Reflect & Assist

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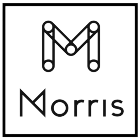
CST-452 Capstone Project Instructional Documentation

Grand Canyon University

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**Instructional Documentation**

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**Introduction**

The Reflect & Assist is a Raspberry Pi kit with all materials and software included to create a Smart Mirror display. This display is a mobile mirror that projects information contained in modules alongside its reflection. The Reflect & Assist kit will include the Raspberry Pi, a monitor, plexiglass, links to required GitHub modules, as well as instructions on how to set up the Raspberry Pi, install all required dependencies, and assemble the mirror set up. As a kit, those interesting in building a customizable smart mirror will find all essential resources in a centralized location, making learning programming and embedded systems simpler and more accessible.

The kit will include 14 different display module options including an alarm clock, weather display, a daily Bible quote, and many others, as well as access to a website for managing the individual display. To encourage creativity and expansion, access to an extended list of potential modules and a template for personalized module creation has been included as well.

**Materials**

To establish the mirror, you will need:

* CanaKit Rasberry Pi 4 Model B Starter Kit
* Sceptre 24" Frameless Ultra Thin 1080P LED Monitor
* SupremeTech See-Through Two-Way Mirror (18x24 Inch, 0.04 Inch Thick Acrylic)
* Solid Foil Washi Tape Decorative Self Adhesive Masking Tape 15mm x 10 Meters (Gold)
* USB Keyboard
* USB Mouse
* Razor Blade

**Physical Construction**

1. Follow the instructions in the Quick Start Guide to set up the Raspberry Pi. An online copy can be found here: <https://www.canakit.com/quick-start/pi>.





1. Place the acrylic on a flat surface with the film still intact.
2. Disconnect the monitor and place it screen down on the acrylic.



1. Using a marker, trace the size of the monitor onto the acrylic film.
2. Apply pressure to the acrylic and trace the marker lines with a razor blade.
3. Repeat step 5 until a tactile divot is apparent in the acrylic.
4. Place the larger side of the acrylic on the flat surface with the divot on the edge of the surface.
5. Apply firm pressure to the larger side and bend the shorter side off the edge of the surface. It will snap off with a clean edge.
6. Once this has been done for all extra acrylic, remove the film off both sides of the acrylic.
7. Place the acrylic on the screen side of the monitor and use washi tape to secure the edges of the acrylic to the screen. The monitor should now be reflective.



1. Reconnect the monitor to the Raspberry Pi.

**Third Party Download**

The smart mirror functionality relies on the installation of third-party software by MichMich on GitHub. Follow these installation instructions to establish the software: <https://docs.magicmirror.builders/getting-started/installation.html#manual-installation>. To stop the mirror, press Ctrl+Q. The following third-party additions will also require download.

Moon Phases - <https://github.com/NolanKingdon/MMM-MoonPhase>

Globe View - <https://github.com/LukeSkywalker92/MMM-Globe>

Daily Bible Verse - <https://github.com/arthurgarzajr/MMM-DailyBibleVerse>

Alarm Clock - <https://github.com/fewieden/MMM-AlarmClock>

Insults - <https://github.com/mykle1/MMM-Insults>

Sports - <https://github.com/jclarke0000/MMM-MyScoreboard>

Instructions for each of these downloads can be found in the README document connected to each repository.

**Management Download / Hosting**

The management site requires additional software for setup. To establish the server, language, and database, follow these instructions: <https://raspberrytips.com/web-server-setup-on-raspberry-pi/#PHPMyAdmin>. Once these have been established, run this SQL query to set up the management site database: <https://github.com/KMorris63/SeniorProject1/blob/main/mirror.sql>. The necessary management site files can then be downloaded here: <https://github.com/KMorris63/SeniorProject1/tree/main/Mirror1>. Download those files in /var/www/html on the Pi so they can be accessed on the Apache server.

From the terminal, type ifconfig and press enter. In the browser, enter [IP ADDRESS]/Mirror1/presentation/views/home.php

**Additional Modules**

Additional modules have been created by a variety of programmers. Here is a list of additional modules currently available: <https://github.com/MichMich/MagicMirror/wiki/3rd-Party-Modules>. If the desired module is not yet available, follow these instructions to create one: <https://docs.magicmirror.builders/development/introduction.html>.

**Amazon Links**

Raspberry Pi - <https://www.canakit.com/raspberry-pi-4-starter-kit.html>

Two-Way Mirror - <https://www.amazon.com/gp/product/B01CZ35XWY/ref=ppx_yo_dt_b_asin_title_o03_s01?ie=UTF8&psc=1>

Monitor - <https://www.amazon.com/gp/product/B0812BG24T/ref=ppx_yo_dt_b_asin_title_o05_s00?ie=UTF8&psc=1>

Tape - <https://www.amazon.com/Solid-Decorative-Adhesive-Masking-Meters/dp/B08H1H4B7P/ref=sr_1_3?crid=10EY2G2VSFDHS&keywords=gold%2Bwashi%2Btape&qid=1650774752&sprefix=gold%2Bwashi%2Btape%2Caps%2C115&sr=8-3&th=1>

Keyboard - <https://www.amazon.com/Manhattan-104-key-Keyboard-Built-Indicator/dp/B07RQVB3HQ/ref=sr_1_1_sspa?keywords=usb+keyboard&qid=1650776074&sprefix=usb+keyboa%2Caps%2C175&sr=8-1-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUExODNKV0RUVjQyMVJJJmVuY3J5cHRlZElkPUEwNDM0MDY1MzU3QkRJRFRKNkdDTiZlbmNyeXB0ZWRBZElkPUEwMDQxOTQyTE1USjFVT1hRTjFFJndpZGdldE5hbWU9c3BfYXRmJmFjdGlvbj1jbGlja1JlZGlyZWN0JmRvTm90TG9nQ2xpY2s9dHJ1ZQ==>

Mouse - <https://www.amazon.com/AmazonBasics-3-Button-Wired-Computer-1-Pack/dp/B005EJH6RW/ref=sr_1_1_sspa?crid=3SEM81IRUC28G&keywords=usb+mouse&qid=1650776095&sprefix=usb+mous%2Caps%2C159&sr=8-1-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEyWFlTN1lNTE9KWEk3JmVuY3J5cHRlZElkPUEwNDQ1MTE2VFYyVlZCM1EzR1dWJmVuY3J5cHRlZEFkSWQ9QTA0ODI5ODYxVldOSDdUNE1KNDdOJndpZGdldE5hbWU9c3BfYXRmJmFjdGlvbj1jbGlja1JlZGlyZWN0JmRvTm90TG9nQ2xpY2s9dHJ1ZQ==>