

CAN2IP Gateway IGW/963 ***with DIL/NetPC DNP/9265***

First Steps



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Document Revision: 1.1
Date: 2015-08-27

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1 INTRODUCTION

This documentation gives you an overview about the initial operation and the first steps of use with your new CAN2IP Gateway IGW/963.

1.1 Checklist

Compare the content of your IGW/936-L start-up package with the checklist below.

If any item is missing or appears to be damaged, please contact SSV!

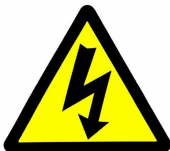
- ✓ CAN2IP Gateway IGW/963
- ✓ 1x Null modem cable
- ✓ 2x Adapter cable with RS232 connector
- ✓ 1x 24 VDC Plug-in power supply
- ✓ Documentation
- ✓ CD-ROM



Please note: For operation you will need one Ethernet patch cable!

1.2 Safety Guidelines

Please read the following safety guidelines carefully! In case of property or personal damage by not paying attention to this document and/or by incorrect handling, we do not assume liability. In such cases any warranty claim expires.



ATTENTION!

Observe precautions for handling – electrostatic sensitive device!

- Discharge yourself before you work with the device, e.g. by touching a heater of metal, to avoid damages.
- Stay grounded while working with the device to avoid damage through electrostatic discharge.

1.3 Conventions

Convention	Usage
bold	Important terms
<code>monospace</code>	Filenames, Pathnames, program code, command lines
<i>italic</i>	Special names and terms

Table 1: Conventions used in this document

1.4 Features and Technical Data

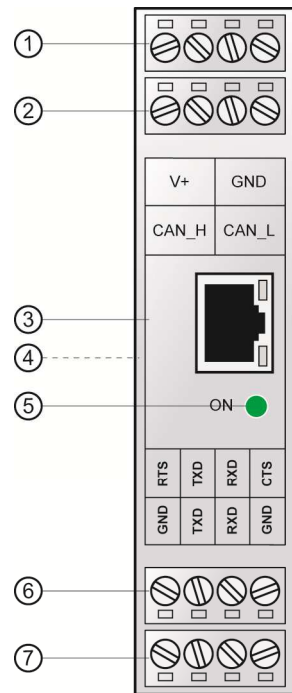
The IGW/963 comes with a preinstalled U-Boot boot loader and an Embedded Linux operating system. The IGW/963 Linux consists of two main components: 1. the Linux kernel and 2. the root file system.

The IGW/963 U-Boot boot loader allows the downloading of new Linux kernel versions and root file systems to the IGW/963 RAM and Flash. This in system programming feature can be used by a simple serial and Ethernet link between the development system and the IGW/963.

Processor	
Manufacturer / Type	Atmel AT91SAM9263 32-bit ARM9-MCU (DIL/NetPC DNP/9265)
Clock speed	192 MHz
Memory	
RAM	32 MB SDRAM
Flash	32 MB NOR memory
Storage media	1x internal microSD card holder
Interfaces	
Ethernet	1x 10/100 Mbps (RJ45)
Serial I/Os	1x RS232 serial port with flow control (screw terminal) 1x RS232 serial port RX/TX only (screw terminal=
CAN	1x Galvanically isolated (screw terminal) Baud rates from 50 kbps up to 1 Mbps BasicCAN/FullCAN support CAN 2.0A/2.0B support CANopen protocol support
Special Functions	
RTC	1x Real Time Clock with internal battery-backup
Watchdog	1x Timer watchdog (hardware-based, software-configurable) 1x Power supervisor (hardware-based)
Displays / Control Elements	
LEDs	1x Power 1x LAN activity 1x VPN connection established
Electrical Characteristics	
Power supply	12 .. 24 VDC from external power supply
Power consumption	~1.2 W
Mechanical Characteristics	
Protection class	IP20 industrial case for 35 mm DIN-rail mounting
Mass	< 150 g
Dimensions	112 mm x 100 mm x 22.5 mm
Operating temperature	0 .. 70 °C
Standards and Certifications	
EMC	CE
Environmental standards	RoHS, WEEE

Table 2: Features and technical data

1.5 Overview



- ① Power supply
- ② CAN interface
- ③ Ethernet interface
- ④ DIN-rail mounting (backside)

- ⑤ Power LED
- ⑥ COM1 serial interface
- ⑦ COM2 serial interface

Figure 1: Overview IGW/963

2 HARD- AND SOFTWARE REQUIREMENTS

To work with the IGW/963 a software development environment is needed.

This development environment requires a computer as development system to access the IGW/963 via serial console or Telnet. The computer should comply with the following hard- and software requirements:

- Windows XP / 7 / 8 or Linux
- Serial (COM) interface
- Terminal program (HyperTerminal or Minicom)
- 10/100 Mbps Ethernet network controller and TCP/IP configuration
- Web browser
- Telnet client
- CD-ROM drive

Please check which IP address your computer actual has and keep this IP address in mind.

On a Linux-PC just open a shell console and enter `ifconfig`. On a Windows-PC please open a DOS window and enter: `ipconfig`. Now the IP address is displayed in the DOS window.



Please note: With a Linux-PC as development system it is possible to develop programs in all languages for the IGW/963. Linux is especially for programming in C/C++ as PC operating system required because of the GNU cross tools. With a Windows-PC the shell-script programming as well as the HTML- and Java-applet programming of the Web server is possible.

3 GETTING STARTED

3.1 Serial Link between IGW/963 COM1 and PC

Setup the serial link between the COM1 port of the IGW/963 and your PC like shown in the figure below. Use the adapter cable for this connection. COM1 is used as console.

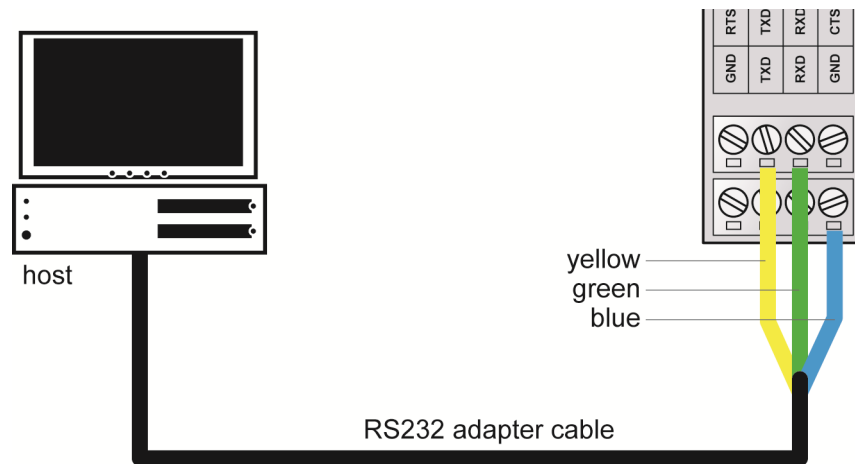


Figure 2: Serial link between IGW963 COM1 and PC

Connect the adapter cable with an unused COM port of your PC. Make sure that this PC COM port supports 115.200 bps.

3.2 Serial Link between IGW/963 COM2 and PC

You may also use the COM2 port of the IGW/963 for a serial link like shown in the figure below. Use the adapter cable for this connection. COM2 is for free usage.



Please note: The COM2 port does **NOT** support RTS/CTS and works with max. 9.600 bps.

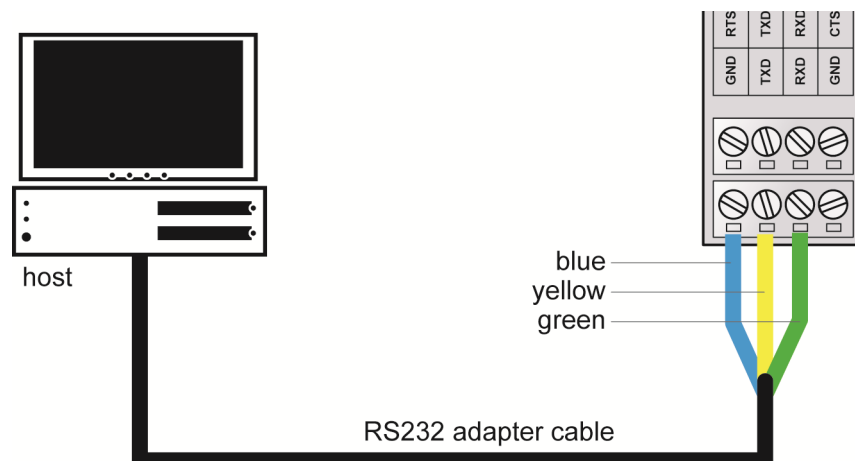


Figure 3: Serial link between IGW/963 COM2 and PC

3.3 Ethernet Link between IGW/963 and PC

Setup the Ethernet LAN link between the IGW/963 and your PC.

Use an Ethernet cable (figure 4) or a switch-based infrastructure (figure 5) for the LAN connection.

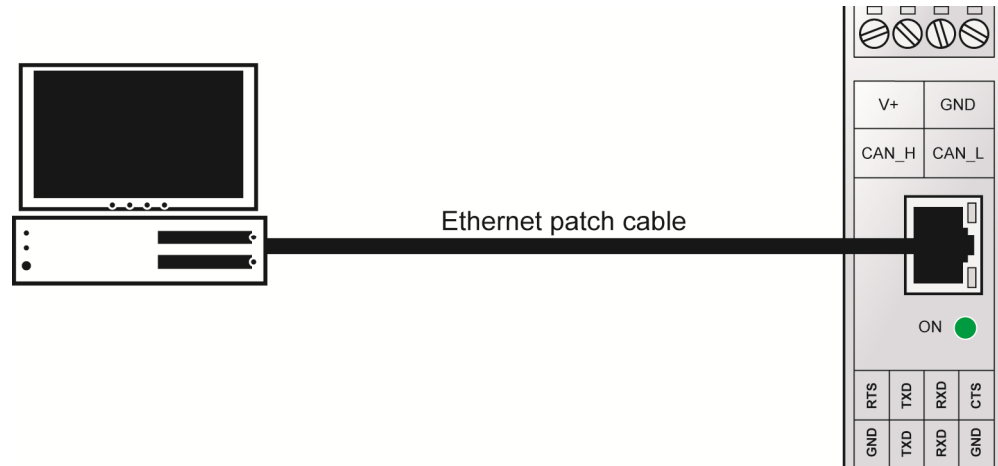


Figure 4: Ethernet link between IGW/963 and PC



Please note: The IGW/963 comes with the default IP address **192.168.0.126**. Please make sure that your PC can work with the IP address range 192.168.0.x.

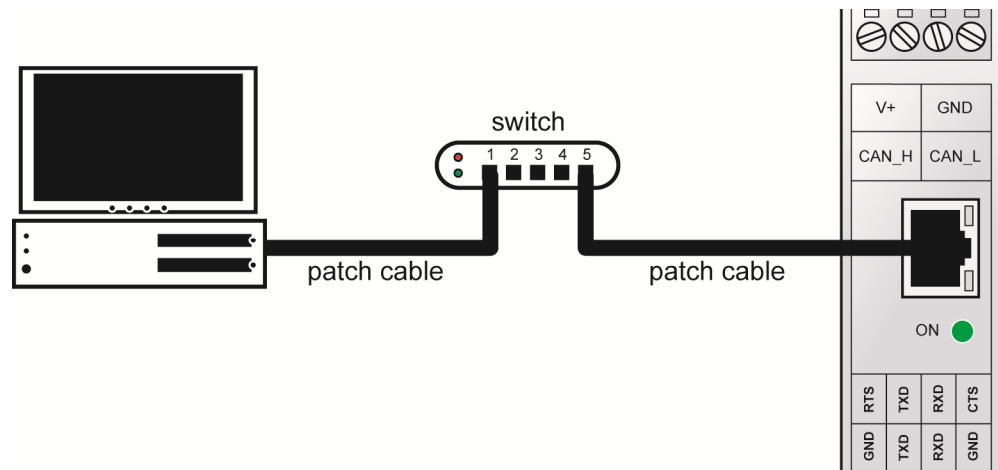


Figure 5: Switch-based Ethernet link between IGW/963 and PC

3.4 Connecting Power Supply and Power-up the IGW/963

Connect the 24 VDC plug-in power supply with the screw terminals of the IGW/963 like shown in the figure below.

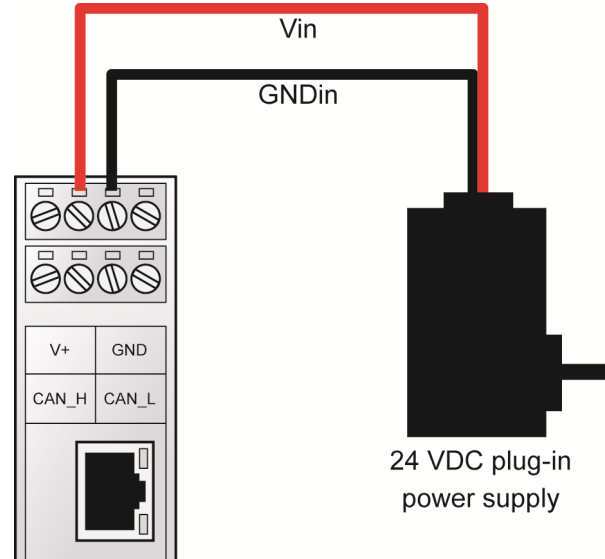
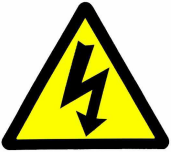


Figure 6: Power supply for the IGW/963



CAUTION!

Providing the IGW/963 with a voltage higher than the regular 12 .. 24 VDC could resolve in damaged device components!

Make sure that all cable connections are OK. Then power-up the Starter Kit.

3.5 Using Serial Link over COM1 with Terminal Program

Run *HyperTerminal* on your Windows-PC, *minicom* or a similar simple terminal emulation program on your Linux-based PC.



Figure 7: Direct connection setup with HyperTerminal

Setup a direct connection over **COM1** of the IGW/963 with the parameters of table 2. Make sure, that the PC COM port supports 115.200 bps.

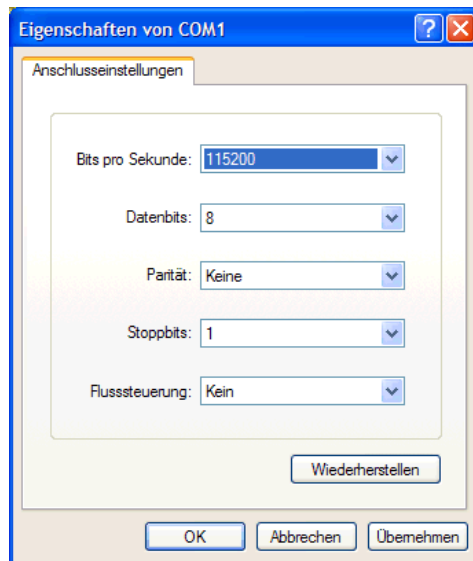


Figure 8: Parameter setup with HyperTerminal

Parameter	Value
Speed	115.200 bps
Data Bits	8
Parity	None
Stop Bits	1
Protocol	No (Xon/Xoff, RTS/CTS or similar)

Table 3: Setup parameters for the serial link over COM1

3.6 Power-up IGW/963 with RCM disabled

After power-up the IGW/963 starts an automatic boot process from the on-board flash memory chip. This process consists of two steps:

1. Directly after power-up, the IGW/963 runs the U-Boot boot loader program for some milliseconds. U-Boot initializes the hardware components (hardware init). **With RCM disabled** (please see the *DIL/NetPC DNP/9265 hardware reference manual* for details), there is no U-Boot text message output over the CAN2IP Gateway IGW/963 COM1 serial interface and no **boot delay**-based¹ wait period. Direct after the hardware init, the U-Boot boot loader starts the Linux OS image.
2. Linux takes control over the IGW/963 hardware and runs all necessary processes for coming up to live.

```
COM7:115200baud - Tera Term VT
File Edit Setup Control Window Resize Help
Linux version 2.6.24.7 (mha@hareangle-saturn) (gcc version 4.1.2) #2 PREEMPT Thu Jul 2 15:
42:14 CEST 2009
CPU: ARM926EJ-S [41069265] revision 5 (ARMv5TEJ), cr=00053177
Machine: SSV Hardware 9263/1
Memory policy: ECC disabled, Data cache writeback
Clocks: CPU 192 MHz, master 96 MHz, main 16.000 MHz
CPU0: D VIVT write-back cache
CPU0: I cache: 16384 bytes, associativity 4, 32 byte lines, 128 sets
CPU0: D cache: 16384 bytes, associativity 4, 32 byte lines, 128 sets
Built 1 zonelists in Zone order, mobility grouping on. total pages: 8128
Kernel command line: mem=32M console=ttyAT0,115200 noinitrd root=/dev/mtdblock2 rootfstype
=iff52 ro
AT91: 160 gpio irqs in 5 banks
PID hash table entries: 128 (order: 7, 512 bytes)
Console: colour dummy device 80x30
Dentry cache hash table entries: 4096 (order: 2, 16384 bytes)
Inode-cache hash table entries: 2048 (order: 1, 8192 bytes)
Memory: 32MB = 32MB total
Memory: 29356KB available (2740K code, 240K data, 100K init)
Mount-cache hash table entries: 512
CPU: Testing write buffer coherency: ok
net_namespace: 64 bytes
NET: Registered protocol family 16
SCSI subsystem initialized
usbcore: registered new interface driver usbfs
usbcore: registered new interface driver hub
usbcore: registered new device driver usb
NET: Registered protocol family 2
Time: pit clocksource has been installed.
IP route cache hash table entries: 1024 (order: 0, 4096 bytes)
TCP established hash table entries: 1024 (order: 1, 8192 bytes)
TCP bind hash table entries: 1024 (order: 0, 4096 bytes)
TCP: Hash tables configured (established 1024 bind 1024)
TCP reno registered
NetWinder Floating Point Emulator V0.97 (double precision)
```

Figure 9: Linux booting process with HyperTerminal



Please note: The U-Boot environment variable **boot delay** does not influence the IGW/963 boot process with RCM (Remote Console Mode) disabled.

The IGW/963 Linux supports a serial console. It allows running a Linux-based system in a headless configuration without a monitor or keyboard. Wait until the Linux boot process finishes. Please use the username **root** and the password **root**. Then press Enter.

“**boot delay**” is a U-Boot environment variable. The value defines a wait time before U-Boot starts the Linux operating system.

3.7 Power-up IGW/963 with RCM enabled

The IGW/963 boot sequence with RCM enabled is similar to the boot procedure with RCM disabled. Only the first step is different:

1. The IGW/963 runs the U-Boot boot loader program. This software shows a wait message over the IGW/963 COM1 serial interface if RCM is enabled (please see the *DIL/NetPC DNP/9265 hardware reference manual* for details). It is possible to interrupt the boot process and switch to the U-Boot command line interface. Just hit a key of your terminal emulation program.
2. Without interruption the U-Boot boot loader starts a Linux OS image after the wait period from the IGW/963 Flash memory.

```

COM7:115200baud - Tera Term VT
File Edit Setup Control Window Resize Help

U-Boot 1.1.5 (Jun 16 2009 - 14:14:32) SSV-Embedded
Board: DNP/9265
DRAM: 32 MB
Flash: 32 MB
Watchdog: off
In: serial
Out: serial
Err: serial
Hit any key to stop autoboot: 2 █
    
```

Figure 10: U-Boot wait message



Please note: The U-Boot command line interface allows you to change the wait time of the first step. Please see the U-Boot environment variable **boot delay** for details.

```

COM7:115200baud - Tera Term VT
File Edit Setup Control Window Resize Help

0x00000000-0x00008000 : "boot.bin"
0x00020000-0x00060000 : "u-boot"
at91_ohci at91_ohci: AT91 OHCI
at91_ohci at91_ohci: new USB bus registered, assigned bus number 1
at91_ohci at91_ohci: irq 29, io mem 0x00a00000
usb usb1: configuration #1 chosen from 1 choice
hub 1-0:1.0: USB hub found
hub 1-0:1.0: 1 port detected
Initializing USB Mass Storage driver...
usbcore: registered new interface driver usb-storage
USB Mass Storage support registered.
mice: PS/2 mouse device common for all mice
at91sam9_wdt: Watchdog register already programmed.
TCP cubic registered
NET: Registered protocol family 1
NET: Registered protocol family 17
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
VFS: Mounted root (jffs2 filesystem) readonly.
Freeing init memory: 100K
INI1: version 2.86 booting
Mounting sys filesystem.....done
Mounting /dev ramdisk.....done
Populating /dev.....done
Mounting local filesystems.....done
Setting up IP spoofing protection.....done
Configuring network interfaces.....done
INI1: Entering runlevel: 5
Starting internet superserver inetd.....done
Starting syslogd/klogd.....done
Starting Lighttpd Web Server.....done

DNP/9265 Linux emlinux ttyAT0
emlinux login: █
    
```

Figure 11: Linux booting process after the U-Boot boot delay

```

COM7:115200baud Tera Term VT
File Edit Setup Control Window Resize Help
INIT: Entering runlevel: 5
Starting Internet superserver inetd.....done
Starting syslogd/klogd.....done
Starting Lighttpd Web Server.....done

DNP/9265 Linux emblinux ttyAT0
emblinux login: root
Password:
root@emblinux:~$ ps
PID  Uid      VmSize  Stat  Command
1    root      528     S    init [5]
2    root          SW<  [kthreadd]
3    root          SW<  [ksoftirqd/0]
4    root          SW<  [watchdog/0]
5    root          SW<  [events/0]
6    root          SW<  [khelper]
42   root          SW<  [kblockd/0]
57   root          SW<  [khubd]
62   root          SW<  [kmmcd]
83   root          SW<  [pdflush]
84   root          SW<  [pdflush]
85   root          SW<  [kswapd0]
86   root          SW<  [aic/0]
685  root          SW<  [mtdblockd]
732  root          SW<  [rpciod/0]
740  root      1352    S    wd_keepalive
775  root          SWN  [jffs2_gcd_mtd3]
824  root      580     S    /usr/libexec/inetd
829  root      612     S    /sbin/syslogd -n -0 /var/log/syslog/messages -s 32 -b
831  root      604     S    /sbin/klogd -n
837  root      612     S    /usr/sbin/lighttpd -f /etc/lighttpd.conf
840  root      832     S    -sh
841  root      744     R    ps
root@emblinux:~$

```

Figure 12: After a login the serial console offers a Linux command line interface

Wait until the Linux boot process finishes. Please use the username **root** and the password **root**. Then press Enter.

3.8 IGW/963 Linux File System

After booting the IGW/963 all directories in the root file system are **read-only**. There are only three exceptions, which are shown in the following table:

Directory	Remark
/flash	R/W directory, non-volatile memory within Flash
/home/root	R/W directory, RAM disk, volatile memory
/var/volatile	R/W directory, RAM disk, volatile memory

Table 4: R/W directories in the file system

The read-only restriction protects all files of the file system. Under ordinary operating conditions it is not possible to overwrite or delete a file which is necessary for the IGW/963.

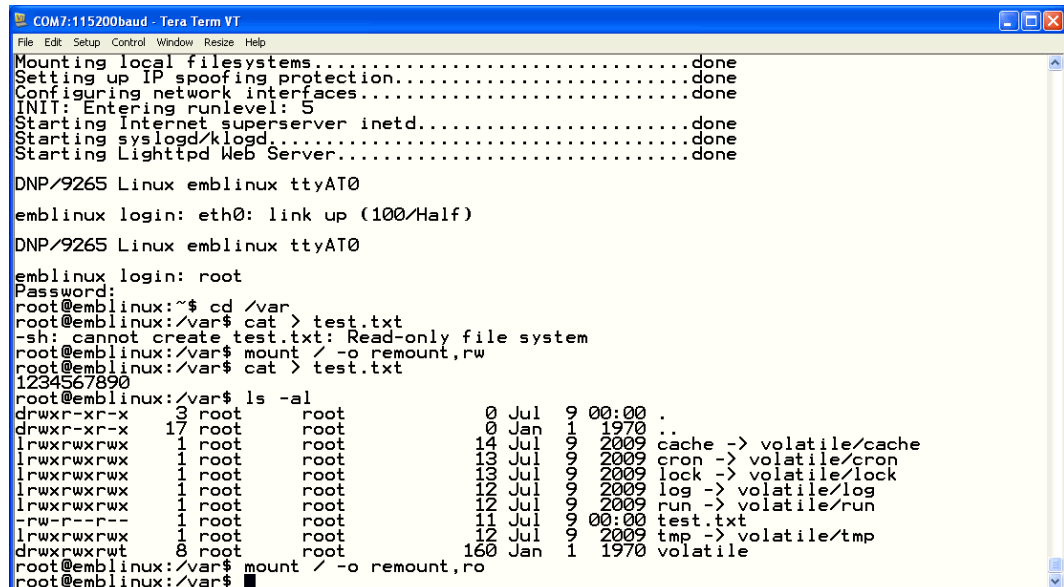
To disable the write protection just login with the username **root** and the password **root** and enter the following command:

```
mount / -o remount,rw
```

This command „mounts„ the file system as **read/write**. All files are now writable and deletable. Please pay attention not to damage important system files! With the command

```
mount / -o remount,ro
```

the system is set to the read-only initial condition after the boot process.



```

COM7:115200baud - Tera Term VT
File Edit Setup Control Window Resize Help
Mounting local filesystems.....done
Setting up IP spoofing protection.....done
Configuring network interfaces.....done
INIT: Entering runlevel: 5
Starting internet superserver inetd.....done
Starting syslogd/klogd.....done
Starting Lighttpd Web Server.....done

DNP/9265 Linux emblinux ttyAT0
emblinux login: eth0: link up (100/Half)
DNP/9265 Linux emblinux ttyAT0
emblinux login: root
Password:
root@emblinux:~$ cd /var
root@emblinux:/var$ cat > test.txt
-sh: cannot create test.txt: Read-only file system
root@emblinux:/var$ mount / -o remount,rw
root@emblinux:/var$ cat > test.txt
1234567890
root@emblinux:/var$ ls -al
drwxr-xr-x  3 root  root    0 Jul  9 00:00 .
drwxr-xr-x 17 root  root   16 Jul  1 1970 ..
lrwxrwxrwx  1 root  root   14 Jul  9 2009 cache -> volatile/cache
lrwxrwxrwx  1 root  root   13 Jul  9 2009 cron -> volatile/cron
lrwxrwxrwx  1 root  root   13 Jul  9 2009 lock -> volatile/lock
lrwxrwxrwx  1 root  root   12 Jul  9 2009 log -> volatile/log
lrwxrwxrwx  1 root  root   12 Jul  9 2009 run -> volatile/run
-rw-r--r--  1 root  root    0 Jul  1 1970 test.txt
lrwxrwxrwx  1 root  root   12 Jul  9 2009 tmp -> volatile/tmp
drwxrwxrwt  8 root  root  160 Jan  1 1970 volatile
root@emblinux:/var$ mount / -o remount,ro
root@emblinux:/var$

```

Figure 13: Disabling the write protection with the mount command

3.9 Checking IP Address of PC

Make sure that your PC is using the right IP address for the Ethernet-based TCP/IP communication with the IGW/963.

Please use 192.168.0.1 or 192.168.0.254 for your PC and 192.168.0.126 for the IGW/963.

```

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Dokumente und Einstellungen\kdw>ipconfig

Windows-IP-Konfiguration

Ethernetadapter LAN-Verbindung:

    Verbindungsspezifisches DNS-Suffix:
    IP-Adresse. . . . . : 192.168.0.254
    Subnetzmaske. . . . . : 255.255.255.0
    Standardgateway . . . . . :

C:\Dokumente und Einstellungen\kdw>
    
```

Figure 14: Windows-PC IP address check with ipconfig

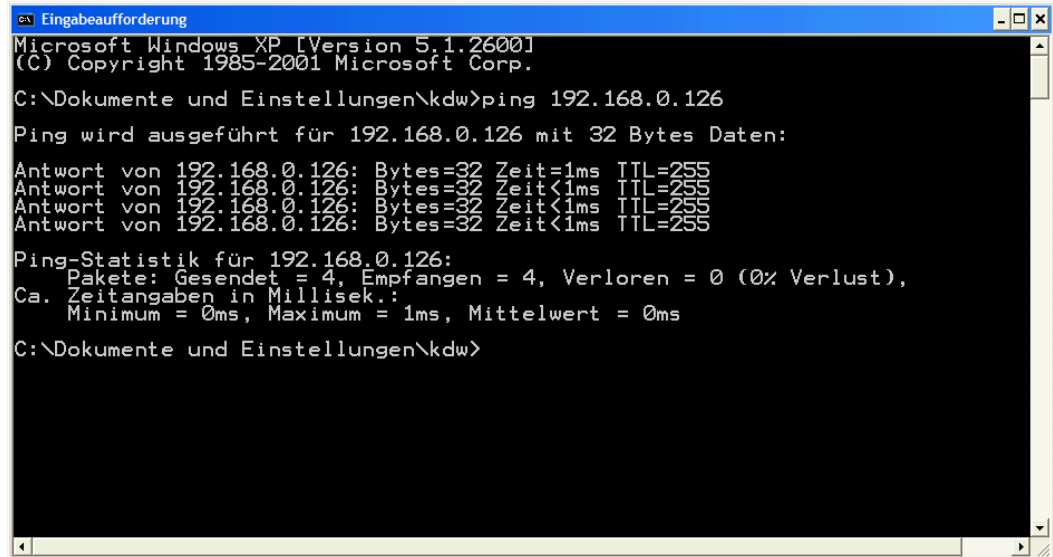
Talk to your network administrator if you have problems with the IP address understanding.



Please note: To change the ex factory IP address 192.168.0.126 of the IGW/963 please refer to **chapter 3.17**.

3.10 Checking Ethernet-based TCP/IP Communication

Check the Ethernet-based TCP/IP communication between the IGW/963 and the PC with a simple *ping* command.



```
Eingabeaufforderung
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Dokumente und Einstellungen\kdw>ping 192.168.0.126

Ping wird ausgeführt für 192.168.0.126 mit 32 Bytes Daten:

Antwort von 192.168.0.126: Bytes=32 Zeit=1ms TTL=255
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=255
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=255
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=255

Ping-Statistik für 192.168.0.126:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0 (0% Verlust),
    Ca. Zeitangaben in Millisek.:
        Minimum = 0ms, Maximum = 1ms, Mittelwert = 0ms

C:\Dokumente und Einstellungen\kdw>
```

Figure 15: Windows-PC TCP/IP communication check with ping

First check the cable connections and then the IP addresses if your *ping* does not work. Then check the TCP/IP setup of your PC.

3.11 Using a Telnet Connection

Run a Telnet client program on your PC with the IP address of the IGW/963. You can use a Telnet session for remote entering Linux commands.

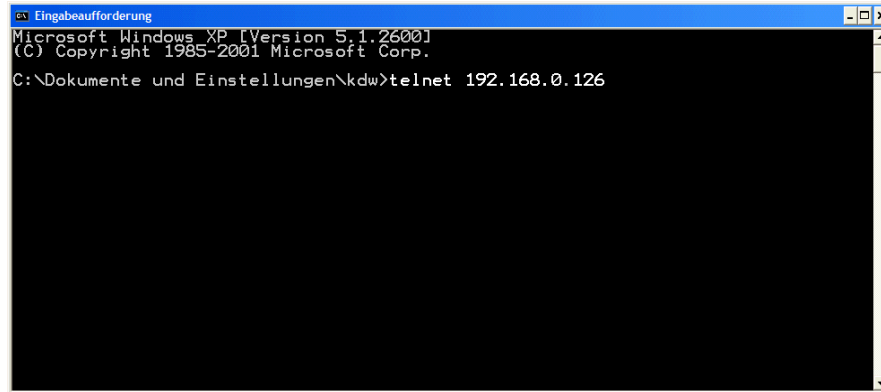


Figure 16: Run the Windows Telnet client program

Wait until the IGW/963 Linux requests a user name. Please use the login name **root** and the password **root**. Then press Enter.



Please note: The IGW/963 Linux comes with *BusyBox*. All Linux command line commands are implemented in *BusyBox*. *BusyBox* combines tiny versions of many common UNIX utilities into a single small executable. It provides replacements for most of the utilities you usually find in GNU *fileutils*, *shellutils*, etc. The utilities in *BusyBox* generally have fewer options than their full-featured GNU cousins; however, the options that are included provide the expected functionality and behave very much like their GNU counterparts. *BusyBox* provides a fairly complete environment for any small or embedded system.

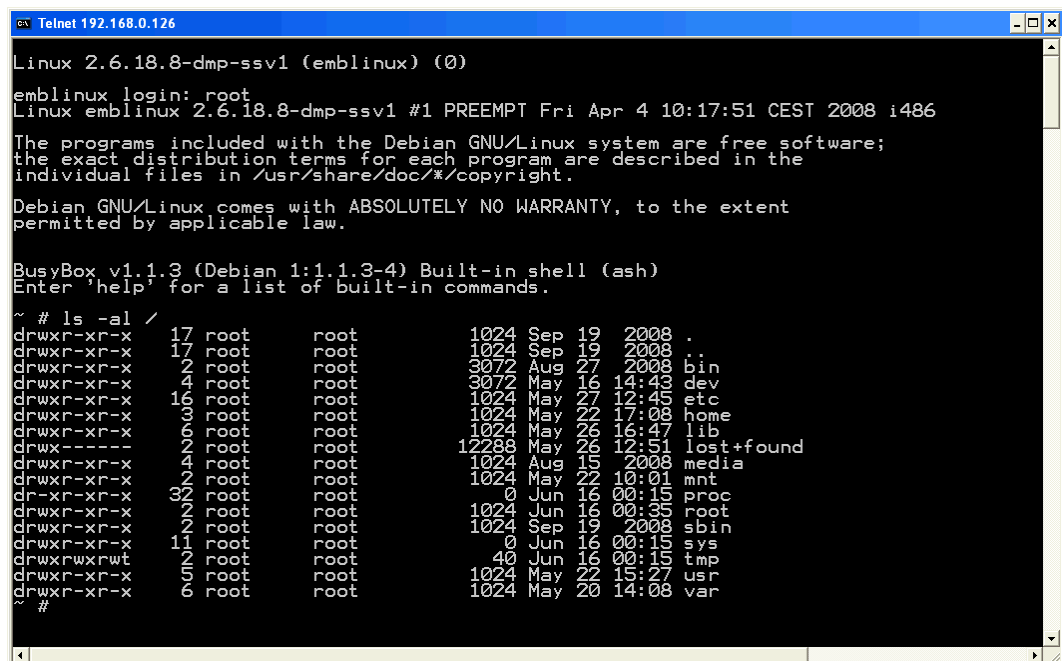


Figure 17: Using Linux commands within a Telnet client window

3.12 Checking FTP Server

The IGW/963 Linux comes with a pre-installed FTP server. This server allows the file transfer via Ethernet between a PC and the IGW/963.

Run an FTP client program like *FileZilla* on your PC for a test.

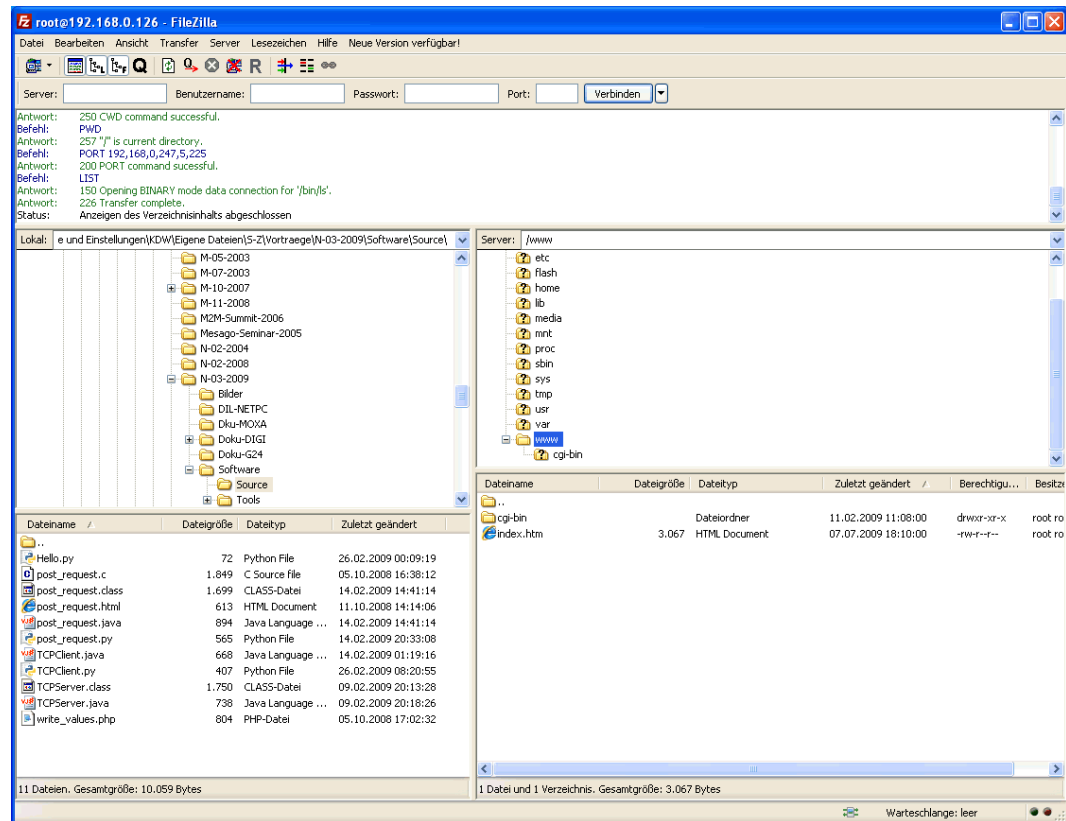


Figure 18: FileZilla as FTP client to access the FTP server

Use for the FTP login the IP address **192.168.0.126**, the username **root** and the password **root**. With this login you have FTP read/write permission in the file system of the IGW/963.



Please note: Before you start an FTP file transfer to the IGW/963, please make sure you have the read/write permission in the file system. For further information about the file system please refer to **chapter 3.8**.

3.13 Checking TFTP Client

The IGW/963 Linux comes with a pre installed TFTP client. This client allows the file transfer via Ethernet between a PC and the IGW/963.

Run a TFTP server like *TFTPD32* on your PC for a test.

To transfer a file with the name *autostart.sh* into the directory `/var` of the IGW/963 execute the following commands within a Telnet session:

```
cd /var
tftp 192.168.0.249
get autostart.sh
quit
```

With the first command you change into the directory `/var` of the IGW/963.

The second command establishes a connection to the TFTP server. In this example the PC with the TFTP server has the IP address `192.168.0.249`.

The third command transfers the file with TFTP-GET. After the file transfer Linux shows how many bytes have been transferred.

The fourth command disconnects the TFTP server. You can now access the new file in the file system of the IGW/963.

```
192.168.0.126:23 - Tera Term VT
File Edit Setup Control Window Resize Help
root@at91sam9263:/$ cd /var
root@at91sam9263:/var$ tftp 192.168.0.249
tftp> get autostart.sh
Received 224 bytes in 0.0 seconds
tftp> quit
root@at91sam9263:/var$ ls -al
drwxr-xr-x  3 root  root    1024 Jan  1  02:03 .
drwxr-xr-x 14 root  root    1024 Jan  1  00:01 ..
-rw-r--r--  1 root  root     224 Jan  1  02:05 autostart.sh
lrwxrwxrwx  1 root  root     14 Feb 11  2009 cache -> volatile/cache
-rw-r--r--  1 root  root     10 Jan  1  00:43 es
lrwxrwxrwx  1 root  root     13 Feb 11  2009 lock -> volatile/lock
lrwxrwxrwx  1 root  root     12 Feb 11  2009 log -> volatile/log
lrwxrwxrwx  1 root  root     12 Feb 11  2009 run -> volatile/run
drwxrwxrwt  7 root  root    140 Feb 11  2009 tmp -> volatile/tmp
root@at91sam9263:/var$
```

Figure 19: File transfer via TFTP



Please note: Before you start a TFTP file transfer to the IGW/963, please make sure you have the read/write permission within the file system. For further information about the file system please refer to **chapter 3.8**.

3.14 Checking HTTP Server

The IGW/963 Linux comes with a pre-installed Web server.

Run a Web browser on your PC for a test and enter the following address

http://192.168.0.126

into the address bar of the browser. The browser shows the file *index.html* which is stored in the directory /www of the IGW/963. Into this directory you can load own files.



Figure 20: Checking the Web server of the IGW/963 with a browser

3.15 First HTML Page

Create a simple HTML file on the PC. Therefore at least a simple text editor or a special HTML editor like *PSPad* is needed.

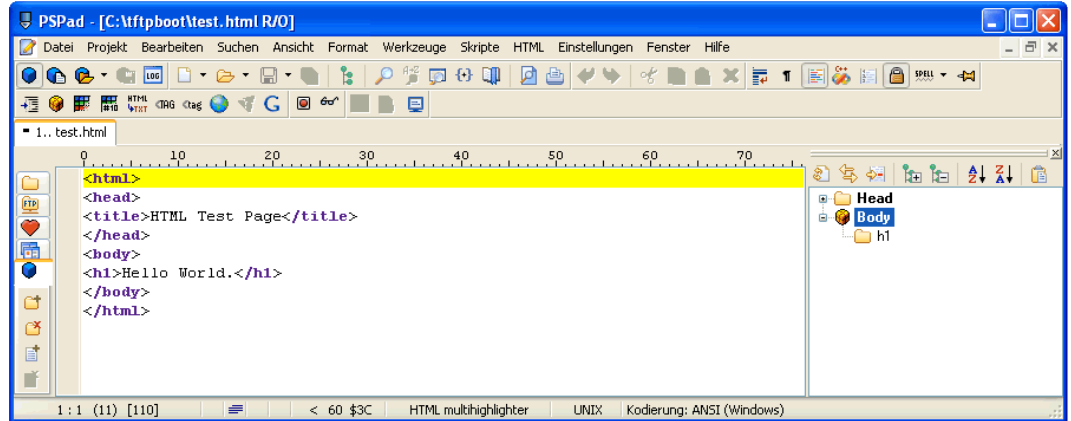


Figure 21: Creation of a simple HTML file on the PC

Transfer the new HTML file (e.g. *test.html*) via FTP or TFTP into the directory `/www` of the IGW/963. Then enter the following URL in the address bar of the browser:

`http://192.168.0.126/test.html`

The browser displays the new file.

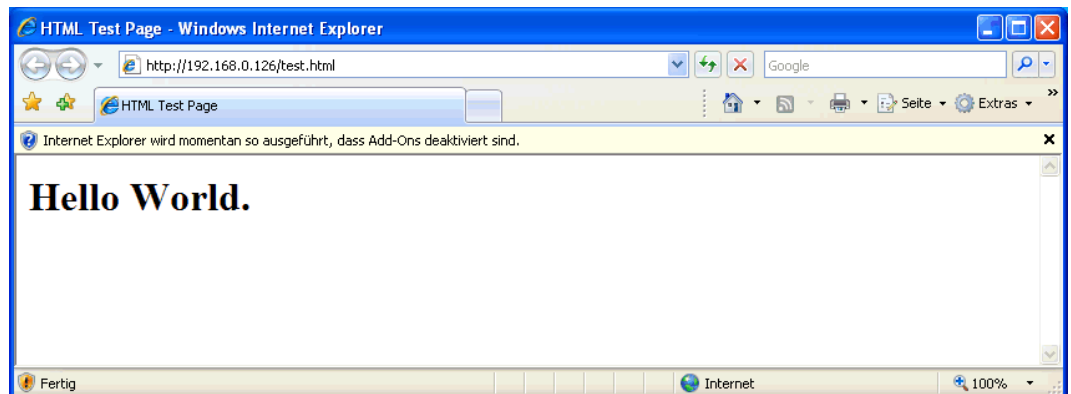


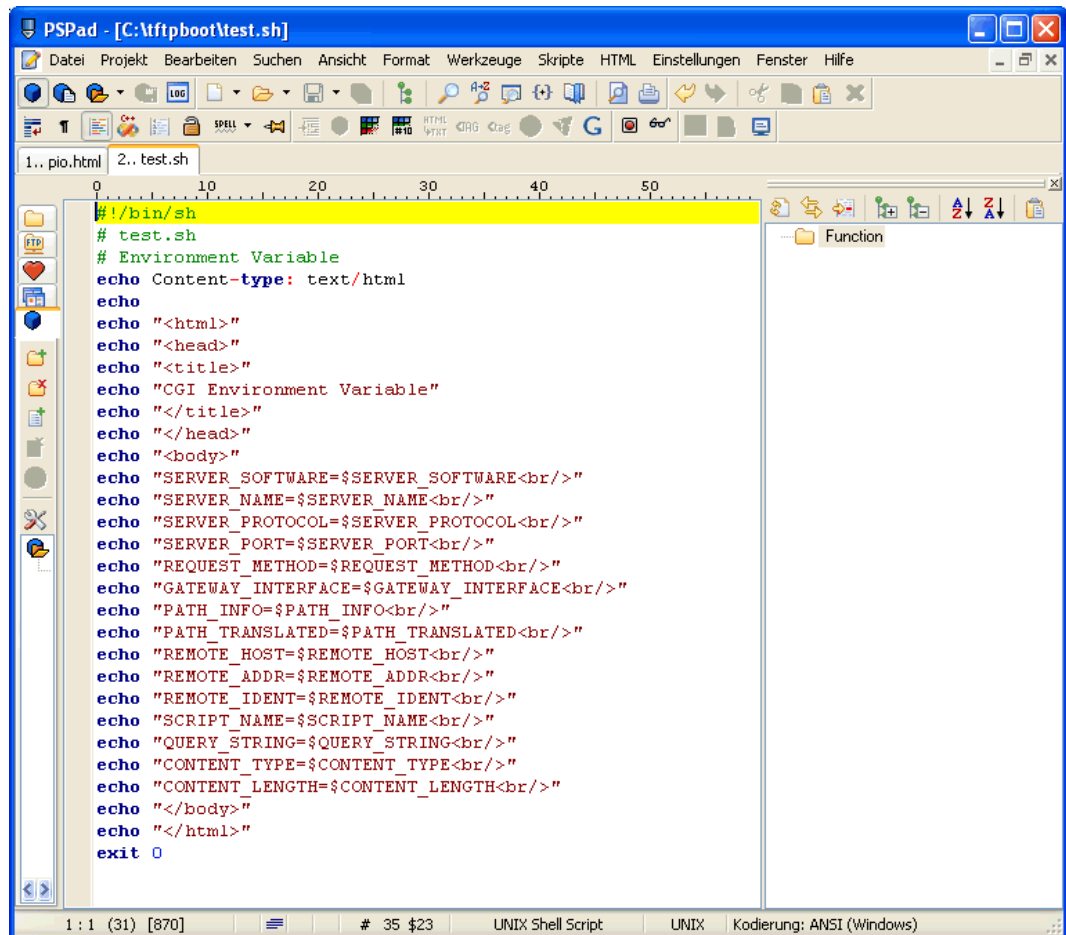
Figure 22: The new HTML file is displayed by the browser



Please note: Before you start an FTP or TFTP file transfer to the IGW/963, please make sure you have the read/write permission within the file system. For further information about the file system please refer to **chapter 3.8**.

3.16 First CGI Program

Create a Linux shell script with an adequate editor on your PC. Please regard that Linux shell text files expect only an LF (line feed) as end of line. In this example the script file is named *test.sh*.



```

#!/bin/sh
# test.sh
# Environment Variable
echo Content-type: text/html
echo
echo "<html>"
echo "<head>"
echo "<title>"
echo "CGI Environment Variable"
echo "</title>"
echo "</head>"
echo "<body>"
echo "SERVER_SOFTWARE=$SERVER_SOFTWARE<br/>"
echo "SERVER_NAME=$SERVER_NAME<br/>"
echo "SERVER_PROTOCOL=$SERVER_PROTOCOL<br/>"
echo "SERVER_PORT=$SERVER_PORT<br/>"
echo "REQUEST_METHOD=$REQUEST_METHOD<br/>"
echo "GATEWAY_INTERFACE=$GATEWAY_INTERFACE<br/>"
echo "PATH_INFO=$PATH_INFO<br/>"
echo "PATH_TRANSLATED=$PATH_TRANSLATED<br/>"
echo "REMOTE_HOST=$REMOTE_HOST<br/>"
echo "REMOTE_ADDR=$REMOTE_ADDR<br/>"
echo "REMOTE_IDENT=$REMOTE_IDENT<br/>"
echo "SCRIPT_NAME=$SCRIPT_NAME<br/>"
echo "QUERY_STRING=$QUERY_STRING<br/>"
echo "CONTENT_TYPE=$CONTENT_TYPE<br/>"
echo "CONTENT_LENGTH=$CONTENT_LENGTH<br/>"
echo "</body>"
echo "</html>"
exit 0

```

Figure 23: Creation of a shell script on a Windows PC

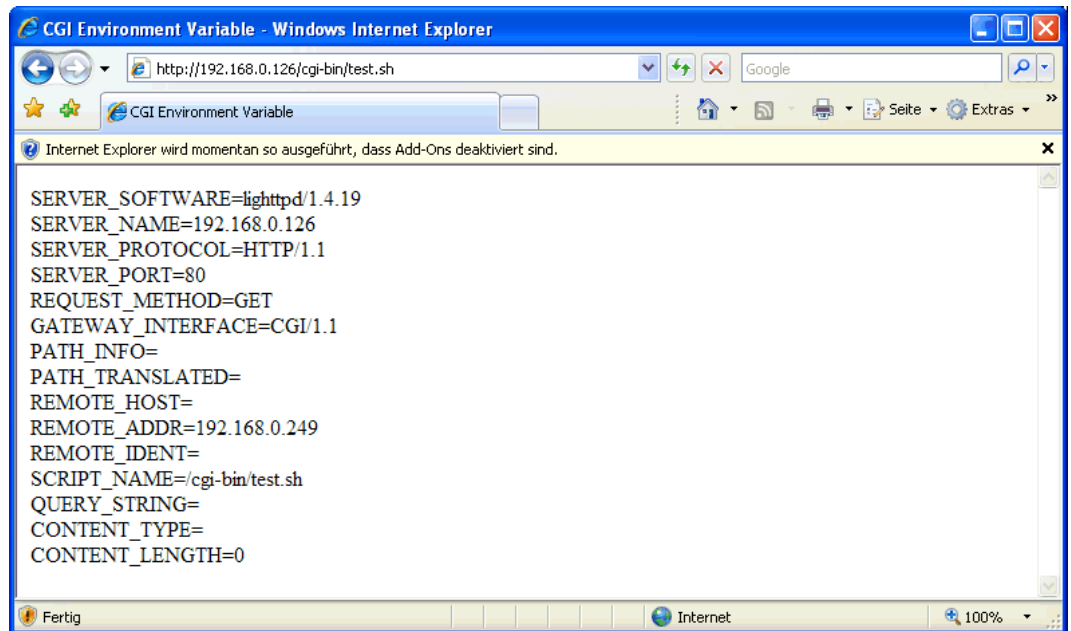
Transfer the new shell script via FTP or TFTP into the directory `/www/cgi-bin` of the IGW/963. Start a Telnet session and execute the following command:

```
chmod +x test.sh
```

This command converts the shell script into an executable program. Enter the following URL in the address bar of a Web browser:

```
http://192.168.0.126/cgi-bin/test.sh
```

The program is now running and shows its messages within the browser.



```

SERVER_SOFTWARE=lighttpd/1.4.19
SERVER_NAME=192.168.0.126
SERVER_PROTOCOL=HTTP/1.1
SERVER_PORT=80
REQUEST_METHOD=GET
GATEWAY_INTERFACE=CGI/1.1
PATH_INFO=
PATH_TRANSLATED=
REMOTE_HOST=
REMOTE_ADDR=192.168.0.249
REMOTE_IDENT=
SCRIPT_NAME=/cgi-bin/test.sh
QUERY_STRING=
CONTENT_TYPE=
CONTENT_LENGTH=0
    
```

Figure 24: Outputs of the shell script within a browser



Please note: Before you start an FTP or TFTP file transfer to the IGW/963, please make sure you have the read/write permission within the file system. For further information about the file system please refer to **chapter 3.8**.

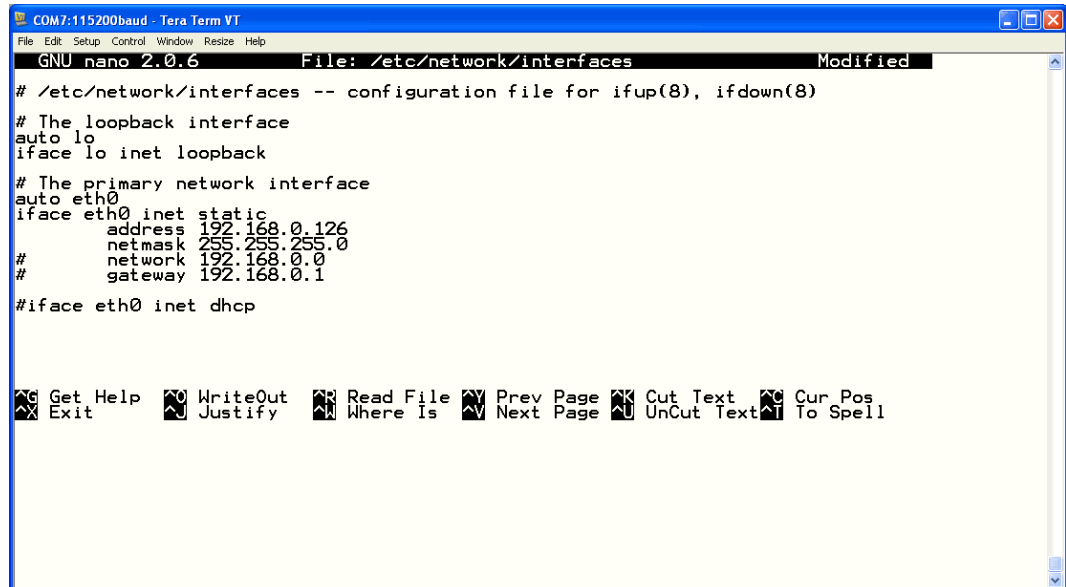
3.17 Changing Ex Factory IP Address

The default IP address of the IGW/963 is 192.168.0.126.

The IP address settings are stored in the file `/etc/network/interfaces`.

Run a Telnet session and start the editor *nano* which is part of the Linux with the following command:

```
TERM=vt102 nano /etc/network/interfaces
```



```

COM7:115200baud - Tera Term VT
File Edit Setup Control Window Resize Help
GNU nano 2.0.6 File: /etc/network/interfaces Modified
# /etc/network/interfaces -- configuration file for ifup(8), ifdown(8)
# The loopback interface
auto lo
iface lo inet loopback
# The primary network interface
auto eth0
iface eth0 inet static
    address 192.168.0.126
    netmask 255.255.255.0
    # network 192.168.0.0
    # gateway 192.168.0.1
#iface eth0 inet dhcp

Get Help WriteOut Read File Prev Page Cut Text Cur Pos
Exit Justify Where Is Next Page UnCut Text To Spell

```

Figure 25: The editor *nano* within a Telnet session

Change the file `/etc/network/interfaces` to your needs and save it.

The changes of the IP address settings will not be active until a system reboot.



Please note: To change a file with the editor *nano*, you need the read/write permission within the file system. For further information about the file system please refer to **chapter 3.8**.

4 LINUX BOOT MESSAGES

```
Linux version 2.6.24.7 (mha@hareangle-saturn) ↵*
(gcc version 4.1.2) #2 PREEMPT Thu Jul 2 15:42:14 CEST 2013
CPU: ARM926EJ-S [41069265] revision 5 (ARMv5TEJ), cr=00053177
Machine: SSV Hardware 9263/1
Memory policy: ECC disabled, Data cache writeback
Clocks: CPU 192 MHz, master 96 MHz, main 16.000 MHz
CPU0: D VIVT write-back cache
CPU0: I cache: 16384 bytes, associativity 4, 32 byte lines, ↵
128 sets
CPU0: D cache: 16384 bytes, associativity 4, 32 byte lines, ↵
128 sets
Built 1 zonelists in Zone order, mobility grouping on. ↵
Total pages: 8128
Kernel command line: mem=32M console=ttyAT0,115200 ↵
noinitrd root=/dev/mtdblock2 rootfstype=jffs2 ro
AT91: 160 gpio irqs in 5 banks
PID hash table entries: 128 (order: 7, 512 bytes)
Console: colour dummy device 80x30
Dentry cache hash table entries: 4096 (order: 2, 16384 bytes)
Inode-cache hash table entries: 2048 (order: 1, 8192 bytes)
Memory: 32MB = 32MB total
Memory: 29356KB available (2740K code, 240K data, 100K init)
Mount-cache hash table entries: 512
CPU: Testing write buffer coherency: ok
net_namespace: 64 bytes
NET: Registered protocol family 16
SCSI subsystem initialized
usbcore: registered new interface driver usbfs
usbcore: registered new interface driver hub
usbcore: registered new device driver usb
NET: Registered protocol family 2
Time: pit clocksource has been installed.
IP route cache hash table entries: 1024 (order: 0, 4096 bytes)
TCP established hash table entries: 1024 (order: 1, 8192 bytes)
TCP bind hash table entries: 1024 (order: 0, 4096 bytes)
TCP: Hash tables configured (established 1024 bind 1024)
TCP reno registered
NetWinder Floating Point Emulator V0.97 (double precision)
JFFS2 version 2.2. (NAND) © 2001-2006 Red Hat, Inc.
io scheduler noop registered
io scheduler anticipatory registered (default)
atmel_usart.0: ttyAT0 at MMIO 0xffff8c000 (irq = 7) is a ↵
ATMEL_SERIAL
console [ttyAT0] enabled
atmel_usart.1: ttyAT1 at MMIO 0xffff90000 (irq = 8) is a ↵
ATMEL_SERIAL
atmel_usart.3: ttyAT3 at MMIO 0xfeffee00 (irq = 1) is a ↵
ATMEL_SERIAL
MACB_mii_bus: probed
eth0: Atmel MACB at 0xfffb0000 irq 21 (02:80:ad:1f:12:34)
eth0: attached PHY driver [Davicom DM9161E] ↵
(mii_bus:phy_addr=ffffffff:00, irq=-1)
physmap platform flash device: 02000000 at 10000000
physmap-flash.0: Found 1 x16 devices at 0x0 in 16-bit bank
```

```

Intel/Sharp Extended Query Table at 0x010A
Intel/Sharp Extended Query Table at 0x010A
Intel/Sharp Extended Query Table at 0x010A
Intel/Sharp Extended Query Table at 0x010A
Intel/Sharp Extended Query Table at 0x010A
Using buffer write method
cfi_cmdset_0001: Erase suspend on write enabled
cmdlinepart partition parsing not available
RedBoot partition parsing not available
Using physmap partition information
Creating 8 MTD partitions on "physmap-flash.0":
0x00060000-0x00260000 : "kernel"
0x00260000-0x02000000 : "rootfs"
0x00260000-0x00a60000 : "rootfs small"
0x00a60000-0x02000000 : "scrap"
0x00008000-0x00010000 : "u-boot config"
0x00010000-0x00018000 : "ssv config"
0x00000000-0x00008000 : "boot.bin"
0x00020000-0x00060000 : "u-boot"
at91_ohci at91_ohci: AT91 OHCI
at91_ohci at91_ohci: new USB bus registered, assigned bus number 1
at91_ohci at91_ohci: irq 29, io mem 0x00a00000
usb usb1: configuration #1 chosen from 1 choice
hub 1-0:1.0: USB hub found
hub 1-0:1.0: 1 port detected
Initializing USB Mass Storage driver...
usbcore: registered new interface driver usb-storage
USB Mass Storage support registered.
mice: PS/2 mouse device common for all mice
at91sam9_wdt: Watchdog register already programmed.
TCP cubic registered
NET: Registered protocol family 1
NET: Registered protocol family 17
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
VFS: Mounted root (jffs2 filesystem) readonly.
Freeing init memory: 100K

INIT: version 2.86 booting

Mounting sys filesystem.....done
Mounting /dev ramdisk.....done
Populating /dev.....done
Mounting local filesystems.....done
Setting up IP spoofing protection.....done
Configuring network interfaces.....done

INIT: Entering runlevel: 5

Starting Internet superserver inetd.....done
Starting syslogd/klogd.....done
Starting Lighttpd Web Server.....done

DNP/9265 Linux emblinux ttyAT0

emblinux login:

```

*This symbol “↵” shows that the following line belongs to the previous line.

5 HELPFUL LITERATURE

- DIL/NetPC DNP/9265 hardware reference manual
- AT91SAM9263 Preliminary www.atmel.com
- AT91SAM9263 Preliminary Summary www.atmel.com
- ARM926EJ-S Technical Reference manual www.atmel.com

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DOCUMENT HISTORY

Revision	Date	Remarks	Name
1.0	2014-03-27	First version	WBU
1.1	2015-08-27	Edited chapters 1.1 and 1.4	WBU

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