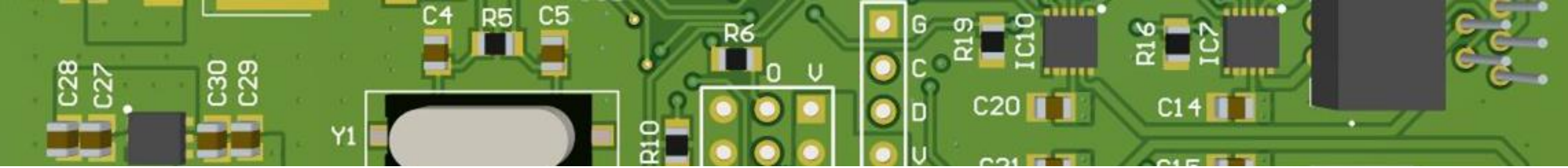
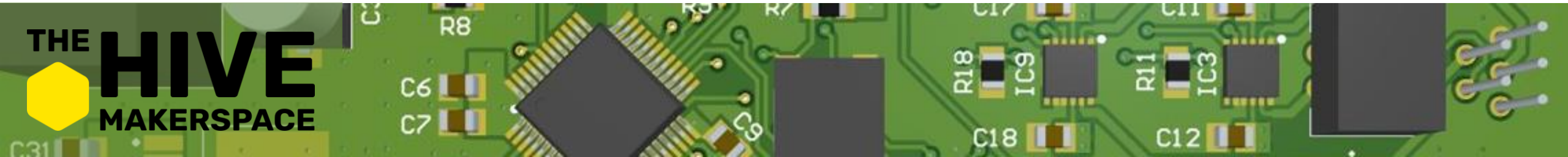


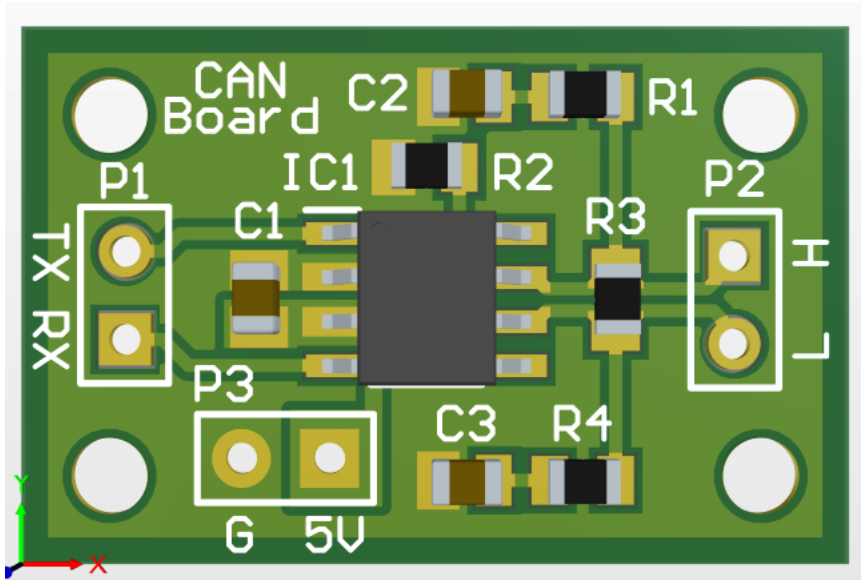
Welcome to Part 1 of the Altium Designer Workshop!



Workshop Overview

- **Part 1: Schematic Design**
  - Basics of Altium Designer
  - Adding components
  - Connecting components
  - Bonus Material: Hierarchical Schematics

- **Part 2: PCB Design**
  - Moving from schematic to PCB layout
  - Layout tips and best practices
  - Routing techniques
  - Silkscreen tips
  - Bonus Material: Multilayer PCBs

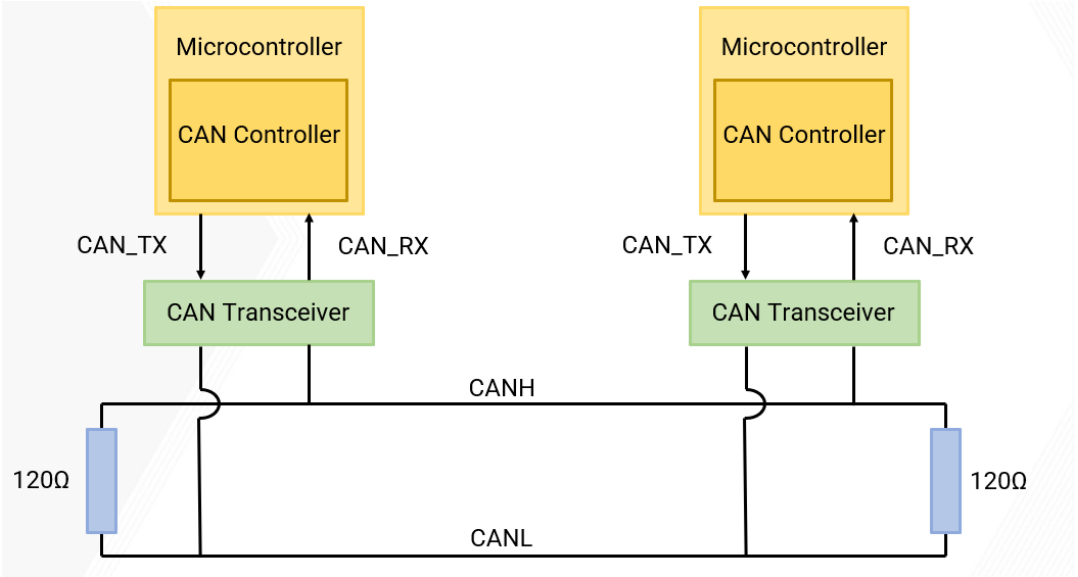


- **Final Deliverable: 2-layer CAN transceiver PCB design**

THE HIVE MAKERSPACE

Project Intro – CAN Transceiver

- CAN = Controller Area Network
- Two signals instead of one!
- Transceiver converts single-ended signals to differential signals



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Getting Started!

Tasks:

- Make a new project
- Make a new schematic
- Save them!!!

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Adding Components

Tasks:

- Install AltiumWorkshop.IntLib from https://tinyurl.com/AltiumFall2022
- Import and place components
- Place power port symbols (and rename VCC power ports)

Keyboard Shortcuts:

- Ctrl + Scroll = Zoom
- Right Click + Drag = Move schematic/PCB
- Click and Hold + Space = Rotate component
- Backspace = Undo Net/Trace Segment
- Esc = Exit active tool

Required Components:

- (x3: P1, P2, P3) 2-pin headers (“Header 2”) from Miscellaneous Connectors Library
- (x1: IC1) CAN Transceiver from workshop library
- (x1: C1) 0.1uF capacitor from workshop library
- (x2: C2, C3) 560pF capacitors from workshop library
- (x2: R1, R4) 100 Ohm resistors from workshop library
- (x1: R2) 4.7 kOhm resistor from workshop library
- (x1: R3) ERA-6AEB121V (120 Ohm resistor) from Library Loader
- (x5) Ground Power Port Symbol
- (x2) VCC Power Port Symbol

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Connecting Components

Tasks:

- Connect all components using either nets or net labels
- Label the CANH net “CAN_P” and the CANL net “CAN_N”

Keyboard Shortcuts:

- Ctrl + Scroll = Zoom
- Right Click + Drag = Move schematic/PCB
- Click and Hold + Space = Rotate component
- Backspace = Undo Net/Trace Segment
- Esc = Exit active tool

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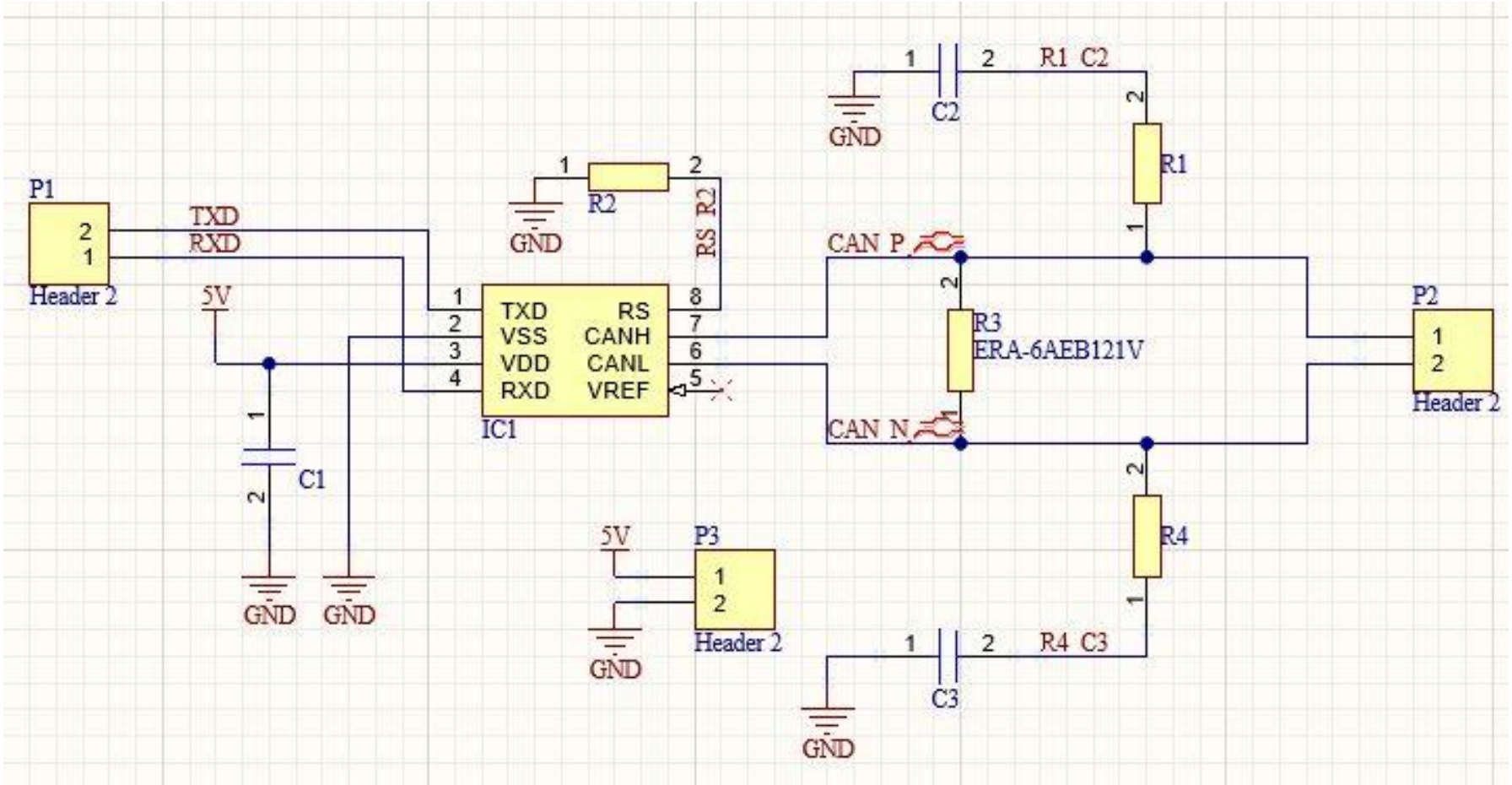
Adding Important Symbols

Tasks:

- **Add Generic No ERC symbols to any pin that is left floating**
- **Add Differential Pair symbols to CANH and CANL**

Example Schematic



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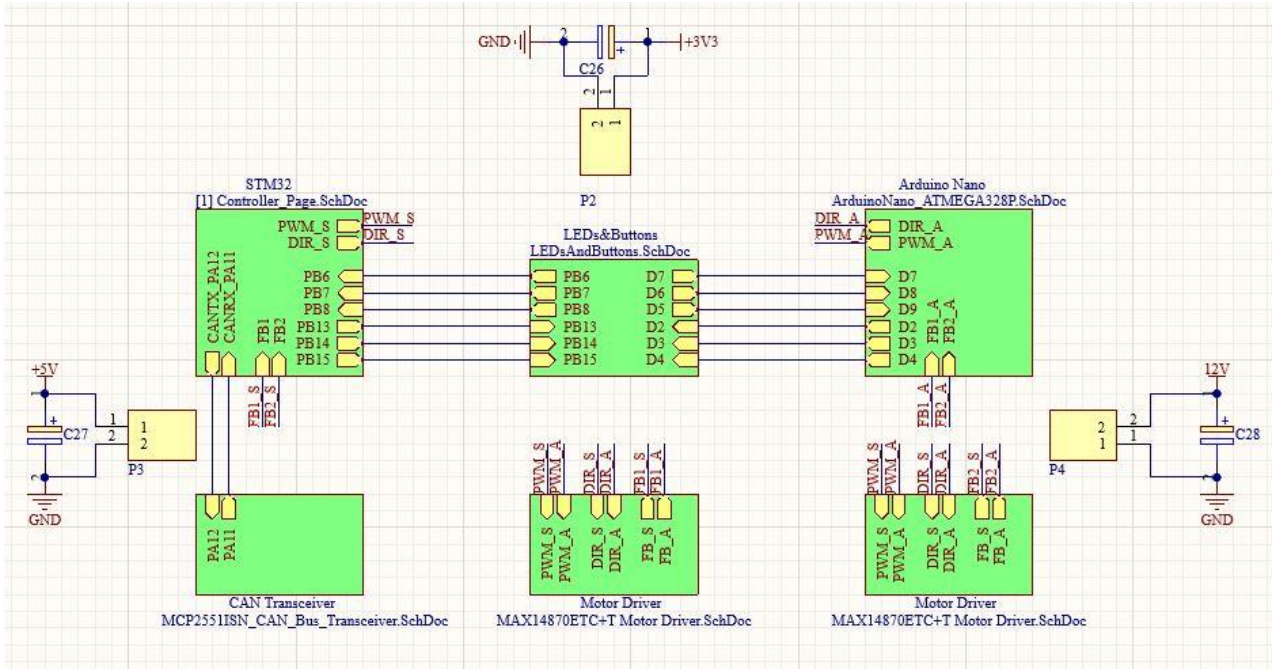
Making Hierarchical Schematics

<u>*OPTIONAL* Tasks:</u>

- **Make a new schematic sheet**
- **Add sheet symbols and link them to the CAN transceiver schematic**
- **Add sheet entries to each sheet symbol**
- **Using nets and net labels, play with connecting sheet entries**



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Congratulations!

<u>You Now Know How To:</u>

- **Make a new Altium project**
- **Install a library**
- **Add components to a schematic sheet**
- **Connect components using nets and net labels**
- **Add Generic No ERC and differential pair symbols**
- **Make hierarchical schematics**

See you next week!

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