IPsecure Router KNX

Handbuch

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1 Allgemein

Der Theben IPsecure Router KNX verbindet den KNX-Bus mit einem Ethernet-Netzwerk. Über das Netzwerk können KNX-Telegramme an andere Geräte gesendet oder von diesen empfangen werden. Das Gerät unterstützt das KNX-Secure-Protokoll (KNXnet/IP Security).

1.1 Nutzung des Produkthandbuchs

Das vorliegende Handbuch gibt Ihnen detaillierte technische Informationen über Funktion, Montage und Programmierung des Theben KNX-Geräts. Anhand von Beispielen wird der Einsatz erläutert.

Das Handbuch ist in folgende Kapitel unterteilt:

Kapitel 1	Allgemein
Kapitel 2	Gerätetechnik
Kapitel 3	Inbetriebnahme
Kapitel 4	Planung und Anwendung
Kapitel A	Anhang

1.1.1 Hinweise

In diesem Handbuch werden Hinweise und Sicherheitshinweise folgendermaßen dargestellt:

Hinweis
Bedienungserleichterungen, Bedienungstipps

Beispiele
Anwendungsbeispiele, Einbaubeispiele, Programmierbeispiele

Wichtig
Dieser Sicherheitshinweis wird verwendet, sobald die Gefahr einer Funktionsstörung besteht, ohne Schaden- oder Verletzungsrisiko.

Achtung
Dieser Sicherheitshinweis wird verwendet, sobald die Gefahr einer Funktionsstörung besteht, ohne Schaden- oder Verletzungsrisiko.

 **Gefahr**
Dieser Sicherheitshinweis wird verwendet, sobald bei unsachgemäßer Handhabung Gefahr für Leib und Leben besteht.

 **Gefahr**
Dieser Sicherheitshinweis wird verwendet, sobald bei unsachgemäßer Handhabung akute Lebensgefahr besteht.

1.2 KNXnet/IP Security

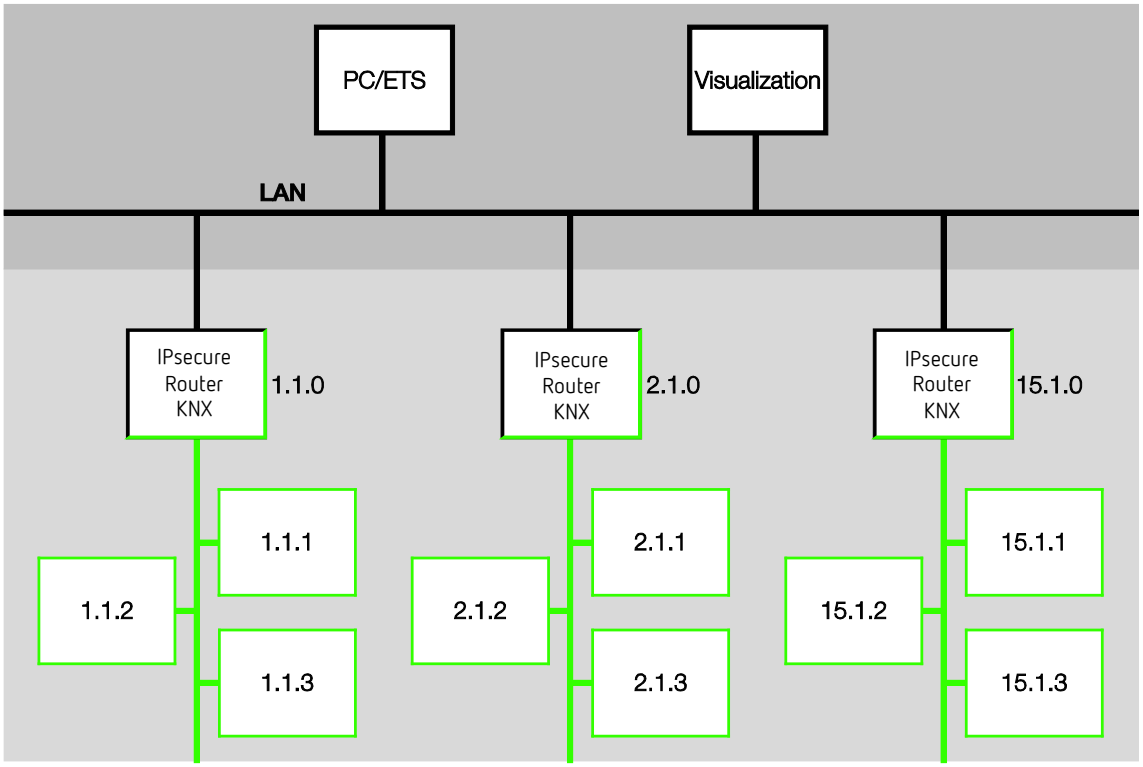
Das Gerät sollte immer im KNX Secure-Modus betrieben werden. So ist sichergestellt, dass die Laufzeitkommunikation auf dem IP-Backbone, die Tunneling Server und die Inbetriebnahme des Gerätes selbst sicher sind.

Siehe auch Kapitel, KNX Secure.

1.3 Produkt- und Funktionsübersicht

Der Theben IPsecure Router KNX verbindet den KNX-Bus mit einem Ethernet-Netzwerk. Über das Netzwerk können KNX-Telegramme an andere Geräte gesendet oder von diesen empfangen werden.

Das Gerät verwendet zur Kommunikation das KNXnet/IP-Protokoll der KNX Association (Routing und Tunneling).



Der Router verfügt über 5 Tunneling Server, siehe Kapitel Die Verwendung der integrierten Tunneling Server. Diese unterstützen sowohl den Busmonitor- als auch den Gruppenmonitorbetrieb. Die Tunneling Server können im KNX Secure-Modus betrieben werden.

Alternativ zur KNX-Standardkommunikation (Multicast) können bis zu 10 IPsecure Router KNX auch über das Unicast-Protokoll miteinander kommunizieren, siehe Kapitel KNX-Telegramme im Netzwerk. Der KNX Secure-Modus ist in dem Fall nicht verfügbar.

Die Spannungsversorgung kann über PoE (Power over Ethernet) nach IEEE 802.3af Class 1 erfolgen oder über eine Hilfsspannung.

Für die IPsecure Router KNX steht das Theben IP-Tool zur Verfügung, mit dem die Router im Netzwerk gefunden werden können (IP-Discovery), die Einstellungen für die Unicast-Kommunikation vorgenommen werden können und im Bedarfsfall die Firmware aktualisiert werden kann, siehe Kapitel Das Theben IP-Tool .

Für das Firmware Update steht eine ETS App (ABB KNX Bus Update) zur Verfügung. Sofern der KNX Secure-Modus bei den Geräten nicht aktiviert ist, kann ein Firmware Update auch mit dem i-bus® Tool erfolgen.

Während des Updatevorgangs muss zusätzlich zum IP-Netzwerk (LAN) auch der KNX-Bus (TP) angeschlossen sein, damit die KNX-Parameter korrekt wiederhergestellt werden können. Andernfalls schlägt der Updatevorgang fehl.

Es muss sichergestellt werden, dass während des Updatevorgangs kein Spannungsausfall (KNX oder IP) auftritt, da ansonsten das Gerät zerstört werden kann.

Das Gerät unterstützt die KNX-Standardfunktion "Überwachung auf Busspannungsausfall". Dies ist eine Netzwerk-Management-Funktion, die z. B. von Visualisierungen verwendet wird (siehe Kap. Überwachung auf Busspannungsausfall.

1.3.1 Überwachung auf Busspannungsausfall

Der IPsecure Router KNX überwacht den KNX-TP-Bus auf Spannungsausfall. Bei einer Zustandsänderung der Busspannung wird ein Broadcastbefehl vom Typ "NetworkParameterWrite" auf das IP-Netzwerk gesendet.

Folgende Werte werden gesendet:

- Busspannungsausfall: "00063301" (hex)
- Busspannungswiederkehr: "00063300" (hex)

Diese Telegramme können z. B. von einer Visualisierung ausgewertet werden.

Typ	Bedeutung	Info
NetworkParameterWrite	Busspannungsausfall TP1	00 06 33 01
NetworkParameterWrite	Busspannungswiederkehr TP1	00 06 33 00

1.3.2 Übersicht Versionen

Gerät	IPsecure Router KNX	
Applikation	IPsecure Router KNX	IPsecure Router KNX
ETS	ETS 4/5	ETS 5
Eigenschaften *IPsecure Router KNX*		
Anzahl Tunneling Server	5	5
Anzahl Unicast-Verbindungen	10	10
Überwachung auf Busspannungsausfall (siehe Kap. Überwachung auf Busspannungsausfall)	■	■
Filterung Gruppentelegramme Hauptgruppe 0...31	■	■
IP-Discovery (IP-Tool)	■	■
Firmware Update (IP-Tool)	■	■*
Parametrierung Unicast (IP-Tool)	■	■*
Firmware Update mit KNX Bus Update App	-	■
Power over Ethernet	■	■
KNX Secure	-	■

■ = Eigenschaft trifft zu

- = Eigenschaft trifft nicht zu

* Nur wenn Gerät nicht im KNX Secure-Modus betrieben wird

2 Gerätetechnik

IPsecure Router KNX

Der IPsecure Router KNX bildet die Schnittstelle zwischen KNX-Installationen und IP-Netzwerken. Er kann als Linien- oder Bereichskoppler eingesetzt werden und dabei das lokale Netzwerk (LAN) für den Austausch von Telegrammen zwischen den Linien/Bereichen nutzen.

Mit der ETS können KNX-Geräte über das LAN programmiert werden (es stehen 5 Tunneling Server zur Verfügung). Das Gerät verwendet das KNXnet/IP-Protokoll der KNX-Association (Routing und Tunneling). Alternativ kann das Gerät über Unicast kommunizieren.
Die Stromversorgung erfolgt über 12 bis 30 V DC oder PoE (Power over Ethernet) nach IEEE 802.3af Class 1.

2.1 Technische Daten

Versorgung	Hilfsspannung U_s	12...30 V DC (+10 % / -15 %) oder PoE (IEEE 802.3af Klasse 1)
	Verlustleistung	Maximal 1,8 W
	Stromaufnahme Hilfsspannung	Maximal 120 mA bei 12 V
	Nennspannung U_n	12 V DC
	Stromaufnahme KNX	< 10 mA
Anschlüsse	KNX	Busanschlussklemme
	Betriebsspannung	Steckklemme
	LAN	RJ45-Buchse für 10/100BaseT, IEEE 802.3 Netzwerke, AutoSensing
Bedien- und Anzeigeelemente	LED rot und Taste	Zur Vergabe der physikalischen Adresse
	LED grün "On"	Anzeige Betriebsbereitschaft
	LED gelb "LAN/Link"	Anzeige Netzwerkverbindung
	LED gelb "Telegram"	Anzeige KNX-Telegrammverkehr
Schutzart	IP 20	Nach DIN EN 60 529
Schutzklasse	II	Nach DIN EN 61 140
Isolationskategorie	Überspannungskategorie	III nach DIN EN 60 664-1
	Verschmutzungsgrad	2 nach DIN EN 60 664-1
KNX-Sicherheitskleinspannung	SELV 30 V DC	
Temperaturbereich	Betrieb	-5 °C...+45 °C
	Lagerung	-25 °C...+55 °C
	Transport	-25 °C...+70 °C
Umgebungsbedingung	maximale Luftfeuchte	95 %, keine Betauung zulässig
	Luftdruck	Atmosphäre bis 2.000 m

IPsecure Router KNX
Gerätetechnik

Design	Reiheneinbaugerät (REG)	Modulares Installationsgerät, Pro*M*
	Abmessungen	90 x 36 x 64 mm (H x B x T)
	Einbaubreite	2 Module à 18 mm
	Einbautiefe	68 mm
Montage	Auf Tragschiene 35 mm	Nach DIN EN 60 715
Einbaulage	Beliebig	
Gewicht	0,1 kg	
Gehäuse, Farbe	Kunststoff, halogenfrei, grau	
Approbation	KNX nach EN 50 090-1, -2	
CE-Zeichen	gemäß EMV- und Niederspannungsrichtlinien	

Gerätetyp	Applikation	maximale Anzahl Kommunikationsobjekte	maximale Anzahl Gruppenadressen	maximale Anzahl Zuordnungen
IPsecure Router KNX	IPsecure Router KNX /...*	0	0	0

* ... = aktuelle Versionsnummer der Applikation. **Bitte beachten Sie hierzu die Softwareinformationen auf unserer Homepage.**

Hinweis

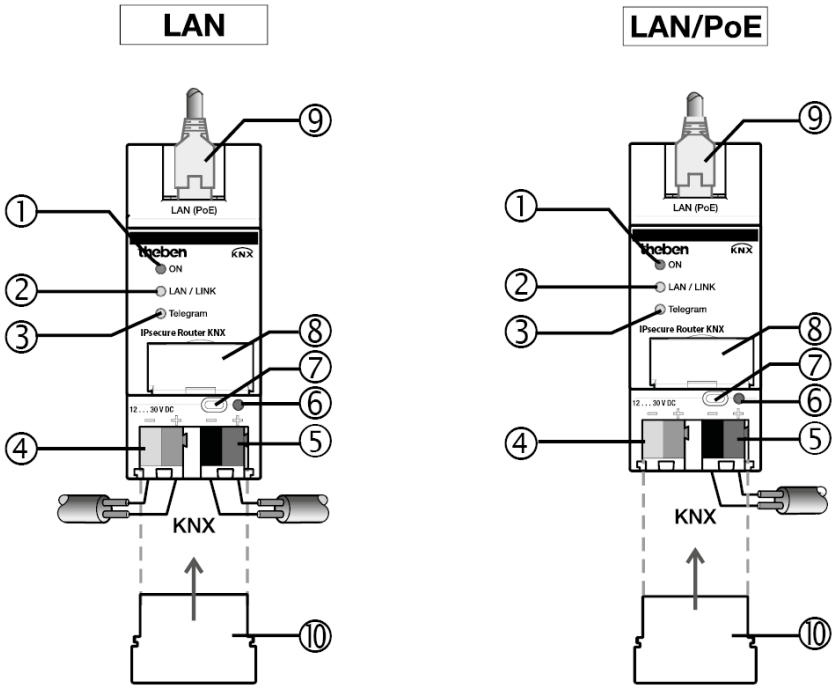
Für die Programmierung sind die ETS und die aktuelle Applikation des Gerätes erforderlich. Soll das Gerät im KNX Secure-Modus betrieben werden, ist zusätzlich der seitlich auf dem Gerät aufgebrachte Inbetriebnahmeschlüssel (FDSK, siehe Kapitel, KNX Secure) erforderlich.

Die aktuelle Applikation finden Sie mit der entsprechenden Softwareinformation zum Download im Internet unter *http://www.theben.de/downloads*. Nach dem Import in die ETS liegt die das Gerät im Fenster *Kataloge* unter *Hersteller/THEBEN AG/Systemgeräte/IPsecure Router KNX*.

Das Gerät unterstützt nicht die Verschließfunktion eines KNX-Geräts in der ETS. Falls Sie den Zugriff auf alle Geräte des Projekts durch einen *BCU-Schlüssel* sperren, hat es auf dieses Gerät keine Auswirkung. Es kann weiterhin ausgelesen und programmiert werden.

Ausnahme: Wenn der KNX Secure-Modus aktiviert ist, kann das Gerät nicht mehr mit einer anderen ETS programmiert werden.

2.2 Anschluss

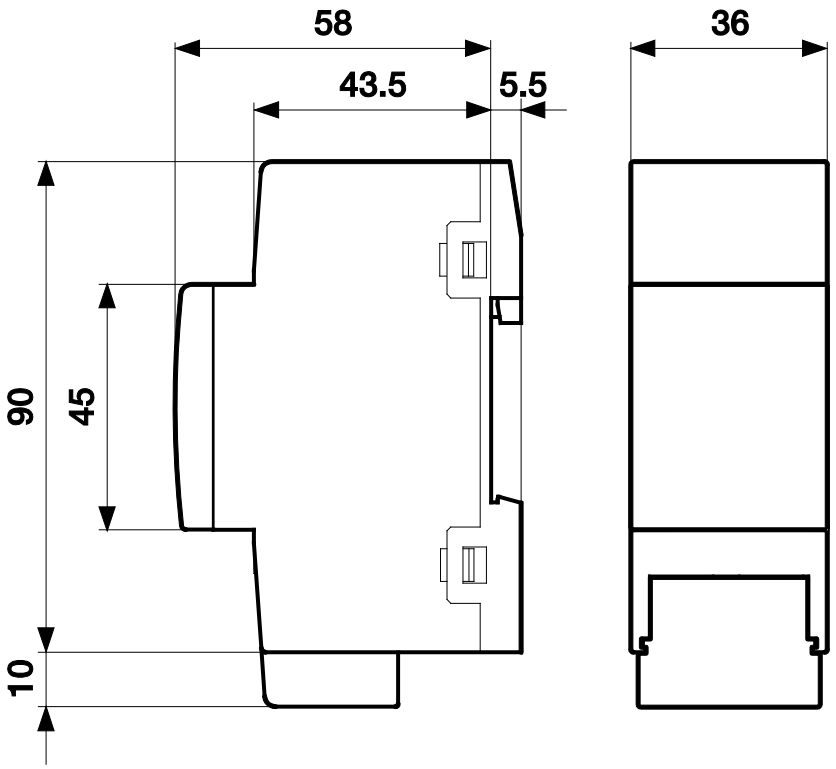


IPsecure Router KNX

1	LED ON	**6**	LED *Programmieren*
2	LED LAN/LINK	**7**	Taste *Programmieren*
3	LED Telegramm	**8**	Schildträger
4	Anschluss Spannungsversorgung	**9**	Anschluss LAN bzw. LAN/PoE
5	Anschluss KNX	**10**	Abdeckkappe

Hinweis
Es ist auch möglich, den Router über den unverdrosselten Spannungsausgang einer KNX-Spannungsversorgung (Typ SV/S) zu versorgen.

2.3 Maßbild



IPsecure Router KNX

2.4 Montage und Installation

Das Gerät ist ein Reiheneinbaugerät zum Einbau in Verteilern zur Schnellbefestigung auf 35-mm-Tragschienen nach DIN EN 60 715.

Das Gerät kann in jeder Einbaulage montiert werden.

Die Verbindung zum Bus erfolgt über die mitgelieferte Busanschlussklemme. Die Klemmenbezeichnung befindet sich auf dem Gehäuse.

Das Gerät ist betriebsbereit, nachdem die Busspannung und die Hilfsspannung angelegt wurden.

Die Zugänglichkeit des Geräts zum Betreiben, Prüfen, Besichtigen, Warten und Reparieren muss gemäß DIN VDE 0100-520 sichergestellt sein.

Inbetriebnahmevoraussetzung

Um das Gerät in Betrieb zu nehmen, werden ein PC mit der ETS 5 oder höher sowie eine Versorgungsspannung von 12 bis 30 V DC benötigt. Alternativ kann die Versorgung über PoE (Power over Ethernet) erfolgen.

Mit dem Anlegen der Busspannung und der Hilfsspannung ist das Gerät betriebsbereit.

Montage und Inbetriebnahme dürfen nur von Elektrofachkräften ausgeführt werden. Bei der Planung und Errichtung von elektrischen Anlagen sowie von sicherheitstechnischen Anlagen für Einbruch- und Branderkennung sind die einschlägigen Normen, Richtlinien, Vorschriften und Bestimmungen des jeweiligen Landes zu beachten.

- Gerät bei Transport, Lagerung und im Betrieb vor Feuchtigkeit, Schmutz und Beschädigung schützen!
- Gerät nur innerhalb der spezifizierten technischen Daten betreiben!
- Gerät nur im geschlossenen Gehäuse (Verteiler) betreiben!
- Vor Montagearbeiten ist das Gerät spannungsfrei zu schalten.

Gefahr

Um gefährliche Berührungsspannung durch Rückspeisung aus unterschiedlichen Außenleitern zu vermeiden, muss bei einer Erweiterung oder Änderung des elektrischen Anschlusses eine allpolige Abschaltung vorgenommen werden.

Auslieferungszustand

Das Gerät wird mit der physikalischen Adresse 15.15.0 ausgeliefert.

Alle physikalischen Adressen der Tunneling-Verbindungen stehen im Auslieferungszustand auf 15.15.100, d.h. nach außen ist nur ein Tunnel sichtbar. Erst nach dem ersten Download werden die in der ETS eingestellen Adressen der Tunneling-Verbindungen übernommen. Die IP-Adresse ist auf automatische Vergabe (DHCP/AutoIP) eingestellt.

Hinweis

Das Gerät wird ab Werk mit der Option *Weiterleiten* ausgeliefert. Das entspricht nicht der Standardeinstellung in der Applikation, erleichtert aber die Inbetriebnahme. Siehe Kapitel Parameterfenster KNX -> LAN.

Nach dem ersten Download wird dann die parametrierte Einstellung übernommen.

Vergabe der physikalischen Adresse

In der ETS erfolgt die Vergabe und Programmierung der physikalischen Adressen und Parameter.

Das Gerät besitzt zur Vergabe der physikalischen Adresse eine Taste *Programmieren*. Nachdem die Taste betätigt wurde, leuchtet die rote LED *Programmieren* auf. Sie erlischt, sobald die ETS die physikalische Adresse vergeben hat oder die Taste *Programmieren* erneut betätigt wurde.

Downloadverhalten

Das Gerät kann auf unterschiedliche Arten programmiert werden: Über einen der integrierten Tunneling Server, über lokalen Download, über KNXnet/IP Routing oder über eine weitere Programmierschnittstelle (USB oder IP).

Hinweis
Wird für die Programmierung eines KNX Secure-Gerätes eine USB-Schnittstelle verwendet, muss diese „Long Frames" unterstützen. Geeignet ist z. B. die USB-Schnittstelle von Theben.

Damit das Gerät programmiert werden kann, muss eine Verbindung zum KNX TP (Twisted Pair) bestehen.

Nach erfolgtem Download startet das Gerät neu und schließt alle offenen Tunneling-Verbindungen. Sofern beim Download die IP-Adresse des Gerätes geändert wurde, müssen die Tunneling-Verbindungen manuell in den Tunneling Clients neu konfiguriert werden. Tunneling Clients stellen die Verbindung zum Server über die IP-Adresse her.

Entladen des Gerätes und Rücksetzen auf Werkseinstellungen

Das Gerät kann auf Werkseinstellungen zurückgesetzt werden. Da es sich um ein Secure-Gerät handelt, ist folgendes zu beachten:

Im KNX Secure-Modus-Betrieb kann das Gerät über die ETS nur dann zurückgesetzt werden, wenn die ETS das Projekt verwendet, mit dem das Gerät parametriert wurde, bzw. wenn im Projekt der Inbetriebnahmeschlüssel vorhanden ist.

Über einen Rechtsklick auf das Gerät in der ETS kann das Gerät entladen werden.

Option: Applikation entladen

- Die IP-Adresse und IP-Konfiguration bleiben erhalten
- Die Unicast-Konfiguration bleibt erhalten, sofern vorhanden
- Die Passwörter und IP Adressen der Tunnelingserver werden gelöscht
- Der Schlüssel für die Multicastkommunikation („Backbone Key") bleibt
- Der von der ETS vergebene Tool Key bleibt erhalten, d.h.für die erneute Programmierung ist der FDSK nicht erforderlich.
- Die physikalische Adresse bleibt erhalten

Option: Physikalische Adresse und Applikation entladen

- Das Gerät wird auf Werkszustand zurück gesetzt
- Für die erneute Inbetriebnahme ist der FDSK notwendig, sofern er nicht von der ursprünglichen Inbetriebnahme noch im ETS Projekt vorhanden ist.

Das Zurücksetzen auf Werkseinstellungen kann auch direkt am Gerät vorgenommen werden. Dies stellt kein Sicherheitsrisiko dar, da das Gerät anschließend nicht mehr Teil der Anlage ist.

- Drücken der Programmiertaste bei nicht verbundenem KNX Bus
- Programmiertaste gedrückt halten und Busklemme aufstecken. Die Programmier-LED blinkt (2 Hz).
- Taste mindestens 5s gedrückt halten und dann loslassen. Die Programmier-LED erlischt, das Gerät startet neu mit Werkseinstellungen.

Verbindet sich nach dem Rücksetzen die ETS mit dem Gerät und der FDSK-Schlüssel des Gerätes ist der ETS noch bekannt, kann der Router erneut programmiert werden. Die ETS meldet in dem Fall, dass das Gerät zurückgesetzt wurde.

Weitere Hinweise zum FDSK (Factory Default Setup Key), siehe Kapitel, KNX Secure.

Reinigen

Das Gerät ist vor dem Reinigen spannungsfrei zu schalten. Verschmutzte Geräte können mit einem trockenen oder leicht mit Seifenlauge angefeuchteten Tuch gereinigt werden. Auf keinen Fall dürfen ätzende Mittel oder Lösungsmittel verwendet werden.

Wartung

Das Gerät ist wartungsfrei. Bei Schäden, z. B. durch Transport und/oder Lagerung, dürfen keine Reparaturen vorgenommen werden.

2.5 Beschreibung der Ein- und Ausgänge

Versorgungsspannungseingang 12 bis 30 V DC

Am Eingang für die Versorgungsspannung darf nur eine Gleichspannung von 12 bis 30 V angeschlossen werden. Wir empfehlen die Verwendung der Netzteile Spannungsvers. 640 mA T KNX aus unserem Sortiment.

Achtung
Die Versorgungsspannung muss 12 bis 30 V DC betragen, oder das Gerät wird über PoE (Power over Ethernet) nach IEEE 802.3af Class 1 versorgt. Bei Anschluss von 230 V kann das Gerät zerstört werden!

KNX-Anschluss

Zum Anschluss an den KNX-Bus wird die mitgelieferte Busanschlussklemme verwendet.

Hinweis
Zur Programmierung ist die ETS 5 in der aktuellsten Version erforderlich.

LAN-Anschluss

Die Netzwerkanbindung erfolgt über eine Ethernet-RJ45-Schnittstelle für LAN-Netzwerke. Die Netzwerkschnittstelle kann mit einer Übertragungsgeschwindigkeit von 10/100 MBit/s betrieben werden. Die Netzwerkaktivität wird durch die LED LAN/LINK auf der Gehäusefrontseite angezeigt.

2.6 Bedienelemente

Es befinden sich keine Bedienelemente am IPsecure Router KNX.

2.7 Anzeigeelemente

Auf der Frontseite des IPsecure Routers KNX befinden sich drei LEDs:

ON | LAN/LINK | Telegram

ON

- Die LED leuchtet wenige Sekunden nach Zuschalten der Hilfsspannung.
- Die LED leuchtet nach dem Zuschalten der Hilfsspannung zunächst dauerhaft. Nach ca. 40 Sekunden beginnt die LED zu blinken, bis der Aufstartvorgang vollständig abgeschlossen ist und die LED wieder dauerhaft leuchtet. Dies kann je nach Größe der Filtertabelle 5 bis 60 Sekunden dauern.

LAN/LINK

- Die LED leuchtet, wenn die Hilfsspannung vorhanden ist und der Router an ein Ethernet-Netzwerk angeschlossen ist.
- Die LED blinkt, wenn das Gerät Aktivität auf dem Netzwerk erkennt, z. B. wenn Daten ausgetauscht werden.

Telegram

- Die LED leuchtet, wenn der Router an ein TP-Netzwerk angeschlossen ist und der Aufstartvorgang (siehe LED "On") vollständig abgeschlossen ist.
- Die LED blinkt, wenn das Gerät Aktivität auf der KNX-Sublinie TP1 (Twisted Pair 1) erkennt, z. B. wenn Daten ausgetauscht werden.

3 Inbetriebnahme

Die Parametrierung des IPsecure Router KNX erfolgt mit der Applikation und der Engineering Tool Software ETS.

Die Applikation ist unter *Theben AG/Systemgeräte/IPsecure Router KNX* zu finden.

Für die Parametrierung wird ein PC oder Laptop mit der ETS und eine Anbindung an den KNX-Bus benötigt.

3.1 Überblick

Die Parametrierung des IPsecure Routers KNX erfolgt mit der Engineering Tool Software ETS 5 in der aktuellsten Version.

Einige Funktionen (Unicast) werden über ein separates Tool (IP-Tool) parametriert.

3.2 Parameter

Dieses Kapitel beschreibt die Parameter des IPsecure Routers KNX anhand der Parameterfenster.

Die Parameterfenster sind dynamisch aufgebaut, so dass je nach Parametrierung und Funktion der Ausgänge weitere Parameter oder ganze Parameterfenster freigegeben werden.

Die Defaultwerte der Parameter sind unterstrichen dargestellt, z. B.:

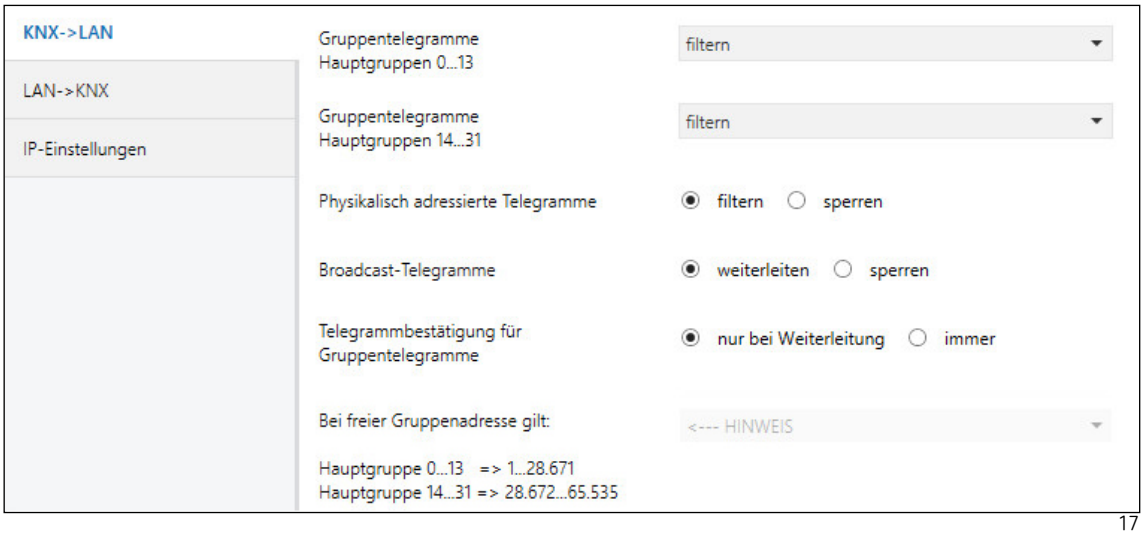
Optionen: ja

<u>nein</u>

3.2.1.1 Parameterfenster *KNX -> LAN*

Im Parameterfenster *KNX -> LAN* kann die Bearbeitung der Telegramme vom KNX-System zum LAN-Netzwerk festgelegt werden.

Hinweis
Das Gerät wird ab Werk mit der Option *Weiterleiten* ausgeliefert. Das entspricht nicht der Standardeinstellung in der Applikation, erleichtert aber die Inbetriebnahme. Nach dem ersten Download wird dann die parametrierte Einstellung übernommen.



Gruppentelegramme Hauptgruppe 0...13

Optionen: filtern
weiterleiten
sperren

Dieser Parameter legt fest, ob Telegramme mit Gruppenadressen der Hauptgruppen 0 bis 13 gefiltert, weitergeleitet oder gesperrt werden sollen.

- *filtern*: Die Telegramme mit Gruppenadressen der Hauptgruppen 0 bis 13 vom KNX zum LAN werden gemäß der Filtertabelle, welche von der ETS automatisch berechnet wird, gefiltert.
- *weiterleiten*: Alle Gruppentelegramme der Hauptgruppen 0 bis 13 werden weitergeleitet, ohne Berücksichtigung der Filtertabelle.

Wichtig
Diese Einstellung ist nur für Inbetriebnahme und Diagnose sinnvoll. Im Normalbetrieb sollte diese nicht verwendet werden. Da durch diese Einstellung die KNX-Linien überlastet werden können, kann es zu einem Telegrammverlust kommen.

- *sperren*: Alle Gruppentelegramme vom KNX zum LAN werden gesperrt, ohne Berücksichtigung der Filtertabelle.

Gruppentelegramme Hauptgruppe 14...31

Optionen: filtern
weiterleiten
sperren

Dieser Parameter legt fest, ob Telegramme mit Gruppenadressen der Hauptgruppen 14 bis 31 gefiltert, weitergeleitet oder gesperrt werden sollen.

- *filtern*: Die Telegramme mit Gruppenadressen der Hauptgruppen 14 bis 31 vom KNX zum LAN werden gemäß der Filtertabelle, welche von der ETS automatisch berechnet wird, gefiltert.
- *weiterleiten*: Alle Gruppentelegramme der Hauptgruppen 14 bis 31 werden weitergeleitet.

Wichtig
Diese Einstellung ist nur für Inbetriebnahme und Diagnose sinnvoll. Im Normalbetrieb sollte diese nicht verwendet werden. Da durch diese Einstellung die KNX-Linien überlastet werden können, kann es zu einem Telegrammverlust kommen.

- *sperren*: Es werden keine Gruppentelegramme der Hauptgruppen 14 bis 31 vom KNX zum LAN übertragen.

Physikalisch adressierte Telegramme

Optionen: filtern
sperren

Dieser Parameter legt fest, ob physikalisch adressierte Telegramme gefiltert oder gesperrt werden.

- *filtern*: Es werden nur die Telegramme vom KNX zum LAN übertragen, welche die Linie des IPsecure Router KNX zum LAN verlassen sollen.
- *sperren*: Physikalisch adressierte Telegramme werden nicht vom IPsecure Router KNX bearbeitet. Bei dieser Einstellung ist es nicht möglich, aus der Linie unterhalb des IPsecure Router KNX heraus in eine andere Linie hinein physikalisch adressierte Telegramme zu schicken, z.B. während der Programmierung.

Broadcast-Telegramme

Optionen: weiterleiten
sperren

Dieser Parameter legt fest, ob Broadcast-Telegramme weitergeleitet oder gesperrt werden.

- *weiterleiten*: Broadcast-Telegramme werden weitergeleitet.
- *sperren*: Broadcast-Telegramme werden nicht vom IPsecure Router KNX bearbeitet. Bei dieser Einstellung ist es nicht möglich, aus der Linie unterhalb des IPsecure Router KNX heraus in eine andere Linie hinein Broadcast-Telegramme zu schicken, z. B. während der Programmierung.

Der Parameter *Broadcast-Telegramme* gilt auch für „System Broadcast-Telegramme". Details siehe Kapitel, System Broadcast.

Telegrammbestätigung für Gruppentelegramme

Optionen: nur bei Weiterleitung
immer

Dieser Parameter legt fest, ob der IPsecure Router KNX Gruppentelegramme mit einem Telegramm bestätigen soll.

- *nur bei Weiterleitung*: Die Gruppentelegramme werden nur bestätigt (ACK senden), wenn sie vom IPsecure Router KNX auch auf das LAN weitergeleitet werden. Damit werden nur Telegramme bestätigt, die auch in der Filtertabelle des IPsecure Router KNX eingetragen sind.
- *immer*: Alle Gruppentelegramme auf dem KNX werden durch den IPsecure Router KNX bestätigt.

Bei freier Gruppenadresse gilt:

Hauptgruppen 0...13 => 1...28.671
Hauptgruppe 14...31 => 28.672...65.535

Hinweis
In der ETS 5 besteht die Möglichkeit, die Gruppenadressen nicht zwei- oder dreistufig zu vergeben, sondern frei. Wird die freie Gruppenadressansicht gewählt, entspricht Hauptgruppe 0...13 dem Untergruppenbereich 1...28.671 und Hauptgruppe 14...31 dem Untergruppenbereich 28.672...65.535. Details hierzu sind in der Hilfe der ETS nachzulesen.

3.2.1.2 Parameterfenster *LAN -> KNX*

Im Parameterfenster LAN -> KNX kann die Bearbeitung der Telegramme vom LAN-Netzwerk zum KNX-System festgelegt werden.

Gruppentelegramme Hauptgruppe 0...13

Optionen: filtern
weiterleiten
sperren

Dieser Parameter legt fest, ob Telegramme mit Gruppenadressen der Hauptgruppen 0 bis 13 gefiltert, weitergeleitet oder gesperrt werden sollen.

- *filtern*: Die Telegramme mit Gruppenadressen der Hauptgruppen 0 bis 13 vom LAN zum KNX werden gemäß der Filtertabelle, welche von der ETS automatisch berechnet wird, gefiltert.
- *weiterleiten*: Alle Gruppentelegramme der Hauptgruppen 0 bis 13 werden weitergeleitet, ohne Berücksichtigung der Filtertabelle.

Wichtig
Diese Einstellung ist nur für Inbetriebnahme und Diagnose sinnvoll. Im Normalbetrieb sollte diese nicht verwendet werden. Da durch diese Einstellung die KNX-Linien überlastet werden können, kann es zu einem Telegrammverlust kommen.

- *sperren*: Alle Gruppentelegramme vom LAN zum KNX werden gesperrt, ohne Berücksichtigung der Filtertabelle.

Gruppentelegramme
Hauptgruppe 14...31

Optionen: filtern
weiterleiten
sperren

Dieser Parameter legt fest, ob Telegramme mit Gruppenadressen der Hauptgruppen 14 bis 31 gefiltert, weitergeleitet oder gesperrt werden sollen.

- *filtern*: Die Telegramme mit Gruppenadressen der Hauptgruppen 14 bis 31 vom LAN zum KNX werden gemäß der Filtertabelle, welche von der ETS automatisch berechnet wird, gefiltert.
- *weiterleiten*: Alle Gruppentelegramme der Hauptgruppen 14 bis 31 werden weitergeleitet.

Wichtig
Diese Einstellung ist nur für Inbetriebnahme und Diagnose sinnvoll. Im Normalbetrieb sollte diese nicht verwendet werden. Da durch diese Einstellung die KNX-Linien überlastet werden können, kann es zu einem Telegrammverlust kommen.

- *sperren*: Es werden keine Gruppentelegramme der Hauptgruppen 14 bis 31 vom LAN zum KNX übertragen.

Physikalisch adressierte Telegramme

Optionen: filtern
sperren

Dieser Parameter legt fest, ob physikalisch adressierte Telegramme gefiltert oder gesperrt werden.

- *filtern*: Es werden nur die Telegramme vom LAN zum KNX übertragen, welche die Linie des IPsecure Router KNX zum LAN verlassen sollen.
- *sperren*: Physikalisch adressierte Telegramme werden nicht vom IPsecure Router KNX bearbeitet. Bei dieser Einstellung ist es nicht möglich, von der Hauptlinie in die KNX TP-Linie hinein physikalisch adressierte Telegramme zu schicken, z. B. während der Programmierung.

Broadcast-Telegramme

Optionen: weiterleiten
sperren

Dieser Parameter legt fest, ob Broadcast-Telegramme weitergeleitet oder gesperrt werden.

- *weiterleiten*: Broadcast-Telegramme werden weitergeleitet.
- *sperren*: Broadcast-Telegramme werden nicht vom IPsecure Router KNX KNX bearbeitet. Bei dieser Einstellung ist es nicht möglich, von der Hauptlinie in die KNX TP-Linie hinein Broadcast-Telegramme zu schicken, z. B. während der Programmierung.

Bei Übertragungsfehlern Telegramme wiederholen

Optionen: ja
nein
benutzerdefiniert

- *ja:* Wird bei der Übertragung eines Telegramms ein Fehler erkannt, wird das Telegramm bis zu drei Mal wiederholt
- *nein:* Die Übertragung wird nicht wiederholt.
- *benutzerdefiniert:* Das Verhalten kann für die unterschiedlichen Telegrammarten individuell eingestellt werden.

  Gruppenadressierte Telegramme wiederholen

  Optionen: ja
  nein

  - *ja:* Wird bei der Übertragung eines gruppenadressierten Telegramms ein Fehler erkannt, wird das Telegramm bis zu drei Mal wiederholt.
  - *nein:* Die Übertragung wird nicht wiederholt.

  Physikalisch adressierte Telegramme wiederholen

  Optionen: ja
  nein

  - *ja:* Wird bei der Übertragung eines physikalisch adressierten Telegramms ein Fehler erkannt, wird das Telegramm bis zu drei Mal wiederholt.
  - *nein:* Die Übertragung wird nicht wiederholt.

  Broadcast-Telegramme wiederholen

  Optionen: ja
  nein

  - *ja:* Wird bei der Übertragung eines Broadcast-Telegramms ein Fehler erkannt, wird das Telegramm bis zu drei Mal wiederholt.
  - *nein:* Die Übertragung wird nicht wiederholt.

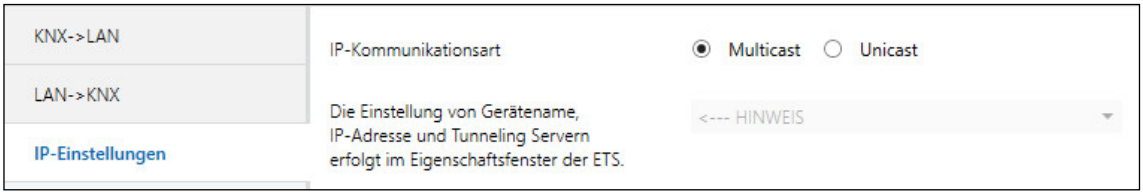
Bei freier Gruppenadresse gilt:

Hauptgruppen 0...13 => 1...28.671
Hauptgruppe 14...31 => 28.672...65.535

Hinweis
In der ETS 5 besteht die Möglichkeit, die Gruppenadressen nicht zwei- oder dreistufig zu vergeben, sondern frei. Wird die freie Gruppenadressansicht gewählt, entspricht Hauptgruppe 0...13 dem Untergruppenbereich 1...28.671 und Hauptgruppe 14...31 dem Untergruppenbereich 28.672...65.535. Details hierzu sind in der Hilfe der ETS nachzulesen.

3.2.1.3 Parameterfenster *IP-Einstellungen*

Im Parameterfenster *IP-Einstellungen* wird eingestellt, wie der IPsecure Router KNX über IP kommuniziert.



IP-Kommunikationsart

Optionen: Multicast
Unicast

Die IP-Kommunikationsart legt fest, welche Art von Telegrammen der IPsecure Router KNX auf das IP-Netzwerk sendet.

- *Multicast*: Dies ist die für KNXnet/IP von der KNX Association festgelegte Kommunikationsart für KNX-IP-Geräte. Diese Einstellung sollte so beibehalten werden und nur geändert werden, wenn durch das vorhandene Netzwerk die Notwendwendigkeit besteht, Telegramme als Unicast zu senden.

  Zur Einstellung der Routing Multicast Adresse siehe Routing Multicast Adresse,

- *Unicast*: Das Routing für dieses Gerät wird abgeschaltet.

  Diese spezielle Kommunikation ist nicht gemäß KNXnet/IP-Spezifikation. Zur Konfiguration wird das Theben IP-Tool benötigt.

  Die Kommunikationsart *Unicast* kann nicht verwendet werden, wenn das Gerät im KNX Secure-Modus betrieben wird. Wird bei aktiviertem KNX Secure-Modus *Unicast* ausgewählt, schaltet die ETS auf *Multicast* um. Die Parametrierung *Unicast* in der Applikation wird dann ignoriert.

  Um die Kommunikationsart *Unicast* zu verwenden, muss der KNX Secure-Modus in der ETS abgeschaltet werden.

Hinweis
Eine Beschreibung der Funktionen ist in der Onlinehilfe des IP-Tools zu finden.

Sowohl bei Auswahl *Multicast*, als auch bei Auswahl *Unicast* erscheint folgender Hinweis:

Die Einstellung von Gerätename,
IP-Adresse und Tunneling Servern
erfolgt im Eigenschaftsfenster der ETS.

Bei Auswahl *Unicast* erscheint zusätzlich folgender Hinweis:

Achtung! Diese Einstellung schaltet das Routing für dieses Gerät ab. Die IP-Telegramme werden nun als Unicast an bis zu 9 Zieladressen gesendet.

Die Unicast-Konfiguration erfolgt mit dem Theben IP-Tool.

Siehe Beschreibung Kommunikation Unicast, Kapitel KNX-Telegramme im Netzwerk,

Das IP-Tool kann kostenlos von unserer Homepage (www.theben.de/downloads) geladen werden.

Für das IP-Tool ist keine ETS und auch keine Installation des Falcon erforderlich.

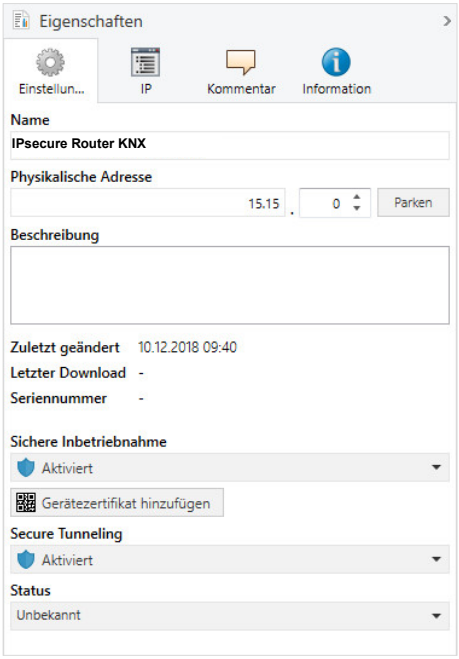
Die Systemanforderungen sind ein Windows-System ab Betriebssystemversion Windows 7 (Service Pack 3) und das .NET Framework ab Version 4.7.2.

Der integrierte Falcon 5.0 unterschützt nur USB und IP-Schnittstellen (kein RS232).

Hinweis
Eine Beschreibung der Funktionen ist in der Onlinehilfe des IP-Tools zu finden.

Wichtig
Es ist nicht möglich, die Unicast-Kommunikation bei aktiviertem KNX Secure-Modus zu nutzen. Ist der KNX Secure-Modus aktiviert und der Parameter *IP-Kommunikationsart* auf *Unicast* gesetzt, wird dennoch die Multicast-Kommunikation aktiviert. Bei der Parametrierung der Unicast Adressen über das IP-Tool wird ein entsprechender Hinweis angezeigt.

Die weitere Konfiguration der IP-Parameter (Gerätename, Zuweisung der IP-Adresse per DHCP oder fest) erfolgt im entsprechenden Eigenschaftenfenster der ETS.



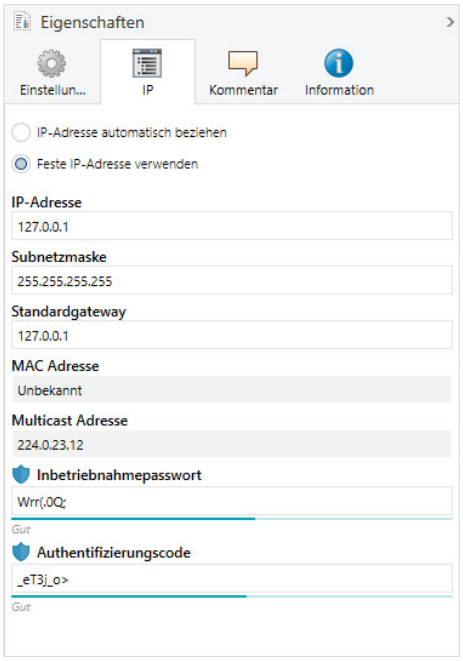
Im Eigenschaftsfenster *Einstellungen* kann der Gerätename eingetragen werden. Im Feld *Name* kann der Gerätename, der ins Gerät geladen wird, geändert werden.

Der Gerätename dient der Identifizierung des Geräts im LAN. Bei einer Suchanfrage, z. B. durch die ETS, meldet jedes KNXnet/IP-Gerät seinen Namen und kann darüber zugeordnet werden. So kann z. B. durch den Namen IPsecure Router KNX, EG, UV7 auch der Einbauort des Geräts mitgeteilt werden.

Hinweis
Bei Auslieferung lautet der Gerätename standardmäßig "IPsecure Router KNX". Nach dem ersten Download wird der Gerätename, der im Eigenschaftsfenster der ETS eingetragen wird, ins Gerät geladen.

Achtung
Es werden nur die ersten 30 Zeichen des Gerätenamens ins Gerät geladen, der Rest wird abgeschnitten.

Im Eigenschaftsfenster *IP* kann die IP-Adresse definiert werden.



Für die Einstellung der IP-Adresse stehen folgende Optionen zur Verfügung:

Optionen: IP-Adresse automatisch beziehen
Folgende IP-Adresse verwenden

- *IP-Adresse automatisch beziehen*: In der Standardeinstellung erwartet der IPsecure Router KNX die Zuweisung einer IP-Adresse durch einen DHCP-Server (dynamic host configuration protocol). Dieser Server vergibt auf Anfrage eine freie IP-Adresse an das Gerät. Ist kein DHCP-Server im Netzwerk verfügbar oder antwortet dieser nicht, so startet das Gerät eine Auto-IP-Prozedur. Es vergibt sich selbst eine Adresse aus dem reservierten Bereich für Auto-IP-Adressen (169.254.xxx.yyy).

  Zu DHCP: siehe Kap. Vergabe der IP-Adresse,

- *Feste IP-Adresse verwenden*: Ist kein DHCP-Server im Netzwerk installiert oder soll die IP-Adresse immer gleich sein, so kann sie auch fest vergeben werden. Bei der Vergabe von festen IP-Adressen ist darauf zu achten, dass jedes Gerät eine unterschiedliche IP-Adresse erhält.

Hinweis
Die Routing Multicast Adresse wird hier nur angezeigt. Zur Einstellung der Routing Multicast Adresse siehe Routing Multicast Adresse,.

Hinweis
Die MAC-Adresse wird nach einem Download aus dem Gerät ausgelesen. Zusätzlich ist die MAC-Adresse auf dem Gerät aufgebracht und kann alternativ über das IP-Tool ermitelt werden.

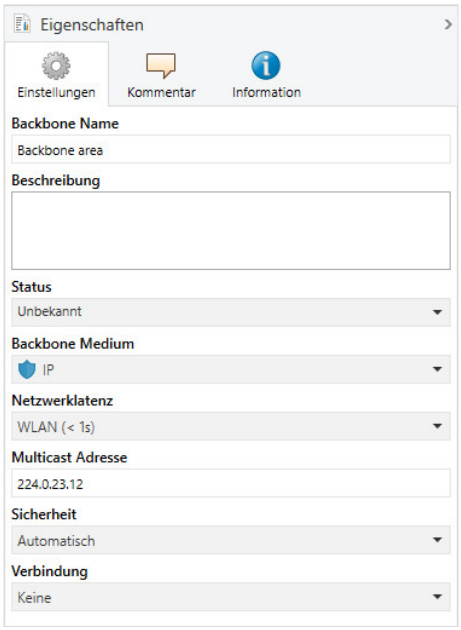
Hinweis
Eine Beschreibung der Funktionen ist in der Onlinehilfe des IP-Tools zu finden.

Routing Multicast Adresse
(Standard = 224.0.23.12)

Optionen: 224.0.23.12

Die Routing Multicast Adresse legt die Zieladresse der IP-Telegramme des IPsecure Router KNX fest. Die voreingestellte Adresse 224.0.23.12 ist die für KNXnet/IP von der KNX-Association zusammen mit der IANA festgelegte Adresse für KNX-IP-Geräte. Diese Adresse sollte so beibehalten werden und nur geändert werden, wenn durch das vorhandene Netzwerk die Notwendwendigkeit besteht, eine andere Adresse aus dem Bereich 224.0.0.0 bis 239.255.255.255 (reservierter Bereich für Multicast-Adressen) zu verwenden.

Die Einstellung der Routing Multicast Adresse erfolgt in der ETS in der Ansicht *Topologie* (Auswahl der Topologie, dann kann im Eigenschaftenfenster auf dem Reiter *Einstellungen* die Routing Multicast Adresse eingestellt werden):



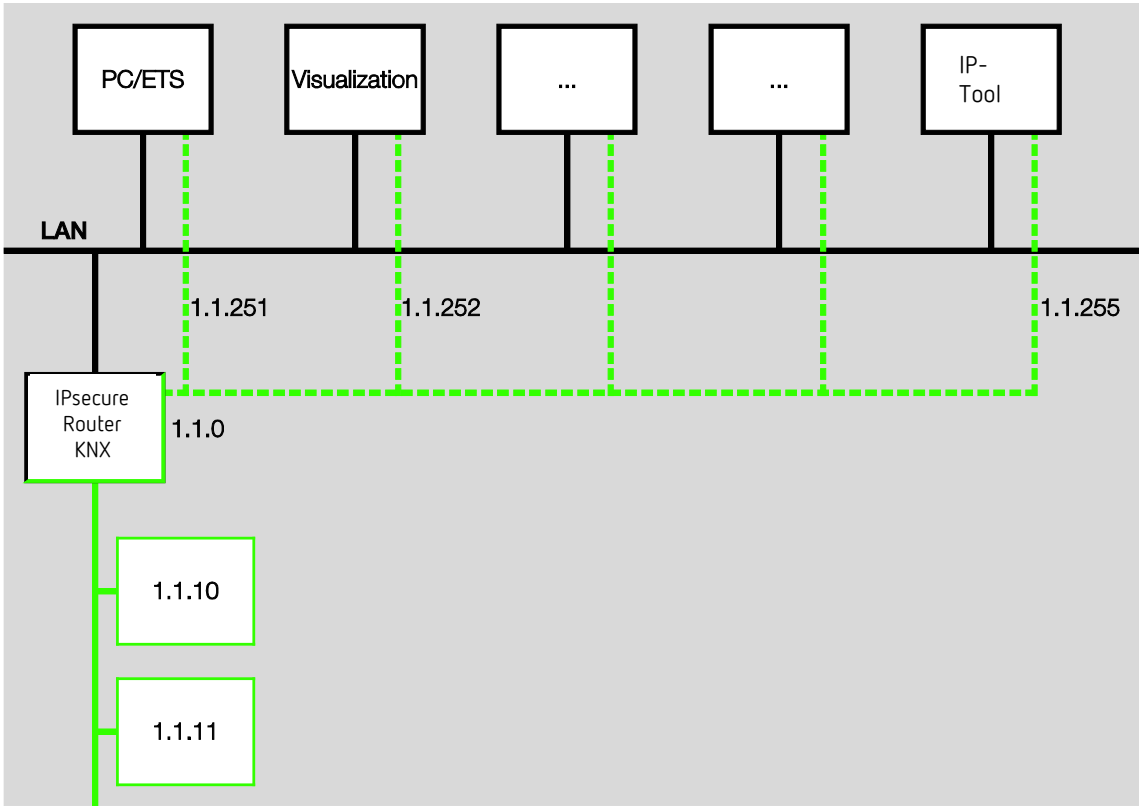
Wichtig
Alle IPsecure Router KNX oder anderen KNXnet/IP-Geräte, die Telegramme am IP-Netzwerk austauschen sollen, müssen die gleiche Routing Multicast-Adresse verwenden.

3.3 Kommunikationsobjekte

Der IPsecure Router KNX hat keine KNX-Kommunikationsobjekte.

3.4 Die Verwendung der integrierten Tunneling Server

Der IPsecure Router KNX bietet 5 zusätzliche physikalische Adressen, die für eine Tunneling-Verbindung verwendet werden können. Diese sogenannten Tunneling Server können mit der ETS als Programmierschnittstelle oder mit einem anderen Client, z.B. einer Visualisierung, verwendet werden.



Bei Tunneling verbindet sich ein Client mit einer Buslinie. Das Tunneling-Verfahren verwendet UDP, beinhaltet aber eine Sicherungsschicht, so dass im Fehlerfall Telegramme wiederholt werden. Ab ETS 5 wird Tunneling V2 unterstützt. Hier wird anstatt UDP TCP verwendet und die Sicherungsschicht des TCP für die Übertragung verwendet.

Hinweis
Die physikalische Adresse für die Tunneling-Verbindung muss in die Topologie passen. Daher müssen die Adressen aus dem Adressbereich der untergeordneten Linie gewählt werden. Bei Auslieferung haben alle Tunneling Server die Adresse 15.15.100. In der ETS 5 werden die ersten fünf freien Adressen in der Linie automatisch vergeben, nachdem der Router in eine Linie eingefügt wurde.

Die Tunneling Server können auch mit KNX Secure verschlüsselt werden. Ist der KNX Secure-Modus aktiviert, benötigt ein Client, das in der ETS vergebene Passwort.
Details siehe Kapitel, KNX Secure.

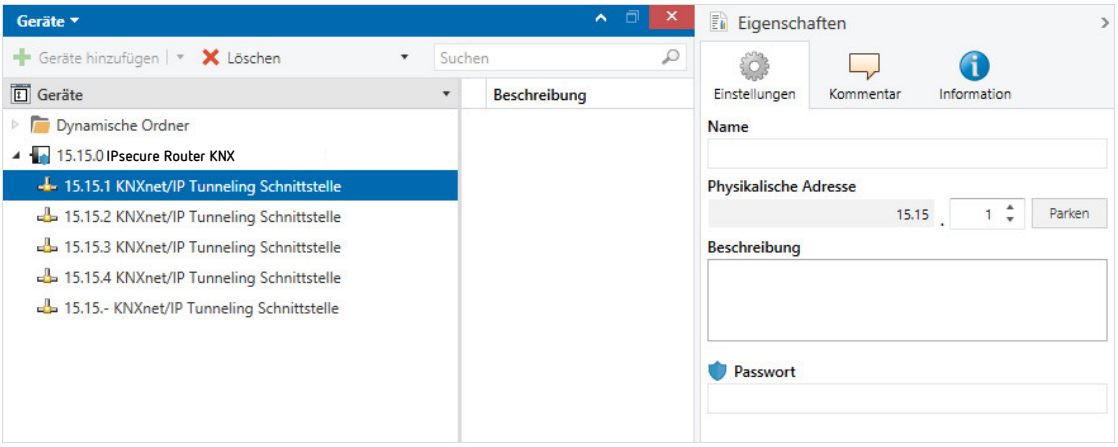
3.4.1 Einstellungen in der ETS 5

In der ETS steht für die Einstellung der zusätzlichen physikalischen Adressen ein zusätzliches Eigenschaftenfenster zur Verfügung.

Die ETS reserviert automatisch nach Einfügen des Routers in die Linie die ersten fünf freien Adressen dieser Linie für die Tunneling Server des Routers. Dies ist eine Eigenschaft der ETS und kann nicht geändert werden.

Nach dem ersten Download stehen die Adressen im Gerät zur Verfügung.

Ist dies nicht erwünscht, kann die Einstellung manuell im Eigenschaftenfenster geändert werden:



Zum Ändern der Adresse die aktuelle Geräteadresse bzw. zusätzliche Adresse markieren und mit den Pfeiltasten nach oben oder unten die gewünschte Ziffer auswählen. Durch Markieren einer anderen Adresse wird die geänderte Adresse gespeichert.

Die geänderten Adressen werden erst nach einem Download vom Gerät übernommen.

Parken

Ist für einen Tunnel die Option Parken aktiviert, so erhält dieser Tunnel die Adresse 15.15.255.

Sofern bei allen Tunneling Servern die Option Parken gewählt wird, erhalten alle Tunneling Server die Adresse 15.15.255. Damit ist nur ein Tunneling Server verfügbar.

3.5 KNX Secure

Der IPsecure Router ist ein KNX-Gerät nach dem KNX Secure-Standard. D. h. das Gerät kann sicher in Betrieb genommen werden, die Kommunikation auf dem IP-Backbone ist sicher (alle KNX-IP-Geräte müssen dazu das KNXnet/IP Security-Protokoll unterstützen) und die Tunnelingverbindungen sind verschlüsselt.

Bei der Inbetriebnahme des Geräts sind daher folgende Dinge zu berücksichtigen.

- Sobald ein KNX Secure-Gerät in ein Projekt importiert wird, muss zwingend ein Projektpasswort vergeben werden. Das Projekt ist damit gegen unbefugten Zugriff geschützt.
  Das Passwort muss sicher aufbewahrt werden – ohne dieses Passwort ist ein Zugriff auf das Projekt nicht möglich (auch nicht durch die KNX-Association)!
- Bei der Inbetriebnahme eines KNX Secure-Gerätes (erster Download) ist ein Inbetriebnahmeschlüssel erforderlich. Dieser Schlüssel (FDSK = Factory Default Setup Key) ist auf einem Aufkleber seitlich auf dem Gerät aufgebracht und muss vor dem ersten Download in die ETS importiert werden.
  - Beim ersten Download des Gerätes öffnet sich in der ETS ein Fenster, die zur Eingabe des Schlüssels auffordert. Das Zertifikat kann alternativ auch mit einem QR-Scanner eingelesen werden (empfohlen).
  - Alternativ können auch die Zertifikate aller Secure-Geräte vorab in die ETS eingegeben werden. Dies erfolgt auf der Projektübersichtsseite auf dem Reiter „Sicherheit".
  - Der FDSK-Aufkleber ist doppelt auf dem Gerät aufgebracht. Ein Teil kann für die Projektdokumentation verwendet werden, der andere kann auf dem Gerät verbleiben.
    Ohne den FDSK kann das Gerät nach einem Reset nicht mehr im KNX Secure-Modus betrieben werden!

Der FDSK wird nur für die Erstinbetriebnahme benötigt. Danach vergibt die ETS neue Schlüssel.
Der FDSK wird erst wieder benötigt, wenn das Gerät auf Werkseinstellungen zurückgesetzt wurde (z. B. wenn das Gerät in einer anderen Anlage mit einem anderen ETS Projekt verwendet werden soll).

Die ETS vergibt an alle KNX IP Secure-Geräte im Projekt den „Backbone" Schlüssel und erzeugt auch für jeden Tunneling Server separate Passwörter. Die Passwörter können bei Bedarf geändert werden.
Die Schlüssel werden von der ETS erzeugt und verwaltet. Bei Bedarf können Schlüssel und Passwörter exportiert werden (z. B. falls ein Client auf einen der Tunnel zugreifen möchte).

Sofern erforderlich, kann der Router auf Werkseinstellungen zurückgesetzt werden, Siehe Kapitel 2.4. Entladen des Gerätes und Rücksetzen auf Werkseinstellungen.

4 Planung und Anwendung

4.1 Der IPsecure Router KNX im Netzwerk

Der IPsecure Router KNX ist für den Einsatz in 10/100-BaseT-Netzwerken nach IEEE 802.3 ausgelegt. Das Gerät besitzt eine AutoSensing-Funktion und stellt die Übertragungsgeschwindigkeit (10 oder 100 MBit) automatisch ein.

4.1.1 Vergabe der IP-Adresse

DHCP/AutoIP

Die IP-Adresse des Geräts kann von einem DHCP-Server bezogen werden. Dazu ist die Einstellung einer automatischen Vergabe der IP-Adresse in der ETS nötig, siehe IP-Einstellungen. Wird bei dieser Einstellung kein DHCP-Server gefunden, startet das Gerät eine AutoIP-Prozedur und vergibt sich selbständig eine IP-Adresse aus dem Bereich 169.254.xxx.yyy.

Die IP-Adresse, die das Gerät beim Starten erhält (per DHCP oder AutoIP), wird beibehalten bis

- zum nächsten Neustart (Aus-/Einschalten oder Neuprogrammierung)
- ein DHCP-Server verfügbar ist
- zum Ablauf des des DHCP Lease

Beim Starten ist kein DHPC-Server vorhanden

Sollte beim Starten des IP-Router Secures kein DHCP-Server vorhanden sein, vergibt sich das Gerät selbst eine AutoIP-Adresse. Der Router sucht dann zyklisch (drei Telegramme im Abstand von 3 Sekunden, anschließend 20 Sekunden Pause) nach einem DHCP-Server. Sobald wieder ein Server vorhanden ist, wird die vom DHCP-Server zugeteilte Adresse verwendet.

DHCP-Server fällt aus (Gerät hat IP-Adresse bereits von DHCP bezogen)

Bis zum Ende der Lease-Zeit (Gültigkeitsdauer der IP-Adresse, wird bei der Vergabe der IP-Adresse vom DHCP-Server festgelegt) laufen die Anfragen zur Verlängerung der Nutzungsrechte dieser IP-Adresse ins Leere. Die IP-Adresse wird weiter verwendet.

Am Ende der Lease-Zeit oder nach einem Download suchen sich die Geräte eine AutoIP-Adresse.

Feste IP-Adresse

Soll die IP-Adresse des IPsecure Router KNX fest zugeordnet sein, so kann in der ETS eine feste IP-Adresse (sowie Subnet-Maske und Standard Gateway) eingestellt werden, siehe Parameterfenster IP-Einstellungen.

4.1.2 KNX-Telegramme im Netzwerk (Routing)

Hinweis
Bei der Auslegung des KNX-Systems ist zu beachten, dass die Anzahl der übertragenen Telegramme auch beim Einsatz des IPsecure Router KNX s begrenzt ist. Durch die hohe Übertragungsrate auf IP-Seite (10/100 MBit/s) können bei hohem Datenaufkommen systembedingt in der TP1-Linie (9,6kBit/s) Telegramme verloren gehen.

Multicast

Multicast bezeichnet die Kommunikation eines Senders mit einer Gruppe von Empfängern.

Der IPsecure Router sendet die KNX-Telegramme verpackt als UDP/IP-Telegramme auf das IP-Netzwerk und alle IPsecure Router, bei denen die gleiche Multicast-Adresse parametriert ist, empfangen dieses Telegramm und werten es aus. Sofern ein Telegramm für die entsprechende Sublinie bestimmt ist, routet der IPsecure Router das Telegramm in die Linie, ansonsten wird es verworfen.

Der IPsecure Router sendet Telegramme von KNX auf das IP-Netzwerk gemäß KNXnet/IP-Protokollspezifikation. Diese Telegramme werden in der Standardeinstellung als Multicast-Telegramme auf die Multicast-IP-Adresse 224.0.23.12 Port 3671 gesendet. Diese Multicast-IP-Adresse ist die für KNXnet/IP von der KNX Association zusammen mit der IANA festgelegte Adresse für KNX IP-Geräte. Diese Adresse sollte so beibehalten und nur geändert werden, wenn durch das vorhandene Netzwerk die Notwendwendigkeit besteht, eine andere Adresse zu verwenden.

Damit mehrere IPsecure Router im Netzwerk miteinander kommunizieren können, muss zwischen den Geräten eine Multicast-Kommunikation möglich sein. Je nach Art des Netzwerks und der Einstellung der verwendeten Netzwerkkomponenten, z.B. Router, Switch oder Firewall, muss die Multicast-IP-Adresse 224.0.23.12 eventuell erst noch explizit freigeschaltet werden. Bitte sprechen Sie dazu mit dem Netzwerkadministrator.

Weitere Informationen siehe:
Kap. 3.2.3: Parameterfenster IP-Einstellungen

Unicast

Unicast bezeichnet allgemein die Kommunikation zwischen einem Sender und einem Empfänger. Der Router stellt also zu jedem IP-Router innerhalb der Unicast-Gruppe eine Kommunikationsverbindung her.

Falls in einem Netzwerk keine Multicast-Kommunikation möglich ist, können die IP-Router auch über Unicast miteinander kommunizieren. Bis zu zehn IP-Router können zu einer Unicast-Gruppe zusammengefasst werden. Die Unicast-Gruppe kann aus IP Router KNX und/oder IPsecure Router KNX bestehen, auch gemischt. Jedem Router werden dann neun IP-Adressen zugewiesen, an die er seine Telegramme versendet.

Die Konfiguration dieser Unicast-Gruppe erfolgt einfach und automatisch mit dem IP- Tool.

Es ist auch möglich, einen Client (z. B. eine Visualisierung) mit dieser Unicast-Gruppe zu verknüpfen. In diesem Fall ist eine der zehn Unicast-Adressen vom Client belegt, und es können noch neun IPsecure Router verknüpft werden.

Die genaue Beschreibung, wie die Konfiguration mit dem IP-Tool funktioniert, ist in der Hilfe des IP-Tools zu finden (siehe Kap. Das Theben IP-Tool).

Hinweis
Sobald in der ETS unter IP-Kommunikationsart der Parameter auf *Unicast* umgestellt wird, ist die Funktion *Multicast* deaktiviert. Die Geräte können dann nicht mehr über Multicast Routing, sondern nur noch über einen der integrierten Tunneling Server oder eine separate Programmierschnittstelle programmiert werden. Allerdings wird die Kommunikationsart erst umgestellt, wenn die Parametrierung mit dem i-bus® Tool erfolgt ist. Bis dahin steht der Router intern noch auf Multicast. Dies hat den Vorteil, dass der Router über Multicast programmiert werden kann.

Weitere Informationen siehe:
Parameterfenster IP-Einstellungen

Hinweis
Eine Beschreibung der Funktionen ist in der Onlinehilfe des IP-Tools zu finden.

Hinweis
• Bei der Verwendung der Kommunikationsart Unicast muss sicher gestellt sein, dass sich die IP-Adresse des Routers im laufenden Betrieb nicht ändert. Dazu sollte entweder eine feste IP-Adresse vergeben werden, oder eine entsprechende Einstellung beim DHCP-Server erfolgen. • Durch die ETS werden bei Änderung der physikalischen Adresse alle IP-Parameter ebenfalls aktualisiert. D.h. auch wenn nur die Option Programmieren physikalische Adresse in der ETS ausgewählt wird, werden der Gerätename, die Multicast-Adresse, IP-Kommunikationsart (DHCP, AutoIP, fest), IP-Adresse, Subnetzmaske, Standard-Gateway und alle Tunneling-Adressen neu geladen. Sofern sich die IP-Adresse dabei ändert, muss die Unicast-Konfiguration mit dem IP-Tool erneut durchgeführt werden.

Die Kommunikationsart *Unicast* kann nicht verwendet werden, wenn das Gerät im KNX Secure-Modus betrieben wird. Wird bei aktiviertem KNX Secure-Modus *Unicast* ausgewählt, schaltet die ETS auf *Multicast* um. Die Parametrierung *Unicast* in der Applikation wird dann ignoriert.

Um die Kommunikationsart *Unicast* zu verwenden, muss der KNX Secure-Modus in der ETS abgeschaltet werden.

4.1.3 Überwachung

Die Überwachung einer Tunnelingverbindung sollte bei einer aktiven Tunneling Verbindung über ein „CONNECTIONSTATE_REQUEST" erfolgen, ist aber auch per T-Connect möglich. Die Überwachung eines Gerätes über T-Connect kann Nachteile haben, z. B. bei Überwachungs-, Programmier- oder Scanvorgängen in der Linie.

System Broadcast

In einer KNX-Anlage müssen alle IP-Geräte, die miteinander kommunizieren wollen, die gleiche Multicast-Adresse nutzen. Standardmäßig wird die Adresse 224.0.23.12 Port 3671 verwendet, siehe Multicast.

Wird in einer Anlage die Multicastadresse geändert, kann es bei der Inbetriebnahme u. U. zu Problemen kommen. Wird z. B. zuerst die Multicastadresse des nächstgelegenen Routers geändert, schaltet dieser nach der Programmierung auf die neue Mulicast-Adresse um. Der Rest der Anlage ist für ihn dann nicht mehr erreichbar und die übrigen Router in der Anlage können nicht mehr programmiert werden.

Diese Geräte kann die ETS dann über die „System Broadcast Adresse" erreichen. Über die System Broadcast Adresse kann die Multicast-Adresse aller KNX IP-Geräte und auch der Backbone Schlüssel geändert werden. Dies funktioniert nur, wenn das Gerät entweder nicht im KNX Secure-Modus betrieben wird oder der ETS der Backbone Schlüssel bekannt ist.

Das Weiterleiten von System Broadcast Telegramme kann über den Parameter *Broadcast-Telegramme weiterleiten/sperren* eingestellt werden, d.h. dieser Parameter ist für (Standard) Broadcast-Telegramme und System Broadcast-Telegramme wirksam.

4.1.4 IGMP

Das Gerät unterstützt IGMP snooping in der Version V3.

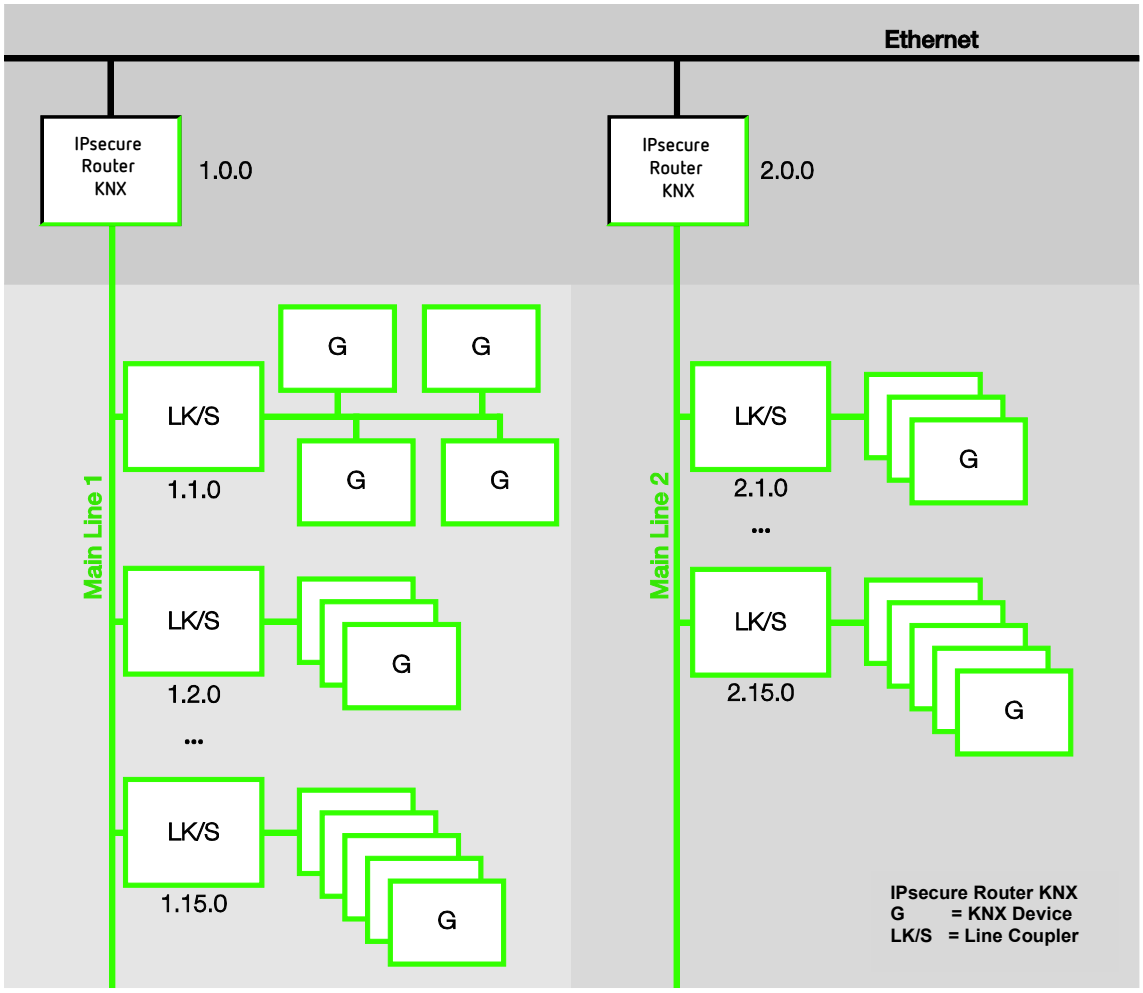
IGMP snooping ist die Fähigkeit Multicast Routing Verkehr nur dorthin weiterzuleiten, wo er auch benötigt wird. Die IT-Infrastruktur und das Gerät müssen die gleiche IGMP-Version benutzen, sonst funktioniert der IGMP-Mechanismus nicht.

Zum Freischalten einer Multicast Adresse meldet sich das Gerät mit einem Membership Report bei dieser Multicast Adresse an.

4.1.5 IPsecure Router KNX als Bereichskoppler

Der IPsecure Router KNX kann in KNX-Anlagen die Funktion eines Bereichskopplers übernehmen. Dafür muss er die physikalische Adresse eines Bereichskopplers (1.0.0...15.0.0) erhalten. In einem ETS-Projekt können bis zu 15 Bereiche mit Bereichskopplern angelegt werden.

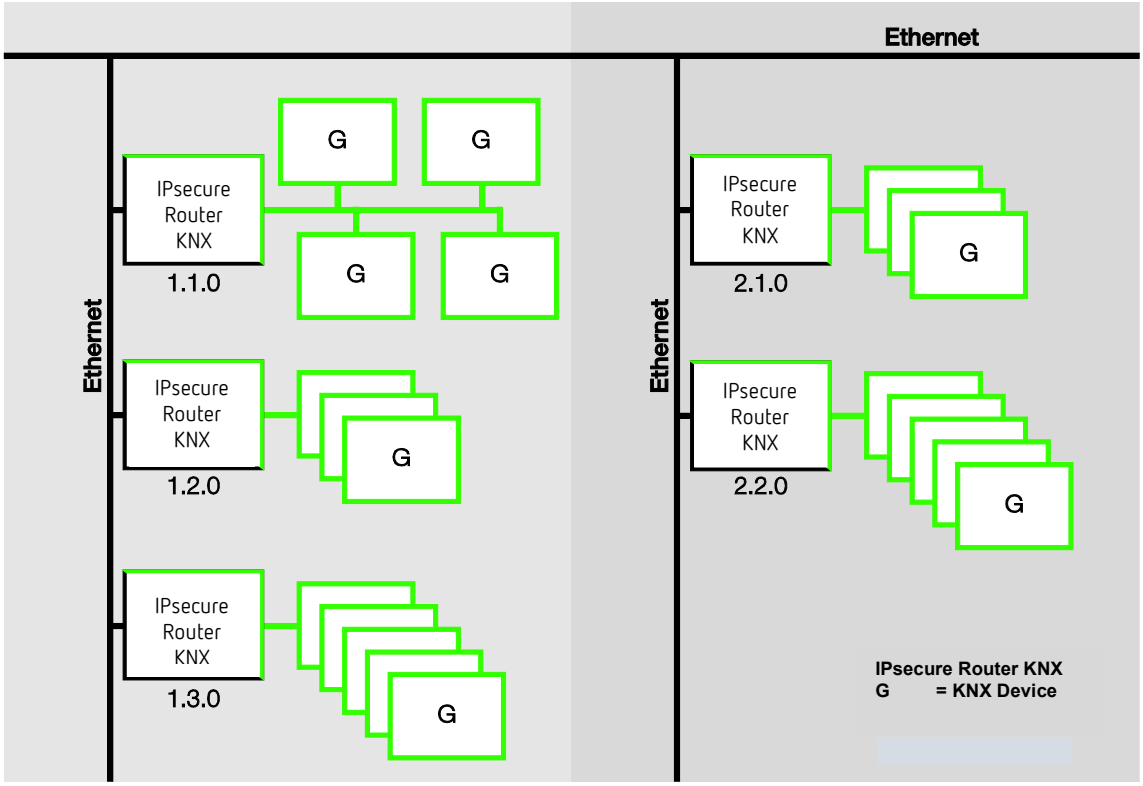
Das folgende Bild zeigt diese Topologie mit IPsecure Router KNX n als Bereichskoppler und KNX-Linienkoppler (LK/S).



4.1.6 IPsecure Router KNX als Linienkoppler

Der IPsecure Router KNX kann in KNX-Anlagen die Funktion eines Linienkopplers übernehmen. Dafür muss er die physikalische Adresse eines Linienkopplers (1.1.0...15.15.0) erhalten.

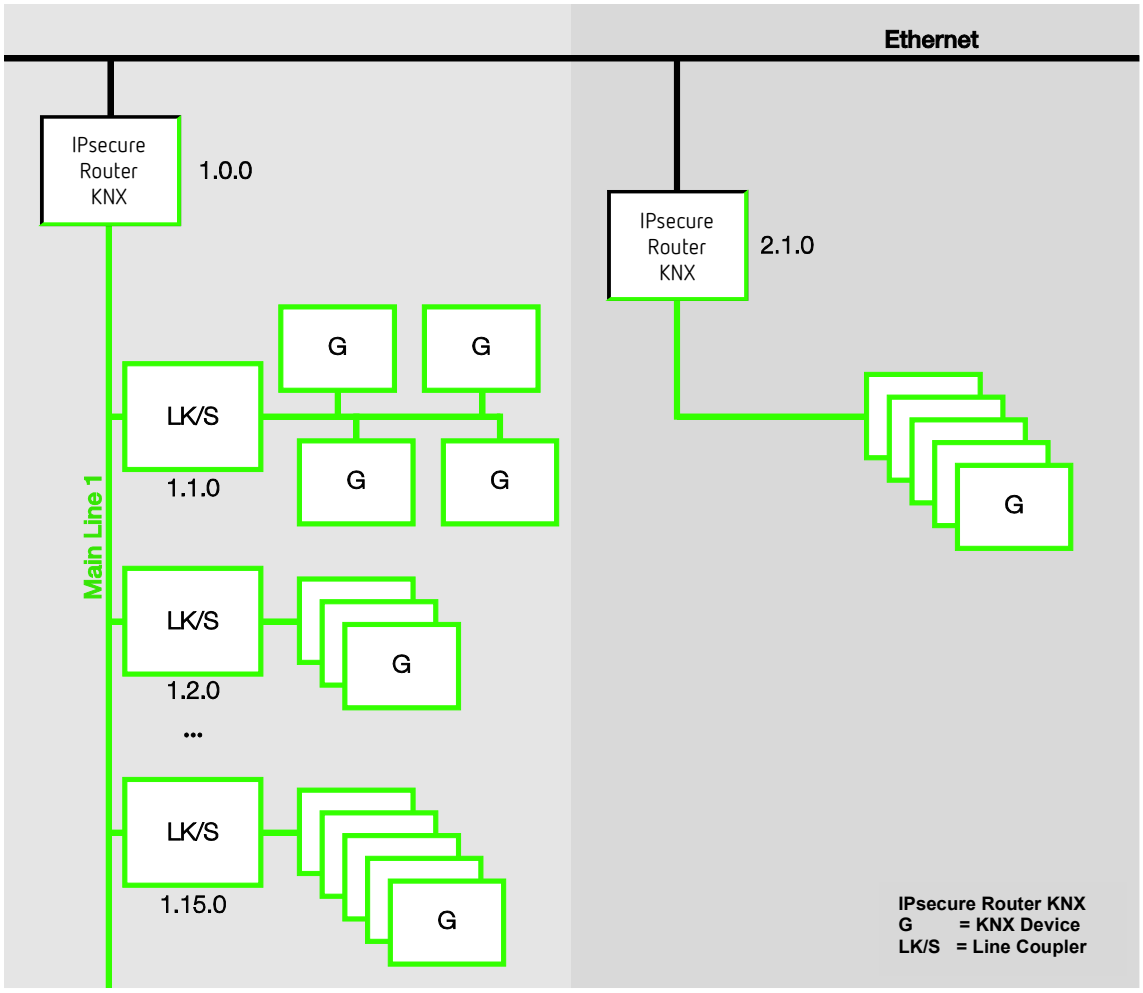
Das folgende Bild zeigt diese Topologie mit IPsecure Router KNX als Linienkoppler.



4.1.7 Gemischte Topologie

Ist es innerhalb einer KNX-.Anlage nötig, den IPsecure Router KNX an einer Stelle, z. B. Bürohaus, als Bereichskoppler und an anderer Stelle, z. B. entfernte Tiefgarage, als Linienkoppler einzusetzen, so ist dies möglich.

Dabei muss nur beachtet werden, dass der IPsecure Router KNX als Linienkoppler die Linienkoppleradresse aus einem freien Bereich verwendet, z. B. hier im Bild.

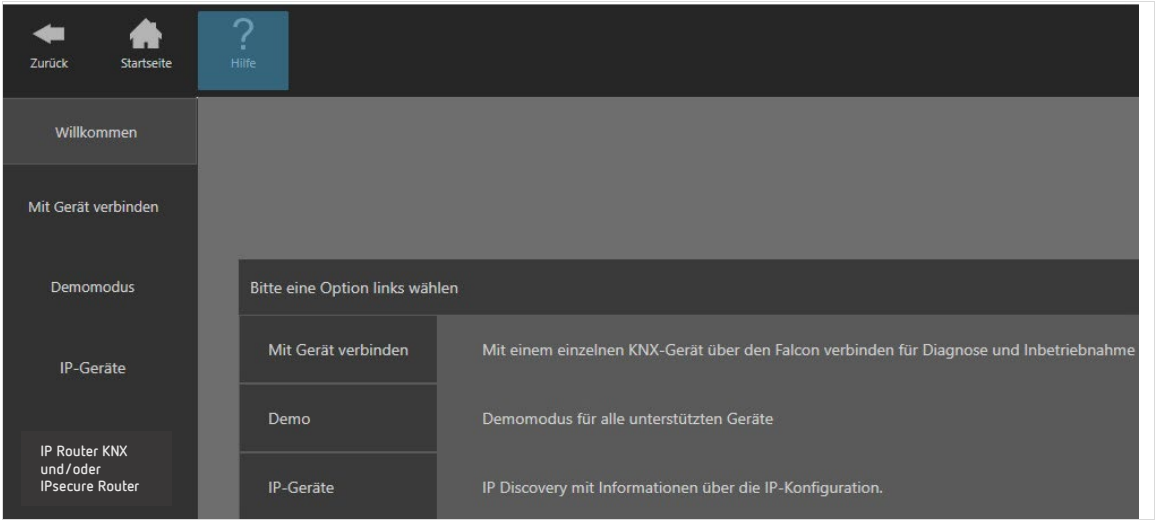


4.2 Das Theben IP-Tool

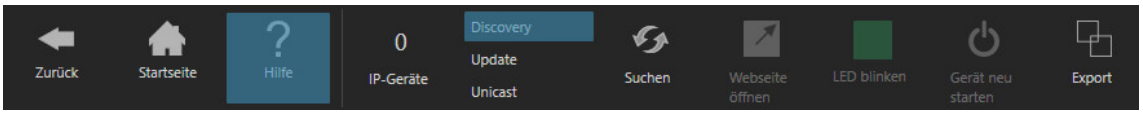
Das Theben IP-Tool wird benötigt, um bestimmte Funktionen bei den Theben IP-Geräten einzustellen.

Es erleichtert die Inbetriebnahme auf IP-Seite.

Klicken Sie auf der Startseite des IP- Tools auf *Verbinden*, in dem danach erscheinenden Fenster dann auf *IP-Geräte*.



Multifunktionsleiste: Umschalten zwischen Discovery, Firmware Update und Unicast



Klicken Sie auf die entsprechende Schaltfläche, um den Modus *Discovery*, *Update* oder *Unicast* auszuwählen.

Discovery

Wählen Sie in der Multifunktionsleiste den Modus *Discovery*. Diese Funktion dient zum Auffinden und Anzeigen von IP-Geräten im Netzwerk. Wird der IP-Router im KNX Secure-Modus betrieben, werden nicht alle Informationen angezeigt.

Hinweis
Eine Beschreibung der Funktionen ist in der Onlinehilfe des IP-Tools zu finden.

Firmware Update

Im KNX Secure-Modus kann das Gerät nicht mit dem IP- Tool aktualisiert werden.
Das Firmwareupdate kann in diesem Fall nur mit der ETS App „KNX Bus Update" erfolgen,
die kostenlos im KNX Online Shop geladen werden kann.

Wählen Sie in der Multifunktionsleiste den Modus *Update*. Sofern es einmal notwendig sein sollte, kann mit dieser Funktion die Firmware aktualisiert werden.

Wichtig
Die Firmware muss vorab aus dem Internet geladen werden (*www.theben.de/downloads)*. Dazu verbindet sich das IP-Tool **bei bestehender Internetverbindung** mit einem Server. Für die Aktualisierung der Geräte auf der Anlage ist dann keine Internetverbindung mehr notwendig.

Wichtig
Während des Updatevorgangs muss zusätzlich zum IP-Netzwerk (LAN) auch der KNX-Bus (TP) angeschlossen sein, damit die KNX-Parameter korrekt wiederhergestellt werden können. Andernfalls schlägt der Updatevorgang fehl. Es muss sichergestellt werden, dass während des Updatevorgangs kein Spannungsausfall (KNX oder IP) auftritt, da ansonsten das Gerät zerstört werden kann.

Hinweis
Eine Beschreibung der Funktionen ist in der Onlinehilfe des IP-Tools zu finden.

Hinweis
Für den Updatevorgang muss das IP-Tool mit Administratorrechten ausgeführt werden.

Unicast

Wählen Sie in der Multifunktionsleiste den Modus *Unicast*.

Diese Funktion ist nur verfügbar, wenn vorher in der ETS-Applikation der Parameter IP-Kommunikationsart auf *Unicast* umgestellt worden ist. Parametrierung, siehe Parameterfenster IP-Kommunikationsart

Hinweis
Eine Beschreibung der Funktionen ist in der Onlinehilfe des IP-Tools zu finden.

IPsecure Router KNX
Third party software components, notices and OSS license texts

A Anhang

Third party software components, notices and OSS license texts

Inhaltsverzeichnis

IPsecure Router KNX
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- 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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- glibc (v2.11.1)

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- binutils (v2.21)

- gdbserver (v7.2.50.20100908-cvs)

- gmplib (v5.0.4)

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- uclibc (v0.9.31.1)

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- popt (v1.16)

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- libgcc (v4.5.1)

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- AT91Bootstrap 1.9 (v1.9)

- dropbear sshd (v2012.55)

- libpcap (v1.2.1)

- libxml2 (v2.7.8)

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- OpenSSL (v1.0.1g)

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- util Linux (v2.20.1)

- zlib (v1.2.6)

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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!

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.

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=====

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=====

sshpty.c is taken from OpenSSH 3.5p1,

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=====

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.

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

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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.)

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
```

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REPORTING BUGS: Again, see gdb/README, binutils/README, etc., for info

on where and how to report problems.

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/mailing-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'

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.

* 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
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.

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

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

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.

* 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

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 occured.

* 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.)

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.

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

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) cpmod 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
(use [.macro32]unzip.exe to extract). A PRIMOS executable is available
in ftp://ftp.lysator.liu.se/pub/primos/run/gzip.run.

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.

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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Inc.

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Documentation License'' file as part of this distribution.

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.

Compilation and installation

==========

In order to compiler 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'.

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

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.

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

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	HPUX
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

| 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.

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\"

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".

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 Octeon 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.

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.

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.

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>.

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 ffitest.c for sparc builds.

1.08 Oct-15-96

Fixed n32 problem. Many clean-ups.

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.

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

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.

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).

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.

coderules.txt Coding style rules --- please read if you contribute code.

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.

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.

LEGAL ISSUES

==========

In plain English:

1. We don't promise that this software works. (But if you find any bugs,
   please let us know!)
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.

In legalese:

The authors make NO WARRANTY or representation, either express or implied,
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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
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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
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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
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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
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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,

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."

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.ijg.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...

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.

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.

ARCHIVE LOCATIONS

==========

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/.

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

ACKNOWLEDGMENTS

==========

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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.)

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.

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);
```

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);
```

```
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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modification, are permitted provided that the following conditions
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ABBpower , at91ft12, at91gpbr hardware driver (v1.0):

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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.

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, Tilera 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

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.

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.

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.

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

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

```
                    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
```

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.

- 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.

- 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!

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

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.

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.

- 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 *0xXXXXXXXX". (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.

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 |
   ***************************************************************
```

```
**********************************************************************
| 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.

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:

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.

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.

(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 lsof 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.

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?

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.

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.

Old Dialect Support

==========

Remnants of source code and binaries for dialects for which lsof 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.

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.)

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.

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

Vic Abell <abe@purdue.edu>

September 27, 2011

LibXml2 (v2.7.8):

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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 <ecki@debian.org> and

now maintained by Michael Meskes <meskes@debian.org>.

This package was put together by me, Bernd Eckenfels <ecki@debian.org>,

from the sources, which I obtained from

http://charm.cs.uiuc.edu/~jyelon/software.html

The debian/* Files are based on Ian Jacksons hello Package.

All patches by me are subject to the GPL.

Original Copyright from memstat.c:

```
 * This software copyright 1997 Joshua M. Yelon.
 * Distribution subject to the terms of the GPL.
```

On Debian GNU/Linux systems, the complete text of the GNU General

Public License can be found in `/usr/share/common-licenses/GPL'.

Ncurses (v5.7):

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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:

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-widec 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.

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

`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.

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).

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), captoinfo(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.

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.

OpenSSL (v1.0.1g):

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==========

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*

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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

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

Emain domain: freemail.hu

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STACK-LESS JUST-IN-TIME COMPILER

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THE C++ WRAPPER FUNCTIONS

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End

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.

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
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.

** 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.

** 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.

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.cygnus.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
<ftp://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.

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'.

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.

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 sorted 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.

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>.

* Copying

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Local Variables:

mode: outline

paragraph-separate: "[]*$"

version-control: never

End:

---

u-boot (v2010.09):

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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 lincenses 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 Lincense 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 Lincense Identifiers here; these are available at [2].

[1] http://spdx.org/

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

uClibc (v0.9.31.1):

A C library for embedded Linux

uClibc (aka µClibc/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 µClinux) 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

- 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

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

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/

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

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:

* 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.

For example normal system (NSS modules are available):

```
# ./mount.static -v -f -n -ouid=kzak /mnt/foo
LABEL=/mnt/foo on /mnt/foo type vfat (rw,uid=500)
                                    ^^^^^^^
```

and without NSS modules:

```
# chroot . ./mount.static -v -f -n -ouid=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
```

```
// 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 {
```

```
//! 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;
};
```

```
//! 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(){};
```

```
 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_
```

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.

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>, or to Gilles Vollant <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> wrote an article about zlib for the Jan. 1997 issue of Dr. Dobb'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/ .

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.

- 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
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Version 2.1, February 1999

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Version 3, 29 June 2007

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