

Hydra

Communication Engine for the European Installation Bus



Table of Contents

Introduction.....	3
System Requirements:.....	4
Minimum Hardware.....	4
Software Requirements.....	4
Additional Requirements.....	4
Recommended Environment for a standalone Solution.....	4
Installation.....	5
Linux.....	5
Windows.....	5
How does Hydra works ?.....	7
Restrictions.....	7
1-Wire®-Devices.....	8
Temperature Sensors.....	8
Humidity Sensors.....	8
Switch Devices.....	8
Screenshot.....	9
Frequently Asked Questions	10
When I doubleclick the icon, the command shell closes directly after startup.....	10
How can I change the default device address 0.0.0 ?	10
Hydra License.....	11

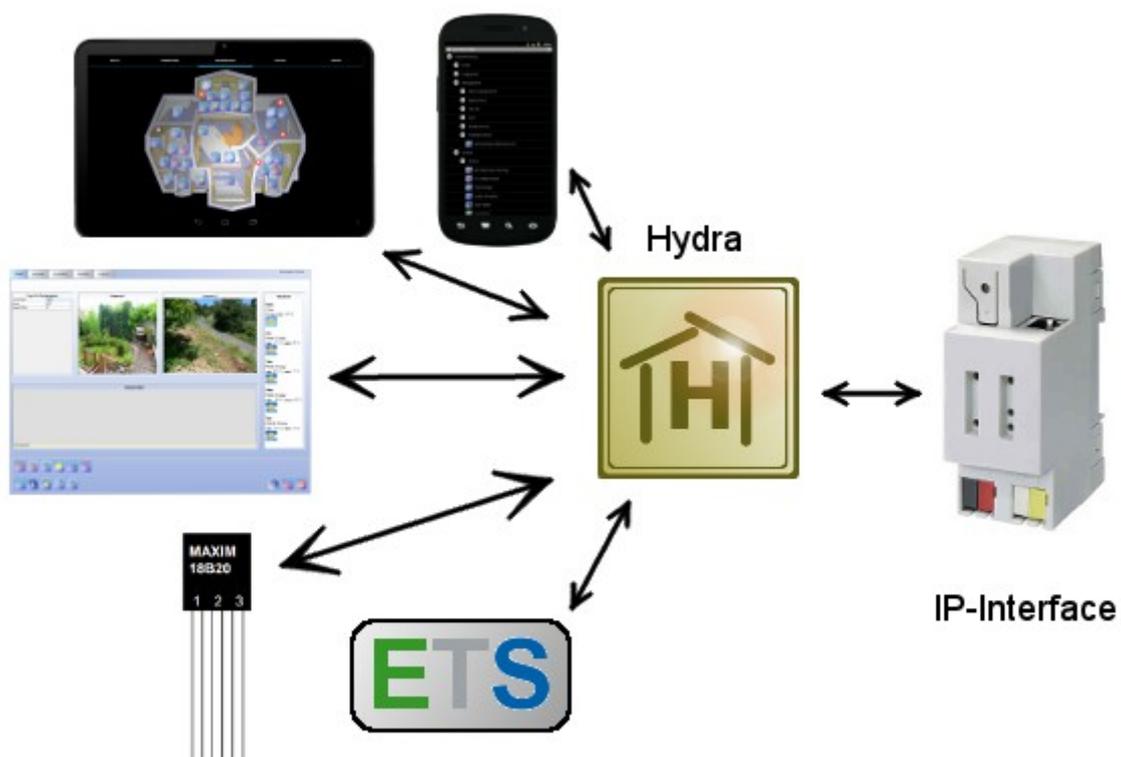
Introduction

Hydra is the communication engine for ConfluentiaBus, but can also be used as standalone solution for any product that connects via IP to the EIB/KNX tunnel protocol.

You can connect multiple clients to one IP Interface without the need of having a special EIB/KNX Router. All you have to do is start Hydra on a Windows or Linux server, connect to your IP interface and let your clients connect to Hydra.

Since version 0.8.0.1 Hydra supports 1-Wire® devices for integration in your KNX®-environment.

KNX® is a registered trademark of the KNX Association. 1-Wire® is a registered trademark of Dallas Semiconductor. Windows® is a registered trademark of Microsoft Corporation. Apple®, Macintosh® and Mac OS® are registered trademarks of Apple Inc. VIA C7® is a registered trademark of VIA Technology Incorporation .



System Requirements:

- Windows XP Service Pack 3
- Windows Vista Service Pack 2
- Windows 7, 8, 10
- Linux (e.g. Ubuntu)

Minimum Hardware

- Pentium 500 MHz
- 512 MB RAM
- 1 GB free hard drive space
- Network adapter

Software Requirements

- Java Runtime Environment 1.8 or greater

Additional Requirements

- IP-Interface to your Bus-Installation
- 3-ary groupaddresses
- no extended telegrams

Recommended Environment for a standalone Solution

- VIA C7 Processor 1,5 GHz
- 1 GB RAM
- 120 GB Hard Disk
- Linux (Ubuntu)

Installation

Linux

Please install java first, e.g. “sudo apt-get install openjdk-8-jre”

Extract the tarball-archive of Hydra in your home directory and switch to the newly created directory „Hydra“.

Start Hydra with the following command:

java -jar Hydra.jar

Hydra automatically finds the IP address of your interface.

If the IP-addresses were not found or you have multiple local ethernet interfaces or multiple EIB/KNX interfaces you might start Hydra with these parameters:

java -jar Hydra.jar -localIP:x.x.x.x:3671 -interfaceIP:y.y.y.y:3671

where x.x.x.x is the IP of your PC and y.y.y.y the IP of your EIB/KNX IP interface.

Example:

java -jar Hydra.jar -localIP:192.168.178.20:3671 -interfaceIP:192.168.17.100:3671

The number 3671 is the default port number of the UPD connection.

If you want to use network address translation start Hydra with the parameter **-NAT**

The 1-wire-function will be started automatically. Before using Hydra with this option, you have to install the 1-wire-drivers first. For Linux there are only drivers for COM-Ports available (not for USB). You find the driver in the rxtx-subdirectory. See the INSTALL-file for installation instructions.

If you want to install Hydra on a Raspberry Pi with a Raspbian image, follow these instructions:

1. Install the current RXTX-Java library: **sudo apt-get install librxtx-java**
2. Copy the files to the corresponding Java library directories:
sudo cp /usr/share/java/RXTXcomm.jar /usr/lib/jvm/jdk-8-oracle-arm-vfp-hflt/jre/lib/ext
sudo cp /usr/lib/jni/librxtxSerial.so /usr/lib/jvm/jdk-8-oracle-arm-vfp-hflt/jre/lib/arm/librxtxSerial.so

Windows

Launch the installer in administration mode and follow the dialogs. After the installation you have a new folder Hydra in your start menu.

Start Hydra by clicking on the icon. Hydra automatically finds the IP address of your interface.

If the IP-addresses were not found or you have multiple local ethernet interfaces or multiple EIB/KNX interfaces you might start Hydra with these parameters:

Installation

-localIP:x.x.x.x:portnumber

-interfaceIP:y.y.y.y:portnumber

where x.x.x.x is the IP of your PC and y.y.y.y the IP of your EIB/KNX IP interface.

If you want to use network address translation, start Hydra with the parameter -NAT

Right click on the icon, open *Properties*. Change the command line according to the following example:

Hydra.exe -localIP:192.168.178.20:3671 -interfaceIP:192.168.178.100:3671

The 1-Wire-Option is started automatically. Before using Hydra with this option, you have to install the 1-wire-drivers first. The drivers can be downloaded from http://www.maximintegrated.com/en/products/ibutton/software/tmex/download_drivers.cfm

How does Hydra works ?

Hydra connects to the EIB/KNX interface like a normal client that “speaks” the tunnel protocol. After having received a positive connection response it sends heartbeats to the interface (connection state requests / responses).

Now Hydra opens a listener channel to receive connection requests from other clients.

If a clients sends a connection request, Hydra answers with a connection response, stores all client parameters (channel id, ip address, sequence numbers, control- and data-port, etc.) and starts sending connection state requests (heartbeats).

The EIB/KNX tunnel protocol defines different handshake-mechanism to acknowledge the successful transport of the data packets. The difficulty is now to provide each client with the correct answer, so that client 1 does not receive the answer for client 2.

Hydra solves this problem by storing each specific state of the client, e.g. if Hydra receives a tunnel request acknowledge from the interface with sequential number 23, it looks which client waits for this acknowledge with the this sequential number. Asynchronous answers, e.g. a response from a group read will be directed to the client that waits for a response of this group address.

Furthermore group writes from your EIB/KNX components will be broadcasted to all clients.

Restrictions

- Maximum of three clients that can connect to one IP interface (Standard edition)
- Only one client per IP (add virtual IPs if you need more than one client per ethernet interface)
- Only tunnel protocol via IP is supported, no device configuration of the IP interface, no USB- or serial adapters supported
- Only 3-ary groupaddresses are supported
- No extended telegrams

1-Wire®-Devices

Hydra will search for connected 1-Wire® devices on startup and logs unconfigured 1-wire devices into a file "1wire_unconfigured.txt". Here you can find the IDs of your connected devices.

Open the file 1wire.cfg in your preferred texteditor.

Add one line for each object of a 1-Wire® device. An object is the equivalent to the KNX/EIB communication object.

Syntax: DeviceID-ObjectID Groupaddress Refresh Threshold Resolution

The threshold value can be a relative (add a percent sign after the value) or an absolute value (degree for temperatures and percentage for humidity). When using absolute values, do not add the unit at the end of the value!

Example for a temperature sensor mapped to the groupaddress 1/2/3. The value will be refreshed every 600 seconds, the temperature resolution is 0.25°, when the value differs by 0.5° or greater, it will be sent to the bus:

```
14000003BC7CAC28-0 1/2/3 600 0.5 0.25
```

The parameters resolution and threshold will be ignored by switch devices.

Currently the following 1-Wire® devices will be supported:

Temperature Sensors

Object 0: Temperature (read)

Humidity Sensors

Object 0: Humidity(read)

Switch Devices

Four objects for each channel:

Object 0: Channel 1: Latchstate (read)

Object 1: Channel 1: Level, if supported (read)

Object 2: Channel 1: Sensed Activity, if supported (read)

Object 3: Channel 1: Latchstate (write)

Object 4: Channel 2: Latchstate (read)

Object 5: Channel 2: Level, if supported (read)

Object 6: Channel 2: Sensed Activity, if supported (read)

Object 7: Channel 2: Latchstate (write)

... depending on the number of channels

Screenshot

```

C:\> Eingabeaufforderung
Apr 5, 2015 10:25:02 AM INFO Hydra v1.1.2.3
Apr 5, 2015 10:25:02 AM INFO Copyright 2010-2015 by Martin Mirgel
Apr 5, 2015 10:25:02 AM INFO Demoversion valid until 01/06/2015
Apr 5, 2015 10:25:11 AM INFO Found 1-wire interface (DS9490) USB1
Apr 5, 2015 10:25:12 AM CONFG Setting speedmode of adapter (DS9490) USB1 to normal
Apr 5, 2015 10:25:12 AM WARN Found unconfigured 1-wire device DS18B20 on (DS9490), USB1, Address: EB000003BC7A4128
Apr 5, 2015 10:25:12 AM WARN Found unconfigured 1-wire device DS1990A on (DS9490), USB1, Address: E90000003465C381
Apr 5, 2015 10:25:12 AM INFO Setting device address to 0.0.0
Apr 5, 2015 10:25:12 AM INFO Local socket bound to /192.168.178.50:3671
Apr 5, 2015 10:25:12 AM INFO Sender started successfully
Apr 5, 2015 10:25:12 AM INFO Receiver started successfully
Apr 5, 2015 10:25:12 AM INFO Connecting...
Apr 5, 2015 10:25:12 AM DEBUG Sending data to /192.168.178.20:3671: 06 10 02 05 00 1a 08 01 c0 a8 b2 32 0e 57 08 01 c0 a
8 b2 32 0e 57 04 04 02 00
Apr 5, 2015 10:25:12 AM DEBUG Received data from /192.168.178.20: 06 10 02 06 00 14 49 00 08 01 c0 a8 b2 14 0e 57 04 04
10 ff
Apr 5, 2015 10:25:12 AM CONFG Received Connection-Response from Interface
Apr 5, 2015 10:25:12 AM INFO Connected on channel 73
Apr 5, 2015 10:25:12 AM CONFG Sending heartbeat connection state request to interface
Apr 5, 2015 10:25:12 AM DEBUG Sending data to /192.168.178.20:3671: 06 10 02 07 00 10 49 00 08 01 c0 a8 b2 32 0e 57
Apr 5, 2015 10:25:12 AM DEBUG Received data from /192.168.178.20: 06 10 02 08 00 08 49 00
Apr 5, 2015 10:25:12 AM CONFG Received Connection-State-Response from Interface
Apr 5, 2015 10:25:12 AM CONFG Received heartbeat response from interface
Apr 5, 2015 10:25:12 AM CONFG Heartbeat ok
Apr 5, 2015 10:25:24 AM DEBUG Received data from /192.168.178.20: 06 10 04 20 00 16 04 49 00 00 29 00 bc d0 10 30 12 01
02 00 00 1d
Apr 5, 2015 10:25:24 AM CONFG Received Tunneling-Request from Interface
Apr 5, 2015 10:25:24 AM CONFG Frame from 1.0.48 to 2/2/1
Apr 5, 2015 10:25:24 AM CONFG L-Data Indication (Group-Write) on SeqNr.: 0
Apr 5, 2015 10:25:24 AM CONFG Sending Service Ack Tunneling-Acknowledge to /192.168.178.20 with sequence 0 on channel 7
3
Apr 5, 2015 10:25:24 AM DEBUG Sending data to /192.168.178.20:3671: 06 10 04 21 00 0a 04 49 00 00
Apr 5, 2015 10:25:24 AM DEBUG Received data from /192.168.178.20: 06 10 04 20 00 16 04 49 01 00 29 00 bc e0 10 ff 12 24
02 00 00 1c
Apr 5, 2015 10:25:24 AM CONFG Received Tunneling-Request from Interface
Apr 5, 2015 10:25:24 AM CONFG Frame from 1.0.255 to 2/2/36
Apr 5, 2015 10:25:24 AM CONFG L-Data Indication (Group-Write) on SeqNr.: 1
Apr 5, 2015 10:25:24 AM CONFG Sending Service Ack Tunneling-Acknowledge to /192.168.178.20 with sequence 1 on channel 7
3
Apr 5, 2015 10:25:24 AM DEBUG Sending data to /192.168.178.20:3671: 06 10 04 21 00 0a 04 49 01 00
Apr 5, 2015 10:25:27 AM CONFG Sending heartbeat connection state request to interface
Apr 5, 2015 10:25:27 AM DEBUG Sending data to /192.168.178.20:3671: 06 10 02 07 00 10 49 00 08 01 c0 a8 b2 32 0e 57
Apr 5, 2015 10:25:27 AM DEBUG Received data from /192.168.178.20: 06 10 02 08 00 08 49 00
Apr 5, 2015 10:25:27 AM CONFG Received Connection-State-Response from Interface
Apr 5, 2015 10:25:27 AM CONFG Received heartbeat response from interface
Apr 5, 2015 10:25:27 AM CONFG Heartbeat ok
Apr 5, 2015 10:25:28 AM DEBUG Received data from /192.168.178.20: 06 10 04 20 00 17 04 49 02 00 29 00 bc e0 10 06 0b 0d
03 00 00 00 bd

```

Frequently Asked Questions

When I doubleclick the icon, the command shell closes directly after startup.

Probably there is an error at startup (e.g. no interface found, interface busy). Start the program from a command shell to see the error-messages.

How can I change the default device address 0.0.0 ?

You can set an individual device address by providing it with the parameter **-deviceAddress:<device-address>**, e.g. **-deviceAddress:0.0.1** for the device address 0.0.1.

Hydra License

<https://www.confluentibus.com>

Copyright (C) 2010-2017, Martin Mirgel.

This license (the "License") is a legal agreement between you (either an individual or a single entity) and Martin Mirgel covering the use, installation, copying or distribution of "Hydra".

Please read the license terms below. If you do not agree to all of the terms and conditions of this License, then do not use, install, copy, or distribute Hydra. In addition, if you paid a license fee to Martin Mirgel or an authorized Hydra reseller, you may return to Martin Mirgel a copy of the registration code and a signed affidavit of De-Installation and Non-Use within fifteen (15) days after purchase, for a full refund of the license fee, detracted of any purchase specific fees and expenses already paid or to be paid by Martin Mirgel, including refund related costs.

TERMS AND CONDITIONS

1. Your Agreement to this License

This License applies to the Hydra and any accompanying distributable files, data and materials. You should carefully read the following terms and conditions before using, installing, copying, or distributing Hydra. Unless otherwise agreed in a writing signed by to Martin Mirgel, your use, installation, copying, or distribution of Hydra indicates your acceptance of this License.

The terms and conditions of this License describe the permitted use of each Licensed Copy of Hydra and non licensed copies of Hydar for demonstration purposes.

2. Scope of License

Martin Mirgel grants to you, for each licensed copy, a limited, non-exclusive, non-transferable, royalty-free license to use, install, copy or distribute Hydra.

All rights of any kind in Hydra which are not expressly granted in this License are entirely

Hydra License

and exclusively reserved to and by to Martin Mirgel. Hydra is protected by applicable national and international laws and treaties.

You may use, install, copy and distribute Hydra solely as expressly provided in this License. You may not rent, lease, loan, sub-license, modify, translate, reverse engineer, decompile, disassemble, or create derivative works based on, Hydra, in whole or in part, nor permit anyone else to do so. You may not make access to Hydra available to others in connection with a service bureau, application service provider, or similar business, nor permit anyone else to do so.

It is agreed that in exchange for the license set forth herein, you will pay a onetime license fee. The fee value will be specified on the official web site of Martin Mirgel at the moment of the purchase.

3. License Models

When purchasing a license, you will have the option to choose the following models, which restricts your rights of usage and integration of Hydra under the terms of this license:

- a). Standard-Installation: Three channels, i.e. three clients can connect via Hydra to one IP interface.
- b). Additional Clients: One additional client to connect to the via Hydra to the IP interface.
- c). Additional Options
- d.) Free Version: The same as a). with a maximum number of 2 clients.

License fees may be different depending on the license model.

4. License Validity

This license is not valid to competitors of Hydra or ConfluentiaBus.

5. Unlicensed Copies

If you did not pay for a non-free license, you may use unlicensed copies of Hydra for the exclusive purpose of demonstration. In this case you will be using Hydra in "demo mode". Without derogating from the forgoing, you may not use Hydra in "demo mode" for commercial purposes. Hydra shall be used only for evaluation purposes and may not be used or disclosed for any other purposes, including without limitation, external distribution

or software development. You may not remove demo notices from the interface nor disable the ability to

display such notices or modify Hydra. Product support is not offered for Hydra in "demo mode".

6. Upgrades

Martin Mirgel will provide you with free upgrades of Hydra within its purchased version, i.e. if you purchased version 1.1, all versions that begin with 1.1 are free. Such upgrades will include any upgrades for Hydra that are released by Martin Mirgel for general distribution to Hydra licensees. Martin Mirgel has no obligation to provide you with any upgrades that are not released for general distribution. Nothing in this Agreement shall be construed to obligate Martin Mirgel to provide upgrades to you under any circumstances.

7. Reservation of Rights and Ownership

Martin Mirgel reserves all rights not expressly granted to you in this License. Hydra is protected by copyright and other intellectual property laws and

treaties. Martin Mirgel owns the title, copyright, and other intellectual property rights in Hydra, its files and its Source Code. This License does not grant you any rights to trademarks or service Hydra brands.

8. Termination

Without prejudice to any other rights, Martin Mirgel may terminate this License if you fail to comply with the terms and conditions of this License. In such

event, your right to use, install, copy and distribute Hydra terminates automatically and you must then destroy all copies of Hydra in your possession.

9. Warranty

Martin Mirgel represents and warrants that he has full title and ownership to Hydra and has the authority to grant the license hereunder. To the best of Martin Mirgel's knowledge Hydra does not infringe upon the intellectual property rights of any third party and that he did not receive any notice regarding any alleged infringement thereof.

10. Disclaimer of Warranties

Hydra and its related material are provided "AS IS" and without warranty of any kind and the Owner expressly disclaims all other warranties, expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

11. EXCLUSION OF INCIDENTAL, CONSEQUENTIAL AND CERTAIN OTHER DAMAGES. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL MARTIN MIRGEL BE LIABLE FOR ANY SPECIAL, INCIDENTAL, PUNITIVE, INDIRECT, OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFITS OR CONFIDENTIAL OR OTHER INFORMATION, FOR BUSINESS INTERRUPTION, FOR PERSONAL INJURY, FOR LOSS OF PRIVACY, FOR FAILURE TO MEET ANY DUTY INCLUDING OF GOOD FAITH OR OF REASONABLE CARE, FOR NEGLIGENCE, AND FOR ANY OTHER PECUNIARY OR OTHER LOSS WHATSOEVER) ARISING OUT OF OR IN ANY WAY RELATED TO THE USE OF OR INABILITY TO USE HYDRA, THE PROVISION OF OR FAILURE TO PROVIDE SUPPORT OR OTHER SERVICES, INFORMATION, SOFTWARE, AND RELATED CONTENT THROUGH HYDRA OR OTHERWISE ARISING OUT OF THE USE OF HYDRA, OR OTHERWISE UNDER OR IN CONNECTION WITH ANY PROVISION OF THIS LICENSE, EVEN IN THE EVENT OF THE FAULT, TORT (INCLUDING NEGLIGENCE), MISREPRESENTATION, STRICT LIABILITY, BREACH OF CONTRACT, AND EVEN IF MARTIN MIRGEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

12. Limitation of Liability

In no event shall Hydra's liability exceed the license fee paid, if any.

END OF TERMS AND CONDITIONS