

C4-KNX-IPR

IP Router, MDRC

User Guide



Control4®

This manual describes the function and configuration of the *IP Router, MDRC*.

IP Router, MDRC, SKU: C4-KNX-IPR.

KNXPROD filename: IPR/S 3.1.41, download: <https://ctrl4.co/knx-ipr>

Use with the Control4® KNX Tool (download at <https://ctrl4.co/knx-tool>).

Subject to change.

Exclusion of liability:

Although the contents of this document have been checked to ensure that they are consistent with the hardware and software, deviations cannot be completely excluded.

We therefore cannot accept liability. Any necessary corrections will be incorporated in new versions of the manual.

Please inform us of any suggested improvements.

Control4® KNX

Contents

Contents

Page

1	General.....	3
1.1	Using the product manual.....	3
1.1.1	Notes	4
1.2	Product and functional overview.....	5
1.2.1	Monitoring for bus voltage failure.....	6
1.2.2	Overview of versions	6
2	Device technology.....	7
2.1	Technical data	7
2.2	Connection diagram	9
2.3	Dimension drawing	10
2.4	Mounting and installation	11
2.5	Description of inputs and outputs	13
2.6	Operating controls	14
2.7	Display elements	14
3	Commissioning	15
3.1	Overview.....	15
3.2	Parameters	16
3.2.1	Application for ETS 5.6.....	17
3.2.1.1	Parameter window <i>KNX -> LAN</i>	17
3.2.1.2	Parameter window <i>LAN -> KNX</i>	20
3.2.1.3	Parameter window <i>IP settings</i>	23
3.2.2	Application for ETS 3 (IP Router/1.1)	29
3.2.2.1	Parameter window <i>KNX -> LAN</i>	29
3.2.2.2	Parameter window <i>LAN -> KNX</i>	31
3.2.2.3	Parameter window <i>IP settings</i>	33
3.3	Communication objects	36
3.4	Use of the integrated tunneling servers	36
3.4.1	Settings in ETS 5.6.....	37
4	Planning and application.....	39
4.1	The IP Router in the network.....	39
4.1.1	Assignment of IP address.....	39
4.1.2	KNX telegrams in the network (routing)	40
4.1.3	IP Router as an area coupler.....	41
4.1.4	IP Router as a line coupler	42
4.1.5	Mixed topology	43
4.2	The Control4® KNX Tool.....	44
A	Appendix.....	45
A.1	Ordering data.....	45

Control4® KNX

Contents

Software components structured by applicable license:	49
Copyright notices:	52
ABBPwer, at91ft12, at91gpbr hardware driver (v1.0):	52
AT91 Bootstrap (v1.9):	52
Buildroot (v2012-05):	53
Busybox (v1.20.1):	54
CodeSourcery G++ Lite (v2010.09-50):	68
Dropbear sshd (v2012.55):	81
Expat (v2.1.0):	85
Gdbserver (v7.2.50.20100908-cvs):	86
Glib (v2.30.2):	88
Gzip (v1.5):	97
Kmod (v8):	102
Libffi (3.0.11):	105
Libjpeg (v9a):	119
Libxml2 (v2.7.8):	135
LibPcap (v1.2.1):	136
Linux (v3.2.26):	137
LibXml2 (v2.7.8):	165
Memstat (v0.8):	166
Ncurses (v5.7):	167
OpenSSL (v1.0.1g):	175
Pcre (v8.30):	179
ROM-Bootloader:	183
GNU Tar (v1.17):	183
uClibc (v0.9.31.1):	195
Udev (v058):	196
Util-Linux (v2.20.1):	199
XML-RPC++ (v0.7):	203
Zlib (v1.2.6):	208
OSS License texts:	213
GNU General Public License (GPL), Version 3.0	213
GNU General Public License (GPL), Version 2.0	222
GNU General Public License (GPL), Version 1.0	238
GNU Library General Public License (LGPL), Version 2.0	242
GNU Lesser General Public License (LGPL), Version 2.1	252
GNU Lesser General Public License (LGPL), Version 3.0	261
GNU Free Documentation License (FDL), Version 1.3	264
GCC Runtime Library Exception (RLE), Version 3.1	272
The BSD 2-Clause License (Template)	273
The MIT License (MIT) (Template)	274

Control4® KNX General

1 General

The Control4® KNX IP Router, MDRC C4-KNX-IPR (*KNXPROD File Name: IPR/S 3.1.41*, download: <https://ctrl4.co/knx-ipr>) connects the KNX bus with an Ethernet network. KNX telegrams can be sent to or received from other devices via the network.

1.1 Using the product manual

This manual provides detailed technical information on the function, installation and programming of the Control4® KNX device. The application is explained using examples.

This manual is divided into the following chapters:

Chapter 1	General
Chapter 2	Device technology
Chapter 3	Commissioning
Chapter 4	Planning and application
Chapter A	Appendix

1.1.1 Notes


Notes and safety instructions are represented as follows in this manual:



Note
Tips for usage and operation

Examples
Application examples, installation examples, programming examples

Important
These safety instructions are used as soon as there is danger of a malfunction without risk of damage or injury.

Attention
These safety instructions are used as soon as there is danger of a malfunction without risk of damage or injury.

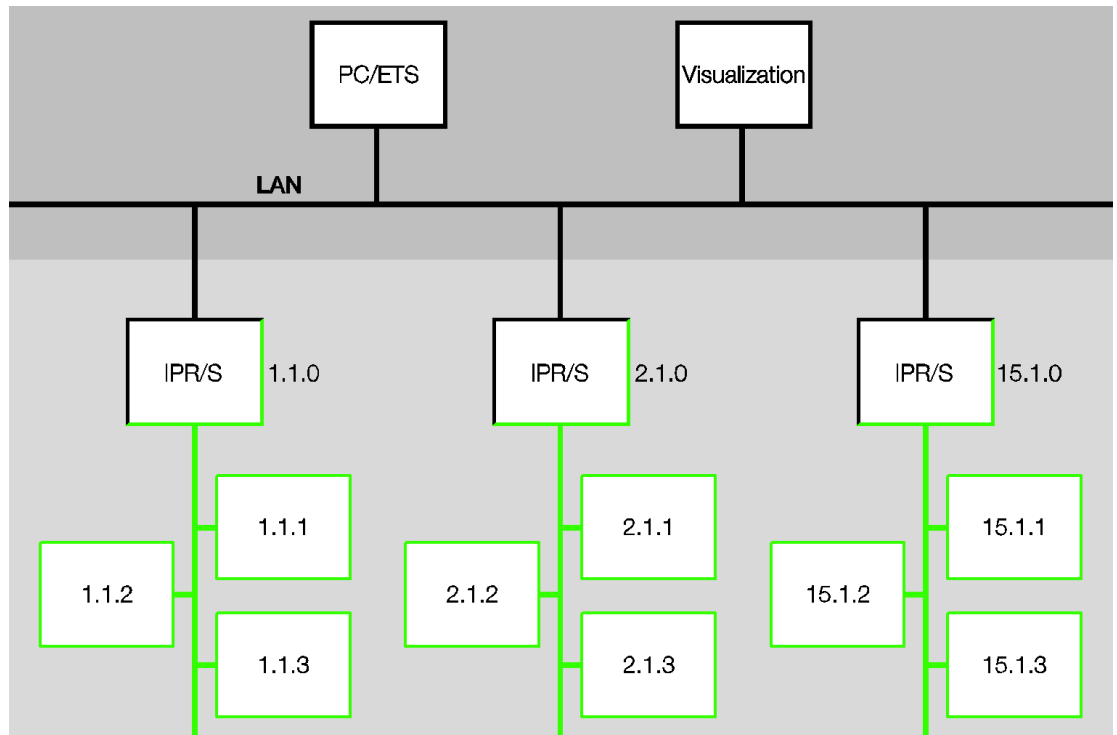
	Danger
These safety instructions are used if there is a danger to life and limb with inappropriate use.	

 	Danger
These safety instructions are used if there is an extreme danger to life with inappropriate use.	

1.2 Product and functional overview

The Control4® KNX IP Router, MDRC C4-KNX-IPR (*KNXPROD File Name: IPR/S 3.1.41*, download: <https://ctrl4.co/knx-ipr>) connects the KNX bus with an Ethernet network. KNX telegrams can be sent to or received from other devices via the network.

The device uses the KNXnet/IP protocol from the KNX Association (routing and tunneling) for communication.



The Router features five tunneling servers, see chapter [Use of the integrated tunneling servers](#), p. 36. They support both bus monitor and group monitor mode (alternative).

Power can be supplied via PoE (Power over Ethernet) according to IEEE 802.3af class 1 or via an auxiliary voltage.

The Control4® KNX Tool is available for the IP Routers (download: <https://ctrl4.co/knx-tool>). It allows the Routers to be found in the network (IP discovery) and the firmware to be updated if necessary. See chapter [The Control4® KNX Tool](#), p. 44.

The device supports the KNX standard function "Monitoring for bus voltage failure". This is a network management function, which is used by visual display systems, for example (see chapter [Monitoring for bus voltage failure](#), p. 6).

The IP Router supports the full filter table for all main groups, i.e. main groups 0...31 (or group addresses 1...65,535 with free group address view). (Use ETS 5.6 or greater).

Control4® KNX General

1.2.1 Monitoring for bus voltage failure

The IP Router monitors the KNX TP bus for voltage failure. When the status of the bus voltage changes, a broadcast command of the type "NetworkParameterWrite" is sent on the IP network.

The following values are sent:

- Bus voltage failure: "00063301" (hex)
- Bus voltage recovery: "00063300" (hex)

These telegrams can be evaluated, e.g. by a visual display system.

Type	DPT	Info
NetworkParameterWrite		00 06 33 01
NetworkParameterWrite		00 06 33 00

1.2.2 Overview of versions

The following table provides an overview of the possible functions with the Control4® KNX IP Router, MDRS C4-KNX-IPR (*KNXPROD File Name: IPR/S 3.1.41*, download: <https://ctrl4.co/knx-ipr>).

Use ETS 5.6 or greater.

Device	C4-KNX-IPR
Application	IP Router/2.0
ETS	ETS 5.6
Properties of IP Router	
Number of tunneling servers	5
Monitoring for bus voltage failure (see chapter Monitoring for bus voltage failure , p. 6)	■
Filter Group telegrams main group 0...13	■
Filter Group telegrams main group 14...31	■ (ETS 5.6 or higher)
IP discovery (Control4® KNX Tool)	■
Firmware update (Control4® KNX Tool)	■
Power over Ethernet	■

■ = property applies

- = property does not apply

Control4® KNX Device technology

2 Device technology



C4-KNX-IPR

(KNXPROD File Name: IPR/S 3.1.41)

The Control4® KNX IP Router, MDRC C4-KNX-IPR (KNXPROD File Name: IPR/S 3.1.41, download: <https://ctrl4.co/knx-ipr>) is the interface between KNX installations and IP networks. It can be used as a line coupler or area coupler and can utilize the local network (LAN) for exchange of telegrams between lines/areas.

KNX devices can be programmed via LAN using ETS (five tunneling servers are available). The device uses the KNXnet/IP protocol from the KNX Association (routing and tunneling). The device is powered by 12 to 30 V DC or PoE (Power over Ethernet).

2.1 Technical data

Supply	Auxiliary voltage U_s	12...30 V DC (+10%/-15%) or PoE (IEEE 802.3af class 1)
	Power dissipation	Maximum 1.8 W
	Auxiliary voltage current consumption	Maximum 120 mA at 12 V
	Rated voltage U_n	12 V DC
	Current consumption KNX	< 10 mA
Connections	KNX	Bus connection terminal
	Plug-in terminal for operating voltage	Plug-in terminal
	LAN	RJ45 socket for 10/100BaseT, IEEE 802.3 networks, AutoSensing
Operating and display elements	Red LED and button	For assignment of the physical address
	Green "On" LED	Operation readiness indicator
	Yellow "LAN/Link" LED	Network connection indicator
	Yellow "Telegram" LED	KNX telegram traffic indicator
Protection degree	IP 20	To DIN EN 60 529
Protection class	II	To DIN EN 61 140
Isolation category	Overvoltage category	III according to DIN EN 60 664-1
	Pollution degree	2 according to DIN EN 60 664-1
KNX safety extra low voltage	SELV 30 V DC	
Temperature range	Operation	-5...+45 °C
	Storage	-25...+55 °C
	Transport	-25...+70 °C
Ambient conditions	Maximum air humidity	95 %, no condensation allowed
	Atmospheric pressure	Atmosphere up to 2,000 m

Control4® KNX

Device technology

Design	Modular installation device (MDRC)	Modular installation device, ProM
	Overall dimensions	90 x 36 x 64 mm (H x W x D)
	Mounting width	2x 18 mm modules
	Mounting depth	68 mm
Installation	On 35 mm mounting rail	To DIN EN 60 715
Mounting position	Any	
Weight	0.1 kg	
Housing, color	Plastic, halogen free, gray	
Approvals	KNX to EN 50 090-1, -2	
CE mark	In accordance with the EMC directive and low voltage directive	

Device type	Application	Maximum number of communication objects	Maximum number of group addresses	Maximum number of assignments
C4-KNX-IPR (KNXPROD File Name: IPR/S 3.1.41)	IP Router/...*	0	0	0

* ... = Current version number of the application. **Please refer to the software information on our website for this purpose.**

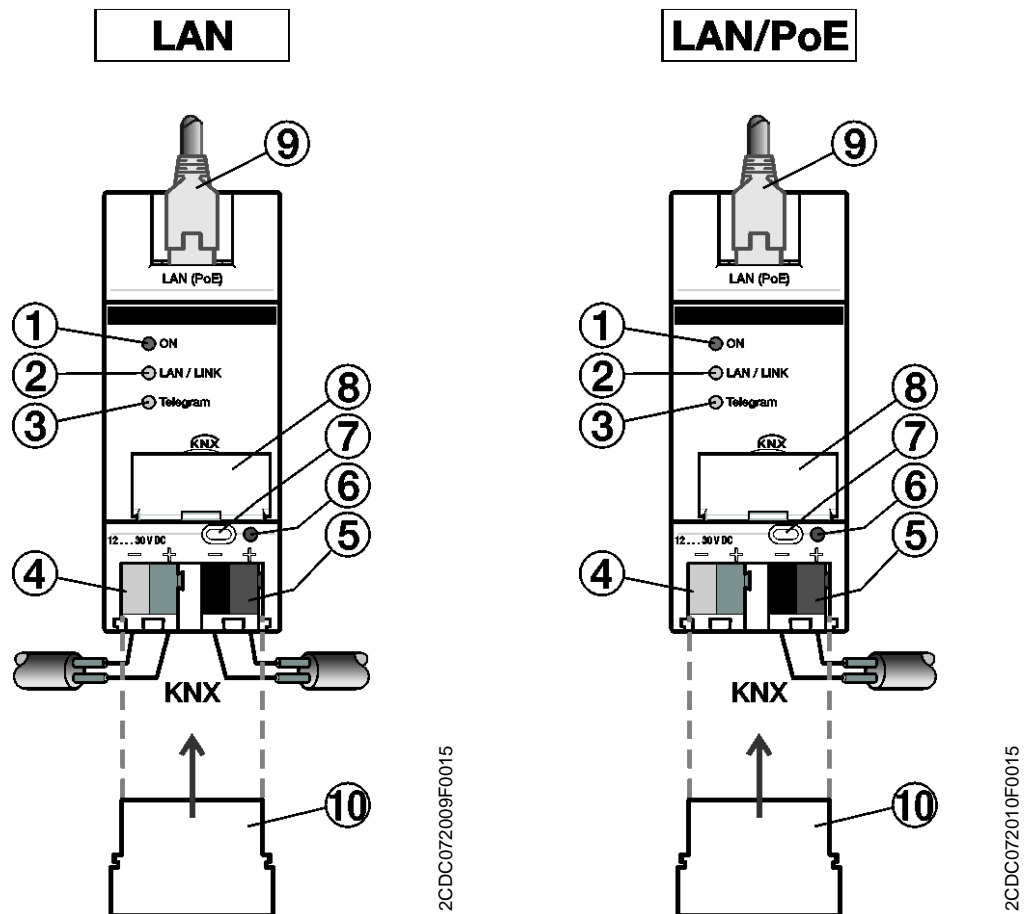
Note

ETS and the current version of the device application are required for programming. Use ETS 5.6 or greater.

The current application can be found with the corresponding software information for download at <http://ctrl4.co/knx-ipr>. The device does not support the locking function of a KNX device in ETS. If you use a *BCU code* to inhibit access to all the project devices, it has no effect on this device. Data can still be read and programmed.

Control4® KNX Device technology

2.2 Connection diagram



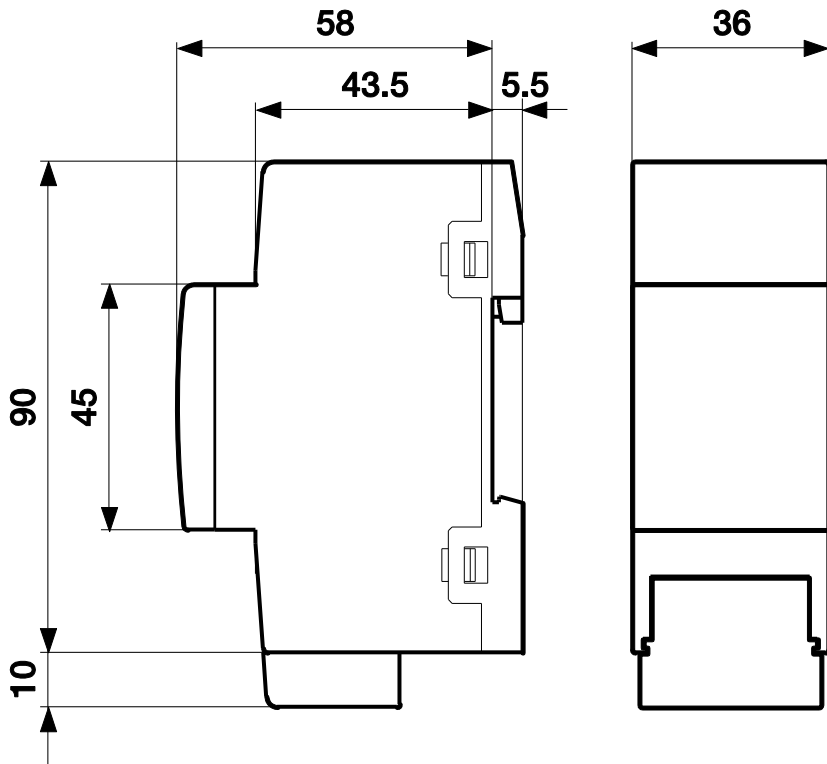
C4-KNX-IPR

(KNXPROD File Name: IPR/S 3.1.41)

- 1 ON LED
- 2 LAN/LINK LED
- 3 Telegram LED
- 4 Power supply connection
- 5 KNX connection

- 6 Programming LED
- 7 Programming button
- 8 Label carrier
- 9 LAN or LAN/PoE connection
- 10 Cover cap

2.3 Dimension drawing



C4-KNX-IPR
(KNXPROD File Name: IPR/S 3.1.41)

2CDC072020F0015

2.4 Mounting and installation

The device is a modular installation device for quick installation in distribution boards on 35 mm mounting rails to DIN EN 60 715.

The installation position can be selected as required.

The connection to the bus is implemented using the supplied bus connection terminal. The terminal assignment is located on the housing.

The device is ready for operation after connecting the bus voltage and the auxiliary voltage.

Accessibility to the device for the purpose of operation, testing, visual inspection, maintenance and repair must be provided compliant to DIN VDE 0100-520.

Commissioning requirement

In order to commission the device, use a PC with ETS 5.6 or higher and supply voltage of 12 to 30 V DC. Alternatively, the device can be powered via PoE (Power over Ethernet).

The device is ready for operation after connection to the bus voltage and auxiliary voltage.

Mounting and commissioning may only be carried out by electrical specialists. The appropriate standards, directives, regulations and specifications for the appropriate country should be observed when planning and setting up electrical installations and security systems for intrusion and fire detection.

- Protect the device from damp, dirt and damage during transport, storage and operation.
- Only operate the device within the specified technical data!
- The device should only be operated in an enclosed housing (distribution board)!
- The voltage supply to the device must be switched off before mounting work is performed.



Danger

To avoid dangerous touch voltages which originate through feedback from differing phase conductors, all poles must be disconnected when extending or modifying the electrical connections.

Supplied state

The device is supplied with the physical address 15.15.0 and five additional physical addresses 15.15.100 for tunneling connections.

The IP address is set to automatic IP assignment (DHCP/AutoIP).

Note

The device is supplied with the option *Route*. This is not the default setting in the application, but it simplifies commissioning.

The programmed setting will be adopted after the first download.

Assignment of the physical address

The physical addresses and parameters are assigned and programmed in ETS. (Use ETS 5.6 or greater).

The device features a *Programming* button for assignment of the physical address. The red *Programming* LED lights up after the button has been pressed. It goes off as soon as ETS has assigned the physical address or the *Programming* button is pressed again.

Control4® KNX

Device technology

Download reaction

The device can be programmed in various ways: via one of the integrated tunneling servers ("local download"), via KNXnet/IP routing or via another programming interface (USB or IP).

There must be a connection to the KNX TP (twisted pair) in order to program the device.

Approx. 10 seconds after the download is complete, the device reboots and closes all open tunneling connections. If the device's IP address was changed during the download, the tunneling connections must be reconfigured manually in the tunneling clients. Tunneling clients establish the connection to the server via the IP address.

The data programmed with ETS is adopted approx. 30-60 seconds after the download.

Cleaning

The voltage supply to the device must be switched off before cleaning. If devices become dirty, they can be cleaned using a dry cloth or a cloth dampened with a soapy solution. Corrosive agents or solutions should never be used.

Maintenance

The device is maintenance-free. In the event of damage (e.g. during transport and/or storage), repairs must not be carried out.

2.5 Description of inputs and outputs

Supply voltage input 12 to 30 V DC

Only a DC voltage in a range of 12 to 30 V may be connected to the power supply input. We recommend using an NT/S power supply from our range.

Attention

The supply voltage must be 12 to 30 V DC, or the device is powered via PoE (Power over Ethernet) according to IEEE 802.3af class 1.

The device can be destroyed if it is connected to 230 V!

KNX connection

The supplied bus connection terminal is used to connect to the KNX bus.

Note

Programming requires ETS 5.6 or higher.

LAN connection

The network connection is carried out via an Ethernet RJ45 interface for LAN networks. The network interface can be operated with a transmission speed of 10/100 Mbit/s. Network activity is indicated by the LAN/LINK LED on the front of the device.

2.6 Operating controls

There are no operating controls located on the IP Router.

2.7 Display elements

Three indicator LEDs are located on the front of the IP Router:



ON



LAN/LINK



Telegram

ON

- The LED lights up a few seconds after the auxiliary voltage is connected.
- After the auxiliary voltage is connected, the LED initially lights up continuously. After approx. 40 seconds, the LED starts flashing until the startup process is complete and the LED lights up continuously again. Depending on the size of the filter table, this can take 5 to 60 seconds.

LAN/LINK

- The LED lights up when the auxiliary voltage is present, and the Router is connected to an Ethernet network.
- The LED flashes when the device detects activity on the network, e.g. when data is exchanged.

Telegram

- The LED lights up when the Router is connected to a TP network and the startup process is complete (see "On" LED).
- The LED flashes when the device detects activity on the KNX subline TP1 (twisted pair 1), e.g. when data is exchanged.

Control4® KNX Commissioning

3 Commissioning

The IP Router is parameterized using the application and the Engineering Tool Software ETS.

Use ETS 5.6 or greater.

The application can be found under *Control4/System components/Routing*.

For parameterization purposes, a PC or laptop with ETS and a connection to KNX are required.

3.1 Overview

The IP Router is parameterized using the Engineering Tool Software ETS 5.6 or higher.

3.2 Parameters

This chapter describes the parameters of the IP Router using the parameter windows.

The parameter windows feature a dynamic structure so that further parameters or whole parameter windows may be enabled depending on the parameterization and the function of the outputs.

The default values of the parameters are underlined, e.g.:

Options: Yes
 No

Note
The screenshots were created in ETS 5. The depictions may differ slightly. The parameters and options are identical.

Control4® KNX Commissioning

3.2.1 Application for ETS 5.6

3.2.1.1 Parameter window *KNX -> LAN*

In the parameter window *KNX -> LAN* it is possible to define the processing of telegrams from the KNX system to the LAN network.

Note

The device is supplied with the option *Route*. This is not the default setting in the application, but it simplifies commissioning.
The programmed setting will be adopted after the first download.

KNX->LAN

LAN->KNX

IP settings

Group telegrams
main groups 0...13

Group telegrams
main groups 14...31

Physically addressed telegrams

Broadcast telegrams

Telegram confirmation
for group telegrams

If free group address structure is used:

Main group 0...13 => 1...28,671

Main group 14...31 => 28,672...65,535

Filter

Filter

☒ Filter ☐ Block

☒ Route ☐ Block

☒ Only if routed ☐ Always

<--- NOTE

Control4® KNX Commissioning

Group telegrams main groups 0...13

Options: Filter
 Route
 Block

This parameter defines whether telegrams with group addresses of the main groups 0 to 13 are filtered, routed or blocked.

- *Filter*: Telegrams with the group addresses of the main groups 0 to 13 from KNX to LAN are filtered in accordance with the filter table, which is automatically calculated by ETS.
- *Route*: All group telegrams of main groups 0 to 13 are routed without considering the filter table settings.

Important

This setting is only useful for commissioning and diagnostics. It should not be used during normal operation.

As this setting can overload the KNX lines, a loss of telegrams could occur.

- *Block*: All group telegrams from KNX to LAN are blocked without considering the filter table settings.

Group telegrams main groups 14...31

Options: Filter
 Route
 Block

This parameter defines whether telegrams with group addresses of the main groups 14 to 31 are filtered, routed or blocked.

- *Filter*: Telegrams with the group addresses of the main groups 14 to 31 from KNX to LAN are filtered in accordance with the filter table, which is automatically calculated by ETS.
- *Route*: All group telegrams of main groups 14 to 31 are routed.

Important

This setting is only useful for commissioning and diagnostics. It should not be used during normal operation.

As this setting can overload the KNX lines, a loss of telegrams could occur.

- *Block*: All group telegrams of main groups 14 to 31 from KNX to LAN are blocked.

Control4® KNX Commissioning

Physically addressed telegrams

Options: Filter
Block

This parameter defines whether physically addressed telegrams are filtered or blocked.

- *Filter*: Only telegrams from KNX to LAN that are to exit the line of the IP Router to LAN are sent.
- *Block*: Physically addressed telegrams are not processed by the IP Router. It is not possible to send physically addressed telegrams from a line below the IP Router to another line, e.g. during programming.

Broadcast telegrams

Options: Route
Block

This parameter defines whether broadcast telegrams are routed or blocked.

- *Route*: Broadcast telegrams are routed.
- *Block*: Broadcast telegrams are not processed by the IP Router. It is not possible to send broadcast telegrams from a line below the IP Router to another line, e.g. during programming.

Telegram confirmation for group telegrams

Options: Only if routed
Always

This parameter defines whether the IP Router is to acknowledge group telegrams.

- *Only if routed*: The group telegrams are acknowledged (send ACK) only if they are also routed by the IP Router to LAN. Thus, only telegrams that are in the IP Router filter table are acknowledged.
- *Always*: All group telegrams on KNX are acknowledged by the IP Router.

If free group address structure is used:

Main group 0...13 => 1...28,671

Main group 14...31 => 28,672...65,535

Note

In ETS 5.6 it is possible to freely assign group addresses (instead of two- or three-stage group addresses). If the free group address view is selected, main group 0...13 corresponds to subgroup range 1...28,671 and main group 14...31 corresponds to subgroup range 28,672...65,535. Relevant details can be found in the Help for ETS.

3.2.1.2 Parameter window LAN -> KNX

In the parameter window LAN -> KNX it is possible to define the processing of telegrams from the LAN network to the KNX system.

KNX->LAN	Group telegrams main groups 0...13	Filter
LAN->KNX	Group telegrams main groups 14...31	Filter
IP settings	Physically addressed telegrams	<input checked="" type="radio"/> Filter <input type="radio"/> Block
	Broadcast telegrams	<input checked="" type="radio"/> Route <input type="radio"/> Block
	In case of errors repeat telegrams	Yes
	If free group address structure is used:	<--- NOTE
	Main group 0...13 => 1...28,671 Main group 14...31 => 28,672...65,535	

Group telegrams
main groups 0...13

Options: Filter
Route
Block

This parameter defines whether telegrams with group addresses of the main groups 0 to 13 are filtered, routed or blocked.

- Filter*: Telegrams with the group addresses of the main groups 0 to 13 from LAN to KNX are filtered in accordance with the filter table, which is automatically calculated by ETS.
- Route*: All group telegrams of main groups 0 to 13 are routed without considering the filter table settings.

Important
This setting is only useful for commissioning and diagnostics. It should not be used during normal operation. As this setting can overload the KNX lines, a loss of telegrams could occur.

- Block*: All group telegrams from LAN to KNX are blocked without considering the filter table settings.

Control4® KNX Commissioning

Group telegrams main groups 14...31

Options: Filter
 Route
 Block

This parameter defines whether telegrams with group addresses of the main groups 14 to 31 are filtered, routed or blocked.

- *Filter*: Telegrams with the group addresses of the main groups 14 to 31 from LAN to KNX are filtered in accordance with the filter table, which is automatically calculated by ETS.
- *Route*: All group telegrams of main groups 14 to 31 are routed.

Important

This setting is only useful for commissioning and diagnostics. It should not be used during normal operation.
As this setting can overload the KNX lines, a loss of telegrams could occur.

- *Block*: All group telegrams of main groups 14 to 31 from LAN to KNX are blocked.

Physically addressed telegrams

Options: Filter
 Block

This parameter defines whether physically addressed telegrams are filtered or blocked.

- *Filter*: Only telegrams from LAN to KNX that are to exit the line of the IP Router to LAN are sent.
- *Block*: Physically addressed telegrams are not processed by the IP Router. It is not possible to send physically addressed telegrams from the main line into the KNX TP line, e.g. during programming.

Broadcast telegrams

Options: Route
 Block

This parameter defines whether broadcast telegrams are routed or blocked.

- *Route*: Broadcast telegrams are routed.
- *Block*: Broadcast telegrams are not processed by the IP Router. It is not possible to send broadcast telegrams from the main line into the KNX TP line, e.g. during programming.

Control4® KNX Commissioning

In case of errors repeat telegrams

Options: Yes
 No
 User-defined

- **Yes:** If an error is detected when a telegram is transmitted, the telegram is repeated up to three times.
- **No:** The telegram is not repeated.
- **User-defined:** The reaction can be set individually for different types of telegram.

Repeat group addressed telegrams

Options: Yes
 No

- **Yes:** If an error is detected when a group addressed telegram is transmitted, the telegram is repeated up to three times.
- **No:** The telegram is not repeated.

Repeat physically addressed telegrams

Options: Yes
 No

- **Yes:** If an error is detected when a physically addressed telegram is transmitted, the telegram is repeated up to three times.
- **No:** The telegram is not repeated.

Repeat broadcast telegrams

Options: Yes
 No

- **Yes:** If an error is detected when a broadcast telegram is transmitted, the telegram is repeated up to three times.
- **No:** The telegram is not repeated.

If free group address structure is used:

Main group 0...13 => 1...28,671

Main group 14...31 => 28,672...65,535

Note

In ETS 5.6 it is possible to freely assign group addresses (instead of two- or three-stage group addresses). If the free group address view is selected, main group 0...13 corresponds to subgroup range 1...28,671 and main group 14...31 corresponds to subgroup range 28,672...65,535. Relevant details can be found in the Help for ETS.

Control4® KNX Commissioning

3.2.1.3 Parameter window *IP settings*

Parameter window *IP settings* is used to set how the IP Router communicates via IP.

KNX->LAN	Type of IP communication	<input checked="" type="radio"/> Multicast <input type="radio"/> Unicast
LAN->KNX	The device name, IP address and tunneling servers are set in the Properties window of ETS.	<--- NOTE
IP settings		

Type of IP communication

Option: Multicast

The type of IP communication defines the type of telegrams that the IP Router sends on the IP network.

- *Multicast*: This is the standard communication using KNX-IP devices for KNXnet/IP from the KNX Association.

For setting the routing multicast address, see [Routing multicast address](#), p. 28.

Note

It is not possible to limit the multicast address range with the application for ETS 5.6.

The following message appears if *Multicast* is selected:

The device name, IP address and tunneling servers are set in the Properties window of ETS.

Control4® KNX Commissioning

The Control4® KNX Tool can be downloaded for free from <https://ctrl4.co/knx-tool>.

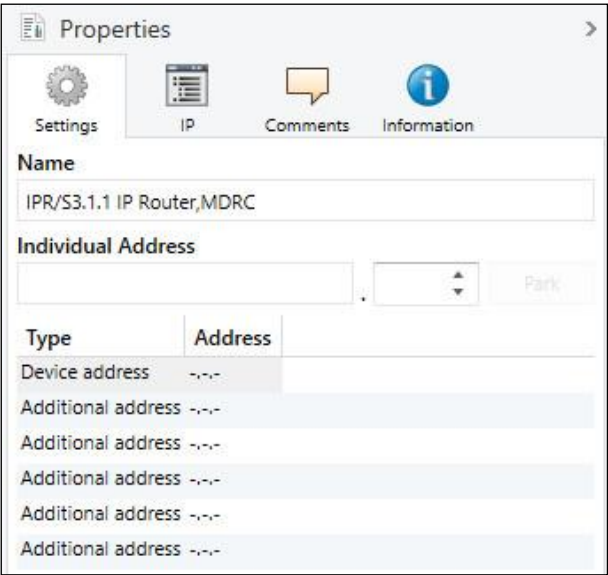
No ETS or installation of Falcon is required for the Control4® KNX Tool.

System requirements: system with Windows 7 operating system (service pack 3) or later and .NET Framework 4.0.

The integrated Falcon 5.0 supports only USB and IP interfaces (no RS232).

Control4® KNX Commissioning

The remaining configuration of the IP parameters (device name, assignment of the IP address by DHCP or fixed) takes place in the corresponding Properties window of ETS.



Type	Address
Device address	---
Additional address	---
Additional address	---
Additional address	---
Additional address	---
Additional address	---

The device name can be entered in the *Settings* Properties window. The device name loaded into the device can be changed in the *Name* field.

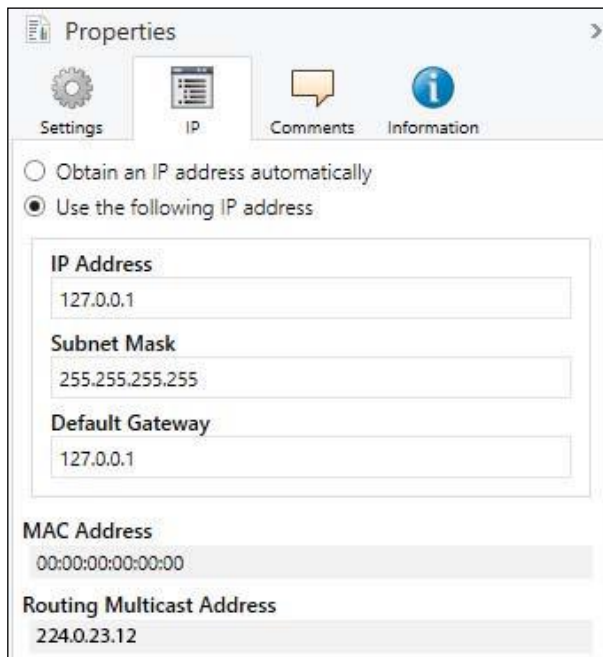
The device name is used for identification of the device on LAN. After a search query, e.g. by ETS, every KNXnet/IP device reports its name and can be allocated accordingly. For example, the installation location can be identified by the names assigned to the devices, e.g. IPR, HALL, SUB7, etc.

Note
The default device name on delivery is "IP Router". After the first download, the device name entered in the Properties window of ETS is loaded into the device.

Attention
Only the first 30 characters of the device name are loaded into the device; the rest is truncated.

Control4® KNX Commissioning

The IP address can be defined in the *IP* Properties window.



Properties

Settings IP Comments Information

☐ Obtain an IP address automatically

☒ Use the following IP address

IP Address
127.0.0.1

Subnet Mask
255.255.255.255

Default Gateway
127.0.0.1

MAC Address
00:00:00:00:00:00

Routing Multicast Address
224.0.23.12

The following options are available for setting the IP address:

Options: Obtain an IP address automatically
Use the following IP address

- *Obtain an IP address automatically:* In the default setting the IP Router expects the assignment of an IP address by a DHCP (dynamic host configuration protocol) server. This server responds to a request by assigning a free IP address to the device. If a DHCP server is not available in the network or it does not respond within 30 seconds, the device starts an auto IP procedure. It assigns itself an address from the reserved range for auto IP addresses (169.254.xxx.yyy).

For information about DHCP: see chapter [Assignment of IP address](#), p. 39.

- *Use the following IP address:* If no DHCP server is installed on the network or if the IP address should remain static, it can be assigned as fixed.

IP address

Options: 192.168.0.3

Subnet mask

Options: 255.255.255.0

Default gateway

Options: 192.168.0.1

MAC address

Options: 00:00:00:00:00:00

Control4® KNX Commissioning

Note
The routing multicast address is displayed only here. For setting the routing multicast address, see Routing multicast address , p. 28.

Note
The MAC address is read from the device after a download. The MAC address is additionally labeled on the device, or it can be determined via the Control4® KNX Tool.

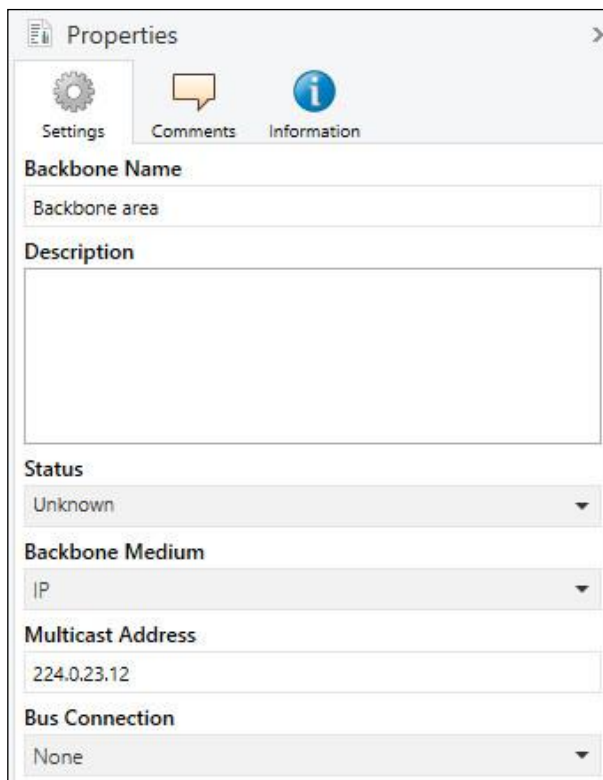
Control4® KNX Commissioning

Routing multicast address (default = 224.0.23.12)

Options: 224.0.23.12

The routing multicast address defines the target address of the IP telegrams of the IP Router. The preset address 224.0.23.12 is the defined address for the KNXnet/IP from the KNX Association in conjunction with IANA for KNX-IP devices. This address should be retained and only changed if the existing network demands that another address from the range 224.0.0.0 to 239.255.255.255 (reserved range for multicast addresses) be used.

The routing multicast address is set in ETS in the view *Topology* (topology selection; the routing multicast address can then be set on the *Settings* tab in the Properties window):



The screenshot shows the 'Properties' window in ETS, specifically the 'Settings' tab. The window has a title bar 'Properties' with a right-pointing arrow. Below the title bar are three icons: a gear for 'Settings', a speech bubble for 'Comments', and an 'i' in a circle for 'Information'. The main content area contains several fields and dropdown menus:

- Backbone Name:** A text field containing 'Backbone area'.
- Description:** A large empty text area.
- Status:** A dropdown menu currently showing 'Unknown'.
- Backbone Medium:** A dropdown menu currently showing 'IP'.
- Multicast Address:** A text field containing '224.0.23.12'.
- Bus Connection:** A dropdown menu currently showing 'None'.

Important

All IP Routers or other KNXnet/IP devices that are required to exchange telegrams on the IP network must use the same routing multicast address.

If devices are to be used in the same network but are not to exchange telegrams, they must use different routing multicast addresses.

Control4® KNX Commissioning

3.2.2 Application for ETS 3 (IP Router/1.1)

3.2.2.1 Parameter window *KNX -> LAN*

In the parameter window *KNX -> LAN* it is possible to define the processing of telegrams from the KNX system to the LAN network.

Note

The device is supplied with the option *Route*. This is not the default setting in the application, but it simplifies commissioning.
The programmed setting will be adopted after the first download.

KNX->LAN	Group telegrams main groups 0...13	Filter
LAN->KNX	Group telegrams main groups 14...31	<input checked="" type="radio"/> Route <input type="radio"/> Block
IP settings	Physically addressed telegrams and broadcast telegrams	<input checked="" type="radio"/> Filter <input type="radio"/> Block
Type of IP communication	Telegram confirmation for group telegrams	<input checked="" type="radio"/> Only if routed <input type="radio"/> Always

Group telegrams main groups 0...13

Options: Filter
Route
Block

This parameter defines whether telegrams with group addresses of the main groups 0 to 13 are filtered, routed or blocked.

- *Filter*: Telegrams with the group addresses of the main groups 0 to 13 from KNX to LAN are filtered in accordance with the filter table, which is automatically calculated by ETS.
- *Route*: All group telegrams of main groups 0 to 13 are routed without considering the filter table settings.

Important

This setting is only useful for commissioning and diagnostics. It should not be used during normal operation.

As this setting can overload the KNX lines, a loss of telegrams could occur.

- *Block*: All group telegrams from KNX to LAN are blocked without considering the filter table settings.

Control4® KNX Commissioning

Group telegrams main groups 14...31

Options: Route
 Block

This parameter defines whether telegrams with group addresses of the main groups 14 to 31 are routed or blocked.

- *Route*: All group telegrams of main groups 14 to 31 are routed.
- *Block*: All group telegrams of main groups 14 to 31 from KNX to LAN are blocked.

Physically addressed telegrams and broadcast telegrams

Options: Filter
 Block

This parameter defines whether physically addressed telegrams or broadcast telegrams are filtered or blocked.

- *Filter*: Only telegrams from KNX to LAN that are to exit the line of the IP Router to LAN are sent.
- *Block*: Physically addressed telegrams and broadcast telegrams are not processed by the IP Router. It is not possible to program other devices in the system with ETS from the line below the level of the IP Router – neither via the USB connection nor using the tunneling function of the IP Router.

Telegram confirmation for group telegrams

Options: Only if routed
 Always

This parameter defines whether the IP Router is to acknowledge group telegrams.

- *Only if routed*: The group telegrams are acknowledged (send ACK) only if they are also routed by the IP Router to LAN. Thus, only telegrams that are in the IP Router filter table are acknowledged.
- *Always*: All group telegrams on the KNX are acknowledged by the IP Router.

Control4® KNX Commissioning

3.2.2.2 Parameter window LAN -> KNX

In the parameter window LAN -> KNX it is possible to define the processing of telegrams from the LAN network to the KNX system.

KNX->LAN	Group telegrams main groups 0...13	Filter
LAN->KNX	Group telegrams main groups 14...31	<input checked="" type="radio"/> Route <input type="radio"/> Block
IP settings	Physically addressed telegrams and broadcast telegrams	<input checked="" type="radio"/> Filter <input type="radio"/> Block
Type of IP communication		

Group telegrams main groups 0...13

Options: Filter
Route
Block

This parameter defines whether telegrams with group addresses of the main groups 0 to 13 are filtered, routed or blocked.

- *Filter*: Telegrams with the group addresses of the main groups 0 to 13 from LAN to KNX are filtered in accordance with the filter table, which is automatically calculated by ETS.
- *Route*: All group telegrams of main groups 0 to 13 are routed without considering the filter table settings.

Important

This setting is only useful for commissioning and diagnostics. It should not be used during normal operation.

As this setting can overload the KNX lines, a loss of telegrams could occur.

- *Block*: All group telegrams from LAN to KNX are blocked without considering the filter table settings.

Control4® KNX Commissioning

Group telegrams main groups 14...31

Options: Route
 Block

This parameter defines whether telegrams with group addresses of the main groups 14 to 31 are routed or blocked.

Note

From ETS 5.6 and higher, the main groups 14...31 can be filtered. The application *IP Router/2.0* must be used for this purpose.

- *Route*: All group telegrams of main groups 14 to 31 are routed.
- *Block*: All group telegrams of main groups 14 to 31 from LAN to KNX are blocked.

Physically addressed telegrams and broadcast telegrams

Options: Filter
 Block

This parameter defines whether physically addressed telegrams or broadcast telegrams are filtered or blocked.

- *Filter*: Only telegrams from LAN to KNX that are to be transferred into the line are sent.
- *Block*: Physically addressed telegrams or broadcast telegrams from LAN to KNX are blocked.

Control4® KNX Commissioning

3.2.2.3 Parameter window *IP settings*

Settings on the IP side of the IP Router are made in the parameter window *IP settings*.

KNX->LAN	Device name (max. 30 char.)	IP Router IPR/S3.1.1
LAN->KNX	IP address assignment	<input checked="" type="radio"/> Automatic (DHCP, AutoIP) <input type="radio"/> Fixed
IP settings		
Type of IP communication		

Device name (max. 30 char.)

Options: IP Router C4-KNX-IPR

The device name is used for identification of the device on LAN. After a search query, e.g. by ETS, every KNXnet/IP device reports its name and can be allocated accordingly. For example, the installation location can be identified by the names assigned to the devices, e.g. IPR, HALL, SUB7, etc.

The text may be a maximum of 30 characters in length. This name is also displayed when this device is determined in ETS as the communication interface.

Note

The default device name on delivery is "IP Router". The device name is adopted from the application after the first download.

For further information see [Use of the integrated tunneling servers](#), p. 36

IP address assignment

Options: Automatic (DHCP, AutoIP)
Fixed

- *Automatic (DHCP, AutoIP)*: In the default setting the IP Router expects the assignment of an IP address by a DHCP (dynamic host configuration protocol) server. This server responds to a request by assigning a free IP address to the device. If a DHCP server is not available in the network or it does not respond, the device starts an auto IP procedure. It assigns itself an address from the reserved range for auto IP addresses (169.254.xxx.yyy).
- *Fixed*: If no DHCP server is installed on the network or if the IP address should remain static, it can be assigned as fixed.

The parameter window expands by the IP address settings.

Control4® KNX Commissioning

These parameters are visible only if the option *Fixed* has been selected for the parameter *IP address assignment*.

KNX->LAN	Device name (max. 30 char.)	IP Router IPR/S3.1.1
LAN->KNX	IP address assignment	<input type="radio"/> Automatic (DHCP, AutoIP) <input checked="" type="radio"/> Fixed
IP settings		
Type of IP communication	IP address	
	Byte 1	192
	Byte 2	168
	Byte 3	0
	Byte 4	222
	Subnet mask	
	Byte 1	255
	Byte 2	255
	Byte 3	255
	Byte 4	0
	Default gateway	
	Byte 1	0
	Byte 2	0
	Byte 3	0
	Byte 4	0

IP address

Byte x

Options: 0...255

The IP address is the unique address of the IP Router in LAN.

This address must be entered byte by byte, e.g. as follows for address 192.168.0.222:

Byte 1: 192
Byte 2: 168
Byte 3: 0
Byte 4: 222

Control4® KNX Commissioning

Subnet mask

Byte x

Options: 0...255

The *Subnet mask* defines the network class. The subnet mask must be set to reflect the number and structure of the subnets. In the simplest case of a small network the subnet mask 255.255.255.0 should be set as follows:

Byte 1:	255
Byte 2:	255
Byte 3:	255
Byte 4:	0

Default gateway

Byte x

Options: 0...255

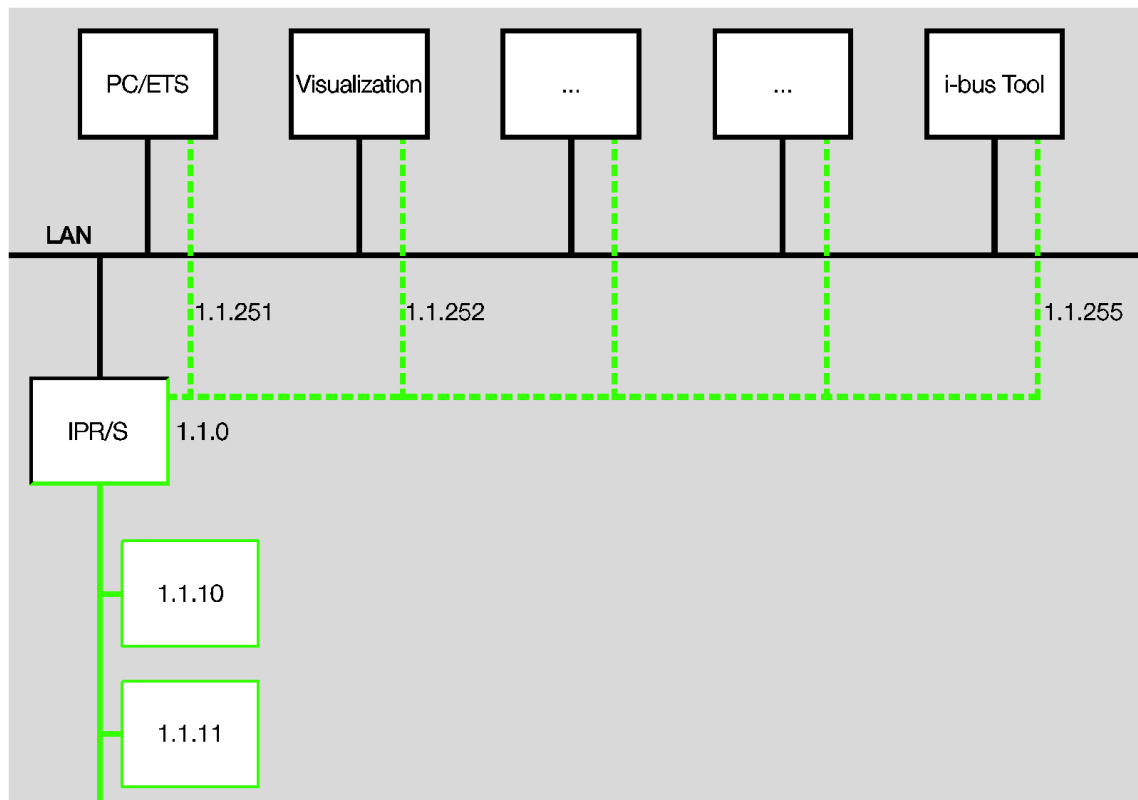
The parameter *Default gateway* defines the connection point, e.g. the IP address, of a Router between networks through which IP telegrams are transferred. These gateways are available only in large networks. The setting 0.0.0.0 can be retained for small networks.

3.3 Communication objects

The IP Router IP Router has no KNX communication objects.

3.4 Use of the integrated tunneling servers

The IP Router offers five additional physical addresses, which can be used for a tunneling connection. These so-called tunneling servers can be used with ETS as a programming interface or with another client, e.g. a visual display system.



Tunneling involves a client connecting to a bus line. The tunneling process uses UDP but includes a data link layer so that telegrams are repeated in the event of an error.

Note

The physical address for the tunneling connection must fit the topology. Therefore, the addresses must be selected from the address range of the subordinate line. On delivery, all tunneling servers have the address 15.15.100.

Parameterization of the tunneling connections depends on the ETS version used.

- In ETS 5.6, the first five free addresses in the line are assigned after the Router has been inserted into a line.

Control4® KNX Commissioning

3.4.1 Settings in ETS 5.6

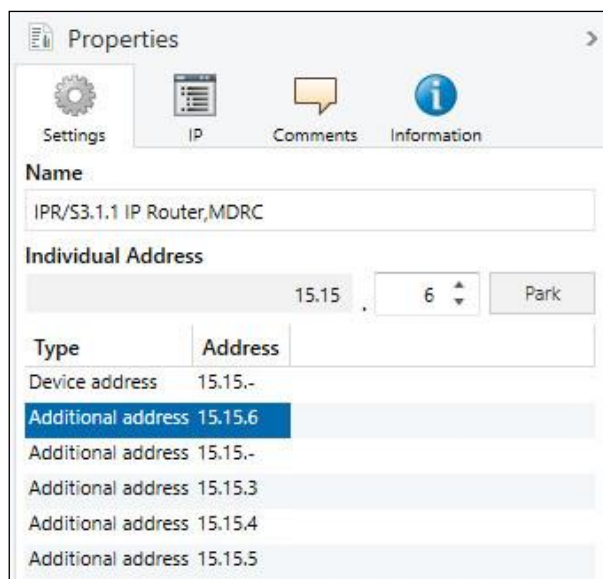
In ETS version ETS 5.6 or higher, an additional Properties window is available for setting the additional physical addresses.

After insertion of the Router into the line, ETS automatically reserves the first five free addresses of this line for the tunneling servers of the Router (ETS 5.6). This is a property of ETS and cannot be changed.

Although all five addresses of the device are 15.15.100 when the device is supplied, the addresses will be changed to the first free addresses in the project after the first download.

If this is not desired, it can be changed manually in the Properties window.

Changing the address



To change the address, mark the current device address or additional address and then select the desired numeral using the up or down arrow key. The changed address is saved when another address is marked.

The changed addresses are adopted by the device only after a download.

Park

If the option *Park* is activated for a tunnel, this tunnel will not be used.

If the option *Park* is selected for all tunneling servers, all tunneling servers will be assigned the address 15.15.255. Only one tunneling server is available as a result.

Control4® KNX Commissioning

Control4® KNX

Planning and application

4 Planning and application

4.1 The IP Router in the network

The IP Router is designed for use in 10/100 BaseT networks compliant to IEEE 802.3. The device features an AutoSensing function and sets the baud rate (10 or 100 Mbit) automatically.

4.1.1 Assignment of IP address

DHCP/AutoIP

The IP address of the device can be received from a DHCP server. For this purpose the automatic assignment setting of the IP address in ETS is required, see [Parameter window IP settings](#), p. 33 (for application *IP Router/1.1*). If no DHCP server is found with this setting, the device starts an AutoIP procedure and autonomously assigns itself an IP address from the range 169.254.xxx.yyy.

The IP address that the device receives during start-up (via DHCP or AutoIP) is retained until the next restart (switched off/on or reprogramming) or until a DHCP server is available again.

No DHCP server available during start-up:

If no DHCP server is available during start-up, the device assigns itself an AutoIP address. The Router then cyclically (3 telegrams at intervals of 3 seconds, followed by a pause of 20 seconds) searches for a DHCP server. As soon as a server is available again, the address assigned by the DHCP server is used.

DHCP server fails (device has already received IP address from the DHCP):

Requests to extend the utilization rights for this IP address remain unanswered until the end of the lease time (IP address validity time; this is defined by the DHCP server during assignment of the IP address). The IP address continues to be used.

At the end of the lease time or after a download, the devices search for an AutoIP address.

Fixed IP address

If the IP address of the IP Router is to have a fixed assignment, a fixed IP address (as well as a subnet mask and a default gateway) can be set in ETS, see [Parameter window IP settings](#), p. 23 (for application *IP Router/2.0*) or [Parameter window IP settings](#), p. 33 (for application *IP Router/1.1*).

Control4® KNX

Planning and application

4.1.2 KNX telegrams in the network (routing)

Note
With the design of the KNX system it is important to note that the number of transferred telegrams is also limited when the IP Router is used. Due to the high baud rate on the IP side (10/100 Mbit/s), telegrams may be lost with high levels of data exchange on the TP1 line (9.6 kbit/s) for system reasons.

Note
The IP Router cannot be reached during IP, TCP or UDP flooding (access from the Internet). All services will be available again as soon as flooding ends. Rate limiting must be set at the network level to avoid this reaction. Please discuss the topic with your network administrator.

Multicast

The IP Router sends telegrams from KNX to the IP network in accordance with the KNXnet/IP protocol specification. These telegrams are sent in the default setting as multicast telegrams to the multicast IP address 224.0.23.12 port 3671. This multicast IP address is the defined address for the KNXnet/IP from the KNX Association in conjunction with IANA for KNX-IP devices. This address should be retained and only changed if the existing network demands that another address be used.

In order for several IP Routers in a network to communicate with one another, multicast communication must be possible between the devices.

Depending on the type of network and the setting of the network components used, e.g. Routers, switches or firewalls, the multicast IP address 224.0.23.12 may need to be enabled explicitly beforehand.

Please discuss the topic with your network administrator.

Multicast designates communication of a transmitter with a group of receivers. The IP Router sends the KNX telegrams packaged as UPD/IP telegrams on the IP network, and all IP Routers parameterized with the same multicast address receive and evaluate these telegrams.

If a telegram is intended for the corresponding subline, the IP Router routes the telegram into the line. Otherwise, it is rejected.

For more information, see [Parameter window IP settings](#), p. 23 (for ETS 5.6)

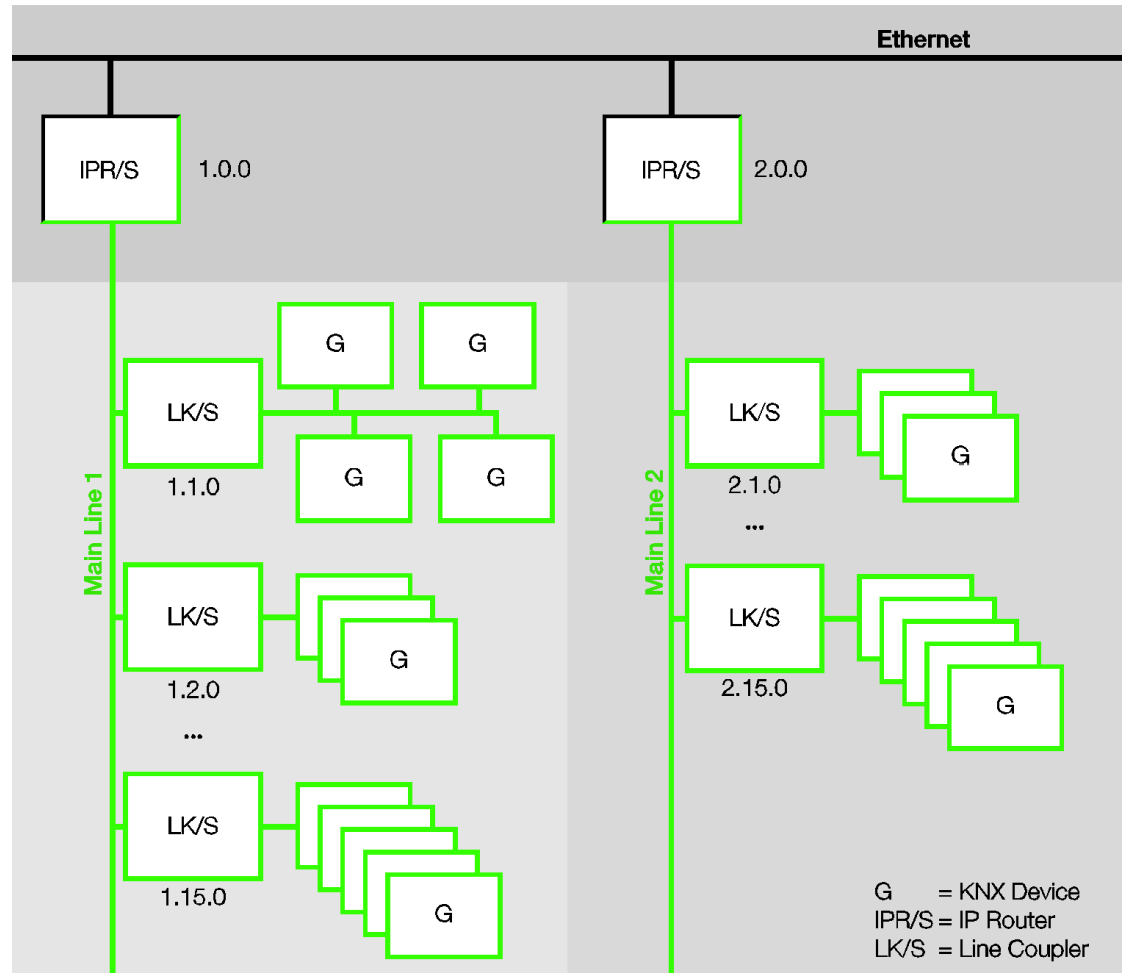
Control4® KNX

Planning and application

4.1.3 IP Router as an area coupler

The IP Router in a KNX system can assume the function of an area coupler. To do this it must be given the physical address of an area coupler (1.0.0...15.0.0). Up to 15 areas can be defined with area couplers in an ETS project.

The following figure shows this topology with IP Routers as area couplers and KNX Line Couplers (LK/S).



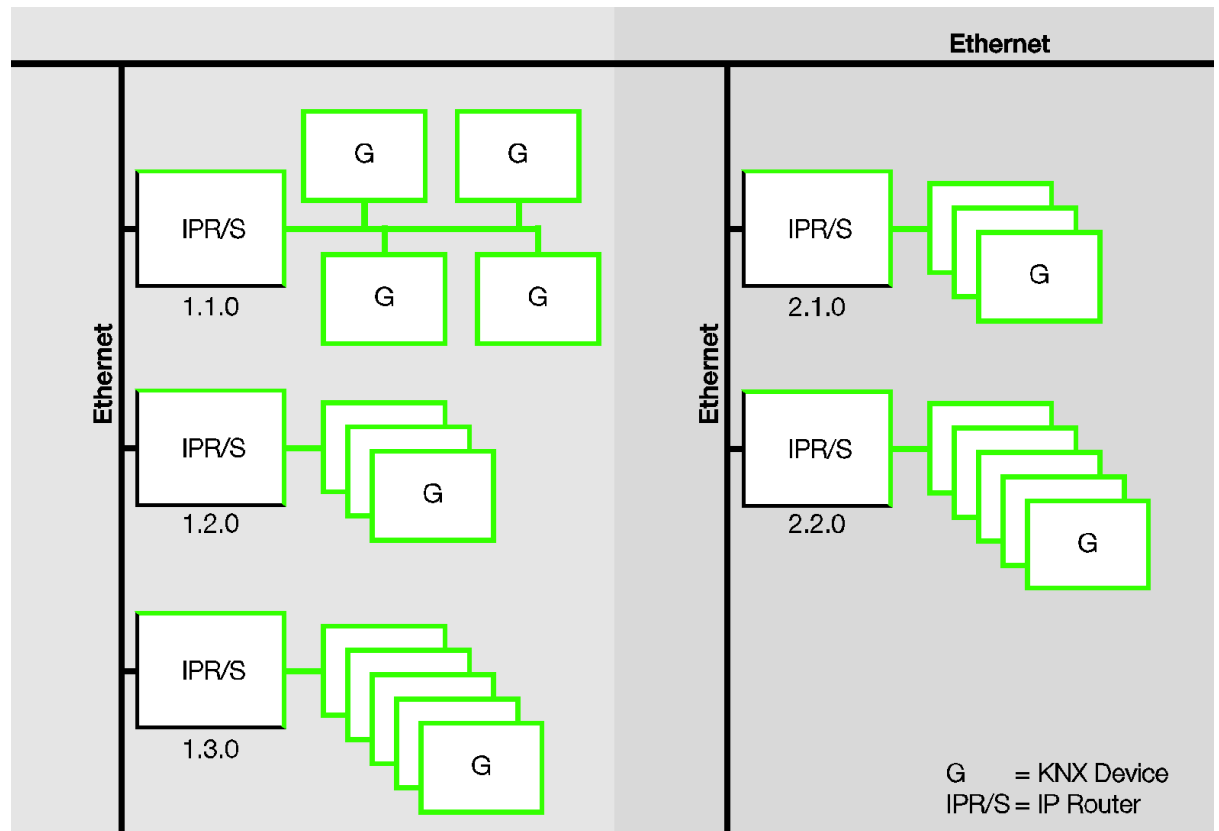
Control4® KNX

Planning and application

4.1.4 IP Router as a line coupler

The IP Router in a KNX system can assume the function of a line coupler. To do this it must be given the physical address of a line coupler (1.1.0...15.15.0).

The following illustration shows the topology with IP Routers as line couplers.



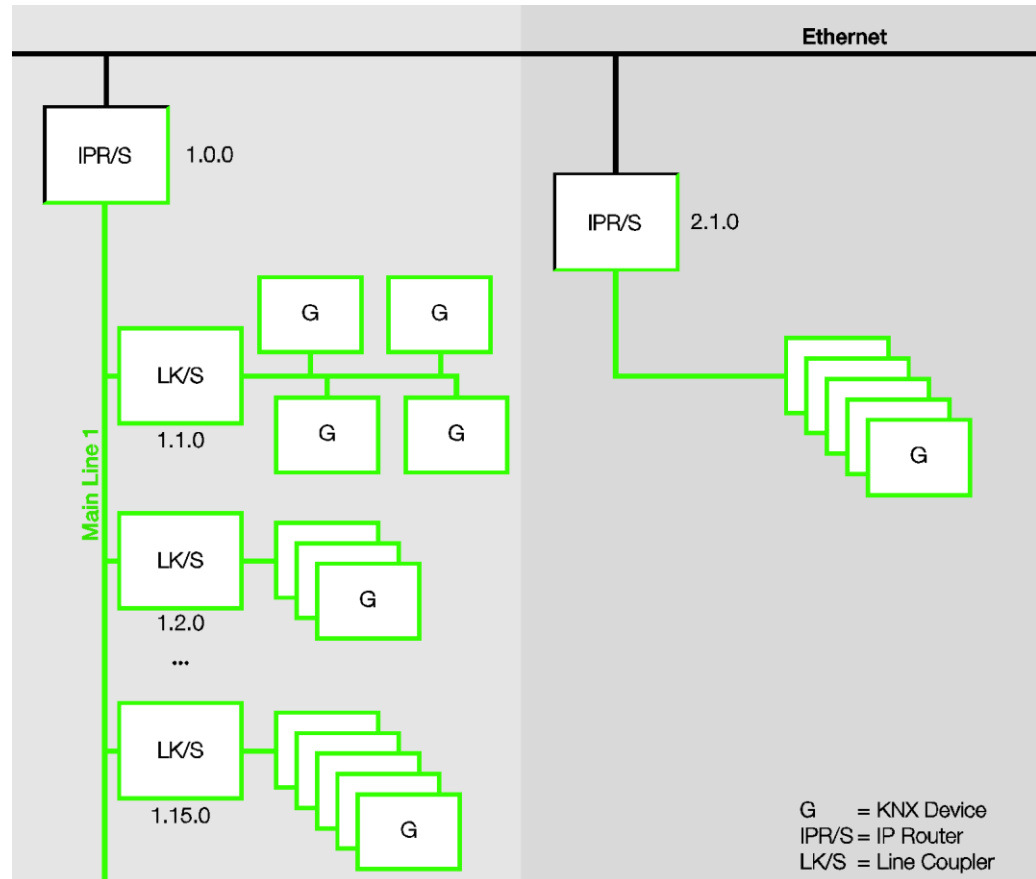
Control4® KNX

Planning and application

4.1.5 Mixed topology

In a KNX system, the IP Router can be used as an area coupler at one point, e.g. office complex, and as a line coupler at another point, e.g. a remote underground garage.

To do this ensure that the IP Router uses the line coupler address from a free area as the line coupler, e.g. 2.1.0 in the figure.



Control4® KNX

Planning and application

4.2 The Control4® KNX Tool

The Control4® KNX Tool is required in order to set certain functions of the C4-KNX-IPR IP devices. It simplifies commissioning on the IP side.

The IP settings are accessible via the buttons *Connect*  and *IP devices* .

Ribbon area: switching between Discovery and Firmware Update



Click the corresponding button to select *Discovery* or *Update* mode.

Discovery

Select *Discovery* mode in the ribbon area.

This function serves to find and display Control4® IP devices in the network.

Firmware update

Select *Update* mode in the ribbon area.

If this should become necessary, the firmware can be updated using this function.

Important
The firmware must be downloaded from https://ctrl4.co/knx-tool . For this purpose, the Control4® KNX Tool connects to a server if an Internet connection is available . An Internet connection is then no longer necessary in order to update the system devices.

Important
During the update process, the KNX bus (TP) must be connected in addition to the IP network (LAN) so that the KNX parameters can be restored correctly. Otherwise, the update process will fail.

Note
The Control4® KNX Tool must be run with administrator rights for the update process.

Control4® KNX

Appendix

A Appendix

A.1 Ordering data

Device type	Product name	Weight 1 pc [kg]	Packaging [pcs.]
C4-KNX-IPR (KNXPROD File Name: IPR/S 3.1.41)	IP Router, MDRC	0.1	1

Application program

The current application program can be found with the corresponding software information for download at <http://ctrl4.co/knx-ipr>.

Control4® KNX

Third party software components, notices and OSS license texts

Third party software components, notices and OSS license texts

Software components structured by applicable license:	49
Copyright notices:	52
ABBPpower , at91ft12, at91gpbr hardware driver (v1.0):	52
AT91 Bootstrap (v1.9):	52
Buildroot (v2012-05):	53
Busybox (v1.20.1):	54
CodeSourcery G++ Lite (v2010.09-50):	68
Dropbear sshd (v2012.55):	81
Expat (v2.1.0):	85
Gdbserver (v7.2.50.20100908-cvs):	86
Glib (v2.30.2):	88
Gzip (v1.5):	97
Kmod (v8):	102
Libffi (3.0.11):	105
Libjpeg (v9a):	119
Libkmod (v8):	133
Libxml2 (v2.7.8):	135
LibPcap (v1.2.1):	136
Linux (v3.2.26):	137
Lsof (v4.85):	152
LibXml2 (v2.7.8):	165
Memstat (v0.8):	166
Ncurses (v5.7):	167
OpenSSL (v1.0.1g):	175
Pcre (v8.30):	179
Popt (v1.16):	182
ROM-Bootloader:	183
GNU Tar (v1.17):	183
u-boot (v2010.09):	194
uClibc (v0.9.31.1):	195
Udev (v058):	196
Util-Linux (v2.20.1):	199

Control4® KNX

Third party software components, notices and OSS license texts

XML-RPC++ (v0.7):	203
Zlib (v1.2.6):	208
OSS License texts:	213
GNU General Public License (GPL), Version 3.0	213
GNU General Public License (GPL), Version 2.0	222
GNU General Public License (GPL), Version 1.0	238
GNU Library General Public License (LGPL), Version 2.0	242
GNU Lesser General Public License (LGPL), Version 2.1	252
GNU Lesser General Public License (LGPL), Version 3.0	261
GNU Free Documentation License (FDL), Version 1.3	264
GCC Runtime Library Exception (RLE), Version 3.1	272
The BSD 2-Clause License (Template)	273
The MIT License (MIT) (Template)	274

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- memstat (v0.8)

under General Public License (GPL) Version 2:

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- at91ft12 (v1.0)
- at91gpbr (v1.0)
- buildroot (v2012-05)
- busybox (v1.20.1)
- gdbserver (v7.2.50.20100908-cvs)
- glibc (v2.11.1)
- kmod (v8)
- libgcc (v4.5.1)
- Linux (v3.2.26)
- mtd-utils (v1.4.9)
- U-Boot (v2010.09)
- udev (v058)
- util Linux (v2.20.1)

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- gdbserver (v7.2.50.20100908-cvs)
- gzip (v1.5)
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- binutils (v2.21)

- gdbserver (v7.2.50.20100908-cvs)

- glib (libglib2) (v2.30.2)

- util Linux (v2.20.1)

under Lesser General Public License (LGPL) Version 2.1:

- glibc (v2.11.1)

- libgcc (v4.5.1)

- libkmod (v8)

- uclibc (v0.9.31.1)

- XML-RPC++ (v0.7)

under Lesser General Public License (LGPL) Version 3:

- binutils (v2.21)

- gdbserver (v7.2.50.20100908-cvs)

- gmp (v5.0.4)

- libgcc (v4.5.1)

- uclibc (v0.9.31.1)

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- popt (v1.16)

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- libgcc (v4.5.1)

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- dropbear sshd (v2012.55)

- libpcap (v1.2.1)

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- libxml2 (v2.7.8)
- lsof (v4.85)
- OpenSSL (v1.0.1g)
- Pcre (v8.30)
- util Linux (v2.20.1)
- zlib (v1.2.6)

under MIT licenses:

- expat (v2.1.0)

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- ncurses (v5.7)

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ABBpower, at91ft12, at91gpbr hardware driver (v1.0):

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Buildroot (v2012-05):

Buildroot is a simple, efficient and easy-to-use tool to generate embedded Linux systems through cross-compilation.

The documentation can be found in docs/manual. You can generate a text document with 'make manual-text' and read output/docs/manual/manual.text.

Online documentation can be found at <http://buildroot.org/docs.html>

To build and use the buildroot stuff, do the following:

- 1) run 'make menuconfig'
- 2) select the target architecture and the packages you wish to compile
- 3) run 'make'
- 4) wait while it compiles
- 5) find the kernel, bootloader, root filesystem, etc. in output/images

You do not need to be root to build or run buildroot. Have fun!

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Buildroot comes with a basic configuration for a number of boards. Run

'make list-defconfigs' to view the list of provided configurations.

Please feed suggestions, bug reports, insults, and bribes back to the

buildroot mailing list: buildroot@buildroot.org

You can also find us on #buildroot on Freenode IRC.

Busybox (v1.20.1):

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Dropbear sshd (v2012.55):

Dropbear contains a number of components from different sources, hence there are a few licenses and authors involved. All licenses are fairly non-restrictive.

The majority of code is written by Matt Johnston, under the license below.

Portions of the client-mode work are (c) 2004 Mihnea Stoenescu, under the same license:

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=====

LibTomCrypt and LibTomMath are written by Tom St Denis, and are Public Domain.

=====

sshpty.c is taken from OpenSSH 3.5p1,

Copyright (c) 1995 Tatu Ylonen <ylo@cs.hut.fi>, Espoo, Finland

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"As far as I am concerned, the code I have written for this software can be used freely for any purpose. Any derived versions of this software must be clearly marked as such, and if the derived work is incompatible with the protocol description in the RFC file, it must be called by a name other than "ssh" or "Secure Shell". "

=====

loginrec.c

loginrec.h

atomicio.h

atomicio.c

and strlcat() (included in util.c) are from OpenSSH 3.6.1p2, and are licensed under the 2 point BSD license.

loginrec is written primarily by Andre Lucas, atomicio.c by Theo de Raadt.

strlcat() is (c) Todd C. Miller

=====

Import code in keyimport.c is modified from PuTTY's import.c, licensed as follows:

PuTTY is copyright 1997-2003 Simon Tatham.

Portions copyright Robert de Bath, Joris van Rantwijk, Delian

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Delchev, Andreas Schultz, Jeroen Massar, Wez Furlong, Nicolas Barry,

Justin Bradford, and CORE SDI S.A.

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Expat (v2.1.0):

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and Clark Cooper

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Gdbserver (v7.2.50.20100908-cvs):

README for GNU development tools

This directory contains various GNU compilers, assemblers, linkers, debuggers, etc., plus their support routines, definitions, and documentation.

If you are receiving this as part of a GDB release, see the file gdb/README.

If with a binutils release, see binutils/README; if with a libg++ release, see libg++/README, etc. That'll give you info about this package -- supported targets, how to use it, how to report bugs, etc.

It is now possible to automatically configure and build a variety of tools with one command. To build all of the tools contained herein, run the ``configure" script here, e.g.:

```
./configure
```

```
make
```

To install them (by default in /usr/local/bin, /usr/local/lib, etc), then do:

```
make install
```

(If the configure script can't determine your type of computer, give it the name as an argument, for instance ``./configure sun4". You can use the script ``config.sub" to test whether a name is recognized; if it is, config.sub translates it to a triplet specifying CPU, vendor, and OS.)

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If you have more than one compiler on your system, it is often best to explicitly set CC in the environment before running configure, and to also set CC when running make. For example (assuming sh/bash/ksh):

```
CC=gcc ./configure  
  
make
```

A similar example using csh:

```
setenv CC gcc  
  
./configure  
  
make
```

Much of the code and documentation enclosed is copyright by the Free Software Foundation, Inc. See the file COPYING or COPYING.LIB in the various directories, for a description of the GNU General Public License terms under which you can copy the files.

REPORTING BUGS: Again, see gdb/README, binutils/README, etc., for info on where and how to report problems.

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Glib (v2.30.2):

General Information

=====

This is GLib version 2.30.2. GLib is the low-level core library that forms the basis for projects such as GTK+ and GNOME. It provides data structure handling for C, portability wrappers, and interfaces for such runtime functionality as an event loop, threads, dynamic loading, and an object system.

The official ftp site is:

<ftp://ftp.gtk.org/pub/glib>

The official web site is:

<http://www.gtk.org/>

Information about mailing lists can be found at

<http://www.gtk.org/mailling-lists.html>

To subscribe: mail -s subscribe gtk-list-request@gnome.org < /dev/null

(Send mail to gtk-list-request@gnome.org with the subject "subscribe")

Installation

=====

See the file 'INSTALL'

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Notes about GLib 2.30

=====

* GObject includes a generic marshaller, `g_cclosure_marshal_generic`.

To use it, simply specify NULL as the marshaller in `g_signal_new()`.

The generic marshaller is implemented with libffi, and consequently

GObject depends on libffi now.

Notes about GLib 2.28

=====

* The GApplication API has changed compared to the version that was included in the 2.25 development snapshots. Existing users will need adjustments.

Notes about GLib 2.26

=====

* Nothing noteworthy.

Notes about GLib 2.24

=====

* It is now allowed to call `g_thread_init(NULL)` multiple times, and to call glib functions before `g_thread_init(NULL)` is called (although the later is mainly a change in docs as this worked before too). See the GThread reference documentation for the details.

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* GObject now links to GThread and threads are enabled automatically

when `g_type_init()` is called.

* GObject no longer allows to call `g_object_set()` on construct-only properties

while an object is being initialized. If this behavior is needed, setting a

custom constructor that just chains up will re-enable this functionality.

* `GMappedFile` on an empty file now returns `NULL` for the contents instead of

returning an empty string. The documentation specifically states that code

may not rely on nul-termination here so any breakage caused by this change

is a bug in application code.

Notes about GLib 2.22

=====

* Repeated calls to `g_simple_async_result_set_op_res_gpointer` used

to leak the data. This has been fixed to always call the provided

destroy notify.

Notes about GLib 2.20

=====

* The functions for launching applications (e.g. `g_app_info_launch()` +

friends) now passes a FUSE file:// URI if possible (requires gvfs

with the FUSE daemon to be running and operational). With gvfs 2.26,

FUSE file:// URIs will be mapped back to gio URIs in the `GFile`

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constructors. The intent of this change is to better integrate POSIX-only applications, see bug #528670 for the rationale. The only user-visible change is when an application needs to examine an URI passed to it (e.g. as a positional parameter). Instead of looking at the given URI, the application will now need to look at the result of `g_file_get_uri()` after having constructed a `GFile` object with the given URI.

Notes about GLib 2.18

=====

* The recommended way of using GLib has always been to only include the toplevel headers `glib.h`, `glib-object.h` and `gio.h`. GLib enforces this by generating an error when individual headers are directly included. To help with the transition, the enforcement is not turned on by default for GLib headers (it is turned on for `GObject` and `GIO`). To turn it on, define the preprocessor symbol `G_DISABLE_SINGLE_INCLUDES`.

Notes about GLib 2.16

=====

* GLib now includes `GIO`, which adds optional dependencies against `libattr` and `libselinux` for extended attribute and SELinux support. Use `--disable-xattr` and `--disable-selinux` to build without these.

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Notes about GLib 2.10

=====

- * The functions `g_snprintf()` and `g_vsnprintf()` have been removed from the `gprintf.h` header, since they are already declared in `glib.h`. This doesn't break documented use of `gprintf.h`, but people have been known to include `gprintf.h` without including `glib.h`.
- * The Unicode support has been updated to Unicode 4.1. This adds several new members to the `GUnicodeBreakType` enumeration.
- * The support for Solaris threads has been retired. Solaris has provided POSIX threads for long enough now to have them available on every Solaris platform.
- * 'make check' has been changed to validate translations by calling `msgfmt` with the `-c` option. As a result, it may fail on systems with older `gettext` implementations (GNU `gettext` < 0.14.1, or Solaris `gettext`). 'make check' will also fail on systems where the C compiler does not support ELF visibility attributes.
- * The `GMemChunk` API has been deprecated in favour of a new 'slice allocator'. See the `g_slice` documentation for more details.
- * A new type, `GInitiallyUnowned`, has been introduced, which is intended to serve as a common implementation of the 'floating reference' concept that is e.g. used by `GtkObject`. Note that changing the

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inheritance hierarchy of a type can cause problems for language bindings and other code which needs to work closely with the type system. Therefore, switching to `GInitiallyUnowned` should be done carefully. `g_object_compat_control()` has been added to GLib 2.8.5 to help with the transition.

Notes about GLib 2.6.0

=====

* GLib 2.6 introduces the concept of 'GLib filename encoding', which is the on-disk encoding on Unix, but UTF-8 on Windows. All GLib functions returning or accepting pathnames have been changed to expect filenames in this encoding, and the common POSIX functions dealing with pathnames have been wrapped. These wrappers are declared in the header `<glib/gstdio.h>` which must be included explicitly; it is not included through `<glib.h>`.

On current (NT-based) Windows versions, where the on-disk file names are Unicode, these wrappers use the wide-character API in the C library. Thus applications can handle file names containing any Unicode characters through GLib's own API and its POSIX wrappers, not just file names restricted to characters in the system codepage.

To keep binary compatibility with applications compiled against older versions of GLib, the Windows DLL still provides entry points with the old semantics using the old names, and applications compiled against GLib 2.6 will actually use new names for the

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functions. This is transparent to the programmer.

When compiling against GLib 2.6, applications intended to be portable to Windows must take the UTF-8 file name encoding into consideration, and use the gstdio wrappers to access files whose names have been constructed from strings returned from GLib.

* Likewise, `g_get_user_name()` and `g_get_real_name()` have been changed to return UTF-8 on Windows, while keeping the old semantics for applications compiled against older versions of GLib.

* The GLib uses an `'_'` prefix to indicate private symbols that must not be used by applications. On some platforms, symbols beginning with prefixes such as `_g` will be exported from the library, on others not. In no case can applications use these private symbols. In addition to that, GLib+ 2.6 makes several symbols private which were not in any installed header files and were never intended to be exported.

* To reduce code size and improve efficiency, GLib, when compiled with the GNU toolchain, has separate internal and external entry points for exported functions. The internal names, which begin with `IA__`, may be seen when debugging a GLib program.

* On Windows, GLib no longer opens a console window when printing warning messages if `stdout` or `stderr` are invalid, as they are in "Windows subsystem" (GUI) applications. Simply redirect `stdout` or `stderr` if you need to see them.

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* The child watch functionality tends to reveal a bug in many thread implementations (in particular the older LinuxThreads implementation on Linux) where it's not possible to call `waitpid()` for a child created in a different thread. For this reason, for maximum portability, you should structure your code to fork all child processes that you want to wait for from the main thread.

* A problem was recently discovered with `g_signal_connect_object()`; it doesn't actually disconnect the signal handler once the object being connected to dies, just disables it. See the API docs for the function for further details and the correct workaround that will continue to work with future versions of GLib.

How to report bugs

=====

Bugs should be reported to the GNOME bug tracking system.

(<http://bugzilla.gnome.org>, product glib.) You will need to create an account for yourself.

In the bug report please include:

* Information about your system. For instance:

- What operating system and version
- For Linux, what version of the C library

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And anything else you think is relevant.

* How to reproduce the bug.

If you can reproduce it with one of the test programs that are built
in the tests/ subdirectory, that will be most convenient. Otherwise,
please include a short test program that exhibits the behavior.

As a last resort, you can also provide a pointer to a larger piece
of software that can be downloaded.

* If the bug was a crash, the exact text that was printed out
when the crash occurred.

* Further information such as stack traces may be useful, but
is not necessary.

Patches

=====

Patches should also be submitted to bugzilla.gnome.org. If the
patch fixes an existing bug, add the patch as an attachment
to that bug report.

Otherwise, enter a new bug report that describes the patch,
and attach the patch to that bug report.

Patches should be in unified diff form. (The -up option to GNUdiff.)

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Gzip (v1.5):

This is the file README for the gzip distribution.

The GNU gzip home page is <http://www.gnu.org/software/gzip>.

gzip (GNU zip) is a compression utility designed to be a replacement for 'compress'. Its main advantages over compress are much better compression and freedom from patented algorithms. The GNU Project uses it as the standard compression program for its system.

gzip currently uses by default the LZ77 algorithm used in zip 1.9 (the portable pkzip compatible archiver). The gzip format was however designed to accommodate several compression algorithms. See below for a comparison of zip and gzip.

gunzip can currently decompress files created by gzip, compress or pack. The detection of the input format is automatic. For the gzip format, gunzip checks a 32 bit CRC. For pack, gunzip checks the uncompressed length. The 'compress' format was not designed to allow consistency checks. However gunzip is sometimes able to detect a bad .Z file because there is some redundancy in the .Z compression format. If you get an error when uncompressing a .Z file, do not assume that the .Z file is correct simply because the standard uncompress does not complain. This generally means that the standard uncompress does not check its input, and happily generates garbage output.

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gzip produces files with a .gz extension. Previous versions of gzip used the .z extension, which was already used by the 'pack' Huffman encoder. gunzip is able to decompress .z files (packed or gzip'ed).

Several planned features are not yet supported (see the file TODO).

See the file NEWS for a summary of changes since the last release.

See the file INSTALL for installation instructions.

WARNING: gzip is sensitive to compiler bugs, particularly when optimizing. Use "make check" to check that gzip was compiled correctly. Try compiling gzip without any optimization if you have a problem.

Please send all comments and bug reports by electronic mail to <bug-gzip@gnu.org>.

Bug reports should ideally include:

- * The complete output of "gzip -V" (or the contents of revision.h if you can't get gzip to compile)
- * The hardware and operating system (try "uname -a")
- * The compiler used to compile (if it is gcc, use "gcc -v")
- * A description of the bug behavior
- * The input to gzip, that triggered the bug

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If you send me patches for machines I don't have access to, please test them very carefully. gzip is used for backups, it must be extremely reliable.

The znew and gzexe shell scripts provided with gzip benefit from (but do not require) the (non-GNU) cpmud utility to transfer file attributes.

The sample programs zread.c, sub.c and add.c in subdirectory sample are provided as examples of useful complements to gzip. Read the comments inside each source file. The perl script ztouch is also provided as example (not installed by default since it relies on perl).

gzip is free software, you can redistribute it and/or modify it under the terms of the GNU General Public License, a copy of which is provided under the name COPYING. The latest version of gzip are always available from <ftp://ftp.gnu.org/gnu/gzip> or in any of the gnu mirror sites.

- sources in gzip-*.tar (or .shar or .tar.gz).
- MSDOS lha self-extracting exe in gzip-msdos-*.exe. Once extracted, copy gzip.exe to gunzip.exe and zcat.exe, or use "gzip -d" to decompress. gzip386.exe runs much faster but only on 386 and above; it was compiled with djgpp 1.10 available in directory omnigate.clarkson.edu/pub/msdos/djgpp.

A VMS executable is in [ftp://ftp.spc.edu/\[.macro32.savesets\]gzip-1-*.zip](ftp://ftp.spc.edu/[.macro32.savesets]gzip-1-*.zip) (use [.macro32]unzip.exe to extract). A PRIMOS executable is available in <ftp://ftp.lysator.liu.se/pub/primos/run/gzip.run>.

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Some ftp servers can automatically make a tar.Z from a tar file. If you are getting gzip for the first time, you can ask for a tar.Z file instead of the much larger tar file.

Many thanks to those who provided me with bug reports and feedback. See the files THANKS and ChangeLog for more details.

Note about zip vs. gzip:

The name 'gzip' was a very unfortunate choice, because zip and gzip are two really different programs, although the actual compression and decompression sources were written by the same persons. A different name should have been used for gzip, but it is too late to change now.

zip is an archiver: it compresses several files into a single archive file. gzip is a simple compressor: each file is compressed separately. Both share the same compression and decompression code for the 'deflate' method. unzip can also decompress old zip archives (implode, shrink and reduce methods). gunzip can also decompress files created by compress and pack. zip 1.9 and gzip do not support compression methods other than deflation. (zip 1.0 supports shrink and implode). Better compression methods may be added in future versions of gzip. zip will always stick to absolute compatibility with pkzip, it is thus constrained by PKWare, which is a commercial company. The gzip header format is deliberately different from that of pkzip to avoid such a constraint.

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On Unix, gzip is mostly useful in combination with tar. GNU tar

1.11.2 and later has a -z option to invoke gzip automatically. "tar -z"

compresses better than zip, since gzip can then take advantage of

redundancy between distinct files. The drawback is that you must

scan the whole tar.gz file in order to extract a single file near

the end; unzip can directly seek to the end of the zip file. There

is no overhead when you extract the whole archive anyway.

If a member of a .zip archive is damaged, other files can still

be recovered. If a .tar.gz file is damaged, files beyond the failure

point cannot be recovered. (Future versions of gzip will have

error recovery features.)

gzip and gunzip are distributed as a single program. zip and unzip

are, for historical reasons, two separate programs, although the

authors of these two programs work closely together in the Info-ZIP

team. zip and unzip are not associated with the GNU project.

See <http://info-zip.org/> for more about zip and unzip.

For any copyright year range specified as YYYY-ZZZZ in this package

note that the range specifies every single year in that closed interval.

=====

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Kmod (v8):

kmod - Linux kernel module handling

OVERVIEW

=====

kmod is a set of tools to handle common tasks with Linux kernel modules like insert, remove, list, check properties, resolve dependencies and aliases.

These tools are designed on top of libkmod, a library that is shipped with kmod. See libkmod/README for more details on this library and how to use it.

The aim is to be compatible with tools, configurations and indexes from module-init-tools project.

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Compilation and installation

=====

In order to compile the source code you need following software packages:

- GCC compiler
- GNU C library

Optional dependencies:

- ZLIB library
- LZMA library

Typical configuration:

```
./configure CFLAGS="-g -O2" --prefix=/usr \  
--sysconfdir=/etc --libdir=/usr/lib
```

Configure automatically searches for all required components and packages.

To compile and install run:

```
make && make install
```

Hacking

=====

Run 'bootstrap' script before configure. If you want to accept the recommended flags, you just need to run 'bootstrap-configure'.

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Make sure to read the CODING-STYLE file and the other READMEs: libkmod/README
and testsuite/README.

Information

=====

Signed packages:

<http://www.kernel.org/pub/linux/utils/kernel/kmod/>

Mailing list:

linux-modules@vger.kernel.org

Git:

<git://git.kernel.org/pub/scm/utils/kernel/kmod/kmod.git>

<http://git.kernel.org/pub/scm/utils/kernel/kmod/kmod.git>

<https://git.kernel.org/pub/scm/utils/kernel/kmod/kmod.git>

Gitweb:

<http://git.kernel.org/?p=utils/kernel/kmod/kmod.git>

Irc:

#kmod on irc.freenode.org

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Libffi (3.0.11):

Status

=====

libffi-3.0.11 was released on April 11, 2012. Check the libffi web page for updates: <URL:<http://sourceware.org/libffi/>>.

What is libffi?

=====

Compilers for high level languages generate code that follow certain conventions. These conventions are necessary, in part, for separate compilation to work. One such convention is the "calling convention". The "calling convention" is essentially a set of assumptions made by the compiler about where function arguments will be found on entry to a function. A "calling convention" also specifies where the return value for a function is found.

Some programs may not know at the time of compilation what arguments are to be passed to a function. For instance, an interpreter may be told at run-time about the number and types of arguments used to call a given function. Libffi can be used in such programs to provide a bridge from the interpreter program to compiled code.

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The libffi library provides a portable, high level programming interface to various calling conventions. This allows a programmer to call any function specified by a call interface description at run time.

FFI stands for Foreign Function Interface. A foreign function interface is the popular name for the interface that allows code written in one language to call code written in another language. The libffi library really only provides the lowest, machine dependent layer of a fully featured foreign function interface. A layer must exist above libffi that handles type conversions for values passed between the two languages.

Supported Platforms

=====

Libffi has been ported to many different platforms.

For specific configuration details and testing status, please refer to the wiki page here:

http://www.moxielogic.org/wiki/index.php?title=Libffi_3.0.11

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At the time of release, the following basic configurations have been tested:

-----+-----		
Architecture	Operating System	
-----+-----		
Alpha	Linux	
Alpha	Tru64	
ARM	Linux	
ARM	iOS	
AVR32	Linux	
HPPA	HP-UX	
IA-64	Linux	
M68K	FreeMiNT	
M68K	RTEMS	
MIPS	IRIX	
MIPS	Linux	
MIPS	RTEMS	
MIPS64	Linux	
PowerPC	AMIGA	
PowerPC	Linux	
PowerPC	Mac OSX	
PowerPC	FreeBSD	
PowerPC64	Linux	
S390	Linux	
S390X	Linux	
SPARC	Linux	

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SPARC	Solaris	
SPARC64	Linux	
SPARC64	FreeBSD	
X86	FreeBSD	
X86	Interix	
X86	kFreeBSD	
X86	Linux	
X86	Mac OSX	
X86	OpenBSD	
X86	OS/2	
X86	Solaris	
X86	Windows/Cygwin	
X86	Windows/MingW	
X86-64	FreeBSD	
X86-64	Linux	
X86-64	Linux/x32	
X86-64	OpenBSD	
X86-64	Windows/MingW	
-----+-----		

Please send additional platform test results to

libffi-discuss@sourceware.org and feel free to update the wiki page

above.

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Installing libffi

=====

First you must configure the distribution for your particular system. Go to the directory you wish to build libffi in and run the "configure" program found in the root directory of the libffi source distribution.

You may want to tell configure where to install the libffi library and header files. To do that, use the --prefix configure switch. Libffi will install under /usr/local by default.

If you want to enable extra run-time debugging checks use the the --enable-debug configure switch. This is useful when your program dies mysteriously while using libffi.

Another useful configure switch is --enable-purify-safety. Using this will add some extra code which will suppress certain warnings when you are using Purify with libffi. Only use this switch when using Purify, as it will slow down the library.

It's also possible to build libffi on Windows platforms with Microsoft's Visual C++ compiler. In this case, use the msvcc.sh wrapper script during configuration like so:

```
path/to/configure CC=path/to/msvcc.sh LD=link CPP=\"cl -nologo -EP\"
```

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For 64-bit Windows builds, use `CC="path/to/msvcc.sh -m64"`.

You may also need to specify `--build` appropriately. When building with MSVC under a MingW environment, you may need to remove the line in `configure` that sets `'fix_srcfile_path'` to a `'cygpath'` command. (`'cygpath'` is not present in MingW, and is not required when using MingW-style paths.)

For iOS builds, run `generate-ios-source-and-headers.py` and then `libffi.xcodeproj` should work.

`Configure` has many other options. Use `"configure --help"` to see them all.

Once `configure` has finished, type `"make"`. Note that you must be using GNU make. You can ftp GNU make from `prep.ai.mit.edu:/pub/gnu`.

To ensure that `libffi` is working as advertised, type `"make check"`.

This will require that you have DejaGNU installed.

To install the library and header files, type `"make install"`.

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History

=====

See the ChangeLog files for details.

3.0.11 Apr-11-12

Add support for variadic functions (ffi_prep_cif_var).

Add Linux/x32 support.

Add thiscall, fastcall and MSVC cdecl support on Windows.

Add Amiga and newer MacOS support.

Add m68k FreeMiNT support.

Integration with iOS' xcode build tools.

Fix Oocteon and MC68881 support.

Fix code pessimizations.

Lots of build fixes.

3.0.10 Aug-23-11

Add support for Apple's iOS.

Add support for ARM VFP ABI.

Add RTEMS support for MIPS and M68K.

Fix instruction cache clearing problems on

ARM and SPARC.

Fix the N64 build on mips-sgi-irix6.5.

Enable builds with Microsoft's compiler.

Enable x86 builds with Oracle's Solaris compiler.

Fix support for calling code compiled with Oracle's Sparc

Solaris compiler.

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Testsuite fixes for Tru64 Unix.

Additional platform support.

3.0.9 Dec-31-09

Add AVR32 and win64 ports. Add ARM softfp support.

Many fixes for AIX, Solaris, HP-UX, *BSD.

Several PowerPC and x86-64 bug fixes.

Build DLL for windows.

3.0.8 Dec-19-08

Add *BSD, BeOS, and PA-Linux support.

3.0.7 Nov-11-08

Fix for ppc FreeBSD.

(thanks to Andreas Tobler)

3.0.6 Jul-17-08

Fix for closures on sh.

Mark the sh/sh64 stack as non-executable.

(both thanks to Kaz Kojima)

3.0.5 Apr-3-08

Fix libffi.pc file.

Fix #define ARM for IcedTea users.

Fix x86 closure bug.

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3.0.4 Feb-24-08

Fix x86 OpenBSD configury.

3.0.3 Feb-22-08

Enable x86 OpenBSD thanks to Thomas Heller, and

x86-64 FreeBSD thanks to Björn König and Andreas Tobler.

Clean up test instruction in README.

3.0.2 Feb-21-08

Improved x86 FreeBSD support.

Thanks to Björn König.

3.0.1 Feb-15-08

Fix instruction cache flushing bug on MIPS.

Thanks to David Daney.

3.0.0 Feb-15-08

Many changes, mostly thanks to the GCC project.

Cygnus Solutions is now Red Hat.

[10 years go by...]

1.20 Oct-5-98

Raffaele Sena produces ARM port.

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1.19 Oct-5-98

Fixed x86 long double and long long return support.

m68k bug fixes from Andreas Schwab.

Patch for DU assembler compatibility for the Alpha from Richard
Henderson.

1.18 Apr-17-98

Bug fixes and MIPS configuration changes.

1.17 Feb-24-98

Bug fixes and m68k port from Andreas Schwab. PowerPC port from
Geoffrey Keating. Various bug x86, Sparc and MIPS bug fixes.

1.16 Feb-11-98

Richard Henderson produces Alpha port.

1.15 Dec-4-97

Fixed an n32 ABI bug. New libtool, auto* support.

1.14 May-13-97

libtool is now used to generate shared and static libraries.

Fixed a minor portability problem reported by Russ McManus

<mcmanr@eq.gs.com>.

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1.13 Dec-2-96

Added --enable-purify-safety to keep Purify from complaining about certain low level code.

Sparc fix for calling functions with < 6 args.

Linux x86 a.out fix.

1.12 Nov-22-96

Added missing ffi_type_void, needed for supporting void return types. Fixed test case for non MIPS machines. Cygnus Support is now Cygnus Solutions.

1.11 Oct-30-96

Added notes about GNU make.

1.10 Oct-29-96

Added configuration fix for non GNU compilers.

1.09 Oct-29-96

Added --enable-debug configure switch. Clean-ups based on LCLint feedback. ffi_mips.h is always installed. Many configuration fixes. Fixed fftest.c for sparc builds.

1.08 Oct-15-96

Fixed n32 problem. Many clean-ups.

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1.07 Oct-14-96

Gordon Irlam rewrites v8.S again. Bug fixes.

1.06 Oct-14-96

Gordon Irlam improved the sparc port.

1.05 Oct-14-96

Interface changes based on feedback.

1.04 Oct-11-96

Sparc port complete (modulo struct passing bug).

1.03 Oct-10-96

Passing struct args, and returning struct values works for
all architectures/calling conventions. Expanded tests.

1.02 Oct-9-96

Added SGI n32 support. Fixed bugs in both o32 and Linux support.

Added "make test".

1.01 Oct-8-96

Fixed float passing bug in mips version. Restructured some
of the code. Builds cleanly with SGI tools.

1.00 Oct-7-96

First release. No public announcement.

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Authors & Credits

=====

libffi was originally written by Anthony Green <green@moxielogic.com>.

The developers of the GNU Compiler Collection project have made innumerable valuable contributions. See the ChangeLog file for details.

Some of the ideas behind libffi were inspired by Gianni Mariani's free gencall library for Silicon Graphics machines.

The closure mechanism was designed and implemented by Kresten Krab Thorup.

Major processor architecture ports were contributed by the following developers:

alpha	Richard Henderson
arm	Raffaele Sena
cris	Simon Posnjak, Hans-Peter Nilsson
frv	Anthony Green
ia64	Hans Boehm
m32r	Kazuhiro Inaoka
m68k	Andreas Schwab
mips	Anthony Green, Casey Marshall

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mips64	David Daney
pa	Randolph Chung, Dave Anglin, Andreas Tobler
powerpc	Geoffrey Keating, Andreas Tobler, David Edelsohn, John Hornkvist
powerpc64	Jakub Jelinek
s390	Gerhard Tonn, Ulrich Weigand
sh	Kaz Kojima
sh64	Kaz Kojima
sparc	Anthony Green, Gordon Irlam
x86	Anthony Green, Jon Beniston
x86-64	Bo Thorsen

Jesper Skov and Andrew Haley both did more than their fair share of
stepping through the code and tracking down bugs.

Thanks also to Tom Tromey for bug fixes, documentation and
configuration help.

Thanks to Jim Blandy, who provided some useful feedback on the libffi
interface.

Andreas Tobler has done a tremendous amount of work on the testsuite.

Alex Oliva solved the executable page problem for SELinux.

The list above is almost certainly incomplete and inaccurate. I'm
happy to make corrections or additions upon request.

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If you have a problem, or have found a bug, please send a note to the
author at green@moxielogic.com, or the project mailing list at
libffi-discuss@sourceware.org.

Libjpeg (v9a):

The Independent JPEG Group's JPEG software

=====

README for release 8d of 15-Jan-2012

=====

This distribution contains the eighth public release of the Independent JPEG
Group's free JPEG software. You are welcome to redistribute this software and
to use it for any purpose, subject to the conditions under LEGAL ISSUES, below.

This software is the work of Tom Lane, Guido Vollbeding, Philip Gladstone,
Bill Allombert, Jim Boucher, Lee Crocker, Bob Friesenhahn, Ben Jackson,
Julian Minguillon, Luis Ortiz, George Phillips, Davide Rossi, Ge' Weijers,
and other members of the Independent JPEG Group.

IJG is not affiliated with the ISO/IEC JTC1/SC29/WG1 standards committee
(also known as JPEG, together with ITU-T SG16).

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DOCUMENTATION ROADMAP

=====

This file contains the following sections:

- OVERVIEW General description of JPEG and the IJG software.
- LEGAL ISSUES Copyright, lack of warranty, terms of distribution.
- REFERENCES Where to learn more about JPEG.
- ARCHIVE LOCATIONS Where to find newer versions of this software.
- ACKNOWLEDGMENTS Special thanks.
- FILE FORMAT WARS Software *not* to get.
- TO DO Plans for future IJG releases.

Other documentation files in the distribution are:

User documentation:

- install.txt How to configure and install the IJG software.
- usage.txt Usage instructions for cjpeg, djpeg, jpegtran,
rdjpgcom, and wrjpgcom.
- *.1 Unix-style man pages for programs (same info as usage.txt).
- wizard.txt Advanced usage instructions for JPEG wizards only.
- change.log Version-to-version change highlights.

Programmer and internal documentation:

- libjpeg.txt How to use the JPEG library in your own programs.
- example.c Sample code for calling the JPEG library.
- structure.txt Overview of the JPEG library's internal structure.
- filelist.txt Road map of IJG files.
- coderrules.txt Coding style rules --- please read if you contribute code.

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Please read at least the files `install.txt` and `usage.txt`. Some information can also be found in the JPEG FAQ (Frequently Asked Questions) article. See ARCHIVE LOCATIONS below to find out where to obtain the FAQ article.

If you want to understand how the JPEG code works, we suggest reading one or more of the REFERENCES, then looking at the documentation files (in roughly the order listed) before diving into the code.

OVERVIEW

=====

This package contains C software to implement JPEG image encoding, decoding, and transcoding. JPEG (pronounced "jay-peg") is a standardized compression method for full-color and gray-scale images.

This software implements JPEG baseline, extended-sequential, and progressive compression processes. Provision is made for supporting all variants of these processes, although some uncommon parameter settings aren't implemented yet. We have made no provision for supporting the hierarchical or lossless processes defined in the standard.

We provide a set of library routines for reading and writing JPEG image files, plus two sample applications "cjpeg" and "djpeg", which use the library to perform conversion between JPEG and some other popular image file formats. The library is intended to be reused in other applications.

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In order to support file conversion and viewing software, we have included considerable functionality beyond the bare JPEG coding/decoding capability; for example, the color quantization modules are not strictly part of JPEG decoding, but they are essential for output to colormapped file formats or colormapped displays. These extra functions can be compiled out of the library if not required for a particular application.

We have also included "jpegtran", a utility for lossless transcoding between different JPEG processes, and "rdjpgcom" and "wrjpgcom", two simple applications for inserting and extracting textual comments in JFIF files.

The emphasis in designing this software has been on achieving portability and flexibility, while also making it fast enough to be useful. In particular, the software is not intended to be read as a tutorial on JPEG. (See the REFERENCES section for introductory material.) Rather, it is intended to be reliable, portable, industrial-strength code. We do not claim to have achieved that goal in every aspect of the software, but we strive for it.

We welcome the use of this software as a component of commercial products. No royalty is required, but we do ask for an acknowledgement in product documentation, as described under LEGAL ISSUES.

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LEGAL ISSUES

=====

In plain English:

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2. You can use this software for whatever you want. You don't have to pay us.
3. You may not pretend that you wrote this software. If you use it in a program, you must acknowledge somewhere in your documentation that you've used the IJG code.

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unaltered; and any additions, deletions, or changes to the original files

must be clearly indicated in accompanying documentation.

(2) If only executable code is distributed, then the accompanying documentation must state that "this software is based in part on the work of the Independent JPEG Group".

(3) Permission for use of this software is granted only if the user accepts full responsibility for any undesirable consequences; the authors accept NO LIABILITY for damages of any kind.

These conditions apply to any software derived from or based on the IJG code, not just to the unmodified library. If you use our work, you ought to acknowledge us.

Permission is NOT granted for the use of any IJG author's name or company name in advertising or publicity relating to this software or products derived from it. This software may be referred to only as "the Independent JPEG Group's software".

We specifically permit and encourage the use of this software as the basis of commercial products, provided that all warranty or liability claims are assumed by the product vendor.

ansi2knr.c is included in this distribution by permission of L. Peter Deutsch, sole proprietor of its copyright holder, Aladdin Enterprises of Menlo Park, CA. ansi2knr.c is NOT covered by the above copyright and conditions, but instead by the usual distribution terms of the Free Software Foundation; principally,

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that you must include source code if you redistribute it. (See the file `ansi2knr.c` for full details.) However, since `ansi2knr.c` is not needed as part of any program generated from the IJG code, this does not limit you more than the foregoing paragraphs do.

The Unix configuration script "configure" was produced with GNU Autoconf.

It is copyright by the Free Software Foundation but is freely distributable.

The same holds for its supporting scripts (`config.guess`, `config.sub`, `ltmain.sh`). Another support script, `install-sh`, is copyright by X Consortium but is also freely distributable.

The IJG distribution formerly included code to read and write GIF files.

To avoid entanglement with the Unisys LZW patent, GIF reading support has been removed altogether, and the GIF writer has been simplified to produce "uncompressed GIFs". This technique does not use the LZW algorithm; the resulting GIF files are larger than usual, but are readable by all standard GIF decoders.

We are required to state that

"The Graphics Interchange Format(c) is the Copyright property of CompuServe Incorporated. GIF(sm) is a Service Mark property of CompuServe Incorporated."

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REFERENCES

=====

We recommend reading one or more of these references before trying to understand the innards of the JPEG software.

The best short technical introduction to the JPEG compression algorithm is

Wallace, Gregory K. "The JPEG Still Picture Compression Standard",

Communications of the ACM, April 1991 (vol. 34 no. 4), pp. 30-44.

(Adjacent articles in that issue discuss MPEG motion picture compression, applications of JPEG, and related topics.) If you don't have the CACM issue handy, a PostScript file containing a revised version of Wallace's article is available at <http://www.iijg.org/files/wallace.ps.gz>. The file (actually a preprint for an article that appeared in IEEE Trans. Consumer Electronics) omits the sample images that appeared in CACM, but it includes corrections and some added material. Note: the Wallace article is copyright ACM and IEEE, and it may not be used for commercial purposes.

A somewhat less technical, more leisurely introduction to JPEG can be found in "The Data Compression Book" by Mark Nelson and Jean-loup Gailly, published by M&T Books (New York), 2nd ed. 1996, ISBN 1-55851-434-1. This book provides good explanations and example C code for a multitude of compression methods including JPEG. It is an excellent source if you are comfortable reading C code but don't know much about data compression in general. The book's JPEG sample code is far from industrial-strength, but when you are ready to look at a full implementation, you've got one here...

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The best currently available description of JPEG is the textbook "JPEG Still Image Data Compression Standard" by William B. Pennebaker and Joan L. Mitchell, published by Van Nostrand Reinhold, 1993, ISBN 0-442-01272-1. Price US\$59.95, 638 pp. The book includes the complete text of the ISO JPEG standards (DIS 10918-1 and draft DIS 10918-2).

Although this is by far the most detailed and comprehensive exposition of JPEG publicly available, we point out that it is still missing an explanation of the most essential properties and algorithms of the underlying DCT technology.

If you think that you know about DCT-based JPEG after reading this book, then you are in delusion. The real fundamentals and corresponding potential of DCT-based JPEG are not publicly known so far, and that is the reason for all the mistaken developments taking place in the image coding domain.

The original JPEG standard is divided into two parts, Part 1 being the actual specification, while Part 2 covers compliance testing methods. Part 1 is titled "Digital Compression and Coding of Continuous-tone Still Images, Part 1: Requirements and guidelines" and has document numbers ISO/IEC IS 10918-1, ITU-T T.81. Part 2 is titled "Digital Compression and Coding of Continuous-tone Still Images, Part 2: Compliance testing" and has document numbers ISO/IEC IS 10918-2, ITU-T T.83.

IJG JPEG 8 introduces an implementation of the JPEG SmartScale extension which is specified in two documents: A contributed document at ITU and ISO with title "ITU-T JPEG-Plus Proposal for Extending ITU-T T.81 for Advanced Image Coding", April 2006, Geneva, Switzerland. The latest version of this document is Revision 3. And a contributed document ISO/IEC JTC1/SC29/WG1 N 5799 with title "Evolution of JPEG", June/July 2011, Berlin, Germany.

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The JPEG standard does not specify all details of an interchangeable file format. For the omitted details we follow the "JFIF" conventions, revision 1.02. JFIF 1.02 has been adopted as an Ecma International Technical Report and thus received a formal publication status. It is available as a free download in PDF format from <http://www.ecma-international.org/publications/techreports/E-TR-098.htm>. A PostScript version of the JFIF document is available at <http://www.ijg.org/files/jfif.ps.gz>. There is also a plain text version at <http://www.ijg.org/files/jfif.txt.gz>, but it is missing the figures.

The TIFF 6.0 file format specification can be obtained by FTP from <ftp://ftp.sgi.com/graphics/tiff/TIFF6.ps.gz>. The JPEG incorporation scheme found in the TIFF 6.0 spec of 3-June-92 has a number of serious problems. IJG does not recommend use of the TIFF 6.0 design (TIFF Compression tag 6). Instead, we recommend the JPEG design proposed by TIFF Technical Note #2 (Compression tag 7). Copies of this Note can be obtained from <http://www.ijg.org/files/>. It is expected that the next revision of the TIFF spec will replace the 6.0 JPEG design with the Note's design. Although IJG's own code does not support TIFF/JPEG, the free libtiff library uses our library to implement TIFF/JPEG per the Note.

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ARCHIVE LOCATIONS

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The "official" archive site for this software is www.ijg.org.

The most recent released version can always be found there in

directory "files". This particular version will be archived as

<http://www.ijg.org/files/jpegsrc.v8d.tar.gz>, and in Windows-compatible

"zip" archive format as <http://www.ijg.org/files/jpegsr8d.zip>.

The JPEG FAQ (Frequently Asked Questions) article is a source of some
general information about JPEG.

It is available on the World Wide Web at <http://www.faqs.org/faqs/jpeg-faq/>

and other news.answers archive sites, including the official news.answers

archive at [rtfm.mit.edu](ftp://rtfm.mit.edu/pub/usenet/news.answers/jpeg-faq/): <ftp://rtfm.mit.edu/pub/usenet/news.answers/jpeg-faq/>.

If you don't have Web or FTP access, send e-mail to mail-server@rtfm.mit.edu

with body

send usenet/news.answers/jpeg-faq/part1

send usenet/news.answers/jpeg-faq/part2

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ACKNOWLEDGMENTS

=====

Thank to Juergen Bruder for providing me with a copy of the common DCT algorithm article, only to find out that I had come to the same result in a more direct and comprehensible way with a more generative approach.

Thank to Istvan Sebestyen and Joan L. Mitchell for inviting me to the ITU JPEG (Study Group 16) meeting in Geneva, Switzerland.

Thank to Thomas Wiegand and Gary Sullivan for inviting me to the Joint Video Team (MPEG & ITU) meeting in Geneva, Switzerland.

Thank to Thomas Richter and Daniel Lee for inviting me to the ISO/IEC JTC1/SC29/WG1 (also known as JPEG, together with ITU-T SG16) meeting in Berlin, Germany.

Thank to John Korejwa and Massimo Ballerini for inviting me to fruitful consultations in Boston, MA and Milan, Italy.

Thank to Hendrik Elstner, Roland Fassauer, Simone Zuck, Guenther Maier-Gerber, Walter Stoeber, Fred Schmitz, and Norbert Braunagel for corresponding business development.

Thank to Nico Zschach and Dirk Stelling of the technical support team at the Digital Images company in Halle for providing me with extra equipment for configuration tests.

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Thank to Richard F. Lyon (then of Foveon Inc.) for fruitful
communication about JPEG configuration in Sigma Photo Pro software.

Thank to Andrew Finkenstadt for hosting the ijg.org site.

Last but not least special thank to Thomas G. Lane for the original
design and development of this singular software package.

FILE FORMAT WARS

=====

The ISO/IEC JTC1/SC29/WG1 standards committee (also known as JPEG, together
with ITU-T SG16) currently promotes different formats containing the name
"JPEG" which is misleading because these formats are incompatible with
original DCT-based JPEG and are based on faulty technologies.

IJG therefore does not and will not support such momentary mistakes
(see REFERENCES).

There exist also distributions under the name "OpenJPEG" promoting such
kind of formats which is misleading because they don't support original
JPEG images.

We have no sympathy for the promotion of inferior formats. Indeed, one of
the original reasons for developing this free software was to help force
convergence on common, interoperable format standards for JPEG files.

Don't use an incompatible file format!

(In any case, our decoder will remain capable of reading existing JPEG
image files indefinitely.)

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Furthermore, the ISO committee pretends to be "responsible for the popular JPEG" in their public reports which is not true because they don't respond to actual requirements for the maintenance of the original JPEG specification.

There are currently distributions in circulation containing the name "libjpeg" which claim to be a "derivative" or "fork" of the original libjpeg, but don't have the features and are incompatible with formats supported by actual IJG libjpeg distributions. Furthermore, they violate the license conditions as described under LEGAL ISSUES above.

We have no sympathy for the release of misleading and illegal distributions derived from obsolete code bases.

Don't use an obsolete code base!

TO DO

=====

Version 8 is the first release of a new generation JPEG standard to overcome the limitations of the original JPEG specification. More features are being prepared for coming releases...

Please send bug reports, offers of help, etc. to jpeg-info@jpegclub.org.

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Libkmod (v8):

libkmod - linux kernel module handling library

ABSTRACT

=====

libkmod was created to allow programs to easily insert, remove and list modules, also checking its properties, dependencies and aliases.

there is no shared/global context information and it can be used by multiple sites on a single program, also being able to be used from threads, although it's not thread safe (you must lock explicitly).

OVERVIEW

=====

Every user should create and manage it's own library context with:

```
struct kmod_ctx *ctx = kmod_new(kernel_dirname);  
  
kmod_unref(ctx);
```

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Modules can be created with by various means:

```
struct kmod_module *mod;

int err;

err = kmod_module_new_from_path(ctx, path, &mod);

if (err < 0) {

    /* code */

} else {

    /* code */

    kmod_module_unref(mod);

}

err = kmod_module_new_from_name(ctx, name, &mod);

if (err < 0) {

    /* code */

} else {

    /* code */

    kmod_module_unref(mod);

}
```

Or could be resolved from a known alias to a list of alternatives:

```
struct kmod_list *list, *itr;

int err;

err = kmod_module_new_from_lookup(ctx, alias, &list);
```


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```
if (err < 0) {  
  
    /* code */  
  
} else {  
  
    kmod_list_foreach(itr, list) {  
  
        struct kmod_module *mod = kmod_module_get_module(itr);  
  
        /* code */  
  
    }  
  
}
```

Libxml2 (v2.7.8):

Except where otherwise noted in the source code (e.g. the files hash.c, list.c and the trio files, which are covered by a similar licence but with different Copyright notices) all the files are:

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LibPcap (v1.2.1):

License: BSD

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Linux (v3.2.26):

Linux kernel release 3.x <<http://kernel.org/>>

These are the release notes for Linux version 3. Read them carefully, as they tell you what this is all about, explain how to install the kernel, and what to do if something goes wrong.

WHAT IS LINUX?

Linux is a clone of the operating system Unix, written from scratch by Linus Torvalds with assistance from a loosely-knit team of hackers across the Net. It aims towards POSIX and Single UNIX Specification compliance.

It has all the features you would expect in a modern fully-fledged Unix, including true multitasking, virtual memory, shared libraries, demand loading, shared copy-on-write executables, proper memory management, and multistack networking including IPv4 and IPv6.

It is distributed under the GNU General Public License - see the accompanying COPYING file for more details.

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ON WHAT HARDWARE DOES IT RUN?

Although originally developed first for 32-bit x86-based PCs (386 or higher), today Linux also runs on (at least) the Compaq Alpha AXP, Sun SPARC and UltraSPARC, Motorola 68000, PowerPC, PowerPC64, ARM, Hitachi SuperH, Cell, IBM S/390, MIPS, HP PA-RISC, Intel IA-64, DEC VAX, AMD x86-64, AXIS CRIS, Xtensa, Tiler TILE, AVR32 and Renesas M32R architectures.

Linux is easily portable to most general-purpose 32- or 64-bit architectures as long as they have a paged memory management unit (PMMU) and a port of the GNU C compiler (gcc) (part of The GNU Compiler Collection, GCC). Linux has also been ported to a number of architectures without a PMMU, although functionality is then obviously somewhat limited.

Linux has also been ported to itself. You can now run the kernel as a userspace application - this is called UserMode Linux (UML).

DOCUMENTATION:

- There is a lot of documentation available both in electronic form on the Internet and in books, both Linux-specific and pertaining to general UNIX questions. I'd recommend looking into the documentation subdirectories on any Linux FTP site for the LDP (Linux Documentation Project) books. This README is not meant to be documentation on the system: there are much better sources available.
- There are various README files in the Documentation/ subdirectory: these typically contain kernel-specific installation notes for some

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drivers for example. See Documentation/00-INDEX for a list of what is contained in each file. Please read the Changes file, as it contains information about the problems, which may result by upgrading your kernel.

- The Documentation/DocBook/ subdirectory contains several guides for kernel developers and users. These guides can be rendered in a number of formats: PostScript (.ps), PDF, HTML, & man-pages, among others. After installation, "make psdocs", "make pdfdocs", "make htmldocs", or "make mandocs" will render the documentation in the requested format.

INSTALLING the kernel source:

- If you install the full sources, put the kernel tarball in a directory where you have permissions (eg. your home directory) and unpack it:

```
gzip -cd linux-3.X.tar.gz | tar xvf -
```

or

```
bzip2 -dc linux-3.X.tar.bz2 | tar xvf -
```

Replace "XX" with the version number of the latest kernel.

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Do NOT use the /usr/src/linux area! This area has a (usually incomplete) set of kernel headers that are used by the library header files. They should match the library, and not get messed up by whatever the kernel-du-jour happens to be.

- You can also upgrade between 3.x releases by patching. Patches are distributed in the traditional gzip and the newer bzip2 format. To install by patching, get all the newer patch files, enter the top level directory of the kernel source (linux-3.x) and execute:

```
gzip -cd ../patch-3.x.gz | patch -p1
```

or

```
bzip2 -dc ../patch-3.x.bz2 | patch -p1
```

(repeat xx for all versions bigger than the version of your current source tree, `_in_order_`) and you should be ok. You may want to remove the backup files (`xxx~` or `xxx.orig`), and make sure that there are no failed patches (`xxx#` or `xxx.rej`). If there are, either you or me has made a mistake.

Unlike patches for the 3.x kernels, patches for the 3.x.y kernels (also known as the `-stable` kernels) are not incremental but instead apply directly to the base 3.x kernel. Please read [Documentation/applying-patches.txt](#) for more information.

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Alternatively, the script patch-kernel can be used to automate this process. It determines the current kernel version and applies any patches found.

```
linux/scripts/patch-kernel linux
```

The first argument in the command above is the location of the kernel source. Patches are applied from the current directory, but an alternative directory can be specified as the second argument.

- If you are upgrading between releases using the stable series patches (for example, patch-3.x.y), note that these "dot-releases" are not incremental and must be applied to the 3.x base tree. For example, if your base kernel is 3.0 and you want to apply the 3.0.3 patch, you do not and indeed must not first apply the 3.0.1 and 3.0.2 patches. Similarly, if you are running kernel version 3.0.2 and want to jump to 3.0.3, you must first reverse the 3.0.2 patch (that is, patch -R) before applying the 3.0.3 patch.

You can read more on this in [Documentation/applying-patches.txt](#)

- Make sure you have no stale .o files and dependencies lying around:

```
cd linux
```

```
make mrproper
```

You should now have the sources correctly installed.

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SOFTWARE REQUIREMENTS

Compiling and running the 3.x kernels requires up-to-date versions of various software packages. Consult Documentation/Changes for the minimum version numbers required and how to get updates for these packages. Beware that using excessively old versions of these packages can cause indirect errors that are very difficult to track down, so don't assume that you can just update packages when obvious problems arise during build or operation.

BUILD directory for the kernel:

When compiling the kernel all output files will per default be stored together with the kernel source code.

Using the option "make O=output/dir" allow you to specify an alternate place for the output files (including .config).

Example:

kernel source code: /usr/src/linux-3.N

build directory: /home/name/build/kernel

To configure and build the kernel use:

```
cd /usr/src/linux-3.N
```

```
make O=/home/name/build/kernel menuconfig
```

```
make O=/home/name/build/kernel
```

```
sudo make O=/home/name/build/kernel modules_install install
```


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Please note: If the 'O=output/dir' option is used then it must be used for all invocations of make.

CONFIGURING the kernel:

Do not skip this step even if you are only upgrading one minor version. New configuration options are added in each release, and odd problems will turn up if the configuration files are not set up as expected. If you want to carry your existing configuration to a new version with minimal work, use "make oldconfig", which will only ask you for the answers to new questions.

- Alternate configuration commands are:

- "make config" Plain text interface.
- "make menuconfig" Text based color menus, radiolists & dialogs.
- "make nconfig" Enhanced text based color menus.
- "make xconfig" X windows (Qt) based configuration tool.
- "make gconfig" X windows (Gtk) based configuration tool.
- "make oldconfig" Default all questions based on the contents of your existing `./config` file and asking about new config symbols.
- "make silentoldconfig"
 - Like above, but avoids cluttering the screen with questions already answered.
 - Additionally updates the dependencies.
- "make defconfig" Create a `./config` file by using the default symbol values from either `arch/$ARCH/defconfig`

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or arch/\$ARCH/configs/\${PLATFORM}_defconfig,

depending on the architecture.

"make \${PLATFORM}_defconfig"

Create a ./config file by using the default

symbol values from

arch/\$ARCH/configs/\${PLATFORM}_defconfig.

Use "make help" to get a list of all available

platforms of your architecture.

"make allyesconfig"

Create a ./config file by setting symbol

values to 'y' as much as possible.

"make allmodconfig"

Create a ./config file by setting symbol

values to 'm' as much as possible.

"make allnoconfig" Create a ./config file by setting symbol

values to 'n' as much as possible.

"make randconfig" Create a ./config file by setting symbol

values to random values.

You can find more information on using the Linux kernel config tools

in Documentation/kbuild/kconfig.txt.

NOTES on "make config":

- having unnecessary drivers will make the kernel bigger, and can under some circumstances lead to problems: probing for a nonexistent controller card may confuse your other controllers
- compiling the kernel with "Processor type" set higher than 386

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will result in a kernel that does NOT work on a 386. The

kernel will detect this on bootup, and give up.

- A kernel with math-emulation compiled in will still use the coprocessor if one is present: the math emulation will just never get used in that case. The kernel will be slightly larger, but will work on different machines regardless of whether they have a math coprocessor or not.
- the "kernel hacking" configuration details usually result in a bigger or slower kernel (or both), and can even make the kernel less stable by configuring some routines to actively try to break bad code to find kernel problems (kmalloc()). Thus you should probably answer 'n' to the questions for "development", "experimental", or "debugging" features.

COMPILING the kernel:

- Make sure you have at least gcc 3.2 available.

For more information, refer to Documentation/Changes.

Please note that you can still run a.out user programs with this kernel.

- Do a "make" to create a compressed kernel image. It is also possible to do "make install" if you have lilo installed to suit the kernel makefiles, but you may want to check your particular lilo setup first.

To do the actual install you have to be root, but none of the normal build should require that. Don't take the name of root in vain.

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- If you configured any of the parts of the kernel as `modules', you will also have to do "make modules_install".

- Verbose kernel compile/build output:

Normally the kernel build system runs in a fairly quiet mode (but not totally silent). However, sometimes you or other kernel developers need to see compile, link, or other commands exactly as they are executed. For this, use "verbose" build mode. This is done by inserting "V=1" in the "make" command. E.g.:

```
make V=1 all
```

To have the build system also tell the reason for the rebuild of each target, use "V=2". The default is "V=0".

- Keep a backup kernel handy in case something goes wrong. This is especially true for the development releases, since each new release contains new code which has not been debugged. Make sure you keep a backup of the modules corresponding to that kernel, as well. If you are installing a new kernel with the same version number as your working kernel, make a backup of your modules directory before you do a "make modules_install".

Alternatively, before compiling, use the kernel config option "LOCALVERSION" to append a unique suffix to the regular kernel version. LOCALVERSION can be set in the "General Setup" menu.

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- In order to boot your new kernel, you'll need to copy the kernel

image (e.g. .../linux/arch/i386/boot/bzImage after compilation)

to the place where your regular bootable kernel is found.

- Booting a kernel directly from a floppy without the assistance of a

bootloader such as LILO, is no longer supported.

If you boot Linux from the hard drive, chances are you use LILO which

uses the kernel image as specified in the file /etc/lilo.conf. The

kernel image file is usually /vmlinuz, /boot/vmlinuz, /bzImage or

/boot/bzImage. To use the new kernel, save a copy of the old image

and copy the new image over the old one. Then, you MUST RERUN LILO

to update the loading map!! If you don't, you won't be able to boot

the new kernel image.

Reinstalling LILO is usually a matter of running /sbin/lilo.

You may wish to edit /etc/lilo.conf to specify an entry for your

old kernel image (say, /vmlinux.old) in case the new one does not

work. See the LILO docs for more information.

After reinstalling LILO, you should be all set. Shutdown the system,

reboot, and enjoy!

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If you ever need to change the default root device, video mode, ramdisk size, etc. in the kernel image, use the 'rdev' program (or alternatively the LILO boot options when appropriate). No need to recompile the kernel to change these parameters.

- Reboot with the new kernel and enjoy.

IF SOMETHING GOES WRONG:

- If you have problems that seem to be due to kernel bugs, please check the file MAINTAINERS to see if there is a particular person associated with the part of the kernel that you are having trouble with. If there isn't anyone listed there, then the second best thing is to mail them to me (torvalds@linux-foundation.org), and possibly to any other relevant mailing-list or to the newsgroup.
- In all bug-reports, *please* tell what kernel you are talking about, how to duplicate the problem, and what your setup is (use your common sense). If the problem is new, tell me so, and if the problem is old, please try to tell me when you first noticed it.
- If the bug results in a message like

unable to handle kernel paging request at address C0000010

Oops: 0002

EIP: 0010:XXXXXXXX

eax: xxxxxxxx ebx: xxxxxxxx ecx: xxxxxxxx edx: xxxxxxxx

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```
esi: xxxxxxxx  edi: xxxxxxxx  ebp: xxxxxxxx
```

```
ds: xxxx  es: xxxx  fs: xxxx  gs: xxxx
```

```
Pid: xx, process nr: xx
```

```
xx xx xx xx xx xx xx xx xx xx
```

or similar kernel debugging information on your screen or in your system log, please duplicate it **exactly**. The dump may look incomprehensible to you, but it does contain information that may help debugging the problem. The text above the dump is also important: it tells something about why the kernel dumped code (in the above example it's due to a bad kernel pointer). More information on making sense of the dump is in [Documentation/oops-tracing.txt](#)

- If you compiled the kernel with CONFIG_KALLSYMS you can send the dump as is, otherwise you will have to use the "ksymoops" program to make sense of the dump (but compiling with CONFIG_KALLSYMS is usually preferred).

This utility can be downloaded from

<ftp://ftp.<country>.kernel.org/pub/linux/utils/kernel/ksymoops/> .

Alternately you can do the dump lookup by hand:

- In debugging dumps like the above, it helps enormously if you can look up what the EIP value means. The hex value as such doesn't help me or anybody else very much: it will depend on your particular kernel setup. What you should do is take the hex value from the EIP line (ignore the "0010:"), and look it up in the kernel namelist to see which kernel function contains the offending address.

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To find out the kernel function name, you'll need to find the system binary associated with the kernel that exhibited the symptom. This is the file 'linux/vmlinux'. To extract the namelist and match it against the EIP from the kernel crash, do:

```
nm vmlinux | sort | less
```

This will give you a list of kernel addresses sorted in ascending order, from which it is simple to find the function that contains the offending address. Note that the address given by the kernel debugging messages will not necessarily match exactly with the function addresses (in fact, that is very unlikely), so you can't just 'grep' the list: the list will, however, give you the starting point of each kernel function, so by looking for the function that has a starting address lower than the one you are searching for but is followed by a function with a higher address you will find the one you want. In fact, it may be a good idea to include a bit of "context" in your problem report, giving a few lines around the interesting one.

If you for some reason cannot do the above (you have a pre-compiled kernel image or similar), telling me as much about your setup as possible will help. Please read the REPORTING-BUGS document for details.

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- Alternately, you can use gdb on a running kernel. (read-only; i.e. you cannot change values or set break points.) To do this, first compile the kernel with -g; edit arch/i386/Makefile appropriately, then do a "make clean". You'll also need to enable CONFIG_PROC_FS (via "make config").

After you've rebooted with the new kernel, do "gdb vmlinux /proc/kcore".

You can now use all the usual gdb commands. The command to look up the point where your system crashed is "l *0XXXXXXXX". (Replace the XXXes with the EIP value.)

gdb'ing a non-running kernel currently fails because gdb (wrongly) disregards the starting offset for which the kernel is compiled.

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Lsof (v4.85):

lsof (LiSt Open Files) version 4

(revision 4.85)

| The latest release of lsof is always available via anonymous ftp |

| from lsof.itap.purdue.edu. Look in pub/tools/unix/lsof. |

| CHECK THE PATCHES/ SUBDIRECTORY FOR FIXES TO THE LATEST LSOF DISTRIBUTION. |

| AVOID USING PRE-BUILT LSOF BINARIES: SEE THE "PRE-BUILT LSOF BINARIES" |

| SECTION IN 00README FOR AN EXPLANATION. |

| READ 00LSOF-L FOR INFORMATION ON THE LSOF-L LISTSERV MAILING LIST. |

| CHECK 00FAQ BEFORE REPORTING BUGS TO <abe@purdue.edu>. |

| 00FAQ ALSO AT: ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof/FAQ |

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| IMPORTANT! This README file explains how the lsof tar archive |

| is assembled -- it's a "wrapper" tar archive. Please read the |

| explanation of its naming and construction, immediately |

| following the initial list of supported dialects. |

Lsof version 4 lists open files for running UNIX processes. It is a
descendent of ofiles, fstat, and lsof versions 1, 2, and 3. It has
been tested recently on these UNIX dialects.

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AIX 5.3

Apple Darwin 9 and Mac OS X 10.[56]

FreeBSD 4.9 and 6.4 for x86-based systems

FreeBSD 8.[02] and 9.0 for AMD64-based systems

Linux 2.1.72 and above for x86-based systems

Solaris 9, 10 and 11

Lsof 4 may work on other versions of these dialects, but hasn't been tested there recently. Lsof versions 2 and 3 are still available and may provide older dialect version support. See the notes on them in this file.

The pub/tools/unix/lsof/contrib directory on lsof.itap.purdue.edu also contains information on other ports.

Version 4 of lsof is distributed as bzip2'd, gzip'd and compressed tar archives in the files:

<ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof/lsof.tar.bz2>

and

<ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof/lsof.tar.gz>

and

<ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof/lsof.tar.Z>

These files are links to the current distribution, whose name includes the revision number:

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`ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof_<rev>.tar.bz2`

and

`ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof_<rev>.tar.gz`

and

`ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof_<rev>.tar.Z`

<rev> is the revision number -- e.g., 4.85. These archives are called wrappers, because the lsof source tar archive, its GPG certificate (lsof_<rev>_src.tar.sig), and some documentation files are wrapped together inside them. (The GPG certificate authenticates the source tar archive.) A tar archive with: a ``.bz2" suffix has been compressed with bzip2; ``.gz", with gzip; and ``.Z", with compress.

When the wrapper tar is gunzip'd or uncompressed, and its tar archive contents are extracted, an lsof_4.85 subdirectory is created in the directory where the extraction was performed. The lsof_4.85 subdirectory contains these files:

00.README.FIRST contains introductory distribution
information.

README.lsof_4.85 contains instructions for the
security-conscious on how to be
sure that no one has tampered with
the distribution.

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RELEASE_SUMMARY_4.85 is this file.

lsof_4.85_src.tar is a tar archive, containing the
lsof sources. When extracted with
tar it creates a subdirectory named
lsof_4.85_src in the directory
where the extraction was performed.
The lsof source files will be found
in lsof_4.85_src.

lsof_4.85_src.tar.sig is a GPG certificate, authenticating
the lsof_4.85_src.tar archive. See the
README.lsof_4.85 file for more
information on GPG authentication of
lsof_4.85_src.tar.

If you've obtained this file and an lsof distribution from a mirror
site, please be aware that THE LATEST VERSION OF LSOF IS AVAILABLE VIA
ANONYMOUS FTP FROM LSOF.ITAP.PURDUE.EDU IN THE PUB/TOOLS/UNIX/LSOF
DIRECTORY.

Patches to lsof distributions may be found in the patches/ sub-
directory where you found lsof.tar.bz2, lsof.tar.gz or lsof.tar.Z.

If there are any patches to the current distribution, they will be
found in the patches/4.85/ branch.

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(If you need a copy of gunzip, look for it at prep.ai.mit.edu in `pub/gnu/gzip*`.)

* The September 27, 2011 revision (4.85): adds an automatic work-around for an `lgrp_root` conflict in some Solaris 9 and 10 versions; supports FreeBSD 7.4 and 8.[12] (8.1 not tested); adds fixes for Solaris 11 kernel module path determination; picked lint for Linux; added more Linux cross configuration support; adds support for Mac OS X 10.6; tested on FreeBSD 6.4; adapts to FreeBSD ZFS update; drops support for FreeBSD 7.x; adjusts for Solaris 10 with patch 144488-10; added Linux `+|-e` option support; adjusts for a FreeBSD 9 change; fixes a Linux `AF_UNIX` path reporting bug; adjusts for dropping of RPC headers from Linux Glibc 2.14; adds Linux Netlink protocol support; corrects UDP6-lite Linux path.

Read the `00.README.FIRST` in the `lsf` distribution first.

Read the `00DIST` distribution file for more details on feature additions and bug fixes.

The `00README` distribution file has build instructions, dialect descriptions, special feature discussions, and installation hints.

The `00FAQ` file contains a list of frequently asked questions and their answers.

The `00DCACHE` file explains device cache file path formation.

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The 00PORTING file contains information on porting lsof to other UNIX dialects.

The 00QUICKSTART file gives a quick introduction to using lsof.

The distribution files lsof.8 (nroff source) and lsof.man (nroff formatted output) contain the manual page for lsof; it is the only other documentation besides the source code (it's included).

Version 4 Binaries

=====

Version 4 binaries for some revisions, dialects, and platforms may be found in pub/tools/unix/lsof/binaries. Check the README files for exact descriptions. Check the dialect-specific Makefiles for installation instructions. CHECKSUMS and GPG certificates are provided for authentication.

Please think very carefully before you decide to use a pre-built binary instead of making your own from the sources. Here are some points to consider:

1. Lsof must run setgid or setuid. Are you willing to trust that power to a binary you didn't construct yourself?

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2. Lsof binaries may be generated on a system whose configuration header files differ from yours. Under Digital UNIX (DEC OSF/1), for example, lsof includes header files from the machine's configuration directory, /sys/<name>. Are you willing to gamble that your configuration directory's header files match the ones used to compile lsof?

3. Lsof is often configured with specific options that are determined from the configuration of the system on which it is configured -- e.g., Solaris patch level, dynamic loader libraries, etc. Are you sure that the lsof binary you retrieve will have been configured for your system? If you get a binary that is misconfigured for you, it may not work at all.

If you haven't already guessed, I believe firmly that you should retrieve sources and build your own binary. If you still want to use the distribution binaries, please authenticate what you retrieved with the GPG certificates; please compare checksums, too.

Version 4 Checksums

=====

Security checksums -- both MD5 and sum(1) -- for revisions of lsof version 4 are contained in the README.lsof_<rev> files in the wrapper tar archives of pub/tools/unix/lsof.

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The CHECKSUMS file, found with the distribution archives, contains information on validating the archives with external MD5 checksums and external GPG certificates.

GPG Certificates

=====

The lsof wrapper tar archive includes a GPG certificate file in its contained lsof_4.71_src.tar.sig file.

Binary files have detached GPG certificates that may be found in their directories with ".sig" extensions.

The certificates are signed with my GPG public key, which may be found in the file:

ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof/Victor_A_Abell.gpg

My key may also be available at some public key servers,

There is also authentication information in the CHECKSUMS file (a link to CHECKSUMS_<rev>), found with the lsof distribution files. CHECKSUMS contains external MD5 checksums for the distribution files and information on using the external GPG certificates, found with the lsof distribution files.

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Old Dialect Support

=====

Remnants of source code and binaries for dialects for which I so far once
provided support may be obtained by request. Send the request to
abe@purdue.edu.

Dialects no longer supported include:

CDC EP/IX

MIPS RISC/os

Motorola V/88

Pyramid DC/OSx

Pyramid Reliant UNIX

Sequent DYNIX

SGI IRIX

SunOS 4.1.x

Ultrix

Generally I drop support for a dialect when I no longer have access to
a test system.

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Lsof Version 2

=====

The version 3 predecessor, revision 36 of version 2, is also available
upon request. Send the request to abe@purdue.edu.

I recommend you avoid lsof version 2. It's out of date and I no
longer provide support for it. (Versions 3 and 4 support more
dialects, and have many enhancements, bug fixes, and improvements.)

Version 2 was tested on the following UNIX dialects:

AIX 3.2.[1234] for the IBM RISC/System 6000

DEC OSF/1 1.[23] and 2.0 for the DEC Alpha

EP/IX 1.4.3 and 2.1.1 for the CDC 4680

ETAV 1.17 for the ETA-10P*

FreeBSD 1.0e for x86-based systems

HP-UX [789].x for HP systems

IRIX 4.0.5 and 5.1.1 for SGI systems

NEXTSTEP 2.1, 3.0, 3.1 for NeXT systems

Sequent Dynix 3.0.12 for Sequent Symmetry systems

SunOS 4.1.[123] for Sun 3 and 4 systems

SunOS 5.[13] (Solaris 2.[13]) for Sun 4 systems

Ultrix 2.2 and 4.2 for DEC systems

(If you need a copy of gunzip, look for it at prep.ai.mit.edu in
pub/gnu.)

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Version 2 Checksums

=====

MD5:

(OLD/lsof236tar.gz) = f8a1ab3971ea2f6a3ea16752f84409e8

sum(1):

39996 106 OLD/lsof236tar.gz

The file OLD/lsof236tar.gz.asc is a detached PGP certificate that may
be used to authenticate OLD/lsof236tar.gz with my PGP public key. You
may find my PGP public key at:

ftp://lsof.itap.purdue.edu/pub/tools/unix/lsof/OLD/Victor_A_Abell.pgp

Lsof Version 3

=====

The last revision of lsof version 3, 3.88, may obtained by request.

Send the request to abe@purdue.edu.

I recommend version 4 over version 3. It is the version I actively
support.

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Lsof version 3 was tested on these UNIX dialects:

AIX 3.2.5, 4.1[.1234], and 4.2

BSDI BSD/OS 2.0, 2.0.1, and 2.1 for x86-based systems

DC/OSx 1.1 for Pyramid systems

Digital UNIX (DEC OSF/1) 2.0, 3.0, 3.2, and 4.0

EP/IX 2.1.1 for the CDC 4680

FreeBSD 1.1.5.1, 2.0, 2.0.5, 2.1, 2.1.5 for x86-based
systems

HP-UX 8.x, 9.x, 10.01, 10.10, and 10.20

IRIX 5.2, 5.3, 6.0, 6.0.1, and 6.[124]

Linux 2.0.3[01] and 2.1.57 for x86-based systems

NetBSD 1.0, 1.1, and 1.2 for x86 and SPARC-based
systems

NEXTSTEP 2.1 and 3.[0123] for NEXTSTEP architectures

OpenBSD 1.2 and 2.0 for x86-based systems

Reliant UNIX 5.43 for Pyramid systems

RISC/os 4.52 for MIPS R2000-based systems

SCO OpenServer 1.1, 3.0, and 5.0.[024] for x86-based
systems

SCO UnixWare 2.1 and 2.1.1 for x86-based systems

Sequent PTX 2.1.[1569], 4.0.[23], 4.1.[024], 4.2[.1],
and 4.3

Solaris 2.[12345], 2.5.1, and 2.6-Beta

SunOS 4.1.x

Ultrix 4.2, 4.3, 4.4, and 4.5

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Vic Abell <abe@purdue.edu>

September 27, 2011

LibXml2 (v2.7.8):

Except where otherwise noted in the source code (e.g. the files hash.c, list.c and the trio files, which are covered by a similar licence but with different Copyright notices) all the files are:

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Memstat (v0.8):

This is Debian GNU/Linux's prepackaged version of Joshua M. Yelon's memstat, for a long time maintained upstream by Bernd Eckenfels <eck@debian.org> and now maintained by Michael Meskes <meskes@debian.org>.

This package was put together by me, Bernd Eckenfels <eck@debian.org>, from the sources, which I obtained from <http://charm.cs.uiuc.edu/~jyelon/software.html>

The debian/* Files are based on Ian Jackson's hello Package.

All patches by me are subject to the GPL.

Original Copyright from memstat.c:

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On Debian GNU/Linux systems, the complete text of the GNU General Public License can be found in `/usr/share/common-licenses/GPL`.

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Ncurses (v5.7):

```
-----
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```

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-- \$Id: README,v 1.23 2006/04/22 22:19:37 tom Exp \$

README file for the ncurses package

See the file ANNOUNCE for a summary of ncurses features and ports.

See the file INSTALL for instructions on how to build and install ncurses.

See the file NEWS for a release history and bug-fix notes.

See the file TO-DO for things that still need doing, including known bugs.

Browse the file misc/ncurses-intro.html for narrative descriptions of how to use ncurses and the panel, menu, and form libraries.

Browse the file doc/html/hackguide.html for a tour of the package internals.

ROADMAP AND PACKAGE OVERVIEW:

You should be reading this file in a directory called: ncurses-d.d, where d.d is the current version number (see the dist.mk file in this directory for that). There should be a number of subdirectories, including `c++', `form', `man', `menu', `misc', `ncurses', `panel', `progs', `test', `tack' and `Ada95'. (The `tack' program may be distributed separately).

A full build/install of this package typically installs several libraries, a handful of utilities, and a database hierarchy. Here is an inventory of the pieces:

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The libraries are:

libncurses.a (normal)
libncurses.so (shared)
libncurses_g.a (debug and trace code enabled)
libncurses_p.a (profiling enabled)

libpanel.a (normal)
libpanel.so (shared)
libpanel_g.a (debug and trace code enabled)

libmenu.a (normal)
libmenu.so (shared)
libmenu_g.a (debug enabled)

libform.a (normal)
libform.so (shared)
libform_g.a (debug enabled)

If you configure using the `--enable-widc` option, a "w" is appended to the library names (e.g., `libncursesw.a`), and the resulting libraries support wide-characters, e.g., via a UTF-8 locale. The corresponding header files are compatible with the non-wide-character configuration; wide-character features are provided by `ifdef`'s in the header files. The wide-character library interfaces are not binary-compatible with the non-wide-character version.

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The ncurses libraries implement the curses API. The panel, menu and forms libraries implement clones of the SVr4 panel, menu and forms APIs. The source code for these lives in the ``ncurses'`, `panel'`, `menu'`, and `form'` directories respectively.`

In the ``c++'` directory, you'll find code that defines an interface to the curses, forms, menus and panels library packaged as C++ classes, and a demo program in C++ to test it. These class definition modules are not installed by the 'make install.libs' rule as libncurses++.`

In the ``Ada95'` directory, you'll find code and documentation for an Ada95 binding of the curses API, to be used with the GNAT compiler. This binding is built by a normal top-level `make'` if configure detects an usable version of GNAT (3.11 or above). It is not installed automatically. See the Ada95 directory for more build and installation instructions and for documentation of the binding.`

To do its job, the ncurses code needs your terminal type to be set in the environment variable `TERM` (normally set by your OS; under UNIX, `getty(1)` typically does this, but you can override it in your `.profile`); and, it needs a database of terminal descriptions in which to look up your terminal type's capabilities.

In older (V7/BSD) versions of curses, the database was a flat text file, `/etc/termcap`; in newer (USG/USL) versions, the database is a hierarchy of fast-loading binary description blocks under `/usr/lib/terminfo`. These binary blocks are compiled from an improved editable text representation called

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`terminfo' format (documented in man/terminfo.5). The ncurses library can use either /etc/termcap or the compiled binary terminfo blocks, but prefers the second form.

In the `misc' directory, there is a text file terminfo.src, in editable terminfo format, which can be used to generate the terminfo binaries (that's what make install.data does). If the package was built with the --enable-termcap option enabled, and the ncurses library cannot find a terminfo description for your terminal, it will fall back to the termcap file supplied with your system (which the ncurses package installation leaves strictly alone).

The utilities are as follows:

tic	-- terminfo source to binary compiler
infocmp	-- terminfo binary to source decompiler/comparator
clear	-- emits clear-screen for current terminal
tput	-- shell-script access to terminal capabilities.
toe	-- table of entries utility
tset	-- terminal-initialization utility

The first two (tic and infocmp) are used for manipulating terminfo descriptions; the next two (clear and tput) are for use in shell scripts. The last (tset) is provided for 4.4BSD compatibility. The source code for all of these lives in the `progs' directory.

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Detailed documentation for all libraries and utilities can be found in the

`man' and `doc' directories. An HTML introduction to ncurses, panels, and

menus programming lives in the `doc/html' directory. Manpages in HTML format

are under `doc/html/man'.

The `test' directory contains programs that can be used to verify or

demonstrate the functions of the ncurses libraries. See test/README for

descriptions of these programs. Notably, the `ncurses' utility is designed to

help you systematically exercise the library functions.

AUTHORS:

Pavel Curtis:

wrote the original ncurses

Zeyd M. Ben-Halim:

port of original to Linux and many enhancements.

Thomas Dickey (maintainer for 1.9.9g through 4.1, resuming with FSF's 5.0):

configuration scripts, porting, mods to adhere to XSI Curses in the

areas of background color, terminal modes. Also memory leak testing,

the wresize, default colors and key definition extensions and numerous

bug fixes (more than half of those enumerated in NEWS beginning with

the internal release 1.8.9).

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Florian La Roche (official maintainer for FSF's ncurses 4.2)

Beginning with release 4.2, ncurses is distributed under an MIT-style license.

Eric S. Raymond:

the man pages, infocmp(1), tput(1), clear(1), captinfo(1), tset(1), toe(1), most of tic(1), trace levels, the HTML intro, wgetnstr() and many other entry points, the cursor-movement optimization, the scroll-pack optimizer for vertical motions, the mouse interface and xterm mouse support, and the ncurses test program.

Juergen Pfeifer

The menu and form libraries, C++ bindings for ncurses, menus, forms and panels, as well as the Ada95 binding. Ongoing support for panel.

CONTRIBUTORS:

Alexander V. Lukyanov

for numerous fixes and improvements to the optimization logic.

David MacKenzie

for first-class bug-chasing and methodical testing.

Ross Ridge

for the code that hacks termcap parameterized strings into terminfo.

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Warren Tucker and Gerhard Fuernkranz,

for writing and sending the panel library.

Hellmuth Michaelis,

for many patches and testing the optimization code.

Eric Newton, Ulrich Drepper, and Anatoly Ivasyuk:

the C++ code.

Jonathan Ross,

for lessons in using sed.

Keith Bostic (maintainer of 4.4BSD curses)

for help, criticism, comments, bug-finding, and being willing to
deep-six BSD curses for this one when it grew up.

Richard Stallman,

for his commitment to making ncurses free software.

Countless other people have contributed by reporting bugs, sending fixes,
suggesting improvements, and generally whining about ncurses :-)

BUGS:

See the INSTALL file for bug and developer-list addresses.

The Hacker's Guide in the doc directory includes some guidelines
on how to report bugs in ways that will get them fixed most quickly.

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OpenSSL (v1.0.1g):

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=====

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* Hudson (tjh@cryptsoft.com).

*

*/

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*

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* by Eric Young (eay@cryptsoft.com).

* The implementation was written so as to conform with Netscapes SSL.

*

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- */

Pcre (v8.30):

PCRE LICENCE

PCRE is a library of functions to support regular expressions whose syntax and semantics are as close as possible to those of the Perl 5 language.

Release 8 of PCRE is distributed under the terms of the "BSD" licence, as specified below. The documentation for PCRE, supplied in the "doc" directory, is distributed under the same terms as the software itself.

The basic library functions are written in C and are freestanding. Also included in the distribution is a set of C++ wrapper functions, and a just-in-time compiler that can be used to optimize pattern matching. These are both optional features that can be omitted when the library is built.

THE BASIC LIBRARY FUNCTIONS

Written by: Philip Hazel

Email local part: ph10

Email domain: cam.ac.uk

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University of Cambridge Computing Service,

Cambridge, England.

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PCRE JUST-IN-TIME COMPILATION SUPPORT

Written by: Zoltan Herczeg

Email local part: hzmester

Email domain: freemail.hu

Copyright(c) 2010-2014 Zoltan Herczeg

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STACK-LESS JUST-IN-TIME COMPILER

Written by: Zoltan Herczeg

Email local part: hzmester

Email domain: freemail.hu

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THE C++ WRAPPER FUNCTIONS

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End

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Popt (v1.16):

This is the popt(3) command line option parsing library. While it is similiar to getopt(3), it contains a number of enhancements, including:

- 1) popt is fully reentrant
- 2) popt can parse arbitrary argv[] style arrays while
getopt(3) makes this quite difficult
- 3) popt allows users to alias command line arguments
- 4) popt provides convience functions for parsing strings
into argv[] style arrays

Complete documentation on popt(3) is available in popt.ps (included in this tarball), which is excerpted with permission from the book "Linux Application Development" by Michael K. Johnson and Erik Troan (available from Addison Wesley in May, 1998).

Comments on popt should be addressed to popt-devel@rpm5.org.

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ROM-Bootloader:

Boot strategies

AT91 chips embed a boot ROM code. It is enabled depending on BMS (Boot Mode Select) pin state on reset.

The ROM code scans the contents of different media like serial FLASH, NAND FLASH, SD/MMC Card and serial EEPROM.

If a valid application is available then it downloads this application into the chip internal SRAM and runs it.

To determine if a valid application is present the ROM code checks the eight ARM exception vectors.

If no valid application is available then SAM-BA Monitor is executed. It waits for transactions either on the USB device, or on the DBGU serial port, then the SAM-BA tool can be used to program FLASH or EEPROM present on your board.

For more information on this topic, please check the corresponding SAM product datasheet section Boot Strategies.

GNU Tar (v1.17):

README for GNU tar

See the end of file for copying conditions.

* Introduction

Please glance through *all* sections of this

'README' file before starting configuration. Also make sure you read files

'ABOUT-NLS' and 'INSTALL' if you are not familiar with them already.

If you got the 'tar' distribution in 'shar' format, time stamps ought to be properly restored; do not ignore such complaints at 'unshar' time.

GNU 'tar' saves many files together into a single tape or disk

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archive, and can restore individual files from the archive. It includes multivolume support, the ability to archive sparse files, automatic archive compression/decompression, remote archives and special features that allow 'tar' to be used for incremental and full backups. This distribution also includes 'rmt', the remote tape server. The 'mt' tape drive control program is in the GNU 'cpio' distribution.

GNU 'tar' is derived from John Gilmore's public domain 'tar'.

See file 'ABOUT-NLS' for how to customize this program to your language.

See file 'COPYING' for copying conditions.

See file 'INSTALL' for compilation and installation instructions.

See file 'PORTS' for various ports of GNU tar to non-Unix systems.

See file 'NEWS' for a list of major changes in the current release.

See file 'THANKS' for a list of contributors.

Besides those configure options documented in files 'INSTALL' and 'ABOUT-NLS', an extra option may be accepted after './configure':

* Install

** Selecting the default archive format.

The default archive format is GNU, this can be overridden by presetting DEFAULT_ARCHIVE_FORMAT while configuring. The allowed values are GNU, V7, OLDGNU, USTAR and POSIX.

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**** Selecting the default archive device**

The default archive device is now 'stdin' on read and 'stdout' on write.

The installer can still override this by presetting 'DEFAULT_ARCHIVE'

in the environment before configuring (the behavior of '-[0-7]' or

'-[0-7]lmh' options in 'tar' are then derived automatically). Similarly,

'DEFAULT_BLOCKING' can be preset to something else than 20.

**** Selecting full pathname of the "rmt" binary.**

Previous versions of tar always looked for "rmt" binary in the

directory "/etc/rmt". However, the "rmt" program included

in the distribution was installed under "\$prefix/libexec/rmt".

To fix this discrepancy, tar now looks for "\$prefix/libexec/rmt".

If you do not want this behavior, specify full path name of

"rmt" binary using DEFAULT_RMT_DIR variable, e.g.:

```
./configure DEFAULT_RMT_DIR=/etc
```

If you already have a copy of "rmt" installed and wish to use it

instead of the version supplied with the distribution, use --with-rmt

option:

```
./configure --with-rmt=/etc/rmt
```

This will also disable building the included version of rmt.

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**** Installing backup scripts.**

This version of tar is shipped with the shell scripts for producing incremental backups (dumps) and restoring filesystems from them.

The name of the backup script is "backup". The name of the restore script is "restore". They are installed in "\$prefix/sbin" directory.

Use option --enable-backup-scripts to compile and install these scripts.

**** '--disable-largefile'** omits support for large files, even if the operating system supports large files. Typically, large files are those larger than 2 GB on a 32-bit host.

*** Installation hints**

Here are a few hints which might help installing 'tar' on some systems.

**** gzip and bzip2.**

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GNU tar uses the gzip and bzip2 programs to read and write compressed archives. If you don't have these programs already, you need to install them. Their sources can be found at:

<ftp://ftp.gnu.org/gnu/gzip/>

<http://sourceware.cygnum.com/bzip2/>

If you see the following symptoms:

```
$ tar -xzf file.tar.gz
```

```
gzip: stdin: decompression OK, trailing garbage ignored
```

```
tar: Child returned status 2
```

then you have encountered a gzip incompatibility that should be fixed in gzip test version 1.3, which as of this writing is available at <http://alpha.gnu.org/gnu/gzip/>. You can work around the incompatibility by using a shell command like

```
'gzip -d <file.tar.gz | tar -xzf -'.
```

**** Solaris issues.**

GNU tar exercises many features that can cause problems with older GCC versions. In particular, GCC 2.8.1 (sparc, -O1 or -O2) is known to miscompile GNU tar. No compiler-related problems have been reported when using GCC 2.95.2 or later.

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Recent versions of Solaris tar sport a new -E option to generate extended headers in an undocumented format. GNU tar does not understand these headers.

**** Static linking.**

Some platform will, by default, prepare a smaller 'tar' executable which depends on shared libraries. Since GNU 'tar' may be used for system-level backups and disaster recovery, installers might prefer to force static linking, making a bigger 'tar' executable maybe, but able to work standalone, in situations where shared libraries are not available.

The way to achieve static linking varies between systems. Set LDFLAGS to a value from the table below, before configuration (see 'INSTALL').

Platform	Compiler	LDFLAGS
(any)	Gnu C	-static
AIX		(vendor)-bnso -bI:/lib/syscalls.exp
HPUX		(vendor)-Wl,-a,archive
IRIX		(vendor)-non_shared
OSF		(vendor)-non_shared
SCO 3.2v5		(vendor)-dn
Solaris		(vendor)-Bstatic
SunOS		(vendor)-Bstatic

**** Failed tests 'ignfail.sh' or 'incremen.sh'.**

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In an NFS environment, lack of synchronization between machine clocks might create difficulties to any tool comparing dates and file time stamps, like 'tar' in incremental dumps. This has been a recurrent problem with GNU Make for the last few years. We would like a general solution.

**** BSD compatibility matters.**

Set LIBS to '-lbsd' before configuration (see 'INSTALL') if the linker complains about 'bsd_ioctl' (Slackware). Also set CPPFLAGS to '-I/usr/include/bsd' if <sgtty.h> is not found (Slackware).

**** OPENStep 4.2 swap files**

Tar cannot read the file /private/vm/swapfile.front (even as root). This file is not a real file, but some kind of uncompressed view of the real compressed swap file; there is no reason to back it up, so the simplest workaround is to avoid tarring this file.

*** Special topics**

Here are a few special matters about GNU 'tar', not related to build matters. See previous section for such.

**** File attributes.**

About *security*, it is probable that future releases of 'tar' will have some behavior changed. There are many pending suggestions to choose from.

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Today, extracting an archive not being 'root', 'tar' will restore suid/sgid bits on files but owned by the extracting user. 'root' automatically gets a lot of special privileges, '-p' might later become required to get them.

GNU 'tar' does not properly restore symlink attributes. Various systems implement flavors of symbolic links showing different behavior and properties. We did not successfully sort all these out yet. Currently, the 'lchown' call will be used if available, but that's all.

** POSIX compliance.

GNU 'tar' is able to create archive in the following formats:

*** The format of UNIX version 7

*** POSIX.1-1988 format, also known as "ustar format"

*** POSIX.1-2001 format, also known as "pax format"

*** Old GNU format (described below)

In addition to those, GNU 'tar' is also able to read archives produced by 'star' archiver.

A so called 'Old GNU' format is based on an early draft of the POSIX 1003.1 'ustar' standard which is different from the final standard. It defines its extensions (such as incremental backups and handling of the long file names) in a way incompatible with any existing tar archive format, therefore the use of old GNU format is strongly discouraged.

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Please read the file NEWS for more information about POSIX compliance and new 'tar' features.

* What's next?

GNU tar will be merged into GNU paxutils: a project containing several utilities related to creating and handling archives in various formats. The project will include tar, cpio and pax utilities.

* Bug reporting.

Send bug reports to <bug-tar@gnu.org>. A bug report should contain an adequate description of the problem, your input, what you expected, what you got, and why this is wrong. Diffs are welcome, but they only describe a solution, from which the problem might be uneasy to infer. If needed, submit actual data files with your report. Small data files are preferred. Big files may sometimes be necessary, but do not send them to the report address; rather take special arrangement with the maintainer.

Your feedback will help us to make a better and more portable package. Consider documentation errors as bugs, and report them as such. If you develop anything pertaining to 'tar' or have suggestions, let us know and share your findings by writing to <bug-tar@gnu.org>.

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Local Variables:

mode: outline

paragraph-separate: "[]*\$"

version-control: never

End:

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u-boot (v2010.09):

U-Boot is Free Software. It is copyrighted by Wolfgang Denk and many others who contributed code (see the actual source code and the git commit messages for details). You can redistribute U-Boot and/or modify it under the terms of version 2 of the GNU General Public License as published by the Free Software Foundation. Most of it can also be distributed, at your option, under any later version of the GNU General Public License -- see individual files for exceptions.

NOTE! This license does not cover the so-called "standalone" applications that use U-Boot services by means of the jump table provided by U-Boot exactly for this purpose - this is merely considered normal use of U-Boot, and does not fall under the heading of "derived work" -- see file Licenses/Exceptions for details.

Also note that the GPL and the other licenses are copyrighted by the Free Software Foundation and other organizations, but the instance of code that they refer to (the U-Boot source code) is copyrighted by me and others who actually wrote it.

-- Wolfgang Denk

Like many other projects, U-Boot had a tradition of including big blocks of License headers in all files. This not only blew up the source code with mostly redundant information, but also made it very difficult to generate License Clearing Reports. An additional problem was that even the same licenses were referred to by a number of slightly varying text blocks (full, abbreviated, different indentation, line wrapping and/or white space, with obsolete address information, ...) which made automatic processing a nightmare.

To make this easier, such license headers in the source files have been replaced with a single line reference to Unique License Identifiers as defined by the Linux Foundation's SPDX project [1]. For example, in a source file the full "GPL v2.0 or later" header text was replaced by a single line:

SPDX-License-Identifier: GPL-2.0+

We use the SPDX Unique License Identifiers here; these are available at [2].

[1] <http://spdx.org/>

[2] <http://spdx.org/licenses/>

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uClibc (v0.9.31.1):

A C library for embedded Linux

uClibc (aka μ Clibc/pronounced yew-see-lib-see) is a C library for developing embedded Linux systems. It is much smaller than the GNU C Library, but nearly all applications supported by glibc also work perfectly with uClibc. Porting applications from glibc to uClibc typically involves just recompiling the source code. uClibc even supports shared libraries and threading. It currently runs on standard Linux and MMU-less (also known as μ Clinux) systems with support for alpha, amd64, ARM, Blackfin, cris, h8300, hppa, i386, i960, ia64, m68k, mips/mipsel, PowerPC, SH, SPARC, and v850 processors.

If you are building an embedded Linux system and you find that glibc is eating up too much space, you may want to consider using uClibc. If you are building a huge fileserver with 12 Terabytes of storage, then using glibc may make more sense. Unless, for example, that 12 Terabytes will be Network Attached Storage and you plan to burn Linux into the system's firmware...

uClibc is maintained by Erik Andersen and is licensed under the GNU LESSER GENERAL PUBLIC LICENSE . This license allows you to make closed source commercial applications using uClibc. (Please consider sharing some of the money you make ;-). You do not need to give away all your source code just because you use uClibc and/or run on Linux. See the list of Frequently Asked Questions for details.

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Udev (v058):

udev - a userspace implementation of devfs

For more information on the design, and structure of this project, see the files in the docs/ directory.

To use:

- You must be running a 2.6 version of the Linux kernel.
- Your 2.6 kernel must have had CONFIG_HOTPLUG enabled when it was built.
- Make sure sysfs is mounted. udev will figure out where sysfs is mounted, but the traditional place for it is at /sys. You can mount it by hand by running:

```
mount -t sysfs none /sys
```

- Make sure you have the latest version of the linux-hotplug scripts. They are available at linux-hotplug.sf.net or from your local kernel.org mirror at:

```
kernel.org/pub/linux/utils/kernel/hotplug/
```

They are required in order for udev to work properly.

If for some reason you do not install the hotplug scripts, you must tell the kernel to point the hotplug binary at wherever you install udev at. This can be done by:

```
echo "/sbin/udev" > /proc/sys/kernel/hotplug
```

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- Build the project:

```
make
```

Note:

There are a number of different flags that you can use when building udev. They are as follows:

`prefix`

set this to the default root that you want udev to be installed into. This works just like the 'configure --prefix' script does. Default value is ". Only override this if you really know what you are doing.

`USE_KLIBC`

if set to 'true', udev is built and linked against the included version of klibc. Default value is 'false'.

`USE_LOG`

if set to 'true', udev will emit messages to the syslog when it creates or removes device nodes. This is helpful to see what udev is doing. This is enabled by default. Note, if you are building udev against klibc it is recommended that you disable this option (due to klibc's syslog implementation.)

`USE_SELINUX`

if set to 'true', udev will be built with SELinux support enabled. This is disabled by default.

`DEBUG`

if set to 'true', debugging messages will be sent to the syslog as udev is run. Default value is 'false'.

`KERNEL_DIR`

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If this is not set it will default to `/lib/modules/$(uname -r)/build`

This is used if `USE_KLIBC=true` to find the kernel include

directory that klibc needs to build against. This must be set

if you are not building udev while running a 2.6 kernel.

So, if you want to build udev using klibc with debugging messages, you would do:

```
make USE_KLIBC=true DEBUG=true
```

- Install the project:

```
make install
```

This will put the udev binary in `/sbin`, create the `/udev` and `/etc/udev` directories, and place the udev configuration files in `/etc/udev`. You will probably want to edit the `*.rules` files to create custom naming rules. More info on how the config files are set up are contained in comments in the files, and is located in the documentation.

- Add and remove devices from the system and marvel as nodes are created and removed in `/udev/` based on the device types.

- If you later get sick of it, uninstall it:

```
make uninstall
```


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Things are still quite rough, but it should work properly. If nothing seems to happen, make sure your build worked properly by running the udev-test.pl script as root in the test/ subdirectory of the udev source tree.

Development and documentation help is very much appreciated, see the TODO file for a list of things left to be done.

Any comment/questions/concerns please let me and the other udev developers know by sending a message to the linux-hotplug-devel mailing list at:

`linux-hotplug-devel@lists.sourceforge.net`

greg k-h

`greg@kroah.com`

Util-Linux (v2.20.1):

util-linux

util-linux is a random collection of Linux utilities

Note that in years 2006-2010 this project used the name "util-linux-ng".

WEB PAGE:

<http://kernel.org/~kzak/util-linux/>

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MAILING LIST:

E-MAIL: util-linux@vger.kernel.org

URL: <http://vger.kernel.org/vger-lists.html#util-linux>

DOWNLOAD:

<ftp://ftp.kernel.org/pub/linux/utils/util-linux/>

SOURCE CODE:

Web interface:

<http://git.kernel.org/?p=utils/util-linux/util-linux.git>

Checkout:

`git clone git://git.kernel.org/pub/scm/utils/util-linux/util-linux.git util-linux`

NLS (PO TRANSLATIONS):

PO files are maintained by:

<http://translationproject.org/domain/util-linux-ng.html>

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NEUTRALITY:

The stuff in util-linux should be rather distribution-neutral.

No RPMs/DEBs/... are provided - get yours from your distributor.

VERSION SCHEMA:

Standard releases:

`<major>.<minor>[.<maint>[.<bugfix>]]`

major = fatal and deep changes

minor = typical release with new features

maint = maintenance releases; bug fixes only

bugfix = unplanned releases for critical/security bugs

Development releases:

`<major>.<minor>-rc<N>`

COMPILATION:

See the INSTALL file for more details.

Notes:

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* use SUID_CFLAGS and SUID_LDFLAGS when you want to define special compiler options for typical suid programs, for example:

```
./configure SUID_CFLAGS="-fpie" SUID_LDFLAGS="-pie"
```

This feature is currently supported for chfn, chsh, newgrp, write, mount, and umount.

STATIC LINKING:

Use `--enable-static-programs[=LIST]` configure option when you want to use statically linked programs.

Note, `mount(8)` uses `get{pw,gr}nam()` and `getpwuid()` functions for translation from username and groupname to UID and GID. These functions could be implemented by dynamically loaded independent modules (NSS) in your libc (e.g. glibc). These modules are not statically linked to `mount(8)` and `mount.static` is still using `dlopen()` like dynamically linked version.

The translation won't work in environment where NSS modules are not installed.

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For example normal system (NSS modules are available):

```
# ./mount.static -v -f -n -oid=kzak /mnt/foo  
  
LABEL=/mnt/foo on /mnt/foo type vfat (rw,uid=500)  
  
^^^^^^
```

and without NSS modules:

```
# chroot . ./mount.static -v -f -n -oid=kzak /mnt/win  
  
LABEL=/mnt/win on /mnt/win type vfat (rw,uid=kzak)  
  
^^^^^^
```

XML-RPC++ (v0.7):

```
#ifndef _XMLRPC_H_  
  
#define _XMLRPC_H_  
  
//  
  
// XmlRpc++ Copyright (c) 2002-2003 by Chris Morley  
  
// 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
```

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```
// License along with this library; if not, write to the Free Software
// Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307
//
```

```
/* changed by ise GmbH 2013 */
```

```
#if defined(_MSC_VER)

# pragma warning(disable:4786) // identifier was truncated in debug info

#endif
```

```
#ifndef MAKEDEPEND

# include <string>

#endif
```

```
#include "dllexport.h"

#include "XmlRpcClient.h"

#include "XmlRpcException.h"

#include "XmlRpcServer.h"

#include "XmlRpcServerProxy.h"

#include "XmlRpcServerMethod.h"

#include "XmlRpcValue.h"

#include "XmlRpcUtil.h"
```

```
namespace XmlRpc {
```

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//! An interface allowing custom handling of error message reporting.

```
class XMLRPC_DLLEXPORT XmlRpcErrorHandler {
```

```
public:
```

//! Returns a pointer to the currently installed error handling object.

```
static XmlRpcErrorHandler* getErrorHandler()
```

```
{ return _errorHandler; }
```

//! Specifies the error handler.

```
static void setErrorHandler(XmlRpcErrorHandler* eh)
```

```
{ _errorHandler = eh; }
```

//! Report an error. Custom error handlers should define this method.

```
virtual void error(const char* msg) = 0;
```

//! Define virtual destructor to avoid compiler warnings

```
virtual ~XmlRpcErrorHandler(){};
```

```
protected:
```

```
static XmlRpcErrorHandler* _errorHandler;
```

```
};
```

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//! An interface allowing custom handling of informational message reporting.

```
class XMLRPC_DLLEXPORT XmlRpcLogHandler {
```

```
public:
```

//! Returns a pointer to the currently installed message reporting object.

```
static XmlRpcLogHandler* getLogHandler()
```

```
{ return _logHandler; }
```

//! Specifies the message handler.

```
static void setLogHandler(XmlRpcLogHandler* lh)
```

```
{ _logHandler = lh; }
```

//! Returns the level of verbosity of informational messages. 0 is no output, 5 is very verbose.

```
static int getVerbosity()
```

```
{ return _verbosity; }
```

//! Specify the level of verbosity of informational messages. 0 is no output, 5 is very verbose.

```
static void setVerbosity(int v)
```

```
{ _verbosity = v; }
```

//! Output a message. Custom error handlers should define this method.

```
virtual void log(int level, const char* msg) = 0;
```

//! Define virtual destructor to avoid compiler warnings

```
virtual ~XmlRpcLogHandler(){};
```


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protected:

```
static XmlRpcLogHandler* _logHandler;
```

```
static int _verbosity;
```

```
};
```

```
//! Returns log message verbosity. This is short for XmlRpcLogHandler::getVerbosity()
```

```
int XMLRPC_DLLEXPORT getVerbosity();
```

```
//! Sets log message verbosity. This is short for XmlRpcLogHandler::setVerbosity(level)
```

```
void XMLRPC_DLLEXPORT setVerbosity(int level);
```

```
//! Version identifier
```

```
extern const char XMLRPC_VERSION[];
```

```
} // namespace XmlRpc
```

```
#endif // _XMLRPC_H_
```

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Zlib (v1.2.6):

ZLIB DATA COMPRESSION LIBRARY

zlib 1.2.6 is a general purpose data compression library. All the code is thread safe. The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <http://tools.ietf.org/html/rfc1950> (zlib format), rfc1951 (deflate format) and rfc1952 (gzip format).

All functions of the compression library are documented in the file `zlib.h` (volunteer to write man pages welcome, contact zlib@gzip.org). A usage example of the library is given in the file `test/example.c` which also tests that the library is working correctly. Another example is given in the file `test/minigzip.c`. The compression library itself is composed of all source files in the root directory.

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To compile all files and run the test program, follow the instructions given at the top of Makefile.in. In short `./configure; make test`, and if that goes well, `make install` should work for most flavors of Unix. For Windows, use one of the special makefiles in `win32/` or `contrib/vstudio/`. For VMS, use `make_vms.com`.

Questions about zlib should be sent to [<zlib@gzip.org>](mailto:zlib@gzip.org), or to Gilles Vollant [<info@winimage.com>](mailto:info@winimage.com) for the Windows DLL version. The zlib home page is <http://zlib.net/>. Before reporting a problem, please check this site to verify that you have the latest version of zlib; otherwise get the latest version and check whether the problem still exists or not.

PLEASE read the zlib FAQ http://zlib.net/zlib_faq.html before asking for help.

Mark Nelson [<markn@ieee.org>](mailto:markn@ieee.org) wrote an article about zlib for the Jan. 1997 issue of Dr. Dobbs's Journal; a copy of the article is available at <http://marknelson.us/1997/01/01/zlib-engine/>.

The changes made in version 1.2.6 are documented in the file `ChangeLog`.

Unsupported third party contributions are provided in directory `contrib/`.

zlib is available in Java using the `java.util.zip` package, documented at <http://java.sun.com/developer/technicalArticles/Programming/compression/>.

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A Perl interface to zlib written by Paul Marquess <pmqs@cpan.org> is available

at CPAN (Comprehensive Perl Archive Network) sites, including

<http://search.cpan.org/~pmqs/IO-Compress-Zlib/> .

A Python interface to zlib written by A.M. Kuchling <amk@amk.ca> is

available in Python 1.5 and later versions, see

<http://docs.python.org/library/zlib.html> .

zlib is built into tcl: <http://wiki.tcl.tk/4610> .

An experimental package to read and write files in .zip format, written on top

of zlib by Gilles Vollant <info@winimage.com>, is available in the

contrib/minizip directory of zlib.

Notes for some targets:

- For Windows DLL versions, please see win32/DLL_FAQ.txt

- For 64-bit Irix, deflate.c must be compiled without any optimization. With

- O, one libpng test fails. The test works in 32 bit mode (with the -n32

- compiler flag). The compiler bug has been reported to SGI.

- zlib doesn't work with gcc 2.6.3 on a DEC 3000/300LX under OSF/1 2.1 it works

- when compiled with cc.

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- On Digital Unix 4.0D (formely OSF/1) on AlphaServer, the cc option -std1 is necessary to get gzprintf working correctly. This is done by configure.
- zlib doesn't work on HP-UX 9.05 with some versions of /bin/cc. It works with other compilers. Use "make test" to check your compiler.
- gzdopen is not supported on RISCOS or BEOS.
- For PalmOs, see <http://palmzlib.sourceforge.net/>

Acknowledgments:

The deflate format used by zlib was defined by Phil Katz. The deflate and zlib specifications were written by L. Peter Deutsch. Thanks to all the people who reported problems and suggested various improvements in zlib; they are too numerous to cite here.

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Jean-loup Gailly Mark Adler
jloup@gzip.org madler@alumni.caltech.edu

If you use the zlib library in a product, we would appreciate *not* receiving lengthy legal documents to sign. The sources are provided for free but without warranty of any kind. The library has been entirely written by Jean-loup Gailly and Mark Adler; it does not include third-party code.

If you redistribute modified sources, we would appreciate that you include in the file ChangeLog history information documenting your changes. Please read the FAQ for more information on the distribution of modified source versions.

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Version 3, 29 June 2007

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