

Manual

for PIMeasurement program

ver. 0.1

Yunsong Zhao

1 Introduction

The PIMeasurement program is used to measure the LI and IV curve of laser diodes using current source, temperature controller and power meter. All the instruments are wrapped in according matlab classes.

2 Usage

The program can be called through the command “PIMeasurement” in Matlab. Make sure the classes of all the instruments that you are going to use are in the same directory as “PIMeasurement.m” or can be accessed by Matlab through pathdef. If everything goes well, the first window you can get is shown in Fig. 1

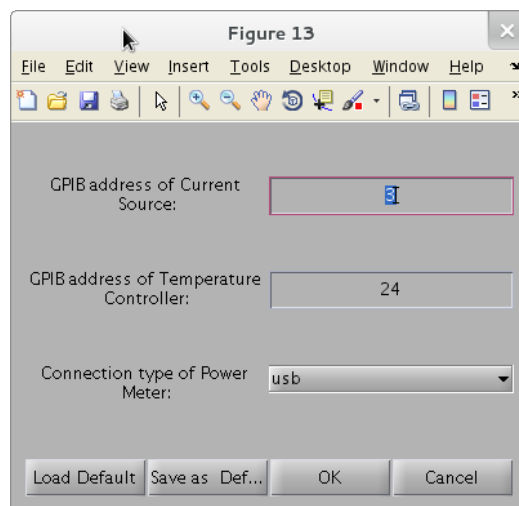


Figure 1: PIMeasurement Setup

You will find two text edits, one popup menu and four buttons in this window. Most of these components are self-explained. The first two text edits ask for the gpib addresses of the current source and temperature controller since the two instruments are controlled through GPIB interfaces. The following popup menu asks for the connection type of the power meter. There are two options to communicate our power meter. One is through USB and the other one is through serial ports. If you want to use “usb” port, make sure “usbdll.dll” and “NewpDll.h” at the same directory as “PIMeasurement.m”. If you want to use serial port, make sure you select the right “com” port(“com1”,“com2”,etc.) in the popup menu. The “Load Default” button is used to load the default parameters to overwrite the current parameters. The default setup is restored every time when the program is called. The “Save as Default” button is used to save the current parameters as the default setup. The “OK” button is used to accept the current parameters and continue to next window. The “Cancel” button is used to exit the program.

After the “OK” button is pressed to accept the parameters, the Fig. 2 will be shown.

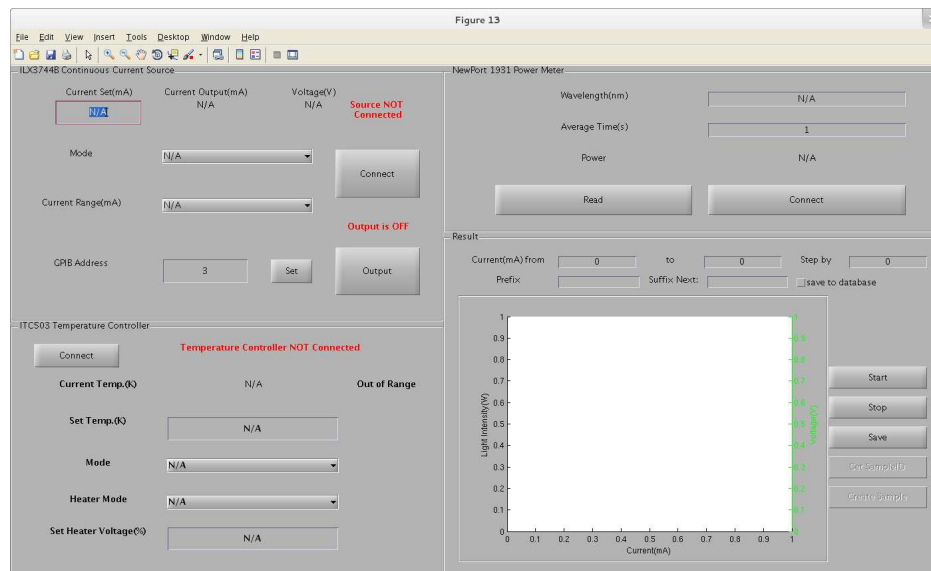


Figure 2: Main window

There are four panels in this window. Each panel represents an equipment and is plotted and controlled by the according class. The equipment name is shown in the title region of each panel. In Fig. 2, you can find “ILX3744B Continuous Current Source”, “ITC503 Temperature Controller”, “NewPort 1931 Power Meter” and “Result” in the title region.

In the “ILX3744B Continuous Current Source” panel, the first text edit called

“Current Set” is to set the output current. You should press “enter” button in keyboard after the value is entered in this text edit to send the value to the current source. The following two texts(“Current Output(mA)”, “Voltage(V)”) show the current and voltage information. These values will be updated periodically when the communication is established. The red text “Source NOT Connected” shows the connection status and it will change to green text “Source Connected” after the connection is established. The button below is used to connect to the current source. After clicked, if the connection is established, the text on the button will change to “Disconnect” and used to disconnect the current source. The red text “Output is OFF” shows the status of output enable. If the current output is enabled by clicking the “Output” button below, the red text will change to green text “Output is ON”. There are two popup menus in this panel, one is for the operation mode of current source and the other one is to set the current range of current source. You can choose the proper one for your measurement.

In the “ITC503 Temperature Controller” panel, the “Connect” button and red text have the same function as mentioned above. The text bar below is used to show the current temperature of the sensor which will be refreshed periodically when connected. The text “Out of Range” shows the state of temperature stability. Once the temperature is within 0.1K away from the set temperature, it will show “Stable”. The text edit below is used to set temperature. You should press “enter” to confirm the set temperature. The “Mode” popup menu is used to show the operation mode of the temperature controller. This parameter is to set how you can operate the controller (remote or local) and whether to lock the front panel of the controller (locked or unlocked). To have our gui remote controller work, this has to be set as “Remote&Locked”. The popup menu below is used to set the operation mode of heater and gas control. Since we don’t have a gas controller, the only thing that matters to us is the heater mode(Manual or Auto). If the heater mode is set to be manual, the heater voltage below will be used to set the heater power level.

In the “NewPort 1931 Power Meter” panel, the “Wavelength(nm)” text edit shows and sets the wavelength of the power meter. Once the power meter is connected by clicking the “Connect” button, this text edit will be updated by the current wavelength set in the power meter. You can enter your wavelength in this text edit and press “enter” to confirm. The “Average Time(s)” text edit below is to set how many seconds you want to average the measurement results. Once you require the average power of the power meter, this is the time that the meter used to average the results. The “Power” text below shows the instant power level read from power meter periodically. The “Read” button is used to update the power read instantly after pressing this button.

In the “Result” panel, you should tell the program the start current, the end current and the step. The “Prefix” and “Suffix Next” text edits are used to set

the filename if you want to save the measurement data. The filename will be constructed in the format: \$Prefix_.\$Suffix.mat. And the number in “Suffix Next” will be added by 1 automatically after you press “Save” button. The checkbox “save to database” next to the “Suffix Next” has not been implemented yet, so will be ignored here for now. The axes below is for viewing and checking the measurement results. The result will be refreshed after new data point is available. The “Start” button is used to start new measurement. The “Stop” button is used to stop the current measurement. The “Save” button is used to save the current result to a mat file named after “Prefix” and “Suffix Next”(See above for details). Make sure the current output is enabled in the current source before starting a new measurement.