



Multifunktions-Gateway

1-Wire® to EIB/KNX® Edition

Kurzanleitung

Rechtliche Hinweise:

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1. Einführung

WireGate soll in dieser Variante primär die Nutzung von 1-Wire Sensoren für bestehende KNX-Installationen ermöglichen.

Für den Betrieb ist folgendes erforderlich:

- Eine WireGate Appliance inkl. Steckernetzteil
- Eine KNX-Schnittstelle (siehe Datenblatt)
- Mind. ein 1-Wire Hostadapter (DS9490R)
- Mind. ein unterstützter 1-Wire Sensor

- Für die Konfiguration ist **temporär** ein PC mit Netzwerkanschluss und Webbrowser erforderlich.

Aktuelle Informationen sind jeweils in der Online-Hilfe der Konfigurationsoberfläche und unter <http://www.wiregate.de> abrufbar.

1.1. Support

Support wird über die eMail-Adresse support@wiregate.de abgewickelt. Um Ihnen eine schnelle Bearbeitung Ihrer Supportanfrage zu gewährleisten, bitten wir um eine möglichst detaillierte Beschreibung des Problems.

Bevor Sie mit uns in Kontakt treten bitten wir darum den abgesicherten Wartungszugang („WireGate Central“) zu aktivieren sofern Netzwerk und Internetanschluss vorhanden sind. Dies ermöglicht ggfs. einen direkten Zugriff auf das Gerät und damit eine schnelle Problembeseitigung.

1.2. Sicherheitshinweise

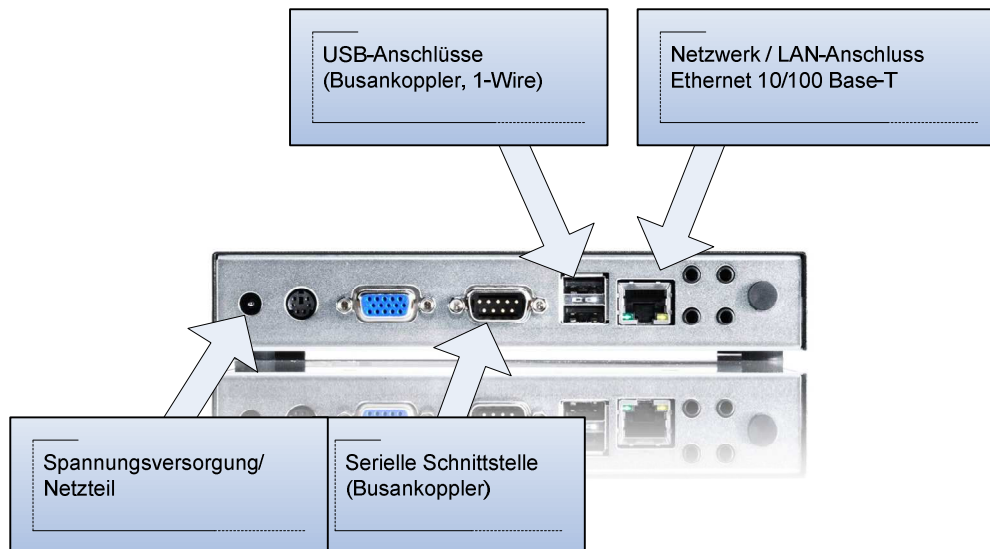
- Einsatzgebiet / CE-Kennzeichnung gemäß EMV-Richtlinie (Wohn- und Zweckbau), EMV erfüllt EN 61000-6-2, EN 61000-6-3 (2005), Änderungen vorbehalten.
- Bei Veränderungen des Gerätes durch den Anwender können einzelne oder alle Zertifizierungen ihre Wirksamkeit verlieren.
- Einbau und Montage elektrischer Geräte müssen durch Elektrofachkräfte erfolgen, der Anschluss von KNX/EIB-Schnittstellen erfordert Fachkenntnisse durch KNX-Schulungen.
- Bei Nichtbeachtung der Anleitung können Schäden am Gerät, Brand oder andere Gefahren auftreten.
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- ElabNET übernimmt keine Verantwortung für den Gebrauch der Geräte in einem Projekt, das nicht von ElabNET erwähnt wird. In dem durch das anwendbare Recht weitestgestatteten Umfang, ist ElabNET unter keinen Umständen verantwortlich für den Verlust von Daten oder Einkünften oder für jedwede Folge- oder unmittelbaren Schäden, wie auch immer diese verursacht worden sind.
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1.3. Open Source Software

Dieses Produkt enthält freie/Open Source Software, die der GPL (**GENERAL PUBLIC LICENSE**) unterliegt. Eine Kopie der GPL finden Sie anbei. Alle Quelltexte können bei uns angefordert werden bzw. sind unter repo.wiregate.de mit dem Debian Paketmanagementsystem kostenlos abrufbar.

2. Inbetriebnahme WireGate

2.1. Übersicht



Bitte beachten Sie: An der Unterseite des Gerätes befindet sich ein Etikett mit Produkt- und Benutzerinformationen für die Inbetriebnahme.

2.2. Funktionen

Die unterstützten Funktionen des Gerätes sind derzeit:

- 1-Wire Sensoren -> EIB-Anbindung (unterstützte siehe Datenblatt/Online-Hilfe)
- Nutzung als IP-Gateway/Programmierschnittstelle
- NTP-synchronisierter Zeitversand auf EIB (nur wenn Internetanbindung vorhanden)
- VPN-Server

2.3. Systemvoraussetzungen für die Inbetriebnahme

- PC mit Netzwerkschnittstelle und Web-Browser (Von ElabNET getestet und empfohlen: Firefox 2+, Internet Explorer 7+)
- Netzsteckdose zum Anschluss des mitgelieferten Steckernetzteils (100-240V, 50/60Hz)
- Ethernet Hub, Switch oder Crossover-Kabel
- Einen oder mehrere 1-Wire to USB-Adapter (z.B. DS9490R Lieferumfang je nach Bestellung und Paket)
- EIB/KNX Schnittstelle:
 - o KNXnet/IP Router (z.B. IP-Router Siemens N146)
 - o KNXnet/IP Tunneling-Schnittstelle (z.B. Siemens N148, nur exklusive Nutzung möglich!).
 - o TP-UART (seriell/RS232 oder mit unterstütztem USB-Seriell-Wandler).

- FT1.2/BCU2 (seriell/RS232 – alle Hersteller).
- USB (alle außer ABB USB/S 1.1).

2.4. Inbetriebnahme

- Verbinden Sie die Netzwerkschnittstelle per Netzwerkkabel (CAT5) mit einem Ethernet Hub, Switch oder mittels Crossover-Kabel direkt an den zur Inbetriebnahme genutzten PC.
- ggfs. anschließen der EIB/KNX-Schnittstelle
- Anschließen des/der 1-Wire to USB-Adapter.
- **Erst nach Anschluss aller Komponenten:** Anschließen der Stromversorgung mittels mitgeliefertem Steckernetzteil.
- **WICHTIG:** Beim erstmaligen Start nach der Auslieferung wird das geheime Schlüsselmaterial für den VPN-Server im Hintergrund erstellt, dieser Prozess dauert bis zu 45 Minuten.
In dieser Zeit sollte das Gerät nicht vom Strom getrennt werden!
- Aus Sicherheitsgründen erfolgt dies erst beim Endkunden, um eine Kompromittierung oder Duplikate auszuschließen.

Nun startet das Gerät und ist nach etwa 1-2 Minuten betriebsbereit. Die Betriebsbereitschaft wird durch fünf Bieptöne (2x kurz, 3x lang) signalisiert (außer VPN-Server s.o.)

- Im Auslieferungszustand erfolgt die IP-Adressvergabe per DHCP bzw. AutoIP, es sollte somit zur Inbetriebnahme keine weitere Netzwerkkonfiguration notwendig sein.

-> Sie können nun mittels Webbrowser auf dem PC die Konfiguration vornehmen. Geben Sie hierzu in der Adresszeile folgende Adresse ein:

<http://wiregateXXXX:10000> XXXX entspricht der laufenden Gerätenummer, die auf dem Etikett an der Unterseite des Geräts aufgedruckt ist.



Anmelden bei Webmin

Sie müssen einen Benutzernamen und ein Passwort zur Anmeldung am Webmin Server auf wiregate102 eingeben.

Benutzername

Passwort

Anmeldung dauerhaft speichern?

- Anschließend geben Sie den Benutzernamen („user“) und das Passwort (siehe Etikett auf der Unterseite des Geräts) ein.

2.4.1. Details zur IP-Konfiguration

Im Auslieferungszustand erfolgt die Namensauflösung mittels SMB/samba, damit Sie im Browser bequem den Hostnamen eingeben können. Zusätzlich läuft ein bonjour/zeroconf-Dienst für entsprechend konfigurierte Apple/Linux-Clients.

Sollte der Zugriff über den Namen wiregateXXX nicht möglich sein, müssen Sie die IP-Adresse des Gerätes anderweitig (DHCP-Server, arp-Tabelle, Netzwerksniffer) feststellen.

Alternativ kann die aktuelle IP-Konfiguration nach anstecken eines VGA-Monitors an der lokalen Konsole abgelesen werden.

2.4.2. EIB/KNX-Buszugriff konfigurieren

Unter dem Menüpunkt EIB/ KNX Buszugriff können Sie die Konfiguration der EIB-Schnittstelle vornehmen:



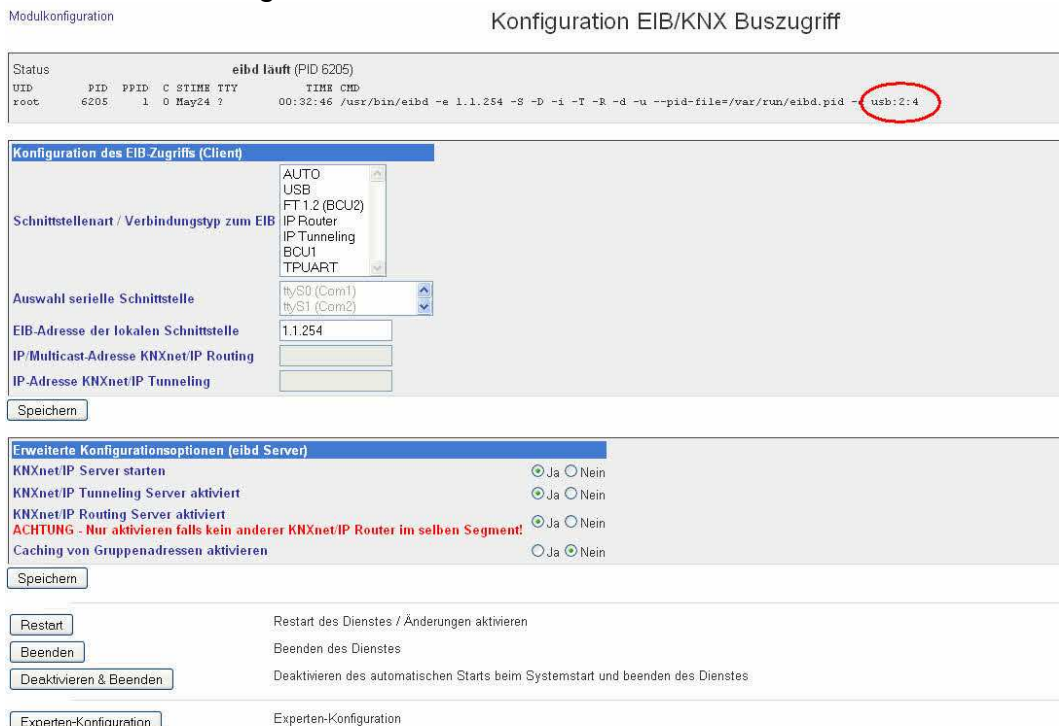
System hostname wiregate102
 Time on system Tue May 26 15:50:37 2009
 System uptime 17 days, 22 hours, 50 minutes
 CPU load averages 0.23 (1 min) 0.14 (5 mins) 0.09 (15 mins)
 Real memory 242.96 MB total, 182.28 MB used
 Local disk space 3.53 GB total, 954.41 MB used

Wartungsverbindung zu WireGate Central beenden

Wartungsverbindung:

- Weitere Details entnehmen Sie bitte der Online-Hilfe.

Ob und welche Schnittstelle bereits automatisch erkannt wurde, können Sie beim Aufruf der Konfigurationsseite sehen:



2.4.3. 1-Wire Sensoren konfigurieren

- Unter dem Menüpunkt Sensoren / Werte konfigurieren erfolgt die Konfiguration/Zuordnung der 1-Wire Sensoren:

The screenshot shows the WIREGATE web interface. At the top left, there is a 'Hilfe...' link and 'Modulkonfiguration'. The main menu contains several icons: 'Globale Einstellungen', 'LAN / Netzwerkeinstellungen', 'EIB', '1-wire Buszugriff', 'Sensoren / Werte konfigurieren' (circled in red), 'Seriiell/LAN Einstellungen', 'VPN Einstellungen', and 'Status'. Below the menu, system information is displayed:

System hostname	wiregate102
Time on system	Tue May 26 15:50:37 2009
System uptime	17 days, 22 hours, 50 minutes
CPU load averages	0.23 (1 min) 0.14 (5 mins) 0.09 (15 mins)
Real memory	242.36 MB total, 182.28 MB used
Local disk space	3.53 GB total, 954.41 MB used

At the bottom, there is a button 'Wartungsverbindung zu WireGate Central beenden' and a status indicator 'Wartungsverbindung: [green light]'.

- Die Einrichtung ist selbsterklärend, weitere Details entnehmen Sie bitte der Online-Hilfe.

This screenshot shows the top part of the WIREGATE web interface. The 'Hilfe...' link is circled in red. The 'Modulkonfiguration' text is visible below it. The WIREGATE logo is on the right side.

3. Installation der 1-Wire Sensoren / Topologie Verkabelung

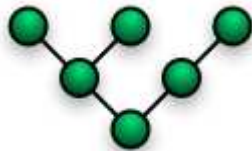
Vergessen Sie nun bitte erst einmal alles, was Sie bisher darüber gelesen haben. Das Wichtigste vorab: **Es ist ganz einfach!**

Topologie / Busaufbau / Verdrahtung:

- Leitung: z.B. Y(St)Y 2x2x0,6 oder Cat5 (gefordert sind lediglich verdrehte Adern ohne Schirmung)
- Optimal: Linie mit kurzen Abzweigen <3m; Gesamtlänge bis 300m möglich.



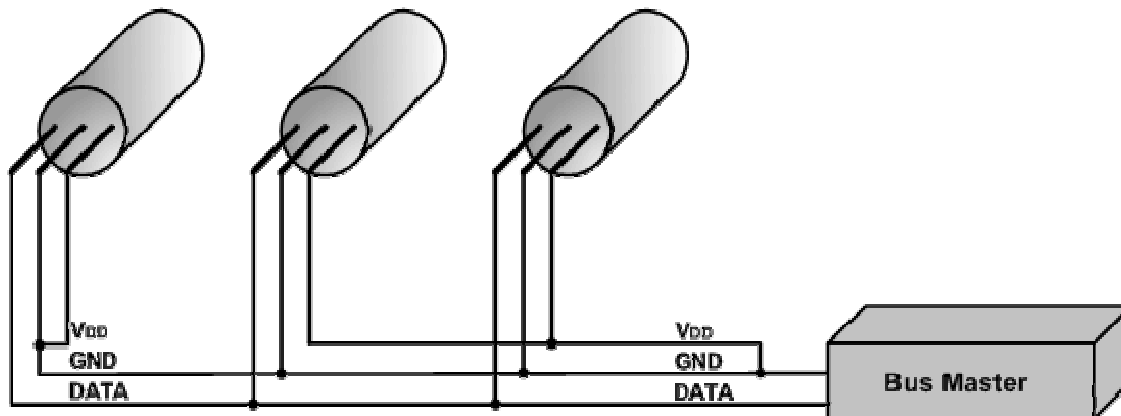
- Baum/Sternstrukturen: Bis 100m Gesamtlänge **und** weniger als 20 Sensoren können auch beliebige Baum/Sternstrukturen aufgebaut werden.



Dies gilt pro 1-Wire Bus, es können durch einfaches Anstecken mehrerer DS9490R Hostadapter, ggfs. über USB-Hubs quasi beliebig viele Busse (getestet bisher 15!) an einem WireGate angeschlossen werden.

Wichtig: Bitte sehen Sie von jeglichen „Optimierungsmaßnahmen“, gleich aus welcher Quelle ab! Keine zusätzlichen Stützkondensatoren, Widerstände, Dioden und dergleichen integrieren.

Installationsvariante „Parasitic Power“ (empfohlen):



Es werden lediglich zwei Adern am Busmaster angeschlossen: GND und DATA (DQ)
Wichtig: Der Anschluss V_{DD} jedes Sensors ist mit GND zu verbinden. Dies kann am Sensor, in Stockwerks-Klemmdosen oder am Busmaster erfolgen.

Der Sensor bezieht seine Spannungsversorgung hierbei „parasitär“ aus der DATA-Leitung. Damit hier ein ausreichend großer Strom geliefert werden kann ist ein Busmaster mit Strong-Pullup erforderlich. Die in unserem Shop erhältlichen Busmaster gewährleisten dies.

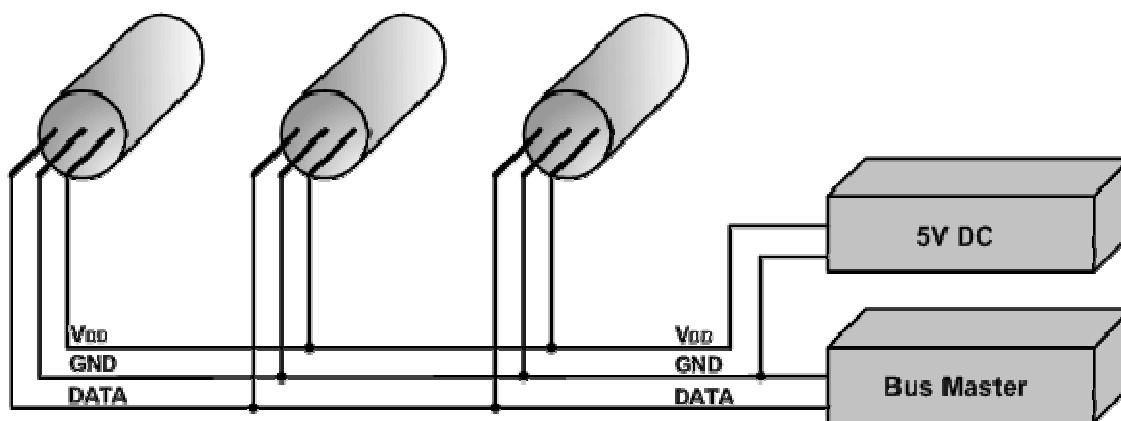
Einschränkungen:

- Nur bei Sensoren deren Datenblatt diesen Betrieb vorsieht (Temperatur, Luftfeuchte)
- Gesamt-Kabellänge pro Bus: $\leq 100\text{m}$
- Anzahl der Sensoren pro Bus: ≤ 20
- Eingeschränkter Messbereich: max: ca. 80°C
- Pin V_{DD} des Sensors ist mit GND zu verbinden!

Wir empfehlen diese Installationsvariante wegen dem geringeren Verkabelungsaufwand und wegen der Einsparung eines separaten Netzteiles.

Jedoch: Um alle Möglichkeiten zur späteren Erweiterung für Sensoren die eine zusätzliche Spannungsversorgung benötigen offenzuhalten, empfehlen wir, trotz parasitärem Anschluss der Temperatursensoren mit nur zwei Adern, soweit möglich mind. 3-4 Adern für 1-Wire zu verlegen und vorzusehen.

Installationsvariante mit eigener Spannungsversorgung:



Bei Verwendung anderer Sensoren die nicht für „Parasitic Power“ freigegeben sind (vor allem iButtonLink Multisensor) müssen separat 5V (stabilisiert) eingespeist werden.

An das separate Netzteil und den Busmaster müssen hierbei alle drei Anschlüsse des Sensors separat angeschlossen werden. Wichtig: GND des Netzteiles muss mit GND des Busmaster verbunden werden. Hinweis: Einige Hersteller vertreiben 1-Wire-Sensoren / Platinen die zusätzlich mit 12V gespeist werden müssen!

Empfehlung für die Verkabelung allgemein:

Es gibt zwei Installationsoptionen, die beliebig gemischt werden können:

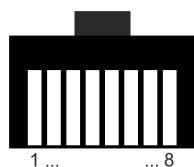
- Festverdrahtet, für den Elektroinstallateur „ganz normal“ mit geschirmten und paarweise verdrehten Installationskabel z.B. „**J-Y(St)Y 2x2x0,6**“, sowie in UP/AP-Dosen mit (Micro)Steckklemmen oder in der Verteilung auf Reihenklemmen bzw. LSA+-Leiste.
- **WICHTIG:** Für DATA und GND ist jeweils ein verdrehtes Pärchen zu verwenden! (bei J-Y(St)Y meist jeweils rt/sw und ge/ws)
- Steckbar: Wo lösbare Steckverbindungen bevorzugt werden: Mit handelsüblichen Cat5-Patchkabeln und Panels, RJ12 / RJ45-Steckern.

Belegung der Adern bei Nutzung mit Stecker

Farbe (z.B. J-Y(St)Y)	Farbe (WireGate Sensoren)	Funktion	RJ-12 6/6 Stecker	RJ-45 8/8 Stecker
Schwarz (sw)	Blau	Masse (GND)	4	5
Rot (rt)	Weiss	Data	3	4
			2	3
Gelb (ge)	Schwarz	V _{DD} (+5 VDC)	1	2

RJ-45 Stecker
(von vorne)

RJ-12 Stecker
(von vorne)



Belegung Temperatursensor DS18B20: (flache Seite vorne, Beinchen unten)



(BOTTOM VIEW)

1/links: GND
2/mitte: DATA (DQ)
3/rechts: V_{DD}

Praktische Hinweise:

- Die Schirme und Beilaufdrähte werden **nicht** angeschlossen und an Klemmstellen **nicht** durchverbunden.
- Wir empfehlen die Sensoren nacheinander anzuschließen und jeweils einen Suchlauf am WireGate zu starten und die Zuordnung (Name/Bezeichnung) vorzunehmen. Von uns bezogene Sensoren haben ein Etikett mit der Seriennummer, die bei der Installation einfach nur notiert werden sollte.

3.1. 1-Wire® im Detail

Die optimale Funktion des 1-Wire Bus wird im Prinzip nach unseren Erfahrungen vor allem von drei Parametern entscheidend bestimmt:

1. Auswahl des Busmasters und dessen optimale und fehlertolerante Ansteuerung. Diesen Part erledigt WireGate für Sie.
2. Summe der Länge aller Leitungen.
3. Verwendete Topologie

Falls Sie sich schon mit 1-Wire beschäftigt haben:

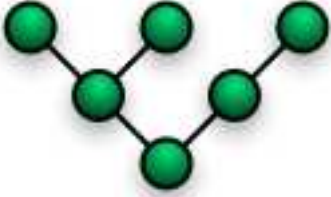
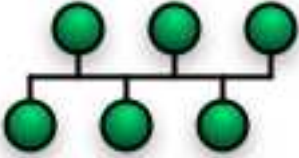


Die Hersteller sprechen hier, bei unterschiedlichsten Bedingungen bis weit über 500m mögliche Gesamtlänge. Dies ist zwar in der Praxis möglich, allerdings mit gewissen Risiken verbunden.

Wir weichen hier also bewusst vom verbreiteten Abschreiben der Herstellerangaben ab und interpretieren diese konservativ, weil es stark von vielen Parametern abhängt und es auch nicht darum geht einen Wettbewerb im Sensorweitwurf zu gewinnen.

Das Ergebnis soll eine zuverlässige, einfache und professionelle Lösung für Sensorik sein, die wir hiermit aufzeigen wollen. Keine Bastelei oder ein Längenweltrekord.

Mit der Übersicht über verschiedene Topologien wollen wir das Thema dann auch bereits schließen.

Tabellarische Übersicht Topologien:

Art:	Bezeichnung:	Zulässig/Länge:	Empfohlen:
1-Wire Installation als Linie mit Abzweigen	Baumstruktur 	Ja / max. 100m Gesamtlänge und <=20 Sensoren	Eingeschränkt, nur bei kleinen Installationen
als Linie mit kurzen Abzweigen	Baumstruktur, kurze Abzweige 	Ja / bis zu 300m möglich.	Ja, fast optimale Längenausdehnung möglich.
Wird auf die "Äste" verzichtet, alle Sensoren hängen hintereinander	Linie 	Ja / bis zu 300m möglich.	Ja, optimale Installation, maximale Reichweite möglich.
Alle Sensorleitungen werden an einem Punkt zusammen- geführt	Stern 	Ja / max. 100m Gesamtlänge und <= 20 Sensoren.	Eingeschränkt, nur bei kleinen Installationen
Wird ein Ende mit dem Anfang verbunden entsteht ein	=> Ring	Nein	Nein, keine Funktion

Für weitergehende Informationen sei auf die Anwendungshinweise des Herstellers Maxim verwiesen (in Englisch <http://pdfserv.maxim-ic.com/en/an/AN148.pdf>), an denen wir uns – allerdings sehr konservativ – auch zusätzlich zu eigenen Tests und Erfahrungen orientiert haben.

Wenn die bisher hier genannten Punkte und Grenzen berücksichtigt werden, ist ein weitergehendes Studium allerdings nicht notwendig.

4. Technische Daten

4.1. Technische Daten (Gateway):

- Schutzart (nach EN 60529): IP 20
- Betriebstemperatur: 0°C – 50°C
- Stromversorgung: 12V DC/1,2A, externes Schaltnetzteil (5,5/2,1mm, + innen), (100-240V, 50/60Hz)
Leistungsaufnahme im Normalbetrieb: ca. 5W
- Abmessungen BxHxT 176x30x174mm
- VESA Montage mit 4 Schrauben im Abstand von 100mm möglich
- EMV: erfüllt EN 61000-6-2, EN 61000-6-3 (2005)
- Einsatzgebiet / CE-Kennzeichnung gemäss EMV-Richtlinie (Wohn- und Zweckbau)
- CPU: 500 MHz AMD Geode (LX800) 5x86
- HW-Watchdog und AES-Beschleuniger in Chipsatz integriert
- DRAM: 256 MB SDRAM (fest)
- Speicher: 4GB Industrial CompactFlash für Betriebssystem und Daten

Schnittstellen (extern zugänglich):

- Ethernet 10/100 MBit, Auto-negotiation
- 1x D-Sub 9 / RS-232
- 2x USB 2.0 High-speed
- Audio: Line-in, Line-out, Mic, Kopfhörer
- VGA (D-Sub15)
- PS/2 für Tastatur/Maus (kombiniert)

Schnittstellen (nur intern – nicht für den Anwender zugänglich!)

- 1x miniPCI (für z.B. WLAN, SMA-Antennenausgang am Gehäuse vorhanden)
- 1x PCI 3,3V (in diesem Gehäuse nicht nutzbar)
- IDE-Anschluss (44 Pins)
- 2. serieller RS-232 Port (10 Pin Pfostenstecker)
- 2 weitere USB 2.0 (10 Pin Pfostenstecker)
- LPT (Drucker, 26 Pin Pfostenstecker)
- 24xGPIO
- Power+Reset-[Taster](#), Betriebs-, HDD(CF)-LED (nicht angeschlossen!)

4.2. Technische Daten (1-Wire Temperaturfühler):

- Messbereich: -55..85°C (2-Leiteranschluss), -55..12 5°C (3-Leiteranschluss).
- [Sensor](#): DS18B20+
- Anschluss: 2/3-Leiteranschluss (Data,GND,Vcc) an [1-Wire](#) Bus.
- Anschlussleitung: Silikon 1,5m (Anlege) / 3m (Tauchhülse)
- Schutzklasse: III (nach EN 60730).
- Schutzart: IP65 (nach EN 60529) für Anlegefühler, Tauchhülse: IP68

5. Entsorgung



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- Altgeräteentsorgung -
Lise-Meitner-Str. 1
85662 Hohenbrunn

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