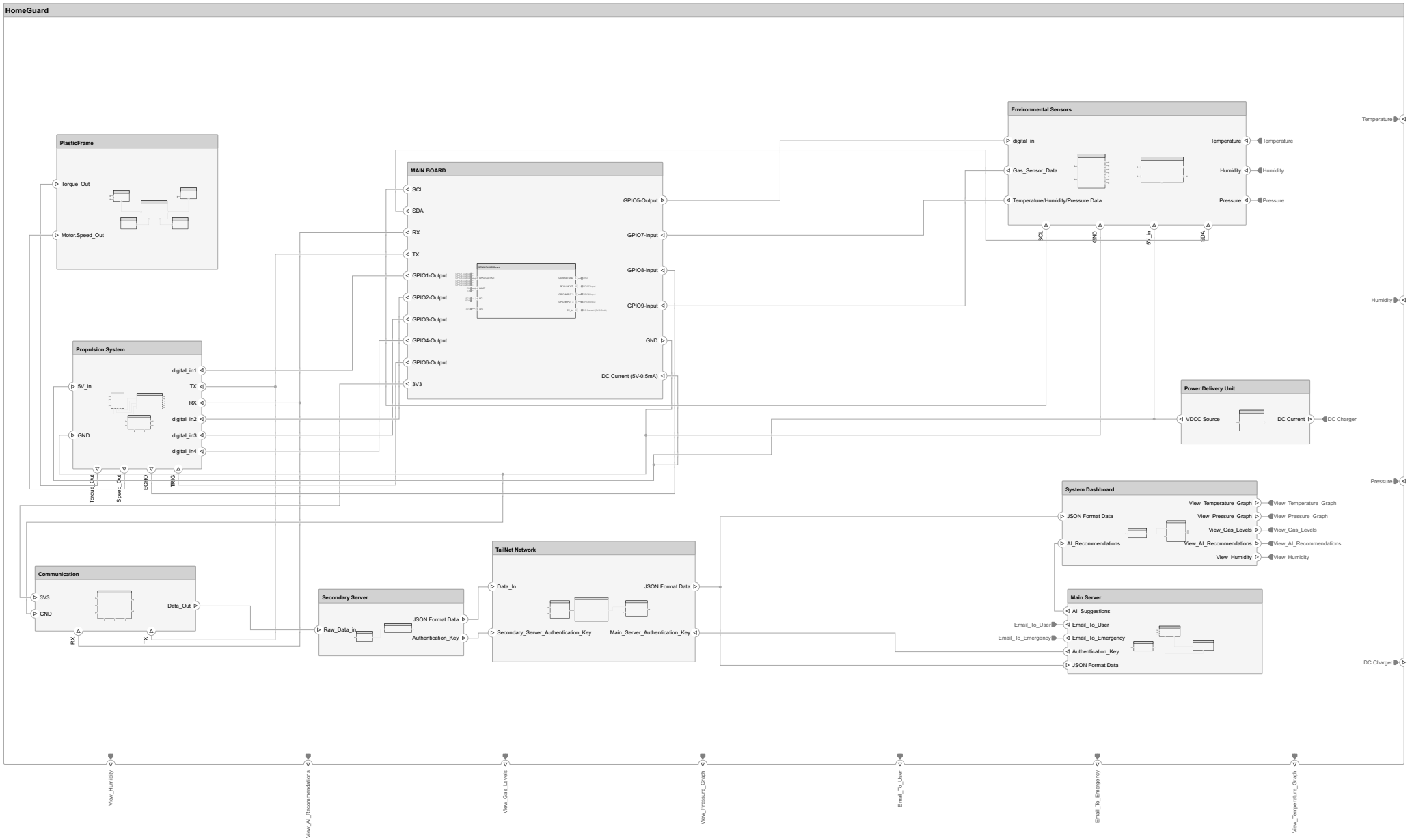
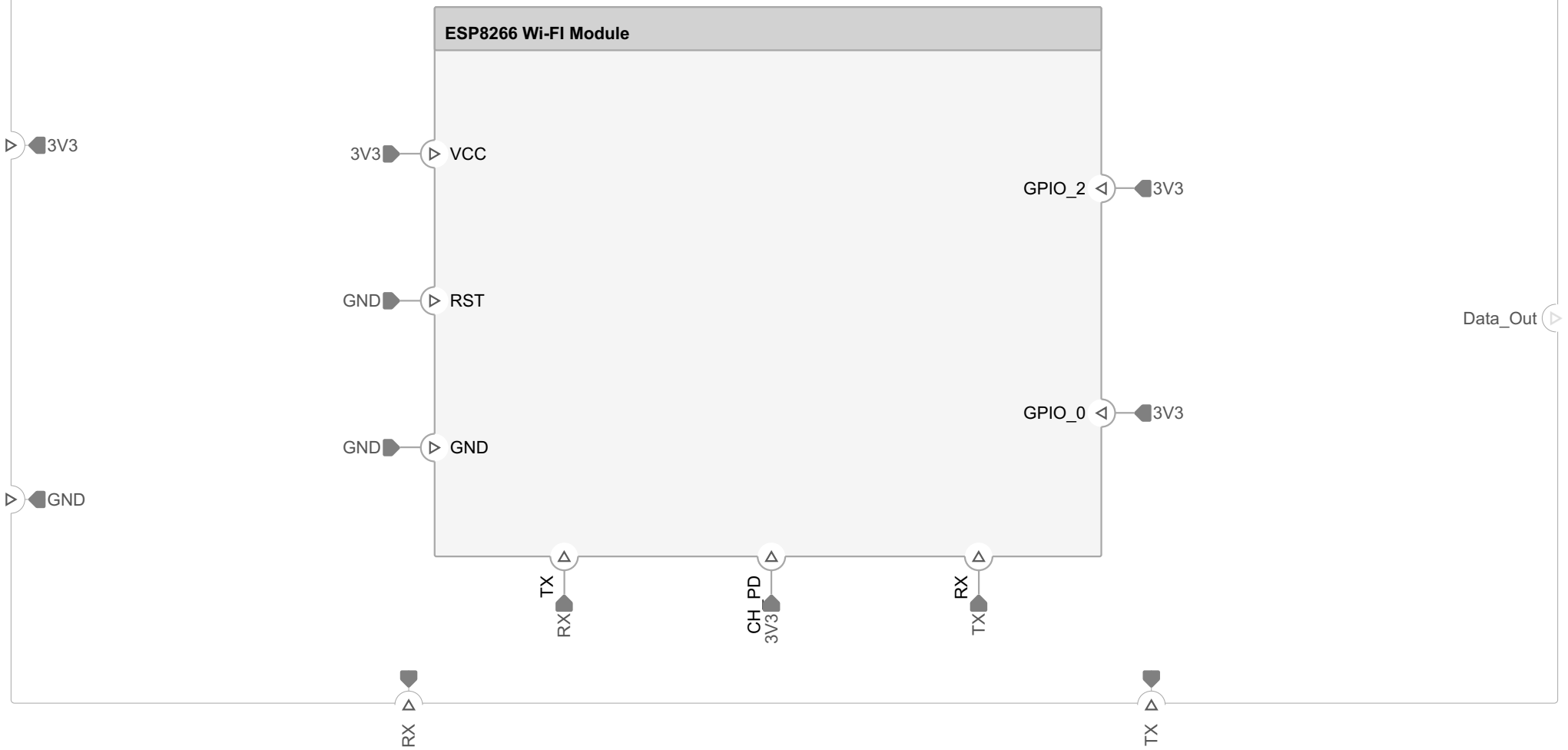
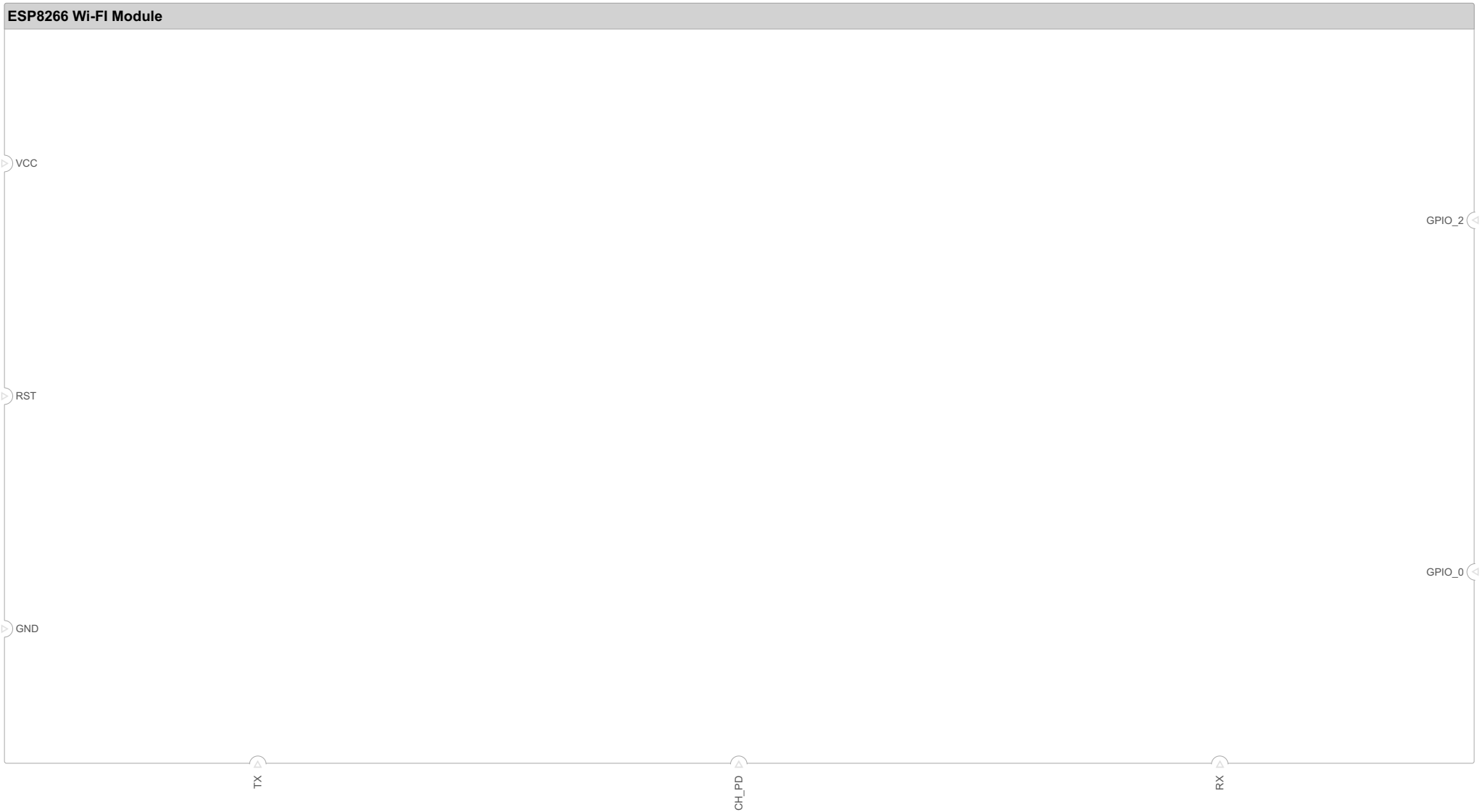
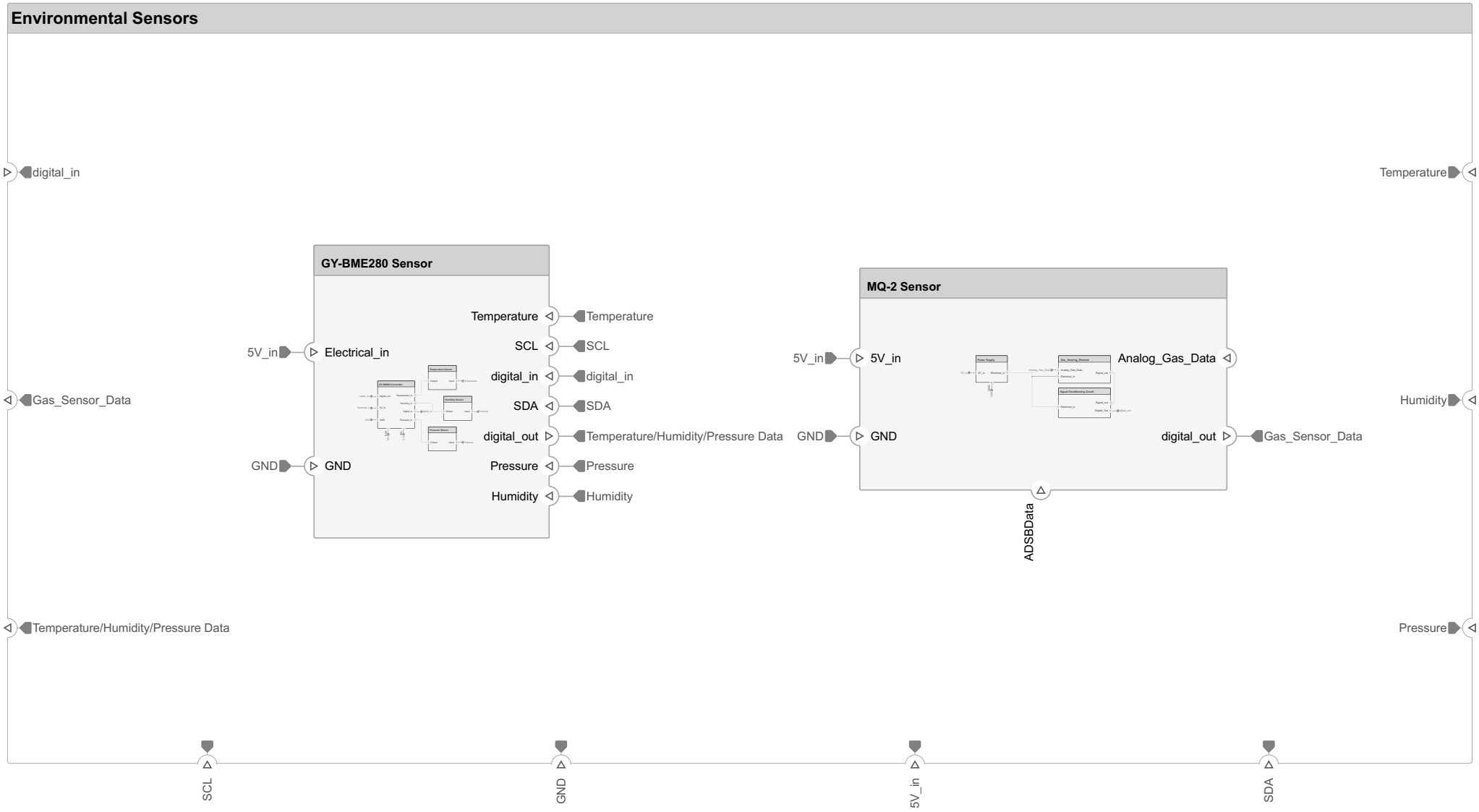

HomeGuard
PlasticFrame
Torque_Out
Motor.Speed_Out
MAIN BOARD
SCL
SDA
RX
TX
GPIO1-Output
GPIO2-Output
GPIO3-Output
GPIO4-Output
GPIO6-Output
3V3
GPIO5-Output
GPIO7-Input
GPIO8-Input
GPIO9-Input
GND
DC Current (5V-0.5mA)
Environmental Sensors
digital_in
Gas_Sensor_Data
Temperature/Humidity/Pressure Data
Temperature
Humidity
Pressure
SCL
GND
5V_in
SDA
Propulsion System
5V_in
GND
digital_in1
TX
RX
digital_in2
digital_in3
digital_in4
Torque_Out
Speed_Out
ECHO
TRIG
Power Delivery Unit
VDCC Source
DC Current
DC Charger
Communication
3V3
GND
Data_Out
RX
TX
Secondary Server
Raw_Data_in
JSON Format Data
Authentication_Key
TailNet Network
Data_In
JSON Format Data
Secondary_Server_Authentication_Key
Main_Server_Authentication_Key
System Dashboard
JSON Format Data
AI_Recommendations
View_Temperature_Graph
View_Pressure_Graph
View_Gas_Levels
View_AI_Recommendations
View_Humidity
Main Server
AI_Suggestions
Email_To_User
Email_To_Emergency
Authentication_Key
JSON Format Data
Temperature
Humidity
Pressure
DC Charger
View_Humidity
View_AI_Recommendations
View_Gas_Levels
View_Pressure_Graph
Email_To_User
Email_To_Emergency
View_Temperature_Graph

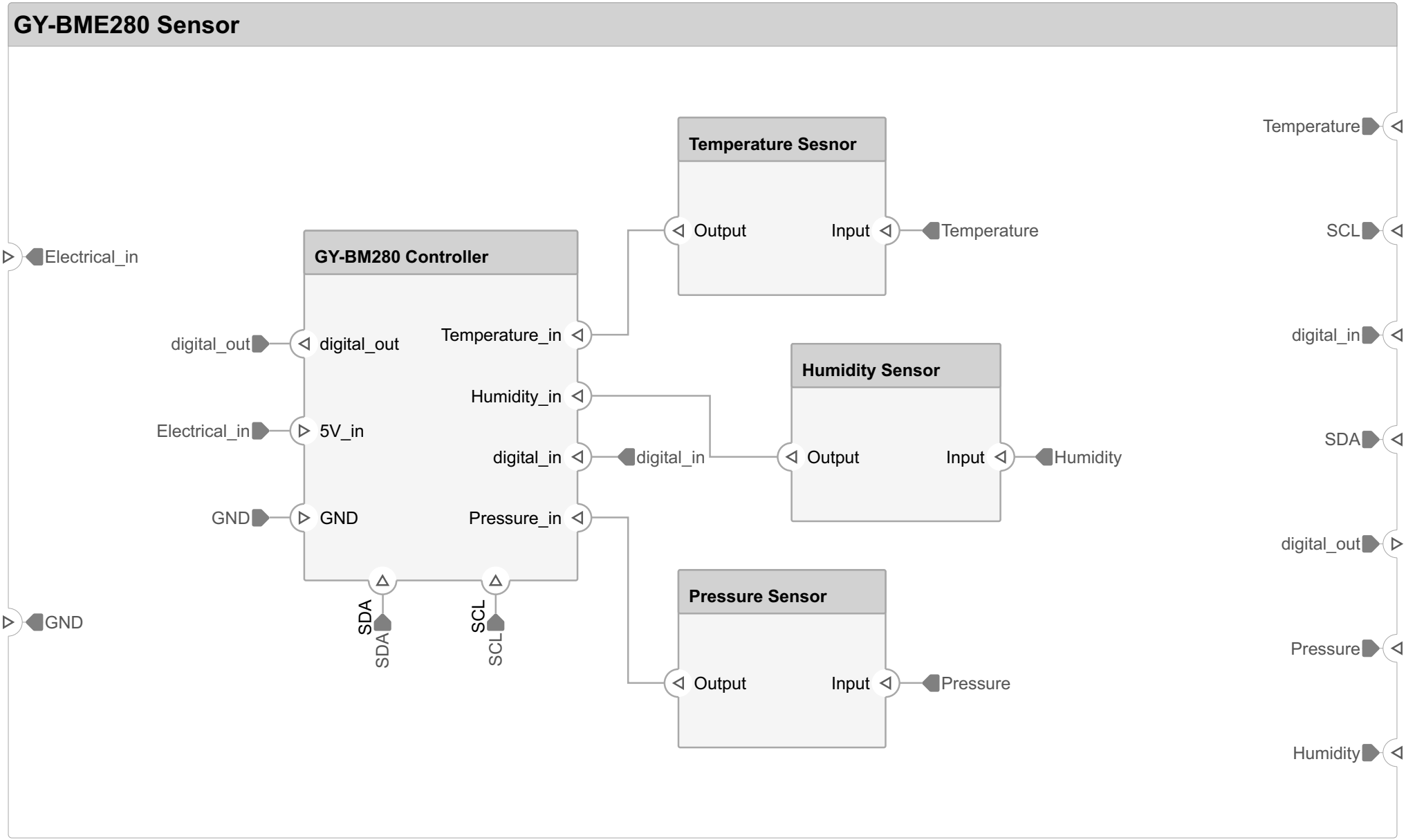
Communication

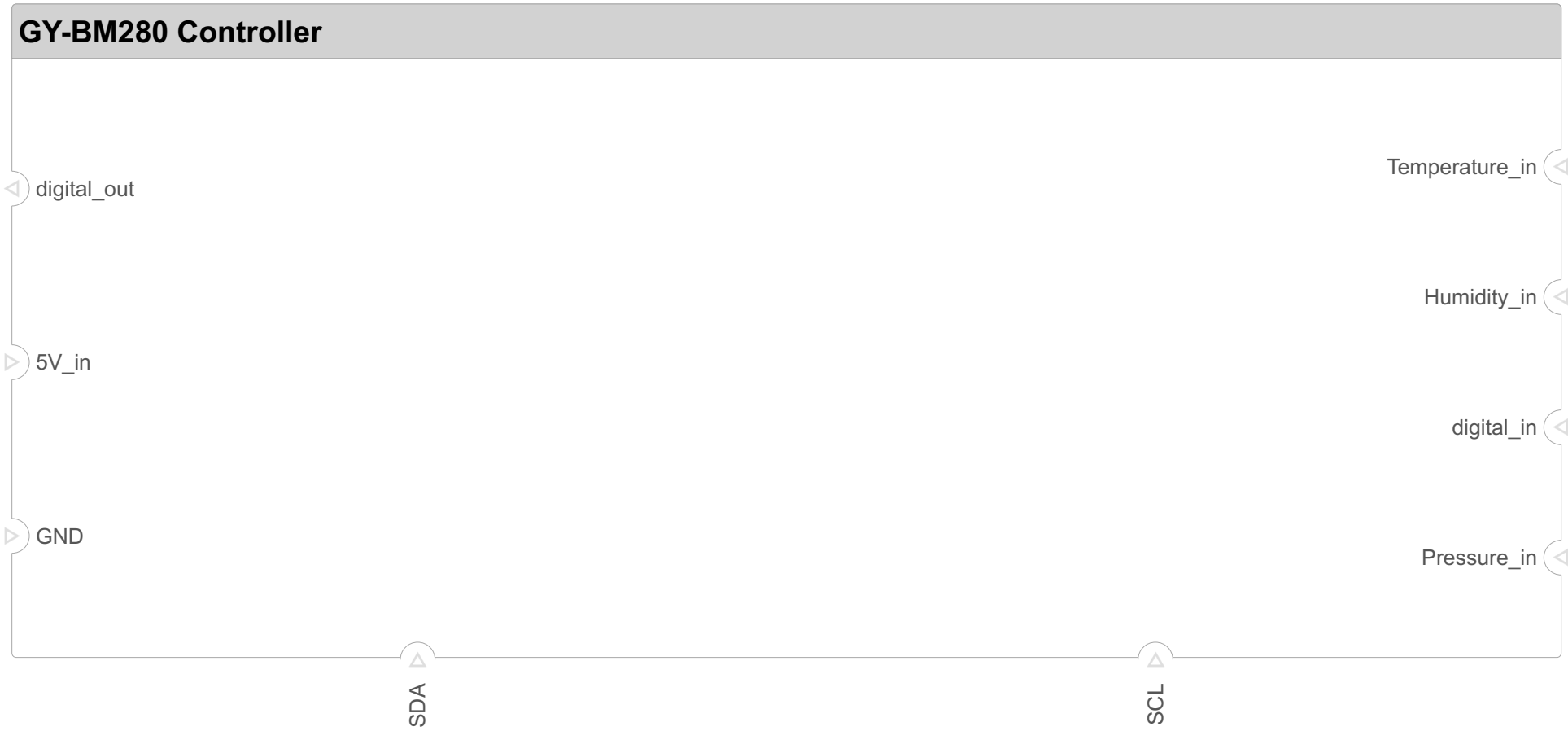


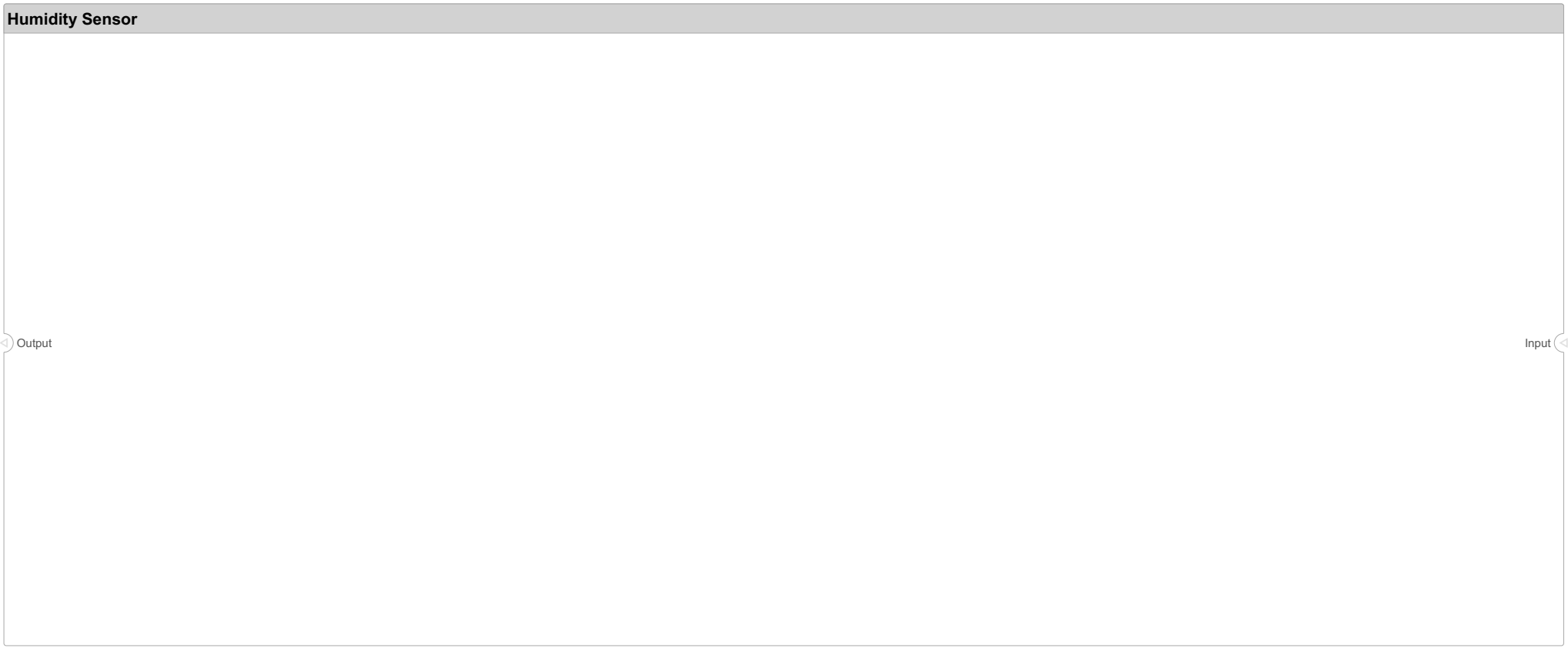

ESP8266 Wi-FI Module
VCC
RST
GND
GPIO_2
GPIO_0
TX
CH_PD
RX

Environmental Sensors

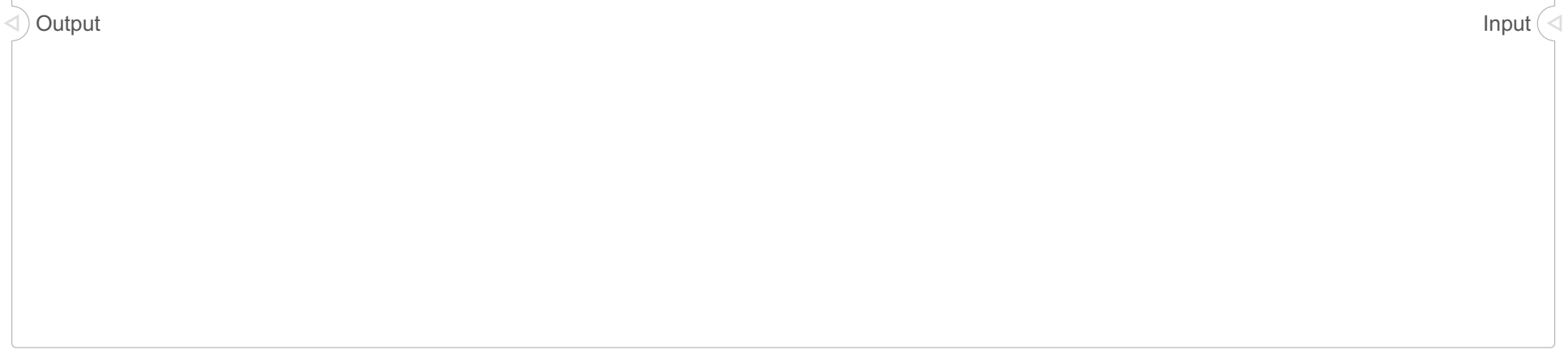



GY-BME280 Sensor
Temperature Sesnor
Output
Input
Temperature
Electrical_in
GY-BM280 Controller
digital_out
digital_out
Temperature_in
Humidity_in
Electrical_in
5V_in
digital_in
digital_in
Humidity Sensor
Output
Input
Humidity
GND
GND
Pressure_in
SDA
SCL
GND
SDA
SCL
Pressure Sensor
Output
Input
Pressure
Temperature
SCL
digital_in
SDA
digital_out
Pressure
Humidity


GY-BM280 Controller
digital_out
5V_in
GND
SDA
SCL
Temperature_in
Humidity_in
digital_in
Pressure_in


Humidity Sensor
Output
Input

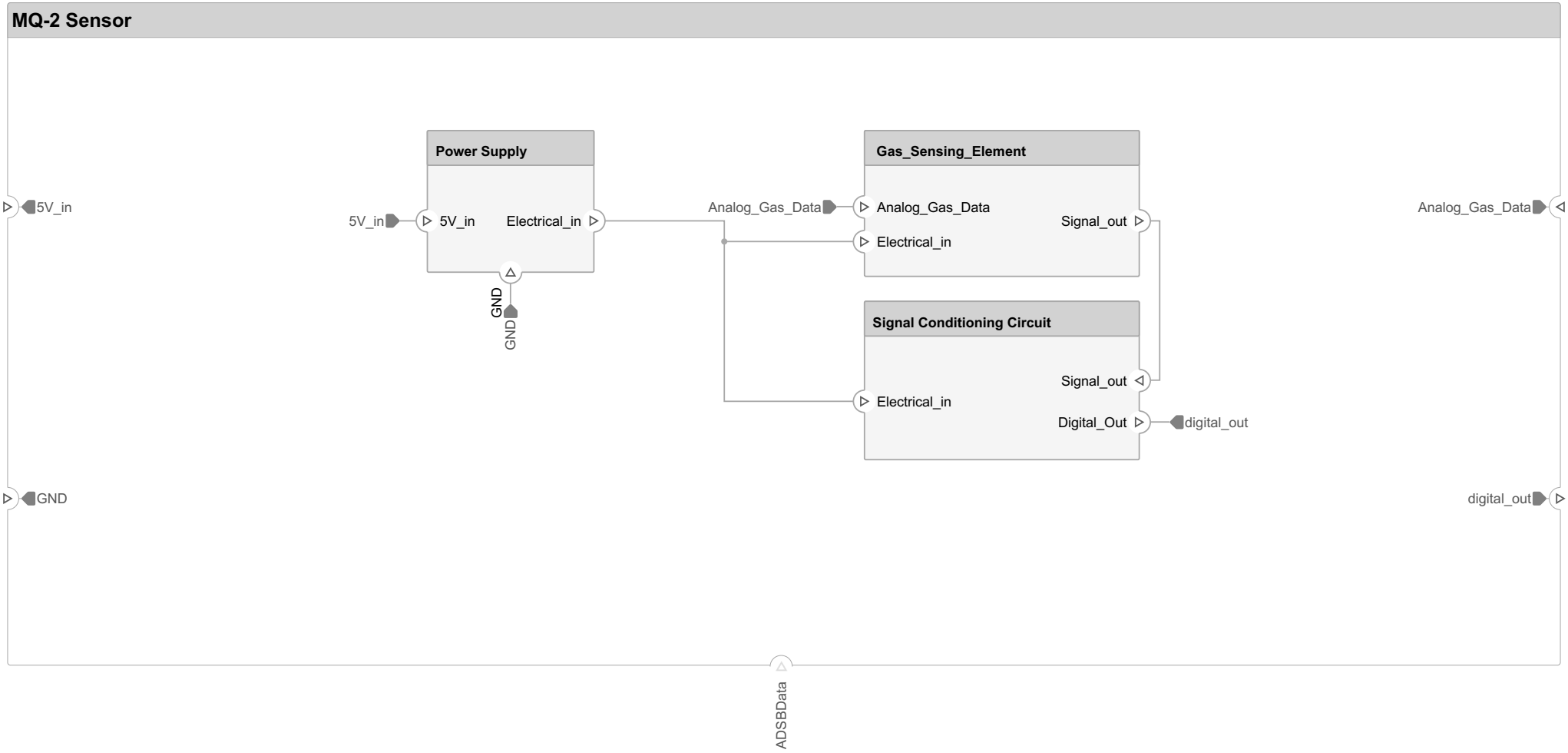
Pressure Sensor

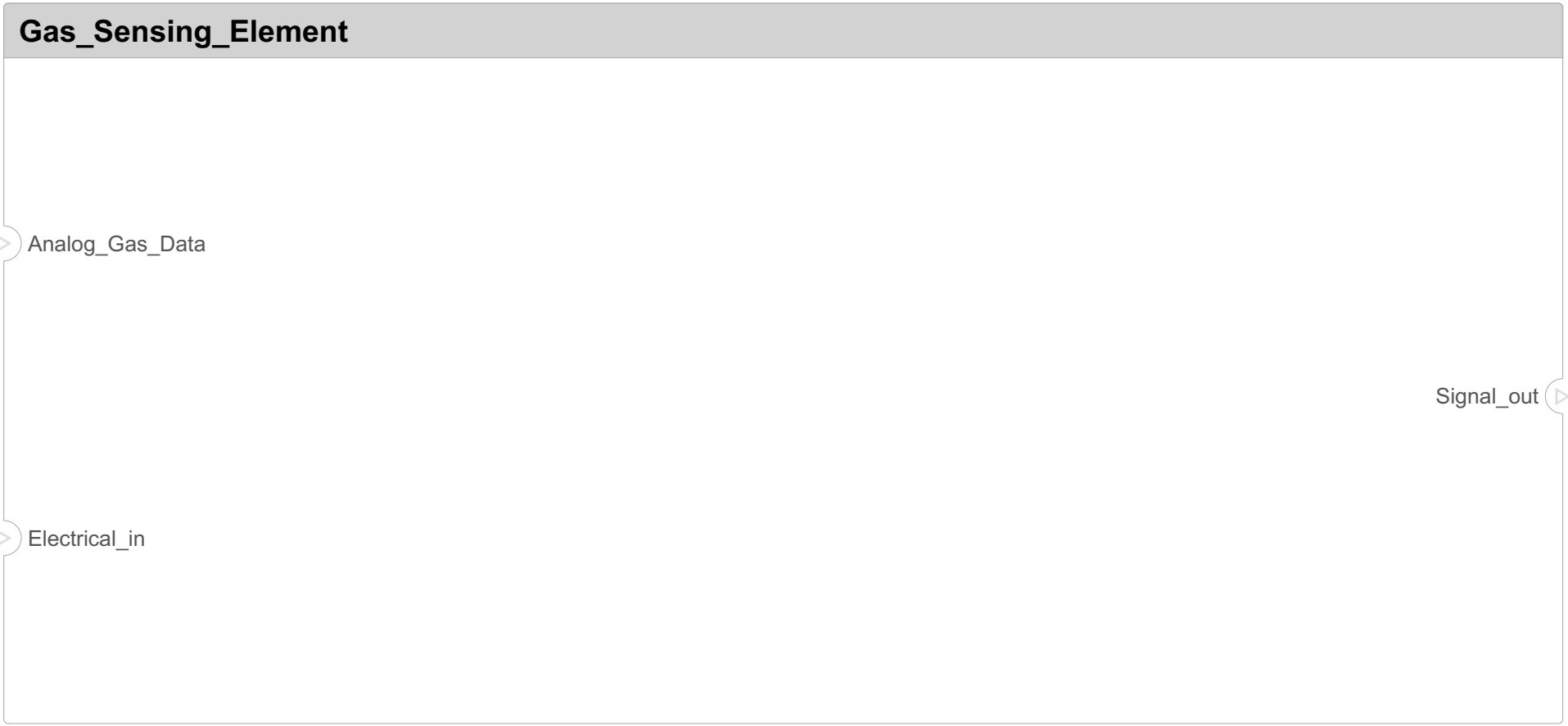


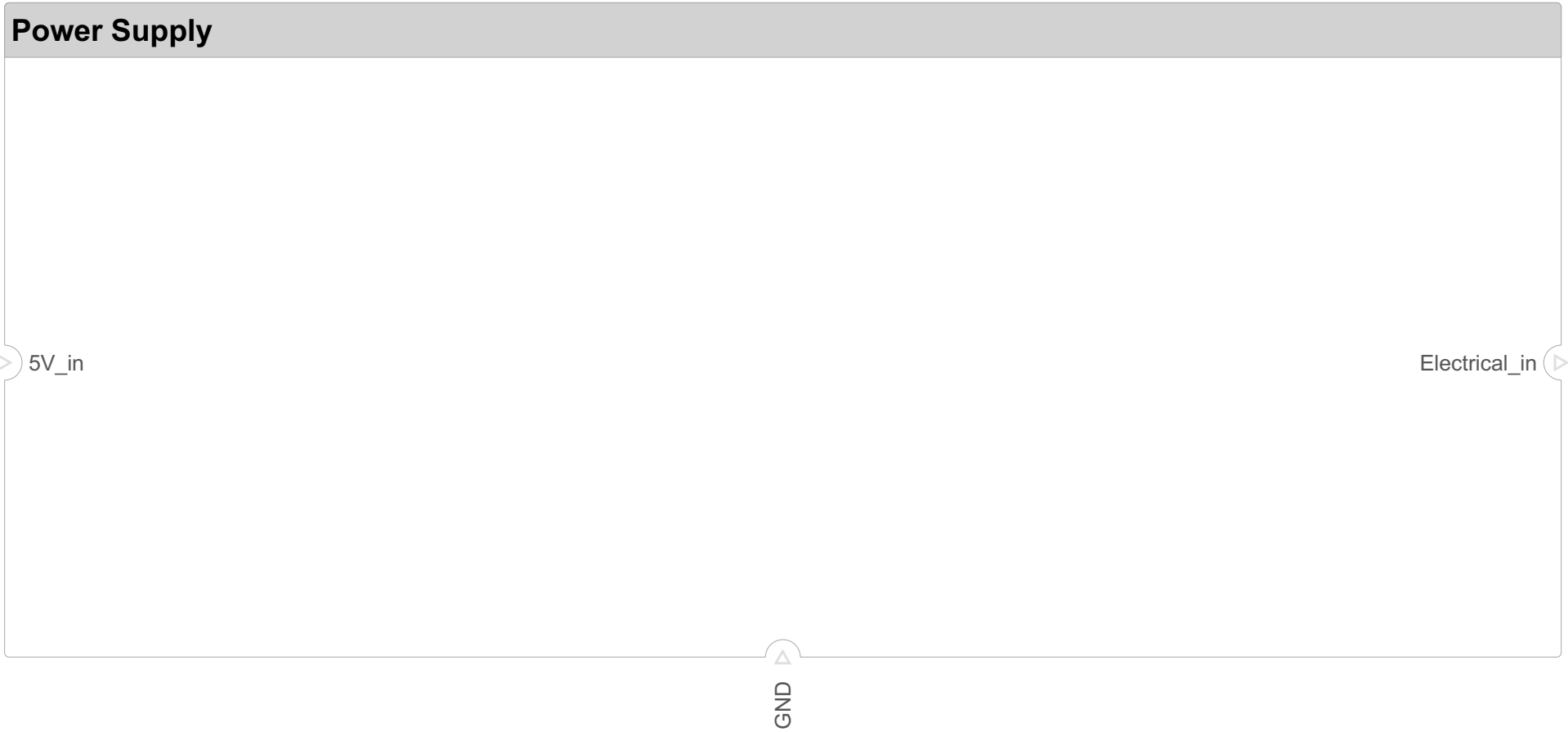
Temperature Sesnor

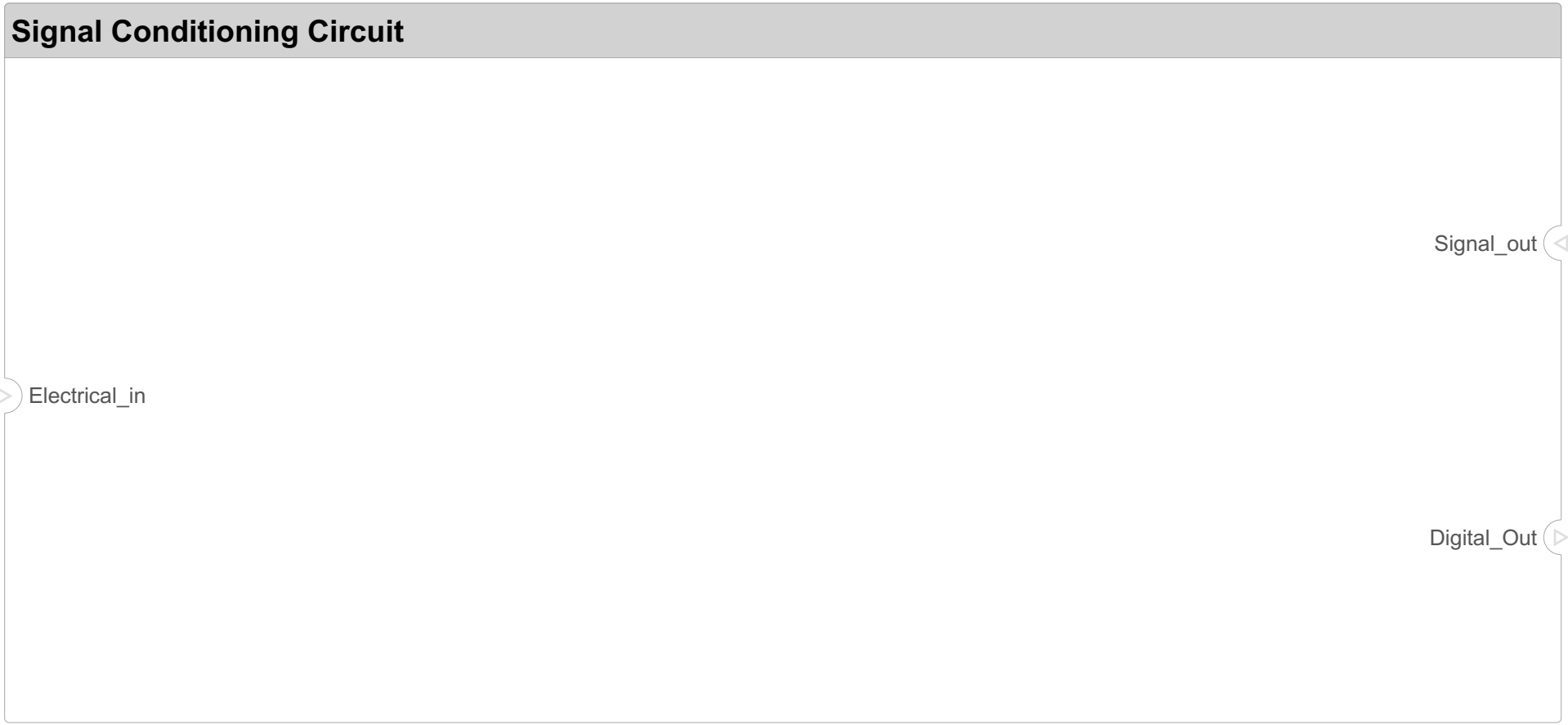
Output

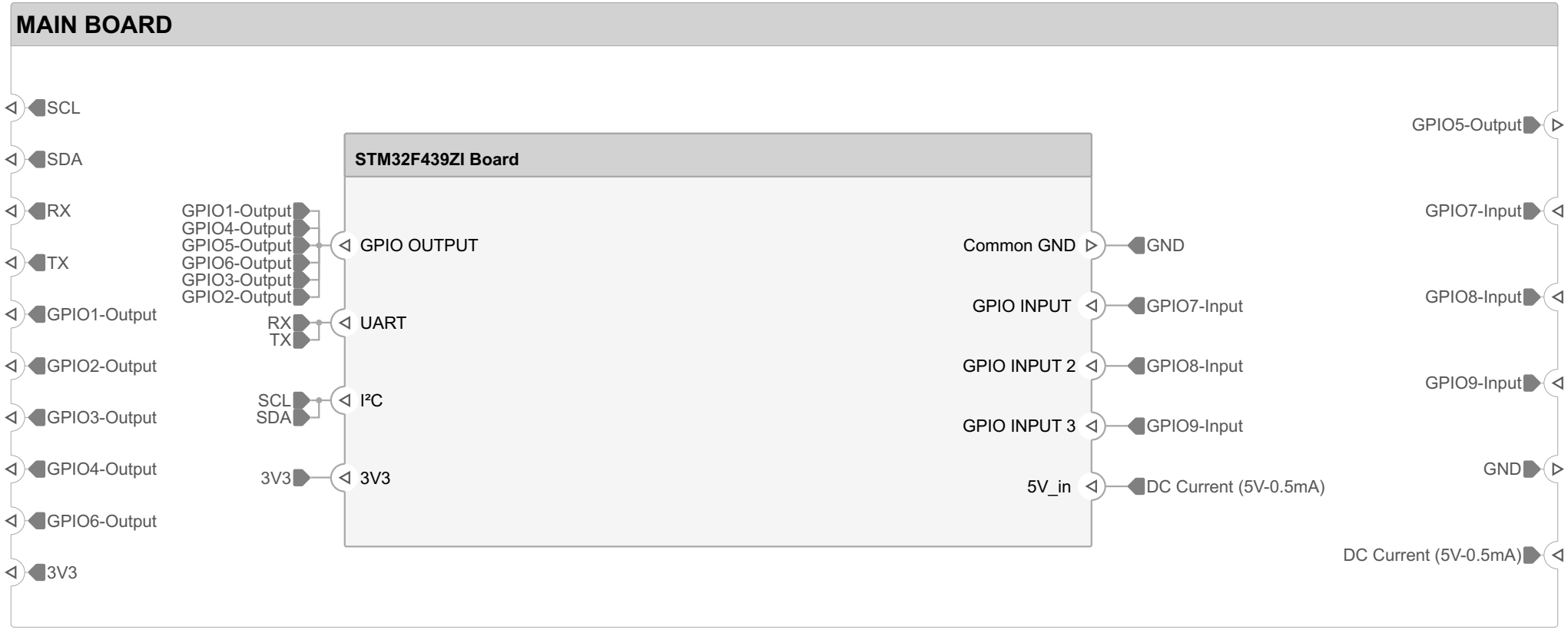
Input

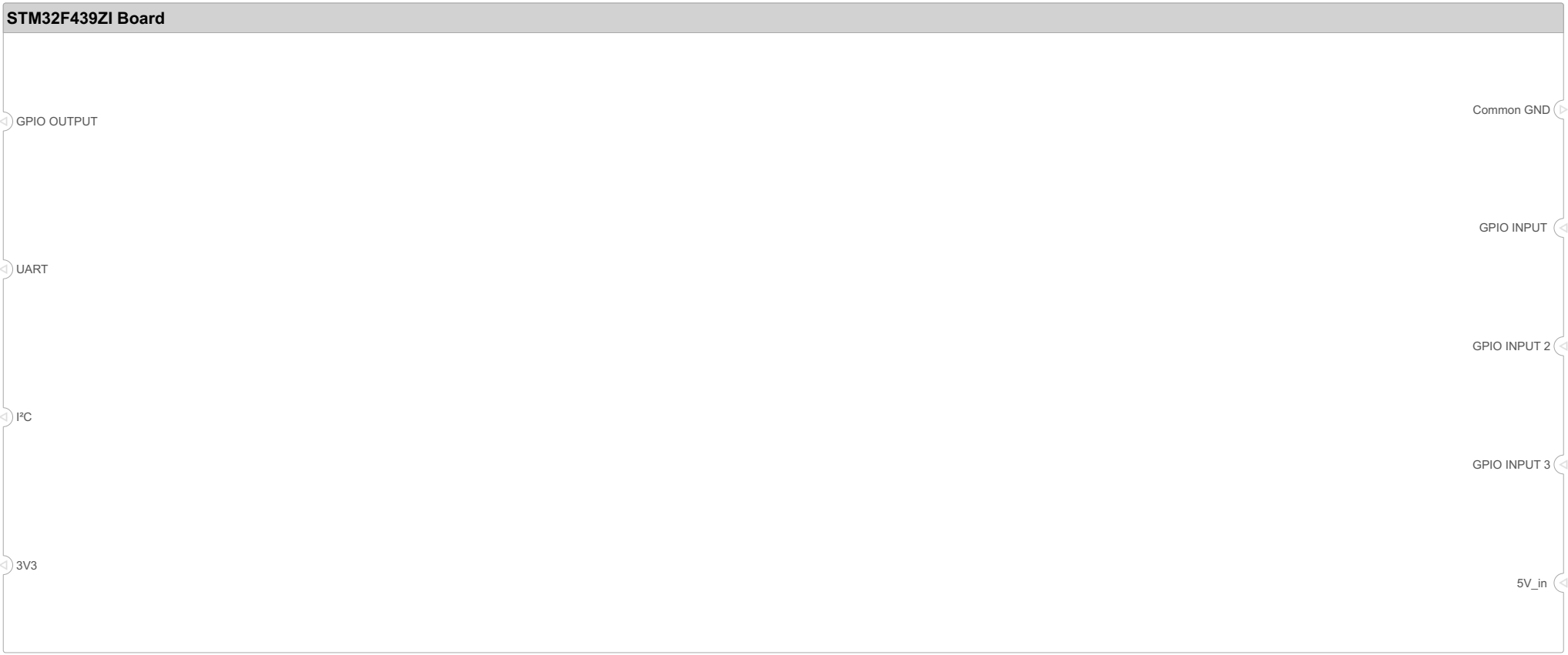

MQ-2 Sensor
5V_in
GND
Power Supply
5V_in
5V_in
Electrical_in
GND
GND
Analog_Gas_Data
Gas_Sensing_Element
Analog_Gas_Data
Electrical_in
Signal_out
Signal Conditioning Circuit
Electrical_in
Signal_out
Digital_Out
digital_out
Analog_Gas_Data
digital_out
ADSBData

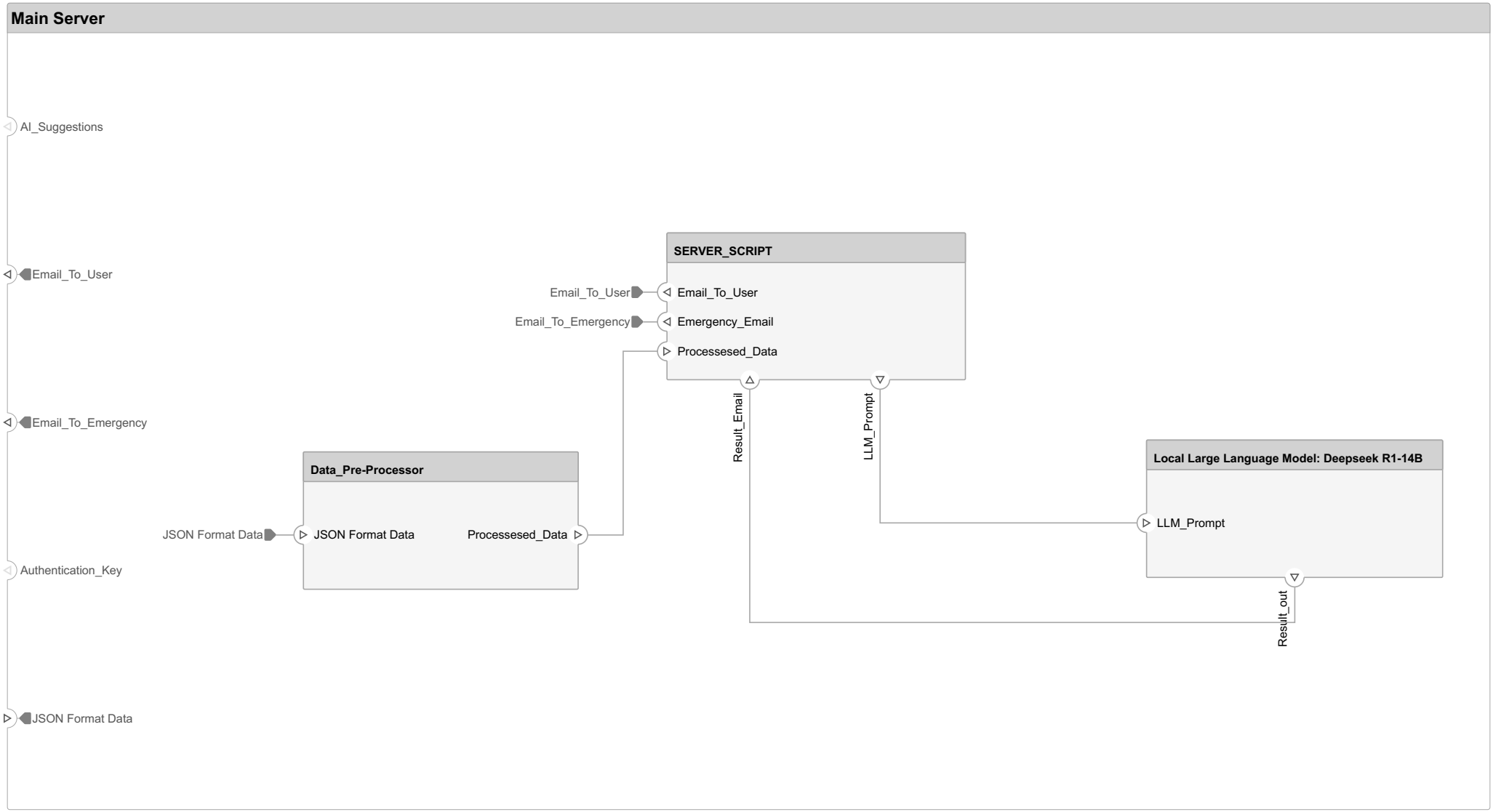

Gas_Sensing_Element
Analog_Gas_Data
Signal_out
Electrical_in

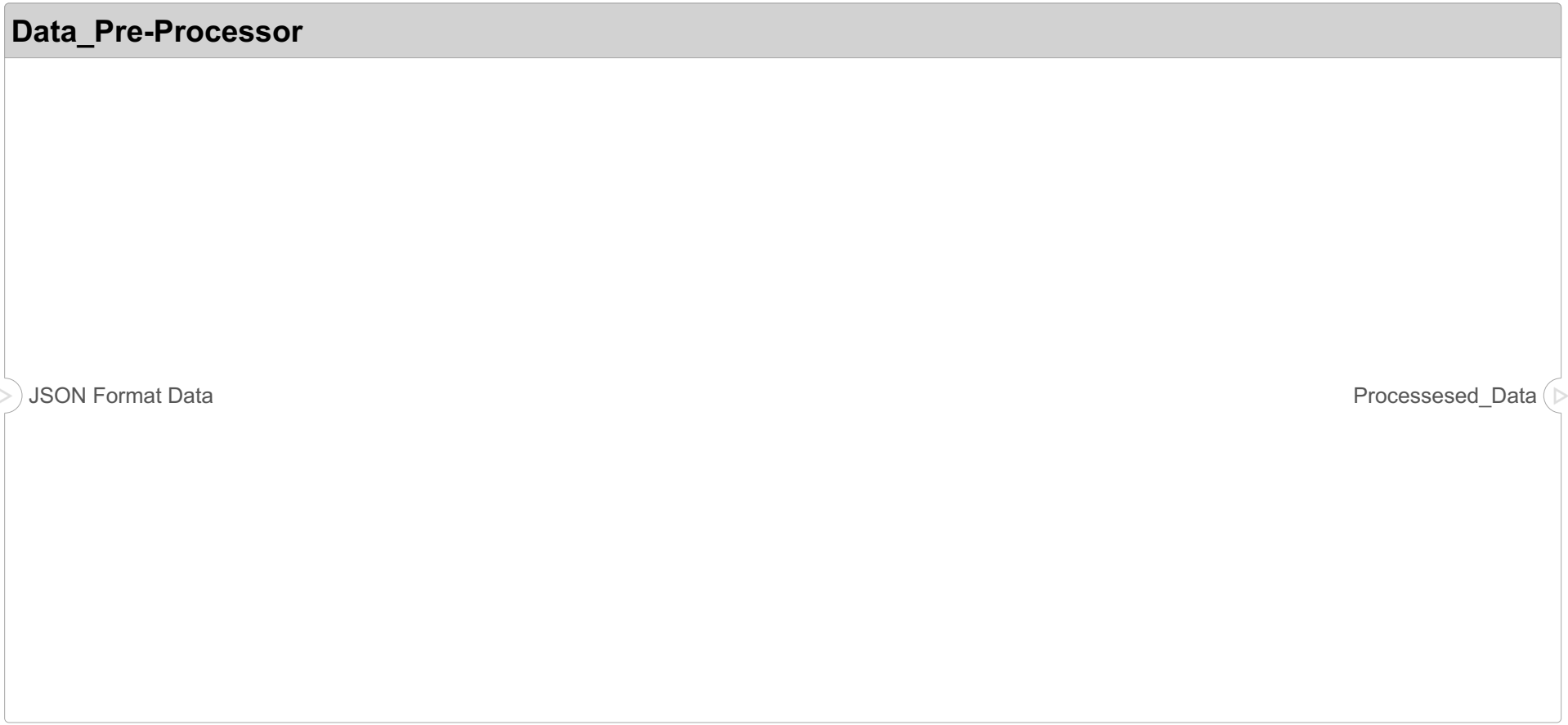

Power Supply
5V_in
Electrical_in
GND

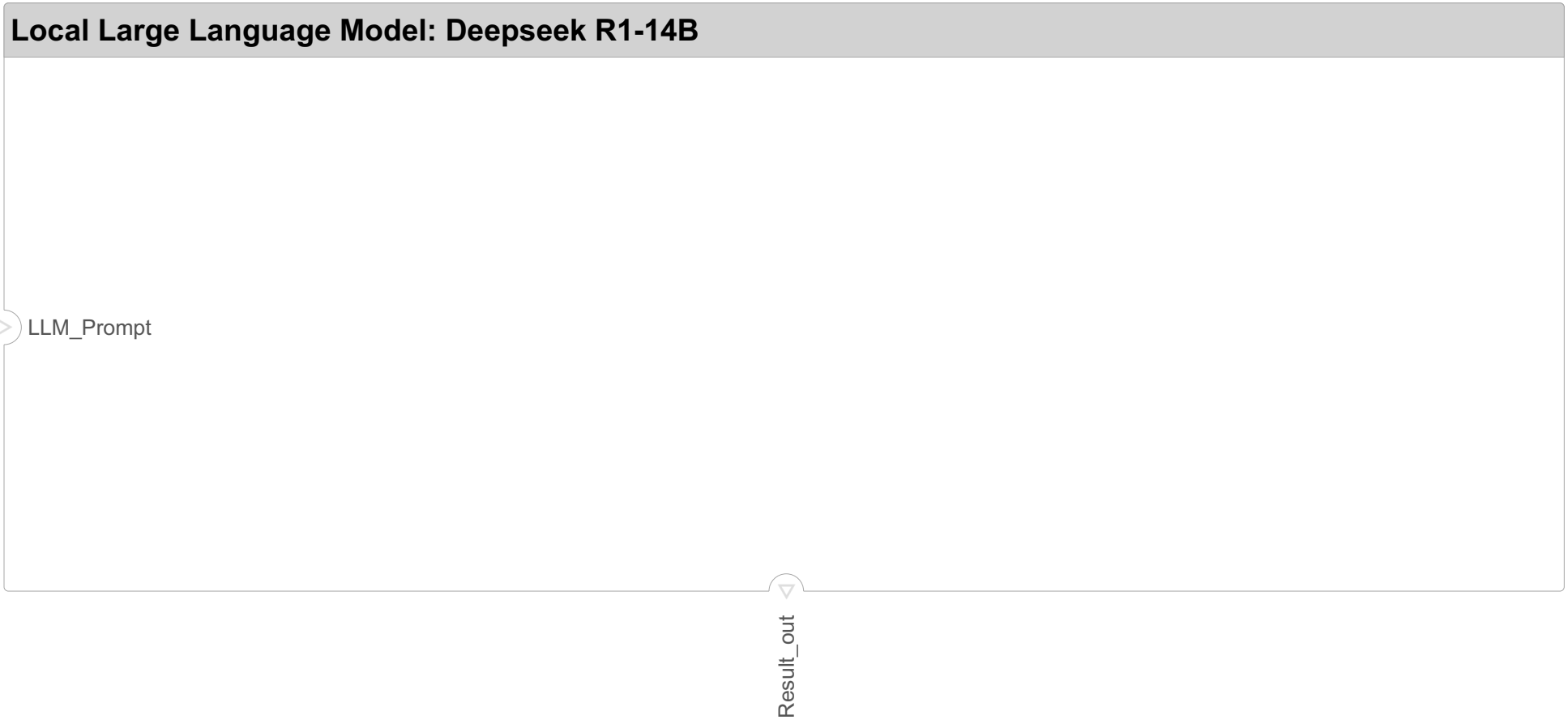

Signal Conditioning Circuit
Signal_out
Electrical_in
Digital_Out


MAIN BOARD
SCL
SDA
RX
TX
GPIO1-Output
GPIO2-Output
GPIO3-Output
GPIO4-Output
GPIO6-Output
3V3
STM32F439ZI Board
GPIO1-Output
GPIO4-Output
GPIO5-Output
GPIO6-Output
GPIO3-Output
GPIO2-Output
GPIO OUTPUT
RX
TX
UART
SCL
SDA
I²C
3V3
3V3
Common GND
GND
GPIO INPUT
GPIO7-Input
GPIO INPUT 2
GPIO8-Input
GPIO INPUT 3
GPIO9-Input
5V_in
DC Current (5V-0.5mA)
GPIO5-Output
GPIO7-Input
GPIO8-Input
GPIO9-Input
GND
DC Current (5V-0.5mA)

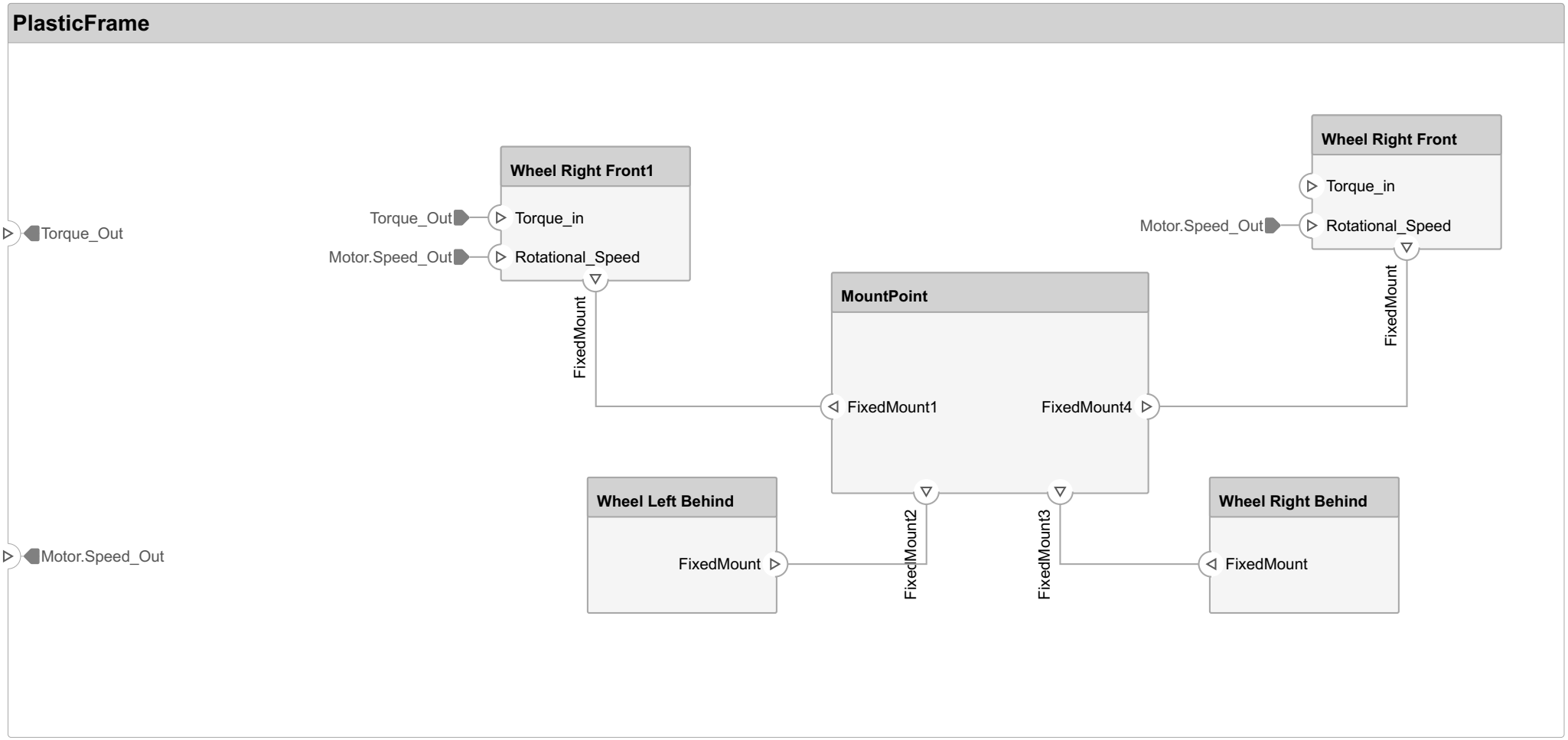

STM32F439ZI Board
GPIO OUTPUT
UART
I²C
3V3
Common GND
GPIO INPUT
GPIO INPUT 2
GPIO INPUT 3
5V_in

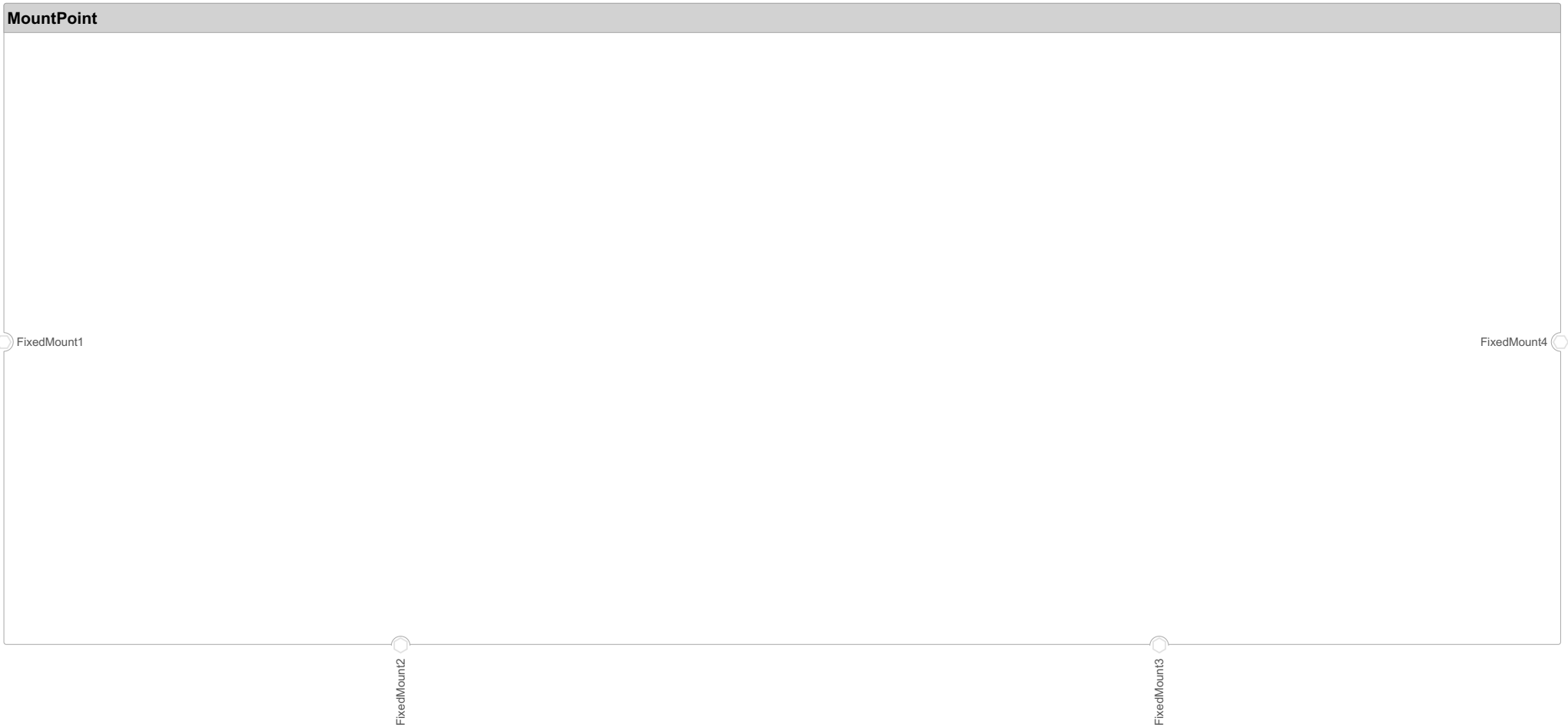

Main Server
AI_Suggestions
Email_To_User
Email_To_Emergency
Authentication_Key
JSON Format Data
SERVER_SCRIPT
Email_To_User
Email_To_Emergency
Email_To_User
Emergency_Email
Processesed_Data
Result_Email
LLM_Prompt
Data_Pre-Processor
JSON Format Data
JSON Format Data
Processesed_Data
Local Large Language Model: Deepseek R1-14B
LLM_Prompt
Result_out


Data_Pre-Processor
JSON Format Data
Processesed_Data

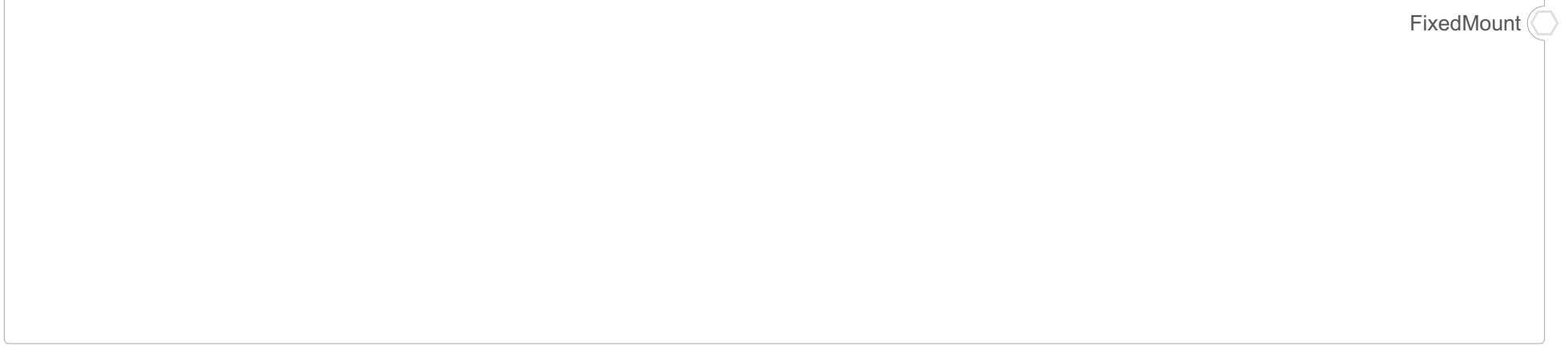

Local Large Language Model: Deepseek R1-14B
LLM_Prompt
Result_out

SERVER_SCRIPT
Email_To_User
Emergency_Email
Processesed_Data
Result_Email
LLM_Prompt

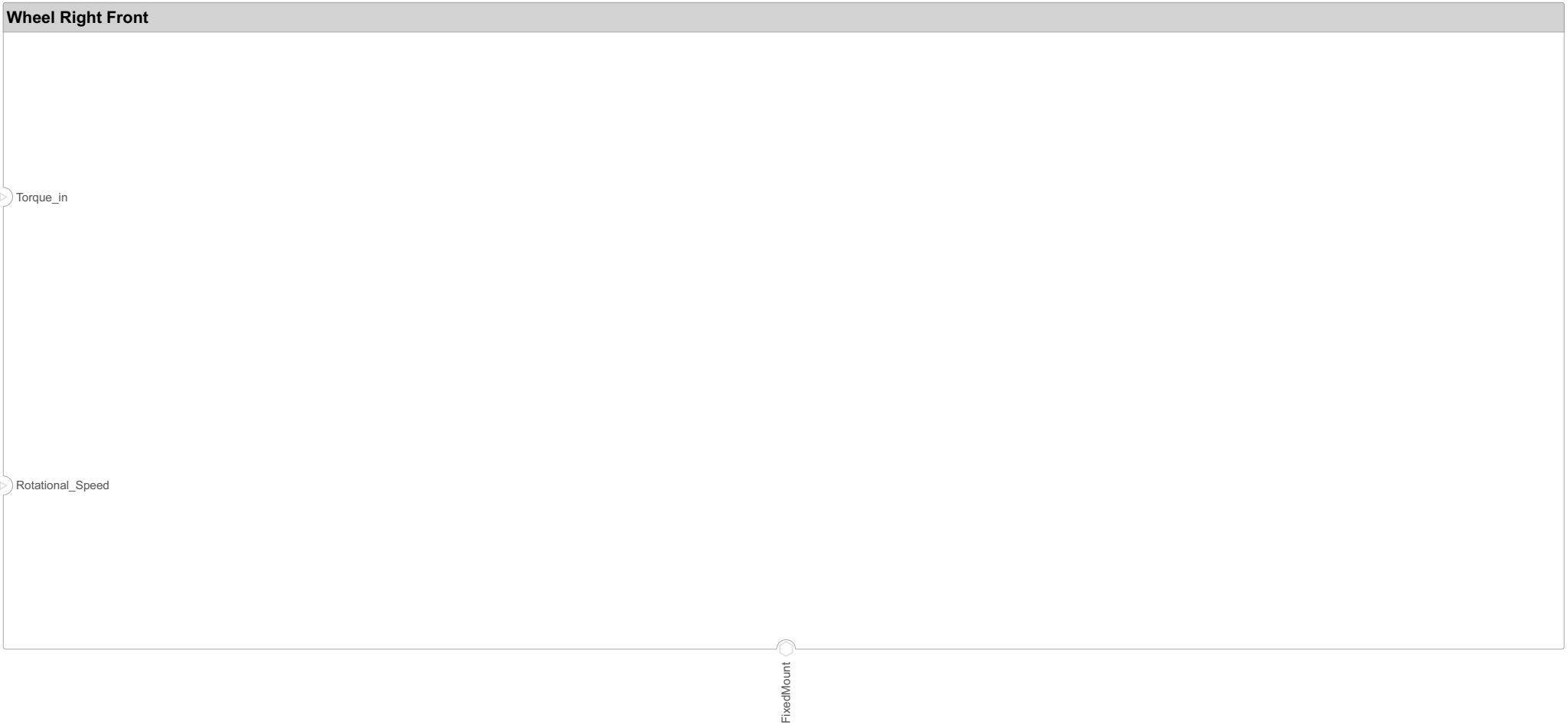

PlasticFrame
Torque_Out
Motor.Speed_Out
Wheel Right Front1
Torque_Out
Motor.Speed_Out
Torque_in
Rotational_Speed
FixedMount
MountPoint
FixedMount1
FixedMount4
Wheel Right Front
Torque_in
Motor.Speed_Out
Rotational_Speed
FixedMount
Wheel Left Behind
FixedMount
FixedMount2
FixedMount3
Wheel Right Behind
FixedMount

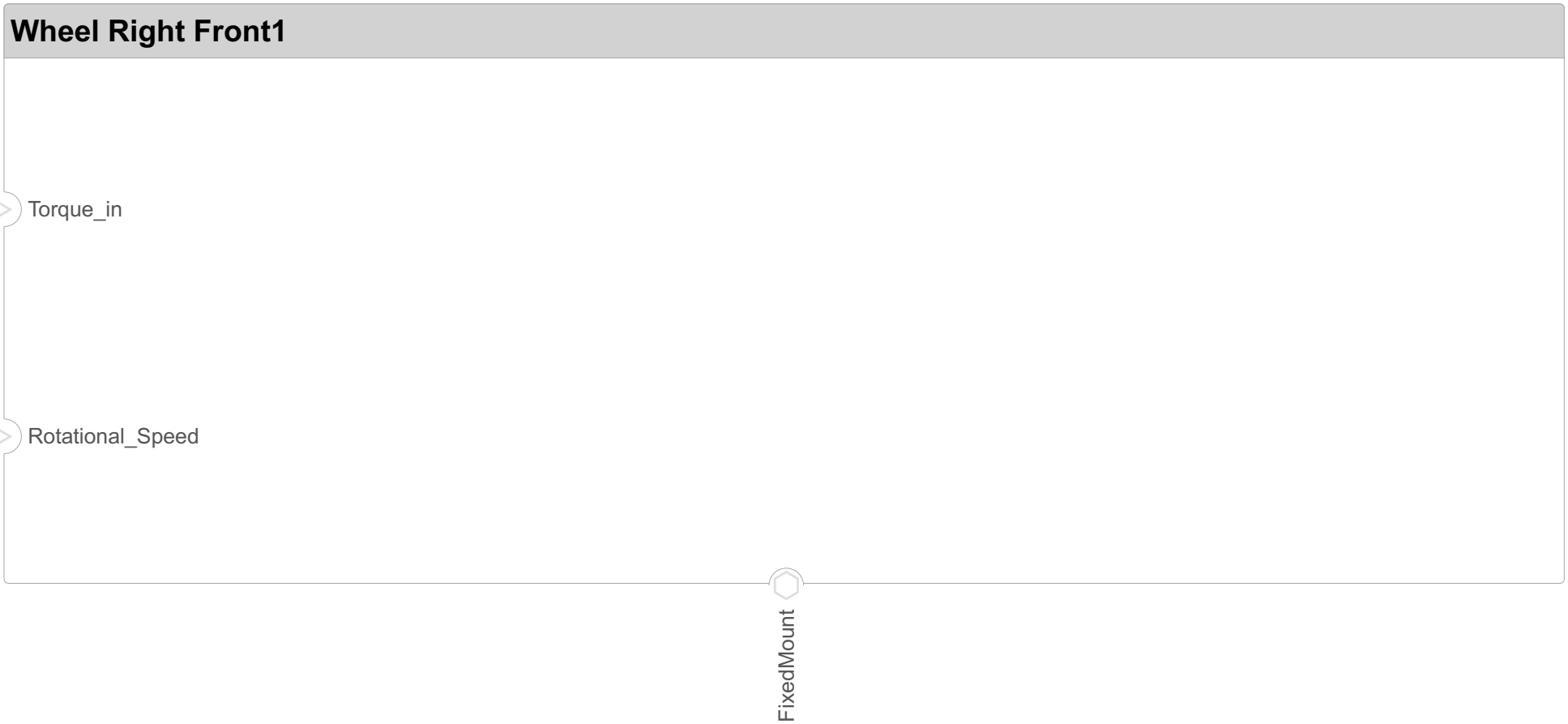

MountPoint
FixedMount1
FixedMount2
FixedMount3
FixedMount4

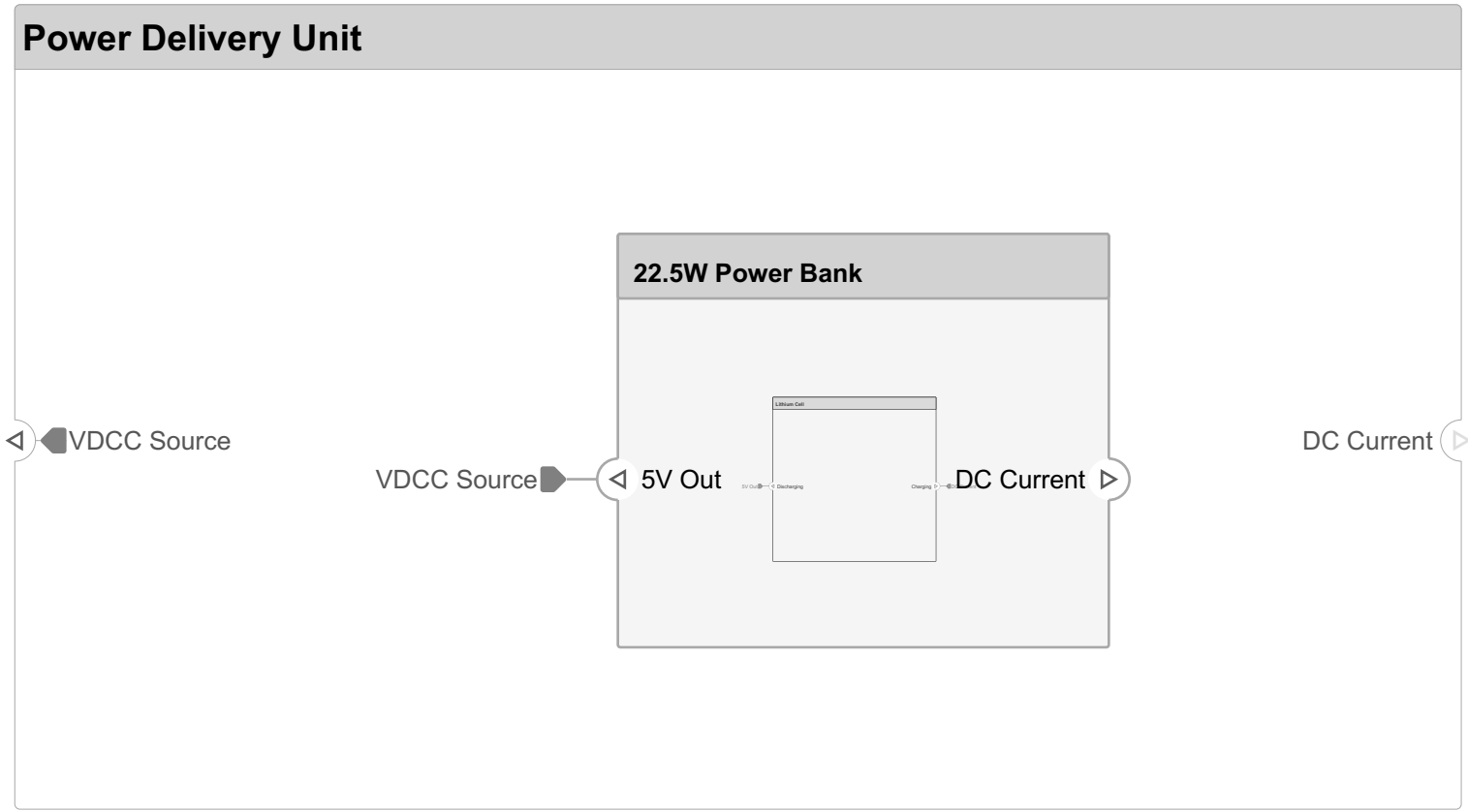
Wheel Left Behind



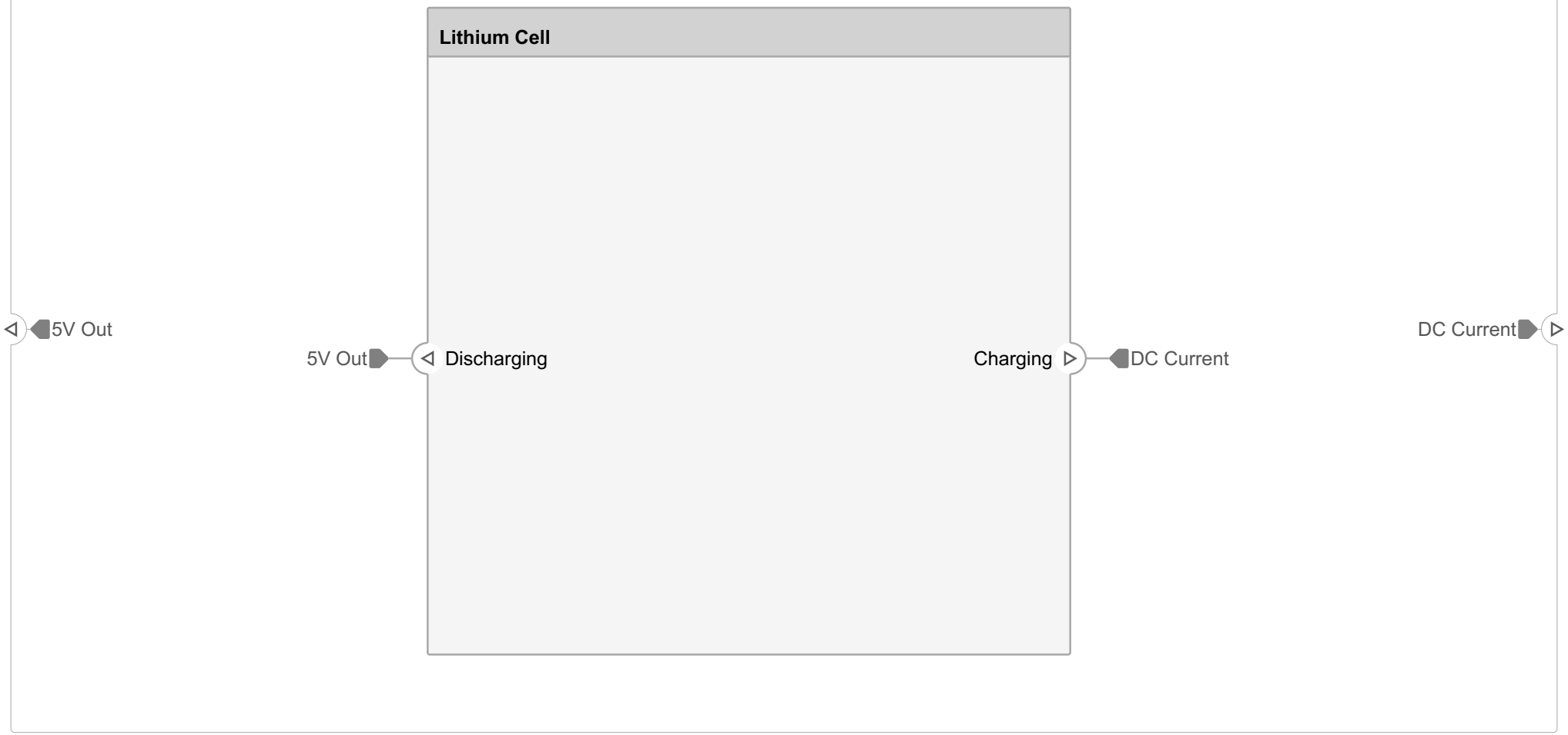
Wheel Right Behind


Wheel Right Front
Torque_in
Rotational_Speed
FixedMount


Wheel Right Front1
Torque_in
Rotational_Speed
FixedMount


Power Delivery Unit
VDCC Source
22.5W Power Bank
VDCC Source
5V Out
Lithium Cell
5V Out
Discharging
Charging
DC Current
DC Current

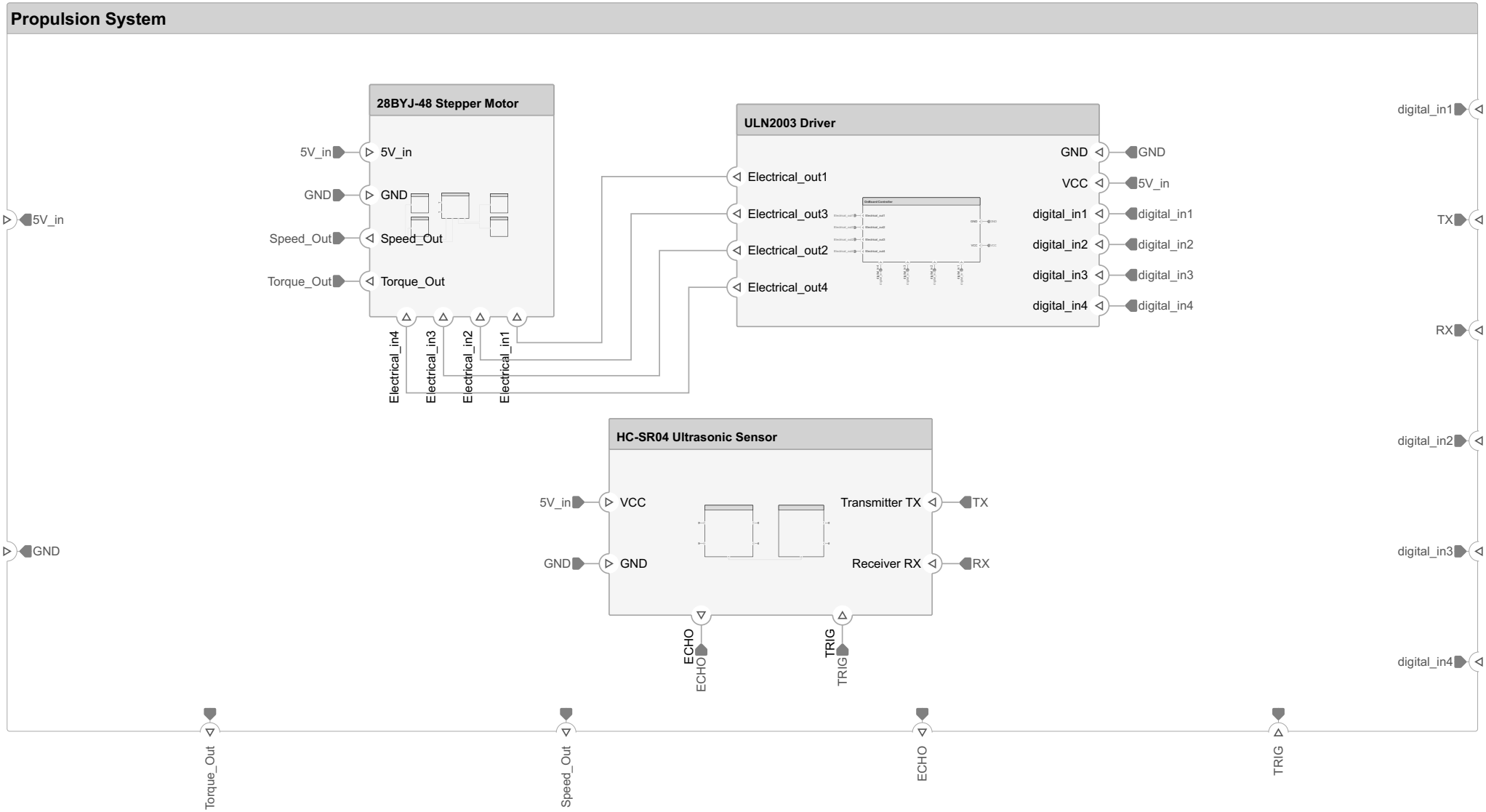
22.5W Power Bank

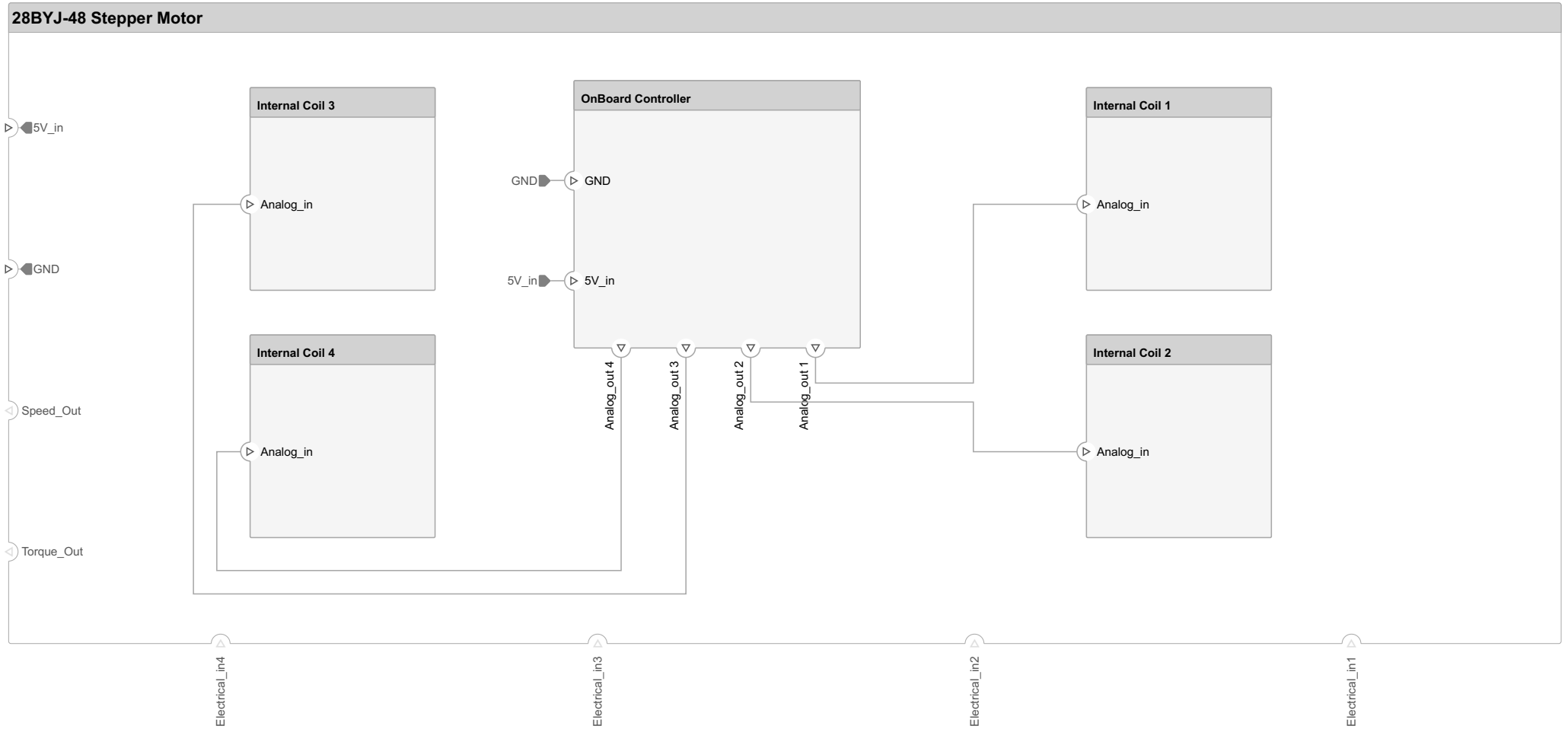


Lithium Cell

Discharging

Charging


Propulsion System
28BYJ-48 Stepper Motor
5V_in
GND
Speed_Out
Torque_Out
Electrical_in4
Electrical_in3
Electrical_in2
Electrical_in1
ULN2003 Driver
Electrical_out1
Electrical_out3
Electrical_out2
Electrical_out4
GND
VCC
5V_in
digital_in1
digital_in2
digital_in3
digital_in4
HC-SR04 Ultrasonic Sensor
VCC
GND
Transmitter TX
Receiver RX
TX
RX
ECHO
TRIG
5V_in
GND
digital_in1
TX
RX
digital_in2
digital_in3
digital_in4
Torque_Out
Speed_Out
ECHO
TRIG


28BYJ-48 Stepper Motor
5V_in
GND
Speed_Out
Torque_Out
Internal Coil 3
Analog_in
Internal Coil 4
Analog_in
OnBoard Controller
GND
GND
5V_in
5V_in
Analog_out4
Analog_out3
Analog_out2
Analog_out1
Internal Coil 1
Analog_in
Internal Coil 2
Analog_in
Electrical_in4
Electrical_in3
Electrical_in2
Electrical_in1

Internal Coil 1

Analog_in

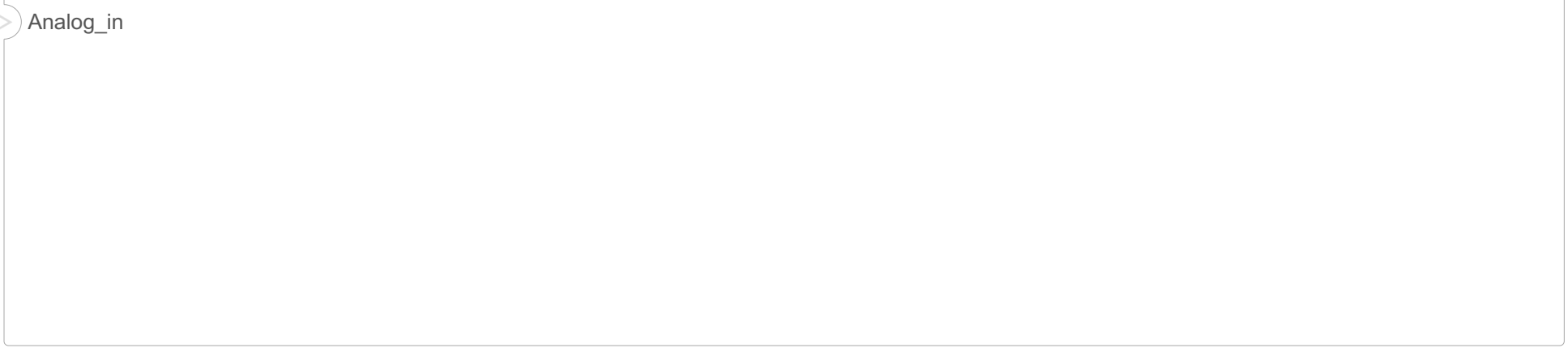
Internal Coil 2

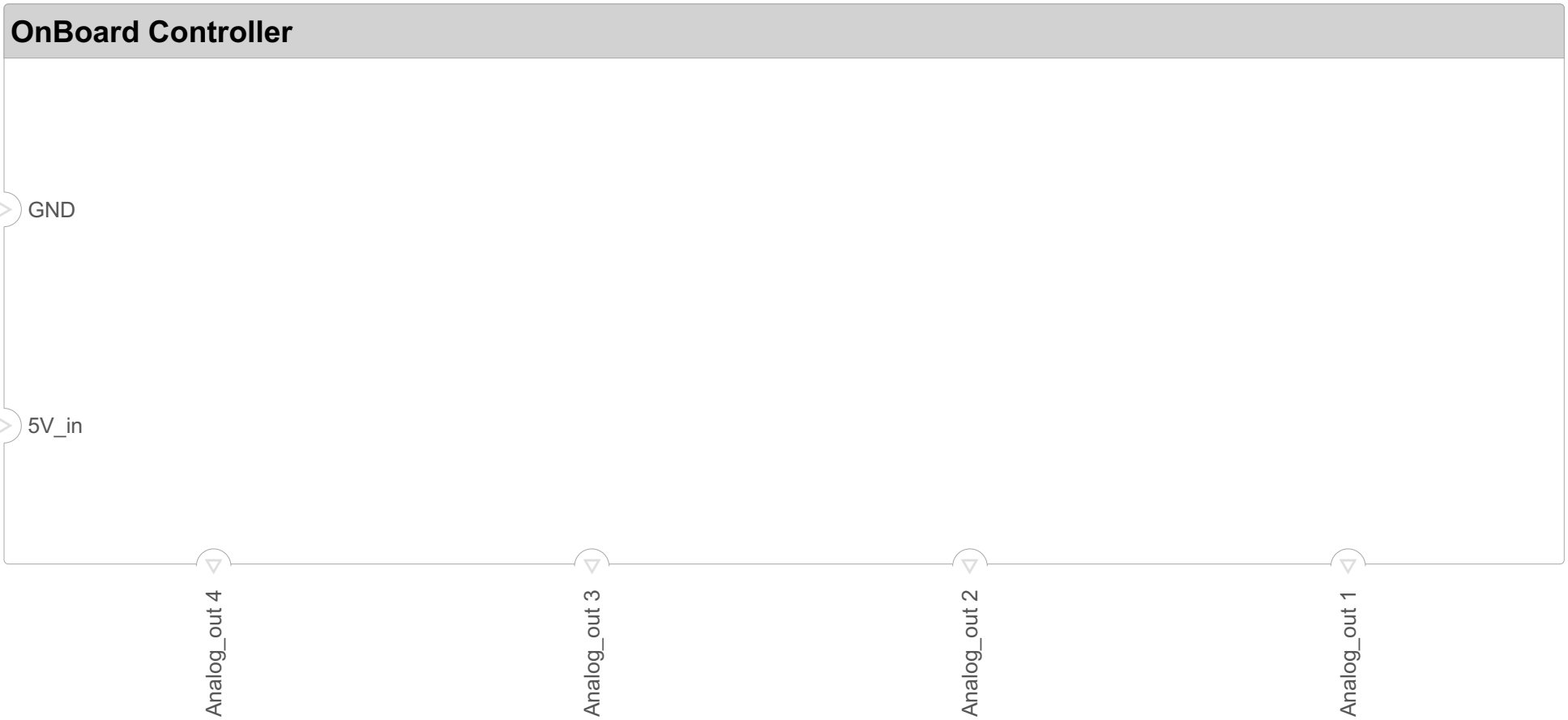
Analog_in

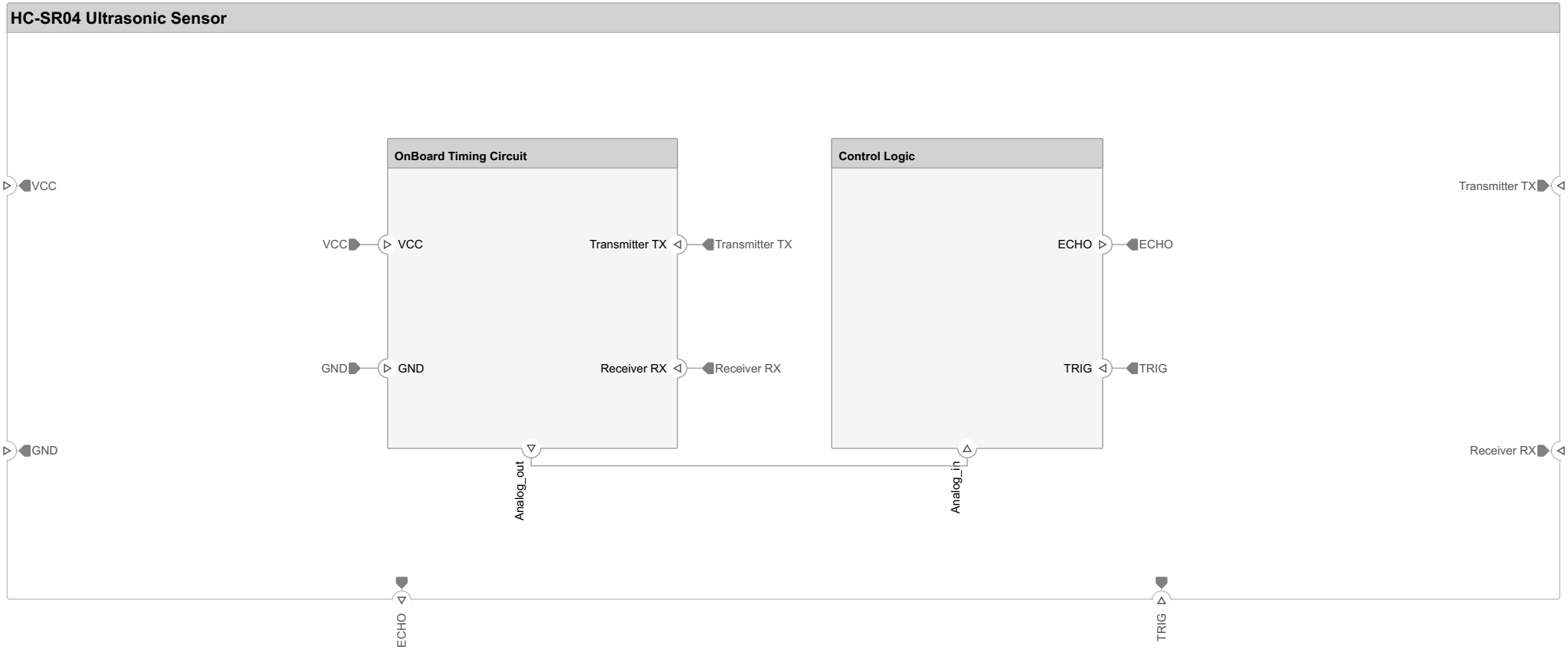
Internal Coil 3

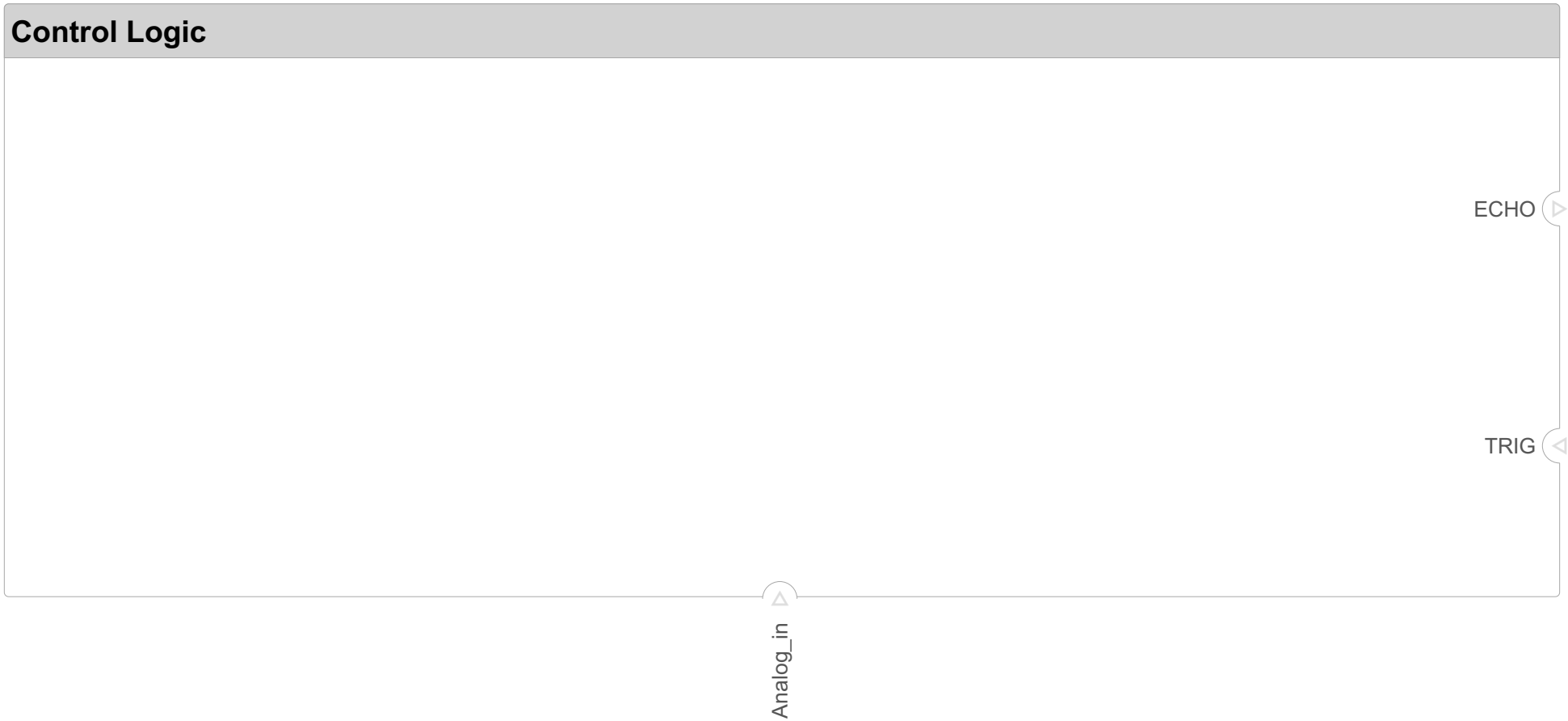
Analog_in

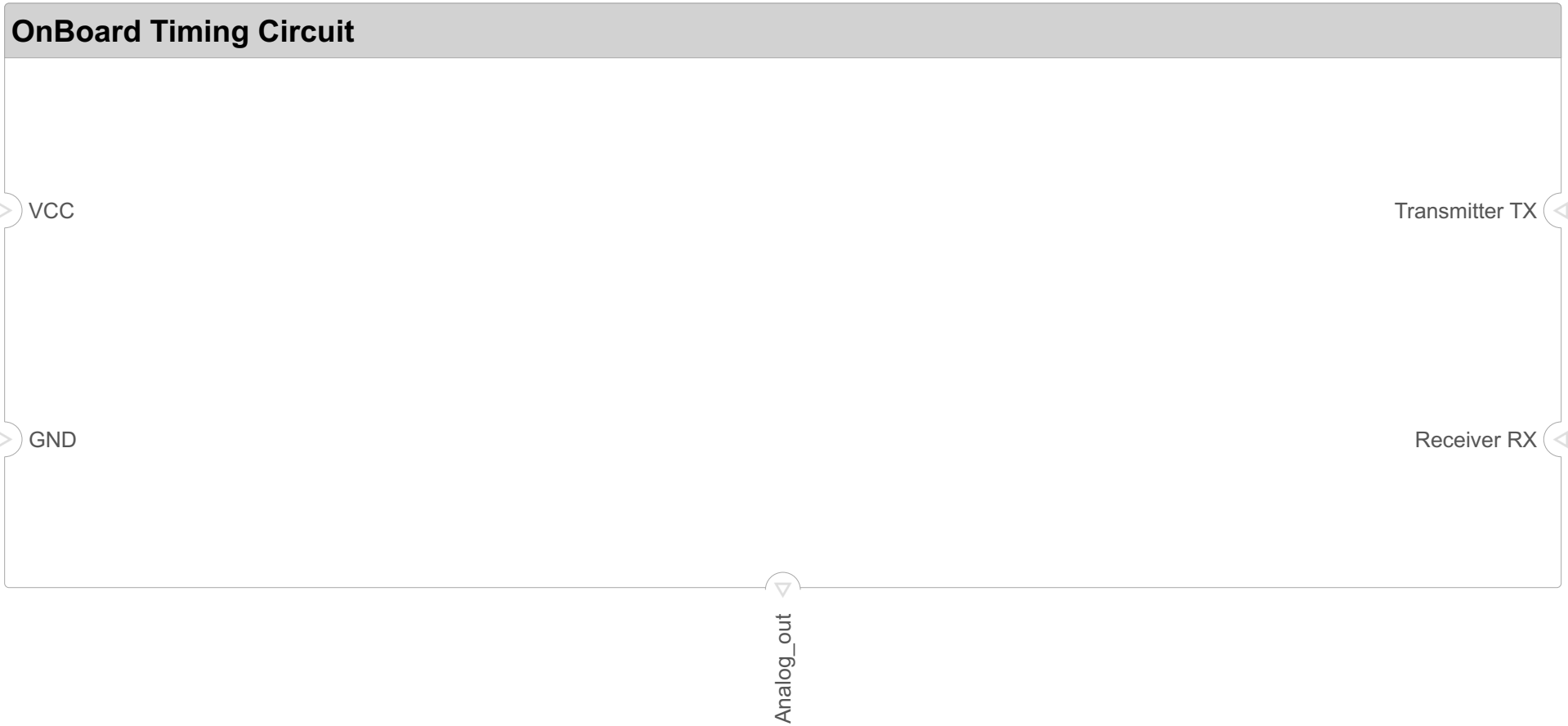
Internal Coil 4

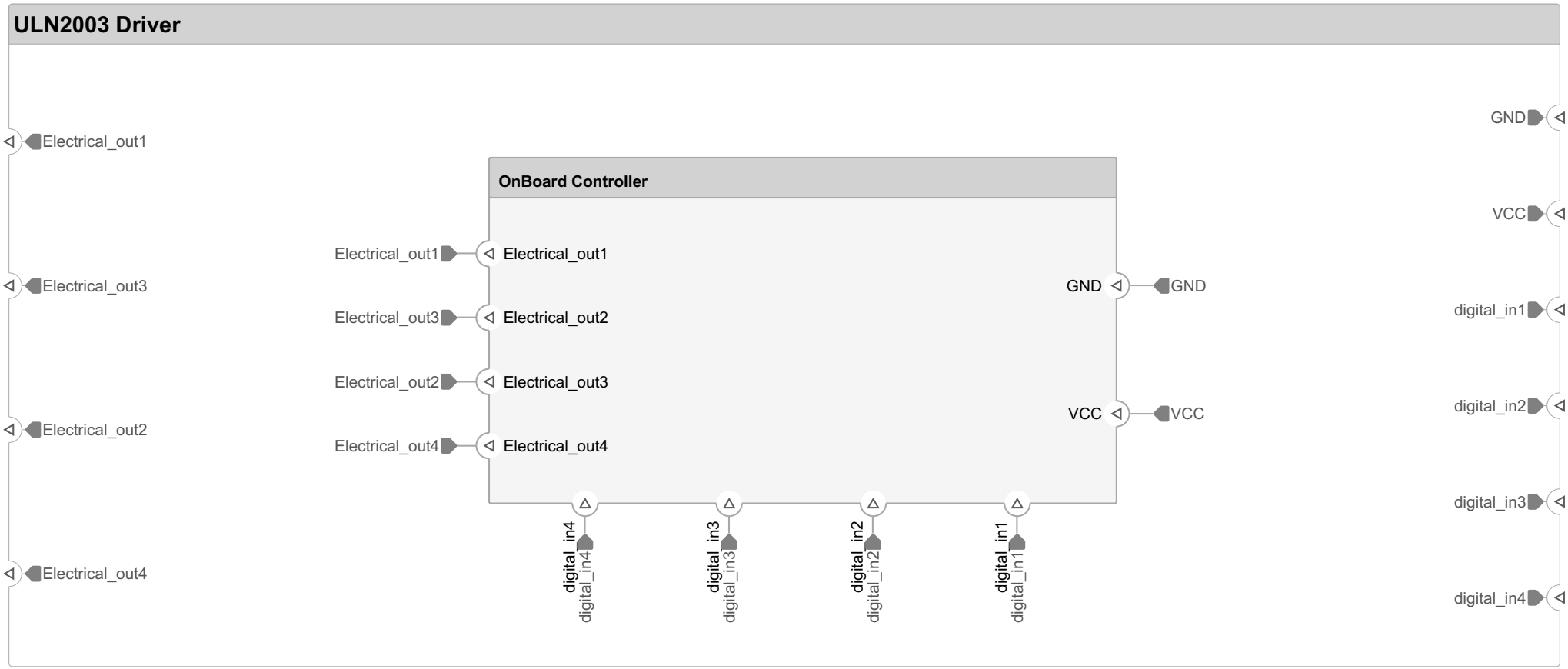


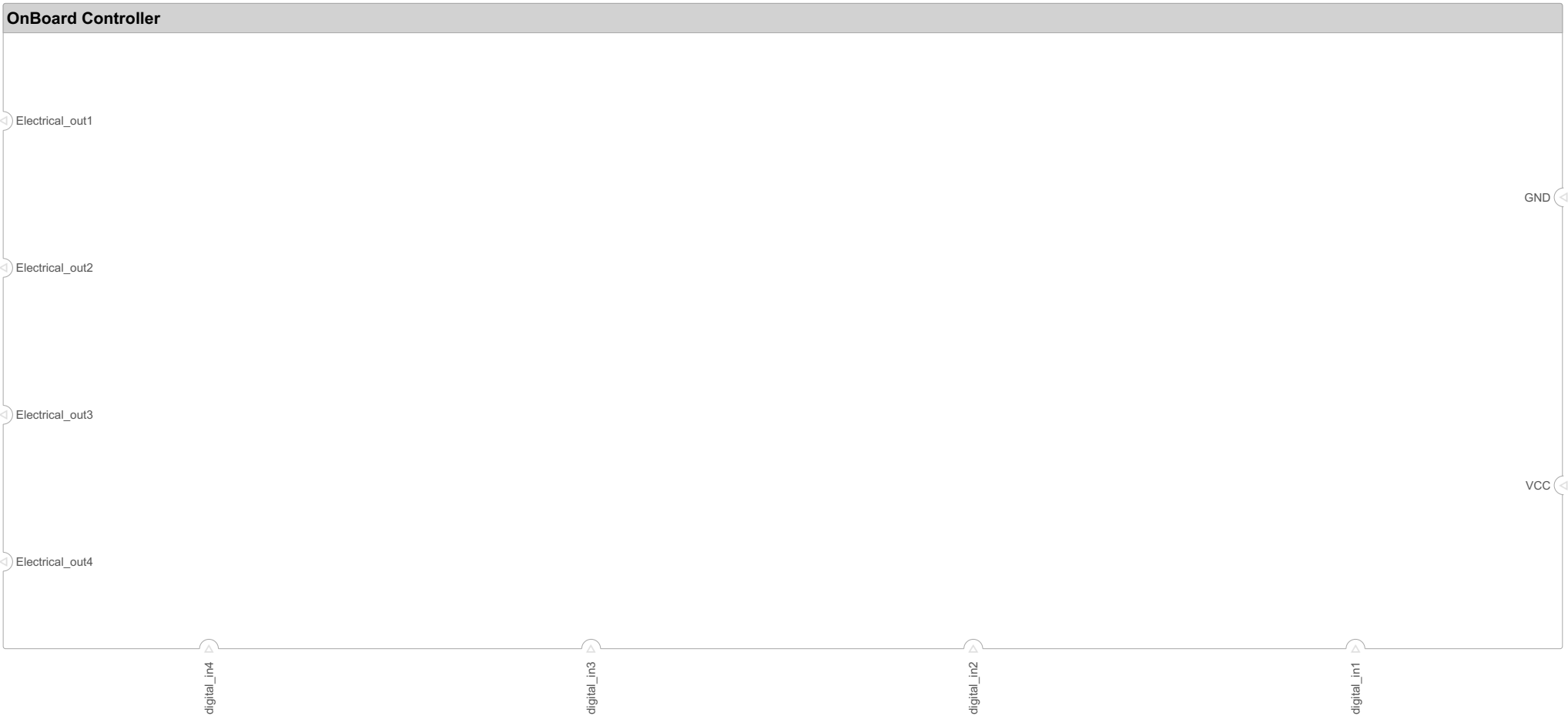

OnBoard Controller
GND
5V_in
Analog_out 4
Analog_out 3
Analog_out 2
Analog_out 1

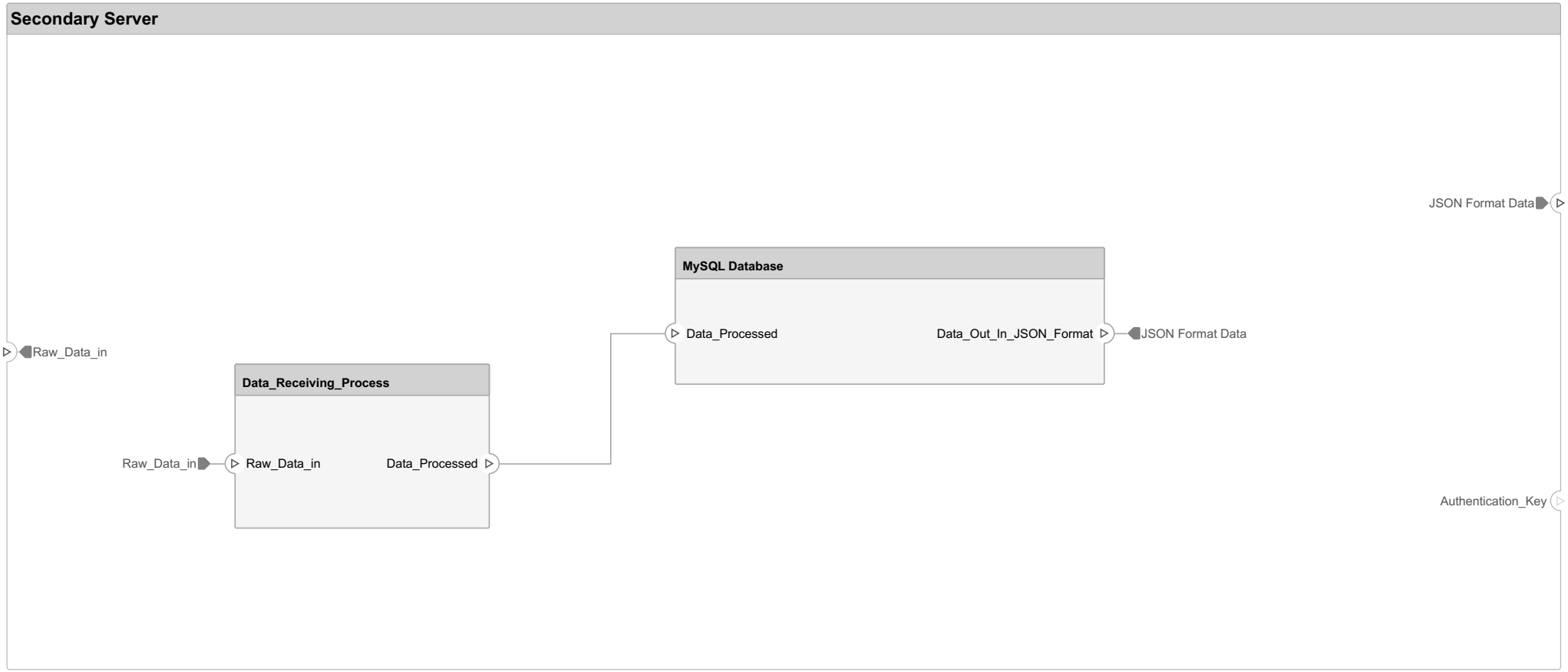

HC-SR04 Ultrasonic Sensor
OnBoard Timing Circuit
Control Logic
VCC
GND
ECHO
TRIG
Transmitter TX
Receiver RX
Analog_out
Analog_in

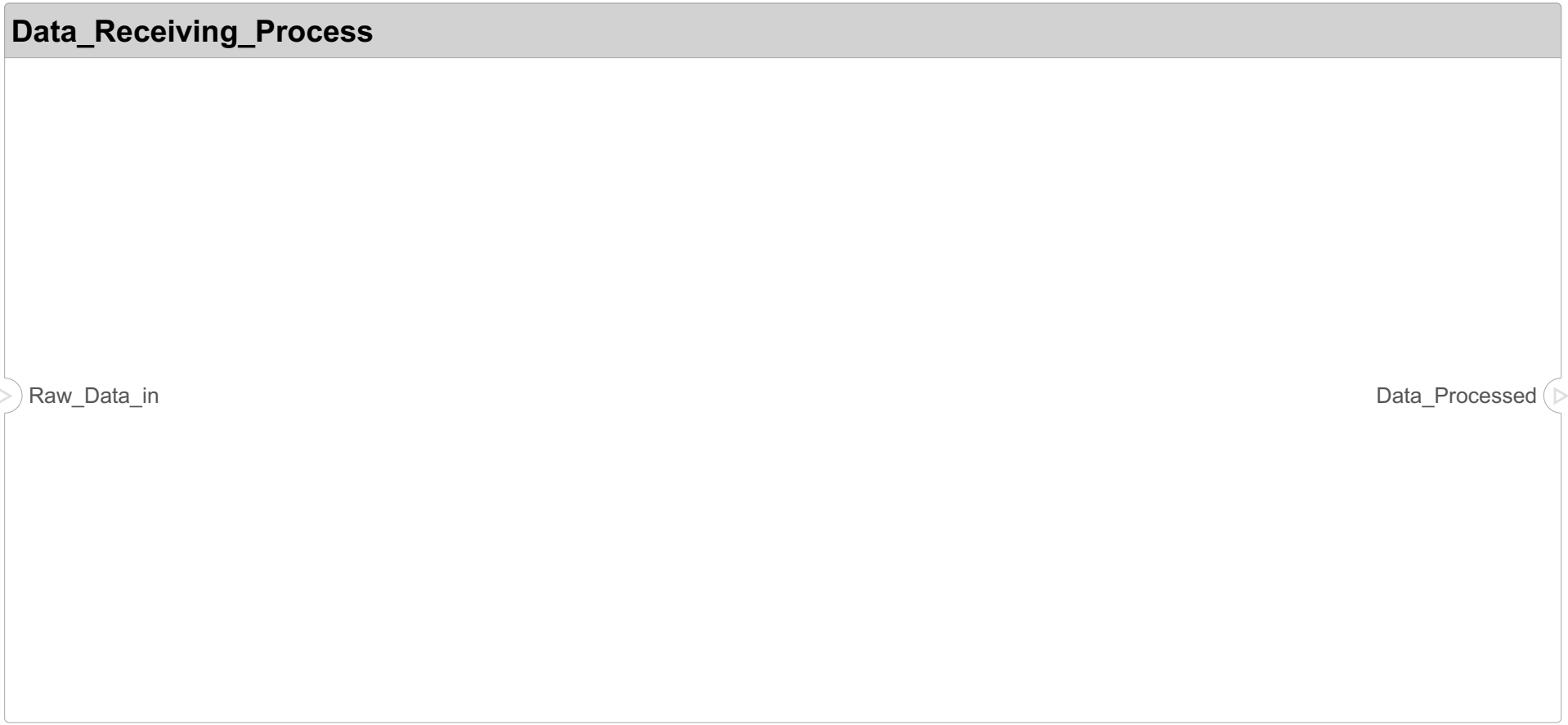

Control Logic
ECHO
TRIG
Analog_in

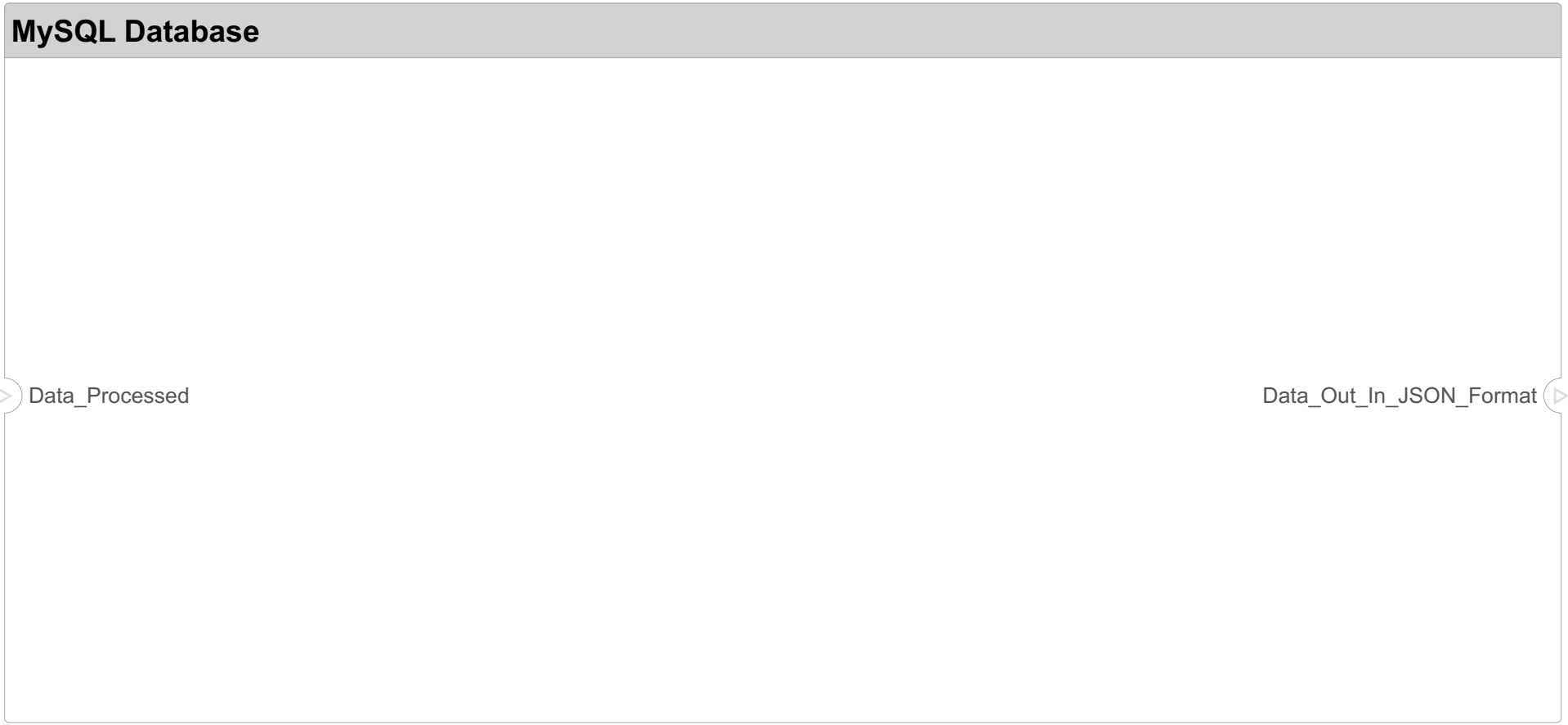

OnBoard Timing Circuit
VCC
GND
Analog_out
Transmitter TX
Receiver RX

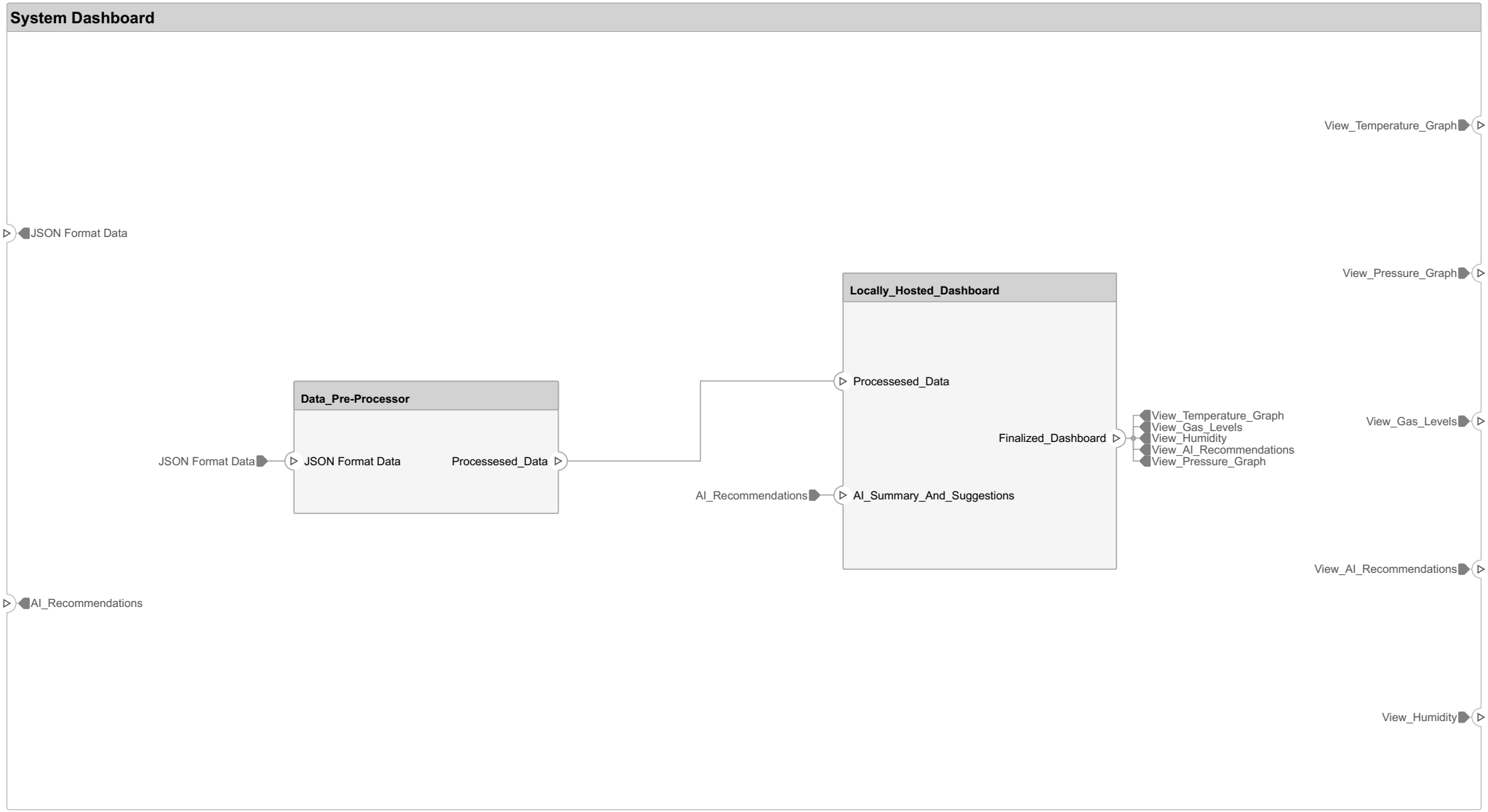

ULN2003 Driver
Electrical_out1
Electrical_out3
Electrical_out2
Electrical_out4
OnBoard Controller
Electrical_out1
Electrical_out2
Electrical_out3
Electrical_out4
GND
VCC
digital_in4
digital_in3
digital_in2
digital_in1
GND
VCC
digital_in1
digital_in2
digital_in3
digital_in4

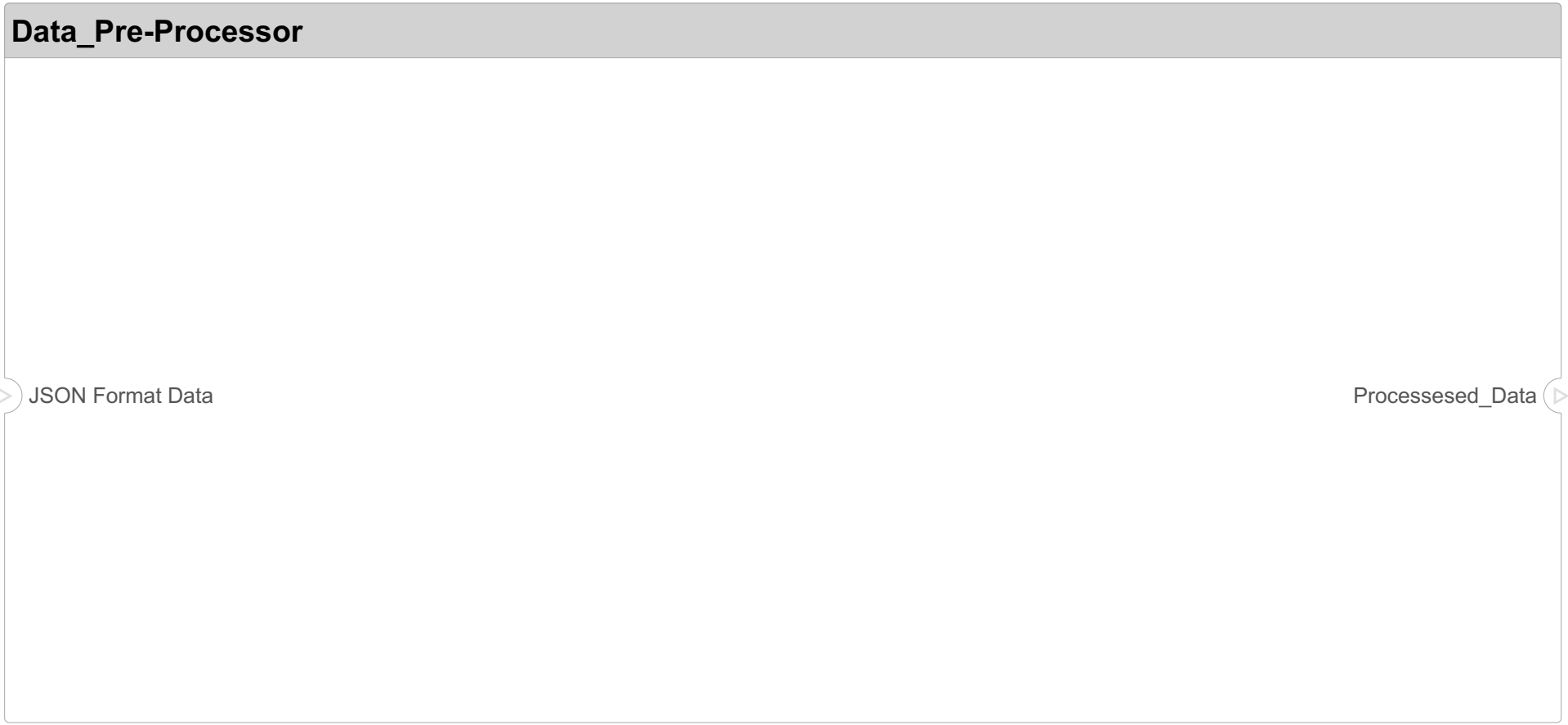

OnBoard Controller
Electrical_out1
Electrical_out2
Electrical_out3
Electrical_out4
GND
VCC
digital_in4
digital_in3
digital_in2
digital_in1

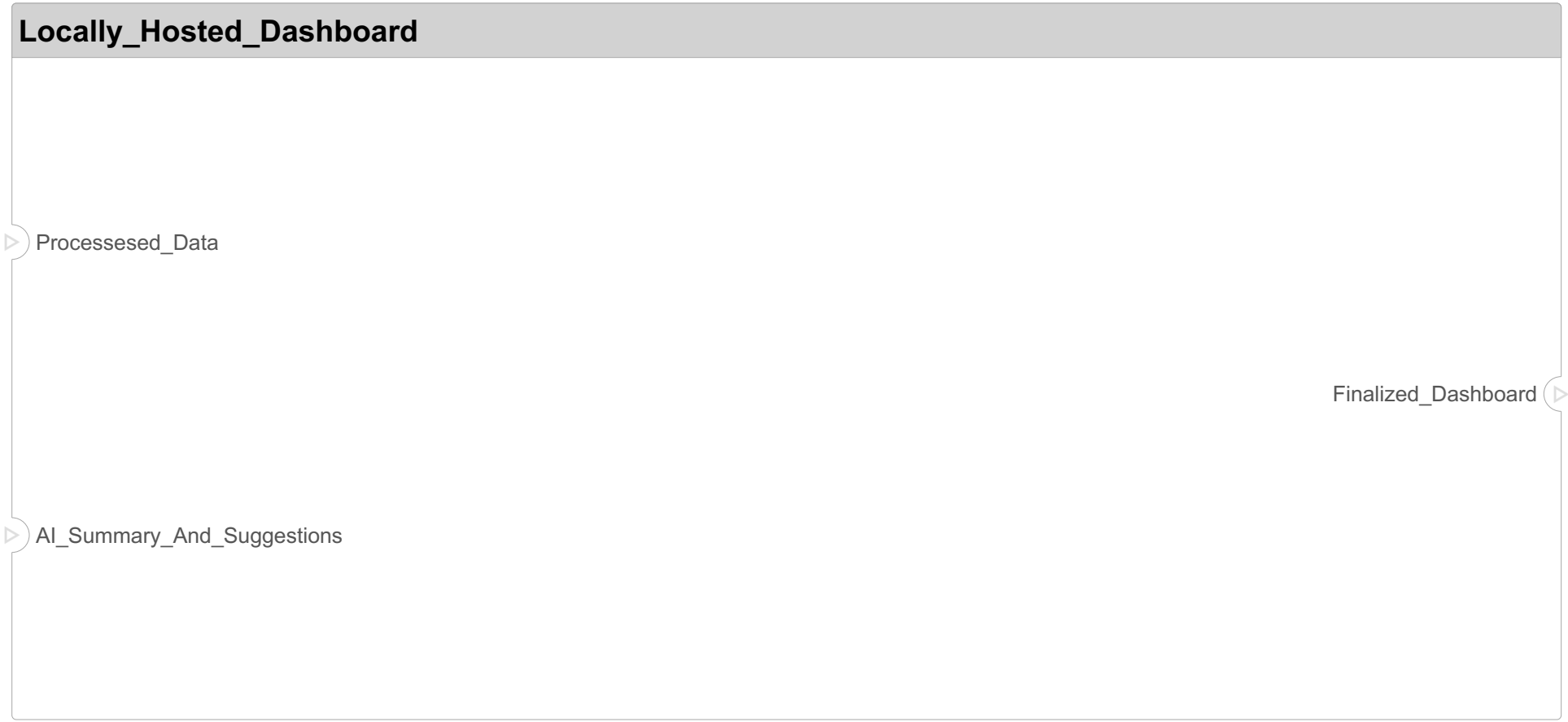

Secondary Server
JSON Format Data
MySQL Database
Data_Processed
Data_Out_In_JSON_Format
JSON Format Data
Raw_Data_in
Data_Receiving_Process
Raw_Data_in
Raw_Data_in
Data_Processed
Authentication_Key

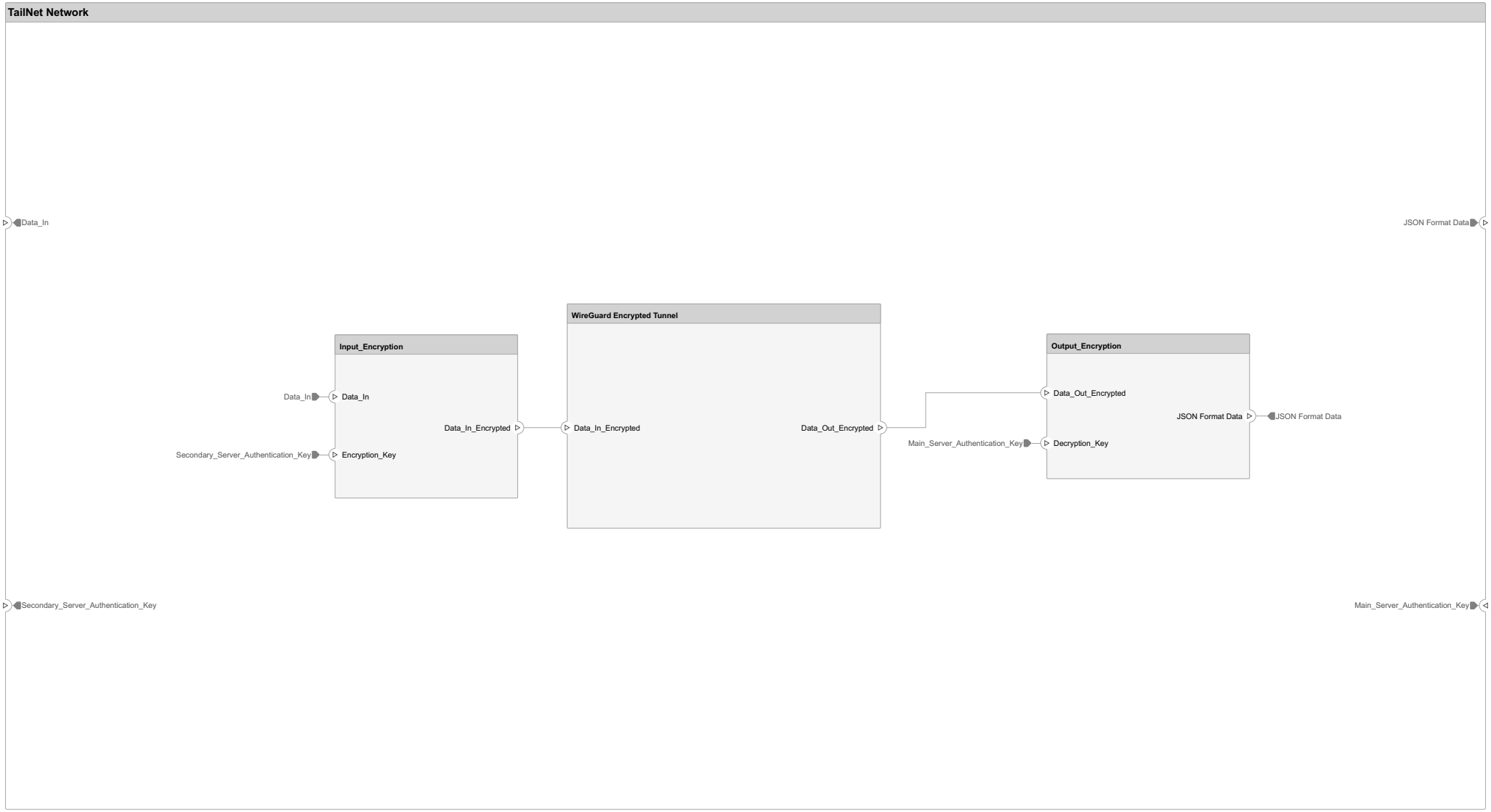

Data_Receiving_Process
Raw_Data_in
Data_Processed

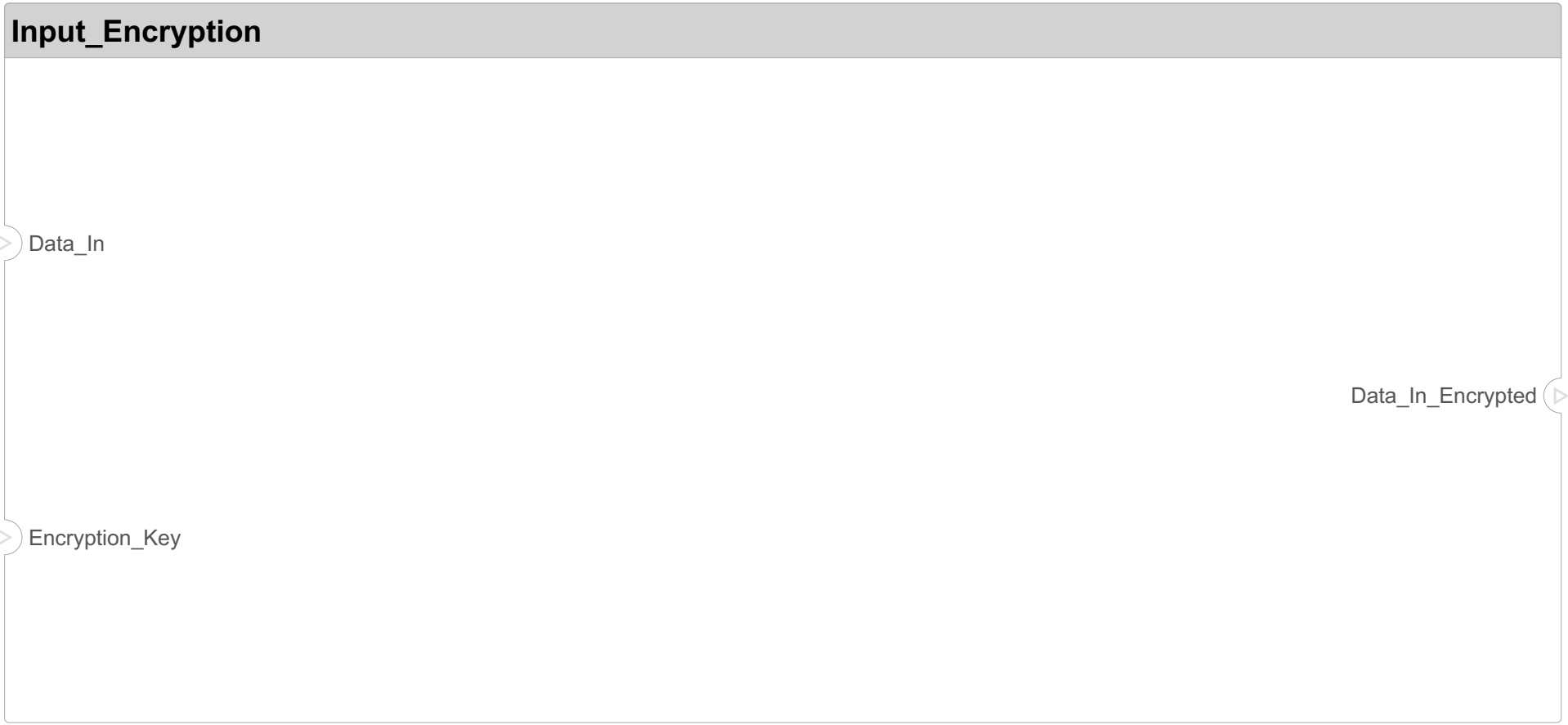

MySQL Database
Data_Processed
Data_Out_In_JSON_Format

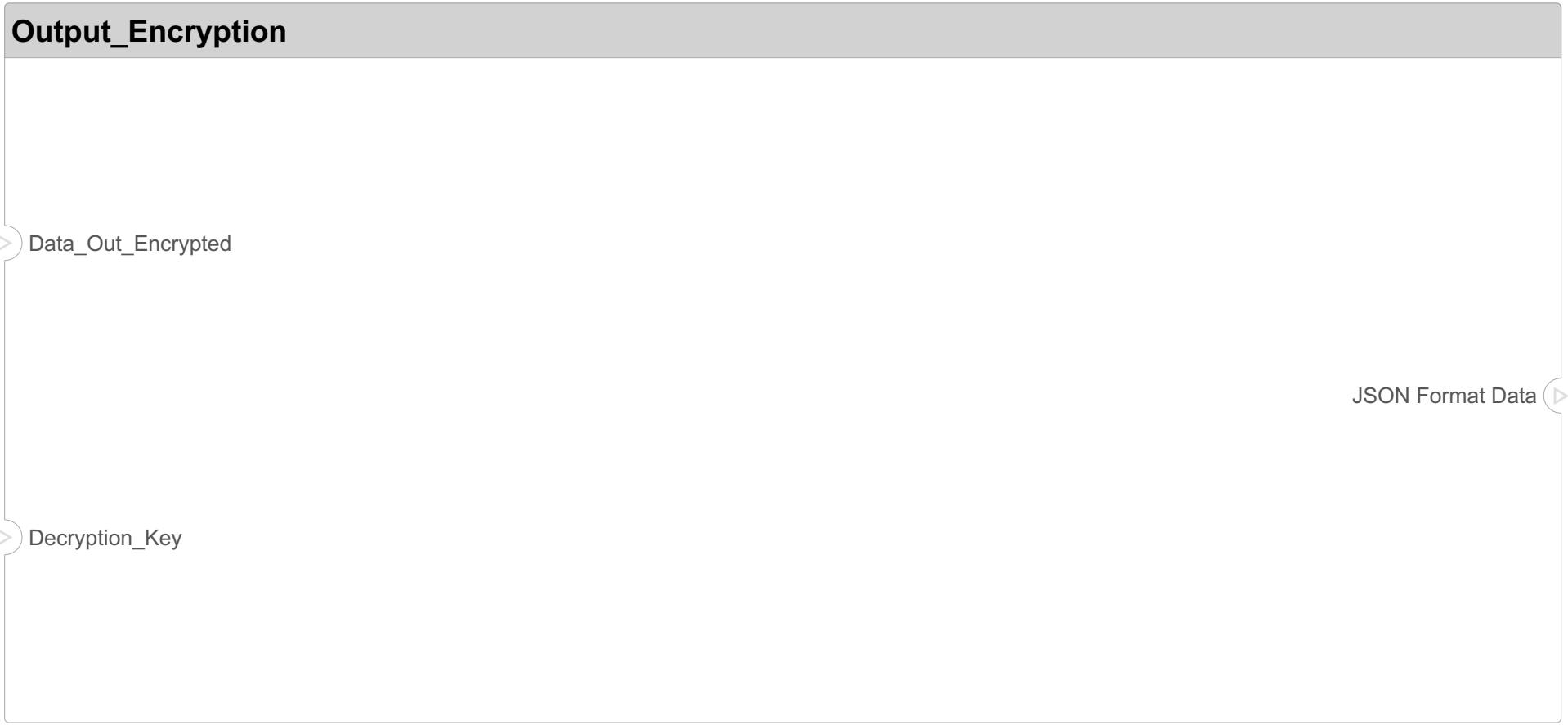

System Dashboard
JSON Format Data
AI_Recommendations
Data_Pre-Processor
JSON Format Data
JSON Format Data
Processesed_Data
Locally_Hosted_Dashboard
Processesed_Data
AI_Recommendations
AI_Summary_And_Suggestions
Finalized_Dashboard
View_Temperature_Graph
View_Gas_Levels
View_Humidity
View_AI_Recommendations
View_Pressure_Graph
View_Temperature_Graph
View_Pressure_Graph
View_Gas_Levels
View_AI_Recommendations
View_Humidity


Data_Pre-Processor
JSON Format Data
Processesed_Data


Locally_Hosted_Dashboard
Processesed_Data
AI_Summary_And_Suggestions
Finalized_Dashboard


TailNet Network
Data_In
JSON Format Data
WireGuard Encrypted Tunnel
Input_Encryption
Data_In
Data_In
Data_In_Encrypted
Secondary_Server_Authentication_Key
Encryption_Key
Data_In_Encrypted
Data_Out_Encrypted
Output_Encryption
Data_Out_Encrypted
JSON Format Data
JSON Format Data
Main_Server_Authentication_Key
Decryption_Key
Secondary_Server_Authentication_Key
Main_Server_Authentication_Key


Input_Encryption
Data_In
Data_In_Encrypted
Encryption_Key


Output_Encryption
Data_Out_Encrypted
JSON Format Data
Decryption_Key

WireGuard Encrypted Tunnel
Data_In_Encrypted
Data_Out_Encrypted