4</b>
<b>3</b>	<b>Configuration Application Description .....</b>	<b>5</b>
3.1	Configuring the Hilscher PROFINET IO Controller .....	5
3.2	Configuring the Hilscher PROFINET IO Device.....	6
3.3	Basic Application Startup .....	14
3.4	Application Explanation.....	16
<b>4</b>	<b>Appendix .....</b>	<b>19</b>
4.1	List of Tables .....	19
4.2	List of Figures.....	19
4.3	Contacts .....	20

# 1 Introduction

## 1.1 About this Document

This manual describes how to run the Acyclic Data-Exchange Example Application for Hilscher PROFINET IO Controller stack.

The required components are

- 1 PC with 2 PC cards cifX
- Hilscher PROFINET IO Controller stack Version 2.5.5.0 (or newer)
- Microsoft Visual Studio .NET 2005

## 1.2 List of Revisions

Rev	Date	Name	Chapter	Revision
1	2013-01-29	MKub	all	Created
2	2013-07-17	HH	4.3	Contacts updated.

Table 1: List of Revisions

## 2 Features of Acyclic Data-Exchange Example Application

The Profinet Acyclic Data-Exchange Example Application is a straight forward implementation which shows usage of some acyclic services of Hilscher PROFINET IO Controller, e. g.:

- Get device name(s) of connected IO-Device(s) and the handle to perform acyclic read and write operations
- Get the MAC-Address, device name and IP-Address from connected IO Devices
- Perform acyclic Read Record
- Perform acyclic Implicit Read Record
- Perform acyclic Write Record
- Set new output data
- Request DCP ResetFactorySettings from an IO Device

## 3 Configuration Application Description

### 3.1 Configuring the Hilscher PROFINET IO Controller

- Load PROFINET IO Controller firmware file via cifX Driver Setup Utility on your PC card cifX.

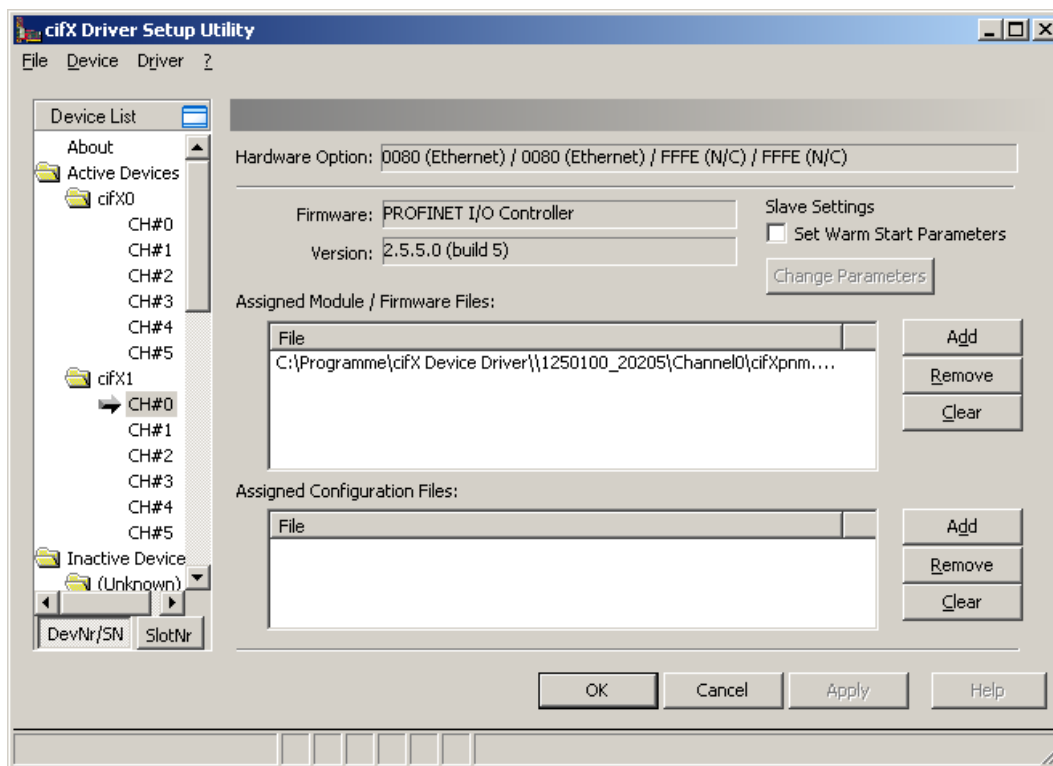


Figure 1: CifX Setup to load the PROFINET IO Controller Firmware

## 3.2 Configuring the Hilscher PROFINET IO Device

- Load PROFINET IO Device firmware file via cifX Driver Setup Utility on your PC card cifX.

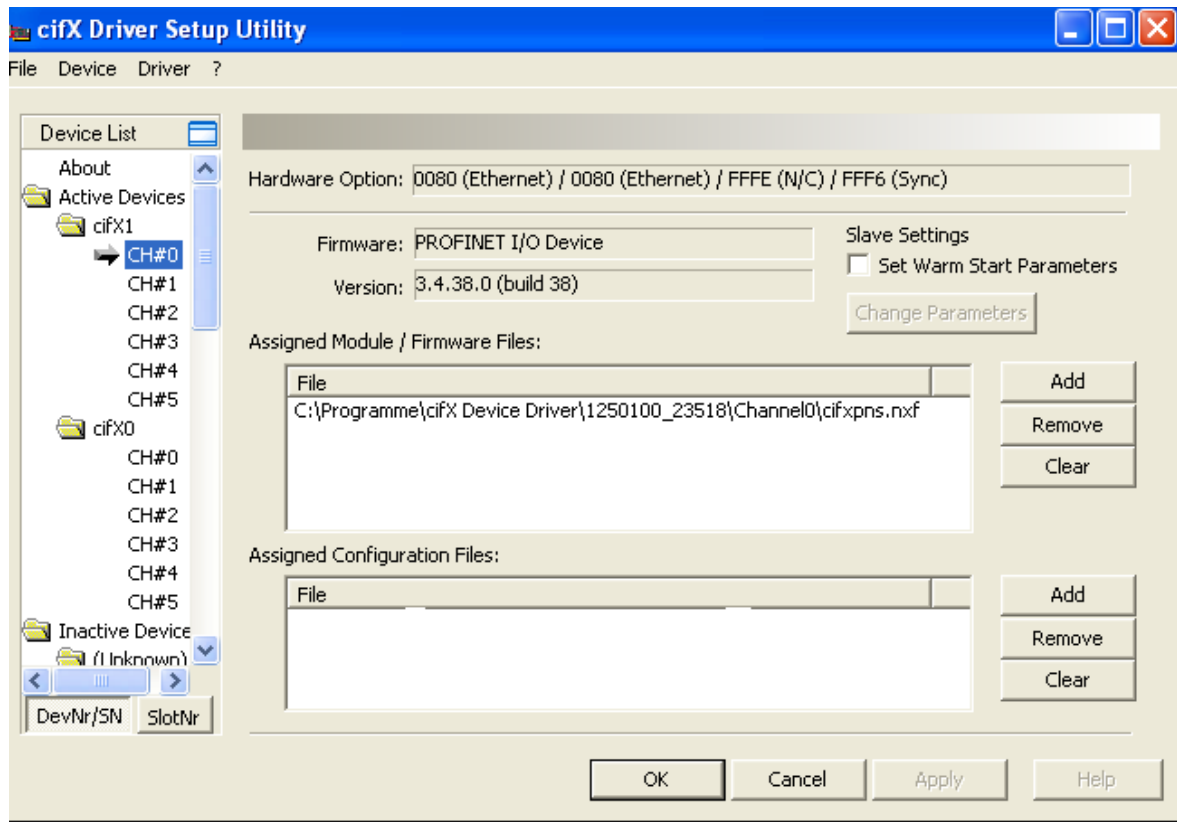


Figure 2: CifX Setup to load the PROFINET IO Device Firmware

On the next step it is required to load the IO Device configuration via Sycon.net

- In Menu “Network” choose “Import Device Descriptions”

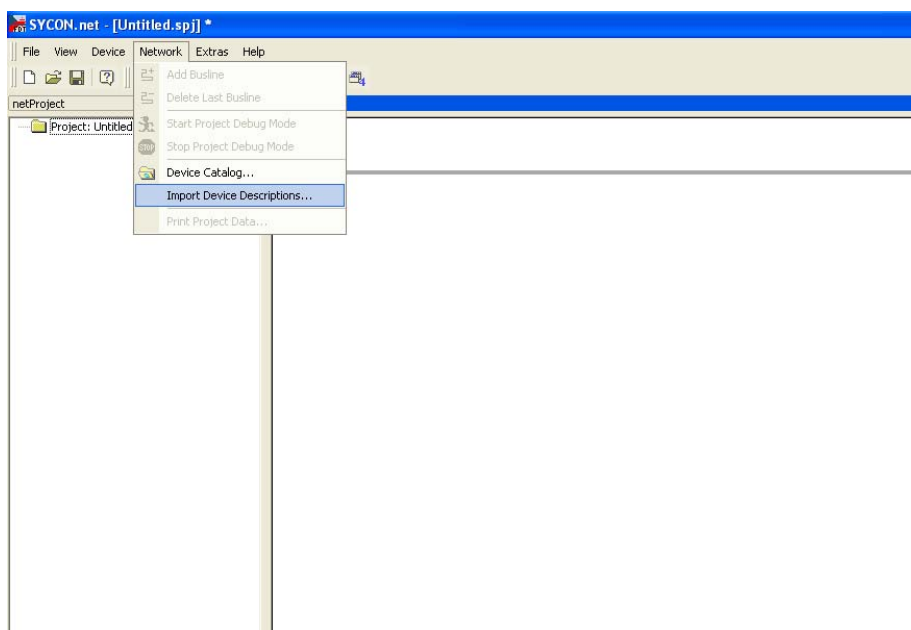


Figure 3: Import a SDDML File

- Select the GSDML
- and choose the correct file type, it is important that PROFINET GSDML (\*.xml) is selected

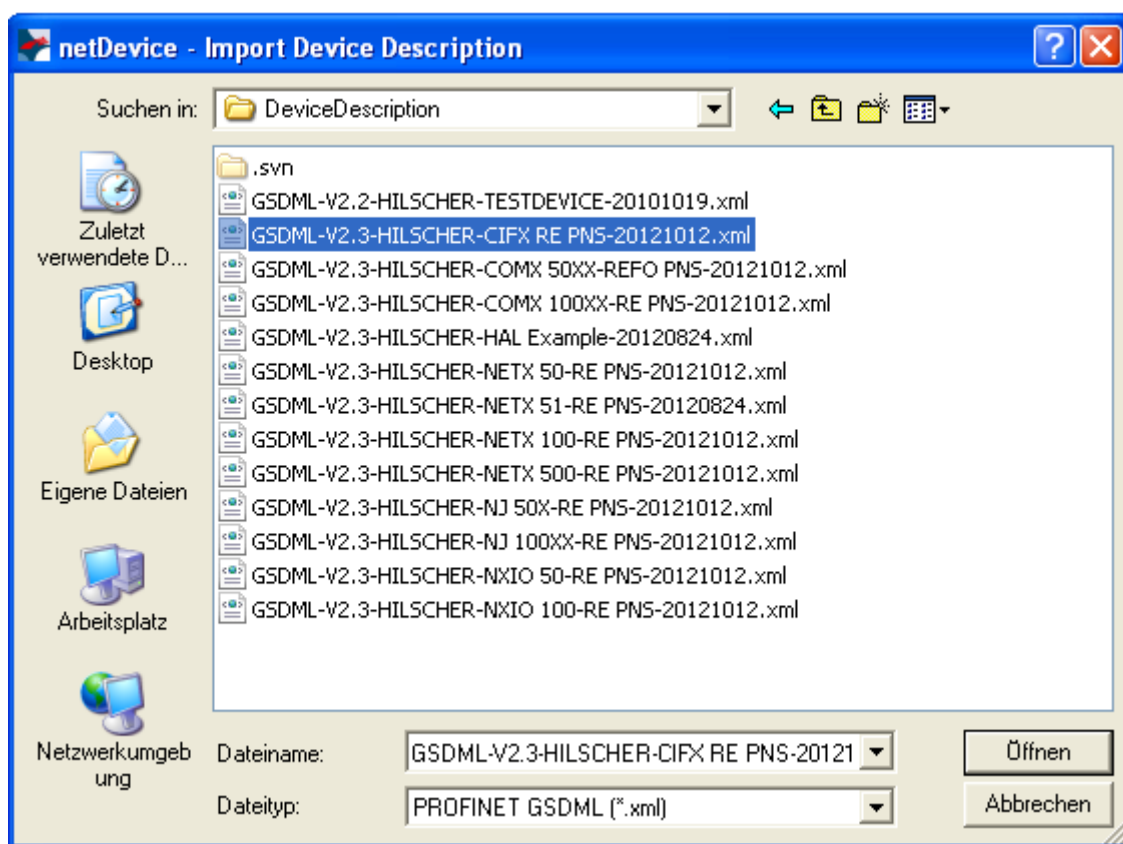


Figure 4: Select the GSDML and choose the correct File Type

- For this example "CIFX 50-RE" PCI card is used as Master.

- Choose the CIFX\_RE\_PNM via Drag and Drop and put it to the gray bus line

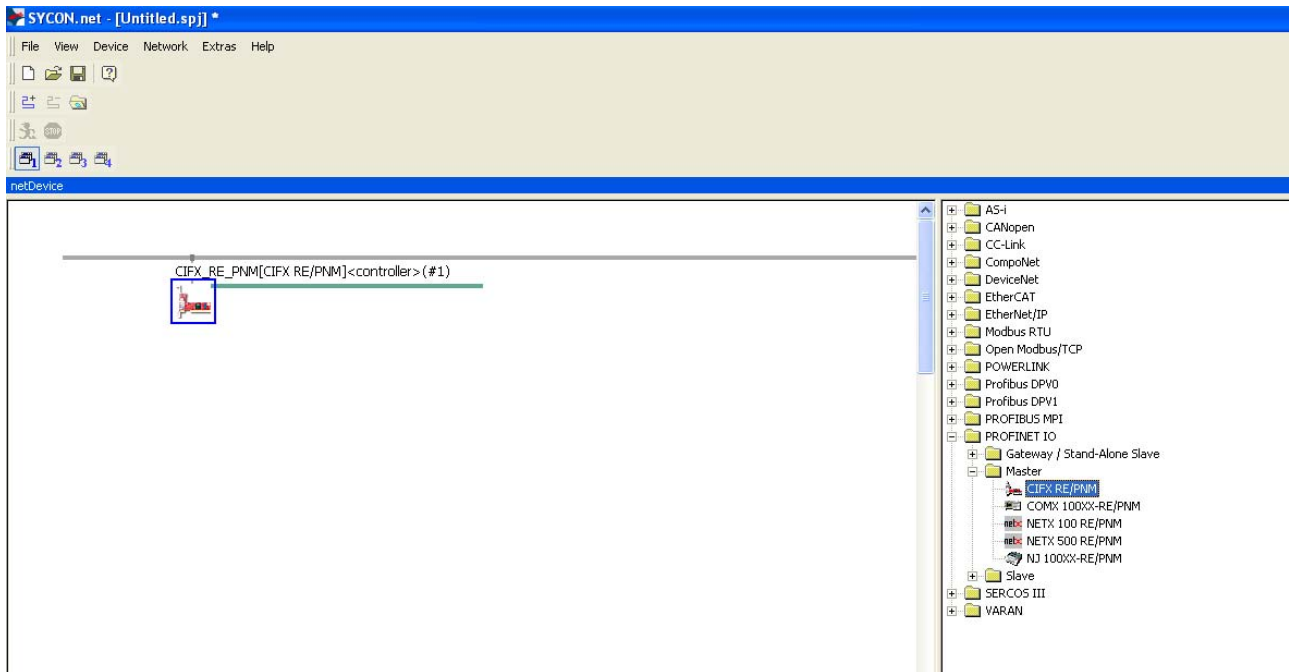


Figure 5: SYCON.net for netX to configure the Hilscher PROFINET Master

- Now open the configuration dialog by double clicking on the PROFINET Master.
- Select the cifX card, by marking it in the device selection (see Figure 6: Select the correct Hardware).



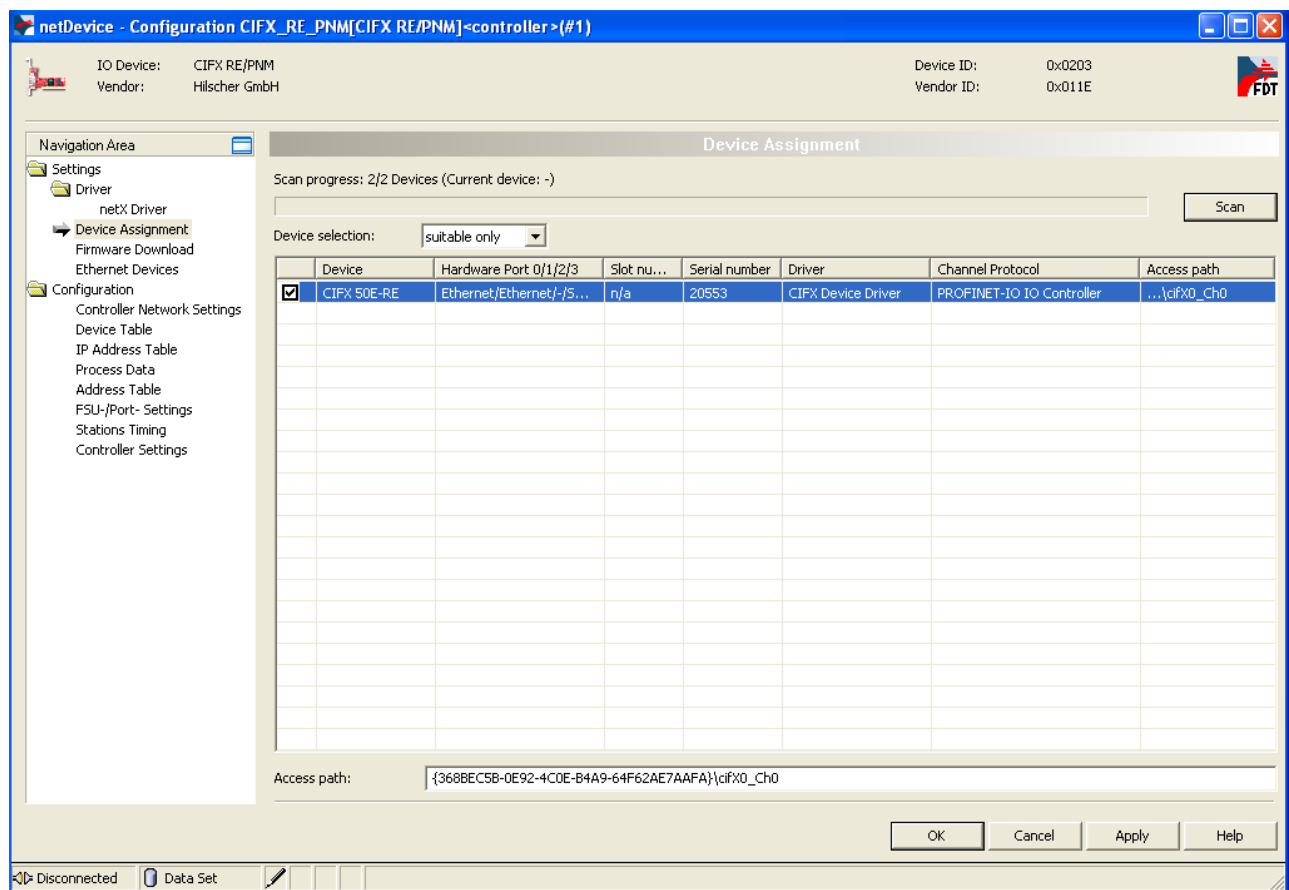


Figure 6: Select the correct Hardware

- Choose the “CIFX\_RE\_PNS\_V3.4.19 – V3.4.x” via Drag and Drop and put it to the green bus line

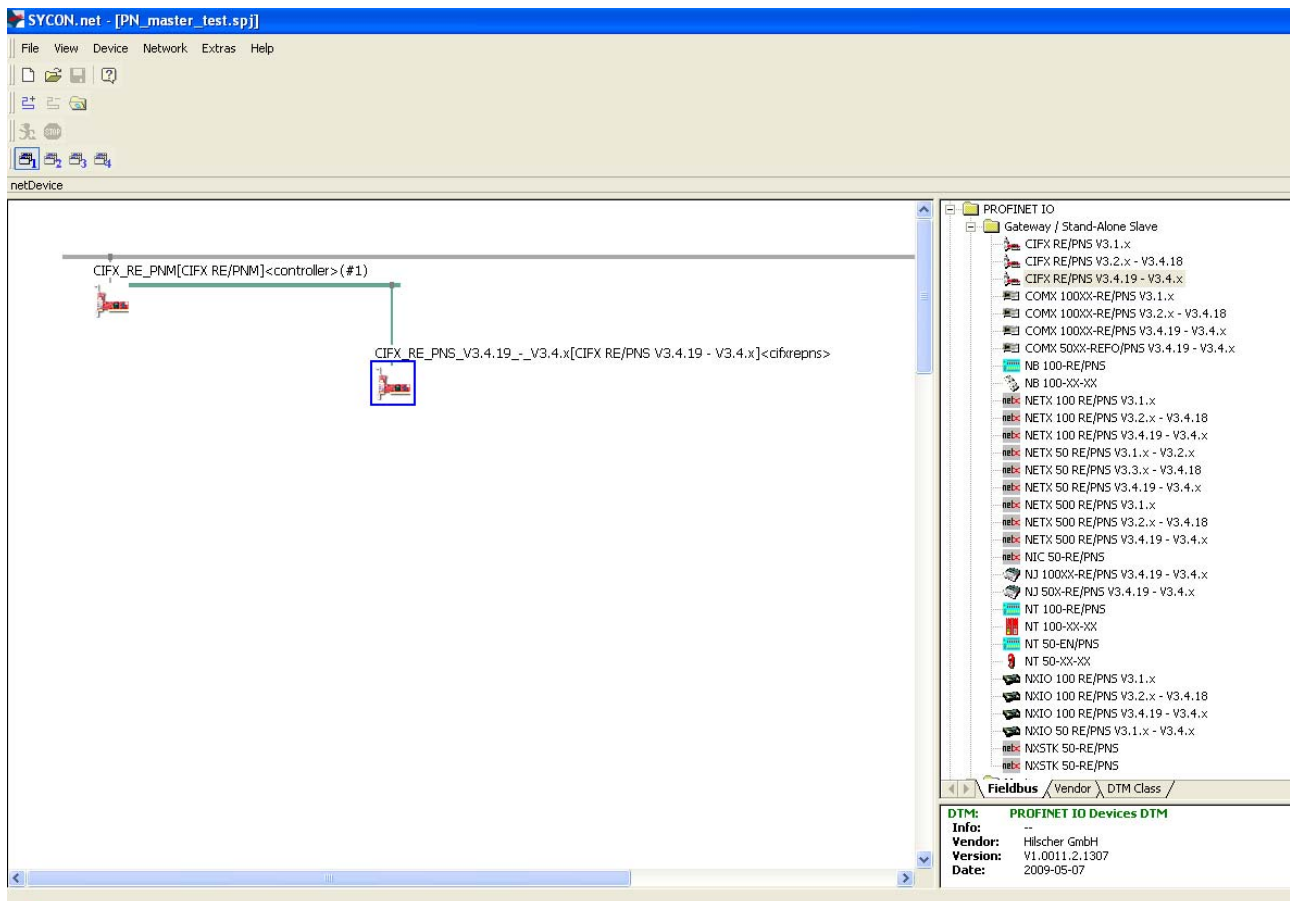
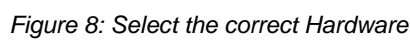


Figure 7: SYCON.net for netX to configure the Hilscher PROFINET Slave

- Now open the configuration dialog by double click on the PROFINET Slave.
- Select the cifX card, by marking it in the device selection (see Figure 8).



- Add In- and Output-Modules into the Slave-Configuration

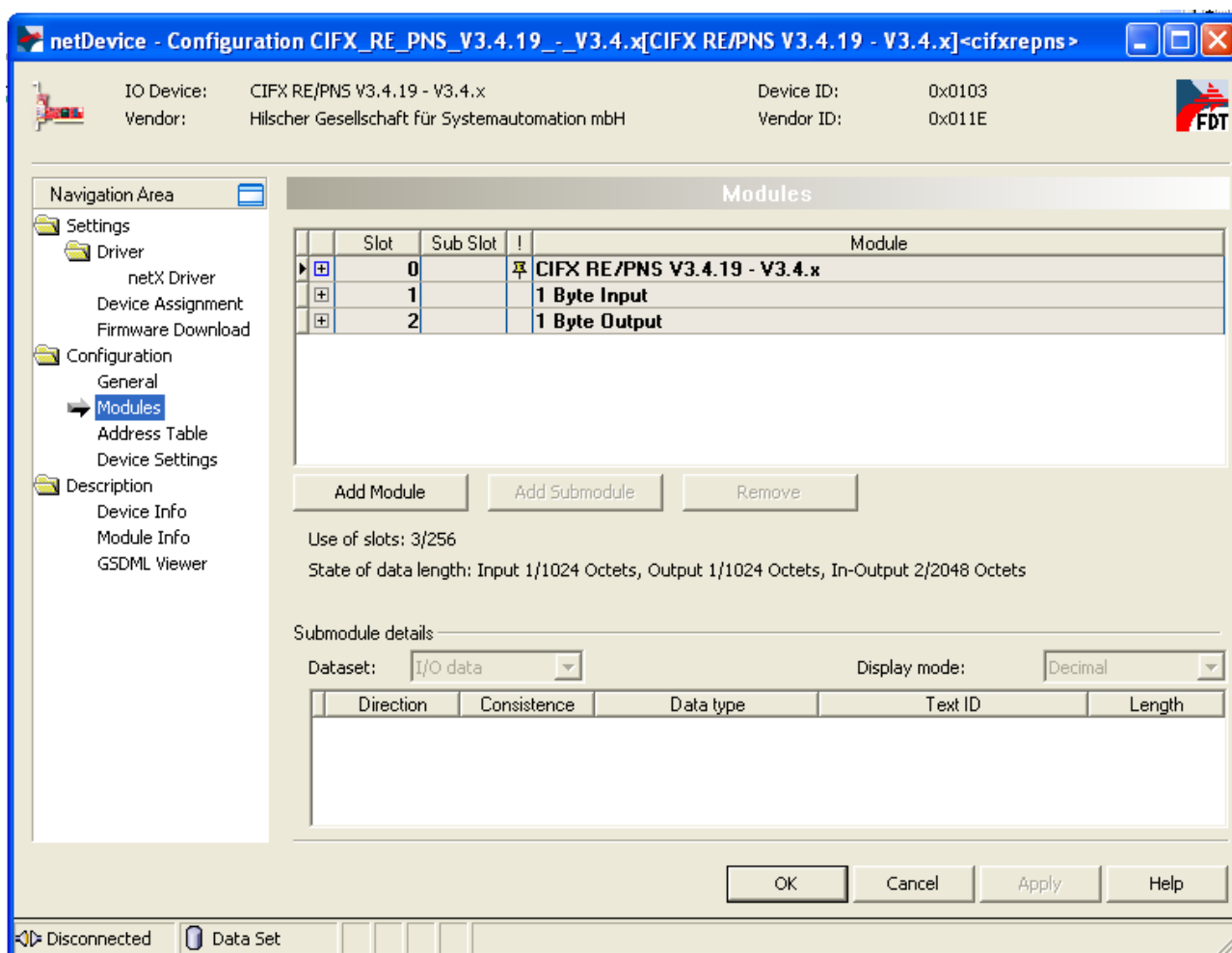


Figure 9: Slave-Module Configuration

- Open the context menu of the master device and download the default configuration to the master.

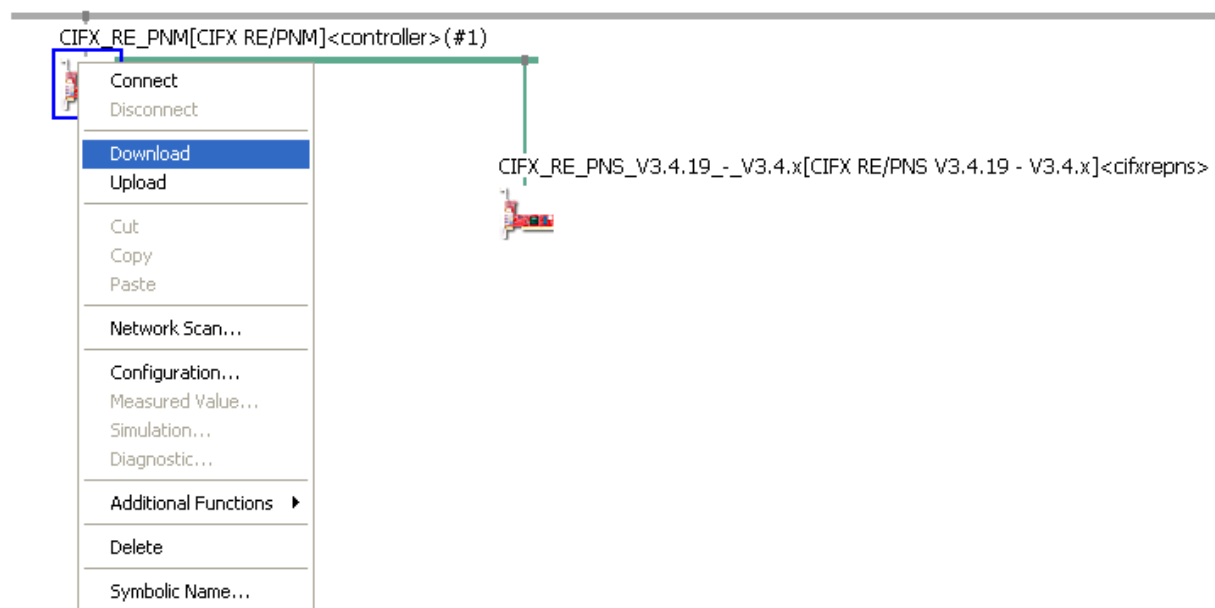


Figure 10: Download the default Configuration to the Master

- Open the context menu of the slave device and download the default configuration to the slave.

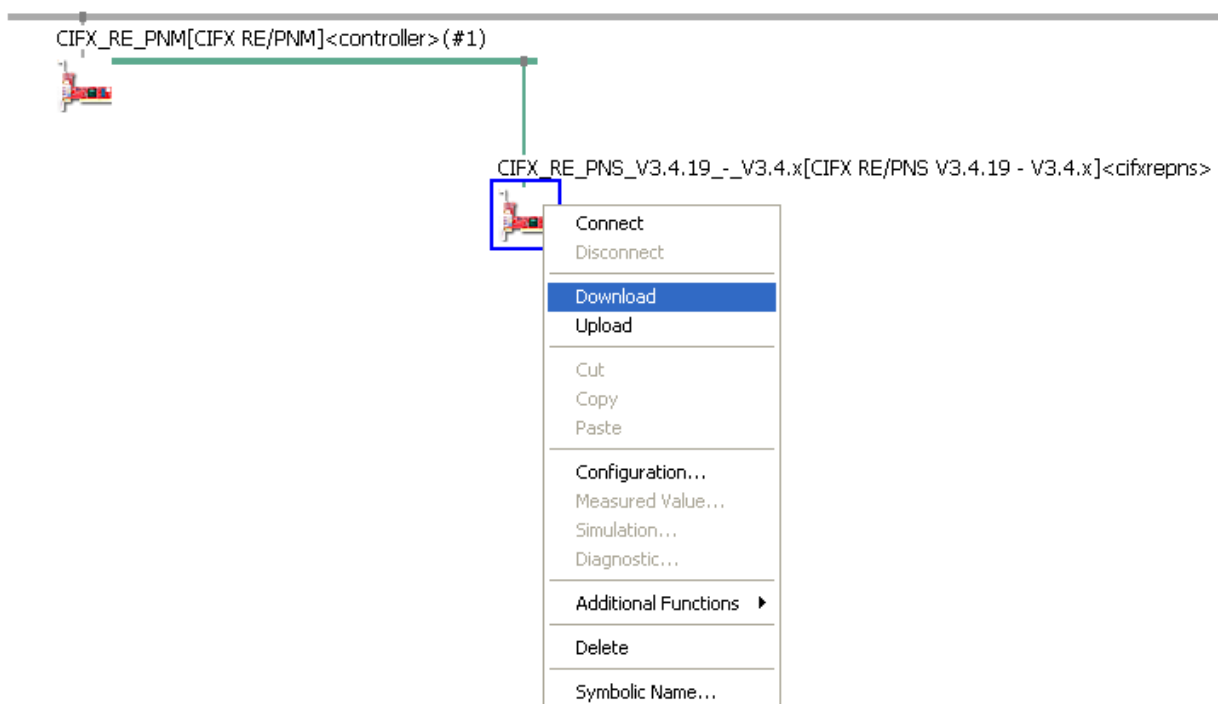


Figure 11: Download the default configuration to the slave

### 3.3 Basic Application Startup

- Open PROFINET IO Controller Acyclic Data Exchange Example Application (CifX\_ApDemo.sln) using Microsoft Visual Studio 2005 or higher.
- Open file Application.cpp and adjust the board name at the beginning of the App\_main() function. Set the board instance of the CifX-Card to which you have loaded the PROFINET IO Controller firmware.

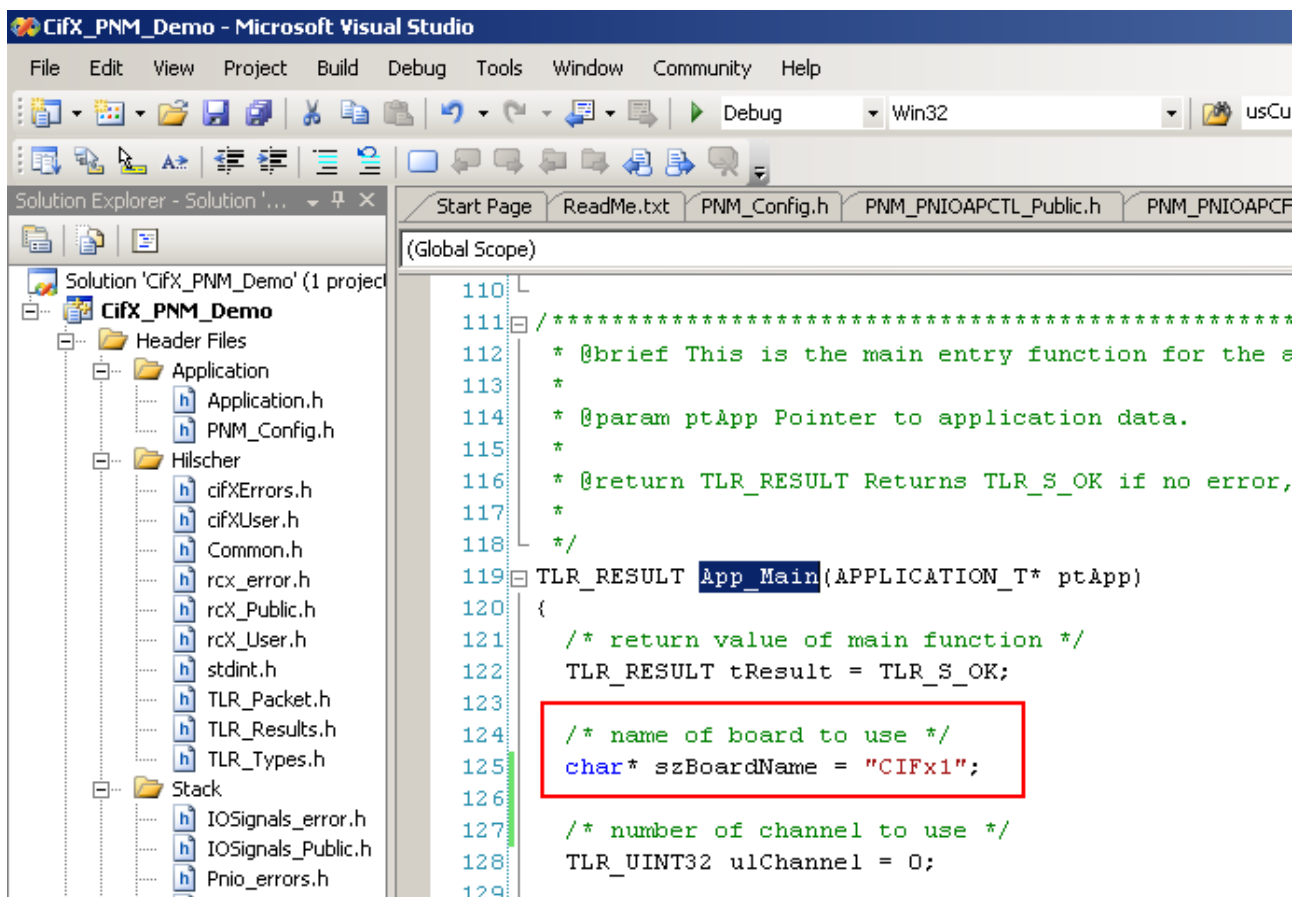


Figure 12: Adjust the CifX Board Instance

- Build and start the Configuration Example Application.

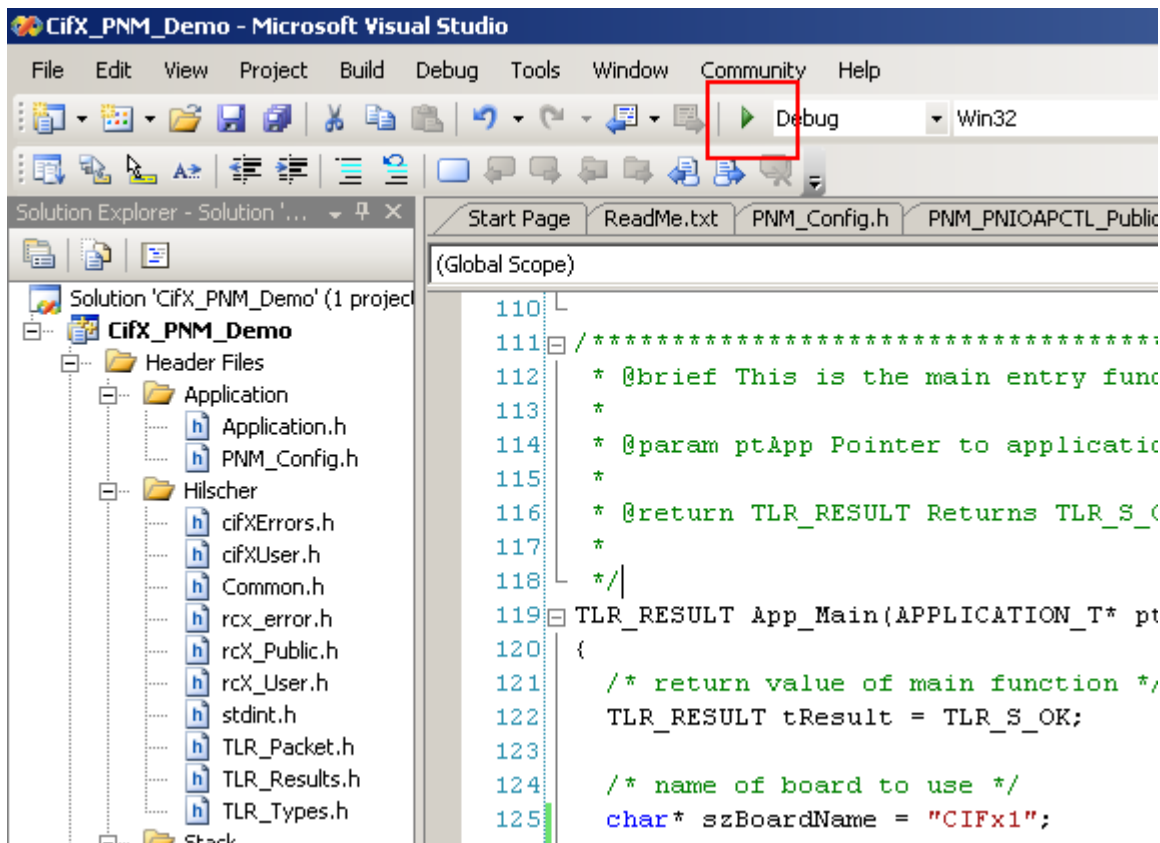


Figure 13: Starting the Example

- You can read or write acyclic data:

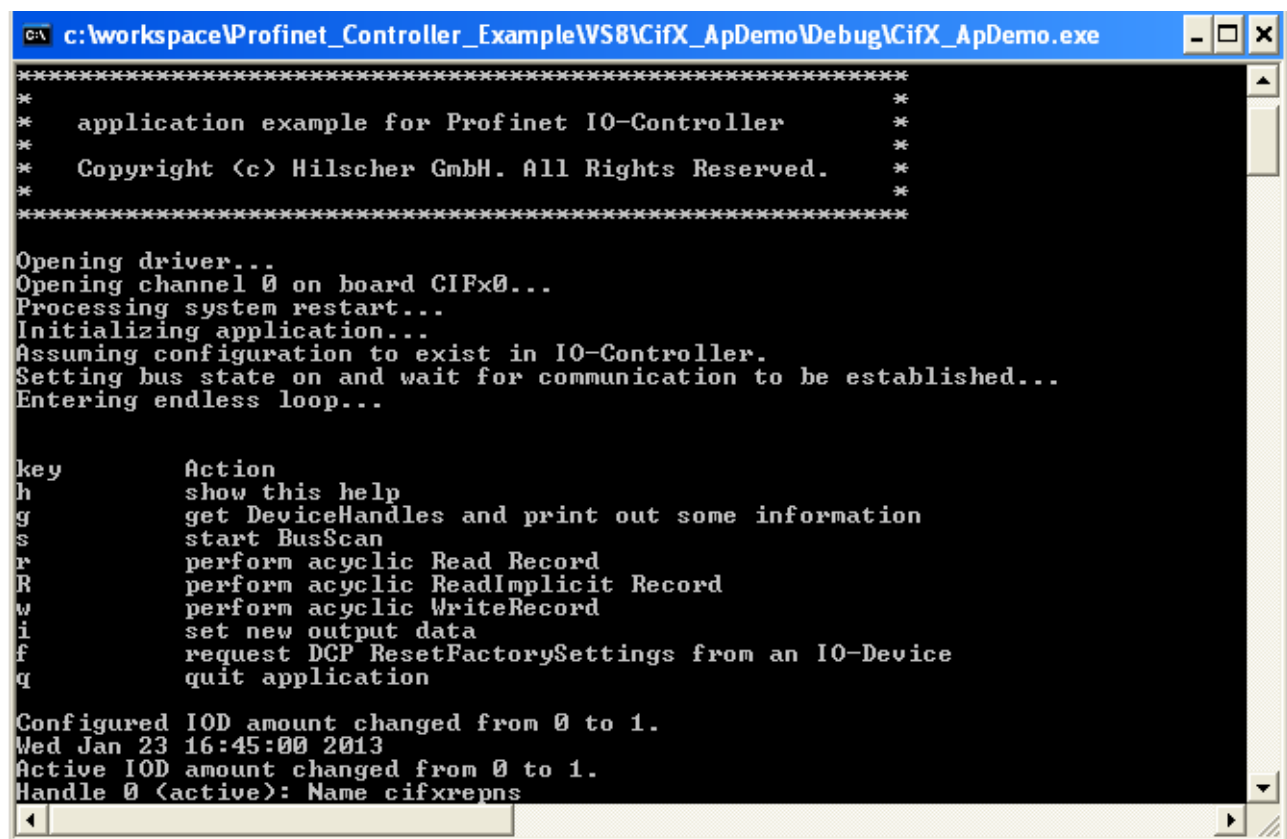


Figure 14: Acyclic Data Exchange

### 3.4 Application Explanation

Printing keys, shown in Figure 14, following information can be won:

1. Printing key 'g', the device handle will be returned to use it to perform acyclic read or write data record. The device names of connected IO-Devices will be displayed.
2. Printing key 's', the connected IO-Devices will be shown, inclusive device name, MAC- and IP-Address:

```
c:\workspace\Profinet_Controller_Example\VS8\CifX_ApDemo\Debug\CifX_ApDemo.exe
Processing system restart...
Initializing application...
Assuming configuration to exist in IO-Controller.
Setting bus state on and wait for communication to be established...
Entering endless loop...

key      Action
h        show this help
g        get DeviceHandles and print out some information
s        start BusScan
r        perform acyclic Read Record
R        perform acyclic ReadImplicit Record
w        perform acyclic WriteRecord
i        set new output data
f        request DCP ResetFactorySettings from an IO-Device
q        quit application

Configured IOD amount changed from 0 to 1.
Wed Jan 30 09:36:33 2013
Active IOD amount changed from 0 to 1.
Handle 0 (active): Name cifxrepns
found IO-Device with MAC 00:02:a2:23:06:9d, name "cifxrepns" and IP 0xc0a80002
BusScan finished. Found 1 IO-Devices.
```

Figure 15: Found IO-Devices

3. Printing key 'r', acyclic Read Record can be performed (see Figure 16).
  - A. Select device handle (here: 0)
  - B. Enter API (here: 0)
  - C. Enter Slot and Subslot (see configuration with sycon on Figure 9)
  - D. Enter Index (see Profinet specification, here I&M0 is used: 0xAFF0 = 45040)
  - E. 60 bytes on data are returned (not visible in console application)



```

c:\workspace\Profinet_Controller_Example\WS8\CifX_ApDemo\Debug\CifX_ApDemo.exe
Setting bus state on and wait for communication to be established...
Entering endless loop...

key      Action
h        show this help
g        get DeviceHandles and print out some information
s        start BusScan
r        perform acyclic Read Record
R        perform acyclic ReadImplicit Record
w        perform acyclic WriteRecord
i        set new output data
f        request DCP ResetFactorySettings from an IO-Device
q        quit application

Configured IOD amount changed from 0 to 1.
Wed Jan 30 12:07:07 2013
Active IOD amount changed from 0 to 1.
Handle 0 (active): Name cifxrepns
From which IO-Device shall data be read? Enter handle:
What API shall be used? Enter API: 0
What slot shall be used? Enter slot: 1
What subslot shall be used? Enter subslot: 1
What index shall be read? Enter index: 45040
Read on IOD 0, API 0, Slot 1, Subslot 1, Index 45040 returned 60 byte:

```

Figure 16: Perform Acyclic Read Record

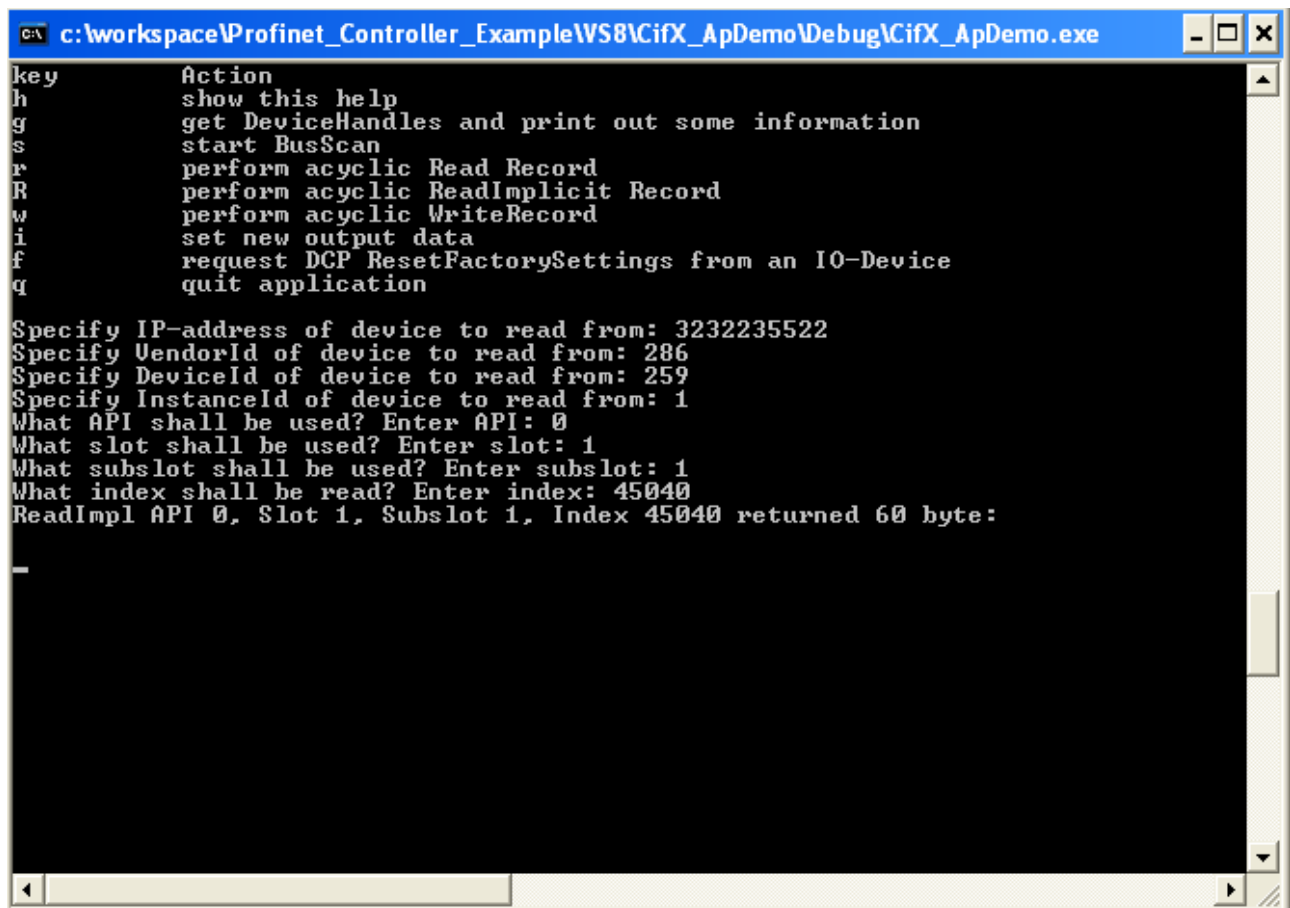
4. Printing key 'R', acyclic Read Implicit Record can be performed (see Figure 17).

The same procedure as above, but the access occurs indirectly via IP-Address:

- A. Enter the IP-Address in following form, e.g:
 

192.168.0.2 (dec) = C0.A8.00.02 (hex)

Without dots, C0080002 (hex) = 3232235522 (dec) => this number is to type
- B. Type Vendor ID and Device ID. Both IDs you find on the Sercos Configuration Page from the IO-Device
- C. Type InstanceID = 1 (InstanceID = 1 for all Hilscher Devices).
- D. Enter API (here: 0)
- E. Enter Slot and Subslot
- F. Enter Index (see Profinet specification, here used: 0xAFF0 = 45040)



```
C:\workspace\Profinet_Controller_Example\WS8\CifX_ApDemo\Debug\CifX_ApDemo.exe
key      Action
h        show this help
g        get DeviceHandles and print out some information
s        start BusScan
r        perform acyclic Read Record
R        perform acyclic ReadImplicit Record
w        perform acyclic WriteRecord
i        set new output data
f        request DCP ResetFactorySettings from an IO-Device
q        quit application

Specify IP-address of device to read from: 3232235522
Specify VendorId of device to read from: 286
Specify DeviceId of device to read from: 259
Specify InstanceId of device to read from: 1
What API shall be used? Enter API: 0
What slot shall be used? Enter slot: 1
What subslot shall be used? Enter subslot: 1
What index shall be read? Enter index: 45040
ReadImpl API 0, Slot 1, Subslot 1, Index 45040 returned 60 byte:
```

Figure 17: Perform Acyclic Implicit Record

5. Printing key 'w', acyclic Write Record can be performed:
  - A. Select device handle (here: 0)
  - B. Enter API (here: 0)
  - C. Enter Slot and Subslot (see configuration with Sycon on Figure 9)
  - D. Enter Index (see Profinet specification or device description)
  - E. Type number of bytes to be written
  - F. Type the value.
  - G. Write Confirmation occurs.
6. Printing key 'i', acyclic new output data can be set in order to write values to DPM.

## 4 Appendix

### 4.1 List of Tables

Table 1: List of Revisions .....	3
----------------------------------	---

### 4.2 List of Figures

Figure 1: CifX Setup to load the PROFINET IO Controller Firmware .....	5
Figure 2: CifX Setup to load the PROFINET IO Device Firmware.....	6
Figure 3: Import a SDDML File.....	6
Figure 4: Select the GSDML and choose the correct File Type .....	7
Figure 5: SYCON.net for netX to configure the Hilscher PROFINET Master .....	8
Figure 6: Select the correct Hardware.....	9
Figure 7: SYCON.net for netX to configure the Hilscher PROFINET Slave .....	10
Figure 8: Select the correct Hardware.....	11
Figure 9: Slave-Module Configuration.....	12
Figure 10: Download the default Configuration to the Master .....	13
Figure 11: Download the default configuration to the slave.....	13
Figure 12: Adjust the CifX Board Instance .....	14
Figure 13: Starting the Example.....	15
Figure 14: Acyclic Data Exchange .....	15
Figure 15: Found IO-Devices .....	16
Figure 16: Perform Acyclic Read Record .....	17
Figure 17: Perform Acyclic Implicit Record.....	18

## 4.3 Contacts

### Headquarters

#### Germany

Hilscher Gesellschaft für  
Systemautomation mbH  
Rheinstrasse 15  
65795 Hattersheim  
Phone: +49 (0) 6190 9907-0  
Fax: +49 (0) 6190 9907-50  
E-Mail: [info@hilscher.com](mailto:info@hilscher.com)

#### Support

Phone: +49 (0) 6190 9907-99  
E-Mail: [de.support@hilscher.com](mailto:de.support@hilscher.com)

### Subsidiaries

#### China

Hilscher Systemautomation (Shanghai) Co. Ltd.  
200010 Shanghai  
Phone: +86 (0) 21-6355-5161  
E-Mail: [info@hilscher.cn](mailto:info@hilscher.cn)

#### Support

Phone: +86 (0) 21-6355-5161  
E-Mail: [cn.support@hilscher.com](mailto:cn.support@hilscher.com)

#### France

Hilscher France S.a.r.l.  
69500 Bron  
Phone: +33 (0) 4 72 37 98 40  
E-Mail: [info@hilscher.fr](mailto:info@hilscher.fr)

#### Support

Phone: +33 (0) 4 72 37 98 40  
E-Mail: [fr.support@hilscher.com](mailto:fr.support@hilscher.com)

#### India

Hilscher India Pvt. Ltd.  
New Delhi - 110 065  
Phone: +91 11 26915430  
E-Mail: [info@hilscher.in](mailto:info@hilscher.in)

#### Italy

Hilscher Italia S.r.l.  
20090 Vimodrone (MI)  
Phone: +39 02 25007068  
E-Mail: [info@hilscher.it](mailto:info@hilscher.it)

#### Support

Phone: +39 02 25007068  
E-Mail: [it.support@hilscher.com](mailto:it.support@hilscher.com)

#### Japan

Hilscher Japan KK  
Tokyo, 160-0022  
Phone: +81 (0) 3-5362-0521  
E-Mail: [info@hilscher.jp](mailto:info@hilscher.jp)

#### Support

Phone: +81 (0) 3-5362-0521  
E-Mail: [jp.support@hilscher.com](mailto:jp.support@hilscher.com)

#### Korea

Hilscher Korea Inc.  
Seongnam, Gyeonggi, 463-400  
Phone: +82 (0) 31-789-3715  
E-Mail: [info@hilscher.kr](mailto:info@hilscher.kr)

#### Switzerland

Hilscher Swiss GmbH  
4500 Solothurn  
Phone: +41 (0) 32 623 6633  
E-Mail: [info@hilscher.ch](mailto:info@hilscher.ch)

#### Support

Phone: +49 (0) 6190 9907-99  
E-Mail: [ch.support@hilscher.com](mailto:ch.support@hilscher.com)

#### USA

Hilscher North America, Inc.  
Lisle, IL 60532  
Phone: +1 630-505-5301  
E-Mail: [info@hilscher.us](mailto:info@hilscher.us)

#### Support

Phone: +1 630-505-5301  
E-Mail: [us.support@hilscher.com](mailto:us.support@hilscher.com)