

# PROJECT POST-MORTEM

**Project Title:** Pattern Generator

**Date Prepared:** 12/08/20

## Project Overview:

The goal of this project was to create a PCB that used the ATMEGA 328PB chip to create binary sequences at both 3.3V and 5V with a user interface that at least made sense. There were several ways that were going to be implemented to do each of these tasks but for the project to be considered success full this meant that there must be multiple independent channels with there own adjustable binary sequences. This also meant that there had to be a user interface capable of allowing the end user to adjust the binary sequence for each of the channels as well as adjust the logic level that all channels were using. This was tested by making sure that the input received from each of the channels matched what was being indicated by the end user and that when the channel was adjusted the binary sequence of only that specific channel changed.

## Key Accomplishments:

For this project, the early stages of designing and planning went very well with plenty of redundancy in place. The project was designed with two possible display methods the OLED display and a set of individual LEDs, and two sets of input methods serial and a rotary encoder. This allowed for flexibility and adaptability in the firmware, if one of these failed in hardware or presented to much of a challenge to program there was an alternative route so it would help guarantee the project would be functional at the end. The firmware it's self-worked well with little to no issues this was mostly do to planning in advanced what the general structure of the code looked like in advance. This structure essentially had 3 modes a mode to change the voltage, a mode to change the selected channel, and one to change the pattern output. This worked very well with the rotary encoder which had a built-in button which allow modes to be changed with a button press and the values in each mode to be shifted by turning the nob. One of the most key success was the use of CMOS inverters to toggle all the channels at a specified logic level. This method works flawlessly in prototyping and was a key part in making sure the there was correct output.

## Key Problem Areas:

One of the first major obstacles was with getting parts for the first prototype because this project in its early stages required the use of oscilloscopes which I only had access to in lab which made my window for prototyping even smaller. There were issues with getting parts form suppliers hence issues getting those parts for prototyping this set me back a lab session and a half for prototyping with only 4 labs in total allotted for prototyping. Because the circuit could not finalize without prototyping, I had to use 2 extra lab sessions to get the prototyping finalized to begin work on finalizing designs. The second issue was caused mainly by rushing to make up for lost time which led to a lack of understanding of what was required and what formats to use when submitting assignments. No matter how many times I looked at the write up I could not understand what exactly was expected of me because I was not taking my time or talking to other students about the criteria. This caused major setbacks due to designs not getting approved and ended up causing me to miss the deadline to get my board fabricated by the school. By the time I was able to get approved it was too late I was able to get a board sent out and get credit, but I was not able to get my PCBs in time to populate and test them correctly. To at least allow for my design to be demoed I had

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to build a fully functional prototype and buy a digital discovery to demo it but the prototype used a 3V instead of a 3.3V which caused issues reading the output in 3V mode making the results for that portion of the demo inconclusive.

### Post Project Tasks/Future Considerations

A lot of the issues with trying to complete this project involved poor time management and loss of time. To prevent this in the future I would suggest making a schedule ahead of time to avoid spending too much time on small details like was the case in the early development stages with the design and prototyping. Making a schedule also would have allowed for the planning of setbacks. Another major adjustment would be to reduce the amount of time spent reworking elements of the project that already worked. The next adjustment is to establish better communications so when something is wrong it can be more quickly addressed. The biggest and most necessary adjustment would be to take my time reading the requirements more carefully and be less shy about asking questions.

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### Lessons Learned:

Category	Lesson Learned	Achieved?	Comments
Project Planning	Product concept was appropriate to Business Objectives	Y	
	Project Plan and Schedule were well-documented, with appropriate structure and detail	N	Not much documentation on deadlines
	Project Schedule encompassed all aspects of the project	Y	
	Tasks were defined adequately	Y	
	Stakeholders (e.g., Sponsor, Customer) had appropriate input into the project planning process	N/A	
	Requirements were gathered to sufficient detail	Y	
	Requirements were documented clearly	Y	
	Specifications were clear and well-documented	Y	
	Test Plan was adequate, understandable, and well-documented	Y	
	External dependencies were identified, agreements signed	Y	
	Project budget was well defined	N	No budget was defined
	End of Phase Criteria were clear for all project phases	Y	
	Project Plan had buy-in from the stakeholders	N/A	
	Stakeholders had easy access to Project Plan and Schedule	N/A	
Project Execution	Project stuck to its original goals	Y	
	Changes in direction that did occur were of manageable frequency and magnitude	Y	
	Project baselines (Scope, Time, Cost, Quality) were well-managed (e.g., changed through a formal Change Control Process)	Y	
	Design changes were well-controlled	N	Some changes were made despite working wasting time
	Basic project management processes (e.g., Risk Management, Issue Management) were adequate	N	The risk of getting parts and boards from suppliers was not fully considered causing mismanagement of time
	Project tracked progress against baselines and reported accurate status	Y	
	Procurement (e.g., RFP, Contract with vendor) went smoothly	N	Vender delivered stencil but did not deliver PCB or certain parts
	Contracted vendor provided acceptable deliverables of appropriate quality, on time, and within budget	N	Products were not delivered on time some products did not arrive at all
	Stakeholders were satisfied with the information they received	N/A	

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Category	Lesson Learned	Achieved?	Comments
	The project had adequate Quality Control	Y	
	Requirements – specifications – Test Plan were well-managed (e.g., Requirements Management System was used)	Y	
<b>Human Factors</b>	Project Manager reported to the appropriate part of the organization	Y	
	Project Manager was effective	N	I could have made better use of time and did not complete my goal
	Project Team was properly organized and staffed	N/A	
	Project Manager and staff received adequate training	Y	
	Project Team's talent and experience were adequate	Y	
	Project team worked effectively on project goals	Y	
	Project team worked effectively with outside entities	N	I struggle with communicating with Tim effectively and it cause setbacks
	There was good communication within the Project Team	N/A	
	Management gave this project adequate attention and time	N	This project required lab equipment to complete effectively so it need a little bit more time for prototyping
	Resources were not over-committed	N	
	Resources were consistently committed to project aims	N	Not enough resources
	Functional areas cooperated well	Y	
	Conflicting departmental goals did not cause problems	Y	
	Authority and accountability were well defined and public	Y	
<b>Overall</b>	Initial cost and schedule estimates were accurate	N/A	
	Product was delivered within amended schedule	N	
	Product was delivered within amended budget	N	
	Overall Change Control was effective	N	
	External dependencies were understood and well-managed	N	
	Technology chosen was appropriate	Y	
	The project was a technological success	N	
	Customer's needs/requirements were met	N/A	
	Customer was satisfied with the product	N/A	
	Project Objectives were met	N	Not completed even though functional prototype works as expected
	Business Objectives were met	N/A	

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**Project Close Acceptance:**

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Project Manager Signature

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Sponsor Signature

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Marcel Vieira

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Project Manager Name

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Sponsor Name

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12/08/20

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Date

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Date