

MGW/920

Smart Metering Gateway

First Steps



SSV Embedded Systems

Heisterbergallee 72
D-30453 Hannover
Phone: +49 (0)511/40 000-0
Fax: +49 (0)511/40 000-40
E-mail: sales@ist1.de

Manual Revision: 1.1
Date: 2008-05-08

CONTENT

- 1 INTRODUCTION3
 - 1.1 Safety Guidelines3
 - 1.2 Conventions3
 - 1.3 Application Environment.....4
 - 1.4 Features and Technical Data.....5
- 2 OVERVIEW6
- 3 GETTING STARTED.....7
 - 3.1 Ethernet Link between MGW/920 and PC.....7
 - 3.2 Connecting Power Supply and Power-up the MGW/920.....8
 - 3.3 Checking IP Address of PC9
 - 3.4 Checking Ethernet-based TCP/IP Communication10
 - 3.5 Changing Ex Factory IP Address (IPbyNet)11
- 4 MECHANICAL DIMENSIONS13
- 5 PINOUTS14
 - 5.1 Ethernet Interface (RJ45).....14
 - 5.2 M-Bus Master Interface (RJ12).....14
- 6 HELPFUL LITERATURE15
- CONTACT.....15
- DOCUMENT HISTORY15

1 INTRODUCTION

The default configuration of an MGW/920 Smart Metering Gateway contains one 10/100 Mbps Ethernet LAN interface and one M-Bus master interface for up to ten external M-Bus meters.

For using the MGW/920 you need an Ethernet link to your PC or to an Internet router. This link needs a standard Ethernet patch or cross-over cable.

1.1 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.

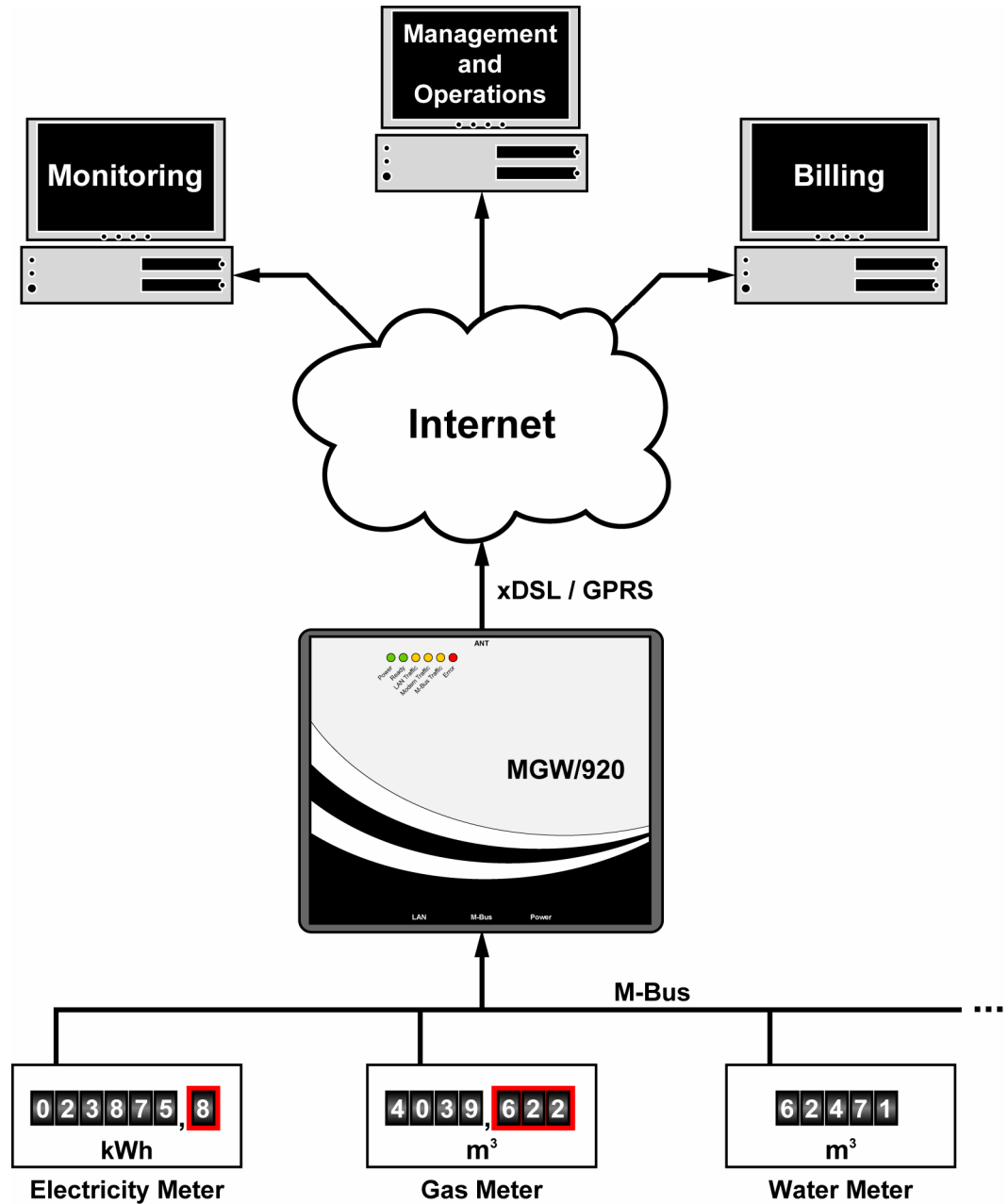
1.2 Conventions

Convention	Usage
bold	Important terms
<i>italic</i>	Filenames, user inputs
monospace	Pathnames, program code, command lines

Table 1: Conventions used in this Document

1.3 Application Environment

Figure 1 shows the typical application environment for the MGW/920 Smart Metering Gateway. One side is connected over the M-Bus (metering Bus) to gas, electricity, water or other types of consumption meters. The other side offers an IP-based Internet link via wired xDSL (Ethernet) or wireless GPRS (GSM/GPRS modem).



The application environment allows the transfer of energy consumption data over the Internet as an IP-based network to IT-hosted monitoring, billing or management applications in real time.

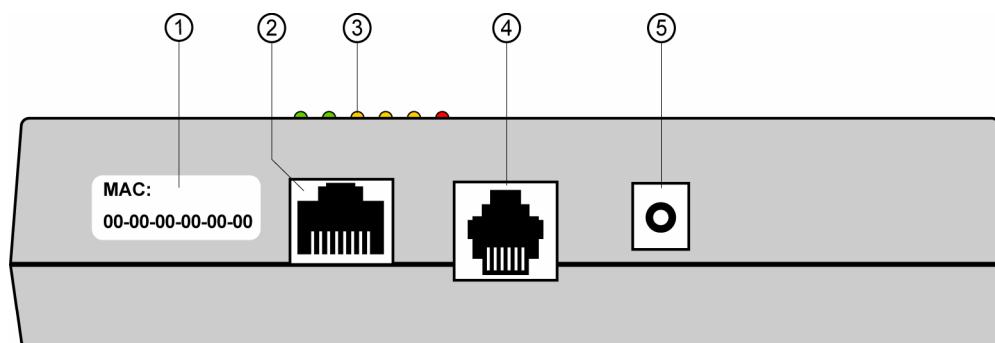
Fig. 1: Application Environment for the MGW/920

1.4 Features and Technical Data

- MGW/920 with DIL/NetPC DNP/9200 @ 180 MHz
- 1x Real Time Clock (RTC) with battery backup
- 1x M-Bus master interface (RJ12)
- 1x 10/100 Mbps Ethernet LAN interface (RJ45)
- 6x status LED
- Modem socket for GSM/GPRS modem expansion

The MGW/920 M-Bus master interface supports up to ten external M-Bus meters and a max. distance of 10 km. The M-Bus communication speed can range from 300 to 19.200 bps.

2 OVERVIEW



- ① Label with MAC address
- ② 10/100 Mbps Ethernet interface (RJ45)
- ③ Status LEDs (top side)
- ④ M-Bus master interface (RJ12)
- ⑤ Power connector

Fig. 2: Overview MGW/920

3 GETTING STARTED

3.1 Ethernet Link between MGW/920 and PC

Setup the Ethernet link between the Ethernet connector of the MGW/920 and your PC. Use an Ethernet cross-over cable or a router-based infrastructure for the Ethernet connection.

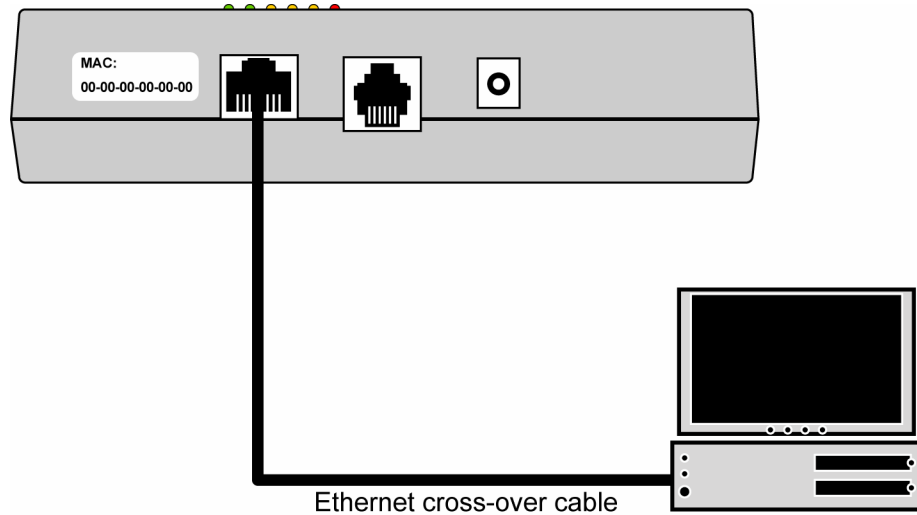


Fig. 3: Ethernet link between MGW/920 and PC

Please note: The MGW/920 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.

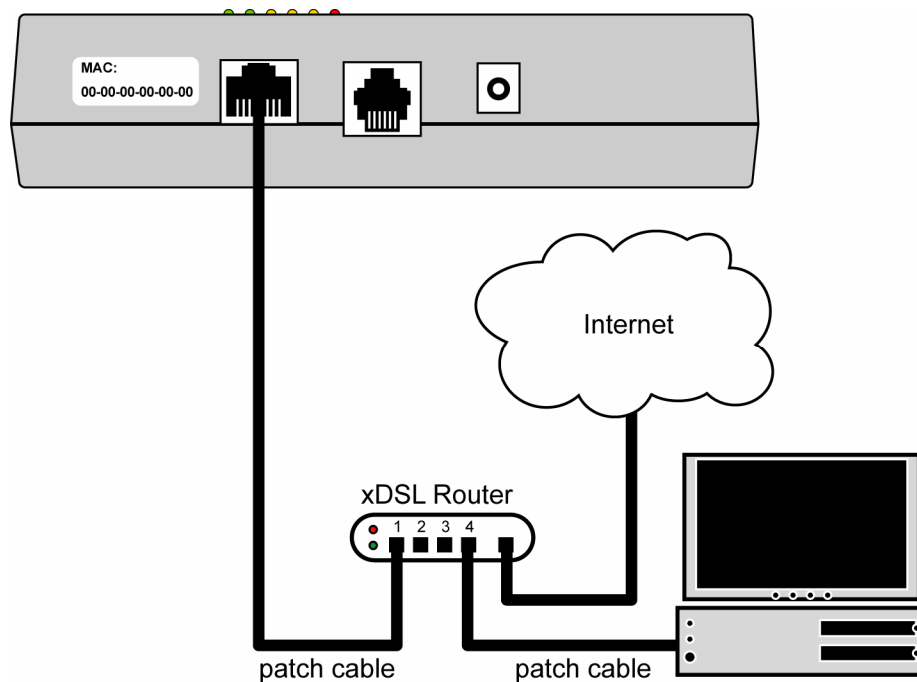


Fig. 4: Router-based Ethernet link between MGW/920 and PC

3.2 Connecting Power Supply and Power-up the MGW/920

Connect the 12 VDC power supply with the 5.5 mm x 2.5 mm barrel plug to the MGW/920.

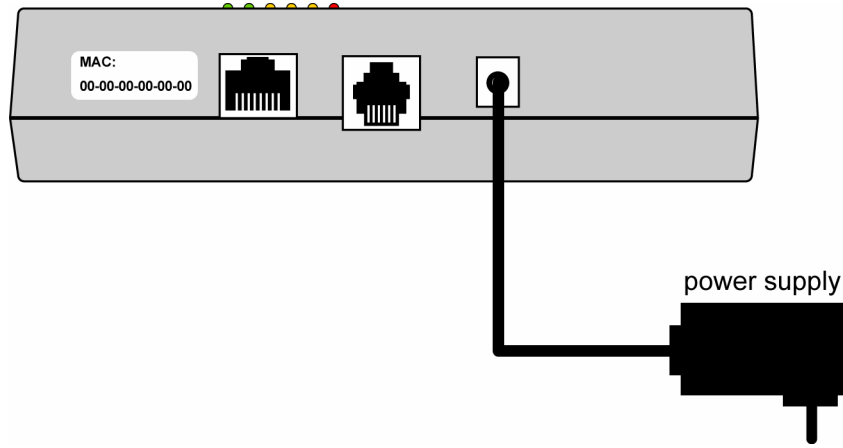


Fig. 5: Power supply for the MGW/920



CAUTION: Providing the MGW/920 with a voltage higher than the regular 12 VDC $\pm 10\%$ could resolve in damaged board components!

Please pay attention to the polarity of the power connector: the + pole is in the center!

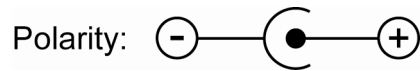
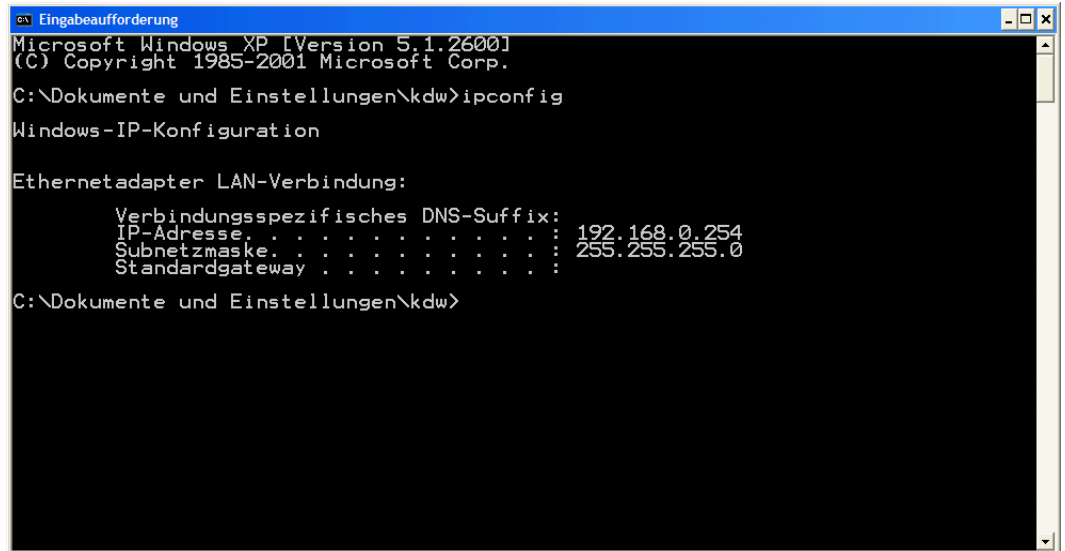


Fig. 6: Polarity of the power connector

3.3 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 MGW/920. Use 192.168.0.1 or 192.168.0.254 for your PC and 192.168.0.126 for the MGW/920.



```

Eingabeaufforderung
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 . . . . . :

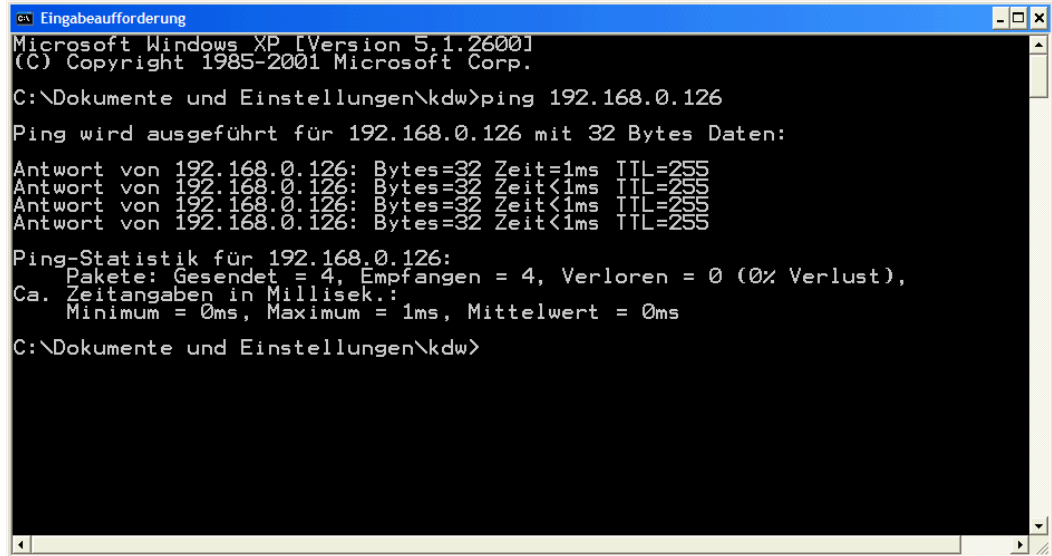
C:\Dokumente und Einstellungen\kdw>
    
```

Fig. 7: Windows-PC IP address check with *ipconfig*

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

3.4 Checking Ethernet-based TCP/IP Communication

Check the Ethernet-based TCP/IP communication between the MGW/920 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>
```

Fig. 8: 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.

3.5 Changing Ex Factory IP Address (IPbyNet)

The ex factory value for the default IP address is **192.168.0.126**. The network mask for this address is **255.255.255.0**. You can change the IP address and the network mask over an Ethernet link with the MGW/920 IPbyNET feature.

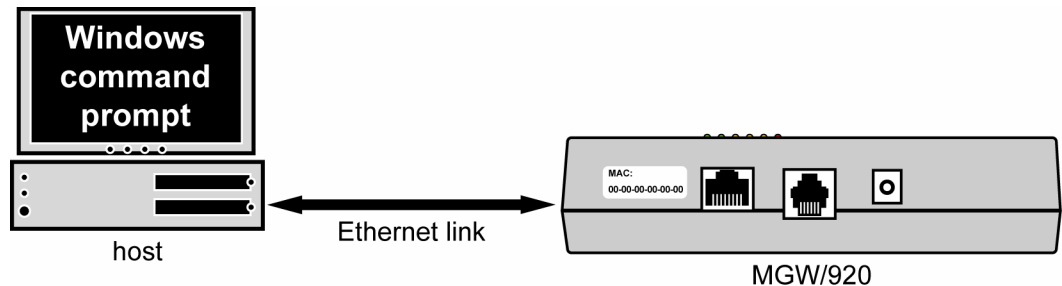


Fig. 9: Environment for IP address change with IPbyNet

IPbyNET is a MGW/920 firmware component, which checks directly after each boot process the presence of ICMP echo request packets with the MAC address of the MGW/920 Ethernet interface. If an ICMP packet is available, the IPbyNET firmware extracts the destination IP address from the ICMP echo request packet and sets the MGW/920 Ethernet interface with this IP address.

```

C:\>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=64
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=64
Ping-Statistik für 192.168.0.126:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0 (0% Verlust),
    Ca. Zeitangaben in Millisek.:
        Minimum = 0ms, Maximum = 0ms, Mittelwert = 0ms
C:\>arp -s 192.168.0.10 02-80-AD-20-D3-7F
C:\>ping -t -w 300 192.168.0.10
Ping wird ausgeführt für 192.168.0.10 mit 32 Bytes Daten:
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Antwort von 192.168.0.10: Bytes=32 Zeit=2ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
    
```

Fig. 10: Changing the IP address with IPbyNet

Please see the label with the MAC address on the front of your MGW/920 to find the MAC address for your MGW/920. Then run a Windows command prompt and enter the following two command lines:

```

arp -s 192.168.0.10 02-80-AD-20-D3-7F
ping -t -w 300 192.168.0.10
    
```

The first command line creates an ARP table entry for the IP address 192.168.0.10 and the MAC address 02-80-AD-20-D3-7F. The second command line sends an ICMP echo request to the device with the MAC address 02-80-AD-20-D3-7F. This request contains the new IP address 192.168.0.10.

Change the IP address and the MAC address of the two command lines. Use the IP address of your needs and the given MAC address from your MGW/920.

Then reboot the MGW/920. After a few seconds the MGW/920 responds to the *ping* with the new IP address.

4 MECHANICAL DIMENSIONS

All length dimensions have a tolerance of 0.5 mm. The keyhole drillings are suitable for M4 screws.

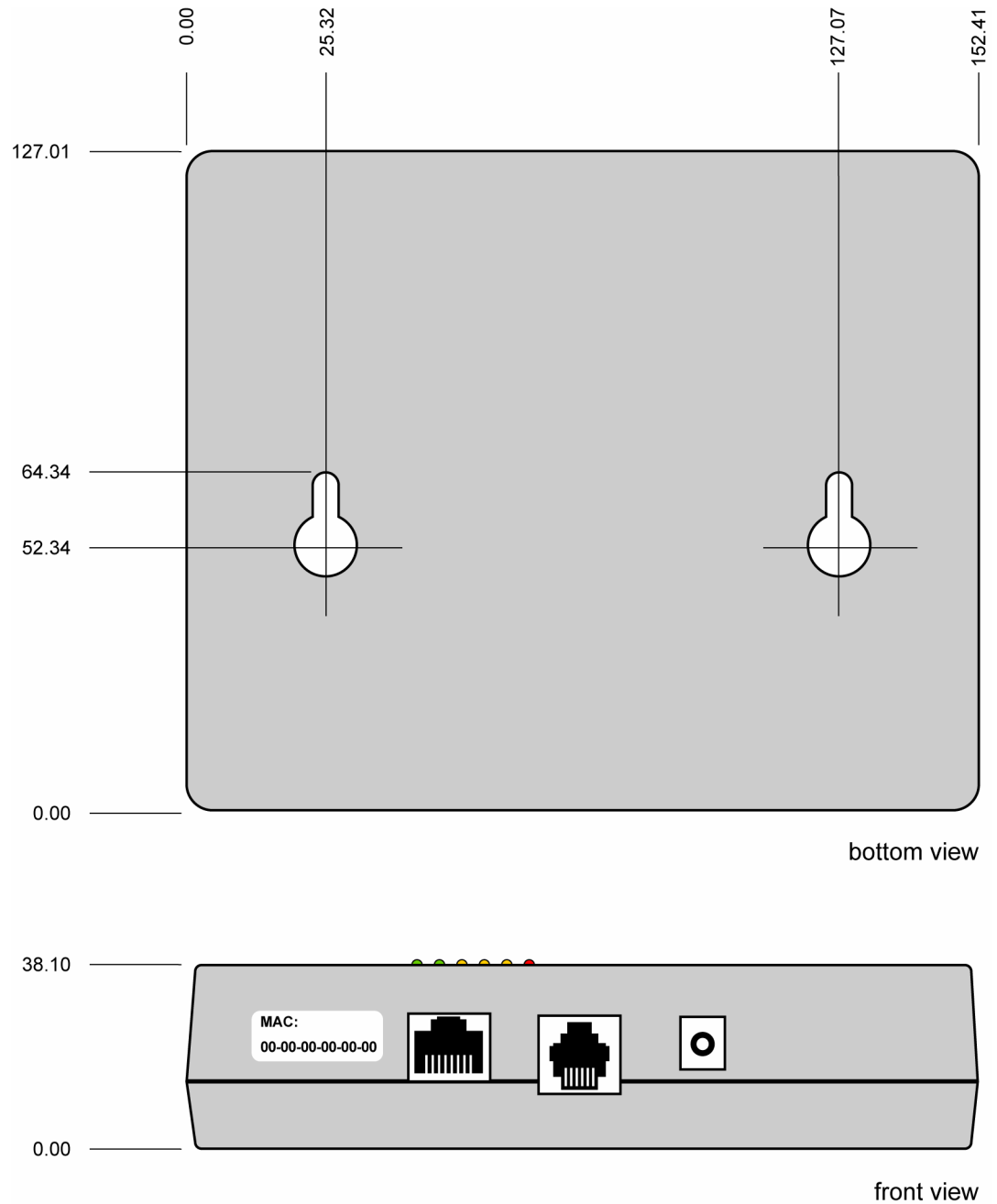


Fig. 11: Mechanical dimensions of the MGW/920

5 PINOUTS

5.1 Ethernet Interface (RJ45)

Pin	Name	Function
1	TX+	10/100 Mbps LAN, TX+ Pin
2	TX-	10/100 Mbps LAN, TX- Pin
3	RX+	10/100 Mbps LAN, RX+ Pin
4	---	Not Connected
5	---	Not Connected
6	RX-	10/100 Mbps LAN, RX- Pin
7	---	Not Connected
8	---	Not Connected

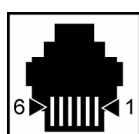
Table 2: Pinout Ethernet interface



5.2 M-Bus Master Interface (RJ12)

Pin	Name	Function
1	---	Not Connected
2	---	Not Connected
3	MBUS2	M-Bus Signal 2 (+)
4	MBUS1	M-Bus Signal 1 (-)
5	---	Not Connected
6	---	Not Connected

Table 3: Pinout M-Bus master interface



6 HELPFUL LITERATURE

- DIL/NetPC DNP/9200 hardware reference
- MB/920-E2M Base Board hardware reference

CONTACT

SSV Software Systems

Heisterbergallee 72

D-30453 Hannover / Germany

Phone: +49 (0)511/40 000-0

Fax: +49 (0)511/40 000-40

E-mail: sales@ist1.de

Internet: www.ssv-embedded.de

Support: www.ssv-comm.de/forum

For actual information about the MGW/920 visit us at
www.ssv-comm.de.

DOCUMENT HISTORY

Revision	Date	Remarks	Name
1.0	2008-04-21	first version	WBU
1.1	2008-05-08	product name changed	WBU

The content of this document can change any time without announcement. There is taken over no guarantee for the accuracy of the statements. The user assumes the entire risk as to the accuracy and the use of this document. Information in this document is provided 'as is' without warranty of any kind. Some names within this document can be trademarks of their respective holders.

© 2008 SSV EMBEDDED SYSTEMS. All rights reserved.