

NetDCU10

First Steps

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F & S Elektronik Systeme GmbH
Untere Waldplätze 23
D-70569 Stuttgart
Phone.: (+49)(0)711/1237220 Fax: (+49)(0)711/12372299

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1 Getting started

This documentation is a step by step introduction in how to use NetDCU10 with NetDCU-Startintf4. The connectors referenced in this documentation are on the NetDCU-Startintf4. The documentation does NOT explain how to use NetDCU10 without NetDCU-Startintf4.

Before you start, please read carefully the readme.txt file in the root directory of the CD.

The latest version of this document can be found at

<http://www.download-e.netdcu.de>

Additional support information can be found in our discussion forum at

<http://www.forum.fs-net.de>

Next picture shows the NetDCU-Startintf4 for NetDCU10 with the position and description of connectors.

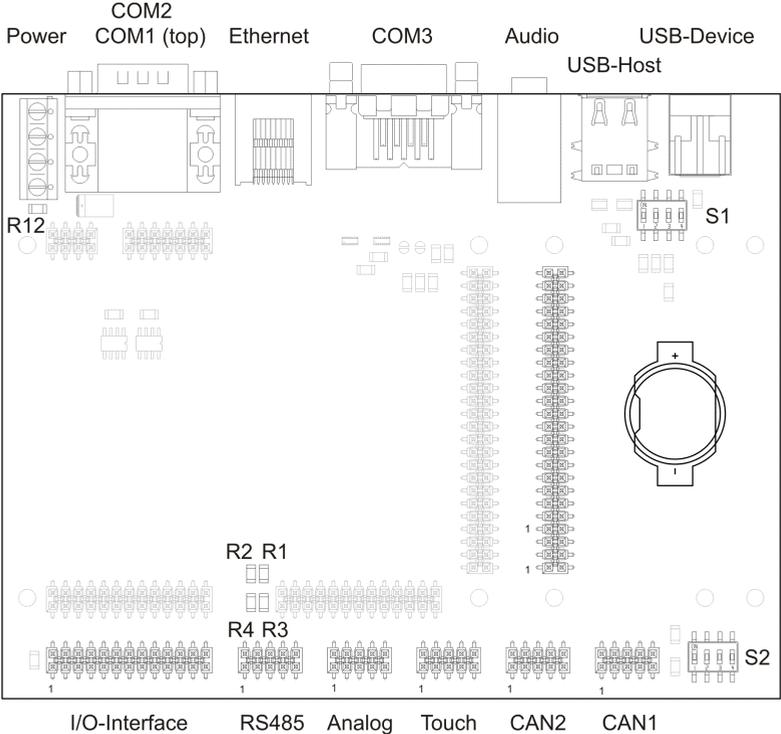


Figure 1: NetDCU-Startintf4 without NetDCU10.

Important:

Before LCD display is connected to NetDCU10, make sure that the NetDCU10 hardware is configured correctly:

Display supply 3.3V JP2

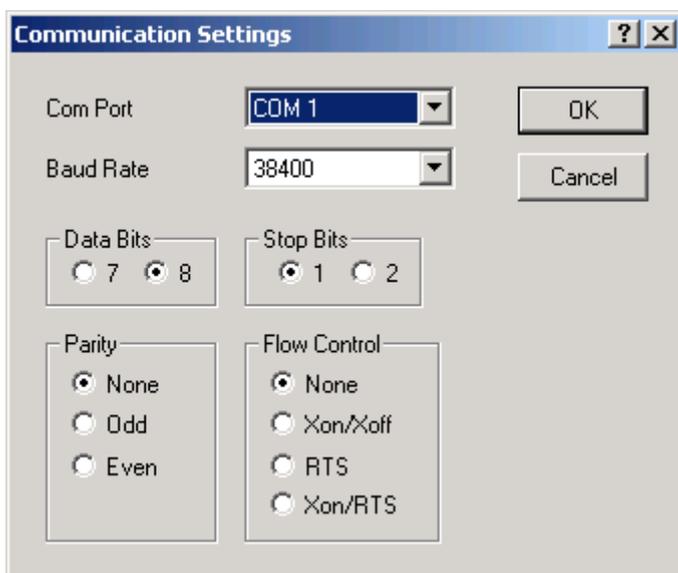
Display supply 5V JP1

ÄSee NetDCU10 hardware documentation.

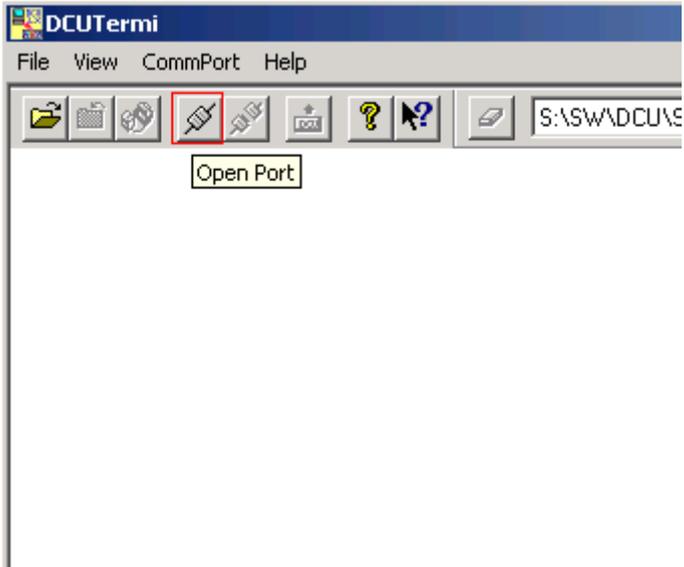
1.1 Powering-on NetDCU10

Before you power on NetDCU10, you should make a serial connection between NetDCU10 and your PC. Please use the cables shipped with the NetDCU10 Starter Kit. On the PC, you should have installed DCUTerm.exe as terminal program. Follow the steps below, to make a connection:

- Install DCUTerm.exe on your PC
- Configure DCUTerm as shown in the following picture:



- Press the connect button in DCUTerm.exe



- Use serial cable shipped with NetDCU10 Starter Kit to make a connection between COM1: and your PC
- Make a cable between power connector (blue) of NetDCU-Startintf4 and your power supply. At this moment you only need to connect ground and +5V (2A).

After these steps the LED marked with RUN should be on and you should see output similar to the following in the terminal windows of DCUTerm.exe.

```
Microsoft Windows CE Ethernet Bootloader ...  
Microsoft Windows CE Bootloader for NetDCU10 ...  
Portions copyright (c) 2007 F&S Elektronik Systeme ...  
Boot Loader, Version 1.00  
StepStone Loader, Version N100
```

```
...
```

```
NetDCU Config Utility Ready  
Version: 001  
Type help for commands
```

```
!>
```

If you don't see text similar to the above one:

- Check serial connection
- Check power supply
- Check settings of DCUTerm.exe

Note, by default the NDCUCFG.EXE (see below) runs on COM1: and the processors debug output is disabled. You can enable and disable the debug output by step into the bootloader (press "shift+s" into the terminal program connected to NetDCUs COM1: and hold the keys while power on NetDCU10) and use the command "O". You can also move NDCUCFG.EXE to COMX: by modify registry value "Port" under HKLM\system\ndcucfg ("Port"=string: COMX:).

2 Configuration

Configuration of NetDCU10 device is provided by different means. Though most powerful and acceptable way is running NDCUCFG.EXE software utility. In fact, this is a standard command prompt program allowing you to adjust variety of system parameters whether it type of LCD display connected to NetDCU10 or its contrast intensity.

Most of changes done to NetDCU10 device through NDCUCFG.EXE utility are stored in persistent system registry, and take effect after next reboot of NetDCU10 device.

According to device's software architecture, this utility is automatically started on the COM1:. As well, the utility can be remotely executed over TELNET connection, once you have got network access to NetDCU10 device.

As it will be described further, there are also other ways to pass to the NetDCU10 device its settings. All in all, software components and core of operating system running on NetDCU10 offer you an easy and effective way to make necessary settings.

Below comes description of LCD-display selection and adjustment. It is also demonstrates pretty good how to use NDCUCFG.EXE utility.

2.1 Display configuration

2.1.1 Displays supported by NetDCU10

NetDCU10 device is capable of working with different kinds of liquid crystal displays. Technically, those fall into two categories: active (TFT) and passive (STN) LCD's. Representatives of different categories, usually they require different approaches of power management. NetDCU10 provides both necessary ways to manage displays of each of mentioned type.

A list of all currently tested displays can be obtained from the Folder "DisplaySettings" of the CD.

In general the display support is split into two categories, displays with built-in settings and displays that must be individually configured.

The following table lists displays with built-in support:

Mode	Name	X x Y	Type
0	Kyocera KCS3224	320x240	Passive
1	Sharp LM8V31	640x480	Passive
2	Toshiba LTM04C380K	640x480	Active
3	SHARP LQ104V1DG11	640x480	Active
4	Not used	800x600	Active
5	SHARP LQ057Q3DC02	320x240	Active
6	Kyocera TCG057	320x240	Active

Table 2. Display modes, parameters and types

Technical details on setting the display port J3 are explained and demonstrated in the hardware documentation. Actual document provides only information on handling basic configuration tools and doing LCD configuration using it.

2.1.2 Using NDCUCFG.EXE utility

As already shown in chapter 1.1 NDCUCFG.EXE utility is started automatically on COM1:..After boot NetDCU10 device and wait until following prompt message will appear:

```
NetDCU Config Utility Ready  
Version: 030  
Type help for commands
```

```
!>
```

If you can see it, then you are ready to pass commands to NDCUCFG.EXE utility. Otherwise something went wrong. Check various parameters described in chapter 1.1.

If you have success on starting NDCUCFG.EXE over the serial line of your PC, then you can start passing commands to the utility. It's recommended that first command you issue is the command *help*. This is final part of what you will see on issuing it:

```
. . . list of messages starts earlier  
backlight off  
start <file name>  
quit  
help  
help <command>  
!>
```

You definitely know how to use such trivial (but important!) commands as *help* and *quit* . For all other commands you can use hint given you in last string of above output. I.e. if you do not know how to issue command *backlight* then you type following and then press Enter:

```
!>help backlight
```

two possible ways of executing this command will be shown you in response. If you still interesting in what command *backlight off* does, just type and finish with Enter the following:

!>help backlight off

and you will get satisfying answer to you *help*-request. Upper examples demonstrate how the NDCUCFG.EXE utility functions in general. Now, let us turn to display setting up.

To configure LCD, find in Table 2 mode corresponding to display you have connected to NetDCU10 device. Let us assume that this mode is '0' (Kyocera KCS3224). So, type and finish with Enter following command:

!>display mode set 0

last digit in previous string is nothing but mode you going to activate for your display. Program confirms the fact that mode has been successfully set with outputting an "OK" message. Now you can check whether the changes you have initiated have been accepted:

!>display mode get

the press Enter. If everything is correct, answer you get is:

**OK 0
!>**

Choosing different type of LCD or providing other changes to NetDCU10 device are done completely similarly.

Hence, if you are not sure that changes you have done are 'for the good' you can merely reboot your NetDCU10 device, so changes will not take effect after reboot.

But if you want to save your changes you have to issue one more command.

2.1.3 Saving display parameters to registry

After changes as for type of display were correctly done, and special checking following it have approved this fact, it's suitable time to save those changes from RAM memory to physical media, so they will take an effect after next reboot of NetDCU10 device.

Enter following:

```
!>reg save
```

and press Enter. Procedure of physical saving takes about two seconds – do nothing during this period! If you can see “OK” message again then it means that all the changes provided to NetDCU10 system during current session of working with NDCUCFG.EXE utility are stored in persistent registry.

This is all. Now reboot, and, if type of display was defined by you correctly then on display will appear the windows welcome screen.

If it is different, check if you've done everything correctly and try again.

2.2 Network interface configuration

NetDCU10 implements powerful and stable Ethernet interface which allows customer to create on its basis a variety of modern hardware Internet applications highly required by modern market of data processing and transporting appliances.

Ethernet interface implemented in NetDCU10 meets 802.3 10BaseT specifications by IEEE, and provides safe data transfer on speeds up to 100 Mbit/sec.

Actual release of Ethernet interface in devices series NetDCU10 has recommended itself as stable and productive, since most of hardware circuits of its controlling communication port are realised by core of powerful, 32-bit processor.

The same time, Ethernet interface implemented in NetDCU10 offers certain flexibility, which is powered by kernel of operating system supplied along with NetDCU10.

Such a co-existence of stability and flexibility gives you a set of principally new features allowing to adjust, evaluate and use the device in significantly easier way than it was previously.

2.2.1 Network - General Facts

Being integrated into IP-network, in order to get directly referred by other network devices, every NetDCU10 device must obtain its own IP-address, unique within entire network segment. Such address along with other necessary parameters generally must be confirmed by network administrator.

Get preferred IP-address from range of currently available IP-addresses (for example 192.168.5.5) , and mark this address as one currently being assigned to NetDCU10. Ask your network administrator if you don't know how to obtain unused IP-address or see "Network – Network address".

Hardware layer of communication between network devices assumes every device to have one more address. This another kind of address is a so-called MAC-address, or 'Ethernet address', or 'physical address'. It is formed of six-byte sequence, and, in accordance to corresponding IEEE's regulations, is unique for every network device across the World.

2.2.2 Network – Network address

Every IP-Address can be split into the network address and station address. It's not part of this documentation to describe all details of this but we want to explain how you can obtain your network address from your PC.

Open command window and type:

```
C:>telnet
```

then press Enter. Output you get must be relative to following:

Windows IP configuration:

Ethernet Adapter RTL81391:

IP address: 192.168.5.131

Subnet mask: 255.255.255.0

Standard Gateway:

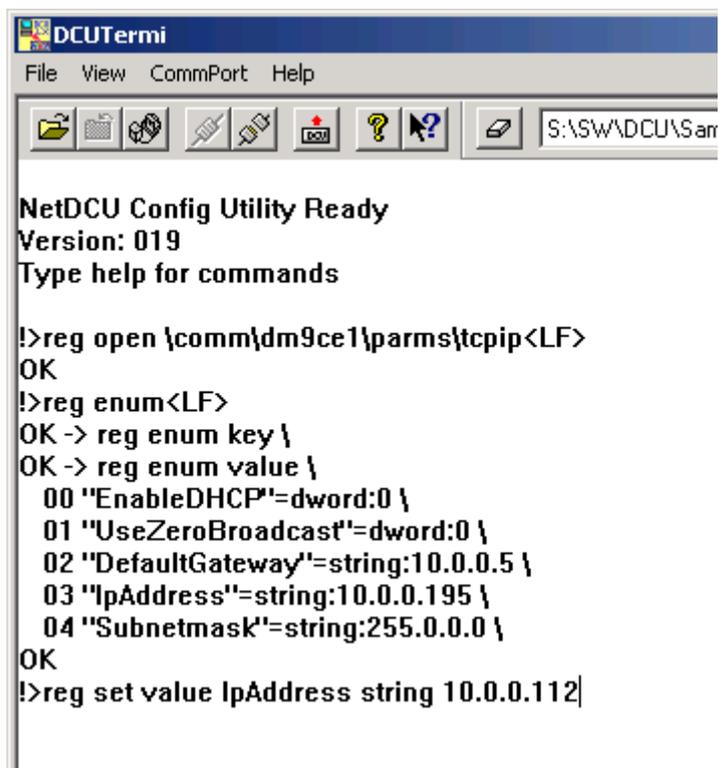
From this information you can calculate your network address. Interpret the values as hexadecimal values and do a logical and of IP address and subnet mask. The result is the network address.

192	.	168	.	5	.	131
255	.	255	.	255	.	0
192	.	168	.	5	.	0

So, for our example network address is 192.168.5.0 and station address within this network is 192.168.5.131. Only stations that are in the same network can communicate with each other.

2.2.3 Network – Adjusting IP-Address

By default NetDCU10 is configured to get IP-Settings from DHCP server ("EnableDHCP"=dword:1). Best way to modify the IP address and Subnet mask of NetDCU10 is by using NDCUCFG.EXE over serial line.



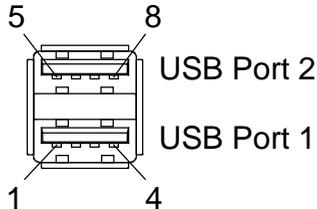
The screenshot shows a terminal window titled "DCUTermi" with a menu bar (File, View, CommPort, Help) and a toolbar. The address bar shows "S:\SW\DCU\San". The terminal content is as follows:

```
NetDCU Config Utility Ready
Version: 019
Type help for commands

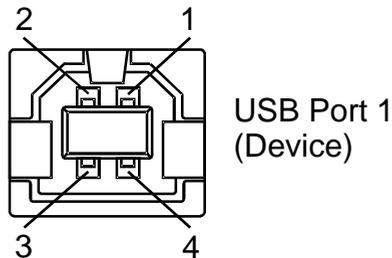
!>reg open \comm\dm9ce1\parms\tcpip<LF>
OK
!>reg enum<LF>
OK -> reg enum key {
OK -> reg enum value {
    00 "EnableDHCP"=dword:0 {
    01 "UseZeroBroadcast"=dword:0 {
    02 "DefaultGateway"=string:10.0.0.5 {
    03 "IpAddress"=string:10.0.0.195 {
    04 "Subnetmask"=string:255.0.0.0 {
OK
!>reg set value IpAddress string 10.0.0.112|
```

2.3 USB Host/Device configuration

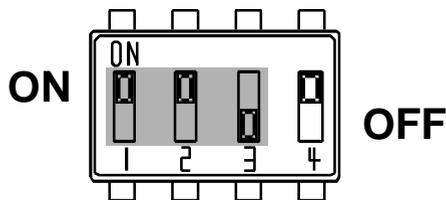
NetDCU10 has two USB ports which are aligned with a standard USB connector (Lumberg, 2401 02) on Start Interface.



By default, USB Port 2 is configured as USB host and USB Port 1 is configured as USB Device.



Additionally USB Port 1 can be configured as HOST-Port. This is done with DIP-Switch 1.1 to 1.3 and changes in the registry:



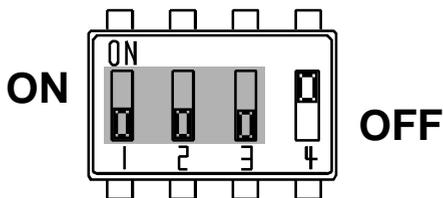
Configuration USB Port 1 as HOST 1

The best way to make the needed registry changes is to use ndcucfg and type the following commands:

```
Reg open \Drivers\BuiltIn\OHCD  
Reg set val PortCount dword 2
```

```
Reg open \Drivers\BuiltIn\USBFN  
Reg set val Flags dword 4  
Reg save
```

USB Port 1 can also be configured as USB DEVICE. DIP-Switches 1.1 to 1.3 has to be changed. The device port is on the USB-Device connector. Port 1 of the USB-Host connector (Fig. 10) must not be used!



Configuration USB Port 1 as DEVICE 1

3 Software Development

For software development you have to use Visual Studio 2005 or newer. The image shipped with NetDCU10 starter kit automatically includes Microsoft Compact Framework. This gives the possibility to develop software in managed code. At the time C# and VB.NET are supported. It is also possible to develop software in native code (C++) but before you can do this you have to install the SDK "NetDCU10_SDK" (including System Development Kit for NetDCU10 device and operating system Windows CE 6.0).

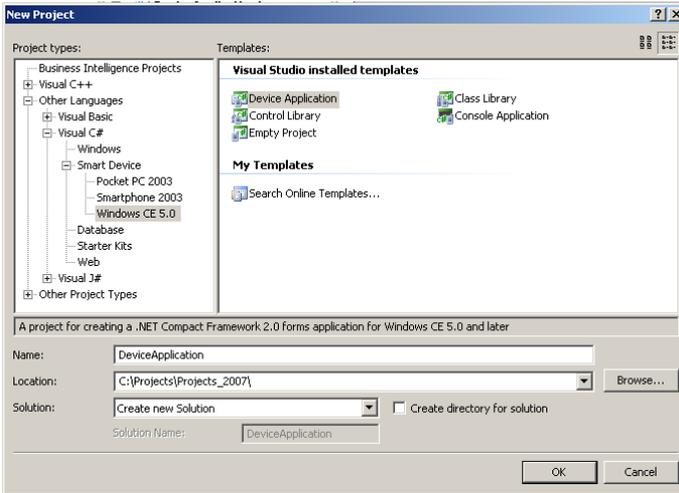
To connect Visual Studio to NetDCU10 for software development you can use an USB device connection or an Ethernet connection.

A detailed description how to connect via Ethernet is given by "Connect VS 2005 to NetDCU using LAN" which you can download from <http://www.fs-net.de/download/bin/>.

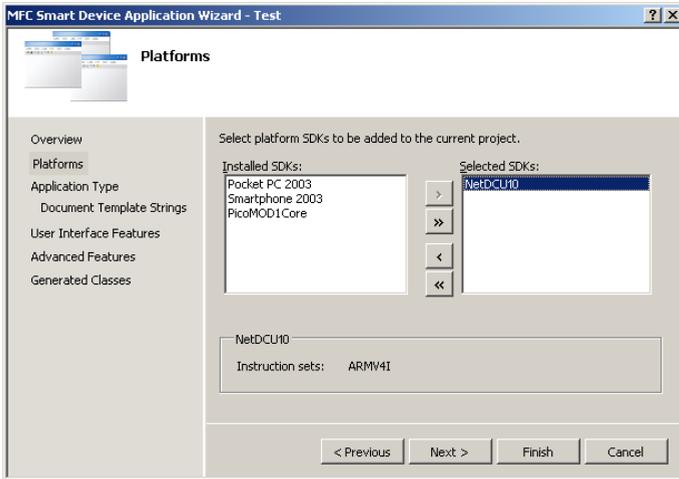
More easy is to connect via USB device using Microsoft ActiveSync. For this install the latest version of ActiveSync on your PC (download ActiveSync from <http://www.microsoft.com>), configure USB Port1 as Device and connect NetDCU10 and PC using the USB device connector shipped with the NetDCU-Startint4. The connection is established automatically.

Just on thing you have to bear in mind while create the new "smart device application" for managed code select "Windows CE 6.0 Device" for native code select the "NetDCU10" device (see pictures below). After you have finished the project you can deploy the application on the device (e.g. by press "F5" for start debugger or press "Ctrl+F5" for run without debugging).

Project settings for using managed code:



Project settings for using native code:



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