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SCARAB: Research Document

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Author: Stuart Rossiter

Student Number: C00284845

Course: BSc (Hons.) Software Development

Supervisor: Joseph Kehoe

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# Introduction

## Abstract

The SCARAB device and accompanying program are retro game preservation tools designed to check the health of retro game cartridges, and manage their save data. The device, built around a microcontroller, interfaces with the cartridges via cartridge port modules. These modules can be swapped in and out, allowing for a variety of cartridge types, and providing future expansion options. The SCARAB device can auto-detect the inserted modules, and can detect whether a cartridge is inserted. The SCARAB program provides a GUI for the user to interact with. It provides options to dump and restore save data, run a full diagnostic checkup on an inserted cartridge, and run individual tests. It also serves as a save browser, allowing the user to view the save files they have dumped from cartridges.

## Overview

# SCARAB PC Program

## 2.1 Languages

## 2.2 Libraries

## 2.3 Layout

# SCARAB Device

## Microcontrollers

To serve as an interface between the cartridge port modules and the SCARAB PC program, some kind of microcontroller was deemed necessary. Microcontrollers are small computers on a single chip. They contain a processor core, RAM, and EEPROM, for storing programs to run. The purpose of a microcontroller is to manage a specific set of tasks within an embedded system, without the need for a complex operating system [1]. This is perfect for the SCARAB, as there are only a handful of tasks necessary, and a dedicated machine or Raspberry Pi would be excessive. The brand of microcontroller I had settled on was Arduino.

### Why Arduino?

Among the reasons for choosing Arduino, the main one was the variety of development boards. Several families of boards exist, such as Nano, MKR, UNO, Classic, and Mega, sporting over 30 different boards between them [2]. Given the sheer number of boards, and all their different configurations, there is sure to be a board suitable for the SCARAB. In addition to this, Arduino is inexpensive, has cross-platform support, and the software and hardware are completely open source. Choosing Arduino is not all that needs to be chosen, however. The most suitable board needs to be chosen, and in this case, it’s the Arduino Mega 2560.

### Arduino Mega 2560

## 3.2 Languages

## 3.3 Game Cartridges

## 3.4 Electronic Components

# Similar Products

# Conclusion

# Appendix

# Glossary

SCARAB – Save and Cartridge Aid Requiring Adapter Boards

GUI – Graphical User Interface

RAM – Random Access Memory

EEPROM – Electrically Erasable Programmable Read-Only Memory

# Bibliography

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[2] Arduino (2022). *Arduino Hardware*. [online] www.arduino.cc. Available at: https://www.arduino.cc/en/hardware [Accessed 9 Oct. 2025].