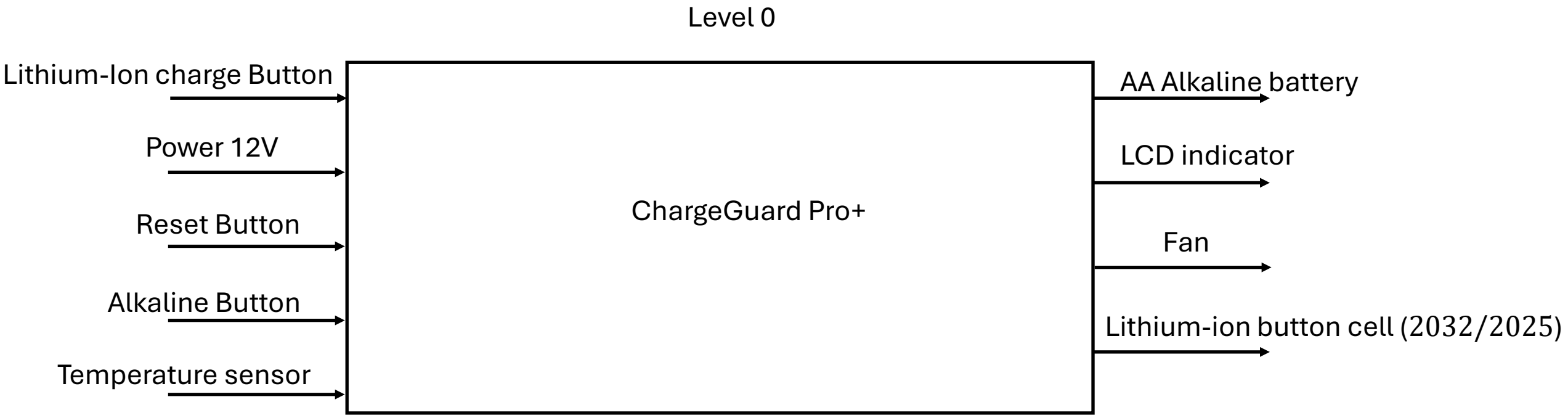
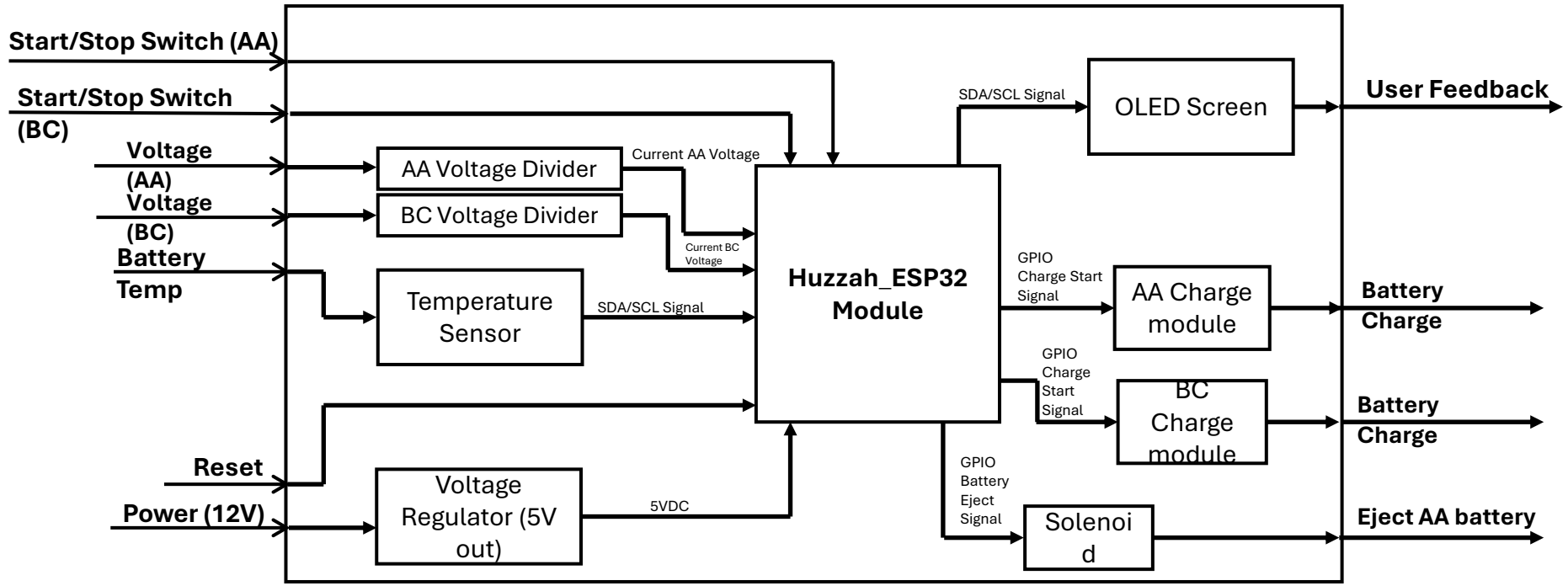
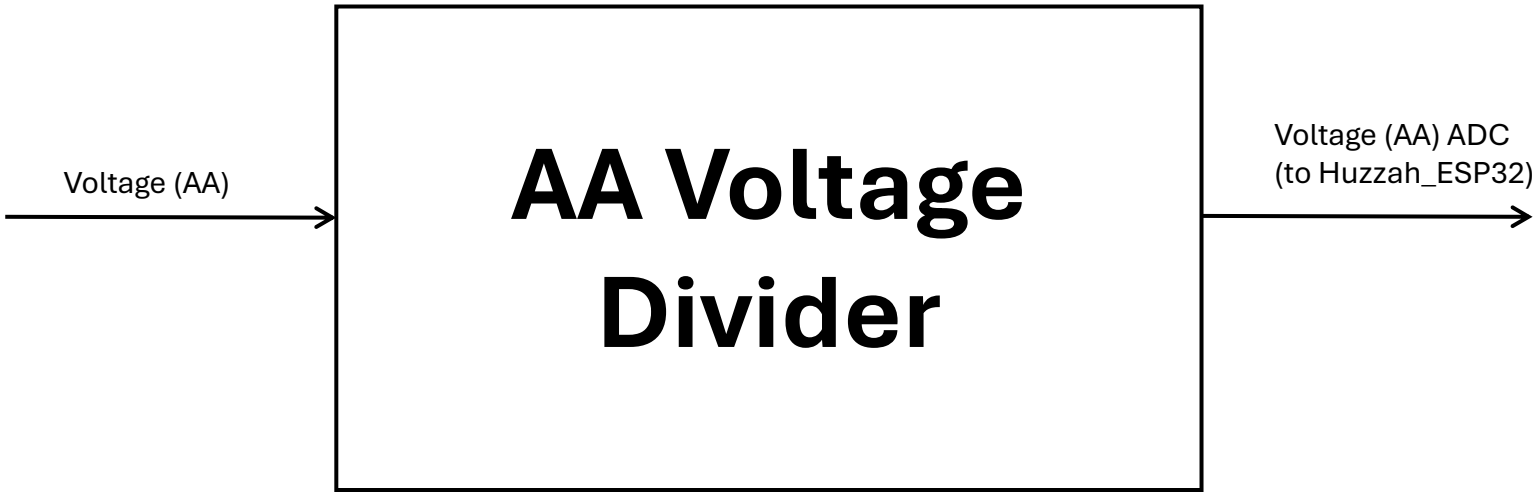


Level 0	
Module	ChargeGuard Pro+
Inputs	Power 12V, Lithium-ion Button, Alkaline button, reset button, Temperature sensor
Output	AA Alkaline battery, Lithium-ion button cell (2032 or 2025) , 12V Fan, LCD indicator
Functionality	Uses 12V power source to charge either a lithium-ion button cell or Alkaline AA batteries. Should include an LCD indicator to display temperature.

Level 1 - ChargeGuard Pro+

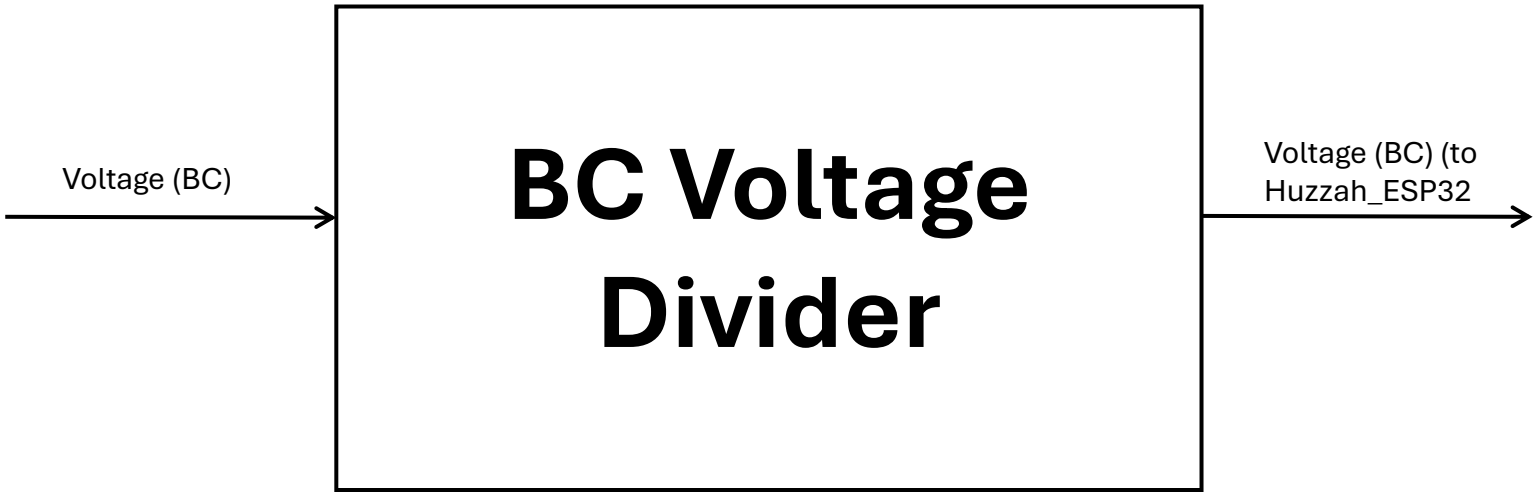


AA Voltage Divider: Level 1



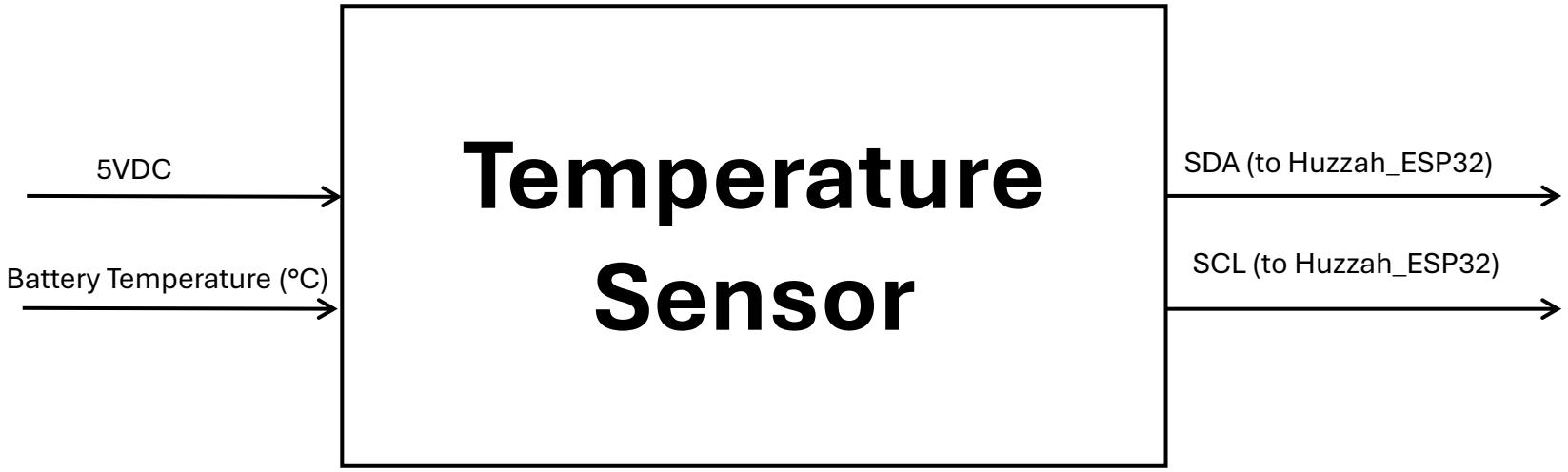
Level 1	
Module	AA Voltage Divider
Inputs	AA Battey Voltage
Output	AA Battery Voltage
Functionality	Use a voltage divider to measure current value of AA battery voltage

BC Voltage Divider: Level 1



Level 1	
Module	BC Voltage Divider
Inputs	BC Battey Voltage
Output	BC Battery Voltage
Functionality	Use a voltage divider to measure current value of BC battery voltage

Temperature Sensor: Level 1



Level 1	
Module	Temperature Sensor
Inputs	5VDC (power supply), Battery Temperature measured in °C
Output	SDA/SCL to the Huzzah_ESP32
Functionality	Measure temperature of battery that is currently being charged, read using the ESP32 I2C bus

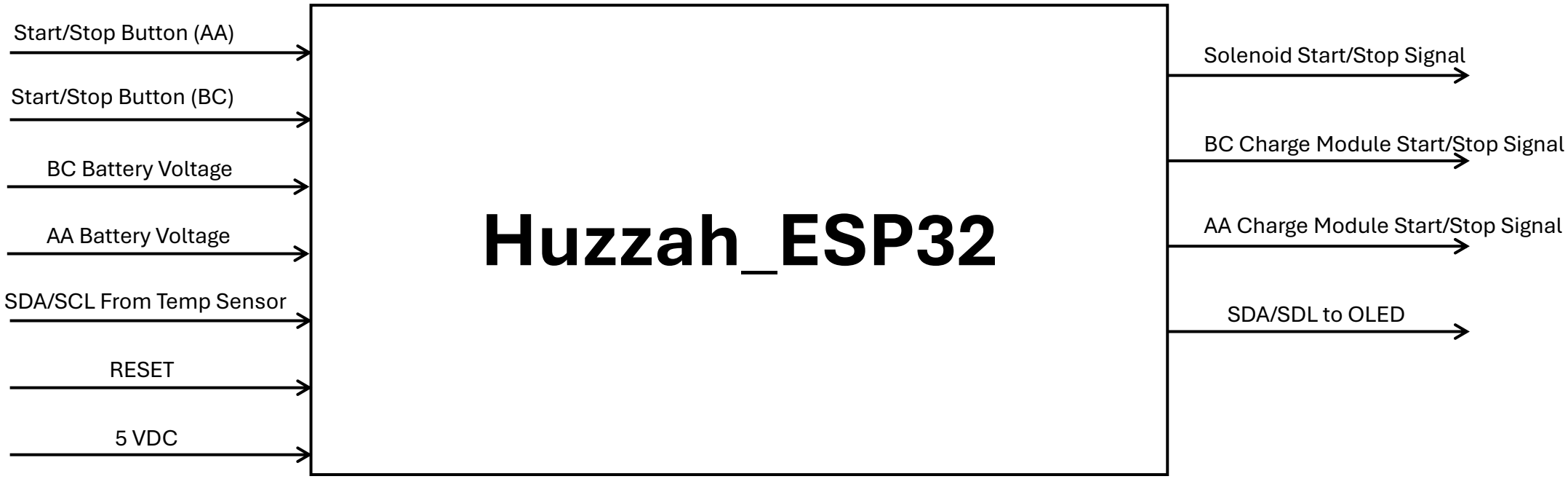
OLED Screen: Level 1

Level 1	
Module	OLED Screen
Inputs	5VDC (power supply), SDA/SCL from the Huzzah_ESP32
Output	Battery temperature, battery voltage
Functionality	Display current system information to user via OLED Screen

Solenoid: Level 1

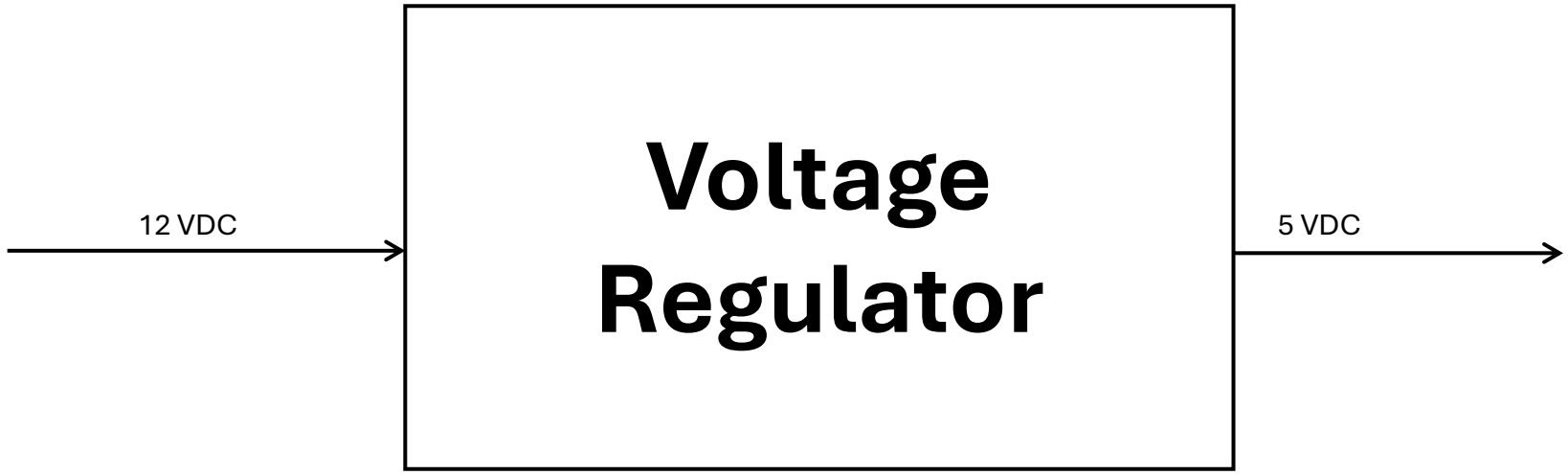
Level 1	
Module	Solenoid
Inputs	5VDC
Output	Actuating Armature
Functionality	When the battery is done charging, using the armature to eject the charged battery

Huzzah_ESP32: Level 1



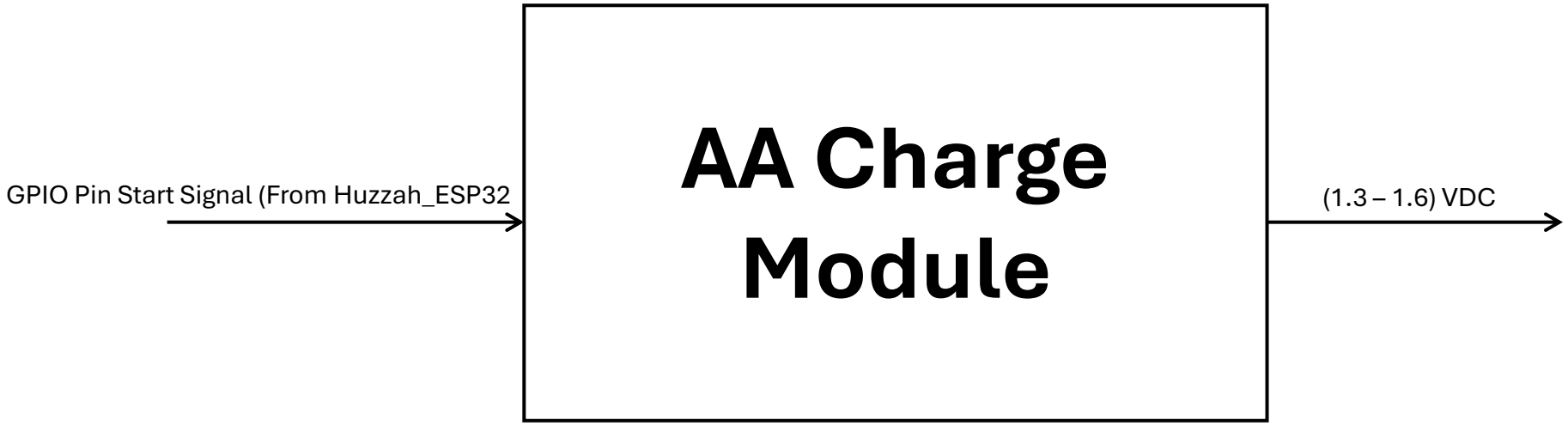
Level 1	
Module	Huzzah_ESP32
Inputs	Start/Stop Charge Button (Qty. (1) for each AA and BC batteries), BC/AA Current Voltage, SDA/SCL from temp sensor, Reset, 5VDC from regulator to power uC
Output	Solenoid start/stop signal, BC and AA charge module Start/Stop charging signal, SDA/SCL to user OLED display
Functionality	Continuously read and store current values for temperature, voltage, and button states. Send signals to start/stop charging based on input thresholds and system state. Display real-time system status: temperature, voltage, charging state, and errors. Transition between states (e.g., charging, waiting, error) based on input conditions and thresholds.

Voltage Regulator : Level 1



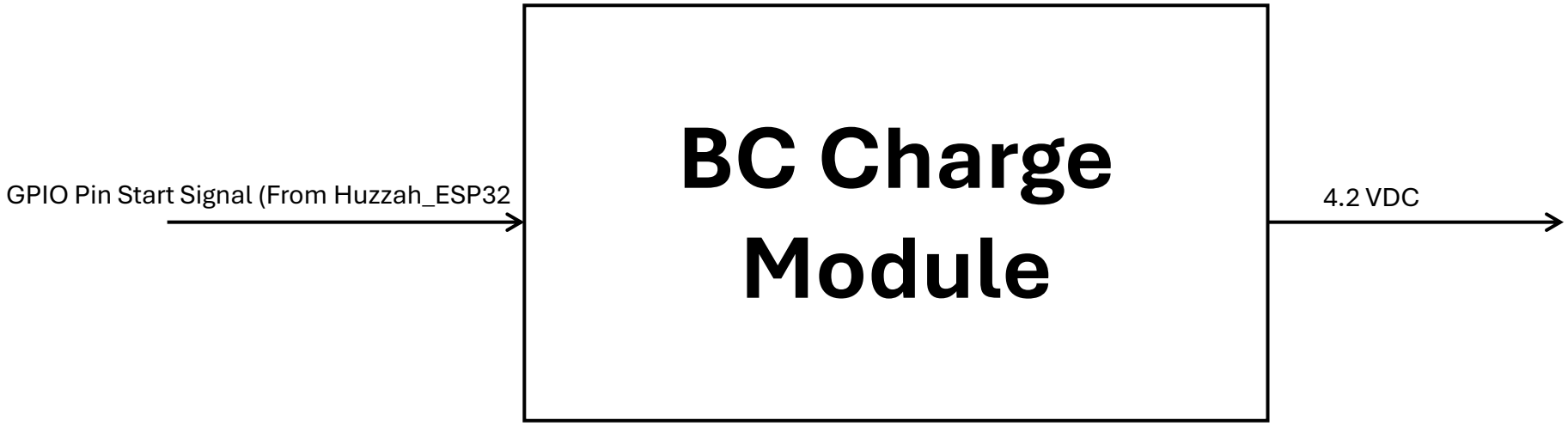
Level 1	
Module	Voltage Regulator
Inputs	12 VDC (from 12VDC wall wart)
Output	5 VDC
Functionality	Steps down 12VDC input to a stable 5VDC output.

AA Charge Module: Level 1



Level 1	
Module	AA Charging Module
Inputs	Start Charging Signal
Output	(1.3 – 1.6) VDC Charging Voltage
Functionality	Starts charging AA battery when a start signal comes from the Huzzah_ESP32

BC Charge Module: Level 1



Level 1	
Module	BC Charging Module
Inputs	Start Charging Signal
Output	4.2 VDC Charging Voltage
Functionality	Starts charging BC battery when a start signal comes from the Huzzah_ESP32