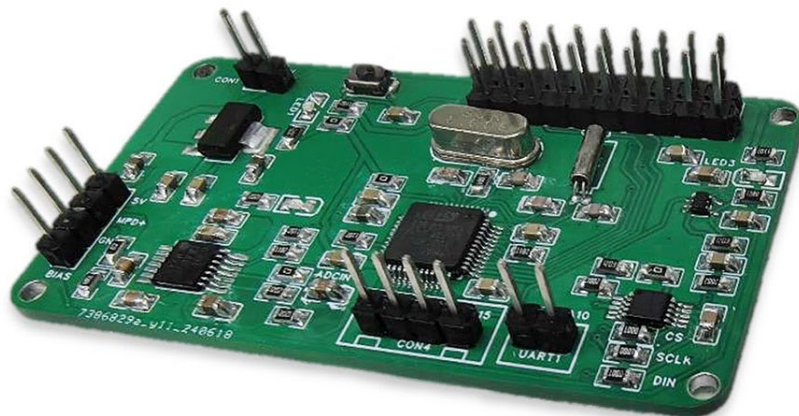# Bias Control Manual

Vision: 2024.7

1. Functionality

The intensity modulator bias controller (hereinafter called the "Controller") automates the quadrature bias control of intensity modulators.

2. Precautions

This bias controller may not realize the control under special requirements, such as maximum and minimum point control and control under ultra-high optical power input. Please contact our sales and marketing staff if you have such special control requirements.

Intensity modulator input optical power requirement: When the device's input optical power is greater than 14dBm, the working point determined automatically by the controller may have a deviation between the desired quadrature point. This deviation can be corrected manually by the fine-tuning function. The specific operation of the fine-tuning function is described in the subsequent introduction. Please do not use the bias controller when the input optical power exceeds 17dBm, as it may cause damage to the controller.

Other usage requirements: Please keep the bias controller powered off when connecting or disconnecting the intensity modulator. A hot plug may damage the controlled intensity modulator.

Double-check the connections before and after connecting the device to avoid modulator damage.

The RF signal input to the modulator should be after the automatic bias control has been stabilized.

3. Structure

The controller has 3 main wiring regions:

1. Power supply; 2. Modulator connection; 3. UART;
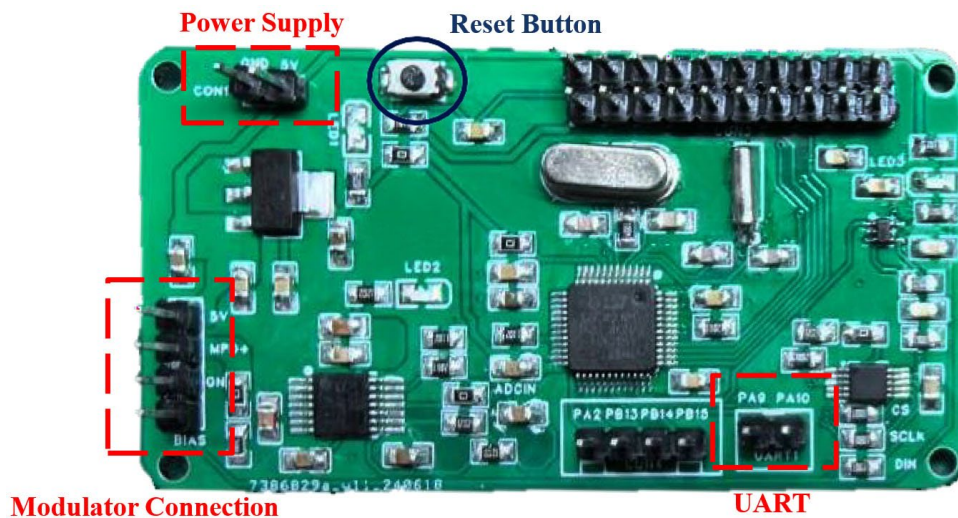
and a reset button. (Fig.1)

Fig.1 the structure of the controller

Power supply region has two pins with the silk screen '5V' and 'GND';

Modulator connection region has 4 pins with the silk screen '5V', 'MPD+', 'GND' and 'BIAS';

UART region has 3 pins with the silk screen 'PA9', 'PA10'.
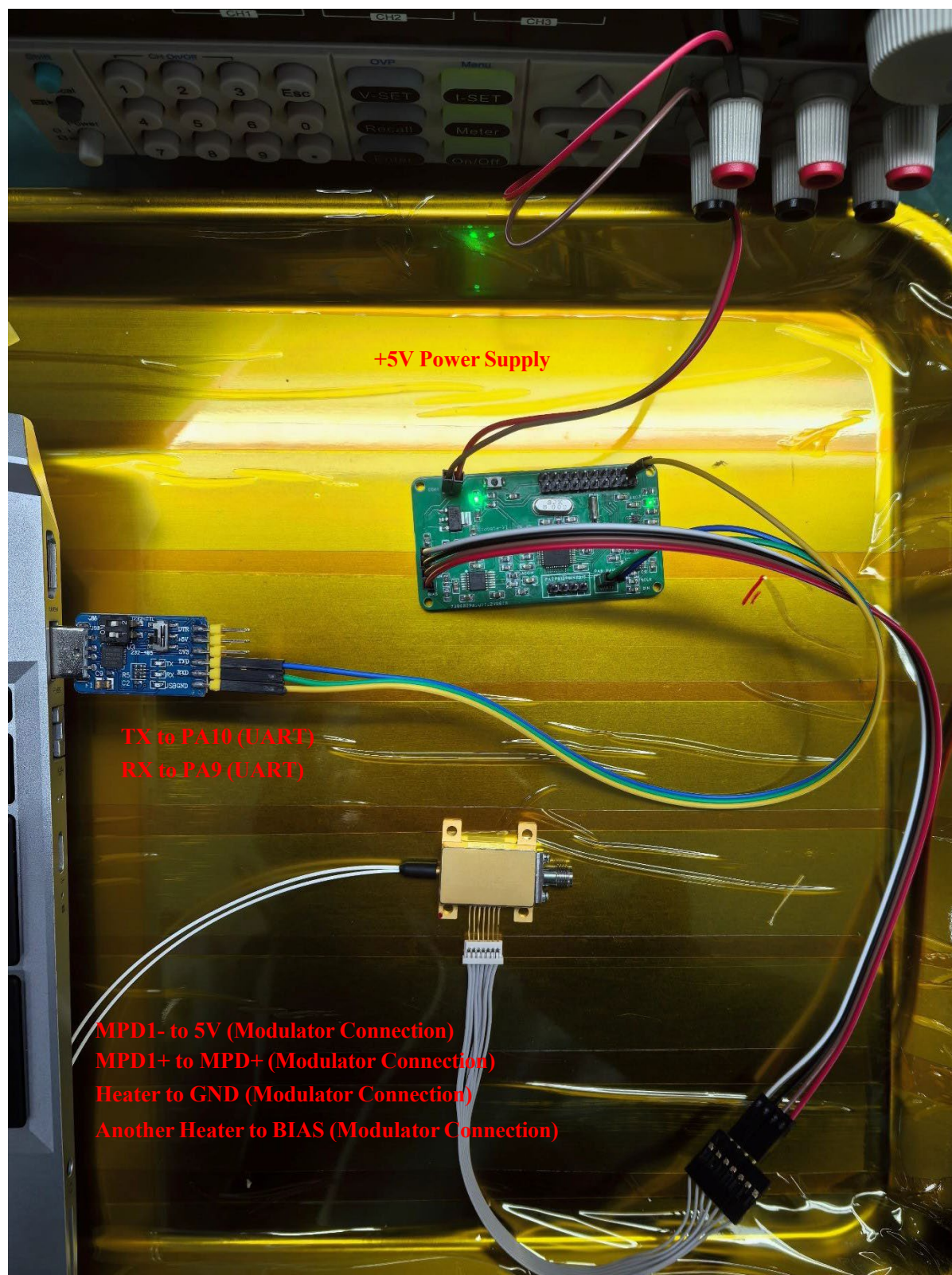
4. Wiring

Please wiring as shown in Fig.2.

+5V Power Supply

TX to PA10 (UART)
RX to PA9 (UART)

MPD1- to 5V (Modulator Connection)
MPD1+ to MPD+ (Modulator Connection)
Heater to GND (Modulator Connection)
Another Heater to BIAS (Modulator Connection)

Fig. 2 wiring of the controller

Please double-check the PIN definition of the intensity modulator to avoid damage.

5. Starting & Reset of Controller

Once the wiring is complete, turn on the optical input to the modulator and then turn on the 5V power source for the controller for starting. Monitor the output optical power of the intensity modulator after power on, a curve similar to Fig. 3 can be observed. Eventually, the device output light will be controlled at around half the maximum value, i.e., near the quadrature point. Generally, it lasts 30 seconds before locking to the quadrature point.
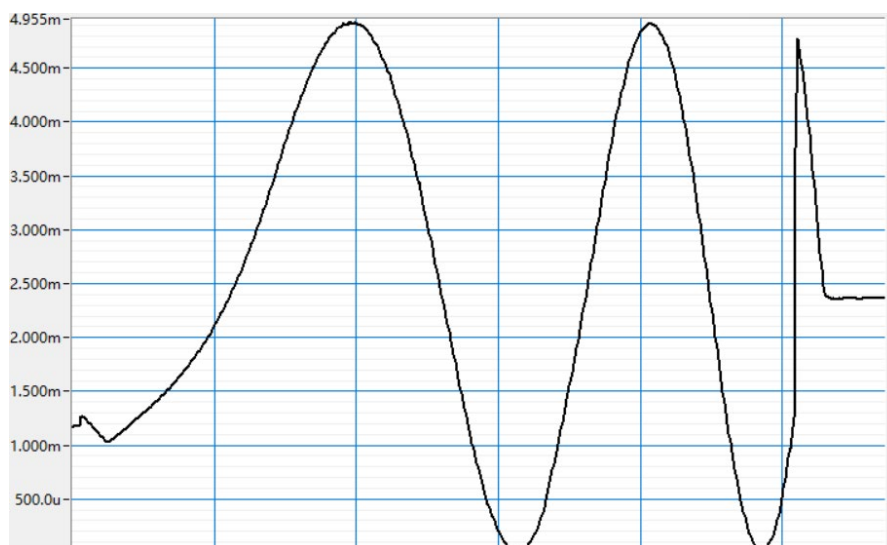

Fig. 3 Typical bias control curve of optical output (Y-axis in mW）

If the optical input to the modulator needs to be modified during the control process, press the reset button to restart the control process, or the working point will deviate.

6. Fine-Tuning Function

The fine-tuning function requires the connection to the host computer. The serial communication protocol between the controller and the host computer is UART and the logic is TTL. The baud rate of the communication is 9600.

Note

Please send the command after the quadrature point locking is finished.

Command list (ASCII)

Command	Description
6	Show/hide the target MPD value of quadrature point.
w	Increase the target MPD value by 1. The optical output power will be slightly reduced.
s	Reduce the target MPD value by 1. The optical output power will be slightly increased.
a	Increase the target MPD value by 10. The optical output power will be significantly reduced.
d	Reduce the target MPD value by 10. The optical output power will be significantly increased.