

MNT REFORM NEXT—OPERATOR HANDBOOK—1ST ED.



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Preface to the First Edition

It's become a tradition that I write the preface to the Operator Handbook for a new MNT computer on that computer itself, and that is what I'm doing right now. I'm so grateful for having arrived at this moment. It took more than two years to develop this machine, and getting it ready to ship it to you. It was hard to get here. I remember that roughly in the middle of 2025, I said to some members of the team, "Looks like we figured out a way to break even [with MNT], we have a processor that works well enough for a lot of people, we smoothed out a lot of bumps in our supply chain, maybe we can finally just focus on refining what we have, and have a vacation sometimes."

Totally jinxed it. The AI industry, driven by unfathomable new levels of greed, gobbled up all the memory chips, prices for SSDs and DRAM exploded. Luckily, we had already sourced the processor modules for the MNT Reform Next campaign—but not all of the SSDs. By New Year's Day 2026, parts of the tech press had already declared the personal computing market over (we disagree). I have to admit that I had some sleepless nights over how to make everything work.

But we didn't despair, and thanks to your unwavering support, we're still here. Open hardware computers—developed and understandable by actual humans—are needed more than

ever. Every new crisis emphasizes the points that we've been trying to make since the summer of 2017, when we started the original MNT Reform project. 10 years ago, people with mainstream tech industry backgrounds didn't get why we were trying to make laptops that are repairable and upgradable by anyone, and why we were giving away the design files and sources, so that the computers and their parts could be manufactured in low-tech ways in different places, if needed. Then came COVID-19, a total disruption of electronics supply chains, a comeback of (techno-)fascism, and more global crises. Making less resource intensive and more independent computing devices doesn't look so far-fetched today.

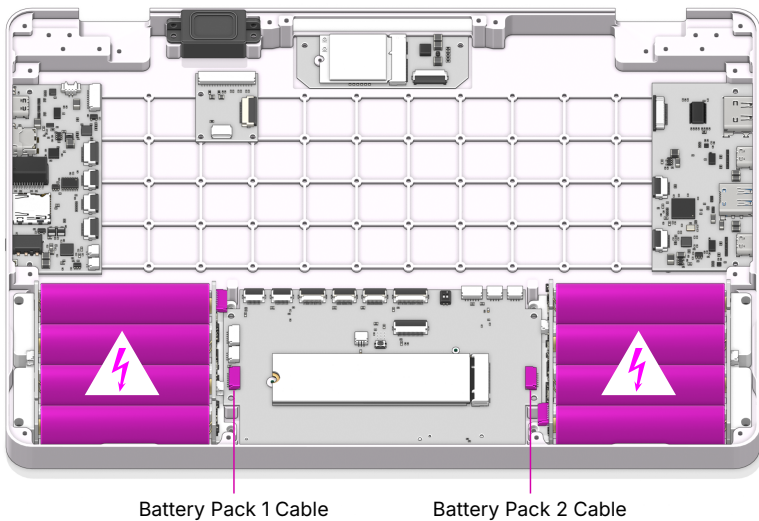
MNT Reform Next is our tiny contribution to improve the status quo. This laptop is the result of many lessons that my team and I learned along the way, including lots of feedback from people who used our earlier models. While it looks and feels more streamlined from the outside, and is designed as a "daily driver", it's even more modular and hackable than the "classic" MNT Reform if you peek beneath its surface. This book is meant to be your companion for when you do.

—Lucie, Berlin, 2026-09-07

Chapter 1

Safety & Recycling

1.1 Hazards



Before you get started with your MNT Reform Next, please read these safety instructions carefully to prevent harm to yourself and your environment.

Electrical Shock and Fire Hazard: Please be extra careful while and after opening the case of the device. MNT Reform Next uses 8 batteries in packs of 4 each. The packs charge up to 14.5 volts and can easily deliver multiple amperes of current. Do not touch any part of the battery system with metal tools.

Before servicing anything on the inside, make sure that the wall power is unplugged and unplug the two internal battery pack cables. Before exchanging circuit boards, take out the two battery packs first and store them safely.

Damage to Hearing: The headphone output of MNT Reform Next can be forced to extreme volume which may damage your hearing if you are not careful. Please make sure to set the volume to 30% or less before connecting headphones to the laptop, and then adjust the volume to a comfortable level.

1.2 Recycling



Don't throw any MNT Reform Next parts in the trash! Batteries and electronics contain materials that are harmful to the environment if not properly disposed of.

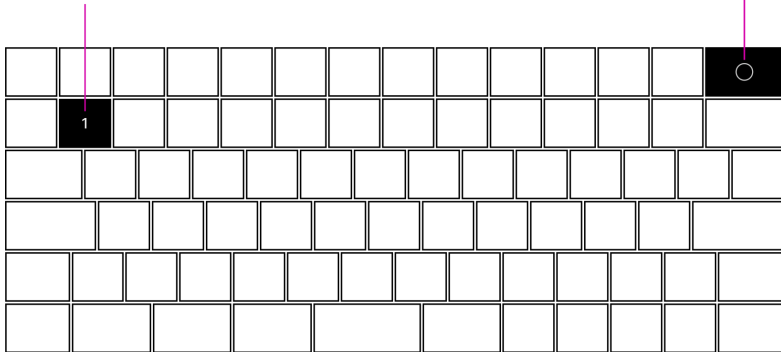
You can mail any of the parts back to MNT Research, and we will recycle them for you. Alternatively, you can recycle batteries at a local battery collection facility and dispose of electronics and cables at a local e-waste facility.

Quick Start

2.1 Step 1: Turn On

Press **Circle**, then **1** to turn the power on

Circle



To turn on MNT Reform Next, press *Circle* and then 1.

The *Circle* key is used for system control commands. When you press *Circle*, a menu of system control functions and their shortcuts will be displayed on the OLED screen embedded in

the keyboard.

2.2 Step 3: Log In

After being powered on, the main processor will boot the operating system installed on eMMC flash memory. The operating system's kernel will show diagnostic information as it activates all the devices in the system until finally arriving at the login prompt. On first boot, the Setup Wizard will walk you through the configuration process. You'll select your keyboard layout and your time zone, choose a desktop environment, and finally, create a user account. Once everything is set up, you can start installing software and using MNT Reform Next. If you are new to the Debian GNU/Linux operating system or want to learn about specifics of the system software shipped with MNT Reform Next, please refer to the chapters "Linux Console Basics," "Graphical Desktops," and "Software."

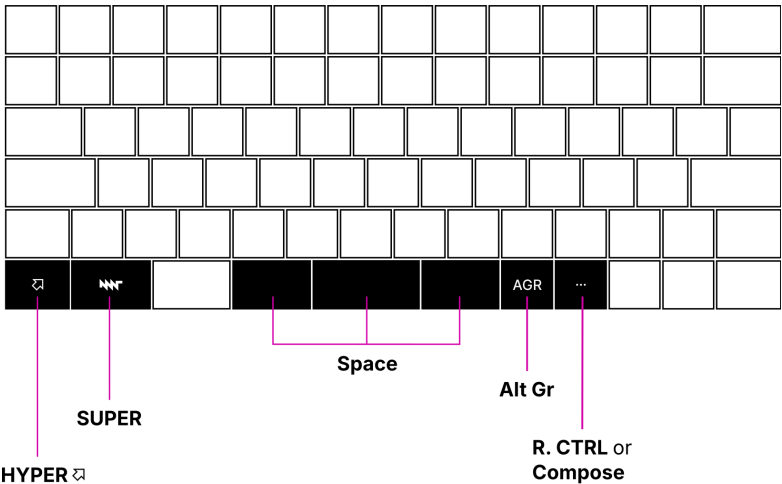
The following chapter will introduce you to the input devices of MNT Reform Next.

Chapter 3

Input Devices

MNT Reform Next comes with a keyboard and a multi-touch trackpad preinstalled.

3.1 Keyboard



The keyboard layout is close to standard ANSI, with some

non-standard choices. The biggest difference is the space bar, which is split into three large keys so it doesn't have to be mechanically stabilized, and, if you're an advanced user, you can remap two of these space keys to other functions.

Because many advanced users remap the traditional Caps Lock key to a different function, we swapped Caps Lock for a *CTRL* key right away. This makes the use of common *CTRL* key combinations more ergonomic.

Right next to the *AGR* key—short for “Alternate Graphic”—is a special key with 3 dots (an ellipsis). It is intended as a user-defined key, which is mapped to *Right CTRL* by default. We recommend remapping this key to *Compose*, a key that allows you to generate Unicode symbols from Compose sequences.

MNT Reform Next features an additional modifier key, the *HYPER* key, in the lower left. *HYPER* provides an additional layer of key combinations and “media keys”. Here is the list of shortcuts you can use with *HYPER*:

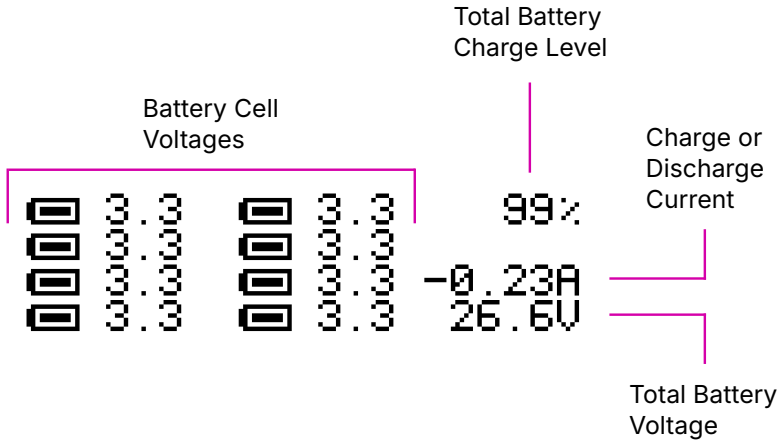
Shortcut	Function
<i>HYPER</i> + <i>F1</i>	Decrease Brightness
<i>HYPER</i> + <i>F2</i>	Increase Brightness
<i>HYPER</i> + <i>F7</i>	Previous Track
<i>HYPER</i> + <i>F8</i>	Play
<i>HYPER</i> + <i>F9</i>	Next Track
<i>HYPER</i> + <i>F10</i>	Silent
<i>HYPER</i> + <i>F11</i>	Volume Down
<i>HYPER</i> + <i>F12</i>	Volume Up
<i>HYPER</i> +←	Home
<i>HYPER</i> +→	End
<i>HYPER</i> +↑	Page Up
<i>HYPER</i> +↓	Page Down

3.2 OLED Menu

Selected Function	Shortcut Key
Exit Menu	ESC
Power On	1
Power Off	0
Reset	r

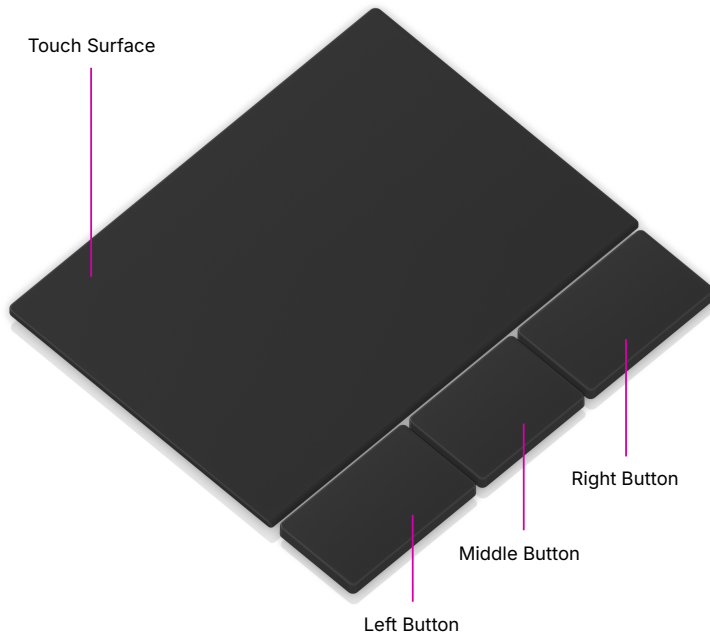
Another special key that you already encountered is the *CIRCLE* key, in the top right. This key is dedicated to power and system management functions that are completely independent from the operating system.

The keyboard has a built-in OLED display for interaction with the System Controller on the mainboard. Pressing the *CIRCLE* key activates a menu on this display. You can highlight an option and scroll through the menu by using the $\uparrow$ and $\downarrow$ keys. To trigger the highlighted option, press *ENTER*. Alternatively, you can press the shortcut key that is displayed on the right hand side of each menu option. For example, to show the Battery Status, press *B* when the menu is active. To leave the menu, press *ESC*.



You can see detailed battery information including the estimated total charge percentage on the *Battery Status* screen available in the OLED menu. Each cell icon corresponds to one of the battery cells. The leftmost group of four icons represents the battery pack on the left side of the device, and the group on the right represents the battery pack on the right. The locations of the battery icons correspond to the physical locations of the battery cells in the laptop.

3.3 Trackpad



Slide one finger across the trackpad's glass surface to move the cursor. Tapping with one finger acts like a left mouse button click. Slide two fingers across the surface to scroll in any direction, and pinch in and out to zoom. Tapping with two fingers performs a right click. The GNOME desktop also supports three-finger movements to switch between workspaces.

Below the trackpad surface you'll find 3 mechanical buttons. These act like a computer mouse's left, middle and right buttons, respectively.

Chapter 4

Linux Console Basics

4.1 Console and Shell

MNT Reform Next ships with a lightly customized Debian GNU/Linux distribution. Once powered on, MNT Reform Next will boot to a login screen.

From here, you can reach a graphical desktop or the Linux console. If something goes wrong, you can always go back to the console and fix things—if you know a few basics of Linux administration. To reach the console from the login screen, you can use the key combination `ALT+F1`, or `ALT+F2` to go to the second console, etc.

After logging in on the console, you are in control of a shell. The default shell is called `bash`¹, but there are many other shells available. You can use the shell to type in commands for your computer to execute, but also to write programs (scripts) that combine commands to do more complex tasks. For example, this handbook is generated by a `bash` script combining a few text and graphics related tools.

This chapter will introduce you to the basics of exploring

¹The “GNU Bourne-Again Shell”.

and administering your MNT Reform Next system using the shell first and then a graphical desktop. You can also launch shells on the desktop to use tools that don't have a graphical user interface. Using these tools, you can troubleshoot some problems with the operating system by yourself.

4.2 Root User

The most powerful user in the system is `root`. When logged in as `root`, you can modify but also destroy any file in the system. To prevent others from logging in as `root`, you should protect the account with a password (the Setup Wizard asks you to do this). In the shell, you execute all commands by typing them in and pressing *ENTER*. To set your password, execute this command:

```
passwd
```

The `passwd` command will ask you for a new password two times, but will not display it while typing (so it cannot be gleaned by onlookers).

During normal Linux usage you will rarely want to be `root`—only when performing changes to the system configuration, which includes adding or removing users or software and controlling background services. Instead, you should create a less privileged user account for yourself.

4.3 Create a New User and Password

You have created a user in the Setup Wizard after powering on your MNT Reform Next for the first time. In order to add another user account to the system, log in as `root` and execute the `adduser` command:

```
adduser kim
```

This will create a new user named `kim`, and add a new home directory for `kim` at `/home/kim`. The `adduser` command will ask

you for a password and a few questions that you can skip by just pressing *ENTER*.

If you want to change the password for the user `kim` later, you can use the `passwd` command as before:

```
passwd kim
```

4.4 Logging In and Out

You can log out of the console or a terminal window by pressing *CTRL+D*. Alternatively, you can type `exit` in the terminal.

When logged out, you will see the login prompt. Type the username that you added in the previous step and press *ENTER*. Next, type your password (it is not displayed). Press *ENTER* to complete the login.

4.5 Sudo

To make bigger changes to the system you will often need to use a command that requires `root` (superuser) privileges. Logging out of your user account just to log back in as `root` is inconvenient. Instead, you can temporarily become `root` by either switching to it as `su` (switch user) or give your regular user account `sudo` privileges².

Sudo allows you to use a command as `root` by typing `sudo command`—but only if you are a member of the `sudo` group. To add your user to the `sudo` group, first log out and login as `root`. Then you can execute the following command:

```
usermod -a -G sudo kim
```

(Substitute your username for `kim` here).

²`sudo` means “switch user and do”.

The `-a` flag means “Append the user to the group”, while the `-G` option specifies the name of the group you want to add the user to: `sudo`.

Log out and login as your regular user again. From now on, you can execute commands which require root privileges using `sudo`. For example, to shut down your computer safely before turning it off, you can type:

```
sudo shutdown now
```

4.6 File System

Your system’s file storage is organized in a tree of directories. To move around in it, you use the `cd` command to change the current directory. The top of the hierarchy is called root (not to be confused with the superuser of the same name), but written as the symbol `/`. To go to the root directory, enter:

```
cd /
```

To see what’s here, use the `ls` (list) command:

```
ls
```

If you want to know more details, such as the modification times and permissions of files, use:

```
ls -l
```

You can also add the flag `-h` to get “human readable” file sizes instead of the raw number of bytes:

```
ls -lh
```

There are two virtual files in every directory, called `..` (two dots) and `.` (one dot). The single `.` means “here” (i.e. the current directory), and you can use it if you ever want to specify the current directory explicitly. For example, if you want to copy the file `/tmp/myfile` to the current directory, you can type:

```
cp /tmp/myfile .
```

To go to the parent directory (a top-level directory that contains subdirectories, the so-called “children”), use:

```
cd ..
```

Commands like `ls` have many options. To learn about them, you can read the built-in manual pages:

```
man ls
```

With `man` you can learn more about any command. You should make yourself familiar with the most important commands like `cp` (copy), `mv` (move), `rm` (remove), `mkdir` (make directory), `mount` and `ln` (link). Armed with this knowledge, you will be able to navigate any UNIX-like system, not only Linux.

4.6.1 Filesystem Hierarchy

When you issue `ls` at the root of the filesystem (`/`), you will see the following directories:

Directory	Purpose
<code>/</code>	Top (“root”) of the filesystem
<code>/bin</code>	Commands (“binaries”), such as <code>ls</code> , <code>cp</code>
<code>/sbin</code>	Commands usually only used by <code>root</code>
<code>/lib</code>	Libraries (common code shared between binaries)
<code>/usr</code>	Files managed only by the package manager
<code>/boot</code>	Boot loader related files (like Linux kernel ³)
<code>/etc</code>	System configuration files
<code>/home</code>	Home directories of user accounts
<code>/root</code>	Special home directory for <code>root</code>
<code>/mnt</code>	A place to mount other filesystems
<code>/media</code>	Another place to mount filesystems
<code>/proc</code>	Live information about processes
<code>/sys</code>	More live information from the kernel
<code>/dev</code>	Device files providing access to hardware
<code>/run</code>	Temporary files related to background services
<code>/tmp</code>	Temporary files—deleted on restarts

³The kernel is the privileged core of the operating system.

Directory	Purpose
<code>/srv</code>	Files used by servers such as web servers

A good way to explore files and directories that take up disk space is using the `ncdu` program. It calculates the size of each (sub)directory and allows you to browse your filesystem and even delete unwanted files (you should only do this in your home directory, though):

```
ncdu /
```

4.6.2 Home Directory

If your username is `kim`, your home directory is located at `/home/kim`. There's a shortcut for your home directory using the tilde symbol `~`. To go to your home directory, you can type:

```
cd ~
```

If you list the contents of your home directory, you will see a number of directories with self-explanatory names, such as `Pictures`, `Music`, `Documents` and `Downloads`. The last one is used by web browsers to store downloaded files, for example. Feel free to create your own subdirectories in your home directory as needed.

4.6.3 Dot Files

Your home directory also contains a number of hidden files and directories called "dot files." Their names start with a dot (`.`) and for tidiness, are usually hidden. To see them, use the `-a` flag with `ls`:

```
ls -a
```

Often times, dot files contain your personal configuration for certain programs. Many programs collect configuration files in the `~/.config` subdirectory.

4.6.4 Permissions

As you are the owner of your home directory, your user account is allowed to modify any files and subdirectories contained in it. But you cannot change system configuration files in `/etc` or delete a command in `/bin`, except if you're `root`. This is because of the ownership and permission settings on these files and directories.

If you list the contents of your home directory with `ls -l`, you will see your username twice in each row, after a cryptic-looking column of letters and dashes and a number:

```
drwxr-xr-x  4 kim kim 4096 Nov  2 20:52 Music
rw-r--r--   1 kim kim   8 Jan  9 20:03 notes.txt
```

The letters and dashes at the beginning describe the file mode bits of the file or directory. A "d" at the beginning signifies a directory. The following 9 letters are three triplets describing "user" (owner), "group," and "all" permissions, in that order. "r" means read, "w" write, and "x" execute. An "x" on a file means that this is an "executable," a program that can be run, or in the case of a directory, that it can be entered.

The first occurrence of a username in each row is the owner of the file or directory. The first triplet of mode bits on `notes.txt` tells you that you, the owner, can read and write but not execute this file (after all, it is just a text file).

The second occurrence of `kim` names the group `kim`, not the user. When you create a new user, the system also creates a group with the same name and only you as a member. You could add other users to your group to share files with them, for example. The second triplet of mode bits, `r--`, tells you that members of this group can only read your file, not change it.

Lastly, the third mode triplet (`r--` in this example) says that any other user logged into your system can read this file.

To change the mode bits of a file, you can use `chmod`. For example, to give nobody but yourself (assuming you're the

owner) the permission to read and write the file `notes.txt`, execute:

```
chmod a=u, rw notes.txt
```

This invocation first sets an empty list of modes for all users (`a=`) and then read and write modes for the user/owner (`u=rw`) on the file.

To learn more about managing modes and ownership, be sure to read the `man` pages for `chmod`, `chown`, and `chgrp`.

4.6.5 Pipes

Linux features some advanced concepts that are central to the UNIX philosophy (Linux is a flavor of UNIX). One that you will often encounter is the pipe, symbolized by `|`. You can use pipes to feed the output of one program to the input of another program. For example, you can use the pager `less` to paginate a long stream of text, such as the output of `dmesg`. This tool prints all diagnostic messages of the operating system kernel, and using `less` lets you view it page-by-page instead of having to scroll back to the beginning:

```
dmesg | less
```

Or page through a long list of files:

```
ls -la ~/Downloads | less
```

You can also build more complex pipelines. The following command will output the last 5 lines containing the word “usb” in the kernel log:

```
dmesg | grep usb | tail -n 5
```

4.6.6 Links

If you list the contents of `/usr/lib` with `ls -l` you will see a number of files that point to another file with an arrow (`->`). This is because the file on the left hand side is a “symbolic link” to the “real” file on the right hand side. Symbolic links

and “hard links” can be created using the `ln` command as a means to point to a file using another name. This can be useful to create shortcuts. Refer to the manual page with `man ln` to learn about the details of links.

4.6.7 Finding Files

If you don’t remember where you put a file, or want to search a complex hierarchy of directories for something specific, you can use `find`:

```
find -name "notes*"
```

This will display any file or subdirectory whose name starts with “notes” in the current directory. `man find` will reveal many more options for finding files.

The `rgrep` command will look for words in the content of a file:

```
rgrep --color spice
```

This will look for any occurrence of the word “spice” in files in the current directory and its subdirectories, and display each line in which the word was found, with the word itself highlighted.

4.6.8 Mount Points

The root directory `/` is actually a collection of filesystems “mounted” into one virtual filesystem. These can be located on different disks, media or even the network—or be purely virtual in the case of `/dev`, `/proc` or `/sys`.

For example, if you want to access files stored on a USB stick, you would first mount one of the filesystems contained on the USB stick into an empty directory called a mount point. This could be something like `/mnt` or `/media/usb-stick`. Usually, desktop environments can help you to automatically mount removable media, but it’s useful to know how to do the same process manually.

First, you need to find the block device of the media you want to mount. For this, you can use the command `lsblk`. An example (partial) `lsblk` output could be:

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
sda	8:0	1	28.9G	0	disk	
sda1	8:1	1	28.9G	0	part	

Here, `sda1` is the block device of the first partition on the USB stick. If you are unsure which is the right device, you can issue `dmesg -w` and then plug in the USB stick. You'll see something like this appear in the kernel log:

```
[...] sd 0:0:0:0: [sda] Attached SCSI removable disk
```

Which tells you that `sda` (or in your case, something else) is the block device you're looking for.

To mount the partition on the USB stick at `/mnt`, do:

```
sudo mount /dev/sda1 /mnt
```

If successful, this will—in UNIX tradition—output nothing, and you can find your files by navigating to `/mnt` with the usual commands.

Before unplugging your USB stick, you should unmount it. This makes sure any pending changes are written to the device (note that the command is `umount`, not “unmount”):

```
sudo umount /mnt
```

4.7 Environment Variables

As the shell is not only a command interpreter but also a programming environment, it supports variables. These are placeholder names that contain a value that can be changed at any time. For example, you could make a universal greeting command like this:

```
echo Hello, $name.
```


The output of this command changes depending on the value of the variable `$name`. To change the variable:

```
name=World
```

If you now execute the same `echo` line as before, you'll see this output:

```
Hello, World.
```

Variables are often used to define an environment for other programs. This means that a program can change its behavior according to these variables. These so called environment variables are set before starting the program. To see all currently defined environment variables, you can use the `env` command. You will see a few specific ones among the output:

```
HOME=/home/kim  
PWD=/home  
SHELL=/bin/bash  
USER=kim
```

This means that another way to reach your home directory is `cd $HOME`, and another way to refer to your username is `$USER`. A critically important variable is `$PATH`, which is a list of directories (separated by `:"`) that the shell searches when looking for a command that you want it to execute. For example, when you type `ls`, your shell will only find it if `/bin` is in your `$PATH`, because `ls` actually resides at `/usr/bin/ls`.

4.8 Working with Text Files

Most system configuration is done by editing text files.

The two most common text editors in Linux are `vim` and `emacs`, which both have a steep (but rewarding) learning curve. Thus, Reform Next system provides an editor more suited for beginners called `micro`.

You can create, view, and edit files using the `micro` text editor. To edit a file in the current directory named `file.txt`, use:

```
micro file.txt
```

While in `micro`, you can use `CTRL+S` to save, `CTRL+Q` to quit, and `CTRL+G` to display a help menu.

4.9 Scripts

By now you know most of the ingredients to be able to write shell scripts: programs interpreted by the shell. By writing shell scripts, you can create your own commands to extend the capabilities of your computer. Here is an example script that greets the user:

```
#!/bin/bash

day=$(date +%A)
echo Hello, $USER. Today is $day.
```

The first line of the script, called the “shebang” line is important to tell the operating system that this script is to be interpreted by the shell `/bin/sh`. Save the script to a file named `greet.sh`. Mark the file executable and execute it:

```
chmod a+x ./greet.sh
./greet.sh
```

You can learn more about programming the shell by reading its manual page `man sh`. The more advanced `bash` shell is documented in `man bash`.

4.10 What Is My Computer Doing?

You can check your RAM usage, CPU usage, and processes currently running by using `htop`:

```
htop
```

Hit `F1` to display the built-in help screen.

You will see that there are a few processes running that you didn’t start yourself. These are background processes, also

called services, daemons, or units. They are controlled by `systemd`, the so-called “init system”. It is the first program started by the Linux kernel, and it spawns all other programs including services. You can learn more about `systemd` by reading the manual page:

```
man systemd
```

The most important commands to manage `systemd` are `systemctl` and `journalctl`. Their manual pages are worth a look, too. To see the list of known units and their status, you can use:

```
systemctl
```

To inspect a unit in more detail, you can pass its name to `systemctl`. For example:

```
systemctl status ssh
```

Instead of `status`, you can use verbs like `start`, `stop` or `restart` to control units.

The Linux kernel itself outputs a lot of diagnostic information at boot and when hardware changes (e.g. new devices are plugged in). To see the kernel log, you can (as superuser) use:

```
sudo dmesg -H
```

4.11 Inspect Hardware

The following commands are useful to inspect devices connected internally or externally:

Command	Description
<code>lsblk</code>	List block devices (storage).
<code>lsusb</code>	List USB devices.
<code>lspci</code>	List devices connected to PCIe ports.
<code>lscpu</code>	Get information about the processors.
<code>free -h</code>	Get information about system memory.

4.12 Clock

To see the current date and time, you can use the `date` command. The date and time are set by the `ntp` ("Network Time Protocol") service by synchronizing to time servers on the internet.

The mainboard of MNT Reform Next has a battery-backed real-time clock chip. This chip saves the date and time even if your system is shut down or loses power. You can interact (as `root`) with the clock using the `hwclock` tool. Review `man hwclock` for the details.

4.13 Network

MNT Reform Next has a built-in Gigabit Ethernet (1 GbE) interface for networking (available on the *Ix Industrial* jack on *Port Board One*). Additionally, you can install a Wi-Fi/Bluetooth card in the M.2 slot in the center back of the device.

Usually, you want to use the GUI of a convenient management tool like `network-manager` (preinstalled, available in GNOME Control Center), or the terminal-based tool `nmtui` to manage your network connections.

To see and change details of your network connections, you can use the `ip` command:

Command	Meaning
<code>ip addr</code>	Show the status of the network interfaces ⁴ .
<code>ip route</code>	Show the network routing table.

You can trigger an automatic configuration of an interface via DHCP by executing `dhclient eth0`, and you can change the DNS servers by editing the file `/etc/resolv.conf`.

⁴`eth0` is the built-in Ethernet; `wlp1s0` is a Wi-Fi interface.

To connect to a remote computer via a secure shell connection, try `ssh` followed by the IP address of the computer you want to connect to. If you want to login to MNT Reform Next over the network, you can enable the secure shell daemon service as follows:

```
sudo systemctl enable sshd
```

You can then login to MNT Reform Next from another computer on your local network by executing:

```
ssh kim@192.168.1.242
```

Replace the username `kim` with your own username and the IP address `192.168.1.242` with your own IP address. You can find your IP address by looking for the `inet` entries in the output of the `ip addr` command.

Before using SSH functionality, you should generate a public/private key pair by executing `ssh-keygen`.

4.14 Bluetooth

The standard Wi-Fi M.2 card of MNT Reform Next (Intel AX210 or similar) features integrated Bluetooth. This technology lets you connect to wireless devices that are close to your MNT Reform Next (usually a few meters), such as headsets, speakers or mobile phones.

If you ever need to troubleshoot Bluetooth, you can try restarting its service using `systemctl restart bluetooth` or interact with `blueman` on the command line using `bluetoothctl`.

4.15 Shutdown

To turn off MNT Reform Next, you should shut down the system cleanly by executing:

```
systemctl poweroff
```

or

```
sudo shutdown -h now
```

On the Sway desktop, you can click the `reform-tray` icon and select `shutdown`.

In the Debian system shipped with MNT Reform Next, the shutdown process will ask the System Controller to turn off the power. In case you have to turn off the power manually (for example if the system is unresponsive or you are using an alternative OS), press *Circle* and then *0* (zero).

4.16 Sleep/Wake

The sleep (suspend) / wake functionality works only with some of our Processor Modules. While it's proven to work with the MNT Quasar modules, it's unsupported on the RCORE RK3588 module at the time of writing. Please consult your modules' manual and any MNT software/firmware updates for further details.

To enter sleep mode, execute this command:

```
systemctl suspend
```

You can also use the `reform-tray` icon and select sleep mode.

To make the system wake up from sleep, select the *Wake* item from the keyboard OLED menu.

4.17 Installing and Removing Software

The Debian GNU/Linux distribution has access to a large number of software packages. No matter which desktop you use, these are centrally managed by `apt`, the package manager. Generally, on a Linux system you rarely download executables from the internet and launch them. Instead, you can cleanly install and remove software packages by using the package manager. `apt` also has the ability to search for keywords (or regular expression patterns):

```
apt search browser
```

This will list all packages in the `apt` cache that contain the keyword “browser”. To refresh `apt`’s list of packages available in the online Debian *repository* (the library of packages), use the following command:

```
sudo apt update
```

If you have found a package you would like to install:

```
sudo apt install firefox
```

To remove (uninstall) the package from your system:

```
sudo apt remove firefox
```

To explore all of `apt`’s functionality, read the man pages for `apt` and `apt-cache`. If you are more comfortable with a graphical user interface for managing `apt` (and other) packages, you can use the `gnome-software` GUI instead.

Chapter 5

Graphical Desktops

5.1 Sway and GNOME

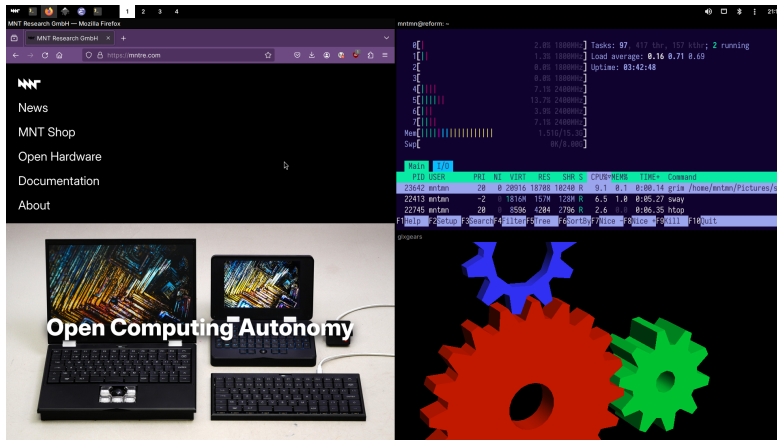
MNT Reform Next ships with two graphical environments called “desktops”. The Debian distribution, which the system on the eMMC is based on, has a number of additional desktops in its package manager (see section “Alternative Desktops” at the end of this chapter) that you can try.

1. **Sway** emphasizes the concept of “tiling.” This means that normally, windows don’t overlap, but instead the screen space is automatically divided to make space for new windows. This desktop consumes minimal system resources, but relies heavily on keyboard shortcuts, which makes it harder to learn.
2. **GNOME** features classic overlapping windows, a point-and-click driven interface, and a modern look. In GNOME, you can drag windows to the corners or edges of the screen and they will be snapped. They also have minimize, maximize, and close buttons.

You initially choose between Sway and GNOME in the MNT Reform Next Setup Wizard. This choice will be reflected

as the default on the login screen, but you can change it by clicking the settings icon after selecting your username (without entering your password) on the GDM login screen.

5.2 The Sway Desktop



Sway is optimized for use with keyboard shortcuts, most of which are combinations of *SUPER*¹ and other keys. These are the most important shortcuts:

Key Combinations	Function
<i>SUPER</i> + <i>D</i>	Open the launcher to start applications
<i>SUPER</i> + <i>ENTER</i>	Open a terminal
<i>SUPER</i> + <i>ESC</i>	Close active window
<i>SUPER</i> +1...	Go to workspace 1–9
<i>SUPER</i> + <i>SHIFT</i> +1...	Move active window to workspace 1–9
<i>SUPER</i> + <i>SHIFT</i> + <i>S</i>	Take screenshot (in ~/Pictures)
<i>SUPER</i> + <i>SHIFT</i> + <i>X</i>	Take screenshot of an area

¹*SUPER* is the key with the MNT Research logo next to the *HYPER* key.

5.2.1 Tiling

You can start a new terminal window by using the shortcut *SUPER+ENTER*. When you press *SUPER+ENTER* multiple times to open several terminals, you'll notice that your currently open windows will be resized to accommodate for the new window. You can switch between these windows by holding the *SUPER* key and pressing the cursor (arrow) keys in the desired direction.

If you keep adding windows, they will continuously shrink horizontally, but if you would rather have a window split vertically, you can. Use these shortcuts for deciding:

Shortcut	Function
<i>SUPER+H</i>	Split window horizontally
<i>SUPER+V</i>	Split window vertically

Note that the window is not split instantaneously. You're just telling Sway "The next time I create a window, put it below/beside my current window."

You may also use *SUPER+W* to tell Sway to use tabs. You can switch your tab using the same shortcuts for switching between windows. You can end this function by pressing *SUPER+E*. You can use *SUPER+ESC* to close the currently selected window.

5.2.2 Launching Applications

Reform Next's Sway desktop includes the `wofi` launcher, a popup menu for launching an application by typing a part of its name. Press *SUPER+D* to open the menu. Over time, `wofi` will remember the applications you regularly launch and will sort them by frequency of use.

5.2.3 Top Bar

Sway on Reform Next comes with an information bar at the top of the screen, which is provided by the `waybar` package. The bar is divided into the following sections:

Section	Action on click
MNT Research logo	Open the launcher
Icons of running applications	Switch to application
Workspace numbers	Switch to workspace
Tray icons	Settings for network, volume, etc.
Clock	Toggle date/clock

You can completely customize the top bar by editing the config file `~/.config/waybar/config` and the CSS-based styling file `~/.config/waybar/style.css`.

`man waybar` explains the available configuration options.

5.2.4 Workspaces

If you have a lot of windows open, they might not all fit on the screen at once. For this purpose, multiple set of windows can be arranged in workspaces.

You can change your active workspace with the number keys, for example:

Shortcut	Function
<i>SUPER</i> +2	Go to workspace 2
<i>SUPER</i> +1	Go back to workspace 1
<i>SUPER</i> + <i>SHIFT</i> +5	Move active window to workspace 5

You can open different spaces for different programs. For example, you might want to put your code-editing programs in workspace 1, a web browser in workspace 2, and some instant messaging programs in workspace 3.

5.2.5 Display Brightness

With Sway, you can set the display's brightness using the `brightnessctl` command or, more conveniently, use one of these keyboard shortcuts:

Shortcut	Function
<code>HYPER+SUPER+1</code>	Decrease display brightness
<code>HYPER+SUPER+2</code>	Increase display brightness

5.2.6 Sway Config File

You can tailor Sway's behavior and keyboard shortcuts by editing the file `~/.config/sway/config` or one of the included files in the `~/.config/sway/config.d` directory.

All configuration options are documented in the manual page that you can access by typing `man 5 sway` in a terminal. More information is also available in the Sway Wiki: <https://github.com/swaywm/sway/wiki>

Some of the most important configuration options are explained in the following sections.

5.2.7 Network, Wi-Fi, and Bluetooth

You can connect to Wi-Fi networks and configure Ethernet as well as VPN connections by clicking the respective buttons in the tray area of the top bar.

On Sway, you'll see a Bluetooth icon in the tray area of the top bar. This icon is powered by the `blueman` package behind the scenes and clicking on it with the left mouse button will open the *Bluetooth Devices* window, where you can search for nearby devices to connect to. Right clicking on a Bluetooth device will give you the options to connect, pair, or get more information. You can also right-click on the Bluetooth icon in the top bar itself to open a context menu with more options,

like toggling the Bluetooth visibility of your MNT Reform Next, sending files or reestablishing recent connections.

Note that any Bluetooth audio devices, when connected, will appear in *Volume Control* (started by launching it from the speaker icon in the top bar or manually from the launcher). Here you can choose them as the default output or input device and adjust the volume.

5.2.8 Sound

There are multiple ways to change the audio volume:

- Scroll (with the Trackball's Wheel Mode) up and down while the mouse cursor is hovering over the speaker icon.
- Click on the speaker icon in the top bar and select *Volume Control*. In the *Output Devices* tab, you can control the volume with the slider in the *Built-in Audio Speaker* (or *Built-in Audio Headphones*) section.

To change between the built-in Speaker output and headphones, you can use *Volume Control* as well. Go to the *Configuration* tab and select the *Profile* under *Built-in Audio*, either *MNT Reform Next Hi-Fi Audio (Speaker)* or *MNT Reform Next Hi-Fi Audio (Headphones)*. The exact names of the profiles can differ depending on your Processor Module.

5.2.9 Keyboard Layout

The keyboard layout is normally configured by the MNT Reform Next Setup Wizard. Should you want to configure it manually, you can edit the `~/.config/sway/config.d/input` file. For example, the following snippet will change the layout to the EU layout for any connected keyboard:

```
input * {
    xkb_layout eu
    xkb_options lv3:ralt_switch
}
```

5.2.10 Trackpad Speed

A common thing that people want to tune to their particular taste is the speed of the trackpad's cursor movement. For Sway, you could add an `input` section (or extend the existing one) to the `~/.config/sway/config.d/input` file as such:

```
input * {  
    accel_profile adaptive  
    pointer_accel 1.0  
}
```

Where `pointer_accel` can be a number between -1.0 and 1.0.

You can find out about all of the details of Sway's input configuration by opening its manual page using `man sway-input`.

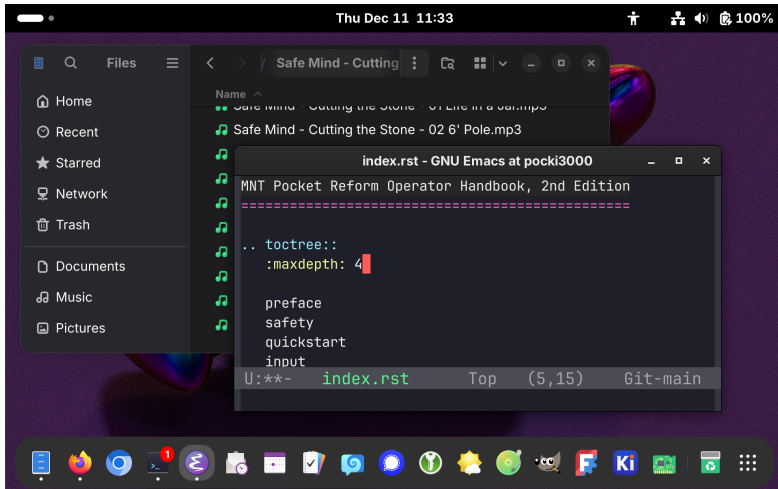
5.2.11 External Displays

Some Processor Modules allow you to connect an external display on the HDMI port. If your module supports dual display, plugging in an external monitor should just work. If you want to configure the placement and resolution of this monitor, take a look at `man sway-output` and create an `output HDMI-A-1` section in your Sway config file. Other helpful tools that you can install for these purposes are `kanshi` and `wlr-randr`.

You can also use `swaymsg` to control your displays on the fly or when pressing certain key combinations. The following example script will switch from internal to external display and force a standard 1080p mode:

```
#!/bin/sh  
swaymsg output eDP-1 disable  
swaymsg output HDMI-A-1 enable  
swaymsg output HDMI-A-1 modeline 148.50 1920 2448 2492\  
2640 1080 1084 1089\  
1125 +hsync +vsync
```

5.3 The GNOME Desktop



GNOME on MNT Reform Next supports a number of customized keyboard shortcuts to speed up working with the desktop:

Shortcut	Function
<i>SUPER</i>	Open <i>Activities</i> overview and launch applications
<i>SUPER</i> +← or →	Tile window to left or right
<i>SUPER</i> +↑ or ↓	(Un)maximize window
<i>SUPER</i> +TAB	Cycle through running applications
<i>ALT</i> +TAB	Cycle through windows of the focused application
<i>SUPER</i> +ENTER	Open a terminal
<i>SUPER</i> +ESC	Close the focused window
<i>SUPER</i> +SHIFT+S	Take screenshot (in ~/Pictures)
<i>SUPER</i> +SHIFT+X	Take screenshot of an area
<i>SUPER</i> +SHIFT+R	Make a screen recording of an area
<i>HYPER</i> +F1	Decrease display brightness
<i>HYPER</i> +F2	Increase display brightness
<i>HYPER</i> +F10	Toggle silent volume
<i>HYPER</i> +F11	Decrease volume
<i>HYPER</i> +F12	Increase volume

To speed up your window juggling, you can move windows not only by dragging their title bar, but also by holding *SUPER* and dragging (with the left trackpad button) anywhere in a window. To resize the window from any point, you can hold *SUPER* and drag on the window with the right trackpad button.

5.3.1 Launching Applications

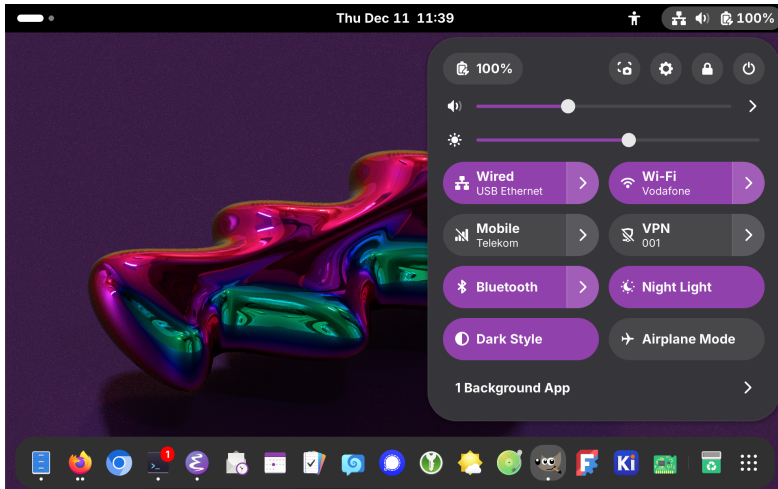
With GNOME, you can start an application using the dock (the row of icons on the bottom of the screen, also called *Dash*) or the *Activities overview* (opened by pressing the *SUPER* key). You can find an application by typing a part of its name in the overview. You can pin a frequently used application in the dock by right clicking its icon and choosing “Pin to Dock.”

5.3.2 Top Bar

The top bar in GNOME has 3 major sections:

- Left side: Workspaces indicator. If you have multiple workspaces configured, it highlights which one is currently active. Clicking on the indicator brings up the *Activities* overview.
- Middle: Date and time. Clicking on them opens a drop-down with a list of notifications and the calendar. You can set up the calendar using the *Evolution* application (an email client with built-in calendaring and task management) or the more minimalistic *Calendar* application.
- Right side: Accessibility menu, and a combined indicator for network, volume and battery status. Clicking this indicator brings up the *System Menu*.

5.3.3 System Menu: Volume, Brightness, Network



The System Menu lets you control all important settings of the system. From top to bottom:

- Buttons (from left to right):
 - Battery status
 - Taking screenshots
 - Settings
 - Lock screen
 - Power off / Reboot / Log out
- Volume slider
- Display brightness slider
- *Quick Settings*

The *Quick Settings* are a mix of buttons that control network interfaces like Wi-Fi, Ethernet, Cellphone network, Bluetooth. You can connect to your respective networks and devices here, or toggle them on and off. In addition, there are toggle

buttons for the user interface's *Dark Mode*, *Airplane Mode* (which shuts down all radio interfaces) and *Night Light* (to automatically set the display to a more eye-friendly hue at night).

5.3.4 Sound

Beyond adjusting the audio volume, you can also switch between the built-in speaker and headphones (or USB and Bluetooth audio devices) by clicking the arrow icon right next to the volume slider in the *System Menu*. From there, you can also reach the more detailed *Sound* page of the *Settings* application.

5.3.5 Settings: Keyboard Layout, Displays and More

All of the *Quick Settings* can be configured in more detail in *GNOME Settings* (also called `gnome-control-center`), an application that you can access by clicking the gear icon in the *System Menu*. Alternatively, you can find it as a normal application in the *Activities* overview by typing "Settings."

In addition to networks, you can configure almost all important aspects of the system here. Some of the most commonly needed settings are:

- *Keyboard*: The keyboard layout is initially configured by the MNT Reform Next Setup Wizard, but you can change it here.
- *Mouse & Touchpad*: Change the speed and behavior of the trackpad (or external mouse/trackball).
- *Sound*: Change audio devices, volumes, and the alert sound.
- *Displays*: Configure display scale and external displays.

There are many additional, hidden settings that don't appear in the *GNOME Settings* application. You can explore them

using `gnome-tweaks` or the `gsettings` command-line tool.

5.4 Alternative Desktops

You're not limited to the desktop options that we include with the System Image. You can install any desktop environment that is packaged in Debian. For example, you can install KDE by entering `sudo apt install kde-standard`, or Xfce4 by entering `sudo apt install xfce4` in a terminal. To switch between desktop environments, click on the gear icon on the GDM login screen after selecting your username (before entering your password).

Please note that installing a heavyweight desktop environment like KDE will affect your existing GNOME installation too, by adding additional services, changing icons/fonts/cursors etc. So this isn't without risk (or at least some cleanup work if you later decide to go back).

Chapter 6

Software

We ship the Reform Next system in a minimalist form to give you the freedom to decide what you want to install. As we want the device to be practical out of the box, we preinstalled some essential tools, which are listed in the following section. We also included a section about the so-called “Reform Tools,” which are Reform (series) specific helpers and scripts.

MNT Reform Next can run most Linux applications that are available for 64-bit ARM-based computers (also called AArch64 or ARM64), and many x86-64 Linux applications through emulation by `box64`.

6.1 Preinstalled Software

Document Viewer View PDFs and other documents.

Command: `papers`

<https://apps.gnome.org/Papers>

Firefox Mozilla's open-source web browser. We disable AI features and ads with a default configuration file.

Command: `firefox`

<https://www.mozilla.org/firefox>

ptyxis A terminal emulator that is fast, minimalistic, and lightweight.

Command: `ptyxis`

Keyboard shortcut: *SUPER+ENTER*

<https://gitlab.gnome.org/Chergert/ptyxis>

GNOME Disks Partition, format, and manage internal and external disks.

Command: `gnome-disks`

<https://wiki.gnome.org/Apps/Disks>

Grim & Slurp Grim is a wayland-based screenshot tool, and Slurp lets you select the region of the screen you want to capture (used for Sway).

Command: `grim -g "${slurp}"`

Keyboard shortcut: *SUPER+SHIFT+X*

<https://wayland.emersion.fr/grim>

htop A terminal-based look at system processes, CPU and memory usage.

Command: `htop`

<https://htop.dev>

micro An accessible, fresh terminal-based text editor.

Command: `micro`

<https://micro-editor.github.io/>

Luanti (previously Minetest) A 3D block-based open-world game focused on exploration, resource gathering, and construction.

Command: `minetest`

<https://minetest.net>

MPV A versatile, terminal-based media player.

Command: `mpv a-movie-file.mp4`

<https://mpv.io>

NCurses Disk Usage Terminal-based disk usage analysis utility.

Command: `ncdu`

<https://dev.yorhel.nl/ncdu>

Neverball This 3D game lets you guide a ball through 24 challenging levels.

Command: `neverball`

<https://neverball.org>

Sxiv A simple and fast image viewer.

Command: `sxiv`

<https://github.com/muennich/sxiv/>

Thunar Lightweight file manager. Used on the Sway desktop.

Command: `thunar`

<https://docs.xfce.org/xfce/thunar/start>

Vim The other major open text editor.

Command: `vim` (Exit by typing `:q` followed by *ENTER*)

<https://www.vim.org>

Wayland Event Viewer Useful when debugging input devices under wayland-based compositors such as Sway.

Command: `wev`

<https://git.sr.ht/~sircmpwn/wev>

Wayvnc Access your MNT Reform Next desktop remotely from VNC clients on other platforms using this server application.

Command: `wayvnc`

<https://github.com/any1/wayvnc>

wf-recorder Record MP4 video of your desktop with this program on the Sway desktop.

Command: `wf-recorder` (Stop with `CTRL+C`. The resulting video is named "recording.mp4")

<https://github.com/ammen99/wf-recorder>

6.2 Updating Software

We recommend updating your software on a regular basis as bugs get fixed, new features are introduced and improvements are made. For this purpose, Debian has an integrated package manager called `apt`. You can stay up to date by executing the following command: `sudo apt update`. This will show you how many packages can be updated. You can either update individual packages using `sudo apt install package-name` or everything at once with one command: `sudo apt full-upgrade`.

You can also use *GNOME Software* to explore and install packages with a graphical user interface. Debian doesn't have all Linux software packaged, and you can find additional software using the `flatpak` command and *Flathub* (an "App Store" for Linux). Please note that *Flathub* packages are not vetted by MNT or Debian and potentially have risks. You can add the software catalog from *Flathub* to *GNOME Software* using the following commands:

```
sudo apt install flatpak
```

```
# the following goes on one line!
```



```
flatpak remote-add flathub  
https://dl.flathub.org/repo/flathub.flatpakrepo
```

6.3 Flashing the System Image

If your operating system is broken or you want to set up a new system (for example when upgrading to a new Processor Module), you can create a bootable SD card by downloading the MNT Reform Next System Image from: <https://mnt.re/system-image>

First of all, back up all your important data! The following process will erase everything that is on the SD card you decide to flash.

From the link above, download the file whose name matches the Processor Module in your MNT Reform Next:

Processor Module	Filename
RCORE RK3588	reform-next-system-rk3588.img.gz
Quasar QCS6490	reform-next-system-qcs6490.img.gz
Quasar QCS8550	reform-next-system-qcs8550.img.gz

Note that the images for MNT Reform Next may not be compatible with MNT Pocket Reform and MNT Reform (Classic).

Unzip the image using `gunzip` (substitute your actual image file name, also in the following steps):

```
gunzip reform-next-system-rk3588.img.gz
```

Identify the device name of your SD card. For example, you can check the output of `lsblk` before and after you insert the card and compare which new device appears. Below we use the device `sdX`, but it will be a different one on your computer.

Copy the image to your SD card (**Warning: all data on the SD card will be erased!**):

```
sudo dd if=reform-next-system-rk3588.img of=/dev/sdX \  
bs=8M status=progress
```

That's it—now you can boot your Reform Next from the freshly flashed SD card.

As new modules become available, you can refer to our on-line guide: <https://source.mnt.re/reform/reform-system-image#downloading-and-flashing-a-system-image>

6.4 Reform Tools

We have our own Debian package called `reform-tools`. These tools are designed to automate otherwise tedious system configuration tasks, so we encourage you to check them out.

Command	Function
<code>reform-check</code>	Tries to analyze what's wrong with your OS.
<code>reform-help</code>	Shows you a list of useful commands.
<code>reform-setup-encrypted-disk</code>	Use this for moving your OS to an NVMe SSD with encryption (recommended).
<code>reform-flash-bootloader</code>	This tool updates the bootloader (u-boot or barebox).
<code>reform-rescue-shell</code>	If your system is unbootable, run this from an SD card to get a shell into it.
<code>reform-migrate</code>	Helps you with OS migration from SD card to NVME or eMMC flash.

More information about `reform-tools`: <https://source.mnt.re/reform/reform-tools>

6.5 Running x86 Software

A popular architecture for computers is x86-64 (a.k.a. AMD64). Binaries compiled for this architecture are normally incompatible with ARM processors. If you want to use binary software, you should make sure that it is built for AArch64 for best performance. The vast majority of open-source software is available for AArch64 (also called `arm64`).

Until RISC architecture will change everything, many games and proprietary closed-source applications are only available as x86 or x86-64 binaries. If you need to run such a binary, you can use a binary translator such as `box64`, which you can install using `sudo apt install box64`.

```
box64 ./my-game
```

You can even run some Microsoft Windows applications on MNT Reform Next by chaining `box64` and `wine`, which is a Linux compatibility layer for Windows binaries:

```
box64 wine ./my-game
```

Box64 can emulate 32-bit x86 binaries as well. For example, you can install Valve's Steam app using the included script:

```
/usr/share/doc/box64/examples/install_steam.sh
```

Please note that Steam itself is not open source software.

6.6 GPU Hacks

At the time of writing, most MNT Reform Next Processor Modules are based on ARM System-on-Chips that contain a GPU meant for mobile or “embedded” use. Multiple factors define the limits of the versions of OpenGL, OpenGL ES and Vulkan APIs that software can use on MNT Reform Next: for example, the space- or energy-saving architecture of these GPUs, or the capabilities of the often reverse-engineered open-source drivers such as `etnaviv` or `panfrost`.

Sometimes, graphics heavy applications or 3D games are written with large and power hungry desktop GPUs in mind and require a GL or Vulkan version that is out of reach of your device. In some cases the developers do not really require the features available for higher OpenGL versions, though, and you can try to work around the limitation by pretending that your system supports a higher version than it really does. To do this, you can set the following environment variables in a terminal and then launch your application or game from this same terminal:

```
export MESA_GL_VERSION_OVERRIDE=4.2
export MESA_GLSL_VERSION_OVERRIDE=420
my-game
```

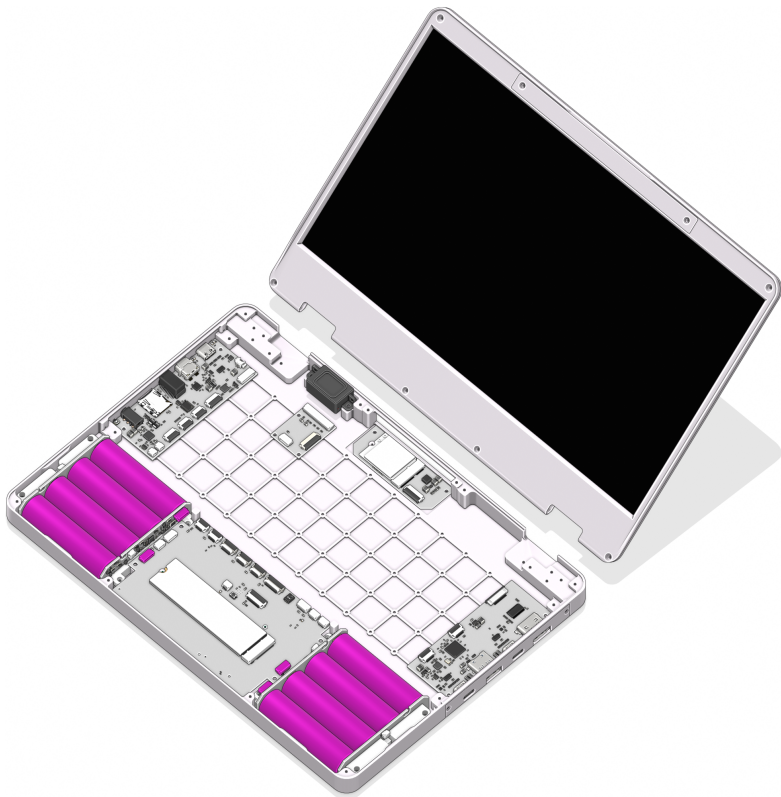
If this fails, you can always fall back to software emulation of OpenGL, which will be slow but sometimes usable:

```
export LIBGL_ALWAYS_SOFTWARE=1
my-game
```

Mesa is the collection of Linux 3D graphics drivers. You can learn more about various Mesa environment variables at <https://docs.mesa3d.org/envvars>

Chapter 7

Hardware



7.1 Case Parts

The MNT Reform Next laptop has a unique modular, open and extensible hardware design. This chapter explains the major components and how they're connected.

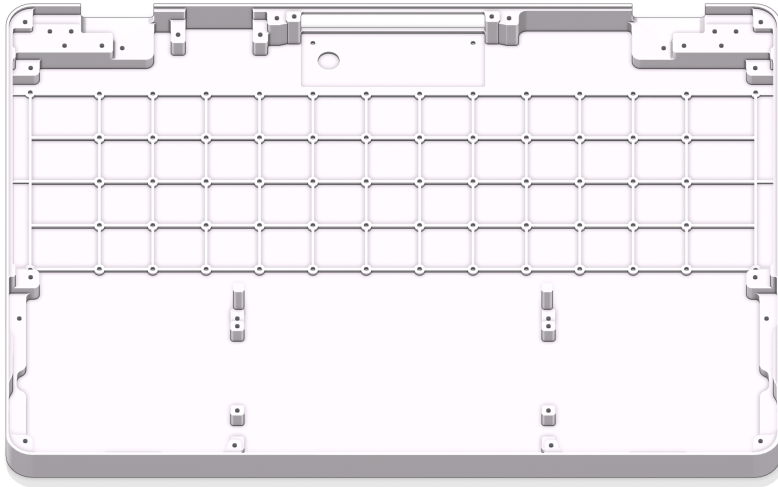
The case consists of four big parts. All parts are CNC milled from sand-blasted and anodized 6061 aluminum.

1. **Main Case:** the chassis of MNT Reform Next. Most of the PCBs (printed circuit boards) are attached to it with screws.
2. **Keyboard Frame:** a bezel that covers the top of the main case, frames the keyboard and provides palm rests. The trackpad is mounted into it from below.
3. **Display Case:** houses the display and the upper halves of the hinges.
4. **Display Frame:** the bezel for the display. The camera cover is mounted into it above the display.

The case also has a total of four small covers: two aluminum covers for the ports on the left and right side, one aluminum cover above the display for the camera kit or other extensions, and one acrylic cover in the back for the Wi-Fi/BT module and one of its antennas.

For easy (dis)assembly, MNT Reform Next uses black, carbon steel M2 screws with Phillips-head everywhere—with one exception: M4x5 on the top half of the hinges. The screws are partially covered with nylon to prevent vibrations from loosening them in their threads.

7.1.1 Main Case



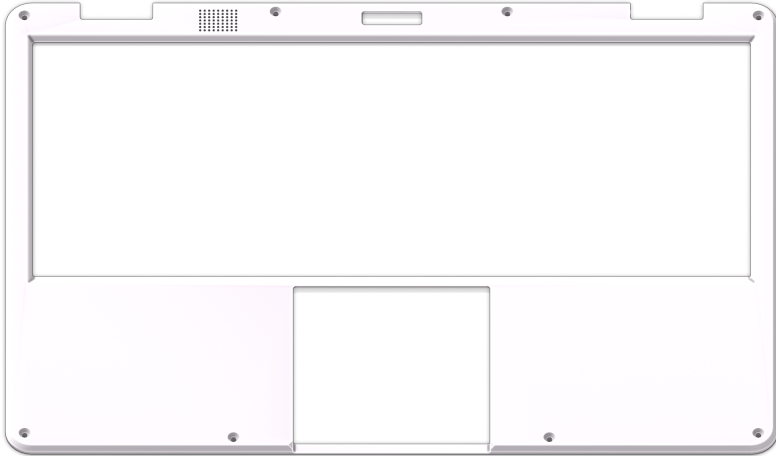
The main case has a prominent grid of 20x20mm spaced M2 threads which allows for flexible customization of the laptop through small modules called *Tiles*. This feature was inspired by the “Peek Array” (named after its inventor Dr. Nadya Peek) in Bunnie Studios’ 2014 open-source hardware Novena computer. It houses most of the electronics:

- The *Mainboard* with its *Processor Module*
- The two *Port Boards*, exposing ports through openings on the left and right
- any *Tiles* installed on the 20x20mm *Mounting Grid*
- A *Mono Speaker*
- The *Wi-Fi/BT Module*
- The *Keyboard*
- The *OLED display*
- Two identical *LiFePO4 Battery Packs*

The main case connects to the Display Case through two hinges. It also features two laser cut carbon steel strips

inserted into slots below the front edge. These are attracted by the magnets in display case when closing the laptop, holding it shut.

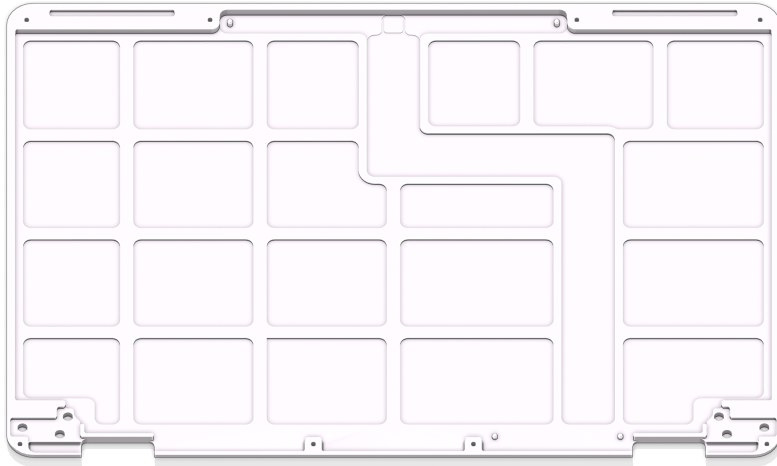
7.1.2 Keyboard Frame



The keyboard frame closes the the main case from the top. It's attached with eight M2x8 countersunk screws.

The keyboard frame also houses the trackpad sensor board and trackpad button board—see the *Trackpad* section further down.

7.1.3 Display Case



The eDP display panel rests in the display case. The display cable is fed through the left hinge and into the main case, where it connects to the *eDP Adapter Tile*.

The left and right hinges are mounted in the bottom left and right corners of the display case with three M4x5 countersunk screws each. Note that the hinge labeled "SMS-ZZ-219-L" goes on the right side, and the hinge labeled "SMS-ZZ-219-R" goes on the left side. The other half of each hinge is mounted to the main case with four M2x8 countersunk screws.

Two neodymium magnets are mounted along the top edge of the Screen Back. These attract the carbon steel strips in the Main Case when closing the laptop.

7.1.4 Display Frame



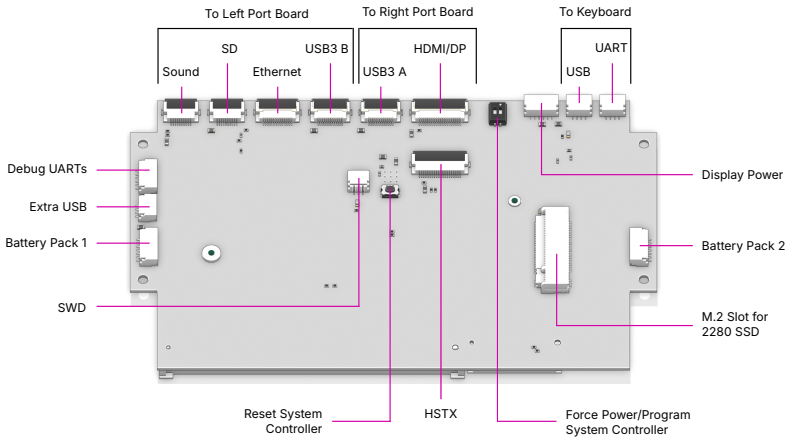
The display frame serves as a bezel for the display. It is mounted with seven M2x4 countersunk screws to the display case.

The display frame also has a rectangular cutout near the top. If you don't have a camera or other kit for this area, this opening is covered by the fully closed *camera cover*, which is an aluminum rectangle mounted with two M2x4 countersunk screws. The camera kit includes a replacement for this cover which has a hole for the camera sensor.

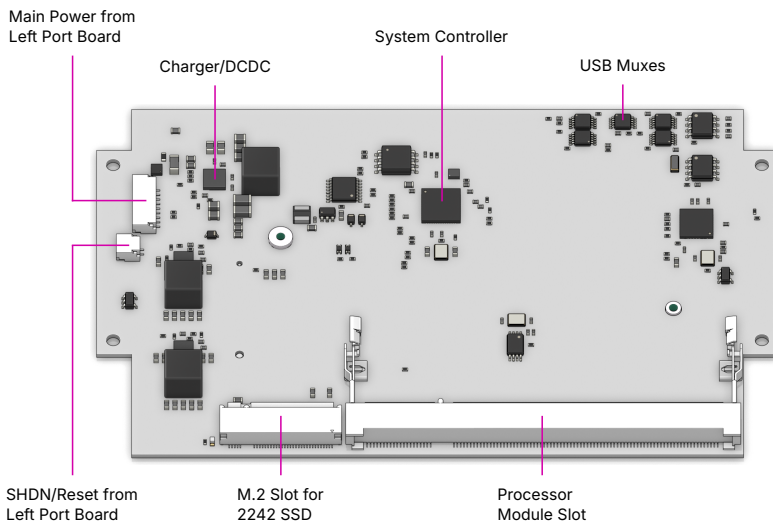
7.1.5 Port Covers

The Port Covers are two pieces of anodized aluminum that cover the side openings of the Main Case (mounted with two countersunk M2x4 screws each). Future Port Boards will include alternative Port Covers to accommodate different layouts.

7.2 Mainboard



The mainboard rests between the two battery packs and carries the Processor Module and up to two NVMe SSDs. It has no ports connected directly to the outside, instead it's connected by a number of cables to the two port boards and the rest of the system. It is screwed to four 2.5mm tall steel hex spacers with four M2x4 pan head screws, which in turn are attached to M2 mounting posts on the main case.



The Mainboard has the following features:

- **System controller:** an RP2350A dual-core Cortex-M33 MCU that controls the battery packs, the charger, the main power rails, USB-C PD communication via the left port board, and USB port muxing. It is connected to the Processor Module via SPI and USB, so it can report battery and system status to the OS. It has a dedicated UART (SYSCTL) line to the keyboard, so that you can issue power on/off commands and battery status queries from the keyboard's OLED menu.
- **Power system:** based on the BQ25792 buck/boost charger, it regulates charging of the two battery packs and seamlessly switches between USB-C and battery power.
- **M.2 slot, 2280:** A key M slot with up to 4 PCIe lanes that you can use for a 2280-sized NVMe SSD, intended for primary storage expansion.
- **M.2 slot, 2242:** A key M slot with up to 2 PCIe lanes that you can use for a 2242-sized NVMe SSD, for secondary storage expansion.

- **Internal battery connectors:** two identical 7-pin JST-SH connectors for connecting the battery packs on the top side (J11 and J12). The battery packs' voltages are connected together on the mainboard in parallel, but each pack can be gated separately via I²C commands by the System Controller to allow for balancing and redundant operation.
- **Internal power connectors:** the mainboard has a bidirectional 6-pin power connection to the left port board, through connector J7 on the bottom side. The mainboard also has a dedicated 6-pin JST-SH connector (J10) for the display on the top side, as the display's backlight is usually a major energy consumer.
- **Internal data connectors:** the mainboard has a row of 6 flat cable connectors that provide data and power to I/O chips and ports on the port boards. The first group goes to the left port board, labeled from left to right: "Sound", "SD", "Ethernet", and "USB3 B". The second group supplies the right port board: "USB3 A" and "HDMI/DP".
- **Internal input connectors:** the rightmost two 4-pin JST-SH connectors, next to the display power connector, are reserved for the keyboard and its little OLED screen and multi-touch trackpad. J6, labeled "HID USB" goes to the "USB" connector on the keyboard and established—you guessed it—USB HID connectivity for the keyboard and trackpad functions to the operating system. The "HID UART" line next to it is required for System Controller interactions of the keyboard, where it goes to a connector named "UART". This connection is required to be able to turn the laptop on and off and view battery/charging status on the keyboard's OLED display.
- **Hard reset line:** The 2-pin JST-SH connector J1 on the bottom of the mainboard (labeled "SHDN") leads to the left port board's hard reset button. When this circuit is closed by the button, it turns off standby 3.3V power, resetting the system controller and power chips.

- **System controller switches:** Normally only needed for firmware development, there's a reset button ("SYSRST") as well as a debug connector ("SWD"), and two little DIP switches on SW1. The first one, "FORCE POWER", forces the mainboard's power rails on as a last resort to boot the system without firmware. The other one, "PROG", forces the System Controller into USB programming (flashing) mode.

7.2.1 System Controller

Independent from the main Processor Module, a low-power microcontroller sits on MNT Reform Next's mainboard. The RP2350A is a dual-core hybrid ARM Cortex-M33/Hazard3 RISC-V processor that uses very little power and is always on as long as there is battery or wall power present. We call this processor the *System Controller*.

The System Controller runs a program in an endless loop that has the following jobs:

- Powering the individual voltage rails of the system on and off
- Monitoring the voltage of each battery cell
- Balancing battery cells. If a cell is overvoltage, charging is halted and the overvoltage cells are discharged until they are back to a nominal voltage
- Turning off the system if battery cells are under-voltage/discharged
- Regulating and reporting the total current flowing in and out of the batteries

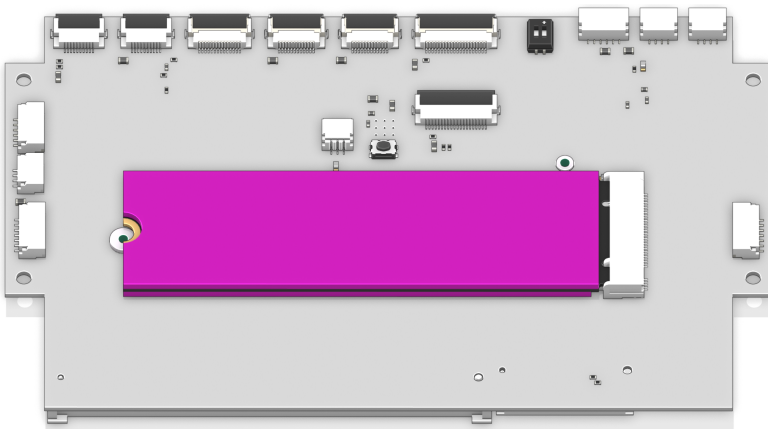
Your main way of communicating with the System Controller is with the Keyboard. The Keyboard has, aside from its USB connection to the main processor, a separate serial (UART) line to the mainboard's SYSCTL port. A 115200 baud connection is always established between the Keyboard and the System Controller.

The System Controller accepts commands in plain text form. A command consists of a word, sometimes followed by one or more parameters, and has to be wrapped in parentheses. The command `(set-rail 0 1)`, for example, turns on power rail number zero (the first one), while the command `(pdreset)` resets the USB-C Power Delivery state. For an up-to-date command reference, refer to the `README.md` file in the firmware directory of MNT Reform Next's source code repository: <https://source.mnt.re/reform/reform-next/-/tree/main/nref-sysctl-fw/README.md>

The individual cell voltages are measured by the battery monitor chip in each battery pack and reported via I²C to the System Controller. The total voltages and currents are measured by the charge and DC-DC controller chip on the mainboard and also reported via I²C.

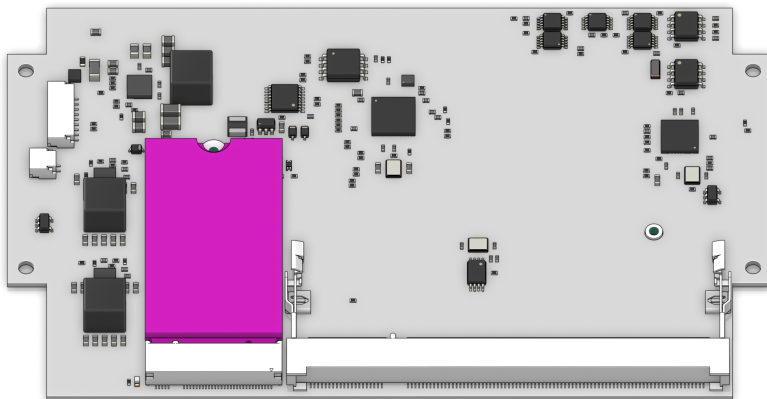
The System Controller is connected to the Processor Module through a SPI interface and through USB. The System Image ships with a kernel module/driver called `mnt-sc` which makes battery information and power control available to the OS. The source code for this driver is available in the system-controller directory of the `reform-tools` repository.

7.2.2 2280 M.2 Socket (Key M)



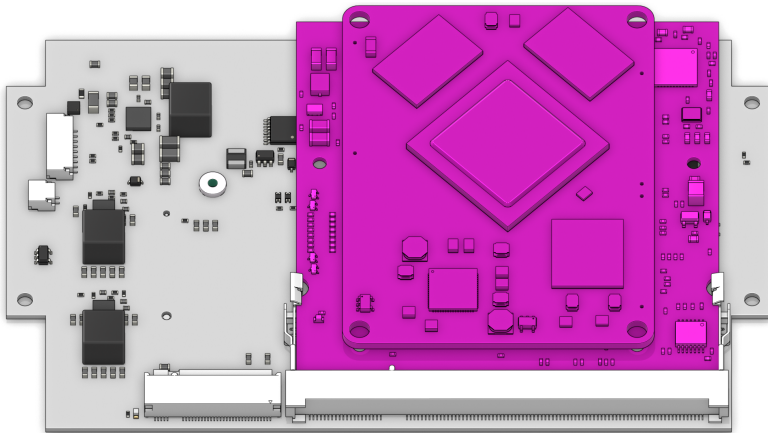
Some Processor Modules (like RCORE and Quasar) feature a PCIe 3.0 controller that is connected to the 2280 M.2 socket on the top side of the mainboard. This slot is intended for primary storage expansion using a full-size (2280) NVMe SSD. To install an SSD, plug it into the socket at an angle and then fix it with an SSD mounting screw to the threaded mounting hole in the mainboard.

7.2.3 2242 M.2 Socket (Key M)



The standard use for this slot is to install a secondary, 2242 size M.2 NVMe SSD. Depending on your Processor Module, this port features up to 2x PCIe lanes. Plug the SSD disk into the socket and secure it with an SSD mounting screw using the threaded hole in the mainboard.

7.2.4 Processor Module

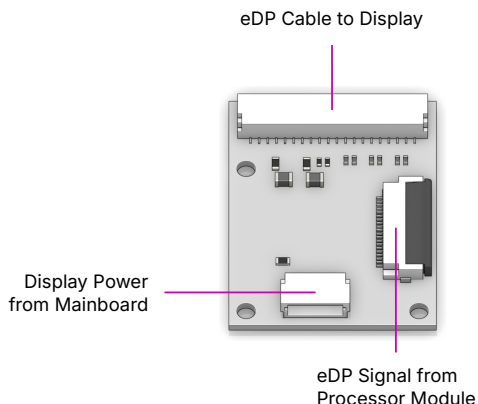


A unique feature of the MNT Reform series of computers is the exchangeable *Processor Module*. When the first classic MNT Reform was released in 2020, we had only one Processor Module to offer. Now, six years later, there is a whole range of them, each with different features to accommodate individual preferences. We are constantly developing new modules for MNT Reform Next. The standard at the time of writing is the RCore with RK3588—a powerful Processor Module with 4x performant ARM Cortex-A76 cores, 4x power-efficient ARM Cortex-A55 cores, and up to 32 GB RAM.

You can plug an MNT Processor Module into the 200-pin mainboard connector U1 at an angle, and push it down until it clicks into place. If you want to learn more about Reform Next's Processor Modules or develop your own, take a look at the schematics and KiCad projects in our source code repositories at <https://source.mnt.re/reform>.

The Processor Module has at least two of its own flat cable connectors, one that's connected to the Wi-Fi/BT board (this port has PCIe and USB signals for Wi-Fi/BT cards), and the other one providing an eDP (embedded DisplayPort) signal to the screen through the Display Adapter.

7.2.5 Display Adapter

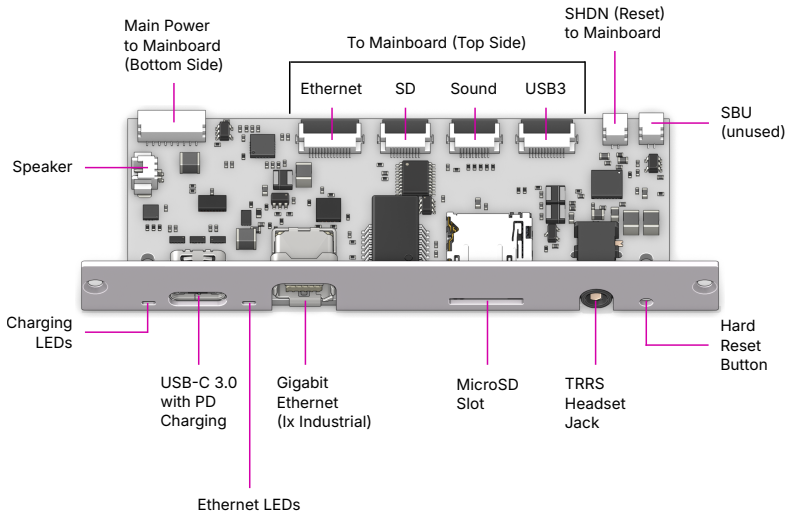


The display in MNT Reform Next conforms to the eDP (embedded DisplayPort) standard. Some Processor Modules output eDP directly, like the standard RCORE/RK3588 module. A flex cable connects the port labeled *HDMI/DP* on the Processor Module to a small PCB called the *eDP Adapter Tile* on the mainboard's mounting grid. This tile adapts the signals to a JST-SH connector and a cable that is fed through the left hinge.

The smaller, 6-pin JST-SH connector has to be connected to the "DISP PWR" on the mainboard, so that the display receives power.

The display adapter is mounted to the mounting grid with three M2x3 countersunk screws.

7.3 Left Port Board



The left port board (also called “port board one”) does a lot of heavy lifting in MNT Reform Next and is required for being able to charge the batteries:

- USB-C port with Power Delivery:** the most important and complex port of the system. You'll mainly use this port for charging MNT Reform Next using a standard USB-C PD power supply. In “sink” mode, the System Controller (on the mainboard) negotiates up to 20V from the supply over CC lines driven by the FUSB302B chip on this port board. In “source” mode, it can power a USB device with 5V/1.5A. This is handled automatically by System Controller firmware. USB3 signals from the mainboard are automatically muxed to the correct pins according to the USB-C cable's plug-in orientation, and their signal quality is boosted by an EQCO5X31C0 reclocker/redriver. In addition, MNT Reform Next can switch (mux) various different functions to this port's USB2 pins (this is done on the mainboard):

1. Host mode: Regular USB2 host of the Processor

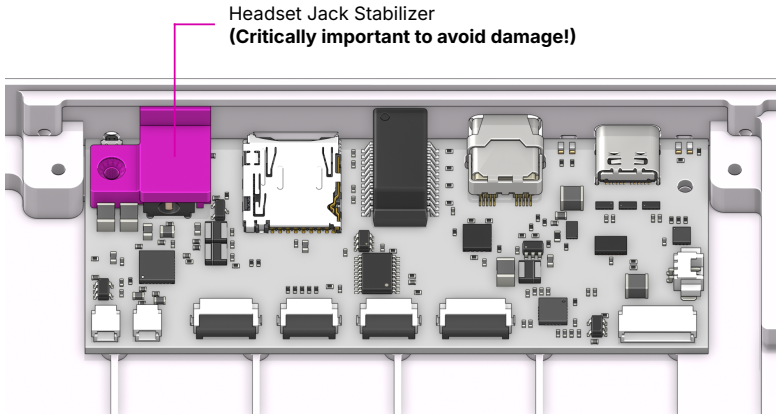
Module. This is the default mode when the system is turned on.

2. System controller mode: This mode switches the System Controller's UART to this port instead of the Processor's USB host, allowing you to debug or flash the System Controller without disassembling the laptop. This is the default mode when the laptop is turned off.
 3. Serial console mode: This mode exposes the Processor's UART as a USB-UART device, allowing you to conveniently see bootloader and OS kernel boot/debug output without disassembling the laptop.
 4. USB bootloader/EDL mode, where instead of connecting Processor Module USB2 pins to a hub on the mainboard, they're directly connected to this port, so you can use USB recovery modes of some Processor Modules like RCORE/RK3588 (rkloader) or Quasar (Qualcomm EDL). Modes 3 and 4 can be activated using the OLED menu's "System Control" sub-menu.
- **Ix Industrial Ethernet port:** this port carries regular Gigabit Ethernet in a compact form that can be adapted to classic RJ-45 using a passive adapter cable.
 - **MicroSD card slot:** you can insert regular MicroSD cards here—push an inserted card a bit further to eject it again. Note that the default bootloader will try to boot from a MicroSD card, which can be useful for OS repairs or re-installations.
 - **LEDs:** A status LED on the left of the USB-C port signals charging with a red glow, while a blue LED signals that the system is powered on. Two LEDs on the left of the Ethernet port show link status and activity.
 - **Hard Reset button:** Poke it through the hole with a pointy (but not too sharp) object to hard reset the whole

system (momentarily cuts 3.3V standby power).

- **3.5mm headset jack (TRRS) and sound chip:** A TI TLV320AIC3100 audio DAC/ADC (digital-to-analog and analog-to-digital converter)/amplifier interfaces with the headphone/microphone jack and powers the speaker.

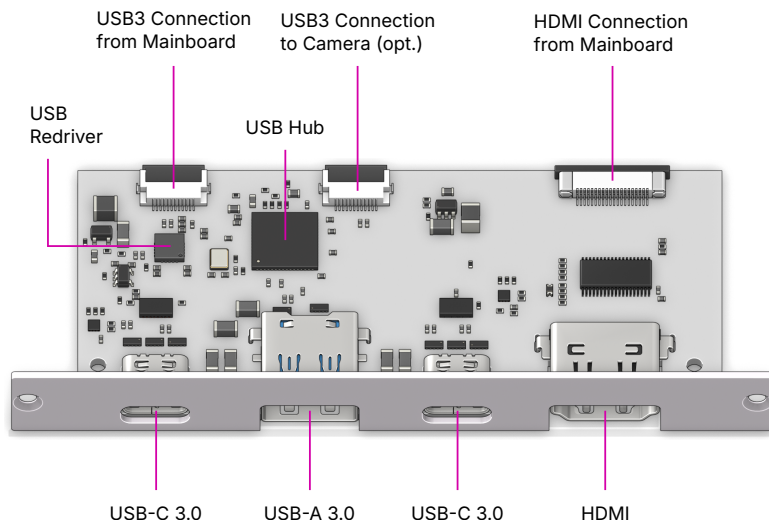
Warning: it's critically important not to plug anything into the headset jack unless the stabilizer is installed, otherwise the jack will break off the board and cause permanent damage! The stabilizer is a 3D printed part that is screwed through the port board into the main case. **This part is pre-installed by MNT—make sure you put it back in place after servicing the laptop.**



Headset Jack Stabilizer
(Critically important to avoid damage!)

The stabilizer is mounted through one hole of the left port board with a countersunk M2x6 screw, while the other end of the port board uses a M2x3.5 (or M2x4) screw.

7.4 Right Port Board

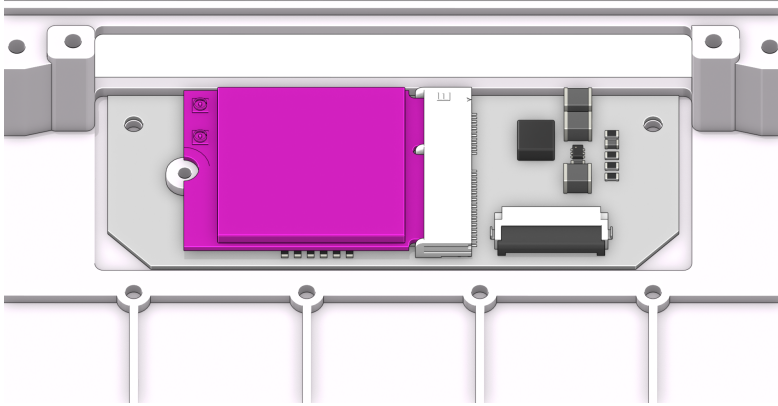


The right port board (also known as “port board two”) mainly provides a range of USB3 ports (2x USB-C and 1x USB-A) and an HDMI port. Through its integrated Super-Speed USB hub, it also supplies the optional camera module or other extensions with internal USB3 signals.

This port boards connects to the internal “USB3 A” and “HDMI” connectors on the main board. Please note that the internal connector and flat cable for HDMI are special, as the cable is plugged in upside down, with contacts facing up instead of down. When servicing this area, please pay attention to the markings on the cable.

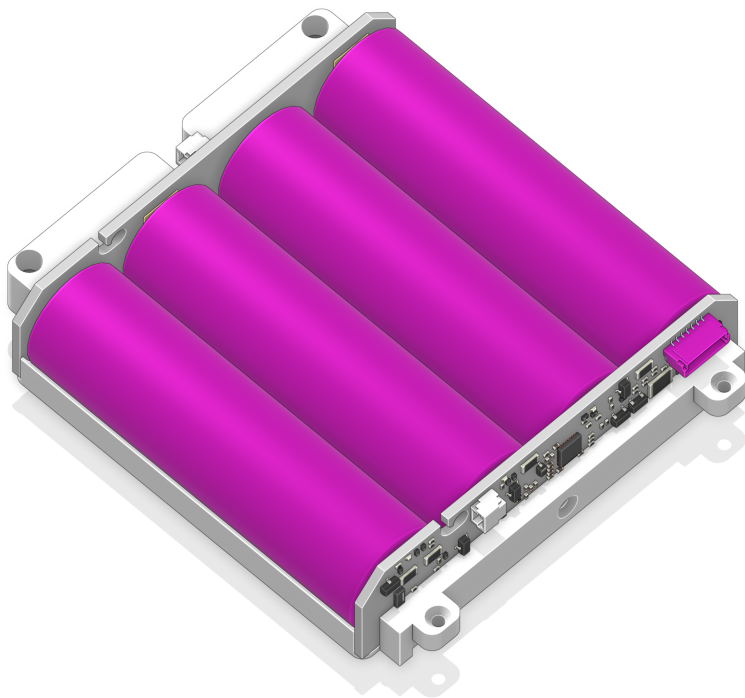
The right port board is mounted with two countersunk M2x3.5 (or M2x4) screws.

7.5 Wi-Fi/Bluetooth Module



This small PCB is located below the keyboard, in the middle of the main case's back side, where it's mounted with two M2x3 countersunk screws. It connects the data and power coming from the Processor Module's Wi-Fi/BT flat cable to an M.2 slot with an E key meant for cards providing Wi-Fi and Bluetooth connectivity, like the standard Intel AX210 card. The Wi-Fi/BT card has two MHF4 connectors for radio antennas. One antenna (with a short cable) is attached to the acrylic back cover directly behind the Wi-Fi/BT module, while the other antenna is attached next to the keyboard.

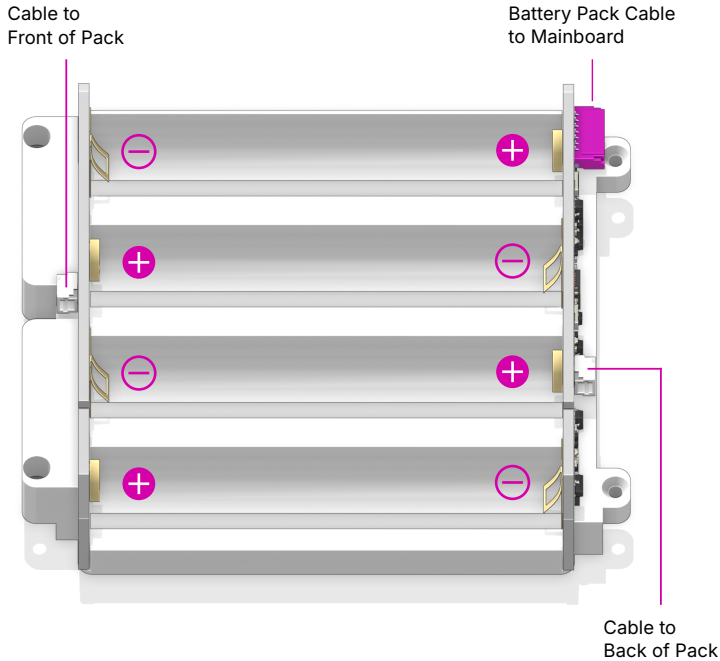
7.6 Battery Packs



MNT Reform Next has two identical battery packs, referred to as the Left and Right packs. Each pack holds four 18650 LiFePO4 cells (3.2V). Please note that each battery pack is mounted with two M2x8 countersunk screws on its outer side (closer to the laptop's wall), but two M2x6 countersunk screws on the inner side (next to the mainboard).

You may be tempted to try cells of other chemistries like Li-Ion or NiMH, but never do this, as these are incompatible.

Only use LiFePO4 cells with MNT Reform Next!



When inserting battery cells, make sure that the positive and negative poles are facing in the correct direction. The poles are marked on the silkscreen of the battery pack PCBs.

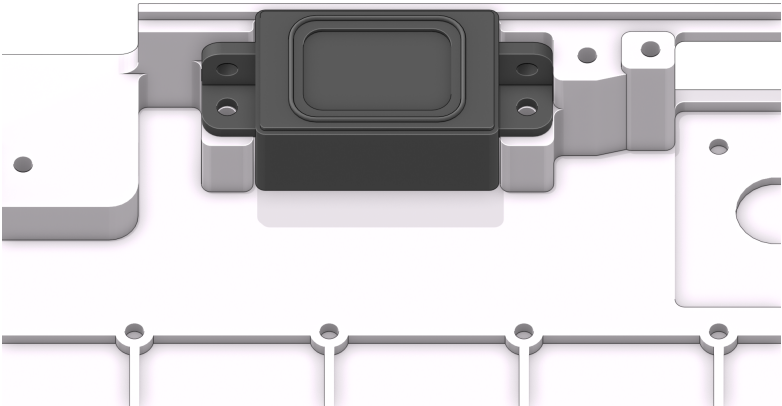
Remove the battery packs before doing any work inside MNT Reform Next to prevent damage from accidental discharge.

7.6.1 Compatible Battery Cells

The following table lists some compatible LiFePO₄ cells, but any LiFePO₄ chemistry cell of 18650 size should work. It is not recommended to mix cells of different capacities, as the lowest capacity cell will dictate the lowest safe point of discharge.

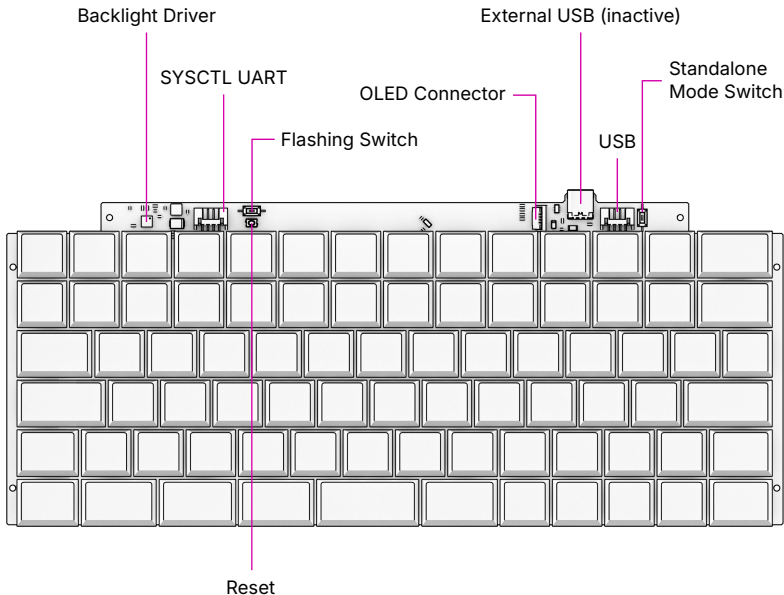
Brand	Model	Capacity
JGNE	JGCFR18650-2200	2200mAh
Eremit	18650 LiFePO4	2000mAh

7.7 Mono Speaker



The speaker is mounted in the back near the left hinge with two M2x4 pan head screws. The speaker has a 2-pin PicoBlade cable that connects to the audio circuit on the left port board.

7.8 Keyboard



The keyboard is mounted to the top of the Main Case with six M2x4 pan head screws. It is powered by an RP2040 microcontroller. The controller scans the row/column matrix of keyswitches and reports key presses via USB HID (human interface device) to the mainboard. Each switch has a diode to prevent ghosting, so you can press multiple keys at once. The microcontroller runs a firmware based on `pico-sdk` and `tinyusb` which is an open source library for implementing USB input devices. On the MNT Reform Next, the keyboard also scans the trackpad's multi-touch sensor data and the state of the trackpad's 3 buttons.

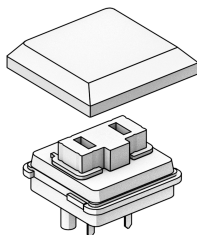
The second role of the keyboard is to serve as a user interface to the System Controller on the mainboard, even when the main processor is turned off. To make this possible, the keyboard connects via a separate UART cable to the mainboard's SYSCCTL UART header.

The keyboard can alternatively be taken out of the laptop and used as a standalone USB-C device. To enable this function, turn on the *STANDALONE* switch near the top right corner. When using the keyboard in the laptop, this switch has to be turned off.

7.8.1 Keyboard Backlight

Most keys have a light emitting diode (LED) to illuminate the transparent part of the keycaps, making the laser engraved letters visible in darkness. You can control the backlight's brightness via *Circle* followed by *F1* or *F2*, or use the OLED menu. To change the keyboard backlight's color, you can use *F3/*F4** for hue and *F5/*F6** for saturation control while the OLED menu is open.

7.8.2 Replacing a Keycap



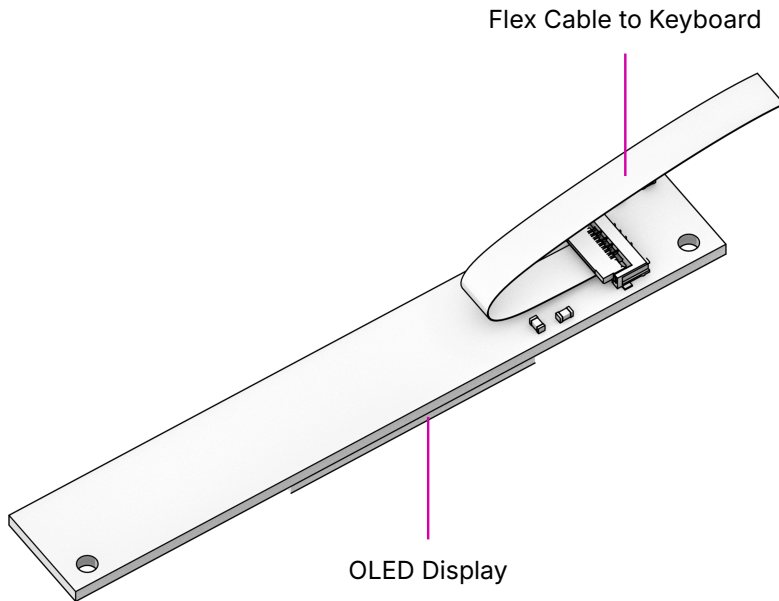
MNT Reform Next comes with custom *MBK Choc Glow* keycaps by FKcaps, but you can use any keycaps compatible with Kailh Choc keyswitches. You can pull out individual keycaps with your fingernails—or better, using a keycap puller—and swap them around.

7.8.3 Replacing a Keyswitch

Should a keyswitch ever break, you can replace it with Kailh Choc Brown (CPG135001D02) or Kailh Choc White (CPG135001D03).

The best way to desolder the switch is a desoldering gun. If you don't have one, use a soldering iron and solder wick to remove the solder of one pin. Try to pull out the corresponding side of the switch from the top while continuing to heat the pin. Repeat the same for the other pin and go back and forth until you can remove the switch.

7.9 OLED Module

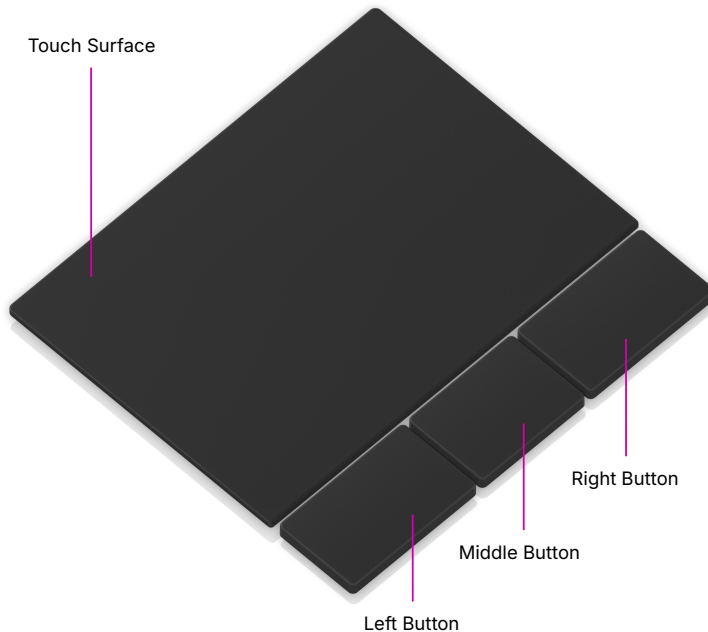


The OLED display sits on the OLED Module which is connected to the keyboard through a 4-pin, 1mm pitch flex cable. The communication protocol is I²C. The module is mounted in the Main Box on top of the keyboard with two M2x4 pan head screws.

If you're feeling creative and want to customize your OLED with text, images or even animations, we've got you covered. Check the MNT Reform Next source repository and navigate to the `reform2-keyboard-fw/kbdgfx-demo` directory. This

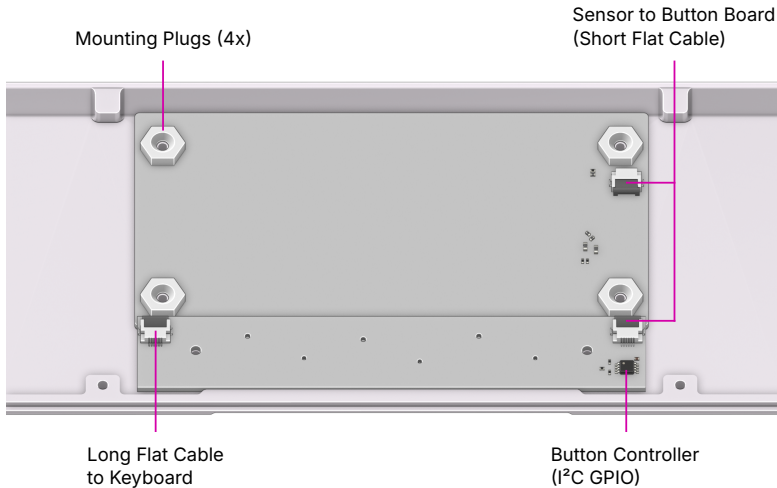
directory contains example code that serves as a starting point for developing your own custom OLED graphics.

7.10 Trackpad



The trackpad sensor is a sandwich of two custom parts: - A PCB that integrates an Azoteq IQS9150 capacitive sensor which senses and reports touch coordinates over I²C. - A glass surface that provides a smooth touch surface.

The trackpad's 3 buttons are on a separate PCB adjacent to the trackpad sensor. The buttons are based on Kailh PG1316S ultra low profile mechanical switches.



The trackpad sensor and buttons are controlled by the keyboard's microcontroller. A long 6-pin flat cable from the keyboard to the button board provides 3.3V power and an I²C data bus, while a shorter version of this cable carries the same bus further to the trackpad sensor.

While the trackpad button board is attached to the main case by two M2x4 pan head screws, the sensor is held in place by four 3D-printed hexagonal plugs that are in turn secured by four countersunk M2x4 screws. The goal of this design is to be able to adjust the sensor's position more precisely, accommodating for variations in machined part dimensions.

7.11 Compatible Displays

MNT Reform Next was designed to be compatible with a number of 12.5 inch (diagonal) 1920x1080 pixel eDP displays. We tested the following display models successfully:

Brand	Model
Innolux	N125HCE-GN1 (Center Connector)
Innolux	N125HCE-GN1 (Side Connector)
Innolux	N125HCE-GPA (glossy or matte)
BOE	NV125FH1-N82
AU Optronics	B125HAN02.2

Chapter 8

Advanced Topics

A computer is a complex system where hardware and software interact, and sometimes, unpredicted problems may appear. Should you experience issues with MNT Reform Next, please use our online troubleshooting guides via <https://support.mnt.re>. If your issue isn't listed you can submit a custom message to us via the same link.

8.1 Updating the Firmware

If there's trouble related to charging or power, or the functionality of the keyboard and trackpad, you should try to update the System Controller Firmware and the Keyboard Firmware.

The recommended way to do this is using the *GNOME Firmware* application, or `fwupdmgmt update`. If you're unsure, refer to <https://community.mnt.re> and <https://support.mnt.re>.

For reference, the source code of the firmware is here:

- System Controller <https://source.mnt.re/reform/reform-next/-/tree/main/nref-sysctl-fw>.

- Keyboard/Trackpad (shared with the classic MNT Reform) <https://source.mnt.re/reform/reform/-/tree/main/reform2-keyboard4-fw>.

8.2 Rescue Shell and Reform-Check

The `reform-tools` package includes the `rescue-shell` tool that is meant to be run from a fresh System Image flashed to MicroSD card or USB stick (refer to *Flashing the System Image* in the chapter *Software*). Once your MicroSD/USB system has booted, complete the Setup Wizard with dummy data, launch a terminal and run `sudo rescue-shell`. It will attempt to mount your existing system on eMMC/SSD and give you a root shell there, where you can repair your system or copy out important data. You can also run `reform-check` inside this shell to get some automated diagnostics.

8.3 Serial Console

If you need to do low-level console debugging, for example to see boot logs when nothing is printed on the screen, MNT Reform Next features a convenient built-in UART-to-USB function on the USB-C port normally used for charging (on the left side of the laptop). You can enable this feature by going to the *System Control* submenu in the OLED menu and selecting *USB function: UART*.

Then, connect another computer to the USB-C port on the left side and use a terminal program such as `tio` to interact with the console:

```
# See table for baud rate
tio /dev/ttyUSB0 -b 1500000
```

Please note that kernel output could be suppressed by kernel parameters. Override these parameters in u-boot by interrupting it's automatic boot with a keypress. Then use `setenv`:

```
setenv bootargs keep_bootcon earlycon  
boot
```


Chapter 9

Schematics

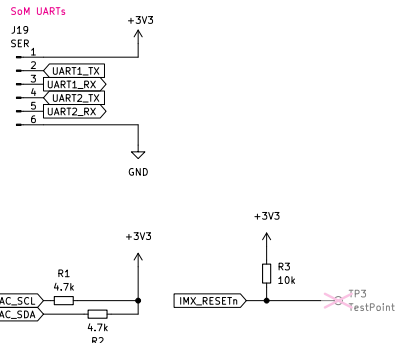
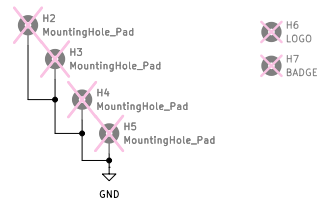
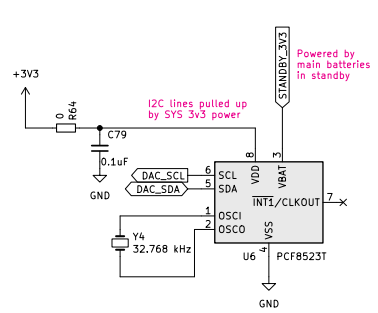
All MNT Reform Next related schematics, design files and documentation are publicly available on our GitLab instance:

<https://source.mnt.re/reform/reform-next>

All folders that have “pcb” in their name contain KiCad projects that you can explore interactively.

9.1 Mainboard Schematics

Realtime Clock

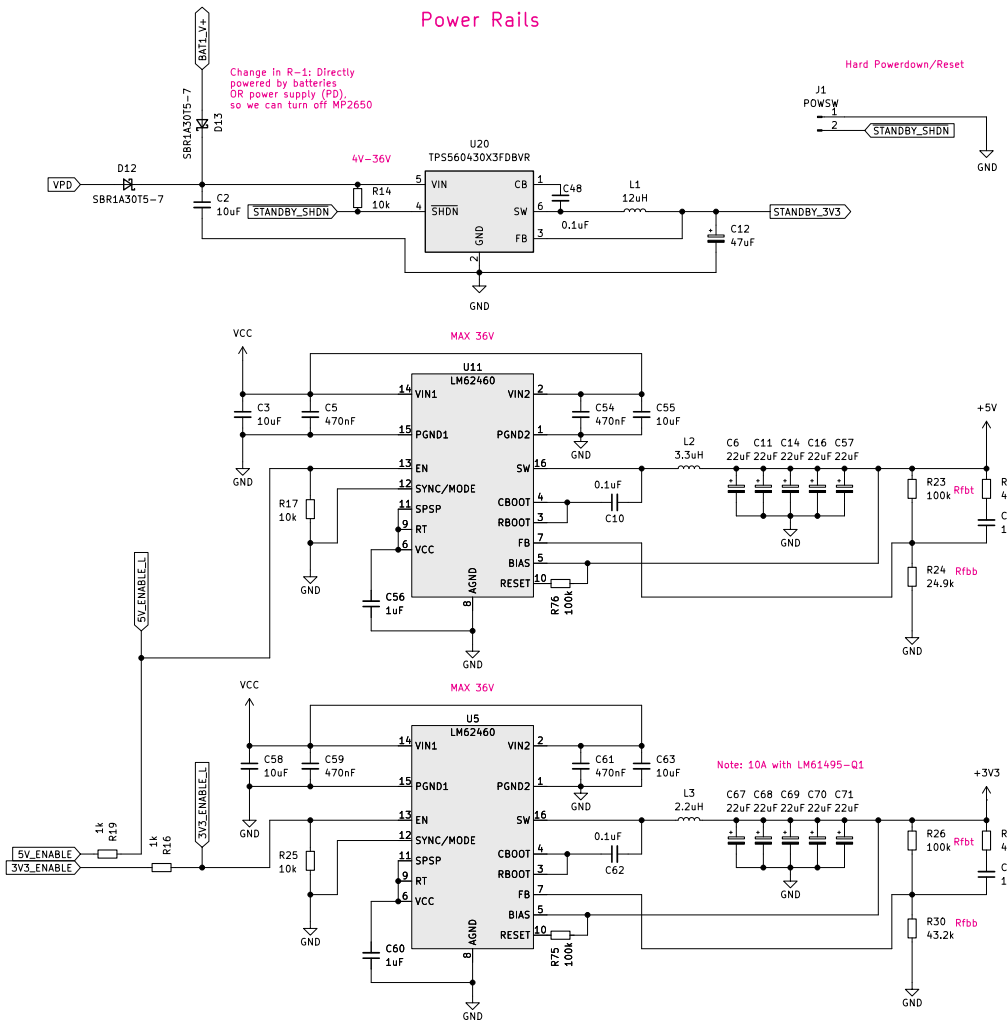


Note: 1473149-4 is incompatible!
the correct one is 1473149-1! (or 1717254-1)

Power Rails

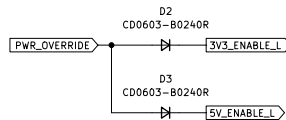
Change in R-1: Directly powered by batteries
OR power supply (PD)
so we can turn off MP2650

Hard Powerdown/Reset

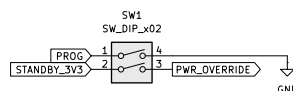
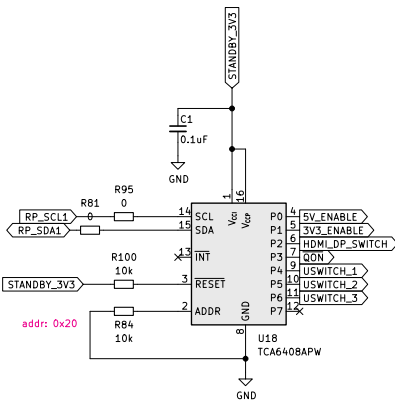


Enable Switches

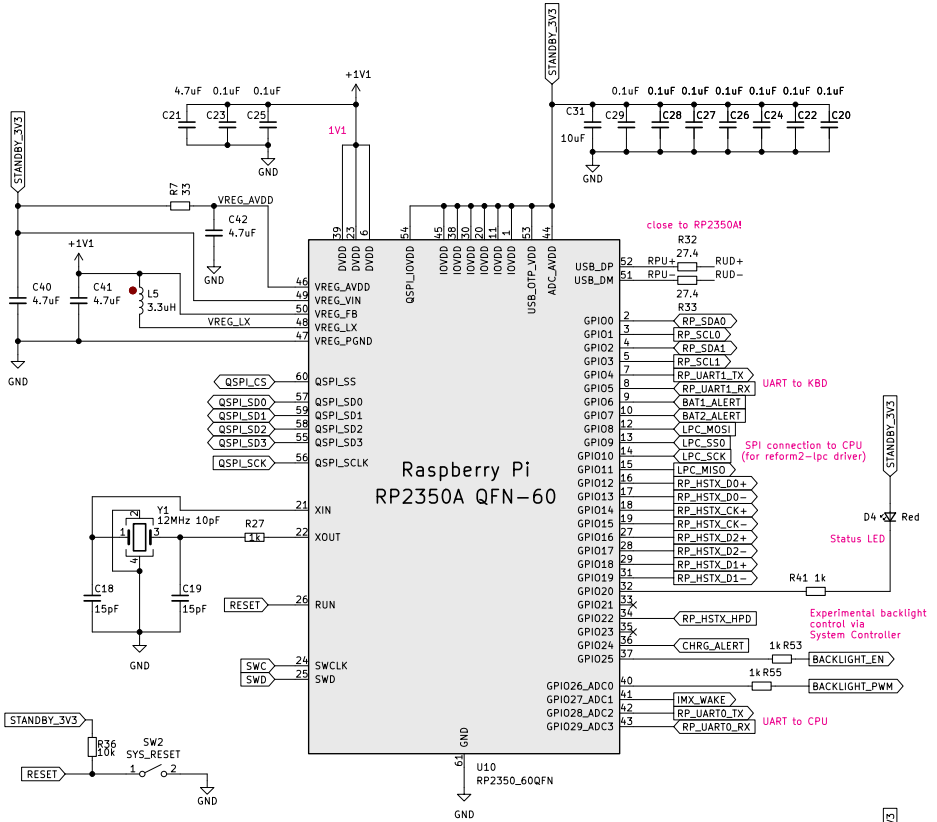
Force Power (for Sysctl Bringup)



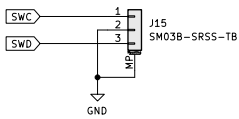
Control DIP Switches



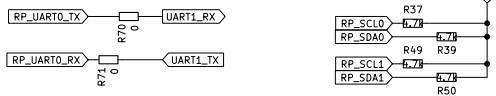
System Controller



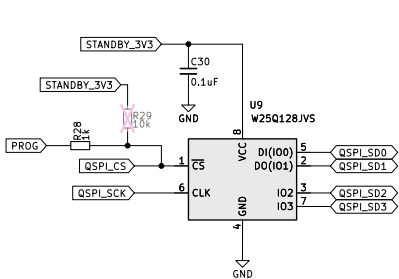
JST Debug Connector (SWD)



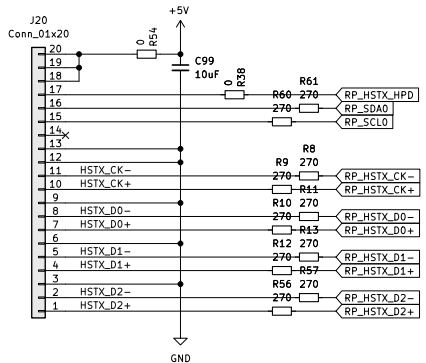
Experimental UART forwarding



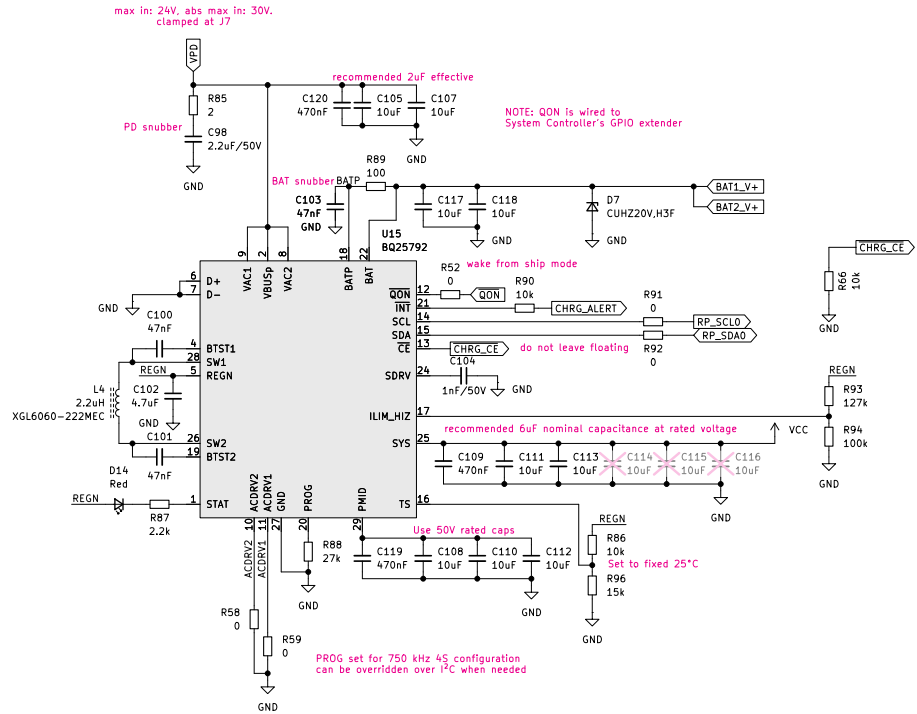
Firmware Flash Memory



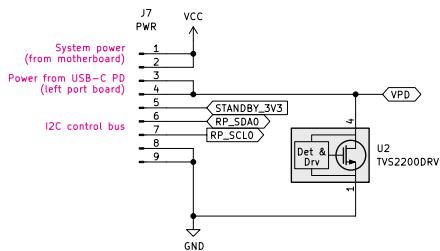
Experimental HDMI/HSTX port for RP2350



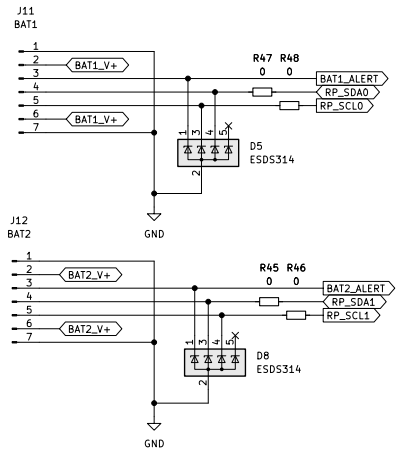
Buck/Boost Charger/DCDC



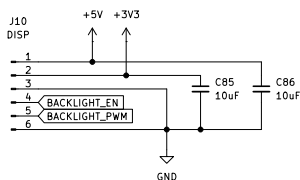
Power Interface



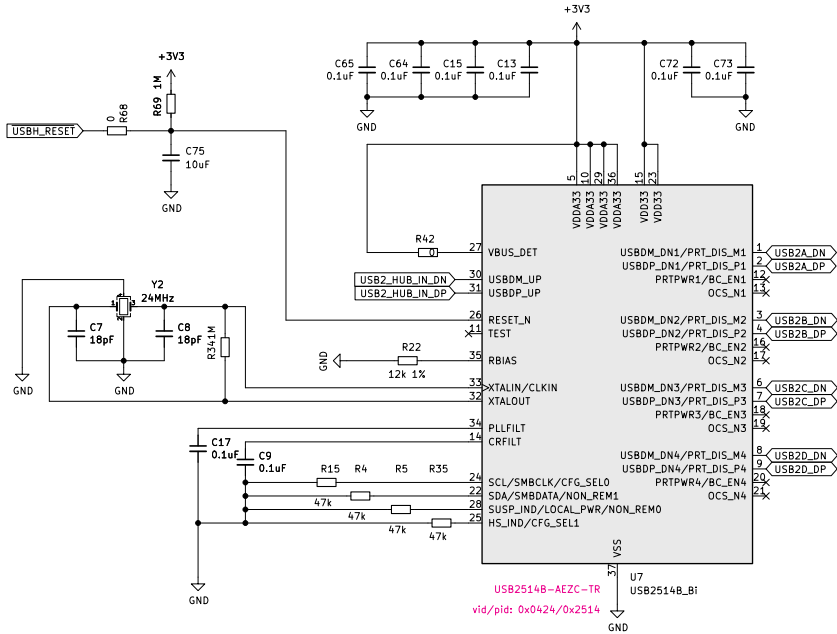
Battery Pack Interfaces



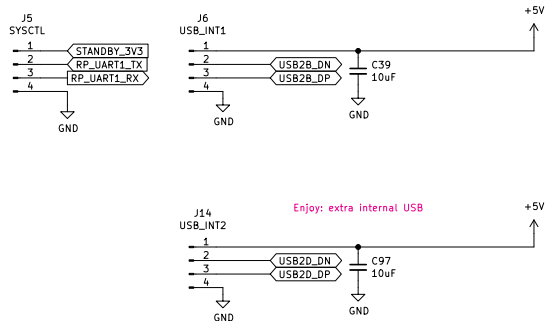
Display Power/Backlight



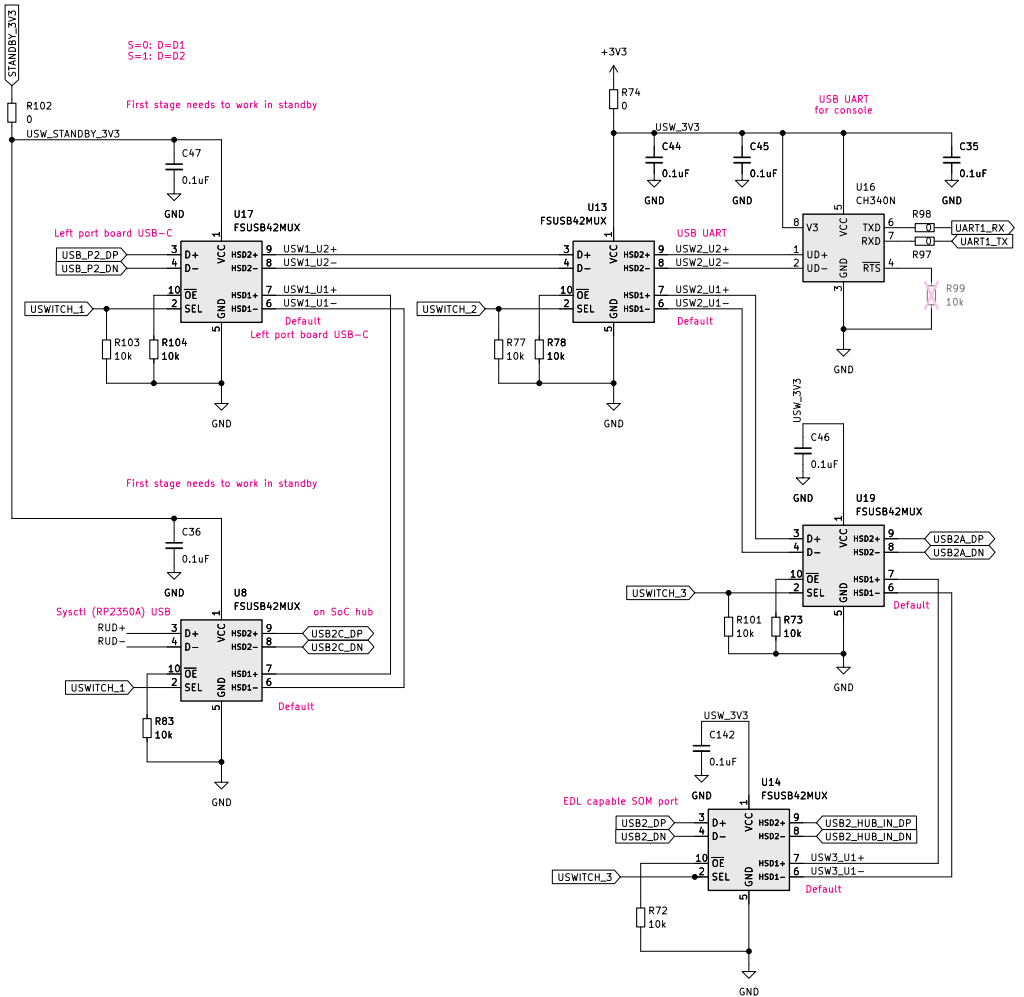
USB2.0 hub for Keyboard and System Controller



Internal USB/UART (Keyboard/Trackpad Interface)

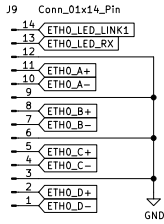


USB Muxing Dungeon

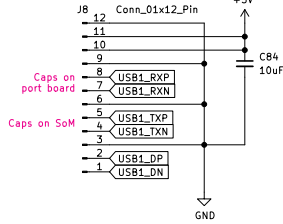


Internal Data Interfaces

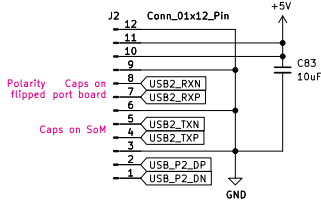
1GbE to port board left
cable: opposite sides



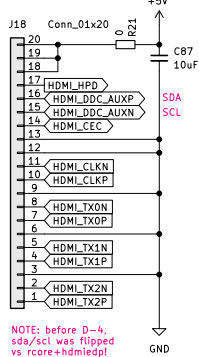
USB3 A, to port board right
cable: opposite sides



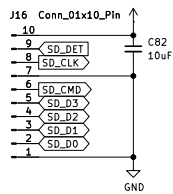
USB3 B, to port board left
cable: opposite sides



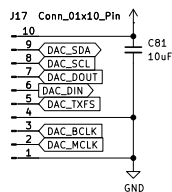
HDMI/DP to port board right
cable: same sides!



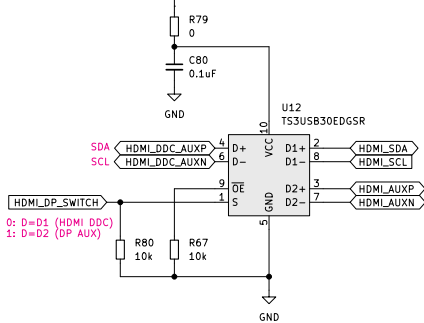
SD Card, to port board left
cable: opposite sides +3V3



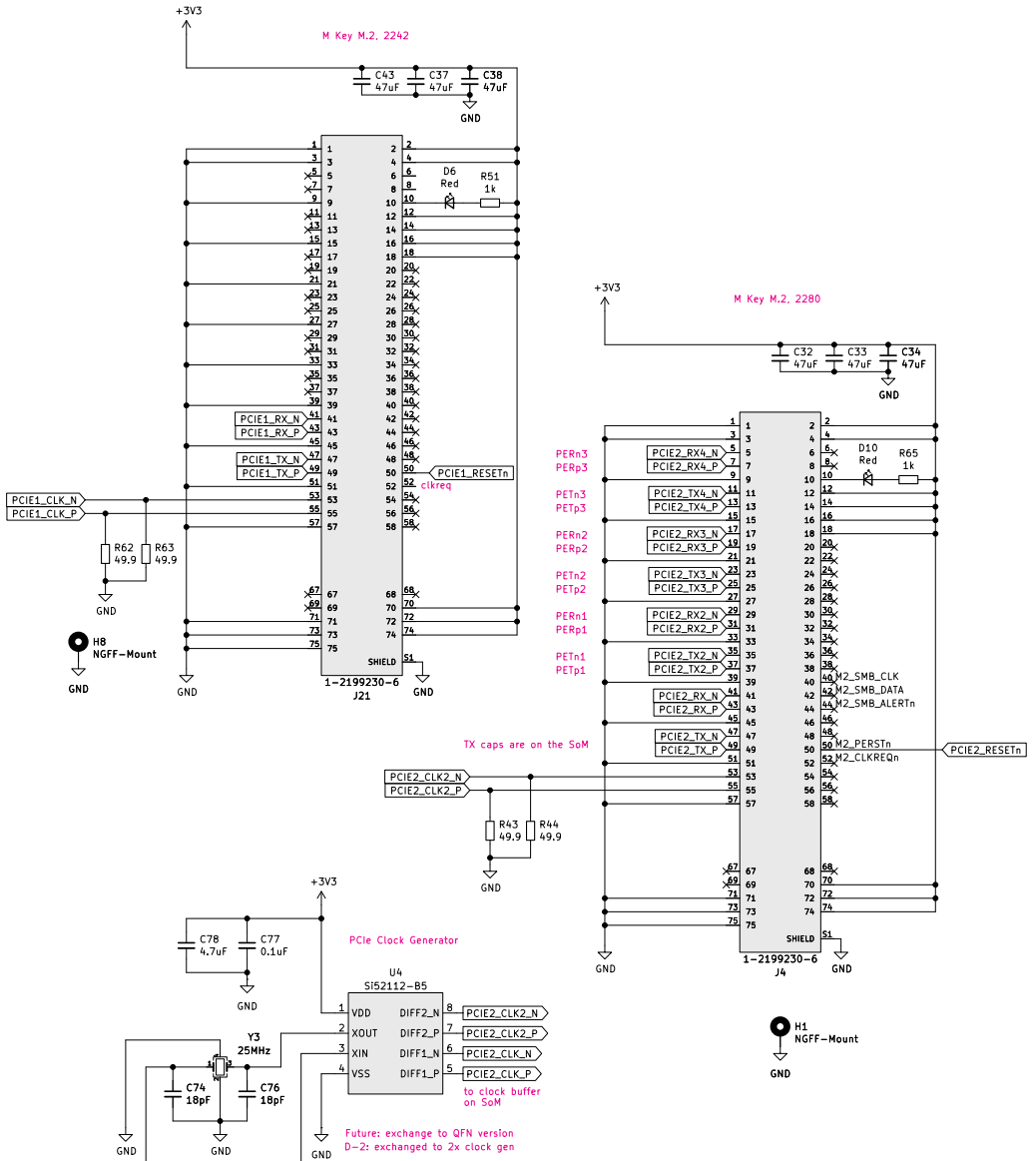
I2S Audio to port board left
cable: opposite sides +3V3



+3V3 new in D-2:
HDMI DDC vs DP AUX mux



M.2 Card Slots



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Sheet: /

File: nref-motherboard.kicad_sch

Title: MNT Reform Next Mainboard

Size: A1

Date: 2026-03-25

Rev: R-1

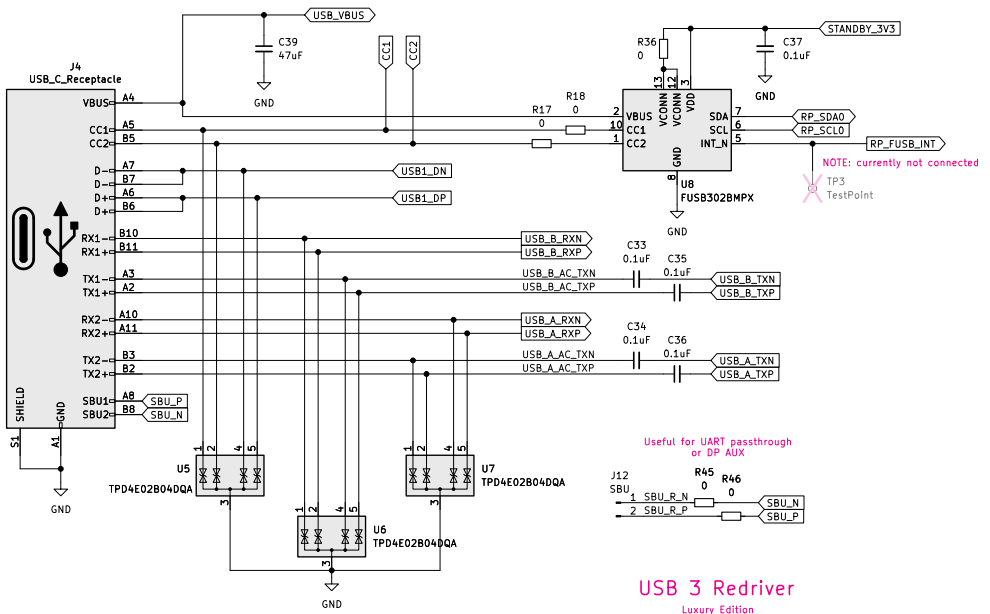
KiCad E.D.A. 10.0.4

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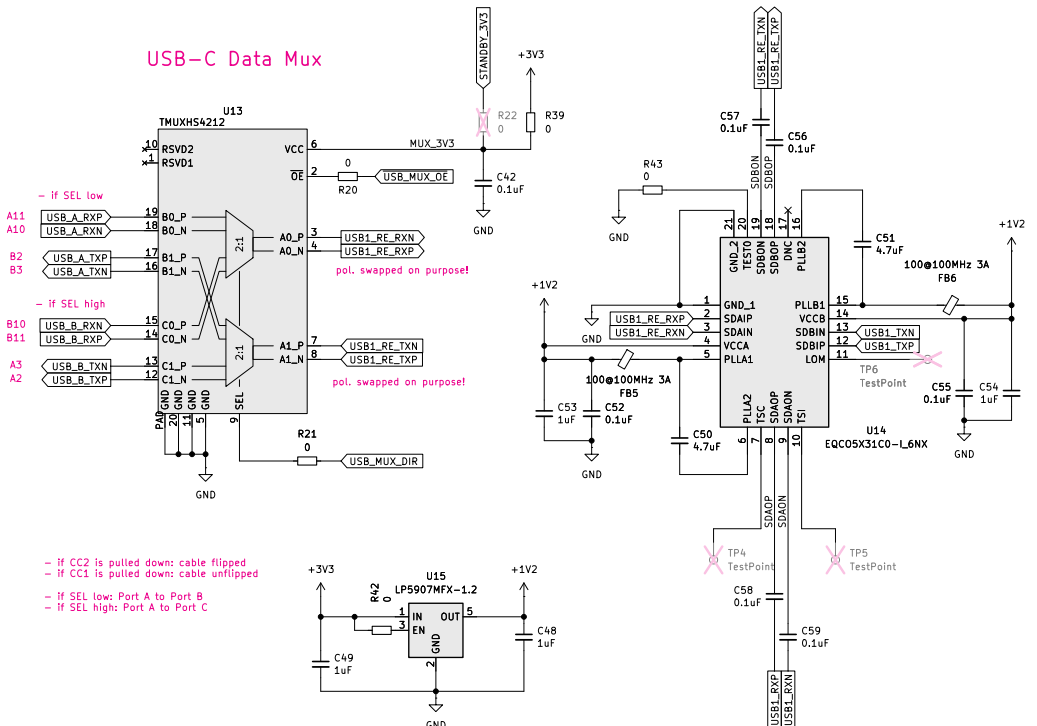
9.2 Port Board Left Schematics

Port Board One (Left)

USB-C port 1 with PD charging

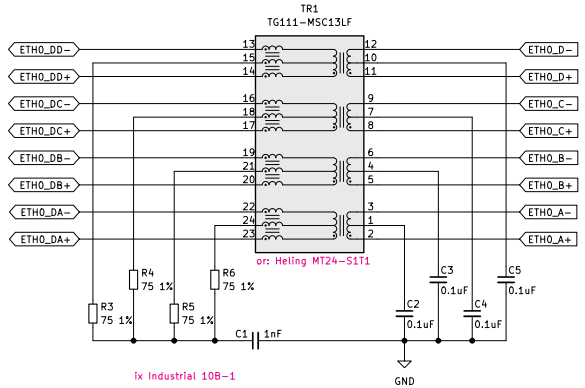
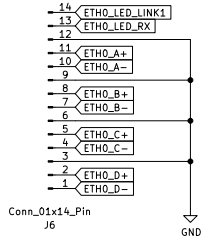


USB-C Data Mux

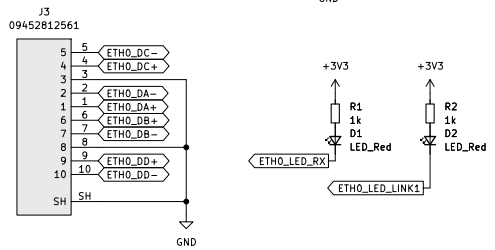
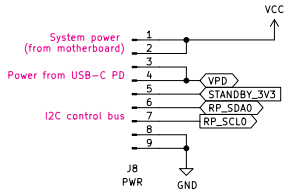


1Gb Ethernet

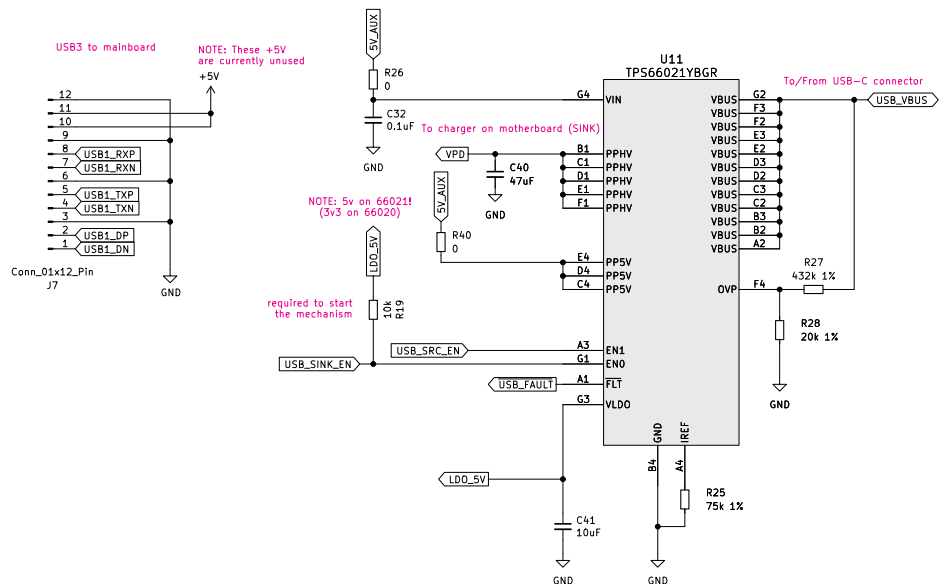
1GBe to mainboard



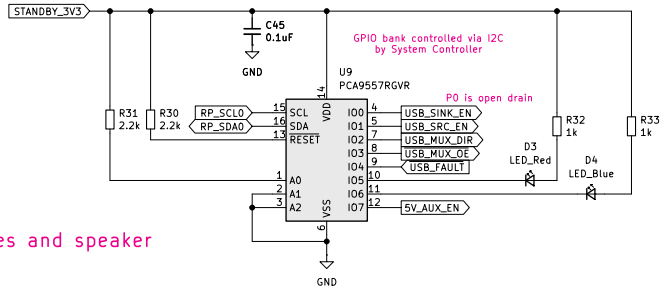
Power Interface
(not flipped)



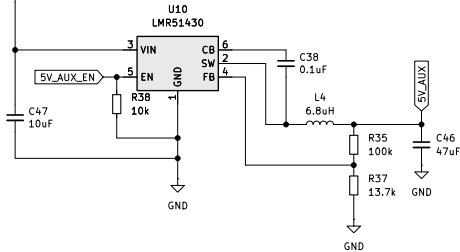
USB-C PD Power Mux



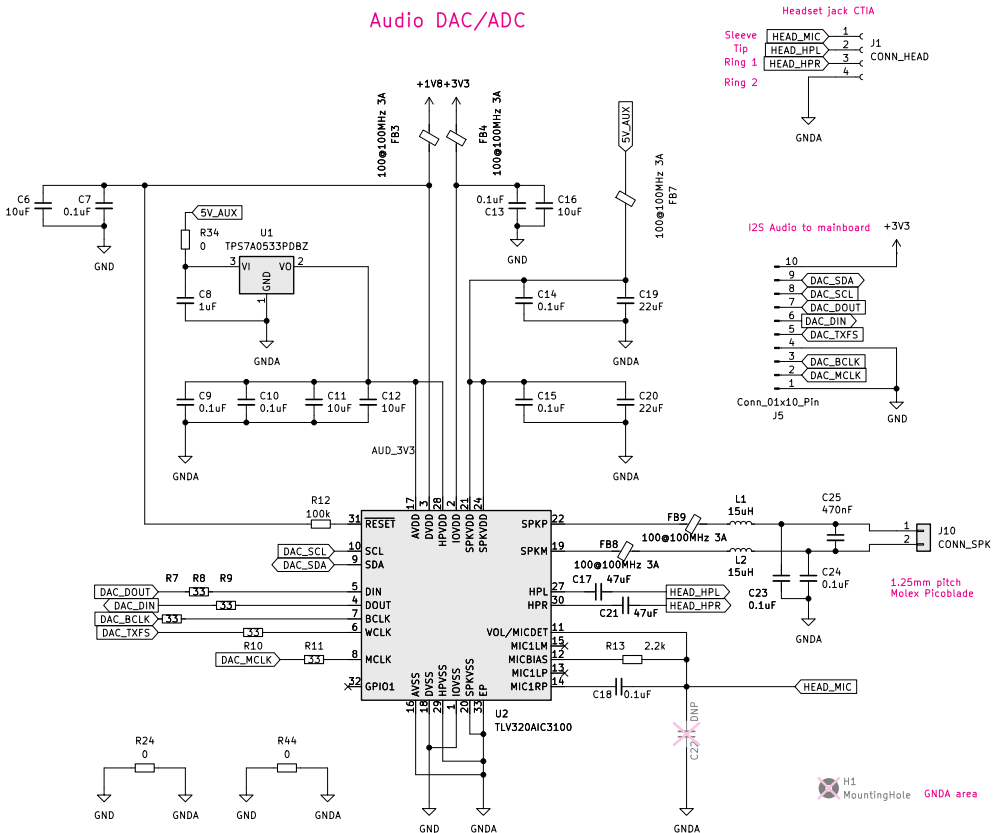
System Controller Remote GPIO Bank



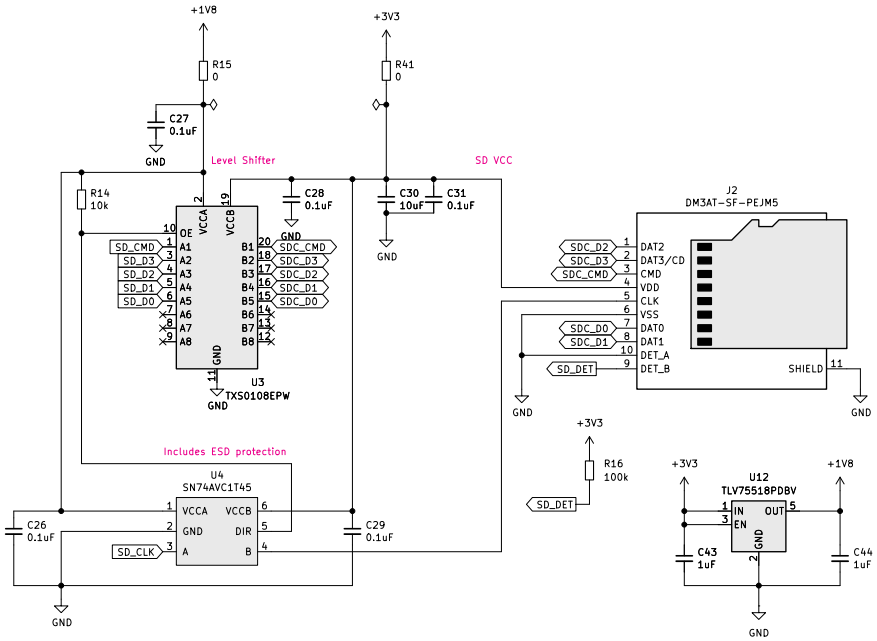
Local 5V for USB devices and speaker



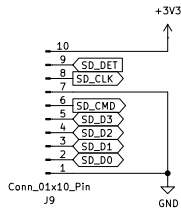
Audio DAC/ADC



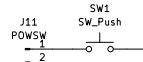
MicroSD Slot



SD Card to mainboard



Standby Shutdown Switch



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File: nref-ports-one.kicad_sch

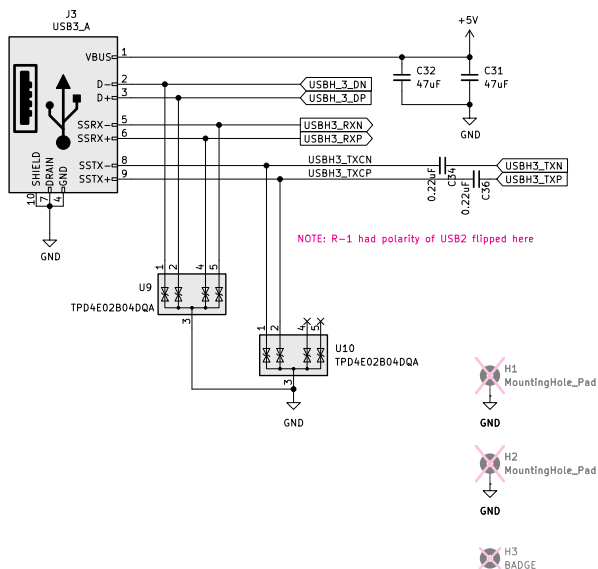
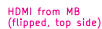
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Size: A2 | Date: 2026-06-01
KiCad E.D.A. 10.0.4

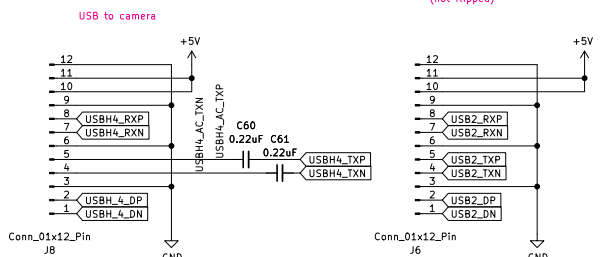
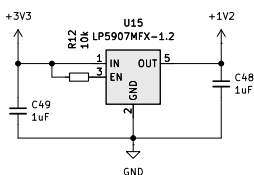
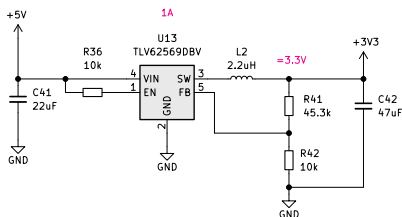
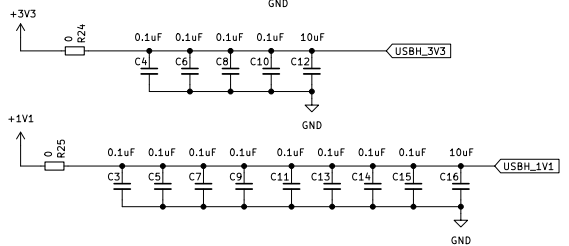
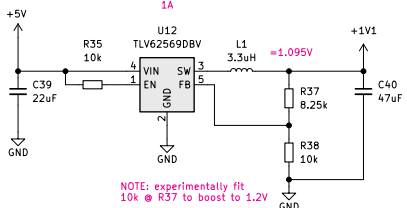
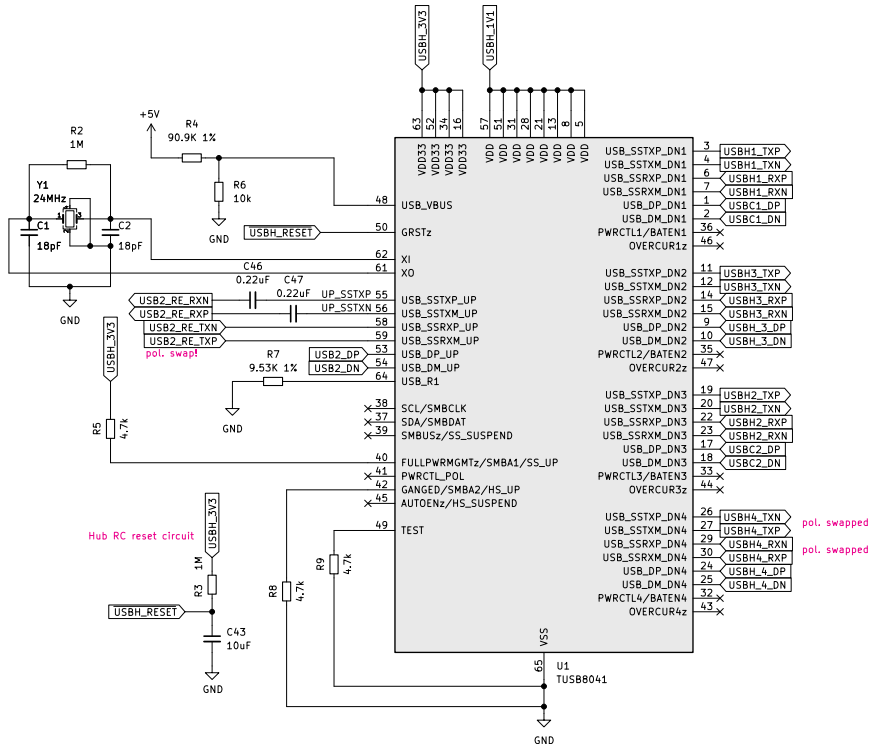
Rev: R-1
Id: 1/1

9.3 Port Board Right Schematics

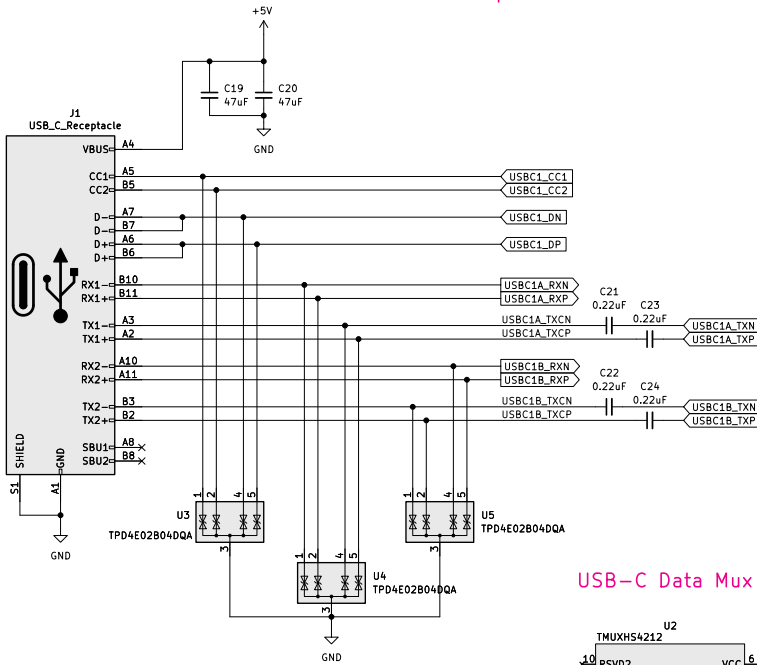
HDMI



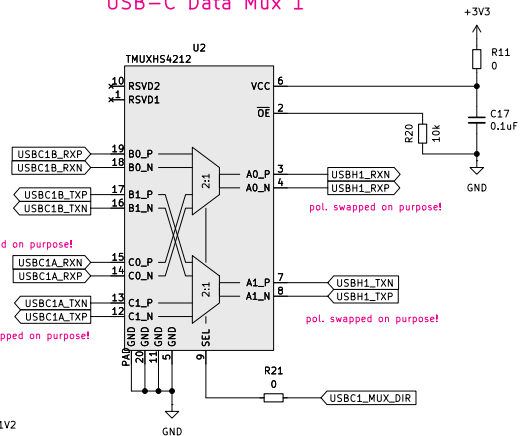
USB Hub



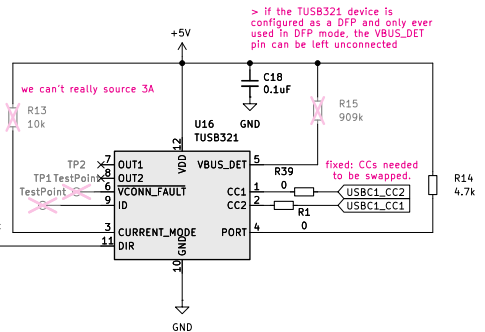
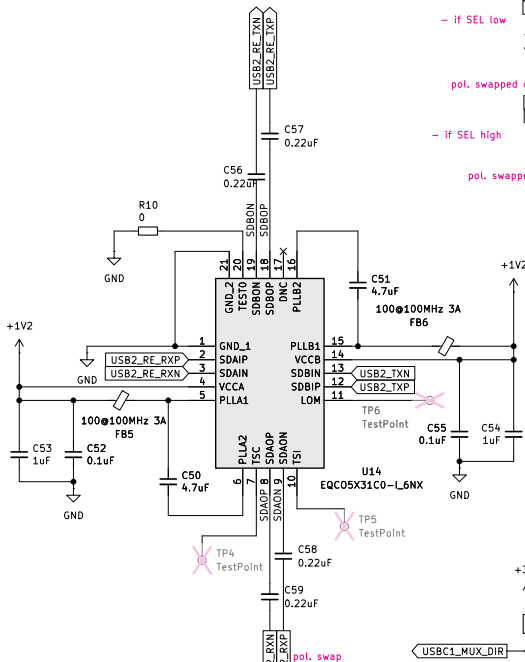
USB-C port 1



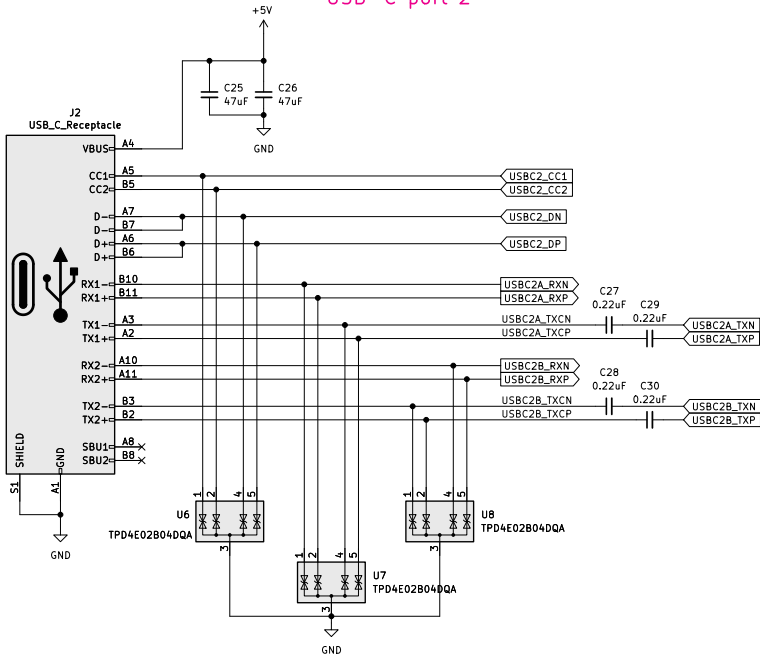
USB-C Data Mux 1



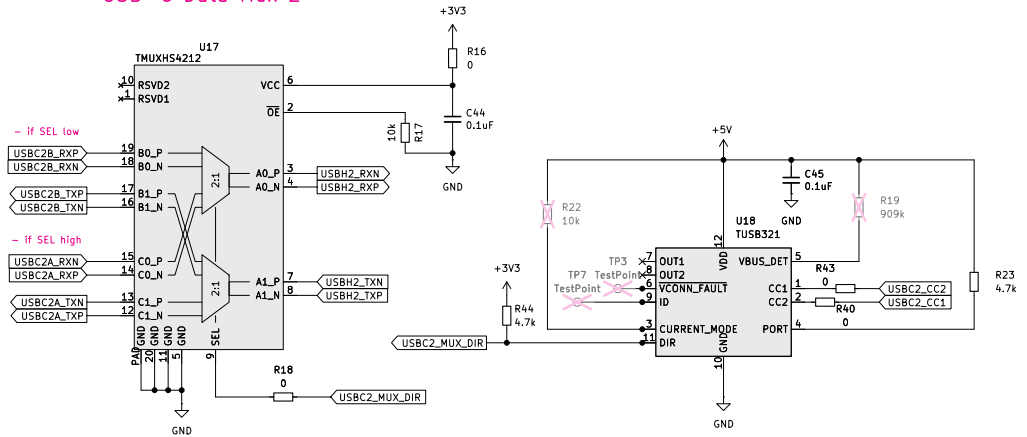
USB 3 Redriver



USB-C port 2



USB-C Data Mux 2



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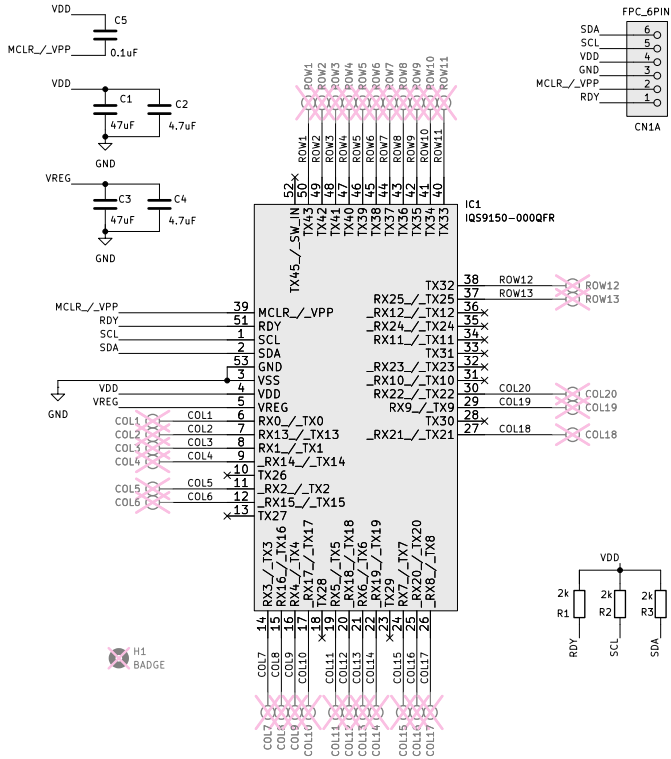
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Rev: D-2
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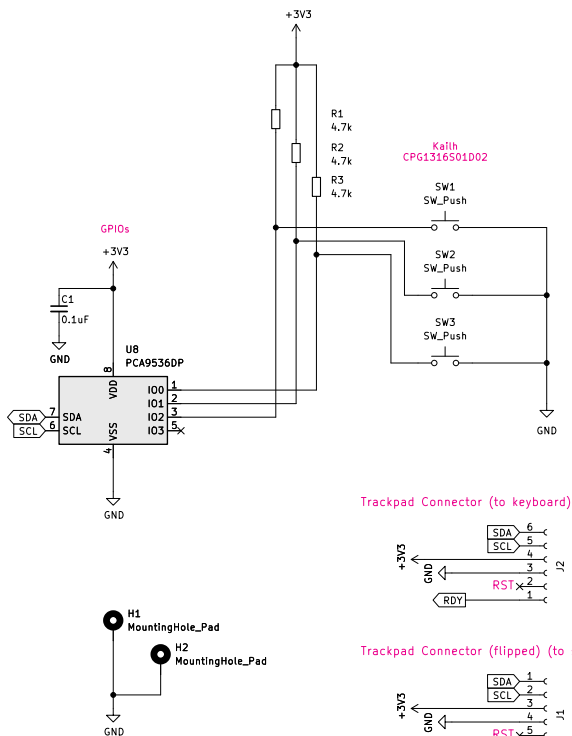
9.4 Trackpad Sensor Schematics

Trackpad Sensor



9.5 Trackpad Buttons Schematics

MNT Reform Next Trackpad Buttons



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Sheet: /
File: nref-trackpad-buttons3.kicad_sch

Title: MNT Reform Next Trackpad Buttons

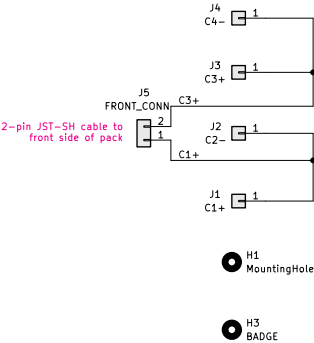
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KiCad E.D.A. 10.0.4

Rev: R-1
Id: 1/1

9.6 Battery Pack (Front) Schematics

9.7 Battery Pack (Back) Schematics

MNT Reform Next Battery Pack
(Back Side)



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Engineer: Lucie Hartmann
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Sheet: /
File: nref-batterypack-backside.kicad_sch

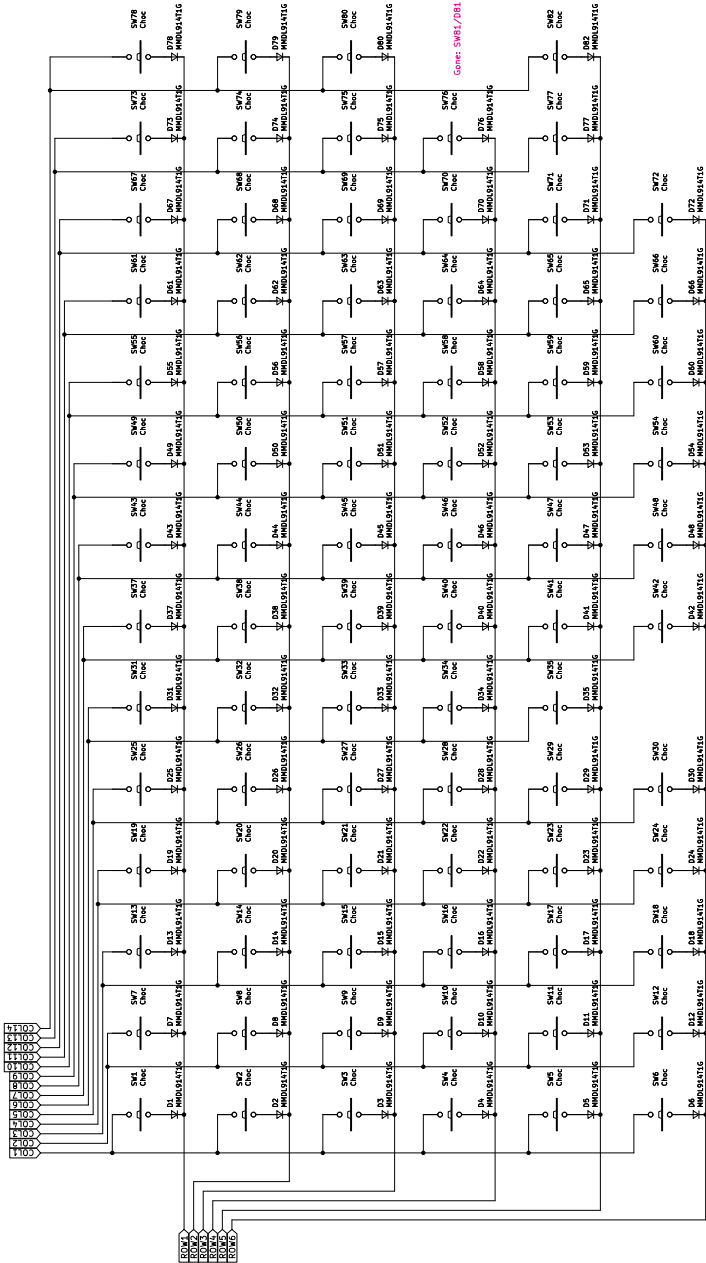
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Size: A4 | Date: 2026-06-01
KiCad E.D.A. 10.0.4

Rev: R-1
Id: 1/1

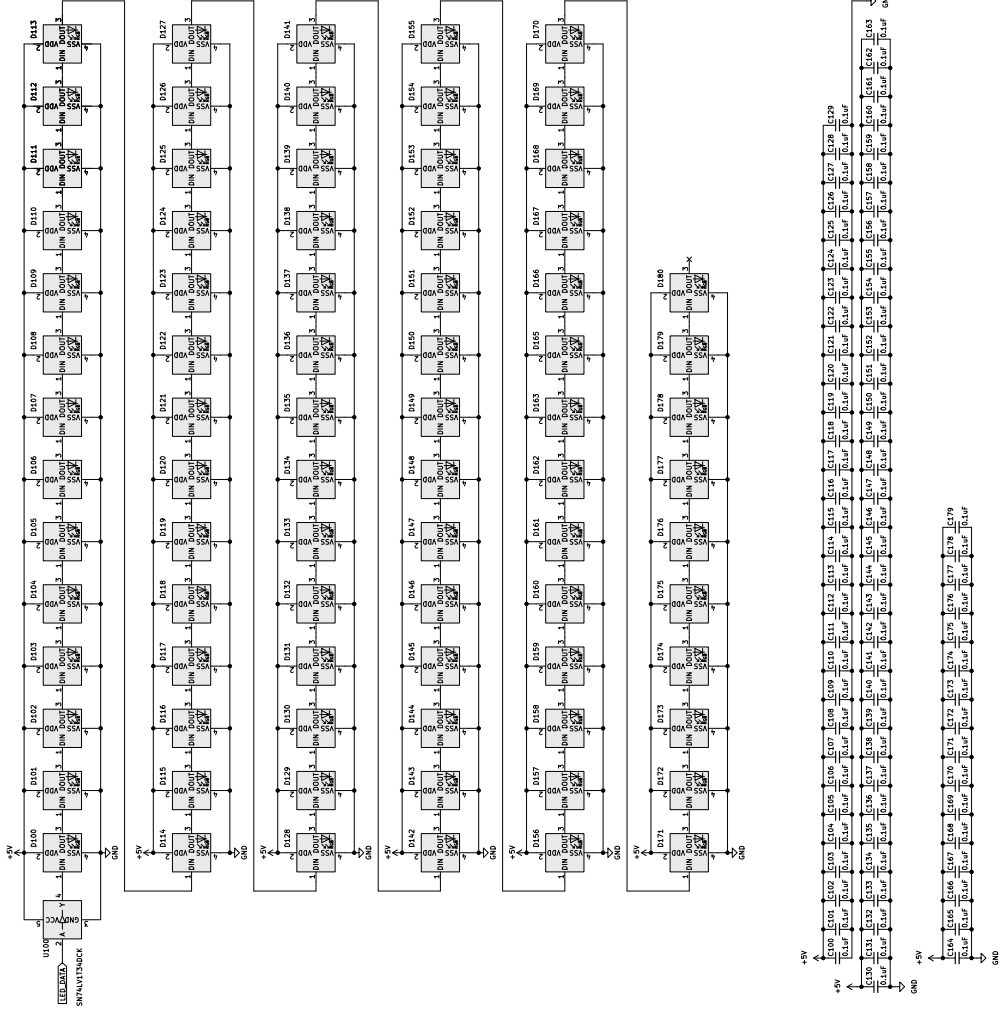
9.8 Keyboard Schematics

Matrix



Reform KBD MCU
File: reform-kbd-mcu-led.sch

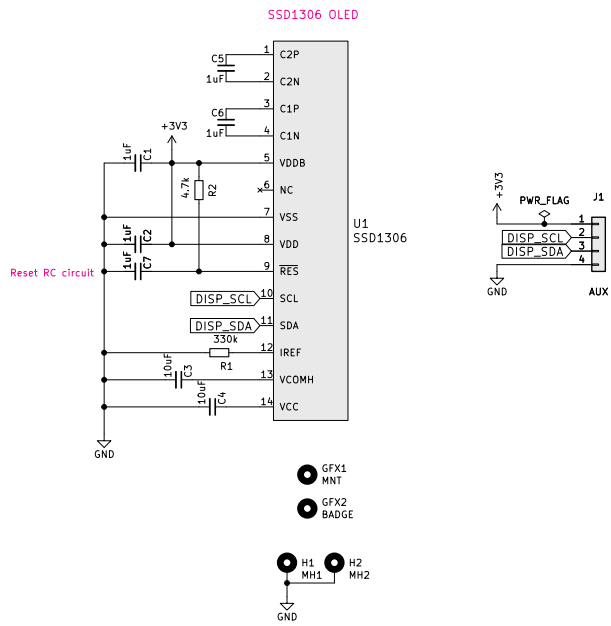
Reform KBD Backlight
File: reform2-keyboard-backlight-led.sch



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SN74V123A-Q100

9.9 Keyboard OLED Schematics

Keyboard OLED Module

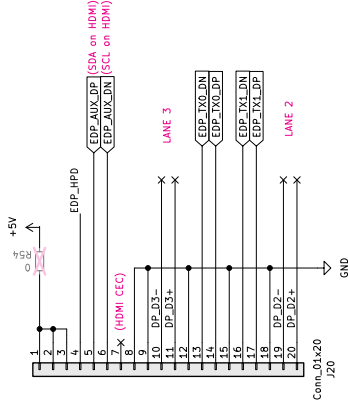


https://mntre.com License: CERN OHL-S 2.0 Engineer: Lucie Hartmann MNT Research GmbH, Copyright 2020–2026 Sheet: / File: reform2-oled.kicad_sch		
Title: MNT Reform 2 Keyboard OLED Module		
Size: A4	Date: 2020–09–08	Rev: 2.0 R–1
KiCad E.D.A. 10.0.4		Id: 1/1

9.10 Display Adapter (eDP) Schematics

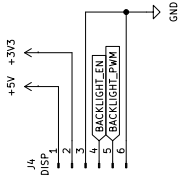
eDP Display Adapter

Next DP/HDMI socket

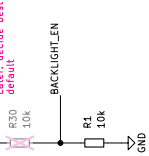


20pin FFC input compatible with next+rx7 flipped so use same side cable

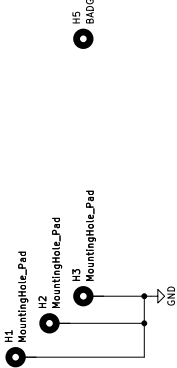
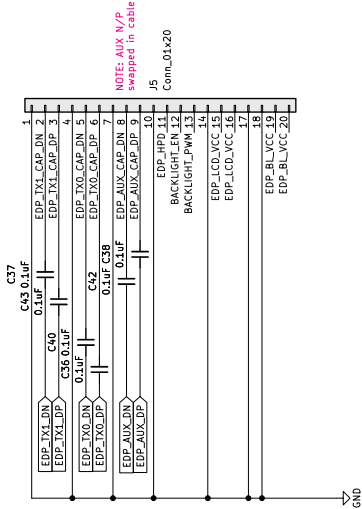
Next Display Pwr/Backlight



Later: decide best default

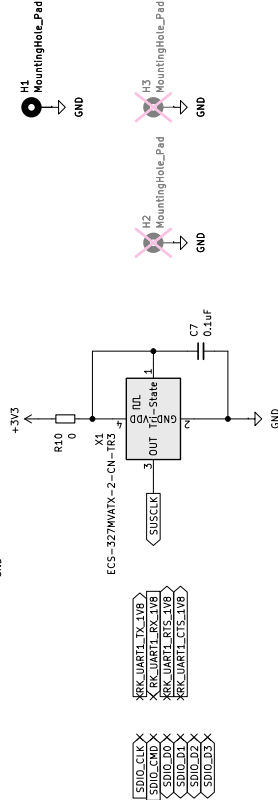


Reform Next Display Connector (Socket)



9.11 Wi-Fi/BT Module Schematics

WiFi/BT/Internal Expansion
(not flipped, need opposite contact cable!)



File: jfm-jun-03
Page: 1 / 2

Id: 1/1

Chapter 10

Online Resources

Get the latest news and additional resources for MNT Reform
Next at:

- The MNT Research website: <https://mntre.com>
- The MNT Community forum: <https://community.mnt.re>
- Source code repositories (including electronics design files and 3D models for printing and laser cutting):
<https://source.mnt.re/reform>
- MNT Research Shop: <https://shop.mntre.com>
- MNT Research Support: <https://support.mnt.re>
- Modularity explained (including a comparison table of Processor Modules): <https://mntre.com/modularity.html>
- PDF and web versions of manuals, including this handbook: <https://mntre.com/docs-reform-next.html>
- MNT Research on Crowd Supply: <https://www.crowdsupply.com/mnt>
- MNT Research on the Fediverse: <https://mastodon.social/@mntmn>

You can join fellow MNT enthusiasts in the official IRC channel `#mnt-reform` on `irc.libera.chat`.

Discover more about the main software building blocks of the MNT Reform ecosystem:

- Debian GNU/Linux: <https://debian.org>
- U-Boot: <https://docs.u-boot.org/en/latest/>
- Sway: <https://swaywm.org>
- GNOME: <https://gnome.org>

Chapter 11

Credits

The MNT Reform Next Operator Handbook, First Edition.
Berlin, August 2026. Written by Lucie L. Hartmann and Anri
Paul Hennies. Published by MNT Research GmbH.

Management, Electronics, Software Lucie L. Hartmann

Industrial Design Ana Beatriz Albertini Dantas

Mechanical & Sleeve Design Greta Melnik

Major Contributions Elen Eisendle (Power System Electronics), Timon Skerutsch (Trackpad Sensor), Johannes
Schauer Marin Rodrigues (Debian Integration & Tooling)

Copywriting, Communications, Campaign Anri Paul
Hennies

Support, Internal Software Plom Heller

Assembly Greta Melnik, Rob Fisk

Testing, Assembly, Repairs Liaizon Wakest

Handbook Design 100rabbits, Lucie L. Hartmann, Anri Paul
Hennies

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Managing Director: Lucie L. Hartmann

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VAT ID: DE278908891

WEEE: DE 33315564

Web: <https://mntre.com>

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