

User Guide for Easer 25 (PN00421)

By S&S Tech

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WARNING: THIS CONTROLLER IS NOT REVERSE-POLARITY PROTECTED. PLEASE CHECK YOUR CONNECTIONS BEFORE YOU TURN THE SPEED CONTROLLER ON.



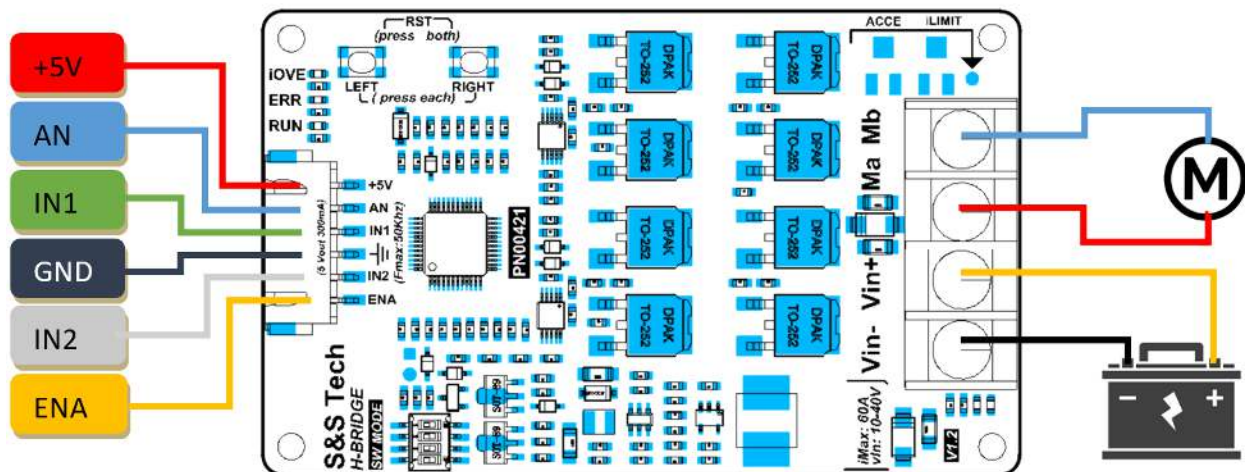
System Requirements

- Motor Type: Brush DC
- DC Voltage: 10-30 VDC
- Minimum PWM Signal Frequency: 500 Hz
- Rated Current at 25°C: 25A Continuous, 60A Peak (0.5 sec)
- Logic Voltage: Low 0 - 0.8 vdc, High 2 - 28 vdc
- Analog Pin Max. Signal Voltage: 3.3 vdc
- Ambient Temperature: 0 - 50°C (32 - 122°F)
- Maximum Operating Temperature: 100°C
- Humidity: 40% - 90% RH
- Maximum Shock: 5.9 m/s²

Features

- 10-30 VDC
- 25A Continuous, 60A Peak
- **Acceleration/Deceleration Adjustment (Soft Start/Stop)**
- **Travel Limits by Current Sensing (No More Limit Switches)**
- **On-board +5v Power Supply 250 mA Max.**
- **Radio PPM Control**
- PWM/Dir Standard Two-wire Control
- **PMW 50/50** Single-wire Speed and Direction Controls
- Analog/Dir Standard Potentiometer Control
- **Analog Joystick** Style Potentiometer Control
- UART Control
- **Fixed Quiet 16 KHz** Frequency Driver Output
- **On-board Test Buttons**
- Under Voltage Protection
- Over Voltage Protection
- Over Temperature Protection
- Overcurrent Protection

Layout



+5V: 5vdc, 250mA Power Supply

AN: Analog Input

IN1: PWM/RX/PPM/ANA_JOY (Depending on the Set Mode)

GND: Logic Ground

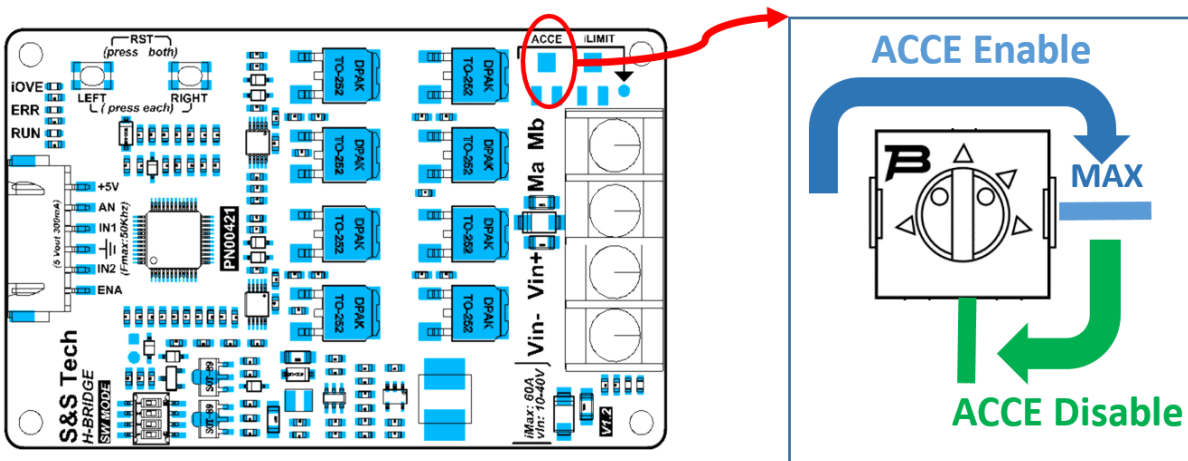
IN2: DIR/TX/3V3 (Depending on the Set Mode)

ENA: Status and Reset. ENA also functions as a signal connection for stop at Low and start at High.

- Vin-**: Power Source Ground (Negative)
- Vin+**: Power Source 10-30vdc (Positive)
- Ma**: Motor's Wire Lead a
- Mb**: Motor's Wire Lead b

Acceleration/Deceleration Adjustment

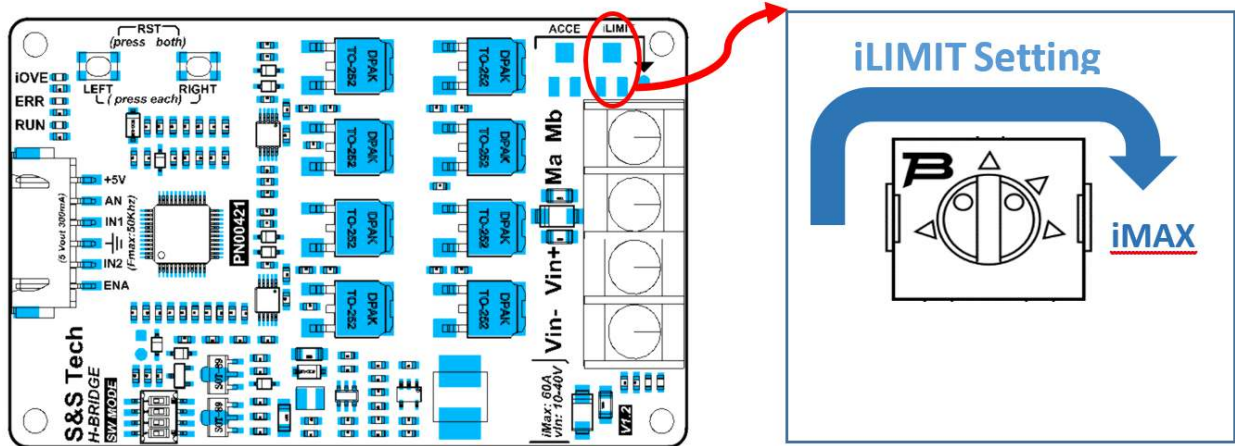
This is how you set up your soft start/stop. This feature is helpful if your power supply is unable to absorb the regenerative energy returning from the motor and you wish not to set up a voltage clamp. This feature also helps smoothen your motion controls.



Soft Start/Stop Adjustment

Travel Limits by Current Sensing

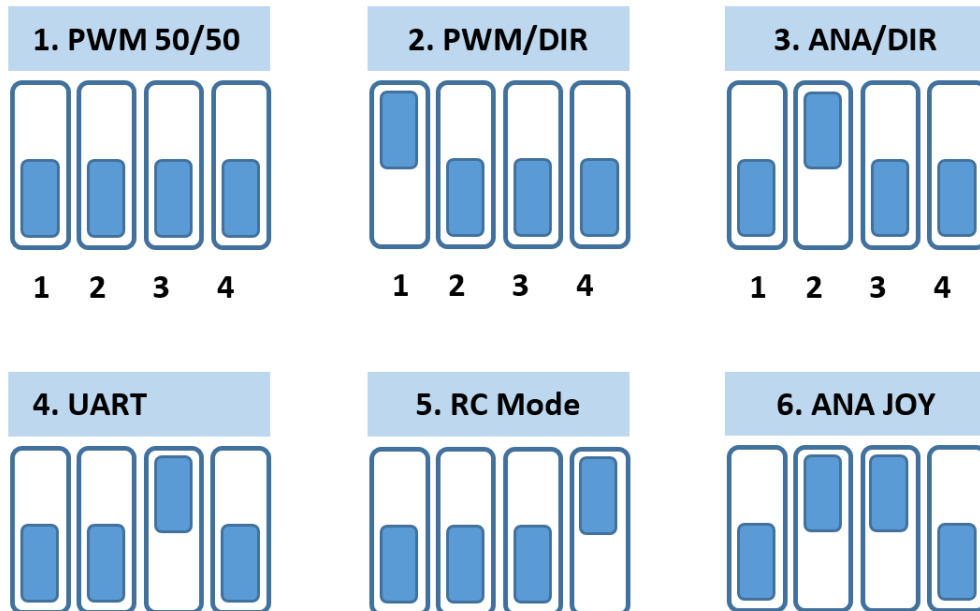
By using this current sensing feature, you no longer need to wire up two limit switches to define the travel limits of your motor. When your motor travels and hits a physical stop A, the current draw of the motor becomes higher due to resistance. The controller senses it and stops the motor at that point but the motor can still be reversed until it hits a physical stop B. The current limit needs to be set a little higher than the operating current in order for this feature to work.



Current Limit Setting

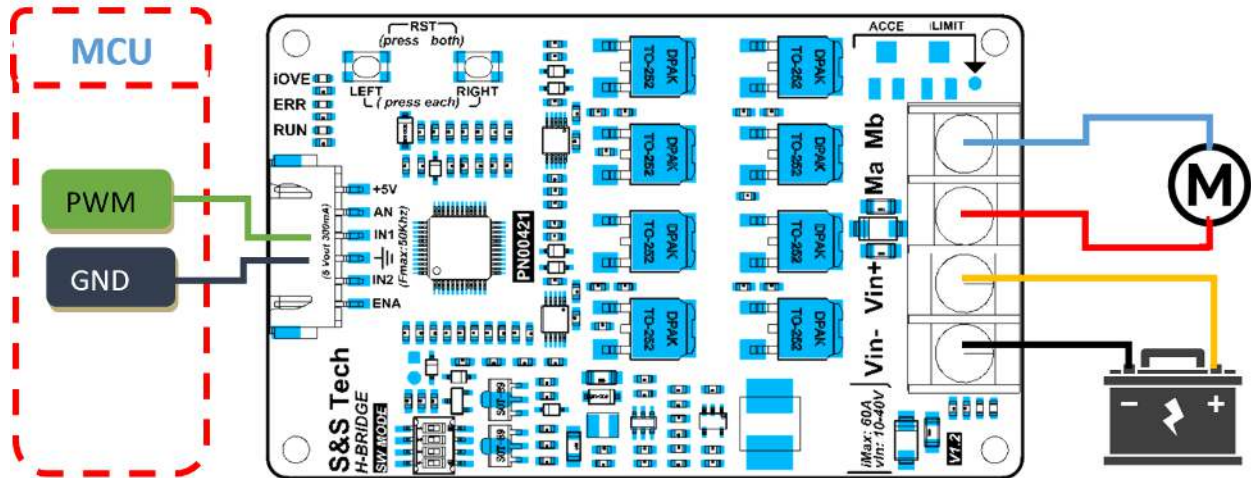
DIP Settings and Modes

Dip switch mode configuration:



PWM 50/50

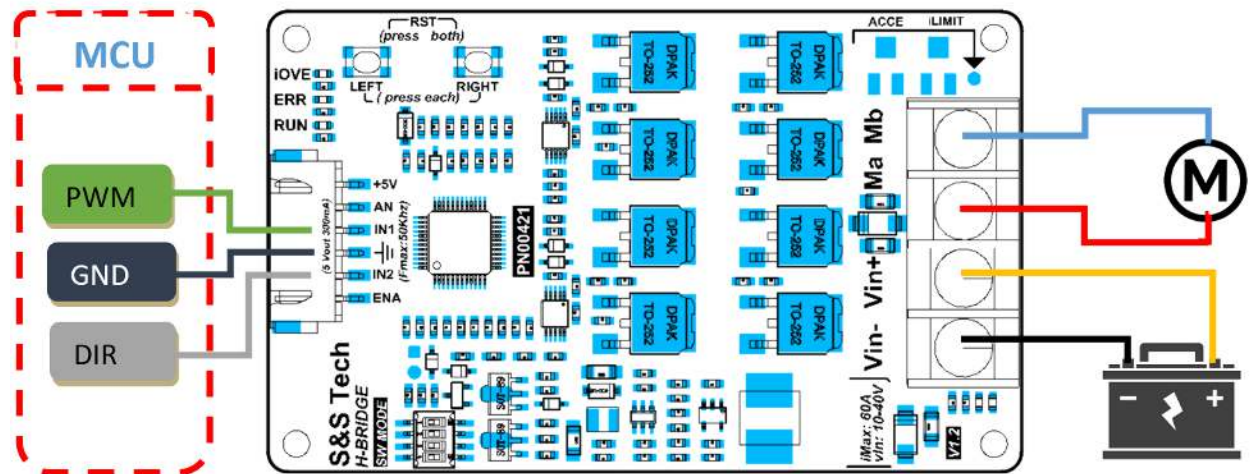
PWM 0-48% duty cycle covers the forward speed signal where 48% is maximum. PWM 48-52% duty cycle covers the stop signal. PWM 52-100% duty cycle covers the reverse speed signal where 100% is maximum. DIR wire is not necessary.



PWM 50/50 Wiring

PWM/DIR

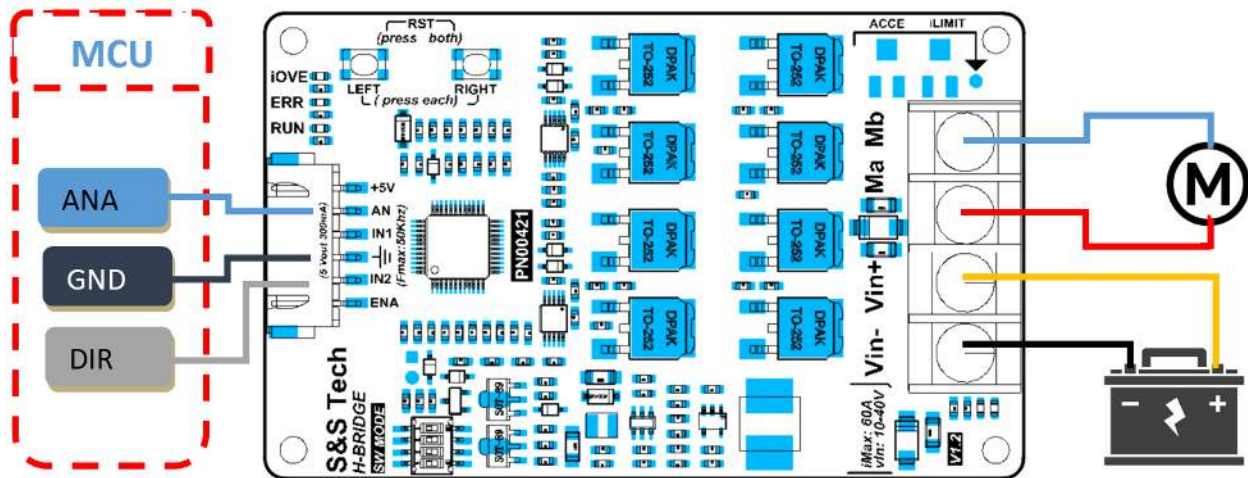
PWM 0-100% duty cycle covers the speed range where 100% is maximum. DIR logic voltage is High for one direction, Low for reverse.



PWM/DIR Wiring

ANA/DIR

Analog 0-3.3vdc covers the speed range where 3.3v is maximum. Voltage beyond 3.3vdc (5v for example), will not increase speed any further. DIR logic voltage is High for one direction, Low for reverse. DIR by default is Low. For the (10k or 20k Ohm) potentiometer wiring, be sure to connect +5v to your VCC wire. VCC refers to the pot's wire that requires a power supply input (3.3v or 5v). EAN connection is for stop at LOW and start at HIGH.

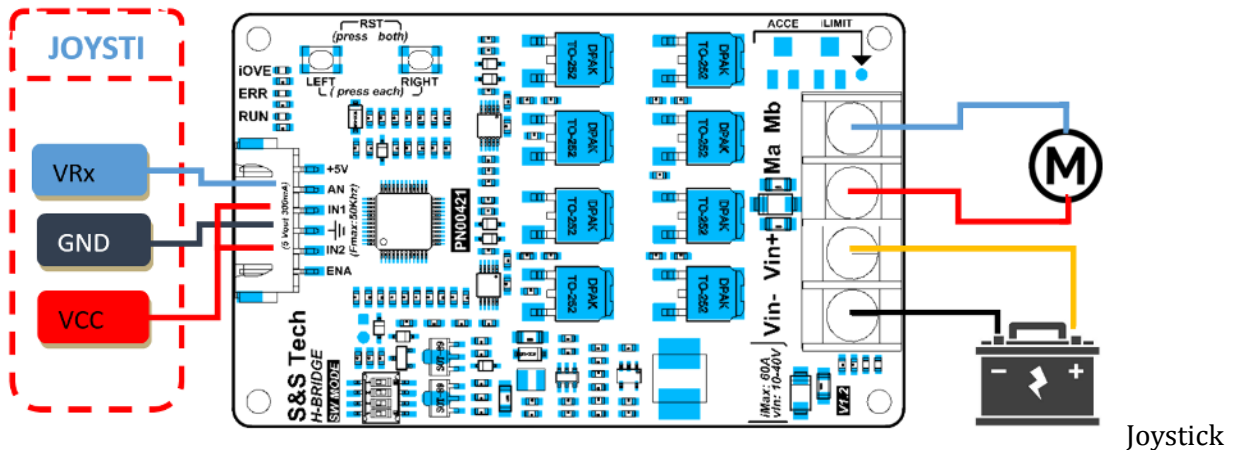


ANA/DIR Wiring

Analog Joystick

You may use a (10k Ohm) potentiometer based joystick to connect to the controller by using this mode. You may also connect to a simple (20k Ohm) potentiometer so it becomes a bi-directional speed control knob. **IN1 and IN2 both have to be joined to connect to the VCC of your joystick to work properly.** Keep in mind, some joysticks would label their VCC's as +5V. For wiring to a 3-pin (20k Ohm) potentiometer, connect AN to the wiper (center) pin, connect GND to the ground pin, connect **BOTH** IN1 and IN2 to the VCC pin.

ANALOG Joystick Mode Connection:



Mode Wiring

Joystick

UART

Before using this feature, a node number needs to be assigned to the motor driver. In case of running multiple boards, be sure they do not have identical node numbers that will cause communication conflicts. Valid node numbers are 1 to 10. To assign a node number to your motor driver, simply press and hold the two on-board push buttons for 3 seconds then let go. Press the "LEFT" or "RIGHT" button multiple times to increase/decrease your node number. The LED light will indicate the node number by flashing your assigned number of times. Press both push buttons to exit (save) the node setting.

This driver supports the **ASCII UART** command line. The MCU (Arduino for example) will be the master. Use the "*NO ? \n*" command to request for all addresses assigned.

Protocol Settings

Baud Rate: 115200

Word Length: 8 Bit

Stop Bits: 1

Parity: None

Command Format and Examples

Nx [?] [Dy] [Az] [C] [R1607] [Gj] [S] \n

Nx: x = address of driver (0 Broadcast)

?: Help Command (x>0)

Dy: y = duty(-1000 =< y <=1000; y>0: dir=1; y<=0: dir =0); refresh rate should be less than 5 secs

Az: z= Acceleration(0 =< j <= 65000); z=0: no acceleration

C: Clear error

R1607: Reset MCU

K: Return the rx command.

S: Check sum of command $S = [atoi(x)] + [atoi(y)] + [atoi(z)]$

G: Get driver information (G1: One Time; G3 Until new data).

Example1: *NO ? \n* (Request addresses of all existing drivers in the Uart Network)

Example2: *N1 ? \n* (Help command from driver 1)

Example3: *N1 D500 A200 G3 \n* (Set driver velocity =50% and get the status)

When **G** command is sent, the motor driver will return the status with the following format:

N [iF] [iL] [V] [D] [T] [H] [E]

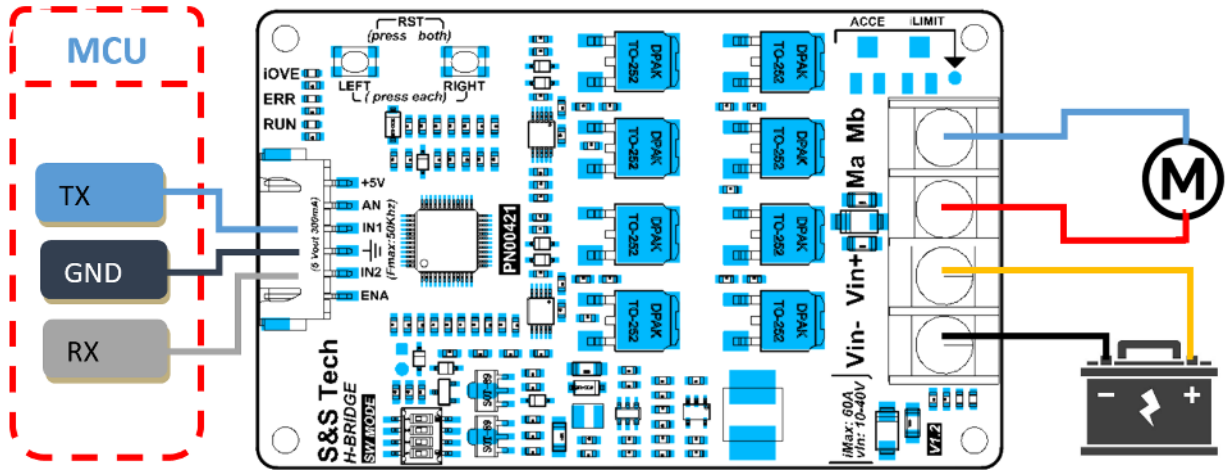
iF: Current Feedback (mA)

iL: Current Limit (mA)

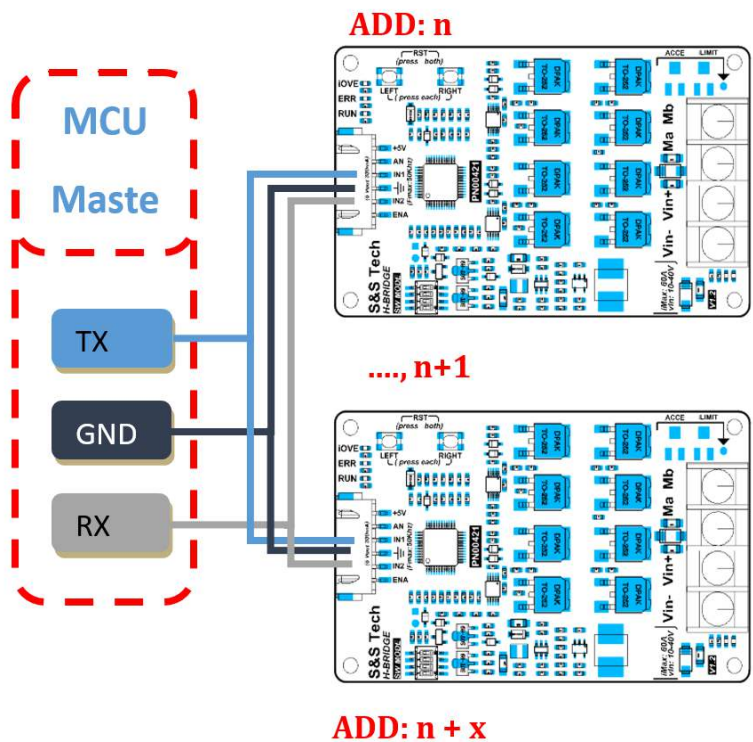
V: Voltage Bus (V)

D: Duty (/1000)

- T: Temperature (degree)
- E: Error code
 - 1: vBus Error (10V<= vBus <= 40V)
 - 2: Over Temperature
 - 3: Short Circuit
 - 4: Frequency In out of range
- H: Travel limit by current sensing iLIMIT (0: stop left; 1: stop right, 3: stop within limits)



UART Wiring to One Board

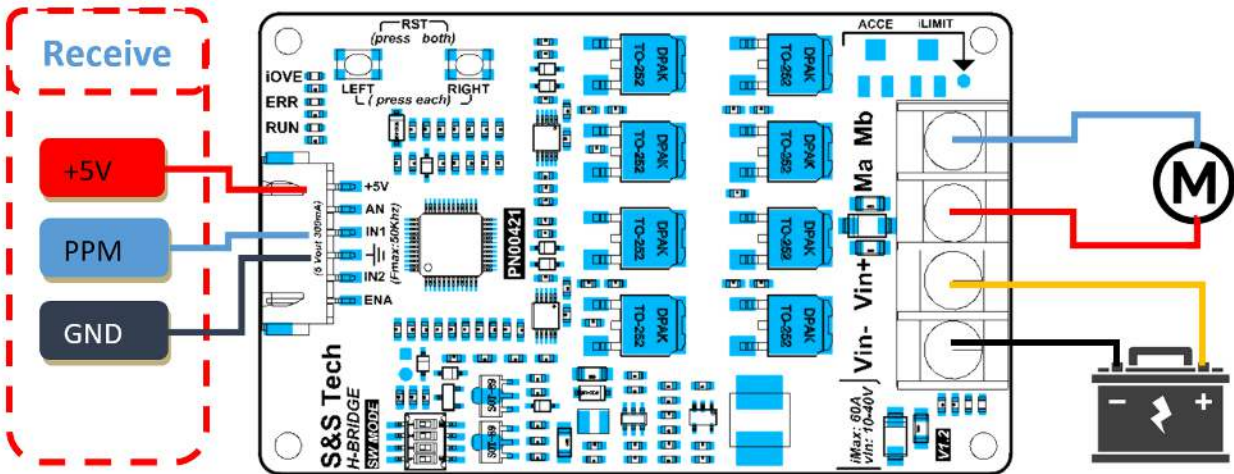


UART Wiring to Multiple Boards

RC Mode

Use this feature to connect to your RC (radio control) receiver that outputs the standard PPM signal. Tweak the ACCE trim pot for a smoother operation.

RC Mode 1 Connection (*Independent Mode*):



Connecting to a Radio Receiver