Software Manual Linux
(Deutsch)

Version 1.0

Stand: 10.11.2020

Inhaltsverzeichnis

1 Einleitung

Dieses Handbuch enthält die allgemeine Softwaredokumentation für Janz Tec Systeme.

Nicht jedes System enthält alle in diesem Handbuch beschriebenen Features.
Standardmäßig wird in den Janz Tec Systemen ein **Debian**-Image verwendet.

Die von Ihrem System verwendete Imagenummer finden Sie unter **/root/imageversion.txt**.

Wenn Sie weitere Informationen oder Hilfe benötigen, nutzen Sie unser Service-Desk oder wenden Sie sich an unseren Support.

Die allgemeinen Servicebedingungen finden Sie unter:

https://www.janztec.com/software-lizenzbedingungen/

Sie erreichen uns unter: **support@janztec.com**

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2 Sicherheitshinweise

Verbinden Sie dieses Gerät nicht mit dem Internet, solange keine entsprechenden Sicherheitsvorkehrungen gegen unerwünscht eingehende Netzwerkverbindungen getroffen wurden. (VPN/Firewall)

3 Benutzermanagement

Janz Tec Images verfügen standardmäßig über 2 voreingestellte Nutzer (root und dev) und einen Service-Nutzer:

- „root"

  Debian standard root-Benutzer; Kein Passwort zugewiesen.

  Automatische Anmeldung an lokalen Konsolen tty1, tty3 - 6 (USB + DVI+D/Display).

  SSH-Login erlaubt (nur schlüsselbasierte Authentifizierung, siehe Kapitel 5).

  Anmeldung mit passwortbasierter Authentifizierung nicht zulässig.

- „dev"

  Zusätzlicher Nutzer für imagespezifische Aufgaben, welche keinen Root-Zugriff erfordern; Kein Passwort zugewiesen.

  Kein SSH-Zugriff erlaubt.

  Hat sudo-Rechte (kann Programme mit sudo-Befehl als root ausführen).

- „service"

  Dieser Benutzer ist standardmäßig nicht aktiv.

  Der Service-Benutzer kann manuell über jconfig oder per USB-Stick temporär aktiviert werden und darf sich per SSH einloggen.

  Siehe Kapitel 5 „SSH Terminal – Autorisierung per Service Nutzer" für weitere Informationen.
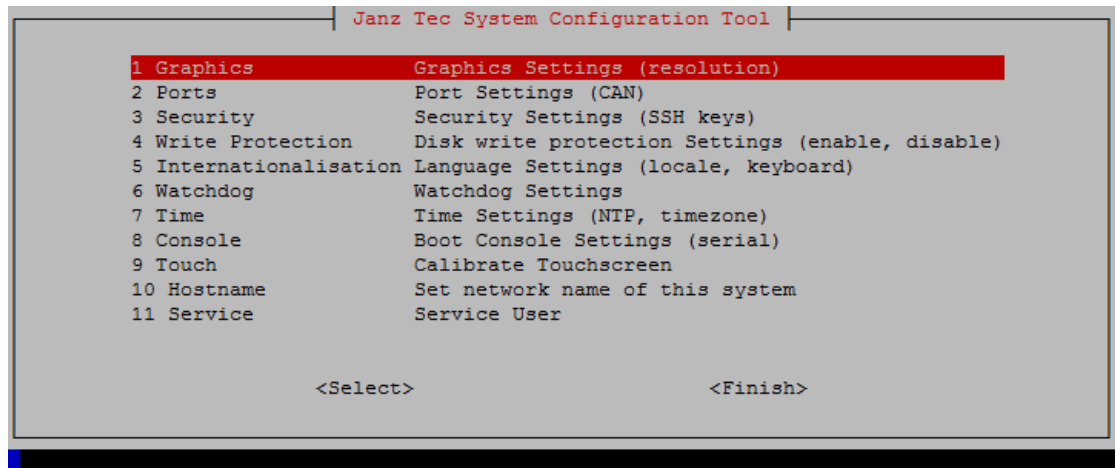

Auf Wunsch können weitere Nutzter für kundenspezifische Images eingerichtet werden.

4 System Konfiguration

Auf Janz Tec Systemen mit Debian-Images ist das Konfigurationstool „jconfig" installiert.

Um in das Konfigurationstool zu gelangen loggen Sie sich per SSH ein oder schließen Sie eine USB-Tastatur und ein Display an das System an und drücken Sie „STRG + ALT + F3" um die Konsole zu öffnen.

Führen Sie „jconfig" aus, um das Tool zu starten. (root@emPC-xxxxxxx:(read only):~# jconfig)

```
┤ Janz Tec System Configuration Tool ├

1 Graphics            Graphics Settings (resolution)
2 Ports               Port Settings (CAN)
3 Security            Security Settings (SSH keys)
4 Write Protection    Disk write protection Settings (enable, disable)
5 Internationalisation Language Settings (locale, keyboard)
6 Watchdog            Watchdog Settings
7 Time                Time Settings (NTP, timezone)
8 Console             Boot Console Settings (serial)
9 Touch               Calibrate Touchscreen
10 Hostname           Set network name of this system
11 Service            Service User


        <Select>                        <Finish>
```

Folgende Optionen können anschließend konfiguriert werden:

- o Graphics
  Festlegung einer DVI-D-Auflösung (nur für emPC-A/iMX6 Systeme)
- o Ports
  Setzen einer Standard-Baudrate für CAN-Bus
- o Security
- o Importieren eines öffentlichen SSH-Schlüssels für den root-user via USB (siehe Kap. 5.2.2)
- o Write Protection
  Schreibschutz aktivieren/deaktivieren (siehe Kap. 9)
- o Internationalisation
  Tastaturlayout und Systemsprache wählen
- o Watchdog
  Aktivieren/Deaktivieren des CPU-Watchdogs (siehe Kap. 10)
  Aktivieren/Deaktiveren zusätzlicher Watchdog-Monitorskripte
- o Time
  Aktivieren/Deaktivieren des NTP-Clients
  Einstellen der Zeitzone
- o Console
  Boot Console-Einstellungen
- o Touch
  Kalibrierung des Touchscreens (nur für emVIEW Systeme)
- o Hostname
  Netzwerkname des Systems einstellen
- o Service
  Aktivieren des temporären Service-Nutzers für SSH-Zugriff (siehe Kap. 5.15.2.1)

5 SSH

5.1 SSH Server

Auf Janz Tec Systemen ist standardmäßig ein SSH-Daemon installiert, welcher einen verschlüsselten SFTP-Zugang zu Daten und Verzeichnissen des Systems ermöglicht. Nutzen Sie hierfür ein SFTP kompatibles Programm, wie z.B. WinSCP.

Der SSH-Daemon unterstützt folgende Cipher Suites:

KexAlgorithms: curve25519-sha256@libssh.org, diffie-hellman-group18-sha512, diffie-hellman-group14-sha256, diffie-hellman-group16-sha512

Ciphers: chacha20-poly1305@openssh.com, aes256-gcm@openssh.com, aes128-gcm@openssh.com, aes256-ctr, aes192-ctr, aes128-ctr

MACs: hmac-sha2-512-etm@openssh.com, hmac-sha2-256-etm@openssh.com, umac-128-etm@openssh.com

Leere Passwörter sind nicht erlaubt. (PermitEmptyPasswords no)

5.2 SSH Terminal

Zur Bedienung des SSH-Terminals wird folgende Software empfohlen:

PuTTY (https://de.wikipedia.org/wiki/PuTTY)
WinSCP (https://de.wikipedia.org/wiki/WinSCP)

(Siehe hierzu auch Kapitel 5.3 „SSH-Zugriff und Dateiübertragung)

Die Authentifizierung des SSH-Terminals beim SSH-Server kann auf zwei Wegen geschehen: Temporär über den Service-Nutzer oder dauerhaft mittels privater Schlüsseldateien.

Da Systeme mit Schlüsselpaar-Authentifizierung wesentlich schwieriger zu kompromittieren sind als Systeme mit Kennwort-Authentifizierung, erlauben Linux Standardimages ab der Imagenummer IMG_LX100 in der Standardkonfiguration (/etc/ssh/sshd_config) keinen SSH-Zugriff der auf dem System aktivierten Linux Benutzer mittels passwortbasierter Authentifikation.

5.2.1 Authentifizierung per Service Nutzer

Wenn Sie physikalischen Zugang zum System haben, kann der temporäre Service-Nutzer aktiviert werden. Dieser Nutzer kann SSH nutzen und hat **sudo** Rechte.

Der Service-Nutzer kann wahlweise per Konsole und „**jconfig**" oder per **USB-Stick** aktiviert werden.

Der Service-Benutzer dient Wartungszwecken oder der Installation einer schlüsselbasierten Authentifizierung. Nutzen Sie für Produktionsanwendungen die schlüsselbasierte Authentifizierung!

*Anmeldevorgang mit **jconfig**:*

- Schließen Sie eine USB-Tastatur und ein Display an das System an und drücken Sie „STRG + ALT + F3" um die Konsole zu öffnen
- Führen Sie „jconfig" aus. (`root@emPC-xxxxxxx:(read only):~# jconfig`)
- Gehen Sie zu „Menu / Service / Activate temporary service account for remote SSH access"

Der Benutzername und das Passwort für den Service-Nutzer werden angezeigt.

```
User account for service user enabled! (Console and SSH remote access)

   Username: service
   Password: 789331-226426-852331

Close this dialog to disable service account!




                            <Ok>
```

Das Passwort wird beim Öffnen des Dialogfeldes jedes Mal neu per Zufall generiert. Der Service-Account ist gültig, so lange das Dialogfeld geöffnet ist und erlischt mit Schließen des Dialogfeldes (<ok>) oder automatisch nach 24 Stunden.

*Anmeldevorgang mit **USB-Stick**:*

Diese Funktion ist nur verfügbar, solange dem Root-Benutzer kein Passwort zugewiesen wurde.

Um den Service-Nutzer ohne Anschließen eines Displays per USB-Stick zu aktiveren, gehen Sie wie folgt vor:

Erstellen Sie auf einem USB-Stick eine Datei **„serviceuser.txt"** und stecken Sie den USB-Stick für einige Sekunden an Ihr Gerät.
Der Service-Nutzer ist nun für **24 Stunden** mit einem zufällig generierten Passwort freigeschaltet.
Den entsprechende Nutzername und Passwort finden Sie in der Datei „serviceuser.txt"

Sie können den USB-Stick hintereinander an mehrere Geräte anstecken. Die „serviceuser.txt" enthält anschließend alle IP-Adressen sowie die Zugangsdaten der freigeschalteten Service-Nutzer der angesteckten Geräte.

5.2.2 Authentifizierung per privater Schlüsseldatei

Die Authentifizierung per Schlüsseldateien ist eine sehr sichere Möglichkeit sich über SSH mit Ihrem Gerät zu verbinden. Die folgenden Abschnitte beschreiben, wie die notwendigen Schlüsseldateien generiert und der öffentliche Schlüssel (Public Key) auf einem emPC installiert wird.

Desktop PC:

Unter Windows kann der **PuTTY Key Generator** (puttygen.exe) zur Generierung eines Schlüsselpaars verwendet werden:

- Starten Sie PuttyGen:
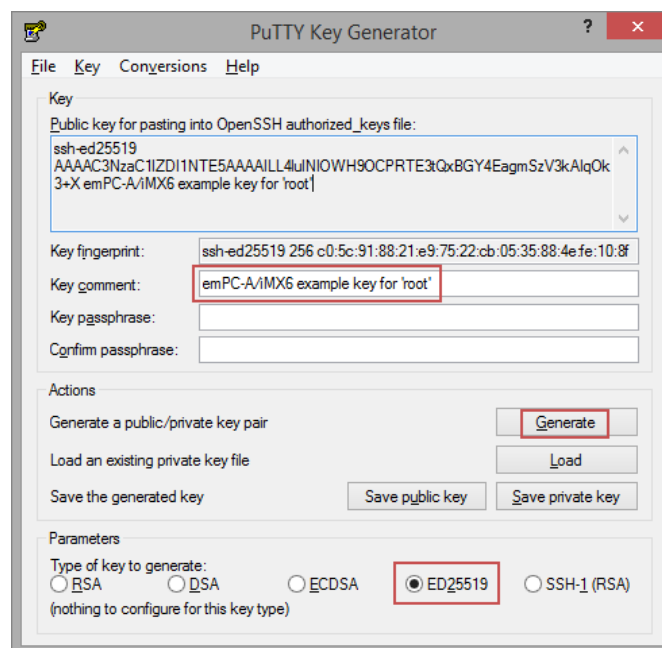
- Wählen Sie den Schlüsseltyp **ED25519** aus.
- Um ein neues Schlüsselpaar zu generieren, klicken Sie auf **Generate.**
- Durch Bewegen der Maus über die leere Fläche im oberen Bereich des Fensters werden die für die Schlüsselgenerierung notwendigen Zufallsdaten generiert.
- Nachdem die Generierung abgeschlossen ist, können Sie den **Public Key** mit dem Button **Save public key** speichern. Wählen Sie einen Dateinamen, der diesen Schlüssel als Public Key identifiziert, z.B. **examplekey.pub**.
- **Save private key** speichert den **Private Key** im PuTTY Format.
- Wählen Sie einen Dateinamen, der diesen Schlüssel als geheimen Private Key identifiziert, z.B. **secret_examplekey.ppk**.

⚠️ Halten Sie diesen privaten Schlüssel geheim, da jeder, der Zugriff auf diesen Schlüssel hat, eine SSH-Verbindung zum emPC herstellen kann. Wenn mehrere Benutzer Zugriff auf ein Gerät haben sollen, erwägen Sie die Erstellung mehrerer Schlüsselpaare (eines für jeden einzelnen Benutzer).

Wenn der Private Key auch von anderen Programmen als PuTTY verwendet werden soll, (z.B OpenSSH-kompatible Programme), kann dieser auch im OpenSSH Dateiformat exportiert werden. **Menu / Conversions / Export OpenSSH key**.

- Notieren Sie sich für den späteren Abgleich den „key fingerprint".
- Kopieren Sie den Public Key auf einen USB-Stick:
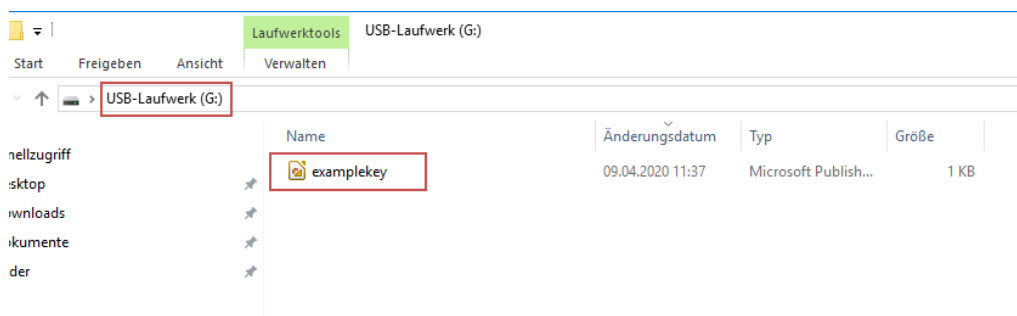
emPC/emVIEW:
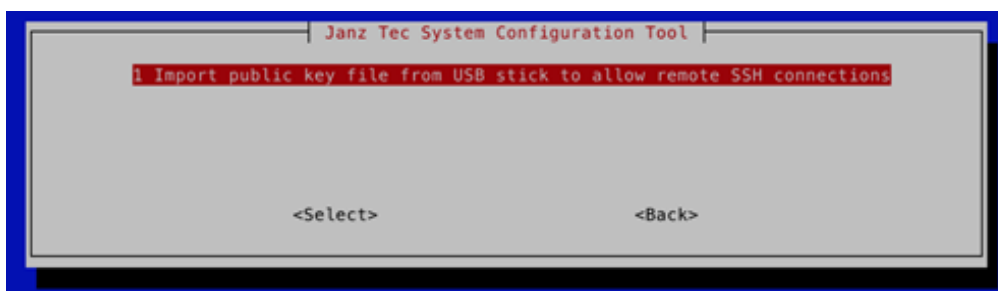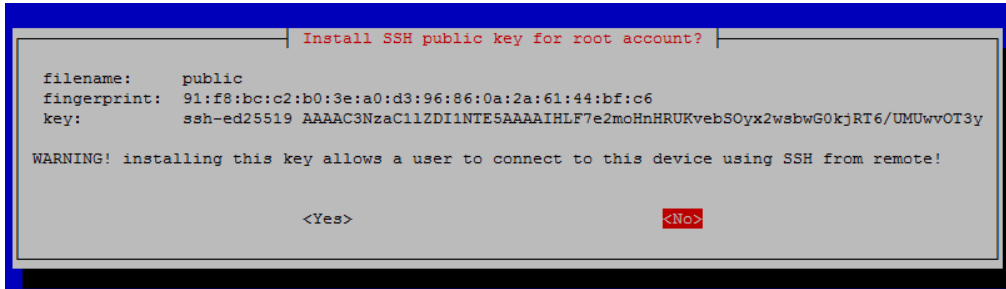
- Schließen Sie den USB-Stick an Ihr Janz Tec-System (emPC/emVIEW) an.
- Schließen Sie eine USB-Tastatur und ein Display an das System an und drücken Sie „STRG + ALT + F3" um die Konsole zu öffnen.
- Führen Sie „jconfig" aus. (`root@emPC-xxxxxxx:(read only):~# jconfig`)
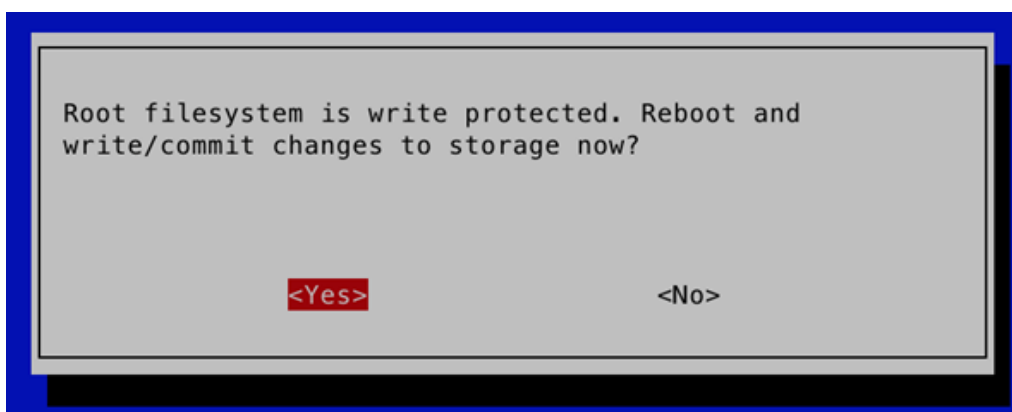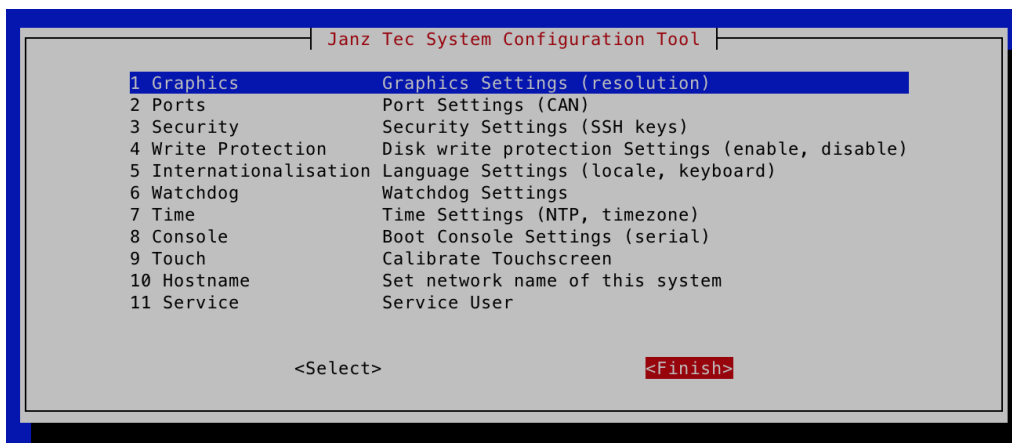- Gehen Sie zu „Menu / Security / Import SSH keys".
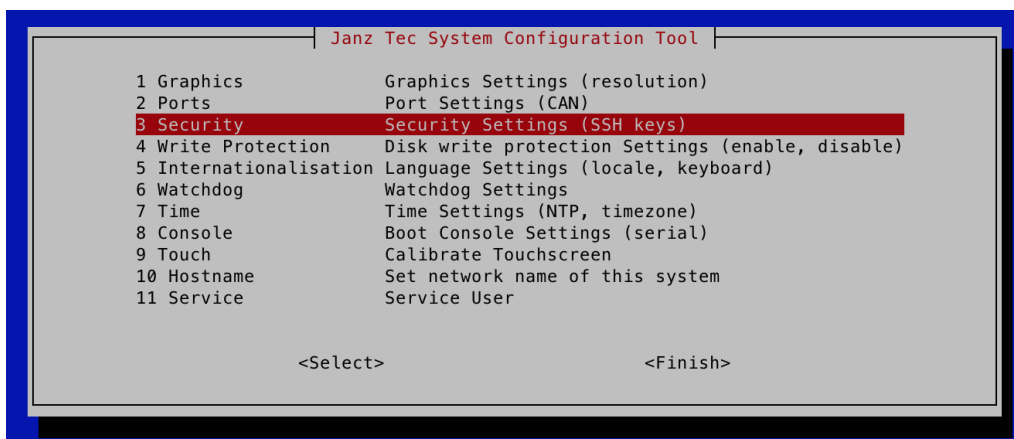
- Importieren Sie den Public Key vom USB-Stick für den root-Benutzer.

- Gleichen Sie vor Bestätigen des Dialogfeldes den angezeigten „fingerprint" mit dem zuvor notierten „key fingerprint" ab! Dies verhindert, dass Man-In-The-Middle Angriffe stattfinden können.

```
|  Install SSH public key for root account?  |

filename:     public
fingerprint:  91:f8:bc:c2:b0:3e:a0:d3:96:86:0a:2a:61:44:bf:c6
key:          ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIHLF7e2moHnHRUKvebSOyx2wsbwG0kjRT6/UMUwvOT3y

WARNING! installing this key allows a user to connect to this device using SSH from remote!

                    <Yes>                              <No>
```

- Führen Sie ein „Reboot and write/commit" durch, um die Änderungen dauerhaft auf der Speicherkarte zu speichern.

```
|  Janz Tec System Configuration Tool  |

1 Graphics            Graphics Settings (resolution)
2 Ports               Port Settings (CAN)
3 Security            Security Settings (SSH keys)
4 Write Protection    Disk write protection Settings (enable, disable)
5 Internationalisation Language Settings (locale, keyboard)
6 Watchdog            Watchdog Settings
7 Time                Time Settings (NTP, timezone)
8 Console             Boot Console Settings (serial)
9 Touch               Calibrate Touchscreen
10 Hostname           Set network name of this system
11 Service            Service User

            <Select>                        <Finish>
```

```
Root filesystem is write protected. Reboot and
write/commit changes to storage now?




       <Yes>                      <No>
```

ℹ Für die Authentifizierung kann Janz Tec ein kundenspezifisches Image bereitstellen, welches Ihre öffentlichen Schlüssel enthält. Hierzu müssen Sie Janz Tec vor der Imageerstellung Ihre öffentlichen Schlüssel zur Verfügung stellen.
Sollten Sie dies wünschen, kontaktieren Sie bitte Ihren Janz-Tec-Vertriebsmitarbeiter.
Die dazugehörigen privaten Schlüssel verbleiben bei Ihnen, sodass nur Sie SSH-Verbindungen zu Ihren Geräten herstellen können. (Empfohlene Vorgehensweise)

5.3 SSH-Zugriff und Dateiübertragung

Für die direkte Interaktion mit dem Server und der Kommunikation via Befehlszeile empfehlen wir die Verwendung von PuTTY. Für den Datenaustausch zwischen SSH-Terminal und SSH-Server empfehlen wir die Verwendung von WinSCP.

5.3.1 PuTTY

Um eine Verbindung via PuTTY herzustellen, nutzen Sie den zuvor erstellten privaten Schlüssel (private.key.pkk). Siehe hierzu Kapitel 5.2 "SSH-Terminal".

- Starten Sie die Windows-Anwendung PuTTY.
- Tragen Sie in das Feld "Host Name" die Zeile "root@" gefolgt von der IP Adresse des emPC ein. Der Port muss auf 22 eingestellt bleiben (SSH Protokoll).
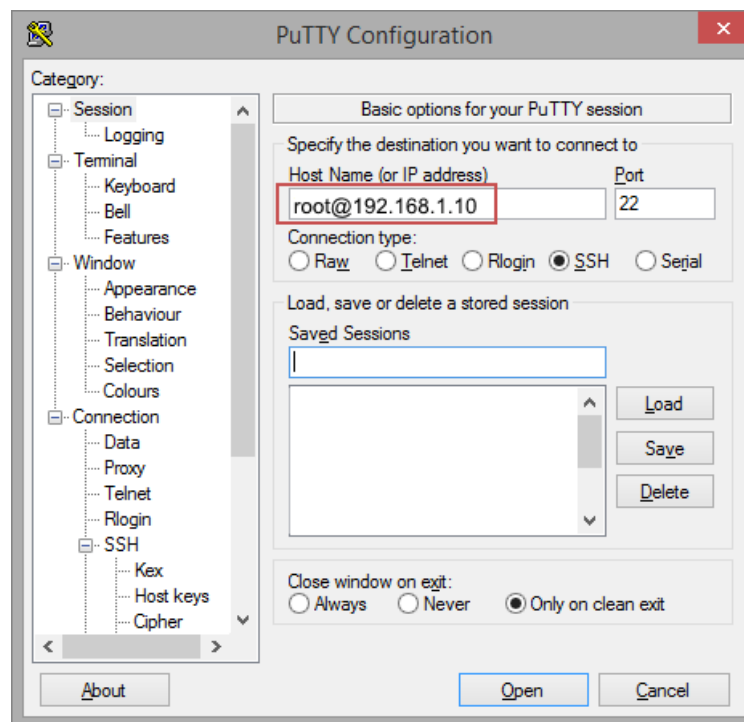
- In den SSH Authentifizierungseinstellungen wird die Datei des privaten Schlüssels im PuTTY Format (.ppk) hinterlegt.
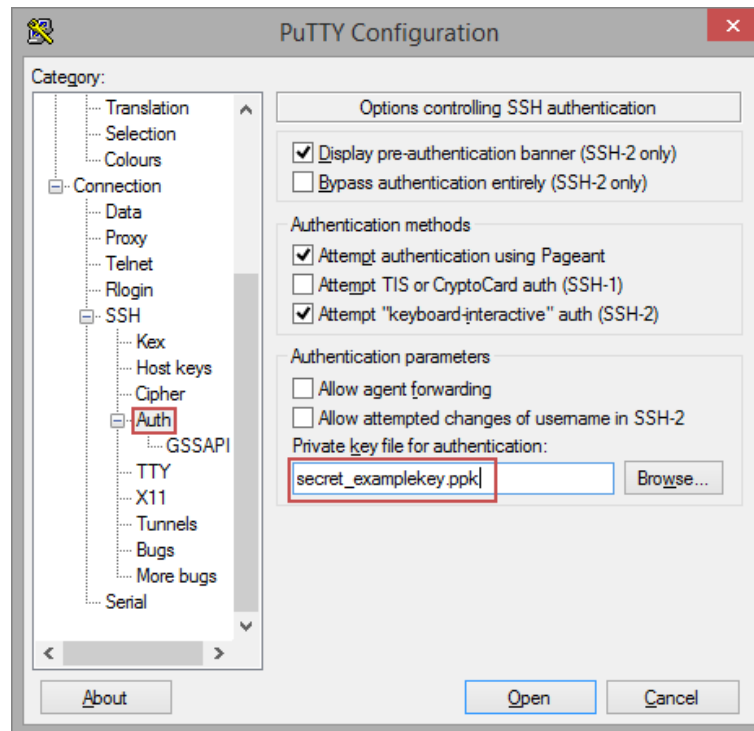
- Im Feld "Saved Session" kann ein Name dieser Konfiguration eingegeben werden. Mit **Save** wird diese für zukünftige Verwendung gespeichert und kann jederzeit wieder per **Load** geladen werden.
- **Open** startet den Verbindungsaufbau und öffnet das Konsolenfenster für den root Benutzer.

Linux SSH Kommando:

Von einem Linux basierten PC / Notebook kann mit Hilfe des Linux SSH Kommandos eine SSH Verbindung zum emPC mittels des exportieren privaten Schlüssels oder des Service-Nutzers im OpenSSH Format hergestellt werden.

Beispiel einer SSH-Verbindung mit privatem Schlüssel

Beispiel einer SSH-Verbindung mittels Service-Nutzer

5.3.2 WinSCP

WinSCP dient zur Dateiübertragung von und zu Ihrem Server. WinSCP ist eine Dateiübertragungsanwendung, die Secure FTP verwendet.

Nutzen Sie zur Authentifizierung den gleichen privaten Schlüssel, den Sie mit PuTTY generiert haben. (siehe hierzu Kap. 5.2 SSH Terminal)
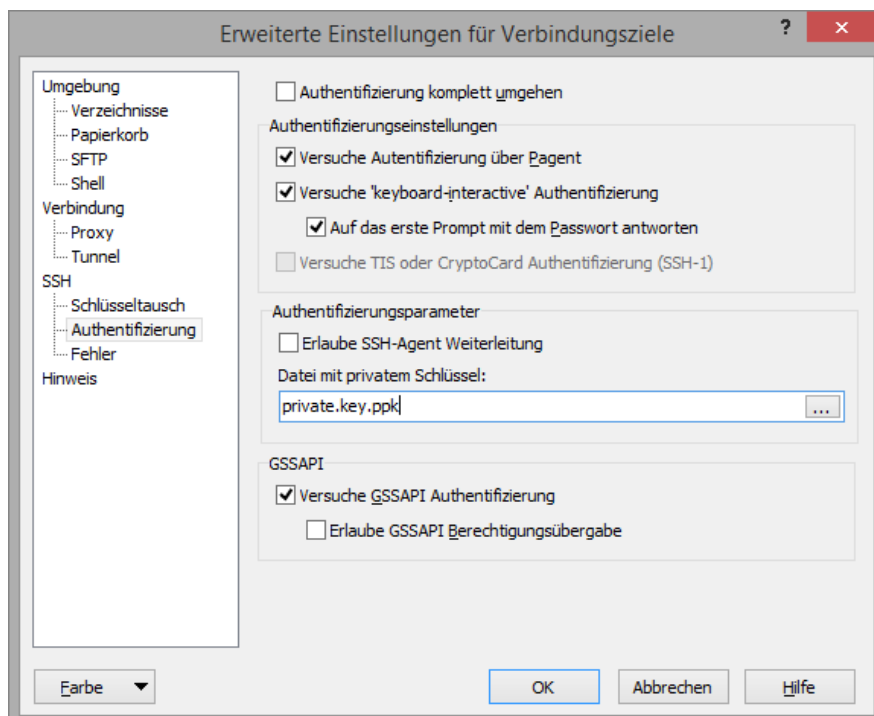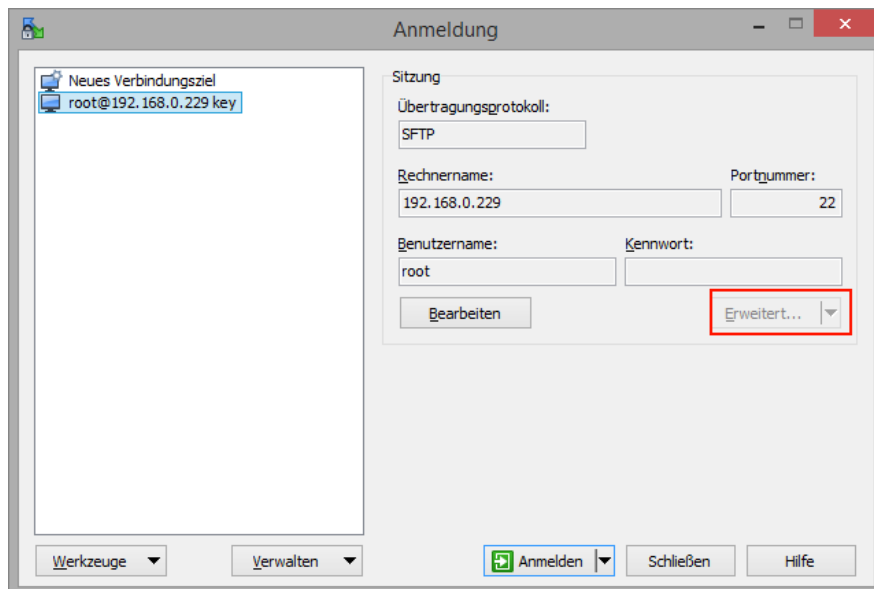
6 Festplattenpartitionierung

ℹ️ Um die Systemstabilität zu verbessern, wird bei jedem Bootvorgang eine Dateisystemüberprüfung durchgeführt. (Die Überprüfung kann bis zu 2 Minuten dauern.)

Das System enthält standardmäßig 3 Partitionen:

- /dev/sda1: Bootpartition
    - Bei X86-Prozessoren: Gemountet auf /boot/
    - Bei iMX6-Prozessoren: nicht gemountet
    - Enthält die Bootloader-Konfiguration
    - Enthält den Linux Kernel

- /dev/sda2: Linux Systempartition
    - Schreibgeschützt
    - Enthält das Debian root filesystem

- /dev/sda3: Datenpartition
    - Beschreibbar
    - Gemountet auf /data/
    - Enthält das Docker-Verzeichnis für Docker-Images

7 Ethernet-Schnittstellen

Janz Tec Systeme verfügen standardmäßig über 2 Ethernet-Ports mit folgender Konfiguration:

- **Ethernet 0**: Verwendet eine **statische IP-Adresse**

    Empfohlen für Echtzeit-Ethernet-Protokolle.

    Beim ersten Start des Systems wird eine feste IP-Adresse aus dem Bereich 169.254.x.y zugewiesen. Die Zahlen x und y entsprechen dezimal den letzten beiden Bytes der Ethernet 0 MAC-Adresse.

- **Ethernet 1**: Automatische Zuweisung der IP-Adresse via **DHCP**

    Empfohlen für z.B. den Anschluss eines PCs mit der CODESYS Entwicklungsumgebung.

Um die aktuelle Netzwerkkonfiguration einzusehen, nutzen Sie den Befehl: **„sudo nano /etc/network/interfaces"**

```
#auto eth0
allow-hotplug eth0
#iface eth0 inet dhcp
iface eth0 inet static
        address 192.168.100.1
        netmask 255.255.255.0

#auto eth1
allow-hotplug eth1
iface eth1 inet dhcp
```

🛈 Auf Wunsch können die Ethernet-Ports kundenspezifisch konfiguriert werden.

8 Image Update

⚠️ Wenn Sie Ihr System zum ersten Mal auf ein neues Image aktualisieren, empfehlen wir Ihnen vor dem Update ein Backup der Speicherkarte anzulegen.

⚠️ Standardmäßig wird das Betriebssystem nach dem Update auf Werkseinstellungen zurückgesetzt. In der Vergangenheit vorgenommene Einstellungen (Netzwerk-IP-Adresse, SSH-Keys, Benutzer, Kennwörter, …) werden dabei evtl. nicht übernommen.

8.1 Update per USB-Stick

ⓘ *Die Möglichkeit ein Update per USB-Stick aufzuspielen besteht derzeit ausschließlich auf **emPC-A/iMX6**-Systemen.*

ⓘ *Nur eine begrenzte Auswahl von USB-Sticks ist mit der entsprechenden USB-Boot-Funktion kompatibel.*

Kompatible USB-Sticks sind z.B.:

- *Verbatim: PinStripe USB2.0 Drive 16GB Go*
- *Intenso: Basic Line 2.0 High Speed 16GB*

Bevor vom USB-Stick gebootet und Updates installiert werden können, müssen der USB-Stick und der emPC-A/iMX6 entsprechend eingerichtet werden. Siehe hierzu „Einrichtung des USB-Sticks/emPC-A" am Ende dieses Kapitels.

Schließen Sie den USB-Stick an den USB1-Port (direkt neben der rot/grünen LED).

Nachdem der emPC-A/iMX6 vom USB-Stick bootet, startet das Image-Backup- und Installationsprogramm.
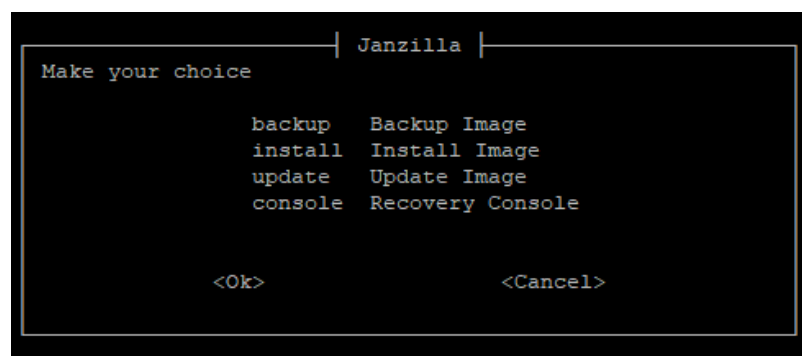
Folgende Aktionen können anschließend ausgeführt werden:

o backup: Backup Image
Komprimiert den Inhalt der CFast-Karte und speichert ihn als Image-Verzeichnis auf den USB-Stick.

o install: Install Image
Listet alle auf dem USB-Stick befindlichen Image-Verzeichnisse auf. Die Auswahl eines Images installiert dieses auf der CFast Karte und ersetzt alle Daten.

⚠ Alle Daten auf der CFast-Karte werden bei der Installation gelöscht.

o update: Update Image
Listet alle auf dem USB-Stick befindlichen Image-Verzeichnisse auf. Nach der Auswahl eines Images formatiert das Update-Skript die Boot- und Systempartitionen und stellt alle Dateien aus den .tgz-Dateien wieder her. Die Daten auf der Daten-Partition bleiben erhalten.

⚠ Alle Daten der Boot- und Systempartitition auf der CFast-Karte werden beim Updaten gelöscht.

Einrichtung des USB-Sticks/emPC-A

Zur Einrichtung des USB-Sticks und des emPC-A/iMX6 gehen Sie wie folgt vor:

USB-Stick:

- Formatieren Sie das Dateisystem des USB-Sticks in FAT32.
- Extrahieren Sie die „update-imx6-usbstick_v<latest-version>.tgz" in das Stammverzeichnis des USB-Sticks

emPC-A/iMX6:

Um die USB-Boot-Funktion auf einem emPC-A/iMX6 zu aktivieren, ist es erforderlich, dass das System mindestens einmal ein Linux-Image mit einer Image-Nummer größer oder gleich IMG-LX100 bootet.
Während des ersten Bootens wird die Konfiguration des Bootloaders automatisch auf diese Boot-Reihenfolge geändert: 1. USB-Boot, 2. CFast-Karte, 3. interne eMMC, 4. SD-Karte.

Um die Boot-Reihenfolge beim ersten Booten zu ändern, können Sie eine bootfähige CFast Karte verwenden.

Gehen Sie dafür wie folgt vor:

- Formatieren Sie die CFast-Karte mit FAT32 unter Verwendung eines USB-zu-CFast-Kartenlesers.
- Extrahieren Sie die „Partition 1.tgz" aus einem beliebigen Image ≥ IMG_LX100 in das Stammverzeichnis der CFast-Karte
- Booten Sie das System einmal mit dieser CFast Karte.
- Stellen Sie sicher, dass das System mindestens 1 Minute eingeschaltet ist und während der Neukonfiguration der Boot-Reihenfolge kein Ausschalten erfolgt.

Sollten Sie hierbei Unterstützung benötigen, wenden Sie sich bitte an unseren Support. (siehe Kapitel 1)

8.2 Update per Update-Service

Janz Tec bietet einen kundenspezifischen Update-Service an, mit dem Janz Tec Geräte mit Hilfe eines Update-Clients sicher, schnell und einfach aktualisiert werden können. Ein physikalischer Zugang zu den Geräten ist hierbei nicht nötig.

Für weitere Informationen und eine individuelle Beratung kontaktieren Sie bitte Ihren Janz-Tec-Ansprechpartner.

9 Schreibschutzfilter

Die Linux-Systempartition /dev/sda2 ist standardmäßig schreibgeschützt.

Das Datenverzeichnis befindet sich auf der beschreibbaren Partition /dev/sd3.

ℹ Wenn der Schreibschutz aktiviert ist, wird in der Anmeldeaufforderung „read only" angezeigt.

ℹ Stromausfälle können bei laufenden Systemen zu Beschädigungen des Dateisystems und anschließenden Problemen beim Neustart führen.
Aktivieren Sie für die Nutzung in Produktionsumgebungen den Schreibschutz oder verwenden Sie eine USV (unterbrechungsfreie Stromversorgung).

Verwenden Sie das Konfigurationstool oder benutzen Sie alternativ die folgenden Befehle um den Schreibschutz zu aktivieren/deaktivieren. Dabei wird das System jeweils neu gestartet:

```
Aktivieren:
root@emPC-xxxxxxx:# reboot-ro

Deaktivieren:
root@emPC-xxxxxxx:# reboot-rw
```

Benutzen Sie den Befehl „reboot-commit" um Änderungen in schreibgeschützte Partitionen zu schreiben. Dabei wird das System jeweils neu gestartet:

```
Commit:
root@emPC-xxxxxxx:# reboot-commit

Commit & Schreibschutz deaktiveren:
root@emPC-xxxxxxx:# reboot-commit-rw
```

10 Watchdog

Janz Tec Systeme verfügen standardmäßig über verschiedene Watchdogs, welche bei einer Fehlfunktion oder bei Überschreitung gewisser Grenzwerte automatisch einen Neustart des Systems einleiten.

Führen Sie „**jconfig**" aus, um die Watchdogs zu aktivieren/deaktiveren.

Folgende Watchdogs stehen zur Auswahl:
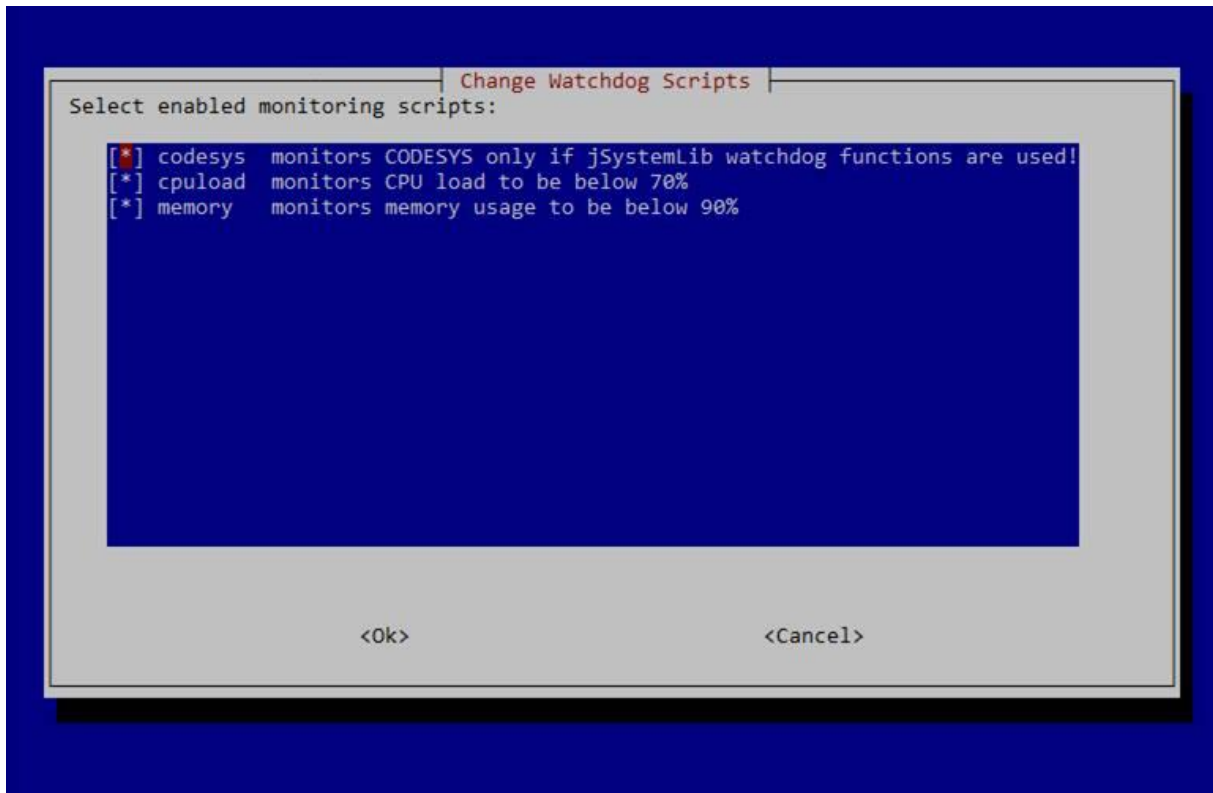
Die Watchdog-Monitorskripe finden Sie unter: **„/opt/janztec/watchdog/monitor.d"**

11 Docker

Docker ist standardmäßig vorinstalliert und speichert Images auf der Datenpartition im Verzeichnis /data/var/lib/docker.

Um die installierte Docker-Version anzeigen zu lassen, verwendeten sie:

```
root@emPC-xxxxxxx:/home/dev# docker version
```

Docker-Container müssen passend für armhf konfiguriert sein.

Beispiel:

```
root@empc-aimx6:/home/dev# docker run armhf/hello-world
Unable to find image 'armhf/hello-world:latest' locally
latest: Pulling from armhf/hello-world
a0691bf12e4e: Pull complete
Digest: sha256:9701edc932223a66e49dd6c894a11db8c2cf4eccd1414f1ec105a623bf16b426
Status: Downloaded newer image for armhf/hello-world:latest


Hello from Docker on armhf!
This message shows that your installation appears to be working correctly.
```

12 Codesys

Das CODESYS-Projektverzeichnis befindet sich standardmäßig auf der Datenpartition mit Lese- und Schreibzugriff.

12.1 CODESYS Development Environment

Die CODESYS-Entwicklungsumgebung ist unter http://www.codesys.com verfügbar.

> ℹ️ Wir empfehlen CODESYS v3.5 mit dem jeweils aktuellsten Service Pack (SP) zu verwenden.

Für die erstmalige Verbindung ist eine Anmeldung für den Benutzer "Administrator" erforderlich. Das initiale Passwort wird in der Target-Visualisierung angezeigt und ist auch in der Datei /data/opt/codesys/initialpassword.txt verfügbar.

> ℹ️ Nach erfolgreicher Anmeldung muss das Passwort in ein sicheres Passwort Ihrer Wahl geändert werden.
>
> Weitere Informationen zum Benutzermanagement in CODESYS finden Sie unter https://help.codesys.com.

Sie können den Kennwortschutz für den Administrator entfernen. Wählen Sie dazu auf dem Gerät "Original zurücksetzen" (Rechtsklick in der Gerätestruktur), und geben Sie den Benutzernamen "Administrator" und das im vorherigen Schritt eingegebene Passwort ein.

Wichtig: Ein "reboot-commit" ist erforderlich!

Informationen zur Sicherheit von CODESYS finden Sie unter https://www.codesys.com/security.html.

12.2 CODESYS Runtime System

CAN/CAN-Open-Optimierung (zur Reduzierung von CAN-Jitter)

- Erstellen Sie eine zusätzliche Task mit dem Namen "CANTask", der Priorität 0 und 1 ms Zykluszeit.
- Öffnen Sie für jeden CAN-Gerätebaumeintrag den CANopen_Manager, Reiter: "CANopen I/O Mapping" und ändern Sie den Wert von "Buscyclic-Task" in "CANTask"

12.3 Lizenzdongle

Wenn die CODESYS-Laufzeitlizenz auf einem USB-CODESYS-Lizenzschlüssel (CODESYS-Key) installiert ist, stellen Sie sicher, dass der Lizenz-Dongle immer an einem der USB-Ports angeschlossen ist (empfohlener Port 0).

> ⚠️ Janz Tec empfiehlt ausdrücklich die Verwendung eines **Lizenz-Dongles**!

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

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

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

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b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or

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Version 2.1, February 1999

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