

General Purpose Data Acquisition System Using STM32 and FreeRTOS

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LM118: BEng in Electronic and Computer Engineering
Autumn semester 2024 Interim Presentation



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Presentation Overview

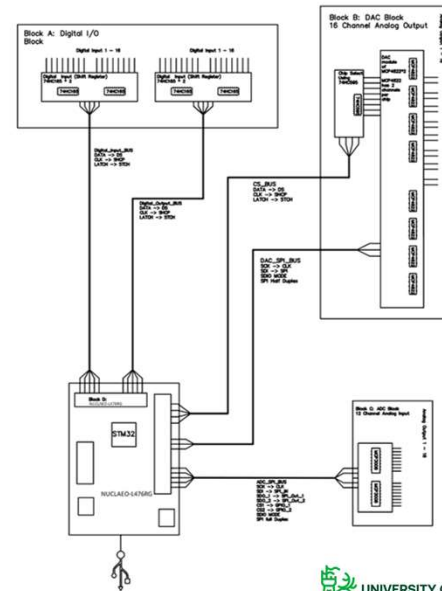
- Project introduction and objectives
- Hardware System design.
- Software System design
- Gantt chart
- Conclusions and next steps



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Project Overview – Hardware

- The project consists of four custom-designed modules to achieve 16×16 analog I/O and 16×16 digital I/O.
- 1. DAC module (MCP3008 * 2)
- 2. ADC module (MCP4822 * 8 and 74HC595 as CS)
- 3. Digital Input (74HC165 * 2)
- 4. Digital Output (74HC595 * 2)
- Connected by header, planning on making 3 PCB board, A shield board, an analog board and a digital board, connected via a Flexible flat cable (FFC)

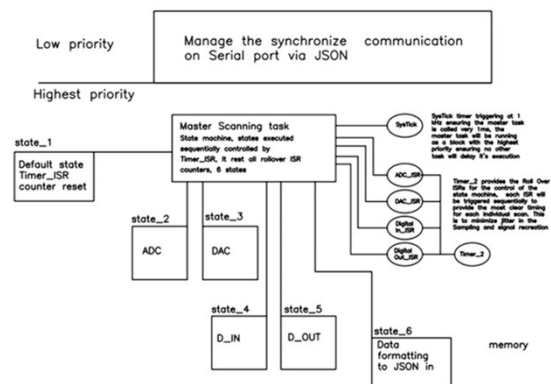


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Project Overview Software

- In our application, a 2-level priority is defined: the highest priority Master Scanning task, and the low priority data management and Serial communication task.
- Purpose of Configuring the Master Scanning Task as an FSM controlled by ISR

RTOS Task Priority Diagram



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Project Gantt chart

FYP_Qinyuans_Project_implmantaion_Gantt_Chart																
Sem 1		Week														
Task no.	Task	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Ground work (Background research and learning)	0	0	0	0	0										
2	Interim Report	-	-	-	-	0	0	0	0	Behind schedule!!	-	-	-	-	Exam	Exam
3	Schematic Design	-	-	-	-	0	0	0	0	DONE	-	-	-	-	Exam	Exam
4	Autumn Semester Presentation	-	-	-	-	0	0	0	0	Due Friday 12th December and 14th December, 15th August	-	-	-	-	Exam	Exam
5	Code Development	-	-	-	-	-	-	-	-		0	0	0	0	Exam	Exam
6	PCB Layout	-	-	-	-	-	-	-	-		-	-	0	0	Exam	Exam
Winter Break		Week														
Task no.	Task	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	First PCB Schematic and Layout	-	Christmas	0	0	Order PCB		END								
2	PCB Testing	-		-	-	-	0	END								
Sem 2		Week														
Task no.	Task	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-
1	Final Report Due & Presentation	-	0	0	0	0	0	0	Final Report Due		END					
2	PCB with STM32 on board	-	0	Ord				-			END					
3	PCB Testing	-	-	0	0	0	0	0			END					

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Conclusions

- Project summary:
 - Prototype schematics done, the next step will of implementing the prototype will exciting yet challenging, I am expecting imperfection and improvement in the current schematics, as well as challenges in implementing the relatively complexed RTOS code architecture, after prototype, we will be focused on dishing the custom PCB.
- Work completed to-date:
 - Significant progress has been made in understanding and developing the foundations of the project, a schematic has been made while the breadboard testing prototype is under development.
- Next steps:
 - Hard ware: Finish the prototye on a bread board.
 - Soft ware: Finish the prototype some ware that will be the foundation in next step.

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