

UNIC-CASS Design-to-Tapeout Meetup #6 (Oct. 23, 2024)

2nd design review and top integration plan

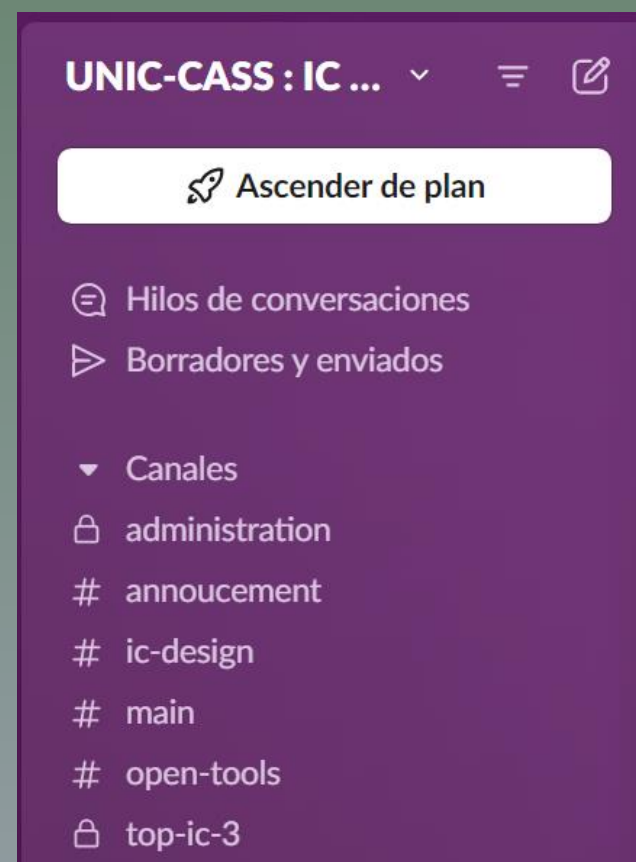
Presented by: D-to-T mentoring team



Design-to-Tapeout Mentoring

Communication and organization

- ▶ Bi-weekly mentoring sessions
- ▶ Slack Channel
- ▶ UNIC-CASS website



UNIC-CASS Slack channel:
<https://unic-cass.slack.com/>

A screenshot of the UNIC-CASS website. The page title is 'Universalization of IC Design from CASS (UNIC-CASS)'. The main heading is 'Universalization of IC Design from CASS (UNIC-CASS)'. Below the heading is a paragraph describing the program: 'The Universalization of IC Design from CASS (UNIC-CASS) program is a structured end-to-end Integrated Circuit (IC) design-to-test experiential learning. The program aims to improve the know-how and accessibility to IC Design technologies for enthusiasts and design communities worldwide in low-to-middle-income and/or low-opportunity countries. This program is of strategic cooperation with the Solid-State Circuits Society serving geographical-complementing locations.' Below this is a link to 'UNIC-CASS Mentoring Session Recordings & Presentations'. Further down, there is another paragraph: 'The IEEE Circuits and Systems Society (CASS) invites you to participate in the Universalization of IC Design from CASS (UNIC-CASS) program, a structured end-to-end Integrated Circuit (IC) design-to-test experiential learning. The program aims to improve the know-how and accessibility to IC Design technologies for enthusiasts and design communities worldwide in low-to-middle-income and/or low-opportunity countries. This program is of strategic cooperation with the Solid-State Circuits Society serving geographical-complementing locations.' Below this is another paragraph: 'There are no restrictions to designing your ideal chip on design complexity or type (digital, analog/RF, or mixed-signal). Based on the quality of their submitted chip design proposals, selected participants will get the opportunity to learn from carefully curated materials on the CASS MiLe platform, hands-on design mentoring by experts in the field, submit designs to CASS-sponsored fabrication runs via Efabless chipIgnite program and test your fabricated chip at selected testing facilities.' At the bottom, there is a section titled 'UNIC-CASS Materials & Tools' with four buttons: 'GitHub', 'UNIC-CASS Slack Channel', 'CASS Microlearning', and 'UNIC-CASS Training Materials (GitHub)'. Below these buttons is a link to 'UNIC-CASS Mentoring Session Recordings & Presentations'.

Recordings and presentations: <https://ieeecas.org/unic-cass-mentoring-session-recordings-presentations>

UNIC-CASS educational material



Universalization of IC Design from CASS (UNIC-CASS)

9 followers <https://ieee-cas.org/universalization-i...>

Source: <https://github.com/unic-cass/unic-cass.github.io>

- New videos made by volunteers following the lecture notes
- Lecture notes in Markdown format
 - ⇒ You can contribute by updating them
- New document theme using Just-the-docs Jekyll theme
- Latest materials in Github
- Materials in CASS-MiLe will be updated into v2.0 soon
- Add instructions for Klayout in analog design flow

- Layout
- DRC
- LVS

The screenshot shows the website interface for 'Universalization of IC Design in CASS'. On the left is a navigation menu with items: Home, Course introduction (highlighted), 1.1 Introduction to the course, 1.2 Introduction to PDKs, 1.3 Introduction to the Digital Design Flow, 1.4 Introduction to Analog Design Flow with opensource tools, Environment Setup, Analog Design Flow, Digital Design Flow, Preparing the design for tapeout, and Design examples. On the right, there is a search bar and a section titled '1. Course Introduction' with a 'TABLE OF CONTENTS' list: 1.1 Introduction to the course, 1.2 Introduction to PDKs, 1.3 Introduction to the Digital Design Flow, and 1.4 Introduction to Analog Design Flow with opensource tools. At the bottom right, it says 'Copyright © 2024 IEEE CASS' and 'Edit this page on GitHub.'

Website: <https://unic-cass.github.io>

The screenshot shows the CASS-MiLe website with a grid of seven course cards. The cards are: UNICASS 1 - Course Introduction; UNICASS 2 - Design Tool Installation & Working Environment setup; UNICASS 3 - Analog design flow with opensource tools; UNICASS 4 - Digital design flows with Opensource tools; UNICASS 5 - Functional Verification (In Depth); UNICASS 6 - Preparing the design for tapeout (guided by Efabless); and UNICASS 7 - Design examples. Each card features a background image related to the course topic.

CASS-MiLe: <https://ml.ieee-cas.org>

Design-to-Tapeout Mentoring Team 2024



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Main Design-to-tapeout milestones

- ▶ **First design review (mock tapeout)**
 - Purpose: Prepare the teams in advance for the final tape-out phase
 - Date: Last week of September
- ▶ **Second design review (first DRC/LVS clean design delivery)**
 - Purpose: Verify feasibility of designs and top integration
 - Date: Second half of October
- ▶ **UNIC-CASS tapeout**
 - Purpose: final delivery of top designs
 - Date: November 8th

Design-to-Tapeout Mentoring

Weekly mentoring sessions 1

Activities	Date/ Deadline	Purpose/ comments	Your Deliverables (provide info/links on your GitHub)	We will provide/handle
1st Meet-up	Aug 12, 1pm-2pm UTC	Kick-off meeting	N/A	N/A
Weekly meet-ups	21/8,28/8,4/9, 18/9 1pm-2pm UTC	Mentoring and Design groups to present progress. Short presentations on topics such as Caravel/Caravan, best practices, pitfalls to avoid.	N/A	Slides and videos will be posted on the UNI-CASS website
1st Design submission [Mock tape-out]	Sep 25	Prepare the teams in advance for the final tape-out phase	Passing pre-check report	1. Detailed instructions for pre-check 2. Example files
1st Design Review & Feedback	Oct 2	Provide feedback and advice for the next stages	N/A	Feedback on the pre-check work
Weekly meet-ups	23/10, 30/10, 6/11 1pm-2pm UTC	Focused mentoring + preparation for final tape-out + evaluate status of potential drop-outs	N/A	Slides and videos will be posted on the UNI-CASS website

Design-to-Tapeout Mentoring

Weekly mentoring sessions 2

Activities	Date/ Deadline	Purpose/ comments	Your Deliverables (provide info/links on your GitHub)	We will provide/handle
2nd Design submission		Verify feasibility of designs and top integration Oct 21	Detailed circuit description (pinout, area and functionality) + DRC/LVS reports on Efabless platform	Check reports to confirm all blocks are LVS and DRC clean.
2nd Design Review & Feedback from mentors		Provide feedback and advice for the final stages Oct 23	N/A	Feedback on the individual designs + advice for top merge
Efabless pre-check + tapeout		Complete tape-out work on Efabless platform Nov 8	Deliver COMPLETE Caravel/Caravan drop-ins to Efabless final check	Provide assistance to tape-out leaders within the teams
Tape-out		See: Nov 11 https://efabless.com/chipignite	N/A	List of winner teams included in this tapeout List of unfinished designs to candidate for 2025 UNIC-CASS program
Chip delivery date		See: Apr 11 https://efabless.com/chipignite	N/A	Chip shipping and testing logistics

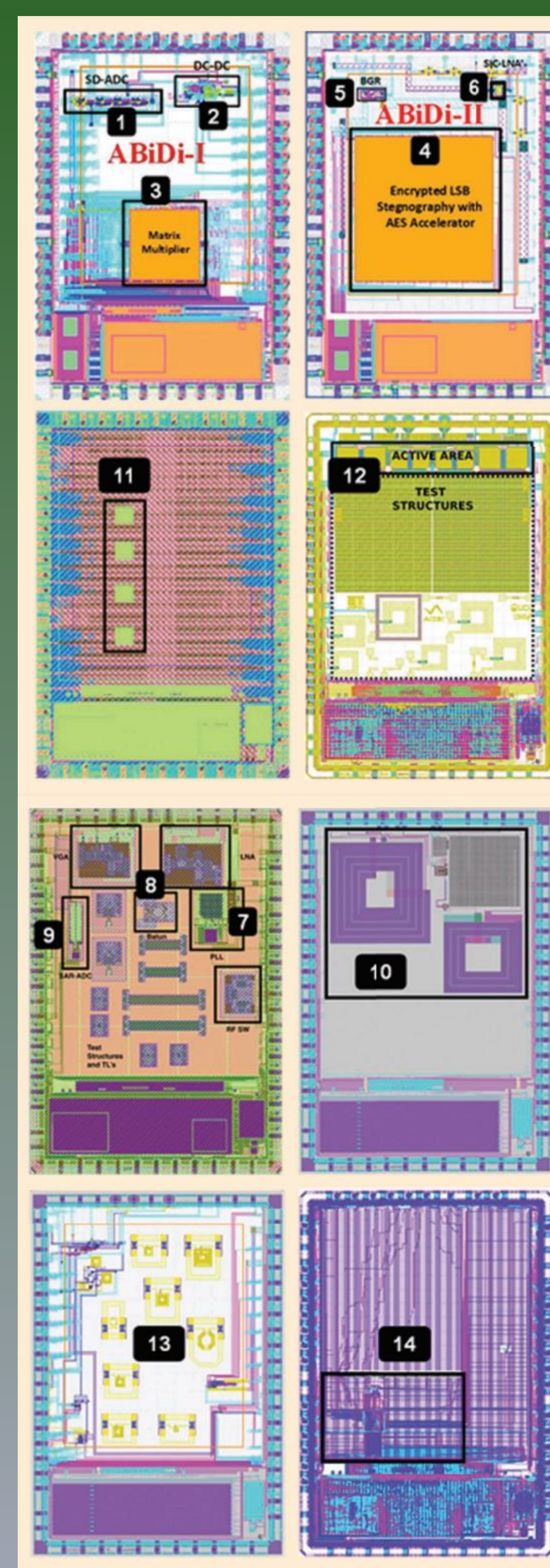
Additional remarks I

▶ Firm deadlines!

- November 11 is the hard tapeout date provided by Efabless
- Please plan according to the proposed activities: design submission and reviews (see schedule)
- These last 3 mentoring sessions will be focused on top integration discussions

Additional remarks II

- ▶ **UNIC-CASS uses multi-block caravels**
 - Area and pin count are limited for each project
 - Exact numbers will be adjusted as we see progress
 - Minimize merge work as much as possible → communication among teams is essential!



Additional remarks III

- ▶ **Finalizing the design is not the finishing line!**
 - Efabless pre-checks
 - Tapeout checks
 - Based on previous experience, some issues can arise at these steps
 - Allocate extra time to understand and execute this
 - Mock tapeout!

NEXT STEPS REQUIRE EXTENSIVE COLLABORATION AMONG TEAMS

Current actions by design teams

- ▶ Get in touch with your top integration team (ICX, see next presentation) and determine a **top integration leader** before next Monday 28/10
 - The **top integration leader** is in charge of the activities needed for the integration of all the blocks within the Caravel/Caravan chip
- ▶ Confirm your **area usage** within project teams and top integration teams using the provided spreadsheet before next Monday 28/10
- ▶ Confirm your **pin usage** within project teams and top integration teams using the provided spreadsheet before next Monday 28/10
- ▶ Create a plan for integration

Regarding the pin list

- ▶ Digital chips
 - Caravel datasheet:
https://raw.githubusercontent.com/milovanovic/caravel_spectrometer/master/doc/caravel_datasheet.pdf
- ▶ Analog/AMS chips
 - The best reference for the pin differences is here:
https://github.com/efabless/caravel_user_project_analog/blob/main/verilog/rtl/user_analog_proj_example.v



CAS

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For more information and to join CASS, visit:

IEEE-CAS.ORG