Implementing Rexx on the Libre Computer ‘Le Potato’ SBC

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Overview

- History & Goal of the Libre Computer Project
- Libre Computer Project SBC Models
- Technical Specifics of the ‘Le Potato’ SBC
- ‘Le Potato’ vs. Raspberry Pi 3B
- Available Linux Distros for ‘Le Potato’
- Installing Armbian Linux
- Installing OpenJDK 8
- Installing NetRexx 4.04
- Installing ooRexx 5.0
- Installing BSF4ooRexx
- Findings and Recommendations
- List of Web References
History & Goal of the Libre Computer Project

- Project by **Shenzhen Libre Technology Co., Ltd.**
- Shenzhen, Guangdong Province, China
- **Goal**: Produce standards-compliant single-board computers (SBC) and upstream software stack to power them
- **Crowd-funding** on Indiegogo and **Kickstarter** to market their **SBC designs**
- **Open Source** Projects
- **Technical Support** Lacking when Compared to the Raspberry Pi Products; Better than Average Compared to most SBCs
Libre Computer SBC Models

- 3 SBC Models
  - ROC-RK3328-CC (Renegade)
  - AML-S905X-CC (Le Potato)
  - ALL-H3-CC (Tritium)

- All Models use **ARM Cortex CPUs**
- All Models use **Mali GPU Technology**
- **Cryptography Extensions** for the Renegade and Le Potato
- Le Potato Results from the Kickstarter Project
  - 658 Backers Pledged $43,560 to Fund Project as of 9/11/2022
Tech Specs - Le Potato

- Similar HW to Raspberry Pi 3 Model B
- Amlogic S905X SoC Board
- ARM Cortex 64 Bit Quad Core 1.512 GHz CPU
- Up to 2GB DDR3 SDRAM
- 100 MB Fast Ethernet Port for Internet Connectivity
- No On Board WiFi Chip; USB WiFi Adapter Required
- Spring Loaded Micro SDXC Card Slot for Basic Storage
- Interface for eMMC 5.0 Storage on Bottom of Board
Tech Specs - Le Potato ...

- HDMI 2.0 Display Standard Size Port
- 4 USB Ports
- Audio Output Jack (Configured for HDMI Output)
- Can Run a Subset of Linux Server & Desktop Distros
  - Older Linux Kernel v4.19 (Debian)
  - Most Current/Used Linux Distro: **Armbian** (23.02 Current; 22.08 Used)
  - Older Versions: Debian (9 Stretch) and Ubuntu (16.04 LTS)
Tech Specs - Le Potato ...

- Additional Gaming & Home Theater PC OS Software
  - Retropie (Gaming)
  - Android (HTPC)
  - LibreELEC (HTPC)
  - Lakka (Gaming)
- Armbian v22.08 will be Selected for This Presentation
  - Xfce 4 Desktop
  - Vast Repository of Available Added Ubuntu .deb Packages
Le Potato vs. Raspberry Pi 3B

- **Better Availability for Le Potato**
  - Less Supply Chain Issues
  - Available from Amazon or LoveRPi (reseller)

- **Hardware Outperforms RPi 3B** in Several Tests

- **Le Potato Uses Less Power** than the RPi 3B

- **iUniker RPi3B Case** Used with Modifications to Middle Part of Case to Fit Le Potato Board

- **Lower Price**
  - **Source**: Amazon – May 2023 (Compared to September 2022)
  - **Le Potato** – $35 USD (Price Drop from $45 in September 2022)
  - **Raspberry Pi 3B+ Board** – $100 USD (Price Drop from $139 USD in September 2022)
Le Potato vs. Raspberry Pi 3B

- Le Potato SBC Box and SBC Screenshot
Le Potato vs. Raspberry Pi 3B

- Le Potato SBC Screenshot
Le Potato vs. Raspberry Pi 3B

- LoveRPi Raspberry Pi 3B Case for Le Potato Screenshot
Le Potato vs. Raspberry Pi 3B

- LoveRPI Heat-sink for Le Potato SBC Screenshot
Le Potato vs. Raspberry Pi 3B

- Raspberry Pi 3B SBC Screenshot
Le Potato vs. Raspberry Pi 3B

- iUniker Raspberry Pi 3B Case Screenshot
Installing Armbian Linux

- Debian / **Ubuntu** Based Distro
- SBC Focus on Performance (Thrifty with RAM)
- Image Also Available for the Raspberry Pi 4B
- Le Potato Xfce Desktop Current Download URL:
  - https://redirect.armbian.com/lepotato/Jammy_current_xfce
- Le Potato CLI Current Download URL:
  - https://redirect.armbian.com/lepotato/Jammy_current
Installing Armbian Linux ...

- To Improve I/O **Select a High Quality Micro SDXC Card with UHS-I Capability**
- Good Brands Readily Available:
  - Samsung Pro Endurance
  - SanDisk Ultra, Ultra Plus, Extreme, Extreme Plus
- **Recommendation:** Opt for a Card With $\geq 64$GB Storage
Installing Armbian Linux …

• Use a **Bit Accurate** Copy or Flashing Tool

• **Recommendations:**
  - **Balena Etcher** (32 or 64 Bit Windows and Linux Intel)
  - Win32DiskImager (32 or 64 Bit Windows)
  - Disk Utility (macOS)
  - Linux **dd** Utility (32 or 64 Bit Linux)

• Balena Etcher used from a Windows 10 Pro PC
Installing Armbian Linux ...

- Once The Micro SDXC Card is Flashed & Verified:
  - **Unmount** or **Eject** from Computer Used to Flash The SD Card
  - **Insert** the Micro SD Card into the Slot on the Le Potato SBC
  - **Power on the SBC** for the Initial Boot Up of Armbian Linux & Wait ...

- On Initial Boot **Set The Following Settings Entries** from the Command Prompt:
  - Change The **root** Password
  - Select The Terminal Shell Type (**BASH** or **ZSH**)
  - **Add a User** Account, Name and Password
  - Verify The **Timezone** and Accept **Language Setting** Based on Timezone
Installing Armbian Linux ...

- Once All The Settings Are Computer:
  - Wait A While …
  - Computer will Start Up The Xfce Desktop Manager
  - Navigation Bar is at The Top of The Display
- **LibreOffice Suite** is Part of The Initial Installation
- **Thunar** is the File Explorer Tool
- No Java Installation with Initial Setup
- **Geany** and **Notepadqq** Are Installed for Text Editors
- **GDebi** is Installed for Additional Software Installation of Debian Packages (a bit Buggy)
Installing Armbian Linux ...

Xfce Desktop Screenshot
Installing Open JDK 8

- Open a BASH Shell Prompt
  - Applications => Terminal Emulator
- Enter the following command:
  - `$ apt install openjdk-8-jdk`
- Enter `y` to accept installation with related dependencies
- To verify the install:
  - `$ javac -version`
Installing Open JDK 8 ...

- To Make Java Available to the Current User:
  - Modify the $HOME/.bashrc File and Add The Following:
    - export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-arm64
    - export PATH=$JAVA_HOME/bin:$PATH
  - Use A Text Edit Program vs. An Office Word Processor
  - **Nano**, **Geany** or **Notepadqq** will Work for Example
Installing Net Rexx 4.04

• In This Presentation I will add NetRexx v4.04 GA To The /opt Directory::
  - $ cd /opt
  - $ sudo mkdir netrexx
  - $ cd netrexx
  - $ sudo unzip NetRexx-4.04-GA.zip

• To Add The NetRexx JAR Libraries to the OpenJDK 8 JRE Extensions:
  - $ sudo cp ./lib/*.jar $JAVA_HOME/jre/lib/ext
  - $ sudo cp ./runlib/*.jar $JAVA_HOME/jre/lib/ext
Installing ooRexx 5.0

- Use One of the Following Debian Package Files From the ooRexx Source Forge Site:
  - DEB Package for Armbian Jammy: ooRexx-5.0.0-12583.raspbianpios64.aarch64.deb
  - DEB Package for Raspbian Bullseye: ooRexx-5.0.0-12583.raspbianpios64.aarch64.deb
  - DEB Package for Raspbian Buster: ooRexx-5.0.0-12583.raspbianpios32.armv7l.deb
- Or One Can Checkout & Build the Latest Subversion Release
- Pre-Requisite Packages Required for Build of ooRexx
  - cmake
  - subversion
  - libncurses-dev
- Recommendation: Download and Install the Binary .deb Package for 64 Bit
  - sudo apt install $HOME/Downloads/ooRexx-5.0.0-12583.raspbianpios64.aarch64.deb
- Verify the Install from the Bash Shell Prompt:
  - - $ rexx -V
Installing ooRexx 5.0

- Sample ooRexx Program to Measure CPU Temp
- **Program**: rpicputemp.rex
- Checks The Temperature Value in File:
  - `/sys/class/thermal/thermal_zone0/temp`
- Utility: **vcgencmd** is Not Available for CPUs that are not Broadcom
- It is on the Raspberry Pi OS Distros, but does not Run; **VCHI Initialization Error**
- Le Potato Hardware is Not Compatible for the Broadcom RPi Userland Utilities
Installing ooRexx 5.0

- Program: rpicutemp.rex
Installing ooRexx 5.0

- Run Output: rpicutemp.rex
Installing BSF4ooRexx

- Download and Unzip Either of the Following Versions:
  - v641
  - v850
- With v850 The Jar Files can be Made Available to ooRexx
- For Java 8, Copy the BSF Binary Jar File to the $JAVA_HOME/jre/lib/ext Directory
- For Java 9 and up, Add the BSF Binary Jar File to the Java Classpath (One Solution; Other Alternatives Exist)
Findings and Recommendations

- **Supply Chain Issues** have resulted in **Hugely Inflated Prices** for the Raspberry PI SBCs
- **Very Few Alternatives for Under $50 USD** Exist for SBCs in Today’s Market
- The Libre Office ‘Le Potato’ is one of the few alternatives for an SBC under $50 USD
- **Le Potato Compares with the Raspberry Pi 3B** in terms of functionality and performances
- It **Does Not Match The Capabilities of the Raspberry Pi 4B**
- There are **More Issues with the Le Potato Hardware vs. The Raspberry Pi 3B**
- For those **Willing To Accept Compromises** Le Potato can be used as a **Minimal Desktop Computing Environment**
- A **Lean Linux OS is a Requirement; Armbian** is the Best and Most Current Choice for an Linux OS Platform
- Better to Pick a **Debian Package Based Distro** such as Armbian Jammy over a Raspbian OS Conversion
- Attempted to Install **Endless OS** with No Success
Findings and Recommendations

- Armbian Linux and Raspberry Pi OS Buster (32 Bit) and Bullseye (64 Bit) Works Fairly Well with Some Bugs Encountered
  - **Shutdown** Would Not Work Consistently from Linux; **Rebooted** SBC Instead
  - **Workaround**: Pull Power Cord At End of Shutdown Cycle or **Add On/Off Switch to Power Supply**
  - System Would Reboot Periodically When Using The **Chromium Web Browser** on Raspberry Pi OS (Raspbian)
  - Firefox ESR Package Can Be Installed, But Does Not Run Well on Raspberry Pi OS Versions

- **Raspbian OS Conversions using a Raspberry Pi 4 Model B**
  - 64 Bit Bullseye (Debian 11 aarch64) **Works OK** with Minor Graphics Issues
  - 32 Bit Buster (Debian 10 armv7l) Works; **Package Architecture Issues Prevented Upgrade** of Linux Kernel Past v6.0

- Little Documentation for Le Potato Exists vs. The Raspberry Pi 3B

- It can be utilized as a **low budget SBC Desktop Environment** Utilizing a Rexx Tech Stack

- Findings with Other Libre Computer SBCs:
  - Renegade: Positive Use Experiences with 4GB Model; Better Stability vs. Le Potato (Able to Power Off SBC)
  - Tritium: Not Tested; Web Reports of Boot and Stability Issues with Armbian and Debian Distro
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<td>YouTube - Le Potato Full Setup Guide - Raspberry Pi 3 Affordable Alternative!</td>
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<td>Rexxinfo – Rexx CPS Benchmark Numbers for Le Potato</td>
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<td><a href="http://rexxinfo.org/links/articles/benchmarking.html">http://rexxinfo.org/links/articles/benchmarking.html</a></td>
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Acknowledgments

- James A. Chambers – For His **Tech Blog Articles** on the ‘Le Potato’ SBC
- Per Olov Jonsson – For His Efforts to Build Binary Images for the Raspbian OS Dialects of ooRexx 5.0 via Jenkins
- Howard Fosdick – Published Rexx CPS Benchmarks Now Available on the Updated [rexxinfo.org](http://rexxinfo.org) Website using Regina and ooRexx
- Armbian Project – For Providing **Up to Date Kernel Linux Distros for SBCs** Other Than Raspberry Pis
End of Presentation

- Questions?
- Comments?
- Copy of Slides Available on the Rexx LA Website