

Operation Procedures for Green SLM PL530 Laser Source

Model: PL530E32

(7-11-2026)

The PL530E32 laser source utilizes the ESP32 TTGO-T-Display board to control the Osram PL530 laser diode and TEC. The system supports four operation modes. **WiFi Access Point and Bluetooth modes provide wireless remote control from compatible devices.**

1. Push Button Mode
2. Serial Port Mode
3. WiFi Access Point Mode
4. Bluetooth Mode

Note: Timer control is available in **Serial Port, WiFi Access Point, and Bluetooth modes only.**

1. Push Button Operation Mode

A) Turn on the Power and Enable Laser Power Output

- **Turn power on:**
- plug the +5 VDC power supply into the onboard Power Jack (P1) or a +5V USB Type-C adapter cable to the USB-C connector, then set the sliding switch (S1) to the **ON** position.
- When the TTGO board screen displays “**Temp = Good**” with a blue background, press the Laser Enable Switch (S2) to activate the laser power output. Switch S2 toggles the laser power **Enable / Disable**.

B) Laser and Heater Current Adjustment

- The laser and heater current adjustment potentiometers, **POT1** and **POT2**, are preset to optimal positions. However.
- The laser current can be adjusted from **0** to approximate 460 mA, and the heater current from approximately 50 to 77 mA.
The factory preset values are approximately:
- Laser current $\approx$ **450** mA.
Heater current $\approx$ **650** mA:
- **Note:** the heater current has a significant impact on the laser power output, if adjustment is required, finely adjust the heater current potentiometer.
- The laser current, heater current, and TEC temperature values are displayed on the TTGO screen.

C) Open and Close the Shutter

Press the pushbutton (S3) to toggle the shutter **Open / Close**.

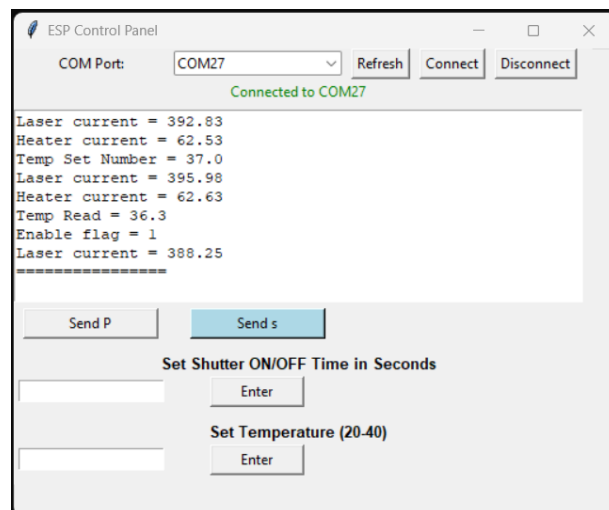
2. Serial Port Operation Mode

A) Connect the Serial Port to the Computer

- **Turn power on**
- Use a USB-C / USB-A **data** cable to connect the TTGO board to the computer.
- **Note: If a USB Type-C to USB-A data cable is used alone to power the unit (without the main power supply), the shutter will not be activated**

B) Set UP the Control Panel

- Download the Serial Port Control Panel from www.pdcontrol.com.
 - Locate item #8 and click “**Download Control Panel.**”
 - Unzip the downloaded file and open “**Control_Panel_60307.exe**”.
- A Control Panel window will appear, as shown in the image below.



C) Set the COM Port

- Select the serial port number in the COM Port field, and click the Connect button, a green message text will display Connected to COMx, x represents the actual port number.
- Click the “**Disconnect**” button to disconnect the serial port.

D) Enable/Disable Laser Power and Open/Close the Shutter with Timer Function

- Click the “**Laser ON/OFF**” button to toggle the laser power output (ON/OFF).
- Click the “**Shutter ON/OFF**” button to toggle the shutter open or close.
- When the shutter is closed, enter a number in the “**Set Shutter ON/OFF Time in Seconds**” field, then click the **Enter** button. The shutter will open immediately and automatically close after the specified number of seconds.

E) Using PuTTY, HyperTerminal or Arduino IDE for Serial Port Control

- Set the baud rate to **115200** and select the correct serial port number when using PuTTY or HyperTerminal.
- In the input prompt window:
- Type “**p**” and press **Enter** to toggle the laser power output ON or OFF.
- Type “**s**” and press **Enter** to toggle the shutter Open or Closed.
- Type “**t**” followed by a number (20 to 40), then press **Enter** to set the TEC temperature to the specified value in °C.

Shutter Timer

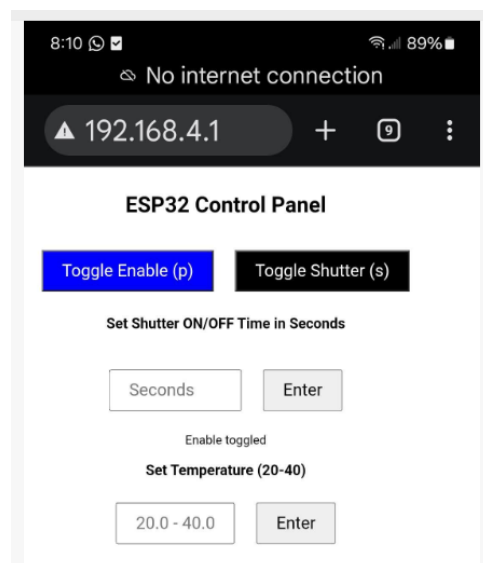
- Type “**s**” followed by a number, then press **Enter** to set the shutter open time in seconds.. For example, **s10** sets the shutter open time to **10 seconds**

3. WiFi Access Point Mode

A) Turn power on

B) Set Up a WiFi-Enabled Device

- Use a WiFi-enabled device (such as a smartphone or laptop) and search for available networks, through *Settings* → *Connections* → *TTGO_AP*.
Network ID: TTGO_AP
Password: 12345678
- Once connected, open a web browser and go to **192.168.4.1** to open the control webpage shown below.



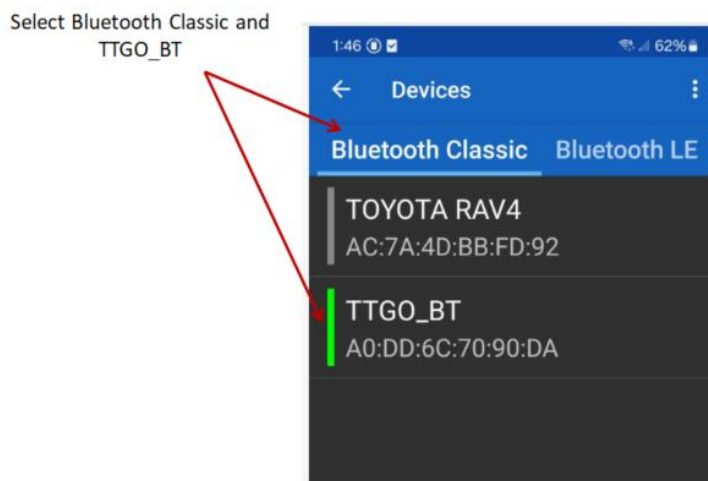
- Press the “**Toggle Enable (p)**” button to enable or disable the laser power output.
- Press the “**Toggle Shutter (s)**” button to open or close the shutter.
- In the **Seconds** field, type in a number for the desired shutter-open time in seconds. Press the Enter button, the shutter will open for the number of seconds entered then close.
- Enter a value between 20 °C and 40 °C for the desired TEC temperature, then press **Enter** to apply the setting.

4. Bluetooth Mode

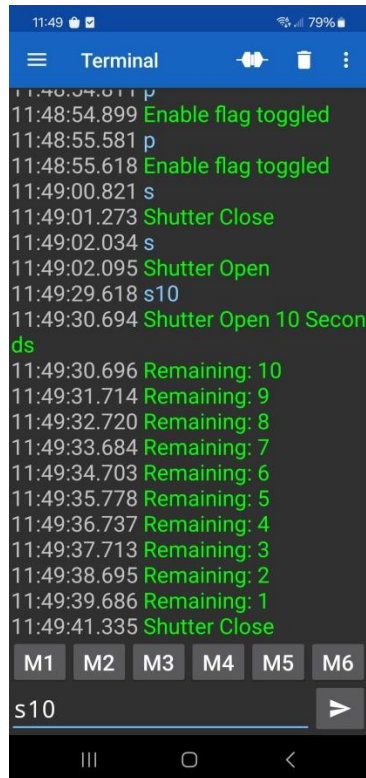
A) Set up the Android Phone for a Bluetooth Connection

Turn power on

- Download and install “**Serial Bluetooth Terminal**” from the Google Play Store. Then pair your phone with “**TTGO_BT**” through *Settings* → *Connections* → *Bluetooth*.
- Open the Serial Bluetooth Terminal app and select *Bluetooth Classic* and *TTGO_BT* from the **Device** list, as shown in the picture below



- When the terminal window appears (as shown in the picture below), type “**p**” and press **Enter** to toggle the laser power output ON or OFF.
- Type “**s**” and press **Enter** to toggle the shutter Open or Close.
- Type “**s**” followed by a number to set the shutter to open for the specified number of seconds.
- Type “**t**” followed by a number to open the shutter for the specified number of seconds.



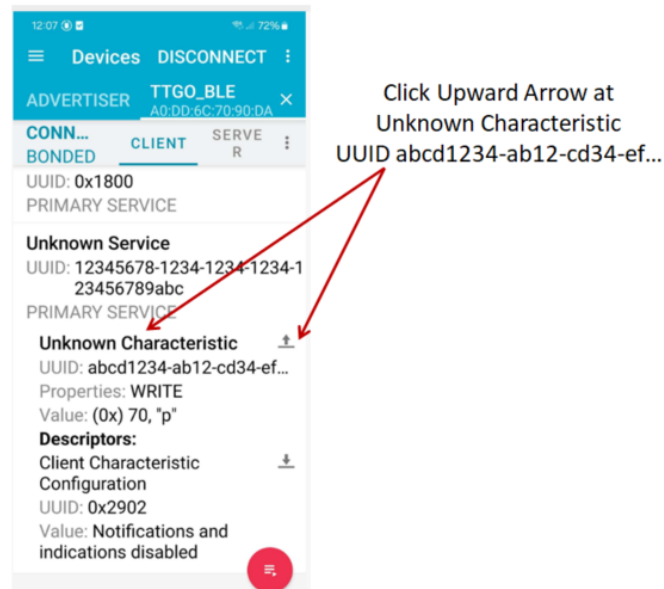
B) Set up the iPhone for a Bluetooth Connection

Turn power on

- Download and install an iPhone app for Bluetooth, for example, **nRF Connect for Mobile**.
- Pair with TTGO_BT, open the app, select TTGO_BLE and CONNECT:



- Click the Upward Arrow shown on the picture below



- In the **New Value** field, click the dropdown arrow and select **TEXT (UTF-8)**. Then enter the previously described control commands (see the Operating Procedure for Android phone) to toggle the laser Enable/Disable, toggle the shutter Open/Close, set the shutter time, and set the TEC temperature.
- Follow the steps shown in the picture below to send commands to the unit.

