Davis Remmel

reMarkable Connection Utility

All-in-One Local Tablet Management

User Manual

Contents

Preface

i

You may have seen my work in the reMarkable tablet hacking community. I'm the one who added a microSD card to the tablet, then later installed a desktop GNU/Linux environment. My efforts focus on making the device usable in a general computing context.

This software, reMarkable Connection Utility (RCU), unshackles its users from reMarkable's proprietary cloud. The benefits are numerous: snapshots are low-level and full, personal notes never leave the owner's control, users may personalize their device, and totally new features like sharing notebooks are possible. These are things the manufacturer won't provide.

Unlike restrictive black-box software, RCU gives its users *freedom*. Under the terms of its license, the GNU Affero General Public License 3.0, users hold the freedom to use it for any purpose, read the source code, modify it, share it with whomever they wish, or even re-sell it—as long as they pass forward these same freedoms. This viral licensing forms a web of non-restrictive (*free*) software, leading the world toward transparency and trust, precipitating *rights* for software users.

If you are a privacy-minded individual who wants to support independent free software development, please buy RCU. The funds generated will support me through writing a non-proprietary handwriting recognition engine, eventually hoping to author "magic paper" software influenced by Dynabook.

I would greatly appreciate your purchase; thank you.

Davis Remmel
Author of RCU

Support Information *ii*

This manual, and the RCU software, are available online from the official project page.

ii.1 General Support

Customers of RCU's original author are entitled to some email support. The author will try his best to satisfy each customer. Please write an email using the following header fields and reference the transaction ID in the message body.

To: Davis Remmel <d@visr.me>
Subject: RCU Support

ii.2 Getting Updates

Updates for release versions are announced through the RCU-Announce mailing list. Updates for development versions are announced through the (opt-in) RCU-Develop mailing list. Additionally, notices are posted to the project's web page (RSS available). The program will not update itself automatically, but can check for the existence of new versions from the About RCU Pane.

Customers will receive any published updates for a minimum of 365 days from the purchase date. The RCU program will never stop working; updates provide improvements, but a user can never be locked out of the software they already own.

ii.3 Defect Reporting

For users who can identify a fault with the program, and its specific circumstance of action, please submit a defect report via email with the following

header fields. In the message body, please include: (a) a description of what is seen when using the program, (b) what is expected to be seen when using the program, (c) steps to reproduce the problem, and (d) information about the operating system and RCU version number (found in the About RCU Pane).

To: Davis Remmel <d@visr.me>
Subject: RCU Defect: *Short description of problem*

ii.4 Mailing Lists

There are two mailing lists: RCU-Announce, and RCU-Develop. All customers are automatically subscribed to the RCU-Announce list.

RCU-Announce only broadcasts when there are new release (stable) versions of the program. Old versions of RCU are linked in this archive.

Subscribing to RCU-Develop is optional. It is a bidirectional list meant to solicit feedback on beta features, discuss general program development, and speed up the release cycle.

RCU-Announce https://lists.davisr.me/mailman/listinfo/rcu-announce
RCU-Develop https://lists.davisr.me/mailman/listinfo/rcu-develop

To subscribe to RCU-Develop, please write an email with the following header fields and reference the transaction ID in the message body.

To: Davis Remmel <d@visr.me>
Subject: Subscribe to RCU-Develop

ii.5 Contributing Patches

Since RCU is free software, users may create and share modifications. Some users may wish for their modifications with others, or to have them be reincorporated into the official RCU software.

The source code of RCU is canonically distributed as a tarball, but is also available as a Git repository. The easiest way to make contributions is to submit diffs to the RCU-Develop mailing list.

1. Starting with the RCU development version source code, make changes and log all commits with relevant details.

   Commit messages should contain a concise title and descriptive body, explaining not only a summary of the changes, but also why the changes were made. Each commit should be digestible and generally not change more than 250 lines.

2. Send an email to the RCU-Develop mailing list using *git-send-email*.

The author watches this mailing list for all submissions. Others are encouraged to create a discussion around submissions. There is no guarantee that submissions will be accepted. Smaller patches have a higher chance of being accepted.

1 Introduction

RCU allows complete offline management of a reMarkable tablet, without needing to connect to the manufacturer's proprietary cloud. It gives its users total freedom.

Using this software, one may take and restore whole-disk snapshots, check battery health, capture screenshots, manage notebooks and templates, set wallpaper, install third-party software packages, and print from any system application through a virtual printer.

1.1 Compatibility

Hardware	reMarkable 1, 2, and Paper Pro
Software	1.8.1.1–3.18.2.3
PC	FreeBSD 13–14, Debian 12.5, Fedora 41, openSUSE Leap 15.6 RHEL 7.9, Ubuntu 20/22/24 LTS, macOS 12–15, Windows 10–11

IMPORTANT NOTICE

If this program is critical to one's workflow, **adhere to the printed compatibility;** disable automatic updates on the tablet and only update its system software after compatibility in RCU is listed.

It is against reMarkable's terms of service to develop or use third-party tools with beta system software.

1.2 System Requirements

RCU will likely run under any OS released since 2017, and its hardware requirements are minimal. It requires at-minimum 100 megabytes of disk space, and may use up to 250 megabytes of memory during some operations.

1.3 Running RCU

RCU is distributed as a single binary package. It does not need to be installed and will run from any directory. Running RCU is as easy as double-clicking on its executable icon. RCU may connect to a tablet by USB or Wi-Fi. During periods of data transfer, never disconnect the tablet; doing so may result in a corrupted transfer.

It is possible to upload a Recovery OS with RCU, which provides an emergency SSH connection over USB and allows the user to take or restore snapshots of their device. For this recovery OS to boot, one must grant USB access under GNU/Linux and Windows, as detailed in Section 1.7: Notes about GNU/Linux and Section 1.8: Notes about Windows .

RCU's application data resides in the paths defined in Figure 1.1.

FreeBSD, GNU/Linux	Settings: *~/.config/davisr/rcu.conf* Shared data: *~/.local/share/davisr/rcu*
macOS	Settings: *~/Library/Preferences/rcu.plist* Shared data: *~/Library/Application Support/rcu*
Windows	Settings: *HKEY_CURRENT_USER\SOFTWARE\davisr\rcu* Shared data: *%APPDATA%\davisr\rcu*

Figure 1.1: Application data paths for supported platforms

1.4 Finding the Connection Settings

RCU uses a technology called SSH (Secure Shell) to communicate with a tablet. Since SSH is a network protocol, three pieces of information are required: the Host (or IP address), Username, and Password. These are found on the tablet, in *Menu–Settings–Help–About–Copyrights and licenses*, under the section titled *GPLv3 Compliance*.

When using a USB connection, the host will be "10.11.99.1", the username will be "root", and the password will vary depending on the tablet. The locations of these settings are shown in Figure 1.2.

A reMarkable Paper Pro (RMPP) must first be put into (and remain in) Developer Mode[1] before these connection settings appear. In order to connect to an RMPP over Wi-Fi, an SSH command[2] must first be issued.

1.5 Enabling the USB web interface

When using system software 3.0+, is strongly recommended to use the tablet's internal software to render documents. To enable its web interface, first plug the tablet directly into a PC with its USB cable (not through a hub). Then, open Menu–Settings–Storage, and enable *USB Connection*[3].

1.6 Entering Recovery Mode

An RM1 tablet may be placed into a recovery/flash mode with this sequence. If necessary, RCU can take and restore snapshots without there being a functional operating system. This mode is also necessary to install the Windows *libusb* driver.

1. Turn the device off.
2. Hold the middle facial button while turning the device on with the power button.

[1] See reMarkable's website for more details.
[2] `rm-ssh-over-wlan on`
[3] This was called *USB Web Interface* prior to system software 3.18.

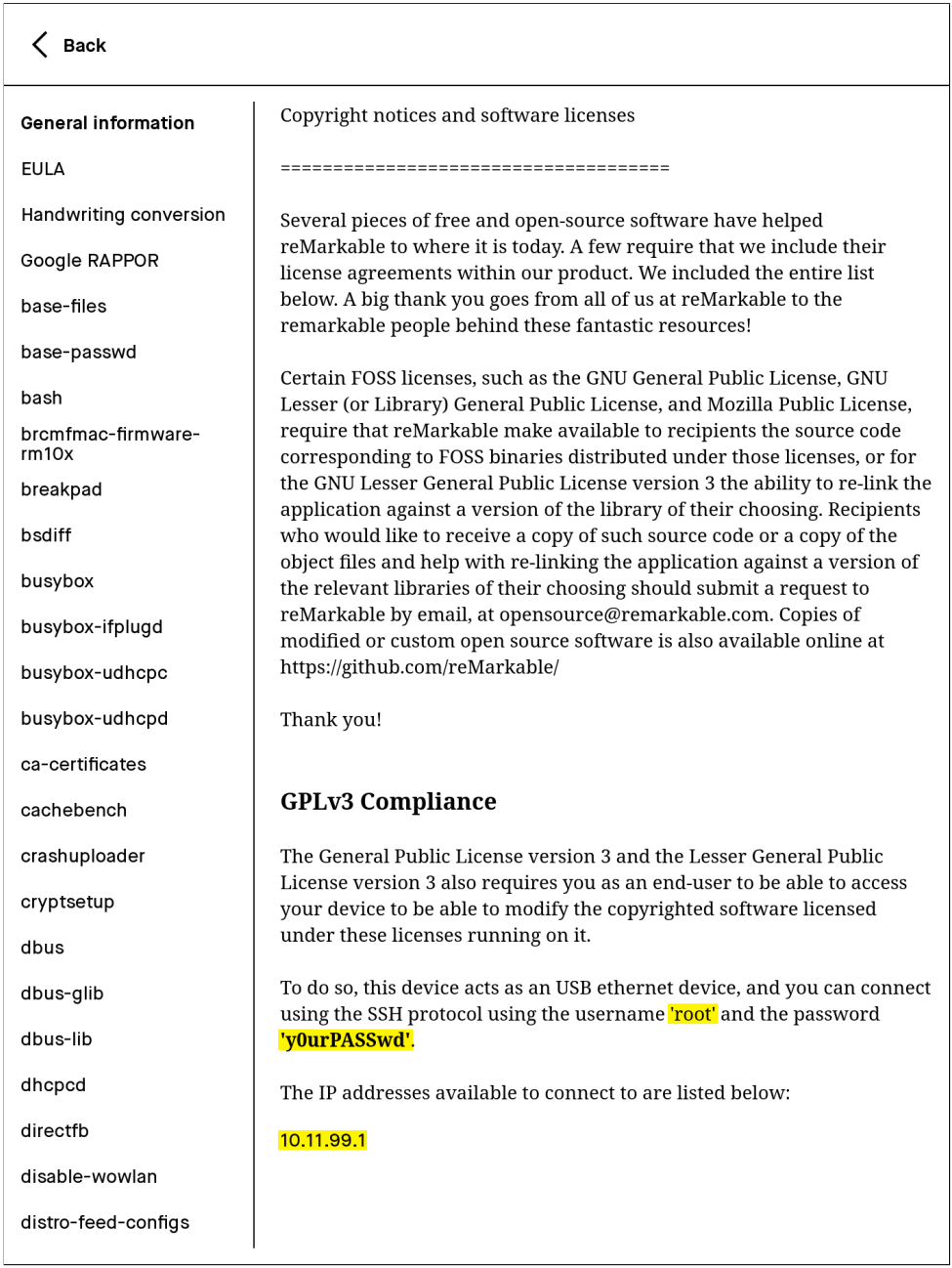

Figure 1.2: “Copyrights and licenses” page with connection settings highlighted in yellow

3. Continue holding the middle facial button for five seconds. The display will not update, but it is on.
4. The tablet should appear on the PC as *SE Blank MERGEZ*. It is now in recovery mode.

When done, restart the tablet by holding the power button for 10 seconds; release, then press the power button to turn it on normally.

1.7 Notes about GNU/Linux

In order to use low-level snapshots with RM1 devices, GNU/Linux hosts must grant read and write access to the tablet via *udev*. While in recovery mode, the tablet appears as a different USB device than normal operation.

Create a new udev ruleset at */etc/udev/rules.d/50-remarkable.rules*, as shown in Figure 1.3. Replace the *GROUP* value with a group belonging to the host's user. After creating this file, reboot the host computer.

```
1 SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2",
  ↪  ATTRS{idProduct}=="0061", MODE="0660", GROUP="yourgroup"
2 SUBSYSTEM=="usb", ATTRS{idVendor}=="15a2",
  ↪  ATTRS{idProduct}=="0063", MODE="0660", GROUP="yourgroup"
```

Figure 1.3: */etc/udev/rules.d/50-remarkable.rules*

Running on unsupported GNU/Linux distributions

RCU works under many GNU/Linux distributions, even if a binary is not distributed for one's specific platform. The most-common incompatibility of a binary version is that PySide2 (Qt) targets a different version of *glibc*, forming symbol lookup errors.

A user with an unsupported GNU/Linux distribution may need to buld their own binary, or run the program from source. This is performed by downloading the "Source Code Archive" version of the program, then issuing *make run* (to run from source), or *make* to build a binary. This is covered further in Chapter 5: Developing with RCU .

1.8 Notes about Windows

In order to use low-level snapshots with RM1 devices, Windows hosts must use the *libusb-win32* driver. Distributed with the RCU binary is a copy of Zadig, a utility that makes it simple to install this driver. First, the tablet must first be placed into recovery mode, which will appear as a new type of USB device.

1. Connect the tablet to a PC with USB.
2. Put the tablet into recovery mode by following the steps in Section 1.6: Entering Recovery Mode .
3. Open Zadig
    a) From the *Options* menu, enable *List All Devices*.
    b) In the device list, select *SE Blank MERGEZ*.
    c) Set the driver target to *libusb-win32*.
    d) Click *Install Driver* and wait for it to complete.
4. Hold the tablet's power button for 10 seconds; release, and press it again to turn the tablet on normally.
5. Reboot the PC

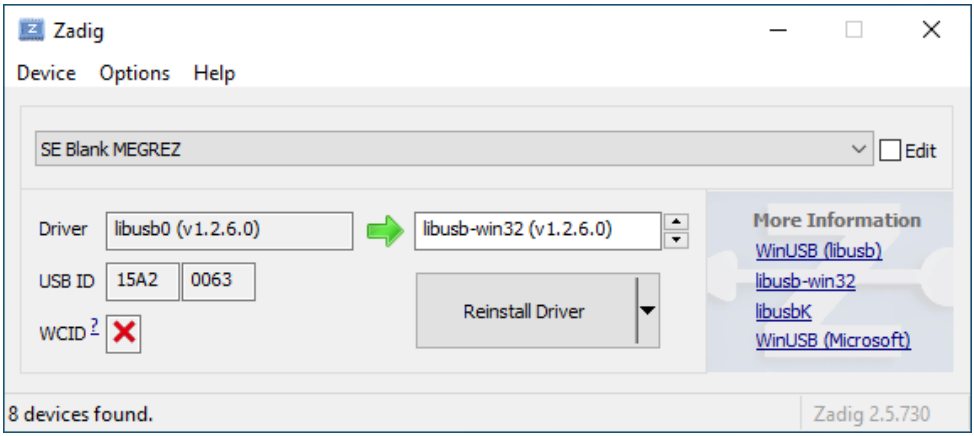

Figure 1.4: Installing the *libusb-win32* driver for Windows

2 Basic Operation

RCU is organized into separate panes, each handling a dedicated task. Panes may be switched by clicking on their titles in the left sidebar.

2.1 Connection Pane

When RCU is launched, it will show the Connection Pane. Three fields are needed to make a connection: Host, Username, and Password. Read more in Section 1.4: Finding the Connection Settings .

Once entered, these connection settings will persist after pressing the Save button. Pressing the Connect button will initiate a connection to the

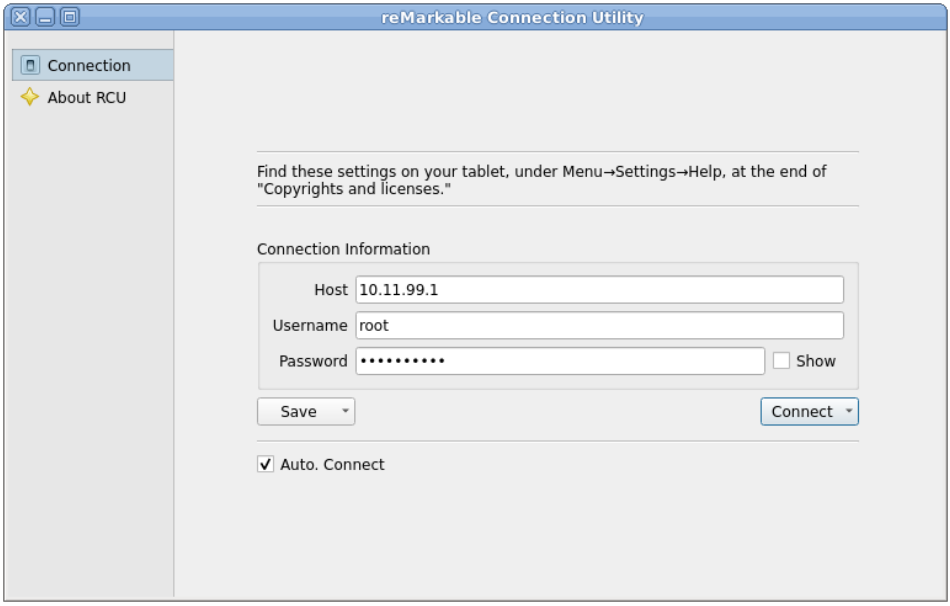

Figure 2.1: Connection Pane

device. If the Auto. Connect checkbox is enabled, RCU will immediately attempt to connect when launched.

Connection presets may be stored, for using RCU with multiple devices or on multiple networks. Presets are accessed through the small arrow on the Save button. New presets may be added, and the active preset may be renamed, saved, or deleted.

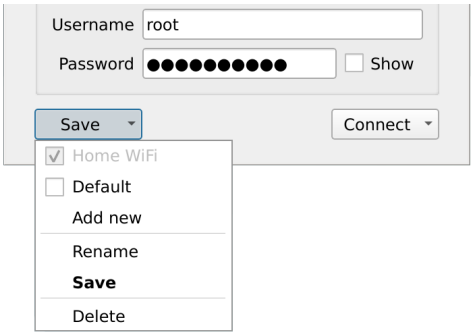

Figure 2.2: Access presets in the Save button drop-down menu.

If a user finds themselves with an unresponsive RM1 tablet, they may place their device into a recovery mode by holding down the home button while pressing the power button. Expand the *Connect* button by pressing the arrow, then click *Enter Recovery OS* (Figure 2.3) to boot over USB.[1]

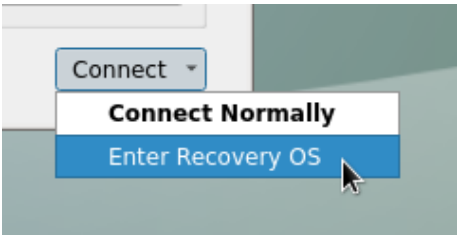

Figure 2.3: Enter Recovery OS

[1] If the tablet has previously loaded the recovery OS, clicking this menu item will enter the existing recovery session.

2.2 Device Info Pane

This pane shows the user information about their tablet, and allows one to perform low-level device operations.

Rename

An owner may sign their name to their tablet using the Rename button. This will change the the label from reading *Connected reMarkable* to *Name's reMarkable* in the Device Info Pane. This name will also be used in the author field of embedded PDF highlight annotations (when enabled).

Snapshots

Snapshots allow one to dump the state of their tablet to the local PC. There are two major types of snapshots: low-level, and high-level. Low-level

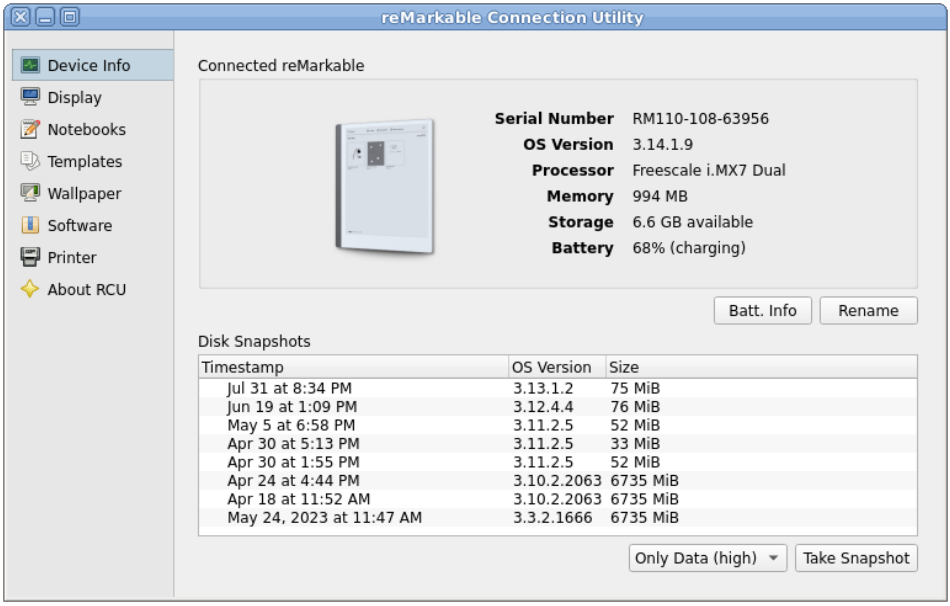

Figure 2.4: Device Info Pane

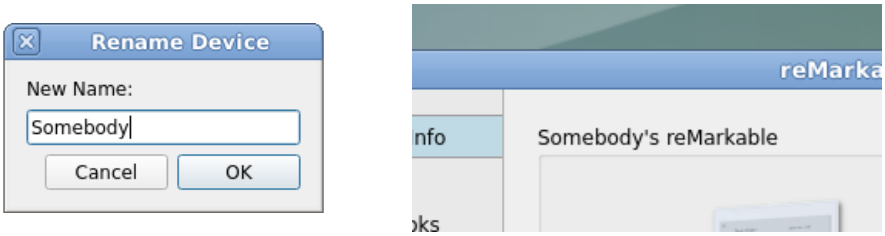

Figure 2.5: Entering a new device name

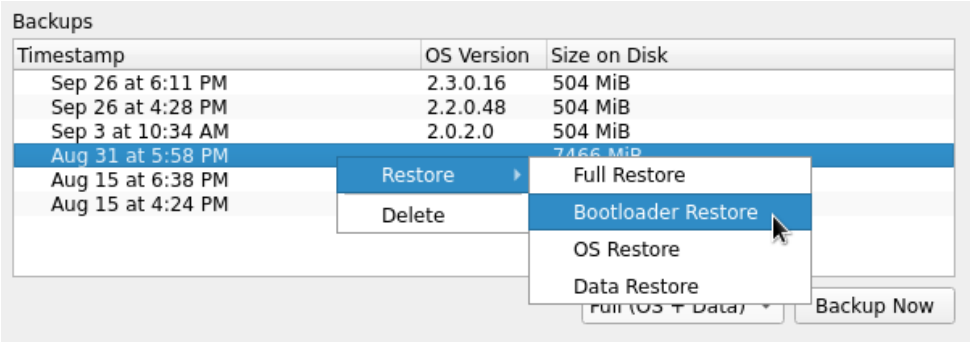

Figure 2.6: A Full snapshot may be restored completely, only the bootloader, only the OS partitions, or only the Data partition.

snapshots dump the tablet's entire disk partition(s). High-level snapshots only dump the contents of the tablet's file system.

Snapshots may only be restored to the device as they were taken. Original data is not altered during a restore. If a user links their tablet with the first-party reMarkable Cloud, restoring a snapshot could interfere with cloud synchronization.

On RM2, both low-level and high-level Data snapshots may be taken, but only high-level snapshots may be restored. All snapshot types are compatible with RM1 because its hardware cannot be bricked during low-level restores.

There are three minor snapshot types: OS-only, Data-only, and Full. Snapshots may only be taken or restored through a USB connection. Only Full snapshots may be used to restore a totally-bricked device.

OS snapshots will restore the operating system partitions to the tablet's

internal storage. These cannot be used to restore a bricked device. If a user applies an undesired OS update to their tablet, an OS snapshot may be used to downgrade to the prior OS without losing data. However, there can be no guarantee the data will remain compatible with the old OS image, such as when reMarkable's system software was updated from version 1 to 2. A copy of the bootloader is captured with an OS snapshot.

Data snapshots will restore the data partition, where user documents (notebooks and uploaded files) and application settings (Wi-Fi networks, passwords and codes) reside, to the tablet's internal storage. They will not affect the operating system partitions, and are best used to revert a bulk of documents to an earlier state.

Full snapshots, as seen in Figure 2.6, may be used to restore a bricked device should the need ever arise. They require the most storage space on the client PC because they contain a complete mirror of the tablet's internal storage. A Full snapshot may be restored completely, or used to restore only the OS, or used to restore only the Data, or used to restore the bootloader.

Although it is possible for advanced users to extract individual files from snapshots, RCU cannot. If a user finds themselves in this situation, they may refer to Appendix A: Snapshot Archive Format .

A custom snapshot directory may be set by modifying the *share_path* variable in RCU's settings (see Section 1.3: Running RCU for OS-specific locations).

Battery Information

Detailed information about a tablet's battery may be seen by pressing the Batt. Info button.

- Status: whether the battery is discharging, charging, or full.
- Temperature: the current temperature of the battery in Celsius and Fahrenheit.
- Current Charge: the presently-stored power, in milliamperes×hours.
- Full Charge Capacity: the amount of power stored on the last full-charge, in milliamperes×hours. The progress bar beneath this field

indicates the current charge divided by the full charge capacity (a measure of the current state of charge).

- Design Capacity: the amount of power the battery was originally designed to store, in milliamperes×hours. The progress bar beneath this field indicates the full charge capacity divided by the design capacity (a measure of battery health compared to when it left the factory).

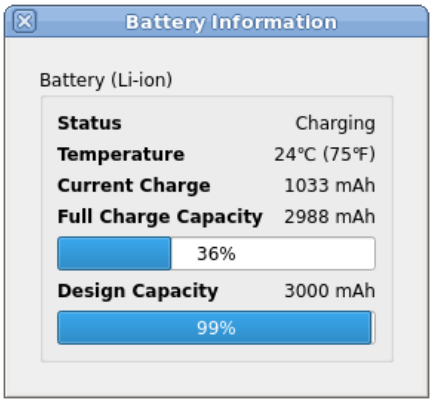

Figure 2.7: Battery information.

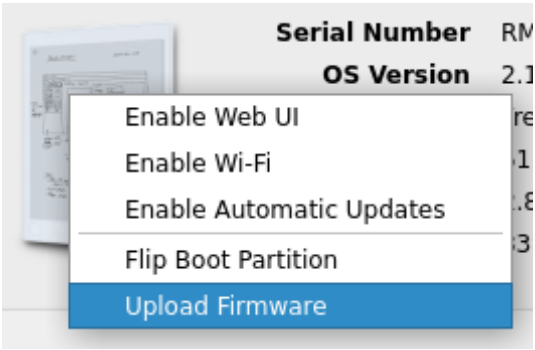

Figure 2.8: The contextual menu, raised by right-clicking on the tablet icon, shows additional operations.

Flip Boot Partition

The Flip Boot Partition menu item is used to switch which boot partition is active and inactive. Right-click on the tablet icon to see this menu.

The tablet has two boot partitions. It always has one set to Active and the other Inactive. During a system software update, the new system software image is written to the inactive partition. Once the write procedure is verified, the tablet marks this newly-written partition Active and marks the other partition Inactive (flipping them).

If one accidentally upgrades their device's system software version, they may immediately revert it by right-clicking the tablet icon, then choosing the Flip Boot Partition menu item. There is no guarantee that data written after a system software upgrade (such as newly-created or modified documents) will be compatible with the older system software version. This operation is performed at one's own risk. It is wise to keep low-level snapshots and document-level archives before using this feature.

Upload Firmware

The Upload Firmware menu item is used to upgrade, downgrade, or reinstall reMarkable system software (with a *.signed* file extension) to the inactive boot partition. Right-click on the tablet icon to see this menu. A USB connection is required for uploading new system software.

Unexpected concequences to tablet data may occur when upgrading system software outside the official upgrade path. reMarkable's notebook data format is known to change between major system software revisions. Using system software not designed to read the format of already-saved notebooks could result in inoperability or errors. One example of such a case is when downgrading from system software 3.0 (or above) to 2.15 (or below): notebooks opened or created with the newer firmware cannot be read with the older system software.

Because system software images are protected by copyright, links shall not be provided here.

2.3 Display Pane

A user may capture screenshots of their tablet through the Display Pane. Press the Refresh button to preview the screen, then press the Save Screenshot button to record the image to disk. The image orientation may be rotated 90 degrees by choosing between the *Portrait* and *Landscape* radio buttons.

Keyboard shortcuts exist in this pane for saving a screenshot to disk (Ctrl+S), copying the screenshot to the system clipboard (Ctrl+C), and refreshing the image (Ctrl+R or F5).

Screenshots are saved as lossless, 8-bit grayscale PNG (no alpha) images, measuring 1404×1872 pixels.

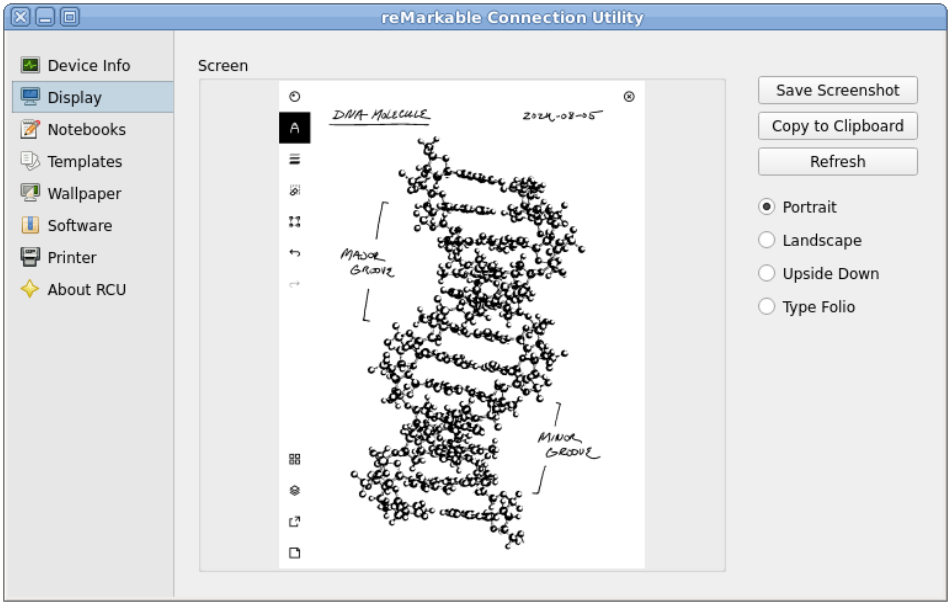

Figure 2.9: Display Pane

2.4 Notebooks Pane

Documents may be transmitted between a tablet and PC through the Notebooks Pane. The default download type is a reMarkable Notebook Archive (RMN) because it can fully restore editable notebooks and their templates[2].

Documents may be uploaded to the device as RMN, PDF, or Epub files. Click the Upload button to select which files to upload. Uploading an RMN will always create a cloned document, changing the document's internal identifier (UUID).

Documents may be downloaded from the device as RMNs, or exported as PDF or Markdown. It is recommended to archive notebooks with the RMN format because they are lossless, containing all the information needed

[2]Information about the RMN format may be found in Appendix B: Notebook Archive Format .

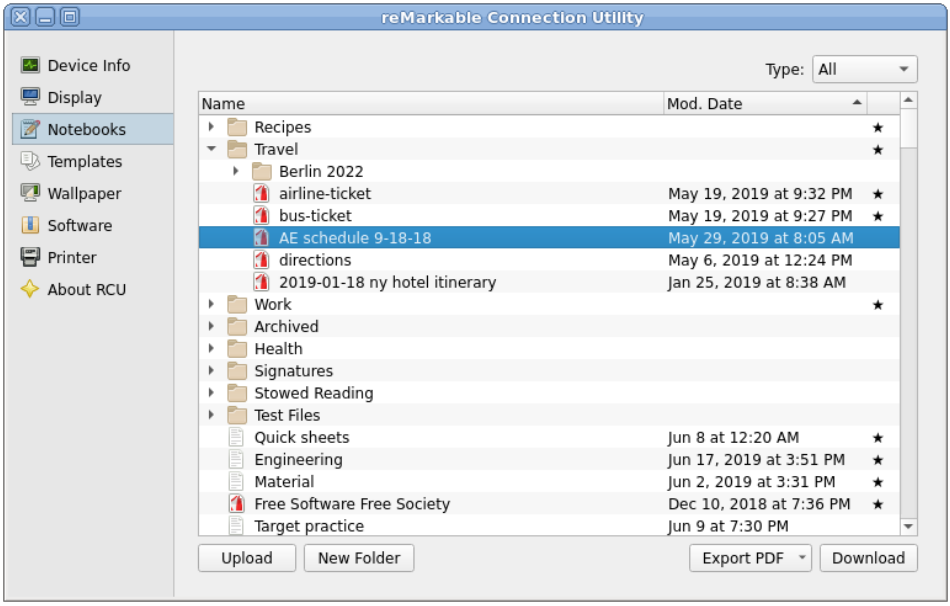

Figure 2.10: Notebooks Pane

to re-create a PDF.[3] When downloading a single file, it may be renamed before it is saved. When downloading files as a batch the user must select a new directory to save them in. When exporting a batch, if identically-named files already exist in the target directory, they will be overwritten.

Various style options may be found inside the Export PDF menu by clicking that button's arrow. These options are detailed in Chapter 3: PDF Export Options . One may set the default renderer from this menu by choosing an export action.

By right-clicking on a document, operations such as Rename, Delete, or Favorite may be performed. When items are favorited, they appear with a star icon at the top of the tree view's sort. Additional export options are also available under this menu, such as to export typed text as Markdown, or to export snap-highlights as plain-text.

Documents may be re-organized by dragging and dropping them into the desired collections.

The Notebooks Pane will automatically refresh when changes are made on the tablet. Notebook data may be forcibly refreshed with Ctrl+R or F5.

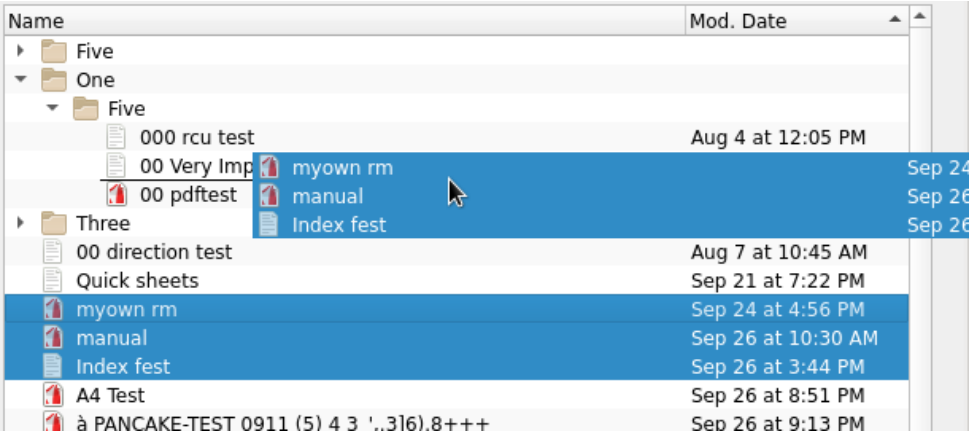

Figure 2.11: Documents may be organized by dragging and dropping between collections.

[3]RCU may convert RMN to PDF without connecting to a tablet. See Chapter 4: Command Line Options .

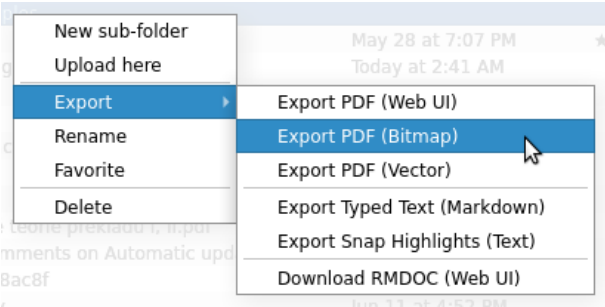

Figure 2.12: The contextual export menu has additional export methods.

Figure 2.13: Choose ink colors, export options, and the default renderer in Chapter 3: PDF Export Options .

2.5 Templates Pane

Users may add or remove their own templates in SVG, PNG, or Template Archive Format (RMT). SVG or RMT formats are preferred.

Add a template to the tablet by clicking the Upload button, then selecting an RMT file. SVG and PNG templates will require the user to enter the appropriate metadata, as shown in Figure 2.15, and should be of appropriate resolution (1404×1872 pixels).

Download a template from the tablet by selecting one in the list view, clicking the Download button, then choosing a filename to save.

To delete a template from the tablet, right-click on it, then choose Delete. Upon confirmation, RCU will permanantly delete the template from the device.

Template are installed to the tablet in *~/.local/share/remarkable/templates*. Softlinks are created in */usr/share/remarkable/templates*, where the system tem-

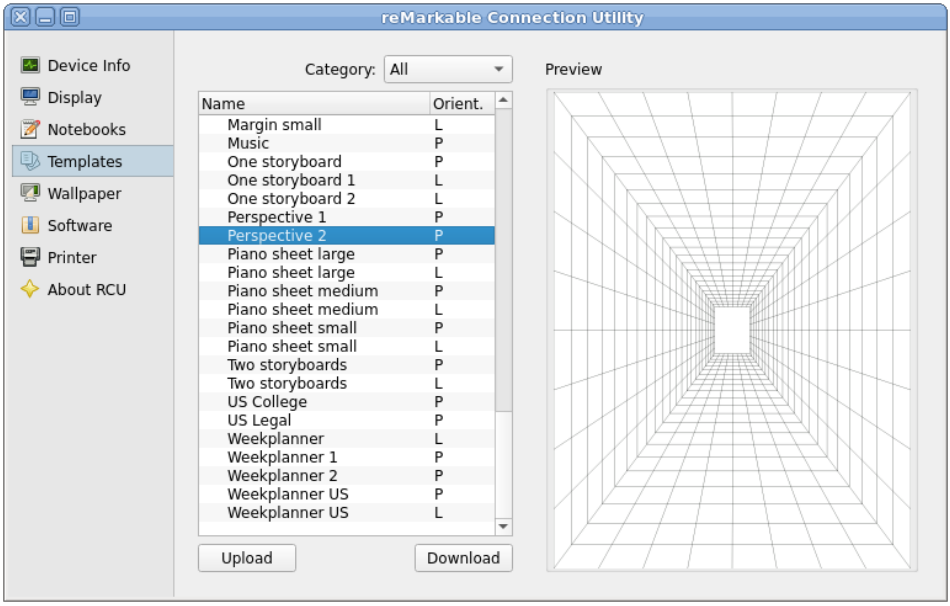

Figure 2.14: Templates Pane

plates are stored. A system update may remove these links, and the templates will not load in the tablet's interface. If the user previously installed custom templates using RCU, this situation will be detected, the program will alert the user, and the template links may be restored automatically. Because templates always reside on the device, any copy of RCU on any computer may be used to fix these links.

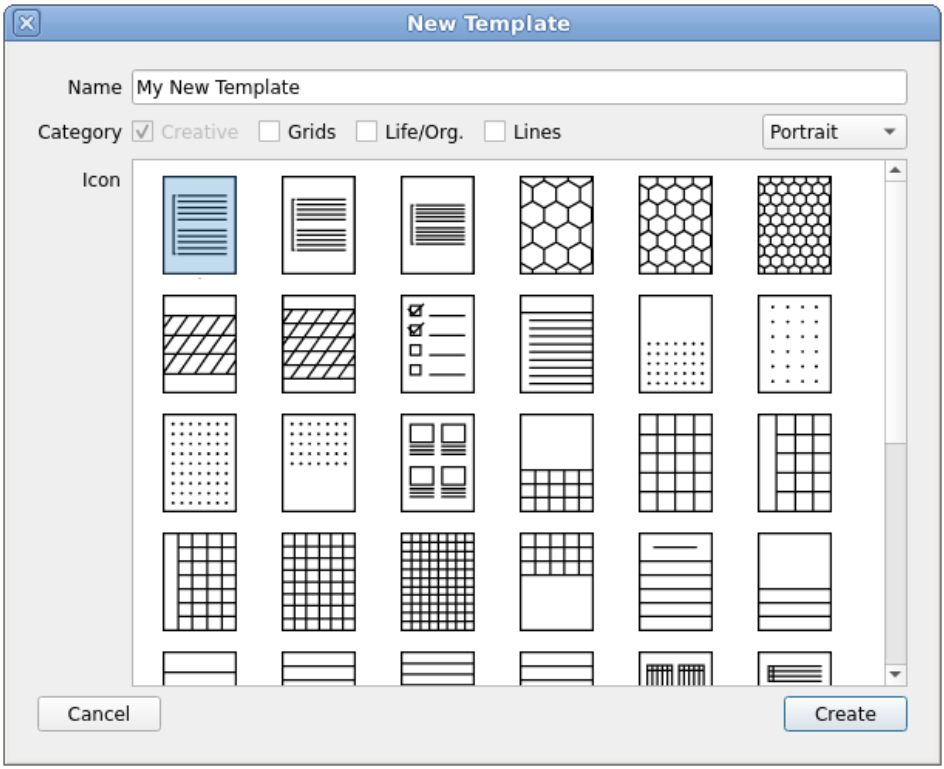

Figure 2.15: *New Template* modal for uploading SVG and PNG templates.

2.6 Wallpaper Pane

Device wallpapers[4] may be changed for the following screens: Suspended (sleep), Powered Off, Starting, Rebooting, Overheating, and Battery Empty.

Users may update wallpaper by pressing the Upload button and selecting a PNG image. It is recommended these images have a resolution of 1404×1872 pixels without transparency.

Images may be reset to the factory-defaults by clicking the Reset button. The current wallpaper may be downloaded with the Download button.

[4]These are sometimes called "splash" images.

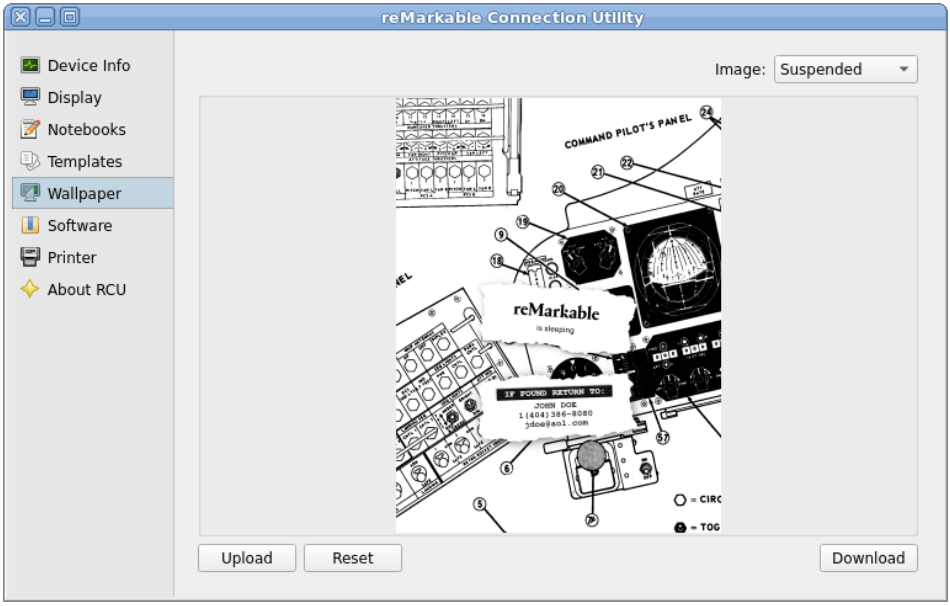

Figure 2.16: Wallpaper Pane

2.7 Software Pane

Third-party software may be uploaded to the device in the reMarkable Software Package (RMPKG) format. For details about creating an RMPKG file, please read Appendix D: Software Package Format .

To install a software package, click the Upload button, select an RMPKG file, then wait for the install process to complete. RCU's interface may freeze momentarily.

To remove a software package, select one in the list view, then click the Uninstall button and wait for the removal process to complete.

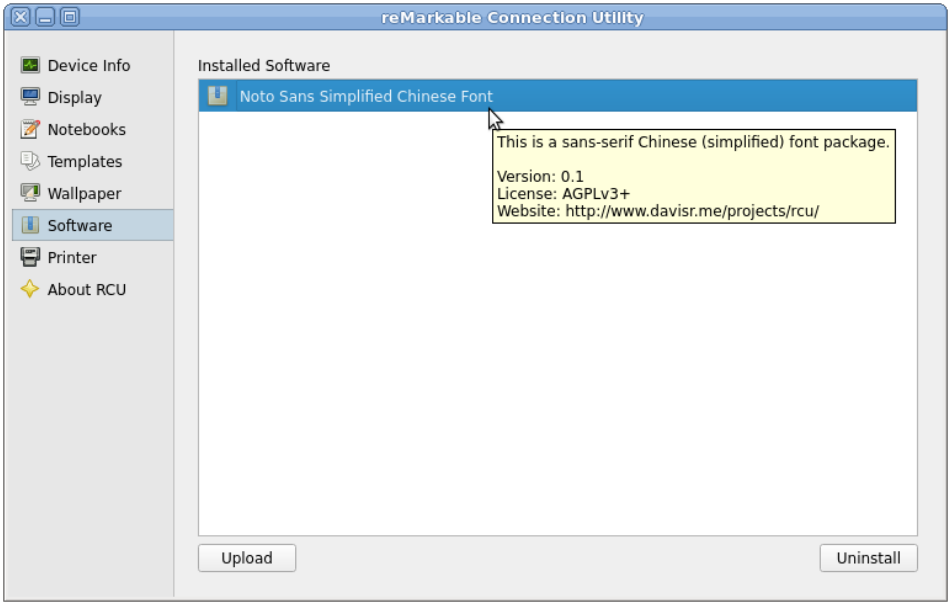

Figure 2.17: Software Pane

2.8 Printer Pane

The virtual printer may allow one to print documents to their tablet natively from any application on their computer. It works by emulating a network printer that converts print commands to PDF, then uploads the result as a new document into the tablet's root collection.

Before the virtual printer may be used, it must be added through the computer's printer settings. The Settings button will open these printer settings.

The virtual printer's state may be changed with the Start or Stop button. Once RCU connects to a tablet, the virtual printer will resume its last operating state.

The computer's print queue will hold pending documents until the virtual printer is started, after which the documents will be uploaded to the tablet.

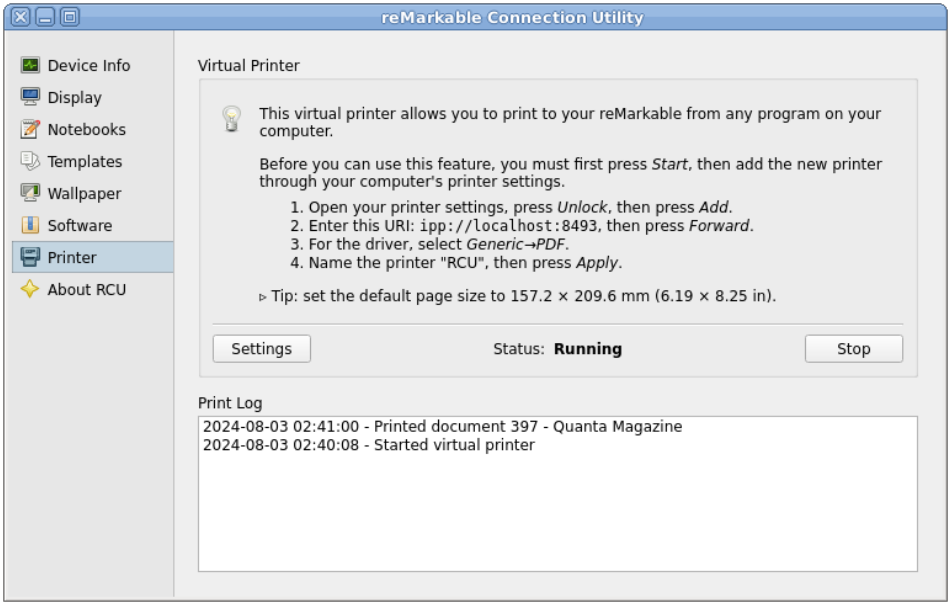

Figure 2.18: Printer Pane

Specific instructions for adding a printer vary per host operating system and desktop environment, and are displayed in the pane's information box. The virtual printer will bind to *localhost:8493* and communicate via Internet Printing Protocol (IPP). The accepted data format is usually PostScript, except on FreeBSD and GNU/Linux, where the data format is expected to be PDF.

2.9 About RCU Pane

Meta information about RCU may be viewed in the About RCU Pane. This view contains its version number, credits to the people and software RCU depends upon, and copies of relevant software licenses.

By clicking the Check for Updates button, a user may request RCU to contact the update server to check if they are running the latest version.

By clicking the Fetch Compatibility button, a user may request RCU to contact the update server to download the latest compatibility table. When the reMarkable company issues a non-breaking software update, a new compatibility table allows the old version of RCU to work with the new system software version.

Enabling “On Start” will check for updates and fetch new compatibility each time RCU is started.

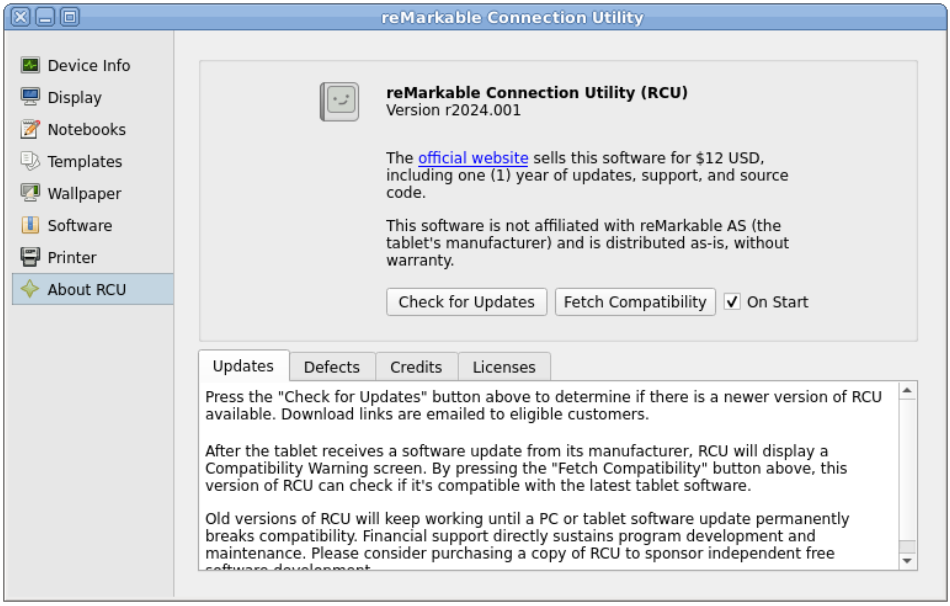

Figure 2.19: About RCU Pane

3 PDF Export Options

RCU has three PDF rendering modes, each producing a different kind of result. Users of newer tablet software expecting stability should use the web UI renderer, which creates a PDF on the tablet using reMarkable's own software and copies the result back. However, that method cannot use RCU's custom rendering options. RCU also has its own PDF renderers which can produce files with custom rendering properties and either *Bitmap* or *Vector* graphics.

Bitmap and Vector renderers are wholly compatible with system software 2.15 and below, and experimental with 3.0 or later.[1] These renderers are custom-written and lag behind reMarkable file format changes.

A specific PDF renderer may be temporarily selected through the contextual menu (Figure 2.12). A default renderer may be selected in the Notebooks pane under the Export PDF menu (Figure 2.13).

Export Density

RCU may export bitmap PDFs in either standard density (1404×1872 pixels, 0.25 MB/page) or high density (2808×3744 pixels, 0.5 MB/page).

Annotations

RCU may convert all highlight strokes to PDF highlight annotations, as shown in Figure 3.2. If a name is provided using the Rename button in the Device Info Pane, that name will be inserted into the anontation's author field.

When the Grouped Annotations export option is enabled, highlights within one stroke-width of each other will be embedded as a single highlight annotation.

[1] Check the Release Notes regarding this feature's compatibility with system software 3.0+.

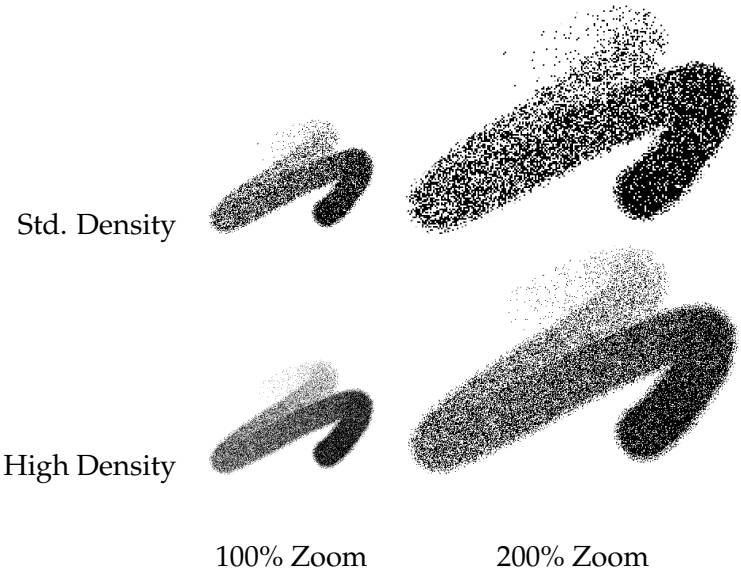

Figure 3.1: Comparison of export densities using the Pencil pen.

If bookmarks are made with *ddvk/remarkable-hacks*, these will be inserted at the top of the resulting PDF's outline index.

Layers

RCU may export each reMarkable document layer as a PDF optional content group (OCG). Most PDF readers render the OCG list into a Layers sidebar index, like shown in Figure 3.3.

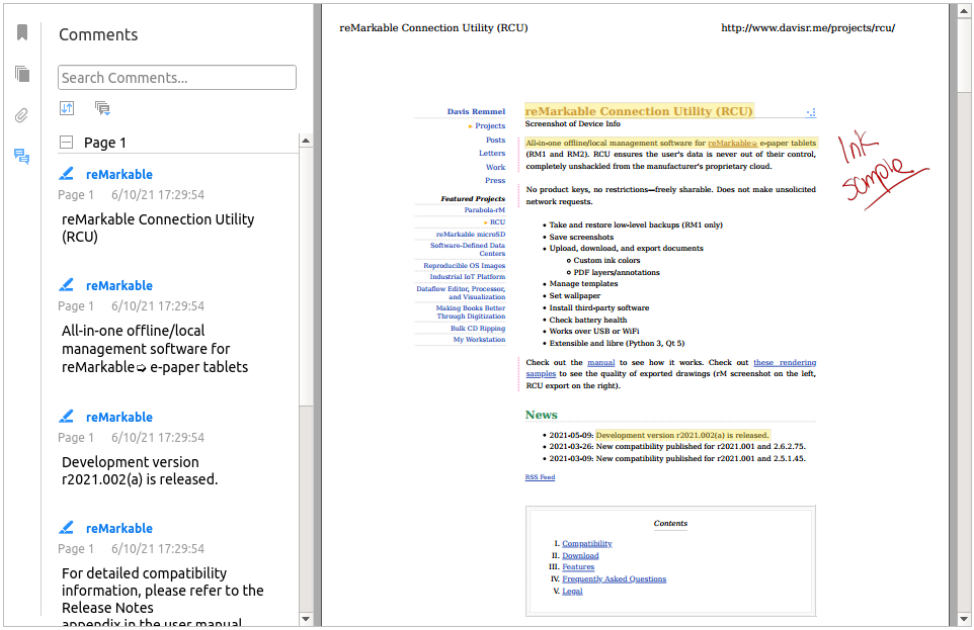

Figure 3.2: Exported highlight annotations shown in a PDF reader's sidebar.

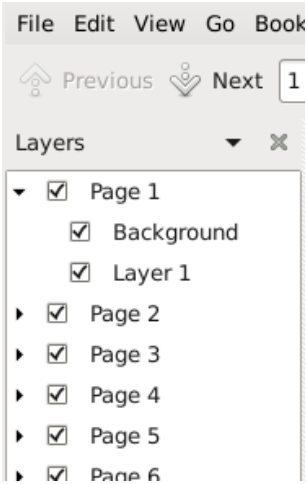

Figure 3.3: Document layers are extracted as PDF layers.

4 Command Line Options

RCU may operate either as a GUI or a CLI program, and its behavior may be changed with flags and arguments.

Application Options

- `-h, --help`
  Print command line options and exit.
- `-v, --version`
  Print version number and exit.
- `--autoconnect`
  Immediately connect to the last-used preset.
- `--dark`
  Force dark theme.
- `--no-check-compat`
  Skip pane compatibility checks (load anyway).
- `--no-check-reclaim-storage`
  Skip check for deleted documents.
- `--cli`
  Don't show GUI or log (best used with `--autoconnect`).
- `--purge-settings`
  Delete all saved configuration (like presets, export options, and file paths).

Rendering Options

- `--render-rmn-pdf-b "in.rmn" "out.pdf"`
  (Files) Render a local RMN archive to PDF (bitmap).

- `--render-rmn-pdf-v "in.rmn" "out.pdf"`
  (Files) Render a local RMN archive to PDF (vector).

- `--page-range "1,3-10"`
  (String) Set the page numbers or ranges (separated by commas) to use in final resulting PDF.

- `--layered 1`
  (Boolean) Export the PDF with embedded layers (optional content groups).

- `--annotated 1`
  (Boolean) Export the PDF with embedded highlight annotations.

- `--grouped-annots 1`
  (Boolean) Group embedded highlight annotations by proximity.

- `--res-mod 2`
  (Numerical) Bitmap PDF pixel density modifier.

- `--color-black "0,0,0"`
  (String) Set the RGB value of "black" ink.

- `--color-gray "128,128,128"`
  (String) Set the RGB value of "gray" ink.

- `--color-white "255,255,255"`
  (String) Set the RGB value of "white" ink.

- `--color-blue "0,0,255"`
  (String) Set the RGB value of "blue" ink.

- `--color-red "255,0,0"`
  (String) Set the RGB value of "red" ink.

- `--color-highlight "253,255,50"`
  (String) Set the RGB value of "yellow" highlighter.

- `--color-highlight-green "169,250,92"`
  (String) Set the RGB value of "green" highlighter.

- `--color-highlight-pink "255,85,207"`
  (String) Set the RGB value of "pink" highlighter.

- `--color-highlight-gray "207,207,207"`
  (String) Set the RGB value of "gray" highlighter.

Display Options

- `--screenshot-0 "out.png"`
  (File) Save a screenshot as PNG (portrait).

- `--screenshot-90 "out.png"`
  (File) Save a screenshot as PNG (landscape).

- `--screenshot-180 "out.png"`
  (File) Save a screenshot as PNG (upside down).

- `--screenshot-270 "out.png"`
  (File) Save a screenshot as PNG (type folio).

Notebook Options

- `--list-documents`
  Tab-separated list of documents (`doc_id`, `name`, and `modification date`).

- `--list-collections`
  Tab-separated list of collections (`col_id`, `name`, and `modification date`).

- `--upload-doc "in.pdf"`
  (File) Upload document.

- `--upload-doc-to "in.pdf" <col_id>`
  (File) Upload document to specific collection.

- `--download-doc <doc_id> "out.rmn"`
  (File) Download RMN notebook archive.

- `--download-rmdoc <doc_id> "out.rmdoc"`
  (File) Download RMDOC notebook archive.
- `--export-pdf-rm <doc_id> "out.pdf"`
  (File) Export PDF (web UI).
- `--export-pdf-b <doc_id> "out.pdf"`
  (File) Export PDF (bitmap).
- `--export-pdf-v <doc_id> "out.pdf"`
  (File) Export PDF (vector).
- `--export-pdf-o <doc_id> "out.pdf"`
  (File) Export PDF (original base).
- `--export-epub-o <doc_id> "out.pdf"`
  (File) Export Epub (original base).
- `--export-snaphighlights-txt <doc_id> "out.txt"`
  (File) Export snap highlights (text).
- `--export-typedtext-md <doc_id> "out.md"`
  (File) Export typed text (Markdown).

4.1 Example Usage

Export a specific document as a bitmap PDF.

1. Find the ID of the document.
   ```
   ./rcu --autoconnect --cli --list-documents
   ```
2. Use that ID to export a PDF.
   ```
   ./rcu --autoconnect --cli \
   --export-pdf-b "<doc_id>" "/tmp/out.pdf"
   ```

Upload a document to the root folder.

```
./rcu --autoconnect --cli --upload-doc "somefile.pdf"
```

Convert a local RMN to vector PDF without connecting to the tablet.

```
./rcu --render-rmn-pdf-v "somefile.rmn" "/tmp/out.pdf"
```

Export the snap highlights from a document.

```
./rcu --autoconnect --cli \
--export-snap-highlights <doc_id> "/tmp/out.txt"
```

5 *Developing with RCU*

RCU is a program which is written for Python 3.6–3.10. It uses the Qt graphics library (C++) through bindings using PySide2. Template icon (font) rendering is handled with Pillow. PDF operations are handled with Qt and pikepdf. PC/tablet communications go through SSH using Paramiko. Although RCU is written in Python, the source and interpreter can be combined into a single executable using PyInstaller. All dependency management is handled with Python's internal virtual environment tool (venv).

The build machine should be a targeted platform (FreeBSD, GNU/Linux, macOS, or Windows). It expects to use `python3.9` on FreeBSD (included with base system), and will detect `python{10..6}` on all other platforms. Python should be supportive of virtual environments using `python3 -m venv`. The PC should have GNU Make and Bash.

To build the binary, run `make`. Most targets utilize a Python venv, automatically created at *rcu/venv*. Build assets may be cleaned with `make clean`. The venv and documentation are not usually cleaned, so remove them with `make clean-venv` and `make clean-doc`.

Under Windows, a binary must be built with `Make-win.bat {console|windowed}`.

5.1 Platform dependencies

When building RCU on a specific platform, the following dependencies are required. RCU requires no dependencies merely to run from a compiled state.

FreeBSD 13.2	*gmake bash rust qpdf py39-pyside2*
FreeBSD 14.2	*gmake bash rust qpdf py311-pyside2*
Fedora 41	*make python3.8*
openSUSE 15.6	*make libgthread-2_0-0*
RHEL 7.9	*python3*
Ubuntu 20.04 LTS	*make binutils python3.8-venv libxcb-xinerama0*

Ubuntu 22.04 LTS	*make binutils python3.10-venv libxcb-xinerama0*
Ubuntu 24.04 LTS	*libxcb-xinerama0*
macOS 12	*brew qpdf*
Windows 10	Python 3.10, MS VCpp 14, Ghostscript 10.01.2

5.2 Common Makefile Targets

all	Build just the binary for the current platform (default target).
run	Run the program from source within venv.
venv	Create the python venv for dependency management.
doc	Compile the user manual as PDF (requires LaTeX).
package	Build the release archive for the current platform.
clean	Purge build assets (but keep venv and documentation).

5.3 Adding Custom Panes

The pane architecture of RCU is modular, so new panes are straightforward to add. To write a new pane, first create a new directory under *src/panes* to hold the new pane's code. In that directory, create a file, *pane.py*, which will serve as the focal point of execution.

The *pane.py* file must contain a class for the pane, implementing the following requirements: (a) the pane must inherit from the *UIController* class[1], (b) it must provide the *name* and *ui_filename* class variables, and (c) it must initialize first through the parent class. An example is listed in Figure 5.2.

The pane must be accompanied by a Qt UI file, specified in the class variable *ExamplePane.ui_filename*. This is exposed to the pane's class as *self.window* upon instantiation.

After adding the *pane.py* file, import it within *src/panes/__init__.py* (Figure 5.1). Once added, the pane will draw itself into RCU's main window.

For non-immediate tasks, it is recommended to use a Worker object. RCU's GUI runs on the main thread, and blocking this may provide a poor user experience. Workers may be executed in the thread pool, which re-

[1] Find the UIController source code at *src/controllers/UIController.py*.

turn to the main thread via asynchronous callback. For examples of worker usage, please read a bundled pane's code.

```
1 from .example.pane import ExamplePane
2
3 paneslist = [
4     # ...
5     ExamplePane
6     ]
```

Figure 5.1: Example of importing *pane.py* in *src/panes/__init__.py*

```
'''
pane.py
This is an example pane.

License: AGPLv3 or later
'''

from Worker import worker
from pathlib import Path
from controllers import UIController

class ExamplePane(UIController):
    name = 'Example Pane'

    # Dynamic path loading works when running from source
    # and binary.
    adir = Path(__file__).parent.parent
    bdir = Path(__file__).parent
    ui_filename = Path(adir / bdir / 'example.ui')

    xochitl_versions = [
        '^3\.4\.[0-9]+\.[0-9]+$'
    ]

    @classmethod
    def get_icon(cls):
        path_s = str(Path(cls.bdir / 'icons' / 'emblem.png'))
        icon = QIcon()
        icon.addFile(path_s, QSize(16, 16), QIcon.Normal, QIcon.On)
        return icon

    def __init__(self, pane_controller):
        super(type(self), self).__init__(
            pane_controller.model, pane_controller.threadpool)
        # Exposed now are self.model, self.window, and
        # self.threadpool.
        # ...
```

Figure 5.2: Example source code for *pane.py*

6 Troubleshooting

RCU can't connect to the tablet.

If a connection between the PC and reMarkable can't be established, the Connection Pane will show an error message.

The most-common problem is trying to use incorrect login information. The font used by the device to show the password can be confusing if certain characters are used, such as uppercase "I", lowercase "L", and number "1". Try different combinations if your password contains these characters.

If you are certian the login information is correct, it is recommended to use *ping* to see if your PC is able to communicate with the tablet. Another way to test network connectivity is to enable the USB web interface. If you can connect using the web interface, you likely don't have a network problem.

If you use a PC supplied by an employer, they may be blocking network requests. In that case, it is best to speak with the IT department about granting access.

The tablet reboots after some operations.

The tablet may appear to reboot after some operations, such as after uploading a PDF, taking a snapshot, or setting new wallpaper. This is normal behavior. The main program running on the tablet, called Xochitl, must be restarted to become aware of changes made by third-party software. If you would like to see this improved, please ask reMarkable AS to "provide a software mechanism for Xochitl to become aware of third-party changes to notebooks, templates, and wallpaper, without requiring one to restart the Xochitl system service."

RCU is showing a Compatibility Warning screen.

When a reMarkable tablet receives an update to the latest system software, RCU may display a Compatibility Warning screen. Since RCU trails re-

Markable updates, it defaults to block access if using the program with a reMarkable system software version it doesn't know about. This mechanism is to prevent RCU from clobbering the tablet if reMarkable had introduced a breaking update.

If a tablet update is found to be non-breaking, then RCU does not need to be wholly updated. Instead, RCU can download a new compatibility table that will allow it to work with new tablet software. This table may be updated in the About RCU Pane with the Fetch Compatibility button.

This warning message may be bypassed with the `--no-check-compat` command-line flag.

Templates aren't included with exported notebooks.

If a compatibility warning is bypassed for the Notebooks Pane, but not for the Templates Pane, then templates will not be included in PDF or RMN exports. Both panes must be loaded for templates to become exported.

Documents created or modified with system software 3.0+ can't be exported as Bitmap or Vector PDFs.

Support for exporting PDFs through RCU's custom renderer (Bitmap and Vector export options) from documents created or modified with system software 3.0+ is experimental. The document types which may be rendered with RCU's internal renderer are Epubs and PDFs with a reMarkable-native aspect ratio, and notebooks which do not use the continuous pages or text input features.

Any document may be exported with the reMarkable's own renderer by using the Export PDF (Web UI) option. Please refer to Notebooks Pane for information about export types.

The "Export PDF (Web UI)" option is disabled.

RCU can export documents through the tablet's internal web interface (UI), either over USB or Wi-Fi. However, the interface's state may only be changed when the tablet is plugged into a computer with USB.

To enable the tablet's web interface, follow the steps in Section 1.5: Enabling the USB web interface .

Adding the virtual printer failed.

With some configurations, your operating system's printer manager may fail to add RCU's virtual printer.

On Windows, a common message is "Windows could not connect to the printer." In this case, you must press the *Start* button in the Printer Pane to enable the virtual printer service.

If using FreeBSD or GNU/Linux, the system's default printer configuration tool may not mesh well with the CUPS print subsystem. Notably, Ubuntu's *gnome-control-center* can fail with a generic "Failed to add new printer" message, even though it works fine on other systems, like Fedora. In cases like these, open your local CUPS web administrative panel at http://localhost:631/ and add the printer there. When prompted, export and use the PPD driver file from RCU.

Snapshot Archive Format

A

Low-level snapshots are stored on the PC's disk under RCU's shared data directory. The exact path for each operating system is listed in Figure 1.1.

Each snapshot archive is given a unique identifier, and a directory is created to store its contents. An example directory structure is listed in Figure A.1

```
backups
└── 902b512b-8742-481d-b5f1-e185c0668e9f
    ├── files
    │   ├── mmcblk1boot0.bin
    │   ├── mmcblk1boot1.bin
    │   └── mmcblk1.bin
    └── backup.json
```

Figure A.1: Example structure of a snapshot archive

The *backup.json* file contains metadata about the snapshot, and is used by RCU to populate the UI. In summary, this file contains the snapshot's ID, timestamp, device information, the device's partition table (output of *fdisk -l*), and checksums of the dumped partitions.

Depending on the reMarkable hardware variant, the eMMC device may reside at */dev/mmcblk1* for RM1, or */dev/mmcblk2* for RM2.

OS snapshots store the bootloader, secondary boot partition (containing factory device information), the bootloader data partition, primary OS partition, and secondary OS partition. The primary OS may reside on *mmcblk1p2* or *mmcblk1p3*, flipping after every system update.

- /dev/mmcblk1boot0
- /dev/mmcblk1boot1
- /dev/mmcblk1p1

- /dev/mmcblk1p2
- /dev/mmcblk1p3

Data snapshots only store the data partition, which is mounted as */home/root*.

- /dev/mmcblk1p7 or /dev/mmcblk2p4

Full snapshots store the bootloader, secondary boot partition, and the entire contents of the eMMC (all partitions combined).

- /dev/mmcblk1boot0
- /dev/mmcblk1boot1
- /dev/mmcblk1

Notebook Archive Format

B

Notebook Archive (RMN) files contain the raw editable data used by Xochitl, plus a copy of each template applied. They have an obvious structure, as seen in Figure B.1. This directory is a direct export from Xochitl's files, from the device at *~/.local/share/remarkable/xochitl*.

```
ExampleNotebook.rmn
├── 6bde82bd-f580-456b-8275-c853438707a6/
│   ├── 5ae652c8-280b-4b00-9563-72f25f16ac29.rm
│   ├── 3e9610c9-7633-4964-8198-adc0d1968cea.rm
│   └── (...)
├── 6bde82bd-f580-456b-8275-c853438707a6.highlights/
├── 6bde82bd-f580-456b-8275-c853438707a6.bookm
├── 6bde82bd-f580-456b-8275-c853438707a6.content
├── 6bde82bd-f580-456b-8275-c853438707a6.metadata
├── 6bde82bd-f580-456b-8275-c853438707a6.pagedata
├── Blank.rmt
└── Small Lines.rmt
```

Figure B.1: Example structure of a notebook archive

When saving a document it is preferred to use the RMN format over the PDF format because RMN files contain an exact copy of those notebooks. Therefore, a PDF may always be generated from an RMN archive.[1]

Notebook archive files store all templates used in the document. When uploading an archive to a new device, these templates will be automatically installed if they didn't already exist.

[1] See: Command Line Options

C Template Archive Format

The Template Archive (RMT) format stores a vector image and reMarkable UI metadata in a single file. Typically, reMarkable templates are shared as singular PNG images; this has a number of drawbacks, like being stuck with a static resolution and lack of metadata.

The RMT format solves those issues by bundling a vector image of the template (SVG), instead of a bitmap image, and includes template metadata (JSON) in a tape-archive (TAR). An example file structure of an RMT file may be seen in Figure C.1.

```
ExampleTemplate.rmt
├── template.json
└── template.svg
```

Figure C.1: Example structure of a template archive

The *template.json* file should contain, at minimum, a structure similar to Figure C.2. The *fileName* attribute should be a UUID and is necessary to prevent template collisions; if this is not explicitly specified, one will be generated by RCU.[1] The *categories* array may contain any of the following strings:

- Creative
- Grids
- Life/organize
- Lines

The *template.svg* file should contain valid SVG data and have a viewport resolution of 1404×1872 pixels. When a template archive is uploaded, these

[1] Do not share manually-created RMT files that don't have a *fileName* attribute, otherwise collisions may occur or there could be multiple versions of identical templates.

```
{
    "categories": [
        "Creative"
    ],
    "iconCode": "\ue9d5",
    "landscape": false,
    "name": "Example Template",
    "fileName": "<UUID>"
}
```

Figure C.2: Example source code for *template.json*

files are not extracted to the default template location (*/usr/share/remarkable/templates*). Instead, they are extracted into the user's home directory at *~/.local/share/remarkable/templates*. Upon upload, RCU will convert the SVG image to a PNG image to retain compatibility with Xochitl.

If the tablet receives an update that clears the system template directory, the templates will become unavailable from the interface. RCU may detect this condition and prompt the user to recreate these template links, in-effect restoring the templates (they do not need to be re-uploaded).

Software Package Format

D

Please download the RCU sources, then find the *rmpkg-sample* directory. This sample package contains useful information about the package format in a practical way, by using a self-extracting shell script with a tape-archive payload.

The RMPKG format is a self-contained executable that exposes a number of command line arguments. This format has several convenient properties:

- Installable any time, directly onto a stock tablet, no other software required (not even RCU).
- Self-contained package format convenient to download, convenient for authors to earn income for their work.
- Possible to write an RMPKG in any language that targets ARMv7
- No Internet access required
- Handles own compatibility checks, installation, and uninstallation

There are many ways to build a program that fit this description. The easiest way to configure an RMPKG is with an ordinary shell script, appended with the application's binary payload (like a .tar), which self-executes. An RMPKG should expose the following flags.

- `--info`
  Prints information about the package useful for anyone who stumbles upon it
- `--manifest`
  Prints a manifest of any files touched by the package; used for detecting conflicting packages
- `--install`
  Installs the package payload to the system

- `--uninstall`
  Uninstalls the package payload from the system

RCU uploads packages to the tablet's *~/.rmpkg* directory.

Release Notes

E

E.1 v4.0.24

Released on May 20, 2025, this version updates nearly every aspect of the program with recent system software compatibility, recent operating system compatibility, has a new renderer for truly native PDF output, provides Markdown text exports, adds a new Printer pane, allows direct firmware uploads, and fixes outstanding defects.

Compatibility

Hardware	reMarkable 1, 2, and Paper Pro
Software	1.8.1.1–3.18.2.3
PC	FreeBSD 13–14, Debian 12.5, Fedora 41, openSUSE Leap 15.6 RHEL 7.9, Ubuntu 20/22/24 LTS, macOS 12–15, Windows 10–11

Important Notices

! It is recommended that users of system software 3.0+ export PDF documents through the Web UI export option.

! This version of RCU rewrites the PDF renderer, which may have unknown defects. Compatibility with reMarkable system software 3.0+ is limited, and may only render Epubs and PDFs with a reMarkable-native aspect ratio, and notebooks which do not use the continuous pages or text input features.[1]

! Low-level disk snapshots for RM2 and RMPP may be taken, but not yet restored.

[1] See Section E.1: Workarounds for more details.

Release Notes

- Adds system software compatibility for 2.10.0.324 through 3.18.2.3.
- Adds hardware compatibility with reMarkable Paper Pro.
- Updated the minimum supported operating systems.
- Switched to semantic "semver" version numbering (used to be in YYYY.nnn(format).
- Integrates the Connection Dialog into a new Connection Pane, with the option for automatically starting the connection.
- Introduces Printer Pane which can act as a virtual printer for receiving documents.
- Introduces a one-window modality, replacing the old Connection Dialog with the new Connection Pane.
- Adds CLI arguments: `--purge-settings`, `--no-check-reclaim-storage`, `--screenshot-0`, `--screenshot-90`, `--screenshot-180`, `--screenshot-270`, `--page-range`, `--layered`, `--annotated`, `--grouped-annots`, `--res-mod`, `--color-black`, `--color-gray`, `--color-white`, `--color-blue`, `--color-red`, `--color-highlight`, `--color-highlight-green`, `--color-highlight-pink`, `--color-highlight-gray`, `--export-pdf-rm`, `--export-epub-o`, `--export-snaphighlights-txt`, `--export-typedtext-md`, `--download-rmdoc`.
- Ability to en/disable tablet settings: Web UI, Wi-Fi, Automatic Updates.
- Ability to upload specific firmware.
- Ability to flip the active boot partition.
- Ability to take and restore Data snapshots of RM2.
- Ability to delete snapshots in-bulk.

- Ability to capture screenshots in any orientation.
- Ability to copy screenshots to system clipboard.
- Ability to delete templates in-bulk.
- Ability to export password-protected PDFs.
- Ability to set default PDF renderer.
- Ability to export PDFs via Web UI, either over USB or Wi-Fi.
- Ability to export typed text as Markdown.
- Ability to export snap highlights as plain-text.
- Ability to download original Epub backing files.
- Ability to upload and download reMarkable-native RMDOC files (3.10).
- Ability to change wallpapers for Starting, Rebooting, Overheating, and Battery Empty screens.
- Ability to restore wallpapers after system software update.
- Ability to automatically check/fetch RCU updates upon start.
- Adds a high-level Data snapshot option.
- Adds a GUI option for automatically connecting to the last-used preset.
- Adds PDF export option for fallback-to-Web-UI rendering.
- Adds PDF export option for highlight annotation grouping.
- Adds PDF export options for editing more brush colors.
- Retains *ddvk/remarkable-hacks* bookmarks in PDF exports and RMN operations.
- Supports high-DPI displays, such as Apple Retina.

- Faster macOS application start time.
- Adds tooltip text, keyboard shortcuts, accessibility names to most operations.
- Shows battery state of charge in Device Info pane.
- Renames *Backups* to *Snapshots* in Device Info pane and documentation.
- Lock recovery OS to take/restore snapshots only at Full-level.
- Always uploads RMN archives as new documents.
- Allows document uploads to be aborted.
- Highlight colors will bleed through page content, not opaquely cover it.
- Uses bitmap templates background for bitmap PDF exports.
- Ability to render rearranged pages, and user-added note pages.
- Renders native PDF elements so individual sketch components may be exported as singular images.
- Renders bitmap PDFs with smaller file sizes and lossless quality.
- Improves PDF highlight annotation compatibility with more PDF clients.
- Improves vector PDF output with realistic brush rendering.
- Shows dialog for failed PDF exports.
- Skips bogus template icon codes, which might exist from using other template-upload software.
- Bundles two executables for Windows, *RCU.exe* (no console) and *RCU-CLI.exe* (with console).
- Supports Python 3.10.

- Fixes defect where Windows could paint the application window beyond the screen border.
- Fixes defect where snapshots taken under recovery OS could not be right-clicked.
- Fixes PDF renderer geometry issues relating to CropBox, MediaBox, Adjust View, and highlight annotation bounding rectangles.
- Fixes defects where PDF layers could sometimes not be applied properly, or could cause Adobe Acrobat to report "Generic Error".
- Fixes defect where some PDFs failed to export due to a malformed base PDF, or a base PDF using obscure stream encodings.
- Fixes compatibility with Wayland on GNU/Linux platforms.

Known Defects

- Custom rendering for documents created or modified with system software 3.0+ is limited to Epubs and PDFs with a reMarkable-native aspect ratio, and notebooks which do not use the continuous pages or text input features.
- In system software 3.8+, the Web UI can not be enabled through RCU. Instead, the tablet must be connected via USB to a PC when it boots to keep the Web UI enabled. Please contact reMarkable AS and ask them to fix this problem.
- Most large PDFs (greater than 500 MB) cannot be exported with system software 3.0+.
- Lucida Console is forced on macOS, instead of using the default system typeface.
- No warning for RMPKG fault.

Workarounds

Bitmap/Vector Rendering Errors with Ink/Positioning

RCU's custom PDF renderer (bitmap/vector) has perfect compatibility with system software 1.8 through 2.15. System software 3.0, however, changed the way certain types of documents are rendered, and RCU's rendering logic cannot yet differntiate between these different document types.[2]

To work around this issue, a hack can be employed. Before one begins marking up a document, the PDF page aspect ratio should be equal to the ratio of the tablet's screen (3:4). One can automatically re-page a PDF document by transferring it through RCU's virtual printer with a user-defined page size.

In most applications, the page size is defined on a per-application basis. For instance, in Mozilla Firefox, the page size is defined in File–Print–Page Setup. A custom paper size can be made with the same dimensions as the tablet's screen: 157.2×209.6 mm (6.19×8.25 in).

[2]For instance, in 3.0+ an A4-size PDF will become centered on the screen. However, in 2.15 and below, it would be left-aligned. This is one example of a difference of rendering logic. Other differences relate to the absolute size of ink/annotations.

E.2 v4.0 (r2021.002)

Released on September 10, 2021, this version addresses compatibility with system software 2.9.1.236, adds CLI options for transferring documents, and improves PDF handling and rendering.

Compatibility

Hardware	reMarkable 1 & 2
Software	1.8.1.1–2.9.1.236
PC	FreeBSD 13.0, Ubuntu 18/20 LTS, Fedora 33, openSUSE 15.2, CentOS 7, macOS 10.13, Windows 10

Release Notes

- Compatibility with system software 2.9.1.236, rm2fb.[3]
- Snap-highlighted text extracts into PDF highlight comments.
- High Density export option (4x DPI bitmap rendering).
- Create folders and sub-folders.
- Sticky favorited documents and collections on-top.
- Removed pop-up notice when connection becomes interrupted.
- Check for pseudo-deleted files and prompt non-cloud users to purge.
- New CLI options:
  `--cli`, `--screenshot-p`, `--screenshot-l`, `--list-documents`, `--list-collections`, `--download-doc`, `--export-pdf-b`, `--export-pdf-v`, `--export-pdf-o`, `--upload-doc`, `--upload-doc-to`, `--render-rmn-pdf-b`, `--render-rmn-pdf-v`
- Show error message for About Pane network failures.

[3] This is a shim for other third-party software (not RCU) to display graphics on RM2. Read more: *ddvk/remarkable2-framebuffer*.

- Improved PDF handling with regards to CropBox, MediaBox.
- Improved handling with reMarkable Cloud.
- Bundle SSL certificates.
- Sanitize quote characters from filenames.
- Fixed defect where Mechanical Pencil v1 (from system software prior to 1.8.1.1) rendered incorrectly.
- Fixed defect where RM2 screenshots were mis-aligned by 8 pixels.
- Fixed defect where using Adjust View had no effect on exported PDFs.
- Fixed defect where the recovery OS was dependent upon contents of eMMC. Tablet now shows black screen during recovery operations.
- Fixed defect where connection presets could disappear.
- Fixed defect where RMN uploads were invisible if they were originally taken from a parent folder.
- Fixed defect where the program could crash for macOS 11 (Big Sur) users when exporting select PDFs.

Known Defects

- Some documents exported with a base PDF and Layers enabled may render OK, but be reported in Adobe Acrobat as having a generic error, and the Background layer may toggle the entire page.
- Improper annotation rotation with PDF pages that are rotated 270 degrees (usually appearing upside-down).
- Some PDFs are unable to be decoded and fail to export, or export blank. Some examples are password-protected PDFs, and My Deep Guide's yearly planner.[4]

[4] A temporary workaround is to process these PDFs with *qpdf* and overwrite the original PDF on the device through SSH.

- Lucida Console is forced on macOS, instead of the default system typeface, because of a font-rendering issue in Qt with macOS 11 (Big Sur) where space characters that appear after a comma or period are invisible.
- No warning for RMPKG fault

E.3 v3.0 (r2021.001)

Released on January 31, 2021, this version addresses compatibility for reMarkable 2, system software 2.5.0.27, and macOS Big Sur, fixes bugs and annoying behavior, and introduces new features.

Compatibility

Hardware	reMarkable 1 & 2
Software	1.8.1.1–2.5.0.27
PC	FreeBSD 12.1, Ubuntu 18/20 LTS, Fedora 33, openSUSE 15.2, CentOS 7, macOS 10.13-11.1, Windows 10

Important Notices

! Low-level backup/restore is unsupported with reMarkable 2.

! reMarkable 2 owners on Windows do not need to install the libusb driver.

Release Notes

- reMarkable 2 compatibility, screenshots
- System software 2.5.0.27 compatibility
- macOS 11 (Big Sur) compatibility
- KDE, dark theme support
- Parabola-rM backup/restore
- Directly import SVG and PNG images as templates
- Multiple presets for different networks
- Password visibility toggle
- Hierarchical download/export documents

- CLI flags: *--autoconnect*, *--dark*, *--no-compat-check*
- Rename documents and collections
- Application icon, GNU/Linux installers
- Fetch new compatibility tables without updating RCU
- Switches program license to GNU AGPLv3 or later
- Uses to .app packaging for macOS
- Makefile conveniences, like venv and packaging
- Keyboard shortcuts for quitting/closing
- Fixes defect where key-based authentication was used instead of password
- Fixes defect where data-only restore was non-functional
- Fixes defect where */home/root* was sometimes used instead of *$HOME*
- Fixes defect where backups under Windows failed when running RCU from a non-primary volume
- Fixes defect where upload progress meter never changed from 0%

Known Defects

- Unable to load recovery OS when the tablet has a botched splash image.[5]
- Some documents exported with a base PDF and Layers enabled may render OK, but be reported in Adobe Acrobat as having a generic error, and the Background layer may toggle the entire page.
- Force-refreshing the Notebooks Pane doesn't work under FreeBSD or macOS.

[5] A new recovery OS is available by email, but was not polished enough to make this release.

- No conflict check for RMPKGs
- No warning for RMPKG fault

E.4 v2.0 (r2020.003)

Released on October 3, 2020, this version addresses compatibility for system software 2.3.0.16, fixes bugs and annoying behavior, and introduces new export options.

Compatibility[6]

Hardware	RM100, RM102 (reMarkable 1)
Software	1.8.1.1–2.3.0.16
PC	FreeBSD 12.1, Ubuntu 18.04, macOS 10.13, Windows 10

Important Notices

! This version changes the settings and data paths. To migrate old backups, copy the *backups* directory from the old data directory to the new one. The old data directories are:

FreeBSD, GNU/Linux: *~/.config/rcu*

macOS: *~/Library/Preferences*

Windows: *C:\HKEY_CURRENT_USER\SOFTWARE\rcu\rcu*

Release Notes

- System software 2.3.0.16 compatibility
- Resizable UI, with Hi-DPI support
- New application data directory, user-setable in configuration file
  - FreeBSD, GNU/Linux

    Settings: *~/.config/davisr/rcu.conf*

    Data: *~/.local/share/davisr/rcu*
  - macOS

[6] This version is likely compatible with reMarkable 2 (except backup/restore) but is untested.

Settings: *~/Library/Preferences/rcu.plist*
Data: *~/Library/Application Support/rcu*

- Windows

  Settings: *HKEY_CURRENT_USER\SOFTWARE\davisr\rcu*
  Data: *%APPDATA%\davisr\rcu*

- Faster startup/load time
- Automatic notebook view refresh (force with Ctrl+R or F5)
- Drag-and-drop document organization within the Notebooks Pane
- Save last-used directory for import/export operations
- Save notebook sorting method
- Upload to any collection (document folder)
- No longer requires Host to be an IP address in the Connection Dialog
- A port may be given in the Host field, separated with a ':' (colon)
- New Export PDF options
  - PDF annotations for highlights
  - PDF layers (OCG) for each document layer
  - Customizable ink colors
  - Auto-open exported PDF
- Fix Wallpaper Pane bugs
  - Removed "Powered Off" overlay text
  - Set to Original button works as-expected and will always keep a backup
- Fix rM Cloud compatibility bugs (delete, re-uploading old archives)
- Sanitize export filenames

- Compatibility with more GNU/Linux distros
  - Now requires libxcb as a dependency (install *libxcb-xinerama0*)
- Warning popup when the tablet is disconnected
- reMy, from which RCU gets its .lines parser, is now credited visibly in the About Pane
- Reduce logging verbosity
- Smoother lines when exporting vectors

Known Defects

- Some documents exported with a base PDF and Layers enabled may report in Adobe Acrobat as having a generic error, but otherwise render OK.
- Force-refreshing the Notebooks Pane doesn't work under macOS.
- No conflict check for RMPKGs
- No warning for RMPKG fault

E.5 v1.1 (r2020.002)

Released on September 6, 2020, this version addresses issues blocking users from running v1.0 (r2020.001).

Compatibility

Hardware	RM100, RM102 (reMarkable 1)
Software	1.8.1.1–2.2.0.48
PC	FreeBSD 12.1, Ubuntu 18.04, macOS 10.13, Windows 10

Release Notes

- Fix "unknown document version" bug
- Fix improper handling of tall PDF documents
- Warn user when not taking/restoring backup from USB
- Set executable permission in macOS release archive
- Update manual with recovery mode instructions
- Update manual with Windows driver instructions

Known Defects

- No conflict check for RMPKGs
- No warning for RMPKG fault

E.6 v1.0 (r2020.001)

Released on September 5, 2020, this is the first released version of RCU.

Compatibility

Hardware	RM100, RM102 (reMarkable 1)
Software	1.8.1.1–2.2.0.48
PC	FreeBSD 12.1, Ubuntu 18.04, macOS 10.13, Windows 10

Release Notes

- First release of reMarkable Connection Utility (RCU)
- Application will open with console window

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