



WLAN Radio Modem 802.11 a/b/g

– Top Hat Rail or Flange Casing –

HG 76342-A

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1 Introduction

The radio modem HG 76342-A is intended to connect devices with Ethernet or serial interfaces to a Wireless Local Area Network (WLAN) corresponding to the 802.11 a/b/g standard.

The radio modem can receive and transmit data via 2 Ethernet LAN ports and can transfer this data via a WLAN Interface to a matching WLAN access point that is connected to a stationary LAN. The radio modem can also receive and transmit data via a serial port. This data can be exchanged via a TCP- or UDP-Socket with other devices by using the LAN or WLAN interfaces of the radio modem.

The HG 76342-A needs many parameters to handle all the different interfaces. The radio modem supports a Web interface to configure all these parameters. In addition a further interface is available to locate, configure, upgrade and to monitor the radio modem. This interface is used by the UCP-Config-Program.

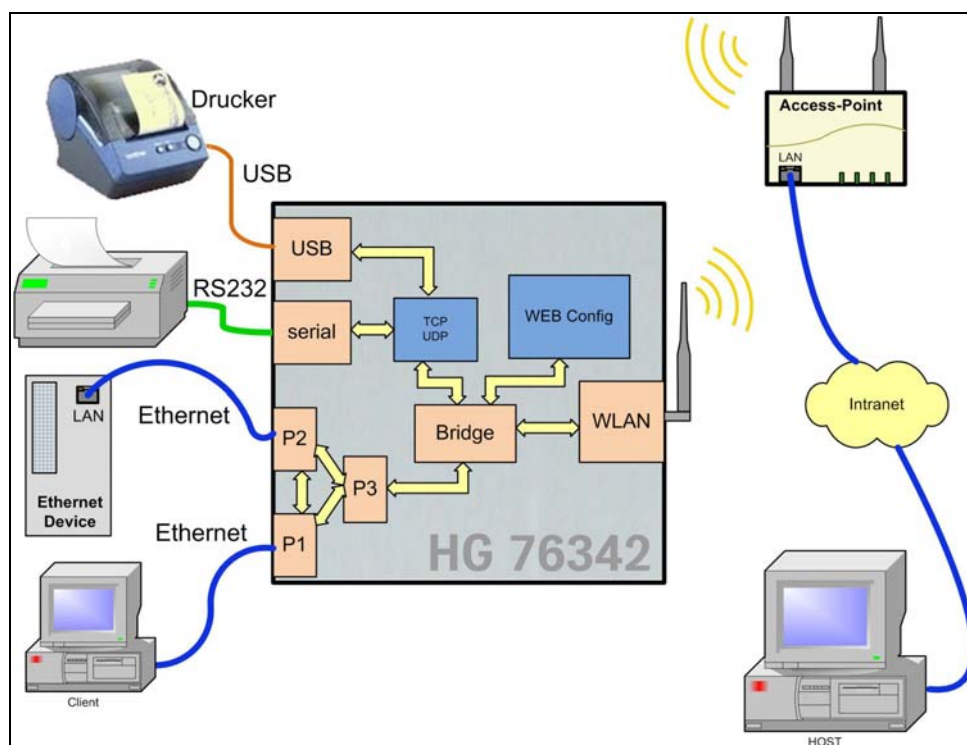


Figure 1 System Overview

1.1 Variants

The device is available in two different variants:

1. HG 76342**YA**: WLAN radio modem with top hat rail casing (see section 2.1.1 on page 8)
2. HG 76342**ZA**: WLAN radio modem with flange casing (see section 2.1.2 on page 9)

1.2 Block schematic

The following picture shows the function groups of the HG 76342-A module.

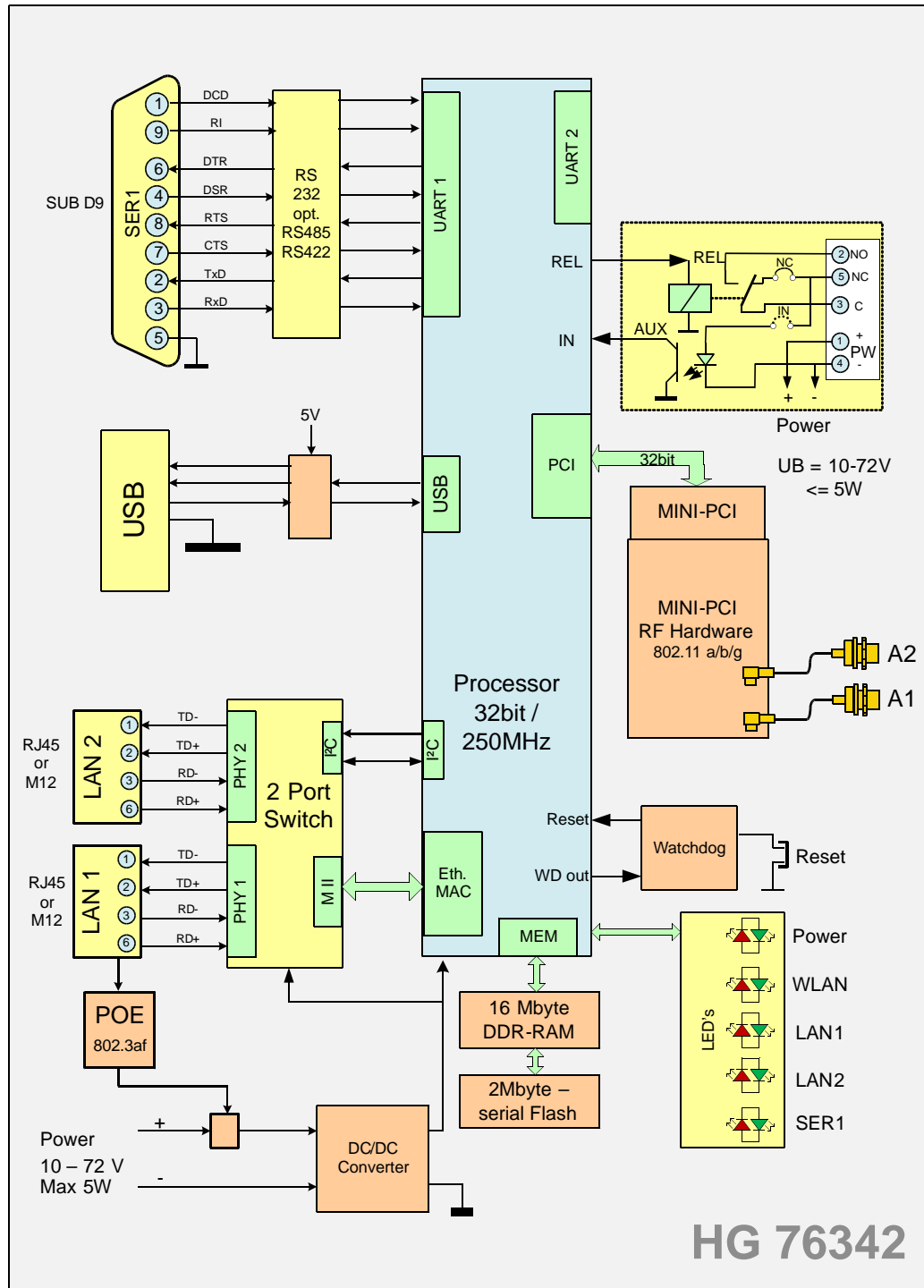


Figure 2 Block schematic

The main component of the radio modem is a 32bit network processor that controls all the different functions.

1.3 Interfaces

The interfaces are:

1. Mini-PCI-Socket
2. Two Ethernet-Interfaces 10/100 MBit + auto MDI (auto crossover function)
3. 1 serial interface with 6 status lines
4. 1 x USB connection (data logging)
5. Relay switch an optional an AUX input with optocoupler

The Ethernet ports have RJ45 plugs. Because of the auto MDI functionality the radio modem can be attached to a HUB or the LAN port of a computer with standard patch cables. The HG 76342-A recognizes the cable polarity and automatically connects the right signal lines.

The serial port is connected via a 9 pin female D-SUB connector. The pin allocation makes it possible to connect to a computer COM port with a 1 to 1 serial cable. The exact pin allocation is shown in Table 1 on page 6 below. The radio modem can be powered by a supply with a voltage between 10 – 72V. The typical power consumption is 4.0 Watt.

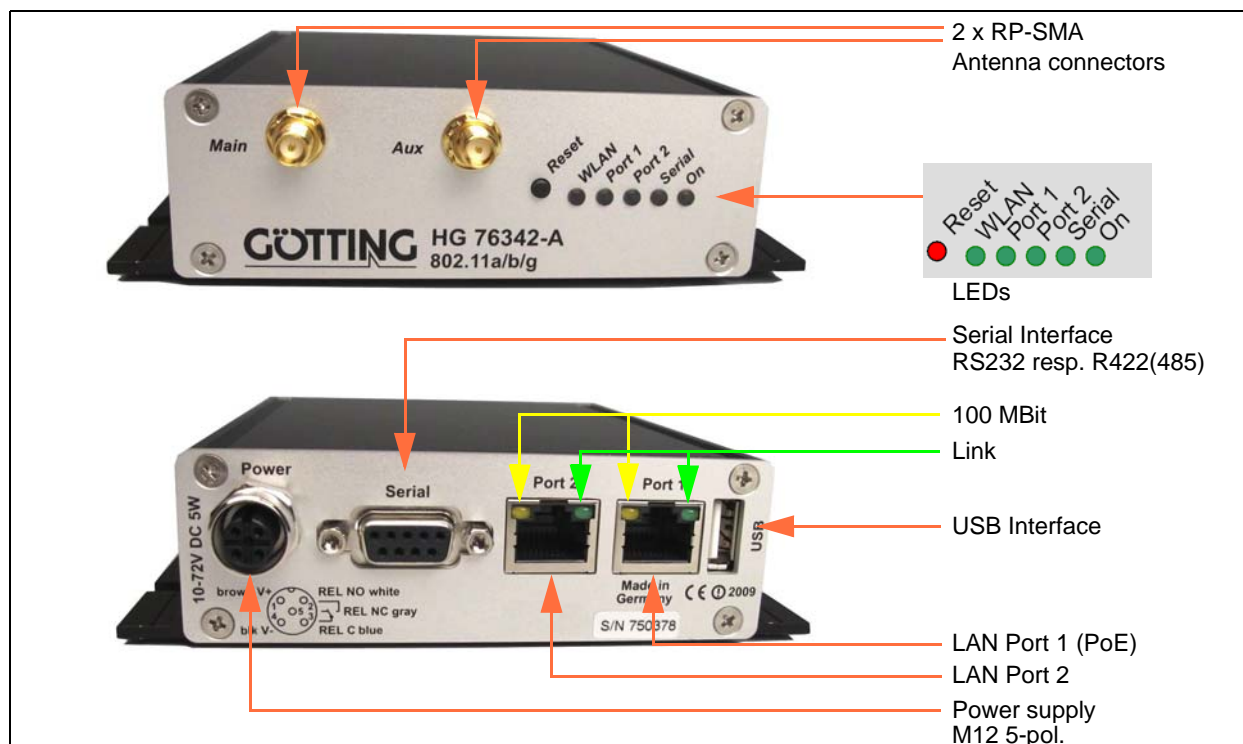


Figure 3 Connectors and LEDs

The picture shows the HG 76342-A in a standard configuration with 2 LAN ports (RJ45) and an M12 plug to connect the power supply and the relay.

1.4 Pin Allocations

1.4.1 9 pin Sub-D female Serial

Pin	RS 232		RS 422(485)	
	Function	Direction	Function	Direction
1	DCD	IN	NC	
2	TxD	OUT	Tx+	OUT
3	RxD	IN	Rx-	IN
4	DSR	IN	NC	
5	GND		GND	
6	DTR	OUT	NC	
7	CTS	IN	Rx+	IN
8	RTS	OUT	Tx-	OUT
9	RI	IN	NC	

Table 1 Pin allocation 9 pin Sub-D female

1.4.2 5 pin M12 female Power

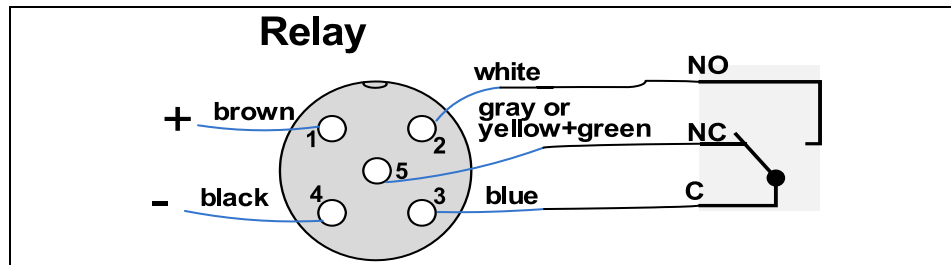


Figure 4 Pin allocation 5-pin M12 female Power

1.5 Meaning of the LEDs



The 5 LED's at the front side show the operating status of the HG 76342-A. All lamps are 2 color red and green shining LED's. If both LED's are on, the lamp is shining orange. Reset is no LED but instead a push-button used to reset the device (see section 2.3 on page 10).

LED	Function
On	<ul style="list-style-type: none"> - off: on power supply - green: power supply OK - orange green blinking: Normal operation, HG 76342-A ready for service
Serial	<ul style="list-style-type: none"> - steady off: no communication partner is connected to the radio modem - green: A communication partner is connected to the radio modem. When data is transmitted or received via the serial port the LED is switched off shortly.
Port 1 Port 2	<ul style="list-style-type: none"> - off: no device connected to the LAN port. - green: an Ethernet device is connected to the LAN port. Blinking shortly signals activity.
WLAN	<ul style="list-style-type: none"> - Red blinking: searching for RF-connection (scanning) or doing the authentication. - steady green: Found a suitable Access-Point and established a connection - green + orange blinking: RF activity (receive or transmit)

Table 2 Function of the LEDs

2 First Time Setup

To set up the HG 76342-A it has to be connected with a patch cable to the Ethernet interface of a computer. After applying power, the green "Link LED" on the RJ45 connector shines when a link is detected. The yellow "100 MBit" LED indicates a 100 MBit connection.

The "Port 1 or 2" LED on the front panel shines green when a connection has been established via the Ethernet. The "WLAN" LED on the front panel will be blinking red because usually no suitable WLAN is recognized.

2.1 Montage

Das Gehäuse steht in zwei Varianten zur Verfügung, einmal in einem Hutschienengehäuse und einmal in einem Flanschgehäuse. Im Folgenden finden Sie Gehäusezeichnungen mit den Abmessungen der Montagevorrichtungen.

2.1.1 HG 76342YA Top Hat Rail Casing

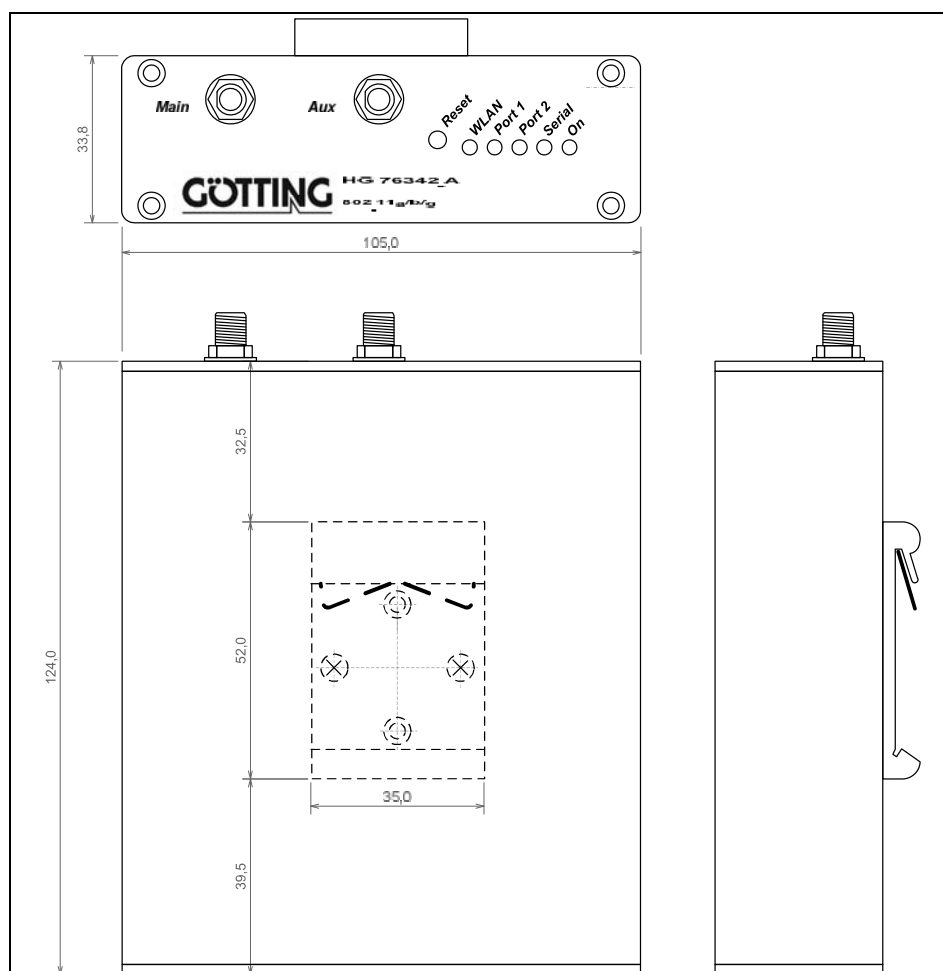


Figure 5 Dimensions HG 76342YA with Top Hat Rail Casing

2.1.2 HG 76342ZA with Flange Casing

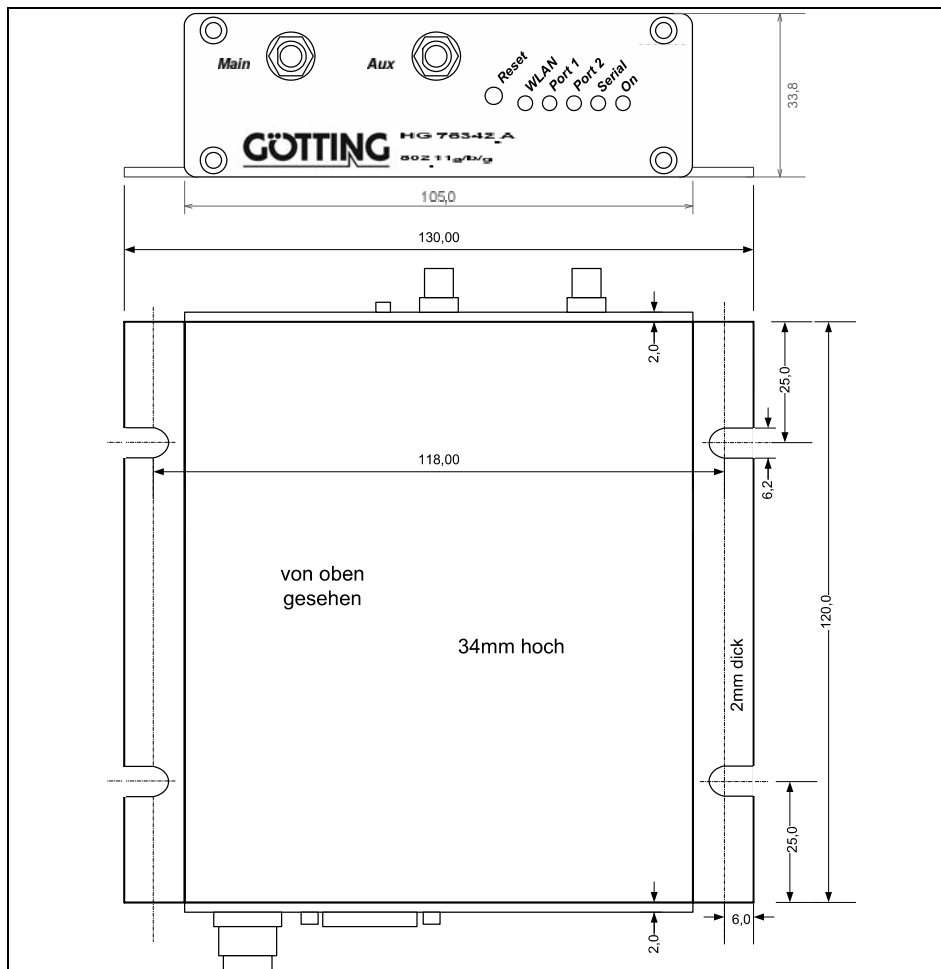


Figure 6 Dimensions HG 76342YA with flange casing

2.2 The UCP-Config Program

To do the „first time setup“ the radio modem has to be connected via the LAN-Interface to the computer (PC) that runs the UCP-Config-Program.

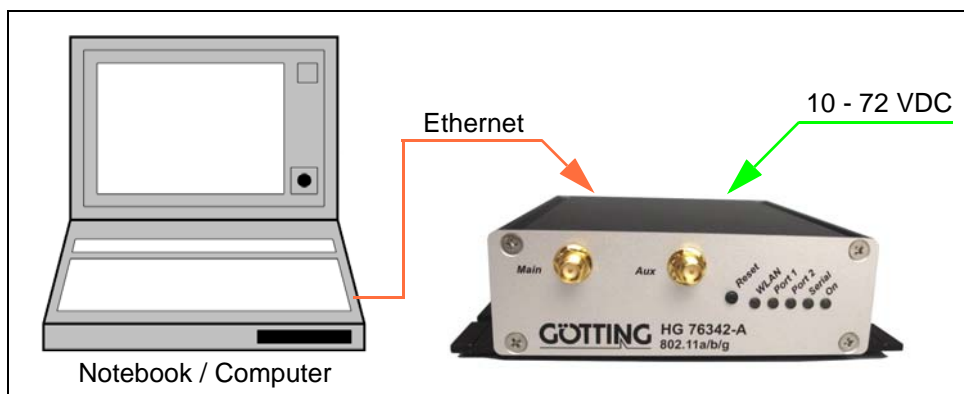


Figure 7 Sketch: Arrangement to configure the radio modem

NOTE! You have to observe:



- The connected PC should have a fixed IP address. (no DHCP)
- The LAN-Interface at the PC must be detected as connected. Check the parameter of the LAN-Interface with the „ipconfig“-command.
- If the LAN-Interface of the PC is correctly recognized then press the „refresh“-button of the UCP-config-program.
- An active firewall could prevent the communication to the radio modem.

After the start the UCP-Config-Program ascertained all network interfaces that are active at the PC. After this the UCP-Config-Program sends broadcast UDP requests to all these interfaces. The registered answers of the HG 76342-A devices are shown in a list.

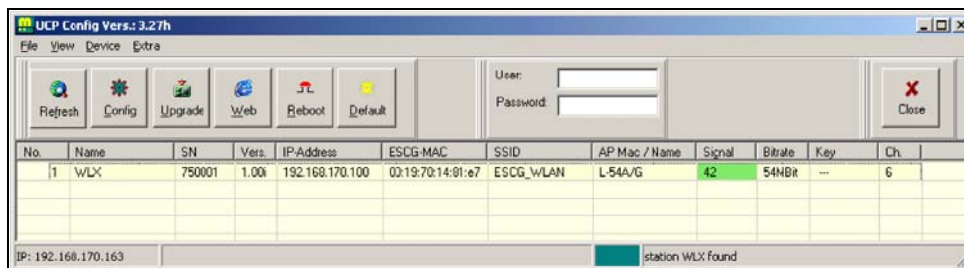


Figure 8 Screenshot UCP-Config program

All located HG 76342-A devices are shown in a list with their station names, firmware versions and addresses. The WLAN connection is also shown with a signal quality value. The value can be interpreted as follows:

- Signal ≥ 40 → very good connection
- Signal ≥ 30 → good connection
- Signal ≥ 20 → connection is OK, the device starts to search for better AP's
- Signal < 20 → connection restricted, the bit rates will be lowered

NOTE! For a more detailed description of the UCP config program please refer to the separately available manual.



2.3 Reset to factory default

The factory default settings can be restored by pressing the reset button located on the front panel for a period of more than 10 Seconds. While the reset button is pressed, the "ON"-LED blinks orange more faster. When the radio modem does a restart the default settings are configured. Now the reset button can be released.

Main factory default values:

```
Device Name: "HG76342"  
SSID = "ESCG_WLAN"  
WEP = OFF  
WPA = OFF  
802.1x = OFF  
802.1x user: "" (empty)  
802.1x password: "" (empty)  
MODE= 802.11b/g
```

```
IP = 192.168.170.100  
Netmask = "255.255.255.0"  
Gateway = 192.168.170.249
```

```
user = "" (empty)  
password = "" (empty)
```

```
SER1: inactive
```

3 WEB Interface

After you have established a connection between your web browser and the radio modem the first thing shown is the info page (see below). This page and the page listing all currently registered access points can be opened freely. In case that a `user` and `password` have been defined accessing all other web pages requires that those values are entered.

3.1 Info Page

After getting a connection with a WEB browser to the HG 76342-A, a WEB page of the radio modem is shown that gives status information to the user.

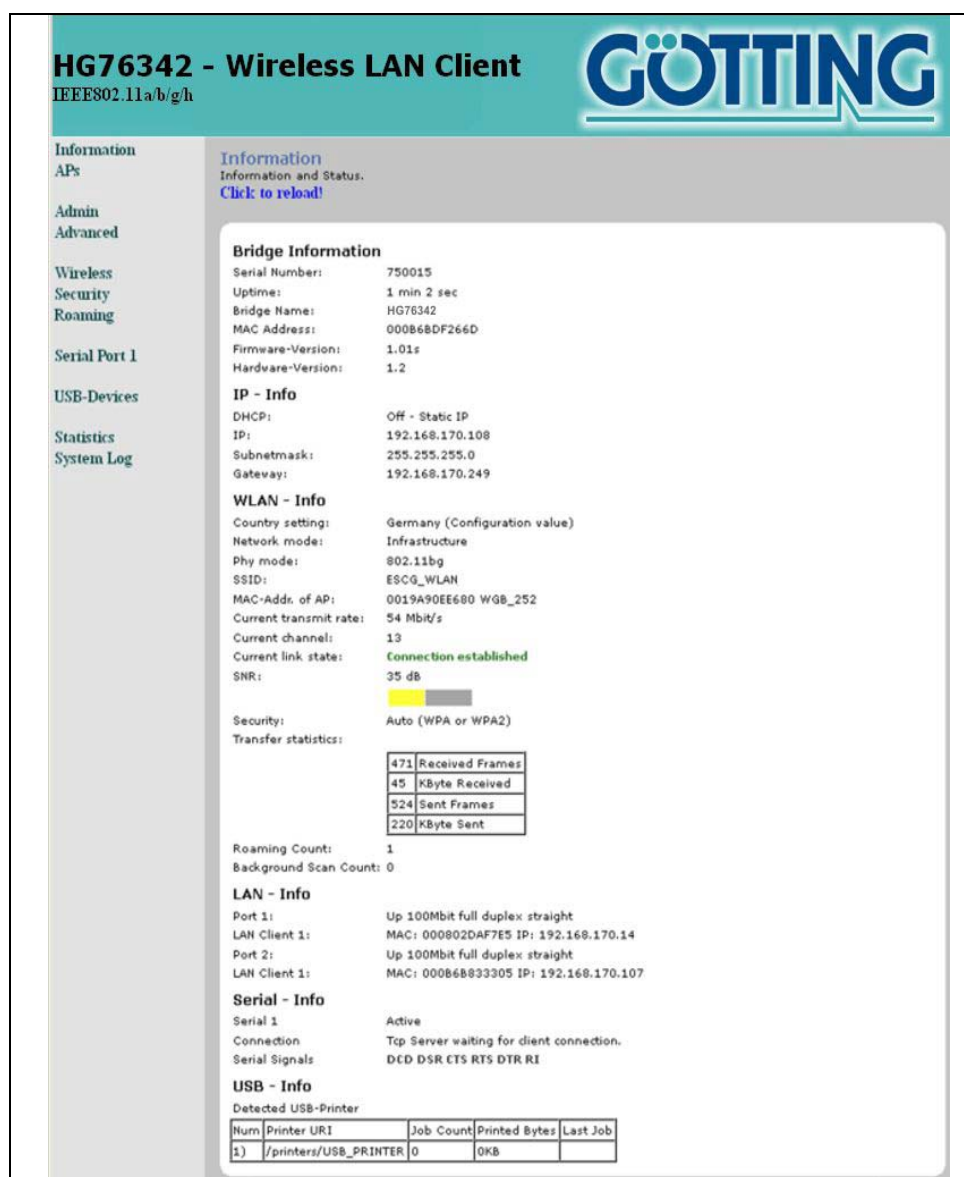


Figure 9 Screenshot of the Info Page

3.1.1 Bridge Information

This section shows general information regarding the radio modem.

Info	Note
Serial Number	Serial number of the device
Up-time	This is the time the device is running since power up or since the last reset.
UTC-Time (optional)	This is the internal daytime of the device. At start-up this time is set to 01.01.2000 00:00:00 o'clock. If the IP address of a time server is configured the device try's to get the daytime from there. The daytime is used for sys-log messages.
Bridge Name	This name is configured at the Admin page. The name is shown in the config program in the first column.
MAC Address	This is the MAC address that the device uses for communication via the WLAN. Normally this MAC address is taken from the build in RF-unit. The user can configure different modes to use other MAC addresses (Cloning resp. Bridging).
Firmware-Version	
Hardware-Version	

Table 3 Info Page - Bridge Information

3.1.2 IP-Info

Info	Note
DHCP	The device can use a static IP address or can get a IP address from an DHCP server. This can be configured on the Admin page.
IP	This is the IP address the device currently uses.
Subnetmask	
Gateway	IP address of the gateway.

Table 4 Info Page - IP-Info

3.1.3 WLAN-Info


WLAN - Info									
Country setting:	Germany (802.11d)								
Network mode:	Infrastructure								
Phy mode:	802.11bg								
SSID:	ESCG_WLAN								
MAC-Addr. of AP:	0A0B6B33E78D L-54A/G								
Current transmit rate:	24 Mbit/s								
Current channel:	1								
Current link state:	Connection established								
SNR:	42 dB								
									
Security:	None								
Transfer statistics:	<table border="1"> <tbody> <tr> <td>193</td> <td>Received Frames</td> </tr> <tr> <td>33</td> <td>KByte Received</td> </tr> <tr> <td>110</td> <td>Sent Frames</td> </tr> <tr> <td>32</td> <td>KByte Sent</td> </tr> </tbody> </table>	193	Received Frames	33	KByte Received	110	Sent Frames	32	KByte Sent
193	Received Frames								
33	KByte Received								
110	Sent Frames								
32	KByte Sent								
Roaming Count:	1								
Background Scan Count:	0								

Figure 10 Screenshot WLAN-Info

Info	Note
Country setting	Because there are country depending rules to use WLAN the user has to select the country where the device will operate. If the Option IEEE802.11d is active, the country specific settings will be received from the AP (if possible). If the device received this information, the country setting is marked with „(802.11d)“
Network mode	2 Modes are supported: Infrastructure → The device will connect to APs Adhoc → The device will work in a point to point network
Phy mode	The following modes are supported: 802.11 bg → 2.4 GHz Band with 11 or 54 MBit max. 802.11 g → 2.4 GHz with 54 MBit max. 802.11 b → 2.4 GHz with 11 MBit max. 802.11 a → 5 GHz with 54 MBit max.
SSID	This is the „Service Set Identifier“, that’s the name of the wireless network
MAC-Addr. of AP	If the device is connected to an access-point the MAC address of this access-point is shown here.
Current transmit rate	This is the actual used transmit rate that the WLAN card uses to transfer data
Current channel	The used channel is given by the access-point.
Current link state	When the connection to the access-point is completed the status info Connection established is shown. A status message with red letters signals an unconnected status.

Table 6 Info Page - WLAN-Info (part 1 of 2)

Info	Note												
SNR	<p>SNR shows the „signal noise ratio“. The value can be interpreted by the following rules:</p> <table border="1"> <thead> <tr> <th>SNR</th> <th>State</th> </tr> </thead> <tbody> <tr> <td>≥ 40</td> <td>very good radio reception</td> </tr> <tr> <td>≥ 30</td> <td>good radio reception</td> </tr> <tr> <td>≥ 20</td> <td>good radio reception but depending on the configuration the device starts to scan other channels for „better“ access-points</td> </tr> <tr> <td>≥ 10</td> <td>poor radio reception, the transmit rates will be lowered. The device will scan other channels to find „better“ access-points</td> </tr> <tr> <td>< 10</td> <td>very poor radio reception, the data throughput will be lowered</td> </tr> </tbody> </table> <p>Table 5 Quality of the reception signal</p>	SNR	State	≥ 40	very good radio reception	≥ 30	good radio reception	≥ 20	good radio reception but depending on the configuration the device starts to scan other channels for „better“ access-points	≥ 10	poor radio reception, the transmit rates will be lowered. The device will scan other channels to find „better“ access-points	< 10	very poor radio reception, the data throughput will be lowered
SNR	State												
≥ 40	very good radio reception												
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≥ 10	poor radio reception, the transmit rates will be lowered. The device will scan other channels to find „better“ access-points												
< 10	very poor radio reception, the data throughput will be lowered												
Security	<p>The used security method is shown.</p> <p>None WEP WPA(2) EAP-PEAP (TTLS, TLS, LEAP)</p>												
Transfer statistics	This table shows some statistical values of the transceiver module.												
Roaming Count	This value tells the number of roaming cycles since the last reset.												
Background Scan Count	If the radio reception is getting worse the device scans other channels for better reachable access-points. The number of scan cycles are shown here.												

Table 6 Info Page - WLAN-Info (part 2 of 2)

3.1.4 LAN-Info

In this section the actual status of the both LAN ports is shown.

Info	Note
Port 1 (2)	<p>Down → no LAN cable is connected or the LAN Client is not switched on Up → LAN cable is connected, client detected 10 oder 100 MBit → transmission speed full oder half duplex → simultaneous send and receive on or off</p>
LAN-Client	Table of the registered MAC addresses of client devices at the LAN port.

Table 7 Info Page - LAN-Info

4 Technical Data

4.1 Hardware

Hardware		
CPU	Type	32bit network processor 250MHz clock
	Memory	2MByte Flash 16MByte DRAM
Interfaces	Ethernet	2 x 10/100 Mbps Fast Ethernet Auto MDI/MDIX thereof 1 x with PoE (LAN Port 1)
	Serial 1	RS232 with handshake signals RTS, CTS, DSR, DTR,DCD (input), RI (input) optional RS485, RS422
	Mini-PCI	qualified to drive RF-Cards the Chipsets from Atheros (AR5112, AR5113,AR5414)
	Relay	Relay switch contact can be switch via WLAN or LAN
	AUX-Input (optional)	Signal input (24V, galv. separated)
Antenna connectors	Ant 1	Standard: RP-SMA Optional: TNC, RP-TNC, N
	Ant 2	Like Ant 1
LEDs	5 LEDs	Power WLAN (wireless) Port 1 (LAN) Port 2 (LAN) Serial (RS232)
Power supply	Connector	Hirschmann M12 5-pol. Connector
	Consumption	< 4,5 W (typ.) < 5W (max.)
	Voltage range	10 - 72 V
Temperature range		0 - 60° C
Dimensions	Board	120 x 100 x 20 mm
	Case	Standard: 125 x 105 x 35 mm
	Weight	approx. 450g

Table 14 Technical Data Hardware

4.2 WLAN Interface

WLAN Interface	
Security	IEEE 802.11i WPA(2) (Wifi Protected Access) (PSK/TKIP), WEP 64/128, IEEE 802.1x (EAP-PEAP, EAP-TLS, EAP-TTLS, LEAP Supplicant)
Data rates	802.11b 11, 5.5, 2 & 1 MBit/s 802.11g 54, 48, 36, 24, 18, 12, 9, 6 MBit/s 802.11a 54, 48, 36, 24, 18, 12, 9, 6 MBit/s
Frequencies	ISM-Band: 2.400 MHz to 2.483 MHz U-NII Band: 5.150 MHz to 5.350 MHz (ETSI, RegTP Indoor) 5.470 MHz to 5.725 MHz (ETSI, RegTP Outdoor)
Channels	802.11b/g: ETSI: 1-13, (3 non overlapping) 802.11a: ETSI: 19 non overlapping (5.150-5.320 & 5.500-5.700 MHz)
Transmit power level	802.11b/g: 18dBm peak 802.11a: 18 or 17dBm

Table 15 Technical Data WLAN Interface

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7 Handbook Conventions

At the time this manual was printed, the following symbols and marks were used in all Götting KG documentations:

- ♦ For security advice, the following symbols stand for different degrees of danger and importance:

NOTE!



ATTENTION!



WARNING!



- ♦ Further information or advice are indicated as follows:

TIP!



- ♦ Program texts and variables are indicated through the use of the *Script Courier*.
- ♦ Whenever the pressing of letter keys is required for program entries, the required **L**etter **K**eys are indicated as such (for any programs of Götting KG small and capital letters are equally valid).
- ♦ Sections, drawings and tables are subsequential numbers throughout the complete document. In addition, each documents includes a list of contents showing the page numbers following the front. If a document exceeds 10 pages, it also has a drawings list and a list of tables on the last few pages. If required, in case a document is correspondingly long and complex, a index is added in the back.
- ♦ Each document shows a small table including meta information, such as developer, author, revision and date of issue, on the front page. The information regarding revision and date of issue are also included in the bottom line on each page of the document. This way it is possible to clear identify the source document for each bit of information.
- ♦ Online version (PDF) and printed handbook are always generated from the same source. Due to the consequent use of Adobe FrameMaker for these documentations, it is possible to use the cross hints and content entries (including page numbers of the index) of the PDF file for automatic transfer to the corresponding content.



8 Copyright and Terms of Liability

8.1 Copyright

This manual is protected by copyright. All rights reserved. Violations are subject to penal legislation of the Copyright.

8.2 Exclusion of Liability

Any information given is to be understood as system description only, but is not to be taken as guaranteed features. Any values are reference values. The product characteristics are only valid if the systems are used according to the description.

This instruction manual has been drawn up to the best of our knowledge. Installation, setup and operation of the device will be on the customer's own risk. Liability for consequential defects is excluded. We reserve the right for changes encouraging technical improvements. We also reserve the right to change the contents of this manual without having to give notice to any third party.

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