MASTERMIND

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MASTERMIND INPUT MODULE

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Game Mechanics And Software

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HOW TO PLAY

GAME OBJECTIVES

AN INTRODUCTION TO MASTERMIND

OBJECTIVES -

In Mastermind a four colour code is randomly generated (colours aren't repeated) and it's your goal to crack it. As you input different guesses, you'll receive clues in the form of coloured LEDs - either green or orange, see page 6 - which will aid you in your decoding. You only have 10 guesses however there is no time limit.

DIGITAL VAULT

HOW TO ACCESS ALL FILES USED IN THE PROJECT

ONLINE PORTFOLIO -

All 3D files, code and documentation can be found digitally on my portfolio through the following link.

https://mlc-projects.uk/?page_id=2

INITIAL SETUP

AN EXPLANATION OF THE PRE-GAME SETUP PROCESS

SOUND ON/OFF -

At the bottom of the LED matrix (screen), you should see a green row of LEDs (lights) - This indicates that you currently have sound enabled, meaning you'll hear a beep after each button input.

TO CHANGE THIS:
To enter silent mode - where no sound is produced digitally - press down the far left red button. You should see the bottom row of LEDs (lights) change from green to red, indicating the change has been successful.
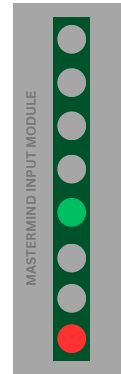
BRIGHTNESS -

If you're playing in a dimly lit room or an extremely bright environment, you may wish to change the brightness of you display so that you can see properly.

TO CHANGE THIS:
To Increase the brightness, press the far right pink button until you've reached a satisfactory brightness.

To decrease the brightness, press the blue button until you've reached a satisfactory brightness.
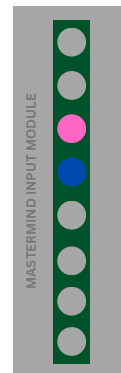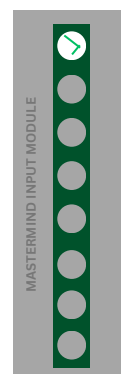
STARTING A GAME

HOW TO PLAY AFTER INITIAL SETUP

WHITE CONFIRMATION BUTTON -

On the far right of the system's input module (row of buttons), you should find a white button with a green tick on its face. This is knows as the confirmation button.

TO START A GAME:
Once you're happy with your pre-game setting (sound on/off AND brightness), you simply press the confirmation button to begin.

NOTE: ONCE A GAME HAS STARTED, SETTING CANOT BE CHANGED UNTIL NEXT GAME

HOW TO USE THE SYSTEM

AN EXPLANATION OF THE INPUT AND OUTPUT SYSTEMS

INPUTTING COLOURS -

Once in a game, you'll notice a white flashing LED. This LED is requesting an input and will continue to flash until an input is received.

To provide an input simply hold down the colour you want until it appears on the LED matrix (display) - Note that colours can only be entered once per round.

DUPLICATE COLOURS -

The game mechanics in this version of Mastermind don't allow for duplicate colours (the same colour appearing twice or more in the sequence).

HOW THIS COULD AFFECT YOU:
If you're holding down a coloured button and the colour isn't being added to your guess and show on the display, it could be because you've used the colour already and therefore can't use it again.

CHANGING INPUTS -

Mis clicks can be very frustrating, and that's why in this system you can clear your guess and write it again assuming you haven't already confirmed your guess using the white confirmation button mentioned previously.

HOW TO CLEAR YOUR GUESS:
Simply press the far right red button with a black cross on it and you guess will be wiped.

CONFRIMING INPUTS -

Once happy with your guess, press the far right white confirmation button. Your guess will be submitted and you will be given clues as a result

MASTERMIND INPUT MODULE
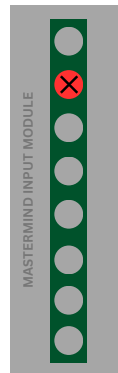
THE PEG SYSTEM

HOW ITS CHANGED FOR THIS SYSTEM

GREEN -

Since you can't display black on an LED (light) display, black pegs you would expect in the original Mastermind have been replaced with green LEDs (lights).

WHAT DOES A GREEN LED MEAN?
It simply means that one of the colours in your guess is in the correct place compared to the hidden code. However this green LED (light) is not in order and therefore the index of it has no correlation to the index of your guess.

ORANGE -

WHAT DOES AN ORANGE LED MEAN?
It simply means that one of the colours in your guess is in the hidden code, however isn't in the right place. This orange LED (light) is not in order and therefore the index of it has no correlation to the index of your guess.

ENDING

WIN / LOSE

HOW TO READ THE RESULT OF A GAME

MOST BOTTOM LEFT AND RIGHT LEDS -

These 2 LEDs represent if you've won or lost the game (indicated in the diagram bellow with green squares.

IN THE EVENT OF A WIN:
If you've won, the 2 LEDs (lights) previously mentioned will appear green, indicating your game result.

IN THE EVENT OF A LOSS:
If you've lost, the 2 LEDs (lights) previously mentioned will appear red, indicating your game result.

READING THE HIDDEN CODE -

Once a game has finished the four colour code is revealed in the middle of the bottom row (indicated in the diagram below with orange squares).


HIDDEN CODE REVELED

WIN / LOSE INDICATION

MASTERMIND INPUT MODULE
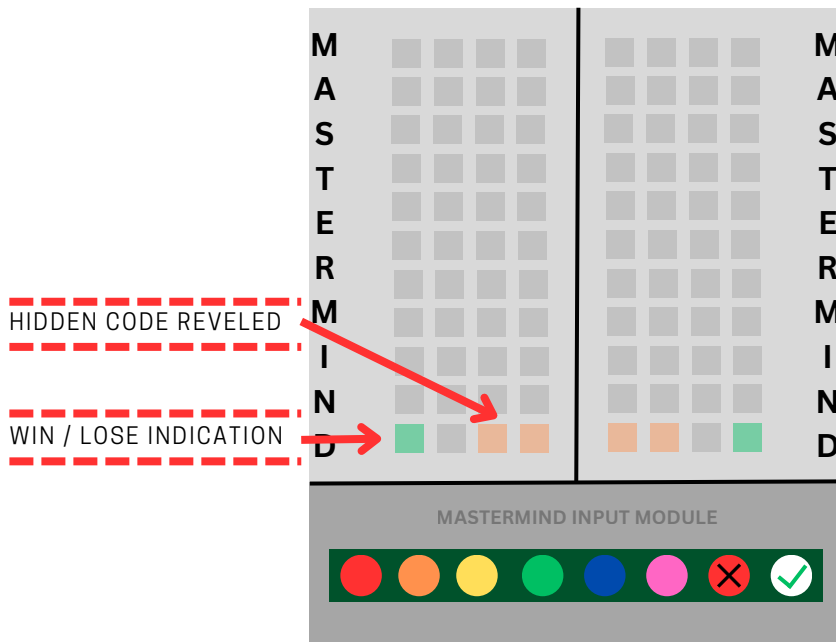
REPLAY

HOW TO PLAY AGAIN

HOW TO RESETART THE SYSTEM POST GAME RESULT

WHITE CONFIRMATION BUTTON -

To start a new game simply press the white confirmation button. To prevent accidental easel of completed games, there's a 3 second cooldown post game completion before the button can be used to start a new game

MASTERMIND INPUT MODULE
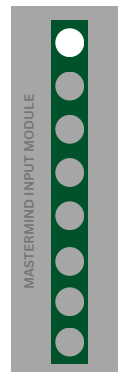
DISSASEMBLY

EXTRACTING THE SEEEDUINO XIAO

HOW TO REMOVE THE MICROPROCESSOR

BACK PANAL REMOVAL -

On the back of the system (the side with the signature), you'll find 6 M3 hexagonal bolts. These can be removed using a 2.5mm Allen wrench.

NOTE: ONCE BOLTS ARE REMOVED ALL MODULES WILL BECOME INDEPENDENT AND THEREFORE ARE SUSCEPTIBLE TO DAMAGE

A green PCB should be viable in the main compartment (the box housing the display), to remove the Seeeduino Xiao, simply push down on the PCB and gently pull the Seeeduino out.

This microcontroller can now be implemented into any project of your choosing or taken for maintenance.

ACCESSING THE LED MATRIX

HOW TO VIEW THE UNDIFFUSED MATRIX

DIFFUSER REMOVAL -

On the front of the system you'll find 4 M3 bolts on the front of the main compartment (square box housing the display). These can be removed using a 2.5mm Allen wrench
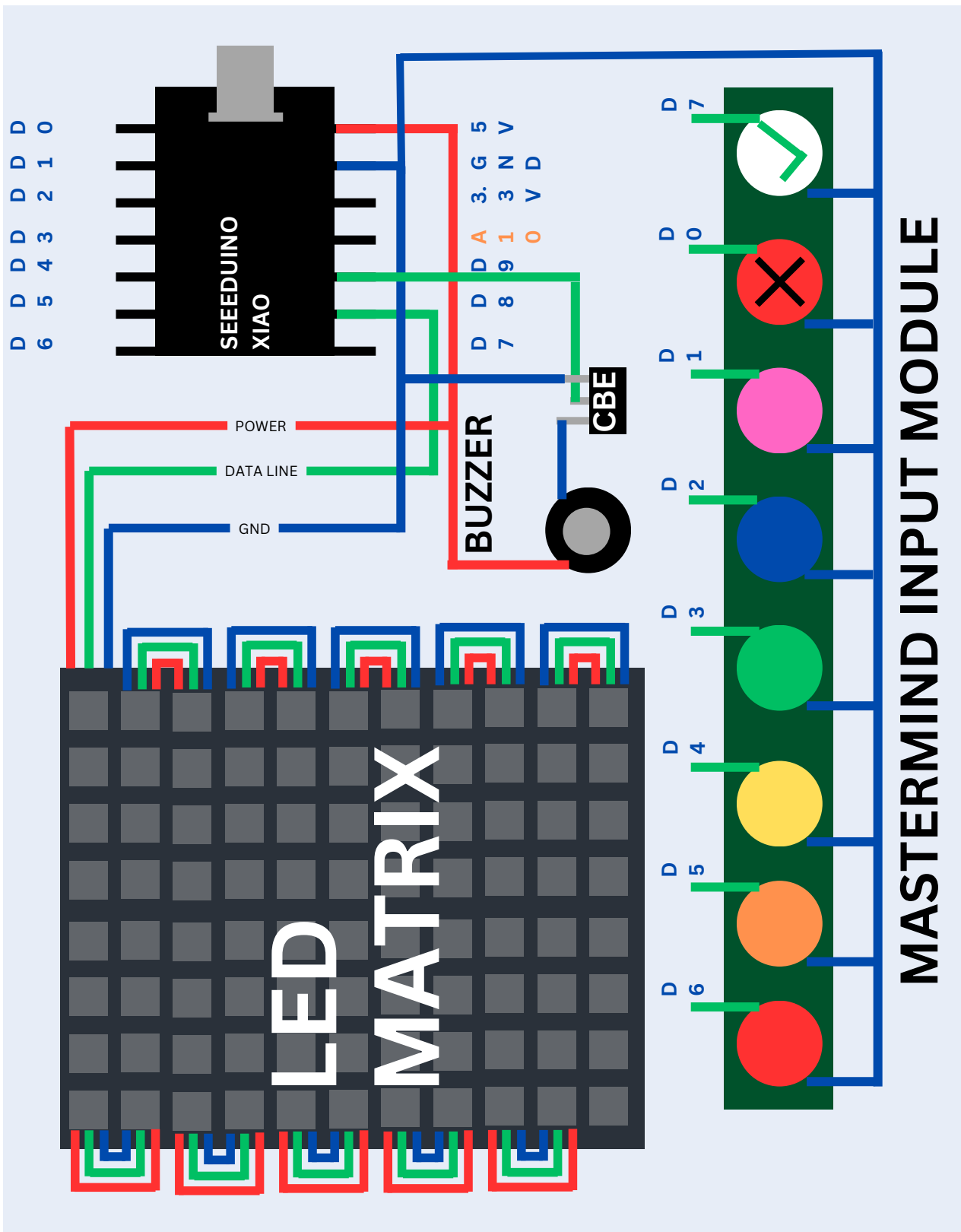
NOTE: ONCE BOLTS ARE REMOVED ALL MODULES WILL BECOME INDEPENDENT AND THEREFORE ARE SUSCEPTIBLE TO DAMAGE

It isn't advised that you interfere with the module's wiring however in the event of required maintenance know that the data line of all LEDs are connected in series

ASSEMBLY

WIRING DIAGRAM

HOW THE SYSTEM IS CONNECTED

SEEEDUINO XIAO

D6 D5 D4 D3 D2 D1 D0

D7 D8 D9 DA1.3 G3 5V VD 0 N D

POWER

DATA LINE

GND

BUZZER

CBE

LED MATRIX

MASTERMIND INPUT MODULE

D7
D0
D1
D2
D3
D4
D5
D6

COMPONENTS LIST

ALL HARDWARE USED IN THE PROJECT

LED MATRIX -

- WS2812B Smart RGB LED Strip (1m 96 LEDs)
  - Strip was cut into 11, 8 LED long sections which were then soldered together in series

INPUT MODULE -

- 8x Momentary Tact Tactile Switch
- 1x Universal Circuit Board Single Side PCB Prototyping Boards 5*7cm

BUZZER -

- Active Piezo Electric Buzzers
- Generic Transistor (Model Unknown)
- 1x Universal Circuit Board Single Side PCB Prototyping Boards 5*7cm

PROCESSOR -

- Seeeduino Xiao SAMD21 Core

CASE-

- 3D Printed - Files Available Through Digital Vault
- 10x M3*8 Bolts