Manual
USB-Server

Model	53641 (Beta-Version)
Release	1.02, March 2010

W&T

Subject to errors and changes:
Since mistakes are always possible, all of the information in this manual should be applied with discretion. Please let us know of any errors or unclear instructions so that we can correct them as quickly as possible.

Perform work on and with W&T products only as described here and after you have read and understood the manual in full. Unauthorized actions may create hazardous conditions. We are not liable for the consequences of unauthorized actions. When in doubt, please consult with us or your dealer.

W&T

This device contains software components which are subject to one or more Open Source licenses. The Appendix to this document contains copies of these licenses.

The associated source text can be downloaded at no charge from:

http://www.wut.de/e.5wwww-60-inus-000.php

You may also obtain the source code from us in the form of a data medium for a period of three years after the last product shipment for a nominal charge. To avail yourself of this offer, please contact us at *info@wut.de*.

This offer is valid for every recipient of this notification.

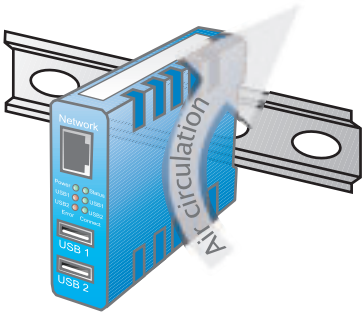
Content

1 Quickstart

Those who are already familiar with use of the W&T USB-Server will find on the following pages a quick start procedure with the basic steps from hardware installation to IP assignment and starting the Windows driver. Additional information is contained in the respective detail sections.

Step 1: Installation

The housing of the *W&T USB-Server* and the arrangement of the ventilation slot is designed for installation on a standard DIN rail per DIN EN 50022-35.



Especially in local conditions at elevated temperatures any alternate method of mounting must still ensure adequate air circulation.

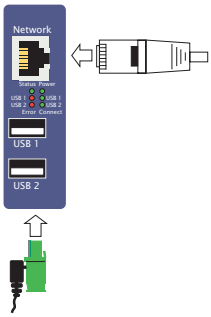
Step 2: Power and network connection

Power-over-Ethernet

When PoE is used (IEEE802.3af) power for the *W&T USB-Server* is provided by the network infrastructure, so that simply connecting the network cable is all that is required.

Using an external power supply

Alternately power can be brought in externally to the screw terminal located on the underneath of the device. The wide-range input of the USB-Server allows use of DC voltage from +24 - +48V. The input is reverse polarity protected, i.e. the polarity of the supply voltage is not critical.



Presence of the correct voltage is indicated by the *Power* LED.

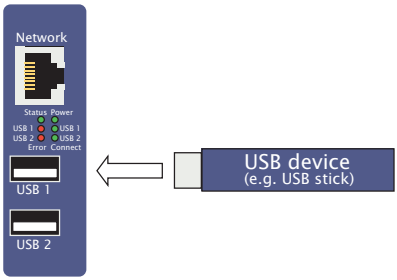
Network connection

Connection to the 10/100BaseT network is accomplished using a 1:1 wired, standard RJ45 patch cable. If a link can be established with the switch, this is indicated by illumination of the green *Status* LED.

Detailed information about the supply voltage and the network connection of the W&T USB-Server can be found in the Hardware *section.*

Step 3: Connecting the USB devices

The *W&T USB-Server* provides two USB 2.0 ports for connecting USB devices. The ports are capable of providing max. 500mA each for supplying the connected devices.



LED USBx Error

The LEDs indicate overload or a short circuit on the respective USB port. The supply voltage to the affected USB port is turned off and the connected device is disabled.

LED USBx Connect

The LED indicates an active connection to a *W&T USB Port Redirector* located in the network.

Detailed information about the USB connections of the W&T USB-Server can be found in the Hardware *section.*

Step 4: Setting the network parameters

The default address of the *W&T USB-Server* is:

190.107.233.110

In addition, DHCP protocol is the factory default. If the network in question has a DHCP server, the network basic parameters are automatically assigned after powering up the *W&T USB-Server* and after it is connected to the network.

Alternately the *WuTility* inventory and management tool can be used to switch to static network parameters. Install this tool on a Windows PC from the included product CD; the PC must be located in the same subnet as the *W&T USB-Server*.

After starting, *WuTility* automatically searches the network for accessible W&T network devices. Select from the list of found devices the desired *W&T USB-Server* and then click on the *IP Address* button.

The following dialog allows you to switch to *Static* mode for manually assigning the IP address, subnet mask and gateway. Activating *Static* mode automatically deactivates DHCP protocol.

Detailed information about the various methods of assigning the IP address is found in the Assigning the IP address *section.*

Step 5: Installing the W&T USB Port Redirector

The *W&T USB Port Redirector* implemented as a Windows core driver makes a virtual USB host controller available. Install it on a Windows XP or higher machine using the W&T product CD included in the scope of delivery. Login as Administrator or with administrator rights is required for installation.

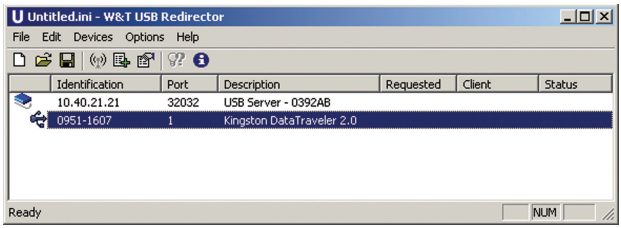
After starting the W&T product CD, the link *Search* is located on the *USB-Server* tab. In the following dialog select the 32- or 64-bit version as required by your system and then click on the *Install/Uninstall* button. In addition to the actual core driver the associated configuration and management tool is also installed in the new program group *W&T USB Port Redirector*.

To make it possible to publish updates to the W&T USB Redirector as soon as possible, the driver is not WHQL certified. To successfully finish the installation the corresponding message from the Windows logo test must be acknowledged with Continue installation.

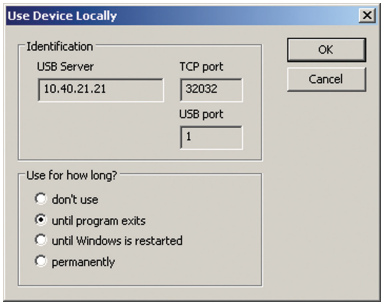
Detailed information about installing is found in the W&T USB Port Redirector *section.*

Step 6: Connecting to a USB device

The configuration tool is started from the new program group *W&T USB Port Redirector*. The local subnet is automatically searched for by *W&T USB Servers* and connected USB devices.



Double-clicking on the desired device results in the following dialog.



In addition to the three options for duration, any existing connection can also be closed here.

- *Dont' use*
  Quits any existing connection to a USB device so that it can be used by other systems.
- *Until program exits*
  The USB device remains logged on in the system until the configuration tool is closed.
- *Until Windows is restarted*
  The USB device remains logged on in the system even after the configuration tool is closed. It is not logged off until Windows is restarted. D

- *Permanently*
  The USB device is permanently logged on in the system. This means that after a computer restart the connection is automatically restored and the USB device logged on in the system.

Like when plugging in to a local USB port, clicking the OK button adds the USB device to the WIndows plug&play system. The device-specific driver installation than then be used as if it were connected to a local USB port on the computer.

If the Windows computer and the W&T USB-Server are not located in the same subnet, no automatic inventorying can take place. The W&T USB-Server must first be manually added using Device → Add.

Detailed information on the function of the W&T USB Port Redirector is found in the W&T USB Port Redirector *section.*

2 System Overview and Function

The W&T USB-Server together with the W&T USB Port Redirector provides a transparent network tunnel for sending USB datagrams.

- Data connection concept
- Virtual USB-Host-Controller

2.1 Introduction to the W&T USB-Server

The *W&T USB-Server* in conjunction with the computer-side in *W&T USB Port Redirector* enables the addition of remote USB devices located in the network. With respect to the device-specific drivers and applications these behave as if they were connected to a local USB port on the computer.

2.1.1 Supported USB modes

The *W&T USB-Server* conforms with USB 1.0, 1.1 and 2.0 with transmission speeds of 1.5 Mbit/s (Low), 12 Mbit/s (Full) and 480 Mbit/s (High). This means most USB devices using the transfer modes *Control, Interrupt* and *Bulk* are supported. *Isochronal* mode, which is used mainly in audio and video applications, is in development.

Due to the complex interaction between operating system, often multiple driver instances and the respective hardware, USB applications are in practice not always plug&play. W&T therefore offers the service of a compatibility check of your USB device together with the *W&T USB-Server*. For additional information, see our Web site at http://www.wut.de/53641.

2.1.2 Maximum number of USB devices

Although the *W&T USB-Server* is designed for direct connection of two USB devices, connection of an external USB hub per USB port is also supported. This allows max. 8 USB devices to be connected and incorporated through the *W&T USB Port Redirector* into Windows systems. It should be noted however that multi-function devices do often already have internal hubs.

With respect to data throughput - especially when connecting High-Speed USB devices - it must be remembered that only a theoretical bandwidth of maximum 100Mbis/s is available on the network side.

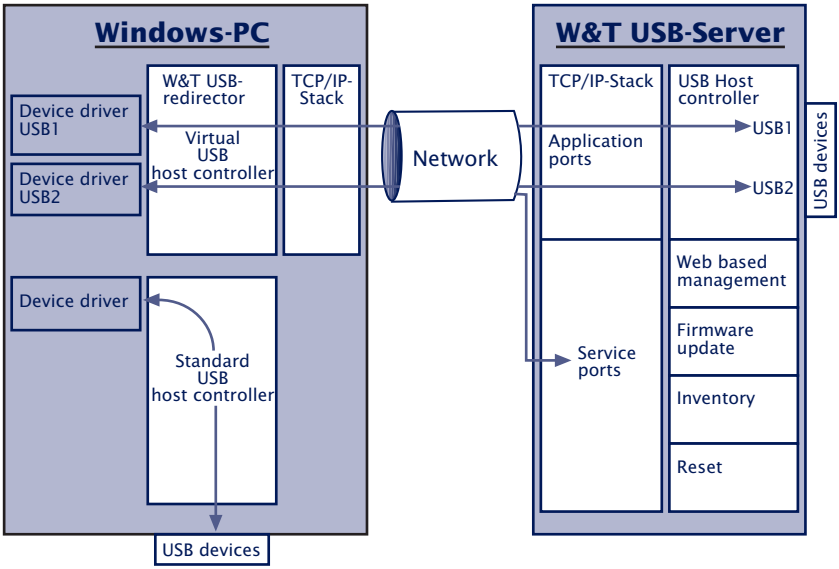
2.1.3 System overview

On the hardware side the *W&T USB-Server* adapts the USB devices. Processing of the time-critical USB protocol takes place locally and is mirrored - time-decoupled - on the network side to a TCP server service.

On the software side the *W&T USB Port Redirector* acts as a virtual USB host controller. When the user connects to one of the USB devices, the latter is available to the respective system after opening the network connection as if it were locally connected. Connections to USB devices are always exclusive, i.e. a simultaneous attempt from a competing USB Port Redirector is rejected and can only take place after closing the first connection.

In order to keep the configuration effort of the firewall in protected environments to a minimum, the entire network communication takes place or a single, configurable TCP port. In parallel with this there are management services for configuration, firmware updates etc. available which, however, are not required for the connection between USB-Server and USB Port Redirector.

A list of all ports used by the USB-Server can be found in the Appendix.


Windows-PC
W&T USB-redirector
TCP/IP-Stack
Device driver USB1
Virtual USB host controller
Device driver USB2
Device driver
Standard USB host controller
USB devices
Network
W&T USB-Server
TCP/IP-Stack
USB Host controller
Application ports
USB1
USB2
USB devices
Web based management
Firmware update
Service ports
Inventory
Reset

3 Assigning/Changing IP Parameters

After the hardware installation of the USB-Server, the IP address and any subnet mask and gateway for operation in a TCP/IP network must be assigned. Please check with your systems administrator for the correct values of these parameters. The USB-Server factory default IP address is 190.107.233.110.

- Setting the IP address, subnet mask and gateway address using the management tool *WuTility*
- Setting the IP address, subnet mask and gateway address using DHCP protocol
- Changing the IP parameters using Web-Based-Management

3.1 Managing the network parameters in the USB-Server

The W&T USB-Server distinguishes between two modes with respect to its network-side basic parameters..

Static
IP address, subnet mask and gateway are stgored in the non-volatile setup of the USB-Server, and DHCP protocol is disabled. The parameters set using this method remain stored even after power interruptions and resets until they are changed using *WuTility* or Web-Based-Management.

DHCP (factory default setting)
DHCP protocol is enabled and the USB-Server attempts to obtain its IP parameters from a DHCP server located in the network. If no DHCP server can be accessed or the attempt to obtain an IP address is rejected, the USB server operates using the factory default IP address 190.107.233.110. When switching from *Static* to *DHCP* mode using WuTility or Web-Based-Management, the USB-Server reverts to this default IP address until valid new parameters are assigned.

3.2 *DHCP mode* (factory default setting)

Many networks use DHCP (Dynamic Host Configuration Protocol) for centralized and dynamic assignining of the network parameters. As shipped and after a reset to the factory default settings, *DHCP* mode is enabled, so that in network environments with dynamic IP assigning all you need to do is connect the device to the network. The following parameters can be assigned using DHCP:

An explanation of the gasic terms and fundamentals of addressing in the Internet as well as DHCP and BOOTP can be found in our manual „TCP/IP-Ethernet and Web-IO“".

- IP address
- Subnet mask
- Gateway address
- Lease time

After an unintended address assignment or address change to an unknown address using DHCP protocol, the management tool WuTility *can be used to find the USB server and uniquely identify it based on its MAC address. Changing the wrong IP address or switching to* Static *mode while disabling DHCP protocol can also be done using* WuTility.

3.2.1 Activating DHCP mode

DHCP protocol is activated by switching from *Static* mode to *DHCP* mode using WuTility or Web-Based Management of the USB-Server. The previous static IP address is then deleted and DHCP protocol is enabled. The USB-Server returns to its default address 190.107.233.110 until new network parameters are assigned using a DHCP server.

- **Activating using the management tool WuTility**
  In the device list select the desired USB-Server and click on the *IP Address* button. In the following dialog window check

the radio button *DHCP* and then click on the *Continue* button.

- **Activating using Web Based Management**
  In the menu *Config → Device → Basic Settings → Network* select the option *Static*. After entering the new IP address and the valid subnet mask and gateway address, click on the *Apply* button. To save the new setting in the USB-Server, select *Logout* and *Save*. The device can now be reached under the new IP address.

  Switching from Static to DHCP mode causes the device to revert from the static set IP address to the factory default setting 190.107.233.110. If the IP assignment using DHCP fails, for example because no DHCP server is available, the USB-Server may no longer be reachable, especially in routed network environments. Reactivating Static *mode using WuTIlity can only be done using a computer in the same physical network.*

3.2.2 Deactivating DHCP mode

DHCP mode is deactivated by switching from *DHCP* mode to *Static* mode using WuTility or Web-Based-Management on the USB-Server. In both cases the new values for IP address, subnet mask and gateway address must be manually specified.

Each IP address must be unique within the network.

- **Deactivating using the WuTility management tool**
  From the device list select the desired USB-Server and click on the *IP Address* button. In the resulting dialog window activate the *Static* radio button. After entering the new IP address and the valid subnet mask and gateway address click on the *Continue* button..

- **Activating using Web Based Management**
  In the menu *Config → Device → Basic Settings → Network* activate the *Static* option. After entering the new IP address as well as the valid subnet mask and gateway address click

on the *Apply* button. Clicking on *Logout* and *Save* saves the new setting in the USB-Server and the device can again be accessed under the new IP address.

3.2.3 System Name

To support a possible later automated updating of the DNS system using the DHCP server, the USB-Server identifies itself within the DHCP protocol by its system name. The factory default name is USBSERVER- followed by the last three places of the Ethernet address. For example the factory set system name of a USB-Server having Ethernet address 00:c0:3d:01:02:03 is USBSERVER-010203. The system name of the USB-Server can be changed using Web Based Management.

3.2.4 Lease time

The lease time determined and sent by the DHCP server specifies the time limit of the assigned IP address. After half the lease time has expired the USB-Server attempts to extend the time and update the address. If this is not possible by the time the lease time expires, for example because the DHCP server can no longer be reached, the USB-Server deletes the IP address and reverts to the factory default address 190.107.233.110. At the same time the cyclical search for alternate DHCP servers for assigning a new IP address is started.

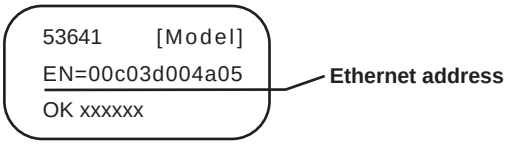
Because the clock is absent the lease time for the current IP address is no longer available after a reset. After the restart there is then a corresponding update request with the original DHCP server. If the latter cannot be reached at this point in time, the USB-Server deletes the IP address and reverts to the factory default address 190.107.233.110. At the same time the cyclical search for alternate DHCP servers for assigning a new IP address is started.

In *DHCP* mode the remaining lease time in seconds together with the current IP address is displayed on the Web page *Doc → Properties*.

If after the assigned lease time has expired the DHCP server cannot be reached, the USB-Server deletes the IP address and reverts to the factory default address 190.107.233.110 and starts the cyclical search for alternate DHCP servers. All existing connections to W&T USB Port Redirectors are closed. To prevent problems of this kind we recommend configuring the lease time in the DHCP server to infinite *whenever possible.*

3.2.5 Reserved IP addresses

The USB-Server is designed as a TCP server and therefore provides services which can be used as needed by computer-side USB Port Redirectors. In order to open a connection these need of course the current IP address of the USB-Server, so that it makes sense to reserve a particular IP address for the USB-Server on the DHCP server. This is generally done by linking the IP address to be assigned to the unique Ethernet address of the USB-Server, which can be found on the sticker on the housing.



3.2.6 Dynamic IP addresses

Fully dynamic address assignment, where the USB-Server gets another IP address after each restart or after expiration of the lese time, only makes sense in network environments with automatic cross-connection between the DHCP and DNS

services. This means when a new IP address is assigned to the UBS-Server, the DHCP server then also automatically updates the DNS system. The new address is then associated with the respective domain name. For detailed information about your network environment, consult with your system administrator if in doubt.

3.3 *Static* mode

In *Static* mode the USB-Server uses static network parameters and DHCP protocol is disabled. There are two ways of assigning the static values for IP address, subnet mask and gateway.

3.3.1 Assigning static IP parameters using WuTility

The Windows tool WuTility in version 3.70 and higher supports inventorying and management of the network basic parameters of W&T USB-Servers:

- IP address
- Subnet mask
- Gateway address
- Umschaltung Static/DHCP

To assign these parameters the PC and USB-Server must be located in the same physical network, whereby the function is independent of the current address settings of the USB-Server. This means even if the current parameters of the USB-Server do not match the settings of the PC, you can still always use *WuTility* to make a change. Any system password set in the USB-Server must however be known.

Installing WuTility
The quickest way to install WuTility is using the *Install* button on the start screen of the product CD included with the product.

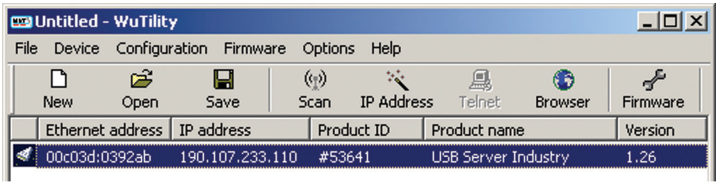
Then start *WuTility* using

Start → Programs → W&T Software Toolkit → WuTility

Starting the assignment dialog
Be sure that both the USB-Server and the computer are connected to the same physical network. After starting, *WuTility* automatically searches the local network for connected W&T network devices and creates an inventory list. This search

procedure can be repeated as often as desired by clicking on the *Scan* button:

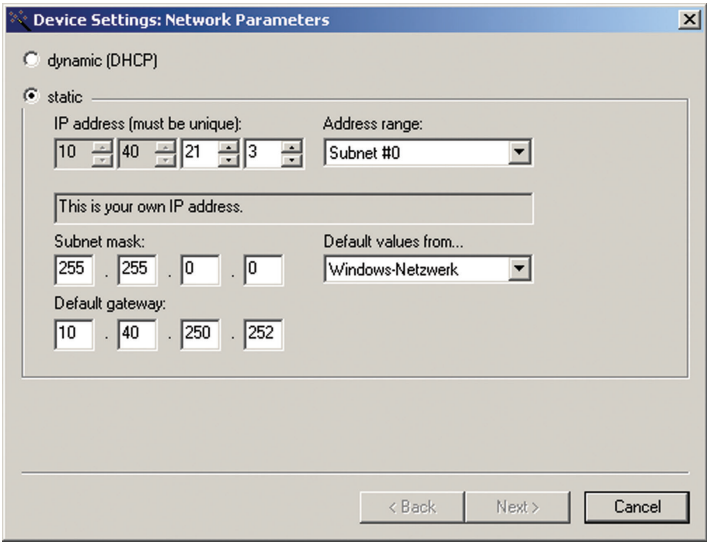
Within the inv entory list you can identify the desired USB-Server by its MAC address. For initial installations this IP address is 190.107.233.110.



Select the desired USB-Server and then click on the *IP address* button:

In the resulting dialog window activate the radio button *Static* and enter the desired values for the IP address, the subnet mask and the gateway address.

Each IP address must be unique within the network.



After clicking on the *Continue* button you are also prompted for the system password. Then the network parameters are stored in the USB-Server in non-volatile memory.

All further settings are made using Web-Based-Management of the USB-Server and an Internet browser. Select the desired USB-Server from the WuTility inventory list and click on the *Browser* button.

Additional information about management of the USB-Server can be found in the section *Web-Based-Management.*

Changing the network parameters is protected by the system password. To prevent unauthorized use, we recommend assigning a system password for operating Com-Servers.

3.3.2 Assigning static IP parameters using WBM

As shipped and after a reset to the factory default settings the USB-Server is in *DHCP* mode. As long as no address is assigned using a DHCP server, the USB-Server can also be reached in parallel through its default IP address 190.107.233.110. Switching to *Static* mode and assigning the new IP parameters can also be done using Web-Based-Management and a browser.

In contrast to address assigning using WuTility, initial startup of multiple USB-Servers using the methods described in the following can be done only in sequence. Only after a USB-Server has received its new IP address can the next USB-Server be connected to the network.

Notify the responsible network administrator before makingany changes to the network settings of a computer.

On the computer side one of the two following conditions must be met:

- The IP address of the computer used is in the subnet range 190.107.0.0 or is temporarily changed to an appropriate value. You need administrator rights to change the IP address of a computer. Notify your responsible network administrator before making changes to the network settings of a computer.

- A fixed route which directs the IP address 190.107.233.110 to the local network is setr up on the computer. Administrator rights are required in order to set up such a route. The command line syntax for creating a fixed route under Windows XP is:

```
route ADD 190.107.233.110 MASK 255.255.255.255 [IP address of the PC]
```

Finally, start the Internet browser and enter the destination *http:// 190.107.233.110* in the address line and change the network settings to the new values on the Web pages of the USB-Server.

4 Hardware - Interfaces and Indicators

- Supply voltage via PoE and external
- Ethernet port
- USB ports
- LED indicators

4.1 Supply voltage

Power for the W&T USB-Server can be provided either via PoE or from an external power supply.

4.1.1 PoE supply

The model 53641 USB-Server is suitable for use in PoE environments according to IEEE802.3af. Here the supply voltage is brought in by the network infrastructure through the RJ45 terminal. The USB-Server supports both phantom power using data pairs 1/2 and 3/6 as well as power thorugh the unused wire pairs 4/5 and 7/8.

In order to enable power management for the supplying components, the USB-Server identifies itself as a Power Class 3 device (power consumption from 6.49W to 12.95W).

4.1.2 External supply

As an alternative to PoE, the USB-Server can also be powered through the plug-in screw terminal located on the underneath of the housing. The DC voltage used must lie in the following range:

- DC voltage: 24V (-10%) - 48V (+10%)

The input of the USB-Server is equipped with a bridge rectifier, so that the polarity of the supply voltage is non-critical.

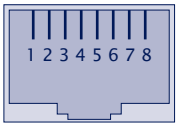
The current draw can be found in the technical appendix.

4.2 Ethernet port

The USB-Server Industry has an IEEE 802.3 compatible network terminal. The physical connection is made using TP copper cable.

4.2.1 10/100BaseT to RJ45

The 10/100BaseT network interface has a shielded RJ45 connector. The assignments indicated in the following illustration correspond to an MDI interface, so that the connection to the hub or switch is made using a max. 100m long, 1:1 wired and shielded patch cable.



Pin	Direction	Device *w/o* PoE	Device *with* PoE
1	Out	Tx+	Tx+
2	Out	Tx-	Tx-
3	In	Rx+	Rx+
4	In	nc	Vcc positive
5	IN	nc	Vcc positive
6	In	Rx-	Rx-
7	In	nc	Vcc negative
8	In	nc	Vcc negative

The network connection is galvanically isolated from the supply voltage and the USB ports to at least 500V_{rms}.

Power-over-Ethernet - PoE
The USB-Server can obtain its power through the network interface according to IEEE802.3af/Power-over-Ethernet. Power can be brought in using the data pairs or the wire pairs unused with 10/100BaseT (see also the *Supply Voltage* section).

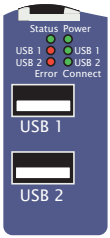
Auto Negotiation: 10/100BaseT, Full/Half Duplex

In its factory default setting the W&T USB-Server uses *Auto-Negotiation* mode. To prevent communication problems caused for example by a duplex mismatch, we recommend also operating the used port on the switch or hub in *Auto-Negotiation* mode. Here both the transmission speed and the duplex procedure are automatically negotiated and correspondingly set in the devices.

Managable switches often use special protocols (Spanning Tree Protocol, Port-Trunking, ...), as needed for example for uplinks to other switches or the wideband connection of servers. These protocols are generally not needed for connecting normal terminal devices such as the USB-Server, but they may slow down opening of communication considerably after a restart. We recommend disabling these protocols and functions on the port used for the USB-Server. Please consult with your system administrator in this regard.

4.3 USB ports

The USB standard specifies both the wiring of the port and the names of the signal lines. The configuration shown below corresponds to a USB standard port. Both USB ports are able to provide devices with 5V and a maximum of 500mA each, independently of each other. To prevent hardware damage the respective USB port is automatically disconnected when there is an overload and this is indicated by the associated LED turning on.



USB Port

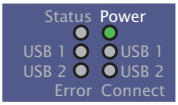
Pin	Name	Description
1	VCC	+5 V
2	D-	Data -
3	D+	Data +
4	GND	Ground

Both ports of the *W&T USB-Server* conform with USB 1.0, 1.1 and 2.0 with transmission speeds of 1.5 Mbit/s (Low), 12 Mbit/s (Full) and 480 Mbit/s (High). This means most USB devices using the transfer modes *Control, Interrupt* and *Bulk* are supported. *Isochronal* mode, which is used mainly in audio and video applications, is in development.

In accordance with the USB standard, connecting and unplugging USB devices is always possible and permissible from a purely electrical point of view (hot-plugging). To prevent data loss - for example when using memory sticks - we recommend disconnecting devices only when there is no connection between a network computer and the USB device and the associated Status *LED is off.*

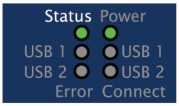
4.4 LED indicators

The USB-Server has six LEDs on the front panel.



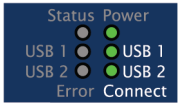
Power

OFF: No power is present. Check for proper connection of the supply voltage on PoE or from the external power supply.
ON: There is power from PoE or the external power supply.



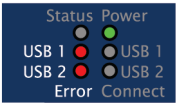
Status

OFF: There is no link to a switch or hub. Check the cabling to the switch/hum and whether it us turned on or not.
ON: There is a link to a switch or hub.
Flashing: Indicates network-side data traffic between the USB-Server and a network component.



Connect USB1|2

OFF: There is no connection to a W&T USB Port Redirector in the network..
ON: There is an active connection between the USB device connected to an associated port and the *W&T USB Port Redirector*. The USB device is incorporated into a system and unplugging it may result in data loss.



Error USB1|2

ON: The corresponding port was automatically disabled due to an overload. The connected USB device requires a current of > 500mA or is defective.

Special case - firmware update

If the USB-Server was initialized by the *WuTility* management tool for a firmware update, the four LEDs *USB-Connect USB1/2* and *USB-Error1/2* flash cyclically approx. once a second. Active sending of firmware files is indicated in addition by flashing of the *Status* LED.

Special case - reset to factory default settings

When there is a hardware reset to the factory default settings using the internal jumper, cyclical flashing of the four LEDs *USB-Connect USB1/2* and *USB-Error1/2* indicates that the factory settings were successfully initialized. The jumper can then be removed and the USB-Server is ready again after a power-down reset (see *Appendix*, *Reset to factory default settings* section).

5 The W&T USB Port Redirector

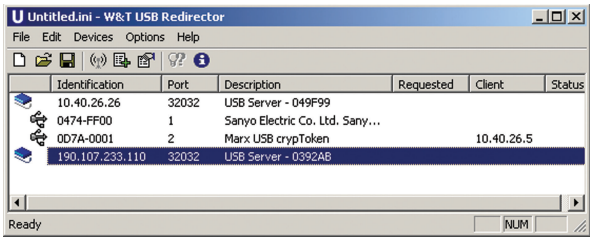
The W&T USB Port Redirector consists on one hand of the virtual host controller designed as a Windows core driver. In addition to controlling the network connection to the USB-Server, it takes care of system-side processing of the USB handling. The associated configuration tool inventories the available USB-Servers and allows the connected USB devices to be logged on and off with a mouse click.

- System requirements
- Installation/Deinstallation
- Using the configuration tool
- Configuring the W&T USB Port Redirector

5.1 Overview

The *W&T USB Port Redirector*, which is implemented as a Windows core driver, provides a virtual USB host controller which behaves with respect to the Windows system like a local standard controller.

Configuration of the core driver is registry-based using the configuration tool which is started using the link *Configure USB Port Redirector*. In addition, the configuration tool automatically searches the local subnet for W&T USB-Servers and enters them in a list with any connected USB devices.



Additional and possibly more recent information about the individual configuration options can be found in the online help for the W&T USB Port Redirector.

5.1.1 Port numbers

To communicate with the USB devices the *W&T USB Port Redirector* uses the *UsbServerPort* configured in the USB-Server. The factory set name is TCP/32032.

Any installed security components (software or hardware firewall, security suites etc.) *must* allow communication over this port number without delay. This is now however absolutely necessary for the UDP port 8513 used for automatic inventorying. Inserting the USB-Servers can be done in this case

manually (for additional information see section *The inventory list*).5.2 Installation/Deinstallation of the W&T USB Port Redirector

5.2 Installation/Deinstallation of the USB Redirector

Installation of the *W&T USB Port Redirector* can be done directly from the product CD included in the scope of delivery. Alternatively the current version and updates are always available on the W&T Web site at http://www.wut.de.

On the system side the following requirements must be met:

- Operating system Windows XP/Vista/Windows7 incl. 64-bit and server editions
- Login as Administrator or Administrator rights

In order to be able to publish W&T USB Port Redirector *updates in as timely a fashion as possible, the driver is not WHQL certified. To successfully finish the installation the corresponding message for the Windows logo test must be acknowledged with* Continue installation.

In addition to the core driver of the *W&T USB Port Redirector* the associated configuration tool is installed, which is located in the Windows Start menu in the new program group *W&T USB Port Redirector.*

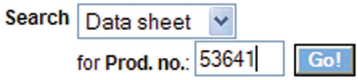
Installation of the W&T USB Port Redirector *is done as an update to any already present older versions. All the settings and connection parameters made remain intact and are then available unchanged.*

5.2.1 Installation from the product CD

After starting the product CD included in the scope of delivery, first select the desired language *Deutsch* or *English* and then go to the *USB-Server* tab. After clicking on the *Search* button select the 32- or 64-bit version of the driver as appropriate for your system in the resulting dialog box and click on the *Install/ Uninstall* button.

5.2.2 Installation from download

From the homepage http://www.wut.de the simplest methodd is to enter article number *53641* in the Search function. Set the drop-down box to *Drivers* and then click on the *Go* button.



The following page contains a direct link to the current version. After downloading and unzipping the archive, start the installation by starting the MSI file.

5.2.3 Uninstalling

For uninstalling, the program group W*&T USB Port Redirector* has its own *Uninstall* entry. Alternatively you can uninstall using the Windows software management function in the Control Panel.

5.3 The inventory list

The inventory lists in the configuration tool represent the required and available W&T USB-Servers with the connected USB devices along with additional information in a tree structure.

	Identification	Port	Description	Requested	Client	Status
	10.40.26.26	32032	USB Server - 049F99			
	0474-FF00	1	Sanyo Electric Co. Ltd. Sany...			
	0D7A-0001	2	Marx USB crypToken		10.40.26.5	

- Icon for USB-Server
- Icon for a USB device. This is connected to the first USB-Server shown above.
- **Identification**
  For USB-Servers you enter here the IP address. For USB devices the vendor and product ID are shown.
- **Port**
  For USB-Servers the TCP port used for USB data exchange is shown (factory setting = 32032). For USB devices which of the two physical USB ports on the USB-Server the device is connected to is shown.
- **Description**
  For USB-Servers the system name is indicated here. This is configurble using Web Based Management and is factory set to *usbserver-* followed by the last three places of the MAC address (e.g.. *usbserver-040506*). For USB devices the description read out via USB is shown..
- **Requested**
  Indication whether and, if appropriate, how long USB devices are connected on the resepctive computer.
- **Client**
  IP address of the computer on which the USB device is connected. To open a coinnection to this USB device this column must be blank.
- **Status**
  Error and status messages for the respective USB device..

5.3.1 Automatic inventory list creation

Here the local subnet automatically searches for *W&T USB-Servern*s and USB devices connected to them. The inventorizing is done in two phases, whereby first the *W&T USB-Servers* are found using a UDP broadcast (port 8513). Then any connected USB devices are queried using a TCP connection to the *UsbServerPort* (factory setting 32032). If the *UsbServerPort* is reconfigured via Web Based Management in the USB-Server, the specification *TCP-Port* must be changed accordingly in the Properties dialog box.

The search is carried out automatically each time the configuration tool is started and when creating a new list using the *File → New* function.

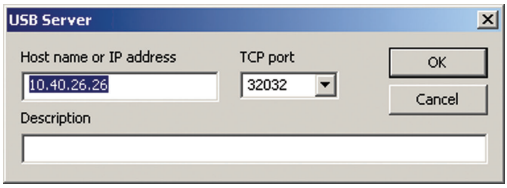
A manual search can be performed at any time by clicking the *Scan* button.

Automatic inventorizing is done using UDP port 8513 and the TCP UsbServerPort *configured in the USB-Server (factory setting = 32032). Any firewall or security software installed in the respective computer must permit this communication.*

5.3.2 Manual entries in the configuration list

Remote USB-Servers connected through routers or gateways cannot be detected by the automatic scan function of the configuration tool. The entry in the inventory list must in such cases be made manually.

The menu path *Devices → Add* opens the following dialog:



Enter here the IP address or the host name of the desired USB-Server. The local TCP port on the USB-Server used for further communication is factory set to 32032. If the *UsbServerPort* is reconfigured via Web Based Management in the USB-Server, the specification *TCP-Port* must be changed accordingly in the Properties dialog box.

Clicking on *OK* adds the USB-Server to the inventory list and the configuration tool attempts to use the specified TCP port to locate the connected USB devices.

5.3.3 Saving and opening inventory lists

Especially in routed environments with manually added USB-Servers you should save created inventory lists.

The configuration tool always opens automatically at startup and checks the availability of the USB-Servers and USB devices. In addiiton, the local network is always searched for new devices.

Saved but no longer accessible devices remain in the list but are shown as grayed out.

5.4 Using USB devices - Plug/Unplug

To enable a USB device connected on the USB-Server in the Windows plug and play system, it must be included using the configuration tool. Compared with a local computer, this corresponds to plugging the device into a USB port. Windows then installs any existing standard drivers (e.g. many memory sticks), keyboards, etc.) or starts the search for device-specific drivers.

5.4.1 System response / conflict protection

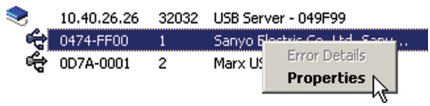
A USB device can be used by only one PC at any given time. Only after the latter has closed the connection can the device be used by a different computer. The information as to whether a USB device is already in use can be found in the *Users* column in the inventory list.

The procedure described below for including a USB device is irrespective of any conflict. If the desired USB device is in use, the USB Port Redirector cyclically attempts to open a connection.

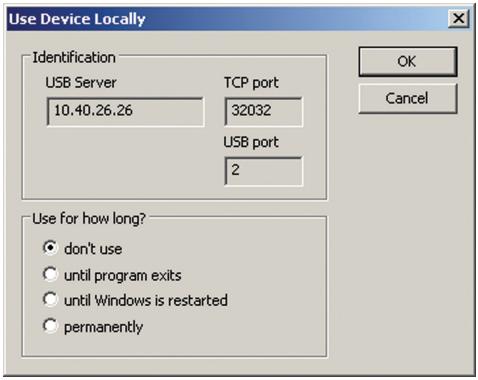
Conflict protection refers to the respective USB port to which the device is connected. This means a simultaneous access from two PCs to different USB ports is of course not a problem.

5.4.2 Adding a USB device - Plug

Select the desired USB device in the inventory list of the configuration tool and right-click on it. You can also double-click on the desired device.



The *Properties* menu opens the following dialog box:



While adding you have three options. Clicking on the *OK* button after selecting the desired option opens the connection to the USB device and triggers the plug event in the Windows system.

- until program exits
  The device remains connected until the configuration tool is closed.
- until Windows is restarted
  The device remains linked in the system until Windows is closed. The Start/Stop configuration tool can be closed without affecting the connection to the device.
- permanently
  The USB device is linked permanently. When the computer is restarted an attempt is automatically made to link the device again.

5.4.3 Closing a connection - Unplug

Just as for linking a USB device, suspending it is done using the Properties dialog box.

- don't use
  Clicking on the *OK* button after selecting closes the connection to the USB device and triggers the Unplug event in the Windows system.

6 Web-Based-Management

The W&T USB-Server configuration is Web-based and can be opened using any Web browser. WBM (Web-Based Management) is session-oriented. This means all changes made are first temporarily buffer stored and not saved in the non-volatile Setup of the USB-Server until a final save function has been performed.

- Navigation within the WBM
- List of connected USB-Devices
- Network basic parameters
- Diagnostic functions

6.1 Starting and navigating the WBM

To access the WBM of the USB-Server, start your Internet browser and enter the IP address of the USB-Server and a port number if appropriate.

http://[IP-Adresse]:[port number]

Ab Werk ist für das WBM der HTTP-Standard-Port 80 konfiguriert. In diesem Fall kann die Angabe der Portnummer in der Adresszeile entfallen.

The factory default setting is for HTTP standard Port 80. In this case you do not need to enter the port number in the address line.

6.1.1 Navigation concept of the USB-Server

The WBM of the USB-Server is session-oriented using a password-protectedlogin. Without a login the start page simply shows basic information but does not permit any changes to the settings.

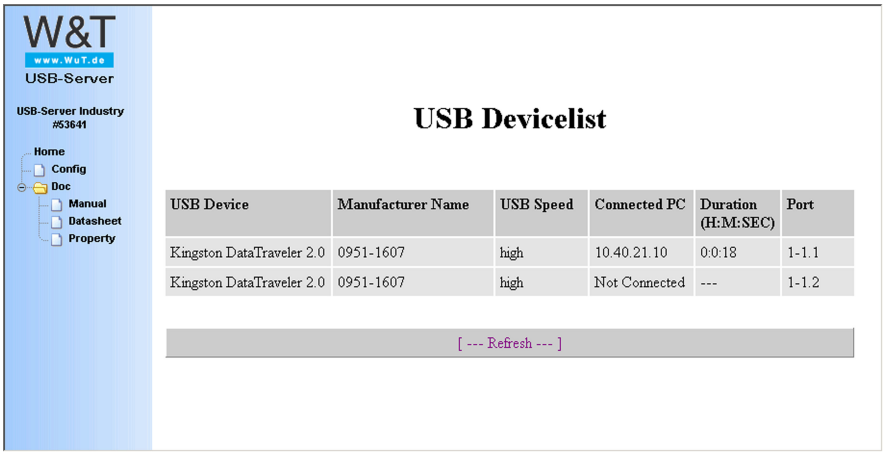
After loggin in you can make any unber of settings during a configuration session. Clicking on the *Apply* button on the respective pages causes them to be temporarily stored by the USB-Server. Once all the settings have been made, exit the configuration session and use *Logout* and click on *Save*. Only now are all changes sent to the non-volatile memory of the USB-Server and activated..

You can exit a configuration session at any time without saving your changes by clicking on the *Cancel* button.

To ensure errorless running of the configuration sessionwe recommend that when within the WBM only the nvaigation links provided by the USB-Server be used rather than the Back *and* Forward *function of the browser.*

6.1.2 The Start page of the USB-Server

The basic struction of the Web pages in the USB-Server is divided into the navigation tree on the left side and the main frame with the contents of the respective menu branch on the right side.



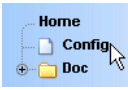
Without logging in you can view a list of the connected USB devices with their associated information. In addition, the menu branch *Doc* provides access to the quick user's guide, the data sheet and the Properties page with device-specific information.

6.2 WBM - configuration sessions

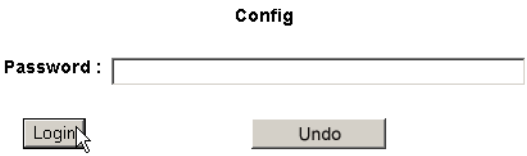
Setting on the W&T USB-Server are made within password-protected configuration sessions. These are exclusive, i.e. only one session can be active at a time.

6.2.1 Login

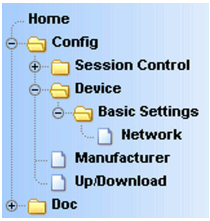
The *Config* link in the navigation tree takes you to the login page of the USB-Server.



In its factory default setting the USB-Server does not require a password. In this case the *Password* entry field remains blank, and clicking on the *Login* button starts a configuration session. If a password as assigned by the user, it must of course be entered.



After successful login an expanded configuration tree appears.



6.2.2 Logout

Quit a configuration session by using the *Logout* page of the USB-Server.

All functions except for Cancel cause any connections from PCs to connected USB devices to be closed. To prevent data loss, we recommend any users listed on the homepage of the USB-Server to be previously notified.

Save

... closes the session and saves all changes made to the non-volatile memory of the USB-Server. If the changes require restarting the device, this is automatically performed.

Cancel

... closes the session and cancels all changes.

Restore Defaults

... closes the session and reverts to the settings of the USB-Server. All settings which are different from the default values including the network parameters are lost.

In environments with static network parameters (no DHCP)assigning the new IP address can be done only from a workstation which is located in the same *subnet as the USB-Server.*

Hardware Reset

...closes the session without saving any changes and restarts the USB-Server.

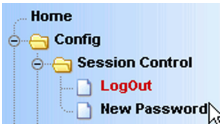
6.3 WBM - Assigning passwords

The password may be up to 32 characters and protects the following configuration accesses to the W&T USB-Server.

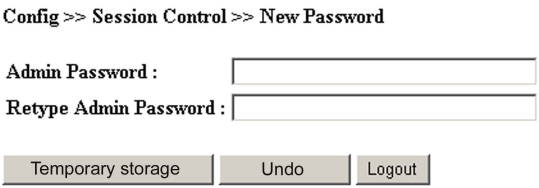
- Web Based Management
- Uploading configurations
- Firmware update
- Reset Port
- Setting using WuTility

Deleting an unknown or forgotten password to the can only be done by a hardware reset of the USB-Server to its default settings.

Config → Session Control → New password in the navigation tree takes you to the Web page for assigning or changing the password.

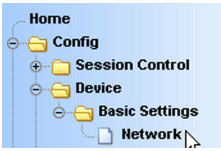


Enter the new password into both fields. To delete an existing password, leave both fields blank. Clicking on the *Apply* or *Log-out* button temporarily saves the change. Final saving to the non-volatile memory is done from the *Logout* page and clicking on the *Save* button.



6.4 WBM - Network basic parameters

Config → Device → Basic Settings → Network in the navigation tree takes you to the Web page with the network-side basic parameters.



Saving changes made here closes any connections from PCs to connected USB devices. To prevent data loss, we recommend any users listed on the homepage of the USB-Server to be previously notified.

Config >> Device >> Basic Settings >> Network

DHCP	☐
IP Addr :	10.40.21.21
Subnet Mask :	255.255.0.0
Gateway :	10.40.250.252
Http Port :	80
UsbServer Port :	32032
Keepalive :	

Temporary storage | Undo | Logout

DHCP ☐

In *DHCP* mode the USB-Server obtains the network-side basic parameters IP address, subnet mask and gateway address from a DHCP server located in a network. In *Static* mode these parameters are determined statically using the following entry fields. Detailed information about both modes can be found in the sections *DHCP Mode* and *Static Mode*.

IP Addr : 10.40.21.21

For entering the IP address when DHCP is disabled.

Subnet Mask : 255.255.0.0

For entering the subnet mask for the respective network when DHCP is disabled.

Gateway : 10.40.250.252

For entering the gateway for the respective network when DHCP is disabled.

Valid values for IP address, subnet mask and gateway canbe obtained from your network administrator. If you assign the IP address yourself, be sure that there are no address conflicts with other devices.

Http Port : 80

TCP port number (decimal) under which the Web-Based-Management of the USB-Server can be reached. The factory setting is for HTTP standard port 80. When using other port numbers, these must be separated by a colon with opening the WBM in the address line of the browser (*e.g. http://10.10.1.1:1234*)

UsbServer Port : 32032

TCP port number (decimal) under which the *W&T USB Port Redirector* communicates with the connected USB devices. When using a different port number, it must be entered the same in the Properties of the USB-Server in the configuration tool (see *Inventory List* for additional information).

The TCP port used here must be permitted in any firewallsbetween the USB-Server and the USB Port Redirector. The USB Port Redirector acts here as a client and is thereby the connection partner.

Keepalive : 5

The Keep-Alive-Check, which is factory set to 5s, monitors *all* TCP connections. If there is no data traffic within a TCP connection for the specified time limit, the USB-Server generates a Keep-Alive packet. If the connection partner does *not* respond to this packet, the connection in the USB-Server is reset. The affected USB device is then available again to other PCs.

7 Appendix

- Up-/downloading configuration data
- Firmware update
- Reset to factory default settings
- Used ports and network security
- Technical data

7.1 Up- and downloading configuration data

The USB-Server allows you to read out all its current configuration data or write it back to the device. This allows complicated setting profiles to be archived and sent back complete to thedevices whenever needed. FOr group startups all you need to do is configure a device using Web-Based-Management and then copy the profile you have created to the other USB-Servers.

The USB-Server provides the configuration profiles in XML format. This makes it possible to modify the data using a text editor before uploading to another device.

7.1.1 Up- and downloading the configuration using WBM

In the Up-/Download menu branch use the *Download* button to read and save the configuration of the USB-Server. Likewise the *Upload* button can be used to send a saved configuration profile to the USB-Server.

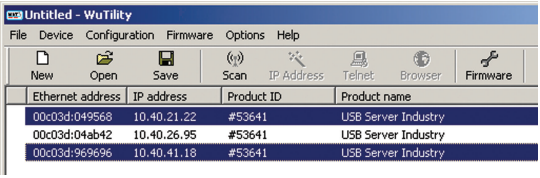
Downloading a configuration from the USB-Server does not provide a pure XML file. Handling of this file format varies with different browsers. If you want the file to be represented by the browser formatted, the browser has probably automatically inserted HTML formatting for this purpose. In this case only the pure source text for the page needs to be saved.

When uploading configuration profiles using WBM, the USB-Server receives all the settings contained in the XML file including the basic parameters IP address, subnet mask and gateway address. If you want these settings to remain unchanged, the XML file must be modified accordingly before upload using a text editor.

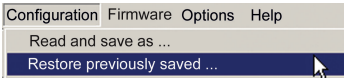
7.1.2 Up- and downloading using WuTility

Alternately you can up- and download configuration profiles using the WuTility management tool. The advantage compared with the method of using the Web pages in the unit is that multiple devices can be processed at the same time.

Highlight one or more USB-Servers in the WuTility inventory list.



Start the up- or download then using the following menu items:



Naming of the downloaded configuration profiles is automatic, e.g. using the IP addresses of the devices.

To avoid an address conflict when simultaneously uploadinga configuration to multiple devices, the IP address is not *sent by WuTility. THis means the devices can still be accessed after the upload under their old IP addresses. All other settings correspond to the sent configuration.*

7.2 Firmware update

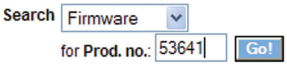
The operating software of the USB-Server is constantly being improved. The following section describes the procedure for uploading the firmware.

7.2.1 Where is the current firmware available?

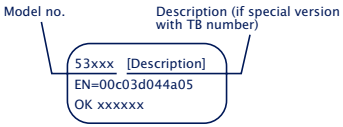
The latest firmware including the available update tools and a revision list is published on our Web site at the following address:

http://www.wut.de

The easiest way to navigate there is to use the Search function on the left side. First enter the model number of your device in the entry field. Select *Firmware* in the associated selection box and then click on the *Go* button.



If you do not know the model number, you can find it on the sticker on the narrow side of the housing. There the Ethernet address is also printed.



7.2.2 Firmware update under Windows

No special preparation of the USB-Server is necessary for the firmware update.

New firmware is sent to the USB-Server using the WuTility management tool. In the inventory list highlight the desired USB-Server and then click on the *Firmware* button.

In the following dialog box you select only the firmware file you want to send (*.uhd) and then click on the *Continue* button. After successful sending the USB-Server automatically performs a restart and is then ready to use.

Interrupting the update process may result in failure of thedevice. Therefore you should verify that the supply voltage is stable and the network connection reliable before updating.

7.3 Resetting the USB-Server

If the USB-Server needs to be reset without changing its settings, socket 8888 can be used. If a connection is opened to this port the USB-Server immediately closes it again and then performs a restart of the firmware.

Use of the system password

If a system password has been configured, this must be null terminated (= [*password*] + 0x00) and sent to the USB-Server within 2s after a successful connection opening. If the USB-Server receives an incorrect or no systen password within this time, it sends the message *PASSWD?* followed by a null byte (0x00) to the client and closes the TCP connection..

If no system password is configured, the USB-Server, as described in the example, immediately closes the TCP connection after it is opened and performs a reset.

After this reset all buffer contents and any currently activeconnections are deleted/closed. This reset can be initiated by any station and should be used only in emergencies!

7.4 Reset to factory defaults

The USB-Server can be reset to its factory default settings using the following methods.

7.4.1 Hardware reset to factory default settings

To use this method the motherboard of the USB-Server has a jumper next to the network port. This is OUT for standard mode.

Put this jumper IN and then connect power to the USB-Server. After approx. 15 seconds the four LEDs *USB Connect* and *USB Error* flash cyclically. The USB-Server is now reset to its factory default settings and is ready to use again after removing the jumper and after a reset.

Opening the housing
First disconnect all cables from the USB-Server. Open the DIN rail mount housing by gently pressing on the narrow sides of the housing. The housing cover can now be removed and the board removed from the housing body.

7.4.2 Software reset to factory default settings

In addition to the hardware method, the USB-Server can also be restored to its factory default settings using Web-Based-Management. After Login the *Restore Factory Defaults* button is visible in the *Logout* menu branch.

7.5 Used ports and network security

In its standard factory setting the USB-Server uses the TCP and UDP port numbers shown in the table below.

Port-/Socket-number	Application	Password protection?	Configurable
32032 (TCP)	Data USB redirector	no	yes
80 (TCP)	Web-Based-Management	yes	yes
8888 (TCP)	Reset USB-Server	yes	no
2682 (TCP)	Initialize Firmware update	yes	no
8513 (UDP)	Inventory	no	no
69 (UDP)	Firmware update (only after initialized through 2682)	(yes)	no

When the factory setrting for the sevices for USB data transmission *and* WBM, *different TCP port numbers must always be used.*

The USB-Server and network security

Network security is being given increasing attention today, and rightly so. All experts agree that there is no such thing as absolute security given today‘s state of the art. Each customer must therefore seek an appropriate balance between security, functionaltiy and cost for his specific needs and circumstances.

To give the customer the greatest possible flexibility based on changing security requirements, from a purely testing and installation environment to critical production applications, the security measures are highly configurable. The present document provides an overview of the security measures implemented in USB-Servers which can be used. It is assumed that the original firmware from W&T (without any customer-specific adaptations) is being used. Additional details can be found in the respective sections of this manual.

The authorization concept of the USB-Server

The control and configuration access to the USB-Server is password protected. The factory default setting is for *no* password, so that simply logging in provides full access to the corresponding settings and functions. To prevent unauthorized access, we therefore strongly recommend using a password. Additional related measures, such as the composition of the password and regularly changing it, should be organizationally ensured as needed by the customer.

Passwords are sent to the USB-Server unencrypted. It must therefore be ensured that password-protected access takes place only using an Intranet which the customer presumes to be secure. For access over the public Internet additional measures must be taken, for example constructing a VPN tunnel (Virtual Private Network). This is however a general problem of network security for which each customer must find an individual solution.

Ports with special functions

In addition to access using Web Based Management, other functions can be enabled using various TCP and UDP ports. These are shown in the previous table. Details can be found in the corresponding sections of this manual.

- **Inventorizing tool**

  Like all intelligent components from W&T the USB-Server can be accessed using the *WuTility* tool. Here information is read from UDP port 8513. This port cannot be turned off. No write access is possible through this path.

- **Firmware update**

  (see section *Firmware update*)
  Initializing a firmware update is handled by the system password protected TCP port 2682. For a firmware update only the operating system of the USB-Server is updated. The configuration data (IP address, gateway etc.) remain intact.

- **Reading/writing the configuration data**

(see section *Up- and downloading the configuration data*)
The configuration profiles can be read from and written to USB-Servers using the WuTility tool or Web-Based-Management. In both cases this is done using the TCP port reserved for Web-Based-Management.

- **USB-Server reset**

(see section *Resetting the USB-Server*)
TCP port 8888 permits a complete reset of the USB-Server. The port is not configurable and is password protected.

7.6 Technical data

Supply voltage ... Power over Ethernet External supply	 37 - 57V DC from PSE DC 24V - 48V (+/-10%)
Current draw ... Power over Ethernet Ext. supply without USB devices Ext. supply with 2 USB devices a 2,5W	 PoE Class 3 (6,49-12,95W) typ. 50mA @24V DC typ. 350mA @ 24V DC
Network	10/100BaseT, autonegotiating RJ45 STP
Galvanic isolation	Network: min. 500V
USB ports	2 x Type A
USB speed	480 Mbit/s
Permissible ambient temperature ... ... storage ... operating, non-cascaded ... operating, cascaded	 -40 ... +85°C 0 ... +70°C 0 ... +60°C
Permissible relative humidity	0 - 95% (non condensing)
Dimensions	ca. 200g
Weight	105 x 75 x 22mm

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