

## APPLICATIONS

- Raman spectrometer
- Bio-medical
- Sensing

## FEATURES

- Max output power: 600 mW
- Center wavelength:  $785\pm 0.5$  nm
- Line width (FWHM):  $< 0.08$  nm
- Fiber: 105/125 $\mu$ m, 0.22NA, FC/PC or SMA905
- Interface: UART
- Power supply: +5V/DC

## ADVANTAGE

- Narrow line
- High stability
- Low power consumption
- High reliability

## GENERAL DESCRIPTION

ATR20202 785nm narrow line laser is characteristic by its high reliability and ultra-narrow line-width. ATR20202 operates with a single 5V power supply and can output 600 mW laser power. When ATR20202 is used in Raman spectrometer, it will help to obtain high spectral stability and high resolution. It can be controlled through the TTL interface by the offered pin-out definition and the communication protocol. The output laser power can be changed continuously by changing the LD working current with the commands.



Figure 1 ATR20202 with optical fiber

## SPECIFICATIONS

Optical Parameters	Specs			Conditions
	Min	Typ	Max	
Wavelength center	784.5	785 nm	785.5	
Line-width	0.04	0.06 nm	0.08 nm	FWHM
Output Power			600 mW	Multimode fiber coupled
Power stability in 2h			0.4%	RMSE
Stability time		5 s	7s	Power stability while open laser
SMSR		>40 dB		
Optical fiber	105/125um multimode fiber 0.22NA			Fiber coupled
Connector	FC/PC			Fiber coupled
Electrical Parameters				
LD working current	300mA	700mA	1000mA	
TEC (°C) (±5)		25 °C		
Power Supply	4.75 V	5 V	5.25 V	
Current (Laser on)		0.75 A	2.5 A	TEC on
Current (Laser off)		0.3 A	1.3 A	TEC on

## 1 Laser Parameter

I <sub>th</sub> (A)	Max Power (mW)	Max I <sub>op</sub> (A)	% Power 0.04 NA (MIN 6%)	λ <sub>c</sub> (nm)	FWHM (nm)	SMSR (dB)TYP.
0.3	500	0.98	11	785±0.5	0.1	>40

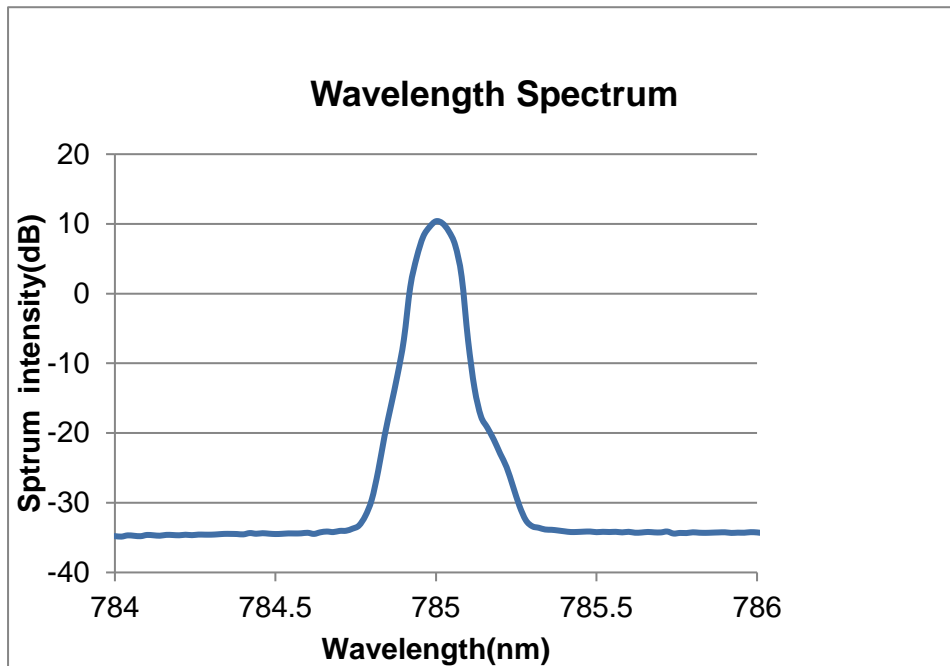


Figure 2 the locked center wavelength of the laser ATR20202 output

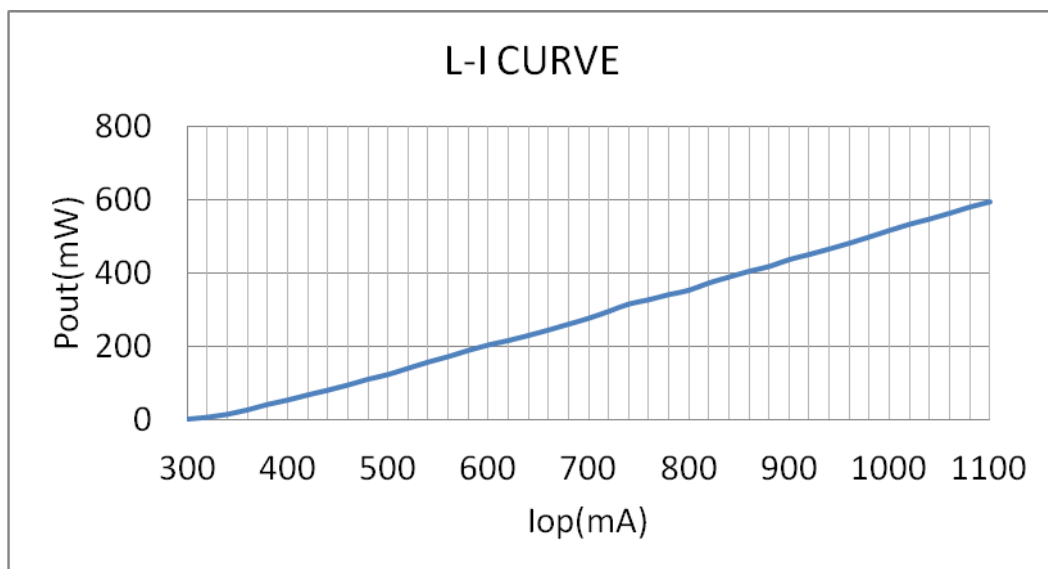


Figure 3 the relationship between output laser power and the operation current

## 2 Reliability and Stability

Figure 4 showing the stability times while open laser. The typical stabilization time is 5 seconds. This parameter affects the application directly in rapid detection.

Figure 5 showing the long term power stability testing result of 5 samples, it indicated that the laser has a good stability in continuous work.

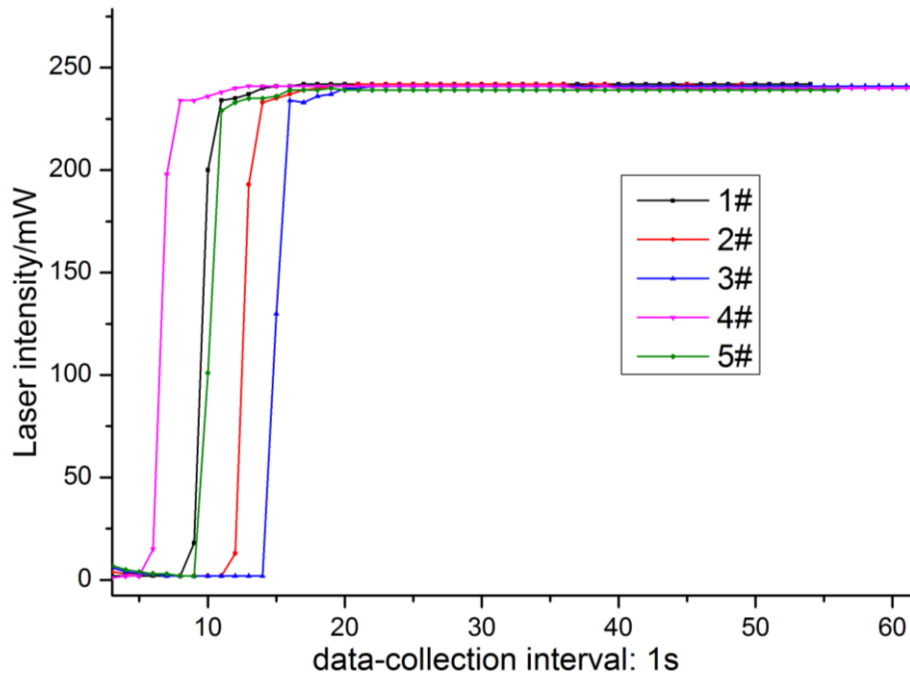


Figure 4 Power stability testing results of 5 samples

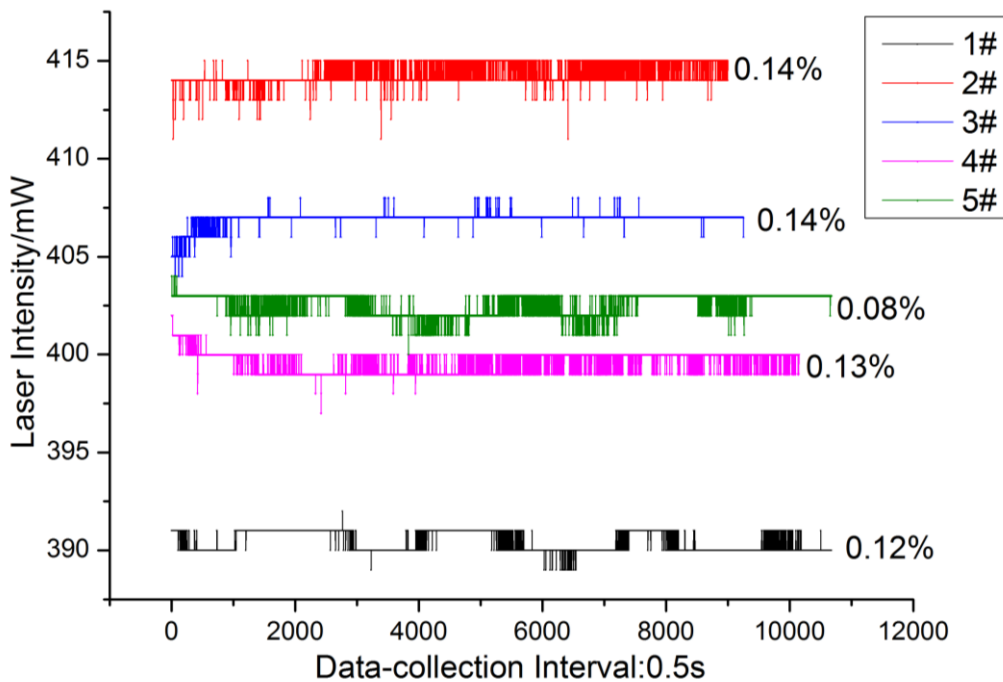


Figure 5 Long term stability testing results of 5 samples

### 3 Electrical Pin-out

The module is equipped with a 10-pin (male) connector (2x5, 2 mm pitch) The Pin-out is outlined in Table below. Refer to the Figure 6 for the pin numbering.

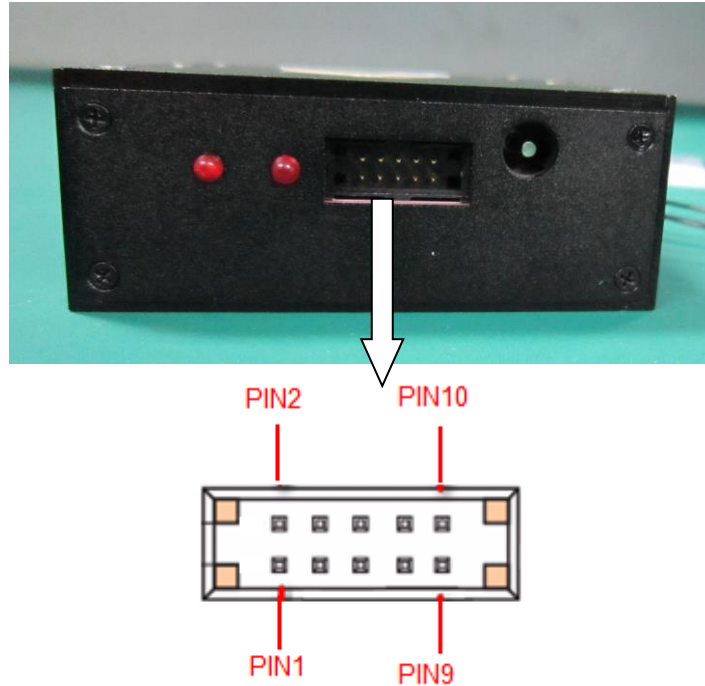


Figure 6 PIN drawing

Table 1 Pin-Out Function Descriptions

Pin	Description	INPUT/OUTPUT	Function Description
1	NC		Not used
2	NC		Not used
3	NC		Not used
4	NC		Not used
5	TX	Output	RS-232 serial input signal,3.3V TTL levels
6	RX	Input	RS-232 serial output signal ,3.3 V TTL levels
7	GND	Input/output	Ground
8	GND	Input/output	Ground
9	VCC	Output	5V power supply
10	VCC	Output	5V power supply

# 4 Communication Protocol

## 4.1 Serial Interface

The RS232 serial interface is at 3.3V TTL levels, and the default setting as below:

Table 2 Defaults UART parameters

Parameter	Default
Data rate (baud)	115200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

### a) RS232 Protocol and Command Format

#### Host send:

0,1	2, 3	4	5... (N-1)	N
Head (2bytes)	Length (2 bytes)	Command ID (1byte)	Data	Checksum (1byte)

#### LD module response:

0, 1	2, 3	4	5... (N-1)	N
Head (2bytes)	Length (2bytes)	Command ID (1byte)	Data	Checksum (1byte)

#### Description:

All data sent to/from the spectrometer is encoded in Hexadecimal format.

**Head:** 2bytes, used to locate the start of a communication packet, fixed to "0xAA 0x55".

**Length:** 2 bytes, number of bytes from "Length" to "Checksum".

Example: the command length is 1000 bytes, The length = 0x03E8.

The MSB byte is 0x03, and the LSB byte is 0xE8.

**Command ID:** 1byte.

**Data:** The Data is determined according to the command, and the Data can be empty.

**Checksum:** 1byte, accumulation of all bytes from "Length" to "Data".

i.e Checksum = (Length + Message ID + Data)&0xff.

#### Example:

Command : Get spectrum version: (all data is Hexadecimal data)

Host send: AA 55 00 04 02 06

**Note:**

Head: AA 55

Length: 00 04

Command ID: 02

Data: Blank

Checksum: 06 = 0x00+0x04+0x02.

**LD module response:** AA 55 00 0A 02 30 30 30 30 30 30 2C

## B) Commands overview

No.	Description	Command ID	Host Send	LD module Response
1	Get spectrum firmware version	0X02	<Head><Length><Command ID><Checksum>	<Head><Length><Command ID><Data><Checksum> Data: 6 bytes, Hardware version (3bytes) + software version (3bytes), encoded in US ASCII.
2	Get manufacture name	0X09	<Head><Length><Command ID><Checksum>	<Head><Length><Command ID><Data><Checksum> Data: 6 bytes, encoded in US ASCII. i.e OPTOSKY
3	Set LD Current	0X20	<Head><Length><Command ID><data><Checksum> Data: 2bytes, encoded in HEX. Range from (0x0000~0x03E8mA),the units is mA.	<Head><Length><Command ID><Data><Checksum> Data: 0x00 -- success 0x01 -- fail

## 5 Mechanical Drawings

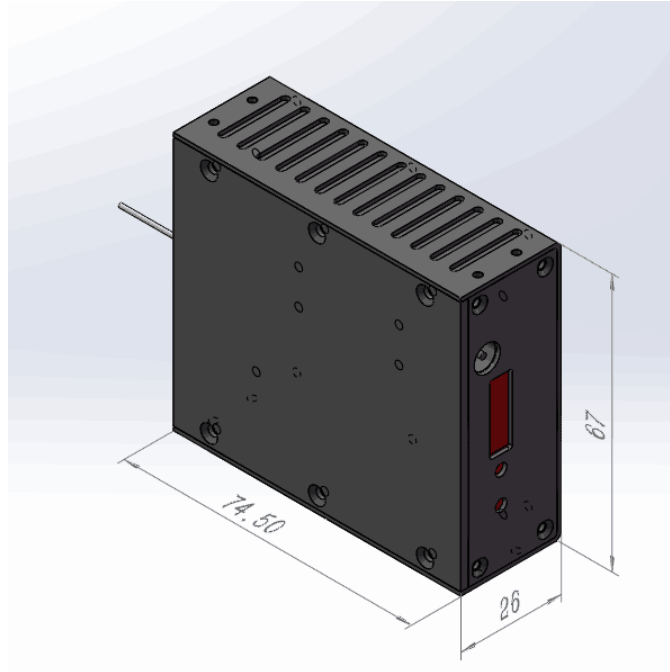


Figure 7 ATR20202 outline dimensions

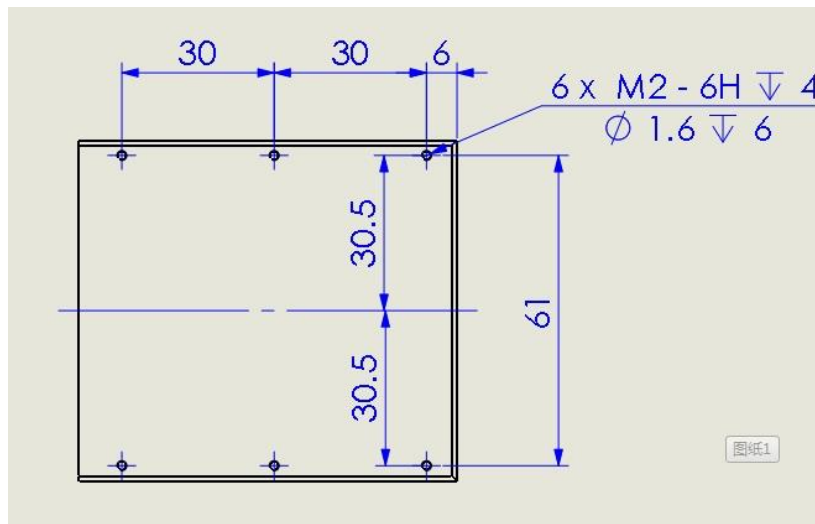


Figure 8 The mount holes of ATR20202

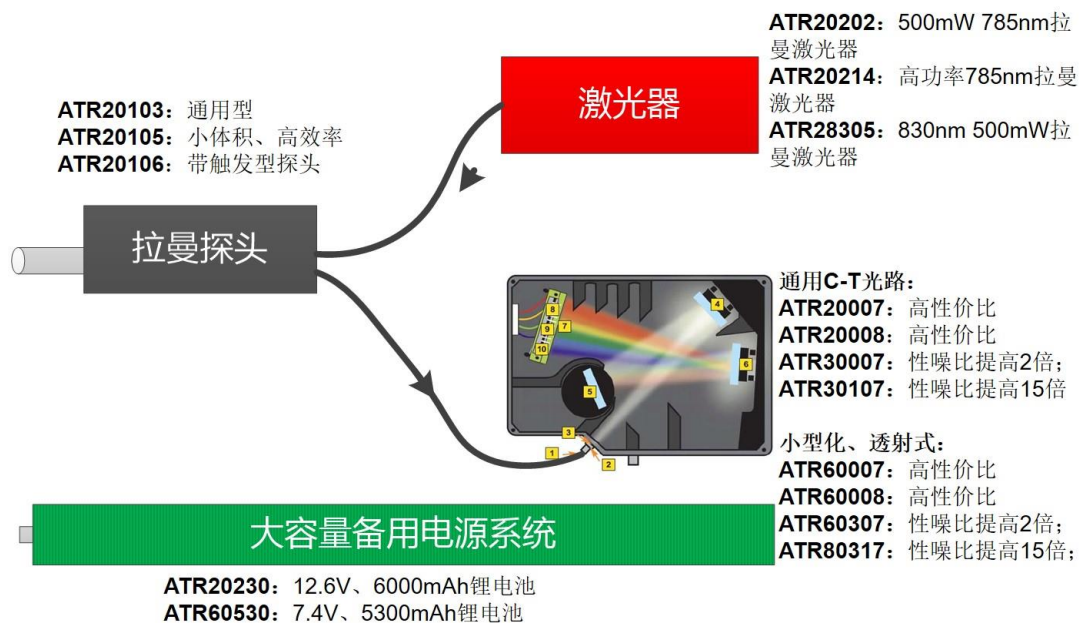
## 6 Order Guide

Order No	Wavelength	Line Width	Max Output Power	Spectral region
----------	------------	------------	------------------	-----------------



ATR20202-785	785±0.5 nm	0.08 nm	600 mW	For 785 nm Raman Spectrometer
ATR20202-1064	1064±0.5 nm	0.08 nm	600 mW	For 1064 nm Raman Spectrometer
ATR20202-830	830±0.5 nm	0.08 nm	600 mW	For 830 nm Raman Spectrometer

## 6 Application for Raman Spectrometer



## 7 Contract Information

1503 Blding A04, 3<sup>rd</sup> Software Park, Jimei, Xiamen, 361005, China

Tel: +86-592-6102588

Email: sales@optosky.com

[www.optosky.com](http://www.optosky.com)