

QUAD+, ±0.05 dB



DATASHEET

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The LNBC series bias controllers enhance the performance of intensity modulators by automatically biasing and stabilizing them at the quadrature point. This is achieved by injecting a low-frequency, low-amplitude dither signal and using built-in photodetectors to form a feedback loop for bias control. This loop helps maintain optimal performance and minimize temperature dependence. The bias is applied via an integrated microheater. The LNBC is designed for use with thin-film lithium niobate modulators that have integrated detectors and microheaters inside the modulator.

#### **Features**

- Automated Bias Control
- Long-Term Stability
- Small Footprint

### **Applications**

- Radar
- RoF
- Laboratory Uses
- Concept Proving
- Instrumentation

### **Specifications**

Parameter	Min	Typical	Max	Unit
Initialization		15	30	S
Optical output power stability		±0.05		dB
Supply voltage	4.5	5	5.5	٧
DC bias output voltage	0		4.5	٧
Quadrature point selection		QUAD+		٧
Control step	0.2			mV
Modulator Optical Input			20	dBm
Operating Temperature*	0		60	°C
Storage Temperature	-40		85	°C
Operating Humidity (no condensation)	20		70	%

<sup>\*</sup> Higher operating temperature is available for customization.

**Note:** The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this <u>link</u>]:

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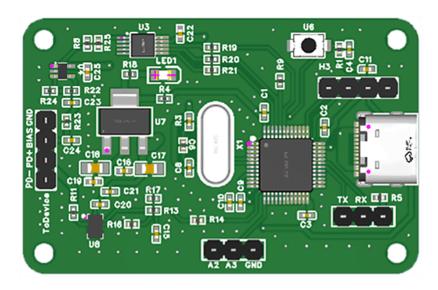
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#### **Dimensions (mm)**



<sup>\*</sup>Product dimensions may change without notice. This is sometimes required for non-standard specifications.

#### **Pinout**

Category	PIN	Description			
Power Supply	Type-C Port	Type-C 5V power supply			
Modulator Connection (ToDevice)	PD-	Connect to MPD cathode			
	PD+	Connect to MPD Anode			
	GND	Connect to heater bias electrode			
	BIAS	Connect to another heater bias electrode			
Communication	Тх	UART TTL communication TX			
	Rx	UART TTL communication RX			
	GND	GND of the controller			
Dimensions	LxWxH	51 mm x 33 mm x 1.6 mm			

#### **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: Please do not use the bias controller when the input optical power exceeds 23 dBm, 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.





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#### **Structure**



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

 ToDevice region has 4 pins with the silk screen 'PD-', 'PD+', 'GND' and 'BIAS';
UART region has 3 pins with the silk screen 'TX', 'RX', the third one without silk screen is the board GND.

#### **Accessories**

The controller has 2 accessories: a type-C to USB cable and a UART Module

#### **UART Module**



### **Ordering Information**

		1	1	1	1	1	1		1	
Prefix	Configuration						Power Supply			
LNBC-	Amplitude = 1							No = 1 Yes = 2		

Power

supply



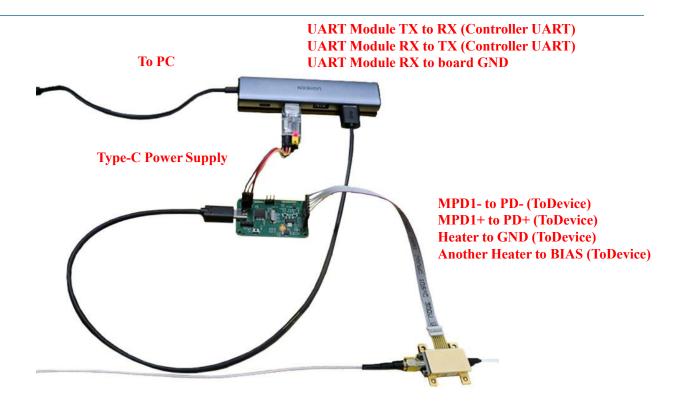




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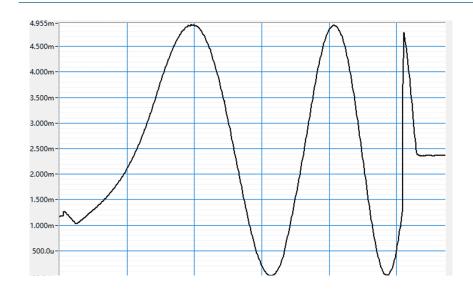


### Wiring



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

#### Typical bias control curve of optical output (Y-axis in mW)



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 (connect the usb cable). Monitor the output optical power of the intensity modulator after power on, a curve similar to figure 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.

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.

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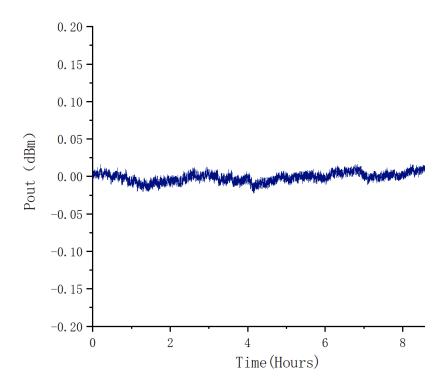
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### **Output Optical Power Stability**









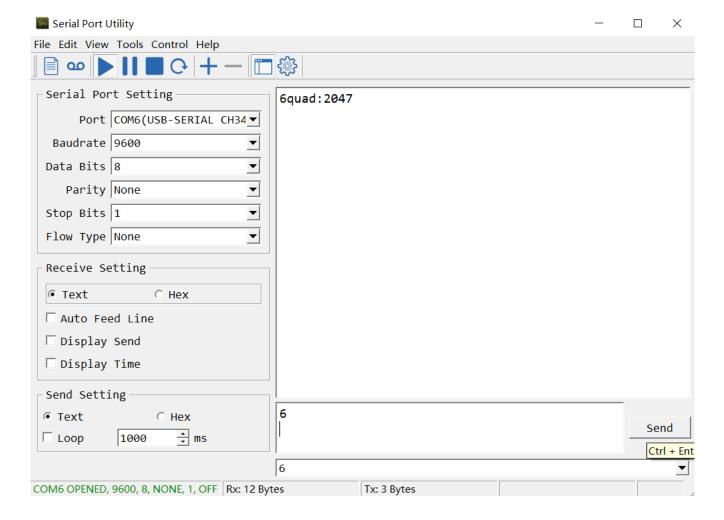
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### Fine-Tuning Function (Send "6" and an "enter" to show the target MPD value)

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. Find the serial port of the Uart module, the name should be "USB-SERIAL CH340".

After the quadrature point locking is finished, send a "6" followed by an "enter" through the serial interface to get the target MPD value of quadrature point.





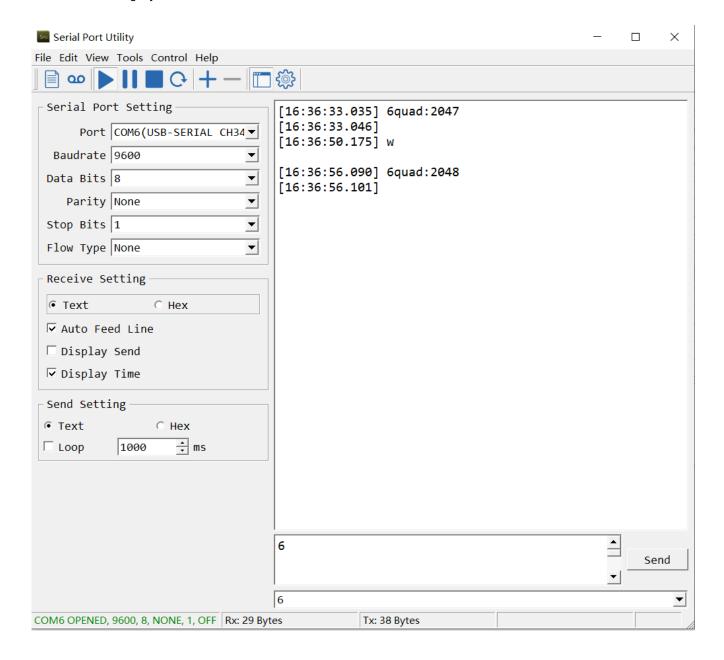
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### Fine-Tuning Function (Send "w" and an "enter" to make the target MPD value plus 1)

Sending a "w" followed by an "enter" through the serial interface will increase the target MPD value by 1. The output optical power of the modulator will be slightly reduced.

Sending a "s" followed by an "enter" through the serial interface will reduce the target MPD value by 1. The output optical power of the modulator will be slightly increased





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### Fine-Tuning Function (Send "a" and an "enter" to make the target MPD value plus 10)

Sending a "a" followed by an "enter" through the serial interface will increase the target MPD value by 10. The output optical power of the modulator will be significantly reduced.

Sending a "d" followed by an "enter" through the serial interface will reduce the target MPD value by 10. The output optical power of the modulator will be significantly increased.

