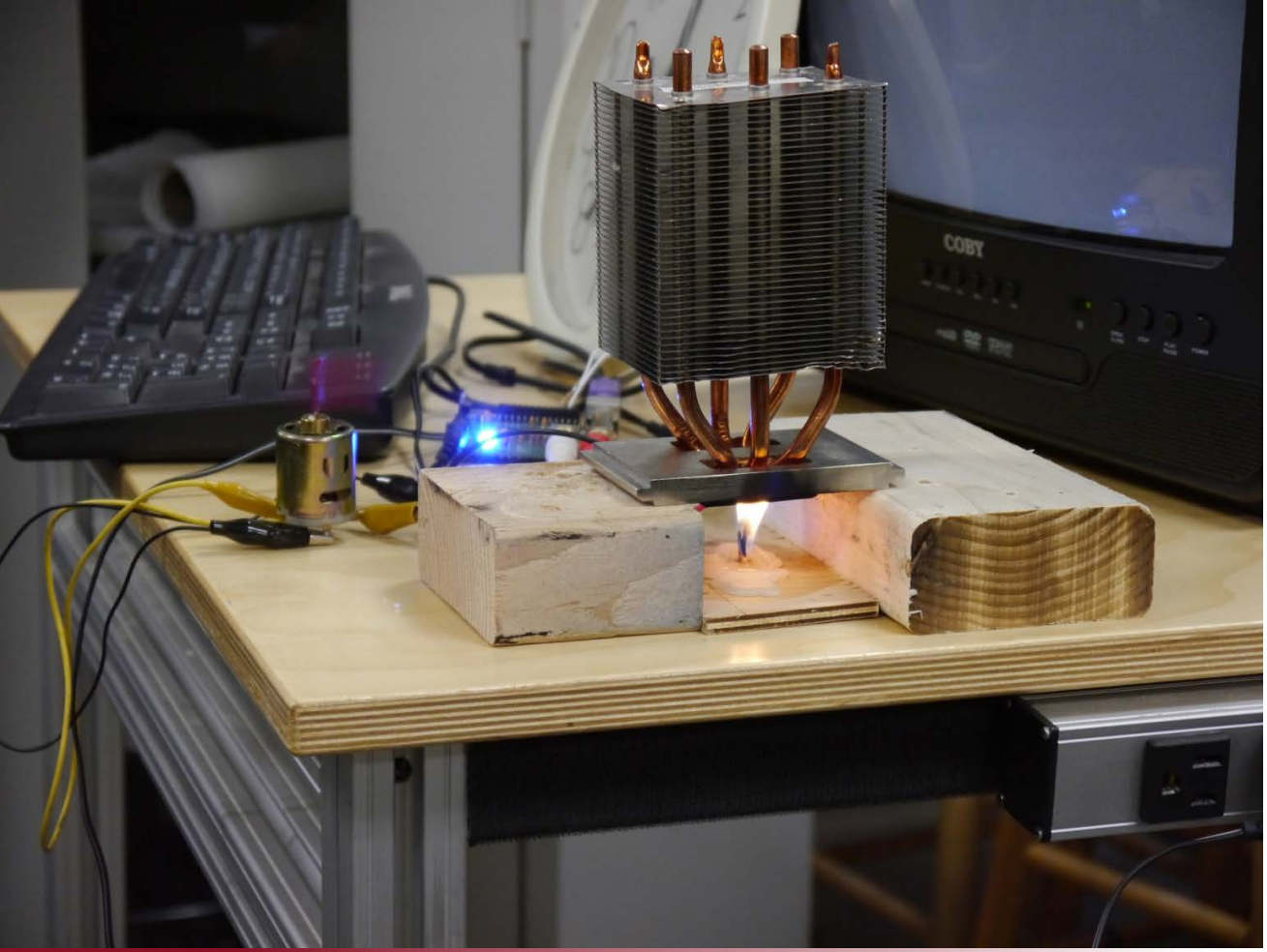


ECE Senior Design Project

SDP21

Lecture 7

Monday, 1 February 2021

Outline of Lecture 7, 1 February 2021

- Schedule
- Reminders
- **CDR Rubric**

February 2021						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1  Lecture 7 (CDR prep)	2	3	4	5	6
7	8 Lecture 8 (Design of Experiments)	9	10	11	12	13
14	15 Check-In #4	16 Check-In #4	17 Check-In #4	18 Check-In #4	19	20
21	22 Lecture 9 (Alumni)	23	24 Wellbeing Wednesday	25	26	27
28						

"You Are Here" by Amy Johnquest

CDR Week begins March 8, 2021

Five weeks from today!

FPR Week begins April 19, 2021

Semester at a glance

February 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 Classes Begin Lecture 7 (CDR prep)	2	3	4	5	6
7	8 Lecture 8 (Design of Experiments)	9	10	11	12	13
14	15 Check-In #4	16 Check-In #4	17 Check-In #4	18 Check-In #4	19	20
21	22 Lecture 9 (Alumni)	23	24 Wellbeing Wednesday	25	26	27
28						

Five weeks from today!

March 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 Wed Class Schedule Lecture 10 (CDR)	2	3	4	5	6
7	8 CDR	9 CDR	10 CDR	11 CDR	12 CDR	13
14	15 Lecture 11 (SDP Report)	16	17	18	19 Websites due	20
21	22 Check-In #5 w/ PCBA demo	23 Check-In #5 w/ PCBA demo	24 Check-In #5 w/ PCBA demo	25 Check-In #5 w/ PCBA demo	26	27
28	29	30	31			

Eleven weeks from today!

April 2021

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5 Lecture 12 (FPR)	6	7	8	9 Draft SDP report due	10
11	12	13	14 \Wellbeing Wednesday	15	16	17
18	19 FPR	20 FPR	21 FPR	22 FPR	23 FPR	24
25	26	27	28	29	30 Demo Day	1

May 2021						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
2	3	4 Last Day of Classes Final SDP Report due	5	6 Finals begin	7	8
9	10	11	12 Finals end	13	14 Graduation	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Websites

Wednesday, January 6th

kris 11:35 AM

@everyone Hi SDP21 Teams: Your SDP21 website directories are now active and ready for you to build within. Please refer to instructions i-iii directly below. kris

\\\

i) using an sftp, login in to defiant.ecs.umass.edu using your team's credentials:

username: sdp-xx (xx = team #)
password: conveyed via your teamxx-and-course-coordinator slack channel

Example (for Team 5):
username: sdp-05
password: .....

ii) open your directory by navigating to your team's subfolder (see screen shot of directory below):

www/organizations/sdp/sdp21/teamxx

iii) build your website in www/organizations/sdp/sdp21/teamxx. **Note: For archival purposes, all website source code must reside in your directory. It is not permitted to supply a link to another website-hosting location.**

At minimum, websites should contain:

- Team members
- Problem Statement
- System Specs
- Block Diagram
- Software Diagrams
- PDR slides
- MDR slides
- suitable videos

Please see past sdp websites for inspiration:

- SDP20: http://www.ecs.umass.edu/ece/sdp/sdp20/
- SDP19: http://www.ecs.umass.edu/ece/sdp/sdp19/
- SDP18: http://www.ecs.umass.edu/ece/sdp/sdp18/
- SDP17: http://www.ecs.umass.edu/ece/sdp/sdp17/
- SDP16: http://www.ecs.umass.edu/ece/sdp/sdp16/

Consider linking your LinkedIn on your website!

Reminders

Advisor-team weekly meeting

Team meeting (at least weekly) and team communication

Check Slack every day

Keep on committing your code to your Github repo (frequently!)

SDP21 Consultant: Dr. Charles Malloch
Tuesdays and Wednesdays, 7-9 PM*
(The Zoom number is posted in Slack #main-channel)

Check Slack--some weeks will be different
Send a direct message on Slack for additional assistance!

M5 vs. SDP lab, when to use each

SDP Lab	**M5**
● General project meeting/work ● Picking up parts that Shira has located for you ● Power supply, oscilloscope, multimeter ● Get some breadboard wire from the spools ● “Raspberry Pi station”	● You need to solder something and you’ve already spoken with Shira about training ● Shira specifically told you to go in to M5 for certain parts you need (she told you how to find them) ● You need workspace but SDP lab has reached capacity (15 persons), while M5 has NOT yet reached capacity

Use the Reservation System for SDP Lab: tinyurl.com/sdp21res

Contact Shira via Slack for M5 requests

Why? To help you find things, to get you the training you need.

M5 vs. SDP lab, when to use each

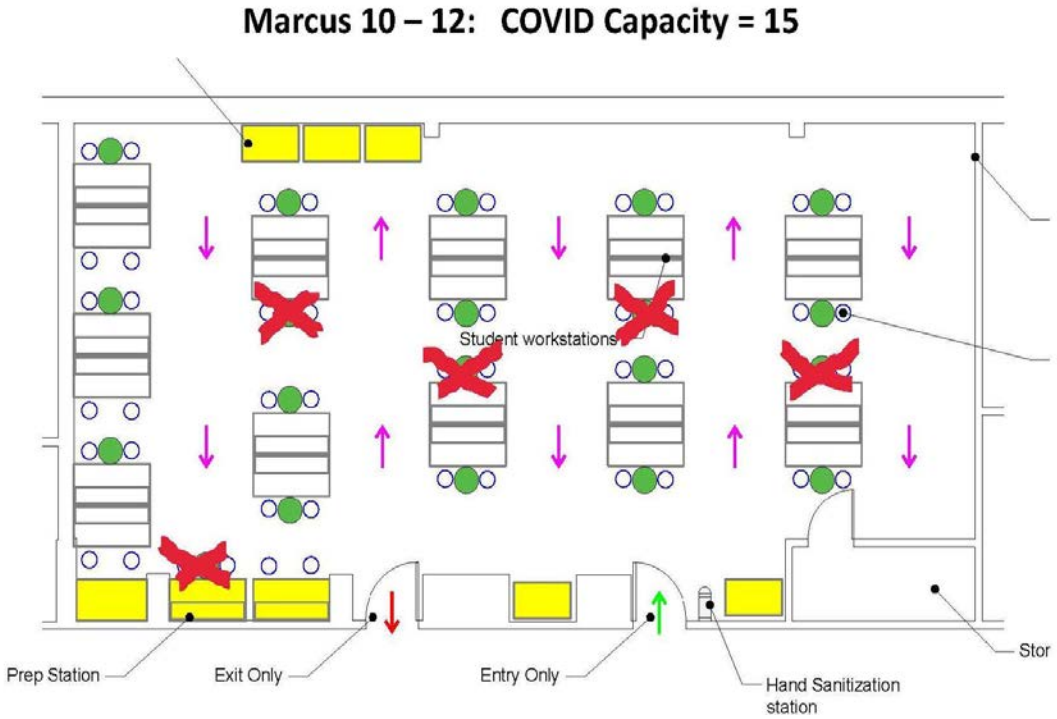
IMPORTANT: Read this section first.
No more than 15 users may be concurrently in SDP Lab (Marcus 10&12). Max 2 per bench (only if working on the same thing; otherwise 1 per bench)
Before you make a reservation, check the other signups for the same date to ensure the lab is not full.
YOU MUST BE IN THE TESTING PROGRAM https://www.umass.edu/coronavirus/news/update-covid-19-asymptomatic-testing-program
Plan your visits during the hours of 8am to 8pm M-F; Marcus Hall may be locked outside these hours
You must wear a face mask AND face shield while in the lab.

Name	Phone #	Team #	Visit Date	Visit Time	SDP Lab or M5?	Duration

Reserving lab time: more detail

CAPACITY FOR
Marcus 10-12

15

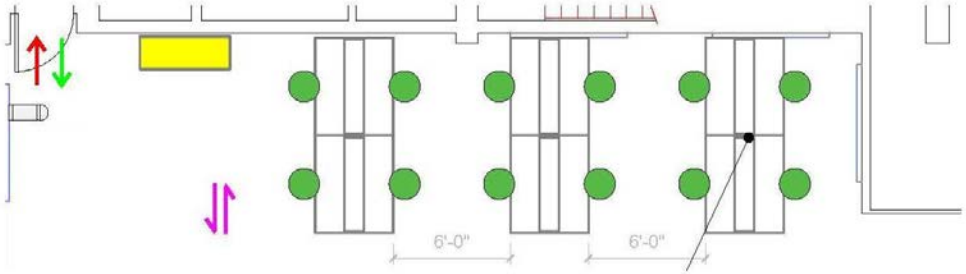


Reserving lab time: more detail

CAPACITY FOR
M5 Great Room

12

Marcus 5 (Great Room): COVID Capacity = 12

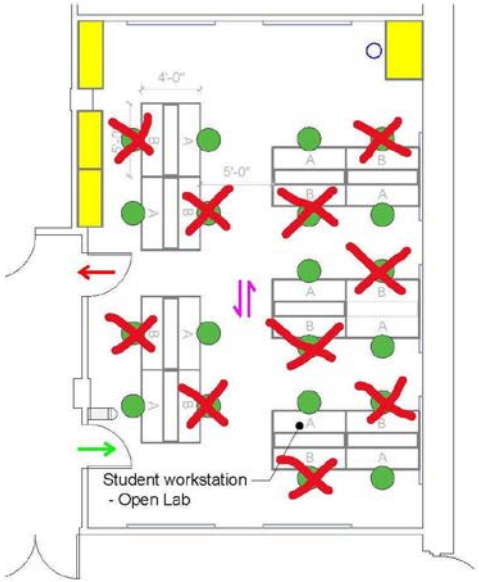


Reserving lab time: more detail

CAPACITY FOR
M5 Good Room

10

Marcus 5 (Good Room): COVID Capacity = 10



Policy on the Use of Off-The-Shelf PCBAs

All off-the-shelf electronic hardware that your team hopes to use in your April demos must be submitted to the course coordinators for review. Only approved hardware can be used in April. Submit queries ASAP so you can move forward with confidence. Use your **teamxy-and-course-coordinator** channel for your queries.

Examples of hardware likely to receive approval:

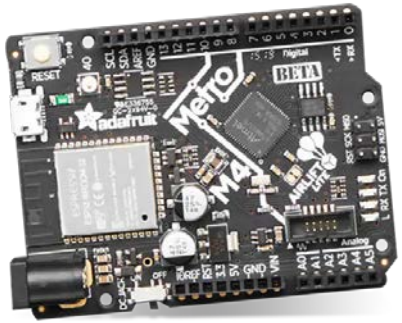
- Single-board Linux Computers (Raspberry Pi, Beagle, etc.) (but ONLY if there is a demonstrated need for that level of computing power.)

Examples of hardware unlikely to receive approval:

- Arduinos & Arduino clones, mbed boards
- A breakout board with low level of complexity (count the pins!)

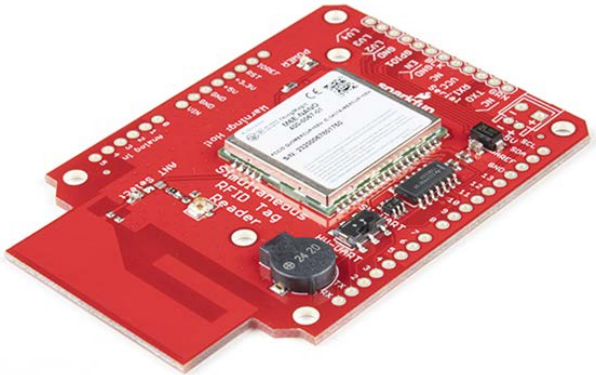
Single Board Computers and Break out boards:

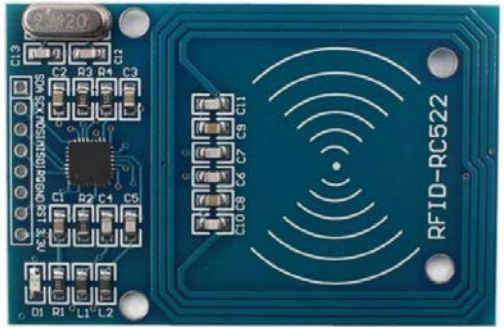
Not for use at FPR unless request is made and permission is granted!

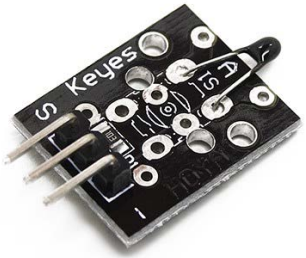


Single Board Computers and Break out boards:

Not for use at FPR unless request is made and permission is granted!







Single Board Computers and Break out boards:

Not for use at FPR unless request is made and permission is granted!

https://www.digikey.com/en/products/detail/espressif-systems/ESP8266EX/8028408

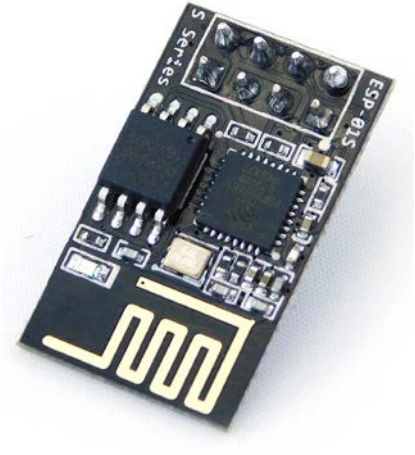
ESP8266 Wi-Fi SoC Solution

	Image	Manufacturer Part Number	Description	Available Quantity	View Details
		ESP-LAUNCHER	EVAL BOARD FOR ESP8266EX	16 - Immediate	View Details
		ESP8266EX	IC RF TXRX+MCU WIFI 32VFQFN	3396 - Immediate	View Details
		ESP-WROOM-02	RX TXRX MOD WIFI TRACE ANT SMD	1300 - Immediate	View Details

Espressif provides the SMD module—ESP-WROOM-02 that integrates ESP8266EX. The module has been adjusted to get the best RF performance. We recommend using ESP-WROOM-02 for tests or for further development.

> 📖 ***Note:***
>
> *For more information on ESP8266EX, please refer to ESP8266EX Datasheet.*

The module size is (18.00 ± 0.10) mm x (20.00 ± 0.10) mm x (2.80 ± 0.10) mm. The type of flash used on this module is an SPI flash with a package size of SOP 8-150 mil. The gain of the on-board PCB antenna is 2 dBi.



vs.

SPI to Wi-Fi module with 4Mb Flash

ATWINC1500

Status: In Production

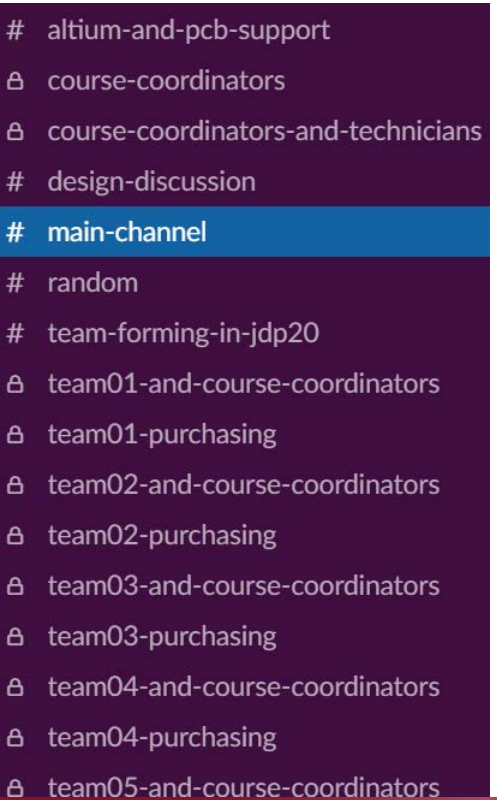
View Datasheet | View Comparisons | View CAD Symbols

Features:

- Single-band 2.4GHz b/g/n IoT Network Controller
- Extreme low power
- Small form factor module measures just 21.7 x 14.7mm
- Agency Certified in the US, Canada, Europe, Japan, Korea, China, India and Taiwan
- Security protocols supported: WPA/WPA2 Personal and Enterprise, TLS, SSL

View More

Conversation with Course Coordinators Via Slack



Let's talk:

- SBC/BOB exemption requests and discussion
- Soldering help requests (schedule time to meet with Shira)
- Request about M5/SDP inventory, borrowing tools
- Misc questions, but please
  - Consider the channel #altium-and-pcb-support
  - Consider questions that are relevant to all can go on #main-channel
  - Talk it over with team members and advisor
  - Go to Dr. Malloch's office hours or sending Dr. Malloch a message requesting to meet via Zoom
  - **It is easier to get help earlier rather than later**

CDR Rubric Overview

5%	Presentation & Demo
15%	Documentation of the Current Prototype
45%	Integrated System
15%	Custom PCB
15%	FPR Plan
5%	Project Management Plan

Presentation & Demo	
5%	
• Presentation must include **Problem Statement & System Specifications**	
• Includes the list of CDR deliverables (as submitted in ECE 415)	
• Begins on time, has been practiced & rehearsed	
• Teamliness and professionalism	

Rubric
(4.0) The presentation and demo were excellent.
(3.0) The presentation and demo were good.
(2.0) The presentation and demo were fair.
(1.0) The presentation and demo were unsatisfactory.

Documentation of the Current Prototype
15%
• Describes the **current prototype**
• Includes diagrams & lists for hardware & software
• Includes any other relevant documentation

Rubric
(4.0) Documentation of the current prototype is excellent (clear and complete).
(3.0) Documentation of the current prototype is good (mostly complete, but some details are missing or unclear).
(2.0) Documentation of the current prototype is fair (missing or unclear on significant portions).
(1.0) Documentation of the current prototype is unsatisfactory.

Integrated System
45%
• Demonstration of the integrated system
• Meets the milestones set by the CDR deliverables
• Discusses which system specifications are currently satisfied by the current prototype and which are yet to be met

Rubric
(4.0) A demonstration of a fully functioning, integrated system (team is on schedule to FPR).
(3.0) A demonstration of a mostly functioning, integrated system (team is slightly behind schedule to FPR).
(2.0) A demonstration of a partly functioning, integrated system (team is significantly behind schedule to FPR).
(1.0) The demonstration was unsatisfactory (the evaluators have major concerns about the team's progress towards FPR).

Custom PCB
15%
• Populated or blank PCB in hand
• Schematic and board layout are shown and explained

Rubric
(4.0) The custom PCB (fabricated) is in the possession of the team.
(3.0) The custom PCB was ordered, but has not yet arrived.
(2.0) The custom PCB has not yet been ordered.
(1.0) The custom PCB design progress is not satisfactory.

Ordering the PCB

Monday, January 18th

Shira Epstein 2:52 PM

Hello @everyone!!!!

Have you placed your first PCB order?

If not, are you on course to place your first PCB order by **February 15th?**

This matter concerns every team member, not just the PCB lead designer!

Typical turnaround + shipping times for PCB fabrication services are 2-3 weeks. If you order by February 15th, you are likely to receive your bare board in time for the CDR requirement [see Lecture 6, slide #37, Nov 2nd 2020]. This course requirement stipulates that your team will have *at least* the blank PCB in hand at your CDR. You are encouraged to design and place your PCB order as soon as possible.

Reminder: CDR will take place the week of March 8th, 2021. See the schedule.

Are you on course to place your first PCB order by **February 15th**?
Typical turnaround + shipping times for PCB fabrication services are **2-3 weeks**.
If you order by February 15th, you are likely to receive your bare board in time for the **CDR requirement** [see Lecture 6, slide #37, Nov 2nd 2020].

PCB companies list (partial)

Consider:

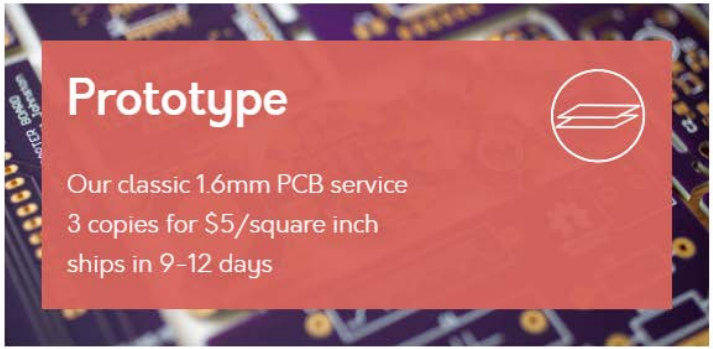
- Cost
- Time to ship
- Shipping options (time and cost)
- Special options (flexible boards, etc)
- Chinese New Year! Feb 6- Feb 18 2021

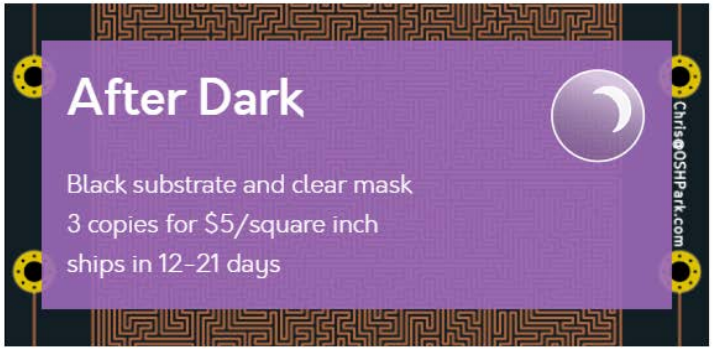
- **JLC PCB**
  - Shenzhen, China
  - Very cheap boards ($5 - $10 for ~10 copies).
  - Takes around 2-3 weeks
- **OSHPark**
  - Portland, Oregon
  - More expensive boards claiming better tolerances and quality control
  - Standard boards: $5 / sq. inch, 3 copies. (2 layers)
  - Ships in 9-12 days, offers rush shipping at a premium
- **PCBWay**
  - Shenzhen, China
  - Relatively cheap boards, shipping can be expensive
  - Offers many specialty boards - Flexible, Clear, etc
- **Seeed Fusion**
  - Board fab
  - Part procurement
  - Board population
- AllPCB, lion circuits, dirtypcb, and many others

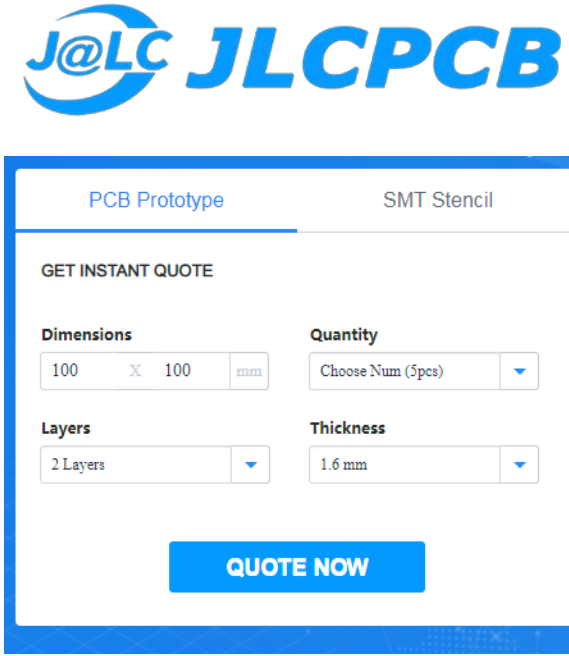
OSHPARK
Perfect Purple Prompt PCBs

Check out the:

- Pre-order Checklist
- Fabrication services overview
- Shipping Info & Turnaround Times







JLCPCB 2021 holidays Schedule (GMT+8)

Order Date / Delivery Date / Order Type	Confirm order on Jan 29th	Confirm order on Jan 30th	Confirm order on Jan 31th	Confirm order on Feb 1st	Confirm order on Feb 2nd	Confirm order on Feb 3rd	Confirm order on Feb 4th	Confirm order on Feb 5th	Orders placed on holidays (Feb 6th- 18th)
1/2 layers prototype (1-2 days)	Jan 31th	Feb 1th	Feb 2th	Feb 3th	Feb 4th	Feb 5th	Arrange Production		
1/2 layers prototype (3 days)	Feb 2th	Feb 3th	Feb 4th	Feb 5th	Arrange Production				
1/2 layers small batch (5-6 days)	Feb 4th	Feb 5th	Arrange Production						
4 layers prototype (4-5 days)	Feb 3th	Feb 4th	Feb 5th	After holidays					Review Orders No production
4 layers prototype (3 days)	Feb 2th	Feb 3th	Feb 4th	Feb 5th	After holidays				Review Orders No production
4 layers prototype (2 days)	Feb 1th	Feb 2th	Feb 3th	Feb 4th	Feb 5th	After holidays			Review Orders No production
4 layers small batch (6-8 days)	Feb 5th	After holidays							Review Orders No production
6 layers prototype (6-7days)	Feb 5th	After holidays							Review Orders No production
4-layer SMT Assembly	After holidays								Review Orders No production
6-layer SMT Assembly	After holidays								Review Orders No production

* The delivery time in the form is for reference and subject to the actual audit results.
Please kindly schedule your orders ahead of time.

Getting help with your PCB Design and the software

You can use any PCB design software you like.
We recommend Altium. Licenses are available to SDP students.
M5 staff members have developed video tutorials for Altium 21:

Altium 21 Tutorials:
https://youtube.com/playlist?list=PLP8NURcgEAm1SxSKGEcEckfxoIChSZLI2

Watch-A-Long Project (Altium 21 and beyond):
https://youtube.com/playlist?list=PLP8NURcgEAm2rLgFuEo3sccsKJeEyNyNy

You can get help on the #altium-and-pcb-support Slack channel

FPR Plan	
15%	
• Describes the **planned FPR version of the system.** Highlight changes between current and FPR versions	
• Plan for testing the project for compliance to system specifications	
• Plan for hardening the prototype	
• Plan for FPR demonstration	

Rubric
(4.0) Plan for FPR is excellent (clear and complete).
(3.0) Plan for FPR is good (mostly complete, but some details are missing or unclear).
(2.0) Plan for FPR is fair (missing or unclear on significant portions).
(1.0) Plan for FPR is unsatisfactory.

Project Management Plan
5%
• Gantt chart from CDR to FPR
• Expenditures (current & projected)
• State team member responsibilities from CDR to FPR

Rubric
(4.0) Project management plan is excellent (clear and complete).
(3.0) Project management plan is good (mostly complete, but some details are missing or unclear).
(2.0) Project management plan is fair (missing or unclear on significant portions).
(1.0) Project management plan is unsatisfactory.

Questions?