

Status of the documentation:
31.07.2014

KNX IP interface

Order No. 2168 00



Table of Contents

1	<u>Product definition</u>	<u>4</u>
1.1	Product catalogue	4
1.2	Accessories.....	4
1.3	Application	4
2	<u>Installation, electrical connection and operation</u>	<u>5</u>
2.1	Safety instructions	5
2.2	Device design.....	6
2.3	Installation and electrical connection	7
2.4	Start-up	9
2.5	Operation	10
3	<u>Technical data.....</u>	<u>12</u>
4	<u>Software description</u>	<u>13</u>
4.1	Software specification	13
4.2	Software "KNX/IP interface 901410"	14
4.2.1	Range of functions.....	14
4.2.2	Information on the software	15
4.2.3	Object table	16
4.2.4	Functional description.....	17
4.2.5	State of delivery.....	18
4.2.6	Parameters.....	19
5	<u>Appendix</u>	<u>20</u>
5.1	Operation in the ETS3.....	20
5.2	Operation in the ETS4.....	24

6	<u>License Agreement for the KNX/IP interface software</u>	28
6.1	Definitions	28
6.2	Subject matter of the agreement	28
6.3	Rights of use of the KNX/IP interface software	28
6.4	Restriction of rights of use	29
6.5	Ownership, secrecy	30
6.6	Changes, additional deliveries	30
6.7	Warranty	30
6.8	Liability	31
6.9	Applicable law	31
6.10	Termination	31
6.11	Subsidiary agreements and changes to the agreement	31
6.12	Exception	31
7	<u>Open Source Software</u>	32
7.1	GNU GPL, Version 2, June 1991	33
7.2	GNU LGPL, Version 2.1, February 1999	38

1 Product definition

1.1 Product catalogue

Product name: KNX/IP interface
Application: IP interface
Design: DRA (series installation)
Order No.: 2168 00

1.2 Accessories

Additional power supply
Order No.: 1296 00
KNX/EIB power supply 320 mA
Order No.: 1086 00

1.3 Application

The KNX/IP interface connects an Instabus KNX/EIB line to a data network (Ethernet) using the Internet Protocol (IP). It utilises the KNXnet/IP standard (tunneling) so that bus access is possible from a PC or other data processing devices via an IP network.

The KNX/IP interface can be used with the ETS 3.0 Version "f" or higher or the ETS 4.0 or higher.

The device supports up to 4 KNXnet/IP tunneling connections and thus enables parallel bus access, e.g. via the ETS and other PC software.

It has an integrated switch with two RJ45 connections. This enables several KNX/IP interfaces or other IP devices to be connected to the distribution without the aid of other active components.

The KNX/IP interface requires a separate power supply 24..30V DC $\pm 10\%$ to operate. The KNX/IP interface is supplied with power by this operating power connection.

2 Installation, electrical connection and operation

2.1 Safety instructions

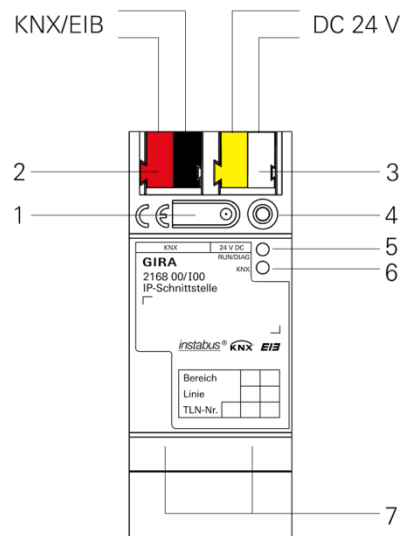
Installation and mounting of electrical devices may only be carried out by a qualified electrician. In doing so,

the applicable accident prevention regulations must be observed.

Failure to observe the installation instructions can result in damage to the device, fire or other dangers.

Please see the operating instructions enclosed with the device for more information.

2.2 Device design



Dimensions:

Width (W):
36 mm (2 HP)

Height (H):
90 mm

Depth (D):
74 mm

Figure 1: KNX/IP interface

1 Programming button

2 KNX connection

3 External power supply connection* 24..30V DC $\pm 10\%$.

4 Programming LED (red)

on: programming mode on
off: programming mode off

5 LED operation indication (green)

on: ready for operation
flashing: diagnosis code

6 LED KNX (yellow)

on: KNX is connected
off: KNX is not connected
flashing: data on KNX line

7 Ethernet connection

- 10/100 speed (green)
 - on: 100 Mbit/s
 - off: 10 Mbit/s
- link/ACT (orange)
 - on: link to IP network
 - off: no connection
 - flashing: data reception on IP

2.3 Installation and electrical connection



DANGER!

Electric shock if live parts are touched. Electric shock may lead to death. Isolate connection cables before working on the device. Cover up live parts in the vicinity!

Installing the device

- Snap the cap rail on according to DIN EN 60715. Network connection must be located on the bottom.
- ❗ A KNX/EIB data rail is not necessary.
- ❗ Observe temperature range (0 °C...+45 °C) and ensure sufficient cooling if necessary.

Connecting the device

- Connecting the KNX/EIB bus to the KNX connection of the interface (2) with a KNX/EIB connection terminal.
- Connecting the external power supply* to the power supply connection (3) of the interface using a KNX/EIB connection terminal (preferably yellow/white).
- Connecting one or two network lines to the network connection of the interface (7).

*: The non-choked output of a KNX/EIB power supply unit can also be used as an external power supply. Ensure that the maximum quantity of KNX/EIB devices which can be operated with the KNX/EIB power supply unit is reduced accordingly.

Mounting / removing the cover cap

A cover cap can be mounted for secure isolation to protect the bus connection / power supply connection from dangerous voltage, particularly in the connection area.

The cap is mounted with an attached bus and power supply terminal and a connected bus and power supply line to the rear.

- Mounting the cover cap: The cover cap is pushed over the bus terminal (compare with Figure 2.A) until it engages noticeably.
- Removing the cover cap: The cover cap is removed by pressing it in slightly on the side and pulling it off to the front (compare with Figure 2.B).

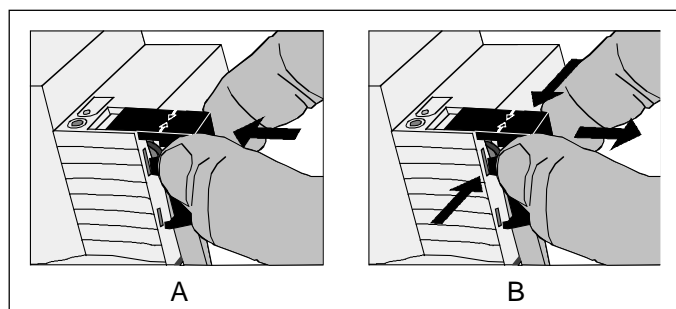


Figure 2: Mounting / removing the cover cap

2.4 Start-up

After installing the device and connecting the bus line, power supply and Ethernet, the device can be started up.

The following physical addresses are factory preset

Interface	15.15.255
-----------	-----------

This address has to be reprogrammed in order to be able to use the device. In addition, the application program should be imported.

Programming the physical address of the interface

Programming is done in the programming environment of the ETS (3.0f, 4.0 or higher). An additional KNX/EIB data interface is not required for programming. A connection to the device can be established via IP or KNX.

- Ensure that the device and bus voltage are switched on
- Ensure that the programming LED (4) is not illuminated.
- Press the programming button (1).
Programming LED (4) lights up red
- Program the physical address using the ETS.
Programming LED (4) goes out after a successful programming process.
- Make note of the physical address on the device
- If the device was programmed without an additional KNX/EIB data interface, the tunneling connection must be set up again after the programming process.

Programming application programmes and configuration data

After programming the physical address, the application program for the interface must be imported to the device. A connection to the device can be established via IP or KNX.

- Ensure that the device and bus voltage are switched on
- Parameterise the respective device accordingly in the ETS
- Import the software to the device
- Start-up is complete
- If the device was programmed without an additional KNX/EIB data interface, the tunneling connection must be set up again after the programming process.

2.5 Operation

The KNX/IP interface features 3 status LEDs on the top of the housing and 4 status LEDs on the network connection. In addition, there is a programming button with which the interface can be put into programming mode.

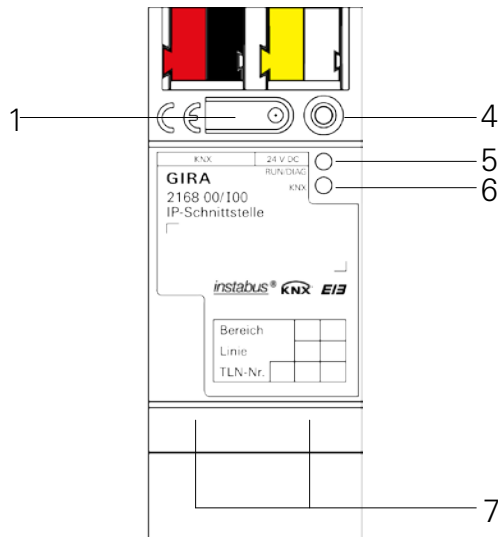


Figure 3: KNX/IP interface

1 Programming button

4 Programming LED (red)

on: programming mode on
off: programming mode off

5 LED operation indication (green)

on: ready for operation
flashing: diagnosis code

6 LED KNX (yellow)

on: KNX is connected
off: KNX is not connected
flashing: data on KNX line

7 Ethernet connection

- 10/100 speed (green)
 - on: 100 Mbit/s
 - off: 10 Mbit/s
- link/ACT (orange)
 - on: link to IP network
 - off: no connection
 - flashing: data reception on IP

Diagnosis codes

The current device status can be concluded using the operation indication (5):

- LED off: device is not switched on or not yet completely powered up.
- LED on: device is ready for operation.
- LED flashes slowly (~1Hz): Device is not configured or was configured with impermissible parameters. The physical address must be set for the interface and the application program must be imported to the device with permissible parameters for the LED to stop flashing. See "2.4 Start-up" for more details.
- LED flashes quickly (~4Hz): internal device error. Please contact support.

LED status when starting up the device

When the device is started up properly, the yellow LED (6) flashes when the operating voltage is applied, thus signalling the start-up process. As soon as the device has completely started up, the green LED (5) lights up continuously if the device is already parameterised, or it flashes according to the diagnosis codes. From this time on, the yellow LED (6) signals the KNX bus status and KNX telegrams.

A self-test is carried out when the device is started up. If an error occurs here, the yellow LED (6) and the green LED (5) flash alternately directly after the operating voltage is applied. In this case, please contact support.

3 Technical data

KNX medium	TP
Start-up mode	S mode (ETS)
KNX supply	DC 21...30V SELV
KNX connection	Bus connection terminal
External supply	
Voltage	DC 24..30V \pm 10%
Connection	connection terminal
Power consumption	typically 2W (for 24V DC, 2 Ethernet lines connected)
IP communication	Ethernet 10 /100 BaseT (10/100 MBit)
IP connection	2 x RJ45
Supported protocols	ARP, ICMP, IGMPv3, UDP/IP, DHCP, AutoIP KNXnet/IP in compliance with KNX system specification: core, tunneling, device management
Ambient temperature	0 °C to +45 °C
Storage temperature	-25 °C to +70 °C
Installation width	36 mm (2 HP)
Installation height	90 mm
Installation depth	74 mm
Protection type	IP20 (compliant with EN60529)
Protection class	III (compliant with IEC 61140)
Test marks	KNX, CE

4 Software description

4.1 Software specification

ETS search paths: - Communication / IP interface/ KNX/IP interface

Configuration: S-mode standard

Applications:

No.	Brief description	Name	Version
1	KNX/IP interface	KNX/IP interface 901410	1.0

4.2 Software "KNX/IP interface 901410"

4.2.1 Range of functions

- Simple connection to higher-level network systems by using the Internet Protocol (IP)
- Direct access from each point in the IP network to the KNX/EIB installation (KNXnet/IP tunneling)
- Simple configuration with the ETS 3/4
- Support of up to 4 parallel KNXnet/IP tunneling connections
- Support of a bus monitor connection
- Simple connection of visualisation systems and facility management systems

4.2.2 Information on the software

- The KNX/IP interface can be parameterised for ETS 3.0f or higher.
- When using ETS 3.0f, the Falcon must be updated to Version 2.0. The update can be obtained from the KNX homepage (<http://www.knx.org>) free of charge.

4.2.3 Object table

Number of communication objects: 0

4.2.4 Functional description

IP address assignment

The device's IP address can either be assigned manually or via a DHCP server. This can be configured using the "IP address assignment" parameter on the "General" parameter page.





For the "Manual entry" setting, the values which are preset on the "IP address", "IP subnet mask" and "IP standard gateway" parameter pages are valid for the interface. In the state of delivery, the interface gets its IP address from a DHCP server.

For the "From DHCP service" setting, a DHCP interface must assign the KNX/IP interface a valid IP address. If there is not a DHCP server available for this setting, the interface starts up after a certain waiting time with an AutoIP address (address range from 169.254.1.0 to 169.254.254.255). As soon as a DHCP server is available, the device is automatically assigned a new IP address.

4.2.5 State of delivery

Physical address	15.15.255
physical address of the tunneling connections	15.15.255
Device name	Gira KNX/IP interface
IP address assignment	from DHCP service
IP address	DHCP
IP subnet mask	DHCP
IP standard gateway	DHCP

4.2.6 Parameters

Description:	Values:	Comments:
 General		
Device name (maximum of 30 characters)	max. 30 characters, Gira KNX/IP interface	Via this parameter, the KNX/IP interface receives a unique name of a maximum of 30 characters which serves the simple recognition of the device when searching with a KNXnet/IP visualisation or with the ETS.
IP address assignment	From DHCP service manual entry	Defines if the IP address of the device is assigned manually or automatically (by the DHCP server).
 IP address		
IP address		
Byte 1 (0...255)	0..255, 192	Defines the IP address of the KNX/IP interface if manual address assignment is activated. The address is compiled of 4 individual bytes. Default is 192.168.0.10. If invalid parameters are configured (e.g. a gateway which does not match the set IP address or the configured DNS addresses), the device is automatically set to DHCP and the green LED begins to flash slowly (~1Hz).
Byte 2 (0...255)	0..255, 168	
Byte 3 (0...255)	0..255, 0	
Byte 4 (0...255)	0..255, 10	
 IP subnet mask		
IP subnet mask		
Byte 1 (0...255)	0..255, 255	Defines the IP subnet mask of the KNX/IP interface if manual address assignment is activated. The mask is compiled of 4 individual bytes. Default is 255.255.255.0.
Byte 2 (0...255)	0..255, 255	
Byte 3 (0...255)	0..255, 255	
Byte 4 (0...255)	0..255, 0	
 IP standard gateway		
IP standard gateway		
Byte 1 (0...255)	0..255, 0	Defines the IP address of the standard gateway if manual address assignment is activated. The address is compiled of 4 individual bytes. Default is 0.0.0.0.
Byte 2 (0...255)	0..255, 0	
Byte 3 (0...255)	0..255, 0	
Byte 4 (0...255)	0..255, 0	

5 Appendix

5.1 Operation in the ETS3

Via an IP data network and a KNX/IP interface, a direct connection can be established from a PC or other data processing devices in the networks (e.g. visualisations) to the KNX/EIB. Thus, access to the bus is possible from every point in the IP data network.

The ETS3 and ETS4 facilitate the configuration of KNX/EIB installations via the existing IP data network and use the KNX/IP interface such as a conventional serial RS232 or USB data interface to communicate with the bus. This also includes downloading from bus devices or the function of the group monitor or the bus monitor.

For stable communication via KNXnet/IP tunneling, a second physical address (similar to the local physical address for an RS232 or USB connection) must be set via the ETS3 or ETS4.

The following steps must be carried out to configure the communication interfaces:

1. First the ETS3 must be started and the option dialogue of the communication properties must be called up
(Extras → Options → Kommunikation (Tools/Options/Communication) – compare with Figure 7).

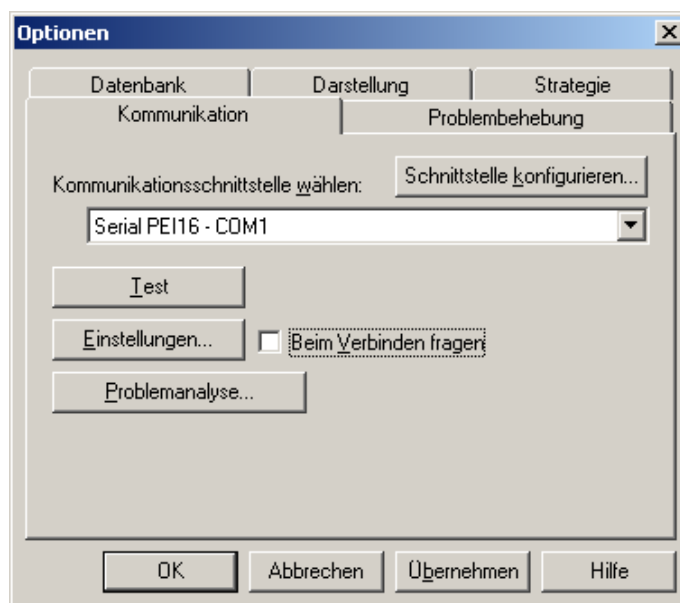


Figure 4: Option dialogue of the communication properties of the ETS3

2. Select the "Schnittstelle konfigurieren" (Configure interface) button. The "ETS Connection Manager" window opens (compare with Figure 8).

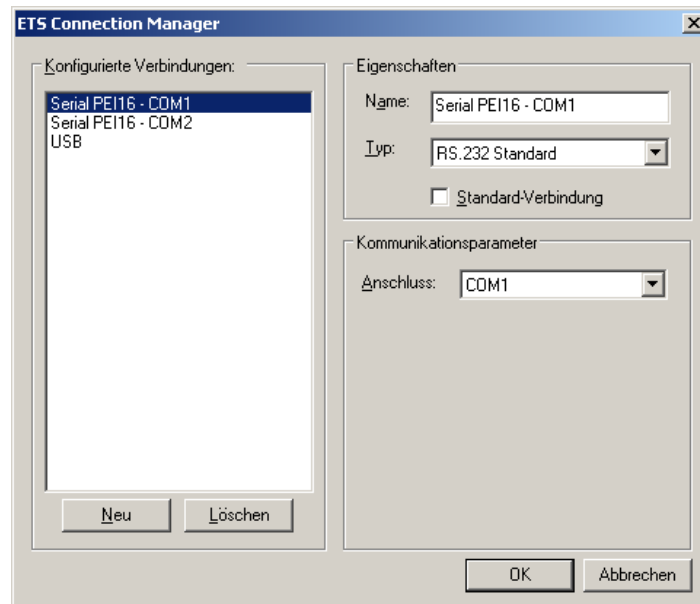


Figure 5: ETS Connection Manager

3. Create a new connection. For this, select the "Neu" (New) button. Give the new connection a unique name. Select "KNXnet/IP" as type (compare with Figure 9). Subsequently the ETS automatically searches the IP data network for available IP communication devices.

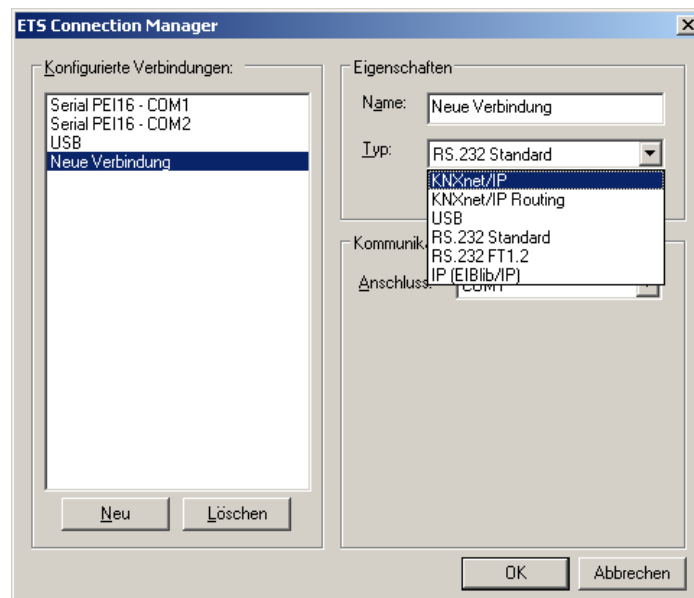


Figure 6: Create new connection as KNXnet/IP

4. In the "KNXnet/IP Gerät" (KNXnet/IP device) device list, all KNX/IP interfaces found in the IP network are listed (compare with Figure 10). The name assigned in the ETS (default "Gira KNX/IP Schnittstelle") (Gira KNX/IP interface) and the IP address of the KNX/IP interface are displayed. Any (P) which might follow this information signals an activated programming mode. In this way, individual devices can also be identified specifically in systems with several interfaces. In the device list, the KNX/IP interface must be selected which should serve as a "data interface" in the configured connection.

By clicking the "Erneut scannen" (Scan again) button, the ETS begins an additional scan process and again searches the IP network for IP interfaces.

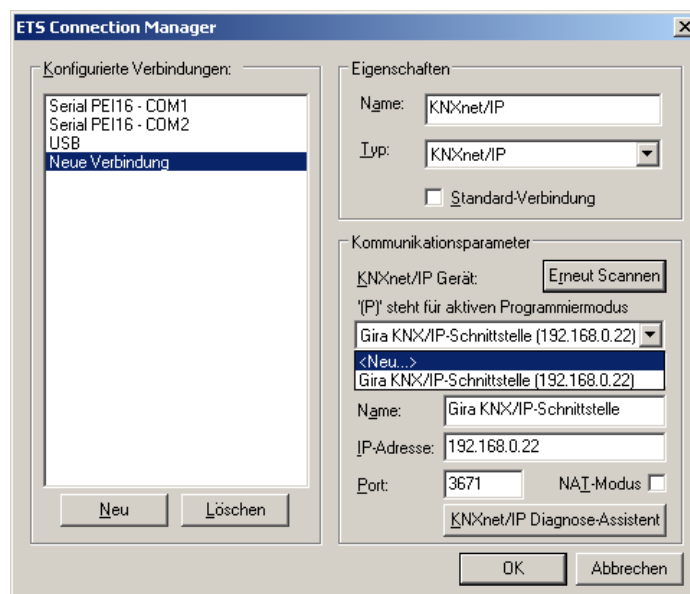


Figure 7: Device list under communication parameters with all IP interfaces found

5. Subsequently the configuration of the new connection can be completed by clicking the "OK" button. The communication parameters (compare with Figure 11) should remain unchanged.

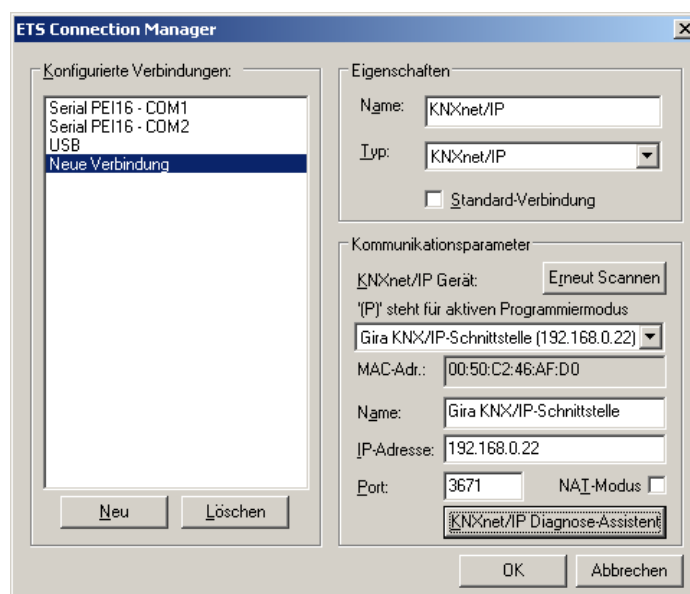


Figure 8: Complete interface configuration of the KNX/IP interface

- For stable communication via KNXnet/IP tunneling, a second physical address (similar to the local physical address for an RS232 or USB connection) must be set via the ETS. For this, select the new KNXnet/IP connection as the interface in the option dialogue of the communication properties (compare with Figure 12) and click the "Einstellungen" (Settings) button.

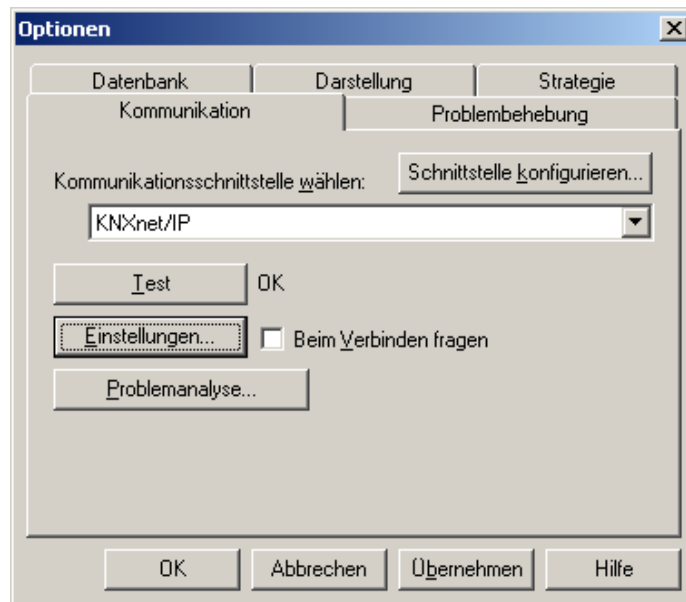


Figure 9: Select communication interface KNXnet/IP and open settings

- The settings of the local interface open (compare with Figure 13). In the "Physical address" field, the physical address of the IP data interface must now be entered. It must be ensured that an address from another device in the ETS project is not used (if necessary, check using the ETS "Is the address free?"). Following successful address assignment, a dummy device should be inserted in the ETS project at the topologically correct position.
In the state of delivery, the physical address "15.15.255" is preset.
By clicking the "OK" button, configuration of the IP data interface is completed. The IP connection can then be used.

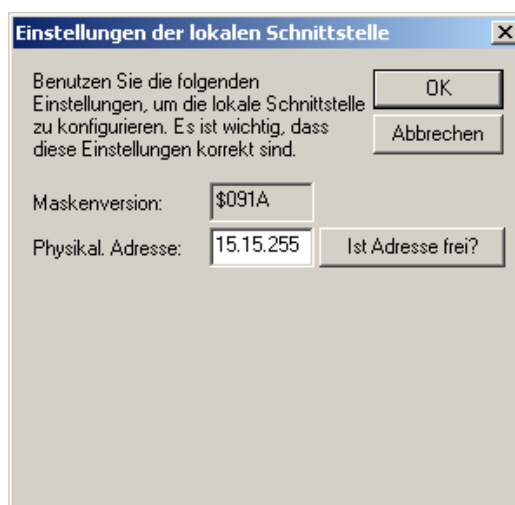


Figure 10: Settings of the local interface

NEW

5.2 Operation in the ETS4

Via an IP data network and a KNX/IP interface, a direct connection can be established from a PC or other data processing devices in the networks (e.g. visualisations) to the KNX/EIB. Thus, access to the bus is possible from every point in the IP data network.

The ETS3 and ETS4 facilitate the configuration of KNX/EIB installations via the existing IP data network and use the KNX/IP interface such as a conventional serial RS232 or USB data interface to communicate with the bus. This also includes downloading from bus devices or the function of the group monitor (no support of the bus monitor mode).

For stable communication via KNXnet/IP tunneling, a second physical address (similar to the local physical address for an RS232 or USB connection) must be set via the ETS3 or ETS4.

The following steps must be carried out to configure the communication interfaces:

1. First the ETS4 must be started and the settings for communication must be opened (Einstellungen -> Kommunikation (Settings/Communication) – compare with Figure 14)

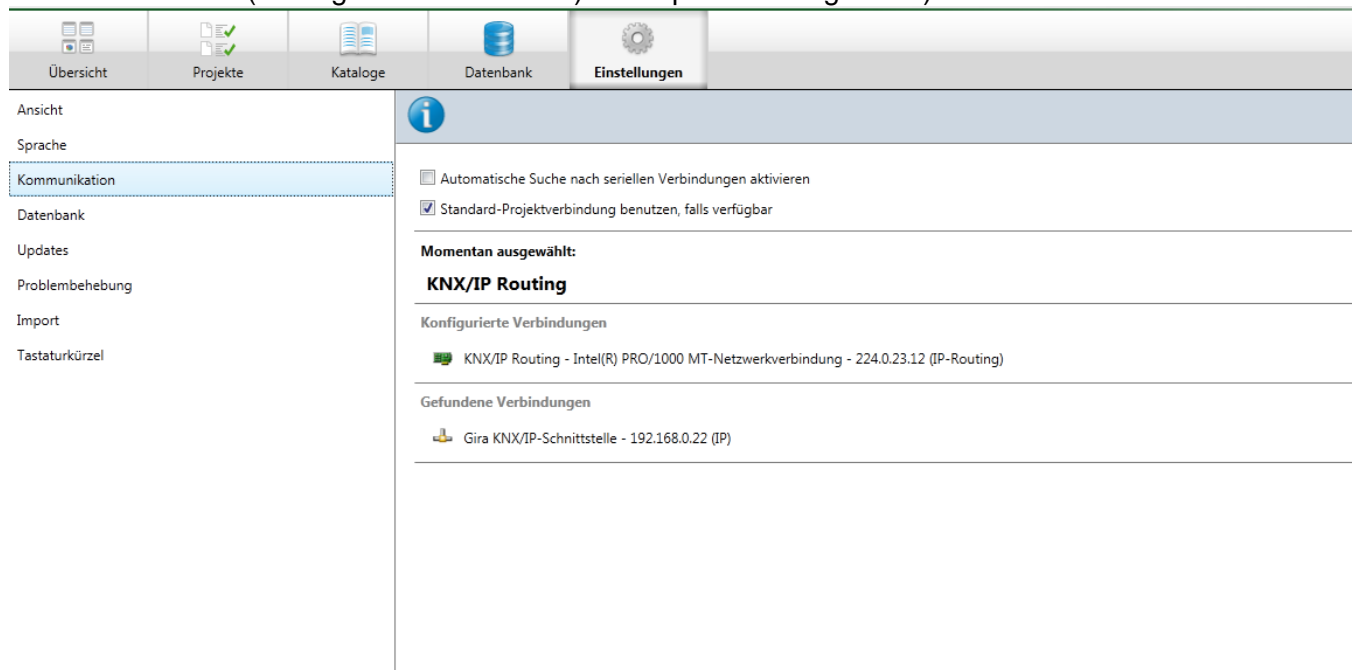


Figure 11: Communication settings in the ETS4

2. Then select the KNX/IP interface in the device list under "Gefundene Verbindungen" (Connections found) and click on "Auswählen (Select)".

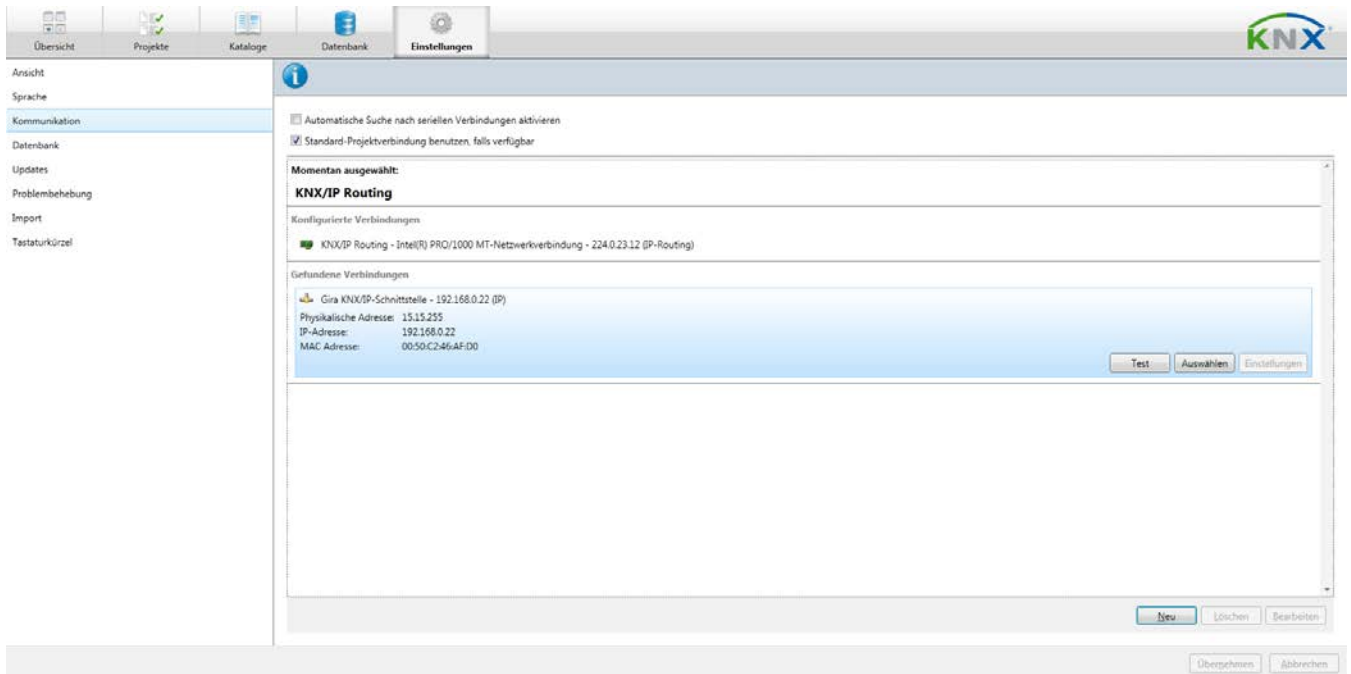


Figure 12: Select device for tunneling connection in the ETS 4

3. The interface now appears under "Konfigurierte Verbindungen" (Configured connections).

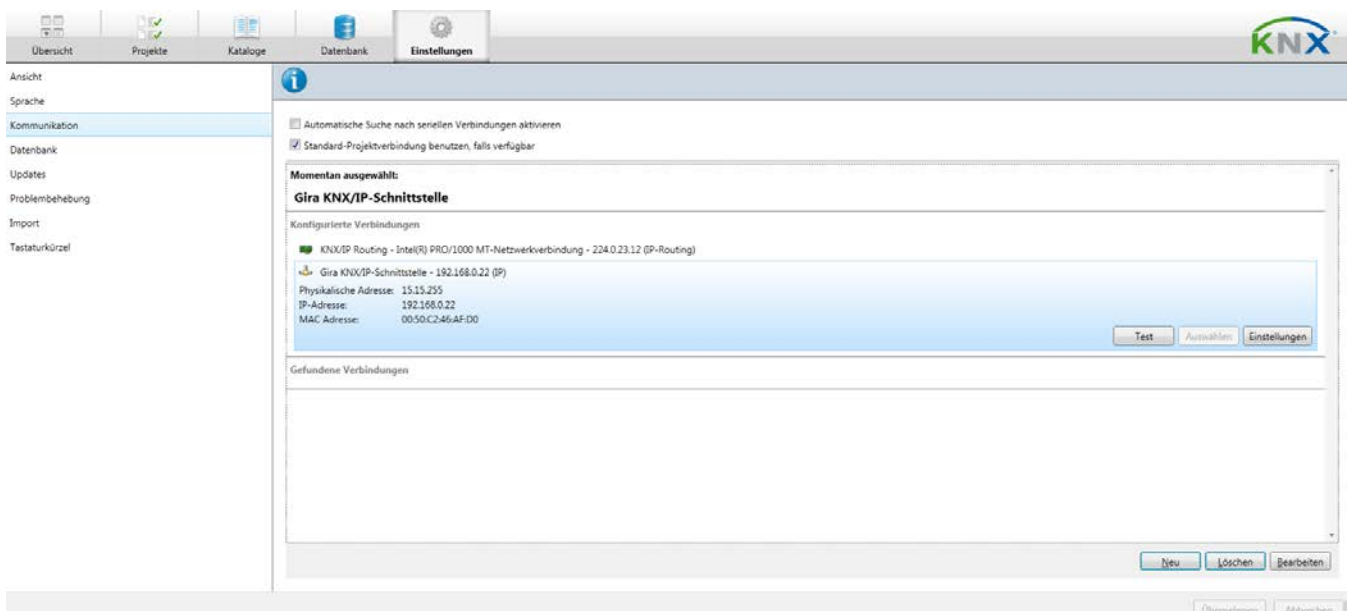


Figure 13: Device was selected in the ETS4

4. For stable communication via KNXnet/IP tunneling, a second physical address (similar to the local physical address for an RS232 or USB connection) must be set via the ETS. For this, select the device under "Konfigurierte Verbindungen" (Configured connections) and click "Einstellungen" (Settings).

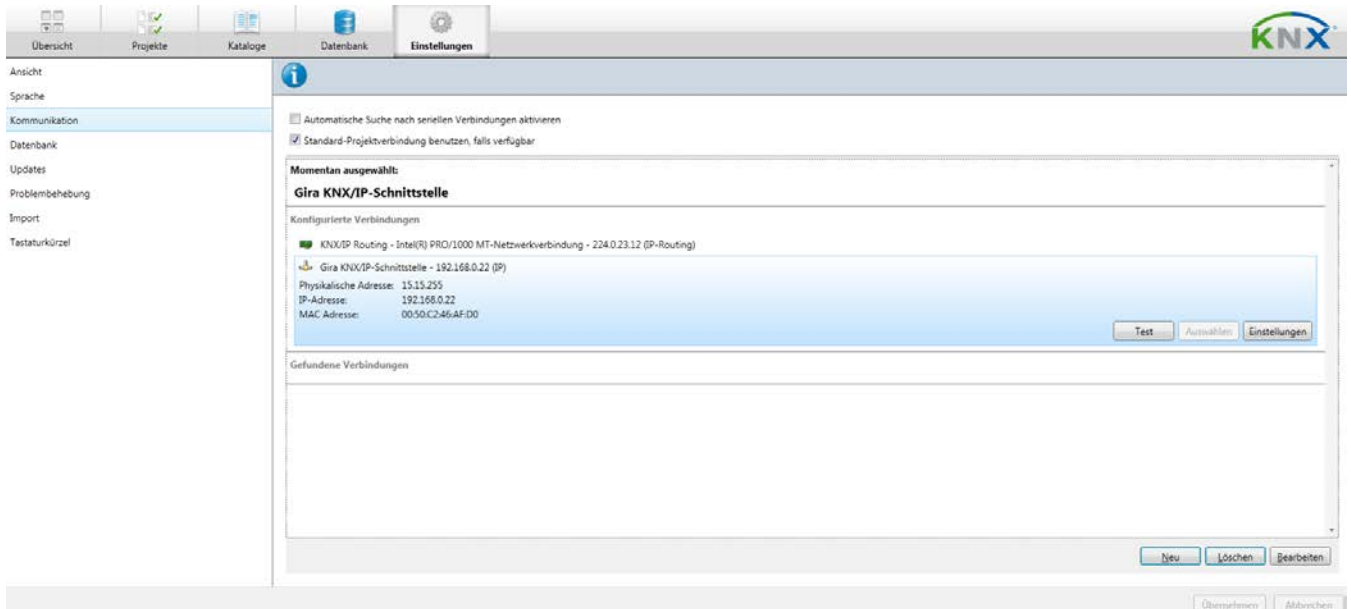


Figure 14: Select device in the ETS4 under "Configured connections"

5. The configuration dialogue opens. The desired address must now be entered in the field of the physical address of the device. It must be ensured that an address from another device in the ETS project is not used (if necessary, check using the ETS "Address free?").

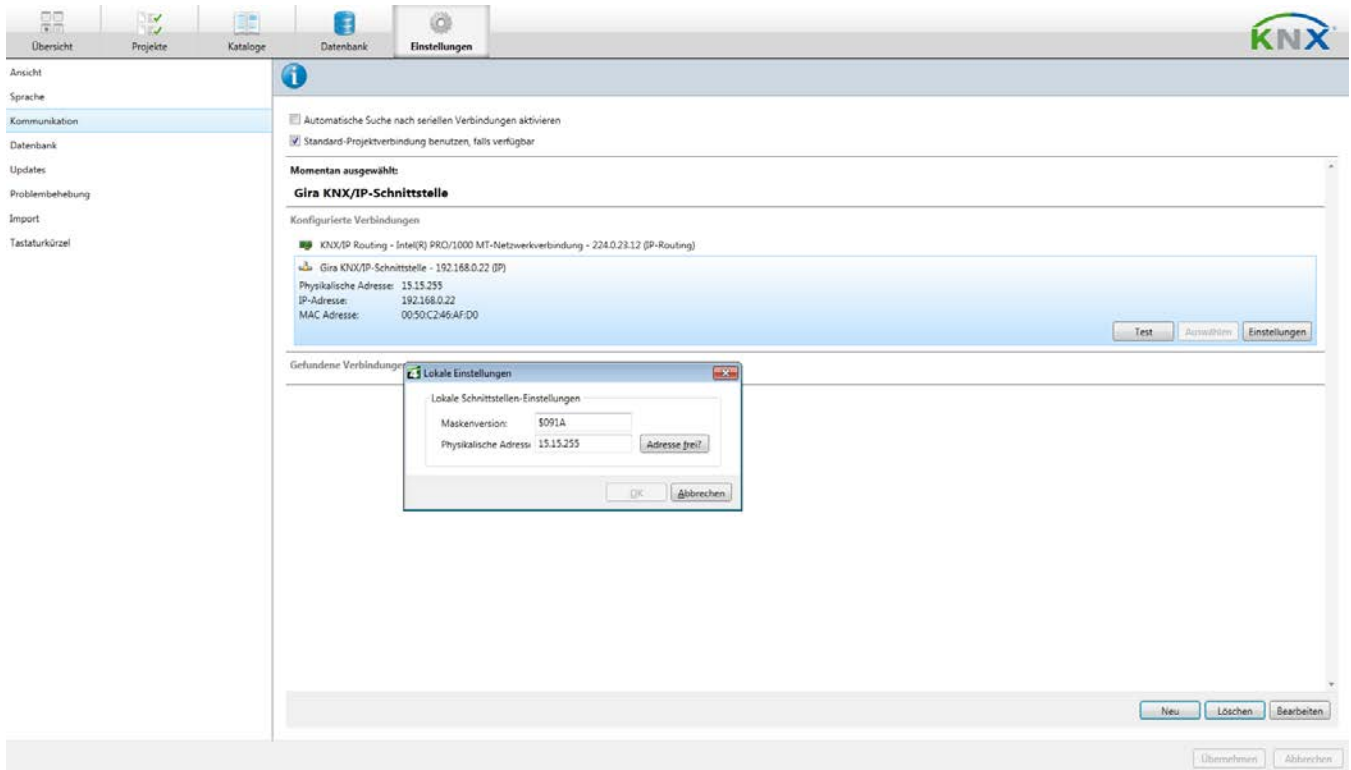


Figure 15: Setting the local physical address

6 License Agreement for the KNX/IP interface software

Hereinafter are the contract terms for your use of the software as the "licensee".

By accepting this agreement and installing the KNX/IP interface software or putting the KNX/IP interface into use, you conclude an agreement with Gira, Giersiepen GmbH & Co KG and agree to be legally bound to the terms of this agreement.

6.1 Definitions

Licensor: Gira, Giersiepen GmbH & Co KG, Radevormwald, Germany

Licensee: The lawful recipient of the KNX/IP interface software

Firmware: Software which is embedded on the KNX/IP interface hardware and enables operation of the DCS-IP-gateway.

KNX/IP interface software: The KNX/IP interface software denotes all of the software provided for the KNX/IP interface product, including the operating data. This particularly includes the firmware and the product database.

6.2 Subject matter of the agreement

The subject matter of this agreement is the KNX/IP interface software provided on data carriers or through downloads, as well as the corresponding documentation in written and electronic form.

6.3 Rights of use of the KNX/IP interface software

The licensor grants the licensee the non-exclusive, non-transferable right to use the KNX/IP interface software for an unlimited time in accordance with the following conditions for the purposes and applications specified in the valid version of the documentation (which shall be provided in printed form or also as online help or online documentation).

The licensee is obliged to ensure that each person who uses the program only does so as part of this license agreement and observes this license agreement.

6.4 Restriction of rights of use

- 6.4.1 The licensee is not authorised to use, copy, process or transfer the KNX/IP interface software in whole or in part in any way other than as described herein. Excluded from this is one (1) copy, which shall be produced by the licensee exclusively for archiving and backup purposes.
- 6.4.2 The licensee is not authorised to apply reverse-engineering techniques to the KNX/IP interface software or to convert the KNX/IP interface software to another form. Such techniques particularly include disassembly (conversion of the binary-coded computer instructions of an executable program into an assembler language which can be read by humans) or decompilation (conversion of binary-coded computer instructions or assembler instructions into source code in the form of high-level language instructions).
- 6.4.3 The firmware may only be installed and used on the hardware (KNX/IP interface) approved by the licensor.
- 6.4.4 The KNX/IP interface software may not be passed on to third parties, nor may it be made accessible to third parties.
- 6.4.5 The licensee is not authorised to rent or lease the KNX/IP interface software or grant sublicenses to the program.
- 6.4.6 The licensee requires written approval from the licensor to create and distribute software which is derived from the KNX/IP interface software.
- 6.4.7 The mechanisms of the license management and copying protection of the KNX/IP interface software may not be analysed, published, circumvented or disabled.

6.5 Ownership, secrecy

6.5.1 The KNX/IP interface software and the documentation (which shall be provided in printed form or also as online help or online documentation) are business secrets of the licensor and/or the object of copyright and/or other rights and shall continue to belong to the licensor. The licensee shall observe these rights.

6.5.2 Neither the software nor the data backup copy nor the documentation (which shall be provided in printed form or also as online help or online documentation) may be passed on to third parties at any point in time, in whole or in part, for a charge or free of charge.

6.6 Changes, additional deliveries

The KNX/IP interface software and the documentation (which shall be provided in printed form or also as online help or online documentation) shall be subject to possible changes by the licensor.

6.7 Warranty

The KNX/IP interface software shall be delivered together with software from third parties as listed in section 11. No warranty is provided for software from third parties.

6.7.1 The KNX/IP interface software and the documentation (which shall be provided in printed form or also as online help or online documentation) shall be provided to the licensee in the respective valid version. The warranty period for the KNX/IP interface software is 24 months. During this time the licensor shall provide the following warranty:

- The software shall be free of material and manufacturing defects when turned over to the customer.
 - The software shall function in accordance with the documentation included with it in the respective valid version.
 - The software shall be runnable on the computer stations specified by the licensor.
- The warranty shall be fulfilled with the supply of spare parts.

6.7.2 Otherwise, no warranty shall be provided for the freedom from faults of the KNX/IP interface software and its data structures from defects. Nor does the warranty cover defects due to improper use or other causes outside the influence of the licensor. Any additional warranty claims shall be excluded.

6.8 Liability

The licensor shall not be liable for damages due to loss of profit, data loss or any other financial loss resulting as part of the use of the KNX/IP interface software, even if the licensor is aware of the possibility of damage of that type.

This limitation of liability is valid for all damage claims of the licensee, regardless of the legal basis. In any case, liability is limited to the purchase price of the product.

The exclusion of liability does not apply to damage caused by premeditation or gross negligence on the part of the licensor. Furthermore, claims based on the statutory regulations for product liability shall remain intact.

6.9 Applicable law

This agreement is subject to the laws of the Federal Republic of Germany.
The place of jurisdiction is Cologne, Germany.

6.10 Termination

This agreement and the rights granted herein shall end if the licensee fails to fulfil one or more provisions of this agreement or terminates this agreement in writing. The KNX/IP interface software and the documentation turned over (which is provided in printed form or also as online help or online documentation) including all copies shall in this case be returned immediately and without being requested to do so. No claim to reimbursement of the price paid shall be accepted in this case.

The license for use of the KNX/IP interface software shall expire upon the termination of the agreement. In this case, the KNX/IP interface product must be taken out of operation. Further use of the KNX/IP interface without a license is precluded.

The start-up software and the visualisation software must be uninstalled and all copies must be destroyed or returned to the licensor.

6.11 Subsidiary agreements and changes to the agreement

Subsidiary agreements and changes to the agreement shall only be valid in writing.

6.12 Exception

All rights not expressly mentioned in this agreement are reserved.

7 Open Source Software

This product uses software from third-party sources which are used within the scope of the GNU General Public License (GPL) or Lesser GNU General Public License LGPL.

The software packages used in this product which are licensed under the GPL/LGPL are described in the following.

Software package	U-Boot
Version of the software	2010.06
Supplier	http://www.denx.de/wiki/U-Boot/WebHome
License	GNU GPL, Version 2, June 1991
Copyright notice	Copyright © 2000-2010 by Wolfgang Denk et al.

Software package	GNU/Linux
Version of the software	2.6.30
Supplier	http://kernel.org
License	GNU GPL, Version 2, June 1991
Copyright notice	Copyright © 1992-2010 by Linus Torvalds et al.

Software package	Buildroot
Version of the software	2010.11
Supplier	http://buildroot.org
License	GNU GPL, Version 2, June 1991
Copyright notice	Copyright © 1999-2005 Erik Andersen, 2006-2011 The Buildroot developers

Software package	GNU C Library (GLIBC)
Version of the software	2.11.1
Supplier	http://www.gnu.org/s/libc/
License	GNU LGPL, Version 2.1, February 1999
Copyright notice	Copyright © 1996-2010 by Roland McGrath et al.

The license texts of the GPL and LGPL are available via the following web page:
<http://www.gnu.org/licenses/licenses.html>

License text: Gira does not assume any liability or provide a warranty for this software.

The source code for this software can be obtained via the e-mail address info@gira.de.

This offer is valid for three years after the discontinuation of the service for this product.

7.1 GNU GPL, Version 2, June 1991

GNU GENERAL PUBLIC LICENSE Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:
 - a. You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
 - b. You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
 - c. If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:
 - d. Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
 - e. Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
 - f. Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.
5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.
6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.
9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.
12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the program's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

```
This program is free software; you can redistribute it and/or modify it under the terms of the GNU  
General Public License as published by the Free Software Foundation; either version 2 of the  
License, or (at your option) any later version.
```

```
This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY;  
without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR  
PURPOSE. See the GNU General Public License for more details.
```

```
You should have received a copy of the GNU General Public License along with this program; if  
not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-  
1301 USA.
```

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

```
Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program 'Gnomovision' (which makes passes at compilers) written by James Hacker.

```
<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Lesser General Public License instead of this License.

7.2 GNU LGPL, Version 2.1, February 1999

GNU LESSER GENERAL PUBLIC LICENSE Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc. 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

GNU LESSER GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:
 - a) The modified work must itself be a software library.
 - b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
 - c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the brary, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

- a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)
- b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.
- c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.
- d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.
- e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:
 - a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.
 - b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.
8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.
9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.
10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.
11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.
13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.
16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library `Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990

Ty Coon, President of Vice

That's all there is to it!