



MINISTRY OF EDUCATION, SINGAPORE
in collaboration with
CAMBRIDGE ASSESSMENT INTERNATIONAL EDUCATION
General Certificate of Education Ordinary Level

ELECTRONICS

6063/02

Paper 2

For examination from 2025

SPECIMEN PAPER

To be given to candidates at the beginning of the year of the examination.

READ THESE INSTRUCTIONS FIRST

The project is to be completed for submission to your teacher and you will be informed of the date of submission by your teacher. All work submitted is to be done by you. You are required to acknowledge any work done and contributions towards your project by any other party.

This document consists of **4** printed pages.



Singapore Examinations and Assessment Board



Cambridge Assessment
International Education

Candidate Information

This is an application-specific electronic project which involves the design, building and testing of an electronic circuit to solve a specific problem. The project is carried out over a period of 32 hours, requiring candidates to build a prototype (project hardware) and document the process (project report), carrying a total of 100 marks.

Theme for Project: **Uses of electronics in sport.**

To assist you, but not to restrict your thinking, a number of design briefs are outlined below.

- **A real-time digital attendance display is required by operators of a sports stadium to show how many spectators are present in the stadium during an event.**
- **A timer is required for a 'beep test' where participants run back and forth between two points upon hearing a beep. The timer must produce a beep at timed intervals which can be gradually reduced by the operator.**
- **A scoreboard is required for displaying a basketball score. The scoreboard must be capable of adding and deducting points scored by both teams in a game.**
- **During a game of cricket, the light level needs to be monitored. Low levels of light may result in floodlights being required or the game being suspended. A device is needed to indicate whether the light level is sufficient.**
- **You may choose to use one of these starting points or you can respond to a design brief of your own choice using the given theme of uses of electronics in sport.**

All of the above design briefs should incorporate:

- at least one input subsystem to produce an analogue or a digital signal
- suitable process subsystems, interconnected to achieve the required function, using non-programmable components
- an output subsystem (or subsystems) to produce the required output
- power only from batteries or a low voltage power supply unit (maximum 12V).

Candidates should follow the assessment rubric on pages 3 and 4.

Candidates may also find it useful to refer to 'Assessment Rubric for Project', available in the Examination Syllabus.

Project Hardware and Report (100 marks)**1 Project Plan (5 marks)**

Successful project begins with a detailed project plan. Project planning includes identification of the key activities, time management and resource allocation. The plan should take into consideration time needed for testing, ongoing evaluation and modification during the realisation of the design. A good project plan helps to keep track of the progress of the project.

2 Analysis of Project Specifications (5 marks)

An analysis of the project specifications can be performed by generating a system block diagram, together with its various subsystems (input, process and output), to describe the approach to how the specifications can be realised.

3 Research (10 marks)

Research will allow candidates to obtain information needed to make informed decisions at various stages of the design work. A thorough research involves seeking out information from a range of sources such as textbooks, datasheets, internet and the library. A good research work should answer all aspects of questions posed earlier, allowing relevant findings to be evaluated. Before embarking on research, it is also essential for candidates to pose questions to guide their research on how the specifications can be realised.

4 Investigation and Generation of Technical Solutions (10 marks)

Candidates should generate a range of possible technical solutions and express them through system block diagrams and circuit diagrams. It is also essential for candidates to perform relevant computer simulations to investigate these solutions. A comparison of these simulations should also be provided.

5 Detailed Development and Description of the Final Technical Solution (10 marks)

From the investigation, candidates are to select the best technical solution for prototyping and justifying with reasons the selection of this solution. Full details of this solution (e.g. list of components used) should also be included. During prototyping, candidates are to record any modifications/refinements made, including the development of enhancement(s), if any. Candidates should include photographs of the prototype, a complete set of circuit diagrams (with test points corresponding to those used during testing), any enhancement(s) made, a list of components and other useful details.

6 Enhancement (15 marks)

Candidates should demonstrate creativity in the design of the project using good engineering design practices that lead to enhancements in areas such as improving user experience and the prototype performing better than the stated specifications.

7 Testing Activities and Measurement Results (10 marks)

Candidates should document all the tests conducted (including enhancements) and make comparisons between the results obtained and results from the computer simulation, with plausible explanations to the outcome of the comparison provided. Candidates should also record measurements obtained from tests conducted such as waveforms (e.g. voltage-time graph) and readings (e.g. voltage, current, resistance, frequency and period). To help present the results clearly, candidates should use tables with clear headings.

8 Project Reflection (10 marks)

Engineers can improve their work processes and capture the learning points by performing a reflection of their project, which includes the design process and building of the prototype. The following questions could be used as a guide:

- Do you consider your project a success? Explain.
- If you are to do this project again, will you use the same design choice? Explain.
- How can your project be improved?
- How did you overcome the challenges you faced?
- How could the problems be avoided?

9 Functionality of Project (15 marks)

The prototype should be fully functional and reliable and satisfy all design specifications.

10 Quality of Project (5 marks)

Candidates should reflect attention to design and construction details and demonstrate a very high degree of workmanship and high quality of finish in the prototype.

11 Organisation and Presentation (5 marks)

The report should be organised and well-structured, with contents presented in a clear, logical and coherent manner. Due recognition and acknowledgement should be accorded to the information sources and person.