Boston University
Electrical & Computer
Engineering

Type-C PPS with Parallel
Battery Management
Evaluation Board

Team Number_____1_____
Customer____Analog Devices____

Type-C PPS (Programmable Power Supply)
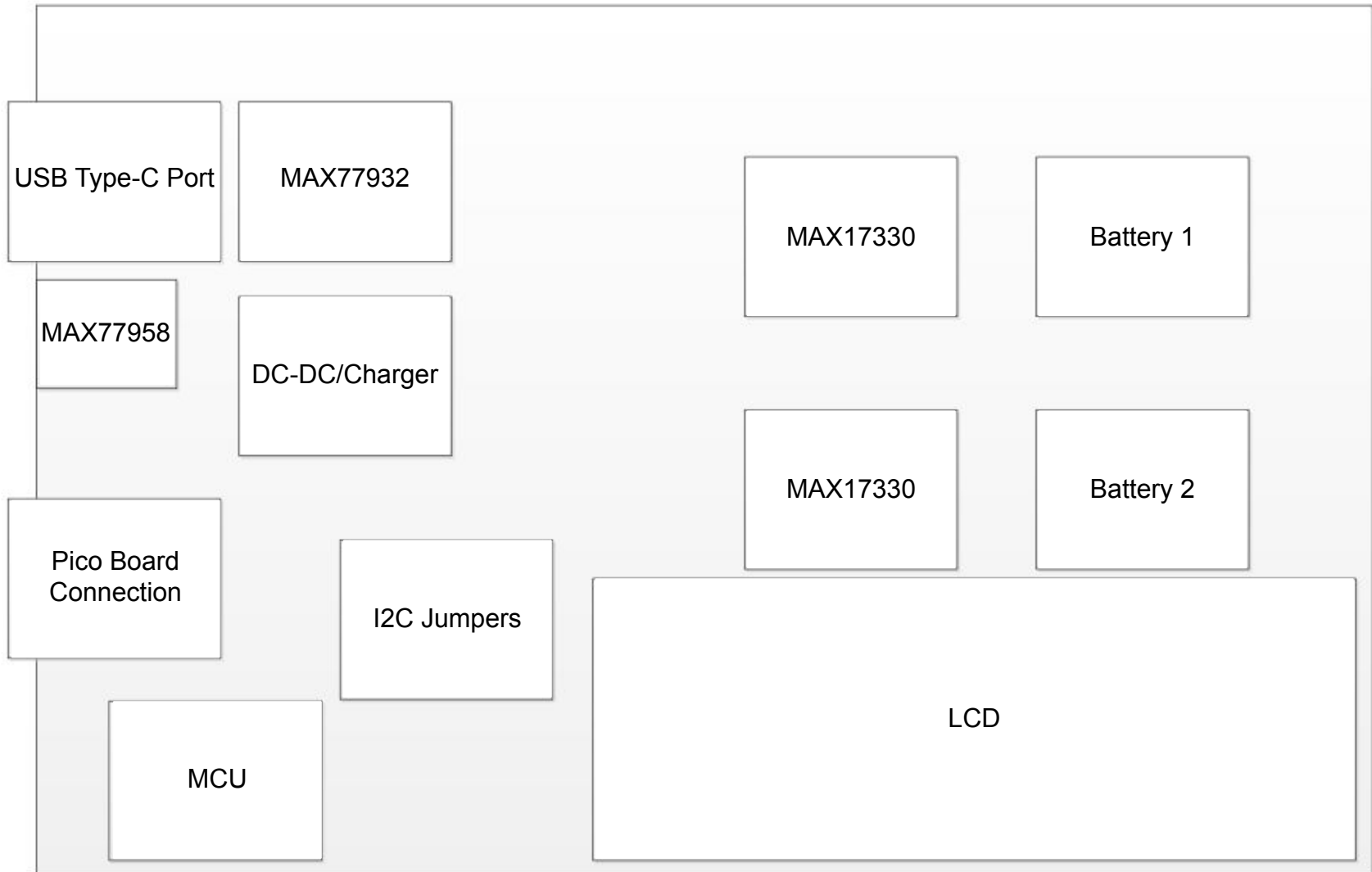# with Parallel Battery Management Evaluation Board

Team 1

Antonio Alonso, David Liu, Eric Cho, Harry Katsaros, Sunwoo Park

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Problem Statement

Design a PCB with Type-C PPS input and software to showcase the parallel battery management functionality of the MAX17330 (charger, fuel gauge, and protector for lithium ion batteries) for customer technology demonstrations and trade shows.

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Visualization

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Deliverables

- Functional PCB with straightforward display of key information for two batteries:
  - Charging/discharging state
  - Charging/discharging current
  - Battery capacity
  - Power flow diagram from Type-C port, batteries and to system load (input/output)
- Software to control each component on board via MCU

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Requirements (Functions)

- Parallel Battery Management:
  - Manage initialization of gauge and alerts for parallel battery charging
  - Manage when to request increase or decrease voltage from switch cap
  - Report state of each battery to display
- Display
  - Receive data from battery and power systems
  - Display power flow from Type-C port, batteries and to system load
- PPS Negotiation
  - Interface with MAX77958 to detect available power on Type-C port and set adapter voltage to appropriate levels
  - Respond to voltage adjustments from battery charger
  - Report power levels to display

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Objectives

- Report clear, accurate current and voltage readings gained from chips to LCD
- Cableless design (except for USB Type-C input)
- Use ADI chips for DC-DC converter/charger, USB Type-C power delivery controller, and switch-capacitor converter
- Software controls components from onboard MCU
- User-friendly interface
- Portable and durable

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Constraints

- Time
  - Fabrication and assembly of PCB takes ~5 weeks
  - Shipping of EV kits and parts take up to a week
- USB Type-C PPS protocols
- Limited MCU memory
- Limited physical size of PCB
- Cableless design
- Unable to use I2C libraries owned by ADI that facilitate communication between MCU and IC
- Must use ADI chips for DC-DC converter/charger, USB type-C power delivery controller, and switch-capacitor converter
- Only get 2 EV kits per ADI IC on the board
- Distance/Time Zones
  - 3-hour time difference between Boston and San Jose
  - Far from ADI's Battery Management Team

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Competing Technologies / Patents / Other Products

- None
- ADI has the ability to show off the chip in separate parts (i.e. not every component on one board)