DEDITEC GMBH

USB-TTL-32 / USB-TTL-64

Hardware-Description

2011 November

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Introduction

1. Introduction

1.1. General remarks

First of all, we would like to congratulate you to the purchase of a high quality DEDITEC product.

Our products are being developed by our engineers according to quality requirements of high standard. Already during design and development we take care that our products have -besides quality- a long availability and an optimal flexibility.

Modular design

The modular design of our products reduces the time and the cost of development. Therefor we can offer you high quality products at a competitive price.

Availability

Because of the modular design of our products, we have to redesign only a module instead of the whole product, in case a specific component is no longer available.

1.2. Customer satisfaction

Our philosophy: a content customer will come again. Therefor customer satisfaction is in first place for us.

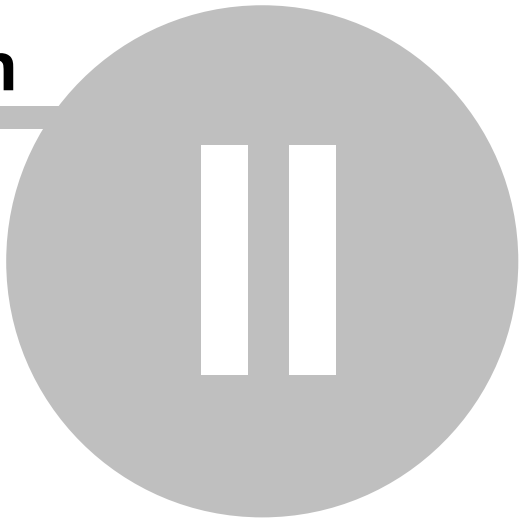
If by any chance, you are not content with the performance of our product, please contact us by phone or mail immediately.

We take care of the problem.

1.3. Customer response

Our best products are co-developments together with our customers. Therefor we are thankful for comments and suggestions.

Hardware description



2. Hardware description

2.1. Introduction

The USB-OPTOIN-X-RELAIS-X modules provide relays with a maximum switching voltage of 36V DC (max. 1A, 15 watts) and Opto-in inputs, which are suitable for industrial applications for registration of status or even to count the changes of state of the inputs.

Our USB modules have been developed for industrial applications for measurement, control and regulation. The modules all feature a USB interface and can therefore be connected to PC systems with USB bus. The USB bus has been used successfully for many years in use and is characterized by its high flexibility.

As terminal block, user-friendly terminal strips with locking protection and ejection mechanism are used. They allow quick replugging . The wire connection itself is realised with a screwless connector system. A tool is included with each module.

2.2. Quick installation

2.2.1. Step 1 - Installation of the software and driver

Now install the driver DELIB library with the file "delib_install.exe" from the supplied DEDITEC-Driver CD.

These can be found in the "\zip\DELIB\delib_install.exe" on the DEDITEC-Driver CD.

Note: On our website www.deditec.de you can always find the latest DELIB driver version.

2.2.2. Step 2 - Connecting of the module

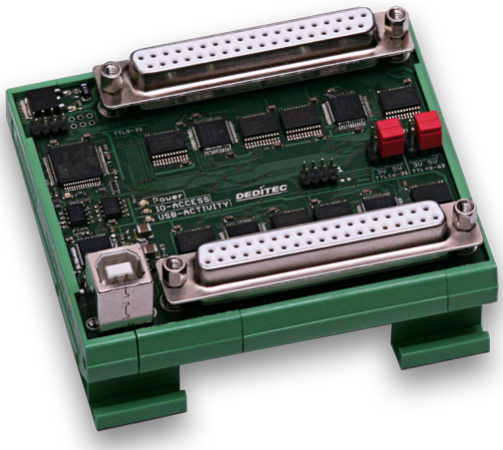
Connect your PC via USB cable to the USB connector of the module.

After about 20 seconds, the module is detected by the driver and can now be tested and operated.

2.2.3. Step 3 - Testing the connection and the module

In the Start menu, see "Start -> All Programs -> DEDITEC -> DELIB -> Sample Programs" you will find some example programs to test your module.

2.3. Technical data



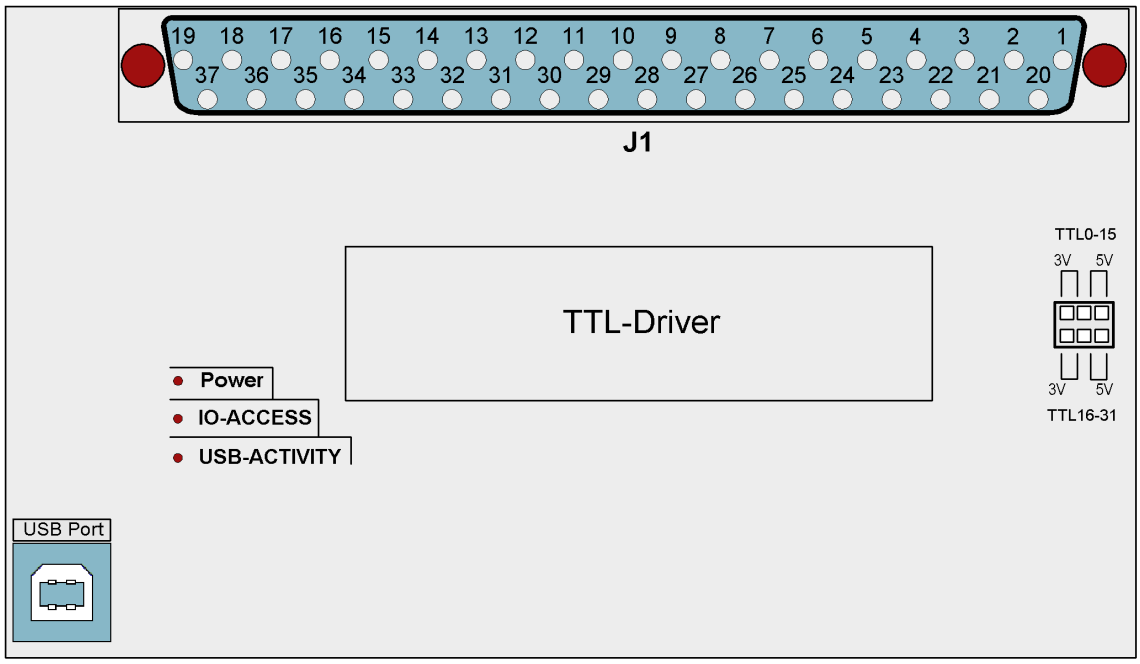
- USB-Interface (USB 1.1 / USB 2.0)
- 5V from the USB bus
- TTL Pegel 5V to 1,3V
- TTL-I/O (in 8-way blocks adjustable as input or output)
- Activity-LED Power (Indicates that the module is in operation)
- IO-Access (Indicates the access to the TTL-I/O)
- USB-Activity (Indicates that a signal processing via the USB bus is taking place)
- Operating temperature 10°C..+50°C
- Dimensions 90 mm x 77 mm x 42 mm (L x W x H)

Product specific data:

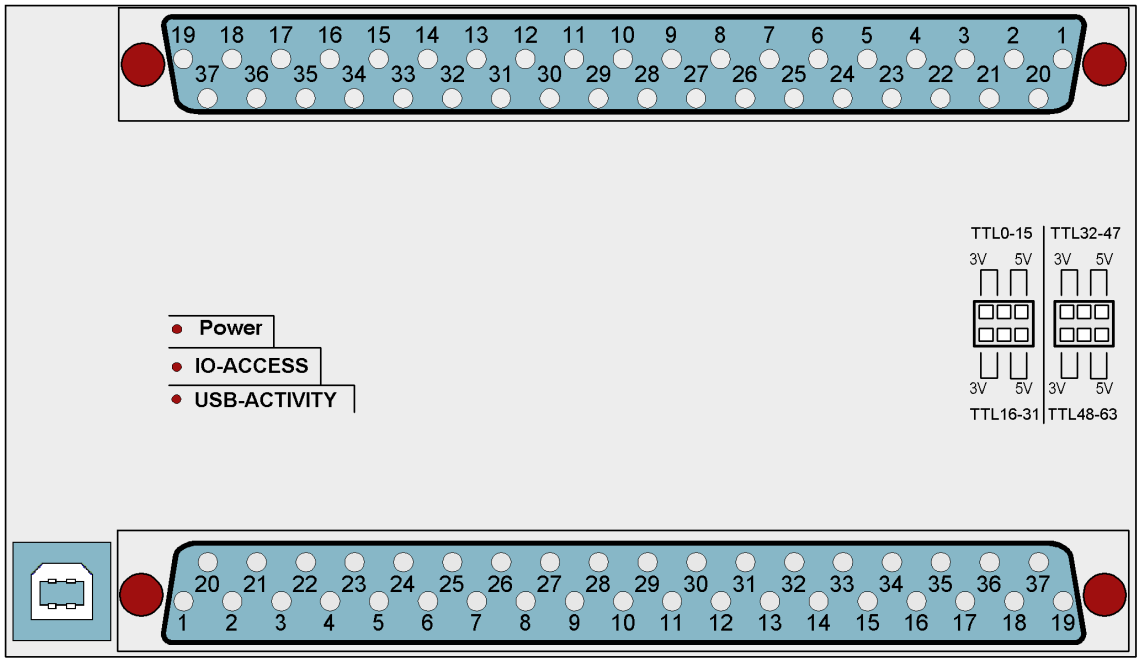
Product	TTL-I/O's	Connectors
USB-TTL-32	32	1*37 pin D-sub connector
USB-TTL-64	64	2*37 pin D-sub connector

2.4. Overview screens

2.4.1. Overview screen USB-TTL-32

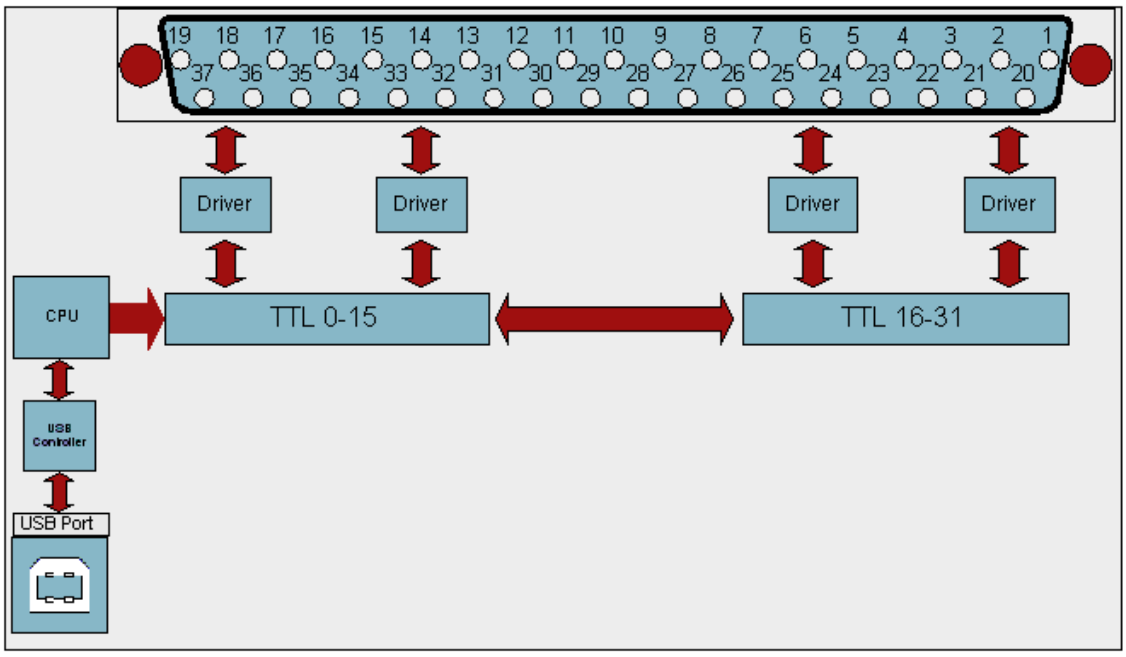


2.4.2. Overview screen USB-TTL-64

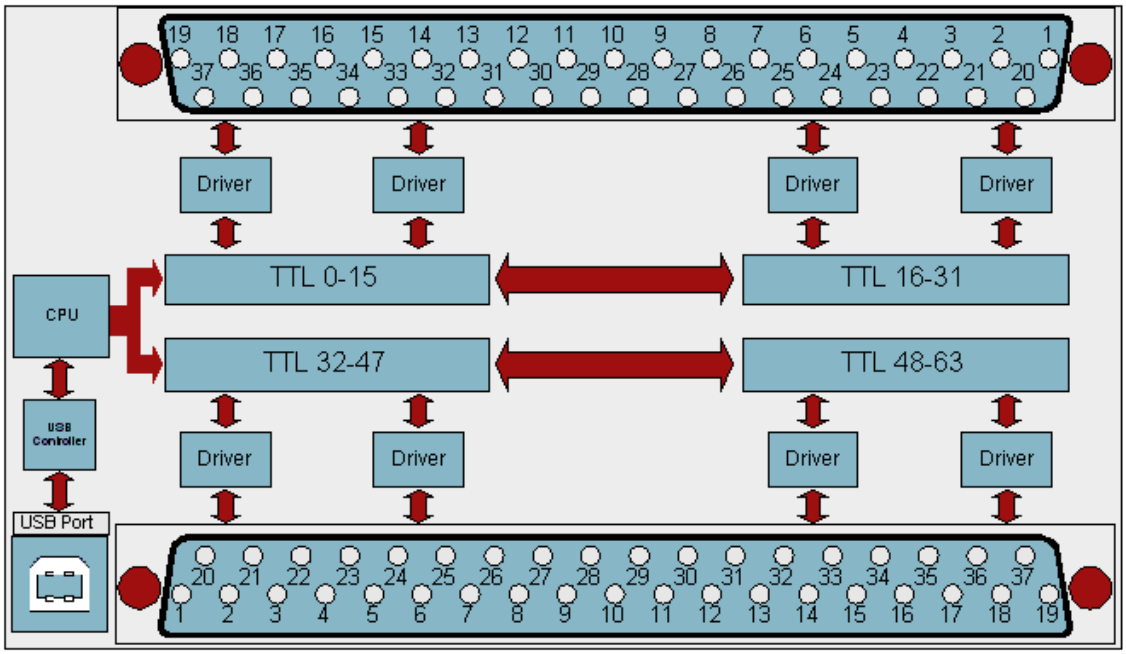


2.5. Block diagram

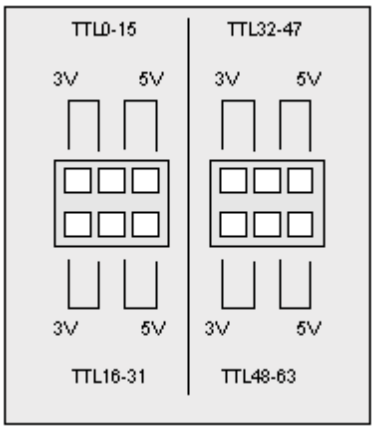
2.5.1. Block diagram USB-TTL-32



2.5.2. Block diagram USB-TTL-64



2.6. Configuration of the voltage level of TTL-I/O's



TTL level of 1.8 V to 5 V:

By default, you can select the TTL level of 3.3 V or 5V via jumper.

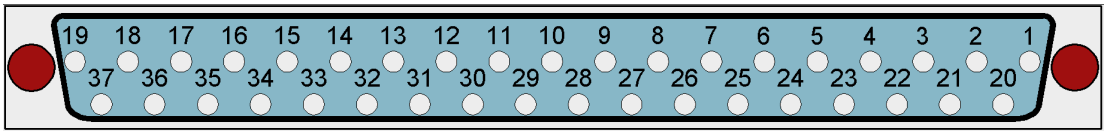
If you remove the jumper on the module, you can apply your own voltage between 1.8 V to 5 V to the TTL-I/O module, so the possibilities of the modules were significantly increased.

If you want to apply your own voltage, this is done via the VIN pin see chapter **Pin assignment.**

The TTL-I/O's of the module can be configured in a 16 blocks.

2.7. Pin assignment

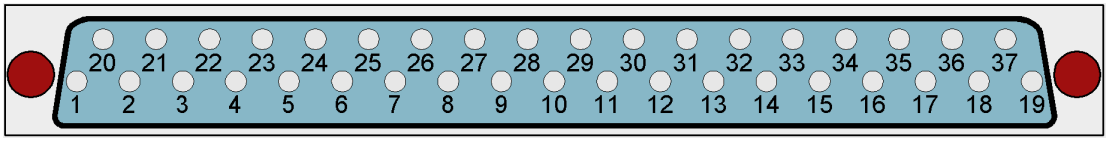
2.7.1. J1 - Pin assignment USB-TTL-I/O 0-31



Port	Pin	Port	Pin
1	I/O 16	20	I/O 17
2	I/O 18	21	I/O 19
3	I/O 20	22	I/O 21
4	I/O 22	23	I/O 23
5	I/O 24	24	I/O 25
6	I/O 26	25	I/O 27
7	I/O 28	26	I/O 29
8	I/O 30	27	I/O 31
9	I/O 0	28	I/O 1
10	I/O 2	29	I/O 3
11	I/O 4	30	I/O 5
12	I/O 6	31	I/O 7
13	I/O 8	32	I/O 9
14	I/O 10	33	I/O 11
15	I/O 12	34	I/O 13
16	I/O 14	35	I/O 15
17	VIN 0-15	36	VIN 16-31
18	GND	37	GND
19	GND		

Note: The VIN pin is used to apply your own voltage to the I/O's of the module. This voltage can be between 1.8V and 5V.

2.7.2. J2 - Pin assignment USB-TTL-I/O 32-63



Port	Pin	Port	Pin
1	I/O 48	20	I/O 49
2	I/O 50	21	I/O 51
3	I/O 52	22	I/O 53
4	I/O 54	23	I/O 55
5	I/O 56	24	I/O 57
6	I/O 58	25	I/O 59
7	I/O 60	26	I/O 61
8	I/O 62	27	I/O 63
9	I/O 32	28	I/O 33
10	I/O 34	29	I/O 35
11	I/O 36	30	I/O 37
12	I/O 38	31	I/O 39
13	I/O 40	32	I/O 41
14	I/O 42	33	I/O 43
15	I/O 44	34	I/O 45
16	I/O 46	35	I/O 47
17	VIN 32-47	36	VIN 48-63
18	GND	37	GND
19	GND		

Note: The VIN pin is used to apply your own voltage to the I/O's of the module. This voltage can be between 1.8V and 5V.

Software

3. Software

3.1. Using our products

3.1.1. Access via graphical applications

We provide driverinterfaces e.g. for LabVIEW and ProfiLab. The DELIB driver library is the basis, which can be directly activated by ProfiLAB.
For LabVIEW, we provide a simple driver connection with examples!

3.1.2. Access via the DELIB driver library

In the appendix, you can find the complete function reference for the integration of our API-functions in your software. In addition we provide examples for the following programming languages:

- C
- C++
- C#
- Delphi
- VisualBasic
- VB.NET
- MS-Office

3.1.3. Access via protocol

The protocol for the activation of our products is open source. So you are able to use our products on systems without Windows or Linux.

3.1.4. Access via provided test programs

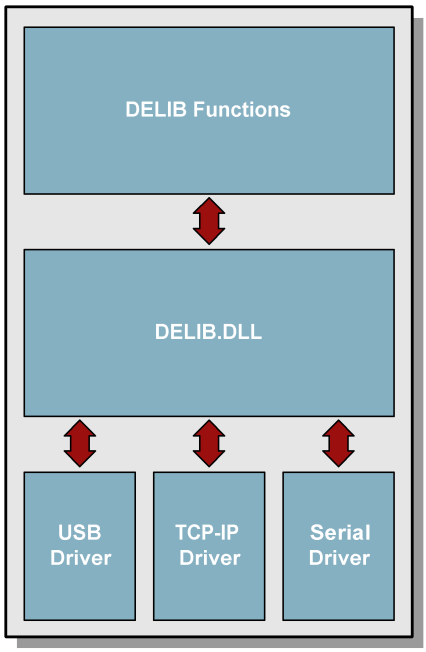
We provide simple handling test programs for the most important functions of our products. These will be installed automatically by the installation of the DELIB driver library.

So you can test directly e.g. relays or you can check the voltage of an A/D converter.

3.2. DELIB driver library

3.2.1. Overview

The following figure explains the structure of the DELIB driver library



The DELIB driver library allows an uniform response of DEDITEC hardware with particular consideration of the following viewpoints:

- Independent of operating system
- Independent of programming language
- Independent of the product

3.2.1.1. Program under diverse operating systems

The DELIB driver library allows an uniform response of our products on diverse operating systems.
We has made sure, that all of our products can be responded by a few commands. Whatever which operating system you use. - Therefore the DELIB cares!

3.2.1.2. Program with diverse programming languages

We provide uniform commands to create own applications. This will be solved by the DELIB driver library.
You choose the programming language!

It can be simply developed applications under C++, C, Visual Basic, Delphi or LabVIEW®.

3.2.1.3. Program independent of the interface

Write your application independent of the interface !
Program an application for an USB product of us. - Also, it will work with an ethernet or RS-232 product of us !

3.2.1.4. SDK-Kit for Programmer

Integrate the DELIB in your application. On demand you receive an installation script for free, which allows you, to integrate the DELIB installation in your application.

3.2.2. Supported operating systems

Our products support the following operating systems:

- Windows 7
- Windows Vista
- Windows XP
- Windows 2000
- Linux

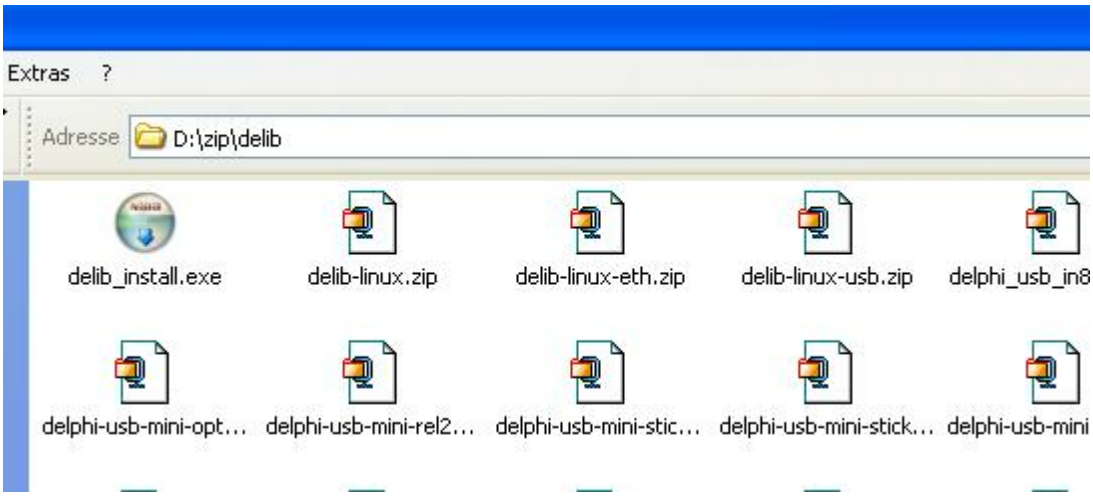
3.2.3. Supported programming languages

Our products are responsive via the following programming languages:

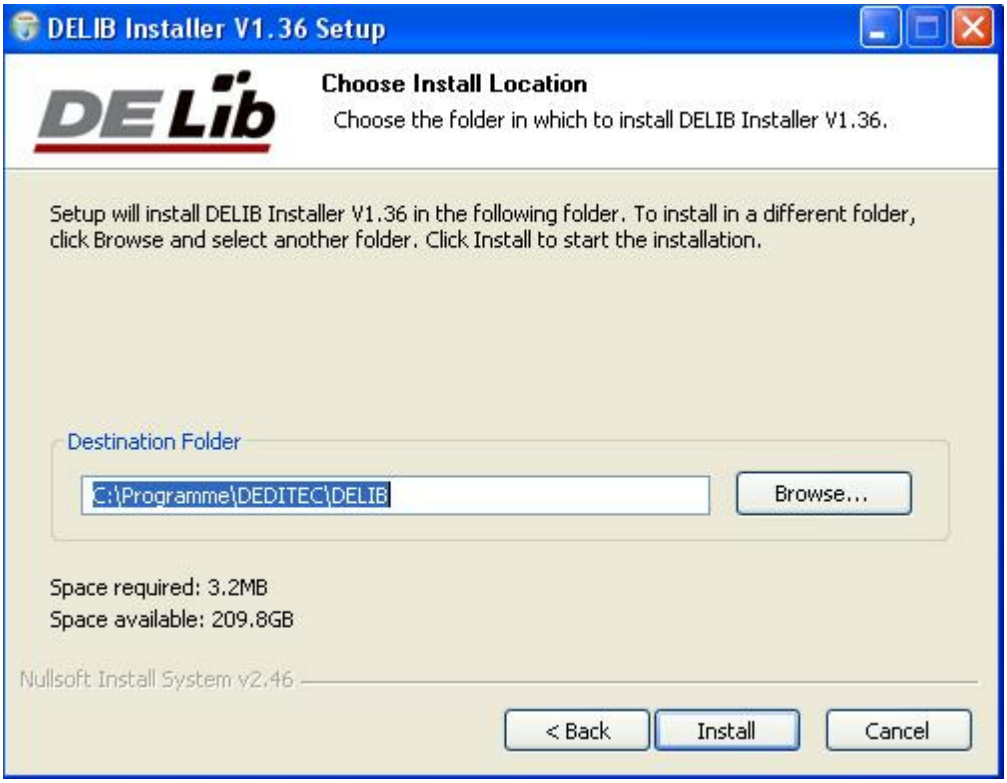
- C
- C++
- C#
- Delphi
- VisualBasic
- VB.NET
- MS-Office

3.2.4. Installation DELIB driver library

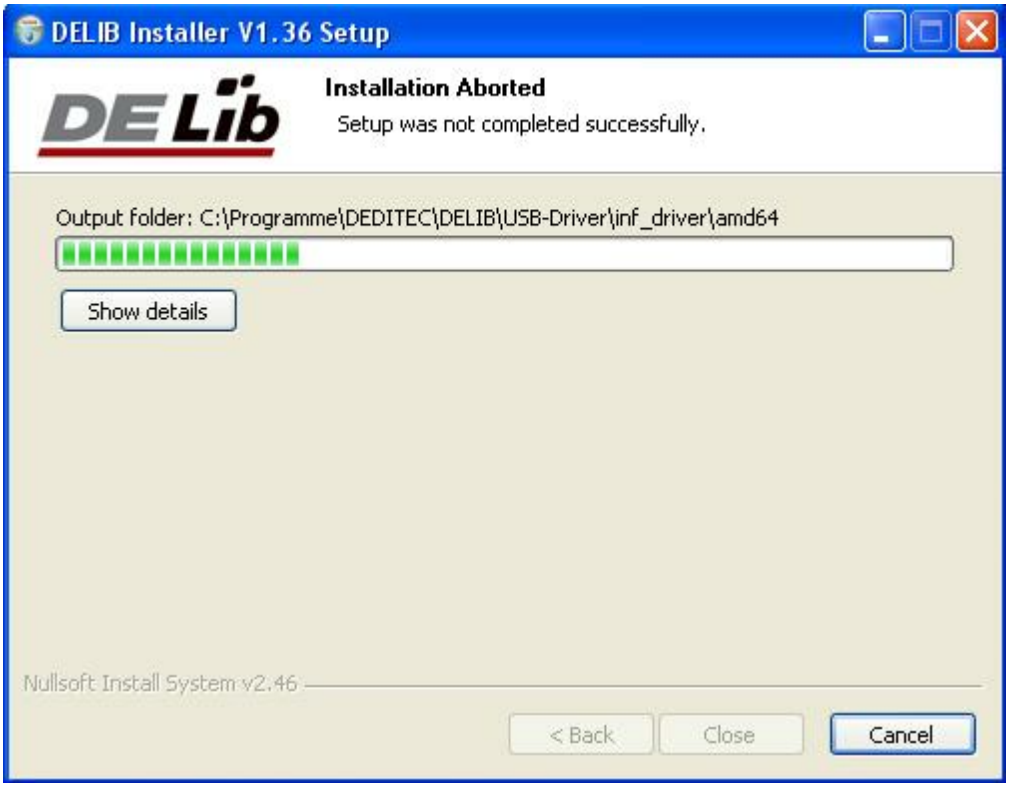
Our DELIB installer start screen.



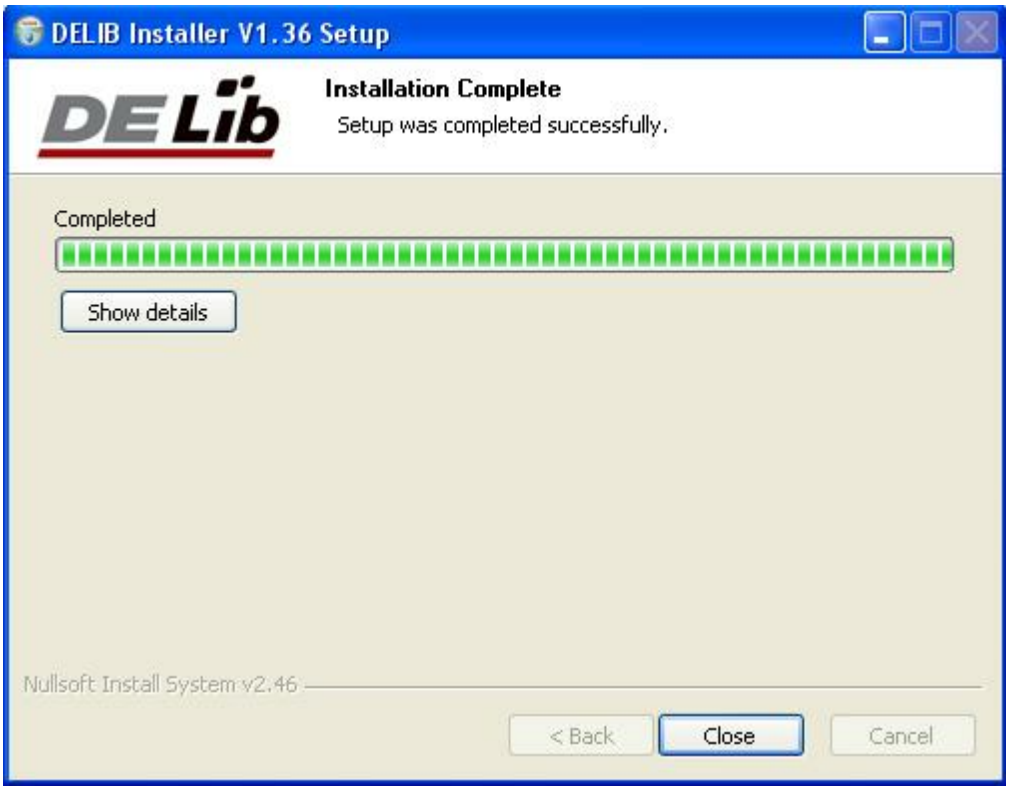
Insert the DEDITEC driver CD into the drive and start **„delib_install.exe“**. The DELIB driver library is also available on http://www.deditec.en/delib



Click on **„Install“**.



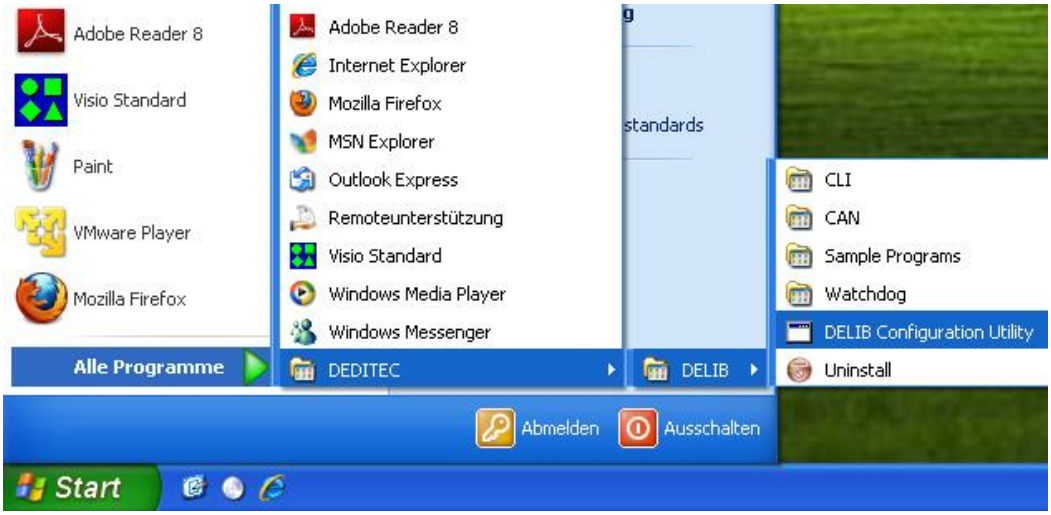
The drivers will be installed.



The DELIB driver library is now installed. Press **„Close“** to finish the installation.

You can configure your module with the **„DELIB Configuration Utility“** (see next chapter). This is only necessary, if more than one module is present.

3.2.5. DELIB Configuration Utility

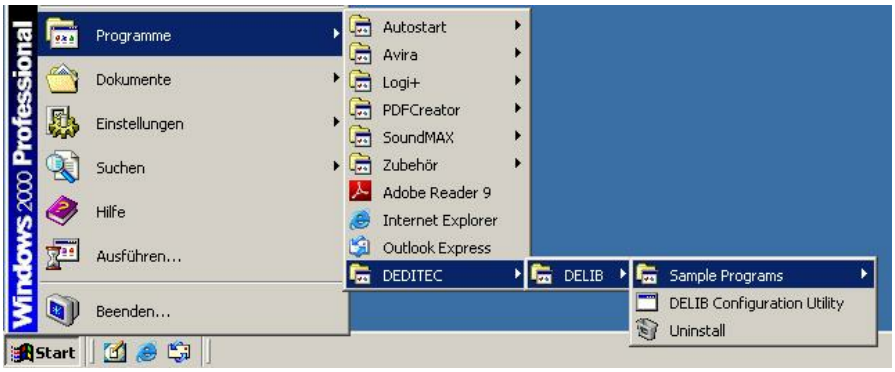


Start the **"DELIB Configuration Utility"** as follows:
Start → Programs → DEDITEC → DELIB → DELIB Configuration Utility.

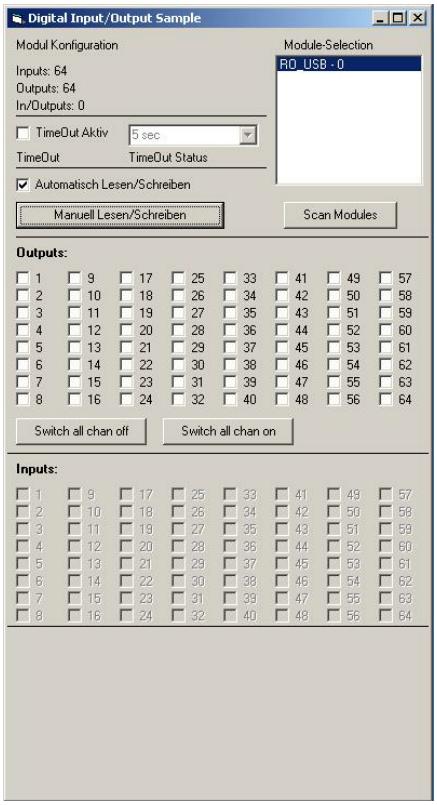
The **„DELIB Configuration Utility"** is a program to configure and subdivide identical USB-modules in the system. This is only necessary if more than one module is present.

3.3. Test programs

3.3.1. Digital Input-Output Demo



Start **"Digital Input-Output Demo"** as follows:
Start → Programme → DEDITEC → DELIB → Digital Input-Output Demo.



The screenshot shows a test of the RO-USB-O64-R64. The configuration of the module (64 inputs and 64 outputs) is shown on the upper left side.

DELIB API reference

4. DELIB API reference

4.1. Management functions

4.1.1. DapiOpenModule

Description
This function opens a particular module.

Definition
ULONG DapiOpenModule(ULONG moduleID, ULONG nr);

Parameters
moduleID=Specifies the module, which is to be opened (see delib.h)
nr=Indicates No of module which is to be opened.
nr=0 -> 1. module
nr=1 -> 2. module

Return value
handle=handle to the corresponding module
handle=0 -> Module was not found

Remarks
The handle returned by this function is needed to identify the module for all other functions.

Example program

```
// USB-Modul öffnen
handle = DapiOpenModule(RO_USB1, 0);
printf("handle = %x\n", handle);
if (handle==0)
{
// USB Modul wurde nicht gefunden
printf("Modul konnte nicht geöffnet werden\n");
return;
}
```

4.1.2. DapiCloseModule

Description
This command closes an opened module.

Definition
ULONG DapiCloseModule(ULONG handle);

Parameters
handle=This is the handle of an opened module

Return value
none

Example program

```
// Close the module
DapiCloseModule(handle);
```

4.1.3. DapiGetDELIBVersion

Description
This function returns the installed DELIB version.

Definition
ULONG DapiGetDELIBVersion(ULONG mode, ULONG par);

Parameters
mode=Mode, with which the version is readout (must be 0).
par=This parameter is not defined (must be 0).

Return value
version=Version number of the installed DELIB version [hex].

Example program

```
version = DapiGetDELIBVersion(0, 0);
//Bei installierter Version 1.32 ist version = 132(hex)
```

4.1.4. DapiSpecialCMDGetModuleConfig

Description

This command returns the hardware equipment (number of in-/output channels) of the module.

Definition

ULONG DapiSpecialCommand(ULONG handle,
DAPI_SPECIAL_CMD_GET_MODULE_CONFIG, par, 0, 0);

Parameters

handle=This is the handle of an open module.

Get number of digital input channels

par=DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DI

Get number of digital output channels

par=DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DO

Get number of digital in-/output channels

par=DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DX

Get number of analog input channels

par=DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_AD

Get number of analog output channels

par=DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DA

Get number of stepper channels

par=DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_STEPPER

Return value

Get number of digital input channels

return=Number of digital input channels

Get number of digital output channels

return=Number of digital output channels

Get number of digital in-/output channels

return=Number of digital in-/output channels

Get number of analog input channels

return=Number of analog input channels

Get number of analog output channels

return=Number of analog output channels

Get number of stepper channels

return=Number of stepper channels

Example program

```
ret=DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_GET_MODULE_CONFIG,
DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DI, 0, 0);
//Gibt die Anzahl der digitalen Eingangskanäle zurück
ret=DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_GET_MODULE_CONFIG,
DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DO, 0, 0);
//Gibt die Anzahl der digitalen Ausgangskanäle zurück
ret=DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_GET_MODULE_CONFIG,
DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DX, 0, 0);
//Gibt die Anzahl der digitalen Ein-/Ausgangskanäle zurück
ret=DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_GET_MODULE_CONFIG,
DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_AD, 0, 0);
//Gibt die Anzahl der analogen Eingangskanäle zurück
ret=DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_GET_MODULE_CONFIG,
DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_DA, 0, 0);
//Gibt die Anzahl der analogen Ausgangskanäle zurück
ret=DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_GET_MODULE_CONFIG,
DAPI_SPECIAL_GET_MODULE_CONFIG_PAR_STEPPER, 0, 0);
//Gibt die Anzahl der Stepperkanäle zurück
```

4.2. Error handling

4.2.1. DapiGetLastError

Description
This function returns the last registered error.

Definition
ULONG DapiGetLastError();

Parameters
None

Return value
Error code
0=no error. (see delib.h)

Example program

```
ULONG error;
error=DapiGetLastError();
if(error==0) return FALSE;
printf("ERROR = %d", error);
```

4.2.2. DapiGetLastErrorText

Description

This function reads the text of the last registered error.

Definition

*extern ULONG __stdcall DapiGetLastErrorText(unsigned char * msg, unsigned long msg_length);*

Parameters

msg = text buffer

msg_length = length of the buffer

Example program

```
BOOL IsError ()
{
  if (DapiGetLastError () != DAPI_ERR_NONE)
       {
         unsigned char msg[500];

         DapiGetLastErrorText((unsigned char*) msg, sizeof(msg));
         printf ("Error Code = %x * Message = %s\n", 0, msg);
         return TRUE;
       }
  return FALSE;
}
```

4.3. Set TTL-In-/Outputs direction

4.3.1. DAPI_SPECIAL_CMD_SET_DIR_DX_8

Description

This command sets the direction of the TTL-In/Outputs (8-Bit way).

Definition

void DapiSpecialCommand(ULONG handle, DAPI_SPECIAL_CMD_SET_DIR_DX_8, ULONG ch, ULONG dir, 0);

Parameters

handle=This is the handle of an opened module.

ch=Specifies the number of the output,from which the direction will be set (0, 8, 16, 24 ..). Values between are invalid.

dir=(8-Bit) gives the direction for 8 In/Outputs. (1=output / 0=input)

Example program

```
DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_SET_DIR_DX_8, 0, 1, 0);

// Set Dir of TTL-I/O CH0 to out
```

4.4. Reading Digital inputs

4.4.1. DapiDIGet1

Description
This command reads a single digit input.

Definition
ULONG DapiDIGet1(ULONG handle, ULONG ch);

Parameters
handle=This is the handle of an opened module.
ch=Specifies the number of input that is to be read (0 ..).

Return value
State of the input (0 / 1).

4.4.2. DapiDIGet8

Description
This command reads 8 digital inputs simultaneously.

Definition
ULONG DapiDIGet8(ULONG handle, ULONG ch);

Parameters
handle=This is the handle of an opened module.
ch=Specifies the number of the input, from which it begins to read from (0, 8, 16, 24, 32, ..)

Return value
State of the read inputs.

4.4.3. DapiDIGet16

Description
This command reads 16 digital inputs simultaneously.

Definition
ULONG DapiDIGet16(ULONG handle, ULONG ch);

Parameters
handle=This is the handle of an opened module.
ch=Specifies the number of the input, from which it begins to read from (0, 16, 32, ..)

Return value
State of the read inputs.

4.4.4. DapiDIGet32

Description
This command reads 32 digital inputs simultaneously.

Definition
ULONG DapiDIGet32(ULONG handle, ULONG ch);

Parameters
handle=This is the handle of an opened module.
ch=Specifies the number of the input, from which it begins to read from (0, 32, 64, ..)

Return value
State of the read inputs.

Example program

```
unsigned long data;
// ------------------------------------------------------
// Einen Wert von den Eingängen lesen (Eingang 1-31)
data = (unsigned long) DapiDIGet32(handle, 0);
// Chan Start = 0
printf("Eingang 0-31 : 0x%x\n", data);
printf("Taste für weiter\n");
getch();
// ------------------------------------------------------
// Einen Wert von den Eingängen lesen (Eingang 32-64)
data = (unsigned long) DapiDIGet32(handle, 32);
// Chan Start = 32
printf("Eingang 32-64 : 0x%x\n", data);
printf("Taste für weiter\n");
getch();
```

4.4.5. DapiDIGet64

Description
This command reads 64 digital inputs simultaneously.

Definition
ULONGLONG DapiDIGet64(ULONG handle, ULONG ch);

Parameters
handle=This is the handle of an opened module.
ch=Specifies the number of the input,from which it begins to read from (0, 64, ..)

Return value
State of the read inputs.

4.4.6. DapiDIGetFF32

Description

This command reads the flip-flops from the inputs and resets them. (Input state change).

Definition

ULONG DapiDIGetFF32(ULONG handle, ULONG ch);

Parameters

handle=This is the handle of an opened module .

ch=Specifies the number of the input, from which it begins to read from (0, 32, ..)

Return value

State of 32 input change states

4.4.7. DapiDIGetCounter

Description
This command reads the counter of a digital input

Definition
ULONG DapiDIGetCounter(ULONG handle, ULONG ch, ULONG mode);

Parameters
handle=This is the handle of an opened module.
ch=Specifies the digital input,from which the counter will be read.
mode=0 (Normal counter function)
mode=DAPI_CNT_MODE_READ_WITH_RESET (Reading and resetting the counter)
mode=DAPI_CNT_MODE_READ_LATCHED (Reading the latched counter)

Return value
Value of the counter.

Example program

```
value = DapiDIGetCounter(handle, 0 ,0);
// Reading counter of DI Chan 0

value = DapiDIGetCounter(handle, 1 ,0);
// Reading counter of DI Chan 1

value = DapiDIGetCounter(handle, 8 ,0);
// Reading counter of DI Chan 8

value = DapiDIGetCounter(handle, 0 ,DAPI_CNT_MODE_READ_WITH_RESET);
// Reading AND resetting counter of DI Chan 0

value = DapiDIGetCounter(handle, 1, DAPI_CNT_MODE_READ_LATCHED);
// Reading the latched counter of DI Chan 1
```

4.5. Setting Digital outputs

4.5.1. DapiDOSet1

Description
This is the command to set a single output.

Definition
void DapiDOSet1(ULONG handle, ULONG ch, ULONG data);

Parameters
handle=This is the handle of an opened module
ch=Specifies the number of the output to be set to (0 ..)
data=Specifies the data value that is to be written (0 / 1)

Return value
None

4.5.2. DapiDOSet8

Description
This command sets 8 digital outputs simultaneously.

Definition
void DapiDOSet8(ULONG handle, ULONG ch, ULONG data);

Parameters
handle=This is the handle of an opened module
ch=Specifies the number of the output, from which it begins to write to (0, 8, 16, 24, 32, ..)
data=Specifies the data values, to write to the outputs

Return value
None

4.5.3. DapiDOSet16

Description
This command sets 16 digital outputs simultaneously.

Definition
void DapiDOSet16(ULONG handle, ULONG ch, ULONG data);

Parameters
handle=This is the handle of an opened module
ch=Specifies the number of the output, from which it begins to write to (0, 16, 32, ..)
data=Specifies the data values, to write to the outputs

Return value
None

4.5.4. DapiDOSet32

Description
This command sets 32 digital outputs simultaneously.

Definition
void DapiDOSet32(ULONG handle, ULONG ch, ULONG data);

Parameters
handle=This is the handle of an opened module
ch=Specifies the number of the output, from which it begins to write to (0, 32, 64, ..)
data=Specifies the data values, to write to the outputs

Return value
None

Example program

```
// Einen Wert auf die Ausgänge schreiben
data = 0x0000ff00; // Ausgänge 9-16 werden auf 1 gesetzt
DapiDOSet32(handle, 0, data); // Chan Start = 0
printf("Schreibe auf Ausgänge Daten=0x%x\n", data);
printf("Taste für weiter\n");
getch();
// ------------------------------------------------
// Einen Wert auf die Ausgänge schreiben
data = 0x80000000; // Ausgang 32 wird auf 1 gesetzt
DapiDOSet32(handle, 0, data); // Chan Start = 0
printf("Schreibe auf Ausgänge Daten=0x%x\n", data);
printf("Taste für weiter\n");
getch();
// ------------------------------------------------
// Einen Wert auf die Ausgänge schreiben
data = 0x80000000; // Ausgang 64 wird auf 1 gesetzt
DapiDOSet32(handle, 32, data); // Chan Start = 32
printf("Schreibe auf Ausgänge Daten=0x%x\n", data);
printf("Taste für weiter\n");
getch();
```

4.5.5. DapiDOSet64

Description
This command is to set 64 digital outputs.

Definition
void DapiDOSet64(ULONG handle, ULONG ch, ULONG data);

Parameters
handle=This is the handle of an opened module
ch=Specifies the number of the output, from which it begins to write to (0, 64, ..)
data=Specifies the data values, to write to the outputs

Return value
None

4.5.6. DapiDOReadback32

Description
This command reads back the 32 digital outputs.

Definition
ULONG DapiDOReadback32(ULONG handle, ULONG ch);

Parameters
handle=This is the handle of an opened module
ch=Specifies the number of the input, from which it begins to read from (0, 32, ..)

Return value
Status of 32 outputs.

4.5.7. DapiDOReadback64

Description
This command reads back the 64 digital outputs.

Definition
ULONGLONG DapiDOReadback64(ULONG handle, ULONG ch);

Parameters
handle=This is the handle of an opened module
ch=Specifies the number of the input, from which it begins to read from (0, 64, ..)

Return value
Status of 64 outputs.

4.6. Example program

```
//***************************************************************************
//***************************************************************************
//***************************************************************************
//***************************************************************************
//***************************************************************************
//
//
//  product: usb-ttl-32 (ModuleID = USB_TTL_32)
//  configuration: ttl-io
//  programming language: vc
//
//
//  (c) DEDITEC GmbH, 2011
//  web: http://www.deditec.de/
//  mail: vertrieb@deditec.de
//
//
//***************************************************************************
//***************************************************************************
//***************************************************************************
//***************************************************************************
//***************************************************************************
//
//
// Please include the following library on linking: delib.lib
//
// This can be done at the project settings (Project/Settings/Link ->
// Object/library modules) .. extend the existing line with the ending
// "$(DELIB_LIB)\delib.lib"        (with quotation marks)
//
// Including the header file delib.h (Project/Settings/C/C++ -> select
category
// "Preprocessor" -> Additional inlude directories) .. enter the line
// "$(DELIB_INCLUDE)"       (with quotation marks)

#include <windows.h>
#include <stdio.h>
#include "conio.h"

#include "delib.h"

// ----------------------------------------------------------------------------
// GetLastError function

BOOL IsError()
{
       unsigned char msg[500];

       if (DapiGetLastError() != DAPI_ERR_NONE)
       {

              DapiGetLastErrorText((unsigned char*) msg, sizeof(msg));
              printf("Error Code = %x * Message = %s\n", 0, msg);
```

```
                DapiClearLastError();

                return TRUE;
        }

        return FALSE;
}

//***************************************************************************
//***************************************************************************
//***************************************************************************
//***************************************************************************
//***************************************************************************

void main(void)
{
        unsigned long handle;
        unsigned long data;

        // -------------------------------------------------------------------
        // Open Module

        handle = DapiOpenModule(USB_TTL_32,0);

        printf("Module handle = %x\n", handle);

        // -------------------------------------------------------------------
        // Module not found!

        if (handle==0)
        {
                printf("Could not open module!\n");
                printf("Press any key to exit\n");
                getch();
                return;
        }

        // -------------------------------------------------------------------
        // Module found!

        printf("Module has been opened\n");

        // -------------------------------------------------------------------
        // Switch i/o to inputs

        DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_SET_DIR_DX_8, 0, 0, 0);
        IsError();
        printf("Channel 0-7 has been set to inputs\n");
        printf("Press any key to continue\n");
        getch();

        // -------------------------------------------------------------------
        // Read value of inputs 0-7

        data = DapiDIGet8(handle, 0);
        IsError();
```

```
        printf("Value of inputs 0-7 = %d\n", data);
        printf("Press any key to continue\n");
        getch();

        // ------------------------------------------------------------------------
        // Switch i/o to outputs

        DapiSpecialCommand(handle, DAPI_SPECIAL_CMD_SET_DIR_DX_8, 0, 255, 0);
        IsError();
        printf("Channel 0-7 has been set to outputs\n");
        printf("Press any key to continue\n");
        getch();

        // ------------------------------------------------------------------------
        // Write values to outputs 0-7

        DapiDOSet8(handle, 0, 0xf0);
        IsError();
        printf("Write 0xf0 to outputs 0-7\n");
        printf("Press any key to continue\n");
        getch();

        // ------------------------------------------------------------------------
        // Readback a value of inputs 0-7

        data = DapiDIGet8(handle, 0);
        IsError();
        printf("Readback input 0-7 (from output 0-7)\n");
        printf("value = %d\n", data);
        printf("Press any key to continue\n");
        getch();

        // ------------------------------------------------------------------------
        // Close Module

        DapiCloseModule(handle);
        printf("Module closed\n");
        printf("End of program!\n");
        printf("Press any key to exit\n");
        getch();

        return ;
}
```

Appendix

5. Appendix

5.1. Revisions

Rev 2.00	First DEDITEC issue

5.2. Copyrights and trademarks

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